Abstract Submitted
for the DAMOP16 Meeting of
The American Physical Society

Finite temperature quenches of fermions in an optical lattice IAN G. WHITE, RANDALL G. HULET, KADEN R. A. HAZZARD, Rice University — Although interaction quenches are known to drive interesting dynamics, most prior work has focused on quenches initiated from states that are well below the system's ordering temperature. Motivated by experiments with ultracold fermions in optical lattices, which currently are outside of this regime, we study interaction quenches in the Fermi-Hubbard model that start from finite-temperature initial states. We show that interesting dynamics occurs even under these conditions. A particularly important scenario is quenching to non-interacting systems, which despite its simplicity has been the focus of recent work as a prototype for integrability and prethermalization. In the limit where the temperature T is much greater than the tunneling t, we find that there is transient growth of short-ranged correlations. However, the steady state created in this case is essentially trivial: it is equivalent to an equilibrium $T/t = \infty$ state. We find more interesting steady states for large, but finite, T/t. We calculate the associated experimental observables by combining a high-T expansion of the interacting initial state with the exact calculation of the non-interacting dynamics.

Ian G. White
Rice University

Date submitted: 29 Jan 2016 Electronic form version 1.4