Abstract Submitted
for the DAMOP12 Meeting of
The American Physical Society

Quantum Mixtures of Ultracold Lithium and Ytterbium Atoms[1]

ALEXANDER KHRAMOV, ANDERS HANSEN, WILLIAM DOWD, ALAN JAMISON, BEN PLOTKIN-SWING, BEN SCHWYN, SUBHADEEP GUPTA, University of Washington — Quantum mixtures of alkali and spin-singlet atoms offer new opportunities for studying few- and many-body physics, and also represent a starting point for producing paramagnetic polar molecules, of interest in various applications including quantum simulation and precision measurement. We report on studies of manipulating quantum mixtures of lithium (alkali) and ytterbium (spin-singlet) atoms by external magnetic fields. In one study, we achieve differential spatial control of the two atomic species by applying a magnetic gradient. Using this technique we are able to place bosonic ^{174}Yb inside a deeply Fermi degenerate ^{6}Li cloud as an interspecies probe. This gradient technique will also alleviate the relative gravitational sag for LiYb molecule formation work. In a separate study, we investigate the effect of ^{174}Yb on Li_2 dimer formation and stability near the broad ^{6}Li Feshbach resonance. The collisional stability of the Li-Yb mixture is adequate to allow time-resolved studies of these effects. We find evidence of modified Li_2 formation rate as well Li_2-Yb interactions. We will also report on studies of the Fermi-Fermi ^{173}Yb-^{6}Li system and outline prospects for future work.

[1]Supported by the National Science Foundation and Sloan Foundation.

Alexander Khramov
University of Washington

Date submitted: 30 Jan 2012 Electronic form version 1.4