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Electrical Engineering/CSI

Stage III CIAN Box

- Optical packet switching
 - Avoid OEO to retain speed
 - Optical header processing
 - Optical logic and math

Optically??!

Carry: 110
A: 1230
B: +0123

SUM: 2013

Optical Math

- Optical functions in a base number set
 - Optical addition

Current State of the Art

- OEO (Elec. computation) ~10-100 Gb/s

Advances to State of the Art

- Optical computation ~ 1-10Tb/s
- Multi-dimensional signals
 - Amplitude -Phase -Frequency
- 1-bit per symbol
 - ❖ OOK/BPSK – *too slow*
- N-bit per symbol
 - ❖ M-PSK (QPSK, 8/16-PSK)
 - ❖ QAM

1-Bit per Symbol (OOK/BPSK)

Multi-Phase Symbols (M-PSK)

Optical Half Adder Implementation

Architecture

Experimental Setup