

We have known for a while now that galaxies residing in clusters are redder in colour, less actively star-forming and more bulge-dominated than their counterparts in the field (small groups of galaxies). But so far, it has been difficult to pinpoint exactly why this is the case.

In Matharu et al., (2019), we tracked the morphology of both star-forming and quiescent (not star-forming) galaxies across the stellar mass—size plane, both in the field and cluster environments. In the figure on the right, the first column shows the results for the field and the second column shows the results for Galaxy Clusters. This experiment was conducted with galaxies residing at a time when the Universe was approximately 6 billion years old.

The first thing to notice is that both star-forming (blue points) and quiescent (red points) galaxies broadly follow the same mass—size relations in both environments for all three types of morphology. However, **there is clearly a larger fraction of quiescent intermediates and bulge-like galaxies in the clusters.** This excess population of quiescent intermediates and bulge-like galaxies indicates that the cluster environment is more efficient at quenching galaxies of their star formation than the field environment.

The increased efficiency in quenching intermediate-type galaxies may be directly responsible for the larger fraction of quiescent bulge-like galaxies in clusters, because the physical process could make the galaxy end up looking more bulge-like. This result suggests **there is a direct morphological consequence of environmental quenching.** Go to the website below to find out more about this work.

