SFB 1078

Protonation Dynamics in Protein Function

Mon, **Dec. 10,** 2018

15:15 – 17:30

Freie Universität Berlin
Physics Department
Lecture Hall B

(Arnimallee 14, 14195 Berlin-Dahlem)

➤ Colloquium

➤ **Prof. Michael Börsch** – Friedrich-Schiller-Universität Jena

Fast subunit rotation in F_oF_1-ATP synthase by single-molecule FRET in an ABELtrap

Since 20 years we apply intensity-based and time-resolved single-molecule FRET measurements to study subunit rotation and regulatory conformational changes of individual F_oF_1-ATP synthases in liposomes, either driven by ATP hydrolysis or during ATP synthesis. However, observation times of freely diffusing proteoliposomes in a confocal microscope are limited by Brownian motion. In addition, arbitrary trajectories through the confocal detection volume cause large intensity fluctuations in smFRET traces. Intensity fluctuations result in varying precision for the smFRET distance measurement within the data for a single enzyme at work. To counteract diffusive motion actively in real time we have built a fast anti-Brownian electrokinetic trap (ABELtrap, invented by A. E. Cohen and W. E. Moerner at Stanford). The ABELtrap utilizes a laser focus pattern controlled by a programmable FPGA. The FPGA estimates the position of a fluorescent molecule in the trapping region and applies voltages onto electrodes to push back the molecule into the center of the laser pattern. We recorded surprisingly fast subunit rotation of F_oF_1-ATP synthases at different ATP concentrations, and could analyze Michaelis-Menten kinetics as extracted from single-molecule FRET traces of individual membrane enzymes hold in solution by the ABEL trap.

➤ **Dr. Mohamed Ibrahim** – Humboldt-Universität zu Berlin

Towards the first atomic movie of water oxidation in Photosystem II

Dr. Ibrahim, a postdoc in the group of Prof. Holger Dobbek (project A5), will -among others- elucidate the latest results on water oxidation in PS II, a topic also recently published in *Nature*.

Coffee and tea are ready at 15:00 and during the break from 16:15 – 16:30.   *www.sfb1078.de*

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