THE 3-D DISTRIBUTION OF ABELL CLUSTERS

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The Struble & Rood catalogue (*Ap. J. Supp,* **63**, 543) of all measured Abell cluster redshifts is analysed, with corrections for the selection biases. This contains 533 redshifts with $|b| \geq 30^o$, $z \leq 0.3$ compared with 104 in the sample of Bahcall & Soneira (*Ap. J.* **270**, 20). Although the catalogue contains biases in angular position (redshifts are preferentially measured in apparent "supercluster" regions) the information on redshift clustering is effectively unbiased since one cannot tell *a priori* whether pairs of clusters close on the sky are really associated in redshift. Thus the distribution of redshift differences for pairs of given angle & distance classes, $f(\Delta z|\theta, D_1, D_2)$, is a fair sample of the true distribution. Then by normalising to the "correct" angular correlation function, we obtain the joint distribution $f(\Delta z, \theta)$ and hence $\xi(r)$. In practice, in the estimation of ξ we assign each *pair* a weight a where

$$a = \frac{1 + w_A(\theta; D_1, D_2)}{1 + w_{SR}(\theta; D_1, D_2)}$$

where w_A is the correlation or cross correlation for the appropriate subset of the whole Abell catalogue. This gives $\xi(r) \approx (r/20\ h^{-1}Mpc)^{-1.8}$, just slightly smaller than the result of Bahcall & Soneira, but here $\xi(r) \approx 0$ for $r \geq 50\ h^{-1}Mpc$.

However, calculating ξ as a function of projected separation r_p and redshift separation r_z, a strong positive tail is found for $r_p \leq 20\ h^{-1}Mpc$, extending to $r_z \sim 200\ h^{-1}Mpc$. This effect is not due to the selection biases as it is present in the nearly complete $D \leq 4, R \geq 0$ subsample. It has been previously noted by Ciardullo, Ford & Harms (*Ap. J.* **293**, 69). Bahcall, Soneira & Burgett (*Ap. J.* ,**311**, 15) claim that this elongation is bounded and infer that it is caused by peculiar velocities $\sim 2000 km/s$. However, although the *number* of excess pairs does fall at large r_z, the correlation function (which is excess count divided by random) stays clearly positive, indicating the presence of line-of-sight selection effects in the Abell catalogue.

These projection effects can be compensated for using a method similar to that used by Kruszewski (*Ap. J.*, in press) to analyse quasar clustering; after the pair counts are binned in r_z and r_p, columns of constant r_p are normalised so that $\overline{\xi(r_z, r_p)} = 0$ for large r_z.

This method of analysis gives $\xi(r) \approx (r/12\ h^{-1}Mpc)^{-1.8}$ indicating that the standard $\Omega_0 = 1$ cold dark matter model should not be excluded.

J. Audouze et al. (eds.), Large Scale Structures of the Universe, 538.