

Abstract Submitted  
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**Photoassociation of ultracold LiRb molecules with short pulses near a Feshbach resonance**<sup>1</sup> MARKO GACESA, University of Connecticut - Storrs, SUBHAS GHOSAL, Birla Institute of Technology and Science Pilani, Hyderabad, India, JASON BYRD, Quantum Theory Project, University of Florida, Gainesville, FL, USA, ROBIN CÔTÉ, University of Connecticut - Storrs — Ultracold diatomic molecules prepared in the lowest ro-vibrational state are a required first step in many experimental studies aimed at investigating the properties of cold quantum matter. We propose a novel approach to produce such molecules in a two-color photoassociation experiment with short pulses performed near a Feshbach resonance. Specifically, we report the results of a theoretical investigation of formation of  $^6\text{Li}^{87}\text{Rb}$  molecules in a magnetic field. We show that the molecular formation rate can be significantly increased if the pump step is performed near a magnetic Feshbach resonance due to the strong coupling between the energetically open and closed hyperfine states. In addition, the dependence of the nodal structure of the total wave function on the magnetic field allows for enhanced control over the shape and position of the wave packet. The proposed approach is applicable to different systems that have accessible Feshbach resonances.

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