Galaxy Population in the Infall Regions of Intermediate Redshift Clusters

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Abstract. We investigate the galaxy populations in 6 clusters of different x-ray luminosities at intermediate redshifts ($z \approx 0.25$) concentrating on their star formation activity. Our ~ 500 Calar Alto MOSCA spectra come from targets covering large fields out to 2–4 cluster virial radii. To probe this so-called infall region is important since here newly arriving galaxies from the surrounding field encounter the special environment of clusters for the first time. We selected 3 fields containing 2 clusters each from the X-ray Dark Cluster Survey (Gilbank *et al.* 2004). Results for one field were already published by Gerken *et al.* 2004.

We find evidence that the process(es) that suppresses or truncates the star formation activity in cluster galaxies, sets in already at rather large distances from the cluster cores corresponding to low projected local galaxy densities. This changes the fraction of star forming galaxies rather quickly.

Keywords. galaxies: evolution – cluster of galaxies
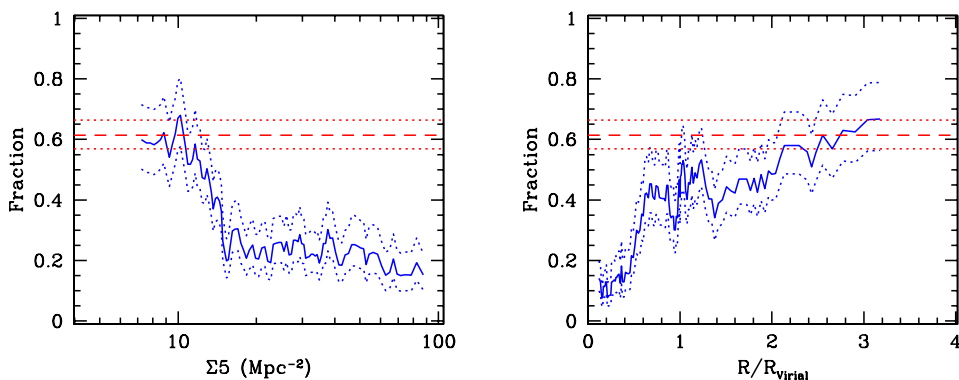
Figure 1. Left: Fraction of star forming galaxies (defined to have either [OII] or Hα in emission) as function of the projected density to the 5th neighbour. The solid line shows this fraction for cluster member galaxies, whereas the dotted lines delineate the 84% confidence levels. The dashed horizontal lines indicate the average fraction in the field between $0.15 < z < 0.35$. We see that the fraction starts to fall from the field value rapidly at rather low densities between $10 < \Sigma_5 < 15$ Mpc^{-1} becoming rather flat thereafter over a wide range of values. Right: Same as in Left, but now as function of normalized virial radius. The fraction of star forming galaxies decreases from the field level at $R \approx 3R_{\rm vir}$ towards smaller core distances. Inside of $R < 0.8R_{\rm vir}$ a strong depletion of star-forming galaxies is observed. The ripples in the curves are due to statistical variation and should not be seen as local trends.

References

Gerken, B., Ziegler, B., Balogh, M., Gilbank, D., Fritz, A., & Jäger, K. 2004 A&A, 421, 59.
Gilbank, D. G., Bower, R. G., Castander, F. J., & Ziegler, B. L., 2004 MNRAS, 348, 551.