Spectral properties of atoms/ions in kappa-distribution plasmas

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The study of atomic systems under the influence of plasma environments is of great importance as this process has been used for plasma diagnostics and several other spectroscopic applications. Several spectral or structural properties of plasma-embedded atoms, ions, molecules have been studied extensively within the framework of weakly coupled plasma environments ([1], references therein). In weakly coupled thermal plasmas, the screened interaction between the plasma particles can be modeled by the standard Debye-H*ü*ckel potential obtained by the thermal Maxwellian distributions. It is well-known that charged-particle velocity distributions in space and astrophysical plasma environments are commonly non-Maxwellian. In space environments, plasmas are generally observed to possess a non-Maxwellian high-energy tail that can be well-modeled by a generalized Lorentzian (or kappa) distribution function containing the spectral index κ [2]. The kappa distribution provides a replacement of the Maxwell distribution when dealing with systems in stationary states out of thermal equilibrium. Investigation on atomic processes in non-Maxwellian plasma environments has also been performed in the recent years ([3], references therein). The details of atomic processes in weakly coupled thermal (Maxwellian) and weakly coupled nonthermal (non-Maxwellian) plasma environments can be found from the earlier works [1, 3], reference therein. In the conference, we intend to present our most recent works on the plasmas screening effects on transition wavelength and polarizability of atoms/ions in kappa-distribution plasmas.

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