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Toward Control of Collisions between Ultracold Triplet Ground State NaLi Molecule and Na Atom[1] HYUNGMOK SON, Harvard University/Massachusetts Institute of Technology, JULIANA PARK, YUKUN LU, Massachusetts Institute of Technology, ALAN JAMISON, University of Waterloo, WOLFGANG KETTERLE, Massachusetts Institute of Technology — There have been extensive efforts in understanding molecular collisions in the quantum regime. As the colliding bodies get heavier, due to the high rovibrational density-of-states of the collision complex, theoretical simulation of collisions becomes challenging and experimental observation of resolvable scattering resonances is predicted to be difficult. Utracold NaLi – the lightest bi-alkali molecule – that lives long in the triplet manifold of the electronic spin offers a new platform for the study of atom-molecule and molecule-molecule collisions, as a benchmark system for theoretical quantum scattering calculations. We report progress on magnetic control of collisions between the triplet ground state NaLi molecules and Na atoms, building from a recent result on internal state control of colliding particles. This can help improve the efficiency of sympathetic cooling of a spin-polarized NaLi-Na mixture at ultracold temperature, which has been recently demonstrated, and in understanding the short-range physics and the three-body potential energy surface.

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