



The inner Saturnian magnetosphere as revealed by Cassini MIMI/LEMMS moon absorption signature observations

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Since the Saturn Orbit Insertion in July 2004, Cassini has performed numerous crossings of Saturn's inner moons L-shells at various longitudinal distances from the moons. The Low Energy Magnetospheric Measurement System (LEMMS) has detected a significant number of absorption features, referred to as microsignatures, in its lowest energy electron channels (20-100 keV) as well as in the MeV energy range. By studying the structure and the evolution of these microsignatures we have reached to the following preliminary conclusions: (i) The microsignatures refill primarily by radial microdiffusion, generated by magnetic fluctuations rather than large scale electric fields, (ii) pitch angle diffusion and dust scattering should also be considered around the core of the E-ring, (iii) satellite sweeping filters radially diffusing electrons resulting in a highly monoenergetic electron spectrum in the innermost magnetosphere ($L < 3.5$) and that (iv) the energetic particle drift shell deviation from axisymmetry shows a notable dependence on local time ($L > 5$), revealing the influence of magnetospheric convection effects very deep in the magnetosphere.