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Few-body physics with ultracold Cs atoms and molecules[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 — Ultracold atomic gases are versatile systems to study few-body physics because of full control over the external and internal degrees of freedom and the magnetic tunability of the scattering properties using Feshbach resonances. Here we experimentally study three- and four-body physics by investigating ultracold (30-250 nK) atom-dimer and dimer-dimer collisions with Cs Feshbach molecules in various molecular states and Cs atoms in different hyperfine states. 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 relaxation rate is also observed when the atoms are transferred to a different hyperfine sublevel. For dimer-dimer collisions we have observed a suppression of the collisional loss rate.

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