

# MANOs

Micro- & Nano-scale Optical Components  
Key Components for Novel Optical Devices  
and Systems

Heinrich-Hertz-Institut  
science in action



## Application

- Optical communications
- Spectroscopy
- Sensor technology
- Measuring technique
- Medicine
- Lasers
- Bio-technology
- Materials processing
- Imaging

## Specifications

- wafer size: from 1 inch up to 5 inches  
circular or square
- feature size: from x mm to nano-scale (>50 nm)
- structure depth: from x nm up to 8  $\mu\text{m}$
- aspect ratio: from 1 up to 6
- profile: binary, multi-level, continuous
- wavelength: from DUV to IR

## Materials

- Quartz-glass
- Silica ( $\text{SiO}_2$ )
- Silicon (Si)
- Silicon-Nitride ( $\text{Si}_3\text{N}_4$ )
- Resins
- PMMA

## Fabrication technique

Advanced fabrication facilities:

- Photolithography (SÜSS-Maskaligners)
- Direct ebeam-writing (LEICA EBPG5000+)  
combined with
- Dry etching techniques (RIE & CAIBE)

## Quality

- high fidelity pattern transfer
- high uniformity
- smooth surfaces
- steep sidewalls
- high optical efficiencies
- low SNR

### Contact

Fraunhofer Institute  
for Telecommunications  
Heinrich-Hertz-Institut  
Photonic Components

Einsteinufer 37  
10587 Berlin  
Germany

Dipl.-Phys. Margit Ferstl  
tel: +49 30 31002 430  
fax: +49 30 31002 558  
margit.ferstl@hhi.fraunhofer.de  
www.hhi.fraunhofer.de

