

Measuring the Time-of-Flight with an optical MEMS-modulator

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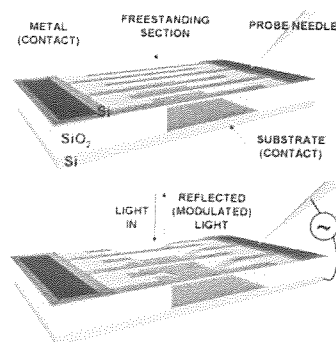
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Silicon-on-insulator (SOI) is an attractive material system for passive nanophotonic components.

One of the routes to add active functionality to these passive photonic chips is mechanical motion. Microscale components that allow controlled mechanical motion are called NEMS (Micro Electro-Mechanical Systems).

The goal of our research is to demonstrate some active photonic functions based on mechanical motion relying on mature SOI technology. Possible applications are (small displacement) sensing, switching and spatial light modulators. The latter could be a key component in Time-of-flight range finding systems.

However reliable fabrication of such microphotonic MEMS is not straightforward. Consequently in our poster we will discuss the fabrication process and address the specific difficulties encountered. Furthermore we will explain the actuation mechanism that enables controlled mechanical motion.



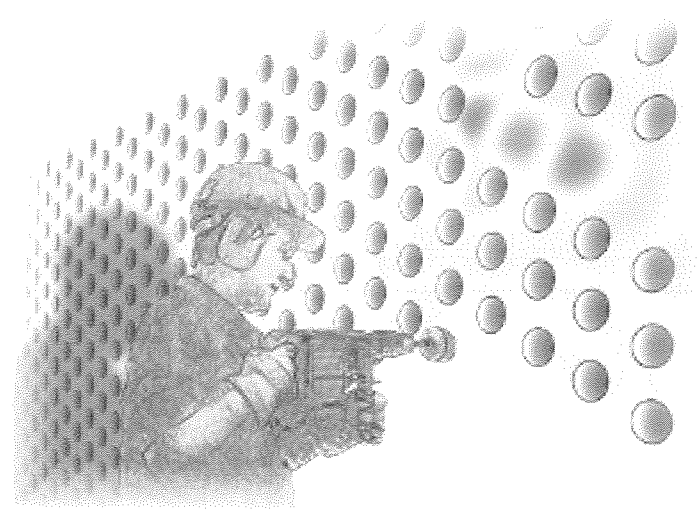
MEMS spatial light modulator in SOI: not actuated (above), actuated (below)

Finally we will present experimental results of an optical MEMS-modulator and demonstrate its application in a Time-Of-Flight range finding system.

SPRING SCHOOL

Technology for Photonics Integration

PORTOFERRAIO, ELBA ISLAND, ITALY
11 TO 17 MAY 2008



NAME:

ABSTRACTS OF POSTERS

Poster session I:

- 1. **V-Groove approach for inverted taper coupling in silicon photonics:** J. V. Galán
2. **Experimental Study of the Non-Linear Dynamics of Quantum-Dot InAs/InGaAsP/InP (100) Twin-Stripe Lasers Emitting at 1.5 μ m:** Jose Pozo
3. **InGaAs-InAlGaAs Monolithically Integrated Temporal Phase Coded OCDMA Encoder/Decoder:** S. McMaster
4. **A spectrally resolved study of quantum dot lasers:** G.A.P. Thé
5. **Carrier Transport Effects in Multi Layer Quantum Dot Lasers:** M. Rossetti
6. **Membrane couplers for optical interconnections on CMOS ICs:** A. Morant
7. **Optical Losses in Photonic Crystal Waveguides, Induced by Contact Strips for Electrical Pumping:** Peter Kaspar
- 8. **Measuring the Time-of-Flight with an optical MEMS-modulator:** Joris Roels
9. **InP-membrane based photodetector for optical interconnections on Si:** P.R.A. Binetti
10. **High bandwidth InP-based 1.55 μ m waveguide photodetector fabricated in an amplifier layer stack with active-passive integration:** L. Xu
11. **Design and simulation of movable micromirrors on silicon substrate:** Comanescu Florin Constantin
- 12. **Fabrication of polymer-based devices using nanoimprint technology,** Jie Teng
- 13. **Liquid crystal technology for wavelength tuning in SOI structures:** Wout De Cort
- 14. **Photonic Reservoir Computing: interconnected Semiconductor Optical Amplifiers:** Kristof Vandoorne
15. **Waveguide – grating photonic system analysis for sensor applications:** Roxana Ileana Rebigan
16. **Design Of A Monolithically Integrated All-Optical Label Swapper For Spectral Amplitude Code Labels Using Cross-Gain Modulation:** Christian Habib
17. **Combined Technologies: Photolithography and Electron Beam Lithography for RF Filters on GaN Development:** Herghelegiu Alexandru
18. **Deep dry-etched single-mode narrow waveguide for all-optical switches with InGaAs/AlAsSb quantum wells:** Ping Ma
19. **Assessment of mesh-interconnected integrated photonic switch circuits:** Aaron Albores Mejia
20. **SOI-based couplers for the transition from DPSK- to DQPSK-demodulators:** Karsten Voigt
21. **Adjustment of birefringence on Silicon-on-Insulator (SOI) by mechanical bending:** Georg Winzer
22. **Analysis of thermal crosstalk between DFB-laserdiodes on SOI:** B. Wohlfeil
23. **Towards optimization of Raman effect in SOI rib waveguides – compromise between linear loss and carrier lifetime:** Andrzej Gajda
24. **Bragg Gratings on SOI Rib Waveguides - A Comparison of Different Geometries:** Ivano Giuntori
25. **Slow Light in Chalcogenide Photonic Crystals:** Marcel Spurny

Poster session II:

26. **A comparative study of compact electro-optic modulators based on 1D corrugated waveguide surrounded by Silicon dioxide:** Antoine Brimont
27. **Design and Fabrication of Apodised Crows on Silicon Nitride:** J.D. Domenech
28. **Silicon optical modulator:** Fengqiao Dong
29. **Large Integration Scale Circuits in SiON Technology:** Carlo Ferrari
30. **SOI photonic wires-based devices: sidewall roughness-induced losses and characterization:** Antonio Canciamilla
31. **InP Photonic Crystals bonded to SOI wires:** Yacine Halioua & Tim Karle
- 32. **Fabrication of photonic integrated circuits using high resolution CMOS fabrication process:** Shankar Kumar Selvaraja
- 33. **Silicon compatible laser based on colloidal quantum dots:** Bram De Geyter
- 34. **Al₂O₃:Er waveguide amplifiers for Si-technology compatible integrated optical applications:** L. Agazzi
- 35. **Label-free nanophotonic biosensors in silicon based on slot waveguides:** Tom Claes
36. **Design of an integrated electro-optically tunable filter for tunable laser purposes:** B.W. Tilma
37. **Sol-Gel Ormosil-on-Silicon Microphotonics:** Paulo Moreira
38. **10 Gb/s All-Optical Non-Inverted 1x4 Multi-Wavelength Conversion in a 1.55 μ m QD-SOA:** J. Herrera
39. **Photonic Crystal Membrane Type Tunable Nanocavities in InP/InGaAsP:** Mehmet Ali Dundar
- 40. **Process Development for passive photonic circuits on BCB- bonded InP membranes on silicon:** F. Bordas
41. **Novel grating structures for dual-mode laser devices:** S. Ginestar
- 42. **Hybrid III-V/Silicon laser based on DVS-BCB die-to-wafer bonding:** Stevan Stankovic
43. **Fabrication of high brilliance diode lasers in the near-infrared wavelength range:** D. Feise
44. **The Nanostructuring Platform for Photonic Integration:** William Whelan Curtin
45. **Design of a reconfigurable optical interconnect for large-scale multiprocessor networks:** Iñigo Artundo
46. **Photonic crystal waveguides with ring-shaped holes on silicon-on-insulator:** A. Säynätjoki
47. **Towards optimizing photonic crystal cavities for Quantum Dot coupling:** Khaled Mnaymneh
48. **Quantum Confined Stark Effect (QCSE) Tuned Lasers:** Francesca Pozzi
49. **Multi-waveguide based collector array for the detection of backscattered light from highly scattering media:** N. Ismail
50. **Continuous wave InGaAsP/InP Fabry-Perot lasers on silicon:** Tiphaine Dupont