

Optical Interconnects with Silicon Photonics

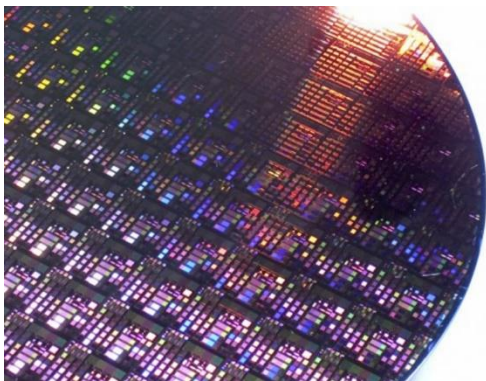
Photonics



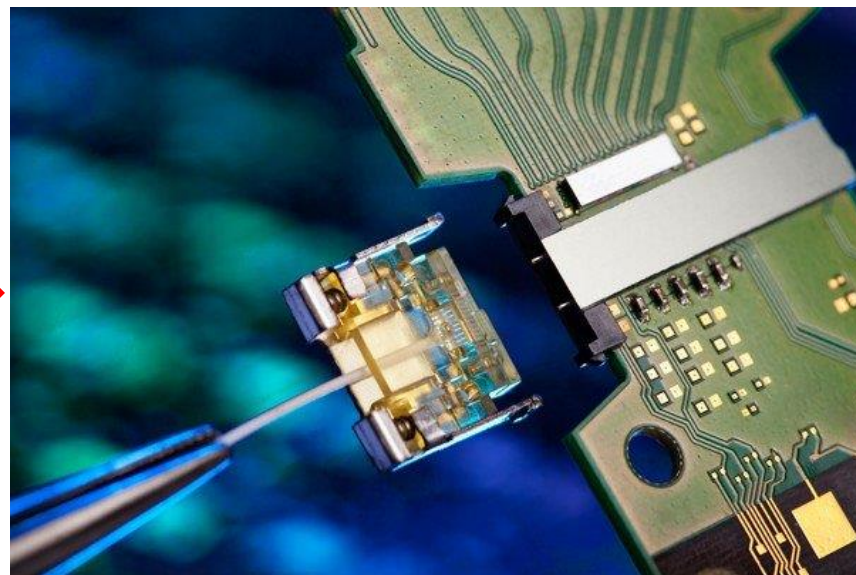
No BW limit in fiber → High-speed



Si Electronics



Si Photonics



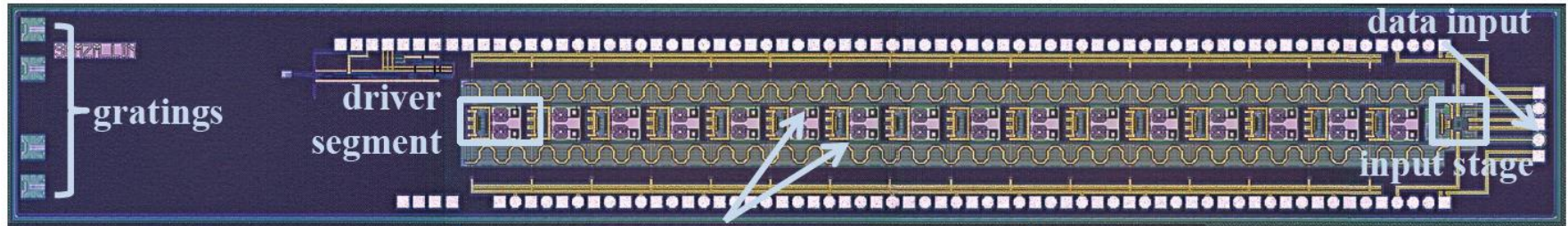
Intel

High-speed & cost-efficient technology

Mature technology → High-volume w/ low-cost

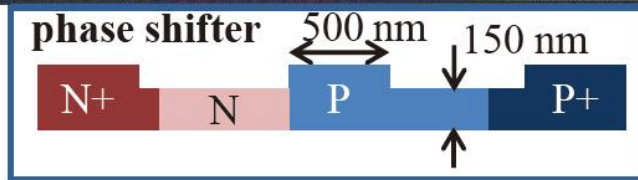
Efficient Tx Design with Si Ring Modulator

Si Mach-Zehnder (MZM)



MZM length: 6.08mm

<IHP, CLEO, 2016>

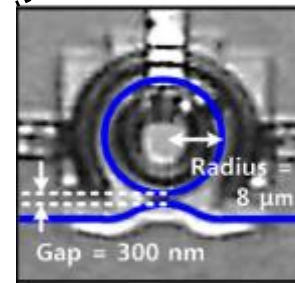


Si MZM

- Large footprint (~mm) 😞
- Poor energy-efficiency (>1pJ/b) 😞
- Required MUX/DEMUX for WDM 😞

Si RM

- Small footprint (~ μm) 😊
- Moderate energy-efficiency(<1pJ/b) 😞
- Suitable for WDM 😊
- Sensitive to temperature** 😞 → Temperature controller required!

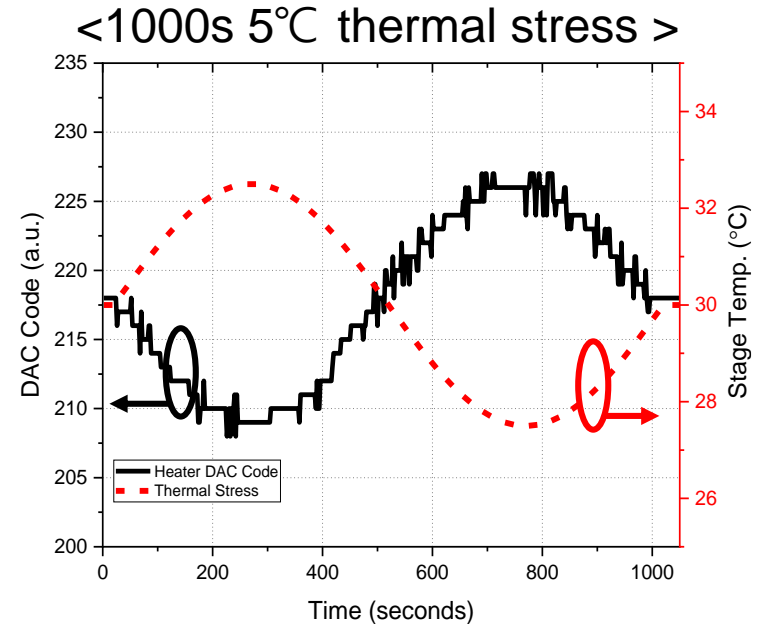
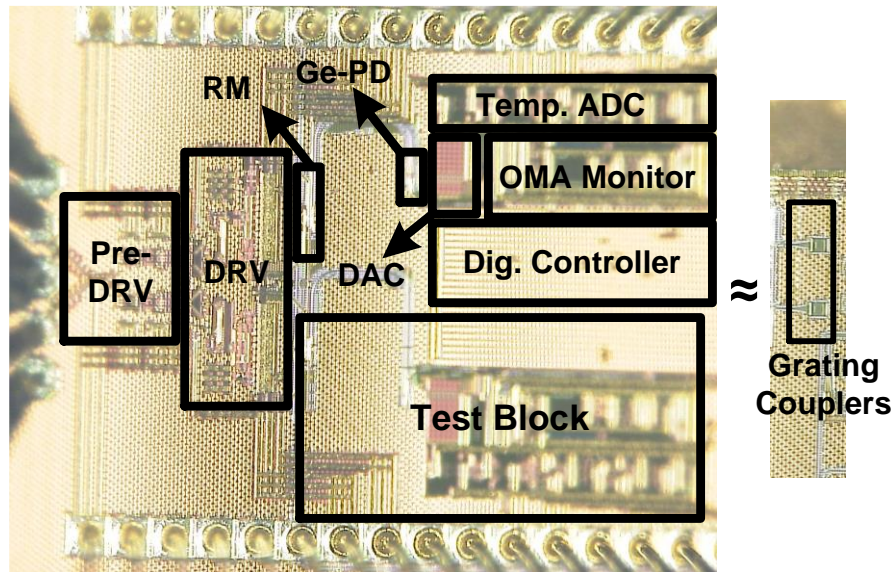


Si Ring Modulator (RM)

Radius: 8μm

Monolithically Integrated Tx w/ Temp. Controller

Will be presented on 20'OFC



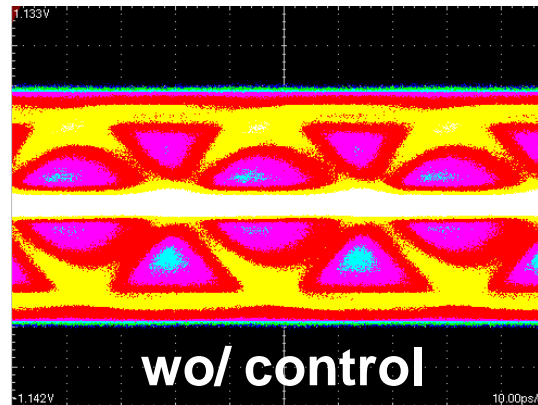
IHP's Photonic BiCMOS tech.

→ Driver + RM

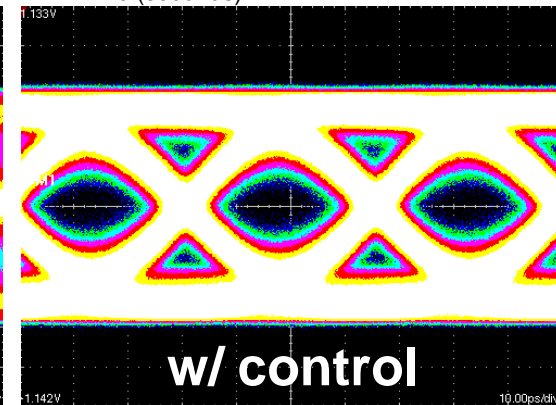
+ Temp. Controller



innovations
for high
performance
microelectronics



w/ control



w/ control

with 25Gb/s PRBS 2³¹-1