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Einladung
zum
Physikalischen Kolloquium

Montag, 26.04.2010 um 16.15 Uhr im H2 (O25)

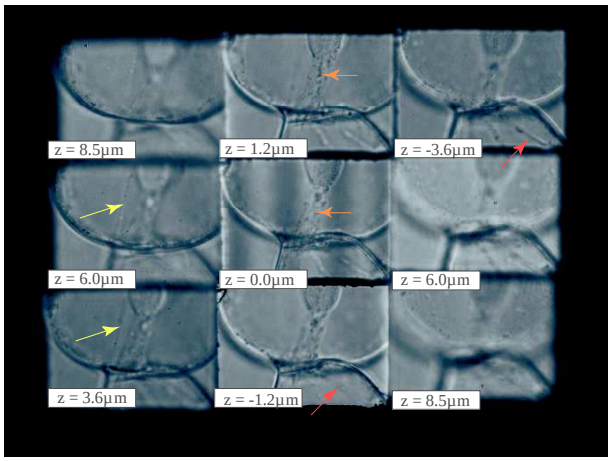
und

um 15:30 Uhr zum Gespräch bei Getränken und Gebäck im Institut für Quantenmaterie, Uni West, Raum 45.2.304

Prof. Dr. Stefan Bernet
Sektion für Biochemische Physik
Universität Innsbruck

Spatial light modulators in holographic laser trapping and microscopy

Spatial light modulators (SLMs) are very flexible tools in modern microscopy. We use miniaturized liquid crystal displays which can act as pure phase modulators for an incoming light wave, with a resolution (1920 x 1080 pixels) sufficient to display phase holograms. Such an SLM introduced into a Fourier plane of an optical microscope can be used to realize a variety of novel contrast enhancement techniques for the imaging and/or quantitative mapping of transparent samples, or to generate a set of images of a whole extended sample volume simultaneously (see figure below).



Furthermore the same SLMs can be used for holographic steering of an external laser beam in a microscope's sample plane. This allows to realize flexible optical traps ("laser tweezers") used for trapping and manipulation of microscopic samples. Amongst other things one can realize a so-called holographic optical mirror trap, which can be used to control a large sample volume at a long working distance with a low numerical aperture objective, for example to trap relatively big self-propelling organisms (protozoa) without affecting their viability.

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