Nanyang Technological University
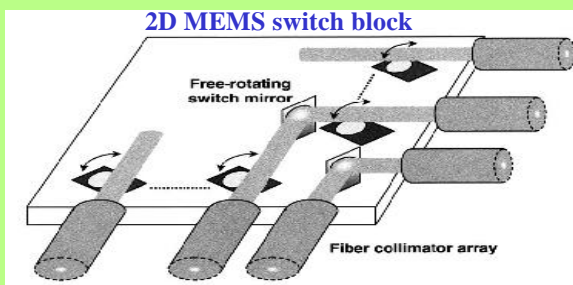## Network Technology Research Centre

## Architecture Designing for Multi-stage 2D MEMS Optical Switch

Objective:

To design a multi-stage 2D MEMS optical space switch network with minimum maximum power loss of calls and maximum loss difference between calls

**2D MEMS switch block**

Introduction:

- The next generation optical network is expected to be flexible enough to establish, remodify and release optical channels on demand
- All optical space switch is a key component of an optical network node (i.e.,OXC)
- 2D MEMS switch is a most promising technology of optical space switch
- Multi-stage switch network like Clos network is a good option to construct a large scale switch
- To minimize the maximum power loss of calls and maximum loss difference between calls is an important issue when designing a multi-stage optical switch network
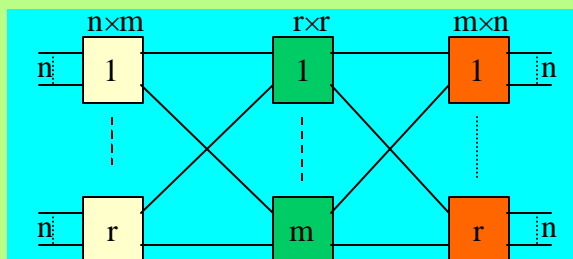
Approach:

- Three stage Clos network is selected to construct a large scale MEMS switch network
- A power loss model for a single MEMS switch block is developed first
- Based on the single block model, a power loss model for the multistage network is further developed
- The low bounds on the maximum power loss of calls and the maximum loss difference between calls are found
- Three connection patterns used to connect two neighboring stages are proposed; they are able to minimize both the maximum power loss of calls and the maximum loss difference between calls for multi-stage networks to the low bounds
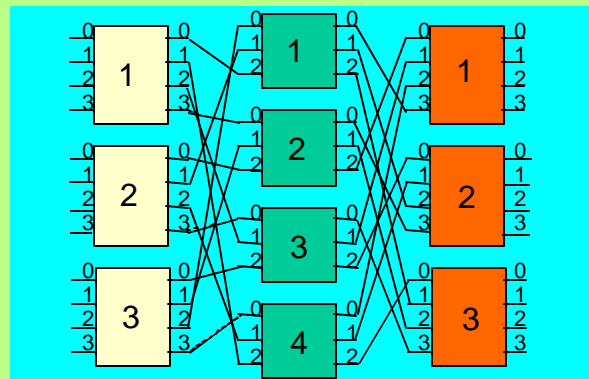
Conclusions and Future Work:

- Three connection patterns have been proposed for multi-stage switch network to minimize both the maximum power loss of calls and the maximum loss difference between calls
- Further study can be extended to the Clos network with more than three stages

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