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# Electron-impact excitation and dielectronic recombination cross-sections of Tungsten Ions

The study of electron-ion collisions always be a prime area of research as it provides the fundamental understanding of the dynamical behavior of different atomic processes in the high temperature plasma. During the collisions, the electrons can be recombined with ions through different reactions such as electron-impact excitation (EIE), dielectronic recombination (DR) and many more. In EIE process, the ions get excited through the collisions with highly energetic electrons followed by the radiative decay. This radiation loss affects the plasma ignition process and stability. Conversely, the DR usually occurs at lower electron energy compared to EIE and changes the charge state of the ions. Thus, it affects both the radiative energy losses and ionization balance in the plasma. An accurate information of these atomic processes thus plays a significant role in the diagnostics of plasma. The present work entails the calculation of EIE and DR cross-sections for Tungsten ions (W27+ to W29+) as they are being evaluated as prospective plasma-facing materials in magnetic confinement devices like the ITER tokamak [1-2]. These ions are selected from the recent experiment performed at NIFS Japan [3]. The calculations are performed using the relativistic method and the required wave functions are calculated using Multi-configuration Dirac-Fock method through GRASP2k, and Flexible atomic code. The accuracy of these wave functions is ascertained by comparing the transition energies and oscillator strengths with the previously reported measurements [3].

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