Fachgruppe Physik und Astronomie Universität Bonn

Physikalisches Kolloquium
Fachgruppe Physik/Astronomie der Universität Bonn

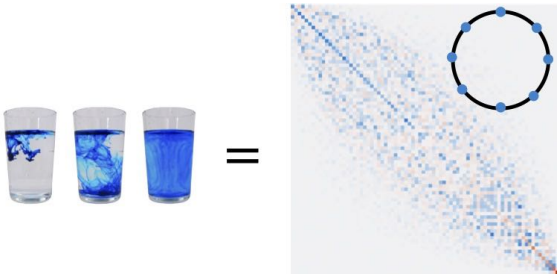
UNIVERSITÄT BONN

Friday, 03.11.2023, 1:15 p.m.
in Lecture Hall I of the Physics Institute

Silvia Pappalardi

Universität Köln

„Quantum Systems out-of-equilibrium: the Eigenstate Thermalization Hypothesis and Beyond“



Understanding how thermal equilibrium and irreversibility arise from unitary quantum evolution is a theme as old as quantum mechanics. This question has recently been the focus of great attention due to the great experimental progress in quantum simulations, which now allow us to probe dynamics at unprecedented time scales in condensed matter physics.
The current framework for understanding quantum dynamics is given by the Eigenstate-Thermmalization Hypothesis (ETH). This is a simple assumption on the structure of local observables in the energy eigenbasis, that has proved to be extremely successful in describing some dynamical properties of physical Hamiltonian systems.

In this colloquium, I will discuss the recent developments in the field going beyond the standard framework. First, if one is interested in correlations of multiple times (relevant beyond linear response or to account for chaos), it becomes clear that ETH as was known is incomplete. I will introduce the full version of ETH and the emergence of Free Probability as the right tool to describe it. Secondly, I will describe the different mechanisms leading to violations of ETH and I will present long-range interacting systems as a remarkable example.

Everybody is welcome, especially students of all semesters.

Coffee and tea will be available after the colloquium.

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