

Title: Sputtering of dust grains and its consequences for space processes

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Abstract: A great part of matter in a space has a form of dust grains, tiny pieces of rocks with the dimensions of hundreds nanometers to hundreds micrometers. In this environment dust grains undergo collisions with energetic particles (electron, ions, UV photons) that leads to their charging and modification. The presented thesis studies ion–dust interactions and is focussed on dust grain modification through ion implantation and its destruction via sputtering process. Two computer models are presented – first for computing the ion implantation profile in the grain and second, for the shape of the sputtered grain lying on the surface of a bigger object. The resulting shape of the grain is compared with that obtained experimentally. Important results of the thesis are measured sputtering yields for spherical SiO_2 grains at several surface potentials obtained by simultaneous ion and electron bombardments.

Keywords: ions, dust grains, sputtering, sputtering yield, implantation profile