

Colour Properties of Group Galaxies in Pan-STARRS MD Survey Fields

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Abstract. How environment shapes galaxies on groups scale in the early universe is poorly constrained. Here we carry out a study of the colour properties of galaxies against environment using Pan-STARRS medium deep (PS1 MD) survey data. We first focus on the MD04 field which overlays with the COSMOS field with published photo- z and group catalogs. Photo- z with the accuracy of $\Delta z/(1+z) \sim 0.058$ for 0.36 million galaxies are derived based on PS1 photometry and CFHT- u . Together with a probabilistic-based group finder, PFOF, we are able to identify galaxy groups and find a 83%-86% matching rate with the X-ray groups (George *et al.* 2011) or spectroscopically selected groups (Knobel *et al.* 2012) with intermediate redshift ($z \sim 0.7$). Among the matched samples (see Fig. 1), we found the colours of BCGs to be indistinguishable from other members, but group galaxies tend to be redder than those in the field for a given range of z -band magnitude, suggesting environmental effects on the evolutionary history of galaxies. This is qualitatively consistent with the X-ray study (George *et al.* 2011). The rest-frame quantities, e.g. colours, stellar mass and star formation rates, will be included and expanded to larger MD fields ($\sim 70 \text{ deg}^2$) to probe the cosmic evolution of galaxy properties in a forthcoming study.

Keywords. galaxies: evolution, galaxies: elliptical and lenticular, cD

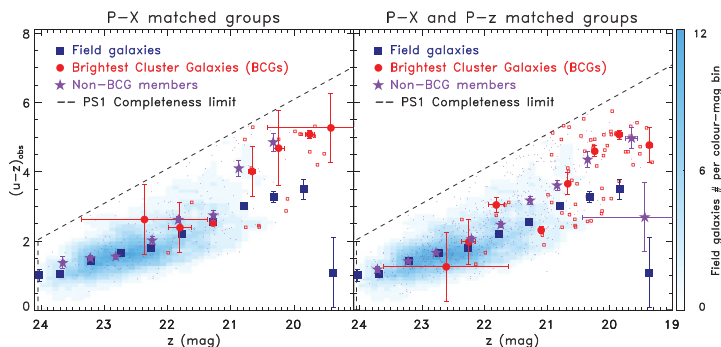


Figure 1. The left hand panel shows the colour properties of 25 PFOF-X-ray matched groups, serving as the most secure group sample in MD04. In addition, there are spec- z selected zCOSMOS groups in the field, allowing us to increase the sample size with groups fairly reliably identified. Therefore, a sample of 75 groups is collected by combining “PFOF-X-ray matched” with “PFOF-X-ray unmatched but PFOF-zCOSMOS matched” groups (right panel). Both panels show a significant difference between galaxy colour in groups and field at the bright end.

References

- George, M. R., *et al.* 2011, *ApJ*, 742, 125
 Knobel, C., *et al.* 2012, *ApJ*, 753, 121