Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Scrambling and thermalization behavior of a diffusive system ANNABELLE BOHRDT, Department of Physics, Technical University of Munich, 85748 Garching, Germany, CHRISTIAN B. MENDL, Stanford University, Menlo Park, California 94025, USA, MANUEL ENDRES, Division of Physics, Mathematics and Astronomy, California Institute of Technology, Pasadena, CA 91125, USA, MICHAEL KNAP, Department of Physics, Walter Schottky Institute, and Institute for Advanced Study, Technical University of Munich, 85748 Garching, Germany — Dynamical correlation functions give valuable insights into the thermalization behavior of a many-body system. We investigate different dynamical correlation functions in the non-integrable one-dimensional Bose-Hubbard model by means of density matrix renormalization group schemes. At high temperatures, well defined quasi-particles cease to exist and the time-ordered Greens function exhibits rapidly decaying excitations. Out-of-time ordered (OTO) correlators on the other hand have recently been proposed to describe the spread of quantum information, which is not necessarily coupled to the propagation of quasi-particles. Despite the high temperatures, we indeed observe that the OTO correlators display a pronounced linear light-cone. Our numerical analysis moreover reveals that the scrambling of information does not account for the slowest timescale in the thermalization behavior of the system. Instead, conserved quantities cause hydrodynamic long-time tails which decelerate the full thermalization. We furthermore propose two different interferometric schemes to approach the challenge of measuring time-ordered as well as out-of-time ordered dynamical correlation functions in real space in cold atom experiments.

Annabelle Bohrdt
Department of Physics, Technical University of Munich, 85748 Garching, Germany

Date submitted: 10 Nov 2016 Electronic form version 1.4