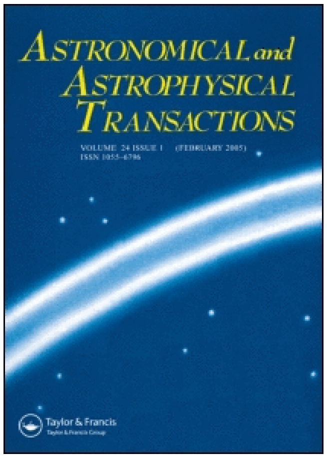

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COSMOLOGICAL EVOLUTION OF RADIO SOURCES

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It is commonly accepted that, in the frame of the unified scheme (Urry and Padovani, 1995), compact (CD 'core–dominated') and extended (LD 'lobe–dominated') extragalactic radio sources differ only by the orientation of their radio axis towards the observer. On the other hand, in the relativistic beaming models it is assumed that all radio sources have an intrinsically steep spectrum and flat-spectrum sources arise if their strongly Doppler-boosted core dominates the total flux in the observed frequency range. It is also assumed that all extragalactic radio sources with flux density $S_{1.4} > 1$ mJy belong to two parent populations: FRI and FRII differing by their radio power, optical/UV spectral characteristics, very likely by jet power and speed, etc.

In this contribution, we select and use the 1.4 GHz normalized differential counts $n(S)$ of radio sources of different morphological types, to verify predictions of the dual-population model of radio source evolution recently proposed by Jackson and Wall (1999).

KEY WORDS Extragalactic radio sources, cosmological evolution

Using the dual–population model for extragalactic radio sources proposed by Jackson and Wall (1999) we have calculated the 1.4 GHz $n(S)$ and $n(z)$ counts. Our observational counts are based on the GB/GB2 sample (Machalski, 1998) and the BDFL revised list (Bridle and Fomalont, 1974). The sources classified as compact steep-spectrum (CSS) are assumed to be very small type. As we cannot separate CD-type sources derived from the two assumed parent populations (FRI and FRII), we counted them together. The n(S) counts of $\mathrm{FRI_{LD}}$, $\mathrm{FRII_{LD}}$ and $\mathrm{(FRI{+}FRII)_{CD}}$, predicted from the model, are shown in Figure 1*a* and compared with the observational data. Figure 2 shows the 1.4 GHz predicted n(z) counts n(z).

Our analysis of the counts within the unification scheme, evolution and relativistic beaming models leads to the following conclusions:

1. In general, the predicted counts are underestimated for $\mathrm{FRII_{LD}}$, $\mathrm{FRI_{LD}}$ and compact objects.

2. The predicted fraction of sources (Figure 1*b*) well fit the observational data except for compact objects.

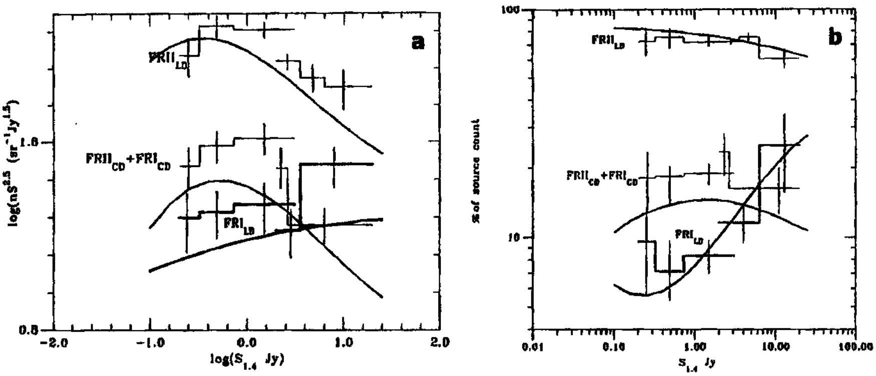

Figure 1 (a), Normalized differential counts. (b), Percentage of sources of different morphological types.

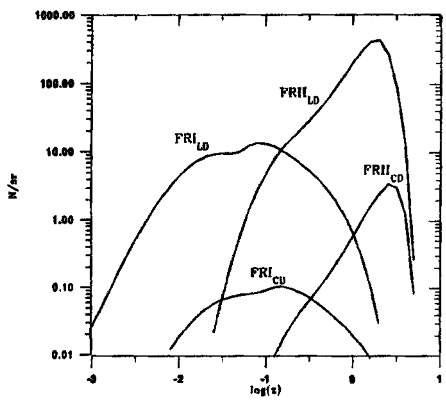

Figure 2 Expected number of sources N with flux $0.2 < S_{1.4} < 3$ Jy vs. redshift $\log(z)$.

3. It is still impossible to compare the predicted counts $n(z)$ with observational data because we have no sample of sources with a reasonably large number of measured redshifts.

4. The idea of a dual-population unification scheme for extragalactic radio sources connected with the evolution and relativistic beaming models could be substantially correct, however the form of Local Luminosity Functions and evolution functions as well as the beaming parameters require further investigations based on the counts at various frequencies and low flux densities.

Acknowledgments

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