EPSC Abstracts,
Vol. 2, EPSC2007-A-00345, 2007
European Planetary Science Congress 2007

The E ring as seen by the Cassini dust detector

S. Kempf (1), R. Srama (1), U. Beckmann (1), F. Postberg (1), T. Economou (2) and J. Hillier (3)

(1) MPI für Kernphysik, Heidelberg, Germany (2) University of Chicago, USA, (3) Open University, UK

Starting in 2004, the Cassini spacecraft drastically changed our picture of the Saturnian dust. In the Saturnian system most of the dust particles are found within the diffuse E ring - the largest known planetary ring in the Solar system. Since Cassini is equipped with a dust detector it became possible for the first time to investigate the evolution cycle of the Saturnian dust. There are two processes feeding the ring with fresh dust: collisions of micrometeoroids with the surfaces of icy moons and dust injection by the recently discovered ice volcanoes on the moon Enceladus. After injection into the ring the particles spend most of their lifespan as ring particles. Finally, the grains get lost by collisions with the main rings or with the moons. More interesting, some of the ring particles interact strongly with Saturn's magnetic field and will finally form fast dust streams which were discovered by Cassini during her approach to Saturn.

We are still at the beginning of our understanding of the physical processes relevant for the dust life cycle. However, Cassini already provided us with some of the major pieces to accomplish a comprehensive picture. Here, we will give an overview about the major findings by the Cassini dust detector and discuss the implications of these findings.