Abstract Submitted
for the DAMOP05 Meeting of
The American Physical Society

**Collective Excitations of Trapped Fermi Gas in the BCS-BEC Crossover** ALEXANDER L. ZUBAREV, YEONG E. KIM, Purdue Nuclear and Many-Body Theory Group, Department of Physics, Purdue University, West Lafayette, Indiana 47907 — The zero-temperature properties of a dilute two-component Fermi gas in the BCS-BEC crossover are investigated. On the basis of a generalization of the Hylleraas-Undheim method we construct rigorous upper bounds to the collective frequencies for the radial and the axial breathing mode of the Fermi gas under harmonic confinement in the framework of the hydrodynamic theory. The bounds are compared to experimental data on confined vapors of Li(6) atoms. Note that we do not use the scaling approximation of Refs.[1], the polytropic approximation of Refs.[2] and the first order perturbation approximation of Ref.[3]. [1] Y.E. Kim and A.L. Zubarev, Phys. Rev. A 70, 033612 (2004); Phys. Lett. A 327, 397 (2004). [2] H. Heiselberg, cond-mat/0403041; H. Hu et al, Phys. Rev. Lett. 93, 190 403 (2004); N. Manini and L. Salasnich, cond-mat/0407039. [3] A. Bulgac and G.F. Bertsch, cond-mat/0404687.

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Date submitted: 26 Jan 2005 Electronic form version 1.4