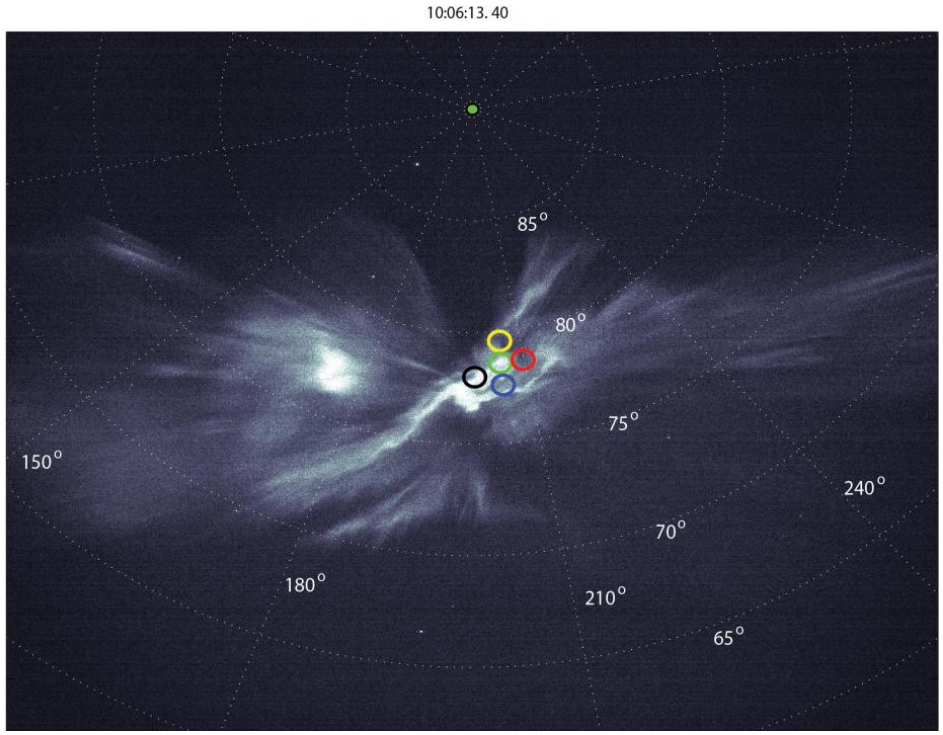


Partitioning of energy into auroral fine scale breakup arcs

Hanna Dahlgren[1], Josh Semeter[1],

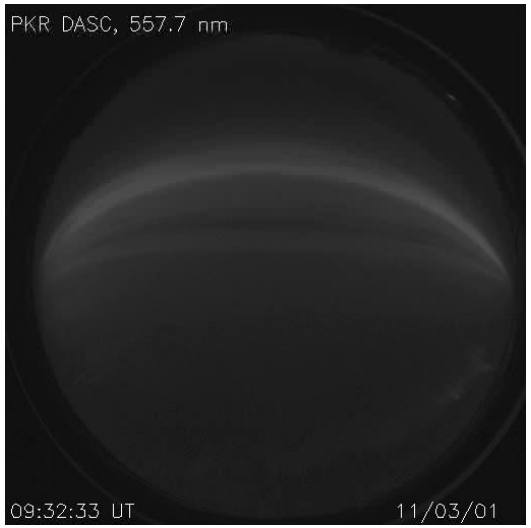
R.A. Marshall[2]

[1]Boston University, [2]Stanford University

Observations of dynamic, flaming rays

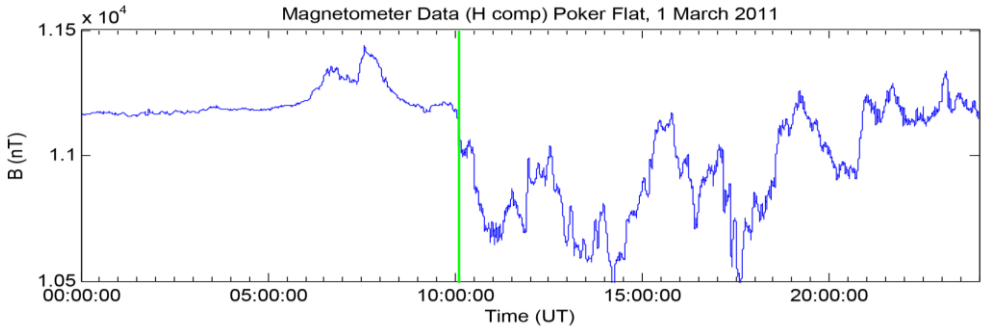
BOSTON UNIVERSITY

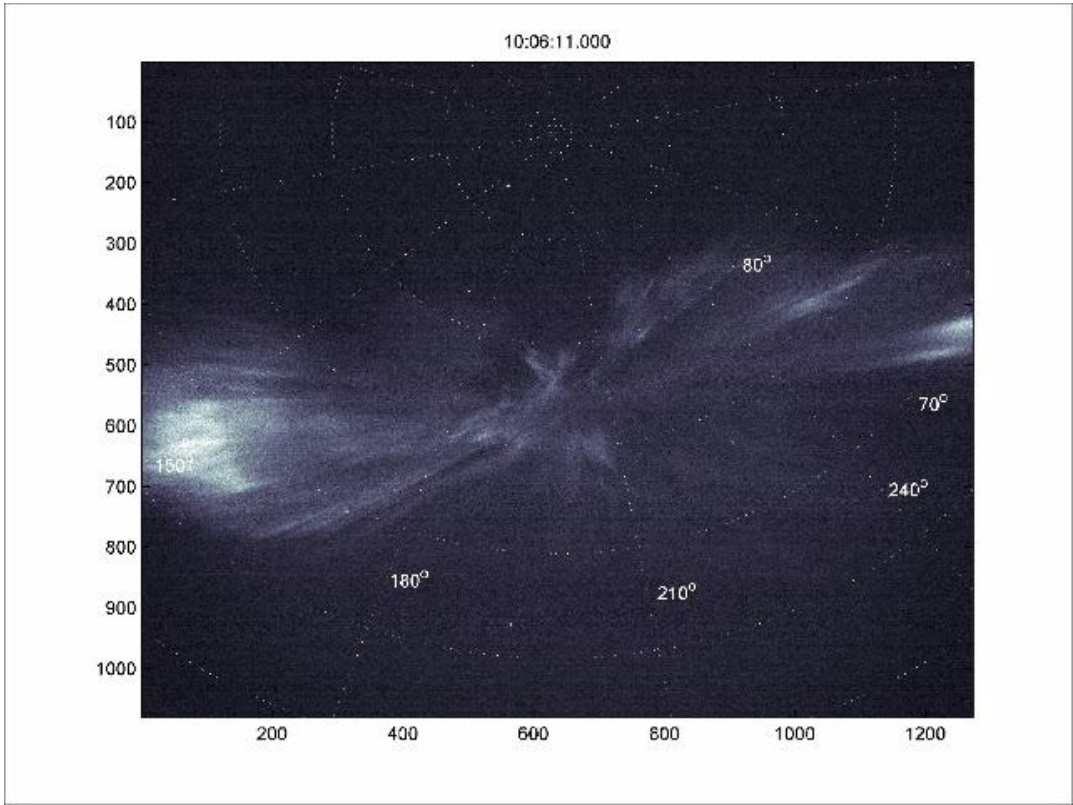
1 March 2011 substorm
Poker Flat, Alaska



5577 Allsky video courtesy: Don Hampton

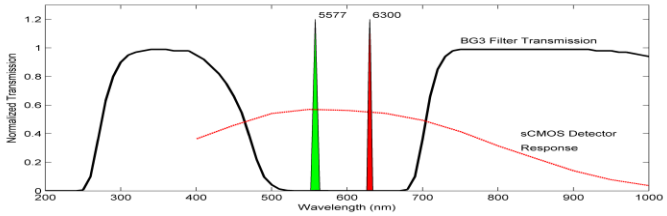
Geophysical Institute Magnetometer Array (GIMA) site at Poker Flat



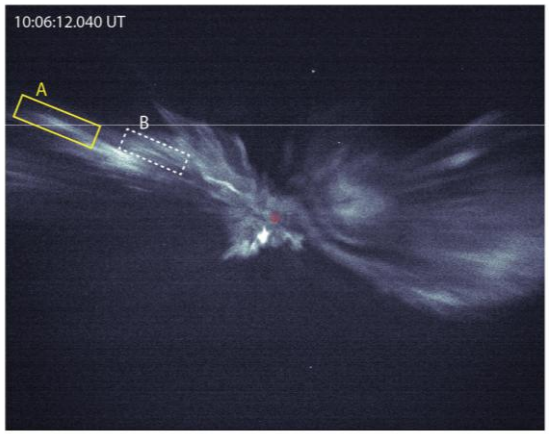


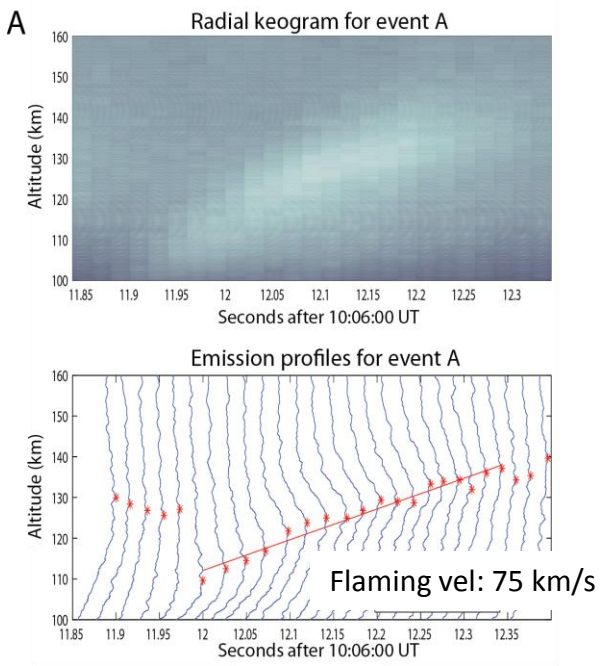
High speed imager:

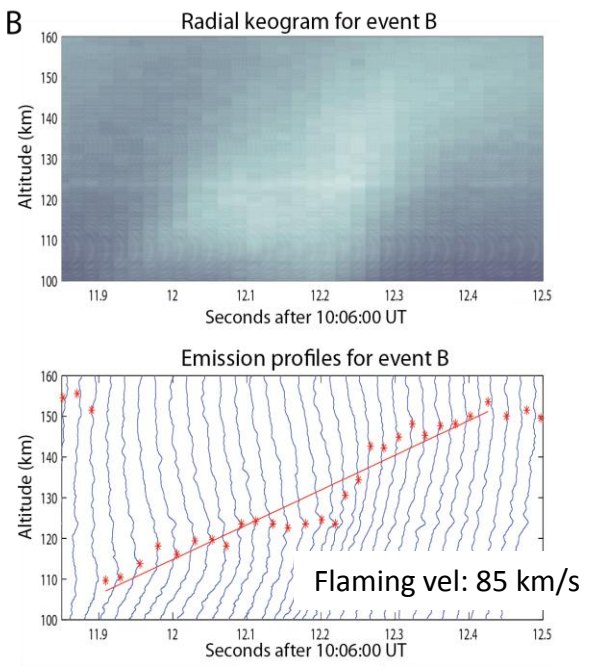
sCMOS detector ('Neo'), 2560 x 2160 pxls
25 mm F/0.95 lens -> 33 x 29 deg FOV
Spatial resolution: 27 m
Temp. resolution: 50 fps in 12 s burst mode
BG3 filter



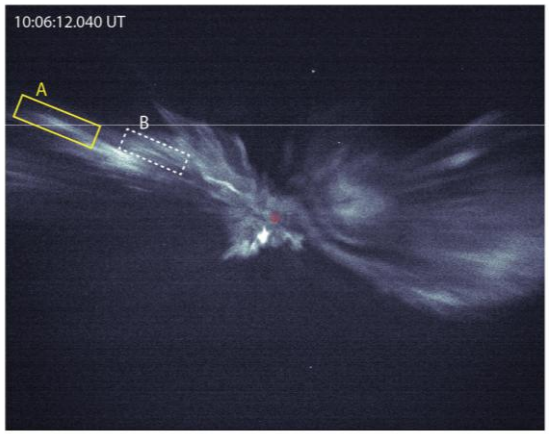
Flaming characteristics from analyzed rays

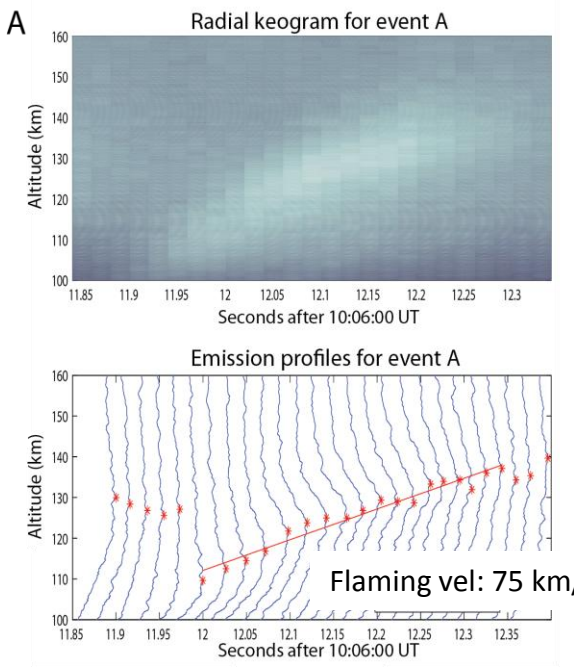


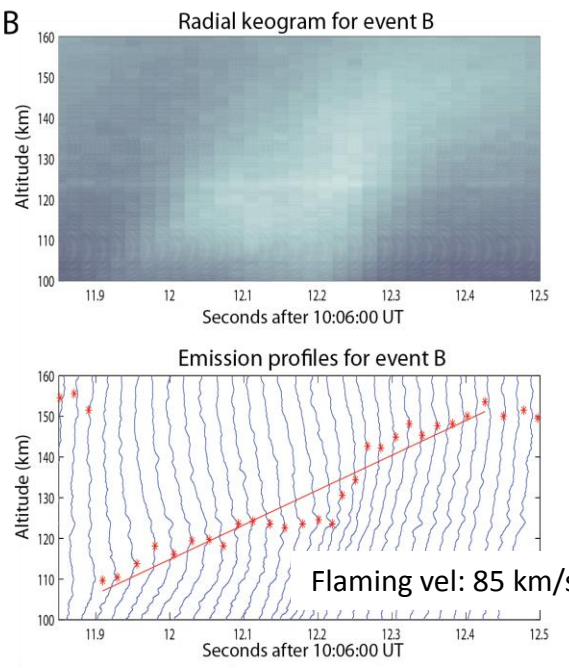


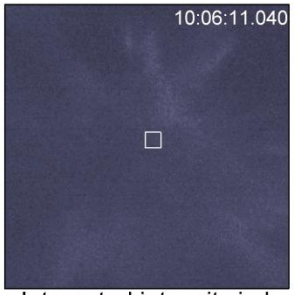


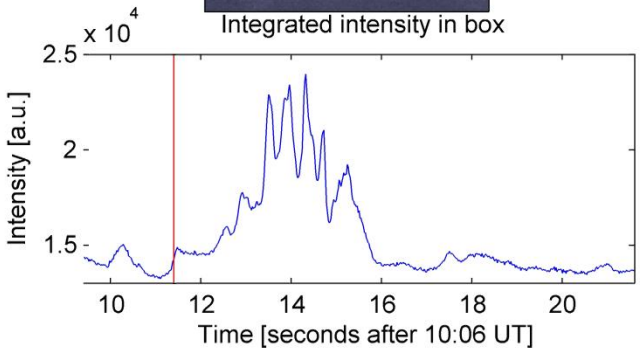
Flaming characteristics from analyzed rays



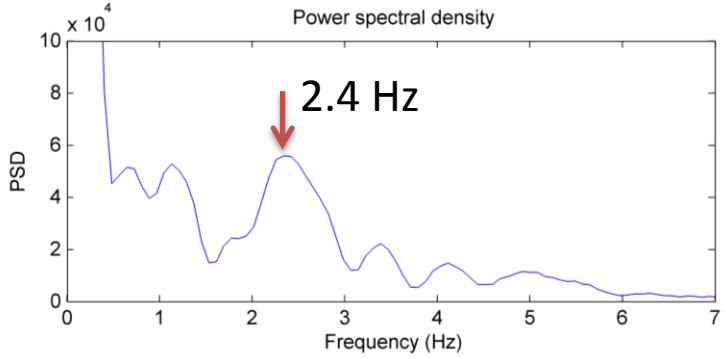








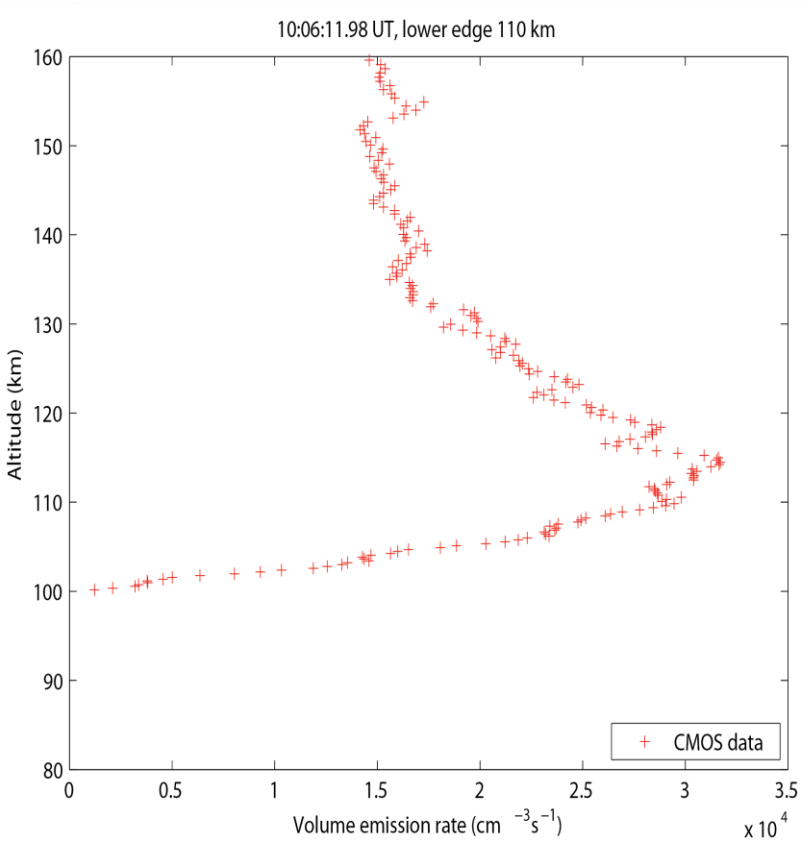
A 2.4 Hz modulation detected – corresponds to the flaming time of ~0.4 s.

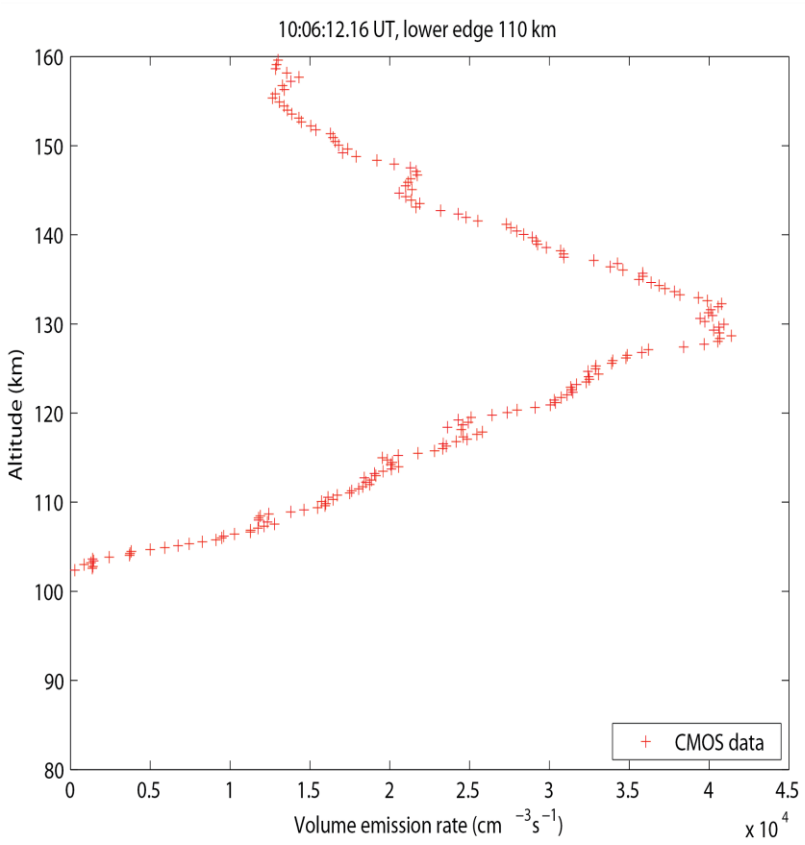


Magnetometer data show Pi1B pulsations at this time

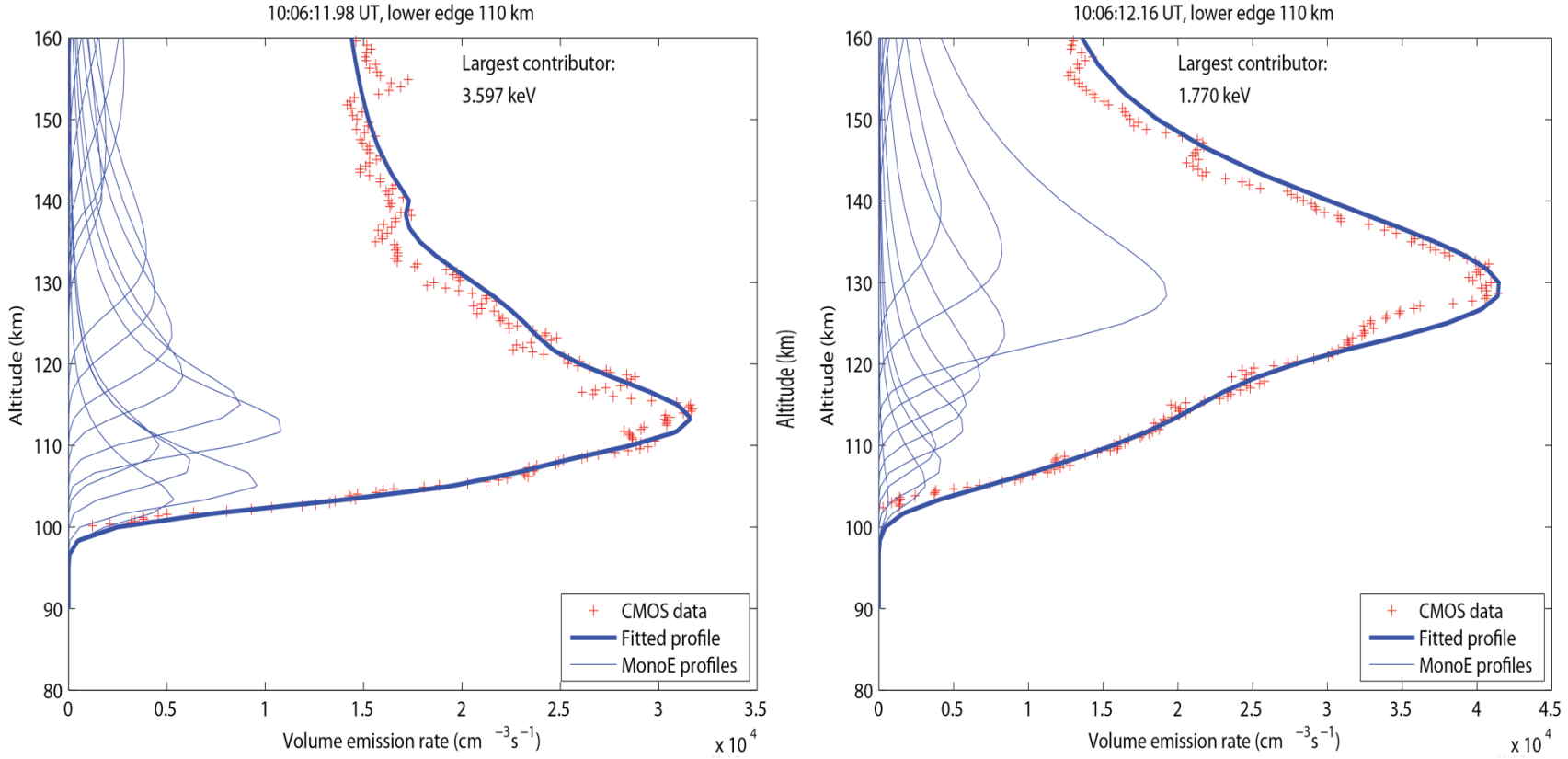
Time-dispersed electron precipitation

Ev





Time-dispersed electron precipitation

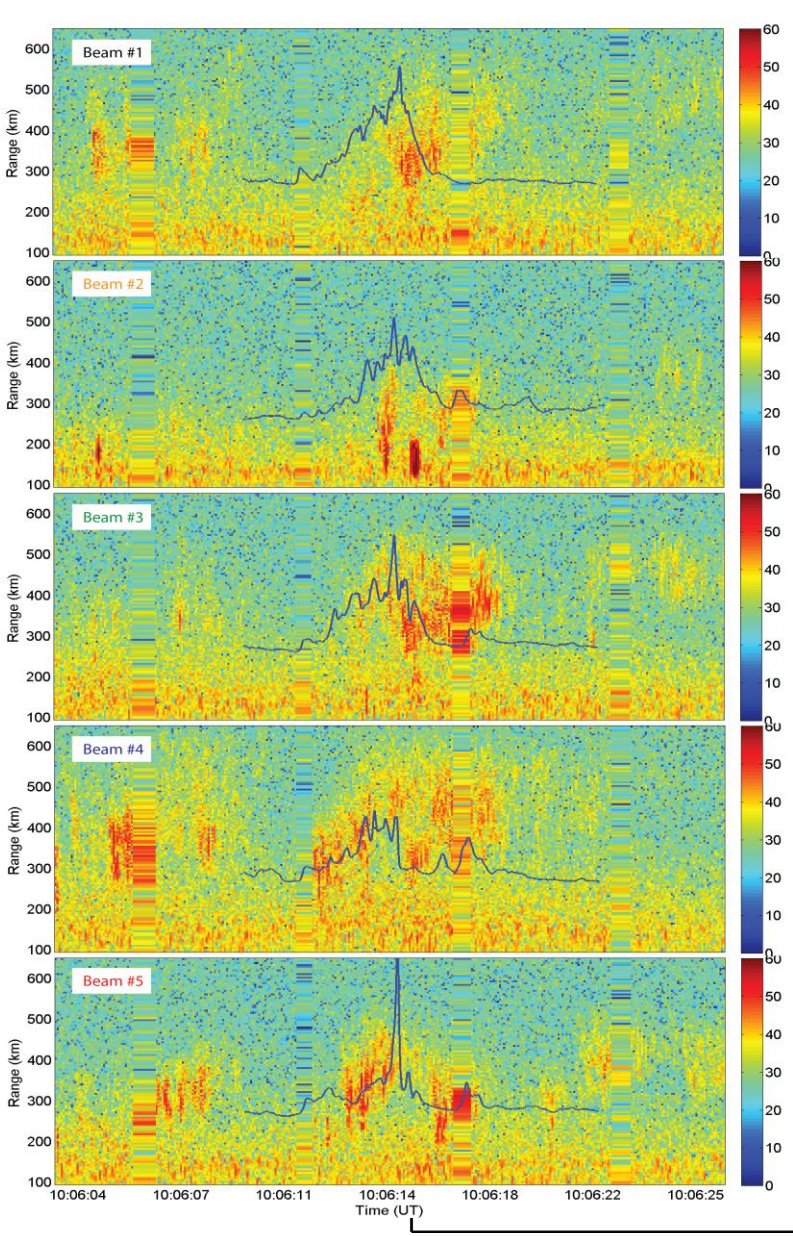


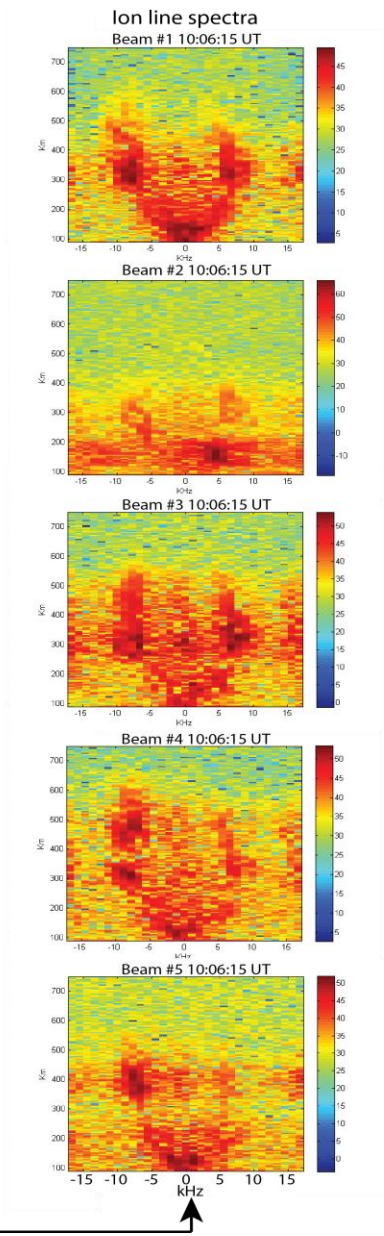
Monoenergetic emission rate profiles for N_2^+ emissions, as modeled with the TRANSCAR model [Zettergren et al. 2007], are used to estimate the energy of the precipitating electrons.

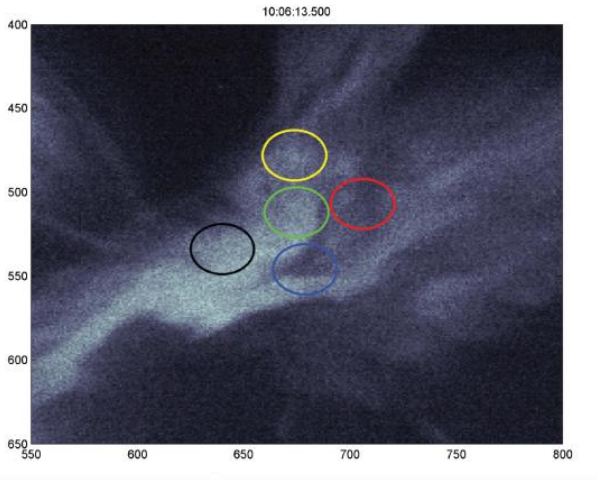
By fitting modeled profiles to the measured data, the energy flux of each flux tube is also estimated

By combining observations and modeling we can derive volume emission rates, characteristic energy and energy flux of the precipitation – **at micro-scale temporal and spatial resolution**
The energy flux is partitioned into fine scale structures for which we can study the motion

Adding to the picture: PFISR data showing NEIALs







NEIALs – signatures of Langmuir turbulence.

Different responses in each PFISR beam - **Horizontal variations**

See todays posters IRRI-16 by Hassanali Akbari and ITIT-08 by Michael Hirsch