

Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Cold atoms in time dependent optical lattices I. B. SPIELMAN, B. BROWN, P. LEE, N. LUNDBLAD, J. V. PORTO, W. D. PHILLIPS, National Institute of Standards and Technology — Cold atoms in optical lattices provide new avenues for studying iconic condensed matter problems. Using an initially Bose condensed sample of ^{87}Rb atoms, we first implement the Bose-Hubbard model (the intensity of the static lattice potential determine the constants in the Bose-Hubbard model). This “native” Hamiltonian, with only on-site interactions, exhibits just two phases of matter: insulator and superfluid. Additional phases, such as a supersolid and density wave, are expected when nearest-neighbor interactions are added. Here we show preliminary results where we extend the “native” Bose-Hubbard Hamiltonian by rapidly varying the lattice potential.

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Date submitted: 20 Nov 2006

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