OBSERVATIONS OF 3C 273 WITH HIGH NORTH-SOUTH RESOLUTION

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The quasar 3C 273 lies at a declination of +2°. Maps made with northern hemisphere VLBI Networks clearly show superluminal motion, but the north-south resolution is poor and details cannot be seen. We have now made two observations at 10.7 GHz with the Itapetinga Radio Observatory in Brazil, and one at 5.0 GHz using the Hartebeesthoek Observatory in South Africa along with the European and U.S. VLBI Networks (Biretta *et al.* 1985).

A major new result is that the VLBI jet does not have a simple monotonic curvature. The 11-GHz maps show new superluminal components about 1 milliarcsecond from the core at position angles between −140° and −120°. Comparison of these positions with those of components farther from the core shows that the VLBI jet first curves north and then south, and ultimately points to the optical jet.

Another result is that components near the core change position angle as they move out. This behavior is similar to that first seen in 3C 345, and occurs at about the same projected distance of 2 pc from the core ($H_0 = 100$ km s^{-1} Mpc^{-1}) (Biretta *et al.* 1983; Moore *et al.* 1983).

The observed curvature of the VLBI jet cannot be due to precession of the central engine, since simple models produce neither the non-monotonic curvature nor the position angle changes. The overall curvature to the south is probably caused by external pressures which bend the jet.

REFERENCES

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DISCUSSION

Burbidge : Have several groups studied the same superluminal sources and if so, do they agree ? Secondly, what happens when you plot the apparent superluminal velocity against redshift ?

Cohen : 3C 345 has been studied by several groups and the maps are in good agreement. In general, there is an anti-correlation between proper motion and redshift. For example, 3C 120 has the smallest redshift and the largest proper motion. The apparent transverse velocity, calculated for a co-moving observer using a standard cosmology, shows no particular correlation with redshift. In any one source these velocities can differ by a factor 2 or more for different components, and this might be enough to obscure any real redshift dependence.

Bramwell : What are the statistics of the correlation of the epoch of zero separation with known flux outbursts ?

Cohen : In 3C345 there are large outbursts which are correlated with C4 and C3, and perhaps C2. The peak flux density ($\gtrsim$ 10 GHz) occurs when the component is at a projected angle of 0".3 from the core, not at the extrapolated zero position. There is well-documented acceleration in C4. Other superluminal sources are presumably like 3C 345 and so the general lack of a good correlation between outbursts and extrapolated zero separation is not surprising.

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