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Physical properties of Brightest Cluster Galaxies up to redshift 1.80 based on HST data

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Galaxy clusters are the largest gravitationally bound structures in the Universe, and are believed to form by accretion of galaxies and mergers with smaller groups of galaxies. Clusters have generally in their center a very massive galaxy (BCG, the Brightest Cluster Galaxy), which is located at the bottom of the cluster gravitational potential well, and has grown by accreting gas as well as many smaller galaxies. Those extremely massive and bright galaxies, usually described as supermassive elliptical galaxies or cD galaxies, constitute a distinct class of galaxies on their own. BCGs can be up to 2 magnitudes brighter than the second ranked galaxy in their cluster, which makes them easily recognisable. A few studies (West et al. 2017, Durret et al. 2016) also show that BCGs tend to be aligned along a preferential axis, which is the major axis of the cluster in which they reside, hinting at the close link between BCGs and their host clusters. BCGs can give us important clues on the way clusters have formed and evolved, and enable to impose strong contraints on cosmological models by comparing them with the results obtained with numerical simulations.

We present a study of the physical properties of a large sample of BCGs between redshift 0.1 and 1.8, using high resolution photometry with images taken with the Hubble Space Telescope, as well as a new tool to detect automatically the BCGs on optical images (Chu et al. 2021).

Field

Cosmology

Day constaints

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