

Magnetic Structure and Particle Flow at a Northward IMF Reconnection Line

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On March 18, 2002, the Cluster satellites traveled from the earth's northern mantle into the magnetosheath. During this time, the IMAGE spacecraft observed a long-lived proton emission northward of the auroral zone. The Cluster electron and magnetic field data suggest Cluster passed within 1 km of an active reconnection line, entering the ion diffusion region and the electron diffusion region. We present the current structure, velocity, orientation, and size of the reconnection line, as well as evidence for waves accompanying reconnection at different length scales. We propose that the x-line is globally stable during Cluster's passage through the magnetopause, owing to the presence of a plasma depletion layer. Ion and electron flows in the magnetopause boundary layer are consistent with this and with the presence of reconnection in the conjugate hemisphere as well.