THE RADIO STRUCTURES OF THE COMPACT STEEP SPECTRUM SOURCES 3C119, 3C287 AND 3C343

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The compact steep spectrum radio sources, 3C119, 3C287 and 3C343, are identified with QSO'S of redshift 0.46, 1.055 and 0.988 and visual magnitude 20.0, 17.7 and 20.6 respectively. The overall physical extent of each source is ~500 pc (Fanti et al. 1985, 1986). Here we present the results of new global VLBI 18 cm observations which have been combined with MERLIN data to improve the U-V coverage. The data were mapped using the CALTECH and AIPS software packages and also using OLAF software system developed in Jodrell Bank for 3C119 and 3C343.

The resulting map of 3C119 is shown in Figure 1a. The RMS noise level at some distance from the source in the final cleaned map is 1 mJy/beam. The dynamic range in the map (peak value to RMS noise) is therefore about 3000 to 1. The four brightest components marked as A, B, C and D can also be found in the 6 cm map by Fanti et al., (1986). The brightness distributions at 6 cm and 18 cm are in good agreement when the two maps are superimposed. The spectrum of component A is inverted between 6 and 18 cm, suggesting that it is the true nucleus of 3C119. The high dynamic range and the good u-v coverage allows us to identify another three extended components with low surface brightness, E, F and G, amongst which only E is clear in the previous map at 18 cm by Fanti et al.

The resolution of the present map of 3C287 (Fig. 1b) is sufficient to see the structure in some detail. The bright peak can be fitted with a Gaussian model with HPW = 26 x 15 mas and position angle = 100°. There is a clear change in the source position angle going from the peak towards the north. The filamentary structures to the west and south west (S_{18} = 0.5 Jy) may be a continuation of the spiral. The shape of 3C287 suggests a curved "core-jet". An unpublished low quality EVN map of 3C287 at 6 cm shows a morphology similar to the present 18 cm map. A spectral index analysis (by T. Venturi, Bologna) indicates that the brightest peak in both maps has a steep spectrum.

The morphology of 3C343 is very complex (Fig. 1c). The brightness distribution is multi-peaked. If we consider the source to be composed

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of four parts A, B, C and D, their flux densities are roughly 2000, 400,500 and 1000 mJy. The three elongated components, A, B and C have position angles 40°, 90° and 180° and similar widths of ~30 mas; component D is a plateau of emission. "A" is obviously connected with the others by bridges of emission. Another isolated emission peak E with ~100 mJy appears well detached from the main emitting region. The map accounts for all the source flux density at 18 cm. The structure of 3C343 suggests a knotty jet which might be deflected, distorted and split by impact with the interstellar medium.

REFERENCES

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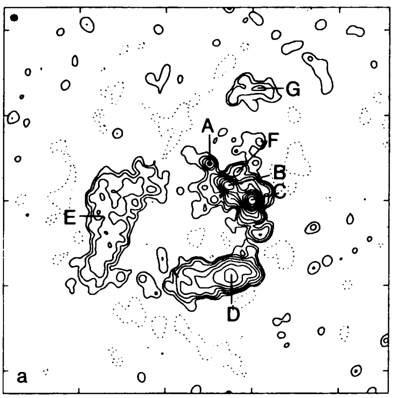

Figure 1:
a) Brightness distribution of 3C119 at 18 cm from AIPS/OLAF. Beam: 5 mas^2; tick separation: 60 mas; peak: 2.993 Jy/beam; contours (%): -0.10, -0.05, 0.05, 0.10, 0.20, 0.40, 0.80, 1.60, 3.20, 6.40, 12.80, 25.60,51.20.
b) Brightness distribution of 3C287 at 18 cm. Beam: 18 x 13 mas (p.a.=5°); tick separation 100 mas; peak: 1.480 Jy/beam; contour (%): -1, -0.5, 0.5, 1, 2, 5, 10, 20, 30, 40, 50, 60, 70, 80, 90.
c) Brightness distribution of 3C343 at 18 cm. Beam: 15 mas^2; peak: 341 mJy/beam; tick separation: 100 mas; contours (%): -1, 1, 2, 5, 10, 20, 30, 40, 50, 60, 70, 80, 90.