Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Condensate Properties for Strongly Repulsive Bosons in a Double Well JOEL CORBO, UC Berkeley, JONATHAN DUBOIS, LLNL, BIRGITTA WHALEY, UC Berkeley — We present path integral ground state (PIGS) quantum Monte Carlo calculations for the ground state (T = 0) properties of repulsively interacting bosons in a three-dimensional external double well potential over a range of interaction strengths and potential parameters. We focus on calculation of ground state number statistics in order to understand the level of squeezing that the system may exhibit as a function of interaction strength. For weak interactions (i.e. where the standard two-mode model of a BEC in a double well is applicable) we produce results consistent with the two-more model. However, for stronger interactions, we find a novel and somewhat surprising relationship between squeezing and interaction strength. We find that these new features are qualitatively consistent with squeezing calculations carried out using an improved, recently-proposed eight-mode model, although this model is insufficient to quantititively predict the results of the full quantum Monte Carlo simulation.

Joel Corbo
UC Berkeley

Date submitted: 10 Nov 2011 Electronic form version 1.4