



Pi2 Observations by Cluster in the Magnetotail

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We have studied conjunctions between the Cluster spacecraft and the magnetometers of the 210 meridian chain during Pi2 activity in 2001. We present three events where Cluster is: 1) on closed field lines in the northern lobe of the Earth's magnetotail; 2) on open field lines in the southern lobe; and 3) in the current sheet of the magnetotail. The Cluster and 210 meridian data are investigated by time series comparison, cross-correlation and wavelet analysis. All three events show Pi2 wave activity at Cluster ($-16R_E < X < -18R_E$), albeit with mutual differences. We use the capability of Cluster to determine propagation directions of the waves, and compare the travel time of the waves with cross-correlations between the Cluster and ground data. For the first event we find that the possible precursor of the Pi2 waves passes by Cluster and arrives at Earth starting the Pi2 waves, which are then observed travelling tailward at Cluster. For the other two events there are tailward moving waves on the open field lines and Earthward moving waves in the current sheet.