

Introduction to AMO

Thematic brokerage workshops

EU Brokerage Event on Kets in Horizon 2020

Strasbourg, 17th October 2017

AMO GmbH Company Profile:



**Gesellschaft für Angewandte
Mikro- und Optoelektronik mbH**

Managing Directors:

- Prof. Max Lemme
- Dr. Michael Hornung

- High-Tech SME (non-profit)
- Research Foundry
- Close ties to RWTH Aachen University

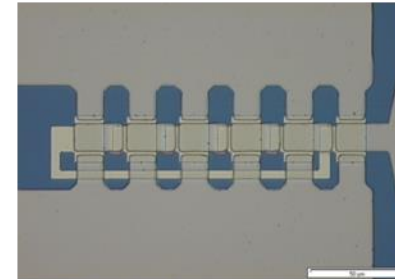
- 400 m² clean room
- 36 staff members

- Key technologies
 - Silicon technology base
 - Nanofabrication (OL, NIL, EBL, LIL)
 - New materials integration
 - (high-k/metal gate, graphene, 2D)
 - Applications
 - Nanoelectronics
 - Nanophotonics
 - Integrated Sensors

Fields of Expertise

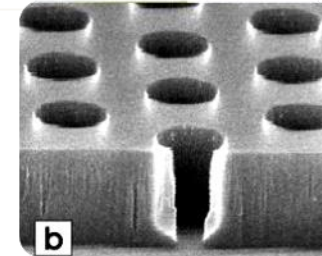
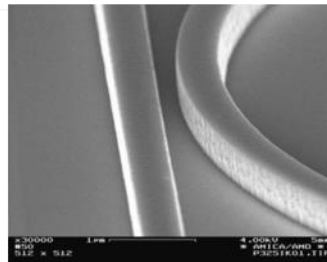
Nanoelectronics

- Graphene electronics and optoelectronics
- SOI FinFet integration for low power CMOS
- Epitaxial gate oxides and metal gate integration
- Nanowire technology



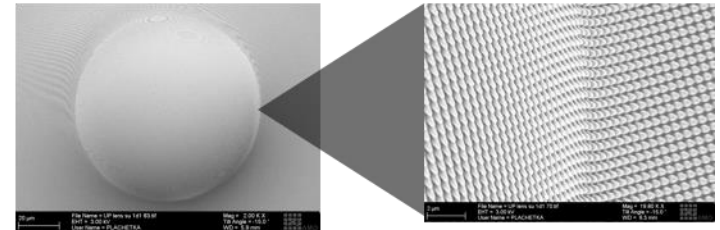
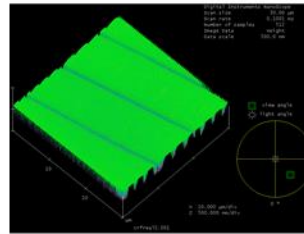
Nanophotonics

- Integrated silicon photonic systems
- Passive and active device prototype development
- High resolution / high quality fabrication for low-loss waveguides



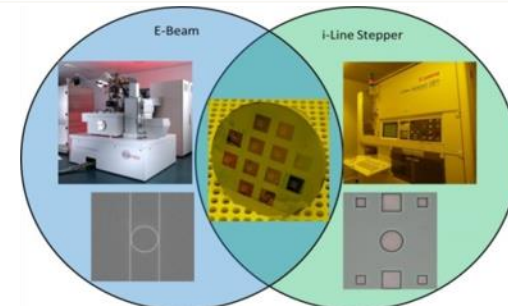
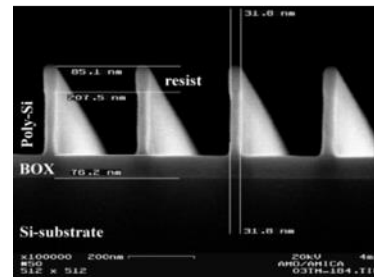
Sensor Technology

- Plasmonic surfaces for SEVS
- Structures for light management
- Simulation for advanced applications
- Chips for biochemical sensing



Nanofabrication

- Advanced lithography techniques (EBL, i-line, UV-NIL, IL)
- Advanced pattern transfer (Mix-Match-Lithography)
- Process & template development
- Si-CMOS technology platform



Silicon Photonics

- **Integrated Photonic Circuits**

- **Passive components**

- Low loss waveguides
- Resonators
- Fiber-to-chip coupling

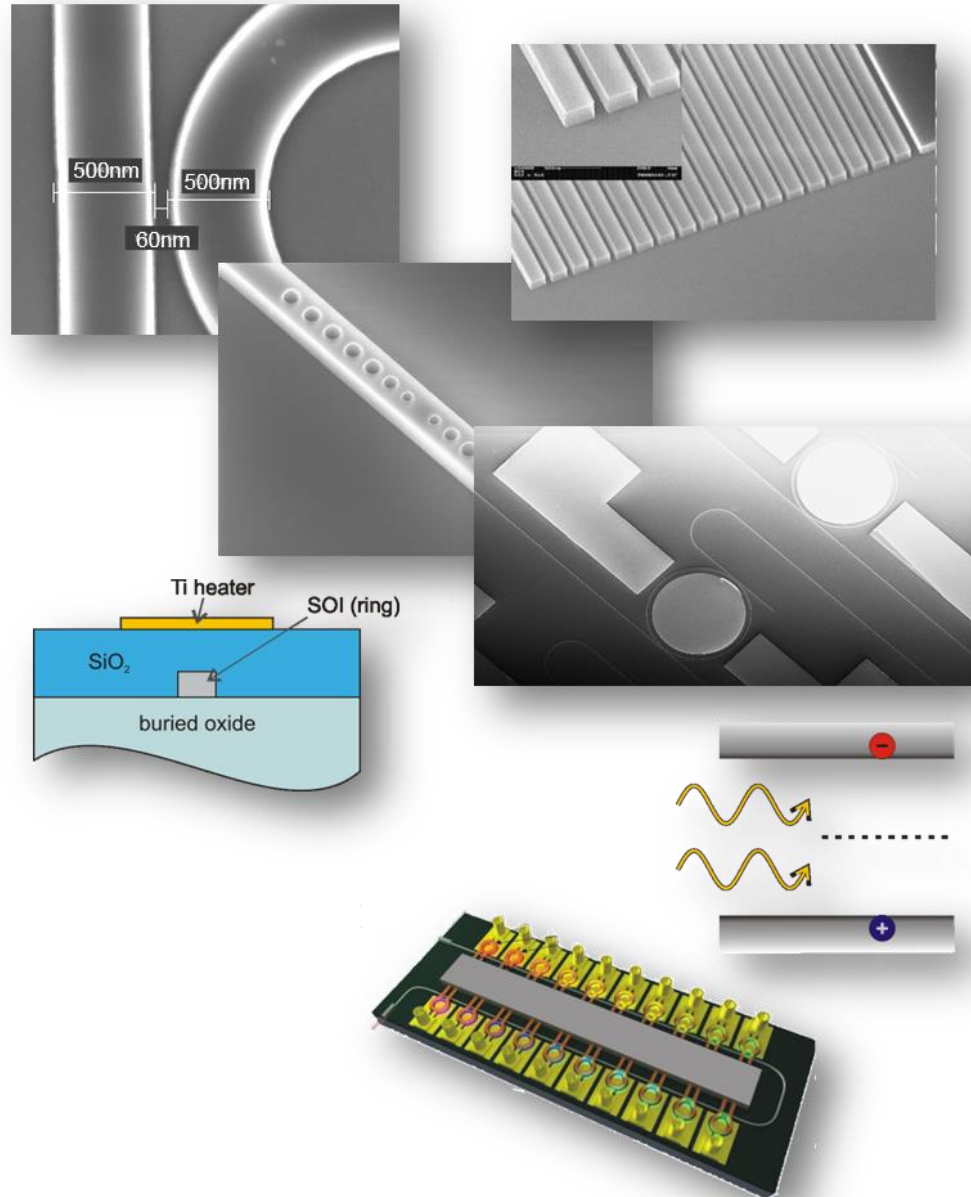
- **Active components**

- Heaters
- Modulators
- IR detectors

- **System integration**

- **Applications**

- ICT
- Sensing



Sensor Technology

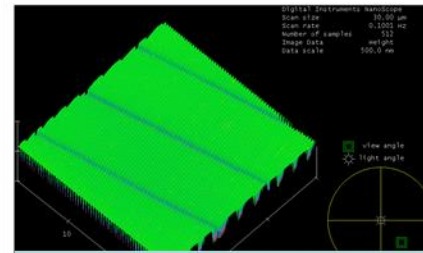
- Plasmonic surfaces for SEVS (Surface Enhanced Vibrational Spectroscopy)
 - Detection of explosives
 - Drug screening
 - Identification of water contaminants

- Structures for light management
 - Subwavelength structures (antireflective pattern)
 - Periodic diffraction gratings
 - Refined 3D-surfaces (improved lens arrays)

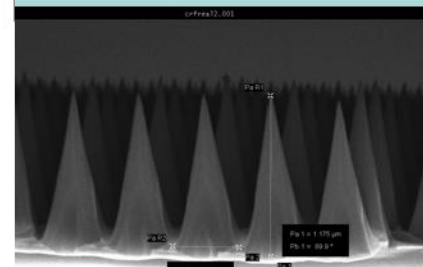
- Simulation for advanced applications
 - FDTD-Simulation
 - Near field
 - Far field
 - EM-field enhancement

- Chips for biochemical sensing
 - THz-near field

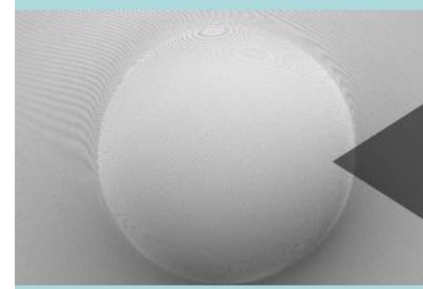
- SHM-Sensor networks on CFRP



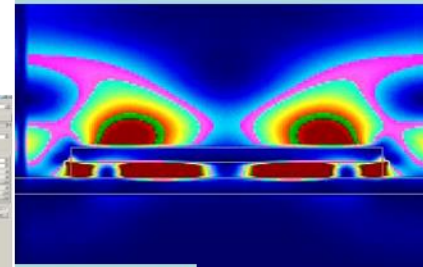
SEVS-substrate



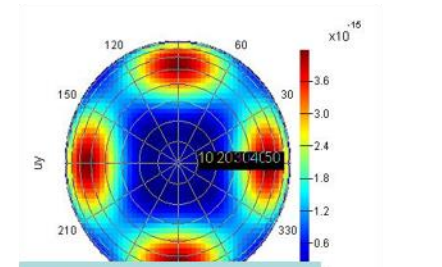
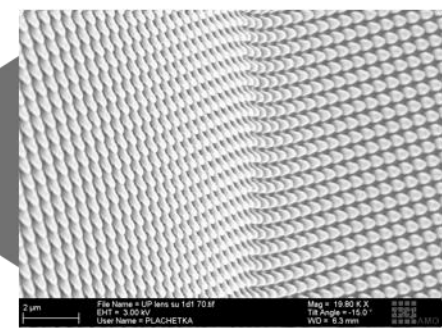
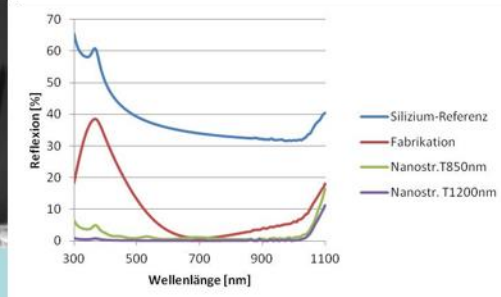
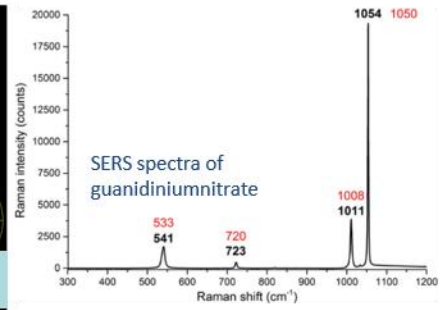
Antireflective pattern



Nanopatterned lens arrays



EM-field



Infrastructure

Lithography

Electron beam lithography

- High resolution (~ 5 nm), highly flexible

Optical lithography (6" I-line stepper)

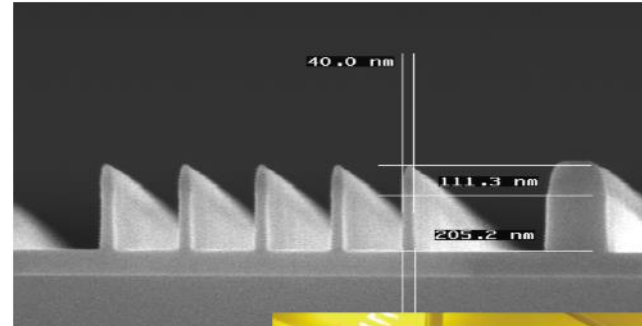
- Easy and fast fabrication of complex designs
- Interference lithography

Interference lithography

- Large area nano gratings

Nanoimprint lithography

- Flexible template and resist material development
- non planar surfaces



Pattern transfer by ICP/RIE

- Anisotropic profiles, smooth surfaces

Dielectric deposition

- LPCVD Si_3N_4 , SiO_2 , Al_2O_3 ,...

And much more...

- Wet processing, automated SEM
- Ion implantation (As, B, P, Si,....)
- Metal deposition (Al, Ti, TiN, W, Ni, Cr)
- Electrical and optical characterization



Collaboration:

- Biotechnology
 - Integrated photonics for sensing
 - Surface Enhanced Spectroscopy (including detection of explosives)
 - THz-near field measurements (also in liquids)
 - Microfluidics
- Regenerative Energy-Systems/-Storage
 - Direct Methanol Fuel Cell (DMFC) membrane reducing methanol diffusion; also for VRFB)
 - Li-Accumulators (Si/graphene-based anode)
 - Antireflective surfaces
- Environmental Technology
 - CO₂-Splitting (improving catalysts by plasmonic interaction)
- Sensor networks on composites (SHM)
- Hall-Sensors based on 2D-materials
- Highly efficient pulse compression gratings (laser tools)

Contact details

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