

X-RAY OBSERVATIONS OF BLAZARS WITH *GINGA* AND *ASCA*

M. TASHIRO, K. MAKISHIMA and Y. KOHMURA
The University of Tokyo, 7-3-1 Hongo, Bunkyo-ku, Tokyo, Japan

T. OHASHI
Tokyo Metropolitan University, 1-1 Minami-Osawa, Hachioji, Tokyo, Japan

C. OTANI, T. KII, R. FUJIMOTO and F. MAKINO
Institute of Space and Astronautical Science, 3-1-1 Yoshinodai, Sagami-hara, Kanagawa, Japan

and

GINGA TEAM and *ASCA* TEAM

1. *Ginga* Observations of Highly Variable BL Lacs

Among 13 BL Lacs observed with *Ginga*, 1H 0323+022, Mkn 421 and PKS 2155-304 exhibited significant variability during each (typically one day) observation [1]. On the flux-hardness plane, the data points obtained from each source draw a sort of clockwise hysteresis motion. It means that the spectrum hardens before the source gets brighter, while the spectrum softens before the source becomes fainter. Such a soft-lag behavior, first pointed out for PKS2155-304 by Sembay et al. [2]. These properties were also confirmed with the discrete cross correlation function technique.

The soft-lag property is predicted by the synchrotron emission model. Suppose that synchrotron emission arises from relativistic electrons, continuously injected with a fixed spectral shape into a region of homogeneous magnetic field. In this case, flux of the more energetic electrons are expected to respond more quickly to the changes in the electron injection rate because they have shorter life times, thus producing the larger time lags for the softer X-rays.

2. *ASCA* Observation of Mkn 421

We observed Mkn 421 on May 10–11, 1993 as one PV observations of *ASCA*. The source was in a low state on 10 and flared up on 11. Using PHA ratio technique, we confirmed that convex or flat spectrum is exhibited in the low state, while flat or concave spectrum in the flaring state. Although the results are still preliminary, it can support not only the similar results obtained by Tashiro with *Ginga* [1], but also the synchrotron emission model mentioned above.

References

1. Tashiro, M.: 1993, Ph. D. Thesis, *the University of Tokyo*
2. Sembay, S. et al. : 1993, *ApJ* **404**, pp. 112–123