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.