

Component reconnection at the magnetopause with Cluster and DSP

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Abstract

Coordinate Double Star (DSP) and Cluster measurements have brought new results concerning the physics of the magnetopause. We can see for the first time, the evolution of structures at small scales within the Cluster tetrahedron, and then at large scales with Cluster and Double Star conjunction. This paper presents a part of DSP and Cluster observations of magnetic reconnection at the dayside magnetopause by introducing a few interesting events. These include: (a) DSP/TC-1 observations of the magnetic shear angle across the magnetopause near/at the reconnection site which was considerably smaller than 180 degree and observations of noticeable guide field near/in the diffusion region. (b) TC-1 observations of magnetic reconnection at the dayside low-latitude magnetopause for northward IMF when a strong By component exists. (c) Observations of plasma jets simultaneously at the subsolar point and near the cusp, with Cluster and TC-1 both in the same hemisphere or in the northern and southern hemisphere, respectively, different suggesting that reconnection is preferentially initiated near the subsolar point and then propagates to the high-latitudes. (d) Almost simultaneous observations of an FTE by Cluster and TC-1 at different positions of the flux rope. This allows us to infer the large-scale configuration of the reconnected magnetic tube near the dayside magnetopause. (e) Simultaneous observations anti-parallel reconnection signatures by Cluster at the high-latitude magnetopause and component reconnection by TC-1 in the low-latitude region.. The possible implications of these observations are discussed. New challenges to the present theories of magnetic reconnection and magnetopause reconnection models are addressed.

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