CREATION OF DUSTY PLASMAS IN GLOW DISCHARGE IN THE NARROWING OF A CURRENT CHANNEL IN MAGNETIC FIELD WITH INDUCTION UP TO 1 T

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Studies of dusty structures formed in the new type of glow-discharge trap are of interest from the standpoint of future experiments with complex plasmas in superstrong magnetic fields in which the dust component is magnetized [1-7]. This work consists of two parts.

In the first part the geometry and dynamics of dust structures in a longitudinal magneticfield is studied experimentally. The structures are formed in a glow-discharge trap created in the double electric layer produced as a result of discharge narrowing by means of a dielectric insert introduced in the discharge tube. Different types of dielectric inserts were used: conical and plane ones with symmetric and asymmetric apertures. Conditions for the existence of stable dust structures are determined for dust grains of different density and different dispersity. According to the experimental results, the angular velocity of dust rotation is $\geq 10\ s^{-1}$, which is the fastest type of dust motion for all types of discharges in small magnetic field.

The second part presents the results of a new study of the rotational dynamics of the trapped particles in a large magnetic field, which exceeds the value corresponding to the magnetization of ions. The results show that, up to a value of 10000 G dust structures exist in the trap. They are quite stable. Dynamics of rotational motion of the horizontal dusty sections is presented in the form of graphs on the magnetic induction. The rotation is interpreted by analyzing the dynamics of individual dust grains.

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