



Statistical study of magnetic field fluctuations in the Earth magnetosheath

O. Alexandrova (1), E. Budnik (2), V. Génot (2), C. Lacombe(1),
C. Jacquy (2), I. Dandouras (2), E. Lucek (3)

(1) LESIA, Observatoire de Paris, France (contact email: olga.alexandrova@obspm.fr)

(2) CESR, Toulouse, France, (3) Imperial College, London, UK

Applying a search and classification tool developed at CDPP (Centre de la Physique des Plasmas, <http://cdpp.cesr.fr>) on CLUSTER data, we investigate the magnetic field fluctuations in the Earth magnetosheath in the frequency range $[0.05 - 5]$ Hz, close to the ion cyclotron frequency. It is known that for a high plasma beta and a moderate ion temperature anisotropy, the mirror type fluctuations are dominant in the magnetosheath: the longitudinal fluctuations to the mean magnetic field are more important than the transverse ones, $\delta B_{\parallel} > \delta B_{\perp}$. In the case of a low plasma beta and a high temperature anisotropy, the Alfvénic fluctuations dominate, $\delta B_{\parallel} < \delta B_{\perp}$. To investigate magnetic fluctuations statistically, we introduce the compressibility coefficient $\eta_{\tau} = \delta B_{\parallel}^2 / \delta B^2$, where the fluctuations are calculated at a scale τ and δB^2 being the total energy of the fluctuations on this scale. Finally, we show the dependence of η_{τ} on the plasma parameters in the solar wind and in the magnetosheath as well as on the bow-shock geometry. This study clarifies the character (Alfvénic or mirror) of the turbulence in the magnetosheath.