

**Giants towards the Edge of the Universe:  
Mpc-scale radio galaxies at low and high redshift**

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**Abstract**

Giant radio galaxies (GRGs), defined here as having a projected linear size  $>1 \text{ Mpc}/h_{75}$ , and only about 150 of them are reported in the literature. In recent efforts of our research team we have used automated algorithms as well as visual inspection of large-scale radio surveys like NVSS, WENSS, SUMSS and FIRST, to increase the number of known GRGs. These methods, together with findings of volunteers of the Radio Galaxy Zoo project, have led us to increase the number of known GRGs to over 500, plus about the same number of sources with sizes between 0.7 and 1 Mpc, with about one third of their sizes based on photometric redshifts. Restricting ourselves to the region covered homogeneously by both the SDSS and FIRST surveys, we estimate the space density of GRGs with increasing redshift out to  $z \sim 0.4$ . As a pilot project to probe the more distant Universe for the presence of GRGs, we applied a visual inspection of moderately extended ( $2' - 5'$ ) NVSS sources to look for faint optical counterparts in SDSS Stripe 82, covering  $270 \text{ deg}^2$  near the celestial equator, and largely covered by a deep high-resolution VLA survey. We present our findings in terms of a density estimate for GRGs at redshift beyond 0.5. A visual classification of all SDSS spectra available for GRGs shows that e.g., the fraction of QSO+Sy1 types is 40% at redshift below 0.4 and 80% at higher redshifts. Likewise, the fraction of dwarf AGN is 30% at low and only 10% at higher redshift.