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CLUSTER observations in the magnetosheath: 1. Anisotropies of the turbulence

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The STAFF-Spectral Analyser on Cluster measures the magnetic fluctuations in 3 directions and the electric fluctuations in 2 directions, between 8 Hz and 4 kHz. In the magnetosheath, at a given frequency, all the terms of these fluctuation tensors depend strongly on the angle Θ_{BV} between the local B field and the local flow velocity V. i) around 1 kHz, the relation between Θ_{BV} and the trace $\delta Eˆ2$ of the tensor of the electric fluctuations can be modelled if we assume that the electric fluctuations are Doppler-shifted ion acoustic waves, with wave vectors k strongly collimated along the B field and with an intensity proportional to $kˆ{-3}$. ii) around 10 Hz, the relation between Θ_{BV} and the trace $\delta Bˆ2$ of the tensor of the magnetic fluctuations can be modelled if we assume that the magnetic fluctuations have a vanishing frequency and are Doppler-shifted up to 10 Hz (the "whistler" range), with wave vectors k confined in a plane perpendicular to B and with an intensity proportional to $kˆ{-3}$. These last results are compared with the results of the k-filtering technique (Sahraoui et al., 2004).