Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Quantum Quenches in an XXZ Spin Chain with an Inhomogeneous Initial State[1] JARRETT LANCASTER, New York Univeristy, ADITI MITRA, New York University — We present results for the non-equilibrium dynamics of a quantum XXZ spin chain, whose spins are initially arranged in a domain wall profile, via the application of a spatially-varying magnetic field in the z-direction. The system is driven out of equilibrium by rapidly turning off the magnetic field, leaving the system in a highly excited state. We study the time-evolution of the domain wall profile and various two-point correlation functions. The results are obtained both numerically and analytically via a bosonization approach. For the case of the XX chain, which maps onto a model of non-interacting fermions, we find an interesting even-odd dichotomy in the long-time behavior of the transverse correlation function for sites spaced by n lattice points. For the XXZ chain, we highlight how the domain wall dynamics depend on whether the system is in the gapless XX phase or in the gapped, Ising phase.

[1]Supported by NSF-DMR 0705584

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Date submitted: 20 Nov 2009 Electronic form version 1.4