Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Distributions of entropy and superfluid density of trapped bosons in optical lattices[1] NANDINI TRIVEDI, Department of Physics, The Ohio State University, YASUYUKI KATO, Institute for Solid State Physics, University of Tokyo, QI ZHOU, Department of Physics, The Ohio State University , NAOKI KAWASHIMA, Institute for Solid State Physics, University of Tokyo — Based on a large scale quantum Monte Carlo simulations of the Bose Hubbard model using the worm algorithm[1], we calculate the inhomogeneous distribution of entropy and superfluid density of trapped bosons in optical lattices. We show that most of the entropy is concentrated in the conducting shells. As the lattice is ramped up under adiabatic conditions, we show that the temperature increases and the superfluid regions in the trap can vanish. However, by opening up the trap at fixed lattice height, the system effectively cools, the entropy gets redistributed in the trap and superfluid regions reemerge. [1] Sharp Peaks in the Momentum Distribution of Bosons in Optical Lattices in Normal State Yasuyuki Kato, Qi Zhou, Naoki Kawashima and Nandini Trivedi Nature Physics, 4, 617 (2008)

[1]NT acknowledges support from ARO and DARPA under grant # W911NF-08-1-0338.

Qi Zhou
Department of Physics, The Ohio State University

Date submitted: 26 Nov 2008 Electronic form version 1.4