

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



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Post-selection-free Measurement-Induced Phase Transition in Driven Atomic Gases with Collective Decay

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I will discuss the properties of a monitored ensemble of atoms driven by a laser field and in the presence of collective decay.

By varying the strength of the external drive, the atomic cloud undergoes a measurement-induced phase transition separating two phases with entanglement entropy scaling sub-extensively with the system size. The critical point coincides with the transition to a superradiant spontaneous emission. This setup is implementable in current light-matter interaction devices, and most notably, the monitored dynamics is free from the post-selection measurement problem, even in the case of imperfect monitoring.

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