GC2024-STP053

Observation of stationary current sheet in the magnetosphere

Diana D. Bryzhakhina[1] , Sergey V. Apatenkov[1]

[1] Санкт-Петербургский государственный университет

st072438@student.spbu.ru

We investigate Earth's magnetotail current sheet under quiet magnetospheric conditions using Cluster satellites' observations. We consider mainly caused by satellites' motion current sheet crossings with duration of 30 – 45 minutes, in contrast to most previous studies, where the crossings took 10 minutes or less and were caused by flapping motions. Obtained current sheet are embedded with thicknesses of 1,5-2Re or 40-100 proton gyroradii. The electric current calculated using curlometer method has similar value to the sum of the three contributions to the current calculated by plasma parameters (proton diamagnetic current, electron diamagnetic current, anisotropic electron current). Near the current sheet's center electrons provides the main contribution (1-4 nA/m2) to the sum current, protons are demagnetized. Ion diamagnetic current provides the main contribution to the sum current far from the current sheet's center.

The research was supported by the grant of the Theoretical Physics and Mathematics Advancement Foundation «BASIS» № 23-1-2-24-1 "Investigation of stationary current sheets in the Earth's magnetosphere ".