

Microelectromechanical Mirrors for Silicon Photonics Applications

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BACKGROUND

Progress in micro-electro-mechanical systems (MEMS) technology is driving the miniaturization and realization of complex optical components and making possible their inclusion with planar integrated optics structures such as waveguides filters and mirrors. These elements are commonly labelled as planar micro-opto-electromechanical systems (MOEMS). Silicon (Si) photonics has received extensive attention in recent years as a promising technology for next-generation high-speed, low-loss, low-power consumption, and low-cost communication and scanning systems.

TECHNOLOGY

The inventors have established a technology based on an innovative rotational MEMS mirror that can control the direction of propagation of light beams inside of planar waveguides implemented in Si photonics.

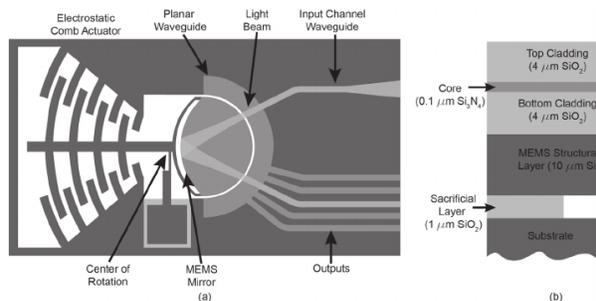


Figure 1. Schematic of basic MEMS mirror showing the different parts of the system: (a) top view, and (b) cross-section.

In Figure 1 the MEMS mirror is used to redirect the signal from an input waveguide into a selected channel from an array of output waveguides. Another potential application could be in the implementation of continuously tunable optical delay lines for Optical Coherence Tomography, in which the MEMS mirror is integrated in a Si photonics design including an optical waveguide and a dispersive echelle grating. Many

different design configurations are possible, including an OCT chip design.

COMPETITIVE ADVANTAGES

- Rotational MEMS perfect for applications needing fast and precise selectivity or tunability
- Implementation of MEMS in silicon photonics ensures compactness, avoiding the use of multiple bulk optical components and bypassing time-consuming alignment procedures.
- Cost effective
- Compatible with large scale micro-fabrication processes

APPLICATIONS

- Medical Imaging such as Optical Coherence Tomography
- Spectrometry
- Optical Telecommunications

TECHNOLOGY DEVELOPMENTAL STAGE

- Test chips have been fabricated and tested
- Co-development is pursued in the field of Optical Telecommunications
- Patent pending

BUSINESS OPPORTUNITY

- Licensing / co-development (in fields such as Medical Imaging or Spectrometry)

Note: an exclusive license has already been granted in the field of Optical Telecommunications

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