



Point-One

Pole of innovative technology on nanoelectronics and embedded systems

MEMSLand

Cost Effective MEMS to Develop a Sustainable High Tech Business

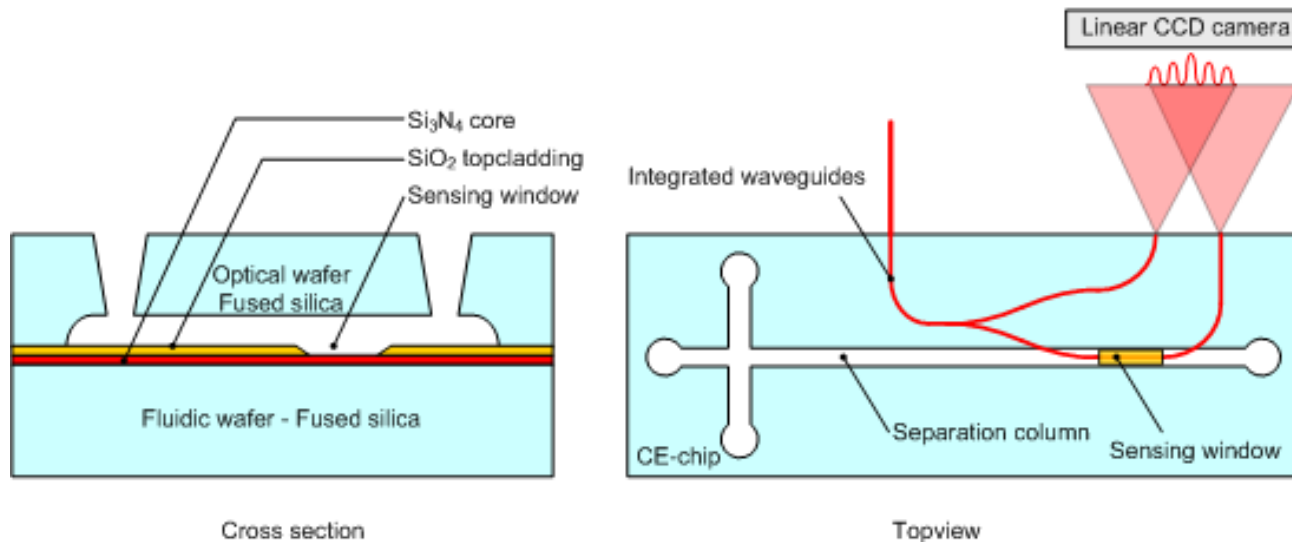
BC6 Optical Sensor



Douwe Geuzebroek

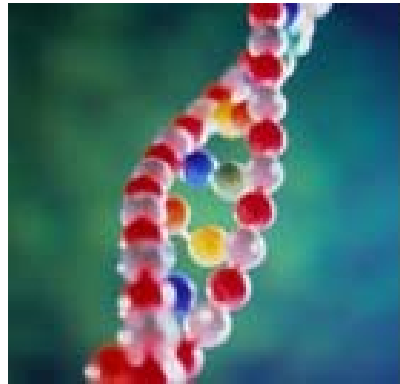
Optical Sensor

- Optical Sensor integrated into microfluidics platform
- Optical sensor is based on Young interferometer or Mach-Zehnder interferometer principle
- The Fluidic layer uses Capillary Electrophoresis to separate different contents of the fluid.
- The combination of optical and microfluidic sensor is favourable since very sensitive devices can be created



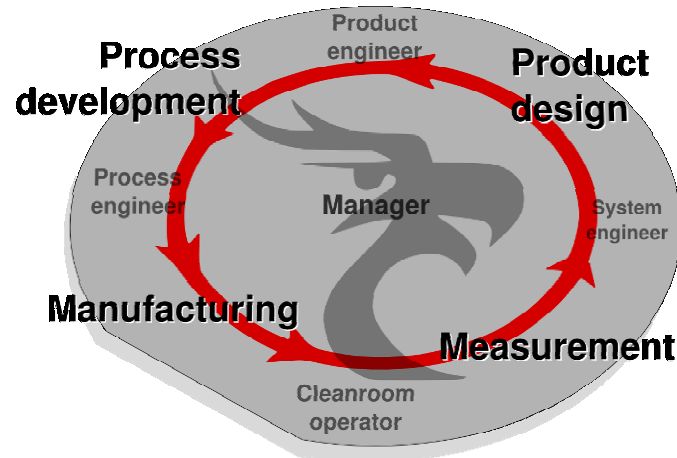
Applications Optical sensor

- These devices can be used as sensing elements for
 - environmental monitoring,
 - security (homeland defence)
 - analytical instruments for industrial process control
 - etc.



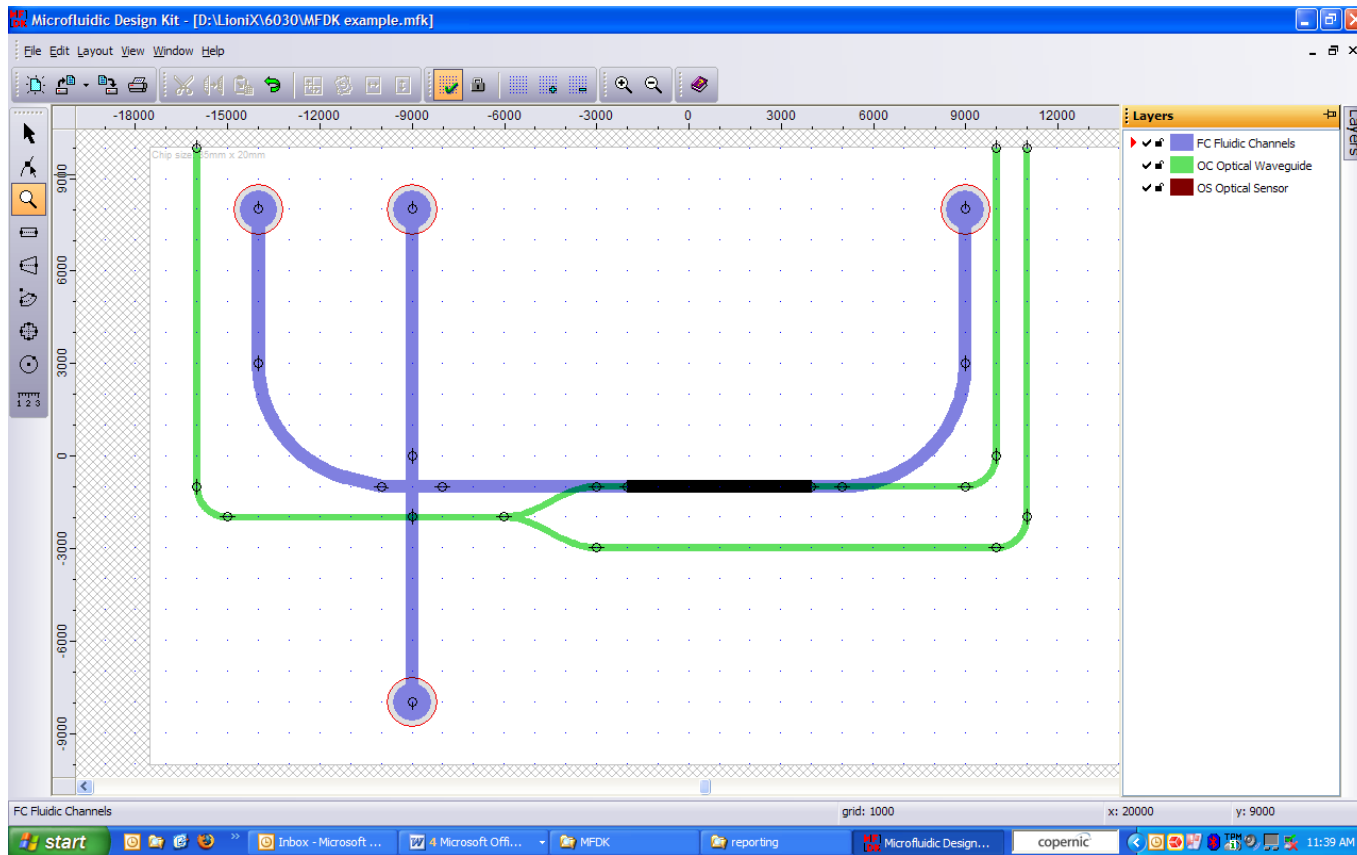
WP2 microfluidics design kit

- A “symbolic” design environment.
 - The software tool will translate the “symbolic” design into the actual chip lay-out (mask) and process flow.
 - Taking into account the design rules of the manufacturing environment (user selectable technology).
 - Part of Manufacturing Execution System (Phoenix & Limis)



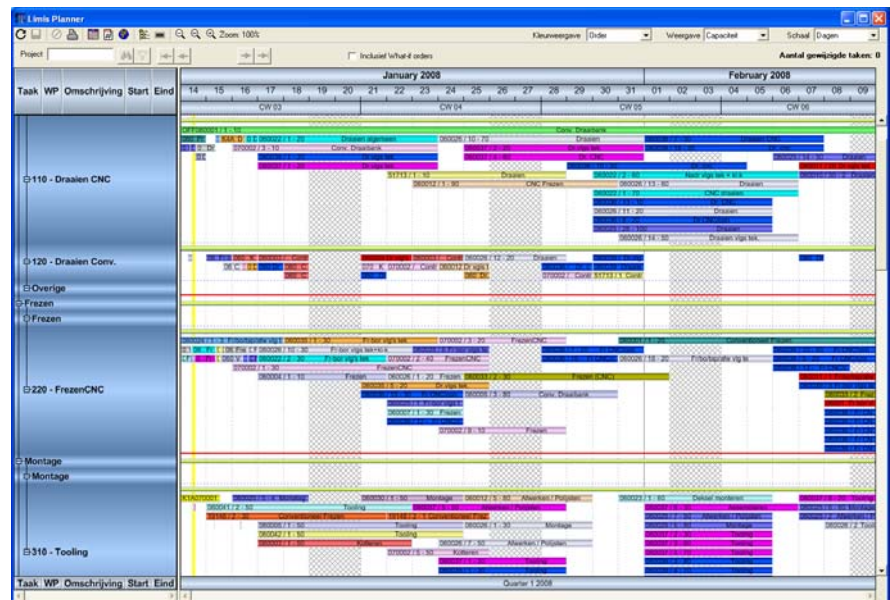
WP2 microfluidics design kit

- UT-TST



WP2 MES

- First set-up of demonstrator system including communicating software (PhoeniX-LIMIS) realised
- Planboard design



WP3

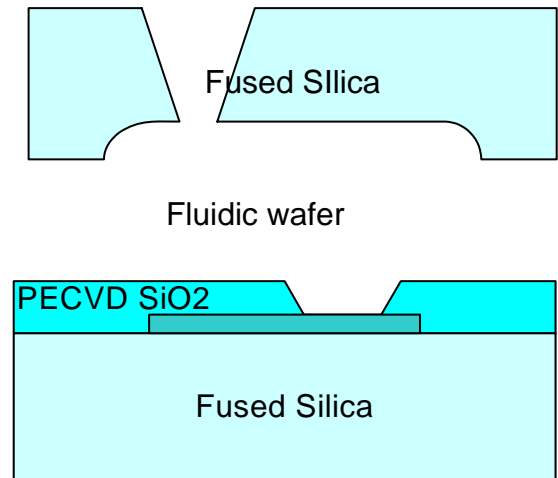
Deposition of high quality optical layer on fused silica

- Paterning waveguide structures
- Deposition of top cladding and interaction windows

- Bonding:

- The yield of the direct bonding process of fused silica wafers is further improved by controlling surface roughness

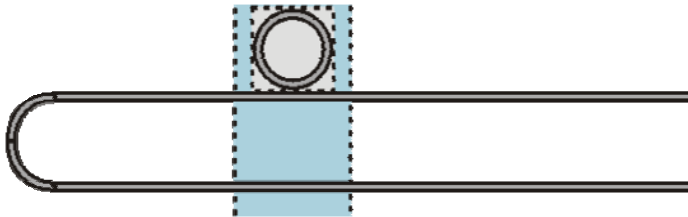
- Other detection principles by partners (UT-IOMS, UT-Bios)



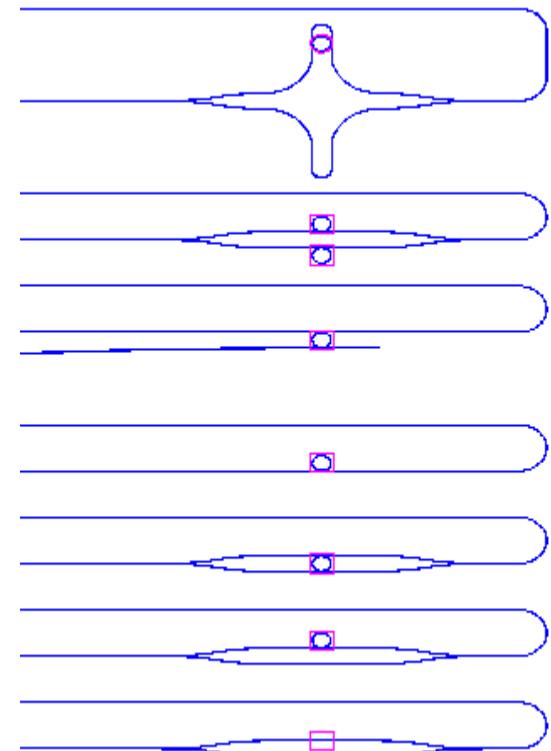
Optical wafer

WP3

- Other detection principle by LioniX
- Enhancements of intensity of light in sensing window: microring resonator



- Mask design ready



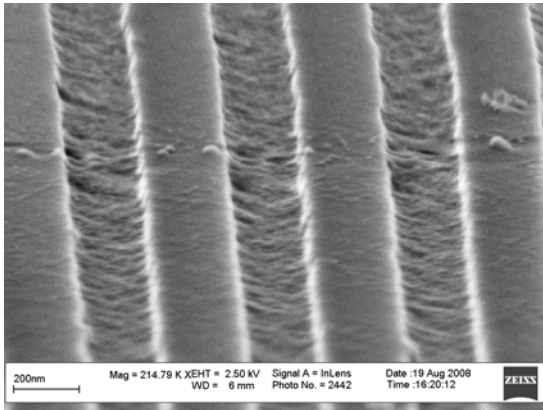
WP3

- Improvement of optical sensor part

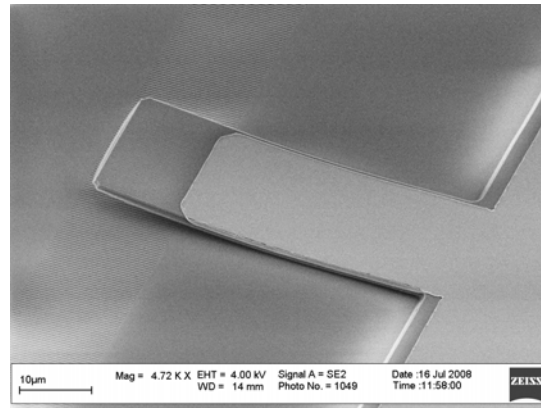
(UT-IOMS) **MESA+**

Institute for Nanotechnology

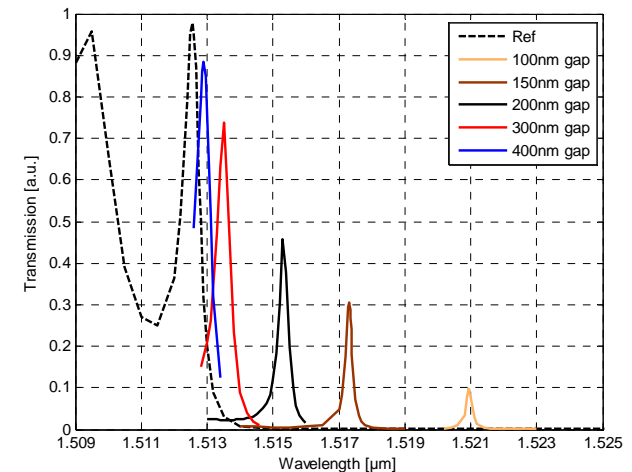
Slow light photonic crystal



Gratings fabricated by Laser Interference Lithography (LIL)

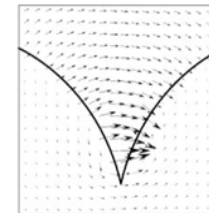
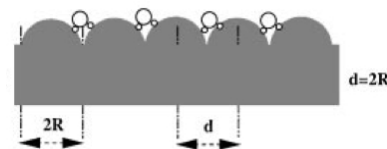


Low initial bending cantilever

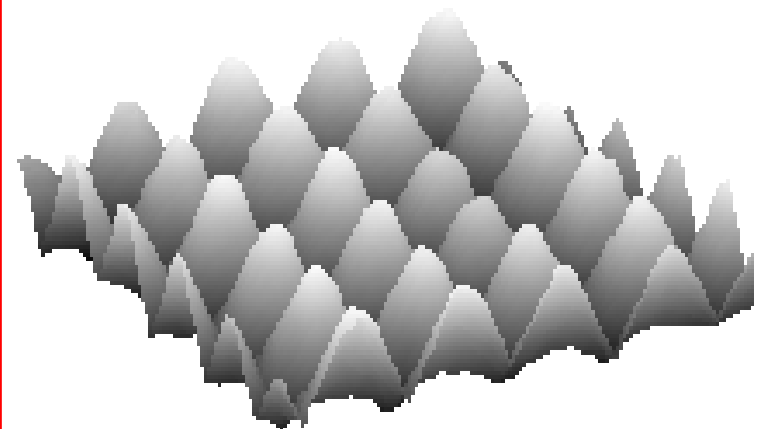
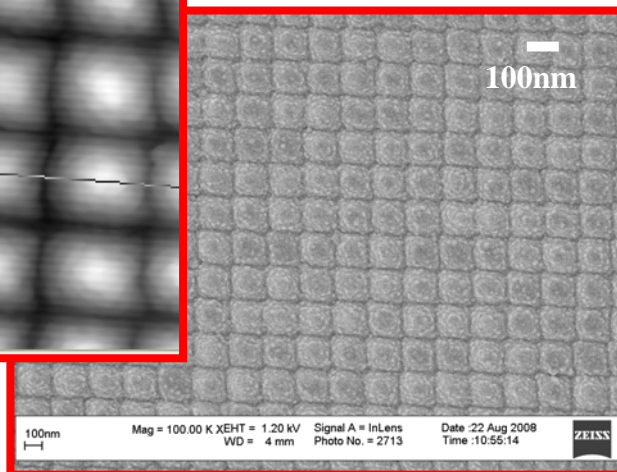
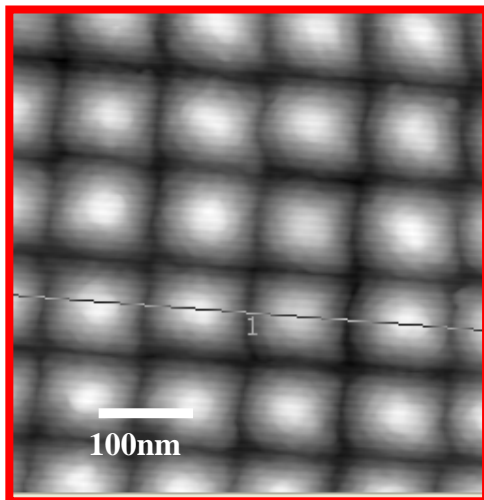


WP3

- Enhancement of selectivity: label free detection by Raman scattering UT-BIOS

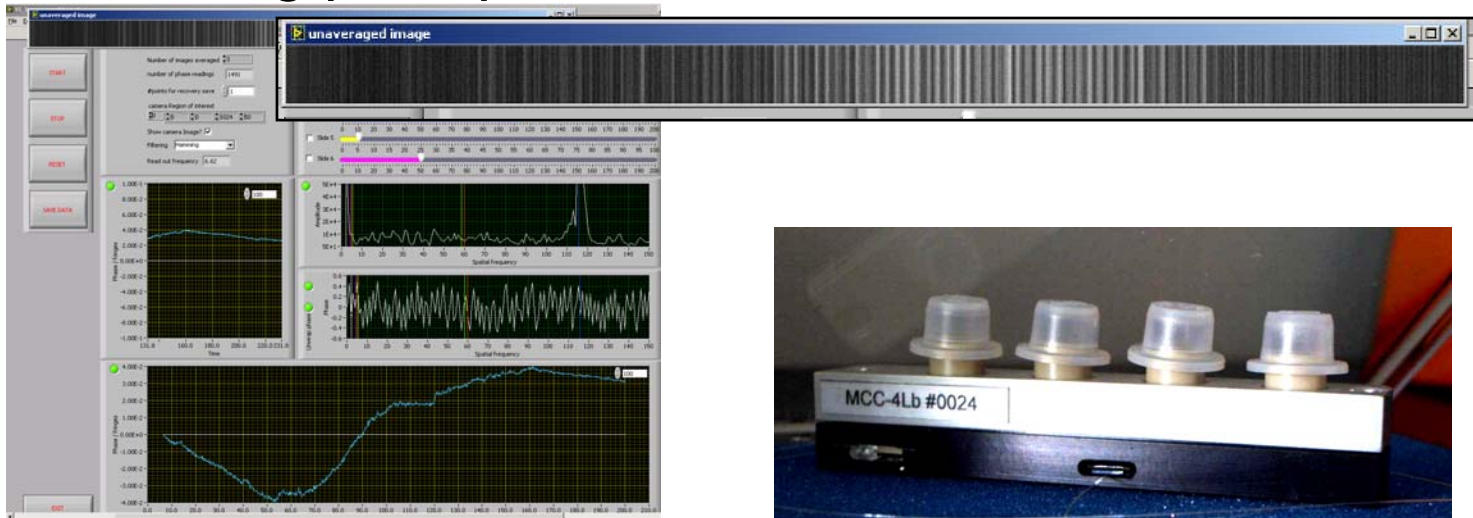


Garcia-Vidal, 1996



WP6

- Demonstration model for the optical sensor
 - Capabilities of combining optical waveguiding and sensing principles with microfluidics



- Together with Boschman a molded package is under investigation