# ON THE COSMOLOGICAL EVOLUTION OF RADIO QUIET AND RADIO LOUD QUASARS

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This contribution gives further insight into the problem of an 'evolution' of the function $G(>R)$ [$R$ is the ratio between radio and optical luminosity of a QSO] suggested by Visnovsky et al.(1992,ApJ,391,560), and recently by Schmidt et al.(1995,AJ,109,473). Using the Optical Luminosity Function for optically selected quasars derived by Boyle et al.(1988,MNRAS, 235,935), and evolving (cf. Schmidt et al. 1995) or non-evolving (cf. Marshall 1987,ApJ,316,84) $G(>R)$ function, an evolutionary function $E(z)$ for the population of both *radio quiet* and *radio loud* quasars is determined by modelling the distributions of redshift $n(z)$, as well as counts of apparent optical blue magnitude $n(B)$ and radio 5 GHz flux density $n(S)$ in samples with *different* radio and optical *limits*, respectively, and fitting them to the available observational data.

Resultant evolutionary function in the form $E(z) \propto (1+z)^{k(z)}$ is shown in Fig.1(left panel). In Fig. 1(right panel), and in Fig.2(left and right panel), the observed distributions of redshift $n(z)$, blue magnitude $n(B)$, and 5 GHz flux density $n(S)$, in different samples of optical and radio QSOs, are compared with the distributions expected from the Model.

The conclusions are as follows:

(1) The resultant function $E(z)$ is strikingly similar to the corresponding one derived from the evolutionary function for the total population of radio sources found by Condon (1984,ApJ,287,461). The $E(z)$ resulting from the present model peaks at $z \approx 2.3$ and slowly decreases for higher redshifts. A similar result of a 'redshift cut-off' was found by Dunlop & Peacock (1990,MNRAS,247,19) for flat- and steep-spectrum radio loud quasars. This is the first (to my knowledge) indication that a similar evolution may apply to luminous but radio quiet QSOs.



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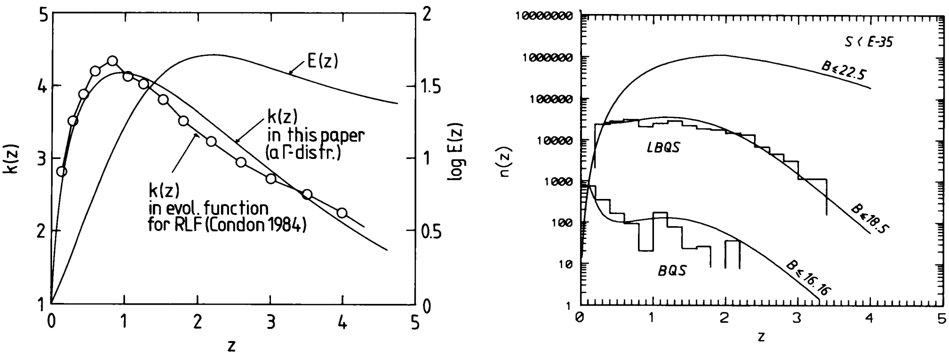


*Figure 1.* **Left panel:** Fitted power $k(z)$ in the evolutionary function $E(z)$ and the function itself. **Right panel:** Observed redshift distributions for radio quiet QSO, and the model predictions

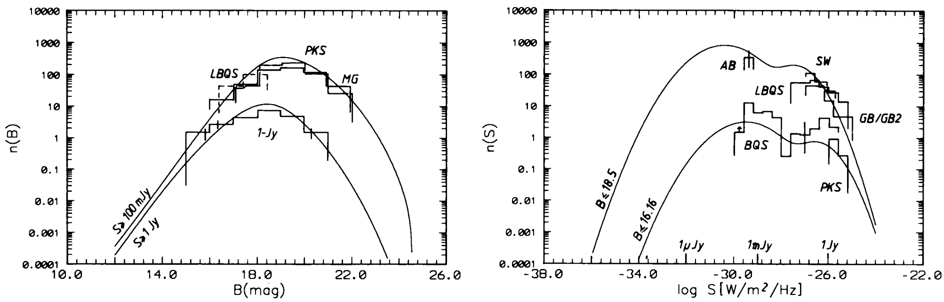


*Figure 2.* **Left panel:** Observed distributions of $B$ magnitude for radio loud QSO, and the model predictions. **Right panel:** Observed distributions of 5-GHz flux density, and the Model predictions

(2) The same evolution for both populations of QSOs cannot be rejected, although the available data on radio quiet but optically luminous QSOs are still insufficient to prove that.

(3) Existing observational data do not allow yet to constrain predicted distributions $n(z)$, $n(B)$, $n(S)$ for evolving or non-evolving function $G(>R)$. The calculations showed that in order to model these distributions with the function $G(>R,z)$ evolving (decreasing) with redshift [as proposed by Schmidt et al.], a stronger luminosity evolution $E(z)$ would be necessary for QSOs. The fit still can be satisfactory, but evolutionary functions for quasars and all radio sources will be different.