ELECTRON BEAM OBSERVATIONS IN THE NEAR-EARTH PLASMA SHEET BOUNDARY LAYER DURING ACTIVE PERIODS

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Electron beams are known to play an important role in the dynamics of the plasma sheet boundary layer. The interaction between high-frequency waves and such electron beams have been studied in detail by in-situ observations and simulations. However, electron observations are usually limited to obtaining some pitch-angle distribution in a relatively lower time resolution compared to the time-scales of the fields. In this study we used data from the Electron Drift Instrument (EDI) together with those from Plasma Electron And Current Experiment (PEACE) onboard Cluster to study the characteristics of electron beams associated with electric field disturbances during active plasma sheet boundary layer crossing events in the near-Earth tail. Although the primary purpose of the detector of the EDI instrument is to measure the artificial electron beams to obtain the drift velocity of these electrons, the detectors can be also used to measure natural electron flux at 500 eV (or 1 keV) in parallel/anti-parallel or perpendicular to the magnetic field with high time resolution (up to 8 ms). In order to obtain a sub-spin profile of the parallel electron anisotropy, which is required to resolve small-scale structures within the plasma sheet boundary layer, we performed a relative calibration analysis by obtaining the correction factors among the different detector look directions on an event-by-event basis. In this presentation we show several examples when the anisotropy of 500 eV electrons are observed associated with disturbances in electric field and magnetic fields and describe their detailed profiles including their relationship between electrons and fields at small scales.

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