The Destruction of Quasars Clustering at $z > 2$

Yaoquan Chu and Xingfen Zhu
Center for Astrophysics
University of Science and Technology of China
Hefei, Anhui, China

The study of quasars clustering could become an important discriminant among different scenarios of the formation of large scale structure. The quasar clustering has now been confirmed and measured (Chu and Fang, 1986; Shaver, 1988) and the evolution of quasar clustering has been reported (Fang, Chu and Zhu, 1985; Chu and Fang, 1986). In the present work a large sample of about 3600 quasars in Hewitt-Burbidge catalog is employed and it is divided into several subsamples with different redshift ranges, a comparison of the correlation function in different subsamples provides then a mean of studying the evolution of the clustering with cosmology time.

The statistical methods we used here is similar to Shaver (1984). We calculate the correlation fuction for four quasar subsamples with $z > 2.1$, 2.2, 2.3, 2.4, and find the amplitudes of correlation function for all subsamples with $z > 2$ almost equal or less than 0, the significant level for the difference of correlation amplitudes between $z < 2.1$ and $z > 2.1$ is 2.3σ, and the difference between $z < 2.2$ and $z > 2.2$ is 3.8σ.

The higher redshift quasar in the catalog are, on avarege, brighter than the lower redshift quasars. So it is necessary tocheck whether the difference of quasar clustering between higher andlower redshifts is due to the redshift or due to the selection effect on the brightness of quasar. In order to check the difference in the distribution of the absolute magnitude for the two groups of quasar with different seperation, we use the two sample Kolmogorov-Smirnov Test and find that at the significant level of 0.1 these two groups of quasar are drawn from population with same distribution. We can conclude that the absence of clustering at $z > 2$ is not due to the selection effect on the brightness of quasar

Hoping to increase the significance of the change in quasar clustering with redshift , Next we divide all quasars into 6 redshift bins, each bin consists of similar number of quasars. The estimated amplitudes of quasar correlation function at 10 Mpc (comoving projected distance with $q_0 = 0$ and $H_0 = 100$ km/sec*Mpc) and its errors are ploted in Fig. 1 as a function of redshift. In this figure it is clearly exhibited that the correlation function of quasar clustering change at higher

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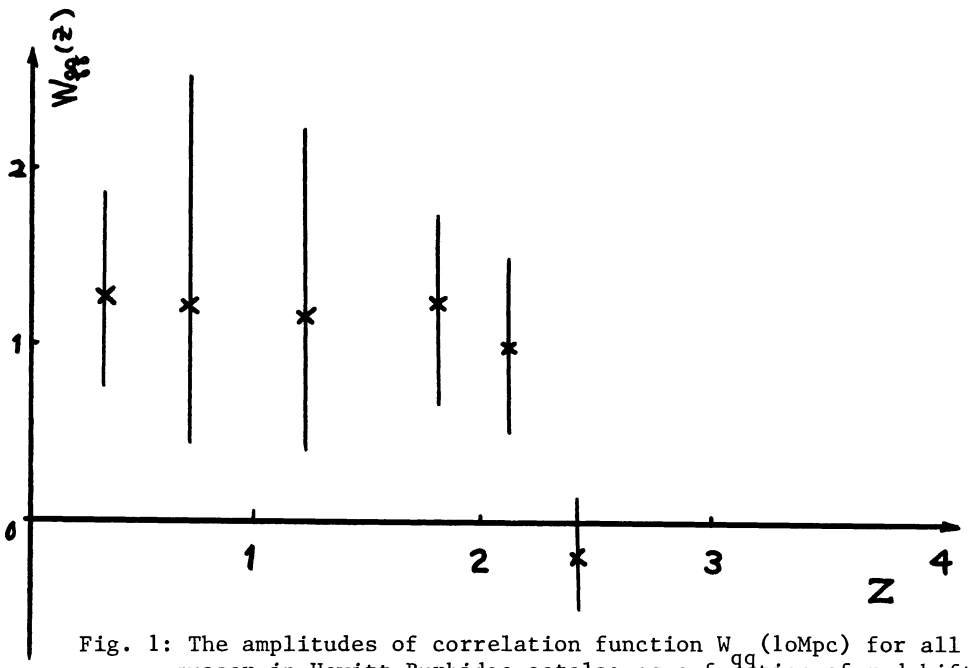

Fig. 1: The amplitudes of correlation function W_{qq} (1oMpc) for all quasar in Hewitt-Burbidge catalog as a function of redshift.

redshift bin. For all subsamples with $z<2$, the amplitudes of correlation function are consistent with each other, and no any clustering exists beyond $z>2$. The change of clustering strength seems quite sharp at $z>2$. This result must be regarded with caution, because the choose of redshift boundaries is somewhat subjective. An analysis has therefore been made using different way to divide the redshift range. The redshift range are divided into four equal intevals of " growth time", i.e. since the perturbation should grow as $(1+z)^{-1}$, the redshift intervals then have been divided in this manner. The same feature is found in the new set of subsamples.

References

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