Abstract Submitted
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**Bose-Einstein Condensation in Trapped Dipolar Gases** KWANGSIK NHO, D.P. LANDAU, Center for Simulational Physics, University of Georgia — Using path integral Monte Carlo simulation methods[1], we have studied the equilibrium properties of harmonically trapped atomic condensates with long-range dipole-dipole interactions in addition to the usual short-range s-wave interactions. The recent observation of Bose-Einstein condensation of molecules has renewed interest in the investigation of quantum gases with dipolar interactions[2]. We have calculated the energetics and structural properties such as the total density profiles, the condensate density profiles, and the condensate fraction for various values of the number of atoms, dipolar moment, and the trap aspect ratio as a function of temperature. We found that the sign and the value of the dipole-dipole interaction energy depend on the trapping geometry. For a disk-shaped trap, the net effect of interactions is repulsive and the condensate expands with respect to that without long-range interactions along the radial direction. For dipoles oriented along the axis of a cylindrical trap we have found shrinking of the condensate due to the attractive dipolar interaction.

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