Supersoft X-ray Sources – New Developments

2009 Science Workshop

European Space Astronomy Centre, May 18th - 20th , 2009

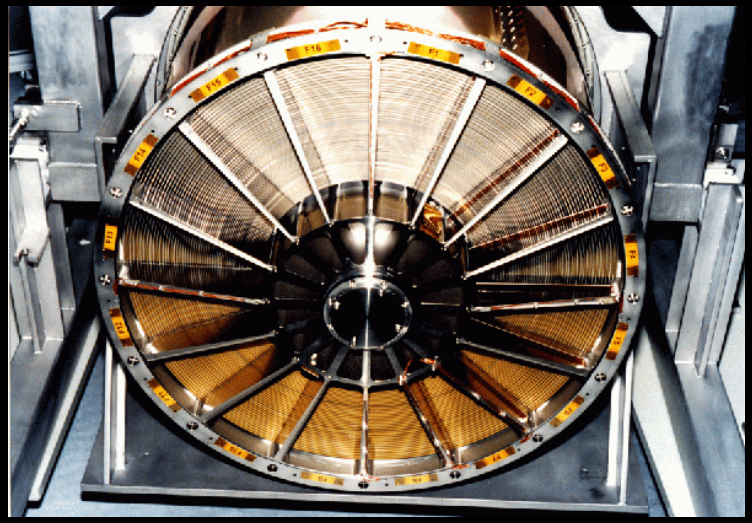
Norbert Schartel

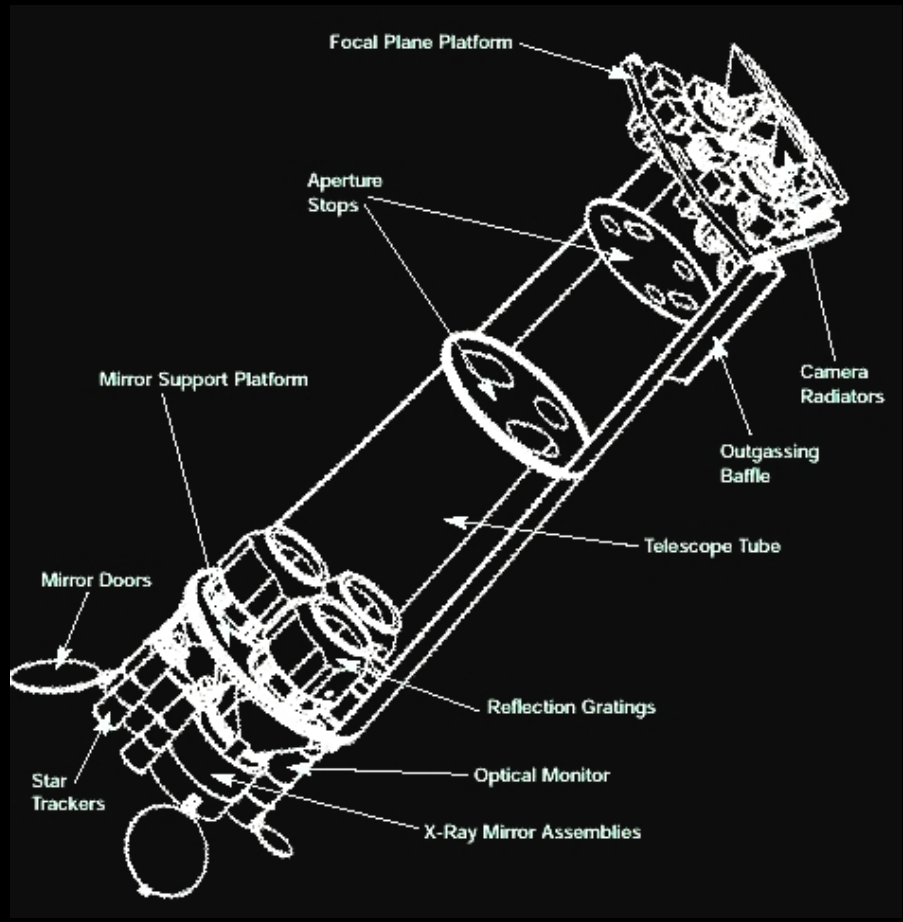
XMM-Newton Project Scientist

Content

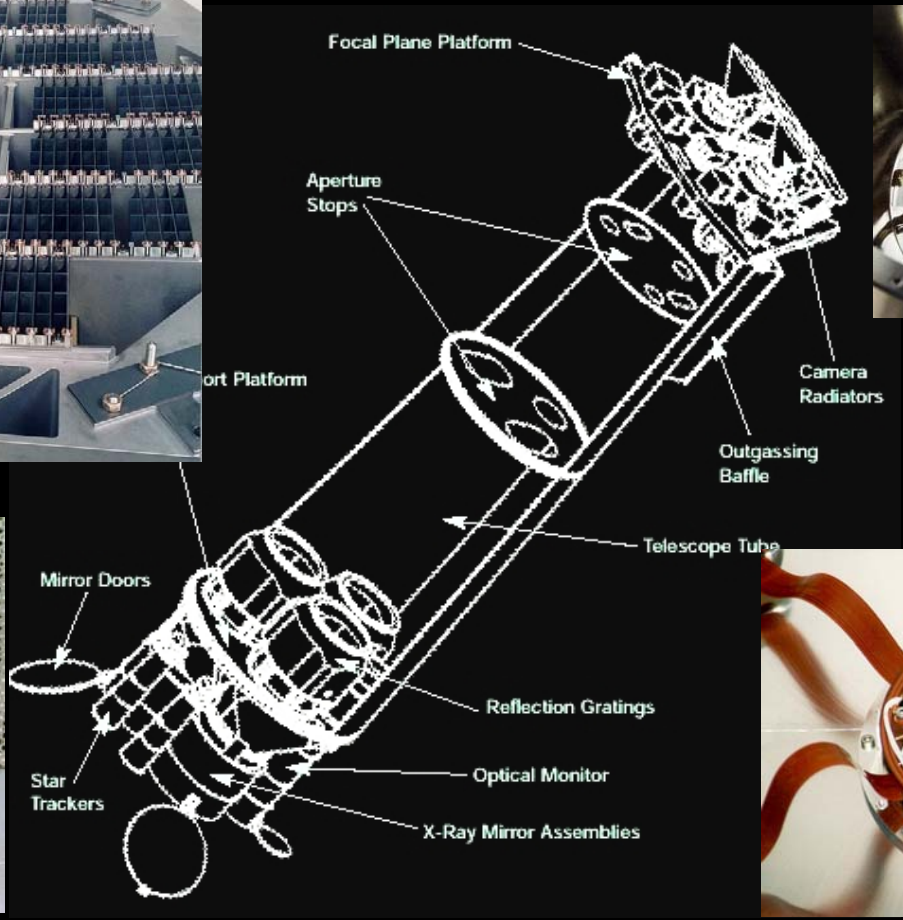
- 10 years XMM-Newton
- Supersoft X-ray Sources

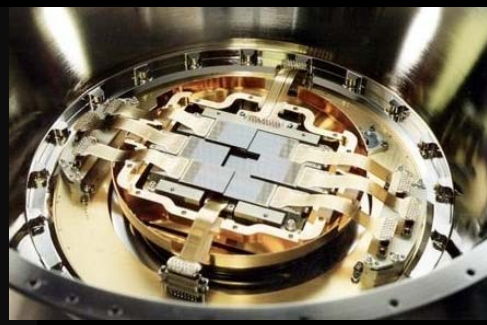
Spacecraft and Mirrors

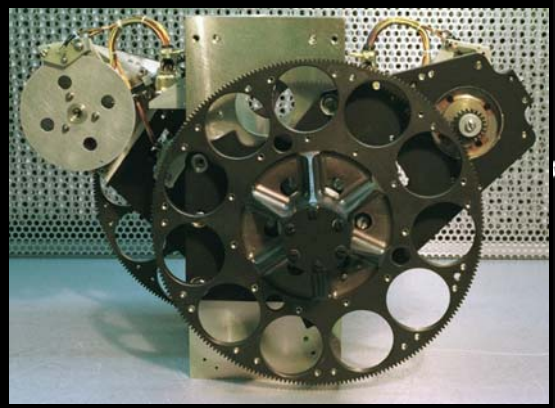


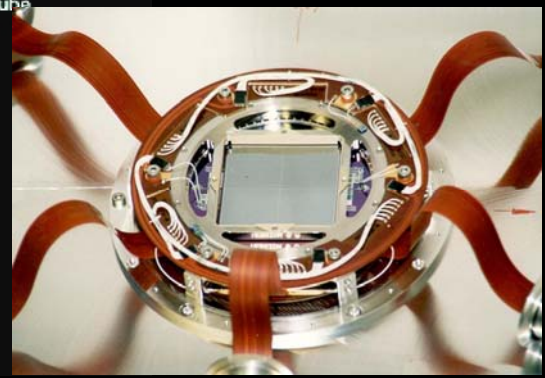


Instruments









XMM-Newton

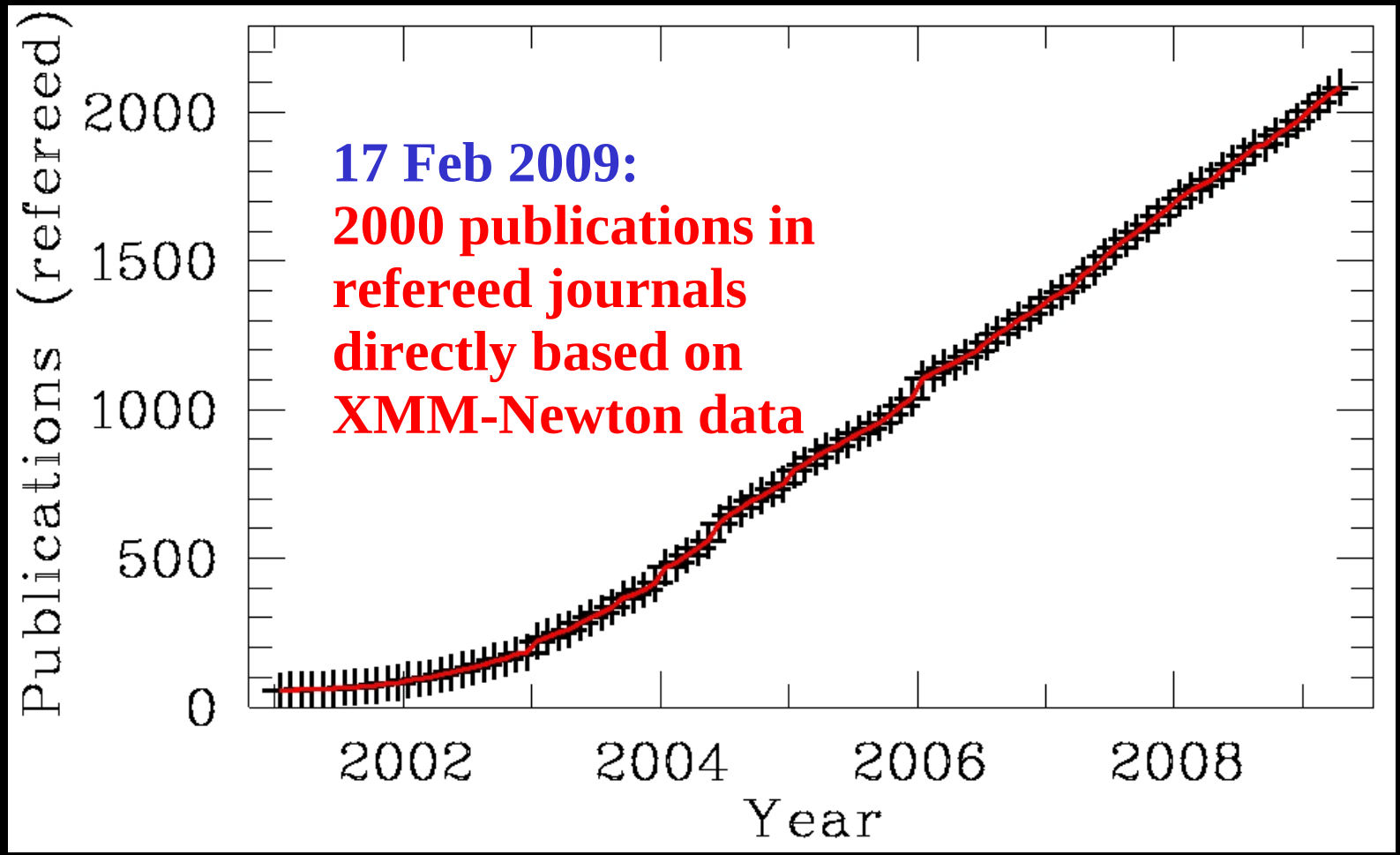
3 Mirror Modules / highest effective collecting area ever

Six simultaneously observing instruments:

- 3 CCD cameras (one pn and two MOSs)
- 2 spectrometers (RGS)
- 1 optical Monitor (OM)

XMM-Newton launch on 10 December 1999

Publications



Status of the Spacecraft

Spacecraft status is very good

In May 2007 Mission Extended Operations Review concluded that XMM-Newton can operate at least up to 2018

All systems are running on their primary unit, i.e. full redundancy still available

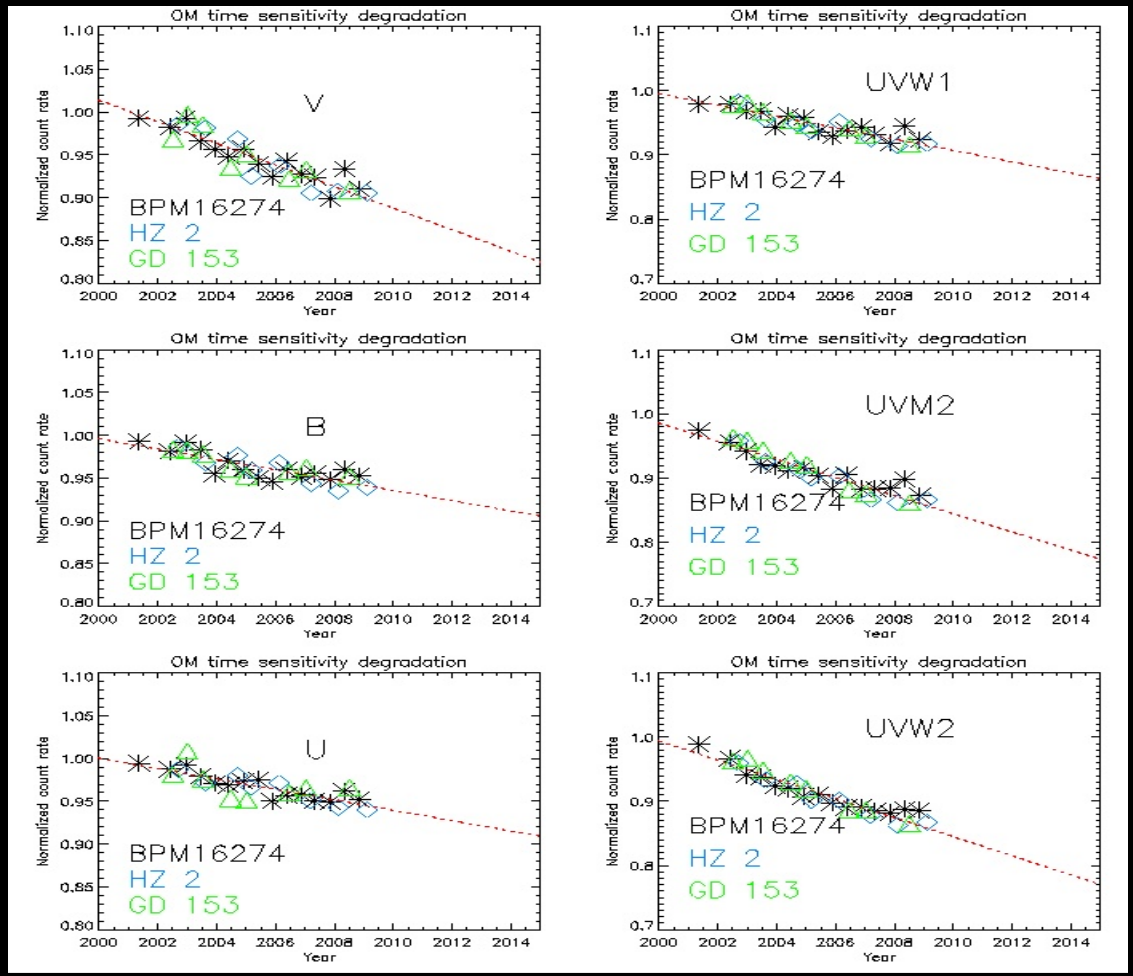
At 2009 April, 81 kg of fuel remain with usage of around 6.2 kg per year

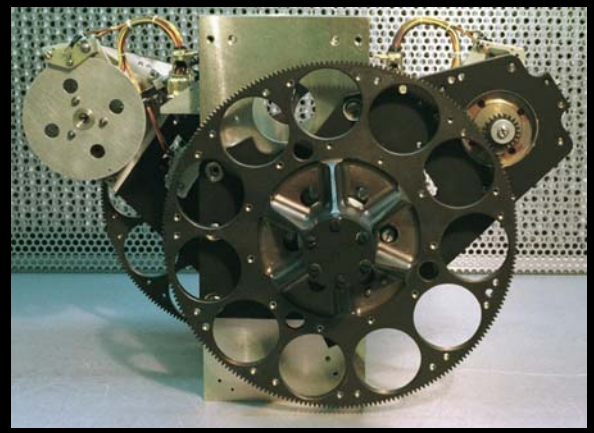
The solar array is generating around 1950 W and between 800-1200 W are used.

All other consumable are fine, too

On November 2007, the SPC approved operations until end of 2012. Further extensions will be reviewed in 2 years time

OM time sensitivity degradation

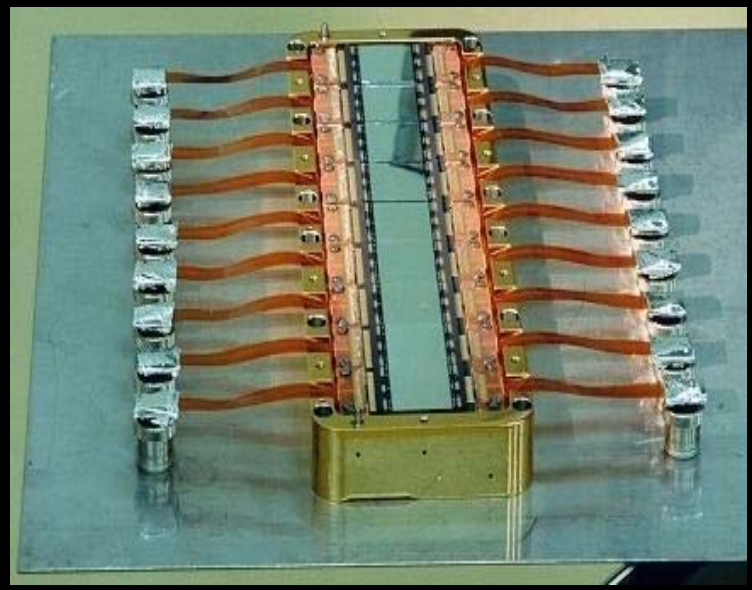




Sensitivity loss in 2015:

- **U, B, V, UVW1 : < 15 %**
- **UVM2, UVW2 : < 25 %**

Status of the Reflection Grating Spectrometers

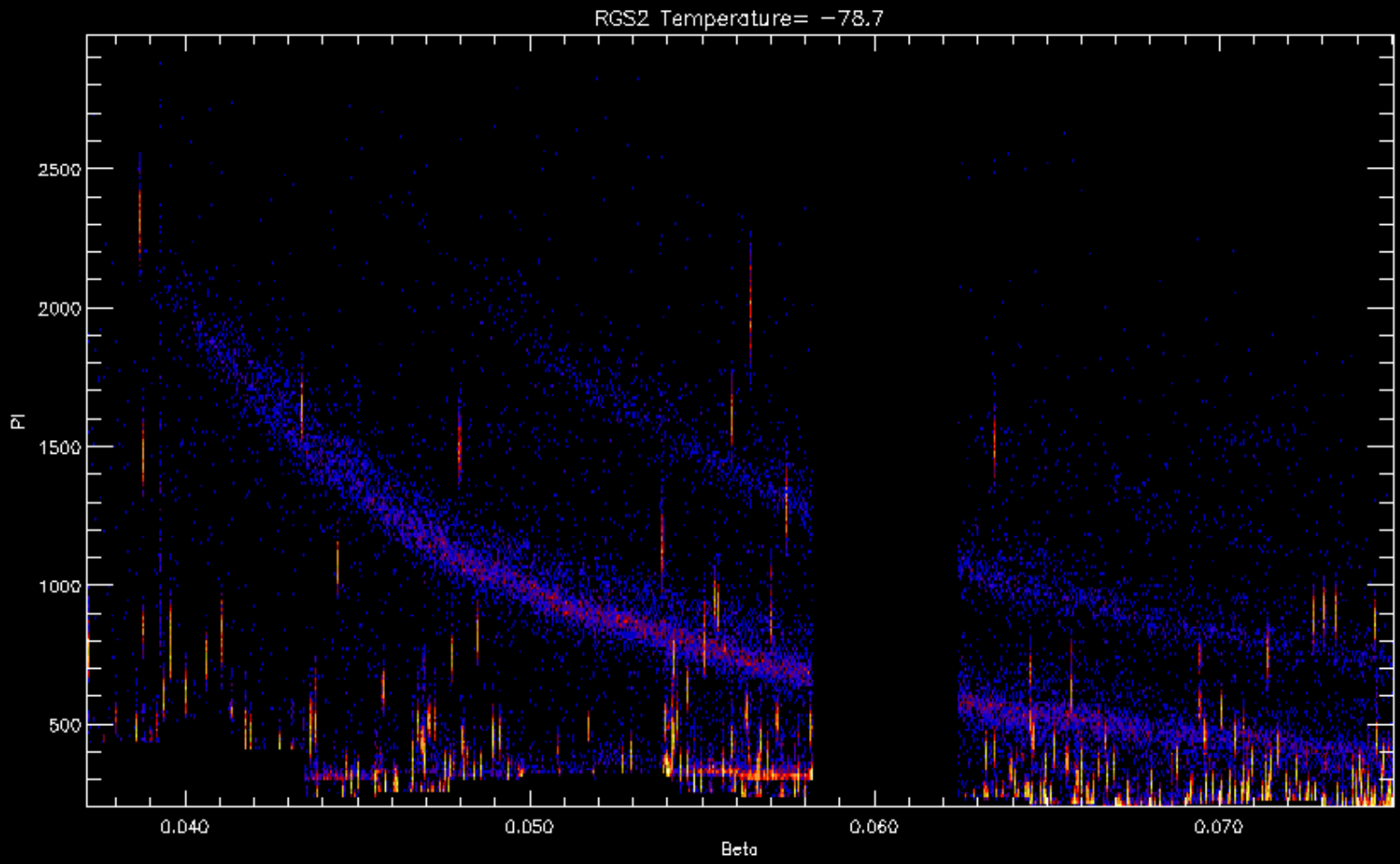


2 CCDs were lost early in the mission (full wavelength coverage due to redundancy between RGS1 and RGS2)

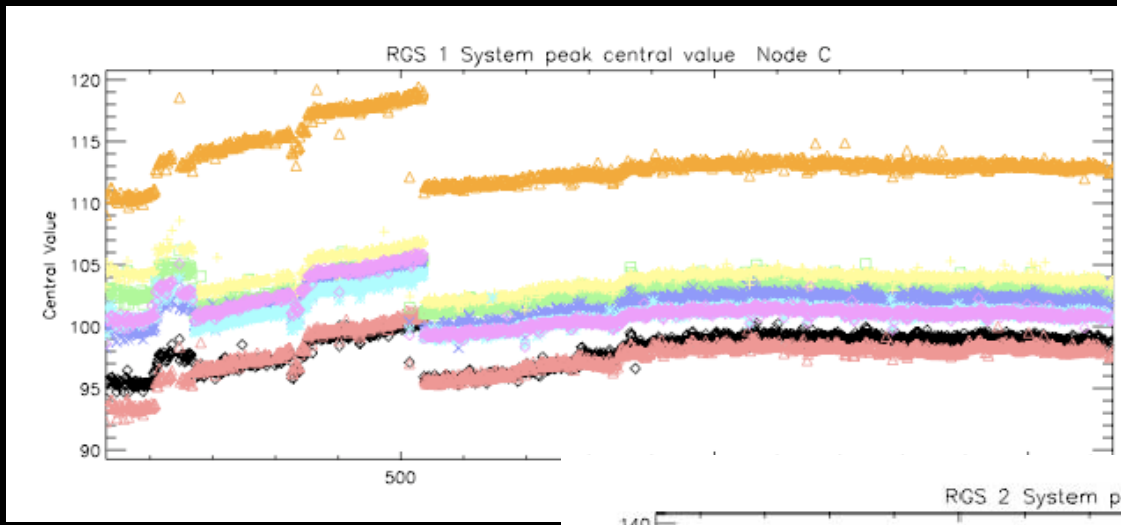
RGS 2 single readout mode since August 2007 to avoid ADC errors (no impacts for large majority of sources)

Reduction in EPIC MOS and RGS operating T in 2002 resulted in far fewer hot pixels

Status of the Reflection Grating Spectrometers

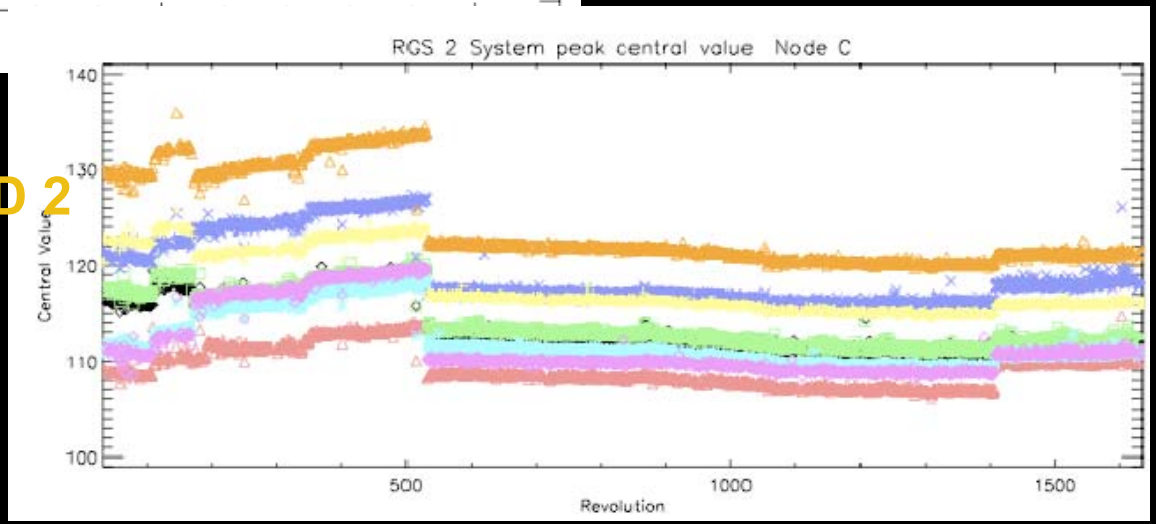


RGS Offset Evolution

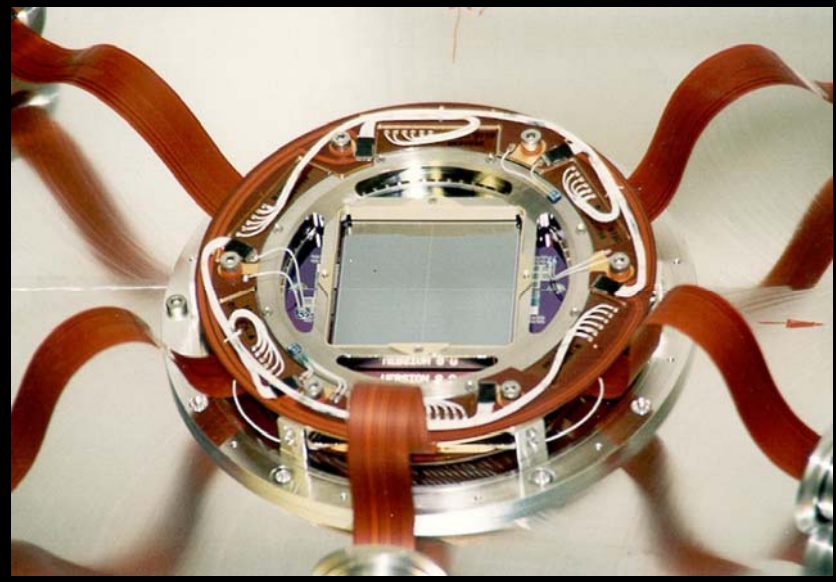


Offsets pretty smooth after “cooling” in rev 532
Almost no sensitiv-eness to solar flares.

Only change in last period due to R1-CCD 2 new operational voltages from rev 1400 on



Status of the EPIC Cameras

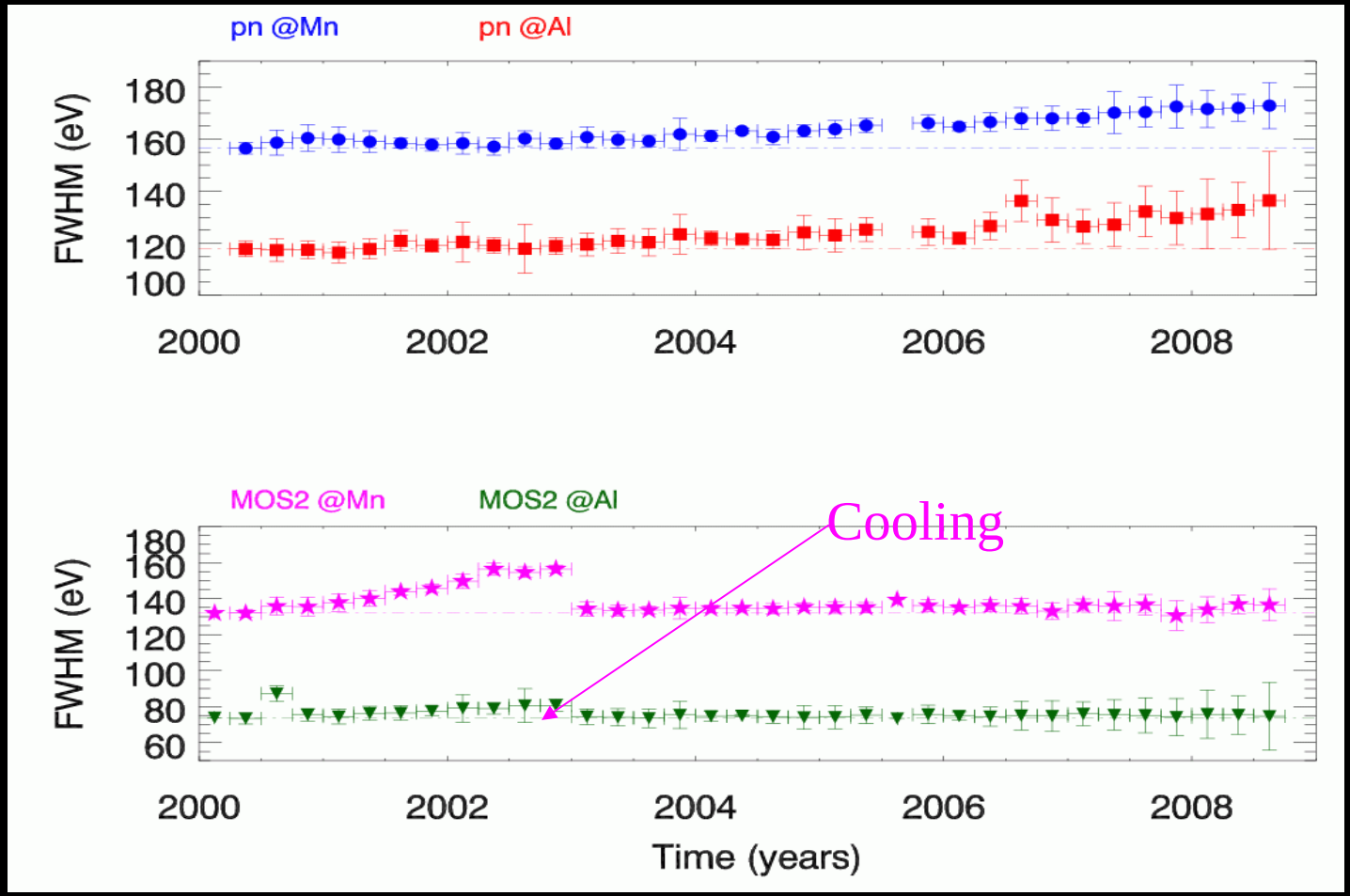


The Nov 2002 reduction in EPIC MOS (and RGS) operating T resulted in far fewer hot pixels, and decreased energy resolution degradation rates.

4 micrometeoroid impact events in 7 yrs have resulted in the loss of 1 in 14 of the MOS CCDs – a 5% reduction in the EPIC area.

No effects of contamination visible

EPIC Resolution



Extrapolation in 2015:

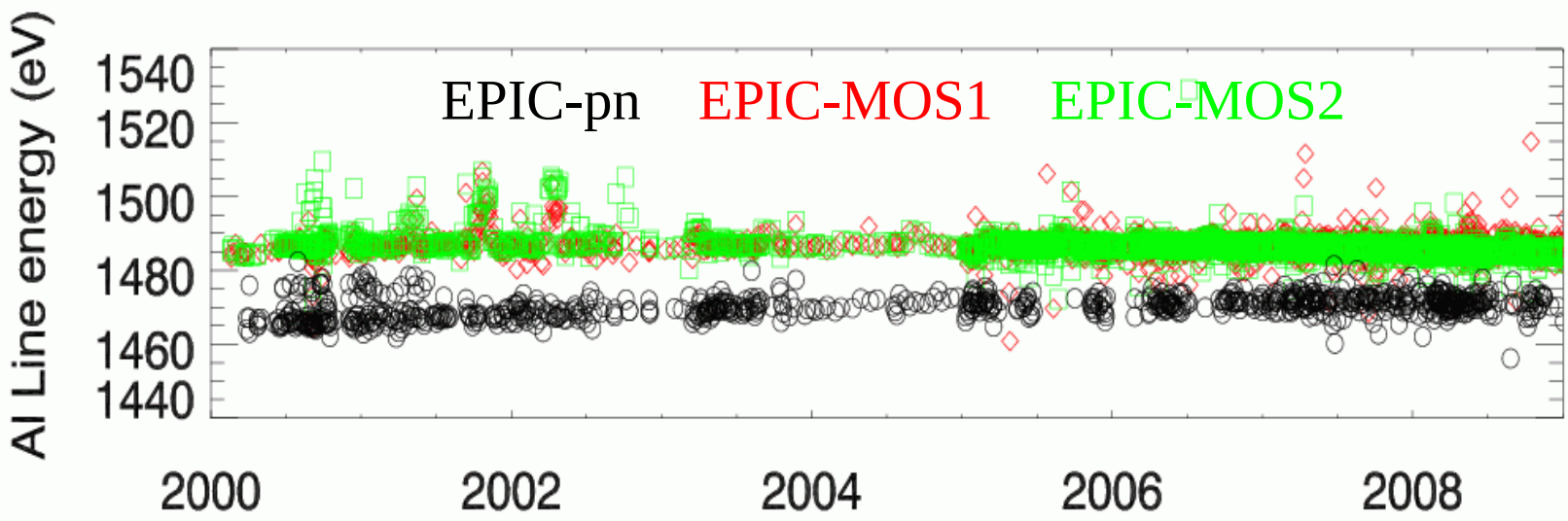
190 eV

150 eV

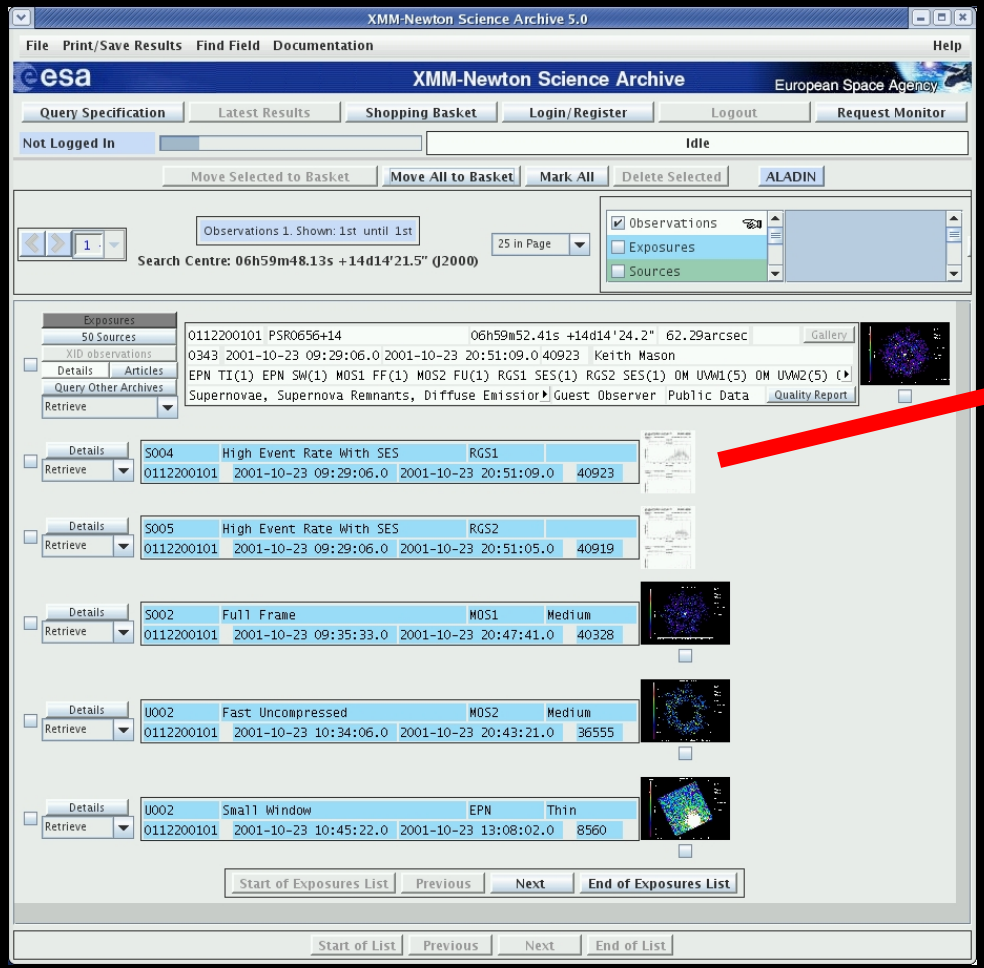
76-77 eV

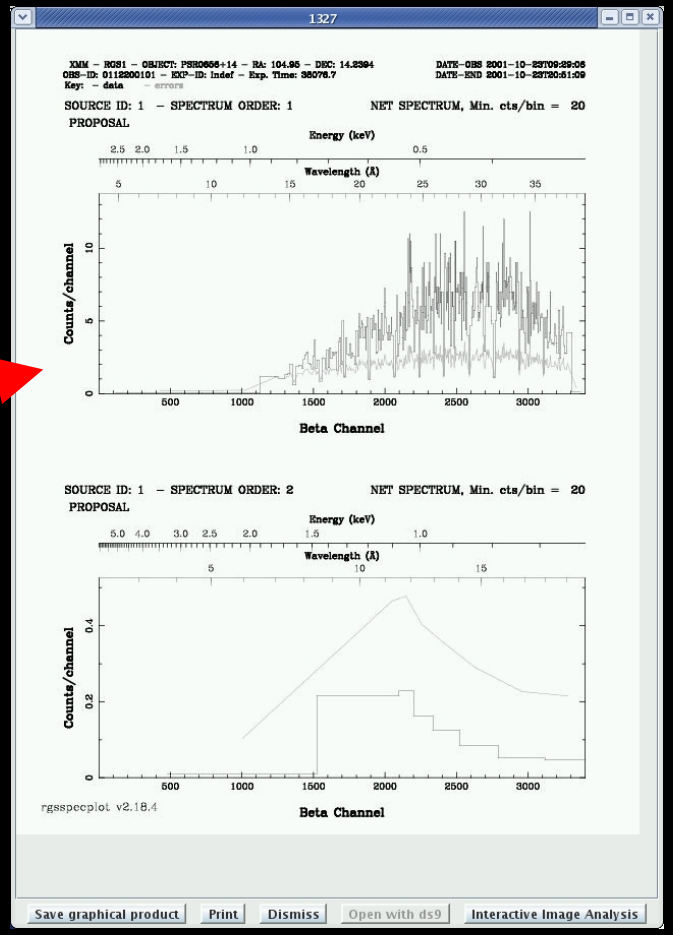
139 eV

CTI/gain well under control

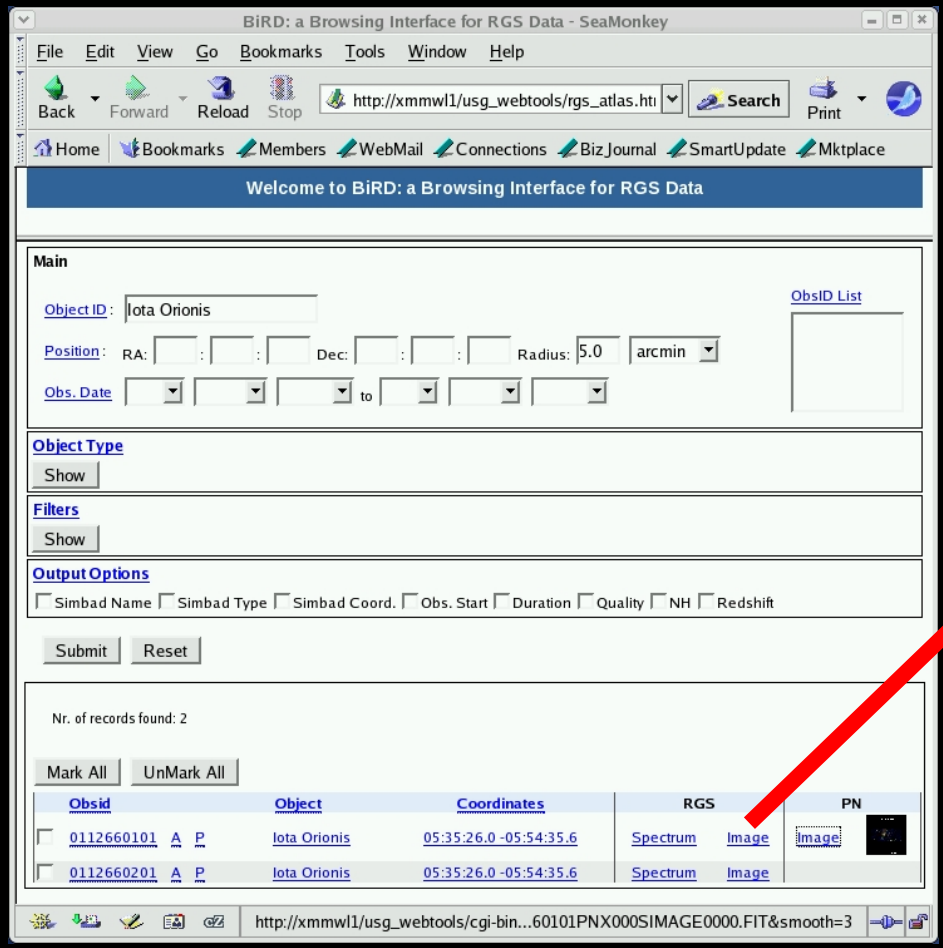


The XMM-Newton Archive is full!





BiRD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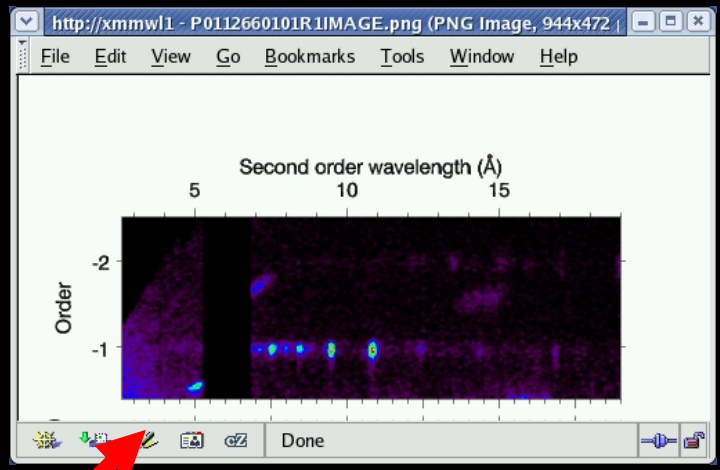
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5
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15
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-2
-1
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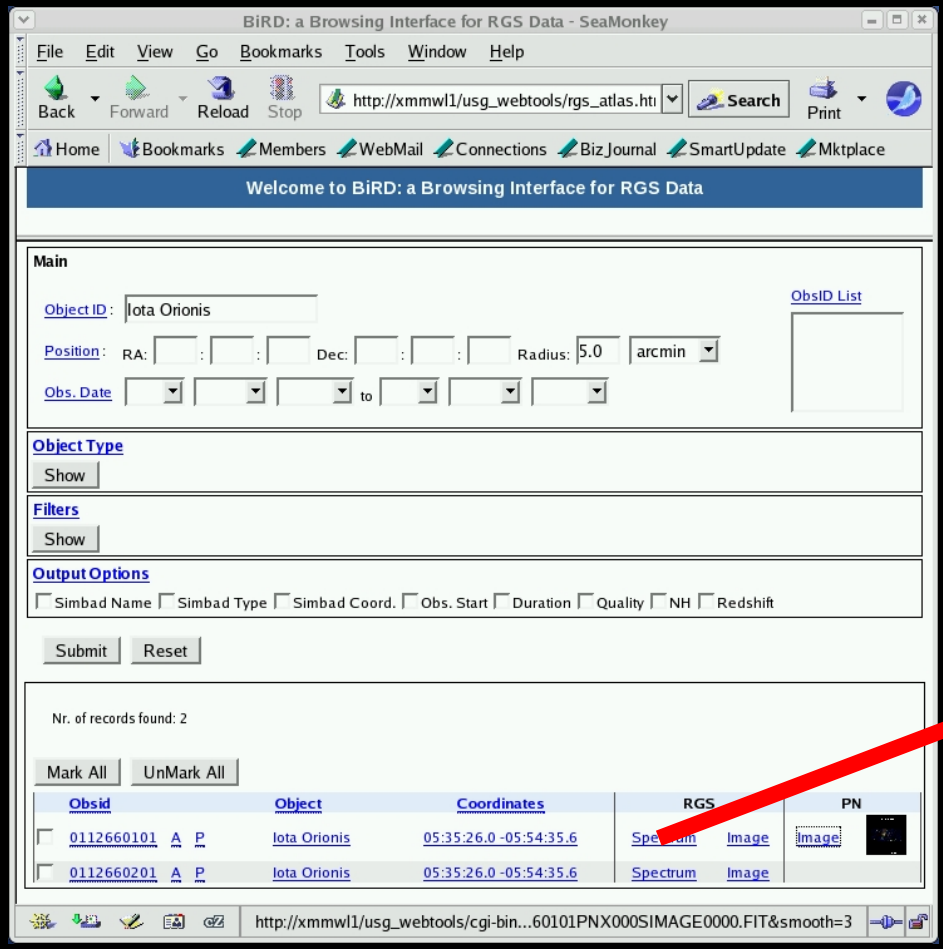
BiRD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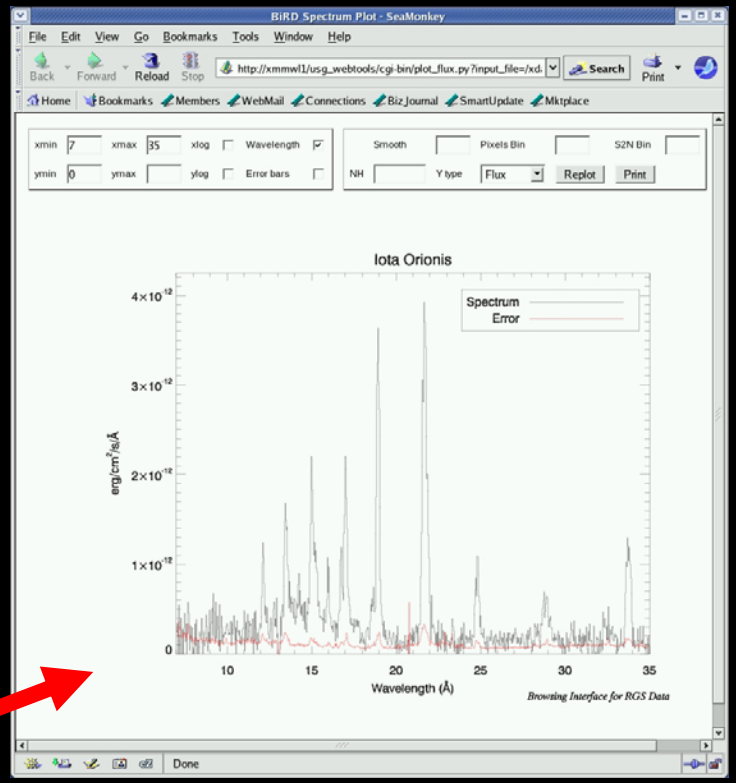
BiRD Spectrum Plot - SeaMonkey
File Edit View Go Bookmarks Tools Window Help
Home Bookmarks Members WebMail Connections Biz Journal SmartUpdate Mktplace
Replot Print
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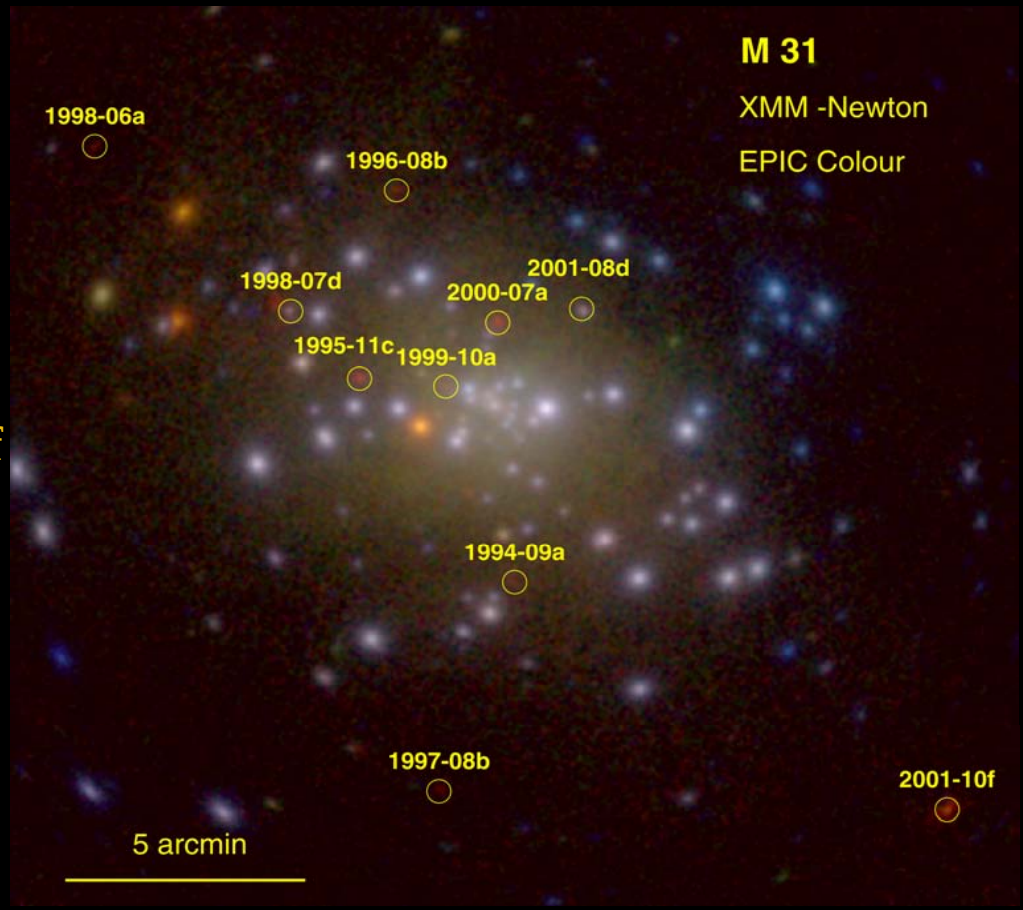
Spectrum
Error
erg/cm²/s/Å
Wavelength (Å)
Browsing Interface for RGS Data
Done

X-Ray Monitoring of Novae in M 31

- X-ray counterparts of optical novae in M 31 based on Chandra and XMM-Newton data
- 11 out of 34 novae are detected within a year after the optical outburst in X-rays
- 11 novae detection of the end of the supersoft source phase
- 7 novae are still bright >1200 day after outburst.
- W. Pietsch et al., 2007, A&A 465, 375



➔ number of novae at supersoft X-rays is much higher than previously estimated (>30%)

Next Call of Proposals: AO9

- **Planned key milestones:**
  - Announcement: 25 August 2009
  - **Due date for proposals: 9 October 2009 (12:00 UT)**
  - Final approved program: late December 2009
  - Second phase submission: 11 January – 5 February 2010
  - Start of observations: May 2010

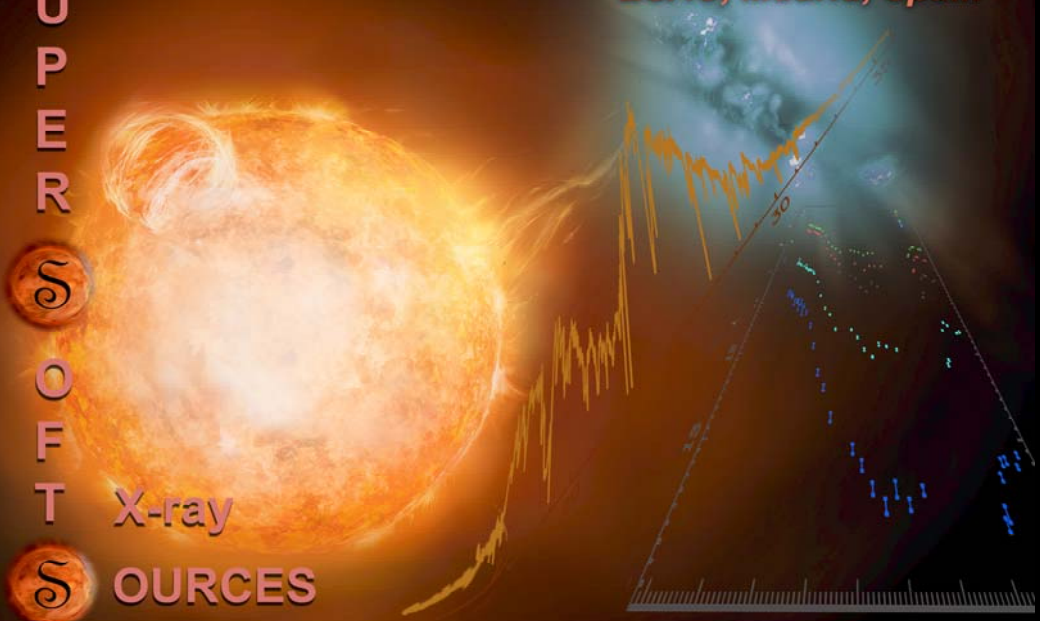
XMM-NEWTON WORKSHOP 2009

http://xmm.esac.esa.int/external/xmm_science/workshops/2009_science/

SCIENCE WORKSHOP May 18-20, 2009

ESAC, Madrid, Spain

SUPERSOFT X-ray SOURCES



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M. Diaz-Trigo
M. Arpizou
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R. Gonzalez	ESA XMM-Newton SOC, Madrid, Spain
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M. Hernanz	ICE/CSIC & IEEC, Barcelona, Spain
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K. Mukai	NASA/GSFC, Greenbelt, USA
M. Orio	INAF - Padova, Italy
J. Osborne	University of Leicester, UK
N. Schartel	ESA XMM-Newton SOC, Madrid, Spain

Credits
Artists impression: Inga Nielsen
Light Curve: LMU

Proceedings

- Proceedings as regular issue of Astronomische Nachrichten / Astronomical Notes
- Deadline 17 July
- Strict Page Limit: Who will not contribute?