UNIVERSIDAD DE GUANAJUATO

DIVISIÓN DE CIENCIAS NATURALES Y EXACTAS

DEPARTAMENTO DE ASTRONOMíA

EVOLUCIÓN DE GALAXIAS EN CÚMULOS MASIVOS: IMÁGENES DEL CERCANO INFRARROJO EN ABELL 85

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Dedicated to Balaji Venkatapathy....

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ABSTRACT

The main goal of this work is to investigate the different physical mechanisms affecting galaxy properties and evolution within massive clusters. With this aim we analyzed a series of near infra red images (NIR) of the brightest galaxies in Abell 85, including a sample of late-type objects, most of which are HI-deficient. The remaining galaxies studied in this work are the brightest early-types, both lenticulars and ellipticals. We constructed a catalogue of NIR magnitudes and images; they later used to analyse the presence of any possible strong asymmetry in the stellar disk of spirals and lenticulars, which would be an indication of relatively old (some 10^9 years) gravitational interactions. Previous studies have shown that hydrodynamical mechanisms, mainly ram-pressure stripping, are at work on the spiral population of this cluster, However by comparing our dataset with models we will be able to find the role of other physical mechanisms of very different origin, such as ram-pressure stripping and gravitational pre processing, suffered by the galaxies during their infall to the massive cluster Abell 85.

We targeted 82 galaxies distributed along 26 fields in the cluster Abell 85, observed through the NIR bands J (1.275μm), H (1.672μm) and K' (2.124μm). The whole imaging has been done along several runs with the 2.1m telescope of National Astronomical Observatory (OAN), located in San Pedro Martir, Mexico. The thesis was devoted to the 2011 observing run and the image reduction and analysis of some of the previous data. We present a J, H, K' photometry catalog of 77 galaxies; we applied an asymmetry analysis to the largest 44 objects, and report about a dozen galaxies with clear asymmetry features. Taken into account the projected position of these disturbed galaxies across the cluster, we conclude that gravitational pre-processing can not be considered straightforward as the strongest physical mechanisums driving galaxy evolution in massive clusters, as several authors claimed along the last decade.