



Laboratory simulation of dust grain discharging from high potentials

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Dust grains can be found in various space plasma that often contains hot electrons and/or ions. Beside other charging/discharging currents, the reachable surface potential of highly curved grains is limited by field emissions. Our previous results on glass and gold grains suggested that the discharging characteristics are not influenced only by the grain material and its structure but also by charging history, especially by ion/electron treatment.

Our experimental set-up allows us to trap a single dust grain and to determine its charge-to-mass ratio from its motion and record its time evolution. The grain can be irradiated by electron and/or ion guns up to 10 keV. We have chosen amorphous carbon spherical grains that exhibit rather small secondary emission yield and thus, discharging characteristics for both high-energy electron charging and low-energy electron attachment can be observed. We didn't find any difference in the work function, however, our preliminary results reveal an emission current increase due to bombardment by high-energy electrons.