Track 1: Optical Fibers and Fiber-based Devices

13:30-15:30 · November 6, 2025 · Thursday
Design and applictaions of Special optical fibers
Presider: Shifeng Zhou, South China University of Technology, 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 fibersand attache 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 variousfiber microstructure arrays using femtosecond laser direct writing technology. Distributed high-temperature sensing up to 700°C was achieved by usingfiber 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 Chen[1], Jochen Hellmig[2], Jason Hurley[1], Rashid Safaisini[3], Snigdharaj Mishra[1], Gunter Larisch[3], Roman Koerner[4], **Ming-Jun Li[1]**
1.Corning Incorporated, United States;2.Trumpf Photonic Components B.V., Netherlands;
*3.TRUMPF Photonic Components Gmb*H, 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.
Keywords：VCSEL, single-mode fiber, bandwidth, PAM4, data center

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 LP_{11} 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 LP_{11} 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 Riumkin[1], Denis Lipatov[2], Mikhail Yashkov[2], Sergei Firstov[1], Mikhail Melkumov[1]
1.Prokhorov General Physics Institute of the Russian Academy of Sciences, Dianov Fiber Optics Research Center, Russia;2.G.G. Devyatykh 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 Sun[2], Haoguang Liu[2], Yu An[1], Xuanzhe Zhang[1], Linpin Zhang[1], Ziwen Li[1], Yiyang Luo[1*], Jindong Wang[1], Qizhen Sun[2], PerryPing Shum[3]
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 princeple 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 Wang[2], Ying Qiu[1*], Xiang Li[3*], Hongguang Sun[1], Chao Yang[1], Ming Luo[1], Pengfei Ma[4], Yunlong Bai[4]
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 lightover the fiber, with a received power penalty of less than 0.1 dB.

12:00-13:30 Lunch Break

13:30-15:30 · 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 · ACP2025-0725-10
Symmetric Four-State Modulation in Fiber-Optic Gyroscopes for Simultaneous Measurement of Angular Velocity and Temperature
Xinyu Cao[1], Wenbo Wang[1], Haoyan Liu[1], Fangshuo Shi[1], Yanjun Chen[2], Zhengbin Li[1]
1.Peking University, China;2.Central South University, China
A symmetric four-state square-wave modulation scheme is proposed for IFOGs, enabling simultaneous measurement of angular velocity and temperature. Without additional sensors, the method achieves high precision and thermal stability, as demonstrated through theoretical analysis and experimental validation under varying thermal conditions.

14:15-14:30 · 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 afiber-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 0~1.4 N.

14:30-14:45 · 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.

14:45-15:00 · 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.

15:00-15:15 · ACP2025-0729-32
A Highly Robust Wearable Respiration Monitoring System for Clinical Application
Yulin Qiu[1], Xi Chen[1], Tianyu Chen[1], Yunfei Chai[2], Weimin Lyu[1*], Changyuan Yu[1]
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.

15:15-15:30 · 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 Sessiom
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, therebymanufacturing 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 Zhang[1], Mengqiu Fan[2], Ke Yao[2], Yifei Qi[1], 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: Sze Yun SET, Tokyo Univeristy, Japan

10:30-11:00 · ACP2025-0801-102 **Invited**
Ultra-wideband Raman-amplified Coherent Transmissions
Dini Pratiwi[1], **Mingming Tan[1*]**, Wladek Forysiak[2]
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 Huang[1], Jiaxin Xu[1], Kai Wang[1], Lilong Dai[1], Haochen Tian[2], Youjian Song[3], Hairun Guo[1], Chengbo Mou[1*]
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 Filtering
Shangde 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 applictaions
Presider: TBD

13:30-14:00 · ACP2025-0728-15 **Invited**
Multicore Fiber Amplifier with Energy-efficient Pump Integration
Sijing Liang[1], John Downie[2], Jason Hurley[2], Lidia Galdino[3], Periklis Petropoulos[1], Yongmin Jung[1]
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 Pratiwi[1*], Aleksandr Donodin[1], Vladimir Gordienko[1], Mohammed Patel[1], Ruben S. Luis[2], Andrew Ellis[1], Sergei Turitsyn[1], Wladek Forysiak[3], **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
Investigation of Weakly-coupled Multi-core EDFAs With Core and Cladding Pump Schemes
Yuanpeng Ding[1*], Baolong Zhu[2], Lei Shen[1*], Junjie Qi[1], Xin Huang[1], Zhaolong Liao[1], Shiqi Zhou[1], Lei Zhang[1], Jie Luo[1]
1.Yangtze Optical Fibre and Cable Joint Stock Limited Company, China;2.Peking University, China
Weconstructedcore-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 Li[1], Caoyuan Wang[1], Yu Qin[1], Jie Zhu[1], Dahao Xu[1], Yichun Shen[2], 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.

Keywords：water vapor, absorption, hollow-core fibers

16:45-17:00 · ACP2025-0731-8

Modal Bandwidth and VCSEL Transmission Capability of Multimode Fibers at Long Wavelengths Including 980 nm and 1060 nm

Xin Chen[1*], Hao Dong[1], Hao Chen[2], Simit Patel[1], David Meagan[1], Ming-Jun Li[1]

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

13:30-15:45 · November 6, 2025 · Thursday
AI-assited optical communications
Presider: Jingchi Li, Shanghai Jiao Tong Univerisity, 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 leanirng for end-to-end-learning for fiber-optic communication will be adressed

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[1*], Sebastian Kuehl[1], Mohammad Seifi Laleh[1], Silas Oettinghaus[1], Annika Dochhan[1], Robert Killey[2], Polina Bayvel[2]
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], **Xiatao 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[1*], Xin Qin[1], Yadong Gong[1], Anxu Zhang[1], Xiaowei Lou[2], Yuqing Han[1], Zheqing Lv[1], Xiaoli Huo[1], Junjie Li[1]
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 Detetion 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
First Real-time 62.1 Tb/s DWDM Data Center Interconnect Over a Seamless 87 nm Optical Spectrum Based on Unified Optics
Yuqian Zhang[1], Mingqing Zuo[1], Dongchen Zhang[2], Junjie Qi[3], Dawei Ge[1], Dong Wang[1], Baoluo Yan[2], Hu Shi[2], Zhaolong Liao[3], Lei Shen[3,4], Dechao Zhang[1*], Han Li[1]
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 Yang[1], Mingqing Zuo[2], Chenyang Ma[1], Boxiong Cui[1], Zhengyang Xie[1*], Dong Wang[2*]
1.Beihang University, China; 2.China Mobile Research Institute, China
We construct a neural network thatcorrects closed-formISRS GN model. The result is shown thatsignal 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.

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 Tang[1], Yaguang Hao[1], Xiuquan Cui[1], Linsheng Fan[1], Zhongliang Sun[1], Junpeng Liang[1], Zhaopeng Xu[1], Yanfu Yang[2*], Weisheng Hu[1], 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 Yuan[1], Yuhao Fang[1], Haojie zhang[1], Xue Cheng[2], Dayu Shi[1], Weiqi Lu[1], Zexu Liu[1], 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 Wu[3], Tonghui Ji[1], Honglin Ji[1], Hui Chen[1], Yingying Zhou[1], Jianwei Tang[1], Zhongliang Sun[1], Linsheng Fan[1], Junpeng Liang[1], Jinlong Wei[1], Yuan Jiang[2], Zhixue He[1], Weisheng Hu[1]

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 Wang[1], Chao Li[1], Xu Zhang[1], Wei Ding[3], Yingying Wang[3], Xinke Tang[1], Ke Li[1], Lei Wang[1], Zhixue He[1], Jian Song[2]

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 thata 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 Huang[1], Yanbiao Chang[1], Shikui Shen[1], Shuo Xu[2], Lei Shen[2], Lei Zhang[2], Jie Luo[2], He Zhang[1], Zelin Wang[1], Guangquan Wang[1], 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 Li[1], Junyi Liu[1], Jie Liu[1*], Haolin Zhou[1], Shuqi Mo[1], Yuming Huang[1], Yining Huang[1], Lei Shen[2], Shuo Xu[2], Lei Zhang[2], Jie Luo[2], 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 Cui**[1], Yuxiao Wang[2], Yating Zhang[3], Yu Deng[1], Zhuo Liu[1], Chao Wu[1], Zilin Fan[1], Bin Hao[1], Leimin Zhang[1], Yong Chen[2], Bin Wu[2], Shang Cao[3], Shenghui Hu[3], Haibin Liu[3], Lei Shen[4], Lei Zhang[4], Jie Luo[4], Yan Sun[1], Qi Wan[1], Bing Yan[2], Ninglun Gu[1]

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 demapperby 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, 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 Fang[1], Md Osman Ali[1], Safa Alghadi[1], Mariam Abdullah[2], Shuo Li[1], Sithamparanathan Kandeepan[1], Withawat Withayachumnankul[2], Cuiwei He[3], **Ke Wang**[1*]

1.Royal Mebourne 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

TBD

Di Che

Nokia Bell Labs, United Sates

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 Ju[1], Yuhan Hu[1], Zengyi Xu[1], 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 anintegrated quintuple-laser to achieve68.90 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 Zhou[1], Zhilan Lu[1], Zhe Feng[1], Guowei Jiang[2], 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 NLTCP 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 Zhang[1], Zhilan Lu[1], Zhe Feng[1], Yuan Wei[1], Guowei Jiang[2,3,4], Jianyang Shi[1], Junwen Zhang[1]

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

zhiyan Chen[1,2], Lihang Liu[1], Yuru Tang[1,2], Ru i Jiang[2], Xinke Tang[2], H.ongyan Fu[1]

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.

Track 2

08:30-10:00 · November 8, 2025 · Saturday
Hollow-core fiber transmisions
Presider: Lin Sun, Soochow University, 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 demonstrationin 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 Ozolins[1*], Armands Ostrovskis[2], Darja Cirjulina[2], Toms Salgals[2], Minkyu Kim[3], Peter De Heyn[3], Michael Koenigsmann[4], Benjamin Krueger[4], Fabio Pittalà[4], Hadrien Louchet[4], Lu Zhang[5], Xianbin Yu[5], Vjaceslavs Bobrovs[2], Xiaodan Pang[2, 5]
1.RIga Technical University, Latvia; 2.Riga Technical University, Latvia; 3.imec, Belgium; 4.Keysight Technologies Deutchland, 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 achievebetter sensitivity with VPN design for both 200 Gbaud OOK and 112Gbaud 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 Shen[1], Yu Qin[2], Suiyao Zhu[3], Mingyi Gao[1*], Limin Xiao[2], Yichun Shen[4], Jie Zhu[2], Gangxiang Shen[1]
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 multiplexingcyclic-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 Unrepeatered WDM Transmission with > 1.2-Tb/s/λ signals over 217.1-km AR-HCF by EDFA-only Amplification
Siyuan Liu[1], Dawei Ge[2*], Qiang Qiu[3], Yiqi Li[3], Peng Li[4], Mingqing Zuo[2], Baoluo Yan[3], Dong Wang[2], Lei Zhang[4], Dechao Zhang[2], Jie Luo[4], Han Li[2], Zhangyuan Chen[1*]
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 unrepeatered 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 Sun[3], 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, ect.

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; 2.1FINITY 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-PONfor 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 Xie[1], Lei Zhang[2], Peng Li[2], Song Gao[3], Lipeng Feng[1], Nan Lu[4], Yongmei Sun[5], 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 teraherz communications
Presider: 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 Zhang[1], Xiaodi You[1*], Xinwei Du[2], Jian Chen[3], Changyuan Yu[4], Mingyi Gao[1], Gangxiang Shen[1]

1.Soochow University, China; 2.Beijing Normal-Hong Kong Baptist University, Hong Kong, 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], Yuhan Hu[1], Xiangdong Zhang[1], Zengyi Xu[1], Guowei Jiang[2,3,4], Nan Chi[1]
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 transmisisons
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*, Xiaoan 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 Long[1], Wei Chen[1], Albert Huang[2], Yezi Guo[2], Quanfei Fu[2], Yong Yang[2], Kuan Zhang[2], Junbin Huang[2*], Zhangyuan Chen[1*]
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)

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 Liu*, 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[1*], Changyuan Yu[3], Xiangjun Xin[4]
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
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 Li[1], Jie Li[2], Yan Li[3], Ming Luo[2], Kailai Deng[2], Ning Wang[1], Zipiao Zhao[1], Jian Wu[3], Han Li[1], 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 featuresof thenovelHIC-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 industrialstandardization 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, LiZuyu, LiuYuheng, XiongJinqi, GanHongyi, Lifan*
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 Zhu[1], Xuanyi Liu[1], Yi Hao[1], Shichen Zheng[1], Annan Xia[1], Hong Ye[1], Qian Li[2], Małgorzata Szczerska[3], H. Y. Fu[1*]
1.Tsinghua University, China; 2.Peking University, China; 3.Gdańsk University of Technology, Poland
We propose a quantitative phase imaging LiDAR using acustom-builtbroadband dissipative soliton fiber laser, encoding spatial information to spectrum via spectral scanning and time-stretching withSynchrosqueezingtransform, achieving 30.72-MHz detection and 140.31-μmlateralresolution.

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 tolerane 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 Sui[3], Fan Li[1,2*]
1.School of Electrical and Information Technology, Sun Yat-sen University, China; 2.Guangdong Provincial Key Laboratory of Optoelectronic 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 Zou[2], Yuheng Liu[1], Yifan Chen[1], 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 Xie[1], Zhudong Shi[1], Runzhe Fan[1], Yuyang Gao[1], Fei Liu[1], Jichun Ma[2], Xian Zhou[1*]
1.University of Science and Technology Beijing, China; 2.China Information Technology Design & Consulting Institute Co., Ltd., China
Thispaper proposes an EDFA-Aided Dual-Domain Mapping Correlation Method-based PowerProfileEstimation (EADDM-CM-PPE) method forsub-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 Zhou, 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 Wang[2], Lei Hu[1], Fan Li[2], Yi Cai[1]
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 Liu[1], Junwei Zhang[1], Fan Li[1], Zhaohui Li[1], Chao Lu[2]
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 Hu[1], Yixiao Zhu[1*], Xiang Cai[2], Ziheng Zhang[1], Chongyu Wang[1], Weisheng Hu[1], 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 Wang[2], Jianjun Yu[2], Fan Li[1], Jianyu Long[2], Mingzhu Yin[1], Wei Wang[1], Weihao Ni[1], Yuheng Liu[1]
1.Sun Yat-sen University, China; 2.Fudan University, China
A bit-levelPS-4D-16QAM scheme with two-stage CPR addresses DFB laser phase noise. In 200GDFB-deployed TFDM-PON simulationover 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 univercity, 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 Linsheng[1], Sun Zhongliang[1], Xu Zhaopeng[1], 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-with, 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. Simulationshow 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 Yan[1], Fan Zhang[2], 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.

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 Fang[2], Xiang Cai[2], Yimin Hu[1], Ziheng Zhang[1], Lingjun Zhou[2], Xian Zhou[3], Weisheng Hu[1], 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 Cui[1], Quanzhen Luo[1], Lipeng Feng[2], Yi Cai[1], Gangxiang Shen[1], 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 Yuxi[1], Ma Zhengyu[1], Zhao Xue[1], Zhang Jing[1*], Yang Qi[2], Qiu Kun[1]
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

10:30-11:45 · 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 Yan[1], Jingming Zhang[1,2], Yinghuan Li[1], Liwang Lu[1], Jingchuan Wang[1], Chao Lu[1]
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 highlightsmart 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 Tian[1], Jian Zhao[2*], Yunfan Zhang[2], Gan Zheng[1], **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 Zhang[1], Zhixue He[1], Jian Song[2], 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.

12:00-13:30 Lunch Break

13:30-15:30 · November 8, 2025 · Saturday
Optical transmision 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 talkhighlights 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 Li[1], Changyuan Yu[1], Ming Tang[2*], Zixian Wei[1]
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
Chen Shuhang, Zeng Zhihong, **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 Xu[1], Jianwei Tang[1], Chuanchuan Yang[2], Yuping Zhao[2]
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 Andreev[2], Dimitrii Starykh[1], Oleg Nanii[3], Vladimir Treshchikov[1]
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
Transmisions systems and devices
Presider: Fabio Bottoni, Cisco, United States

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 Guo*
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 Qiao[1], Baolong Zhu[1], Yuyang Gao[3], Mingqing Zuo[4], Jian Cui[5], Jiarui Zhang[1], Siyuan Liu[1], Honglin Ji[2], Lei Shen[6], jie Luo[6], Yongqi He[1], 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

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 Zhang[1], Yueqiu Mu[1], Lipeng Feng[1], Lijun Ma[2], Lei Shen[3], Xishuo Wang[1], Yi Ding[1], Zhengyu Liu[1], Shuo Xu[4], Lei Zhang[3], Jie Luo[3], Yi Yu[2], Xiaoli Huo[1], Junjie Li[1], Chengliang Zhang[1]

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

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 presentrecent advances in the ITU-T initiative onInternational Optical Networks towards 2030 and Beyond (ION-2030) for the AI era, highlightingthe 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 He[1], Yongjie Shi[2], Yuchen Song[2], Qibin Wu[2], Lixia Xi[1], 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 splitDNN inference tasks in MEC networks interconnected bymetro optical networks. Simulation results showthe 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 Zhang[1], Xia Sheng[1], Kai Lv[1], Hao Liu[1], Lipeng Feng[1], Xishuo Wang[1], Tao Ma[2], Zhenfang Wang[2], Xiaoli Huo[1], Junjie Li[1]
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 Cao[1], Dechao Zhang[1], Jiang Sun[1], Mingqing Zuo[1], Tao Wei[2], **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

08:30-10:00 · 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**
TBD
Junwen Zhang
Fudan University, China
TBD

09:45-10:00 · ACP2025-0802-5
Adaptive Deep Reinforcement Learning-based Smart Handover for Hybrid Li-Fi and Wi-Fi Networks
Zhiwen Yang, Kai Zhang, Yuhan 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.

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 protectionscheme for C+L multi-band WDM networks, with enhancedsurvivability in accident or disaster-caused multi-failure scenarios. We have incorporated practical C+L system characteristics into our model and designed a computation-efficient heuristicsolution.

11:30-11:45 · ACP2025-0801-151
Causal Learning Based Faults Localization Fusion Method for Large-scale OTN
Xin Qin[1*], **Xiaotian Jiang[1]**, Zhengyi Zou[2], Yadong Gong[1], Hui Li[2], Xiaofeng Wu[3], Rentao Gu[2], Xiaoli Huo[1], Meng Chen[4], Junjie Li[1]
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[1*], Liuyan Han[1], Han Li[1], Chunming Yu[2], Wei Hong[3]
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 asymmetrycompensation in large-scale 10k+ node networks without manual OTDRmeasurement.

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 Sciullo[1], Cristian Antonelli[1], Mëmëdhe Ibrahimi[2], Giovanni Simone Sticca[2], Francesco Musumeci[2], Massimo Tornatore[2]

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 Qin[2], Yadong Gong[2], Yuqing Han[2], Zheqing Lv[2], Xiankun Zhu[3], Xiaowei Lou[3], Rentao Gu[1]

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 Shi[2], Yuchen Song[2], Yihang Lou[2], Lixia Xi[1], Xiaoguang Zhang[1]

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

We propose a DQN-based online method for optimizating EDFA reconfiguration order in optical networks, featuring anadaptive reward 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 Networks

Xin Qin[1], **Jie Li[2]**, Boya Sun[1], Zhiqun Gu[2*], Xiaotian Jiang[1], Xia Gao[1], Rentao Gu[2], Xiaoli Huo[1], Yuefeng Ji[2]

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 Networks

Zhiwei Yu[1], Chengze Du[1], **Heng Xu[1]**, Haojie Wang[2], Bo Liu[1], Jialong Li[1*]

1.Shenzhen University of Advanced Technoloy, 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 Sessiom

18:30-20:30 Banquet & Awards Ceremony

Track 3: Network Architectures, Management and Applications

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, areconfigurable 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 Ribezzo[1*], Sebastiano Cocchi[1], Zahidy Mujtaba[2], Qi Wu[3], Antonio Mecozzi[4], Cristian Antonelli[4], Alessandro Zavatta[5], Davide Bacco[1]
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 Zheng[1], Yuan Cao[1*], Xiaoyu Wang[2]
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, increasingthe success probability of cloud-edge service requests by 24.42%, while improvingmultidimensional resources utilization.

09:45-10:00 · ACP2025-0731-44
Purification-enabled Entanglement Capability-Prioritized Routing in Quantum Networks
XuanLi Dou[1], Xiaosong Yu[1], Yuhang Liu[1], Jingjing Geng[2*], Yongli Zhao[1], Jie Zhang[1]
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 centres, 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 Technoloy, 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
Presider: 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.
Keywords: NaaS, service auto-management, multi-domain optical network

13:45-14:00 · ACP2025-0815-127
Digital Twin-Assisted Health Assessment for S+C+L-Band Transmission
Yu Tang[1], Yan Shi[1], Yujia Yang[2], Shikui Shen[1], Chuangye Wang[1], He Zhang[1], Zelin Wang[1], Guangquan Wang[1], Xiaomei Ma[1], Zhengsi Shi[1], Xiaocun Liu[1], Mei Song[1], Danshi Wang[2], Xiongyan Tang[1]
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 Wang[1], Qiaolun Zhang[2], Jiawei Zhang[3], Xin Wang[4], Zheng Zhang[2], Zhiqun Gu[3], Jingjing Wang[1], Massimo Tornatore[2]
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 Shen[2], Yongcheng Li[2]
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. N×N

14:45-15:00 · ACP2025-0814-48
Multi-Hop Power-Spectrum and GSNR Prediction based on Cascade Learning
Shangbo Lin[1], Zhiqun Gu[1*], Xin Qin[2], Xiaotian Jiang[2], Shaopeng Li[1], Jiawei Zhang[2], Xiaoli Huo[2], Yuefeng Ji[1]
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 ISRSGN 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 Liu[1], 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 Lin[1], Liyazhou HU[1*], Wang Wei[2], Zhu Han[3], Zhao Yongli[2], Zhang Jie[2]

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 Wei[1], Hua Wang[1*], Wei Wang[2], Yifeng Li[1], Long Wang[3], Yongli Zhao[2]

1.College of Computer and Information Engineering (College of Artifical 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)

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 technologiesinnovation and ITU-Tstandardization progress of optical networks, mainly including 800GandbeyondWDM/OTN, C+L band transmission, digital twin, convergentsensing 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 Liu[1], Cheng Yuming[1], Yihao Zhang[1], Xiang Shaowen[1], Qiu Qizhi[1], Massimo Tornatore[2], Hu Weisheng[1], 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

Novel Deterministic Ultra-Low Latency Multi-Services Slicing Technology for Data Center Network and Field Trial

Han Li[1], Liuyan Han[1*], **Minxue Wang[1]**, Hongqiang Zou[2], Lirong Bai[2], Sheng Liu[1], Wei Xue[3], Xinyu Chen[1], Rongduo Lu[1], Dechao Zhang[1]

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 Scheduling

Chengze Du[1], Zhiwei Yu[1], **Heng Xu[1]**, Haojie Wang[2], Bo Liu[1], Jialong Li[1*]

1.Shenzhen University of Advanced Technoloy, 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 Technoloy, 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 explorethe 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 Luo[1], **Yan Zeng[2]**, Frank Effenberger[1]
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 Han[1], Xiang Lu[2], **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.fin, as well as a unified scheduling protocol. The PON bandwidth can be reserved by using scheduling information of G.fin 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 Shao[2], Zelin Wang[2], Guangquan Wang[2], Xiongyan Tang[2*], Min Zhang[3]
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 Su[2], 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 · ACP2025-0730-9 **Invited**

Communication and Sensing via Hermite-Gaussian Time-Domain Mode-Division-Multiple-Access

Xiaonan Yu
Changchun University of Science and Technology, 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**
TBD
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 Li[1], Jinglong Zhu[1], Dechao Zhang[1], Yan Zeng[2], Yuanqiu Luo[3]
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 Sessiom
18:30-20:30 Banquet & Awards Ceremony

Track 4: Optoelectronic Devices and Integration

13:30-15:30 · 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 inte-grated 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. Theses results herald fully-integrated, self-referenced optical frequency combs for a wide range of applications.

14:30-14:45 · ACP2025-0813-16
Direct epitaxy of InAs/GaAs quantum dot laser array on Si (001)
WanLin Liu[1,2], KeHan Jiang[1,2], Kun Zhou[1,2], JiaZe Xu[1,2], Tao Yang[1*], XiaoGuang Yang[1,2*]
1.Laboratory of Solid State Optoelectronics Information Technology, Institute of Semiconductors, Chinese Academy of Sciences, China;2.Center of Materials Science and Optoelectronics Engineering, University of Chinese Academy of Sciences, China
A 1.3 micron InAs/GaAs quantum dot distributed feedback (DFB) laser with high output power, low noise and insensitivity to optical feedback is realized on Si(001) substrate.

14:45-15:00 · ACP2025-0815-136
Narrow-linewidth hybrid-integrated self-injection locked laser at 1015.75 nm
Hongfei Zhang[1], Yilin Wu[1], Sigang Yang[1], Hongwei Chen[1], Hui Wang[2], 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.

15:00-15:15 · 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).

15:15-15:30 · 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: Jianan Duan, Harbin Institute of Technology (Shenzhen), China

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 factorultracompact (~3λ) terahertz quantum cascade laseris 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 $\mu J\ cm^{-2}$ 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-powerand dense c-band semiconductor optical amplifier array. Each channel of the array exhibits a high output power greater than 22dBm, 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 laserwhich exhibits an optical power over130mW, an SMSRexceeds 45 dB, an averaged RIN of below -145 dB/Hzand a 3dB modulation bandwidth exceeds15 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 Deng[1], Jingyu Chang[1], Yuting Ye[1], Jialing Jian[2], Jianghong Wu[3], Hongtao Lin[4], **Lan Li[1*]**

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. Ledentsov[2], Abdullah S. Karar[3], Jason E. Hurley[1], O. Yu. Makarov[2], Hao Dong[1], Ahmad Atieh[3], Li Ming-Jun[1], Nikolay Ledentsov[2]

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-Si_3N_4DBR 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 Lv[1], Long Zhang[1], Dajian Liu[1,2], Gaopeng Wang[1], Ming Zhang[1,3], Haorui Liu[1], daoxin Dai[1,3,4*]
1.State Key Laboratory of Extreme Photonics and Instrumentation, Zhejiang Key Laboratory of Optoe-lectronic 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-μm 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 Liu[1], Ying Wang[1], Baosuan Chen[1], Weixiang Hu[1], Wei Chu[1], Haiwen Cai[2], 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 Densisty Interconnects
Chen Hu[1], Hairong Mao[2], Qian Zhang[1], Jinsheng Xu[1], Jia Li[1], Yueqi Zhao[1], Chenhui Li[1*]
1.Zhejaing 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 Si_3N_4 PIC platform. It features 0.5 dB/m waveguide loss and inverse-designed components, including MMIs (~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 Salgals[1], Darja Cirjulina[1], Said El-Busaidy[2], Michael Koenigsmann[2], Benjamin Krüger[2], Fabio Pittalà[2], Lu Zhang[3], Xianbin Yu[3], Hadrien Louchet[2], Robert Jahn[2], Kazuo Yamaguchi[2], Markus Gruen[2], Vjaceslavs Bobrovs[1], Marcel Zeiler[2], 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/√mW) acousto-optic modulatorwith a giant photoelastic coefficient of 2.4,first extracted in antimony trisulfide, an order of magnitude larger than that of $LiNbO_3$ 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 Li[1], Yunlong Nie[1], Hang Song[1], Chenming Zhao[2], Yuquan Peng[2], Chaoyang Zhang[2], Hao Tang[1], 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 Vπ·L of 0.16 V·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

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 Zhong[1], Huan Li[2], Fei Guo[2], Dan Lu[2], Yanrong Song[1], 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 Wang[1], Yihang Li[1,2], Jian Li[1,2], Xi Wang[1], Rongxing Mao[1], Rui Zhong[1], Shuang Gao[1], Guodong Gao[1], 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 Lu[3], Yuxiang Yin[3], Jianing Wang[1], Yeyu Tong[3*], Lei Wang[2], Hon Ki Tsang[4], 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*], Tiegen Liu[1,2], Jiaqi Wang[3*], Hon Ki Tsang[4], 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 Chen[1], Li Liu[1*], Jiazhu Duan[2]
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 achievementis the realization of a12 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 Lin[1], Chenxingyu Huang[1], Jin Li[1], Bin Xu[1], Ni Zhang[2], Kun Yuan[2], Yihong Zhao[2], 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 Xu[1], Yizhou Zhang[1], 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 Xu[1], Jinxuan Lin[1], Zhenmin Chen[2], Zhengtong Liu[2], Connie Chang-Hasnain[1,3], H. Y. Fu[1*]
1.Tsinghua University, China; 2.Peng Cheng Laboratory, China; 3.Berxel Photonics Co., Ltd., China
We realized the inverse design of a1 × 2wavelengthmultiplexerusing 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 Li[1], Xiang Li[2], Lin Wu[1], Ming Luo[1], Yuan Li[2], Qi Zhou[2], Hanbing Li[1], Tianye Huang[2], 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 fabricatea 4.8 μm × 1.94 μm 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 Jiang[1], Yuanrong Zhang[1], Kaiyuan Wang[1], Qiaomu Hu[1], Luluzi Lu[2], 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 μm² 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 Qiu[1], Mathias Prost[1], Guillaume Croes[1], Hao Hu[2], Joost Brouckaert[1], Roelof Jansen[1], Peter Gerets[1], Marcus Dahlem[1]
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 solvedisturbance 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)

13:30-15:30 · November 6, 2025 · Thursday
Functional Devices (1)
Presider: Shunfa Liu, Sun Yat-sen 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, highlighting experimental results and discussing challenges toward high-speed, long-distance transmission using quantum cascade lasers, modulators, and detectors.

14:00-14:30 · ACP2025-0729-9 **Invited**
High-quality photonic quantum devices based on semiconductor cavity quantum electrodynamics
Shunfa Liu
Sun Yat-sen University, China
In this talk, I'll present techniques forconstructing and manipulating cavity quantum electrodynamics systems implemented on a semiconductor platform, as well as their applications in developing high-quality single-photon sources and high-fidelity entangled photon pair sources.

14:30-14:45 · 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.

14:45-15:00 · ACP2025-0723-3
Band-Rejection Filter with Grating-Assisted Directional Coupler Embedded in Mach-Zehnder Interferometery 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

15:00-15:15 · 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.

15:15-15:30 · ACP2025-0801-1
Ultra-High Sensitivity 50G-Class APD Based on a Microhole Array Metasurface for High-Speed PON Applications
Ning Wang[1], Junwei Li[1*], Xinjia Qiu[2], Wenjun Chen[2], Zhen Dong[2], Xiaoshuo Jia[1], Borui Li[2], He Yuan[2], Zelin Wang[2], Dechao Zhang[1]
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 metasuface 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, Zhejaing 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 usingpseudomagnetic fieldsin silicon photonic crystals attelecommunication 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 Zhou[1], Yao Sun[1], Yaxiao Lai[2], Changyu Hu[3], Hao Hu[3], Bo Zhao[3], Jun Liu[3], 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
Ultra-Compact Si-SiN Interlayer Coupling Using Shortcuts-to-Adiabaticity
Yang Yunhong, Xu Weihan, Yuan Qiqi, Wang Danye, Lu Liangjun, Zhou Linjie, Chen Jianping
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.
Keywords: adiabatic devices, silicon photonics, interlayer waveguide couplers

16:45-17:00 · ACP2025-0815-73
A Preset-free Wavelength Locking Method for Microring Resonators Based on Temporal Logic and Dithering Signals
Yizhou Zhang[1], Bohan Chu[1], Yue Xu[1], Yu Li[1, 2*], Jianping Chen[1, 2], Linjie Zhou[1, 2]
1.Shanghai JiaoTong University, China; 2.SJTU- Pinghu Institute of Intelligent Optoelectronics, China;
A wavelength locking method for microring resonators based on dithering signals and temporal logic. Estabilished apreset-free feed-back algorithm, reaching locking precises of 20and 22 pm ,respectivly, under 1Hz-560pm and 40Hz-100pm thermal fluctuations.

17:00-17:15 · ACP2025-0801-74
Crosstalk Mitigation in Multi-Channel ThermoOptic Chips from Common-Ground Voltage Division
Mingshen Peng[1], Xiaoqun Yu[1], Jiaqi Li[1], Jinjie Zeng[1], Shuai Lin[1], 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 0.32nm to 0.35nm) 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 Sridhar[1], Rao Lingampalli[1], Pradeep Swargam[1], Iwan Kartawira[1], Manveer Singh[1], Robert Huey[2], Jay Pabley[2]
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 includereducing 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 Liu[1], Lijia Song[2], Jiayue Zhu[1], 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_{π}, 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 presentahigh-delay-density and low-losssilicon opticaldelay line that combines a broadened Archimedean spiral with waveguide superlatticesto 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 Jinwen[2], Yu Fengxin[2], Yang Chengkun[2], Wang Xin[1,2], Shen Ruoyu[2], Yang Fenghe[2], Zhao Haibin[1], Chu Wei[2], 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 Jinwen[2], Yu Fengxin[2], Yang Chengkun[2], Wang Xin[1,2], Shen Ruoyu[2], Yang Fenghe[2], Zhao Haibin[1], Chu Wei[2], 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-μmdiameter PD exhibits 50 GHz bandwidth with 0.73 A/W responsivity and 16 dBm output power.

11:15-11:30 · ACP2025-0731-102

57-GHz C+L Band Germanium Waveguide Photodetector with Interleaved Junctions

Yihang Li[1,2], Jianing Wang[1], Yuxiang Yin[3], Jian Li[1,2], Kaihang Lu[3], Xi Wang[1], Daoqun Liu[2], Xi Xiao[2], 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 Eabled 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 CAS, 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 μm 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 ultravioletavalanche 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 Sun[1], 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 Lai[1], Zhiwei Yang[2], Qi Chen[1], Tian Zhang[1*], Jian Dai[1], Kun Xu[1]
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 Liu[1], Yuyao Huang[1], Zhenghang Zhang[1], Peng Meng Chan[1], Run Sun[1], Tingzhao Fu[2], Yuhao Wang[1], Sigang Yang[1], 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
Huang Yu, Yang Yigong, Zhou Pei, Lau Kuenyao, Li Nianqiang
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 Sessiom
18:30-20:30 Banquet & Awards Ceremony

08:30-10:00 · 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 $PtSe_2$-on-silicon waveguide devices
Tianping Xu[1], Rui Niu[1], Liqiang Qi[1], Shuqi Xiao[2], Tiegen Liu[1], Hon Ki Tsang[2], 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 $PtSe_2$-on-silicon devices by integrating low-dimensional $PtSe_2$ films on ultrathin silicon devices. The absorption coefficients of the $PtSe_2$-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 · ACP2025-0731-84
Hybrid Integration of Carbon Nanotubes and Silicon Nanobeam Cavity for Efficient Emission Coupling
Xiao Zijun[1], Weiwei Zhang[2], Ramos-Alonso Carlos[1], Arianna Filaramo[3], Nicolas Dubreuil[4], Laurent Vivien[1*]
1.Centre de nanosciences et de nanotechnologies, France; 2. Songshan Lake Materials Laboratory, France; 3.CEA, France; 4. LP2N, France
We demonstrate an optimization ofemission coupling for hybird integration with carbon nanotubes and silicon nanobeam cavity

09:15-09:30 · 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.

09:30-09:45 · ACP2025-0815-87
Nonvolatile Silicon-based Optical Switch based on Low-loss Phase Change Material
Wencheng Yue[1], 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.

09:45-10:00 · 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 Zheng[1], Tiannan Han[2], Hengtai Xiang[1], Yuanrong Li[1], Junhuan Li[1], Leyi Hu[1], 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 Hanghzou, 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 Xiang[1], Jing Liu[2], Laiwen Yu[1], Yuanrong Li[1], Liang Gao[2], Jingshu Guo[1*], Jiang Tang[2], 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 $pW/Hz^{1/2}$.

Keywords: silicon photonics, photodetector, graphene, quantum dots

11:00-11:15 · ACP2025-0801-192

Compact Mid-Infrared Inverse-Designed Passive Devices Based on LNOI

Deng Haoqing[1], Zhang Guowu[2], Yu Zejie[1], Dai Daoxin[1]
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, demonstratingenhanced 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 Campo[1], Nayem Al Kayed[2], Bhavin Shastri[2], Jose Capmany Francoy[1]
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 succesfully solving a three-node ferromagnetic coupling problem.

14:15-14:30 · ACP2025-0730-58
High-wavelength-uniformity artificial gauge field based micorings 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 Zhu[1], Kailai Liu[2], Shujie Pan[3], Xin Hua[1], Yifan Liu[1], Xinyu Yang[1], Yuhan Gong[2], Chao Yang[2], Ming Luo[2], Hongguang Zhang[1], Daigao Chen[1], Siming Chen[3], 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 Yang[1], **Ying Zhu**[1], Yifan Liu[1], Xueyi Jiang[1], Hongguang Zhang[1], Daigao Chen[1], 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 builda systematic modeling for MZI-based network with imperfections andproposean N-ary distributed architecture based on noise-aware search for large-scale photonic convolutional neural networks, achieving a 60.59% relative accuracy improvementover 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-Company[1], Jason McKinney[2], Andrew Weiner[2]
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 thehigh 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 paramatric oscillator
Yuxuan Ouyang, Yanfeng Zhang, Jiaqi Li, Jinjie Zeng, Shuai Lin, Jieyang Wang, Yinchen 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 Zhou[1], Zhihan Sun[1], Yueyang Yu[1], Yantao Wu[1], Tian Qi[1], Shengjiang Dai[2], Changyu Hu[2], Hao Hu[2], Bo Zhao[2], Jun Liu[2], 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 circuitlevel design environments

Track 5: Microwave Photonics and Optical Signal Processing

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 viaTwin-SSB Modulation
Zhanjiang Wang[1], Kaile Li[2], Qiufei Song[1], Feixiang Zhang[1], Shuhui Zhou[1], Tong Li[1], Yibo Huang[1], 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 térahertz 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 Song[1], Kaile Li[2], Zhanjiang Wang[1], Shuhui Zhou[1], Feixiang Zhang[1], Tong Li[1], Xiande Lin[1], 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 Xin[1], Jiao Zhang[2*], Min Zhu[1*], Qing Zhong[1], Weidong Tong[1], Yunwu Wang[2], Mingzheng Lei[2], Junjie Ding[2], Yuancheng Cai[2], Bingchang Hua[2], Yucong Zou[2], Jianjun Yu[2]
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 He[1], Yan Li[1*], Zhengjie Wang[1], Jin Wu[2], Ziqi Song[2], Zhuang Wu[2], Ziqian Fan[3], Wenjie Guo[1], Jian Wu[1]
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 reducingthe data volume required for chaotic radar ranging.

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 anoptical computing-in-memoryconvolutional processor, which leverages hybrid wavelength-mode multiplexingand 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 Ge2Sb2Se4Te1and 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 41.14TOPS/mm2and an energy efficiency of 12.03TOPS/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

08:30-10:00 · 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 photonic-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 Liu[1], Qianwu Zhang[1,2*], Junjie Zhang[1,2], Zhiyong Lu[3], Wenpeng Cui[4], Xianzhuo Li[1], Zixuan Ming[1], Wenzhong Liu[1], Kun Chen[1]

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 throughsegmented 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

Track 5

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 technologiesare 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 Politecnica 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 Deng[1], Yuan Cao[2], 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 attackcapabilities. 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 Dong[1], Haoyu Zhang[1], Yinjun Liu[1], An Yan[1], Guowei Jiang[2,3], Jianyang Shi[1], Nan Chi[1], Junwen Zhang[1*]

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 VCSEL

Ling Zheng[1*], **Xinrui Hu**[1], Pan Zhang[1], Xingxing Guo[2], Yahui Zhang[2], Shuiying Xiang[2]

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 by19% and 24%, respectively. Furthermore, this study investigates the effects ofthe number of training epochsandthe initial learning rateon the model performance.

15:30-17:30 Coffee Break & Poster Session

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,-115.8dBc/Hz phase noise,44dB SNR RF Beating Generation for Beamforming

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 Hua[1], Yifan Liu[1], Xinyu Yang[1], Xueyi Jiang[1], Hongguang Zhang[1], Daigao Chen[1], 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

13:30-11:45 · 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 Zheng[1], **Pan Zhang[1]**, Xinrui Hu[1], Xingxing Guo[2], Yahui Zhang[2], Shuiying Xiang[2]

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 Wang[1], JunJie Ding[2], Min Zhu[1], Long Zhang[2], Jia Meng[1], WeiDong Tong[1], Yuancheng Cai[2], Jiao Zhang[2], Bingchang Hua[2], Mingzheng Lei[2], Kaihui Wang[3], Jianjun Yu[3]

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

SNR-Enhanced Constant-Envelope THz Signal Transmission at 300 GHz based on Modified Arctangent Algorithm

Jiankang Li[1], Yuancheng Cai[2*], Xiang Meng[1], Zicheng Fang[1], Jiao Zhang[2], Mingzheng Lei[2], Bingchang Hua[2], Junjie Ding[2], Xingyu Chen[2], Yunwu Wang[2], Jianjun Yu[2], 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 Li[1], Xiang Liu[2], Wei Wei[1*], Weilin Xie[1], Yi Dong[1]

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 Cui[1], Chenyang Ma[1], Cheng Gu[2], Xinyu Jin[1], Wen Xie[2], Zhengyang Xie[1*], Xin Zhao[1], Pengwei Gong[2], Zheng Zheng[1]

1.Beihang University, China; 2.Beijing Institute of Radio Metrology and Measurement, China

We proposes and verifies 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, Guiling 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 μs interception.

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

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) substratesis recognized as the mostpromising and low-cost method for realizing high-performance on-chip light sources in silicon photonic integrated circuits (PICs). Although great progresses have been made only about growing III-V QD lasers on Si, monolithic integration of III-V lasers and siliconwaveguideson the same waferis still unavailable. Here, we demonstrate an embedded InAs/GaAs QD laser directly grown on the trenched SOI substrate, enabling monolithic integration with buttcoupled 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 thepatterned trenched SOI platform. The (111)-faceted sawtooth structures are effectiveto 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 supperlattices, high-quality III-V film with low threading dislocation density (~10^6/cm^2) and low surface roughness (RMS < 1nm) is achieved on the trenched SOI substrate. By utilizing the trenched 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, CAS, 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 talkpresentslateral 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*], Evgeniy Sergeev[1,2], Sergey Avdeev[1], Aleksey Kramarenko[1], Kirill Buzaverov[1,2], Oksana Shmonina[1], Aleksandr Baburin[1,2], Ilya Ryzhikov[1], Ilya Rodionov[1,2]
1.Bauman Moscow State Technical University, Russia;2.Dukhov Research Institute of Automatics (VNIIA), Russia
We demonstrateNbN-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 Bukatin[2], Aleksei Kramarenko[2], Evgeniy Lotkov[1,2], Evgeny Zikiy[1,2], Ilya Ryzhikov[2], 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
Deterministic soliton microcombs enabled by copper-free photonic integrated circuits
Xinru Ji[1*], Xurong Li[1], Zheru Qiu[1], Rui Ning Wang[2], Marta Divall[1], Andrey Gelash[1], Grigory Lihachev[1], Tobias Kippenberg[1]
1.Swiss Federal Institute of Technology Lausanne (EPFL), Switzerland;2.Luxtelligence SA, Switzerland
We trace thermal effects in Si_3N_4microresonators 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

Jiaxin Zheng[1], Jianyu Shi[1], Yan Zhou[2], Hao Wu[2], Yu Sun[1], Junde Lu[1], Jie Shi[1], Lanling Chen[1], Yueqin Li[1], Jian Sun[1], Zhengsong Li[1], Jun Qin[1]

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/HTCCpackaging isdesignedand simulated. The transceiver achieves a bandwidth of approximately 40 GHz, with clear eye diagramobserved 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 Kong[1], Yongmei Sun[2*], Zhenhua Li[1], Qi Zhao[1], Yuting Wang[2], Yaoxian Gao[2], 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 Zhou[3,4], Bing-Cheng Yang[3,4], Yun-Ru Fan[1,2*], Hao Li[3,4], Li-Xing You[3,4], Xin Ou[3,4,5,6*], Guang-Can Guo[1,2,7,8], Qiang Zhou[1,2,7,8*]

1.Institute of Fundamental and Frontier Sciences, China;2.University of Electronic Science and Technology of China, China;3.Shanghai Institute of Microsystem and Information Technology, China;4.Chinese Academy of Sciences, China;5.The Center of Materials Science and Optoelectronics Engineering, China;6.University of Chinese Academy of Sciences, China;

7.CAS Center For Excellence in Quantum Information and Quantum Physics, China;8.University of Science and Technology of China, China

We reportentangledphoton pairs generation in a 4H-silicon carbidemicroring chip via spontaneous four-wave mixing, achievinghigh 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 Yu[1], Li Zhang[2], Zhicheng Jin[1], Jialiang Wang[1], Fangxiang Wang[3], 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 niobatemicrodisk, enabled bysecond 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 Sun[1], Xingyu Tang[2], Qiankun Li[1], Zhenyu Liu[2], Yongyuan Chu[1], Chengbo Mou[1], 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 Ta_2O_5waveguides, enabling broadband supercontinuum generation. This provides an effective solution for on-chip broadband SC spectra in Ta_2O_5-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 Deng[1], Jin Li[1], Xiujie Dou[1], Yaoming Wei[1], Yang Tan[2], Jiawei Wang[1*]
1.Harbin Institute of Technology, Shenzhen, China;2.Shandong University, China
We demonstrate the experimental realization of optically pumpedlasing 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 Si_3N_4 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 Filter
Tiantian Li[1*], **Huanlu Zhang[1]**, Yumeng Liu[1], Zhangfeng Ge[2], Zhanqiang Hui[1], Huimin Du[1]
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 devices
Kirill Buzaverov[1,2*], Aleksandr Baburin[1,2], Evgeny Sergeev[1], Sergey Avdeev[1], Evgeniy Lotkov[1], Sergey Bukatin[1], Ilya Stepanov[1], Alexey Kramarenko[1], Ali Amiraslanov[1], Dmitriy Serkin[1], 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 Source

Yazhou Zhao[1], Riyao Song[1], Jiarui Li[1], Hao Li[2], Lixing You[2], Yao Xiao[3], Yunru Fan[1], 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.CAS 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 internet.

11:30-11:45 · ACP2025-0731-72

On-Chip Real-Time Shot Noise Calibration for Continuous-Variable Quantum Key Distribution

Xuesong 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 Links

Ji Zhang[1], **Riyao Song[2]**, Yu Qin[3], Jie Sun[1], Lipeng Feng[4], Huimin Tan[1], Yichun Shen[3], Yazhou Zhao[2], Hao Li[5], Lixing You[5], Yao Xiao[6], Yunru Fan[2], 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.CAS 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°/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° × 1.55° within an ultra-compact 560 μm² 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 μm × 635 μm) 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 Ou[1], Zhaohui Li[2]
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 Liu[2], Marco Clementi[3], Shuang Qiu[2], Limin Lin[2], 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 withlow 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 ~ 10 × 140 μm².

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 CAS, 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 LiADR 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 chipscale 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 Lin[1], Jin Li[1], Ran Cheng[1], Jiaqi Zhao[1], Yang Tan[2], 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

Place: Function Room K3

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
Yonsei University, Korea
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: Yongkang Dong, Harbin Institute of Technology, China

08:30-09:15 · ACP2025-0915-17 **Keynote**
Forward Brillouin scattering in few-mode fibres: Opportunities for accurate temperature sensing
Marcelo A. Soto
Universidad Técnica Federico Santa María, Chile
This presentation will provide an overview of the mechanisms, key features, and experimental and simulation results of forward Brillouin scattering in few-mode fibres, highlighting its potential for high-precision temperature sensing.

09:15-09:45 · ACP2025-0915-20 **Invited**
TBD
Qizhen Sun
Huazhong University of Science and Technology, China
TBD

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 toforma 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**
TBD
Bo Liu
Zhejiang LAB, China
TBD

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 innovativefor 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 Jiang[1], Ming Tang[3]
1.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 DAS
Ke 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 OFDRbased 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

08:30-10:00 · November 8, 2025 · Saturday
Novel Photonic Sensors
Presider: Lipeng Sun, Jinan University, China

Track 7

08:30-09:00 · ACP2025-0915-21 **Invited**
TBD
Ruohui Wang[1]
Northwest University, China
TBD

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 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.

09:30-10:00 · ACP2025-0730-3 **Invited**
Chalcogenide-based photonic integrated devices and sensing applications
Jingshun Pan[1*], Zhaohui Li[2]
1.South China Normal University, China;2.Sun Yat-sen University, China
Chalcogenide-based materials, belonging to the sixth main group, have garnered widespread attention owing to their myriad advantages, including transmissibility spanning the visible to mid-infrared wavelength ranges, ultra-low optical loss, high nonlinearity, and substantial elasto-optical coefficients. Herein, we present innovative research on chalcogenide-based materials, encompassing chalcogenide compound-based material systems, the fabrication of integrated photonic chips and devices, as well as integrated chip demodulation systems and their applications. This study explores a novel chalcogenide-based material characterized by exceptional elasto-optical coefficients, whose fabrication process enables efficient detection of high-sensitivity ultrasonic signals. We have suc-

cessfully fabricated a photonic micro-ring array device with a quality factor approaching 10^6, a noise-equivalent pressure as low as 2.2 mPa/Hz^(1/2), and an ultrasonic signal bandwidth coverage of 175 MHz. Leveraging advanced parallel spectroscopic detection technology, our research achieves wavefront array detection of ultrasonic fields, with applications encompassing photoacoustic imaging of living zebrafish, three-dimensional photoacoustic imaging of leaf veins, and real-time online blood pressure monitoring in humans, thereby demonstrating extensive application prospects.

10:00–10:30 Coffee Break

10:30-11:30 · 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.

11:00-11:30 · ACP2025-0729-52 **Invited**
Operando Decoupling of Lithium-ion Transport Dynamic of Batteries Using Tilted Fiber Bragg Grating Sensors
Fu Liu
Northwestern Polytechnical University, China
An operando fiber-optic method has been developed to monitor ion transport in batteries, revealing deviations from the DFN model and highlighting the need for models that account for nonuniform reaction and current density.

12:00–13:30 Lunch Break

13:30-16:00 · November 8, 2025 · Saturday
Photonic Bio-sensors
Presider: TBD

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 sensivities 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 tumortheranostics, 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 oftherapeutic doses(thermal and drugs) to tumor sites for intraoperative synergistic photothermal-chemotherapy but also provides real-time dose monitoringthrough 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 managementcycles.

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 Kai[1], Junming Zhou[1,2], Junyi Li[2], Nanguang Chen[1,2*]

1.National Unversity 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 Yang[1], Yifan Duan[1], Jiahui Jin[1], Yunting Du[2], Yang Zheng[2], Xiaojing Tong[2], Yang Zhang[1*], Wei Peng[1]

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 Deng, 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 Li, 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: TBD

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[1*], Yutian Liu[1], Qiarong Xiao[1], Zijian Li[1], Zixian Wei[2], Changyuan Yu[2], Chaoran Huang[1], Chester Shu[1]
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 Bin[1], Yutong Liu[1], Junwei Zhang[1*], Zhaohui Li[1], Chao Lu[2]
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 Wang[1], 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 Liu[1], Yue Pang[2], Yidi Wang[1], Min Zhang[1], 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: TBD

16:00-16:15 ·ACP2025-0801-71

AWG-based 128-channel end-to-end matrix multiplication chip

Chun Gao[1], Xiaowan Shen[1], Xinxiang Niu[2], Zejie Yu[1], Yiwei Xie[1], Pan Wang[1], 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 Dai[*]
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 Wu[2], Yunhao Zhang[1,2], Haowen Shu[1*], Xingjun Wang[1*]
1. Peking University, China; 2. Pengcheng Laboratory, China

We implement an 850-nm vertical-cavity surfaceemitting 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 Chen[1], Huan He[2], Zhiyong Zhao[1*], Ming Tang[1], Chao Lu[2]
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.

13:30–15:30· November 6, 2025 · Thursday
Best Paper Award I
Presider: TBD

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, Ziye Zhong, Ming Luo
State key laboratory of Optical Communication Technologies and Networks, China Information Communication Technologies Group Corporation, China
AnFPGA-accelerated correlation OTDR achieving 2cm resolution over 95km in real timeis 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 Cheng[1], Zhaopeng Xu[1], Shangcheng Wang[1], Honglin Ji[1*], Xiansong Fang[2], Yixiao Zhu[3], Lulu Liu[1], Tonghui Ji[1], Lingjun Zhou[2], Zhixue He[1], Weisheng Hu[3], Juhao Li[2]
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 Cai[2], Xiansong Fang[2], Chenbo Zhang[2], Yimin Hu[1], Ziheng Zhang[1], Lingjun Zhou[2], Chongyu Wang[1], Fan Zhang[2], Weisheng Hu[1]
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 Li[1], Jinhan Cai[1], Biswanath Mukherjee[2], 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
Yuanchao Yu, Xin Li, Wei Gao, Liangjun Lu, Jianping Chen, Linjie Zhou, Yanyang Zhou, Wansu Bao
Shanghai Jiao Tong University, China
We demonstrate an 8 × 8 × 2λ 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: TBD

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, Weihan Wang, Weike Zhao, Ruitao Ma, Daoxin Dai*
Zhejiang University, China
We demonstrated a 36-channel hybrid mode/wavelength division multiplexing transmitter on lithium-niobiate-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/Si_3N_4 Hybrid-Integrated Mode-Locked Laser
Mengran Qiao[1], Xiaoying Guo[1], Xinhang Li[1], 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/Si_3N_4mode-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 Qi[7], Hao Li[8], Lixing You[8], Kai Guo[9], 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. CAS 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 ($LiTaO_3$) 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 $LiTaO_3$ 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.