OBSERVATIONS OF RADIO GALAXIES AND QSR WITH RATAN-600

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We shall tell you briefly about the main observational program connected with radio galaxies. Different theories of radio galaxies predict different types of spectral index variations across the main body of the source. One would expect that the best solution of the problem is the construction of two-dimensional maps at a number of frequencies. However, we suggest that in some cases (i.e., for standard well-aligned structures) one-dimensional images with filled aperture may be much more accurate in determination of the variations of the spectral index along the major axes of radio galaxies. We now have 47 one-dimensional multifrequency images of all sources brighter than 1 Jy at centimeter wavelengths in the declination range -43° - +53° resolvable with our beam. Up to 7 frequencies were used (1.35, 2.08, 3.9, 6.5, 8.2, 13, and 31 cm). Cyg A is the best example showing structures of different scale: nuclear sources, bridges, main bubbles, and hot spots.

The main results are:

1. We have found no well established cases of any variation of the spectral index over the one-dimensional images, excluding the nuclear source. If they exist they are below the sensitivity of our measurements. The better the signal-to-noise ratio the smaller the upper limit on the spectral index variations.

The mean rms deviations of spectral index across the sources in our sample are below 0.04 (with dispersion of the integrated spectral indices 0.14) and are fully explained by the sensitivity of our maps.

2. For the classical doubles the flux density ratio of the main components is independent of frequency over the whole observable range to very high accuracy, even for the case of curved integrated spectrum. accuracy. We interpret this fact as direct evidence of small speed of separations of the components. For Cyg A, we estimated $v < 0.03$ c. In comparing our results with existing theories, we think that the best agreement may be found with in situ acceleration theories.

D. S. Heeschen and C. M. Wade (eds.), Extragalactic Radio Sources, 33–34.

3. We have found "Cyg A features" around two superlight-velocity sources, 3C 273 and 3C 120. In both cases the position of the blobs coincide well with the jet-like features. The energy content in these blobs is much greater than in the bright portion of the sources.

We have now observed a much weaker sample of ~2000 RG and QSR in our deep sky survey program at a level ~1 mJy at 7.6 cm.

https://doi.org/10.1017/S0074180900027224 Published online by Cambridge University Press