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Quantum Quenching in an Optical Lattice DAVID CHEN, CECILIA BORRIES, CAROLYN MELDGIN, BRIAN DEMARCO, University of Illinois at Urbana-Champaign — We present measurements of an Rb-87 gas trapped in a 3D optical lattice that is rapidly "quenched" into a purely harmonic potential. We determine the excitation energy after the quench by measuring the deviation from a smooth profile in images taken after relatively long time-of-flight. We observe that the excitation energy grows as the initial lattice depth is increased beyond the critical value for atoms in the Mott-insulator phase to occupy the center of the lattice. The presence of structures similar to vortices in the images suggests that this process is similar to Kibble-Zureck mechanism for vortex formation. We discuss the effect of quenching rate on the excitations and analyze features in the image autocorrelation.

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