

## Negatively-charged particle pickup in the Enceladus plume

**G. H. Jones** (1,2), C. S. Arridge (1,2), A. Coates (1,2), A. J. Coates (1,2), A. Wellbrock (1,2), H. Kriegel (3), P. Meier (3)  
(1) Mullard Space Science Laboratory, University College London, Holmbury St. Mary, Dorking, UK (g.h.jones@ucl.ac.uk),  
(2) The Centre for Planetary Sciences at UCL/Birkbeck, London, UK, (3) Institut für theoretische Physik, TU Braunschweig,  
Germany

### Abstract

One of the key discoveries of the Cassini spacecraft's traverses of the Enceladus plume was that of negatively-charged nanograins and ions, as detected by CAPS- ELS. The trajectories of these charged particles are expected to be affected by the motional electric field in the vicinity of the moon, especially those of the low mass ions.

During some Enceladus encounters, the particles have been observed arriving at the spacecraft in the local ram direction, i.e. close to being at rest with respect to Enceladus, presumably shortly after their formation and before the acceleration associated with the pickup process. During other encounters however, the ions have been observed to arrive at the spacecraft well away from the ram direction, in the gyroplane at  $\sim 90$  degrees to the local magnetic field direction, indicating their pickup by the local plasma flow.

We present an overview of observations of these negative pickup nanograins in the Enceladus plume, and our interpretation of these observations, and attempts to trace the origins of the grains using a hybrid simulation of the plume.

