Abstract Submitted
for the DAMOP12 Meeting of
The American Physical Society

Degeneracies in trapped two-component Fermi gases[1] D. BLUME, K.M. DAILY, D. RAKSHIT, Washington State University — We report on previously unobserved degeneracies in two-component equal-mass Fermi gases with zero-range interactions under isotropic harmonic confinement. Over the past 10 years or so, two-component Fermi gases with zero-range interactions have become a paradigm for modeling condensed matter systems, nuclear matter and neutron matter. We provide strong evidence that the eigen energies of the $(3,1)$ system consisting of three spin-up atoms and one spin-down atom are degenerate with the eigen energies of the $(2,2)$ system consisting of two spin-up atoms and two spin-down atoms for any s-wave scattering length a_s, including infinitely large, positive and negative a_s. Evidence for the existence of analogous degeneracies for larger systems is presented. The degeneracies evidenced in our study introduce a new class of highly-correlated systems for which such degeneracies, and thus an underlying symmetry, exist.

[1]We gratefully acknowledge support by the NSF and the ARO.

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Date submitted: 26 Jan 2012 Electronic form version 1.4