

Abstract Submitted
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Dependence of scattering length on dipole moment in condensates of polar molecules: Gross-Pitaevskii vs diffusion Monte Carlo simulations SHAI RONEN, JILA, University of Colorado, DANIELE BORTOLOTTI, JILA, University of Colorado and Lens, University of Florence, JOHN BOHN, JILA, University of Colorado, DOERTE BLUME, Washington State University — We consider a Bose-Einstein condensate of polar molecules in a harmonic trap, where the effective dipole may be tuned by an external field. We demonstrate that taking into account the dependence of the scattering length on the dipole moment is essential in order to reproduce the correct ground state energy and to predict the stability diagram of the condensate. We compare Gross-Pitaevskii with diffusion Monte Carlo calculations, and show that the Gross-Pitaevskii theory with the renormalized dipole-dependent scattering length reproduces very well the Monte Carlo results. The behavior of the condensate in non-isotropic traps is also examined.

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