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Hubbard Thermalization and Dynamics over Long Timescales¹ LAURA WADLEIGH, NICHOLAS KOWALSKI, PHILIP RUSS, BRIAN DE-MARCO, University of Illinois - Urbana-Champaign — Atomic lattice gases have been an important tool to study the Hubbard model. We explain a new technique we have developed to study Hubbard thermalization and dynamics over extraordinarily long timescales. A optical cylindrical barrier is used to create a hole in the density profile of a thermal gas of ⁸⁷Rb atoms trapped in a cubic lattice. The barrier is suddenly removed, and in-situ images are taken after waiting more than four orders of magnitude in tunneling time. We observe that the gas relaxes without a characteristic time scale, potentially indicating glassy dynamics arising from kinetic constraints. The effects of disorder, magnetic dipole interactions, excited band atoms, nearest-neighbor interactions, and single particle localized states will be discussed.

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