UNIVERSITÄT LEIPZIG

Fakultät für Physik und Geowissenschaften

Peter-Debye-Institut für Physik
der weichen Materie

Peter Debye Lecture

Tuesday, 24 October 2023 at 16:30

Dr. Sarah A. M. Loos

University of Cambridge (UK)

About fluctuating systems far from equilibrium: nonreciprocal matter and non-Markovian transport

Reciprocity is a hallmark of thermal equilibrium, but ubiquitously broken in far-from-equilibrium systems.
I discuss how nonreciprocal interactions can fundamentally affect the phases and fluctuations of many-body systems. Using a two-dimensional XY model, where spins interact only with the neighbors within their 'vision cones', we show how non-reciprocity can lead to true long-range order.

In binary fluids, nonreciprocal coupling between fluid components can cause the emergence of traveling waves through PT symmetry-breaking phase transitions. Here, fluctuations not only inflate, as in equilibrium criticality, but also develop an asymptotically increasing time-reversal asymmetry. Finally, I present ongoing projects about transport of particles through correlated environments with internal relaxation processes, leading to non-Markovian dynamics. We study optimal protocols to drag a particle through a viscoelastic fluid using minimal power, and transport through near-critical fluids.

Venue: Universität Leipzig, Faculty of Physics and Earth Sciences
04103 Leipzig, Linnéstraße 5, Lecture Hall for Theoretical Physics

After the lecture, there will be a reception in the Aula for registered participants. Please register for the reception until October 2, 2023 by sending an email to andrea.kramer@uni-leipzig.de.

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