

BACKSPLASH GALAXIES

V. Coenda^{1,2} and H. Muriel^{1,2}

We explore the properties of galaxies on the outskirts of clusters and their dependence on recent dynamical history in order to understand the real impact that the cluster core has on the evolution of galaxies.

We analyse the properties of more than 1000 galaxies brighter than $M_{0.1r} = -19.6$ on the outskirts of 90 clusters ($1 < r/r_{vir} < 2$) in the redshift range $0.05 < z < 0.10$ (the cluster sample is described in Coenda & Muriel 2009). Using the line of sight velocity of galaxies relative to the cluster's mean, we selected high and low velocity subsamples. Theoretical predictions (see Gill et al. 2005 and Mahajan et al. 2011) indicate that a significant fraction of the first subsample should be backsplash galaxies (BS), that is, objects that have already orbited near the cluster centre. A significant proportion of the sample of high relative velocity (HV) galaxies seems to be composed by infalling objects.

Our results suggest that, at fixed stellar mass, late-type galaxies in the BS sample are systematically older, redder and have formed fewer stars during the last 3 Gyrs than galaxies in the HV sample (see Figure 1). This result is consistent with models that assume that the central regions of clusters are effective in quenching the star formation by means of processes such as ram pressure stripping or strangulation. At fixed stellar mass, BS galaxies show some evidence of having higher surface brightness and smaller size than HV galaxies. These results are consistent with the scenario where galaxies that have orbited the central regions of clusters are more likely to suffer tidal effects, producing loss of mass as well as a re-distribution of matter towards more compact configurations. Finally, we found a higher fraction of early-type galaxies in the BS sample, supporting the idea that the central region of clusters of galaxies may contribute to the transformation of morphological types towards earlier types.

REFERENCES

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 Gill, S. P. D., Knebe, A., & Gibson, B. K. 2005, *MNRAS*, 356, 1327

¹Instituto de Astronomía Teórica y Experimental IATE, CONICET, Laprida 922, X5000BGR, Córdoba, Argentina.

²Observatorio Astronómico, Universidad Nacional de Córdoba, Laprida 854, X5000BGR, Córdoba, Argentina.

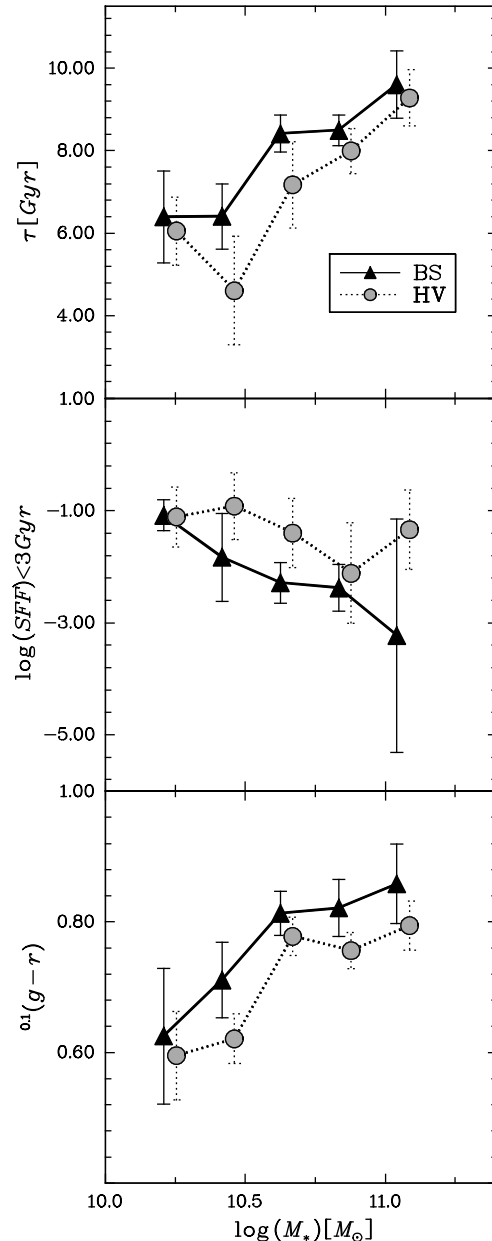


Fig. 1. Age (top), star formation fraction during the last 3 Gyrs (middle) and color (bottom) as a function of stellar mass for late-type galaxies. Points represent the median in each bin.

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