

OpenQMBP2023: New perspectives in the out-of-equilibrium dynamics of open many-body quantum systems



Contribution ID: 15

Type: **not specified**

Triviality of quantum trajectories close to a directed percolation transition

Tuesday, June 20, 2023 3:00 PM (20 minutes)

In this talk, I will discuss a variation of the standard framework of measurement-induced phase transitions, where the projective measurements are followed by control operations steering the system toward a pure absorbing state. In these dynamics, two types of phase transition occur as the rate of these control operations is increased: a measurement-induced entanglement transition, and a directed percolation transition into the absorbing state. I will present analytical and numerical evidence showing that these transitions are generically distinct, with the quantum trajectories becoming disentangled before the absorbing state transition is reached. To this end, I will introduce simple classes of models where the measurements in each quantum trajectory define an effective tensor network (ETN) where the nontrivial time evolution takes place. By analyzing the entanglement properties of the ETN, I will show that the entanglement and absorbing-state transitions coincide only in the limit of the infinite local Hilbert-space dimension. Focusing on a Clifford model which allows numerical simulations for large system sizes, I will then present data supporting these predictions and allowing one to study the finite-size crossover between the two transitions at large local Hilbert space dimension.

Presenter: PIROLI, Lorenzo (ENS Paris)

Session Classification: Quantum Trajectories and Measurement Induced Phase Transitions