

Physikalisches Kolloquium

Quantifying living systems: Using non-equilibrium statistical physics to extract molecular information from mesoscopic measurements

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Living biological systems are continuously reorganizing their structure to perform their function. The mechanical activity plays here an important role, as the constant generation of forces drives fluctuations as well as controlled motion of intracellular particles, membranes and cells. From a physical point of view, this active motion drives the system far away from thermodynamic equilibrium, which can be measured as a violation of equilibrium quantities such as the fluctuation dissipation theorem.

Quantifying the out-of-equilibrium components provides the possibility to model the active molecular processes. We measure the energy and the forces actively applied on membranes as well as cellular granules and model these with an active Langevin approach. By comparing the predictions of forces and mechanics with the measurement of the fluctuations and viscoelastic properties we can extract molecular parameters from mesoscopic measurements. This gives timescales and chemical reaction parameters such as forces, binding states and velocities of the underlying proteins using a simple average measurement of the active motion.

Der Gast wird betreut von Herrn Prof. Dr. Widera

Gäste sind herzlich willkommen

Kaffeeauschank ab 17:00 Uhr

Montag, 14.05.2018, 17:15 Uhr

Gebäude 46, Hörsaal 270