



Correlation analysis of magnetosheath fluctuations

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The magnetized, collisionless plasma can support a wide variety of wave modes which may propagate, damp, or grow and the magnetosheath is a good example of such plasma. Moreover, the magnetosheath plays an important role in the transmission of variations observed in the solar wind toward and through the magnetopause. Various instabilities at the bow shock and magnetopause, or within the magnetosheath itself, can launch fast, slow, and drift mirror mode waves into the magnetosheath. As a result, magnetosheath magnetic field and ion density fluctuate often with magnitudes exceeding the mean value and the nature of these fluctuations is still poorly understood, especially from a statistical point of view.

Using magnetic field and ion density measurements on four Cluster spacecraft, we analyze different types of fluctuations in the magnetosheath near the dawn-dusk meridian within a range of frequencies from 0 to 0.125 Hz. We discuss their occurrence rate and their correlation lengths as a function of the location, solar wind conditions and other parameters.