RESULTS FROM THE 1000 GALAXY SAMPLE: THE CORRELATION FUNCTION AT $z = 0.75$ AND THE EVOLUTION OF THE CHARACTERISTIC LUMINOSITY

Edwin D. Loh
Joseph Henry Laboratories
Princeton University
Princeton, New Jersey 08544
USA

This paper announces two results from a catalog of redshifts and fluxes for a flux limited sample of 1000 field galaxies (Loh and Spillar, 1986, *Ap. J.*, **307**, L1).

The angular correlation function for galaxies with redshifts z between 0.15 and 0.85 has been measured. I fit to a spatial correlation function of the form $\xi(r_p) = (r_0/r_p)^\gamma (1+z)^{-(3+\epsilon)}$, where r_p is the proper distance, and ϵ is a measure of the evolution of the clustering. To estimate the local value of r_0 for a sample comparable in density to the present one, I use the average of the CfA sample and the KOS and AARS samples, which include some and no rich clusters. These data and local measurements imply $r_0 = (4.8 \pm 0.3)h^{-1}$ Mpc and $\epsilon = -0.5 \pm 0.5$ for an Einstein-deSitter universe ($\Omega = 1$). If instead $\Omega = 0$, then $\epsilon = -1.3 \pm 0.5$; *i. e.*, clustering was stronger in the past. Thus the data are consistent with the assumptions that $\Omega = 1$ and that clustering is stable ($\epsilon = 0$), *i. e.*, that physical associations of galaxies neither expand nor contract. For either choice of geometries, the correlation length r_0 has not evolved substantially since $z = 0.8$; r_0 at $z = 0.8$ is between 0.8 and 2.2 of its current value with 95% confidence.

The characteristic magnitude M^* of the Schechter luminosity function has been measured for this sample of field galaxies. (The spatial density of galaxies of luminosity L is $\phi^*(1+z)^3 x^\alpha e^{-x}\, dx$, where $x = L/L^*$. The characteristic luminosity is L^*, the density is ϕ^*, and α is a parameter, chosen to be -1.25. $M^* = -2.5 \log_{10} L^*$.) These data and the KOSS sample are fitted to this model for the characteristic magnitude: $M^*(z) = M_0^* + M_1^* \ln(1+z)$. The samples are divided into red galaxies, those with the colors of Sb and earlier galaxies, and blue galaxies. If $\Omega = 1$ is assumed, then $M_0^* = -20.5 \pm 0.2$ and $M_1^* = -0.7 \pm 0.5$ for the red galaxies, and $M_0^* = -20.0 \pm 0.2$ and $M_1^* = -0.4 \pm 0.5$ for the blue galaxies. If $\Omega = 0.1$, then M_1^* changes by -0.6. In Tinsley's models, $M_1^* = -1.5$ for red galaxies, and $M_1^* = -0.3$ for blue ones. Thus there is some evidence, though not of high statistical significance, that the characteristic luminosities of red and blue galaxies evolve more closely than Tinsley's models predict.

The picture of field galaxies at $z = 0.75$ that emerges from these data is similar to the picture of galaxies nearby. The luminosity has changed little, and the physical associations of galaxies are like those nearby. (This is a statement about the whole; it says nothing about individual galaxies.) Galaxies with the colors of nearby elliptical galaxies are present in these data up to $z = 0.9$, the highest redshift for which the K correction of ellipital galaxies is small in the 800 nm band. Galaxies were already mature at $z = 0.75$.

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