

Effect of proton motion on electron-proton radiative recombination in the solar wind

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We investigate radiative recombination under conditions where both electrons and protons are in motion, thereby avoiding the stationary-ion approximation. The recombination cross section and rate coefficient are evaluated as functions of the kinematic parameters, with emphasis on regimes characteristic of the solar atmosphere, solar wind, and heliosphere. Particular attention is given to the impact of proton motion on the recombination rate. The total cross section is evaluated within the framework of nonrelativistic quantum electrodynamics, appropriate for particle energies typical of the solar atmosphere and solar wind. The results demonstrate that accounting for proton motion significantly enhances the overall recombination rate, particularly when the electron population is hot [1].

Reference:

[1] Tamaz Kereselidze, Irakli Noselidze, and Malcolm Druett
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