



Laser-Laboratorium Göttingen e.V.

Seminar

Vortragsankündigung:

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Department of Applied Physics, Osaka University

Title: "Saturated excitation (SAX) microscopy for three-dimensional sub-diffraction imaging".

The spatial resolution in optical microscopy is subject to the diffraction limit of light. This classical limitation is overcome in fluorescence microscopy by using saturation or photoswitching effects in optical transitions of fluorescence molecules. In this talk, I present a simple technique to improve the spatial resolution of fluorescence microscopy by using saturation phenomena in the fluorescence emission of probe molecules. In our technique called saturated excitation (SAX) microscopy, fluorescence molecules are excited with high excitation intensity enough to induce the saturation phenomena. Since the saturation effect appears prominently in the center of laser focus, it can be used for improving the spatial resolution. In SAX microscopy, it is also expected to achieve significant suppression effects of out-focus signals in a similar manner as two-photon fluorescence microscopy, because induction of the nonlinear fluorescence response is limited in the laser focus. To extract the nonlinear response, we modulated the excitation intensity at a single frequency and demodulated the emitted fluorescence signals at the harmonic frequencies. Thus, an optical system for SAX microscopy is realized just by adding laser intensity modulators and a lock-in amplifier into a typical confocal fluorescence microscope. Using the SAX microscope, we observed biological samples and the result confirmed the improvement of the spatial resolution in three-dimensions beyond the diffraction limit.

Termin: 14. April 2011 um 09 Uhr s.t. im Seminarraum
Veranstaltungsort: Laser-Laboratorium Göttingen e.V., Hans-Adolf-Krebs-Weg 1, 37077 Göttingen

Gastgeber: Alexander Egener