AU A-Khalili, A, Rosen, S, Danared, H, Derkatch, AM, Kallberg, A, Larsson, M, Le Padellec, A, Neau, A, Semaniak, J, Thomas, R, af Ugglas, M, Vikor, L, Zong, W, van der Zande, WJ, Urbain, X, Jensen, MJ, Bilodeau, RC, Heber, O, Pedersen, HB, Andersen, LH, Lange, M, Levin, J, Gwinner, G, Knoll, L, Scheffel, M, Schwalm, D, Wester, R, Zajfman, D, Wolf, A
TI Absolute high-resolution rate coefficients for dissociative recombination of electrons with HD+: Comparison of results from three heavy-ion storage rings
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AB Experimental data are presented from three different heavy-ion storage rings (ASTRID in Aarhus, CRYRING in Stockholm, and TSR in Heidelberg) to assess the reliability of this experimental tool for the extraction of absolute rate coefficients and cross sections for dissociative recombination (DR). The DR reaction between HD. and electrons has been studied between 0 and 30 eV on a dense energy grid. HD+ displays two characteristic local maxima in the DR rate around 9 and 16 eV. These maxima influence the data analysis at smaller collision energies. We conclude that resonant structures in the DR cross sections are reproduced among the experiments within the collision energy resolution. The absolute cross sections agree within the systematic experimental errors of 20% related to the measurement of the ion currents. Absolute thermal rate coefficients for HD. ions are given for an electron temperature range of 50-300 K. Results for the DR cross section and the thermal rate coefficients are compared to recent theoretical calculations including rotational effects, finding satisfactory agreement.
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