Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Quantized vortex states of strongly interacting bosons in a rotating optical lattice RAJIV BHAT, B.M. PEDEN, B.T. SEAMAN, M. KRAEMER, JILA, NIST and U. of Colorado-Boulder, L.D. CARR, Colorado School of Mines, Golden, M.J. HOLLAND, JILA, NIST and U. of Colorado-Boulder — The analogy between ultracold atoms in optical lattices and electrons in crystal lattices is a manifestly rich one. If the optical lattice is rotating rapidly, many of the features associated with electrons in strong magnetic fields emerge. Even high correlated effects and quantum states like those underlying the fractional quantum Hall effect can potentially be realized. We examine small square two-dimensional systems with low filling via exact diagonalization of a modified Bose-Hubbard Hamiltonian. In this talk I will present some results showing the effects of the quantization of circulation, the appearance of vortices, and some of the novel features of quantum phase transitions in these systems.

Rajiv Bhat
JILA, NIST and U. of Colorado-Boulder

Date submitted: 02 Dec 2006 Electronic form version 1.4