Contribution ID: **9** Type: **not specified**

The clustering of dark matter haloes in alternative cosmological models

Tuesday 15 July 2025 12:00 (30 minutes)

The clustering of large scale structure has been recognised as a fundamental cosmological probe, which offers us the possibility to constrain fundamental parameters, such as the matter density content of the Universe. Currently, the most acknowledged cosmological scenario is the ΛCDM model, which assumes that dark matter particles exist in a 'cold' version, namely in the form of very massive candidates, e.g. WIMPs, or condensates of light axions. It is consistent with observations on scales ranging from the size of the cosmological horizon to the typical intergalactic distances. However, some possible tensions, related to the number of satellite galaxies and to the halo density profiles, have been suggested by observations at the typical galactic and sub-galactic scales, of the order of $k$pc. One possible solution is provided by complex baryonic feedback. Another possibility is to explore the dark sector, investigating the macroscopic consequences of alternative cosmological scenarios based on the existence of warm dark matter (WDM) or self-interacting dark matter (SIDM) particles. For this reason, we have used a set of dark matter-only simulations to investigate the clustering properties of halos in both cold and different WDM and SIDM models. In particular, the small-scale clustering of dark matter halos provides a valid way to discriminate between different cosmological scenarios, in preparation for a more detailed study that fully incorporates baryonic effects, and for comparison with observational data from galaxy clustering.

Author: ROMANELLO, Massimiliano (Università di Bologna)

Presenter: ROMANELLO, Massimiliano (Università di Bologna)

Session Classification: II day