

Title: The Role of Secondary Electron Emission in Dust Grain Charging

Author: Ivana Richterová

Department: Department of Surface and Plasma Science

Supervisor: Prof. RNDr. Zdeněk Němeček, DrSc.

Abstract: This work presents a secondary emission model focused on micron and submicron dust grains. The results allowed us to predict surface potentials of grains charged by 50 eV -- 15 keV electron beams. The probability that such electrons penetrate through grains increases with their energy and decreases with a grain size and depends on a grain shape. Model predictions were experimentally verified for glass, gold, and carbon spherical grains and for lunar regolith simulants. In dusty plasmas, charge accumulated on dust grains and plasma parameters govern the ensemble dynamics. The model can be thus utilised in calculations of phenomenon in planet magnetospheres (e.g. spokes in Saturn's rings), in tokamak edge plasmas, etc.

Keywords: Secondary emission, dust grains, dust charging