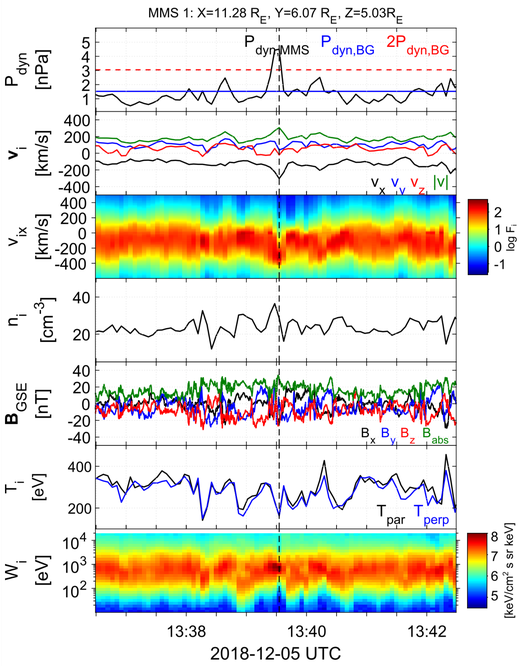
Investigation of magnetosheath jet kinetic structure and plasma moment derivation

Savvas Raptis[1], Tomas Karlsson[1], Andris Vaivads[1], Martin Lindberg[1], Andreas Johlander[2], Henriette Trollvik[1]

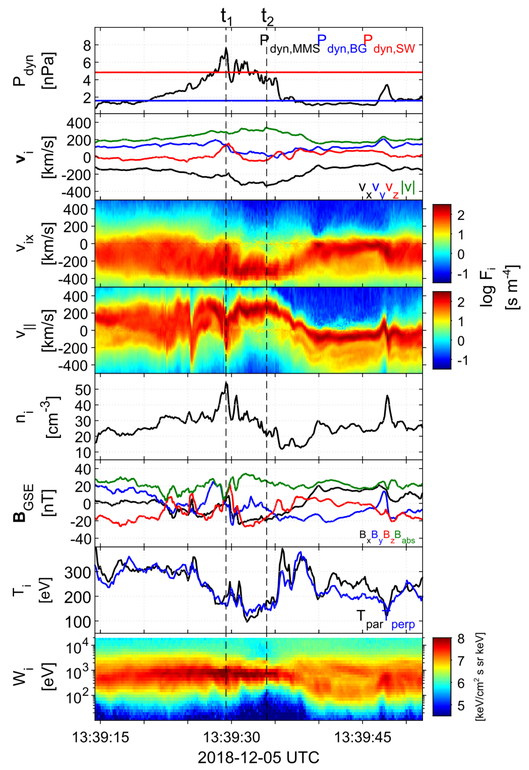
[1]Space and Plasma Physics, KTH Royal Institute of Technology, Stockholm, Sweden, [2]Swedish institute of Space Physics, Uppsala, Sweden

Event

Fast (low-resolution) data

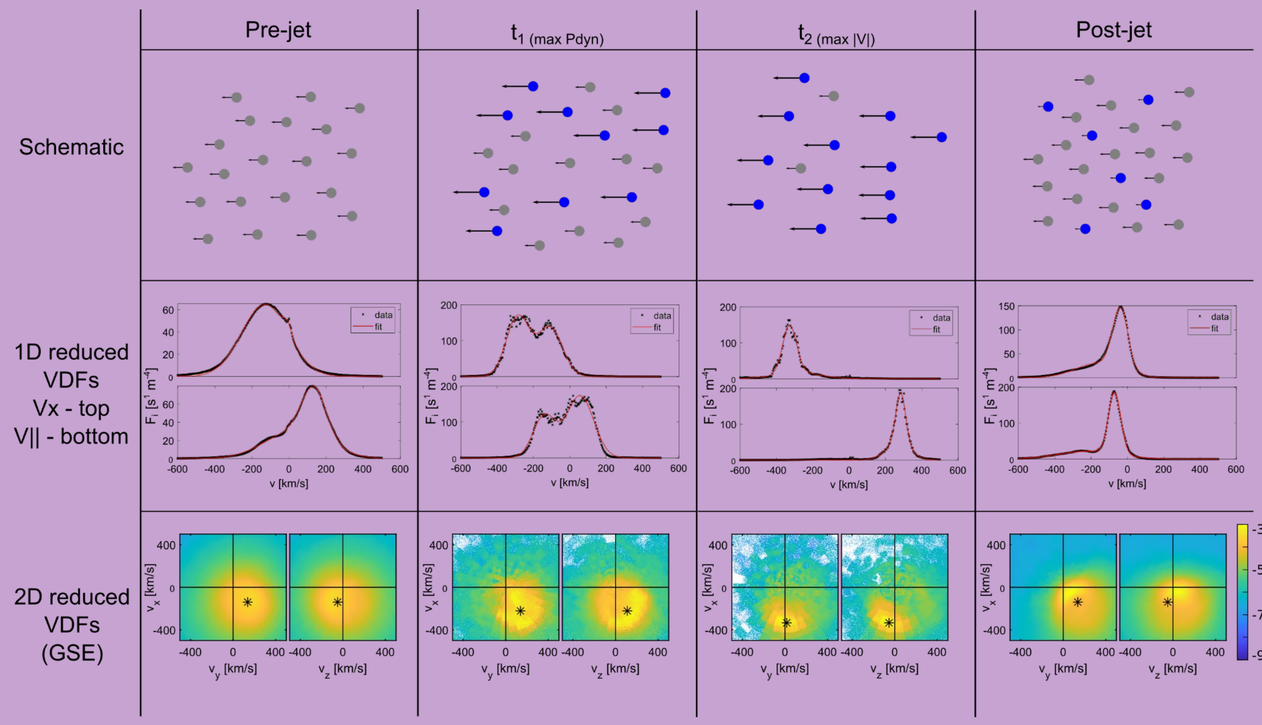


Burst (high-resolution) data



Read the full article here
Or see
How jets can be formed here

"Magnetosheath jets evolve and interact with the background exhibiting non-Maxwellian ion VDFs"



Conclusions & Discussion

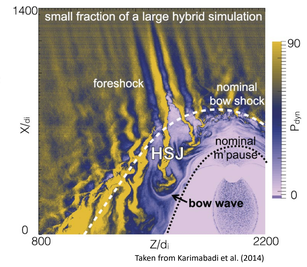
- Jet **partial** plasma **moments deviate** significantly **from** the **full** (raw) measured ones.
- They exhibit double-peak **non-Maxwellian VDFs** that can excite waves and highlight a complex interaction with the background MSH
- The velocity and density of quasi-parallel magnetosheath jets can be less variable than previously thought indicating a direct **connection to the solar wind and its embedded foreshock structures**

More info: savvasraptis@gmail.com | savvasraptis.github.io

Quasi-Parallel Magnetosheath Jets

Dynamic pressure enhancements relative to the background magnetosheath:

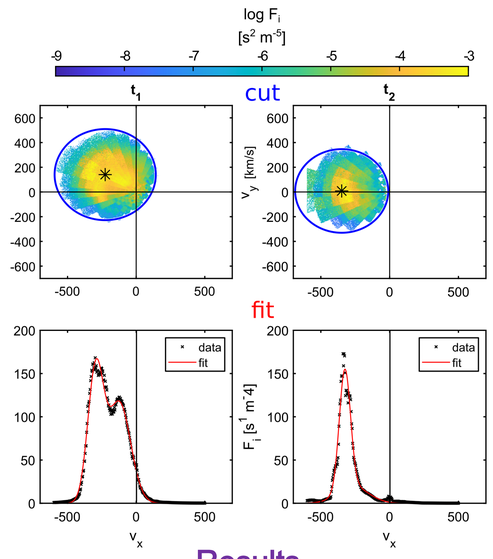
$$P_{dyn} \geq 2\langle P_{dyn} \rangle_{MHS}$$



Method

Using NASA's Magnetospheric Multiscale (**MMS**) Mission burst (high – resolution) velocity distribution functions (VDFs) to derive partial plasma moments

Cut = remove parts of VDF equal to thermal velocity
Fit = fit two Maxwellians in 1D reduced VDFs



Results