

Comparison of SphinX and XRT observations during very low solar activity

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Outline

- SphinX
- Hinode & XRT
- XRT observations in 2009
- XRT & SphinX

SphinX: *Solar Photometer in X-Rays*

Energy range: $\approx 1\text{--}15$ keV

Resolution: ≈ 0.4 keV

Mass: ≈ 3.7 kg

*Power consumption: 10 W
(peak)*

Satellite: CORONAS-PHOTON

Orbit: circular, inclination 82.5° ,
height 550 km, period 95 minutes



Mission duration: 20 Feb. 2009 – 29 Nov. 2009

Verz solar low activity.

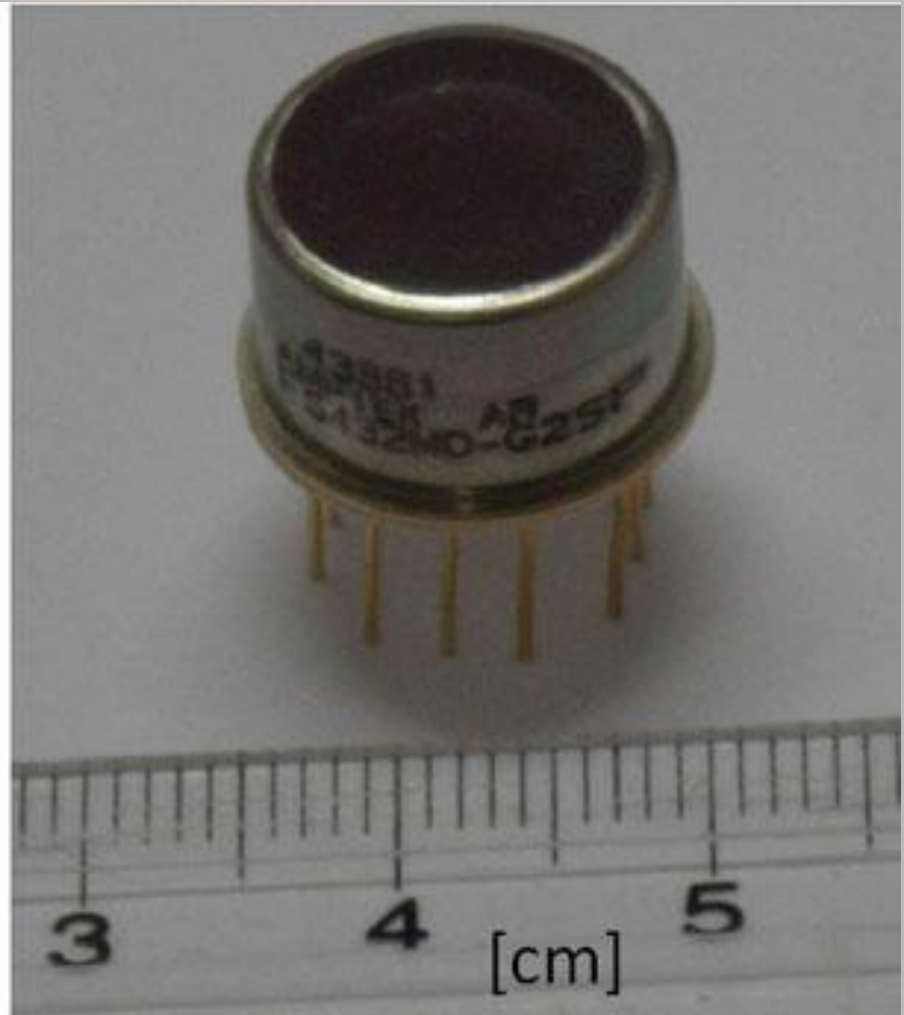
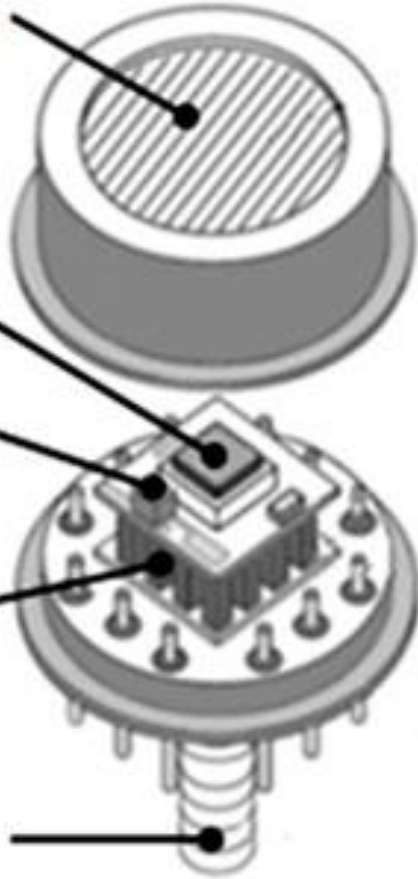
Beryllium window

Silicon crystal

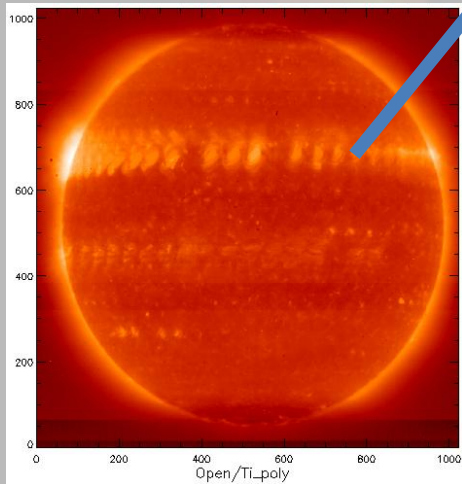
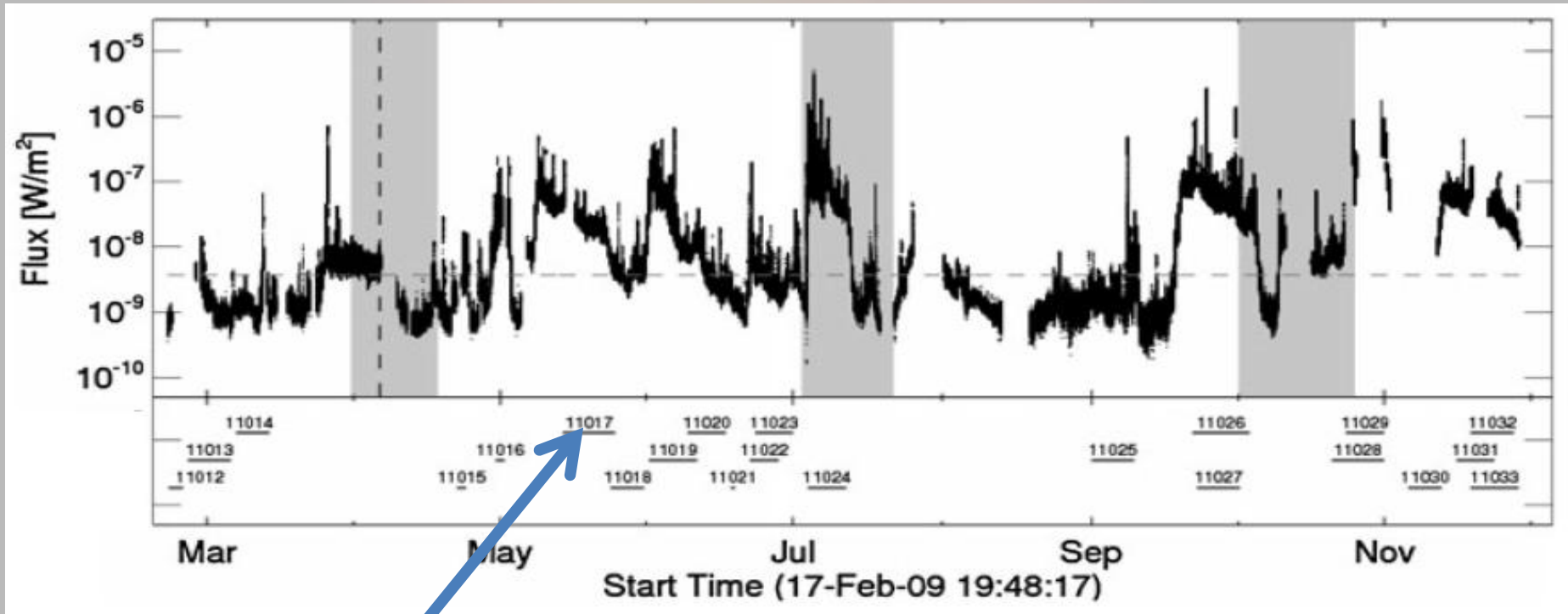
FET transistor

Peltier cooler

Mounting stand



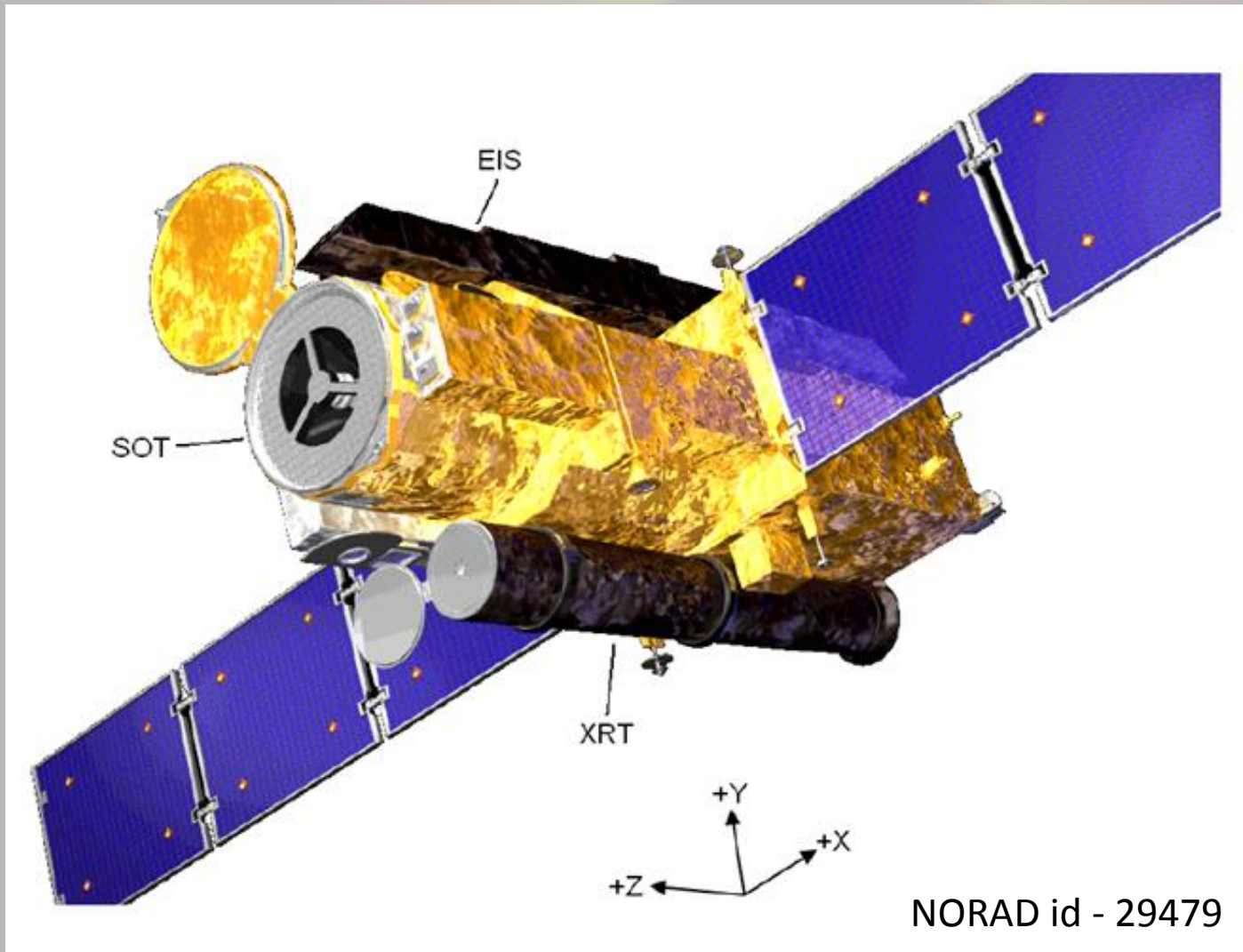
SphinX lightcurve – mission long



XRT stack plot for 11017
Active Region
(76 images superimposed)

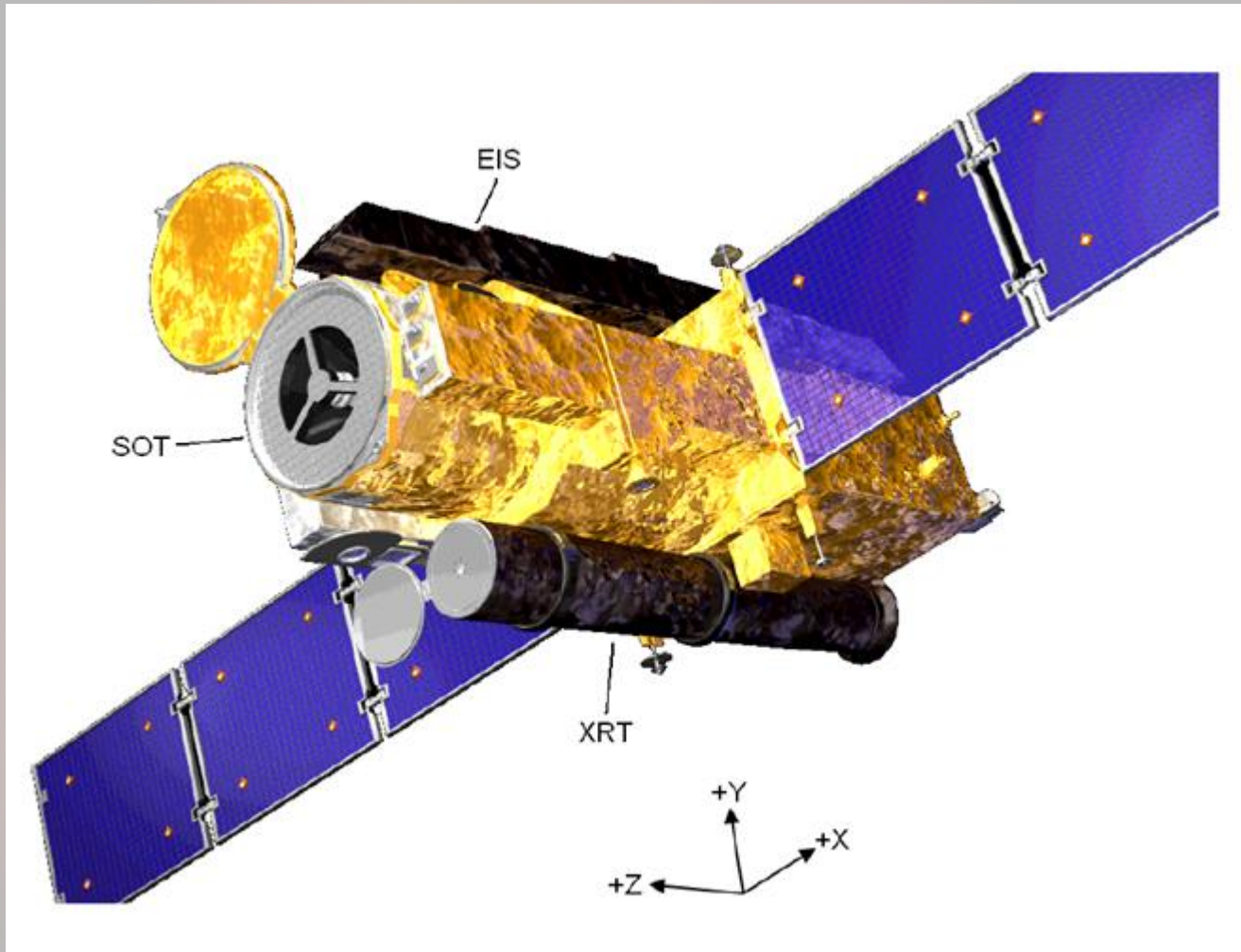
Solar B, renamed Hinode (pronounced 'hee-no-day')
launch Friday September 22, 2006

Management:
Japan (JAXA)



Kosugi, T et al., *The Hinode (Solar-B) mission: an overview, 2007, Solar Physics, 243,*

Hinode instruments



- Solar Optical Telescope (SOT)
- X-Ray Telescope (XRT)
- Extreme Ultraviolet Imaging Spectrometer (EIS)

XRT orbit params



REAL TIME SATELLITE TRACKING <http://www.n2yo.com/?s=29479>

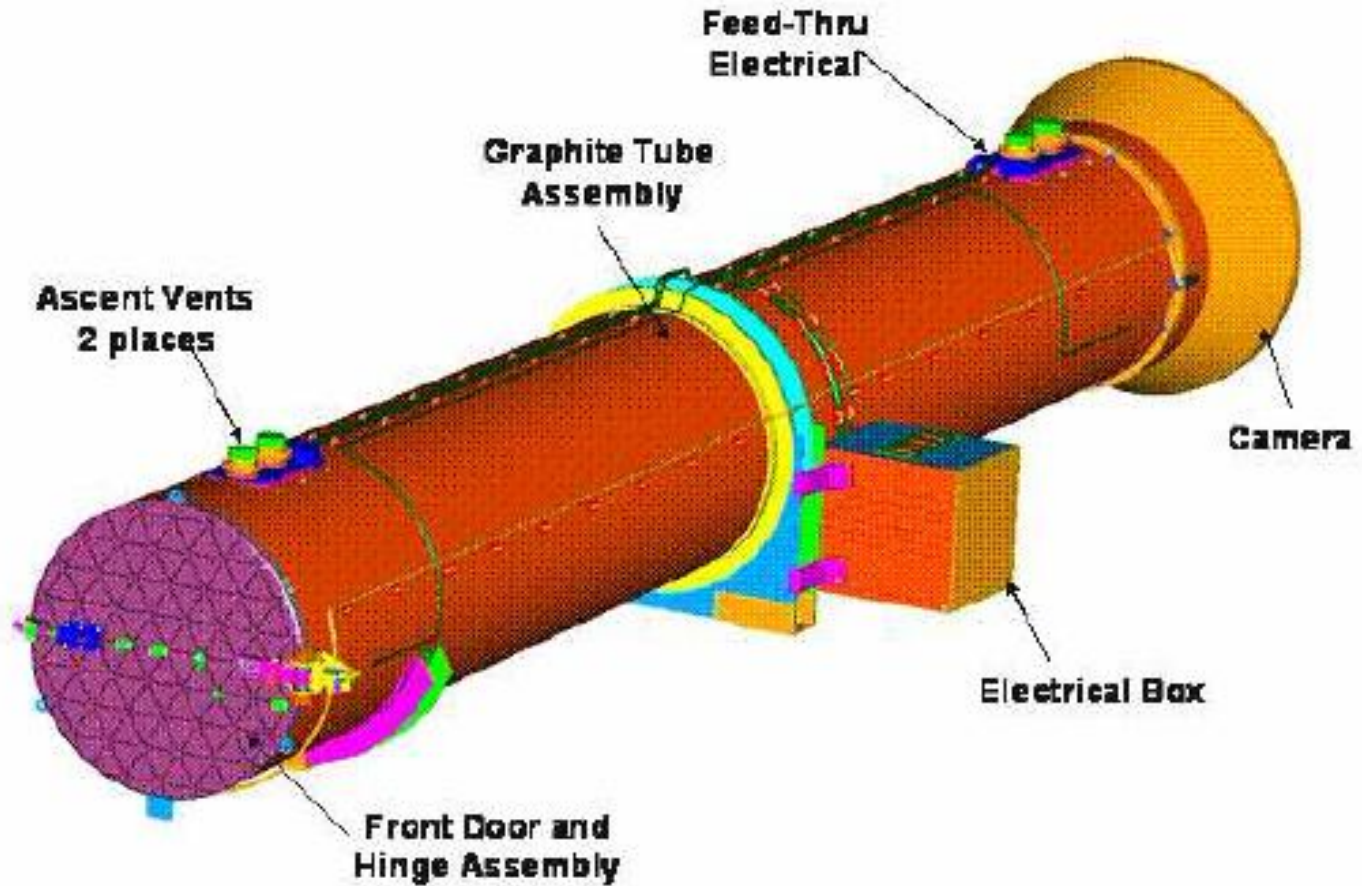
Height - 680 km

Period - 96 min

Inclination - 97,9°

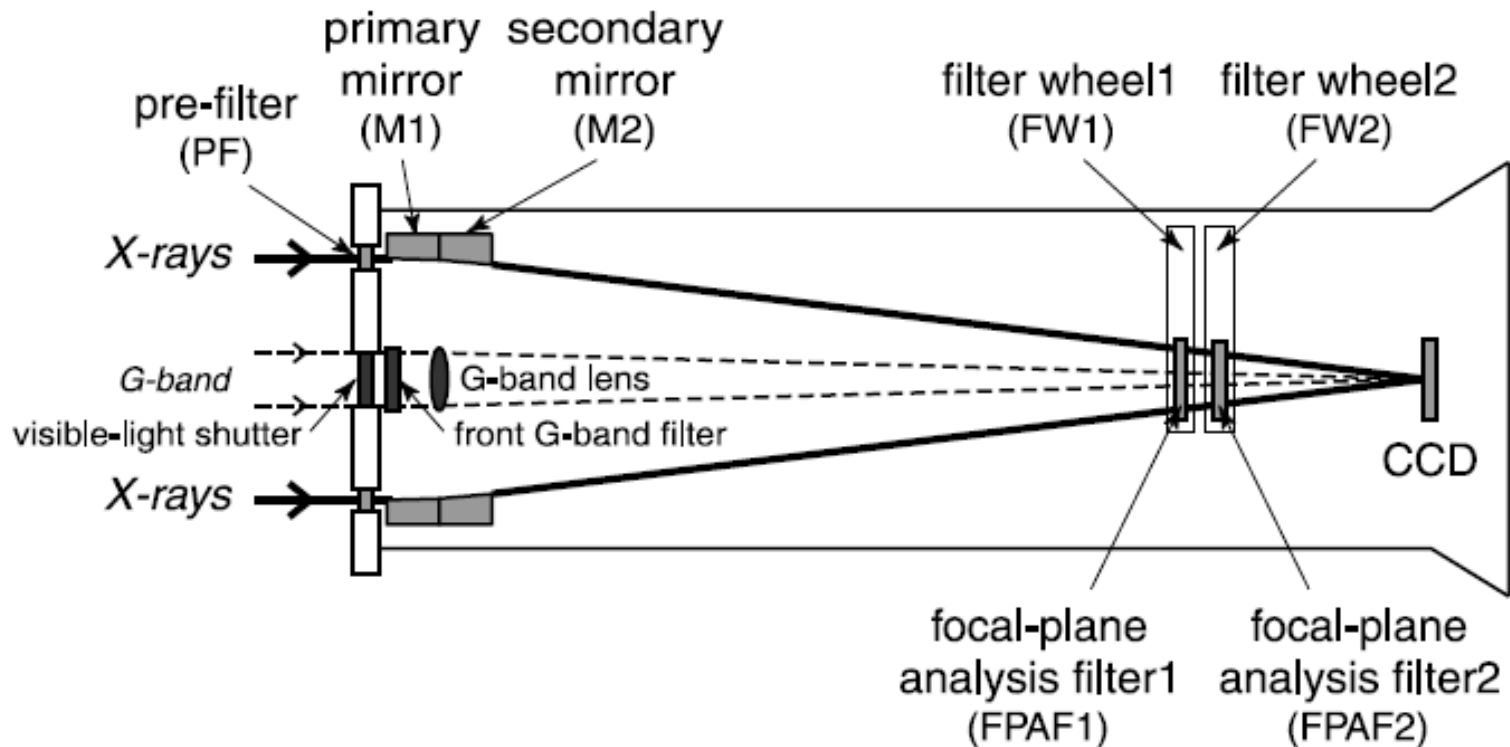
Att controll - 0,4 arcmin/min

XRT telescope



XRT telescope

Coronal-Temperature-Diagnostic Capability of the *Hinode*/X-Ray Telescope



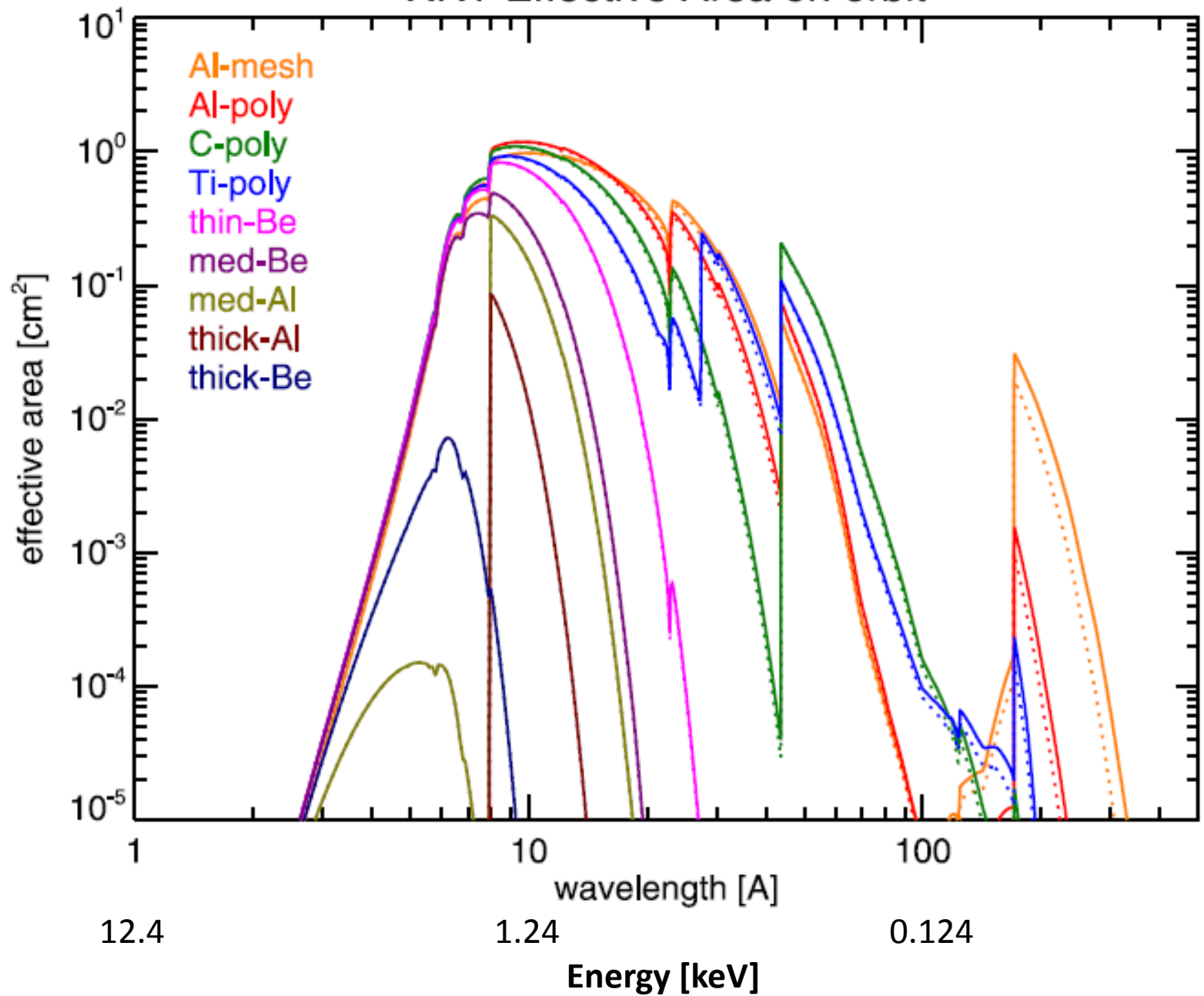
XRT uses 2048x2048 pixel CCD detector

XRT filter wheels

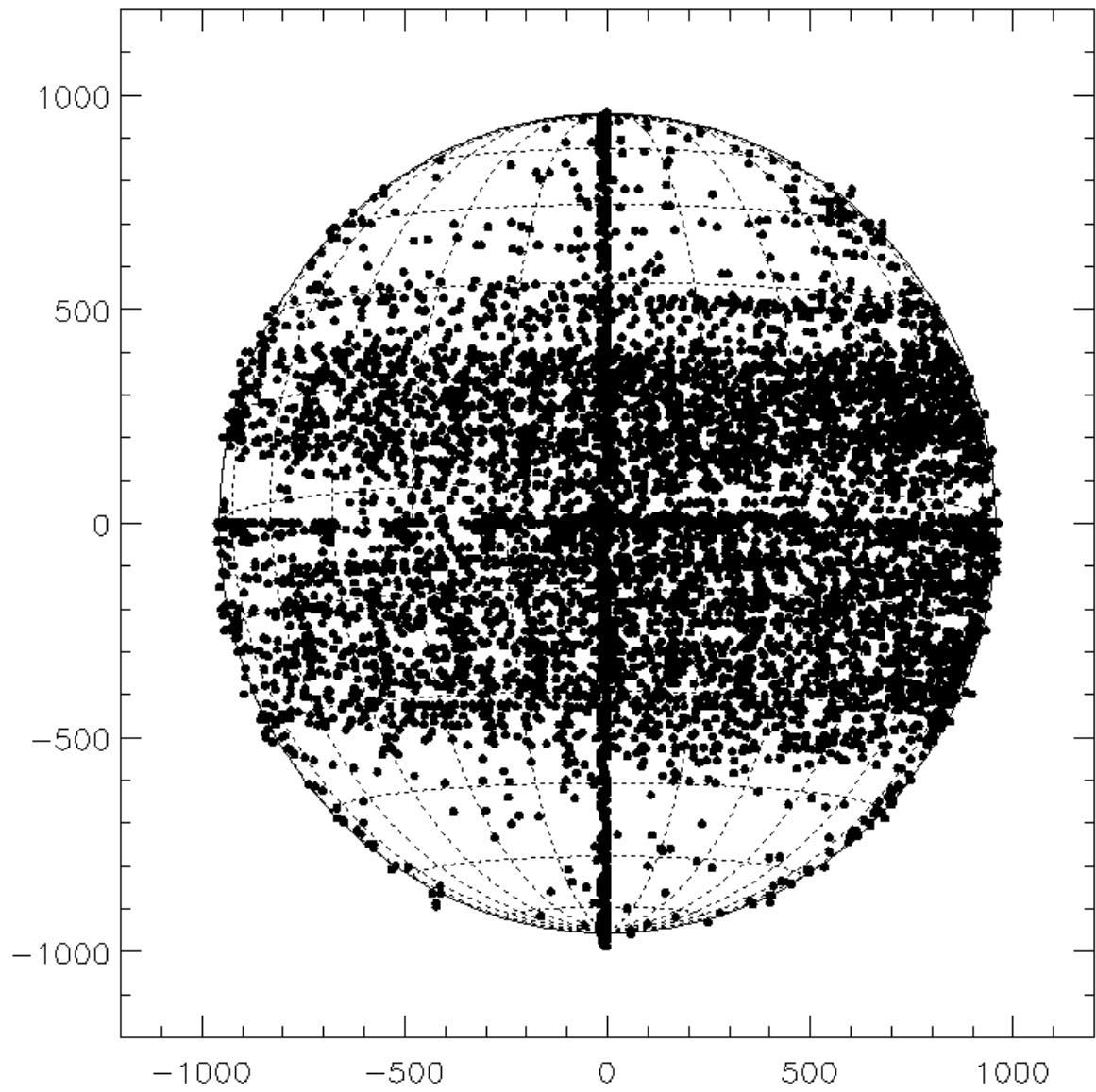


Golub, L., et al., *The X-ray Telescope (XRT) for the Hinode Mission*, 2007, *Solar Physics*, 243, 63

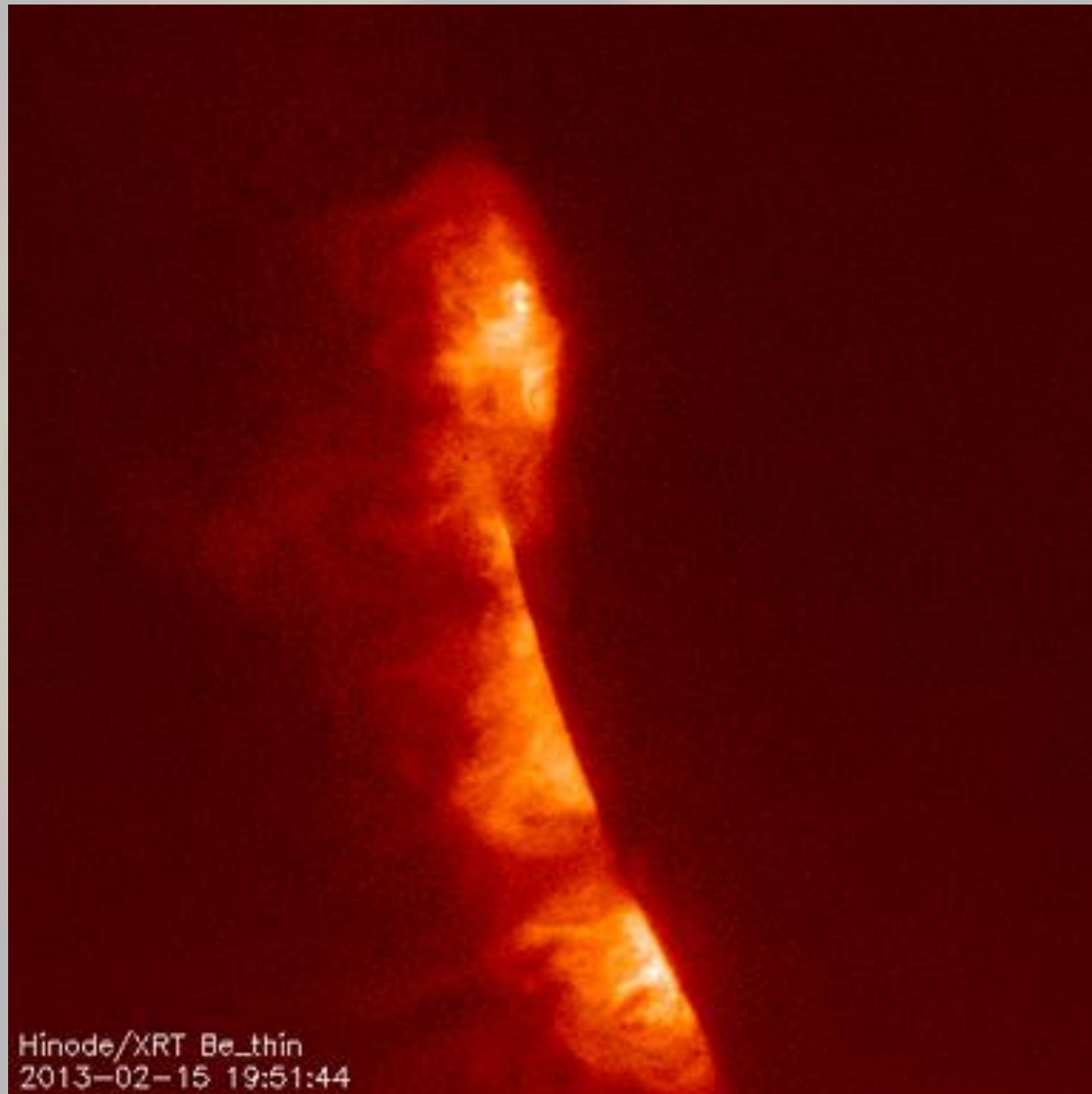
XRT Effective Area on orbit



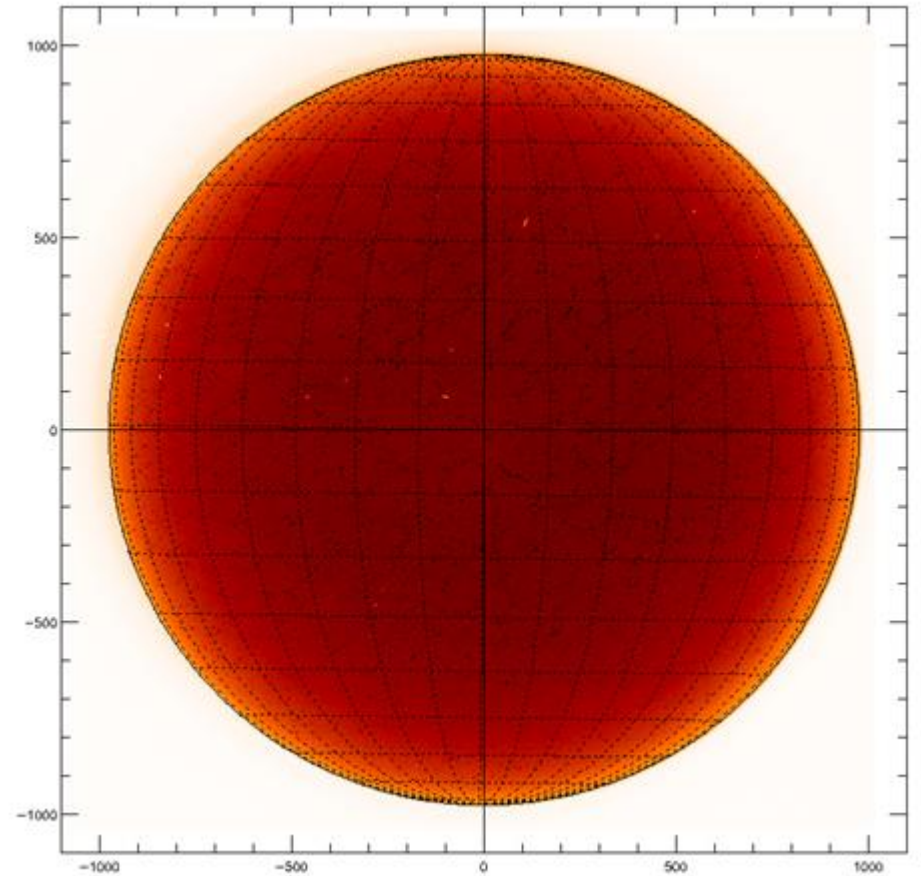
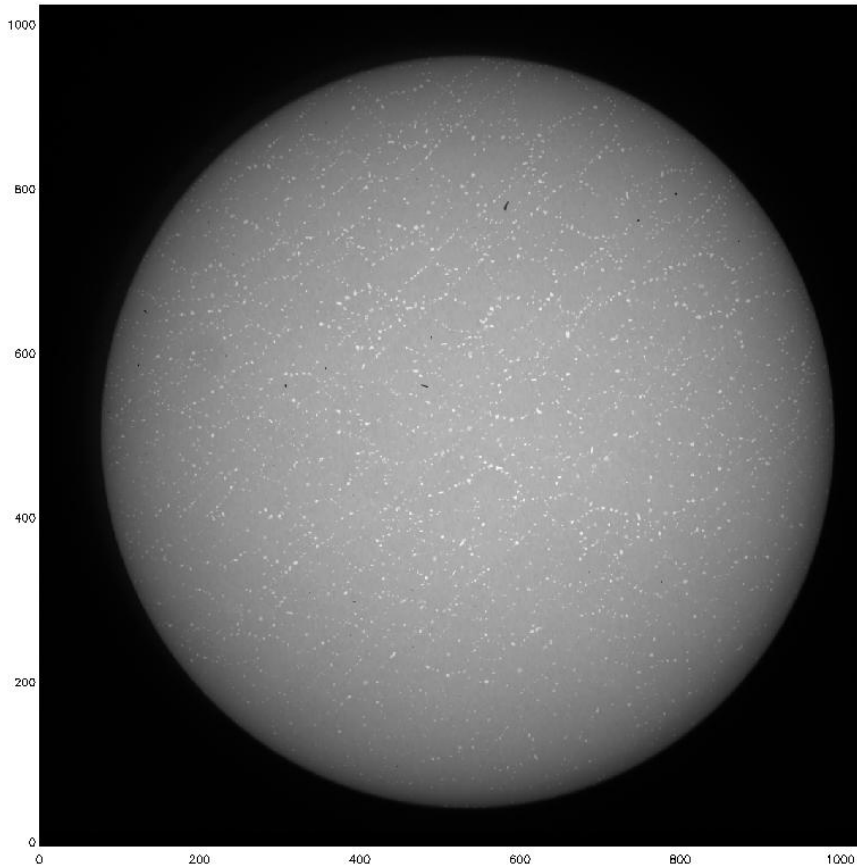
Hinode pointing



XRT data – PFI images

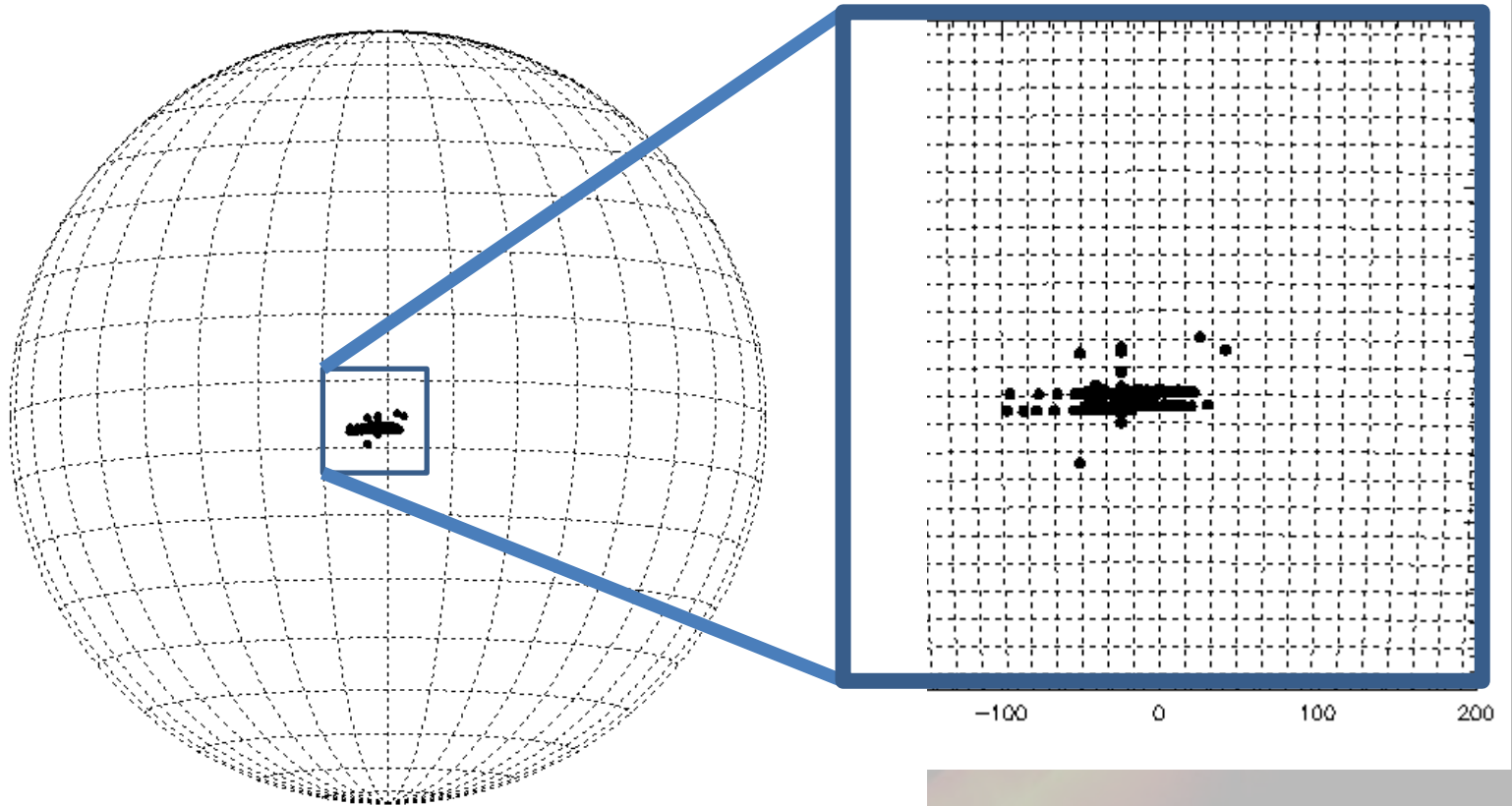


XRT data – FFI images

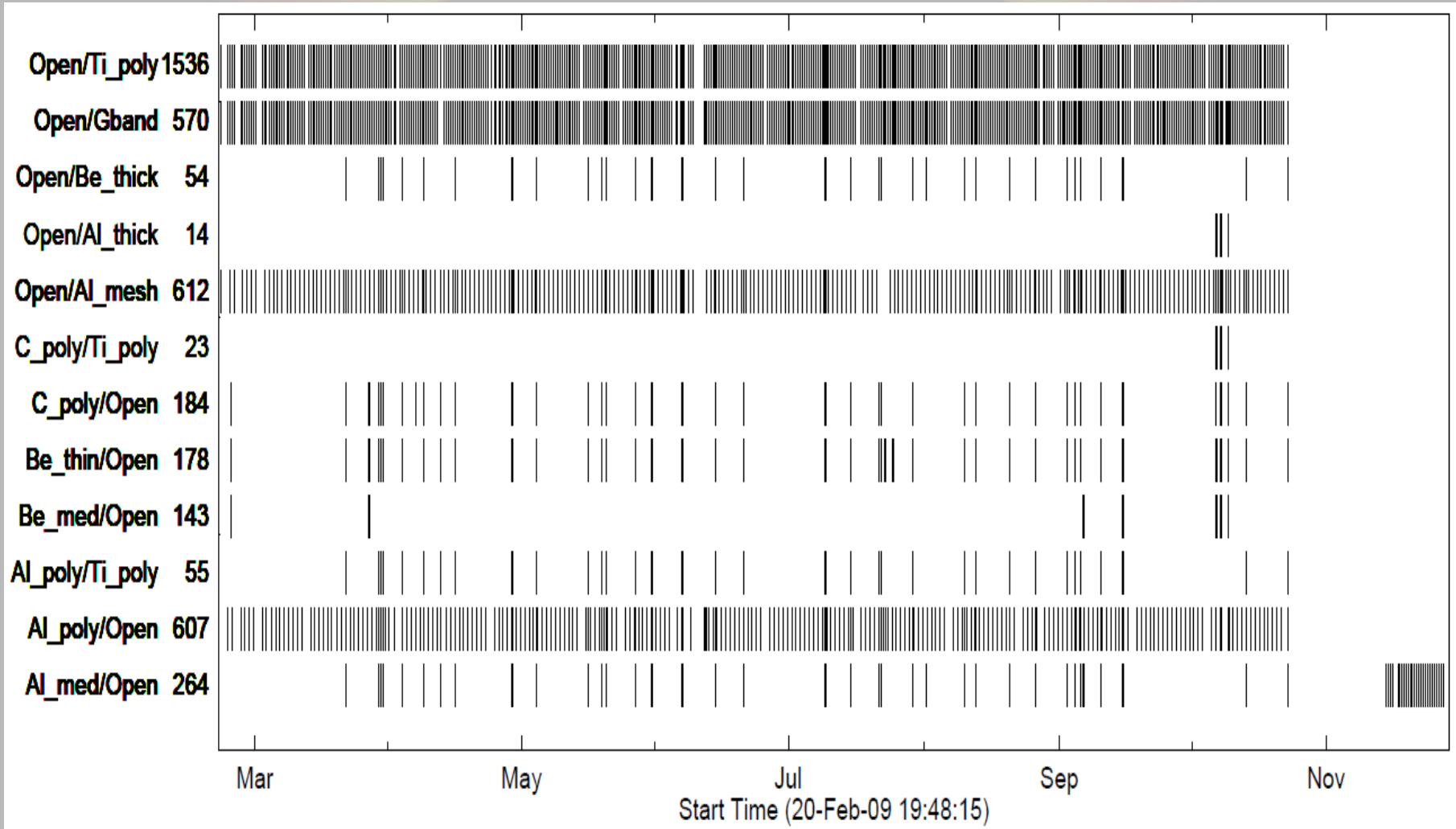


Cadence – usually 1, 2 images a day

Hinode pointing for full frames in 2009



XRT full frames – 2009 coverage

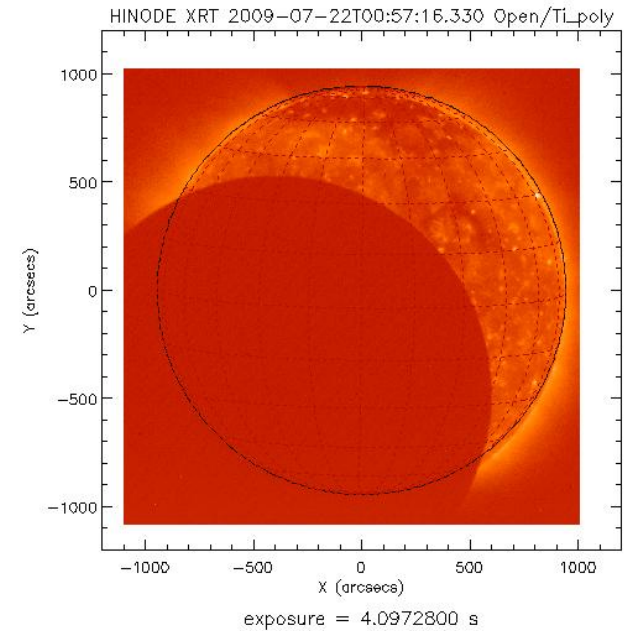


XRT 2009 Eclipse

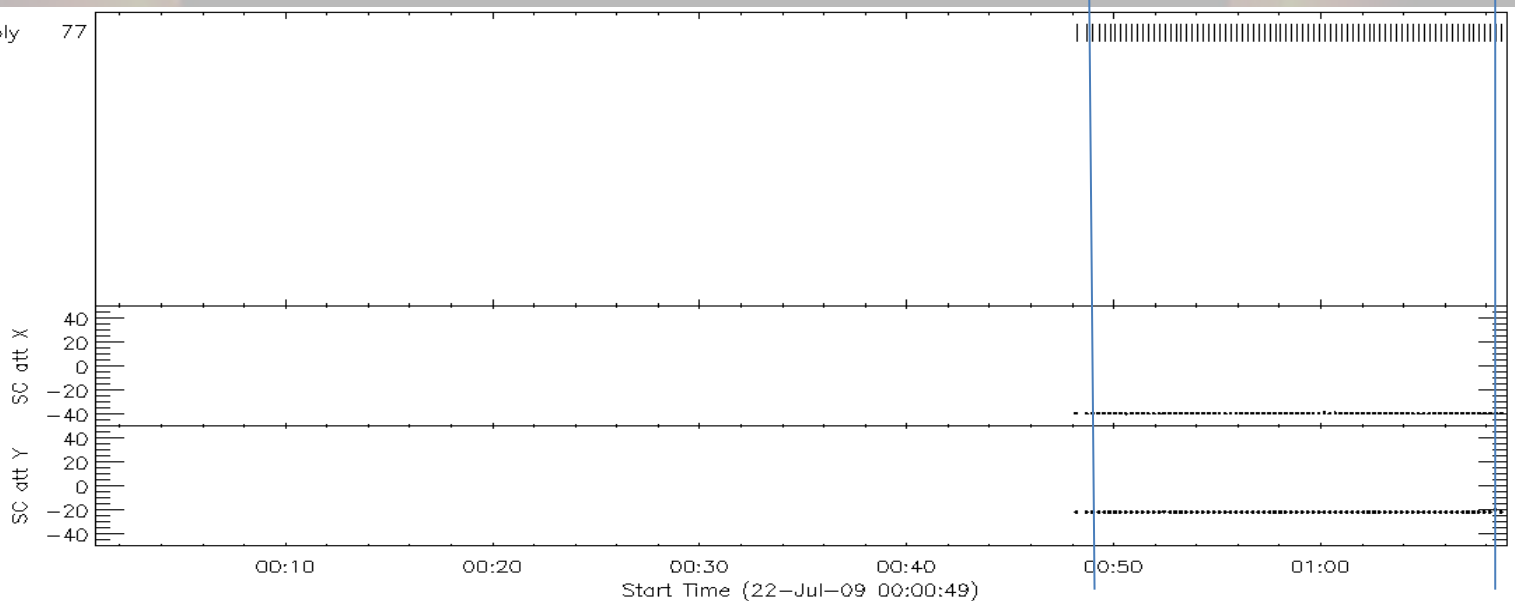
00:50 – 01:07

22 July 2009

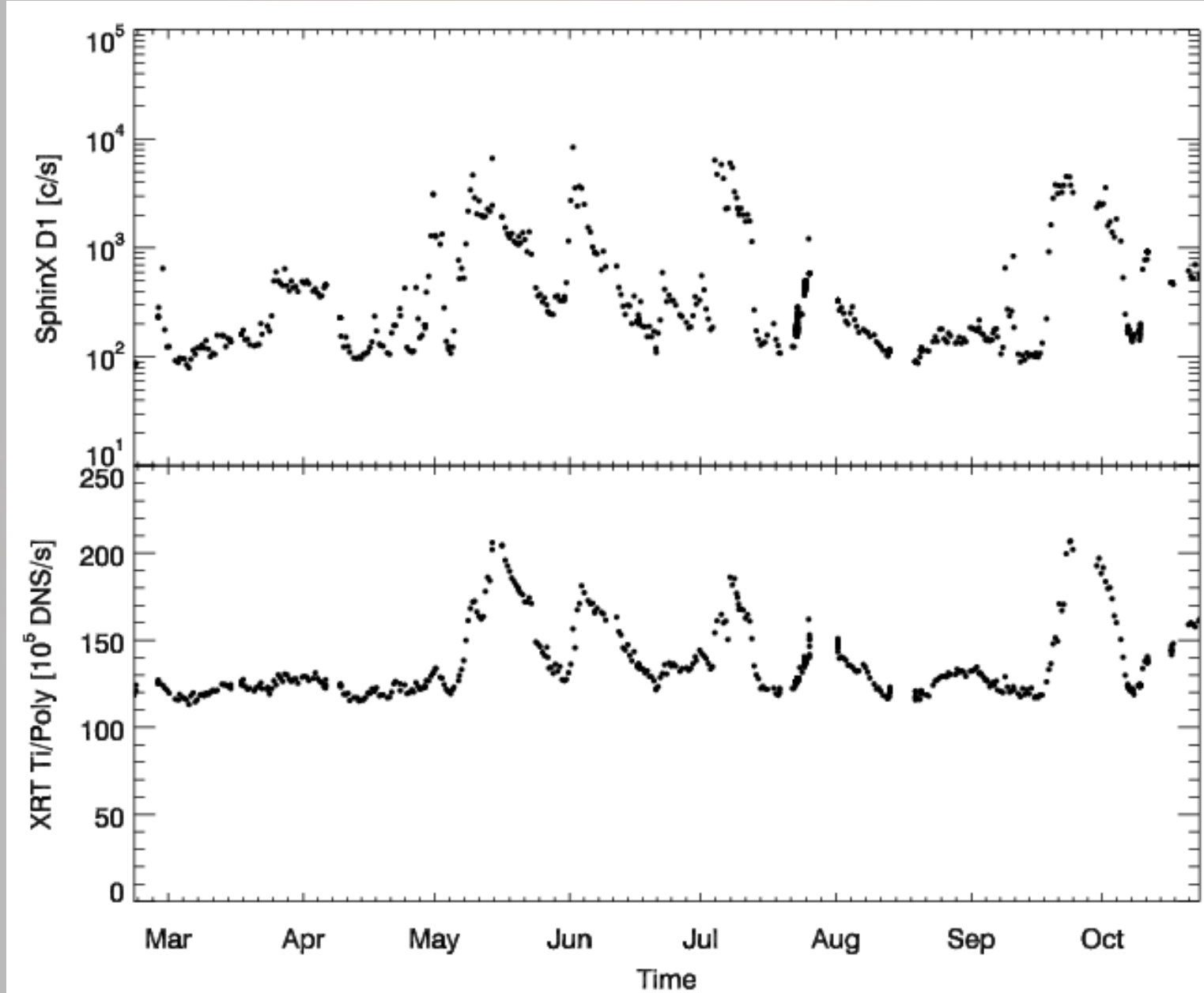
(images in one XRT filter only)



Open/Ti_poly 77



XRT and SphinX light curves in 2009



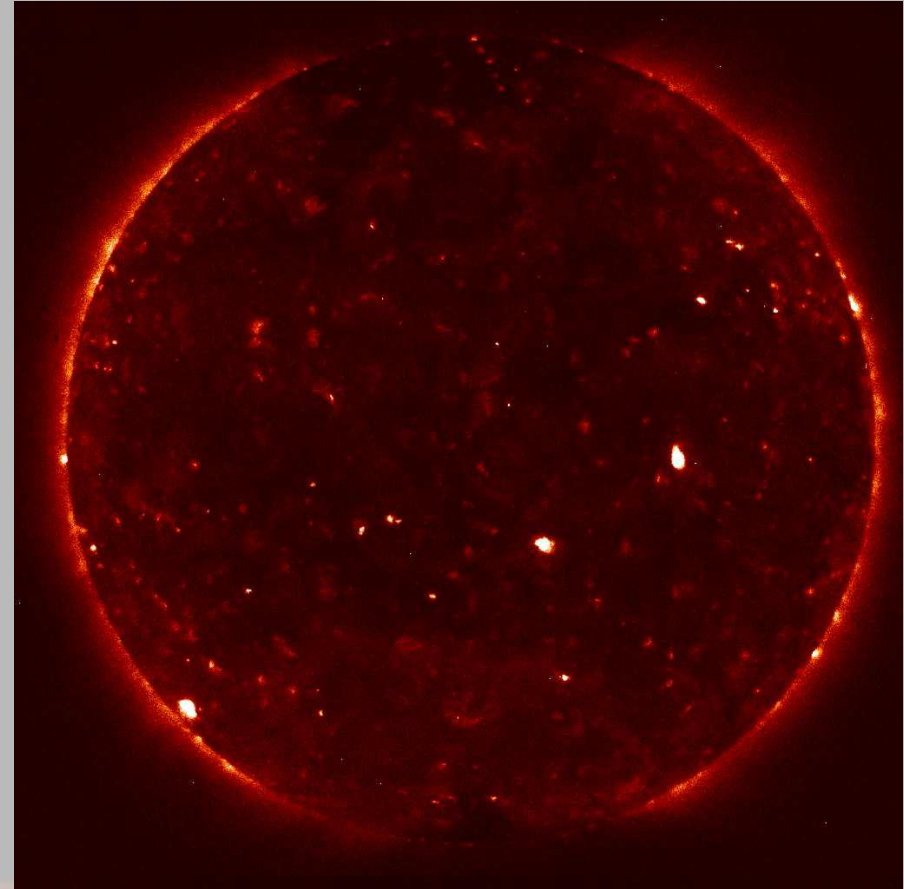
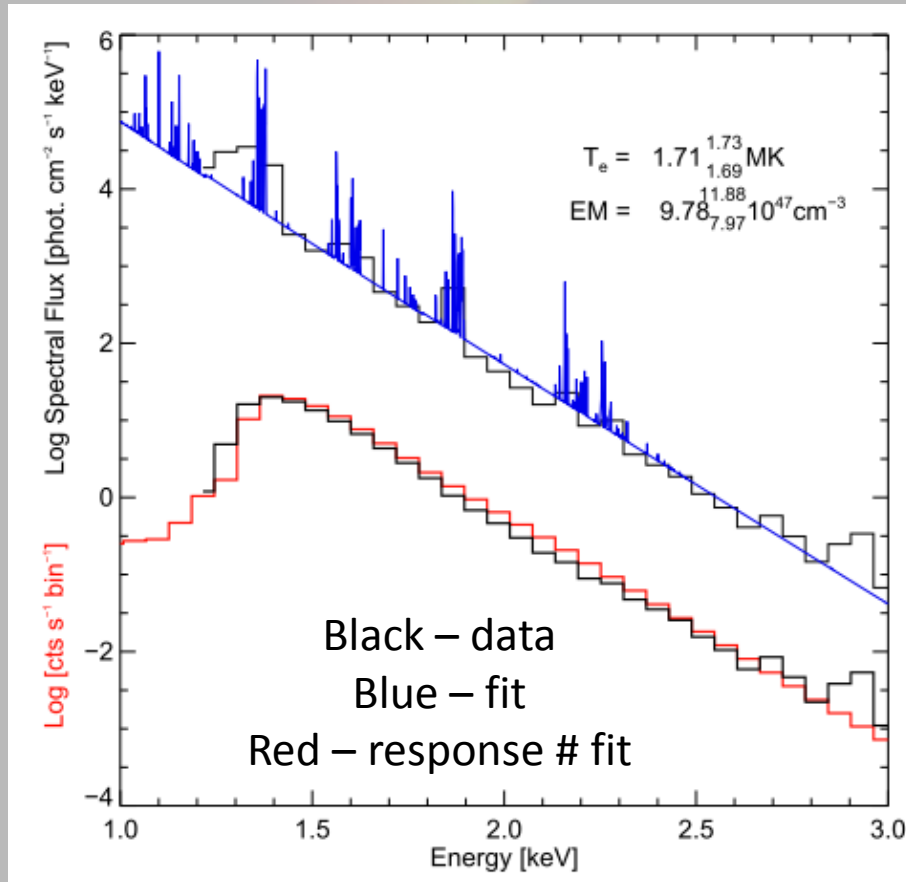
Extremely quiet X-ray Sun

SphinX spectrum for interval

2009 Sep. 16 between 01:50 UT and 07:33 UT

XRT image taken

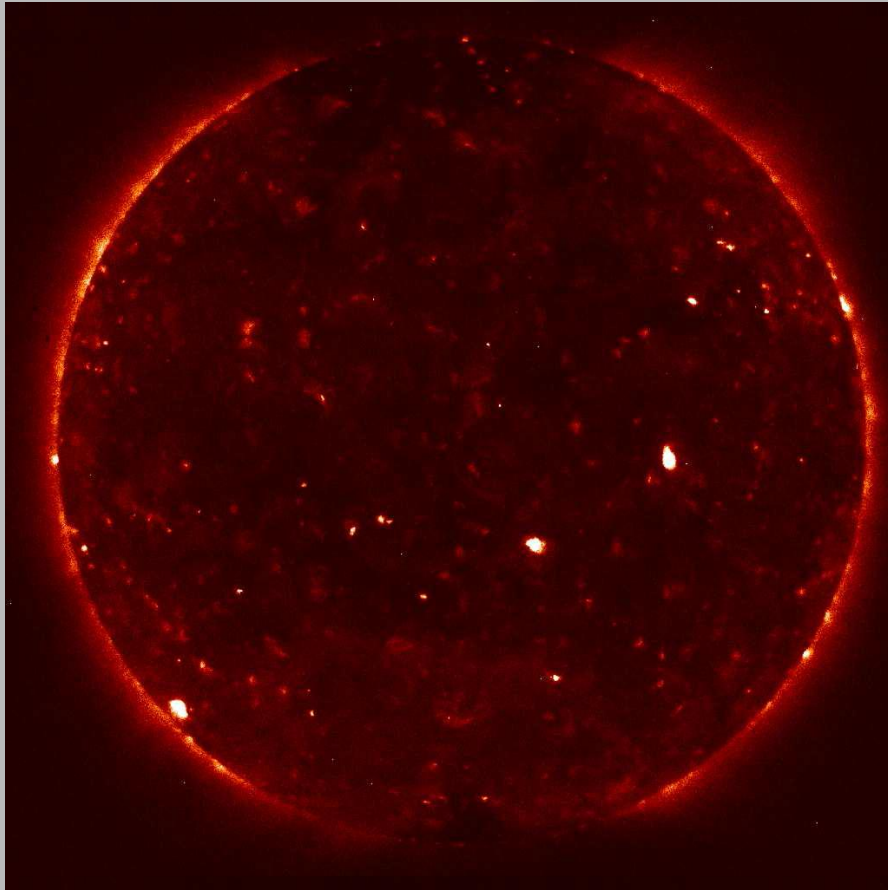
on 2009 September 15 at 15:47:31 UT



Fit obtained using <http://www.chiantidatabase.org/>

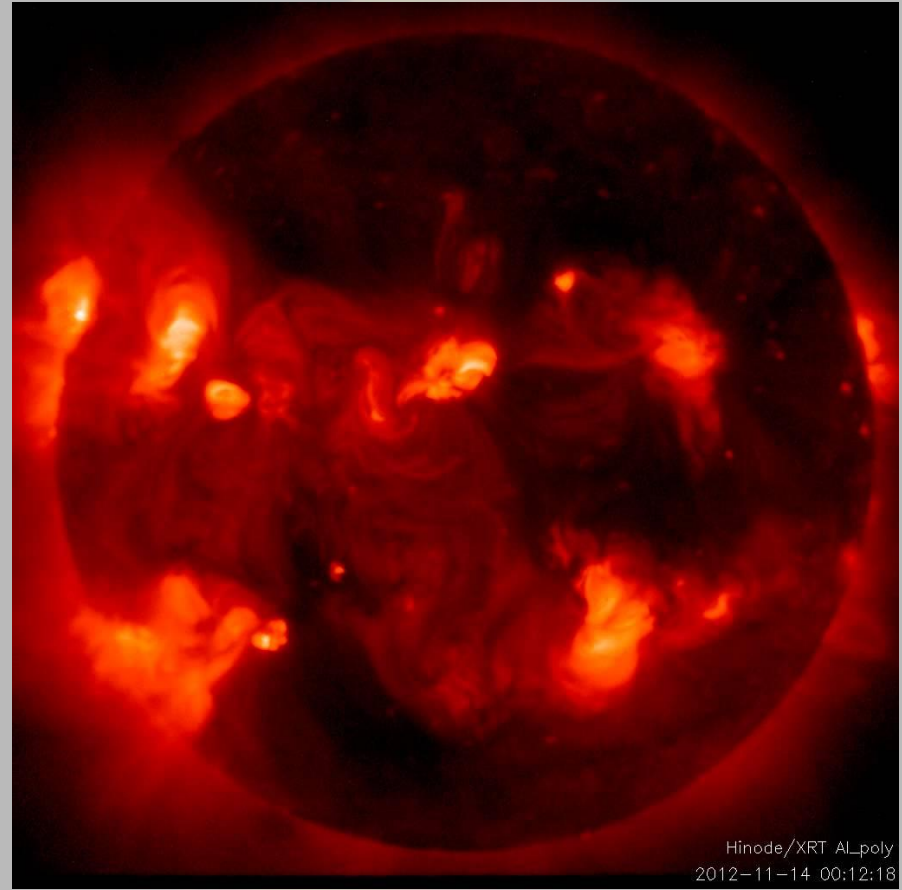
Quiet

15 September 2009



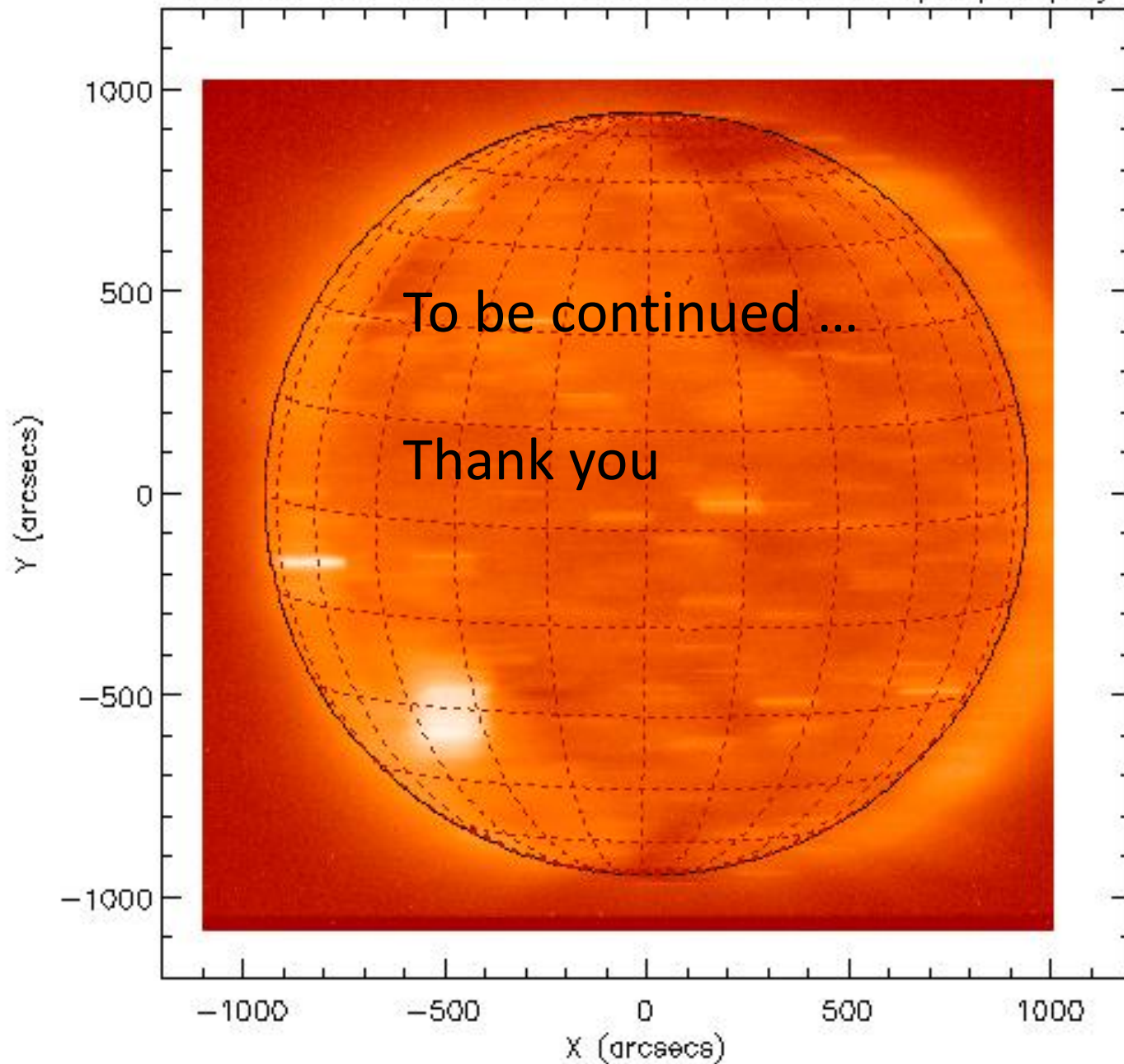
Active

14 November 2012



Conclusions

- SphinX and XRT provide complementary data.
- XRT can provide context data and spatial resolutions for SphinX.
- XRT could extend SphinX towards lower E, EM and T.
- Comparison of physical solar plasma parameters derived from SphinX and XRT data is possible.
- Both datasets can be useful in DM studies.



To be continued ...

Thank you

exposure = 11.572480 s