

Abstract Submitted
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Direct photoassociation of halo molecules in ultracold $^{86}\text{Sr}^1$ J. A. AMAN, JOSHUA HILL, T. C. KILLIAN, Rice Univ — We investigate the creation of $^1S_0+^1S_0$ halo molecules in strontium 86 through direct photoassociation in an optical dipole trap. We drive two photon Raman transitions near-resonance with a molecular level of the $^1S_0+^3P_1$ interatomic potential as the intermediate state. This provides large Frank-Condon factors and allows us to observe resonances for the creation of halo molecules through higher order Raman processes. The halo molecule is bound by $E_B \approx 85$ kHz at low excitation-laser intensity, but experiments show large AC Stark shifts of the molecular binding energy. These conditions suggest that STIRAP should be very effective for improving molecular conversion efficiency. Further experiments in a 3D lattice will explore molecular lifetimes and collision rates.

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