



Plasma and dust characteristics of the Enceladus plume

Shotaro Sakai (1), Michiko Morooka (2), Jan-Erik Wahlund (3), and Shigeto Watanabe (1)

(1) Department of CosmoSciences, Hokkaido University, Sapporo, Japan, (2) Planetary Plasma and Atmospheric Research Center, Graduate School of Science, Tohoku University, Sendai, Japan, (3) Swedish Institute of Space Physics, Uppsala, Sweden

We will present the Cassini the Radio Plasma Wave Science (RPWS) /Langmuir probe (LP) observations from the Enceladus flybys. Previous results from E03-E06 flybys showed that the electron densities were less than 1% of the ion densities up to $7 R_E$ above the South Pole. This is due to that the plume dust of nano- to micro- meter sized are negatively charged and electrically coupled to the background magnetospheric plasma. Here we use E07, E08 and E11 encounters, where Cassini passed across the plume of various altitudes, to determine the vertical and altitudinal structure of the Enceladus plume and its dust and plasma characteristics. The ion/electron densities were about 10^4 cm^{-3} for E07 where the Cassini was 100 km from Enceladus, while they decrease to 10^2 cm^{-3} at the altitude around 2000 km for E08 and 11. The electrical potential of the dust was mostly negative in the plume. At times, positive dust potentials were found in around the plume. It is possible that charging of dust doesn't achieve a static state since dust has just been released from Enceladus. We will discuss the dust charge state and the plasma characteristics in the plume.