

**Einladung**  
zum  
**Physikalischen Kolloquium**  
**Montag, 18.12.2017**  
**16:15 Uhr in N24/H13**



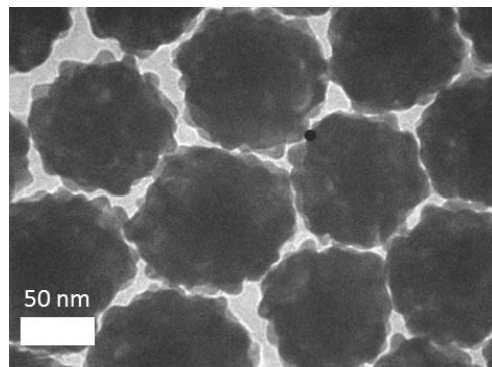
**Professor Dr. Heinrich Hörber**  
Senior-Professor Experimentelle Physik  
Universität Ulm

**Interacting with Nano Structures**

Transfer and interaction of electrons and photons within matter seems to be a physical problem solved longtime ago - but it is not! Especially, if one does not look from a macroscopic point of view, but down to the nano-scale, on the interaction of a single electron or photon with a single molecule. Maxwell's equations would let us hardly expect any interaction of a photon with an atom. Furthermore, a description of the transfer of low energy electrons in non-conducting matter would not only be essential to understand the second step in photosynthesis, but to generally understand catalysis in Biology.

In my talk I will not be able to offer solutions to these problems, but I would like to summarise my attempts to these questions, which I hope at least can point in the direction of possible solutions. These attempts naturally include quantification of interactions, which often are described using Newton's concept of force. Unfortunately, at the nano-scale forces between structures are not constant, but highly fluctuating due to thermal motion. This asks for a statistical approach to such measurements, which can be based on the work of Boltzmann. I will try to convince that using potentials instead of forces helps to understand the Mechanics of Molecular Motors.

Interaction of photons with matter is core to our study of the function of cellular structures in Biology and therefore, I will finish with new aspects on photon interaction with matter, which might provide a better understanding of the process and also might pave the way to a new type of super resolution microscopy, which does not need fluorescence markers.



Ab 16.00 Uhr Kaffee, Tee und Kekse vor dem Hörsaal H13

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

**Host:** Prof. Dr. O. Marti, Tel. 23011, off.: 23010