MAX-BORN-INSTITUT FÜR NICHTLINEARE OPTIK UND KURZZEITSPEKTROSKOPIE IM FVB E.V.

Institutskolloquium

Am Mittwoch, **24. Oktober 2007 um 16:00 Uhr** spricht

Prof. Dr. Mischa Bonn

FOM-Institute for Atomic and Molecular Physics

über

"Water at biological membranes: structure, dynamics and biomolecular sensing"

Abstract: Many of the properties of biological membranes and transmembrane proteins depend on the structure and dynamics of water molecules at the membrane/water interface. Experimental studies of water in these environments are difficult because of the challenge of isolating the signal of interfacial water from that of the bulk, in particular when ultrafast time resolution is required.

We report a series of surface specific studies of the membrane/water interface using vibrational sum frequency generation (VSFG) spectroscopy, both in equilibrium and with ultrafast resolution. Owing to its interface specificity, VSFG is sensitive only to the one monolayer of water molecules at the membrane/water interface. The static VSFG spectra reveal distinct peaks in the O-H stretch region, in contrast to the bulk vibrational spectrum; changes in the amplitudes of these water peaks can be used to quantify the picomolar adsorption of DNA to the model membrane surface.

Using femtosecond time-resolved VSFG, we probe the vibrational dynamics of interfacial water molecules. In contrast to water at a variety of other interfaces, membrane-bound water does not rapidly exchange vibrational energy with the underlying bulk. This observation illustrates that membrane-bound water is an inherent part of the membrane: water at the membrane interface does not just terminate the bulk.

Ort: **Max-Born-Saal,**
MBI, Max-Born-Str. 2a

Prof. Dr. I.V. Hertel

■ **Direktor Bereich A** Prof. Dr. Ingolf V. Hertel ■ **Direktor Bereich B** Prof. Dr. Wolfgang Sandner ■ **Direktor Bereich C** Prof. Dr. Thomas Elsässer ■ **Bereich Z** Dr. Jörn Kändler

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