New diagnostic diagrams to identify ram pressure stripped galaxies

Introduction:

In galaxy clusters, one of the most significant mechanisms driving galaxy transformation is Ram Pressure Stripping (RPS), which occurs as galaxies interact with the intracluster medium during their infall. This process can lead to the removal of gas from galaxies, dramatically altering their morphology and star formation. In this talk, we introduce a new method for identifying RPS galaxy candidates by conducting a detailed morphological analysis of galaxy images sourced from the Legacy Survey.

Methods:

We analyzed a sample of approximately 600 galaxies across diverse environments, including groups, clusters, tidally interacting pairs, and the field. Using the ASTROMORPHLIB software, we calculated key morphological parameters such as asymmetry (A), concentration (C), Sérsic index (n), and bulge strength (F, G, M20). The analysis was supplemented with diagnostic diagrams combining these parameters to detect galaxies showing RPS signatures.

Results:

A distinctive Morphological Transition Zone was identified, where highly disturbed galaxies decouple from isolated systems. This zone helped isolate potential RPS candidates. After visual inspection to eliminate contaminants, we identified 33 new RPS candidates within nearby galaxy clusters (Hydra, Fornax, and CLoGS sample), with one-third of these galaxies showing clear evidence of unwinding spiral arms.

Interpretation and Conclusion:

The identification of this Morphological Transition Zone offers a novel approach to distinguishing galaxies undergoing RPS from other types of disturbed galaxies. The discovery of these new candidates highlights the effectiveness of this method in expanding the catalog of known RPS galaxies. Future work will focus on refining the method to increase the sample size of RPS candidates, potentially providing new insights into galaxy evolution in clusters.

Nivel de formación

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