TECHNISCHE UNIVERSITÄT CHEMNITZ

Sächsische Forschergruppe FOR 877
From Local Constraints to Macroscopic Transport

Symposium der Sächsischen Forschergruppe FOR 877

Donnerstag, den 24.02.2011, um 17:15 Uhr
Ort: Reichenhainer Str. 70; Neues Physikgebäude, Raum: 2/P032

Prof. Dr. Matthias Weiss

Universität Bayreuth
Experimentelle Physik I

Physikalisches Sonderkolloquium:

Protein motion in living cells – anomalous is normal

Diffusion is the basic means of intracellular transport, e.g. for membrane-bound and soluble proteins. However, due to macromolecular crowding and oligomerization processes, the random walk may be obstructed and a change in the diffusion characteristics towards anomalous diffusion (‘subdiffusion’) is anticipated. Using fluorescence correlation spectroscopy (FCS) in combination with computer simulations, we were able to determine and quantify the subdiffusive motion of transmembrane proteins in the endoplasmic reticulum and the strongly anomalous diffusion of fluorescently tagged, inert tracer particles in the cytoplasm and the nucleus of living cells. While the observed anomalous diffusion of membrane proteins is most likely a signature of a dynamic oligomerization process, subdiffusion in the cytoplasm and the nucleus is a consequence of the highly crowded state of the respective fluids. In the latter case, quantifying the anomalous diffusion allows one to determine the viscoelastic properties (i.e. the complex shear modulus) of the fluids on the nanoscale in vivo. Based on the observation, that anomalous diffusion is indeed a fairly common phenomenon, we finally discuss how generic cellular processes (e.g. complex formation) are altered in the presence of subdiffusion.

Alle Zuhörer sind ab 17:00 Uhr zum Kaffee im Raum 2/P033 eingeladen.

Informationen zum Vortrag erteilt Prof. Dr. Günter Radons, Tel. 0371/531-33205