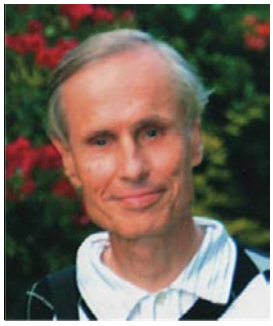
ulm university universität
uulm

Einladung
zum
Physikalischen Kolloquium
Montag, 29.06.2015
16:15 Uhr in N24/H13



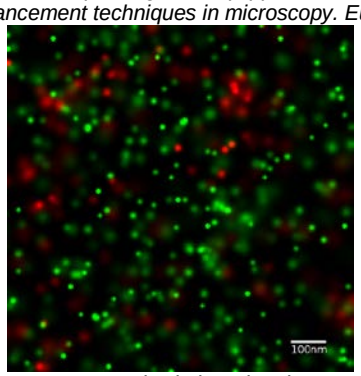
Prof. Dr. Dr. Christoph Cremer

[1]Superresolution Microscopy, Institute of Molecular Biology (IMB), Mainz
[2)]Kirchhoff Institute of Physics (KIP), and Institute of Pharmacy&Molecular Biotechnology (IPMB) University Heidelberg

Light Microscopy at the Nanoscale

Novel developments in optical technology and photophysics made it possible to radically overcome the diffraction limit (ca. 200 nm laterally, 600 nm along the optical axis) of conventional far-field fluorescence microscopy. The lecture will give an overview of the state of the art. Presently, three principal “nanoscopy” families have been established: “Nanoscopy” based on focused laser beams, like 4Pi-, and STED- (STimulated Emission Depletion) microscopy; nanoscopy based on Structured Illumination Excitation, like SMI (Structured Modulated Illumination) microscopy and SIM (Structured Illumination Microscopy); and nanoscopy based on various modes of Localization Microscopy. These and related far-field light microscopy methods have opened an avenue to image nanostructures down to single molecule resolution; they made possible to measure the size of molecule aggregates of few tens of nm diameter and to analyze the spatial distribution of individual molecules with a light optical resolution down to the few nanometer range, corresponding to ca. 1/100 of the exciting wavelength. Application examples obtained by focused, structured, and localization techniques cover a variety of biostructures, such as membrane complexes, neuronal synapses, cellular protein distribution, nuclear nanostructures of normal, and cancer cells, as well as the “nanoimaging” of individual viruses and lithographically generated nanostructures. Each of the nanoscopy methods described has its peculiar advantages; as a whole, they provide a tool set of light microscopy approaches to the nanoscale and open a wide range of perspectives in Biology, Medicine and the Material Sciences. Further improvements are expected to make possible a three-dimensional lightoptical resolution down to the 1 nm scale. The combination with Electron- and X-ray microscopy techniques is anticipated to provide further nanostructural insights.

M. Ehrenberg. Scientific Background on the Nobel Prize in Chemistry 2014, www.nobelprize.org).
C. Cremer, Optics far Beyond the Diffraction Limit: From Focused Nanoscopy to Spectrally Assigned Localization Microscopy (2012). In: Springer Handbook of Lasers and Optics, 2nd edition (F. Träger, Edit.), pp. 1351 – 1389.
*C. Cremer, B.R. Masters (2013) Resolution enhancement techniques in microscopy. Eur. Phys. J. H **38**: 281–344.*



www.optics.imb-mainz.de

Ab 15.45 Kaffee, Tee und Kekse vor dem Hörsaal H13

Organisation: **Prof. Dr. F. Jelezko, Tel. 23750**

Host: **Prof. Dr. C. Gebhardt, Tel. 23364, off.: 23051**