

Characteristics of pitch angle distribution of energetic electrons in Saturn's inner magnetosphere

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Energetic particles in magnetized planet have been studied to understand particle acceleration and loss processes. In order to examine the acceleration and loss processes, it is important to clarify energetic particles and wave distributions. The Magnetospheric Imaging Instrument (MIMI) onboard the Cassini spacecraft has observed energetic particles in Saturn's magnetosphere. To clarify energetic particle distribution, we have investigated pitch angle distributions of 20 keV - a few MeV electrons in the inner magnetosphere ($<15 R_s$). In order to examine anisotropy of pitch angle distribution, anisotropy index is calculated by following Morioka et al., 2001. As the result of the analyses for the first four orbital paths after the closest approach in 2004, butterfly distribution of a few MeV electrons appear around 4-9 R_s at the inbound orbital paths. Possible mechanisms explaining butterfly distribution would be outward transport or some loss processes for 90 deg pitch angle electrons, such as Coulomb collisions with neutral gases, strong diffusion through wave-particle interactions, absorption by the rings, and drift shell splitting. In this presentation, we will discuss the effect of absorption by the E-ring and the possibility of wave-particle interactions based on the Radio and Plasma Wave Science (RPWS) data.