

Dolag & Komatsu

Hot & Warm: Simulating Galaxy Clusters with Interacting Dark Matter

Galaxy clusters are ideal cosmological probes of the matter distribution. Therefore they contribute significantly to the understanding of our standard cosmological model. However, there remain uncertainties within the standard LCDM model, which need to be investigated in detail. In particular, today's high precision cosmology depends on details of mapping our theoretical understanding of the formation of galaxy clusters to their observational properties and their fundamental scaling relations. By performing cosmological, hydrodynamical simulations we plan to investigate the effects of different forms of dark matter onto observable properties of galaxy clusters. Especially we want to investigate possible extensions of the LCDM model by (a) investigating models for warm dark matter; (b) explicitly including neutrinos as part of the dark matter component and (c) investigating models for interacting dark matter. We will study the changes of the internal structure of galaxy clusters, their observational scaling relations as well as produce predictions for ongoing and future surveys like PLANCK, SPT, eROSITA and DES.