

Wave activity around the X-line observed in Magnetotail

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We have examined plasma wave activity observed in the near Earth magnetotail reconnection events. Geotail encountered several reconnection sites in 20 years observation where the enhanced cross-tail electron current layer was detected in association with the simultaneous plasma flow and magnetic field reversals. The intense plasma wave activity in wide frequency range is observed in the electron-ion decoupling region around the X-line. However, surprisingly, wave intensity right in the center of the electron current layer, that is a possible X-line, is much weaker than that in its surrounding region. The observed wave power at the X-line cannot explain the anomalous resistivity sufficient to the energy dissipation for fast magnetic reconnection. The Geotail observation suggests that the magnetic diffusion region of the near Earth magnetotail reconnection site is mainly controlled by the physics of the collisionless reconnection process.