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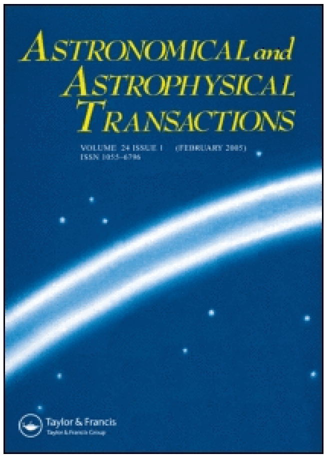

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New giant radio sources

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NEW GIANT RADIO SOURCES

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Giant radio sources (GRSs) are extremely valuable for better understanding the last stages of evolution of radio sources and their host galaxies, constraining the analytical models of their time evolution, verifying orientation–dependent unified schemes, etc.

On the basis of the population statistics, derived from the existing evolutionary models, we have realized a deep deficit of low–luminosity GRSs observed at redshifts < 0.3–0.4 (Machalski and Jamrozy, 2000).

In order to determine the cause of this deficit and find the missing giants, we have selected a sample of faint FRII-type GRS candidates, using the VLA 1.4 GHz sky surveys: NVSS (Condon *et al.*, 1998) and FIRST (Becker *et al.*, 1995). The first results of a search for the radio cores of our candidates with deep VLA observations at 4.9 GHz and 8.4 GHz, and the follow-up spectroscopic observations of identified optical counterparts is presented.

KEY WORDS Extragalactic radio sources, giant radio sources

Using the evolving 1.4-GHz Luminosity Function and the Linear-size Function derived for the Fanaroff–Riley type II radio sources, we calculated the expected numbers of sources with linear size exceeding 1 Mpc as a function of redshift and 1.4 GHz luminosity (Machalski and Jamrozy, 2001). In comparison to those expected numbers, the fraction of observed (recognized) giants gradually decreases with fading total flux density (Table 1). An evident deficit of giant sources in the D–z plane was found at redshifts $z < 0.4$ where the majority of them should be, e.g. only about 9–10 percent of such sources are known within the 1.4 GHz flux density range 50 mJy $< S <$ 500 mJy in respect of the model predictions.

Therefore, we have started a project to find these missing GRSs. From the NVSS and FIRST surveys we have selected a sample of 37 FRII-type giant candidates, i.e. lobe-dominated sources with an angular separation between their hotspots larger than 3 arc min, a total flux density at 1.4 GHz less than 300 mJy, and whose optical counterpart is not brighter than $R \approx 17$ mag lying in a sky area of 0.51 sr.

For 26 of these 37 candidates a radio core was detected in the FIRST survey. Up to now, during the deep C and/or X band observations with the VLA B and CnB arrays, we have detected faint cores in 5 of our 8 candidates. Their integrated flux density ranges from 1.1 mJy (at 4.9 GHz) to 0.36 mJy (at 8.4 GHz). These 26 + 5 cores are identified with 17 optical counterparts visible on the POSS plates (only one

Table 1.

	Jy	*500 mJy* $\leq S <$ *2 Jy*	*50 mJy* $\leq S <$ *500 mJy*
observed	9	26	33
expected	8.8	45.7	350
obs/expect.	1.02	0.57	0.09

may be a QSO), and 6 faint galaxies with $20.3 < R\,\mathrm{mag} < 21.5$ detected by us during the deep R-band imaging with the 2.1m telescope of the McDonald Observatory (Texas). The same telescope was used to carry out the optical spectroscopy of 15 identified galaxies with $R < 18.5$ mag. As a result, we got the spectrum and have determined the redshift of all observed galaxies. These redshifts, ranging from 0.086 to 0.331, confirm that 9 of 15 have a projected linear size exceeding 1 Mpc. For the 6 galaxies with $R > 20.3$ mag, a redshift within 0.15–0.23 will be large enough to provide $D > 1$ Mpc. The radio and optical observations of other candidates are in progress.

At this first step of our investigation we can form the following conclusions:

1. Indeed, there are many low-luminosity giant radio sources undetected in the former sky surveys.
2. The radio cores of most of them have a flux density at $\nu > 5$ GHz less or much less than 1 mJy, thus are not easy to detect which, in turn, prevents their optical identification.
3. The host galaxies evidently do not obey the Hubble diagram for powerful radio galaxies with strong jets. Our results seem to confirm the hypothesis that the lack of 'the alignment component' (possibly caused by young massive stars formed by the enhanced jet-induced star formation; Rees, 1989) may play a role in GRSs, especially since the finding that this component in distant 3C sources decreases with increasing size of radio source (Best *et al.*, 1996).
4. Many low-luminosity GRSs may be remnants of the former activity of their parent galaxies which now are strongly evolved.

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References

Becker, R., White, R., and Helfand, D. (1995) *Astrophys. J.* **450**, 559.
Best, P. N., Longair, M. S., and Röttgering, H. J. A. (1996) *Mon. Not. R. Astron. Soc.* **280**, L9.

Condon, J. J., Cotton, W. D., Greisen, E. W. *et al.* (1998), *Astron. J.*, **115** 1693.
Machalski, J. and Jamrozy, M. (2001) *The Universe at Low Radio Frequencies*, *Proc. IAU Symp.* **199**, ASP Conf. Ser. (in print).
Rees, M. J. (1989), *Mon. Not. R. Astron. Soc.* **239** 1.