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.