



Hisaki & Astro-H: Temporal variability Tomoki Kimura (RIKEN,JP), Hisaki Science team, R. Kraft (Harvard-Smithsonian Astrophys. Obs), R. Elsner (NASA), W. Dunn, G. Branduardi-Raymont (Univ. Coll. London), R. Gladstone (SwRI), and Y. Ezoe (Tokyo Metropolitan Univ., JP)





What is Hisaki?



Hisaki satellite



An earth-orbiting EUV space telescope dedicated for planets

- EXCEED instrument continuously monitors EUV emissions from atmospheres and plasmas around planets
- Targets : Mercury, Venus, Mars, Jupiter, Saturn, and stars

Specifications

Launch date	14 Sep 2013
Weight	330kg
Size	1m×1m×4m
Orbit	950km×1150km (LEO)
Inclination	31 deg
Nominal mission life	1 year
Pointing accuracy (best perform.)	±5 arc-sec



Led by JAXA, U Tokyo, and Tohoku U





Synergetic observations









Hisaki-HST campaign Jan 1-16 2014

published papers

Kimura et al. (2015), Geophys. Res. Lett. Tao et al. (2015), J. Geophys. Res. Badman et al. (2016), Geophys. Res. Lett. (Tue)

Hisaki-HST campaign (Kimura+) Internally-driven auroral explosions found during solar wind quiet period. Association with internal processes of magnetosphere like Vasyliunas RX? Fotal Power (GW) 000 Auroral total power 800 600 400 200 Pdyn[nPa] 0.100 0.010 Dynamic pressure of SW (Tao+05) 0.001 -1010 20 30 DOY 2014 Cover image of GRL JAXA, AGU, and Lancaster U press releases 25 Mar 2015







Spectral diagnostic (Tao+)











Hisaki-X-ray campaign Apr 8-21 2014 published papers

Kimura, T., et al. (2016), J. Geophys. Res.





- CXO High Resolution Camera
- 'spot' region with large intensity and surrounding region 'halo'
- Halo is overlapping with the main oval latitude, (Spot: red, halo: blue)







Local time distribution



- Polar X-ray source is magnetically mapped the equatorial magnetosphere using the flux equivalence mapping model [Vogt+11]
- Mainly populated in the noon to post dusk sector
- Suggestive of association with KH instability and/or m'pause reconnection?







Synergies with JUNO 2016-17





Hisaki & Hitomi (Astro-H)







- EUV spectrometer (EXCEED): continuous long-term monitoring of dynamics in aurora and IPT
- Daily auroral activities can be a proxy for solar wind condition



- Soft X-ray Spectrometer (SXS): highly resolved soft X-ray spectroscopy (7eV FWHM) corresponding to +/-750km/s particle velocity resolution.
- Line shift and width give bulk velocity and temperature of highly charged heavy ions e.g., O⁶⁺ above a few MeV/amu



JUNO









Synergies summary



"Monitor"

ひさき

 Auroral dynamics with source electron measurements

"Microscope"



- Solar wind response of X-ray aurora
- Spectral diagnostic
 EUV & X-ray aurora

- X-ray line spectroscopy with source ion measurements
- X-ray continuum with source electron



"Highest energy"