

Locations of Magnetopause Magnetic Reconnection: The Role of Magnetosheath Plasma Pressure

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Question of where magnetic reconnection (MR) occurs or equivalently what mechanisms control the initiation of MR on the dayside magnetopause is intensively studied but not fully understood. Here, a novel statistic study reveals that magnetosheath thermal pressure maximizes near the subsolar point, its location, however, is modified by the dipole tilt angle in a manner the same as MR locations are. The maximum sheath thermal pressure, cooccurring with the enhanced magnetic pressure immediately inside the magnetopause, is though to be linked to a maximum magnetopause current density, where tearing mode instabilities tend to develop and MR initiates. The high pressure region shifts from the subsolar region due to magnetopause reshaping when the dipole tilt angle varies. The sheath flow stagnation point, however, remains unchanged at the subsolar point, and Xlines thus are embedded within sub Alfvénic sheath flows and are convected toward high latitudes. The successive Xlines may thus generate flux ropes.

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