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Spectroscopy of the Mott insulator to Bose glass transition CAROLYN MELDGIN, LAURA WADLEIGH, PHILIP RUSS, BRIAN DEMARCO, University of Illinois at Urbana-Champaign — We present measurements probing the Mott insulator to Bose glass transition in three dimensions using spectroscopic techniques. Ultracold 87Rb atoms trapped in a cubic optical lattice with independently controlled speckle disorder are used to realize the disordered Bose Hubbard model. The Mott gap is measured in the clean lattice using Raman spectroscopy. The addition of disorder causes a phase transition to the Bose glass state, which has a gapless excitation spectrum. We use this signature to detect the phase transition as the ratio of Hubbard to tunneling energies is varied.

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