Speaker: Oded ZILBERBERG (University of Konstanz, Germany)

Title: **Observing measurement-induced entanglement transitions using mixed states**

Abstract: Measurement in quantum mechanics is among the most fundamental and debated processes in modern physics. In theory, it can be described by the use of pure quantum trajectories in stochastic Schrödinger equations, or by (averaged) master equations for the density matrix of mixed states. Whereas both descriptions lead to the same measurement statistics for linear observables, the entanglement along quantum trajectories reveals measurement-induced transitions (MITs), which are allegedly invisible to the steady-state density matrix. Moreover, in contrast to the pure state trajectories, there is no standard way to quantify the entanglement of a mixed state. Recently, we have introduced the "configuration coherence", a mixed-state entanglement measure for systems with a fixed conserved charge. In my talk, I will demonstrate that the configuration coherence in both the trajectories and master equation approaches reveal the MIT. Specifically, we find that, in both scenarios, the same intermediate-time entanglement dynamics appears. Our finding suggests that the MIT is a manifestation of coherent-to-diffusive crossover in random walks. In summary, our result enables the investigation of the measurement-induced entanglement phase transition in the context of mixed states and sheds light on its physical origin.