

## Hubble Space Telescope and New-Horizons simultaneous observations: Evidence of particle acceleration in the Jovian magnetotail

A. Radioti (1), D. Grodent (1), M. Hill (2), J.-C. Gérard (1), R. L. McNutt, Jr. (2) and S. M. Krimigis (2,3)

(1) LPAP, Université de Liège, Liège, Belgium (a.radioti@ulg.ac.be), (2) Applied Physics Laboratory, Johns Hopkins University, Laurel, USA, (3) Academy of Athens, Athens, Greece.)

The Hubble Space Telescope (HST) observed periodic isolated spots on the Jovian aurora, during the HST-ACS (Advanced Camera of Surveys) 2007 campaign. The auroral spots occur with 2- to 3- day quasi-periodicity (Figure 1), and they magnetically map to the dawn sector of the magnetosphere. Because of their periodic cycle and observed location, it had been suggested that the polar dawn spots are related to the precipitated, heated plasma during reconnection process taking place in the Jovian magnetotail [1].

The New-Horizons spacecraft traversed the length of the Jovian magnetotail to  $> 2500 R_J$  in early 2007. The spacecraft's PEPSSI (Pluto Energetic Particle Spectrometer Science Investigation) instrument measured velocity dispersions, anisotropies and compositional variations in the Jovian magnetotail ( $> 500 R_J$ ) with a  $\sim 3$  day periodicity. They reported signatures of energetic particle streaming away from the planet and injection sites in the near-tail region, possibly associated with magnetic reconnection events [2].

In the present study we compare a set of simultaneous HST and New-Horizons observations. During this period HST observes isolated auroral dawn spots and New-Horizons detects energetic ions exhibiting velocity dispersion streaming away from the planet on the same day, evidence of particle acceleration in the Jovian magnetotail. Based on this unique set of simultaneous observations we examine to what extent the Jovian ionosphere is supplied with accelerated plasma from the magnetotail and discuss the properties of the process.

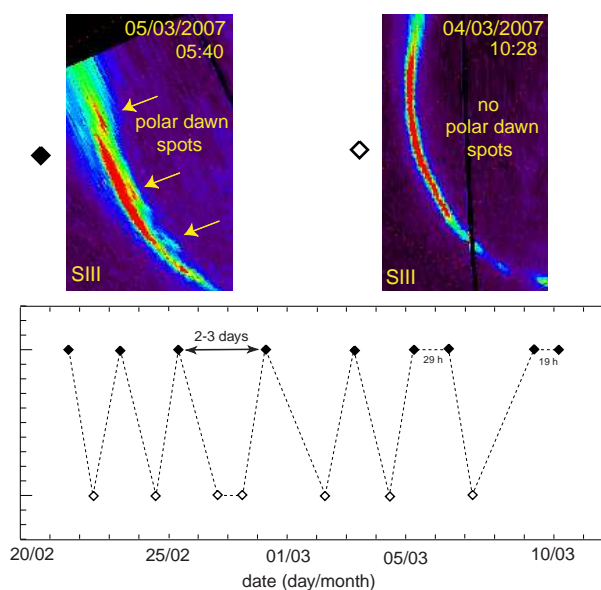


Figure 1: 2- to 3-day periodic occurrence of the polar dawn spots for the time frame of 20 February to 10 March 2007 with daily observations. The dates (day/month) along which auroral polar dawn spots are observed are indicated with filled diamonds, and those along which no auroral polar dawn spots are observed are shown with empty diamonds. The polar projections on top demonstrate two representative examples during this time frame [1].

### References

- [1] Radioti, A., D. Grodent, J.-C. Gérard, B. Bonfond and J.T. Clarke (2008), GRL, 35, L03104, doi:10.1029/2007GL032460.
- [2] McNutt R. L., Jr., et al. (2007), Science, 318, 220.