

Abstract Submitted  
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**Feshbach and Photoassociation Resonances in an Ultracold Lithium-Ytterbium Mixture**<sup>1</sup> RICHARD ROY, RAJENDRA SHRESTHA, ALAINA GREEN, SUBHADEEP GUPTA, Department of Physics, University of Washington — Magnetic Feshbach resonances have allowed great success in the production of ultracold diatomic molecules from bi-alkali mixtures, but have so far eluded observation in mixtures of alkali and alkaline-earth-like atoms. Inelastic collisional properties of ultracold atomic systems exhibit resonant behavior in the vicinity of such resonances, providing a detection signature. We study magnetic field dependent inelastic effects via atom loss spectroscopy in an ultracold heteronuclear mixture of alkali  ${}^6\text{Li}$  in the ground state and alkaline-earth-like  ${}^{174}\text{Yb}$  in an excited electronic metastable state ( ${}^3P_2$ ,  $m_J = ?1$ ). We observe a variation of the interspecies inelastic two-body rate coefficient by nearly one order of magnitude over a 100 ? 520 G magnetic field range. By comparing to ab-initio calculations we link our observations to interspecies Feshbach resonances arising from anisotropic interactions in this novel collisional system. Furthermore, we present photoassociation (PA) spectroscopy of  ${}^6\text{Li}$  and multiple isotopes of Yb using the Li D line (671 nm), working towards all optical coherent production of ground state LiYb molecules in a 3 dimensional optical lattice.

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