

The Hydrangea simulations: life and death of cluster galaxies from high to low redshift

Hydrodynamical simulations provide invaluable insight into the physical processes that drive the evolution of galaxies. In the last years, such simulations have reached the point where they can model isolated galaxies relatively well, but have not been able to stretch to the realm of massive galaxy clusters because of their low volume density. In my talk, I introduce the Hydrangea simulations, the first attempt in applying a realistic galaxy formation model to study satellite galaxies in and around massive galaxy clusters. I will highlight some successes and failures of the simulations that emerge from comparisons to low-redshift observations, including the satellite stellar mass function, quenched satellite fraction, and the stellar and gas content of the simulated clusters. Finally, I will discuss what the simulations predict about the fraction of satellite galaxies that were accreted at high redshift and survive until the present day. Mainly as a consequence of “pre-processing”, a significant fraction of satellites is disrupted. Therefore, care must be taken when comparing observations of high-redshift proto-cluster galaxies with their descendants in the local Universe.