Room A (Grand Ballroom 1), 2F | Chair: Akira Kawai. (NTT, inc.)

Mo1A | June 29 (Mon), 2026
Transmission over Hollow-Core Fiber | 13:00-14:30

Mo1A-1 **13:00-13:15**

1.2T(4λx300G) Interconnect over 14km NANF using Shared-Carrier Kramers-Kronig Detection

Hilmi Othman, Kyle R.H. Bottrill, Suttikarn Wantee, Gregory T. Jasion, Hesham Sakr, Francesco Poletti, Periklis Petropoulos
University of Southampton

We present 1.2Tb/s (4λ×300Gb/s) directdetection transmission over 14-km of NANF using KramersKronig receiver and carrier sharing. By harnessing the high linearity and low dispersion of hollow-core NANF, penaltyfree transmission was demonstrated at high-launch power.

Mo1A-2 **13:15-13:30**

4.96 Tbit/s DWDM-IMDD Transmission over 11.6 km of Hollow-Core DNANF

Suttikarn Wantee, Kyle R.H. Bottrill, Hilmi Othman, Hao Liu, Periklis Petropoulos
University of Southampton

We demonstrate transmission of 4.96 Tbit/s DWDMIMDD signals in the C-band over 11.6-km of dispersionuncompensated hollow-core fibre with 31×160 Gbit/s PAM6 channels, all operating below the 6.25% HD-FEC threshold.

Mo1A-3 **13:30-13:45**

SOA based Full C-Band 800G ZR Transmission over a 60.85 km AR-HCF DCI Link

Carina Castineiras Carrero[1], Arnaud Dupas[1], Amirhossein Ghazisaeidi[1], Haïk Mardoyan[1], Célia Cruz[2], Cosimo Caló[2], Fabrice Blache[2], Arnaud Wilk[2], Olivier Delorme[2], Nicolas Vaissiere[2], Karim Mekhazni[2], Igor Mijovic[2], Oriol Bertan Pardo[3], Jérémie Renaudier[1]
[1]Nokia Bell Labs, [2]III-V Lab, Palaiseau, [3]Nokia

We demonstrate 800G ZR transmission over 60.85 km of low loss AR-HCF using dual-polarization variable confinement SOA. Full C-band transmission of 39x800G ZR channels is achieved over a DCI link, yielding 31.4 Tb/s throughput with 6.4 b/s/Hz spectral efficiency.

Mo1A-4 **13:45-14:00**

WSS-Based Optical Domain Equalization to Mitigate Gas Absorption Penalties in Hollow-Core Fiber for Wide-Area AI Interconnects

Hong Liu[1,2], Shan Huang[5], Chengbo Li[1,3], Baoluo Yan[1,2], Dongchen Zhang[1,2], Jun Chu[4], Yangguang Liu[1,2], Hu Shi[1,2]
[1]State Key Laboratory of Mobile Network and Mobile Multimedia Technology, [2]WDM System Department of Wireline Product R&D Institute, [3]Hardware System Department, [4]State Key Laboratory of Optical Fibre & Cable Manufacture technology, [5]China Mobile Information Technology Co., Ltd.

A WSS-based optical equalization method is proposed to compensate gas absorption in hollow-core fiber, extending transmission distance from ~200km to 400km for high-speed signals.

Mo1A-5 **14:00-14:15**

Ultra-Dense WDM Transmission Using SSB A-RoF Signals Over a Hollow-Core Fiber

Natsuhiro Yamada[1], Hironori Yamaji[1], Kimitami Yanai[1], Satoshi Fujita[1], Takeshi Takagi[2], Kazunori Mukasa[2], Motoharu Matsuura[1,3]
[1]University of Electro-Communications, [2]Lightera Japan Co., Ltd., [3]Keio University

We demonstrate ultra-dense wavelength division multiplexing transmission using single-sideband analog radio-over-fiber signals over a 1-km hollow-core fiber. We successfully achieved high tansmission performance with a channel spacing twice the carrier frequency of the modulated signal.

Mo1A-6 **14:15-14:30**

Evaluation of Nonlinear Effects in DWDM Transmission Using a Hollow-Core Fiber

Kimitami Yanai[1], Natsuhiro Yamada[1], Takeshi Takagi[2], Kazunori Mukasa[2], Motoharu Matsuura[1,3]
[1]University of Electro-Communications, [2]Lightera Japan Co., Ltd., [3]Keio University

We experimentally evaluated nonlinear effects in dense wavelength-division multiplexing transmission using a hollow-core fiber (HCF) in detail. We demonstrated that HCFs significantly suppress these effects compared with silica-core fibers and provide high transmission characterics.

Room B (Grand Ballroom 2), 2F | Chair: Fernandez-Ruiz Maria R. (University of Alcalá)

Mo1B | June 29 (Mon), 2026
Distributed Fiber-Optic Sensing I | 13:00-14:30

Mo1B-1 **13:00-13:15**

Highly Integrated Interrogator for Distributed Acoustic Sensing

Zhicheng Jin[1], Jiageng Chen[1], Zhengwen Li[1], Hanzhao Li[2], Keke Hu[2], Xuhui Yu[2], Zuyuan He[1]
[1]Shanghai Jiao Tong University, [2]Ningbo AllianStream Photonics Technology Co., Ltd.

We demonstrate a near-complete integrated DAS interrogator based on hybrid InP–SOI integration, achieving 18.52 pε/√Hz strain resolution and ~8 m spatial resolution over a 5 km sensing fiber.

Mo1B-2 **13:15-13:30**

Phase Noise Compensation with IQ Imbalance Correction for IM-based DAS

Zhicheng Jin[1], Jiageng Chen[1], Zhengyuan Xiao[1], Jiazhen Ji[1], Zhengwen Li[1], Hanzhao Li[2], Xuhui Yu[2], Zuyuan he[1]
[1]Shanghai Jiao Tong University, [2]Ningbo AllianStream Photonics Technology Co., Ltd.

We propose a phase noise compensation (PNC) method with IQ imbalance correction for IM-based DAS, validated on sub-100 kHz and sub-100 Hz lasers, and demonstrating the necessity of IQ imbalance compensation through comparative analysis.

Mo1B-3 **Invited** **13:30-14:00**

Harnessing Fiber Rayleigh Scattering: Unlocking Advanced Sensing and Novel Lasers

Yifei Qi, Yingqing Wu, Zinan Wang
University of Electronic Science and Technology of China

Rayleigh scattering establishes a fundamental physical foundation for a range of emerging photonic technologies. Representative directions include distributed fiber sensing enabled by non-oscillatory Rayleigh scattering feedback, and random fiber lasers enabled by oscillatory Rayleigh scattering feedback, supporting applications such as distributed acoustic sensing and high-power laser system.

Mo1B-4 **14:00-14:15**

Multi-Fiber/Multi-DAS Array System with Clock-Free Synchronization

Wataru Kohno[1], Shuji Murakami[2], Noriyuki Tonami[1], Ting Wang[2]
[1]Advanced Network Research Laboratories, NEC Corporation, [2]NEC Laboratories America Inc.

We demonstrate distributed fiber-optic acoustic sensing that employs a mechanical synchronizer to achieve samplelevel synchronization of signals across independent sensors. This enables phase-noise suppression and bandwidth extension in standard multi-fiber optical cables without hardware modification.

Mo1B-5 **14:15-14:30**

Near-Field Acoustic Imaging Using Distributed Acoustic Sensing and Adaptive Beamforming

Sebastián San Martín[1], Felipe Mejías[1], Gonzalo Carrasco[2], Matías Zañartu[1,2], Marcelo A. Soto[1,2]
[1]Universidad Técnica Federico Santa María, [2]Universidad Técnica Federico Santa María

We propose an adaptive beamforming approach for nearfield acoustic imaging with fibre-optic distributed acoustic sensors. Results show that Frost beamforming enhances image contrast compared with conventional delay-and-sum processing, facilitating acoustic source localisation.

Mo1C-1 **13:00-13:15**

O-band Up-to-200GBd PAM Interconnects with a Broadband Packaged EO-equalizer-integrated TFLN Modulator

Paikun Zhu[1], Yuya Yamaguchi[1], Pham Tien Dat[1], Shingo Takano[2], Shotaro Hirata[2], Yu Kataoka[2], Junichiro Ichikawa[2], Tetsuya Fujino[2], Yuki Yoshida[1], Kouichi Akahane[1], Naokatsu Yamamoto[1], Atsushi Kanno[3,1], Tetsuya Kawanishi[4,1]
[1]NICT, Koganei, [2]Sumitomo Osaka Cement Co. Ltd., Funabashi, [3]Nagoya Institute of Technology, [4]Waseda University,

We demonstrate O-band up-to-200GBd and up-to480Gb/s/lane IM-DD links over 1km or 10km SMF with standard PAM formats and low-complexity digital equalization, leveraging a fully-packaged EO-equalizerintegrated TFLN modulator having 100GHz electro-optic bandwidth and ultra-broad optical bandwidth.

Mo1C-2 **13:15-13:30**

Net 211 Gb/s Optical-Amplification-Free Transmission using a 1064 nm Lithium Niobate Mach Zehnder Modulator

Darja Cirjulina[1], Toms Salgals[1], Armands Ostrovskis[1,2], Hadrien Louchet[2], Michael Koenigsmann[2], Fabio Pittalà[2], Benjamin Krüger[2], Lu Zhang[3], Xianbin Yu[3], Richard Schatz[4], Stefan Dahlfort[5], Nicolas Grossard[6], Robert Jahn[2], Kazuo Yamaguchi[2], Markus Gruen[2], Vjaceslavs Bobrovs[1], Xiaodan Pang[1,3], Oskars Ozolins[1]
[1]Riga Technical University, [2]Keysight Technologies Deutschland GmbH, [3]Zhejiang University, [4]RISE Research Institutes of Sweden, [5]Ericsson AB, [6]Exail Photonics

We demonstrate 190 GBaud OOK, 106.25 GBaud PAM4 and 90 GBaud PAM6 transmission using a 1064 nm lithium niobate Mach-Zehnder modulator (MZM). We achieve performance satisfying 6.25% overhead HD-FEC requirements after 100-meter SMF transmission.

Mo1C-3 **13:30-13:45**

Field Demonstration of 320-Gb/s Single-Sideband Coherent Optical Detection for Next-Generation DCIs

Xiaoying Zhang[1,2], Qi Wu[2], Haiqiang Wei[2], Chao Lu[2], Alan Pak Tao Lau[2], Jiahao Huo[1], Kangping Zhong[2]
[1]University of Science and Technology Beijing, [2]The Hong Kong Polytechnic University, Hong Kong

In this paper, we successfully demonstrated a field transmission of 320Gbit/s SCM-16QAM/PAM-4 signal over 109km deployed link using single-sideband coherent optical detection technique for fine-speed granularity DCIs application.

Mo1C-4 **13:45-14:00**

First Experimental Demonstration of 4-core MCF Transmission Using 800G FR4 Optics and MMC Connectors

Jason Hurley, Doug Butler, Xin Chen, Kevin Bennett, Clifford Sutton, Michael Famularo, Sergejs Makovejs
Corning Incorporated

We experimentally show 800G FR4 transmission over MCF up to 3.35 km, achieving BER levels <10-8. We used 4-core MCF MMC connectors to demonstrate the practicality of using MCF-based solution in real-world deployments.

Mo1C-5 **Invited** **14:00-14:30**

Hollow Core Fiber based Data Center Interconnection

Songnian Fu, Cong Zhang, Yuwen Qin
Guangdong University of Technology

To satisfy both capacity and latency requirements of data-center interconnection (DCI), we experimentally demonstrate hollow-core fiber (HCF)-based DCI schemes. The results validate HCF superiority in high-capacity, lowlatency DCI applications.

Room D (Capri), 2F | Chair: Devin Brinkley (Taara Connect)

Mo1D | June 29 (Mon), 2026
Free-Space Optical Satellite Communications | 13:00-14:30

Mo1D-1 **13:00-13:15**

Pilot-efficient Adaptive Equalization Enabled Synthetic Aperture Reception for Tbit/s-class Satellite-Ground FSO Links

Haoyu Zhang[1,2], Fang Dong[1,2], Chaoxu Chen[1,2], Yuan Wei[1,2], Jianyang Shi[1,2], Junwen Zhang[1,2], Nan Chi[1,2]
[1]Fudan University, [2]Shanghai Engineering Research Center

A pilot-efficient, pre-trained adaptive equalization and combining framework for synthetic aperture reception without online retraining, achieving 3.6 Gbps net-rate gain in a 660-km 1.99-Tbit/s equivalent satellite-ground FSO link with fewer multiplications and 2% pilot overhead.

Mo1D-2 **13:15-13:30**

Dynamic Adaptive Beam Control Using a Variable-Focus Liquid Lens for Free-Space Optical Systems

Seyun Oh, Hoon Kim
Korea Advanced Institute of Science and Technology

We experimentally demonstrate adaptive beam divergence control in response to instantaneous pointing errors using a variable-focus liquid lens. The approach achieves lower outage probabilities than fixed beam divergence even with tenfold larger pointing errors.

Mo1D-3 **Invited** **13:30-14:00**

Advancing 6G NTNs for Integrating LEO Satellite Laser Communications with FSO and 5G NR

Wei-Ting Huang[1], Chi-Hsiang Hsu[1], Feng-Ti Chen[1], Jia-Hui Chou[1] Ting-Wei Zhang[2], Ming-Ta Yang[2], Hai-Han Lu[1]
[1]National Taipei University of Technology, [2]Industrial Technology Research Institute

An OWC-fiber-FSO-5G NR hybrid system is employed to emulate an advanced LEO satellite-fiber-FSO-5G NR NTN. This system serves as a practical testbed and lays the groundwork for the realization of 6G NTN global communication networks.

Mo1D-4 **14:00-14:15**

Experimental Comparison Between Quadrant Detector and 4×4 Photodetector Array for Fast Beam Tracking in Free-Space Optical Systems

Mat T. Nguyen, Woohyeon Moon, Hoon Kim
Korea Advanced Institute of Science and Technology

We experimentally compare a quadrant detector and a 4×4 photodetector array for fast beam tracking in free-space optical systems. The results show that the photodetector array provides 40.7% faster beam tracking than the quadrant detector.

Mo1D-5 **14:15-14:30**

An Expanding-Window Network Coding Design for Satellite-to-Ground Optical Communications

Luozhang Liang, Bingli Guo, Jiayi Wang, Xuwei Xue, Yu Zhou, Shanguo Huang
Beijing University of Posts and Telecommunications

This paper proposes a packet-level forward error correction design named Expanding Window Random Linear Network Coding for satellite to ground optical links to significantly reduce latency and enhance throughput in long-delay channels.

Room E (Sydney), 2F | Chair: Kyoungsik Yu (KAIST)

Mo1E | June 29 (Mon), 2026

Silicon Photonics Platforms | 13:00-14:30

Mo1E-1 **Invited** **13:00-13:30**

300-mm Silicon Photonics Platform at Samsung Foundry

Hyundai Park
Samsung Electronics Co., Ltd.

The architectural transition toward extending optical interconnects into the package level is positioning silicon photonics as a key enabling technology for next-generation AI infrastructure, supported by its strong compatibility with existing semiconductor manufacturing ecosystems. In this invited presentation, we provide an overview of Samsung Foundry's 300-mm silicon photonics platform and review the current status of its development.

Mo1E-2 **13:30-13:45**

AWG Wavelength Routers on Silicon Nitride Platform for O-band CW-WDM Applications

Avijit Koley San-Liang Lee
National Taiwan University of Science and Technology

We demonstrate a scalable O-band 8x8 cyclic AWG for wavelength routing using tunable lasers. With 2.85-dB insertion loss and 1.4-dB non-uniformity, it enables low-loss, high-capacity photonic switching for next-generation optical interconnects and data center applications.

Mo1E-3 **13:45-14:00**

Taper-based Low-Loss Stitching in Silicon Nitride Waveguide on Glass for Wafer-Level Optical Interconnect

Seokhyeon Yoon, Taewon Jin, Seokyoung Shin, Younghyun Kim
Hanyang University

We demonstrate a tapered SiN stitching waveguide on a glass substrate that reduces stitching loss in wafer-scale optical interconnects. A stitching loss of 0.042 dB/interface at 1310 nm enables low-loss, scalable optical routing for copackaged optics.

Mo1E-4 **14:00-14:15**

Star Coupler as the Enabler Toward Multi-wavelength ELSFP Module for CPO Applications

Chia-Hsuan Chien, Wen-Hsin Chuang, Chih-Hsien Chen, Yung-Jr Hung
National Sun Yat-sen University

A low-loss SiN star coupler enabling multi-wavelength external laser small form pluggable (MW-ELSFP) modules for DWDM co-packaged optics (CPO) is proposed and experimentally demonstrated. The 4×4 prototype shows uniform wavelength distribution with <1 dB excess loss.

Mo1E-5 **14:15-14:30**

Mass-producible Optical Isolator Chips based on Silicon Photonics

Seung Hwan Kim[1,3], Beomsu Park[1], Ji Woon Park[1], Hyo-Seung Park[1], Juyeong Moon[1], Sung Hyeon Jang[1], Nam Soo Park[2], Han-Youl Ryu[3], Kyong Hon Kim[1]
[1]PhotoniSol Inc., [2]National Nanofab Center, [3]Inha University

Mass-producible integrated optical isolator chips have been demonstrated using CMOS-based silicon (Si) waveguide fabrication and sputter-coated magneto-optic (MO) film coating.

Mo1F-1 Tutorial 13:00-14:00

Silicon Photonic Integrated Circuits with Asymmetry

Daoxin Dai[1,2], Weixun Zhu[1], Mingyu Zhu[1], Dajian Liu[1]
[1]Zhejiang University, [2]China Jiliang University

Silicon photonic integrated circuits have been developed successfully by integrating various passive and active photonic devices. In particular, this tutorial gives a review and discussion on asymmetric silicon photonics which breaks the structural symmetry, including passive and active devices as well as large-scale silicon photonic chips in various applications.

Mo1F-2 Invited 14:00-14:30

Integrated Lithium Niobate Microwave and Terahertz Photonics

Cheng Wang
City University of Hong Kong

I will discuss our recent efforts on developing a thin-film lithium niobate (TFLN) microwave photonic platform that simultaneously features efficient, linear, and high-speed electro-optic modulators for high-fidelity microwave-optic conversion, low-loss functional photonic networks that can be configured for a variety of signal processing tasks, as well as large-scale, low-cost manufacturability. I will first discuss a variety of high-performance device-level building blocks as well as ultra-compact inverse-designed photonic elements. Building upon this platform, we further demonstrate high-performance microwave and terahertz photonic system-level applications.

Mo1G-1 **Invited** **13:00-13:30**

Distributed Quantum Sensing with Entangled Photons

Hyang-Tag Lim[1,2]
[1]Korea Institute of Science and Technology, [2]Korea University of Science and Technology

We experimentally demonstrate distributed quantum sensing using polarization-entangled and multi-mode N00N states. Quantum-enhanced phase estimation beyond the standard quantum limit, approaching Heisenberg scaling, establishes scalable entanglement-based quantum metrology.

Mo1G-2 **Invited** **13:30-14:00**

Photonic Quantum Sensing using Frequency Entangled Photons

Shigeki Takeuchi
Kyoto University

We report advances in quantum sensing with entangled photons, including ultra-broadband high-resolution quantum infrared spectroscopy (QIRS) and QIRS using pulsed laser pumping. We also report our recent progress in dispersion tolerant quantum optical coherence tomography (QOCT).

Mo1G-3 **14:00-14:15**

Multilevel Quantum Routing of Quantum-Classical Hybrid Packets Using All-Fiber Devices

Tae Yeong Park[1,2], Youn Chang Jeong[3], Myeong Soo Kang[2], Kwang Yong Song[4], Paul G. Kwiat[5], Hee Su Park[1,2,4]
[1]Korea Research Institute of Standards and Science, [2]Korea Advanced Institute of Science and Technology, [3]The Affiliated Institute of Electronics and Telecommunications Research Institute, [4]Chung-Ang University, [5]University of Illinois at Urbana-Champaign

We propose and experimentally demonstrate a packetwise quantum router for hybrid packets containing both quantum and classical information. Time-bin BB84 quantum key distribution over tens of km verifies successful packet routing to multiple nodes with 4% QBER, implying applicability to scalable multi-user quantum networks.

Mo1G-4 **14:15-14:30**

Polarization Disturbance Compensation in a Deployed Fiber Entanglement Network

Marcus J. Clark, Nicole Luc, Ruizhi Yang, Rui Wang, Dimitra Simeonidou, Siddarth K. Joshi
University of Bristol

We present polarisation degree-of-freedom correction on an active, subterrain deployed fiber, quantum network, with counter-propagated entanglement and polarisation control signals simultaneously in deployed fibre links, achieving 99.98% QKD uptime on a deployed fibre link.

Room A (Grand Ballroom 1), 2F Chair: Songnian Fu (Guangdong University of Technology)

Mo2A June 29 (Mon), 2026
Optical Sensing & Converged Systems 14:45-16:15

Mo2A-1 Invited 14:45-15:15

High-Speed and Intelligent Optical Access Networks: Advancing Coherent PON and Distributed Fiber Sensing Toward the Next-Generation Broadband Era

Zhensheng Jia
CableLabs

This paper reviews the recent advancement of Coherent PON (CPON) and Distributed Fiber Optic Sensing (DFOS), highlighting recent 100G specification releases and the transformative potential of intelligent, high-speed access networks for the next-generation broadband era.

Mo2A-2 15:15-15:30

Integrated Unidirectional Forward Sensing and Communication over a Parallel HCF-SMF Link

Jiwei Xie, Yiwen Zhang, Zexu Liu, Weiqi Lu, Haojie Zhu, Puzhen Yuan, William Shieh
Westlake University

We propose and experimentally demonstrate a joint communication and unidirectional forward sensing scheme employing a parallel HCF-SMF link. Forward sensing with ~35-m accuracy over 1-km and 50-GBaud PAM-4 transmission have been achieved simultaneously.

Mo2A-3 15:30-15:45

Rapid State-of-Polarization Change Point Detection via Minimum Lossy Coding Length

Shaobo Han, Ming-Fang Huang, Yue-Kai Huang, Philip N. Ji
NEC Laboratories America, Inc.

We propose a rapid state-of-polarization disturbance change-point detection and localization method using lossy coding length of kernel features. Field experiments validate accurate detection of subtle changes and precise localization, enabling reliable fiber identification and monitoring.

Mo2A-4 15:45-16:00

Field Trial of Urban Monitoring over Telecom Networks with Rayleigh-based DTSS

Jian Fang[1], Ming-Fang Huang[1], Scott Kotrla[2], Jeffrey A. Mundt[2], Yaowen Li[1], Jamie Lynn[1], Philip Ji[1], Shuji Murakami[1], Ting Wang[1]
[1]NEC Laboratories America, Inc., [2]Verizon

We present field trial on urban monitoring over telecom networks using Rayleigh-based distributed temperature/ strain sensor (DTSS), showing the capability of detecting subtle infrastructure signatures including manhole locations, road traffic, sprinklers and underground leakage events.

Mo2A-5 16:00-16:15

A Low-cost Wavelength Selectable Distributed Vibration Sensor with a Unified Sensitivity for the Whole Route Security Monitoring in PONs

Yaowen Li[1], Benyuan Zhu[2], Jian Fang[1], Shuji Murakami[1], Philip N. Ji[1], Ting Wang[1], Paul S. Westbrook[2], Zhou Shi[2], Ken Feder[2]
[1]NEC Labs America, [2]Lightera Labs

We demonstrate a low-cost wavelength selectable distributed vibration sensor to monitor the whole routes in a 1x32 PON architecture with a unified sensitivity. The results obtained from the lab and a field testbed are presented.

Room B (Grand Ballroom 2), 2F	Chair: Kwanil Lee (KIST)
Mo2B	June 29 (Mon), 2026
Acousto-Optic Sensing	14:45-16:15

Mo2B-1 Tutorial 14:45-15:45

Measurement and Sensing Techniques Through Acousto optic and Photo acoustic Effects

Kentaro Nakamura
Institute of Science Tokyo, Japan

This tutorial overviews several examples of measurement technique utilizing the interaction between ultrasound and light. First, acousto-optic measurements of ultrasound in air are explained. Second, photoacoustic measurement technique aiming at thin blood vessels is discussed.

Mo2B-2 Invited 15:45-16:15

Towards a Global Sensing Network: New Advances in Distributed Acoustic Sensing

María R. Fernández-Ruiz[1], Yan Ren[1], Julia Mateu-Comas[1], Alonso Romero-Barrueco[1], Miguel Soriano-Amat[2], Sonia Martin-Lopez[2], Miguel Gonzalez-Herraez[1]
[1]Universidad de Alcalá, [2]Institute of Optics “Daza de Valdés” IO-CSIC

We discuss the main challenges of DAS technology for becoming a ubiquitous sensing system incorporated in current telecom fiber networks, along with recent advances and future research directions towards this goal.

Mo2C-1 **14:45-15:00**

Two-Dimensional Activation Functions for Interface Reduction in Optical Accelerators

Yamato Misugi, Chua Hanns Christian J., Junichi Suzuki, Junya Nishioka, Mizuki Shirao, Nobuo Ohata
Mitsubishi Electric Corporation

For classification task in optical accelerators, we proposed two-dimensional activation functions. This method is useful for achieving large-scale optical accelerators because it can reduce the number of photodiodes and high-speed interfaces.

Mo2C-2 **15:00-15:15**

3.1 Tbps/(λ·mm) High Density Optical I/O with Multicore Fibers

Bo Xu[1], Yaotian Zhao[1], Fangchen Hu[1], Shuyuan Liu[1], Zhipei Wang[2], Aoxue Wang[2], Xiao Hu[1], Jianyang Shi[1], Haiwen Cai[1], Wei Chu[1]
[1]Zhangjiang Laboratory, [2]Fudan University

We propose a solution to quadruple shoreline density with 4-core fibers, and demonstrate a transmission of 100 Gbps/λ using bias-free silicon MRM and Ge/Si PD, achieving a high shoreline bandwidth density of 3.1 Tbps/(λ·mm).

Mo2C-3 **Invited** **15:15-15:45**

Terabit Data-Center Interconnects Enabled by Broadband TFLN Modulators

Yixiao Zhu[1], Lingjun Zhou[2], Xiansong Fang[2,3], Yaxi Yan[4], Weisheng Hu[1], Ke Li[3], Fan Zhang[2,3]
[1]Shanghai Jiao Tong University, [2]Peking University, [3]Pengcheng Laboratory, [4]The Hong Kong Polytechnic University

Artificial intelligence is driving unprecedented bandwidth demands for computing data centers. We review the recent advances of thin-film lithium niobate modulators for boosting the baud rate, bitrate and coverage in coherent and direct-detection optical interconnects.

Mo2C-4 **15:45-16:00**

A Study on 2.5D Stacked Optical Chiplets on Glass Substrate for Terabit-Scale Interconnects

Jyung Chan Lee Joon Ki Lee
Electronics and Telecommunications Research Institute

We demonstrate 2.5D optical chiplets on glass, overcoming 'Se-Wa-Re' challenges. Results confirm 80μm warpage on glass wafer and >50GHz bandwidth, proving 2.5D/3D stacking and optical I/O essential for AI 'Scale-in' and 'Scale-out' architectures.

Mo2C-5 **16:00-16:15**

Flexible Optical Interconnects Enabled by Silicon Photonic Bandwidth Steering Using a 4 × 4 Dual-Microring Optical Switch

Bin Zhang[1,2], Qishen Liang[1], Baojie Hou[1], Yongdi Zhang[1], Lingzhi Yuan[1], Bangmin Gong[1], Zichao Zhao[1], HaoranMa[1], Huihui Zhu[1], Junhui Shi[2], Hui Yu[2], Tao Zou[2], Yuehai Wang[1], Jianyi Yang[1]
[1]Zhejiang University, [2]Zhejiang Lab

We propose an optical network architecture for building ML training clusters through dynamic bandwidth steering enabled by a nonblocking optical switch based on dualmicroring resonators. Our design accelerates the training time of ResNet18 by 41.8% on a physical testbed.

Room D (Capri), 2F | Chair: Joonyoung Kim (imec)

Mo2D | June 29 (Mon), 2026

LiDAR and Wireless Optical Communications | 14:45-16:15

Mo2D-1 **14:45-15:00**

Real-Time 162 Gbit/s Photonic THz Transmission at 300 GHz Using a Novel Orthomode Transducer

Liga Bai[1], Zhe Ding[1], Lu Zhang[1], Zhidong Lyu[1], Zian Wang[1], Oskars Ozolins[3], Xiaodan Pang[1,3], Changming Zhang[2], Shilie Zheng[1], Xianbin Yu[1,3]
[1]Zhejiang University, [2]Zhejiang Lab, [3]Riga Technical University

We demonstrate a photonic terahertz communication system achieving a record 162 Gbit/s real-time data rate at 300 GHz, enabled by frequency and polarization multiplexing with a novel orthomode transducer of single symmetric Bøifot structure.

Mo2D-2 **15:00-15:15**

Record 221 Gb/s Dual Polarization THz Wireless Transmission Over 500 m Using PCS-64QAM at 300 GHz

In-Ho Baek[1], Oliver Stiewe[1], Robert Elschner[1], Markus Rösch[2], Axel Tessmann[2], Markus Nölle[3], Lutz Molle[3], Colja Schubert[1], Ronald Freund[1,4]
[1]Heinrich Hertz Institute (HHI), [2]Fraunhofer-Institut für Angewandte Festkörperphysik, [3]Hochschule für Technik und Wirtschaft Berlin, [4]Technische Universität Berlin

We report a record dual-polarization (DP) terahertz (THz) wireless transmission, achieving a net data rate of 221.5 Gb/s over a 500-m distance at 300 GHz carrier frequency.

Mo2D-3 **15:15-15:30**

Investigation of Scalability for Multi-hop Inter-Satellite Links using All-optical Relays

Satoshi Shinada, Shoichiro Oda, Hideaki Kotake, Toshimasa Umezawa, Yusuke Hirota, Hideaki Furukawa
National Institute of Information and Communications Technology

Transmission performance in multi-hop optical intersatellite links using all-optical relays was experimentally investigated. Results show all-optical repeaters with highpower optical fiber amplifiers can support over 10,000 km transmission distance of all-optical inter-satellite relays.

Mo2D-4 **15:30-15:45**

Intelligent Reflecting Surface-Assisted Pointing, Acquisition, and Tracking Algorithm for Cellular FSO Communication

Gihong Park, Hoon Kim
Korea Advanced Institute of Science and Technology

We propose a pointing, acquisition, and tracking algorithm to secure a reflected path for free-space optical links in cellular environment. The proof-of-concept experimental demonstration is performed by using fast steering mirrors and variable focus lenses.

Mo2D-5 **Invited** **15:45-16:15**

FMCW LiDAR Architectures: Overview, Trade-offs, and Design Selection

Javier Pérez Santacruz[1], Jac Romme[2], Esteban Venialgo Araujo[2], Joonyoung Kim[1], Mathias Prost[1], Ruud M. Oldenbeuving[3], Marcus S. Dahlem[1], Dongjae Shin[2]
[1]imec, [2]imec-NL Holst Centre

This work provides a high-level overview of FMCW LiDAR architectures, outlining key performance indicators and the main trade-offs that guide optimal architectural selection once system requirements are defined.

Mo2E-1 **14:45-15:00**

Wafer-Scale and Stable Single-Photon Sources on an 8-Inch Si_3N_4 Platform

Lingzhi Yuan[1], Baojie Hou[1], Zichao Zhao[1], Haoran Ma, Qishen Liang [1], Bin Zhang[1,2], Zhujun Wei[1], Huihui Zhu[1], Yuehai Wang[1], Jianyi Yang[1]
[1]Zhejiang University, [2]Zhejiang Lab

We demonstrate scalable and highly stable singlephoton sources on an 8-inch silicon nitride platform by employing Pound-Drever-Hall locking to actively suppress resonance drift.

Mo2E-2 **15:00-15:15**

Ultra-Low Loss Optical Phase Shifter on a 200-mm LPCVD Silicon Nitride Platform

Huaqing Qiu, David Coenen, Jon Kjellman, Tangla David Kongnyuy, Mathias Prost, Joost Brouckaert, Roelof Jansen, Marcus S. Dahlem
imec

We demonstrate a high-performance silicon nitride optical phase shifter with measured 0.22 dB insertion loss and −19 dB back reflection, and with simulated 29 mW/π power consumption and 5.5 kHz bandwidth.

Mo2E-3 **Invited** **15:15-15:45**

Manufacturable Integrated Photonics for Fault-Tolerant Quantum Computing

Gyeongho Son
PsiQuantum Corp.

Fault-tolerant quantum computing requires manufacturable hardware with ultralow loss and scalable packaging. We review an integrated silicon photonics platform fabricated in a 300-mm foundry, demonstrating high-fidelity qubit operations and chip-to-fiber coupling losses as low as 52 mdB.

Mo2E-4 **15:45-16:00**

A WDM-MDM Photonic Chip for Matrix-Vector Multiplication

Qingrui Yao[11,2], Chengdu Cao[1], Qiaolv Ling[1], Yiwei Xie[1], Huan Li[1], Zejie Yu[1], Xiangxing Bai[2], Yaocheng Shi[1], Daoxin Dai[1]
[1]Zhejiang University, [2]QIANYUAN Laboratory

We demonstrate an on-chip 8×8 matrix-vector multiplier using hybrid wavelength (2) and mode multiplexing (4) (WDM+MDM). Parallel multi-wavelength and multi-mode operation is achieved on a silicon photonics platform, verifying scalability processing capability.

Mo2E-5 **16:00-16:15**

On-Chip Optical Extreme Learning Machine via Supercontinuum Generation in Silicon Nitride Waveguides

Ruifeng Chen, Linanna Qi, Qian Li
Peking University

We demonstrate an integrated optical extreme learning machine utilizing supercontinuum generation in silicon nitride waveguides, achieving 87.5% accuracy for MNIST handwritten digit classification.

Mo2F-1 Invited 14:45-15:15

Beyond 300 Gb/s Optical-Amplification-Free Transmission at 85 ℃ using BTO Silicon Photonics Mach-Zehnder Modulator

Armands Ostrovskis[1,2], Thomas Kornher[3], Felix Eltes[3], Darja Cirjulina[1], Toms Salgals[1], Mateusz Zbik[3], Wouter Diels[3], Michael Koenigsmann[2], Benjamin Krüger[2], Fabio Pittalà[2], Lu Zhang[4], Xianbin Yu[4], Markus Gruen[2], Hadrien Louchet[2], Robert Jahn[2], Kazuo Yamaguchi[2], Vjaceslavs Bobrovs[1], Cyriel Minkenberg[3], Xiaodan Pang[4,1], Oskars Ozolins[1]
[1]Riga Technical University, [2]Keysight Technologies Deutschland GmbH, [3]Lumiphase AG, [4] Zhejiang University

We demonstrate an O-band barium titanate (BTO) MachZehnder Modulator (MZM) achieving record beyond 300 Gb/s net optical-amplification-free transmission over 500 m SMF at 85 ℃ supporting OOK, PAM4/6/8 with performance below 6.25% OH HD-FEC threshold of 4.5×10^{-3}.

Mo2F-2 15:15-15:30

Above 67 GHz Electro-optic Phase Modulators on an InP Membrane Platform

Ali Kaan Sunnetcioglu, Duarte Fernandes da Silva, James Arthur Hillier, Floris Pronk, Yi Wang, Weiming Yao, Kevin Williams, Yuqing Jiao
Eindhoven University of Technology

A compact high-speed electro-optic phase modulator is fabricated on an InP membrane platform. Characterized device shows EO response of -1.26 dB at 67 GHz and $V\pi L$ of 0.357 V.cm.

Mo2F-3 15:30-15:45

Mid-Infrared Silicon Electro-Optic Modulators via Standard Foundry Processes

Zengfan Shen[1], Qiyuan Li[1], Zhiwei Yan[1], Yuheng Liu[3], Yuqin Yuan[4], Qiyuan Yi[1], Guanglian Cheng[1], Xinzhe Xiong[1], Xuchen Peng[1], Hanming Yuan[1], Jiahao Xing[1], Qixin Xu[1], Lipeng Xia[3], Jialin He[4], Junwen Zhang[4], Yi Zou[3], Li Shen[1,2]
[1]Huazhong University of Science and Technology, [2]Optics Valley Laboratory, [3]ShanghaiTech University, [4]Fudan University

We demonstrate 3.55 μm mid-infrared electro-absorption (EAM) and Mach-Zehnder (MZM) modulators via standard SOI foundries. The EAM achieves a 41 dB extinction ratio and the MZM features a 15 dB ratio and a low 0.0054 V·cm $V\pi L$. Both exhibit sub 30 ns response times.

Mo2F-4 15:45-16:00

Epitaxial PLZT Electro-Optic Platform for Low-Loss, Low Vπ·L Optical Modulators

Keiichi Nashimoto[1,2] Kazuhide Harada[1]
[1]EpiPhotonics Corp, [2]EpiPhotonics USA, Inc.

Epitaxial PLZT thin films on sapphire enable low-loss waveguides with 1.6 dB/cm. Mach–Zehnder modulators show $V\pi$ = 3.9 V and $V\pi \cdot L$ = 0.39 V·cm, demonstrating PLZT as a practical electro-optic photonic platform.

Mo2G-1 **14:45-15:00**

Investigation of Image-based Computational Aberration Correction in Visible-light Micro Optical Coherence Tomography

Ansel Chen[1], Shuichi Makita[2], Yoshiaki Yasuno[2], Myeong Jin Ju[1]
[1]University of British Columbia, [2]University of Tsukuba, Tsukuba

We investigate image-based computational aberration correction for visible-light micro-optical coherence tomography to reconstruct high-resolution volume. Correction performance is evaluated regarding different spectra and optimization regions, while short-time-Fourier-transform-based analysis examines wavelength-dependent scattering and spectroscopy potential.

Mo2G-2 **15:00-15:15**

Investigation of Physiology and Dynamics Structures of Cancer Spheroid by Dynamic OCT and Fluorescence Imaging

Rion Morishita[1], Ibrahim Abd El-Sadek[1,2], Atsuko Furukawa[1], Satoshi Matsusaka[1], Shuichi Makita[1], Yoshiaki Yasuno[1]
[1]University of Tsukuba, [2]Damietta University

This paper investigates the relationships between dynamic domains visualized by dynamic OCT and physiological domains of anti-cancer treated tumor spheroids. We found that the combination of dynamic OCT and fluorescence imaging gives a complementary understanding of cellular physiology.

Mo2G-3 **15:15-15:30**

Ultra-High-Sensitive Microvasculature Imaging of in vivo Human Skin Using Dynamic Optical Coherence Tomography (DOCT)

Haotian Li[1], Rion Morishita[1], Cunyou Bao[1], Shadil Basheer[1], Yu Guo[1], Ibrahim Abd El-Sadek[1,2], Shuichi Makita[1], Yoshiaki Yasuno[1]
[1]University of Tsukuba, [2]Damietta University

We demonstrated a dynamic OCT (DOCT)-based approach which achieved ultra-high-sensitivity for in vivo human skin microvasculature imaging. The proposed method visualizes fine capillaries at inner forearm skin and enables comprehensive assessment of skin microcirculation.

Mo2G-4 **15:30-15:45**

Neural-Network-Based High-Speed Multi-Contrast Dynamic Optical Coherence Tomography

Yusong Liu[1], Ibrahim Abd El-Sadek[1,2], Rion Morishita[1], Chettanat Padungatthakij[3], Atsuko Furukawa[1], Satoshi Matsusaka[1], Yoshiaki Yasuno[1]
[1]University of Tsukuba, [2]Damietta University, [3]King Mongkut's Institute of Technology Ladkrabang

We demonstrated a neural network method incorporating non-uniform time scanning to generate multicontrast dynamic optical coherence tomography (MCDOCT) while reducing the frame number to 1/8 of conventional method, enabling high-speed MC-DOCT imaging of 6 s/volume.

Mo2G-5 **Invited** **15:45-16:15**

High-Speed and Long-Range Optical Coherence Tomography Imaging with a MEMS-Tunable HCG-VCSEL Light Source

Hsiang-Chieh Lee
National Taiwan University

Swept-source optical coherence tomography (SS-OCT) enables high-speed, non-invasive, three-dimensional imaging and has become indispensable in ophthalmic diagnostics. However, the high cost of commercial swept-sources remains a major barrier to widespread deployment. To address this challenge, we investigate a compact, cost-effective high-contrast grating vertical-cavity surface-emitting laser (HCGVCSEL) as a wavelength-swept laser light source at ~1060 nm and demonstrate its applicability to SS-OCT imaging across multiple configurations.

Grand Ballroom 4 (Grand Ballroom 4), 2F

P1 June 29 (Mon), 2026
Poster Session I 16:30-18:00

P1-1 **16:30-18:00**

Dynamic RIN Modeling of SOA-based Incoherent Pump Module for Forward Raman Amplification

Koji Igarashi[1], Kazuaki Kiyota[2], Shigehiro Takasaka[2], Junji Yoshida[2]
[1]The University of Osaka, [2]Furukawa Electric Co., Ltd.

Incoherent broadband pump modules for forward Raman amplification exhibit low-frequency RIN suppression. A dynamic SOA model with gain saturation and carrier recovery successfully reproduces the observed low frequency RIN behavior.

P1-2 **16:30-18:00**

Photo and Current Pumped CirD Laser Operated under RT-CW Conditions

Wataru Fukuda, Fuma Hayashi, Rubing Zuo, Yuto Nakai, Masato Morifuji, Hirotake Kajii, Tetsuya Yagi, Akihiro Maruta, Nobuhiko Kikuchi, Masahiko Kondow
University of Osaka

We propose an electrode structure for an open top resonator. This enables to evaluate the optical properties of CirD (Circular Defect in two-dimensional photonic crystal) laser by both photo and current pumping under RT-CW conditions.

P1-3 **16:30-18:00**

Comparative Analysis of Ge- and GaAs-Based InGaAs/GaAsP Multi-Quantum Wells Epitaxy

Zeyu Wan[1], Yun-Cheng Yang[2], Chao-Hsin Wu[2], Guangrui Xia[1]
[1]The University of British Columbia, [2]National Taiwan University

InGaAs/GaAsP multi-quantum wells grown on GaAs and engineered Ge substrates were investigated. The Ge-based MQWs exhibit higher tensile stress, misfit dislocations, and degraded crystallinity, requiring future improvements for the performance and reliability for Ge-based VCSELs.

P1-4 **16:30-18:00**

Fully Digital OPLL for Thin-Film Lithium-Niobate Lasers Enabling Frequency Stabilization and Linewidth Narrowing

Zuyu Li[1], Nuoqi Yang[1], Meiqi Li[1], Bin Zhang[1], Fan Li[1]
Sun Yat-Sen University

We propose an FPGA-based fully digital frequencystabilization scheme for thin-film lithium niobate laser, featuring significant noise suppression and automatic lock acquisition. The measured frequency-noise PSD is reduced by 22 dB at 1 kHz offset.

P1-5 **16:30-18:00**

A Repetition Rate Tunable (5 MHz?3.4 GHz) Semiconductor Mode-Locked Laser

Yueying Niu, Defan Sun, Fei Guo, Ruikang Zhang, Dan Lu
University of Chinese Academy of Sciences

We report a monolithically integrated quantum-well semiconductor mode-locked laser with an intra-cavity pulse picker, generating continuously tunable low-repetition-rate pulses (5 MHz–3.4 GHz), with a minimum duty cycle of 1/1942.

P1-6 **16:30-18:00**

Heterogeneous Integration of InAlGaAs DFB Laser on a SiC substrate

Tung-Hsuan Lin, Yu-Yen Huang, Wei-Cheng Feng, Yu-Hao Tu, Chung-wei Hsiao, Yang Jeng Chen, Yi-Jen Chiu
National Sun Yat-Sen University

A 1300nm InAlGaAs III–V/SiC DFB laser with n-side grating was integrated on a SiC substrate using adhesive wafer bonding technology, leading to 5.2 mW CW operation with 35dB SMSR on single-side facet without coating.

P1-7 **16:30-18:00**

Chirp-Aware Transmission Analysis of 100-Gb/s-PAM4 CWDM4 EMLs Using Gaussian Pulse Modeling and TDECQ Measurements

K-H Huang, Jian Fang, Ming Yu, Xiaoli Ge, Chen Gao, Zhongbao Wu, Cedric Gao, Jiaheng, Kaifeng Yang
Zetta Semiconductor Co., Ltd

We evaluated 100-Gb/s PAM4 CWDM4 EML transmission using chirp-aware Gaussian pulse modeling and TDECQ measurements, demonstrating dispersion-limited performance prediction and design optimization over standard single-mode fiber, with applicability to 400G-LR4 systems.

P1-8 **16:30-18:00**

High Spurious Suppression Wideband Signal Generation based on Optical Injection Locking

Xukai Ji, Zheng Wang, Jiale Qiao, Yuchen Huang, Feifei Yin, Yitang Dai, Kun Xu
Beijing University of Posts and Telecommunications

A wideband signal generation scheme based on optical frequency comb (OFC) and optical injection locking is proposed, and 18GHz linear frequency modulated signal with 30.39dB spurious suppression ratio is demonstrated via OFC-based spectrum splicing experimentally.

P1-9 **16:30-18:00**

Development of High-Speed AlGaInP Red RF Micro-LEDs for Optical Communication Systems

Yee Chee Keong, Zhi-An Lin, Ming-June Wu, Natchanon Prechatavanich, Cheng-En Wu, Zi-Wei Chye, Chao-Hsin Wu
National Taiwan University

625-nm AlGaInP red RF micro-LEDs demonstrate highspeed modulation performance with a measured −3 dB bandwidth exceeding 30MHz. Device design, fabrication, and characterization confirm suitability for visible-light communication and high-data-rate optical interconnect applications and beyond.

P1-10 **16:30-18:00**

Design and Optimization of an a-Si:H Intermediary Layer for O-band SOA Integration on a Photonic Platform

Daehong Kim[1], Honghyuk Kim[1], Jinkwan Kwoen[2], Younghyun Ki[1]
[1]Hanyang University, [2]The University of Tokyo

Optimal a-Si:H bridges for hybrid SOAs are identified via modal analysis. High-index bridges enable compact QDSOAs, while low-index bridges maximize QW-SOA gain. Selective adjustment ensures peak on-chip gain for diverse devices on a single platform.

P1-11 **16:30-18:00**

Continuous-Wave Laser in a Femtosecond-Laser-Inscribed Yb:YVO4 Channel Waveguide

Ji-Hoon Park, Jungyoon Kim, Deok-Woo Kim, Yungeun Oh, Young-Jin Kim, Fabian Rotermund
Korea Advanced Institute of Science and Technology

We demonstrate stable continuous-wave laser operation in a femtosecond-laser-inscribed Yb:YVO4 surface channel waveguide.

P1-12 **16:30-18:00**

Ultracompact 48×48 Silicon Photonic Arrayed Waveguide Grating Router with 100GHz Spacing

Xin Fu, Yingyi Liu, Lan Yan0, Lin Yang
Chinese Academy of Sciences

We design and experimentally demonstrate a 48×48 100 GHz arrayed waveguide grating router (AWGR) with singleetching step on silicon-on-insulator (SOI) platform. The arrayed waveguide region of this device is horseshoe-shaped to realize a small footprint of 1.5 mm ×1 mm.

P1-13 **16:30-18:00**

Ultra-Low Stitching Loss Waveguide Interfaces for Wafer-Scale Photonic Routing Using Angled and Inverse Tapers

Taewon Jin, Seokhyeon Yoon, Younghyun Kim
Hanyang University

Stepper-induced shot-to-shot misalignment creates stitchboundary discontinuities and excess loss that accumulates in large-area routing. We propose stitching-tolerant interfaces: an angled (Approach C, 0.0048 dB/interface) and an inverse taper (Approach D, ~0.001 dB/interface) in simulation.

P1-14 **16:30-18:00**

67-GHz Low-Loss GCPW with Periodic Vias for High-Speed Optical Interconnects

Min-Yen Hsieh[1], Chien-Wei Huang[1], Chun-Nien Liu[1], Zingway Pei[1], Cheng-Mu Tsai[1], Zhi-Ting Ye[1], Chun-Wei Tsai[2], Wood-Hi Cheng[1]
[1]National Chung Hsing University, [2]National United University

A λg-based via-fenced single-ended GCPW is proposed for millimeter-wave PCB interconnects in optical transceivers. The 10-mm structure shows 1.59-dB loss at 67- GHz, with S11 below −10 dB and S21 above −3 dB for 112G/224G systems.

P1-15 **16:30-18:00**

Highly Uniform Emission from Tantalum Pentoxide Grating Couplers Fabricated by Single-Step Contact Lithography

Junke Zhou, Mingjian You, Zhenyu Liu, Zhengqi Li, Ning Ding, Jiaxin Hou, Weiren Cheng, Ziming Zhang, Xingyu Tang, Shengjie Liu, Qiwei Zheng, Qiancheng Zhao[1],
Southern University of Science and Technology

We demonstrate shallow-etched Ta2O5 grating couplers with far-field emission nonuniformity less than 8.13% within 55% grating area at 1550 nm. The grating couplers are realized by cost-effective contact lithography, suitable for large-scale quantum photonic circuits.

P1-16 **16:30-18:00**

Rapid Initial Phase Calibration of OPA via Enhanced SPGD Algorithm with Nesterov-Accelerated Adaptive Moment Estimation

Songyang Li, Lei Zhang
Beijing University of Posts and Telecommunications

An enhanced SPGD algorithm combined with Nadam (Nesterov-accelerated Adaptive Moment Estimation) is proposed to correct OPA initial phase errors. Comparative analyses verify its markedly faster calibration speed than conventional optimization algorithms.

P1-17 **16:30-18:00**

Design of PtSe2-Based Waveguide-Integrated Polarizers

Tianping Xu[1,2,3], Si Chen[1,2,3], Zunyue Zhang[1,2,3], Tiegen Liu[1,2,3], Jiaqi Wang[4], Zhenzhou Cheng[1,2,3]
[1]State Key Laboratory of Precision Measuring Technology and Instruments, [2]Tianjin University, [3]Key Laboratory of Opto-electronic Information Technology, [4]Shenzhen University

We proposed PtSe2-based waveguide-integrated polarizers by integrating low-dimensional PtSe2 nanoribbons on silicon waveguide devices. The TE0-to-TM0 and TM0-to-TE0 modal extinction ratios are calculated to be 0.01502 dB/μm and 0.00754 dB/μm at 2250 nm wavelengths.

P1-18 **16:30-18:00**

Near-Field Characterization of Azimuthally Polarized Beams with Different Nanoprobes

Yajuan Dong[1,2], Xiaotong Zhu[1,2], Yu Wang[1,2], Jinwei Zeng[1,2], Jian Wang[1,2]
[1]Huazhong University of Science and Technology, [2]Optics Valley Laboratory

We propose using metallic and dielectric nanoprobes to measure tightly focused azimuthally polarized beams, enabling detection and differentiation of electric and magnetic contributions at the nanoscale. This approach facilitates the investigation of optical magnetism.

P1-19 **16:30-18:00**

Non-Reciprocal Polarization Rotation Enabled by Metasurface-Based Optical Platform

Yoon-Ho Sunwoo[1], Yun-Jae Kwon[1], Jong-Guk Jeong[1], Xie Zou[1], Woo-Bin Lee[1], Duk-Yong Choi[2], Sang-Shin Lee[1]
[1]Kwangwoon University, [2]Australian National University

We propose and demonstrate a metasurface-integrated non-reciprocal polarization rotator that combines a focusing metasurface (FMS), a magneto-optic film (MOF), and a meta-wave plate (MWP).

P1-20 **16:30-18:00**

On-Chip Photonic Neural Network Processors by Low-Rank Approximation

Weiwei Pan, Min Gong, Heng Chen, Chen Ji
Zhejiang University

We have demonstrated a photonic neural network processor using low-rank approximation. A 4×3 matrix is implemented with three microrings and four Mach-Zehnder Interferometers, reducing components by 41.67% and achieving 97% accuracy in digit classification task.

P1-21 **16:30-18:00**

Design of High-Order Series-Coupled Microring Resonator Wavelength Filters Using Success-

History-Based Adaptive CMA-ES

Nao Murasawa, Taro Arakawa
Yokohama National University

We propose a success-history-based adaptive CMA-ES method (SHACMA) for high-order microring resonator (MRR) wavelength filter design, and demonstrate a sixthorder silicon MRR filter with inherent robustness to fabrication errors without explicitly considering them.

P1-22 **16:30-18:00**

Femtosecond Laser Direct-Writing Lithium Niobate-Based Type-II Mode Converter Device

Xuhu Han[1], Yuying Wang[1], Jiacheng Hu[1], Lijing Zhong[2], Jianrong Qiu[1]
[1]Zhejiang University, [2]Ningbo University

The present study proposes a methodology for the optimization of the consistency of structures processed by femtosecond lasers in lithium niobate (LiNbO3). The methodology combines the slit beam shaping with layered scan speed control. This approach has successfully demonstrated the mode conversion of multimode interference within LiNbO3.

P1-23 **16:30-18:00**

Reconfigurable Multifunctional Nano-Photonic Device for Thermal Photonics Management

Mingyu LUO, Zhengyu ZHANG, Chao LU
The Hong Kong Polytechnic University

A multifunctional nanostructure with phase-change material GST enables switching between infrared detection and stealth (95% to 22%@3-5 μm), with high laser absorption (>50% while the average <20%) at 10.6 μm, demonstrating a compact switchable nanophotonic device.

P1-24 **16:30-18:00**

High-Capacity OAM-SK via Envelope-Comb Target-Locking Microring Arrays

Zili Cai, Zhang Tian, Qi Chen, Yihang Lai, Jubo Hao, Jian Dai, Kun Xu
Beijing University of Posts and Telecommunications

We propose an envelope-comb target locking strategy for microring arrays to overcome free-space capacity limits. By generating ±50th-order OAM modes, it achieves >99% demultiplexed purity via spatial filtering, enabling 8-ary OAM shift-keying below the HD-FEC limit.

P1-25 **16:30-18:00**

High-Sensitivity Strain Sensor based on a Mach-Zehnder Interferometer with Optical Vernier Effect

Jun Wang, Hu Zhang, Jiaqi Wang, Yihui Li, Yijie Rong, Xiaoguang Zhang
Beijing University of Posts and Telecommunications

We propose a strain sensor based on a few-mode fiber Mach–Zehnder interferometer incorporating the Vernier effect. The sensitivity magnitude is enhanced from 2.19 to 23.41 pm/με, corresponding to a magnification factor of 10.69.

P1-26 **16:30-18:00**

Ghost-Correlation Suppression in BOCDR based on Reference-Switching Subtraction

Ryo Shibazaki[1], Keita Kikuchi[1,2], Yosuke Mizuno[2], Heeyoung Lee[1]
[1]Shibaura Institute of Technology, [2]Yokohama National University

We propose a ghost-correlation suppression technique for Brillouin optical correlation-domain reflectometry based on reference-switching subtraction, which enables accurate Brillouin frequency shift measurement under strong reflection conditions. Its effectiveness is experimentally verified through distributed temperature sensing.

P1-27 **16:30-18:00**

Brillouin Characterization of High-Numerical-Aperture Silica Fibers and Demonstration of Distributed Sensing

Shu Iwasaki[1], Keita Kikuchi[1,2], Natsuho Yagishita[2], Shimbu Shirai[2], Yosuke Mizuno[2], Heeyoung Lee[1]
[1]Shibaura Institute of Technology, [2]Yokohama National University

We systematically investigate Brillouin frequency shift characteristics in high-numerical-aperture (NA) silica fibers. Both strain and temperature coefficients decrease with increasing NA. Distributed strain and temperature sensing is also demonstrated using a high-NA fiber.

P1-28 **16:30-18:00**

Ultrahigh Sensitive Fiber FPI Sensor Using Triangularly-Ground SMFs with Vernier Effect

Ciao-Huei Chung, Chin-Ping Yu

National Sun Yat-sen University

We proposed an ultrahigh sensitive fiber FPI gas pressure sensor based on an HCF sandwiched between two triangularly-ground SMFs. The measured gas pressure sensitivity is as high as -41.83nm/MPa with the Vernier effect.

P1-29 **16:30-18:00**

High-Sensitivity Peanut Allergen Detection Using an Anti-Resonant Fiber Biosensor

Ching-Hsiang Shih[1], Bo-Chen Guan[1], Chang-Yue Chiang[2], Chien-Hsing Chen[3], Cheng-Ling Lee[1]
[1]National United University, [2]National Changhua University of Education, [3]National Pingtung University of Science and Technology

We demonstrate a dual side-polished SMF–HCF–SMF high-sensitivity antiresonant (ARROW) fiber biosensor for peanut allergen Ara h1 detection, enhancing interaction in a liquid-filled core and yielding rapid redshift detection with LOQ of 1×10-8 g/mL.

P1-30 **16:30-18:00**

High-Sensitivity Fiber-Optic Current Sensor Using a Novel Reflective FLRD

Peng Xiang[1], Yuan Ke[1], Can Li[1], Junchang Huang[1,2], Li Xia[1]
[1]Huazhong University of Science and Technology, [2]Chinese Academy of Sciences

We have proposed a multi-ring PS-FLRD current sensor with a novel connection method. Compared to traditional designs, its reflective structure significantly enhances detection sensitivity and stability.

P1-31 **16:30-18:00**

Dual-Channel Fiber-Optic Current Sensor based on a 4×4 Single-Mode Fiber Coupler

Yuan Ke[1], Can Li[1], Peng Xiang[1], Jianguang Li[2], Zili Xu[2], Wei Li[1], Li Xia[1]
[1]Huazhong University of Science and Technology, [2]China Electric Power Research Institute

A passive dual-channel current sensor using a 4×4 singlemode fiber coupler and Sagnac interferometer is proposed. Differential demodulation ensures high stability and linearity (R2 > 0.992), with potential for multi-channel expansion.

P1-32 **16:30-18:00**

Low-Frequency Vibration Detection Using Dual-Pulse Coherent Scheme in Φ-OTDR

MengtingYu[1], HaiwenHuang[1], LeiDong[2], WuLiu[3], HanbingLi[3], MingLuo[3], XiangLi[1]
[1]ChinaUniversityofGeosciences, [2]Wuhan WUTOS Co., Ltd., ,China, [3]Information and Communication Technologies Group Corporation

A dual-pulse heterodyne configuration with adaptive piecewise detrend is used to suppress nonlinear laser drift. This approach yields signal-to-noise ratios of 36.3, 29.8, and 19.2 dB at 10, 1, and 0.1 Hz, thereby significantly improving sub-hertz vibration sensing performance.

P1-33 **16:30-18:00**

Brillouin Sensing Characteristics of a Highly Birefringent Spun Optical Fiber

Jun Gi Hong, Kwang Yong Song
Chung-Ang University

This paper investigates the Brillouin sensing characteristics of a 20 m highly birefringent spun optical fiber (SHB fiber) using a Brillouin optical correlation domain analysis (BOCDA) system.

P1-34 **16:30-18:00**

BOTDA-Based Distributed Surface Temperature Mapping for Experimental Evaluation of Radiative Cooling Materials

Radomyr Diachenko, Kwanil Lee
Korea Institute of Science and Technology

We demonstrate a BOTDA-based distributed fiber sensor for surface temperature mapping to evaluate radiative cooling structures. The reconstructed temperature distribution shows good agreement with thermocouple measurements with a standard deviation of 0.37 °C.

P1-35 **16:30-18:00**

Investigation of Laser Linewidth Effects in LFM-Based Phase Sensitive Optical Time Domain Reflectometry

Xi CHEN[1], Maoqi Liu[1], Zixian Wei[1], Changyuan YU[1], Zhaohui Li[2]
[1]The Hong Kong Polytechnic University, [2]Sun Yat-sen University

A comprehensive simulation framework for LFM-φOTDR is developed to identify the linewidth and pulse-width conditions under which noise-floor degradation renders sensing unusable at different distances.

P1-36 **16:30-18:00**

A Study on Fiber-Optic Shape Sensing Techniques under Low-Curvature Conditions

Hyuga Kurokawa[1], Shintaro Nakamoto[1], Makito Kobayashi[1], Nobutomo Hanzawa[2], Takashi Matsui[2], Kazuhide Nakajima[2], Kiyoshi Kamimura[2], Hideaki Murayama[1]
[1]The University of Tokyo, [2]NTT, inc.

A new shape sensing method for reconstructing a twodimensional plane under low-curvature conditions is proposed, and its effectiveness was demonstrated through experiments using large-diameter MCF and an indoor cable.

P1-37 **16:30-18:00**

300-Gb/s 32-QAM Self-Coherent FSOC Transmission System for Intra-DCI

Sang-Rok Moon[1], Sun Hyok Chang[1], Hun-Sik Kang[1], Sunghyun Bae[2]
[1]Electronics and Telecommunications Research Institute, [2]Sejong University,

We demonstrate a free-space optical communicationbased rack-to-rack data center interconnect by transmitting a 300-Gb/s, 32-QAM polarization-multiplexed signal and remote local oscillator over a 3-m link, proving the architecture's feasibility.

P1-38 **16:30-18:00**

Optically Powered Remote Unit With Uplink Remote Modulation Using a Pure-Silica Inner-Cladding Double-Clad Fiber

Satoshi Fujita[1], Naoto Ohnishi[1], Yuki Gomi[1], Shih-Chun Lin[2], Suresh Subramaniam[3], Hiroshi Hasegawa[4], Motoharu Matsuura[1]
[1]University of Electro-Communications, [2]North Carolina State University, [3]George Washington University, [4]Nagoya University

We demonstrate optically powered remote unit (RU) with uplink remote modulation using a pure-silica innercladding double-clad fiber. We achieved good transmission characteristics of downlink and uplink signals using the RU without an external power supply.

P1-39 **16:30-18:00**

Demonstration of ODN Monitoring for Discriminating Active and Inactive Fibers in Heterogeneous Passive Optical Networks

Kwang Ok Kim, Kyeong Hwan Doo, Hwan 2Seok Chung
Electronics and Telecommunications Research Institute

We demonstrate protocol-based ODN monitoring for heterogeneous passive optical networks. An FPGA-based ODN monitoring results with commercially deployed EPON ONTs are presented to confirm the system's capability in real-time active fiber identification.

P1-40 **16:30-18:00**

End-to-End BER-TDECQ Prediction and Bandwidth-Driven Modulation Optimization for 448-Gb/s PAM4/6/8 IM/DD Links

Govind Sharan Yadav, Sheng-Yuan Zheng, Kai-Ming Feng
National Tsing Hua University

We present a unified system-level numerical framework for 448-Gb/s PAM4/6/8 IM/DD links that enables accurate evaluation of transmitter bandwidth limitation, TDECQ, and equalization-induced noise enhancement, providing reliable performance assessment under bandwidth-constrained conditions for next-generation optical interconnects.

P1-41 **16:30-18:00**

Demonstration of Remote-Control-Enabled Bidirectional 100 Gbps Optical Transceiver for All Photonic Network

Kenichi Nakura, Hayato Suga, Satoshi Yoshima, Tadashi Tomizuka, Noriaki Nakamura, Ryo Matsue, Hiroaki Shintaku
Mitsubishi Electric Corporation

We demonstrated a single-fiber, bidirectional 100 Gbps APN transceiver with a wavelength-multiplexed management channel enabling NETCONF-based remote control. Experiments show error-free 100 Gbps throughput at a 99.9% load while supporting TX on/off and inventory retrieval.

P1-42 **16:30-18:00**

Power-Over-Fiber Using a Pure-Silica Inner-Cladding Double-Clad Fiber for Fire Detection System in Expressway Tunnels

Yuto Terada[1], Hayato Seto[1], Naoto Ohnishi[1], Yuki Okumura[2], Taku Nakayama[2], Hiroki Ueda[2], Masaki Hiro[2],

Susumu Morikura[1], Motoharu Matsuura[1]
[1]University of Electro-Communications, [2]Nippon Expressway Research Institute Company Limited

We demonstrate power-over-fiber for driving a fire detector and its transmitter with fire detection signal transmission using a pure-silica inner-cladding double-clad fiber. We successfully demonstrated an accurate operation of the fire detector and transmitter.

P1-43 **16:30-18:00**

Demonstration of Cross-Domain Optical Switching Control Using Open Platform: O-RAN RIC and TransportPCE

Naotaka Shibata, Hirotaka Ujikawa, Takumi Harada, Yuka Okamoto, Tomoya Hatano, Tatsuya Shimada
NTT, inc.

We develop an entirely open and standardized coordinated system using O-RAN RIC and TransportPCEbased controller with Transport API. Coordinated optical path switching by fiber cross connects with processing time equivalent to non-cooperative switching is demonstrated.

P1-44 **16:30-18:00**

Causally Disentangled Hierarchical Model for Open-Set Fault Diagnosis in Optical Networks

Bingli Guo[1], Yuting Ma[1], Yu Zhou[1], Shanguo Huang[1], Yu Tang[2], Yan Shi[2], Guangquan Wang[2]
[1]Beijing University of Posts and Telecommunications, [2]China Unicom Research Institute

We propose a Causally Disentangled Hierarchical Diagnostic Model (CD-HDM) for soft faults in optical networks. It supports anomaly detection and open-set recognition, identifies unseen fault combinations, and provides interpretable decision support.

P1-45 **16:30-18:00**

Slot-Based Deterministic Bandwidth Allocation for Industrial Passive Optical Networks

Kyeong Hwan Doo, Kwang Ok Kim, Hwan Seok Chung
Electronics and Telecommunications Research Institute

A slot-based deterministic bandwidth allocation scheme for industrial applications is demonstrated. The results show that the latency is bounded within two slots, achieving a maximum latency of 22 μs and a jitter of 8 μs.

P1-46 **16:30-18:00**

Preflight-Gated Sim-to-Real Transfer for AI-Driven Natural-Language PON Operations

Chansung Park, Yongwook Ra, Hwan Seok Chung
Electronics and Telecommunications Research Institute

We demonstrate a preflight-gated transfer pipeline for naturallanguage PON operations. A command fidelity preflight plane validates safety and goal satisfaction before real execution, while intent-preserving prompt repair enables re-preflight after failures and improves operational reliability.

P1-47 **16:30-18:00**

Spectrum-QAM Based 1-TBaud Coherent Transmitter with Optical Fourier Transform

Chi Zhang[1], Saiyang Liu[1], Lun Li[1], Wenying Chen[2], Yitian Gong[2]
[1]The Hong Kong Polytechnic University, [2]Huazhong University of Science and Technology

We demonstrate, for the first time, a 1-TBaud transmitter with a capacity of 3 Tb/s enabled by a spectrumquadrature-amplitude-modulation (QAM) encoding scheme, utilizing a complementary large disperser pair and a 20- GHz I/Q modulator in C-band.

P1-48 **16:30-18:00**

Enhanced Power Profile Estimation Integrating Residual Regression and Power Fitting

Lixia Xi, Zengyi Sun, Yichao Wang, Yu Zhang, Tianrun Sun
Beijing University of Posts and Telecommunications

A joint scheme of bilateral filter based residual regression and power fitting to improve the noise performance of Power Profile Estimation is proposed, which achieves a 36.25% reduction in mean squared error.

P1-49 **16:30-18:00**

GSNR Estimation Method Using Pre-FEC BER Under Controlled Received Power

Ken Ito[1], Hiroshi Shibata[1], Kohei Watanabe[1], Motohiro Banno[2], Shinji Morimoto[2], Yosho Kanda[2]
[1]NTT, inc., [2]Anritsu Corporation

We propose a GSNR estimation method that uses pre-FEC BER measurements from digital coherent optics modules under controlled received optical power. Experiments with ROADM-based networks show accuracy within 1 dB of GNPy simulations.

P1-50 **16:30-18:00**

Mitigation of Turbulence-Induced Depolarization and Scintillation in FSO Systems with Partially Coherent Beams

Nan Cui, Qingxuan Li, Boyang Hou, Zhipeng Zheng, Xiaoguang Zhang
Beijing University of Posts and Telecommunications

The atmospheric turbulence mitigation technique based on GSM partially coherent beams is investigated in the DPFSO system. This technique maintains an almost constant scintillation index, reduces depolarization by 35%–45%, and sustains more reliable BER.

P1-51 **16:30-18:00**

Mitigation of Equalization-Enhanced Phase Noise by Joint Timing and ML Phase Recovery

Xinwei Du[1], Ziyuan Liu[1], Wenqiang Ma[1], Qiong Li[1], Qian Wang[2], Changyuan Yu[3], Pooi-Yuen Kam[4]
[1]Beijing Normal-Hong Kong Baptist University, [2]Zhejiang University of Technology, [3]The Hong Kong Polytechnic University, [4]The Chinese University of Hong Kong

We propose to mitigate the EEPN effects via Gardner timing recovery and maximum likelihood phase recovery, where we identify the expressions of EEPN-related timing jitter and phase distortions theoretically.

P1-52 **16:30-18:00**

Abnormal Noise Location Estimation Using APSK Scattering Coefficient-Modulated Signal

Ryosuke Takagi[1], Takumi Motomura[2], Kaito Geshi[1], Akihiro Maruta[1], Ken Mishina[1]
[1]The University of Osaka, [2]National Institute of Technology, Nara College

We propose a method for estimating the location of abnormal noise using an APSK scattering coefficientmodulated signal. This method achieves a transmission rate of 2.3 Gbps while maintaining the accuracy of the noise location estimation.

P1-53 **16:30-18:00**

Nonlinear Distortion Compensation in Optical Fibers for Inter-Satellite All-Optical Networks

Kota Kurome[1], Shoichiro Oda[2], Satoshi Shinada[2], Ken Mishina[1]
[1]The University of Osaka, [2]National Institute of Information and Communications Technology

We investigate nonlinear distortion in LEO constellations and propose a nonlinear compensation method. The simulation results demonstrate that the proposed method mitigates nonlinear distortion, significantly extending relayhop limits in 64-Gbaud WDM-16QAM space optical networks.

P1-54 **16:30-18:00**

MLSE with Novel Adaptive Transition-Based Noise Whitening Post Filter

Meng-Ting Zhuo[1], Jyehong Chen[1], Widhianto Benedictus Yohanes Bagus[2]
[1]National Yang Ming Chiao Tung University, [2]MediaTek Inc.

This paper proposes a transition-based adaptive noisewhitening MLSE scheme. The filter parameters are jointly optimized using gradient descent. Experimental results demonstrate that the proposed TB-MLSE consistently achieves lower BER than conventional MLSE.

P1-55 **16:30-18:00**

Hexagonal Search Pattern for Acquiring Inter-Satellite Link Under Elliptical Uncertainty Area

JaeHun Jang, Hyungjun Kim, Hyosang Yoon
Korea Advanced Institute of Science and Technology

Acquiring the opposite satellite for the inter-satellite link in beaconless free-space optical communication is crucial and the most time-consuming process. This research suggests allocating the search beam to fit the elliptical field of uncertainty.

P1-56 **16:30-18:00**

QAM Quantum Noise Stream Cipher in LEO-LEO Laser Inter-Satellite Links

Yajie Li, Ran Zhao, Ziyan Chen, Shuang Wei, Wei Wang, Yongli Zhao, Jie Zhang
Beijing University of Posts and Telecommunications

We propose a physical-layer encryption scheme based on quantum noise stream ciphering for a 200 Gbit/s LEO-LEO laser inter-satellite link, achieving secure transmission over 9800 km with an eavesdropping detection failure

probability greater than 99.93%.

P1-57 **16:30-18:00**

Measurement of Tx and Rx I/Q Frequency Response Using a CADD Receiver

Takaya Maeda, Masaki Sato, Kohei Hosokawa
NEC Corporation

We introduce a method for measuring the I/Q frequency responses of the transmitter and coherent receiver using a carrier-assisted differential detection receiver to receive single-sideband OFDM signals and show the results of numerical simulations.

P1-58 **16:30-18:00**

Laser Frequency Noise Characterization based on Adaptive Extended Kalman Filter

Dawei Wang[1], Jinghang Huang[1], Jinpeng Liao[1], Zhenlin Zhao[1], Xingwen Yi[2]
[1]Sun Yat-sen University, [2]Bangor University

We propose an adaptive laser frequency noise estimation method using an Extended Kalman Filter based on maximum likelihood estimation. It autonomously optimizes the measurement noise covariance, enabling accurate linewidth characterization and effective white noise suppression.

P1-59 **16:30-18:00**

Channel Prediction for Satellite Optical Communications Using a Dual-Branch Model

Zhenming Yu, Wei Zhang, Hongyu Huang, Xiangyong Dong, Yan Ma, Kun Xu
Beijing University of Posts and Telecommunications

An adaptive dual-branch channel prediction framework is proposed for satellite optical communications, combining convolutional feature extraction, bidirectional temporal modeling, and interpolation enhancement, enabling highly accurate channel state prediction with an R^2 of 0.997.

P1-60 **16:30-18:00**

Polarization Estimation in Focused Light Propagating through a Fluctuating Refractive Index Field

Yoshihisa Takayama
Tokai University

The polarization state of a focused beam propagating 100 m through a fluctuating refractive-index field is evaluated. Simulations show the ellipticity angle of the transmitted beam exceeds 3 deg when Cn2 = 10-12 m-2/3.

P1-61 **16:30-18:00**

Turbulence-Resilient Channel Configuration of Mode-Division Multiplexed System Using Mode Diversity with a Limited Mode Pool

Hoon Kim, Jinbae Park
Korea Institute of Science and Technology

We investigate mode-division multiplexing with modediversity under atmospheric turbulence using split-step Fourier simulations to identify channel configurations that maximize capacity. Optimal mode pairing and spacing enhance diversity gain and mitigate inter-channel coupling for free-space optic links.

P1-62 **16:30-18:00**

Energy Advantage of Self-Coherent Receiver in Ground-to-LEO FSO Uplink

Zehua Li, Amila Kariyawasam, Shunji Kimura
Kyushu University

We simulate a ground-to-LEO FSO uplink using multi-phase-screen wave optics. Even at 80° elevation, the Gaussian-mode power fraction is 1.99% (17.01-dB penalty) for Gaussian-LO coherent detection, while self-coherent reception avoids this loss.

P1-63 **16:30-18:00**

Subcarrier-Paired Phase Encryption for Modulation-Layer Security in DCO-OFDM

Takahiro Kodama, Kiichiro Kuwahara, Hyuga Nagami, Haruto Miyamoto, Kaho Mitani, Tadashi Utsunomiya, Seigo Tamura, Keita Tanaka
Kagawa University

We propose subcarrier-paired phase encryption for DCOOFDM optical wireless communication. The scheme preserves Hermitian symmetry required for IM/DD systems while enabling modulation-layer encryption. Simulations show correct decoding for legitimate receivers and randomguess BER for eavesdroppers.

P1-64 **16:30-18:00**

RC Channel Equalization for Satellite Optical Links with SOA-Based Activations

Feng Wen[1], Qiao Huang[1], Hanwen Gao[1], Xin Hu[1], Feng Yang[2], Baojian Wu[1], Kun Qiu[1]
[1]University of Electronic Science and Technology of China, [2]Marolabs Co. Ltd.

We propose a reservoir computing equalizer with SOAbased activations for satellite fiber and free-space links. On QPSK/16QAM at 40/200 Gbps, it achieves zero-bit error rate and up to 4.07 dB SNR gain, outperforming conventional functions.

P1-65 **16:30-18:00**

Universalized Privacy in Distributed Quantum Sensing

Hyang-Tag Lim[1], Min Namkung[1], Dong-Hyun Kim[1], Seongjin Hong[2], Yong-Su Kim[1], Su-Yong Lee[3]
[1]Korea Institute of Science and Technology, [2]Yonsei University, [3]Agency for Defense Development

This abstract discusses a universalized framework for analyzing privacy of distributed quantum sensing, covering any experimental situations. This framework is demonstrated within linear optics setting, in which all phases are not exposed to untrusted parties.

P1-66 **16:30-18:00**

Single Photon Detector Characterization Using Frequency Domain Interferometric Method

Nishanth Chandra, Anubhav Kumar, Pradeep Kumar Krishnamurthy
Indian Institute of Technology Kanpur

We demonstrate characterization of a gated InGaAs single-photon detector using a frequency-domain interferometer in a frequency-coded quantum key distribution framework. Phase-dependent avalanche statistics enable estimation of detector efficiency and dark count rate without requiring a heralded photon source.

P1-67 **16:30-18:00**

Distributed Quantum Sensing with Multi-Mode N00N States for Arbitrary Weights

Seongjin Hong, Hyunwoo Yoo, Dong-Hyun Kim, Hyang-Tag Lim
Korea Institute of Science and Technology

We experimentally demonstrate distributed quantum sensing with multi-mode N00N states using multipass interactions, showing that Heisenberg scaling can be achieved for the estimation of a weighted sum of distributed phases.

P1-68 **16:30-18:00**

Gain Sensing Using Two-Mode Bright Squeezed States

Seongjin Hong, Yu-Yeong Jeong
Yonsei University

We theoretically analyze the sensitivity bounds for estimating optical gain using various types of squeezed states. Furthermore, we investigate the sensitivity in noisy and lossy environments to identify robust quantum states for optical gain sensing.

P1-69 **16:30-18:00**

Quantum Deep Metrology Based Quantum Performance Benchmarking

Ajung Kim[1], H.Y. Kim[1], Lucas Son[2], Y.H. Gu[1]
[1]Sejong University, [2]SQK inc.

Quantum performance benchmarking is developed based on quantum deep-metrology, which couples Fisherinformation–optimized probe circuits with a cross-layer compiler. The suite outputs portable KPIs and noiseparameter estimates for QPUs under controlled optimization policies.

P1-70 **16:30-18:00**

Compact VCSEL-Swept FBG Interrogation System, Powered by Cost-Efficient FPGA

Sanghoon Chin, Séverine Denis
CSEM

We present a compact, low-cost FBG sensing system enabled by a broad-tuning VCSEL sweep. This architecture achieves accurate temperature and strain interrogation with reduced power, simplified optics, and strong potential for scalable, field-deployable fiber-sensing applications.

P1-71 **16:30-18:00**

A 0.06 pm Resolution Chip-Scale Coherent Optical Spectrum Analyzer based on External Cavity Laser

Hexi Han[1], Qingshuai Su[1], Fang Wei[1], Xiangyue Li[2], Chen Chen[1], Haoyang Pi[3], Han Liu[1], Wei Chu[1], Haiwen Cai[1]
[1]Zhangjiang Laboratory, [2]Fudan University, [3]Shanghai Institute of Optics and Fine Mechanics

We demonstrate a chip-scale coherent optical spectrum analyzer enabled by a widely tunable integrated external- cavity swept laser and on-chip coherent receiver, achieving 0.06 pm resolution and over 60 dB dynamic range across the C-band.

P1-72 **16:30-18:00**

Annealing-Induced Phase Transformations and Interfacial Kinetics in Dion-Jacobson Perovskite Bilayers

Fabian Rotermund[1], Deokhyun Yoon[1], Jaehee Lee[1], Junho Park[2], Jangwon Seo[1]
[1]Korea Advanced Institute of Science and Technology, [2]Korea Research Institute of Standards and Science

Broadband Transient Reflection (TR) spectroscopy reveals an annealing-induced n-value phase transformation (n=1 → n=2) in Dion-Jacobson (DJ) perovskite passivation layers, accompanied by modified interfacial decay kinetics in 3D/2D bilayers, consistent with improved device efficiency.

P1-73 **16:30-18:00**

Colorless Fiber Optic Micro-Vibration Sensor Using Circulating Optical Feedback

Ching Hung Chang, Chih Yen Li
National Chiayi University

We propose a colorless, filter-free sensing system using optical circulation to enhance signals and compensate for losses. It precisely detects extremely weak vibrations induced by just 10.29 μJ of gravitational potential energy.

P1-74 **16:30-18:00**

A Wedge-Shaped Side-Polished Fiber Bragg Grating Biosensor for Label-Free IgG Detection

Chia-Cheng Cheng[1], Chang-Yue Chiang[2], Wen-Fung Liu[1], Kun-Huang Chen[1]
[1]Feng Chia University, [2]National Changhua University of Education

A wedge-shaped side-polished fiber Bragg grating biosensor with partially exposed core is demonstrated for label-free IgG detection. The sensor exhibits a refractiveindex sensitivity of 10.6 nm/RIU and a detection limit of 1.57 ng/mL.

P1-75 **16:30-18:00**

Cavity Length Matched Phase Demodulation for High-Finesse Fabry-Perot Acoustic Sensor

Ziyu Zhang[1], Shengquan Mu[2]
[1]The Hong Kong Polytechnic University, [2]Huazhong University of Science and Technology

This paper presents a cavity length-matched phase demodulation scheme for high-finesse Fabry-Perot (FP) sensors. Multi-beam interference is converted into optical path length variations by controlling the light source coherence length.

P1-76 **16:30-18:00**

Measurement Range Extension in CSDI Using a Tunable Filter and a Dispersive Ring Cavity

Eun Seo Choi, Hyun Sung Kim, Hye Jun Ma
Chosun University

A wavelength-tunable dispersive ring cavity was implemented to extend the CSDI measurement range while providing stable optical loss compensation across the full CFBG reflection wavelength range.

P1-77 **16:30-18:00**

Early Detection of Surface Tracking in Polymeric Insulators Using Optical Fiber-Based Distributed Acoustic Sensing

Balaji Srinivasan, V R Ranjith, R Akash, P S Harrish[1], R Sarathi
Indian Institute of Technology Madras

A Phase-Optical Time Domain Reflectometer-based distributed acoustic sensing system has been used to detect discharge-induced vibrations in an incline plane test. The acoustics detected show clear spectral signatures for the different stages of tracking.

Room A (Grand Ballroom 1), 2F

Chair: Benedikt Geiger
(Karlsruhe Institute of Technology)

Tu1A
Advanced Optical Technologies

June 30 (Tue), 2026
08:30-10:00

Tu1A-1 **08:30-08:45**

Feedback-Free Photonic Reservoir Computing Enabled by a Commercial SOA

Suhua Wang, Tingyu Fu, Jiajun Ji, Jiajia Shen, Mingyi Gao
Soochow University

We present a compact, scalable photonic reservoir computing leveraging intrinsic SOA free-carrier recovery for memory. This loop-free architecture achieves NMSEs of 0.023 and 0.048 on Mackey-Glass and Santa Fe benchmarks, eliminating complex feedback requirements.

Tu1A-2 **08:45-09:00**

Reservoir Computing Equalization for Long-Distance Indoor Optical Wireless Communication

Cuiwei He[1], Chen Chen[2], Chengwei Fang[3], Ke Wang[3], Christina Lim[4]
[1]Japan Advanced Institute of Science and Technology, [2]Chongqing University, [3]RMIT University, [4]University of Melbourne

We demonstrate a 16 m indoor optical wireless link using a fluorescent fiber antenna, silicon photomultiplier, and reservoir computing equalization. The equalizer mitigates bandwidth limitation and nonlinear distortion, enabling reliable 200 Mbps transmission.

Tu1A-3 **09:00-09:15**

Simultaneous Compensation of Chromatic Dispersion and SPM in A-RoF Transmission

Kaito Okada, Toshiaki Shitaba, Akihiro Tanabe, Youichi Fukada, Ryo Miyatake, Masayoshi Sekiguchi, Tatsuya Shimada
NTT, inc.

We propose a method to simultaneously compensate for both chromatic dispersion and self-phase modulation and demonstrate a single span extension of 35% over the conventional method, indicating promise in increasing analog radio-over-fiber distances.

Tu1A-4 **09:15-09:30**

All-Optical MFM System Using Phase-Locked P1 Semiconductor Laser Dynamics

Yu-Huai Chang, Hao-Wen Weng Lin, Yu-Han Hung
National Sun Yat-Sen University

We propose a photonic microwave frequency measurement (MFM) system utilizing phase-Locked PeriodOne (P1) dynamics of semiconductor lasers. Target microwave frequencies are estimated via optical injection power with errors below ±60 MHz across 16.5–21 GHz.

Tu1A-5 **09:30-09:45**

High-Capacity Digital Coherent Complex Optical Reservoir Computing with Long Optical Fiber Loop

Toshihiko Hirooka, Masataka Nakazawa
Tohoku University

We propose high-capacity digital-coherent reservoir computing using long fiber-loop recirculation and FPGAbased nonlinear processing. High-speed coherent pulses enable large-scale complex-valued computations. Performance improvement in NARMA-10 prediction and dispersion compensation by increasing neurons are numerically demonstrated.

Tu1A-6 **09:45-10:00**

Generating a Large Time-Bandwidth Product Linear Chirp Signal based on Dual-OFCs

Xiaonan Chen, Liao Chen, Yvfan Du, Ye Tian, Rongwu Liu, Yang Liu, Chi Zhang, Xinliang Zhang
Huazhong University of Science and Technology

We utilize a vernier dual-OFCs to generate a chirped radio-frequency signal with a duration of 50μs, a 3dB bandwidth of 117.4GHz and a TBP of 3.75 × 107 to enhance the performance of radar system.

Tu1B-1 **08:30-08:45**

Kilometer-Range Strain Sensing Using Slope-Assisted PPRM-BOCDR

Takumi Morikawa[1], Keita Kikuchi[1,2], Ryo Inoue[1], Yosuke Mizuno[2], Heeyoung Lee[1]
[1]Shibaura Institute of Technology, [2]Yokohama National University

We demonstrate slope-assisted Brillouin optical correlation-domain reflectometry based on periodic pseudorandom modulation, enabling kilometer-range distributed strain sensing. A 50-cm strained section was detected at 1 km with 6.9-cm spatial resolution and ~2000 effective sensing points.

Tu1B-2 **08:45-09:00**

Linear-Region Extension of Slope-Assisted BOTDR by Using Linear Frequency-Modulated Pulses

Lihuang Li, Jiageng Chen, Yang Zhang, Mengying Ru, Zuyuan He
Shanghai Jiao Tong University

A significantly extended linear region for slope-assisted BOTDR has been achieved by employing linear frequency modulated (LFM) pulses. An approximately 380 MHz linear region is experimentally demonstrated, exhibiting excellent slope linearity (R2 > 0.99).

Tu1B-3 **09:00-09:15**

Bridging the Domain Gap in DAS: Adapting Vision Foundation Models for Infrastructure Security

Yangmin Ding, Sarper Ozharar, Ting Wang
NEC Labs America, Inc.

Distributed Acoustic Sensing may suffer severe cross-day domain shift. We bridge this gap by encoding 1D phase signals into physics-informed 3-channel gradient tensors and adapting Vision Foundation Models (ViT-B/16), achieving superior threat detection over baselines.

Tu1B-4 **09:15-09:30**

Up to Two Orders of Magnitude Data Volume Reduction in Distributed Fiber Sensing by Compressed Wavelets

Antonia Baies[1,2], Amirhossein Ghazisaeidi[1], Rajiv Boddeda[1], Haik Mardoyan[1], Christian Dorize[2], Sterenn Guerrier[1], Jérémie Renaudier[1]
[1]Nokia Bell-Labs France, [2]Ecole Polytechnique

We introduce a novel signal-processing architecture leveraging compressed sensing and wavelets to reduce data volume in distributed fiber sensing. In a binaryclassification over field trial data we achieved up to 100-fold (20-fold) compression at the expense of an absolute accuracy decrease of 6.5% (2.5%).

Tu1B-5 **Invited** **09:30-10:00**

Fiber Optic Sensing Using Submarine Cables

Miguel Gonzalez-Herraez[1], Maria R. Fernandez-Ruiz[2], Hugo F. Martins[1], Javier Macias-Guarasa[2], Erick E. Ramírez-Torres[2], Daniel Pizarro[2], Javier Tejedor[3], Pedro J. Vidal-Moreno[2], Sira E. Palazuelos-Cagigas[2], Sonia Martin Lopez[1], Ethan Williams[4], Zhongwen Zhan[4], Roel Vantilho[5]
[1]CSIC, [2]University of Alcalá, [3]Universidad San Pablo CEU, [4]California Institute of Technology, [5]Marlinks

Submarine optical fiber cables are essential to global communications, but are vulnerable to damage. Distributed Acoustic Sensing combined with machine learning can detect threats and also provide ocean data, improving understanding of waves, currents, etc.

Room C (Grand Ballroom 3), 2F | Chair: Takahiro Suzuki (NTT, inc.)

Tu1C | June 30 (Tue), 2026

AI-Native Autonomous Optical Access Networks | 08:30-10:00

Tu1C-1 **08:30-08:45**

Power-Efficient OLT Architectures Enabled by Traffic-Aware AI

Yuanqiu Luo[1], Dezhi Zhang[2], Yang Lu[3], Dekun Liu[3], Frank Effenberger[1]
[1]Futurewei Technologies, [2]State Key Laboratory of Optical Fiber and Cable Manufacture Technology, [3]Huawei Technologies

This paper proposes a traffic-aware and AI-enabled OLT architecture that jointly optimizes power consumption of external interfaces and internal high-speed resources. It enables demand-adaptive and energy-proportional operation for next-generation passive optical networks.

Tu1C-2 **08:45-09:00**

Noise & Interference Loading for Capacity on Demand with Fine-Tuned LLM-Assisted Optical Access Network Automation

Geyang Wang, Lan Zeng, Lian-Kuan Chen
The Chinese University of Hong Kong

We propose an LLM-powered digital twin that employs precoding to reshape noise and interference in an automated optical network. A 50-Gb/s, 20-km experiment demonstrates ~4.3-dB sensitivity gain and significantly reduced BER.

Tu1C-3 **Invited** **09:00-09:30**

Resilience Enhancement of Optical Networks via Collaborative Resource and Data Sharing

Sugang Xu[1], Yusuke Hirota[1], Subhadeep Sahoo[2], Noboru Yoshikane[3], Xiaocheng Zhang[4], Angela Mitrovska[5], Behnam Shariati[5], Yuki Yoshida[1], Taiga Suzuki[1], Masaki Shiraiwa[1], Sifat Ferdousi[2], Takehiro Tsuritani[3], Shigenari Suzuki[4], Pooyan Safari[5], Johannes K. Fischer[5], Ronald Freund[5,6], Massimo Tornatore[7], Biswanath Mukherjee[2,8], Yoshinari Awaji[1]
[1]NICT, [2]University of California, [3]KDDI Research, Inc., [4]NTT Docomo Business, [5]Fraunhofer HHI, [6]Technical University of Berlin, [7]Politecnico di Milano, [8]Soochow University

To enhance the resilience of network-cloud ecosystems, we investigate two collaborative approaches: (i) multi-entity optical network resource sharing for rapid recovery, and (ii) dataset sharing across optical network testbeds to support AI/ML-driven resilience improvement.

Tu1C-4 **Invited** **09:30-10:00**

Virtualization and PHY Softwarization in Optical Access Networks

Takahiro Suzuki, Jun-ichi Kani, Tatsuya Shimada
NTT, inc.

This invited talk discusses the evolution of access networks towards virtualization and PHY softwarization. It presents latest technological progress and remaining issues toward partial virtualization and full software implementation.

Room D (Capri), 2F | Chair: Sheng-Kwang Hwang (National Cheng Kung University)

Tu1D | June 30 (Tue), 2026

Photonic Devices in Wireless Optical Communications | 08:30-10:00

Tu1D-1 **Invited** **08:30-09:00**

Terrestrial Wireless Optical Communication Integrated into a Photonic Module

Devin Brinkley, Tymon Barwicz, Jean-Laurent Plateau, Ondrej Čierny, Greg Allan, Danielius Kramnik, Sanam Mozaffari, Michael Caverley
Taara Connect

We present a silicon photonic module incorporating an Optical Phased Array for terrestrial wireless optical communication. The architecture enables solid state steering, atmospheric correction, wavefront sensing and bidirectional communication in a compact, cost-effective device.

Tu1D-2 **09:00-09:15**

Amplitude-Modulated Overhead Assisted Magnitude-Squared Cross-Correlation Frame Synchronization for Pilot-Aided DSP in Coherent Optical Satellite Communication

Shoma Tateno, Hidemi Noguchi, Kohei Hosokawa
NEC Corp.

We proposed amplitude-modulated overhead assisted magnitude-squared cross-correlation frame synchronization, which expands the FOC margin by 22.5 times compared to the conventional cross-correlation method and enables robust practical pilot-aided DSP for inter-satellite communication with the Doppler-shift.

Tu1D-3 **09:15-09:30**

65-dB Link-Budget C-Band Free-Space Optical Transmission Using a Directly Modulated InP-PCSEL

Shota Ishimura[1], Takeshi Aoki[2,3], Takuya Inoue[3], Yuhki Itoh[2,3], Kosuke Fujii[2], Makoto Ogasawara[2,3], Hiroyuki Yoshinaga[2,3], Yusuke Sawada[2,3], Shun Kimura[2], Naoki Fujiwara[2,3], Hideki Yagi[2], Masaki Yanagisawa[2], Hidenori Takahashi[1], Takehiro Tsuritani[1], Ryohei Morita[3], Masahiro Yoshida[3], Menaka De Zoysa[3], Kenji Ishizaki[3], Susumu Noda[4]
[1]KDDI Research, Inc., [2]Sumitomo Electric Industries, Ltd., [3]Kyoto University, [4]Kyoto University Institute for Advanced Study

We demonstrate C-band free-space optical transmission using a directly modulated InP photonic-crystal surface-emitting laser with receiver-side EDFA preamplification, achieving 1-Gbaud OOK transmission with a 65-dB link budget.

Tu1D-4 **09:30-09:45**

200-Gb/s/1.2-km Free-Space Optical Links Employing a Triplet-Lens System and Metasurfaces

Chun-Cheng Liang, Wei-Zhi Jiang, Yen-Chen Chen, Yen-Jen Chen, Hai-Han Lu
National Taipei University of Technology

A 200-Gb/s/1.2-km free-space optical link is successfully demonstrated using WDM-PAM4 scheme with triplet-lens system and metasurfaces, enabling efficient beam collimation, high deflection efficiency, and large angle deflection, paving the way for 6G optical wireless communications.

Room E (Sydney), 2F

Chair: Lei Zhang
(Beijing University of Posts and Telecommunications)

Tu1E
Thin-Film & Reconfigurable Photonics

June 30 (Tue), 2026
08:30-10:00

Tu1E-1 **08:30-08:45**

Programmable On-Chip Bandpass Filtering via Grating Bandgap Manipulation

Boshu Sun, Lan Li
Westlake University

We propose a novel grating-based control strategy for programmable filtering, enabling broadband wavelength tuning and intensity modulation for narrowband filtering. Experimental results demonstrate a tunable wavelength range of 12 nm and an attenuation exceeding 30 dB.

Tu1E-2 **08:45-09:00**

Demonstration of the Single-Ring Vernier Effect Enabling Two-Ring Flat-Top Vernier WDM Filters

Taein Kim, Seungwon Kim, Youngbin Kim, Youngik Sohn, Kyoungsik Yu
Korea Advanced Institute of Science and Technology

We demonstrate the Single-Ring Vernier Effect (SRVE): one microring with two-point coupling creates a virtual cavity, inducing the Vernier effect. Using SRVE, two-ring filters enable Vernier and flat-top response for WDM.

Tu1E-3 **Invited** **09:00-09:30**

Hybrid Thin Film Silicon Photoncis Integration

Yi-jen Chiu
National Sun Yat-Sen University

Thin-film photonics integration using different material templates will be introduced and discussed in the presentation. Using spot size converter (SSC) and different substrate, photonic devices performance can be promoted by taking advantages of material properties.

Tu1E-4 **09:30-09:45**

CMA-ES-Assisted Spectral Flattening of a Multi-Electrode Thermally Tunable 16-Channel Arrayed Waveguide Grating

Yuanli Yue, Emmanuel Gooskens, Wim Bogaerts, Peter Bienstman
Ghent University-imec

We present an optimization approach for spectral flattening of a three-electrode 16-channel AWG using CMAES. Peak-to-peak transmission variation is reduced from 15.24 dB to 2.81 dB, significantly improving spectral uniformity for photonic tensor core applications.

Tu1E-5 **09:45-10:00**

Narrow-Band Optical Filtering Using Dual Mutually-Coupled SiN Microring Resonators

Tao Song, Lei Zhang
Beijing University of Posts and Telecommunications

We demonstrate a narrow-band optical filter employing two mutually coupled silicon nitride (SiN) microring resonators. The filter exhibits a 3-dB bandwidth of approximately 145 MHz and a shape factor of 1.89.

Room F (Sicily), 2F — Chair: Yuya Yamaguchi (NICT)

Tu1F — June 30 (Tue), 2026

High-Speed Modulators II & Wavelength Conversion — 08:30-10:00

Tu1F-1 **Invited** **08:30-09:00**

High-Capacity Enabling C+L-Band InP-Based Coherent Driver Modulators

Josuke Ozaki, Yoshihiro Ogiso, Mitsuteru Ishikawa
NTT Innovative Devices Corporation

We developed a C+L-band operable InP-based coherent driver modulator with over 90-GHz electro-optic bandwidth and demonstrated 1.8 Tbps per wavelength single-carrier transmission, enabling next-generation high-capacity optical communication systems across the C+L band.

Tu1F-2 **09:00-09:15**

Silicon Photonics Microwave Receiver based on Electro-Absorption Modulator Integrated with Slanted Mirror

Jian-Hua Lin[1], Shou-Ming Chen[1,2], Bo-Hong Chen[1,2], Rih-You Chen[1,2], Yi-Jen Chiu[1]
[1]National Sun Yat-Sen University, [2]LandMark Optoelectronics Corporation

Photonic microwave receiver based on slanted mirrorintegrated InGaAsP electro-absorption modulator (EAM) has been demonstrated on a Si photonics template, allowing optical coupling from underneath Si waveguide and enabling microwave mixing function.

Tu1F-3 **09:15-09:30**

Lossless Bidirectional Post-Fabrication Trimming of Silicon Ring Modulators

Haozhe Sun, Yating Wu, Tao Chu
Zhejiang University

We demonstrate lossless bidirectional trimming of silicon ring modulators via hybrid thermal annealing. Permanent resonance shifts are achieved without performance degradation, providing a robust calibration solution for high-density, high-speed optical interconnects.

Tu1F-4 **09:30-09:45**

Broadband Wavelength Conversion based on Chalcogenide Waveguides

Ling Luo, Shulin Deng, Nan Li, Yongguang Xiao, Qingming Chen, Zhaohui Li
Sun Yat-Sen University

This paper presents a broadband wavelength converter based on chalcogenide waveguides. Using 1550 nm continuous-wave (CW) pumping, we achieve a 170 nm 3-dB conversion bandwidth covering the entire S+C+L bands in a 9.23 cm waveguide.

Tu1F-5 **09:45-10:00**

Parallel Two-Step Parameter Control for Automatic 50-GHz Double-Frequency-Spaced Flat Comb Generation Using 25-GHz In-Phase/Quadrature Modulator

Koshiro Hashihara, Shun Harada, Tomoya Suzuki, Koushi Chinone, Takahide Sakamoto
Tokyo Metropolitan University

We demonstrate parallel two-step parameter control (P-TSPC) method, which automatically guides to optimal condition for double-frequency-spaced flat optical comb generation using in-phase/quadrature modulator (IQM). 50-GHz-spaced flat comb is experimentally generated using 25-GHz IQM.

Tu1G-1 **08:30-08:45**

Quantum Teleportation over a Metropolitan Fiber Network in Berlin

Matheus Sena[1], Zofia A. Borowska[1], Shane Andrewski[2], Olivia Brasher[2], Giorgio de Pascalis[3], Mael Flament[2], Marc Geitz[1], Mehdi Namazi[2], Oliver Holschke[1]
[1]Deutsche Telekom AG, [2]Qunnect Inc., [3]Paderborn University

We demonstrate quantum teleportation using off-the-shelf components over a 13.7-km metropolitan fiber link in Berlin carrying co-propagating classical traffic. An average fidelity of 88.9 ± 4.0% is achieved under carriergrade real-world conditions, demonstrating compatibility with telecom infrastructure.

Tu1G-2 **08:45-09:00**

All-Optical Routing and Storage for Photonic Quantum Bits

Pengfei Wang[1], Soyoung Baek[1], Fumihiro Kaneda[1,2]
[1]Tohoku University, [2]Japan Science and Technology Agency

We demonstrate an electro-optic router and fiber-loop storage preserving photonic polarization qubits. The router achieves 1.3% insertion loss and entanglement-preserving routing. The storage exhibits > 99% polarization process fidelity, advancing time-multiplexed photonic quantum applications.

Tu1G-3 **Invited** **09:00-09:30**

Programmable Continuous-Variable Photonic Quantum Computing in the Time Domain

Shuntaro Takeda
The University of Tokyo

We present our recent advances in time-domain continuous-variable photonic quantum computing, including a programmable quantum processor for nonGaussian states and a versatile quantum light source that programmably generates non-Gaussian states with arbitrary temporal waveforms.

Tu1G-4 **09:30-09:45**

Mitigating and Suppressing Noise in Bosonic Systems with Linear Optical Methods

Y. S. Teo[1,2], S. U. Shringarpure[2], S. Cho[2], H. Jeong[2]
[1]Sejong University, [2]Seoul National University

We propose linear-optical protocols for mitigating thermal and displacement noise with photon-subtraction gadgets and probabilistic error cancellation, and suppressing dephasing noise using vacuum-based Mach–Zehnder interferometry.

Tu1G-5 **09:45-10:00**

Programmable High-Dimensional Quantum Gates over a 20-m Multimode Fiber Using Long-Coherence Atomic Single Photons

Changhoon Baek[1], Danbi Kim[1], Juntaek Oh[2], Minsu Kim[1], Seokchan Yoon[1], Wonshik Choi[2], Han Seb Moon[1]
[1]Pusan National University, [2]Korea University

We demonstrate programmable high-dimensional quantum gates over a 20-m multimode fiber using longcoherence atomic single photons. This platform enables scalable, high-fidelity unitary operations in complex media, advancing robust fiber-based high-dimensional quantum communication networks.

Tu2A-1 **10:15-10:30**

Do Vector Beams Outperform Scalar Beams in Reducing Scintillation Index?

Woohyeon Moon, Hoon Kim
Korea Advanced Institute of Science and Technology

We analyze the minimum achievable scintillation indices of vector beams in atmospheric turbulence using constrained Riemannian optimization. For a given average received intensity, optimally structured vector and scalar beams exhibit identical minimum scintillation indices.

Tu2A-2 **10:30-10:45**

First Demonstration of Token Communication in Photonic-Assisted Fiber–mmWave Systems

Yuan Wei[1], Yuqin Yuan[1], Yinjun Liu[1], Junhao Zhao[1], Haoyu Zhang[1], Boyu Dong[1], Chaoxu Chen[1], Fang Dong[1], Nan Chi[1], Jianyang Shi[2], Junwen Zhang[1]
[1]Fudan University, [2]Zhangjiang Laboratory

A token communication framework is demonstrated in a photonic-assisted fiber–mmWave system, achieving a maximum compression ratio of 64× and significantly outperforming conventional JPEG and RS coding in transmission efficiency.

Tu2A-3 **10:45-11:00**

Probabilistic Constellation Shaping for Optical Wireless Communication with SiPMs

Xiaohan Zhao, Cuiwei He, Brian Kurkoski
Japan Advanced Institute of Science and Technology

A new asymmetrical probabilistic amplitude shaping (PAS) scheme is proposed for IM/DD-based optical wireless communication using SiPM to mitigate nonlinear signal distortion.

Tu2A-4 **11:00-11:15**

Real-Time THz Video Signal Optical Wireless Transmission System without Electrical Mixing

Zheng Wang, Zanxun Qiu, Xukai Ji, Mingkang Zhang, Feifei Yin, Yitang Dai, Kun Xu
Beijing University of Posts and Telecommunications

We demonstrate a real-time terahertz (THz) video signal optical wireless transmission system. The 4K video signal is successfully transmitted in the THz-over-fiber (ToF) wireless link without THz electrical mixers.

Tu2A-5 **Invited** **11:15-11:45**

Demonstration of an LLM-Centric Optical Network Control and Management Plane

Cen Wang, Chenxiao Zhang, Yuta Wakayama, Takehiro Tsuritani
KDDI Research, Inc.

This report summarizes a set of design principles for an LLM-centric optical network control and management plane. Based on these principles, a plane is designed and implemented, and its effectiveness in fault prediction and low-overhead recovery is validated through demonstrations in both a transport network and an AI scale-across scenario.

Tu2B-1 **Invited** **10:15-10:45**

Integrated Radio-over-Fiber for the Latest Applications Requests

Paolo Ghelfi[1], Filippo Scotti[1], Luca Rinaldi[1], Antonella Bogoni[2]
[1]CNIT, [2]Scuola Superiore Sant'Anna

Although Radio-over-Fiber is a simple and consolidated solution, the rapid advancements of integrated photonic technologies are enabling new nuances, meeting the increasingly pressing requests of the wireless communication systems.

Tu2B-2 **Invited** **10:45-11:15**

Compact FPGAs Catalyzing Innovation in Optical Fiber Sensing and FMCW LiDAR

Sanghoon Chin, Séverine Denis, Jannis Holzer
Centre Suisse d'Electronique et Microtechnique SA (CSEM)

Compact FPGAs are accelerating innovation in optical fiber sensing and FMCW LiDAR by enabling fast, efficient signal processing and reduced system footprints. Their real-time adaptability supports scalable, energy-efficient architectures that advance next-generation photonic sensing applications.

Tu2B-3 **11:15-11:30**

20-GHz Bandwidth Optical STFT with 160-MHz Resolution Using Cascaded Combs

Xue Lan[1], Haoyan Xu[1], Shilong Chen[1], Kun Xu[1], Ming Li[2,3], Yitang Dai[1]
[1]Beijing University of Posts and Telecommunications, [2]Chinese Academy of Sciences, [3]University of Chinese Academy of Sciences

This work demonstrates a Short-Time Fourier Transform (STFT) architecture with 125 resolvable frequency components using cascaded optical frequency combs. The proposed architecture utilizes only 1/2500 of the dispersion required by conventional schemes.

Tu2B-4 **11:30-11:45**

Hilbert Transform, a Mathematical Tool for Multi-Parametric Interferometric Signal Demodulation

J. Esquivel-Hernandez[1], María de los Ángeles Martínez-Guerrero[1], R. Martínez-Manuel[1], L. Valentín-Coronado[1,2], D. Maldonado-Hurtado[3], D. Barrera[3], S. Sales[3]
[1]Centro de Investigaciones en Optica, [2]Tecnología e Innovación, [3]Universitat Politècnica de València

A robust method for multi-parameter monitoring in interferometric-fiber-based sensing applications using the Hilbert Transform (HT) is presented. Experimental results demonstrating the HT's application in simultaneous monitoring of two physical parameters are presented.

Room C (Grand Ballroom 3), 2F — Chair: Zhensheng Jia (CableLabs)

Tu2C — June 30 (Tue), 2026

Advanced Technologies for PON Evolution — 10:15-11:45

Tu2C-1 **Invited** **10:15-10:45**

Enabling Technologies and Signal Processing for Very High Speed PON

Ryo Koma, Jin Uchiyama, Kazutaka Hara, Jun-ichi Kani, Tatsuya Shimada
NTT, inc.

This invited talk reviews recent advances in enabling transmission schemes and digital signal processing technologies for future optical access systems beyond the 50Gbps era.

Tu2C-2 **10:45-11:00**

Adaptive Periodic Clustering for Time-Sensitive Flow Scheduling in Industrial TDM-PON

Xiang Zhou[1], Jin Li[2], Yonghan Wu[1], Yi Huang[1], Weixuan Fan[1], Dongxu Zhang[1], Mengxin Zhang[1], Danshi Wang[1], Min Zhang[1]
[1]Beijing University of Posts and Telecommunications, [2]South China Normal University

To improve the scalability of time-sensitive flows scheduling, we propose a constraint-driven adaptive periodic clustering method. Simulations show our method can effectively aggregate time-sensitive flows and preserve deterministic delay bounds for scalable deterministic bandwidth allocation.

Tu2C-3 **11:00-11:15**

SSB and DCPC Enabled 120-Gbaud Full C-Band PON for Direct-Detection Based VHSP

Kyungmin Woo, HanHyub Lee, HwanSeok Chung
Electronics and Telecommunications Research Institute

We report a 120-Gbaud directly-detected PON operating at C-band by using single-sideband modulation and digital chromatic dispersion pre-compensation. The results show ~360 ps/nm dispersion tolerance, enabling full C-band utilization and cost-effective coexistence with legacy PONs.

Tu2C-4 **11:15-11:30**

Experimental Demonstration of 23-dB Symmetrical 10G FTTR Using 2.5G Front End

Zhicheng Ye[1], Xuming Wu[1], Yuanqiu Luo[2], Frank Effenberger[2], Yang Lu[1], Dekun Liu[1], Yan Zeng[1]
[1]Huawei Technologies, [2]Futurewei Technologies

We demonstrate 10 Gb/s FTTR transmission by reusing 2.5G optical front-end components. The experiment achieves a 23 dB loss budget, showing a low-cost approach for upgrading FTTR systems to 10G.

Tu2C-5 **11:30-11:45**

Real-Valued Modulation and Single-Sideband Filtering for Heterodyne Detected PONs

Yi Che[1], Sunghyun Bae[2], Hoon Kim[1]
[1]Korea Advanced Institute of Science and Technology, [2]Sejong University

We propose and demonstrate the single-sideband filtering to relieve the bandwidth requirement of heterodyne receiver. We achieve decent receiver sensitivities of ~-20.8 dBm for 100-Gb/s OOK signals using a heterodyne receiver having 42- GHz bandwidth.

Tu2D-1 **10:15-10:30**

Sub-THz Signal Generation Using Optical Heterodyne Detection of Cavity-Locked Lasers and Receiver DSP

Dohun Koh[1], Kyungmin Woo[2], Hoon Kim[1]
[1]Korea Advanced Institute of Science and Technology, [2]Electronics and Telecommunications Research Institute

We propose and demonstrate sub-THz signal generation using two lasers wavelength-locked to an optical cavity and receiver-side DSP to suppress frequency drift and phase noise. The 132.2-GHz carrier achieves two-order improved frequency stability and 40-Gb/s transmission.

Tu2D-2 **10:30-10:45**

Integrated Secure Communication and Radar Jamming Empowered by THz Photonics

Junhao Zhang[1,2], Mingzheng Lei[2], Qing Zhong[1,2], Min Zhu[1,2], Junjie Ding[2], Long Zhang[2], Bingchang Hua[2], Yuancheng Cai[2], Jiao Zhang[2], Xingyu Chen[2], Jianjun Yu[2,3]
[1]Southeast University, [2]Purple Mountain Laboratories, [3]Fudan University

We experimentally demonstrate a photonics-aided OFDM ISAC system for secure communication and cooperative radar jamming at THz band. The system achieves a 105.8-Gbps data rate and a 7-mm radial resolution over a 3-m wireless link.

Tu2D-3 **Invited** **10:45-11:15**

Feasibility and Performance of Photonics-Assisted Sub-THz Wireless X-haul Links

Sang-Rok Moon, Sooyeon Kim, Minkyu Sung, Seung-Hyun Cho
Electronics and Telecommunications Research Institute

This paper experimentally investigates the feasibility of 300-GHz-band transmission for X-haul links. A photonicsbased transmitter is employed to deliver QPSK signals over 200 m wireless links, validating its practical applicability.

Tu2D-4 **11:15-11:30**

OptoChannelDiffusion: Conditional Latent Diffusion Channel Model for G-band Fiber-Terahertz Integrated Communication Systems

Liangtao Chen, Chengxi Wang, Yuan Wei, Yinjun Liu, Boyu Dong, Yaxuan Li, Nan Chi, Junwen Zhang
Fudan University

Enabling high-fidelity digital twins for G-band fiberterahertz systems at 209-GHz, we propose OptoChannelDiffusion. Integrating conditional attention and 1D diffusion models for full-condition-domain modeling, it achieves a 0.0091 EVM error, reducing baseline errors by 95%.

Tu2D-5 **11:30-11:45**

Improved Pilot-Assisted Equalization in Phase-Noise-Limited Terahertz OFDM Links

Bowen Liu, Hitomi Uemura, Takasumi Tanabe
Keio University

A pilot-assisted equalizer for phase-noise-limited THz OFDM systems is proposed. Using phase-noise-aware weighted estimation, it stabilizes equalization, improves phase noise tolerance, and expands feasible regions for highorder QAM with low computational complexity.

Tu2E-1 Tutorial 10:15-11:15

Micro-Transfer Printing for Heterogeneous Silicon Photonics

Gunther Roelkens
Ghent University-imec

In this tutorial I will discuss micro-transfer printing technology and its use for heterogeneous silicon photonic integrated circuits. Next-generation silicon photonics will require the intimate and scalable integration of nonnative photonic components, such as LiNbO3 modulators and IIIV opto-electronic components (amplifiers, lasers). Microtransfer printing is a technology that enables such scalable integration without fundamentally changing the silicon photonics process flow. I will also illustrate the versatility of the technology through the demonstration of e.g. heterogeneous electronic/photonic integrated circuits & quantum photonics circuits based on micro-transfer printing.

Tu2E-2 Invited 11:15-11:45

Membrane InP-based Photonic Devices on Si for Optical Interconnects

Tatsurou Hiraki, Takuro Fujii, Takuma Aihara, Yoshiho Maeda, Tadashi Minotani, Norio Sato, Tomonari Sato, Shinji Matsuo
NTT, inc.

Membrane InP-based photonic devices on silicon provide strong optical confinement and small capacitance. We review high-speed membrane InP-based modulators and integrated lasers, demonstrate a low-power transmitter, and discuss future directions including wafer-level interconnects.

Tu2F-1 **10:15-10:30**

Bandwidth Enhancement for 200-Gbaud Photodiode Using Inductive Peaking Technique based on Coplanar Waveguide

Yusuke Araki, Yuki Yamada, Takuya Hoshi, Shohei Kosuga, Fumito Nakajima
NTT, inc.

This paper investigates the impact of inductive peaking on photodiodes (PDs) with high-impedance coplanar waveguides (CPWs) for bandwidth enhancement. We demonstrate InP/InGaAs PDs with the bandwidth extended over 100 GHz and 200-Gbaud operation.

Tu2F-2 **10:30-10:45**

Ultrahigh-Power Ge-on-Si Photodetector Employing Subwavelength Grating Waveguide

Xiaoyang Zhao[1], Shiao Zhao[1], Yu Zhang[1,2]
[1]Huazhong University of Science and Technology, [2]Optics Valley Laboratory

We report a side-coupled Ge-on-Si photodetector with ultrahigh saturation current exceeding 100 mA, attributed to an integrated subwavelength grating waveguide. Furthermore, 50 Gbps non-return-to-zero (NRZ) eye diagrams were successfully obtained under photocurrent of 40 mA.

Tu2F-3 **Invited** **10:45-11:15**

200-GHz Range Photodetector Technology for High-Baud Rate Optical Fiber Communication

Toshimasa Umezawa, Atsushi Matsumoto, Kouichi Akahane, Naokatsu Yamamoto
National Institute of Information and Communications Technology

We present ultra-broadband photodetectors (PDs) operating from DC to beyond 200 GHz based on a unitravelling carrier (UTC) PD structure. We demonstrate their fundamental performance for intensity-modulation direct-detection (IMDD) and phase-shifting keying (PSK) signal detection, targeting next-generation optical fiber communication systems.

Tu2F-4 **11:15-11:30**

High-Speed Si-Based GeSn Receiver for Extended-Wavelength-Band Optical Communication

Ruoyun Ji[1], Hui Cong[1,2], Caile Wang[1,2], Yue Li[1,2], Siqi Zhang[1,2], Fenghe Fu[1,2], Chunlai Xue[1,2]
[1]Chinese Academy of Sciences, [2]University of Chinese Academy of Sciences

Si-based GeSn photodetector with a record 3-dB bandwidth exceeding 50 GHz under a low bias of 2.4 V is demonstrated. This low-voltage operation prospers the first co-packaging integration of GeSn photodetectors with transimpedance amplifiers.

Tu2F-5 **11:30-11:45**

Simultaneous Bandwidth and Saturation Enhancement in Ge–Si Photodetectors through Via-Contact Engineering

Jian Wang, Can Hua, Guanyu Chen
Chongqing University

We show that via-contact engineering reduces series resistance in waveguide-integrated Ge-Si photodetectors, simultaneously improving 3 dB bandwidth and saturation photocurrent. Measurements on 40 devices validate a fabrication-compatible strategy for high-speed, high-power microwave-photonic link applications.

Tu2G-1 **Invited** **10:15-10:45**

Silicon-Based Heterogeneous Integrated Quantum Photonic Chips

Gong Zhang
Zhejiang University

Implementing quantum information systems traditionally relies on free-space optics or discrete fiber-optic components, which suffer from large size, low reliability, and limited scalability. This presentation will highlight the team's breakthroughs in heterogeneously integrated photonic quantum information chips, including a self-testing quantum random number generator (QRNG) chip, an integrated continuous-variable quantum key distribution chip, and on-chip key components.

Tu2G-2 **Invited** **10:45-11:15**

Continuous-Variable Entanglement-Assisted Quantum Communication and Quantum Chip

Xiaolong Su, Siyu Ren, Xuezhi Zhu, Meihong Wang
Shanxi University

We demonstrate the deterministic entanglement-assisted quantum communication based on continuous-variable entangled state over 20-km fiber channels and the deterministic generation of a continuous-variable multipartite entanglement with an integrated optical chip.

Tu2G-3 **11:15-11:30**

Fully Integrated PIC-Based Phase-Encoding QKD Transmitter Packaged in a CFP2 Module

Junsang Oh, Joong-Seon Choe, Byung-Seok Choi, Ju Hee Baek, Chun Ju Youn
Electronics and Telecommunications Research Institute

We present the first PIC-based QKD transmitter packaged in a CFP2 module for phase-encoding BB84, integrating a laser diode, a delay-line interferometer, variable optical attenuators, and a phase modulator, and experimentally demonstrate promising performance.

Tu2G-4 **11:30-11:45**

1.3 km Free-Space Entanglement-Based QKD with Polarization-Entangled Photons

Taewon Kim, Hyeokin Kang, Gibeen Gu, Jaeyoon Kim, Heonoh Kim, Young-Jin Kim
Korea Advanced Institute of Science and Technology

Quantum key distribution (QKD) enables cryptographic key distribution with unconditional security. We demonstrate a campus-scale 1.3 km free-space QKD link and a Sagnac-based polarization-entangled photon-pair source using a type-II PPKTP crystal, together with pumppower-dependent efficiency characterization. Building on this platform, we will perform full QKD operation.

Tu3A-1 **13:15-13:30**

Securing Physical Layer of Access Networks with Optical Key Distribution

Mateusz Kucharczyk[1,2], Jarosław P. Turkiewicz[3], Karol Kowalik[4], Artur Stabrawa[1], Patryk Urban[1,5], Konrad Banaszek[1,2]
[1]Quantum Optical Technologies sp. z o.o., [2]University of Warsaw, [3]Warsaw University of Technology, [4]Fiberhost S.A., [5]West Pomeranian University of Technology

Point-to-multipoint IM/DD distribution of cryptographic keys is presented as a security measure for passive optical networks. A proof-of-principle demonstration in a model 64- user configuration achieved key rates exceeding 100 Mb/s.

Tu3A-2 **13:30-13:45**

Two-Layer Chaotic Encryption for Alamouti-Coded Simplified Coherent Systems

Xiaoqian Liu, Jifan Yin, Chun-Kit Chan
The Chinese University of Hong Kong

We propose a two-layer chaotic encryption scheme for Alamouti-coded simplified coherent systems by integrating chaotic mapping and coding. 25-Gbaud secure transmission over 100-km fiber is simulated without performance penalty, achieving a 2^{159} key space.

Tu3A-3 **13:45-14:00**

Optical-Switching-Based Memory Sharing for High-Bandwidth Distributed Computing

Qishen Liang[1], Bin Zhang[1,2], Zichao Zhao[1], Lingzhi Yuan[1], Baojie Hou[1], Haoran Ma[1], Yongdi Zhang[1], Bangmin Gong[1], Huihui Zhu[1], Yuehai Wang[1], Jianyi Yang[1,3]
[1]Zhejiang University, [2]Zhejiang Lab, [3]Jinhua Institute of Zhejiang University

We propose an optical-switching-based memory sharing scheme for distributed computing. Experimental FPGAbased validation using silicon-integrated HSS switches demonstrates a 66% latency reduction in matrix multiplication, offering a scalable high-performance architecture.

Tu3A-4 **14:00-14:15**

Deployment of AI Workflows over Multi-Cluster Distributed Computing Infrastructures

Salvatore Spadaro, Albert Pagès, Enric Guasch, Fernando Agraz
Universitat Politècnica de Catalunya

Supporting data-intensive AI workflows across multicluster computing infrastructures requires high performance networking. This work develops a Machine Learning agent to accurately estimate network end-to-end latency, assuring network solutions match the rigorous AI workflows requirements.

Tu3A-5 **Invited** **14:15-14:45**

Metro/Access Converged Network Technology

Shin Kaneko, Jun-ichi Kani, Tatsuya Shimada
NTT, inc.

This invited talk addresses driving forces for metro/access convergence, and reviews progress in research regarding extending dense-wavelength-divisionmultiplexing-based metro networks to access areas from the perspectives of end-to-end client-signal optical transmission and remote-control-and-management of optical-path endpoints.

Tu3B-1 **Invited** **13:15-13:45**

AI-enhanced Data Analytics for Distributed Acoustic Sensing: Methods and Real-world Case Studies

Huioon Kim, Hyoyoung Jung, Donjung Lee, Young Ho Kim, Myoung Jin Kim
Korea Photonics Technology Institute

This paper reviews AI-enhanced data analytics for distributed acoustic sensing (DAS), covering signal denoising, event classification, and anomaly detection. KOPTI's case studies demonstrate real-world applications in perimeter security, industrial monitoring, and spatiotemporal anomaly detection.

Tu3B-2 **13:45-14:00**

Integrated Vibration Sensing and Communication over Anti-Resonant Hollow-Core Fiber

Siyuan Liu[1,2], Jiarui Zhang[1], Yucong Liu[2], Mingqing Zuo[2], Dawei Ge[2], Peng Li[3], Dong Wang[2], Lei Zhang[3], Dechao Zhang[2], Jie Luo[3], Zhangyuan Chen[1]
[1]Peking University, [2]China Mobile Research Institute, [3]Yangtze Optical Fibre and Cable Joint Stock Limited Company

We experimentally demonstrate simultaneous 32-GBaud 16QAM bidirectional transmission and vibration sensing over a 142-km two-span anti-resonant hollow-core fiber. Vibration localization is achieved by extracting phase information from both co- and counter-propagating communication signals.

Tu3B-3 **14:00-14:15**

Inter-Core Spontaneous Raman Scattering in Multi-Band Multi-Core Fiber Optical Systems

Jun Sakaguchi, Hideaki Furukawa
National Institute of Information and Communications Technology

We characterize the wavelength-dependent backward inter-core spontaneous Raman scattering caused by O, E, S, C, L-band lightwave in a 7-core fiber system. O-band shows potential advantage for use in classical-quantum coexisting multi-core fiber transmission systems.

Tu3B-4 **Invited** **14:15-14:45**

Multicore Fiber and System Solutions for High-Capacity Submarine Cables

John D. Downie[1], Lidia Galdino[2], Pascal Pecci[3], Jason Hurley[1], Sijing Liang[4], Periklis Petropoulos[4], Yongmin Jung[4]
[1]Corning Incorporated, [2]Corning Optical Communications, [3]Meta, [4]University of Southampton

We examine fiber and system options for future highcapacity submarine cables of 1 and 2 Pb/s. We focus on multicore fiber systems for the largest capacity cables and analyze fiber and amplifier options.

Tu3C-1 **13:15-13:30**

350 Gb/s Hybrid TDM/TFDM Coherent Access Supporting Concurrent PON and Fiber/FSO Links

Haipeng Zhang, Zhensheng Jia
Cable Television Laboratories Inc.

We demonstrate a TDM/TFDM hybrid coherent access network concentrating DSC processing at the OLT while using simple SC ONUs/endpoints. Three adaptable DSCs deliver 350 Gb/s bidirectional capacity, supporting P2MP PON and dedicated fiber/FSO P2P links.

Tu3C-2 **13:30-13:45**

Demonstration of 480-Gb/s 32-QAM PTBC Signal Transmission for Next-Generation Optical Access Networks

Jongwan Kim, Sang-Rok Moon, Sun Hyok Chang, Hun-Sik Kang, Joon Ki Lee
Electronics and Telecommunications Research Institute

We demonstrate the first 480-Gb/s 32-QAM PTBC transmission using a single-polarization coherent receiver for next-generation optical access networks. After 20-km fiber transmission, a 23-dB power budget is achieved, confirming PTBC feasibility, scalability, and compact operation.

Tu3C-3 **Invited** **13:45-14:15**

FTTR+X: Integrated Intelligence and Sensing

Gangxiang Shen[1], Jinhan Cai[1], Xiang Wang[2], Tianhai Chang[2]
[1]Soochow University, [2]Huawei Technologies Co., Ltd.

This invited talk discusses key enabling technologies of FTTR to fully unlock its potential for high-quality future access services, focusing on AI-driven deployment and optimization as well as integrated sensing capabilities for intelligent, adaptive, and service-aware indoor networks.

Tu3C-4 **14:15-14:30**

Upstream NOMA-DSCM for Coherent PONs via All-Optical Channel Aggregation

Chen Ding[1], Zijian Li[1], Qiarong Xiao[1], Yutian Liu[1], Zixian Wei[2], Ka Suen Lee[1], Chaoran Huang[1], Changyuan Yu[2], Chester Shu[1]
[1]The Chinese University of Hong Kong, [2]The Hong Kong Polytechnic University

We demonstrate joint NOMA-DSCM transmission for upstream coherent PONs using photonics-assisted spectral aggregation and subcarrier-pair Alamouti coding. Our results show reduced spectral occupancy and improved edgesubcarrier performance, validating practical capacity scaling.

Tu3C-5 **14:30-14:45**

On the Performance of Joint Optical- Electrical Polarization Tracking for PM-IM/DD Systems

Juntao Cao[1], Chen Cheng[1,2], Haiqiang Wei[1], Qi Wu[1], Xingyu Zhu[1], Wenyu Wang[1], Ming Tang[2], Chao Lu[1], Alan Pak Tao Lau[1], Kangping Zhong[1]
[1]The Hong Kong Polytechnic University, [2]Huazhong University of Science and Technology

We experimentally study the performance of joint optical and electrical polarization tracking in a 224- Gbit/s PM-IM/DD transmission system with SiP polarization controller. The tracking speed was doubled compared to optical polarization tracking scheme.

Room D (Capri), 2F	Chair: Di Che (Nokia Bell Labs)
Tu3D	June 30 (Tue), 2026
High-Symbol-Rate, High-Capacity Optical Transmission	13:15-14:45

Tu3D-1 Tutorial 13:15-14:15

DSP-Enabled High-Symbol-Rate Optical Transmission with Wideband Analog Front-Ends

Masanori Nakamura
NTT, inc.

Increasing symbol rates beyond 200 GBd is key to scaling per-wavelength capacity in optical transmission. This tutorial covers bandwidth-extension methods using wideband electrical front-ends and digital decompositionand-recombination processing, and DSP-based equalization and impairment compensation techniques.

Tu3D-2 Invited 14:15-14:45

Ultra-Wideband Multi-Band Transmission and Band-Expansion Using Wavelength Conversion

Tomoyuki Kato
Finity, Inc.

This paper presents wavelength conversion techniques for ultra-wideband multi-band optical transmission. This approach facilitates spectral expansion and increased utilization across the transparent fiber window, aiming to boost overall capacity for future high-demand networks.

Tu3E-1 Invited 13:15-13:45

An Integrated Platform for Ultra-Low-Power Reconfigurable Silicon Photonics Leveraging Wafer-Scale Vacuum Sealed MEMS

August Djuphammar[1], Pierre Edinger[1], Yihang Chen[1], Yingying Li[1], Gaehun Jo[1], Cleitus Antony[2], Simon J. Bleiker[1], Sofie Janssen[3], Selva Rajmohan[3], Frank Niklaus[1], Wim Bogaerts[3,4], Kristinn B. Gylfason[1]
[1]KTH Royal Institute of Technology, [2]Tyndall National Institute of Technology, [3]Interuniversity Microelectronics Centre, [4]Ghent University-imec

High power consumption currently limits the density of reconfigurable Photonic Integrated Circuits (PICs). We demonstrate micromechanical actuation on a commercially available silicon photonics platform, achieving orders-of-magnitude reductions in power compared to thermo-optic counterparts.

Tu3E-2 Invited 13:45-14:15

Reconfigurable Photonics based on Phase Changes Materials

Ying Sun, Yiting Yun, Kai Xu, Weiquan Wang, Hongtao Lin
Zhejiang University

Reconfigurable photonics provides critical support for next-generation photonic technologies. By integrating phase change materials, we demonstrate microring optical neural networks with >95% accuracy and routing networks with nonvolatile multilevel switching and >10,000-cycle high endurance.

Tu3E-3 14:15-14:30

Photonic Tensor Core on a Silicon Photonic MEMS

Seungmin Chae[1], Youngjae Jeong[2], Dong Uk Kim[1], Giyeon Shin[2], Gimok Byun[2], Jae Hyeon Kim[1], Young Jae Park[1], Man Jae Her[1], Jinyoung Cha[1], Hojune Lee[1], Jeongmook Lim[3], Taein Kim[1], Dongyoun Mah[1], Minjae Kim[1], Kyoungsik Yu[2], Sangyoon Han[1]
[1]Daegu Gyeongbuk Institute of Science and Technology, [2]Korea Advanced Institute of Science and Technology

We demonstrate a Photonic Tensor Core architecture based on silicon photonics MEMS platform and its operational principle. Experimental characterization of the MEMS-based phase shifters and tunable directional couplers is presented to verify their performance.

Tu3E-4 14:30-14:45

Scalable Programmable Silicon Photonic MEMS on a Commercial Silicon Photonics Foundry

Jeongmook Lim[1], Dong Uk Kim[1], Jae Hyeon Kim[1], Youngjae Jeong[2], Gimok Byun[2], Giyeon Shin[2], Young Jae Park[1], Man Jae Her[1], Hojune Lee[1], Jinyoung Cha[1], Seungmin Chae[1], Minjae Kim[1], Dongyoun Mah[1], S Gunasagar[3], Jasper Leong[3], Ramadas Nambatyathu[3], Robin Chao[3]
[1]Daegu Gyeongbuk Institute of Science and Technology, [2]Korea Advanced Institute of Science and Technology, [3]CompoundTek Pte Ltd

We report a MEMS-based programmable photonic integrated circuit fabricated via a commercial silicon photonics foundry. Characterizing core building blocks – phase shifter and tunable directional coupler – validate their robust optical performance and seamless foundry integration.

Tu3F-1 **Invited** **13:15-13:45**

High-Speed Vertical-Illumination Photodiodes for beyond-200-Gbaud Applications

Yuki Yamada, Ikue Hiraoka, Yusuke Araki, Takuya Hoshi, Yoshiho Maeda, Shohei Kosuga, Takahiro Nakamura, Shoko Tatsumi, Fumito Nakajima
NTT, inc.

We present our recent work on high-speed verticalillumination InP/InGaAs photodiodes (PDs) with over 200-GHz bandwidth. Interference-based absorption enhancement yields a high responsivity of over 0.5 A/W. The inverted p-down structure ensures excellent reliability.

Tu3F-2 **13:45-14:00**

Ultrafast and Ultrahigh Extinction Ratio Optical Switch on a TFLT Platform

Zhengyuan Bao, Haoran Li, Taoran Yao, Zejie Yu, Daoxin Dai
Zhejiang University

We report an ultrahigh extinction ratio (>40 dB) and ultrafast (<20 ns) cascaded Mach-Zehnder interferometer electro-optic switch operating at 850 nm on a thin-film lithium tantalate platform.

Tu3F-3 **14:00-14:15**

Waveguide-Integrated Plasmonic Ge-on-Si Photodetector Achieving 1.53 A/W at 1550 nm

Wei Chen, Yu Yu, Xinliang Zhang
Huazhong University of Science and Technology

We demonstrate a photoconductive-gain-assisted waveguide-integrated plasmonic Ge-on-Si photodetector, achieving 1.53 A/W at 1550 nm under -1.5 V bias with GHzscale bandwidth, exceeding the quantum limit at low operating voltage.

Tu3F-4 **14:15-14:30**

Optoelectronic Third-order Intermodulation Distortion Measurement for Photodetectors

Kunqian Yang[1], Yunqi Liao[1], Xingbang Zhu[1], Jianbin Fu[2], Min Xue[1], Shilong Pan[1]
[1]Nanjing University of Aeronautics and Astronautics, [2]Newkey Photonics Information Technology Limited Liability Company

We propose and demonstrate a measurement method to characterize third-order intermodulation distortion in photodetectors. The third-order intercept point and spurious-free dynamic range of a high-speed commercial photodetector are experimentally obtained.

Tu3F-5 **14:30-14:45**

Bottom-Grating-Assisted Polarization-Sensitive Ge PD with Enhanced Response at 1.6 μm

Fenghe Fu[1,2], Hui Cong[1,2], Chi Xu[1,2], Ruoyun Ji[1], Huirong Zhou[1,2], Chunlai Xue[1,2]
[1]Chinese Academy of Sciences, [2]University of Chinese Academy of Sciences

A polarization-sensitive Ge photodetector operating at 1.6 μm was developed using a CMOS compatible selective epitaxial growth process. Polarization selectivity is introduced by a bottom-grating structure, yielding an extinction ratio of about 3.

Tu3G-1 Invited 13:15-13:45

Breaking the Scattering Barrier: Non-Invasive Deep Tissue Imaging Using Reflection Matrix Based Wavefront Shaping

Zhongping Chen
University of California, Irvine

Multiple light scattering is the primary obstacle for deep tissue imaging. We present an innovative method to overcome this limitation, enabling the delivery of light energy to unprecedented depths within scattering media.

Tu3G-2 Invited 13:45-14:15

Vibrational Imaging of Cells and Semiconductors with Stimulated Raman Scattering

Yasuyuki Ozeki
The University of Tokyo

Stimulated Raman scattering (SRS) microscopy enables high-speed vibrational imaging. We present recent advances including super-multiplexed and super-resolution imaging of cells, as well as applications to two-dimensional materials, wide-bandgap semiconductors, and silicon.

Tu3G-3 14:15-14:30

Versatile Mid-Infrared Photoacoustic Microscopy for Label-Free Biomedical Imaging

Eunwoo Park[1], Dong Gyu Hwang[1], Jinah Jang[1], Chulhong Kim[1,2]
[1]Pohang University of Science and Technology, [2]Opticho Inc.

We present versatile mid-infrared photoacoustic microscopy (MIR-PAM) for label-free biomedical imaging through deep learning-based image transformation and polarization-sensitive analysis. These approaches enable chemically sensitive visualization and structural characterization of biological samples, demonstrating expanded capabilities of MIR-PAM.

Tu3G-4 14:30-14:45

High-Resolution Biomedical Imaging with Structured Illumination by Random Plasmonic Nanostructures

Sukhyeon Ka, Hajun Yoo, Minghao Wang, KwanHwi Ko, Donghyun Kim
Yonsei University

We demonstrate super-resolution imaging using random plasmonic near-field illumination produced by gold nanoislands. By combining speckle patterns with the blindSIM algorithm, we resolved 130-nm adjacent features in cellular microtubules, providing a simplified, cost-effective biomedical sensing platform.

Tu4A-1 **15:00-15:15**

Sequential Loss Estimation Using GNPy and Ensemble Kalman Filter

Ryu Shinzaki[1], Setsuo Yoshida[1], Keiji Shimada[1], Yukito Tsunoda[1], Yasuhiko Aoki[1], Martin Bouda[2], Inwoong Kim[2], Paparao Palacharla[2]
[1]1Finity Inc., [21]Finity Americas Inc.

We propose a method integrating the Ensemble Kalman Filter and GNPy to estimate model parameters for optical networks and accurately detect loss changes at fiber span input/output from received SNR and span losses in experiments.

Tu4A-2 **15:15-15:30**

Learning to Adapt: Evolving ML for Evolving Network Infrastructures

Emilio Paolini[1], Andrea Sgambelluri[1], Luca Valcarenghi[1], Piero Castoldi[1], Filippo Ponzini[2], Teresa Pepe[2], Giulio Bottari[2], Paola Iovanna[2]
[1]Scuola Superiore Sant'Anna, [2]Ericsson

We propose a continual-learning AI framework leveraging high-frequency telemetry for proactive optical-network fault management, enabling adaptation to evolving configurations while preserving prior knowledge through continual learning.

Tu4A-3 **Invited** **15:30-16:00**

AI-Driven Network Operations for 6G: LLM Based Automated Provisioning with Network Digital Twin Verification

Kwang-koog Lee, Eunjung Lee, Eun-Do Kim, Jung-hyo Lee, Hee-Heon Jung, Jin-Ha Lee, Jemin Chung
KT Corp.

This paper proposes a novel AI-driven operational framework designed for the automated configuration of wired IP routers within the 6G ecosystem. Our approach integrates a domainspecific Large Language Model (LLM) for intent-based script generation with a high-fidelity Network Digital Twin for pre-deployment validation. We introduce "Net Genie," an automated agent that orchestrates this workflow to ensure both operational agility and network reliability. Experimental results demonstrate that the proposed framework reduces configuration lead time by 80%.

Tu4A-4 **Invited** **16:00-16:30**

Bridging the Trust Gap in AI-Driven Optical Networks with Structured Explainability

Kiarash Rezaei[1], Omran Ayoub[2], Carlos Natalino[1], Paolo Monti[1]
[1]Chalmers University of Technology, [2]University of Applied Sciences and Arts of Southern Switzerland

AI/ML models can automate optical-network decisions, yet operators distrust their opaque outputs. Existing explainability methods help but remain hard to interpret and not directly actionable. We propose the Capture–Characterize– Communicate (3C) framework, which formalizes explainability as an end-to-end pipeline, i.e., from capturing model behavior, through local explanations, to human-readable decision guidance. The framework is demonstrated on two optical-network problems: explainable RL for RMSA and LLM-augmented explainability for QoT estimation, where it produces auditable, operator-facing explanations.

Room B (Grand Ballroom 2), 2F	Chair: Nguyen Linh Viet (University of South Australia)
Tu4B	June 30 (Tue), 2026
Fiber Amplifiers	15:00-16:30

Tu4B-1 **Invited** **15:00-15:30**

Advanced Cladding-Pumped Multi-Core Fiber Amplifier for Power-Efficient Transmission.

Taiji Sakamoto
NTT, inc.

The progress of cladding-pumped multicore fiber amplifiers for improving power efficiency is reviewed, and amplifier fiber designs and amplifier configuration techniques for achieving lower power consumption than conventional amplifiers are introduced.

Tu4B-2 **15:30-15:45**

Coupled 4-Core Erbium-Doped Fiber Amplifier with A Power Conversion Efficiency of 39 %

Masato Tanaka, Takafumi Ohtsuka, Koichi Shirahata, Hirotaka Sakuma, Takemi Hasegawa, Soichi Endo, Shintaro Mouri, Hidehisa Tazawa
Sumitomo Electric Industries, Ltd.

A coupled 4-core erbium-doped fiber amplifier (EDFA) with power conversion efficiency of 39.0 % is reported. The highest record in multi-core EDFAs is achieved using core pumping and multi-core fibers with a narrower core pitch.

Tu4B-3 **15:45-16:00**

High-Gain Lumped Raman Amplifier for 1614.2-1657.0 nm with Negligible Double Rayleigh Scattering Penalty

Shun Okada[1], Kyosuke Sone[1], Hidenobu Muranaka[1], Hiroki Ooi[1], Yu Tanaka[1], Shunya Hayashi[2], Junji Yoshida[2], Ryuichi Sugizaki[2], Shigehiro Takasaka[2], Michihiro Nakanishi[2], Masashi Abe[3], Shimpei Shimizu[3], Takushi Kazama[3], Takeshi Umeki[3], Takayuki Kobayashi[3], Yutaka Miyamoto[3], Takeshi Hoshida[1]
[1]1Finity Inc., [2]Furukawa Electric Co., Ltd., [3]NTT, inc.

We report a lumped Raman amplifier for 4.8 THz gain bandwidth across L- and U-bands achieving 40 dB average gain, 5 dB gain variation, 5 dB maximum noise figure, and negligible double Rayleigh scattering-induced penalty.

Tu4B-4 **Invited** **16:00-16:30**

Innovative Approach in Optical Fiber Fabrication Technologies for Enhanced Fiber Lasers

Jaesun Kim
Taihan Fiberoptics Co., Ltd.

Fibers in lasers are still concern to enhance power, beam quality and reliabilities of lasers for various applications, which drives the development of novel materials, design with innovative fiber fabrication technologies.

Tu4C-1 **15:00-15:15**

Frequency-Offset Tolerant Burst-Mode Receiver for 200G Coherent PON Supporting 27 dB Dynamic Range

Jad Sarkis[1,2], Robert Palmer[1], Giuseppe Talli[1], Maxim Kuschnerov[1], Valter Ferrero[2], Roberto Gaudino[2]
[1]Huawei Heisenberg Research Center, [2]Politecnico di Torino

We experimentally demonstrate a gross 256Gb/s DP-QPSK coherent burst-mode transmission in C-band over 40km for an extended PON uplink, using a commercial fixed-gain receiver supporting 27dB dynamic range and up to 12GHz frequency offset.

Tu4C-2 **15:15-15:30**

11-dB DC Leakage Tolerance Enhancement for 200G Coherent PON Upstream with Low-Complexity Block-Wise Adaptive Cancellation

Yutong Pan[1], Tianhong Zhang[1], Yixiao Zhu[2], Guangying Yang[2], Fan Zhang[1,3]
[1]Peking University, [2]Shanghai Jiao Tong University, [3]Peng Cheng Laboratory

We propose and experimentally demonstrate a lowcomplexity block-wise adaptive DC leakage cancellation scheme for 240-Gb/s/ λ coherent TDM-PON upstream, achieving a 11.0-dB improvement in DC tolerance and a power budget of 39.7 dB over 25-km SSMF.

Tu4C-3 **15:30-15:45**

Impact of Frequency Offset on Robust 200G Interleaved-DSCM Coherent PON

Adrian A. Juarez[1], Haipeng Zhang[2], Zhensheng Jia[2], Xin Chen[1], Ming-Jun Li[1]
[1]Corning Incorporated, [2]Cable Television Laboratories, Inc.

We evaluate frequency-offset compensation in a 200 G interleaved DSCM PON architecture, demonstrating 1 GHz frequency-offset tolerance for both LO–ONU and ONU– ONU mismatch scenarios at BER = 2×10^{-2} with standard coherent DSP.

Tu4C-4 **15:45-16:00**

Demonstration of 200-Gb/s Coherent-Lite PON with 45.2-dB Link Budget over AR-HCF

Chen Yang[1], Siyu Chen[1], Zheli Liu[1], Can Zhao[1], Hao Wen[1], Jun Wang[1], Mingming Zhang[1], Yuqi Li[1], Zihe Hu[1], Peng Li[2], Lei Zhang[2], Jie Luo[2], Lei Shi[1], Ming Tang[1]
[1]Huazhong University of Science and Technology, [2]YOFC

We propose an ultra-simple self-homodyne coherent-lite PON over HCF by incorporating on-chip optical frequency comb. Experimental results demonstrate a 45.2-dB link budget, achieving a single-wavelength net rate of 196.5 Gb/s.

Tu4C-5 **Invited** **16:00-16:30**

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

Junwen Zhang, Penghao Luo, Shouyun Cai, An Yan, Renle Zheng
Fudan University

Coherent passive optical network (CPON) has become a strong candidate for next-generation optical access networks and are considered a potential solution for 100G PON specification. This paper discusses key technologies for intelligent and flexible CPON.

Room D (Capri), 2F | Chair: Inwoong Kim (1Finity)

Tu4D | June 30 (Tue), 2026

DSP for Short-Reach Optical Access | 15:00-16:30

Tu4D-1 **Invited** **15:00-15:30**

Real-Time FPGA Implementation of a PTBC DSP Architecture for Coherent-Lite Fronthaul Optical Access Links

Hun-Sik Kang, Chanho Park, Jung-Yeol Oh, Jongwan Kim, Joon Ki Lee, Hae Young Rha
Electronics and Telecommunications Research Institute

We demonstrate a real-time FPGA implementation of a feedforward PTBC DSP architecture for coherent-lite fronthaul links. The proposed design enables scalable high parallelism processing and achieves 100-Gb/s 16-QAM transmission over 20 km single-mode fiber (SMF).

Tu4D-2 **15:30-15:45**

Mini-Batch Gradient Descent Adam Algorithm for Fast-Converging Volterra Equalizers

Jaeyoon Kim, Hoon Kim
Korea Advanced Institute of Science and Technology

An Adam-optimized Volterra nonlinear equalizer using mini-batch gradient descent is proposed and demonstrated for IM/DD systems. We achieve significantly faster convergence than traditional RLS-based Volterra equalizers in 240 Gb/s PAM-4 signal experiments.

Tu4D-3 **15:45-16:00**

A Novel 3-D SVDD System with 64-Point Stokes Constellation for Short-Reach Optical Communication

Weiqi Lu, Yuhao Fang, Puzhen Yuan, Jiwei Xie, Dayu Shi, Haojie Zhu, Zexu Liu, William Shieh
Westlake University

We propose a DP-IQ-based 3-D SVDD scheme that directly generates a 64-point constellation in the Stokes space. We experimentally transmit 30-Gbaud 3-D SVDD signals over 10-km SSMF with KAN equalizer mitigating nonlinear distortion.

Tu4D-4 **16:00-16:15**

Amplitude-Directed DD-LMS Equalizer for Multipath Interference Mitigation in IMDD PAM4 Systems

Runlin Tan, Meng Xiang, Junjiang Xiang, Gai Zhou, Songnian Fu, Yuwen Qin
Guangdong University of Technology

We propose an amplitude-directed decision- directed least-mean-square (DD-LMS) equalizer for multipath interference (MPI) mitigation in IMDD PAM4 links, experimentally achieving ~1.4 dB signal-tointerference ratio tolerance improvement over recently reported MPI-mitigation techniques.

Tu4D-5 **16:15-16:30**

Performance Comparison of Transition and Level-Based Equalization in Direct-Modulated Laser-Based IM/DD Optical Links

Meng-Ci Sie, Benedictus Yohanes Bagus Widhianto, Jyehong Chen, Meng-Ting Zhou, Ming-Lin Kan
National Yang Ming Chiao Tung University

This work experimentally compares transition- and level-based equalizers in 26.5625-GBd VCSEL IM/DD link under extender 500 multimode range. Results show that transition-based DFE achieves superior skew mitigation and BER improvement with significantly reduced tap complexity.

Room E (Sydney), 2F

Chair: Kristinn Gylfason (KTH Royal Institute of Technology)

Tu4E

Silicon Photonics for Sensing & Imaging

June 30 (Tue), 2026

15:00-16:30

Tu4E-1 Invited 15:00-15:30

Silicon Photonics for Gas Sensing

Zhenzhou Cheng[1,2], Jiaqi Wang[3], Zunyue Zhang[1,2], Tiegen Liu[1,2]
[1]Tianjin University, [2]Key Laboratory of Optoelectronic Information Technology, Ministry of Education, [3]Shenzhen University

We presented our efforts in developing silicon devices for gas sensing, including suspended nanomembrane silicon (SNS) waveguides, microcavities, grating couplers, and photodetectors. Using the SNS waveguide devices, we demonstrate on-chip multiple-gas sensing.

Tu4E-2 15:30-15:45

Innovation-Driven Dual-Parameter Sensor for Wide-Range Temperature and Refractive Index Measurement

Xinzhe Xiong, Guanglian Cheng, Qiyuan Yi, Zhiwei Yan, Qiyuan Li, Zengfan Shen, Hanming Yuan, Xuchen Peng, Jiahao Xing, Qixin Xu, Lishen
Huazhong University of Science and Technology

We proposed a free spectral range (FSR) tracking method that converts FSR constraints into new sensing dimensions. By applying this method, we implemented a wide-range dual-parameter sensor for temperature and refractive index.

Tu4E-3 15:45-16:00

Inverse-Designed Silicon Nitride Computational Spectrometer with Sub-ångström Resolution

Kai Wang[1], Enge Zhang[1,2], Lei Zhang[1]
[1]Beijing University of Posts and Telecommunications, [2]Ludong University

We present a silicon nitride computational spectrometer, leveraging inverse design to achieve a spectral resolution of 80 pm within the C-band.

Tu4E-4 Invited 16:00-16:30

Silicon Photonic Beam Steerers for Chip-Scale LiDAR and Microscopy

Chung-Yu Hsu[1], Hsun-Sung Chiu[1], Chieh-Chih Yu[1], Ping-Yen Hsieh[1], Li-Jun Tung[1], Yu Heng Hong[2], Hao-Chung Kuo[1,2], Chi-Wai Chow[1], You-Chia Chang[1]
[1]National Yang Ming Chiao Tung University, [2]Hon Hai Research Institute

We present two silicon photonic beam steerers: one based on a metalens focal plane array, producing a collimated beam for LiDAR, and an optical phased array producing a focused beam steerable throughout a 3D volume.

Room F (Sicily), 2F — Chair: Tatsurou Hiraki (NTT, inc.)

Tu4F — June 30 (Tue), 2026

III-V on Silicon Active Devices I — 15:00-16:30

Tu4F-1 **15:00-15:15**

Optical Chiplet with 0.30-pJ/bit Receiver Using Membrane III-V Photodetector on Si

Yoshiya Shikama[1,2], Suguru Yamaoka[1,2], Tatsurou Hiraki[1,2], Tadashi Minotani[1,2], Yohei Saito[1], Takuma Aihara[1,2], Yoshiho Maeda[1,2], Toru Miura[1], Takuro Fujii[1,2], Yuichi Tsujita[1,2], Tomonari Sato[1,2], Norio Sato[1,2], Yuzo Sasaki[1], Shinji Matsuo[2]
[1]NTT Device Innovation Center, [2]NTT Device Technology Labs

We demonstrate a four-channel optical receiver chiplet integrating low-capacitance, high-responsivity membrane III–V photodetectors on Si waveguides with a low-power TIA. It achieves 0.51 A/W fiber-to-PD responsivity and 64 Gbit/s PAM4 at 0.30 pJ/bit.

Tu4F-2 **15:15-15:30**

90-GHz-Bandwidth Membrane EA-DFB Laser on Si with Wide Operating Temperature Range

Hiroshi Kato[1,2], Takuma Aihara[1,2], Tatsurou Hiraki[1,2], Yoshiho Maeda[1,2], Takuro Fujii[1,2], Tomonari Sato[1,2], Shinji Matsuo[2]
[1]NTT Device Innovation Center, [2]NTT Device Technology Labs

We demonstrate wide temperature range (20-50ºC) operation of an O-band membrane InGaAlAs EA-DFB laser on a silicon photonics platform, achieving clear eye openings at 320-Gbit/s PAM4 using a 90-GHz-bandwidth EAM.

Tu4F-3 **Invited** **15:30-16:00**

Tunable Lasers with InP-Gain Regions on Si Photonic Circuits Using Chip-on-Wafer Bonding

Takuo Hiratani[1,2,5], Kento Komatsu[1,2,5], Hidenari Fujikata[1,2], Naoki Fujiwara[1,2,5], Naoko Inoue[1,2,5], Takehiko Kikuchi[1,2,5], Takuya Mitarai[1,2,5], Shun Kimura[1,2], Takuya Okimoto[1,2,5], Yusuke Sawada[1,2], Eiichi Banno[1,3], Takashi Matsui[3], Takeshi Fujisawa[4], Nobuhiko Nishiyama[2,5], Hideki Yagi[1,2,5]
[1]Sumitomo Electric Industries, Ltd, [2]Photonics Electronics Technology Research Association, [3]Sumitomo Electric Device Innovations, Inc., [4]Hosei University, [5]Institute of Science Tokyo

This paper reviews InP/Si heterogeneously integrated tunable lasers using chip-on-wafer bonding method. The single-chip tunable laser for the C and L bands with the narrow spectral linewidth (< 50 kHz) is demonstrated using this technology.

Tu4F-4 **16:00-16:15**

High-Efficient and Compact InP/Si Heterogeneously Integrated Coherent-Receiver PICs Using Chip-on-Wafer Bonding

Takuya Mitarai[1,2], Takuya Okimoto[1,2], Shun Kimura[1,2], Takehiko Kikuchi[1,2], Naoko Inoue[1,2], Naoki Fujiwara[1,2], Nobuhiko Nishiyama[2,3], Hideki Yagi[1,2]
[1]Sumitomo Electric Industries, Ltd, [2]Photonics Electronics Technology Research Association, [3]Institute of Science Tokyo

We demonstrate coherent receiver PICs with a Siphotonics-based 90◦ hybrid and four InGaAs PDs on a 1.2 mm2 chip. They exhibit high responsivity (> 0.13 A/W) with small I/Q channel imbalances (60 GHz).

Tu4F-5 **16:15-16:30**

Monolithic InAs/GaAs Quantum-Dot Laser Diodes on Si for Silicon Photonics Enabled by All-MOCVD Epitaxy: Benchmarking Against GaAs and Ridge-Engineered Functionality

HoSung Kim[1], Honghwi Park[2], Seungchul Lee[2], Dae-Myeong Geum[2], Daehwan Jung[3], Won Seok Han[2]
[1]Samsung Advanced Institute of Technology, [2]Electronics and Telecommunications Research Institute, [3]Korea Institute of Science and Technology

We report an all-MOCVD approach for monolithic InAs/GaAs QDLDs on Si(100) and benchmark key metrics with reference devices.

Room G (Miami), 2F | Chair: Tae Joong Eom (Pusan national university)

Tu4G | June 30 (Tue), 2026
Computational Methods in Imaging and Microscopy | 15:00-16:30

Tu4G-1 **Invited** **15:00-15:30**

Seeing through Skins and Bones: Reflection Matrix Approaches for Deep-Tissue Optical Imaging

Wonshik Choi
Korea University

We present reflection matrix microscopy methods that deterministically exploit multiple scattering for deep-tissue imaging. Recent advances include through-skull brain imaging and super-resolution imaging beyond conventional depth limits.

Tu4G-2 **Invited** **15:30-16:00**

Uncertainty-Aware Computational Imaging

Ni Chen, Edmund Y. Lam
The University of Hong Kong

Computational imaging reconstructs scenes from indirect measurements via algorithms. This work presents an uncertainty-aware framework that quantifies and propagates reconstruction uncertainty, enabling robust, trustworthy imaging in applications spanning multiple computational imaging systems.

Tu4G-3 **16:00-16:15**

Perceptual-Enhancement in Light Field Microscope via Dual-Spectral Fusion Network

Munkh-Uchral Erdenebat, Suyeon Park, Jingwen Bu, Erdenebayar Bayarsaikhan, Eun-Joo Ha, Se-Han Kwon, Ji-Sub Park, Hak-Rin Kim
Kyungpook National University

We propose a perceptual-enhancement method for light field microscopic display system via dual-spectrum and related end-to-end multimodal network. This fusion enhances luminance and texture, producing high-fidelity three-dimensional models with improved accuracy for lowvisibility illumination conditions.

Tu4G-4 **16:15-16:30**

Bend-Induced Polarization Maintaining Fiber-Based Interferometer for Simultaneous Dual-Parameter Sensing

Ashish Kumar, Hyoung Won Baac
Sungkyunkwan University

This paper presents an interferometric scheme using a bent polarization-maintaining fiber for simultaneous refractive index and temperature sensing, achieving -260.32 nm/RIU and -221 pm/°C sensitivities with a 20.98 dBm extinction ratio via bending-induced birefringence tuning.

Grand Ballroom 4 (Grand Ballroom 4), 2F

P2 June 30 (Tue), 2026
Poster Session II 16:30-18:00

P2-1 **16:30-18:00**

A Digital Low-Dropout Regulator for Silicon Photonic Thermo-Optic Tuning Applications

Jenchieh Liu[1], Hsuan-Cheng Liu[1], Zhen Jie Hong[2]
[1]National United University, [2]Feng Chia University

A digital LDO with automatic bit switching is proposed for driving silicon photonic heaters. It can arrive a high power-efficient, DAC-less driver for overshoot suppression, ensuring precise thermal control and device reliability.

P2-2 **16:30-18:00**

Measurement of Electrical Crosstalk Intensity in Dual-Parallel Mach-Zehnder Modulator

Taiki Aritomi, Qingchuan Huang, Tetsuya Kawanishi
Waseda University

Using our crosstalk model for a dual-parallel Mach–Zehnder modulator, we performed measurements under expanded conditions. Results confirm a frequency dependence of the electrical crosstalk and demonstrate improved accuracy and scalability of the method.

P2-3 **16:30-18:00**

Design of Circular Antenna Integrated Microring Resonator Optical Modulator for 100 GHz Band Radio over Fiber Systems

Jihan Ryu[1], Yuto Yamada[1], Hiroshi Murata[2], Taro Arakawa[1]
[1]Yokohama National University, [2]Mie University

We present a theoretical design of a 100-GHz-band antenna-integrated microring resonator (MRR) optical modulator for radio-over-fiber systems. By combining a single MRR with an optimized InGaAs/InAlAs multiplequantum-well, the proposed device enables highly efficient modulation.

P2-4 **16:30-18:00**

Ultra-Wideband InP/EO Polymer Modulators with Coaxial Segmented Electrodes

Kensuke Ikai, J Fujikata
Tokushima University

We analyzed the effect of the square lattice and triangular lattice-based photonic crystal (PC) structures application to the InP/EO polymer hybrid (IPH) modulators on optical loss and wavelength bandwidth.

P2-5 **16:30-18:00**

Silicon Nitride Slot Waveguide Thermo-Optic Phase Modulator Embedded in Polymer Layer

Min-Cheol Oh, Siuh Wei Tan, Eun-su Lee, Kwon-Wook Chun, Jinung Jin
Pusan National University

We demonstrate a silicon nitride slot waveguide thermooptic phase modulator embedded in polymer platform. Enhanced optical confinement in the high thermo-optic polymer region enables low π-phase shift power, improved modulation efficiency, and compact photonic integration.

P2-6 **16:30-18:00**

Identical-Active III-V Laser and Electro-Absorption Modulator on SOI for Silicon Photonic O-Band Applications

HoSung Kim, Dongsik Shim, Rafael Chu, Youngzoon Yoon, Bongyoung Jang, Jaesoong Lee, Byunghoon Na, JungHo Cha, Young-Geun Roh
Samsung Electronics

We demonstrate an identical-active electro-absorption modulated laser (IA-EML) on SOI, where the laser diode (LD) and electro-absorption modulator (EAM) share the same III– V active region without regrowth.

P2-7 **16:30-18:00**

The Zero-Static-Power MZI Optical Convolution Matrix Based on Sb_2S_3

Qiuyan Yao, Libin Zhang, Daqing Meng, Yijie Liang, Hui Hui, Jie Zhang
Beijing University of Posts and Telecommunications

We developed an optical convolution matrix for the SVD Clements architecture, by introducing a non-volatile Sb2S3-

based MZI, achieving a PCC of 0.916 and a significant reduction in power consumption.

P2-8 **16:30-18:00**

Plasmonic Lead Zirconate Titanate Phase Modulator

Liao Chen[1], Ruiji Gao[1], Jihao Zhao[1], Feng Qiu[2], Chi Zhang[1], Yang Liu[1], Xinliang Zhang[1]
[1]Wuhan National Laboratory for Optoelectronics, [2]Juhe Electro-Optic Tech. Co. Ltd.

We demonstrate an efficient plasmonic lead zirconate titanate phase modulator. The proposed plasmonic modulator achieves a modulation efficiency of 996 V·μm and a 6-dB electro-optic bandwidth exceeding 65 GHz.

P2-9 **16:30-18:00**

Fabrication of a DBR Resonator Based on Nb_2O_5 Horizontal Slot Waveguides with a 100-nm-Thick Hollow Slot for Sensing Devices

Katsumi Nakatsuhara, Umi Endo, Nao Suzuki, Yoshiki Hayama
Kanagawa Institute of Technology

We designed and fabricated DBR resonators based on Nb2O5 horizontal slot waveguides with 100-nm-thick hollow slots. Furthermore, refractive-index changes were observed in the fabricated devices.

P2-10 **16:30-18:00**

Quantitative Characterization of Nonlinear Resonance Shifts in Silicon Microrings Using Multi-FSR Probe Characterization

Chia-Chien Wei, Shou-Ting Peng, Huei-Hua Lai, Yung-Jr Hung
National Sun Yat-sen University

We experimentally demonstrate the true resonance shifts of silicon microrings under high-power injection using multiFSR characterization. This method eliminates nonlinear artifacts, enabling the first experimental reconstruction of intrinsic, steady-state spectral profiles.

P2-11 **16:30-18:00**

Time-Domain Interleaving Model for Nonlinear Dynamics in Silicon Micro-Ring Modulators

Zhiyuan Zhou[1,3], Zhihan Sun[1,3], Yueyang Yu[1,3], Yu Lu[1,3], Qingyun Xian[1,3], Qi Tian[1,3], Changyu Hu[2], Hao Hu[2], Jun Liu[2], Shengjiang Dai[2], Shuang Zheng[1,3,4], Minming Zhang[1,3,4]
[1]Huazhong University of Science and Technology, [2]Hubei Jiufengshan Laboratory, [3]National Engineering Research Center for Next Generation Internet Access System, [4]Optics Valley Laboratory

We propose a time-domain interleaving model for silicon micro-ring modulators capturing thermal and free-carrier nonlinearities. Validated by experiments, the model accurately simulates sweep-speed-dependent spectra and insertion-loss-dependent bandwidths, while predicting selfpulsation dynamics.

P2-12 **16:30-18:00**

A 36 Gb/s Silicon Micro-Ring Modulator Transmitter with Driver Resistance Optimized for Bonding-Wire Inductance

Sehwan Park[1], Dae-Won Rho[2], Yongjin Ji[1], Jaewon Lee[1], Woo-Young Choi[1]
[1]Yonsei University, [2]Texas A&M University

This paper presents a silicon (Si) micro-ring modulator (MRM) transmitter with package-level optimization of the driver resistance considering bonding-wire inductance. The implemented MRM transmitter achieves 36 Gb/s PRBS-31 NRZ operation with 3.87 pJ/bit energy efficiency.

P2-13 **16:30-18:00**

SiN 2 × 2 Mach-Zehnder Thermo-Optic Switch with $P\pi$ < 40 mW and Response Time < 30 μs

Yuanhao Li, Haojie Xue, Luyang Liu, Yichen Zhang, Lei Zhang
Beijing University of Posts and Telecommunications

We report a 2 × 2 SiN thermo-optic switch with folded Euler-spiral phase shifter. At 1550 nm, it achieves ~ 38 mW $P\pi$, > 50 dB cross-port extinction ratio, < 30 μs switching.

P2-14 **16:30-18:00**

Resonance-Enhanced Coherence Network for an On-Chip IR Computational Spectrometer

Zhijie Wei, Zunyue Zhang, Rui Niu, Tiegen Liu, Zhenzhou Cheng
Tianjin University

We investigate an on-chip infrared computational spectrometer based on a resonance-enhanced coherence network, aiming to enhance spectral diversity by jointly magnifying structural dispersion and effective optical path difference.

P2-15 **16:30-18:00**

Optical Switch Using Cascaded Rotatable Diffractive Layers

Mian Wu[1], Lin Wu[1], Zichen Liu[2] Jin Tao[1,2]
[1]China Information and Communication Technologies Group Corporation, [2]Peng Cheng Laboratory

Based on cascaded diffraction layers and rotation mechanism, we demonstrate an optical switch with mode multiplexing function, offering new perspectives for future high-speed optical switching.

P2-16 **16:30-18:00**

Dual-Size Microlens Array Integration on 6×6 Arrayed Photodetector

Y. Ohnuki[1,2], T. Umezawa[2], N. Yam amoto[2], K. Akahane, T[2]. Kawanishi[1,2]
[1]Waseda University, [2]National Institute of Information and Communications Technology

We designed a microlens array on a high-speed photodetector array to improve the sensitivity between its pixels. The microlenses, comprising lenses with two different sizes, were fabricated using a thermal reflow process.

P2-17 **16:30-18:00**

High-Efficiency Fiber-to-Silicon Nitride Grating Coupling Enabled by Printed Diffractive Optical Elements

Zhuo Deng[1,2], Shu Jiang[1], Jianran Zhang[1,2], Jiahao Wei[1,2], Kenneth K.Y. Wong[1,2]
[1]Advanced Biomedical Instrumentation Centre, [2]The University of Hong Kong

A novel fiber-to-chip coupling strategy has been proposed using diffractive optical element printed on fiber to enhance the mode overlap. Coupling efficiency of 85.1% is numerically demonstrated for a DBR-equipped SiN grating coupler at 920 nm.

P2-18 **16:30-18:00**

Inverse Design of Photonic Devices in Hybrid Silicon Nitride-on-Lithium Niobate Platform

Aman Verma, Varun Raghunathan
Indian Institute of Science

Adjoint-based inverse design is used to design 50:50 beam splitters and mode converters in hybrid silicon nitride on lithium niobate guided-wave platform. Fabrication compatible design optimization, device fabrication and experimental characterization results are presented.

P2-19 **16:30-18:00**

Inverse Design of Photonic Devices via Gradient-Guided Network Screening

Qi Zhou[1], Jiahao Li[1], Ming Luo[2], Lin Wu[2], Bohao Sun[2], Hanbing Li[2], Ying Qiu[2], Hailong Zhou[3], Xiang Li[1]
[1]China University of Geosciences, [2]State Key Laboratory of Optical Communication Technologies and Networks, [3]Huazhong University of Science and Technology

A hybrid inverse-design algorithm combining gradient guidance and neural network screening is proposed for silicon photonic devices. A 3:7 power splitter is designed, achieving an insertion loss of 0.52 dB with accurate power splitting.

P2-20 **16:30-18:00**

Patterning Technology of Benzocyclobutene-Based Graphene Modulator on Si Photonics

Era Budi Prayekti, Wei-Cheng Feng, Rih-You Chen, Yanita Devi, Chun-Hu Chen, Yi-Jen Chiu
National Sun Yat-sen University

Patterning technologies for Benzocyclobutene (BCB)- based graphene modulator on the top of silicon-on-insulator (SOI)-waveguide was demonstrated. The BCB was used as planarization material for patterned graphene, leading to modulator function in silicon photonics(SiP) template.

P2-21 **16:30-18:00**

Compact Silicon Nitride Passive Components Optimized via Fused Polygon Search Algorithm

Yi Xu, Lei Zhang
Beijing University of Posts and Telecommunications

We report silicon nitride power splitter, mode converter and (de)multiplexer with lengths < 30 μm, optimized via fused polygon search algorithm. The losses and crosstalk are below 1.54 dB and −18 dB in C band.

P2-22 **16:30-18:00**

Si3N4 Bend at O-Band with 25-μm Radius and 5 mdB/90° via Modified Hermite Optimization

Donghao Li, Yi Xu, Lei Zhang

Beijing University of Posts and Telecommunications

An optimized modified Hermite Si3N4 waveguide bend with a 25-μm radius is reported for O-band. Measurements across an 8-inch wafer yield a loss of 5.18 ± 0.38 mdB/90°, demonstrating high fabrication uniformity.

P2-23 **16:30-18:00**

Frequency Doubling to Quintupling by Using Phase to Intensity Modulation

Sangjoon, Park, Kyoungsik Yu
Korea Advanced Institute of Science and Technology

We applied dispersion induced phase-to - intensity modulation to demonstrate frequency multiplication from doubling to quintupling with a favorable link budget and high output tone power. Using this approach we generated frequencymultiplied RF tones up to 76.5 GHz via quintupling.

P2-24 **16:30-18:00**

Low-Scattering-Loss Waveguide Bragg Gratings via Femtosecond Laser Direct Writing Method

Jiacheng Hu[1], Yuying Wang[1], Xuhu Han[1], Lijing Zhong[2], Jianrong Qiu[1]
[1]Zhejiang University, [2]Ningbo University

We propose a femtosecond plane-by-plane inscription technique to fabricate low-scattering loss waveguide Bragg gratings. By optimizing beam shaping, the resulting refractive index distribution significantly reduces scattering loss while maintaining high reflectivity.

P2-25 **16:30-18:00**

Low Loss Edge Couplers for Thin Film Deeply Etched Lithium Niobate Integrated Circuits

Christian Niclaas Saggau, Michael Galili, Leif Katsuo Oxenløwe, Yunhong Ding
Technical University of Denmark

LiNbO3 is crucial for high performance integrated optical devices. Coupling from fiber to chip stays a challenging task. We investigate a simplified approach for deeply etched devices with a theoretical facet loss < 2dB.

P2-26 **16:30-18:00**

VAD-Based Radiation-Hardened Optical Fiber for High-Temperature Nuclear Applications

Dae Seung Moon[1], Chang Hyun Jung[1], Minhyeok Wie[1], Gukbeen Ryu[2], Wookjin Jeong[2], Youngwoong Kim[2], Jongyeol Kim[2], Young Ho Kim[3]
[1]Taihan Fiberoptics Co., Ltd, [2]Korea Atomic Energy Research Institute, [3]Korea Photonics Technology Institute

A radiation-resistant optical fiber was developed using fluorine-doped silica fabricated by the VAD process, which enables high-purity fluorine-doped silica, and an optimized high-temperature polyidide coating. The fiber exhibited stable performance at 300 oC and significantly reduced radiation-induced attenuation.

P2-27 **16:30-18:00**

Optical Cable Identification to Reduce Service Recovery Time

Hongseok Shin, Hyunbin Na
SK Telecom

We propose an optical cable identification method using pluggable modules that autonomously broadcast unique IDs upon fiber loss. A low-rate random-slot scheme enables robust detection in WDM networks, accelerating restoration and improving operational resilience.

P2-28 **16:30-18:00**

Birefringence Properties of PM Double Clad Fiber Depending on Geometry and Materials of Stress-Applying Parts

Suh-young Kwon[1], Taeho Woo[1], Janghyun Ryu[1], Jaesun Kim[2], Ju Han Lee[1]
[1]University of Seoul, [2]Taihan Fiberoptics

We numerically investigated the birefringence properties of 20/400-μm polarization-maintaining DCFs depending on the geometry and materials of the stress-applying parts (SAPs). Results show that that the SAP geometry and boron doping concentrations significantly impact birefringence.

P2-29 **16:30-18:00**

Measurement of GAWBS Phase Noise Correlation in Two-Core Fiber

Tetsuya Yoshida, Masato Yoshida, Keisuke Kasai, Toshihiko Hirooka, Masataka Nakazawa
Tohoku University

We measured the GAWBS phase noise correlation in a two-core fiber. We found that there is a refractive index

fluctuation along the fiber, which reduces the correlation between the two cores.

P2-30 **16:30-18:00**

Contact-Position Detection based on Reflection Spectrum Variations in Wet-Etched POF

Yuri Wada[1], Koyo Shibuta[2], Motoki Kouchi[2], Keito Ishida[2], Taiki Kumagai[3], Keita Kikuchi[1,3], Shimbu Shirai[3], Daisuke Yamane[2], Yosuke Mizuno[3], Heeyoung Lee[1]
[1]Shibaura Institute of Technology, [2]Ritsumeikan University, [3]Yokohama National University

We propose a distributed contact-position sensing method using reflection-spectrum variations in wet-etched perfluorinated plastic optical fiber. The dip wavelength shifts linearly with contact position (−0.126 nm/cm), enabling position detection using a simple broadband reflection measurement.

P2-31 **16:30-18:00**

Experimental Demonstration of Online Random Bit Generation by Mixing Chaotic Signals with a Pulse-Amplitude Modulation Signal

Itzel S. Castillo-Garcia[1,2], Ignacio E. Zaldivar-Huerta[1], Min Won Lee[2]
[1]Instituto Nacional de Astrofísica, Óptica y Electrónica, [2]Université Sorbonne Paris Nord

This work experimentally demonstrates an optoelectronic Random Bit Generator based on amplitude-domain modification of chaotic laser signals using an 8-level Pulse Amplitude Modulation waveform, unlike conventional digital post-processing, maintaining the full 8-bit in real time.

P2-32 **16:30-18:00**

Crosstalk Characteristics of Two Core Fiber Submarine Cables

Yuki Kawaguchi[1], Hirotaka Sakuma[1], Tetsuya Haruna[1], Tetsuya Hayashi[1], Hideki Yamaguhi[1], Masaaki Hirano[1], Takemi Hasegawa[1], Keisuke Yasuhara[2], Juan Carlos Aquino[2], Daishi Masuda[2]
[1]Sumitomo Electric Industries, Ltd., [2]OCC Corporation

We demonstrated the XT characteristics of submarine two-core fiber cables. The cabled fiber XT is improved by 30 dB compared to a spooled fiber. The measured cables' XTs are low enough to suppress SNR degradation.

P2-33 **16:30-18:00**

Cobalt Doped Single Mode Optical Fiber with Flat Attenuation within Telecom Band

Haitao Zhang, Joseph E McCarthy, Rick C Layton, Anthony Carapella, David E Baker, Guangran Zhang, Ming-Jun Li
Corning Incorporated

A cobalt-doped single-mode optical fiber with flat attenuation spectrum was fabricated. The attenuation across 1310-1560nm varies between 0.37 dB/cm and 0.40 dB/cm, representing a variation of less than 8%.

P2-34 **16:30-18:00**

On the Impacts of Polarization Related Impairments in OPGW

Shengqi Qian[1], Fang Chen[1], Bozhong Li[1], Yi Zhang[1], Ruyi Zhang[1], Rongjia Lei[1], Yixuan Zhang[2], Xianhua Liu[2], Chuanbowen Sun[2]
[1]State Grid Information & Telecommunication Center, [2]Huawei Technologies Co., Ltd.

We experimentally demonstrate that the coupling among SOP rotation, DGD and PDL induces an extra 3.6-dB penalty in 100G OPGW systems. Furthermore, system stability under lightning-induced SOP transients along with DGD and PDL is investigated.

P2-35 **16:30-18:00**

Fiber Bending-Induced Wavelength-Dependent Loss Monitoring via Spectral Power Tracing

Yu Wang[1], Shengnan Li[2], Zhengsi Shi[1], Hong Zhu[1], Ying Zhou[1], Yixin Zhao[1], Jingjing Shi[1], Wenbin Chen[2], Min Zhang[2], Danshi Wang[2]
[1]China United Network Communications Group Co., Ltd., [2]Beijing University of Posts and Telecommunications

We propose a spectral power tracing method to localize fiber bending and characterize its wavelength-dependent loss by tracing power evolution, achieving localization errors below 0.8 km, verified by C+L-band experiments.

P2-36 **16:30-18:00**

Temperature-Insensitive Photon Buffer based on a Hybrid PANDA Fiber Configuration

Eun Chae Ha[1,2], Hee Su Park[2], Kwang Yong Song[1]
[1]Chung-Ang University, [2]Korea Research Institute of Standard and Science

We experimentally demonstrate a temperature-insensitive all-fiber photon buffer utilizing a hybrid PANDA fiber

configuration. We achieve enhanced optical path length stability with a significantly reduced fiber length compared to a former single-fiber-based scheme.

P2-37 **16:30-18:00**

Design and Fabrication of a 10-Fold Pitch-Converting Fused Fiber FIFO for High Yield

Kazusa Shinno[1], Yusuke Fujii[2], Soichi Kobayashi[2], Naoto Yoshimoto[1]
[1]Chitose Institute of Science and Technology, [2]Photonic Science Technology Inc.

We report a 10-fold pitch-converting fused fiber FIFO. Optimized double-core tapering achieves < 0.5dB loss and < -50dB crosstalk. Extensive measurements (N=40,60) validate high yield, demonstrating scalable mass production using existing fiber drawing infrastructure.

P2-38 **16:30-18:00**

EDA-RoF: Elastic Digital-Analog Radio-Over-Fiber (RoF) Modulation and Demodulation Architecture Enabling Seamless Transition between Analog-RoF and Digital-RoF

Xiaobo Zeng[1], Liangcai Chen[1], Pan Liu[1], Ruonan Deng[2]
[1]Xiangtan University, [2]National University of Defense Technology

We propose and demonstrate an elastic digital-analog radio-over-fiber modulation and demodulation architecture, which firstly enables seamless connection between analog RoF and digital-RoF solutions, achieving quasi-linear SNR scaling with respect to $1/\eta$ and with R2=0.9908.

P2-39 **16:30-18:00**

Impact of Single-WSS Architecture on Wavelength Requirements in Colorless-Directionless ROADMs

Masahiro Kitada[1], Fuma Sato[1], Takashi Miyamura[2], Satoru Okamoto[2], Naoaki Yamanaka[2], Masahiko Jinno[1,2]
[1]Kagawa University, [2]Keio Frontier Research & Education Collaborative Square

Numerical results for various small-scale network topologies indicate that, when joint switching is employed, a single multi-input-port WSS–based CDROADM requires no additional wavelengths compared with a conventional CD-ROADM, thereby supporting the effectiveness of the single-WSS architecture.

P2-40 **16:30-18:00**

Experimental Evaluation of Coherent Transceiver Mode Optimization for IP over DWDM with Multi-Model YANG Support

Tatsuya Matsumura[1], Kazuya Anazawa[1], Hideki Nishizawa[1], Yoshiaki Sone[1], Betoule Christophe[2], Olivier Renais[2], Dmitrii Briantcev[3], Daniel Kilper[3]
[1]NTT, Inc., [2]Orange Innovation/Networks, [3]Trinity College Dublin

We experimentally evaluate coherent transceiver mode optimization for an IP-over-DWDM network that employs multiple YANG models, using a unified SDN controller to enable automatic optimization of 200G/400G transmission performance

P2-41 **16:30-18:00**

Simultaneous 5G NR Signal and Power Transmission over a Hollow-Core Fiber for Radio Units without Power Amplifiers

Ryotaro Osada[1], Satoshi Fujita[1], Yuki Gomi[1], Takeshi Takagi[2], Kazunori Mukasa[2], Motoharu Matsuura[1,3]
[1]University of Electro-Communications, [2]Lightera Japan Co., Ltd., [3]Keio University

We demonstrate simultaneous downlink 5G new-radio (NR) signal and power transmission using a hollow-core fiber and high-power photodiode. We successfully achieved the 5G output power of approximately 10 dBm without electrical amplifiers in radio units.

P2-42 **16:30-18:00**

Adaptive Trellis-Path Control MLSE based on Gaussian Mixture Model Fitting for O-Band Net 400-Gbps PAM-6 IM-DD 2-km Transmission

Hiroki Taniguchi, Shuto Yamamoto, Masanori Nakamura, Yukinobu Nakajima, Etsushi Yamazaki
NTT, inc.

We propose an adaptive trellis-path-control MLSE using Gaussian mixture model fitting to simplify trellis diagrams, achieving BER comparable to conventional MLSE in a Net 400-Gb/s O-band PAM-6 IM-DD 2-km transmission with only 0.92% computational cost.

P2-43 **16:30-18:00**

Robust Service Migration under Network State Data Missing for Industrial PON-MEC: A Tensor-Train-Enhanced DRL Approach

Shu Dong[1], Jin Li[2], Yintao Li[3], Menghui Li[4], Danshi Wang[1], Min Zhang[1]
[1]Beijing University of Posts and Telecommunications, [2]South China Normal University, [3]State Grid Jibei Electric Power Company Limited, [4]State Grid Jibei Information and Telecommunication Company

To tackle network state data missing in industrial passive optical networks, we propose a tensor-train-enhanced deep reinforcement learning framework. By reconstructing global states, our framework minimizes delay and jitter, ensuring resilient service continuity against baselines.

P2-44 **16:30-18:00**

Flow-Aware Scheduling for Hybrid AWGR-MEMS Optical Switching in Data Centers

Tingting Bao, Xin Li, Yongli Zhao, Meng Lian, Jie Zhang
Beijing University of Posts and Telecommunications

Data center traffic is highly heterogeneous, and a single OCS cannot meet diverse demands. Therefore, a hybrid MEMS-AWGR architecture and a flow-aware scheduling algorithm are proposed to optimize weighted completion time and improve overall throughput.

P2-45 **16:30-18:00**

Evaluation of Transmission throughput Increase in Approximate-Computing Interconnection Networks Using PAM Signals

Eisuke Hara, Tasuku Takabuchi, Itsuro Morita
Waseda University

The effectiveness of the Approximate-computing interconnection networks using PAM signals was evaluated. Assuming FP64 numbers transmission, 1.6- and 1.9-times higher throughput can be achieved with the appropriate number of protected and truncated bits.

P2-46 **16:30-18:00**

Experimental Demonstration ofa Hardware-Based Multi-Band RF Platform for Radio-over-Fiber Transmission

Joon Young Huh[1], Jongwan Kim[1], Hun-Sik Kang[1], Byoung Chul Lim[2], Young Jin Lee[2], Gang Deuk Yun[2], Jun Ki Lee[1]
[1]Electronics & Telecommunications Research Institute, [2]FRTeK Co., Ltd.

We demonstrate a multi-band RF platform for radioover-fiber transmission generating five bands spanning 0.5– 10 GHz. The signals are optically transmitted over 20 km fiber, achieving EVM below the 3GPP requirement of 8% for 64-QAM transmission.

P2-47 **16:30-18:00**

A Safety Guardrail Framework for AI Agents in Optical Network Configuration Loops

Hong Zhu[1], Yidi Wang[2], Zhi Meng[1], Shengsheng Sha[1], Dan Wang[1], Mingyu Xia[1], Ting Lan[1], Min Zhang[2], Danshi Wang[2]
[1]China United Network Communications Group Co., Ltd., [2]Beijing University of Posts and Telecommunications

Proposed a safety framework for optical network agents using automated policy pipelines. It enhances intent recognition and operational reliability, enabling secure deployment of AI agents in critical intelligent network infrastructures.

P2-48 **16:30-18:00**

Two-Branch Transformer-CNN-Based Adaptive Compensation Network for Phase Noise in Photonic Terahertz OFDM System

Shenao Cai, Jianguo Yu, Long Zhou, Tong Li, Zhanjiang Wang, Feixiang Zhang
Beijing University of Posts and Telecommunications

This paper proposes a two-branch deep-learning network, named AdaPhaseNet, for compensating phase noise in photonic terahertz OFDM systems. Experiments show that the proposed network substantially surpasses the baseline methods, achieving lower BER and improved EVM.

P2-49 **16:30-18:00**

Real-Time Simplified MLSE with Shift-Only Branch Metrics for High-Speed IM/DD Systems

Meiqi Li, Zijin Zhou, Wenjun Yu, Weihao Ni, Baihui Jiang, Jialin Zhou, Ziyan Li, Zuyu Li, Fan Li
Sun Yatsen University

This paper proposes a real-time simplified MLSE equalizer for high-speed IM-DD systems. By employing a DSP-free shift-only branch metric unit and saturation-based path metrics, the FPGA implementation achieves significant resource savings with negligible performance penalty.

P2-50 **16:30-18:00**

Linear Power-over-Fiber Transmission System Using 10km Hollow Core Fiber

Yao Guo, Yuemei Li, Yuyao Wu, Jie An, Zhiguo Zhang
Beijing University of Posts and Telecommunications

Using a 10 km hollow core fiber, the power-over-fiber system achieves a linear transmission of 4.9 W optical power, delivering an output power of up to 3.5 W with a transmission efficiency of approximately 71%.

P2-51 **16:30-18:00**

Diversity-Enhanced Fluorescent Fiber Antennas for MIMO VLC Systems

Xingchen Yu[1], Zhihong Zeng[1], Dengke Wang[1], Fengli Yang[1], Cuiwei He[2], Chen Chen[1]
[1]Chongqing University, [2]Japan Advanced Institute of Science and Technology

A multiple-input multipleoutput (MIMO) visible light communication (VLC) system employing diversity-enhanced fluorescent fiber antennas (FFAs) is experimentally demonstrated. By introducing spatial and angle diversities in FFAs, the error performance of a 2×2 MIMO VLC system can be significantly improved.

P2-52 **16:30-18:00**

Control of Interacting Spin-Pulse Waveforms in an Oscillator-Less Photonic Ising Machine and Its Similarity to the AM Mode-Locking of a Laser

Masataka Nakazawa, Toshihiko Hirooka
Tohoku University

We analyze pulse dynamics in an oscillator-less photonic Ising machine and show steady-state pulses become Gaussian. From its consistency with AM mode-locking theory, we show filter bandwidth can control pulse width and improve computation performance.

P2-53 **16:30-18:00**

A White-Box Low-Complexity Hybrid Neural Equalizer with LMS-Only Transfer for IM/DD PAM-4 Short-Reach Links

Ming-Lin Kan[1], Benedictus Yohanes Bagus Widhianto[2], Jyehong Chen[1]
[1]National Yang Ming Chiao Tung University, [2]MediaTek Inc.

We propose a white-box hybrid equalizer FFE–VINN– DFE with physics-guided sizing, LRR pruning, and LMSonly transfer. Under matched complexity, it achieves lower BER than conventional FFE–DFE–VNLE and VINN–DFE baselines across B2B/2km/6km.

P2-54 **16:30-18:00**

Delay-Based Photonic Reservoir Computing Equalizer for IM/DD NRZ-OOK Fiber Links

Kaveesha Gimhana[1], Christina Lim[1], Ampalavanapillai Nirmalathas[1], Yui Otagaki[2], Hiroshi Murata[2]
[1]The University of Melbourne, [2]Mie University

We investigate the performance of an IM/DD NRZ-OOK transmission link with delay-based photonics reservoir computing (PRC) equalizer experimentally, analytically and via simulation. All results show that the PRC equalizer outperform digital equalizers (NLMS FFE+DFE).

P2-55 **16:30-18:00**

Modified Transition-Based Decision Feedback Equalization for VCSEL-Based Short-Reach IM/DD System

Meng-Ci Sie[1], Benedictus Yohanes Bagus Widhianto[2], Jyehong Chen[1]
[1]National Yang Ming Chiao Tung University, [2]MediaTek Inc.

We propose a modified transition-based decision feedback equalizer with similarity-based transition merging to reduce the complexity of transition-based equalization, while still improving coefficient adaptation robustness and BER performance in a 53-Gb/s, 500-m PAM-4 optical link

P2-56 **16:30-18:00**

Optical Wireless Communication System Combining MIMO and Diversity Techniques

Yuki Sato, Shiro Ryu
Meiji University

A receiver pair selection criterion for optical multipleinput multiple-output systems is proposed. Maximizing the

minimum singular value enlarges the worst-case Euclidean distance. Experiments demonstrate expanded feasible communication regions compared with conventional criteria.

P2-57 **16:30-18:00**

A Refined Shared-Pruned FNN-Based Equalizer for Cost-Effective IM/DD Transmission

Cancan Chen[1,2], Zhaopeng Xu[1], Qi Wu[3], Tonghui Ji[4], Honglin Ji[1], Xu Zhang[1], Zhongliang Sun[1], Linsheng Fan[1], Jianwei Tang[1], Junpeng Liang[1], Jinlong Wei[1], Zhixue He[1], Weisheng Hu[1]
[1]Pengcheng Laboratory, [2]Sun Yat-sen University, [3]The Hong Kong Polytechnic University, [4]Great Bay University

A refined shared-pruned FNN-based equalizer is proposed for 120-Gb/s PAM-8 DML-based IM/DD systems, combining global clustering, structured pruning, and center-constrained optimization to achieve 72.5% memory reduction compared with FNN while maintaining 7% HDFEC-compliant BER.

P2-58 **16:30-18:00**

Nonlinear Compensation of TDSC-IM Signals Using Complex-Valued Reservoir Computing

Hayata Sukigara, Wataru Imajuku
Meijo University

We experimentally demonstrate compensation of nonlinear optical distortions using complex-valued reservoir computing. The results indicate that time-domain singlecarrier index modulation signaling reduces the required number of reservoir nodes.

P2-59 **16:30-18:00**

Robust EEPN-Aware Signal Detection with Anisotropic Additive-Noise Approximation

Buwei He, Jingyi Lyu, Zimo Cui
Beijing Normal-Hong Kong Baptist University

We propose an anisotropic additive-noise approximation for EEPN-aware likelihood-based detection. Splitting EEPN into radial and angular variances yields BER gains in strong-EEPN regimes while matching MED under weak EEPN, with stable anisotropy factor across linewidth.

P2-60 **16:30-18:00**

Hidden-Layer Unit Requirements of Complex-Valued Extreme Learning Machine for Fiber-Optic Nonlinearity Mitigation

Hidetoshi Nishida[1], Kizuku Ochiri[1], Takumi Yamamoto[1], Takahide Sakamoto[2], Naokatsu Yamamoto[3], Moriya Nakamura[1]
[1]Meiji University, [2]Tokyo Metropolitan University, [3]National Institute of Information and Communications Technology

We clarified hidden-layer unit requirements of complexvalued extreme learning machine nonlinear equalizers as a function of input tap length. Experiments on optical 16QAM transmission demonstrated effective nonlinearity mitigation and validated our equalizer design methodology.

P2-61 **16:30-18:00**

Robust Neural Equalization via Bagging Ensembles in 50-GBd PAM6 DML Links

Yuting Xu[1,2], Zhaopeng Xu[1], Cancan Chen[1], Zhixue He[1], Chuanchuan Yang[3], Yuping Zhao[3]
[1]Pengcheng Laboratory, [2]Peking University Shenzhen Graduate School, [3]Peking University

We present a bagging-ensemble equalizer of lightweight FCN learners for DML-IM/DD links, trained with bootstrap resampling and diverse initialization. Experiments show 50- GBd PAM6 over 10-km SSMF with lower BER than FFE, Volterra, and single-FCN baselines.

P2-62 **16:30-18:00**

Hut Skipping Using Data Distribution for Long-Haul Terrestrial Fiber-Optic Transmission

Silas Lasak Hedeboe, Arjun Kurur, Christian Koefoed Schou, Oliver Malte Lülloff Larsen, Deming Kong, Leif Katsuo Oxenløwe
Technical University of Denmark

We propose to decrease the number of amplifier sites, by distributing a given data amount into more fibers or cores, resulting in increased span lengths in fiber-optic cables.

P2-63 **16:30-18:00**

Impact of Amplified Spontaneous Emission Noise on Optical Multi-Eigenvalue Modulated Signal

Kojiro Nakagawa, Kazuma Nishino, Shogo Nakao, Ken Mishina, Akihiro Maruta
The University of Osaka

We theoretically analyze impact of amplified spontaneous emission noise on optical multi-eigenvalue modulated signal and show that the result is consistent with the numerical simulation results.

P2-64 **16:30-18:00**

Fiber Nonlinearity Mitigation Using ComplexValued Reservoir Computing with Dispersion Compensation Preprocessing

Shunya Uchide[1], Soya Shimonura[1], Takumi Yamamota[1], Tsuyoshi Yamada[1], Takahide Sakamoto[2], Naokatsu Yamamoto[3], Moriya Nakamura[1]
[1]Meiji University, [2]Tokyo Metropolitan University, [3]National Institute of Information and Communications Technology

We demonstrate that linear dispersion-compensation preprocessing enables computationally efficient fiber nonlinearity mitigation using a nonlinear equalizer based on complex-valued reservoir computing. The equalization performance was validated through numerical simulations and experiments.

P2-65 **16:30-18:00**

A Physics-Informed Fourier Neural Operator for Fiber Nonlinearity Compensation in WDM Coherent Optical Systems

Haoqian Yu, Xinyu Zhu, Haiqiang Wei, Chao Lu, Alan Pak Tao Lau, Kangping Zhong
The Hong Kong Polytechnic University

We propose a physics-embedded FNO that explicitly integrates symmetric inverse SSFM layers as a surrogate for DBP. This method achieves comparable performance with DBP while reducing computational complexity and enhancing physics consistency.

P2-66 **16:30-18:00**

Quaternion-Valued Reservoir Computing-Based Nonlinear Equalizer for Fiber Nonlinearity Mitigation

Yuto Ishigami[1], Kizuku Ochri[1], Shunya Uchide[1], Soya Shimomura[1], Takumi Yamamoto[1], Tsuyoshi Yamada[1], Yuki Arisawa[1], Takahide Sakamoto[2], Naokatsu Yamamoto[3], Moriya Nakamura[1]
[1]Meiji University, [2]Tokyo Metropolitan University, [3]National Institute of Information and Communications Technology

We propose a fiber nonlinearity mitigation scheme based on quaternion-valued reservoir computing. Its computational efficiency is investigated and compared with real-valued and complex-valued schemes through numerical simulations and experiments of optical 16QAM transmission.

P2-67 **16:30-18:00**

FPGA-Based Quantum Random Number Generation and Photon-Number-Resolving Analysis Using Time-Multiplexed SPAD

Lien-Chun Hsu, Yi-Shan Lee
National Tsing Hua University

PNR measurements and quantum random number generation using a gated SPAD with a time-multiplexing architecture are investigated. Experimental results under different detection efficiencies show clear trends in photon statistics and acceptable random number characteristics.

P2-68 **16:30-18:00**

Robust Generation of Topological Biphoton Mode via Adiabatic Passage

Jaesung Lim, Jihwan Kim, Dong-Gil Im, Kyungdeuk Park, Dongkyu Kim, Yonggi Jo, Yong Sup Ihn
Ageny for Defense Development

We suppress fabrication-induced unintended nonlinear coupling in conventional topological biphoton generation by employing an adiabatic passage that preserves the biphoton Schmidt number and state fidelity under waveguide gap disorder.

P2-69 **16:30-18:00**

Integrated Reconfigurable Time-Frequency Mode Encoded Quantum State Generator

Bangmin Gong[1], Liao Ye[1], Qishen Liang[1], Baojie Hou[1], Yongdi Zhang[1], Haoran Ma[1], Huihui Zhu[1], Yuehai Wang[1], Jianyi Yang[1,2]
[1]Zhejiang University, [2]Jinhua Institute of Zhejiang University

We present an integrated reconfigurable time-frequencymode (TFM) encoded quantum state generator. Leveraging an FIR pulse shaper and a coupled-ring resonator, the architecture controls joint spectral amplitudes, supporting on-chip high-dimensional entangled TFM state generation without post-manipulation.

P2-70 **16:30-18:00**

CMOS Camera-Based Ultra-Precise Real-Time Beam Tracking System for Free-Space Quantum Key Distribution

Jongcheol Won[1], Hye Lyn Kwak[2], Minchul Kim[1], Jin-Woo Kim[1], Byung-Seok Choi[1], Chun Ju Youn[1]
[1]Electronics and Telecommunications Research Institute, [2]Korea University

This paper presents a CMOS camera–based beam tracking system that integrates sub-pixel centroid estimation with fast steering mirror (FSM) based closed-loop control. Over a 2.5 m link, the system achieved coarse tracking errors of 3.002 μrad (X-axis) and 5.319 μrad (Y-axis).

P2-71 **16:30-18:00**

Cascaded Squeezing of Coherent States with Phase Diffusion and Loss

Yunseo Jeong, Seongjin Hong
Yonsei University

We theoretically investigate the improvement of squeezing level through cascaded squeezing process. We further analyze the effects of optical loss and phase diffusion on the achievable squeezing in realistic experimental conditions.

P2-72 **16:30-18:00**

High-Resolution Optical Spectrum Analysis Using a Compact VCSEL-Swept Architecture

Sanghoon Chin, Séverine Denis, Ewelina Obrzud
Centre Suisse d'Électronique et de Microtechnique

We demonstrate a compact and cost-efficient VCSELbased optical spectrum analyzer delivering high spectral resolution and kHz-rate sweeping for accurate characterization of unknown light sources with reduced power consumption, simplified optics and scalable integration potential.

P2-73 **16:30-18:00**

Classification of Microplastic Mixtures in Raman Spectroscopy Using 1D-CNN

Yuki Taguchi, Hideki Yokoi
Shibaura Institute of Technology

This paper presents a classification method for microplastic mixtures using a one-dimensional convolutional neural network. The model achieved 100% accuracy in identifying polystyrene, polyethylene, and polymethyl methacrylate within mixed solutions from Raman spectra.

P2-74 **16:30-18:00**

High-Precision Fiber-Optic Vibration Recognition Using MulDasDSConvMamba

Haoyi Sun[1], Zhiguo Zhang[1], Ziyang Xiao[2], Hua Wang[2], Luming Li[2]
[1]Beijing University of Posts and Telecommunications, [2]State Grid JiangXi Information&Telecommunication Branch

To reduce false alarms in DAS perimeter security,we propose MulDasDSConvMamba,integrating multi-scale convolution, Mamba, and attention.It achieves 98.04% accuracy on four intrusion types,outperforming STL by 10.58%,validating data-driven approaches for reliable sensing.

P2-75 **16:30-18:00**

Non-Contact Cardiac Monitoring Using mmWave Radar and Diffusion-Based ECG Reconstruction

Tzu-Chi Tsai, Jyehong Chen
National Yang Ming Chiao Tung University

This work extends the AirECG diffusion framework for ECG reconstruction from continuous-wave mmWave radar. The proposed approach improves waveform similarity and reconstruction stability during overnight continuous monitoring, supporting reliable non-contact cardiac monitoring during long-duration overnight conditions.

P2-76 **16:30-18:00**

Advances in Resonant Micro-Optic Gyroscopes

Yaqi Yong, Binjie Li, Bo Wang, Shuang Liu, Huilian Ma
Zhejiang University

Recent advances in resonant micro-optic gyroscopes are reviewed. Multi-mode detection scheme with a whisperinggallery-mode microcavity achieves 0.095°/√h angular random walk and 0.17°/h bias instability, meeting tacticalgrade requirements with superior stability.

P2-77 **16:30-18:00**

Method for Measurement Range Extension in the Time Domain of the Self-Coupling Laser Velocimeter and Operational Considerations

Daiki Sato, Norio Tsuda
Aichi Institute of Technology

This paper reports a method for improving the measurement range of a self-coupling laser velocimeter through time-domain signal processing, including evaluation results. In addition, we consider optimization for timedomain signal processing methods, which haven't yet been discussed.

P2-78 **16:30-18:00**

Two-Dimensional Motor Vibration Sensor based on Fiber Bragg Gratings

Yuan-Hong Lin, Kuan-Chen Yeh, Wen-Fung Liu, Shih-Hsien Hsu, Shian-Ming Liu
Feng Chia University

We propose a two-dimensional contact-type fiber Bragg grating (FBG) vibration sensor for detecting motor fault characteristics by monitoring the grating wavelength shift induced by the strain from motor vibrations.

P2-79 **16:30-18:00**

Improvement of Recognition Rate of Optoelectronic Convolution Computing based on Pixel Filling Method

Ruo-xing Guo, Yu-lu Zhou, Zhi-guo Nie, Yan-feng Bi, Yong-pan Gao, Chuan Wang
Beijing University of Posts and Telecommunications

This paper proposes a pixel filling method for an optical convolutional neural network to improve image classification accuracy. Experimental results on the MNIST dataset show that the classification accuracy improves from 91.12% to 92.03%.

Room A (Grand Ballroom 1), 2F | Chair: Tomoyuki Kato (1Finity Corp.)

We1A | July 1 (Wed), 2026
PCS and FEC Coding Technologies | 08:30-10:00

We1A-1 Invited 08:30-09:00

Probabilistic Constellation Shaping: From Point-to-Point Links to Networks

Joan M. Gené, Jordi Perelló
Universitat Politècnica de Catalunya · BarcelonaTech (UPC)

This paper presents an interferometric scheme using a bent polarization-maintaining fiber for simultaneous refractive index and temperature sensing, achieving -260.32 nm/RIU and -221 pm/°C sensitivities with a 20.98 dBm extinction ratio via bending-induced birefringence tuning.

We1A-2 09:00-09:15

Demonstration of Effective Block-Wise MLSE Using Pilot Symbols under Duobinary Coding

Yukinobu Nakajima, Hiroki Taniguchi, Shuto Yamamoto, Masanori Nakamura, Etsushi Yamazaki
NTT Network Innovation Laboratories

We analyzed block-wise MLSE for a duobinary signal generated from 64-Gbaud PDM-16QAM with 23-GHz bandwidth. Placing pilot symbols at both ends of each MLSE block improved Q-factor by 0.7 dB over other pilot symbol placements.

We1A-3 09:15-09:30

Experimental Evaluation of BER Performance of Polar-Coded Offload Method for Reducing SD-FEC Decoder Complexity

Zhiyuan Song[1], Yohei Koganei[2], Koji Igarashi[1]
[1]The University of Osaka, [2]1Finity Inc.

We experimentally evaluate the BER performance of the polar-coded offload method for reducing SD-FEC decoding complexity. Compared with an LDPC code, it reduces the complexity to one-third while maintaining BER performance.

We1A-4 09:30-09:45

Complexity Reduction with Adaptive Chase-2 Decoding for SFEC Inner Code

Shuto Yamamoto, Shuto Sugawara, Etsushi Yamazaki
NTT Network Innovation Laboratories

We evaluated the applicability of Adaptive Chase-2 decoding scheme to the SFEC inner code based on Hamming (68, 60) and demonstrate that the scheme reduces the number of test patterns in soft-decision decoding by 76%.

We1A-5 09:45-10:00

Experimental Evaluation of Quantization and Clipping Effects on Rate-Optimized PCS Signals

Shuto Sugawara, Minami Takahashi, Shuto Yamamoto, Masanori Nakamura, Asuka Matsushita, Etsushi Yamazaki
NTT Network Innovation Laboratories

The optimal PCS entropy rate and RMS were experimentally evaluated for DP-PCS-16QAM considering DAC quantization and clipping effects. Optimal RMS increased with entropy rate at 1.89 and 0.85 dB/(bits/symbol) for 600 and 400 Gbps, respectively.

Room B (Grand Ballroom 2), 2F | Chair: Jasesun Kim (Taihan Fiberoptics)

We1B | July 1 (Wed), 2026
Fiber Lasers | 08:30-10:00

We1B-1 **08:30-08:45**

Femtosecond All-Polarization-Maintaining Yb Doped Fiber Laser for Stable Supercontinuum Generation

Kaiyan Huang[1], Hong Jin[1], Siwei Peng[1], H. Y. Fu[2], Qian Li[1]
[1]Peking University, [2]Tsinghua University

An all-polarization-maintaining Yb-doped linear-cavity seed laser, amplified by a PM-MOPA, generates a stable supercontinuum with a -30-dB spectral coverage of 894-1232 nm, 46 MHz repetition rate, and excellent long-term power stability.

We1B-2 **08:45-09:00**

Near-Zero Dispersion Soliton from an All-PM Linear-Cavity Tm-Doped Fiber Laser with Interferometric Mode-Locking

Yixuan Liu[1], Siwei Peng[1], H. Y. Fu[2], Qian Li[1]
[1]Peking University, [2]Tsinghua University

We demonstrate an all-polarization-maintaining linear- cavity interferometric-mode-locked Tm-doped fiber laser with near-zero dispersion at 1943.45 nm. A pulse train with 26.85 nm spectral width, 222.3 fs duration, and 32.2 MHz repetition rate is generated.

We1B-3 **09:00-09:15**

Passive Harmonic Mode-Locking of a Diode-Pumped Fiber-Optic Cesium Vapor Laser

Sunghoon Jeong[1], Seokjin Kim[2], Kyunghwan Oh[1,3], Seongjin Hong[1]
[1]Yonsei University, [2]Korea Institute of Science and Technology, [3]Nazarbayev University School of Sciences and Humanities

We demonstrate a passive harmonic mode-locked diode- pumped cesium (Cs) vapor laser based on an optical fiber ring cavity. Pulses with a repetition rate of 547.6 MHz and a duration of 657.6 ps are obtained.

We1B-4 **09:15-09:30**

Study of Failure Modes Caused by High-Power Leakage in Hollow-Core Fibers

Takeshi Takagi[1], Keita Takahata[1], Kazunori Mukasa[1], Balint Varady[2], Zoltan Varallyay[2]
[1]Lightera Japan Co., Ltd., [2]Furukawa Electric Institute of Technology Ltd.

We experimentally demonstrate failure modes of hollowcore fibers (HCFs), which is not the fiber fuse, during highpower transmissions and confirmed bending potentially cause the failure. These results show good applicability of HCFs for high-power applications.

We1B-5 **Invited** **09:30-10:00**

Multimode Fiber Amplifiers with High Quality Focused Output based on Wavefront Shaping the Input Seed

Linh V. Nguyen[1], Michael R. Oermann[2], David G. Lancaster[1], Dmitrii Y. Stepanov[2], Shahraam Afshar V.[1], Heike Ebendorff-Heidepriem[1], David J. Ottaway[1], Stephen C. Warren-Smith[1]
[1]Adelaide University, [2]Defence Science and Technology Group

Wavefront shaping the input seed to a multimode fiber amplifier can deliver diffraction-limited beams, higher nonlinear thresholds, and scalable power from a single fiber device.

Room C (Grand Ballroom 3), 2F | Chair: Seung-Hyun Cho (ETRI)

We1C | July 1 (Wed), 2026
Converged Fiber-Wireless & RoF Systems | 08:30-10:00

We1C-1 **08:30-08:45**

Comparison of Sigma-Delta and Analog Radio over Fiber for Next Generation FTTR

Sophie Thiele[1], Christian Bluemm[2], Stefano Calabrò[2], Stephan Pachnicke[1]
[1]Kiel University, [2]Huawei Technologies Duesseldorf GmbH

Wi-Fi distribution via sigma-delta radio over fiber is a promising technology for FTTR. We demonstrate 256-QAM transmission using a nonlinear SFP+ module and 1024-QAM VCSEL-based transmission with a sensitivity gain of 1.5 dB over ARoF.

We1C-2 **08:45-09:00**

Low-Cost Intensity Modulator Integrating 1.05 Tb/s CPRI-Equivalent Rate 1024-QAM RoF and 200-Gb/s PON for Fixed-Mobile Access Network

Yixiao Zhu[1], Yutong Pan[2], Tianhong Zhang[2], Xiang Cai[2], Jingchi Li[1], Fan Zhang[2], Weisheng Hu[1]
[1]Shanghai Jiao Tong University, [2]Peking University

We demonstrate fixed-mobile converged access network carrying RoF and PON signals with a single intensity modulator, achieving flexible radio-access from 1.05-Tb/s 1024-QAM to 527.3-Gb/s 65536-QAM at 51.9-dB SNR, and 100/200-Gb/s PON with 40.0/30.7-dB power budget.

We1C-3 **Invited** **09:00-09:30**

Optical-Wireless Cooperative Control for Future Radio Access Network

Kenji Miyamoto
NTT Access Network Service Systems Laboratories

This invited paper introduces the optical-wireless cooperative control we have proposed for 6G RAN. We review recent studies and experimental results for cooperative control between RAN and X-haul optical transport to achieve 6G requirements.

We1C-4 **Invited** **09:30-10:00**

Scaling LLM Fine-Tuning in Radio Access Network Deployment

Emilio Paolini
Sant'Anna School of Advanced Studies

We propose a transport-aware LLM adaptation framework for RAN edge nodes, combining continuous lightweight adapter updates over packet backhaul with opportunistic full fine-tuning triggered by high-capacity optical paths, enabling scalable deployment without overwhelming transport resources.

Room D (Capri), 2F — Chair: Tong Ye (Fujitsu)

We1D — July 1 (Wed), 2026
Technologies for Coherent Short-Reach Transmission — 08:30-10:00

We1D-1 **08:30-08:45**

A Bias-Modulated Multi-Residual-Carrier Scheme for Robust Phase Recovery under Bias Drift and DC Blocking

Tianhong Zhang[1], Yutong Pan[1], Xiansong Fang[1], Yixiao Zhu[2], Fan Zhang[1,3]
[1]Peking University, [2]Shanghai Jiao Tong University, [3]Peng Cheng Laboratory

We propose a bias-modulated multi-residual-carrier scheme for robust phase recovery under bias variations and receiver DC blocking. Experiments using 100-kHz ECL and 1-MHz DFB lasers show consistent phase tracking and performance comparable to single-residual-carrier recovery.

We1D-2 **08:45-09:00**

All-Digital Baud-Rate Timing Recovery for Short-Reach Coherent Optical Transmission

Menghong Xu[1], Sheng Cui[1], Jingpeng Liu[1], Jianfeng Han[1], Jing Dai[2], Ming Tang[1]
[1]Huazhong University of Science and Technology, [2]FiberHome Telecommunication Technologies Co., Ltd.

We propose an all-digital baud-rate timing recovery (TR) scheme featuring a low timing jitter timing phase error detector (TPED) and sinc-function resampling.

We1D-3 **Invited** **09:00-09:30**

Monolithically Integrated SiP Self-Coherent Detection Receivers for Optical Interconnects

Jingchi Li, Yikai Su
Shanghai Jiao Tong University

The proliferation of large-scale AI models has created an urgent demand for high-capacity and low-cost integrated photonic interconnects. Here we demonstrate several monolithically integrated SiP self-coherent receivers which support up to single-polarization 600 Gb/s transmission.

We1D-4 **09:30-09:45**

Mitigation of Phase-to-Amplitude Noise in Optical SSB System via Phase Locking

Songyan Liu, Tianwai Bo, Shuhua Zhao, Yihao Zhou, Jun Dong, Zhongwei Tan, Yi Dong
Beijing Institute of Technology

We developed a self-heterodyne based optical phaselocked-loop to mitigate laser phase noise and achieved a 0.5– 1.1 dB improvement in receiver sensitivity by applying it to optical single-sideband systems over a 300-km transmission link.

We1D-5 **09:45-10:00**

In-Service Transmitter Full-Field Frequency Response Monitoring Utilizing the Embedded Photodetector

Jie Xu, Meng Xiang, Junjiang Xiang, Gai Zhou, Songnian Fu, Yuwen Qin
Guangdong University of Technology

We report a training-symbol enabled in-service full-field frequency-response monitoring for digital- subcarrier-multiplexing (DSM) transceiver. Utilizing an embedded photodetector with 55-GHz bandwidth for 96- GBaud DSM signals achieves both 0.32-dB amplitude and 0.05-rad phase estimation errors .

We1E-1 **Invited** **08:30-09:00**

Nonlinear Optics in Silicon-Based Photonic Devices

D. T. H. Tan, X. X. Chia, K. Y. K. Ong, J. W. Choi, B-. U. Sohn, G. F. R. Chen, A. Chowdury
Singapore University of Technology and Design

Photonic devices implemented on silicon-based platforms are advantageous owing to their compatibility with complementary metal oxide semiconductor processing and advantageous optical properties enabling high modal confinement, low loss and high optical nonlinearities. We report deterministic, reconfigurable generation of soliton crystals, further showcasing their higher comb line power compared to the single soliton state. The soliton crystals are experimentally demonstrated to be excellent vessels for high-speed data transmission.

We1E-2 **09:00-09:15**

Silicon Nitride 2 × 2 Thermo-Optic Switch with Pπ < 30 mW and Response Time < 20 μs

Luyang Liu, Haojie Xue, Yichen Zhang, Lei Zhang
Beijing University of Posts and Telecommunications

We report a 2 × 2 SiN Mach-Zehnder thermo-optic switch featuring folded waveguides. At 1550 nm, it achieves 25 mW Pπ, > 25 dB extinction ratio, and 18 μs switching time.

We1E-3 **09:15-09:30**

Monolithic Integration of Dual-Segment Electro-Absorption Modulators for Optical Single-Sideband Generation

Cheng-En Jiang[1], Shou-Ming Chen[1], Kun-Sian Lin[1], Bo-Hong Chen[2], Rih-You Chen[1], Yi-Jen Chiu[1]
[1]National Sun Yat-Sen University, [2]LandMark Optoelectronics Corporation

Monolithic dual EAMs integration for 20GHz optical single-side-band (OSSB) generation has been proposed and demonstrated. A titled micro-mirror integrated EAM enables efficient vertical emission and high-density packaging for optoelectronic sensing, achieving 8dB suppression.

We1E-4 **Invited** **09:30-10:00**

Nonlinear Effects in High-Q Multimode Silicon Resonators

He Gao, Yaojing Zhang
The Chinese University of Hong Kong, Shenzhen

This paper explores nonlinear effects in high-Q multimode silicon resonators and observes TE0-mode-based Raman lasers, higher-order-mode-based Raman lasers, and RamanKerr frequency combs.

Room F (Sicily), 2F — Chair: Tatsurou Hiraki (NTT, inc.)

We1F — July 1 (Wed), 2026

III-V on Silicon Active Devices II & Electronic ICs — 08:30-10:00

We1F-1 **Invited** **08:30-09:00**

Ultra-Low Power SiGe ASIC for InP Mach Zehnder Modulator and CMOS Quenching-IC for SPAD for QKD Communication

Jung Han Choi
Fraunhofer Institute for Telecommunications, Heinrich Hertz Institute

This talk presents ultra-low power SiGe HBT driver for InP Mach-Zehnder modulator and CMOS active quenching IC for InP single-photon avalanche diode for quantum key distribution. The driver exploits co-design methodology, implementing non-50 Ω impedance-match between the modulator and the driver. 360 mW power consumption is achieved to generate 3 Vpp,diff for differential 50 Ω load. The active quenching circuit supports two modes, gated- and free-running modes. It consumes 60 mW. It supports up to 100 MHz gate pulse.

We1F-2 **09:00-09:15**

Demonstration of Microdisk Modulator Driven by InP/Si Hybrid SIS Capacitor

Kyunghwan Kim, Jae-Hoon Han
Korea Institute of Science and Technology

We demonstrate a microdisk modulator with InP/Al2O3/Si hybrid SIS capacitor by oxide wafer bonding. The fabricated microdisk modulator achieves 49.3 pm/V high tuning efficiency with 28.2 nm large FSR by carrier accumulation in SIS interface.

We1F-3 **09:15-09:30**

Heterogeneously Integrated III-V/Si Semiconductor Optical Amplifier Switch

Jaeseong Jeon, Il-Sug Chung
Ulsan National Institute of Science and Technology

An optical switch based on heterogeneously integrated III-V/Si semiconductor optical amplifier (SOA) has been designed, fabricated, and characterized. It demonstrates >11 dB gain as amplifier and a record-high extinction ratio (ER) of >81 dB as switch.

We1F-4 **09:30-09:45**

20 dB Gain Heterogeneous Integration Semiconductor Optical Amplifier on 220nm Silicon-on-Insulator Platform

Haibo Kuang, Guobiao Tang, Yu Zhang
Huazhong University of Science and Technology

We proposed and fabricated a III-V-on-220-nm siliconon-insulator (SOI) semiconductor optical amplifier (SOA) via direct bonding. The device yields a small-signal gain of ~20 dB and a saturated output power of 8 dBm.

We1F-5 **09:45-10:00**

Heterogeneously Integrated Vernier Laser with 45-nm Tuning Range

Sangmin Oh, Il-Sug Chung
Ulsan National Institute of Science and Technology

We demonstrate a heterogeneously integrated III-V-onSOI Vernier racetrack ring laser using a 10-nm BCB bonding. The device achieves 6.8-mW single-facet output power, 2.6-kHz linewidth, 45.09-K/W thermal impedance, and a 45-nm wavelength tuning range.

We1G-1 Invited 08:30-09:00

Toward Practical Quantum Communication Networks: Mode-Pairing QKD and Beyond

Xiongfeng Ma
Tsinghua University

We review mode-pairing MDI-QKD enabling sqrt(eta) scaling without global phase locking, then discuss field deployment, quantum-dot single-photon untrusted relays, and long-lived ion-memory entanglement as complementary routes to practical quantum networks.

We1G-2 Invited 09:00-09:30

Fully Dynamic and Automated 4-Node Switched QKD Network with PUF-Based Authentication

Nikolaos Makris[1], Persefoni Konteli[1], Evgenia N. Sassalou[2], Stylianos A. Kazazis[2], Alkinoos Papageorgopoulos[1], Stefanos Vasileiadis[3], Konstantinos Tsimvrakidis[1], Symeon Tsintzos[2], George M. Nikolopoulos[4], George T. Kanellos[1]
[1]National and Kapodistrian University of Athens, [2]Qubitech Company, Inc., [3]UBITECH, [4]Institute of Electronic Structure and Laser (IESL), Foundation for Research and Technology-Hellas (FORTH)

We demonstrate a centrally automated four-node dynamic switched Quantum Key Distribution network with real-time, on-demand dynamic PUF-based authentication per link and experimentally evaluate its system performance.

We1G-3 09:30-09:45

OPA-Based Free-Space QKD System with Direct Fiber-Network Compatibility

Minchul Kim[1,2], Junsang Oh[1], Byung-Seok Choi[1], Joong-Seon Choe[1], Ju Hee Baek[1], Chun Ju Youn[1], Jong-Bum You[3], Hyo-Hoon Park[2], Hamza Kurt[2], Hoon Kim[2]
[1]Electronics and Telecommunications Research Institute, [2]Korea Advanced Institute of Science and Technology, [3]National NanoFab Center

We experimentally demonstrate a free-space quantum key distribution (QKD) system employing an optical phasedarray(OPA) chip-based transmitter and a receiver connected via 6-km fiber link, enabling seamless compatibility and integration with existing fiber-based QKD networks.

We1G-4 09:45-10:00

Demonstration of 4 × 10 Mbaud FDM-CV-QKD System

Donghyeok Lee[1,2], Jaehyeok Han[1,2], Yong-Su Kim[2], Sunghyun Bae[1]
[1]Sejong University, [2]Korea Institute of Science and Technology

We demonstrate a four-channel FDM-CV-QKD system using 10-Mbaud Gaussian-modulated signals. The fourchannel system enhances secret key rates for distances up to 71 km, achieving a 3.7-fold gain over the single-channel case in the back-to-back scenario.

Grand Ballroom 4 (Grand Ballroom 4), 2F

P3 July 1 (Wed), 2026
Poster Session III 10:00-11:45

P3-1 **10:00-11:45**

A Modified CMOS SPAD Structure for Improved Detection Probability and Jitter Performance

Liang-Jheng Chen, Jia-Heng Zhan, Jau-Yang Wu
National Taiwan University of Science and Technology

We propose a structural design to enhance the performance of a CMOS SPAD using TSMC 0.18 μm technology. The design's photon detection efficiency and dark count rates were evaluated and verified through TCAD simulations.

P3-2 **10:00-11:45**

Wavelength Demultiplexing Enabled by Guided-Mode Coupling Ge Photodetectors for Chip-Level Optical Interconnects

Ching-Yu Hsu[1], Xin-Yu Xie[2], Zingway Pei[2], Jia-Ming Liu[1,2,3]
[1]National Yang Ming Chiao Tung University, [2]National Chung Hsing University, [3]University of California

We propose CMOS-compatible, surface-illuminated Geon-SOI photodetectors integrating guided-mode-coupling resonant gratings for wavelength-division-multiplexing decoding. Simulations show ~80% absorbance, ~10-nm linewidth tunable from 1530–1580 nm, and 19.98-GHz bandwidth at -4 V.

P3-3 **10:00-11:45**

Integrated 1535-nm Tx/Rx and High-Peak-Current Driver for Kilometer-Class Single-Point dToF LiDAR

Jui-Chuan Liu[1], Chien-Wei Huang[1], Chun-Nien Liu[1], Zing-way Pei[1], Cheng-Mu Tsai[1], Zhi-Ting Ye[2], Chun-Wei Tsai[3], Wood-Hi Cheng[1]
[1]National Chung Hsing University, [2]National Chung Cheng University, [3]National United University

A compact eye-safe 1535-nm single-point dToF LiDAR integrating a low-inductance high-peak-current driver and deterministic timing synchronization is demonstrated. The transmitter generates ~3 ns, >100 μJ pulses at 10 Hz.

P3-4 **10:00-11:45**

High-Responsivity Blue Photodetectors based on n-ZnSe:Al/p-CuSCN Heterojunctions

Fang-Hsing Wang, Zhi-Xian Lin
National Chung Hsing University

High-performance blue-light photodetectors were fabricated using n-ZnSe:Al nanosheet arrays and p-CuSCN heterojunctions by chemical bath deposition and spincoating. This solution-processed device achieved a peak responsivity of 1.82×10^3 A/W and high spectral selectivity.

P3-5 **10:00-11:45**

A High-Power Ge/Si Photodetector based on Hybrid Butt-and-Side-Coupling

Di Xu, Yuhang Wan, Jingyuan Hu, Zheng Zheng
Beihang University

A high-power Ge/Si photodetector with near-uniformcarrier-generation is proposed by utilizing a compact hybrid butt-side coupler. A saturation power of 29 mW and a responsivity of 0.95 A/W at 1550 nm is estimated with a footprint of 7×40 μm^2.

P3-6 **10:00-11:45**

Active Pupil-Steering Module for Eyebox Expansion in Holographic Near-Eye Displays

Erkhembaatar Dashdavaa, Erdenebayar Bayarsaikhan, Munkh-Uchral Erdenebat, MinSeok Kim, Ji-Sub Park, Hak-Rin Kim
Kyungpook National University

We propose dynamic pupil steering method for holographic near-eye displays that expands the eyebox using polarization-dependent quarter-waveplate–geometric phase prism (QWP–GPP) module, enabling two-dimensional beam steering to form a 3×3 array of nine exit pupils.

P3-7 **10:00-11:45**

Broadband High-Efficiency SPAD in 180 nm BCD Technology

Hyun-Seung Choi[1], Doyoon Eom[1], Injun Park[2], Young-Jin Woo[2], Youngcheol Chae[1,2], Myung-Jae Lee[1]

[1]Yonsei University, [2]XO Semiconductor Inc.

A single-photon avalanche diode (SPAD) implemented in 180 nm Bipolar-CMOS-DMOS (BCD) technology is demonstrated. The device achieves approximately 60% photon detection probability (PDP) over a broad 475-625 nm spectral range while maintaining a low dark count rate (DCR).

P3-8 **10:00-11:45**

Design and Optimization of 3D-Stacked Backside-Illuminated SPADs

Hyo-Sung Park[1], Woo-Young Choi[1], Myung-Jae Lee[1,2]
[1]Yonsei University, [2]TruPixel, Inc.

Edge breakdown in 3D-stacked backside-illuminated SPADs is prevented using a virtual guard ring implemented with an additional deep P-well implantation at the junction. The SPAD fabricated in 40 nm CIS technology demonstrates a uniform avalanche region, resolving the default structural limitations.

P3-9 **10:00-11:45**

Two-Dimensional Beam Steering and Phase Calibration of 32- and 128-Channel Optical Phased Arrays Using the REV Algorithm

Aibek Bekbergen, Il-Sug Chung
Ulsan National Institute of Science and Technology

We present the calibration of 32-channel and 128-channel optical phased arrays (OPAs) using the Rotating Element Electric Field Vector algorithm (REV). We successfully demonstrated two-dimensional beam steering, achieving a 30°×6.82° Field of View (FOV).

P3-10 **10:00-11:45**

Deep Neural Network-Based Beam Routing for a Silicon Photonic Focal Plane Array

Yun-Jae Kwon, Jun-Cheol Kim, Yoon-Ho Sunwoo, Sang-Shin Lee
Kwangwoon University

We propose and experimentally demonstrate a deep neural network (DNN)-based beam routing method for a silicon photonic focal plane array (FPA). The DNN predicts the driving powers required to route the optical beam to a target antenna element.

P3-11 **10:00-11:45**

Inductive Peaking Enhanced 3-dB Bandwidth InGaAs PIN Photodiode for 200G PAM4 Operation

Shinmo An, Duk-Jun Kim, Seok-Jun Yun, Dong-Hun Lee, Young-Tak Han
Electronics and Telecommunications Research Institute

3-dB bandwidth extension of InGaAs PIN photodiode using CPW electrode inductive peaking has been precisely analyzed by an equivalent circuit model that includes transittime effects. Fabricated photodiodes demonstrated the 3-dB bandwidth extension from 47 GHz to over 70GHz.

P3-12 **10:00-11:45**

Full-Polarization Vectorial Meta-Holography

Dengji He[1,2], Guanghao Xu[1,2], Jinwei Zeng[1,2], Jian Wang[1,2]
[1]Huazhong University of Science and Technology, [2]Optics Valley Laboratory

We propose a full-polarization vectorial metaholography using a dielectric geometric-phase metasurface, enabling independent control of amplitude, phase and arbitrary polarization distribution of the target field solely via meta-unit rotation.

P3-13 **10:00-11:45**

Flexible Integrated Photonics with Lowtemperature a-Si:H Sputtering

Wei-Hsuan Hsieh[1], Song-Ying Wu[1], Sheng-Hui Chen[1], Pei-Hsun Wang[2]
[1]National Central University, [2]National Yang Ming Chiao Tung University

High-index, low-loss a-Si:H films are demonstrated by low-temperature (70 °C) sputtering. High quality waveguides are realized with quality factors up to 10^5, providing flexible process integration of silicon photonics.

P3-14 **10:00-11:45**

Air-Spaced Transparent Metasurface for Ultra-Broadband Polarization Conversion

Huu Lam Phan, Syed Ahson Ali Shah, Juhoon Baek, Doyoon Lee, Minkyung Kim
Gwangju Institute of Science and Technology

An air-spaced ultra-broadband polarization-converting metasurface achieves 9.0–32.5 GHz operation with PCR above 90% and 63% optical transmittance. Multi-resonant coupling under reduced loading enables transparencycompatible polarization control and potential dielectric sensing functionality.

P3-15 **10:00-11:45**

Burst-Mode Femtosecond Laser Direct Writing of Ridge Waveguides in MgO:LiNbO3

Tsung-Ching Li, Jhih-Wei Liao, Tzu-Cheng Liu, You-Qi Lin, Ya-Chih Tsai, Shou-Tai Lin
Feng Chia University

Optimization of burst number, ridge geometry, and wet etching enabled reduced propagation losses of 1.13 dB/cm (n_o) and 3.27 dB/cm (n_e) at 1064 nm in MgO:$LiNbO_3$ ridge waveguides through improved surface quality.

P3-16 **10:00-11:45**

High-Q Dual-Resonant Dielectric Metasurface for Mid-Infrared Sensing

Syed Ahson Ali Shah, Huu Lam Phan, Minkyung Kim
Gwangju Institute of Science and Technology

An all-dielectric mid-infrared metasurface exhibiting dual resonances is numerically investigated. A global scaling factor enables systematic spectral tuning and achieves the sharp mode quality factor upto 23,130, providing a scalable platform for high-resolution spectral sensing.

P3-17 **10:00-11:45**

High-Efficiency SiN Triple-Tip Edge Coupler with a Bottom Metal Reflector on Glass for Co-packaged Optical Systems

Kyungjin Jo, Taewon Jin, Heeyun Jung, Younghyun Kim
Hanynag University

Large mode mismatch between optical fibers and waveguides causes significant coupling loss in CPO platforms, increasing energy consumption. We propose a SiN edge coupler achieving high-efficiency coupling with 0.24 dB loss at 1310 nm.

P3-18 **10:00-11:45**

Surface Plasmon Resonance Refractive Index Sensing based on Photonic Integrated Chips

Meng Jiang, Xuewen Shu
Huazhong University of Science and Technology

We propose a refractive index sensor combining waveguide Bragg grating and surface plasmon resonance. It shows high sensitivity of 512.4 nm/RIU and good stability, providing a feasible scheme for microscale photonic sensors.

P3-19 **10:00-11:45**

Terahertz Vortex Mode Converter based on Multimode Waveguide

Yu Lu[1,2], Jia Luo[1,2], Zhiyuan Zhou[1,2], Shuang Zheng[1,2,3]
[1]Huazhong University of Science and Technology, [2]National Engineering Research Center for Next Generation Internet Access System, [3]Optics Valley Laboratory

We design a mode converter operating in terahertz (THz) regime based on modes coherent superposition. The device features a simple structure, low fabrication cost, enables mutual conversion between OAM ±1 vortex beams.

P3-20 **10:00-11:45**

Optical Characteristics of SC-Type End-Capped Hollow-Core Fiber Connector

Katsuyoshi Sakaime, Ryo Nagase, Hideaki Furukawa
National Institute of Information and Communications Technology

In the end-capped hollow-core fiber connector developed in this study, in which the ferrule endface is sealed with a thin glass plate, we improved the connection characteristics by employing high-precision zirconia ferrules and optimizing the assembly process.

P3-21 **10:00-11:45**

Multimode Grating Coupler Using 2D-Grating Structure for Highly Coupled Four-Core Fiber

Yuzhuang Xie, Peijyun Lin, Haisong Jiang, Kiichi Hamamoto
Kyushu University

A multimode grating coupler was designed to realize supermodes coupling. The grating coupler enables light coupling while preserving mode integrity, simulation results show coupling loss below 4.7 dB for TE0 to TE3 mode, respectively.

P3-22 **10:00-11:45**

Compact and Low-Loss Evanescent Coupler between SiN-on-Glass and SiN-on-SOI Platforms for Co-Packaged Optics

Seokyoung Shin, Younghyun Kim
Hanyang University

We propose an optimized evanescent coupler between SiN tapers on glass and SOI platforms for co-packaged optics at 1310 nm. It achieves 0.14 dB loss over 40 μm, reducing footprint threefold versus conventional linear tapers.

P3-23 **10:00-11:45**

Wide-Bandwidth Frequency Difference Measurement Using a Repetition-Rate-Locked Optical Frequency Comb

Boyu Chen, Hao Gao, Baodong Zhao, Yapeng Liu, Yinglu Qin, Song Yu, Bin Luo
Beijing University of Posts and Telecommunications

We present a wide-bandwidth frequency difference measurement method using a repetition-rate-locked optical frequency comb. Dual heterodyne detection enables common-mode offset cancellation, achieving high-precision measurements and providing a promising approach for wide-bandwidth frequency difference measurements.

P3-24 **10:00-11:45**

Enhanced Single-Pixel Imaging through a Multimode Fiber via Mode Modulation

Ning Zhan, Zhenming Yu, Liming Cheng, Jingyue Ma, Jiayu Di, Liang Lin, Tongshuo Zhang, Yanfeng Liu, Yu Zhang, Ping Fang, Kun Xu
Beijing University of Posts and Telecommunications

We propose a mode modulation method for enhanced single-pixel imaging through a multimode fiber. By selectively exciting high-order modes, this method enables the fiber to generate finer illumination speckles, thus improving the imaging quality.

P3-25 **10:00-11:45**

Q-Switched Pulse Generation in a 1.7 μm Thulium-Doped Fiber Laser Using Frequency-Shifted Feedback

Jee Hwan Kim, Junha Jung, Taeho Woo, Jaehak Choi, Ju Han Lee
University of Seoul

We demonstrate absorber-free passive Q-switched pulse generation in a 1.7 μm all-fiber thulium-doped fiber laser using frequency-shifted feedback (FSF). Stable microsecond pulses are obtained, confirming FSF as an effective mechanism for pulsed operation.

P3-26 **10:00-11:45**

Generation and Characterization of Odd /Even Order Brillouin Combs for RF Applications

Sharashti Saxena, Harsh Vaid, Amol Choudhary
Indian Institute of Technology Delhi

A tunable Brillouin comb is experimentally demonstrated with key characteristics, including RIN, temporal response, and stability, analyzed. The comb lines serve as carriers in a radio-over-fiber link and evaluated for QPSK and 16QAM modulation formats.

P3-27 **10:00-11:45**

Phase-Dominated GHz-Bandwidth Filtering in Dispersion-Assisted SBS Systems

Md Kamran Afroz, Deeksha Jachpure, Chowdhury Kamruzzaman, Arijit Das, Amol Choudhary
Indian Institute of Technology Delhi

This work demonstrates a microwave photonic filter synthesized using phase asymmetry with dispersion-assisted Brillouin scattering. Using two-tone RF-interference and controlled phase imbalance, a simple approach for flat, lowpower and reconfigurable GHz-class filters are achieved.

P3-28 **10:00-11:45**

Broadband Spectral Shifting in Continuously Femtosecond-Laser-Modified Optical Fiber for Wavelength-Locking-Free Dynamic Sensing

Shunsuke Nagata[1], Yuma Matsushita[2], Shimbu Shirai[1], Keita Kikuchi[1,3], Heeyoung Lee[3], Kenji Goya[2], Yosuke Mizuno[1]
[1]Yokohama National University, [2]Akita Prefectural University, [3]Shibaura Institute of Technology

A broadband interference spectrum generated in a continuously femtosecond-laser-modified fiber is shown to shift uniformly under strain and temperature. This enables wavelength-locking-free interrogation and simple high-speed point sensing with sensitivities comparable to fiber Bragg gratings.

P3-29 **10:00-11:45**

Mirror-less Single-Ended Observation of Depolarized Guided Acoustic-Wave Brillouin Scattering Using Fresnel Reflection

Ariasu Tamura[1], Neisei Hayashi[2], Yosuke Mizuno[1]
[1]Yokohama National University, [2]The Graduate School for the Creation of New Photonics Industries

We experimentally demonstrate mirror-less single-ended observation of depolarized guided acoustic-wave Brillouin scattering (GAWBS) using Fresnel reflection at fiber ends. Clear GAWBS spectra were observed even in a 13-m-long silica fiber, enabling simplified forward Brillouin sensing.

P3-30 **10:00-11:45**

Glass-Cladding Integration of a 9 μm Small-Core Chromium-Doped Crystalline Fiber Achieving 11.9dB Net Gain

Zhi-Hong Xu[1], Kai-Chieh Chang[2], Chien-Wei Huang[1], Chun-Nien Liu[1], Zingway Pei[1], Cheng-Mu Tsai[1], Zhi Ting Ye[1], Chun Wei Tsai[3], Wood-Hi Cheng[1]
[1]National Chung Hsing University, [2]National Taiwan University, [3]National United University

Using a glass-cladding process, a small-diameter singlemode chromium-doped crystalline fiber with a 9 μm core and 125 μm cladding was realized, exhibiting 300 nm broadband and achieving gain of 11.9 dB at 1550 nm wavelength.

P3-31 **10:00-11:45**

Experimental Characterization of Two Different Types of Optical Fiber Microcavities

Liudmila Silanteva[1,2], Robert Rylander[2], Viktor Brandels[2], Per Karlsson[2], Chigo Okonkwo[2], Thomas Bradley[1,2],Thomas Bradley[1,2]
[1]Eindhoven University of Technology, [2]NorthLab Photonics

We fabricate and experimentally characterize untapered and tapered fiber Bragg grating (FBG) microcavities, and microfiber knot resonators (MKR), achieving $\boldsymbol{Q} = \mathbf{5}.\mathbf{4} \times \mathbf{10^5}$ and $\boldsymbol{Q}\sim\mathbf{1} \times \mathbf{10^6}$ with free spectral range (FSR) of 4 nm and $\mathbf{0}.\mathbf{16}$ nm, respectively.

P3-32 **10:00-11:45**

Statistical Analysis of Spatial Mode Dispersion in Coupled 2- and 4-Core Fibers by Using Linear Optical Sampling in Coupled 2- and 4-Core Fibers by Using Linear Optical Sampling

Keita Konishi[1], Akira Izumoto[1], Takahiro Suyama[1], Chao Zhang[2,3], Fumihiko Ito[1], Shingo Ohno[4], Atsushi Nakamura[4], Kunihiro Toge[4]
[1]Shimane University, [2]Kogakuin University, [3]The University of Tokyo, [4]NTT, inc.

The statistical properties of spatial mode dispersion in 2- core and 4-core coupled multicore fibers are investigated using bandwidth-decomposed measurements, and the resulting probability distribution is found to approximately follow a chi distribution.

P3-33 **10:00-11:45**

Mid-Infrared Continuous-Wave Parametric Amplification in Silicon Core Fibers

Qixin Xu, Zhiwei Yan, Xuchen Peng, Zengfan Shen, Xinzhe Xiong, Qiyuan Yi, Guanglian Cheng, Qiyuan Li, Hanming Yuan, Jiahao Xing, Li Shen
Huazhong University of Science and Technology

We theoretically investigated the generation of continuous-wave parametric gain in silicon core fiber at mid-infrared wavelengths under the combined effects of multiphoton absorption and free-carrier effects.

P3-34 **10:00-11:45**

Analysis of Transient Effects in 1 kW-Class Ytterbium-Doped Fiber Amplifiers

Seungwon Jun, Dong Joon Kim, Jong-Won Lee, Daehee Lee, Joonhoi Koo, Junsu Lee
Agency for Defense Development

We experimentally investigated the transient effects with a rise time of 309 ms in 1 kW-class polarization maintaining (PM) ytterbium-doped fiber amplifiers. Optical output characteristics, including output power, polarized power, backscattered power, and spectra were systematically investigated.

P3-35 **10:00-11:45**

Optical Bistability in a COF Saturable-Absorber Erbium-Doped Fiber Laser

Hsuan-Sen Wang[1], Wen-Hsuan Kuan[2], Gong-Ru Lin[3], Kuei-Huei Lin[2], Shiao-Wei Kuo[1], Chao-Kuei Lee[1]
[1]National Sun Yat-sen University, [2]University of Taipei, [3]National Taiwan University

We demonstrate optical bistability (OB) in an erbiumdoped fiber laser (EDFL) using a low-saturation-intensity covalent organic framework (COF) saturable absorber. Two OB regions are observed with a novel direct mode-locking to non-lasing transition and stepwise pulse-number hysteresis, indicating first-order phase-transition-like dynamics.

P3-36 **10:00-11:45**

Non-Orthogonal PAM4-OFDM Optical Transmission for Long-Reach Access Networks

Joungmoon Lee, Jinwoo Park, Sang-Kook Han
Yonsei University

We propose a non-orthogonal framework for converged PAM4 and RoF-OFDM transmissions over long-reach PONs. Re-engineered dispersion pre-compensation exploits power fading nulls for spectral coexistence, achieving robust highcapacity transmission with small power penalties below FEC limits.

P3-37 **10:00-11:45**

Terminal-Node Wavelength Conversion for Equipment-Efficient Network-Side 1+1 Protection: Numerical and Field Validation

Junnosuke Iyama[1], Mayuri Nakagawa[1], Hiroki Mori[1], Takeshi Seki[1], Rie Hayashi[1], Toshihiko Tamura[1], Sei Kim[2], Kota Ito[2]
[1]NTT, inc., [2]NTT EAST, Inc.

We propose wavelength conversion at terminal-node add/drop parts for network-side 1+1 protection. Numerical analysis shows about 65% equipment reduction with restoration performance comparable to client-side protection. Field demonstrations validate restoration with the proposed node architecture.

P3-38 **10:00-11:45**

AI-Driven Tidal Traffic Forecasting Enabling Energy Efficiency and Latency-Awareness in Integrated FWA-PON

Aveesha Gunasekara, Sourav Mondal, Elaine Wong
University of Melbourne

We propose a novel framework integrating Fixed Wireless Access and Passive Optical Networks, with AI-driven traffic forecasting to achieve up to 48% energy savings and 74% latency reduction, enabling energyefficient, low-latency connectivity.

P3-39 **10:00-11:45**

A Novel Spectrum Defragmentation Method based on Heterogeneous GNN Trained with DRL

Takafumi Tanaka
NTT, inc.

We propose a GNN/DRL-based defragmentation method using a novel graph structure for the spectrum defragmentation problem in optical networks. Our method achieves up to a 20% improvement in blocking probability compared with conventional methods.

P3-40 **10:00-11:45**

Time-Frequency Patching Perception for Latent Anomaly Detection in Optical Networks

Changjian Sun[1], Chunyu Zhang[2], Cheng Xing[1], Min Zhang[1], Danshi Wang[1]
[1]Beijing University of Posts and Telecommunications, [2]University of Science, Technology Beijing

We proposed a time-frequency patching fusion method for latent anomaly detection in optical networks, achieving an F1 score of 97.07% and providing a reference for troubleshooting early-stage anomalies.

P3-41 **10:00-11:45**

Remote Receiver Characterization for QoT Estimation using BER Measurement Functions in Transceivers

Kai Ikuta, Ryo Igarashi, Ryo Koma, Kazutaka Hara, Jun-ichi Kan, Tatsuya Shimada
NTT, inc.

We propose a remote receiver-feature extraction method for QoT estimation using built-in BER-measurement functions of transceivers with no dedicated equipment at user premises and demonstrate its feasibility for 25-Gbps duobinary transmission systems.

P3-42 **10:00-11:45**

QoT-Feasible Online RMSA with Service-Aware Adaptation

Haojie Wang, Yixin Wang
Beijing University of Posts and Telecommunications

We propose full-rate-first, service-aware bandwidth adaptation for QoT-constrained online RMSA in elastic optical networks, enabling modulation downshift and longer reach. At 800 Erlangs, highest-priority (Class-0) blocking is < 4% vs ~21% (No-Deg) and ~9% (USP).

P3-43 **10:00-11:45**

Coherent PON In-Service Laser Health Monitoring using OLT-based Carrier-Phase Estimation

Lukas Fonk, Stephan Pachnicke
Kiel University

We show the feasibility of DSP-based laser linewidth estimation in a burst-mode scenario using the OLT carrier phase recovery. Our concept enables anomaly detection, while also being robust against ROP fluctuations of 10 dB.

P3-44 **10:00-11:45**

All-Photonic Switching based on Wavelength Grating Routers for 100-Gb/s Optical Links

Kuan Lin Huan, San Liang Lee
National Taiwan University of Science and Technology

The feasibility of all-photonic switching by using tunable lasers and wavelength grating routers is verified for connecting 100-Gb/s optical links, which can find applications in AI infrastructure and networks.

P3-45 **10:00-11:45**

LLM-Enabled Token Communication in 200G Coherent TDM-PON

Junhao Zhao[1,2], Penghao Luo[1], Yuan Wei[1], Huayuan Qin[1,2], Chengxi Wang[1], Ouhan Huang[1], Sizhe Xing[1], Boyu Dong[1], Aolong Sun[1], Xuyu Deng[1], An Yan[1], Nan Chi[1], Junwen Zhang[1]
[1]Fudan University, [2]Shanghai Innovation Institute

We demonstrate an LLM-enabled multimodal token communication in a 200-Gb/s coherent TDM-PON, achieving up to 125× compression ratio, while cross-modal recovery improves reconstruction robustness under high compression.

P3-46 **10:00-11:45**

Tracking Spectral Evolution: Agile Few-Shot Light Source Recognition for Optical Network Anomaly Detection

Jiaxi Li[1], Nan Hua[2], Junfeng Cao[2], Weichen Hou[2], Yatong Xiao[2], Zhenrong Zhang[1], Xiaoping Zheng[2]
[1]Guangxi University, [2]Tsinghua University

Time-varying spectral evolution severely degrades light source recognition in anomaly detection systems. We propose a MAML based few-shot calibration mechanism to dynamically track spectral signatures; Experiments show 6- source accuracy improves from 82% to 94%.

P3-47 **10:00-11:45**

Dual-Polarization Multi-level IM/DD with Adaptive Polarization Tracking for Underwater Optical Wireless Communication

Masanori Hanawa
University of Yamanashi

We propose dual-polarization multi-level IM/DD scheme for underwater optical wireless communication. Blind polarization tracking with nearest-neighbor detection achieves 2- to 4-bits/symbol and provides strong robustness against polarization axis mismatch in dynamic underwater environments.

P3-48 **10:00-11:45**

Signal Quality Evaluation of SOA-Amplified TDSC-IM Signals

Kiyoto Takahashi, Wataru Imajuku
Meijo University

We experimentally evaluate SOA-amplified 25-Gbaud TDSC-IM signals for coherent PONs. Excellent performance is achieved at 9 dB gain (200 mA), while higher gain induces saturation-driven phase distortion, degrading the amplitude– phase modulation channel.

P3-49 **10:00-11:45**

Experimental Receiver Sensitivity Evaluation of PAM-4 based TDSC-IM Optical Signals

Yuto Yamauchi, Kenyu Goto, Wataru Imajuku
Meijo University

This paper evaluates 25-Gbaud Four-level Pulse Amplitude Modulation (PAM-4) applied to Time Domain Single Carrier Index Modulation (TDSC-IM) through transmission experiments, confirming superior receiver sensitivity compared to conventional PAM-4.

P3-50 **10:00-11:45**

Machine Learning-Based Modeling of Add/Drop Transients in Cascaded EDFAs

Huanyong Wang[1,2], Christina Wen-Hsin Cheng[2,3], Hua Liu[2], Zhongqi Pan[1]
[1]University of Louisiana at Lafayette, [2]Molex LLC, [3]University of California

We propose an RNN-based model to predict add/drop transients in cascaded EDFAs, achieving median MAEs of 0.15 dB (excursion phase) and 0.09 dB (recovery phase). Event-specific training reveals scenario-dependent variations in prediction accuracy.

P3-51 **10:00-11:45**

Frequency Comb based Multi-Channel Free Space Optical Communication with Amplitude Noise Suppression

Hyeokin Kang, Taewon Kim, Jaeyoon Kim, Gibeen Gu, Young-Jin Kim
Korea Advanced Institute of Science and Technology

We established a 1.3 km outdoor multi-channel optical link based on a frequency comb, incorporating a position, acquisition and tracking (PAT) system for precise single mode fiber (SMF) coupling. Atmospheric turbulenceinduced amplitude noise was quantitatively characterized and mitigated.

P3-52 **10:00-11:45**

Physics-Informed Deep Learning with a Spectrally Filtered Loss Function for Dispersion Profile Estimation in Optical Fibers

Keigo Kaizu[1], Keisho Yamamoto[1], Takumi Takahashi[2], Tadashi Wadayama[2], Koji Igarashi[1]
[1]The University of Osaka, [2]Nagoya Institute of Technology,

For estimation of the fiber dispersion profile using physics-informed deep learning, high-frequency components of the loss function degrade its convexity. We propose spectral filtering of the loss function to enable stable, high-resolution distributed dispersion estimation.

P3-53 **10:00-11:45**

EDFA Failure Timing Prediction in ROADMs

Tomoki Honda, Ken Ito, Rie Hayashi
NTT, inc.

We propose a method that predicts EDFA failure timing in ROADMs by monitoring OSNR degradation. Experiments show that accurate prediction is achieved by curve fitting with appropriate degradation data points.

P3-54 **10:00-11:45**

Free-Space Frequency Transfer Using a Limiting Photodetector Under Atmospheric Turbulence

Yapeng Liu, Hao Gao, Jie Zhang, Baodong Zhao, Zhanyu Yang, Bin Luo, SongYu
Beijing University of Posts and Telecommunications

We demonstrate a free-space frequency transfer system using a photodetector with a limiting amplifier and wide input power range. Over a 300 m outdoor link, turbulence-induced power fluctuations are effectively suppressed.

P3-55 **10:00-11:45**

Experimental Demonstration of Remote Pumped Aerial Relay Gain Unit for Air-Ground-Space Integrated Networks

Kunfeng Liu, Liqian Wang, Yiwei Zhao
Beijing University of Posts and Telecommunications

This paper proposes a remote pumping amplification for spatial energy transmission, enabling aerial relay platforms to amplify weak signals while eliminating the need for electrical power, providing a feasible validation approach for the relay platforms.

P3-56 **10:00-11:45**

Complexity and Latency Evaluation of a Block-Length-Scalable Successive Cancellation Decoder for Ultra-Long Polar Codes

Gakuto Kanematsu[1], Mizuki Yamamoto[1], Yohei Koganei[2], Koji Igarashi[1]
[1]The University of Osaka, [2]1Finity

A successive cancellation decoder for polar codes scalable with the block length is synthesized on FPGAs. Complexity is one-tenth that of an LDPC decoder, and latency is 5.9 μs at a block length of 104 .

P3-57 **10:00-11:45**

A Flat-Top Beam-Based Integrated Visible Light Positioning and Communication System Using DMD Projector

Zhiyue Yin[1], Yuru Tang[1,3], Connie Chang-Hasnain[1,2], H. Y. Fu[1]
[1]Tsinghua University, [2]Berxel Photonics Co., Ltd., [3]Pengcheng Laboratory

We propose a novel DMD-based flat-top beam VLPC system for indoor scenarios, achieving an RMS flatness of 1.3%, reliable OFDM communication under low-SNR conditions, and localization errors below 8 cm within a 36 m2 area.

P3-58 **10:00-11:45**

Proactive Rate Adaptation in Turbulent UOWC via DNN-based SNR Prediction

Huayu Wang[1], Masanori Hanawa[2], Zhu Li[1], Meilin He[1]
[1]Hangzhou Dianzi University, [2]University of Yamanashi

We propose a DNN-based proactive SNR prediction scheme for underwater optical wireless communication. ResNet extracts statistical features to dynamically adapt LDPC rates, yielding a 16.2% throughput enhancement over lookup tables under typical log-normal turbulence.

P3-59 **10:00-11:45**

Joint LDPC-Coded PRS and DNN-Based Soft Decision Receiver for Bandwidth-Limited UOWC

Dishen Lin[1], Masanori Hanawa[2]
[1]Hangzhou Dianzi University, [2]University of Yamanashi

We propose a joint LDPC-PRS-DNN framework for bandwidth-limited UOWC, combining LDPC-coded PRS with DNN-based soft detection, achieving a 2.7 dB gain over OOK threshold detection while increasing the 99% occupied bandwidth by only 8.83%.

P3-60 **10:00-11:45**

Impact of Intra-Band Crosstalk on Optical Filter Estimation Using Digital Longitudinal Monitoring

Yota Sagara, Ryuta Shiraki, Eiji Oki
Kyoto University

This paper investigates the impact of intra-band crosstalk on optical filter estimation using digital longitudinal monitoring. Numerical results show that spectral distortion affects estimation error, suggesting the potential to estimate filters applied to other ports.

P3-61 **10:00-11:45**

Quaternion-Valued Neural Network-Based Fiber Nonlinearity Mitigation for Polarization-Multiplexed Optical Signals

Kizuku Ochiri, Yuto Ishigami, Moriya Nakamura
Meiji University

We propose a fiber nonlinearity mitigation scheme using a quaternion-valued neural network for polarization-multiplexed optical transmission systems. The proposed method achieves faster training and computationally efficient nonlinear equalization compared with real-valued and complex-valued schemes.

P3-62 **10:00-11:45**

Headerless Recovery of PAM2/PAM4 Ratios Using CNN for Optical Wireless Links

Ayumu Kariya, Kiichiro Kuwahara, Fumiya Kobori, Takahiro Kodama
Kagawa University

We propose a CNN-based, headerless method for estimating PAM2/PAM4 ratios in optical wireless links. Experiments show accurate ratio estimation across p-values under bandwidth-limited conditions, enabling reliable demodulation even when header information is corrupted.

P3-63 **10:00-11:45**

An Apodized FBG Filter Configuration for Separation of O-Band QKD Channel over C-Band DWDM Communication Systems

Kyungtaek Lee[1], Namwook Joe[2], Taeho Woo[2], Suckwoo Shin[2], Ju Han Lee[2]
[1]Korea Aerospace Research Institute, [2]University of Seoul

An apodized FBG filter configuration with a ~93-dB channel isolation is proposed for separation of O-band QKD channel from classical C-band communication channels and its performances were evaluated in terms of secret key rate.

P3-64 **10:00-11:45**

Simulation-Based Security Analysis of COW and DPS QKD: Decoy State Limitations and Positional Vulnerability under IAR Attacks

Hsiang-Chun Hsu, Yuh-Renn Wu
National Taiwan University

We simulate COW and DPS QKD under IAR attacks using mutual information analysis. DPS decoy states cannot reduce information leakage, while COW detects eavesdropping through monitor-line decoy ratio variations. Interception position critically impacts both protocols.

P3-65 **10:00-11:45**

Quantization Noise Shaping in CVQKD Using Delta-Sigma Modulation

Wenjun Fan[1], Zhenlin Zhao[1], Xingwen Yi[2], Dawei Wang[1]
[1]Sun Yat-sen University, [2]Bangor University

We propose a quantization noise shaping method based on delta-sigma modulation for CVQKD. It reduces excess noise from low-resolution DACs, enabling higher pilot power and effective key generation under conditions where standard quantization fails.

P3-66 **10:00-11:45**

A Study of Co/Counter-propagation Design for O-/C-band QKD and APN DWDM Signals

Jian-Kai Huang, Ying-Ru Chen, Ju-Kai Chen
Chunghwa Telecom Co., Ltd.

We evaluate O- and C-band QKD coexistence with APN DWDM signals, identify direction-dependent limits, validate ETSI-014 key delivery, and demonstrate stable operation with experimentally confirmed power constraints and security behavior.

P3-67 **10:00-11:45**

Distance Scaling of Teleportation in Hybrid Quantum–Classical Fiber Links

Federico Fissore, Andrea Ferraro, Alberto Polato, Jake Smith, Roberto Proietti
Polytechnic University of Turino

We analyze quantum teleportation over hybrid quantum–classical fiber links using a sender–receiver architecture with quantum memories at both nodes. Fiber loss, optimized classical launch power, memory decoherence, and Raman-induced depolarization jointly determine teleportation fidelity.

P3-68 **10:00-11:45**

Solid-State Optical Beam Scanner of FMCW LiDAR Sensor for Autonomous Driving

Nan Ei Yu, Toijam Sunder Meetie
Gwangju Institute of Science and Technology

We demonstrate 2D beam steering using arrayed waveguide grating (AWG)-based optical phased array (OPA) integrated with MEMS and angular expansion, providing a field-of-view (FOV) of 76.58o (H)×48o (V) via wavelength tuning (C-band), and further demonstrate FMCW ranging.

P3-69 **10:00-11:45**

Plug And Play Prior for Deconvolution of Optical Coherence Tomography

Fu Liu[1,2], Shuyuan Zhu[1,2], Dongmei Huang[1,2]
[1]The Hong Kong Polytechnic University, [2]The Hong Kong Polytechnic University Shenzhen Research Institute

We report a plug-and-play prior method to reconstruct optical coherence tomography images and suppress noise simultaneously. A blind deconvolution technique is adopted to alleviate sidelobe artifacts and improve image contrast and resolution.

P3-70 **10:00-11:45**

Vibration Compensation based on a Dual-Probe FMCW LiDAR

Riku Kondo[1], Takahiro Nagata[1], Yuto Kusaka[1], Hiroki Yamazaki[1], Chao Zhang[2,3],Fumihiko Ito[1], Shingo Ohno[4], Atsushi Nakamura[4], Kunihiro Toge[4]
[1]Shimane University, [2]Kogakuin University, [3]The University of Tokyo, [4]NTT, inc.

We propose a dual-probe FMCW LiDAR system for an in-process measurement. Based on this method, we succeeded in compensation through experiments using sinusoidal vibration. This article presents the results of 3D measurements acquired under vibration.

P3-71 **10:00-11:45**

Phase Retrieval in Reflection Microscopy via TIE-Consistent Reference Selection and Neural Defocus Field

Yongjun Lim
Electronics and Telecommunications Research Institute

A hybrid framework for stable reflection-type transport of intensity equation (TIE) phase retrieval is proposed. By optimizing reference planes and learning neural defocus fields, the method ensures consistency and repeatability despite mechanical uncertainties.

P3-72 **10:00-11:45**

In vivo ultrastructural and dynamics imaging of whole zebrafish by multi-contrast OCT

Shadil Basheer[1], Yiheng Lim[1], Cunyou Bao[1], Ibrahim Abd El-Sadek[1,2], Toshiki Obokata[1], Aiyi Suic, Shuichi Makita[1], Makoto Kobayashi[1], Yoshiaki Yasuno[1]
[1]University of Tsukuba, [2]Damietta University

Zebrafish are vital biomedical models, yet traditional imaging lacks in whole-body ultrastructural analysis. We developed a custom 1.3-μm swept-source Jones-matrix optical coherence tomography (JM-OCT) system integrated with a motorized stage to overcome these limitations.

P3-73 **10:00-11:45**

Deep-Learning Enhancement of OCT for Automatic Spheroid Evaluation: Future Prediction and Fine Segmentation

Zheng Yuping[1], Ibrahim Abd El-Sadek[1,2], Yusong Liu[1], Rameesa Rafi MH[1], Shadil Basheer[1], Atsuko Furukawa[1], Satoshi Matsusaka[1], Yoshiaki Yasuno[1]
[1]University of Tsukuba, [2]Damietta University

Our recently proposed automatic time-lapse optical-coherence tomography revealed drug-spheroid interactions, but manual segmentation and uniform longterm imaging are inefficient. Therefore, we propose two deep-learning approaches enabling automatic segmentation and predicting spheroid volume at future timepoints.

P3-74 **10:00-11:45**

A 1.3 μm Swept Source Optical Coherence Tomography based on Time Stretching a Supercontinuum Source

Laiyang Dang[1,2], Shuyuan Zhu[1], Wenhao Zhu[1,2], Fu Liu[1,2], Dongmei Huang[1,2]
[1]The Hong Kong Polytechnic University, [2]The Hong Kong Polytechnic University Shenzhen Research Institute

We report a 1.3 μm swept source optical coherence tomography based on time stretching a supercontinuum source, which achieves 14.1 MHz rate, 7.5 μm resolution and 58.5 mm range, breaking bandwidth-speed-range constraints.

P3-75 **10:00-11:45**

Extended-Range FMCW LiDAR Using AWG-Based Wavelength-Division Reference Paths

Sangwon Park, Sang Min Park, Hwidon Lee, Chang-Seok Kim
Pusan National University

We propose a range-extended frequency-modulated continuous-wave (FMCW) light detection and ranging (LiDAR) system using arrayed waveguide grating (AWG)- based wavelength-division reference paths to resolve range ambiguity without increasing system hardware complexity.

P3-76 **10:00-11:45**

FMCW LiDAR with Combined Mechanical and Spectral Steering for Improved Angular Resolution and Point Density

Seongmun Jeong, Sang Min Park, Hwidon Lee, Chang-seok Kim
Pusan National University

Mechanical and spectral beam steering frequency modulated continuous wave (FMCW) light detection and ranging (LiDAR) mitigates scan speed-angular resolution constraints. Fast spectral steering and slow mechanical scanning increase angular resolution and point density over wide field of view (FoV).

P3-77 **10:00-11:45**

Wavelength-Multiplexed Interferometer for Extended-Range FMCW LiDAR

Wontae Choe[1], Sang Min Park[1], Min Uk Jung[2], Hwidon Lee[1], Chang-Seok Kim[1]
[1]Pusan National University, [2]Korea Photonics Technology Institute

We present a wavelength-multiplexed interferometer for FMCW LiDAR that extends the measurable range beyond the limits of laser coherence. A novel frequency-decoding method resolves ambiguity, enabling unambiguous distance measurement and improving the practicality of extendedrange FMCW sensing.

We2A-1 Invited 13:15-13:45

Impact of Equalization-Enhanced Phase Noise on Tbps-Class Coherent Transceivers and Joint Optimization of Laser Phase Noise and DSP Compensation

Yo Nakamura, Tomoo Takahara, Shinsuke Tanaka, Hisao Nakashima
1Finity Inc.

High-baud-rate coherent transmission suffers from severe EEPN caused by digital dispersion compensation. We introduce an EEPN budgeting method and quantify the trade-off between laser phase noise characteristics and DSP configuration assuming a 1.6 Tbit/s system.

We2A-2 13:45-14:00

High-Power (500 mW) Narrow-Linewidth (11.5 kHz) Distributed Feedback Laser

Hao Song[1,2], Huasong Linfang[1,2], Ruikang Zhang[1,2], Hao Wang[1,2], Dan Lu[1,2]
[1]Institute of Semiconductors, Chinese Academy of Sciences, [2]University of Chinese Academy of Sciences

We demonstrate a high-power, narrow-linewidth DFB laser. At 25 °C, the epi-down bonded DFB laser delivers 534 mW in continuous-wave (CW) operation with an intrinsic linewidth of 11.5 kHz.

We2A-3 14:00-14:15

Full S-Band Tunable Laser with a Trident Tapered Coupler

Dongwei Zhuang, Quanxin Na, Qijie Xie, Chunyang Ma, Ningli Chen, Li Wang, Mengqi Wu, Xiaomin Nie, Zhixue He, Lei Wang
Peng Cheng Laboratory

We demonstrate an external-cavity laser covering the full S-band with a 116.02 nm tuning range, a maximum output power of 13.54 dBm, an optimal SMSR of 68.74 dB, an intrinsic linewidth of 503 Hz, and RIN below -151.97 dBc/Hz.

We2A-4 14:15-14:30

Modulation Response of Photonic Crystal Lasers with Linear Dispersion

Christos Papapanos[1], Mariusz Drong[1], Md Ishfak Tahmid[1], Boubacar Kanté[1,2]
[1]University of California, Berkeley, [2]Lawrence Berkeley National Laboratory

We theoretically study modulation dynamics in photonic crystal lasers with linear (Dirac) dispersion, showing that it enhances relaxation frequency scaling and enables significantly higher modulation bandwidth compared with conventional quadratic band edge devices.

We2A-5 14:30-14:45

Demonstration of a Novel Built-in Channel Waveguide (BCW) Laser Emitting at 1300nm

Ika Novitasari[1], Alfred Albert[1], Zih-Jie Sun[1], Akihiko Kasukawa[1,2], San-Liang Lee[1]
[1]National Taiwan University of Science and Technology, [2]Ministry of Education Taiwan

A novel Built-in Channel Waveguide (BCW) laser with a wider channel width (>5 μm) is fabricated for the first time. It demonstrates high fabrication tolerance, single-mode operation, and high-power capability, showing significant potential for scaling.

Room B (Grand Ballroom 2), 2F	Chair: Miguel Gonzalez-Herraez (University of Alcala)
We2B	July 1 (Wed), 2026
Multimode & Multicore Fibers	13:15-14:45

We2B-1 **13:15-13:30**

Development of Ge-Doped Low-Loss Air-Gap 4-Core Multicore Fiber

Shugo Takeuchi, Tomoya Akao, Keita Takahata, Osanobu Fukuo, Kazunori Mukasa, Yoshihiro Arashitani
Lightera Japan Co., Ltd.

We successfully developed Ge-doped air-gap 4-core multicore fiber (MCF), satisfied low-loss (< -45 dB/100 km). The optimum structure was realized by the FEM-based design and fabrication-process optimizations.

We2B-2 **13:30-13:45**

Optimizations of Multi-Core Fibers for Short Wavelength and Short Reach Applications

Kazunori Mukasa
Lightera Japan Co., Ltd.

Optimization studies on multi-core fibers in 900nm band for short-reach applications taking HOM effects into account were performed. The effect of additional confinements of HOM for inside cores with 37-core fibers were also investigated.

We2B-3 **Invited** **13:45-14:15**

Spatiotemporal Optical Toroidal Beams in Multimode Fibers

A.V. Komonen[1], N.K. Fontaine[2], M. Plöschner[1], M.M. Morote[1], D.T. Neilson[2], J. Carpenter[1], M. Mounaix[1]
[1]The University of Queensland, Brisbane, [2]Nokia Bell Labs

We experimentally demonstrate the ability to generate tailored spatiotemporal optical beams after propagation through a multimode optical fiber. Specifically, we show optical toroidal beams with different geometrical properties and orbital angular momentum.

We2B-4 **14:15-14:30**

All-Fiber Phase Control for Coherent Beam Combining in Multicore Fiber Systems

Yuanchong Zhang[1], Michalis N. Zervas[1,2], Yongmin Jung[1]
[1]University of Southampton, [2]TRUMPF Laser UK Ltd

We demonstrate an all-fiber phase control technique for coherent beam combination in a four-core multicore fiber. Two-dimensional (2D) fiber bending together with uniaxial transverse compression enables >80% combining efficiency at 1550 nm.

We2B-5 **14:30-14:45**

Development of 7-Core Air-Gap Optical Fiber for Signal and Power Transmission with Enhanced Fiber-Fuse Resistance

Tomoya Akao[1], Shugo Takeuchi[1], Keita Takahata[1], Takeshi Takagi[1], Osanobu Fukuo[1], Kazunori Mukasa[1], Kalipada Chatterjee[2], Toshio Morioka[2]
[1]Lightera Japan Co., Ltd., [2]Technical University of Denmark

We fabricated a 7-core air-gap fiber enabling simultaneous signal and power transmission. The outer cores meet ITU-T G.654 standards with reduced crosstalk, while both center and outer cores show better fiber-fuse resistance than standard SMF.

Room C (Grand Ballroom 3), 2F

Chair: Emilio Paolini (Scuola Superiore Sant'Anna)

We2C
Satellite Optical Communication

July 1 (Wed), 2026
13:15-14:45

We2C-1 **13:15-13:30**

Analysis on Benefit of Introducing WDM into Inter-satellite All-optical Networks

Shoichiro Oda, Anthony Brasi, Yusuke Hirota, Hideaki Kotake, Satoshi Shinada, Hideaki Furukawa
National Institute of Information and Communications Technology

Using Starlink orbital-data-driven routing and OSNR modeling under fixed power of high-power amplifiers, we quantify WDM capacity gain in inter-satellite all-optical networks: total throughput over ten paths rises from 25 to 52 Tbps (~110% improvement).

We2C-2 **13:30-13:45**

Load-Balanced Routing and Access Selection with Wavelength Alignment Degree in LEO Satellite Optical Networks

Yu Sun[1], Zhiyuan Che[1], Yuneng Deng[1], Liulei Zhou[1], Bowen Chen[1,2]
Politecnico di Torino

In this paper, we propose a load-balanced routing algorithm based on wavelength alignment degree (WADR) and a load-balanced access satellite selection algorithm with maximum path wavelength alignment degree (MPWAS).

We2C-3 **13:45-14:00**

Demonstration of Rate-Adaptive, Multi-Rate Quality-of-Transmission Estimation in Inter-Satellite All-Optical Networks

Anthony Brasi, Shoichiro Oda, Yusuke Hirota, Hideaki Kotake, Satoshi Shinada, Hideaki Furukawa
National Institute of Information and Communications Technology

Using Starlink orbital data, we experimentally demonstrate multi-rate QoT estimation via 200-Gbps optical probing and rate-adaptation from 100 to 400 Gbps with ≤0.4 dB estimation error in an inter-satellite all-optical network testbed.

We2C-4 **14:00-14:15**

Temporal and Spatial Variation-Based Turbulence Adaptive Prediction for Reliable Satellite-Ground Optical Network

Zhe Niu[1], Hui Yang[1], Qiuyan Yao[1], Yuxuan Yan[1], Buzheng Wei[2], Jie Zhang[1]
[1]Beijing University of Posts and Telecommunications, [2]China Unicom Research institute

We propose a turbulence adaptive prediction model for satellite-to-ground optical networks, it is designed based on the neural architecture search and method of weighting the predicted results, prediction accuracy and network reliability are effectively improved.

We2C-5 **14:15-14:30**

DRL-STR: Penalty-Aware Topology Learning Optimization for Dynamic Satellite Optical Networks

Zhao Li, Hui Yang, Qiuyan Yao, Jingchao Mai, Jie Zhang
Beijing University of Posts and Telecommunications

We leverage hierarchical deep reinforcement learning (DRL) to optimize satellite network topology reconfiguration (STR), achieving penalty-aware autonomous learning of topology reconfiguration frequency and link adjustment strategies. Compared with traditional solutions, this solution reduces delay by 16.3%.

We2C-6 **14:30-14:45**

Mobile Orbital Domain-Based Hierarchical Routing with Joint Path and Gateway Selection

Zilong Ye[1,2], Philip N. Ji[1], Ting Wang[1]
[1]NEC Laboratories America, [2]California State University Los Angeles

We propose to jointly optimize path and gateway selection to achieve load balancing for mobile orbital domain-based hierarchical routing in satellite networks. The load at bottleneck gateway satellites can be reduced by 22% on average.

Room D (Capri), 2F | Chair: Sang-Rok Moon (ETRI)

We2D | July 1 (Wed), 2026

Radio-over-Fiber and Optical Wireless Systems | 13:15-14:45

We2D-1 **13:15-13:30**

216 Gbit/s, Polarization- Multiplexed Fully Coherent Optical and Wireless Transmission at 30 GHz for 6G RAN

Arata Watanabe, Yusei Sakuma, Tomoki Joichi, Keisuke Kasai, Toshihiko Hirooka, Masato Yoshida, Masataka Nakazawa
Tohoku University

We demonstrate a 216 Gbit/s polarization-division multiplexed (PDM) fully coherent transmission at 30 GHzIF. By using a polarization dependence-free injection-locked heterodyne-detection circuit, PDM-64 QAM signals were transmitted over a 10 km-SMF and over 10 m wirelessly.

We2D-2 **13:30-13:45**

1.5-Tb/s OWC Systems Employing High-Power EDFAs, Large-Aperture Receivers, and CPAs/FPAs

Wei-Zhi Jiang, Wei-Ting Huang, Chi-Hsiang Hsu, Yen-Chen Chen, Hai-Han Lu
National Taipei University of Technology

A 1.5-Tb/s OWC system over a 1.6-km free-space link is successfully implemented employing HP-EDFAs, large-aperture receivers, and CPAs/FPAs. The successful implementation of the 1.5-Tb/s OWC link validates the feasibility of high-capacity long-distance optical wireless transmission.

We2D-3 **Invited** **13:45-14:15**

Towards Integrated Front-Ends for Radio-Over-Fiber Systems

Joonyoung Kim[1], Javier Perez Santacruz[1], Xin Yin[2], Gunther Roelkens[3], Xavier Rottenberg[1], Dongjae Shin[4]
[1]imec, [2]imec-Ghent University, [3]imec NL, [4]imec-NL Holst Centre

We review recent advances in integrated photonics for radio-over-fiber systems, focusing on monolithic and hybrid integration of ultra-high-speed photodiodes, lasers, and modulators, enabling compact and scalable architectures for high-frequency wireless communication and sensing.

We2D-4 **14:15-14:30**

Ceiling-Source-Free Indoor OWC with SOA Lumped Amplification

Takahiro Kodama[1], Mikolaj Wolny[2], Eduward Tangdiongga[2]
[1]Kagawa University, [2]Eindhoven University of Technology

We demonstrate a single-fiber bidirectional indoor OWC cell using SOA lumped amplification and polarization-multiplexed seed distribution with external modulation, eliminating ceiling light sources. A 10-cm cell at 2 m achieves 500 Mb/s downlink.

We2D-5 **14:30-14:45**

A Tree Based 6G-RoF Architecture with Mutual Feeder Fiber Protection and Restoration

Po-Hong Tsai, Ching-Hung Chang, Zhen-Wei Wu, Wei-Che Yen
National Chiayi University

We propose a resilient 6G-RoF architecture where feeder fibers from two transmission systems act as mutual backups, ensuring robust self-healing and error-free transmission against fiber failures.

We2E-1 **13:15-13:30**

Compact and Low-Loss Silicon Nitride Rib Waveguide Bends Using Width-Modulated NAdjustable Trajectories

Ja-Hyun Ku[1], Hui-jae Cho[1], Ga-Young Park[1], Kap-Joong Kim[2], Byung-Seok Choi[2], Jong-Bum You[1]
[1]National NanoFab Center, [2]Electronics and Telecommunications Research Institute

We experimentally demonstrate compact, low-loss silicon nitride rib waveguide bends using width-modulated Nadjustable trajectories. By effectively suppressing both slab leakage and radiation loss, substantial loss reductions are achieved across various bend radii.

We2E-2 **13:30-13:45**

Compact Silicon Nitride Edge Coupler Optimized via Covariance-Matrix-Assisted Particle Swarm Optimization

Zhengyang Li, Yichen Zhang, Lei Zhang
Beijing University of Posts and Telecommunications

We report a compact SiN edge coupler optimized via covariance-matrix-assisted particle swarm optimization. It exhibits approximately 1.1 dB insertion loss and below 0.3 dB polarization-dependent loss at 1550 nm for 4-μm modefield diameter fibers.

We2E-3 **13:45-14:00**

Near-Athermal Silicon Nitride (De)multiplexer with a Wavelength Shift of ~2 pm/K

Shiqi Zhang, Donghao Li, Luyang Liu, Haojie Xue, Yichen Zhang, Lei Zhang
Beijing University of Posts and Telecommunications

We report a silicon nitride (de)multiplexer that employs varying waveguide widths to achieve a temperature-insensitive response. The device exhibits a low temperature-dependent wavelength shift of 2 pm/K and a π-phase-shift power of 29 mW.

We2E-4 **14:00-14:15**

Effective Depth and Nonlinearity in an Integrated Photonic Recurrent Network

Yongdi Zhang[1], Qishen Liang[1], Zichao Zhao[1], Haoran Ma[1], Baojie Hou[1], Yawen Tu[1],Bin Zhang[1,2], Bangmin Gong[1], Huihui Zhu[1], Yuehai Wang[1], Jianyi Yang[1,3]
[1]Zhejiang University, [2]Zhejiang Lab, [3]Jinhua Institute of Zhejiang University

We demonstrate an integrated photonic recurrent network in which optical feedback enhances effective depth and enables nonlinear input–output mappings without increasing physical layers.

We2E-5 **Invited** **14:15-14:45**

From Sensing Applications to 200Gbps/lane Silicon Photonics Using 300mm Platforms

Frédéric Boeuf, Louise-Eugenie Bataille, Leopold Virot, Lorenzo Lazzari, Stephane Monfray, Eva Kempf, Sebastien Cremer
STMicroelectronics

Beginning in the 1980s, Silicon Photonics evolved into a key technology for low-cost, high-speed optical transceivers. We present STMicroelectronics' PIC50 and PIC100 platforms, enabling high-speed modulators, detectors, OPAs, and heterogeneous III–V/SOI integration for datacom, LiDAR, and quantum applications.

We2F-1 **13:15-13:30**

ntegrated Wavelength Division Multiplexing Transmitter with Dispersion Pre-compensation

Weihan Wang, Ruitao Ma, Fei Huang, Mingyu Zhu, Aoyun Gao, Zexu Wang, Shujun Liu, Weike Zhao, Yiwei Xie, Zejie Yu, Daoxin Dai
Zhejiang University

We demonstrate a 4-channel wavelength division multiplexing transmitter using thin-film lithium tantalate, enabling 100 Gbaud signal transmission, and successfully mitigating the chromatic dispersion penalty over 1.5 km of single-mode fiber via dispersion pre-compensation.

We2F-2 **13:30-13:45**

3–300 K 850 nm VCSEL for Cryogenic Optical Interconnects with 128 Gbps PAM-4 at 3 K

Etina Zou1, Zetai Liu2, Min-Hsin Wu1, Chung-Hsin Yu1, Yun-Cheng Yang1, Milton Feng2, Chao-Hsin Wu1
[1]National Taiwan University, [2]University of Illinois Urbana-Champaign

We demonstrate an 850 nm cryo-VCSEL operating from 3–300 K with 10–91 mW output, 1.18 W/A slope efficiency and 0.254 WPE. 128-Gb/s PAM-4 direct modulation at 3 K, indicating potential for cryogenic optical interconnects.

We2F-3 **13:45-14:00**

High-Bandwidth-Density 850 nm VCSEL Array for Terabit Optical Interconnects

Min-Hsin Wu, Etina Zou, I-Chi Liu, Yun-Cheng Yang, Chao-Hsin Wu
National Taiwan University

We demonstrate a compact 850-nm VCSEL array achieving over 1 Tb/s/mm² bandwidth density. Each channel supports 25.8 Gb/s NRZ and 53.1 Gb/s PAM-4 for highdensity optical interconnects.

We2F-4 **14:00-14:15**

A 2-λ × 50-Gb/s PAM-4 Silicon RingResonator-Based WDM Optical Receiver

Jae-Ho Lee[1], Dong-Hyeon Kim[1], Yongjin Ji[1], Seung-Jae Yang[1], Hyun-Kyu Kim[2], Woo-Young Choi[1]
[1]Yonsei Universit, [2]Samsung Electronics Co., Ltd.

We demonstrate a 2-λ × 50-Gb/s PAM-4 silicon (Si) ringresonator-based wavelength division multiplexing (WDM) optical receiver. Each optical receiver achieves BER less than 1e-12 for 32-Gb/s NRZ and less than 2.4e-4 for 50-Gb/s PAM-4 data.

We2F-5 **Invited** **14:15-14:45**

Zn-Diffusion Single-Mode VCSELs at 850 and 1060 nm for High-Speed AI Interconnection

Jin-Wei Shi
National Central University

We review our recent work about 850 and 1060 nm single-mode VCSELs for high-speed modulations. With optimized Zn-diffusion apertures, simultaneous improvements in statice, dynamics, and transmission performances can be achieved in both these two wavelengths.

We2G-1 Invited 13:15-13:45

All-Fiber Laser via Hybrid Optical Amplifier in the NIR-III Region for Multi-Contrast Photoacoustic Microscopy

Yitian Tong[1], Huajun Tang[1], Jixiang Chen[1], Najia Sharmin[1], Jinge Wei[1], Kevin K. Tsia[1,2], Kenneth K.Y. Wong[1,2]
[1]The University of Hong Kong, [2]Hong Kong Science Park

We report an all-fiber NIR-III laser leveraging flexible optical parametric conversion. The source generates switchable 1725-nm/1930-nm pulses with programmable pulse widths, 1.5-μJ pulse energy, and frequencies up to 100 kHz, enabling bond-selective, multi-contrast photoacoustic microscopy.

We2G-2 13:45-14:00

Quantum Induced-Coherence Interferometry Using a SPAD Array for High-Resolution Infrared Depth Profiling

Hyung Beom Kim[1,2], Tae Yeong Park[1,2], Myeong Soo Kang[1], Hongki Yoo[1], Hee Su Park[1,2]
[1]Korea Advanced Institute of Science and Technology, [2]Korea Research Institute of Standards and Science

We present a quantum induced-coherence tomography based on visible-infrared interband entangled photon pairs.

We2G-3 14:00-14:15

Fixed-Decoder Autoencoder for Robust Nanoscale Displacement Extraction in Optical Coherent Sensing

Md Nazmul Hussain, Ayumi Ito, Yasuhiro Okamura, Masanori Hanawa
University of Yamanashi

A Fixed Decoder Autoencoder reconstructs nanoscale displacement waveforms from noisy optical interferometric phase measurements. Physically guided by an Exponentially Modified Gaussian kernel, the system achieves 99% linearity over 2.17-15.02 nm range, suitable for biomedical metrology.

We2G-4 14:15-14:30

A Short-Time Fourier Transform Based Spatiotemporal Continuity Filter for Distributed Acoustic Sensing

Zhang Yuchen[1,2], Chen Chen[2], Liu Yifan[3], Liu Zexi[3], Gao Kan[3], Wang Zhaoyong[2], Wei Fang[2], Cai Haiwen[2]
[1]Fudan University, [2]ZhangJiang Laboratory, [3]Chinese Academy of Sciences

A smoothing filter based on the short-time Fourier transform and spatiotemporal continuity for DAS signal post-processing is proposed for the first time. A 9.86 dB SNR enhancement is achieved for 125 Hz vibration signal at 62 km.

We2G-5 14:30-14:45

High Range Resolution Si SLG FMCW LiDAR with Wideband DFB LD Predistortion Using OnChip Interferometer

Shota Nawa, Mikiya Kamata, Takemasa Tamanuki, Toshihiko Baba
Yokohama National University

We demonstrate Si photonics SLG FMCW LiDAR integrated with an interferometer including a long delay line for injection current predistortion of DFB LD. 167-GHz frequency sweep achieves record high range resolution of 0.47 mm.

We3D-1 Invited 15:00-15:30

Ultrahigh-Capacity Coupled-Core MultiCore Fiber Transmission Systems enabled by Advanced DSPs

Akira Kawai, Kohki Shibahara, Masanori Nakamura, Megumi Hoshi, Takayuki Kobayashi, Yutaka Miyamoto
NTT, inc.

In this presentation, we provide an overview of CCFbased SDM-MIMO transmission exceeding 10 Tb/s/λ, with an emphasis on DSP. We introduce an experimental demonstration of over-14 Tb/s/λ transmission with coding technique robust to mode-dependent loss.

We3D-2 15:30-15:45

Integrated Temperature and Vibration Sensing and Communication based on Weakly Coupled FMFs

Jiarui Zhang[1,2], Gang Qiao[2], Mingqing Zuo[2], Bowen Lin[2], Yu Yang[2], Yiran Wang[2], Chengbin Long[2], Siyuan Liu[2], Yongqi He[2], Zhangyuan Chen[2], Juhao Li[2,3]
[1]China Telecom, [2]Peking University,[3]Peng Cheng Laboratory

We demonstrate simultaneous vibration and temperature monitoring using telecom signals from a 32-Gbaud 16QAM MDM system, achieved by adjusting the DSP algorithms, without the need for additional spectrum or fiber sources.

We3D-3 15:45-16:00

Shared-Wavelength Integrated Communication and Sensing Scheme over Single-Mode Fiber

Jiajia Shen[1], Suiyao Zhu[2], Jiajun Ji[1], Tingyu Fu[1], Suhua Wang[1], Fengge Wang[3], Mingyi Gao[1]
[1]Soochow University, [2]Harbin Institute of Technology, [3]Zhongyuan University of Technology

We propose a shared-wavelength integrated sensing and communication (ISAC) scheme. This scheme achieves vibration reconstruction through phase-modulated probe signals and continuous communication signals, simultaneously realizing interference-free multi-carrier transmission and high-signal-to-noise-ratio (SNR) sensing demodulation.

We3D-4 16:00-16:15

Monitoring of Polarization Fluctuation Speed with Dual-Branch Delay Interferometers

Shiro Ryu[1], Kenya Hitomi[2], Taku Saito[2]
[1]Meiji University, [2]SoftBank Corp

We propose a dual-branch delay interferometers to measure the speed of polarization fluctuation. The proposed system estimates the speed of polarization fluctuations on the Poincaré sphere, as demonstrated in laboratory and 142-km field experiments.

We3D-5 16:15-16:30

Domain Generalization Framework for Robust Linear and Nonlinear SNR Monitoring in Unseen Optical Network Conditions

Qi Hu[1], Hongcheng Wu[1], Haohua Wang[1], Bang Yang[2], Gai Zhou[3], Yanfu Yang[2], Yang Li[4], Faisal Nadeem Khan[1]
[1]Tsinghua University, [2]Harbin Institute of Technology, [3]Guangdong University of Technology, [4]Chinese University of Hong Kong

We propose a domain generalization framework for robust linear and nonlinear SNR monitoring under unseen network conditions without requiring any retraining of ML model, achieving MAEs for linear and nonlinear SNR of 0.65-dB and 0.78-dB, respectively.

We3E-1 **15:00-15:15**

Cascaded Micro-ring Resonators Enabled Ultrahigh Resolution On-Chip Computational Spectrometer

Xinchen Wan, Haoyang Sun, Tongtian Zhang, Guangya Zhou
National University of Singapore

This paper reports an advanced high resolution on-chip computational spectrometer achieved through cascaded thermal tuned micro-ring resonators (MRRs). Our proposed spectrometer is able to achieve high resolution (<30 pm).

We3E-2 **15:15-15:30**

Integrated Programmable Microcomb Shaper for Optical Convolution Processing

Haoran Zhang[1] Xiaotian Zhu[2], Shifan Chen[1], Yifu Xu[1], Jiajia Wang[1], Zhihui Liu[1], ShuaiWang[1], Yunping Bai[1], Brent E. Little[3], Roberto Morandotti[4], David J. Moss[5], Sai T. Chu[2], Xingyuan Xu[1]
[1]Beijing University of Posts and Telecommunications, [2]City University of Hong Kong, [3]QXP Technology Inc., [4]INRS-Énergie, Matériaux et Télécommunications, [5]Swinburne University of Technology

We present an integrated programmable microcomb shaper (PMS) based on a CMOS-compatible, high-index doped silica glass platform, capable of processing 100.3-GHz microcombs and demonstrated in optical convolution processing.

We3E-3 **15:30-15:45**

Second-order Microring Thermo-optic Switch on SOI with Sub-5 μs Response Time

Haojie Xue, Yuanhao Li, Lei Zhang
Beijing University of Posts and Telecommunications

We demonstrate a pulsed-driven, second-order microring thermo-optic switch on silicon-on-insulator (SOI), reducing the response time from 31 μs to sub-5 μs.

We3E-4 **Invited** **15:45-16:15**

On-chip Ultra-Low-Loss Chalcogenide Glass Optical Waveguides and Resonators for Mid-Infrared Photonics

Hansuek Lee[1], Daewon Suk[1], Kiyoung Ko[1], Soobong Park[1], Kwang-Hoon Ko[2], Duk Choi[3], Fabian Rotermund[1]
[1]Korea Advanced Institute of Science and Technology, [2]Korea Atomic Energy Research Institute, [3]Australian National University

We present mid-infrared chalcogenide glass on-chip waveguides and resonators with a propagation loss of 0.29 dB/m and a Q-factor of 67 million, enabling applications including Brillouin lasers with 85 Hz linewidth and dispersive-wave supercontinuum generation.

Room F (Sicily), 2F — Chair: Yo Nakamura (Fujitsu)

We3F — July 1 (Wed), 2026

Coherent Communications & Novel Sources — 15:00-16:30

We3F-1 **Invited** **15:00-15:30**

Ultra-Compact Coherent Transmitters for NextGeneration Datacenter Interconnects

Erwan Weckenmann, Alireza Geravand, Jean-Michel Vallée, Farshid Shateri, Zibo Zheng, Simon Levasseur, Leslie A. Rusch, Wei Shi
Université Laval

We review our recent works on ultra-compact silicon photonic coherent transmitters, demonstrating record bandwidth density and energy efficiency. Our results, including multi-wavelength and super-channel demonstrations, highlight their scalability for nextgeneration datacenter interconnects.

We3F-2 **15:30-15:45**

Temperature Stabilization Technique for Si Micro-Ring-based Coherent QPSK Transmitter

oungkwan Jo[1,2], Yongjin Ji[1], Stefan Lischke[3], Christian Mai[3], Lars Zimmermann[3,4], Woo-Young Choi[1]
[1]Yonsei University, [2]Electronics and Telecommunications Research Institute, [3]IHP – Leibniz-Institut für innovative Mikroelektronik, [4]Technische Universität Berlin

A temperature stabilization technique is demonstrated for a Si micro-ring-based coherent transmitter operating at 25-Gbaud QPSK. The technique provides initial bias optimization and real-time bias tracking. Its operation is successfully verified through measurement under intentional temperature perturbation.

We3F-3 **15:45-16:00**

140-Gbaud Lumped-EML Submodule Using a Capacitive Wire-Bonding Pad and LC Resonance

Seok-Jun Yun[1,2], Young-Tak Han[1], Dong-Hoon Lee[1], Dong-Hyo Lee[1], Young-Kyu Choi[1], Hoon Kim[2], and Yongsoon Baek[1]
[1]Electronics and Telecommunications Research Institute, [2]Korea Advanced Institute of Science and Technology

We develop a lumped-EML submodule leveraging LC resonance and a capacitive wire-bonding pad to achieve >100-GHz modulation bandwidth. The fabricated submodule demonstrates successful 140-Gbaud PAM-4 and PAM-6 signal transmissions.

We3F-4 **16:00-16:15**

A Free-Space Optical Communication Link Enabled by Quantum Dot Comb Laser

Shujie Pan[1,2], Dingyi Wu[3],Shihao Ding[4], Junjie Yang[2], Xi Xiao[3], Chao Zhao[1,5], Siming Chen[1,5]
[1]Chinese Academy of Sciences, [2]HS Photonics Co., Ltd., [3]National Information Optoelectronics Innovation Center, [4]Shenzhen Technology University, [5]University of Chinese Academy of Science

We demonstrate a 64 Gbit/s/λ free-space optical link using a 100 GHz quantum dot mode-locked laser. This integrated multi-wavelength source is predicted to support distances exceeding 500 m, offering a cost-effective solution for next-generation terrestrial networks.

We3F-5 **16:15-16:30**

Lasing Characteristics of GaInAsP SCH-MQW High-Mesa LDs Grown on Hydrophilic Bonding InP/Si Substrate

Qiguang Jia, Zhehao Huang, Rong Le, Mizuki Holt, Koki Tominaga, Chaoke Ban, Ruiqi Zhang, Liang Zhao, Kazuhiko Shimomura
Sophia Universit

Successful lasing has been achieved in GaInAsP SCH-MQW laser diode of high-mesa structure grown on a hydrophilic bonding InP/Si substrate by MOVPE. The threshold current was comparable with the same structure on InP substrate.

Room G (Miami), 2F | Chair: Huilian Ma (Zhejiang University)

We3G | July 1 (Wed), 2026

Multi-modal Optical Technologies for Imaging and Sensing | 15:00-16:30

We3G-1 Invited 15:00-15:30

Label-Free Interferometric Imaging of Neural Activity and Its Application for Optoretinography

Tong Ling[1,2,3]
[1]Nanyang Technological University, [2]Singapore Eye Research Institute, [3]Singapore National Eye Centre

Nanoscale deformation accompanies membrane potential change and other functional activities in primary neurons and retinal cells. Detecting these deformations using labelfree interferometric imaging techniques, such as quantitative phase imaging and phase-resolved optical coherence tomography, enables functional neuroimaging at the cellular level without electrodes or fluorescence markers, which can benefit the diagnosis of retinal degenerative diseases and the exploration of new ways to interface neurons all-optically.

We3G-2 15:30-15:45

High-Speed Bidirectional IlluminationV Switching for Enhanced Surface Plasmon Resonance Microscopy

Inseop Byeon, Kwanhwi Ko, Hajun Yoo, Gwiyeong Moon, Donghyun Kim
Yonsei University

In this study, we optimized surface plasmon resonance microscopy (SPRM) using bidirectional illumination to enhance the visibility of live cells. The result with U2OS cells confirmed improved visualization of cellular contours with enhanced clarity.

We3G-3 15:45-16:00

Improving THz Image Quality via SelfSupervised Noise Reduction in THz-TDS

Han-Cheol Ryu[1], Seung-Hwan Jung[1], Inhee Maeng[2], Seung Jae Oh[2]
[1]Sahmyook University, [2]Yonsei University College of Medicine

We propose a self-supervised Noise2Noise framework: adjacent frequency images in the THz-TDS 3D spectral cube share spatial content but exhibit independent noise, providing natural training pairs.

We3G-4 16:00-16:15

All-PM Fiber-Based FMCW-LiDAR to Measure Depolarization of the Target Surface

Jaehwan Yang, Seonghyeon Ahn, Seokju Byun, Jaeheung Kim, Chang-Seok Kim, Taejoong Eom
Pusan National University

We propose an all-PM fiber-based polarization-sensitive FMCW-LiDAR. By utilizing 3D Degree of Linear Polarization (DoLP) imaging, this system quantifies surface depolarization, enabling enhanced target recognition even when objects overlap at the same range.

We3G-5 16:15-16:30

Distance Analysis for Dynamic Velocity Characterization in FMCW LiDAR

Wan-Chun Lin, Cheng-Chi Hsiao, Shih-Hsiang Hsu
National Taiwan University of Science and Technology

Accurate dynamic velocity measurement is achieved through a frequency-modulated continuous-wave (FMCW) light detection and ranging (LiDAR) system. A theoretical model describing the maximum measurable distance versus target velocity is derived and experimentally validated.

Room A (Grand Ballroom 1), 2F | Chair: Sunghyun Bae (Sejong University)

Th1A | July 2 (Thu), 2026
Multiplexing: Space, Wavelength, and Subcarrier | 08:30-10:00

Th1A-1 **Invited** **08:30-09:00**

Reducing Energy Consumption of Amplified Links through Space-Division Multiplexing

Leif Katsuo Oxenløwe
Technical University of Denmark

Optical fiber systems may save on resources and energy consumption by transmitting data slightly differently, using more spatial channels, and technologies such as optical frequency combs can support this change.

Th1A-2 **09:00-09:15**

Real-Time 200km Repeater Length 800ZR+DWDM Transmission for AI-Driven DCI

B. Zhu[1], T. Geisler[1], P. I. Borel[1], M, Stegmaier[1], B. Palsdottir[1], P. Jenneve[2], H. Zhang[2]
[1]Lightera Japan Co., Ltd, [2]Cisco Systems

We report record-setting real-time 26.4-Tb/s (33×800Gb/s) 800ZR+ DWDM transmission over 1003 km of SCUBA125 fiber with 200.5-km amplifier spans, demonstrating scalable, cost-effective, high-capacity connectivity for AI-driven metro-regional data-center interconnect (DCI) applications.

Th1A-3 **09:15-09:30**

Experimental OFDM Transmission Over MMF Under Launch-Offset-Dependent Modal Dispersion With Real-Time Equalization

Kanna Onda, Kazuhiko Tamesue, Nao Komatsu, Tetsuya Kawanishi
Waseda University

We demonstrated OFDM signal transmission over multimode fiber in the presence of modal dispersion due to launch offset, achieving stable 64-QAM transmission at 16 GHz over 1 km with a baseband transceiver featuring realtime equalization.

Th1A-4 **09:30-09:45**

Frequency-Domain Filtering with Fractional Oversampling and Integrated Sampling-Rate Conversion for MIMO Equalization in Coupled Multi-Core Fiber Transmission

Takahiro Odagawa, Manabu Arikawa, Kohei Hosokawa
NEC Corporation

We propose non-integer sampling-rate conversion integrated with frequency-domain pre-processing filter for MIMO equalization in long-haul coupled multi-core fiber transmission. Reduction of the computation complexity by 13% with similar performance to conventional DSP is experimentally demonstrated.

Th1A-5 **09:45-10:00**

Pulse-Shape Design for Digital Subcarrier Systems in the Presence of Finite-Length Tx/Rx Filters, Quantization and Clipping Noise

Roya Gholamipourfard Amirhossein Ghazisaeidi
Nokia Bell Labs

We propose an analytical framework that enables system parameter optimization and performance evaluation for digital subcarrier multiplexing and single-carrier transmission, accounting for quantization noise and finite impulse response filter lengths at both transmitter and receiver.

Room B (Grand Ballroom 2), 2F | Chair: Youngwoong Kim (KAERI)

Th1B | July 2 (Thu), 2026
Fiber Gratings & Resonators | 08:30-10:00

Th1B-1 **08:30-08:45**

Lightweight ISAC for Pipeline Monitoring via STM32-Optimized FBG Phase Demodulation

Jiajun Ji[1], Jiajia Shen[1], Tingyu Fu[1], Suhua Wang[1], Fengge Wang[2], Mingyi Gao[1]
[1]Soochow University, Suzhou, [2]University of Technology

We present an STM32-based FBG interrogator for pipeline monitoring, employing blockwise polyphasedecimated phase demodulation to reduce FIR workload 250- fold and memory to single-frame buffering, enabling efficient long-term ISAC on resource-constrained embedded systems.

Th1B-2 **08:45-09:00**

Demodulation of Two Slow V Ernier Sensors using a Pattern Recognition Algorithm

María de los Ángeles Martínez-Guerrero[1], Jonathan Esquivel-Hernández[1], Rodolfo Martínez-Manuel[1], Luis M. Valentín-Coronado[1,2]
[1]Centro de Investigaciones en Óptica, A.C., [2]Secretaría de Ciencia, Humanidades, Tecnología e Innovación

Demodulation of a two-point fiber sensor based on SlowVernier is presented. Using a Pattern-Recognition algorithm, the proposed approach enables identification of overlapping interferometric signals without the need for conventional demodulation techniques or large training datasets.

Th1B-3 **Invited** **09:00-09:30**

Cavity Optomechanics in Chained Microbottle Resonators

Motoki Asano, Hajime Okamoto, Hiroshi Yamaguchi
NTT, Inc.

We demonstrate an optomechanical array of microbottle resonators fabricated on a silica glass fiber. This scalable all-fiber optomechanical architecture enables integrated phonon lasers, waveguides, and detectors through optomechanical functionality and ultrasensitive detection.

Th1B-4 **09:30-09:45**

Numerical Investigation of Mode Leakage and Power Extraction in Side-Polished Hollow-Core Anti-Resonant Fibers

Yuyao Wu, Yuemei Li, Yao Guo, Zhiguo Zhang
Beijing University of Posts and Telecommunications

This study numerically investigates mode leakage and power extraction in side-polished hollow-core anti-resonant fibers, demonstrating controllable 15%–76% optical power splitting by adjusting polishing depth and polished length.

Th1B-5 **09:45-10:00**

Mode-Selective LPFGs with Radial Modulation Control for Broadband 2-LP MDL Equalization

Takumi Kimura[1], Takanori Sato[1], Masaki Wada[2], Yoko Yamashita[1,2], Taro Iwaya[2], Takashi Matsui[2], Kazuhide Nakajima[2], Kunimasa Saitoh[1]
[1]Hokkaido University, [2] NTT, inc.

We propose an LPFG-based MDL equalizer for 2-LPmode transmission using radially controlled refractive-index modulation. By enhancing LP01-to-cladding-mode coupling while suppressing LP11-mode excess loss, we achieve C-band MDL compensation with significantly reduced device length.

Th1C-1 **08:30-08:45**

Real-time and Wide Field-of-View (FOV) Dual-Feedback Optical Tracking and Alignment System for Free-Space Optical Communications

Guo-Liang Shih[1], Chia-Yu Lee[1], Yuan-Zeng Lin[1], Yu-Han Lin[1], Yu-Heng Hong[2], Hao-Chung Kuo[1,2], Huang-Ming Chen[1], Chi-Wai Chow[1]
[1]National Yang Ming Chiao Tung University, [2]Hon Hai Research Institute

We demonstrate a real-time wide field-of-view (FOV) dual-feedback optical tracking and alignment system integrating both coarse and fine alignments. The process is completed within seconds over a 60°-FOV, enabling stable free-space-optical-communication (FSOC) at 73.6-Gbit/s/λ.

Th1C-2 **08:45-09:00**

Aerial Mirror Relay for Low-Loss Underwater–Airborne Optical Communication

K. Kuwahara[1], H. Miyamoto[1], K. Ichinose[1], D. Kuzuhara[1], K. Maekawa[1], K. Tanaka[2], S. Hayashida[2], T. Kodama[1]
[1]Kagawa University, [2]Sangikyo Corporation

We demonstrate a low-loss underwater–airborne optical link using an aerial mirror relay that minimizes underwater attenuation. Adaptive OFDM enables stable bidirectional transmission and real-time 4K-UHD streaming under class1 eye-safe 850-nm illumination in turbid seawater.

Th1C-3 **09:00-09:15**

End-to-End Demonstration of Congestion-Free Real-Time Remote Control System with Traffic-Type-Aware Prediction

Yuka Okamoto, Naotaka Shibata, Kenji Miyamoto, Tomoya Hatano, Tatsuya Shimada
NTT, inc.

We performed end-to-end demonstrations of real-time drone control system with wireless and optical links, and achieved

Th1C-4 **09:15-09:30**

Beamforming for Arrayed Waveguide Grating Router-Based Optical Wireless Communication

Yin-He Jian[1], Guo-Liang Shih[1], Chi-Wai Chow[1], Eduward Tangdiongga[2]
[1]National Yang Ming Chiao Tung University, [2]Eindhoven University of Technology

A high reconfiguration-rate beamforming-technique using wavelength-fixed laser and phase modulator is proposed for arrayed-waveguide-grating-router-based setup. Data-rate of 36.6-Gbps and sum-rate of > 30-Gbps are realized in single-user and two-user scenarios. Extendibility is confirmed by simulation.

Th1C-5 **Invited** **09:30-10:00**

Photonic Integrated Transceivers for Broadband Optical Wireless Communication

Eduward Tangdiongga
Eindhoven University of Technology

Optical wireless communication uses narrow, steerable beams as secure high-capacity links. Photonic integrated circuits enable compact, low-power beam steering and wideaperture receivers. This talk presents PIC-based designs enabling scalable, broadband, high-density indoor OWC networks.

Room D (Capri), 2F | Chair: Asuka Matshushita (NTT, inc.)

Th1D | July 2 (Thu), 2026

Long-Haul Transmission Enabling Technologies | 08:30-10:00

Th1D-1 **08:30-08:45**

1.28 Tbit/s/λ, 16 QAM, 3,200 km Digital Coherent Nyquist Pulse Transmission Using Multi-Carrier Method

Ryota Endo, Masato Yoshida, Toshihiko Hirooka, Keisuke Kasai, Masataka Nakazawa
Tohoku University

We present an ultrahigh-speed coherent Nyquist pulse TDM transmission in a fully digital scheme. A four-carrier, polarization-multiplexed 40 Gbaud, 16 QAM (1.28 Tbit/s/λ) signal was successfully transmitted over 3,200 km using a multi-carrier method.

Th1D-2 **08:45-09:00**

Spatially Informed Active Sampling for Grey-Box QoT Modeling with Field-Trial Validation

Xiaoshu Yu, Yihao Zhang, Hao Lin, Weisheng Hu, Qunbi Zhuge
Shanghai Jiao Tong University

We propose a spatially feature-aware active sampling framework to predict Q-factors of a 30-channel WDM system in a physics-informed manner. It achieves an MAE below 0.2 dB with stable convergence using fewer than 150 samples.

Th1D-3 **Invited** **09:00-09:30**

Colorless Detection of WDM Superchannel with a Frequency Comb-Based Local Oscillator

Di Che
Nokia Bell Labs

We propose colorless detection of WDM signals with neither demultiplexers nor laser wavelength control using a frequency comb as the local oscillator. The concept is demonstrated with single-shot reception of a THz-class superchannel highly tolerant to laser frequency drift.

Th1D-4 **09:30-09:45**

Techno-Economic and Power Analysis of Terrestrial Long-Haul C+C and C+L Systems

John D. Downie[1], Viacheslav Ivanov[2], Lidia Galdino[3], Tomasz Kolodziejczyk[4], Colin Wallace[5]
[1]Corning Research and Development Corp., [2]Corning SAS Suomen Sivulike, [3]Corning Optical Communications, [4]Corning Optical Communications, [5]Microsoft

We analyze the cost and power efficiency of C+C and C+L long-haul terrestrial systems for various fibers with different span lengths producing equal GSNR. Advanced fiber types enable lower system cost/bit and smaller carbon footprint.

Th1D-5 **09:45-10:00**

Numerical Evaluation of Error-Floor Behavior in Polar Codes with Ultra-Large Block Lengths for Optical Fiber Transmission

Mizuki Yamamoto[1], Gakuto Kanematsu[1], Yohei Koganei[2], Koji Igarashi[1]
[1]The University of Osaka, [2]1Finity Inc.

We numerically show that ultra-long polar codes exhibit no observable error floor even with 4-bit LLR quantization, while the same quantization significantly increases the error floor in LDPC codes.

Th1E-1 **Invited** **08:30-09:00**

Scalable Optical Metasurface for On-Edge Machine Vision

Chaoran Huang, Mingcheng Luo, Jiayong Peng, Chester Shu
The Chinese University of Hong Kong

We present a metasurface-based ultra-wide optical learning machine with 41 million parameters, where a fixed untrained metasurface approximates trained performance and a compact digital backend enables adaptable, fabrication-tolerant, large-scale machine vision competitive with leading models.

Th1E-2 **09:00-09:15**

Wavelength-Controlled Lateral Focus Scanning using a Laterally Translated Quadratic Phase Metasurface

Jong-Guk Jeong[1], Yoon-Ho Sunwoo[1], Yun-Jae Kwon[1], Xipeng Lu[1], Duk-Yong Choi[2], Sang-Shin Lee[1]
[1]Kwangwoon University, [2]Australian National University

A laterally translated quadratic phase metasurface (MS) is demonstrated for wavelength-controlled lateral focus scanning under oblique incidence, achieving a 321 μm scan range and approximately 55% focusing efficiency across 1530–1600 nm.

Th1E-3 **09:15-09:30**

THz-Optical Signal Conversion Demonstration using Metasurface-based Transparent EO Modulator

Rizadi Sasmita Darwis[1,2], Yui Otagaki[1], Hiroshi Murata[1]
[1]Mie Univeristy, [2]Politeknik Caltex Riau

We proposed a novel transparent electro-optic (EO) modulator based on a metasurface for THz-optical signal conversion, which operated with a wideband frequency response and can pass through THz signals, enabling integration with wireless communication and sensor systems.

Th1E-4 **09:30-09:45**

Three-Mode Waveguide Lens Based on Mosaic Structure

Mizuki Koyama[1], Yasuhide Tsuji[2], Takuya Mitarai[3], Yusuke Sawada[3], Takuya Okimoto[3], Takuo Hiratani[3], Kento Komatsu[3], Hideki Yagi[3], Naoki Fujiwara[3], Takeshi Fujisawa[1]
[1]Hosei University, [2]Muroran Institute of Technology, [3]Sumitomo Electric Industries, Ltd.

We propose and experimentally demonstrate a three-mode waveguide lens based on a mosaic structure. The device is designed by recently developed gradient direct-binary-search method, and low-loss three-mode transmission is demonstrated.

Th1E-5 **09:45-10:00**

Ultrasmall Mode Mixers Based on Mosaic Structure Designed by Gradient Direct Binary Search Method

Shizunari Aomori[1], Yasuhide Tsuji[2], Takuya Mitarai[3], Yusuke Sawada[3], Takuya Okimoto[3], Takuo Hiratani[3], Kento Komatsu[3], Hideki Yagi[3], Naoki Fujiwara[3], Takeshi Fujisawa[1]
[1]Hosei University, [2]Muroran Institute of Technology, [3]Sumitomo Electric Industries, Ltd.

An ultrasmall mosaic-based mode mixer was proposed and experimentally demonstrated for the first time. The devices are designed by using a gradient direct binary search method, enabling efficient optimization of large-scale mosaic devices.

Th1F-1 **Invited** **08:30-09:00**

Active Meta-optical Fiber Integrated Devices

Ho Wai Howard Lee, Andrew Palmer, Yucheng Jin Harvey Lin, Jin Yan, A. Teoh, Emma Wallace-Wilmot, Sophia Turean
University of California

I will review the various material platforms (metallic, dielectric, and compound structures) and geometric platforms which have been utilized in "meta"-fiber devices to date. I will present our recent development of "Meta"-optical fiber, an advanced optical fiber integrated with emerging metasurface concepts.

Th1F-2 **09:00-09:15**

A Quasi-Monostatic Focal-Plane-Array LiDAR on a 200-mm Silicon Photonics Platform

Guillaume Croes[1], Mathias Prost[1], Huaqing Qiu[1], Manuel Reza[1], Jac Romme[2], Javier Perez Santacruz[1,2], Elbert Bechthum[2], Ziduo Lin[1], Jochem Govers[2], Pawel Bembnowicz[2], Brecht Berteloot[1], Esteban Venialgo[2], Erik Emmen[1], Tangla D. Kongnyuy[1], Nicolas Chauvet[2], Peter Girouard[2], Maliheh Ramezani[1], Puvendren Subramaniam[1], Padraic E. Morrissey[3], Sean Collins[3], Matthew L. Hall[3], Peter O'Brien[3], Christian Bachmann[2], Ruud Oldenbeuving[2], Joost Brouckaert[1], Dongjae Shin[2], Roelof Jansen[1], Peter Gerets[1], Marcus S. Dahlem[1]
[1]imec, [2]imec Netherlands, [3]Tyndall National Institute

We demonstrate an integrated quasi-monostatic focalplane-array FMCW LiDAR on a 200-mm silicon photonics platform, achieving a 15-m range that is currently constrained by system low-pass filtering, indicating clear scalability towards substantially longer distances.

Th1F-3 **09:15-09:30**

Line-Beam LiDAR Based on a 128-Channel Monolithic Polymer–SiN Optical Phased Array

Eun-Su Lee[1], Jinung Jin[1], Yoon-Ho Sunwoo[2], Yun-Jae Kwon[2], Seong-Hyeon Ju[3], Sun-Woong Yoon[3], Kwon-Wook Chun[1], Jung-O Son[3], Sang-Shin Lee[2], Min-Cheol Oh[1]
[1]Pusan National University, [2]Kwangwoon University, [3]i3system

We demonstrate line-beam scanning LiDARs using a 128-channel monolithically integrated polymer–SiN optical phased array at 1550-nm wavelength. Real-time imaging is achieved over a total field of view of 50° × 8°.

Th1F-4 **09:30-09:45**

Short-Cavity DFB Laser with 38.7-GHz Chirp Bandwidth in SiPh FMCW LiDAR

Yen-Wei Li[1], Te-Hua Liu[1], Yi-Hsuan Chen[1], DongDong Li[2], Jhih-Jia Kang[2], Teng-Hsiang Chang[2], Chao-Hsin Wu[1]
[1]National Taiwan University, [2]Delta Electrons

We demonstrated a 600-μm short-cavity DFB laser cooperated with silicon PIC for FMCW LiDAR. Through predistorted direct modulation, the DFB Laser achieves 38.7-GHz chirp bandwidth, enabling 4-mm resolution and 7-m free-space ranging without external modulators.

Th1F-5 **09:45-10:00**

OPLL-Driven Optical Frequency Chirp Linearization for Coherent FMCW LiDAR with Enhanced Linearity and Stability

Jongpil La, Jieun Choi, Jungwon Chang
Lambda innoVision Inc.

OPLL controller and DPD algorithm for linear frequency chirp generation of FMCW LiDAR is addressed. Photonic integrated complex MZI is used to detect and control the instantaneous optical chirp rate, achieving 200 kHz linewidth and 6 GHz bandwidth.

Room G (Miami), 2F | Chair: Han Cheol Ryu (Sahmyook University)

Th1G | July 2 (Thu), 2026
Precision Optical Sensing and Measurement | 08:30-10:00

Th1G-1 **08:30-08:45**

Co-Optimization of Aperiodic Spacing and Fishbone Grating Coupler for SiN Optical Phased Arrays Using Enhanced PSO

Yi-Ting Lin, Xiu-Ru Yang, Shih-Hsiang Hsu
National Taiwan University of Science and Technology

We propose a hybrid adaptive particle-swarmoptimization framework to co-optimize aperiodic antenna spacing and fishbone grating couplers in 32-channel SiN optical-phased-arrays at 1.55-μm wavelengths, achieving effective sidelobe suppression across 0°–40° beam-steering while maintaining fabrication robustness.

Th1G-2 **08:45-09:00**

All-optical Atomic Magnetometer for Dual-axis Magnetic Field Measurement with Polarizationmodulated Light Beam

Nuozhou Xu[1,2], Shudong Lin[1,2], Ying Zhou[1,2], Xiaoyu Li[1,2], Peiling Cui[1,2], Jixi Lu[1,2]
[1] Beihang University, [2]Hefei National Laboratory

This study presents an all-optical atomic magnetometer for dual-axis magnetic field measurement with polarization-modulated light beam. A modulated magnetic field is generated by light-shift, replacing traditional coils-based modulation. We demonstrate the feasibility of this scheme.

Th1G-3 **09:00-09:15**

Photometric Stereo with Parabolic Mirror for 3D Reconstruction of Specular Surfaces

Sang-Jun Kim[1,2], Hyun Woo Ko[1,3], Sunghyun Han[1,3], Hamong Shim[4], Seung Ah Lee[5], Paul Hongsuck Seo[3], Min-Chul Park[1,2,3], Seon Kyu Yoon[4]
[1]Korea Institute of Science and Technology, [2]Yonsei University, [3]Korea University, [4]Korea Photonics Technology Institute, [5]Seoul National University

This paper presents a parabolic mirror–based dark-field photometric stereo method for three-dimensional reconstruction of metallic and glossy surfaces. Under a controlled illumination geometry, the proposed configuration reduces specular reflection artifacts.

Th1G-4 **09:15-09:30**

AI-Assisted Reflectance Spectroscopy for Mural Pigment Degradation Detection

Rui Niu[1,2,3], Zunyue Zhang[1,2,3], Zhenzhou Cheng[1,2,3]
[1]State Key Laboratory of Precision Measuring Technology and Instruments, [2]Tianjin University, [3]Ministry of Education

We demonstrate an AI-assisted reflectance spectroscopy to detect the mural pigment degradation associated with chloride. The system integrates an automated spectral acquisition system with a convolutional neural network, achieving 92.8% accuracy in degradation detection.

Th1G-5 **Invited** **09:30-10:00**

Broadband Source-Driven Resonant Optical Gyroscope

Huilian Ma[1], Binjie Li[1], Yaqi Yong[1], Qingwen Liu[2], Zuyuan He[2]
[1]Zhejiang University, [2]Shanghai Jiao Tong University

This report details a broadband light source-driven resonant optical gyroscope, covering its operating principle, system architecture, relative intensity noise suppression, and challenges of low power utilization in high-Q resonators.

Th2A-1 **10:15-10:30**

Modal-Decoupled Physics-Informed Digital Twin for Passive Integrated Photonic Reservoirs

Yihang Lai, Tian Zhang, Qi Chen, Zili Cai, Jubo Hao, Jian Dai, Kun Xu
Beijing University of Posts and Telecommunications

We propose a physics-informed method to establish a digital twin for passive integrated photonic reservoirs. By leveraging modal decoupling, our framework yields a 0.995 reconstruction accuracy with merely 120 nodes, outperforming conventional random reservoir networks.

Th2A-2 **10:30-10:45**

On-Chip Tunable Narrow Bandpass Filter for Terahertz Communication Systems

Ziwei Wang[1,4], Liao Chen[2], Lin Wu[1], Ming Luo[1], Tiancai Jiang[1], Chi Zhang[2], Jin Tao[1,3], Xinliang Zhang[2]
[1]China Information Communication Technologies Group Corporation (CICT), [2]Huazhong University of Science and Technology, [3]Peng Cheng Laboratory, [4]Hubei Optical Fundamental Research Center

We propose a 284 MHz narrow bandpass filter with tunability based on on-chip terahertz ring resonator and demonstrate terahertz communication demodulation with a bit error rate of 1.07×10^{-7}.

Th2A-3 **10:45-11:00**

Silicon Based High-Order Mode Filter with Cascaded Asymmetric Couplers

Guanyu Chen[1], Jian Wang[1], Duowei Zeng[2], Mengyuan Ye[2]
[1]Chongqing University, [2]China University of Geosciences Wuhan

A silicon high-order mode-pass filter using cascaded asymmetric directional couplers enables arbitrary higherorder mode selection. The TE_2 filter achieves 15 dB extinction across 1520–1580 nm.

Th2A-4 **11:00-11:15**

Fold-back Directional Coupler for Compact Photonic Circuit Layouts

Injoon Lee, Fumio Shohda, Kenichi Terao, Keita Mochizuki
Mitsubishi Electric Corporation

We theoretically and experimentally demonstrate a foldback directional coupler based on phase compensation structure. Leveraging the vertical dimension instead of the horizontal enables the effective arrangement of even extremely long devices in integrated photonic circuits.

Th2A-5 **11:15-11:30**

First Experimental Demonstration of SiN Waveguide 1×2 Power Splitters Based on Mosaic Structure

Keigo Fujimoto[1], Yasuhide Tsuji[2], Takeshi Fujisawa[1]
[1]Faculty of Science and Engineering Hosei University, [2]Graduate School of Engineering Muroran Institute of Technology

Mosaic-based 1×2 power splitter based on SiN waveguide is proposed and experimentally demonstrated, for the first time. Gradient direct binary search method greatly accelerates the optimization compared with conventional direct binary search method.

Th2A-6 **11:30-11:45**

Low-Loss and High-Uniformity 4×4 Silicon Nitride Multi-Mode Interference Coupler on a Glass-Based Photonic Platform

Jihyun Lee, Seokyoung Shin, Kyungjin Jo, Younghyun Kim
Hanyang University

We demonstrate a glass-based 4×4 SiN multi-mode interference coupler achieving 0.02–0.16 dB insertion loss and uniformity below 0.44 dB at 1310 nm, enabling scalable, low-loss photonic integration on glass substrates.

Th2B-1 **10:15-10:30**

Practical Optical Time Domain Reflectometry for Hollow-core Fibers

Keita Takahata, Takeshi Takagi, Kazunori Mukasa
Lightera Japan Co., Ltd.

We demonstrated OTDR measurement of HCFs by controlling return loss. Reasonable transmission and coupling loss evaluation were possible for PBGF, whereas ARF required optimizing return loss and SMF-ARF coupling loss for reliable characterization.

Th2B-2 **Invited** **10:30-11:00**

Radiation Effects and Hardening Strategies in Fiber Optic Sensors

Wookjin Jeong[1], Jong-Yeol Kim[1], Gukbeen Ryu[1], Young-Gwan Hwang[1], Daeseung Moon[2], Young-Woong Kim[1]
[1]Korea Atomic Energy Research Institute, [2]Taihan Fiberoptics Co., Ltd.

Radiation-induced attenuation (RIA) significantly degrades the performance of fiber-optic sensing systems operating in radiation environments. This invited paper discusses hardening strategies, including radiation-hardened fibers, photobleaching, and reference-assisted compensation, to mitigate sensing errors and improve measurement reliability.

Th2B-3 **11:00-11:15**

Ultra-sensitive Fiber Tip Refractive Index Sensor Based on Bound States in the Continuum

Yujian Li[1], Pin Xu[1], Zhi Cheng[1], Ping Lu[2], Changyuan Yu[1]
[1]Hong Kong Polytechnic University, [2]Huazhong University of Science and Technology

An ultra-sensitive fiber refractive index sensor was demonstrated by leveraging bound states in the continuum. The designed meta-surface supports sharp Fano resonances, achieving a simulated sensitivity of 751.43 nm/RIU with a compact and cost-effective probe configuration.

Room C (Grand Ballroom 3), 2F — Chair: Sugang Xu (NICT)

Th2C — July 2 (Thu), 2026

Programmable & Disaggregated Optical Infrastructure — 10:15-11:45

Th2C-1 **10:15-10:30**

Joint Decision-Aware Compression and Offloading for Low-Delay Fixed-Mobile Converged Industrial Networks

Mengxin Zhang[1], Yintao Li[2], Cong Zhu[3], Jin Li[4], Danshi Wang[1], Min Zhang[1]
[1]Beijing University of Posts and Telecommunications, [2]State Grid Jibei Electric Power Company Limited, [3]State Grid Jibei Information and Telecommunication Company, [4]South China Normal University

To address heavy signaling overheads in industrial networks, we propose a decision-aware task offloading framework that jointly optimizes state compression and offloading policy, achieving a 48% delay reduction while maintaining minimal jitter under high loads.

Th2C-2 **10:30-10:45**

Prototype and Demonstration of an Optical-Analog-Optical (OAO) Wavelength Converter for Multi-Domain Optical Direct-Connect Architecture

Hiroki Mori, Junnosuke Hiyama, Takeshi Seki, Rie Hayashi, Toshihiko Tamura
NTT, inc.

We demonstrate an OAO-based wavelength converter for multi-domain optical direct-connect boundaries. It converts 100G-class QPSK signals with SC-FEC and oFEC with limited OSNR penalties, enabling flexible transceiver selection and wavelength-plan decoupling across domains.

Th2C-3 **Invited** **10:45-11:15**

Advanced Programmable Transceivers and Quantum-Secure Communications for Future SDN-Enabled Optical Networks

Michela Svaluto Moreolo[1], Javier Vilchez[1], Laia Nadal[1], Joel Compte[1], Antonio Melgar[2], Jose Manuel Rivas-Moscoso[2], Ramon Casellas[1], Josep M. Fabrega[1], Rafael Cantó[1], Raul Muñoz[1]
[1]Centre Tecnològic de Telecomunicacions de Catalunya, [2]Telefónica CTIO

This work presents advanced programmable transceivers and the adoption of continuous-variable quantum key distribution (CV-QKD), to operate classical and quantum channels sharing the same SDN-enabled optical network infrastructure, enabling high-capacity, agile, and quantumsecure communications.

Th2C-4 **Invited** **11:15-11:45**

Policy-Enforced Network Automation using Data Space Principles

Angela Mitrovska[1,2], Behnam Shariati[1], Hussein Zaid[1], Aydin Jafari[1], Pooyan Safari[1], Johannes Karl Fischer[1], Ronald Freund[1,2]
[1]Fraunhofer Institute for Telecommunications, [2]Technical University of Berlin

We present a governance framework that uses data space principles to enable policy-enforced cross-stakeholder device control, cross-domain performance validation, and AI-assisted automation in disaggregated optical networks.

Th2D-1 Invited 10:15-10:45

Modeling Equalization-Enhanced Phase Noise

Benedikt Geiger[1], Fred Buchali[2], Vahid Aref[2], Laurent Schmalen[1]
[1]Karlsruhe Institute of Technology (KIT), [2]Nokia

Equalization-enhanced phase noise has emerged as a critical impairment in high-baud-rate coherent optical systems. This talk reviews recent modeling advances, highlights its distortion-induced nature, and discusses implications for DSP-based mitigation.

Th2D-2 10:45-11:00

Improving the Accuracy of Longitudinal Power Profile Estimation with Statistical Averaging

Inwoong Kim[1], Olga Vassilieva[1], Ryu Shinzaki[2], Motohiko Eto[2], Paparao Palacharla[1]
[1]1Finity Americas, Inc., [2]1Finity

The statistical average of longitudinal power profile estimations (PPE), obtained by concatenating multiple sampled waveforms, achieves better accuracy than a simple average of individual PPEs. Experimentally, this method improved the PPE dynamic range by 7 dB.

Th2D-3 11:00-11:15

Cost-Effective FA-MSO-NN Equalizer for PDM PS-1024QAM Coherent Optical Transmission

Tingyu Fu, Suhua Wang, Jiajun Ji, Jiajia Shen, Mingyi Gao
Soochow University

We propose and experimentally demonstrate a featureaugmented multi-symbol-output neural network for 20- Gbaud PDM PS-1024QAM transmission over 80 km SSMF, significantly reducing computational complexity and providing a cost-efficient, high-capacity solution for nextgeneration metro data center interconnects.

Th2D-4 11:15-11:30

Wide-Range and Low-Complexity Frequency Offset Compensation Utilizing Complex-Valued Gardner Timing Error Detector

Tomonaga Tanaka, Hidemi Noguchi, Kenji Wakafuji
NEC Corporation

We propose a low-complexity carrier frequency offset compensation method utilizing the complex-valued Gardner timing error detector. Combined with coarse compensation reducing error to within the symbol rate, it enables widerange compensation and supports high-order QAM.

Th2D-5 11:30-11:45

SNR Estimation of Weakly Coupled Multicore Fiber Transmission Lines Using GNPy

Yusuke Sasaki[1], Koshiro Hashihara[2], Wakako Maeda[1], Masaki Wada[3], Takashi Matsui[3], Kazuhide Nakajima[3]
[1]NEC Corporation, Kawasaki, [2]Tokyo Metropolitan University, [3]NTT, inc.

We extend the open-source tool GNPy to estimate the signal-to-noise ratio for multicore fiber transmission lines. The extended GNPy shows good agreement with both the analytically derived SNR and the experimental results.

Th2E-1 **10:15-10:30**

Low-Loss and Compact Lithium Niobate Waveguide Crossing using Inverted Tapers

Xiaoyan Liu Tao Chu
Zhejiang University

A compact low-loss lithium niobate waveguide crossing based on Gaussian beam synthesis is demonstrated, achieving insertion loss below 0.048 dB across the O-band (minimum 0.041 dB) and crosstalk below −40 dB.

Th2E-2 **Invited** **10:30-11:00**

High-Speed Optical Phased Array based on Heterogeneously Integrated Lithium Niobateon-Silicon Nitride Platform

Chenxi Wang Yan Cai
Chinese Academy of Sciences

In this work, we propose and experimentally demonstrate an ultrafast and low-power-consumption optical phased array system based on a heterogeneously integrated thin-film lithium niobate-silicon nitride platform, which employs 8-inch wafer-level bonding technology.

Th2E-3 **11:00-11:15**

Acousto-optic Frequency Shifting and Modulation on a Hybrid Thin-film Lithium Niobate-Chalcogenide Integrated Platform

Jun Yue, Zhiqiang Yang, Zhaohui Li
Sun Yat-sen University

We demonstrate a TFLN-ChG acousto-optic frequency shifter. Using a focusing IDT, the device achieves 7.7%/W efficiency and 37 dB carrier suppression, with sub-100 ns switching speeds for high-speed amplitude modulation.

Th2E-4 **11:15-11:30**

Microwave Photonic Beamforming System based on Soliton Microcombs and Integrated Waveguide Bragg Grating

Zhichang Che[1], Rongan Wu[1], Zhenzhou Tang[1], Jijun He[1], Siyu Su[1], Zhenmin Du[2], Hongwei Chen[2], Shilong Pan[1]
[1]Nanjing University of Aeronautics and Astronautics, [2]Tsinghua University

A microwave photonic beamforming system based on soliton microcombs and integrated waveguide Bragg grating is proposed, which achieves multiple beamforming within ± 23° without significant beam squint.

Th2F-1 **10:15-10:30**

Multiple-User OWC via Parallel Excited Optical Phased Arrays

Caiming Sun, Jiarui Zhang
The Chinese University of Hong Kong

Multiple-user optical wireless communications (OWC) are experimentally demonstrated with actively phase controlled and parallel excited optical phased arrays (OPA). The 50°×29.6° angle coverage and 1-Gbps data rate are achieved with multi-wavelength multiplexing.

Th2F-2 **10:30-10:45**

In-Situ Photoresistor Based Dual-Drop Port Microring Weight Bank

Baojie Hou, Zichao Zhao, Qishen Liang, Haoran Ma, Bin Zhang, Lingzhi Yuan, Zhujun Wei, Ziyi Fu, Tingge Dai, Huihui Zhu, Yuehai Wang, Jianyi Yang
Zhejiang University

We present a dual-drop weight bank incorporating in-situ photoresistor calibration, designed for photonic neural network processors. This structure realizes a tunable linear region for weight matrix mapping, with state calibration performed via in-situ resistors of dual microrings.

Th2F-3 **10:45-11:00**

Sub-2 kHz Narrow-Linewidth 1550 nm DFB Laser for FMCW LiDAR Applications

Te-Hua Liu, Yi-Hsuan Chen, Yen-Wei Li, Yu-Chun Chen, Chao-Hsin Wu
National Taiwan University

A 600-μm-cavity 1550-nm optimized DFB laser achieving 1.44-kHz Lorentzian linewidth, >53-dB SMSR, 50-mW output power, and 3.57-GHz chirp bandwidth under 100- kHz modulation is demonstrated for FMCW LiDAR.

Th2F-4 **11:00-11:15**

Non-Volatile Micro-Ring Optical Switch on SiN-on-Glass for Panel-Level Interconnects

SeongHyeok Bae, Taewon Jin, Simin Chen, Younghyun Kim
Hanyang University

We propose a non-volatile ferroelectric–oxide–semiconductor micro-ring switch on SiN-on-glass for dense, low-power reconfigurable routing in large-scale packaging.

Th2F-5 **Invited** **11:15-11:45**

Scalable Optical Neural Network Chip based on Multi-Plane Light Conversion

Takuo Tanemura, Chun Ren, Ryota Tanomura
The University of Tokyo

Large-scale optical neural network processor based on multiplane light conversion (MPLC) is demonstrated on a silicon photonic chip. Strong nonlocal coherent coupling at each MPLC stage offers superior scalability for the number of phase shifters.

Room G (Miami), 2F | Chair: Oskars Ozolins (Riga Technical University)

Th2G | July 2 (Thu), 2026

Nonlinear Active Cevices | 10:15-11:45

Th2G-1 **Invited** **10:15-10:45**

Electro-Optic-Equalizer-Integrated Thin-Film Lithium Niobate Modulator for High Baud-Rate Signaling

Yuya Yamaguchi
National Institute of Information and Communications Technology

We review a thin-film lithium niobate (TFLN) modulator with an integrated electro-optic equalizer, enabling modulator bandwidth extension. The combination of an electro-optic equalizer and a TFLN is expected to enable ultra-high-speed baud-rate modulation in future optical fiber communications.

Th2G-2 **Invited** **10:45-11:15**

Nonlinear Wavelength Conversion in a Thin-Film Lithium Niobate Waveguide

Haoran Li, Zejie Yu
Zhejiang University

We reported integrated nonlinear wavelength conversion, including efficient difference frequency generation and effective four-wave mixing on thin-film periodically poled lithium niobate waveguides using an adaptive poling method to overcome the thickness variations across long waveguides.

Th2G-3 **11:15-11:30**

Nanophotonic Electro-Optic Polarization Mode Converter on Periodically Poled Thin Film Lithium Niobate

Muhammad Adil[1], Tien-Dat Pham[1], Po-Hsiang Huang[1], Reinhard Geiss[2], Frank Setzpfandt[2,3], Yen-Hung Chen[1]
[1]National Central University, [2]Fraunhofer Institute of Applied Optics and Precision Engineering, [3]Friedrich Schiller University

We demonstrate an electro-optic polarization mode converter on periodically poled lithium-niobate-on-insulator nanophotonic platforms. A 2.64-mm device achieves fast TETM conversion with >20-dB conversion efficiency in the telecom band, enabling polarization control for photonic integrated circuits.

Th2G-4 **11:30-11:45**

1.28 Tb/s High-Speed Wavelength Conversion Leveraging the Transmission Directionality of Semiconductor Optical Amplifiers

Ye Tian , Tong Cao, Liao Chen, Chi Zhang, Yang Liu, Xinliang Zhang
Huazhong University of Science and Technology

We demonstrate a bidirectional all-optical wavelength converter that significantly enhances Q-factor and extinction ratio, outperforming conventional schemes and showing Tb/s potential.