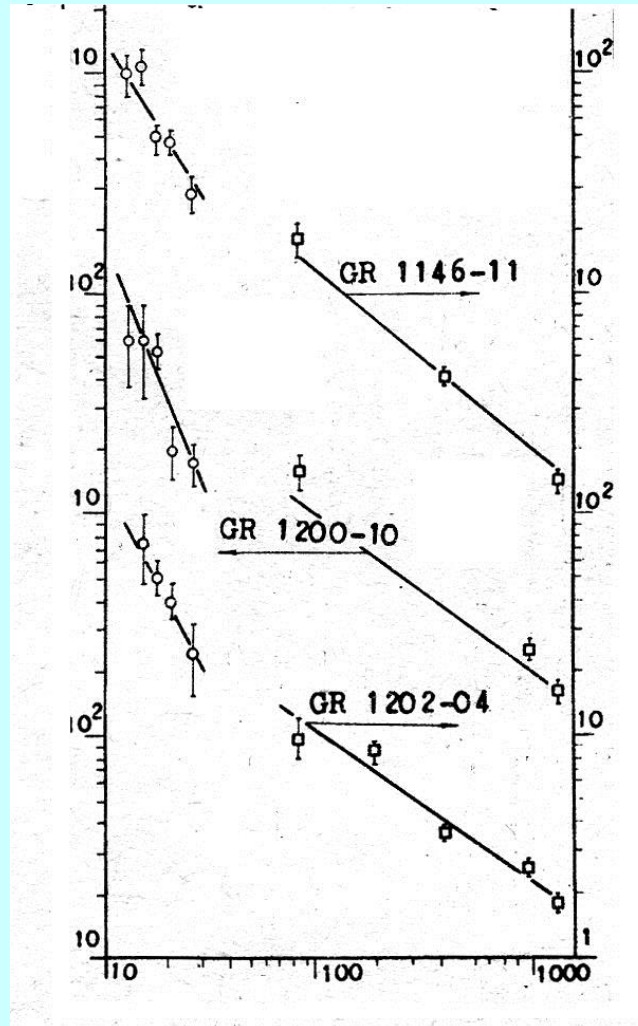


EVOLUTION OF LUMINOSITY – LINEAR SIZE RELATION FOR SOURCES WITH STEEP RADIO SPECTRUM

A. Miroshnichenko



Examples of steep spectra of type C⁺



$$\Omega_M = 0.27; \quad \Omega_\Lambda = 0.73; \quad H_0 = 71 \frac{\text{km}}{\text{s} \cdot \text{Mpc}}$$

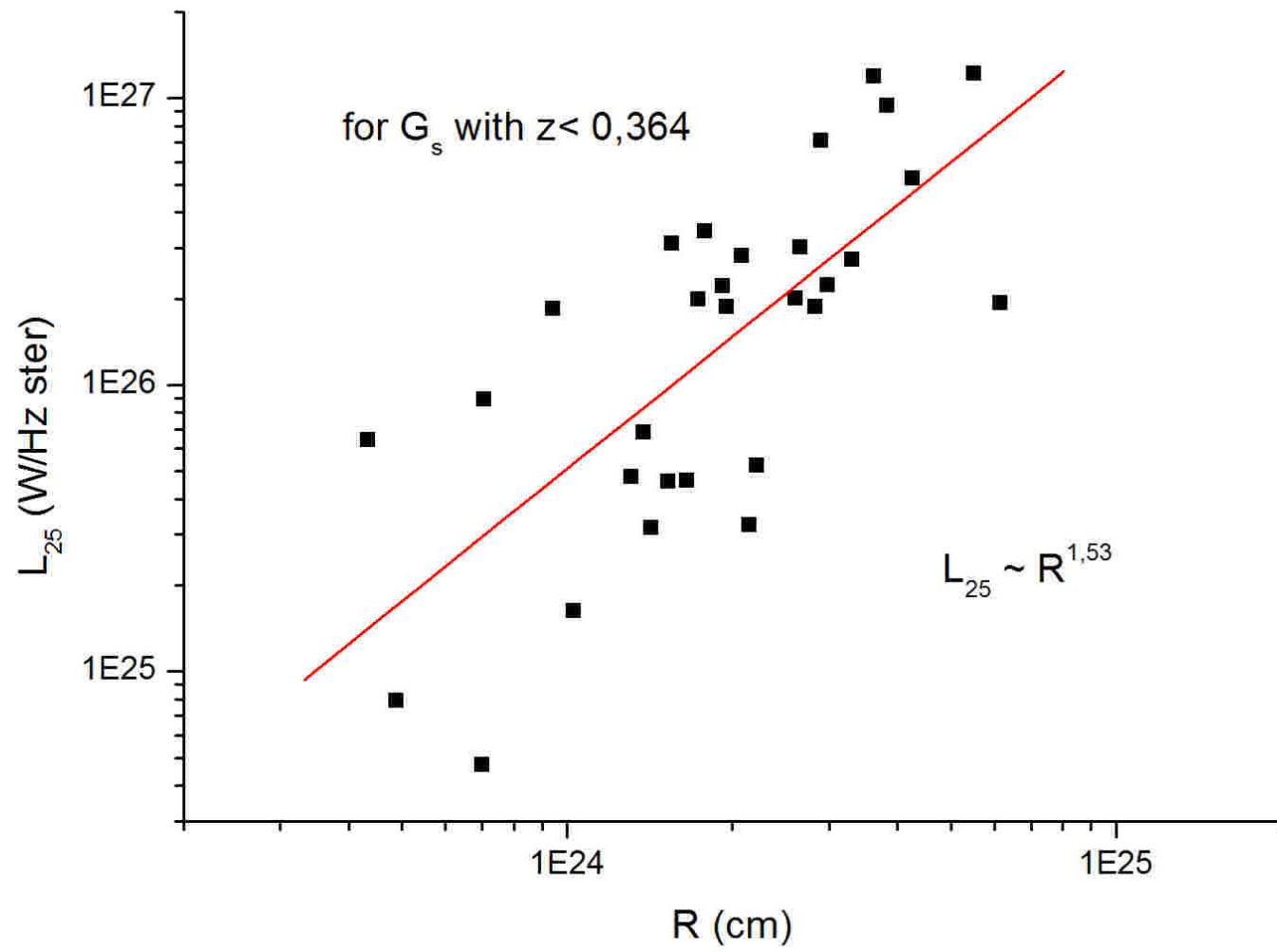
$$r = \frac{c}{H_0} \int_0^z \frac{dz}{\sqrt{\Omega_M (1+z)^3 + \Omega_\Lambda}}$$

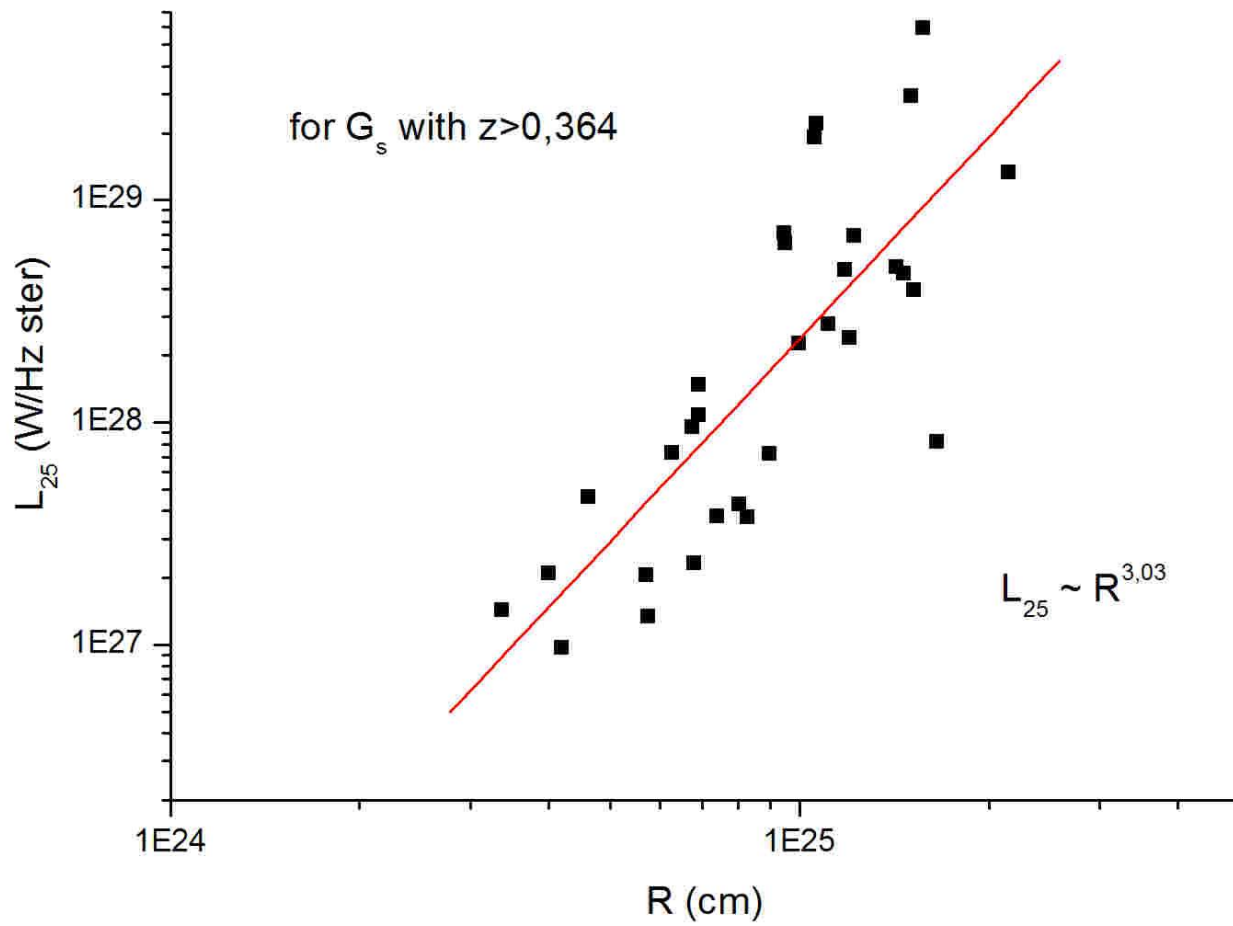
$$L_\nu = S_\nu r^2 (1+z)^{1+\alpha}$$

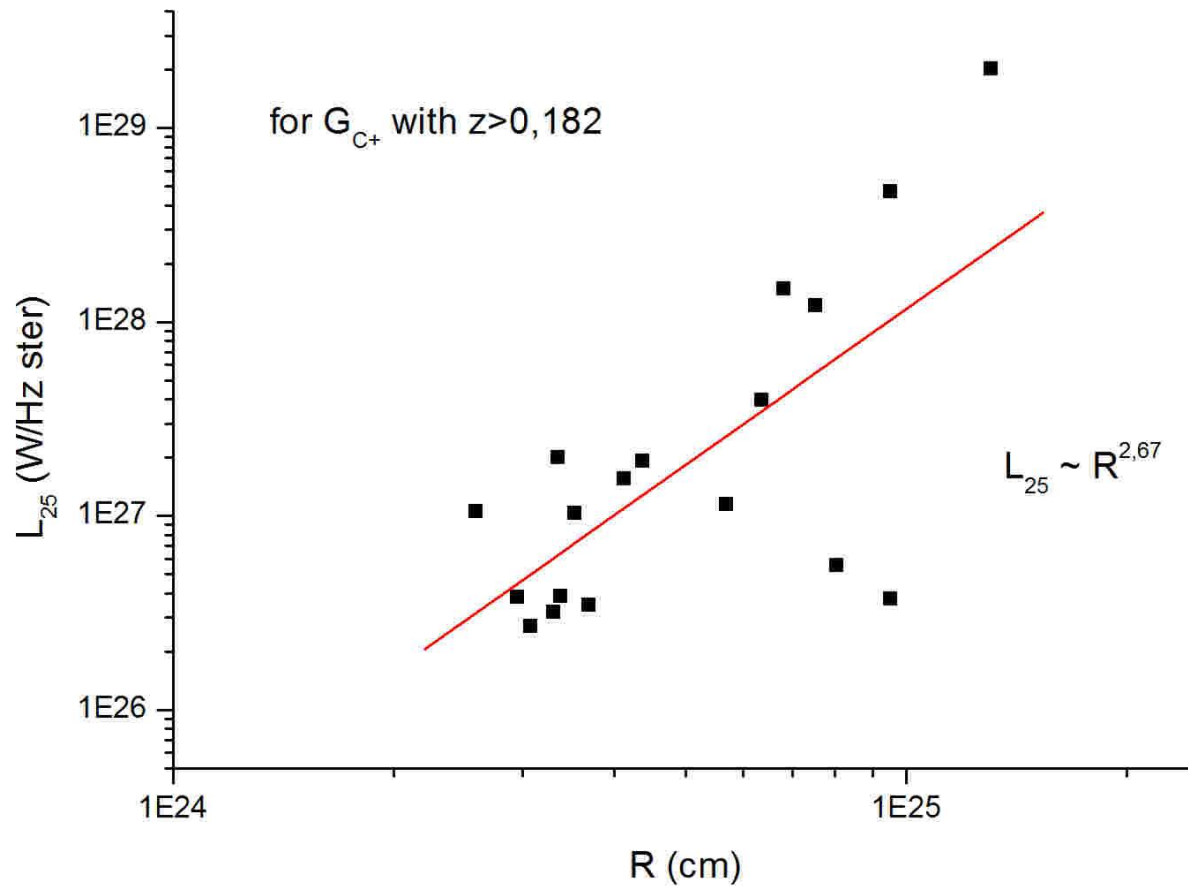
$$R = \theta \cdot r$$

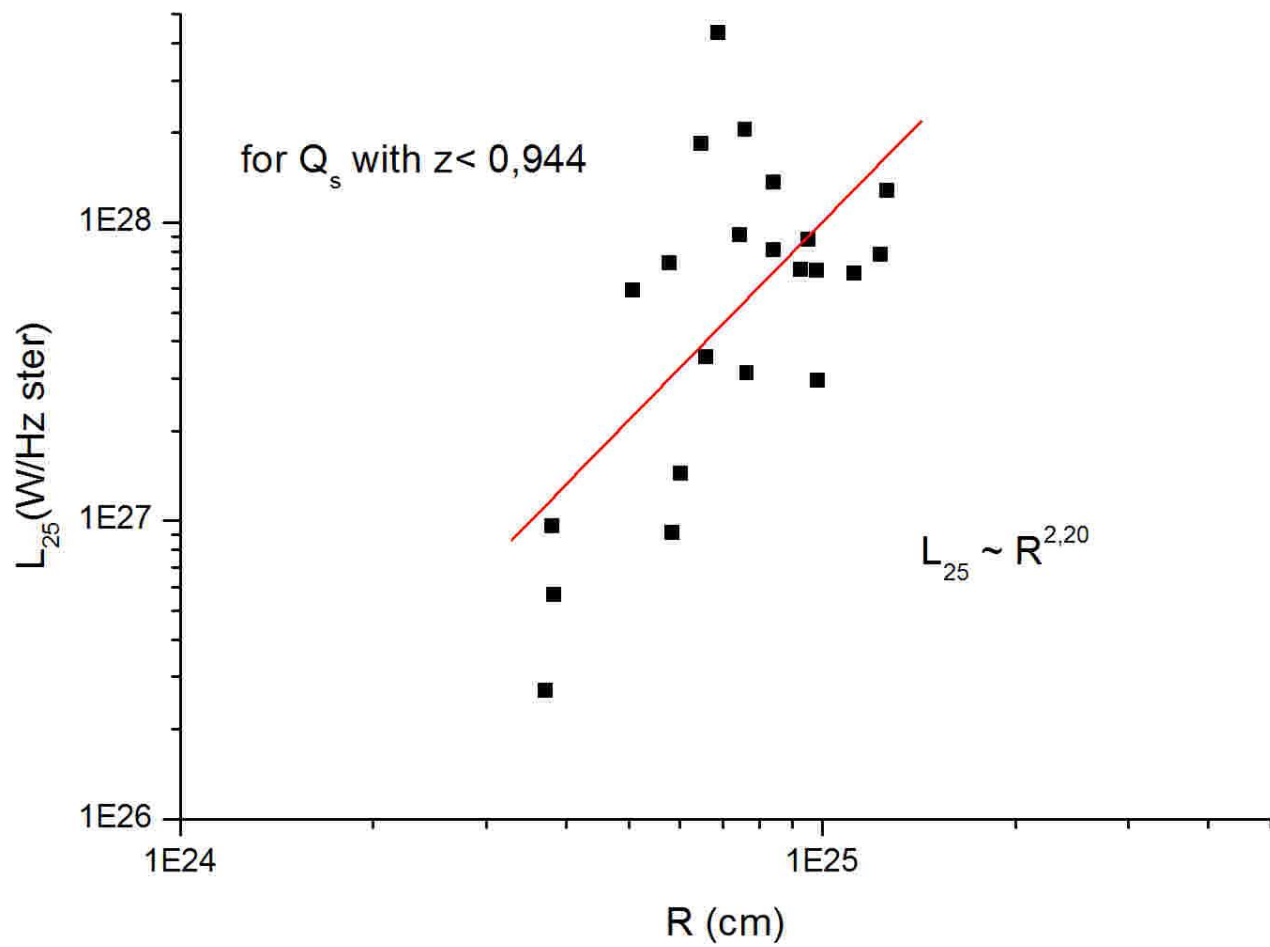
The detailed study of the identified radio sources with steep spectra at the decametre band (Miroshnichenko, 2010, 2012a, 2012b, 2013, 2014, 2015) shows, that these radio sources have interesting properties. In particular, these objects have great luminosity ($L_{25} \sim 10^{28}$ W/Hz ster), great characteristic age (10^8 years), giant radio structure (~ 1 Mpc). It is noteworthy that the obtained energy ratio for steep-spectrum sources (Miroshnichenko, 2014) testifies that the energy of relativistic particles prevails over the energy of magnetic field in the galaxies and quasars with steep radio spectra.

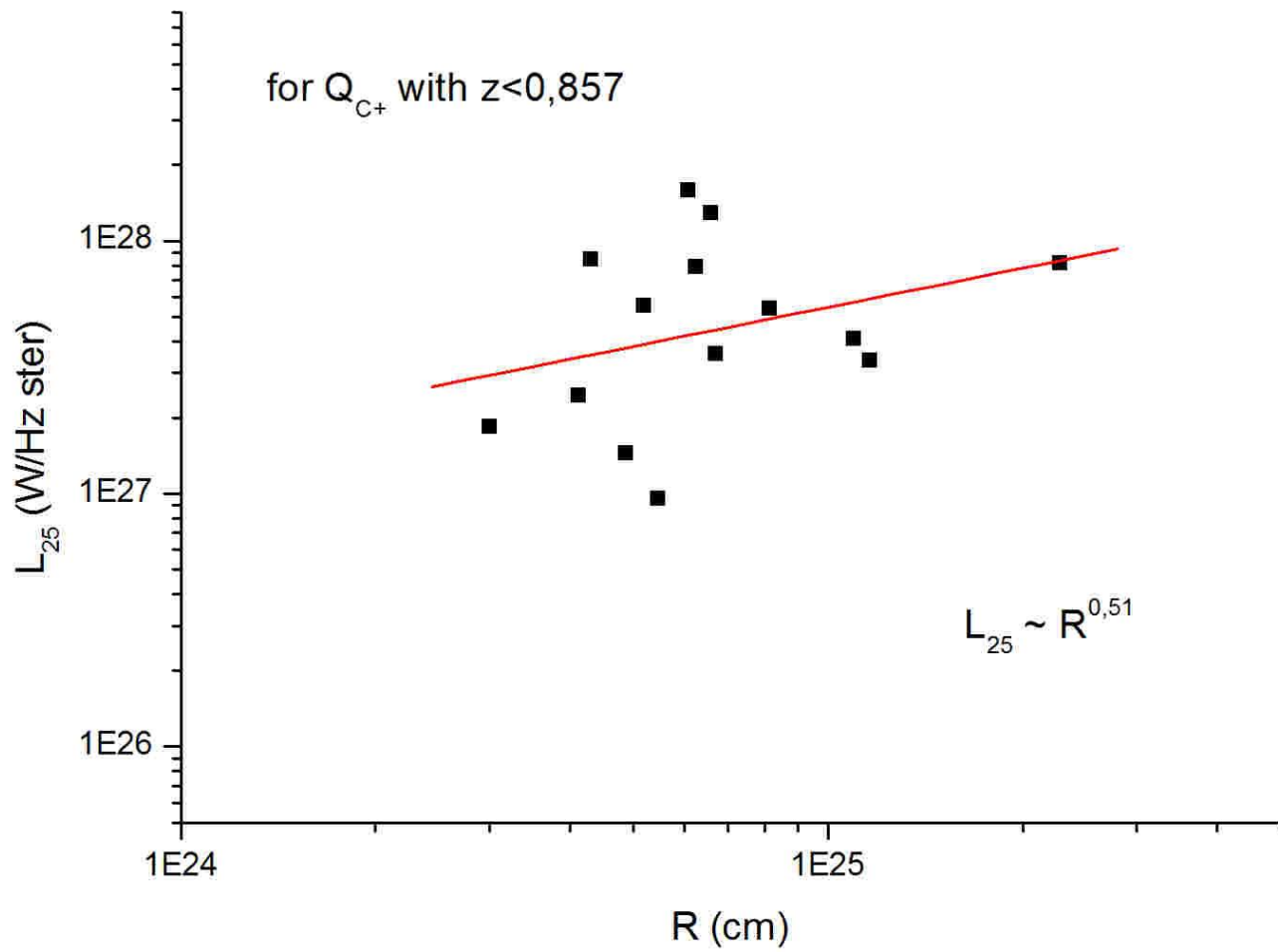
The examined sample of objects with steep spectrum is compiled with the UTR-2 (Grakovo) catalogue of extragalactic sources detected with the UTR-2 telescope (at the frequency range from 10 MHz to 25 MHz). Within the declination ranges from -13 to +20 degrees and from 30 to 40 degrees of the UTR-2 catalogue we have identified 78 galaxies and 55 quasars with linear steep spectrum (S-type) and 52 galaxies and 36 quasars with break steep spectrum (C+type) (with flux density at 25 MHz $S_{25} > 10$ Jy and spectral index larger 1). We use the NED database (<http://nedwww.ipac.caltech.edu>) for the high-frequency and optical identifications. At that the redshift range of objects is enough vast and forms 0.006 – 3.570

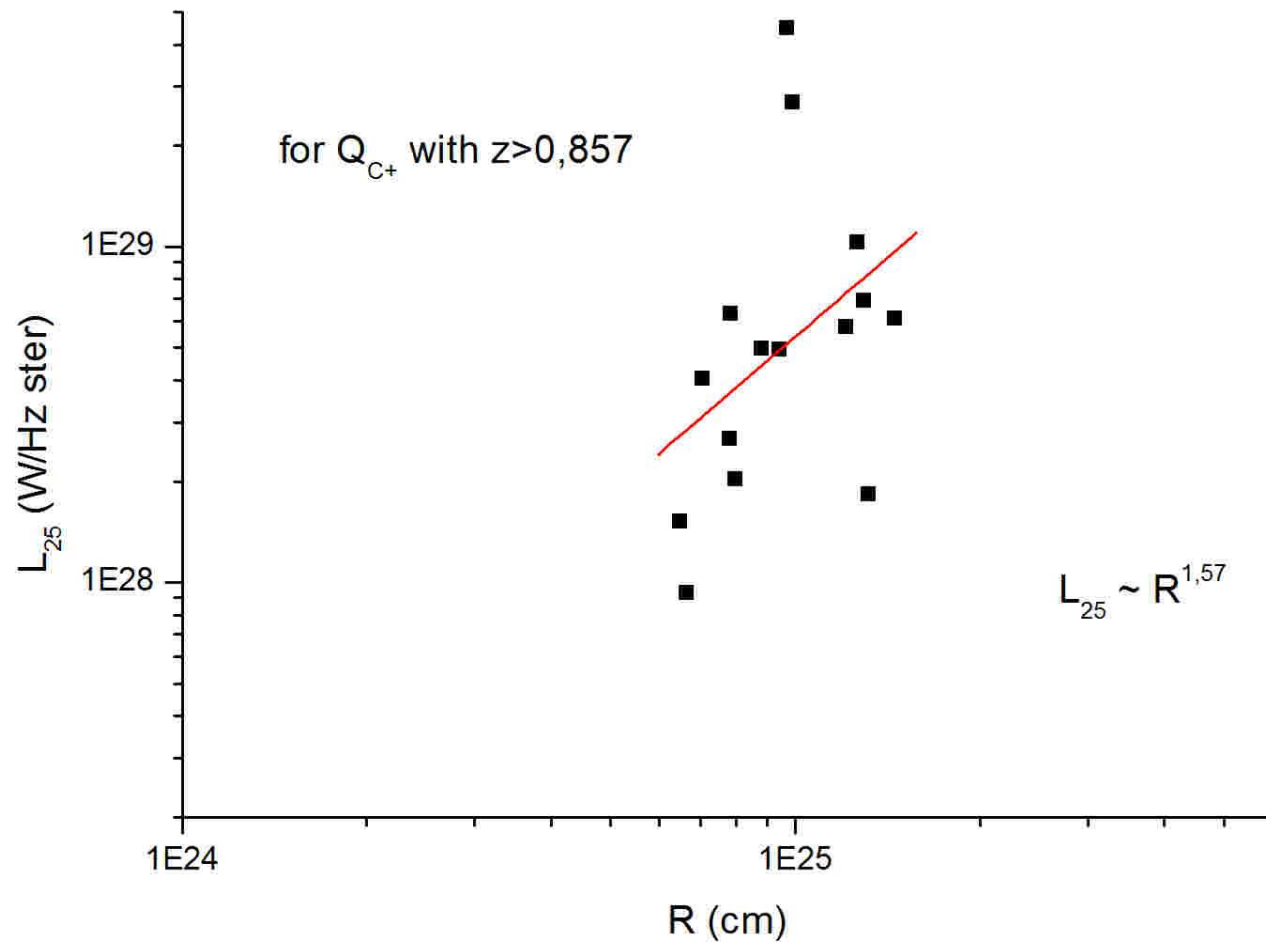


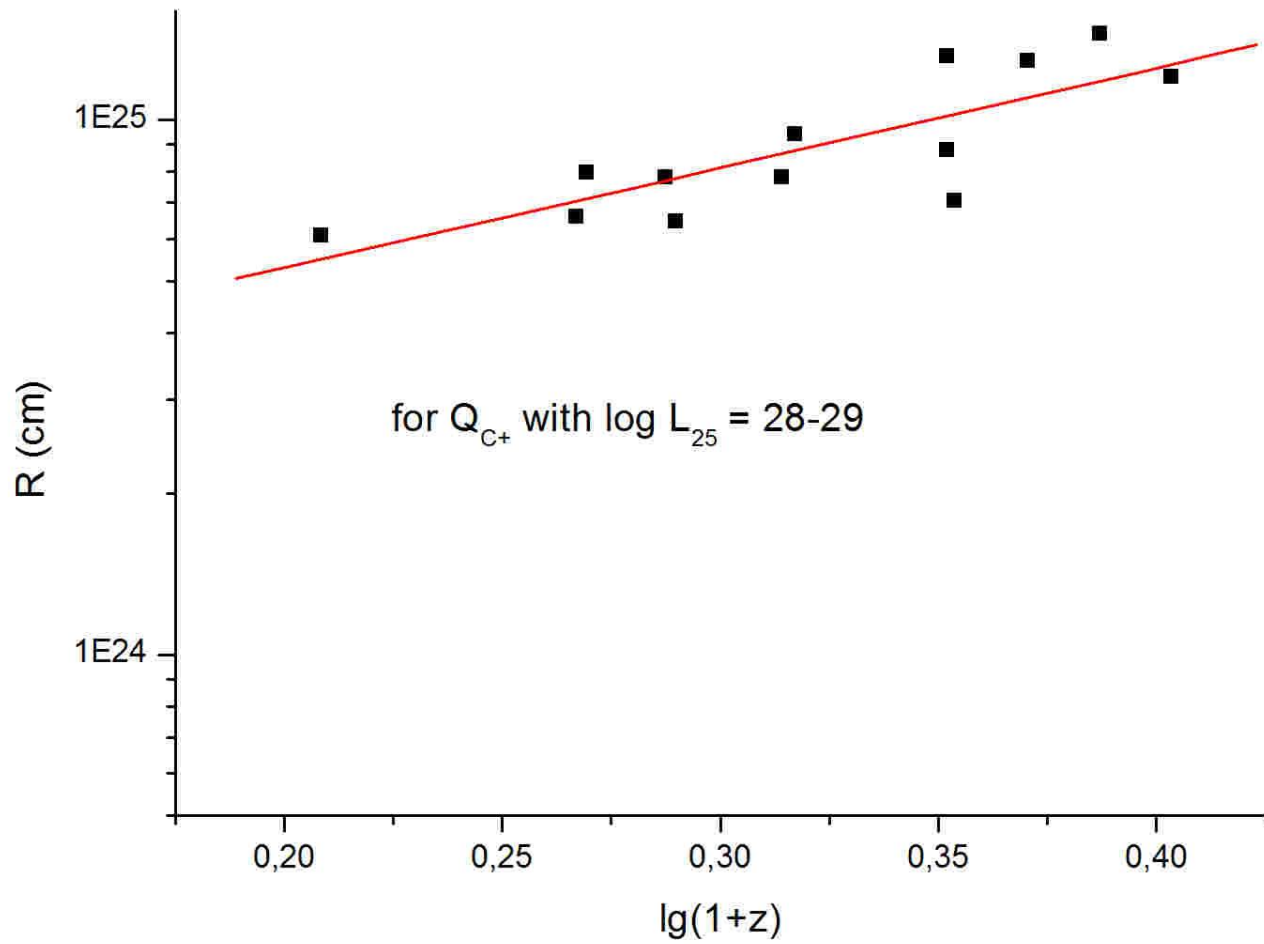


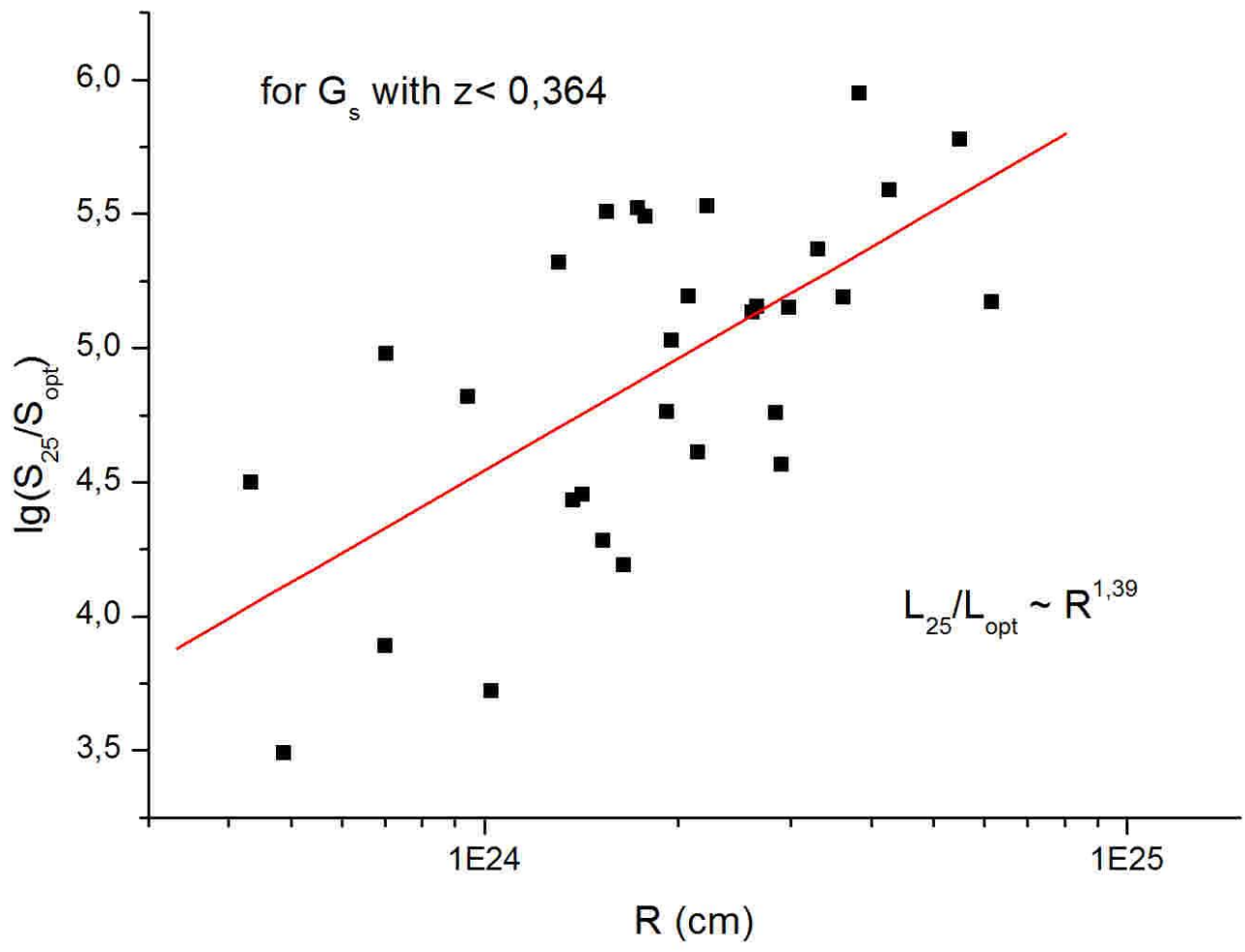


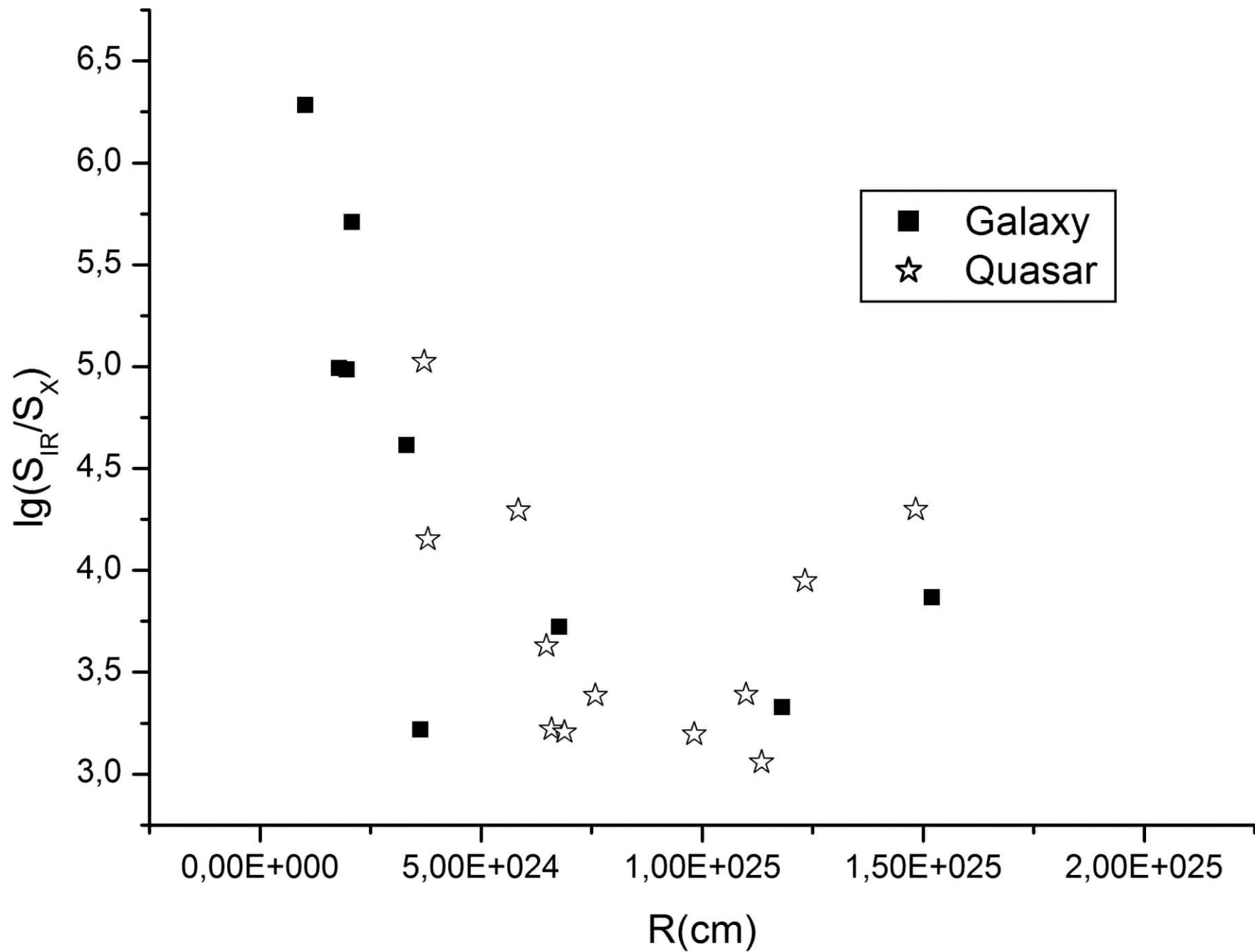












Conclusions

Radio sources with low-frequency steep spectrum and giant structure display the positive correlation of their luminosity and linear size.

The cosmological evolution of linear size of galaxies and quasars with steep radio spectrum is revealed.

The found relation of decametre luminosity and linear size means the huge power of the “central engine” of sources with steep radio spectrum, which provides the rejection of jets to giant distances.