



UNIVERSIDAD TÉCNICA
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DEPARTAMENTO
DE FÍSICA

Defensa Proyecto Investigación para optar al grado de Licenciada en Astrofísica.

Tema: *Galaxy Morphologies in CHANCES
Galaxy Survey.*

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Comisión:

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Abstract: This thesis investigates galaxy classification and its relation to the local and global environment by using publicly available Galaxy Zoo DESI classifications, which combine citizen science and deep learning, and CAS measurements, to classify the galaxies in the CHANCES target selection catalog, which includes galaxies from over 50 clusters, extending out to out to 5R200. We aim to determine which classification method performs better for different morphological types and then analyze the morphology-density and morphology-radius relations. To accomplish this, we defined a threshold for the vote fractions through visual inspection to classify galaxies into morphology types, and used public optical imaging to measure the CAS parameters. This led to the classification of 43.885 galaxies by deep learning, with many galaxies excluded due to issues like shredding and filter constraints. Deep learning performed better at identifying mergers and edge-on disks, which have distinctive appearances. Using CAS, we classified only 11.321 galaxies, as the strict parameter boundaries and poor measurement quality caused by incomplete image processing limited the classification. CAS performed best for classifying elliptical and disk galaxies. The morphology-density and morphology-radius relations revealed that the fraction of elliptical galaxies increases with higher densities and shorter radii, with their morphology primarily influenced by local density. In contrast, disk galaxies increase with larger radii and decrease with higher densities, with environmental effects dominating inside the cluster radius. Mergers are more likely to occur outside the virial radius and at higher densities, suggesting that other physical mechanisms are causing morphological changes within the cluster. To enhance this work, future studies will incorporate the lenticular morphology and improve the overall classification process by addressing overlooked aspects.

Miércoles 15 de enero 2025 a las 10:00 hrs. - Sala Conferencias Dr. Luciano Laroze, E300