X-RAY OBSERVATIONS OF M32 WITH ASCA

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1. Introduction

M32 is the nearest dwarf elliptical galaxy. Its center is known to have a mass concentration of 3×10^6 $M_\odot$, which is usually interpreted as an evidence of a super massive black hole. We observed M32 with *ASCA* two times in July and August of 1996. An X-ray source was detected at the center of M32 and its first broad-band X-ray spectra were obtained. *ASCA* observations of M32 limit the activity of the central black hole to be less than 10^{-6} times of the Eddington limit. We also found two other bright sources within 12 arcmin from the M32 center. One is the newly appeared X-ray source and the other is G144. In this paper, we summarize the results on the new source and G144. For M32, please refer to the publication (Loewenstein et al. 1997).

2. Analysis and Result

We discovered the new source at the north of M32 in the ASCA X-ray images taken in July and August of 1996. No bright sources were anticipated based on the previous observations at this region(figure 1). Although this region was observed with *ASCA* in 1993, the source was not apparent and the upper limit of the X-ray flux was smaller by one order of magnitude than the X-ray flux observed in 1996. The coordinate (J2000) of the new source is $(\alpha,\delta) \sim (00^h42.6^m, 40°57')$, which coincides with a globular cluster in M31 observed in optical band(Battistini et al. 1980). The extracted X-

K. Koyama et al. (eds.), The Hot Universe, 291-292.

ray spectrum is well-fitted by a power-law model ($\Gamma \sim 1.6$) or a thermal bremsstrahlung model($kT \sim 16$keV). The X-ray luminosity in the 0.7-10keV band was $\sim 1.8 \times 10^{38}$erg/s, assuming a distance to M31 (700kpc). The hard spectrum (the index of the power-law fit) and the high X-ray luminosity of the new source suggest a black hole binary as its likely origin. We cannot rule out a distant AGN as an alternative origin, though the X-ray flux increase by more than one order of magnitude for 3 years is not common for AGNs.

G144 is identified as a globular cluster in M31, too. This source was detected in the previous X-ray observations of this region. Its ASCA X-ray spectrum was also fitted with apower-law model as well as a thermal bremsstrahlung model. The X-ray luminosity in the 0.7-10keV band was $\sim 2.7 \times 10^{38}$erg/s at 700kpc. One of the candidates for the origin of this sources is a black hole binary, because of its hard X-ray spectrum and high X-ray luminosity. Note, however, we don't know an (active) black hole binary in globular clusters in our Galaxy.

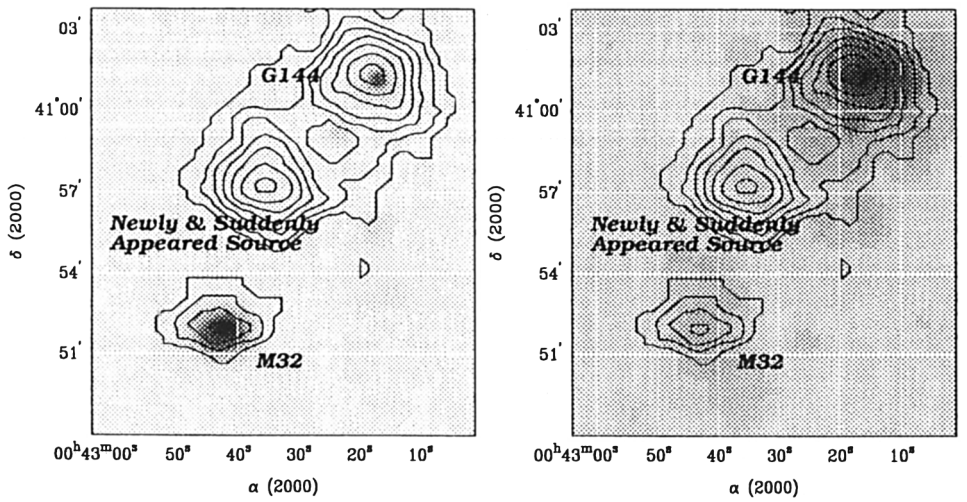

Figure 1. *ASCA* GIS contours [July 1996] superimposed on Left:*ROSAT* PSPC image [July 1991] ,Right:*ASCA* PV phase GIS image [July 1993]

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https://doi.org/10.1017/S0074180900115190 Published online by Cambridge University Press