

CHARGE STATE OF THE MESOSPHERIC SMOKE PARTICLES

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A new instrument was developed at IAP (Leibniz-Institute of Atmospheric Physics e.V. at University of Rostock) in the frame of the REXUS (Rocket Experiment for University Students) project conducted by the German Space Agency (DLR) and Swedish Space Corporation (SSC Esrange). This experiment addresses scientific questions concerning charge state of the mesospheric smoke particles (MSPs).

The idea of the new experiment is to employ a Faraday cup with an electrode which is split into four parts, each made of different material (Cu, Au, C, Cr), so that each part has a different work function. The current from each part of the electrode is measured separately. Comparison of these four measurement channels must yield information about charge state or work function (by means of a potential influence of the triboelectric effect) of the material constituting the dust particles.

The rocket was launched on the 13th March 2009 from Esrange (Kiruna, Sweden). The rocketborne measurements were supported by the EISCAT UHF and VHF radars. During the day of the rocket launch, a X-ray event occurred which caused a relatively high D-region ionization. The high level of ionization, in turn, makes it possible to analyze the spectral shape of the radar signals to infer information about MSPs.

In this paper we present results of the in situ measurements of MSPs and compare it with the ground-based EISCAT measurements.

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