



Ideas for EPD topics for: Publications BSc-theses

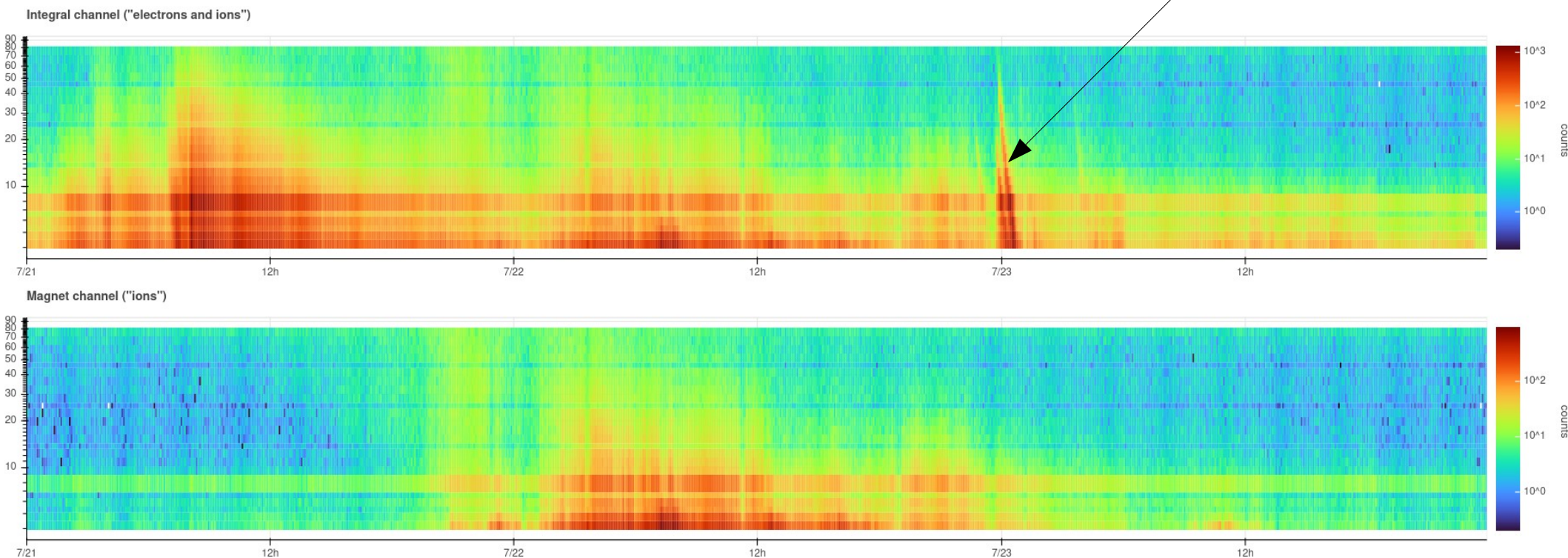
...

- Publ: July events
 - STEP / EPT electron injections
 - SIS, STEP, & EPT ions
- Publ: Small scale activity with STEP
- Publ: March ion velocity-dispersion events with STEP
- Publ: HET GCR counter for April CME Forbush decrease
- Publ: CIRs detailed time and directional dependence
- Publ: spatio-temporal evolution of CIRs: SIS/ULEIS
- BSc: Background studies
- BSc: Influence of heavy ions on EPT & STEP
- And some other interesting time periods...



STEP data for July events: electron injections

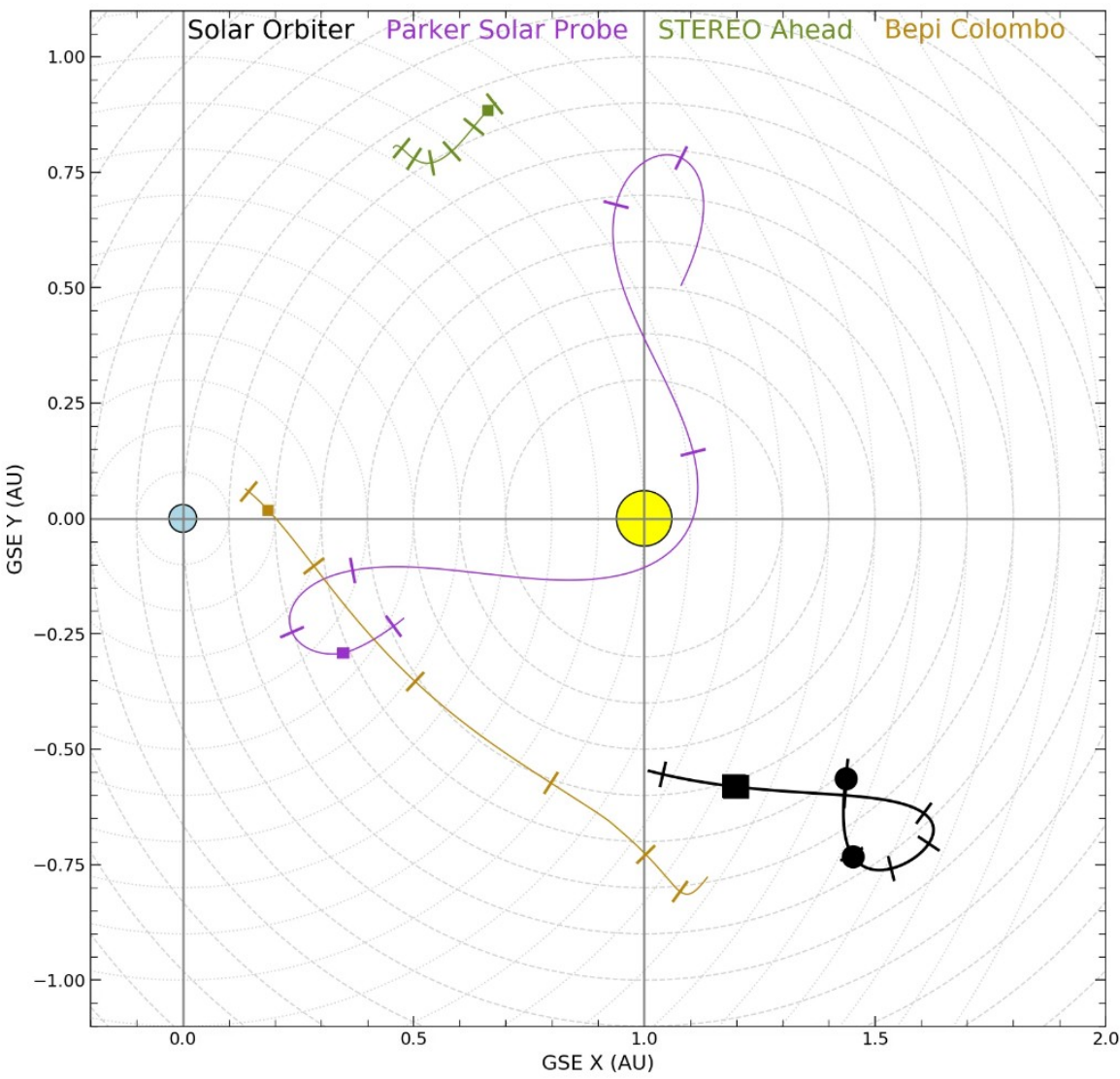
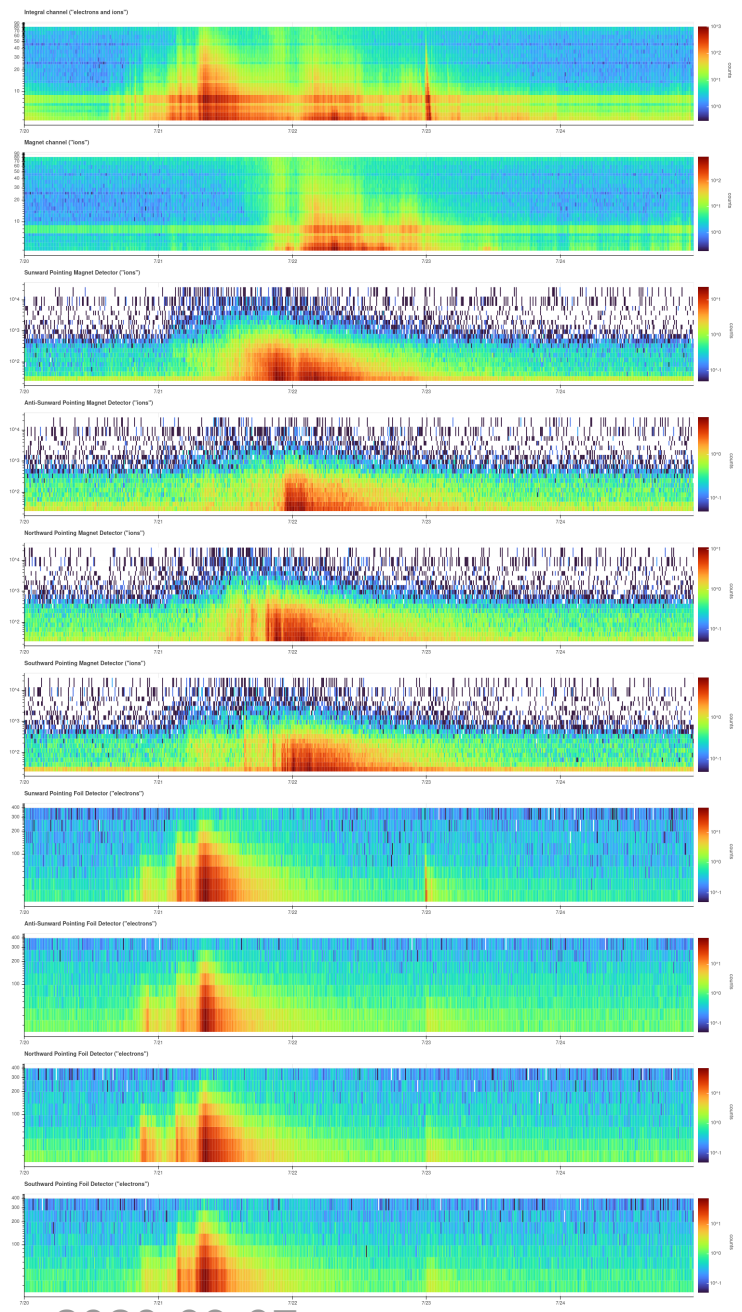
Velocity dispersion





STEP & EPT data for July events: electron inj.

Check with PSP and Beppi



2020-09-07

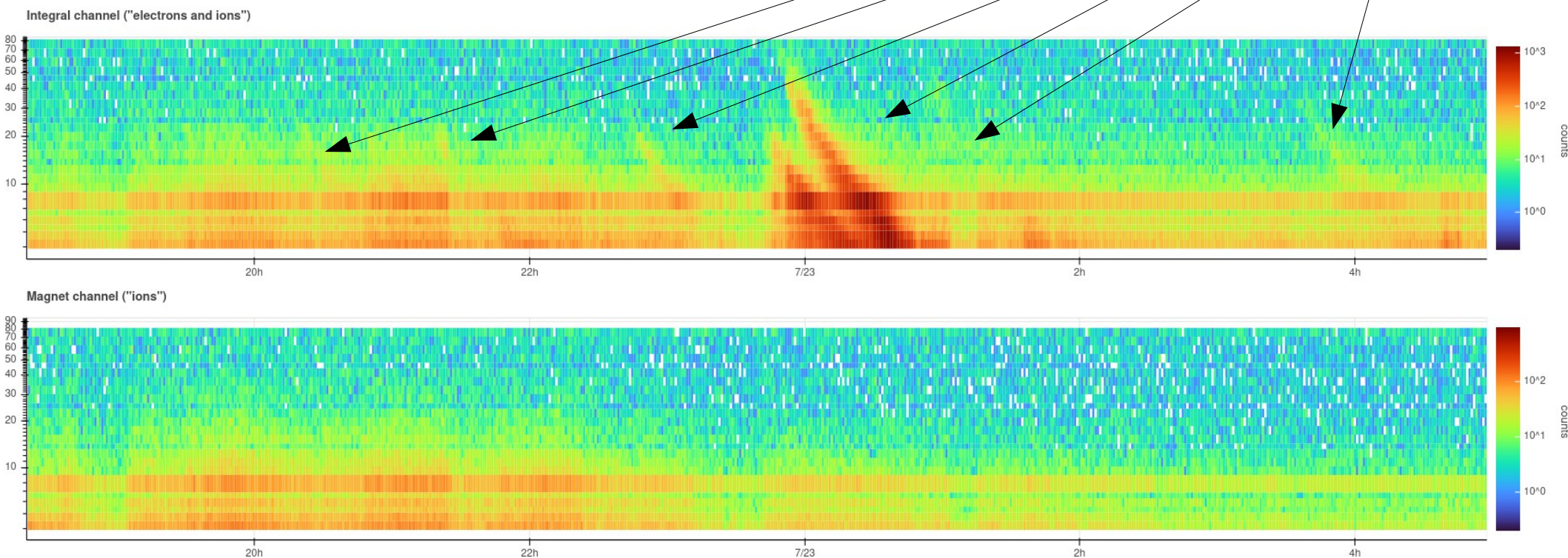
IEAP/rfws



Same time period with STEP 1 minute time res

No background correction made

Velocity dispersion

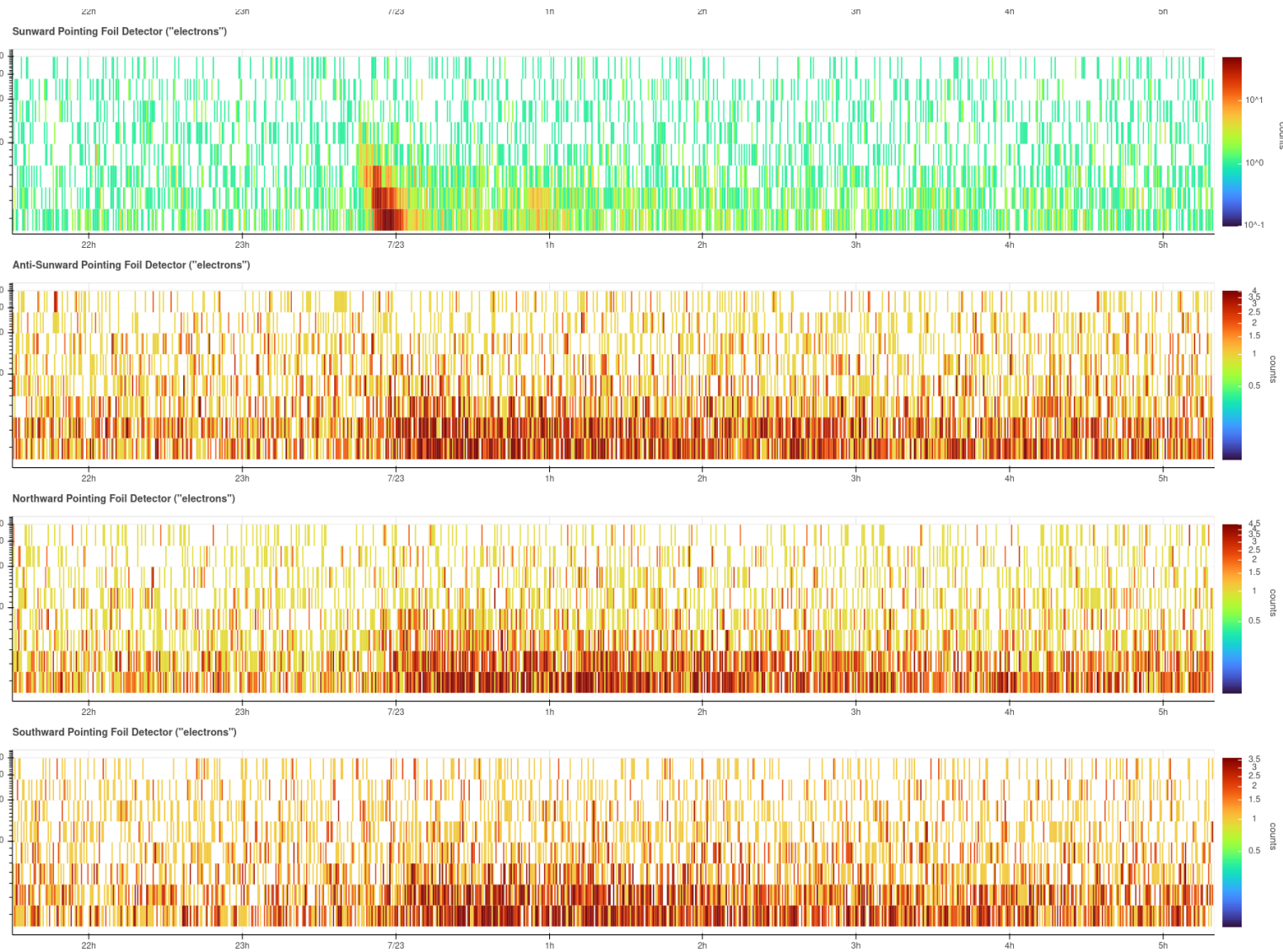


Only low activity seen in ions
Multiple injections of electrons

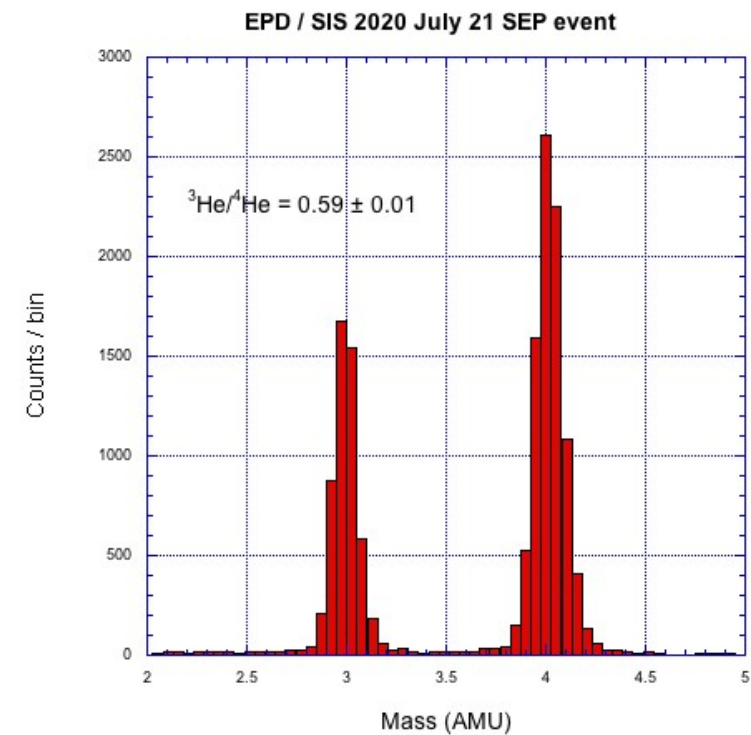
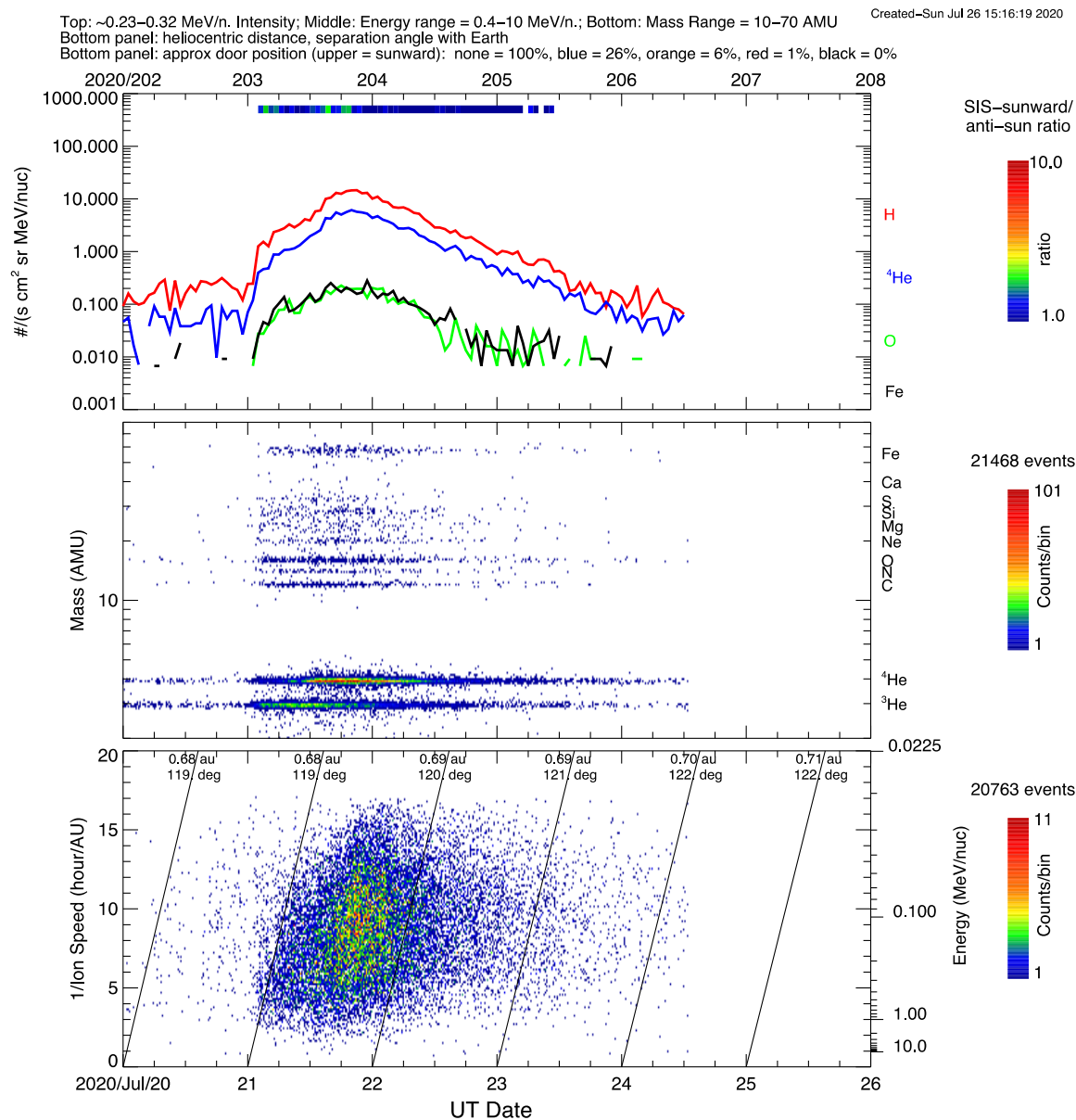
- (Use electron data to calibrate energy loss at lowest energies.)
- (Can we go lower in energy?)



Same time period with EPT 30 seconds time res

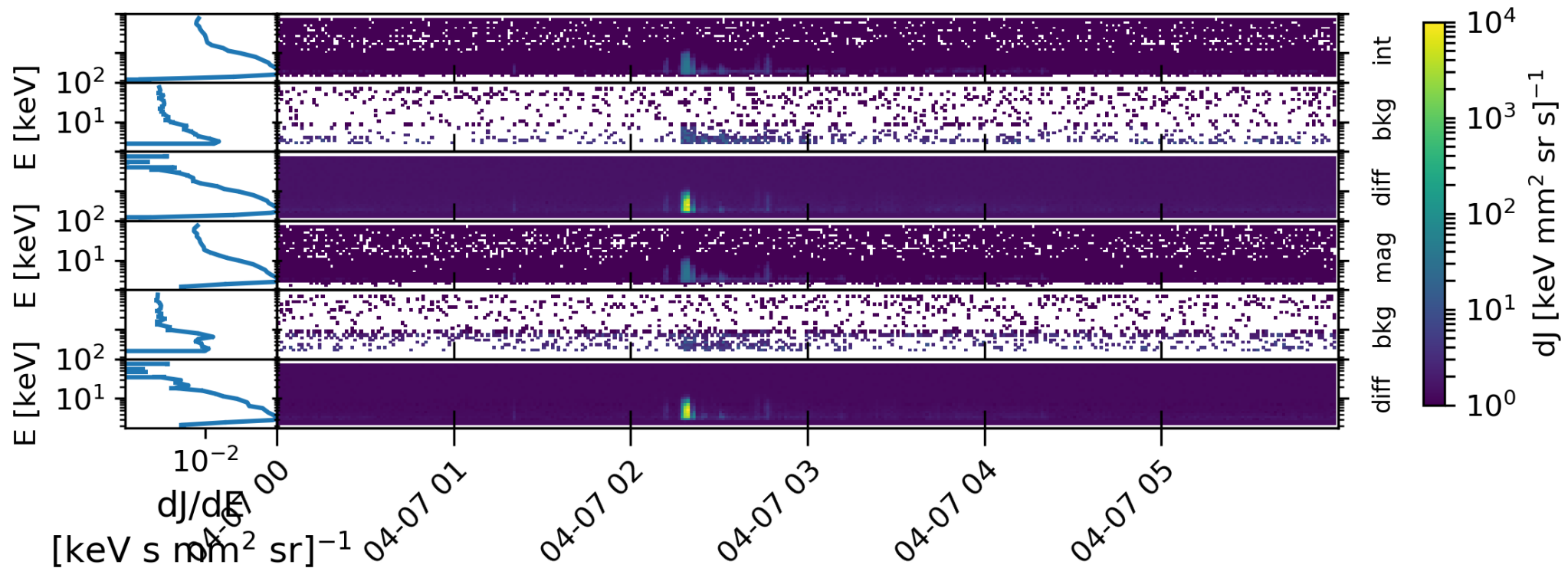


Same time period with SIS: First „large“ event





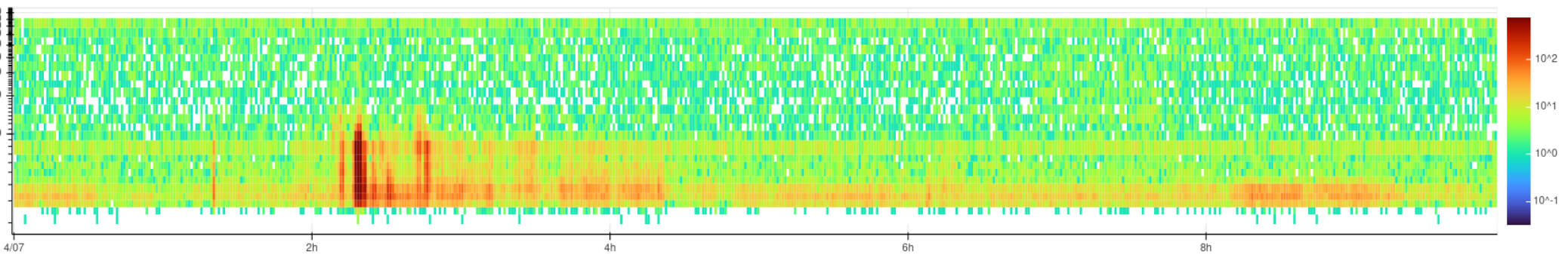
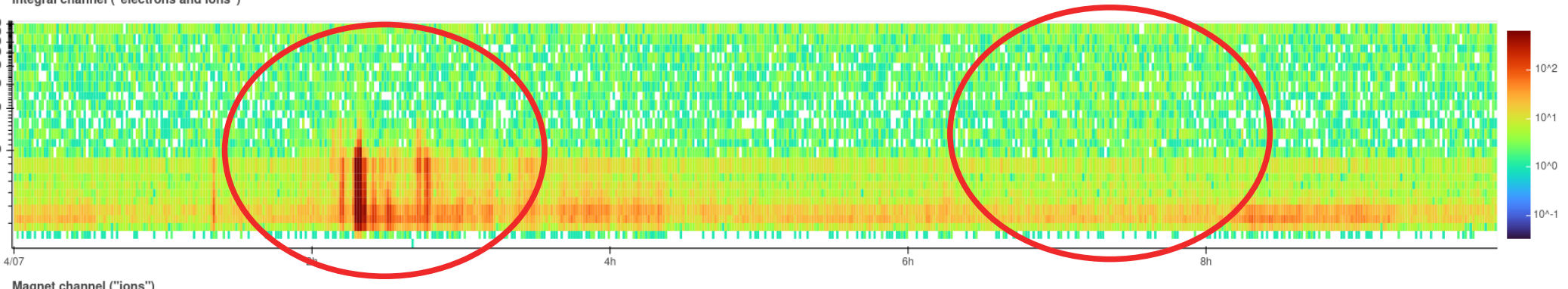
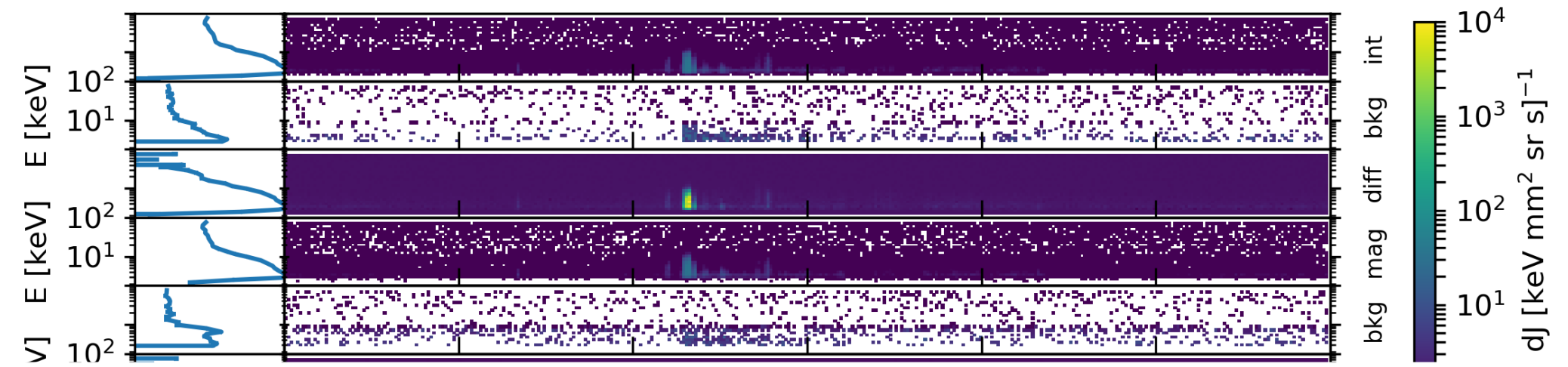
Small-scale activity with STEP What is this?





Small-scale activity with STEP

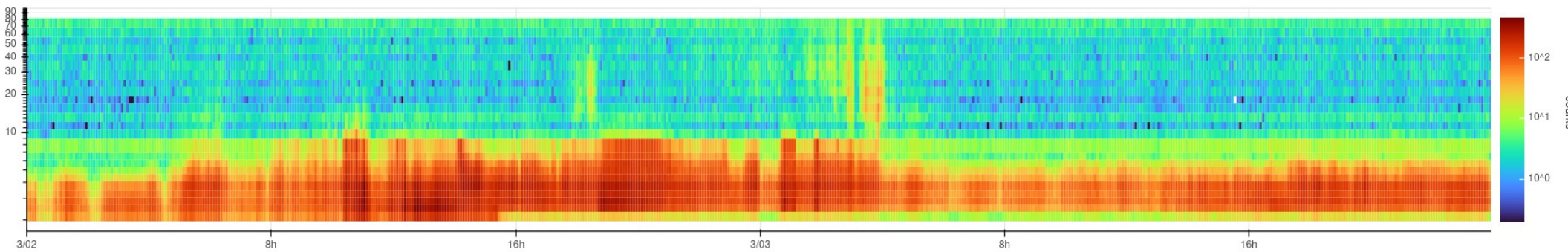
What is this?



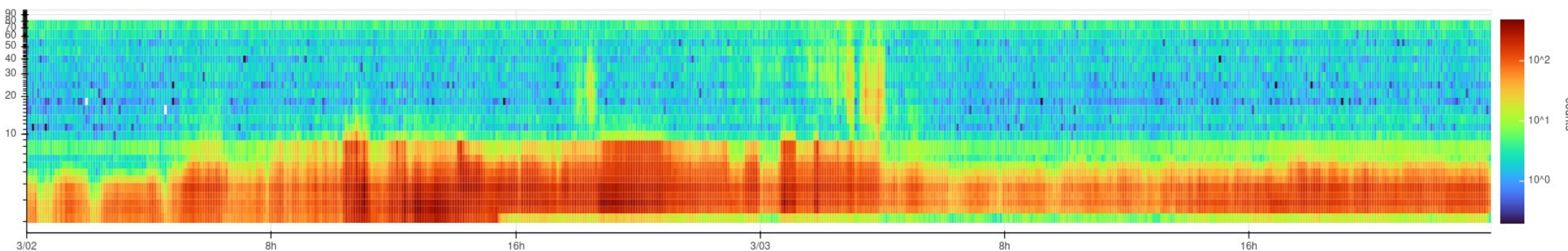


March ion velocity-dispersion events with STEP

Integral channel ("electrons and ions")



Magnet channel ("ions")



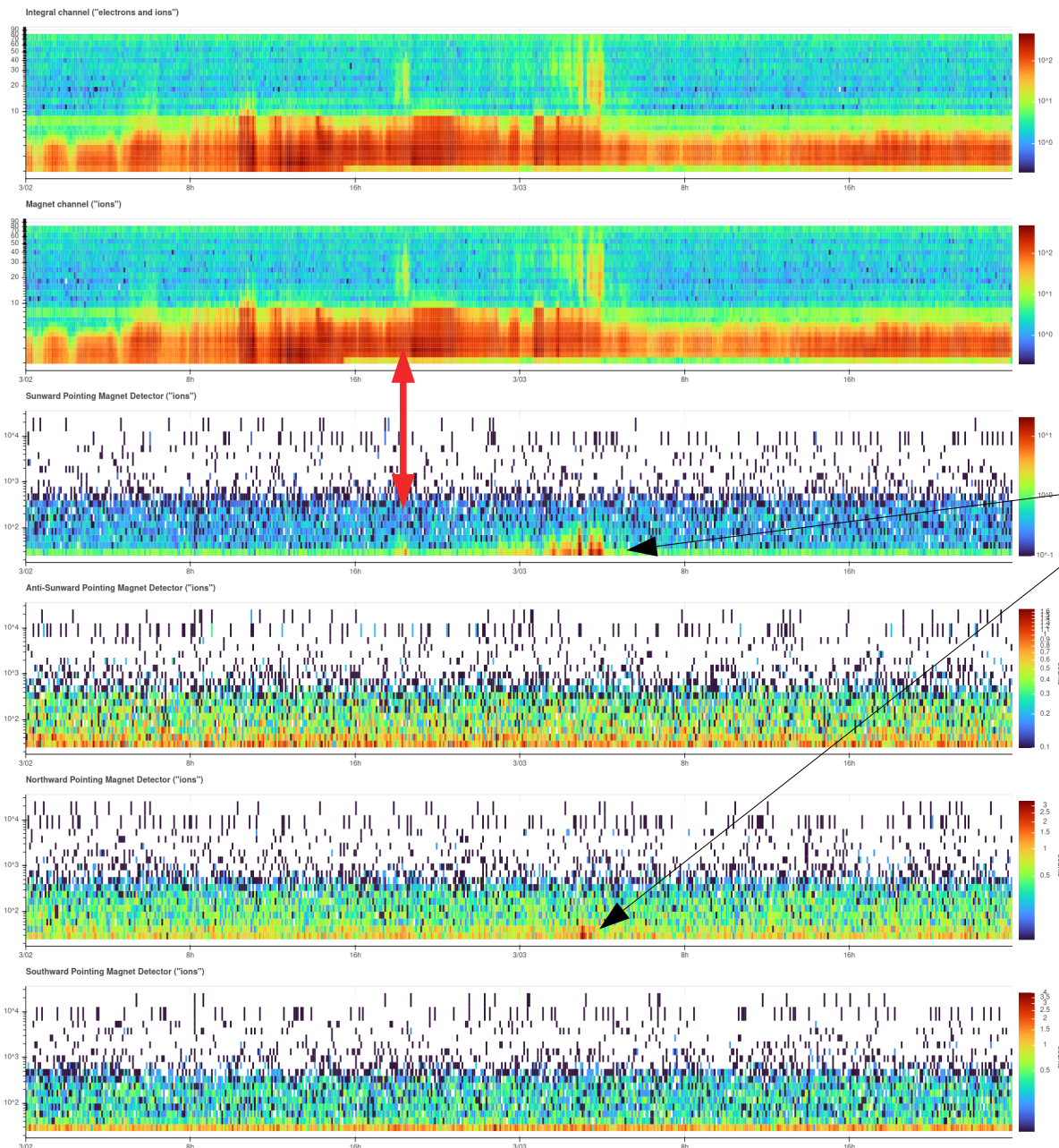
March 2/3, 2020:

Unstable „bump on tail“ distribution. Wave activity RPW/MAG?

(...and a crazy idea: Can this be used as a natural mass spectrometer and separate He from H. Does He arrive later than H? This would also be helpful in determining the low-energy response to H and He ions.)



March ion velocity-dispersion events with EPT



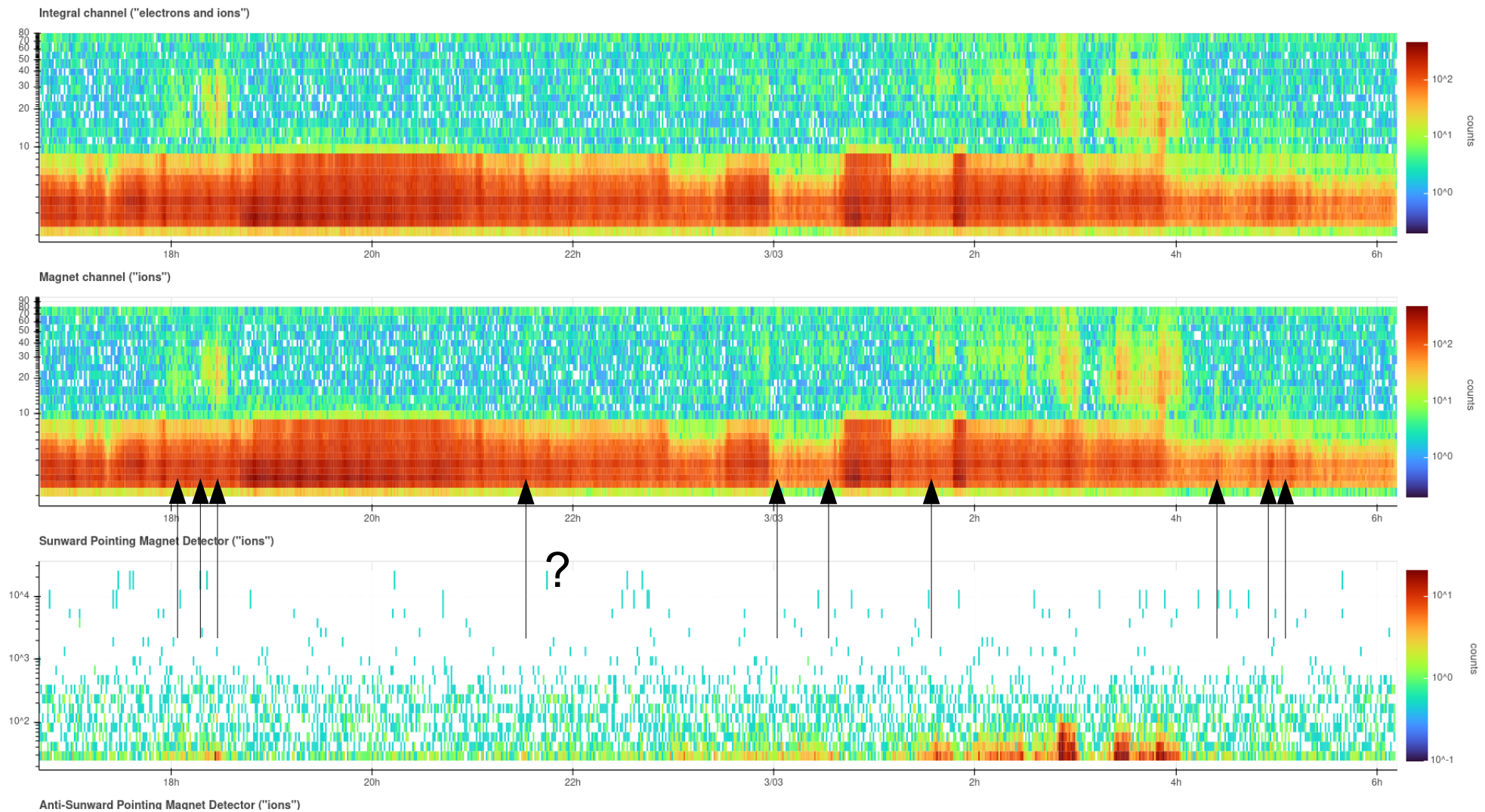
Also seen with EPT
at low energies.

What does
anisotropy tell us?

CAU: Web plotter
should use same
color scale for all
plots or have a
control to do that.



March ion velocity-dispersion events with EPT



Multiple injections see. Rather dynamic time period.

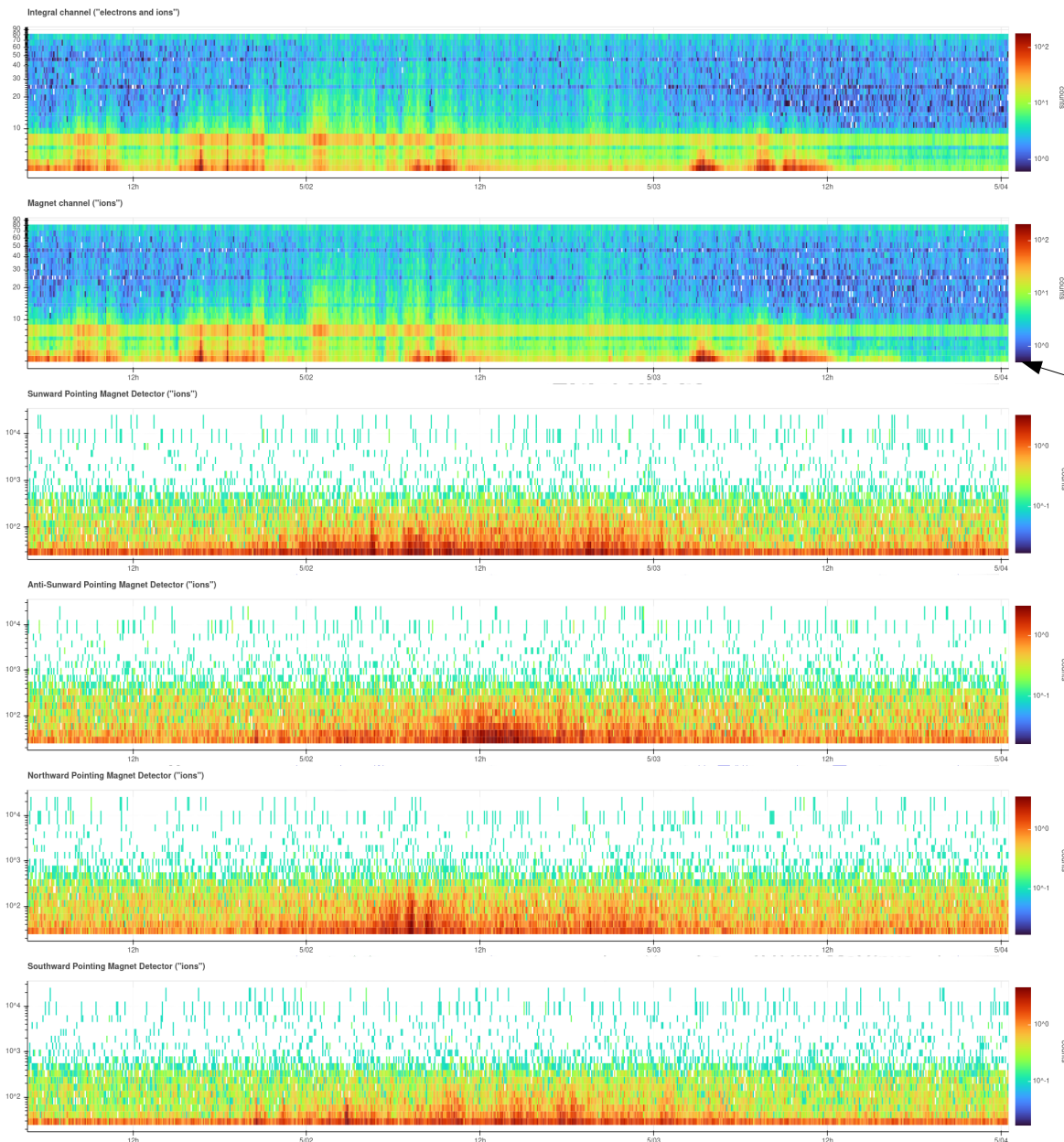


April 20 Forbush Decrease with HET and 1AU assets: Evolution of ICME

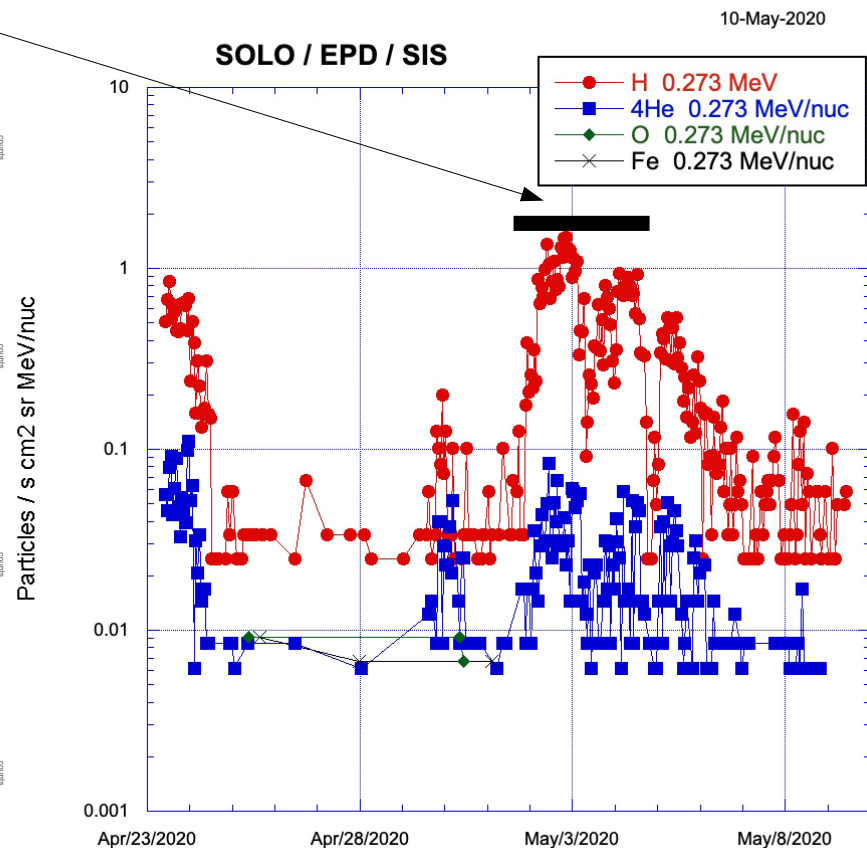
Johan, a slide or two, please



May 1 - 4 CIR STEP-EPT (&SIS)



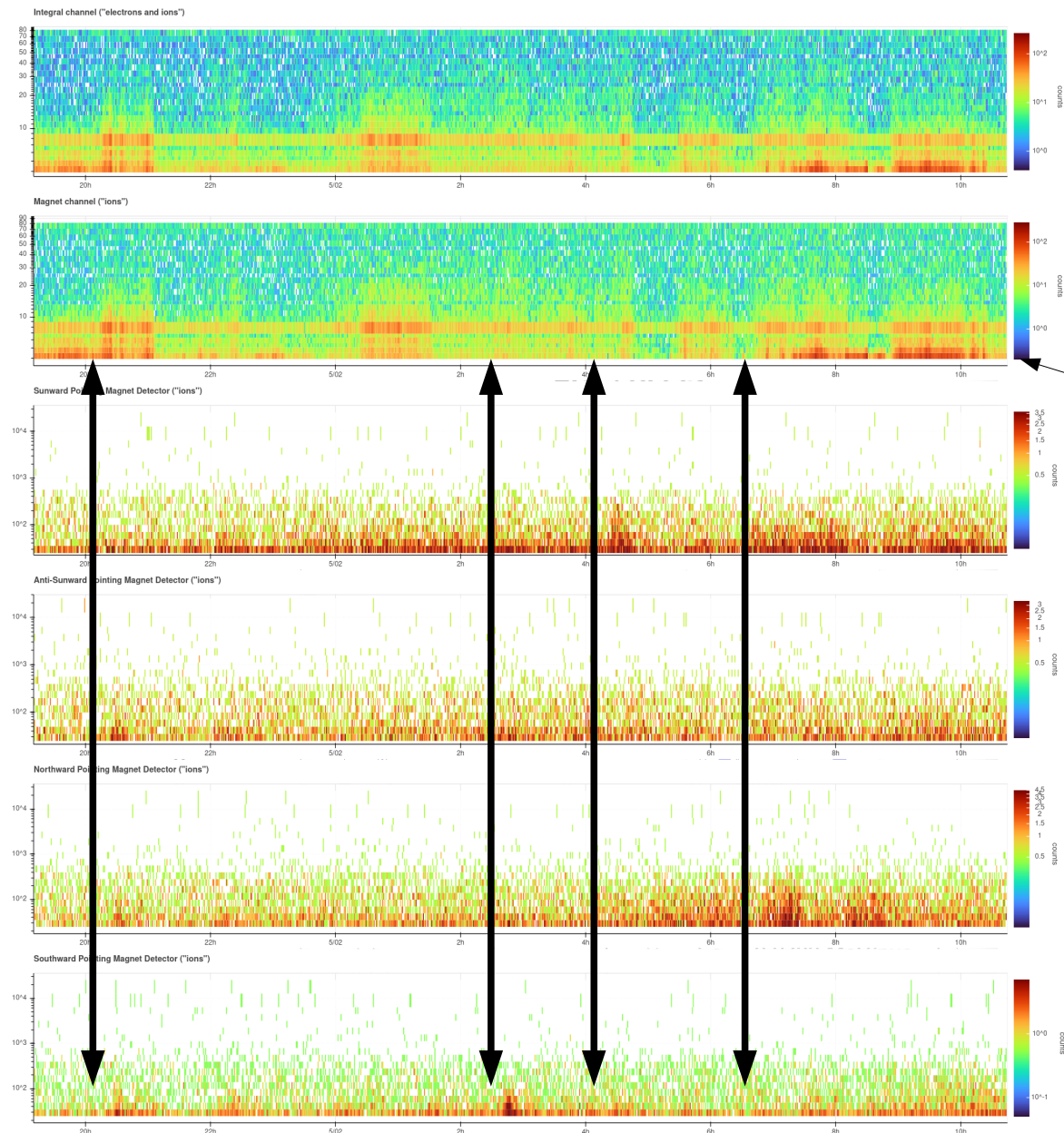
Interesting directional variations seen in EPT. Comparison between STEP and EPT looks interesting, especially times of spikes.



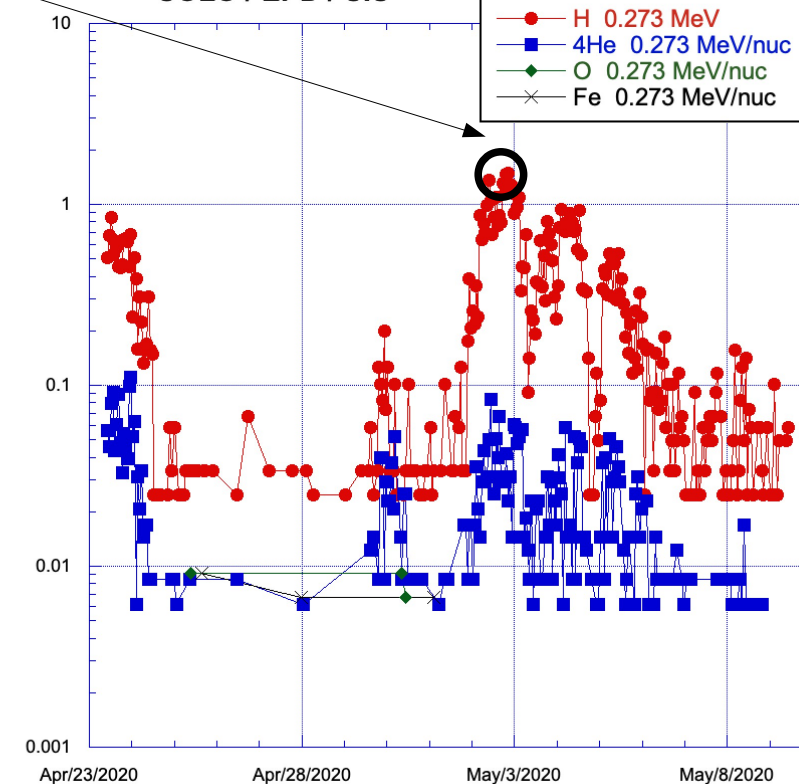


May 1 - 4 CIR STEP-EPT (&SIS) zoomed in

Interesting directional variations seen in EPT.
Comparison between STEP and EPT looks interesting, especially times of spikes.



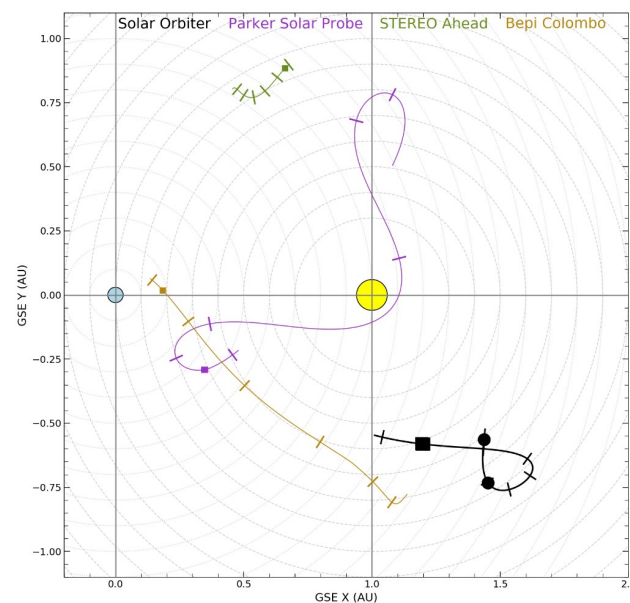
SOLO / EPD / SIS



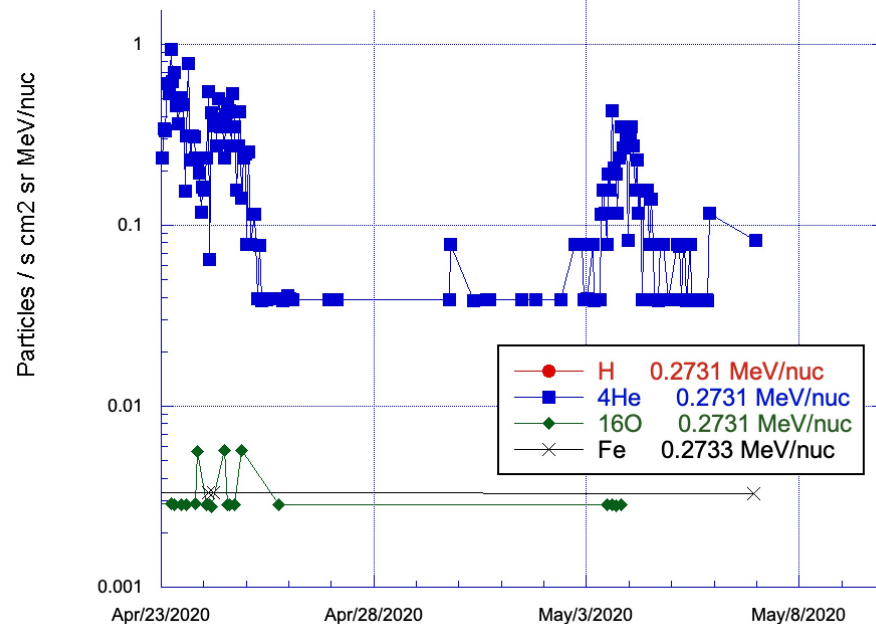


CIRs: spatio-temporal evolution SIS/ULEIS

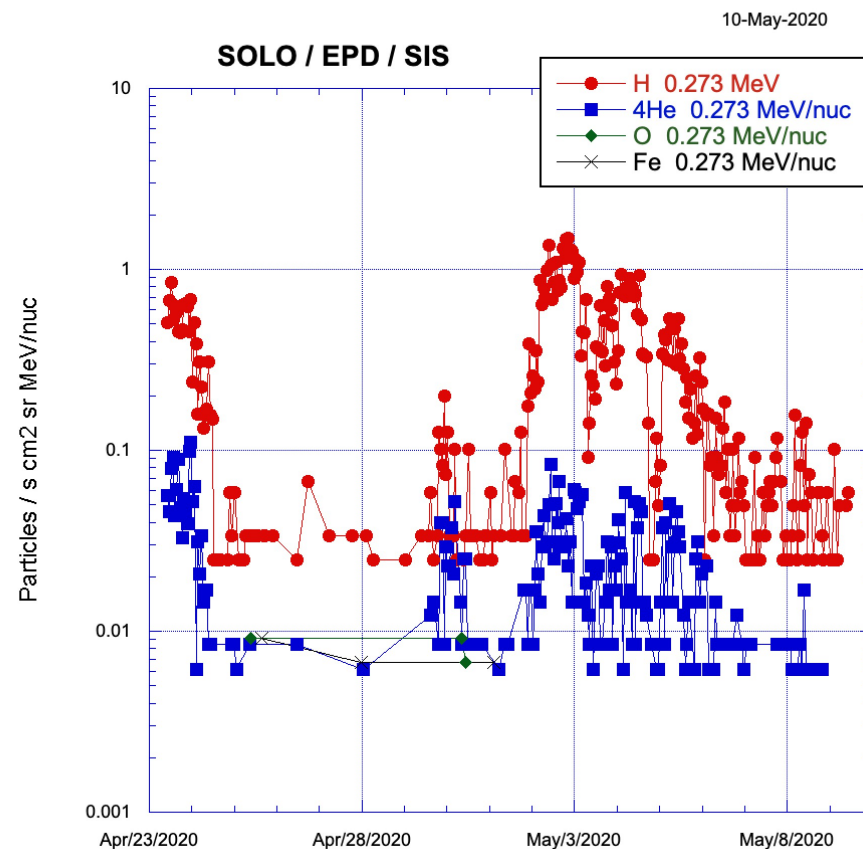
Combine with Beppi Colombo and PSP?



ACE / ULEIS



SOLO / EPD / SIS





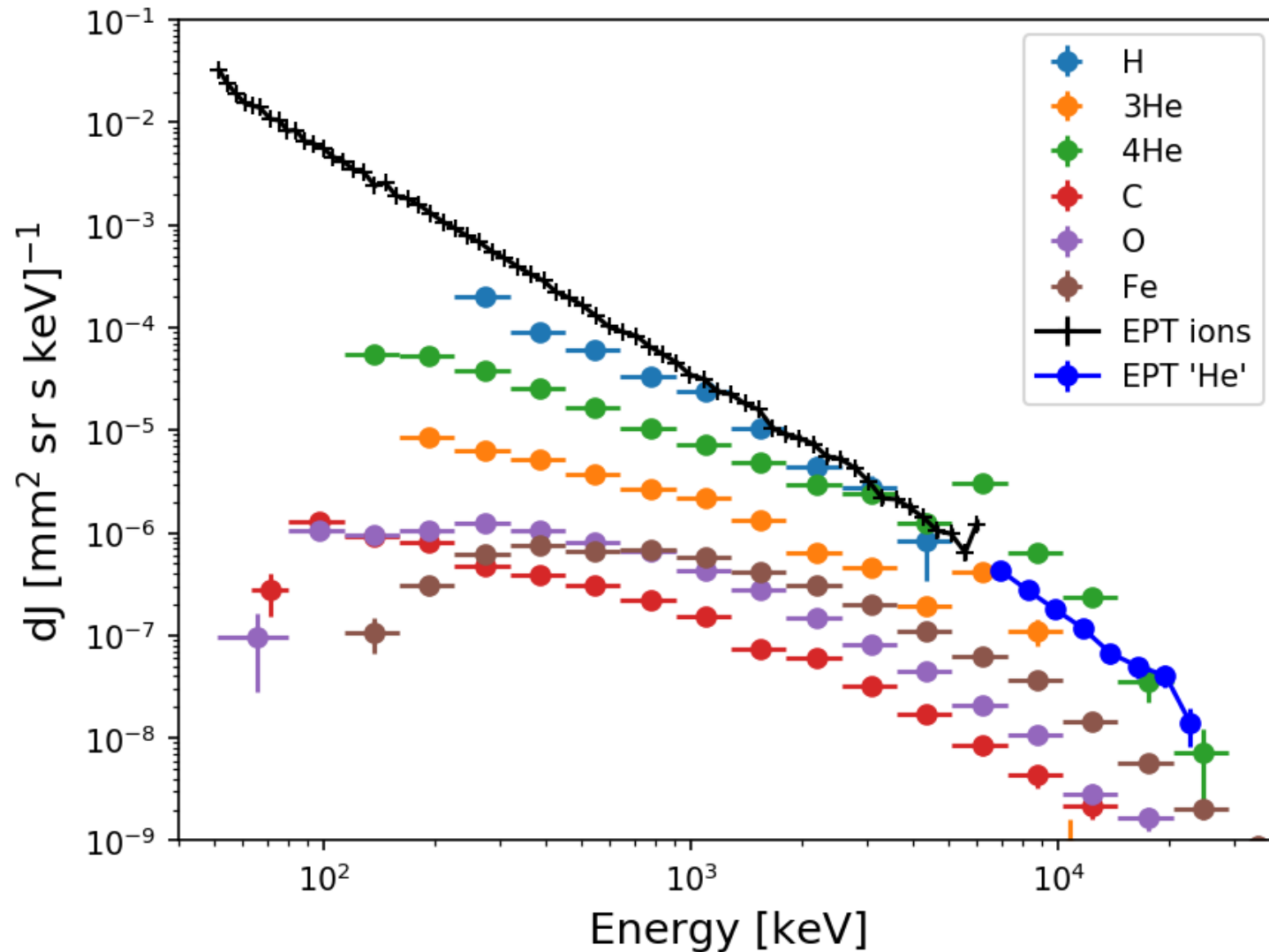
Some topics for BSc-theses and/or HiWis

- STEP: Use electron data to calibrate energy loss at lowest energies using electron velocity dispersion in July event
- STEP: Use ion data to calibrate energy loss at lowest energies using ion velocity dispersion in March event
- STEP/EPT: Can we go lower in energy? Optimize thresholds
- STEP background: How to best get rid of it
- STEP: develop a clean electron/ion data product
- STEP: Influence of heavy ions ($m > 2$ amu) on STEP data products
- EPT background: How to best get rid of it
- EPT penetrating particles: energy calibration
- Web plotter: various additional plots/products



BSc-thesis:

Influence of „heavy ions“ on EPT (and STEP) measurements



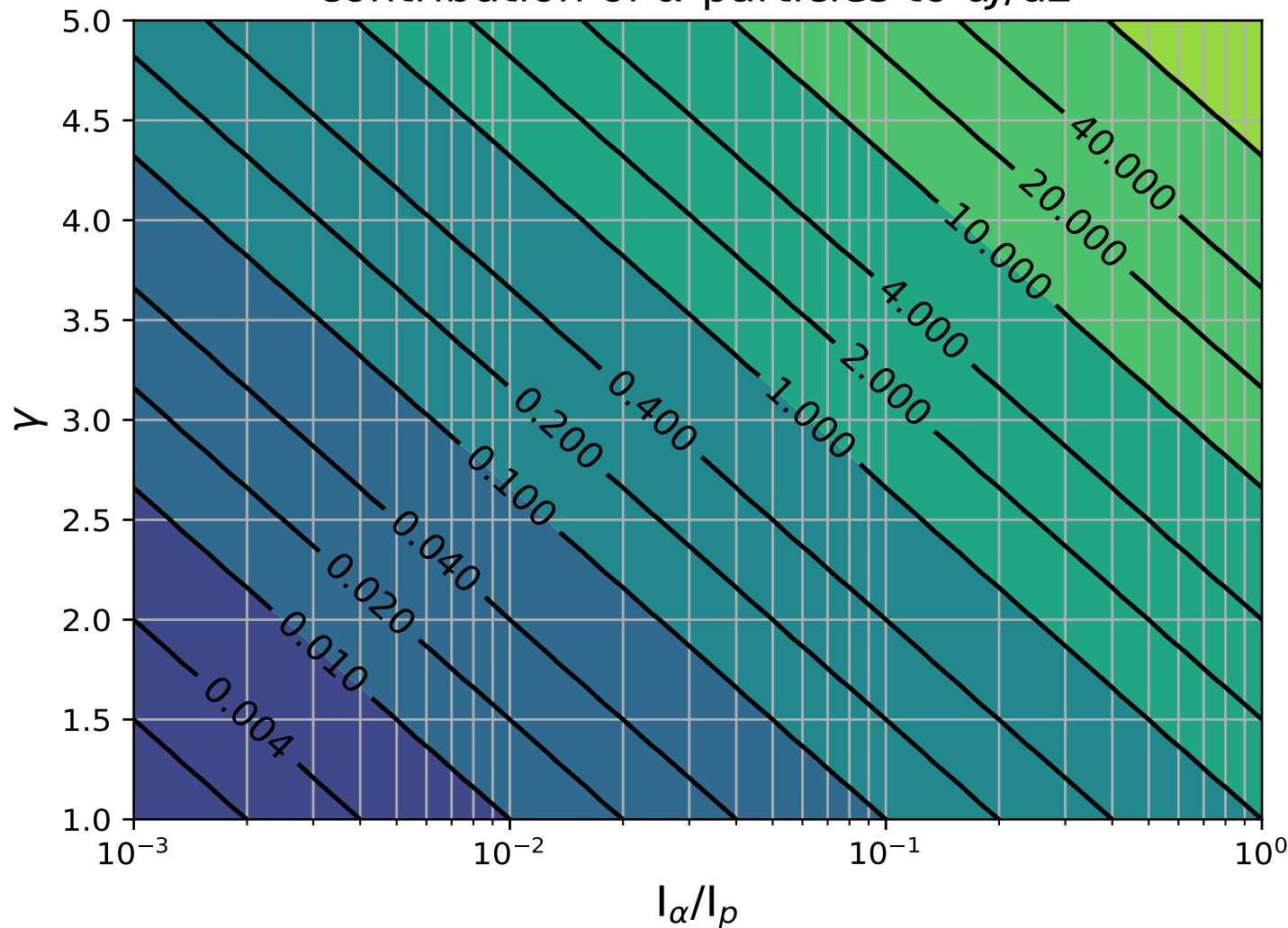


BSc-thesis:

Influence of „heavy ions“ on EPT (and STEP) measurements

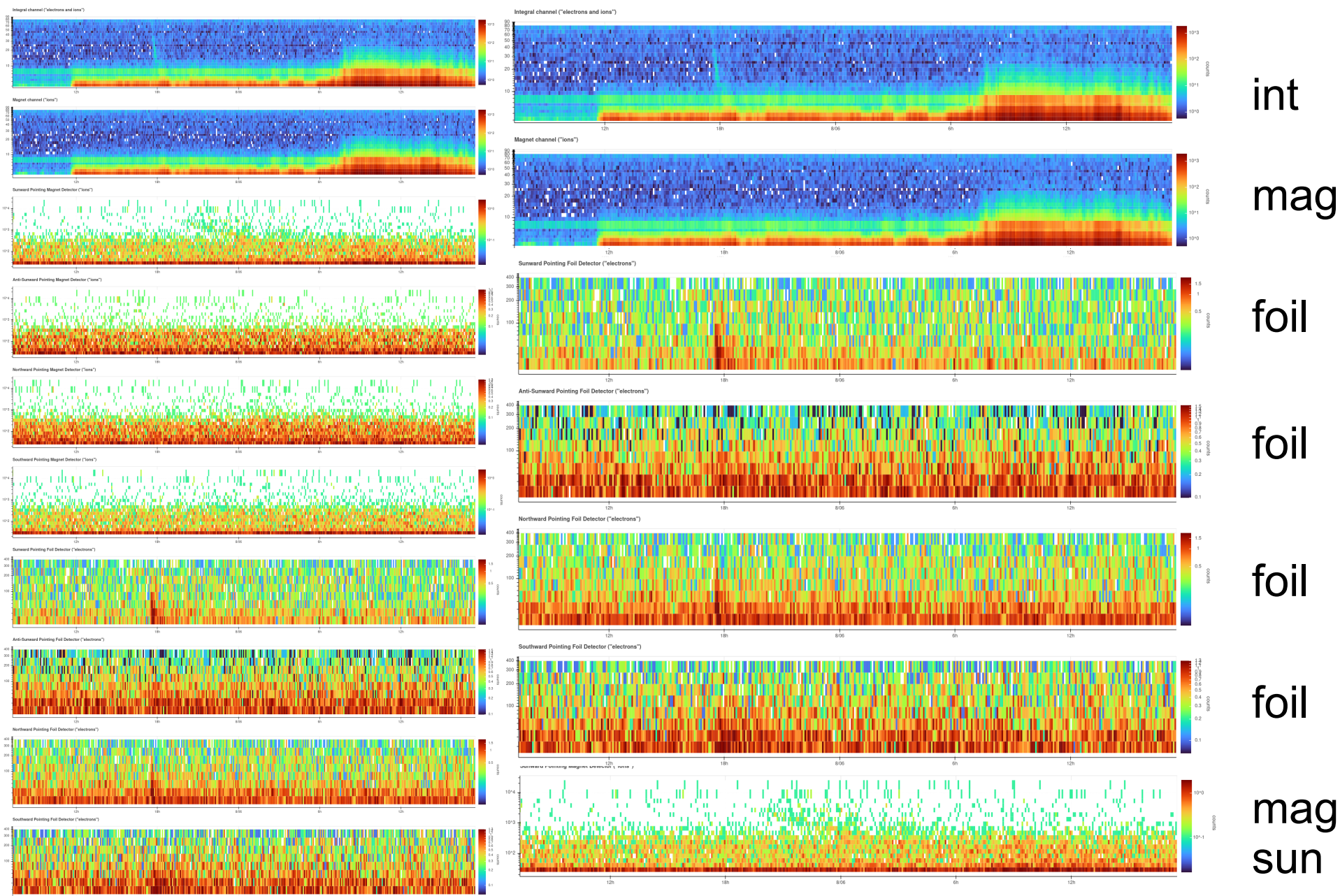
$$\frac{dJ}{dE} = \frac{dJ_p}{dE} + \frac{dJ_\alpha}{dE_\alpha}, \quad \frac{dJ_p}{dE/m_p} = I_p \left(\frac{E_p}{m_p} \right)^{-\gamma}, \quad \frac{dJ}{dE} = I_p E^{-\gamma} (1 + f)$$

contribution of α -particles to dJ/dE



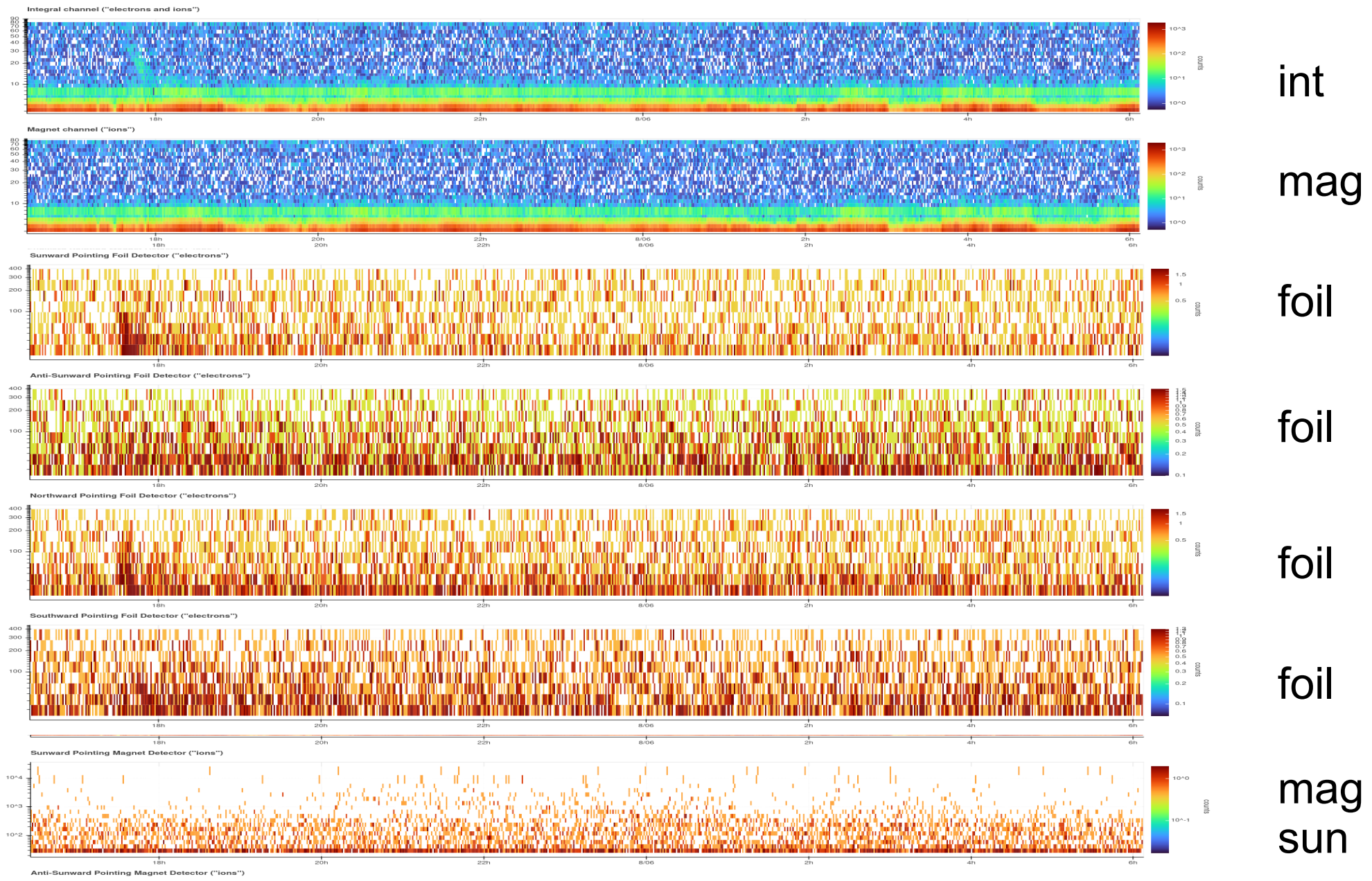


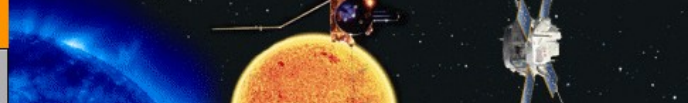
Some other interesting time periods: August 5





Same time period, higher time resolution



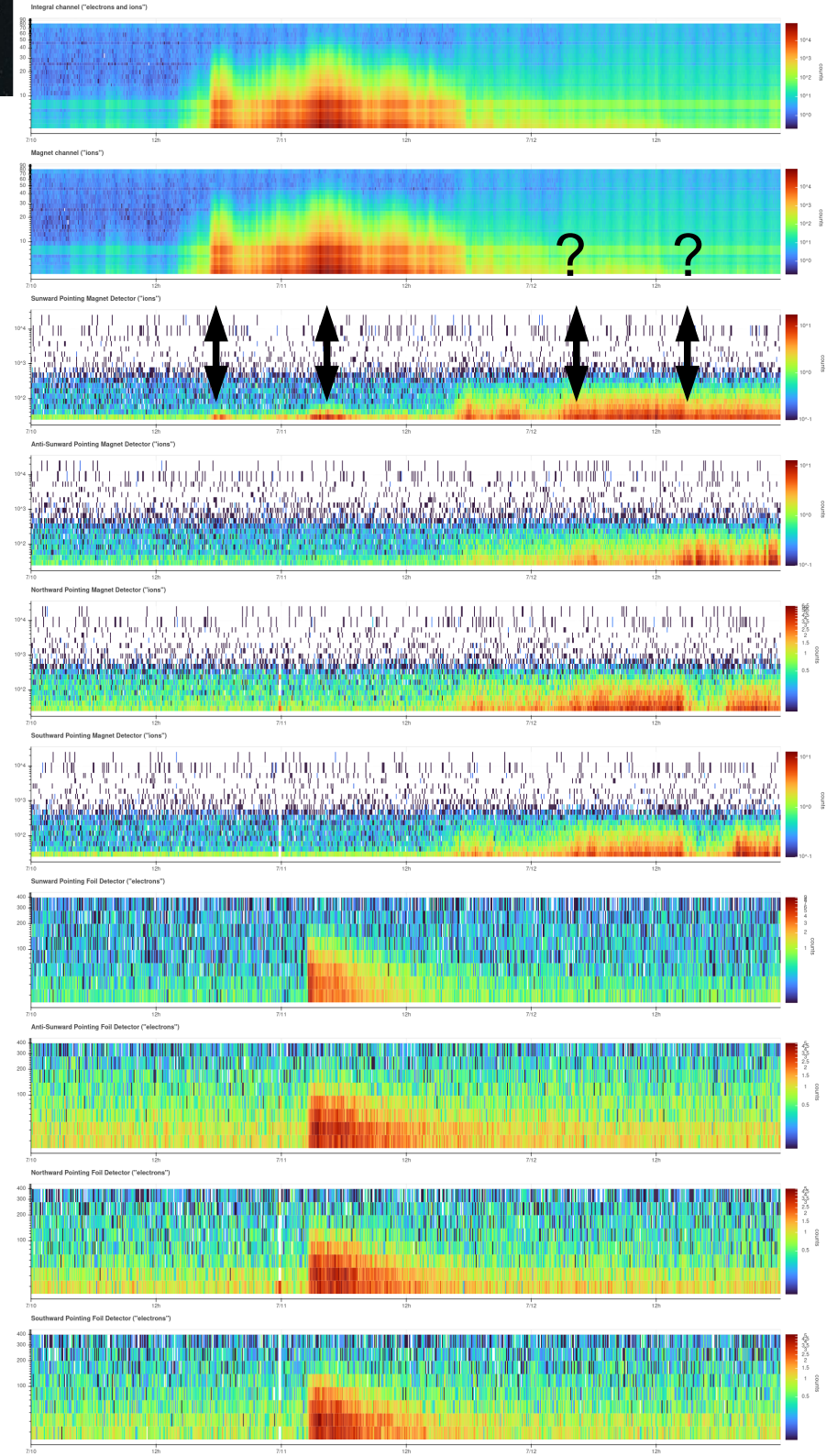


July 11 – 13, 2020

Strong electron event seen in EPT.
Are there signatures in RPW?

Why don't we see anything in STEP
electrons?
Are we dominated by low-energy ions?

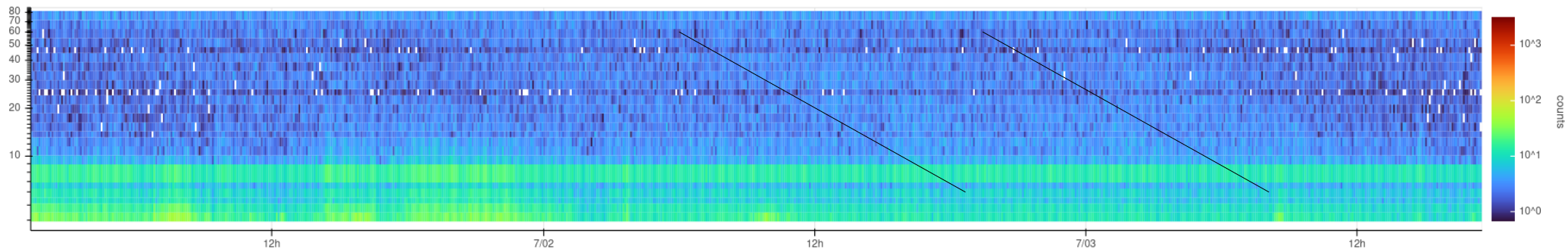
Why do we see significant activity in
EPT but not in STEP in second half?



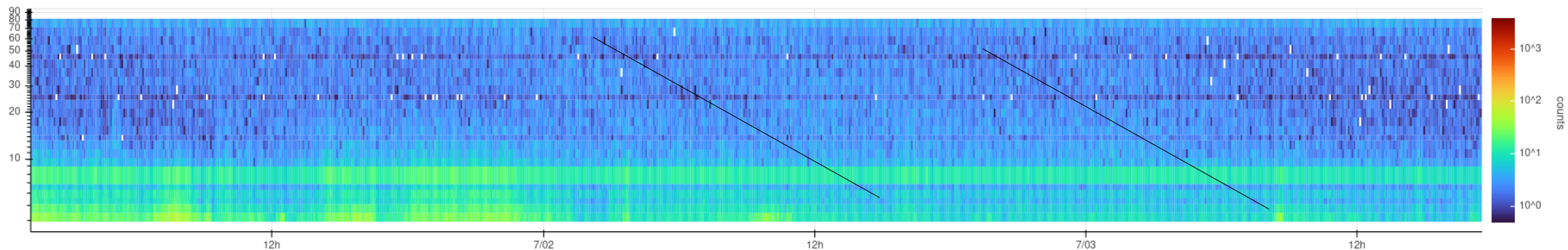


July 1 – 3, 2020

Integral channel ("electrons and ions")



Magnet channel ("ions")

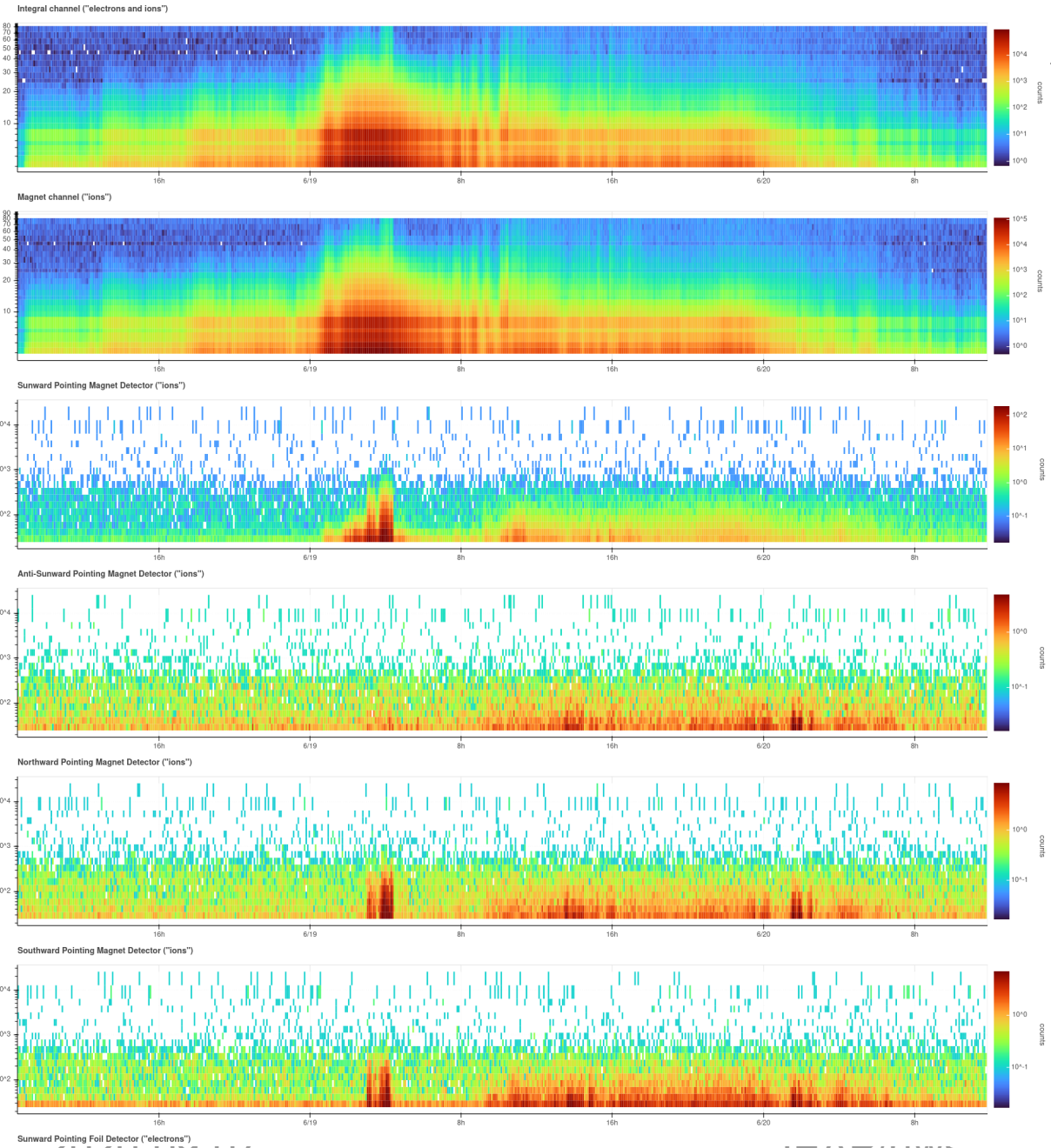


Sunward Pointing Magnet Detector ("ions")

Very, very weak ion dispersion? Or am I only imagining this?
Need to do a real dispersion analysis and then look perpendicular to
tracks to see whether this stands up to scrutiny.



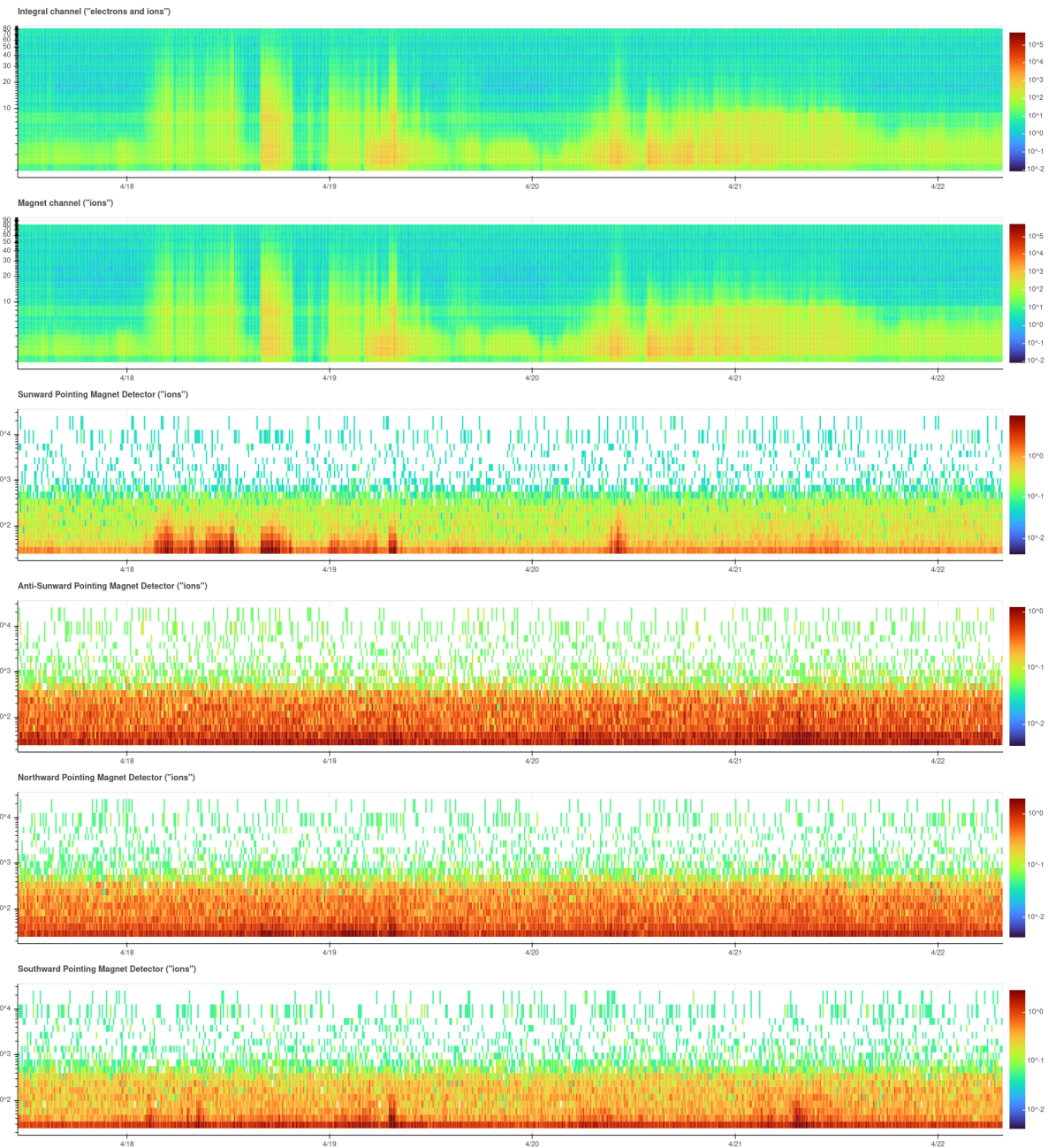
June 19, 2020



Very short ion spikes in EPT. Long-lasting event in STEP and sunward EPT. No electrons seen.



April 19, 2020

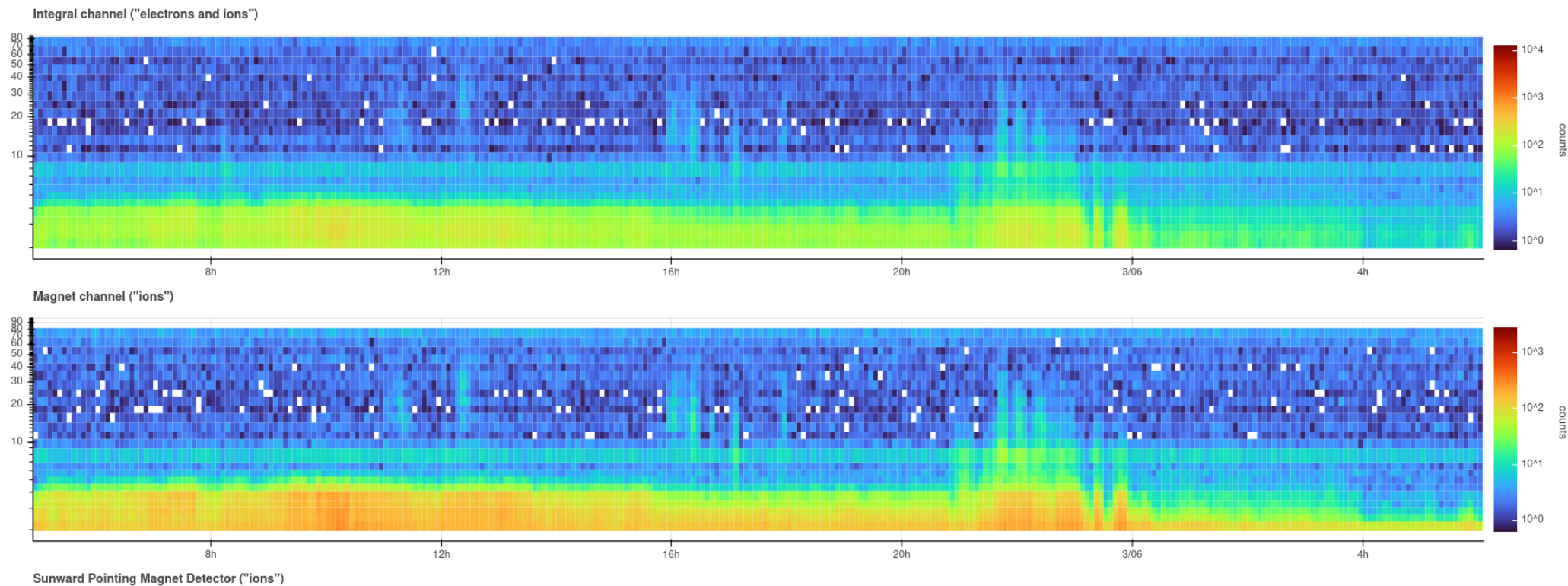


Short ion spikes in EPT.
Long-lasting event in STEP
and sunward EPT. No
electrons seen.

Interesting anisotropies.



March 5, 2020



Some more ion velocity dispersion events seen on March 5th, following the events of March 2nd/3rd.



Some notes:

The web-plotter is really, really useful – thanks to all who have contributed!

It would be great if one could:

- Choose to have the same color bar for all plots of one instrument. Now EPT has different color scales for different telescopes. (I guess it assigns them dynamically.)
- Enter time limits as well, not only dates.
- Plot an energy spectrum for a given time period and choose which telescopes to use.
- Plot science counters too (HET GCR counter, which one is that?)
- Plot MAG data once available