

Abstract Submitted
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Observation of Resonant Effects in Ultracold Collisions between Heteronuclear Feshbach Molecules¹ XIN YE, FUDONG WANG, BING ZHU, MINGYANG GUO, BO LU, DAJUN WANG, Chinese Univ of Hong Kong — Magnetic field dependent dimer-dimer collisional losses are studied with ultracold $^{23}\text{Na}^{87}\text{Rb}$ Feshbach molecules. By ramping the magnetic field across the 347.8 G inter-species Feshbach resonance and removing residual atoms with a magnetic field gradient, ~ 8000 pure NaRb Feshbach molecules with a temperature below $1\ \mu\text{K}$ are produced. By holding the pure molecule sample in a crossed optical dipole trap and measuring the time-dependent loss curves under different magnetic fields near the Feshbach resonance, the dimer-dimer loss rates with respect to the atomic scattering length a are mapped out. We observe a resonant feature at around $a = 600a_0$ and a rising tail at above $a = 1600a_0$. This behavior resembles previous theoretical works on homonuclear Feshbach molecule, where resonant effects between dimer-dimer collisions tied to tetramer bound states were predicted. Our work shows the possibility of exploring four-body physics within a heteronuclear system.

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