

Seminar Talk

Aleksandr Mikhhev, University of Mainz, Germany

“Prethermalization of light and matter at negative temperatures in Rydbergs-cavity interfaces”

Abstract

Modern experimental platforms with light and atoms can be used to engineer quantum systems where atoms interact across the entire setup. Typically, such collective interactions suppress fluctuations as the number of atoms in the cavity increases, pushing the system toward classical behavior.

However, introducing a competing short-range interaction can drastically change the situation. In quantum-optical platforms, this can be achieved using Rydberg atoms, whose blockade mechanism induces short-range interactions that disrupt the purely collective nature of the problem, giving rise to a rich phase diagram and complex nonequilibrium dynamics. In this talk, we will explore how, depending on the parametric regime, the system can exhibit vastly different pathways to thermalization, including a scenario of a long-lived prethermal regime in which light and matter coexist at different temperatures.

Tuesday | 08.04.2025 | 4:00pm

Schrödinger-Saal | ICT building