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Energy distribution of fragments in H2 dissociation by electron impact for the use in numerical models

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In negative hydrogen ion sources, the kinetic energy of the atoms is directly related to the negative ion yield at the caesiated converter, with a larger contribution from hot atoms. The H0 energy distribution is related to the formation process: either the kinetic energy release resulting from dissociation of the hydrogen molecules or molecular ions, or the proton neutralization during reflection at walls. The interpretation of recent experimental measurements related to the translational energy distribution of atoms could profit from accurate inclusion of the initial energy distribution in numerical models. In this work, the inverse cumulative distribution functions related to the main dissociation processes are given, for simple implementation in Monte Carlo numerical simulations. As in negative ion sources non-equilibrium vibrational distributions of H2 are found, the energy distribution of fragments is calculated for all vibrational levels in the Franck-Condon and delta approximation. Finally, the application of the method to a simple testcase is discussed.

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