

Title: Laboratory study of field ion emission from dust grains

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Abstract: Dust particles are common objects in space environment. As a dust particles, we call objects with typical sizes of several atoms up to approximately 100 μm . However, a total mass of dust particles is only about 1% of total mass of our galaxy, the presence of dust particles significantly affects environment. The most interesting is dynamics of dust particles and attached dust charging processes.

The presented thesis consists of two main parts. The first part deals with the experimental study of field ion emission. Our measurements have been performed using gold and carbon spherical dust grains. It has been found that during the charging of dust particle using ion gun are the primary ions implanted under the surface of the dust particle from where they are release in the form of neutral gas. This releasing of implanted ions affects field ion emission for several hours.

The second part of the thesis describes a development of new experimental apparatus determined to the study of photoemission dust charging and consequently to the "true" field ion emission study.

Keywords: dust, dusty plasmas, charging properties, field ion emission, quadrupole trap, photoemission