

Investigations of Formation of Molecular Hydrogen on Dust Grain Analogues

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In the last four years we have been working on a research program to investigate the formation of molecular hydrogen on surfaces of materials of astrophysical interest, such as silicates, carbonaceous particles and ices, and in conditions approximating the ones present in a variety of astrophysical environments.[1] Our experimental studies - the first of their kind,[2] complemented with computer simulations and theoretical analyses,[3] have given not only hydrogen recombination rates under different ISM conditions, but they have also offered new insights into this fundamental astrophysical problem. Here we give a summary of our most recent work, that is the study of molecular hydrogen formation on water ices found in diverse astrophysical environments.[4]

We also report on the status of our newest project, the measurement of how the energy gained in the formation of the molecular hydrogen bond is partitioned between energy retained in the solid (on the surface of which the recombination takes place) and kinetic and roto-vibrational energy of the departing molecule.

References:

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- [4] O. Biham, I. Furman, V. Pirronello and G. Vidali: "Master Equation for Hydrogen Recombination on Grain Surfaces," *Ap.J.* 553, 595 (2001).

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