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State-resolved photon- H_2^+ cross sections and rate coefficients¹ MARK ZAMMIT, Los Alamos National Laboratory, JEREMY SAVAGE, Curtin University, JAMES COLGAN, Los Alamos National Laboratory, DMITRY FURSA, Curtin University, DAVID KILCREASE, CHRISTOPHER FONTES, PETER HAKEL, EDDY TIMMERMANS, Los Alamos National Laboratory — Studies of molecular plasmas both in local thermodynamic equilibrium (LTE) and non-LTE require state-resolved (electronic, vibrational and rotationally resolved) transition cross sections or rate coefficients to calculate populations (for non-LTE plasmas), opacities and emissivities. Here we present state-resolved results of photodissociation and radiative association of H_2^+ and its isotopologues $(D_2^+, T_2^+, HD^+, HT^+, and$ DT⁺). We note that going beyond the commonly utilized "two-level" approximation of H_2^+ could be important in models when dealing with radiation temperatures that can access photon wavelengths around 100 nm. For example at these wavelengths, and a material temperature of 8400K, the photodissociation cross section via the (second electronically excited) $2p\pi_u$ state is over three times larger than the photodissociation cross section via the (first electronically excited) $2p\sigma_u$ state.

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