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Re-Examining Astrophysical Constraints on the Dark Matter Model¹

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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 interest in Warm Dark Matter (WDM) and Self-Interacting Dark Matter (SIDM) models. These small scales, though, are also regions dominated by the influence of baryons. I will present results from high resolution cosmological galaxy simulations that include both baryons and dark matter to show that baryonic physics can significantly alter the dark matter structure and substructure of galaxies, revolutionizing our expectations for galaxy structure and influencing our interpretation of the Dark Matter model.

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