

Strong Ionospheric Electron Heating Associated With Pulsating Auroras ----- A Swarm Survey

Presenter:

Jun Liang, University of Calgary

In courtesy of whole instrumental team of Swarm

GEM & CEDAR Workshop 2016, Santa Fe

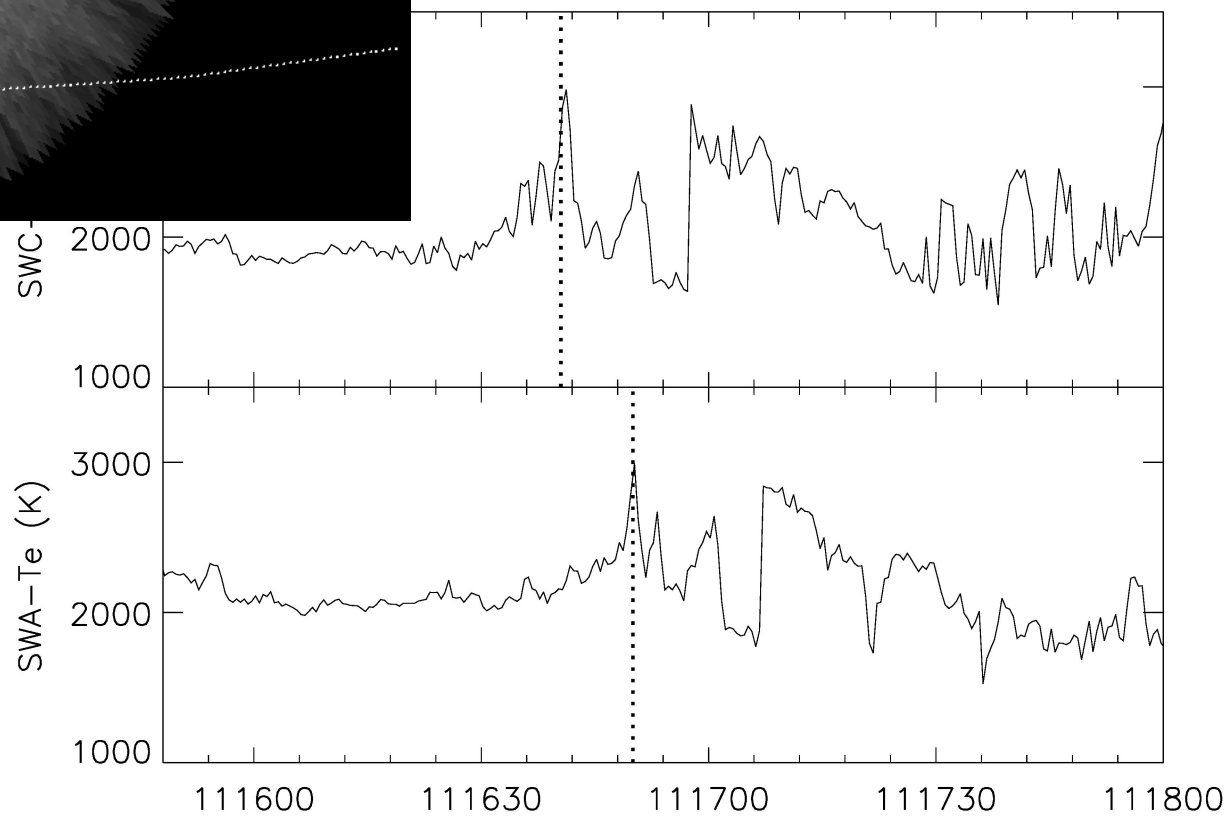
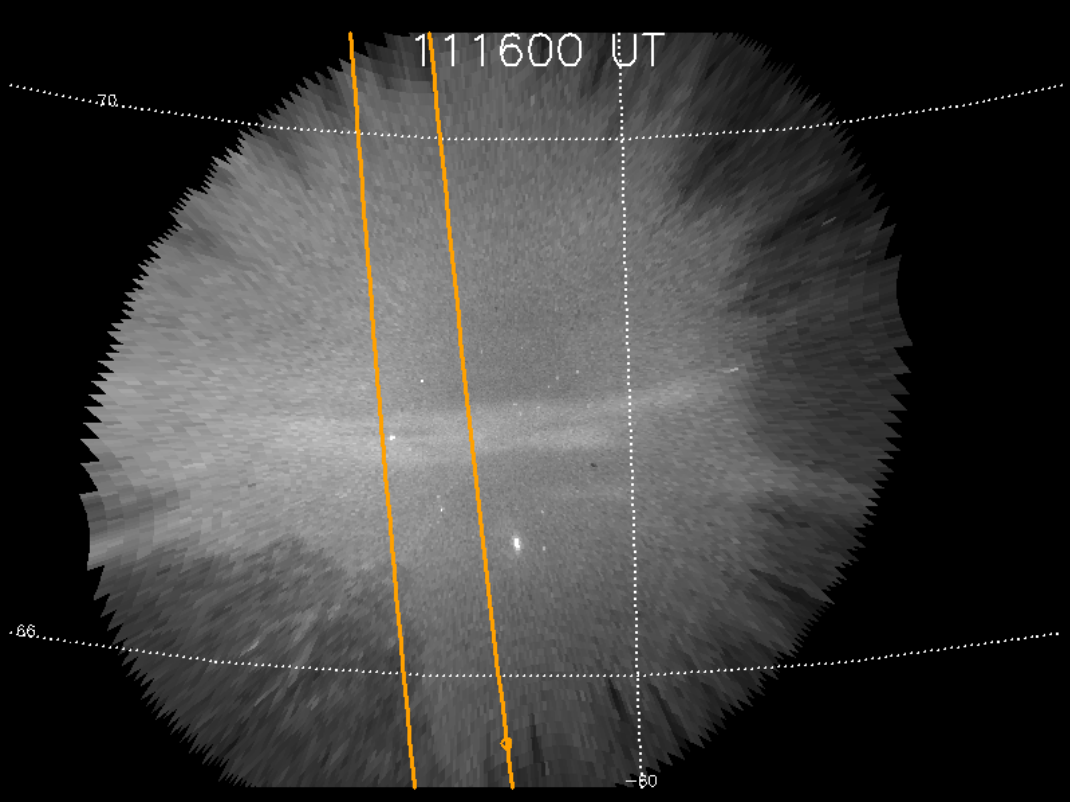


Swarm is the fifth Earth Explorer mission approved in ESA's Living Planet Programme. Three Swarm satellites with identical instruments orbit the Earth at altitudes between 460 and 530 km, measuring **E**, **B**, Te,Ti, Ne etc...

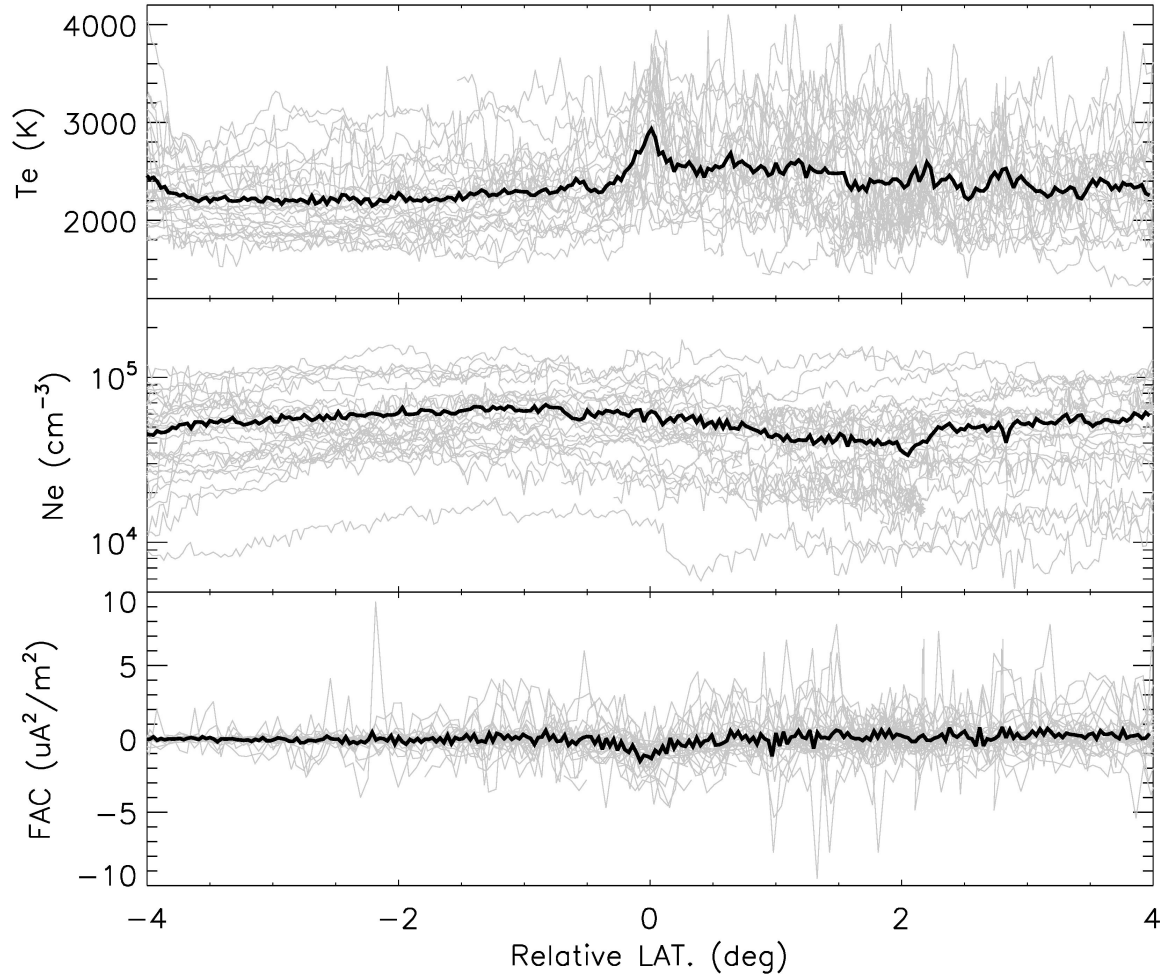
Pulsating aurora is an aurora form which undergoes rapid quasi-periodic fluctuations in intensity. The period typically ranges from a fraction of a second to a few tens of seconds.

Pulsating auroras are often observed in the equatorward portion of the auroral oval.

It is generally pulsating auroras are caused by modulated precipitation of energetic electrons of magnetospheric origin. **Key: energetic electron precipitation with limited number flux (field-aligned current).**



Superimposed epoch analysis on 28 Swarm passages over PAP



Average Te rises from ~2100 K at subauroral latitudes to ~2900 K within the PAP.

This is much stronger than the average increase of Te in the auroral oval.

Results

A Swarm survey unveils a strong Te enhancement associated with pulsating auroras

This sheds profound implication on the M-I-T coupling, since pulsating auroras are fairly common phenomena and may span over 3-4h MLT and last for a few hours [e.g., Jones et al., 2013]

We are working with model guys on the underlying mechanisms of such (surprisingly) strong electron heating led by pulsating auroral precipitation.

Any suggestion?