

Abstract Submitted
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Thermalization in a Disordered Boson Lattice Gas¹ LAURA WADLEIGH, PHILIP RUSS, BRIAN DEMARCO, University of Illinois - Urbana-Champaign — The process of thermalization in closed, strongly interacting, disordered quantum systems is not well understood. We have developed a new technique to study this problem using ultracold 87Rb atoms trapped in a disordered cubic optical lattice. We cool the gas in the presence of a cylindrical optical barrier, which creates a hole in the atomic density profile. The barrier is suddenly removed and in situ images are taken over four orders of magnitude in tunneling time as the gas is allowed to thermalize. We use a multivariate statistical analysis applied to images to detect deviations from thermal equilibrium. We will discuss the timescale for equilibration in the superfluid, Mott insulator, and many-body localized regimes.

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