Double Dayside Detached Auroras: TIMED/GUVI Observations

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New Phenomena

- **Dayside detached aurora: DDA**
  
  DDA was first observed by IMAGE FUV [Zhang et al, JGR, 2003]. GUVI also detected a number of DDA.

- **Double dayside detached aurora: D-DDA**
  
  Only GUVI is able to detect D-DDA [Zhang et al, accepted, GRL, 2004].
Outline

- Previous IMAGE observations of DDA
- GUVI observations of DDA
- GUVI observations of D-DDA
- Explanation
- Summary
GUVI provides a complete spectrum at each point in the scan, simultaneously.

GUVI ‘colors’ are defined on board TIMED by co-adding spectral pixels.
DDA case seen by IMAGE SI-12, Nov. 8, 2000
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Solar wind & IMF condition, Nov. 8, 2000
GUVI images  August 20, 2003

121.6nm

LBHS
GUVI images November 21, 2003

121.6nm

LBHS
IMF data from GEOTAIL on August 19, 2003
GUVI & DMSP
detection of D-DDA on August 19, 2003
DMSP F15 Particle Spectra
Proton flux versus L-shell, after Milillo et al., JGR, 2001
Pressure pulse & compression of the magnetosphere
after Zhou & Tsurutani, GRL, 2001

Auroral oval

D-DDA  DDA
GUVI detects not only DDA, but also D-DDA. The D-DDA is the first optical evidence of double peaks in the ring current fluxes between L=3 and 5 [Milillo et al., 2001].

The D-DDA is caused by sudden solar wind pressure enhancement under a northward IMF condition.

The main source of the D-DDA is energetic proton precipitation from the ring current.

Observations of DDA and D-DDA help to monitor the ring current.
GUVI images  October 20, 2003

121.6nm

LBHS

North  23:13 UT

North  23:13 UT