

Dynamics of the active region in Jupiter's aurorae

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Abstract

The Far-UV aurorae at Jupiter vary on a wide range of timescales. This study focusses on the dynamics of the active region on timescales of a few minutes. Up to now, only the time-tag mode of the Space Telescope Imaging Spectrograph provides access to such fast variations with a high spatial resolution. This active region, located on the dusk flank of the area inside the main auroral oval, is the locus of particularly bright (up to several mega Reyleighs) and sudden (a few tens of seconds) enhancements called flares [1]. A previous study also showed that these flares could re-occur quasi-periodically every 2-3 minutes and propagate from dusk to dawn[2].

Here we use data obtained in 2013 and 2014 to show that this quasi-periodic behaviour is only present on half of the cases and that the affected region could either cover the whole active region or a much smaller area ($\sim 5000\text{km}^2$). We also found areas that were still during part of the observation sequence and then began to blink (see Figure 1). We also show that there is no systematically preferred propagation direction. Finally, sequences acquired successively in the two hemispheres show that the quasi-periodic flares can be in phase.

References

- [1] Waite, H. et al.: An auroral flare at Jupiter, *Nature*, 410, 2001.
- [2] Bonfond, B., Vogt, M. F., Gérard, J.-C., Grodent, D., Radioti, A. and Coumans, V.: Quasi-periodic polar flares at Jupiter: A signature of pulsed dayside reconnections?, *Geophys. Res. Lett.*, 38, 2011.

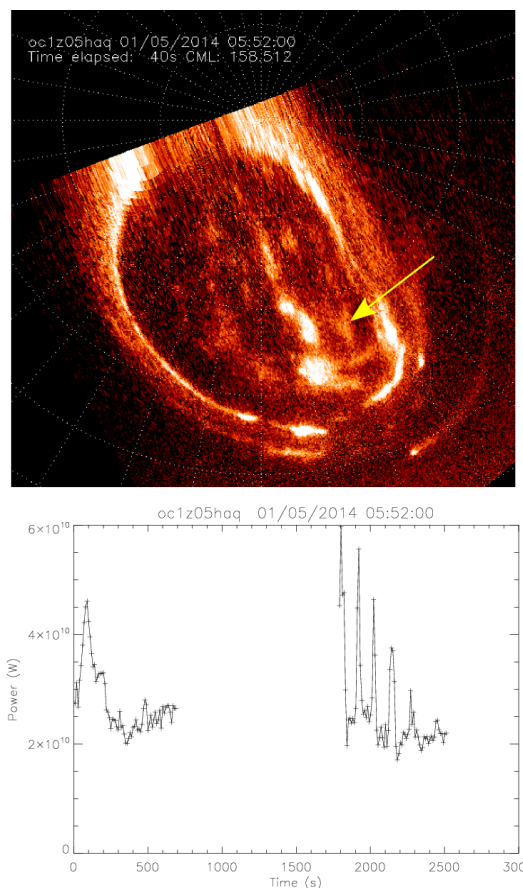


Figure 1: Polar projection of the northern aurorae at Jupiter observed by the Hubble Space Telescope STIS instrument in the Far-UV on January 5th 2014. The bottom plot shows the integrated emitted power for the small V-shaped feature indicated with the arrow. It can be seen that the feature dimmed and then stood still during the first half of the sequence before it began to blink every ~ 2.5 minutes.