

ACP · 2025^{苏州}
Suzhou · China

Asia Communications and Photonics Conference (ACP 2025)

November 5-8, 2025 | Suzhou · China



HOST

Soochow University

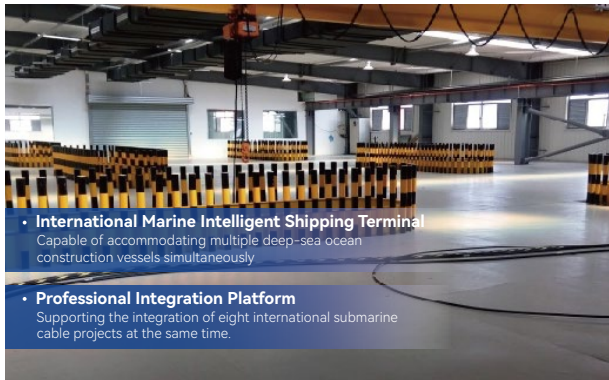
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| IEEE Photonics Society | Optica | SPIE |
| Chinese Optical Society | China Institute of Communications | The Chinese Institute of Electronics |

HMN Technologies Group

HMN Technologies Group Co., Limited. is a world-leading provider of turnkey submarine network solutions in Changshu, Suzhou, China, close to Yangzi River.

HMN Technologies Group designs and manufactures submarine optical cables with 80 UJ & UQJ certificates, submarine special cables, underwater equipments etc.



- **International Marine Intelligent Shipping Terminal**
Capable of accommodating multiple deep-sea ocean construction vessels simultaneously
- **Professional Integration Platform**
Supporting the integration of eight international submarine cable projects at the same time.

- A manufacturing, and integration base for submarine optical cables and underwater special cables, has been established in Changshu. The company owns the first independently designed and developed submarine cable laying ship in China, as well as an independent ten-thousand-ton terminal, which can meet the simultaneous operations of multiple ten-thousand-ton deep-sea ocean construction vessels.
- The submarine optical cable project has a presence in regions such as Asia, Africa, Europe, South America, and Southeast Asia, with a total of 150 projects as well as a cumulative delivery exceeding 110,000 kilometers.



Testing Center

The first CNAS-certified laboratory in China.
The marine communication testing center in the Asia-Pacific region



Submarine Optical Cable Manufacturing Base

The largest submarine optical cable manufacturing and R&D base in Asia



Underwater Special Cable Manufacturing Base

Annual production capacity of 3,000 km of underwater special cables



1,000⁺

DWT-class International Marine Intelligent Shipping Terminal



110,000⁺

Cumulative Delivery Reaches 110,000km



20%

20% Share of Global Subsea Optical Cable Projects



TOP3

Global Submarine Communications

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Welcome to the Asia Communications and Photonics Conference

It is my great pleasure to invite you to participate in the Asia Communications and Photonics Conference (ACP) and share the latest advances in communication and photonics science, technology, and innovations from leading companies, universities, and research institutions around the world. ACP is the largest conference in the Asia-Pacific region dedicated to optical communications, photonics, and related technologies. Established in 2001, ACP has been held annually and is jointly sponsored by the IEEE Photonics Society, Optica, SPIE, Chinese Optical Society (COS), China Institute of Communications (CIC), and China Instrument and Control Society (CIE).

The ACP technical conference offers a comprehensive program including plenary, tutorial, keynote, invited, and contributed talks delivered by leading international academic and industry researchers. This year's topics include Optical Fibers and Fiber-based Devices; Optical Transmission Systems, Subsystems and Technologies; Network Architectures, Management and Applications; Optoelectronic Devices and Integration; Microwave Photonics and Optical Signal Processing; Micro-, Nano-, and Quantum Photonics: Science and Applications; and Photonic Sensors & Bio-Photonics. The conference also features a wide range of workshops and industry forums. With its broad and high-quality technical program, ACP provides an ideal venue to explore emerging research directions and engage with top researchers driving these advances. Nearly 800 papers are scheduled, including over 100 invited, 11 keynote, and 8 tutorial presentations by many of the world's most prominent experts. We sincerely thank all contributors and authors for making ACP a truly outstanding global event.

The Plenary Session on the morning of November 6 will feature four distinguished speakers, including Roland Ryf from Nokia Bell Labs on "How Digital Coherent Optical Technology is Changing Optical Communication and Fiber Sensing," Baohua Jia from RMIT University on "Laser Nanoprinting of Atomaterials and Integrated Photonic Devices", Masatoshi Suzuki from Chitose Institute of Science and Technology on "Transformative Technologies in Optical Communication Systems and Future Prospective," and Hao Wang from Huawei Technologies Co., Ltd. on "Evolution of All-Optical Networks for the AI Era," providing a unique opportunity to hear cutting-edge advances and insights from leading experts in optical communication and photonics.

In addition to the regular technical sessions, 10 workshops and 3 industry forums will feature additional 115 speakers. The pre-conference workshops will be held on Wednesday, November 5, and the industry forums will take place on Saturday, November 8. These workshops and forums are free of charge for all conference registrants. We sincerely thank the organizers and speakers for their contributions to an excellent program.

This year, the Best Paper Award in Industry Innovation, Best Paper Award, Best Student Paper Award, and Best Poster Award will be presented during the Banquet on Friday, November 7. The poster-only session will be held from 15:30 to 17:30 on the same day, providing an excellent opportunity to meet the authors and discuss technical topics in depth.

In addition to the technical program, the conference will feature an impressive range of exhibitions from relevant industries, publishers, and professional organizations.

As the host city of ACP 2025, Suzhou is a famous water town in the south of the Yangtze River, with rivers, lakes, and tidal flats covering 34.6% of its total area. Known as a land of fish and rice and renowned for its silk, the city has earned the reputation of "the paradise on earth." We have also prepared a rich social program to facilitate networking with colleagues from around the world. A conference welcome reception will be held on the evening of Thursday, November 6, followed by a Banquet and Awards Ceremony for conference registrants on Friday, November 7.

Organizing a conference of this scale is a tremendous task, and success would be impossible without the dedicated efforts of many supporters and volunteers. We are deeply grateful to the entire Technical Program Committee and Subcommittee Chairs, who have worked persistently throughout the year to invite speakers, solicit and review papers, and organize technical sessions, resulting in an excellent technical program. We also thank the staff and volunteers of Soochow University, as well as the co-organizers—Huawei and Hengtong—and professional societies such as the IEEE Photonics Society, Optica, SPIE, COS, CIC, CIE, and Suzhou Electronics Society for organizing and sponsoring this outstanding event.

Sincerely,

ACP 2025 General Chair

Prof. Gangxiang (Steven) Shen

Optica Fellow, IEEE ComSoc Distinguished Lecturer
Dean, School of Electronic and Information Engineering
Soochow University



Committee

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Track Committees

Track 1: Optical Fibers and Fiber-based Devices

Leading Chair:

Qizhen Sun, Huazhong University of Science and Technology, China

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Gangding Peng, University of New South Wales, Australia

Yongmin Jung, Optoelectronics Research Centre, University of Southampton, United Kingdom

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Minghua Chen, Tsinghua University, China

Changyuan Yu, The Hong Kong Polytechnic University, Hong Kong, China

Kunimasa Saitoh, Hokkaido University, Japan

Yuki Kawaguchi, Gigaphoton, Japan

Sze Yun SET, Tokyo Univeristy, Japan

Tigang Ning, Beijing Jiaotong University, China

Zheng Zheng, Beihang University, China

Secretary:

Dongdong Zou, Soochow University, China

Track 2: Optical Transmission Systems, Subsystems and Technologies

Leading Chair:

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Yann Frignac, Huawei Technologies France, France

Kangping Zhong, The Hong Kong Polytechnic University, Hong Kong, China

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Fan Zhang, Peking University, China

Fan Li, Sun Yat-sen University, China

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Leading Chair:

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Xiaoliang Chen, University of Science and Technology of China, China

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Zhizhen Zhong, Massachusetts Institute of Technology (MIT), United States

Yongcheng Li, Soochow University, China

Avishek Nag, University College Dublin, Ireland

Sabidur Rahman, ATT, United States

Hiroshi Hasegawa, Nagoya University, Japan

Secretary:

Yongcheng Li, Soochow University, China

Track 4: Optoelectronic Devices and Integration**Leading Chair:**

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Co-Chairs:

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TPC Members:

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Guangwei Cong, AIST, Japan

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Jiawei Wang, Harbin Institute of Technology (Shenzhen), China

Huashun Wen, Nankai University, China

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An He, Soochow University, China

Track 5: Microwave Photonics and Optical Signal Processing**Leading Chair:**

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Jiejun Zhang, Jinan University, China
Nuannuan Shi, Institute of Semiconductors, Chinese Academy of Sciences, China

Secretary:

Huan Huang, Soochow University, China

Track 6: Micro-, Nano-, and Quantum Photonics: Science and Applications

Leading Chair:

Xingjun Wang, Peking University, China

Co-Chairs:

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Daixin Dai, Zhejiang University, China

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Fenghe Yang, Zhangjiang Lab, China

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Weidong Shao, Soochow University, China

Track 7: Photonic Sensors & Bio-Photonics

Leading Chair:

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Yongkang Dong, Harbin Institute of Technology, China

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Yuan Gong, University of Electronic Science and Technology of China, China

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OE JOBS

General Information

Conference Venue

Conference Venue: Kempinski Hotel Suzhou, China

Address: 1 Guobin Road, Suzhou Industrial Park, Suzhou City, Jiangsu Province, China

About Suzhou

National Historical and Cultural City

Exemplary City of World Heritage

City of Crafts and Folk Arts

Lee Kuan Yew World City Prize

Excellent Tourist City of China

International Garden City

National Civilized City

National Ecological City

Registration

Location: Lobby of Kempinski Hotel Suzhou

07:30–20:00 Wednesday, 5 November

07:30–18:00 Thursday, 6 November

08:00–18:30 Friday, 7 November

08:00–16:00 Saturday, 8 November

Onsite Speaker Preparation:

Tutorial/Keynote/Invited/Oral: 45/45/30/15 minutes, including Q & A.

Presenters are required to be in the session room at least 30 minutes prior to their scheduled talk to upload and check their presentation. No shows of the oral presentation will be recorded and these papers will not be published. If you attend the conference but do not present your talk at the scheduled time, your attendance will be deemed invalid and the paper will not be published.

Onsite Poster Preparation

There is no fixed template for Poster. Presenters can make it according to their needs. Presenters should put up their poster before the poster session starts. Each board has a Control ID on it, please note whether it is your own Control ID. Presenters are also required to be standing by their poster during poster session to answer questions and further discuss their work with attendees.

During poster session, staff will record no-show posters and these papers will not be published. Posters put up after the end of the poster session will be counted as invalid posters, and papers will not be published either.

Poster Board Size: 1m (Length) * 2.235m (Height)

Recommended Poster Size: 1.2m (Height) * 0.8m (Width)

Poster Session: 15:30–17:30, Friday, 7 November

Location:

2F

Poster Area I (Track 2)

Poster Area II (Track 1 & Track 4)

1F

Poster Area III (Track 3 & Track 5 & Track 6 & Track 7)

Notes:

For your safety, post area is divided into three zones. Please find the zone of your track and post it. Each board has a Control ID on it, please note if it is your own Control ID when posting.

Poster presenters are responsible to remove their posters, and the conference staff will not collect the posters left at the conference site.

Best Paper Award in Industry Innovation

Any non-invited speaker, who is the first author as well as the presenting author of a paper submitted will be eligible for this award. Five papers focusing on industry and technology will be selected by the ACP 2025 Committee. Certificates and Awards will be presented to the winners at the conference banquet and award ceremony. The nominates of this award are marked Industry Innovation Nomination in this program.

Best Student Paper Award

Best Student Paper Award Competition Session: 13:30–17:30, Thursday, 6 November

Location: Function Room K3, 1F

Any full-time university student, who is the first author as well as presenter of a paper submitted with choosing presentation type of "Best Student Paper Award" will be eligible for this award. Five winners will be selected by the ACP 2025 Committee. Certificates and Awards will be presented to the winners at the conference banquet and award ceremony.

Best Paper Award

Best Paper Award Competition Session: 13:30–17:15, Thursday, 6 November

Location: Function Room K4, 1F

Any non-invited speaker, who is the first author as well as the presenting author of a paper submitted will be eligible for this award. Five winners will be selected by the ACP 2025 Committee. Certificates and Awards will be presented to the winners at the conference banquet and award ceremony.

Best Poster Award

Poster Session: 15:30–17:30, Friday, 7 November

Location:

2F

Poster Area I (Track 2)

Poster Area II (Track 1 & Track 4)

1F

Poster Area III (Track 3 & Track 5 & Track 6 & Track 7)

Any poster paper that is registered by at least one of the authors, presented during the assigned time slot (15:30–17:30) will be eligible for this award. Certificates and Awards will be presented to the winners at the conference banquet and award ceremony.

Exhibition

The ACP 2025 Exhibition is open to all attendees.

Tea Break

10:00–10:30 Wednesday, 5 November

15:00–15:30 Wednesday, 5 November

10:00–10:30 Thursday, 6 November

15:30–16:00 Thursday, 6 November

10:00–10:30 Friday, 7 November

15:30–16:00 Friday, 7 November

10:00–10:30 Saturday, 8 November

15:30–16:00 Saturday, 8 November

Lunch

Location: Seasons café (Buffet Restaurant), 3F & State Ballroom, 2F

12:00–13:30 Thursday, 6 November

Location: Seasons café (Buffet Restaurant), 3F & State Ballroom, 2F

12:00–13:30 Friday, 7 November

Location: Seasons café (Buffet Restaurant), 3F

12:00–13:30 Saturday, 8 November

Dinner

Location: Seasons café (Buffet Restaurant), 3F

17:30–20:30 Wednesday, 5 November

17:30–20:30 Friday, 7 November

Welcome Reception

Location: Lakeside Garden, 1F

18:00–20:00 Thursday, 6 November

Banquet and Award Ceremony

Best Paper Award in Industry Innovation, Best Paper Award, Best Student Paper Award, and Best Poster Award will be presented at the banquet. The banquet is NOT INCLUDED in the registration fee for students, but is included for all other regular registration types. The ticket is provided within the badge.

Location: Grand Ballroom, 2F

Time: 18:30–20:30, Friday, 7 November

Note

Volunteers and staff will wear yellow slings. If you have any questions, you can ask them for help at any time or go to the conference registration table for consultation.

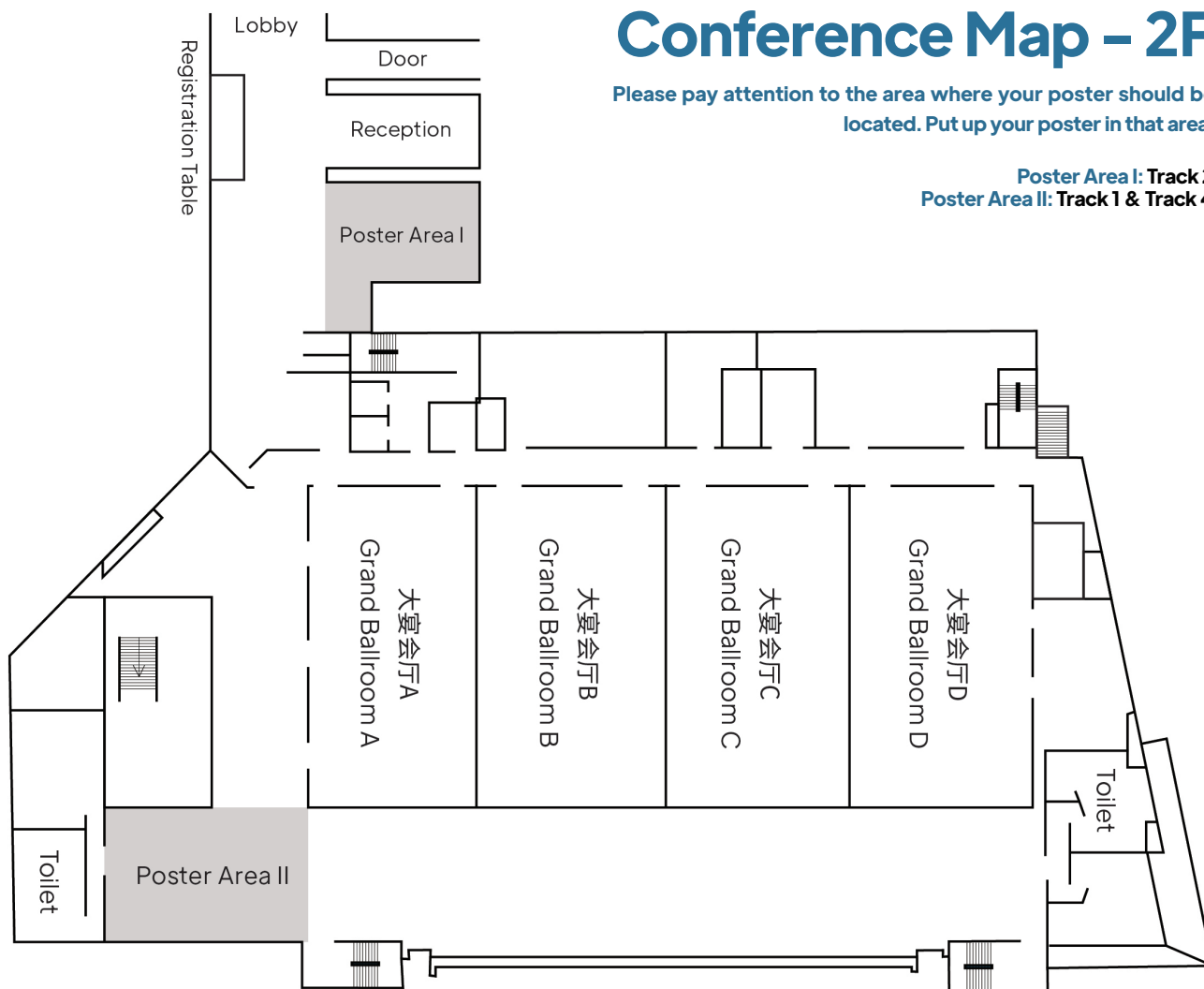
Program at a glance

	Wednesday Nov. 5	Thursday Nov. 6	Friday Nov. 7	Saturday Nov. 8
Registration Lobby, 2F	07:30–20:00	07:30–18:00	08:00–18:30	08:00–16:00
Workshop 1F & 2F	09:00–17:30			
Industry Forum Function Room K3 & K4 & K5, 1F				08:30–12:00
Special Symposium Function Room K3, 1F			13:30–16:00	
Opening Ceremony Grand Ballroom, 2F		08:30–08:45		
Plenary Session Grand Ballroom, 2F		08:50–12:05		
Technical Session 1F & 2F		13:30–17:30	08:30–15:30	08:30–17:30
Best Paper Award Competition Session Function Room K4, 1F		13:30–17:15		
Best Student Paper Award Competition Session Function Room K3, 1F		13:30–17:30		
Postdeadline Paper Session Function Room K3 & K5, 1F				13:30–17:15
Poster Session 1F & 2F			15:30–17:30	
Exhibition 1F & 2F		09:00–18:00	09:00–18:00	09:00–17:00
Welcome Reception Lakeside Garden, 1F		18:00–20:00		
Banquet & Awards Ceremony Grand Ballroom, 2F			18:30–20:30	

Conference Map – 2F

Please pay attention to the area where your poster should be located. Put up your poster in that area.

Poster Area I: Track 2
Poster Area II: Track 1 & Track 4



November 5

Grand Ballroom A

Workshop: Network Transformation in the AI Era: Building a Full-Optical Interconnection Foundation to Support Ubiquitous Intelligence
Workshop: Opportunities and Challenges for Next Generation AI-native Fixed Access Network (AI FAN)

Grand Ballroom B

Workshop: The chances and challenges of hollow core fibers for communication
Workshop: High-speed Optical Transmissions for Data Center/ Intelligent Computing Center Interconnects

Grand Ballroom C

Workshop: Optical Satellite Communications and Networking Towards F6G
Workshop: Challenges and Solutions of Optical Switching in Empowering AI Computing Centers

Grand Ballroom D

Workshop: Integrated Photoelectric Information Processing Technology

November 6 / November 7 / November 8

Grand Ballroom A

Track 2: Optical Transmission Systems, Subsystems and Technologies

Grand Ballroom B

Track 2: Optical Transmission Systems, Subsystems and Technologies (Parallel Session)

Grand Ballroom C

Track 4: Optoelectronic Devices and Integration

Grand Ballroom D

Track 4: Optoelectronic Devices and Integration (Parallel Session)

Poster Session

For your safety, poster area is divided into three zones. Different tracks please go to the corresponding areas.

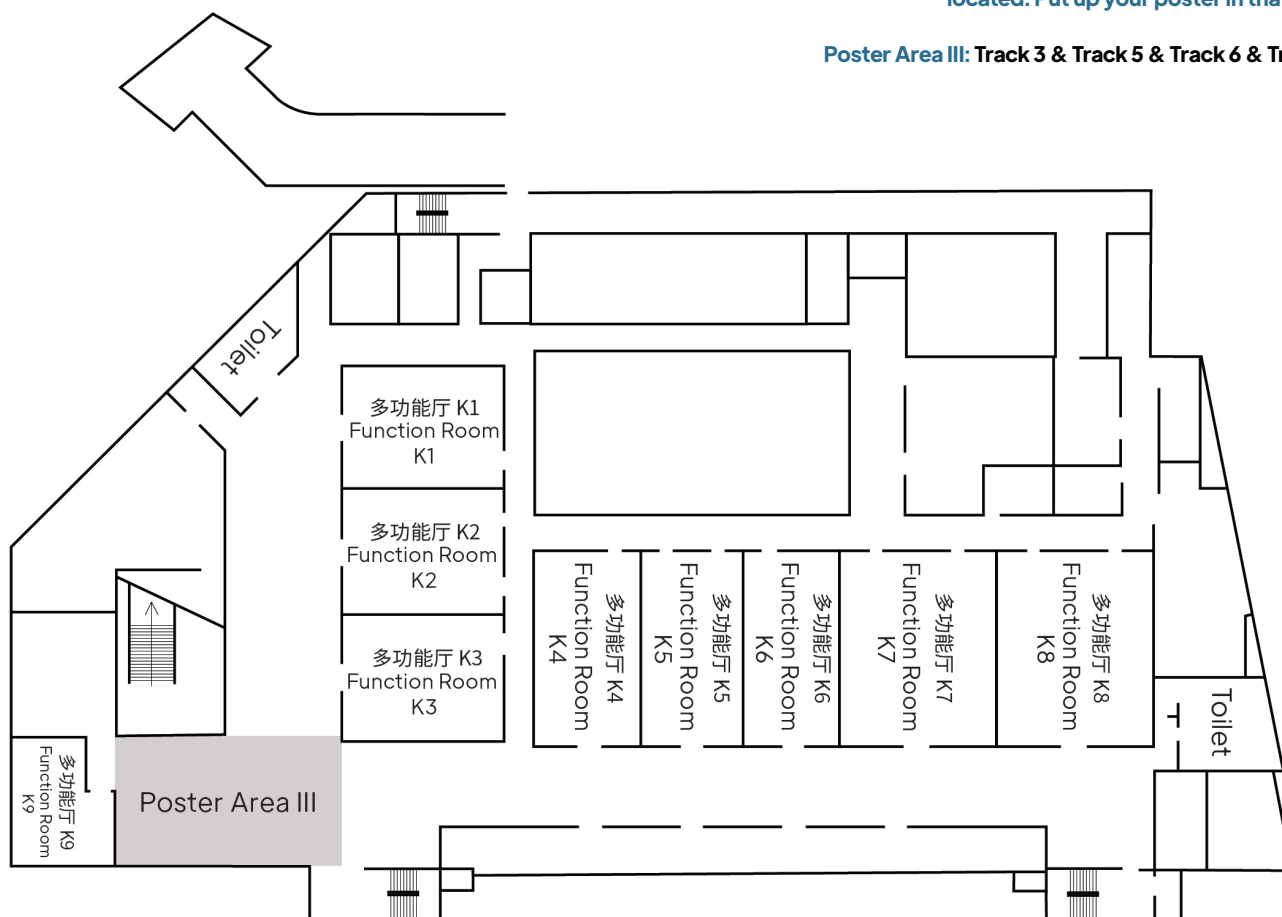
Poster Area I (Track 2)

Poster Area II (Track 1 & Track 4)

Conference Map – 1F

Please pay attention to the area where your poster should be located. Put up your poster in that area.

Poster Area III: Track 3 & Track 5 & Track 6 & Track 7



November 5

Function Room K2

Workshop: When optical networks meet fibre sensing, what is the killer application?

Function Room K3

Workshop: Fiber-Wireless Convergence for 6G Vision towards 2030

Function Room K7

Workshop: Optical sensing and communication in autonomous driving vehicles

November 6

Function Room K1

Track 5: Microwave Photonics and Optical Signal Processing

Function Room K2

Track 6: Micro-, Nano-, and Quantum Photonics: Science and Applications

Function Room K3

Best Student Paper Award Competition Session

Function Room K4

Best Paper Award Competition Session

Function Room K5

Track 3: Network Architectures, Management and Applications (Parallel Session)

Function Room K6

Track 7: Photonic Sensors & Bio-Photonics

Function Room K7

Track 3: Network Architectures, Management and Applications

Function Room K8

Track 1: Optical Fibers and Fiber-based Devices

November 7

Function Room K1

Track 5: Microwave Photonics and Optical Signal Processing

Function Room K2

Track 6: Micro-, Nano-, and Quantum Photonics: Science and Applications

Function Room K3

Special Symposium: State of Optical Access Networks – Standards, Deployments and Applications

Function Room K5

Track 3: Network Architectures, Management and Applications (Parallel Session)

Function Room K6

Track 7: Photonic Sensors & Bio-Photonics

Function Room K7

Track 3: Network Architectures, Management and Applications

Function Room K8

Track 1: Optical Fibers and Fiber-based Devices

November 8

Function Room K1

Track 5: Microwave Photonics and Optical Signal Processing

Function Room K2

Track 6: Micro-, Nano-, and Quantum Photonics: Science and Applications

Function Room K3

Industry Forum: Optical Circuit Switching (OCS) for AI Reconfigurable Datacenter Network (RDCN): Devices, Systems and applications
Postdeadline Paper Session

Function Room K4

Industry Forum: Optical interconnects for AI computing

Function Room K5

Industry Forum: The Deep-Sea Technology Forum

Postdeadline Paper Parallel Session

Function Room K6

Track 7: Photonic Sensors & Bio-Photonics

Function Room K7

Track 3: Network Architectures, Management and Applications

Function Room K8

Track 1: Optical Fibers and Fiber-based Devices

Poster Session

For your safety, poster area is divided into three zones. Different tracks please go to the corresponding areas.

Poster Area III (Track 3 & Track 5 & Track 6 & Track 7)

Workshop

November 5 - Wednesday							
	Grand Ballroom A 2F	Grand Ballroom B 2F	Grand Ballroom C 2F	Grand Ballroom D 2F	Function Room K2 1F	Function Room K3 1F	Function Room K7 1F
09:00-12:00	Workshop: Network Transformation in the AI Era: Building a Full-Optical Interconnection Foundation to Support Ubiquitous Intelligence (09:10-12:40)	Workshop: The chances and challenges of hollow core fibers for communication (ends at 12:15)	Workshop: Optical Satellite Communications and Networking Towards F6G (ends at 11:50)	/	/	/	/
12:00-13:30	Lunch Break						
13:30-17:30	Workshop: Opportunities and Challenges for Next Generation AI-native Fixed Access Network (AI FAN) (14:10-17:40)	Workshop: High-speed Optical Transmissions for Data Center/Intelligent Computing Center Interconnects (ends at 17:20)	Workshop: Challenges and Solutions of Optical Switching in Empowering AI Computing Centers (14:10-17:40)	Workshop: Integrated Photoelectric Information Processing Technology	Workshop: When optical networks meet fibre sensing, what is the killer application?	Workshop: Fiber-Wireless Convergence for 6G Vision towards 2030	Workshop: Optical sensing and communication in autonomous driving vehicles

Special Symposium

November 7 · Friday	
13:30–16:00	State of Optical Access Networks – Standards, Deployments and Applications Function Room K3, 1F

Industry Forum

November 8 · Saturday			
	Function Room K3 1F	Function Room K4 1F	Function Room K5 1F
08:30–12:00	Industry Forum: Optical Circuit Switching (OCS) for AI Reconfigurable Datacenter Network (RDCN): computing Devices, Systems and applications (starts at 09:00)	Industry Forum: Optical interconnects for AI computing (ends at 12:15)	Industry Forum: The Deep-Sea Technology Forum (starts at 09:00)

Workshop

The chances and challenges of hollow core fibers for communication

Description:

With the booming development of new digital services such as artificial intelligence, cloud computing, and industrial internet, the high-capacity and low-latency characteristics are becoming increasingly important in optical fiber networks. However, the capacity limitations of traditional silicon-based fiber systems are becoming apparent in the high-speed transmission system. Meanwhile, the latency cannot be reduced due to the transmission medium. Hollow Core Fiber (HCF) has excellent transmission performance such as low latency, low attenuation, and low dispersion. Recently, a number of fiber manufacturers have reported the latest progress on HCF, which show that the lowest attenuation coefficient has exceeded that of traditional silicon-based fiber. Moreover, the fiber deployment projects and the field trials with single-wave rates ranging from 10G–1.2T have been carried out in the many countries. Those indicate that the technologies of HCF system are moving rapidly from the laboratory to commercialization, but the application of the new-type fiber still faces numerous challenges.

This workshop will review the development status of key technologies of HCF transmission systems and explore the critical issues related to their application from aspects of fibers, devices, systems, standardizations, etc.

Time: 09:00–12:15, November 5

Venue: Grand Ballroom B, 2F

Organizers:

Ansion LM Xiong, State Key Laboratory of Optical Fiber and Cable Manufacture Technology (YOFC)

Anxu Zhang, China Telecom

Lin Sun, Soochow University

Speakers:

President: **Ansion LM Xiong**, State Key Laboratory of Optical Fiber and Cable Manufacture Technology (YOFC)

09:00–09:15 **Lipeng Feng**, China Telecom

Topic: Progress and Application of Hollow-Core Fiber and Communication Systems

09:15–09:30 **Dawei Ge**, China Mobile

Topic: High Speed Transmission Over Deployed AR-HCFs: Challenges, Enabling Technologies, and Future Perspectives

09:30–09:45 **Peng Li**, State Key Laboratory of Optical Fiber and Cable Manufacture Technology (YOFC)

Topic: Hollow Core Fibres: From Laboratory Prototypes to Commercial Applications

09:45–10:00 **Mingjun Li**, Corning Incorporated, USA

Topic: Challenges for scaling hollow core fibers

10:00–10:30 **Coffee Break**

President: **Lipeng Feng**, China Telecom

10:30–10:45 **Mingyang Lyu**, Nokia Shanghai Bell Company

Topic: Discussion of the Potential Impact of Hollow-Core Fiber on Coherent Optical Modules and Systems

10:45–11:00 **Qiang Zhou**, University of Electronic Science and Technology of China

Topic: Quantum state distribution through air in fiber and its industry chain

11:00–11:15 **Ze Dong**, Beijing Institute of Technology

Topic: Symbol multiplexing coding modulation technology for hollow-core fiber transmission system

11:15–11:30 **Chao Li**, Peng Cheng Laboratory

Topic: Bridging Ultra-High Capacity Optical Transmissions over Anti-Resonate Hollow Core Fiber

11:30–11:45 **Jianping Li**, Guangdong University of Technology

Topic: Hollow-core fiber fusion splicing technology with low loss and high efficiency

President: **Lin Sun**, Soochow University

11:45–12:15 **Panel Discussion**

Network Transformation in the AI Era: Building a Full-Optical Interconnection Foundation to Support Ubiquitous Intelligence

Description:

Artificial Intelligence (AI) is rapidly permeating every aspect of production and daily life, creating a ubiquitous demand for intelligent services and computational power. This requires networks to possess ultra-high bandwidth, ultra-low latency, and intelligent coordination to support the real-time flow and processing of massive AI-driven data. At the same time, AI technology will profoundly empower the intelligent evolution of the networks. This workshop will focus on two core topics: "How future optical networks can support ubiquitous AI" and "How AI can drive the intelligence of optical networks". The aim is to consolidate industry consensus, identify key technologies and core demands, and jointly advance an AION target architecture for cloud-network-intelligence convergence in the AI era.

Time: 09:10–12:40, November 5

Venue: Grand Ballroom A, 2F

Chairs:

Shanguo Huang, Vice President of Beijing University of Posts and Telecommunications

Xiang Liu, Huawei Technologies Co., Ltd

Organizers:

Zhenqing Zhao, Huawei Technologies Co., Ltd

Wei Jia, Huawei Technologies Co., Ltd

Bingli Guo, Beijing University of Posts and Telecommunications

Xiandan Tang, Huawei Technologies Co., Ltd

Speakers:

President: **Wei Jia**, Huawei Technologies Co., Ltd

09:10-09:30 **Xiang Liu**, Huawei Technologies Co., Ltd

Topic: International Optical Networks towards 2030 and Beyond (ION-2030) for the AI Era

09:30-09:50 **Dong Wang**, China Mobile Research Institute

Topic: Technical Evolution of AI-Computing-Oriented All-Optical Network

09:50-10:10 **Yongmin Li**, Shanxi University

Topic: Continuous variable quantum key distribution

10:10-10:30 **Coffee Break**

President: **Bingli Guo**, Beijing University of Posts and Telecommunications

10:30-10:50 **Songnian Fu**, Guangdong University of Technology

Topic: Enabling Technique for High Baud-rate Digital Subcarrier Multiplexed Fiber-Optic Transmission

10:50-11:10 **Liang Dou**, Alibaba Group Holding Limited

Topic: Building Intelligent Optical Networks to Sustain the AI Revolution

11:10-11:30 **Danshi Wang**, Beijing University of Posts and Telecommunications

Topic: Towards Specialized LLMs for Optical Networks: Key Technologies and Prospects

11:30-11:50 **Alan Pak Tao Lau**, The Hong Kong Polytechnic University

Topic: Integrated sensing and communications for Metropolitan environments

11:50-12:30 **Panel Discussion**

12:30-12:40 **Summary**

Optical Satellite Communications and Networking Towards F6G

Description:

Optical satellite communications and networking are rapidly advancing as critical technologies to meet the growing global demand for high-capacity, low-latency, and secure connectivity. Leveraging the vast potential of free-space optical links, these systems promise to revolutionize satellite networks by enabling terabit-per-second data rates, interference-free transmission, and enhanced resilience against jamming and interception.

This workshop provides a dedicated forum for academic and industry researchers to exchange the latest developments, challenges, and future directions in optical satellite communications. Topics of interest include inter-satellite optical links, ground-to-satellite and satellite-to-ground optical communications, space-based optical switching and routing, network control and resource management, and integration with terrestrial and space networks. The workshop will also address enabling technologies such as advanced modulation and coding, precision beam pointing, adaptive optics, and digital signal processing for spaceborne environments.

By convening experts across the fields of satellite systems, photonics, networking, and space engineering, this workshop aims to foster interdisciplinary collaboration and identify innovative solutions to current technical bottlenecks. It will serve as a platform to discuss system architectures, experimental testbeds, standardization efforts, and roadmap strategies for deploying scalable and sustainable optical satellite networks to support next-generation global communications.

Time: 09:00–11:50, November 5

Venue: Grand Ballroom C, 2F

Organizers:

Wei Wang, Beijing University of Posts and Telecommunications

Yuping Wu, Huawei Technologies Co. Ltd.

Yongli Zhao, Beijing University of Posts and Telecommunications

Speakers:

President: **Yongli Zhao**, Beijing University of Posts and Telecommunications

09:00–09:20 **Yunbo Li**, China Mobile

Topic: Enhanced Design and Analysis of Frame Format for Space Optical Transport Network

09:20–09:40 **Buzheng Wei**, China Unicom

Topic: Overview of Free Space Optics Application from China Unicom

09:40–10:00 **Wenhua Shi**, China Satellite Communications Company

Topic: One Step of China's Satellite Internet

10:00–10:30 **Coffee Break**

President: **Yuping Wu**, Huawei Technologies Co. Ltd.

10:30–10:50 **Lin Gan**, Huawei Technologies Co. Ltd.

Topic: Challenges and Key Technologies of Optical Satellite Network

10:50–11:10 **Keji Zhou**, Fiberhome Telecommunication Technologies Co., Ltd.

Topic: Challenges and Expectations of Ultra-high Speed Inter-satellite Laser Communication

11:10–11:30 **Kanglian Zhao**, Nanjing University

Topic: Prediction of Cloud Cover and Turbulence for Space-Terrestrial Optical Networking

11:30–11:50 **Yi Jin**, Northwestern Polytechnical University

Topic: The Development and Thoughts on Miniaturized Laser Terminals

High-speed Optical Transmissions for Data Center/ Intelligent Computing Center Interconnects

Description:

Driven by broadband optoelectronic devices, high-speed AD/DA converters, new transmission technologies, and novel digital signal processing methods, short-reach optical communication has become essential to meet the surging demand for future data transmission in data centers and AI computing infrastructures. This workshop focuses on the key issues and latest advancements in short-reach optical fiber communications, tailored for high-performance, low-latency, and energy-efficient interconnects for data center and intelligent computing center.

Topics include but not limit to the high data-rate real-time transmissions under IM/DD and coherent frameworks, ultra-wideband signal mod/demod and signal processing, simplified coherent architectures, advanced device integration, and efficient channel modeling. In addition, the workshop will explore emerging areas such as novel access networks, intelligent fault diagnosis, mid-infrared communications, and cross-disciplinary innovations bridging photonics, computing, and AI.

This workshop invites researchers and engineers from academia and industry to share breakthroughs in device design, system implementation, and algorithm development, promoting collaboration and accelerating the deployment of next-generation short-reach optical communication systems for data-intensive environments.

Time: 13:30–17:20, November 5

Venue: Grand Ballroom B, 2F

Organizers:

Jing Zhang, University of Electronic Science and Technology of China

Qi Yang, Huazhong University of Science and Technology

Fan Zhang, Peking University

Jianming Tang, Bangor University

Speakers:

President: **Jing Zhang**, University of Electronic Science and Technology of China

13:30-13:50 **Junwen Zhang**, Fudan University

Topic: High-Capacity and High-Speed Multi-Dimensional Optical Interconnect Technologies for Intelligent Computing Networks

13:50-14:10 **Zhenming Yu**, Beijing University of Posts and Telecommunications

Topic: Content-oriented integrated optical communication system

14:10-14:30 **Danshi Wang**, Beijing University of Posts and Telecommunications

Topic: Spectral Power Tracing Approach for Fiber Anomaly Detection and Self-healing in Multi-band Transmission Systems

14:30-14:50 **Bin Chen**, Hefei University of Technology

Topic: Hybrid SD/HD FEC for High-speed Optical Communication

14:50-15:10 **Fan Li**, Sun Yat-sen University

Topic: Recent Research Progress on DSP Algorithm Verification for FPGA-Based Real-Time Systems in Simplified Coherent Optical Interconnections

15:10-15:30 **Coffee Break**

President: **Fan Zhang**, Peking University

15:30-15:50 **William Shieh**, Westlake University

Topic: Datacenter Interconnects beyond IMDD

15:50-16:10 **Fumio Koyama**, Institute of Science Tokyo

Topic: Pushing the Limits of VCSEL Technology: Beyond 200 Gb/s Single-Mode VCSELs for Next-Generation SMF and MMF Interconnects

16:10-16:30 **Yu Zhao**, Ciena

Topic: IMDD and Coherent-Lite in Data Center

16:30-16:50 **Zixian Wei**, The Hong Kong Polytechnic University

Topic: Viterbi-Free Digital Resolution Enhancer for Data Centers IM/DD Interconnect with Low-Resolution DAC

16:50-17:20 **Panel Discussion**

Challenges and Solutions of Optical Switching in Empowering AI Computing Centers

Description:

As artificial intelligence (AI) computing centers rapidly scale to meet the increasing demands of large-scale model training and inference, the underlying network infrastructure faces growing pressure in bandwidth, latency, scalability, and energy efficiency. In this context, optical switching technology, with its inherent advantages such as ultra-high bandwidth and low latency, is increasingly recognized as a key enabler for future intelligent computing infrastructures. However, deploying optical switching technologies in AI computing centers still faces several critical challenges at both technical and application levels. From application perspective, the specific use cases in scale-up and scale-out networks, along with the core value they bring, require further discussion and clarification. From application perspective, switching granularity is often fixed and cannot simultaneously support multiple levels of traffic volume. Additionally, switching scale is limited by device bottlenecks, making large-scale expansion difficult. Furthermore, network configuration requires significant control time, hindering support for the highly dynamic traffic demands typical of emerging AI applications. This workshop will explore these technical bottlenecks and discuss recent advances in optical switching devices, high-dimensional optical switching architectures, and network control strategies tailored for distributed AI workloads. Through both academic and industrial perspectives, we aim to identify feasible paths toward building scalable, efficient, and future-proof optical networks for AI computing centers.

Time: 14:10–17:40, November 5

Venue: Grand Ballroom C, 2F

Organizers:

Xuwei Xue, Beijing University of Posts and Telecommunications

Yongcheng Li, Soochow University

Jiawei Zhang, Beijing University of Posts and Telecommunications

Tao Gui, Huawei Technologies Co., Ltd.

Speakers:

President: **Jiawei Zhang**, Beijing University of Posts and Telecommunications

14:10–14:30 **Sisi Tan**, Huawei Technologies Co., Ltd

Topic: Reimagining AI Datacenter Networks with Optical Circuit Switch (OCS)

14:30–14:50 **Yakun Hu**, China Unicom

Topic: Development and Application of Optical Interconnection Technology in Intelligent Computing Centers

14:50–15:10 **Dong Wang**, China Mobile

Topic: Development and Trend of Optical Transport Technologies Enabling Super Clusters for Scaling AI Capabilities

15:10–15:30 **Xiaotian Jiang**, China Telecom

Topic: Exploration of optical interconnection of AI computing centers with intelligent technologies

15:30–15:50 **Coffee Break**

President: **Xuwei Xue**, Beijing University of Posts and Telecommunications

15:50–16:10 **Nicola Calabretta**, Eindhoven University of Technology

Topic: AI cluster networks based on distributed WDM optical switches

16:10–16:30 **Fulong Yan**, Beijing University of Posts and Telecommunications

Topic: A Buffered Optical Switching Fabric with QoS Provisioning for Data Center Networks

16:30–16:50 **Shizhen Zhao**, Shanghai Jiao Tong University

Topic: Network4AI: Key Technologies of Optical Circuit Switching in Data Center Networks

16:50–17:10 **Ning Deng**, Great Bay University

Topic: Enhancing Survivability of AI Computing Clusters with Optical Switching

President: **Tao Gui**, Huawei Technologies Co., Ltd. & **Yongcheng Li**, Soochow University

17:10–17:40 **Panel Discussion**

Opportunities and Challenges for Next Generation AI-native Fixed Access Network (AI FAN)

Description:

Looking ahead to 2030, breakthroughs in areas such as AI large language models, immersive 3D, and embodied intelligence are placing unprecedented demands on future optical network architectures. These include requirements for ultra-large bandwidth, ultra-low latency, ultra-high reliability, and ultra-high security. This workshop will focus on AI-native Fixed Access Network (AI-FAN), discussing topics such as 10-gigabit access based on 50G PON, the evolution of next-generation 200G PON technologies, and new PON scenarios and applications. The aim is to enable high-quality connectivity that brings AI to everyone. Therefore, this workshop hopes to invite experts from academia and industry to discuss and explore the innovations for AI-FAN.

Time: 14:10–17:40, November 5

Venue: Grand Ballroom A, 2F

Organizers:

Xiang Wang, Huawei Technologies Co., Ltd

Yanzhao Lu, Huawei Technologies Co., Ltd

Ji Zhou, Beijing Institute of Technology, Zhuhai

Speakers:

President: **Yanzhao Lu**, Huawei Technologies Co., Ltd

14:10-14:30 **Junwei Li**, China Mobile Research Institute

Topic: Evolution of Optical Access Network Technology

14:30-14:50 **Dezhi Zhang**, China Telecom Research Institute

Topic: Next-Generation Optical Access Network Evolution for High-Speed and Intelligence

14:50-15:10 **Yan Shao**, China Unicom Research Institute

Topic: Key Technologies and Applications of 50G-PON

15:10-15:30 **Gordon Ning Liu**, Soochow University

Topic: Opportunities and challenges of passive optical network in intra-vehicle networks

15:30-15:50 **Coffee Break**

President: **Ji Zhou**, Beijing Institute of Technology, Zhuhai

15:50-16:10 **Xin Xu**, Huawei Technologies Co., Ltd

Topic: Enabling the Ubiquitous AI Era: The AI-FAN Architecture and its Technologies

16:10-16:30 **Roberto Gaudino**, Politecnico di Torino

Topic: Centralized Downstream Digital Chromatic Dispersion Pre-compensation with Direct-Detection for future 200G-PON

16:30-16:50 **Lilin Yi**, Shanghai Jiao Tong University

Topic: AI enabled high performance PON

16:50-17:10 **Junwen Zhang**, Fudan University

Topic: Next-Generation Intelligent and Flexible Optical Access Network based on Coherent Optics

17:10-17:30 **Jianchun Liu**, University of Science and Technology of China

Topic: Large Model Security Inference Based on Terminal-Edge Collaboration

17:30-17:40 **Summary**

Integrated Photoelectric Information Processing Technology

Description:

The integration of photonics and electronics is the main technical path to solve the problems of “high speed, low power consumption, intelligence” faced by information technology, and has shown great technical advantages and potential. Integrated photoelectric information/signal processing technology, facilitated by photoelectric integrated circuits, offer distinct advantages including low interconnect latency, high bandwidth, immunity to electromagnetic interference, and low power consumption. After decades of development, information/signal processing devices have developed from fiber optic devices, passive integration, and active integration to photoelectric integration. At present, information/signal processing technologies face three major challenges: ultra-high speed, ultra-low power consumption, and intelligent integration.

The purpose of this workshop is to provide an overview of ongoing progress and trends in advancing the knowledge, understanding, and novel applications of integrated photoelectric information/signal processing technology. Areas of interest include (but are not limited to):

- Photoelectric materials and devices for signal processing
- Ultrafast nonlinear photonics science
- Programmable and integrated photonics for signal processing
- Integrated Photonics for AI and neuromorphic computing
- Integrated Photonic signal processing for sensing and communications
- Integrated photonics for 6G networks
- AI/machine learning for photonic device design and signal processing
- Integrated microwave photonic signal processing and sensing
- Optical frequency combs for photonic signal processing
- Quantum photonic signal processing

Time: 13:30–17:30, November 5

Venue: Grand Ballroom D, 2F

Organizers:

Huashun Wen, Nankai University

Heng Zhou, University of Electronic Science and Technology of China

Jing Xu, Huazhong University of Science and Technology

Speakers:

President: **Heng Zhou**, University of Electronic Science and Technology of China

13:30–13:50 **Hanke Feng**, City University of Hong Kong

Topic: Chip-scale integrated lithium niobate photonic systems

13:50–14:10 **Minhao Pu**, Technical University of Denmark

Topic: High-performance soliton microcombs

14:10–14:30 **Shiyoshi Yokoyama**, Kyushu University

Topic: Ferroelectric PLZT EO Modulators for High Speed Optical Communications

14:30–14:50 **Lei Lei**, Shenzhen University

Topic: Low-Loss Phase-change Material Assisted Optical Devices and Applications

14:50–15:10 **Junjia Wang**, Southeast University

Topic: Silicon-Based Heterogeneous Integration Modulators

15:10–15:40 **Coffee Break**

President: **Jing Xu**, Huazhong University of Science and Technology

15:40–16:00 **Yinghui Guo**, The Institute of Optics And Electronics, Chinese Academy of Sciences

Topic: Meta-Optics-Based Large Field of View and High Spatiotemporal Resolution Three-Dimensional Imaging

16:00–16:20 **Fangxing Zhang**, Peking University Yangtze Delta Institute of Optoelectronics

Topic: High-Stability, Low-Noise WGM Microresonator-Based Sub-Hertz Laser Technology and Its Application

16:20–16:40 **Zeshan Chang**, Huawei Technologies Co., Ltd.

Topic: Outlook on Optoelectronic Integrated Sensing Technology

16:40–17:00 **Qi Zhang**, Shanghai University

Topic: Integrated Additive and Subtractive Manufacturing of Glass Photonic Sensors for Harsh Environment Applications

17:00–17:30 **Panel Discussion**

Fiber–Wireless Convergence for 6G Vision towards 2030

Description:

Fiber optic communication and high–frequency wireless communication form the core technological foundation of the new generation of information technology. The integration of fiber and wireless communication is of great importance for constructing the typical 6G scenarios towards 2030, including ubiquitous connectivity, immersive communication, integrated sensing and communication, and integrated intelligence and communication.

Time: 13:30–17:30, November 5

Venue: Function Room K3, 1F

Organizers:

Jiao Zhang, Southeast University

Yuancheng Cai, Purple Mountain Laboratories

Wen Zhou, Fudan University

Speakers:

President: **Jiao Zhang**, Southeast University

13:30–13:45 **Lei Deng**, Huazhong University of Science and Technology

Topic: Research and Application of IMDD–RoF and Coherent RoF in Future 6G Mobile Communications

13:45–14:00 **Xiaodan Pang**, Zhejiang University

Topic: Analog Fronthaul Technologies for Cell–Free MIMO Scenarios

14:00–14:15 **Yixiao Zhu**, Shanghai Jiao Tong University

Topic: Coherent–lite fronthaul with time–frequency synchronization

14:15–14:30 **Jingbo Wu**, Nanjing University

Topic: Liquid crystal programmable metasurface for terahertz communication

14:30–14:45 **Junjie Ding**, Purple Mountain Laboratories

Topic: High–Speed Photonics–Aided THz Wireless Transmission with FPGA Implementation

14:45–15:15 **Panel Discussion**

15:15–15:30 **Coffee Break**

President: **Yuancheng Cai**, Purple Mountain Laboratories

15:30–15:45 **Jiaheng Wang**, Southeast University

Topic: Fiber Enabled Network MIMO OWC

15:45–16:00 **Xiong Deng**, Southwest Jiaotong University

Topic: Beam–Steering Techniques for High–Mobility Optical Wireless Communication

16:00–16:15 **Qun Zhang**, Pengcheng Laboratory

Topic: Transceiver Impairment Calibration for High–Speed Optical and Wireless Communication Systems

16:15–16:30 **Mingzheng Lei**, Purple Mountain Laboratories

Topic: Photonic THz Waveform Design for High–Efficiency Time–Frequency ISAC

16:30–16:45 **Xiaolong Pan**, Beijing Institute of Technology

Topic: Application Prospects of OFDM Waveforms in the Era of Integrated Sensing and Communication for Future 6G

16:45–17:00 **Boyu Dong**, Fudan University

Topic: Intelligent Terahertz Communication and Sensing Based on Opto–Electronic Integration

President: **Wen Zhou**, Fudan University

17:00–17:30 **Panel Discussion**

When optical networks meet fibre sensing, what is the killer application?

Description:

Optical fibre is the most suitable media, not only for optical network transmission, but also for distributed sensing. Both of these two main technologies all have decades histories of development since the innovation of fibre. Now, optical networks meet fibre sensing, convergent optical communication and sensing, attract deeply discussions across the industrial and academic, cross the fibre transmission and fibre sensing. Different fibre sensing techniques could be integrated with optical networks, including back-scattering effect based sensing, coherent DSP based sensing. And the optical networks could be the access network, metro networks, longhaul backbone networks, and even transoceanic submarine cable systems. With the enhanced sensing ability and awareness of the around status of fibre/cable, convergent optical communication and sensing could obtain many advantages, to upgrade the reliability and operation of itself, and to provide sensing as a service externally. With quite hot discussions for years, while commercial deployment is still on the way, so what is the killer application, for convergent optical communication and sensing, to make the closed-loop of new technique. The workshop invite opinions to focusing on these issues, how to integrate fibre sensing with different optical networks, how to achieve it cost-effectively, what is the killer application for end-user, especially the operators.

Time: 13:30–17:30, November 5

Venue: Function Room K2, 1F

Organizers:

Shikui Shen, China Unicom

Ming Tang, Huazhong University of Science and Technology

Chao Lu, The Hong Kong Polytechnic University

Speakers:

President: **Chao Lu**, The Hong Kong Polytechnic University

13:30–13:45 **Roland Ryf**, Nokia Bell Labs

Topic: Ultra long-reach distributed acoustic sensing over subsea cables

13:45–14:00 **Chuanbiao Zhang**, China Unicom

Topic: Multi-scenario sensing applications based on existing optical communication systems

14:00–14:15 **Erza Ip**, NEC Labs

Topic: Distributed acoustic sensing in terrestrial and submarine cables

14:15–14:30 **Yaxi Yan**, The Hong Kong Polytechnic University

Topic: Advanced Traffic Monitoring with Distributed Acoustic Sensing over Deployed Fiber Networks

14:30–14:45 **Yanfu Yang**, Harbin Institute of Technology (Shenzhen)

Topic: Integrated Forward Vibration Sensing for Commercial Optical Communication Systems

14:45–15:00 **Xia Gao**, China Telecom

Topic: Progress and exploration of the integrated sensing and communication optical networks

15:00–15:30 **Coffee Break**

President: **Shikui Shen**, China Unicom

15:30–15:45 **Yan Zhao**, Huawei Technologies Co., Ltd

Topic: Integrated communication and distributed acoustic sensing for online co-trench detection

15:45–16:00 **Haijun He**, Southwest Jiaotong University

Topic: Time-Frequency Multiplexing Fiber-based Integrated Sensing and Communication

16:00–16:15 **Du Tang**, China Academy of Information and Communications Technology (CAICT)

Topic: Fiber longitudinal power profile estimation: Research progress and standardization perspectives

16:15–16:30 **Can Zhao**, Shenzhen University

Topic: Integrated communication and sensing in optical fiber digital subcarrier multiplexing system

President: **Ming Tang**, Huazhong University of Science and Technology

16:30–17:30 **Panel Discussion**

Optical sensing and communication in autonomous driving vehicles

Description:

In autonomous driving vehicles, Light Detection and Ranging (LiDAR), as the core environment sensor, provides key spatial information input for scene understanding through accurate calculation of the geometry, spatial position, and motion vector of surrounding objects. With the introduction of optical fiber communication, the intra-vehicle optical network (IVON) constitutes a high-speed data transmission infrastructure within vehicles, which can reliably transmit massive raw data generated by sensors such as high-definition cameras and LiDAR in real time to ensure the data integrity of the decision-making control system under complex working conditions. LiDAR and IVON work together to support the robustness and functional safety of the autonomous driving system. However, as emerging technologies, LiDAR and IVON are both debated in multiple directions. Therefore, this workshop hopes to invite experts from academia and industry in related fields to conduct in-depth discussions on the different technical routes involved.

Time: 13:30–17:30, November 5

Venue: Function Room K7, 1F

Organizers:

Gordon Ning Liu, Soochow University

Jing Wang, Southern University of Science and Technology

Speakers:

President: Jing Wang, Southern University of Science and Technology

13:30-13:45 **Qi Qin**, Shenzhen University

Topic: Quantum FMCW Lidar and Beamforming Optical Phased Array

13:45-14:00 **Ruxue Wang**, Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Sciences

Topic: Research on Thick-Silicon-Based Coherent Receiver Chips

14:00-14:15 **Lei Liang**, Changchun Institute of Optics, Fine Mechanics and Physics, Chinese Academy of Sciences

Topic: High-Power Semiconductor Optical Amplifiers for Integrated Tunable Lasers

14:15-14:30 **Rui Ma**, Xidian University

Topic: Single photon detection imaging chip and automotive applications

14:30-14:45 **Rui Chen**, Zhejiang Raysea Technology Co. Ltd

Topic: Innovations in developing high performance VCSEL laser chip for Automotive Grade LiDAR

14:45-15:15 **Panel Discussion**

15:15-15:45 **Coffee Break**

President: Gordon Ning Liu, Soochow University

15:45-16:00 **Yuyang Gao**, University of Science and Technology Beijing

Topic: Demands and Challenges of In-Vehicle Optical Fiber Communication Technology for Commercial Vehicles

16:00-16:15 **Xin Chen**, Corning Incorporated, USA

Topic: Modal Bandwidth and VCSEL Transmission Capability of Multimode Fibers at 980 nm For In-Vehicle Optical Networks

16:15-16:30 **Hiroyuki Tsuda**, Keio University, Japan

Topic: Highly Reliable In-Vehicle Optical Network: SiPhON

16:30-16:45 **Haijiang Yu**, Wuhan HGGenuine Optics Tech Co., Ltd.

Topic: Driving the Future with Light: SiPh and Quantum Dot Lasers in Automotive optical Connectivity

16:45-17:00 **Lin Ma**, Shanghai Jiao Tong University

Topic: Optical fibers and devices for in-vehicle high-speed interconnects

17:00-17:30 **Panel Discussion**

Special Symposium

State of Optical Access Networks – Standards, Deployments and Applications

co-located with ACP 2025, Suzhou, China

Optical Access Networks (OANs) have become an essential building block in the digital infrastructure of our time, connecting homes, businesses, factories and other communication networks. The purpose of this workshop is to bring together researchers and practitioners in the field of Optical Access Networks to discuss the current state of the OAN standards, deployments and applications. The workshop is featured by two hour-long tutorials from leading experts in this field to share with the audience a holistic view on the state of OAN, followed by a moderated panel discussion. We invite professors, graduate students, and engineers alike to participate in this special symposium, and bring your questions to our panel experts. Access to the workshop is free. Online participation will also be provided through Tencent meeting.

This special symposium is sponsored by Sun Telecom, a leader in fiber optic total solutions based in Shanghai, China.

Time: 13:30–16:00, November 7

Venue: Function Room K3, 1F

Organizers:

Weiqliang Sun, Shanghai Jiao Tong University

Dechao Zhang, China Mobile Research Institute

Speakers:

Presider: **Weisheng Hu**, Shanghai Jiao Tong University

13:30-13:40 **Opening Speech**

13:40-14:00 **Dezhi Zhang**, China Telecom Research Institute

Topic: Evolution of Optical Access Network Technology

14:00-14:20 **Dongxu Zhang**, Research Scientist, Nokia Bell Labs, Nokia Shanghai Bell Co Ltd.

Topic: Prospects for Next-Generation PON Technology and Applications

14:20-14:40 **Ning Wang**, China Mobile Research Institute

Topic: Considerations on PON and FTTR network

14:40-15:00 **Yixiao Zhu**, Shanghai Jiao Tong University, China

Topic: Technologies and Challenges in Coherent PON

15:00-16:00 **Panel Discussion**

Industry Forum

Optical Circuit Switching (OCS) for AI Reconfigurable Datacenter Network (RDCN): Devices, Systems and applications

Description:

The advent of AI/ML has accelerated scaling of training compute capacity, driving the required computation demands to double approximately every 6 months. Reflecting the recent slow-down in Moore's law and the explosion workload, the performance, latency and power consumption of networks are becoming barriers in hyper scale data centres. One potential innovative solution is reconfigurable datacenter network (RDCN): datacenter networks whose large-scale topologies dynamically change over time enabled by optical circuit switching (OCS) technology.

OCS, however, introduces new problems. First, this is a change of paradigm that has a large impact on the network operation and management. New traffic engineering techniques have to be defined to benefit from OCS. Lower, deterministic latency impact on congestion and cannot be fully leveraged without changes of the layer-4 (TCP) protocols. The switching chip itself is adding losses, which need to be included in the transponder design or data center planning. The failure model of OCS switches is still relatively unknown and the impact of the failure of a single OCS in a data center may lead to dramatic traffic losses.

This industry forum aims to bring together leading academics and industry researchers to explore advances in devices and systems on optical circuit switching (OCS), AI RDCN structures and protocols, and in-depth discussion on future AI/ML data centre powered by optical circuit switching (OCS) technology.

Time: 09:00–12:00, November 8

Venue: Function Room K3, 1F

Organizers:

Kangping Zhong, The Hong Kong Polytechnic University

Yvan Pointurier, Huawei France

Xian Zhou, University of Science and Technology Beijing

Hua Zhang, LUSTER LightTech Co., Ltd.

Speakers:

President: **Xian Zhou**, University of Science and Technology Beijing

09:00–09:15 **Xiaoliang Chen**, University of Science and Technology of China

Topic: Spatial and Temporal Scheduling for Accelerating LLM Training in OCS-based DCNs

09:15–09:30 **Yuyang Liu**, China Telecom

Topic: Development and Application of OCS in Data Center Networks

09:30–09:45 **Rentao Gu**, Beijing University of Posts and Telecommunications

Topic: ReFly: A Reconfigurable Architecture for LLM Training Based on Optical Circuit Switching

09:45–10:00 **Daniel Perez-Lopez**, iPrionics

Topic: Fast silicon photonics switches and main AI datacenter applications

10:00–10:30 **Coffee Break**

President: **Hua Zhang**, LUSTER LightTech Co., Ltd.

10:30–10:45 **Mingqing Zuo**, China Mobile

Topic: AI-Computing-Oriented All-Optical Network: Requirement, Challenge, and Technology

10:45–11:00 **Guangpeng Ma**, Lumentum

Topic: Optical Circuit Switching – Opportunity and Challenges

11:00–11:15 **Hua Zhang**, Luster Light Co., Ltd.

Topic: Discussion on optical interconnection technology for AI Reconfigurable Data Center Network

11:15–11:30 **Guanghui Sun**, Huawei Technologies Co., Ltd.

Topic: Optical interconnection helps release AI computing power

President: **Kangping Zhong**, The Hong Kong Polytechnic University

11:30–12:00 **Panel Discussion**

The Deep–Sea Technology Forum

Description:

The Deep–Sea Technology Forum, led by Hengtong Group and supported by the Jiangsu Marine Information Technology and Equipment Innovation Center, will take place in Suzhou from November 5th to 8th. It aims to create an innovation platform for future marine industries, deepen the research and development of common technologies, and establish a marine technology R&D highland in the Asia-Pacific region.

The forum will gather authoritative experts from top marine academic institutions. They will deliver reports and share insights. Participants will discuss the latest achievements and cutting-edge practices in marine communication and perception, analyze technological trends, and predict the industry's future direction, promoting innovation and development in the Asia-Pacific's deep-sea technology sector.

Additionally, the forum will facilitate joint efforts in key projects and promote the integration and sharing of innovative resources. Through discussions and exchanges, the forum aims to integrate R&D with commercial innovation in marine communication and perception in the Asia-Pacific region.

Time: 09:00–12:00, November 8

Venue: Function Room K5, 1F

Organizers:

Xu Lin, HMN Technologies Group Co., Ltd

Song Ji'en, Jiangsu ShenYuan Ocean Information Technology and Equipment Innovation Center Co., Ltd.

Speakers:

President: **Kai Yao**, HMN TECH

09:00-09:15 **Charles Jeremy Brown**, Hengtong HMN Tech Co.Ltd

Topic: A Look Back in History The 8 Key Chinese Inventions Enabling the Subsea Cable Industry as We Know it Today

09:15-09:30 **Takemi Hasegawa**, Sumitomo Electric Asia, Ltd.

Topic: Recent Advances in Submarine Optical Fibers

09:30-09:45 **Shanshan Wang**, Ocean University of China

Topic: Application of Optical Fiber Sensing Technology in Sensing and Measurement of Marine Physical Parameters

09:45-10:00 **Haokun Song**, China Mobile Group Design Institute Co, Ltd.

Topic: Prevention and Detection Technologies for Submarine Cable System Maintenance

10:00-10:30 **Coffee Break**

10:30-10:45 **Xinyi Xie**, Zhejiang University

Topic: SMART Cable: Enabling Ocean Monitoring Through the Convergence of Existing Submarine Telecom Cables and Marine Sensing in China

10:45-11:00 **Tommy Geisler**, Lightera Denmark Aps

Topic: Ultra-Low Loss Fibers for Submarine Cable Systems, Trans-oceanic and SDM high Fiber Count Cable Systems

11:00-11:15 **Mengmeng Zhang**, HMN Technologies Co., Limited

Topic: From Connected to Intelligent: The Next Wave in Submarine Networks

President: **Rendong Xu**, Zhejiang University

11:15-12:00 **Panel Discussion**

Optical interconnects for AI computing

Description:

Datacenters have driven the fast development of pluggable optics in the past decade. Even the speeds of pluggable optical transceivers have been increased about 20 times, from 40 Gb/s a decade ago to 800 Gb/s today, they still fall behind switch ASIC bandwidth increase, which is about 100 times. Since 2023, generative AI has generated unprecedented demands on optical interconnects. AI computing clusters not only demand much larger interconnect bandwidths than before, but have higher requirements on power consumption, bandwidth density, latency and reliability for optical interconnects as well. Will pluggable optics continue to be the main optical interconnect technologies for AI computing? Will new technologies including NPO, CPO, and OIO be better positioned for AI computing interconnects? This forum will bring together experts from various segments in our industry including end users, system vendors, optical transceiver and chip companies to discuss these questions.

Time: 08:30–12:15, November 8

Venue: Function Room K4, 1F

Organizers:

Chongjin Xie, PhotonicX AI Pte. Ltd.

Hanxing Shi, OpenLight Photonics Inc.

Hua Zhang, Luster LightTech Co. Ltd.

Speakers:

President: **Chongjin Xie**, PhotonicX AI Pte. Ltd.

08:30-08:45 **Rui Lu**, Alibaba Cloud

Topic: The Changes of AI Cloud Optical Interconnects

08:45-09:00 **Sidong Fu**, Tencent

Topic: Evolution of Optical Interconnect Technologies for AI Computing Networks

09:00-09:15 **Shaoliang Yu**, Zhijiang Lab

Topic: Linear-Drive Optics for AI Clusters: Bandwidth, Power, and Reliability

09:15-09:30 **Guangcan Mi**, Huawei Technologies Co., Ltd.

Topic: Next Generation Ethernet: Challenges and Progress of 448G Signals

09:30-09:45 **Ningfeng Tang**, ZTE Corporation

Topic: Optical Interconnect Industry Outlook for Intelligent Computing Centers

09:45-10:00 **Lei Wang**, Pengcheng Lab

Topic: Optical devices for different reaches interconnects for AI computing

10:00-10:30 **Coffee Break**

President: **Hanxing Shi**, OpenLight Photonics Inc.

10:30-10:45 **Yaotian Zhao**, Zhangjiang Lab

Topic: Silicon photonics for short-reach interconnects: progress in high-bandwidth and energy-efficient optical I/O

10:45-11:00 **Steve Alleston**, OpenLight Photonics Inc.

Topic: Enabling High speed Interconnects for AI with Heterogeneous Integration

11:00-11:15 **Jinyu Mo**, POET Technologies Pte. Ltd.

Topic: Semiconductorization of Photonics: An Optoelectronics Integration Platform for Next-Generation AI Computing and Data Center

11:15-11:30 **Frank Chang**, Source Photonics Inc.

Topic: Exploring AI network evolution and next path towards 448G/L IMDD for AI computing

11:30-11:45 **Xu Sun**, Crealights Technology Co. Ltd.

Topic: Trends of Large-scale Silicon Photonics Interconnection——Breaking the Bottleneck of Optical Interconnect Mass Production

11:45-12:15 **Panel Discussion**

Opening Ceremony & Plenary Session

November 6 · Thursday	
08:30–08:45	Opening Ceremony · Grand Ballroom 2F Presider: Chao Lu , The Hong Kong Polytechnic University, Hong Kong, China Welcome Speech Presenter: Dr. Bo Liu , Vice Mayor, Suzhou Municipal People's Government Prof. Mingrong Shen , Vice-President, Soochow University Prof. Gangxiang (Steven) Shen , ACP 2025 General Chair & Professor, Soochow University
08:45–08:50	Group Photo
08:50–10:20 · Plenary Session I · Grand Ballroom 2F Presider: Gangxiang Shen, Soochow University, China	
08:50–09:35	How Digital Coherent Optical Technology is Changing Optical Communication and Fiber Sensing Roland Ryf Nokia Bell Labs, United States
09:35–10:20	Laser Nanoprinting of Atomaterials and Integrated Photonic Devices Baohua Jia RMIT University, Australia
10:20–10:35	Coffee Break
10:35–12:05 · Plenary Session II · Grand Ballroom 2F Presider: Yi Cai, Soochow University, China	
10:35–11:20	Transformative Technologies in Optical Communication Systems and Future Prospective Masatoshi Suzuki Chitose Institute of Science and Technology, Japan
11:20–12:05	Evolution of All-Optical Networks for the AI Era Hao Wang Huawei Technologies Co., Ltd., China
12:05–13:30	Lunch Break

**Roland Ryf**

Nokia Bell Labs, United States

Title: How Digital Coherent Optical Technology is Changing Optical Communication and Fiber Sensing**Abstract:**

Digital signal processing technology in combination with coherent optical technology has dramatically changed the world of fiber-optic communication, providing over one order of magnitude more capacity compared to conventional on-off keying systems. Additionally, it has vastly simplified the line system design, as linear and partially nonlinear impairments can now be compensated in the digital domain, rather than in the physical domain. Small factor pluggable coherent transceivers, that plug directly into routers or Ethernet switches, are further simplifying the overall network architecture, making low-cost high-speed optical links ubiquitous. A similar revolution has recently started in reflective fiber sensing interrogators, where optical frequency domain reflectometers (OFDRs) enhanced with digital signal processing technologies are outperforming pulsed based state-of-the-art distributed acoustic sensing (DAS) systems, enabling for the first time to obtain DAS equivalent data for the whole length of transatlantic subsea cables instead of only the shore spans, this without impacting communication channels running over the same fiber.

Biography:

Roland Ryf is a Bell Labs fellow and department head at Nokia Bell Labs, Murray Hill, NJ, USA.

He received the B.S. degree in electrical engineering from the Interstate University of Applied Sciences of Technology, Buchs, Switzerland, in 1990 and the M.S. degree in physics and the Ph.D. degree in physics, working on photorefractive self-focusing and spatial solitons, parallel optical processing based on holographic storage, and fast optical correlation, in 1995 and 2000, respectively.

After joining Bell Labs in 2000 he has been working on MEMS based large port-count optical cross-connect switches, high-resolution optical wavelength filters, multimode components and multimode optical amplifiers, and numerous first experimental demonstrations of long-distance high-capacity space-division multiplexed transmission over multimode fibers and coupled-core multicore fibers. Most recently, he is working on field trials of fiber sensing prototypes based on optical frequency domain refractometers deployed over transatlantic subsea cables.

He is a fellow of the IEEE and a fellow of Optica, recipient of the 2018 William Streifer award, and authored/coauthored over 400 journal and conference publications, and holds over 65 patents.

He is actively involved with the IEEE Photonic Society and Optica, has served as a committee member for various conferences, including the Optical Fiber Conference (OFC), the Conference on Lasers and Electro-Optics (CLEO), and SPIE Photonics West.

**Baohua Jia**

RMIT University, Australia

Title: Laser Nanoprinting of Atomaterials and Integrated Photonic Devices**Abstract:**

This presentation mainly introduces the interaction between 3D nanoprinting and various materials at the atomic scale. Describe the precise and unparalleled manipulation of materials by nanoprinting at the spatial, temporal, and atomic scales. In particular, the application status and broad prospects of optical nanoprinting and two-dimensional photonic integrated devices are introduced in detail. The report will also share the future development directions of ultrafast optical nanoprinting and angstrom material devices, and the major challenges faced. The developed scalable graphene metamaterials show attractive optical and thermal properties. Through patterning with advanced laser nanoprinting technique, functional photonic devices with ultrathin, light weight and flexible nature have been demonstrated promising exciting opportunities for integrated photonics.

Biography:

Distinguished Professor Baohua Jia is a Fellow of Australian Academy of Technological Sciences and Technologies (FTSE), and Future Fellow at RMIT University, Australia. Before joining RMIT University in 2022, Baohua was a tenured professor at Swinburne University of Technology and Founding Director of Centre for Translational Atomaterials. Professor Jia is a Fellow of Optica (previously known as the Optical Society of America), and a Fellow of the Institute of Materials, Minerals and Mining (IMM). Since 2019, Prof. Jia has served as a Colleague of Expert for the Australian Research Council. Professor Jia's research focuses on the design and optical characterization of novel nanostructures and nanomaterials, fabrication, and efficient conversion and storage of light energy. As a leading Chief Investigator, Professor Jia received a total of more than \$90 million in research funding support. Professor Jia has published more than 350 journal papers with an h-index of 85 (Google Scholar) and developed over 20 invention patents and patent applications. Based on Professor Jia's outstanding contributions in scientific research, she has won many awards, including the 2024 Vice Chancellor Research Award, 2017 finalist of the Australian Prime Minister's Science Award, the Vice Chancellor's Industrial Achievement Award in 2011, 2016, and 2018, 2013, Young Science Leader Award, 2012 UNESCO L'Oréal Australia New Zealand Women in Science Award.

**Masatoshi Suzuki**

Chitose Institute of Science and Technology, Japan

Title: Transformative Technologies in Optical Communication Systems and Future Prospective**Abstract:**

Information and communication technology (ICT) is widely spread worldwide, and our life has been drastically changed by ICT, which provides us with various services in our daily lives, business and industries, such as global Internet, SNS, e-mail, telephone, tele-working and so on. Optical communication systems that underpin and enable our worldwide communications infrastructure.

In this presentation, the transformative technologies that enabled significant capacity growth of optical communication systems in past five decades, such as Er-doped optical amplifiers (EDFAs), wavelength division multiplexing (WDM), dispersion managed soliton, and digital coherent transmission, are reviewed. Future technologies leading to further capacity increase both in access and core networks toward beyond 5G/ 6G era are also addressed.

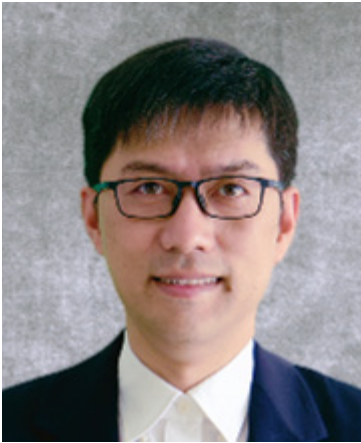
Biography:

Professor Masatoshi Suzuki received B.E., M.E. and Ph.D. degrees from Hokkaido University, Japan, in 1979, 1981 and 1984, respectively. He was the R&D Fellow of KDDI Corp, the Executive Vice President of KDDI R&D Laboratories, President of KDDI foundation and visiting Professor of Waseda University. Currently, he is a Vice President and Professor of Chitose Institute of Science and Technology, Hokkaido, Japan.

Since joining KDD (currently KDDI), Tokyo, Japan in 1984, he has been engaged in research on large-capacity long-haul optical communication systems, including the pioneering research on the world-first EA modulator integrated DFB lasers (EMLs) in 1987, the invention of dispersion managed soliton in 1995, 1Tbit/s transoceanic transmission in 1999, and 10Pbit/s SDM transmission in 2017, which is equivalent of capacity increase of seven order of magnitudes within 30 years. With the technology, he and international teams demonstrated the first 10Gbit/s WDM transmission over 10,000km in 1998, which were applied to most of the trans-Pacific, trans-Atlantic and East-Asian optical submarine cable systems, such as Japan-US, TAT-14, EAC and C2C cables. His current research interests are ultra-large capacity optical communication systems based on space division multiplexing, free-space optical communications for non-terrestrial applications and Silicon Photonics for optical computing.

He is a life Fellow of IEEE, a fellow Emeritus of Optica, and a Fellow and Honorary member of IEICE. He served as an Associate Editor of the Journal of Lightwave Technologies, an elected member of Board of Governors of IEEE Photonics Society and Auditor of IEICE. He is currently a chairman of Photonic Internet Forum.

Through these works, he has co-authored 5 books and more than 420 peer-reviewed journal and conference papers and produced 120 registered International Patents. He has received various awards for his research over the years, including the Best Paper Awards from OEC 1988, IEICE 1996 and OECC 2000, Achievement Award, Distinguished Achievement and Contributions Award and three IEICE Milestone Awards from IEICE. Minister Awards from MEXT and METI in Japan, Kenjiro Sakurai Memorial Prize, Hisoka Maejima Award, Medal with purple ribbon from Emperor in Japan in 2017, Ichimura Prize in industry in 2018, Telecom System Technical Award in 2021, and C&C Prize in 2024. He is the IEEE/Optica 2025 John Tyndall Award recipient, for pioneering and seminal contributions to large capacity long-haul optical communication systems including integrated light sources, dispersion-managed soliton, WDM submarine cable systems, and spatial multiplexing.

**Hao Wang**

Huawei Technologies Co., Ltd., China

Title: Evolution of All-Optical Networks for the AI Era**Abstract:**

The rapid rise of artificial intelligence (AI) is driving transformative demands on optical networks for lower latency, lower power consumption, higher bandwidth, higher reliability, and greater security. This talk explores the evolution of all-optical networks across Home, Access, Transport, Data-center, and Satellite domains in the AI era. Key enabling technologies—including coherent PON, optical-wireless integration, optical circuit switching (OCS), co-packaged optics (CPO), hollow-core fiber (HCF), satellite laser links, and quantum key distribution (QKD)—will be discussed as pathways toward intelligent, energy-efficient, and globally connected optical infrastructures.

Biography:

Hao Wang is Vice President of the Optical Business Product Line. He is responsible for Huawei's optical technology from end to end, including research and innovation, technology development. He takes charge of the transformation and evolution direction of the optical technology, builds the leading competitiveness, and take responsibility for the commercial success of the optical industry.

Since joining Huawei in the year 2001, Mr. Wang has taken on various roles in the company, including software manager, project team R&D representative, director of the product department, director of B&P Laboratory. Mr. Wang has also established Huawei's Zurich Research Center and built Huawei's European Computing Architecture Research Team from 2018 to 2022.

Mr. Wang is also the Deputy Chairman of Photonic-Electronic Integration Committee, Chinese Society for Optical Engineering.

Technical Session

November 6 - Thursday

	Track 1 Function Room K8 1F	Track 2 Grand Ballroom A 2F	Track 2 (Parallel) Grand Ballroom B 2F	Track 3 Function Room K7 1F	Track 3 (Parallel) Function Room K5 1F	Track 4 Grand Ballroom C 2F	Track 4 (Parallel) Grand Ballroom D 2F	Track 5 Function Room K1 1F	Track 6 Function Room K2 1F	Track 7 Function Room K6 1F	Best Paper Award Competition Session Function Room K4 1F	Best Student Paper Award Competition Session Function Room K3 1F
13:30-15:30	Design and Applications of Special optical fibers Presenter: Xinglin Zeng, Shanghai Institute of Optics and Fine Mechanics, China	AI-assisted optical communications Presenter: Jingchi Li, Shanghai Jiao Tong University, China	Passive optical networks Presenter: Xian Zhou, University of Science and Technology Beijing, China	Advances in Autonomous Optical Networks Presenter: Yongcheng Li, Soochow University, China	Core & Transport Network Evolution Presenter: Xiaoliang Chen, University of Science and Technology of China, China	Laser and Active Devices (1) Presenter: He, Soochow University, China Hiroyuki Tsuda, Keio University, Japan	Functional Devices (I) Presenter: An He, Soochow University, China	Terahertz technologies and applications Presenter: Nianqiang Li, Soochow University, China	Quantum Photonics Presenter: Ping Zhao, Sichuan University, China	Multifunctional Photonic Sensors Presenter: Tuan Guo, Jnan University, China	Best Paper Award Competition Session I Presenter: Chao Lu, The Hong Kong Polytechnic University, Hong Kong, China	Best Student Paper Award Competition Session I Presenter: Lena Wosinska, Chalmers University of Technology, Sweden
15:30-16:00	Coffee Break											
16:00-17:30	Physical Mechanisms in optical fibers Presenter: Yongmin Jung, Optoelectronics Research Centre, University of Southampton, United Kingdom	Optical networks and transmissions Presenter: Chao Li, Pengcheng Laboratory, China	Advanced optical communications Presenter: Yanni Ou, Beijing University of Posts and Telecommunications, China	Scalable AI in Optical Infrastructure Presenter: Nan Hua, Tsinghua University, China	Data Center & Computing-Centric Networking Presenter: Weigang Hou, Northeastern University, China	Laser and Active Devices (2) Presenter: Guowei Lu, Kyushu University, Japan	Functional Devices (2) Presenter: Xiaodan Pang, Zhejiang University, China	Microwave Photonics and Radar Systems Presenter: Lu Zhang, Zhejiang University, China	Integrated Photonics Presenter: Ting Wang, Institute of Physics CAS, China	Multifunctional Photonic Sensors Presenter: Fei Xu, Nanjing University, China	Best Paper Award Competition Session II Presenter: Chao Lu, The Hong Kong Polytechnic University, Hong Kong, China	Best Student Paper Award Competition Session II Presenter: Lena Wosinska, Chalmers University of Technology, Sweden
18:00-20:00	Welcome Reception : Lakeside Garden, 1F											

November 7 - Friday										
	Track 1 Function Room K8 1F	Track 2 Grand Ballroom A 2F	Track 2 (Parallel) Grand Ballroom B 2F	Track 3 Function Room K7 1F	Track 3 (Parallel) Function Room K5 1F	Track 4 Grand Ballroom C 2F	Track 4 (Parallel) Grand Ballroom D 2F	Track 5 Function Room K1 1F	Track 6 Function Room K2 1F	Track 7 Function Room K6 1F
08:30-10:00	Optical Fiber based devices President: Liang Wang, Huazhong University of Science and Technology, China	Short-reach optical communications President: Junwei Zhang, Sun Yat-sen University, China	DSP for communication (I) President: Tingwei Wu, Chongqing University of Posts and Telecommunications, China	Optical Wireless Communication President: Jun Li, Soochow University, China	Vehicular Optical Networks President: Jialong Li, Shenzhen University of Advanced Technology, China	Laser and Active Devices (3) President: Jianqi Hu, University of Hong Kong, Hong Kong, China	Functional Devices (3) President: Jiawei Wang, Harbin Institute of Technology (Shenzhen), China	Microwave photonic signal processing (I) President: Tong Lin, Southeast University, China	Integrated Photonics President: Haowen Shu, Peking University, China	Distributed Optical Fiber Sensors President: Zhiyong Zhao, Huazhong University of Science and Technology, China
10:00-10:30	Coffee Break									
10:30-12:00	Hollow-Core Optical Fibers and Applications President: Xin Chen, Principal Scientist with Corning Incorporated, Corning, United States	SDM President: Xiaodan Pang, Zhejiang University, China	DSP for communication (II) President: Jim Zou, Adtran Networks, United States	Transmission Systems & Physical Layer President: Junwen Zhang, Fudan University, China	Optical Access Network Technologies President: Jiawei Zhang, Beijing University of Posts and Telecommunications, China	Photonics & Photonic Devices (I) President: Lan Li, Westlake University, China	Photodetector President: Yuya Shoji, Institute of Science Tokyo, Japan	Microwave photonic signal processing (II) President: Na Qian, Shanghai Jiao Tong University, China	Quantum Photonics President: Ying Xue, The Chinese University of Hong Kong, Hong Kong, China	Distributed Optical Fiber Sensors President: Qizhen Sun, Huazhong University of Science and Technology, China
12:00-13:30	Lunch Break									
13:30-15:30	Optical Fiber Sensing Technology President: Changyuan Yu, The Hong Kong Polytechnic University, Hong Kong, China	Advanced fiber communications President: Kangping Zhong, The Hong Kong Polytechnic University, Hong Kong, China	Modeling and monitoring of optical communication systems President: Yanfu Yang, Harbin Institute of Technology, China	Signal Processing & Fault Diagnosis President: Ning Deng, Great Bay University/ Dongguan Key Lab of Intelligence and Information Technology, China	Next-Generation Industrial Passive Optical Networks President: Xiaosong Yu, Beijing University of Posts and Telecommunications, China	Photonics & Photonic Devices (2) President: Kaiyi Wu, Chalmers University of Technology, Sweden	Optical Computing (I) President: Deming Kong, Technical University of Denmark	Optical Communications and Sensings President: Yang Liu, Huazhong University of Science and Technology, China	Optical Devices: Lasers, Filters, and Waveguides President: Zaijie Yu, Zhejiang University, China	Distributed Optical Fiber Sensors President: Yaxi Yan, The Hong Kong Polytechnic University, Hong Kong, China
15:30-17:30	Coffee Break Poster Session, 1F & 2F									
18:30-20:30	Banquet & Awards Ceremony - Grand Ballroom, 2F									

November 8 - Saturday										
	Track 1 Function Room K8 1F	Track 2 Grand Ballroom A 2F	Track 2 (Parallel) Grand Ballroom B 2F	Track 3 Function Room K7 1F	Track 4 Grand Ballroom C 2F	Track 4 (Parallel) Grand Ballroom D 2F	Track 5 Function Room K1 1F	Track 6 Function Room K2 1F	Track 7 Function Room K6 1F	PDP Session (Parallel) Function Room K5 1F
08:30-10:00	Optical Fiber Lasers President: Chengbo Mou, Shanghai University, China	Hollow-core fiber transmissions President: Zhaopeng Xu, Peng Cheng Laboratory, China	DSP for communication (III) President: Xiang Li, China University of Geosciences, China	Secure Communication and Networking President: Wei Wang, Beijing University of Posts and Telecommunications, China	Modulators and high-speed PIC applications (I) President: Yonghui Tian, Lanzhou University	Advanced Materials (I) President: Lei Bi, University of Electronic Science and Technology, China	Photonic Integrated circuits & devices (I) President: Jiejun Zhang, Jinan University, China	Integrated Photonics President: Tiantian Li, Xi'an University of Posts & Telecommunications, China	Novel Photonic Sensors President: Sun Li-Peng, Jinan University, China	/
	Coffee Break									
10:00-10:30										
10:30-12:00	Optical Fiber Lasers President: Zhijia Hu, Anhui University, China	Transmission systems and devices President: Wen Zhou, Fudan University, China	Optical ISAC President: Jingchuan Wang, Hong Kong Polytechnic University, Hong Kong, China	Sustainable Data Center Solutions President: Huatao Zhu, National University of Defense Technology, China	Modulators and high-speed PIC applications (2) President: Yu Li, Shanghai Jiao Tong University, China	Advanced Materials (2) President: Yaocheng Shi, Zhejiang University, China	Photonic Integrated circuits & devices (II) President: Mengke Wang, University of Electronic Science and Technology of China, China	Quantum Photonics President: Jiawei Wang, Harbin Institute of Technology of Shenzhen, China	Photonic Sensors for Electrical Battery President: Ruohui Wang, Northwest University, China	/
	Lunch Break									
12:00-13:30										
13:30-15:30	Optical Fiber Amplifiers and applications President: Mingming Tan, Aston University, United Kingdom	Optical wireless and terahertz communications President: Lu Zhang, Zhejiang University, China	Optical transmission and sensing techniques President: Yixiao Zhu, Shanghai Jiao Tong University, China	Network Architecture & Switching Technologies President: Xuwei Xue, Beijing University of Posts and Telecommunications, China	Inverse Design President: Hongtao Lin, Zhejiang University, China	Optical Computing (2) President: Rui Tang, Keio University, Japan	Advanced Photonic Systems and Applications (I) President: Xiaojun Xie, Southwest Jiaotong University, China	Optical Devices: Metamaterials, Metatagings President: Xuhao Guo, Shanghai Jiao Tong University, China	Photonic Bio-sensors President: Yang Ran, Jinan University, China	PDP Session I President: Linjie Zhou, Shanghai Jiao Tong University, China
	Coffee Break									
15:30-16:00										
16:00-17:30	Optical Fiber Applications President: Sijing Liang, University of Southampton, United Kingdom	WDM transmissions President: Lipeng Feng, China Telecom Research Institute, China	Transmissions systems and devices President: Fabio Bottoni, Cisco, United States	Space-Ground Integrated Networks President: Jun Li, Soochow University, China	LIDAR and Optical Phased Arrays President: Hao Hu, Technical University of Denmark, Denmark	Nonlinear Optics President: Xiaodan Pang, Zhejiang University, China	Advanced Photonic Systems and Applications (II) President: Jingzhan Shi, Nanjing Normal University, China	Optical Communications, Sensing, and Imaging President: Liangjun Lu, Shanghai Jiao Tong University, China	/	PDP Session II President: Linjie Zhou, Shanghai Jiao Tong University, China

Track 1: Optical Fibers and Fiber-based Devices

Function Room K8, 1F (多功能厅 K8, 1 楼)

13:30–15:30 · November 6, 2025 · Thursday

Design and applications of Special optical fibers

Presider: Xinglin Zeng, Shanghai Institute of Optics and Fine Mechanics, China

13:30–14:15 · ACP2025-0718-1 **Tutorial**

Multimode Fibers for High-capacity Short-reach Communications

Ming-Jun Li

Corning Incorporated, United States

This tutorial provides an overview of multimode fibers for high-speed short-reach transmission. We discuss key design considerations for MMF attributes and review recent progress on new multimode fiber designs to increase the transmission capability.

14:15–14:45 · ACP2025-0725-9 **Invited**

Anti-Resonant Hollow-Core Fiber for Mode Controlling

Xiaobei Zhang

Shanghai University, China

In this paper, recent results and progress in mode control of anti-resonant hollow-core fiber are reviewed and summarized, including single-mode, multi-mode, and polarization-maintaining realized via cladding structure optimization, gas filling, and introduction of symmetry breaking.

14:45–15:00 · ACP2025-0717-1

A Novel Multicore Fiber by Drawing and Attaching Multiple Fibers Together

Ming-Jun Li, Seth Griffin, Brett Knowlton, Joseph McCarthy, Yunfeng Gu, Hector de Pedro, Aramais Zakharian

Corning Incorporated, United States

We propose a new multicore fiber design by drawing multiple preforms simultaneously into fibers and attaching them together. A 4-core fiber has been demonstrated using this design. Fiber geometric and optical characterizations are reported.

15:00–15:15 · ACP2025-0815-145

Femtosecond laser-induced fiber microstructure arrays for distributed high-temperature sensing

Baijie Xu, Jun He*, Bin Du, Xizhen Xu, Yiping Wang

Shenzhen University, China

We report a method for fabricating various fiber microstructure arrays using femtosecond laser direct writing technology. Distributed high-temperature sensing up to 700°C was achieved by using fiber microstructure arrays and OFDR demodulation technique.

15:15–15:30 · ACP2025-0801-13

Standard Single-Mode Fiber with High Modal Bandwidth at 980 nm for High Speed VCSEL Transmission

Adrian Juarez^{1*}, Xin Chen¹, Jochen Hellmig², Jason Hurley¹, Rashid Safaisini³, Snigdharaj Mishra¹, Gunter Larisch³, Roman Koerner⁴,

Ming-Jun Li¹

1. Corning Incorporated, United States; 2. Trumpf Photonic Components B.V., Netherlands;

3. TRUMPF Photonic Components GmbH, Germany; 4. TRUMPF Photonic Components B.V., Netherlands

We successfully transmitted a 40 Gbit/s PAM4 signal over 300 m at 980 nm using a two-mode VCSEL and standard single-mode fiber, exhibiting bi-modal behavior and high modal bandwidth at this wavelength.

15:30–16:00 Coffee Break

16:00–17:30 · November 6, 2025 · Thursday

Physical Mechanisms in optical fibers

Presider: Yongmin Jung, Optoelectronics Research Centre, University of Southampton, United Kingdom

16:00–16:30 · ACP2025–0605–1 **Invited****Chiral photon–phonon Brillouin interaction: in twisted photonic crystal fiber and beyond****Xinglin Zeng***Shanghai Institute of Optics and Fine Mechanics, China*

Some recent findings on multi-dimensional Brillouin interaction in chiral PCF will be shared, including the study of topology-selective SBS and angular momentum-transferring SBS. Both nonlinear effects lead to many novel applications, which will be reviewed.

16:30–17:00 · ACP2025–0620–2 **Invited****Impact of Stress Distribution on Birefringence and Polarization–Mode Dispersion in Multi–Core Fibers****Gustavo Ocampo^{*}**, Kunimasa Saitoh*Hokkaido University, Japan*

We explore the fundamental role of stress distribution on defining birefringence characteristics in multi-core fibers. Our numerical analysis shows how different design parameters dictate stress patterns, directly influencing the fiber's overall polarization-mode dispersion performance.

17:00–17:15 · ACP2025–0730–46

Distributed Characterization of LP₁₁ Modes in Solid– and Hollow–Core Few–Mode Fibers Using Optical Side Scattering/Leakage Radiometry**Zijie Yang**, Yizhi Sun, Yinghui Zhang, Hao Chen, Shoufei Gao, Yingying Wang, Wei Ding^{*}*Jinan University, China*

We present distributed OSSLR characterization of low-loss LP₁₁ modes in G654 solid-core (2 dB/km) and NANF hollow-core fibers (15 dB/km), achieving high-purity excitation, centimeter resolution, and much improved measurement accuracy for advanced fiber quality monitoring.

17:15–17:30 · ACP2025–0801–105

Application of phonon–assisted energy relaxation for management of laser properties of bismuth active centers associated with silicon**Alexander Elopov^{1*}**, Konstantin Riumkin¹, Denis Lipatov², Mikhail Yashkov², Sergei Firstov¹, Mikhail Melkumov¹

1.Prokhorov General Physics Institute of the Russian Academy of Sciences, Dianov Fiber Optics Research Center, Russia; 2.G.G. Devyatikh Institute of Chemistry of High-Purity Substances of the Russian Academy of Sciences, Russia

Application of multi-phonon-assisted energy relaxation for adjustment properties of laser media is demonstrated. A novel approach of laser active media luminescence properties improvement by co-doping of germanosilicate bismuth-doped optical fiber with boron is investigated.

18:00–20:00 Welcome Reception

08:30–10:00 · November 7, 2025 · Friday

Optical Fiber based devices

Presider: Liang Wang, Huazhong University of Science and Technology, China

08:30–09:15 · ACP2025–0729–26 **Keynote****Gain fiber for broadband fiber amplifier****Shifeng Zhou***South China University of Technology, China*

In this talk, the recent progress in designs, fabrications and applications of selected materials for multicomponent gainfibers is introduced. The results about the relation between the material microstructure and its optical properties are introduced. The glasses and fibers with for broadband fiber amplifier are highlighted.

09:15–09:30 · ACP2025–0716–2

S+C+L Band Spatial Mode Multiplexer for Single Mode Fibers to a 7-Core, 3-Mode Multicore Fiber**Jun Li**, Di Lin*, Ying Zheng, Jianping Li, Songnian Fu, Yuwen Qin*Guangdong University of Technology, China*

We propose a few-mode multicore fiber spatial mode multiplexer based on multi-plane light conversion that enables S+C+L band operation with 0.95 dB insertion loss, 1.14 dB mode-dependent loss and -35.21 dB average crosstalk.

09:30–09:45 · ACP2025–0731–59

Broadband and multi-channel higher-order mode converter based on cascaded preset-twist long-period fiber grating**Wenzhe Chang**, Lipeng Feng*, Anxu Zhang, Xishuo Wang, Xiaoli Huo, Chengliang Zhang*China Telecom Research Institute, China*

We demonstrate a multi-channel broadband mode converter based on a preset-twist long-period fiber grating. By optimizing the difference and number of periods, the converter can generate first- to third-order modes within bandwidths exceeding 80 nm.

09:45–10:00 · ACP2025–0815–42

Multi-wavelength chaotic pulses parallel laser ranging**Long Lu**¹, Yixiang Sun², Haoguang Liu², Yu An¹, Xuanzhe Zhang¹, Linpin Zhang¹, Ziwen Li¹, Yiyang Luo^{1*}, Jindong Wang¹, Qizhen Sun², PerryPing Shum³

1.Chongqing University, China; 2.Huazhong University of Science and Technology, China; 3.Southern University of Science and Technology, China

We propose a multi-wavelength chaotic pulse generation system and perform parallel ranging of three channels. Multi-wavelength chaotic pulses with natural orthogonality are generated in a passive-mode-locked fiber laser. This experimental result demonstrates that the parallel ranging system with triple-wavelengths has achieved millimeter-level distance resolution and ranging precision.

10:00–10:30 Coffee Break

10:30–12:00 · November 7, 2025 · Friday

Hollow-Core Optical Fibers and Applications

Presider: Xin Chen, Principal Scientist with Corning Incorporated, Corning, United States

10:30–11:00 · ACP2025–0801–4 **Invited****Optical trapping and metrologies in hollow-core optical fibers****Shangran Xie***Beijing Institute of Technology, China*

In this talk I will present the latest progress on the technique of optical trapping in hollow-core fibers, including the basic principle and its applications on flying particle sensors and single particle characterization.

11:00–11:30 · ACP2025–0915–3 **Invited****HCF-based air-core waveguide devices****Limin Xiao***Fudan University, China*

TBD

11:30–11:45 · ACP2025–0801–22

Feedback control of optical propulsion velocity of microparticles in hollow-core fibers**Chenjie Liang**, Rui Wang, Shangran Xie*Beijing Institute of Technology, China*

Hollow-core optical fibers provide an ideal solution for long-distance object guidance and delivery. We report a real-time monitoring and feedback control on the propulsion velocity of flying microparticles in hollow-core fibers. Doppler velocimetry is employed to acquire the instantaneous velocity of the particle, and PID algorithm is exploited to adjust the laser power through an acousto-optic modulator based on the measured particle velocity. The technique can guide particles over the fiber with controlled speed, benefiting the application of targeted object deliveries.

11:45–12:00 · ACP2025-0801-25

Co-Transmission of Power and Optical Data Using a Hollow-core Fiber**Yi Chen**¹, Xuechun Wang², Ying Qiu^{1*}, Xiang Li^{3*}, Hongguang Sun¹, Chao Yang¹, Ming Luo¹, Pengfei Ma⁴, Yunlong Bai⁴*1.State Key Laboratory of Optical Communication Technologies and Networks, China; 2.China University of Geosciences (Wuhan), China; 3.China University of Geosciences (Wuhan), China; 4.Ruiguang ICT Technology Co., LTD., China*

We designed an AR-HCF for PON and demonstrate the co-transmission of 120 Gbit/s PAM4 signals and the 9 dBm light over the fiber, with a received power penalty of less than 0.1 dB.

12:00–13:30 Lunch Break

13:30–15:15 · November 7, 2025 · Friday

Optical Fiber Sensing Technology**Presider: Changyuan Yu, The Hong Kong Polytechnic University, Hong Kong, China**13:30–14:00 · ACP2025-0730-45 **Invited****High-performance optical frequency domain reflectometer and its applications****Liang Wang***Huazhong University of Science and Technology, China*

A SEFR method is developed to simultaneously compensate both the random laser frequency sweep range and sweep nonlinearity in OFDR. Then shape sensing is demonstrated using right-angle core configuration. Its medical applications are also discussed.

14:00–14:15 · ACP2025-0814-11

Fiber-Optic Force Sensor based on Cascaded Fiber Tapers and Optical Vernier Effect for Enhanced Sensitivity**Yangjun Zheng**, Zihang Ji, Liang Wang^{*}, Ming Tang*Huazhong University of Science and Technology, China*

We present a fiber-optic force sensor based on optical Vernier effect (OVE) via two cascaded tapers with closely matched diameters, which achieves a high sensitivity of -17.51 nm/N within a measurement range of $0 \sim 1.4$ N.

14:15–14:30 · ACP2025-0729-53

Field Trial of Manhole Detection from DAS Ambient Noise Waveform Correlation**Pedro Tovar^{*}, Zhiping Jiang**, Yan Zhao, Linjian Hao, Wei Sun, Changbin Hu*Huawei, Canada*

This work proposes and validates through field trials a novel DAS-based method for manhole detection in optical networks. Leveraging ambient acoustic noise waveform correlation, it eliminates the need for manual excitation or strong vibration events.

14:30–14:45 · ACP2025-0731-81

Energy-Efficient Embedded Architecture for Distributed Optical Fiber Sensing**Jiajun Ji**, Mingyi Gao, Jiajia Shen, Juanjuan Li*Soochow University, China*

This paper proposes an STM32-based distributed optical fiber sensing system integrating Zoom FFT and RMS algorithms, achieving 87.5% energy reduction and 0.2 mJ consumption for efficient vibration detection and localization.

14:45–15:00 · ACP2025-0729-32

A Highly Robust Wearable Respiration Monitoring System for Clinical Application**Yulin Qiu¹**, Xi Chen¹, Tianyu Chen¹, Yunfei Chai², Weimin Lyu^{1*}, Changyuan Yu¹*1.The Hong Kong Polytechnic University, Hong Kong, China; 2.Guangdong Provincial People's Hospital, China*

This study develops a wearable fiber optic respiration monitoring system using ellipse fitting and Arctan algorithms for accurate, robust, long-term tracking of breathing states, supporting clinical applications and patient monitoring in hospitals.

15:00–15:15 · ACP2025–0729–44

Identification of Plastic Microspheres In Liquid-Filled Hollow-Core Optical Fibers**Yuxuan Lang**, Shangran Xie*Beijing Institute of Technology, China*

A rapid microplastics identification technique is proposed based on particle trapping and propulsion in liquid-filled hollow-core optical fibers. Theoretical analysis and measurement results confirm that different types of plastic microspheres exhibit distinct propulsion velocities when driven by optical scattering forces in the hollow core, enabling label-free and on-line identification of microplastic types.

15:30–16:00 Coffee Break**15:30–17:30 Poster Session****18:30–20:30 Banquet & Awards Ceremony**

08:30–10:00 · November 8, 2025 · Saturday

Optical Fiber Lasers

Presider: Chengbo Mou, Shanghai University, China

08:30–09:00 · ACP2025–0618–1 **Invited****Research on Dynamics of Fiber Random Lasers and Magneto-Optical Effects****Zhijia Hu***Anhui University, China*

Random lasers are stimulated emissions caused by disordered scattering, which contain rich physical phenomena such as complex dynamics and turbulence. However, there are challenges such as unclear dynamic processes, high thresholds, and non-directionality. Meanwhile, external disturbances strongly affect the emission of random lasers. The physical mechanism of how disordered changes affect the properties of random lasers has not been systematically studied. The main difficulty lies in how to precisely control the disorder degree of the random laser system and enhance the photon scattering intensity. To explore the physical process of the dynamic evolution of random lasers, we precisely control the disorder degree of the random system through the magneto-optical effect and construct a dynamic model of the disordered scattering system regulated by the magnetic field, revealing the photon Hall effect and the photon magnetoresistance effect of random lasers, providing theoretical support for the application of random lasers. We confine the random scattering system by using a fiber structure and enhance the photon scattering through plasmon resonance energy transfer to strengthen the interaction between light and matter, achieving a reduction in the threshold of random lasers, improving the directionality and emission intensity of random lasers.

09:00–09:15 · ACP2025–0711–1

All-optical multiplication of ultrastable lasers using Kerr microcomb chip**Yanlan Xiao**, Heng Zhou*University of Electronic Science and Technology of China, China*

We produced 100Kerr microcomb teeth, possessing integrated linewidth significantly below 1 Hz, thereby manufacturing 100state-of-the-art USLs. Our method holds potential to proliferate the use of ultrastable lasers in a wide range of applications.

09:15–09:30 · ACP2025–0724–4

Integrated Simulation Framework for Random-Fiber-Laser-Based Seed Source for ICF**Runnan Guan**¹, Jing Zhang¹, Mengqiu Fan², Ke Yao², Yifei Qi¹, Zinan Wang^{1*}

¹.Key Lab of Optical Fiber Sensing and Communications University of Electronic Science and Technology of China, China;².Laser Fusion Research Center China Academy of Engineering Physics, China

This work demonstrates RFL's potential to improve ICF driver performance and provides a reliable tool for optimizing future high-power laser systems.

09:30–09:45 · ACP2025–0816–3

Watt-level linearly polarized single-frequency fiber laser with unit-length high-concentration Yb-doped silica fiber**Yuxia Zheng**, Zhaoyu Chen, Jianxiang Wen*Shanghai University, China*

We prepared high-concentration Yb-doped silica fibers with high-gain coefficients for ultrashort-cavity single-frequency fiber lasers. A linearly polarized single-frequency fiber laser with watt-level output power per unit-length was achieved.

09:45–10:00 · ACP2025–0801–67

A Simple Narrow–Linewidth Brillouin Random Fiber Laser with a Rayleigh–Scattering–Assisted Linear Cavity**Jinyang Hu**, Pei Zhou^{*}, Kun Liu, Wenxin Chen, Nianqiang Li*Soochow University, China*

A compact Brillouin random fiber laser using a single SMF and mirror achieves 514.98 Hz linewidth via combined Brillouin gain and Rayleigh feedback, offering a low–cost solution for coherent light sources.

10:00–10:30 Coffee Break

10:30–12:00 · November 8, 2025 · Saturday

Optical Fiber Lasers

Presider: Zhijia Hu, Anhui University, China

10:30–11:00 · ACP2025–0801–102 **Invited****Ultra–wideband Raman–amplified Coherent Transmissions**Dini Pratiwi¹, **Mingming Tan**^{*}, Wladek Forysiak²*1.Aston University, United Kingdom;2.University of Bristol, United Kingdom*

We review recent Raman amplifiers technologies for ultra–wideband coherent transmission and compare Raman amplifiers and doped–fibre amplifiers for unconventional bands.

11:00–11:30 · ACP2025–0915–2 **Invited****Applications of carbon nanotube mode–locked fiber lasers****Chengbo Mou***Shanghai University, China*

TBD

11:30–11:45 · ACP2025–0729–35

Noise Suppression in a Passively Harmonic Mode–locked Er–doped Fiber Laser with Carbon Nanotubes Film**Kailin Jiang**¹, Qianqian Huang¹, Jiaxin Xu¹, Kai Wang¹, Lilong Dai¹, Haochen Tian², Youjian Song³, Hairun Guo¹, Chengbo Mou^{*}*1.Shanghai University, China;2.National Institute of Metrology, China;3.Tianjin University, China*

We report the reduction of relative intensity noise and timing jitter in a passively harmonic mode–locked Er–doped fiber laser based on a single–walled carbon nanotube film saturable absorber by employing a pump current feedback scheme.

11:45–12:00 · ACP2025–0801–82

Improving Beam Quality of Yb–doped Fiber Laser near 980 nm via Gain FilteringShangde Zhou, Jiufeng Li, Jianqiu Cao^{*}, Maoni Chen, Aimin Liu, Zefeng Wang, Lei Si^{*}, Jinbao Chen*College of Advanced Interdisciplinary Studies, National University of Defense Technology, China*

Beam quality improvement of confined Yb–doped fiber amplifier operating near 980 nm is demonstrated experimentally. Because of gain filtering of higher–order modes, the M^2 factor of signal light is lowered from 2.05 to 1.51.

12:00–13:30 Coffee Break

13:30–15:30 · November 8, 2025 · Saturday

Optical Fiber Amplifiers and applications

Presider: Mingming Tan, Aston University, United Kingdom

13:30–14:00 · ACP2025–0728–15 **Invited****Multicore Fiber Amplifier with Energy–efficient Pump Integration****Sijing Liang**¹, John Downie², Jason Hurley², Lidia Galdino³, Periklis Petropoulos¹, Yongmin Jung¹*1.University of Southampton, United Kingdom;2.Corning Research and Development Corp., United States;3.Corning Incorporated, United States*

We review recent progress in developing energy–efficient multicore fiber (MCF) amplifiers for future submarine systems. A novel MCF amplifier integrated with a pump light distributor was developed and characterized for transoceanic transmission over 4–core fiber.

14:00–14:30 · ACP2025–0728–20 **Invited**
Energy efficient multi core optical amplifiers
Haoshuo Chen
Nokia Bell Labs, United States
 TBD

14:30–14:45 · ACP2025–0815–29
High-power polarization-maintaining single-frequency Brillouin fiber laser in the 1.5 μm band with ultra-high optical signal-to-noise ratio
Minhao Lu, Liyang Wang, Bolun Pan, Xiaojie Guo*
Jinan University, China
 We demonstrate a watt-level single-frequency Brillouin fiber laser by employing polarization-maintaining fiber in a short ring cavity, achieving ultra-high optical signal-to-noise ratio (no less than 81 dB), 38-fold linewidth narrowing and 1535~1560-nm tuning range.

14:45–15:00 · ACP2025–0815–103
Widely-tunable Mode-locked Tm-doped Fiber Laser based on Nonlinear Polarization Rotation
Jianwei Zhou, Feng Tian*, Jing Zhang, Jue Wang, Chengda Huo, Qi Zhang, Qinghua Tian, Fu Wang
Beijing University of Posts and Telecommunications, China
 A widely tunable Tm-doped mode-locked fiber laser based on nonlinear polarization rotation is demonstrated, which can operate at wavelengths ranging from 1932 nm to 1978 nm and the tuning range is up to 46 nm.

15:00–15:15 · ACP2025–0731–109
400G-BASE-LR4 transmission over 25 km SSMF using O-band distributed Raman amplifier
 Dini Pratiwi¹, Aleksandr Donodin¹, Vladimir Gordienko¹, Mohammed Patel¹, Ruben S. Luis², Andrew Ellis¹, Sergei Turitsyn¹, Wladek Forsyia³, **Mingming Tan**¹
1.Aston University, United Kingdom; 2.NICT, Japan; 3.University of Bristol, United Kingdom
 We experimentally investigate 400GBASE-LR4 transceiver performance over an extended reach of 25km SSMF. Using a single wavelength (1195nm), low power Raman amplifier, a decade improvement in BER was measured from 1273nm to 1315nm

15:15–15:30 · ACP2025–0801–29 **Industry Innovation Nomination**
Investigation of Weakly-coupled Multi-core EDFAs With Core and Cladding Pump Schemes
Yuanpeng Ding¹, Baolong Zhu², Lei Shen^{1*}, Junjie Qi¹, Xin Huang¹, Zhaolong Liao¹, Shiqi Zhou¹, Lei Zhang¹, Jie Luo¹
1.Yangtze Optical Fibre and Cable Joint Stock Limited Company, China; 2.Peking University, China
 We constructed core-pumped and cladding-pumped 4-core EDF amplifiers. With multi-wavelength channel signals, both exhibited gain around 25 dB, while the core-pumped demonstrated a maximum CGD of 1.299 dB and NF below 6 dB.

15:30–16:00 Coffee Break

16:00–17:30 · November 8, 2025 · Saturday
Optical Fiber Applications
 Presider: Sijing Liang, University of Southampton, United Kingdom

16:00–16:30 · ACP2025–0915–1 **Invited**
TBD
Kevin Chen
University of Pittsburgh, United States
 TBD

16:30–16:45 · ACP2025–0820–4
Non-Monotonic Variation of Water Vapor Absorption in Sealed-End Hollow-Core Fibers over 20–240°C
Nuo Li¹, Caoyuan Wang¹, Yu Qin¹, Jie Zhu¹, Dahao Xu¹, Yichun Shen², Limin Xiao^{1*}
1.Fudan University, China; 2.R&D Department Zhongtian Technology Advanced Materials Co., Ltd. China
 We demonstrated the temperature-dependent variation of water vapor absorption in hollow-core fibers (HCFs) with sealed splicing ends over a temperature range of 20–240°C. Two main trends were identified: an increase in water vapor absorption was observed below approximately 170°C, whereas a gradual decrease occurred as the temperature increased up to 240°C. The absorption behavior suggests that the initial increase is primarily due to the removal of physically adsorbed water.

16:45-17:00 · ACP2025-0731-8 **Industry Innovation Nomination**

Modal Bandwidth and VCSEL Transmission Capability of Multimode Fibers at Long Wavelengths Including 980 nm and 1060 nm
Xin Chen^{1*}, Hao Dong¹, Hao Chen², Simit Patel¹, David Meagan¹, Ming-Jun Li¹

1. Corning Incorporated, United States Minor Outlying Islands; 2. Corning Optical Communications China, China

Through Monte Carlo simulation, we obtained the modal bandwidth of common types of multimode fibers at long wavelengths from 950-1090 nm. The VCSEL transmission reaches for 25/50/100G are calculated to provide guidance for relevant applications.

Track 2: Optical Transmission Systems, Subsystems and Technologies

Grand Ballroom A, 2F (大宴会厅 A, 2 楼)

13:30–15:45 · November 6, 2025 · Thursday

AI-assisted optical communications

Presider: Jingchi Li, Shanghai Jiao Tong University, China

13:30–14:15·ACP2025–0707–3 **Tutorial**

Advancing the next generation of photonic systems using machine learning

Darko Zibar*

Technical University of Denmark, Denmark

The 2024 Nobel Prize in Physics underscores the growing influence of machine learning in diverse areas of physical science. In this talk, the application of machine learning for end-to-end-learning for fiber-optic communication will be addressed

14:15–14:45·ACP2025–0707–2 **Invited**

Recent advances and future challenges in machine learning-aided fiber-optic communication systems

Faisal Nadeem Khan*

Tsinghua Shenzhen International Graduate School, Tsinghua University, China

We discuss recent developments in ML-assisted methods for various key network functionalities including QoT-estimation, channels power-optimization, failures prediction/localization, etc. Moreover, we highlight several technical/non-technical challenges of ML-based approaches in real-world networks and suggest potential solutions.

14:45–15:15·ACP2025–0731–87 **Invited**

Digital and Neuromorphic Optical Signal Processing for AI Intra-Datacenter Networks

Stephan Pachnicke*, Sebastian Kuehl¹, Mohammad Seifi Laleh¹, Silas Oettinghaus¹, Annika Dochhan¹, Robert Killey², Polina Bayvel²

1.Kiel University, Germany; 2.UCL, United Kingdom

DSP-based and optical reservoir computing (RC)-based signal processing are compared for application in short-reach 112 Gbaud PAM transmission. A photonic integrated circuit is presented for multi WDM-channel signal equalization using a parallel micro-ring resonator RC.

15:15–15:30·ACP2025–0507–1

Attentive Dual-Scale Residual Neural Network for Rogue ONU Identification in Low-Quality Data Scenarios

Handong He^{1,2}, **Xiaotao Huang^{1,2}**, Li He^{1,2*}, Weiliang Zhang^{1,2}, Wei Duan^{1,2*}, Lei Tang^{1,2}, Xingang Huang^{1,2}, Bo Liu^{1,2}, Yifeng Xiong^{1,2}

1.ZTE Corporation, China; 2.State Key Laboratory of Mobile Network and Mobile Multimedia Technology, China

We propose a novel rogue ONU identification method utilizing 2D feature mapping and attentive dual-scale residual connections, achieving average accuracies of 92.09% and 96.37% for 32 ONUs in limiting amplifier and 1 SPS scenarios.

15:30–15:45·ACP2025–0801–88

EDFA Operator: An Accurate and Generalized Neural Operator for Gain Modeling of EDFA

Xiaotian Jiang*, Xin Qin¹, Yadong Gong¹, Anxu Zhang¹, Xiaowei Lou², Yuqing Han¹, Zheqing Lv¹, Xiaoli Huo¹, Junjie Li¹

1.China Telecom Research Institute, China; 2.China Telecom Intelligent Network Technology Co.Ltd., China

We propose a neural operator combining Deep operator network and Fourier neural operator for gain modeling of EDFAs. The operator shows low prediction and generalization errors of 0.0472dB and 0.0486dB in accuracy and extrapolation tests.

15:45–16:00 Coffee Break

16:00–17:30 · November 6, 2025 · Thursday
Optical networks and transmissions
 Presider: Chao Li, Pengcheng Laboratory, China

16:00–16:30·ACP2025–0927–1 **Invited**

Silicon Photonic Self-Coherent Detection Receivers for Optical Interconnects

Jingchi Li, Yikai Su

Shanghai Jiao Tong University, China

The unprecedented surge in distributed training of large-scale AI models relies on massively parallel optical interconnects across data-centers, which demand high-capacity and low-cost integrated photonic interconnects. Here we demonstrate several SiP self-coherent receivers which support up to single-polarization 600 Gb/s transmission over 80-km single-mode fiber.

16:30–16:45·ACP2025–0710–1 **Industry Innovation Nomination**

First Real-time 62.1 Tb/s DWDM Data Center Interconnect Over a Seamless 87 nm Optical Spectrum Based on Unified Optics

Yuqian Zhang¹, Mingqing Zuo¹, Dongchen Zhang², Junjie Qi³, Dawei Ge¹, Dong Wang¹, Baoluo Yan², Hu Shi², Zhaolong Liao³, Lei Shen^{3,4}, Dechao Zhang^{1*}, Han Li¹

1.Department of Fundamental Network Technology, China Mobile Research Institute, China; 2.WDM System Department of ZTE Corporation, China; 3.State Key Laboratory of Optical Fiber and Cable Manufacture Technology, YOFC, China; 4.Optical Valley Laboratory, China

The first real-time 62.1Tb/s transmission over a seamless 87nm spectrum across 80km G.652.D fiber is demonstrated using a unified C+L-band system. The prototype employs broadband EBDFA, simplifying dual-band optics for high-speed data center interconnect.

16:45–17:00·ACP2025–0801–101

Neural Network modified ISRS GN model for accurate QoT estimation in ultra-wideband optical transmission system

Huitong Yang¹, Mingqing Zuo², Chenyang Ma¹, Boxiong Cui¹, Zhengyang Xie^{1*}, Dong Wang^{2*}

1.Beihang University, China; 2.China Mobile Research Institute, China

We construct a neural network that corrects closed-form ISRS GN model. The result is shown that signal to noise ratio evaluation errors over ± 0.5 dB are lower to 6.7% (training dataset) and 14.4% (verifying dataset).

17:00–17:15·ACP2025–0731–39

Non-Orthogonal Digital-Analog Hybrid Optical Transmission Using Fiber Dispersion in Multi-Distance Passive Optical Network

Jinwoo Park, Joungmoon Lee, Sang-Kook Han*

Yonsei University, Korea

Non-orthogonal digital-analogue hybrid optical transmission in multi-distance PON is proposed to increase spectral efficiency and demonstrated with proof-of-concept experiments. Dispersion-induced power fading (DIPF) of optical fiber is deliberately utilized to mitigate interference between heterogeneous signals.

17:15–17:30·ACP2025–0801–191

100-Gb/s Complex-valued Double-sideband Direct-detection PON with 42-dB Optical Power Budget

Xingfeng Li, Xu Zhang*, Hui Chen, Yao Lu, Honglin Ji, Zhaopeng Xu, Peng Sun, Siyue Jin, Tonghui Ji, Shuchao Mi, Bo Wu, Chao Li, Qibing Wang, Zichen Liu, Zhixue He*, Shaohua Yu

Pengcheng Laboratory, China

We propose a complex-valued double-sideband direct-detection PON architecture based on a deep-learning-enabled optimal direct-detection receiver. We demonstrate a record 42-dB optical power budget for 100-Gb/s direct-detection PON over 20-km standard single-mode fiber.

18:00–20:00 Welcome Reception

08:30–10:00 · November 7, 2025 · Friday
Short-reach optical communications
 Presider: Junwei Zhang, Sun Yat-sen University, China

08:30–08:45·ACP2025-0723-2

High-speed, Low-complexity and Real-time FPGA Implementation of PAM-4 Lite-DSP Receiver for IM/DD Optical Data Links

Jianyu Wang^{1,2}, Jianwei Tang¹, Yaguang Hao¹, Xiuquan Cui¹, Linsheng Fan¹, Zhongliang Sun¹, Junpeng Liang¹, Zhaopeng Xu¹, Yanfu Yang^{2*}, Weisheng Hu¹, Jinlong Wei^{1*}

1.Pengcheng Laboratory, China; 2.Harbin Institute of Technology, Shenzhen, China

We implement a low-complexity Lite-DSP based on FPGA for IM/DD optical data links, achieving real-time 29.4912 Gbps PAM4 transmission over 10 km SSMF with BER below the 7% HD-FEC threshold using a 1550 nm DML.

08:45–09:00·ACP2025-0724-16

Cost-Effective and Low-Power Dual Polarization 400-Gb/s 16-QAM Transmission with FSON-Based Coherent Data Centre Interconnects

Lei Liu, Liu Feng, Dayu Shi, William Shieh*

Westlake University, China

We propose and experimentally demonstrate the cost-effective and low-power dual-polarization coherent detection application for data center interconnects based on the FSON architecture. We achieve polarization and coherent demultiplexing of 400-Gb/s DP-16QAM signals by using PACL in optical domain with a single ECL and low-power AOM.

09:00–09:15·ACP2025-0729-43

Delay Interferometer-based Stokes Vector Receiver for Power Fading Mitigation of Dual-polarization IM/DD Systems

Puzhen Yuan¹, Yuhao Fang¹, Haojie zhang¹, Xue Cheng², Dayu Shi¹, Weiqi Lu¹, Zexu Liu¹, William Shieh^{1,2}

1.Westlake University, China; 2.Westlake Institute for Optoelectronics, China

We propose a novel delay interferometer-based Stokes vector receiver architecture for mitigating CD-induced power fading in dual-polarization IM/DD Systems, verified by a 200-Gb/s DP-PAM4 transmission over 20-km SSMF, and 100-Gb/s DP-NRZ transmission over 50-km SSMF.

09:15–09:30·ACP2025-0801-134

Efficient Block-Wise Additive Powers-of-Two Quantization for CNN Equalizer in 135 Gb/s PAM-8 DML-Based IM/DD System

Cancan Chen^{1,2}, Zhaopeng Xu^{1*}, Qi Wu³, Tonghui Ji¹, Honglin Ji¹, Hui Chen¹, Yingying Zhou¹, Jianwei Tang¹, Zhongliang Sun¹, Linsheng Fan¹, Junpeng Liang¹, Jinlong Wei¹, Yuan Jiang², Zhixue He¹, Weisheng Hu¹

1.Pengcheng Laboratory, China; 2.Sun Yat-sen University, China; 3.The Hong Kong Polytechnic University, Hong Kong, China

We propose an efficient block-wise APoT quantization scheme for CNN equalizers in DML-based IM/DD systems. This block-wise strategy enables reliable 135 Gb/s transmission using only 7-bit parameter quantization, maintaining the BER below the 20% SD-FEC threshold while achieving a 78% reduction in memory usage.

09:30–09:45·ACP2025-0815-123

C-band 150Gbaud PAM-4 2.8km Transmission in a 60GHz Bandwidth-limited system enabled by AR-HCF and PF-MLSE

Shouchuan Ma^{1,2}, Qibing Wang¹, Chao Li¹, Xu Zhang¹, Wei Ding³, Yingying Wang³, Xinke Tang¹, Ke Li¹, Lei Wang¹, Zhixue He¹, Jian Song²

1.Pengcheng Laboratory, China; 2.Tsinghua University, China; 3.Jinan University, China

We demonstrate 150-Gbaud PAM-4 transmission over 2.8-km AR-HCF at C band using FFE-PF-MLSE equalization, achieving BER of 8.5×10^{-3} , well below the 15% SD-FEC threshold.

09:45–10:00·ACP2025-0815-69

Balanced Photodetection-Enabled Performance Improvements for Analog Mobile Fronthaul Transmissions Using FBG-Based PMDD

Mingliang Deng*, Ke Li, Huachun Chen, Qiang Liu, Chunsun Deng, Ao Li

Chongqing University of Posts and Telecommunications, China

A BPD is proposed to improve the receiver sensitivity and relax the requirements of the laser wavelength stability for analog MFH links with FBG-enabled PMDD. Simulation results show that a transmission distance- and modulation format-independent receiver sensitivity improvement of ~1.6dB is obtained. Moreover, the minimum EVM merely increases by 1% over a laser frequency drift of 3.6GHz.

10:00–10:30 Coffee Break

10:30–12:00 · November 7, 2025 · Friday

SDM

Presider: Xiaodan Pang, Zhejiang University, China

10:30–11:00·ACP2025–0801–47 **Invited****High-Capacity Optical Fibre Communications Using Orbital Angular Momentum Modes****Jie Liu***Sun Yat-sen University, China*

The unique physical properties of OAM modes enable low-crosstalk, high-density, and large-capacity fiber-optic transmission, supporting simplified MIMO processing and scalable mode-channel multiplexing per fiber.

11:00–11:15·ACP2025–0731–97

Real-time 4-core Transmission over 125 μm cladding G.654.E-compatible MCF by C+L band FIFO-less MC-EDFA

Shuailuo Huang¹, Yanbiao Chang¹, Shikui Shen¹, Shuo Xu², Lei Shen², Lei Zhang², Jie Luo², He Zhang¹, Zelin Wang¹, Guangquan Wang¹, Xiongyan Tang^{1*}

1.State Engineering Research Center of Next Generation Internet Broadband Service Applications, China Unicom Research Institute, China; 2.State Key Laboratory of Optical Fibre and Cable Manufacture Technology, YOFC, China

Real-time 115.2Tb/s and 230.4Tb/s transmission over 125 μm cladding G.654.E-compatible MCF is successfully demonstrated by C+L band FIFO-less MC-EDFA, in which the impact of inter-core crosstalk on transmission performance is investigated.

11:15–11:30·ACP2025–0801–15

956.94-Bit/s/Hz Spectral-Efficiency Transmission over 10-km 19-Core Ring Core Fiber with Low-Complexity 4 x 4 MIMO Equalization

Hualin Li¹, Junyi Liu¹, Jie Liu^{1*}, Haolin Zhou¹, Shuqi Mo¹, Yuming Huang¹, Yining Huang¹, Lei Shen², Shuo Xu², Lei Zhang², Jie Luo², Zhaohui Li^{1*}, Siyuan Yu^{1*}

1.Sun Yat-sen University, China; 2.Yangtze Optical Fibre and Cable Joint Stock Limited Company State Key Laboratory of Optical Fibre and Cable Manufacture Technology, China

We achieved a GMI-estimated spectral efficiency of 956.94 bit/s/Hz over a 10-km, 19-core ring-core fiber by transmitting 266 OAM modes on five WDM channels with low-complexity 4 x 4 MIMO equalization.

11:30–11:45·ACP2025–0815–74

First Demonstration of Real-time 0.67Pb/s Transmission over 356-km 7-Core Fiber using 135-Gbaud C+L-band 1.2Tb/s OTN Transponders

Cheng Chang^{1*}, **Jian Cui¹**, Yuxiao Wang², Yating Zhang³, Yu Deng¹, Zhuo Liu¹, Chao Wu¹, Zilin Fan¹, Bin Hao¹, Leimin Zhang¹, Yong Chen², Bin Wu², Shang Cao³, Shenghui Hu³, Haibin Liu³, Lei Shen⁴, Lei Zhang⁴, Jie Luo⁴, Yan Sun¹, Qi Wan¹, Bing Yan², Ninglun Gu¹

1.Department of Networks, China Mobile Communications Group Co., Ltd., China; 2.Network Management Center, China Mobile Communications Group Shandong Co., Ltd., China; 3.Huawei Technologies Co., Ltd., China; 4.State Key Laboratory of Optical Fibre and Cable Manufacture Technology, YOFC, China

Ultra-high-speed real-time 0.67Pb/s transmission over 356-km multi-core fiber is demonstrated, which is achieved by using length-optimized weakly-coupled 7-core fiber and 135-Gbaud C+L-band 1.2Tb/s OTN transponders with PCS-64QAM modulation format.

11:45–12:00·ACP2025–0801–89

Experimental Validation of 6-Mode Transmission with Neural Network-aided Soft Demapper

Chenxu Huang, Ziyang Lu, Can Zhao, Zhiwei Liang, Yi Lei, Qingqing Hu, Bin Chen^{*}

Hefei University of Technology, China

We experimentally validate the NN-aided soft-decision demapper via a 6-mode SDM fiber transmission system. The results demonstrate that the proposed demapper outperforms the conventional demapper by up to a factor of 80 in terms of BER for 1Tbps/ λ transmission over 73km.

12:00–13:30 Lunch Break

13:30–15:30 · November 7, 2025 · Friday

Advanced fiber communication

Presider: Kangping Zhong, The Hong Kong Polytechnic University, Hong Kong, China

13:30–14:00·ACP2025-0729-2 **Invited****Optical and Terahertz Wireless Communications for 6G and Beyond**Chengwei Fang¹, Md Osman Ali¹, Safa Alghadi¹, Mariam Abdullah², Shuo Li¹, Sithamparanathan Kandeepan¹, Withawat Withayachumnankul², Cuiwei He³, **Ke Wang**^{1*}*1.Royal Melbourne Institute of Technology (RMIT University), Australia; 2.The University of Adelaide, Australia; 3.Japan Advanced Institute of Science and Technology (JAIST), Japan*

This work explores emerging optical and terahertz wireless technologies driving 6G and beyond, highlighting breakthroughs in ultra-high-capacity transmission, integrated photonic/THz systems, and their potential to enable high-capacity and ubiquitous future wireless networks.

14:00–14:30·ACP2025-0915-4 **Invited****Revisiting the Multicarrier Advantage in Point-to-Multipoint Optical Networks****Di Che***Nokia Bell Labs, United States*

TBD

14:30–14:45·ACP2025-0801-197

68.90 Gbps Visible Light Communication System Based on Integrated Quintuple-laser and Iterative Nonlinear Algorithm**Zhiwu Chen**¹, Wenting Ju¹, Yuhan Hu¹, Zengyi Xu¹, Xiaofan Xu^{2,3,4}, Nan Chi^{1*}*1.College of Future Information Technology, Fudan University, China; 2.State Key Laboratory of Satellite Network, China; 3.Shanghai Key Laboratory of Satellite Network, China; 4.Shanghai Satellite Network Research Institute Co., Ltd., China*

We propose a turbulence-resistant high-speed visible light communication system that employs polarization diversity and nonlinear iterative reconstruction algorithm. We design an integrated quintuple-laser to achieve 68.90 Gbps data transmission over a 2-meter free-space link.

14:45–15:00·ACP2025-0801-49

Turbulence-Resilient Visible Light Communication System Utilizing Polarization Diversity Reception and Dual-Branch Reservoir Computing Equalizer**Suning Guan**¹, Zijian Zhou¹, Zhilan Lu¹, Zhe Feng¹, Guowei Jiang², Nan Chi^{1*}*1.Fudan University, China; 2.Tongji University, China*

This paper proposes a dual-branch reservoir computing equalizer for a visible light communication system with polarization diversity reception and NLTCF encoding, mitigating nonlinear distortion, achieving a 10 Gbps data rate, and maintaining BER below 3.8E-3.

15:00–15:15·ACP2025-0815-115

Demonstration of 1.25Tbit/s Atmospheric Turbulence Transmission Based on a Dual-Aperture Spatio-Temporal Fusion Receiver**Fang Dong**¹, Nan Chi^{1*}, Haoyu Zhang¹, Zhilan Lu¹, Zhe Feng¹, Yuan Wei¹, Guowei Jiang^{2,3,4}, Jianyang Shi¹, Junwen Zhang¹*1.Fudan University, China; 2.State Key Laboratory of Satellite Network, China; 3.Shanghai Key Laboratory of Satellite Network, China; 4.Shanghai Satellite Network Research Institute Co., Ltd, China*

We propose a dual-aperture spatio-temporal fusion network (STFN) receiver to mitigate atmospheric turbulence in free-space optical (FSO) communications. Compared with conventional diversity reception techniques, the 2D-STFN can reduce signal reconstruction loss caused by signal-to-noise ratio (SNR) estimation errors, enabling optimal fusion of multi-aperture signals. We demonstrate a 1.25-Tbit/s DWDM atmospheric turbulence transmission system based on a 2D-STFN, achieving up to a 2.5 dB Q-factor improvement per subcarrier.

15:15–15:30·ACP2025-0815-153

Non-Line-of-Sight Full-Duplex Communication System Based on UV-LEDs**zhian Chen**^{1,2}, Lihang Liu¹, Yuru Tang^{1,2}, Rui Jiang², Xinke Tang², Hongyan Fu¹*1.Tsinghua Shenzhen International Graduate School Tsinghua University, China; 2.Pengcheng Laboratory, China;*

We propose and experimentally demonstrate a reflective non-line-of-sight full-duplex communication system based on UV-LEDs and wavelength division duplexing. Highly sensitive SiPMs are employed for the signal detection and RRC filters are used to mitigate the ISI caused by multipath effects. This system can achieve full-duplex communication with a maximum data rate of about 50 Mbps at transmission distance longer than 2 m.

15:30–16:00 Coffee Break**15:30–17:30 Poster Session****18:30–20:30 Banquet & Awards Ceremony**

08:30–10:00 · November 8, 2025 · Saturday
Hollow-core fiber transmissions
 Presider: Zhaopeng Xu, Peng Cheng Laboratory, China

08:30–09:00·ACP2025–0429–2 **Invited**

Ultra-High Capacity Optical Transmission over Anti-Resonate Hollow-Core-Fiber

Xumeng Liu, Zhixue He, Chao Li*

PengCheng Laboratory, China

Anti-resonant hollow-core fibre (AR-HCF) has witnessed rapid development both in fiber fabrication and system demonstration in the last several years. In this talk, we propose and experimentally demonstrate breakthrough achievements for optical transmission in AR-HCF.

09:00–09:30·ACP2025–0915–26 **Invited**

High-Speed O-Band Ring Resonator Modulators for Short-Reach Optical Interconnects

Oskars Ozolins¹, Armands Ostrovskis², Darja Cirjulina², Toms Salgals², Minkyu Kim³, Peter De Heyn³, Michael Koenigsmann⁴, Benjamin Krueger⁴, Fabio Pittalà⁴, Hadrien Louchet⁴, Lu Zhang⁵, Xianbin Yu⁵, Vjaceslavs Bobrovs², Xiaodan Pang^{2,5}

1.Riga Technical University, Latvia; 2.Riga Technical University, Latvia; 3.imec, Belgium; 4.Keysight Technologies Deutschland, Germany; 5.Zhejiang University, China

We compare recent O-band silicon photonics (SiP) ring resonator modulator (RRM) designs with lateral p-n junction (LPN) and vertical PN (VPN). We achieve better sensitivity with VPN design for both 200 Gbaud OOK and 112 Gbaud PAM4 at 6.25% overhead HD-FEC performance threshold (a BER of 4.5×10^{-3}) after transmission over 500 meters of single-mode fiber (SMF).

09:30–09:45·ACP2025–0731–56

WDM cyclic-prefix-free affine frequency division multiplexing transmission over DNANF

Jiajia Shen¹, Yu Qin², Suiyao Zhu³, Mingyi Gao¹, Limin Xiao², Yichun Shen⁴, Jie Zhu², Gangxiang Shen¹

1.Soochow University, China; 2.Fudan University, China; 3.Harbin Institute of Technology, China; 4.Zhongtian Technology Advanced Materials Co, China

In this work, we experimentally demonstrated a wavelength-division multiplexing cyclic-prefix-free affine frequency division multiplexing (AFDM) transmission over 5-km double-nested antiresonant nodeless fiber (DNANF), achieving 193.75 Gb/s data rates for high-speed industrial Internet of Things applications.

09:45–10:00·ACP2025–0801–132

10.7-Tb/s Unrepeated WDM Transmission with > 1.2-Tb/s/λ signals over 217.1-km AR-HCF by EDFA-only Amplification

Siyuan Liu¹, Dawei Ge², Qiang Qiu³, Yiqi Li³, Peng Li⁴, Mingqing Zuo², Baoluo Yan³, Dong Wang², Lei Zhang⁴, Dechao Zhang², Jie Luo⁴, Han Li², Zhangyuan Chen¹*

1.State Key Laboratory of Photonics and Communications, Peking University, China; 2.Department of Fundamental Network Technology, China Mobile Research Institute, China; 3.WDM System Department of Wireline Product R&D Institute, ZTE Corporation, China; 4.State Key Laboratory of Optical Fiber and Cable Manufacture Technology, YOFC, China

A record unrepeated 10.7-Tb/s (1.2-Tb/s/λ) 8λ-WDM transmission with EDFAs only over 217.1-km anti-resonant hollow-core fiber (AR-HCF) was experimentally demonstrated by leveraging AR-HCF's ultralow nonlinearity, in which high-spectral-efficiency single-carrier 148-GBd DP-144QAM-PCS signals were used.

10:00–10:30 Coffee Break

10:30–12:00 · November 8, 2025 · Saturday
Transmission systems and devices
 Presider: Wen Zhou, Fudan University, China

10:30–11:00·ACP2025–0701–1 **Invited**

400Gb/s and Beyond Transmission Systems: Exploring Future Directions and Design Trade-offs

Baoluo Yan^{1,2*}, Cuifeng Sun³, Qiang Qiu^{1,2}, Wenbo Yu^{1,2}, Zhenhua Feng^{1,2}, Hu Shi^{1,2}

1.WDM System Department of Wireline Product R&D Institute, ZTE Corporation, China; 2.State Key Laboratory of Mobile Network and Mobile Multimedia Technology, China; 3.China Mobile Information Technology Co., Ltd., China

This paper explores design trade-offs in extending high-speed optical transmission beyond 400G towards multi-Terabit long-haul systems, with a focus on reach, spectral efficiency, and practical deployment limits, etc.

11:00–11:30·ACP2025–0721–6 **Invited****Towards Energy-Efficient Coherent Transceivers via Optical Offload Architecture****Yohei Sobu**^{1,2*}, Hanwei Chen^{1,2}, Shinsuke Tanaka^{1,2}*1.PETRA, Japan; 2.IFINITY inc., Japan*

Lower power consumption and higher integration density of coherent transceivers are expected to become key challenges in meeting future demands. We propose a compact, energy-efficient transceiver architecture through offloading key functions from electronics to photonics.

11:30–11:45·ACP2025–0815–14

Field demonstration of lossless RDMA over 50G PON**Feng Zhu**, Tao Zeng*, Xinran Huang, Ming Jiang, Dezhi Zhang*China Telecom Research Institute, China*

For the first time, field demonstration of lossless RDMA over 50G-PON for storage-compute disaggregation and data ingestion services is achieved.

11:45–12:00·ACP2025–0801–26

Experimental Coexistence of Quantum Key Distribution and L-band Classical Communication over Hollow-core Fiber**Weiwen Kong**¹, Tianqi Dou^{1*}, Yuheng Xie¹, Lei Zhang², Peng Li², Song Gao³, Lipeng Feng¹, Nan Lu⁴, Yongmei Sun⁵, Jianjun Tang^{1*}

1.China Telecom Research Institute, China; 2.State Key Lab. of Opt. Fib. and Cab. Manuf. Tech. YOFC, China; 3.QuantumCTek Corporation Limited, China; 4.ZTE corporation, China; 5.State Key Lab. of Info. Photo. and Opt. Comm. Beijing Univ. of Posts and Telecom., China

We experimentally demonstrate the coexistence of L band classical communications and QKD over 101.6 km hollowcore fiber, with a classical capacity of 13.6 Tbps and a secure key rate maintained above 8 kbps.

12:00–13:30 Lunch Break

13:30–15:30 · November 8, 2025 · Saturday
Optical wireless and terahertz communications
 President: Lu Zhang, Zhejiang University, China

13:30–14:00·ACP2025–0820–1 **Invited****Demonstration of FSO emergency communication for UAVs and research on its security technology****Wu Tingwei**^{*}, Guo Lei*Chongqing University of Posts and Telecommunications, China*

This report will introduce the team's latest demonstration of the Free Space Optical (FSO) system for unmanned aerial vehicles (UAVs). Together with Chongqing Telecom, the UAV FSO was tested for network access at the Chongqing Mobile Bureau. The performance of the UAV FSO communication system in emergency communication was verified by connecting the UAV FSO communication system relay to the carrier network through BBU/RRU. At the same time, the FSO communication transmission security and BER transmission performance were improved through chaotic encryption and coding modulation techniques.

14:00–14:30·ACP2025–0911–2 **Invited****Long-range AI-aided 6G photonics THz transmission technology****Wen Zhou***Fudan University, China*

Nonlinear effects mitigation is essential for 6G terahertz wireless communication. This article proposes model driven and complex neural network terahertz digital coherent receiver modules, respectively, which effectively improve long-range THz transmission capability.

14:30–14:45·ACP2025–0730–22

A Location-Aware Angular Diversity Scheme for MIMO Visible Light Communication Receivers**Xiaochuan Zhang**¹, Haoqi Zhang¹, Xiaodi You^{1*}, Xinwei Du², Jian Chen³, Changyuan Yu⁴, Mingyi Gao¹, Gangxiang Shen¹

1.Soochow University, China; 2.Beijing Normal-Hong Kong Baptist University, China; 3.Nanjing University of Posts and Telecommunications, China; 4.The Hong Kong Polytechnic University, Hong Kong, China

We propose a location-aware angular diversity scheme for multiple-input multiple-output visible light communication receivers. Using sequential number-theoretic optimization, it efficiently reduces channel correlation and expands the reliable communication area from 39.2% to 73.1%.

14:45-15:00·ACP2025-0731-130

Beyond Gbps Intra-Satellite Optical Wireless Communications Using Limiting Amplifier**Hewei Tian**^{1,2}, Henghao Cheng^{1,2}, Jianhua He^{1,2}, Yongsheng Gong^{1,2}, Yifang Xie^{1,3}, Lu Lu^{1,2*}*1. University of Chinese Academy of Sciences, China; 2. Technology and Engineering Center for Space Utilization, Chinese Academy of Sciences, China; 3. National Space Science Center, Chinese Academy of Sciences, China*

OptiG is a Gbps optical dongle for intra-satellite wireless communications with compact design. It uses laser diode, PIN detector, and FPGA processor, achieving 1.2 Gbps data rate by extending link bandwidth from 246 MHz to 610 MHz through limiting amplifiers.

15:00-15:15·ACP2025-0731-76

Over 1 Gbps underwater non-line-of-sight visible light communication system utilizing integrated 2*2 MIMO receiver**Zhe Feng**¹, Yuhua Hu¹, Xiangdong Zhang¹, Zengyi Xu¹, Guowei Jiang^{2,3,4}, Nan Chi¹*1. Fudan University, China; 2. State Key Laboratory of Satellite Network, China; 3. Shanghai Key Laboratory of Satellite Network, China; 4. Shanghai Satellite Network Research Institute Co., Ltd, China*

This paper presents a high-speed LED-based underwater Non-Line-of-Sight (NLoS) visible light communication (UVLC) system that utilizes a 488 nm green LED for transmitting a 16QAM signal and an integrated 2*2 MIMO receiver for reception over a 1.23-meter distance. The system employs waveform-level and symbol-level equalization, along with adaptive Bit Error Rate (BER)-based fusion algorithm. The results demonstrate that the proposed system achieves a communication rate exceeding 1 Gbps within a 48 mm wide optical spot. The maximum achievable data rate reaches up to 1.4 Gbps, showcasing the system's potential for high-speed UVLC in NLoS links.

15:15-15:30·ACP2025-0731-80

Real-Time Doppler Shift Tracking Scheme for LEO Satellite-Ground Links**KeXiang Wang**, Ao Li, Zhengjie Wang, Xinpei Tang, Yaning Sun, Shuai Wei, Jifang Qiu, Yan Li*, Jian Wu*State Key Laboratory of Information Photonics and Optical Communications Beijing University of Posts and Telecommunications, China*

This paper presents a real-time coherent receiver using digital signal processing-assisted automatic frequency control to compensate for Doppler frequency shift in LEO Satellite-Ground Links.

15:30-16:00 Coffee Break

16:00-17:30 · November 8, 2025 · Saturday

WDM transmissions

Presider: Lipeng Feng, China Telecom Research Institute, China

16:00-16:30·ACP2025-0816-5 **Invited****Recent advances in high-speed simplified coherent passive optical network****Xiang Li****China University of Geoscience (Wuhan), China*

This paper reviews recent progress on coherent passive optical network at data rates of 200 Gb/s. It discusses the technologies to realize the low-cost passive optical network with improved performance and channel condition monitoring abilities.

16:30-16:45·ACP2025-0813-7

Compressed Sensing-based Low-cost Silicon Photonics WDM Channel Monitor with High Tolerance to Chip Process Variations**Dongxu Zhang***, Xiaolan Huang, Xiaofeng Hu, Xiaobo Yi, Kaibin Zhang*Nokia Shanghai Bell Co Ltd, China*

We design and evaluate a low-cost channel monitoring module that employs photonic integrated circuits and compressed sensing techniques for loss-of-light event detection in WDM transmission systems. Simulation demonstrates the design's robustness against chip process variations.

16:45-17:00·ACP2025-0815-12

4x10-Gb/s SWDM Optical Interconnect over 100-m GI-POF Based on VCSEL-based TOSA/ROSA**Siyuan Liu**¹, Chengbin Long¹, Wei Chen¹, Albert Huang², Yezi Guo², Quanfei Fu², Yong Yang², Kuan Zhang², Junbin Huang^{2*}, Zhangyuan Chen¹*1. State Key Laboratory of Photonics and Communications, Peking University, China; 2. AFALIGHT CO., Ltd, China*

This work presents the prototype of a VCSEL-based SWDM system over GI-POF, enabling a 100-m optical interconnect for 4x10-Gb/s NRZ signals. Using commercial SWDM TOSA/ROSA modules, the effectiveness of extending the capacity of POF through parallel wavelength paths is validated.

17:00–17:15·ACP2025-0815-150

GPU-Accelerated Simulation Architecture for Optical WDM-SDM System**Mengsheng Zhai**, Tianwai Bo*, Siying Li, Jun Dong, Yihao Zhou, Zhongwei Tan, Yi Dong*Beijing Institute of Technology, China*

We propose a GPU-based simulation architecture for optical transmission system based on multicore fiber (MCF). By developing an efficient matrix multiplication algorithm, the acceleration ratio reaches 45 and 67 for 2-core and 4-core MCF systems.

17:15–17:30·ACP2025-0705-1

Photon-Level Pulse Amplitude Distribution molding for PMT-Based NLOS Ultraviolet Optical Communication**Fengyu Cao**, Tao Yang*, Haizhao Li, Zhiguo Zhang*Beijing University of Posts and Telecommunications, China*

A novel Weibull-based model for PMT pulse amplitudes in NLOS UV communication is validated via Monte Carlo simulation. Incorporating gain fluctuations and pulse superposition effects, the optimized dual-threshold algorithm achieves 100x BER reduction at 102.34 dB loss, enabling robust photon-level detection under low-SNR conditions.

Track 2: Optical Transmission Systems, Subsystems and Technologies (Parallel Session)

Grand Ballroom B, 2F (大宴会厅 B, 2 楼)

13:30–15:30 · November 6, 2025 · Thursday

Passive optical networks

Presider: Xian Zhou, University of Science and Technology Beijing, China

13:30–14:00·ACP2025-0731-103 **Invited**

Innovation and Evolution Trends of High-Speed and Large-Capacity Optical Interconnection Networks

Xia Sheng^{*}, Hao Liu¹, Anxu Zhang, Yuyang Liu, Kai Lv, Yadong Gong, Xishuo Wang, Lipeng Feng, Xiaoli Huo
China Telecom Research Institute, China

This paper systematically reviewed the innovation and evolution trends of high-speed and large-capacity optical interconnection networks in both data center and telecommunication scenarios.

14:00–14:30·ACP2025-0814-10 **Invited**

50G and B50G Optical Access Networks

Ji Zhou^{1*}, Haide Wang^{2*}, Liangchuan Li^{3*}, Changyuan Yu³, Xiangjun Xin⁴

1.Beijing Institute of Technology, Zhuhai, China; 2.Guangdong Polytechnic Normal University, China; 3.The Hong Kong Polytechnic University, Hong Kong, China; 4.Beijing Institute of Technology, China

The telecom operator has already begun commercially deploying 50G passive optical networks (PONs) to enable 10G access for end-users. The standardization of Beyond 50G (B50G) PON will soon be prioritized on the agendas of the International Telecommunication Union Telecommunication Standardization Sector and European Telecommunication Standards Institute. This talk will present the 50G and B50G optical access networks, including the architectures and algorithms.

14:30–14:45·ACP2025-0709-1

Reflection-Tolerant and Flexible Coherent PON with 240-Gbps Peak Super-Rate Supporting Simplified Coherent and Full-coherent Transceivers Based on Single-laser

Xuyu Deng^{*}, An Yan, Junhao Zhao, Penghao Luo, Yongzhu Hu, Renle Zheng, Jianyang Shi, Nan Chi, Junwen Zhang^{*}

Fudan University, China

We propose a reflection-tolerant and flexible coherent PON solution based on interleaved TFDM, enabling bi-directional transmission with transceivers using single-laser. It supports both simplified- and full-coherent ONUs with compatible OLT-setup, achieving peak 240-Gbps super-rate access.

14:45–15:00·ACP2025-0721-5

Segment-level ODN Fault Localization based on Electrical Dispersion Compensator and APD ROSA in 50G-PON ONU Receiver

Han Hyub Lee^{*}, Hwan Seok Chung

Electronics and Telecommunications Research Institute (ETRI), Korea

We present an ODN fault localization approach in 50G-PON using signal metrics from multiple ONUs. Eye height and APD current comparisons enable segment identification under loss and reflectance, without extra hardware.

15:00–15:15·ACP2025-0725-4 **Industry Innovation Nomination**

200Gb/s PON Upstream Demonstration with Class E2 Power Budget Employing Low-complexity Many-to-one Mapping Based DP-PS-PAM4

Xiaoshuo Jia^{1*}, Junwei Li¹, Jie Li², Yan Li³, Ming Luo², Kailai Deng², Ning Wang¹, Zipiao Zhao¹, Jian Wu³, Han Li¹, Dechao Zhang^{1*}

1.China Mobile Research Institute, China; 2.China Information and Communication Technologies Group Corporation, China; 3.Beijing University of Posts and Telecommunications, China

A low-complexity distribution-matcher-free many-to-one mapping based double-polarization probabilistic shaped PAM4 (DP-PS-PAM4) operating at 200-Gb/s/λ is investigated over a 20-km passive optical network (PON) upstream, whose power budget reaches up to 36-dB (class E2) with the intensity-modulation and coherent-detection structure.

15:15–15:30·ACP2025-0801-90

Experimental Demonstration of Laser Sharing Simplified Coherent Receiver for 100Gbit/s Coherent PON Downstream

Wenyu Wang^{*}, Haiqiang Wei, Changyuan Yu, Chao Lu, Alan Pak Tao Lau, Kangping Zhong

The Hong Kong Polytechnic University, Hong Kong, China

In this paper, we proposed a laser sharing simplified coherent passive optical network (PON) downstream architecture to reduce the cost and maintenance for ONUs. We successfully demonstrated 100Gbit/s per lambda downstream for 16 ONUs sharing only one laser. Power budget higher than 33dB is achieved for all ONUs.

15:30–16:00 **Coffee Break**

16:00–17:30 · November 6, 2025 · Thursday

Advanced optical communications

Presider: Yanni Ou, Beijing University of Posts and Telecommunications, China

16:00–16:30·ACP2025-0630-1 **Invited****HIC-OTN for intelligent computing center interconnections****Dechao Zhang***, Jiang Sun, Dong Wang, Yuqian Zhang, Shan Cao*Department of Fundamental Network Technology, China*

This paper introduces the key technical features of the novel HIC-OTN (hitless intelligent computing OTN) to meet the critical requirements for the interconnection of distributed intelligent computing centers, and also illustrates related field trials.

16:30–17:00·ACP2025-0915-5 **Invited****Evolution of optical networking for AI factory****Jim Zou***Adtran Networks, US*

Photonics are becoming essential to meet the performance, density and power-efficiency needs of modern data centers. As AI, cloud and high-throughput applications create ever-increasing demand, the industry is looking to scalable optical technologies to deliver the next leap in capacity. This talk will explore how optical transmission is reshaping the hyperscale landscape, sharing insights into industrial standardization and advancements.

17:00–17:15·ACP2025-0801-72

A Novel IBT-Based Angle-Domain Frequency Offset Estimation Algorithm for Coherent Optical Communication**Xuefeng Zou**, Zuyu Li, Yuheng Liu, Jinqi Xiong, Hongyi Gan, Fan Li**Sun Yat-Sen University, China*

The paper proposes an improved angle domain-based frequency offset estimation algorithm (Ang-FOE) with inverted binary tree (IBT) architecture, which achieves the extension of the frequency offset estimation range while maintaining low complexity.

17:15–17:30·ACP2025-0813-22

Ultrafast High-Resolution Quantitative Phase Imaging LiDAR Using Synchrosqueezing Transform**Qingyang Zhu¹**, Xuanyi Liu¹, Yi Hao¹, Shichen Zheng¹, Annan Xia¹, Hong Ye¹, Qian Li², Małgorzata Szczerska³, H. Y. Fu**1. Tsinghua University, China; 2. Peking University, China; 3. Gdańsk University of Technology, Poland*

We propose a quantitative phase imaging LiDAR using a custom-built broadband dissipative soliton fiber laser, encoding spatial information to spectrum via spectral scanning and time-stretching with Synchrosqueezing transform, achieving 30.72-MHz detection and 140.31- μ m lateral resolution.

18:00–20:00 Welcome Reception

08:30–10:00 · November 7, 2025 · Friday

DSP for communication (I)

Presider: Tingwei Wu, Chongqing University of Posts and Telecommunications, China

08:30–08:45·ACP2025-0724-8

Kalman Filter-Based Adaptive Decision Threshold for PAM4 IM/DD Links with Multipath Interference**Yibin Li**, Zixian Wei, Li Wang, Changyuan Yu**The Hong Kong Polytechnic University, Hong Kong, China*

We have proposed a Kalman-ADT scheme for MPI-impaired PAM4 signals. By performing symbol-by-symbol threshold updates with Kalman filter, the proposed method improves noise tolerance over conventional block-based ADT, particularly under large laser linewidth scenarios.

08:45–09:00·ACP2025-0726-11

Noise-Aware Sequence Detection in Bandwidth-Limited Coherent Optical Communication Systems**Zeyu Feng**, Zhongxing Tian, Ziang Chen, Huan Huang, Dongdong Zou, Yi Cai**Soochow University, China*

A noise-aware detection scheme employing covariance estimation and spectrum fitting is proposed for optical communication systems with bandwidth limitation. Experiments demonstrated up to 1 dB OSNR gain at 7% FEC threshold compared to conventional schemes.

09:00–09:15·ACP2025–0729–40

Spectrum Notch Coding Modulation for Pilot-Tone-Aided Phase Noise Estimation**Yuheng Liu**^{1,2}, Wei Wang^{1,2}, Yifan Chen^{1,2}, Qi Sui³, Fan Li^{1,2*}*1. School of Electrical and Information Technology, Sun Yat-sen University, China; 2. Guangdong Provincial Key Laboratory of Opto-electronic Information Processing Chips and Systems, Sun Yat-sen University, China; 3. Southern Marine Science and Engineering Guangdong Laboratory, China*

A spectrum notch coding modulation scheme using guided scrambling is proposed, which enables flexible notch and pilot insertion for carrier-phase recovery. Simulation results show that the proposed scheme exhibits high tolerance to laser linewidth.

09:15–09:30·ACP2025–0730–18

Pilot-tone-based Baud-rate Timing Recovery Scheme Assisted by Spectrum Shaping Technique**Wei Wang**¹, Dongdong Zou², Yuheng Liu¹, Yifan Chen¹, Fan Li^{1*}*1. Sun Yat-sen University, China; 2. Soochow University, China;*

A novel pilot-tone-based baud-rate timing recovery scheme is proposed in this paper, which is assisted by a symbol-level guided scrambling technique for spectrum shaping. The proposed scheme exhibits enhanced robustness to chromatic dispersion.

09:30–09:45·ACP2025–0730–25

Opto-electronic Collaborative Real-time Frequency Offset Compensation Scheme for Low-cost Coherent Optical Communication Systems**Hongxia Xing, Zuyu Li, Yuheng Liu, Fan Li****Sun Yat-sen University, China*

An opto-electronic collaborative real-time frequency offset (FO) compensation method for coherent optical communication system is proposed, which can reduce the system complexity while achieving similar BER performance as the traditional FO compensation scheme.

09:45–10:00·ACP2025–0731–104

Power Anomaly Localization and Chromatic Dispersion Coefficient Estimation for Non-uniform Dispersion Links using Power Profile Estimation**Xulong Yan**¹, Rundong Xie¹, Zhudong Shi¹, **Runzhe Fan**¹, Yuyang Gao¹, Fei Liu¹, Jichun Ma², Xian Zhou^{1*}*1. University of Science and Technology Beijing, China; 2. China Information Technology Design & Consulting Institute Co., Ltd., China*

This paper proposes an EDFA-Aided Dual-Domain Mapping Correlation Method-based Power Profile Estimation (EADDM-CM-PPE) method for sub-kilometer-level power anomaly localization in non-uniform chromatic dispersion links, with chromatic dispersion coefficient estimation error within 0.2 ps/(nm·km).

10:00–10:30 Coffee Break

10:30–12:15 · November 7, 2025 · Friday
DSP for communication (II)
Presider: Jim Zou, Adtran Networks, United States

10:30–11:15·ACP2025–0911–1 **Tutorial****Components, DSP, and subsystem design for ultra-high-speed optical transceivers****Vivian Xi Chen***Nokia Bell Labs, United States*

This tutorial aims to provide an overview of the essential components, such as lasers, modulators, and high-speed RF signal generation, for ultra-high-speed optical transceivers. Additionally, potential research directions for future transceivers will be mentioned.

11:15–11:30·ACP2025–0731–133

Low Complexity FTN Signaling Enabled by Feedback-Free THP and Abs-K-Means Clustered Nonlinear Equalizer for Intra-DCI**Jiawen Yao**¹, Dongdong Zou^{1*}, Wei Wang², Lei Hu¹, Fan Li², Yi Cai¹*1. Soochow University, China; 2. Sun Yat-Sen University, China*

An ultra-low complexity FTN signaling scheme enabled by a feedback link free THP and Abs-K-Means clustered TMP nonlinear equalizer is proposed. According to the experimental results, a 79.17% complexity reduction is achieved compared to the typical THP DP-VNLE.

11:30–11:45·ACP2025-0731-23

Low-Complexity Cosine-Term-Based Nonlinear Improved Weighted DFE for C-Band IM/DD Systems**Yutong Liu¹**, Junwei Zhang¹, Fan Li¹, Zhaohui Li¹, Chao Lu²*1. Sun Yat-Sen University, China; 2. The Hong Kong Polytechnic University, Hong Kong, China*

A cosine-term-based nonlinear improved weighted DFE (CTIWDFE) is proposed for a C-band 100-Gb/s PAM-4 60-km system, which reduces computational complexity by 47% and improves receiver sensitivity by 0.2 dB compared to the improved weighted VDFE.

11:45–12:00·ACP2025-0731-51

180-Gbaud Dual-Polarization Subsampling Transmission with 100-GSa/s DAC Based on Partial Response Signaling and Carrier Phase Recovery**Yimin Hu¹**, Yixiao Zhu^{1*}, Xiang Cai², Ziheng Zhang¹, Chongyu Wang¹, Weisheng Hu¹, Fan Zhang^{2*}*1. Shanghai Jiao Tong University, China; 2. Peking University, China*

We experimentally demonstrate 130-Gbaud dual-polarization QPSK signal sub-sampling transmission with only 100-GSa/s DAC, based on partial response and carrier phase recovery. We achieve up to 180-Gbaud transmission, corresponding to a record sub-sampling rate of 0.56.

12:00–12:15·ACP2025-0801-146

Bit-Level Probabilistic Shaping Four-Dimensional Modulation with Two-Stage Carrier Phase Recovery for 200G DFB-based Cost-Effective TFDM-PON**Yifan Chen^{1*}**, Chen Wang², Jianjun Yu², Fan Li¹, Jianyu Long², Mingzhu Yin¹, Wei Wang¹, Weihao Ni¹, Yuheng Liu¹*1. Sun Yat-sen University, China; 2. Fudan University, China*

A bit-level PS-4D-16QAM scheme with two-stage CPR addresses DFB laser phase noise. In 200GDFB-deployed TFDM-PON simulation over 20km SSMF, it achieves 37.4-dB power budget at 7% HD-FEC threshold and ~0.6-dB RPS gain versus PDM-16QAM.

12:15–13:30 Lunch Break

13:30–15:30 · November 7, 2025 · Friday

Modeling and monitoring of optical communication systems

Presider: Yanfu Yang, Harbin Institute of Technology, China

13:30–14:00·ACP2025-0801-140 **Invited****Realistic and Efficient Modeling of Semiconductor Optical Amplifiers for WDM Transmission****Hartmut Hafermann^{*}**, Loig Godard, Abir Hraghi, Iosif Demirtzioglou, Xiaohui Zhao, Yann Frignac*Optical Communication Technology Lab, Paris Research Center, Huawei Technologies France, France*

This paper reviews three recent SOA modeling methodologies –the effective Agrawal model, a semi-phenomenological reservoir model, and a closed-form Gaussian noise model– that enable realistic and efficient simulations and estimation of nonlinear penalties.

14:00–14:15·ACP2025-0801-219

A Fast and Accurate Estimation Method for the Polarization Impairments Induced OSNR Penalty**Tianrun Sun**, Jiarun Zhao, Peiyun Ge, Yichao Wang, Bin Zhang, Nan Cui, Xiaoguang Zhang, Lixia Xi^{*}*Beijing University of Posts and Telecommunications, China*

A method is proposed to estimate OSNR penalty due to polarization impairments, reducing consumed time by a factor of 2000 compared with exhaustive Monte Carlo signal transmission simulations, while maintaining accuracy

14:15–14:30·ACP2025-0807-1

Phase Noise Tolerance for Low-Pilot-Overhead OFDM Terahertz Links Beyond 64-QAM**Bowen Liu^{*}**, Takasumi Tanabe*Keio University, Japan*

This work quantifies phase noise tolerance in 64-QAM 2048-OFDM THz links, revealing that MRRs enable error-free transmission with minimal pilot overhead and significantly reduced DSP complexity.

14:30–14:45·ACP2025–0815–137

Single Pulse Assisted Front-End Response Estimation and Pre-compensation for Bandwidth-Limited Coherent Optical Communication Systems**Ziang Chen**, Zhongxing Tian, Zeyu Feng, Dongdong Zou, Huan Huang, Lin Sun, Gordon Ning Liu, Yi Cai**Soochow University, China*

A measurement-driven single pulse assisted pre-compensation scheme is proposed to mitigate the loss of high-frequency content, as well as spectrum ripples observed in bandwidth-limited coherent communication systems. Experiments demonstrate about 0.5 dB OSNR gain at an 7% FEC threshold compared to schemes without single pulse assistance.

14:45–15:00·ACP2025–0815–76

Group Delay Characterization by Cepstrum Method with Mux/Demux Interference Removal**Liang Junpeng**^{1*}, Wei Jinlong^{1*}, Fan Linsheng¹, Sun Zhongliang¹, Xu Zhaopeng¹, He Zhixue^{1*}*Dept. of Circuits and System Peng Cheng Laboratory, China*

We propose a cepstrum based method for measuring the differential mode group delay (DMGD) in few mode fibers. Various potential impairments that may influence on the measurement are assessed, the results show that the proposed method is robust to noise, laser line-width, and suffer from less influence of CD and PMD over 5km test range. And we also conduct a comparative experiment to eliminate the influence of group delay introduced by the multiplexer/Demultiplexer. The experimental results are compared with those obtained using correlation method, showing a relative error fluctuation within 0.01ps/m.

15:00–15:15·ACP2025–0801–12

Efficient Rate-Adaptive Information Reconciliation with LightGBM-Assisted Syndrome Estimation in QKD-Classical Coexistence Networks**Zhuoming Yang**, **Xun Zhu**, Qianhui Guo, Zikun Zhang, Shang Gao, Yanni Ou*, Kun Xu*State Key Laboratory of Information Photonics and Optical Communications Beijing University of Posts and Telecommunications Beijing, China*

Arate-adaptive information reconciliation with LightGBM-assisted syndrome estimation is proposed for QKD-classical coexistence networks to effectively estimate QBER with millisecond-level runtime. Simulations show that the proposed scheme achieves an overall average efficiency improvement of 10.2%.

15:15–15:30·ACP2025–0801–164

Composite Signal Fiber-longitudinal Power Profile Estimation Scheme Used in Digital Subcarrier Multiplexing Systems**Runzhe Fan**¹, Xulong Yan¹, Fan Zhang², Xian Zhou^{1*}*1.USTB, China; 2.PKU, China*

A composite signal fiber-longitudinal power profile estimation scheme is proposed for digital subcarrier multiplexing (DSCM) systems. For the 4×30GBaud DSCM system, localization mean absolute error (MAE) improved from 7 km to below 1 km, while anomaly estimation MAE improved from 0.8 dB to below 0.15 dB.

15:30–16:00 Coffee Break**15:30–17:30 Poster Session****18:30–20:30 Banquet & Awards Ceremony**

08:30–10:00 · November 8, 2025 · Saturday

DSP for communication (III)

Presider: Xiang Li, China University of Geosciences, China

08:30–09:00·ACP2025–0801–199 **Invited****Low-Cost Coherent Detection from Short-Reach to Long-Haul Transmission****Yixiao Zhu**^{1*}, Xiansong Fang², Xiang Cai², Yimin Hu¹, Ziheng Zhang¹, Lingjun Zhou², Xian Zhou³, Weisheng Hu¹, Fan Zhang^{2*}*1.Shanghai Jiao Tong University, China; 2.Peking University, China; 3.University of Science and Technology Beijing, China*

Coherent optics can enable high-capacity interconnects for AI data centers and computing networks. We review recent advances in low-cost coherent systems, highlighting residual carrier for phase noise tracking, XPM mitigation, and equalization-enhanced phase noise compensation.

09:00–09:15·ACP2025–0815–21

Low-Complexity Nonlinear Equalizer with a Hybrid Decision Scheme Based on Threshold Pruning for IM/DD Systems**Wenxiang Cui¹**, Quanzhen Luo¹, Lipeng Feng², Yi Cai¹, Gangxiang Shen¹, Gordon Ning Liu^{1*}*1. Soochow University, China; 2. China Telecom Research Institute State Key Laboratory of Optical Fiber and Cable Manufacture Technology, China*

We propose a novel hybrid decision scheme based on threshold pruning, which removes redundant branches in multi-symbol decision. The proposed scheme significantly reduces complexity with negligible performance degradation in high-speed IM/DD PAM-4 systems.

09:15–09:30·ACP2025–0815–36

Mitigation of Dither-Signal Beat Interference in Optical SSB System with Remodulation-based Distortion Reconstruction**Jun Dong**, Tianwai Bo^{*}, Zhuo Wang, Haolei Gao, Zhongwei Tan, Yi Dong*Beijing Institute of Technology, China*

We propose a receiver-side remodulation-based distortion cancellation technique to mitigate the dither-signal beat interference caused by the double-sideband dither signals generated in the transmitter. The proposed scheme improves the system's receiver sensitivity by ~1.8dB.

09:30–09:45·ACP2025–0815–57

Low Complexity Chase Decoder for Open Forward Error Correction**Liu Yuxi¹**, Ma Zhengyu¹, Zhao Xue¹, Zhang Jing^{1*}, Yang Qi², Qiu Kun¹*1. University of Electronic Science and Technology of China, China; 2. Huazhong University of Science and Technology, China*

We propose a modified Chase-Pyndiah decoder for oFEC code. The proposed decoder reduces the use of look-up tables (LUTs) and flip-flops (FFs) in FPGA implementation by approximately 16.0% and 20.2% without any performance degradation.

09:45–10:00·ACP2025–0815–71

An Energy-Efficient Fully-Pipelined Dispersion Compensation Hardware Accelerator for Optical Fiber Communications**Bochang Wang**, Zheli liu, Zixuan Shen, Xianqiao Liao, Ming Tang, Chao Wang^{*}*School of Optical and Electronic Information Huazhong University of Science and Technology, China*

This paper presents an energy-efficient dispersion compensation hardware accelerator design for coherent optical fiber communication. To reduce computational complexity, a complex-plane rotation algorithm is proposed to eliminate the complex multiplication in frequency-domain dispersion compensation through a sequence of fixed-angle rotations. To enhance both energy efficiency and computing speed, a fully pipelined complex-plane rotation module is designed by unrolling the rotation operator into a sequence of cascaded operators using only shifts and adders. The dispersion compensation accelerator design exhibits only 8% degradation in dispersion compensation accuracy as compared to the baseline design, under a 240 km transmission distance at 25 Gb/s with 9 dB OSNR. FPGA implementation demonstrates the proposed design can achieve a 6.5 x energy efficiency improvement against the baseline design, operating at 100 MHz and 1V.

10:00–10:30 Coffee Break

10:30–12:00 · November 8, 2025 · Saturday

Optical ISAC

Presider: Jingchuan Wang, Hong Kong Polytechnic University, Hong Kong, China

10:30–11:00·ACP2025–0806–2 **Invited****Integrated Sensing and Communications for Metropolitan Environments****Alan Pak Tao Lau^{1*}**, Yaxi Yan¹, Jingming Zhang^{1,2}, Yinghuan Li¹, Liwang Lu¹, Jingchuan Wang¹, Chao Lu¹*1. The Hong Kong Polytechnic University, Hong Kong, China; 2. Southern University of Science and Technology, China*

We review our recent works on integrated sensing and communications and highlight smart city applications in metropolitan environments through deployed fibers across Hong Kong

11:00–11:30·ACP2025–0728–14 **Invited****Gaussian Pulse-Based PSS-PPM Scheme for Optical Integrated Sensing and Communication Systems****Fengyuan Tian¹**, Jian Zhao^{2*}, Yunfan Zhang², Gan Zheng¹, **Tianhua Xu^{1*}***1. University of Warwick, United Kingdom; 2. Tianjin University, China*

We present a Gaussian pulse-based PSS-PPM optical ISAC system, enabling simultaneous communication and sensing. Simulation results confirm low bit error rates and high-accuracy distance estimation under atmospheric turbulence for both single- and multi-user scenarios.

11:30–11:45·ACP2025–0801–168

Forward–Transmission Vibration Sensing in MDM Optical Communication Systems Using Weakly–Coupled FMFs**Xiaolai Fu**^{1,2}, Xinke Tang^{1*}, Xu Zhang¹, Zhixue He¹, Jian Song², Jintao Wang^{2*}*1. Pengcheng Laboratory, China; 2. Tsinghua University, China*

We propose a forward–transmission vibration sensing scheme based on DMGD in weakly–coupled FMFs, enabling simultaneous coherent communication and vibration sensing. Simulations confirm accurate vibration localization with relaxed timing synchrony requirement.

11:45–12:00 ACP2025–0801–44

Lightweight Semantic Communication Empowered Spaceborne Optical Wireless Transmissions**Ziyang Meng**^{1,2}, Hangfei Zhang^{1,2}, Jianhua He^{1,2}, Yongsheng Gong^{1,2}, Lyu Congmin^{1,2}, Lu Lu^{1,2*}*1. Technology and Engineering Center for Space Utilization, Chinese Academy of Sciences, China; 2. University of Chinese Academy of Sciences, China*

Optical wireless communications (OWC) have been considered a promising solution for delivering massive data in next–generation spaceborne computing constellations, where a powerful space data–center is connected with a huge number of edge nano–satellites with limited computing resources. An important issue in spaceborne computing is the asymmetric property between the edge node and the datacenter. Another important issue in OWC enabled space computing is its low–pass characteristics even using laser diodes (LDs), and thereby constraining the capacity of OWC intra–satellite links, leading to poor overall system performances. Semantic communication, with its advantages in source compression and channel adaptability, may overcome these limitations. However, state–of–the–art semantic models are often large and difficult to deploy on spaceborne edge computing nodes with limited resources. To address these challenges, we propose LitaSem, a lightweight asymmetric semantic communication model designed for high–quality image transmission over low–pass OWC channels. Specifically, we first conduct architectural optimizations and propose a parameter–efficient design approach to shrink the overall model size; and then shift the edge node’s computational burden to the datacenter; and finally jointly integrate OWC’s low–pass channel characteristics into the end–to–end training process. Experimental results show that LitaSem achieves a 17% reduction in model size compared to classical semantic models, while delivering average gains of 9.54~dB in Peak Signal–to–Noise Ratio (PSNR) and 0.22 in Structural Similarity Index Measure (SSIM). These findings demonstrate the potential of LitaSem for efficient and robust image transmission in resource asymmetric– and–constrained spaceborne computing constellations with limited communication bandwidths.

12:00–13:30 Lunch Break**13:30–15:30 · November 8, 2025 · Saturday****Optical transmission and sensing techniques****Presider: Yixiao Zhu, Shanghai Jiao Tong University, China**13:30–14:00·ACP2025–0801–124 **Invited****Recent Advances in Integrated Forward Vibration Sensing in Optical Communication Systems****Bang Yang**, Moxuan Luo, Quhao Zhuo, Jianwei Tang, Yaguang Hao, **Yanfu Yang**^{*}*Harbin Institute of Technology, China*

Integrated fiber–based forward sensing and communication enables environmental monitoring without additional receivers. This talk highlights recent advances in phase and polarization–based sensing, while discussing current challenges.

14:00–14:15·ACP2025–0814–23

Integration of In–band Polarization–Based Sensing and Communication via Fraction Domain Multiplexing**Yue Wang**¹, **Li Wang**^{1*}, Yibin Li¹, Changyuan Yu¹, Ming Tang^{2*}, Zixian Wei¹*1. The Hong Kong Polytechnic University, Hong Kong, China; 2. Huazhong University of Science and Technology, China*

We have proposed an integrated scheme of in–band spectrum polarization sensing and standard coherent communication via fraction domain multiplexing (FrDM). The proposed approach is verified through 480Gb/s DP–16QAM over 32.5km fiber, achieving 6kHz vibration detection.

14:15–14:30·ACP2025–0721–4

Experimental Demonstration of Multi–User Full–Duplex RO–ISAC System**Shuhang Chen**, Zhihong Zeng, **Chen Chen**^{*}*Chongqing University, China*

A multi–user full–duplex retroreflective optical ISAC (RO–ISAC) system using wavelength division duplexing (WDD) and interference cancellation is proposed. Experimental results demonstrate the feasibility of multi–user joint sensing and communication in the RO–ISAC system.

14:30–14:45·ACP2025–0811–8

Orbital Angular Momentum Beam Distribution Recovery based on Reservoir–computing stimulated Generative Adversarial Network (RC–GAN)**Shuiqiu Diao**, Jianjun Li, Tianfeng Zhao, Baojian Wu, Kun Qiu, Feng Wen**Key Lab of Optical Fiber Sensing and Communications, Ministry of Education, School of Information and Communication Engineering University of Electronic Science and Technology of China, China*

We propose a novel method for recovering orbital angular momentum (OAM) beams based on the reservoir–computing stimulated generative adversarial network (RC–GAN). By combining the modified GAN with the RC network, our method effectively recovers distorted OAM beam distributions under a wide range of atmospheric turbulence strengths. The investigations show that the peak signal–to–noise ratio (PSNR) and the structural similarity index measure (SSIM) of up to 53.61 dB and 0.9984 for the recovered OAM distributions, respectively. Furthermore, the training time is significantly reduced by 60% compared to the conventional CNN–based GANs. Our proposed RC–GAN could serve as a viable solution for addressing atmospheric turbulence effects in future satellite–to–ground laser communications.

14:45–15:00·ACP2025–0813–2

Optics–Informed Residual Convolution Network Equalizer with Adaptive Nonlinear Activation for 140 Gbps PAM4 VCSEL–MMF Links**Yuting Xu**¹, Zhaopeng Xu¹, Jianwei Tang¹, Chuanchuan Yang², Yuping Zhao²*1.Pengcheng Laboratory, China; 2.Peking University, China*

This paper proposes an optics–informed residual convolution network with learnable activation function for high–speed VCSEL–MMF optical interconnects. The proposed method significantly enhances performance across 130–140 Gbps PAM–4 transmissions, outperforming Volterra and conventional neural network baselines.

15:00–15:15 · ACP2025–0814–4

Adaptive Threshold Segmentation with Connected Component Expansion for Low–Intensity Scattering Images Extraction in Acoustic Levitation–Based Angular–Resolved Measurements**Yi Yang**, **Zixuan Zhao***, Jingshi Yang*Xi'an Univ of Posts & Telecommunications, China*

In underwater optical communication and detection systems, the concentration of suspended particles such as chlorophyll significantly affects channel performance. By accurately obtaining scattering images of underwater impurity particles, a channel scattering model for underwater wireless optical communication can be established. In order to accurately obtain low–intensity scattering images under low signal–to–noise ratio, this paper proposes an adaptive largest–component area thresholding method (ALCA) to improve the measurement accuracy of chlorophyll solution scattering characteristics and provide high–quality input for underwater optical communication channel modeling. The proposed method integrates intensity distribution features with connected–component information to adaptively adjust the segmentation threshold and perform expansion compensation for weak–scattering regions, thereby suppressing noise interference while preserving fine structural details. In the experiments, a self–developed angle–resolved scattering measurement system based on acoustic levitation technology was employed to acquire full–angle scattering images of chlorophyll solutions, which were then compared with the results obtained using global threshold segmentation (GLOBAL) and local adaptive threshold segmentation (LOCAL) methods. Quantitative analysis based on four key evaluation metrics demonstrates that the proposed method outperforms the reference algorithms in terms of weak scattering region completeness, boundary accuracy, and noise robustness. This approach ensures high–precision extraction of the scattering phase function, providing a reliable foundation for physics–based optical communication link simulations and performance prediction.

15:15–15:30 · ACP2025–0815–95

Hybrid ML Framework for QoT Prediction and Impairment Diagnosis in Heterogeneous Coherent Optical Networks**Ivan Chebykin**¹, George Andreev², Dimitrii Starykh¹, Oleg Nanii³, Vladimir Treshchikov¹*1.T8, Russia; 2.IRE RAS, Russia; 3.MSU, Russia*

We present a hybrid ML framework combining regression and classification for QoT prediction in coherent optical networks. Trained on realistic data, it enables accurate estimation and detection of inoperability causes across diverse topologies and configurations.

15:30–16:00 Coffee Break

16:00–17:30 • November 8, 2025 • Saturday
Transmissions systems and devices
 Presider: Fabio Bottoni, Cisco, United States

Track 2

Parallel Session

16:00–16:30·ACP2025–0729–46 **Invited**

Novel optical amplifiers for optical communications and beyond
Aleksandr Donodin

Aston University, United Kingdom

This talk explores emerging optical amplifiers based on novel materials and spectral bands. We discuss their potential to enable scalable communications and extend into applications beyond traditional telecom networks.

16:30–17:00·ACP2025–0731–86 **Invited**

Beyond 100-Gbps Visible Light Communications Enabled by Thin-Film Lithium Tantalate Electro-optic Modulators
Changjian Guo¹

National Center for International Research on Green Optoelectronics, South China Normal University, China

This talk explores the development of visible light electro-optic modulators base on thin-film lithium tantalite platform. We discuss their advantages in power, bandwidth, and integration, and demonstrating beyond 100Gbps/λ high-speed underwater optical wireless communications.

17:00–17:15·ACP2025–0728–10

Simplified Degenerate Modes Reception Scheme Using only 2 x 2 MIMO–DSP for Weakly–Coupled FMFs Transmission

Chengbin Long^{1,2}, Gang Qiao¹, Baolong Zhu¹, Yuyang Gao³, Mingqing Zuo⁴, Jian Cui⁵, Jiarui Zhang¹, Siyuan Liu¹, Honglin Ji², Lei Shen⁶, Jie Luo⁶, Yongqi He¹, Zhangyuan Chen^{1,2}, Juhao Li^{1,2*}

1.State Key Laboratory of Photonics and Communications, Peking University, China; 2.Pengcheng Labs, China; 3.School of Computer and Communication Engineering, University of Science and Technology Beijing, China; 4.Department of Fundamental Network Technology China Mobile Research Institute, China; 5.Department of Networks, China Mobile Communications Group Co., Ltd., China; 6.State Key Laboratory of Optical Fiber and Cable Manufacture Technology YOFC, China

We propose a simplified reception scheme using only 2 x 2 MIMO–DSP for degenerate modes to accelerate hardware implementation in weakly-coupled FMF transmission system. The scheme is experimentally verified by 4-wavelength, 4-LP-mode mode-division-multiplexing transmission over 60 km FMF.

17:15–17:30·ACP2025–0731–13 **Industry Innovation Nomination**

Real-Time 228.48 Pb/s•km Transmission Demonstration over 5 x 80-km 7-Core Fiber Using 1.2-Tb/s/λ Transceivers Spanning a 12-THz C+L Band

Anxu Zhang¹, Yueqiu Mu¹, Lipeng Feng¹, Lijun Ma², Lei Shen³, Xishuo Wang¹, Yi Ding¹, Zhengyu Liu¹, Shuo Xu⁴, Lei Zhang³, Jie Luo³, Yi Yu², Xiaoli Huo¹, Junjie Li¹, Chengliang Zhang¹

1.China Telecom Research Institute State Key Laboratory of Optical Fiber and Cable Manufacture Technology, China; 2.Huawei Technologies Co. Ltd, China; 3.State Key Laboratory of Optical Fiber and Cable Manufacture technology Optical valley laboratory, China; 4.State Key Laboratory of Optical Fiber and Cable Manufacture technology, China

Real-time transmission of 7-core x 68-λ x 1.2-Tb/s/λ PCS-64-QAM signals across a 12-THz C+L band spectrum over 5 x 80-km MCF is achieved, resulting a total throughput of 571.2 Tb/s and a record capacity-distance product of 228.48 Pb/s•km.

Track 3: Network Architectures, Management and Applications

Function Room K7, 1F (多功能厅 K7, 1 楼)

13:30–15:30 · November 6, 2025 · Thursday
Advances in Autonomous Optical Networks
 Presider: Yongcheng Li, Soochow University, China

13:30–14:15 · ACP2025-0801-55 **Keynote**

Toward Autonomous Optical Networks: Leveraging SDN, ML, and Real-Time Telemetry

Piero Castoldi

Scuola Superiore Sant'Anna, Italy

This keynote explores how SDN, real-time telemetry, and AI/ML are reshaping optical networks enabling adaptive control, cross-layer integration and intelligent automation for building future-proof optical infrastructures to meet future connectivity demands.

14:15–14:45 · ACP2025-0814-5 **Invited**

International Optical Networks towards 2030 and Beyond (ION-2030) for the AI Era

Xiang Liu

Huawei Technologies, China

In this invited talk, we present recent advances in the ITU-T initiative on International Optical Networks towards 2030 and Beyond (ION-2030) for the AI era, highlighting the mutual enhancement of AI and optical networking technologies.

14:45–15:00 · ACP2025-0714-2

Towards Low Latency and High Reliability Optical Network Automation: A Hierarchical Governance Multi-Agent Framework

Yu He¹, Yongjie Shi², Yuchen Song², Qibin Wu², Lixia Xi¹, Xiaoguang Zhang^{1*}

1. Beijing University of Posts and Telecommunications, China; 2. Huawei Technologies Co., Ltd., China

We propose a novel multi-agent hierarchical governance system for optical networks management. By dividing tasks between regional and core agents, the framework reduces service downtime by 74% while improving log parsing accuracy by 22%.

15:00–15:15 · ACP2025-0801-103

OptiAlarmRCAgent: An Intelligent Agent for Alarm Root Cause Analysis in Optical Networks

Jiahai Sun, Hongxiang Wang*, Yuhang Li, Guanjun Gao, Yuefeng Ji, Beibei Zhang

Beijing University of Posts and Telecommunications, China

We propose OptiAlarmRCAgent, a unified intelligent agent integrating graph retrieval-augmented generation (GraphRAG) and deep search technology. Experimental results indicate that this agent achieves commendable performance in terms of alarm root-cause accuracy in optical networks.

15:15–15:30 · ACP2025-0812-11

Adaptive Distributed DNN Inference Offloading in Multi-Access Edge Computing Networks Interconnected by Metro Optical Networks

Jingjie Xin, Xin Li*, Shanguo Huang

Beijing University of Posts and Telecommunications, China

This paper proposes an adaptive distributed DNN inference offloading scheme to flexibly split DNN inference tasks in MEC networks interconnected by metro optical networks. Simulation results show the proposed scheme achieves a high acceptance ratio.

15:30–16:00 Coffee Break

16:00–17:45 · November 6, 2025 · Thursday
Scalable AI in Optical Infrastructure
 Presider: Nan Hua, Tsinghua University, China

16:00–16:30 · ACP2025-0812-3 **Invited**

Exploration of Optical Transmission Network Technology Supporting Distributed Training of Large Language Models

Yuyang Liu^{1*}, Anxu Zhang¹, Xia Sheng¹, Kai Lv¹, Hao Liu¹, Lipeng Feng¹, Xishuo Wang¹, Tao Ma², Zhenfang Wang², Xiaoli Huo¹, Junjie Li¹

1.China Telecom Research Institute, State Key Laboratory of Optical Fiber and Cable Manufacture Technology, China;2.China Telecom Corporation Limited, China

The rapid growth of large language models (LLMs) has exceeded the capacity of single data centers, making distributed training across multiple sites essential. Optical transmission networks have become the carrier base for massive data in distributed training due to their characteristics of ultra large bandwidth, ultra-high reliability, and ultra-low latency. Starting from the analysis of the training requirements for large models, this paper introduces the training capabilities and current situation of mainstream companies, and analyzes and prospects the optical transmission network technology suitable for distributed training in multiple data centers.

16:30–17:00 · ACP2025-0915-8 **Invited**

TBD

Yunbin Xu

China Academy of Information Communications Technology(CAICT), MIIT, China

TBD

17:00–17:30 · ACP2025-0813-13 **Invited**

Field Trial of Decentralized Training with Separation of Compute and Storage over 240km Based on Optical Transport Network for Artificial Intelligence

Shan Cao¹, Dechao Zhang¹, Jiang Sun¹, Mingqing Zuo¹, Tao Wei², **Dong Wang^{1*}**

1.China Mobile Research Institute, China;2.China Mobile Communications Group Hubei Co., Ltd., China

A novel OTN-based decentralized training scheme with separation of compute and storage is proposed and demonstrated in a field trial. The PP training efficiency remains 99.29% when the transmission distance extends to 240 km

17:30–17:45 · ACP2025-0815-91

Conflict-Free Table-Based Timeslot Switching Strategy for Distributed AI Training in a Multi-granularity All-Optical Spine-Leaf Network

Jichen Zhang, Jiawei Zhang^{*}, Bojun Zhang, Zhiqun Gu, Yuefeng Ji^{*}

Beijing University of Posts and Telecommunications, China

We propose a conflict-free table-based timeslot switching strategy, which establishes the conflict-free conditions for optical timeslot switching in multi-granularity all-optical spine-leaf networks through mathematical modeling, and then jointly with predictions of distributed AI training traffic to generate the conflict-free switching timeslot tables. It enables non-blocking optical timeslot switching effectively reducing the source-side blocking rate by 2.87% and improving network throughput by 42.87%.

18:00–20:00 Welcome Reception

08:30–09:45 · November 7, 2025 · Friday
Optical Wireless Communication
 Presider: Jun Li, Soochow University, China

08:30–09:15 · ACP2025-0910-1 **Keynote**

Advanced Techniques for Beam-Steered High-Capacity Optical Wireless Networks

Ton Koonen

Eindhoven University of Technology, Netherlands

Unprecedented wireless capabilities can be achieved by directed narrow infrared beams, providing very high data rates to many densely spaced users individually. Novel concepts for further increasing data capacity and augmenting receiver performance are presented.

09:15–09:45 · ACP2025–0915–11 **Invited****Intelligent and Flexible Coherent Optics for Next-Generation Optical Access Network****Junwen Zhang***Fudan University, China*

Intelligent and flexible coherent optics is emerging as a key enabler for next-generation 200G and 400G optical access networks. This talk reviews recent progress in simplified coherent transceivers, flexible-rate transmission, and AI-assisted DSP optimization. It further discusses practical challenges and explores potential solutions for coherent PON toward data-center access networks.

10:00–10:30 Coffee Break

10:30–12:00 · November 7, 2025 · Friday
Transmission Systems & Physical Layer
 Presider: Junwen Zhang, Fudan University, China

10:30–11:00 · ACP2025–0510–1 **Invited****How intermodal interference affects WDM networks based on hollow core fiber****Thierry Zami^{*}**, Nicola Rossi, Bruno Lavigne*ASN, France*

Since hollow core fiber is now seen as a very promising component for future telecommunication WDM networks, we examine how its benefit for large core networks depends on intermodal interference and on possible optoelectronic regeneration

11:00–11:30 · ACP2025–0801–115 **Invited****Disaster-Resilient Provisioning in C+L Multi-Band Optical Networks**Minwei Fan^{1,2}, Yuanhao Liu^{1,3}, **Ning Deng^{1,3}**

1. Great Bay University, China; 2. Southern University of Science and Technology, China; 3. Dongguan Key Lab of Intelligence and Information Technology, China

We propose a novel provisioning and protection scheme for C+L multi-band WDM networks, with enhanced survivability in accident or disaster-caused multi-failure scenarios. We have incorporated practical C+L system characteristics into our model and designed a computation-efficient heuristic solution.

11:30–11:45 · ACP2025–0801–151 **Industry Innovation Nomination****Causal Learning Based Faults Localization Fusion Method for Large-scale OTN**Xin Qin^{*}, **Xiaotian Jiang¹**, Zhengyi Zou², Yadong Gong¹, Hui Li², Xiaofeng Wu³, Rentao Gu², Xiaoli Huo¹, Meng Chen⁴, Junjie Li¹

1. China Telecom Research Institute, China; 2. Beijing University of Posts and Telecommunications (BUPT), China; 3. Cloud Network Operations Department, China Telecom, China; 4. China Telecom Intelligent Network Technology Co. Ltd., China

This study proposes a slice-based Topological Hawkes Process (sTHP) for alarm analysis and integrating AI classification with interpretable causal modeling to localize faults in large-scale OTN. The field trials show 98.8% root faults localization accuracy (9.7% over Apriori), balancing model transparency and algorithmic precision

11:45–12:00 · ACP2025–0801–62

A Novel Method for Optical Fiber Asymmetry Delay Compensation**Rongduo Lu^{*}**, Liuyan Han¹, Han Li¹, Chunming Yu², Wei Hong³

1. China Mobile Research Institute, China; 2. China Mobile Group Beijing Co., Ltd, China; 3. China Mobile Group Zhejiang Co., Ltd, China

We propose a novel machine-learning-based method using sparse optimization to infer optical fiber asymmetry, achieving sub-10-nanosecond accuracy asymmetry compensation in large-scale 10k+ node networks without manual OTDR measurement.

12:00–13:30 Lunch Break

13:30–15:30 · November 7, 2025 · Friday

Signal Processing & Fault Diagnosis

Presider: Ning Deng, Great Bay University/Dongguan Key Lab of Intelligence and Information Technology, China

13:30–14:00 · ACP2025–0731–73 **Invited****Feedforward Compensation of Frequency Drift and Phase Noise of Sub-THz Signal in Optical Heterodyne Technique**Kyungmin Woo, **Hoon Kim***

KAIST, Korea

We present a feedforward compensation scheme that significantly enhances frequency and phase performance of sub-THz signals generated by the optical heterodyne technique.

14:00–14:30 · ACP2025–0801–6 **Invited****Experimental Insights on Fault Localization and Energy Efficiency in Multi-Core Fiber Systems****Andrea Marotta**^{1*}, Giammarco Di Sciuolo¹, Cristian Antonelli¹, Mëmëdhe Ibrahim², Giovanni Simone Sticca², Francesco Musumeci², Massimo Tornatore²

1.University of L'Aquila, Italy; 2.Politecnico Di Milano, Italy

We report experimental results from the multi-core-fiber testbed in the city of L'Aquila, demonstrating machine-learning-based fault localization that achieves 94% accuracy and discussing energy efficiency in spatially-multiplexed optical systems.

14:30–14:45 · ACP2025–0815–5

Fault Identification in Optical Networks Based on Distillation and Synthetic Sample Augmentation**Meiru Wang**¹, Hui Li^{1*}, Xin Qin², Yadong Gong², Yuqing Han², Zheqing Lv², Xiankun Zhu³, Xiaowei Lou³, Rentao Gu¹

1.Beijing University of Posts and Telecommunications (BUPT), China; 2.China Telecom Research Institute, China; 3.China Telecom Intelligent Network Technology Co.Ltd., China

We propose the Distillation and Synthetic Minority Oversampling Technique Enhanced Root Cause Alarm Framework, achieving over 90% precision and recall and reducing missed-detection and false-alarm rates by over 70% with root-cause alarms less than 1%.

14:45–15:00 · ACP2025–0729–13

DQN-Based Online Optimization of Amplifier Reconfiguration Order for Stability and Reliability in Intelligent Optical Networks**Yu He**¹, Yongjie Shi², Yuchen Song², Yihang Lou², Lixia Xi¹, Xiaoguang Zhang¹

1.Beijing University of Posts and Telecommunications, China; 2.Huawei Technologies Co., Ltd., China

We propose a DQN-based online method for optimizing EDFA reconfiguration order in optical networks, featuring an adaptive re-ward design. This approach avoids up to 1 dB of GSNR degradation and consistently outperforms 97% random orders.

15:00–15:15 · ACP2025–0815–41

Feature Correlation-based Data Augmentation for QoT Estimation in Optical NetworksXin Qin¹, **Jie Li**², Boya Sun¹, Zhiquan Gu^{2*}, Xiaotian Jiang¹, Xia Gao¹, Rentao Gu², Xiaoli Huo¹, Yuefeng Ji²

1.China Telecom Research Institute, China; 2.Beijing University of Posts and Telecommunications, China

We propose a data augmentation strategy based on feature correlation, realizing high-precision QoT estimation of lightpaths with few samples. Simulation results show that the proposed method can reduce the data requirements of QoT estimation by 79% with the same accuracy, effectively saving the training samples.

15:15–15:30 · ACP2025–0722–5

TopoFair: A Fairness-Aware Topology Selection for Reconfigurable Data Center NetworksZhiwei Yu¹, Chengze Du¹, **Heng Xu**¹, Haojie Wang², Bo Liu¹, Jialong Li^{1*}

1.Shenzhen University of Advanced Technology, China; 2.China Mobile Research Institute, China

We propose a lightweight Post-Selection strategy TopoFair to solve the unfairness of opera by balancing the distribution of hops, improving flow completion time up to 49% without sacrificing efficiency.

15:30–16:00 Coffee Break**15:30–17:30 Poster Session****18:30–20:30 Banquet & Awards Ceremony**

08:30–10:00 · November 8, 2025 · Saturday
Secure Communication and Networking
 Presider: Wei Wang, Beijing University of Posts and Telecommunications, China

08:30–09:00 · ACP2025-0606-1 **Invited**

Reconfigurable Intelligent Surface Aided Covert Communication over Optical Network

Huatao Zhu

National University of Defense Technology, China

To overcome the near-far effects and physical obstructions at the receiving end for spread-spectrum communication, a reconfigurable intelligent surface aided covert communication scheme over optical network is proposed and demonstrated by a proof-of-concept experiment.

09:00–09:30 · ACP2025-0801-129 **Invited**

Toward Real-World Quantum Networks: Interoperability, Coexistence, and High-Rate QKD

Domenico Rubezzo¹, Sebastiano Cocchi¹, Zahidy Mujtaba², Qi Wu³, Antonio Mecozzi⁴, Cristian Antonelli⁴, Alessandro Zavatta⁵, Davide Bacco¹

1. University of Florence, Italy; 2. Technical University of Denmark, Denmark; 3. Hong Kong Polytechnic University, Hong Kong, China; 4. University of L'Aquila, Italy; 5. National Institute of Optics, Italy

We present four real-world experiments demonstrating progress toward quantum network deployment, showcasing cross-border connectivity, interoperability of infrastructures, and the use of quantum properties and technologies to enhance key rates and enable coexistence with classical communication.

09:30–09:45 · ACP2025-0727-10

Globally Balanced Multidimensional Resource Allocation for Data Center Optical Networks Secured by Quantum Key Distribution

Yijia Zheng¹, Yuan Cao^{1*}, Xiaoyu Wang²

1. Nanjing University of Posts and Telecommunications, China; 2. China Academy of Information and Communications Technology, China

This paper proposes a globally balanced multidimensional resource allocation algorithm for data center optical networks secured by quantum key distribution, increasing the success probability of cloud-edge service requests by 24.42%, while improving multidimensional resources utilization.

09:45–10:00 · ACP2025-0731-44

Purification-enabled Entanglement Capability-Prioritized Routing in Quantum Networks

XuanLi Dou¹, Xiaosong Yu¹, Yuhang Liu¹, Jingjing Geng^{2*}, Yongli Zhao¹, Jie Zhang¹

1. Beijing University of Posts and Telecommunications, China; 2. Wuhan Software Engineering Vocational College, China

This paper addresses the issues of resource allocation in resource-constrained quantum networks by proposing a Purification-enabled Entanglement Capability-Prioritized Routing Algorithm (Q-PCRA). Simulation results show that, compared with the baseline, the proposed algorithm achieves higher service success rate and better end-to-end fidelity in resource-constrained scenarios.

10:00–10:30 Coffee Break

10:30–12:00 · November 8, 2025 · Saturday
Sustainable Data Center Solutions
 Presider: Huatao Zhu, National University of Defense Technology, China

10:30–11:00 · ACP2025-0915-10 **Invited**

Optical Switching Enhanced AI Data Centers

Xuwei Xue

Beijing University of Posts and Telecommunications, China

Optical switching technologies are emerging as a pivotal innovation to address the escalating bandwidth and energy demands of artificial intelligence (AI) data centers. In this talk, we will present promising schemes for deploying optical switches in AI data centers, highlighting the deployment benefits of link reconfiguration, flow forecasting and redirection, and full mesh link provision.

11:00–11:30 · ACP2025–0813–17 **Invited****Uniform–Cost Multi–Path Routing for Reconfigurable Data Center Networks****Jialong Li***Shenzhen University of Advanced Technology, China*

Reconfigurable data center networks (RDCNs) challenge hop count–based routing due to dynamic topologies. We propose Uniform–Cost Multi–Path (UCMP) routing, balancing latency and bandwidth efficiency, achieving up to 98% lower FCT and 1.55× bandwidth efficiency.

11:30–11:45 · ACP2025–0814–38

Carbon–Aware LLM Inference Instance Deployment and Workload Assignment Across Geo–distributed Data Centers**Yanran Xiao**, Wei Wang, Qiaojun Hu, Yibo Wang, Yajie Li, Yongli Zhao, Jie Zhang*Beijing University of Posts and Telecommunication, China*

We optimize LLM inference deployment and workload assignment across geo–distributed data centers, using a MILP model to minimize GHG emissions under latency constraints. Results show strategic regional allocation significantly reduces carbon footprint in heterogeneous global infrastructures.

11:45–12:00 · ACP2025–0729–51

SWAN: A Network–Aware Scheduler for Adaptive Optical Network Reconfiguration in Distributed LLM Training**Xingyu Liu**, Dianxuan Fu, Xiaomin Liu, Yihao Zhang, Weisheng Hu, Qunbi Zhuge**Shanghai Jiao Tong University, China*

We propose SWAN, a network–aware strategy scheduler that supports switching of parallelization strategies in distributed LLM training by orchestrating optical network topology reconfigurations, achieving up to 38.2% higher network throughput in simulations.

12:00–13:30 Lunch Break

13:30–15:30 · November 8, 2025 · Saturday

Network Architecture & Switching Technologies

President: Xuwei Xue, Beijing University of Posts and Telecommunications, China

13:30–13:45 · ACP2025–0731–27

Field Trial of NaaS–based Service Auto–management Mechanism for Multi–domain Optical Networks**Haibin Huang**, Liuyan Han*, Minxue Wang, Wenhui Zhou, Han Li*Department of Fundamental Network Technology, China Mobile Research Institute, China*

We propose a network–as–a–service (NaaS)–based network automation mechanism for optical networks, and evaluate its automation performances in field tests. The results show that the proposed NaaS–based mechanism achieves faster service setup and adjustment.

13:45–14:00 · ACP2025–0815–127

Digital Twin–Assisted Health Assessment for S+C+L–Band Transmission**Yu Tang¹**, Yan Shi¹, Yujia Yang², Shikui Shen¹, Chuangye Wang¹, He Zhang¹, Zelin Wang¹, Guangquan Wang¹, Xiaomei Ma¹, Zhengsi Shi¹, Xiaocun Liu¹, Mei Song¹, Danshi Wang², Xiongyan Tang¹*1.China Unicom, China;2. Beijing University of Posts and Telecommunications, China*

Health assessment is essential for ensuring reliable operation and proactive maintenance in optical networks. In this work, we demonstrate digital twin–assisted health assessment for a 4–span S+C+L–band transmission system, where optical power and OSNR assessment are carried out.

14:00–14:15 · ACP2025–0730–48

Revisiting Routing Optimization in Cross–Layer Networks with LLM–Assisted Auxiliary Graphs**Ruikun Wang¹**, Qiaolun Zhang², Jiawei Zhang³, Xin Wang⁴, Zheng Zhang², Zhiqun Gu³, Jingjing Wang¹, Massimo Tornatore²*1.Qingdao University of Science and Technology, China;2.Politecnico di Milano, Italy;3.Beijing University of Posts and Telecommunications, China;4.Beijing Information Science and Technology University, China*

We investigate routing optimization in cross–layer networks using a large language model (LLM)–assisted auxiliary graph. Numerical results show that it significantly outperforms both heuristic and DRL methods in terms of resource efficiency and latency reduction.

14:15–14:30 · ACP2025-0815-35

A Novel Node Upgrade Strategy for Partial-Port Wavelength-Conversion MB-OXCs in Multi-Band Optical Networks**Feifei Jin**, Ningning Guo, Yongcheng Li, Gangxiang Shen**Soochow University, China*

Upgrading conventional multi-band optical cross connects (MB-OXCs) to partial-port wavelength conversion (PPWC) MB-OXCs can significantly improve blocking performance in multi-band optical networks. However, PPWC MB-OXCs incur higher costs due to the need for inter-band wavelength converters. Furthermore, node upgrades are typically implemented gradually rather than all at once, raising the question of how to upgrade these nodes efficiently. To address this, we propose a novel strategy that selectively upgrades certain critical nodes to PPWC nodes while keeping the remaining nodes as conventional MB-OXCs. Simulation results demonstrate that the proposed strategy can substantially reduce service blocking while maintaining low network costs.

14:30–14:45 · ACP2025-0730-57

Twisted and Folded: Increasing the Capacity of Clos-WSS Optical Cross-Connect (OXC)**Jiemin Lin**¹, Gangxiang Shen², Yongcheng Li²*1. Cloud Computing Corp., China Telecom., China; 2. Soochow University, China*

In this paper, we propose the TF-Clos-WSS OXC, which integrates the TF-Clos architecture into the conventional Clos-WSS OXC. TF-Clos-WSS OXC improves capacity over conventional Clos-WSS by eliminating idle WSS ports needed for non-blocking.

14:45–15:00 · ACP2025-0814-48

Multi-Hop Power-Spectrum and GSNR Prediction based on Cascade Learning**Shangbo Lin**¹, Zhiqun Gu¹, Xin Qin², Xiaotian Jiang², Shaopeng Li¹, Jiawei Zhang², Xiaoli Huo², Yuefeng Ji¹*1. Beijing University of Posts and Telecommunications, China; 2. State Key Laboratory of Optical Fiber and Cable Manufacture Technology, China Telecom Research Institute, China;*

We propose a cascade learning framework for QoT based on ANN and ISRSNG for C+L WDM operating optical network. Simulations confirm the proposed method's high accuracy in predicting hop-level power-spectrum and GSNR.

15:00–15:15 · ACP2025-0815-23

Topology-Repairing Based on Inter-Satellite Laser Link Reconfiguration in Optical Satellite Networks**Chongzhu Huang**, Wei Wang*, Qiaojun Hu, Yi An, Yongli Zhao, Jie Zhang*Beijing University of Posts and Telecommunications, China*

This paper presents a topology-aware link reconfiguration (TALR) scheme that improves network availability under laser terminal failures, reducing blocking probability by 27.9% and decreasing isolated nodes by 23.3% in simulation.

15:15–15:30 · ACP2025-0815-125

Spatio-Temporal Datacenter Selection and Routing in Bandwidth-Limited Optical Satellite Networks**Kexin Gao**, Wei Wang*, Yanran Xiao, Yujie Li, Yongli Zhao, Jie Zhang*Beijing University of Posts and Telecommunications, China*

STDSRM mitigates spatio-temporal congestion in LEO-DCI networks via joint optimization, reducing blocking ratio by 74.3%. It combines semi-dynamic topology planning (SDRCP) and datacenter selection (STDSS) to resolve tidal-user and DC hotspot congestion.

15:30–16:00 Coffee Break

16:00–17:30 · November 8, 2025 · Saturday
Space-Ground Integrated Networks
 Presider: Jun Li, Soochow University, China

16:00–16:30 · ACP2025-0814-43 **Invited****Robust Space-Ground Integrated Optical Networking over Dynamic LEO Satellite Constellations****Wei Wang**, Yongli Zhao, Jie Zhang*Beijing University of Posts and Telecommunications, China*

The mobility of LEO satellites challenges network's availability and stability. This work investigates survivability strategies to enhance the robustness of optical satellite networks, emphasizing redundancy, fault tolerance, and adaptive reconfiguration to sustain reliable space-ground communications.

16:30-16:45 · ACP2025-0801-174

Impact of Acquisition, Tracking and Pointing (ATP) Capability on Inter-Satellite Path Selection and Performance Evaluation**Shichun Liu¹**, Nan Hua^{2,3,4}, Kangqi Zhu^{2,3,4}, Zhenrong Zhang^{1,5,6*}, Shangyuan Li^{2,3,4}, Xiaoping Zheng^{2,3,4}

1. Guangxi University, China; 2. Beijing National Research Center for Information Science and Technology (BNRist), China; 3. State Key Laboratory of Space Network and Communications Department of Electronic Engineering, China; 4. Tsinghua University, China; 5. School of Computer, Electronics and Information, China; 6. Guangxi Key Laboratory of Multimedia Communications and Network Technology, China

We analyze the acquisition process of inter-satellite laser communication and propose ATP-aware routing to avoid weak links, thereby improving the performance of satellite optical networks.

16:45-17:00 · ACP2025-0814-17

Eavesdropping-Aware Secure Routing in Optical Satellite Networks: A Topology Performance Comparison**Zihao Lin¹**, Liyazhou HU^{1*}, Wang Wei², Zhu Han³, Zhao Yongli², Zhang Jie²

1. Shenzhen Polytechnic University, China; 2. Beijing University of Posts and Telecommunications, China; 3. University of Coimbra, Portugal

This paper proposes an eavesdropping-aware routing method for optical satellite networks. Compared to the performances in full-mesh topology, the fully interconnected topology effectively reduces path risk, latency, and number of hops, but consumes more energy.

17:00-17:15 · ACP2025-0815-32

Sun-Outage-Aware SRLG Modeling and Path Protection in Satellite Optical Networks**Yansong Fu**, Yongli Zhao^{*}, Wei Wang, Xin Li, Wenhong Liu, Jie Zhang

Beijing University of Posts and Telecommunications, China

We propose an SRLG model to mitigate simultaneous sun-induced optical link failures in satellite networks and design a path protection scheme, reducing service blocking rate by 40.1% while maintaining complete protection.

17:15-17:30 · ACP2025-0815-126

A Deep Reinforcement Learning-Based Service Path Prediction Strategy in Multi-Layer LEO Optical Satellite Networks**Yue Wei¹**, Hua Wang^{1*}, Wei Wang², Yifeng Li¹, Long Wang³, Yongli Zhao²

1. College of Computer and Information Engineering (College of Artificial Intelligence), Nanjing Tech University, China; 2. State Key Laboratory of Information Photonics and Optical Communications, Beijing University of Posts and Telecommunications, China; 3. Innovation Academy for Microsatellites of Chinese Academy of Sciences, China

ML-LEO OSNs face dynamic topology and resource challenges. We propose a DRL-based service path prediction strategy using logical domains and MINLP optimization, significantly reducing end-to-end delay and improving load balancing compared to existing methods.

Track 3: Network Architectures, Management and Applications (Parallel Session)

Function Room K5, 1F (多功能厅 K5, 1 楼)

13:30–15:30 · November 6, 2025 · Thursday

Core & Transport Network Evolution

Presider: Xiaoliang Chen, University of Science and Technology of China, China

13:30–14:15 · ACP2025-0814-26 **Keynote**

How the future optical x-haul network architecture in 6G may be implemented? A view from Europe

Ioannis Tomkos

University of Patras, Greece

In this talk, we will outline the evolving vision of major EC-funded research consortia (FLEX-SCALE & PROTEUS-6G) that are investigating the future optical network infrastructure innovations that should be developed to satisfy the stringent requirements of emerging 6G mobile networks.

14:15–14:45 · ACP2025-0721-1 **Invited**

Recently technologies and ITU-T standardization progress of optical networks

Shikui Shen

China Unicom Research Institute, China

This paper summarized recently advance technologies innovation and ITU-T standardization progress of optical networks, mainly including 800G and beyond WDM/OTN, C+L band transmission, digital twin, convergent sensing and communication, open and disaggregated, new fibres, and free space optical communication, etc.

14:45–15:15 · ACP2025-0912-1 **Invited**

LLM-Powered AI Agents for Autonomous Optical Networks: Recent Advances and Field Trial Demonstrations

Qizhi Qiu, Yihao Zhang, Xiaomin Liu, Lilin Yi, Weisheng Hu, Qunbi Zhuge*

Shanghai Jiao Tong University, China

Large language models (LLMs) have catalyzed artificial intelligence (AI) agent development for autonomous optical networks (AONs). This invited paper reviews our recent progress in leveraging LLM-powered AI agents for realizing AONs in field-deployed networks.

15:15–15:30 · ACP2025-0801-206

Field-trial Investigations into the Impact of Digital Twin Accuracy on Optical Power Optimization

Xiaomin Liu¹, Cheng Yuming¹, Yihao Zhang¹, Xiang Shaowen¹, Qiu Qizhi¹, Massimo Tornatore², Hu Weisheng¹, Qunbi Zhuge^{1*}

1. Shanghai Jiao Tong University, China; 2. Politecnico di Milano, Italy

This paper evaluates the impact of Digital Twin (DT) accuracy on optical power optimization using a field-trial testbed.

15:30–16:00 Coffee Break

16:00–17:30 · November 6, 2025 · Thursday

Data Center & Computing-Centric Networking

Presider: Weigang Hou, Northeastern University, China

16:00–16:30 · ACP2025-0724-7 **Invited**

Accelerating Collective Communications in Optical Rackless DC with P4-based In-Network Computing

Weichi Wu, Xingming Cui, Zeyu Li, Xiaoliang Chen, Zuqing Zhu

University of Science and Technology of China, China

This work presents P4-ORDC, a novel architecture that exploits the mutual benefits of optical rackless data centers (ORDCs) and in-network computing (INC) to accelerate collective communications. Specifically, P4-ORDC reshapes collective communications by leveraging optical circuit switching (OCS) to flexibly group computing nodes with more intensive mutual demand and INC to perform in-network aggregation. We devise a hierarchical grouping-based job scheduling scheme to optimize the timing of jobs' computing and communication phases and OCS configurations in P4-ORDC. Our proposal is verified with real-world experiments and numerical simulations, demonstrating job completion time (JCT) reduction over benchmarks.

16:30-17:00 · ACP2025-0801-131 **Invited****Co-packaged optics for high-bandwidth and energy-efficient network in AI data center****Shaoliang Yu***Zhejiang Lab, China*

The advancement of AI has created entirely new demands for computing. CPO, capable of delivering high bandwidth, power efficient, and low latency interconnect, represents the inevitable trends for the evolution of data center networks.

17:00-17:15 · ACP2025-0718-4 **Industry Innovation Nomination****Novel Deterministic Ultra-Low Latency Multi-Services Slicing Technology for Data Center Network and Field Trial**

Han Li¹, Liuyan Han^{1*}, **Minxue Wang¹**, Hongqiang Zou², Lirong Bai², Sheng Liu¹, Wei Xue³, Xinyu Chen¹, Rongduo Lu¹, Dechao Zhang¹
 1.China Mobile Research Institute, China;2.China Mobile Communications Group Co., Ltd., China;3.Huawei Technologies Co., Ltd., China

A novel deterministic low-latency and multi-service slicing technology for DC is reported. Field trials with 3 slicing-tasks show 0.99ms latency, 19.84us jitter, and 10.7-fold jitter reduction over 150km across 3 AZs compared to traditional solutions.

17:15-17:30 · ACP2025-0722-4

Learning Optimal Transport for GPU Allocation: A Deep Learning Approach to Efficient Resource SchedulingChengze Du¹, Zhiwei Yu¹, **Heng Xu¹**, Haojie Wang², Bo Liu¹, Jialong Li^{1*}

1.Shenzhen University of Advanced Technology, China;2.China Mobile Research Institute, China

We propose Deep Optimal Transport (DOT), combining deep learning with optimal transport for GPU resource allocation. Experiments show DOT achieves near-optimal performance while reducing carbon emissions by 20% versus baselines.

18:00-20:00 Welcome Reception

08:30-10:00 · November 7, 2025 · Friday

Vehicular Optical Networks

Presider: Jialong Li, Shenzhen University of Advanced Technology, China

08:30-09:15 · ACP2025-0915-25 **Keynote****Towards Autonomous Communication Infrastructures: From Programmability to Intelligence****Paolo Monti***Chalmers University of Technology, Sweden*

The talk explores the path toward autonomous communication infrastructures, highlighting how virtualization, AI/ML, and automation enable self-driving networks. It discusses opportunities, challenges, and limitations to assess the realistic potential of autonomy.

09:15-09:45 · ACP2025-0814-3 **Invited****Optical Evolution for In-Vehicle Network****Weigang Hou***Chongqing University of Posts and Telecommunications, China*

We systematically explore the evolution of in-vehicle optical network architectures, and our reflective meta-surfaces can function as an alternative in-vehicle optical switching unit.

09:45-10:00 · ACP2025-0815-39

FASync: A Fast and Accurate Time Synchronization Mechanism for All-Optical Metropolitan Spine-Leaf Networks**Xingyi Zhang**, Yuanhang Shi, Huitao Zhou, Jiawei Zhang^{*}, Yuefeng Ji^{*}*Beijing University of Posts and Telecommunications, China*

FASync is a two-stage time synchronization scheme for all-optical MSLN, decoupling synchronization from static slots, compensating link delays, fusing multi-path offsets, achieving sub-10 ns accuracy and 40%+ sync latency reduction.

10:00-10:30 Coffee Break

10:30–12:00 · November 7, 2025 · Friday

Optical Access Network Technologies

Presider: Jiawei Zhang, Beijing University of Posts and Telecommunications, China

10:30–11:00 · ACP2025-0722-9 **Invited****Standard Development and Deployment Status of Fiber-to-the-Room (FTTR)**Yuanqiu Luo¹, **Yan Zeng**², Frank Effenberger¹*1.Futurewei Technologies, United States; 2.Huawei Technologies, China*

This invited talk reviews the latest standardization efforts on Fiber-to-the-Room (FTTR) in ITU-T, ETSI, and CCSA, and provides an overview of its deployment status and adoption trends across global markets.

11:00–11:30 · ACP2025-0731-119 **Invited****Unified Optical Access Network: Architecture and Bandwidth Scheduling**Wanting Han¹, Xiang Lu², **Jun Li**¹*1.Soochow University, China; 2.Universitat Politècnica de Catalunya, Spain*

This paper introduced a unified optical access network that integrates 50G passive optical network (PON) and G.711, as well as a unified scheduling protocol. The PON bandwidth can be reserved by using scheduling information of G.711 to reduce upstream latency.

11:30–11:45 · ACP2025-0814-22

Bandwidth Allocation Algorithm for Industrial Passive Optical Networks Based on Multi-branch LSTM-Attention Model**Weiwei Han**^{1,2,3}, Yan Shao², Zelin Wang², Guangquan Wang², Xiongyan Tang^{2*}, Min Zhang³*1.China United Network Communications Group Corporation Limited, China; 2.China Unicom Research Institute, China; 3.State Key Laboratory of Information Photonics and Optical Communications, Beijing University of Posts and Telecommunications, China*

Targeting industrial PON scenario, we propose a bandwidth allocation algorithm based on multi-branch LSTM-Attention model. Compared to IPACT algorithm, the proposed algorithm is load-independent and maintains low latency (around 1ms), especially under high loads.

11:45–12:00 · ACP2025-0815-44

Stochastic Network Calculus-based Bandwidth allocation scheme for Asynchronous Time-Sensitive Industrial Applications in TDM-PON**Lizhu Liu**¹, Chen Su², Yuefeng Ji^{1*}, Jiawei Zhang^{1*}*1.Beijing University of Posts and Telecommunications, China; 2.Purple Mountain Laboratories, China*

We propose an optimized bandwidth allocation scheme utilizing stochastic network calculus theory. The proposed scheme reduces transmission window sizes while still guaranteeing deterministic transmission, thereby improving both schedulability and resource utilization efficiency.

12:00–13:30 Coffee Break

13:30–15:30 · November 7, 2025 · Friday

Next-Generation Industrial Passive Optical Networks

Presider: Xiaosong Yu, Beijing University of Posts and Telecommunications, China

13:30–14:00 · ACP2025-1016-1 **Invited****Communication and Sensing via Hermite-Gaussian Time-Domain Mode-Division-Multiple-Access****Xiaonan Yu**¹, Zejie He¹, Shoufeng Tong¹, Janosch Meier², Thomas Schneider^{2*}*1.School of Opto-Electronic Engineering Changchun University of Science and Technology, China; 2.Institut für Hochfrequenztechnik Technische Universität Braunschweig, Germany*

We propose a method for time-domain mode division multiplexing based on Hermite Gaussian (HG) signals that can simultaneously perform communication and sensing tasks. An all-electronic time-domain mode division multiplexing transceiver is designed and implemented. The core of this transceiver is a delay-locked loop (DLL) to achieve signal phase locking, thereby enabling mode division multiplexed communications. Through simulation, we verify that this scheme can not only transmit multiplexed data streams at GHz-level communication rates but also simultaneously performs sensing, demonstrating its unique 'communication-sensing integration' capability. This research provides an important step for the development of next-generation integrated, high-speed space laser communication systems.

14:00-14:30 · ACP2025-0915-9 **Invited****Time deterministic optical access network: challenges and solutions****Jiawei Zhang***Beijing University of Posts and Telecommunications, China*

TBD

14:30-14:45 · ACP2025-0815-99

Service Slice-based Deterministic Bandwidth Allocation Scheme for Industrial TDM-PON**Zhiqing Wei**, Xin Li^{*}, Yongli Zhao^{*}*Beijing University of Posts and Telecommunications, China*

To address the problem that existing TDM-PON bandwidth allocation schemes cannot simultaneously provide deterministic guarantees and differentiated service isolation for diverse industrial applications, we propose a Service Slice-based Deterministic Bandwidth Allocation (SSDBA) scheme. This scheme combines service-aware network slicing with time-aware scheduling, introducing multi-dimensional constraints such as delay, jitter, and slice isolation. Simulation results show that SSDBA can achieve deterministic transmission, and the average bandwidth efficiency is 14.66% than FBA.

14:45-15:00 · ACP2025-0801-98

Statistical and Deterministic Delay Guarantee for Industrial PON: A Network Calculus Approach**Weixuan Fan**, Jin Li^{*}, Yonghan Wu, Yi Huang, Dongxu Zhang, Min Zhang*Beijing University of Posts and Telecommunications, China;*

We proposed a statistical and deterministic delay guarantee mechanism based on network calculus to provide differentiated upstream delay guarantees.

15:00-15:15 · ACP2025-0730-5

First Demonstration of FTTR-based RFID Network for Integrated Sensing and Communication**Shan Zhang**¹, Junwei Li¹, Jinglong Zhu¹, Dechao Zhang¹, Yan Zeng², Yuanqiu Luo³*1.China Mobile Research Institute, China;2.Huawei Technologies, China;3.Futurewei Technologies, United States*

A hybrid network architecture integrating FTTR and RFID technologies is firstly proposed to support both gigabit coverage and IoT connections. Leveraging FTTR's coordinated management and sub-190μs low-latency channel, RFID performance is improved and validated in field trials.

15:15-15:30 · ACP2025-0815-2

Noise-resilient Hardware Fingerprinting for Physical-layer Authentication in Passive Optical Networks**Fan Ouyang**, Wei Wang, Jie Zhang^{*}, Tianhe Liu, Yongli Zhao, Yajie Li*Beijing University of Posts and Telecommunications, China*

We propose a noise-resilient PON device authentication method via STFT and attention-fused DSCNN, achieving 99.5% accuracy at 20dB SNR with robust noise resistance.

15:30-16:00 Coffee Break**15:30-17:30 Poster Session****18:30-20:30 Banquet & Awards Ceremony**

Track 4: Optoelectronic Devices and Integration

Grand Ballroom C, 2F (大宴会厅 C, 2 楼)

13:30–15:15 · November 6, 2025 · Thursday
Laser and Active Devices (1)
 Presider: Hiroyuki Tsuda, Keio University, Japan

13:30–14:00 · ACP2025–0801–100 **Invited**

Dynamics of Quantum Dot Frequency Comb Lasers

Jianan Duan

Harbin Institute of Technology (Shenzhen), China

This work demonstrates dynamic control of frequency- and amplitude-modulated combs, along with significant pulse width reduction, by employing a fourth-order 100 GHz colliding-pulse mode-locked quantum dot laser with external optical feedback.

14:00–14:30 · ACP2025–0915–12 **Invited**

Octave-spanning supercontinuum generation from an integrated ultrafast laser

Jianqi Hu

University of Hong Kong, Hong Kong, China

In this talk, I will present our recent results in generating an octave-spanning supercontinuum from an integrated mode-locked laser, both on a photonic integrated silicon nitride (Si₃N₄) platform. The seed laser is based on a linear Mamyshev oscillator cavity formed by two spectrally offset waveguide Bragg gratings. Within this cavity, an erbium-doped Si₃N₄ waveguide provides optical amplification and nonlinear broadening to bridge circulating pulse spectra reflecting from the two gratings. Such a simple laser architecture enables mode-locking, producing streams of pulses with femtosecond duration and nanojoule energy. The output pulses, after de-chirping, can directly drive a 1.5-octave-spanning supercontinuum in a dispersion-engineered Si₃N₄ waveguide. These results herald fully-integrated, self-referenced optical frequency combs for a wide range of applications.

14:30–14:45 · ACP2025–0815–136

Narrow-linewidth hybrid-integrated self-injection locked laser at 1015.75 nm

Hongfei Zhang¹, Yilin Wu¹, Sigang Yang¹, Hongwei Chen¹, Hui Wang², Minghua Chen^{1*}

1. Department of Electronic Engineering, Tsinghua University, China; 2. Changzhou Smartcore Optoelectronic Limited, China

A hybrid integrated self-injection locked laser at 1015.75 nm is demonstrated with an intrinsic linewidth of 470.4 Hz, which is favorable towards quantum computing based on Rubidium atoms.

14:45–15:00 · ACP2025–0815–50

Compared performance of Buried Ridge and Semi-Insulating Buried Structures Quantum Dash Lasers on Indium Phosphide platform

Emmanuel Bourgon, **Alexandre SHEN**, Cosimo Calo, Dalila Make, Delphine Néel, Mokhtar Korti, Nicolas Vaissière, Florence Martin, Karim Mekhazni, Frédéric Pommereau, Olivier Delorme, Arnaud Wilk
III-V Lab, France

We report comparative studies of Semi-Insulating Buried Heterostructure- (SIBH) versus Buried Ridge Structure- (BRS) processed InP based quantum dash lasers in the C band. We show that the SIBH structure outperforms the BRS structure in terms of laser output power and characteristic temperature (T₀).

15:00–15:15 · ACP2025–0815–49

Classification of Multi-dynamics States from Semiconductor Lasers Based on Photonic Reservoir Computing

Shoudi Feng, Nianqiang Li, Huang Yu, Pei Zhou, Kuenyao Lau

Soochow University, China

Dynamics-based states for complex systems are of vital importance in the analysis and application. We apply photonic reservoir computing to classify the multiple dynamic states generated by semiconductor lasers and demonstrate its potential application in classification of multi-dynamics states.

15:30–16:00 Coffee Break

16:00–17:30 · November 6, 2025 · Thursday
Laser and Active Devices (2)
Presider: Guowei Lu, Kyushu University, Japan

16:00–16:30 · ACP2025-0608-1 **Invited**

Ultracompact flatband high-Q single-mode semiconductor lasers

Qijie Wang, Jieyuan Cui

Nanyang Technological University, Singapore

Here we demonstrate a flat-band laser supplemented by multiple bound states in the continuum. By confining light in all three dimensions, a high Q factor ultracompact ($\sim 3\lambda$) terahertz quantum cascade laser is reported.

16:30–16:45 · ACP2025-0725-2

Bidirectional Electrostatic-Actuated HI MEMS-VCSEL

Jisheng Wang, Ning Cui, Hongzhuo Wang, Lishan Fu, Liangliang Zhu, Baolu Guan*

Beijing University of Technology, China

To overcome high voltage and mode hopping in conventional MEMS-VCSELs, this study fabricated a bidirectionally tunable HI MEMS-VCSEL using a three-plate capacitor. Operating below 14 V, it achieved 30.1 nm redshift/blueshift tuning. This validates the structure's feasibility for wide-range tuning and new applications.

16:45–17:00 · ACP2025-0729-8

Optically pumped vertical-cavity surface-emission laser based on quasi-2D perovskite

Liangliang Zhu, Shuai Huang, Qin Zhang, Sunan Li, Baolu Guan

Beijing University of Technology, China

Quasi-2D perovskites have a large exciton binding energy, a natural quantum well structure and a high fluorescence quantum yield (PLQY). Compared with traditional 3D perovskites, the higher environmental stability and unique energy-funnel process of quasi-2D perovskites have attracted widespread attention. In this paper, an optically pumped vertical-cavity surface-emission laser (VCSEL) was constructed using quasi-2D perovskite as the gain medium and distributed Bragg reflector (DBR) as the reflector, achieving a laser output of 535 nm with a laser threshold of $2.2 \mu\text{J cm}^{-2}$ and a linewidth of 0.88 nm. In addition, the constructed quasi-2D perovskite VCSEL also demonstrated qualified stability.

17:00–17:15 · ACP2025-0730-10

High-power and dense semiconductor optical amplifier array

Yang Ke, Yueyang Shi, Ying Liu, Yanfang Wang, Ruijun Wang, Siyuan Yu

State Key Laboratory of Optoelectronic Materials and Technologies, School of Electronics and Information Technology, Sun Yat-sen University, China

We present a high-power and dense c-band semiconductor optical amplifier array. Each channel of the array exhibits a high output power greater than 22 dBm, with channel-to-channel uniformity better than 0.5 dB.

17:15–17:30 · ACP2025-0730-56

Monolithically SOA-Integrated DFB Laser for High-Power, Sub-15 GHz Optical Modules in CPO and RoF Systems

Jie Liang, Anyao Zhu, Zhengqing Ding, Kun Zhan, Ying Yu, Siyuan Yu

Sun Yat-sen University, China

We demonstrate an SOA-integrated DFB laser which exhibits an optical power over 130 mW, an SMSR exceeds 45 dB, an averaged RIN of below -145 dB/Hz and a 3 dB modulation bandwidth exceeds 15 GHz at 20 °C.

18:00–20:00 Welcome Reception

08:30–10:00 · November 7, 2025 · Friday
Laser and Active Devices (3)
 Presider: Jianqi Hu, University of Hong Kong, Hong Kong, China

08:30–09:00 · ACP2025–0730–1 **Invited**

Design and Integration Strategies of Active Photonic Integrated Devices on Flexible Platforms

Qingyan Deng¹, Jingyu Chang¹, Yuting Ye¹, Jialing Jian², Jianghong Wu³, Hongtao Lin⁴, **Lan Li**^{*}

1. Department of Electronic and Information Engineering, School of Engineering, Westlake University, China; 2. Westlake University, China; 3. Department of Applied Physics, The Hong Kong Polytechnic University, Hong Kong, China; 4. College of Information Science and Electronic Engineering, Zhejiang University, China

We propose design and integration strategies for high-performance active photonics on flexible platforms. By leveraging monolithic and hybrid approaches with functional optoelectronic materials, we establish pathways toward complete flexible optoelectronic links, showcasing potential for future wearable systems.

09:00–09:15 · ACP2025–0731–9

Chirp Properties of Single-Mode Multi-Aperture VCSEL Operating at SWDM Wavelengths and Analysis of Transmission Capability for Short Reach Applications

Xin Chen^{1*}, Nikolay Jr. Ledentsov², Abdullah S. Karar³, Jason E. Hurley¹, O. Yu. Makarov², Hao Dong¹, Ahmad Atieh³, Li Ming-Jun¹, Nikolay Ledentsov²

1. Corning Incorporated, United States Minor Outlying Islands; 2. VI Systems GmbH, Germany; 3. Optiwave System Inc., Canada

We characterized the chirp properties of SM MA VCSEL operating at SWDM wavelengths and showed that the chirp can interact with chromatic dispersion favorably to enhance short reach transmission at high data rate.

09:15–09:30 · ACP2025–0801–163

C-band thin film lithium niobate hybrid integrated actively mode-locked laser

Qiang Ying, Rui Ma, Zijun Huang, Xinlun Cai

Sun Yat-sen University, China

We demonstrate the first C-band hybrid integrated mode-locked laser fabricated on the thin film lithium niobate platform. The measured central wavelength, pulse width, average power, peak power, pulse energy are 1542.4 nm, 7.228 ps, 1.778 mW, 22 mW and 0.159 pJ, respectively.

09:30–09:45 · ACP2025–0802–9

High-Power hybrid integrated 850 nm III-V-Si₃N₄ DBR laser

Yueyang Shi, Yang Ke, Jincheng Wei, Ruoyu Xiong, Ruijun Wang, Siyuan YU

State Key Laboratory of Optoelectronic Materials and Technologies, School of Electronics and Information Technology, Sun Yat-sen University, China

We present a hybrid integrated III-V-Si₃N₄DBR laser operating in the 850 nm waveband. The laser outputs an optical power of 32.1 mW with a side mode suppression ration of 41 dB.

09:45–10:00 · ACP2025–0811–3

Thermally Stable High Power 1.3 μm InAs/GaAs Quantum Dot Distributed Feedback Laser Arrays with Ultra-Narrow Linewidth and Low-Noise

KeHan Jiang, Tao Yang, XiaoGuang Yang, JiaZe Xu, Kun Zhou

The Institute of Semiconductors, Chinese Academy of Sciences, China

We demonstrate a thermally stable, high-power InAs/GaAs quantum dot four-channel distributed feedback laser array featuring an ultra-narrow linewidth and low noise.

10:00–10:30 Coffee Break

10:30–12:00 · November 7, 2025 · Friday
Photonics & Photonic Devices(1)
Presider: Lan Li, Westlake University, China

10:30–11:00 · ACP2025-0915-13 **Invited**

Key technologies and integrated chips for microwave photonic radar

Sha Zhu

Nankai University, China

This report presents the essential technologies underpinning microwave photonic radar, encompassing the generation, transmission, and processing of high-frequency, broadband radar waveforms in the optical domain. It also introduces recent breakthroughs in thin-film lithium niobate-based photonic millimeter-wave radar that have achieved centimeter-level resolution in range, velocity, and ISAR measurements.

11:00–11:30 · ACP2025-0815-33 **Invited**

300-mm Silicon Photonics Platform and High-performance Devices for Optical Interconnect Applications

Xiao Hu, Fengxin Yu, Fangchen Hu, Haiwen Cai, Wei Chu

Zhangjiang LAB, China

Silicon photonics leverages the advances of both optoelectronics and microelectronics, enabling high-speed, low-power, and cost-effective optical interconnects through highly integrated chips. In this contribution, we will report on our recent advances in silicon photonics devices. Based on the 300-mm platform, we have developed high-performance electro-optic modulators and photodetectors that support high-throughput optical interconnects.

11:30–11:45 · ACP2025-0718-8

Advanced Mid-Infrared On-Chip Spectrometer with High Resolution and Broad Bandwidth

Da Lv¹, Long Zhang¹, Dajian Liu^{1,2}, Gaopeng Wang¹, Ming Zhang^{1,3}, Haorui Liu¹, daoxin Dai^{1,3,4*}

1.State Key Laboratory of Extreme Photonics and Instrumentation, Zhejiang Key Laboratory of Optoelectronic Information Technology, College of Optical Science and Engineering, Zhejiang University, China; 2.ZJU-Hangzhou Global Scientific and Technological Innovation Center, Zhejiang University, China; 3.Ningbo Research Institute, Zhejiang University, China; 4.iaxing Key Laboratory of Photonic Sensing & Intelligent Imaging, Intelligent Optics & Photonics Research Center, Zhejiang University, China

We demonstrate a spectrometer on silicon for mid-infrared, which consists of a high-Q micro-ring resonator and cascaded adiabatic elliptical micro-ring resonators. Experimentally, the spectrometer features a high resolution of 50 pm and a broad working bandwidth of 230 nm in the 2- μ m band.

11:45–12:00 · ACP2025-0801-122

Breaking the Bandwidth-Resolution Tradeoff in Chip-scale Spectrometers using Vernier Subwavelength Grating Microrings

Hao Deng, Haoran Wang, Ziyang Xiong, Yan Fan, Tong Lin, Junpeng Lu

School of Electrical Science and Engineering Southeast University, China

We experimentally demonstrate a miniaturized Vernier silicon photonic spectrometer based on two cascaded subwavelength gratings microrings. Experimental results show an average resolution of 75 pm over a 160 nm bandwidth for a footprint of less than 0.002 mm²

12:00–13:30 Lunch Break

13:30–15:30 · November 7, 2025 · Friday
Photonics & Photonic Devices(2)
 Presider: Kaiyi Wu, Chalmers University of Technology, Sweden

13:30–14:15 · ACP2025–0801–127 **Keynote**

Large scale silicon photonics and system

Xingjun Wang

Peking University, China

We will introduce our group's work about large scale silicon photonic device, chip and system.

14:15–14:45 · ACP2025–0801–36 **Invited**

Platform–First Photonic Integrated Circuits: All–Silicon Solution

Yuan Yuan

Northeastern University, United States

Silicon has long served as the foundational material for photonic integrated circuits, yet its intrinsic optoelectronic limitations have historically constrained device performance. Our research systematically unlocks the full potential of silicon by advancing modulators, photodiodes, and non-volatile optical memories, culminating in a highly scalable, cost-effective all-silicon solution for large-scale photonic systems.

14:45–15:00 · ACP2025–0731–63

Wafer–Level Characterization of Low–Loss Silicon Photonic Devices Using a High–Throughput and Robust On–Chip Test Structure

Yufei Liu¹, Ying Wang¹, Baosuan Chen¹, Weixiang Hu¹, Wei Chu¹, Haiwen Cai², Fenghe Yang^{1*}

1.Zhangjiang Laboratory, China; 2.Shanghai Institute of Optics and Fine Mechanics, Chinese Academy of Sciences, China

A test structure based on microring resonators is proposed to enable high-throughput and stable wafer-level characterization of ultra-low-loss photonic devices. All measurements are performed directly on the wafer, demonstrating exceptional stability and alignment tolerance: the relative deviation of the median insertion loss across 68 dies remains below 1.7% under varying input optical powers. Furthermore, on-wafer testing of five randomly selected dies exhibits a loss standard deviation below 0.004 dB over the 1545–1555 nm wavelength range, evidencing excellent wavelength insensitivity. This method is applicable to a wide range of fundamental ultra-low-loss passive components for photonic integrated circuits (PICs). The test structure's wafer-level compatibility, combined with its resilience to power fluctuations and alignment errors, enables high-throughput automated, cost-effective characterization in photonics foundries. This capability is critical for reducing manufacturing costs and accelerating the commercialization of next-generation photonic devices.

15:00–15:15 · ACP2025–0815–31

3.5D Co–Packaged Optics Based on a Silicon Interposer for High Density Interconnects

Chen Hu¹, Hairong Mao², Qian Zhang¹, Jinsheng Xu¹, Jia Li¹, Yueqi Zhao¹, Chenhui Li^{1*}

1.Zhejiang Lab, China; 2.Hangzhou International Innovation Institute, Beihang University, China;

We propose a novel 3.5D embedded co-packaging solution for opto-electronic integration. A silicon interposer is fabricated with a 330µm-deep cavity structure using deep reactive ion etching (DRIE), achieving a sidewall angle of 1° to accommodate the co-designed photonic integrated circuits (PIC). The PIC chip was mounted active side facing upward using conductive silver-based adhesives in the previously described cavity. The surface of silicon interposer is act as a stop layer during pick and place process. Subsequently, a modulator driver is bridged and bonded above the PIC and interposer, achieving the shortest connection between the electronic integrated circuits (EIC) and PIC. The packaged transmitter supports 50GBaud PAM4 signals conversion, demonstrating its potentials for high-density integration applications.

15:15–15:30 · ACP2025–0815–133

Ultra–Low–Loss 250nm–thick Silicon Nitride Photonic Integrated Circuits

Zhonghan Wu, Haiyan Jia, Xin Xu, Jiarui Zhang, Zhangjun Huang, Zhichao Ye

Hangzhou Qoretek Co., Ltd., China

We demonstrate an ultra-low-loss 250nm Si₃N₄ PIC platform. It features 0.5 dB/m waveguide loss and inverse-designed components, including MMI's (~20 mdB) and crossings (~4.5 mdB), enabling large-scale, high-performance integration.

15:30–16:00 Coffee Break

15:30–17:30 Poster Session

18:30–20:30 Banquet & Awards Ceremony

08:30–10:00 · November 8, 2025 · Saturday
Modulators and high-speed PIC applications (1)
Presider: Yonghui Tian, Lanzhou University, China

08:30–09:00 · ACP2025–0731–60 **Invited**

448 Gbps optical-amplification-free transmission using TFLN modulator

Armands Ostrovskis^{1,2*}, Toms Salgals¹, Darja Cirjulina¹, Said El-Busaidy², Michael Koenigsmann², Benjamin Krüger², Fabio Pittalà², Lu Zhang³, Xianbin Yu³, Hadrien Louchet², Robert Jahn², Kazuo Yamaguchi², Markus Gruen², Vjaceslavs Bobrovs¹, Marcel Zeiler², Xiaodan Pang^{1,3}, Oskars Ozolins^{1,4}

1.Riga Technical university, Latvia; 2.Keysight Technologies Germany, Germany; 3.Zhejiang University, China; 4.RISE Research Institutes of Sweden, Sweden

Rapid development of AI drives demand for next-generation transceivers. Therefore, we explore approaches enabling 448 Gbps optical-amplification-free transmission in the O-band using a TFLN modulator with 0.6 Vpp driving voltage.

09:00–09:15 · ACP2025–0730–59

Highly efficient acousto-optic modulation in antimony trisulfide with strong photoelasticity integrated on thin-film lithium niobate

Yaqi Liu, Lutong Cai, Lin Zhang

State Key Laboratory of Precision Measuring Technology and Instruments, Tianjin University, China

We demonstrate a highly efficient (0.7 rad/ $\sqrt{\text{mW}}$) acousto-optic modulator with a giant photoelastic coefficient of 2.4, first extracted in antimony trisulfide, an order of magnitude larger than that of LiNbO₃ and other used chalcogenide glasses.

09:15–09:30 · ACP2025–0731–94

High-speed Broadband Wavelength-Parallel Modulation Enabled by Lithium Niobate Asymmetric Modulator

Chaoqian Li¹, Yunlong Nie¹, Hang Song¹, Chenming Zhao², Yuquan Peng², Chaoyang Zhang², Hao Tang¹, Xianmin Jin^{1,2,3*}

1.Center for Integrated Quantum Information Technologies (IQIT), School of Physics and Astronomy and State Key Laboratory of Optics and Communications, Shanghai Jiao Tong University, China; 2.TuringQ Co., Ltd., China; 3.Chip Hub for Integrated Photonics Xplore (CHIPX), Shanghai Jiao Tong University, China

An integrated asymmetric modulator based on thin-film lithium niobate, achieving broadband wavelength-parallel modulation across the entire C-band with high consistency over 7.3 bit and large modulation range exceeding 0.59, with electro-optic bandwidth surpassing 64.25 GHz.

09:30–09:45 · ACP2025–0714–6

On-chip Fourier Transform Spectrometer based on Thin Film Lithium Niobate Michelson Interferometer Modulator

Hao Yao, Jiayao Deng, Yuzhe Sun, Kaixin Chen

University of Electronic Science and Technology of China, China

We propose and experimentally demonstrate an on-chip Fourier transform spectrometer based on an electro-optic Michelson interferometer modulator fabricated on thin-film lithium niobate. The device features a low half-wave voltage of 0.233 V with a compact electrode length of 6.4 cm, benefiting from the double-pass modulation of the Michelson structure. A spectral resolution of 3.8 nm is achieved, and accurate reconstruction of a broadband spectrum spanning about 100 nm is demonstrated.

09:45–10:00 · ACP2025–0726–7

Mode-Engineered SiN-to-BTO Hybrid Electro-Optic Modulator

Yaqi Feng

Beijing University of Posts and Telecommunications, China

We present a compact thin-film barium titanate modulator integrated with SiN waveguides, demonstrating a low $V_{\pi} \cdot L$ of 0.16 V $\cdot$ cm and negligible optical loss, optimized for efficient EO modulation

10:00–10:30 Coffee Break

10:30–12:00 · November 8, 2025 · Saturday
Modulators and high-speed PIC applications (2)
 Presider: Yu Li, Shanghai Jiao Tong University, China

10:30–10:45 · ACP2025–0711–4

200-Gb/s/λ PAM4 Operation for CWDM4–EML Using a Simple Ridge Waveguide Structure and CoC Assembly

Koichi-H Huang, Jian Fang, Shuai Liu, Ming Yu, Xiaoli Ge, Chen Gao, Yanghuo Zhang, Cedric Gao, Kaifeng Yang

Zetta Semiconductor Co., Ltd., China

We have successfully demonstrated massproduction-friendly CWDM4 200-Gb/s/λ PAM4 EMLs with a ridge waveguide, single butt-joint based on InGaAsP–MQW regrowth, and optimized CoC assembly, achieving over 60 GHz bandwidth and TDECQ below 3.0 dB.

10:45–11:00 · ACP2025–0714–7

Monolithically Integrated 4×100 Gb/s Directly Modulated Laser Array

Huan Li, Longfei Zhang, Daibing Zhou, Dan Lu, Lingjuan Zhao, Song Liang

Institute of Semiconductors, Chinese Academy of Sciences, China

A monolithically integrated 4-channel directly modulated 1.3 μm DFB laser array has been fabricated. The device modulation bandwidth is larger than 27 GHz for all four channels. 100 Gb/s PAM4 data transmission of the device has been demonstrated.

11:00–11:15 · ACP2025–0717–5

100 Gb/s directly modulated 1.3 μm dual wavelength DFB laser for THz communications

Longfei Zhang^{1,2,3}, Huan Li^{1,2,3}, Song Liang^{1,2,3*}

1.State Key Laboratory of Optoelectronic Materials and Devices, Institute of Semiconductors, Chinese Academy of Sciences, China;

2.Center of Materials Science and Optoelectronics Engineering, University of Chinese Academy of Sciences, China; 3.Beijing Key

Laboratory of Low Dimensional Semiconductor Materials and Devices, China;

We report 100 Gb/s PAM4 data modulation of 1.3 μm dual wavelength DFB laser, which is a promising light source for photonics based THz communication systems.

11:15–11:30 · ACP2025–0728–5

A 4×50 Gb/s Electro-absorption Modulated Tunable DBR Laser Array

Mengyang Zhong¹, Huan Li², Fei Guo², Dan Lu², Yanrong Song¹, Daibing Zhou^{2*}, Song Liang^{2*}

1.Beijing University of Technology, China; 2.Institute of Semiconductors, Chinese Academy of Sciences, China

We propose an InP-based monolithically integrated four-channel TEML array chip. Each channel supports 50 Gb/s NRZ signal modulation, while featuring parallel modulation capability and a simple tuning method.

11:30–11:45 · ACP2025–0731–48

62 GHz Silicon Photonic Lumped Mach–Zehnder Modulator with Passive RC Equalizer

Jianing Wang¹, Yihang Li^{1,2}, Jian Li^{1,2}, Xi Wang¹, Rongxing Mao¹, Rui Zhong¹, Shuang Gao¹, Guodong Gao¹, Ke Xu^{1,2*}

1.Harbin Institute of Technology, Shenzhen, China; 2. Peng Cheng Laboratory, China

We demonstrate a silicon photonic lumped Mach–Zehnder modulator (MZM) that incorporates a series passive RC equalizer. With 1 mm length, the MZM achieves a record-high 3 dB bandwidth of 62 GHz among lumped MZMs.

11:45–12:00 · ACP2025–0801–73

Silicon Photonic Elliptical Microring Modulator with Ultra-wide Bandwidth over 110 GHz

Jian Li^{1,2}, Yihang Li^{1,2}, Kaihang Lu³, Yuxiang Yin³, Jianing Wang¹, Yeyu Tong^{3*}, Lei Wang², Hon Ki Tsang⁴, Ke Xu^{1,2*}

1.Harbin Institute of Technology, Shenzhen, China; 2.Peng Cheng Laboratory, China; 3.The Hong Kong University of Science and Technology (Guangzhou), China; 4.The Chinese University of Hong Kong, Hong Kong, China

We proposed and experimentally demonstrated a silicon photonic elliptical microring modulator with over 110 GHz electro-optic bandwidth operating at C-band. This elliptical microring modulator can support single-lane four-level pulse amplitude modulation up to 112 Gbaud.

12:00–13:30 Lunch Break

13:30–15:30 · November 8, 2025 · Saturday
Inverse Design
 Presider: Hongtao Lin, Zhejiang University, China

13:30–13:45 · ACP2025–0718–3

Inverse-designed compact waveguide crossing for short-wavelength mid-infrared

Yaru Wang^{1,2}, Muhe Zhang^{1,2}, Zunyue Zhang^{1,2*}, Tiegeng Liu^{1,2}, Jiaqi Wang^{3*}, Hon Ki Tsang⁴, Zhenzhou Cheng^{1,2*}

1. School of Precision Instrument and Opto-electronics Engineering, Tianjin University, China; 2. Key Laboratory of Opto-electronic Information Technology, Ministry of Education, China; 3. College of Physics and Optoelectronic Engineering, Shenzhen University, China; 4. The Chinese University of Hong Kong, Hong Kong, China

We demonstrate an inverse-designed waveguide crossing at 2.35 μm wavelengths. Experimental results show that the device exhibits an insertion loss of 0.24 dB with a crosstalk of -28.67 dB.

13:45–14:00 · ACP2025–0801–161

Inverse-designed Multi-mode Recirculating Structures on Silicon

Yifan Zhao, Yi Hu, Yiding Zheng, Hengtai Xiang, Jingshu Guo, Daoxin Dai

Zhejiang University, China

We propose and demonstrate the silicon-integrated multi-mode recirculating structures, realized via a semi-inverse design methodology. These structures exhibit insertion losses comparable to conventional schemes and achieve up to eightfold compactness in size. Experimentally, Mach-Zehnder interferometers embedding these structures reveals insertion losses of 1~2 dB and 1.8~3 dB for the 3-pass and 4-pass designs, respectively, alongside extinction ratios surpassing 20 dB.

14:00–14:15 · ACP2025–0813–11

Inverse Design for Ultra-Compact Mode Size Converter

Ying Chen¹, Li Liu^{1*}, Jiazhuan Duan²

1. China University of Geosciences, China; 2. China Academy of Engineering Physics, China

We have developed novel optimization algorithms that improve the design paradigm of compact photonic components, achieving record-breaking miniaturization while maintaining high performance. The critical achievement is the realization of a 12 μm –0.5 μm mode size converter with an extremely short length of 2.43 μm , delivering over 90% transmission efficiency.

14:15–14:30 · ACP2025–0814–40

Inverse Design of a High-Performance Edge Coupler Operating at 2- μm Wavelength Band

Jinxuan Lin¹, Chenxingyu Huang¹, Jin Li¹, Bin Xu¹, Ni Zhang², Kun Yuan², Yihong Zhao², H. Y. Fu^{1*}

1. Tsinghua University, China; 2. Shenzhen Jufei Optoelectronics Co, China

A trident-shaped edge coupler with subwavelength grating structures is proposed through inverse design, achieving coupling efficiency of -0.52 dB/ -0.61 dB for the fundamental TE/TM mode at 2- μm wavelength, with 1-dB bandwidth exceeding 200 nm.

14:30–14:45 · ACP2025–0814–8

Generative-deep-learning-model-based fabrication error prediction for digital inverse-designed devices

Yue Xu¹, Yizhou Zhang¹, Yu Li^{1,2*}, Jianping Chen^{1,2}, Linjie Zhou^{1,2}

1. State Key Laboratory of Photonics and Communications, Shanghai Jiao Tong University, China; 2. SJTU-Pinghu Institute of Intelligent Optoelectronics, China

Fabrication errors limit practical inverse-designed silicon photonic nanostructures. We propose a generative deep-learning model predicting device fabrication deviations. Validated on MMI splitters, it achieves 0.5dB prediction error for performance degradation, enabling robust large-scale nanofabrication.

14:45–15:00 · ACP2025–0815–139

Accelerated Inverse Design of 1×2 Wavelength Multiplexer Based on Fabrication Constraints

Jin Li^{1,2}, Bin Xu¹, Jinxuan Lin¹, Zhenmin Chen², Zhengtong Liu², Connie Chang-Hasnain^{1,3}, H. Y. Fu^{1*}

1. Tsinghua University, China; 2. Peng Cheng Laboratory, China; 3. Bercel Photonics Co., Ltd., China

We realized the inverse design of a 1 × 2 wavelength multiplexer using the Schur complement domain decomposition and the effective index method, improving the computational efficiency of FDFD while satisfying strict fabrication constraints.

15:00–15:15 · ACP2025–0730–29

An Ultra-compact Scalable Three-mode (De)Multiplexer by GPU-accelerated Inverse Design**Jiahao Li¹**, Xiang Li², Lin Wu¹, Ming Luo¹, Yuan Li², Qi Zhou², Hanbing Li¹, Tianye Huang², Ying Qiu^{1*}*1.State Key Laboratory of Optical Communication Technologies and Networks China Information and Communication Technologies Group Corporation, China; 2.School of Mechanical Engineering and Electronic Information, China University of Geosciences (Wuhan), China;*We design and fabricate a $4.8\ \mu\text{m} \times 1.94\ \mu\text{m}$ silicon photonic three-mode (de)multiplexer with ultra-low loss and crosstalk, broadband operation over the O–U bands, and robustness to fabrication errors via GPU-accelerated inverse design.

15:15–15:30 · ACP2025–0731–129

Ultra-Compact Inverse-Designed On-Chip Photonic Differentiator**Hao Jiang¹**, Yuanrong Zhang¹, Kaiyuan Wang¹, Qiaomu Hu¹, Luluzi Lu², Shuang Zheng^{1*}, Minming Zhang^{1*}*1.Huazhong University of Science and Technology, China; 2. Wuhan Fisilicon Microelectronics Technology Co., Ltd., China*We present an ultra-compact on-chip optical time-domain differentiator via inverse design based on a photonic crystal-like structure, with $26\ \mu\text{m}^2$ area, 10 nm effective bandwidth, and picosecond-level pulse differentiation capability.**15:30–16:00 Coffee Break**

16:00–17:30 · November 8, 2025 · Saturday

LiDAR and Optical Phased Arrays

Presider: Hao Hu, Technical University of Denmark, Denmark

16:00–16:30 · ACP2025–0731–120 **Invited****Integrated Optical Phased Arrays and LiDAR Application in Silicon Photonics****Huaqing Qiu¹**, Mathias Prost¹, Guillaume Croes¹, Hao Hu², Joost Brouckaert¹, Roelof Jansen¹, Peter Gerets¹, Marcus Dahlem¹*1.IMEC, Belgium; 2.Technical University of Denmark, Denmark*

We present our recent research on integrated optical phased arrays and demonstrate a monolithically integrated biaxial LiDAR system based on an optical phased array on the silicon photonic platform for scalable 3D sensing applications.

16:30–17:00 · ACP2025–0731–10 **Invited****Heterogeneously Integrated Silicon Photonics in Open Access PDK for LiDAR and Optical Interconnects****Hanxing Shi**, Kimchau Nguyen, Beichen Wang, Han Yun*Openlight Photonics, United States*

We demonstrate OpenLight's open-market Si-III-V photonics platform, including heterogeneously integrated III-V lasers and EAMs. This platform enables single-chip transmitter PICs for emerging LiDAR and datacom transceivers in the AI-driven market.

17:00–17:15 · ACP2025–0801–114

On-demand, Arbitrary, Precise Beamforming with Integrated Optical Phased Arrays**Shichong Yang**, Baihe Feng, Fuhao Yu, Guihan Wu, Jing Yuan, Wei Jiang*Nanjing University, China*

We demonstrate the Arbitrary Precise Pattern former (APP-former) to generate complex beams using optical phased arrays without iterative measurements. With Bregman divergence-based linearization, the APP-former efficiently optimizes beams with closed-form solutions per step despite nonconvexity.

17:15–17:30 · ACP2025–0801–70

A Lidar system Based on Rotating Liquid Crystal Polarization Grating**Site Luo***College of Health Science and Environmental Engineering, Shenzhen Technology University, China*

This is the first engineering solution of lidar based on LCPG. The beam steering scheme is constructed by taking a LCPG as the first order and a wedge prism as second order to solve disturbance beam problem, and a circular light absorption film is coated on the center of the wedge prism to absorb 0-order beam from LCPG.

Track 4: Optoelectronic Devices and Integration (Parallel Session)

Grand Ballroom D, 2F (大宴会厅 D, 2 楼)

13:30–15:00 · November 6, 2025 · Thursday

Functional Devices (1)

Presider: An He, Soochow University, China

13:30–14:00 · ACP2025–0619–1 **Invited**

Unipolar Quantum Optoelectronic Devices for Mid-Infrared Free Space Optical Communication

Xiaodan Pang

Zhejiang University, China

We present recent progress on unipolar quantum optoelectronic devices for mid-infrared free space optical communication, high-lighting experimental results and discussing challenges toward high-speed, long-distance transmission using quantum cascade lasers, modulators, and detectors.

14:00–14:15 · ACP2025–0815–40

Passive PDMS-Based Temperature Stabilization for High-Q Optomechanical Microcavities

Mengmeng Chen, Bing Sun

1. Advanced Photonic Technology Lab, College of Electronics and Optical Engineering and College of Flexible Electronics (Future Technology), Nanjing University of Posts and Telecommunications, China

Self-compensating PDMS/silica microcavity slashes optomechanical frequency drift to 71 Hz/°C, enabling ultrastable magnetic field sensing without sacrificing Q or threshold.

14:15–14:30 · ACP2025–0723–3

Band-Rejection Filter with Grating-Assisted Directional Coupler Embedded in Mach-Zehnder Interferometry Arms

Sabah Al-ithawi

University of Electronic Science and Technology of China, Iraq

Optical filters play a crucial role in optical communication and information process systems. In this paper, a band-rejection filter with grating-assisted directional couplers embedded in Mach-Zehnder interferometer arms is proposed and demonstrated experimentally on polymer

14:30–14:45 · ACP2025–0815–6

Rapid Co-Extraction of Effective and Group Refractive Indices for Integrated Photonic Waveguides

Yong Hu, Jiaxin Gu, Chenhui Li, qingyang Du, Shaoliang Yu

Zhejiang Laboratory, China

Accurately and efficiently determining the refractive index of integrated photonic waveguides is crucial for the design of photonic devices. In this paper, we propose a novel approach for simultaneously extracting the effective and group refractive index through selective mode splitting of the photonic crystal microring resonator. The method is experimentally validated on a silicon nitride waveguide platform, achieving measurement accuracy exceeding 0.02% for the effective refractive and 0.5% for the group index within a single measurement.

14:45–15:00 · ACP2025–0801–1

Ultra-High Sensitivity 50G-Class APD Based on a Microhole Array Metasurface for High-Speed PON Applications

Ning Wang¹, Junwei Li^{1*}, Xinjia Qiu², Wenjun Chen², Zhen Dong², Xiaoshuo Jia¹, Borui Li², He Yuan², Zelin Wang², Dechao Zhang¹

1. China Mobile Research Institute, China; 2. Huawei Technologies Co., Ltd., China

We demonstrate the first 50G-class APD operating at O-band using a microhole array based metasurface structure. Simulation results show that the photon absorption efficiency and APD responsivity are improved to be 95% and 9.65A/W, respectively. With this APD, the receiver sensitivity of 50Gb/s signal reaches -27.5dBm.

15:30–16:00 Coffee Break

16:00–17:30 · November 6, 2025 · Thursday
Functional Devices (2)
 Presider: Xiaodan Pang, Zhejiang University, China

16:00–16:15 · ACP2025–0721–3

Directional Couplers with Arbitrary Coupling Ratios Using Pseudomagnetic Fields in Photonic Crystals

Pan Hu, Shuaihu Liu, Lu Sun, Yikai Su

Shanghai Jiao Tong University, China

We propose and experimentally demonstrate directional couplers with arbitrary coupling ratios using pseudomagnetic fields in silicon photonic crystals at telecommunication wavelengths. This work may enable diverse PMF-based functional devices in many fields, such as quantum information processing, nanophotonics, and optical communications.

16:15–16:30 · ACP2025–0801–165

Bandgap–Dispersion Engineered Athermal MZI Filter with Wavelength–Selective Thermal Drift

Zhiyuan Zhou¹, Yao Sun¹, Yaxiao Lai², Changyu Hu³, Hao Hu³, Bo Zhao³, Jun Liu³, Shuang Zheng^{1,4*}, Minming Zhang^{1,4*}

1. Huazhong University of Science and Technology, China; 2. Caliopa Lab of Belgium Research Centre Huawei Technologies Research & Development Ltd, China; 3. Hubei Jiu Feng Shan Laboratory, China; 4. Optics Valley Laboratory, China

We demonstrate an athermal MZI filter using silicon nitride subwavelength waveguides with near-zero thermal drift at 1555 nm and 15 pm/K sensitivity at 1510 nm, enabling simultaneous sensing and stable transmission.

16:30–16:45 · ACP2025–0815–117 **Industry Innovation Nomination**

Ultra-Compact Si–SiN Interlayer Coupling Using Shortcuts-to-Adiabaticity

Yunhong Yang, Weihai Xu, Qiqi Yuan, Danye Wang, Liangjun Lu, Linjie Zhou, Jianping Chen

Shanghai Jiao Tong University, China

This work presents an ultra-compact, broadband, fabrication-tolerant SiN–Si coupler via STA, with a tapered mode-evolution region. The 14 μm device has 0.082 dB insertion loss (1500–1560 nm), 0.059 dB at 1550 nm.

16:45–17:00 · ACP2025–0815–73

A Preset-free Wavelength Locking Method for Microring Resonators Based on Temporal Logic and Dithering Signals

Yizhou Zhang¹, Bohan Chu¹, Yue Xu¹, Yu Li^{1,2*}, Jianping Chen^{1,2}, Linjie Zhou^{1,2}

1. Shanghai Jiao Tong University, China; 2. SJTU–Pinghu Institute of Intelligent Optoelectronics, China;

A wavelength locking method for microring resonators based on dithering signals and temporal logic. Established a preset-free feed-back algorithm, reaching locking precises of 20 and 22 pm, respectively, under 1 Hz–560 pm and 40 Hz–100 pm thermal fluctuations.

17:00–17:15 · ACP2025–0801–74

Crosstalk Mitigation in Multi-Channel ThermoOptic Chips from Common-Ground Voltage Division

Mingshen Peng¹, Xiaoqun Yu¹, Jiaqi Li¹, Jinjie Zeng¹, Shuai Lin¹, Yanfeng Zhang^{2*}

1. Sun Yat-sen University, China; 2. Sun Yat-sen University & Hefei National Laboratory, China

This study examines common-ground voltage division effects on multi-channel micro-ring resonance peaks during thermal tuning. Under the same supplied power, the current source can achieve more effective heating than the voltage source (increasing from 0.32 nm to 0.35 nm) and provide better consistency (with the variance decreasing from 0.015 to 0.004).

17:15–17:30 · ACP2025–0729–1

Hybrid Reconfigurable Optical Add Drop Multiplexer with Asymmetrical Filtering Profiles

Qiang Wang^{1*}, Balakrishnan Sridhar¹, Rao Lingampalli¹, Pradeep Swargam¹, Iwan Kartawira¹, Manveer Singh¹, Robert Huey², Jay Pabley²

1. Equinix Inc, United States; 2. Equinix, United States

ROADM combined with passive splitters doubles port counts, but with many limitations. By introducing asymmetrical filtering profiles between multiplexer and demultiplexer, we overcome current limitation. Additional benefits included reducing bandwidth narrowing and improving spectral efficiency.

18:00–20:00 Welcome Reception

08:30–10:00 · November 7, 2025 · Friday

Functional Devices (3)

Presider: Jiawei Wang, Harbin Institute of Technology (Shenzhen), China

08:30–09:00 · ACP2025-0723-9 **Invited****Magnet-optical Isolator and Switch for Photonic Integrated Circuits****Yuya Shoji***Institute of Science Tokyo, Japan*

We present waveguide-based magneto-optical (MO) isolator and switch. Heterogeneous integration of MO garnet on silicon photonic platform and Si-based MO isolator were developed. In addition, we introduce non-volatile MO switches for photonic computing applications.

09:00–09:15 · ACP2025-0801-209

Bidirectional Diode-Driven Calibration-Free Mach-Zehnder Switch for Scalable Photonic Circuits**Xiaolu Liu¹**, Lijia Song², Jiayue Zhu¹, Huan Li^{1*}, Daoxin Dai^{1*}*1.State Key Laboratory for Modern Optical Instrumentation, College of Optical Science and Engineering, Zhejiang University, China;**2.International Research Center for Advanced Photonics, Zhejiang University, China*

We demonstrate a calibration-free 2×2 Mach-Zehnder switch (MZS) and a 4×4 MZS array that integrates thermally actuated phase shifters with oppositely connected diodes on each arm, enabling bidirectional thermo-optic control via polarity-switched voltage inputs.

09:15–09:30 · ACP2025-0814-1

Single-layer Polarization-insensitive Silicon Optical Switch based on Series Phase Shifter**Ningyu Zhang**, Song Tianqi, Jing Wang*Southern University of Science and Technology, China*

We present a novel polarization-insensitive silicon optical switch based on single-layer channel waveguide and specially designed series phase shifter. The device achieves 2.3 dB insertion loss, ~65 mW P_{TH} , and 20 dB extinction ratio.

09:30–09:45 · ACP2025-0727-3

High-delay-density and Low-loss Silicon Optical Delay Line Using Waveguide Superlattice**Tianqi Song**, Ningyu Zhang, Jing Wang*Southern University of Science and Technology, China*

We present a high-delay-density and low-loss silicon optical delay line that combines a broadened Archimedean spiral with waveguide superlattice to achieve half-wavelength pitch. This delay line exhibits 0.245 dB/cm loss and 3.5 ns/mm² delay density.

09:45–10:00 · ACP2025-0801-181

S+C+L-bands 90° hybrid on silicon**Yi Hu**, Ziyang Wang, Guojiang Yang, Laiwen Yu, Jingshu Guo, Daoxin Dai*Zhejiang University, China*

We demonstrate a 90° hybrid operating in entire S+C+L bands, theoretically with insertion loss 1.6 dB, CMRR 22 dB, phase error 13°. Signal port input measurements show acceptable performance.

10:00–10:30 Coffee Break

10:30–12:00 · November 7, 2025 · Friday

Photodetector

Presider: Yuya Shoji, Institute of Science Tokyo, Japan

10:30–10:45 · ACP2025–0717–2

High-Responsivity Ge Photodetector with 110 GHz Bandwidth at 1310 and 1550 nm Based on 300-mm Silicon-Photonic Platform**Wang Xu**^{1,2}, Song Jinwen², Yu Fengxin², Yang Chengkun², Wang Xin^{1,2}, Shen Ruoyu², Yang Fenghe², Zhao Haibin¹, Chu Wei², Hu Xiao^{2*}, Cai Haiwen^{2*}*1.Fudan University, China; 2.Zhangjiang Laboratory, China*

We demonstrate lateral germanium photodetectors on a 300-mm CMOS silicon photonics platform, achieving a bandwidth of up to 110 GHz with responsivities exceeding 0.97 A/W at 1310 nm and 1.08 A/W at 1550 nm.

10:45–11:00 · ACP2025–0717–4

Beyond 110 GHz L-Band Ge Photodetector under – 1 V Based on 300-mm Silicon-Photonic Platform**Wang Xu**^{1,2}, Song Jinwen², Yu Fengxin², Yang Chengkun², Wang Xin^{1,2}, Shen Ruoyu², Yang Fenghe², Zhao Haibin¹, Chu Wei², Hu Xiao^{2*}, Cai Haiwen^{2*}*1.Fudan University, China; 2.Zhangjiang Laboratory, China*

We demonstrate a race-track Ge photodetector with over 110 GHz bandwidth and 0.8 A/W responsivity at 1590 nm. The Ge PDs are fabricated on a 12-inch CMOS silicon photonic platform by Ge epitaxial deposition process.

11:00–11:15 · ACP2025–0730–50

High Responsivity and High Output Power Photodiodes Utilizing Distributed Bragg Reflectors**Mengjing Xu**, Bing Xiong, Changzheng Sun, Zhibiao Hao, Jian Wang, Lai Wang, Yanjun Han, Hongtao Li, Lin Gan, Yi Luo*Tsinghua University, China*Modified uni-traveling-carrier photodiodes (MUTC-PDs) with distributed Bragg reflectors are proposed for high responsivity and high output power. The fabricated 20- μ m diameter PD exhibits 50 GHz bandwidth with 0.73 A/W responsivity and 16 dBm output power.11:15–11:30 · ACP2025–0731–102 **Industry Innovation Nomination****57-GHz C+L Band Germanium Waveguide Photodetector with Interleaved Junctions****Yihang Li**^{1,2}, Jianing Wang¹, Yuxiang Yin³, Jian Li^{1,2}, Kaihang Lu³, Xi Wang¹, Daoqun Liu², Xi Xiao², Lei Wang^{2*}, Yeyu Tong^{3*}, Ke Xu^{1,2*}*1.Harbin Institute of Technology, Shenzhen, China; 2.Peng Cheng Laboratory, China; 3.The Hong Kong University of Science and Technology (Guangzhou), China*

We demonstrated a C+L band germanium waveguide photodetector with interleaved junctions, fabricated by standard multi-project wafer process. Responsivity of 0.62 A/W and 3-dB bandwidth of 57 GHz were measured under –3 V at 1625 nm. It supports high-speed photodetection of 96 Gb/s NRZ signals.

11:30–11:45 · ACP2025–0731–33

A 106 Gbps Silicon-Germanium Photodiode with 0.94 A/W Responsivity at the O-Band Enabled by Microring Resonator Enhancement**Chao Cheng**, Jintao xue, Shenlei bao, Qian liu, xiangling bu, xishan yu, binhao wang*Xi'an Institute of Optics and Precision Mechanics of Chinese Academy of Sciences, China*We demonstrate a microring resonator-enhanced silicon-germanium photodiode that achieves a responsivity of 0.94 A/W at 1313.5 nm using a 1.8 μ m ultrashort germanium absorption region. Under a reverse bias voltage of 4 V, the device exhibits an exceptionally low dark current of 11 nA and a 3 dB OE bandwidth of 50 GHz. High-speed performance is validated by clear eye diagrams at 53.125 Gbps non-return-to-zero and 106.25 Gbps four-level pulse amplitude modulation signals. This approach offers a promising solution for enhancing photodiode responsivity, with strong potential for use in wavelength-division multiplexing systems.

11:45–12:00 · ACP2025–0801–31

CMOS Compatible Silicon Ultraviolet-Enhanced Avalanche Photodiode**Jing Xiao**^{1,2,3}, Gang Yang^{1,2}, Fujun Sun^{1,2*}, Tianyang Fu^{1,2}, Zaili Yang^{1,3,4}, Gao Hong^{1,3,4}, Wei Tang^{1,2,3}, Yuhang Wang^{1,2,3}, Yan Yang^{5,6*}*1.Key Laboratory of Fabrication Technologies for Integrated Circuits, Chinese Academy of Sciences, China; 2.Institute of Microelectronics, Chinese Academy of Sciences, China; 3.School of Integrated Circuits, University of Chinese Academy of Sciences, China; 4.Institute of Microelectronics, Chinese Academy of Sciences Beijing, China, China; 5.Key Laboratory of Fabrication Technologies for Integrated Circuits, China; 6.Chinese Academy of Sciences Institute of Microelectronics, Chinese Academy of Sciences, China*

We demonstrate a CMOS-compatible ridge-type silicon ultraviolet-avalanche photodiode with an ultra-shallow junction, achieving high responsivity and quantum efficiency at 397 nm, with potential for scalable on-chip readout of trapped-ion qubit fluorescence.

12:00–13:30 Lunch Break

13:30–15:15 · November 7, 2025 · Friday

Optical Computing (1)

Presider: Deming Kong, Technical University of Denmark, Denmark

13:30–14:00 · ACP2025–0610–1 **Invited****Programmable silicon photonic integrated circuits for optical computing****Rui Tang***Keio University, Japan*

Our recent progress on silicon photonic matrix–vector multiplication processors will be introduced, which employ multiplexing across different domains such as wavelength, waveguide, and time.

14:00–14:15 · ACP2025–0718–5 **Oral****Non-volatile programmable photonic network based on MZI and phase-change materials****Shengqiang Li**, Pengxing Guo, Wei Sun, Haoxuan Huang, Jiahao Zhou, Weigang Hou, Lei Guo*School of Communications and Information Engineering, Chongqing University of Posts and Telecommunications Chongqing, China*

This paper presents a non-volatile programmable photonic circuit that utilizes the phase-change material Sb_2Se_3 integrated with a Mach–Zehnder interferometer to form a non-volatile tunable basic unit (NV-TBU), offering an alternative to conventional electrical or thermal tuning methods. The NV-TBU exhibits an insertion loss of less than 0.041 dB and crosstalk below –33.85 dB, while requiring zero static power consumption. By integrating the NV-TBU within a hexagonal mesh architecture, the proposed design enables versatile photonic signal processing and retains its configuration state even when powered off. Simulation results shows that the proposed photonic circuit can be reconfigured to function as an optical differentiator, microring resonator, optical filter, and optical router through the programmable control of the NV-TBUs.

14:15–14:30 · ACP2025–0801–20

Multifunctional Photoelectronic Units Enabling Scalable Photonic Computing**Yuxin Sun¹**, Huan Li^{2*}*1. College of Optical Science and Engineering, Zhejiang University, China; 2. Zhejiang University, China*

Addressing photonic neural networks' scalability and nonlinearity limits, we propose the C3-PCDNN architecture. Its multifunctional C3 unit enables complex-domain nonlinearity, loss compensation, and residual connections, achieving 57.3% accuracy on 1,623-class tasks—15% above non-residual networks.

14:30–14:45 · ACP2025–0814–7

Human Action Recognition with an Integrated Deep Topological Photonic Reservoir Computer**Yihang Lai¹**, Zhiwei Yang², Qi Chen¹, Tian Zhang^{1*}, Jian Dai¹, Kun Xu¹*1. Beijing University of Posts and Telecommunications, China; 2. China Information and Communication Technology Mobile Communication Technology Company Ltd. (CICT Mobile), China*

We propose a 5×5 integrated deep-topology photonic reservoir computer. It exhibits a significant enhancement in memory capacity (from 7.6 bitsto 24.6 bits) and achieves high accuracy on human action recognition (90%) in video streams.

14:45–15:00 · ACP2025–0801–27

Reconfigurable on-chip diffraction-based convolution processor**Wencan Liu¹**, Yuyao Huang¹, Zhenghang Zhang¹, Peng Meng Chan¹, Run Sun¹, Tingzhao Fu², Yuhao Wang¹, Sigang Yang¹, Hongwei Chen^{1*}*1. Tsinghua University, China; 2. National University of Defense Technology, China*

We present an integrated, reconfigurable diffractive convolutional processor based on a hard-parameter sharing algorithm. This enhanced the optoelectronic system performs 12- kernel parallel convolutions, achieving a73% reduction in power-intensive digital computations.

15:00–15:15 · ACP2025–0814–29

Bio-Inspired Graded Photonic Neurons for Efficient Reservoir Computing**Yu Huang**, Yigong Yang, Pei Zhou, Kuenyao Lau, Nianqiang Li*Soochow University, China*

We present a graded neuron model inspired by biological vision, implemented using a commercial distributed feedback (DFB) laser with optoelectronic feedback to modulate carrier dynamics. The feedback loop enables a continuously adjustable output response, emulating the analog encoding capability of graded potentials while maintaining a hardware-friendly design. A reservoir computing architecture is constructed based on this graded neuron, providing a compact and energy-efficient platform for neuromorphic computation. Experimental evaluation on the Iris dataset demonstrates effective feature representation and high classification accuracy. This fully electrical scheme eliminates the need for optical injection and external modulators, reducing system complexity, cost, and power consumption, and is adaptable to various semiconductor laser types.

15:30–16:00 Coffee Break**15:30–17:30 Poster Session****18:30–20:30 Banquet & Awards Ceremony**

08:30–09:45 · November 8, 2025 · Saturday

Advanced Materials (1)

Presider: Lei Bi, University of Electronic Science and Technology, China

08:30–08:45 · ACP2025–0728–19

Optical absorption properties of PtSe₂-on-silicon waveguide devices**Tianping Xu¹**, Rui Niu¹, Liqiang Qi¹, Shuqi Xiao², Tiegeng Liu¹, Hon Ki Tsang², Jiaqi Wang^{3*}, Zhenzhou Cheng^{1*}*1. Tianjin University, China; 2. The Chinese University of Hong Kong, Hong Kong, China; 3. Shenzhen University, China*

We studied optical absorptions of PtSe₂-on-silicon devices by integrating low-dimensional PtSe₂ films on ultrathin silicon devices. The absorption coefficients of the PtSe₂-on-silicon waveguide and microring were 0.0648 dB/μm and 0.453 dB/μm at 2200 nm wavelengths.

08:45–09:00 · ACP2025–0729–33

Erasable Optical Probe for Photonic Integrated Circuits Using Phase Change Materials**Dongyue Sun**, Mingyu Zhu, Yujun Liu, Huan Li, Daoxin Dai, Yaocheng Shi*Zhejiang University, China*

We present an erasable optical probe to monitor waveguide power in photonic integrated circuits, controlled by laser-induced crystallization/amorphization of embedded phase change materials. It is applicable for the detection and pre-calibration of phase errors.

09:00–09:15 · ACP2025–0815–121

Slow-light BTO Modulator With Over 150GHz Electro-optic Response**Yantao Wu***Huazhong University of Science and Technology, China*

We proposed a Mach-Zehnder modulator on a silicon-nitride-loaded barium titanate platform using a slow-light waveguide. This compact 312-μm device achieves a 150 GHz bandwidth and a 0.08 V·cm half-wave voltage-length product.

09:15–09:30 · ACP2025–0815–87

Nonvolatile Silicon-based Optical Switch based on Low-loss Phase Change Material**Wencheng Yue¹**, Kai Liang^{1,2}, Shuai Lei^{1,3}, Yongge Li^{1,3}, Yan Cai^{1*}

1. State Key Laboratory of Materials for Integrated Circuits, Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Sciences, China; 2. University of the Chinese Academy of Sciences, China; 3. University of Shanghai for Science and Technology, China

We proposed and fabricated a nonvolatile silicon-based optical switch utilizing low-loss Sb₂Se₃, achieving reversible amorphous-to-crystalline phase transition via rapid thermal annealing (RTA). The switch exhibits insertion losses (ILs) below 1 dB for both bar and cross states at 1550 nm, with extinction ratios (ERs) reaching ~17 dB. Broadband performance is achieved, with 3 dB bandwidths extending across the measured spectral range (1530 nm – 1580 nm) and ERs consistently exceeding 14 dB. This compact switch showcases low loss, broadband, and zero static power consumption, promising for reconfigurable photonic integrated circuits.

09:30–09:45 · ACP2025–0815–98

A novel phase change material-based non-volatile optical router for optical network-on-chip**Xiangyu He**, Pengxing Guo, Wei Sun, Haoxuan Huang, Shengqiang Li, Weigang Hou, Lei Guo*Chongqing University of Posts and Telecommunications, China*

This paper introduces a novel non-volatile optical router based on phase change material Sb₂Se₃, delivering high extinction ratio, reduced insertion loss, enhanced area efficiency, and low power consumption, making it ideal for high-performance optical network-on-chip.

10:00–10:30 Coffee Break

10:30–12:00 · November 8, 2025 · Saturday
Advanced Materials (2)
 Presider: Yaocheng Shi, Zhejiang University, China

10:30–10:45 · ACP2025–0801–159

Microring Resonator Enhanced Graphene Photodetector Based on Photo-Thermoelectric Effect

Yiding Zheng¹, Tiannan Han², Hengtai Xiang¹, Yuanrong Li¹, Junhuan Li¹, Leyi Hu¹, Laipeng Ma^{3*}, Jingshu Guo^{1*}, Daoxin Dai^{1*}

1.State Key Laboratory of Extreme Photonics and Instrumentation, College of optical Science and Engineering Zhejiang University Hangzhou, China, China; 2.Shenyang National Laboratory for Material Science Institute of Metal Research, Chinese Academy of Sciences, China; 3.Shenyang National Laboratory for Material Science Institute of Metal Research, Chinese Academy of Sciences Shenyang, China, China

A microring graphene photodetector based on the photo-thermoelectric effect is demonstrated, realizing a responsivity of 2.55 V/W and a linear range up to 1.51 mW. It provides a relatively high responsivity and wide-band solution for on-chip detection with a CMOS-friendly fabrication process.

10:45–11:00 · ACP2025–0801–189

Waveguide-Integrated Graphene-Colloidal-Quantum-Dots-Graphene heterostructure Photodetector with High sensitivity

Hengtai Xiang¹, Jing Liu², Laiwen Yu¹, Yuanrong Li¹, Liang Gao², Jingshu Guo^{1*}, Jiang Tang², Daoxin Dai^{1*}

1.Zhejiang University, China; 2.Huazhong University of Science and Technology, China

A graphene-colloidal quantum dot-graphene heterojunction waveguide photodetector is demonstrated, achieving a high responsivity of 37.9 A/W, a low dark current of 1.7 nA, and a noise-equivalent power of 0.01 pW/Hz^{1/2}.

11:00–11:15 · ACP2025–0801–192

Compact Mid-Infrared Inverse-Designed Passive Devices Based on LNOI

Deng Haoqing¹, Zhang Guowu², Yu Zejie¹, Dai Daoxin¹

1.State Key Laboratory of Extreme Photonics and Instrumentation, College of Optical Science and Engineering, Zhejiang University, China; 2.Jiaxing Key Laboratory of Photonic Sensing & Intelligent Imaging, Intelligent Optics & Photonics Research Center, Jiaxing Research Institute, Zhejiang University, China

Compactpassivedevicesoperating at ~3700 nm,including polarization beam splitter,power splitter, and waveguide crossing,are experimentally developed bythe inverse-designmethodon an x-cut lithium niobate on insulator platform.

11:15–11:30 · ACP2025–0731–115

High-Precision 90-Degree Electro-Optic Hybrid with Ultra-Low Phase Error

Siyuan Zhou, **Guanyu Chen**, Ziyao Zhang, Hua Yu, Tao Zhu

Chongqing University, China

An integrated 90° electro-optic hybrid on thin-film lithium niobate utilizes an MMI structure and on-chip phase shifter to achieve 1° phase error and 20 dB CMRR across 1530–1580 nm with sub-3 V drive voltage.

11:30–11:45 · ACP2025–0731–117

Broadband and Robust Suspended Grating Coupler on Ultra-Thin Lithium Niobate

Jindong Lu, **Guanyu Chen**, Ziyao Zhang, Hua Yu

Chongqing University, China

A high-efficiency suspended grating coupler on ultra-thin X-cut LNOI achieves -3.5 dB coupling loss, 90 nm bandwidth, and strong fabrication tolerance, enabling scalable light coupling into fully-etched suspended photonic structures for LNOI integration.

12:00–13:30 Lunch Break

13:30–15:30 · November 8, 2025 · Saturday
Optical Computing (2)
 Presider: Rui Tang, Keio University, Japan

13:30–14:00 · ACP2025–0725–5 **Invited**

Multidimensionally Encoded Photonic Matrix Multipliers for Digital Optical Neural Networks
Deming Kong

Technical University of Denmark, Denmark

We present our recent works on high-precision optical matrix multipliers utilizing multi-dimensional encoding schemes. We explore applications in high-definition image processing and YOLO object detection, demonstrating enhanced accuracy and potential for real-world inference tasks.

14:00–14:15 · ACP2025–0729–38

General-Purpose Programmable Photonic Circuit as an Ising Hamiltonian Computing Engine

Jose Roberto Rausell Campo¹, Nayem Al Kayed², Bhavin Shastri², Jose Capmany Franco¹

1. Universitat Politècnica de València, Spain; 2. Queen's University, Canada

We demonstrate a photonic Ising machine implemented on a general-purpose programmable photonic platform, experimentally performing high fidelity parallel optical matrix-vector multiplications for 3×3 and 4×4 Hamiltonian calculations, and successfully solving a three-node ferromagnetic coupling problem.

14:15–14:30 · ACP2025–0730–58

High-wavelength-uniformity artificial gauge field based microrings for photonic tensor computing

JiaYuan Guo, Wenjia Zhang, Zuyuan He

Shanghai Jiao Tong University, China

We design a microring resonator based the artificial-gauge-field method, which has low fluctuations in extinction ratios and bandwidths within different resonant peaks and different applied voltages, and the close optical weighting bound for 20 wavelengths.

14:30–14:45 · ACP2025–0801–109

Deep convolutional optical neural networks based on MRR array and microcomb

Yunlong Li, Zihang Yang, Haowei Tang, Hao Jiang, Shuang Zheng, Minming Zhang

Huazhong University of Science and Technology, China

We propose a deep convolutional optical neural networks architecture based on MRR array and microcomb. Using the system, the handwritten digits recognition task was simulated with 98.61% accuracy without the assistance of electronic neural networks.

14:45–15:00 · ACP2025–0801–28

A 3.28 TOPS Optoelectronic Neuromorphic Accelerator Achieved by Quadratic Scaling Using Optical Frequency Comb

Ying Zhu¹, Kailai Liu², Shujie Pan³, Xin Hua¹, Yifan Liu¹, Xinyu Yang¹, Yuhang Gong², Chao Yang², Ming Luo², Hongguang Zhang¹, Daigao Chen¹, Siming Chen³, Xi Xiao^{1,4*}

1. National Information Optoelectronics Innovation Center, China; 2. State Key Laboratory of Optical Communication Technologies and Networks, China; 3. Laboratory of Solid State Optoelectronics Information Technology, China; 4. Peng Cheng Laboratory, China
 We propose an integrable optoelectronic neuromorphic accelerator with quadratic scaling, achieving 3.28TOPS and 98.00% accuracy using optical frequency combs.

15:00–15:15 · ACP2025–0801–52

Achieving Non-Unitary Linear Computations on Photonic Networks via Hermitian Augmentation

Xinyu Yang¹, Ying Zhu¹, Yifan Liu¹, Xueyi Jiang¹, Hongguang Zhang¹, Daigao Chen¹, Xi Xiao^{1,2*}

1. National Information Optoelectronics Innovation Center, China; 2. Peng Cheng Laboratory, China

We propose Hermitian Augmentation for non-unitary linear matrix computations on photonic networks, achieving fidelity above 0.997 and MNIST accuracy of 90.10% under imperfections, adaptable to various architectures.

15:15–15:30 · ACP2025–0801–200

N-ary Distributed Architecture Based on Noise-Aware Search for Large-Scale Photonic Convolutional Neural Networks

Ruijia Guo, Yongmei Sun, Zheng Li, Yaoxian Gao

Beijing University of Posts and Telecommunications, China

We build a systematic modeling for MZI-based network with imperfections and propose an N-ary distributed architecture based on noise-aware search for large-scale photonic convolutional neural networks, achieving a 60.59% relative accuracy improvement over existing architectures.

15:30–16:00 Coffee Break

16:00–17:30 · November 8, 2025 · Saturday
Nonlinear Optics
 Presider: Xiaodan Pang, Zhejiang University, China

16:00–16:30 · ACP2025-0630-2 **Invited**

Vernier microcombs for optical atomic clocks and optical frequency synthesizers

Kaiyi Wu^{1,2*}, Victor Torres-Company¹, Jason McKinney², Andrew Weiner²

1. Chalmers University of Technology, Sweden; 2. Purdue University, United States

Stabilization of on-chip microcomb establishes phase-coherent links between optical and radio frequencies. Our Vernier dual-microcomb scheme overcomes the high radio frequency detection challenges in octave-spanning microcombs, enabling stabilized microcomb systems and demonstrating precision metrology applications.

16:30–16:45 · ACP2025-0731-57

Efficient frequency tuning of SiNx optical parametric oscillator

Yuxuan Ouyang, Yanfeng Zhang, Jiaqi Li, Jinjie Zeng, Shuai Lin, Jieyang Wang, Yinchun Xie, Siyuan Yu

SUN YAT-SEN UNIVERSITY, China

We demonstrate efficient broadband continuous tuning of idler frequencies generated through Kerr optical parametric oscillation in a silicon nitride microring resonator, enabled by highly efficient suspended heaters.

16:45–17:00 · ACP2025-0731-91

Direct and Deterministic Single Soliton Generation Enabled by Avoided Mode Crossing in Microresonators

Zhaopeng Li, Qilin Yang, Lilu Wang, Heng Zhou, Bo Xu, Kun Qiu, Yong Geng

University of Electronic Science and Technology of China, China

In this paper, we experimentally demonstrate the direct and deterministic generation of single-soliton in microcavities, which avoids the complex state transitions from the Turing pattern to the chaotic state and then to the soliton state.

17:00–17:15 · ACP2025-0731-38

Broadband Second-Harmonic Generation in a Double-Layer Thin-Film Lithium Niobate Tapered Waveguide

Yuan Li, Lutong Cai, Lin Zhang

Tianjin university, China

We demonstrate broadband second-harmonic generation in a tapered waveguide on the platform of double-layer thin-film lithium niobate. A bandwidth of around 60 nm and a conversion efficiency of around 45% W⁻¹ are achieved.

17:15–17:30 · ACP2025-0815-124

A SPICE Model for Nonlinear Dynamics of Silicon Micro-Ring Modulators

Zhiyuan Zhou¹, Zhihan Sun¹, Yueyang Yu¹, Yantao Wu¹, Tian Qi¹, Shengjiang Dai², Changyu Hu², Hao Hu², Bo Zhao², Jun Liu², Shuang Zheng^{1,3*}, Minming Zhang^{1,3*}

1. Huazhong University of Science and Technology, China; 2. Hubei Jiu Feng Shan Laboratory, China; 3. Optics Valley Laboratory, China

We propose a SPICE-compatible model for silicon micro-ring modulators (MRMs). The model integrates nonlinear electro-optic effect and self-heating dynamics, enabling transient and steady-state simulations within circuit-level design environments.

Track 5: Microwave Photonics and Optical Signal Processing

Function Room K1, 1F (多功能厅 K1, 1 楼)

13:30–15:30 · November 6, 2025 · Thursday
Terahertz technologies and applications
 Presider: Nianqiang Li, Soochow University, China

13:30–14:15 · ACP2025-0605-5 **Tutorial**

Terahertz-Bandwidth Signal Processing with Low-Bandwidth Electronics

Thomas Schneider

TU-Braunschweig, Germany

We review orthogonal sampling for the down-conversion of high-bandwidth into parallel low-bandwidth signals, which drastically reduces the requirements for the electronic signal processing in the optical transceivers and increases SINAD and ENOB.

14:15–14:45 · ACP2025-0624-2 **Invited**

Photonic Terahertz Chaotic Integrated Sensing and Communications (Chaotic-ISAC)

Lu Zhang

Zhejiang University, China

This talk presents our recent work on photonic terahertz chaos for secure ISAC systems, integrating chaos generation, encryption, and radar with optimization framework to balance communication, sensing, and security performance.

14:45–15:00 · ACP2025-0725-6

Filterless Spectral Efficiency Enhancement in Photonics-Assisted Terahertz Communication System via Twin-SSB Modulation

Zhanjiang Wang¹, Kaile Li², Qiufei Song¹, Feixiang Zhang¹, Shuhui Zhou¹, Tong Li¹, Yibo Huang¹, Jianguo Yu^{1*}

1. Beijing University of Posts and Telecommunications, China; 2. Hangzhou Institute of Technology, Xidian University, China

We propose a twin-single-sideband (twin-SSB) modulation scheme for a 400 GHz photonics-assisted terahertz communication system. The scheme employs DSP to separate the left-sideband (LSB) and right-sideband (RSB) signals, thereby eliminating the need for bandpass filters. Simulation results confirm that the BER for both sidebands falls below the HDFEC threshold of 3.8×10^{-3} .

15:00–15:15 · ACP2025-0725-7

Symbol-Level Channel Modeling for 300 GHz Photonic-Assisted THz Communication Systems Using CGAN with Attention

Qiufei Song¹, Kaile Li², Zhanjiang Wang¹, Shuhui Zhou¹, Feixiang Zhang¹, Tong Li¹, Xiande Lin¹, Jianguo Yu^{1*}

1. Beijing University of Posts and Telecommunications, China; 2. Xidian University, China

We propose a conditional generative adversarial network (CGAN)-based channel modeling framework for 300 GHz photonic-assisted terahertz (THz) communication systems. The model achieves accurate symbol reconstruction with robust generalization under diverse conditions, yielding normalized mean squared errors (NMSEs) as low as $1e-4$ in optimal channel cases. In the bad environment, incorporating a self-attention mechanism improves the symbol error rate (SER) by up to 3.8 dB.

15:15–15:30 · ACP2025-0730-30

Resonance-Enhanced FM Noise in Semiconductor Lasers for High-Speed Fiber-THz Convergence Links at 320 GHz

Zhigang Xin¹, Jiao Zhang^{2*}, Min Zhu^{1*}, Qing Zhong¹, Weidong Tong¹, Yunwu Wang², Mingzheng Lei², Junjie Ding², Yuancheng Cai², Bingchang Hua², Yucong Zou², Jianjun Yu²

1. Southeast University, China; 2. Purple Mountain Laboratories, China

We experimentally investigated the robustness of fiber-THz convergence systems to semiconductor laser resonance-enhanced FM noise, enabling 120 Gb/s links with linewidths up to 500 kHz at 1 GHz resonance, under the HD-FEC threshold.

15:30–16:00 Coffee Break

16:00–17:30 · November 6, 2025 · Thursday
Microwave Photonics and Radar Systems
 Presider: Lu Zhang, Zhejiang University, China

16:00–16:30 · ACP2025-0915-15 **Invited**

Photonics-assisted stepped-frequency radar

Ziqian Zhang

The University of Sydney, Australia

Stepped-frequency radar has been widely adopted across diverse applications, including improving climate models to understand global warming, detecting subglacial liquid water on Mars, enabling pedestrian detection for vehicle emergency braking, and facilitating contactless monitoring of vital signs to prevent unattended medical emergencies in aged care. Recent advancements have focused on enhancing signal phase stability and purity, expanding carrier frequency and bandwidth, and driving photonic integration to achieve size, weight, and power (SWaP) optimisation. These developments have led to significant performance improvements in photonics-assisted radars. In this talk, we will focus on a photonic approach to SF radar based on the optical frequency shifting loop (FSL), which enables the generation of ultra-wideband, phase-coherent radar waveforms beyond the limits of electronic methods. By leveraging the OFSL's ability to precisely and rapidly shift optical frequencies, this technique produces broadband microwave signals with high time-frequency linearity and spectral purity, enabling millimetre-level range resolution and robust Doppler detection. We will discuss the underlying principles, recent experimental advances, and demonstrations of high-resolution radar imaging and vital-sign sensing. Finally, we provide forward-looking future directions, including photonic integration and the potential for space-based radar applications.

16:30–17:00 · ACP2025-0716-3 **Invited**

Controllable microwave pulse signal generation based on an actively mode-locked optoelectronic oscillator

Zhen Zeng

University of Electronic Science and Technology of China, China

A novel method for controlling microwave pulses generated by an actively mode-locked optoelectronic oscillator is proposed. By designing the driving waveforms applied to OEO, microwave pulses with programmable pulse width and position can be obtained.

17:00–17:15 · ACP2025-0731-127

Turbulence-Resilient Synthetic Aperture Lidar Imaging Based on Slow-Time Optimization

Linlong He¹, Yan Li^{1*}, Zhengjie Wang¹, Jin Wu², Ziqi Song², Zhuang Wu², Ziqian Fan³, Wenjie Guo¹, Jian Wu¹

1.Beijing University of Posts and Telecommunications, China; 2.The Aerospace Information Research Institute, Chinese Academy of Sciences, China; 3.tianjin University, China

Atmospheric turbulence introduces phase errors and power fluctuations in Synthetic Aperture Lidar imaging. We optimize slow-time length to balance SNR and resolution. Experiments confirm this strategy enhances long-range imaging robustness under turbulence.

17:15–17:30 · ACP2025-0730-41

Chaotic Signal Generation and Compressive Sensing Ranging via Laser Injection with Optoelectronic Feedback

Xinyao Han, Fangzheng Zhang, Xiaoyue Yu, Xin Yan, Hao Wang, Shilong Pan

Nanjing University of Aeronautics and Astronautics, China

This paper proposes a novel method for chaotic signal generation and compressive sensing ranging based on laser injection with optoelectronic feedback. By introducing an optoelectronic feedback loop into an optically injected laser system, the correlation dimension of generated chaotic signals is increased from 5.96 (without feedback) to 13.38 and the spectral flatness is improved from 0.61 to 0.80. When applied to compressive sensing radar ranging, the maximum down-sampling ratio can reach up to 590, significantly reducing the data volume required for chaotic radar ranging.

18:00–20:00 Welcome Reception

08:30–10:00 · November 7, 2025 · Friday
Microwave photonic signal processing(I)
 Presider: Tong Lin, Southeast University, China

08:30–09:15 · ACP2025–0731–58 **Tutorial**

Spatial multiplexing meets dispersion diversity: Enabling advanced signal processing with multicore and few-mode fibers

Mario Annier González, Sergi García, **Ivana Gasulla**

Universitat Politècnica de València, Spain

This invited paper presents key experimental results on advanced signal processing using dispersion-diversity multicore and few-mode optical fibers, enabling reconfigurable true-time delay lines for optical and microwave signals through spatial parallelism and chromatic dispersion diversity.

09:15–09:45 · ACP2025–0801–24 **Invited**

Photonic Array Signal Digitization and Processing: From Architectures to Wideband Applications

Na Qian, Defu Zhou, Yinfu Liu, Peilin Li, Gengle Han, Weiwen Zou

Shanghai Jiao Tong University, China

With the rapid evolution of array signal processing, there is a growing demand for higher data rate, broader bandwidth, and greater consistency. This talk provides an overview of novel architectures for array signal digitization and processing based on photonic technologies, as well as their applications.

09:45–10:00 · ACP2025–0723–5

An Optical Computing-in-Memory Convolutional Processor based on Wavelength-Mode Hybrid Multiplexing and Phase Change Material

Haoxuan Huang, Pengxing Guo, Wei Sun, Shengqiang Li, Xiangyu He, Jiahao Zhou, Weigang Hou, Lei Guo

Chongqing University of Posts and Telecommunications, China

This paper proposes an optical computing-in-memory convolutional processor, which leverages hybrid wavelength-mode multiplexing and phase-change material. First, a subwavelength grating-based mode converter is designed, which realizes highly robust on-chip mode conversion across 9 TE modes. Second, a low-crosstalk optical computing-in-memory multiplication unit is realized, which utilizes the phase-change material $\text{Ge}_2\text{Sb}_2\text{Se}_4\text{Te}_1$ and a passive dual-microring resonator. By combining these designs, this work realizes a 4×9 scale optical convolutional processor which attains a computational density of 41.14 TOPS/mm² and an energy efficiency of 12.03 TOPS/W. The performance of this architecture was validated on the CIFAR-10 dataset, achieving an inference accuracy of 91.45%.

10:00–10:30 Coffee Break

10:30–12:00 · November 7, 2025 · Friday
Microwave photonic signal processing (II)
 Presider: Na Qian, Shanghai Jiao Tong University, China

10:30–11:00 · ACP2025–0731–106 **Invited**

Broadband signal processing using dense wavelength demultiplexed silicon photonic hybrid

Tong Lin, Yan Fan, Haoran Wang, Junpeng Lu, Zhenhua Ni

Southeast University, China

We propose a robust 8- λ 200 GHz-grid dense wavelength division multiplexing coherent receiver using a silicon photonic chip. RF channelizing and 1-Tb/s optical transmission link are demonstrated.

11:00–11:30 · ACP2025–0724–6 **Invited**

Photonics-enabled High-sensitivity and Wide-bandwidth Microwave Phase Noise Analyzers

Jingzhan Shi

Nanjing Normal University, China

Phase noise is a critical performance metric in microwave systems, and the advancement of microwave signal sources introduces new requirements for phase noise analyzers (PNAs) in terms of sensitivity and bandwidth. Conventional electronic PNAs face considerable challenges in fulfilling these enhanced demands. This presentation reviews recent developments in photonic-based microwave PNA research. Microwave photonic (MWP) PNAs are primarily divided into two categories: those based on phase detection and those based on frequency discrimination. MWP phase-detection PNAs employ ultra-short-pulse lasers or optoelectronic oscillators as reference sources to achieve excellent sensitivity. In contrast, MWP frequency-discrimination PNAs are further classified into photon-

ic-substitution-type PNAs and MWP quadrature-frequency-discrimination PNAs. These systems utilize advanced MWP techniques to improve overall performance, providing wider bandwidth and greater sensitivity than traditional methods. Finally, the presentation discusses the current challenges in phase noise measurement technologies and proposes potential research directions aimed at enhancing measurement capabilities.

11:30–11:45 · ACP2025–0731–15

Real-time Ranging System for Coherent LiDAR based on FPGA and Pseudo-random Code Modulation

Jiamin Liu¹, Qianwu Zhang^{1,2*}, Junjie Zhang^{1,2}, Zhiyong Lu³, Wenpeng Cui⁴, Xianzhuo Li¹, Zixuan Ming¹, Wenzhong Liu¹, Kun Chen¹

1.Shanghai University, China; 2.Teralink Optical Corporation (Shanghai), China; 3.Transmission and Detection Technology, Shanghai Institute of Optics and Fine Mechanics, Chinese Academy of Sciences, China; 4.Beijing Smartchip Microelectronics Technology Company Limited, China

We propose an FPGA-based real-time ranging method using dual-channel coherent lidar, resolving ambiguity and resource constraints through segmented processing. Results show 3889 meters long-range measurement with 11.5 dB high SNR and 4.1 ms low latency.

11:45–12:00 · ACP2025–0815–18

Noise-Regulated Optoelectronic Ising Sampler for Accelerated and Noise-Robust Restricted Boltzmann Machines Training

Jiakai Dong, Zihao Chen, Yibin Wan, Zhixian Zhou, Jie Liu, Siyuan Yu

Sun Yat-sen University, China

We experimentally demonstrated a noise-regulated optoelectronic Ising machine for efficient training of restricted Boltzmann machines. Spins are time-multiplexed optical pulses; controllable analog noise tunes an effective temperature to enhance sampling. Leveraging the Ising-RBM energy equivalence, the hardware produces Boltzmann-like samples that accelerate learning. On MNIST, the system achieves effective dimensionality reduction and accurate reconstruction, and maintains high fidelity under large input noise. These results indicate a practical path to robust, hardware-accelerated probabilistic learning.

12:00–13:30 Lunch Break

13:30–15:30 · November 7, 2025 · Friday

Optical Communications and Sensings

Presider: Yang Liu, Huazhong University of Science and Technology, China

13:30–14:00 · ACP2025–0605–4 **Invited**

Microwave Photonics Empowered Integrated Sensing and Communication for 6G

Wang Lihan

National Key Laboratory of Microwave Photonics, China

This talk provides an overview of microwave photonic technologies in wireless communication and sensing, illustrating the performance enhancement brought by photonics. The recent progress and typical performance metrics of key technologies are discussed.

14:00–14:30 · ACP2025–0729–42 **Invited**

Recent Advances in Microwave Photonic Sensing Technologies

Yiping Wang

Nanjing Normal University, China

Microwave photonics, an interdisciplinary field, focuses on the interaction between microwaves and optical waves, enabling the generation, transmission, processing, and measurement of wideband microwave signals using photonic techniques. Microwave photonic sensors are one of the active sub-fields that utilize optical sensors to detect physical quantities such as temperature, strain, and pressure, and employ microwave photonic methods for precise sensing information extraction, offering distinct advantages like high resolution and rapid response. This presentation comprehensively reviews the latest progress in microwave photonic sensing technologies. It begins with an introduction to the fundamental principles of microwave photonic sensing. Subsequently, it elaborates on recent technological breakthroughs, including novel sensor designs, improved demodulation techniques, and enhanced integration levels. The applications of these sensors in diverse fields such as biomedicine, environmental monitoring, and new energy are also presented. Finally, potential future research directions and challenges in the development of microwave photonic sensing technologies are discussed, aiming to provide valuable insights for further research and development in this area.

14:30–14:45 · ACP2025–0709–2

Non-Uniform Programmable Silicon Photonic Mesh**Cristina Catalá-Lahoz**, José Capmany*Universitat Politècnica de Valencia, Spain*

By embedding defect cells inside a uniform hexagonal lattice, programmable photonic meshes attain Vernier-driven path length diversity, extending the free spectral range up to 133 GHz and reducing sampling time to 7.5 picoseconds.

14:45–15:00 · ACP2025–0726–6

Photonic Terahertz Secure Communication with High-dimensional Quantum Noise Cipher**Xiaoxiao Li**¹, Qiuzhuo Deng¹, Yuan Cao², Oskars Ozolins^{3,4}, Xiaodan Pang^{1,3,4}, Lu Zhang^{1*}, Xianbin Yu^{1*}

1. Zhejiang University, China; 2. Nanjing University of Posts and Telecommunications, China; 3. Riga Technical University, Latvia; 4. RISE Research Institutes of Sweden, Sweden

We propose a high-dimensional quantum noise cipher-based photonic terahertz secure communication scheme, with effective anti-eavesdropping and anti-correlation attack capabilities. The experiment demonstrates a 20 Gbps transmission operating at 286 GHz over a 10-meter wireless link.

15:00–15:15 · ACP2025–0727–11

Scintillation-Resistant Coherent Free-Space Optical Communication Based on Local-Oscillator Power Controlling**Penghao Luo**¹, Boyu Dong¹, Haoyu Zhang¹, Yinjun Liu¹, An Yan¹, Guowei Jiang^{2,3}, Jianyang Shi¹, Nan Chi¹, Junwen Zhang^{*}

1. Fudan University, China; 2. Shanghai Satellite Network Research Institute Co., Ltd, China; 3. School of Aerospace Engineering and Applied Mechanics, Tongji University, China

We propose an approach based on power-controlled local-oscillator to mitigate turbulence-induced scintillation in FSO communication. Experimental results in a 100-Gbps 16-QAM system demonstrate that our approach can decrease the standard-deviation of EVM by over 74%.

15:15–15:30 · ACP2025–0728–9

Network Traffic Prediction using Enhanced Photonic Reservoir Computing Based on VCSELLing Zheng^{1*}, **Xinrui Hu**¹, Pan Zhang¹, Xingxing Guo², Yahui Zhang², Shuiying Xiang²

1. Xi'an University of Posts and Telecommunications, China; 2. Xidian University, China

With the growth of Internet technology and network scales, intelligent network management is crucial, especially for accurate traffic prediction to enhance security and user experience. Network traffic is complex, with non-stationarity, nonlinearity, and long-range dependence, making it hard to predict accurately. Traditional methods are insufficient. This study proposes an enhanced photonic reservoir computing model for network traffic prediction. The model uses a vertical-cavity surface-emitting laser based RC to map traffic data to a high-dimensional space and extract features, while LSTM captures temporal characteristics to improve accuracy. It shows strong noise resistance and adaptability. The simulation results demonstrate that, compared to RC and LSTM, the proposed method reduces the normalized root mean square error of the UK academic network dataset collected over different time periods by 19% and 24%, respectively. Furthermore, this study investigates the effects of the number of training epochs and the initial learning rate on the model performance.

15:30–16:00 Coffee Break**15:30–17:30 Poster Session****18:30–20:30 Banquet & Awards Ceremony****08:30–10:00 · November 8, 2025 · Saturday****Photonic integrated circuits & devices (I)**

Presider: Jiejun Zhang, Jinan University, China

08:30–09:00 · ACP2025–0622–1 **Invited****Integrated electro-optic devices based on Pockels materials****Mengke Wang***University of Electronic Science and Technology of China, China*

This talk discusses the importance of integrated electro-optic devices in microwave photonics and optical signal processing, and presents our recent progress in developing integrated devices based on thin-film lithium niobate, barium titanate, and electro-optic polymers.

09:00–09:30 · ACP2025-0731-146 **Invited****Integrated microwave photonics based on graphene and related materials****Alberto Montanaro***CNIT, Italy*

Graphene recently allowed the realization of new integrated optoelectronic devices enabling microwave photonics functionalities, which were revealed to be particularly promising for the next generation radio technology. This talk will present an overview of these results, and some perspectives on their use for the realization of novel 6G antennas concepts based on the interplay of integrated photonics and novel 2D materials.

09:30–09:45 · ACP2025-0801-61

On-chip High Isolation Optical Filter enabling 76 dB CNR, -115.8 dBc/Hz phase noise, 44 dB SNR RF Beating Generation for Beam-forming**Ruijin Qiu**, Ranfeng Gan, Zhenhua Li, Jie Liu, Siyuan Yu*Sun Yat-sen University State Key Laboratory of Optoelectronic Materials and Technologies, China*

An On-chip High Isolation Optical Filter architecture based on Ring-Assisted Mach-Zehnder Interferometer (RAMZI) is proposed to avoid the impact of linewidth and optical path difference (OPD) on RF performance. The RF beating generation system based on such device operates in the sub-15 GHz RF band, achieving a carrier-to-noise ratio (CNR) of up to 76 dB, a phase noise (PN) of -115.8 dBc/Hz@10 kHz, and a signal noise ratio (SNR) of 44.06 dB for 16QAM, 300M Baud. In addition, the system can be applied to the generation of high isolation carrier-suppressed single-sideband (CS-SSB) signals, with carrier isolation and signal isolation levels of up to 46 dB and 53 dB respectively.

09:45–10:00 · ACP2025-0815-122

Photonic Generation of Wideband Frequency-Agile Microwave Signal Using High-Q On-Chip Optical Filters**Yangteng Zhang**, Kunlong Li, Bin Wang, Weifeng Zhang*Beijing Institute of Technology, China*

We propose a photonic approach to generating wideband frequency-agile microwave signals, which exhibits a frequency range spanning 2–30 GHz, a minimum frequency step of 1 MHz and a low phase noise of -110 dBc/Hz@10 kHz.

10:00–10:30 Coffee Break

10:30–11:45 · November 8, 2025 · Saturday

Photonic integrated circuits & devices (II)

Presider: Mengke Wang, University of Electronic Science and Technology of China, China

10:30–11:00 · ACP2025-0801-3 **Invited****Roadmapping the large-scale integrated photonic tensor core****Zhongjin Lin**^{*}, Weihua Yan, Furong Zhong, Xinlun Cai^{*}*Sun Yat-sen University*

Here, we summarize the architectures of integrated photonic tensor cores, discuss their capabilities for large-scale matrix computation, and highlight photogenerated charge integration-based one as a promising architecture for enabling such computation.

11:00–11:30 · ACP2025-0801-60 **Invited****Silicon Photonics Accelerator and Processor for AI Using Integrated Coherent Technologies****Ying Zhu**¹, Xin Hua¹, Yifan Liu¹, Xinyu Yang¹, Xueyi Jiang¹, Hongguang Zhang¹, Daigao Chen¹, Xi Xiao^{1,2*}*1. National Information Optoelectronics Innovation Center, China; 2. Peng Cheng Laboratory, China*

To achieve high-speed and energy-efficient AI computing, we develop photonic AI neuromorphic accelerators and multifunctional programmable processors, integrating innovations from circuit and architecture to algorithm and system.

11:30–11:45 · ACP2025-0801-150

Photonic Dilated Convolution Operator Using Matched Dispersion Coefficient Mechanism**Ruilin Liao**, Yixuan Zheng, Yifu Xu, Yuhang Song, Yunping Bai, Xingyuan Xu*The State Key Laboratory of Information Photonics and Optical Communications, School of Electronic Engineering, Beijing University of Posts and Telecommunications, China*

We proposed a reconfigurable photonic-based dilated convolution operator using matched dispersion mechanism. It achieves efficient multi-scale feature extraction with fewer optical combs, demonstrating its potential in photonic neural network applications.

12:00–13:30 Lunch Break

13:30–15:30 · November 8, 2025 · Saturday
Advanced Photonic Systems and Applications(I)
 Presider: Xiaojun Xie, Southwest Jiaotong University, China

13:30–14:00 · ACP2025–0813–20 **Invited**

Photonic Platforms for Neuromorphic Computing
Chaoran Huang

The Chinese University of Hong Kong, Hong Kong, China

This talk explores advanced photonic platforms, from 2D silicon photonics to 3D metasurfaces, enabling high-speed, low-power neuromorphic computing for AI. We highlight innovations in intelligent signal processing, machine vision, and enhancing accuracy and reliability.

14:00–14:30 · ACP2025–0730–11 **Invited**

Kerr-Induced Coherent Spectral Processing for Versatile Generation of Optical Frequency Combs

Chester Shu, Zijian Li, Chen Ding

The Chinese University of Hong Kong, Hong Kong, China

We demonstrate a Kerr-induced coherent spectro-temporal processing scheme for the generation, processing, and spectral conversion of optical frequency combs (OFCs). Our platform enables the formation of new OFCs with enlarged and programmable free spectral ranges.

14:30–14:45 · ACP2025–0728–7

A Sliding Window Enhanced Photonic Time Delay Reservoir Computing System for Load Forecasting

Ling Zheng¹, **Pan Zhang**¹, Xinrui Hu¹, Xingxing Guo², Yahui Zhang², Shuiying Xiang²

1.Xi'an University of Posts and Telecommunications, China; 2.Xidian University, China

This research presents a photonic time-delay reservoir computing (TD-RC) system for short-term load forecasting (STLF). The system utilizes a sliding window technique to reconstruct the features of the raw data, while employing a vertical cavity surface emitting laser (VCSEL) as a nonlinear node, effectively enhancing the model's nonlinear dynamic characteristics. The model's performance is validated using load datasets from Panama and Johor, Malaysia, and the impact of model parameters on forecasting performance is investigated. Compared to existing models, TD-RC model reduces the mean absolute percentage (MAPE) by 26% to 39% (35% to 50%), and the model's computation time decreases by 45% to 62% (52% to 67%). The results demonstrate that the proposed model can achieve accurate load forecasting while reducing computation time.

14:45–15:00 · ACP2025–0729–16

Beyond 100G Photonics-Aided THz Real-Time Transmission Based on Envelope Detection and Low-Complexity FPGA Implementation

Yikai Wang¹, Junjie Ding², Min Zhu¹, Long Zhang², Jia Meng¹, Weidong Tong¹, Yuancheng Cai², Jiao Zhang², Bingchang Hua², Mingzheng Lei², Kaihui Wang³, Jianjun Yu³

1.Southeast University, China; 2.Purple Mountain Laboratories, China; 3.Fudan University, China

We demonstrate a photonics-aided THz real-time transmission system at 300 GHz based on FPGA, achieving record-breaking 105-Gbps THz signal transmission over 3-meter wireless link by using envelope detection scheme, antenna polarization multiplexing and low-complexity DSP.

15:00–15:15 · ACP2025–0730–24 **Industry Innovation Nomination**

SNR-Enhanced Constant-Envelope THz Signal Transmission at 300 GHz based on Modified Arctangent Algorithm

Jiankang Li¹, Yuancheng Cai^{2*}, Xiang Meng¹, Zicheng Fang¹, Jiao Zhang², Mingzheng Lei², Bingchang Hua², Junjie Ding², Xingyu Chen², Yunwu Wang², Jianjun Yu², Min Zhu^{1*}

1.Southeast University, China; 2.Purple Mountain Laboratories, China

We demonstrated a constant-envelope THz signal transmission over the 1-m wireless link at 300GHz, employing modified arctangent algorithm for phase demodulation. Compared with the intensity modulation scheme, over 15-dB SNR improvements and enhanced robustness are achieved.

15:15–15:30 · ACP2025–0815–55

Joint Time and Frequency Transfer Based on a Stabilized Optical Fiber Link

Zhuoran Li¹, Xiang Liu², Wei Wei^{1*}, Weilin Xie¹, Yi Dong¹

1.Key Laboratory of Photonic Information Technology, Ministry of Industry and Information Technology School of Optics and Photonics Beijing Institute of Technology, China; 2.Institute of Science & Technology Innovation Dongguan University of Technology, China

We demonstrate a distributed dual-site time-frequency transfer system using optical links with tens-of-femtosecond stability. The Allan deviation of 100MHz frequency reaches 1e-15, and the time deviation for the 1PPS time signal reaches 1e-12.

15:30–16:00 Coffee Break

16:00–17:00 · November 8, 2025 · Saturday
Advanced Photonic Systems and Applications(II)
Presider: Jingzhan Shi, Nanjing Normal University, China

16:00–16:30 · ACP2025-1001-1 **Invited**

High-Speed and High-Power Photodetectors: From Homogeneous Material Devices to Heterogeneous Integrated Chips
Xiaojun Xie^{1,2*}

1.Southwest Jiaotong University, China; 2.Key Laboratory of Photonic-Electronic Integration and Communication-Sensing Convergence, Ministry of Education, China

This talk summarizes the evolution of high-performance photodetectors, tracing the progression from homogeneous material devices to heterogeneous integrated chips that break these barriers to achieve high speed, high power and multi-functional integration.

16:30–16:45 · ACP2025-0731-135

Generation of Tunable Phase-Coded Microwave Pulses Based on Active Mode-Locking Optoelectronic Oscillator

Boxiong Cui¹, Chenyang Ma¹, Cheng Gu², Xinyu Jin¹, Wen Xie², Zhengyang Xie^{1*}, Xin Zhao¹, Pengwei Gong², Zheng Zheng¹

1.Beihang University, China; 2.Beijing Institute of Radio Metrology and Measurement, China

We propose and verify a method for generating phase-coded microwave pulse signals based on Active Mode-Locking (AML). With the help of the AML Optoelectronic (AML-OEO), this scheme utilizes a phase modulator driven by phase-coded signals, where the duration of each voltage polarity code is the same as the OEO loop delay, generating phase-coded coherent microwave pulse trains. Such signals have the advantage of a large time-bandwidth product, which can balance the detection range and range resolution of radar, while also possessing characteristics such as anti-interference and low interception. In experiments, we successfully obtained square wave signals and phase-coded pulse sequences encoded with 7-bit Barker codes.

16:45–17:00 · ACP2025-0731-70

Cost-Effective and Bandwidth-Extended Instantaneous Frequency Measurement Based on Stimulated Brillouin Scattering

Jingbo Li, Wei Zhao, Liang Hu, Jianping Chen, Gulling Wu

Shanghai Jiao Tong University, China

A cost-effective and bandwidth-extended instantaneous frequency measurement scheme based on stimulated Brillouin scattering achieves unambiguous frequency-to-time mapping, extending measurement bandwidth to 35 GHz with sub-2 MHz accuracy and 50 μ s interception.

Track 6: Micro-, Nano-, and Quantum Photonics: Science and Applications

Function Room K2, 1F (多功能厅 K2, 1 楼)

13:30–15:15 · November 6, 2025 · Thursday
Quantum Photonics
 Presider: Ping Zhao, Sichuan University, China

13:30–14:15 · ACP2025-0801–38 **Tutorial**

Nonlinear and quantum photonics in SiC-on-Insulator Microring Resonators

Andrew Poon*, Jiantao Wang, Qianni Zhang, Jiayang Li

The Hong Kong University of Science and Technology, Hong Kong, China

In this tutorial, we will give an overview and present our latest progress in nonlinear and quantum photonics using 4H-SiCOI microring resonators, highlighting their potential for integrated quantum photonic technologies.

14:15–14:45 · ACP2025-0731–61 **Invited**

Monolithic integration of III–V quantum dot lasers and silicon waveguides on SOI

Wenqi Wei

Songshan Lake Materials Laboratory, China

Direct epitaxial growth of III–V quantum dot (QD) lasers on Si (001) substrates is recognized as the most promising and low-cost method for realizing high-performance on-chip light sources in silicon photonic integrated circuits (PICs). Although great progress has been made only about growing III–V QD lasers on Si, monolithic integration of III–V lasers and silicon waveguides on the same wafer is still unavailable. Here, we demonstrate an embedded InAs/GaAs QD laser directly grown on the etched SOI substrate, enabling monolithic integration with butt-coupled silicon waveguides. The novel (111)-faceted silicon hollow structures are introduced by homoepitaxial method and used for epitaxial growth of high-quality III–V materials on the patterned etched SOI platform. The (111)-faceted sawtooth structures are effective to suppress the antiphase boundaries (APBs) and lattice-mismatch defects. After heteroepitaxial growth of 2 μm -thick III–V buffer layers, including InGa(Al)As/GaAs quantum well dislocation filters and AlGaAs/GaAs superlattices, high-quality III–V film with low threading dislocation density ($\sim 10^6/\text{cm}^2$) and low surface roughness ($\text{RMS} < 1\text{nm}$) is achieved on the etched SOI substrate. By utilizing the etched SOI substrate with pre-defined silicon waveguides, high-performance embedded InAs QD lasers with monolithically out-coupled silicon waveguide are achieved. By resolving the fabrication challenges in such monolithic integrated architecture, embedded III–V lasers on SOI with continuous-wave lasing up to 85 °C are obtained. And the maximum output power of 6.8 mW can be measured from the butt-coupled silicon waveguide, with an estimated coupling efficiency of approximately –6.7 dB. The results presented here provide a scalable and low-cost epitaxial method for the realization of on-chip light sources directly coupling to the silicon photonic components for future high-density photonic integration.

14:45–15:15 · ACP2025-0731–17 **Invited**

Quantum Dot Lasers: Advances, Applications and Prospects

Siming Chen

Institute of Semiconductors, Chinese Academy of Sciences, China

QD lasers offer superior performance with narrow-linewidth, temperature-stability, wavelength-flexibility, resistance to optical feedback and integration potential. This talk explores their advantages, emerging applications in communications and photonics, and recent progress in device performance and integration.

15:30–16:00 Coffee Break

16:00–17:30 · November 6, 2025 · Thursday
Integrated Photonics
 Presider: Ting Wang, Institute of Physics CAS, China

16:00–16:45 · ACP2025-0729-30 **Keynote**

Chiral optical modes in silicon-based integrated microresonators

Jiawei Wang

Harbin Institute of Technology SZ, Germany

We present silicon-based microring resonators with tailored structural asymmetry for on-chip chirality control, enabling on-chip functionalities such as enhanced sensing, non-reciprocal transmission, directional and mode-selective emission, and non-Hermitian quantum cavity electrodynamics.

16:45–17:30 · ACP2025-0915-16 **Tutorial**

An overview of the capacity limits of classical and quantum optical communication systems

Rene Essiambre

Nokia Bell labs, United States

A survey of the capacity of optical communication systems to transmit information will be presented. We will focus on classical capacities over optical fibers to capacity limits using quantum technologies.

18:00–20:00 Welcome Reception

08:30–10:00 · November 7, 2025 · Friday
Integrated Photonics
 Presider: Haowen Shu, Peking University, China

08:30–09:00 · ACP2025-0726-8 **Invited**

Lateral monolithic integration of III–V devices on SOI

Ying Xue

The Chinese University of Hong Kong, Hong Kong, China

This talk presents lateral monolithic integration of III–V on SOI, enabling high-quality, co-planar device configurations with unique performance in lasers and photodetectors while achieving efficient in-plane coupling between III–V and Si.

09:00–09:15 · ACP2025-0731-43

Waveguide integrated superconducting single-photon detectors with near-unity absorption

Ilya Stepanov^{1,2}, Evgeniy Sergeev^{1,2}, Sergey Avdeev¹, Aleksey Kramarenko¹, Kirill Buzaverov^{1,2}, Oksana Shmonina¹, Aleksandr Baburin^{1,2}, Ilya Ryzhikov¹, Ilya Rodionov^{1,2}

1. Bauman Moscow State Technical University, Russia; 2. Dukhov Research Institute of Automatics (VNIIA), Russia

We demonstrate NbN-based detectors monolithically on a SiN photonic platform with the possibility of both edge and grating coupling. Detectors have demonstrated absorption efficiencies of up to 99.78%, making them near-perfect absorbers of telecom light.

09:15–09:30 · ACP2025-0731-3

Seamless process technology for the flexible fabrication of high-density photonic integrated circuits

Evgeny Sergeev^{1,2}, Kirill Buzaverov^{1,2}, Aleksandr Baburin^{1,2}, Sergei Avdeev^{1,2}, Sergei Bukatin², Aleksei Kramarenko², Evgeniy Lotkov^{1,2}, Evgeny Zikiy^{1,2}, Ilya Ryzhikov², Ilya Rodionov^{1,2}

1. Dukhov Research Institute of Automatics (VNIIA), Russia; 2. FMN Laboratory Bauman Moscow State Technical University, Russia

In this paper, we achieved the fabrication of low- and high-density photonic integrated circuits with ultra-low losses using a new hard-mask-based process flow, suitable for R&D fabrication.

09:30–09:45 · ACP2025-0802-4 **Industry Innovation Nomination**

Deterministic soliton microcombs enabled by copper-free photonic integrated circuits

Xinru Ji¹, Xurong Li¹, Zheru Qiu¹, Rui Ning Wang², Marta Divali¹, Andrey Gelash¹, Grigory Lihachev¹, Tobias Kippenberg¹

1. Swiss Federal Institute of Technology Lausanne (EPFL), Switzerland; 2. Luxtelligence SA, Switzerland

We trace thermal effects in Si₃N₄ microresonators to Cu impurities diffusing from Si substrates. By developing Cu gettering techniques, we achieve deterministic soliton microcomb generation via slow laser scanning.

09:45–10:00 · ACP2025–0731–128

Design and Simulation of High-bandwidth Photonic–electrical Integrated Transceiver Based on 2.5D LTCC/HTCC Packaging**Jiixin Zheng¹**, Jianyu Shi¹, Yan Zhou², Hao Wu², Yu Sun¹, Junde Lu¹, Jie Shi¹, Lanling Chen¹, Yueqin Li¹, Jian Sun¹, Zhengsong Li¹, Jun Qin¹*1. Beijing Information Science and Technology University, China; 2. Peking University Yangtze Delta Institute of Optoelectronics, China*

In this paper, a high bandwidth photonic–electrical integrated transceiver based on 2.5D LTCC/HTCC packaging is designed and simulated. The transceiver achieves a bandwidth of approximately 40 GHz, with clear eye diagram observed at 60 Gbps.

10:00–10:30 Coffee Break**10:30–12:00 · November 7, 2025 · Friday****Quantum Photonics****Presider: Yu Zhang, Huazhong University of Science and Technology, China**10:30–11:00 · ACP2025–0816–6 **Invited****On the Fundamentals of Quantum Electronics: Schrödinger and Dirac Equations****Xiaomin Ren***Beijing University of Posts and Telecommunications, China*

The fundamentals of quantum mechanics, surely also of quantum electronics, have been found of some imperfections. Based on the relevant remedy regarding de Broglie relationship of wave–particle duality, both Schrödinger equation and Dirac equation are comprehensively modified.

11:00–11:15 · ACP2025–0801–79

Twin-Field Quantum Key Distribution Coexists with Classical Communication over Hollow-Core Fibers**Weiwen Kong¹**, Yongmei Sun^{2*}, Zhenhua Li¹, Qi Zhao¹, Yuting Wang², Yaoxian Gao², Jianjun Tang^{1*}*1. China Telecom Research Institute, China; 2. State Key Lab. of Info. Photo. and Opt. Comm. Beijing Univ. of Posts and Telecom, China*

We propose a noise-aware wavelength allocation scheme enabling stable twin-field QKD and classical communication coexistence over hollow-core fibers. By interleaving channels and minimizing nonlinear noise, our approach significantly improves transmission distance and power compatibility for hybrid quantum–classical networks.

11:15–11:30 · ACP2025–0815–30

An Optical Reservoir Computing Design based on Two-Dimensional Quantum Walk**Yushu Wang^{*}**, Yuheng Ding, Yang Chen, Yangcan Long, Ming Tang, Chao Wang^{*}*Huazhong University of Science and Technology, China*

Two-Dimensional Quantum Walk Reservoir Computing (2D-QWRC) is proposed to address insufficient nonlinearity in computation systems based on quantum walk. Evaluation showed its notable performance improvement in the function fitting task and potential in prediction tasks.

11:30–11:45 · ACP2025–0815–25

Broadband Quantum Light Source on a SiC Chip**Hong Zeng^{1,2}**, Li-Ping Zhou³, Bing-Cheng Yang³, Yun-Ru Fan^{1,2*}, Hao Li³, Li-Xing You³, Xin Ou^{3*}, Guang-Can Guo^{1,2,4,5}, Qiang Zhou^{1,2,4,5*}

1. Institute of Fundamental and Frontier Sciences, University of Electronic Science and Technology of China, China; 2. Key Laboratory of Quantum Physics and Photonic Quantum Information, Ministry of Education, University of Electronic Science and Technology of China, China; 3. Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Sciences, China; 4. Center for Quantum Internet, Tianfu Jiangxi Laboratory, China; 5. Chinese Academy of Sciences Center For Excellence in Quantum Information and Quantum Physics, University of Science and Technology of China, China

We report entangled photon pairs generation in a 4H-silicon carbide microring chip via spontaneous four-wave mixing, achieving high generation rate, strong entanglement, and wide spectral bandwidth for integrated quantum photonics.

11:45–12:00 · ACP2025–0731–22

Integrating of optical frequency with quantum key distribution based on 10-km 7-core fiber**Lai Yu¹**, Li Zhang², Zhicheng Jin¹, Jialiang Wang¹, Fangxiang Wang³, Lei Liu^{4*}, Youzhen Gui^{1*}*1. Shanghai Institute of Optics and Fine Mechanics, China; 2. Anhui Asky Quantum Technology CO., LTD, Wuhu, China; 3. University of Science and Technology of China, China; 4. Westlake University, China*

We report the first experimental demonstration hybrid transmission of ultra-stable optical frequency references and quantum key distribution (QKD) signals over a homogeneous multi-core fiber (MCF). The frequency transfer system achieves frequency stabilization at the remote site via active phase noise compensation. A QKD system implementing the BB84 phase-encoding protocol with decoy states is integrated within the platform.

12:00–13:30 Lunch Break

13:30–15:30 · November 7, 2025 · Friday
Optical Devices: Lasers, Filters, and Waveguides
 Presider: Zejie Yu, Zhejiang University, China

13:30–14:00 · ACP2025–0731–114 **Invited**

Visible Brillouin–quadratic microlasers in thin–film lithium niobate platform

Jintian Lin

Shanghai Institute of Optics and Fine Mechanics, Chinese Academy of Sciences, China

On-chip visible Brillouin–quadratic microlaser was reported at 780 nm wavelength in a 117- μm -diameter thin–film lithium niobate microdisk, enabled by second harmonic generation of cross-polarized narrow-linewidth Stokes Brillouin lasing (SBL) in the microdisk via dispersion engineering.

14:00–14:30 · ACP2025–0730–37 **Invited**

Spatiotemporal spectral filtering chip based on active materials

Tingbiao Guo

Zhejiang University, China

This report will introduce a high-performance spatiotemporal spectral filter chip based on active materials, discuss the advantages and disadvantages of different active materials in the construction of spatiotemporal filter chips.

14:30–14:45 · ACP2025–0815–140

Generation of Supercontinuum Spectrum in Dual–Core Tantalum Pentoxide Waveguides

Xueying Sun¹, Xingyu Tang², Qiankun Li¹, Zhenyu Liu², Yongyuan Chu¹, Chengbo Mou¹, Qiancheng Zhao^{2*}, Hairun Guo^{1*}

1. Shanghai University, China; 2. Southern University of Science and Technology, China

We demonstrate a high-dimensional dispersion control strategy via dual-core Ta₂O₅ waveguides, enabling broadband supercontinuum generation. This provides an effective solution for on-chip broadband SC spectra in Ta₂O₅-based platforms.

14:45–15:00 · ACP2025–0815–86

Brillouin Scattering Induced Absorption via Backward Brillouin Scattering on SOI platform

Mingyu Xu, Peng Lei, Yunhui Bai, Xinglong Li, Zhangyuan Chen, Xiaopeng Xie^{*}

Peking University, China

We present the first experimental demonstration of Brillouin scattering induced absorption with backward stimulated Brillouin scattering (SBS) on SOI platform.

15:00–15:15 · ACP2025–0728–17

Mode–Selective Lasing in Dye–Coated Rolled–Up Microtube Cavities

Mingquan Deng¹, Jin Li¹, Xiujie Dou¹, Yaoming Wei¹, Yang Tan², Jiawei Wang^{1*}

1. Harbin Institute of Technology, Shenzhen, China; 2. Shandong University, China

We demonstrate the experimental realization of optically pumped lasing in a dye-coated nanomembrane-based microtubular cavity. By tailoring axial confinement through nanomembrane patterning, we observe higher-order axial modes. Mode-selective lasing is discerned with distinct threshold powers.

15:15–15:30 · ACP2025–0713–2

Common–Mode Noise Suppression with Dual Self–Injection Locked DFB Lasers on a Si₃N₄ Microring

Siyang Li, Zhiming Shi, Xukun Lin, Hairun Guo^{*}

Shanghai University, China

We demonstrate dual self-injection locking of DFB lasers to a 200 GHz silicon nitride microresonator, achieving linewidth narrowing and 23 dB relative frequency noise suppression at 100 Hz offset via common-mode rejection.

15:30–16:00 Coffee Break

15:30–17:30 Poster Session

18:30–20:30 Banquet & Award Ceremony

08:30–10:00 · November 8, 2025 · Saturday

Integrated Photonics

Presider: Tiantian Li, Xi'an University of Posts & Telecommunications, China

08:30–09:00 · ACP2025-0722-3 **Invited****Photonic Integration for Advanced Multidimensional Optical Applications****Yeyu Tong***Hong Kong University of Science and Technology (Guangzhou), China*

We will provide an overview of our recent research advancements in integrated silicon photonics devices and programmable circuits, focusing on their applications in advanced multidimensional optical systems for future high-performance sensing, signal processing, and interconnects.

09:00–09:30 · ACP2025-0729-25 **Invited****Ultra-broadband optical parametric amplification using nonlinear integrated waveguides****Ping Zhao***Sichuan University, China*

In this talk, I will present our recent progress in ultra-broadband continuous-wave optical parametric amplification based on third-order nonlinear integrated waveguide. Moreover, applications such as high-speed all-optical wavelength conversion will also be included.

09:30–09:45 · ACP2025-0801-205

A Programmable On-Chip Dual-Polarization Optical FilterTiantian Li^{1*}, **Huanlu Zhang¹**, Yumeng Liu¹, Zhangfeng Ge², Zhanqiang Hui¹, Huimin Du¹*1. Xi'an University of Posts & Telecommunications, China; 2. Peking University Yangtze Delta Institute of Optoelectronics, China*

A dual-polarization programmable on-chip filter was demonstrated. Two polarizations show FSR tuning of 72.25% and 69.48%, maximum out-of-band suppression of 34.83 dB and 23.61 dB, and 3 dB bandwidth adjustment of 30.32% and 35.06%.

09:45–10:00 · ACP2025-0731-11

Reconfigurable ultralow-loss silicon nitride photonic integrated circuits for prototyping of optoelectronic devicesKirill Buzaverov^{1,2*}, Aleksandr Baburin^{1,2}, Evgeny Sergeev¹, Sergey Avdeev¹, Evgeniy Lotkov¹, Sergey Bukatin¹, Ilya Stepanov¹, Aleksey Kramarenko¹, Ali Amiraslano¹, Dmitriy Serkin¹, Ilya Ryzhikov^{1,3}, Ilya Rodionov^{1,2}*1. FMN Laboratory, Bauman Moscow State Technical University, Russia; 2. Dukhov Research Institute of Automatics (VNIIA), Russia; 3. Institute for Theoretical and Applied Electromagnetics RAS, Russia*

The paper presents the possibilities of prototyping integrated optoelectronic devices based on the developed technology for manufacturing silicon nitride photonic integrated circuits. We achieve ultralow propagation loss of less than 0.02 dB/cm in the wavelength range of 1510–1630 nm. Basic passive and active integrated optical components are also characterized, including grating couplers, microresonators, and thermo-optic phase shifters.

10:00–10:30 Coffee Break

10:30–12:00 · November 8, 2025 · Saturday

Quantum Photonics

Presider: Jiawei Wang, Harbin Institute of Technology Shenzhen, China

10:30–11:15 · ACP2025-0815-75 **Tutorial****III-V Telecom Quantum-Dot lasers Monolithically Grown on Si Platform for Si Photonics****Huiyun Liu***UCL, United Kingdom*

High-performance Si-based 1300-nm InAs/GaAs quantum-dot lasers and 1550-nm InAs/InP quantum-dot lasers have been demonstrated on Si substrates. This presentation will summarize the development milestones of III-V lasers monolithically grown on a Si platform.

11:15–11:30 · ACP2025–0815–78

Duplex Quantum Teleportation System Using a Spatial Multiplexing Quantum Light SourceYazhou Zhao¹, Riyao Song¹, Jiarui Li¹, Hao Li², Lixing You², Yao Xiao³, Yunru Fan¹, Guangcan Guo^{1,3,4}, Qiang Zhou^{1,3,4}

1. Institute of Fundamental and Frontier Sciences, University of Electronic Science and Technology of China, China; 2. Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Sciences, China; 3. Center for Quantum Internet, Tianfu Jiangxi Laboratory, China; 4. Chinese Academy of Sciences Center For Excellence in Quantum Information and Quantum Physics, University of Science and Technology of China, China

We experimentally demonstrate a duplex quantum teleportation system based on a spatially multiplexing quantum light source. Two independent Bell-state measurements enable full-duplex operation, providing a symmetric architecture for scalable quantum inter-net.

11:30–11:45 · ACP2025–0731–72

On-Chip Real-Time Shot Noise Calibration for Continuous-Variable Quantum Key DistributionXuesong Xu, Shiqi Zhang, Lu Fan, Song Yu, Lei Zhang^{*}, Yichen Zhang^{*}

Beijing University of Posts and Telecommunications, China

We develop a continuous-variable quantum key distribution system with an integrated optical switch for real-time shot noise calibration, achieving a secret key rate of 5.11 Mbps over 25.3 km for practical applications.

11:45–12:00 · ACP2025–0815–58

Quantum Teleportation over Hollow-Core Fiber LinksJi Zhang¹, Riyao Song², Yu Qin³, Jie Sun¹, Lipeng Feng⁴, Huimin Tan¹, Yichun Shen³, Yazhou Zhao², Hao Li⁵, Lixing You⁵, Yao Xiao⁶, Yunru Fan², Guangcan Guo^{2,6,7}, Qiang Zhou^{2,6,7*}

1. Cloud and Network Development Department, China Telecom Corporation Limited, China; 2. Institute of Fundamental and Frontier Sciences, University of Electronic Science and Technology of China, China; 3. R&D Department, Jiangsu Zhongtian Technology Co., Ltd., China; 4. State Key Laboratory of Optical Fiber and Cable Manufacture Technology, China Telecom Research Institute, China; 5. Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Sciences, China; 6. Center for Quantum Internet, Tianfu Jiangxi Laboratory, China; 7. Chinese Academy of Sciences Center For Excellence in Quantum Information and Quantum Physics, University of Science and Technology of China, China

We demonstrate quantum teleportation over hollow-core fiber (HCF) links on the China Telecom testbed for the first time. By leveraging HCF's minimal latency, low dispersion, and robustness against environmental disturbances, we achieve high fidelity teleportation with telecom-compatible components, which confirms HCF as a promising channel for the quantum internet.

12:00–13:30 Lunch Break

13:30–15:30 · November 8, 2025 · Saturday

Optical Devices: Metamaterials, Metagratings

Presider: Xuhan Guo, Shanghai Jiao Tong University, China

13:30–14:00 · ACP2025–0628–1 **Invited****Integrated Photonic Metamaterial Antennas for High-Performance Beam Steering**

Junjia Wang

Southeast University, China

Recent breakthroughs in optical phased array (OPA) technology have unlocked new possibilities for precision beam control in applications such as LiDAR, free-space optical communication, and imaging. To address persistent challenges in OPA design, we present metamaterial antenna architectures that advance both performance and integration. First, we demonstrate a subwavelength grating antenna that leverages ridge-waveguide structures and backward-emitting mechanisms to enable exceptional longitudinal beam steering, achieving a record-low beam divergence of 0.13° , a 40.4° scanning range, and ultra-high wavelength sensitivity of $0.236^\circ/\text{nm}$. Second, we introduce an inverse-designed metamaterial antenna platform capable of full 360° two-dimensional (2D) beam steering, maintaining a narrow beam divergence of $1.3^\circ \times 1.55^\circ$ within an ultra-compact $560\ \mu\text{m}^2$ footprint. Both approaches significantly outperform conventional waveguide grating antennas in sensitivity or footprint reduction and support multi-beam operation for enhanced spatial resolution. These advances pave the way for next-generation, multifunctional OPA systems with high-performance beam steering capabilities.

14:00–14:30 · ACP2025–0729–39 **Invited****Electrically and optically reconfigurable phase change materials–integrated photonic devices****Junying Li***Hangzhou Institute for Advanced Study, University of Chinese Academy of Sciences, China*

Chalcogenide phase change materials (PCMs) are promising candidates for ultra-compact, zero-static-power-consumption programmable photonics due to their high refractive index contrast induced by reversible phase transitions between amorphous and crystalline states. In this talk, we will present our work on the development and fabrication of low-loss phase-change thin films, the monolithic back-end integration of phase-change materials into silicon photonics, electrically programmable multi-bit nonvolatile phase and intensity modulation, and laser direct-written PCM-integrated photonic devices. We have successfully realized a series of photonic devices, including nonvolatile optical switches, filters, photonic memories, reconfigurable attenuators, rewritable displays, and reconfigurable geometric phase in hybrid integrated photonics. We highlight that the PCMs can not only provide key technologies for programmable optical networks and in-memory computing, but also enable a powerful platform for investigating advanced physical mechanisms with flexible reconfigurability.

14:30–14:45 · ACP2025–0815–113

Polarization-independent 4-mode multiplexer based on reflective metasurface**Pengjiu Zhao**, Jiangbing Du^{*}, Zuyuan He*Shanghai Jiao Tong University, China*

A polarization-independent 4-mode multiplexer with submillimeter footprint ($127\ \mu\text{m} \times 635\ \mu\text{m}$) based on metasurface with a reflector on the backside is demonstrated achieving a minimum insertion loss of 4.3 dB at 1550 nm.

14:45–15:00 · ACP2025–0723–1

Dynamically Reconfigurable Phase–Change Metasurface on Single–Mode Fiber for Near–Infrared Spectroscopy**Yuru Li**^{1*}, Wanting Ou¹, Zhaohui Li²*1. Sun Yat-sen University, China; 2. Guangdong Provincial Key Laboratory of Optoelectronic Information Processing Chips and Systems, School of Electrical and Information Technology, Sun Yat-sen University, China*

This paper proposes an ultra-wideband spectrometer based on the integration of single-mode fiber and a chalcogenide phase-change material. The chalcogenide phase-change material Sb_2Se_3 exhibits a near-zero extinction coefficient and a high refractive index in the near-infrared region. It can dynamically switch between amorphous and crystalline states, exhibiting a significant difference in refractive index between the two states. An Sb_2Se_3 film was integrated onto a single-mode optical fiber, and its phase state was reversibly modulated through controlled crystallization and amorphization induced by continuous-wave and femtosecond laser irradiation, enabling the realization of a reconfigurable metasurface. As a result, we obtain a spectral resolution of 2 nm and cover a response bandwidth of 275 nm in the wavelength range from 1400 nm to 1675 nm.

15:00–15:15 · ACP2025–0729–45

Real-Time Observation of Ultrafast Thermo–Optic Nonlinearity in Time–Varying Effective Epsilon–Near–Zero Media**Jiaye Wu**^{1*}, Xuanyi Liu², Marco Clementi³, Shuang Qiu², Limin Lin², Zhang-Kai Zhou^{2*}, Camille-Sophie Brès^{1*}*1. École Polytechnique Fédérale de Lausanne (EPFL), Switzerland; 2. Sun Yat-sen University, China; 3. Università di Pavia, Italy*

We present a real-time observation of the ultrafast thermo-optic nonlinearity in time-varying effective epsilon-near-zero (ENZ) media. The results of this work might enable the design of integration-compatible near-terahertz ultrafast thermo-optic modulators with low intensity demands.

15:15–15:30 · ACP2025–0731–132

Ultra–Broadband optical 90° hybrid based on thin film lithium niobate**Zhiqiang Ju**, Ming Zhang^{*}, Daoxin Dai^{*}*Zhejiang University, China*

We realize a TFLN subwavelength-grating 2×4 MMI 90° hybrid with 0.8 dB loss, >20 dB CMRR, <4.5° phase error over C+L wavelength band with an ultra-compact footprint of $\sim 10 \times 140\ \mu\text{m}^2$.

15:30–16:00 Coffee Break

16:00–17:30 · November 8, 2025 · Saturday
Optical Communications, Sensing, and Imaging
Presider: Liangjun Lu, Shanghai Jiao Tong University, China

16:00–16:30 · ACP2025–0801–175 **Invited**

A 1.28 Tbps/Fiber Silicon Photonic DWDM Transceiver for Advanced Optical Interconnects

Shenlei Bao, Chao Cheng, Jintao Xue, Xianglin Bu, Qian Liu, Binhao Wang*

Xi'an Institute of Optics and Precision Mechanics of Chinese Academy of Sciences, China

This paper presents an 8×160 Gbps/fiber microring-based silicon photonic transceiver optimized for chip-to-chip interconnects. The silicon-photonic transceiver architecture leverages wavelength-division multiplexing via microring modulators and dual-ring drop filters, significantly enhancing the bandwidth density.

16:30–16:45 · ACP2025–0815–59

Photon-Counting Polarimetric Imaging LiDAR with a Learning-Based Denoiser

Song Li, Haoran Sun, Hedong Liu, Pengcheng Shao, Yuanzhe Lan, Haofeng Hu, Xiaolong Hu

Tianjin University, China;

We implement a four-branch denoiser for polarimetric imaging LiDAR that uses a fractal superconducting nanowire single-photon detector. This denoiser permits the polarimetric imaging LiDAR to acquire images with decent qualities in photon-starved conditions and relatively short acquisition time.

16:45–17:00 · ACP2025–0731–67

Promoting Carrier Envelope Offset Frequency Detection with DBR Defect-Based Angle-Tunable Narrow Band Filter

Lu Wang, Siyan Wang, Qiankun Li, Chengbo Mou, Hairun Guo*

Shanghai University, China

We design and fabricate a DBR narrow bandpass filter at visible and applied it to the detection of laser carrier envelope offset frequency by means of inline $f-3f$ self-referencing in chip-scale nanophotonic supercontinuum processes.

17:00–17:15 · ACP2025–0731–101

Analysis of Mode Chirality in Microring Resonators via Imaging of Out-of-Plane Light Scattering

Jinjiang Lin¹, Jin Li¹, Ran Cheng¹, Jiaqi Zhao¹, Yang Tan², Jiawei Wang^{1*}

1. Harbin Institute of Technology Shenzhen, China; 2. Shandong University, China

We present a method to assess mode chirality in spiral microring resonators through out-of-plane light scattering imaging which quantitatively maps the asymmetries in the intracavity field intensity. The approach further resolves the chirality changes induced by molecular coating.

17:15–17:30 · ACP2025–0801–95

Experimental Realization of High-Performance Orbital Angular Momentum Demultiplexing Based on Quasi-wavelet Conformal Mapping

Han Cao, Jian Wang

Huazhong University of Science and Technology, China

We employ quasi-wavelet conformal mapping to design micro-structures enabling precise demultiplexing of multiple OAM modes. Experimental results demonstrate successful demultiplexing of 11 OAM modes ($l = -5$ to $+5$) across the 1525–1570 nm bandwidth.

Track 7: Photonic Sensors & Bio-Photonics

Function Room K6, 1F (多功能厅 K6, 1 楼)

13:30–15:30 · November 6, 2025 · Thursday
Multifunctional Photonic Sensors
 Presider: Tuan Guo, Jinan University, China

13:30–14:15 · ACP2025-0507-2 **Keynote**

Thermally Drawn Multifunctional Fibers

Lei Wei

Nanyang Technological University, Singapore

Thermally drawn multifunctional fibers have emerged as a new yet promising route to enable unprecedented development in information technology. This talk provides an overview of the basic concepts, fabrication processes, and developments of semiconductor fibers.

14:15–15:00 · ACP2025-0605-2 **Keynote**

Fiber multifunction-integrated devices for sensing

Fei Xu

Nanjing University, China

With the development of materials science and manufacture technology, the conventional homogeneous doped core and pure cladding structures in a silica fiber have evolved with a new paradigm shift by merging the multi-structures and multi-materials. This emerging trends in optical fibers aim to break the fundamental limit by a single structure and material, and extend their photonic and optoelectronic applications. Here we will show some all-fiber multifunction-integrated devices developed in our labs and their applications in imaging, laser and sensing will also be discussed.

15:00–15:30 · ACP2025-0609-1 **Invited**

Optical micro-/nanofibers enabled sensors and actuators

Lei Zhang

Zhejiang University, China

In this talk, I will introduce our group's recent progress on microfluidic sensors, microforce sensors, and photoactuators based on optical micro-/nanofibers.

15:30–16:00 Coffee Break

16:00–18:00 · November 6, 2025 · Thursday
Multifunctional Photonic Sensors
 Presider: Fei Xu, Nanjing University, China

16:00–16:45 · ACP2025-0915-18 **Keynote**

TBD

Kyunghwan Oh

Nazarbayev University, Kazakhstan

TBD

16:45–17:15 · ACP2025-0729-14 **Invited**

Fiber-optic sensors based on wavelength-swept lasers

Min Yong Jeon, Min Su Kim, Ji Su Kim, Sung Yoon Cho, Soyeon Ahn

Chungnam National University, Korea

We present an ultra-wideband wavelength-swept laser (WSL) with a 440 nm tuning range, enabling real-time dynamic sensing by converting spectral information into the time domain. Applications include FBG, gas, and humidity fiber-optic sensors.

17:15–17:45 · ACP2025–0731–145 **Invited****Field-deployable calibration-free 1f wavelength modulation spectroscopy systems for trace gas monitoring****ARUP CHAKRABORTY***IIT Gandhinagar, India*

This talk will describe the development of robust, field-deployable, battery-powered, fully automated and remotely accessible tunable diode laser-based calibration-free 1f wavelength modulation spectroscopy (WMS) systems for vehicle-mounted and drone-based trace gas measurements in India.

17:45–18:00 · ACP2025–0725–1

Heterogeneous Integrated MEMS-VCSEL: A New Generation of High-Speed Broad-Spectrum Gas Detector**Hongzhuo Wang**, Ning Cui, Jisheng Wang, Baolu Guan**Beijing University of Technology, China*

This study proposes a heterogeneous integrated MEMS-VCSEL, which can detect small molecule gases including helium and carbon dioxide, with a sensitivity of 1800 nm/RIU and a response time of less than 3 seconds.

18:00–20:00 Welcome Reception

08:30–10:00 · November 7, 2025 · Friday

Distributed Optical Fiber Sensors**Presider: Zhiyong Zhao**, Huazhong University of Science and Technology, China08:30–09:15 · ACP2025–1022–1 **Keynote****Forward Brillouin scattering in few-mode fibers: Opportunities for accurate temperature sensing****Marcelo A. Soto¹**, Yichun Li², Liang Zhang²*1. Universidad Tecnica Federico Santa Maria, Chile; 2. Shanghai University, China*

This paper provides an overview of the mechanisms, key features, and experimental and simulation results of forward Brillouin scattering in few-mode fibers, highlighting its potential for high-precision temperature sensing.

09:15–09:45 · ACP2025–0915–20 **Invited****Multifunctional Integrated Fiber-Optic Ultrasonic Transducers and Imaging Applications****Qizhen Sun***Huazhong University of Science and Technology, China*

Fiber-optic ultrasonic transducers offer advantages such as high integration, broad bandwidth, and immunity to electromagnetic interference, which facilitate superior imaging resolution in narrow working spaces and extreme conditions. In recent years, we have conducted a series of studies on high-sensitivity, multifunctional integrated ultrasonic sensing technologies based on special fibers and structures. This presentation will highlight advancements in highly integrated all-fiber photoacoustic/ultrasonic hybrid transducers and dual-modal imaging technology, as well as an all-fiber ultrasonic transducer with ultrasound transmission and reception capabilities. Besides, their applications in endoscopic imaging, battery health monitoring, non-destructive testing, etc will be discussed.

09:45–10:00 · ACP2025–0729–6

Traffic Trajectory Segmentation and Multi-Target Micro-Parameter Extraction via DAS**Siyuan Peng**, Yingqing Wu, Ke Liu, Chunye Liu, Jie Li, Taichao Wang, Minglu Li, Zinan Wang**Key Laboratory of Optical Fiber Sensing and Communications University of Electronic Science and Technology of China, China*

Proposes a DAS-based traffic extraction solution. Using high-resolution DAS for stable signal acquisition, it autonomously designs algorithms and trains networks to classify events, extract trajectories, and get vehicle speed/wheelbase, pedestrian metrics (speed, stride, cadence).

10:00–10:30 Coffee Break

10:30–12:00 · November 7, 2025 · Friday

Distributed Optical Fiber Sensors

Presider: Qizhen Sun, Huazhong University of Science and Technology, China

10:30–11:00 · ACP2025–0915–19 **Invited****Chaotic Raman Distributed Optical Fiber Sensing and Its Applications****Mingjiang Zhang***Taiyuan University of Technology, China*

TBD

11:00–11:30 · ACP2025–0731–66 **Invited****Forward Transmission based Distributed Vibration Sensing and its integration to optical fiber communication systems****Yaxi Yan***, Liwang Lu, Alan Pak Tao Lau, Chao Lu*The Hong Kong Polytechnic University, Hong Kong, China*

We review our recent works on forward transmission based distributed optical fiber vibration sensing and its integration to optical fiber communication systems. Developments from systematic design to advanced digital signal processing algorithms are introduced.

11:30–12:00 · ACP2025–0815–45 **Invited****Remote phase-sensitive OFDR: decoupling spatiotemporal resolution from sensing distance****Shuaiqi Liu***Harbin Institute of Technology, China*

Common-path, self-referenced ϕ -OFDR is proposed to form a remote sensing window decoupling spatiotemporal resolution and sensing distance. Together with scattering-enhanced fiber and noise suppression technique, we achieve 2 cm spatial resolution and 2 kHz frequency response range near the end of 75 km fiber, enabling high-resolution distributed sensing over long-haul fiber.

12:00–13:30 Lunch Break

13:30–16:00 · November 7, 2025 · Friday

Distributed Optical Fiber Sensors

Presider: Yaxi Yan, The Hong Kong Polytechnic University, Hong Kong, China

13:30–14:00 · ACP2025–0915–23 **Invited****Distributed Temperature Sensing with Single-Crystal Fibers: Fabrication and Application****Bo Liu***Zhejiang LAB, China*

The demand for high-precision sensing in harsh environments, such as aerospace propulsion systems, drives the need for optical fiber technologies that can withstand temperatures exceeding 1,600°C. Conventional single-point sensors, however, are constrained by limited spatial resolution and an inability to perform distributed sensing, which hinders their application in real-time, multi-zone thermal monitoring. Addressing these limitations, this study introduces a distributed optical fiber sensing technique that provides full spatial coverage at ultra-high temperatures (>1,600°C). This technique achieves a spatial resolution of 5 cm and a temperature resolution of <1°C with a one-second averaging time. Furthermore, we demonstrate an automated fabrication system for single-crystal fibers based on laser-heated pedestal growth (LHPG) technology, which is critical to realizing the proposed sensing platform.

14:00–14:30 · ACP2025–0729–15 **Invited****Optical frequency comb enabled distributed fiber sensing****Zhiyong Zhao***Huazhong University of Science and Technology, China*

In this talk, I will present our recent advances in optical frequency comb enabled distributed fiber sensing, and I will show how the optical frequency combs revolutionize the field of frequency-swept distributed fiber sensing.

14:30–15:00 · ACP2025–0916–1 **Invited****Operando Events Monitoring with Fiber Sensors in Lithium Metal Batteries****Xun Guan***Tsinghua University Shenzhen International Graduate School, China*

We develop an operando spatiotemporal super-resolution thermal monitoring system capable of real-time, super-resolution temperature mapping across the lithium anode of Lithium metal batteries, which is innovative for localized battery sensing, analysis and fault warning.

15:00-15:15 · ACP2025-0724-1

Linewidth-Tolerant Cost-Effective Phase-Sensitive OTDR with Simultaneous Loss and Vibration Monitoring Ability**Jingchi Cheng**¹, Can Zhao^{2*}, Tao Shang^{1*}, Jing Jiang¹, Ming Tang³¹.Xidian University, China;².Shenzhen University, China;³.Huazhong University of Science and Technology, China

Leveraging random phase modulation and digital subcarrier multiplexing, we experimentally demonstrated a novel cost-effective phase-sensitive optical time-domain reflectometer using a commercial 200-kHz linewidth laser, with the ability to simultaneously monitor the fiber loss and vibration.

15:15-15:30 · ACP2025-0801-5

A Transformer Network for Real-Time Integrated Demodulation and Denoising for DASKe Liu, Siyuan Peng, **Yingqing Wu**, Chunye Liu, Minglu Li, Jie Li, Taichao Wang, Zinan Wang*

Key Laboratory of Optical Fiber Sensing and Communications University of Electronic Science and Technology of China, China

To overcome limitations in conventional phase demodulation methods while enhancing the processing efficiency of massive DAS data, we propose a Transformer-based network for real-time integrated demodulation and denoising for DAS.

15:30-15:45 · ACP2025-0814-12

Enhanced Sensing Resolution using Spectrum Reassignment in OFDR**Zihang Ji**, Zhou Xu, Tianle Chen, Yangjun Zheng, Lei Tu, Liang Wang*, Ming Tang

Huazhong University of Science and Technology, China

We propose a high-performance OFDR based on SPRS. The spatial resolution is enhanced to 4.8 mm, which shows 2.5 times improvement over traditional OFDR. While the strain sensing resolution is improved by 3.2 times.

15:45-16:00 · ACP2025-0814-45

Distributed strain sensing using Doppler-shift-immune ϕ -OFDR with ultra-weak reflection array and Quinn estimation based spectral correction**Yapeng Wang**, Weilin Xie*, Sijing Yang, Qiang Yang, Congfan Wang, Xiang Zheng, Wei Wei, Yi Dong

Beijing Institute of Technology, China

We report on a Doppler-shift-immune ϕ -OFDR based on Quinn estimation based spectral correction and ultra-weak fiber gratings. The proposed method permits suppressing the demodulation errors induced by Doppler effect, thus allows achieving high-precision distributed strain sensing.

15:30-16:00 Coffee Break**15:30-17:30 Poster Session****18:30-20:30 Banquet & Awards Ceremony**

08:30-09:30 · November 8, 2025 · Saturday

Novel Photonic Sensors

Presider: Lipeng Sun, Jinan University, China

08:30-09:00 · ACP2025-0915-21 **Invited****Single-channel single-fiber 3D shape sensing based on femtosecond laser inscribed cladding microstructure****Ruohui Wang**

Northwest University, China

Optical fiber shape sensors offer reliable navigation and tracking capabilities for various applications. However, existing fiber-sensing architectures face a long-standing trade-off between device size and spatial resolution. In this talk, we will introduce our research on single-channel single-fiber shape sensing scheme based on femtosecond laser direct writing: 1. cascaded cladding fiber Bragg gratings (cl-FBGs) 2. misplaced orthogonal eccentric scatterers (MOESs). Principle, 3D deformation reconstruction and anti-environmental interference capability will be presented.

09:00-09:30 · ACP2025-0731-29 **Invited****Chaotic Raman optical fiber sensing****Jian Li**

Taiyuan University of Technology, China

Chaotic Raman Distributed Optical Fiber Sensing (CR-DOFS) is an innovative technology for long-range, high-precision temperature monitoring. It integrates chaotic laser light — characterized by broadband spectrum and low coherence — with the spontaneous Raman scattering effect in optical fibers. Conventional pulsed Raman sensing faces the inherent distance-resolution trade-off due to pulse width limitations. CR-DOFS overcomes this by leveraging the noise-like properties of chaotic light. It employs an auto-correlation

tion signal processing method to achieve continuous distributed sensing over ultra-long distances. The operating principle involves injecting chaotic pump light into the sensing fiber. The intensity of the backscattered Raman anti-Stokes signal is temperature-dependent. By demodulating the cross-correlation function between this scattered signal and the original chaotic light, temperature variations along the entire fiber can be accurately localized. This technology significantly enhances anti-interference capability, effectively suppressing Rayleigh scattering noise and external environmental disturbances, while achieving meter-level or even sub-meter spatial resolution. With critical applications in power cable monitoring, oil/gas pipeline leak detection, and structural health monitoring of large-scale infrastructure, CR-DOFS provides a breakthrough solution for fully distributed temperature sensing in complex environments.

10:00–10:30 Coffee Break

10:30–11:00 · November 8, 2025 · Saturday

Photonic Sensors for Electrical Battery

Presider: Ruohui Wang, Northwest University, China

10:30–11:00 · ACP2025-0729-48 **Invited**

In situ fiber-optic monitoring of electrochemical interfacial dynamics

Lipeng Sun

Jinan University, China

We developed a fiber-optic sensor with ultrahigh refractive index sensitivity for in-situ monitoring of electrode-electrolyte interfaces, enabling real-time tracking of catalytic reactions and revealing reaction mechanisms in electrochemical studies.

12:00–13:30 Lunch Break

13:30–16:00 · November 8, 2025 · Saturday

Photonic Bio-sensors

Presider: Yang Ran, Jinan University, China

13:30–14:00 · ACP2025-0731-31 **Invited**

SPP-MIM Hybridization to Combine SPR and LSPR for Biosensing

Tian Yang

Shanghai Jiao Tong University, China

The hybridization of surface plasmon polaritons and the metal-insulator-metal waveguide provides such a metamaterial film that combines the advantages of SPR and LSPR. A remarkable enhancement of surface sensitivities were obtained across a broad spectral range, using a grating-coupling configuration.

14:00–14:30 · ACP2025-0624-1 **Invited**

Fiber-Optic Theranostics: Towards Precision Tumor Diagnosis and Treatment

Yang Ran

Jinan University, China

Effective treatment of malignant tumors remains a formidable challenge in modern medicine. Fiber-optic theranostics (FOT), which integrates optical fiber technology with phototheranostics, has driven a paradigm shift in the precise diagnosis and treatment of deep-seated tumors by overcoming light penetration limits, circumventing systemic toxicity. Embodying the /medicine-on-a-fiber/ revolution, optical fibers have evolved from simple waveguides to multifunctional theranostic platforms that minimize tissue invasion. Herein, we discuss recent advances in functionalized FOT probes for tumor theranostics, which establish a comprehensive diagnostic-therapeutic-evaluative integrated workflow. Before treatment, tumor edge identification is achieved by revealing the-tumor biomarker gradients (e.g., pH, hypoxia). During treatment, the FOT system not only enables targeted delivery of therapeutic doses (thermal and drugs) to tumor sites for intraoperative synergistic photothermal-chemotherapy but also provides real-time dose monitoring through integrated fiber-optic sensors. After treatment, postoperative efficacy is assessed through dynamic biomarker tracking of residual microenvironments. Collectively, these functionalized FOT probes advance precision oncology toward complete-tumor management cycles.

14:30-15:00 · ACP2025-0814-19 **Invited****High-Performance Fiber-Optic Photoacoustic Sensing for Advanced Endomicroscopy****Long Jin***South China Normal University, China*

We present high-sensitivity fiber-optic photoacoustic sensing technology using optical amplification, overcoming piezoelectric sensor limitations. A miniaturized endoscopic system enables simultaneous microvascular and oxygenation imaging, advancing gastrointestinal disease diagnosis through in vivo visualization.

15:00-15:15 · ACP2025-0801-225

Fast Scanning Slanted Light Sheet Array Microscopy**Long Kai¹**, Junming Zhou^{1,2}, Junyi Li², Nanguang Chen^{1,2*}*1. National University of Singapore, Singapore; 2. NUS (Suzhou) Institute, China*

Mechanical scanning slanted light sheet microscopy achieves three-dimensional scanning by moving samples. Due to the inertia and precision limitations of mechanical stage motion, mechanical drift, vibration, and positioning errors are prone to occur during sample movement, which not only reduces the efficiency of repeated scanning, but also may cause disturbances to the sample, especially to imaging living biological samples. This manuscript developed a novel fast scanning slanted light sheet array microscopy based on a transmission grating and cylindrical microlens array, which enables the light sheet array to cover the entire region within the sample field of view. Its compact structure is compatible with traditional upright widefield microscope, and it has great advantages in high-efficiency 3D fluorescent imaging and real-time 3D scattering imaging.

15:15-15:30 · ACP2025-0815-146

Physics-Aware Cross-Attention Framework Accelerating TFBG-based Plasmonic DNA Bio-sensing**Shenqi Yang¹**, Yifan Duan¹, Jiahui Jin¹, Yunting Du², Yang Zheng², Xiaojing Tong², Yang Zhang^{1*}, Wei Peng¹*1. Dalian University of Technology, China; 2. Cancer Hospital of Dalian University of Technology (Liaoning Cancer Hospital & Institute), China*

We propose a Physics-Aware Cross-Attention framework for accelerated TFBG-SPR biosensing, leveraging full-spectrum temporal encoding with Langmuir-kinetics regularization to jointly predict analyte concentrations and adsorption rates from early-stage sensorgrams.

15:30-15:45 · ACP2025-0729-34

Monocular Depth Estimation Assisted iToF-RGB Fusion for Improved Depth Resolution**Yutong Deng¹**, Yansong Du, Yuting Zhou, Feiyu Jiao, Jian Song, Xun Guan*Tsinghua University, China*

This paper presents an iToF-RGB fusion framework that reprojects and enhances iToF depth maps via a dual-encoder fusion network, achieving improved depth accuracy, structural consistency, and expanded field-of-view across synthetic and real world scenarios.

15:45-16:00 · ACP2025-0731-150

Neural Network-Assisted Extraction of Laguerre-Gaussian Coefficient through Quadriwave Lateral Shearing Interferometry for Speckle Field Sensing**Rong Li¹**, Deng Liu, Liangwei Zhu, Shuhui Li^{*}, Jian Wang*Wuhan National Laboratory for Optoelectronics, School of Optical and Electronic Information, Huazhong University of Science and Technology, China*

We propose a neural network-assisted quadriwave lateral shearing interferometry (QLSI) for speckle field sensing. Through a well-trained network, the mapping between the input QLSI interferograms and the coefficients of Laguerre-Gaussian modes can be established. The Pearson correlation coefficient of reconstructed speckle fields exceed 0.97 and 0.87 in intensity and phase profile.

13:30–15:30 · November 6, 2025 · Thursday

Best Student Paper Award I

Presider: Lena Wosinska, Chalmers University of Technology, Sweden

Function Room K3, 1F (多功能厅 K3, 1 楼)

13:30–13:45 · ACP2025-0729-31

Longitudinal Structure Deformation Monitoring of Nested Anti-resonant Nodeless Fiber based on Multi-beam Interference

Jinze Li, Cong Zhang^{*}, Di Lin, Jianping Li, Meng Xiang, Yuwen Qin, Songnian Fu
Guangdong University of Technology, China

We propose a multi-beam interference model enabling micron-level deformation characterization in nested antiresonant nodeless fiber (NANF), achieving 3.5% error for most parameters and 7% for wall thickness, suitable for in-line drawing monitoring.

13:45–14:00 · ACP2025-0817-4

Generation of Cnoidal Waves and Solitons in an Erbium-doped Fiber Laser with Tunable Modulation Depth

Ruilong Song, Hongbo Jiang^{*}, Zhiming Yang, Jiayi Shen, Xiaoyun Tang, Lei Jin
Harbin Engineering University, China

We continuously tune modulation depth in a fiber laser by tailoring intracavity PDL, revealing a reversible transition from cnoidal waves to soliton rain driven solely by polarization adjustments at constant pump power.

14:00–14:15 · ACP2025-0724-15

Joint Dual-Pilot and MRC Aided NOMA-DSCM for 240-Gbps Coherent PON with Extended Far-End ONU Coverage

Chen Ding^{*}, Yutian Liu¹, Qiarong Xiao¹, Zijian Li¹, Zixian Wei², Changyuan Yu², Chaoran Huang¹, Chester Shu¹

1. The Chinese University of Hong Kong, Hong Kong, China; 2. The Hong Kong Polytechnic University, Hong Kong, China

We present a demonstration of a joint dual-pilot aided and MRC aided NOMA-DSCM system for coherent PON, achieving 240 Gbps and up to 2.86 dB diversity gain, extending far-end ONU coverage with interference-resilient phase estimation.

14:15–14:30 · ACP2025-0730-34

C-Band 112-Gb/s OOK Transmission over 100-km SSMF Enabled by Cluster-Assisted Equalization

Qiang Bin¹, Yutong Liu¹, Junwei Zhang^{1*}, Zhaohui Li¹, Chao Lu²

1. Sun Yat-Sen University, China; 2. The Hong Kong Polytechnic University, Hong Kong, China

C-band 112-Gb/s OOK transmission over 100-km SSMF is demonstrated, enabled by joint equalization with a weight-sharing absolute-term FFE (WSATFFE) and a cluster-assisting look-up-table-based DFE (CLUTDFE). Compared to WSATFFE-WSDFE, the WSATFFE-CLUTDFE saves 30% in real-valued multiplications.

14:30–14:45 · ACP2025-0731-140

FPGA-based Real-Time Synchronization with Robustness and Low Complexity for Burst-Mode 100G Coherent Passive Optical Networks

Renle Zheng, An Yan, Penghao Luo, Yongzhu Hu, Junhao Zhao, Xuyu Deng, Jianyang Shi, Nan Chi, Junwen Zhang^{*}

Key Laboratory of EMW Information (MoE), Fudan University, China

We propose and demonstrate FPGA-based real time synchronization with high robustness and low complexity for burst-mode 100 Gbps coherent PON, based on a novel 91.43 ns preamble, achieving a power budget exceeding ITU-T N1 class (29 dB).

14:45–15:00 · ACP2025-0727-8

Reliable Multi-Station and Multi-Satellite Ground Space Optical Networking by Spatio-Temporal Prediction of Space-Ground Atmospheric Laser Communication Channel

Han Wang¹, Nan Hua^{2,3,4*}, Kangqi Zhu^{2,3,4}, Zhenrong Zhang^{1*}, Shangyuan Li^{2,3,4}, Xiaoping Zheng^{2,3,4}

1. School of Computer, Electronic and Information, Guangxi Key Laboratory of Multimedia Communications and Network Technology, Guangxi University, China; 2. Beijing National Research Center for Information Science and Technology (BNRist), China; 3. State Key Laboratory of Space Network and Communications, China; 4. Tsinghua University, China

This study proposes a Multi-Parameter Joint Prediction (MPJP) architecture for resilient ground-space optical networking. It predicts atmospheric parameters via fused meteorological data, enabling intelligent optical path switching to significantly enhance reliability under weather disturbances.

15:00–15:15 · ACP2025-0727-9

Reinforcement Learning-based Fine-Tuning Large Language Model for High-Performance Alarm Analysis in Optical Networks

Yanli Liu¹, Yue Pang², Yidi Wang¹, Min Zhang¹, Xiaoyuan Ren^{3*}, Danshi Wang^{1*}

1. Beijing University of Posts and Telecommunication, China; 2. China Telecom Cloud Network Operating System R&D Center, China; 3. Chinese Institute of Electronics, China

A large language model (LLM) specialized for alarm analysis in optical networks is developed through reinforced fine-tuning (ReFT) rather than a basic prompt. In the context of alarm analysis, the ReFT-enhanced LLM demonstrates improved accuracies across the four typical tasks.

15:15–15:30 · ACP2025-0801-41

A Fully Real-Domain and Nonlinear Optical Neural Network Architecture

Shan Jiang, Bo Wu, Jialong Zhang, Wenguang Xu, Hailong Zhou, Jainji Dong^{*}

Huazhong University of Science and Technology, China

We propose a dual MRR architecture driven by the differential photocurrent of PDs, which for the first time simultaneously enables real-valued input, computation, and cascaded real-domain nonlinear activation within optical neural networks. The nonlinear response, exhibiting a Tanh-like function, is experimentally demonstrated and further applied to the generator of a generative adversarial network.

15:30–16:00 Coffee Break

16:00–17:30 · November 6, 2025 · Thursday

Best Student Paper Award II

Presider: Lena Wosinska, Chalmers University of Technology, Sweden

Function Room K3, 1F (多功能厅 K3, 1 楼)

16:00–16:15 · ACP2025–0801–71

AWG-based 128-channel end-to-end matrix multiplication chip

Chun Gao¹, Xiaowan Shen¹, Xinxiang Niu², Zejie Yu¹, Yiwei Xie¹, Pan Wang¹, Xiaowen Dong^{2*}, Huan Li^{1*}, Daoxin Dai^{1*}

1. Zhejiang University, China; 2. Huawei Technologies Co., Ltd, China

This work designs and demonstrates a 128-channel, end-to-end optical matrix-computing chip based on an AWG. Characterized with an RNN, the system achieves a normalized mean-square error of 0.0205 on the Mackey–Glass sequence prediction task.

16:15–16:30 · ACP2025–0815–105

Low-loss and Compact Silicon Nitride Photonic Chip for Dispersion Control

Weihan Wang, Ruitao Ma, Shujun Liu, Mingyu Zhu, Zejie Yu, Daoxin Dai¹

State Key Laboratory for Modern Optical Instrumentation, College of Optical Science and Engineering, Zhejiang University, China

We demonstrate an on-chip dispersion controller on silicon nitride, featuring a compact footprint, a maximal dispersion of +23.906 ps/nm and –23.799 ps/nm, a low loss of 0.188 dB/cm and low group delay ripples.

16:30–16:45 · ACP2025–0731–108

Novel Photonic Synchronization Approach for Dual Optical Frequency Combs Based on Spread Spectrum Communication

Yaoping Wu, Jincong Hu, Biao Ge, Ningyuan Zhong, Ke Zhang, Hui Yang, Lianshan Yan, Xihua Zou

Southwest Jiaotong University, China

This paper proposes a novel photonic synchronization approach for dual optical frequency combs (OFCs) based on spread spectrum communication. This approach drastically reduces the required large tunable optical delay value through the Vernier effect between the two distinct free spectrum ranges (FSRs) of dual OFCs in the receiver. In experiments, the optical delay value is dramatically proliferated by a factor of 207. This enables a high-efficient synchronization procedure for dual OFCs based on spread spectrum communication or covert communication, reducing the conventionally required maximum optical delay value from 6250 ps to 30.16 ps.

16:45–17:00 · ACP2025–0815–81

An Approach for Optical Pulse Sequences Achieving $(n+1/2)$ Repetition Rate Multiplication

Ping Li, Kunlin Shao, Xiaohu Tang, Zhouyang Pan, Yamei Zhang^{*}, Dan Zhu, Shilong Pan

National Key Laboratory of Microwave Photonics, Nanjing University of Aeronautics and Astronautics, China

An innovative temporal Talbot effect-based technique for optical pulse sequence repetition rate control is presented, capable of achieving arbitrary $(n+1/2)$ multiplication factors. Distinguished from conventional temporal Talbot effect configurations, this approach incorporates a pre-phase modulation process rather than directly employing phase-free optical pulse sequences. The core novelty lies in the straightforward phase manipulation of optical pulses, where carefully designed temporal phase signals allow for precise control of repetition rate through subsequent dispersion. Both numerical simulations and experimental validations have confirmed the effectiveness and feasibility of this method. Experimental demonstrations successfully achieved repetition rate multiplication (RRM) factors of $1/2$, $3/2$, and $5/2$, validating the operational principles and functionality of the proposed technique. The results indicate that this method provides a robust and flexible solution for precise repetition rate control in optical pulse sequences.

17:00–17:15 · ACP2025–0814–2

Towards over 100 Gb/s Channel Rate Arrayed 850-nm Transmitter for High-Speed Optical Wireless Communication

Peng Yan^{1,2}, Shenghui Wu², Yunhao Zhang^{1,2}, Haowen Shu^{1*}, Xingjun Wang¹

1. Peking University, China; 2. Pengcheng Laboratory, China

We implement an 850-nm vertical-cavity surface-emitting laser (VCSEL) array based high-speed optical wireless transmitting system. Leveraging advanced packaging, all four channels achieve a record-high data rate of over 100 Gb/s in a short stress pattern random quaternary (SSPRQ) PAM4 pattern with a transmitter and dispersion eye closure quaternary (TDECQ) of less than 2.0 dB.

17:15–17:30 · ACP2025–0815–43

Simplified Linewidth-Tolerance OFDR based on Embedded-Referencing Phase Noise Compensation

Shuyan Chen¹, Huan He², Zhiyong Zhao^{1*}, Ming Tang¹, Chao Lu²

1. Huazhong University of Science and Technology, China; 2. The Hong Kong Polytechnic University, Hong Kong, China

We present a simplified linewidth-tolerant OFDR employing embedded-reference phase noise compensation, demonstrating 13.8mm spatial resolution over 1.9km with 200kHz-linewidth laser using single-receiver architecture.

18:00–20:00 Welcome Reception

13:30–15:30 · November 6, 2025 · Thursday

Best Paper Award I

Presider: Chao Lu, The Hong Kong Polytechnic University, Hong Kong, China

Function Room K4, 1F (多功能厅 K4, 1 楼)

13:30–13:45 · ACP2025-0731-107

FPGA-Accelerated Correlation OTDR for Rapid and High-SNR Fibre Reflectometry

Te Ke, Tao Zeng^{*}, Yingmei Pan, Lin Zheng, Baichuan Shao, Ziqing Liu, Botao Yang, Yimei Pan, Ziyi Zhong, Ming Luo
State key laboratory of Optical Communication Technologies and Networks, China Information Communication Technologies Group Corporation, China

An FPGA-accelerated correlation OTDR achieving 2cm resolution over 95km in real time is proposed. Compared to the 95 km detection limit of single-pass offline correlation, a 2^{35} sample zoom-in window improves SNR by 20 dB, clearly resolving fine reflections with high speed and fidelity.

13:45–14:00 · ACP2025-0814-46

A Cost-Effective GRIN Fiber Adapter with Enhanced Misalignment Tolerance for Intra-Vehicle Optical Networks

Zhihao Li, Gordon Ning Liu^{*}, Yi Cai, Gangxiang Shen, Leyuan Zhang, Yu Chen

Soochow University, China

We propose a cost-effective fiber adapter for multimode fiber connection, which adopts a non-contact structure with a built-in GRIN fiber. Simulation results demonstrate it enhances misalignment tolerance and offers large fiber length tolerance.

14:00–14:15 · ACP2025-0730-47

Single-Lane 600-Gb/s IM-DD Link Based on TFLN MZM at sub-pJ/bit for AI Clusters

Ruiting Cheng¹, Zhaopeng Xu¹, Shangcheng Wang¹, Honglin Ji^{1*}, Xiansong Fang², Yixiao Zhu³, Lulu Liu¹, Tonghui Ji¹, Lingjun Zhou², Zhixue He¹, Weisheng Hu³, Juhao Li²

1. Peng Cheng Laboratory, China; 2. Peking University, China; 3. Shanghai Jiao Tong University, China

We experimentally demonstrate single-lane 600-Gbit/s IM-DD transmission link with 154-Gbaud PS-PAM-20 modulation based on a 65-GHz TFLN MZM in the C-band for high-speed and power-efficient AI clusters. Net 466.4-Gbit/s transmission without electrical amplifiers is achieved with sub-pJ/bit energy efficiency for optical interconnecting applications.

14:15–14:30 · ACP2025-0809-1

Single Photodiode Reception of 686-Gb/s Signal by Optical Triple Band Multiplexing for AI Clusters

Yixiao Zhu^{1*}, Xiang Cai², Xiansong Fang², Chenbo Zhang², Yimin Hu¹, Ziheng Zhang¹, Lingjun Zhou², Chongyu Wang¹, Fan Zhang², Weisheng Hu¹

1. Shanghai Jiao Tong University, China; 2. Peking University, China

We experimentally demonstrate triple-band optical multiplexing to extend the digital-to-analog convertor bandwidth without using radio-frequency oscillators and mixers. We achieve single-photodiode reception of 686.6-Gb/s line rate signal over 200-m single-mode fiber for AI clusters.

14:30–14:45 · ACP2025-0812-4

EO comb Enabled 10.56 Tbit/s Self-Homodyne Transmission and Enhanced ϕ -OTDR for ISAC with a 7-Core Fiber

Xu Liu, Chenbo Zhang^{*}, Yi Zou, Zhangyuan Chen, Weiwei Hu, Xiangge He, Xiaopeng Xie

Peking University, China

We propose an ISAC system based on an EO comb and 7-core fiber, achieving 10.56 Tbit/s self-homodyne transmission and high-fidelity ϕ -OTDR sensing, with improved SNR and fading reduction for metro-scale networks.

14:45–15:00 · ACP2025-0802-6

Enhancing FTTR Performance with Preemptive Downlink Scheduling

Ang Li¹, Jinhan Cai¹, Biswanath Mukherjee², Gangxiang Shen^{1*}

1. Soochow University, China; 2. University of California, United States

This paper proposes a preemptive downlink scheduling method for fiber-to-the-room (FTTR) networks that optimizes frame aggregation and leverages Wi-Fi 8's channel preemption to coordinate multi-priority traffic and reduce delay. The adoption of the preemptive algorithm and FTTR centralized control scheduling can reduce the end-to-end average delay of the four types of traffic.

15:00–15:15 · ACP2025-0815-51

Dynamic Autonomous Domain Division in Multi-layer Optical Satellite Networks

Xiaoyuan Fan, Yongli Zhao^{*}, Wei Wang, Yansong Fu, Zijian Cui, Jie Zhang

Beijing University of Posts and Telecommunications, China

Dynamic clustering for LEO/MEO enables efficient multi-domain management, improving stability and cutting end-to-end latency by 35%.

15:15–15:30 · ACP2025-0731-100

8×8×2λ optical switch based on 3D integrated dual coupled microring resonators

Yuanhao Yu, Xin Li, Wei Gao, Liangjun Lu, Jianping Chen, Linjie Zhou, Yanyang Zhou, Wansu Bao

Shanghai Jiao Tong University, China

We demonstrate an $8 \times 8 \times 2\lambda$ space-and-wavelength selective switch (SWSS) based on three-dimensional (3D) integrated dual coupled microring resonators. Full characterization of all switch paths shows an average fiber-to-fiber (on-chip) insertion loss (IL) of 9.4 dB (0.8 dB) with the worst crosstalk of -10.8 dB. The switch exhibits optical bandwidth above 48 GHz and maintains power penalties below 0.33 dB under 25 Gbps on-off keying (OOK) signal transmission.

15:30–16:00 Coffee Break

16:00–17:15 · November 6, 2025 · Thursday

Best Paper Award II

Presider: Chao Lu, The Hong Kong Polytechnic University, Hong Kong, China

Function Room K4, 1F (多功能厅 K4, 1 楼)

16:00–16:15 · ACP2025-0801-154

36×200 Gbps Hybrid Mode/Wavelength Division Multiplexing Transmitter in Lithium Niobate on Insulator

Mingyu Zhu, Dajian Liu, Weihang Wang, Weihe Zhao, Ruitao Ma, Daoxin Dai*

Zhejiang University, China

We demonstrated a 36-channel hybrid mode/wavelength division multiplexing transmitter on lithium-niobate-on-insulator with 0.5 dB excess loss and 30 dB crosstalk. A high-speed data transmission at a rate of 7.2 Tbps can be obtained.

16:15–16:30 · ACP2025-0815-101

High-Performance III-V/Si₃N₄ Hybrid-Integrated Mode-Locked Laser

Mengran Qiao¹, Xiaoying Guo¹, Xinhang Li¹, Yuyao Guo^{1,2*}, Yu Li^{1,2}, Liangjun Lu^{1,2}, Jianping Chen^{1,2}, Linjie Zhou^{1,2}

1. Shanghai Jiao Tong University, China; 2. SJTU-Pinghu Institute of Intelligent Optoelectronics, China

We demonstrate a high-performance III-V/Si₃N₄ mode-locked laser. Stable passive mode-locking achieves a wide 3-dB bandwidth of 9.12 nm and a narrow 10-dB linewidth of 443 Hz. Hybrid mode-locking further enhances the frequency stability.

16:30–16:45 · ACP2025-0808-1

Quantum correlations on a lithium tantalate chip

Dan Xu^{1,2}, Yunru Fan^{1,2,3*}, Bowen Chen^{4,5}, Chengli Wang^{4,5*}, Xuqiang Wang^{4,5}, Jiachen Cai^{4,5}, Haizhi Song^{1,6}, You Wang^{1,6}, Jingbo Qi⁷, Hao Li⁸, Lixing You⁸, Kai Guo⁹, Xin Ou^{4,5*}, Guangcan Guo^{1,2,3,10}, Qiang Zhou^{1,2,3,10*}

1. Institute of Fundamental and Frontier Sciences, University of Electronic Science and Technology of China, China; 2. Key Laboratory of Quantum Physics and Photonic Quantum Information, Ministry of Education, University of Electronic Science and Technology of China, China; 3. Center for Quantum Internet, Tianfu Jiangxi Laboratory, China; 4. State Key Laboratory of Materials for Integrated Circuits, Shanghai Institute of Microsystem and Information Technology, China; 5. The Center of Materials Science and Optoelectronics Engineering, University of Chinese Academy of Sciences, China; 6. Southwest Institute of Technical Physics, China; 7. School of Physics, University of Electronic Science and Technology of China, China; 8. National Key Laboratory of Materials for Integrated Circuits, Shanghai Institute of Microsystem and Information Technology, China; 9. Institute of Systems Engineering, AMS, China; 10. Chinese Academy of Sciences Center For Excellence in Quantum Information and Quantum Physics, University of Science and Technology of China, China

We demonstrate, for the first time to our knowledge, correlated photon-pair generation in a lithium tantalate (LiTaO₃) micro-ring resonator (MRR) via spontaneous four-wave mixing (SFWM), marking a significant step toward integrated quantum photonics on this scalable and mature platform. Our results open the door to monolithically unifying classical and quantum photonic functionalities within a single LiTaO₃ circuit.

16:45–17:00 · ACP2025-0815-120

Optical Frequency Comb-Enabled Parallel Single-Photon 3D Imaging

Jiao Liu, Jianhao Duan, Bin Wang*, Weifeng Zhang

Beijing Institute of Technology, China

We propose a multi-channel single-photon LiDAR system utilizing an electro-optical frequency comb for rapid and precise 3D imaging. The system achieves a 1.11-cm ranging accuracy and a 3,800-pixels/s acquisition rate at a 5.5-meter distance.

17:00–17:15 · ACP2025-0801-130

High Efficient Optical Convolution via Multidimensional Photonic Multiplexing

Baoyue Liu, Shifan Chen*, Yunping Bai*, Xingyuan Xu

Beijing University of Post and Telecommunications, China

We demonstrated a high-efficiency optical convolution accelerator (heOCA) that multiplexes three dimensions of space, wavelength, and time. It achieves near 100% bit efficiency—triple of single-path architectures—and 93.8% MNIST classification accuracy.

18:00–20:00 Welcome Reception

13:30–17:15 · November 8, 2025 · Saturday

Postdeadline Paper Session

Presider: Kangping Zhong, The Hong Kong Polytechnic University, Hong Kong, China

Function Room K3, 1F (多功能厅 K3, 1 楼)

13:30–13:45 · ACP2025-1006-1

Pump Division Multiplexing for Compact High-Efficiency Multicore and Multi-Channel Erbium-Doped Fiber Amplifiers

Haoshuo Chen

Nokia Bell Labs, United States

We propose direct pumping of multicore (MC) erbium-doped fiber amplifiers (EDFAs) and single-mode (SM) EDFA array using a pump diode array chip. Demonstrated 4/7-core MC EDFAs and 4-channel EDFA array achieve SM EDFA-level efficiency.

13:45–14:00 · ACP2025-1007-3

10^{-14} -m Scale Precision Spectrometer with Weakly-Coupled Few-Mode Fiber

Gang Qiao¹, Mingqing Zuo², Jiarui Zhang¹, Chengbin Long¹, Yu Yang³, Honglin Ji³, Lulu Liu³, Zhaopeng Xu³, Shangcheng Wang³, Dawei Ge², Yuyang Gao⁴, Lei Shen⁵, Jie Luo⁵, Weisheng Hu³, Zhangyuan Chen¹, Juhao Li¹

1. Peking University, China; 2. China Mobile Research Institute, China; 3. Peng Cheng Laboratory, China; 4. University of Science and Technology Beijing, China; 5. YOFC, China

We demonstrate an ultrahigh-resolution all-fiber spectrometer achieving spectral measurements of signals with independent wavelengths separated by merely 48 femtometers. This is enabled by a weakly-coupled few-mode fiber with a multiple-ring core structure to suppress modal coupling.

14:00–14:15 · ACP2025-1008-14

Fabrication of Long-distance, Low-loss and Low-gas-absorption Hollow Core Fibre

Peng Li, Guoqun Chen, Anqing Jia, Yuxin Ding, Jun Chu, Dongwen Tan, Liyan Zhang, Lei Zhang*, Jie Luo

Yangtze Optical Fibre and Cable Joint Stock Limited Company, China

We optimized ST-HCF design, fabricated a record-breaking 54km HCF (0.075dB/km), and first proposed two-step gas processing method to address the gas absorption peaks long-term stability issue in HCFs. The link-loss after deployment reached an unprecedented 0.085dB/km.

14:15–14:30 · ACP2025-1009-2

Tailoring optoacoustic Brillouin dynamics of cylindrical vector fiber modes

Jiuming Zhao^{1,3}, Ruochen Yin¹, Jiale Xu^{1,4}, Wenbin He¹, Jiapeng Huang¹, Zhiyuan Huang², Jinxin Zhan¹, Xin Jiang¹, Meng Pang¹, Long Zhang², **Xinglin Zeng¹**

1. Russell Centre for Advanced Lightwave Science (RCALS), Shanghai Institute of Optics and Fine Mechanics and Hangzhou Institute of Optics and Fine Mechanics, China; 2. Shanghai Institute of Optics and Fine Mechanics (SIOM), Chinese Academy of Sciences (CAS), China; 3. School of Physics and Optoelectronic Engineering, Hangzhou Institute for Advanced Study, University of Chinese Academy of Sciences (UCAS), China; 4. School of Material Science and Engineering, Wuhan University of Technology, China

We report Brillouin scattering of cylindrical vector modes in annular-core photonic crystal fiber, show nonreciprocal inter-vector-modal Brillouin-enhanced four-wave mixing, and narrow-linewidth vector mode Brillouin lasers. The results pave a way to advanced vector-mode Brillouin photonics.

14:30–14:45 · ACP2025-1008-6

102.47 Tb/s WDM Transmission in the Extended C+L Band over 1260.65 km of G.654.E Fiber with Hybrid Raman/EDFAs

Zhongxing Tian¹, Zeyu Feng¹, Ziang Chen¹, Qingyu He², Wanzhen Guo³, Dongdong Zou¹, Huan Huang¹, Lin Sun¹, Yancai Luan⁴, Liang Mei⁴, Ming Luo², Jian Zhao³, Gordon Ning Liu¹, Gangxiang Shen¹, Yi Cai^{1*}

1. Soochow University, China; 2. State Key Laboratory of Optical Communication Technologies and Networks, China; 3. South China University of Technology, China; 4. Fiberhome Telecommunication Technologies Co., Ltd, China

We demonstrate a record 102.47-Tb/s WDM transmission over 1260.65-km in the extended C+L-band using 240 × 48-GBaud PCS-64QAM channels, enabled by broadband, flat-gain hybrid Raman-EDFA amplification, ultra-low-loss G.654.E fiber, and an optimized DSP architecture.

14:45–15:00 · ACP2025-1001-3

Asymmetric DSM-DBP enabled 800 Gb/s PS-DP-64QAM Transmission over 2400 km SSMF

Zejun Chen¹, Sailan Yan¹, Chao Li², Gai Zhou¹, Meng Xiang¹, Peng Sun², Zhixue He², Songnian Fu¹, Yuwen Qin¹

1. Key Laboratory of Photonic Technology for Integrated Sensing and Communication, Ministry of Education of China and School of Information Engineering, Guangdong University of Technology, China; 2. Pengcheng Laboratory, China

We experimentally demonstrate single-wavelength 800 Gb/s PS-DP-64QAM transmission over 30×80 km SSMF by implementing the asymmetric digital subcarrier-multiplexing digital back-propagation (DSM-DBP) scheme, achieving 160 km reach extension in comparison with traditional symmetric DSM-DBP, without increasing computational complexity.

15:00–15:30 Coffee Break

15:30-15:45 · ACP2025-1008-1

First Demonstration of 691.2 Gb/s/λ Single-span Unrepeated Transmission over 550-km Support-Tube Hollow Core FiberLi Deng¹, Siyu Chen², Zichen Qian², Yuan Gao³, Peng Li³, Jun Wu³, Xuchen Hua², Yuqi Li², Yang Li¹, Tong Chen¹, Mingming Zhang², Lei Zhang³, Jie Luo³, Chu Jun³, Bozhong Li¹, Jun Liu¹, Hao Wu^{2*}, Ming Tang^{2,4*}

1.State Grid Information & Telecommunication Center (Big Data Center), China; 2.NGIA, School of Optical and Electronic Information; Huazhong University of Science and Technology (HUST), China; 3.State Key Laboratory of Optical Fiber & Cable Manufacture technology; Yangtze Optical Fiber and Cable Joint Stock Limited Company (YOFC), China; 4. Wuhan National Laboratory of Optoelectronics (WLNO), China

We present the experimental verification of a 691.2-Gb/s/λ unrepeated transmission over a 550-km Support-Tube Hollow Core Fiber. Our work achieves, for the first time, the unrepeated HCF transmission that exceeds the single-wavelength transmission capacity record over standard single mode fiber, validating the potential of HCF for expanding the unrepeated transmission capacity.

15:45-16:00 · ACP2025-1008-13

First Real-time Implementation of Low-complexity DP-QPSK Coherent Reception with a Net Data Rate beyond 100Gbit/s on a Single FPGAKaiyang Dong¹, Hongyi Gan¹, Xuefeng Zou¹, Benyao Zou¹, Meiqi Li¹, Wei Wang¹, Yuheng Liu¹, Xiang Li², Zhensen Gao³, Yixiao Zhu⁴, Weisheng Hu⁴, Ming Chen⁵, Zhaohui Li¹, Fan Li^{1*}

1.Sun Yat-Sen University, China; 2.China University of Geosciences, China; 3.Guangdong University of Technology, China; 4.Shanghai Jiao Tong University, China; 5.Hunan Normal University, China

A low-complexity real-time coherent reception of 32-GBaud DP-QPSK on a single FPGA is implemented. Long-term reliable BER below 7% HD-FEC is achieved with a record net bitrate 119.62 Gb/s at ROP-30.8 dBm after 5-km SSF.

16:00-16:15 · ACP2025-1007-5

First Real-Time MDM Transmission Trial over Field-Deployed Weakly-Coupled Few-Mode FiberGang Qiao¹, Lipeng Feng², Anxu Zhang², Chengbin Long¹, Lulu Liu³, Honglin Ji³, Tonghui Ji³, Yu Yang³, Shangcheng Wang³, Zhaopeng Xu², Yuyang Gao⁴, Jinyi Yu¹, Lei Shen⁵, Lei Zhang⁵, Jie Luo⁵, Xu Zhang³, Zhixue He³, Yongqi He¹, Zhangyuan Chen¹, Hongbin Li³, Weisheng Hu³, Shaohua Yu³, Juhao Li^{1*}

1.Peking University, China; 2.China Telecom Research Institute, China; 3.Peng Cheng Laboratory, China; 4.University of Science and Technology Beijing, China; 5.YOFC, China

We report the first real-time mode-division-multiplexing (MDM) transmission trial over field-deployed weakly-coupled few-mode fibers (FMF). 3.6-dB Q²-factor margin is observed for 80-km LP₀₁/LP₀₂ MDM transmission utilizing commercial 400G DP-QPSK OTN transceivers without any modification.

16:15-16:30 · ACP2025-1008-5

Integrated 1-Tb/s/λ Coherent Optical Transmission and Forward Vibration Sensing Using DFB Lasers with Combined Linewidth of 21.4 MHzYixiao Zhu^{1*}, Chenbo Zhang^{2*}, Yi Zou², Xiang Cai², Xiansong Fang², Jingjing Lin², Xian Zhou³, Fan Li⁴, Zhangyuan Chen², Xiaopeng Xie², Weisheng Hu¹, Fan Zhang^{2*}

1.Shanghai Jiao Tong University, China; 2.Peking University, China; 3.University of Science and Technology Beijing, China; 4.Sun Yat-Sen University, China

We experimentally demonstrate extreme cost-effective integrated sensing and communication with coherent transceivers. Using 12.5-MHz transmitting laser and 8.9-MHz LO, we achieve single-wavelength coherent transmission at 1.0-Tb/s line rate over 160-km fiber, and forward vibration sensing by residual carrier with accurate phase noise mitigation and extraction.

16:30-16:45 · ACP2025-1008-9

Real-Time 800G/λ Unrepeated Transmission over 397.3km HCF together with 128km SMFLipeng Feng^{1*}, Anxu Zhang¹, Peng Li², Yuan Gao², Lei Zhang², Jun Wu², Jie Luo², Xiaoli Huo¹, Jianping Li³, Songnian Fu³, Junjie Li¹, Chengliang Zhang¹

1.China Telecom Beijing Research Institute, China; 2.State Key Laboratory of Optical Fiber and Cable Manufacture Technology YOFC, China; 3.Institute of Advanced Technology, Guangdong University of Technology, China

We demonstrate a record of real-time 800G/λ PCS-16QAM unrepeated transmission over 525.3km fiber link, including 397.3km HCF and 128km SMF. The only use of EDFA is capable to unlock the potential of HCF for the unrepeated reach extension.

16:45-17:00 · ACP2025-1006-3

Record Real-time 406.4 Tbit/s S+C+L WDM Transmission over 300 km G.654.E Four-core Fiber based on 400 Gbit/s SiPh Optical ModuleYuhan Gong¹, Chao Yang^{1*}, Qingyu He¹, Ying Qiu¹, Ming Luo¹, Chuyu Peng², Xu Zhang³, Chao Li³, Zhixue He³

1.State Key Laboratory of Optical Communication Technologies and Networks China Information and Communication Technologies Group Corporation, China; 2.Fiberhome Fujikura Optic Technology Co., Ltd China Information and Communication Technologies Group Corporation, China; 3.Pengcheng Laboratory, China

Record 406.4 Tbit/s S+C+L WDM transmission supported by self-developed 400 Gbit/s SiPh commercial optical module is experimentally demonstrated over 300 km 4-core fiber for next generation high-capacity and long-distance transmission applications.

17:00-17:15 · ACP2025-1007-4

Single-Lane 1.96Tb/s NFDM Transmission with 10.26b/s/Hz Net Spectral Efficiency Using Residual Carrier Frequency-Phase RecoveryXiang Cai¹, Lingjun Zhou^{1,2}, Yixiao Zhu³, Xiansong Fang¹, Yunchen Li^{1,2}, Xinyu Chen⁴, Hui Chen², Chao Li², Zhixue He², Lei Wang², Ke Li², Xian Zhou⁵, Fan Zhang^{1,2*}

1.Peking University, China; 2.Peng Cheng Laboratory, China; 3.Shanghai Jiao Tong University, China; 4.China Mobile Research Institute, China; 5.University of Science and Technology Beijing, China

We propose and experimentally demonstrate a residual carrier-based frequency and phase recovery for nonlinear frequency division multiplexing (NFDM), enabling a record high-speed single-lane 1.96Tb/s NFDM transmission over 200km using a segmented TFLN IQ modulator, which achieves 150Gbaud PS-256QAM NFDM signaling with a net spectral efficiency of 10.26b/s/Hz.

13:30–17:15 · November 8, 2025 · Saturday

Postdeadline Paper Parallel Session

Presider: Linjie Zhou, Shanghai Jiao Tong University, China

Function Room K5, 1F (多功能厅 K5, 1 楼)

13:30–13:45 · ACP2025-1001-4

Real-time Integrated 5.08-millimeter Range Resolution and 15.5-Gbps Bidirectional Wireless Communication in Photonic-assisted Terahertz Band System over 270-meter Range

Qihang Wang¹, Wen Zhou^{1*}, Sicong Xu¹, Jie Zhang¹, Siqi Wang¹, Xin Lu¹, Jiali Chen¹, Chengzhen Bian¹, Jingwen Lin¹, Jingtao Ge¹, Zhihang Ou¹, Tong Wang¹, Yuan Ma¹, Tengsheng Zhang¹, Weiping Li¹, Kaihui Wang¹, Xiaolong Pan², Jianjun Yu¹
¹.Fudan University, China; ².Beijing Institute of Technology, China

We demonstrate a real-time integrated 5.08 mm range resolution sensing and 15.5 Gbps communication in outdoor long-range bidirectional photonic-assisted terahertz band system.

13:45–14:00 · ACP2025-1002-2

Advancements of Photonics-based MIMO Radar in High-Resolution Detection of Small Cluster Targets

Jiayuan Kong, Fangzheng Zhang^{*}, Yuewen Zhou, Yihang Wang, Hao Wang, Shilong Pan
Nanjing University of Aeronautics and Astronautics, China

In this paper, high-resolution detection of small cluster targets is demonstrated with a photonics-based radar that has an 8×8 multiple-input-multiple-output (MIMO) array with 8-GHz bandwidth (10–18GHz) in each channel. In the experiment, the range and azimuth resolutions of the established photonics-based MIMO radar are measured to be 2.1 cm and 0.17°, respectively. Based on this photonics-based MIMO radar, precise detection of both static and moving small drones are successfully implemented. The results can soundly verify the high-resolution cluster detection capability of the photonics-based MIMO radar, which provides a good solution to the challenge of small cluster target detection.

14:00–14:15 · ACP2025-1008-18

GeoPipe: a Geo-distributed LLM Training Framework with enhanced Pipeline Parallelism in a Lossless RDMA-enabled Datacenter Optical Transport Network

Jun Dai, Xiaorun Wang, Kexiong Fang, Zheng Yang, Yuefeng Ji^{*}, Jiawei Zhang^{*}
Beijing University of Posts and Telecommunications, China

We demonstrate a geo-distributed LLM training over three datacenters interconnected via a lossless, RDMA-enabled DC-OTN. Overlapped computation with cross-DC communication is achieved under constraint cross-DC bandwidth and HBM, reducing bubble ratio by up to ~78.91%.

14:15–14:30 · ACP2025-1007-1

Demonstration of Hierarchical Digital Twin-enabled End-to-End Key Provisioning in SDN-based Satellite Quantum Key Distribution Networks

Jingjing Liu, Xiaosong Yu^{*}, Yongli Zhao^{*}, Jie Zhang
Beijing University of Posts and Telecommunications, China

Hierarchical digital twin-enabled end-to-end key provisioning in satellite quantum key distribution networks is demonstrated on our testbed. The software-defined-networking control loops are enhanced with a predictive digital twin network, resulting in a reduced service blocking rate and seconds-level latency.

14:30–14:45 · ACP2025-1008-10

Dual EO-Comb Coherent Stitching Enables Record 600 GHz Bandwidth for Ultra-High Resolution FMCW Ranging

Xinhang Li, Xiaozhou Ma, Qinyuan Chen, Yifan Xia, Siyu E, Xianyi Cao, Tianyi Li, Weihang Xu, Yuyao Guo^{*}, Yu Li, Liangjun Lu, Kan Wu^{*}, Jianping Chen, Linjie Zhou
Shanghai Jiao Tong University, China

By combining synchronous tuning of III-V/Si₃N₄ external cavity laser and coherent stitching via dual electro-optic combs, we achieve an equivalent chirp bandwidth of 600 GHz, enabling sub-millimeter ranging resolution of 263 μm in FMCW systems

14:45–15:00 · ACP2025-1008-11

Slanted Grating Antenna Enabled Intentionally Shifted Focal Plane Switch Array for Circulator-Free Quasi-Monostatic LiDAR

Qiqi Yuan, Weihang Xu^{*}, Wei Gao, Jianping Chen, Liangjun Lu, Xinwan Li, Linjie Zhou
Shanghai Jiao Tong University, China

We propose and demonstrate a focal plane switch array (FPSA) comprising juxtaposed slanted grating antennas as transceiving elements with strong crosstalk suppression and quasi-monostatic depth of field. By intentionally shifting the focal plane of the lens, the array is capable of circulator-free LiDAR operation.

15:00–15:15 · ACP2025-0920-1

Versatile low-noise laser via multi-material hybrid integration

Yilin Wu¹, Shuai Shao¹, Hongfei Zhang¹, Qiyin Xue¹, Sigang Yang¹, Hongwei Chen¹, Hui Wang², Minghua Chen^{1*}
¹.Tsinghua University, China; ².Changzhou Smartcore Optoelectronic Limited, China

We demonstrate a hybrid integrated III-V/Si₃N₄-TFLN laser with an intrinsic linewidth of 106 Hz. It supports 10MHz on-off switching, 12 nm wavelength switching, and electro-optic frequency stabilization.

15:15–15:30 · ACP2025–0916–2

Self-Amplified High Speed Transmission Based on Erbium-Doped Lithium Niobate Platform**Yimeng Wang¹**, Bitao Shen^{1*}, Bo Wang¹, Sijie Yang¹, Liyuan Yao¹, Yunhao Zhang¹, Peiqi Zhou², Dan Sun³, Haowen Shu^{1*}, Xingjun Wang^{1*}*1. Peking University, China; 2. China Information and Communication Technologies Group Corporation (CICT), China; 3. Peking University Yangtze Delta Institute of Optoelectronics, China*

We demonstrate the first self-amplified high-speed integrated photonic transmitter based on Erbium-doped lithium niobate platform. The proposed system integrates optical gain and electro-optic dynamics monolithically, supporting up to 170 GHz ultra-high bandwidth electro-optic operation.

15:30–16:00 Coffee Break

16:00–16:15 · ACP2025–1008–4

Heterogeneous integration of III–V semiconductor lasers on 300 nm 220 nm silicon photonics platform**Xian Zhang^{1,2}**, Yu Qiao¹, Shuqing Lin², Zhenqi Liu¹, Hui Chen^{1,2}, **Bing Wang^{1,2*}**, Ruijun Wang^{1,2*}, Siyuan Yu^{1,2}*1. State Key Laboratory of Optoelectronic Materials and Technologies, School of Electronic and Information Technology Sun Yat-sen University, China; 2. Guangzhou Innovation Center of Optoelectronics and Microelectronics, China*

We demonstrate heterogeneous integration of C-band InP-based lasers on 300 nm silicon photonics wafers with a 220 nm thick silicon layer via die-to-wafer bonding. The devices achieve continuous-wave Si-waveguide output power of 5.3 mW.

16:15–16:30 · ACP2025–1008–2

Large-Scale, Zero-Static Power Photonic Accelerator via Non-Volatile Silicon Material Transformation in MZI Phase Shifters**Kaihao Deng¹**, Yating Wu, Bihao Zhang, Tao Chu^{1*}*Zhejiang University, China*

We demonstrate a zero-static power photonic accelerator using non-volatile silicon MZI phase shifters, achieving 10-bit weight control and validating a 64×64 matrix and PCNN with 91.94% MNIST accuracy.

16:30–16:45 · ACP2025–1008–8

Polarization-insensitive Low-loss Calibration-free 4×4 Mach-Zehnder Switches**Yujing Zhu¹**, Lijia Song, Zian Cao, Huan Li, Daoxin Dai*State Key Laboratory for Modern Optical Instrumentation, College of Optical Science and Engineering, Zhejiang University, China*

We propose a polarization-insensitive calibration-free 4×4 Mach-Zehnder interferometer photonic switch on a 400 nm-thick Si₃N₄ platform, exhibiting an excess loss of <~2.1 dB and a low crosstalk of <~ -25 dB for both TE and TM modes C-band in calibration-free state, enabling robust high-density photonic interconnects and reconfigurable networks.

16:45–17:00 · ACP2025–1002–1

Subwavelength Grating Slot Waveguide Micro-ring Resonator with Cosine-type Photonic Crystal for Refractive Index Sensing**Yalin Li^{1,2}**, Jiahao Peng³, Hao Wang^{1,2}, Xianjie Gao^{1,2}, Peichuan Yin^{1,2}, Ruxue Wang^{1,2*}, Aimin Wu^{1,2*}*1. National Key Laboratory of Materials for Integrated Circuits, Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Sciences, China; 2. Center of Materials Science and Optoelectronics Engineering, University of Chinese Academy of Sciences, China; 3. School of Optical-Electrical and Computer Engineering, University of Shanghai for Science and Technology, China*

A SOI-based SWGS micro-ring resonator with 1D photonic crystal is proposed for bulk refractive index sensing; NaCl solution tests show 621 nm/RIU sensitivity for its air-band mode.

17:00–17:15 · ACP2025–0910–2

A waveguide temperature sensor based on cascaded microring structure with enhanced sensitivity**Huan Guan¹**, Yanbo Ren, Zhiguo Yu, Zikuan Liu, Zhiyong Li^{1*}*Institute of Semiconductors, Chinese Academy of Sciences, China*

This work develops a sensitivity-enhanced on-chip temperature sensor based on cascaded micro-ring structure. The sensor consists of two micro-rings with different radii, connected by a common waveguide. This waveguide serves triple purposes: it acts as drop port for the first micro-ring and input and through port for the second micro-ring. This design significantly enhances the spectral slope rate, addressing the challenge of achieving high sensitivity in on-chip temperature sensors and providing a possible solution for their design. Experimental results show that the sensor achieves a spectral slope rate of 2250 dB/nm at wavelength of 1545.554 nm. The micro-ring temperature sensor designed in this study features high sensitivity and a compact structure, making it highly suitable for temperature measurement in very large-scale integrated circuits. It holds significant application potential in the field of on-chip system temperature monitoring.

Poster Session

Track 1: Optical Fibers, Fiber-based Devices

ACP2025-0515-1

Simultaneous Multi-Gas Sensing with Miniaturized Fiber Fabry-Perot Interferometer-Based Photothermal Spectroscopy **Karol Krzempek**

Wroclaw University of Science and Technology, Poland

We demonstrate simultaneous methane and carbon dioxide detection using photothermal spectroscopy with a miniature fiber Fabry-Perot interferometer. The system measures gas-induced refractive index changes at 1550 nm while targeting specific absorption lines at 1651 nm and 2001 nm.

ACP2025-0620-1

Multi-Reference-Compatible Frequency Stabilization of DFB-LDs Lasers Using Fabry-Perot Etalon and Acetylene Cell **Ye Gao**

Tianjin University, China

In this work, we propose a novel frequency-stabilized laser scheme that is compatible with various absorption-spectrum-based frequency reference devices. Experimental results demonstrate that the proposed laser achieves a frequency stability on the order of 10^{-10} .

ACP2025-0714-3

Robust Fiber Type Identification from Power Profile Estimation Using an Encoder-Decoder Network **Kehan He¹, Yongjie Shi², YuChen Song², Yihang Lou², Xiaoguang Zhang¹, Lixia Xi^{1*}**

1. Beijing University of Posts and Telecommunications, China; 2. Huawei Technologies Co., Ltd., China

We propose an encoder-decoder network for robustly identifying fiber types from PPE-derived waveforms, achieving 95% accuracy in complex simulations and successfully identifying fiber types in a 140GBd DP-16QAM, 8-span transmission testbed.

ACP2025-0718-7

Thermalization of the Rayleigh-Jeans distribution in graded-index ring-core multimode fibers **Fengyi Zhang, Hu Zhang, Bohao Xu, Jiaqi Wang, Xiaoguang Zhang, Lixia Xi**

Beijing University of Posts and Telecommunications, China

We investigate the beam self-cleaning (BSC) effect in a graded-index (GRIN) ring-core multimode fiber (MMF) in the framework of thermodynamics, uncovering its atypical thermalization characteristics.

ACP2025-0724-2

Broadband Random Fiber Laser with Chirped Fiber Bragg Grating Feedback **Runnan Guan, Runhao Li, Jing Zhang, Yifei Qi, Wangyouyou Li, Zinan Wang***

Key Lab of Optical Fiber Sensing and Communications University of Electronic Science and Technology of China, China

In this paper, we design and implement a high-reflectivity chirped fiber Bragg grating (CFBG) and, using a simple structure, successfully generate a 3.5 nm RFL.

ACP2025-0724-9

Sensing Branch Multiplexing for Linear Sagnac Interferometer Based on Phase-Generated Carrier Technique **Zhongzheng Yuan, Yuchen Song*, Kaiyuan Wang, Yixiao Ma, Qian Xiao, Bo Jia**

Fudan University, China

This paper proposes a sensing branch multiplexing method for linear Sagnac interferometer, achieved by applying modulations of different frequencies to distinct branches. This method can achieve good quality of recovered phase and high localization accuracy.

ACP2025-0729-19

Improved PGC-Arctan Demodulation Algorithm by Combining Odd Harmonics **Fangshuo Shi¹, Haoyan Liu¹, Yuxiang Wei¹, Wenbo Wang¹, Xinyu Cao¹, Yanjun Chen^{2*}, Zhengbin Li¹**

1. Peking University, China; 2. Central South University, China

We propose an improved PGC-Arctan demodulation algorithm that combines odd harmonics proportionally to maximize the signal-to-noise ratio of fiber-optic interferometric sensor. Without changing optical configuration, the proposed algorithm enhances sensitivity by a factor of 1.59.

ACP2025-0729-7

Design and Optimization of an All-Fiber Mode Multiplexer for C-Band via Tapered Side-Polished Processing**Yingying Zhou^{1,2}, Junpeng Liang^{2*}, Mingjing Zeng², Xiuquan Cui², Jianwei Tang², Hao Shi², Cancan Chen², Jianyu Wang², Hua Yu¹, Zhaopeng Xu², Zhixue He², Jinlong Wei^{2*}***1.South China University of Technology, China; 2.Pengcheng Laboratory, China*

We present a detailed comparative numerical study of two fabrication methods for all-fiber mode-selective couplers used as mode (de)multiplexers. Both designs achieves over 90.92% coupling efficiency and crosstalk below -15.56 dB. Furthermore, our results show that the use of standard ITU-T G.652.D singlemode fiber (SMF) can provide similar coupling efficiency as dedicated SMF does.

ACP2025-0730-16

780 nm GHz Harmonic Mode-locked Pulses Generation via Frequency Doubling**Mengxue Guo¹, Kai Wang¹, Qianqian Huang¹, Lilong Dai¹, Haochen Tian², Hairun Guo¹, Chengbo Mou^{1*}***1.Shanghai University, China; 2.National Institute of Metrology, China*

We report the first demonstration of 780 nm GHz pulse generation via frequency doubling, seeded by a harmonic mode-locked fiber laser. This approach offers a solution for generating 780 nm pulses and enables various applications.

ACP2025-0730-20

Ultra-sensitive Fiber Gas Pressure Sensor based on the Harmonic Optical Vernier Effect**Yujian Li¹***The Hong Kong Polytechnic University, Hong Kong, China*

This paper presents a novel ultra-sensitive fiber gas pressure sensor leveraging the Harmonic Optical Vernier Effect (HOVE) based on hollow core fiber and single core side hole fiber.

ACP2025-0731-149

10-LP Mode Scrambler Based on MPLC with 7 Phase Masks**Liu Liu, Ziling Shen, Jie Zhang, He Wen^{*}***Beijing University of Posts and Telecommunications, China*

Scrambling modes with different propagation velocities effectively reduces the impact of differential mode group delay on mode-division multiplexing transmission. We propose a mode scrambler, which directly swaps mode pairs instead of separating, exchanging and recombining them in the conventional schemes, to facilitate scrambling with simple structure and low loss. Multi-plane light conversion (MPLC) technique is employed to construct a 10-LP mode scrambler. The experimental insertion loss, mode-dependent loss, and average mode crosstalk are -3.8-dB, -4.8-dB, and -9.5-dB, respectively. The device offers a promising solution for DMGD suppression in few-mode fiber systems.

ACP2025-0731-19

Noise Analysis and Fiber Optimization for Coexistent Transmission of Classical Signals and Quantum Key Distribution**Qi Zhao¹, Gang Wang², Li Pei³, Tianqi Dou¹, Weiwen Kong¹, Jianjun Tang¹***1.China Telecom Research Institute, China; 2.China Telecom, China; 3.Beijing Jiaotong University, China*

This article derives the noise model of a quantum-classical coexistence system based on few-mode fibers (FMF). Furthermore, a nanopore-assisted FMF is designed to significantly enhance the transmission distance of quantum signals by over 40%.

ACP2025-0731-6

Design of Six-Mode Polarization-maintaining Photonic Lantern**Zhao Wang¹, Qijun Yan¹, Cai Xiao OuYang², Yan Li^{1*}, Jifang Qiu¹, Jian Wu¹***1.Beijing University of Posts and Telecommunications, China; 2.Wuhan Vocational College of Software and Engineering, China*

We design a six-mode polarization-maintaining photonic lantern. It exhibits a refractive index difference of more than 10^{-4} in both the x and y directions, and the crosstalk exceeds -20 dB, demonstrating good polarization-maintaining performance.

ACP2025-0801-128

Compact Environmentally-Stable Figure-9 Fiber Laser with Large Repetition Rate Tuning Ranges**Rongwei Zhu, Liang Hu^{*}, Ziang Qiu, Zijie Zhou, Guiling Wu, Jianping Chen***Shanghai Jiao Tong University, China*

A compact "figure-9" fiber laser with stable environment is proposed, the repetition rate of the laser is 246 MHz, the direct output pulse width is 103 fs, the 3 dB spectral width is 52 nm.

ACP2025-0801-162

Design of Few-Mode Hollow-Core Anti-resonant Fibers with Bridge-Linked Concentric Tube Pairs
Mengjuan Qin, Youchao Jiang^{*}, Yafan Su, Shiyang Xiao, Wenhua Ren, Guobin Ren, Fengping Yan*Beijing Jiaotong University, China*

This paper proposes a novel bridge-linked dual-nested anti-resonant hollow-core fiber with low-mode transmission performance. The study investigates the influence of the proposed fiber structure parameters on the confinement losses (CL) of each mode in the core. It also provides a detailed analysis of how the effective refractive index and CL of each mode in the fiber change with wavelength under optimal structural parameters. The optimized BLN-ARF can transmit five modes (LP_{01} , LP_{11} , LP_{21} , LP_{02} , and LP_{31}) in the 1–1.6 μm wavelength range. In the 1.6–1.8 μm range, it can transmit four modes (LP_{01} , LP_{11} , LP_{21} , and LP_{31}). The effective refractive index difference Δn_{eff} between each mode is greater than 1×10^{-4} , significantly suppressing coupling between the five LP modes and preventing channel crosstalk between different modes. Furthermore, LP_{01} , LP_{11} , LP_{02} , and LP_{31} all achieve the lowest CL at 1.12 μm , which are 1.84×10^{-7} dB/m, 2×10^{-6} dB/m, 2.5×10^{-4} dB/m, and 2.86×10^{-3} dB/m, respectively. Furthermore, the bending loss and manufacturing tolerances of this BLN-ARF structure were also investigated.

ACP2025-0801-167

Mode Field Diameter with Petermann II Far-Field Definition Matching for Minimized Coupling Loss between AR-HCF and SMF
Qin Yu¹, Zhu Jie¹, Wang Caoyuan¹, Hongli Wang², Li Nuo¹, Gu Ju¹, Xiao Wenzhe¹, Yichun Shen², Xiao Limin¹*1. College of Future Information Technology, Fudan University, China; 2. R&D Department, Zhongtian Technology Advanced Materials Co., Ltd., China*

In this paper, the mode field diameters (MFDs) of the fabricated AR-HCFs were experimentally investigated using near-field MFD with Gaussian approximation and far-field MFD with Petermann II definition. Our simulated and experimental results demonstrate that the coupling loss was minimized when the far-field MFD with Petermann II definition of AR-HCF matched that of reverse-tapered SMF, which was measured by a commercial fiber analysis system.

ACP2025-0801-172

A FDM system for polarimetric fiber laser sensor array based on beat frequency demodulation**Jinglin Feng, Shiyang Xiao^{*}, Ying Wang, Beilei Wu, Zixiao Wang, Youchao Jiang***Beijing Jiaotong University, China*

A FDM system for polarimetric fiber laser sensor array is proposed based on beat frequency demodulation. The system array consists of three sensors, each formed by a section of Erbium-doped fiber (Hi-Bi EDF) and a pair of wavelength matched fiber Bragg gratings (FBGs). Since the differences of cavity length, the beat frequency signal for each sensor can be detected using frequency division multiplexing (FDM) technology. This system only requires a photodetector (PD) and an electrical spectrum analyzer (ESA) to simultaneously monitor all sensors, which reduces the cost of the system and demonstrates promising prospects.

ACP2025-0801-203

Dynamic Scattering Imaging in Ring Core Fiber via Enhanced Optical Neural Networks with Zernike-Vortex Modulation
Xiaoxiao Deng¹, Lei Zhu², Yuqing Chen³, Jianxin Ren⁴, Xiangjun Xin¹, Bo Liu⁵*1. Beijing Institute of Technology, China; 2. Beijing University of Posts and Telecommunications, China; 3. DATANG LINKTECH INFOSYSTEM, China; 4. Nanjing University of Information Science and Technology, China; 5. Tsinghua University, China*

We introduce a space-Fourier domain-enhanced optical convolutional neural network (EOCNN) that enables speckle reconstruction in Ring Core fibers (RCF) platforms. The concept and implementation establish a new framework for complex photonic systems.

ACP2025-0801-32

Spectral Reconstruction of Mode-Locked Fiber Laser via Multimode Fiber**Zhu Yixiao Liu¹, Zheng Gao¹, Jingze Liu¹, Fengming Zhang¹, Hao Wu¹, Chengbo Mou², Luming Zhao¹, Ming Tang¹***1. Wuhan National Laboratory for Optoelectronics (WNLO) and Next Generation Internet Access National Engineering Laboratory (NGIA), School of Optical and Electronic Information, Huazhong University of Science and Technology, China; 2. Key Laboratory of Specialty Fiber Optics and Optical Access Networks, Shanghai University, China*

We propose a spectral reconstruction scheme for mode-locked fiber lasers based on MMF (multimode fiber) and MCF (multicore fiber). This scheme achieves the mapping of spectral information to pulse sequences through the MMF-MCF structure.

ACP2025-0801-56

Design of ultra-low modal delay multimode fiber for 200G per lane VCSEL-MMF based links**Fengming Zhang, Ming Tang^{*}, Senyu Zhang, Zhu Yixiao Liu, Zhongyao Luo***Wuhan National Laboratory for Optoelectronics (WNLO) and Next Generation Internet Access National Engineering Laboratory (NGIA), School of Optical and Electronic Information, Huazhong University of Science and Technology, China*

A novel ultra-low modal delay multimode fiber (MMF) is proposed, providing theoretically higher bandwidth at 850 nm compared to OM3/4 fibers while exhibiting strong coupling efficiency with commercial VCSELs.

ACP2025-0801-85

Resonant Couplings for Vortex Modes in Twisted Threefold Rotationally Symmetric Hollow-Core Fiber**Mingjie Cui, Changyuan Yu****The Hong Kong Polytechnic University, Hong Kong, China*

We numerically show that transmission of vortex modes can be supported in a twisted threefold rotationally symmetric hollow-core fiber. With twist rate increasing, the vortex modes can resonantly couple to the capillary modes at certain twist rates, causing a series of resonant peaks in the loss spectrum. The obtained results suggest that the fiber has potential applications in filtering and conversion of optical vortex.

ACP2025-0801-99

Efficient Task-Adaptive Compression for Distributed Vibration Sensing with Learnable Lightweight Convolutional Operators**Zhongyao Luo^{1,2,3}, Hao Wu^{1,2,3*}, Zhao Ge^{1,2,3}, Ming Tang^{1,2,3}***1. Huazhong University of Science and Technology, China; 2. National Laboratory for Optoelectronics (WNLO), China; 3. National Engineering Laboratory for Next Generation Internet Access System, China*

This paper presents a lightweight, learnable convolutional sensing operator for distributed vibration sensing, achieving 97% event recognition accuracy using only 4% of raw data, significantly reducing computation and outperforming compressed-sensing-based methods.

ACP2025-0806-4

A Low-Loss Fan-In/Fan-Out Device Based on Mode Field Robustness**Tingyu Zhang, Wei Chen*, Junhao Zhang, Fei Wang***Shanghai University, China*

Fan-in/Fan-out (FI/FO) devices are crucial components for achieving low-loss connections between multi-core fibers (MCFs) and single-mode fiber (SMF) arrays. During the fabrication of FI/FO devices using the fused taper method, the mode field diameter (MFD) of conventional bridge fibers undergoes significant changes in the tapering process. This paper design a mode-field-robust bridge fiber (MFF-BF) featuring a two-step step-index waveguide structure, which effectively addresses the issue of drastic mode field variations during the tapering process. During the simulation process of reducing the cladding diameter from 125 μm to 38.5 μm , MFD showed a smooth change. On the other hand, by introducing a low-refractive-index trench structure in the cladding, the fiber enhances the confinement capability of electromagnetic fields in optical waves, thereby reducing inter-core coupling crosstalk (XT). Based on this design, the bridge fiber was fabricated using modified chemical vapor deposition (MCVD) and drawn. And a seven-core FI/FO device fabricated through the fused taper method. Ultimately, the average insertion loss (IL) of the prepared device was below 0.5 dB, and the average XT was below -50 dB. The proposed robust bridge fiber addresses the complexity issues of traditional vanish-core fibers in FI/FO device fabrication, effectively reducing IL and XT while enhancing the applicability of FI/FO devices in communication systems.

ACP2025-0811-9

Pump Feedback Polarization Control for RIN Reduction in an NPR-based Stretched Pulse Fiber Laser**Kailin Jiang¹, Qianqian Huang¹, Jiaxin Xu¹, Kai Wang¹, Lilong Dai¹, Haochen Tian², Youjian Song³, Hairun Guo¹, Chengbo Mou^{1*}***1. Shanghai University, China; 2. National Institute of Metrology, China; 3. Tianjin University, China*

We report an experimental demonstration that suitable polarization control of the pump feedback light provided by the FBG reduces the RIN of the pump laser, thus improving the noise performance of the stretched-pulse fiber laser.

ACP2025-0814-32

Design of a pump coupling mode multiplexer based on multi-plane light conversion**Xiaoyu Yan, Zhifeng Wang, Liang Zhang, Heming Wei, Mengshi Zhu, Fufei Pang****Shanghai University, China*

Multi-plane light conversion (MPLC) combines free-space propagation with spatial phase modulation to enable efficient and complex spatial light transformation. Addressing the challenge of precise multi-wavelength, multi-mode field generation and coupling in specialty fibers, this paper presents an end-to-end design and optimization of an MPLC system using a wavefront matching algorithm. The system converts an input array—one 980 nm pump beam and three 1550 nm signal beams—into the LP_{01} , LP_{11a} , LP_{11b} , and LP_{21} modes supported by a ring-core fiber (RCF). By inversely designing a series of phase plates, a compact device integrating pump coupling and mode multiplexing is realized. Systematic analysis of phase plate number and spacing reveals an optimal setup of four plates spaced 20 mm apart, yielding insertion loss (IL) below 0.5 dB, mode-dependent loss (MDL) of 0.8 dB, and average mode purity (MP) above 94%. These results validate the MPLC device as an efficient, high-fidelity solution for generating structured composite fields in advanced mode-division multiplexing fiber systems, such as ring-core fiber amplifiers.

ACP2025-0814-39

Experimental Demonstration of Bend-Resilient Imaging Using a Multimode Multi-Core Fiber**Deng Liu^{1,2}, Rong Li^{1,2}, Shuhui Li^{1,2*}, Jian Wang¹***1. Huazhong University of Science and Technology, China; 2. Shenzhen Institute of Huazhong University of Science and Technology, China*

We experimentally demonstrate bend-resilient imaging using a multimode multi-core fiber (MM-MCF). Sub-images acquired from different positions are stitched to reconstruct the full field of view under various bending conditions, demonstrating high resilience to bending.

ACP2025-0815-132

A Hybrid Spectral-Phase Fusion Algorithm for Blind-Zone Elimination in OFDR Shape Sensing with UWFBG Arrays
Danting Li*Cheng'du Aircraft Industrial (Group) Co. Ltd., China*

A novel hybrid spectral-phase fusion algorithm has presented to simultaneously utilize both spectral and phase information from the grating, enabling strain detection in the traditionally inaccessible inter-grating regions and effectively doubling the spatial sampling rate.

ACP2025-0815-61

A high-resolution interleaved dual-comb spectroscopy system based on dual recirculating frequency-shifting loops
Yihan Wang, Yin Xu, Hualong Bao**Soochow University, China*

We demonstrate interleaved dual-comb spectroscopy using dual recirculating frequency-shifting loops. It measures $H^{13}C^{14}N$ gas absorption over 240 GHz bandwidth with 100 MHz resolution and a maximum measurement deviation below 3% compared to the reference spectrum.

ACP2025-0815-65

A Flat, Low-Noise, Multi-Wavelength Laser Source Based on a Brillouin Cavity
Zihan Li, Yue Wang, Yin Xu, Hualong Bao**Soochow University, China*

A flat, low-noise, multi-wavelength laser source is achieved via FSOIL by injecting external light into the Brillouin cavity. It features 0.08 Hz²/Hz white noise and 1 dB spectral flatness with high coherence.

ACP2025-0819-3

Variable frequency and pulse width 1560 nm pulsed incoherent source for core pumping of Gain-Switched Thulium-doped fiber laser**Kevin Lui*, Ray Man, KS Tsang, Dicky Chung*, Victor Ho, Sonia Wong***Amonics Limited, China*

A 1560 nm nanosecond incoherent pulsed ASE source for core pumping gain-switched Thulium-doped fiber lasers. The pulse energy exceeded 80 μ J, with a peak power greater than 1300 W and pulse width of 60 ns.

ACP2025-0820-10

Simultaneous sensing of Transverse Load and temperature based on forward Brillouin Scattering using thin-diameter optical fiber**Wenzhe Xiao¹, Dahao Xu¹, Caoyuan Wang¹, Yu Qin¹, Xuetong Zhao¹, Jie Sun¹, Yichun Shen², Limin Xiao***

1.Advanced Fiber Devices and Systems Group, Key Laboratory of Micro and Nano Photonic Structures (MoE), Key Laboratory for Information Science of Electromagnetic Waves (MoE), Shanghai Engineering Research Center of Ultra-Precision Optical Manufacturing, College of Future Information Technology, Fudan University, China; 2.Zhongtian Technology Advanced Materials Co., Ltd., China

We propose and experimentally demonstrate, for the first time, a simultaneous temperature (T) and transverse load (L) sensing technique based on forward Brillouin scattering in a thin-diameter optical fiber. The experiment reveals that the minimum theoretical measurement errors for T and L are 0.09 °C and 0.67 g, respectively.

ACP2025-0820-12

Optical Fiber Shape Reconstruction Based on Optimized Space Curve Helical Extension Method**Mohan Li¹, Caoyuan Wang¹, Jie Sun¹, Wei Ji¹, Wenzhe Xiao¹, Yu Qin^{1,2}, Yichun Shen², Limin Xiao***

1.Fudan University, China; 2.Zhongtian Technology Advanced Materials Co., Ltd., China

We propose a novel 3D shape reconstruction method for multi-core optical fibers using a space curve helical extension approach. Compared with the traditional Frenet-Serret reconstruction method, this approach regards the arc-length element of the space curve as a helical segment for simultaneous bending and torsion measurement. The method performs non-uniform interpolation optimization algorithm with high curvature variation rates and abrupt curvature direction changes. Experimental results demonstrate that this approach enhances the reconstruction accuracy of 3D space curves, showing significant potential for advanced fiber optic shape sensing applications.

ACP2025-0820-15

Multicore fiber-tip polymer Mach-Zehnder interferometer for breath monitoring**Cong Xiong¹, Jie Sun¹, Xuetong Zhao¹, Caoyuan Wang¹, Wei Ji¹, Yichun Shen², Limin Xiao***

1.Fudan university, China; 2.Zhongtian Technology Advanced Materials Co., Ltd, China

We propose and demonstrate a multicore fiber-tip polymer Mach-Zehnder interferometer manufactured by two-photon polymerization for breath monitoring. The multicore fiber-tip sensor has the characteristics of ultracompactness, fast, and flexibility, and it is promising to be a useful tool for non-contact breath monitoring.

ACP2025-0820-3

Measurement of Brillouin Scattering in High-Pressure CO₂-Filled Hollow-Core Fibers with Low Coupling Loss**Dahao Xu¹, Nuo Li¹, Wenzhe Xiao¹, Caoyuan Wang¹, Yu Qin¹, Yunshu Lou², Yichun Shen³, Limin Xiao^{1*}***1. Fudan University, China; 2. University of Cambridge, United Kingdom; 3. R&D Department Zhongtian Technology Advanced Materials Co., Ltd., China*

We present a high-efficiency Brillouin scattering measurement in a 25-meter hollow-core fiber (HCF) filled with carbon dioxide (CO₂) at gas pressures ranging from 5 to 35 bar. By optimizing the fiber coupling structure, we achieve a low coupling loss of 0.8 dB in high-pressure conditions, which would facilitate all-fiber gas-phase Brillouin sensing.

ACP2025-0820-5

Gas Absorption in Low-Loss Anti-resonant Hollow-Core Fibers**Nuo Li¹, Yu Qin¹, Caoyuan Wang¹, Jie Zhu¹, Yichun Shen², Limin Xiao^{1*}***1. Advanced Fiber Devices and Systems Group, Key Laboratory of Micro and Nano Photonic Structures (MoE), Key Laboratory for Information Science of Electromagnetic Waves (MoE), Shanghai Engineering Research Center of Ultra-Precision Optical Manufacturing, College of Future Information Technology, Fudan University, China; 2. Zhongtian Technology Advanced Materials Co., Ltd., China*

We fabricated a 4.2 km low-loss hollow-core anti-resonant fiber with the transmission loss of 0.3 dB/km at 1550 nm. We reported carbon dioxide absorption in HCF with splicing ends in detail. The temperature-dependent variation of carbon dioxide absorption was observed from 20 °C to 60 °C.

ACP2025-0820-6

Quasi-distributed and Simultaneous Sensing of Temperature and Acoustic Impedance Based on frequency-division Multiplexed Depolarized GAWBS**Wenzhe Xiao¹, Ju Gu¹, Yu Qin¹, Mohan Li¹, Caoyuan Wang¹, Yichun Shen², Limin Xiao^{1*}***1. Advanced Fiber Devices and Systems Group, Key Laboratory of Micro and Nano Photonic Structures (MoE), Key Laboratory for Information Science of Electromagnetic Waves (MoE), Shanghai Engineering Research Center of Ultra-Precision Optical Manufacturing, College of Future Information Technology, Fudan University, China; 2. Zhongtian Technology Advanced Materials Co., Ltd., China*

We propose and experimentally demonstrate a quasi-distributed sensing scheme for the simultaneous measurement of temperature and acoustic impedance, based on frequency-division multiplexed depolarized GAWBS using cascaded optical fibers with diameters of 80 μm and 125 μm.

ACP2025-0820-7

3D printed multicore fiber-tip whispering-gallery-mode resonator**Cong Xiong, Xuetong Zhao, Jie Sun, Caoyuan Wang, Wei Ji, Limin Xiao^{1*}***Advanced Fiber Devices and Systems Group, Fudan University, China*

A multicore fiber-tip whispering-gallery-mode resonator was proposed and demonstrated. The resonator was manufactured by two-photon polymerization, and was used to detect the concentration of volatile organic compounds. The ultracompact probe sensor is expected to be applied in some biochemical scenarios.

ACP2025-0820-9

3D printed multicore fiber-tip Mach-Zehnder interferometer**Xuetong Zhao¹, Cong Xiong¹, Jie Sun¹, Wenzhe Xiao¹, Caoyuan Wang¹, Limin Xiao^{1*}, Yichun Shen²***1. Advanced Fiber Devices and Systems Group Fudan University Shanghai, China; 2. Zhongtian Technology Advanced Materials Co., Ltd. Nantong, China*

We propose and demonstrate a multi-core fiber-tip polymer Mach-Zehnder interferometer manufactured by two-photon polymerization for Volatile Organic Compound Concentration Sensing. As MCF have characteristics of high integration and small size, high-sensitivity gas concentration measurement can be achieved on a micro-nano scale platform.

ACP2025-0830-1

Exploration of specific applications of fiber sensors in the Internet of Things**Shuiyan Xu¹***Xiamen Institute of Technology, China*

A Fiber sensor refers to a device that converts the state of the object being measured into measurable optical signals. In fiber sensors, the main function of fibers is to transmit light beams and act as optical modulators. Fiber sensors simplify installation by eliminating the need for complex circuit connections. With the continuous development of sensors towards increased sensitivity, precision, adaptability, compactness, and intelligence, fiber sensors are widely used in various industries, including the industrial Internet of Things, smart cities, environmental monitoring, medical health, national defense, and safety. From the perspective of the Internet of Things industry, fiber sensors offer numerous advantages and characteristics that can meet the construction and operational needs of the Internet of Things. Therefore, based on an overview of the application characteristics and advantages of fiber sensors in the Internet of Things, this paper proposes specific applications of fiber sensors in the Internet of Things, aiming to leverage the role of fiber sensors and promote high-quality development of the Internet of Things industry.

Track 2: Optical Transmission Systems, Subsystems and Technologies

ACP2025-0603-1

Vibration Localization under Unidirectional Single-Channel Transmission Conditions in the DSCM Systems Based on Non-Reciprocity

Bang Yang, Quhao Zhuo, Huiyang Yu, Jianwei Tang, Shuang Gao, Yanfu Yang*

Harbin Institute of Technology, Shenzhen, China

We propose a vibration localization method with frequency-domain pilot tones for vibration-induced phase extraction and achieving vibration localization based on non-reciprocity of vibration-induced phase and link dispersion under single-channel unidirectional transmission.

ACP2025-0714-8

Integrated Computation and Communication with Fiber-optic Transmissions

Jiahao Zhang^{1,2}, Lu Zhang^{1,2*}, Xiaodan Pang^{1,3,4}, Oskars Ozolins^{3,4}, Qun Zhang², Xianbin Yu*

1.Zhejiang University, China; 2.Shandong Zhike Intelligence Computing Inc., China; 3.Riga Technical University, Latvia; 4.RISE Research Institutes of Sweden, Sweden

Fiber-optic transmission systems are leveraged not only as high-speed communication channels but also as nonlinear kernel functions for machine learning computations, enabling the seamless integration of computational intelligence and communication

ACP2025-0714-9

Deep Photonic Reservoir Computing for Long-haul Fiber Transmission Systems Nonlinearity Compensation

Jiahao Zhang^{1,2}, Lu Zhang^{1,2*}, Xiaodan Pang^{1,3,4}, Oskars Ozolins^{3,4}, Qun Zhang², Xianbin Yu*

1.Zhejiang University, China; 2.Shandong Zhike Intelligence Computing Inc., China; 3.Riga Technical University, Latvia; 4.RISE Research Institutes of Sweden, Sweden

We propose deep photonic reservoir computing combined with advanced readout scheme to compensate fiber nonlinearity, achieving comparable performance to digital backpropagation method in long-haul fiber link with reduced complexity and unknown fiber parameters.

ACP2025-0722-6

Phase Modulation-based Fiber-Optic Radio Frequency Transfer Using Dispersion Shifting

Junwei Ren, Long Wang, Liang Hu, Jianping Chen, Guiling Wu*

State Key Laboratory of Photonics and Communications, Department of Electronic Engineering, Shanghai Jiao Tong University, China

We propose and demonstrate a phase modulation-based fiber-optic radio frequency transfer using dispersion shifting. The measured frequency stabilities reach 4.8×10^{-14} at 1 s and 7.7×10^{-17} at 10,000 s, respectively.

ACP2025-0724-10

Fast and Accurate Optical Fiber Channel Modeling Based on Factorized Fourier Neural Operator for PDM Signal Transmission

Zixuan Peng, Anlin Yi*, Lianshan Yan

The Center for Information Photonics and Communications, School of Information Science and Technology, Southwest Jiaotong University, China

Optical fiber channel modeling plays an essential role in simulation, design, performance evaluation and optimization for optical communication system. In this paper, a fast and accurate fiber channel modeling method based Factorized Fourier Neural Operator (F-FNO) is investigated, which achieves computational efficiency and accuracy improvement through the strategy of combining separable spectral layers and improved residual structures. The simulation results show the normalized mean square error (MSE) between the F-FNO method and split-step Fourier method (SSFM) with step size of 0.1km is less than 0.006 in 1600 km 28GBaud 16QAM polarization multiplexing (PDM) optical coherent communication system within the whole launch power ranging from -3dBm to 6dBm. The time consumption is reduced from 137.39s to 1.24s utilizing a central processing unit (CPU), and from 9.27s to only 0.005s using a graphic processing unit (GPU), respectively.

ACP2025-0724-3

Hybrid Check Generalized LDPC Convolutional Codes for Optical Fiber Communications

Yinlong Shi*, Tao Kai¹, Zitao Wei¹, Jian Wang¹, Yongben Wang¹, Xiang Li², Yong Chen², Xiangjun Lu³

1.Wuhan Zhongxing Software Company Limited, China; 2.ZTE Corporation, China; 3.China Mobile Group Shandong Company Limited, China

We construct a class of 28%-overhead HC-GLDPC-CCs with the BCH codes as component code, and investigate the effects of code length, the number of iterations, and the proportion of GC nodes on GLDPC codes. The error floor with 24 iterations is below 10^{-15} for an input BER of $4.51e-2$.

ACP2025-0724-5

Multiplexed Bessel–Gaussian Vortex Beam Chaotic Communication in Obstructed Turbulent Links**Jinyun Cao¹, Ning Jiang^{2*}, Feng Wen², Mingliang Deng², Anran Li², Kun Qiu²***1. University of Electronic Science and Technology of China (UESTC), China; 2. University of Electronic Science and Technology of China, China*

A free-space optical (FSO) communication system based on chaotic encryption and multiplexed Bessel–Gaussian vortex beams (BGVB) is proposed. This enables high-fidelity transmission at 16 Gbit/s aggregate capacity with enhanced security and robustness.

ACP2025-0725-3

Slot-Oriented Deterministic Allocation for Latency and Jitter Minimization in Industrial PON**Kyeong Hwan Doo^{*}, Kwang Ok Kim, Hwan Seok Chung***ETRI, Korea*

We demonstrate a slot-oriented deterministic allocation (SLODA) scheme to minimize latency and jitter in passive optical network (PON) for industrial applications.

ACP2025-0726-12

A multi-core optical transmission system based on four-dimensional probabilistic shaping 1024QAM**Lei Jiang¹, Liu Bo^{2*}, Jianxin Ren², Xiangyu Wu², Yaya Mao³, Bai Yu³, Shuaidong Chen⁴, Yang Wenhan¹, Jiawen Yuan¹***1. Nanjing Institute of Technology, China; 2. Nanjing University of Information Science and Technology, China; 3. Suzhou Polytechnic University, China; 4. Nanjing University of Posts and Telecommunications, China*

An experimental multi-core optical transmission system based on four-dimensional probabilistically shaped (PS) 1024-ary quadrature amplitude modulation (QAM) is proposed. Experimental results of the seven-core system demonstrate that a higher probability distribution parameter in 1024QAM leads to a lower BER.

ACP2025-0726-2

Demonstration of Integrated Chaos Communication and Fiber Optic Vibration Sensing In Optical Fibers**Hongpeng Liang¹, Xing Li¹, Guilin Zeng¹, Yuehua An², Zhensen Gao^{1*}, Yuwen Qin¹***1. School of Information Engineering, and Key Laboratory of Photonic Technology for Integrated Communication and Sensing, Guangdong University of Technology, China; 2. School of Optoelectronic Engineering, Guangdong Polytechnic Normal University, China*

We propose a novel chaotic communication and sensing detection scheme based on random envelope linear frequency modulation (RE-LFM) signals. Integrating sensing technology into secure optical transmission systems can provide early warning of security threats and anomaly detection capabilities for confidential communication systems.

ACP2025-0726-9

Self-Homodyne Alamouti Receiver based on Lightweight Neural Network for Low-Complexity Coherent PONs**Lu Zhang, Hui Yang^{*}, Xihua Zou, Lianshan Yan, Wei Pan***School of Information Science and Technology, Southwest Jiaotong University, China*

A neural network-based self-homodyne Alamouti receiver is proposed for coherent PONs. This hardware-level impairment-suppressing architecture eliminates complex MIMO equalization, reducing DSP complexity by 77.8% and improving sensitivity by 1.5 dB with MHz-class lasers.

ACP2025-0728-2

POF-Based CDMA-VLC System Employing Modified Gold Code with Nonlinear Permutation Function**Zhiyue Yin¹, Lihang Liu¹, Yibin Li¹, Connie Chang-Hasnain^{1,2}, H. Y. Fu^{1*}***1. Tsinghua Shenzhen International Graduate School, Tsinghua University, China; 2. Berxel Photonics Co. Ltd., China*

We propose a novel CDMA-VLC system with POF using modified Gold code. It achieves the system capacity of 5.85 Gbps, with 1.5 Gbps increase over traditional Gold code, corresponding to 34.5% enhancement.

ACP2025-0728-4

Triple-Band WDM Transmission for DCI over 160km with 800 Gb/s per Channel**Miao Gong¹, Xuemeng Hu¹, Xiang Li^{1*}, Chao Yang², Ming Luo², Hanbing Li²***1. China University of Geosciences, China; 2. China Information and Communication Technologies Group Corporation, China*

To meet high-capacity DCI demand, we explore ultra-wideband transmission over 160 km. We used an L-band segmented power optimization method that fits multiple linear regions independently. Simulation results show this approach effectively improves GSNR flatness.

ACP2025-0729-10

Accurate Low-complexity Modified EGN Model Based on Quasi-Monte Carlo Integration Method in Short-reach O-band Coherent-lite WDM Systems**Qiao Yaojun^{1*}, Xie Fei¹, Zhou Yutao¹, Zhou Hao¹, Quan Baoxuan¹, Jiang Yingjie¹, Du Tang¹, Chen Yu², Luo Ji², Zheng Bofang², Yang Aiying³***1. Beijing University of Posts and Telecommunications, China; 2. B&P Laboratory Huawei Technologies Co. Ltd., China; 3. Key Laboratory of Photonics Information Technology School of Optics and Photonics Beijing Institute of Technology, China*

We propose a modified EGN model based on the quasi Monte Carlo method (QMC-MEGN), to reduce both the fiber nonlinear noise estimation error and complexity up to 85% and 97.4% near zero-dispersion frequency, respectively.

ACP2025-0729-18

Iterative Demodulation and Decoding of Combined Trellis-Coded Modulation and LDPC Coding for Optical Fiber Communications**Tiancheng Sun, Yi Cai^{*}, Zhongxing Tian, Qing Wang, Huan Huang, Dongdong Zou***Soochow University, China*

We propose an iterative demodulation and decoding scheme that integrates trellis-coded modulation with low-density parity-check coding through a unified iterative receiver architecture. The proposed scheme offers a 0.8 dB gain over its counterparts with the same spectral efficiency.

ACP2025-0729-20

Online-Trained Adaptive Power Equalization in C+L-Band Optical Networks**Yaoyang Zhang, Yiwen Yang, Zhaojun Xu, Yan Zuo, Wu Liu^{*}, Ming Luo***China Information and Communication Technologies Group Corporation, China*

We demonstrate an adaptive power equalization scheme using online-trained neural networks for 104 C+L-band channels, which achieves target-specific power profiles within 18 training iterations, while maintaining effectiveness under target alterations and monitored channel reductions.

ACP2025-0729-21

Demonstration of Microwave Photonic Stealth Integrated Sensing and Communication System**Feng Jiang, Huatao Zhu, Xin Zhang, Xiangming Xu, Shuwen Chen^{*}, Feiyu Li, Yibo Liu, Yongliang Yin***National University of Defense Technology, China*

This paper proposes a microwave photonic stealth integrated sensing and communication system based on an amplified spontaneous emission (ASE) light source. Utilizing the broad-spectrum characteristics and low coherence of the ASE light source, the modulated signal achieves concealment performance in the optical domain. The feasibility of the proposed method is verified by a proof-of-concept experiment. Linear frequency signals with a frequency range from 2 to 3 GHz are used as electrical carrier and integrated sensing and communication signals are generated by using ASK and BPSK modulation formats. The experimental results show that the signals can be hidden in optical domain while ensuring the communication and sensing performance.

ACP2025-0729-27

Optical STAR-RIS Enhanced Visible Light Positioning with Full Blockage**Defan Shen¹, Xinyan Xie², Mengda Liu¹, Ziyang Meng¹, Jianhua He³, Lu Lu^{3*}***1. University of Chinese Academy of Sciences, China; 2. Fudan University, China; 3. Technology and Engineering Center for Space Utilization, Chinese Academy of Sciences, China*

We propose an OSTAR-RIS-enhanced two-room VLP system using adjacent-room LEDs to overcome full blockage, derive an ML estimator and CRLB, and show via simulations that increasing elements reduces RMSE by 36% and triples coverage.

ACP2025-0729-3

FPGA-based Implementation of Low-Complexity QC-LDPC for Real-Time 50G-PON Systems**KWANGOK KIM^{*}, KYEONGHWAN DOO, HWANSEOK CHUNG***ETRI, Korea*

A low-complexity QC-LDPC codec for high-speed 50G-PON is implemented on FPGA-based OLT and ONU prototypes. The proposed QC-LDPC achieves 50 Gbps performance with reduced hardware resource utilization. An optical gain of about 8.7 dB and error-free 40 Gbps transmission are demonstrated through real-time testing.

ACP2025-0729-41

Performance of Single-Photon, Multiple-Photon, and Analog Detection Modes of SiPM in Underwater Wireless Optical Communication**Jinjia Li^{1*}, Xun Zhou¹, Yi Shen², Changxiang Li¹, Yun Hou³***1. Changzhou Institute of Technology, China; 2. Jiangsu Province Hydrology and Water Resources Investigation Bureau, China; 3. Orient Securities, China*

In this paper, ultralow photon flux links using a silicon photomultiplier (SiPM) with single-photon, multiple-photon, and analog detection modes for underwater wireless optical communications (UWOC) are reported. Different optical link distances may be suitable for three different detection modes of SiPM. Furthermore, the transmitter employs a blue nixie tube array with adjustable light intensity as the light source, which demonstrates the SiPM device's sensitivity.

ACP2025-0730-14

Dynamic congestion-temperature collaborative optimization algorithm in Optical Network-on-Chip**Junji Feng¹, Daqing Meng¹, Hui Yang^{1*}, Shikui Shen², Qiuyan Yao¹, Jie Zhang¹***1. Beijing University of Posts and Telecommunications, China; 2. China Unicom Research Institute, China*

This paper proposes the DCTO algorithm for ONoC to solve performance bottlenecks from congestion-temperature interaction, outperforming XY, only-T and only-C in three scenarios and boosting transmission performance and thermal reliability.

ACP2025-0730-19

Detection and Recognition of Multi-Modulation-Format Signals in Optical Camera Communications**Bingyun Liu¹, Xiaodi You¹, Hai Huang¹, Guanghong Chen², Jian Chen³, Changyuan Yu⁴, Mingyi Gao¹, Gangxiang Shen¹***1. Soochow University, China; 2. Suzhou Polytechnic University, China; 3. Nanjing University of Posts and Telecommunications, China; 4. The Hong Kong Polytechnic University, Hong Kong, China*

We propose a signal detection and modulation recognition scheme for optical camera communications, supporting multiple formats and achieving a joint detection and recognition error probability below 0.01% when the bit error rate is around 10^{-2} .

ACP2025-0730-27

PIMA: Pretrained-Initialized Meta-Adaptation for Power Spectrum Prediction in Multi-Span Optical Multiplex Segments with Few Samples**Junning Liu¹, Yongjie Shi², Lou Yihang², Song Yuchen¹, Zhang Xia¹, Ren Xiaomin¹, Yan Xin¹, Qibin Wu²***1. Beijing University of Posts and Telecommunications, China; 2. Huawei Technologies Co., Ltd., China*

We propose a pretrained-initialized meta-adaptation based hybrid network for accurate power prediction with few samples. On an experimental six-span OMS, the proposed method achieves 0.165 dB MAE using only 25 training samples.

ACP2025-0730-44

A Mamba-Based Model Using Serialized Data Structure for Fast Quality of Transmission Estimation in Optical Networks**Kehan He¹, Yongjie Shi², Yuchen Song², Qibin Wu², Xiaoguang Zhang¹, Lixia Xi¹***1. Beijing University of Posts and Telecommunications, China; 2. Huawei Technologies Co., Ltd., China*

We propose a serialized data structure enabling the Mamba model to learn device impact on signals for QoT estimation in C+ band WDM systems, achieving 0.1 MAE and 3% Transformer FLOPs.

ACP2025-0730-49

Efficient Compensation of Intra and Inter-channel Nonlinearity via Fourier Neural Operator for WDM Optical Transmission System**Yanping Li, Anlin Yi^{*}, Lianshan Yan***The Center for Information Photonics and Communications, School of Information Science and Technology Southwest Jiaotong University, China*

In this paper, a joint intra and inter-channel nonlinearity compensation method is proposed, which is based on Fourier neural operator (FNO). The effectiveness of this scheme is verified by extensive simulations of 5-channel 28GBaud polarization division multiplexing (PDM) 16QAM signal 1200km coherent optical transmission. The results show that the FNO-based scheme achieves 2.78dB, 1.13dB and 0.45dB Q-factor improvement at the launch power of 5dBm/channel compared with only chromatic dispersion compensation (CDC), CDC and self-phase modulation (SPM) compensation with 16StPS-DBP, and multi-channel 5StPS-DBP, respectively. Compared with multi-channel 16StPS-DBP, the Q-factor gap is only 0.3dB at the optimal launch power, while the computation complexity is reduced to only 14.5% in terms of real multiplications (RMs) per symbol per polarization.

ACP2025-0730-54

An Extended EGN Model with Span-Specific Corrections for Hybrid G.653/G.655 Fiber Links**Yutao Zhou¹, Fei Xie¹, Du Tang¹, Baoxuan Quan¹, Hao Zhou¹, Yingjie Jiang¹, Aiyang Yang², Yaojun Qiao¹***1. Beijing University of Posts and Telecommunications, China; 2. Beijing Institute of Technology, China*

We propose an extended enhanced Gaussian noise (EGN) model with span-specific corrections for hybrid G.653/G.655 systems, accounting for dispersion slope and multi-channel interference (MCI). The model achieves less than 0.4 dB error in normalized non-linear interference (NLI) power versus split-step Fourier method (SSFM) in hybrid fiber transmission.

ACP2025-0731-12

Demonstration of Low-Cost High-Capacity Optical Interconnects at C Band Enabled by Optical Frequency Combs with Hollow-Core Fibers**Yuhan Gong¹, Jin Tao¹, Ming Luo¹, Lin Wu¹, Mian Wu¹, Ziang Xiao², Gang Xu², Ying Zhu³, Chao Yang¹***1. China Information and Communication Technologies Group Corporation, China; 2. Huazhong University of Science and Technology, China; 3. National Information Optoelectronics Innovation Center, China*

This paper presents a high-performance short-distance optical interconnect solution based on the combination of OFC and HCF. Experimental results validate 320 Gb/s ((40 Gb/s × 8)) optical interconnect over 10 km HCF.

ACP2025-0731-122

Rapid-Tuning ECL Wavelength Control System for LEO-Ground Coherent Optical Communication**Xu Yang, Zongbi Yu, Yuanzhe Qu, Weiwei Mo, Hao Li, Yingxiong Song^{*}***Shanghai University, China*

We propose a rapid-tuning ECL wavelength control system for LEO-ground coherent optical communication. Experimental results demonstrate that the ECL achieves a Doppler frequency shift range of [-9.68, 12.40] GHz and a maximum sweep rate of 1.32 GHz/s.

ACP2025-0731-124

Transformer-based Multimodal Semantic Communication System for Optical Interconnect in Data Centers**Tianxing Yuan¹, Wenbin Chen¹, Shengnan Li¹, Min Zhang¹, Xiaoyuan Ren², Danshi Wang¹***1. Beijing University of Posts and Telecommunications, China; 2. Chinese Institute of Electronics, China*

A Transformer-based unified semantic communication system is proposed for multimodal data transmission in DCI systems. Compared with the conventional paradigm, the proposed method not only achieves superior performance but also reduces bandwidth by at least 30%, which enhances DCI's robustness and efficiency.

ACP2025-0731-136

12-Gbps/15-m Real-Time White Visible Light Communication Enabled by Tricolor R/G/B Laser Diodes and 16QAM-OFDM**Fei Zhang¹, Tianyi Zhang¹, Xiaojian Hong^{1,2}, Yitong Xie¹, Lihong Jiang¹, Junwei Zhang³, Jiahao Tian¹, Guowu Zhang¹, Gaoxuan Wang^{1,2}, Chao Fei^{1,2}, Sailing He^{1,4}**

1. National Engineering Research Center for Optical Instruments, State Key Laboratory for Extreme Photonics and Instrumentation, Ningbo Global Innovation Center, College of Optical Science and Engineering, Zhejiang University, China; 2. School of Information Science and Engineering, Ningbo Tech University, China; 3. School of Electronics and Information Technology, Sun Yat-sen University, Guangzhou 510275, China; 4. Department of Electromagnetic Engineering, School of Electrical Engineering, Royal Institute of Technology, SE-10044 Stockholm, Sweden

We experimentally demonstrated a 12-Gbps/15-m real-time tricolor red/green/blue (R/G/B) laser diodes based white visible light communication (VLC) system based on 16 quadrature amplitude modulation orthogonal frequency division multiplexing (16QAM-OFDM) using the field programmable gate array (FPGA). To the best of our knowledge, this is the highest data rate in real-time white VLC systems that has ever been reported.

ACP2025-0731-139

FEC-assisted Soft Radius Directed Equalization in Coherent Optical Interconnection**Junyuan Song, Ze Dong, Xiangjun Xin, Rui Wang, Jun Ming, Yujia Mu***Beijing Institute of Technology, China*

This paper proposes an FEC-assisted soft radius directed equalization with recursive least squares algorithm (FEC-assisted RLS-SoftRDE) algorithm for robust polarization demultiplexing in bandwidth-limited coherent systems. Using soft information from FEC-decoder to generate probabilistic /soft ring/ symbol radius estimates, our created a more reliable error reference than hard decisions. Demonstrated in a challenging 60 GBaud DP-64QAM system, the algorithm overcomes bandwidth-induced ISI limitations and mitigates rapid polarization rotation (RSOP). Results show significant gains: 3 dB lower EVM (~18 dB), LDPC decoding to 1e-5 BER in 3-5 iterations, and 4.5 MHz RSOP tracking capability.

ACP2025-0731-141

Multi-Bit Flipping Polar Decoder Based on End-to-End Reinforcement Learning in IM/DD Optical Interconnection**Yujia Mu, Hailian He, Jun Ming, Shaonan Liu, Junyuan Song, Ze Dong***Beijing Institute of Technology, China*

A reinforcement learning-aided bit-flip decision algorithm is proposed for high-speed optical interconnection systems. The CRC syndrome serves as the decoding state to guide a bit-flip agent in optimizing flip actions through iterative environment interactions. Experimental results show that the algorithm improves receiver sensitivity by 0.8-dB compared to traditional SCF decoders while reducing decoding complexity by 84%.

ACP2025-0731-37

Experimental demonstration of co-transmission of high-power energy light and bidirectional high-speed data signals over standard single-mode fiber**Jianping Li¹, Wei Chen, Jianbo Zhang**

Institute of Advanced Photonics Technology, School of Information Engineering; Key Laboratory of Photonic technology for Integrated Sensing and Communication, Ministry of Education; Guangdong Provincial Key Laboratory of Information Photonics Technology, Guangdong University of Technology, China

In this work, we experimentally demonstrate the first power-over-fiber (PoF) system with 1064 nm based 10-W optical power and O-band commercial 4×25 Gbit/s Gbit/s bidirectional data signals transmitted simultaneously over 1 km standard single-mode fiber (SSMF). The optical power transmission efficiency (OPTE) reaches up to 58.5%, and the converted electrical power is ~600 mW after optimizing the fiber fusion splicing. Meanwhile, the bit error rates (BERs) of four-channel data signals are all lower than the hard forward error correction (HD-FEC) threshold of 3.8E-3.

ACP2025-0731-46

Experimental Verification of Potential and Feasible VHSP Simplified Coherent Architectures**Xiaotao Huang¹, Guoqiang Li¹, Zhongyi Wang, Wenhua Zhu, Xingang Huang, Bo Liu***ZTE Corporation, China*

We introduce the VHSP coherent PON process in standardization, and implement three experimental systems by one pair of coherent transceivers to compare the coherent and simplified coherent PON performances.

ACP2025-0731-47

Design of a Low-Power Consumption OWC System Supporting Transmission over 330m
Weiwei Mo¹, Shulei Wang¹, Yuanzhe Qu¹, Yingxiong Song^{1*}, Qianwu Zhang¹, Zhe Zheng²*1. Shanghai University, China; 2. Beijing Smartchip Microelectronics Technology Company Limited, China*

A low-power optical wireless communication (OWC) system is proposed based on the 16-ary pulse position modulation (16-PPM). The system supports 330 m communication at 12.5 Mbps, with 18° (transmitter) and 10° (receiver) angular tolerance at 140 m, and maintains low optical power consumption of 5.875×10^{-7} J/bit.

ACP2025-0731-54

CNN-Transformer Hybrid Architecture for Accurate Power Spectrum Prediction in Multi-Span OMS
Junning Liu¹, Yongjie Shi², Yuchen Song¹, Yihang Lou², Xia Zhang¹, Xiaomin Ren¹, Xin Yan^{1*}, Qibin Wu²*1. Beijing University of Posts and Telecommunications, China; 2. Huawei Technologies Co., Ltd., China*

We implement a CNN-Transformer hybrid network for power prediction under diversified channel-loading configurations. Leveraging transfer learning with only 135 real-world samples, MAE below 0.10 dB is achieved in an experimental C120 6-span OMS.

ACP2025-0731-65

Mode-division multiplexing with elliptical vortices**Zhenyu Wan, Min Yang, Bing Han, Guofeng Yan, Jian Wang****Huazhong University of Science and Technology, China*

We propose a novel mode-division multiplexing scheme that leverages the topological charge, ellipticity, and orientation angle of elliptical Laguerre-Gaussian (ELG) beams to construct a set of multi-dimensional orthogonal channels. Exploiting the singularity-preserving property of ELG modes in the far field, we successfully demultiplex the transmitted ELG modes after free-space propagation and realize a 120 Gbaud 16QAM single-carrier signal transmission.

ACP2025-0731-7

First Experimental Demonstration of Deep Learning-Enabled OAM-DM Optical Communication**Yu Xiao, Dongmei Deng****South China Normal University, China*

We first experimentally demonstrate deep learning directly recognizing amplitude-modulated OAM-DM signals, achieving 100% accuracy even under strong underwater turbulence.

ACP2025-0731-71

High-speed Photonic Reservoir Computing Based on Microring Resonators**Suhua Wang¹, Yujia Yin¹, Shuai Wan², Hongliang Ren³, Chunhua Dong², Mingyi Gao^{1*}***1. School of Electronic and Information Engineering, Soochow University, China; 2. Key Laboratory of Quantum Information, University of Science and Technology of China, China; 3. School of College of Information and Engineering, Zhejiang University of Technology, China*

In this work, we proposed and experimentally demonstrated a high-speed photonic reservoir computing system based on micro-ring resonator. Excellent NMSE performance has been achieved, 0.150 for the NARMA10 task, 0.014 for the Mackey-Glass prediction, and 0.083 for the Santa Fe time series forecasting, with signal processing rate of 25 Gb/s.

ACP2025-0731-74

Turbulence phase reconstruction by OAM-based modal decomposition for ultra-low crosstalk free-space vortex beam multiplexing**Yaoyao Liu, Gengliang Zhao, Lang Zhou, Xiaohang Jia, Andong Wang, Long Zhu****Chongqing University of Posts and Telecommunications, China*

We propose a turbulence compensation scheme for free-space vortex beam multiplexing communications by orbital angular momentum (OAM)-based turbulence phase reconstruction (OAM-TPR). A convolutional neural network (CNN) is employed to establish the relationship between distorted beam distributions and turbulent OAM coefficients. After compensation, the received power of the target mode ($l=3$) is enhanced 1, 3 and 5 dB under weak to strong turbulence ($D/r_0=2, 4$ and 6), respectively. Furthermore, significant crosstalk suppression is observed, with over 18 dB reduction for the adjacent mode ($\Delta l=1$) and over 13 dB suppression for the larger mode spacing ($\Delta l=2$) averagely. The OAM-TPR compensation method offers a novel solution for mitigating mode crosstalk in atmospheric OAM multiplexing communications.

ACP2025-0731-78

Experimental demonstration of turbulence and obstruction resistant free-space optical communication with Bottle vortex beams**Gengliang Zhao¹, Yaoyao Liu¹, Xiaohang Jia², Lang Zhou¹, Andong Wang¹, Long Zhu^{1*}***1. Chongqing University of Posts and Telecommunications, China; 2. Chongqing University of Posts and Telecommunications, China*

To improve the transmission performance of free-space optical (FSO) communication systems under turbulence conditions and multi-sized obstructions, we experimentally demonstrate a 72 Gbit/s FSO communication link and investigate the transmission characteristics of Bottle vortex beams (BVBs) for the first time. The obtained experimental results show that, compared to Bessel beams and OAM beams, BVBs exhibit superior resistance to turbulence, with reduced received power fluctuation and lower average bit-error rate (BER) under moderate turbulence conditions and obstacle conditions. Specifically, at 4 mm obstacle size, the average received optical power of BVBs is increased by 3 dBm and 11 dBm, respectively. In addition, under an obstacle size of 3 mm, the required transmitter power at BER of 3.8×10^{-3} is relaxed by 10 dB comparing with the conventional OAM beam under atmospheric turbulence $D/r_0=2$.

ACP2025-0731-82

Transition-constrained Enumeration Sphere Shaping for Probabilistic Shaping Optical Transmission System**Honglei Yang¹, Lishan Yang¹, Chenglin Bai¹, Hengying Xu¹, Yuanhao Cui¹, Xuezhen Wang², Guizhen Wang¹, Yaozheng Yue¹, Chunyi Su¹***1.Liaocheng University, China; 2.Hefei University of Technology, China*

To address energy fluctuations in probabilistic shaping for optical transmission systems, this work proposes transition-constrained enumerative sphere shaping by introducing cumulative energy transition constraints into the ESS framework to stabilize amplitude variations.

ACP2025-0731-90

Sequence-Optimized Sphere Shaping with Short Blocklength for Optical Transmission System**Xuezhen Wang¹, Zhiwei Liang¹, Jiwei Xu¹, Yi Lei¹, Hailong Lan², Bin Chen¹***1.Hefei University of Technology, China; 2.Liaocheng University, China*

This paper proposes a Sequence-Optimized Sphere Shaping (SO-SS) scheme for probabilistic shaping (PS) transmission system. The scheme employs a two-stage algorithm to optimize amplitude sequences while ensuring energy efficiency.

ACP2025-0731-93

Transformer-Based High-Performance Modeling for OFDM-MMW-RoF Link**Qiyue Hu¹, Jia Ye¹, Wei Pan¹, Lianshan Yan¹, Xihua Zou¹***Southwest Jiaotong University, China*

In this paper, a Transformer-based modeling for orthogonal frequency division multiplexing-millimeter wave-radio over fiber (OFDM-MMW-RoF) links is developed and experimentally validated, where Transformer is a type of deep learning network.

ACP2025-0731-95

Statistical Characterization of Multi-path Interference in Short-reach O-band Coherent-lite Optical Systems**Baoxuan Quan¹, Fei Xie¹, Hao Zhou¹, Yutao Zhou¹, Yingjie Jiang¹, Yaojun Qiao¹, Yu Chen², Bofang Zheng², Du Tang³, Aiying Yang⁴***1.Beijing University of Posts and Telecommunications, China; 2.BP Laboratory Huawei Technologies Co. Ltd., China; 3.China**Academy of Information and Communications Technology, China; 4.Beijing Institute of Technology, China*

We investigate the impact of chromatic dispersion and the number of reflection paths on MPI-induced degradation in short-reach O-band coherent-lite optical systems, showing that the closer the MPI resembles a Gaussian distribution, the more severe the system performance degradation becomes.

ACP2025-0801-104

Design and Implementation of FPGA-Based Real Time BER Measurement System for NLOS Ultraviolet Communication**Dong Zhu, Yong Zuo¹, Tian Luo, Hongzhen Zhang, Xiaobin Hong, Jian Wu***Beijing University of Posts and Telecommunications, China*

This paper designs and implements a real-time bit error rate measurement system for ultraviolet communication. Experimental results demonstrate that the system possesses reliable measurement capability and accurately evaluates communication performance under different scenarios.

ACP2025-0801-108

Impact of DC Drift on Pairwise Maximum Likelihood Receiver with Single-FFT in Layered Asymmetrically Clipped Optical OFDM Systems**Yamin Huang, Wenhui Ma, Xuezhi Hong^{*}***South China Normal University, China*

The impact of DC drift on the pairwise maximum likelihood receiver with single-FFT in layered asymmetrically clipped optical orthogonal frequency division multiplexing systems is analyzed. Mitigation methods are proposed and verified both numerically and experimentally.

ACP2025-0801-11

Multi-mode Multiplexing Few-mode Fiber OTDR for Fast Fading Noise Reduction**Zicheng Huang, Jianlong Mao, Qiong Wang, Feng Liu^{*}***Wenzhou University, China*

This work optimizes FMF-OTDR performance via high-order spatial mode diversity merging. By expanding detection dimensions and measuring unexcited modes' backscattering, it inherently reduces noise, achieving superior dynamic range and faster detection speed

ACP2025-0801-113

A Novel Multi-Scale Analysis Framework for channel modeling in optical Fiber Communication Systems**Haifeng Yang, Yongjun Wang*, Chao Li, Shuaihang Wang, Xin Zhang, Qi Zhang***Beijing University of Posts and Telecommunications, China*

This paper proposes a multi-scale neural network modeling method—multi-scale Fourier Neural Operator (MFNO). By constructing multi-scale features of optical signals, MFNO employs multiple parallel branches that simultaneously operate on spatial variations and the input field of the network. Compared to a single time domain feature input, this approach significantly improves the accuracy of fiber modeling.

ACP2025-0801-141

Optical Omnidirectional Transmitter for Underwater Wireless Optical Communication**Jiaming Lin, Lu Wang, Tongzheng Sun, Shuanghe Liu, Jian Song, Yuhan Dong****Shenzhen International Graduate School, Tsinghua University, China*

An LED-based omnidirectional UWOC transmitter achieves alignment-free, mobile operation, delivering 151 Mbps at 5 m and 50 Mbps at 10 m with stable performance across yaw angles, enabling high-speed dynamic underwater communication.

ACP2025-0801-142

Adaptive FD-DPD and FD-MRC for Underwater Wireless Optical Communication System**Lu Wang, Jiaming Lin, Tongzheng Sun, Shuanghe Liu, Jian Song, Yuhan Dong****Shenzhen International Graduate School, Tsinghua University, China*

To improve the data rate of LED-based UWOC, we propose an adaptive frequency domain digital predistortion and a frequency domain maximum ratio combining algorithms. In a standard pool, the UWOC system achieves 5m-159.9Mbps and 20m-50.8Mbps.

ACP2025-0801-149

Mitigation of Four-Wave Mixing-Induced Signal Quality Degradation Using All-Optical Wavelength Conversion**Junnosuke Hiyama, Minami Haruka, Toshiya Matsuda, Takeshi Seki, Rie Hayashi***Network Service Systems Labs., NTT, Inc., Japan*

We evaluate the wavelength dependence of mitigating four-wave mixing (FWM)-induced signal degradation using all-optical wavelength conversion (AO-WC). Our results show AO-WC enables long-haul 16-QAM transmission across all channels, even with noise from AO-WC and FWM.

ACP2025-0801-153

Energy-Efficient Multi-UAV Path Planning for VLC Networks via Multi-Agent Reinforcement Learning**Yibin Wang, Wentao Ye, Kai Zhang, Yuhan Dong****Shenzhen International Graduate School, Tsinghua University, China*

We propose EEMAPP, a MARL-based framework for energy-efficient UAV-VLC deployment. Using centralized training and structured rewards, EEMAPP achieves superior path coordination, faster convergence, and 42% higher energy efficiency than baseline methods.

ACP2025-0801-180

Performance Enhanced Φ -OTDR Enabled by Frequency-Multiplexed Barker Pulse Coding**Wanxin Li, Dongdong Zou, Zheyuan Lin, Zhentao Zhang, Huan Huang, Yi Cai****Soochow University, China*

A novel frequency-multiplexed Barker-coded Φ OTDR is proposed. This system achieves a fourfold increase in interrogation repetition rate and nearly 5 dB SNR gain over the Golay-coded case, while significantly reducing hardware complexity.

ACP2025-0801-185

Coarse frequency offset estimation using an improved spectrum sliding window for DSCM systems**Xiaozheng Li¹, Jingshuai Qiao¹, Yayun Xu¹, Hengying Xu^{1,2*}, Hong Liu¹, Xusheng Li¹, Chenglin Bai^{1,2*}, Xinkuo Yu^{1,2}, Tongxin Yang^{1,2}**

1. School of Physics Science and Information Engineering Liaocheng University, China; 2. Liaocheng Key Laboratory of Industrial-Internet Research and Application, China

We proposes a frequency offset estimation scheme for digital subcarriers. This scheme is still applicable under the conditions of small roll-off factor and large frequency offset, the estimation accuracy can reach within 30MHz.

ACP2025-0801-19

Demonstration of 200-Gbps/ λ IMDD PON Through 20km Hollow-core Fiber**Luyao Huang****China Telecom Research Institute State Key Laboratory of Optical Fiber and Cable Manufacture Technology, China*

We demonstrate a single-carrier 200G IMDD PON in C-band. The power budget of 30.2 dB is achieved through low-loss, low-dispersion, and low-nonlinearity 20-km hollow-core fiber. Our results provide a potential IMDD path for Very high-speed PON (VHSP).

ACP2025-0801-195

Residual Multi-Task Neural Network Equalization for Performance-Complexity Co-Design in 800 Gb/s 960 km Coherent Optical Links**Tonghui Ji¹, Zhaopeng Xu^{1*}, Qi Wu², Honglin Ji¹, Jianghao Li³, Xingfeng Li¹, Lulu Liu¹, Shangcheng Wang¹, Zhongliang Sun¹, Junpeng Liang¹, Linsheng Fan¹, Jianwei Tang¹, Jinlong Wei¹, Zhixue He¹, Weisheng Hu⁴***1. Pengcheng Laboratory, China; 2. The Hong Kong Polytechnic University, Hong Kong, China; 3. Shandong Normal University, China; 4. Shanghai Jiao Tong University, China*

We propose a residual multi-task neural network (RES-MT-NN) for nonlinear compensation in coherent optical transmission. By introducing residual connections, RES-MT-NN achieves the baseline Q-factor with only 56% of the computational complexity required by the single-task neural network, outperforming conventional multi-task neural networks which require 62%, demonstrated on an 800-Gb/s, 960-km PDM-16QAM system.

ACP2025-0801-2

End-to-End of Tomlinson-Harashima Precoding for Faster-than-Nyquist Coherent Optical Fiber Transmission**Xun Liu¹, Qi Xu^{1*}, Ran Gao¹, Fei Wang¹, Chenchen Wang¹, Junyuan Song¹, Huan Chang¹, Wei Yan¹, Chao Yu², Haoran Zhang², Mu Yang², Xiangjun Xin¹***1. School of Information and Electronics, Beijing Institute of Technology, China; 2. China Telecom Group Satellite Communication Co., Ltd., China*

We propose an end-to-end Tomlinson-Harashima precoding (E2E-THP) for coherent optical fiber transmission systems. It outperforms the conventional THP with optical signal-to-noise ratio (OSNR) improvements of 1.0 dB at 20% soft-decision forward error correction (SD-FEC) threshold.

ACP2025-0801-202

Neural Network-Accelerated On-Site Training for Multi-Impairment Equalization in Single Sideband-Direct Detection 200 Gbps PON Downlink**GuoQian, Xiao Xue, Yang Tao, Zhang Min*, Chen Xue***Beijing University of Posts and Telecommunications, China*

We propose a multi-impairment equalization scheme with neural network for accelerated on-site training in 200G PON downlink system, verifying that performance on par with individual ONU training while reducing training time by an average of 28.57%.

ACP2025-0801-204

Fading-noise-resistant Φ -OTDR based on Extended Kalman Filter**Guanfeng Chen, Jun He*, Bin Du, Baijie Xu, Yihang Wang, Yiping Wang***Shenzhen University, China*

A fading-noise resistant distributed acoustic sensing system based on second-order extended Kalman filter is proposed. The probability of the fading channels is reduced from 11.8% to 0.2% along 62.5 km fiber, while an improvement of 9 dB of equivalent strain resolution is achieved.

ACP2025-0801-21

Chaos-Enhanced Quantization Noise Injection via Dual Delta-Sigma Modulation for Secure Data Center Optical Interconnects**Wenjun Zeng, Chongfu Zhang*, Xinshuai Liang, Jiebing Xia, Yanwei Li, Yue Lin***School of Information and Communication Engineering, University of Electronic Science and Technology of China, China*

We propose a chaos-enhanced quantization noise injection scheme to enhance the security for coherent data center optical interconnection. The effectiveness of the proposed scheme is validated using high-order modulation formats.

ACP2025-0801-212

Enhancing the Spatial Granularity of Power Profile Estimation using Staggered Step MMSE**Zhudong Shi¹, Xulong Yan¹, Rundong Xie¹, Runzhe Fan¹, Fei Liu¹, Yuyang Gao¹, Guiyu Zhang², Xian Zhou^{1*}***1. University of Science and Technology Beijing, China; 2. Beijing University of Posts and Telecommunications, China*

We propose a staggered step MMSE method that optimizes the spatial granularity of power profile estimation. Results demonstrate that the proposed method can reduce the spatial granularity to half of that of MMSE and improves localization accuracy for anomalous attenuation.

ACP2025-0801-214

Method for IQ skew, Frequency Offset and Power Imbalance Calibration in Upstream TFDM PON**Zebang Pi¹, Xiang Li², Ming Li³, Yuhan Gong¹, Ming Luo¹, Jie Li^{1*}***1. State Key Laboratory of Optical Communication Technologies and Networks, China Information and Communication Technologies Group Corporation, China; 2. School of Mechanical Engineering and Electronic Information, China University of Geosciences, China; 3. Wuhan University, Fiberhome Telecommunication Technologies Corporation, China*

We propose a simultaneous calibration scheme for IQ skew, frequency offset, and power imbalance in coherent TFDM-PON upstream systems, and experimentally verify the scheme in a 200-Gb/s transmission over 20-km SSMF.

ACP2025-0801-217

Parallel Structure for Nonlinearity Mitigation based on Enhanced Regular Perturbation Theory**Yichao Wang, Peiyun Ge, Tianrun Sun, Jiarun Zhao, Lixia Xi^{*}, Xiaoguang Zhang***State Key Laboratory of Information Photonics and Optical Communications, Beijing University of Posts and Telecommunications, China*

We proposed and numerically validated a novel parallel fiber nonlinearity mitigation structure. The approach delivers 0.4 dB Q-factor improvement with 84% complexity saving compared to digital back propagation for 130-GBaud systems.

ACP2025-0801-218

Integrated PC-FMCW Automotive Headlamp for Communication, Sensing, and Illumination**Shuanghe Liu¹, Tongzheng Sun¹, Lu Wang², Jiaming Lin¹, Jian Song¹, Yuhan Dong^{*}***1. Shenzhen International Graduate School, Tsinghua University, China; 2. Tsinghua University, China*

This work presents a PC-FMCW laser headlamp system integrating communication, sensing, and adaptive illumination, achieving Gbps data rates and sub-meter ranging accuracy with real-time beam control for intelligent driving applications.

ACP2025-0801-220

LiDAR-based Multi-Frame Track-Before-Detect using Multi-Plane Projection and Hough Transform**Tongzheng Sun, Shuanghe Liu, Jiaming Lin, Wang Lu, Jian Song, Yuhan Dong^{*}***Shenzhen International Graduate School, Tsinghua University, China*

We propose a track-before-detect algorithm for low-SNR environments. It projects a 4D spacetime point cloud onto six planes, applying independent Hough transforms and a rolling windows strategy to detect non-linear weak track.

ACP2025-0801-224

FPGA-Based Hardware Platform for Software Defined Coherent Optical Communication Systems**Bo Jin, Junhao Ba^{*}, Zhen Zuo, Zhiping Huang, Shudong Yuan***National University of Defense Technology, China*

A reconfigurable hardware platform for coherent optical system offline verification, integrating ICR, 40-GSps ADCs, FPGA, successfully demodulates PM-QPSK with EVM 9.96%-19.81% (40 GSps, 12.5-32.5 GBd).

ACP2025-0801-30

Enhanced Frequency-Domain Nonlinear Mitigation with Volterra-Inspired Complex CNN and Mixture-of-Experts Architecture**Zili Fang, Jiaojiao Lv, Yi Zhao, Peiyun Ge, Wenbo Zhang^{*}, Lixia Xi***Beijing University of Posts and Telecommunications, China*

We combine the Volterra-series-inspired MoE mitigation framework with physics-inspired complex-valued CNN for fiber nonlinearities. Simulation results demonstrate 0.26 dB and 0.21 dB Q-factor gain over DBP of 10-step-per-span in 32 GBaud and 64GBaud systems.

ACP2025-0801-59

Performance investigation of ground-to-LEO satellite uplink transmission over atmospheric turbulence based on steady optical beam**Zhengjie Wang¹, Hongpeng Lu¹, Wenjie Guo¹, Yan Li^{1*}, Yang Liu², Ze Zhang³, Hongxiang Guo¹, Xiaobin Hong¹, Jifang Qiu¹, Jian Wu¹***1. State Key Laboratory of Information Photonics and Optical Communications, Beijing University of Posts and Telecommunications, China; 2. School of Photonics and Optical Engineering, Aerospace Information Technology University, China; 3. Aerospace Information Research Institute, Chinese Academy of Sciences, China*

We assess steady optical beam (SOB) performance for space-to-ground uplink in atmospheric turbulence via mode fibers. We analyze received-power distributions and photon-noise-limited spectral efficiency, achieving 1-2 bps/Hz, 2-3 dB average and 5.5 dB 90% gains.

ACP2025-0801-63

FEC-assisted Volterra Nonlinear Equalization for IM/DD Optical interconnection**Xuanwei Liu, Junyuan Song, Rui Wang, Shaonan Liu, Jun Ming, Ze Dong***Beijing Institute of Technology, China*

We propose a FEC-assisted Volterra nonlinear equalization scheme for effective mitigation of MZM-induced nonlinear impairments in high-speed IM/DD systems. Experimental validation on a 80 Gbaud optical PAM4 interconnection demonstrates over 1.5 dB receiver sensitivity improvement compared with conventional methods.

ACP2025-0801-66

Low-Complexity Sparse ESN Equalization for Bandwidth-Constrained High-Speed IMDD Optical Communication Systems**Hum Nath Parajuli¹, Ning Deng^{1*}, Xinping Wang¹, Jing Xu²***1. Great Bay University, China; 2. Zhejiang University, China*

We propose a sparse echo state network-based equalizer for high-speed IMDD optical systems. Sparsity is applied across all neural layers, with LASSO-optimized readout weights and PSO-tuned hyperparameters, we demonstrate 249 multiplications/equalized symbol at 200 Gbps.

ACP2025-0801-68

Demonstration of Advanced ISAC with Dense Frequency Multiplexing for SMART network
Yongfu Wu¹, Lin Sun¹, Jiaqi Cai¹, Yi Cai¹, Gordon Ning Liu¹, Gangxiang Shen¹, Rendong Xu²*1. Soochow University, China; 2. Zhejiang University, China*

We showcase an integrated sensing and communication method via frequency modulation and multiplexing in SMART networks, achieving 0.0625°C temperature resolution by using a shared receiver with coherent communications.

ACP2025-0801-75

Demonstration of 150-GBd PAM-4 Transmission with a 128 GSa/s DAC for Hollow-Core Fiber based Short-Reach Optical Interconnects**Siyue Jin¹, Hui Chen¹, Qibing Wang¹, Xu Zhang¹, Wei Ding², Yingying Wang², Lei Wang¹, Zhixue He¹***1. Peng Cheng Laboratory, China; 2. Jinan University, China*

We demonstrate 150-GBd PAM-4 over 1.4-km NMF using a 128-GSa/s DAC and joint THP-NN equalization, achieving 2.24-Tb/s capacity with 8-λ DWDM in C-band.

ACP2025-0801-78

Demonstration of Core/Shell Narrow Band Quantum-dot Light-emitting Diode (QLED)-based Visible Light Communication
Dawei Xie, Chengbin Kang, Yibin Li, Zixian Wei, Zhongxu Liu, Gang Li, Changyuan Yu^{*}*The Hong Kong Polytechnic University, Hong Kong, China*

A PAM4-modulated VLC system is demonstrated using an optimized red-emitting quantum-dot LED. The QLED exhibits a maximum external quantum efficiency of 18.5% and brightness of 147k nits, which supports 115 Mbps data transmission.

ACP2025-0801-81

Coexistence of Silicon Integrated QKD and 8 Tbps OTN over 10 km Hollow Core Fiber**Xu Yan¹, Xin Hua², Xianghao Zeng³, Yan Wu³, Yanxin Han², Ying Zhu², Daigao Chen², Hongguang Zhang², Ping Du³, Xi Xiao^{2*}***1. National Information Optoelectronics Innovation Center, China Information and Communication Technologies Group Corporation (CICT), China; 2. National Information Optoelectronics Innovation Center, China Information and Communication Technologies Group Corporation, China; 3. Fiberhome Telecommunication Technologies Co., LTD, China Information and Communication Technologies Group Corporation, China*

We demonstrate a commercial OTN-QKD coexistence system using silicon photonics over 10 km hollow-core fiber, achieving 2 kbps QKD with 80λ×100 Gbps classical capacity at 11 dBm, setting a new quantum-classical integration benchmark.

ACP2025-0801-83

Demonstration of Real-time 2.8Tb/s SDM Transmission using Commercial QSFP-DD 400Gb/s Optical Modules over 89-km 7-core Fiber for High-speed Metro and DCI Applications**Jian Cui¹, Chao Wu¹, Zilin Fan¹, Yuxiao Wang², Mingkang Lin³, Cheng Chang¹, Yu Deng¹, Zhuo Liu¹, Weiguang Wang⁴, Bin Hao¹, Leimin Zhang¹, Yong Chen², Bin Wu², Bo Tuo³, Wei Liu³, Junyi Lv³, Lei Shen⁵, Lei Zhang⁵, Jie Luo⁵, Yan Sun¹, Qi Wan¹, Bing Yan², Ninglun Gu¹***1. Department of Networks, China Mobile Communications Group Co., Ltd., China; 2. Network Management Center, China Mobile Communications Group Shandong Co., Ltd., China; 3. Huawei Technologies Co., Ltd., China; 4. Testing Laboratory of Yangtze Optical Fiber and Cable Joint Stock Limited Company, China; 5. State Key Laboratory of Optical Fibre and Cable Manufacture Technology, YOFC, China*

Real-time unrepeatable 2.8Tb/s 89-km SDM transmission is experimentally demonstrated over weakly-coupled 7-core fiber using advanced QSFP-DD 400Gb/s optical modules, which is beneficial for next-generation high-speed metro networks and DCI applications.

ACP2025-0801-84

Pre-Decision Aided K-State Reserved Complex MLSE for Digital Subcarrier Multiplexing Systems**Zhuo Wang¹, Hexun Jiang¹, Yuan Lu², Shuai Wei¹, Chengbo Li¹, Yongben Wang¹, Yong Chen¹, Xiang Li¹***1. ZTE Corporation, China; 2. Shandong Post Planning Designing Co., Ltd., China*

We propose a pre-decision technique to further reduce the computational complexity of complex maximum-likelihood-sequence-estimation (MLSE). Compared to previous K-state reserved complex MLSE, nearly an additional 50% complexity reduction is verified experimentally with negligible performance degradation.

ACP2025-0801-9

Joint Polar-coded Modulation Scheme for Bandwidth-Efficient Short-Reach Optical Interconnection**Hailian He, Yujia Mu, Junyuan Song, Jun Ming, Ran Gao, Ze Dong^{*}***Beijing Institute of Technology, China*

We propose a joint polar coded modulation to mitigate system bandwidth limitations in intensity modulation and directly detected (IM/DD) optical interconnection. Experiments demonstrate 2.6 dB improvement in receiver power sensitivity versus conventional PAM4 over 2-km standard single-mode fiber transmission.

ACP2025-0801-91

Turbulence-Resilient Communication through Beam Shaping Enabled by Multi-Region Turbulence Intensity Sensing
Mengjie Zhou¹, Ruizhe Jin², Shuangcheng Chen¹, Jiazheng Ding¹, Mingfeng Xu³, Zheng Wu¹*1. Tianfu Xinglong Lake Laboratory, China; 2. Fudan University, China; 3. State Key Laboratory of Optical Field Manipulation Science and Technology, China*

The system employs multi-region probe beams and turbulence-aware adaptive shaping to enable real-time turbulence sensing and dynamically tailor the communication beam for resilient optical links.

ACP2025-0801-92

Physical-layer secure WDM optical communication based on filtered-feedback phase encryption**Shuo Diao, Haoyu Zhang, Cheng He, Chenpeng Xue^{*}, Zuxing Zhang, Ting Li***NJUPT, China*

A physical-layer secure 16 QAM WDM optical communication system is proposed by using the filtered-feedback phase encryption. Two identically adjustable filters are deployed between the communication parties for the security enhancement and phase decryption.

ACP2025-0801-94

OAM Mode Demultiplexing and Routing using Twisted-Diffraction Neural Network**Yong Yu¹, Tianqu Chen¹, Mingfeng Xu¹, Jiazheng Ding², Shuangcheng Chen², Mengjie Zhou², Xu Xing¹, Mingbo Pu¹, Xiangang Luo¹***1. State Key Laboratory of Optical Field Manipulation Science and Technology, China; 2. Tianfu Xinglong Lake Laboratory, China*

In this work, we experimentally demonstrate a free-space optical communication system employing twisted diffraction neural network (T-DNN) for orbital angular momentum (OAM) mode demultiplexing and mode routing.

ACP2025-0803-2

Interference Mitigation for Faster-Than-Nyquist mCAP in Bandlimited VLC Using Variable GIM Scheme**Yungui Nie¹, Chen Chen², Siming Mo³, Xiaodi You¹, Qinghai Lu³, Zhihong Zeng², Jinsheng Zhang³, Gangxiang Shen^{1*}***1. Soochow University, China; 2. Chongqing University, China; 3. Jiangsu Etern Co., Ltd, China*

A novel variable gapped index modulation (VGIM) scheme is proposed to mitigate the IBI in FTN-mCAP for bandlimited VLC systems. Experimental results show that FTN-8CAP-VGIM achieves a substantial SE improvement of 108% compared with 8CAP.

ACP2025-0811-2

A Pilot-Aided Kalman Filter Scheme for Joint Equalization of PMD, RSOP and RCD with Resilience to the Carrier Phase Noise
Bin Zhang, Jiarun Zhao, Tianrun Sun, Nan Cui, Lixia Xi, Xiaoguang Zhang^{*}*Beijing University of Posts and Telecommunications, China*

We propose a pilot-aided Kalman filter capable of jointly equalizing PMD, RSOP and RCD. Simulation results demonstrate its reduced OSNR penalty, effective equalization performance under severe impairments and its resilience to phase noise.

ACP2025-0811-4

Programmable Spatiotemporal Photonic Ising Machine with Physical Parallel Simulated Annealing**Jinmin Yang¹, Wenjia Zhang¹, Xin Ye¹, Junjie Yu², Zuyuan He¹***1. Shanghai Jiao Tong University, China; 2. Shanghai Institute of Optics and Fine Mechanics, China*

This paper proposes a fully-programmable spatiotemporal photonic Ising machine enabled by physical parallel simulated annealing method, delivering superior convergence speed and solution quality in addressing Max-cut problems from 16 to 1000 spins.

ACP2025-0811-5

Low-Complexity Signal-Signal Beating Interference Mitigation for CADD Receivers with Improved Spectral Efficiency
Jianghao Li^{1*}, Xinyu Wang¹, Yuan Wan¹, Ke Wang², Ampalavanapillai Nirmalathas³, Christina Lim³*1. Shandong Normal University, China; 2. RMIT University, Australia; 3. The University of Melbourne, Australia*

We propose quasi-interleaved subcarrier loading and successive SSBI cancellation for CADD, which doubles the spectral efficiency with OSNR penalty 5dB and the number of additional required gap subcarriers 6 to achieve 7% FEC limit.

ACP2025-0812-13

Implicit U-Net Fourier Neural Operator for Fiber Nonlinearity Compensation**Xuanyu Zhou, Lin Jiang^{*}, Jie Wen, Liang Liu, Xingchen He, Anlin Yi, Wei Pan, Lianshan Yan***Southwest Jiaotong University, China*

We propose IU-FNO for coherent optical systems, achieving near 5StPs-DBP Q-factor with 80.5% lower complexity, 74.1% fewer parameters, and greatly reduced CPU/GPU processing time.

ACP2025-0812-2

Multifunctional Broadband Optoelectronic Test System via Reused Off-Axis Newtonian Collimator**Xu Ke¹, Yunfei Yan^{2*}, Yuxin Ouyang², Liang Guohao¹, Cai Lijun¹, Xu Chonggao¹***1.CHENGDU AIRCRAFT INDUSTRIAL (GROUP) CO., LTD., China; 2.Beihang University, China*

This paper presents a broadband optoelectronic test system integrating optical axis consistency verification, dynamic target simulation, and laser ranging accuracy testing. The key innovation is the multifunctional reuse of an off-axis Newtonian collimator through optical path switching. Operating across visible (0.4–0.9 μm), MWIR (3–5 μm), LWIR (8–12 μm) and 1064 nm laser bands, the system comprises an optical test module, laser ranging simulator, and arc-shaped motion platform. Experimental results demonstrate: beam parallelism $\leq 5''$, maximum field obstruction deviation of 3.072'', ranging accuracy $\pm 0.55\text{m}$ (150m–30,000m range), and collimator wavefront error $\text{PV}\lambda/4$, $\text{RMS}\lambda/40$, confirming the system's effectiveness for multispectral optoelectronic testing.

ACP2025-0812-5

OCDM-DA-ROF: Orthogonal Chirp Division Multiplexing-Driven Hybrid Digital-Analog Radio-over-Fiber System for Mitigating Power Fading**Xiaobo Zeng^{1*}, Liangcai Chen¹, Pan Liu¹, Ruonan Deng²***1.Xiangtan University, China; 2.National University of Defense Technology, China*

We propose and demonstrate an orthogonal-chirp-division-multiplexing-enabled digital-analog radio-over-fiber technique using discrete Fresnel-transformation, achieving 0.15 km reach extension, 2.83 dB received optical power gain, and 1.2 Tb/s CPRI-equivalent rate in IMDD system with power fading.

ACP2025-0812-6

Wideband radio frequency and time signal distribution using time division multiplex**Wang Chen, Ziang Qiu, Liang Hu^{*}, Guiling Wu, Jianping Chen***Shanghai Jiao Tong University, China*

We report a fiber-based, distributed broadband radio frequency (RF) transmission scheme tailored for distributed radar applications. By adopting the optical switching topology, we enable quasi-lossless scaling of remote antenna sites, since the power the optical carrier penalty remains virtually unchanged as the network grows. A co-located RF switch further provides time-division multiplexing (TDM), so that propagation delay estimation and phase error correction are performed concurrently on a single wavelength. Experiments demonstrate two orders of magnitude enhancement in the long-term instability when transmitting a 300 MHz RF signal, proving the feasibility of steady-phase transmission. In time delay measurement, we get a time deviation (TDEV) of 15 ps at 1 s and 2 ps at 4,000 s. For the high-frequency signals, the overall phase error of the 15 GHz RF signal stays below 4° within 2,000 s, while phase noise measurements confirm excellent broadband fidelity. These results establish a practical platform for high-performance distributed radar systems that demand precise RF synchronization.

ACP2025-0812-7

Demonstration of Free-Space Optical Link Based on Vectorial Optical Polarization Inhomogeneity Coding and Multiplexing**Mingze Cai^{1,2}, Yuzhuo Cao^{1,2}, Runshi Wang^{1,2}, Jing Du^{1,2*}, Jian Wang^{1,2}***1.Huazhong University of Science and Technology, China; 2.Optics Valley Laboratory, China*

In this paper, we propose a free-space optical communication system based on multiplexing of vector beams and encoding of their polarization inhomogeneity. The results demonstrate that this communication approach effectively transmits data under atmospheric turbulence.

ACP2025-0813-12

Waveform-Level Modeling of Nonlinear WDM Channels Using Fourier-Transformer**Shiwei Wang¹, Xiaoli Huo², Xin Qin², Rentao Gu^{1*}, Xiaotian Jiang², Yuefeng Ji¹***1.Beijing University of Posts and Telecommunications, China; 2.China Telecom Research Institute, China*

We propose a hybrid modeling framework called Fourier-Transformer (F-Transformer) for optical fiber channels, which integrates Fourier layers with Transformer encoders to jointly capture linear and nonlinear effects. In a 3-channel WDM system over 800 km of SSMF, the F-Transformer achieves a 21.7% improvement in modeling accuracy compared to the baseline FNO model. The results demonstrate the model's strong generalization ability and high accuracy for waveform-level optical channel modeling in long-distance, multi-channel transmission scenarios.

ACP2025-0813-18

Quasi-Perfect Optical Vortex Beam with Power-Exponent Phase for Free-Space Optical Communication**Lang Zhou, Xiaohang Jia, Yaoyao Liu, Gengliang Zhao, Andong Wang, Long Zhu^{*}***School of Communication and Information Engineering Chongqing University of Posts and Telecommunications, China*

In this paper, we introduce a new type of vortex beams, called quasi-Perfect Optical Vortex Beams (QPOVBs), which feature Rotationally Symmetric Power-Exponential Vortex (RSPEV) phase profiles. The QPOVBs are generated by applying a Fourier transform to Bessel beams with RSPEV phases. We analyze the propagation characteristics and beam quality factor (M^2) of QPOVBs and compare them with Laguerre-Gaussian (LG) beams. It is found that the proposed QPOVB has more modes under lower beam quality factor than LG beam. To evaluate their potential in free-space optical communication, we use a grayscale-coded mapping scheme, enabling 32 distinct QPOVB intensity patterns to serve as symbols in the encoding process, and successfully transmit 32-bit grayscale images with QPOVB mode coding. Our work is expected to accelerate the development of future optical communication encoding schemes.

ACP2025-0813-9

Demonstration of a Free-Space Optical Pulse Position Modulation Communication Link Using Space-Time Wave Packets
Guangshuai Meng^{1,2}, Mingze Cai^{1,2}, Yuzhuo Cao^{1,2}, Jing Du^{1,2*}, Jian Wang^{1,2}*1. Huazhong University of Science and Technology, China; 2. Optics Valley Laboratory, China*

Simulated FSO system comparing diffraction-free ST wave packets vs. LG beams shows ~3–6 dB lower OSNR penalty (with 7% FEC) under turbulence and varying apertures.

ACP2025-0814-16

A Novel Nested-Structure Chaotic Source Design for Secure Optical Transmission Systems**Yujie Wen, Hongxiang Wang*, Chun Zhang, Yuefeng Ji***State Key Laboratory of Information Photonics and Optical Communications Beijing University of Posts and Telecommunications, China*

This paper presents a nested electro-optic chaotic system using coupled feedback loops. The design enhances complexity affordably, achieving 0.0122 Lyapunov exponent, 35.49 GHz bandwidth, and effective time-delay signature suppression.

ACP2025-0814-20

A practical C+L-band power management based on accurate SRS estimation**Yangguang Liu¹, Mo Zhu¹, Yan Zhao², Baoluo Yan², Wenbo Yu², Hu Shi², Huan Chen^{2*}***1. ZTE Corp., China; 2. ZTE Corp., China*

This paper demonstrates an OSNR flattening channel power management method based on online SR estimation for multi-band long-haul transmission systems. Principle and expected performance outcomes are presented.

ACP2025-0814-21

High-Performance WDM PS-PDM 256-QAM Transmission Over DNANF**Tingyu Fu¹, Yu Qin², Jiamin Fan¹, Mingyi Gao^{1*}, Limin Xiao², Yichun Shen³, Jie Zhu², Gangxiang Shen¹***1. Soochow University, China; 2. Fudan University, China; 3. Advanced Materials Co., Ltd. Nantong, China*

In this work, we experimentally demonstrate a wavelength division multiplexing (WDM) probabilistic shaping polarization-division multiplexed (PS-PDM) 256-QAM coherent optical transmission system with 14.8-bit/symbol information entropy through a 5-km double nested anti-resonant nodeless fiber (DNANF). Higher launch power tolerance and 1 dB optical signal-to-noise ratio (OSNR) improvement have been achieved.

ACP2025-0814-34

Low-Complexity Two-Stage Frequency Offset Compensation Algorithm for Real-Time Coherent Optical Communication Systems**Muyu Long, Zhenming Yu*, Xiangyong Dong, Yan Ma, Han Wang, Kun Xu***Beijing University of Posts and Telecommunications, China*

We propose a two-stage frequency offset compensation algorithm using FFT and a modified Costas loop. Results show it reduces complexity by 42.3% while maintaining comparable BER performance in PDM-16QAM systems, enabling efficient real-time coherent reception.

ACP2025-0814-41

Deep-Learning-Assisted Non-Orthogonal Encoding Enhancing High-Capacity and High-Security UWOC**Zitong Wu, Dongmei Deng****1. South China Normal University, China*

We present a deep-learning-assisted high-capacity and high-security non-orthogonal multiplexing underwater wireless optical communication (UWOC) system. Experiment demonstrates the feasibility of 1,296-ary transmission, achieving a 3.81×10^{-3} BER under strong turbulence.

ACP2025-0815-106

Auxiliary Signal supported Long-Haul Optical Transport Network with CDC-ROADM**Tian Qiu¹, Muxin Shi¹, Binxin Cai¹, Yang Zou¹, Jing Li¹, Pengzhuo Sun¹, Jian Xu^{1,2}, Han Long², Dadan Shan², Shenmao Zhang¹, Xiaoxiao Dai^{1*}, Qi Yang¹***1. Huazhong University of Science and Technology, China; 2. Accelink Technologies Co. Ltd, China*

A method of superimposing auxiliary signal for CDC-ROADM optical transport network (OTN) is proposed. It enables the superposition of an auxiliary signal onto any channel to carry critical information. Through the 1000km OTN experiment, it is proved that the loss caused by this method is less than 0.15dB, and it performs well in long-distance transmission.

ACP2025-0815-107

On Adaptive Zero Forcing for Integrated Polarization Sensing and Coherent Optical Communications**Andrej Rode^{1*}, Laurent Schmalen¹, Christian Häger²***1. Karlsruhe Institute of Technology, Germany; 2. Chalmers University of Technology, Sweden*

This work examines noise and polarization-dependent loss effects on LMS-based polarization sensing, quantifying channel inversion deviations and exploring adaptive ZF equalization for improvement. The authors highlight trade-offs between estimation accuracy and communication performance.

ACP2025-0815-112

Regular Perturbation-Based Nonlinear Pre-distortion for Degenerated-mode Transmission**Junpeng Liang^{*}, Jinlong Wei^{*}, Linsheng Fan, Zhongliang Sun, Zhaopeng Xu, Zhixue He^{*}***Peng Cheng Laboratory, China*

We report a transmitter pre-distortion algorithm, derived from perturbation theory, to mitigate the nonlinear effects in four-fold degenerate mode transmission. The impact of link parameter uncertainties on the algorithm's performance is also evaluated.

ACP2025-0815-143

Nonlinear Modeling for High-Speed DAC and ADC Based Optical Fiber Systems Using Volterra Series Integration**Chenjin Li, Jing Zhang^{*}, Junyuan Nie, Hong Lin, Shen Wang, Kun Qiu***University of Electronic Science and Technology of China, China*

We propose and experimentally validate a Volterra series-integrated multiplicative-additive noise modeling framework for effectively characterizing complex high-speed digital-to-analog converter and analog-to-digital converter, achieving signal-to-noise-and-distortion prediction accuracy improvements of up to 71 %.

ACP2025-0815-148

A Low-Complexity Soft-Decision Feedback-Enhanced Neural Network for Multi-Impairment Equalization in 200 Gbps SSB-DD PON Downlink**Xue Xiao, Guo Qian, Yang Tao, Zhang Min, Chen Xue***Beijing University of Posts and Telecommunications, China*

We propose a low-complexity soft-decision feedback enhanced neural network equalizer for 200 Gbps PAM-4 SSB-DD systems. Compared to a conventional feedforward neural network, it achieves a 0.5 dB sensitivity gain with 77.8% fewer trainable parameters.

ACP2025-0815-152

The ISFA Algorithm-optimized OAM-Multiplexed 16QAM MB-OFDM UWBoF System Transmits Over 5km FMF**Hainuo Wang¹, Yongkang Yuan², Changqing Xiang^{3*}, Siyuan Liu², Xiaogang Jiao¹, Xinyi Xi¹, Yifan Chen³**

1.College of Physics and Electromechanical Engineering Jishou University, China; 2.School of Communication and Electronic Engineering Jishou University, China; 3.College of Physics and Electromechanical Engineering Jishou University, China

This paper proposes the application of Symbol In Frequency Domain Averaging (ISFA) algorithm in OAM-UWB multi-channel communication, successfully realizing a new multiplexing dimension: an OAM four-way multiplexing communication system.

ACP2025-0815-154

Joint Beam Tracking and Compensation for Robust Optical Transmission under Turbulence Effects**Weizhen Niu***Chongqing University of Posts and Telecommunications, China*

A beam tracking system based on a single Charge Coupled Device (CCD) detector is proposed to achieve high-precision beam tracking control while reducing system complexity.

ACP2025-0815-155

Optical Sequence Pattern Recognition for Multi-Wavelength BPSK Signals in Photonic Firewalls**Yanbin Shen¹, Yucheng Liu¹, Yanxia Tan², Jiabin Cui¹, Yuefeng Ji¹, Guo-Wei Lu³, Ninghua Zhu⁴, Huashun Wen⁴**

1.Beijing University of Posts and Telecommunications, China; 2.Research Institute of China United Network Communications Co., Ltd, China; 3.Institute for Materials Chemistry and Engineering, Kyushu University, China; 4.Nankai University, China

This paper proposes an optical direct-detection pattern recognition scheme for multi-wavelength BPSK signals based on optical fourier transformation.

ACP2025-0815-156

Experimental Demonstration of Real-Time Beam Tracking with Single CCD for FSO Systems**Li Tang***Chongqing University of Posts and Telecommunications, China*

A beam tracking system based on a single Charge Coupled Device (CCD) detector is proposed to achieve high-precision beam tracking control while reducing system complexity.

ACP2025-0815-16

Transfer Learning-Enabled Efficient Raman Pump Tuning under Dynamic Launch Power for C+L-Band Transmission**Jiaming Liu, Rui Wang, Jinjiang Li, Hong Lin, Jing Zhang^{*}, Kun Qiu***University of Electronic Science and Technology of China, China*

We propose a transfer learning-enabled Transformer framework to simultaneously realize accurate modeling and Raman pump design in C+L-band systems. The RMSE for modeling and peak-to-peak GSNR variation/deviation is within 0.22 dB and 0.86/0.1 dB, respectively.

ACP2025-0815-17

Jitter-Resistant Constant Modulus Algorithm for Free-space Optical Communications with Pointing Error Jitter
Jinjiang Li¹, Lijia Wu¹, Shaohua Hu¹, Qi Yang², Jing Zhang^{1*}, Kun Qiu¹*1. University of Electronic Science and Technology of China, China; 2. Huazhong University of Science and Technology, China*

We propose a jitter-resistant CMA to combat pointing errors in FSO systems. The tolerance to pointing error is improved by over 20% compared with conventional CMA with a 3-dB SNR penalty, ensuring robust signal recovery.

ACP2025-0815-37

LO Polarization-Insensitive Reception Based On a Simple Polarization Controller In Self-Homodyne Coherent Detection Systems**Boyang Hou, Nan Cui^{*}, Zhipeng Zheng, Qingxuan Li, Yan Zhang, Xiaoguang Zhang***Beijing University of Posts and Telecommunications, China*

A simple polarization controller method was proposed for self-homodyne coherent detection systems, ensuring stable system performance despite random polarization variations, which has been verified through both software and hardware simulations with 1Mrad/s RSOP.

ACP2025-0815-46

Frequency Domain Precise and Ultra-wide Range Monitoring of Transceiver IQ Skew for Coherent Systems Using m-sequence
Gao Ye^{1,2}, Linsheng Fan¹, Jinlong Wei^{1*}, Jian Zhao¹, Zhongliang Sun¹, Junpeng Liang¹, Lingguo Cao¹, Hao Shi¹, Jianwei Tang¹, Xiuquan Cui¹, Jianyu Wang¹, Zhixue He¹, Weisheng Hu¹*1. Pengcheng Laboratory, China; 2. South China University of Technology, China*

This paper proposes a novel m-sequence-based frequency-domain method to simultaneously estimate/separate transmitter/receiver IQ skew in optical coherent systems, with ± 0.1 ps accuracy, ≥ -16 to 16 symbol periods range in single measurement, robust to IQ imbalance/polarization variations, compatible with existing systems.

ACP2025-0815-48

Symbol-separated Method for Look-up Table based Digital Pre-distortion for Optical Systems**Yanting ZHOU, Chun Kit Chan^{*}***The Chinese University of Hong Kong, Hong Kong, China*

We propose a symbol-separated approach to compress the size of the look-up table (LUT) for digital pre-distortion to combat the fiber nonlinearity in high-speed optical transmission systems. With the reduced size of the LUT, the requirement of memory storage is largely relaxed. Hence, the system scalability is largely enhanced while the performance is guaranteed. By decomposing a multi-symbol LUT into multiple sub-LUTs, substantial size reduction is realized while preserving comparable bit-error-rate (BER) performance.

ACP2025-0815-54

Secure Free-Space Optical Communication System Based on Diffraction-Free Spatiotemporal Wave Packets**Guangshuai Meng^{1,2}, Mingze Cai^{1,2}, Yuzhuo Cao^{1,2}, Jing Du^{1,2*}, Jian Wang^{1,2}***1. Huazhong University of Science and Technology, China; 2. Optics Valley Laboratory, China*

Simulated secure optical communication uses fundamental-mode spatiotemporal (ST) wave packets to conceal higher-order modes, demonstrating superior atmospheric turbulence tolerance versus traditional Laguerre-Gaussian concealment.

ACP2025-0815-56

Joint Illumination and Communication Design for Mobile Users in Indoor VLC System**Yuyu Wang, Feiyu Jiao, Yuting Zhou, Yansong Du, Jian Song^{*}, Xun Guan^{*}***Tsinghua university, China*

This paper proposes a lighting-unit-based architecture for integrated visible light communication and illumination systems. It enables analytical modeling of illumination and communication performance, and optimization for energy efficiency. Simulations verify the framework's effectiveness and scalability.

ACP2025-0815-7

Reliable Raptor Code based OAM division multiplexing free space optical communication system**Zian Wang, Shanyong Cai^{*}, Zhang Zhiguo, Bingchen Liu***Beijing University of Posts and Telecommunications, China*

Compared with adaptive LPDC coding (switching between 0.7 and 0.5 code rate), the OAM1 / OAM3 multiplexing system, using the Raptor code, has a more stable performance to resist atmospheric turbulence under different turbulence intensities.

ACP2025-0815-82

Two-stage Doppler Effect Compensation for 100-Gbit/s Inter-satellite Laser Communications**Wu Lijia, Li Jinjiang, Hu Shaohua^{*}, Zhang Jing, Lin Hong, Qiu Kun***University of Electronic Science and Technology of China, China*

We propose a two-stage Doppler compensation method for 100-Gbit/s inter-satellite laser communications. We experimentally demonstrate its better Doppler shift tolerance and $\sim 2.5(0.5)$ orders of magnitude BER reduction compared with the fourth-power-FFT algorithm within 0-6 GHz.

ACP2025-0815-83

The Requirement and Technology of Sensing in Optical Access Network Luyao Huang*

China Telecom Research Institute State Key Laboratory of Optical Fiber and Cable Manufacture Technology, China

This paper explores the sensing technologies in optical access networks. It introduces fundamental fiber sensing principles, discusses access network sensing requirements from internal network operations, administration, and maintenance (OAM) to external environment perception and analyzes technical challenges such as handling point-to-multipoint architectures. Current solutions including backscattering type, feed-forward type sensing, and port differentiation are presented, with future trends focusing on / communication + sensing + computing / integration and AI enhancement.

ACP2025-0815-93

Classification RNN-Based Equalization for Indoor Non-Line-of-Sight Optical Wireless Communication Chengwei Fang^{1*}, Cuiwei He², Estrid He¹, Chen Chen³, Shuo Li¹, Yinong Wang¹, Ke Wang¹

1. Royal Melbourne Institute of Technology (RMIT) University, Australia; 2. Japan Advanced Institute of Science and Technology, Japan; 3. Chongqing University, China

Indoor non-line-of-sight (NLOS) optical wireless communication (OWC) offers robust data transmissions against physical obstacles. This paper proposes an NLOS OWC system with RNN-based classification equalization, and up to 94.8% data rate improvement is experimentally achieved.

ACP2025-0819-2

Parallel LED and RIS Transmissions for Vehicular VLC using Spatial Modulations Pengfei Shen^{1,2}, Menghan Li^{1,2}, Lu Lu^{2,3*}

1. Technology and Engineering Center for Space Utilization, Chinese Academy of Sciences, China; 2. University of Chinese Academy of Sciences, China; 3. Technology and Engineering Centre for Space Utilization, Chinese Academy of Sciences, China

In visible light communications (VLC) where the line-of-sight (LoS) link is blocked, reconfigurable intelligent surface (RIS) can be adopted to transmitting the LED's signals to the receiver. RIS is also capable of sending its own messages on top of the reflected light signals using spatial modulation (SM), so as to further increase overall system throughput. In the literature, the straight-forward parallel LED and RIS transmission techniques, e.g., RIS enabled SM (RIS-SM) and RIS enabled generalized SM (RIS-GSM), only activate all the RIS groups with the same probability, which cannot fully utilize the difference among the VLC channels, leading to worse bit error rate (BER) performances. In this paper, we investigate a rate-adaptive parallel LED and RIS transmission scheme, called RAS, in which the RIS groups are activated using different sets of distributions, and thereby increasing sum rates. To realize RAS, we propose a Huffman-code based RAS (HC-RAS) method, by allocating information bits for different RIS groups according to the Huffman coding distribution. Simulation results show that, HC-RAS can have a 5.5 dB gain compared with state-of-the-art constant rate transmission schemes (CRS) using RIS-SM. This finding indicates that, when LED and RIS are exploited jointly using RAS, one can not only dynamically change the data rates for each VLC link, but also increase the overall system throughput in the meantime.

ACP2025-1023-1

Real-Time Multi-Vehicle Detection and Tracking Based on DAS Signals Using YOLOv8 Yu Shi, Zicong Huang, Wang Bing, Wenjin Huang, Zhaohui Li

Sun Yat-sen University, China

Distributed Acoustic Sensing (DAS) enables large-scale, real-time vibration monitoring via fiber optics—yet its application in real-time vehicle trajectory detection and tracking remains underexplored, despite critical needs for cost-effective traffic supervision. Traditional methods struggle with DAS signals' noise and lack of visual features, hindering accurate trajectory extraction. This study proposes a streamlined framework: preprocess DAS vibration signals into 2D feature maps, then use YOLOv8 for Real-Time Multi-Vehicle detection and correlation-based tracking to maintain consistent vehicle identities and trajectories. Preliminary tests on a 2km highway DAS dataset show >85% detection mAP and 704ms End-to-End Detection Latency, validating its potential for intelligent transportation monitoring.

ACP2025-1023-2

A Signal Enhancement Method for Improving Vehicle Detection Rate in Distributed Acoustic Sensing Zicong Huang, Wenjin Huang*, Yu Shi, Jie Liu

Sun Yat-sen University, China

In recent years, traffic monitoring technology based on Distributed Acoustic Sensing (DAS) has attracted significant attention due to its unique advantages. By using existing communication optical fibers, this technology enables all-weather, long-distance, and low-cost perception of vehicle trajectories, providing a feasible pathway for establishing integrated sensing communication traffic monitoring networks. However, complex noise interference in real-road environments severely constrains further improvement in vehicle detection performance. To address this challenge, this paper proposes a vehicle identification method based on distributed optical fiber sensing, which effectively enhances vehicle vibration signal quality through a systematic signal preprocessing pipeline. Experimental results demonstrate that the proposed method significantly improves the signal-to-noise ratio, achieving a detection rate of 70% in vehicle identification tasks, thereby validating the effectiveness and feasibility of the solution in practical scenarios.

Track 3: Network Architectures, Management and Applications

ACP2025-0729-36

LLM-Based Multi-Agent Framework for Automated Optical Network Optimization and Planning**Yian Li, Shan Yin^{*}, Guohao Jin, Xiaodong Liu, Mengru Cai, Shanguo Huang***State Key Laboratory of Information Photonics and Optical Communications (Beijing University of Posts and Telecommunications), China*

This paper proposes an LLM-based multi-agent framework for automated optical network optimization and planning. Evaluated on 2,000 real-world instructions, it achieves 99.3% accuracy and low latency, improving planning efficiency, resource utilization, and reducing technical complexity.

ACP2025-0730-7

Hybrid Direct and Contention-based Bandwidth Allocation in Higher-speed PONs**Zhiwen Ge¹, Zhiyuan Zhong¹, Xiang Lu², Yongcheng Li¹, Jun Li¹, Gangxiang Shen¹***1. Soochow University, China; 2. Universitat Politècnica de Catalunya, Spain*

To enhance system bandwidth efficiency while satisfying diverse latency demands in hybrid traffic scenarios, this paper proposes a hybrid bandwidth allocation scheme for 50G time-division multiplexing passive optical networks that integrates directed bandwidth allocation for time-sensitive services with contention-based dynamic allocation for others.

ACP2025-0731-105

Impairment-Aware Spectrum Allocation with Dedicated Path Protection in C+L Band Elastic Optical Networks**Shiqi Yang¹, Changyin Zhu¹, Xiaoling Wang¹, Weidong Shao¹, Mingyi Gao¹, Bowen Chen¹, Qiang Wang²***1. School of Electronic and Information Engineering, Soochow University, China; 2. Applied Technology College of Soochow University, China*

An impairment-aware spectrum allocation scheme with dedicated path protection was proposed to reduce blocking probability and enhance transmission quality in the C+L band elastic optical networks. Simulation results verify the effectiveness of the proposed scheme.

ACP2025-0801-157

Collaborative Resource Optimization for DualPipe-based Distributed Training in the Intelligent Computing Optical Network**Zixin He, Shan Yin^{*}, Mengru Cai, Xiaodong Liu, Pengzhan Zheng, Shanguo Huang***Beijing University of Posts and Telecommunications, China*

We proposed a collaborative optimization method of computing and networking resources for DualPipe-based distributed training in the optical network, which interconnects intelligent computing centers. Simulation results demonstrate that our method outperforms traditional method in reducing task blocking rates and improving training efficiency.

ACP2025-0801-17

Fine-Grained Baseband Functional Elastic Split for Task Offloading in Mobile Edge Computing Supported by PONs**Ying Wang, Haoru Wang, Ming Ye, Bo Tian, Yongfeng Wei, Caili Gong^{*}***Inner Mongolia University, China*

This paper proposes a task offloading strategy based on fine-grained elastic split of baseband functions. An ILP model and the FG-BFES algorithm are proposed. Results show that the proposed schemes can reduce optical bandwidth consumption.

ACP2025-0801-173

EO Data Downlink Optimization Strategy for Enhanced Continuity and Reliability in VLEO Optical Networks**Wenlong Cheng¹, Hui Yang¹, Zhe Niu¹, Qiuyan Yao¹, Buzheng Wei², Jie Zhang¹***1. Beijing University of Posts and Telecommunications, China; 2. China Unicom Research Institute, China*

We propose a QoS-Aware Dynamic Routing and Scheduling method for solving the frequent link handovers and low transmission reliability in VLEO data downlink networks. Simulation results show our method significantly enhances service continuity and reliability.

ACP2025-0801-190

Resilient Multicast Provisioning in Network Coding-Enabled NG-RANs**Fansong Kong¹, Xin Wang¹, Ruikun Wang², Jing Jiang³, Qin Yin⁴***1. Beijing Information Science and Technology University, China; 2. Qingdao University of Science and Technology, Qingdao, China, China; 3. State Grid Economic and Technological Research Institute Co., Ltd., China; 4. Tianjin Branch of Daqing Oilfield Digital, China*

We propose a low-resource partial-backup algorithm for coding-node deployment and multicast routing algorithm (LR-PB-CNMR) in network-coding-enabled NG-RANs, offering resilience against failures and eavesdropping with significantly reduced spectrum usage compared to backup-protection schemes.

ACP2025-0801-196

Service-Oriented Hybrid Fairness Scheduling in Downlink Visible Light Communication Networks**Ming Yang¹, Xiaodi You¹, Jun Li¹, Xiaochuan Zhang¹, Jian Chen², Changyuan Yu³, Mingyi Gao¹, Gangxiang Shen¹***1. Soochow University, China; 2. Nanjing University of Posts and Telecommunications, China; 3. The Hong Kong Polytechnic University, Hong Kong, China*

We propose a service-oriented hybrid fairness scheduling algorithm for downlink visible light communication networks. By incorporating actual service requirements into fairness considerations, it achieves a Jain's fairness index approaching 1 and effectively reduces average delay.

ACP2025-0801-221

A Machine-Learning-Based Approach for Fault Identification and Localization in Optical Transport Networks Using Source-Alarm Matrices**Yadong Gong¹, Jingwen Hu², Yongyi Xie³, Xin Qin¹, Xiaoli Huo¹, Hui Li², Yuqing Han¹, Qian Hu⁴, Rentao Gu²***1. China Telecom Research Institute, China; 2. Beijing University of Posts and Telecommunications (BUPT), China; 3. China Telecom Shaoxing Branch, China; 4. China Telecom Intelligent Network Technology Co.Ltd., China*

This paper proposes a machine-learning-based method for real-time fault identification and localization in Optical Transport Networks. By employing an alarm slicing algorithm and transforming alarm events into source-alarm matrices, our approach effectively distinguishes different fault types and filters noise alarms. Experimental results show that, compared with other machine learning methods, the XGBoost model performs excellently in fault identification, achieving an identification accuracy of 94.85%, and improves the accuracy of subsequent fault localization. The proposed method shows strong generalization ability across different network environments.

ACP2025-0802-5

Adaptive Deep Reinforcement Learning-based Smart Handover for Hybrid Li-Fi and Wi-Fi Networks**Zhiwen Yang, Kai Zhang, Yuhua Dong^{*}***Tsinghua Shenzhen International Graduate School, China*

We propose an adaptive smart handover scheme based on the double deep Q-network (DDQN) for hybrid Li-Fi and Wi-Fi networks to address frequent handovers and enhance policy stability. Simulation results show that the proposed scheme improves average system throughput by approximately 25% and reduces the total handover rate by over 55% compared to conventional benchmarks.

ACP2025-0802-7

User Aggregation-based Energy-Saving Strategy in FTTR Networks**Yijun Wang, Jinhua Cai, Gangxiang Shen^{*}***Soochow University, China*

As Fiber-To-The-Room (FTTR) networks become more widely deployed, their dense and always-on architecture presents significant energy consumption challenges. This paper proposes a centralized, user aggregation-based energy-saving strategy that dynamically adjusts Sub-Fiber Unit (SFU) activation and station (STA) association. By aggregating STA connections onto fewer active SFUs, the strategy enables idle SFUs to be powered down.

ACP2025-0802-8

Absorbing Intra-node Contention in CD-ROADMs via Traffic Grooming in IP-over-WDM Networks**Zixuan Xu, Gangxiang Shen^{*}, Yongcheng Li***Soochow University, China*

We propose a Port-Aware Traffic Grooming (PA-TG) algorithm that integrates grooming with port-aware RWA to reduce intra-node contention in CD-ROADMs and achieve near-CDC performance in IP-over-WDM networks.

ACP2025-0811-6

Efficient Service Scheduling in Hybrid Optical-Electrical LEO Satellite Networks**Cheng Zhang¹, Yangziyu Song², Hua Wang³, Siming Mo⁴, Qinghai Lu⁴, Qimei Chen², Yongcheng Li^{*}***1. Soochow University, China; 2. Wuhan University, China; 3. Nanjing Tech University, China; 4. Jiangsu Etern Co., Ltd., China*

This paper investigates the service scheduling problem in low earth orbit (LEO) satellite networks comprising both electrical and optical switching satellites. The problem is formulated as a mixed integer linear programming (MILP) model, with the objective of jointly minimizing the total network energy consumption and the overall task completion time (TCT). Three routing strategies are considered, including least energy consumption (LEC), least delay (LD), and Energy-Latency Balancing (ELB) strategies. A simulated annealing-based heuristic algorithm is proposed for service scheduling in hybrid optical-electrical LEO satellite networks. Simulation results demonstrate that the proposed algorithm with ELB strategy can significantly reduce the total network energy consumption while maintaining low overall TCT, achieving performance that is close to that of the MILP model.

ACP2025-0812-10

An Importance-Aware Strategy for Content Evacuation in Cloud-Optical Networks under Cascading Failures**Deyang Liu¹, Xin Li^{1,2}, Yike Jiang¹, Yongli Zhao^{1,2}, Jie Zhang¹***1. Beijing University of Posts and Telecommunications, China; 2. Beijing University of Posts and Telecommunications Shenzhen Institute, China*

We propose the Importance-aware Trajectory-based Content Evacuation (ITCE) strategy to mitigate data loss from cascading failures in cloud-optical networks. By prioritizing content based on business value, ITCE significantly reduces weighted content loss.

ACP2025-0813-4

Traffic Conflict Gain-Adaptive and Load-Aware RWA for LEO Optical Satellite Networks**Yonghan Wu, Jin Li, Yi Huang, Weixuan Fan, Wenbin Chen, Shuo Xia, Yuyang Li, Danshi Wang, Min Zhang***1. Beijing University of Posts and Telecommunications, China*

A traffic conflict gain-adaptive and load-aware RWA algorithm is proposed to address routing challenges, enhance quality of service, and maintain low computational complexity in high-dynamic and large-scale low Earth orbit optical satellite networks.

ACP2025-0813-5

Adaptive Resource Allocation Algorithm for Optical Network Based on Meta Learning**Xiaodong Liu, Shan Yin*, Mengru Cai, Shuyao Wang, Xueyu Fan, Shanguo Huang***Beijing University of Posts and Telecommunications, China*

We introduce meta learning into resource allocation task and propose the Adaptive Resource Allocation (ARA) algorithm. It shows excellent adaptation ability in different topologies. With the integration of reinforcement learning, the optimization ability is also significantly improved. Simulation demonstrates that ARA reduces the consumption of topology adaptation by 67% compared to DRL.

ACP2025-0814-18

Cross-layer Dynamic Bandwidth Allocation in G.711 based Centralized Wi-Fi Access Network**Zhiyuan Zhong, Jun Li*, Tao Zeng², Yongcheng Li, Gangxiang Shen¹***1. Soochow University, China; 2. China Telecom Research Institute, China*

This paper proposes a cross-layer dynamic bandwidth allocation mechanism, where physical layer information from Wi-Fi preamble can be used for bandwidth allocation in G.711 network.

ACP2025-0814-44

Eavesdropping-Aware Secure Routing Based on Beam Accessibility in Optical Satellite Networks**Chenwei Zhang¹, Liyazhou Hu², Wei Wang¹, Zijian Cui¹, Yongli Zhao¹, Jie Zhang¹***1. Beijing University of Posts and Telecommunications, China; 2. School of Electronics and Communication Engineering Shenzhen Polytechnic University, China*

LEO laser links enable fast global access but face eavesdropping risks, threatening data security. We model these risks and design two secure routing algorithms, cutting impact by up to 38.47% with minimal load growth.

ACP2025-0814-47

Learned Light Field Compression for Resource-Constrained Acquisition Systems**Lili Zhao*, Wanxin Shi, Jie Li, Meng Guo, Lei Yang, Wei Yu***China Mobile Communications Co., Ltd., China*

Light field (LF) imaging produces massive data, challenging storage and transmission. We propose a compression framework reducing large LF data to a 12.8 MB model, surpassing international standard VVC/H.266 in quality under resource-constrained acquisition systems.

ACP2025-0815-119

Robust AI Inference Model Placement with Cross Layer Backup over Optical Transport Networks**Yujie Li, Wei Wang, Tianhe Liu, Yibo Wang, Yongli Zhao, Jie Zhang****Beijing University of Posts and Telecommunications, China*

We propose a cross-layer backup scheme integrating compute-node and network redundancy to ensure service continuity during large-scale disasters, achieving higher resilience, success rates, and sustained GPU utilization under severe failures.

ACP2025-0815-128

Dual-Agent-based Resource Allocation for Synergistic Transmission of Classical and Quantum Signals in Multi-core Fiber Networks**Fengkai Sun, Yongmei Sun*, Yaoxian Gao, Yuting Wang***Beijing University of Posts and Telecommunications, China*

We present S-DARL, a dual-agent reinforcement learning scheme for classical-quantum co-propagation in multi-core fiber networks, significantly reducing blocking probability and enhancing synergy compared with state-of-the-art heuristics.

ACP2025-0815-141

Impact of Data Acquisition Accuracy on the Performance of Digital Twin Optical Networks**Junfeng Cao^{1,2}, Nan Hua^{1,2*}, Kangqi Zhu^{1,2}, Qianchi Qin^{1,2}, Siqi Wu^{1,2}, Xiaoping Zheng^{1,2*}***1. Beijing National Research Center for Information Science and Technology (BNRist), China, China; 2. Department of Electronic Engineering, Tsinghua University, Beijing, China*

We present an integrated modeling-emulation-validation framework to systematically analyze how data acquisition accuracy impacts the performance of digital twin optical networks. The framework is experimentally validated using spectrum classification tests as a representative scenario, revealing key degradation mechanisms and providing practical guidelines for resource allocation in the sensing layer.

ACP2025-0815-26

Satellite optical network topology dynamic optimization based on Markov Decision process**Yuguo Kuang, Wei Wang, Yansong Fu, Zijian Cui, Yongli Zhao^{*}, Jie Zhang***Beijing University of Posts and Telecommunications, China*

This paper proposes grouping satellites by orbit and dynamically adjusting the topology through the Markov Decision Process Based on Relaying (MDPBR) algorithm. Simulations demonstrate that the proposed algorithm can reduce the average number of hops.

ACP2025-0815-4

Semi-supervised Learning-based QoT Estimation for Intelligent Computing Optical Network**Jie Li, Zhiquan Gu^{*}, Xin He, Jiawei Zhang, Yuefeng Ji***Beijing University of Posts and Telecommunications, China*

A semi-supervised learning-based QoT estimation method is studied with few labelled samples and unlabeled samples, simulation results demonstrate the proposed method can reduce the prediction error RMSE by 21.12% and 20.61% compared to other methods.

ACP2025-0815-52

Distance-Aware DRL-Based Routing Strategies in QKD-ONs**Shailendra Raghuwanshi¹, Suman Palrecha², Vimal Bhatia^{1,2*}, Xue Hu², Bowen chen²***1. Indian Institute of Technology Indore, India; 2. Soochow University, China*

Resource constraints in quantum key distribution secured optical networks (QKD-ONs) frequently prevent successful quantum light-path request (QLR) fulfillment. This work introduces a routing and resource assignment (RRA) strategy prioritizing minimal transmission distance to address this limitation. The proposed scheme employs a metric evaluating fiber length to determine optimal quantum signal paths. By minimizing cumulative (photon) travel distance, the proposed approach improves resource efficiency. The proposed distance-aware deep reinforcement learning (DA-DRL) based scheme's performance is evaluated against first-fit (FF) and random-fit (RF) methods, across two network topologies NSFNET and UBN24. Simulation results show that, for NSFNET, the proposed approach scheme reduces blocking by 6.18% and 9.18% and for UBN24, by 2.71% and 3.41%, when compared to FF and RF respectively.

ACP2025-0815-64

Adaptive Reconfigurable Optical Direct-Connect Architecture for Hybrid-Parallel AI Workloads**Wenzhe Li^{*}, Guojun Yuan, Zhan Wang***Institute of Computing Technology, Chinese Academy of Sciences, China*

We propose a reconfigurable optical interconnect for hybrid-parallel AI workloads. By leveraging a Jellyfish-inspired topology and traffic-aware reconfiguration, our design supports diverse collective communication patterns. 2048-node simulations with real traces show up to 40% latency reduction over static 3D Torus for large-scale training.

ACP2025-0815-67

Throughput Performance in Mode-Group Division Multiplexing Metro-Scale Data Centre Networks**Yinglong Liang¹, Filipe Ferreira¹, Alejandra Beghelli²***1. University College London, United Kingdom; 2. BT Group, United Kingdom*

We investigate the throughput performance of a metro-scale datacentre network using MGDM over few-mode fibre. Results show a computationally simple heuristic approach achieves 71% of the maximum achievable throughput by ILP (630 vs. 890 Tbps).

ACP2025-0815-70

Experimentation, Exploration, and Practice of Passive Optical Networks in the Field of Industrial Control**Weng Yi***China Telecom Corp Ltd, China*

Traditional industrial networks face limited coverage and difficulty in heterogeneous data transmission. This paper explores using PON to address these issues through experiments, achieving positive results.

ACP2025-0815-79

A Method for LEO Satellite Topology Reconfiguration Based on Elastic Optical Network**Yunhui Wang, Hongxiang Guo^{*}, Jian Wu***Beijing University of Posts and Telecommunications, China*

The flat topology of LEO satellite networks can impact communication performance. This paper demonstrates through experiments that elastic optical link switching enables path optimization. Additionally, we proposed a topology reconfiguration algorithm. Through comparison with the + Grid, our proposed method demonstrates better performance.

ACP2025-0815-9

Hybrid Testbed for Joint Optical Transmission and Switching Architecture in LEO Networks**Yingzi Xu, Hongxiang Guo^{*}, Jian Wu***Beijing University of Posts and Telecommunications, China*

We present a virtual-physical hybrid testbed for system-level validation of joint optical transmission and switching in LEO satellite networks, confirming SDN-controlled reconfigurable paths with switching module insertion loss 18 dB.

ACP2025-0815-97

Link-Related Analytical Model of Blocking Probability for Asymmetric Multi-Fiber Optical Networks**Yuxie Wang, Yejia Shang, Yuchen Yang, Lei-Hong Zhang, Yongcheng Li***Soochow University, China*

This paper develops a novel link-related analytical model for blocking probability in multi-fiber optical networks, specifically considering the scenario where each link contains a different number of fibers, referred to as asymmetric multi-fiber optical networks (aMFONs). The model incorporates the three-dimensional Markov chain to capture the load correlation between adjacent links. Simulation results demonstrate that, compared to existing analytical model ignoring link correlation, our proposed link-related analytical model achieves significantly higher accuracy and better matches the simulation results.

ACP2025-0817-1

Strategies for Upgrading Multi-Granularity ROADMs in an Optical Transport Network**Zhilin Yuan¹, Peng Zhou², Huichao Xu¹, Fengxian Tang³, Vimal Bhatia⁴, Yongcheng Li^{1*}***1. Soochow University, China; 2. Wuhan University, China; 3. Shenzhen Polytechnic University, China; 4. Indian Institute of Technology (IIT), India*

Multi-granularity reconfigurable optical add-drop multiplexers (MG-ROADMs) can enhance the flexibility and resource utilization of optical transport networks (OTNs) in a cost-efficient manner, as they eliminate the need of expensive flexible wavelength selective switches (WSSs). This cost advantage makes MG-ROADM upgrades an attractive option for improving network performance. This paper addresses the problem of MG-ROADM upgrades and proposes three efficient upgrade strategies: traffic demand-based (TD), node connectivity-based (NC), and node upgradation gain-based (NUG). To evaluate their performance, we develop an efficient routing, granularity, and spectrum assignment (RGSA) algorithm that supports scheduling traffic demands in the optical networks where single-granularity (SG-) and MG-ROADMs coexist. Simulation results show that the NUG strategy selects an upgraded node set closely aligned with our developed mixed integer linear programming (MILP) optimization model, achieving higher average bandwidth utilization than the TD and NC strategies.

ACP2025-0817-2

Graph Convolutional Network-Based Service Path Aggregation and Selection in LEO Optical Satellite Networks**Yiming Liu¹, Hua Wang^{1*}, Wei Wang², Yifeng Li³, Yongcheng Li⁴, Yongli Zhao²***1. College of Computer and Information Engineering (College of Artificial Intelligence) Nanjing Tech University, China; 2. State Key Laboratory of Information Photonics and Optical Communications Beijing University of Posts and Telecommunications, China;**3. Nanjing Tech University, China; 4. School of Electronic and Information Engineering Soochow University, China*

This paper proposes a GCN-based path aggregation strategy for LEO optical satellite networks, improving routing efficiency by reducing computational overhead. Simulations show 28.9% higher bandwidth utilization and 15% better load balance than Dijkstra's algorithm.

ACP2025-0817-3

DRL-Aided Resource Scheduling Scheme for Elastic Optical Computing Power Network**Xiao Lin, Yongjie Huang, Hui Yang, Enguo Chen***Fuzhou University, China*

DRL-aided resource-scheduling scheme is proposed for EO-CPN. It merges preemption, storage, and elastic optics to curb AIGC task blocking while maximizing spectrum usage and meeting deadlines.

Track 4: Optoelectronic Devices and Integration

ACP2025-0718-6

High-speed germanium-on-silicon multimode photodiode

Gangqiang Zhou^{*}, Xiong Wanshu, Zhang Na, Zhang Qiang, Lu Chi, Yin Kun, Yu Hui

Zhejiang Lab, China

In this paper, we demonstrate a high-speed germanium-on-silicon (GeSi) multimode photodiode (PD). 100 Gb/s OOK modulation and 200 Gb/s PAM4 modulation are successfully realized for the TE₀ mode, TE₁ mode, and TE₂ mode.

ACP2025-0720-1

High-Efficiency Photonic Antenna for Terahertz Generation in the 275–296 GHz Band Based on MUTC-PD

Yun Wang, Jianguo Yu^{*}, Xiaorui Liu

Beijing University of Posts and Telecommunications, China

This paper presents a photonic antenna operating in the 275–296 GHz range, achieving a 4.67-fold output power increase and 8.4 dBi peak gain at 285 GHz.

ACP2025-0722-7

Thin-film lithium tantalate electro-optic modulator operating at 900nm wavelength

Defeng Shan, Ziliang Ruan, Xijie Wang, Bin Chen, Gengxin Chen, Mingwang Jiang, Guowu Zhang, Liu Liu^{*}

Zhejiang University, China

We demonstrate a low-loss integrated electro-optic Mach-Zehnder modulator in thin-film lithium tantalate at 900nm, featuring a half-wave voltage-length product of 1.65Vcm, an ultra-low optical insertion loss of 0.5dB, a static extinction ratio of 20dB, and a detector-limited bandwidth of 40GHz.

ACP2025-0724-14

Analysis Model for G-Band Photomixer Modules Based on MUTC-PDs

Tian Yuxin^{1,2}, Xiong Bing^{1*}, Wang Guizhen², Sun Changzheng¹, Hao Zhibiao¹, Wang Jian¹, Wang Lai¹, Han Yanjun¹, Li Hongtao¹, Luo Yi¹

1. Tsinghua University, China; 2. China Mobile Research Institute, China

We present a novel model to predict the performance of photomixer modules based on MUTC-PDs. By taking packaging introduced deviances into account, the model provides excellent prediction for the frequency responses of G-band photomixers.

ACP2025-0726-5

Research on Optical Interference Imaging Methods Based on New Aperture and Its Optimization Method

Haijian Jin, Yong Zuo^{*}, Xiaohan Song, Ziteng Gao, Xiaobin Hong, Jian Wu

Beijing University of Posts and Telecommunications, China

This paper proposes a novel optical interference imaging method with a new aperture and its optimization method. By introducing a new Microlens arrangement rule and its optimization method, the Microlens pairing scheme is modified to improve the image sampling rate and enhance the image reconstruction effect.

ACP2025-0728-11

Based on the MoS₂/PdSe₂ Van Der Waals Heterostructure for Scan Imaging

JianQiang Mei¹, Xin He^{2*}

1. East China Jiaotong University, China; 2. Hangzhou City University, China

We present a MoS₂-PdSe₂ vdW heterojunction ultra-broadband polarization-sensitive photodetector using PdSe₂'s anisotropy, yielding 3.56 polarization ratio at 532 nm.

ACP2025-0728-16

Compact and Broadband Thin-film Lithium Niobate Fast Quasi-adiabatic Mode (De)Multiplexer for 800G Photonic Interconnection

Mingxiu Yuan, Ya Han^{*}, Gai Zhou, Meng Xiang, Chi Chen, Kebai Lin, Di Peng, Heyun Tan, Cong Zhang, Shuoyang Qiu, Songnian Fu, Yuwen Qin^{*}

Guangdong University of Technology, China

We demonstrate four-channel fast quasi-adiabatic thin-film lithium niobate mode (de)multiplexers for 800G photonic interconnection, achieving the fabricated length-bandwidth values of 50 μm–153 nm, 96 μm–119 nm, and 115 μm–105 nm, respectively.

ACP2025-0728-6

Optimized Design of Photonic Integrated Interference Imaging Based on Multi-Level Microlens Array and CLEAN Algorithm
Ziteng Gao, Yong Zuo^{*}, Xiaohan Song, Haijian Jin, Jiaheng Wang, Jian Wu*Beijing University of Posts and Telecommunications, China*

This paper presents a photonic integrated interference imaging method based on a multi-level microlens array and the CLEAN algorithm, which effectively addresses the challenges of sparse sampling and imaging artifacts, significantly improving imaging quality.

ACP2025-0729-23

Hybrid Meta-Heuristic Based Crosstalk-Aware Automatic Mapping for Optical Network-on-Chip**Chen Zhao^{1,2}, Qiuyan Yao^{1,2}, Hui Yang^{1,2*}, Daqing Meng^{1,2}, Yijie Liang^{1,2}, Junji Feng^{1,2}***1.Beijing University of Posts and Telecommunications, China; 2.State Key Laboratory of Information Photonics and Optical Communications, China*

We propose a multi-strategy hybrid meta-heuristic mapping method to address crosstalk issues in Optical Network-on-Chip task mapping. Compared with existing mapping algorithms, this method reduces average crosstalk by 19.4% and improves signal-to-noise ratio by 21.86%.

ACP2025-0729-4

Generalized Inverse Design of a Compact Polarization Beam Splitter on X-cut TFLN**Jiangbo Lyu^{1,2}, Guangbiao Wang^{2,3}, Yanhua Shen^{2,4}, Yazhi Pi^{2*}, Zhenmin Chen^{2*}, Ke Xu^{1,2,5*}, Lei Wang²***1.Department of Integrated Circuits, Harbin Institute of Technology (Shenzhen), China; 2.Peng Cheng Laboratory, China; 3.School of Electronics and Information Technology, Sun Yat-sen University, China; 4.Department of Integrated Circuits, Harbin Institute of Technology, China; 5.Guangdong Provincial Key Laboratory of Semiconductor Optoelectronic Materials and Intelligent Photonic Systems, Harbin Institute of Technology, China*

This work presents a compact PBS on X-cut TFLN using generalized inverse design with dielectric tensor optimization, achieving efficient TE₀/TM₀ separation, low IL, high PER, and enhanced integration within a 20 × 8 μm² footprint.

ACP2025-0729-5

Generalized Inverse Design of a Compact Thermo-Optic Switch on SOI Platform**Jiangbo Lyu^{1,2}, Guangbiao Wang^{2,3}, Yanhua Shen^{1,2}, Yazhi Pi^{2*}, Zhenmin Chen^{2*}, Ke Xu^{1,2,4*}, Lei Wang²***1.Department of Integrated Circuits, Harbin Institute of Technology (Shenzhen), China; 2.Peng Cheng Laboratory, China; 3.School of Electronics and Information Technology, Sun Yat-sen University, China; 4.Guangdong Provincial Key Laboratory of Semiconductor Optoelectronic Materials and Intelligent Photonic Systems, Harbin Institute of Technology, China*

We present a compact SOI thermo-optic switch using a generalized inverse design framework that decouples thermal and optical simulations, achieving low IL, suppressed CT, and effective switching with a 15 × 8 μm² footprint.

ACP2025-0729-50

An ultra-broadband optical parametric amplifier based on Ge-Sb-S integrated waveguide**Ling Luo¹, Qingming Chen², Zhaohui Li^{1,3,4*}***1.School of Electronics and Information Technology, Sun Yat-sen University, China; 2.School of Microelectronics Science and Technology, Sun Yat-sen University, China; 3.Guangdong Provincial Key Laboratory of Optoelectronic Information Processing Chips and Systems, China; 4.Southern Marine Science and Engineering Guangdong Laboratory (Zhuhai), China*

This work reports an ultra-broadband optical parametric amplifier based on chalcogenide waveguide. Under continuous-wave (CW) pumping, on-chip net parametric gain spectrum exceeding 500 nm (spanning from 1330 nm to 1850 nm) has been achieved

ACP2025-0730-51

850 nm band Wavelength-division multiplexer on the lithium-niobate-on-insulator platform**Yaoxin Bao¹, Jianghao He¹, Ming Zhang^{2*}, Daoxin Dai^{1*}***1.College of Optical Science and Engineering, Zhejiang university, China; 2.State Key Laboratory of Extreme Photonics and Instrumentation, College of Optical Science and Engineering, International Research Center for Advanced Photonics, Ningbo Innovation Center, Zhejiang University, China*

An 850 nm band optical filter is demonstrated on the 200 nm-thick X-cut lithium-niobate-on-insulator platform. The proposed optical filter exhibits a box-like spectral response accompanied by high SLSR (~ 32 dB) and low excess loss (~ -0.05 dB).

ACP2025-0730-6

Silicon-based Nanohole Assisted Phototransistor with Different Lattices for Wideband Detection**Ziming Liu, Hongyun Xie^{*}, Yudong Ma, Tieyi Li, Yudi Liu, Weizhao Jiao***Beijing University of Technology, China*

We demonstrate silicon-based phototransistors with nanoholes in square and triangular lattices, achieving wideband detection from 400–1000 nm and significantly enhanced responsivity compared to devices without nanohole structures, especially at longer wavelengths.

ACP2025-0730-8

Narrow Linewidth Two-Section DFB Laser Based on Reconstruction Equivalent Chirp Technique**Xiao Liu¹, Shijian Guan¹, Yunshan Zhang^{2*}, Zeyu Gang¹, Xiangfei Chen^{1*}**

1. Key Laboratory of Intelligent Optical Sensing and Manipulation of the Ministry of Education & National Laboratory of Solid State Microstructures & College of Engineering and Applied Sciences & Institute of Optical Communication Engineering & Nanjing University-Tongding Joint Lab for Large-scale Photonic Integrated Circuits, Nanjing University, China; 2. College of Electronics and Optical Engineering, Nanjing University of Posts and Telecommunications, China

A monolithically integrated two-sectionDFBlaser with AR coatings on both facets is proposed. A significant linewidth compression is achieved due to the introduction of optical negative feedback through the reflection section.

ACP2025-0731-112

Single Mode Two Dimensional Photonic Crystal Waveguide on Thin Film Lithium Niobate**Jindong Lu, Guanyu Chen^{*}, Siyuan Zhou, Ziyao Zhang, Hua Yu***Chongqing University, China*

We investigate two-dimensional thin film lithium niobate photonic crystal waveguides, revealing duty cycle-dependent single-mode regimes and mode hybridization, enabling robust single-mode propagation and tunable mode conversion for modulators and integrated optical sensors.

ACP2025-0731-45

Integrated magneto-optical isolator based on high-order absorbing exceptional point**Yaqi Zhou¹, Yan Li^{1*}, Tingge Dai²***1. Ningbo University, China; 2. Zhejiang University, China*

We proposed an integrated passive optical isolator based on a third-order absorbing exceptional point (EP). The 20 dB isolation bandwidth could be increased by 85% to 15 GHz, and the isolation ratio could be increased to 43.6 dB with 3.3 dB insertion loss.

ACP2025-0731-53

Demonstration of 2D Beam Emission by a Multi-wavelength Optical Phased Array**Binghui Li***The Chinese University of Hong Kong (shenzhen), China*

We demonstrate the 2D beam scanning of an optical phased array through multiple wavelength emissions. A field of view of $9^\circ \times 35^\circ$ was accomplished by only thermo-phase control, indicating good potential for high-speed LiDAR scanning.

ACP2025-0731-55

Feedforward Neural Network-Based Integrated Polarization Controller on Thin-Film Lithium Niobate**Yuan Liu, Yanmei Lin, Weihua Yan, Shuxin Wang, Zhongjin Lin^{*}, Xinlun Cai^{*}***Sun Yat-sen University, China*

We propose a high-speed thin-film lithium niobate photonic polarization control system, empowered by feedforward neural network. The system achieves a control latency of near 1 μ s.

ACP2025-0801-166

A fast fiber-optic Fabry-Perot sensing system based on tunable REC-DFB laser array**Yuan Liu, Pan Dai^{*}, Kaichuan Xu, Jiacheng Wang, Yu Wang, Yuan Lv, Yaqiang Fan, Haolin Xia, Jingxuan Zhang, Yufei Wei, Zhenxing Sun, Junwei Dong, Feng Wang, Xiangfei Chen^{*}***Nanjing University, China*

A fiber optic Fabry-Perot sensing system based on a tunable reconstruction-equivalent-chirp distributed feedback laser array is introduced. The system enables real-time acquisition of reflection spectra from Fabry-Perot sensors, featuring high dynamic range and stable operation.

ACP2025-0801-18

Bandwidth optimization for silicon photonic receiver based on T-coil network**Yutian Zhang¹, Meng Deng², Xiaolong Xu², Ziyue Dang², Daigao Chen², Hongguang Zhang², Yu Yu^{1*}, Xi Xiao^{2*}**

1. Wuhan National Laboratory for Optoelectronics and School of Optical and Electronic Information, Huazhong University of Science and Technology, China; 2. National Information Optoelectronics Innovation Center, China Information and Communication Technologies Group Corporation, China

This paper presents a bandwidth optimization scheme for high-speed photonic receiver. By introducing a specifically designed T-coil network between the avalanche photodiode (APD) and transimpedance amplifier (TIA), the receiver bandwidth is improved from 12 to 30 GHz, achieving an 150% improvement. The T-coil network employs inductive peak compensation to effectively counteract the frequency response attenuation caused by the junction capacitance of the APD and the input capacitance of the TIA, and theoretical analysis and full-chain co-simulation demonstrate that it not only achieves ultra-wideband lossless matching but also supports larger process tolerances. The proposed solution provides an effective approach for bandwidth optimization of photonic receivers in high-speed optical communication, holding practical value for applications targeting 6G-era rates of 100 Gbps and above.

ACP2025-0801-194

Microrod laser based on localized Er³⁺ doping**Fan Tang, Hao Zhang, Dingfu Zhang, Yanhong Guo, Baicheng Yao^{*}, Teng Tan^{*}***Key Laboratory of Optical Fiber Sensing and Communications (Education Ministry of China) University of Electronic Science and Technology of China, China*

We propose a high-Q whispering-gallery-mode (WGM) laser via localized Er³⁺ doping strategy. By accurately introducing erbium ions on surface of a silica thin microrod, we realize an active resonator, which demonstrates a passive loaded Q factor higher than 4.8×10^7 . This enables milliwatt threshold lasing with unique high signal-to-noise ratio approaching 40 dB. Such a lasing microcavity fabrication scheme offers a way for flexibly tuning the gain-loss balance in miniature microcavities.

ACP2025-0801-33

Enhancing output of DFB Lasers with Asymmetric Phase Shift and Coupling Coefficient**Siyang Li¹, Zhuoying Wang¹, Zhenxing Sun¹, Xiangfei Chen¹***Nanjing University, China*

A novel REC-based DFB laser using AP and ACC techniques boosts front output power by 30% over symmetric designs. It eases fabrication (less EBL-dependent) and maintains SLM stability, validated experimentally.

ACP2025-0801-34

8-Channel 980-nm Pump Laser Array via Photonic Wire Bonding**Jingjing Li, Wentao Sun, Yue Zhang, Zhenxing Sun^{*}, Rulei Xiao, Xiangfei Chen***Nanjing University, China*

A compact eight-channel laser pump source is demonstrated using photonic wire bonding to hybrid-integrate FP lasers and fiber Bragg gratings, achieving stable single-mode emission at 976 nm across all channels.

ACP2025-0801-40

Low Power Consumption Phase Shifter with Waveguide Folded Array Superlattice**Xudong Liu, Yuanjian Wan, Jian Wang^{*}, Yu Zhang***Huazhong University of Science and Technology, China*

We designed an optical thermo-optic phase shifter based on a superlattice waveguide array, incorporating an undercut process. This device achieves an ultra-high-density waveguide folded array with mere 200-nm inter-waveguide gap and ultra-low-power π phase shifts consuming only 0.35 mW at 1550 nm.

ACP2025-0801-45

Design of Multi-Phase PWM-Driven Thermo-optic Tuning Loop for High-Q Microring Wavelength-locking**Ziying Xie^{1,2}, Siyuan Zhang^{3,4}, Yifan Liu², Zhicheng Wang², Ziyue Dang², Hongguang Zhang², Daigao Chen², Xi Xiao^{2*}, Min Tan^{1*}**

1. School of Integrated Circuits, Huazhong University of Science and Technology, China; 2. National Optoelectronics Innovation Center, China Information Communication Technologies Group Corporation, China; 3. School of Physics, Huazhong University of Science and Technology, China; 4. Department of Electronic Engineering, Tsinghua University, China

This paper presents a multi-phase pulse width modulation (PWM) driven thermo-optic tuning scheme for thermal ripple reduction. By introducing phase as an additional tuning factor, thermal ripples excited from different phase PWM signals can partially cancel each other, enabling higher tuning accuracy at the same PWM frequencies while maintaining the conversion efficiency. A two-phase PWM-driven tuning loop with post-layout simulation results validates the approach. Implemented in the 65 nm CMOS process, the proposed tuning loop achieves wavelength locking of a microring with Q-factor of around 11,590 and high power efficiency. Compared with other solutions in the literature, it achieves significantly higher resolution and smaller thermal ripple at just 10 MHz clock rate, making it suitable for high-Q microring wavelength locking applications.

ACP2025-0801-97

Experimental Demonstration of Low-Crosstalk Optical Vortex Mode Demultiplexer Assisted by Pattern Search Assisted Iterative (PSI) Optimization Algorithm**Han Cao, Jian Wang***Huazhong University of Science and Technology, China*

We propose and experimentally demonstrate a low-crosstalk optical vortex mode demultiplexer based on pattern search assisted iterative (PSI) optimization for coordinate transformation. The device achieves crosstalk levels below -14 dB across the entire C-band.

ACP2025-0802-2

Suspended thin-film lithium tantalate waveguide-integrated photodetector based on pyroelectric effect**Muchun Lin, Ziliang Ruan, Bin Chen, Xijie Wang, Liu Liu, Daoxin Dai***Zhejiang University, China*

A suspended waveguide-integrated pyroelectric photodetector on thin-film lithium tantalate platform is demonstrated. The device exhibits a stable pyroelectric response to modulated optical signals at 1550 nm with a peak voltage responsivity of 521 V/W.

ACP2025-0803-1

AI-Enhanced Design Workflow for Photodetectors**Jihong Ye, Yongqing Huang, Shuhu Tan, Liwen Wang, Xiaomin Ren***Beijing University of post and telecommunications, China*

We present an intelligent design workflow that integrates machine learning (ML) and genetic algorithm (GA) to enable the automated co-design of high-speed photodetectors.

ACP2025-0804-1

Monolithic SiGe-BiCMOS Receiver with Inductorless Pseudo-Differential Photodetection Achieving 138.9 Gbps/mm² Bandwidth Density**Hao Jiang¹, Beiju Huang², Meixin Li¹, Xiaoqing Lv², Kaixin Zhang³, Tianjun Liu⁴, Qixin Wang⁴, Zanyun Zhang^{1*}**

1. Tiangong University, China; 2. Institute of Semiconductors, Chinese Academy of Sciences, China; 3. Suzhou Institute of Microelectronics and Optoelectronics Integration, China; 4. Suzhou Institute of Microelectronics and Optoelectronics Integration, China

We present a monolithically integrated 50 Gb/s silicon photonic receiver utilizing pseudo-differential photodetection, pole-zero cancellation, and transconductance regulation, combining ultra-high compactness (0.36 mm²) with high functionality.

ACP2025-0807-2

High-bandwidth and broad-passband silicon slow-light modulator enabling C+L dual-band operation**Meixin Li¹, Hao Jiang¹, Qixin Wang², Wenjing Zhang¹, Xiaoqing Lv³, Kaixin Zhang², Tianjun Liu², Beiju Huang³, Zanyun Zhang^{1*}**

1. Tiangong University, China; 2. Suzhou Institute of Microelectronics and Optoelectronics Integration, China; 3. Institute of Semiconductors, Chinese Academy of Sciences, China

We demonstrate a silicon slow-light Mach-Zehnder modulator with 85 GHz EO bandwidth, supporting 128 Gbaud OOK modulation, with an exceeding 20 nm passband in C/L-band for high-density high-capacity interconnects applications.

ACP2025-0814-13

Phase-jitter-tolerant characterization of programmable photonic circuits**Jiajia Wang^{*}, Haoran Zhang, Shuying Li, Shuran Zhang, Yunping Bai, Xingyuan Xu***Beijing University of Posts and Telecommunications,*

We demonstrated a universal and phase-jitter-tolerant characterization technique to measure the dynamic performance of programmable photonic integrated circuits (PICs). This approach provides a promising solution for PIC characterization, enabling accelerated physical parameter training.

ACP2025-0814-30

A Structure of W-Shaped High-Speed Silicon-Based Microring Modulator**Huimin Ji, Keyu Xiong, Bin Li, Manwen Liu, Zhihua Li^{*}, Bo Tang, Kai Huang, Ruonan Liu, Peng Zhang***Institute Of Microelectronics Of The Chinese Academy Of Sciences, China*

This paper presents an innovative design of a silicon-based microring modulator based on a W-shaped p-n junction. The proposed device achieve a modulation efficiency of 182.6 pm/V at a bitrate of 80 Gbps in simulation.

ACP2025-0815-100

Low-loss Fiber-Chip Edge Coupler for AlGaAs-on-insulator Platform**Jingwei Chen^{1,2}, Zhengshun Lei^{1,2}, Weiqiang Xie^{1,2*}, Yikai Su^{1,2}**

1. State Key Laboratory of Photonics and Communications, China; 2. School of Information and Electronic Engineering, Shanghai Jiao Tong University, China

We propose an edge coupler based on the AlGaAs-on-insulator platform, utilizing silicon oxynitride as mode converter. The edge coupler exhibits an average coupling loss of 0.76 dB/facet over a wavelength range of 1500–1600 nm.

ACP2025-0815-102

Multi-Wavelength Selective Control System Design for Microring Resonator**sen Cheng^{1,2}, Ruixin Tang^{1,2}, Junjie Zhang^{1,2,3}, Ye Wang^{4*}, Yuanzhe Qu^{1,2}, Yingxiong Song^{1,2*}, Qianwu Zhang^{1,2,3}, Fang Wei⁴, Kun Zhao⁴, Yingying Chi⁵**

1. Key Laboratory of Specialty Optics and Optical Access Networks, Shanghai Institute for Advanced Communication and Data Science, China; 2. Shanghai University, China; 3. Teralink Optical Corporation, China; 4. Zhangjiang Laboratory, China; 5. Beijing Smartchip Microelectronics Technology Company Limited, China

We propose a control system based on an optical link utilizing a SOI technology fabricated MRR. The system achieves wavelength selection and stable wavelength locking within 1.35 seconds for four C-band light waves with arbitrary wavelength spacing exceeding 1 nm.

ACP2025-0815-131

An MPLC-Based 8-Channel C+L-Band Optical 90° Hybrid**Yi Sun, ziling Shen, Jie Zhang, He Wen^{*}***Beijing University of Posts and Telecommunications, China*

We propose an 8-channel C+L band optical 90-degree hybrid using multi-plane light conversion with seven phase plates, achieving -1.57 dB insertion loss, -0.51 dB mode-dependent loss, -33.01 dB crosstalk, and 5° phase errors. Tolerance analyses guide design for scalable coherent receivers.

ACP2025-0815-24

High-bandwidth Compact Thin-Film Lithium Niobate Mach-Zehnder Modulator with Transparent Electrode**zhiguo yu, yanbo ren, huan guan, zikuan liu, lifei tian, zhiyong li^{*}***Institute of Semiconductors, Chinese Academy of Sciences, China*

An high-bandwidth and high-efficiency thin film lithium niobate (TFLN) traveling-wave (TW) Mach-Zehnder modulator (MZM) with transparent electrodes is experimentally demonstrated. The device has an EO response rolling-off 1.8 dB at 110 GHz, and a 3-dB EO bandwidth extrapolating to be 155 GHz. The half-wave voltage-length products is 1.25 V.cm, and on-chip insertion loss is 2.8 dB.

ACP2025-0815-27

Reflective Coded Aperture Broadband Near-Infrared Snapshot Spectral Imaging**Yutong Li¹, Zhenming Yu^{1,2*}, LiMing Cheng¹, Jiayu Di¹, Liang Lin¹, Jingyue Ma¹, Tongshuo Zhang¹, Yue Zhou¹, Haiying Zhao¹, Kun Xu^{1,2}***1.Beijing University of Posts and Telecommunications, China; 2.Xiong'an Aerospace Information Research Institute, China*

We propose a broadband (700-1600nm) NIR snapshot hyperspectral imager using wavelength-segmented design, specialized optical components and a reflective architecture, delivering a compact, cost-effective, and highly flexible alternative to conventional systems.

ACP2025-0815-28

Integrated snapshot near-infrared hypersepctral imaging framework with diffractive optics**Jingyue Ma¹, Zhenming Yu^{1,2*}, Zhengyang Li¹, Liang Lin¹, Liming Cheng¹, Kun Xu^{1,2}***1.Beijing University of Posts and telecommunications, China; 2.Xiong'an Aerospace Information Research Institute, China*

We propose an integrated snapshot near-infrared hyperspectral imaging framework that combines designed DOE with NIRSA-Net. The results demonstrate near-infrared spectral imaging at 700-1000nm with 10nm resolution while achieving improvement of PSNR 1.47dB and SSIM 0.006.

ACP2025-0815-34

High-Speed InGaAs/InAlAs Avalanche Photodiode Based on Heterojunction Dual Charge Layers and Multiple GradingLayers**Lingtong Yang, Yu Li, Xiaofeng Duan^{*}, Kai Liu, Yongqing Huang***Beijing University of Posts and Telecommunications, China*

We propose a SAGCMCT avalanche photodiode (APD) based on heterojunction dual charge layers and multiple grading layers.

ACP2025-0815-53

An Edge Emitting Laser With on-Chip Integrated Two-Photon Polymerization 3D Printed Sidewall Convex Lens**Wei Yu, Guandong Liu^{*}, Hongli Zhu^{*}***Zhejiang Lab, China*

This study demonstrates an alternative monolithic integration approach. A laterally emitting FP laser diode was fabricated. A high-precision two-photon printing process was employed to fabricate a sidewall convex lens forming an on-chip optical system.

ACP2025-0815-68

Hybrid-Integrated Multi-Port Multi-Wavelength Laser Source for Optical I/O**Jiale Xu¹, Zijiang Yang^{1*}, Wentao Sun¹, Zhenxing Sun¹, Yue Zhang¹, Jingjing Li¹, Rulei Xiao¹, Feng Xu², Xiangfei Chen¹***1.Nanjing University, China; 2.China United Network Communications Co., LTD Jiangsu Branch, China*

We propose and experimentally demonstrate a hybrid-integrated multi-port multi-wavelength laser source, which is composed of a fiber array, multimode interference, photonic wire bonding, and DFB laser array.

ACP2025-0815-72

Nonuniform Mesh Topology Optimization for Inverse Design of Large-Scale Silicon Photonic Devices**Xinran Liu, Jifang Qiu^{*}, Lan Wu, Yan Li, Jian Wu***Beijing University of Posts and Telecommunications, China*

We present a nonuniform mesh topology optimization method that reduces design dimensionality while preserving accuracy, validated by simulations of large-scale silicon photonic vertical and multimode couplers.

ACP2025-0815-84**Silicon-Based One-dimensional Slow-Light Waveguide Modulator with High Modulation Efficiency for High-Speed Transmission****Zhen Zhen¹, Xiaobin Liu¹, Siyue Jin², Lei Wang¹***1. Peng Cheng Laboratory, China; 2. 15754309327, China*

We present a compact, reconfigurable slow-light silicon modulator. The device offers a tunable range of half-wave voltage-length product, reaching as low as 0.12 V·cm. The bandwidth ranges from 5 to 30 GHz.

ACP2025-0815-92

Ultra-Thin Silicon Nitride-Assisted Polarization-Insensitive Edge Coupler Based on Thin-Film Lithium Niobate**Zikuan Liu, Zhiguo Yu, Huan Guan, Yanbo Ren, Paiguang Zhao, Zhiyong Li****Chinese Academy of Sciences, China*

A novel ultra-thin silicon nitride-assisted thin-film lithium niobate polarization-independent end-coupler has been proposed and validated, with optimized matching for TE and TM modes. Simulations show coupling loss as low as 0.22-dB at 1550 nm, with over 98% polarization overlap integration for both modes. Experimental results show single-end face loss of 0.7 dB near 1610 nm, with stable performance over a wide wavelength range and large manufacturing tolerances, supporting high-performance LNOI photonic integration systems.

Track 5: Microwave Photonics and Optical Signal Processing

ACP2025-0527-1

Stable Optoelectronic Oscillation for Weak RF Signal Detection Based on Integrated Mutual Injection DFB Laser**Xin Zhang^{*}, Jin Yang, Feiyu Li, Xiangming Xu, Huatao Zhu, Shuwen Chen^{*}***Information Support Force Engineering University, China*

The power stability is improved from 6.27 dB to 0.83 dB, benefiting from the integrated mutual injection Laser. The detection frequency range is flexible and tunable from 1 to 24 GHz for weak RF signal.

ACP2025-0711-2

Optical frequency division referenced topHz–linewidth quantum–noise–limited lasers**Jiahao Hu, Yanlan Xiao, Heng Zhou^{*}***University of Electronic Science and Technology of China, China*

We demonstrate an OFD system leveraging common-cavity bi-color Brillouin lasers as the optical frequency references with Schawlow–Townes linewidth on the 10 μ Hz level and generating 10 GHz microwave oscillator with phase noise of -151 dBc/Hz at 10 kHz.

ACP2025-0714-4

Received Response Based Heuristic Non-binary LDPC Code for NLOS Ultraviolet Communications**Tian Luo¹, Yong Zuo^{1*}, Dong Zhu¹, Hongzhen Zhang¹, Feiyu Li², Jian Wu¹***1. Beijing University of Posts and Telecommunications, China; 2. National University of Defense Technology, China*

This paper proposes a heuristic encoding algorithm for non-binary LDPC parity-check matrices. Simulation results indicate that the proposed scheme significantly lowers the system bit error rate resulting from pulse spreading in ultraviolet communication channels.

ACP2025-0715-2

Photonic-aid dual-band radar using LFM waveforms with opposite chirp polarities**Xuan Li, Tingting Bai^{*}, Yixiao Zhou, Guodong Wang***AFEU, China*

A photonic-aid radar using two linear frequency modulated waveforms with different frequency bands and opposite chirp polarities is proposed. The applications such as moving target detection and joint radar communication are demonstrated.

ACP2025-0724-12

First Unified Optical–Microwave Switching: Experimental Demonstration of Frequency–Division Granularity for Hybrid Satellite Networks**Hanxiao Xue, Wenxin Guo, Lingxiao Li, Zhennan Zheng^{*}, Xinlu Gao, Shanguo Huang***Beijing University of Posts and Telecommunications, China*

We present the first unified architecture integrating all-optical and microwave photonic switching for cross-domain signal interaction. The system achieves 10 GBaud switching granularity with ≤ 5.36 dB SNR penalty and 16.02% EVM for three modulation formats.

ACP2025-0724-13

Integrated Imaging and Processing Based on Pixel–Level PCMs Array Spatially Modulated by VCSELs**Xiaonan An, Yi Guo, Hongxiang Guo^{*}, Jian Wu***Beijing University of Posts and Telecommunications, China*

We propose an all-optical integrated imaging–processing unit using a pixel-level phase-change materials (PCMs) array spatially modulated by VCSELs, featuring single-acquisition/multiple-processing capability for real-time pathology slide analysis.

ACP2025-0727-12

Microwave Photonic Multi-channel Configurable Broadband RF Repeater in Satellite Communication**Lingxiao Li, Hanxiao Xue, Jingxin Zhang, Xinlu Gao^{*}, Zhennan Zheng, Shanguo Huang***Beijing University of Posts and Telecommunications, China*

We proposed a microwave photonic RF repeater using an optical signal processor. The maximum ACPR of signals greater than 30 dB. The EVM reaches 6.51 %, the SFDR is 114.05 dB·Hz^{2/3}.

ACP2025-0727-5

Microwave Photonic Filter Assisted Asymmetric Triangular Waveform Generation**Xiaohong Lan, Yang Jiang^{*}, Jing Xu, Jiancheng Yu, Jinjian Feng, Tingyi Jiang, Hui Zhang, Yu Wu***College of Physics, Guizhou University, China*

The desired spectral profile of an asymmetric triangular waveform can be achieved by shaping the parabolic waveform's spectrum using a microwave photonic filter. The symmetry factor is easily adjusted by varying the filter's free spectral range.

ACP2025-0727-6

Photonic generation of flat microwave frequency combs using Mach-Zehnder Modulators**Jinjian Feng¹, Yang Jian¹, Jing Xu¹, Jiancheng Yu², Xiaohong Lan², Yu Wu²***1. College of Physics, Guizhou University, China; 2. College of Physics, Guizhou University, China*

A photonic method for generating flat microwave frequency combs (MFCs) is proposed and experimentally demonstrated. By exploiting the nonlinear modulation transfer function of a Mach-Zehnder Modulator (MZM), two-line or three-line flat combs can be generated. Cascading MZMs combined with a balanced photodetector inversion function enables the extension of comb line numbers while maintaining good flatness. Theoretical analysis confirms the feasibility of the proposed approach. In proof-of-concept experiments, a 10-line MFC with a flatness of 3.82 dB and a 14-line MFC with a flatness of 4.89 dB are successfully generated. The proposed method enables flexible tuning and good spectral flatness, offering a new access for flat MFC generation.

ACP2025-0729-49

Prediction and Optimization of Satellite Laser Communication Tracking Accuracy Based on Reservoir Computing**Cheng Liu¹, Feng Fan², Jianjun Li¹, Tianfeng Zhao¹, Shuiqiu Diao¹, Feng Wen¹***1. University of Electronic Science and Technology of China, China; 2. Beijing Institute of Telemetry, China*

Addressing the need for high-precision tracking in satellite laser communication, we propose a prediction method based on the reservoir computing (RC) concept. Compared with the conventional prediction method, e.g., the polynomial fitting method, the results show that the proposed RC tracking approach could significantly improve the prediction accuracy by an order of magnitude, resulting into the root mean square error (RMSE) reduced accordingly. The study also reveals the impacts of the data interpolation and the reservoir size on the performance, offering the optimization for practical applications.

ACP2025-0730-42

Bandpass Sampling LFM Radar based on P1 Dynamics of Optically Injected Lasers**Xin Yan¹, Fangzheng Zhang¹, Xiaoyue Yu¹, Genze Wu¹, Hao Wang¹, Yuan Yu²***1. Nanjing University of Aeronautics and Astronautics, China; 2. Huazhong University of Science and Technology, China*

We propose a microwave photonic radar system that utilizes an optically injected semiconductor laser operating in the period-one (P1) dynamics to generate broadband linear frequency-modulated (LFM) signals from 12.5–13.5 GHz. A four-channel time-division multiplexing (TDM) transmit architecture is implemented. To overcome the bottleneck of high-frequency broadband signal acquisition, bandpass sampling is applied at the receiver, the signal is sampled at 4 GSa/s under the condition of a preserved guard interval. Experimental results demonstrate successful signal reconstruction without distortion at this sampling rate, enabling accurate target ranging. Through integration TDM technology, the system achieves high-precision localization for both single and multiple targets, with a positioning error of 0.95 cm, thereby validating the effectiveness and practical applicability of the proposed bandpass sampling scheme.

ACP2025-0731-123

Optical Format Conversion from QPSK to OOK/PAM4 Channels Enabled by Polarization-assisted Phase-sensitive Amplifier**Yuxuan Dong¹, Yanxia Tan¹, Jiabin Cui¹, Guo-Wei Lu², Yuefeng Ji¹, Ninghua Zhu⁴, Huashun Wen⁴***1. Beijing University of Posts and Telecommunications, China; 2. Research Institute of China United Network Communications Co., Ltd., China; 3. Kyushu University, Japan; 4. Nankai University, China*

An optical format conversion scheme between QPSK and OOK/PAM4 signals is proposed. This scheme is enabled by polarization-assisted non-degenerated PSA based vector moving, which separates the signal and generated idler into two distinct polarization states.

ACP2025-0731-18

Transmission Characteristics of Frequency-Dependent Vortex Electromagnetic Wave and Imaging Applications**Jingcan Ma¹, Jiazhen Cai², Yufei Fu²***1. Beijing Aerospace Institute for Metrology and Measurement Technology, China; 2. School of Electronic Engineering Beijing University of Posts and Telecommunications, China*

In this paper, Theoretical derivations and simulations are employed to verify and summarize the propagation characteristics and laws of the frequency-dependent vortex electromagnetic wave. The effectiveness of imaging in both azimuth and elevation is demonstrated.

ACP2025-0731-25

A Dual-Band Microwave Photonic Radar Based on Photonic Frequency Doubling and Data Fusion**Xiaoyu Liu^{1,2}, Lingjie Zhang^{1,2*}, Zhenglin Tang^{1,2}, Mengke Wang^{1,2}, Zhen Zeng^{1,2}, Yaowen Zhang^{1,2}, Zhiyao Zhang^{1,2}, Yong Liu^{1,2}***1. University Of Electronic Science And Technology Of China, China; 2. State Key Laboratory of Electronic Thin Films and Integrated Devices, China*

We demonstrate a dual-band microwave photonic radar system based on photonic frequency doubling and de-chirped reception. An equivalent bandwidth of 12 GHz and a corresponding range resolution of 1.72 cm is achieved after data fusion.

ACP2025-0801-107

Long-term Stable Dual-loop Optoelectronic Oscillator Utilizing Phase-locked Loop**Xinyu Zhu¹, Xiyi Weng¹, Zhuoran Li¹, Xiang Liu², Wei Wei¹, Weilin Xie¹, Yi Dong¹***1. Beijing Institute of Technology, China; 2. Dongguan University of Technology, China*

We propose a dual-loop optoelectronic oscillator with enhanced long-term stability based on the phase-locked loop. The output signal achieves a side-mode suppression ratio of 50 dB. The overlapping Allan deviation reaches 1.9×10^{-13} at 1000s.

ACP2025-0801-112

Efficiency-Enhanced Optical Comb Generation Based on Achromatic Time Lens Assisted Cross-Phase Modulation**Liu Huabei^{1,2}, Xie Qijie¹, Ma Chunyang¹, Na Quanxin¹, Shao Liyang², Wang Lei¹***1. PengCheng Laboratory, China; 2. Department of Electrical and Electronic Engineering, Southern University of Science and Technology, China*

we have demonstrated generation of tunable-space optical combs via cross-phase modulation using rate-multiplied pulse trains. The pulse is pre-processed by an achromatic time lens for enhancing conversion efficiency of the optical comb up to 83%.

ACP2025-0801-138

Local Attention-Enhanced End-to-End Learning Framework for Photonic-Based W-band Fiber-mmWave Integrated Communication Systems**LiangtaoChen¹, Dong Boyu¹, Liu Yinjun¹, Ping Dianyan¹, Li Yaxuan¹, Wei Yuan², Chi Nan², Zhang Junwen^{2*}***1. Fudan University, China; 2. Fudan University, China*

Fiber-mmWave integrated communication systems face significant challenges from complex channel characteristics and computational limitations of existing optimization approaches. This paper proposes a novel local attention-enhanced end-to-end learning framework that reduces computational complexity from $O(L^2)$ to $O(LW)$ while maintaining superior modeling capabilities. The framework integrates a model-driven transmitter, an adaptive channel model with local attention mechanisms for end-to-end training, and a neural receiver with nonlinear equalization. Experimental validation on a 96.5 GHz fiber-mmWave system demonstrates data transmission at 15 GBaud with GMI reaching 5.11 bits/symbol and AIR of 75 Gb/s, showing 0.13–0.24 bits/symbol improvement over baseline methods.

ACP2025-0801-144

Adaptive Noise Compensation for Optical Convolution Systems: A Machine Learning Retraining Approach**Xiyao Jia, Yixuan Zheng, Yifu Xu, Shifan Chen, Yunping Bai, Xingyuan Xu***The State Key Laboratory of Information Photonics and Optical Communications, School of Electronic Engineering, Beijing University of Posts and Telecommunications, China*

We combined photonic convolution processor and electronic compute unit to achieve portrait segmentation, and proposed a noise retraining method for complex optical links to reduce the impact of noise on model performance.

ACP2025-0801-65

High-Performance Chaotic Signal Generation via Optical Heterodyning of Mutually Injected Semiconductor Lasers**Houlin Wang, Pei Zhou, Yu Huang, Nianqiang Li***Soochow University, China*

Using optical heterodyning of two mutually injected semiconductor lasers, we generate a high-performance chaotic microwave signal (35.91 GHz bandwidth, 9.69 dB flatness, TDS=0.057), demonstrating strong potential in random number generation, radar, and secure communications.

ACP2025-0813-15

A Channelized Multi-Microwave Frequency Measurement System Based on Frequency-to-Time Mapping**Ju Chen, Liangshun Zhao, Yue Zhang, Caili Gong, Ying Zhan, Yongfeng Wei***Inner Mongolia University, China*

A high-precision, ultra-wideband multi-channel microwave frequency measurement system based on FTTM, with 60GHz bandwidth, 36.62GHz/ μ s speed, 1MHz error, and image interference immunity.

ACP2025-0815-116

Modeling and Noise Impact Analysis of Electro-Optic Comb Time and Frequency Transfer System**Weiha Liang, Chenbo Zhang, Yi Zou, Zhangyuan Chen, Xiaopeng Xie***Peking University, China*

We performed simulation modeling and noise analysis of an electro-optic comb time-frequency transfer system. The impacts of laser linewidth, photodetector noise, modulator bias drift, and dispersion on system performance were investigated. This work aims to provide quantitative references for the system design and practical deployment of electro-optic comb time-frequency transfer systems, offering guidance for the selection of key components and the optimization of system parameters.

ACP2025-0815-118

A narrow-pulse laser recovery method based on non-synchronized linear optical sampling**Chengda Huo, Feng Tian, Chuanji Yan, Jianwei Zhou, Jing Zhang, Meng Qiu***Beijing University of Posts and Telecommunications, China*

A pulse recovery method based on software-synchronized LOS system is proposed. The method reduced the bandwidth and sampling rate requirements for the devices at the receiving end. An experiment sampling on self-developed ytterbium-doped fiber pulsed lasers is completed, the recovery result correlation coefficient achieve reach 0.9745 to the initial signal.

ACP2025-0815-130

Fast Signal Selection and Parallel Multi-Parameter Extraction Technology based on Optical Channelization**Rui Li, Yin He, Xukai Ji, Feifei Yin, Yitang Dai, Kun Xu***Beijing University of Posts and Telecommunications, China*

fast signal selection and parallel multi-parameter extraction technology using optical channelization delivers 16-GHz instantaneous bandwidth in single scans, achieving parameter extraction at -76 -dBm receiver sensitivity, ≤ 0.3 -MHz frequency error, ≤ 40 -ns time error, and ≤ 1 -dB amplitude deviation.

ACP2025-0815-151

Photonic Architecture for Remote Measurement of DFS and AOA with Self-Interference Cancellation**Liangshun Zhao, Yue Zhang, Ju Chen, Ying Zhan, Cailli Gong, Yongfeng Wei****Inner Mongolia University, China*

A photonic architecture based on stimulated Brillouin scattering is proposed for remote multi-parameter measurement of microwave signals. Compared with previous research, the architecture can not only realize the simultaneous measurement of Doppler frequency shift (DFS) and arrival of angle (AOA) without direction ambiguity, but also eliminate the self-interference signals.

ACP2025-0815-63

Low-Phase-Noise Widely Tunable Stepped-Frequency Microwave Carriers in a Dual-Pump Brillouin Cavity**Jiaxuan Wang, Yihan Wang, Jiansen Ji, Yin Xu, Hualong Bao****Soochow University, China*

We demonstrate an ultra-low noise (-115 dBc/Hz @10 kHz) stepped-frequency microwave carrier tunable from 260–300 GHz, featuring 6.4 GHz scanning bandwidth and $10 \times$ faster frequency hopping rates, meeting next-generation high-frequency requirements.

ACP2025-0815-77

Spectrum-Efficient RoF Link Using MRR-Based Phase Shifters for Signal Demultiplexing**chenhui Liu¹, Wenjie Xuan¹, Xiaoyang Che¹, Yu Liu¹, Junyi Zhang¹, Ruiqi Zheng¹, Jiejun Zhang^{1*}, Jianping Yao², Long Huang^{1*}***1.Jinan University, China; 2.University of Ottawa, China*

We propose and demonstrate a novel spectrum-efficient radio-over-fiber (RoF) link using a dual-drive Mach-Zehnder modulator (DD-MZM) to multiplex two radio-frequency (RF) signals with an identical RF carrier frequency at the transmitter and two microring resonators (MRRs) to demultiplex the two RF signals at a receiver. The proposed RoF link offers a two-fold increase in transmission capacity with a simple configuration and compensate chromatic dispersion at the same time.

ACP2025-0815-80

Ultrahigh-Precision Flash 3D Velocity Imaging**Shukang Xu, Junze Tian, Jiao Liu, Bin Wang*, Weifeng Zhang***Beijing Institute of Technology, China*

We propose an ultrahigh-precision solid-state flash velocity imaging method based on optical coherent detection by leveraging mature CCD sensors. The proposed velocity imaging system exhibits an ultrahigh velocity measurement precision of 1 mm/s.

ACP2025-0816-4

Hybrid FSO and MMW Communication Systems with Simplified Structure and Low Phase Noise**Junjie Zheng, Yejun Liu****Chongqing University of Posts and Telecommunications, China*

We propose a hybrid free-space optical (FSO) and millimeter wave (MMW) communication system with simplified structure and low phase noise, which achieves notable transmission performance even if the laser linewidth reaches tens of MHz.

Track 6: Micro-, Nano-, and Quantum Photonics: Science and Applications

ACP2025-0723-4

Design of Heterogeneous Integrated Tunable Erbium-doped LiNbO₃-GeSbS waveguide laser

Chunxu Wang^{1,2*}, Bing Yue^{1,2}, Honglin Ji¹, Juhao Li¹, Zhixue He¹

1. Department of Circuits and Systems, PengCheng Laboratory (PCL), China; 2. School of Electronics and Information Technology & Guangdong Provincial Key Laboratory of Optoelectronic Information Processing Chips and Systems, Sun Yat-sen University, China
We propose a CMOS-compatible heterogeneous integrated tunable Er-doped LiNbO₃-GeSbS waveguide laser. The resonant cavity structure achieves a transmission loss of 0.3 dB/cm and wavelength tuning across the 1520–1590 nm, while the gain waveguide exhibits a gain of 2.1 dB/cm.

ACP2025-0728-13

Suspended Mid-Infrared Nanobeam Cavity based on Thin Film Lithium Niobate

Zehao Guo, Weixi Liu, Jingshu Guo, Yaocheng Shi*Zhejiang University, China*

We first demonstrate a suspended mid-infrared nanobeam cavity on thin film lithium niobate. Experimental results show ~1.1 dB insertion loss, Q-factor of over 3000 and an extinction ratio of ~15 dB at 3.6 μm wavelength.

ACP2025-0728-18

High-Efficiency Phase-Change Beam Steering for Wavelength-Selective Optical Switching

Xiaoqi He¹, Yan Li², Yuru Li², Yanfeng Zhang^{1,3}, Zhaohui Li^{4,5,6}

1. School of Electronics and Information Technology, Sun Yat-sen University, China; 2. School of Microelectronics Science and Technology, Sun Yat-sen University, China; 3. State Key Laboratory of Optoelectronic and Technologies, Sun Yat-sen University, China; 4. School of Electronics and Information Technology, Sun Yat-sen University, China; 5. Guangdong Provincial Key Laboratory of Optoelectronic Information Processing Chips and Systems, Sun Yat-sen University, China; 6. Southern Laboratory of Ocean Science and Engineering, China

We propose a reconfigurable phase-gradient metasurface based on low-loss phase-change material Sb₂Se₃ for dynamic beam steering. By leveraging the large refractive index contrast in Sb₂Se₃ phase-change, the metasurface generates a tunable phase gradient that enables wavelength-selective beam deflection with high efficiency. This approach provides a compact solution for wavelength-selective optical switches (WSSs), with promising applications in wavelength-division multiplexing (WDM) systems requiring dynamic spatial light control for reconfigurable photonic networks.

ACP2025-0730-17

Dynamics of soliton self-compression in silicon nitride waveguides

Xueying Sun, Hairun Guo^{*}, Qiankun Li, Yongyuan Chu, Chengbo Mou, Chaoqian Wei*Shanghai University, China*

We demonstrate coherent supercontinuum (SC) generation in silicon nitride waveguide chips governed by soliton self-compression regime. Concurrently achieving octave-spanning supercontinuum with few-cycle pulses would benefit to applications from spectroscopy to time-resolved ultrafast detection.

ACP2025-0730-39

Design of a multi-spectral superconducting nanowire singlephoton detector with high efficiency and high speed

Dezhi Li^{1*}, Ziqi Gao¹, Yan Zhang¹, Kai Yang¹, Shen He¹, Xinyi Liu²

1. China Mobile Research Institute, China; 2. Beijing University of Posts and Telecommunications, China

The designed single photon detector shows absorption efficiencies of over 85% at the three target wavelengths of 1550 nm, 1310 nm and 1064 nm while the filling factor of nanowire is only 20%.

ACP2025-0731-118

Photorefractive-Induced Bias Drift Attack Against Continuous-Variable Quantum Key Distribution

Ziyan Zhou, Xuesong Xu, Yichen Zhang, Song Yu*Beijing University of Posts and Telecommunications, China*

We theoretically and experimentally demonstrate an attack on continuous-variable quantum key distribution. The attack exploits photorefractive-induced index changes, causing modulator bias drift, leading to overestimated secret key rates and ultimately compromising system security.

ACP2025-0731-5

Silicon nitride integrated electro-optic modulator based on transparent conductive oxides**Evgeniy Lotkov^{1,2*}, Alexander Baburin^{1,2}, Ali Amiraslanov¹, Kirill Buzaverov^{1,2}, Evgeny Sergeev^{1,2}, Evgeny Chubchev², Alexander Dorofeenko², Evgeny Tereshenkov², Evgeny Andrianov², Sergey Avdeev^{1,2}, Sergey Bukatin¹, Aleksey Kramarenko¹, Ilya Ryzhikov¹, Ilya Rodionov^{1,2}***1.FMN Laboratory Bauman Moscow State Technical University, Russia; 2.Dukhov Research Institute of Automatics (VNIIA), Russia*

Silicon nitride (SiN) is currently the most prominent platform for photonics in the visible and near-IR wavelength bandwidth. However, realizing fast electro-optic modulators, the key components of any integrated optics platform, remains challenging in SiN. Recently, transparent conductive oxides have emerged as a promising material for photonic integrated circuits. In this work, we take an important step towards combining the advantages of both platforms, reporting for the first-time high-speed indium tin oxide electro-optic modulators based on silicon nitride waveguides. We demonstrate a bandwidth higher than 1 GHz, 9.3- μ m-length active element and an insertion loss of 5.7 dB for a 300 nm-thickness SiN waveguide platform. Simulation results of optimized device designs indicate that further improvements are possible, offering promising opportunities for silicon nitride photonic integrated circuit platform combined with indium oxide-based layers.

ACP2025-0731-52

Extreme ultraviolet interference lithography based on table-top HHG light source**Mingjie Yao¹, Xia Yu^{1*}, Hao Li², youyang zhou³, xiaoshi zhang³***1.Beihang University, China; 2.Singapore Institute of Manufacturing Technology, China; 3.Yunnan University, China*

We present a table-top Extreme ultraviolet interference lithography (EUV-IL) system at 29.6 nm central wavelength of high harmonic generation radiation. The EUV-IL generates periodic aerial images of 22 nm half-pitch (HP) at the two-mirror interference system. In this letter, we investigated the influence of femtosecond EUV laser on high resolution interference pattern. The simulation results of the interference pattern are discussed

ACP2025-0731-79

Non-Line-of-Sight Target Recognition Based on Multi-Detection Points Collaboration Strategy**Qi Zhang, Yue Zheng*, Guangyun Shang, Zhonghao Xi, Yongjian Liu***Beihang University, China*

Based on active NLOS system, proposes multi-detection points collaboration with SPAD array and CNN, analyzes key variables' impact; single/multiple target experiments hit 92% accuracy, with great potential.

ACP2025-0731-96

CNN-Based Sub-Pixel Phase-Error Model for LCOS-SLMs**Yuanhao Jiang*, Tomohiro Maeda, Hideyuki Sotobayashi***Aoyama Gakuin University, Japan*

We propose a CNN-based model to learn LCOS-SLM sub-pixel phase-distortion patterns. The proposed network predicts 100×100 distorted phase distributions from 5×5 input patterns, achieving 94% agreement with measurements.

ACP2025-0801-10

Evaluation of Q-factor degradation in high-Q silicon nanocavities induced by electron and gamma-ray irradiation**Ayumi Ishihara^{1*}, Yasushi Takahashi²***1.Osaka Metropolitan University, Japan; 2.Okayama University, Japan*

We investigated radiation effects on high-Q silicon nanocavities. Electron and gamma-ray irradiation were performed, and Q-factor degradation was quantitatively evaluated. Electron beams induced optical loss, while gamma rays showed negligible impact.

ACP2025-0801-136

Ultra-low loss and ultrabroadband Si₃N₄ waveguide-crossing using an inverse design method**Yan Fan, Haoran Wang, Ziyang Xiong, Hao Deng, Tong Lin*, Zhenhua Ni***School of electronic science and engineering Southeast university, China*

A silicon nitride waveguide crossing is demonstrated using a single-hidden-layer neural network-based inverse design. It achieves ultra-low excess loss and 375 nm bandwidth from O to L band. Experimental validation confirms excellent crosstalk suppression and scalability for photonic integration.

ACP2025-0801-152

An On-Chip Tunable Dispersion Compensator Based on 8th-Order FIR Architecture**Shuo Lang*, Yumeng Liu*, Zihan Bai*, Zhangfeng Ge*, Huimin Du*, Tiantian Li****1.Xi'an University of Posts & Telecommunications, China; 2.Peking University Yangtze Delta Institute of Optoelectronics, China*

This paper introduces the design and implementation of an on-chip dispersion compensator based on 8th-order FIR architecture. Experimental results show that it has a dispersion tuning range from -190 ps/nm to +220 ps/nm.

ACP2025-0801-178

Design and Implementation of a Tunable On-Chip Multi-Channel Optical Filter**Zihan Bai¹, Yumeng Liu¹, Shuo Lang¹, Zhangfeng Ge², Huimin Du¹, Tiantian Li^{1*}***1. School of Electronic Engineering Xi'an University of Posts & Telecommunications, China; 2. Peking University Yangtze Delta Institute of Optoelectronics, China*

An on-chip tunable optical filter with multi-channel operation is demonstrated, exhibiting a 0.275 nm FSR, center wavelength tunable up to 45% of the FSR, and extinction ratio adjustable between 12.1 and 17.5 dB; MZI phase tuning enables flexible multi-port power distribution with stable spectra.

ACP2025-0801-186

Performance Analysis of Silicon Microring Resonators using Newtonian Cooling and Non-Fourier Heat Conduction Models**Menglong He^{*}, Matthias Thiele, Abdou Shetewy, Jens Lienig, Kambiz Jamshidi^{*}***Technische Universität Dresden, Germany*

We study and compare thermal dynamics and the corresponding nonlinear model (temporal and steady-state response) of active silicon microring resonators using the traditional Newtonian cooling approach and the non-classical non-Fourier heat conduction framework.

ACP2025-0801-208

Strong 1112 nm Dispersive Wave Generation in z-cut TFLN Waveguide for Potential Ytterbium Clock Applications**Lingfang Wang^{*}, Tianyou Tang, Xiang Bai, Zhibang Guo, Lin Chen***University of Electronic Science and Technology of China, China*

A strong 1112 nm dispersive wave was generated in a 1 μm -wide z-cut TFLN waveguide, showing potential for integrated photonic-chip optical clocks through supercontinuum evolution under varying pump power and polarization.

ACP2025-0801-48

Polarization-Independent and Efficient Second Harmonic Generation on Thin-Film Lithium Niobate**Hanwen Li, Weixi Liu, Liu Liu, Daoxin Dai, Yaocheng Shi^{*}***Zhejiang University, China*

We propose a polarization-independent second harmonic generation device that achieves theoretical TM_0 - TM_0 conversion efficiency exceeding $3950\% \text{W}^{-1} \text{cm}^{-2}$ in the 1540–1560 nm range, with a maximum of $4220\% \text{W}^{-1} \text{cm}^{-2}$, which represents 98% of the TE_0 - TE_0 efficiency.

ACP2025-0801-50

Broadband Filtering in Femtosecond Laser-Driven Thin-Film Lithium Niobate Microresonator**Lingfang Wang^{*}, Tianyou Tang***University of Electronic Science and Technology of China, China*

Leveraging TFLN's strong nonlinearity and polarization-dependent effects, we demonstrated spectral bandwidth tuning of ~ 300 nm and extinction ratio of ~ 21 dB, which enabled applications in tunable spectral filtering and on-chip signal processing.

ACP2025-0801-57

Inverse design of on-chip optical filter by tandem neural networks**Xianxian Jiang, Weijie Xu, Junjia Wang^{*}***Southeast University, China*

We propose on-chip optical filter implemented through nanopixel architecture, which was inverse designed using tandem neural networks. By simply etching a few squares on a slab waveguide, the device can achieve arbitrary transmission spectra across the 1530–1570 nm range. The measured transmission spectral response of the device achieved an extinction ratio exceeding 3 dB, while demonstrating 80% similarity to the target response.

ACP2025-0801-76

High-Fidelity OFDM Signal Demodulation Enabled by Optical-Sample-and-Hold Photonic ADC**Le Zhang, Ruiheng Qin, Na Qian, Xinpei Chen, Jiaxing Wu, Weiwen Zou^{*}***Shanghai Jiao Tong University, China*

This work demonstrates an all-optical sample-and-hold technique that eliminates timing mismatches in time-interleaved photonic analog-to-digital converters by converting sampled points into sustained temporal segments via optical true-time delay.

ACP2025-0812-1

Frequency-reconfigurable optomechanical Airy-beam generator**Pengju Kuang, Ning Fu, Yongjun Huang***University of Electronic Science and Technology of China, China*

This work presents the theoretical framework and demonstration of frequency-reconfigurable Airy beam generator utilizing optomechanical meta-device. We introduce a high-efficiency meta-atom design that enables dynamic modulation of reflection amplitude and phase through external optical excitation.

ACP2025-0813-1

808 nm five-junction VCSEL array chip for high-power applications**WangMengqi^{1,2}, YuLei^{1,2*}, YangYibo^{1,2}, XinYifan^{1,2}, WangYufei^{1,2}, WangPengfei^{1,2}, ZhangYejin^{1,2}, PanJiaoqing^{1,2*}***1.Key Laboratory of Optoelectronic Materials and Devices, Institute of Semiconductors, Chinese Academy of Sciences, China;**2.Center of Materials Science and Optoelectronics Engineering, University of Chinese Academy of Sciences, China*

The 808 nm VCSEL is of considerable application value across a range of fields. In this work, an electro-optical efficiency of 40.14% and a peak output power of 505 W were attained.

ACP2025-0813-8

Optomechanical oscillation and Drude electron-hole plasma in Silicon Photonic crystal cavity**Pengju Kuang, Yongjun Huang***University of Electronic Science and Technology of China, China*

In this paper, the different cavity dynamic Phenomena with optomechanical oscillation and Drude electron-hole plasma are observed and discussed for a two-dimensional (2D) Photonic crystal cavity with suspended beams.

ACP2025-0814-25

Optical Frequency Comb Control via Staircase and Bistability Effects in Cavity Optomechanical-Thermal Systems**Xiangming Xu, Huatao Zhu, Shuwen Chen, Feiyu Li, Xin Zhang***Information Support Force Engineering University, China*

Staircase and bistability effects enable discrete switching of optomechanical frequency combs, achieving 27% tooth count variation with fixed 19.8-MHz spacing

ACP2025-0814-28

Reconfigurable multifunctional nano-photonic device for multiband thermal radiation management**Mingyu Luo^{*}, Zhengyu Zhang, Chao Lu***The Hong Kong Polytechnic University, Hong Kong, China*

In this paper, a multi-functional nanostructure with phase change material (PCM) is proposed to achieve tunable infrared detection, radiation cooling and infrared (IR)-laser compatible camouflage. The proposed device can achieve a higher rate of more than 50% laser absorption at 10.6 μm while ensuring the average infrared emissivity below 20%. It can be observed from Fig. 1 that the absorption rate of the device in the atmospheric window is significantly reduced, especially at 3–5 μm, the maximum absorption rate is significantly reduced from 95% to 22%, and the average absorption rate is also reduced to about 15%.

ACP2025-0815-1

Long-Wave Infrared Broadband Quarter-Wave Plate Based on Silicon Metasurface**Wenkai Lu¹, Ting Chen², Xiaowei Guan², Yaocheng Shi^{1*}***1.Zhejiang University, China; 2.Jiaxing Research Institute of Zhejiang University, China*

Broadband quarter-wave plates are designed using metasurface composed of silicon micro-pillars featuring a truncated elliptical cone. A broadband width of ~1.2 μm and a polarization conversion efficiency exceeding 98% are achieved in long-wave infrared band.

ACP2025-0815-47

Fast Fiber Alignment System for Silicon Photonics Using Model Fitting Approach**Yisu Yang^{*}***Beijing University of Posts and Telecommunications, China*

We demonstrate a model fitting approach in fiber-to-chip automatic alignment system. A reduction of 91.4% of number of measurement of traditional alignment can be achieved without degrading the alignment quality.

ACP2025-0815-8

Multioctave SFDR Stability Characterization in Quartz-based TFLN Modulators up to 50 GHz**Jingmei Zhang, Zihan Tao, Yunhao Zhang, Jianyang Cai, Liyuan Yao, Haowen Shu^{*}, Xingjun Wang^{*}, Yandong He^{*}***Peking University, China*

We systematically analyze the frequency related linearity and spurious-free dynamic range (SFDR) variations in several mainstream electro-optical modulators, including silicon modulator and thin-film lithium niobate (TFLN) modulators. Ultra-wideband experimental measurements over an ultra-wideband range up to 50 GHz are performed for the first time to investigate and verify the broadband SFDR stability of a large bandwidth TFLN modulators based on low-loss quartz substrates, result in a consistent SFDR of 97–99 dB·Hz^{2/3}.

Track 7: Photonic Sensors & Bio-Photonics

ACP2025-0726-13

A High-Sensitivity Near-Infrared Diffuse Reflectance Sensor for Non-Invasive Glucose Monitoring: Design Principles and Experimental Validation**Wenbo Liu, Jin Liu, Jiayu Chen, Di Sun, Kexin Xu, Tongshuai Han****Tianjin University, China*

This study presents a near-infrared diffuse reflectance sensor optimized for human glucose monitoring, achieving high sensitivity at 1550 nm and capable of detecting changes in human skin glucose concentration as small as 0.37 mM.

ACP2025-0726-3

An Optical Waveguide Surface Plasmon Resonance Sensor for Low Refractive Index Sensing**Kemin Li, Yongzheng Liang, Huanbin Qiu, Jiamin Mou, Haolong Huang, Qingming Chen****Sun Yat-sen University, China*

This work develops a highly sensitive optical waveguide SPR sensor for low refractive index (RI) sensing. A high sensitivity of 11000 nm/RIU has been achieved for RI from 1.33 to 1.36, with 10 times enhancement.

ACP2025-0726-4

A Dye-doped Polymer Fiber Based Strain Sensor**Yufei Ma, Xiaoshi Li, Yongzheng Liang, Yikang Peng, Boran Xie, Qingming Chen****Sun Yat-sen University, China*

This work presents a dye doped polymer fiber for strain sensing. Its absorption loss is proportional to the fiber elongation length. The elongation of 165% and detection sensitivity of 72.8 dB/cm have been demonstrated.

ACP2025-0729-17

Application of Correlation OTDR with High-Resolution Localization in Vehicular PONs**Zhaojun Xu^{1,2}, Wu Liu^{1,2}, Yaoyang Zhang^{1,2}, Yan Zuo^{1,2}, Ming Luo^{1,2}***1. National Key Laboratory of Optical Communication Technologies and Networks, China; 2. China Information and Communication Technologies Group Corporation, China*

We propose a correlation detection-based scheme for fault monitoring and localization in vehicle-mounted PON environments, achieving 4 cm spatial resolution and -30 dBm sensitivity. Reflectivity variations under temperature fluctuations and fiber breaks are experimentally analyzed.

ACP2025-0730-26

Chalcogenide-based Optical Micro-ring Sensor Array Patch for Precise Blood Pressure Monitoring**Xiaokai Cai¹, Zhangyi Sun¹, Bonan Chen¹, Jingshun Pan², Zhaohui Li^{1,3*}***1. School of Electronics and Information Technology and Guangdong Provincial Key Laboratory of Optoelectronic Information Processing Chips and Systems, Sun Yat-sen University, China; 2. School of Information and Optoelectronic Science and Engineering, South China Normal University (SCNU), China; 3. Southern Marine Science and Engineering Guangdong Laboratory (Zhuhai), China*

We demonstrate an optical pulse-sensing patch employing 10 chalcogenide microring resonators that precisely monitors pulse waveforms, heart rate, and blood pressure, achieving 4 mmHg deviation from commercial monitors through accurate arterial waveform analysis.

ACP2025-0730-36

A Power Transmission Line Monitoring Scheme Using Correlation-Based OTDR**Hanwen Liu¹, Chenwei Zhu², Xiang Li²***1. School of Optical and Electronic Information, Huazhong University of Science and Technology, China; 2. School of Mechanical Engineering and Electronic Information, China University of Geosciences, China*

Using correlation detection, we propose a dynamic OPGW tension monitoring scheme that achieves 1 cm precision in fault location and stretching sensing. The scheme can achieve icing and galloping monitoring at sampling rates below 10 Hz.

ACP2025-0730-40

High Spatial Resolution Distributed Twist Sensor Based on OFDR in Spun Fiber**Yalin Gao¹, Shuyan Chen¹, Zhiyong Zhao¹, Zhuyixiao Liu¹, Weijun Tong², Ming Tang¹***1. School of Optical and Electronic Information and Wuhan National Laboratory for Optoelectronics, Huazhong University of Science and Technology, Wuhan, China, China; 2. Weijun Tong is with the School of Optical Information and Energy Engineering, School of Mathematics and Physics, Wuhan Institute of Technology, Wuhan, China, China*

We proposed and experimentally demonstrated a high spatial resolution distributed twist sensor based on OFDR in spun fiber, which is promising in applications such as structural safety monitoring, medical intervention, and biomimetic design, etc.

ACP2025-0730-43

Lightweight Multi-Sensor Recognition Network for Optical Sensing System**Yuhao Wang, Yong Zuo*, Yan Wang, Xiaobin Hong, Jian Wu***Beijing University of Posts and Telecommunications, China*

A lightweight multi-sensor recognition network is proposed, which integrates camera and lidar information to improve the robustness of object recognition in optical sensing systems.

ACP2025-0731-28

Dual-mode micro-ring resonator for gas and temperature sensing**Qiyue Lang¹, Rongxiang Guo², Zunyue Zhang¹, Tiegeng Liu¹, Jiaqi wang^{3*}, Hon Ki Tsang⁴, Zhenzhou cheng^{1*}**

1. Tianjin university, China; 2. Tianjin University, China; 3. Shenzhen University, China; 4. The Chinese University of Hong Kong, Hong Kong, China

A dual-mode microring resonator for gas and temperature sensing. CO₂ and temperature sensitivities are measured as 0.422 pm/% and 0.081 nm/K for the TE₀ mode and 0.591 pm/% and 0.079 nm/K for the TE₁ mode.

ACP2025-0731-35

Comparative Analysis of Longitudinal Power Monitoring Techniques for PDL Monitoring**Peiyun Ge, Yichao Wang, Tianrun Sun, Zili Fang, Lixia Xi, Xiaoguang Zhang***Beijing University of Posts and Telecommunications, China*

We compare the performance and complexity of the three LPM methods for PDL localization, and showing that these techniques capture the distributed lumped PDL values, rather than the true local PDL at each element.

ACP2025-0731-42

Point Cloud Semantic Segmentation Method Based On Edge Feature Enhancement**Yan Wang, Yong Zuo*, Xiaobin Hong, Jian Wu, Yuhao Wang***Beijing University of Posts and Telecommunications, China*

Accurate semantic segmentation of LiDAR point clouds is a critical component for perception in autonomous driving, robotics, and intelligent sensing systems. However, the irregular sampling pattern and sparsity of LiDAR data often lead to edge degradation and insufficient context modeling in existing lightweight segmentation networks. To address these challenges, this paper presents EFE-PCSS, an edge feature-enhanced framework specifically designed for LiDAR sensing data. The proposed architecture integrates a bilateral convolution module that performs spatial-feature dual-path interaction, guided by dynamically weighted kernels constrained by geometric consistency and feature similarity, effectively preserving fine structural boundaries in sparse LiDAR scans. Additionally, a channel-spatial attention mechanism and cross-layer dynamic fusion strategy are incorporated to enhance both local detail capture and global contextual reasoning. Extensive experiments on three representative LiDAR benchmarks - SemanticKITTI, Semantic3D, and S3DIS - demonstrate consistent mIoU improvements of 3.9%, 2.6%, and 3.6%, respectively, while maintaining real-time performance. These results highlight the effectiveness and deployment potential of EFE-PCSS in real-world LiDAR-based perception systems.

ACP2025-0731-62

Investigation of Internal Thermal Distribution in Pouch Lithium-ion Batteries during Charging and Discharging**Quan Xu^{1,2}, Min Zhang³, Mengmeng Chen^{1,3*}, Ye Chen⁴, Shaohua Guo³, Fei Xu³**

1. Nanjing Xiaozhuang University, China; 2. Hanjiang No.1 High School Of Yangzhou, China; 3. Nanjing University, China; 4. Nanjing University of Aeronautics and Astronautics, China

A coupled electrochemical-thermal model based on the pseudo-two-dimensional (P2D) structure of lithium-ion batteries was established using Multiphysics to simulate and analyze the spatial and temporal distribution of temperature during battery operation. Based on the simulation results, critical locations that comprehensively represent the thermal characteristics of the battery were selected for temperature monitoring. Accordingly, a temperature sensing system based on fiber Bragg grating (FBG) was designed and implemented. FBG sensors were embedded at the anode, cathode, and the central symmetry axis of pouch-type lithium-ion batteries to collect and analyze internal temperature data. Temperature monitoring was carried out under various current conditions for batteries equipped with embedded FBG sensors. Experimental results revealed a characteristic double-peak fluctuation in internal temperature during a full charge-discharge cycle—rising, then falling, and again rising before finally decreasing, reaching its maximum at the cycle's end. Long-term operational tests demonstrated that the FBG sensors, while ensuring normal charge and discharge cycles, reliably provided real-time, high-precision measurements of internal temperatures. These findings are consistent with results obtained from simulation analysis. The proposed methodology offers robust technical support for the optimization and advancement of lithium-ion batteries, significantly enhancing research and maintenance efficiency.

ACP2025-0731-64

Study on the SNR and demodulated phase precision of Φ -OTDR with Pre-amplification**Qian Zhang¹, Xinyu You¹, Caixiao Ouyang^{2*}, Zhisheng Yang¹, Xiaobin Hong¹, Jian Wu¹**

1. Beijing University of Posts and Telecommunications, China; 2. Wuhan Vocational College of Software and Engineering, China

The SNR and demodulated phase precision in heterodyne-detection pre-amplification Φ -OTDR is modelled and experimentally demonstrated. Results show that Φ -OTDR does not always benefit from the pre-amplification scheme, depending on the noise condition of the photodetector.

ACP2025-0731-77

High-performance Vibration Sensing Based on Subband Phase-Shift Transform in Integrated Sensing and Communication System**Yan Zuo^{1,2}, Wu Liu^{1,2*}, Yafeng Cheng³, Xiang Li³, Ming Luo^{1,2}***1. National Key Laboratory of Optical Communication Technologies and Networks, China; 2. China Information and Communication Technologies Group Corporation, China; 3. School of Mechanical Engineering and Electronic Information, China University of Geosciences, China*

We experimentally propose a high-performance ISAC system which suppresses interference fading in Φ -OTDR, achieving a 82.8 pε/sqrt (Hz) strain sensitivity and a 10 m spatial resolution, while simultaneously supporting 100 Gbps DP-QPSK transmission. Hz

ACP2025-0801-139

Fibre Vibration Sensing and Localization with Cross-Correlation based Neural Network in a Practical Bidirectional Optical Transmission System**Wanxin Zhao^{1,2}, Sen Shen², Vaigai Yokar², Xiaoguang Zhang¹, Lixia Xi¹, Shuangyi Yan², Dimitra Simeonidou²***1. Beijing University of Posts and Telecommunications, China; 2. University of Bristol, United Kingdom*

We present a CC-CNN localization algorithm for vibration detection over Bristol's urban fibre network, achieving an 8-km spatial resolution and outperforming pure cross-correlation methods in accuracy and robustness. High-precision time synchronization over the fibre link with around 200-ns jitter enables precise localization.

ACP2025-0801-170

Helium Ion Irradiation Testing of a Photonic Charge Sensor**Wataru Takahama¹, Ayumi Ishihara¹, Yuta Kanemaru¹, Rikuto Ichinose¹, Kohtaku Suzuki², Yasushi Takahashi^{3*}***1. Osaka Metropolitan University, Japan; 2. The Wakasa Wan Energy Research Center, Japan; 3. Okayama University, Japan*

To evaluate its feasibility for use in space, we investigated the optical response of the photonic charge sensor when exposed to helium ions. The optical output from the sensor decreased in proportion to the helium ion dose. Even after exposure to a helium ion dose equivalent to more than 1000 years of radiation in low Earth orbit, the sensor maintained its functionality.

ACP2025-0801-184

Ultrasensitive Detection of Extracellular Vesicles Using a Microbubble Resonator**Yu Zhang, Songyi Liu, Xiaoying He*, Daquan Yang****Beijing University of Posts and Telecommunications, China*

We present a label-free microbubble resonator (MBR) biosensor for ultrasensitive extracellular vesicles (EVs) detection, which has a quality factor of $\sim 10^6$ and achieves a detection limit of 6 particles/mL, enabling rapid and sensitive EV analysis.

ACP2025-0801-53 **Industry Innovation Nomination****Development of AGF-OFDR-based Distributed Temperature Measurement Technology for Flexible Pouch Sodium-Ion Battery Cell****Zhi Wang, Yinan Ma, Dan Li, Guo Zhu, Junxian Hou*, Fei Liu, Xian Zhou****University of Science and Technology Beijing, China*

This study employs OFDR and AGF for high-resolution thermal monitoring of sodium-ion battery, revealing internal resistance differences and enhancing thermal research.

ACP2025-0801-54

Integrated Reconstructive Spectrometer Based on a Si₃N₄-Si dual-layer Platform**Lin Xiao***Harbin Institute of Technology, China*

We propose and numerically investigate a dual-layer Si₃N₄-Si integrated spectrometer with 40 pm resolution spanning the 1500-1600 nm wavelength range. The device is implemented in a 29 × 29 μm² footprint with 300 sampling channels.

ACP2025-0811-7

High-Precision Micro-Displacement Measurement Based on F-P Interferometer with Improved Quadrature Demodulation Algorithm**Hao Luo****Tianjin university, China*

In this work, a high-precision micro-displacement measurement based on F-P interferometer is proposed and experimentally demonstrated. Combined with the improved orthogonal algorithm, the system achieves 23-pm resolution and 9-nm precision.

ACP2025-0812-8

Implementation of Medical Monitoring Duplex System based on SLIPT
Huillin Ni, Jizhou Zhuang, Yan Zhao, Lipeng Qiu, Yihong Wen, Shaolong Wu*Sochow University, China*

This paper presents the design and implementation of a dual-mode medical monitoring system, achieving simultaneous visible light information and power transmission in the downlink and infrared heart rate data transmission in the uplink.

ACP2025-0813-14

Plasmonic-Enhanced Annular Fiber Grating for Simultaneous Refractive Index and Temperature Sensing
Jintao Cai¹, Lin Zhang², Xuewen Shu^{1*}*1. Huazhong University of Science and Technology, China; 2. Aston University, United Kingdom*

This study introduces a plasmonic-enhanced annular fiber grating biosensor that simultaneously excites Bragg and cladding resonances for dual temperature/RI sensing. The AuNP-functionalized design enhances RI sensitivity through nanoscale plasmonic effects, enabling precision environmental monitoring.

ACP2025-0814-33

High-order cladding mode excited by medium-period chiral fiber gratings
Xiaolong Fan, Siyu Chen, Yuehui Ma, Lu Chen, Chengbo Mou, Yunqi Liu^{*}*Shanghai University, China*

We propose the fabrication of a medium-period chiral fiber grating using an automated CO₂-laser processing system. With a grating period of 48 μm, the 22nd-order cladding mode was successfully excited.

ACP2025-0814-35

A ConvNeXt-Based Method for High-Precision Event Recognition in Φ-OTDR Sensing Systems
Shangkun Zeng^{*}, Di Zheng, Hailong Fan, Zizheng Yue, Han Li*The Center for Information Photonics & Communications, School of Information Science and Technology Southwest Jiaotong University, China*

This work proposes a ConvNeXt-based approach for Φ-OTDR vibration event recognition, achieving 95.1% accuracy and significantly outperforming SVM and CNN methods, demonstrating strong potential for high-performance distributed optical fiber sensing applications.

ACP2025-0814-36

Torsion Sensing Characteristics of Long-Period Fiber Grating Written in Preset Twisted Double Cladding Fiber by CO₂ Laser
Lu Chen, Siyu Chen, Xiaolong Fan, Hang Su, Chengbo Mou, Yunqi Liu^{*}*Shanghai University, China*

We demonstrate a torsion sensor based on a CO₂-laser-inscribed preset twisted LPFG in double cladding fiber. Experiments show that its torsion sensitivity is enhanced compared to conventional LPFG.

ACP2025-0815-104

Nanocavity Sensing Platform for Waterborne Pathogen Detection: 2D Photonic Crystal Approach**SHAMSHAD ALAM^{*}, Soibam Aruna Chanu¹, Uttara Biswas¹, Anas Ashraf¹, Mohd Mansoor Khan², Ramesh Kumar Sonkar¹***1. Department of Electronics and Electrical Engineering, Indian Institute of Technology Guwahati, India; 2. Department of Electronics and Communication Engineering Indian Institute of Information Technology Guwahati, India*

A compact and highly sensitive two-dimensional photonic crystal-based nanocavity optical sensor has been designed for the detection of waterborne bacteria. The proposed sensor utilizes a C-band (1500 nm) optical source and was numerically analyzed for the detection of waterborne bacterial like *Vibrio cholera*, *Escherichia coli*, and *Shigella flexneri*, which are found in water. Numerical simulations demonstrate a maximum sensitivity of 878 nm/RIU and a high-quality factor (Q) of 956, enabling precise detection. The sensor also achieves a signal-to-noise ratio (SNR) of 40 and a response time of 0.0180 ps, respectively, indicating strong performance in practical environments.

ACP2025-0815-15

SPR-based PCF Internal Sensor for the Early-Stage detection of Skin Cancer
Yugesh Kumar P¹, Sangeetha N^{1*}*Vellore Institute of Technology, India*

We propose a SPR-based PCF internal sensor for the detection of skin cancer cells at an early stage. This sensor has the simplest design with circular air holes. Gold (Ag) and titanium (TiO₂) are used as plasmonic materials to increase sensitivity. The measured values are high sensor resolution (SR), which is 5×10^{-5} RIU, improvised signal-to-noise ratio (SNR) of 1.429, improved sensitivity of 2000 nm/RIU and detection limit (DA) of 0.0286 nm^{-1} . Due to its exceptional detecting capabilities and simple design, the aforementioned sensor is suitable for a variety of biosensing applications, particularly the early identification of skin cancer cells.

ACP2025-0815-38

LHJA-YOLO: A Semiconductor Laser Chip Damage Detection Method Based on Lightweight Detection Head and Joint Attention Mechanism**Jue Wang¹, Feng Tian^{1*}, Jianwei Zhou¹, Biao Luo², Qi Zhang¹, Qinghua Tian¹, Fu Wang¹***1. Beijing University of Posts and Telecommunications, China; 2. Accelink Technologies Company Ltd., China*

We propose a novel damage detection method for semiconductor laser chips. Experimental evaluations indicate that the proposed model achieves improvements of 0.4% in mAP@0.5 and 1.5% in mAP@0.5:0.95, while reducing time complexity by 32%.

ACP2025-0815-90

Multi-Parameter Sensor Based on Cascaded Helical Long-Period Gratings in Polarization-Maintaining Fiber**Li'ao Zuo¹, Siyu Chen¹, Xiaolong Fan¹, Yuehui Ma¹, Hang Su¹, Yunqi Liu^{1*}***Shanghai University, China*

We propose a multi-parameter sensor based on a cascaded helical long-period grating in polarization-maintaining fiber that can simultaneously measure temperature, surrounding refractive index, strain, and torsion.

ACP2025-0816-1

Signal Separation Using Deep Non-negative Tensor Factorization and Convolutional Reconstruction Networks in Distributed Optical Fiber Sensing**Bin Chen, Nian Fang***Shanghai University, China*

This paper proposes a signal separation method for distributed optical fiber sensing based on deep non-negative tensor factorization and convolutional reconstruction networks. It outperforms CRNN-A and TFA-DRNN models in scale-invariant signal-to-distortion ratio and correlation coefficients.

光电子集成芯片封测解决方案

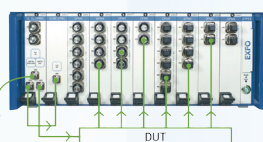
全波段高精度光无源器件测试系统

光电子集成芯片测试

- 支持 OESCLU 全波段扫描
- 高精度测量，结果稳定可靠
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- 支持300mm晶圆测试



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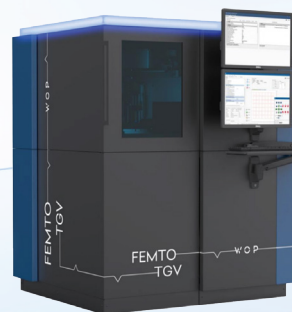
FemtoTGV 超快激光微加工系统

光电子集成芯片封装

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玻璃通孔TGV等多种微加工



光纤整体解决方案

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专业实力 Our Expertise

36年+ 专注和沉淀
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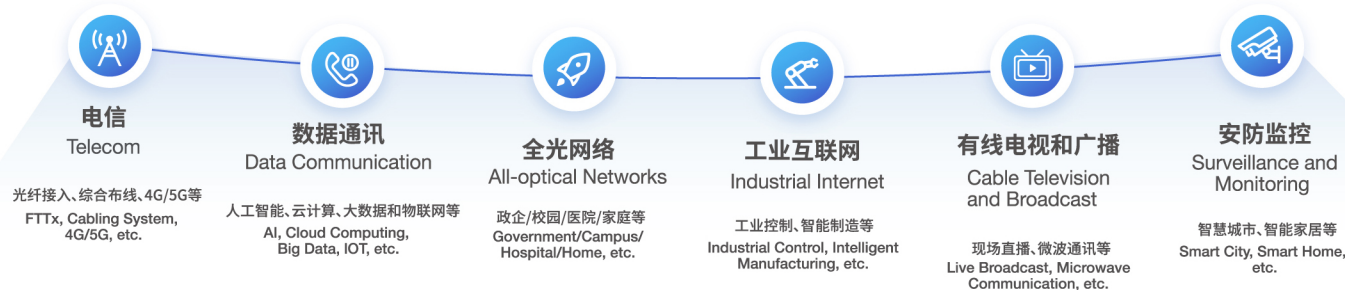
139个+ 国家和地区
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1000种+ 解决方案和产品
Solutions and Products

“Sun Telecom 浦津”以“最大程度满足客户需求”为服务宗旨，为全球客户提供“系统性、定制化、端到端、一站式”光纤整体解决方案。荣获国家级“高新技术企业”、“专精特新企业”、“外国人喜爱的民族品牌”、“中国（光纤通讯行业）十大质量示范品牌”等多项荣誉。我们坚持以质量立足、以创新驱动，不断拓展技术边界、洞察行业趋势，致力于为客户提供更具前瞻性的解决方案。

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光纤方案和产品应用领域 Applications of Our Fiber Optic Solutions



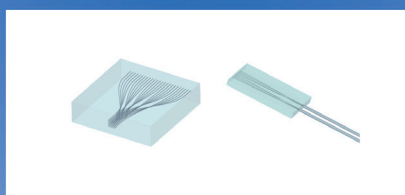
客户信赖 They Trust. We Deliver



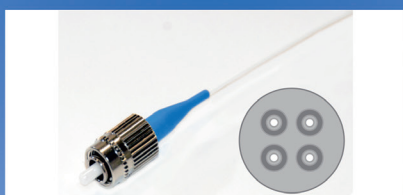
公司介绍 Company Profile

上海光织科技有限公司成立于2019年，是面向大模型、大数据、大算力互连需求的先进光连接方案制造商。公司主要产品为高速刚性和柔性光路板、玻璃基三维光子互连芯片、空分复用器件，与算力芯片等集成后可为人工智能、云计算等领域大幅提高算力。相关产品填补了国内空白，处于国际先进水平，服务于国家重大战略需求，并销往美国、英国、日本等国家。

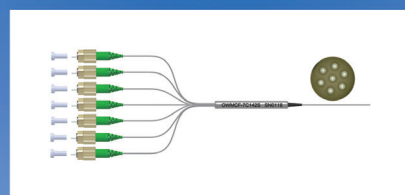
三维光子互连芯片
3D Photonic Interconnect Chip



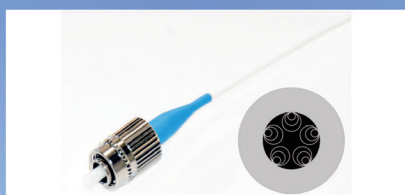
多芯光纤连接器
Multicore Fiber Connector



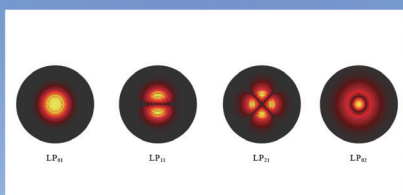
多芯光纤扇入扇出器件
Fan-In/Fan-out Device for Multicore Fiber



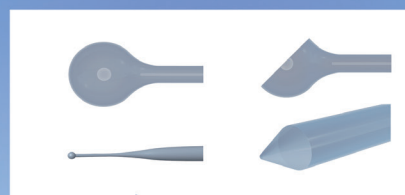
空芯光纤连接器
Hollow Core Fiber Connector



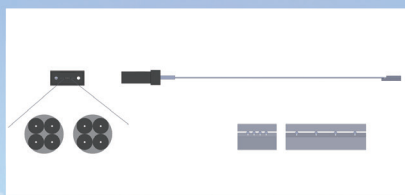
模分复用器
Mode Division Multiplexer



光纤透镜
Fiber Lens



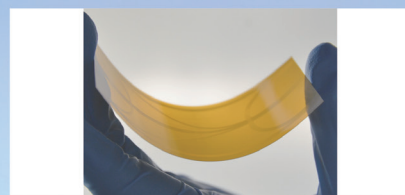
多芯MT-FA光组件
Multi-core MT-FA Optical Component



刚性光路板
Rigid Optical Circuit Board



柔性光路板
Flexible Optical Circuit Board



愿景：成为具有全球影响力的先进光连接方案制造商



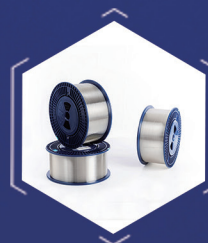
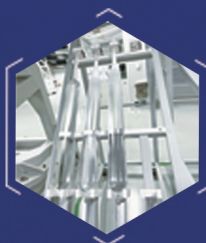
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以光载梦 以芯筑光

永鼎，始创于1978年。旗下江苏永鼎股份有限公司（股票代码600105）于1994年成立，1997年上市，是中国光缆行业首家民营上市公司，经过数十年稳健发展，已形成了“光电交融，协同发展”的战略格局，拥有永鼎光电子等数十家控股、参股公司和研发机构，并在全球十多个国家和地区设立分公司，跻身中国民营企业500强、中国民营企业制造业500强、中国电子元件百强企业及中国电子信息百强企业。



光棒-光纤-光缆

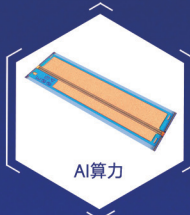
Optical Preform - Optical Fiber - Optical Cable

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芯片-器件-模块

Chips - Components - Modules

激光器芯片
DFB&EML&DBR



AI算力

波分复用器
AWG&WDM



光模块
Transceivers



光纤阵列
Fiber Array



光连接器件
Connectivity

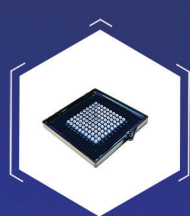
镀膜产品

Coated Products

Z-Block



滤光片
Thin Film Filter



通信 • 激光雷达 • 传感 • 生物医疗





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