Abstract Submitted
for the GEC20 Meeting of
The American Physical Society

Electron recombination of CH^+ and its rotational state dependence[1] DANIEL PAUL, K. BLAUM, J. GÖCK, M. GRIESER, F. GRUSSIE, R. VON HAHN, N. JAIN, C. KRANTZ, H. KRECKEL, C. MEYER, D. MÜLL, O. NOVOTNY, F. NUESSLEIN, S. SAURABH, V. SCHMIDT, P. WILHELM, A. WOLF, Max-Planck-Institut für Kernphysik (MPIK), Heidelberg, Germany, S. GEORGE, MPIK; University of Greifswald, Germany, A. KALOSI, MPIK; CU, New York, NY, USA, X. URBAIN, UCLouvain, Belgium, D.W. SAVIN, CU, New York, NY, USA — Molecular cations in the interstellar medium (ISM) are used to trace the properties of diffuse interstellar clouds, out of which stars and planets are formed. These cations can be destroyed by dissociative recombination (DR) with electrons. Laboratory studies of DR are needed to understand molecular evolution in space. Here we have studied DR of CH^+, which is of particular interest for understanding the diffuse cloud dynamics. In the electrostatic cryogenic storage ring CSR, CH^+ in their lowest rovibrational states can be stored for DR studies at ISM-relevant conditions. Using merged ion and electron beams in an electron cooler, low energy (meV) collisions can be studied. Here we report experimental DR rate coefficient measurements for CH^+, including new results at ISM-relevant meV collision energies. We furthermore studied the rotational state dependence of the DR rate coefficient.

[1]This work is supported, in part, by the Max Planck Society and the NSF Division of Astronomical Sciences Astronomy and Astrophysics Grants Program AST-1907188.

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Date submitted: 12 Jun 2020 Electronic form version 1.4