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The Size-Luminosity Relation of Disk Galaxies in EDisCS Clusters

Stephanie M. Gogarten[1], Julianne J. Dalcanton[1], Luc Simard[2], Gregory Rudnick[3], Vandana Desai[1,4], and the EDisCS Collaboration

[1]Department of Astronomy, University of Washington, Seattle, WA 98195, USA
email: stephanie@astro.washington.edu

[2]Herzberg Institute of Astrophysics, NRC, Victoria, BC V9E 2E7, Canada

[3]National Optical Astronomical Observatories, Tucson, AZ 85719, USA

[4]California Institute of Technology, Pasadena, CA 91125, USA

Abstract. We present the size-luminosity relation (SLR) for disk galaxies observed in eight clusters from the ESO Distant Cluster Survey (EDisCS). These clusters, at redshifts $0.4 < z < 0.8$, were observed with the *Hubble Space Telescope's* Advanced Camera for Surveys. While we observe a change in the SLR with redshift, namely that there is an absence of low surface brightness galaxies at high redshift, we demonstrate that this could be a product of selection effects and thus is not a confirmation of evolution. We also compare the SLR for cluster and field galaxies in each redshift bin and see no significant effects of environment on the SLR.

Keywords. galaxies: evolution, galaxies: clusters: general, galaxies: fundamental parameters

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Our sample of $0.4 < z < 0.8$ clusters from EDisCS was imaged in multiple bands with the Very Large Telescope (VLT) and in I_{814} with HST/ACS. More than 100 galaxies in each field were targeted for spectroscopy with VLT/FORS2. (See White *et al.* 2005 for a complete description of EDisCS.) Structural parameters for galaxies in these clusters were obtained using the fitting program Galaxy IMage 2D (GIM2D, Simard *et al.* 2002). Disk galaxies were selected using a combination of cuts in bulge-to-total ratio and image smoothness. Cluster and field galaxies were distinguished using photometric redshift information, a process which was calibrated using the avaliable spectroscopic redshifts.

The SLR, represented by disk scale length vs. rest-frame B-band absolute magnitude, does not appear to be significantly different for cluster and field galaxies, although we will confirm this result with statistical tests. In higher redshift bins, fewer galaxies are seen with low surface brightness. The selection function was determined by generating simulated galaxies with GIM2D, inserting them into empty parts of the original science images, and determining the percentage detected by SExtractor with the same parameters used in the original detection. Simulated galaxies were transformed from observed to rest-frame properties for each redshift bin using a median k-correction determined from the photometric redshift catalog. Low surface brightness galaxies could not have been detected in the higher redshift bins, so the apparent evolution in the SLR may be due only to selection effects and not reflect a change in the physical properties of the galaxies.

The poster is available online: http://www.astro.washington.edu/stephanie/size_lum_poster.pdf.

References

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