

The role of the stellar mass and the environment in shaping galaxy properties at different redshifts

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Abstract

Distinguishing the separate contributions of environmental versus in situ processes is critical to understanding galaxy evolution. Observational studies have had increasing success quantifying the role of environment and mass in shaping galaxy properties. I will show how color and morphological fractions depend both on mass and environment and how they evolve with time. I will focus on those galaxies that show signs of an ongoing or recent transformation of their star formation activity and/or morphology, and propose an evolutionary scenario for the different subpopulations.

To understand how mass and environment co-work, it is important to understand how they are related. I will present a detailed analysis of the galaxy stellar mass function, both from an observational and theoretical point of view. The observed galaxy stellar mass function is very similar in the field, groups and clusters and its evolution with time (from $z = 0.6$ to 0) does not depend on environment. Semi-analytic models are not able to fully reproduce the observational results, indicating that the adopted recipes to model the evolution of central and satellite galaxies still have to be better implemented in simulations.