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Collisional properties quantum halo dimer[1] STEVEN KNOOP, FRANCESCA FERLAINO, MARTIN BERNINGER, MICHAEL MARK, HANNS-CHRISTOPH NAEGERL, RUDOLF GRIMM[2], Inst. of Experimental Physics and Center for Quantum Physics, Univ. Innsbruck; 6020 Innsbruck, Austria — We present our latest experimental findings on ultracold (30-250 nK) atom-dimer and dimer-dimer collisions involving Cs Feshbach molecules. In particular we have studied the collisional properties of the universal quantum halo dimer. Resonant enhancement of the atom-dimer relaxation rate is observed in a system of three identical bosons and interpreted as being induced by a trimer state, possibly an Efimov state. A strong magnetic field dependence of the atom-dimer relaxation rate is also observed when the atoms are transferred to a different hyperfine sublevel. For collisions between quantum halo dimers the relaxation rate show a strong scattering length dependence and we find a pronounced minimum of relaxation rate coefficient connected to a substantial suppression of the inelastic loss. Moreover, we observe that inelastic collisional decay can be further suppressed by decreasing the temperature of the ultracold sample.

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