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Collisional Radiative Model Using the Fully Relativistic Cross-sections for the Hydrogen-cesium Plasma Relevant to ITER Negative Ion Based NBI System

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An improved collisional radiative (CR) model has been developed for hydrogen-cesium plasma for its application to the negative hydrogen ion sources where we used reliable cross sections. The required electron impact excitation cross-sections have been obtained using fully relativistic distorted wave theory for various fine-structure transitions from the ground as well as excited states. These are then incorporated in the CR model along with other processes such as radiative population transfer, electron impact ionization and mutual neutralization of Cs^+ ion with negative hydrogen ion along with their reverse processes. Results deduced from the present CR model have been compared with earlier experimental as well as the modeling results.

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