

Analysis of the large-scale structure of electrons in Saturn's inner magnetosphere from the quasi-thermal noise observed with Cassini/RPWS antennas

P. Schippers (1), M. Moncuquet (1), N. Meyer-Vernet (1)

(1) LESIA, Observatoire de Paris, Meudon, France.

Abstract

In this paper, we study the large-scale structures of the electrons in the inner magnetosphere of Saturn (from G-ring's to Rhea's orbit -i.e 2.8 to 9 Rs). The electron parameters (density and temperature) are derived from the analysis of the power spectral density measurements obtained with the Cassini/RPWS electric dipole antenna around the local plasma frequency (quasi-thermal noise spectroscopy). About a hundred of Cassini's orbits from July 2004 to 2012 have been analyzed and the parameters were organized in radial distance, latitude and longitude (SLS4N and SLS4S) to investigate the radial diffusion, latitudinal confinement and the longitudinal modulation of the core electrons in the inner plasma torus. We also tentatively investigate the properties of the suprathermal electron population by analyzing the quasi-thermal electrostatic emissions between the gyroharmonics when such emissions are observed.

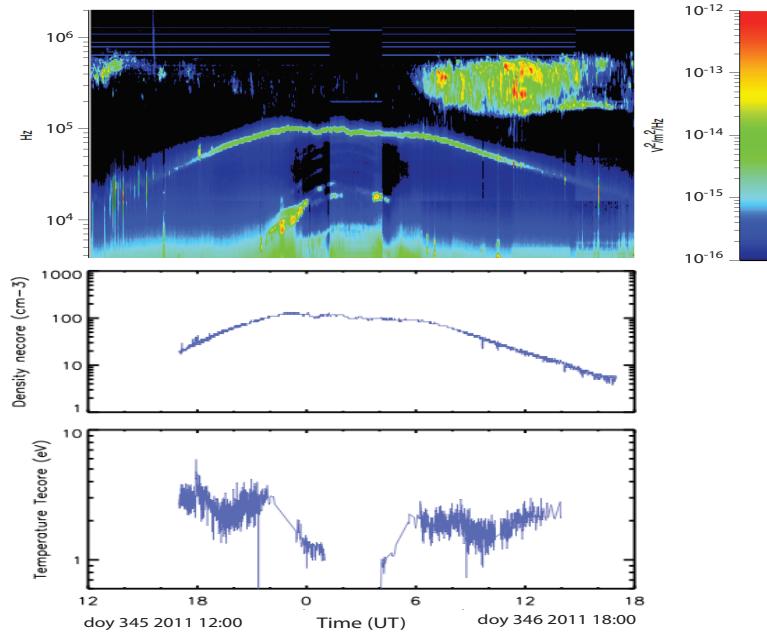


Figure 1: Density and Temperature profile of the core electron population along a near-equatorial orbit in 2011.