



Energy conversion features observed by Cluster in the plasma sheet

O. Marghitu (1,2), M. Hamrin (3), B. Klecker (2), K. Rönmark (3), S. Buchert (4), L.M. Kistler (5), M. André (4) and H. Rème (6)

- (1) Institute for Space Sciences, Bucharest, Romania
 - (2) Max-Planck-Institut für extraterrestrische Physik, Garching, Germany
 - (3) Physics Department, Umeå University, Sweden
 - (4) Swedish Institute of Space Physics, Uppsala, Sweden
 - (5) Space Science Center, Univ. of New Hampshire, Durham, USA
 - (6) CESR-CNRS, Toulouse, France
- (Contact: marghitu@venus.nipne.ro)

Cluster offers appropriate conditions for the investigation of energy conversion by the evaluation of the power density, $\mathbf{E} \cdot \mathbf{J}$, with \mathbf{E} the electric field and \mathbf{J} the current density. After a systematic search through the Cluster plasma sheet data from the summer and fall of 2001, we identified several energy conversion events, most of them loads ($\mathbf{E} \cdot \mathbf{J} > 0$), but also a few generators ($\mathbf{E} \cdot \mathbf{J} < 0$). As expected, the North–South spacecraft crossings at about $19R_E$ geocentric distance show most of the time a large scale load character. Concentrated loads with high power densities can be located around the neutral sheet, in particular close to midnight. Both concentrated load and generator regions, with low to moderate power densities, are observed in the plasma sheet boundary layer. Energy conversion appears to be always associated with the intensification of the bulk plasma flow, and sometimes with temperature anisotropy. One load event, when Cluster repeatedly encounters the neutral sheet, is discussed in more detail, and the observed data features are compared with recently published simulation results.