Abstract Submitted
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Mapping out the finite temperature phase diagram of the Bose Hubbard model[1] QI ZHOU, Department of Physics, The Ohio State University, YASUYUKI KATO, NAOKI KAWASHIMA, Institute for Solid State Physics, University of Tokyo, NANDINI TRIVEDI, Department of Physics, The Ohio State University — We propose a method to experimentally map out the phase diagram of Bose-Hubbard Model at finite temperatures solely based on the density distribution of trapped bosonic atoms in optical lattices. Based on Quantum Monte Carlo simulations in a trap with 10^5 bosons, we show that the phase boundary between the superfluid and normal state is directly located from kinks in the compressibility, which are extracted from the density profile itself. The temperature of bosons in the lattice is obtained from the density profile at the edge. Our method uses general aspects of critical fluctuations at a phase transition and can be extended to other systems, even when exact numerical simulations are not available.

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