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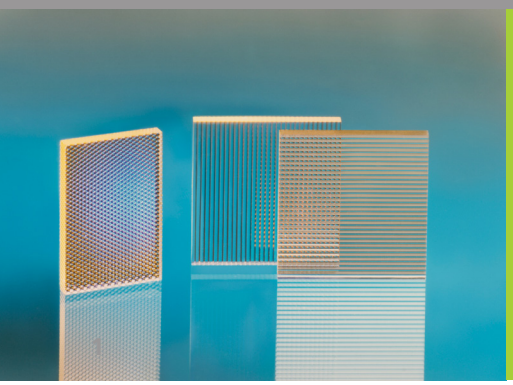

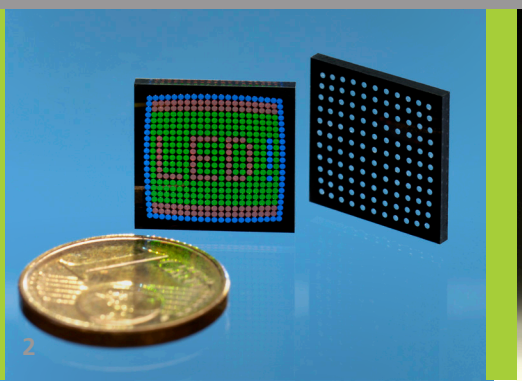

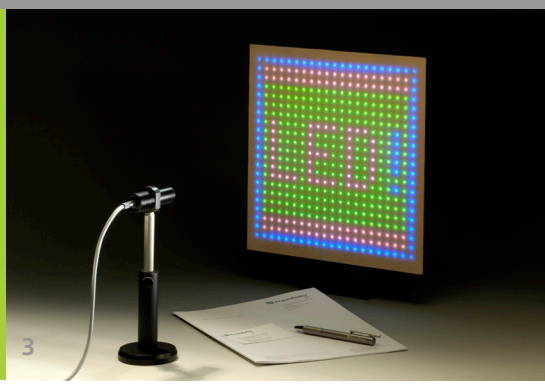

1 *Fly´s eye condensers with replicated tandem lens arrays.*
2 *Buried aperture structures and color filters in comparison to 1 euro-cent coin.*
3 *LED spot array generator with individually colored spots.*

MICRO-OPTICS FOR LED-ILLUMINATION

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Optics

- Efficient illumination systems for modern high-power LEDs
- Design and fabrication of collimation and beam shaping elements
- Design and prototyping of reflective and refractive/ reflective concentrators
- Homogenization with flies-eyes-condensers for rectangular or circular fields with tandem microlens arrays
- Cylindrical or spherical lenslets with optional aperture structures

Realization

- Secondary optics: injection molding
- Prototyping by direct diamond turning of PMMA
- Tertiary optics:
  - Mastering: reflow lens arrays with NA up to 0.25 and Cr-mask for aperture structures
  - Replication: UV-molding of lens arrays on float-glass substrate with optional buried aperture stuctures

Applications

- Beam shaping for high-power LEDs with maximum system transmission
- Switchable, structured illumination