



## **On the growth of mirror mode waves upstream of the magnetopause based on Cluster observations**

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Based on magnetic field measurements, earlier investigations showed that the amplitudes of mirror type fluctuations grow from the terrestrial bow shock towards the magnetopause as the mirror mode magnetic field structures travel along the streamlines frozen in the plasma flow. Local plasma measurements measured by the Cluster Ion Spectrometer and interplanetary parameters measured by ACE are also involved in the present study to analyse the reasons of sudden and slower changes in the evolution of the waves at different locations. A model was developed for determining the plasma flowlines from the bow shock to the observation point in order to study the effect of the quasi-perpendicular bow shock. When the separation between the Cluster spacecraft was over 10 thousand km in the winter/spring season of 2006 and 2007, mirror mode waves were simultaneously observed in remote regions of the magnetosheath and the relation of their amplitudes could be determined. Simultaneous changes in the wave activity are caused by interplanetary disturbances while non-simultaneous changes can be explained by the influence of the local plasma environment. The development of a depletion layer upstream of the magnetopause is also investigated. This layer of reduced plasma beta is not favourable for the growth of mirror mode waves.