

The Influence of Baryons in Interpreting the Cosmological Model

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The cosmological model based on cold dark matter (CDM) and dark energy has been hugely successful in describing the observed evolution and large scale structure of our Universe. However, at small scales (in the smallest galaxies and at the centers of larger galaxies), a number of observations seem to conflict with the predictions CDM cosmology, leading to recent exploration of Warm Dark Matter (WDM) and Self-Interacting Dark Matter (SIDM) models. These small scales, though, are also regions dominated by baryons. The more complex physics of baryons make them more difficult to model. I will show results from some of the highest resolution cosmological galaxy simulations ever produced that include both baryons and dark matter to show that baryonic physics can significantly alter the dark matter structure of galaxies, revolutionizing our expectations for the observed structure of galaxies. I will make the case that baryons have the potential to solve the crisis within CDM, but may also make it difficult to identify CDM vs WDM vs SIDM.