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Quantum quenches in the two-component Bose-Hubbard model

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Cold atoms in optical lattices can be used as quantum simulators to study the temporal evolution of quantum systems, which has lead to increasing interest in the out-of-equilibrium dynamics of bosons in optical lattices. Adding a second species of bosons introduces a wide range of novel quantum phases and provides a platform to explore analogues of spin systems. We study the Bose-Hubbard model for two-component bosons using a strong-coupling approach within the closed-time-path formalism and develop an effective theory for the action of this problem. We obtain equations of motion for the superfluid order parameter and study these in the low frequency, long wavelength limit during a quantum quench for various initial conditions.

Keyword-1

cold atoms

Keyword-2

optical lattice

Keyword-3

Author: BAER, Florian (Simon Fraser University)

Co-author: Dr KENNETT, Malcolm (Simon Fraser University)

Presenter: BAER, Florian (Simon Fraser University)

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