Laboratory Measurements of Dissociative Recombination

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Abstract

Dissociative recombination (DR) reactions serve as a primary loss mechanism of electrons, both within the interstellar medium and in planetary atmospheres. A quantitative knowledge of DR reaction rates is crucial to an accurate modeling of these environments. Ab initio calculation of quantitative DR rates is exceedingly difficult; hence laboratory measurements have provided the main source of information on these processes. It has only been within the last decade that reliable laboratory measurements have become available through advances in ion source technology to control the internal energy in the molecular ion reactants and in the use of heavy ion storage rings to control the electron-ion interaction. This paper will report on the progress that has been made in characterizing the internal energy distributions of the O_2^+ and H_3^+ molecular ions and measuring the DR reaction rates and products for these species.[1,2]
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[1] A. Petrignani, F. Hellberg, R. D. Thomas, M. Larsson, P. C. Cosby, and W. J. van der Zande, J. Chem. Phys. **122**, 234311 (2005).

[2] A. Petrignani, W. J. van der Zande, P. C. Cosby, F. Hellberg, R. D. Thomas, and M. Larsson, J. Chem. Phys. **122**, 014302 (2005).

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