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A New View on the Potential of H-minus Ion Volume Production

MARTHE BACAL, LPTP Ecole Polytechnique Palaiseau France — The "Volume production" of hydrogen negative ions is due to dissociative attachment of low energy electrons to rovibrationally excited molecules. These molecules can be produced by electron collisions, and also through recombinative desorption from surfaces, e.g. the plasma grid of an ion source[1]. It is shown that the second process may be dominant at high plasma density. The surface treatment by dense plasma promotes a "hot-atom reactions" enhancing the recombinative desorption. Several examples of H-minus accelerator ion sources with performances of $\sim 100 \, \mathrm{mA/cm^2}$ confirm this behavior. Fusion-dedicated, cesium free, ion sources can thus be conceptualized on this principle.

[1] M. Bacal, A. Hatayama and J. Peters, IEEE Trans. Plasma Sci. Dec,2005

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