

Abstract Submitted
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Dilute Bose gases interacting via power-law potentials¹ RYAN KALAS, Department of Physics and Astronomy, Washington State University, DOERTE BLUME, Department of Physics and Astronomy, Washington State University, and JILA, University of Colorado — Neutral atoms interact through van der Waals potentials, which asymptotically fall off as r^{-6} . The behaviors of dilute Bose gases can to a good approximation be described by the atom-atom scattering length a_s . However, as the system becomes more dense, corrections arise that depend on the characteristic length of the van der Waals potential. Making use of both essentially exact numerical calculations and semi-analytical solutions, we parameterize these corrections by analyzing the energetics of two- and few-atom systems under external harmonic confinement. We generalize these results to particles interacting through a longer-ranged potential, which asymptotically falls off as r^{-4} . Finally, we consider homogeneous systems interacting through different power-law potentials.

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