

Plasma shielding effects on anti-screening channels for ion-ion collisional excitations in nonthermal plasmas

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The plasma shielding effects on the optically allowed and forbidden anti-screening channels for ion-ion collisional excitations are investigated in Lorentzian plasmas. The semiclassical trajectory method and effective interaction Hamiltonian are employed to obtain the transition amplitudes, differential cross-sections, and momentum transfer-dependent effective projectile charges for the optically allowed and forbidden excitation channels as functions of the impact parameter, collision energy, Debye radius, and spectral index of nonthermal plasmas. It is found that the nonthermal effect suppresses the ion-ion collisional excitation probability in Lorentzian plasmas. Additionally, the influence of nonthermal shielding on the optically allowed transition is found to be more significant than that on the optically forbidden transition.