

DAMOP16-2016-000100

Abstract for an Invited Paper
for the DAMOP16 Meeting of
the American Physical Society

Cold molecules, collisions and reactions¹

JOHANNES HECKER DENSCHLAG, Institut für Quantenmaterie

I will report on recent experiments of my group where we have been studying the formation of ultracold diatomic molecules and their subsequent inelastic/ reactive collisions. For example, in one of these experiments we investigate collisions of triplet Rb_2 molecules in the rovibrational ground state. We observe fast molecular loss and compare the measured loss rates to predictions based on universality. In another set of experiments we investigate the formation of $(\text{BaRb})^+$ molecules after three-body recombination of a single Ba^+ ion with two Rb atoms in an ultracold gas of Rb atoms ². Our investigations indicate that the formed $(\text{BaRb})^+$ molecules are weakly bound and that several secondary processes take place ranging from photodissociation of the $(\text{BaRb})^+$ molecule to reactive collisions with Rb atoms. I will explain how we can experimentally distinguish these processes and what the typical reaction rates are.

¹Support from the German Research foundation DFG and the European Community is acknowledged

²Energy scaling of cold atom-atom-ion three-body recombination, A. Krüchow, A. Mohammadi, A. Härter, J. Hecker Denschlag, J. Perez-Rios, and C. H. Greene arXiv:1510.04938 (2015).