

PROPERTIES OF GALAXIES AND GALAXY CLUSTERS ASSOCIATED WITH QUASARS

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SUMMARY. Quasars at redshifts <1.0 provide good markers for discovering galaxies and galaxy clusters at moderately high redshifts. Recent results from a comprehensive program of imaging surveys of galaxies in quasar fields are summarized.

CCD direct imaging of fields around quasars is used to study the properties of galaxies associated with quasars. The luminosity function (LF) of the associated galaxies at the redshifts of the quasars and the quasar-galaxy covariance function are derived by applying background galaxy count corrections obtained from control fields. Current data are best fitted by a q_0 between 0.0 and 0.5 and an evolution in M^* of -0.9 ± 0.5 mag. It is found that the average environment of radio-loud quasars at $z \sim 0.6$ is about three times richer in galaxies than that of quasars at $z \sim 0.4$ (Yee and Green 1987, *Ap. J.*, 319, 28).

Using imaging data from 37 PG quasars having $0.05 < z < 0.30$, it is found that $\sim 40\%$ of the quasars have at least one associated companion brighter than ~ -19 mag and within a projected radius of 100 kpc. The frequency of finding a companion to a PG quasar is ~ 6 times greater than that for field galaxies, but similar to that of Seyferts. The luminosity distribution of the companions are consistent with that of galaxies randomly drawn from the LF of normal galaxies. No correlation between the properties of the companions and the quasars is found, suggesting that while a companion may trigger the quasar, it does not determine the quasar's level of activity (Yee 1987, *Ap.J.*, 94, in press).

Multicolour CCD images of the fields of Pks0405+12 ($z=0.574$) and Pks0812+02 ($z=0.402$) are analysed. Pks 0812+02 is associated with a cluster of Abell richness class between 0 and 1, whereas Pks0405-12 is found situated in a cluster richer than Abell class 1. Preliminary three-colour photometry indicates that, after background correction, over 50% of the galaxies in both clusters have colours bluer than that expected for Sbc galaxies at the redshift of the quasars. This large blue fraction may indicate the existence of a strong Butcher-Oemler-like effect in these clusters.