VLBI OBSERVATIONS OF WEAK CORES IN EXTENDED QUASARS

J.A. Zensus, R.W. Porcas
Max-Planck-Institut für Radioastronomie, Bonn, F.R.G.

ABSTRACT

We present Mark III VLBI results for a sample of weak cores associated with quasars with extended double lobes. The m.a.s. scale structure is found to be well aligned with the outer structure.

The relativistic beaming models invoked to explain superluminal motion predict that the effect should be seen only rarely in the cores of double radio sources selected without orientation bias (e.g. Scheuer and Readhead 1979; Porcas, this volume). Such a sample is provided by the 30 quasars from the Jodrell Bank 966 MHz survey mapped by Owen et al., 1978 ($S_{966} \geq 0.7$ Jy, $m_B \leq 19$ and angular sizes ≥ 10 arcsec, Porcas, 1981). We have chosen a small group of 'classical double' sources from this sample (see Table below) for high resolution VLBI observations at $\lambda 2.8$ cm, and include 3C 179, for which Porcas (1981) found the superluminal effect. MERLIN maps made at 1.6 GHz are presented in Fig. 1 for the 2 sources for which arc-second resolution maps have not previously been published. Our goal is to test whether the m.a.s. structure of the weak cores is consistent with the assumption of large viewing angles of a relativistic jet and, as a second step, to check for possible motions.

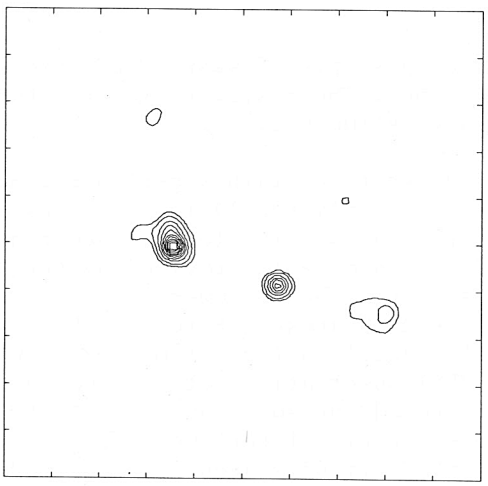
The low core flux densities of the sources require the use of the Mark III VLBI system. So far we have made first epoch observations of 4 sources, in addition to the Mark II observations of 3C 179. The correlation of the data for 2 of the sources was done with the new MPIfR Mark III processor in Bonn which is a replica of the Haystack processor.

Source	z	$S_{966\ MHz}$	$S(core)_{2.7\ GHz}$
0723+67 (3C 179)	0.846	2.87	∿540 mJy
0833+65 (3C 204)	1.112	2.09	∿80
1137+66 (3C 263)	0.652	4.72	∿90
1206+43 (3C 268.4)	1.400	2.64	∿40
1732+65	0.856	1.07	∿60
1951+49	0.466	1.10	∿120

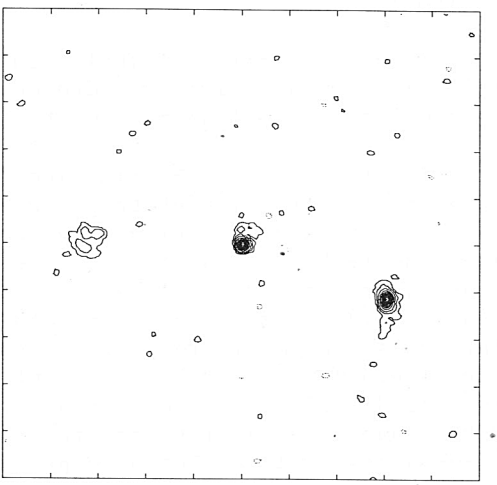
R. Fanti et al. (eds.), VLBI and Compact Radio Sources, 163–164.

In three of the four sources observed we were able to detect compact structure on the m.a.s. scale. Maps of 1137+66 (Zensus et al., 1983) show a double structure, of separation ∿0.5 m.a.s. in p.a. 110°, which is closely aligned with the p.a. of the outer double lobes (Pooley and Henbest, 1974; Owen et al., 1978). Inspection of the visibility data for 1951+49 shows that the structure is elongated in p.a. ∿90°, roughly that of the weaker, Eastern lobe. 3C 179 also shows reasonable alignment between the m.a.s. double structure and the arc-second scale jet (Browne et al., 1982). Thus, a first result from our study is that these sources do not show the frequent structural misalignments which have been found in some of the core-dominated sources (Readhead et al., 1978; Browne et al., 1982). The double structure found in the core of 1137+66 makes this source a suitable candidate for measuring possible component motions with second epoch observations.

Figure 1: 1.6 GHz MERLIN maps



1732+65
Tick interval = 4 arcsec
Restoring beam = 1.3 x 1.3 arcsec



1951+49
Tick interval = 2 arcsec
Restoring beam = 0.35 x 0.35 arcsec

REFERENCES

Browne, I.W.A., Clark, R.R., Moore, P.K., Muxlow, T.W.B., Wilkinson, P.N., Cohen, M.H., Porcas, R.W.: 1982, Nature 299, 788
Owen, F.N., Porcas, R.W. and Neff, S.G.: 1978, Astron. J. 83, 1009
Pooley, G.G. and Henbest, S.N.: 1974, Monthly Notices Roy. Astron. Soc. 169, 494
Porcas, R.W.: 1981, Nature 294, 47
Readhead, A.C.S., Cohen, M.H., Pearson, T.J. and Wilkinson, P.N.: 1978, Nature 276, 768
Scheuer, P.A.G. and Readhead, A.C.S.: 1979, Nature 277, 182
Zensus, J.A., Hough, D.H. and Porcas, R.W.: 1983 (in preparation)

https://doi.org/10.1017/S0074180900077950 Published online by Cambridge University Press