



Contribution ID: 51

Type: not specified

The Three Hundred Project: contrasting clusters galaxy density in hydrodynamical and dark matter simulations

Thursday, July 1, 2021 11:25 AM (20 minutes)

Galaxy cluster detection algorithms for IR and optical surveys are usually tested and optimized using semi-analytical large-scale-structure simulations. However, the impact of baryonic physics in the abundance and structure of dark matter sub-haloes might be important and so lead to significant bias on the performance of those algorithms. Thus, it is important to carefully understand the differences between hydro-dynamical and dark-matter-only (DM-only) simulations. For this purpose, we use the Three Hundred Project sample of 324 galaxy clusters, which correspond to zoom regions re-simulated with full physics and for DM-only. We investigate the substructures of galaxy clusters for three types of simulations: low resolution and high resolution DM-only simulations, and low resolution hydro-dynamical simulations. We find that for equivalent resolution, the hydro-dynamical simulation presents more substructures, especially at low mass, in comparison with the dark-matter-only simulations, which underestimate the galaxy abundance. When increasing the DM-only resolution, this lack of galaxies is compensated. Nevertheless, when accounting for resolution effects we observe that hydro-dynamical simulations predict larger galaxy density towards the cluster core. A potential cause for this effect is the cooling effect of gas, which would make the stellar and gas cores more resistant to be stripped out and to tidal disruptions.

Primary authors: JIMENEZ MUÑOZ, Alejandro (LPSC-CNRS); Dr MACIAS-PEREZ, Juan (LPSC); DE PETRIS, Marco (ROMA1); Prof. YEPES, Gustavo (UAM); FERRAGAMO, Antonio (Sapienza Università di Roma)

Presenter: JIMENEZ MUÑOZ, Alejandro (LPSC-CNRS)