Polariton Demonstrates 448G/lane Eye Diagrams at 1310 nm with PAM4 Modulation

October 1st, 2025
Zurich, Switzerland

Polariton Technologies, leader in high-speed electro-optic (EO) devices for optical communications, announces today new experimental results achieving 448 Gbit/s transmission in the O-band using commercial plasmonic silicon ring resonator modulators.

The measurements are related to the introduction of Polariton's 8-channel transmitter PIC, designed for 3.2T-DR8 optical engines and transceivers. With an electro-optical bandwidth exceeding 145 GHz, ultra-compact integration, and compatibility with high-volume silicon photonics manufacturing, the PIC provides sufficient performance for 400G and 800G per lane operation, showing a way forward for a few technology generations.

As the industry targets ramp-up of next generation transceivers as early as 2027, plasmonic modulators deliver the necessary performance today. Together with energy efficiency and thermal robustness, Polariton is positioning plasmonics as the enabling technology for future data center components, AI, and HPC interconnects.

The work performed in collaboration with the ETH Zurich and the IEF (Institute for Electromagnetic Fields) marks a milestone for optical communication and is unveiled at the European Conference for Optical Communication in Copenhagen (ECOC 2025), as it highlights the pushing the boundaries of connectivity in data centers.

Plasmonic ring resonator modulators (RRMs) fabricated on silicon photonics employed at 1310 nm with PAM4 or higher-order signaling, establish best-in-class metrics for compact transceivers like CPO. While the results showcase data rates for PAM4 modulation, it also confirms the viability of PAM6 and PAM8 signaling for higher throughput. Reaching a steady improvement of what is possible in laboratory setups, the measurement instruments are the limiting factors in terms bandwidth.

"Reaching 448G per lane in the O-band with our plasmonic silicon modulators is an important first milestone. The next step is to co-optimize this device with high-speed electronics in an optical transmit engine to unlock their full performance and power consumption below the 1 pJ/bit" says Benedikt Baeuerle, co-CTO of Polariton. "The combination of silicon photonics and plasmonics will be key for next generation optical transceivers like CPOs where bandwidth, density, and power efficiency converge."

The employed EO modulators excel for their footprint and the versatility to be integrated into a multitude of silicon photonics processes, as a back-end addition to standard semiconductor processing. Unlike silicon microrings, these

components have been proven to work stable for long periods without the need of retuning after small temperature changes.

About Polariton Technologies

Polariton is a Swiss designer and manufacturer of high-performance photonic integrated circuits (PICs) for ultra-high-bandwidth and low-power applications in communication, computing, test & measurement, space, and quantum technologies. Exceptional performance is achieved by combining the established silicon photonics platform with plasmonic active devices, enabling operation in sub-THz and THz regimes with Mach-Zehnder and ring resonator modulators.

Follow Polariton on LinkedIn @polariton-technologies and visit the website.

Media Contact
Helena Echeverri
info@polariton.ch
+41 44 589 51 51