

ANTI-PARALLEL RECONNECTION: DYNAMICS AND RECONNECTION RATE

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Two of the more elusive characteristics of magnetic reconnection are the dynamics of the reconnection line and the reconnection rate. For in situ measurements at the Earth's magnetopause, the location of the reconnection line is difficult to determine unless the line crosses over the spacecraft. In these rare events, the spacecraft observes a reversal in the high-speed flow jets associated with reconnection. Changes in the location of the reconnection line are equally difficult to determine from in situ measurements because the location is known only when the line passes over the spacecraft. This talk focuses on an event when the Cluster spacecraft were at the high latitude magnetopause and observed the reconnection line pass over the spacecraft twice in a 10 minute period. Using velocity cutoffs in the ion distributions, the location of the reconnection line relative to the spacecraft is determined in the intervening time between spacecraft encounters of the line. The reconnection line appears to track the location on the magnetopause where the magnetosheath and magnetospheric magnetic fields are very close to anti-parallel. With this knowledge of the location of the reconnection site, a two-spacecraft method for determining the reconnection rate is applied to simultaneous observations in the boundary layer. This rate is compared to theory and to previous measurements of reconnection rates from other events.

Magnetopause, Magnetic Reconnection, Magnetosheath, Solar Wind-Magnetosphere coupling

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