Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Quasi-universal transient behavior of a nonequilibrium Mott insulator driven by an electric field KARLIS MIKELSONS, JIM FREERICKS, Georgetown University, H.R. KRISHNAMURTHY, Indian Institute of Science, Bangalore — We use a self-consistent strong-coupling expansion for the self-energy (perturbation theory in the hopping) to describe the nonequilibrium dynamics of strongly correlated lattice fermions. We study the three-dimensional homogeneous Fermi-Hubbard model driven by an external electric field showing that the damping of the ensuing Bloch oscillations depends on the direction of the field, and that for a broad range of field strengths, a long-lived transient prethermalized state emerges. This long-lived transient regime implies that thermal equilibrium may be out of reach of the time scales accessible in present cold atom experiments, but shows that an interesting new quasi-universal transient state exists in nonequilibrium governed by a thermalized kinetic energy, but not a thermalized potential energy. In addition, when the field strength is equal in magnitude to the interaction between atoms, the system undergoes a rapid thermalization, characterized by a different quasi-universal behavior of the current and spectral function for different values of the hopping.

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Date submitted: 08 Nov 2012

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