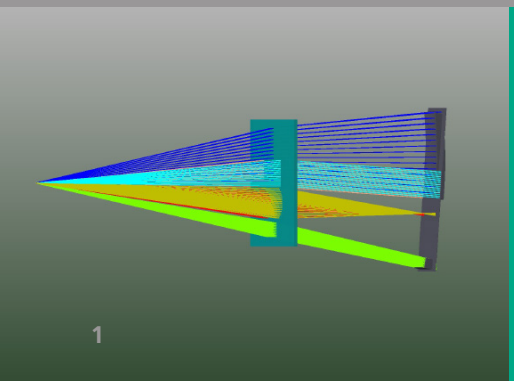
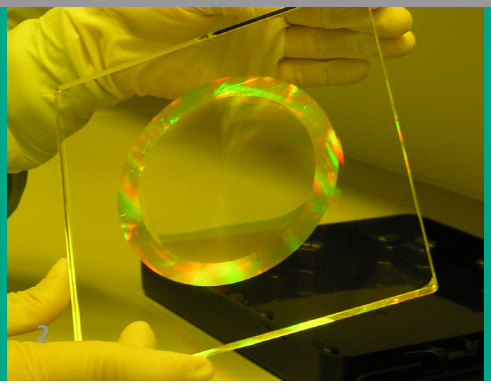
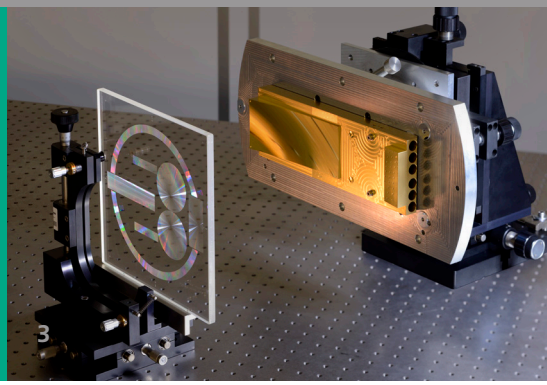
Fraunhofer
IOF

FRAUNHOFER INSTITUTE FOR APPLIED OPTICS AND PRECISION ENGINEERING IOF







1 *Optical design of a CGH for interferometric testing of a freeform mirror.*
2 *Structured CGH on a 6-inch mask blank (152 mm x 152 mm x 6.35 mm).*
3 *Setup for interferometric testing of a freeform mirror.*

Fraunhofer Institute for Applied Optics and Precision Engineering IOF

Albert-Einstein-Straße 7
07745 Jena, Germany

Director
Prof. Dr. Andreas Tünnermann

Head of Business Unit Optical Components and Systems
Prof. Dr. Uwe Zeitner

Contact
Dipl.-Phys. Frank Burmeister
Phone +49 3641 807-274
frank.burmeister@iof.fraunhofer.de

Prof. Dr. Uwe Zeitner
Phone +49 3641 807-403
uwe.zeitner@iof.fraunhofer.de

www.iof.fraunhofer.de

DESIGN AND MANUFACTURING OF COMPUTER-GENERATED HOLOGRAMS

Description

Computer-generated holograms (CGHs) allow for contact-free interferometric testing of demanding optical surfaces, for example aspheres or free-forms, with an accuracy < 10 nm RMS. To realize this, a high-precision lithographic fabrication technology and the use of special substrates with sub-100 nm flatness are needed.

Lithographic process chain

- Coating of substrate with chromium and photoresist
- Exposure by use of electron beam lithography
- Transfer of structure into chromium mask through reactive ion etching (RIE)
- Transfer of structure into substrate through RIE
- Removal of chromium mask (selective removal possible)

Technical data

- Available substrate geometries:
  - 6-inch (152 x 152 x 6.35) mm
  - 9-inch (230 x 230 x 9) mm
  - ET (292 x 150 x 15) mm
- Placement accuracy < 20 nm (3σ)

Our product range

- Optical design of phase functions and layout
- Provision and correction of substrates (transmitted wavefront error < 10 nm RMS)
- Lithographic fabrication of CGHs
- Measurement of placement accuracy
- Measurement of transmitted wavefront