

CHARACTERISTICS OF DUST STRUCTURE IN A TRAP FORMED IN RF INDUCTIVE DISCHARGE

Golubev M.S., Novikov L.A., Dзлиeva E.S., Morozova M.B.,
Pavlov S.I., Karasev V.Yu.*

SPbSU, Saint Petersburg, Russia

**maksider@ya.ru*

Some aspects of complex plasma research require the creation of three-dimensional plasma-dust objects in laboratory conditions. In particular, for experiments with exposure to a magnetic field, you need to have a volumetric dust trap that can hold several thousand particles and remain stable. Such traps exist and are used in strata in DC glow discharges; but in a strong magnetic field there are problems with their stability. We decided to use an RF discharge of induction type which would not have the instability associated with the flow of direct current when applying a magnetic field.

This report describes the first experiments of our team to study the capabilities of a dust trap formed in an induction discharge in neon. Conditions (geometric parameters of the inductor, power put into the discharge, generation frequency, gas pressure) for levitation of the maximum number of particles were selected. Polydisperse quartz particles of irregular shape were used as a dust component. Visual inspection was carried out, as well as the extraction of particles selected by the dust trap using the technique developed in our earlier works.

Among the presented results are the dependence of the longitudinal interparticle distance in the dust structure on the vertical coordinate and the distributions of the average size of particles separated by the discharge at different pressures.

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