MPIDS Colloquium

MAX-PLANCK-GESELLSCHAFT

Irreversibility in active matter systems: Fluctuation theorem and mutual information

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Active particle systems consist of individual entities ("particles") which have the ability to perform motion by consuming energy from the environment and converting it into a self-propulsion drive. Examples are suspensions of biological microorganisms or artificial microswimmers, such as bacteria and colloidal particles with catalytic surfaces. We consider an active Brownian particle which, in addition to being in contact with a thermal bath, is driven by active fluctuations. Our main goal is to develop a trajectory-wise thermodynamic description as a natural generalization of stochastic energetics and thermodynamics for passive Brownian motion in a purely thermal equilibrium environment. We approach this goal by calculating the log-ratio of path probabilities for observing a certain particle trajectory forward in time versus observing its time-reserved twin trajectory, and propose a thermodynamic interpretation of this path probability ratio.

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MPIDS, Seminar room 0.77, Am Faßberg 17, Göttingen

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