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COMPARING GALAXY POPULATIONS IN COMPACT AND LOOSE GROUPS OF GALAXIES

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

We compare the properties of galaxies in compact groups, loose groups, and the field to deepen our understanding of the physical mechanisms acting upon galaxy evolution in different environments. This contribution is detailed in Coenda et al. (2012) and Martínez et al. (2013).

We select samples of galaxies in compact groups identified by McConnachie et al. (2009), loose groups identified by Zandivarez & Martínez (2011), and field galaxies from the seventh data release of the Sloan Digital Sky Survey (Adelman-McCarthy et al. 2008). We compare the properties of the galaxy populations in these different environments: absolute magnitude, colour, size, surface brightness, stellar mass, and concentration. We also study the fraction of red and early-type galaxies, the luminosity function, the colour-luminosity, and luminosity-size relations.

The population of galaxies in compact groups differ from that of loose groups and the field. The fraction of red and early-type galaxies is larger in compact groups. Galaxies in compact groups are, on average, systematically smaller in size, more concentrated, and have higher surface brightnesses than galaxies in the field and in loose groups. At a fixed absolute magnitude, or fixed surface brightness, galaxies in compact groups are smaller in size.

The physical mechanisms that transform galaxies into earlier types could be more effective within compact groups, owing to the typically high densities and small velocity dispersions of these environments, which could explain the large fraction of red and early-type galaxies we found in compact groups. Galaxies inhabiting compact groups have undergone a major transformation compared to galaxies that inhabit loose groups.

We also compare the properties of the brightest group galaxies (BCGs) in both compact and loose groups of galaxies. The fraction of BCGs classified as red and/or early-type as a function of galaxy lu-

minosity are studied. The fraction of the group's total luminosity contained in the BCG and the difference in luminosity between the BCG and the second-ranked galaxy, are also analysed.

Some properties of BCGs in compact and loose groups are comparable. However, BCGs in compact groups are systematically more concentrated and have larger surface brightness than their counterparts in both, high- and low-mass loose groups. The fractions of red and early-type BCGs in compact groups are consistent with those of high-mass loose groups. Comparing BCGs in subsamples of compact and loose groups selected for their similar luminosities, BCGs in compact groups are found to be, on average, brighter, more massive, larger, redder and more frequently classified as elliptical. In compact groups, the BCG contains a larger fraction of the system's total luminosity and differs more in absolute magnitude from the second-ranked galaxy.

BCGs in compact and loose groups are found to be different. Some mechanisms responsible for transforming late-type galaxies into early types, such as mergers, may be more effective within compact groups due to their high densities and small velocity dispersion, which would lead their BCGs along somewhat different evolutionary paths.

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