DUST PLASMA IN A HELIUM DISCHARGE IN A STRONG MAGNETIC FIELD

Novikov L.A.,* Dzlieva E.S., Pavlov S.I., Karasev V.Yu.

SPbSU, Saint Petersburg, Russia

**leontiy.novikov@gmail.com*

It is very attractive to use the lightest gas helium and a strong magnetic field for the magnetization of the ion component and its effect on the dust structure (i.e., to study the magnetic properties of dust plasma). In the presented work volumetric dusty plasma under conditions of a glow discharge in the region of narrowing of the current channel is created in the plasma-forming gas helium in an imposed uniform magnetic field with an induction of up to 1.5 T. Under these conditions the cyclotron radius of the electron is close to the size of the dust particle; and the cyclotron radius of the ion is already less than the Debye screening length. The dust structure in a helium discharge in a strong magnetic field has been obtained for the first time. The conditions under which the angular velocity of rotation of the dust structure was measured were selected. Two features of rotation (a significant increase in the rotation velocity) separated on the magnetic field scale by almost 1 T were discovered. Possible rotation mechanisms are discussed qualitatively.

The work was supported by the Russian Science Foundation, grant No. 22-72-10004.