

The structure of the Hall current system in the vicinity of the magnetic reconnection site

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The spacecraft Geotail has observed the current system in the vicinity of the magnetic reconnection site of the near-Earth magnetotail for substorm onsets. In the outermost region near the plasma sheet/tail lobe boundary, there are field-aligned currents flowing out of the magnetic reconnection site. In the adjacent region, just inside the outflowing current layer, there are field-aligned currents flowing into the magnetic reconnection site. Hence, the Hall current circuit forms the double-sheet structure, the thickness of which is likely of the order of ion inertial length, near the separatrix layer. These field-aligned currents are thought to be closed with currents provided by highly accelerated electrons flowing out of the diffusion region.