

# ASCA OBSERVATION OF “FAILED CLUSTER” OF GALAXIES CANDIDATE, 0806+20

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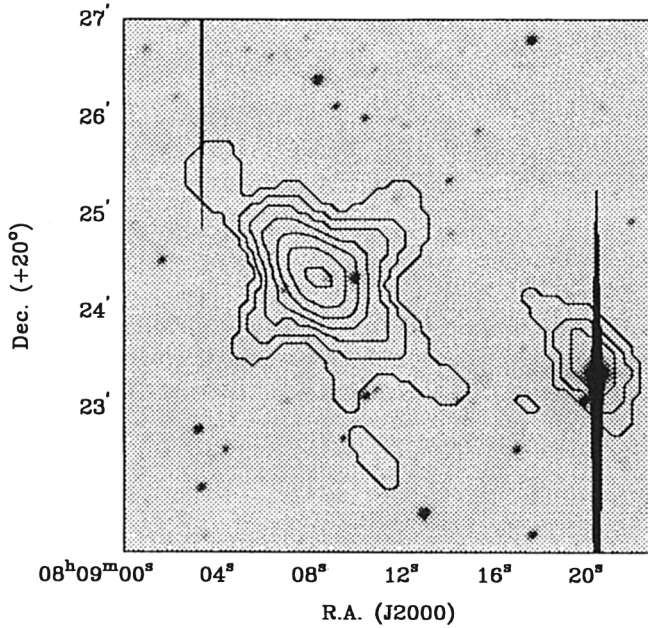
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The hypothetical object called “failed cluster” of galaxies is described by Tucker et al. (1995, ApJ,444,532) as a large cloud of X-ray emitting hot gas without any visible galaxies. They made extensive survey of this type of objects using Einstein IPC database and found only one candidate, 0806+20.

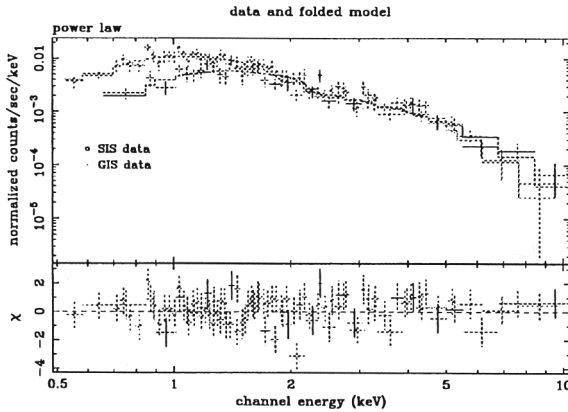
We successfully detected the X-ray emission from 0806+20 with ASCA. The ASCA X-ray image of 0806+20 shows no significant extension. The time variation of X-ray flux is not significant, either. Although we can not determine whether the spectra of 0806+20 are thermal or non-thermal, we find the emission line like feature around 4keV at 95% significance level (figure 2). If we identify it with an Fe-K line, which should contradict that 0806+20 is a “failed” cluster, the redshift value is implied to be around 0.6.

Moreover, we made additional deep R-band follow up observation using Kiso Observatory<sup>1</sup> 105cm Schmidt telescope. However, we could not find any clear counterparts of this X-ray source above R~24 magnitude (figure 1). We thus conclude that 0806+20 is a very distant, rich but no “failed” cluster of galaxies (and so galaxies could not be detected) or an optically faint quasar.

<sup>1</sup>Kiso Observatory is operated by Institute of Astronomy, Faculty of Science, University of Tokyo, Japan.



*Figure 1.* ASCA SIS X-ray contour superposed on the deep R-band image obtained at Kiso observatory. All the stellar images around the X-ray center are identified with Galactic stars.



*Figure 2.* The power law fit to the X-ray spectra of 0806+20 obtained with ASCA, assuming the Galactic  $N_H$ . If we identify 4keV feature with a redshifted Fe-K line, the redshift of 0806+20 is proved to be around 0.6. The best fit photon index is  $1.88^{+0.11}_{-0.09}$  when Fe-K line model is included with this redshift. Adopting the thermal plasma emission model, we obtain  $kT=6.4^{+2.0}_{-1.2}$  keV and metal abundance of  $0.47^{+0.36}_{-0.30}$  times the solar value.