STATISTICAL ANALYSIS OF OBSERVATIONS OF A COMPLETE SAMPLE OF COMPACT EXTRAGALACTIC RADIO SOURCES

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Here are analyzed the results of instantaneous multifrequency observations for a complete sample of 113 extragalactic radio sources (see the paper by Yu.A. Kovalev *et al.* in these Proceedings) with declinations $-30° \div +43°$ from the VLBI–survey [1]. It is tested the hypothesis that quasars and BL Lacs have different nature. Statistical distributions for the turnover flux, turnover frequency, spectral indexes, and other parameters are analyzed.

All spectra before calculations had been transformed to the rest frame of the sources. Red shifts and optical identification are used from [2,3] and some other papers. The following curve has been fitted to the spectra as in [4]: $\log F_\nu = C + (\log \nu - B)^2/2A$. The interpretation of the parameters A, B and C is in the caption to Figure 1. We didn't use data with big $\sigma_{A,B,C}$ in our analysis. To derive the centimeter spectral index α_{cm} we use data at 2.7, 3.9, 7.6, 8.2 cm.

Strong differences in the distribution of parameters A, B and C are absent for 3 studied subgroups of objects (see Figure 1a,b,c). Quasars, BL Lacs and other sources have one peak in the distribution, which is approximately the same for the different types of objects. Obtained distribution testify in the favour to common physical nature of quasars and BL Lacs.

Comparison of Figures 1a,b,c with Figure 2 from paper [4] gives that the peak values of parameters B and C are similar in these works. It can be concluded that limiting, in the present work,the high frequency at 22 GHz did not influence a correct derivation of the turnover frequency (the highest frequency, used in [4], is much higher than 22 GHz).

Unfortunately (or fortunately) we did not see *any* correlation between logarithms of maximum flux and turnover frequency (see Figure 1 and Table 1). Correlation between (C, A) and (B, A) parameters has been derived (see Table 1). What's it? Is it a selection effect or something more than

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selection? This result may show a decreasing number of independent parameters, by which the spectra are characterized [4,5].

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References

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TABLE 1. Correlation Coefficients for the spectral parameters

Optical ID	The number of objects	Correlation Coefficients (Probabilities) (B,A)	(C,A)	(C,B)
Quasars	57	0.331 (98.7%)	0.164 (77.6%)	0.051 (29.2%)
BL Lacs	13	0.161 (40.1%)	0.169 (42.1%)	0.093 (23.9%)
Others	20	0.365 (88.5%)	0.380 (90.3%)	0.079 (25.8%)
All Sample	90	0.333 (99.8%)	0.230 (96.8%)	0.021 (15.5%)

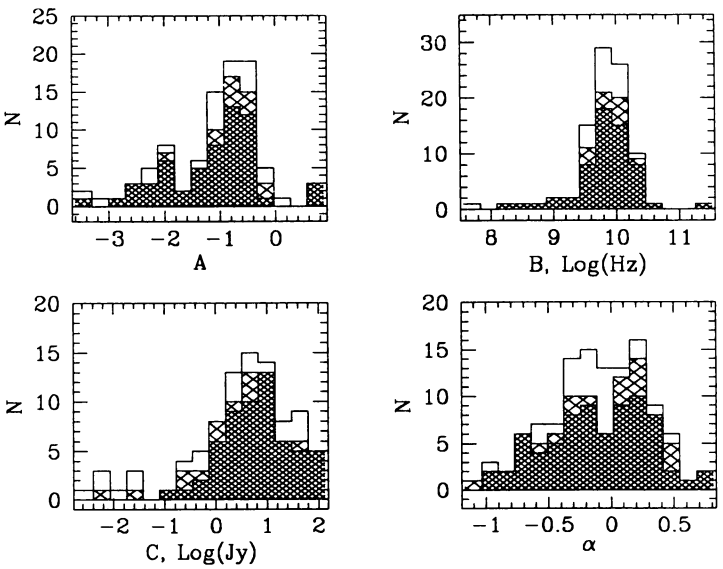

Figure 1. Histograms of the spectral parameters A (a), B (b), C (c) and α_{cm} (d) for sources in the sample. A is an effective width of a spectra, B is a logarithm of the turnover frequency, C is a logarithm of the maximal flux density. It is blacked for quasars, shaded — for BL Lacs, open — for other sources.