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Quenched dynamics in interacting one-dimensional systems: Appearance of current carrying steady states from initial domain wall density profiles[1] JARRETT LANCASTER, New York University, EMANUEL GULL, Columbia University, ADITI MITRA, New York University — Dynamics arising after an interaction quench in the quantum sine-Gordon model is studied for the case of a system initially prepared in a spatially inhomogeneous domain wall state. The time-evolution of the density, current and equal time correlation functions are studied using the truncated Wigner approximation (TWA) to which quantum corrections are added in order to set the limits on its validity. For weak to moderate strengths of the back-scattering interaction, the domain wall is found to spread out ballistically with the system within the light cone reaching a non-equilibrium steady-state characterized by a net current flow. A steady state current is also found to exist for a quench at the exactly solvable Luther-Emery point. The magnitude of the current decreases with increasing strength of the back-scattering interaction. The two-point correlation function of the variable canonically conjugate to the density reaches a steady state which is spatially oscillating at a wavelength which is inversely related to the current.

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