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' x 4.5'
- Description:

1.1 Summary of Chandra Observations

<table>
<thead>
<tr>
<th>Sequence</th>
<th>Obs ID</th>
<th>Instrument</th>
<th>Exposure_{uf} (ks)</th>
<th>Exposure_{f} (ks)</th>
<th>Date Observed</th>
<th>Aimpoint (J2000)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>500025</td>
<td>ACIS-012367</td>
<td>29.3</td>
<td>29.2</td>
<td>2000-07-23</td>
<td>(18 41 19.0, -4 56 14.0)</td>
</tr>
</tbody>
</table>

Exposure_{uf} → Exposure time of un-filtered event file
Exposure_{f} → Exposure time of filtered event file

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

1.2 Chandra Counts and Fluxes

<table>
<thead>
<tr>
<th>Region (keV)</th>
<th>Signal (counts)</th>
<th>Rate (counts s^{-1})</th>
<th>F_{5}^{5} (ergs cm^{-2} s^{-1})</th>
<th>F_{1} (ergs cm^{-2} s^{-1})</th>
<th>L_{X} (ergs s^{-1})</th>
</tr>
</thead>
<tbody>
<tr>
<td>total, (729)</td>
<td>0.3 - 10.0</td>
<td>1.209e+05</td>
<td>4.145e+00</td>
<td>3.09e-11</td>
<td>1.78e-09</td>
</tr>
<tr>
<td></td>
<td>0.3 - 2.1</td>
<td>8.514e+04</td>
<td>2.919e+00</td>
<td>1.24e-11</td>
<td>1.75e-09</td>
</tr>
<tr>
<td></td>
<td>2.1 - 10.0</td>
<td>3.617e+04</td>
<td>1.240e+00</td>
<td>1.86e-11</td>
<td>3.13e-11</td>
</tr>
</tbody>
</table>

- NH = 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

<table>
<thead>
<tr>
<th>Obs ID</th>
<th>Position (J2000)</th>
<th>Size</th>
<th>Net Count</th>
<th>Count rate</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>729</td>
<td>(18 40 00.5, -4 40 22.4)</td>
<td>&lt; 58.1&quot;</td>
<td>746.0</td>
<td>2.55e-02</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(18 40 20.5, -4 47 03.0)</td>
<td>&lt; 48.8&quot;</td>
<td>98.1</td>
<td>3.35e-03</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(18 40 36.3, -4 43 32.9)</td>
<td>&lt; 43.6&quot;</td>
<td>93.4</td>
<td>3.19e-03</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(18 41 11.3, -4 55 20.8)</td>
<td>&lt; 1.7&quot;</td>
<td>36.5</td>
<td>1.25e-03</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(18 41 15.6, -4 52 54.5)</td>
<td>&lt; 3.6&quot;</td>
<td>43.3</td>
<td>1.48e-03</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(18 41 16.2, -4 51 21.8)</td>
<td>&lt; 3.6&quot;</td>
<td>65.0</td>
<td>2.22e-03</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(18 41 24.5, -4 59 13.6)</td>
<td>&lt; 2.4&quot;</td>
<td>33.3</td>
<td>1.14e-03</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(18 41 25.0, -4 53 29.2)</td>
<td>&lt; 4.9&quot;</td>
<td>23.7</td>
<td>8.10e-04</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(18 41 30.6, -4 52 25.2)</td>
<td>&lt; 5.9&quot;</td>
<td>51.7</td>
<td>1.77e-03</td>
<td></td>
</tr>
</tbody>
</table>

(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

- 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
  \[ \text{source} = (xswabs \times (xsvapec + xsvapec)) \]
  \[ \text{reduced } \chi^2 = 8.31551 \]
  \[ \text{nh} = 3.1333 \times 10^{22}/\text{cm}^2 \]

2.2  Total:  
- Two thermal plasma model and power law with nH fixed at above value.
- Gotthelf and Vasisht(1997) gives value between 1.5-3.0
  \[ \text{source} = (xswabs \times ((xsvapec + xsvapec) + \text{powlaw 1d})) \]
  \[ \text{reduced } \chi^2 = 6.05026 \]
  \[ \text{nh} = 3.1333 \times 10^{22}/\text{cm}^2 \]

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

3.2  Soft Band : 300-2100 eV
3. CHANDRA IMAGES : BAND IMAGES

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.
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)