

Photonic integration

Drivers

- 💰 Cost reduction
- Size reduction
- Tackle complexity
 - e.g. Dual mode QPSK
 - Need Rx phase accuracy
 - Easier using waveguides (WG)
- Reliability
 - Interconnect
 - e.g high-performance computing (HPC)
 - chip-to-chip

End-to-end cost is key

10 --> 40 --> 100G

Need for scale

Too big

OIF initiative

Early 100G systems

DWDM system design

“I don't see an overwhelming argument for integration. It's useful and shows up in lower cost and smaller designs but it's not a revolution.” Kim Roberts, Nortel's director of optics research

Developments

- 40 - 100Gbps
 - Long haul
 - 🌐 Infinera 10x40G PIC
 - DP-DQPSK
 - 40- 100GigE
 - 40GBASE-LR4
 - QSFP module
 - Cant fit 8 TO cans - 4 Tx and 4Rx
- FTTx
 - Discrete
 - Monolithic
 - OneChip Photonics
 - EPON Xcvrs
 - Hybrid
 - Enablence Technologies
 - TO cans
 - E.g. Finisar/ NeoPhotonics
- Other apps
 - optical amps
 - JDS Uniphase
 - PLC platform
 - Halves size
 - 🌐 equivalent 50 discretes
 - programmable
 - Interconnect
 - CyOptics/ Kotura ATP 1Terabit/s project
 - wavelength-selective switches
 - Limited application
 - Tunable laser
 - JDSU's XFP laser

Challenges

Need volumes to full benefit



- Chip to Chip
- PON
- QSFP
- LH: 40 and 100G

Intense R&D

Materials

- lasers, spot-size converters, APD
- indium phosphide
- planar lightwave circuits
- hybrid techniques
- active alignment, packaging