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Three-body collision in ultracold Cs/Rb and Cs/Li mixtures[1]
PAUL JULIENNE, YUJUN WANG, Joint Quantum Institute, NIST and the University of Maryland — Three-body collisions, in particular three-body recombination, are important in determining the stability of ultracold atomic mixtures used for making ground state polar molecules. We apply a new three-body model, which uses a multichannel two-body representation of three-body interactions, to study three-body collisions in Cs/Rb and Cs/Li mixtures near isolated Feshbach resonances. We survey a range of two-body resonance widths spanning both narrow and broad resonances. Using accurate two-body models for Li + Cs [1] and Cs + Cs [2] interactions, we predict the positions of Efimov resonances in the Cs + Cs + Li "Efimov-favored" three-body system, for which the Efimov scaling factor is small enough that three consecutive Efimov resonances might be observed. For a Cs/Rb mixture, we show how the resonance width plays a role in determining the minimum of atomic losses in experiments involving narrow resonances. The difference between the loss minimum and maximum when magnetic field is tuned near a narrow resonance is not the same as the two-body width, consistent with recent experimental observations of such differences [3].

[1] Tung, et al., Phys. Rev. A 87,10702(2013)
[2] Berninger et al, arXiv:1212.5584
[3] Takekoshi, et al., Phys. Rev. A 85, 032506(2012)

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Paul Julienne
Joint Quantum Institute, NIST and the University of Maryland

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