عنوان مقاله:

Edge of magnetized electronegative plasma ion source in the presence of collisional adiabatic thermal positive ions

نویسندگان:

Department of Physics, Karaj Branch, Islamic Azad University - - -

(School of Particles and Accelerators, Institute for Research in Fundamental Sciences (IPM - - -

خلاصه مقاله:

AbstractThis paper develops a theoretical model for formation of multilayers in the magnetized electronegative plasma at the edge of plasma ion source. The impacts of positive ion temperature and collisions are studied and quantified by obtaining the structure of the plasma sheath. By adding the negative ions into the discharge, the solutions of Poisson's equation become oscillatory. A finite temperature for the positive ions and also the collisions results in a change in the behavior of such oscillatory solutions. Here, it is assumed that the collision frequency depends on the positive ions velocity and thermal positive ions flow is adiabatic. The spatial distribution of the species density, electric potential, and positive ion velocity is calculated for different values of positive ion temperature and negative ion concentration for two limiting cases where the collision frequency either is constant or depends linearly on velocity. In addition, the influence of the plasma parameters such as negative ion density and temperature and positive ion temperature is investigated on the space charge and positive ion flux as well as parameter space region. It is also shown that the presence of the negative ion into the plasma ion source influences the extracted positive ion flux and increases the positive ions intensity.

کلمات کلیدی:

Magnetized electronegative plasma, Adiabatic thermal positive ions, Presheath, Sheath, Parameter space region