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Role of Feshbach resonances in enhancing the production of deeply bound ultracold LiRb molecules with laser pulses[1] MARKO GACESA, SUBHAS GHOSAL, ROBIN CÔTÉ, University of Connecticut — We investigate the possibility of forming deeply bound LiRb molecules in a two-color photoassociation experiment. Ultracold ^{6}Li and ^{87}Rb atoms colliding in the vicinity of a magnetic Feshbach resonance are photoassociated into an excited electronic state. A wavepacket is then formed by exciting a few vibrational levels of the excited state and allowed to propagate. We calculate the time-dependent overlaps between the wave packet and the lowest vibrational levels of the ground state. After the optimal overlap is obtained we use the second laser pulse to dump the wave packet and efficiently populate the deeply bound ro-vibrational levels of ^{6}Li^{8}7Rb in the ground state. The resulting combination of Feshbach-optimized photoassociation (FOPA) with the time-dependent pump-dump approach will produce a large number of stable ultracold molecules in the ground state. This technique is general and applicable to other systems.

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