Abstract Submitted for the MAR06 Meeting of The American Physical Society

Bose Einstein Condensation in a Box Trap: A Monte Carlo Study CHONGSHAN ZHANG, KWANGSIK NHO, D. P. LANDAU, Center for Simulational Physics, University of Georgia, Athens, GA 30602 — Using the path-integral Monte Carlo method, we have investigated Bose-Einstein condensates in an optical box trap which has been produced very recently ¹. We have used the same geometry as the experiment, and approximated the trapping potential with Gaussian functions at the boundary in order to mimic such a trap. The two-body interaction was described by a hard-sphere potential whose radius equals the *s*-wave scattering length. We have studied the temperture dependence of the equilibrium properties such as the total energy, the total density profiles, and the superfluid fraction. In addition, we have calculated the equilibrium properties as a function of the strength of the two-body interaction. We will compare our simulation results with those for harmonic and hard wall traps.

*Research supported by NASA

¹T. P. Meyrath, F. Schreck, J. L. Hanssen, C.-S. Chuu, and M. G. Raizen, Phys. Rev. A **71**, 041604 (2005)

Chongshan Zhang Center for Simulational Physics, University of Georgia

Date submitted: 30 Nov 2005

Electronic form version 1.4