Influence of interplanetary magnetic field parameters on Magnetosheath turbulence parameters

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The influence of interplanetary magnetic field (IMF) macroparameters on magnetosheath turbulence characteristics is studied. For this purpose the simultaneous observations on spacecraft Interball-1 and outcomes of Sura-Wind experiments on magnetosheath radio sounding are analyzed.

The analysis of Fourier-spectra of turbulence of the magnetic field and ion flow has shown reduction in magnetosheath high-frequency Alfven fluctuation and low- frequency magnetosound fluctuation energies at increase of tangent IMF component to the shock front. Thus the spectral power of flow fluctuations decreases within the whole studied frequency interval. The internal scales are calculated and their dynamics is also investigated. The magnetosound turbulence scales increase within 600-650 km interval and Alfvenic turbulence scales decrease within 120-100 km interval at increase of tangent IMF component. Influence of IMP vector turn is established - strong jumps of scales occur at sharp changes of tangential IMF component. In these moments there is a temporary increase of turbulence scales, as a result of its rotational structure destruction.

The analysis of the experiment data on radio sounding Sura-Wind confirms the control role of tangent IMF component over small-scale magnetosheath structure defined by internal turbulence scales.

MHD approach to magnetosheath turbulence has allowed to determine equations for internal scales and pulsation velocities. Values of these turbulence characteristics correspond to appropriate values obtained by experimental data. Comparison of values of experimental turbulence parameters with theoretical estimations of small-scale structure characteristics allows to estimate non-dimensional numbers of MHD similarity for magnetosheath.

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