Diffuse X-Rays from the Galactic Center Environment
- A Zoo of Iron Line Clumps, Non-Thermal Filaments, and Hot Plasmas -
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1. Introduction

In the Galactic center (GC) region, Ginga and ASCA found the large-scale thin-thermal plasma with strong lines from ionized iron (Koyama et al. 1988, 1996). On the other hand, Murakami et al. (2000; 2001a; 2001b) discovered clumps with a neutral (6.4 keV) iron line, suggesting that these clumps would be X-ray reflection nebulae (XRNe). Moreover, clumps with the high (5–7 keV) iron line are also discovered with Chandra and inferred to be young SNRs (e.g., Senda et al. 2001). In this paper, we report on X-ray structures around the Sgr A, the molecular cloud Sgr B2 and Sgr C, and the radio arc region observed with Chandra and summarize their characteristics.

3. 3.0 – 8.0 keV Images

Many clumps are found! (No.1 – 16)

4. Spectral Fittings

We fitted the spectra of all sources in Figure 2a, 2b, and 2c. spectral model = power-law + Gaussian + absorption

5. Diffuse Emissions around Arches Cluster

The emission is XRN, too?
The irradiating source......inner clusters?
The required source luminosity is ~ 10 times of that of clusters (~10^40 ergs s^-1)
The clusters were more brighter than now (~ a few years)?
Flaring? and/or Bursting?

6. The XRN, Sgr C Region

We fitted the spectrum of Sgr C with XRN model. We fixed the photon index to 2.0 (Murakami et al. 2000) and the equivalent width to 2.0 keV (Kothe 1992), expected value in the case of XRN.

7. Summary

1. With Chandra data, we found many diffuse structures.
2. They are quite different in variety; we classified them with iron lines into 6.4 keV, 6.7 keV, and lineless clumps.
3. The 6.4 keV clumps are suggested to be XRNs, similar to Sgr B2. For many of them, the molecular clouds and the external X-ray sources have not been found.
4. The 6.7 keV clumps may be young SNRs, although the X-ray is higher than ordinary SNRs.
5. We suggest that lineless clumps may emit X-rays by synchrotron process (X-ray filament) in rather weak magnetic field. The diffuse emission around Arches cluster has 6.4 keV line emission, indicating that it is also an XRN. The irradiating X-ray source may be a flaring and/or bursting star in the cluster.
6. The Sgr C region is also an XRN, as suggested by Murakami et al. (2001a).

8. References

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