

S04a

「あすか」による X 線背景放射のスペクトルと大規模揺らぎの研究

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We studied the energy spectrum and the large-scale fluctuation of the X-ray background with the *ASCA* GIS instrument based on the *ASCA* Medium Sensitivity Survey and Large Sky Survey observations. A total of 91 fields with Galactic latitude $|b| > 10^\circ$ was selected, with the sky coverage of 50 deg^2 and 4.2 Ms of exposure. For each field, non X-ray events were carefully subtracted and sources brighter than $\sim 2 \times 10^{-13} \text{ erg cm}^{-2} \text{ s}^{-1}$ (2–10 keV) were eliminated. The 0.5–2 keV intensities of the soft thermal component varied significantly from field to field by $1 \sigma \simeq 52 \%$, and showed a maximum toward the Galactic Center. As for the hard power-law component, an average photon index of 91 fields was obtained to be $\Gamma^{\text{hard}} = 1.412 \pm 0.007 \pm 0.026$ and the average 2–10 keV intensity was calculated as $F_X^{\text{hard}} = (6.38 \pm 0.04 \pm 0.64) \times 10^{-8} \text{ erg cm}^{-2} \text{ s}^{-1} \text{ sr}^{-1}$ (1σ statistic and systematic errors). The 2–10 keV intensities shows a 1σ deviation of $6.49_{-0.61}^{+0.56} \%$, which was explained by the standard $\log N$ - $\log S$ relation. Based on the observed fluctuation, an acceptable region of the $\log N$ - $\log S$ relation was derived in the flux range $10^{-16} \lesssim S \lesssim 2 \times 10^{-13} \text{ erg cm}^{-2} \text{ s}^{-1}$. Fluctuation of the spectral index, on the other hand, implied a large amount of hard sources and a large variation in the intrinsic source spectra ($\Gamma_S \simeq 1.1 \pm 1.0$). According to the recent *Chandra* results reported by Rosati et al. (2001), the X-ray background in 2–10 keV has been resolved into discrete sources by 73–96 % at a flux limit of $S \gtrsim 4.5 \times 10^{-16} \text{ erg cm}^{-2} \text{ s}^{-1}$.