

Institute for Applied Mathematics, Bonn University

## Oberseminar Stochastik

Thursday, 31 October 2024, 16:30

Lipschitz-Saal (LWK 1.016)

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# Interacting run-and-tumble particles as piecewise-deterministic Markov processes - Invariant measure and convergence

We will investigate the long-time behavior of run-and-tumble particles, a stochastic model often used to describe the movement of interacting bacteria. The motivation is to improve the particle-level understanding of out-of-equilibrium phenomena in statistical physics, focusing on motility-induced phase separation - where a dense and a dilute phase coexist, leading to a spatially inhomogeneous particle distribution. We will rely on piecewise-deterministic Markov processes, a class of Markov processes that combine deterministic motion and random jumps. The focus will be on explicit examples from out-of-equilibrium statistical physics, and we will consider the following questions: Is it possible to characterize the invariant measure exactly? How fast does the process converge to it?