

# THE LUMINOSITY-VOLUME TEST FOR QUASI-STELLAR OBJECTS

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(Abstract of a paper by M. S. Longair and P. A. G. Scheuer (1971))

The luminosity-volume test for a complete sample of quasi-stellar objects which consists of all those brighter than prescribed limiting radio and optical flux densities is investigated. The best available sample of QSOs which fulfil these completeness criteria, that described by Schmidt (1968), is used in our analysis.

We show that:

(i) The luminosity-volume test does not depend upon the association of a particular redshift with a particular QSO – all that is important is the range of redshifts of the QSOs.

(ii) The luminosity-volume test and the counts of radio sources and QSOs are closely related. The two tests are not independent methods of investigating the evolution of QSOs over cosmological time-scales.

(iii) 'Luminosity' and 'Density' evolution hypotheses are indistinguishable from the present QSO data and in principle it is very doubtful if they can be distinguished.

(iv) The counts of radio sources are inconsistent with the predictions of realistic Lemaître models in which the distribution of sources is assumed uniform.

(v) The luminosity-volume test for QSOs in Lemaître world models is not consistent with a uniform distribution of sources, in agreement with (iv).

## References

- Longair, M. S. and Scheuer, P. A. G.: 1971, *Monthly Notices Roy. Astron. Soc.* **151**, 45.  
Schmidt, M.: 1968, *Astrophys. J.* **151**, 393.

## Discussion

*Schmidt:* I do not agree with your statement that the  $V/V_m$  test on quasars adds little and is not independent of the analysis of the counts of radio sources in general. Firstly, the  $V/V_m$  test is specifically done on quasars, not on an unspecified mixture of radio galaxies and quasars. Secondly, the quasars probably make up around 25% of the sources in the 3CR catalogue. There was no way to predict in advance whether or not this rather small fraction of the 3CR sources has the same evolution as do all the sources together. Thus the  $V/V_m$  test did supply independent evidence.