Thin current sheet structure near the X-line in substorms

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Using GEOTAIL data, we have calculated the cross-tail current directly from the ion and electron moment data, and have analyzed the structure of the near-Earth current sheet near the X-line. We have found that the intense current sheet is concentrated around the neutral sheet. It is comparable to the ion inertial length. The current sheet with a lower density spreads around it. At the same time, the induced magnetic field $B_y$ is observed around this boundary and inward field-aligned current is observed in the inner region of the plasma sheet and outward current is observed in the outer region of the plasma sheet, suggesting the existence of the Hall-current system.