

SPECTRAL CHARACTERISTICS OF IONS IN THE EARTH'S PLASMASHEET: STATISTICAL RESULTS FROM CLUSTER CIS AND RAPID

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We present a comprehensive statistical study of the spectral characteristics of ions in the Earth's plasma sheet for various geomagnetic disturbance levels. The study is based on more than 2000 hours of data combined from the Cluster CIS and RAPID instruments obtained during the tail season (July-October). In addition we have utilized solar wind measurements from the ACE spacecraft, properly time shifted to be representative for the upstream magnetopause. The results show that the higher energies often deviate significantly from a Maxwellian distribution, and is better represented by a Kappa distribution. The actual spectral slope depends on various magnetospheric driver parameters, such as AE and Dst activity indices, and solar wind input. During disturbed geomagnetic conditions, a significant hardening of the spectra is observed. Periods with high solar wind pressure and a strong magnetopause reconnection rate are also characterized by a much harder spectra. Unlike the electron spectra, we do not see any local time dependence in the ion spectra.

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