Title:
Quench dynamics of one-dimensional bosons in a commensurate periodic potential: Prethermalization and thermalization.

Author: Aditi Mitra, New York University

Abstract:
Results are presented for the quench dynamics of one-dimensional bosons in a commensurate periodic potential. For quenches in the vicinity of the critical point separating the superfluid and the Mott-insulator, the dynamics is found to be quite complex by being characterized by three regimes. One is a short time perturbatively accessible regime which depends on microscopic parameters, the second is an intermediate time prethermalized regime where inelastic effects are weak and correlation functions show universal scaling behavior which is quantified by a nonequilibrium generalization of the Callan-Symanzik equations. The third is a long time regime where inelastic effects become important and the system eventually thermalizes, where the thermalization time is found to depend in a non-monotonic way on the quench amplitude. Due to the parallels between different systems in 1D, our results can also be generalized to quench dynamics of spin-chains.

Refs:
1. Aditi Mitra, Correlation functions in the prethermalized regime after a quantum quench of a spin-chain, Phys. Rev. B 87, 205109 (2013) .
2. Marco Tavora and Aditi Mitra, Quench dynamics of one-dimensional bosons in a commensurate periodic potential: A quantum kinetic equation approach, arXiv:1306.6121