G111.7-02.1

1 Summary

- Common Name: Cas A
- Distance: 3.4 kpc (**Reed et al., 1995**)
- Position of Central Source (J2000): (23 23 27.7, 58 48 54.1)
- X-ray size: 5.9'x5.5'
- 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)
500001	114	ACIS-7	49.9	49.9	2000-01-30	(23 23 26.7, 58 49 03.0)

$\text{Exposure}_{\text{uf}} \rightarrow$ 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)
- No background light-curve filtering was done

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	1.487e+07	2.978e+02	2.59e-09	2.06e-08	2.84e+37
(114)	0.3 - 2.1	1.122e+07	2.247e+02	1.07e-09	1.87e-08	2.58e+37
	2.1 - 10.	3.689e+06	7.389e+01	1.53e-09	1.89e-09	2.61e+36

- N_H = 1.51 ($10^{22} cm^{-2}$)
- Assumed distance: 3.4 kpc (**Reed et al., 1995**)
- nH was derived with two thermal plasma model

1.3 Nearby Sources

Obs ID	Position (J2000)	Size	Net Count	Count rate	Note
114					

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(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.
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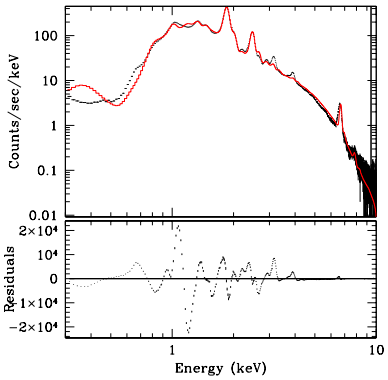
1.4 References

- Reed et al., 1995 ApJ, 440, 706 : Optical Spectra

2 Fit Detail

- See spectrum page for used regions.

2.1 Total:



- Two thermal plasm model
- Abundance of O, Ne, Mg, Si, S, Fe were thawed and linked between two model.

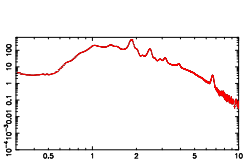
  source=(xswabs * (xsvapec + xsvapec))
  reduced χ^2 = 200.194
  nh = `1.5058 10^22/cm^2`

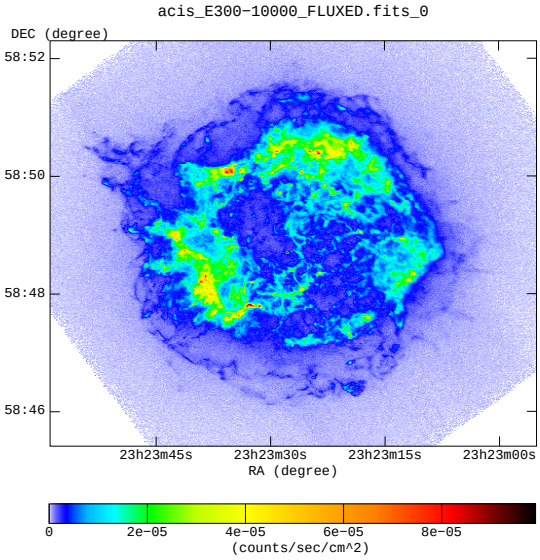
3 Chandra Images : Band Images

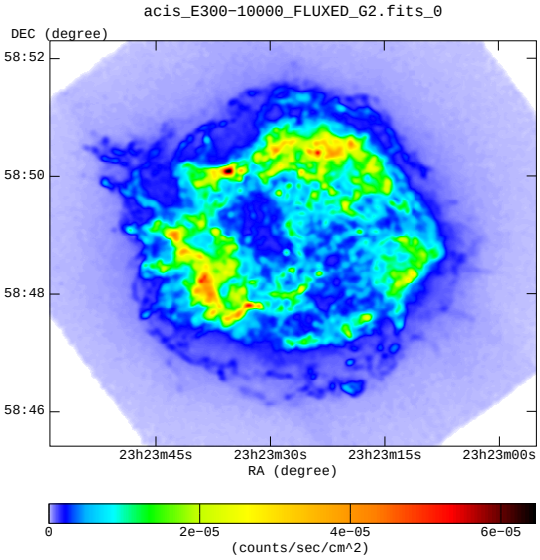
- Left : raw image, binned by 1x1 pixel
- Right : gaussian smoothed version of above (σ = 2 pixel)

3.1 Wide Band Images

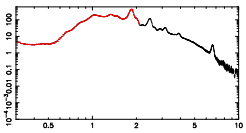
Total : 300-10000 eV

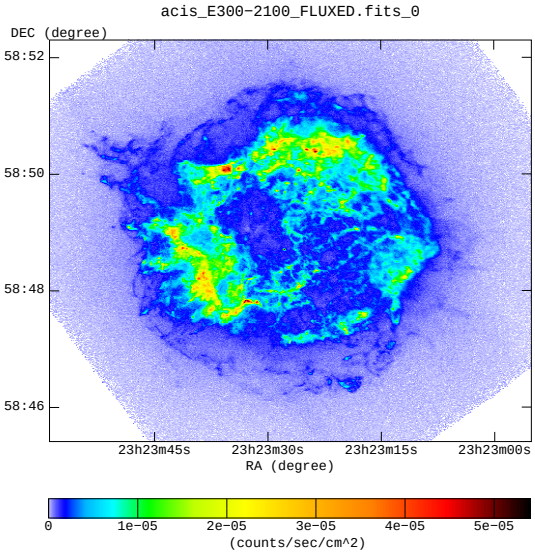


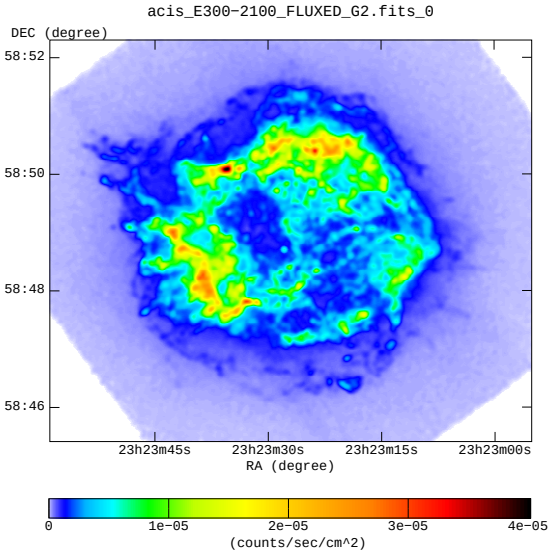




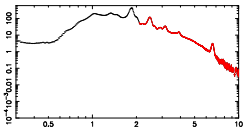
Soft Band : 300-2100 eV

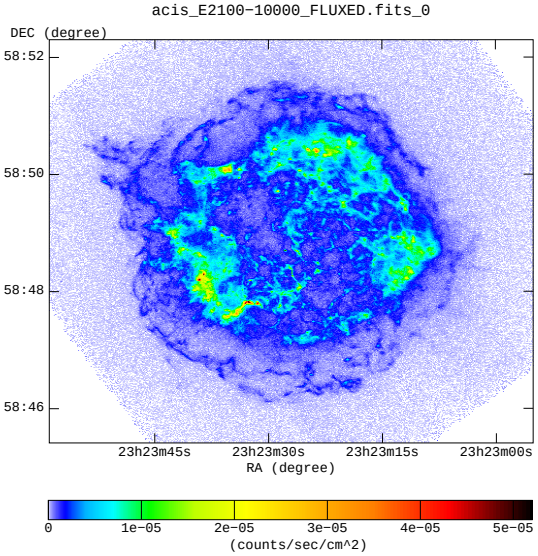


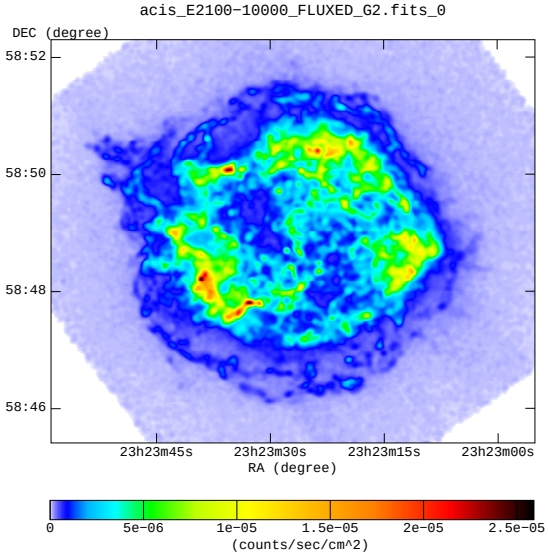




Hard Band : 2100-10000 eV

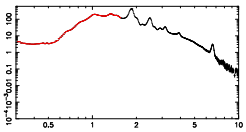


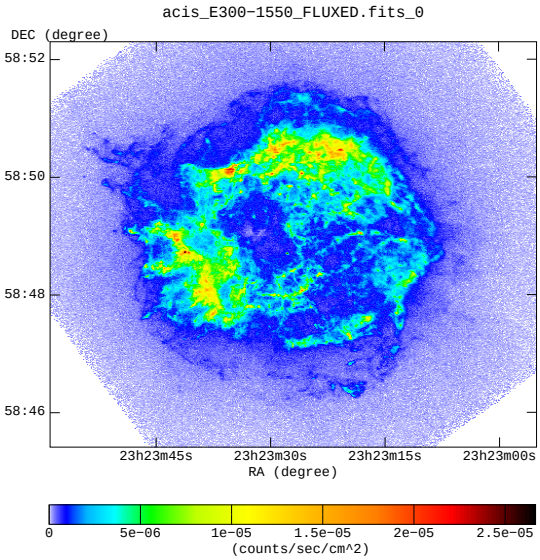


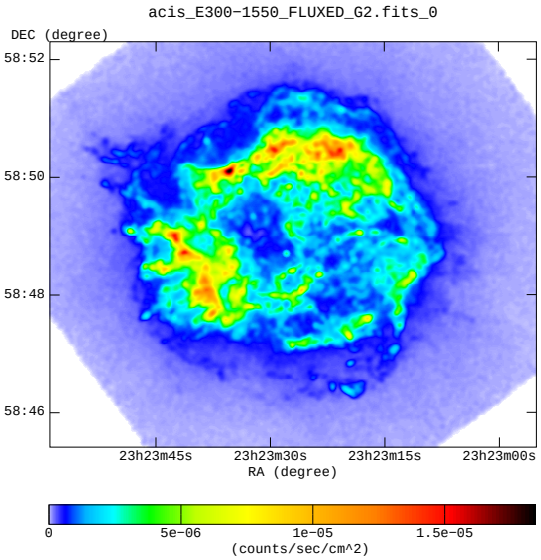


3.2 Band images used in true color image.

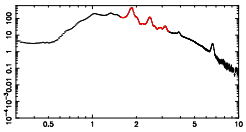
Red : 300-1550 eV

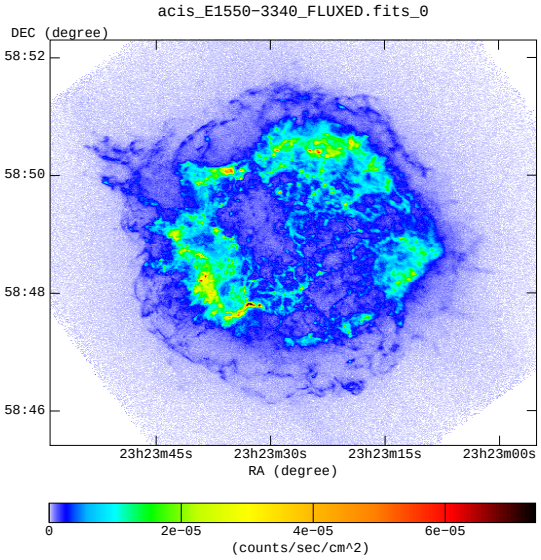


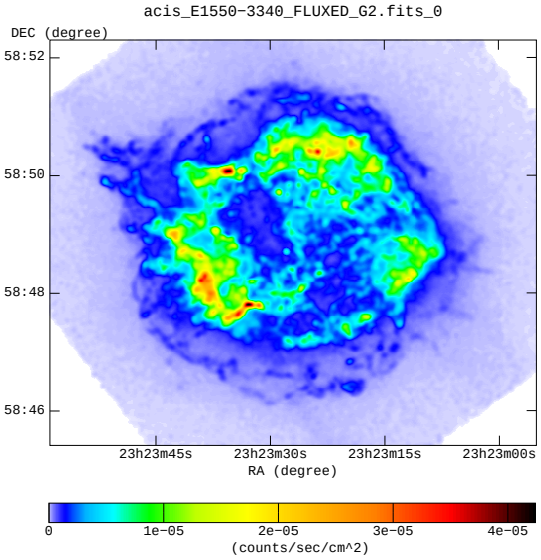




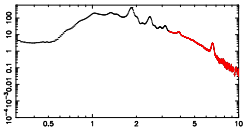
Green : 1550-3340 eV

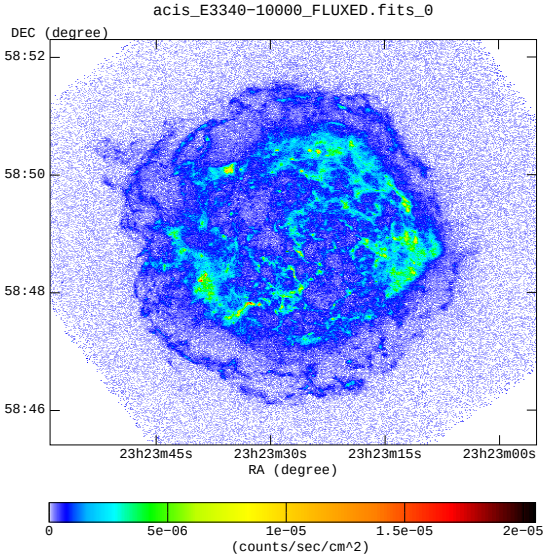


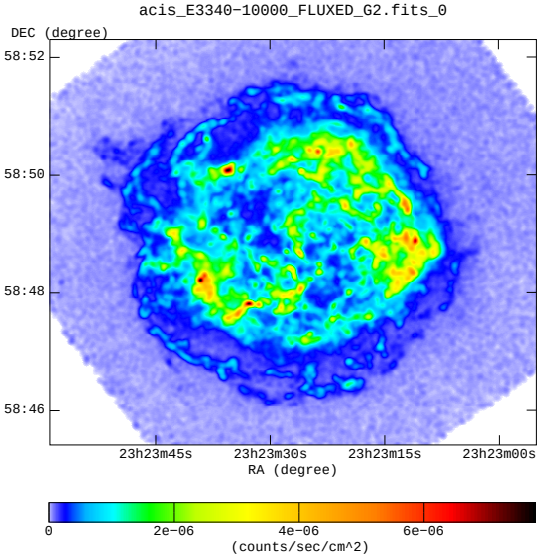




Blue : 3340-10000 eV

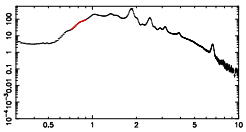


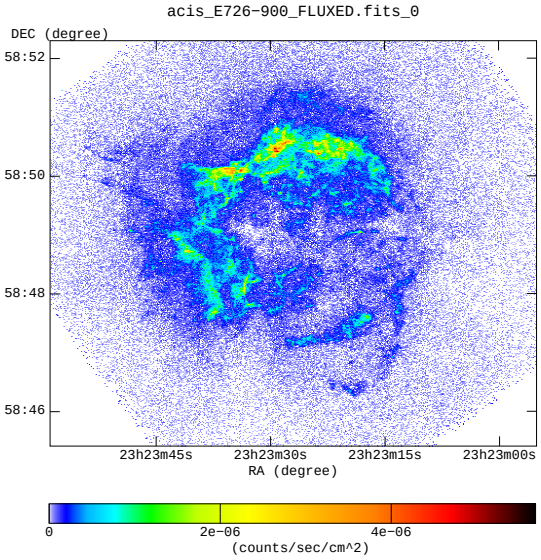


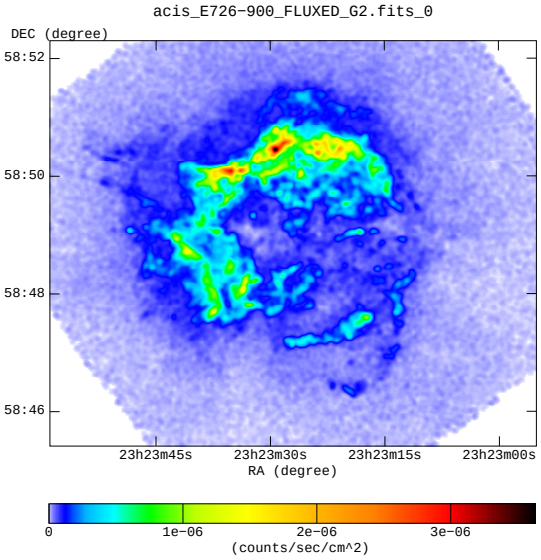


3.3 Misc.

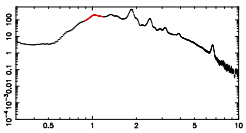
: 726-900 eV

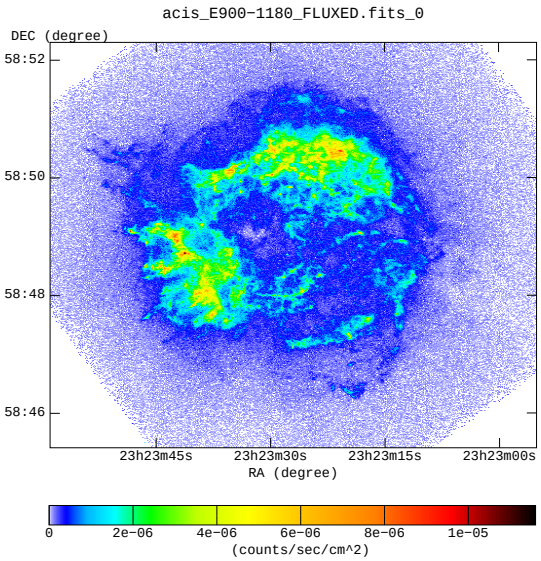


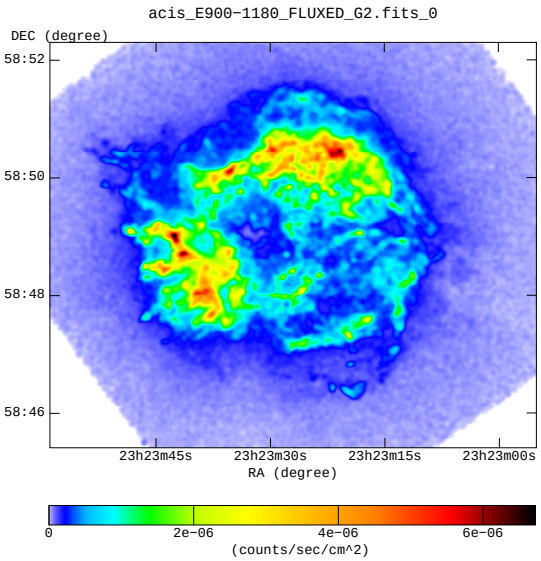




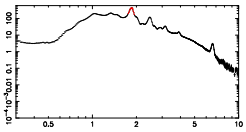
: 900-1180 eV

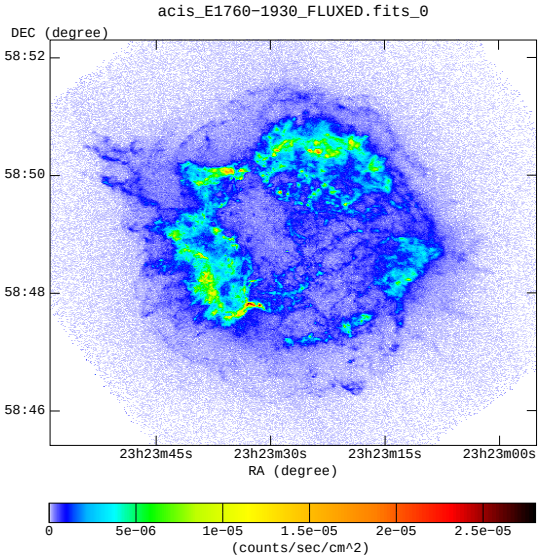


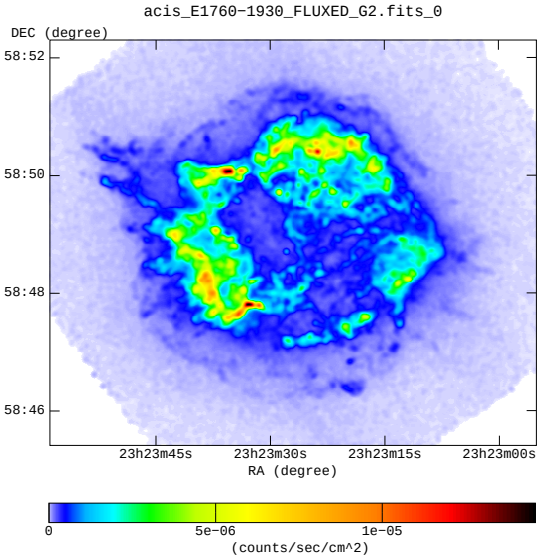




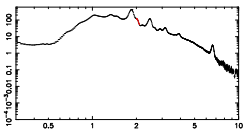
: 1760-1930 eV

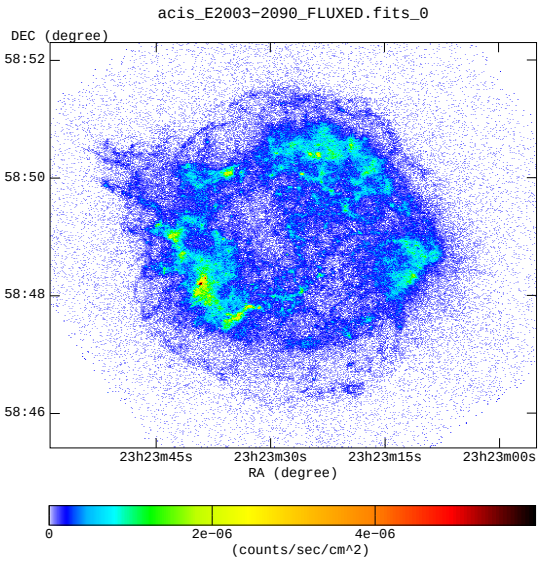


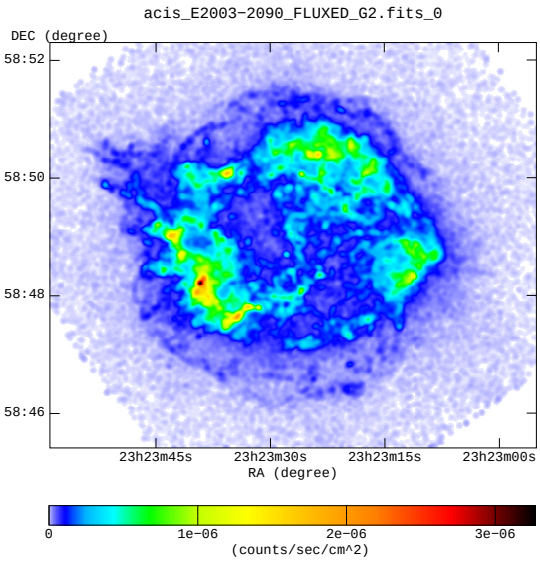




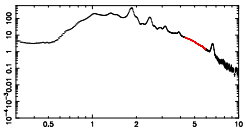
: 2003-2090 eV

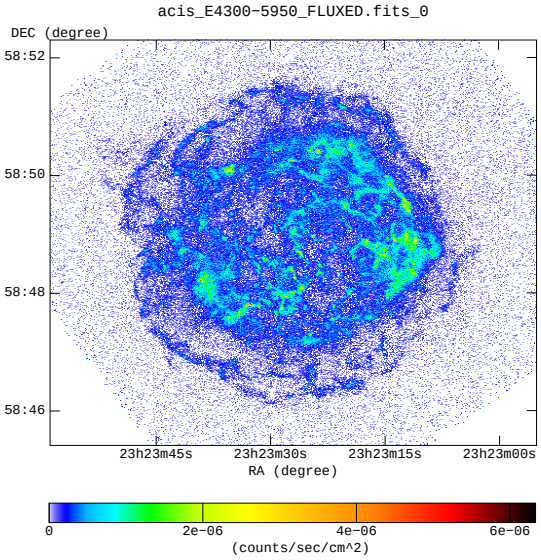


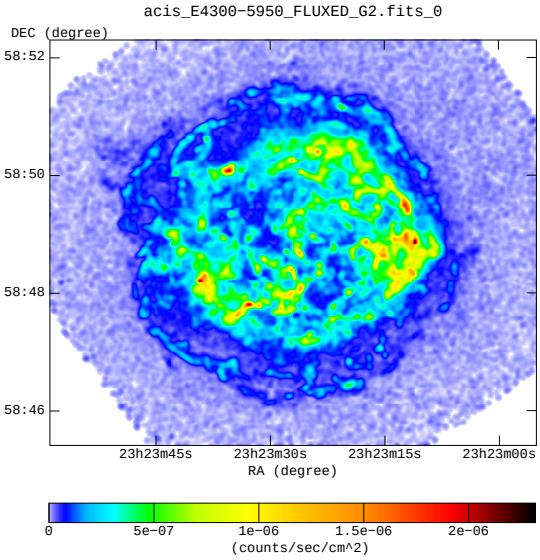




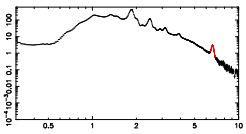
: 4300-5950 eV

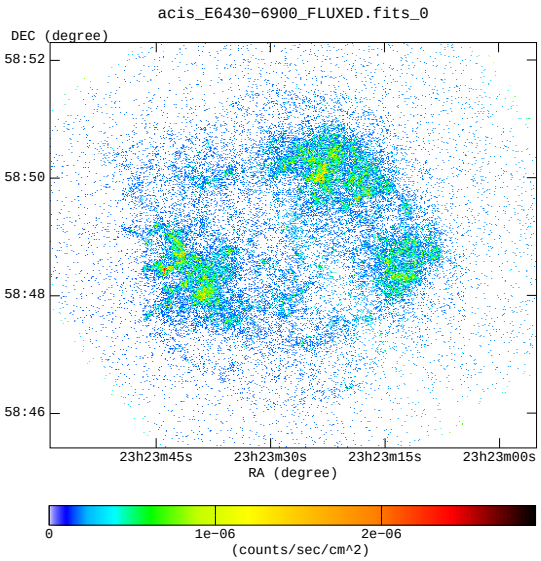


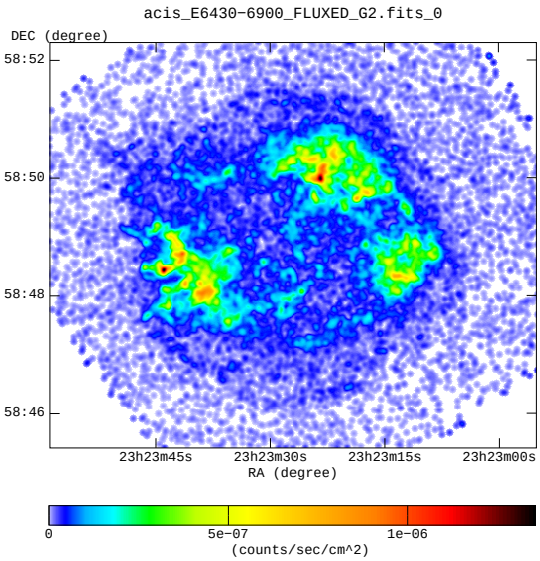




: 6430-6900 eV





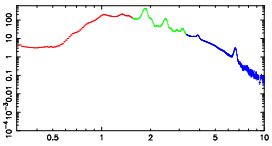


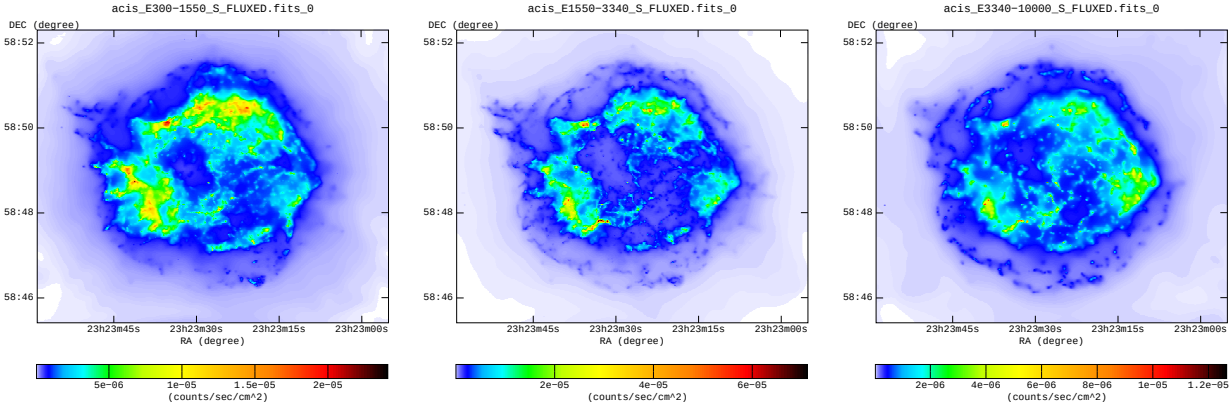
4 Chandra Images : True Color

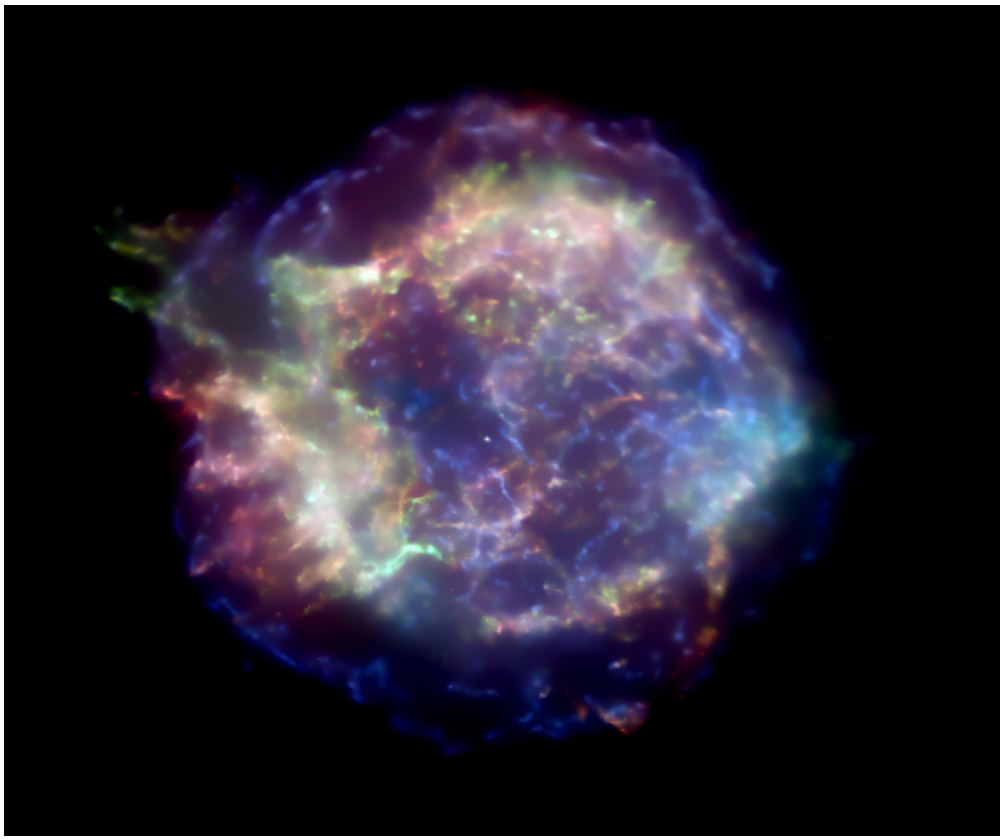
- Individual images are adaptively smoothed.
- Warning : the adaptive smoothing process sometimes produces artifacts.

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

RED : 300-1550 eV
GREEN : 1550-3340 eV
BLUE : 3340-10000 eV





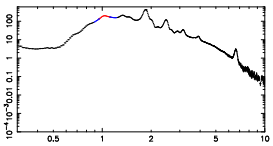


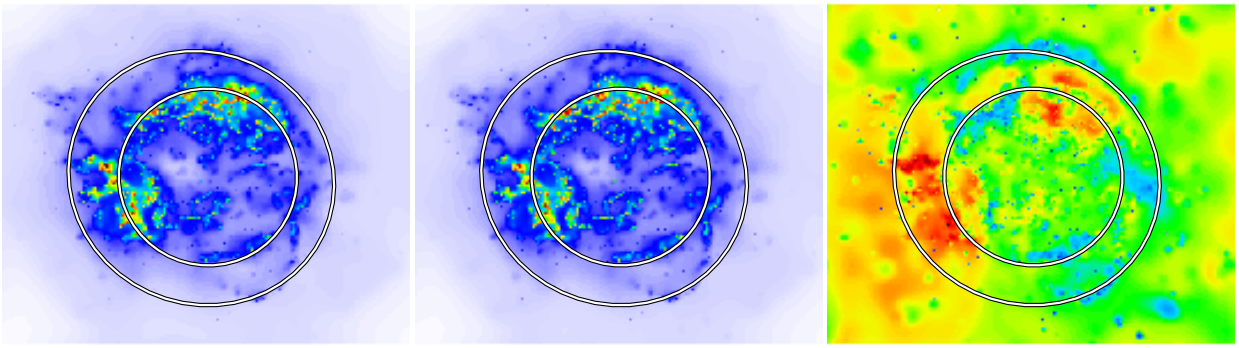
5 Chandra Images : Equivalent Width Map

5.1 Equivalent Width Images

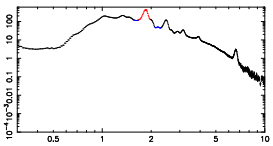
- individual images(line and two continuum) are binned by given pixel size and then adaptively smoothed.
- same scale map (from the least count images) was used for all three images.
- continuum at given line position was estimated by linear interpolation of two continuum image in pixel-by-pixel base.

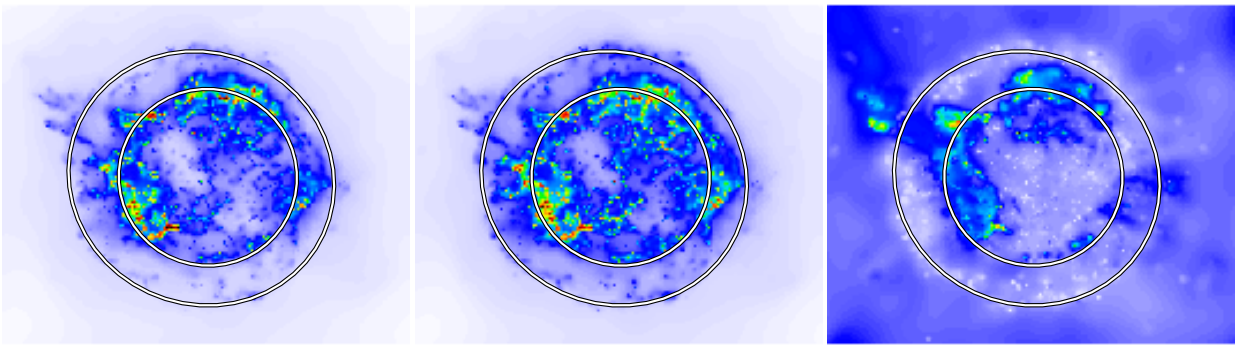
continuum :	897-963 eV
line :	963-1120 eV
continuum :	1120-1220 eV



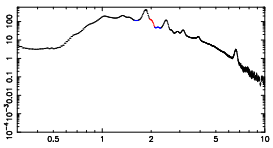


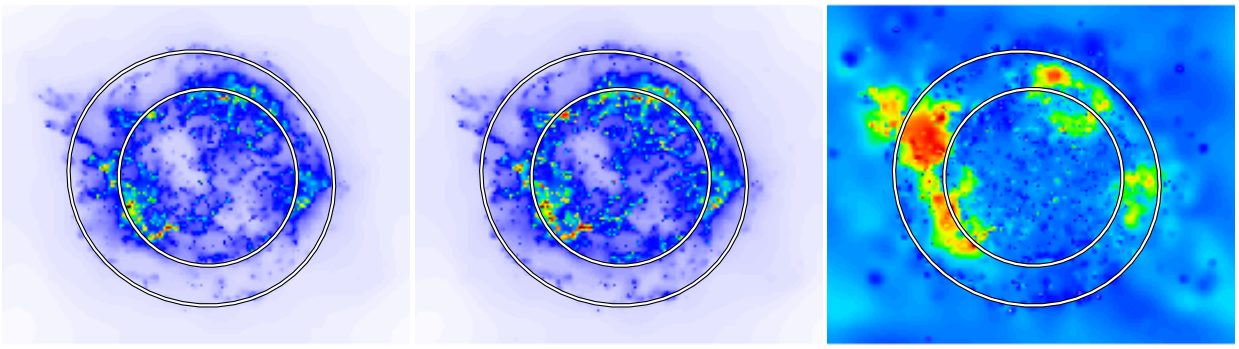
continuum :	1580-1650 eV
line :	1650-1960 eV
continuum :	2110-2280 eV



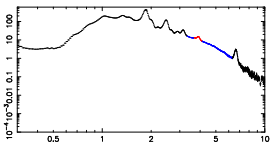


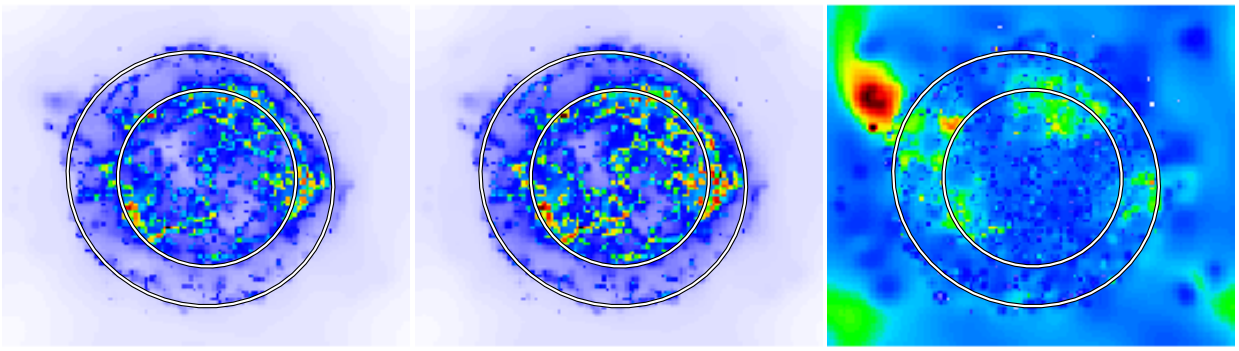
continuum :	1580-1650 eV
line :	1960-2110 eV
continuum :	2110-2280 eV



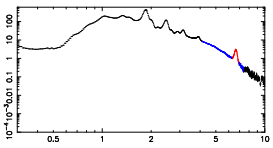


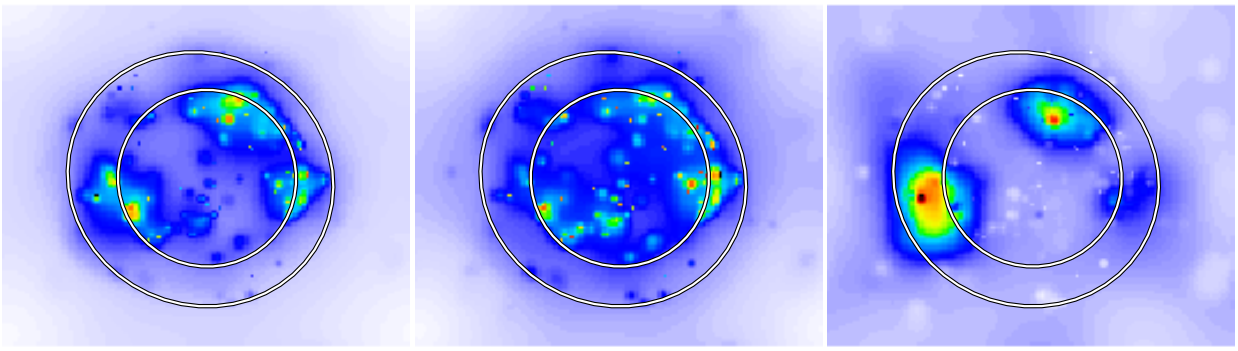
continuum :	3340-3640 eV
line :	3640-4120 eV
continuum :	4120-6250 eV





continuum :	4120-6250 eV
line :	6250-6940 eV
continuum :	6940-7400 eV





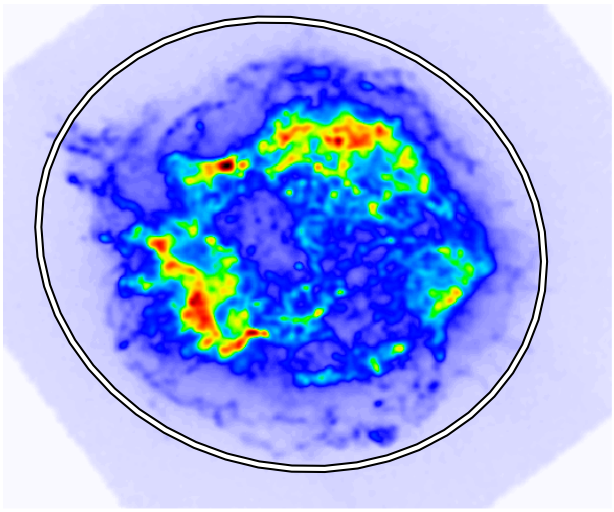
6 Chandra Spectrum

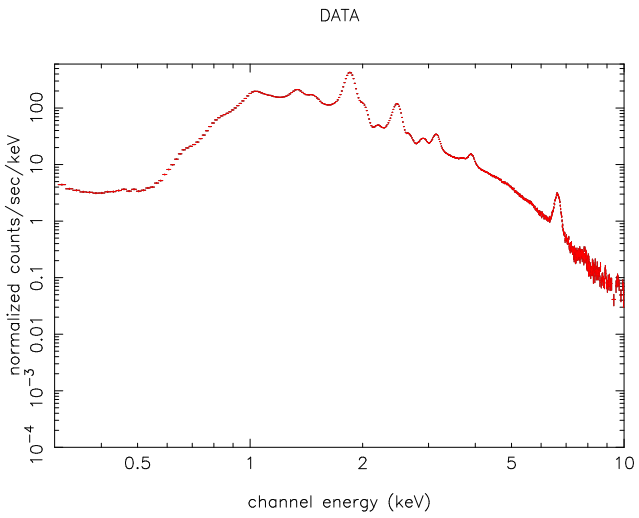
- Images show Regions used to extract spectra
- Regions with red strikes are excluded

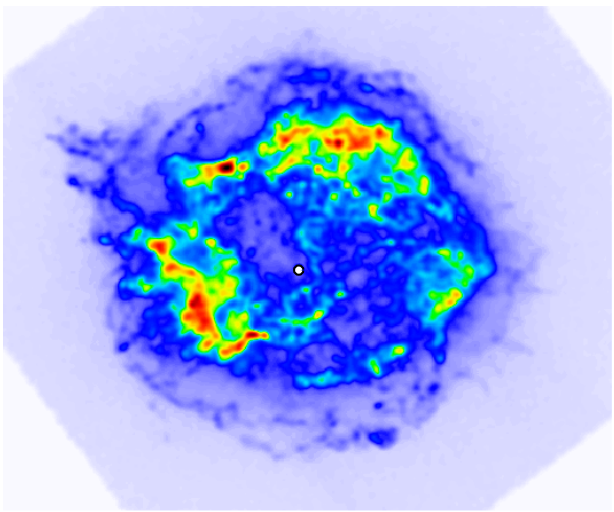
6.1 ObsID 114

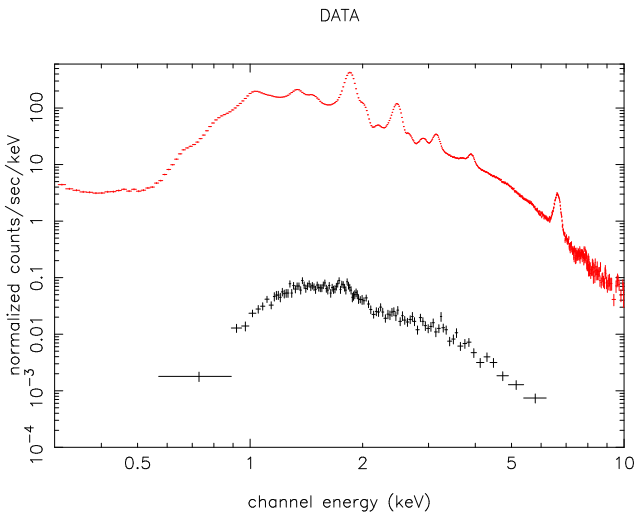
- Background was subtracted from the region around the SNR.

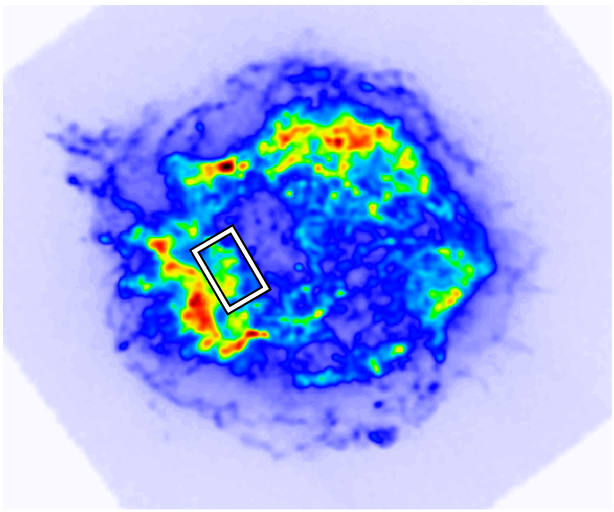
total

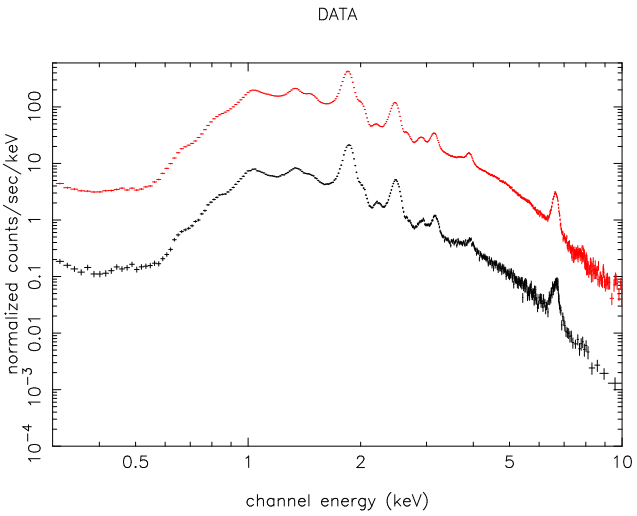


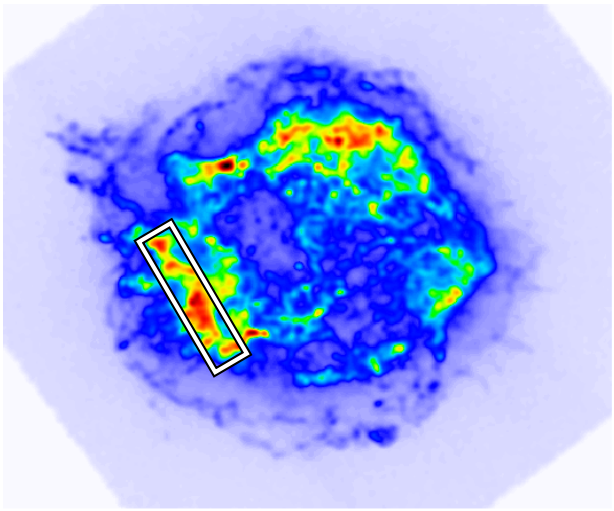


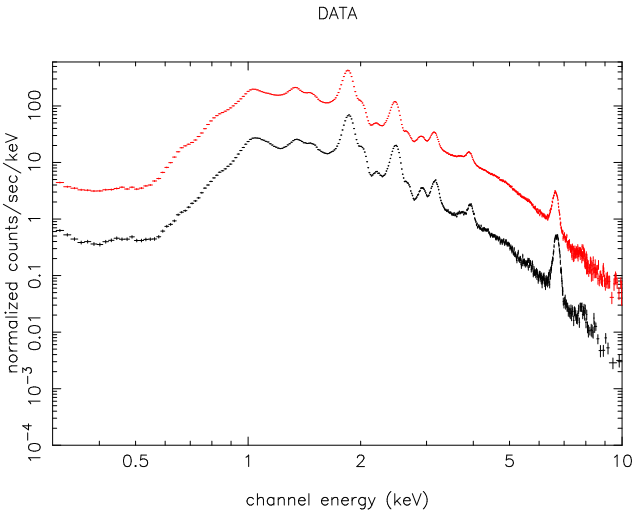


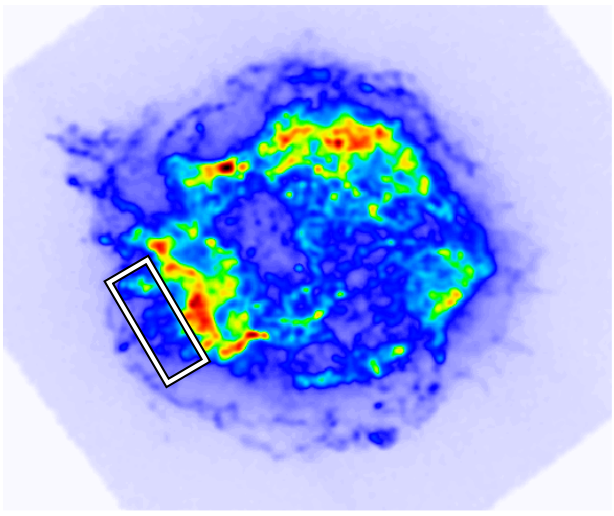


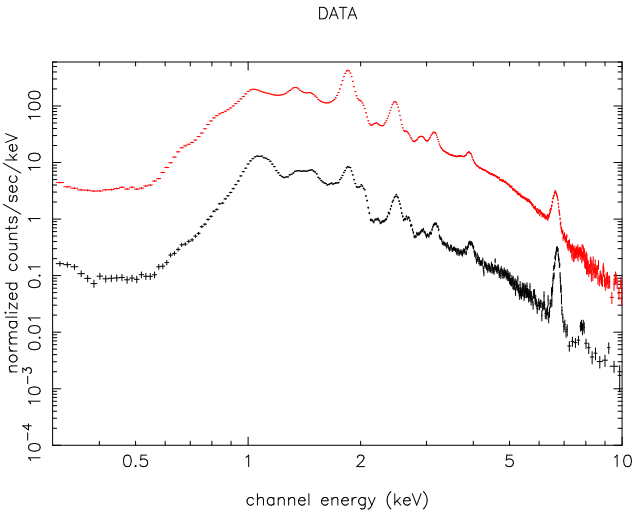


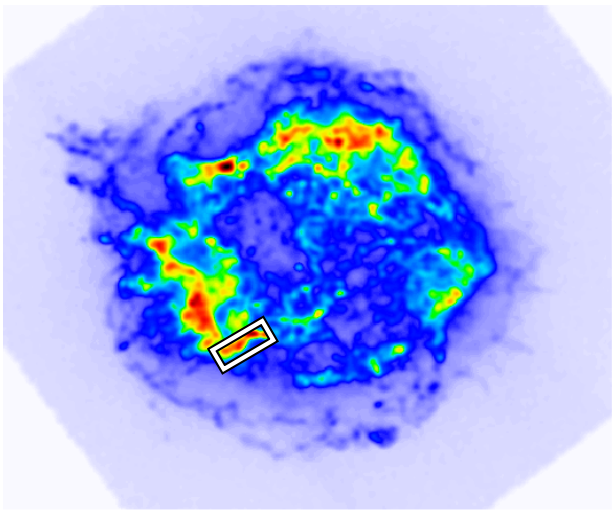

DATA
normalized counts/sec/keV
channel energy (keV)
0.5
1
2
5
10

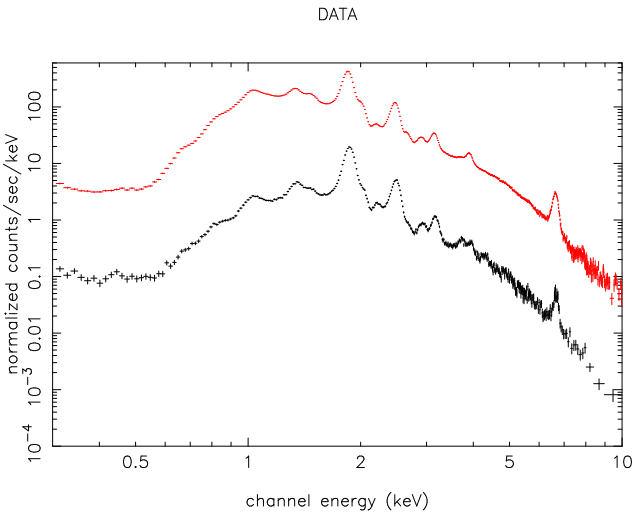


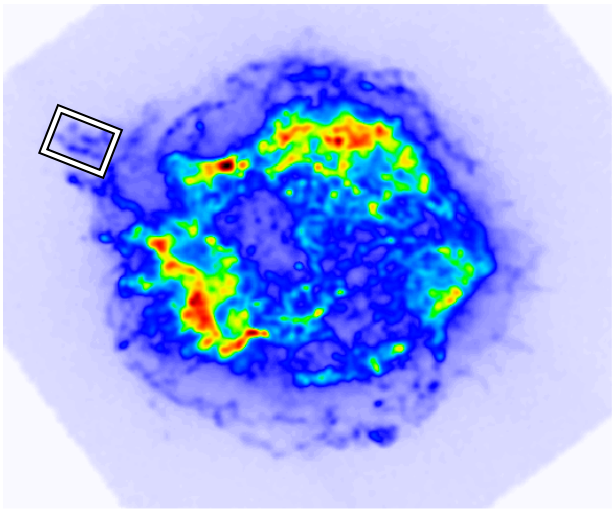

DATA
normalized counts/sec/keV
channel energy (keV)
0.5
1
2
5
10

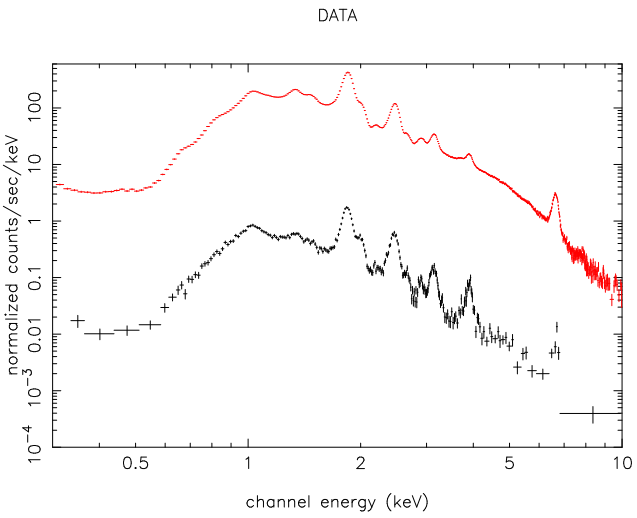


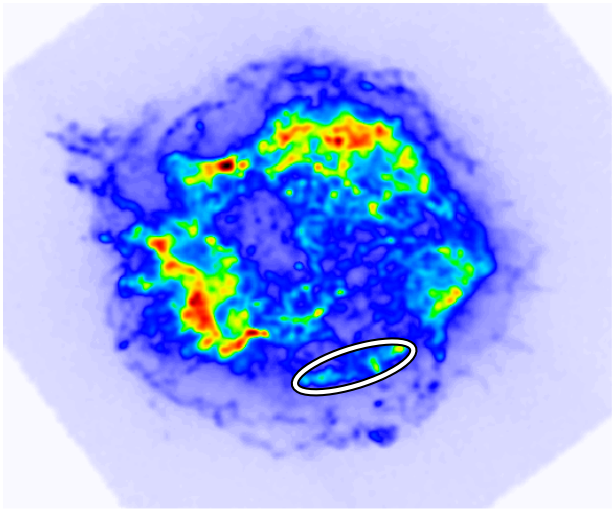

DATA
normalized counts/sec/keV
channel energy (keV)
0.5
1
2
5
10

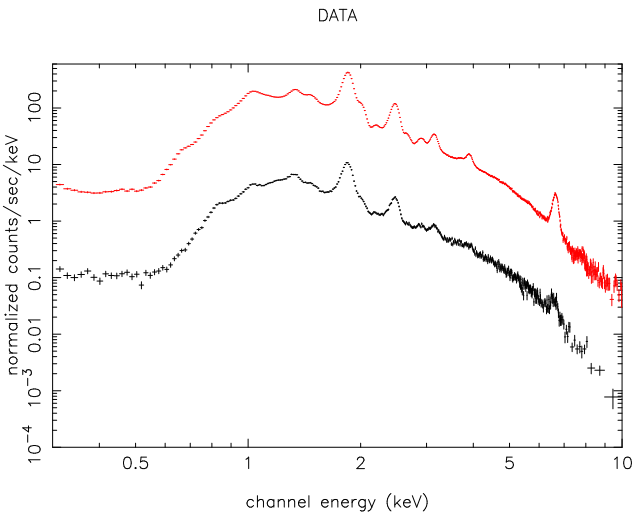


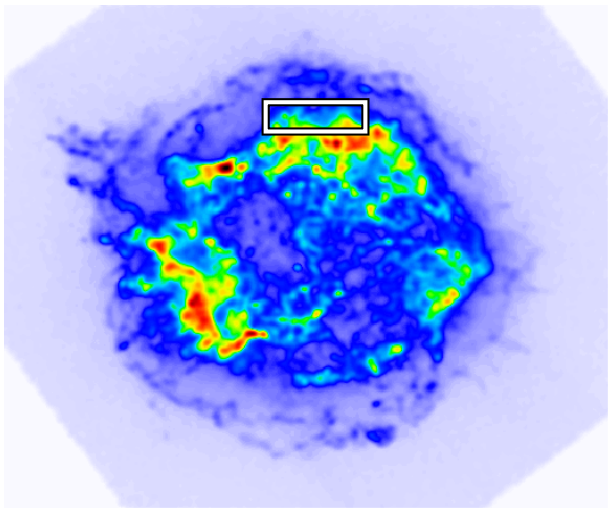

DATA
normalized counts/sec/keV
channel energy (keV)

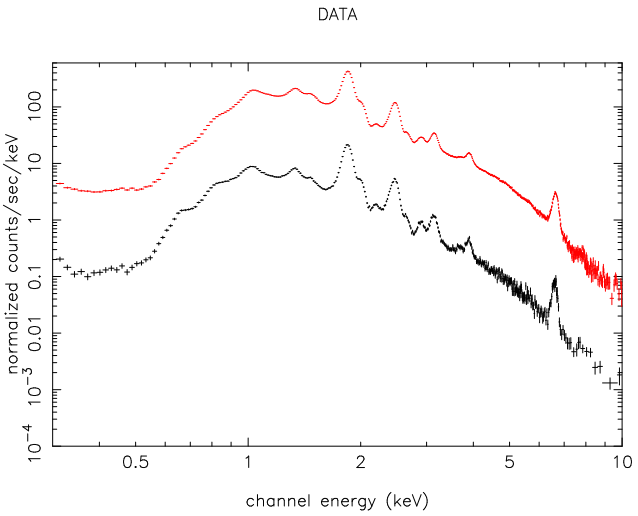


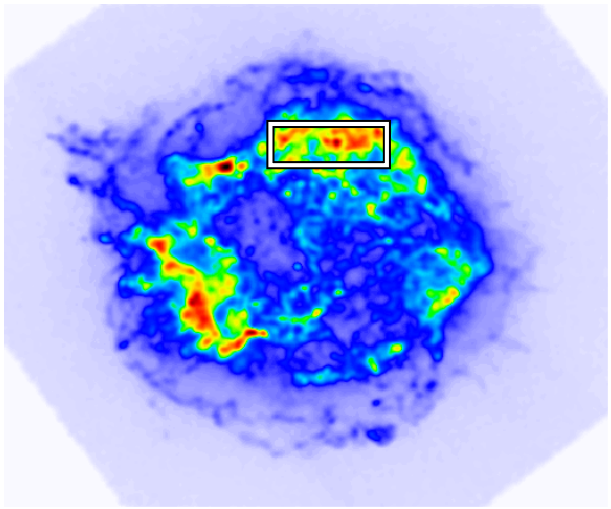

DATA
normalized counts/sec/keV
channel energy (keV)

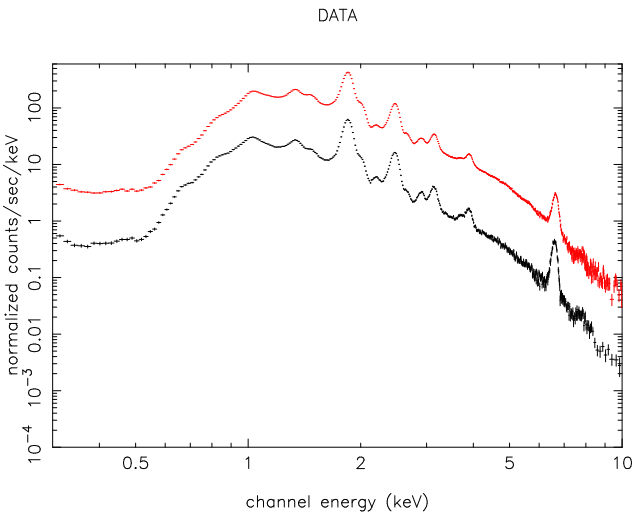


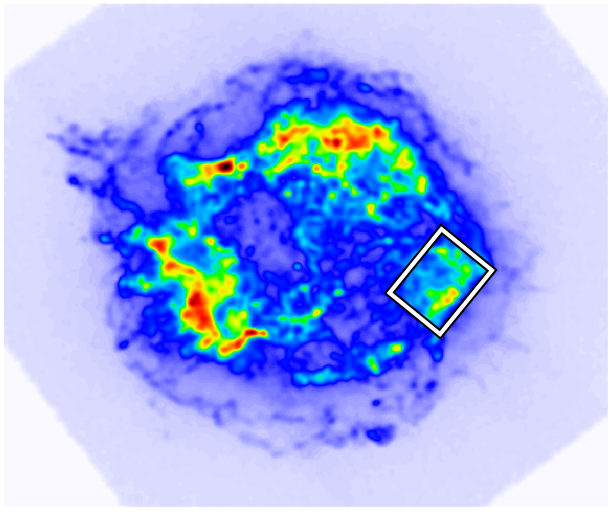

DATA
normalized counts/sec/keV
channel energy (keV)

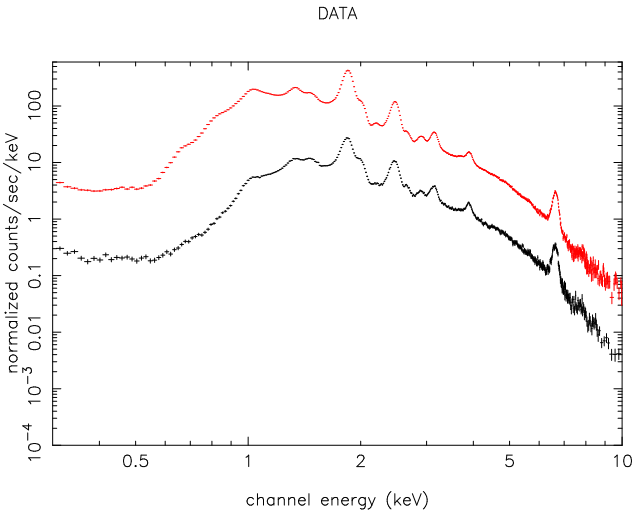


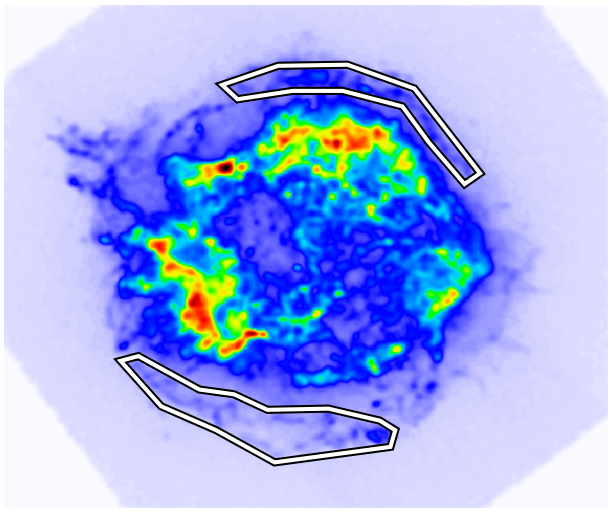

DATA
normalized counts/sec/keV
channel energy (keV)

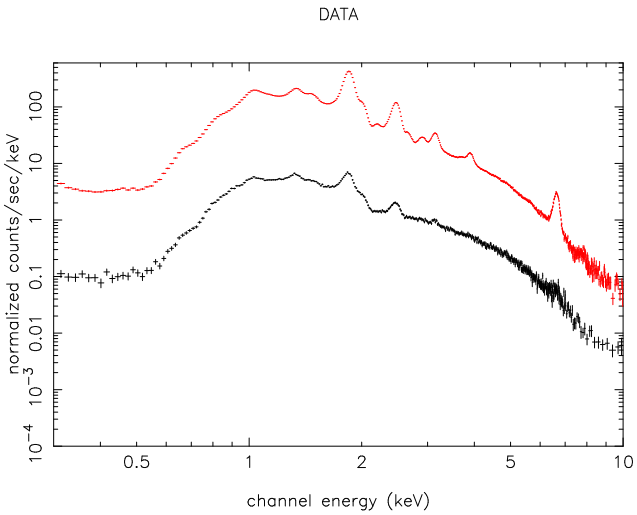



DATA
normalized counts/sec/keV
channel energy (keV)




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

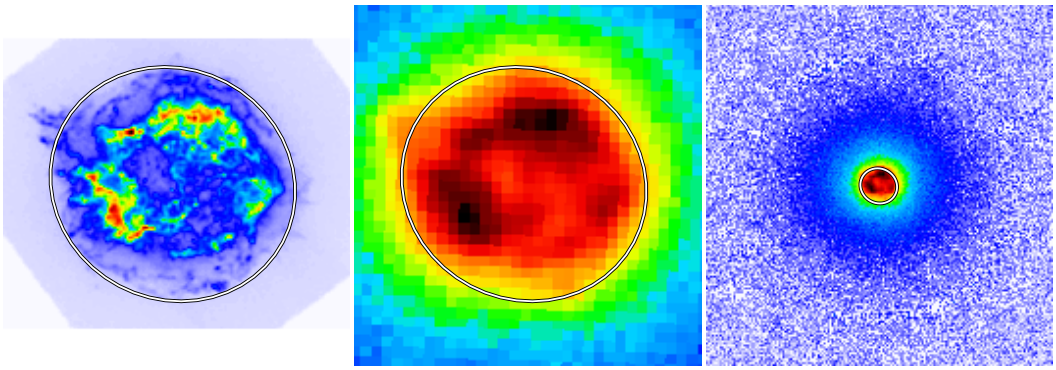



DATA
normalized counts/sec/keV
10^{-4} 10^{-3} 0.01 0.1 1 10 100
0.5 1 2 5 10
channel energy (keV)

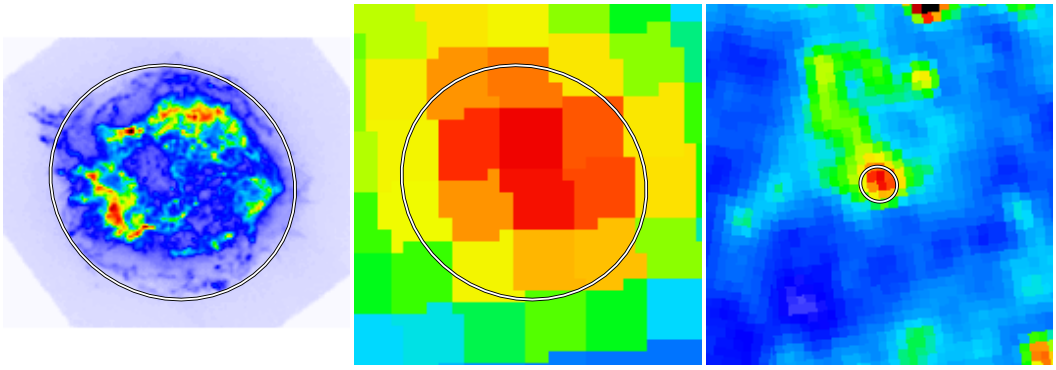
7 Images from Survey Missions

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

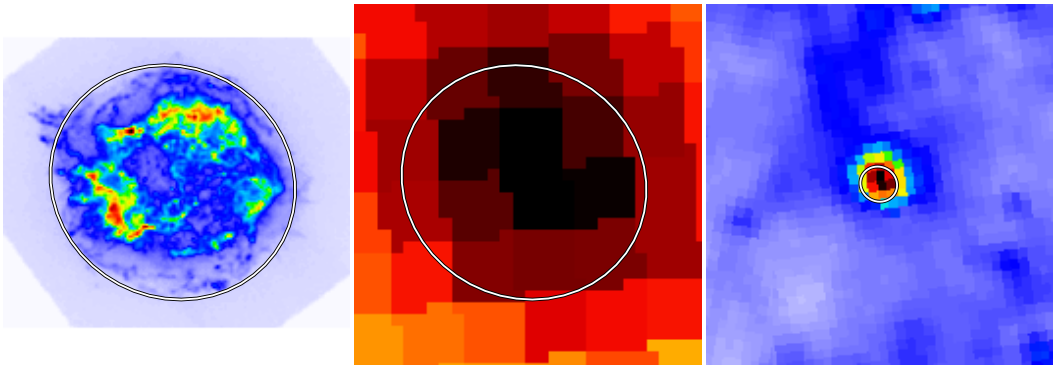
ROSAT PSPC (2.0 deg): X-ray (0.1-2.4 keV)



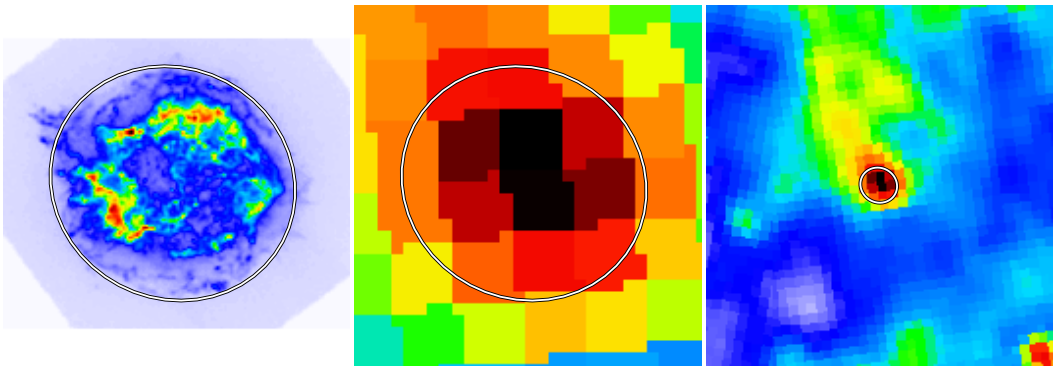
IRAS 12 micron: Infrared (12 micron)



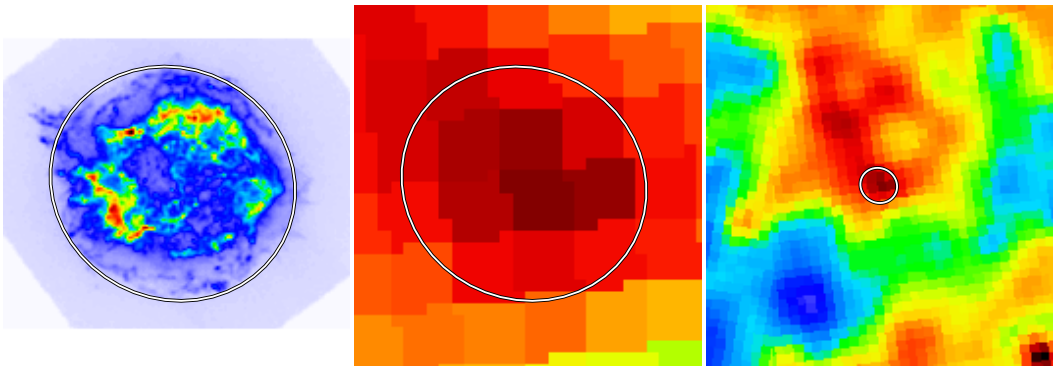
IRAS 25 micron: Infrared (25 micron)



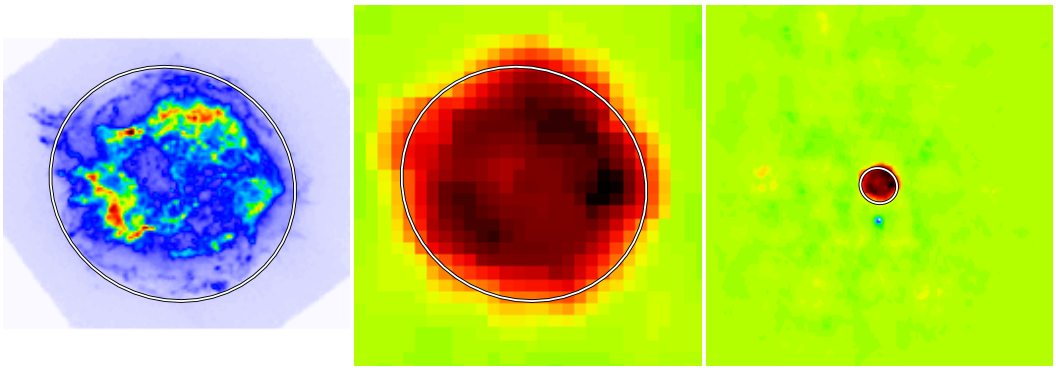
IRAS 60 micron: **Infrared (60 micron)**



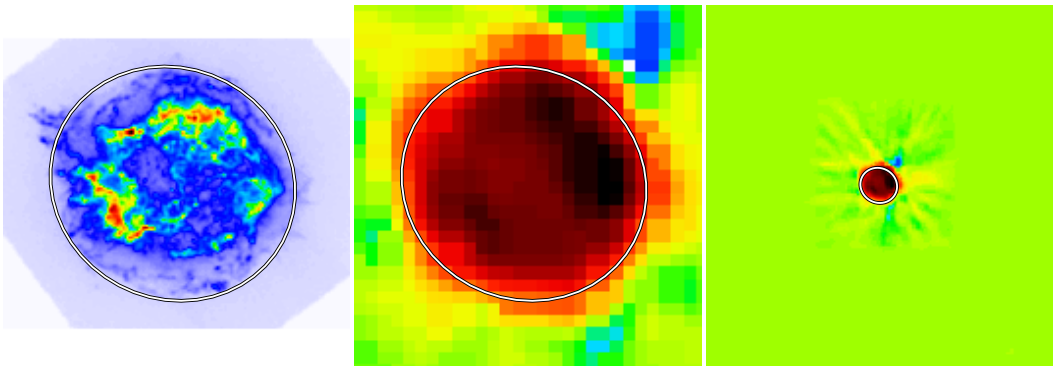
IRAS 100 micron: **Infrared (100 micron)**



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



Westerbork Northern Sky Survey (WENSS): Radio (325 MHz Continuum)



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