Evolution of AGN Space Densities and the Fanaroff–Riley Dichotomy

Melanie A. Gendre[1], Jasper V. Wall[1], and Philip Best[2]

[1]Department of Physics and Astronomy, University of British Columbia, 6224 Agricultural Rd, Vancouver, BC, V6T 1Z1, Canada
Email: `mgendre@phas.ubc.ca`

[2]Institute for Astronomy, Royal Observatory, Blackford Hill, Edinburgh EH9 3HJ, UK

Abstract. We focus on a comparison of the space densities of FR I and FR II extended radio sources at different epochs, and find that FR I and FR II sources show similar space density enhancements in various redshift ranges, possibly implying a common evolution.

Keywords. galaxies: active, galaxies: evolution, galaxies: luminosity function

Based on data compiled in the CoNFIG catalogue (Gendre & Wall 2008; Gendre, Best & Wall 2009), we compute the radio luminosity functions (RLF) for different redshift bins for each FR (Fanaroff & Riley 1974) population using the $1/V_{max}$ technique. The FR I and FR II local ($z \leqslant 0.3$) RLFs, in Figure 1, show apparent differences. The FR II local RLF does not show any turn-over, suggesting that there is no sharp luminosity break between FR I and FR II sources. Overall, these local RLFs indicate that locally FR I and FR II sources constitute two distinct populations. The RLF for each population in Figure 2 was then computed in different redshift bins. The overall behaviour of the enhancement with luminosity of FR I and FR II sources is very similar. With both populations showing similar enhancement history, there may be a common mechanism governing the cosmic evolution.
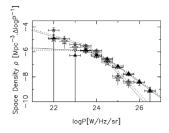

Figure 1. Local luminosity function $\rho(P)$ for FR Is and FR IIs, represented by stars and triangles respectively.
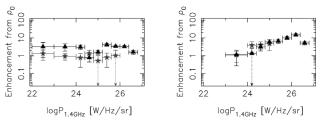
Figure 2. Comparison of the space density enhancement between FR I (stars) and FR II (triangles) sources, for different redshift bins ($0.3 \leqslant z \leqslant 0.8$ and $0.8 \leqslant z \leqslant 1.5$).

References

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