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Formation of LiYb Molecules by Photoassocation[1] RICHARD ROY, RAJENDRA SHRESTHA, ALAINA GREEN, SUBHADEEP GUPTA, Department of Physics, University of Washington — Combining ultracold alkali and alkaline-earth (or earth-like) gases to form ground state doublet sigma molecules offers a paramagnetic degree of freedom, which is attractive for quantum information and simulation applications and studies of controlled chemical reactions. However, the spinless ground electronic state of alkaline-earth atoms renders magnetoassociation techniques infeasible. Instead, coherent Raman techniques may be used to couple free atoms in an ultracold mixture to rovibrational states in the ground electronic manifold. To this end, we perform photoassociation (PA) spectroscopy of ^{6}Li and multiple Yb isotopes in a dual-species MOT on the Li D line (671 nm) and resolve multiple features in the exited electronic YbLi* potentials. We plan to utilize these excited molecular states to perform 2-photon PA spectroscopy of the ground doublet sigma potential. Subsequently, the states with the most favorable Franck-Condon overlap will be targeted for coherent production of ground state molecules in a 3 dimensional optical lattice.

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