Physikalisches Kolloquium

Universität Konstanz

Di 06.02.18
15:15 Uhr
14:45 Uhr, Kaffee/Tee
R 513

Prof. Dr. Thomas Speck
Universität Mainz

Änderung des Themas!

Statistical physics far from thermal equilibrium

Classical thermodynamics has been developed in response to the industrial revolution and the need to understand and optimize devices that convert heat into useful work. Tremendous progress in physics, chemistry, and engineering allows us to image and manipulate matter on smaller and smaller scales, advancing our understanding of biological, and enabling the realization of artificial, nano- and micromachines. Stochastic thermodynamics constitutes a theoretical framework for classical systems driven away from thermal equilibrium, in particular in the presence of strong fluctuations. Quantities like work and heat become stochastic with probability distributions, which, however, are not arbitrary but restricted by fluctuation theorems. I will first give an introduction to stochastic thermodynamics and present selected milestones. I will then discuss an exciting new class of soft matter systems, self-phoretically driven colloidal particles. These constitute a new paradigm in non-equilibrium statistical mechanics since, in contrast to systems driven by external fields and gradients breaking symmetry globally, active particles constantly dissipate heat by converting local free energy into directed motion.