Calculation of Detailed Relativistic Electron Excitation Cross Sections and Application to Hydrogen-Caesium Plasma

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Electron impact excitation cross-sections and rate coefficients have been calculated using fully relativistic distorted wave theory [1] for several fine-structure transitions from the ground as well as excited states of caesium atom in the wide range of incident electron energy. These processes play dominant role in low pressure hydrogen-caesium plasma, which is relevant to the negative ion based neutral beam injectors for the ITER project [2]. As an application, the calculated detailed cross-sections are used to construct a reliable collisional radiative (CR) model [3] to characterize the hydrogen-caesium plasma. 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 are also taken into account. The calculated cross-sections and the extracted plasma parameters from the present model are compared with the available experimental and theoretical results [4].

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