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Conference Guide

Technical Conference: 15 – 19 March 2026
Exhibition: 17 – 19 March 2026
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Agenda of Sessions — Wednesday, 18 March

	Room 403A	Room 403B	Room 408A	Room 408B	Room 411	Rooms 501ABC	Room 502A
07:30–17:00	**Registration Hours,** *South Hall Lobby*						
06:00–07:00	**OFC Fun Run/Walk,** *L.A. Live Plaza, Behind JW Marriott*						
08:00–10:00		**W1A • Thin-Film LN/LT and Silicon Mach-Zehnder Modulators**	**W1B • Laser Prototypes and Packaging** (ends at 09:45)	**W1C • High-Speed Transmission Systems** (ends at 09:15)	**W1D • Transceiver Design, Characterization and Optimization**	**W1E • Next-Generation Fiber Links** (ends at 09:30)	**W1F • Multicore Fiber**
10:00–17:00	**Exhibition Hours,** *South and West Hall (Coffee Service 10:00–11:00, Booths 349, 5041)*						
10:30–12:00	**W2A • Poster Session I,** *Petree Hall C*						
12:00–14:00	**Lunch Break** *(on own; concessions available in Exhibit Hall)*						
12:30–14:00	**The Journal Review Process: All You Need to Know!,** *Room 409B*						
12:30–14:00	**Dedicated Exhibition-Only Time,** *South and West Hall*						
14:00–16:00	**W3A • Optical Network Optimization and Scaling I**	**W3B • Coding, Modulation and DSP**	**W3C • Photonic AI Computing**	**W3D • Distributed Sensing I** (ends at 15:45)	**W3E • Laser Sources and Optical Engines for Optical Interconnection**	**W3F • Optical Signal Processing** (ends at 15:45)	**W3G • Panel: How Do We Model Novel Fiber Designs Such as SDM Fibres, Hollow-Core Fibers and Other New Fibers?**
16:00–16:30	**Coffee Beak,** *Outside Rooms 408AB, 502AB, 515AB*						
16:30–18:30	**W4A • Optical Network Optimization and Scaling II**	**W4B • Fiber-to-Chip Coupling**	**W4C • Wireless Integrated Sensing and Communications**	**W4D • Distributed Sensing II**	**W4E • Advanced Semiconductor Laser Sources**	**W4F • High-Speed Coherent PON Systems and Enabling Technologies**	**W4G • Panel: Is the Ecosystem Ready for Multicore Fibers?**
17:00–18:00	**Network Operator Happy Hour,** *On the DL Lounge*						
17:00–19:00	**Photonic Society of Chinese Heritage (PSC), Photonic Switching for AI Infrastructure - Architecting the Next-Generation AI Fabric,** *Concourse F (Room 152)*						

Room 403B

08:00–10:00
W1A • Thin-Film LN/LT and Silicon Mach-Zehnder Modulators
Presider: Patrick Runge; Fraunhofer HHI, Germany

W1A.1 • 08:00 Invited
Integrated Electro-Optic Frequency-Domain Equalizer for Ultra-Broadband Optical Modulators, Yuya Yamaguchi[1], Paikun Zhu[1], Pham Tien Dat[1], Shingo Takano[2], Shotaro Hirata[2], Yu Kataoka[2], Junichiro Ichikawa[2], Ryo Shimizu[2], Kouichi Akahane[1], Naokatsu Yamamoto[1], Atsushi Kanno[3,1], Tetsuya Kawanishi[4,1]; [1]*National Inst. of Information and Communications Technology, Japan;* [2]*Sumitomo Osaka Cement Co Ltd, Japan;* [3]*Nagoya Inst. of Technology, Japan;* [4]*Waseda Univ., Japan.* We review research on high-speed optical modulator utilizing an integrated electro-optic frequency-domain equalizer, which enables bandwidth expansion of modulator in traveling-wave configuration. The device performance of thin-film lithium niobate modulator with the integrated equalizer is discussed.

Room 408A

08:00–09:45
W1B • Laser Prototypes and Packaging
Presider: Akhiro Noriki, National Inst of Advanced Industrial Science and Technology, Japan

W1B.1 • 08:00 Invited
Rf and Thermal Challenges for Advanced Optical Subsystem Packaging, John Osenbach[1]; [1]*Nokia Solutions and Networks Oy, Finland.* Internet traffic exponential growth driving speed and capacity capability of coherent pluggable modules imposes challenges on rf- and thermal-performance. This paper addresses these challenges with particular attention on environmental impacts on their stability/reliability.

Room 408B

08:00–09:15
W1C • High-speed Transmission Systems
Presider: Haik Mardoyan; Nokia Bell Labs, France

W1C.1 • 08:00 Invited
Coded Modulation Targeting Higher Spectral Efficiency in High-Speed Transmission Systems, Hussam G. Batshon[1]; [1]*Nokia Bell Labs, USA.* We present SPC-coded probabilistic shaping for long-haul optical transmission that enables iterative decoding and improves spectral efficiency without changing the FEC or shaping structure. Experiments at ≥ 100 GBd confirm coding gains at fixed spectral efficiency and improved robustness under practical SNR constraints.

Room 411

08:00–10:00
W1D • Transceiver Design, Characterization and Optimization
Presider: Shota Ishimura; KDDI Research Inc., Japan

W1D.1 • 08:00
Non-Intrusive Separation and Characterization of Transmitter and Receiver Frequency Responses for Coherent Optical Communication System, Linsheng Fan[3], Qun Zhang[3], Shunfeng Wang[3], Xiongbin Yu[3], Xiuquan Cui[3], Zhongliang Sun[3], Zhaopeng Xu[3], Junpeng Liang[3], Qian Xiang[1], Tianjian Zuo[1], Tonghui Ji[3], Yanfu Yang[3,2], Zhixue He[3], Jinlong Wei[3]; [1]*Huawei Technologies Co Ltd, China;* [2]*Harbin Inst. of Technology Shenzhen, China;* [3]*Peng Cheng Laboratory (PCL), Shenzhen, China.* We present a non-intrusive method to characterize coherent transceiver frequency responses without any hardware modification. Compensation using the characterization results improves 2 dB OSNR sensitivity at 7% FEC threshold in a 69-GBaud experimental system.

W1D.2 • 08:15
Modulation Crosstalk Cancellation for Ultra-Dense WDM Silicon Photonic MRM Transmitters, Yongjin Ji[1], Daewon Rho[1], Seung-Jae Yang[1], Woo-Young Choi[1]; [1]*Yonsei Univ., Korea (the Republic of).* An electrical-domain assisted modulation crosstalk cancellation technique for cascaded MRM-based WDM transmitters achieves 4 x 25 Gb/s PAM-4 operation at 340 pm (42.4 GHz) spacing, maintaining clear eyes without modifying the photonic IC.

Room 501ABC

08:00–09:30
W1E • Next-generation Fiber Links
Presider: Molly Piels; OpenLight Photonics, USA

W1E.1 • 08:00 Invited
AI in Performance Optimization of Short Reach Optical Interconnects, Luca Poti[1,2], Asfand Nizamani[1], Li Zhang[1], Dario Cellini[4], Mareli Rodigheri[3], Stella Civelli[5], Ramin Solaimani[1], Pantea Nadimi Goki[4], Muhammad A. Naz[1], Marco Secondini[4], Enrico Forestieri[4], Fabio Cavaliere[6]; [1]*CNIT, Italy;* [2]*Universitas Mercatorum, Italy;* [3]*Universidade Estadual de Campinas, Brazil;* [4]*Scuola Superiore Sant'Anna, Italy;* [5]*Consiglio Nazionale delle Ricerche, Italy;* [6]*Ericsson research Italy, Italy.* We review recent AI techniques for short-reach optical links and demonstrate DSP design for a bipolar PAM system with a direct-detection receiver using physically assisted AI, achieving measurable performance gains over conventional adaptive equalization–based receivers.

Room 502A

08:00–10:00
W1F • Multicore Fiber
Presider: Chiara Lasagni; Universita degli Studi di Parma, Italy

W1F.1 • 08:00
Ultra-Low Birefringence in High-Density Trench-Assisted Multi-Core Fibers via Fluorine-Doped Stress Rods, Gustavo Ocampo[1], Kunimasa Saitoh[1]; [1]*Hokkaido Univ., Japan.* We propose fluorine-doped stress rods to suppress thermally induced birefringence in dense trench-assisted MCFs, achieving single-mode-fiber-like birefringence with worst-case beat length ≥10 m in standard-cladding eight-core, 30 μm-pitch design, extendable to other dense layouts.

W1F.2 • 08:15
Accuracy Limits of Crosstalk Measurement Techniques for Weakly Coupled Multi-Core Fibers, Jonaq N. Sarma[1], Anjana K[1], Chandan S. Yadav[1], Deepa Venkitesh[1]; [1]*Indian Inst. of Technology Madras, India.* We report a comparison between power meter, OTDR and wavelength resolved methods for measuring crosstalk in a weakly coupled multicore fiber revealing trade offs in accuracy, dynamic range, and practicality for network deployment.

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Modulation Crosstalk Cancellation for Ultra-Dense WDM Silicon Photonic MRM Transmitters

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Abstract: A new technique is presented for cancelling modulator crosstalk in a WDM silicon photonic transmitter based on cascaded micro-ring modulators (MRMs) with ultra-dense channel spacing. The crosstalk cancellation is achieved in the electrical domain using a custom-designed CMOS IC that replicates and subtracts the aggressor data for pre-distortion, requiring no modification to the photonic IC. A 4λ × 25 Gb/s PAM-4 operation is demonstrated at 340 pm (42.4 GHz) channel spacing, achieving high spectral efficiency while maintaining clear eye openings under strong inter-channel modulation crosstalk.

1. Introduction

The rapid growth of data traffic in data centers and AI workloads has exposed the bandwidth and scalability limits of conventional electrical interconnects. Optical interconnects offer a promising solution by providing higher capacity, and silicon photonics enables integration within CMOS technology for compact, high-density designs [1]. In silicon photonic transmitters, MRMs provide a small footprint and inherent compatibility with wavelength-division multiplexing (WDM) [2]. However, their periodic transmission spectrum with a finite free-spectral range (FSR) limits the achievable channel number. Reducing channel spacing increases the channel number but it can cause spectral overlap between neighboring channels, resulting in MRM modulation crosstalk. Narrowing the resonance linewidth can suppress this overlap, but a higher Q factor reduces modulation bandwidth [3]. Consequently, modulation crosstalk represents a key limitation in scaling MRM-based transmitters toward dense WDM systems. In this work, we present a Si photonic WDM transmitter containing cascaded MRMs in which the spectrally overlapped cross modulation is compensated by a custom-designed electronic IC (EIC). This approach mitigates the trade-off between modulation bandwidth and channel spacing, enabling compact and scalable WDM transmitters for high-throughput Si photonic interconnects.

2. MRM crosstalk cancellation technique

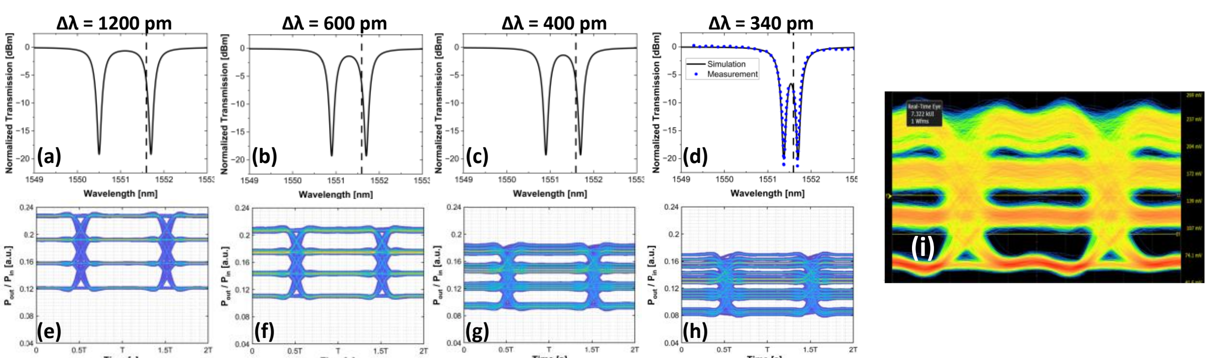
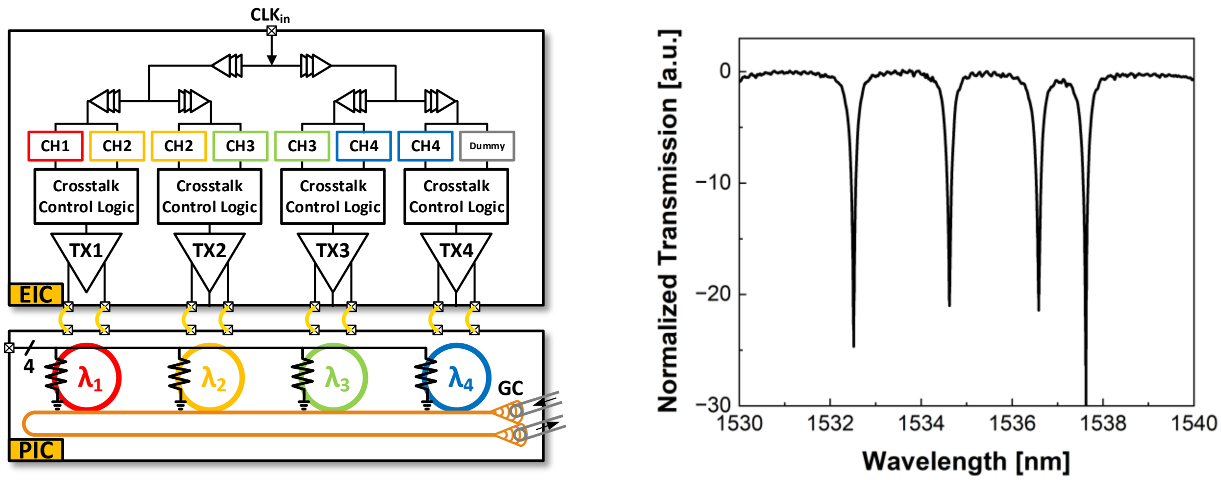


Fig. 1. (a)-(d) Through-port transmission spectra and (e)-(h) simulated 4.8 Gb/s PAM-4 eye diagrams of 2-channel cascaded MRM at different channel spacings, and (i) measured PAM-4 eye diagram at Δλ = 340 pm that matches the simulation.

Fig. 1(a)–(h) show how an aggressor MRM having smaller resonance wavelength causes eye degradation of a main MRM having larger resonance wavelength when both are independently modulated for various channel spacing. For both simulation and measurement, the input wavelength for the main MRM is placed at 100pm smaller than the MRM resonance wavelength. As the aggressor MRM approach the victim, their transmission spectra begin to overlap, and the input light is modulated by both modulators simultaneously, leading to degradation of the main MRM eye. This degradation is caused by the cumulative insertion loss of the cascaded modulators and the aggressor-induced modulation that increases with spectral overlap. To accurately evaluate this behavior and verify the proposed crosstalk-cancellation approach, the Si MRMs are designed with the Q factor of approximately 4500, providing sufficient bandwidth for 25 Gb/s PAM-4 operation while exhibiting noticeable spectral overlap between adjacent channels. For validating the crosstalk model and isolating overlap-induced degradation from bandwidth-related effects, both simulation and measurement were performed at the relatively low date rate of 4.8 Gb/s PAM-4. At the channel spacing of 340 pm, where severe crosstalk occurs, the measured eye diagram in Fig. 1(i) clearly shows that the transmitter output becomes highly degraded and practically unusable without any form of compensation.



(a) (b)

Fig. 2. (a) Block diagram of WDM transmitter with crosstalk cancellation capability, (b) measured through-port transmission spectrum.

Fig. 2(a) shows the proposed MRM crosstalk-cancellation transmitter. The input wavelength for each channel is assumed to operate on the blue side of its resonance, making it sensitive to MRM crosstalk from the neighboring channel on the same side. Also, only the nearest channel induces noticeable crosstalk. To suppress this, the aggressor data are replicated in the electrical domain for pre-distortion. Each driver generates a timing-aligned and weighted copy of the aggressor data and adds it to the main drive signal. Channel 4, which does not experience MRM crosstalk, receives dummy data to preserve circuit symmetry. The driver array is clocked through a tree-type distribution network that provides a physically symmetrical layout for all channels. In this configuration, the critical alignment is between the aggressor data that drives the aggressor modulator and the replicated aggressor data injected into the main driver. Digitally controlled delay lines (DCDLs) are included to fine tune any residual timing skew after global clock distribution to compensate for process and layout variations. This ensures accurate subtraction and stable MRM crosstalk suppression across all channels.

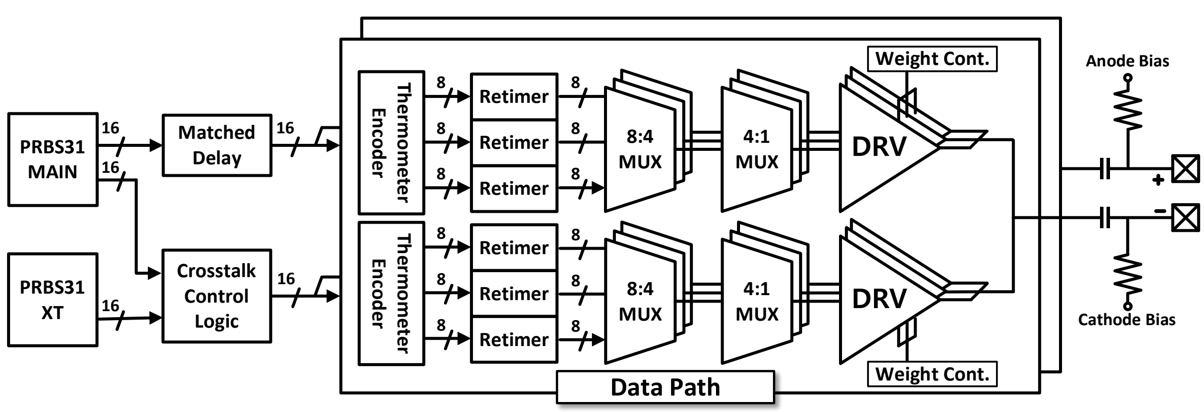
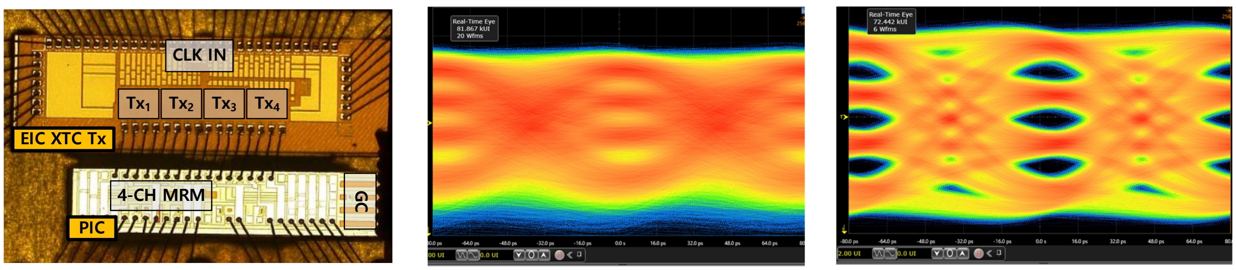


Fig. 3. Electrical implementation of the MRM crosstalk-cancellation driver.

Fig. 3 shows the PAM-4 transmitter architecture implementing the proposed MRM crosstalk-cancellation scheme. The transmitter adopts a PAM-4 driver architecture extended with a compact crosstalk control logic, which receives

PRBS data from both the main and aggressor channels. Based on the instantaneous data combination, this logic determines whether pre-distortion should be applied in a positive or negative direction. The main data path employs thermometer encoding and per-segment weight control for PAM-4 amplitude trimming. The same segmentation is reused in the cancellation path to realize the compensation weight, requiring no extra circuitry. Each driver segment provides independent 4-bit weighting, enabling fine control of the cancellation magnitude. This architecture allows flexible pre-distortion adjustment according to channel spacing, ensuring effective suppression across a wide range of operating conditions.

3. Measurement Results



(a) (b) (c)

Fig. 4. (a) photograph of integrated WDM transmitter, measured 25 Gb/s PAM-4 eye diagrams at 340 pm channel spacing (b) before and (c) after the MRM crosstalk cancellation.

The hardware platform integrates a silicon photonic IC and a CMOS electrical IC via wire bonding, as shown in Fig. 4(a). The EIC, fabricated in Samsung 28-nm CMOS technology, drives the 4-channel MRM array and implements the cancellation logic. The PIC, fabricated with the AMF MPW service, includes MRMs and on-chip metal heaters for wavelength tuning. The fabricated transmitter setup was then evaluated to experimentally verify the effectiveness of the proposed crosstalk-cancellation technique. Experimental verification was performed using 25 Gb/s PAM-4 optical signals at 340 pm (42.4 GHz) channel spacing, a severe crosstalk condition between two representative modulators. Fig. 4(b) and (c) present the measured eye diagrams before and after crosstalk cancellation. Without cancellation, the eye was completely closed due to strong crosstalk between adjacent MRMs. After applying electrical pre-distortion, the eye opening is clearly restored with distinct PAM-4 levels, confirming effective MRM crosstalk suppression. This demonstrates that the proposed architecture maintains signal integrity under ultra-dense WDM spacing. At 25 Gb/s and 340 pm spacing, the achieved spectral density is 0.59 b/s/Hz, representing a clear improvement over conventional MRM transmitters limited by spectral overlap and highlighting the potential for denser WDM integration within a single FSR. This work successfully demonstrated a modulation crosstalk cancellation architecture that preserves PAM-4 signal quality under severe inter-channel interference, enabling compact and scalable ultra-dense WDM silicon photonic transmitters.

4. Acknowledgements

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5. References

[1] C. S. Levy et al., "8-λ × 50 Gbps/λ Heterogeneously Integrated Si-Ph DWDM Transmitter," *IEEE Journal of Solid-State Circuits*, vol. 59, no. 3, pp. 690-703, 2024.

[2] X. Guan et al., “Ultra-dense wavelength-division multiplexing with microring modulator,” *Journal of Lightwave Technology*, vol. 39, no. 13, pp. 4300–4306, 2021.

[3] H. Yu et al., "Trade-off between optical modulation amplitude and modulation bandwidth of silicon micro-ring modulators," *Optics Express,* vol. 22, pp. 15178-15189, 2014.