

Energy, scattering length, and mass dependence of ultracold three-body collisions

J.P. D’Incao and B.D. Esry

Department of Physics, Kansas State University, Manhattan, Kansas

In the ultracold atomic gases community, there is widespread appreciation of the importance of two-body collision physics. Experiments, however, are now increasingly exploring systems and regimes where understanding the *three*-body collision physics is important. Three-body recombination and vibrational relaxation, for instance, limit the lifetimes of atomic and molecular Bose-Einstein condensates, respectively, and collision-induced dissociation should begin to play a role at large scattering lengths. Our focus here will be on delineating the energy, scattering length, and mass dependence for each of these processes for systems with two or three identical particles (either bosons or fermions). These predictions are based on a relatively simple model that we have recently developed which will be briefly discussed. The talk will conclude with a discussion of the prospects for experimentally observing one of the clearest signatures of three-body physics, namely, the Efimov effect.

Supported by the National Science Foundation.