

Abstract Submitted
for the DAMOP07 Meeting of
The American Physical Society

Pseudo-potential treatment of two aligned dipoles under external harmonic confinement¹ KRITTIKA KANJILAL, Department of Physics and Astronomy, Washington State University, Pullman, WA 99164-2814, JOHN BOHN, JILA, NIST and Department of Physics, University of Colorado, Boulder, CO 80309-0440, DOERTE BLUME, Department of Physics and Astronomy, Washington State University, Pullman, WA 99164-2814 AND JILA, University of Colorado, Boulder, CO 80309-0440 — Dipolar Bose and Fermi gases, which are currently being studied extensively experimentally and theoretically, interact through anisotropic, long-range potentials. Here, we replace the long-range potential by a zero-range pseudo-potential that simplifies the theoretical treatment of two dipolar particles in a harmonic trap. Our zero-range pseudo-potential description reproduces the energy spectrum of two dipoles interacting through a shape-dependent potential under external confinement very well, provided that sufficiently many partial waves are included, and readily leads to a classification scheme of the energy spectrum in terms of approximate angular momentum quantum numbers. The results may be directly relevant to the physics of dipolar gases loaded into optical lattices.

¹K. Kanjilal and D. Blume acknowledge support by the NSF through grant PHY-0555316 and J. Bohn by the DOE.

Krittika Kanjilal
Department of Physics and Astronomy, Washington State University,
Pullman, WA 99164-2814.

Date submitted: 31 Jan 2007

Electronic form version 1.4