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Using Feshbach-optimized photoassociation spectroscopy to determine potential energies for excited electronic states of dimers JAMES DIZIKES, ERIC R.I. ABRAHAM, MICHAEL A. MORRISON, University of Oklahoma — Many experiments on ultracold (< 1 mK) gases use magnetic-field-induced Feshbach resonances to enhance photoassociation (PA) [1]. A magnetic field applied to a sample of trapped ultracold atoms induces a Feshbach scattering resonance that can increase the PA rate into bound excited molecular states. We are studying how to use Feshbach resonances in PA spectroscopy [2] to determine accurate excited-state Born-Oppenheimer potential energies. For $^{85}\text{Rb}_2$ we present calculated resonance properties and energies for excited vibrational states that are inaccessible with conventional PA spectroscopy.

[1] Chin et al., *Rev. Mod. Phys.* **82**, 1225 (2010).

[2] Pellegrini et al., *Phys. Rev. Lett.* **101**, 053201 (2008).

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