
Digital free-space photonic switching module using micro-beam optical interconnections and exciton absorption reflection switch (EARS) arrays

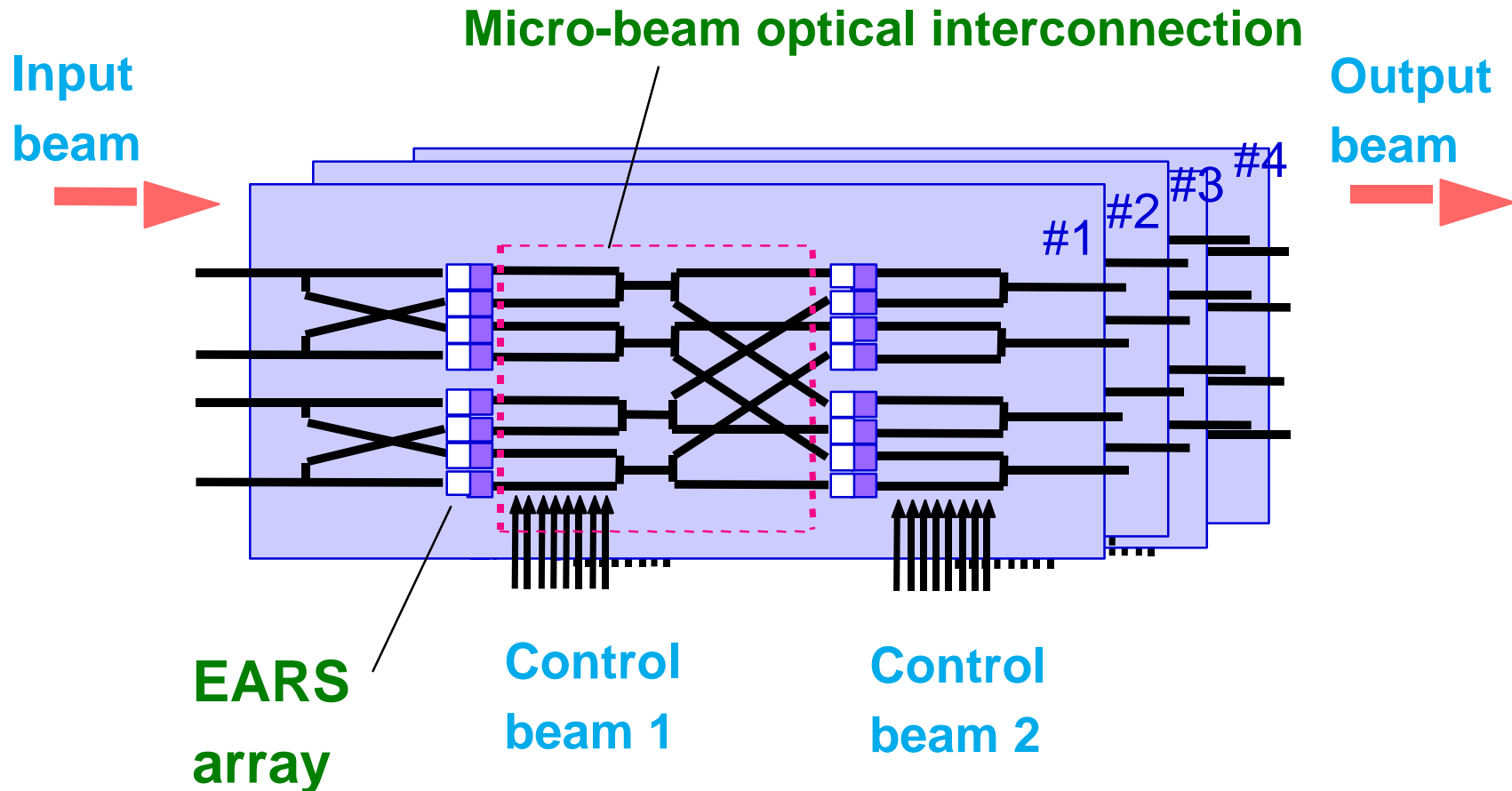
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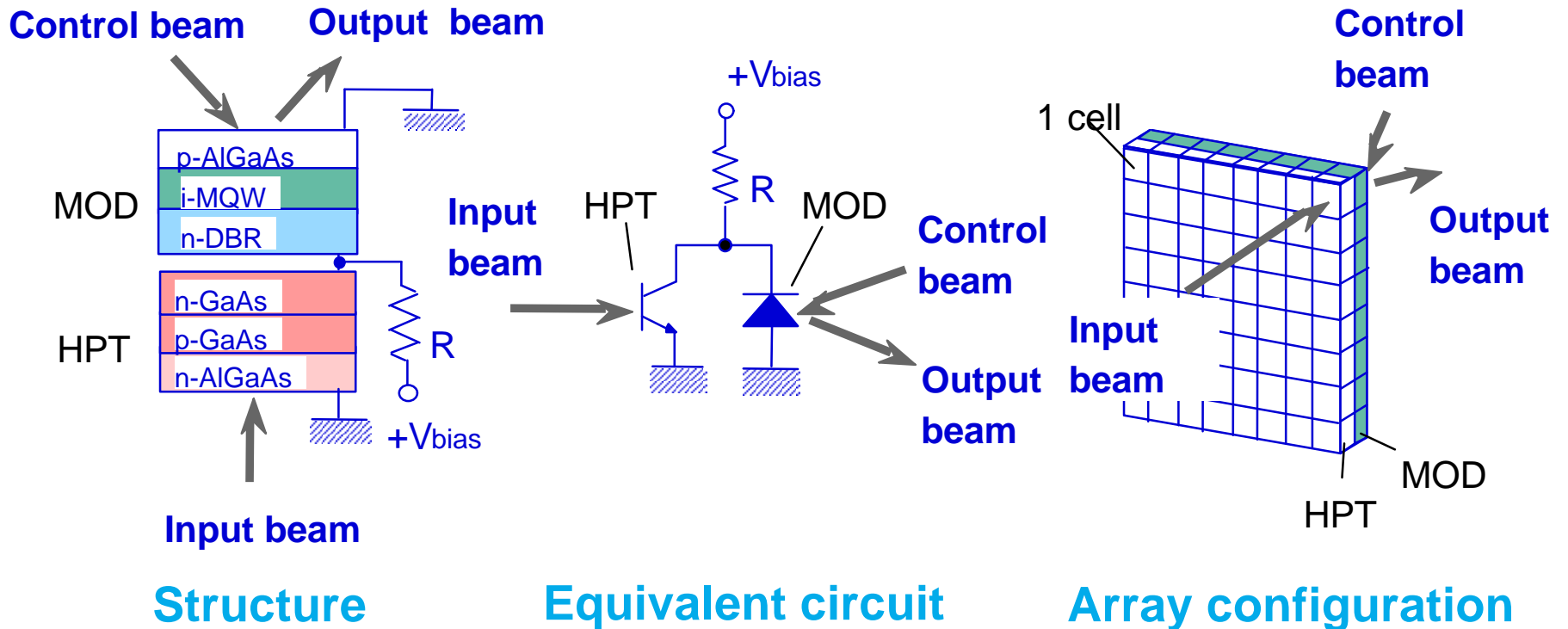
Outline

- . **Digital free-space photonic switch using micro-beam optical interconnections and exciton absorption reflection switch (EARS) arrays.**
- . **Prototype switching module having a 16-input, 16-output, two-stage structure (four sets of 4x 4 switches).**
 - **Highly dense compact structure having two-dimensional fiber-array pigtails.**
 - **Low-loss and low-crosstalk optical interconnections.**
- . **Experimental results.**
 - **Coupling loss and crosstalk of internal connections.**
 - **Switching characteristics.**

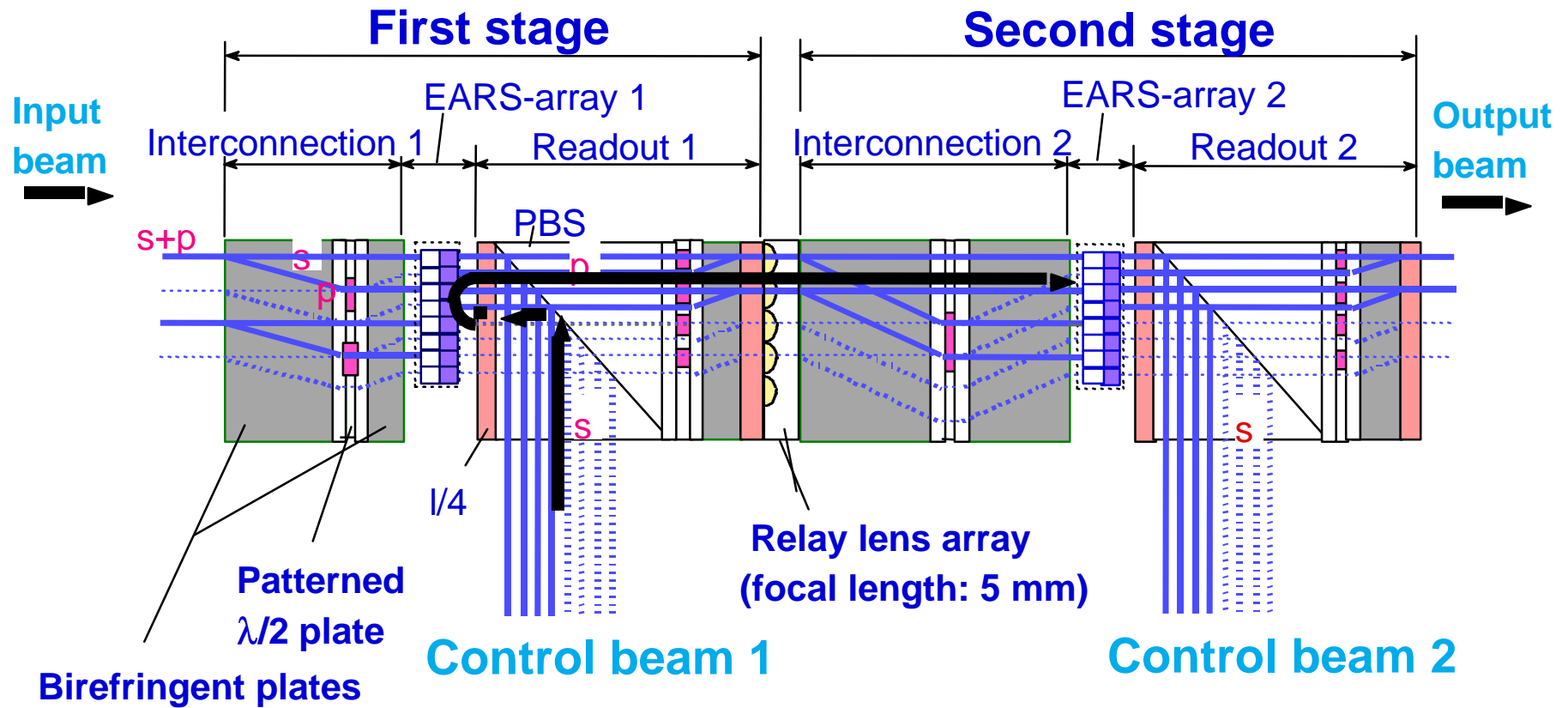
Digital free-space photonic switch using exciton absorption reflection switch (EARS) arrays



Exciton Absorption Reflection Switch (EARS)

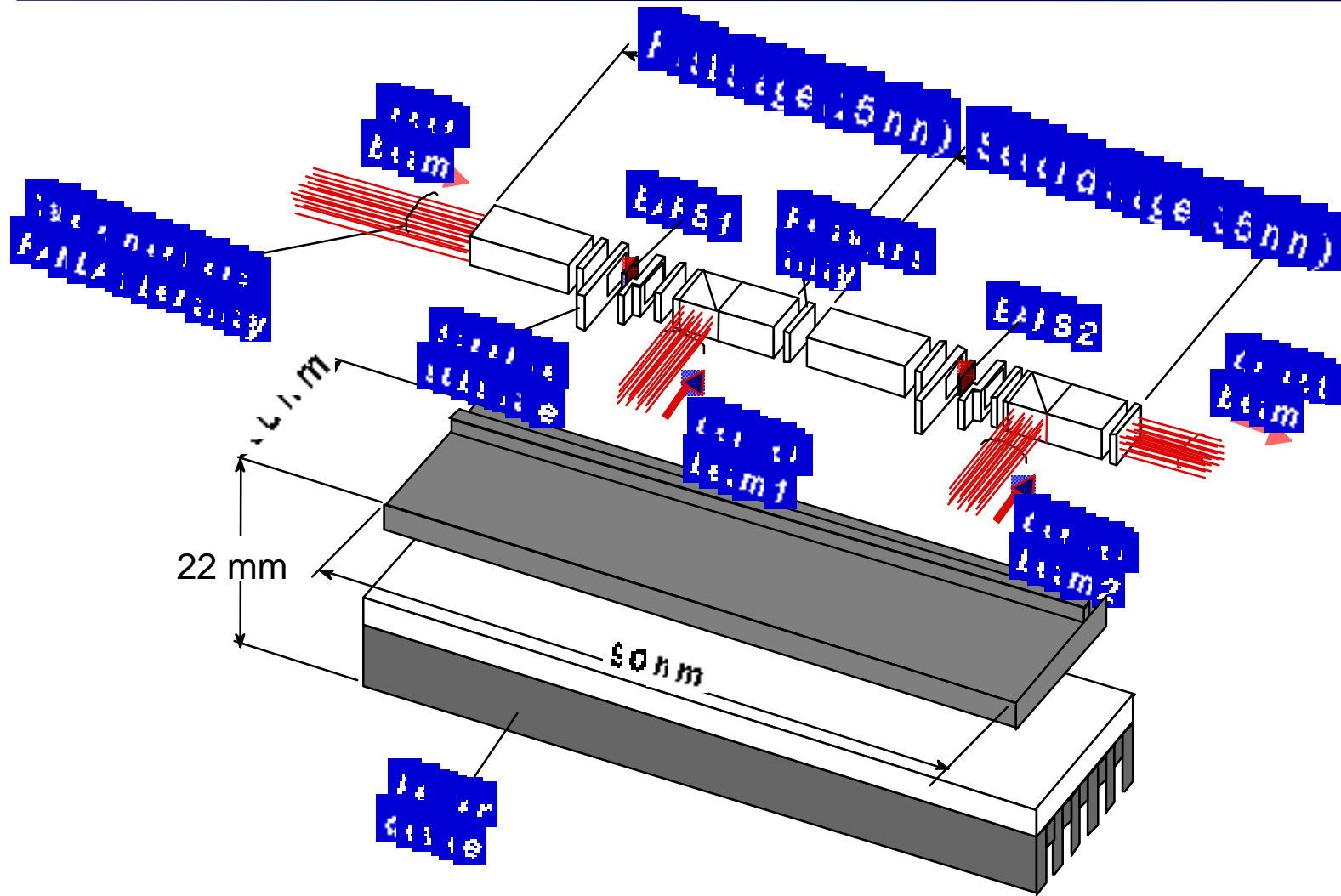


Structure of fabricated switch (top view)

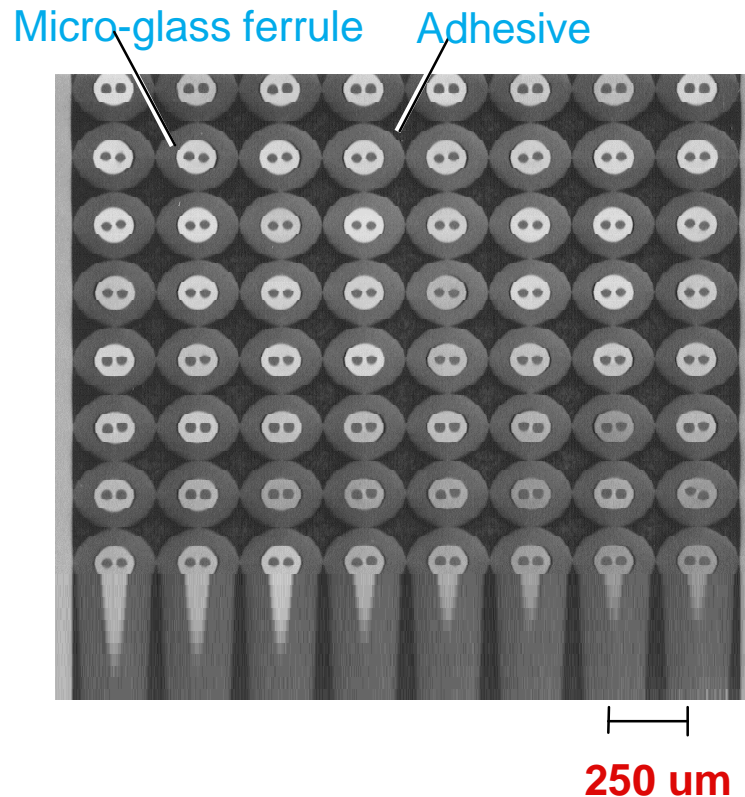


PBS: polarizing beamsplitter

Switch assembly



Two-dimensional PANDA-fiber array



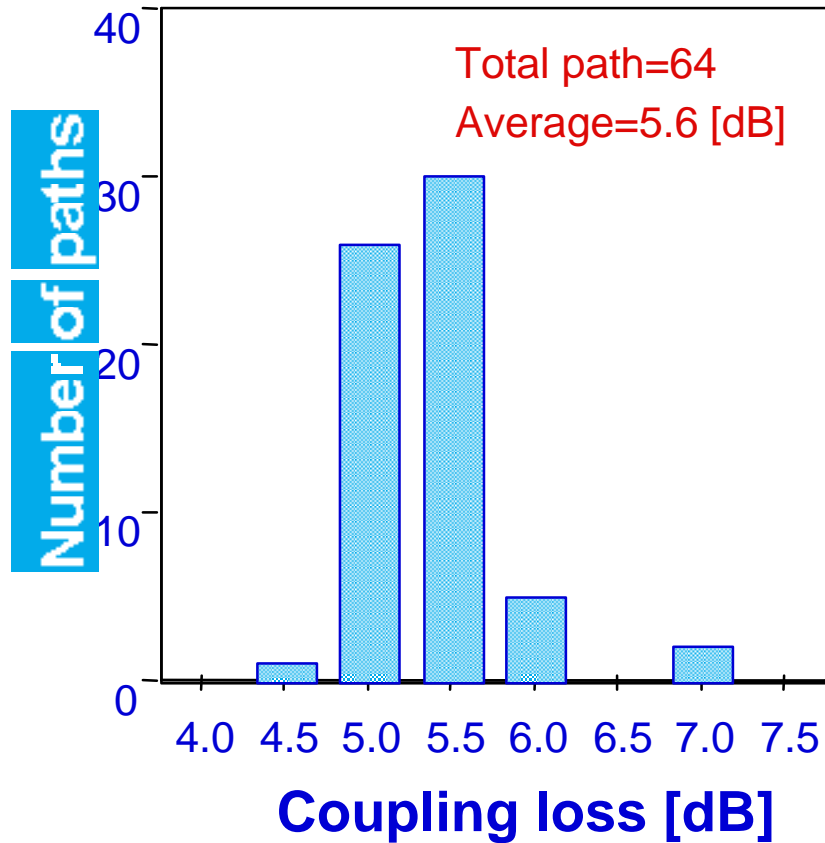
Specifications

Array	8 x 8
Fiber spacing	250 um
Fiber displacement	+/-3 um (average)
Polarization crosstalk	-19.5 dB (average)

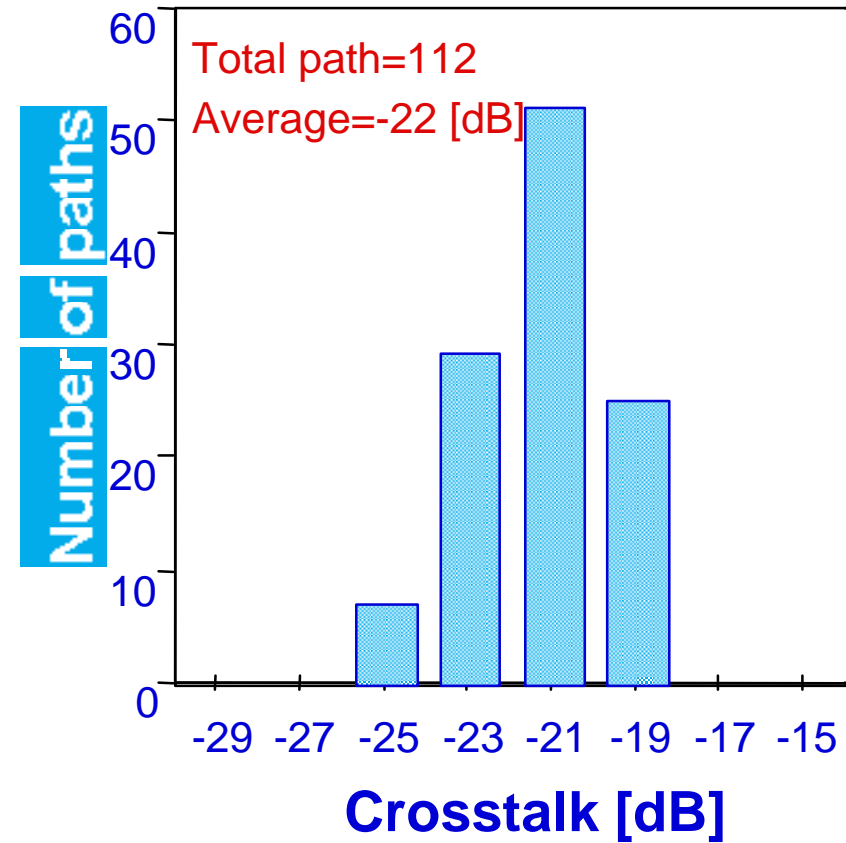
End surface of array

Evaluation of optical blocks (readout-1 and interconnection-2)

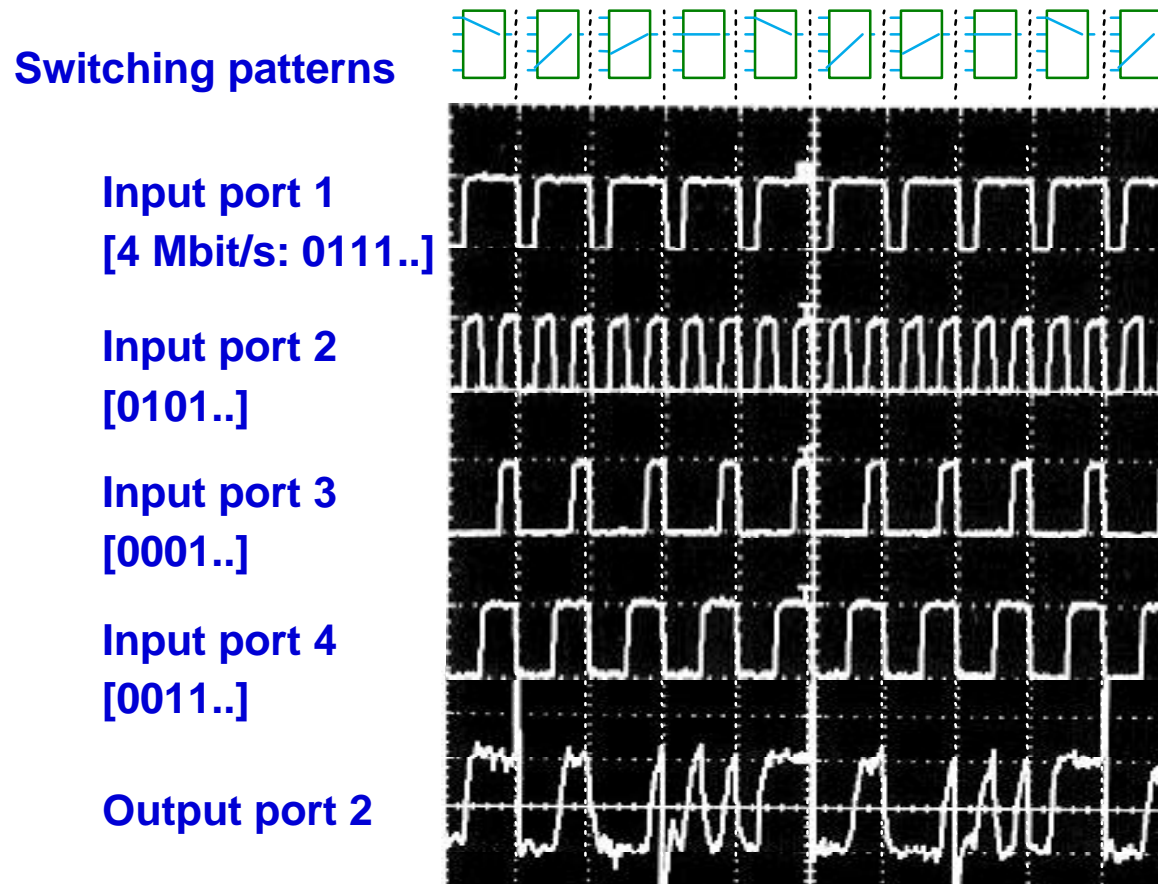
Coupling loss



Crosstalk

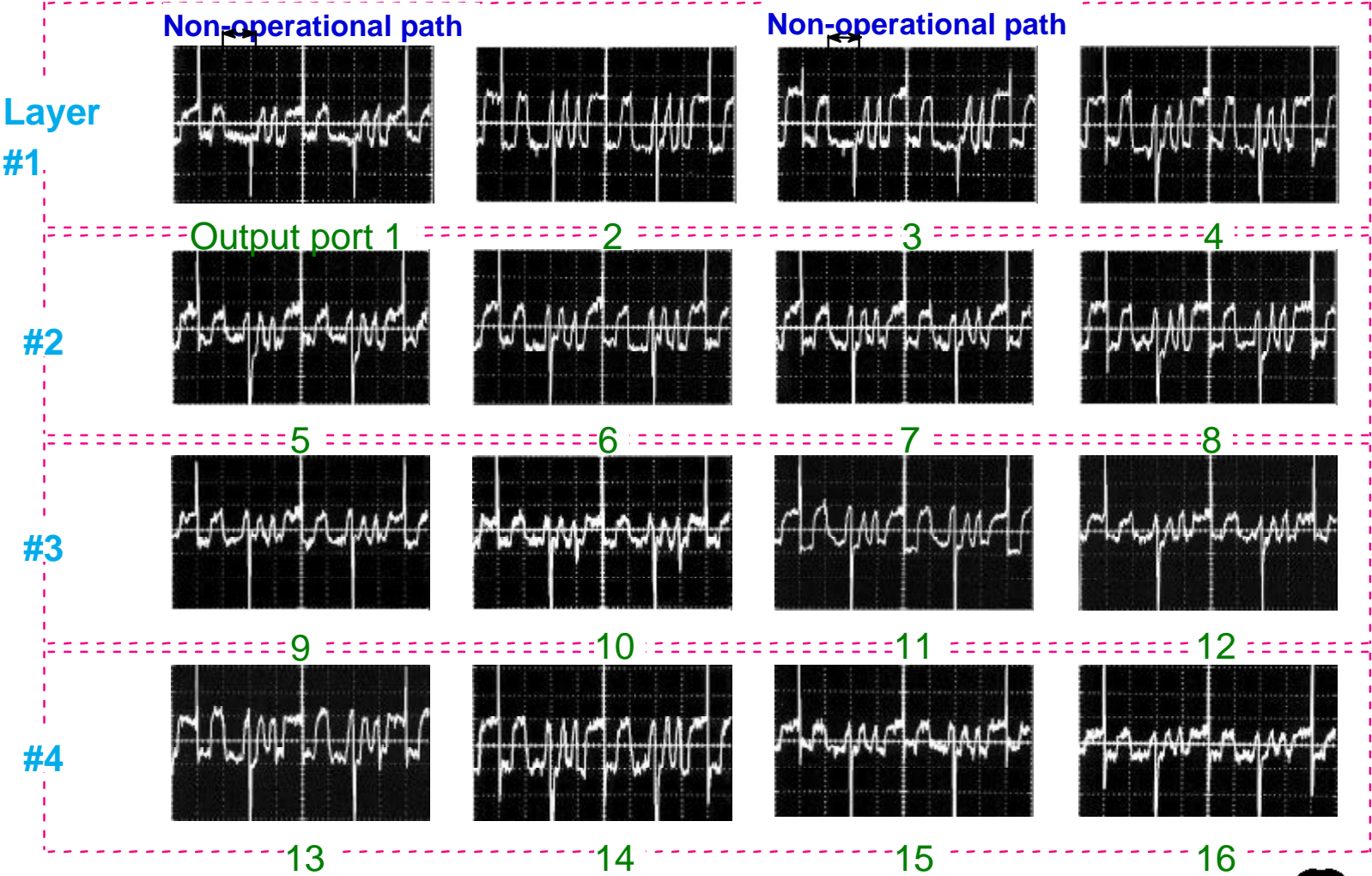


Example output signals



1.0 us

Output signals



Summary

- . Digital free-space photonic switching using exciton absorption reflection switch (EARS) arrays.
- . Prototype switching module having a 16-input, 16-output, two-stage structure (four sets of 4 x 4 switches).
 - Highly dense, compact structure having two-dimensional fiber-array pigtailed.
 - Low-loss (5.6 +/-1.5 dB) optical interconnection circuits.
 - 4-Mbit/s switching (2-stage switching operation).