

Prof. Dr. Karl-Heinz Brenner

ZITI, Universität Heidelberg
Lehrstuhl für Optoelektronik

"Scanning Microscopy with Diffractive Microlenses"

Thursday, 13th March 2014, 14:00 (*s.t.*)

Venue: 2nd Floor Seminar Room
Institute of Molecular Biology (IMB)
Johannes Gutenberg University Campus Mainz

All are welcome to attend

Hosts: Prof. Dr Christoph Cremer and Dr. Udo Birk, IMB
For further information, please contact: Dr. Udo Birk, E-mail: u.birk@imb-mainz.de

Scanning Microscopy with diffractive Microlenses

Due to a new design method, overlapping diffractive micro lens arrays can be realized with high area density, a large working distance and simultaneously with a high numerical aperture (NA) close to 1. Unlike conventional refractive optics, the limit for the NA is not determined by the diameter or by the focal length of the lenses but only by the lithography resolution available in the fabrication process. The optical lithography, available at the institute has a minimum feature size of 600 nm, limiting the minimum spot size to approx. 1 μm . With these diffractive elements, we have realized a scanning microscope with 3 mm working distance, which provides 20 MegaPixel resolution in a field of approx. 6x4 mm. The talk reports about the design of these elements, the design of the scanning microscope and previous experimental results. Furthermore, we discuss other areas of application of these diffractive elements. We conclude with a discussion about possible system enhancements which can be achieved by increasing the lithography resolution or by modifying the pupil distribution.

