

Abstract Submitted  
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**The Effects of Disorder in Systems of Neutral Atoms Confined in Optical Lattices** M. BEELER, E.E. EDWARDS, TAO HONG, S.L. ROLSTON, Joint Quantum Institute and Department of Physics, University of Maryland, National Institute of Standards and Technology — The precise control available in systems of neutral atoms confined in optical lattices makes them an ideal place to investigate the effects of disorder on crystal structure. We will report on experiments to study how atoms in an optical lattice respond to a disordered potential. Even small amounts of disorder can have a profound impact on the energy scales in the system, leading to observable changes in both the dynamic and static properties of the system. Dynamically, disorder introduces new timescales for system response to external perturbations. Statically, even the equilibrium properties of measurable quantities such as the momentum distribution can exhibit large changes. This work is partially supported by the ARO.

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