Geophysical Research Abstracts, Vol. 8, 01539, 2006
SRef-ID: 1607-7962/gra/EGU06-A-01539

Cluster observations in the magnetosheath: anisotropies and intensity of the turbulence at electron scales

C. Lacombe(1), A. Mangeney(1), M. Maksimovic(1), A.A. Samsonov(2), N. Cornilleau-Werhlin(3), C.C. Harvey(4), J.-M. Bosqued(4), P. Trávnícek(5), A. Balogh(6)

(1) LESIA/CNRS, Observatoire de Paris, France, (2) Institute of Physics, St. Petersburg State University, Russia, (3) CETP/UVSQ, Vélizy, France, (4) CESR/CNRS, Toulouse, France, (5) Institute of Atmospheric Physics, Prague, Czech Republique, (6) Imperial College, London, UK

The intensities δB^2 and δE^2 of the magnetic and electric fluctuations measured by STAFF-SA in the magnetosheath (between 8 Hz and 4 kHz) depend strongly on the angle Θ_{BV} between the magnetic field B and the flow velocity V. This is due to the Doppler effect and implies i) that δB^2 and δE^2, in the observed range of wave number k, have power law spectra $k^{-\nu}$ ii) that the wave vectors are mostly perpendicular to B at the electromagnetic (e.m.) scales $kc/\omega_{pe} \simeq$ 0.3 to 30, and mostly parallel to B at the electrostatic (e.s.) scales $k\lambda_{De} \simeq$ 0.1 to 1 (c/ω_{pe} is the electron inertial length, λ_{De} is the Debye length). Parameters other than Θ_{BV} could play a part in the intensities δB^2 and δE^2, observed during about 23 hours on four different days. For instance, at a given frequency in the spacecraft frame, δB^2 and δE^2 increase when the solar wind dynamic pressure P_{DYN} increases. But this increase is only due to the Doppler shift, which is larger when P_{DYN} is larger. In the plasma rest frame, the intensity of the e.m. and e.s. fluctuations do not depend on P_{DYN}, nor on the bow shock angle, nor on the magnetosheath $\beta_{p\|}$ or the T_e/T_p temperature ratio. As δB^2 and δE^2 depend on Θ_{BV} in the spacecraft frame, we look at the distribution of Θ_{BV} in the magnetosheath: numerical 3D MHD simulations show where are the regions where Θ_{BV} reaches 90°. The most intense e.m. waves and the least intense e.s. waves are observed in these regions, at a given frequency.