G027.4+00.0

1 Summary

- Common Name: Kes 73
- Distance: 6.7 kpc (**Sanbonmatsu and Helfand(1992)**)
- Position of Central Source (J2000): (18 41 19.6, -4 56 17.9)
- X-ray size: 4.7'x4.5'
- Description:

1.1 Summary of Chandra Observations

Sequence	Obs ID	Instrument	$\text{Exposure}_{\text{uf}}$ (ks)	$\text{Exposure}_{\text{f}}$ (ks)	Date Observed	Aimpoint (J2000) (α, δ)
500025	729	ACIS-012367	29.3	29.2	2000-07-23	(18 41 19.0, -4 56 14.0)

$\text{Exposure}_{\text{uf}} \rightarrow$ Exposure time of un-filtered event file
$\text{Exposure}_{\text{f}} \rightarrow$ Exposure time of filtered event file

- The whole remnant is covered by chip ACIS-S3(CCD_ID=7)

1.2 Chandra Counts and Fluxes

Region	Energy Range (keV)	Signal (counts)	Rate (counts s^{-1})	F_X^{abs} (ergs cm^{-2} s^{-1})	F_X (ergs cm^{-2} s^{-1})	L_X (ergs s^{-1})
total	0.3 - 10.0	1.209e+05	4.145e+00	3.09e-11	1.78e-09	9.53e+36
(729)	0.3 - 2.1	8.514e+04	2.919e+00	1.24e-11	1.75e-09	9.36e+36
	2.1 - 10.	3.617e+04	1.240e+00	1.86e-11	3.13e-11	1.67e+35

- N_H = 3.13 ($10^{22} cm^{-2}$)
- Assumed distance: 6.7 kpc (**Sanbonmatsu and Helfand(1992)**)
- nH was derived with two thermal plasma model

1.3 Nearby Sources

Obs ID	Position (J2000)	Size	Net Count	Count rate	Note
729					
	(18 40 00.5, -4 50 22.4)	< 58.1”	746.0	2.55e-02	
	(18 40 20.5, -4 47 03.0)	< 48.8”	98.1	3.35e-03	
	(18 40 36.3, -4 43 32.9)	< 43.6”	93.4	3.19e-03	
	(18 41 11.3, -4 55 20.8)	< 1.7”	36.5	1.25e-03	
	(18 41 15.6, -4 52 54.5)	< 3.6”	43.3	1.48e-03	
	(18 41 16.2, -5 01 21.8)	< 3.6”	65.0	2.22e-03	
	(18 41 24.5, -4 59 13.6)	< 2.4”	33.3	1.14e-03	
	(18 41 25.0, -4 53 29.2)	< 4.9”	23.7	8.10e-04	
	(18 41 30.6, -4 52 25.2)	< 5.9”	51.7	1.77e-03	

(note) 1. This nearby source list is incomplete.
All the above sources are originally from the "src2.fits" file
which is distributed with standard chandra processing.
Only sources with significant count rate and which are clear to
visual inspection are included.
2. The size given above is the size of the region used in detecting
that source.
3. For each source, background was subtracted from annular region
around the source.

1.4 References

- Gotthelf and Vasisht, 1997 ApJ, 486L, 133 : ASCA
- Sanbonmatsu and Helfand, 1992 AJ, 104, 2189 : VLA at 1.4 GHz for HI absorption

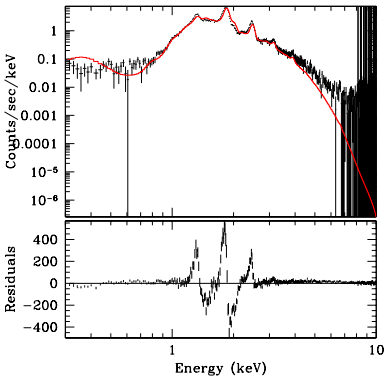
2 Fit Detail

- See spectrum page for used regions.

2.1 Shell:

- Spectrum from **Shell**
- Two thermal plasma model

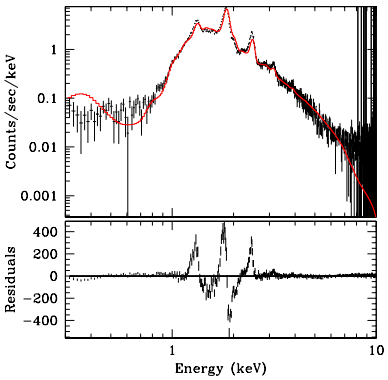
source=(xswabs * (xsvapec + xsvapec))
reduced χ^2 = 8.31551
nh = `3.1333 10^22/cm^2`



2.2 Total:

- two thermal plsma model and power law with nH fixed at above value.
- **Gotthelf and Vasisht(1997)** gives value between 1.5-3.0

source=(xswabs * ((xsvapec + xsvapec) + powlaw1d))
reduced χ^2 = 6.05026
nh = `3.1333 10^22/cm^2`

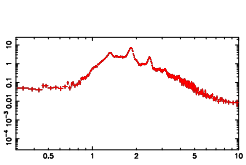


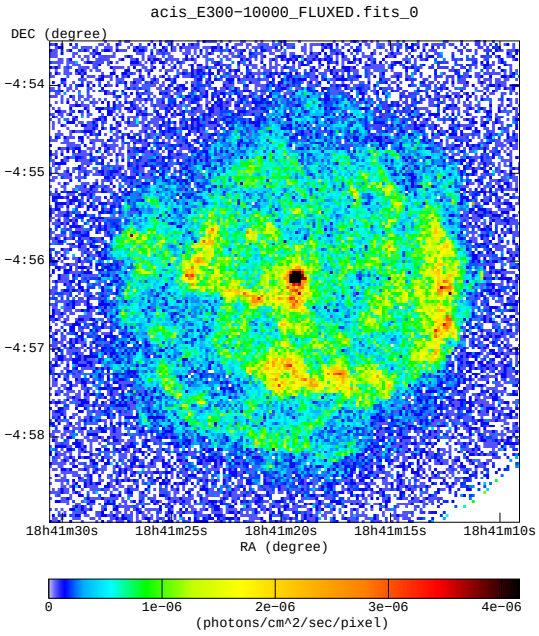
3 Chandra Images : Band Images

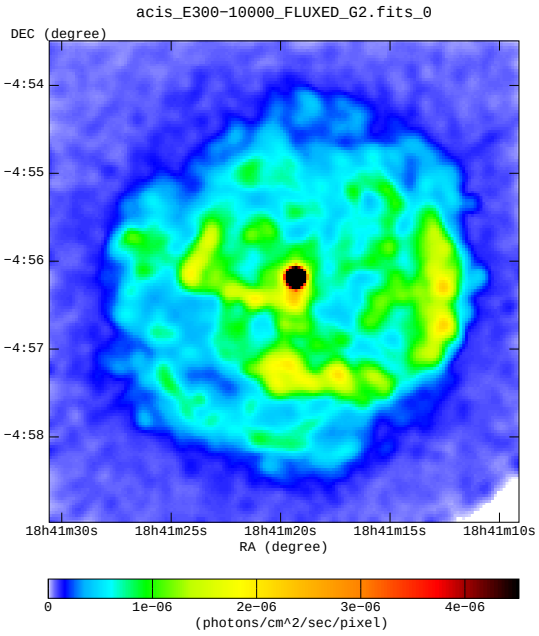
- Left : raw image, binned by 1x1 pixel
- Right : gaussian smoothed version of above (σ = 2 pixel)

3.1 Wide Band Images

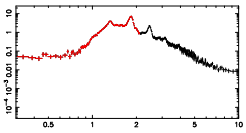
Total : 300-10000 eV

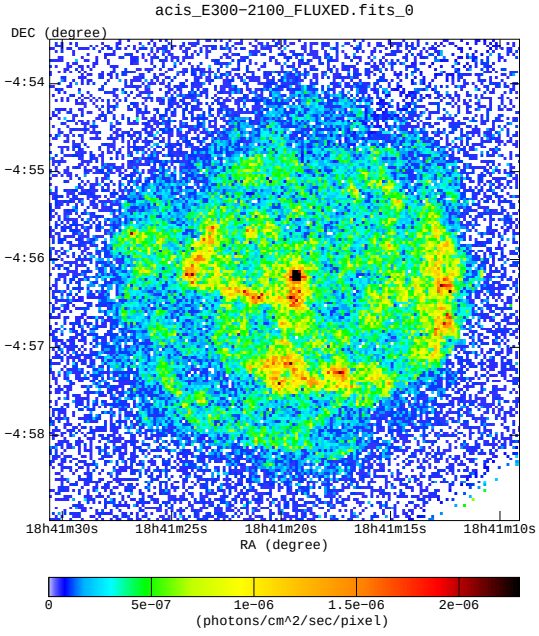


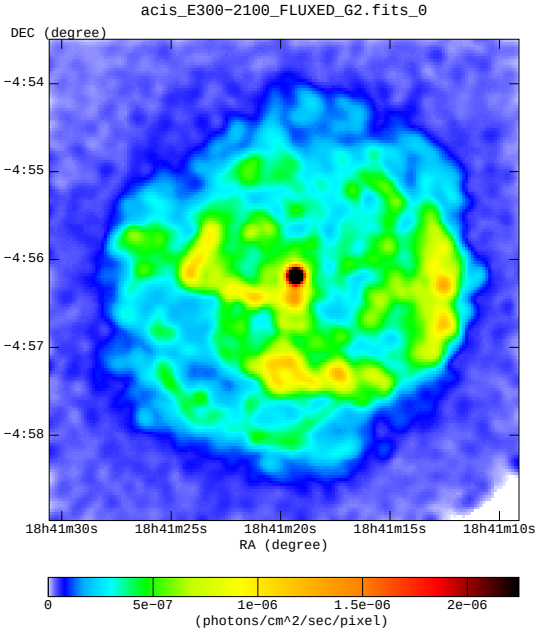




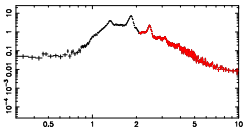
Soft Band : 300-2100 eV

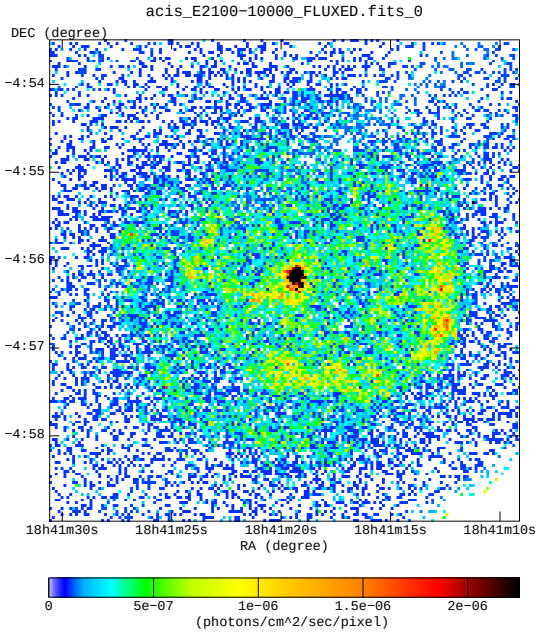


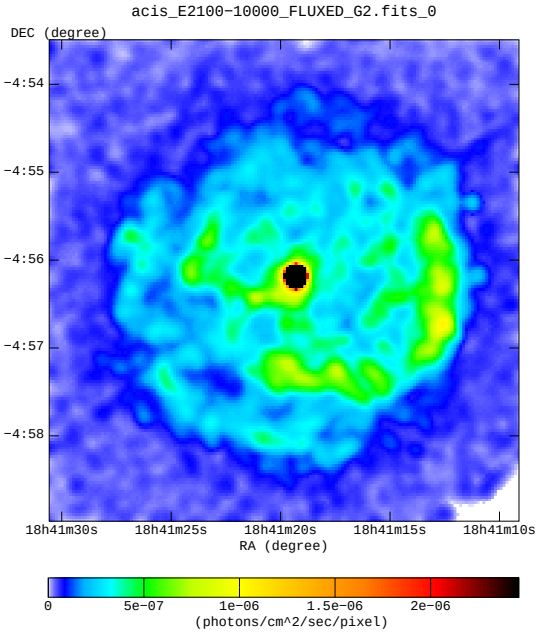




Hard Band : 2100-10000 eV

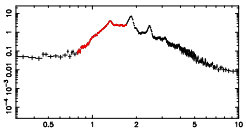


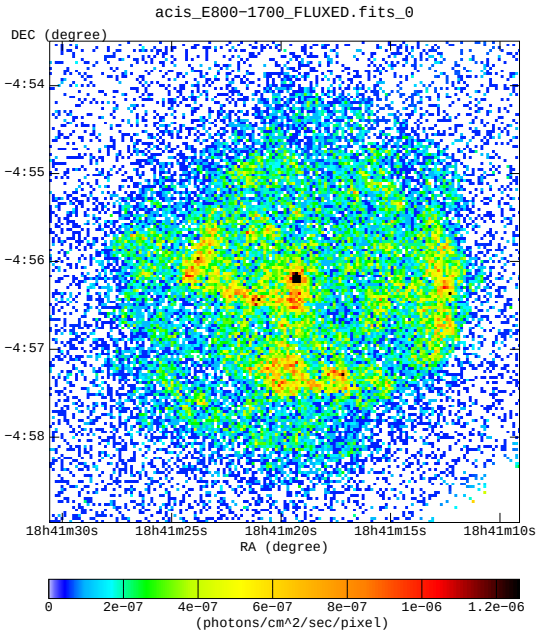


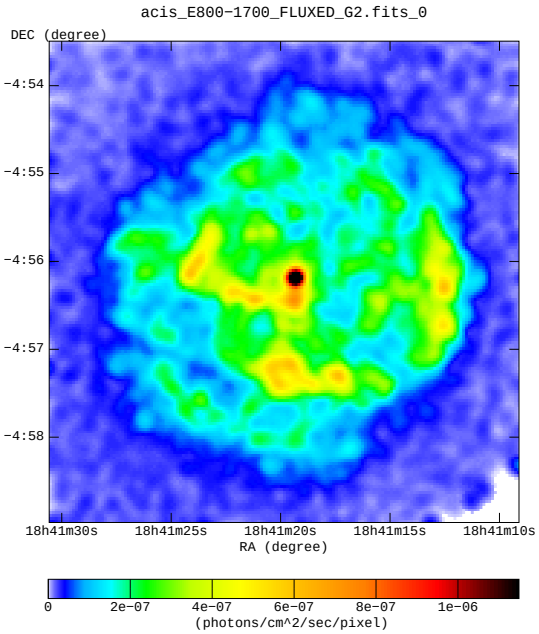


3.2 Band images used in true color image.

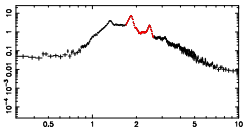
Red : 800-1700 eV

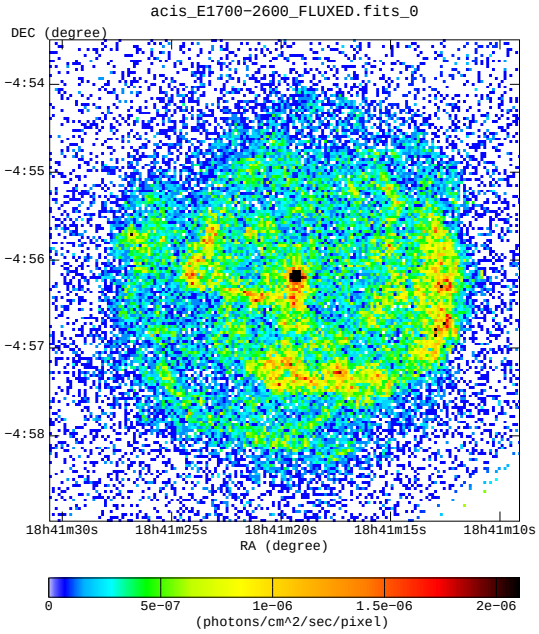


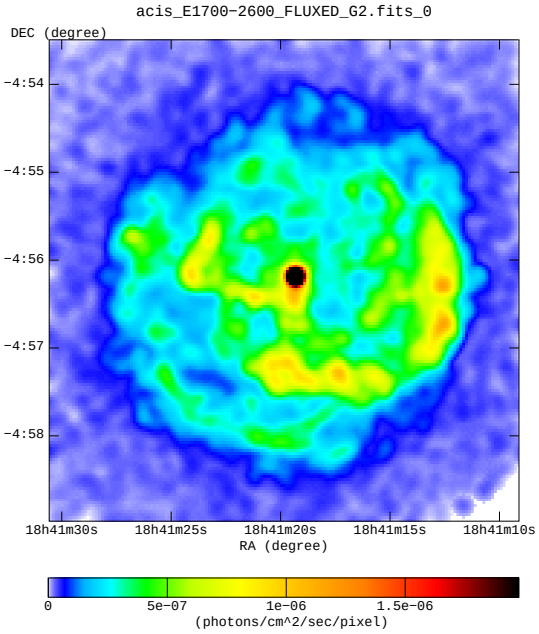




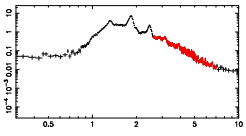
Green : 1700-2600 eV

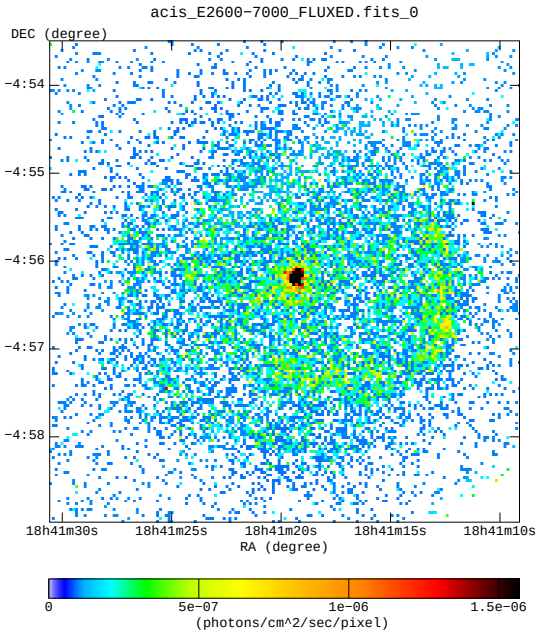


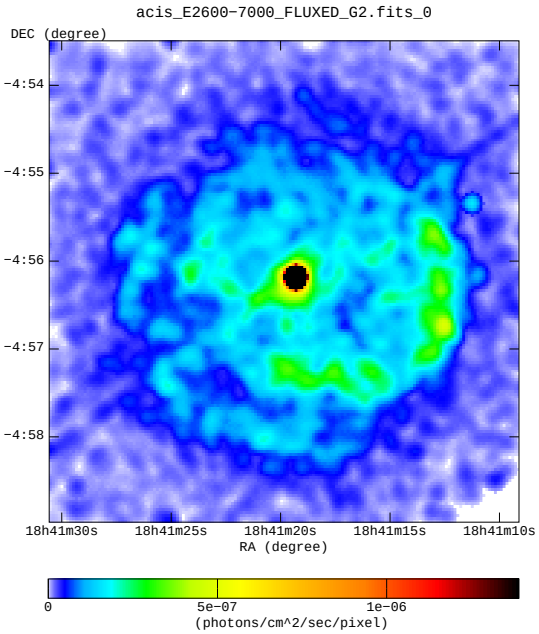




Blue : 2600-7000 eV







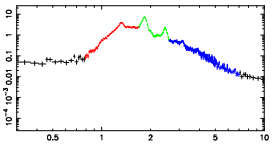
3.3 Misc.

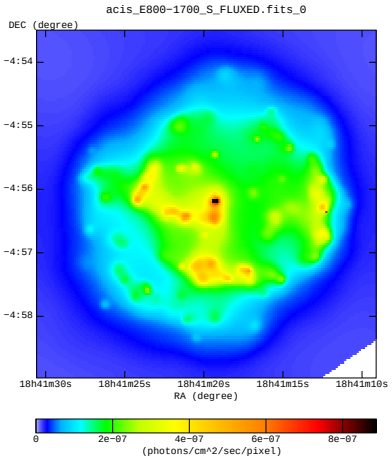
4 Chandra Images : True Color

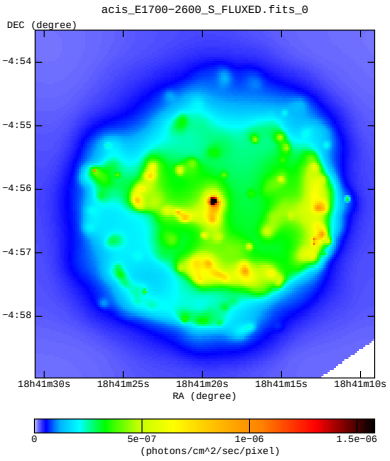
- Individual images are adaptively smoothed.
- Warning : the adaptive smoothing process sometimes produces artifacts.

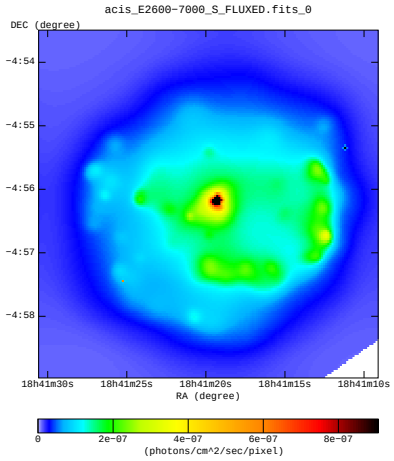
- convolution method : fft
- kernel type : gauss
- significance (min , max) : (3 , 5)

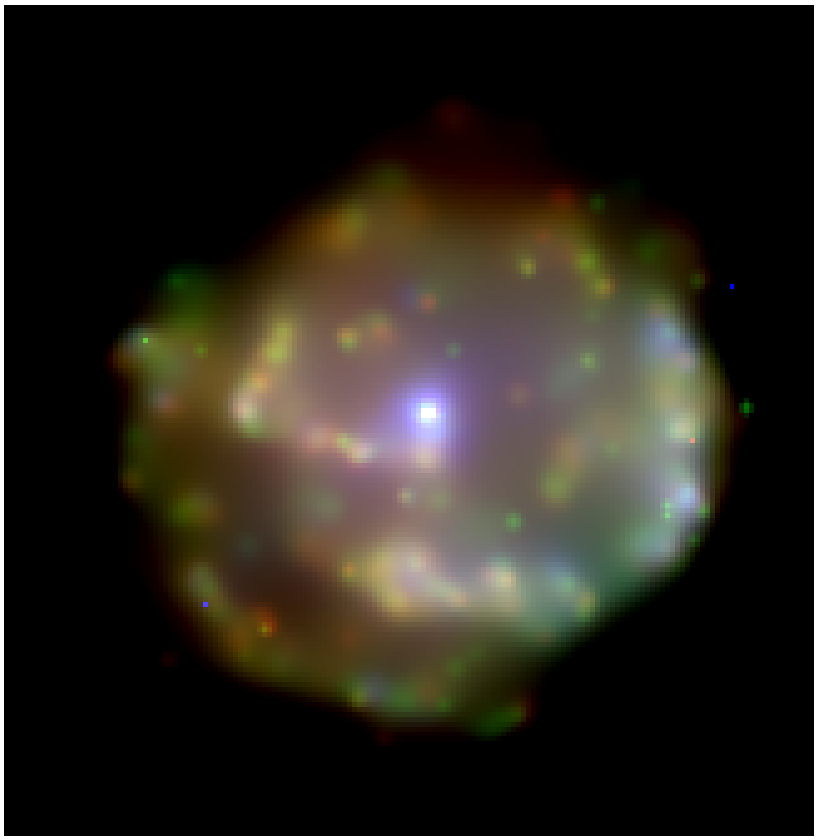
RED : 800-1700 eV
GREEN : 1700-2600 eV
BLUE : 2600-7000 eV











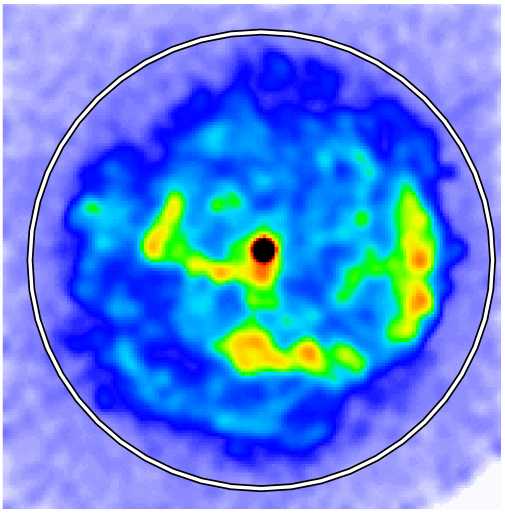
5 Chandra Spectrum

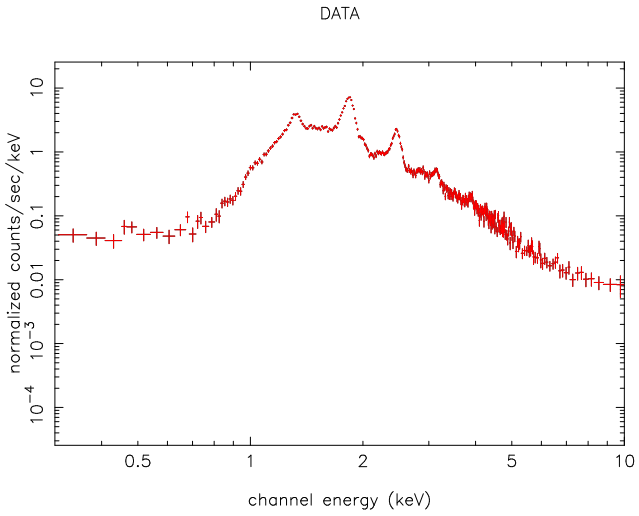
- Images show Regions used to extract spectra
- Regions with red strikes are excluded

5.1 ObsID 729

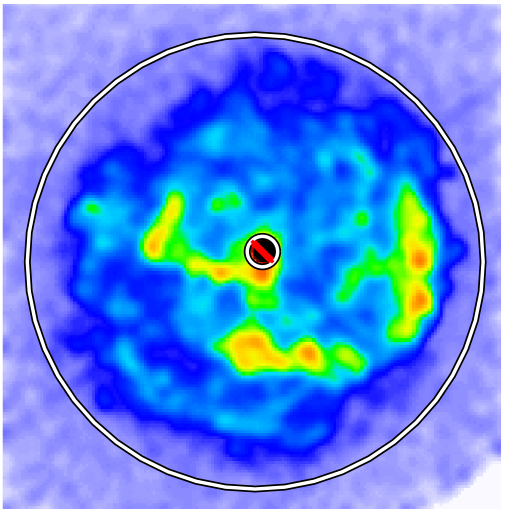
- Background was subtracted from the region around the SNR.

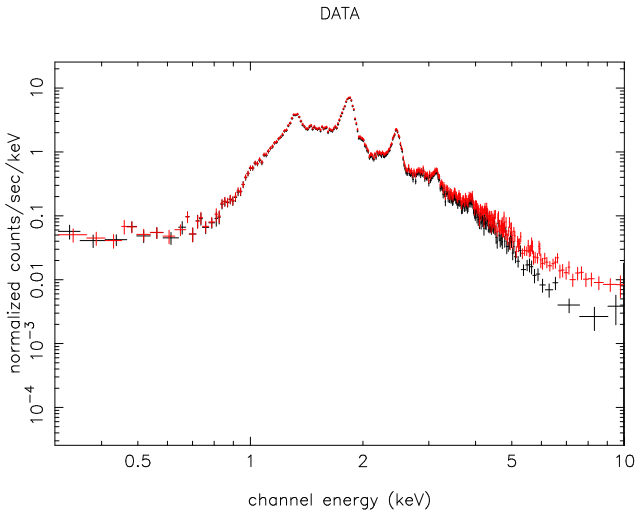
total

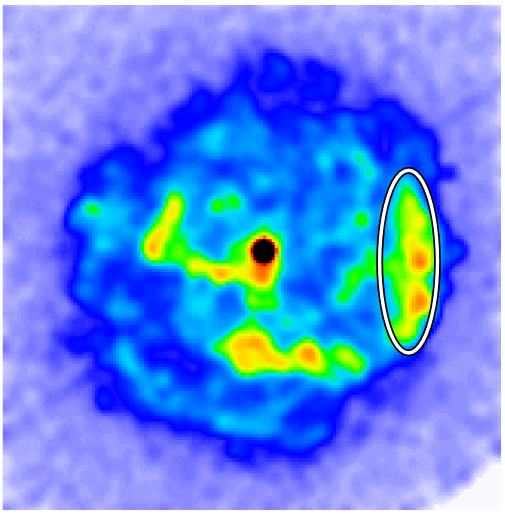


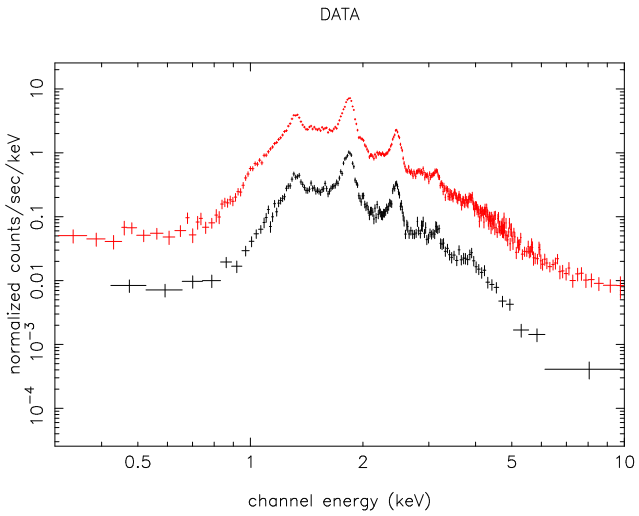


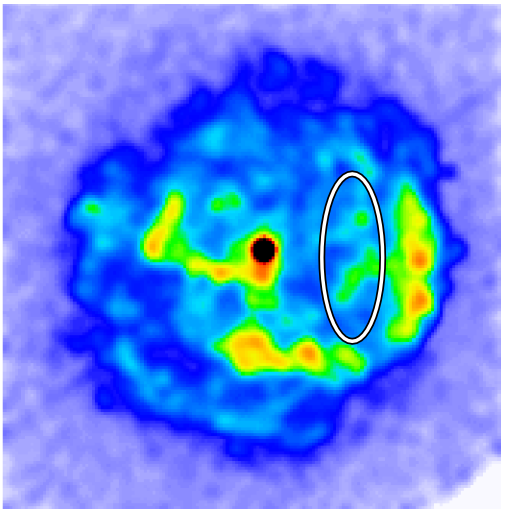
Shell

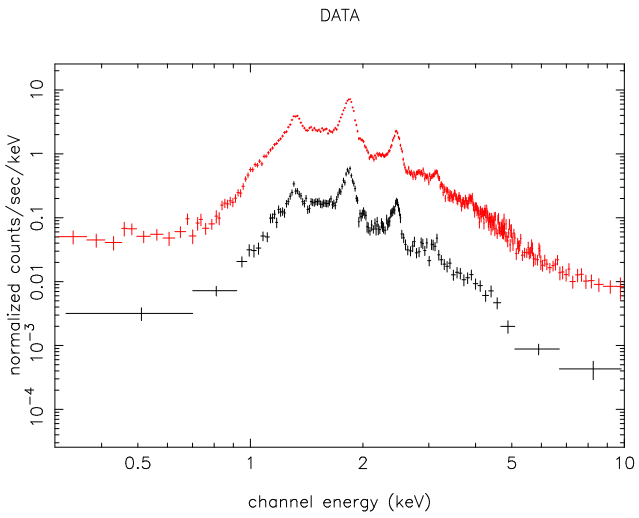


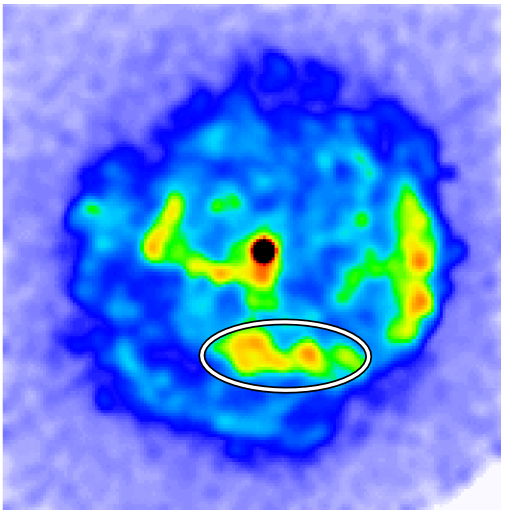


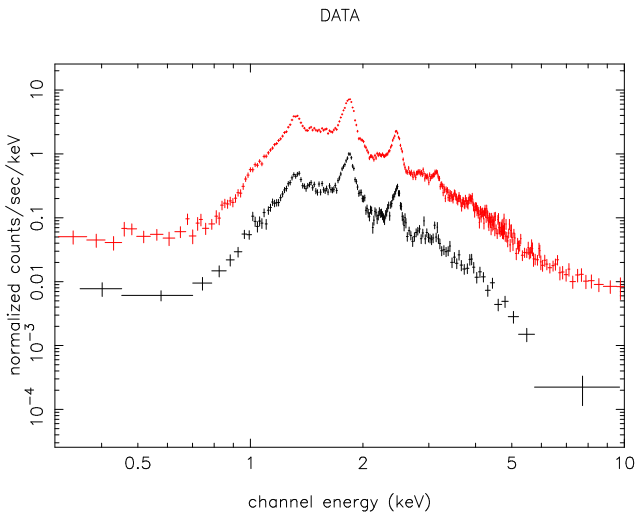


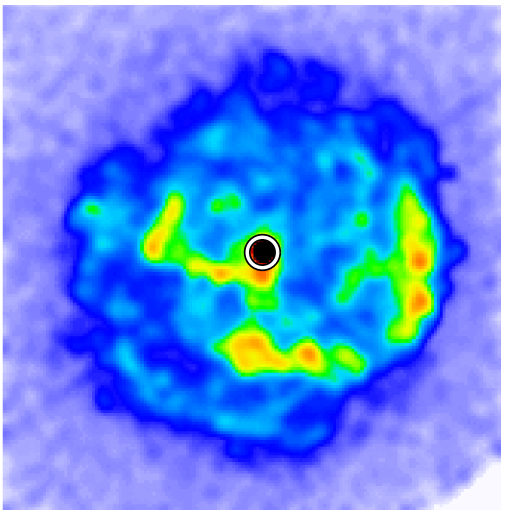

DATA
normalized counts/sec/keV
channel energy (keV)

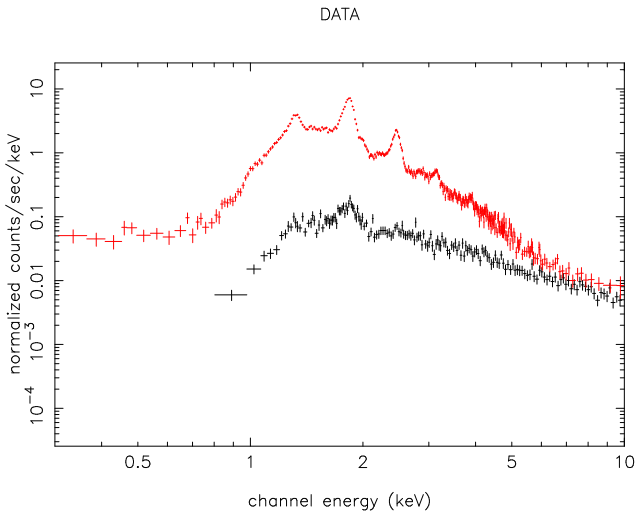



DATA
normalized counts/sec/keV
channel energy (keV)




DATA
normalized counts/sec/keV
channel energy (keV)

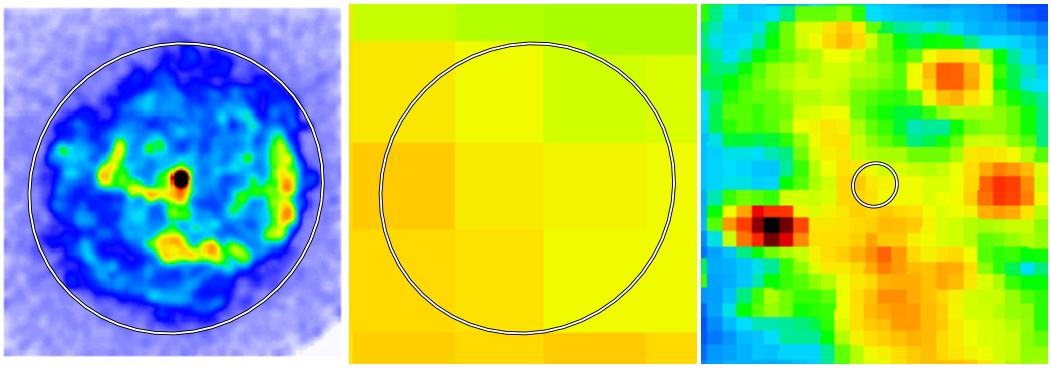



DATA
normalized counts/sec/keV
10^{-4}
10^{-3}
0.01
0.1
1
10
0.5
1
2
5
10
channel energy (keV)

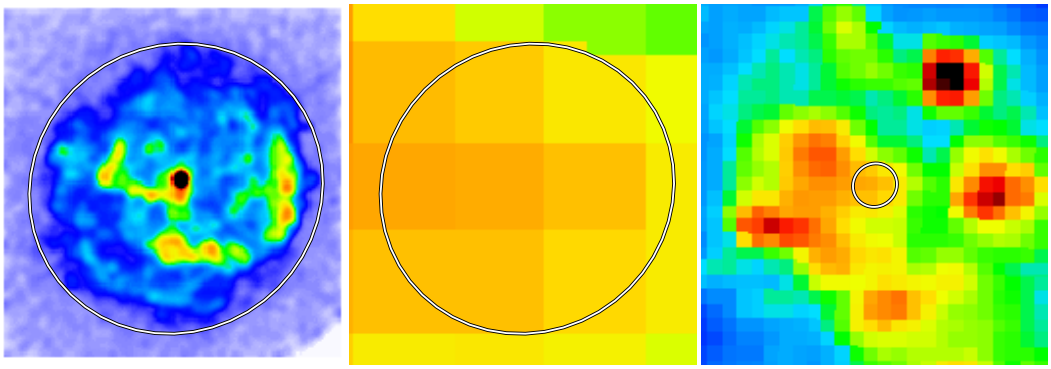
6 Images from Survey Missions

- Left : Chandra Image (0.3-10. keV)
- Center : Images from *SkyView* with the **same** scale
- right : Images from *SkyView* with a **reduced** scale

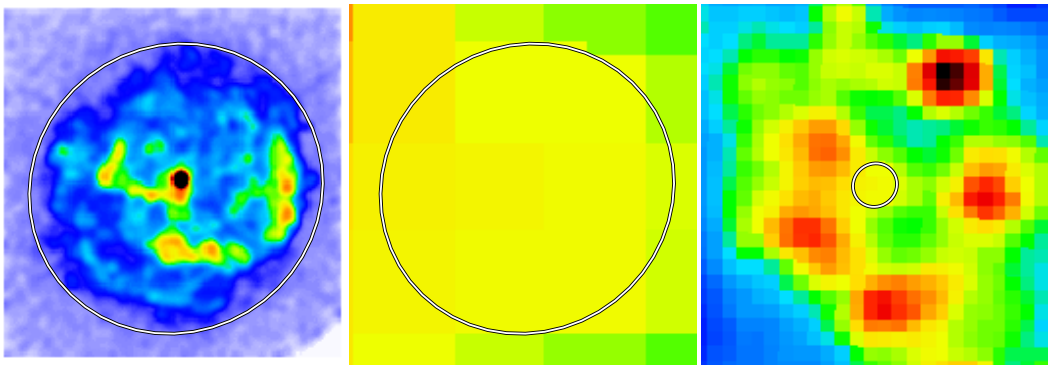
IRAS 12 micron: Infrared (12 micron)



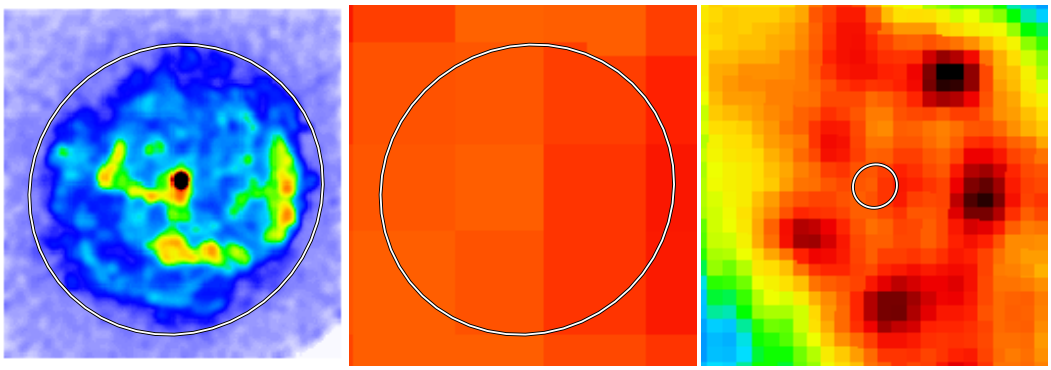
IRAS 25 micron: Infrared (25 micron)



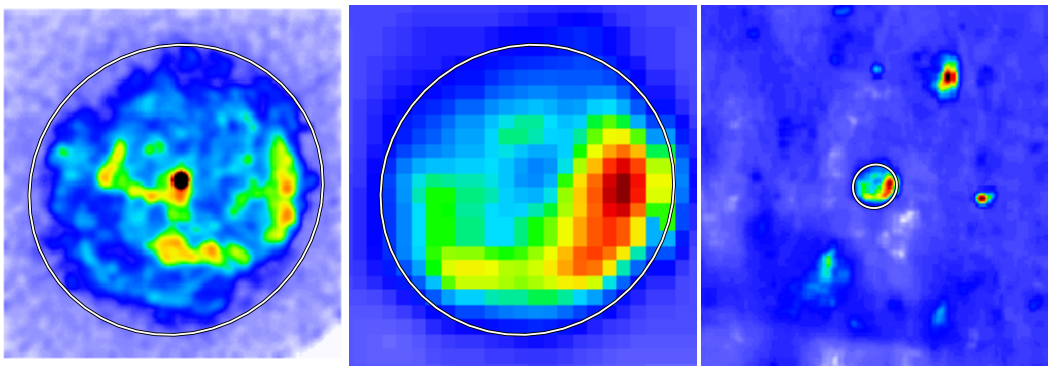
IRAS 60 micron: Infrared (60 micron)



IRAS 100 micron: **Infrared (100 micron)**



NRAO VLA Sky Survey (NVSS): **Radio (1.4 GHz Continuum)**



Digitized Sky Survey: **Optical (J or E band images with a few exceptions)**