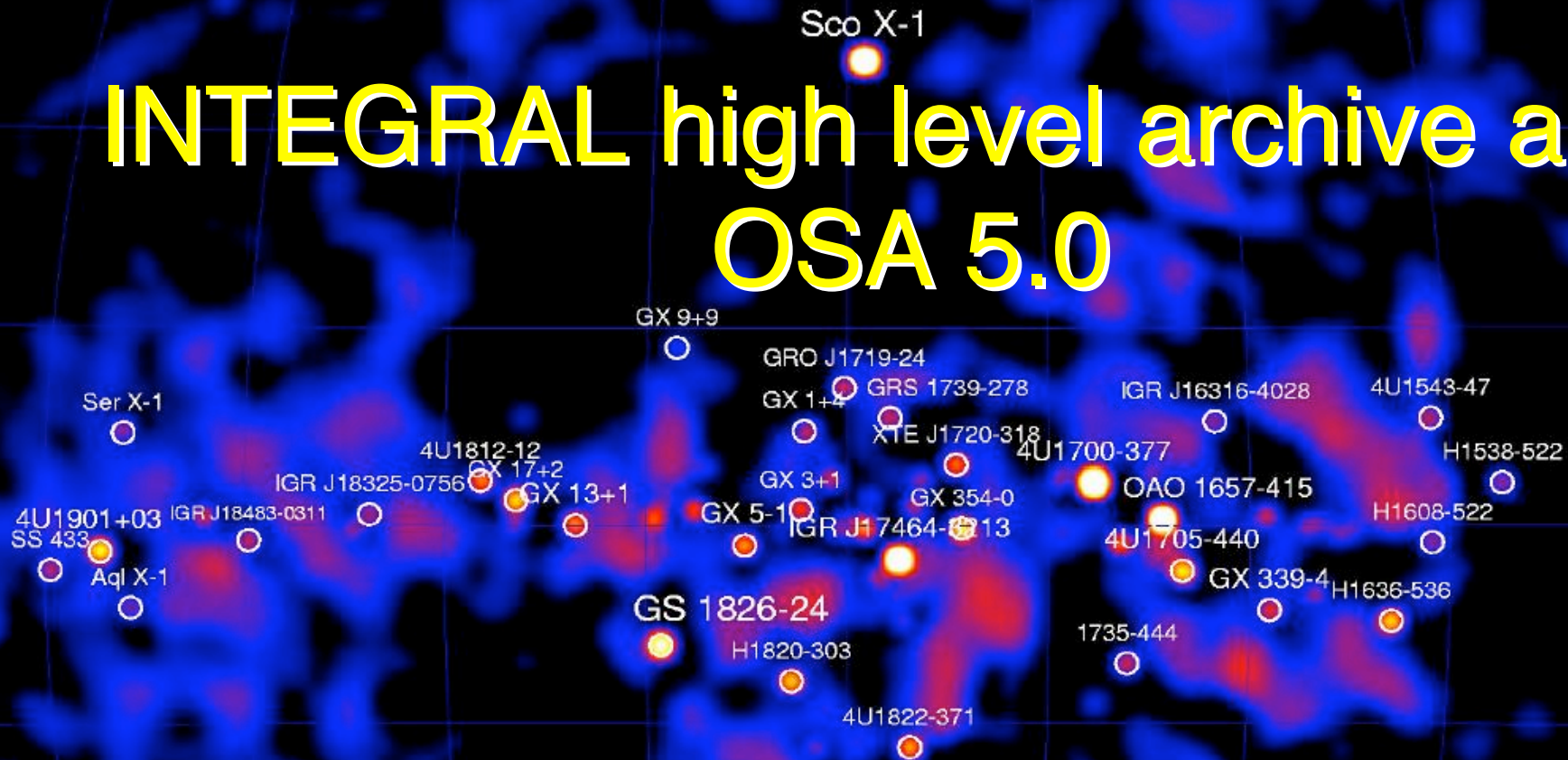


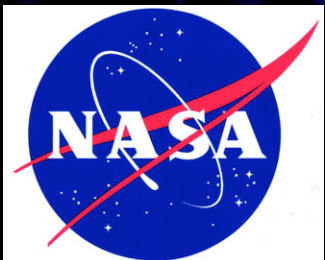
INTEGRAL high level archive and OSA 5.0



Volker Beckmann

Exploration of the Universe Division, NASA Goddard Space Flight Center

C. Shrader, S. Sturmer, B. Teegarden, K. Watanabe

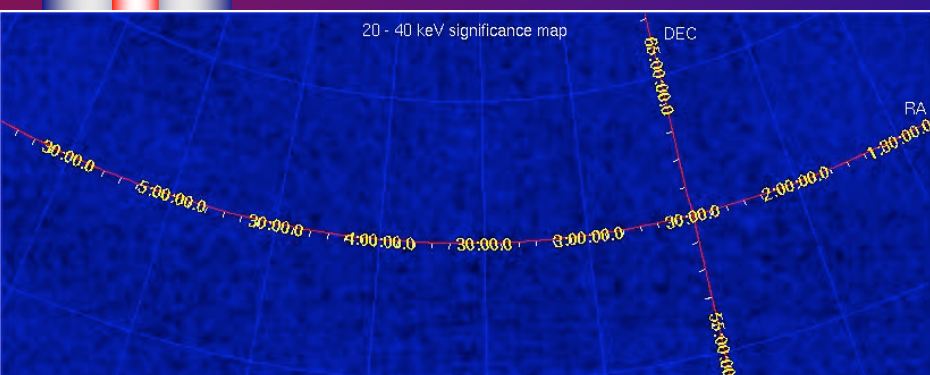


INTEGRAL Activities at GSFC

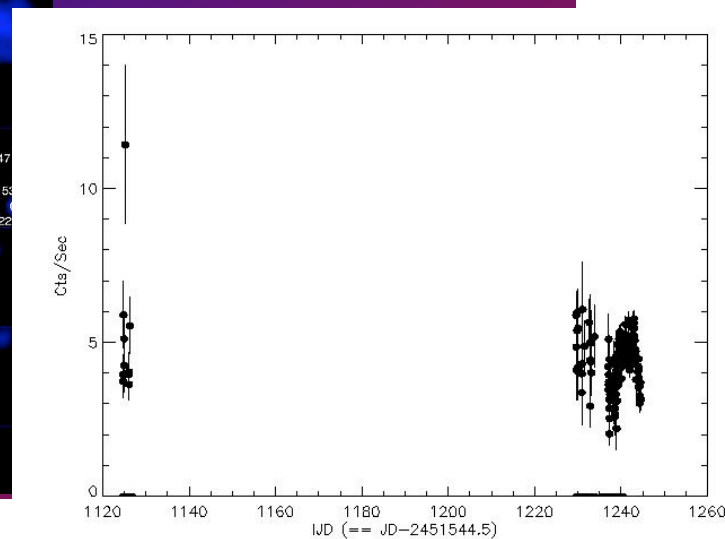
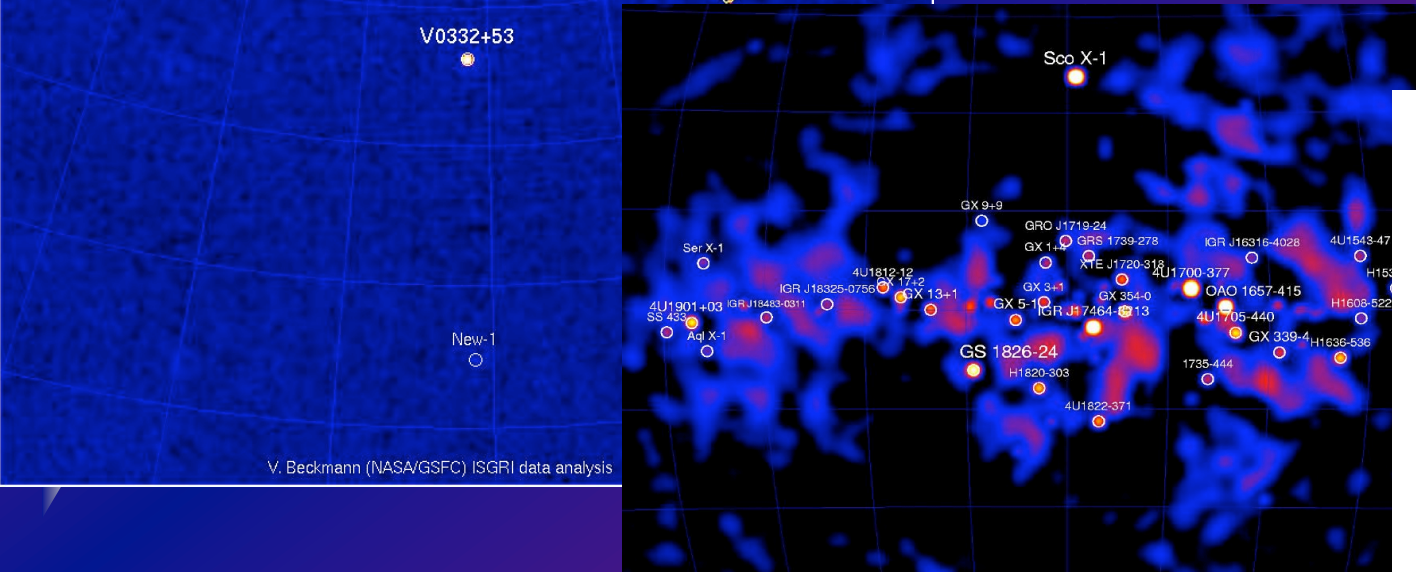
- _ providing high-level data products through HEASARC
- _ INTEGRAL Bright Source Catalog and
- _ INTEGRAL public data results
- _ New software release OSA 5: more user friendly, more options, better responses, better results

HEASARC and INTEGRAL/GOF

- user's interest ? Get to know INTEGRAL results!
- download previews and download the data
- get help with the analysis
- HEASARC as a known portal to high-energy data



ISGRI images (8 energy bands)
SPI images
ISGRI lightcurves
available in FITS and JPEG



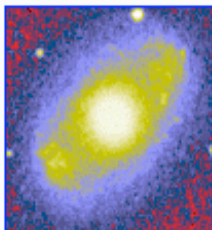
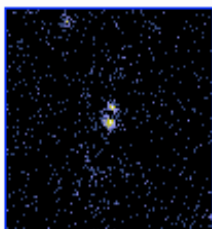
V. Beckmann (NASA/GSFC) ISGRI data analysis

HEASARC and INTEGRAL/GOF

- analysis of public data
- results of > 450 observations in the archive:
“INTEGRAL public data results”
- ISGRI and SPI lightcurves
for 116 bright sources:
“INTEGRAL Bright Source Catalog”
- to be done soon:
include the lightcurves from ISGRI and JEM-X
provided by the ISDC
- include some more (~15) bright sources

[Main Search Form](#) > **Search Results** > Choose Data Products

Images generated by [SkyView](#)
 Click on image to see full *SkyView* image

[DSS](#) Optical image, 2.83'[RASS](#) X-ray image, 75.0'

Images centered on requested position

Search was based on:

Object/Coordinates:
 resolved by SIMBAD (local cache) to [12 10 32.73, +39 24 19.6]

Coord. System: Equatorial, equinox 2000

Maximum Rows:

Search Radius: arc minutes

 as **Browse Tip:** Do you know how to estimate the number of random matches in a cross-correlation? [Learn more on this topic](#) or [See all tips](#)**Table Name/Row Count Summary**

Click on table name to view search results

INTEGRAL IBIS Hard X-Ray Survey of Galactic Center (intgcat)	0	First IBIS/ISGRI Soft Gamma-Ray Galactic Plane Survey Catalog (ibisgpscat)	0
INTEGRAL Bright Source Catalog (intbsc)	1	INTEGRAL Science Window Data (intscw)	206
INTEGRAL Public Pointed Science Window Data (intscwpub)	150	INTEGRAL Public Data Results Catalog (intpublic)	11
INTEGRAL Reference Catalog (intrefcat)	1	INTEGRAL Observing Program (integralao)	4

INTEGRAL Public Data Results Catalog (intpublic)

Search radius used: 600.00'

Select	Related Links	Services	rev	start time	end time	exposure	name	ra	dec	dither pattern	pi lname	pno	Search Offset
<input checked="" type="checkbox"/> All			↓↑	↓↑	↓↑	↓↑ [s]	↓↑	↓↑	↓↑	↓↑	↓↑	↓↑	[']
<input checked="" type="checkbox"/>	AQ	Q R N S D X	75	2003-05-25 21:03:01	2003-05-28 11:31:36	222657	NGC 4151	12 10 32.60	+39 24 20.6	Staring	Amalgamated	0120050	0.030
<input checked="" type="checkbox"/>	AQ	Q R N S D X	75	2003-05-25 21:03:01	2003-05-28 11:31:36	222657	NGC 4151	12 10 32.60	+39 24 20.6	Staring	Amalgamated	0120114	0.030
<input checked="" type="checkbox"/>	AQ	Q R N S D X	75	2003-05-25 21:03:01	2003-05-28 11:31:36	222657	NGC 4151	12 10 32.60	+39 24 20.6	Staring	Amalgamated	0120259	0.030
<input checked="" type="checkbox"/>	AQ	Q R N S D X	74	2003-05-24 01:32:42	2003-05-25 11:43:29	121378	NGC 4151	12 10 32.60	+39 24 20.6	Staring	Amalgamated	0120050	0.030
<input checked="" type="checkbox"/>	AQ	Q R N S D X	74	2003-05-24 01:32:42	2003-05-25 11:43:29	121378	NGC 4151	12 10 32.60	+39 24 20.6	Staring	Amalgamated	0120114	0.030
<input checked="" type="checkbox"/>	AQ	Q R N S D X	74	2003-05-24 01:32:42	2003-05-25 11:43:29	121378	NGC 4151	12 10 32.60	+39 24 20.6	Staring	Amalgamated	0120259	0.030
<input checked="" type="checkbox"/>	AQ	Q R N S D X	74	2003-05-23 07:58:04	2003-05-24 01:16:13	59189	NGC 4736	12 50 53.10	+41 07 13.6	5x5	Della-Ceca	0120068	472.768
<input checked="" type="checkbox"/>	AQ	Q R N S D X	76	2003-05-28 20:51:29	2003-05-29 12:11:20	54602	NGC 4151	12 10 32.60	+39 24 20.6	Staring	Amalgamated	0120050	0.030
<input checked="" type="checkbox"/>	AQ	Q R N S D X	76	2003-05-28 20:51:29	2003-05-29 12:11:20	54602	NGC 4151	12 10 32.60	+39 24 20.6	Staring	Amalgamated	0120114	0.030
<input checked="" type="checkbox"/>	AQ	Q R N S D X	76	2003-05-28 20:51:29	2003-05-29 12:11:20	54602	NGC 4151	12 10 32.60	+39 24 20.6	Staring	Amalgamated	0120259	0.030
<input checked="" type="checkbox"/>	AQ	Q R N S D X	73	2003-05-21 23:24:57	2003-05-22 11:34:27	40820	NGC 4736	12 50 53.10	+41 07 13.6	5x5	Della-Ceca	0120068	472.768

11 rows retrieved from intpublic

Are you interested in data products?

1. Select the checkboxes for the rows of interest above,
2. un-check any data products you are not interested in:

Data Products available for intpublic

- All
- FITS Results Maps (fits)
- JPEG Images (jpgs)
- SPI Analysis Results (results)
- Science Window Lists (scwlists)

3. then click a button below.

Further Actions:

Do you want to your intpublic results? ([help](#))

Do you want to your intpublic results with another catalog or table? ([help](#))

Do you want to all the columns for the rows selected above?

Do you want to query other services for the rows selected? ([help](#))

Services:

NED
SIMBAD
SkyView:ROSAT All-Sky
SkyView:DSS

INTEGRAL Bright Source Catalog (intbsc)

Search radius used: 15.00'

Select	Related Links	Services	name	source type	ra	dec	isgri detections	spi avq flux	spi avq flux error	spi high flux	spi high flux error	spi low flux	spi low flux error	spi remark:
<input type="checkbox"/> All			↓↑	↓↑	↓↑	↓↑	↓↑	↓↑ [mCrab]	↓↑ [mCrab]	↓↑ [mCrab]	↓↑ [mCrab]	↓↑ [mCrab]	↓↑ [mCrab]	↓↑
<input checked="" type="checkbox"/>	Ref	Q R N S D X	NGC 4151	Sy 1.5	12 10 33.0	+39 24 21	157	28	3	35	4	6	2	

1 row retrieved from intbsc


[Browse Home](#)

Data Products for selected rows



Choose Data Products > Retrieve Data Products

- Do you want to view a data product? Click on its hyperlinked data format.
- Do you want to retrieve data products in a tarfile? Check the boxes beside each product and click one of the bottom of the page.

 Select all products for all rows

[INTEGRAL Public Data Results Catalog \(intpublic\)](#) [FTOOLS](#)

rev	start_time	end_time	exposure	name	ra	dec	dither_pattern	pi_lname	pno
74	2003-05-23 07:58:04	2003-05-24 01:16:13	59189	NGC 4736	12 50 53.10	+41 07 13.6	5x5	Della-Ceca	0120068

 Select all products in this row

FITS Results Maps

- ISGRI Results Map (rev74_NGC4736_ISGRI.fits.gz) [FITS](#) 5522 kB
- SPI Significance Map 20-40 keV (rev74_NGC4736_SPI.fits.gz) [FITS](#) 679 kB

Science Window Lists

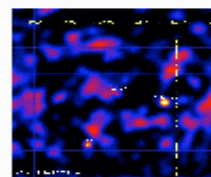
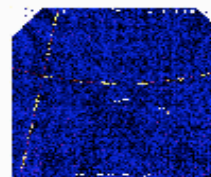
- Science Window List (dolsrev74_NGC4736_cons.txt) [ASCII](#) 1 kB

SPI Analysis Results

- SPI Analysis Results (rev74_NGC4736_results.txt) [ASCII](#) 6 kB

JPEG Images

- ISGRI Significance Image 20-40 keV (rev74_NGC4736_ISGRI.jpg) [JPEG](#) 125 kB
- SPI Significance Image 20-40 keV (rev74_NGC4736_cons.jpg) [JPEG](#) 62 kB



 [What is Hera?](#)

INTEGRAL Bright Source Catalog

Here we present the (apparently) brightest sources seen by INTEGRAL in the 20-40 keV energy band **in public data**. This is **not a flux limit sample**. All results are from consolidated data in the 20 - 40 keV energy band. ISGRI analysis has been performed by Paizis & Chernyakova at [INTEGRAL Science Data Centre](#), SPI analysis was done at [INTEGRAL Guest Observer Facility](#). Apparent flux variations of non-variable sources based on short exposure times and/or far off-axis position. INTEGRAL/SPI fluxes are based on the assumption that $f_{[20-40\text{keV}]} = 0.1783 \text{ ph/cm}^2/\text{sec}$ corresponds to 1 Crab. *Highest flux* measurements require at least a 3 sigma significance. *Lowest flux* represents the lowest *m* flux with at least 1 sigma significance. The average fluxes are weighted means of all measurements with at least 1 sigma significance (if not mentioned different).

In ISGRI the Crab has a count rate of 99 counts/sec (20 - 40 keV) and 40 counts/sec (40 - 60 keV), respectively (determined for revolution 11 on-axis staring observation). For more information on sources seen by ISGRI, see also [Bird et al. 2004, ApJ, 607, L33](#)

You can [download the catalog in fits format here](#) and use it as an input catalog (GNRL-REFR-CAT) in your analysis (note that the flux values in the catalog are the same as in the original ISDC reference catalog).

 [Download the Bright Source Catalog on your PalmOS® or Pocket PC® PDA](#) 

Note! These are preliminary results, and should only give a rough guide of what INTEGRAL can do with respect to point sources

INTEGRAL Bright Source Catalog

Source	Type	RA (J2000.0)	DEC (J2000.0)	ISGRI detections	ISGRI results	SPI average flux [mCrab]	SPI highest flux [mCrab]	SPI lowest flux [mCrab]	SPI lightcurve	Remarks SPI an
V709 Cas	CV	00 28 49	+59 17 22			4 ± 2		4 ± 2	X	
IGR J00370+6122	HMXB	00 37 06	+61 22 00			8 ± 2	8 ± 2	8 ± 2	X	
Gam Cas	Be Star	00 56 43	+60 43 00			9 ± 1	11 ± 3	5 ± 2	X	
SMC X-1	HMXB	01 17 05	-73 26 36	35	X	22 ± 5	22 ± 5	22 ± 5	X	
3A 0114+650	HMXB	01 18 03	+65 17 30			12 ± 2	16 ± 3	6 ± 3	X	
4U 0115+634	HMXB	01 18 32	+63 44 24	6	X	10 ± 3	53 ± 13	4 ± 3	X	
RX J0146.9+6121	XRB	01 47 00	+61 21 24			13 ± 3	18 ± 4	9 ± 4	X	
EXO 0331+530	HMXB	03 35 00	+53 10 24			290 ± 2	707 ± 6	29 ± 26	X	V0332+
X Per	HMXB	03 55 23	+31 02 45	91	X				X	
LMC X-4	HMXB	05 32 50	-66 22 14	117	X	18 ± 1	44 ± 2	3 ± 2	X	
Crab	SNR	05 34 32	+22 00 52	591	X	1000 ± 1	1059 ± 16	916 ± 24	X	
IGR J06074+2205	?	06 07 18	+22 04 52	7	X	9 ± 1	33 ± 10	5 ± 2	X	
H 0614+091	HMXB	06 17 07	+09 08 13	47	X	21 ± 2	67 ± 4	8 ± 3	X	

INTEGRAL Public Data Results - Mozilla

File Edit View Go Bookmarks Tools Window Help

Back Forward Reload Stop

http://hea-www.gsfc.nasa.gov/users/beckmann/obslist.html

Search Print

Home Bookmarks Internet Lookup New&Cool

Integral: Archive INTEGRAL Bright Source Ca... INTEGRAL AGN Catalog SPI data analysis at NASA's... INTEGRAL Public Data Res...

> 450 entries

public data

rev. 19-191
+ public ToO
Crab obser-
vations etc.

input from
PIs (Galactic
Bulge project)

INTEGRAL Public Data Results

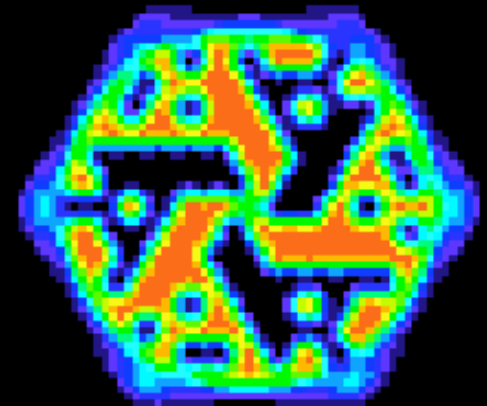
Scientific analysis has been performed by Paizis, Rodriguez, Chernyakova et al. at the [INTEGRAL Science Data Centre](#) for IBIS/ISGRI, and for SPI and some IBIS/ISGRI data at NASA's [INTEGRAL Guest Observer Facility](#).

Scientific results:
 I = ISGRI significance JPEG image 20 - 40 keV (if not mentioned different on the map)
 F = ISGRI results maps (intensity, error, significance, and exposure map) as a gzipped fits file (20,40,60,80,100,150,200,400 keV bands for most of the fits files)
 S = SPI significance image 20 - 40 keV (JPEG)
 F2 = SPI significance map 20 - 40 keV (gzipped fits file)
 L = SPI analysis results (ASCII file)
 W = list of science windows

Rev#	Start Time (UTC)	End Time (UTC)	Exposure Time (s)	Source	RA (J2000) [hr:min:sec]	DEC (J2000) [deg:arcmin:arcsec]	Dither Pattern	PI	Proposal	Scientific Results
239	2004-09-27 12:40:31	2004-09-28 03:09:51	50000	Crab 5x5 40 arcmin	05:34:31.9	+22:00:50.4	Custom	Public	8860058	I F S F2 L W
170	2004-03-06 14:30:26	2004-03-07 05:38:58	50400	Crab	05:34:31.9	+22:00:52.0	5x5	Public	8860048	I F S F2 L W
127	2003-10-28 10:37:49	2003-10-30 23:07:39	203640	IC443	06:17:39.5	+22:23:41.0	HEX	Bykov	0120203	
126	2003-10-25 10:49:27	2003-10-27 23:19:39	203640	IC443	06:17:39.5	+22:23:41.0	HEX	Bykov	0120203	
125	2003-10-22 11:00:22	2003-10-24 23:32:39	203604	IC443	06:17:39.5	+22:23:41.0	HEX	Bykov	0120203	I F S F2 L W
124	2003-10-19 11:12:12	2003-10-21 23:45:39	203604	IC443	06:17:39.5	+22:23:41.0	HEX	Bykov	0120203	I F S F2 L W
123	2003-10-18 21:20:20	2003-10-19 00:22:59	10716	IC443	06:17:39.5	+22:23:41.0	HEX	Bykov	0120203	I F W
123	2003-10-16 10:25:08	2003-10-18 18:13:33	181800	GCDE	18:40:00.0	-06:00:00.0	GCDE	ISWT	0199921	S F2 L W
122	2003-10-13 10:35:55	2003-10-16 00:32:51	201600	GCDE	18:05:00.0	-12:00:00.0	GCDE	ISWT	0199921	S F2 L W
121	2003-10-10 10:45:37	2003-10-13 00:46:22	203400	GCDE	18:18:00.0	-16:00:00.0	GCDE	ISWT	0199921	S F2 L W
120	2003-10-07 10:55:28	2003-10-10 01:02:29	203400	GCDE	17:34:00.0	-24:30:00.0	GCDE	ISWT	0199921	S F2 L W
119	2003-10-04 11:08:35	2003-10-07 01:12:30	203400	GCDE	17:40:00.0	-31:30:00.0	GCDE	ISWT	0199921	S F2 L W
118	2003-10-01 11:21:45	2003-10-04 01:45:57	203400	GCDE	16:45:00.0	-45:30:00.0	GCDE	ISWT	0199921	S F2 L W
117	2003-09-29 10:24:12	2003-09-29 14:25:55	13783	OMC FF #12	17:12:48.0	-06:24:00.0	Staring	Public	8860042	
117	2003-09-28 11:35:01	2003-10-01 01:50:27	187200	GCDE	18:35:00.0	-08:00:00.0	GCDE	ISWT	0199911	S F2 L W

OSA 5.0

- Main criticism to previous releases: difficult to use and not well calibrated
- OSA 5: released on July 1st
- available through INTEGRAL GOF pages
- new: scripts are more user friendly (most important parameters on front page)
- no need for 'DOLs' (filename.fits[1]) anymore!
- new response for ISGRI and SPI (minor changes for SPI)
- imaging software for JEM-X



SPI in OSA 5.0

spi_science_analysis

SPI Scientific Analysis - General Parameters and Options

Filename of input OG:

List of (pseudo) detectors:

Coordinate System:

Save
Save As
Run
Quit
Help
hidden

OPTIONAL first task (check output before proceeding with further tasks)

CAT_I : catalogue extraction:

SPIROS Input Catalog:

Select Tasks to run

POIN : pointing definition:

BIN_I : event binning:

add simulated source (OPTIONAL):

BKG_I : background modeling:

IMA : image analysis:

IBIS in OSA 5.0

- Save
- Save As
- Run
- Quit
- Help
- hidden

startLevel: COR

endLevel: IMA

GENERAL_levelList: COR,GTI,DEAD,BIN_I,BKG_I,CAT_I,IMA,IMA2,BIN_S,SPE,LCR,COMP,CLEAN

CAT_refCat: /INTEGRAL1/integral1/cat/hec/gnrl_refr_cat_0020.fits[1][ISGRI_FLAG==1] browse

SWITCH_disableIsgrI: checked: yes

SWITCH_disablePICsIT: checked: yes

SCW1_GTI_gtiUserI: browse

SCW1_GTI_TimeFormat: IJD

ISGRI_IMA

ISGRI_SPE_and_LCR

PICsIT

- Ok
- Help

IBIS_I_E_band_max: 40 60 80 100 150 200 400

IBIS_I_inEnergyValues: browse

OBS1_SearchMode: 3

OBS1_ToSearch: 3

OBS1_MinCatSouSnr: 6

OBS1_MinNewSouSnr: 7

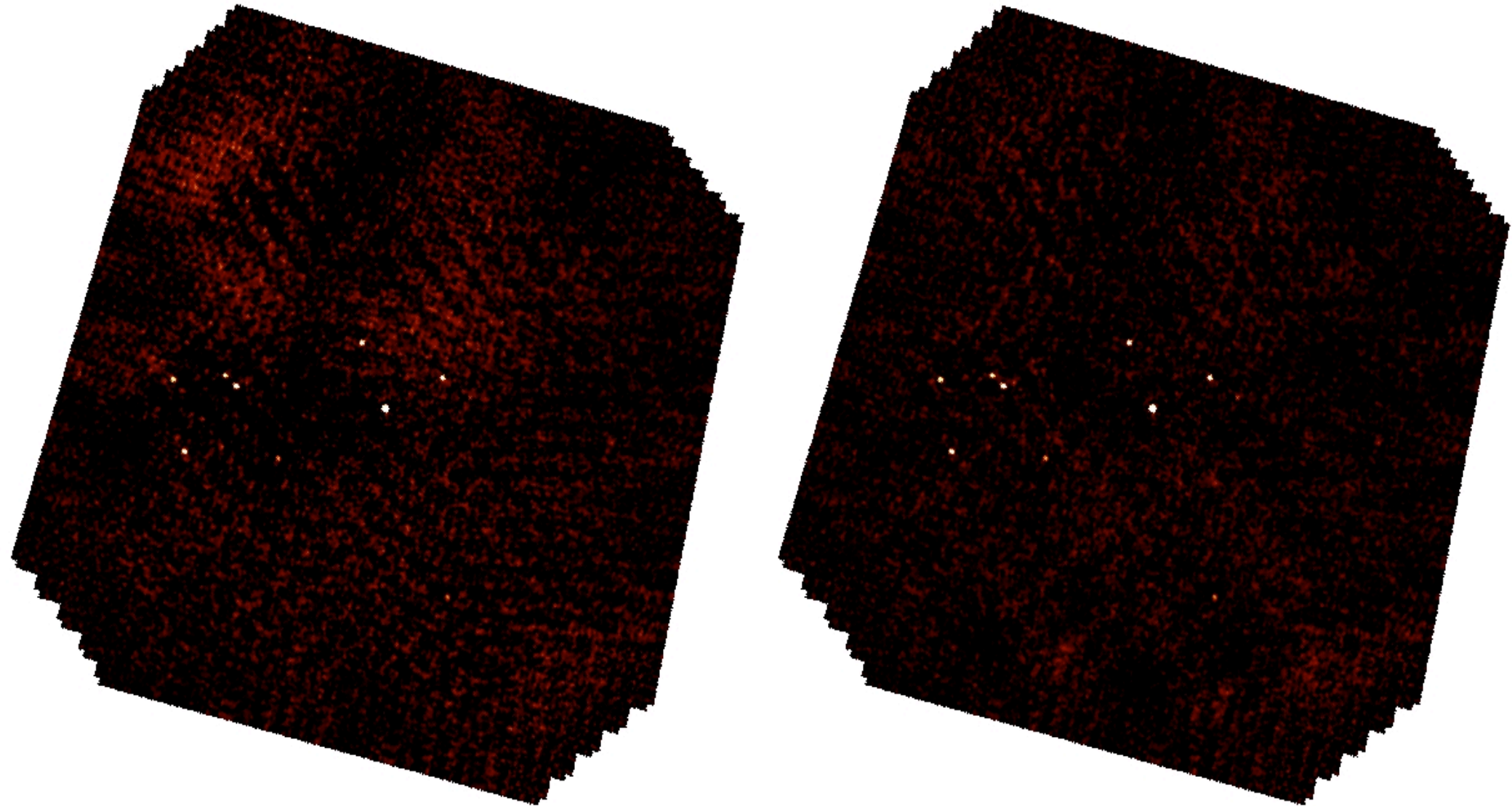
OBS1_DoPart2: 1

OBS1_PixSpread: 0

OBS1_SouFit: 0

SCW1_BKG_I_isgrBkgDol: browse

ISGRI imaging in OSA 5.0

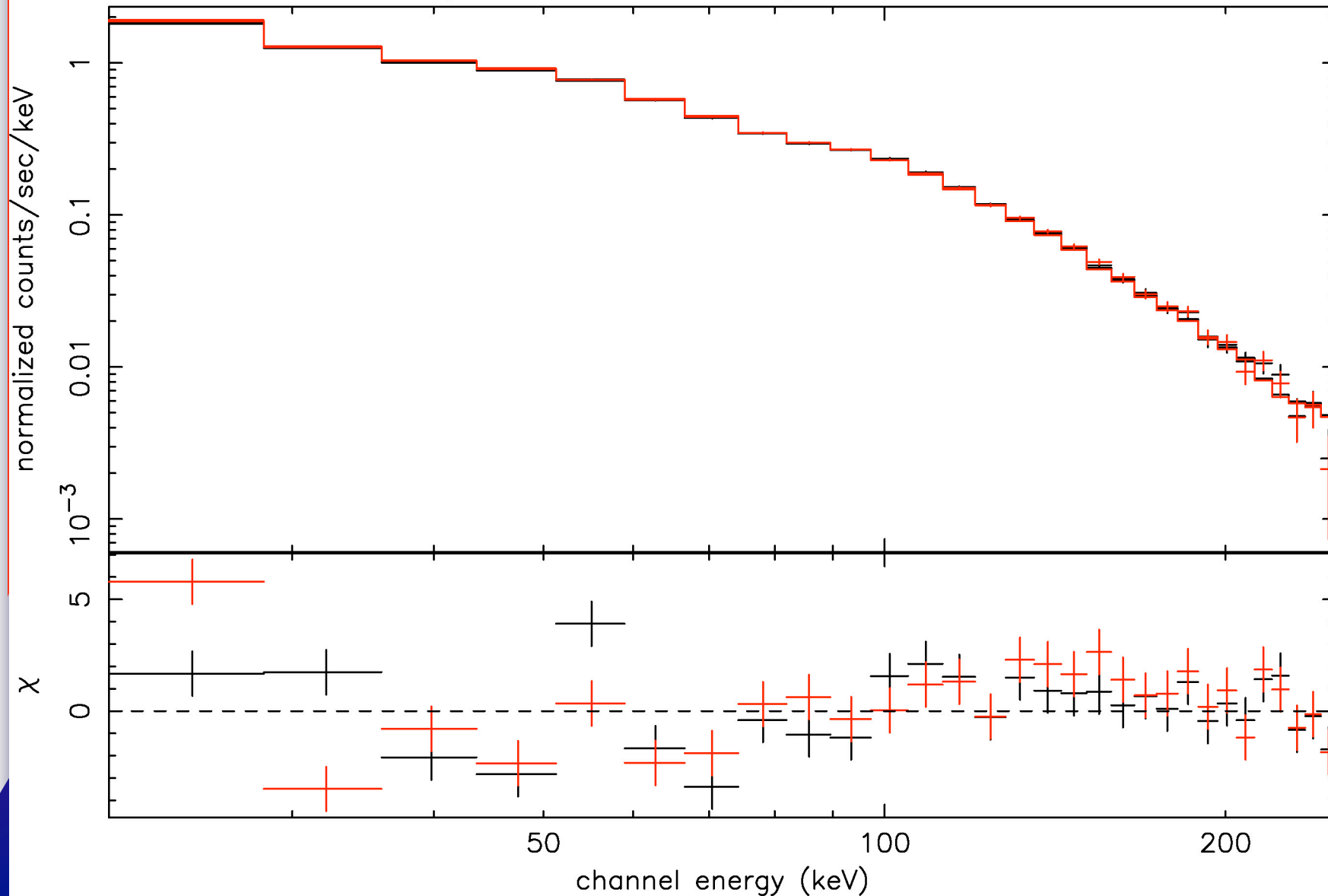


ISGRI spectra in OSA 5.0

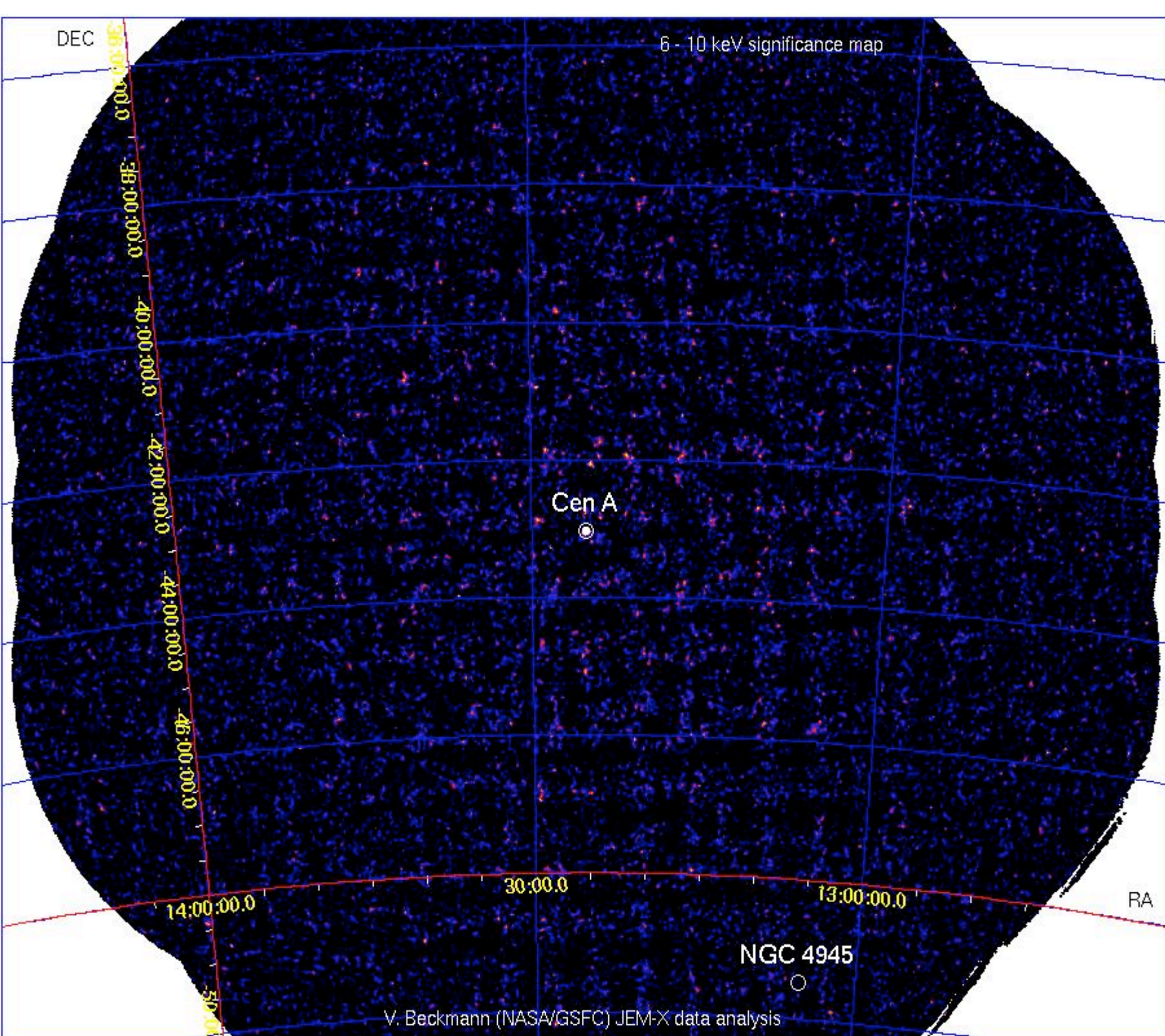
(black = OSA 4.2 / red = OSA 5.0)

data and folded model

XTEJ1550_OSA4.2_sum_pha.fits XTEJ1550_sum_pha.fits

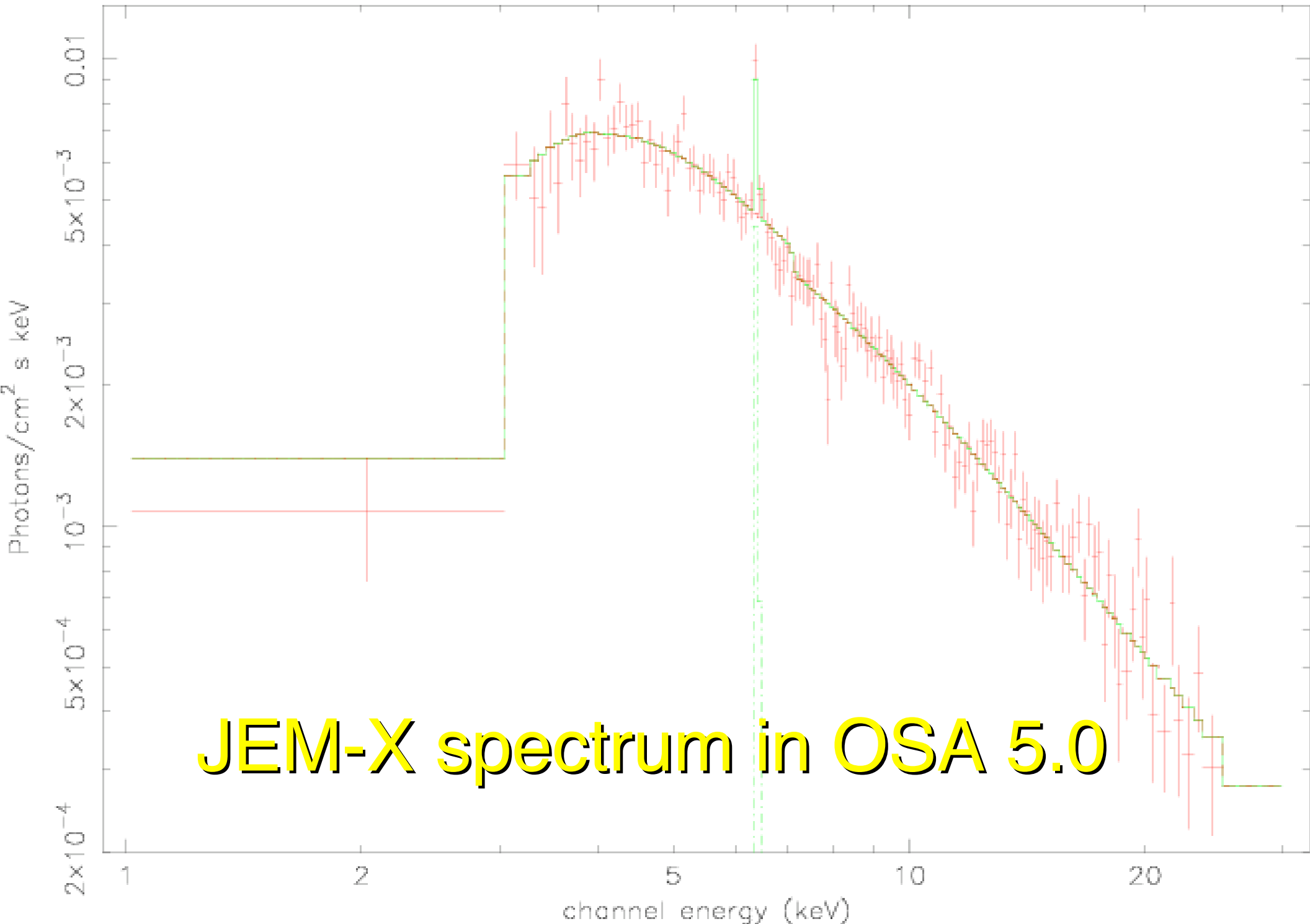


JEM-X mosaic in OSA 5



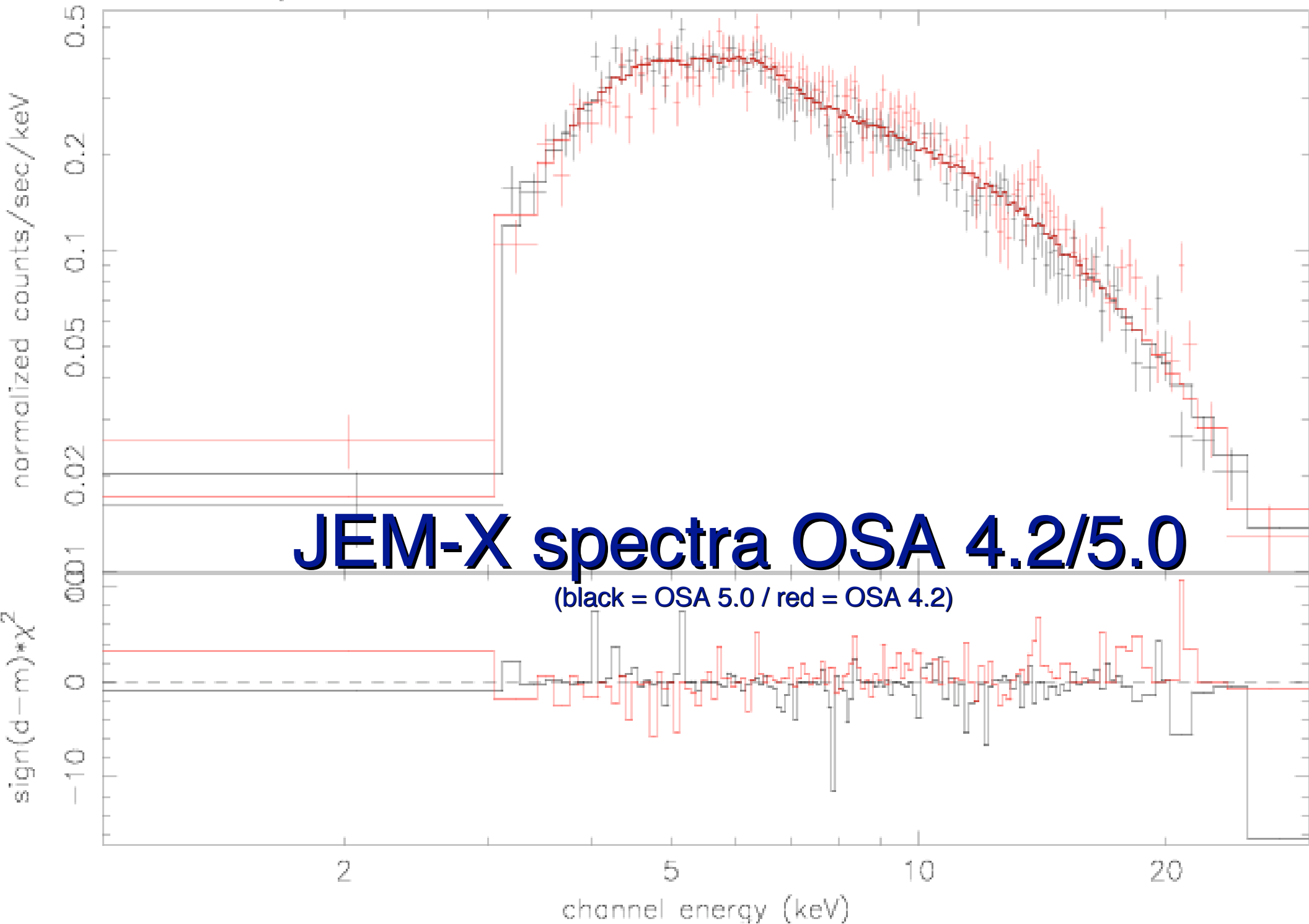
Cen A JEM-X spectrum

absorbed single power (photon index 2.1) low with K alpha line



Cen A JEM-X spectrum

red: OSA 4.2, black: OSA 5.0



Conclusion

- Start a new project? Check the HEASARC archive:
 - get information about ~130 sources
 - get information about ~450 observations
 - get the data, software, and documentation
 - get help from the INTEGRAL GOF if necessary
- OSA 5 improvements:
more user-friendly,
better ISGRI response and background handling,
JEM-X imaging software