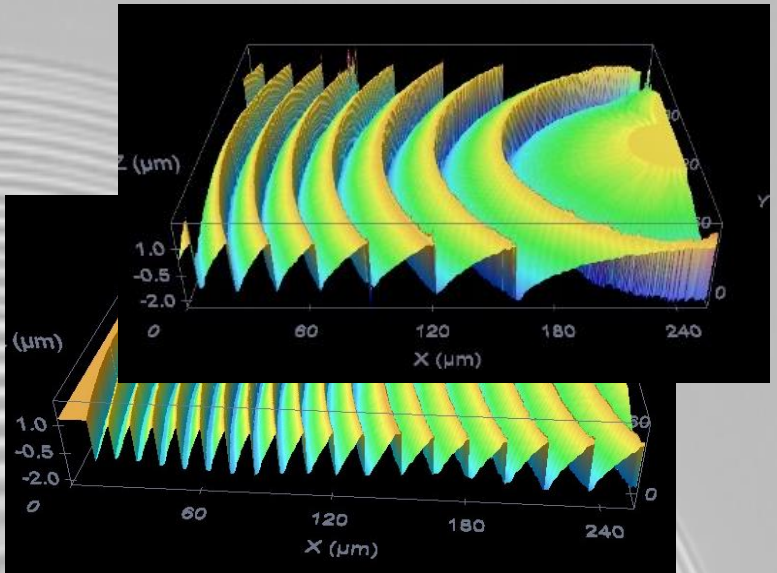


Laser based fabrication of micro optics

Laser-
Laboratorium
Göttingen e.V.

Micro-optical elements by laser ablation

- ▶ Fiber tip lenses
- ▶ Diffractive Fresnel-lenses
- ▶ Multilevel diffractive optical elements
- ▶ Gratings, couplers
- ▶ Hybrid refractive/diffractive elements
- ▶ Borosilicate glass, fused silica, sapphire, doped glass



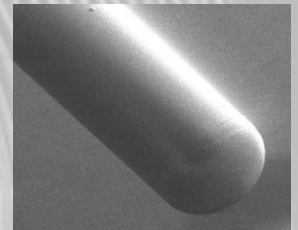
▶ Diffractive Fresnel-lens in glass



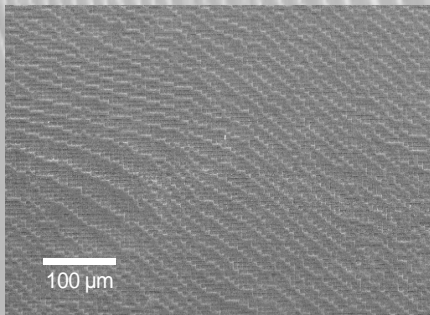
▶ Hybrid gradient index/diffractive lens

Applications

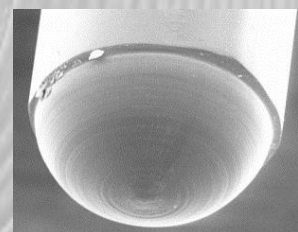
- ▶ Medical applicators
- ▶ Optical distance sensors
- ▶ Endoscopy
- ▶ Waveguide sensors
- ▶ Electro-optical circuit board
- ▶ Telecommunication devices



▶ Fused silica lensed fiber

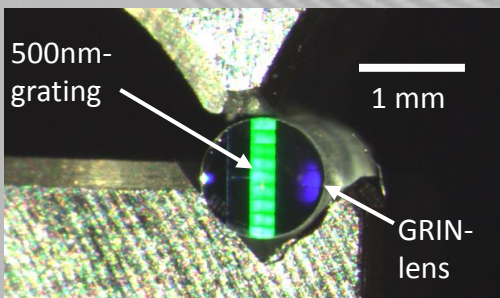


▶ Multilevel diffractive element, fused silica



▶ Sapphire lensed fiber

▼ GRIN lens with coupling grating



▼ Microfluidic/waveguide chip



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