Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

The expansion of strongly interacting fermions after the release from a trap FABIAN HEIDRICH-MEISNER, Institut fuer Theoretische Physik C, RWTH Aachen, Germany, MARCOS RIGOL, Department of Physics, University of California, Santa Cruz, Ca, USA, ALEJANDRO MURAMATSU, Institut fuer Theoretische Physik III, Universitaet Stuttgart, Germany, ADRIAN FEIGUIN, Microsoft Q, University of California, Santa Barbara, CA, USA, ELBIO DAGOTTO, Materials Science and Technology Division, ORNL, and University of Tennessee, Knoxville, TN, USA — Both the recent experimental progress in cold atom gas realizations and developments in computational techniques has fueled interest in nonequilibrium properties of strongly correlated systems. Here we study the expansion of fermions in a one-dimensional lattice after released from a trap. Using the time-dependent density matrix renormalization group method, we analyze properties of the one-particle density matrix as well as the evolution of spin and density correlations. A comparison of particles escaping from a metallic region as compared to a Mott-insulating one shows that some memory on the initial state is preserved during the expansion. We further address the question to what extent the correlations measured during the expansion and thus in a non-equilibrium situation resemble those of appropriately chosen reference systems in equilibrium.

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Date submitted: 29 Nov 2007 Electronic form version 1.4