



ID de Contribution: 9

Type: Oral presentation

Investigation of the homogeneity of energy conversion processes at dipolarization fronts from MMS measurements

vendredi 11 mars 2022 11:00 (25 minutes)

We report on six dipolarization fronts (DFs) embedded in fast earthward flows detected by the Magnetospheric Multiscale mission during a substorm event on 23 July 2017. We analyzed Ohm's law for each event and found that ions are mostly decoupled from the magnetic field by Hall fields. However, the electron pressure gradient term is also contributing to the ion decoupling and likely responsible for an electron decoupling at DF. We also analyzed the energy conversion process and found that the energy in the spacecraft frame is transferred from the

electromagnetic field to the plasma ($J \cdot E > 0$) ahead or at the DF, whereas it is the opposite ($J \cdot E < 0$) behind the front. This reversal is mainly due to a local reversal of the cross-tail current indicating a substructure of the DF. In the fluid frame, we found that the energy is mostly transferred from the plasma to the electromagnetic field ($J \cdot E' < 0$) and should contribute to the deceleration of the fast flow. However, we show that the energy conversion process is not homogeneous at the electron scales due to electric field fluctuations likely related to lower-hybrid drift waves. Our results suggest that the role of DF in the global energy cycle of the magnetosphere still deserves more investigation. In particular, statistical studies on DF are required to be carried out with caution due to these electron scale substructures.

Auteurs principaux: ALQEEQ, Soboh (LPP); Dr LE CONTEL, O; Dr CANU, P.; Dr RETINO, A.; Dr CHUST, T.; Dr MIRIONI, L.; Dr RICHARD, L.; M. A-SI-AHMED, Y.; Dr ALEXANDROVA, A.; Dr CHUVATIN, A.; Dr AHMADI, N.; Dr M. BARAKA, S.; Dr NAKAMURA, R.; Dr D. WILDER, F.; Dr J. GERSHMAN, D.; Dr A. LINDQVIST, P.; Dr V. KHOTYAINTEV, Yu.; Dr E. ERGUN, R.; Dr L. BURCH, J.; Dr B. TORBERT, R.; Prof. T. RUSSELL, C.; Dr MAGNES, W.; Dr J. STRANGWAY, R.; Dr R. BROMUND, K.; Dr WEI, H.; Dr PLASCHKE, F.; Dr J. ANDERSON, B.; Dr L. GILES, B.; Dr A. FUSELIER, S.; Dr SAITO, Y.; Dr LAVRAUD, B.

Orateur: ALQEEQ, Soboh (LPP)

Classification de Session: Contributed talks