



Cluster observations of ion dispersion in the polar cusp under IMF-Bz southward

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The reconnection between the interplanetary magnetic field (IMF) and the Earth's magnetic field is taking place at the magnetopause on magnetic field lines threading through the polar cusp. When the IMF is southward, reconnection occurs near the subsolar point, which is magnetically connected to the equatorward boundary of the polar cusp. Subsequently the ions injected through the reconnection point precipitate in the cusp and are dispersed poleward. If reconnection is continuous and operates at constant rate, the ion dispersion is smooth and continuous. On the other hand if the reconnection rate varies, we expect interruption in the dispersion forming energy steps or staircase. Similarly, multiple entries near the magnetopause could also produce steps at low or mid-altitude when a spacecraft is crossing subsequently the field lines originating from these multiple sources. In addition, motion of the magnetopause induced by solar wind pressure changes or erosion due to reconnection can also induce a motion of the polar cusp and a disruption of the ions dispersion observed by a spacecraft. Cluster with four spacecraft following each other in the mid-altitude cusp can be used to distinguish between these "temporal" and "spatial" effects. We will use Cluster observations from 2001-2005 with time delays between the spacecraft ranging, from 1 min, to a few tens of minutes and up to 2 hours to observe the energy dispersions variations and investigate the link with IMF and solar wind variations.