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Preparation of a mixture of ultracold Cs-133 and Li-6 atoms for the study of inter- species collisions SHIH-KUANG TUNG, COLIN PARKER, JACOB JOHANSEN, CHENG CHIN, The University of Chicago — We report experimental progress toward a Bose-Fermi mixture of Cs-133 (Boson) and Li-6 (Fermion) atoms. Based on a dual-species magneto-optical trap, we trap 10^8 Cs atoms and 10^9 Li atoms at temperatures of $\sim 30 \mu\text{K}$ and $\sim 300 \mu\text{K}$, respectively. Further optical cooling, including optical molasses and degenerate Raman sideband cooling, also have been implemented to cool Cs atoms down to a temperature of $2 \mu\text{K}$. The cooling allows us to load 2×10^7 Cs atoms into a crossed dipole trap. We plan to load Li atoms into a second dipole trap, which spatially separates Li atoms from Cs atoms. After evaporative cooling Li atoms down to a temperature of few μK in the second dipole trap, we will merge the two samples to study collisional properties between the two species. The collisional properties will provide essential knowledge for us to work toward achieving a degenerate quantum gas of cesium and lithium mixture. Furthermore, the result will give important information to identify Li-Cs molecular states below the continuum, from which a scalable quantum information processing can be implemented.

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