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Investigation of molecule-molecule collisions in a trap ISABEL RABEY, THOMAS GANTNER, MANUEL KOLLER, FLORIAN JUNG, MARTIN ZEPPENFELD, GERHARD REMPE, Max Planck Institute for Quantum Optics, Hans Kopfermann Str. 1, 85748, Garching, Germany — Understanding molecular collisions at low energies is a prerequisite for future sympathetic and evaporative cooling of molecules. However, experimental investigation of molecular collisions in this temperature regime is still in its infancy. Our *cryofuge* setup, the combination of cryogenic buffer gas cooling and centrifuge deceleration [1], produces slow and cold molecular beams with a flux of 10^{10}/s and densities up to $10^{9}\mathrm{cm}^{-3}$ at velocities below 20m/s. This low velocity allows molecules to be loaded into an electrostatic trap [2], where they can be held for several seconds. With this long interaction time, studies of both elastic and inelastic collisions are possible. Our method is also entirely generic relying only on the electric dipole moment of the molecule. This will allow a variety of complex polyatomic molecules to be studied including CH_3F, ND_3 and CF_3CCH.
[1] X. Wu *et al.*, Science **358**, 645 (2017)
[2] B. G. U. Englert *et al.*, PRL **107**, 263003 (2011)

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