

Abstract Submitted  
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**Accurate calculations of  $H^-$  photodetachment and radiative attachment for astrophysical applications**<sup>1</sup> P.C. STANCIL, University of Georgia, B.M. MCLAUGHLIN, Queens University Belfast, H.R. SADEGHPOUR, A. DALGARNO, ITAMP, Harvard University, R.C. FORREY, Penn State, Berks Campus — We combine new accurate calculations, asymptotic relations, and available experimental data to construct an  $H^-$  photodetachment cross section reliable for a large range of photon energies. In particular, account is taken of the series of auto-detaching shape and Feshbach resonances between 10.92 and 14.35 eV. The accuracy of the cross section is controlled by ensuring that it satisfies all known oscillator strength sum rules including contributions from the resonances and double photodetachment. From the resulting recommended cross section, spontaneous and stimulated radiative attachment rate coefficients are obtained. Photodetachment rates are also computed for the standard interstellar radiation field and in diffuse and dense interstellar clouds assuming the total-to-selective-extinction ratio  $R_V = 3.1$ . Implications of the new cross sections and rate coefficients are discussed for a variety of astrophysical environments.

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