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Radio frequency field assisted cold collisions¹ YIJUE DING, Purdue University, JOSE D'INCAO, JILA, University of Colorado and NIST, Department of Physics University of Colorado, Boulder, CHRIS GREENE, Purdue University — The radio frequency (RF) field is a promising but less developed tool to control cold collisions. From the few-body perspective, we study cold atom collisions in an external magnetic field and a single-color RF field. We employ the multi-channel quantum defect theory and the hyperspherical toolkit to solve the two-body and three-body Schrödinger equations. Our results show that RF fields can effectively control the two-body scattering length through Feshbach resonances. Such RF induced Feshbach resonances can be applied to quenching experiments or spinor condensates. Analogous to photo association, RF fields can also associate cold atoms into molecules with a reasonable rate. Moreover, we will discuss the feasibility of using RF fields to control three-body recombination, which may improve the experimental timescale by suppressing three-body losses.

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