Best Top-Score Paper Award Nomination

D-Track: Devices

ACP2026-0701-146

High-Fidelity Integer Factorization by QUBO Optimization on a Photonic Ising Chip

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We demonstrate a hardware-assisted 32-bit integer factorization workflow that optimizes a QUBO-derived factorization energy model with a packaged photonic Ising chip. The Ising machine enabled by a multichannel cascaded Mach-Zehnder modulators provides the 7-bit calibrated optical readouts used to evaluate energy differences in order for performing spin flipping, Metropolis updating, and candidate factors verification. On a retained optimized five-instance set of 32-bit QUBO-derived block factorization models, the best optical-path annealing runs increase the aggregate factorization success count from 5/250 for direct bit flips and 22/250 for cir cuit annealing simulation to 91/250. These results demonstrate that a calibrated photonic chip can serve as a practical and scalable accelerator for hardware-assisted QUBO factorization, paving the way toward photonic-enabled large-scale integer factorization.

ACP2026-0715-178

A 1.2 dB Insertion Loss on-Chip Mach-Zehnder Interferometer Type Optical Isolator Based on Stoichiometric Ce:YIG Magneto-Optical Thin Films

Di Wu[1];Zhenyuan Ren[1];Tianchi Zhang[1];Zixuan Wei[1];Jun Qin[1];Lei Bi[1*]

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Integrated optical isolators played a crucial role in photonic integrated circuits (PICs) by effectively stabilizing optical signals, making them indispensable components for advanced photonic systems. However, the practical application of integrated optical isolators was currently limited by their high insertion loss, which was mainly caused by relatively low figureof-merit (FoM) of monolithically deposited Ce:YIG MO thin films on silicon. Here, we showed film stoichiometry played a key role in controlling the material FoM. Due to the preferential ablation of Fe, we demonstrated that nearly stoichiometric Ce1.4Y1.6Fe4.89O12 films on Si(100) could be fabricated using an iron-deficient target. This stoichiometry eliminated the intragranular Fe-rich and Ce-rich segregated domains in Ce:YIG grown on silicon. Consequently, the Ce1.4Y1.6Fe4.89O12 film exhibited a Faraday rotation of -5523 deg/cm and a figureof-merit of 72.7 deg/dB. An MZI-type optical isolator on SiN fabricated by this method demonstrated a record low insertion loss of 1.2 dB and isolation ratio of 27.6 dB at 1556 nm wavelength. Our results provided an important step toward practical application of integrated MO nonreciprocal photonic devices.

ACP2026-0701-63

Inverse-designed Waveguide Enables Sub-picometer Resolution Spectrometer over 700 nm Bandwidth

Hao He[1];Zengji Tu[1];Lin Chang[1]*

1.Peking University, China

We demonstrate a compact and high-performance on-chip spectrometer. By employing inverse design along the sidewalls of a single waveguide, this chip achieves a record fullwidth at half-

maximum of 0.25 pm and an operation bandwidth over 700 nm.

ACP2026-0729-4

Slow-Light Modulator Based on Localized ModeRecycling in Thin-Film Lithium Tantalate

Jiaxuan Gan[1];Weihan Wang[1];Zexu Wang[1];Mingyu Zhu[1];Aoyun Gao[1];Fei Huang[1];Zejie Yu[1];Weike Zhao[1*];Daoxin Dai[1*]

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Electro-optic modulators face an inherent tradeoff between device footprint and operating bandwidth, which fundamentally limits their large-scale integration in modern optical communication networks. Herein, we develop a compact slow-light Mach-Zehnder interferometer (MZI) modulator based on thin-film lithium tantalate (TFLT). The core mechanism employs a series of Bragg gratings to manipulate optical signals. Lightwaves undergo round-trip reflection within a confined region via multiple modes to establish an equivalent slow-light effect, thereby enhancing electro-optic modulation. To introduce a microwave slow-wave effect and perfectly match the optical group index, capacitively loaded T-shaped electrodes are utilized, delivering a matched index of 3.43. The fabricated MZI modulator features an active length of merely 2.15 mm and a low insertion loss of 2 dB. Measurements show a half-wave voltage-length product $V\pi \cdot L$=1.9 V·cm, and the electro-optic response exhibits only 0.87 dB roll-off at 67 GHz. Furthermore, 100-Gbaud PAM-4 optical signal transmission is experimentally demonstrated with the device, providing a highly scalable technical route for next-generation optical transceivers.

ACP2026-0715-119

Nonlinear dynamics in heterogeneously integrated III-V-on-Si microring lasers with on-chip delayed optical feedback

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Microring lasers offer a compact integrated light source with rich nonlinear dynamics including self-pulsation, bistability, and chaos arising from counterpropagating mode interactions. These intrinsic nonlinearities and internal memory make them suitable for photonic reservoir computing. We develop a robust chip-scale fabrication process for heterogeneously integrated III-V-on-Si microring lasers and semiconductor optical amplifiers. Microring lasers (radius 48 μm) exhibit a threshold current density of 1.3 kA·cm-2 and 36.6 dB side-mode suppression ratio. In this paper, we present to our knowledge the first experimental demonstration of feedback-strength-dependent nonlinear dynamics in microring lasers with on-chip delayed feedback, including switching from single to multimode lasing and oscillatory regimes.

ACP2026-0715-20

Impact of Wavelength Detuning on 100-Gb/sPAM4 EML Performance and its Systematic Operating-Point Search

Koichi-H Huang[1*];Jian Fang[1];Ming Yu[1];Xiaoli Ge[1];Chen Gao[1];Zhongbao Wu[1];Jiaheng Jing[1];Cedric Gao[1];Kaifeng Yang[1]

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We have demonstrated that wavelength detuning governs absorption, optical power, RF response, and PAM4 quality in EMLs. A pseudo-FoM identifies optimal bias, validated through 100-Gb/s

PAM4 measurements, enabling systematic operating-point optimization.

ACP2026-0701-24

A 4×128 Gbps 7.8pJ/b Compact Integrated Transmitter with Silicon Slow-Light Modulator

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A 4-channel high-speed hybrid-integrated transmitter for LPO is designed in 90 nm SiGe BiCMOS and 300 mm SiPh, consisting of a linear driver wire-bonded to a codesign silicon slow-light MZM. Measurement results demonstrate 128 Gbps per channel PAM-4 optical eye diagrams.

ACP2026-0703-1

Electrically Tuned High-PerformanceIII-V/LithiumTantalate External-CavityLaser

Xiaoying Guo[1] , Xiao Wu[2] , Yuyao Guo[1,3,*] , Yu L[1,3] , Liangjun Lu[1,3] , Yang He[2] , Cheng Zeng[2] , Jinsong Xia[2,*] , Jianping Chen[1,3] , andLinjie Zhou[1,3]

1.Shanghai Jiao Tong University, China;2. Huazhong University of Science and Technology, China;3.SJTU-Pinghu Institute of Intelligent Optoelectronics, China;

We demonstrate a high-performance III-V/lithium tantalate Pockels laser featuring 28.7-mW output power, 115.6-nm tuning range, and 260-Hz intrinsic linewidth. The laser enables agile FMCW ranging with 17-cm precision over 250-m fiber at 100-kHz modulation rate.

ACP2026-0715-40

An End-to-End 850-nm VCSEL-Based Optical Wireless Link Supporting 130-Gb/s NRZ and 180-Gb/s PAM-4 Transmission

Peng Yan[1];Shenghui Wu[2];Yunhao Zhang[1];Yu Sun[3];Zhen Zhen[2];Qijie Xie[2];Lei Wang[2]*;Haowen Shu[1]*;Xingjun Wang[1]*

1.Peking University, China;2.Pengcheng Laboratory, China;3.Beijing Information Science and Technology University, China

We experimentally demonstrate an end-to-end 850- nm VCSEL-based optical wireless communication link over a 1-m free-space path with offline Volterra-series nonlinear equalization. The link achieves 130-Gb/s NRZ and 180-Gb/s PAM-4 transmission, with both highest-rate signals remaining below the 20% soft-decision forward-error-correction threshold.

ACP2026-0714-28

Monolithic SiN Passive Front-End for Polarization-Insensitive CWDM Applications

Qingyang Du[1]

1.Zhejiang Lab, China

We present a monolithic SiN passive platform for CPO, integrating ECs, PSRs, CWDM filters, and VCs in a 400-nm SiN layer via 12-inch CMOS. Wafer results: EC 1.7 dB (0.3 dB PDL), PSR PER 16.6 dB (loss 0.2 dB), CWDM loss 1.2 dB (crosstalk –14 dB), VC 44.1 mdB. SiN enables heater-free operation.

ACP2026-0701-36

High-Power-Tolerant and Low-Loss Si-SiN Interlayer Coupler Based on a Double-Tapered Adiabatic Structure

Tianqi Song[1];Ningyu Zhang[1];Jing Wang[1]*
1.Southern University of Science and Technology, China
We demonstrate a double-tapered adiabatic Si-SiN interlayer coupler achieving a 0.084-dB insertion loss at 1550 nm and a 1.5-dB enhancement in continuous-wave power tolerance compared to a single-tapered reference device.

ACP2026-0715-153

A compact 32-channel reconfigurable spectral processor based on a Loopback Arrayed Waveguide Grating

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1.Beijing University of Posts and Telecommunications, China;2.City University of Hong Kong, Hong Kong, China;3.QXP Technology Inc., China
We present a compact 32-channel reconfigurable spectral processor based on a loopback arrayed waveguide grating (AWG) and experimentally demonstrate its capability for flexible microcomb spectral shaping.

N-Track: Networks

ACP2026-0630-94

A Vision-Language Model for Optical Equipment Understanding and Fiber Connection Generation

Rui Zhao[1];Shengnan Li[1];Fubin Wang[1];Xiaotian Jiang[2];Ydi Wang[1];Min Zhang[1];Danshi Wang[1*]
1.Beijing University of Posts and Telecommunications, China;2.China Telecom Research Institute, China
A vision-language model (VLM) framework for optical networks is proposed. Fine-tuning Qwen3-VL-8B withLoRA enables accurate panel recognition, layout validation, and automated fiber connection generation, significantly reducing manual effort and errors in on-site O&M.

ACP2026-0716-8

Storage-aided Hierarchical Aggregation and Orchestration for the Optical Internet of Agents

Xiao Lin[1*];Wang Li[1];Ziang Feng[1];Zuqi Teng[1];Haoyuan Zheng[1];Enguo Chen[1*]
1.Fuzhou University, China
We propose SHAO-MoA,a storage-aided hierarchical orchestration framework for the Optical Internet of Agents.A spatio-temporal capacity graph and two-stage residual-flow scheduling improve state aggregation,resource utilization,and collaborative inference under constrained optical resources.

ACP2026-0626-10

Inverse-Designed Meta Processing Units for Task-aware Photonic Computing Systems

Chu Wu[1];Zeyu Cai[1];Songtao Yang[1];Ruoyu Shen[1];Yinan Zhao[1];Haiou Zhang[1];Wei Chu[1];Xing Lin[1*]
1.Tsinghua University, China
Photonic matrix processors require compact, composable operators for task-aware computing. Here, we demonstrate inverse-designed meta processing units (MPUs) with coherent matrix

cascading, hardware-in-the-loop dual-task learning, and neuron-level sharing, reducing programmable-mesh burden while preserving task-specific adaptation.

ACP2026-0715-190

14.6-Tb/s GMI with 400G-per-channel Direct-Detection Optical Interconnects over 25-km AR-HCF

Yixiao Zhu[1*];Yutong Pan[2];Xiang Cai[2];Tianhong Zhang[2];Tianchi Zhong[2];Shikui Shen[3*];Yu Qin[4;5];Yichun Shen[5];Limin Xiao[4];Shuailuo Huang[3];Zelin Wang[3];Weisheng Hu[1];Fan Zhang[2*]

1.Shanghai Jiao Tong University, China;2.Peking University, China;3.China Unicom Research Institute, China;4.Fudan University, China;5.Zhongtian Technology Advanced Materials Co., Ltd, China

We leverage the ultralow nonlinearity of anti-resonant hollow-core fiber to unlock launch power bottleneck for XPM-free massively-parallel DWDM transmission, enabling 400G-per-channel Kramers-Kronig direct detection with 17.4-Tb/s line rate and 14.6-Tb/s GMI-estimated capacity over 25 km.

ACP2026-0713-1

RingStitch: Demand-Aware Optical Stitching for Fragmented TPU Clusters

Huiru Ao[1];Fan Yang[1];Binglei Wang[1];Bo Liu[1];Jialong Li[1*]

1.Shenzhen University of Advanced Technoloy, China

RingStitch is an OCS-based scheduler that combines fragmented TPU rack capacity into logical rings. By prioritizing local placement, fragment-aware selection, and topology-aware ordering, it improves utilization, reduces blocking and waiting time, and limits communication overhead.

ACP2026-0701-84

Hybrid ML-based Rapid Calibration Method for Wavelength Selective Switches

Zihe Zhang[1];Yuzhe Li[1];Xiao Zhang[1];Chen Liu[1];Liangjia Zong[1*]

1.Huazhong University of Science and Technology, China

We propose a hybrid machine-learning-based rapid calibration method and first demonstrate its validation on a commercial-grade 32-port WSS module. Experimental results show over 97% calibration workload reduction while maintaining high port isolation.

ACP2026-0714-26

MoSE: Mode-Switching Expander for Mixed LLM Training and Inference

Fan Yang[1];Ying Zhou[2];Binglei Wang[1];Zhenjie Zhou[1];Jialong Li[1*]

1.Shenzhen University of Advanced Technoloy, China;2.Beijing Jiaotong University, China

We propose MoSE, a mode-switching optical expander that reallocates a fixed-degree edge budget between P-D-biased and uniform topologies, reducing communication cost for mixed LLM inference and training without additional ports or routing-policy changes.

ACP2026-0728-5

A 35-dB-Power-Budget 228-Gb/s EDFA-Free Self-Coherent PON Enabled by Coordinated Two-Stage SOA Control

Yuhao Fang[1];Weiqi Lu[1];Haojie Zhu[1];Yuan Puzhen[1];Dayu Shi[1];William Shieh[1*]

1.Westlake University, China

We demonstrate an EDFA-free 228-Gb/s burst-mode self-coherent PON over 40.72-km SSMF, using uncooled TO-CAN DFB laser and CSPR-optimized coordinated ONU/OLT SOA control we achieve a 35-dB power budget over 30dB ODN range.

T-Track: Transmission

ACP2026-0701-127

First Real-time 128Tb/s and 256Tb/s Unrepeatered Field Trial using 400Gbps and 800Gbps OTN transponders over Field-deployed 137.76-km Ultra-low-loss Multi-core Fiber Link

Zilin Fan[1];Chao Wu[1];Jian Cui[1*];Yu Deng[1];Zhuo Liu[1];Yuxiao Wang[2];Yufeng Han[3];Nan Sun[3];Yue Tian[4];Bin Hao[1];Bin Wu[2];Jinggang Cao[2];Yong Chen[2];Shang Cao[4];Zhihui Dong[3];Wei Sun[3];Yanchun Zhang[3];Cheng Chang[1];Yan Sun[1];Bing Yan[2];Ninglun Gu[1]

1.China Mobile Communications Group Co., Ltd., China;2.China Mobile Communications Group Shandong Co., Ltd., China;3.Jiangsu Hengtong Optic-Electric Co., Ltd., China;4.Huawei Technologies Co.,Ltd., China

First real-time unrepeatered 137.76-km field trial over field-deployed ultra-low-loss large-effective-aera 4-core fiber cable using 400Gbps and 800Gbps backbone OTN transponders is demonstrated, which achieves bit rates of 128Tb/s and 256Tb/s respectively.

ACP2026-0701-229

Photonic Integrated Complementary Carrier-Extracted Self-Coherent Receiver Enabled by Add-drop Resonators

Haojie Zhu[1];Zhengrong Zhao[1];Jinhong Xu[2];Boshu Sun[1];Yuhao Fang[1];Weiqi Lu[1];Dayu Shi[1];Jiwei Xie[1];Puzhen Yuan[1];Jingchi Li[3];Lan Li[1;2];Yikai Su[3];William Shieh[1;2*]

1.Westlake University, China;2.Westlake Institute for Optoelectronics, China;3.Shanghai Jiao Tong University, China

Based on the bandpass and bandstop characteristics of the add-drop racetrack resonators, we demonstrate an integratedcomplementary carrier-extracted self-coherent receiver on the silicon photonic platform, achieving 360-Gb/s data rate over 50-km SSMF.

ACP2026-0715-118

Real-time 48-Tb/s C+L Band Transmission over 412.36 km Hollow-core Fiber with 800 Gb/s/λ

Mi Shuchao[1];Zhang Xu[1*];Li Xingfeng[1];Ji Honglin[1];Wang Qibing[1];Lai Yeping[1];Jiang Ming[1];Feng Jingbin[1];Li Chao[1];Ding Wei[2];He Zhixue[1*];Yu Shaohua[1]

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

Areal-time C+L band transmission system over 412.36 km hollow-core fiber achieving a total capacity of 48 Tbit/s by using commercial 800G coherent optical modules.

ACP2026-0701-35

Real-time 24λ×1.6 Tb/s Transmission over 960km G.652.D Fiber on Super C Band Using 230 Gbaud 64-QAM-PCS Signals

Lingling Hu[1];Mingqing Zuo[1];Zihan Li[2];Shiyu Qin[2];Dawei Ge[1];Dong Wang[1];Dechao Zhang[1*]

1.China Mobile Research Institute, China;2.Huawei Technologies Co.,Ltd, China
We demonstrate a real-time 1.6-Tb/s 230-GBaud dual-subcarrier WDM system over 960-km G.652.D fiber using EDFAs. All 24 channels achieve error-free operation with 1.2-dB OSNR margin (σ=0.28), marking the first demonstration to simultaneously achieve 1.6 Tb/s and 900 km.

ACP2026-0701-125

Modeling and Performance Analysis of Distributed Time-Varying Optical Fiber Channels

William Shieh[1];Weiqi Lu[1*]
1.Westlake University, China
We propose a general model for distributed time-varying (DTV) optical channels. We analytically derive equalization-enhanced time-varying interference (EETI), quantifying performance degradation caused by the interplay between long dispersive memory and fast channel dynamics.

ACP2026-0701-123

First Real-time 256Tb/s 8×68.88-km and 384Tb/s 5×68.88-km Field Trials using 800Gbps and 1.2Tbps OTN Transponders over Fielddeployed ULL MCF Cable

Jian Cui[1*];Yu Deng[1];Zhuo Liu[1];Yuan Li[1];Yuxiao Wang[2];Yue Tian[3];Yufeng Han[4];Nan Sun[4];Chao Wu[1];Zilin Fan[1];Bin Hao[1];Jinggang Cao[2];Yong Chen[2];Bin Wu[2];Shang Cao[3];Zhihui Dong[4];Wei Sun[4];Yanchun Zhang[4];Cheng Chang[1];Yan Sun[1];Bing Yan[2];Ninglun Gu[1]
1.China Mobile Communications Group Co., Ltd., China;2.China Mobile Communications Group Shandong Co., Ltd., China;3.Huawei Technologies Co.,Ltd., China;4.Jiangsu Hengtong Optic-Electric Co., Ltd., China
Real-time 256Tb/s 8×68.88-km and 384Tb/s 5×68.88-km field trials using C+L-band 800Gbps/1.2Tbps OTN transponders are demonstrated, which is achieved over highperformance ultra-low-loss large-effective-aera 4-core fiber cable.

ACP2026-0701-155

Low-Complexity Cascaded Error Feedback Noise Shaping withResidualIn-Band Noise Suppression Achieving Over 10 dB SNR Gain for Fronthaul

Yicheng Xu[1];Yixiao Zhu[1];Yongxin Sun[1];Weisheng Hu[1];Qunbi Zhuge[1*]
1.Shanghai Jiao Tong University, China
We propose a low-complexity 2-bit cascaded error feedback noise shaping (CEFNS) scheme. By using simple-structured FIR filters, a 2-GHz 65536-QAM signal is delivered at 69.2 dB SNR, showing ~10 dB gain over single-stage 2-bit EFNS.

ACP2026-0701-140

Fast and Accurate Waveform-Level Channel Modeling Using Deep Learning for 300 GBaud S+C+L-band systems

Chen Mingzhe[1];Shi Minghui[1];Niu Zekun[1*];Jin Kaiyan[1];Xiao Junzhe[1];Hu Weisheng[1];Yi Lilin[1*]
1.Shanghai Jiao Tong University, China

We propose a Channel Decoupling Method and Temporal-Recurrent and Channel-Attention Network for waveform-level channel modeling in 300~GBaud S+C+L-band systems. It achieves \textless0.2~dB Q-factor error and 97.9\% complexity reduction versus SSFM, outperforming BiLSTM- and Transformer-based baselines, enabling rapid performance evaluation and launch power optimization.

ACP2026-0609-1

Optical Frequency Comb-Assisted MultibandRFSignal Generation Using Actively Phase-Stabilized Spectral Stitching

Hu Jincong[1];Zou Xihua[1*];Zhong Ningyuan[1]

1.Southwest jiaotong university, China

We propose an optical frequency comb-assisted multiband RF generation system using an active PLL. Reducing DAC sampling rates by 50%, it can synthesize 120-Gbit/s communication or 20-GHz LFM signals for flexible radar and communications.

ACP2026-0715-154

Codeword-Error-Ratio-Based Transmitter Compliance Metric for High-Speed Optical Interconnects with DFE-Based Receivers

Leyan Fei[1];Yongxin Sun[1];Yicheng Xu[1];Haiyun Xin[2];Weisheng Hu[1];Qunbi Zhuge[1*]

1.Shanghai Jiao Tong University, China;2.Huawei Technologies Co., Ltd, China

We propose a novel codeword error ratio (CER)-aware transmitter and dispersion eye closure quaternary (TDECQ) metric for PAM4 transceivers based on a decision feedback equalizer (DFE). By utilizing generating function matrices, it jointly models transmitter impairments and DFE error propagation. Simulations and experiments show that our proposed DFE-CER-TDECQ metric can reflect the influence of time-varying transmitter impairments and DFE propagation on FEC performance. This metric accurately evaluates the received optical power (ROP) penalty introduced by the transmitters in the perspective of FEC codeword error ratio for DFE-based systems.

ACP2026-0715-209

1.08-Tb/s Visible-Light Optical Interconnect Using a 50-Channel PDM Transceiver

Xinyi Liu[1];Yunkai Wang[1];Zhuoran Hu[1];Zengyi Xu[1];Suning Guan[1];Nan Chi[1*]

1.Fudan University, China

To meet rapidly growing data-center optical-interconnect demands, we demonstrate a 1.0847-Tb/s visible-light link enabled by high-speed laser diodes and coordinated DSP, using a 50-channel prototype transceiver with polarization-division multiplexing.Over a 1-m free-space link, all 100 branches achieve BERs below the 7% HD-FEC threshold.

ACP2026-0701-27

Demonstration of 10 Mbps Deep-Space Optical Uplink Communication at 0.711Signal Photocounts per Information Bit

Yu Miao[1;2];Yueying Zhan[1];Xiaowei Wu[1];Yang Sun[1;2];Yinan Li[1;2];Shanze Dong[1;2];Yunqi Nie[1;2];Lei Yang[1*]

1.Technology and Engineering Center for Space Utilization, Chinese Academy of Sciences, China;2.University of Chinese Academy of Sciences, China
We propose a digital soft-gated SPAD array receiver for deep-space optical uplinks. The 10 Mbps 16-PPM demonstration system reaches 0.711signal photocounts per information bit, delivering a 0.6 dB sensitivity gain versus the non-gated receiver.

ACP2026-0629-25

A Simplified Optical Wireless Communication System with Integrated Alignment and Ranging Using Retroreflected Beams

Tianjin Mei[1];Wenjing Xuan[1];Yifei Zhu[1];Hanchang Xiao[1];Qirui Xu[1];Chen Liu[1*]
1.Huazhong University of Science and Technology, China
We demonstrate a simplified OWC system employing one photodetector per terminal and retroreflected beams for simultaneous alignment and ranging, achieving 10 Gbps bidirectional transmission and an average ranging error of 4.13 cm over 3--8 m.

ACP2026-0715-168

Highly Robust Time-Trajectory-Coded 4D-BPSK Format for Long-Range Coherent Optical Inter-Satellite Links

Fang Dong[1];Yi Wei[2;3];Haoyu Zhang[1];Zhe Feng[1];Haiwen Cai[4];Jianfeng Sun[5];Feng Bao[1];Junwen Zhang[1;6];Nan Chi[1;6*]
1.Fudan University, China;2.Shanghai Key Laboratory of Collaborative Computing in Spacial Heterogeneous Networks (CCSN), China;3.Shanghai Aerospace Electronic Technology Institute, China;4.Zhang Jiang Laboratory, China;5.Shanghai Satellite Network Research Institute (SSNRI) , China;6.Key Laboratory for Information Science of EMW (MoE) , China
We report a highly robust time-trajectory-coded 4D-BPSK (TTC-4D-BPSK) modulation format for long-range coherent optical inter-satellite links. By introducing temporal trajectory coding across consecutive 4D-BPSK symbols, the proposed format effectively enlarges the Hamming between distinct four-dimensional symbol trajectories, thereby enabling
robust transmission in the low SNR regime. Compared with conventional PM-4QAM modulation, the proposed TTC-4DBPSK achieves a 1.9 dB improvement in photons per bit (PPB) at the forward-error-correction (FEC) threshold of 3.8 × 10-3.We further demonstrate a TTC-4D-BPSK free space optical (FSO) transmission system over an equivalent distance of 2,000 km using dual-aperture reception, achieving a net data rate of 419.1 Gbit/s.

NP-Track: Non-telecom Photonics

ACP2026-0723-4

Bidirectional High-Capacity Integrated Sensing and Communication Emulation Using Interconnected Counter-Propagating Recirculating Loops

Junyu Wu[1];Zexu Liu[1];Lei Liu[1;2];Honglin Jin[3];William Shieh[1;2*]
1.Westlake University, China;2.Westlake Institute for Optoelectronics, China;3.Peng Cheng Laboratory, China
We demonstrate a bidirectional WDM integrated sensing and communication system using interconnected counter-propagating recirculating loops emulating long-haul fiber links,

achieving 6.016-Tbps transmission over 2187.72 km, and DAS sensing with 1.85-km spatial resolution and over 15-dB sensing SNR.

ACP2026-0701-117

SIRT-Based Tomographic Reconstruction of Refractive Index Profiles in Specialty Sensing Fibers with Non-Circular Claddings

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1.Beijing Jiaotong University, China

We propose a tomographic method based on a simultaneous iterative reconstruction technique with phase-domain alignment for refractive index profiling of non-circular cladding fibers. By eliminating the circular symmetry assumptions required by conventional methods, it achieves accurate reconstruction of D-shaped fibers under mechanical jitter, with superior accuracy for sensor metrology.

ACP2026-0714-51

Optomechanically enhanced ppb-level NH3 sensing with a graphene-functionalized on-chip microcavity

Guo Yanhong[1];Wang Yuchen[1];Yang Huize[1];Zhao Guangming[2];Yao Baicheng[1];Tan Teng[1]

1.University of Electronic Science and Technology of China, China;2.Institute of Semiconductors, Chinese Academy of Sciences, China

We demonstrate a graphene-functionalized toroidal optomechanical sensor that preserves high optical Q and converts NH_3adsorption into narrow-linewidth phonon-lasing frequency shifts, enabling ppb-level detection with -36.2 Hz decade^{-1}sensitivity and a fast response time.

ACP2026-0715-64

High-Resolution Multi-Target Ranging via Coherent Chirped Pulse Interferometry

Yitian Gong[1];Yunjie Zeng[1];Chi Zhang[1*]

1. Huazhong University of Science and Technology, China

Chirped pulse interferometry (CPI) measures absolute distance by stretching femtosecond pulses through asymmetric dispersion,magnifying picosecond-scale delays into nanosecond-scale signals. All prior CPI implementations, how- ever, detect only the optical intensity, discarding the phase of the optical field. When two targets lie closer than the temporal span of a single chirped fringe, their zero-frequency oscillation points coalesce and become indistinguishable. Here we show that coherent detection recovers the full complex amplitude of the optical field, enabling simultaneous high-resolution multi-target ranging at the full repetition rate of the frequency comb. Digital dechirping followed by a Fourier transform converts the time- domain fringe pattern into a frequency spectrum where each target appears as an independent spectral peak. Using a self- referencing architecture in which the chirped pulse itself serves as the local oscillator, we experimentally resolve two targets that direct detection cannot separate. The coherent system achieves an overlapping Allan deviation of 138 nm at $\tau = 1.26$ ms.

ACP2026-0701-41

Programmable Photonic Processor for Ultra-Low-Error Multi-Frequency Microwave Photonic Measurement

Ziyao Zhang[1];Yuxin Liang[2];Shijia Fan[2];Hanmeng Li[2];Naidi Cui[2*];Junbo Feng[2*];Guanyu Chen[1*]

1.Chongqing University, China;2.Chongqing United Microelectronics Center (CUMEC), China

We demonstrate a programmable photonic processor for ultra-low-error microwave frequency measurement, combining MZI coarse localization and microring fine detection. It achieves 9 MHz RMSE over 0–20 GHz and supports simultaneous multi-frequency measurement.

ACP2026-0630-29

Ultra-Low-Loss Silicon Nitride Tunable Photonic Delay Line with Nanosecond-Scale Delay

Yuyan Yao[1];Zexv Wang[1];Ruitao Ma[1];Zejie Yu[1];Yiwei Xie[1*];Daoxin Dai[1]

1.Zhejiang University, China

We demonstrate a 4-channel 7-bit true-time delay line on silicon nitride platform, achieving 10.006 ns delay, 78.42 ps resolution, and fiber-to-fiber insertion loss 12.26 dB, enabled by low-loss broadened spiral waveguides and Mach–Zehnder switches (MZSs).

ACP2026-0624-7

Fully On-Chip Ultra-Wideband Simultaneous Measurement of Doppler-Frequency-Shift and Angle-of-Arrival System

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We demonstrate a fully on-chip ultra-wideband microwave photonic system for the simultaneous measurement of DFS and AOA, achieving precise measurements with DFS errors within ±0.03 Hz and AOA errors within ±2 °for a range of -90 °– 90 °in 2–40 GHz frequency band.

ACP2026-0721-3

Entanglement between Integrated Quantum Memories in the Telecom Band

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We experimentally demonstrate entanglement between two integrated telecom-band quantum memories. This demonstration is compatible with existing fiber communication infrastructure, which is essential for future quantum networks.

ACP2026-0714-20

Coherent spin-photon interface of single PL6 color center in silicon carbide

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In this talk, I will presentour investigation of the oxygen-vacancy PL6 color center in 4H-silicon carbide as a coherent spin–photon interface. Although PL6 has recently emerged as a promising platform for quantum information processing, its spin–photon properties have remained largely unexplored.

I will first show how we combine group-theoretical modeling with strain-dependent photoluminescence excitation spectroscopy to fully resolve the excited-state fine structure. Using resonant excitation, we achieve a spin initialization fidelity of99.69 ± 0.03%and a readout contrast of98.31± 1.03%. The spin–photon entangledA_2transition exhibits narrow optical linewidths of about180MHzand a polarization visibility of~82%. I will then discuss coherent optical driving, where we obtain Rabi frequencies up to2.895GHz—approximately 130 times the optical saturation power. Finally, by applying dynamical decoupling, we extend the spin coherence time from0.5msto5.70ms, a ten-fold enhancement.

Our results establish the PL6 center as a competitive solid-state spin–photon interface hosted in a commercially available semiconductor platform, combining near-unity initialization, high-speed coherent control, and millisecond-scale coherence without isotopic purification.

ACP2026-0715-57

LED-Pumped Silicon-Based Nanocavity Light Source with Enhanced Spectral Purity

Jingyu Chang[1];Renjie Tang[1];Zezhao Jv[2];Yalan Si[2];Jinghan Yang[1];Yingchun Wu[1];Yuting Ye[1];Zequn Chen[1];Hongtao Lin[2];Lan Li[1*]

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We demonstrate the first LED-pumped SWIR source using PbS CQDs in a silicon BIC cavity, enabling compact portable devices.

Updated by September 11, 2026