SNR 0505-67.9

1 Summary

- Common Name: DEM L71
- Distance: 50 kpc (distance to LMC, **Westerlund(1990)**)
- Center of X-ray emission (J2000): (05 05 42.0, -67 52 39.8)
- X-ray size: 86” x 74”
- Description: barrel shape outer shell with central patch

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)
500071	775	ACIS-23678	44.8	35.0	2000-01-04	(05 05 41.7, -67 52 38.0)

$\text{Exposure}_{\text{uf}} \rightarrow$ 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	2.395e+05	6.853e+00	1.78e-11	2.62e-11	7.81e+36
(775)	0.3 - 2.1	2.385e+05	6.824e+00	1.73e-11	2.57e-11	7.66e+36
	2.1 - 10.	1.054e+03	3.016e-02	4.98e-13	5.05e-13	1.51e+35
Central Patch	0.3 - 10.0	9.328e+04	2.669e+00	6.89e-12	9.52e-12	2.84e+36
(775)	0.3 - 2.1	9.279e+04	2.655e+00	6.69e-12	9.32e-12	2.78e+36
	2.1 - 10.	5.191e+02	1.485e-02	2.02e-13	2.05e-13	6.11e+34
Outer Shell	0.3 - 10.0	1.464e+05	4.188e+00	1.09e-11	1.67e-11	4.98e+36
(775)	0.3 - 2.1	1.458e+05	4.172e+00	1.06e-11	1.64e-11	4.89e+36
	2.1 - 10.	5.663e+02	1.620e-02	2.96e-13	3.00e-13	8.94e+34

- N_H = 0.07 ($10^{22} cm^{-2}$)
- Assumed distance: 50 kpc (distance to LMC, **Westerlund(1990)**)

1.3 Nearby Sources

Obs ID	Position (J2000)	Size	Net Count	Count rate	Note
775					
	(05 03 44.8, -67 50 47.9)	< 23.9”	241.0	5.38e-03	
	(05 04 42.9, -67 58 31.8)	< 9.8”	42.7	9.53e-04	
	(05 05 06.2, -68 05 08.6)	< 24.0”	130.0	2.90e-03	
	(05 05 11.1, -67 55 11.2)	< 3.5”	48.7	1.09e-03	
	(05 05 18.4, -67 50 14.1)	< 3.1”	54.5	1.22e-03	
	(05 05 21.8, -67 49 32.7)	< 3.7”	233.0	5.20e-03	
	(05 05 42.2, -67 49 51.9)	< 2.6”	42.3	9.44e-04	
	(05 05 50.4, -67 50 17.7)	< 2.1”	1010.0	2.25e-02	
	(05 05 55.3, -67 55 11.1)	< 1.8”	25.4	5.67e-04	
	(05 06 07.3, -67 57 25.5)	< 3.5”	79.5	1.77e-03	
	(05 06 27.8, -67 52 54.2)	< 2.7”	47.1	1.05e-03	
	(05 06 28.9, -68 04 12.8)	< 18.4”	110.0	2.46e-03	
	(05 06 34.3, -67 56 44.1)	< 5.0”	61.9	1.38e-03	
	(05 07 08.0, -68 00 10.6)	< 14.0”	138.0	3.08e-03	
	(05 07 10.3, -67 55 03.7)	< 8.4”	45.2	1.01e-03	
	(05 07 15.9, -67 56 18.4)	< 8.8”	99.7	2.23e-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

- Hughes et al., 1998 ApJ, 505, 732 : ASCA spectrum
- Westerlund, 1990 A&ARv, 2, 29 : Distance to LMC

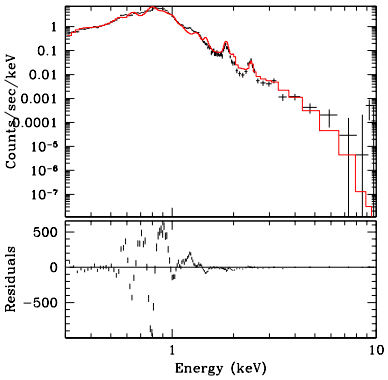
2 Fit Detail

- See spectrum page for used regions.

2.1 Central Patch:

- region: **Central Patch**.
- two thermal plsma model was used.

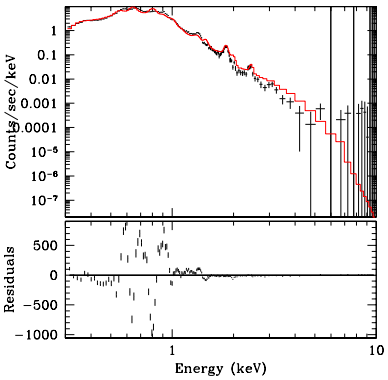
  source=(xswabs * (xsraymond + xsraymond))
  reduced χ^2 = 24.8684
  nh = `0.0626 10^22/cm^2`



2.2 Outer Shell:

- region: **Outer Shell**.
- two thermal plsma model was used with abundance fixed at 0.3

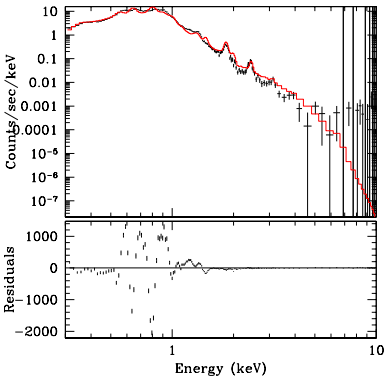
  source=(xswabs * (xsraymond + xsraymond))
  reduced χ^2 = 22.7556
  nh = `0.0688 10^22/cm^2`



2.3 Total:

- Above two model was merged for total specrum.
- Spectrum of three region (Total, Central Patch, outer sheel) were simultaneously fitted with same absorption model.
- flux values in the table are from this fit result.
- **Hughes et al.(1998)** gives 0.04 and 0.06

  source=(xswabs * ((xsraymond + xsraymond) + (xsraymond + xsraymond)))
  reduced χ^2 = 42.3797
  nh = `0.0665 10^22/cm^2`

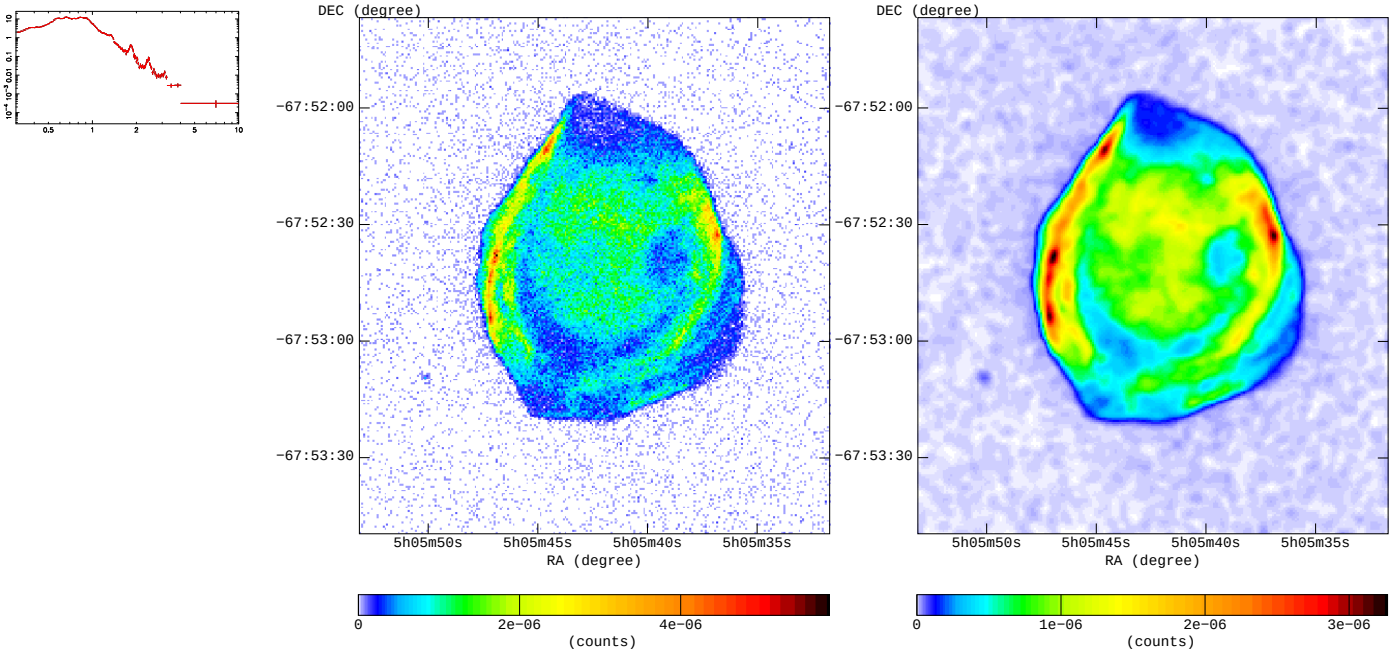


3 Chandra Images : Band Images

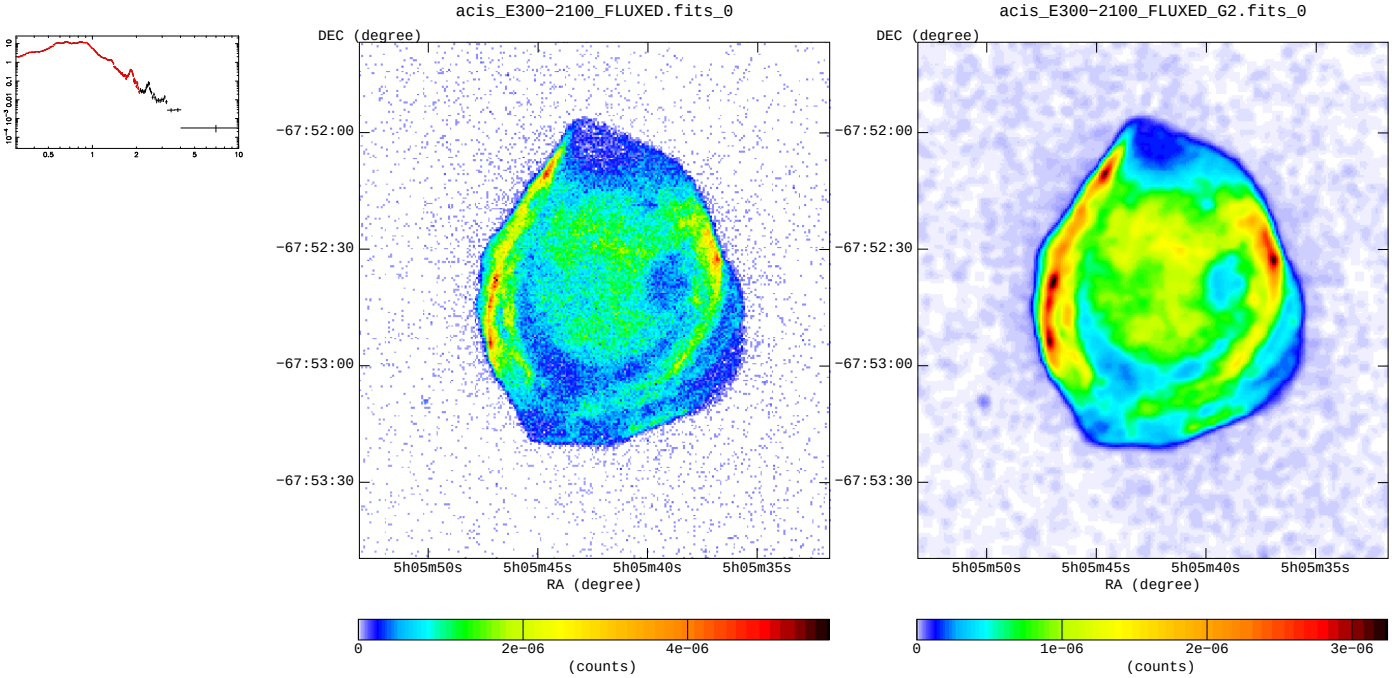
- Left : raw image, binned by 1x1 pixel
- Right : gaussian smoothed version of above (σ = 2 pixel)

3.1 Wide Band Images

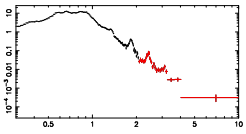
Total : 300-10000 eV

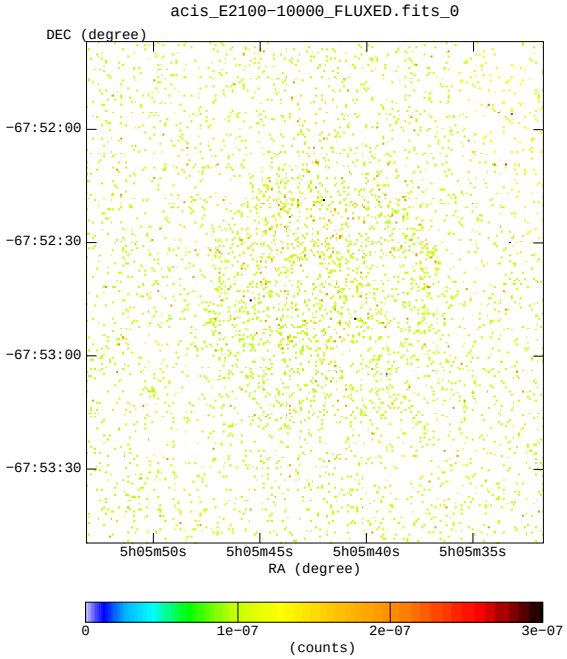


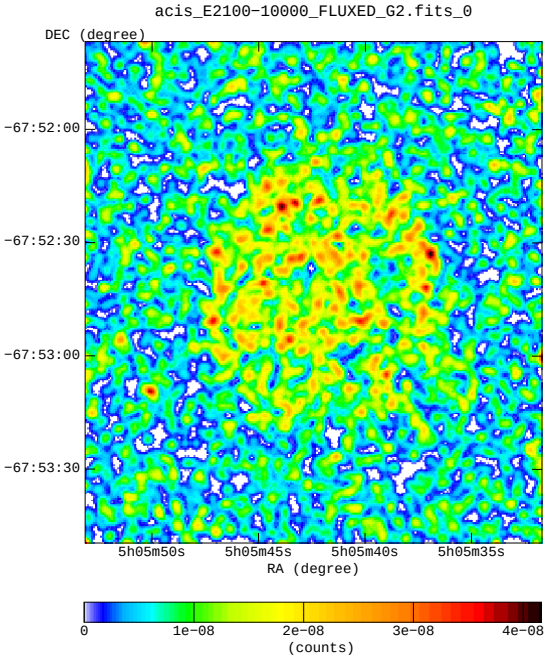
Soft Band : 300-2100 eV



Hard Band : 2100-10000 eV

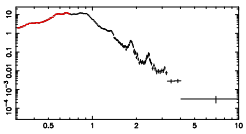


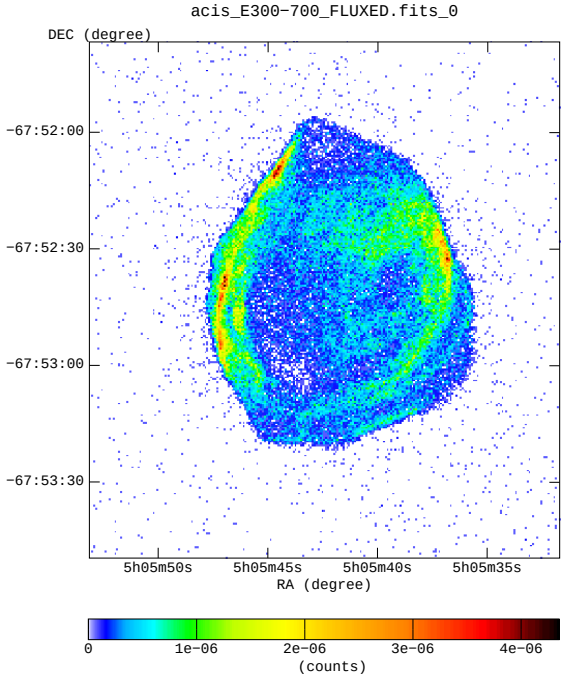


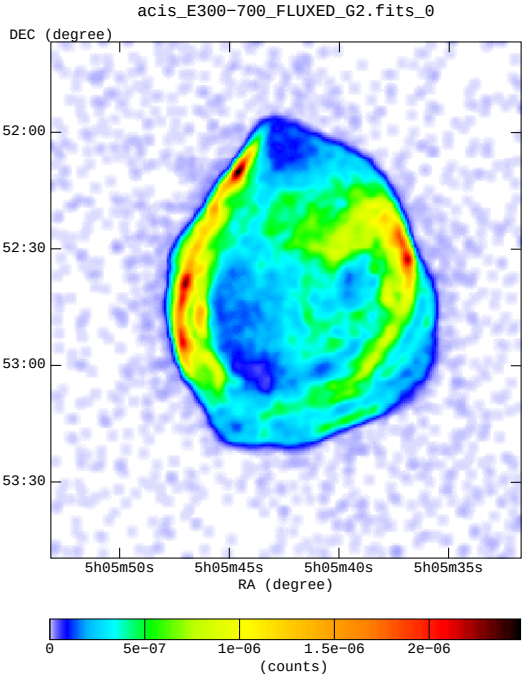


3.2 Band images used in true color image.

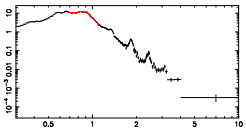
Red : 300-700 eV

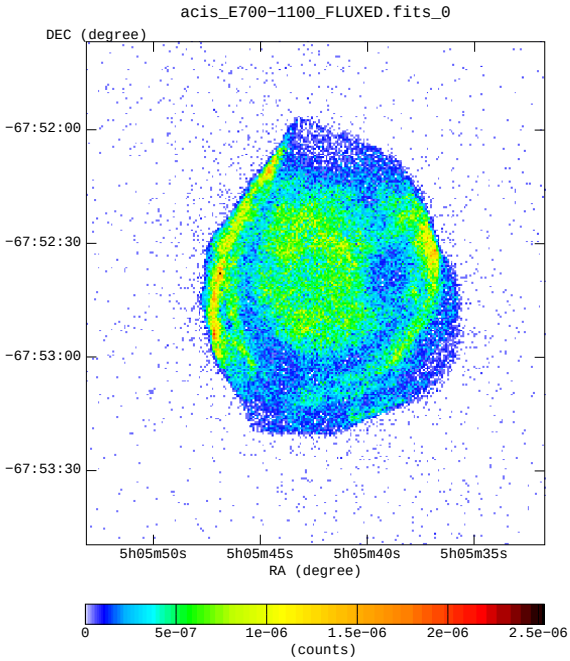


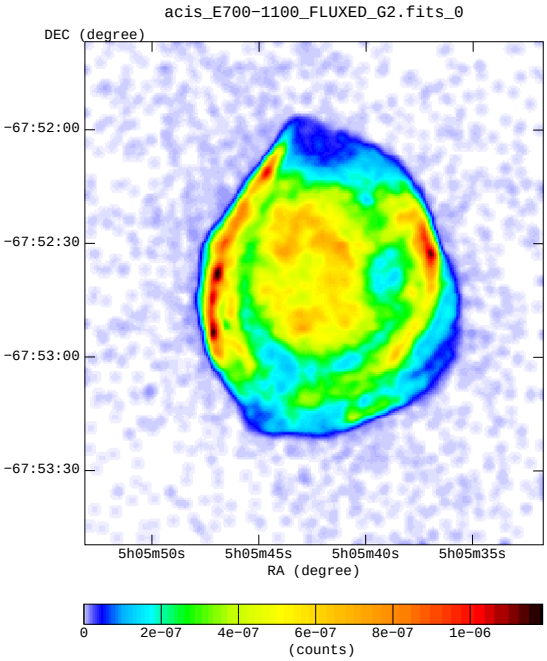




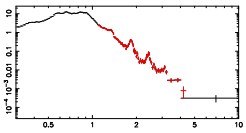
Green : 700-1100 eV

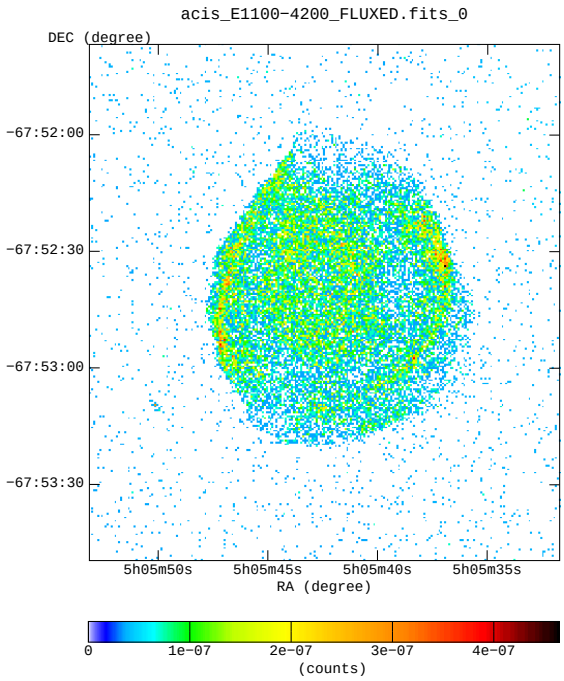


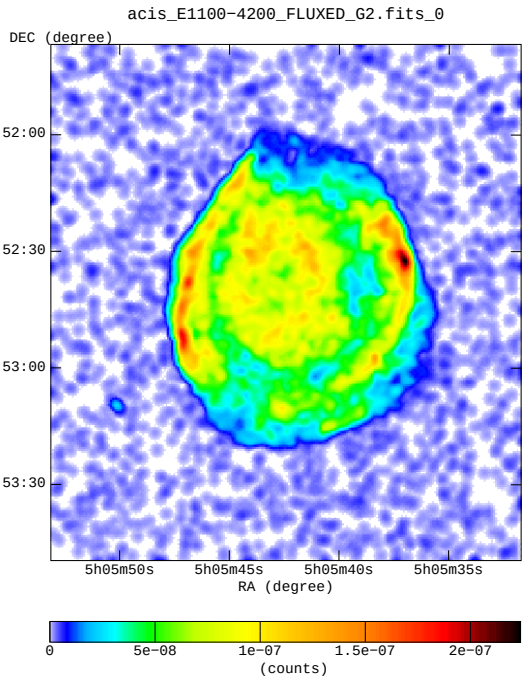




Blue : 1100-4200 eV

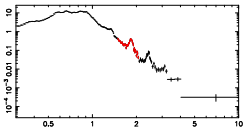


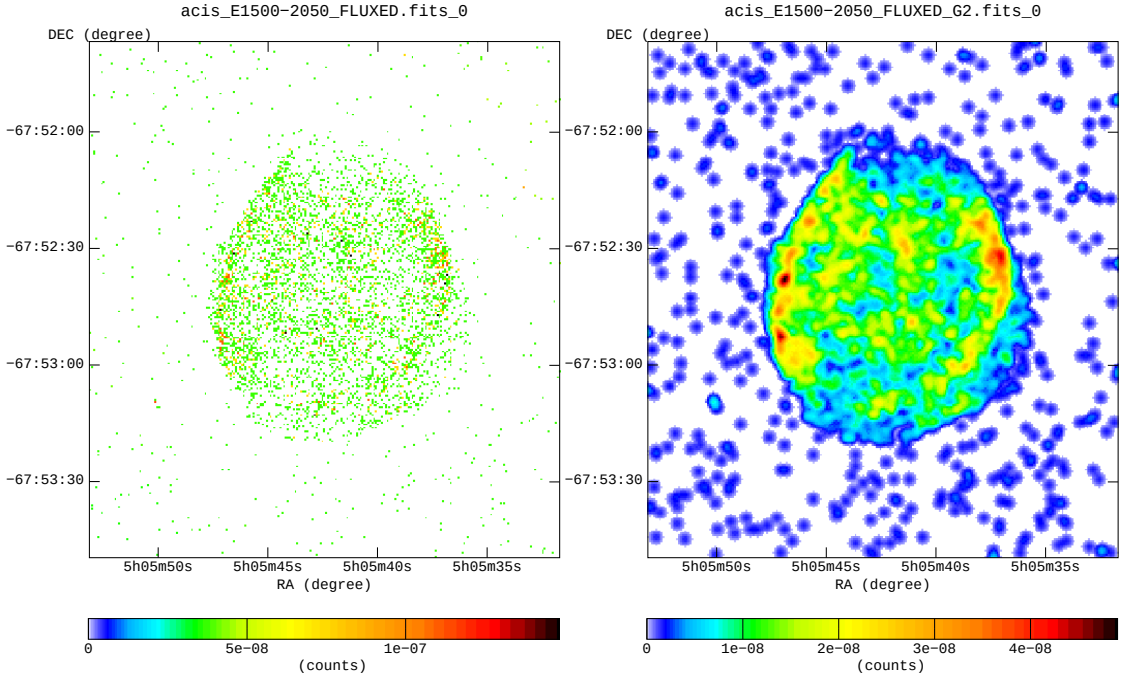




3.3 Misc.

: 1500-2050 eV

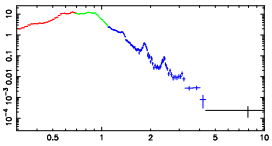


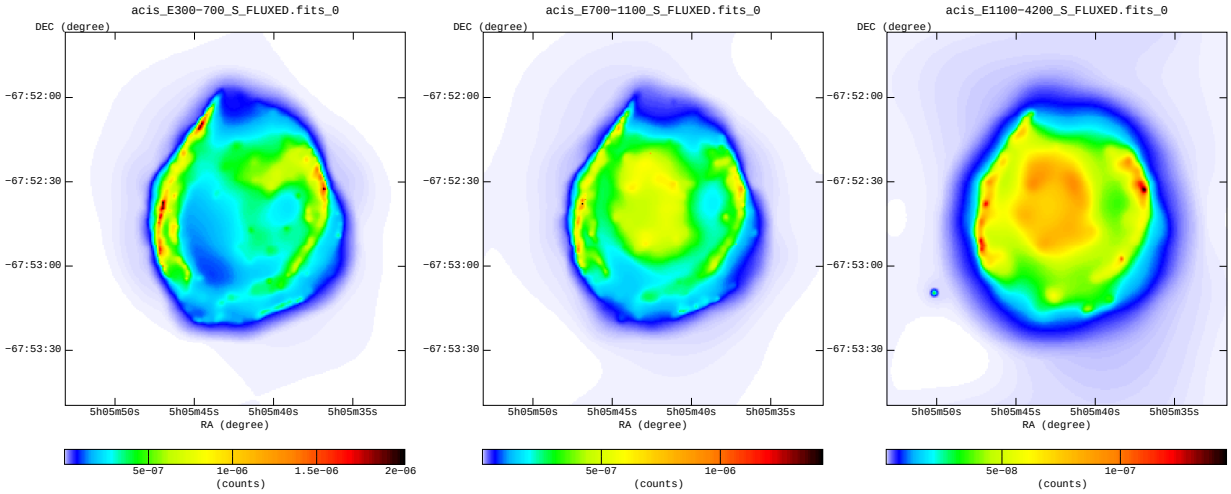


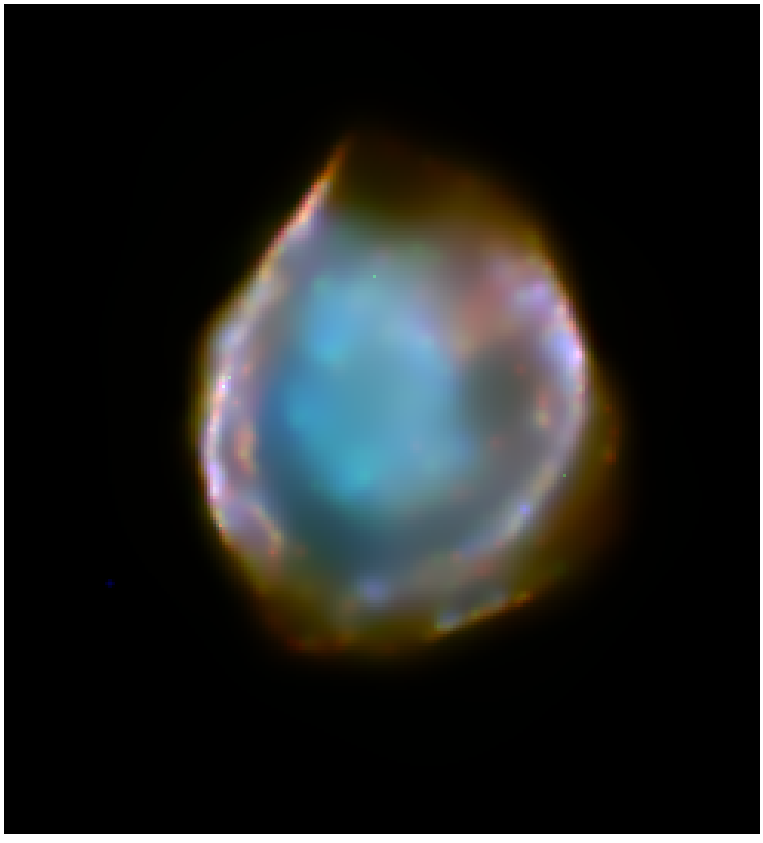
4 Chandra Images : True Color

- 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 : 300-700 eV
GREEN : 700-1100 eV
BLUE : 1100-4200 eV







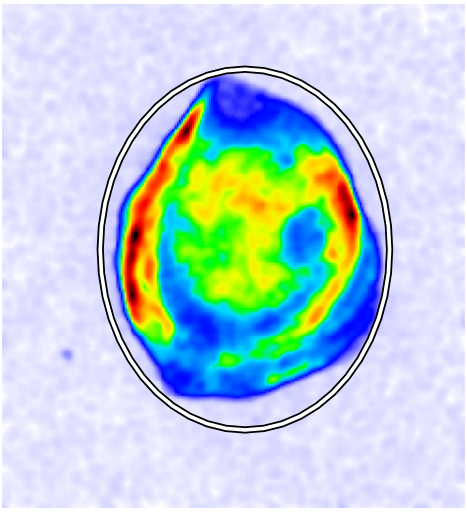
5 Chandra Spectrum

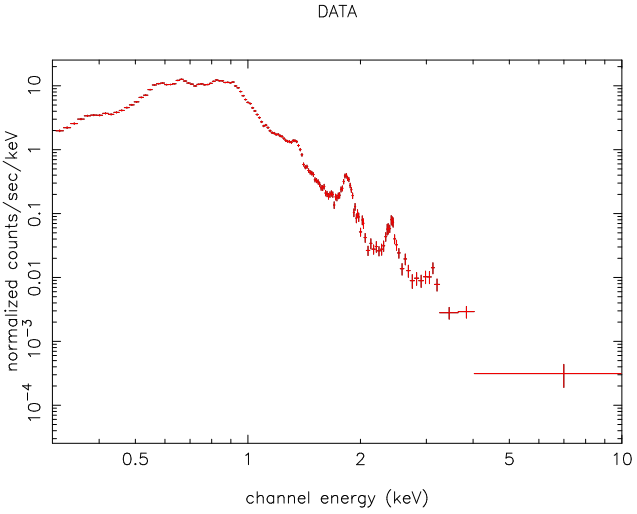
- Images show Regions used to extract spectra
- Regions with red strikes are excluded

5.1 ObsID 775

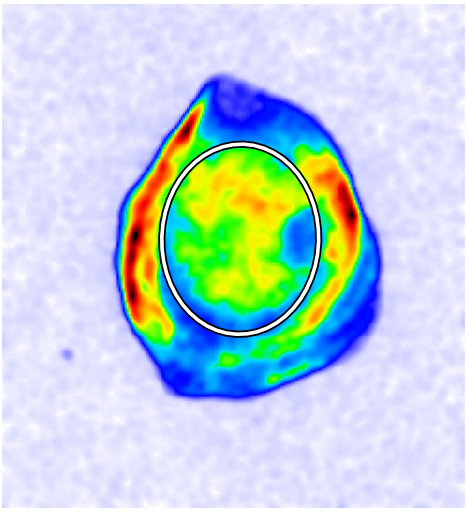
- Background was subtracted from the region around the SNR.

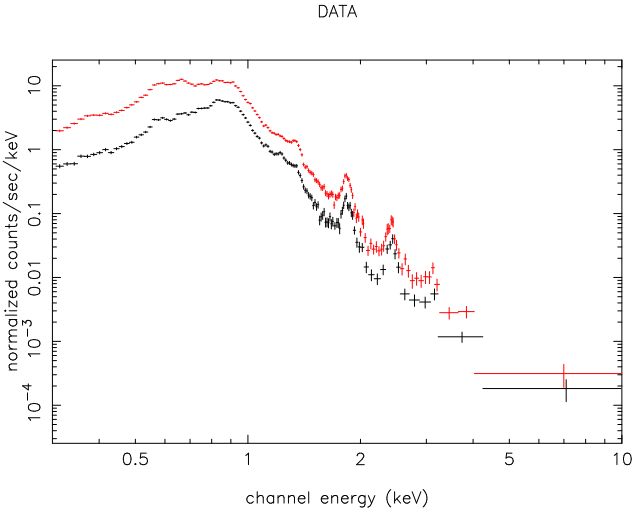
Total



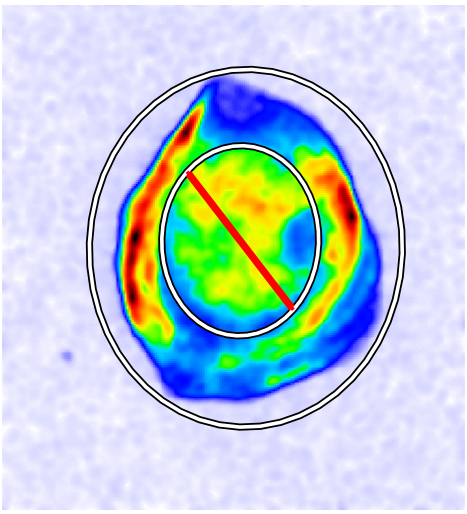


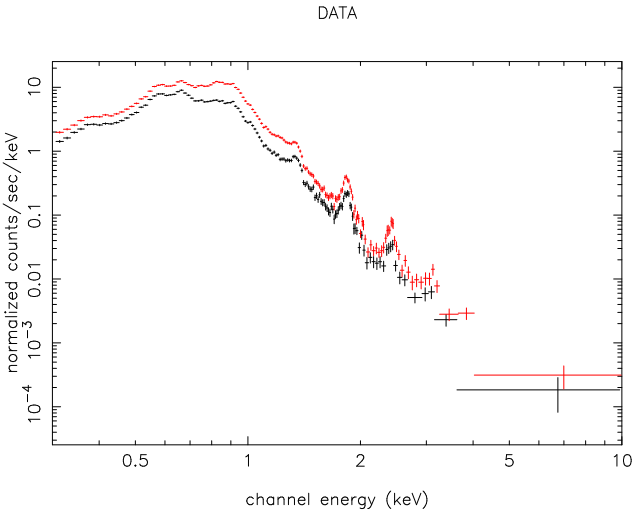
Central Patch

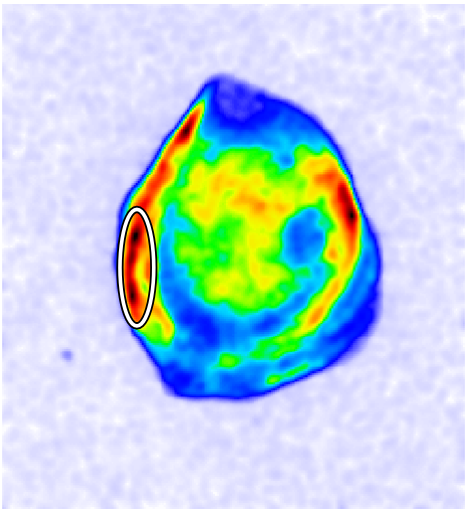


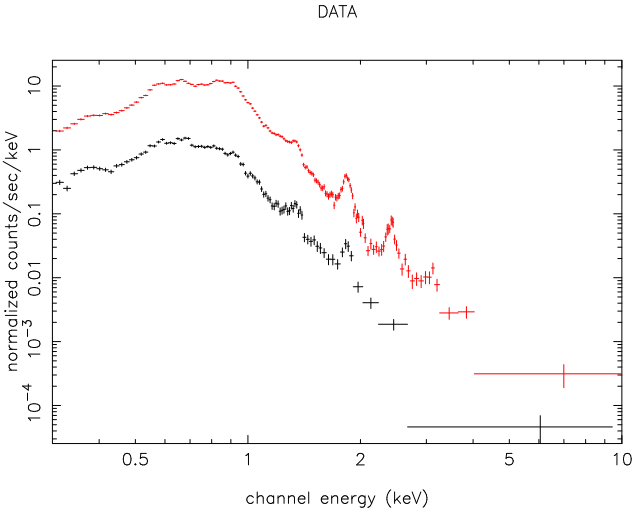


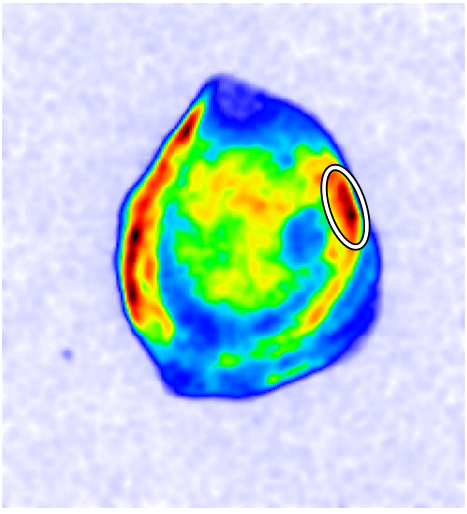
Outer Shell

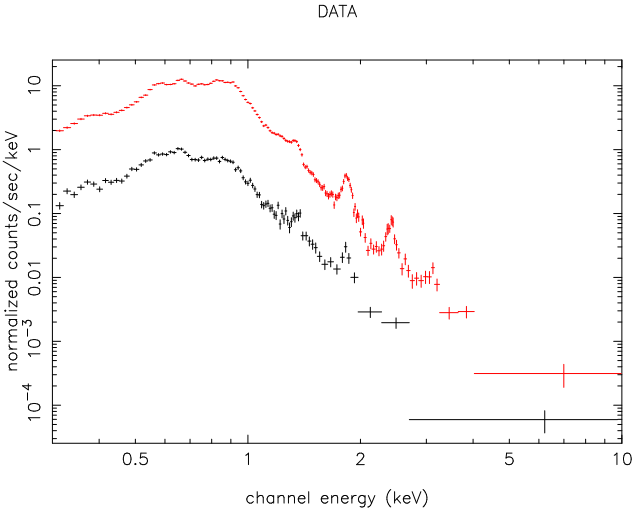


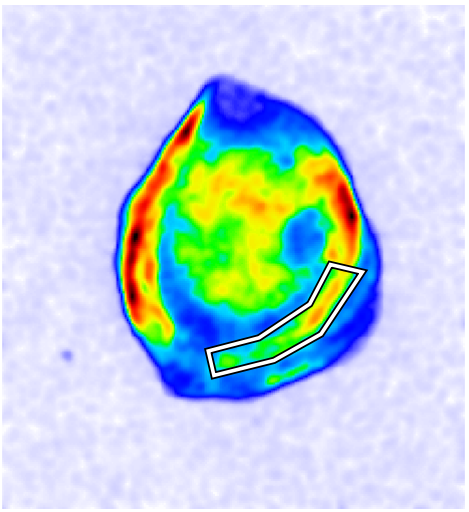

DATA
normalized counts/sec/keV
channel energy (keV)

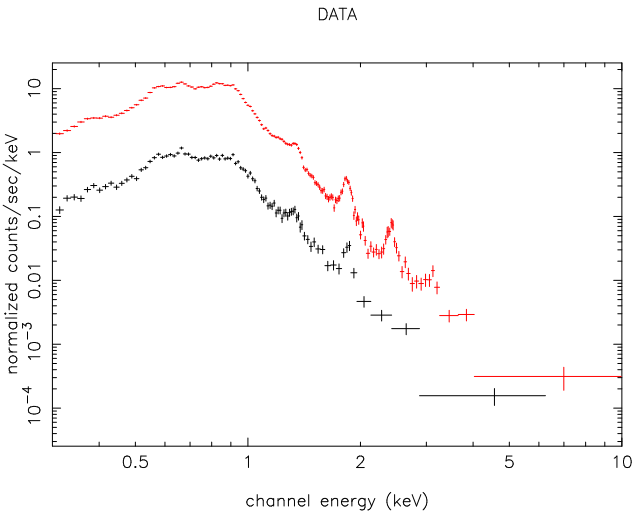


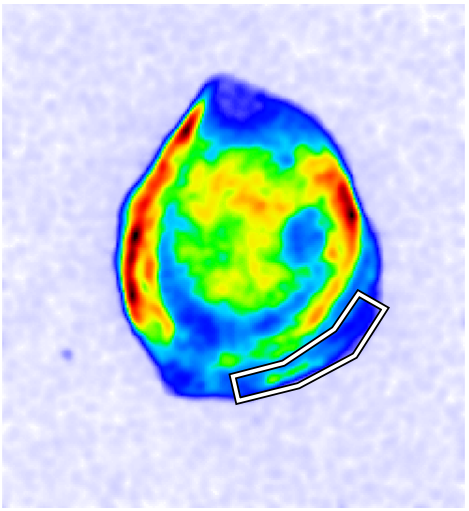

DATA
normalized counts/sec/keV
channel energy (keV)

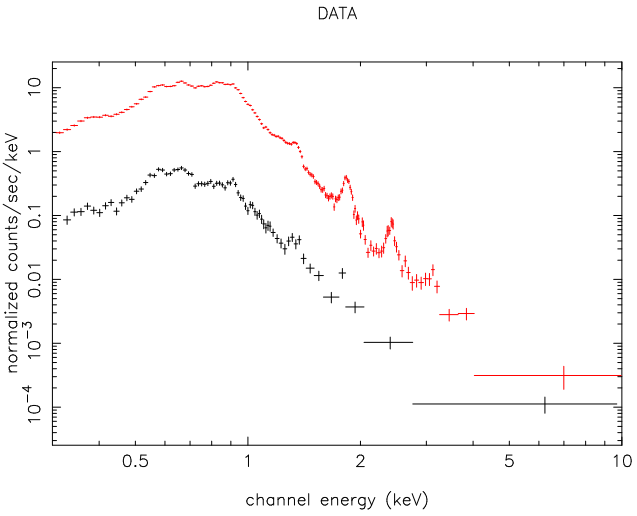


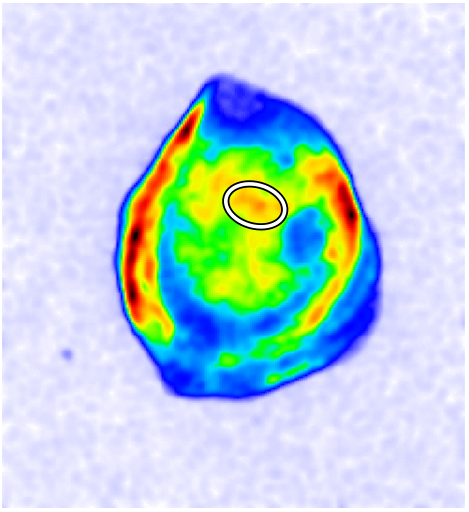

DATA
normalized counts/sec/keV
channel energy (keV)

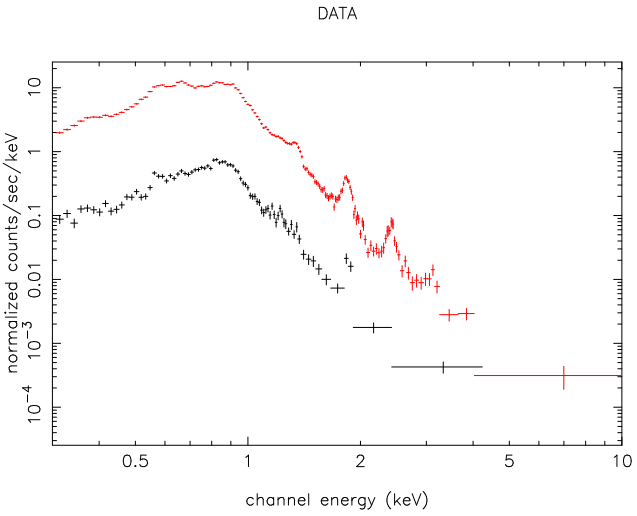



DATA
normalized counts/sec/keV
channel energy (keV)




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

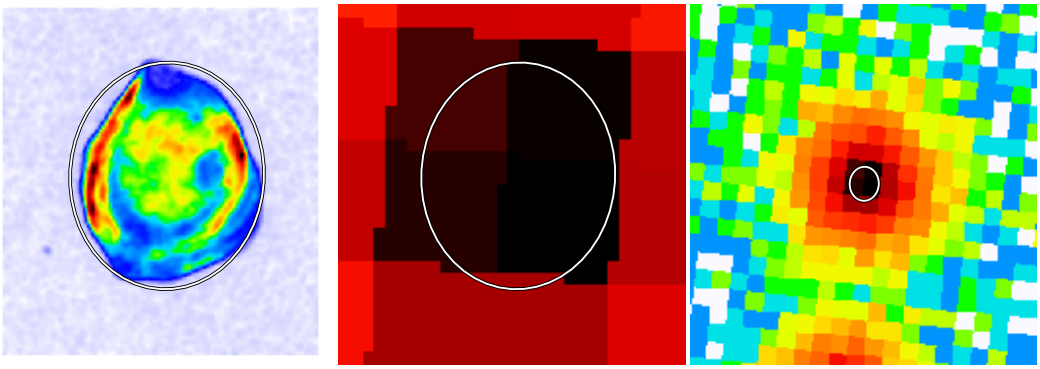



DATA
normalized counts/sec/keV
channel energy (keV)

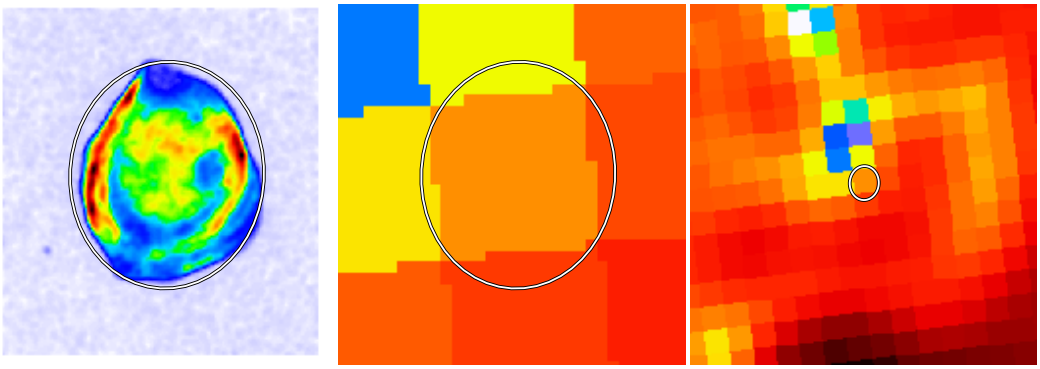
6 Images from Survey Missions

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

ROSAT All Sky Survey (Broad Band): X-ray (0.1-2.4 keV)



4850 MHz: Radio (4850 MHz continuum)



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