

VLBI Observations of a Sample of 15 EGRET-detected AGNs at 5 GHz

X. Y. Hong^{1,2}, D.R. Jiang^{1,2}, R. T. Schilizzi³, G. Nicolson⁴, Z.-Q. Shen⁵,
W. H. Wang^{1,2}

1. Shanghai Astronomical Observatory, 80 Nandan road, Shanghai 200030, China

2. National Astronomical Observatories, China

3. Joint Institute for VLBI in Europe, Postus 2, 7900 AA, Dwingeloo, The Netherlands

4. Hartebeesthoek Radio Astronomy Observatory, P. O. Box 443, Krugersdorp 1740, South Africa

5. The Institute of Space and Astronomical Science, Yoshinodia 3-1-1, Sagamihara, Kanagawa 229-8510, Japan

Abstract. We report VLBI observations of 15 EGRET-detected AGNs with European VLBI Network (EVN) at 5 GHz. All sources in the sample display core-jet structures.

1. Introduction

The third EGRET catalog of high-energy gamma-ray sources indicated that the EGRET has detected 66 AGNs with high-confidence identifications at energies above 100 MeV (Hartman et al. 1999). All these high energy AGNs belong to the blazar category, which may indicate that there is a relation between gamma-ray and radio emission. On the other hand, only a small fraction of radio loud AGNs are gamma-ray loud sources. Several statistical researches have been made to study the emission properties of EGRET sources with radio data (e.g. Hong et al. 1998, Cao, 2000). However, about one third of the EGRET-detected AGNs do not have sufficient compact structure information for statistical research. To obtain a more complete sample of VLBI images of EGRET-detected AGNs for further study, we observed 15 such sources with the EVN at 5 GHz. This paper reports on the observations and presents some of the results.

2. Observations and the sample

Two snapshot VLBI experiments were carried out for 15 EGRET-detected AGNs with the EVN at 5 GHz in June and November, 1997. The total observational time was about 50 hours. The participating VLBI stations were Effelsberg, Shanghai, Crimea, Jodrell Bank, Medicina, Onsala, HartRAO, Urumqi, WSRT, and Torun. The sample contained the following sources, all quasars: 0202+149, 0446+112, 0440-003, 0827+243, 0829+046, 0954+556, 1229-021, 1331+170, 1604+159, 1606+ 106, 1510-089, 1908-201, 2022-077, 2209+236, and 2356+196. The

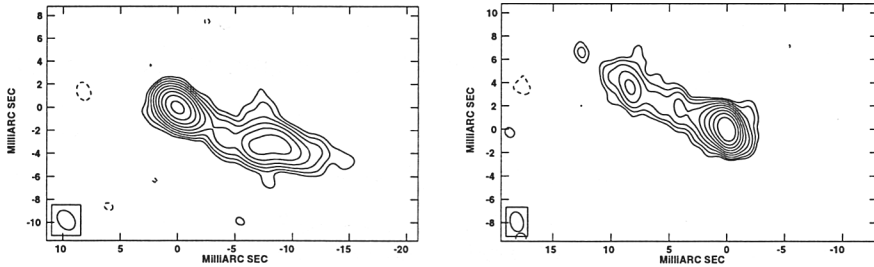


Figure 1. (left) VLBI image of 1229-021 at 5 GHz; peak flux density=0.30 Jy/beam, contours = $9.1E-4$ (-1, 1, 2, 4, 8, 16, 32, 64, 128, 256) Jy/beam; (right) VLBI image of 1604+159 at 5 GHz; peak flux density=0.18 Jy/beam, counts = $2.5E-4$ (-1, 1, 2, 4, 8, 16, 32, 64, 128, 256) Jy/beam

data were recorded with MK III VLBI system with an effective bandwidth of 28 MHz, and processed with the MK III correlator of the Max-Planck-Institut für Radioastronomie (Germany).

3. Data reduction and the results

The VLBI data were edited, calibrated and reduced using standard tasks in the NRAO's Astronomical Image Processing System (AIPS).

VLBI images of two of the 15 sources, 1229-021 and 1604+159, are shown in Fig. 1. All of the sources showed core-jet structures. The position angles of the structures have been obtained in order to study the change in orientation of the jet from pc scales to kpc scales to determine if there any relation between the misalignment of jets and emission of gamma-rays since the jet directions of blazars are not always aligned from pc- to kpc-scale (e. g. Pearson & Readhead, 1988, Wehrle et al. 1992, Hong et al. 1998, 1999, Xu et al. 1994).

References

- Cao, X. W. 2000, *A&A*, 355, 44
 Hartman, R. C. et al. 1999, *ApJS*, 123, 79
 Hong, X.Y., Jiang, D.R., Shen, Z.Q. et al. 1998, *A&A*, 330, L45
 Hong, X.Y., Venturi, T., Wan, T.S. et al. 1999, *A&AS*, 134, 201
 Pearson, T. J. & Readhead, A. C. S. 1988, *ApJ*, 328, 114
 Wehrle, A. E. et al. 1992, *ApJ*, 391, 589
 Xu, W. et al. 1994, in *Compact Extragalactic Radio Sources*, ed. J. A. Jensus, K. I. Kellerman, p7