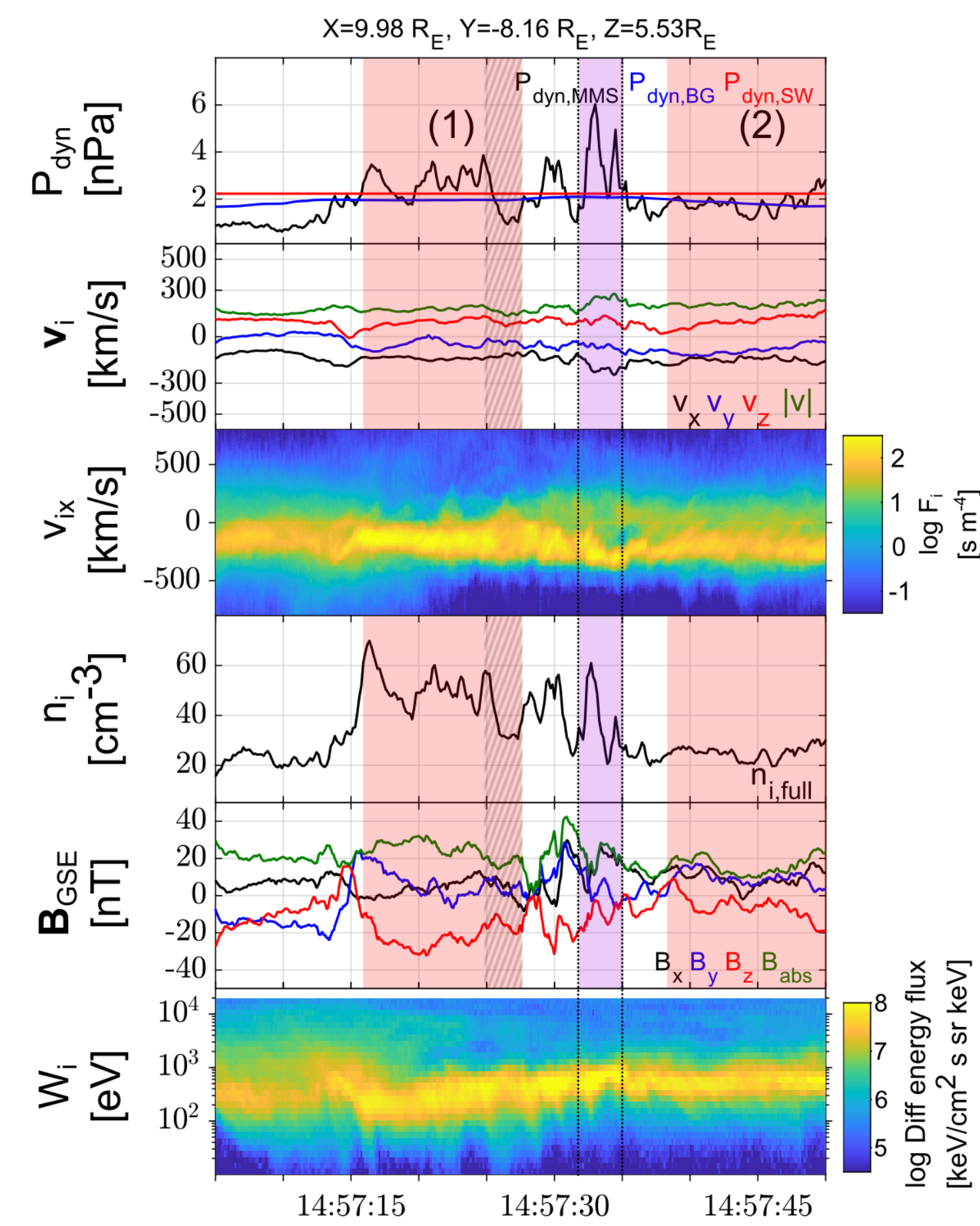


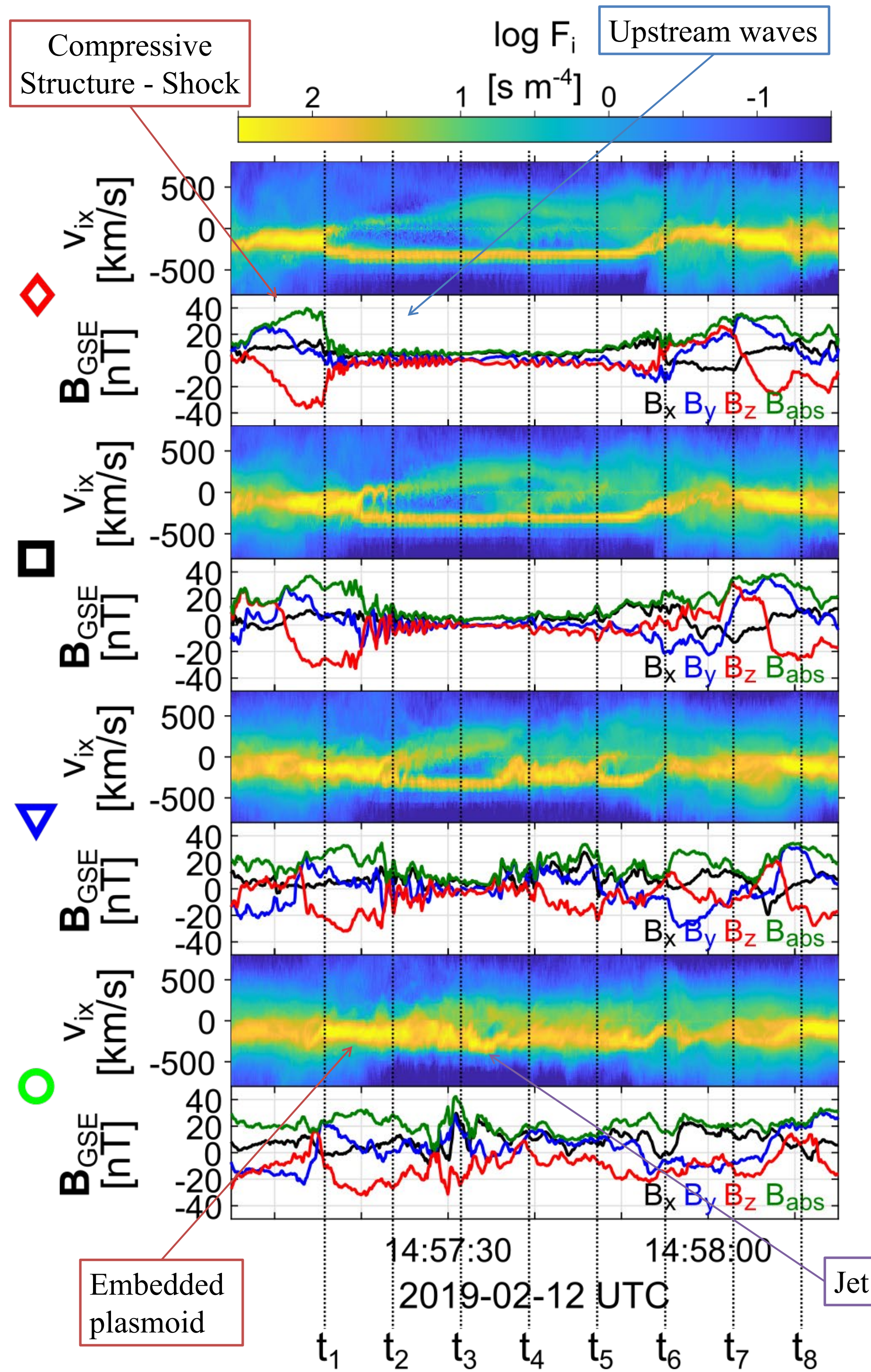
Results

MMS3

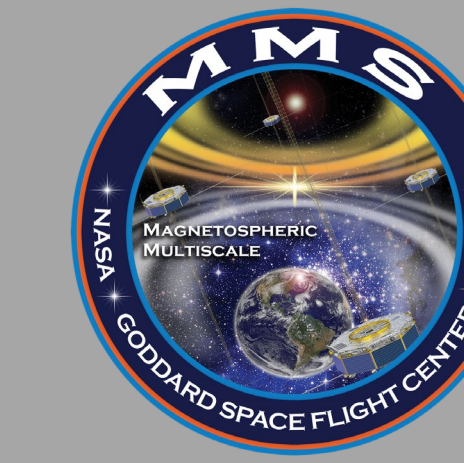


Jet Properties:

- Supermagnetosonic: $M_{MS} \approx 1.1 - 1.4$
- Anti-sunward: $V_x \approx 350$ km/s
- $\frac{P_{dyn,jet}}{P_{dyn,MSH}} \approx \frac{P_{dyn,jet}}{P_{dyn,SW}} \approx 3$



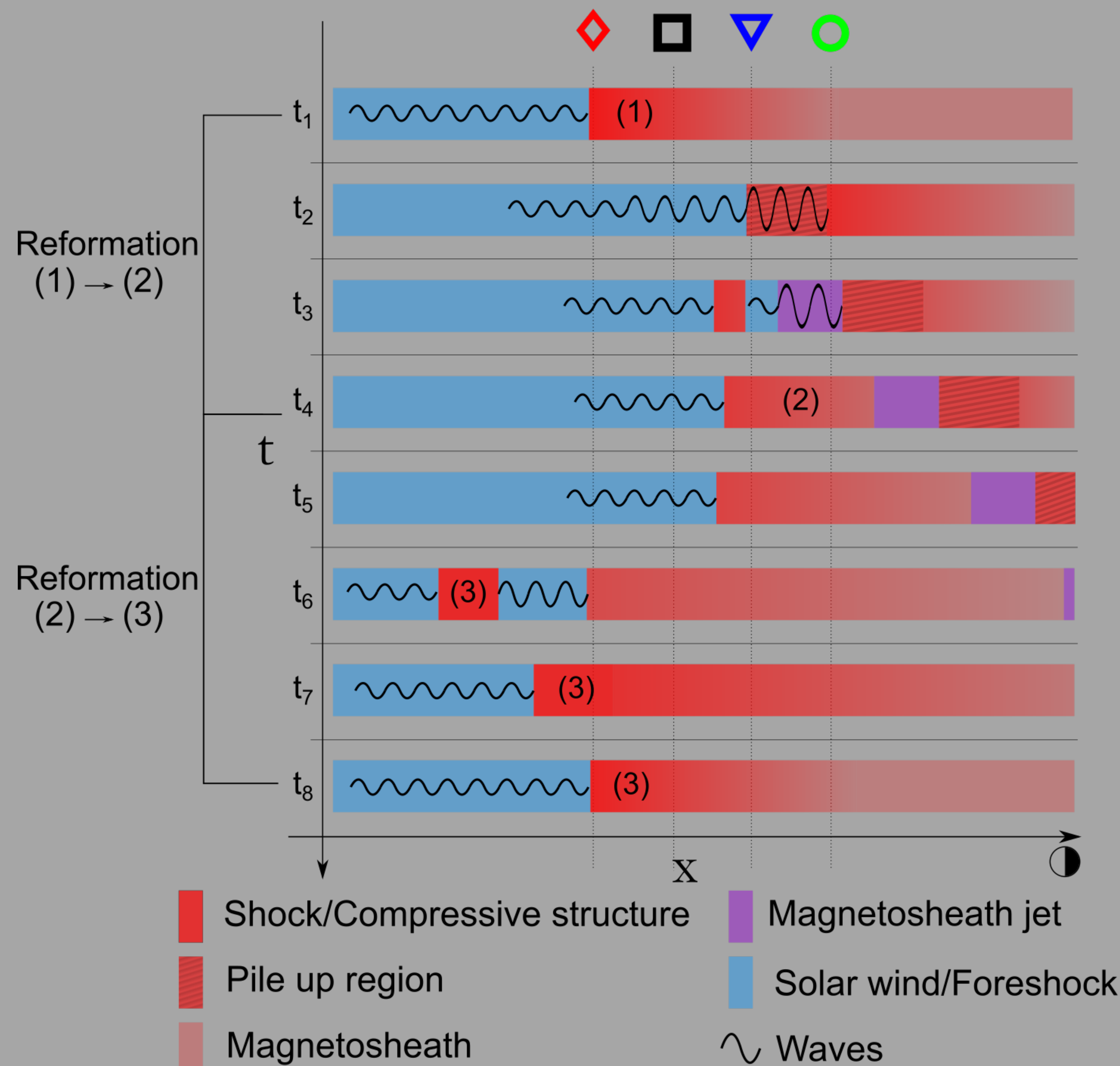
High-speed plasma jets generated by the cyclic behavior of the Earth's bow shock



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“Plasma jets forming by the evolution of upstream waves & bow shock’s reformation”

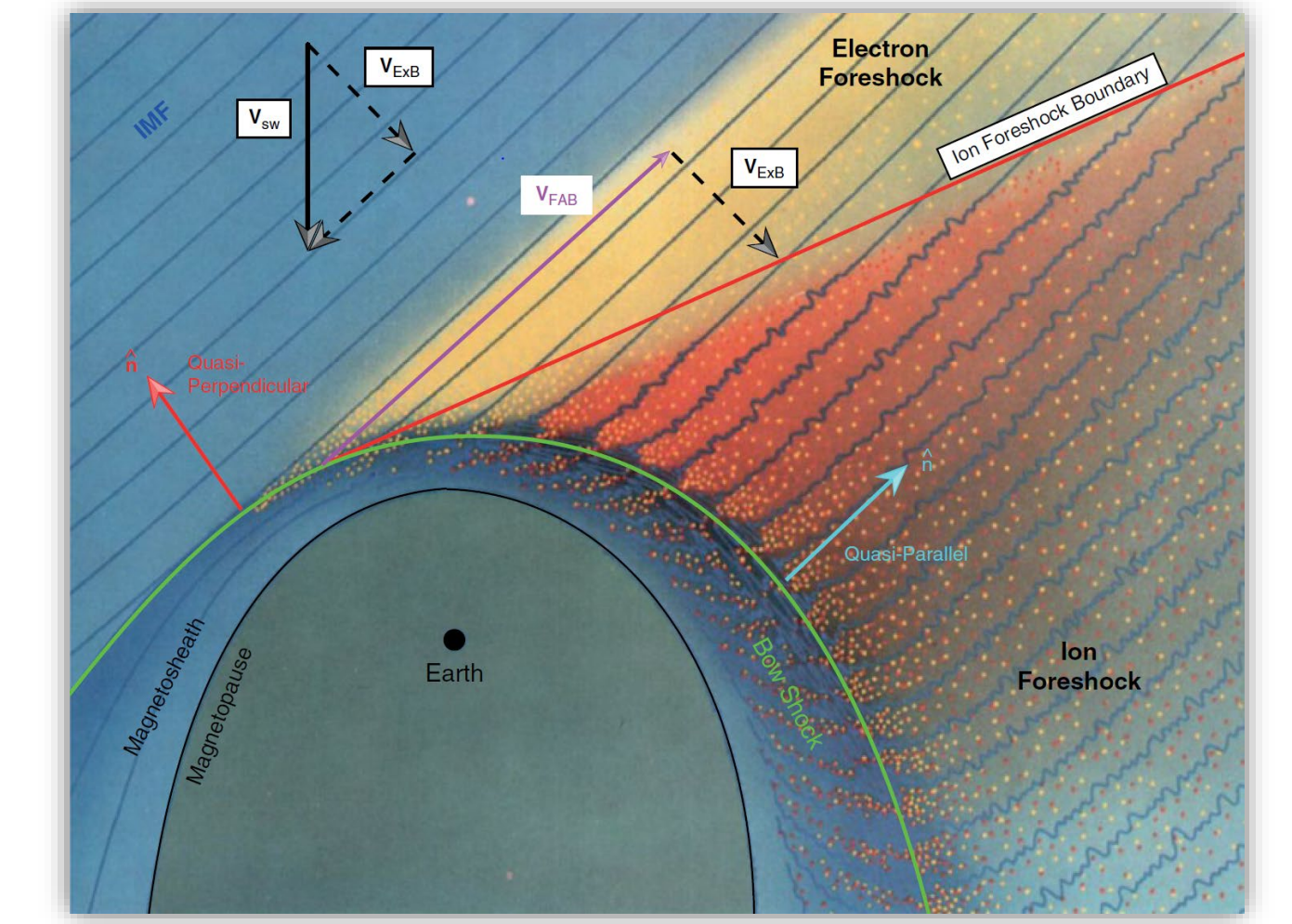


Introduction

Bow shock

Solar wind is **braked, thermalized & compressed**, forming the magnetosheath, downstream of the shock

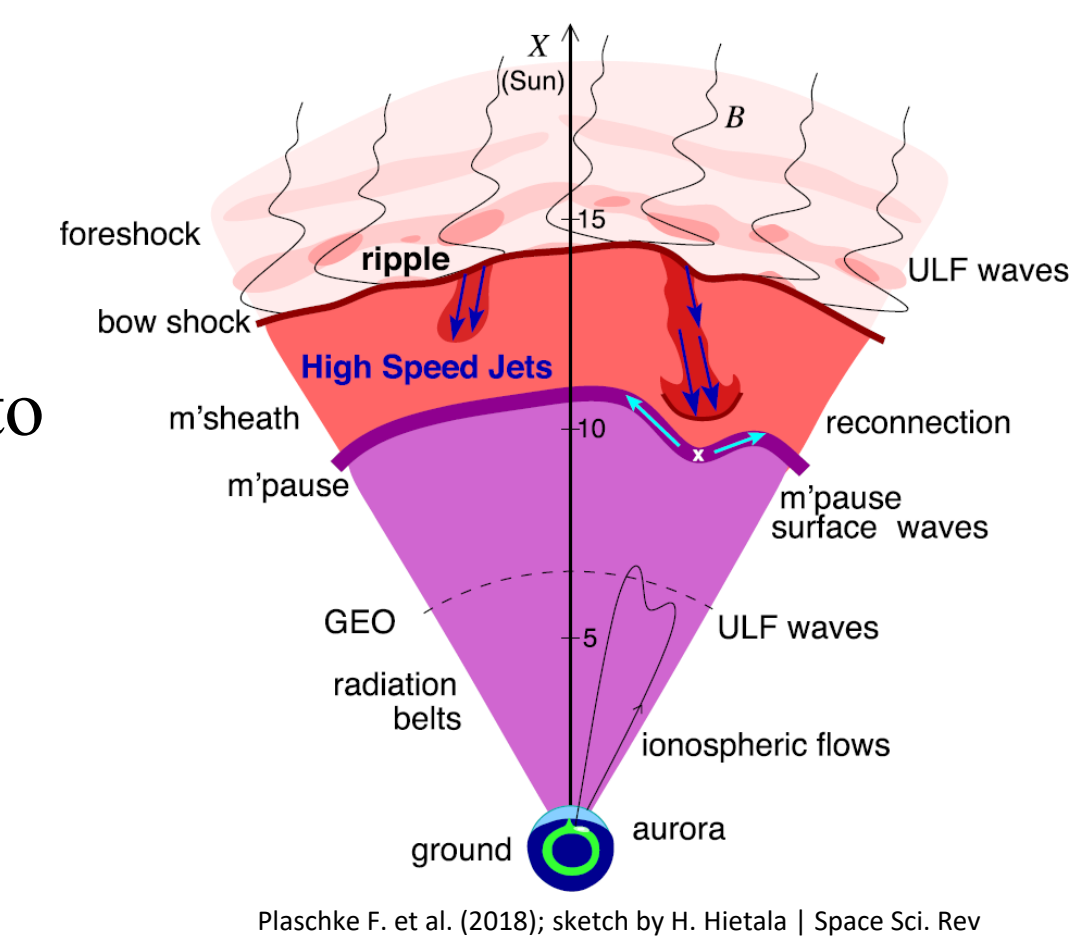
Shocks are one of *nature’s most powerful accelerations*



High Speed Jets

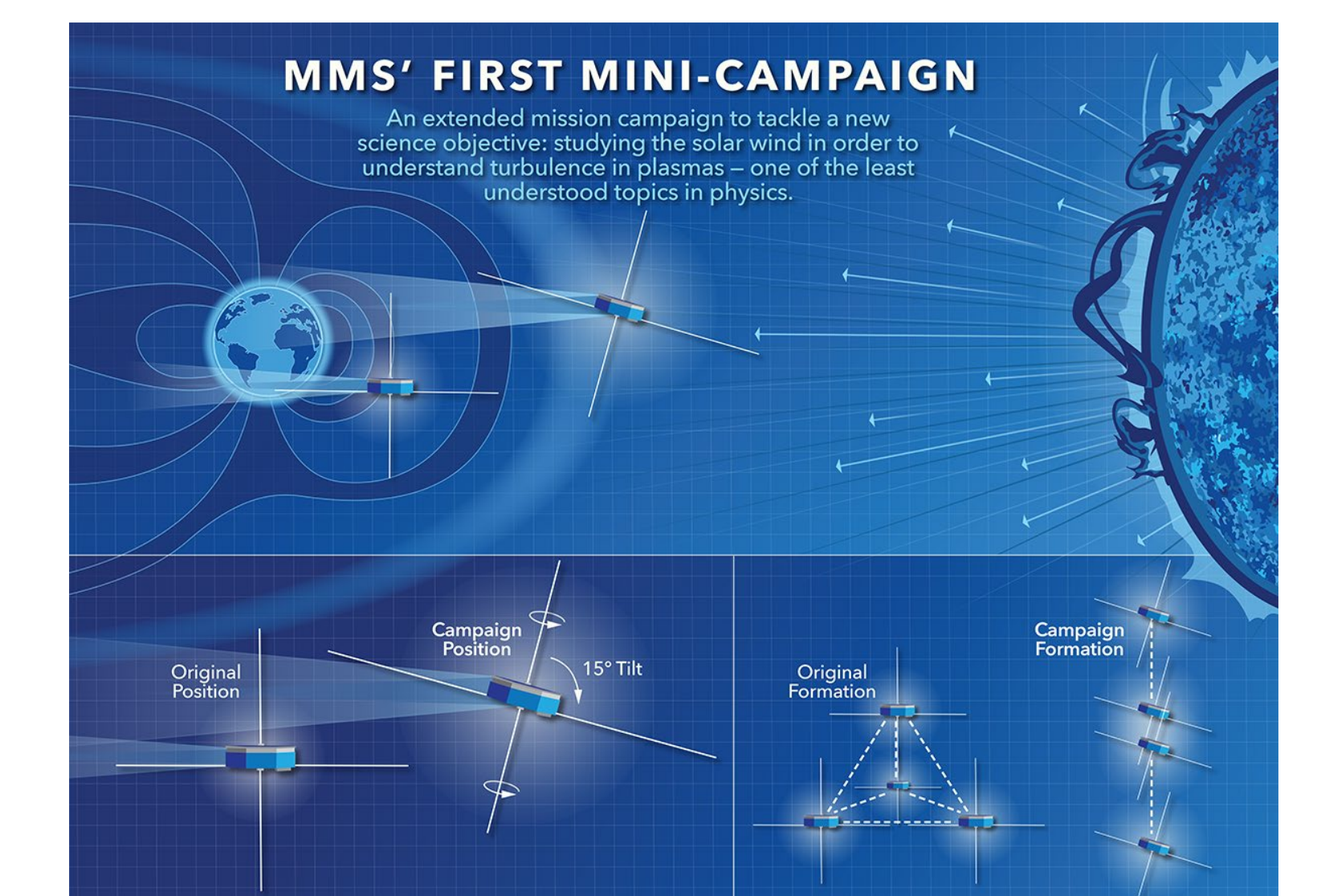
Dynamic pressure enhancements relative to the background magnetosheath

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



Methods

NASA's Magnetospheric Multiscale (MMS) Mission, consisting of 4 satellites (MMS 1 – 4)



- Turbulence campaign (large separation)
- Spacecraft aligned in Sun-Earth line
- Burst data (high resolution) available

Conclusion & Discussion

- **Embedded plasmoids** (downstream density enhancements) originate from non-linearly evolved upstream waves (“shock remnants”)
- **High-speed jets** are generated from the evolution of the upstream waves and the reformation process
- Results could be fundamental and exist in **other shock environments** (laboratories, planets, and astrophysical objects)

Read the full article here and the popular science version here



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