SUMMER SEMESTER 2025

RTG 2756 CYTAC SEMINAR SERIES

TUESDAY, JUNE 10
17:00 IN HS5

CYTAC
RTG 2756

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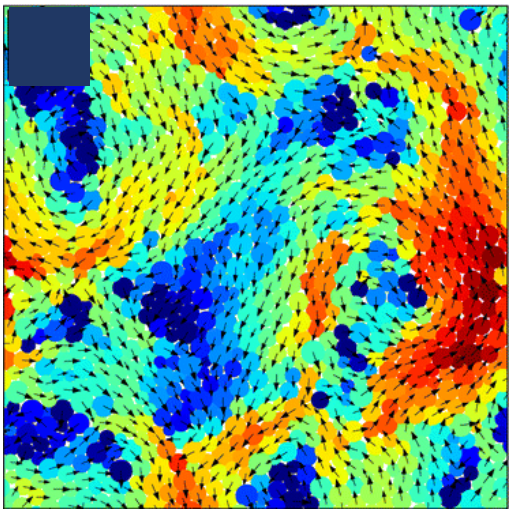
Institute for Theoretical Physics

INTERMITTENCY, AVALANCHES AND AGING IN EXTREMELY PERSISTENT ACTIVE MATTER



Recent experiments and simulations have revealed glassy features in the cytoplasm, living tissues as well as dense assemblies of self propelled colloids. This leads to a fundamental question: how do these active amorphous materials differ from passive glasses, created either by lowering temperature or by increasing density? To address this, we investigate dense systems of self-propelled particles, with an emphasis on the limit of large persistence times. The system then evolves intermittently between mechanical equilibria where active forces balance interparticle interactions. We develop an efficient numerical strategy allowing us to resolve the statistical properties of elastic and plastic relaxation events caused by activity-driven fluctuations. We find a time evolution consisting of a succession of scale-free elastic events and broadly distributed plastic events, with both having properties that depend on the system size. Correlations between plastic events lead to emergent dynamic facilitation and heterogeneous relaxation dynamics. Our results show that the steady state dynamics of extremely persistent active systems is qualitatively similar to that of sheared amorphous solids, yet with some important differences. Time permitting, extensions to aging behaviour will be discussed.