

Abstract Submitted
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Non-equilibrium dynamics and heating of cold atoms in optical lattices ANDREW DALEY, University of Pittsburgh, HANNES PICHLER, PETER ZOLLER, University of Innsbruck — We study the dissipative many-body dynamics of cold atoms in optical lattices that is induced by incoherent scattering of light from the lattice lasers. The resulting heating process is intrinsically non-equilibrium, and involves an important interplay between the atomic physics of the spontaneous emission process and the many-body physics of the state present in the system. In particular, we observe important differences for strongly and weakly interacting regimes, as well as a strong dependence on the sign of the laser detuning from the excited atomic state. We compute heating rates and changes to characteristic correlation functions based on a microscopic master equation. In 1D this equation can be propagated exactly by combining time-dependent density matrix renormalization group (t-DMRG) methods with quantum trajectory techniques.

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