

## 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	Exposure <sub>uf</sub> (ks)	Exposure <sub>f</sub> (ks)	Date Observed	Aimpoint (J2000) ( $\alpha$ , $\delta$ )
500025	729	ACIS-I012367	29.3	29.2	2000-07-23	( 18 41 19.0, -4 56 14.0 )

Exposure<sub>uf</sub> → Exposure time of un-filtered event file

Exposure<sub>f</sub> → 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 <sup>-1</sup> )	F <sub>X</sub> <sup>abs</sup> (ergs cm <sup>-2</sup> s <sup>-1</sup> )	F <sub>X</sub> (ergs cm <sup>-2</sup> s <sup>-1</sup> )	L <sub>X</sub> (ergs s <sup>-1</sup> )
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<sub>H</sub> = 3.13 (10<sup>22</sup> cm<sup>-2</sup>)
- 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

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

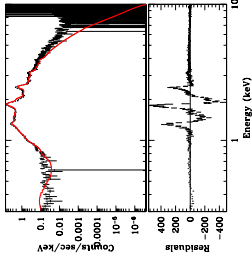
## 2 Fit Detail

- See spectrum page for used regions.

### 2.1 Shell:

- Spectrum from Shell
- Two thermal plasma model

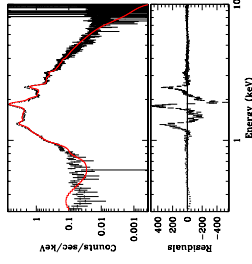
```
source=(xswabs * (xsvapec + xsvapec))
reduced  $\chi^2$  = 8.31511
nh = 3.1333 1022/cm2
```



### 2.2 Total:

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

```
source=(xswabs * ((xsvapec + xsvapec) + powlaw1d))
reduced  $\chi^2$  = 6.05026
nh = 3.1333 1022/cm2
```

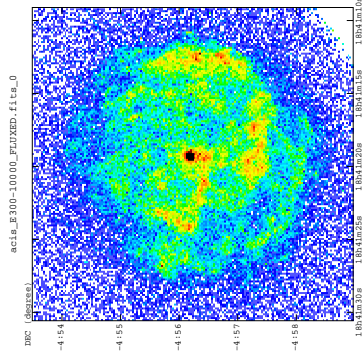
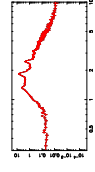


## 3 Chandra Images : Band Images

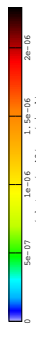
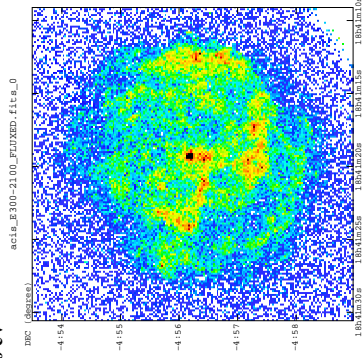
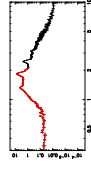
- Left : raw image, binned by 1x1 pixel
- Right : gaussian smoothed version of above ( $\sigma = 2$  pixel)

### 3.1 Wide Band Images

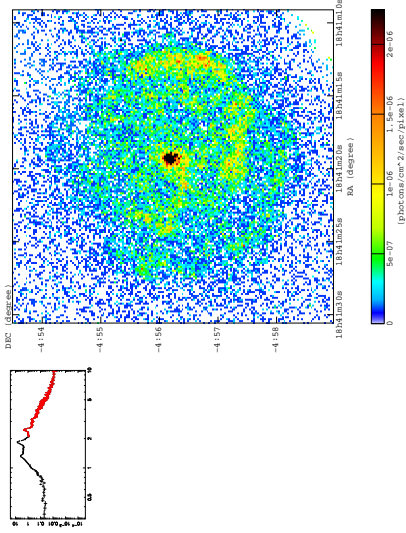
Total : 300-10000 eV



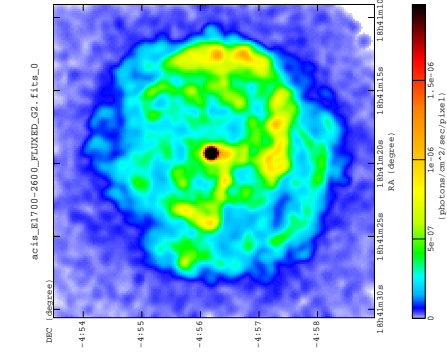
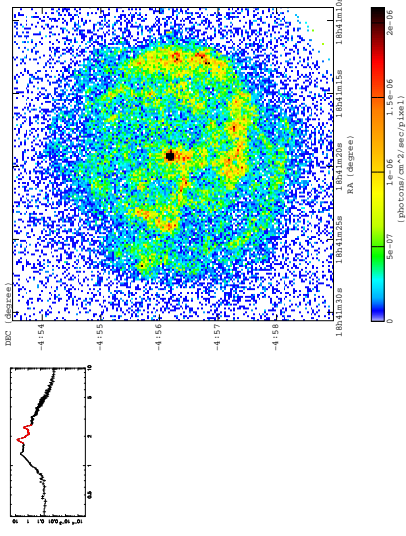
Soft Band : 300-2100 eV



**Hard Band : 2100-10000 eV**

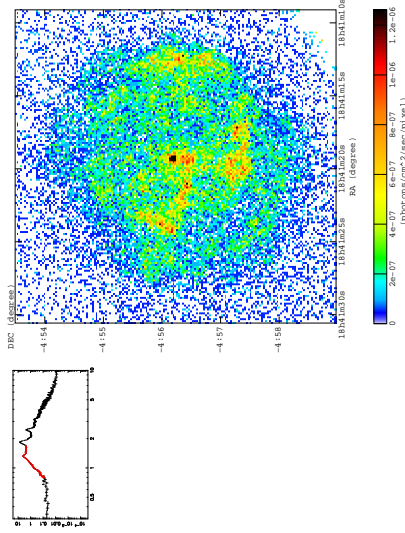


**Green : 1700-2600 eV**

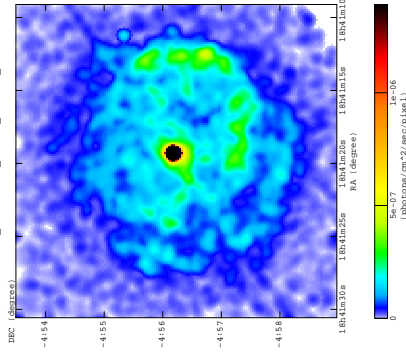
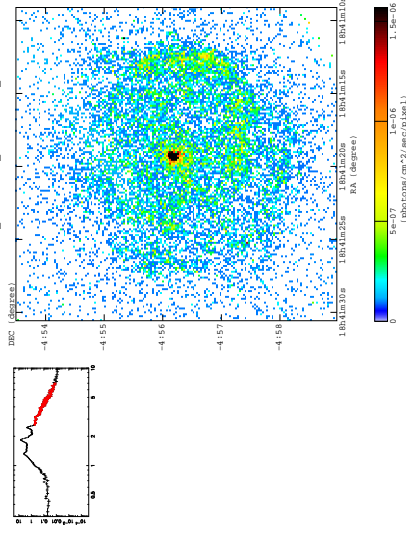


**3.2 Band images used in true color image.**

**Red : 800-1700 eV**



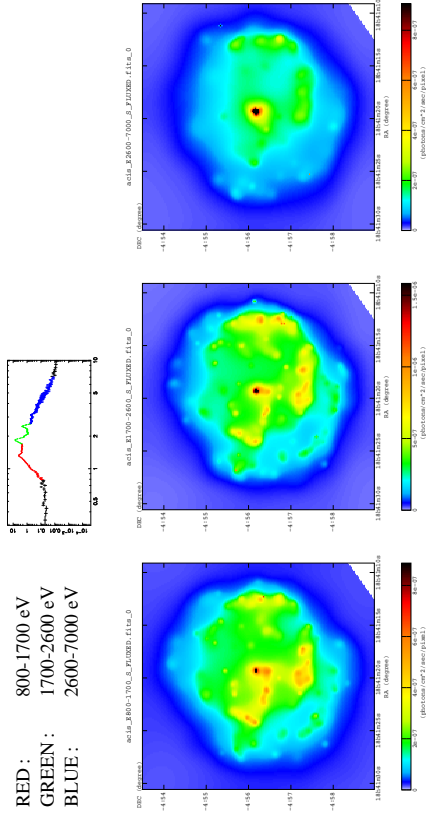
**Blue : 2600-7000 eV**



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



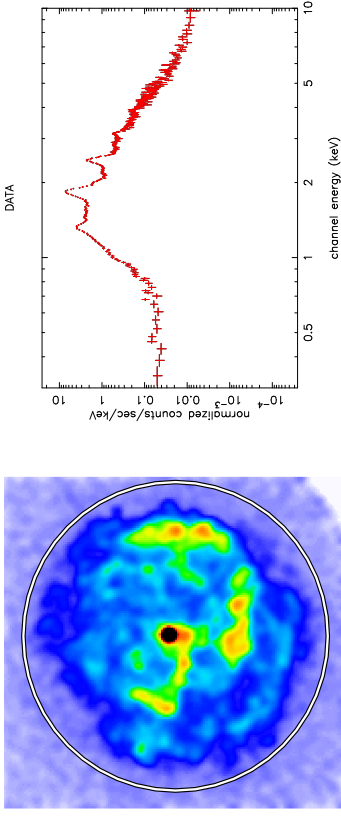
#### 5 Chandra Spectrum

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

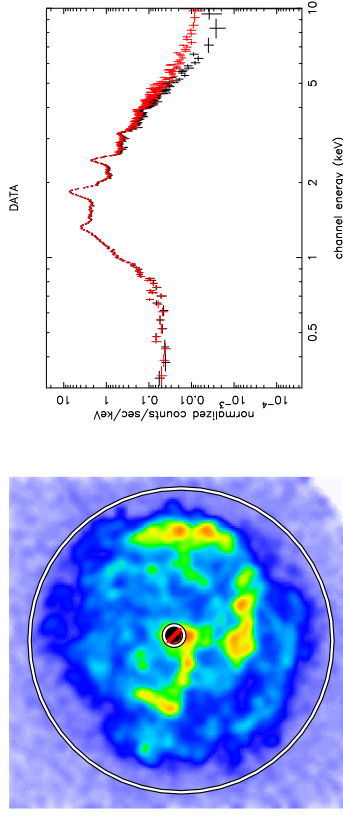
##### 5.1 ObsID 729

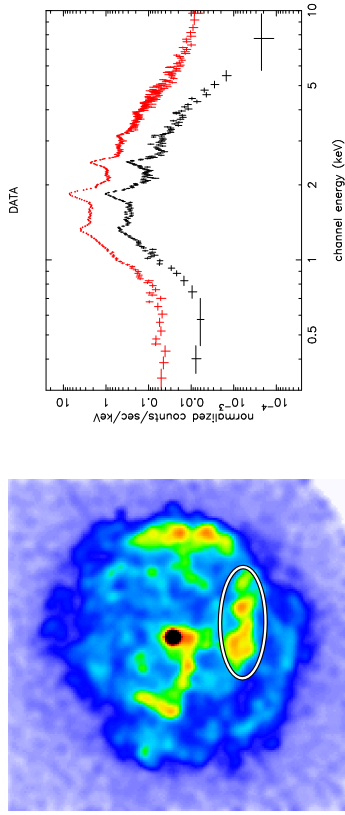
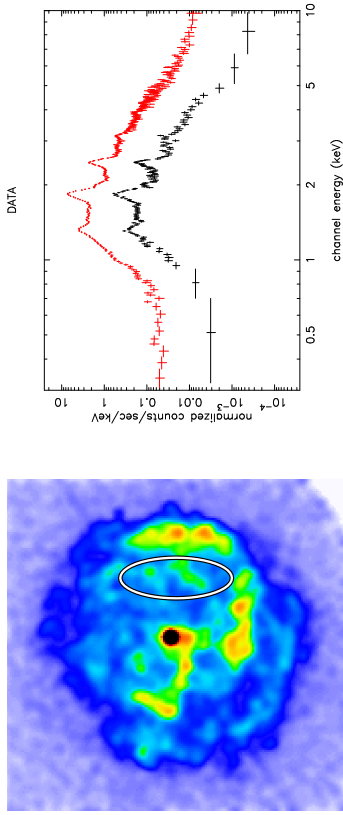
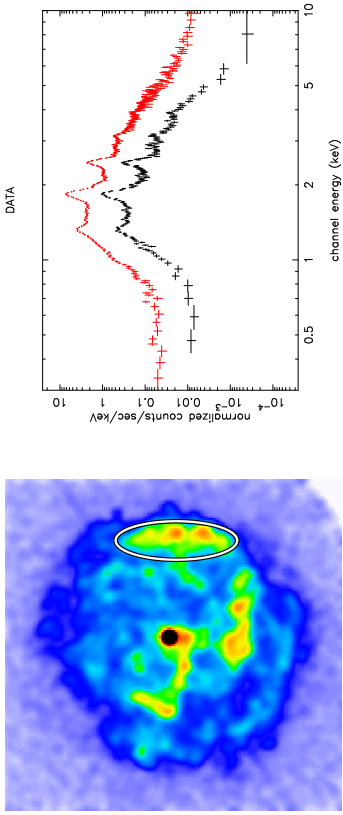
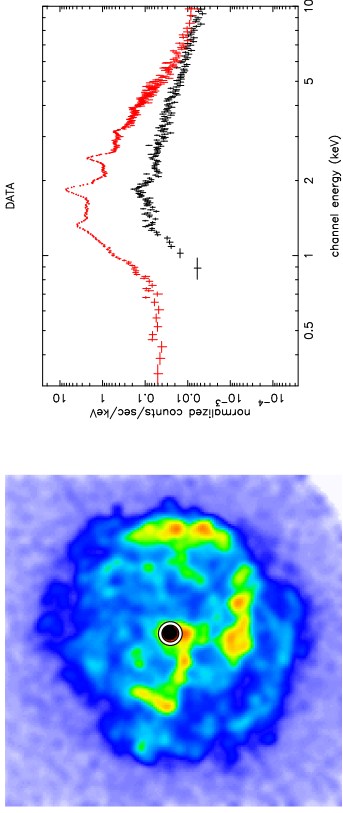
- Background was subtracted from the region around the SNR.

total



Shell

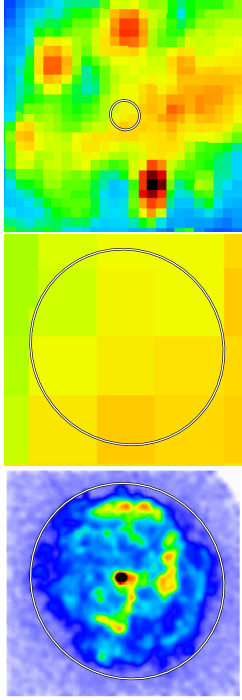




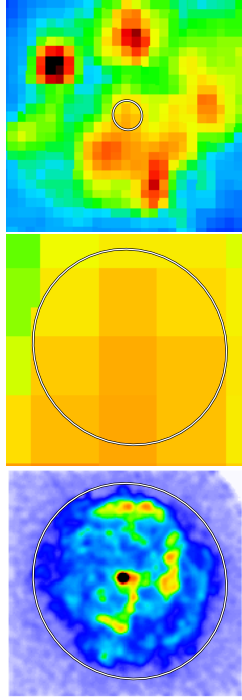
### 6 Images from Survey Missions

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

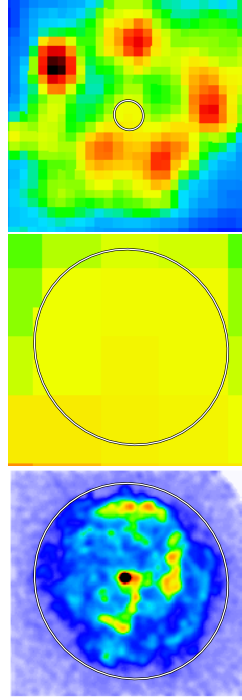
#### IRAS 12 micron: Infrared (12 micron)



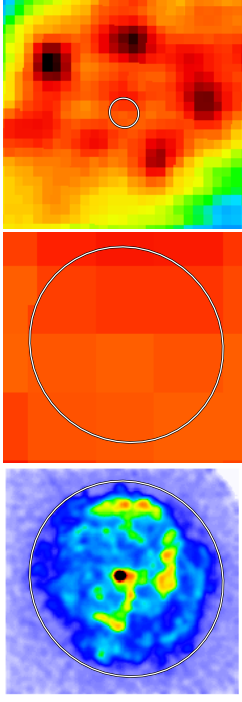
#### IRAS 25 micron: Infrared (25 micron)



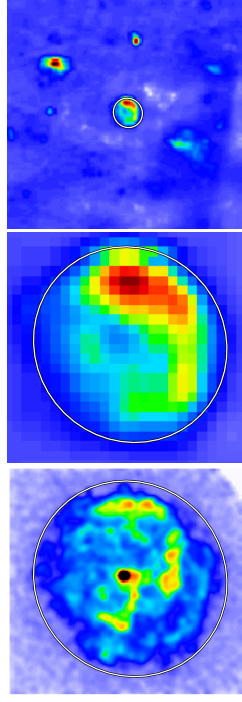
#### IRAS 60 micron: Infrared (60 micron)



#### 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)

