



Contribution ID: 81

Type: WP3

The AIDA project: galaxy formation in alternative dark matter models

Despite years of experimental searches, understanding dark matter, a cornerstone of modern cosmology, remains elusive. For a variety of models, telescope observations often provide the only constraints on the nature of dark matter, and thus, new upcoming observations will be instrumental in studying dark matter through the comparison with numerical predictions. Only recently, simulations with alternative dark matter models have moved towards modelling dm variations and baryons at the same time, essential to derive realistic predictions.

I will present the first results from the AIDA-TNG simulations, a new set of cosmological simulations including CDM, WDM and SIDM, together with a complete treatment of galaxy formation. Thanks to the comparison between CDM and ADM, as well as hydro and dmo runs, we can constrain the effects of dark matter models on quantities such as halo statistics and matter power spectrum, galaxy shapes and dynamics, or the properties of their satellites. Moreover, cosmological boxes provide large statistics of galaxies, allowing us to create mock observations at multiple scales that can be compared to real data and used as training sets.

The simulations have been partly run on Leonardo and are the result of a Flagship project of WP3.

Giorno preferito

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