

Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Large N expansion for superfluid Fermi gases at unitarity MARTIN Y. VEILLETTE, University of Colorado, DANIEL E. SHEEHY, Iowa State University, LEO RADZIHOVSKY, University of Colorado — We study an s -wave resonant Fermi gas near the unitarity point. We treat this problem by generalizing the Fermi gas to a model with $2N$ hyperfine states (with $\text{Sp}(2N)$ symmetry). We show that for $N = \infty$, the model can be solved exactly by the BEC-BCS mean field solution. In order to address the physically relevant problem ($N = 1$), we perform a systematic $1/N$ loop expansion around the BEC-BCS solution. For $N = 1$, we obtain a variety of thermodynamic quantities, including the energy, the pairing gap, and the upper critical polarization. We compare our results to experimental data and other theoretical approaches.

Martin Y. Veillette
University of Colorado

Date submitted: 09 Nov 2006

Electronic form version 1.4