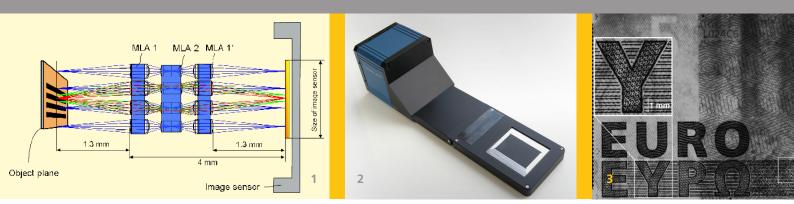


FRAUNHOFER INSTITUTE FOR APPLIED OPTICS AND PRECISION ENGINEERING IOF



1 Schematic working principle.

2 Example prototype in adapted

commercial camera housing.

3 Captured image of a five euro banknote. The inset shows two times magnified details.

Fraunhofer Institute for Applied Optics and Precision Engineering IOF

Albert-Einstein-Straße 7 07745 Jena

Director Prof. Dr. Andreas Tünnermann

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

Contact

Dr. Norbert Danz Phone +49 3641 807-750 norbert.danz@iof.fraunhofer.de

www.iof.fraunhofer.de

COMPACT MICROOPTICAL IMAGING SYSTEM FOR DIGITAL CLOSE-UP IMAGING

Ambition

Digital close-up imaging of extended object fields with high resolution using a compact optical system setup.

Characteristics

- optical setup using three double-sided microlensarray modules on a digital image sensor
- multichannel imaging with partial image stitching
- aspherical and achromatic lenslets
- unity magnification
- object-to-image distance 5.3 mm
- numerical aperture 0.1
- object field size 36 mm x 24 mm (scalable with image sensor size)
- resolution up to 4 µm

Application

- inspection of surfaces, print materials
- bio-/ medical imaging
- document analysis
- digitalization of photographic film material

Technology

- wafer-scale process on thin glass substrates
- master generation using lithography and resist reflow
- proportional transfer by dry etching (RIE, ICP) for aspherical lenslets
- double-sided, aligned UV-molding
- UV-structuring of absorbing polymer diaphragm arrays
- module assembly using alignment marks
- AR-coating of surfaces
- dicing with chip saw