

Abstract Submitted
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Interplay of spontaneous emissions and thermalization of cold bosons in optical lattices ANDREW DALEY, JOHANNES SCHACHENMAYER, University of Pittsburgh, LODE POLLET, Ludwig-Maximilians-Universität München, MATTHIAS TROYER, ETH Zurich — We study the non-equilibrium dynamics of cold bosons in an optical lattice, in the presence of spontaneous emission events from incoherent light scattering. Computing the dynamics described by the many-body master equation, we characterize the behaviour of both intra- and inter-band excitations, and identify to what extent excitations can be thermalized by the system, and on which timescales this occurs. Comparing simple observables, we find regimes with weak interactions and intra-band excitations in which the system relaxes rapidly to values described by a thermal distribution. Conversely, we find that for inter-band excitations or in regimes of stronger interactions that thermalization of simple observables such as the kinetic energy does not occur on typical experimental timescales. As well as providing an experimentally realizable case study for thermalization in these system, these results have important implications for the characterization of heating and decoherence in optical lattice experiments.

Andrew Daley
University of Pittsburgh

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