

Abstract Submitted
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Thermalization vs. Localization in the Disordered Hubbard Model WILLIAM MORONG, WENCHAO XU, WILLIAM MCGEHEE, BRIAN DEMARCO, University of Illinois — Using ultracold 40K fermions trapped in a disordered optical lattice, we observe the presence of a strongly-interacting, localized state in a realization of the disordered Fermi-Hubbard model. Through measurements of center-of-mass velocity after an applied impulse, we show that this localized state persists to non-zero temperature, in contrast with longstanding expectations but in agreement with the general predictions of recent many-body localization (MBL) models. We propose further experiments to clarify the presence of MBL states in a closed, strongly-interacting 3D system, and more generally investigate the thermalization or lack thereof under these conditions.

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