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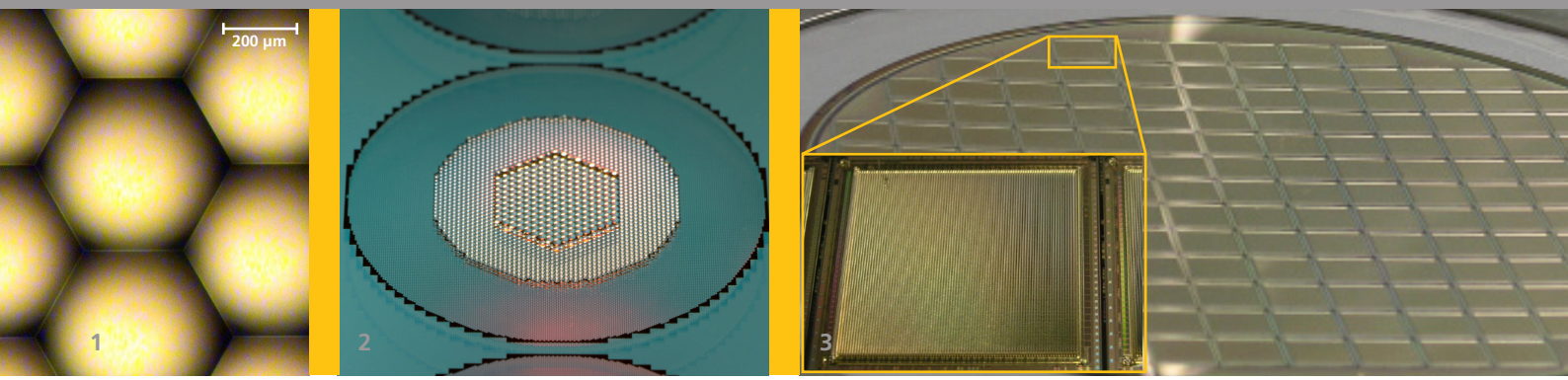

1 *Detail of high fill factor lens array mastered by lithography, reflow and RIE.*
2 *Double sided beam homogenizer with 3 different zones NA 0.1, 0.2, 0.3, and buried aperture array.*
3 *Si CMOS wafer with lens arrays on top of the detector area by selective UV curing.*

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MICROLENS ARRAYS

Objective

Reproducible fabrication of refractive microlenses with parameters derived from system design calculations.

Technology

- Mastering by lithography and reflow
- Replication by UV polymer molding or
- Transfer to silicon, glass or fused silica by reactive ion etching
- AR-coating, dicing
- Integration of aperture-/filter structures
- Double-sided patterning (tandem arrays)

Geometry of the lens arrays

- Spherical, cylindrical or elliptical lenslets; sag up to 100 µm
- Layout und focal length varying across the array or wafer (“Chirp”)
- Lens diameter: 5 µm – 3000 µm
- Resolution/lens gap: 1 µm
- High fill factor, lateral precision
- Homogeneity of focal lengths +1% across wafer
- Generation of aspheres by reactive ion etching (RIE)
- 100% fill factor of arrays by RIE assisted mastering

Replication by UV molding

- As thin polymer layer on glass, Si, etc.
- High lateral and axial precision
- High chemical/thermal stability
- On top of processed wafers (CMOS, VCSEL)

Applications

- Laser/fiber collimation
- Beam forming elements, homogenizer
- Fill factor enhancement on detector arrays
- Field-of-view matching for displays
- Miniaturized imaging systems, sensors