

# Condensed Matter Theory Seminar

**Ralf Eichhorn**  
NORDITA

## Colloidal heat engines driven by temperature anisotropy: exactly solvable models

We consider microscopic heat engines, which consist of a single micrometer-sized colloidal particle as the 'working medium'. Via an anisotropic thermal environment with a 'hot' and a 'cold' direction, the particle is in simultaneous contact with two heat baths at different temperatures. With the proper confinement the colloid then works as an autonomous heat engine without the need for external time-dependent controls. We analyze simple models of this general setup, which allow for solving their equations of motion analytically, including the thermal fluctuations associated with the two heat baths. From these exact solutions we can access heat, work, and efficiency distributions, and in that way characterize the properties of the thermal engine. We also discuss the possibilities of experimentally realizing our simple model systems with state-of-the-art micro-(fluidic) technology.

**Friday, 19.10.2018, 14:15 Uhr**  
**D2-240**