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Electron- and photon-molecule data for hydrogen plasmas MARK ZAMMIT, JAMES COLGAN, DAVID KILCREASE, CHRISTOPHER FONTES, JEFFERY LEIDING, PETER HAKEL, EDDY TIMMERMANS, Los Alamos National Laboratory, DMITRY FURSA, LIAM SCARLETT, JONATHAN TAPLEY, JEREMY SAVAGE, IGOR BRAY, Curtin University — Studies of low-temperature plasmas both in local thermodynamic equilibrium (LTE) and non-LTE require state-resolved (electronic, vibrational and rotationally resolved) transition cross sections or rate coefficients of molecules to calculate populations (for non-LTE plasmas), opacities and emissivities. Recently we developed ab initio methods and general codes to calculate electron- and photon-molecule collision data of hydrogen H2 [1,2], the ion H2+ [3,4] and the isotopologues. We highlight results that differ with commonly "accepted" and used data, which may have implications in astrophysics and fusion plasma modeling. For example, we note that for material temperatures T<2000 K, isotopic effects should be take into account to obtain LTE-averaged photodissociation cross sections accurate to better than 10-20%. [1] M. C. Zammit et al. Phys. Rev. Lett. 116, 233201 (2016) [2] M. C. Zammit et al. Phys. Rev. A 95, 022708 (2017) [3] M. C. Zammit et al. Phys. Rev. A 90, 022711 (2014) [4] M. C. Zammit et al. Astrophys. J. 851, 64 (2017)

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