

## The DREAMS Project: Investigating Small Scale Tensions

In this talk, I will introduce the DREAMS project, an innovative approach to understanding the astrophysical implications of alternative dark matter models and their effects on galaxy formation and evolution. The DREAMS project will ultimately comprise thousands of cosmological hydrodynamic simulations that simultaneously vary over dark matter physics, astrophysics, and cosmology in modeling a range of systems—from galaxy clusters to ultra-faint satellites. Such extensive simulation suites can provide adequate training sets for machine-learning-based analyses. I will cover the analysis of two simulation suites focused on MW-mass halos, comprising 2048 unique hydrodynamic simulations. One suite has a unique Warm Dark Matter particle mass for each simulation, the other contains Cold Dark Matter, both vary the initial density field and several parameters controlling the strength of baryonic feedback within the IllustrisTNG model. With these simulations, we examine how uncertainties in formation history and baryonic feedback impact measurements taken with different dark matter models.

**Author:** ROSE, Jonah Rose (Princeton)

**Co-authors:** Dr VILLAESCUSA-NAVARRO, Francisco (Simons Foundation); Prof. LISANTI, Mariangela (Princeton University); Prof. TORREY, Paul (UVA)

**Presenter:** ROSE, Jonah Rose (Princeton)