EPSC Abstracts,
Vol. 2, EPSC2007-A-00267, 2007
European Planetary Science Congress 2007

Dynamcis of Saturnian stream particles in interplanetary space

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Discovery of high velocity streams of nanometer-sized dust originating from Saturnian system was one of the major findings during the approach of Cassini spacecraft to Saturn. Based on the impact signals caused by the Saturnian stream particles as well as by numerical simulations, those grains were found to have similar properties with Jovian stream particles (radii ranging between 2 and 25 nm, speeds $>$ 100km/s). The dynamics of stream particles are dominated by the interplanetary magnetic field(IMF). Hence the electrostatic potential of tiny grains is essential property for understanding their dynamical evolution. Due to the quantum nature of charge and small grain size, stochastic charging effect need to be considered to obtain correct trajectory calculation. Here we apply stochastic charging effect, instead of continuous currents, for stream particles. The dynamical properties of stream particles, together with stochastic charging and IMF structure, are explored.