

Abstract Submitted
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Radiative association of H_2 and H^- at low temperature: can we observe H_3^- in the interstellar medium?¹ MEHDI AYOUIZ, Department of Chemistry, Marquette University, Milwaukee 53201, USA, OLIVIER DULIEU, Laboratoire Aime Cotton, CNRS, Orsay, MAURICE RAOULT, Laboratoire Aime Cotton, CNRS, Orsay, France, VIATCHESLAV KOKOOLINE, Department of Physics, University of Central Florida, Orlando, Florida 32816, USA — We develop the theory of radiative association of an atom and a diatomic molecule within a close-coupling framework. We apply it to the formation of H_3^- after the low energy collision (below 0.5 eV) of H_2 with H^- . Using recently obtained potential energy and permanent dipole moment surfaces of H_3^- , we calculate the lowest rovibrational levels of the H_3^- electronic ground state, and the cross section for the formation of H_3^- by radiative association between H^- and ortho- and para- H_2 . We discuss the possibility for the H_3^- ion to be formed and observed in the cold and dense interstellar medium in an environment with a high ionization rate and thus suggest a way to detect the H_3^- ion in the interstellar medium. Such an observation would be a probe for the presence of H^- in the interstellar medium.

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Olivier Dulieu
Laboratoire Aime Cotton, CNRS, Orsay

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