



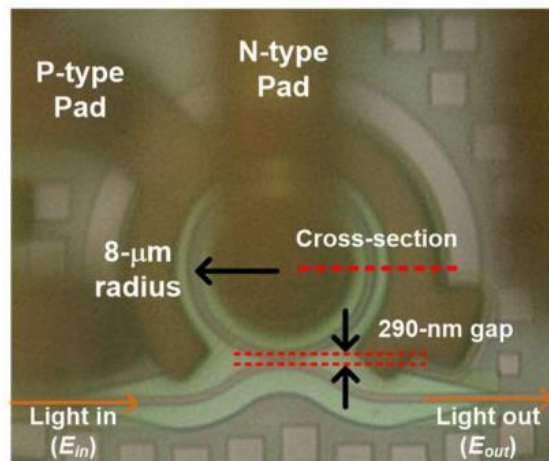
2023-1

Workshop

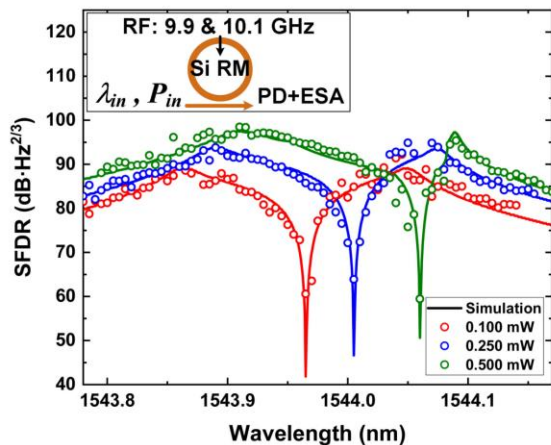
Youngkwan Jo

**High-Speed Circuits & Systems Lab
Dept. of Electrical and Electronic Engineering
Yonsei University**

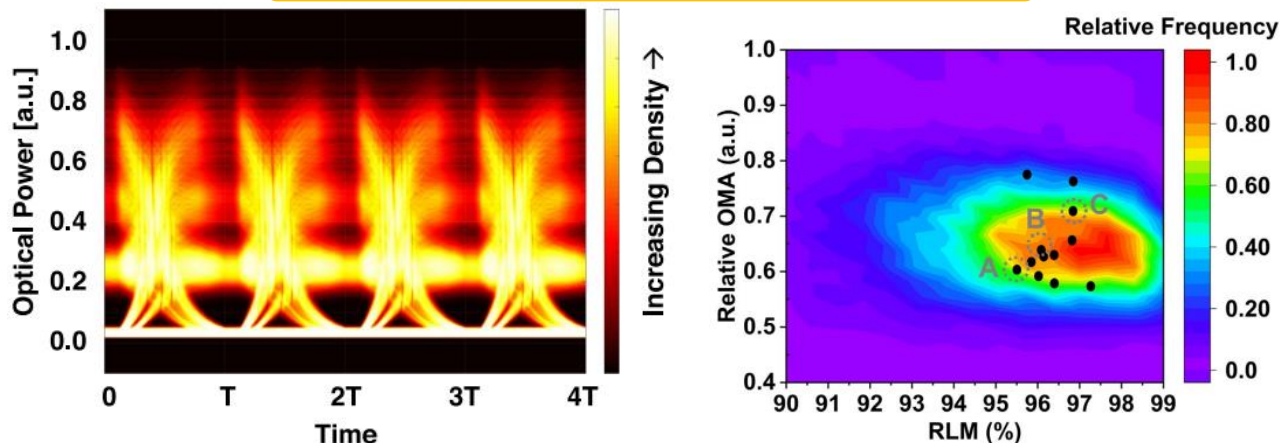
Si Ring Modulators (RMs)



Modulation Linearity



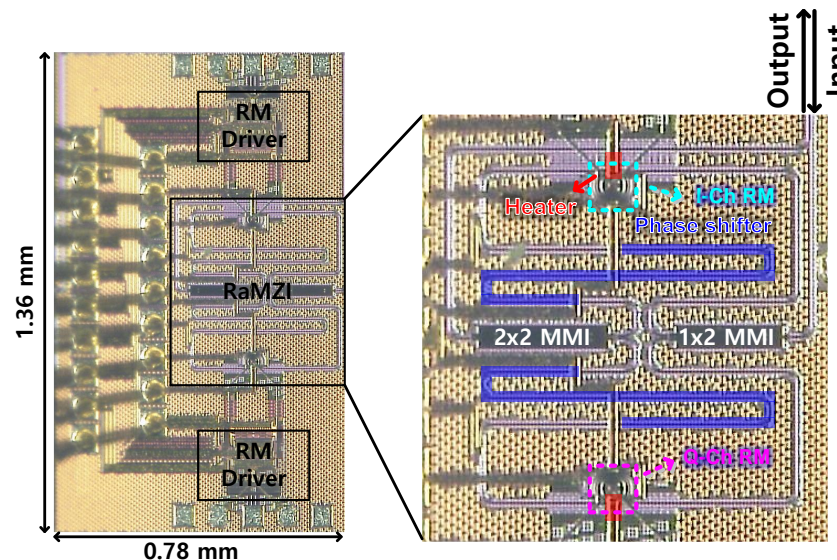
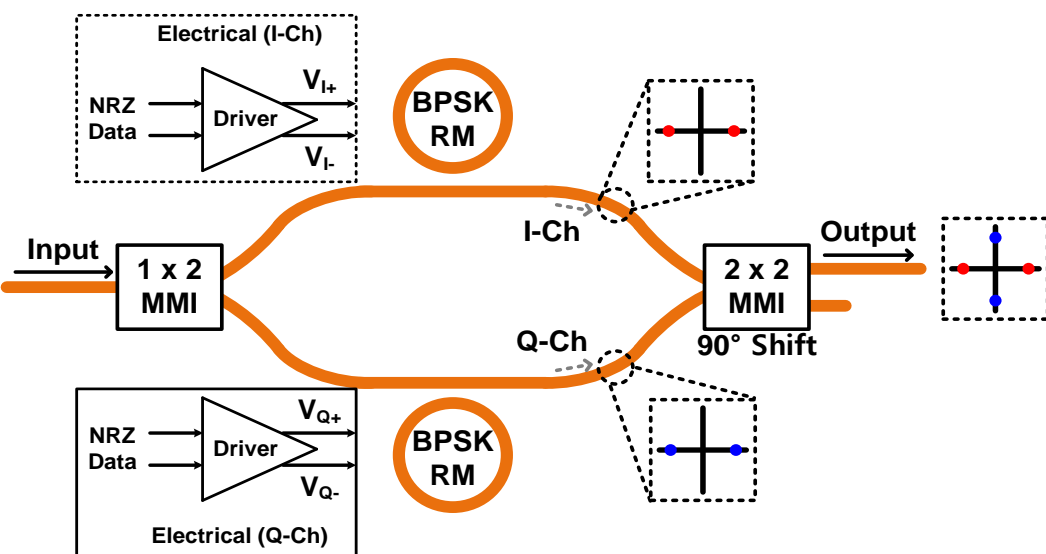
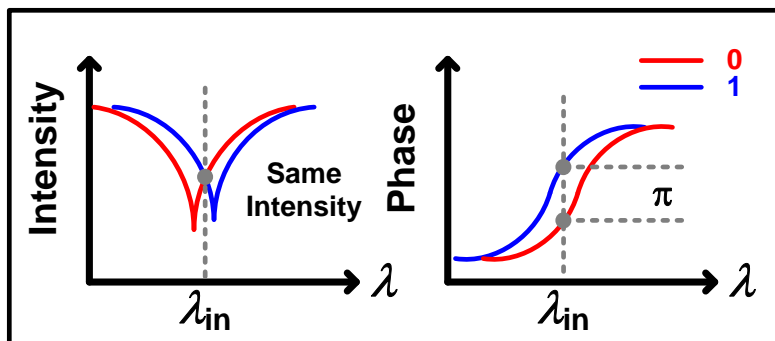
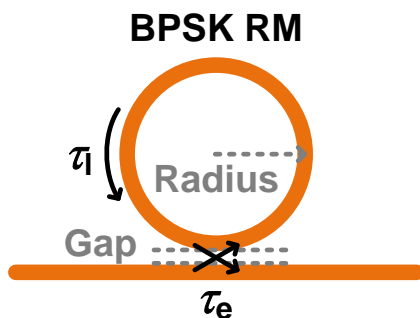
Monte-Carlo Characterization



IEEE/OSA Journal of Lightwave Technology, 2021

Japanese Journal of Applied Physics, 2023

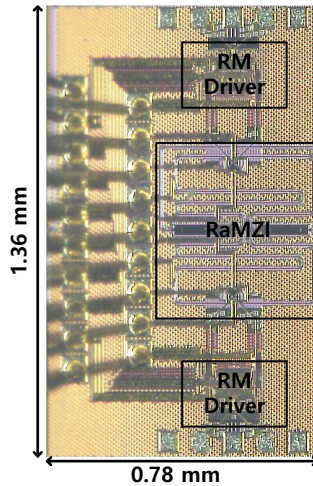
RM for Phase-Shift Keying Modulation?



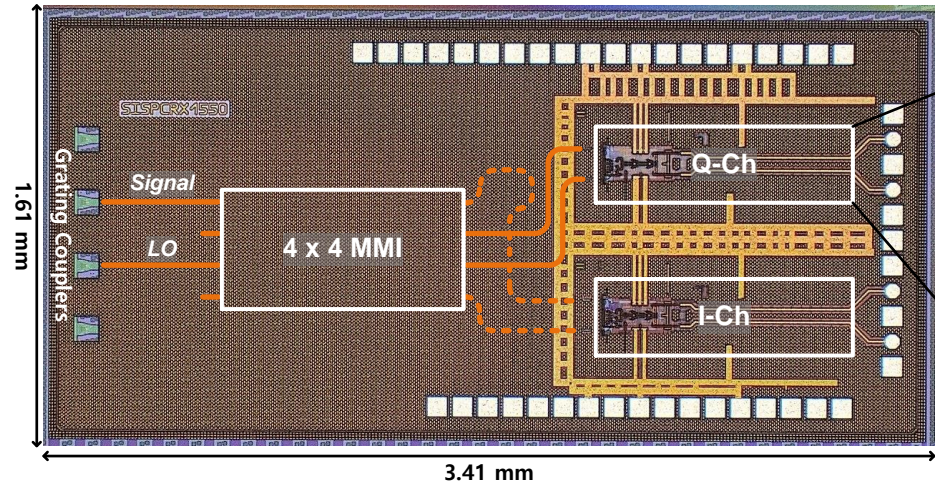
Fabricated by IHP's 0.25 μ m Si photonic BiCMOS process

Co-Measurements of EPIC QPSK Tx and Rx

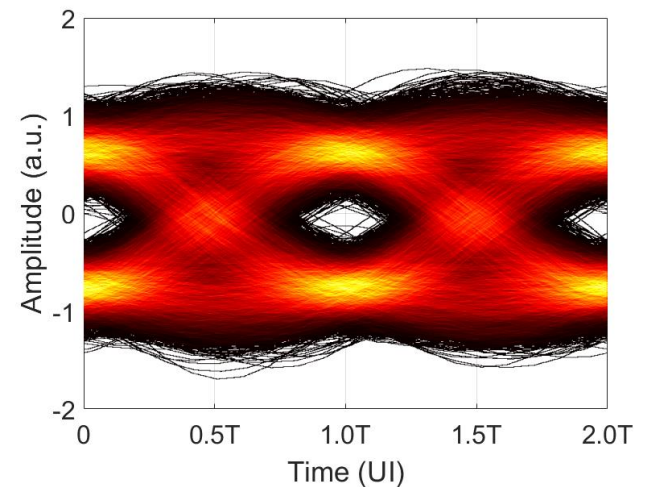
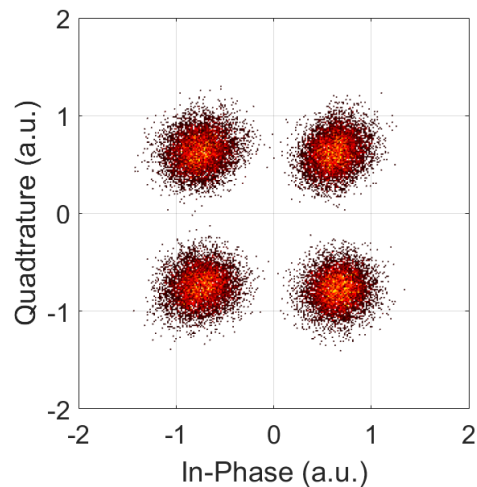
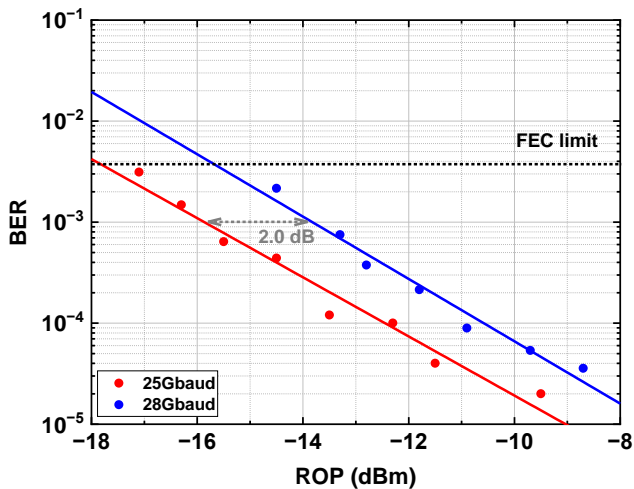
Coherent Transmitter EPIC



Coherent Receiver EPIC



BER curve, constellation and re-sampled eye diagram for 28Gbaud EPIC QPSK transceiver



Past and Future

● 2022-2

- *Measurements: 50-Gb/s Si ring QPSK transmitters (EPIC)*
- *Guest scientist at IHP (Leibniz-Institut für innovative Mikroelektronik)
Subject: “Ultrafast Ge p-i-n photodiode analysis and optimization”*

● 2023-1

- *Measurement: system measurement of Si photonic BiCMOS coherent transmitter with receiver at IHP*
- *Phase response modeling and parametric optimization of RM as PSK modulators*
- *Publication: “Monte Carlo characterization of Si ring modulator PAM-4 eye diagram performance,” Japanese Journal of Applied Physics, June 2023*
- *Conference: “A Si Photonic BiCMOS Coherent QPSK Transmitter Based on Parallel-Dual Ring Modulators,” IEEE SiPhotonics, April 2023*

● 2023-2

- ***Thesis***