

Ultra-Diffuse Galaxies study

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Low Surface Brightness Galaxies (LSBGs) are defined as galaxies with an average central surface brightness, $\Sigma(0,r)$, below the typical level of the night sky. LSBGs are estimated to contribute less than 1% to the luminosity of the local observable universe; however, their contribution to the total number density of galaxies is estimated to be around 40% to 50%. Exploring the standard evolution of LSBGs and investigating the reasons behind their faint nature could be crucial to understanding our universe. Among LSBGs, a subsample of objects has been identified: classified as Ultra Diffuse Galaxies (UDGs), which are LSBGs having a central surface brightness measured in g-band, $\Sigma(0,g)$, larger than $24 \text{ mag per arcsec}^2$ and an extended half-light radius, $r_{1/2}$, larger than 1.5 kpc. UDGs populate the distribution tail of the LSBGs' luminosity profile, inhabiting field, group and cluster environments. Previous studies have established substantial differences in the properties of UDGs according to their host environment. Comparing properties in different UDGs hosting environments would allow us to find the most likely evolutionary path of these galaxies, factoring out the episodic events due to their surroundings. In our work, we validated the performance of a Machine Learning model developed to find LSBGs and UDGs, extracting also physical properties of LSBGs/UDGs through redshift measurements such as star formation rates (SFRs) and stellar masses (M_{star}).

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