MICRO-OPTO-MECHANICAL SYSTEMS

(MOMS)

Frank Merat
Mehran Mehragany

Case Western Reserve University
Cleveland, OH 44106

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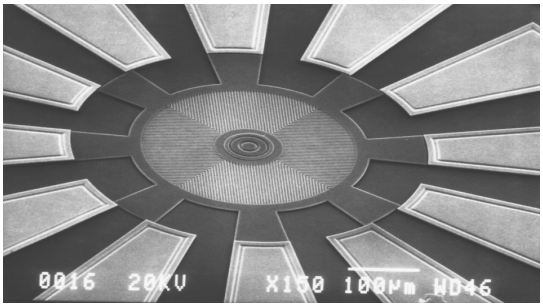
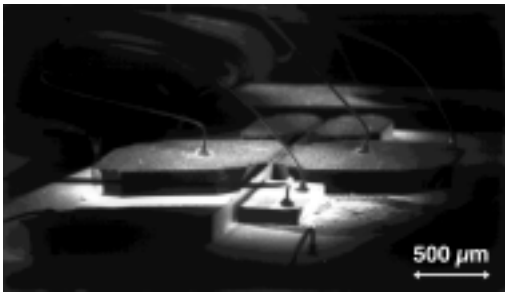
Micro-Opto-Mechanical Systems

- microscanners
  - optical diffraction grating fabricated on solid rotor of micromotor
  - polysilicon surface micromachining



- tunable laser diodes
  - short coupled cavity LD
  - high aspect ratio (111) cantilever beam
  - (111) silicon bonded to glass substrate



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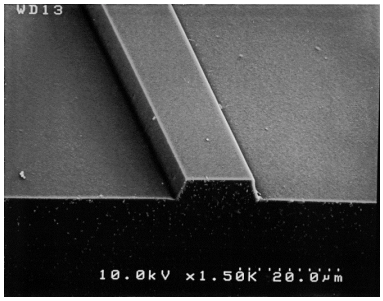
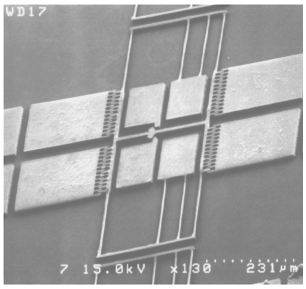
Micro-Opto-Mechanical Systems

- anistropically etched rib waveguide
  - ultrasonic agitation
  - epitaxial Si on doped Si



- nickel microrelays with metallic contacts
  - electrostatic actuation
  - rubbing action
  - stiff suspension



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Microscanner

- developed specifications for new micromotor scanner with Reliance Electric
- collaborative CWRU/Rockwell fabrication
- 2-level e-beam fabricated high efficiency diffraction grating

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Rib Waveguides

- all silicon rib (6.7µm tall by 10 µm wide) waveguides
- fabricated rib waveguides with fiber guiding U-grooves on (110) substrates
- used ultrasonic agitation to reduce surface roughness to approximately 350 Å
- single mode propagation loss of 1.68 dB/cm at 1.55µm

tunable infrared filters

- etch support structures on doubled sided polished (100) wafers
- deposit multilayer dielectric ZnSe and ThF_4 optical coatings through a KOH etched shadow mask
- use additional dielectric coating layers to obtain desired etalon spacing
- bond wafers together using low melting point metals