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PEM027-02 Room: Function Room B Time: May 24 14:00-14:15

Some new aspects of magnetic dipolarizations in the inner plasma sheet

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The radiation belt MeV particle flux variations are closely related to generation and dynamics of keV seed particles in the inner plasma sheet through wave-particle interactions. Such keV particles are often generated by substorm occurrence in the near-Earth tail, which is inevitably associated with electromagnetic processes via magnetic field dipolarizations. While this session is designed primarily for particle dynamics, this talk will focus on some new aspects of the magnetic field dipolarization itself in the near-earth tail (X= -8 to -12 RE) that we recently obtained from the THEMIS observations, hoping that our results can shed some light on particle dynamics as well. Specifically, this talk will include the following findings and aspects. (1) Most of the dipolarizations studied here indicate fluctuations that markedly dominate at a discrete frequency in low frequency regime (below local proton gyro-frequency), while high frequency fluctuations are also accompanied but usually when spacecraft is close enough to the neutral sheet. (2) Interestingly there are sometimes two or more discrete frequencies to dominate magnetic fluctuations. (3) Majority of the cases indicate exponential growth of waves with growth time less than 2 min at such a low frequency regime, starting a few minutes prior to dipolarization onset time. The whole process is therefore an instability process by definition. (4) We however find some features indicating that the instability process and structure may be more complex than conventional understanding. (5) Our study also covers issues related to correlation or coherence between two nearby dipolarizations. (6) We will finally discuss implications of these findings on energetic particle dynamics.

Keywords: Plasma sheet, Substorm, Magnetic dipolarization, THEMIS observation, Near-earth tail, Energetic particles