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ELECTRON SCALE TURBULENCE IN THE EARTH'S MAGNETOTAIL

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GOALS

- We have an interval in the Earth's magnetotail with very high ion speed Vx ~ 1000km/s
- Calibration of SC potential is possible for this event
- We look at the Merged FSM data, calibrated SC potential and electric fields
- A bit preliminary so comments and questions are welcome

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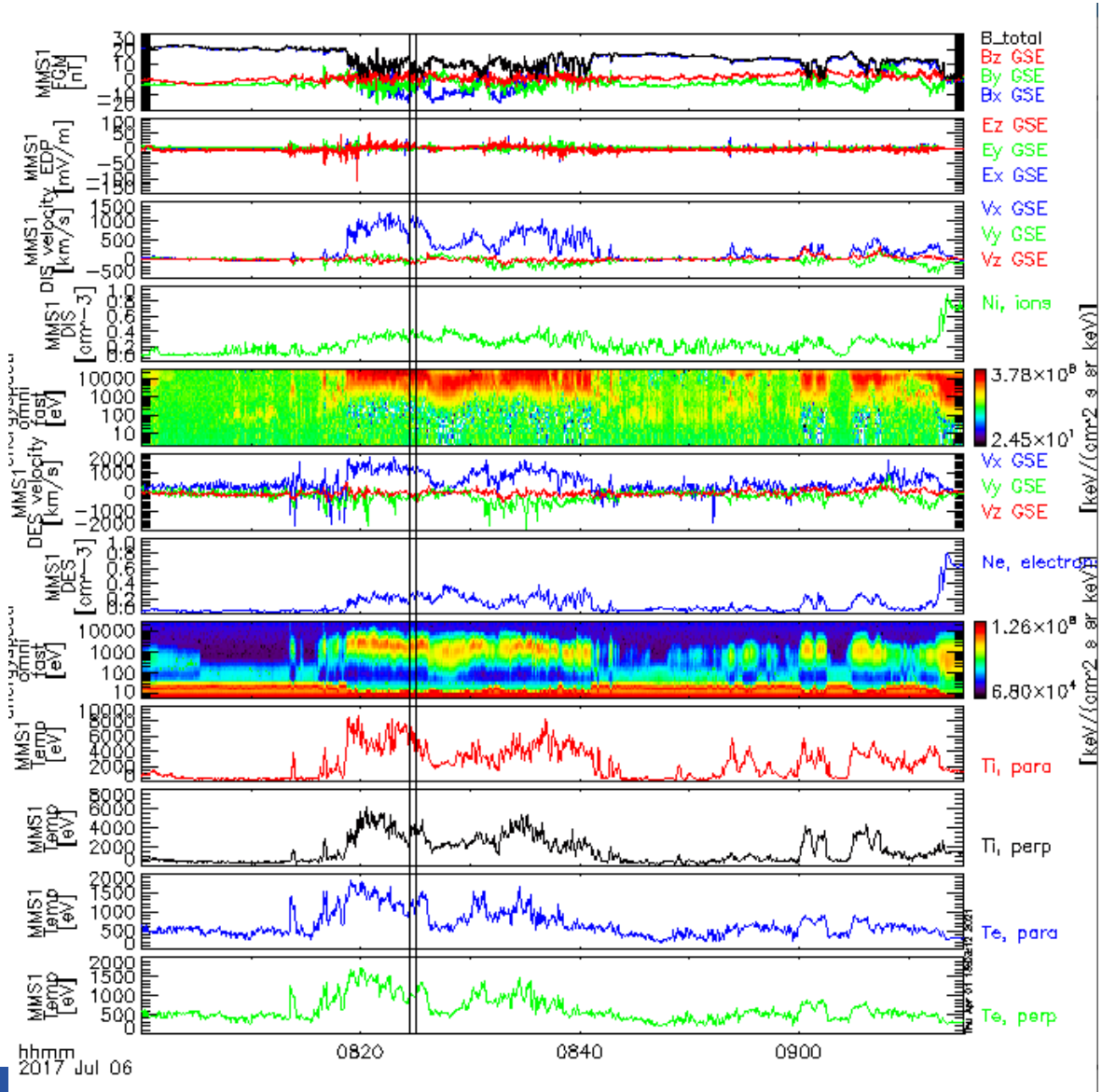
OVERVIEW OF THE EVENT-LARGE SCALE



- MMS is in the Earth's Magnetotail
- Flows of ~1000km/s in the +X GSE direction
- We consider a small part where B field direction is fairly constant (mean field is well defined) and where electric field fluctuations are low <30mV/m (SC potential method can be used to determine density.

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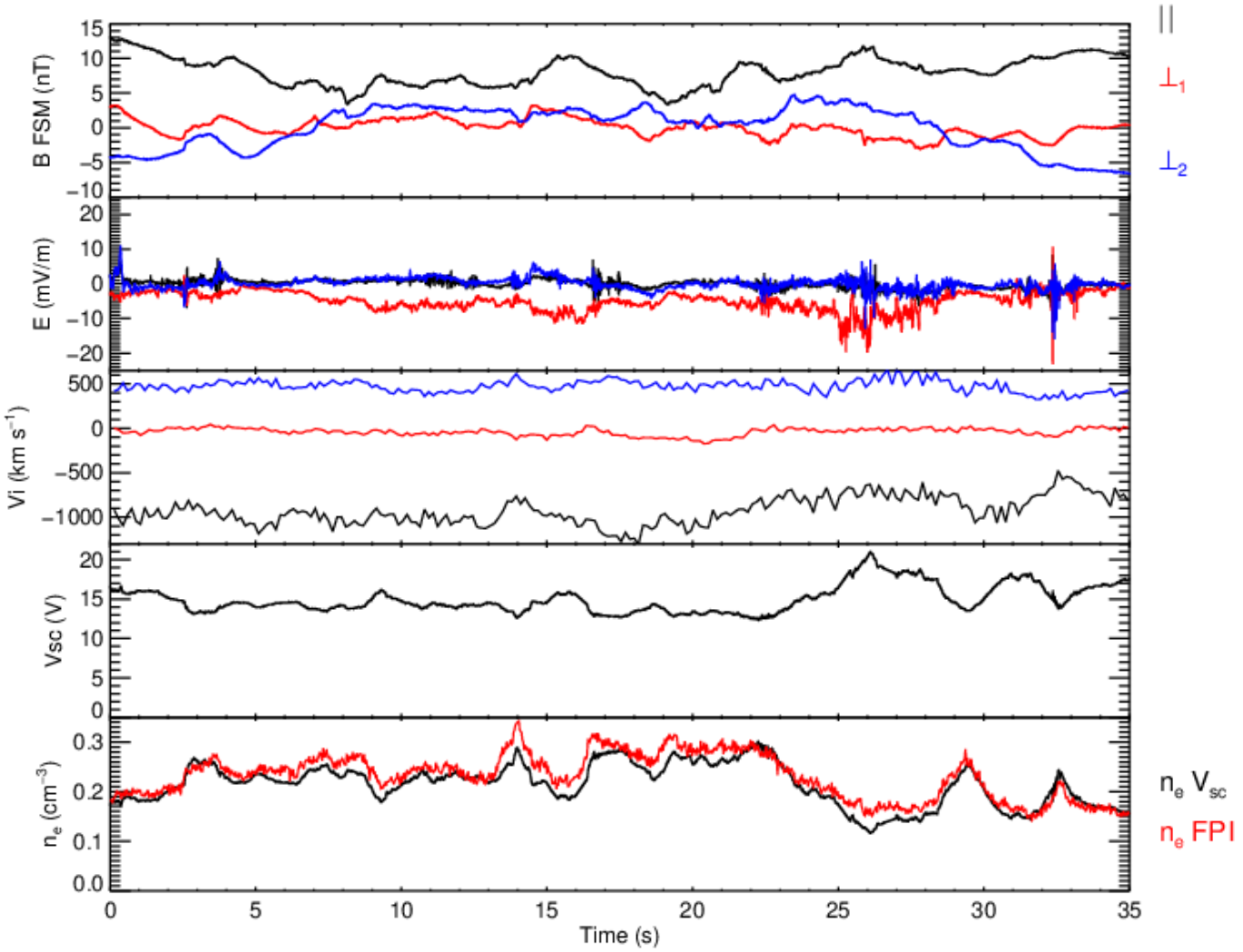
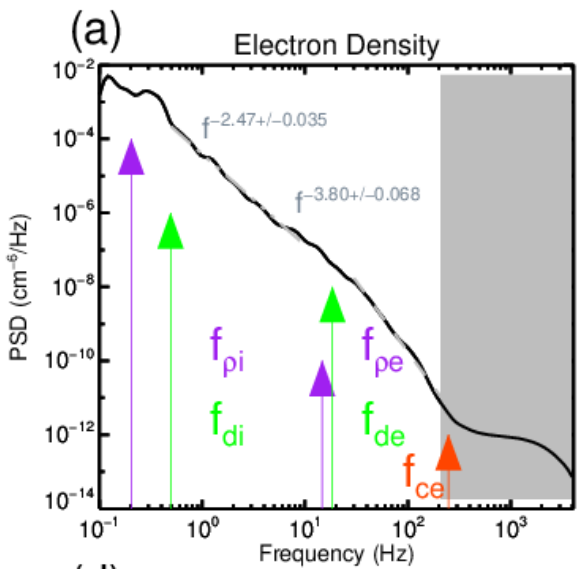
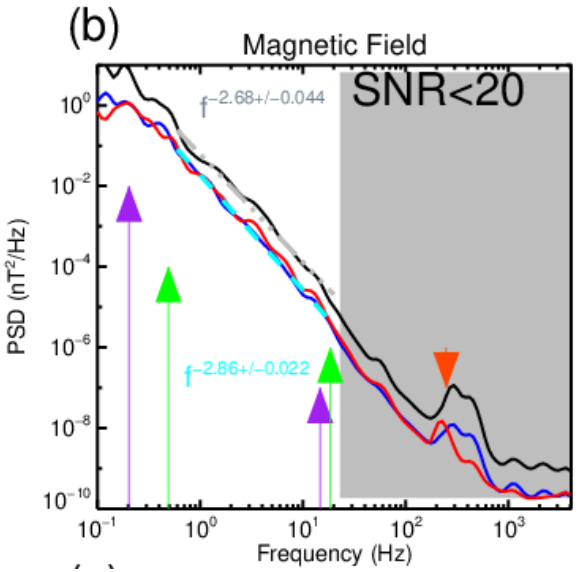
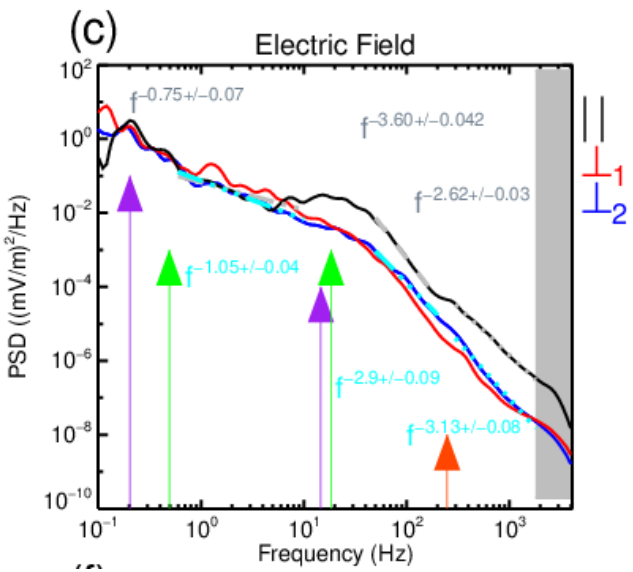
EVENT IN FIELD ALIGNED COORDINATES



SPECTRAL ANALYSIS –WAVELET SPECTRA







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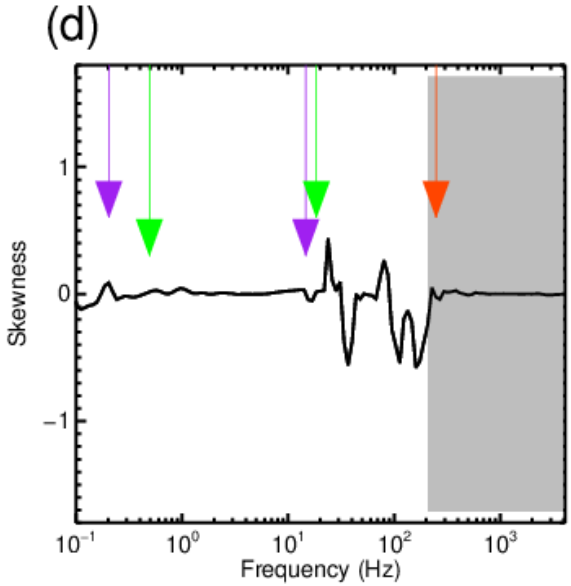
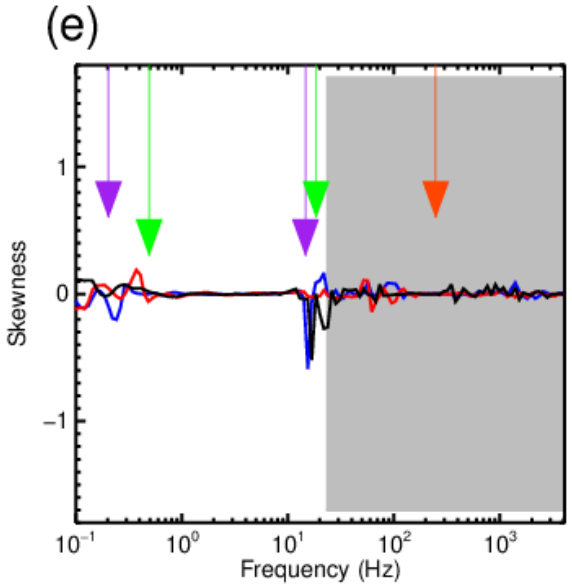
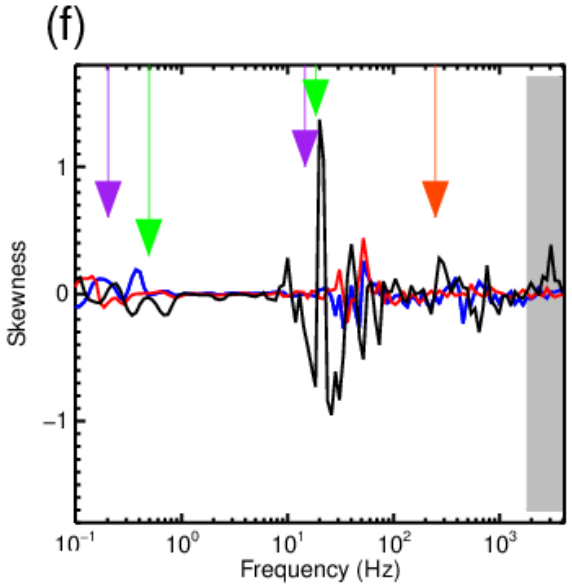
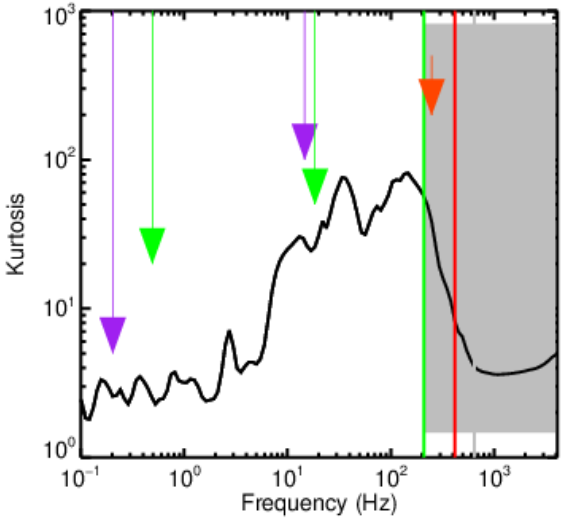
SKEWNESS

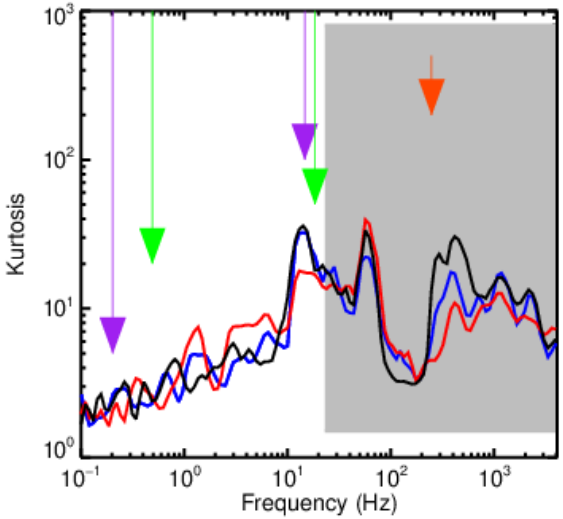


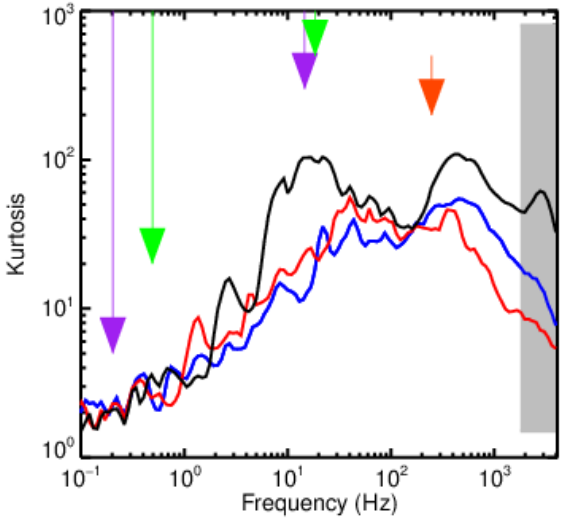




KURTOSIS


Kurtosis
Frequency (Hz)


Kurtosis
Frequency (Hz)


Kurtosis
Frequency (Hz)

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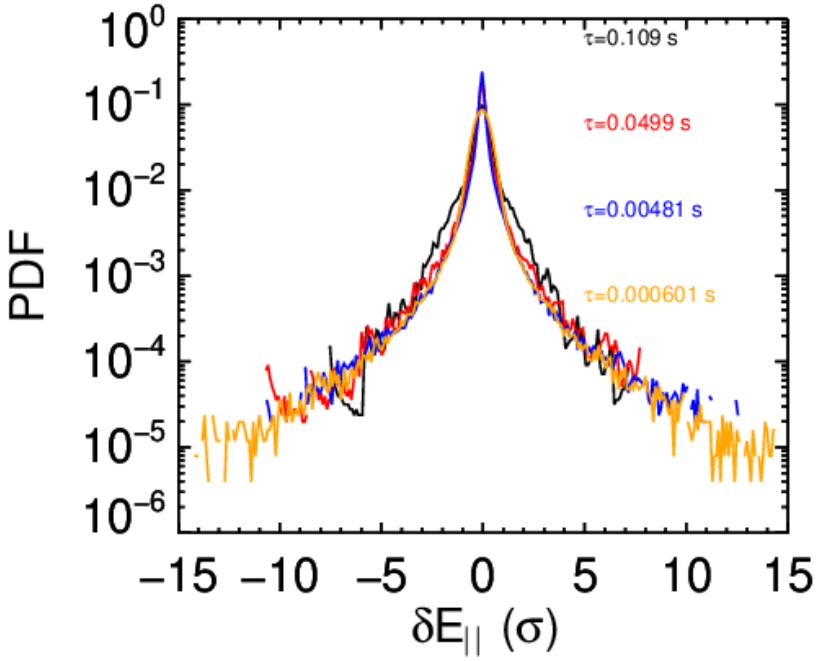
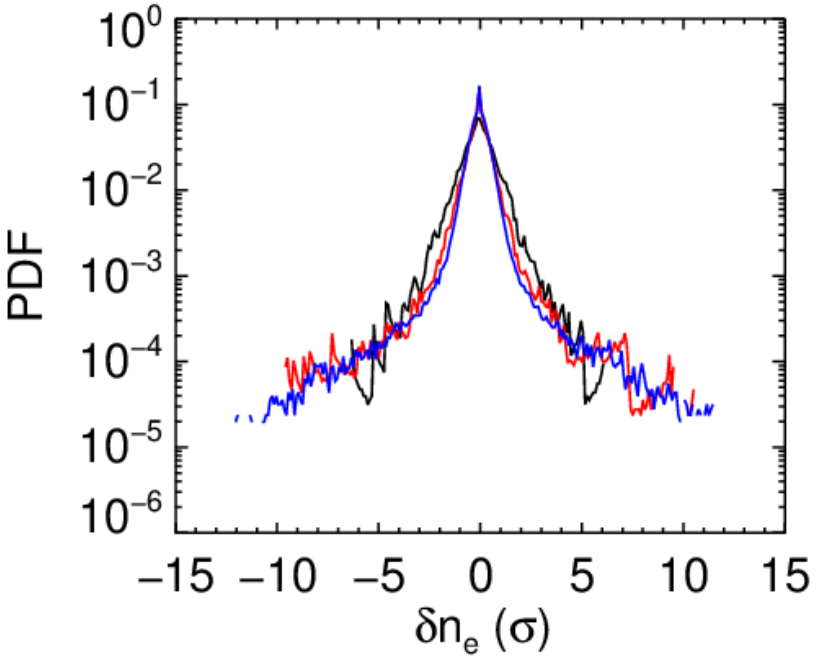
PROBABILITY DISTRIBUTION FUNCTIONS





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CONCLUSIONS/TALKING POINTS

- Different noise levels for different quantities make comparison difficult
- Density measurement down to 200Hz
- Skewness varies a lot near the characteristic scales of electrons (and protons although time series is too short to resolve protons)
- Kurtosis increases with frequency in all measurements (until we reach noise)
- How to best use this data? Use a longer time interval (prefereable) but other problems arise. Local magnetic field? Throw out density measurements when E is above a certain threshold?