

Abstract Submitted  
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**Few-body ultracold reactions in a Bose-Fermi mixtures**<sup>1</sup> CHEN ZHANG, JAVIER VON STECHER, CHRIS H. GREENE, JILA and Physics Department, University of Colorado at Boulder — This project investigates the properties of fermionic molecule  $^{87}\text{Rb}^{40}\text{K}$ , including (i) its formation from a mixed gas of bosonic  $^{87}\text{Rb}$  and fermionic  $^{40}\text{K}$  through magnetic field ramping and (ii) its scattering properties after formation. This has been approached mainly from the few body perspective: the spectrum of two bosons( $^{87}\text{Rb}$ ) and two fermions( $^{40}\text{K}$ ) is first calculated in a harmonic trap using correlated-Gaussian basis throughout the range of a broad Fano-Feshbach resonance. This provides a few-body solution to the magneto-association of fermionic Feshbach molecules, subsequently used to study the time-evolution of the system as the scattering length changes, mimicking experiments with Bose-Fermi mixture near Fano-Feshbach resonances. The structure of avoided crossings in the few-body spectrum enables an interpretation of the dynamics of the system as a sequence of Landau-Zener transitions. The calculated molecule formation rate is compared with experimental observations. Molecule-atom and molecule-molecule scattering properties are also discussed.

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