Abstract Submitted
for the DAMOP18 Meeting of
The American Physical Society

Dipole Oscillations of a BEC Immersed in a Degenerate Fermi Gas BRIAN DESALVO, KRUTIK PATEL, GEYUE CAI, CHENG CHIN, Univ of Chicago — For most ultracold atom experiments, the natural environment for a Bose-Einstein condensate (BEC) is vacuum. However, in a Bose-Fermi mixture, the BEC can be completely immersed inside of a degenerate Fermi gas. Interactions with such an environment can alter the dynamics and excitations of the BEC. We realize such a system by preparing a dual degenerate Bose-Fermi mixture of bosonic ^{133}Cs and ^{6}Li. Owing to the different quantum statistics of the particles as well as the large mass imbalance, the Cs BEC is much smaller than degenerate Fermi gas of Li and therefore is completely surrounded by fermions. To study the dynamics of this system, we excite a dipole oscillation of the Cs BEC. Taking advantage of an interspecies Feshbach resonance near 892 G, we study the effects of interactions on both the damping rate and frequency of the oscillation. For small scattering lengths, our results are well-described by mean-field theory. However, for large scattering lengths a number of surprising features are observed including a saturation in the damping rate and a non-linear dependence of the measured frequency shift. In this talk, we will present our results as well as our preliminary work on describing these unexpected features.

Brian DeSalvo
Univ of Chicago

Date submitted: 26 Jan 2018 Electronic form version 1.4