G43.3-0.2

1 Summary

- Common Name: W49B
- Distance: 8 kpc (Moffett & Reynolds, 1994 and reference therein)
- Center of X-ray emission (J2000): (19 11 07.5, 09 06 27.1)
- X-ray size: 5.5’x4.4’
- Description:

1.1 Summary of Chandra Observations

<table>
<thead>
<tr>
<th>Sequence</th>
<th>Obs ID</th>
<th>Instrument</th>
<th>Exposure$_{\text{uf}}$ (ks)</th>
<th>Exposure$_{\text{f}}$ (ks)</th>
<th>Date Observed</th>
<th>Aimpoint (J2000) $(\alpha, \delta)$</th>
</tr>
</thead>
<tbody>
<tr>
<td>500004</td>
<td>117</td>
<td>ACIS-012367</td>
<td>53.9</td>
<td>53.3</td>
<td>2000-07-08</td>
<td>(19 11 06.6, 09 06 00.0)</td>
</tr>
</tbody>
</table>

Exposure$_{\text{uf}}$ → Exposure time of un-filtered event file
Exposure$_{\text{f}}$ → 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>$F_{\text{X}}^\text{abs}$ (ergs cm$^{-2}$ s$^{-1}$)</th>
<th>$F_{\text{X}}$ (ergs cm$^{-2}$ s$^{-1}$)</th>
<th>$L_{\text{X}}$ (ergs s$^{-1}$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total (117)</td>
<td>0.3 - 10.0</td>
<td>2.222e+05</td>
<td>4.168e+00</td>
<td>6.22e-11</td>
<td>5.99e-09</td>
</tr>
<tr>
<td></td>
<td>0.3 - 2.1</td>
<td>6.402e+04</td>
<td>1.201e+00</td>
<td>5.43e-12</td>
<td>5.87e-09</td>
</tr>
<tr>
<td></td>
<td>2.1 - 10.0</td>
<td>1.589e+05</td>
<td>2.981e+00</td>
<td>5.69e-11</td>
<td>1.19e-10</td>
</tr>
</tbody>
</table>

- $N_{\text{H}} = 5.71 (10^{22} cm^{-2})$
- Assumed distance: 8 kpc (Moffett & Reynolds, 1994 and reference therein)
- 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>117</td>
<td>( 19 10 21.9, 09 05 02.7 )</td>
<td>&lt; 14.3’’</td>
<td>822.0</td>
<td>1.53e-02</td>
<td></td>
</tr>
<tr>
<td></td>
<td>( 19 10 35.3, 09 06 42.3 )</td>
<td>&lt; 6.3’’</td>
<td>34.1</td>
<td>6.33e-04</td>
<td></td>
</tr>
<tr>
<td></td>
<td>( 19 10 43.3, 09 22 05.3 )</td>
<td>&lt; 43.5’’</td>
<td>177.0</td>
<td>3.29e-03</td>
<td></td>
</tr>
<tr>
<td></td>
<td>( 19 10 58.8, 09 01 49.9 )</td>
<td>&lt; 3.3’’</td>
<td>268.0</td>
<td>4.98e-03</td>
<td></td>
</tr>
<tr>
<td></td>
<td>( 19 11 05.7, 09 02 33.7 )</td>
<td>&lt; 3.4’’</td>
<td>78.2</td>
<td>1.45e-03</td>
<td></td>
</tr>
<tr>
<td></td>
<td>( 19 11 06.1, 09 02 07.0 )</td>
<td>&lt; 3.5’’</td>
<td>58.1</td>
<td>1.08e-03</td>
<td></td>
</tr>
<tr>
<td></td>
<td>( 19 11 14.6, 09 03 27.7 )</td>
<td>&lt; 3.6’’</td>
<td>34.2</td>
<td>6.35e-04</td>
<td></td>
</tr>
<tr>
<td></td>
<td>( 19 11 21.2, 09 05 02.6 )</td>
<td>&lt; 4.5’’</td>
<td>118.0</td>
<td>2.19e-03</td>
<td></td>
</tr>
<tr>
<td></td>
<td>( 19 11 24.1, 09 05 10.8 )</td>
<td>&lt; 5.1’’</td>
<td>70.7</td>
<td>1.31e-03</td>
<td></td>
</tr>
</tbody>
</table>

\[\text{(note) 1. This nearby source list is incomplete.} \]
\[\text{All the above sources are originally from the "src2.fits" file which is distributed with standard chandra processing.} \]
\[\text{Only sources with significant count rate and which are clear to visual inspection are included.} \]

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

- Moffett & Reynolds, 1994 : VLA at 330 MHz, 1.48 GHz and 4.85 GHz
2 Fit Detail

- See spectrum page for used regions.

2.1 Total:

- Two thermal plasma model used.
- Elemental abundance of Fe was thawed and linked between two models.

source = (xswabs * (xsvraymond + xsvraymond))
reduced $\chi^2 = 7.23762$
$nh = 5.7071 \times 10^{22}/cm^2$
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

3 CHANDRA IMAGES : BAND IMAGES

![Wide Band Images](image_url)

Soft Band : 300-2100 eV

![Soft Band Images](image_url)
3.2 Band images used in true color image.

Red : 1000-2120 eV
Green: 2120-4100 eV

Blue: 4100-8000 eV
3.3 Misc.

: 1750-1920 eV

: 1920-2120 eV
CHANDRA IMAGES: BAND IMAGES

- **2270-2580 eV**

- **2580-2780 eV**
3 CHANDRA IMAGES: BAND IMAGES

: 3000-3260 eV

: 4250-6300 eV
CHANDRA IMAGES : BAND IMAGES

: 6300-7000 eV

![Image of acis_E6300−7000_FLUXED.fits_0](acis_E6300−7000_FLUXED.fits_0)

![Image of acis_E6300−7000_FLUXED_G2.fits_0](acis_E6300−7000_FLUXED_G2.fits_0)
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: 1000-2120 eV
GREEN: 2120-4100 eV
BLUE: 4100-8000 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.

<table>
<thead>
<tr>
<th>Continuum</th>
<th>Line</th>
<th>Continuum</th>
</tr>
</thead>
<tbody>
<tr>
<td>1590-1730 eV</td>
<td>1780-1890 eV</td>
<td>2150-2260 eV</td>
</tr>
</tbody>
</table>

![Image of Chandra Images: Equivalent Width Map]
continuum : 2160-2250 eV
line : 2380-2550 eV
continuum : 2820-2980 eV

continuum : 2160-2250 eV
line : 2610-2730 eV
continuum : 2820-2980 eV
continuum : 4500-6200 eV
line : 6500-6900 eV
continuum : 7100-7600 eV
6 Chandra Spectrum

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

6.1 ObsID 117

- Background was subtracted from the region around the SNR.

Total
6 CHANDRA SPECTRUM
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 All Sky Survey (Broad Band): 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)
Digitized Sky Survey: Optical (J or E band images with a few exceptions)