Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Properties of a few-body trapped two-component Fermi gas at unitarity[1] JAVIER VON STECHER, Department of Physics and JILA, University of Colorado, Boulder, CO 80309-0440, DOERTE BLUME, Department of Physics and Astronomy, Washington State University, Pullman, Washington 99164-2814, CHRIS H. GREENE, Department of Physics and JILA, University of Colorado, Boulder, CO 80309-0440 — We consider a trapped two-component Fermi system with even and odd number of fermions N. Unlike fermions interact with a short-range two-body potential which does not support a bound state and is characterized by an infinite scattering length. Using two different numerical techniques, i.e., a correlated Gaussians basis expansion method and a fixed-node diffusion Monte Carlo method, we solve the many-body Schrodinger equation and determine the spectrum and structural properties. Analyzing the excitation spectrum and the wavefunctions, we demonstrate that this system exhibits unique universal properties [1], in agreement with analytical predictions [2]. Furthermore, we determine the excitation gap up to N = 30 and we compare it with recent predictions. [1] D. Blume, J. von Stecher, and Chris H. Greene, e-print arXiv:cond-mat/0708.2734 [2] F. Werner and Y. Castin, Phys. Rev. A 74, 053604 (2006).

[1]This work was supported in part by NSF.

Javier von Stecher
Dept. of Physics and JILA, University of Colorado, Boulder, CO 80309-0440

Date submitted: 30 Nov 2007 Electronic form version 1.4