ted electrons profile was larger than the tilted angle ψ is observed.

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4 - 16 Dissociative Recombination of Imidogen Radical Ions[1]

Yang Bian[2,3], Novotny Oldňich[4,2], KrantzClaude[2], BuhrHenrik[5], MendesMario[2]
Nordhorn Christian[2], Geppert Dietrich Wolf[6], Berg Max[2], BingDennis[2]
Domesle Christian[2], Grussie Florian[2], Savin Wolf Daniel[4]
Schwalm Dirk[5,2], CaiXiaohong and Wolf Andreas[2]

Dissociative recombination (DR) of molecular ions with electrons is one of the key processes in low density and low temperature plasma environments. DR removes ionized species and produces neutral fragments, thus affecting chemical composition of the plasma. Rate coefficient, fragmentation branching ratios and excitation of final fragments resulted from DR gives helpful information for modeling these plasmas.

The imidogen radical NH has been detected in some comets and in the sun, which is very important in nitrogen-bearing chemical reaction in atmospheric media. Simply nitrogen hydrides, such as NH^+, are intermediates for forming ammonia in cold interstellar clouds[1]. Here DR is an important destruction channel for NH^+, thus reducing also the abundance of ammonia. Up to now, theoretical investigation on DR of NH^+ does not exist. Experimentally this reaction was previously investigated only for vibrationally excited NH^+ and low collision energies[2].

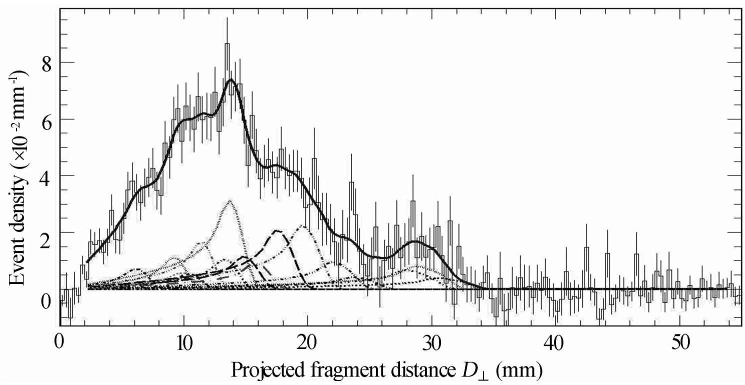

Fig. 1 Normalized projected fragment distance distribution $P(D_\perp)$ measured in the DR of NH^+ at relative collision energy E=4.6 eV and the detector distance from the reaction zone of 9.41 m. The thin solid line displays the measured imaging data together with statistical uncertainty. The thick solid line is the result of a fit with simulated distributions (dashed lines) corresponding to various product excitation channels.

We have experimentally investigated the DR of NH^+ at the TSR storage ring of the Max Planck Institute for Nuclear Physics in Heidelberg, Germany. A narrow, 6.2 MeV beam of vibrationally code NH^+

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2 Max Planck Institute for Nuclear Physics, D-69117 Heidelberg, Germany.
3 University of Chinese Academy of Sciences, Beijing 100049, People's Republic of China.
4 Columbia Astrophysics Laboratory, Columbia University, New York, NY 10027, USA.
5 Department of Particle Physics, Weizmann Institute of Science, Rehovot 76100, Israel.
6 Department of Physics, Stockholm University, AlbaNova, SE-106 91 Stockholm, Sweden.

was merged with a photocathode-produced electron beam. In this configuration we could control the collision energy at sub-meV level and cover the collision energies up to 12 eV. Taking advantage of an Energy-sensitive Multistrip detector system (EMU)[3], we acquired projected fragment distance distributions for each collision energy. The fragment distances are proportional to the kinetic energy released (KER) in the reaction. In turn, KER indicates internal excitation of the DR products. We use a model to fit the fragment distance distribution[4]. In this way we assign the product excitation channels and we obtain their branching ratios at each collision energy. This is a key information for investigating the DR dynamics.

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