Dynamics of a Many-Body-Localized System Coupled to a Bath

MARK FISCHER, MYKOLA MAKSYMENKO, EHUD ALTMAN, Weizmann Institute of Science — Coupling a many-body localized system to a dissipative bath necessarily leads to delocalization. Here we investigate the nature of the ensuing relaxation dynamics and the information it holds on the many-body localized state. To solve for the time evolution, we formulate the relevant Lindblad equation in terms of the local integrals of motion of the underlying localized Hamiltonian. This allows to map the quantum evolution deep in the localized state to tractable classical rate equations. We consider two different types of dissipation relevant to systems of ultra-cold atoms: particle loss and dephasing due to inelastic scattering on the lattice lasers. Only the first mechanism shows a pronounced effect of interactions on the relaxation of observables.

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