

## AT A GLANCE

Micro optical elements for realizing optical functions on HHI's micro optical bench or other hybrid integration platforms.

### Micro optical elements

- GRIN lenses for generating
  - Parallel beams
  - Focussed beams
- Free space optical elements
  - Isolators, circulators
  - NLO crystals
- Thin Film Filter Elements
  - High-pass / low-pass filters
  - Polarization handling (PBS)

### Applications

- Quantum technology
  - QRNGs, BB84 transmitter
  - Squeezed and heralded light sources
  - DV-QKD / CV-QKD TRx
- Laser technology
  - Isolators, circulators, NLO crystals
  - On-chip wavelength meters
  - $\lambda/4$  wave and  $\lambda/2$  wave plates

## References

### International R&D projects

PHOENICS

POETICS

POLYNICES

QSNP

Qu-Test / Qu-Pilot

SPRINTER

TERA 6G

TERAMEASURE

TERAWAY

(funded by EU commission)

### National R&D projects

PolyChrome Berlin

PoLiSiQ

QuNET

Silhouette

VOMBAT

(funded by BMBF)

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### Photonic Components

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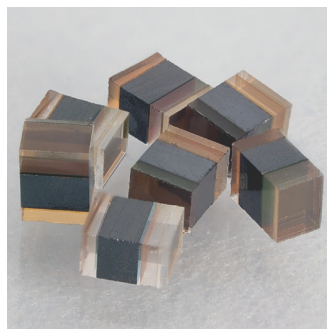
[www.hhi.fraunhofer.de/pc](http://www.hhi.fraunhofer.de/pc)



*Grin Lenses*

### Grin Lenses

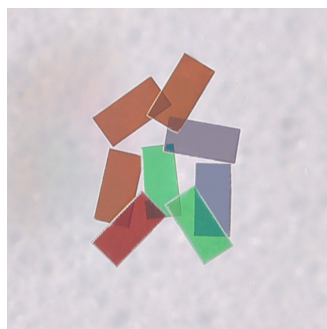
- 125µm diameter
- Customized design
- AR/HR coating optional



*Isolators*

### Isolators

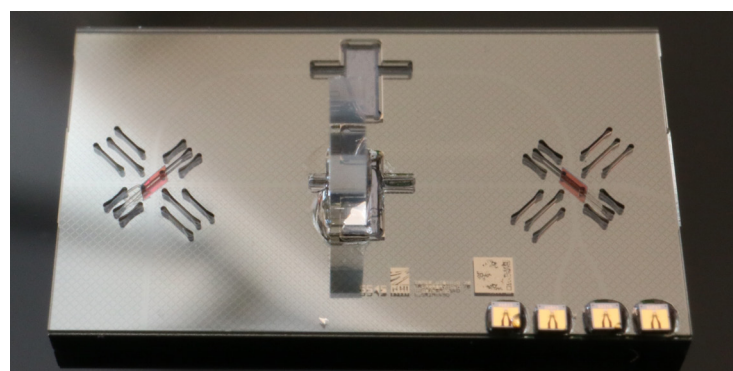
- 50 dB isolation (@ 1550nm)
- Size: 1mm<sup>3</sup>



*Thin Film Filter Elements*

### Thin Film Filter Elements

- Thickness 10-30µm
- Size: 0,5mm<sup>2</sup>
- Customized design
- Pump suppression > 70 dB
- Polarization handling (PBS)



*HHI's micro optical bench PolyBoard*