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The Fornax Deep Survey with VST: Surface Photometry of LTGs inside the virial radius of the Fornax cluster

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Spiral galaxies and irregular galaxies, which fall under the 'Late Type Galaxies' (hereafter, LTGs) morphology classification have been researched in the past mostly concerning the evolution of structures (e.g. formation of spiral arms). These galaxies, rich in atomic and molecular gas content help us understand the kinematics and dynamics of star formation. Studying the effect of the environment (e.g. field, cluster) in which the galaxy is located in, is vital in unravelling the formation of their unique substructures. Further elaborating on this, it is important to know the position of a galaxy in the cluster, investigate their evolution through modelling (e.g surface brightness profiles), and morphologically classify them based on their substructures (e.g lopsided or warped disk, bars, peanut shaped bulges, spiral arms). A comprehensive analysis of these structures probe the mechanisms involved in their formation, thus distinguishing between their peculiarities. Over the past decades, researchers have been able to substantiate this by showing that brighter bulges have higher surface brightness, peanut shaped bulges are bars thickened out of the disk plane, the colour of the bulges are correlated with the central colours of their corresponding disks, stellar halos show substructures in the form of stellar streams, bulge to disk ratio increases from early type galaxies to late type galaxies, and many more. With ongoing, deeper exploration in multi-bands, of galaxies, we will be able to resolve their composition, formation, and evolution in cosmic time.
With this motivation, we present LTGs, which are brighter than mB <= 14 mag inside the virial radius of the Fornax Cluster. The deep multi-band images and high resolution of the Fornax Deep Survey (FDS) data allow us to map the light distribution and colour down to a surface brightness level of 28-30 mag in g and 28-29 in i bands, thus enabling us to investigate the composition and structure of the disks in these galaxies. This image depth is also advantageous in exploring the possibilities for the mechanisms driving the formation and evolution of the substructures within these galaxies, especially under the influence of the cluster environment causing strangulation, ram-pressure stripping, galaxy-galaxy harassment. For the purpose of this research, we extracted the (i) azimuthally-averaged surface brightness profiles profiles for each object from the sky-subtracted images in four respective bands (ii) position angle (PA), and ellipticity profiles (iii) g-i colour profiles, (iv) g-i colour maps (v) residual images and isophotal model, to point out the impressive structures that define their corresponding morphology.

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