Abstract Submitted
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Bose-Einstein Condensation in low dimensionality[1] KWANGSIK NHO, D.P. LANDAU, Center for Simulational Physics, University of Georgia — Using path integral Monte Carlo simulation methods[1], we have studied properties of Bose-Einstein Condensates harmonically trapped in low dimemsion. Each boson has a hard-sphere potential whose core radius equals its corresponding scattering length. We have tightly confined the motion of trapped particles in one or more direction by increasing the trap anisotropy in order to simulate lower dimensional atomic gases. We have investigated the effect of both the temperature and the dimemsionality on the energetics and structural properties such as the total energy, the density profile, and the superfluid fraction. Our results show that the physics of low dimensional bosonic systems is very different from that of their three dimensional counterparts[2]. The superfluid fraction for a quasi-2D boson gas decreases faster than that for both a quasi-1D system[3] and a true 3D system with increasing temperature. The superfluid fraction decreases gradually as the two-body interaction strength increases although it shows no noticable dependence for both a quasi-1D system and a true 3D system.
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