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Current sheet observations in the magnetotail by Cluster

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The tail current sheet and its dynamics are key elements in magnetospheric physics. With the four-point measurements Cluster enabled us to study spatial and temporal characteristics of the current sheet and relevant plasma characteristics at different spatial scales. From the observations in 2001 and 2002, when the Cluster tetrahedron scale was 2000 km and 4000 km, different types of current sheet including off-equatorial current sheets (or bifurcated current sheets) and structure of the fast flows were obtained. With the tetrahedron scale of 250 km, Cluster observation in 2003 allowed to resolve the structure less than the ion inertia scale. In this paper we show examples of current sheets during high-speed flows associated with an X line as well as during a period of stagnant plasma and discuss the advantages and limitation of the four-point observation for investigating the current sheet processes.