

# Thermalization and Prethermalization Dynamics in One-dimensional Quantum Fluids: An Interaction Quench in the Luttinger Model

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Abstract:

We study the non-equilibrium dynamics of interacting, one-dimensional fermions, described by the interacting Luttinger model, after a sudden interaction quench. Including phonon scattering processes in the Luttinger model, we derive a kinetic equation for the phonon distribution function, based on the non-perturbative Dyson-Schwinger equations. The kinetic equation describes the relaxation of the system beyond the quadratic Luttinger theory, including thermalization dynamics at long time scales. We show that after the quantum quench, the system of interacting fermions evolves towards a thermal state, described by a thermal Gibbs ensemble, and in which way the metastable, prethermal generalized Gibbs ensemble determines the dynamics at intermediate time scales.