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Spectroscopy of ultracold LiRb molecules JOHN LORENZ, ADEEL ALTAF, SOURAV DUTTA, DANIEL ELLIOTT, YONG CHEN, Purdue University
— Using resonantly enhanced multiphoton ionization (REMPI), we detect ultracold LiRb molecules created via photoassociation (PA) in a ^{7}Li/^{85}Rb dual species MOT. PA resonances below the D_1 and D_2 lines of Rb have been observed through both trap loss and REMPI spectroscopy. Decay pathways from different PA resonances allow us to map several different electronic potentials. To study the $a^3\Sigma^+$ potential, we create molecules in the $2(0^-)$ potential. These molecules mainly decay to the triplet electronic ground state. REMPI spectra show the vibrational levels of the $a^3\Sigma^+$ potential, as well as deeply bound levels belonging to the $(3)^3\Pi$ state through which the molecules are ionized. The vibrational structure of the $X^1\Sigma^+$ potential is observed via PA to other electronic potentials, such as the 4(1) which corresponds to the $B^1\Pi$ at close range. Molecules in the $X^1\Sigma^+$ state are likely ionized via the $(4)^1\Sigma^+$ electronic potential. Continuing these studies will help identify possible pathways from free atoms to LiRb molecules in the rovibronic ground state.

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