Electron Transport Coefficients in Helium–Xenon Mixture

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The use of the gas-mixture discharge in studying dusty plasma shows that the dust component has a number of interesting features [1 -3]. A small argon [4], krypton [5], and xenon [6] additive to helium resulted in a significant change in dust component properties.

The main objective of this study is to present the new calculated data on electron drift characteristics in the heliumxenon mixture, which can be useful when designing experiments with dusty plasma.

The analysis of the distribution functions shows that they cannot be described at all by any one-parameter function with an effective temperature defined by the relation . As to the real distribution function, we can distinguish several characteristic energy ranges, the distribution in which is controlled by the dominance or competition of various processes:

1. The region of subthermal energies:  - the distribution in this region is controlled in many respects by excitation and ionization events after which electrons appear in the low-energy region.
2. The thermal energy region: - the distribution in this region is controlled by the drift in the energy space with a diffusion coefficient defined by the elastic collision cross section.
3. The energy region  the distribution in this region is controlled by the drift in the energy space and the line slope in the linear approximation of the excitation cross section.
4. The energy range:  - the distribution in this range is controlled by the velocity drift in the energy space and the line slope in the linear approximation of the ionization cross section

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