

EGU22-671

<https://doi.org/10.5194/egusphere-egu22-671>

EGU General Assembly 2022

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Causes of jets in the quasi-perpendicular magnetosheath

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Magnetosheath jets are currently an important topic in the field of magnetosheath physics. It is thought that 97 % of the jets are produced by the shock rippling at quasi-parallel shocks. Recently, large statistical studies of magnetosheath jets have been performed, however it is not clear whether rippling also produces jets found downstream of quasi-perpendicular shocks. We analyze four types of events in the quasi-perpendicular magnetosheath with signatures characteristic of magnetosheath jets, namely increased density and/or dynamic pressure, that were not produced by the shock rippling: 1) magnetic flux tubes connected to the quasi-parallel bow-shock, 2) non-reconnecting current sheets, 3) reconnection exhausts and 4) mirror mode waves. The flux tubes are downstream equivalents of the upstream traveling foreshocks. Magnetosheath jets can impact the magnetopause, so knowing the conditions under which they form may enable us to understand their signatures in the magnetosphere.