

DUSTY PLASMAS OF GAS MIXTURES

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The data obtained in numerical calculations of characteristics of drift of ions and electrons in constant electric field in *He-Kr* mixtures [1, 2] allowed us to make the analysis of the first experimental results [3, 4] on qualitative level. It follows:

- first, at low concentration of *Kr* anisotropy of interaction of dust particles, that is most strongly shown in the big difference of distances between particles in a chain and between chains at 1% *Kr* and low pressure, increases; this fact naturally associates with supersonic character of the ionic stream;

- secondly, in *He-Kr* mixtures even at very low concentration of *Kr* (much less than 1%) helium ions practically are not presented, also the characteristics of the ionic stream are caused by *Kr* atoms; it requires a new look at well-known problem of the influence of an admixture on the discharge; however this question was not given a proper attention in dusty plasma researches;

- thirdly, at a high pressure the change of *Kr* concentration influences more considerably on average distances between dust particles (distances between particles in chain are approximately equal to interchain distances); this fact can be connected with that circumstance that, as calculations show, the change of *Kr* concentration influences on average electron energy more strongly because of the big energy inputs to *He* excitation and almost total absence of its ionization.

Full analysis requires calculations of the discharge characteristics as a whole – determination of electron density, accounting of non-local effects in electric field distribution. Also, it is necessary to reconsider dust particle charging kinetics taking into account deviations of electron distribution function from the Maxwellian and the lowered number of bounded ions (because of the reduction of impact frequency of ions with atoms of own gas). It is planned to consider these questions in following works with new experimental results.

Reference

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