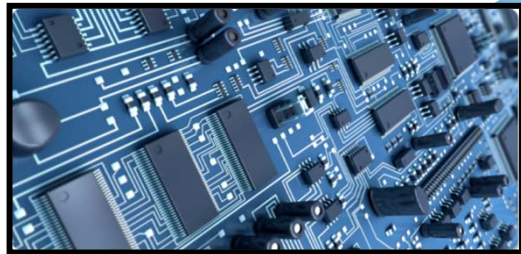
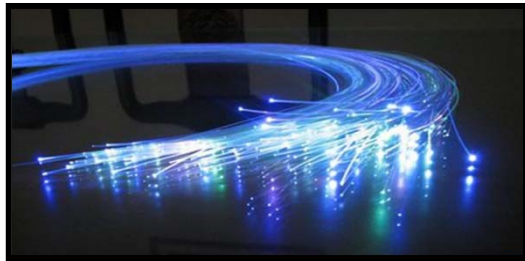


# Silicon Photonics: The Emerging Technology

- Motivation:

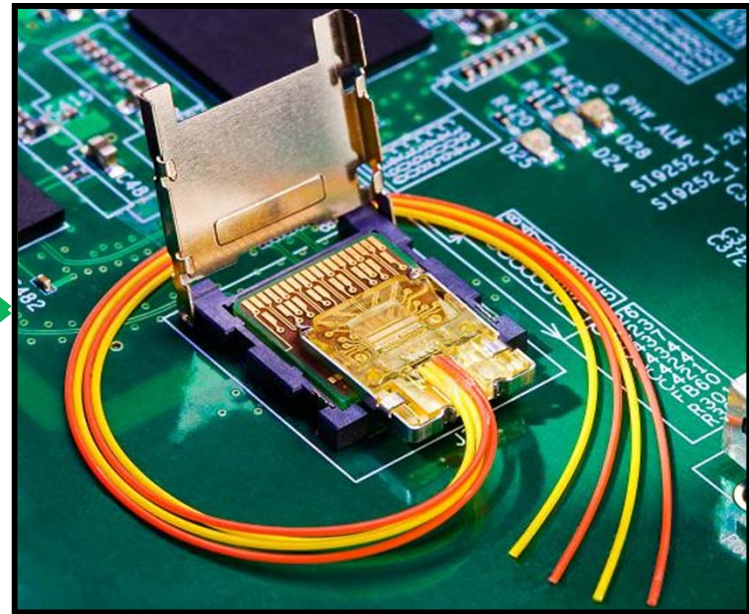
- More Moore: Continuation of **Scaling** and **Integration**.
- More than Moore: New materials and **new technology (photonics)**.

Photonics



Electronics

Electronic-Photonic Integrated Circuits

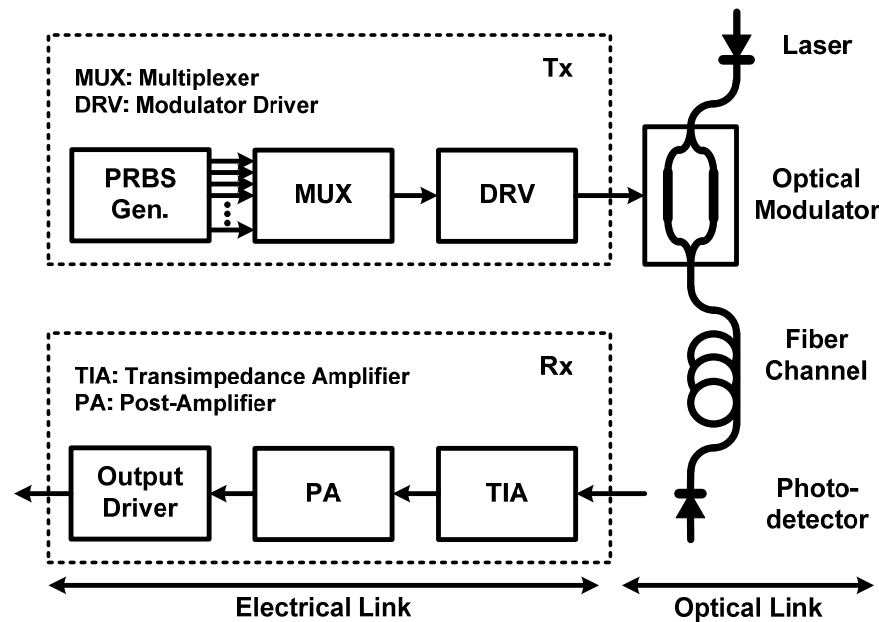


***“Development of CMOS-compatible optical components is of paramount importance”***

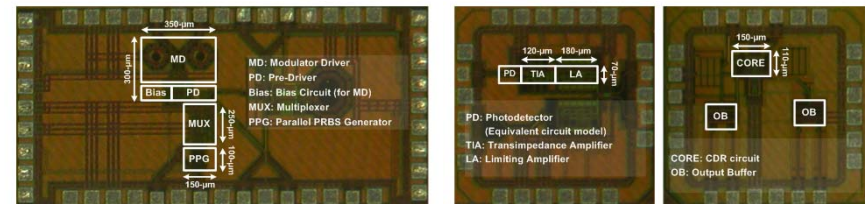
**(ITRS Roadmap 2009 – Interconnect, p.56)**

# 25-Gb/s Transceiver Design & Demonstration

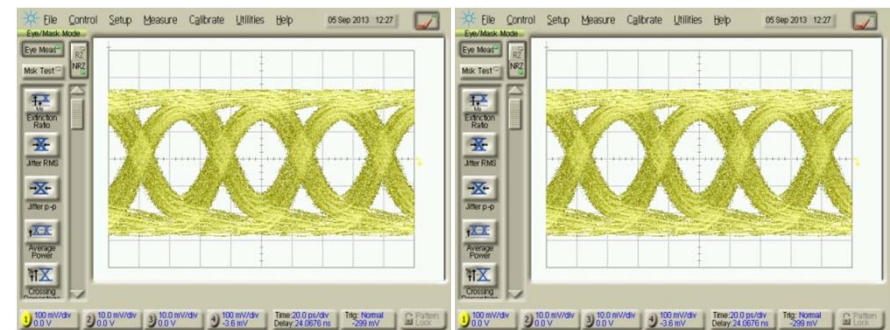
- A 25-Gb/s electronic front-end of Si photonic transceiver.
  - The fastest broadband data transmission in HSCS lab.
  - Fabricated with TSMC 65-nm standard CMOS technology.
  - Considerations on ‘hybrid-integration’ with photonic devices (using bonding-wires).



Block Diagram



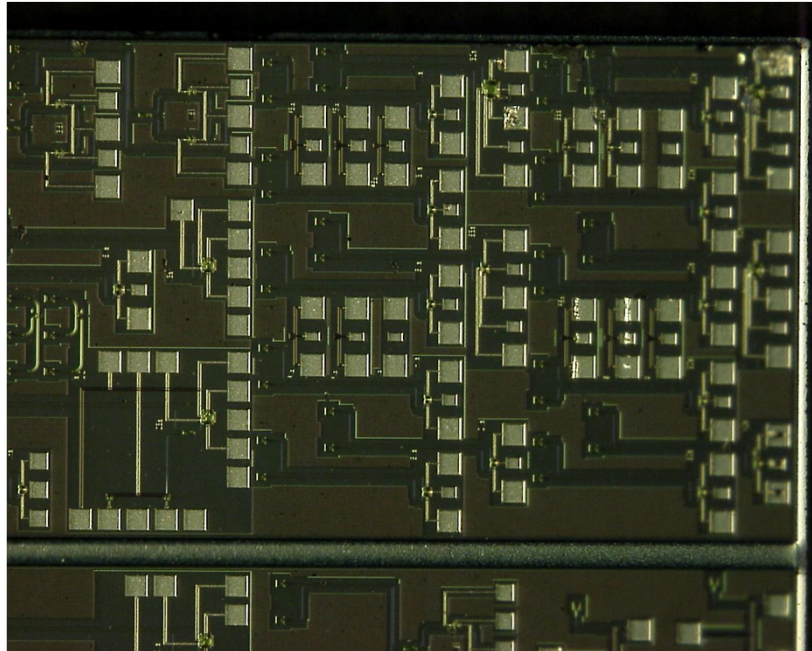
Micro-photograph



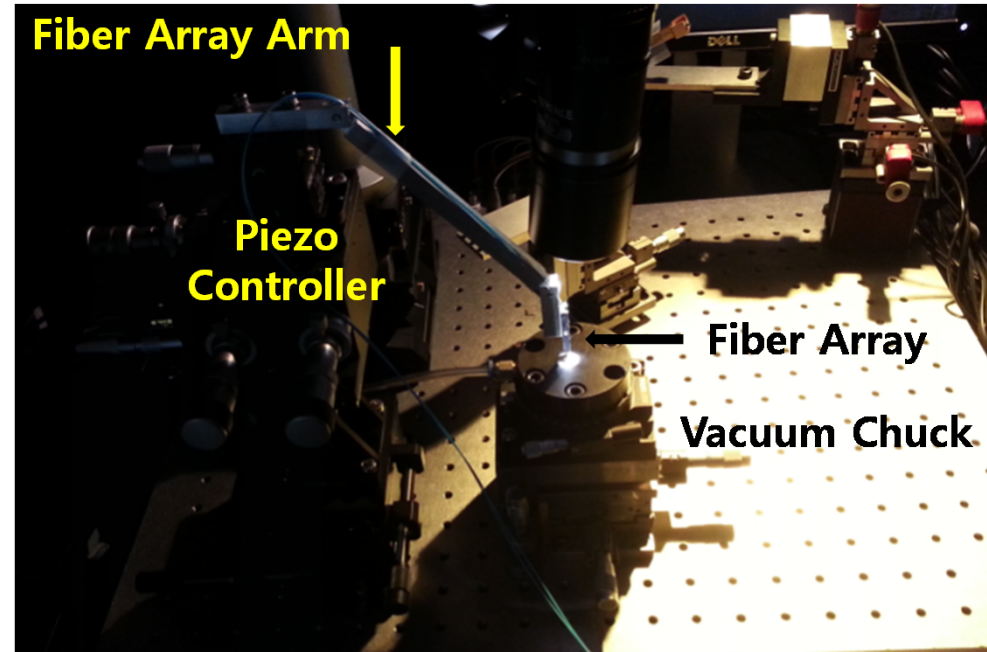
Eye-diagram of Tx (left) and Rx(right)

# Si Micro-Ring Modulator Design & Modeling

- Measurement setup for photonic devices has been established.
  - Measurements of our first photonic devices (IME-002) with our own setup.
  - Verifications on DC, AC and transient responses of our photonic devices.
  - Behavioral modeling of micro-ring modulator based on coupled-mode theory.



IME-002 chip micro-photograph



Measurement setup