

Origin of large-scale plasma jets in the magnetosheath

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Previous studies shown that an important source of the solar wind plasma inside the dayside magnetosphere is large-scale plasma jets, fast and dense plasma streams in the magnetosheath. A number of mechanisms have been proposed for the jet generation and are used for interpretation of experimental data. THEMIS observations of plasma and magnetic field in the magnetosheath provided a lot of new information about plasma jets. Statistically, it has been shown that the duration of jets peaks at ~30 second and they are predominantly observed during intervals of quasi-radial IMF. It is believed that most of jets are formed at rippled quasi-parallel bow shock. However, this mechanism is difficult to apply for generation of large-scale jets of minute duration. We studied large-scale plasma jets, whose duration varies from 30 sec to 3 minutes. From THEMIS observations, it was collected 642 large-scale jets in the years 2007 -2009. Analysis of those jets with using upstream solar wind conditions has shown that the jets generated under quasi-radial IMF are usually slower and weaker. Fastest and strongest jets are generated in interaction of the bow shock with rotational discontinuities.

Keywords: solar wind, bow shock, magnetosheath, plasma jets