Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Probing two-fluid hydrodynamics in a trapped Fermi superfluid at unitarity[1] EDWARD TAYLOR[2], ALLAN GRIFFIN, University of Toronto, HUI HU[3], XIA-JI LIU, University of Queensland — We develop a variational approach to calculate the density response function at finite temperatures of the lowest-lying two-fluid dipole and breathing modes in a trapped two-component Fermi superfluid close to a Feshbach resonance. The out-of-phase oscillations, which are the analogue in trapped gases of second sound in uniform superfluids, have so far not been observed in cold-atom experiments. At unitarity, we show that these modes are observable at finite temperatures via two-photon Bragg scattering, whose spectrum is related to the imaginary part of density response function. This provides direct evidence for superfluidity and a promising way to test microscopic results for thermodynamics at unitarity. (arXiv:0709.0698, 0711.0561).

[1]E.T. and A.G. were supported by NSERC of Canada. H.H. and X.-J.L. are supported by the National Fundamental Research Program of China Grant Nos. 2006CB921404 and 2006CB921306, and the Australian Research Council Center of Excellence.
[2]Now at CNR-INFM BEC Center, Universita di Trento
[3]Also at Renmin University of China

Edward Taylor
Universita di Trento

Date submitted: 27 Nov 2007 Electronic form version 1.4