

HOW DO BRIGHTEST CLUSTER GALAXIES GROW?

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Brightest Groups and Cluster Galaxies (BGGs/BCGs) represent the most luminous systems known at present epochs. The extent to which such extreme galaxies have acquired their particular properties from their privileged location at the centres of halos and/or their high density environment is of key astrophysical interest. Unfortunately, the assembly history and evolution of these giant galaxies is still poorly understood.

We have analysed the growth of Brightest Cluster and Groups galaxies (BCG/BGG) over the last 3 billion years using a large sample (883 BCGs/BGG) from the Galaxy and Mass Assembly Survey (Driver et al. 2011; GAMA). Our analysis is based on the comparison of stellar mass in like-with-like halos. We find no statistically significant growth from redshift $z = 0.27$ to $z = 0.09$, in agreement with previous observational studies (Lin et al. 2013). In Figure 1 we compare our groups and clusters results with hierarchical models of galaxy formation. The upper panel shows the BCG stellar mass ratio evolution with cosmic time, the solid line represents the semi-analytic model (SAM) of De Lucia & Blaizot (2007), and the yellow dots that of Tonini et al. (2012). Our GAMA galaxies are shown as red circles. The studies of Lin et al. (2014), and Lidman et al. (2012) are shown as blue hexagons, and green triangles respectively. The observations are compared to the models, by normalising the highest redshift point to the model of De Lucia & Blaizot (2007). Both of these studies cover a broader redshift range (down to $z=1.5$). We conclude that overall BCGs acquire their stellar mass rapidly at early epochs, this is consistent with SAMs predictions. However, in the last 3 billion years their growth in stellar mass slows down, and there is still some tension between SAMs and observations. Nevertheless, this difference can be due to systematic errors (e.g. stellar mass estimations). SAMs predict a stellar mass growth of $\sim 30 - 20$ per cent in the last 3 billion years, and this value could fall within the error bars of our analysis.

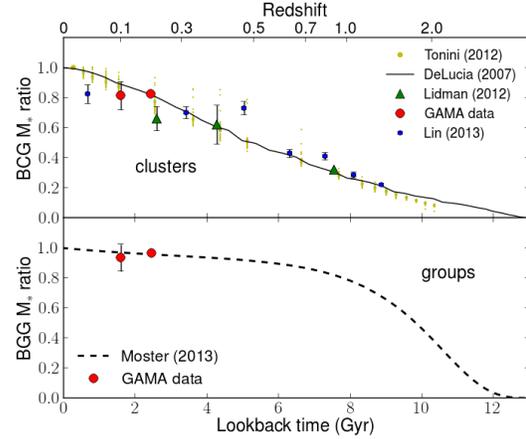


Fig. 1. Brightest group and cluster galaxies stellar mass ratio evolution with cosmic time.

In the lower panel of Figure 1 we show the BGG stellar mass ratio evolution with cosmic time. The dashed line represents the halo-occupation model of Moster et al. (2013). The red circles are our GAMA galaxies. Our results are in good agreement with the model, unfortunately is not possible to draw any conclusions due to the lack of group studies at high redshifts.

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