

2021—2022 ASTROPHYSICS SEMINAR SERIES

Disentangling dark matter physics through cosmological hydrodynamics simulations of low mass galaxies and Local Group observations.

One of the most important mysteries of astrophysics is the nature of dark matter. Current cosmological galaxy simulations following the standard CDM model assume dark matter is a massive collisionless particle, this assumption leads to remarkable agreement with the large-scale structure ($>a$ few Mpc). However, the agreement at smaller scales has remained challenging for CDM simulations. I will present theoretical predictions for the internal structure of faint dwarf galaxies within the Milky Way and those in the field from state-of-the-art hydrodynamics cosmological simulations using FIRE-2 feedback physics and Self-Interacting dark matter, and for the Scalar Field/Fuzzy dark matter model evolving under the IllustrisTNG astrophysics. I will provide current astronomical constraints to the dark matter nature from the latest census and kinematics of Milky Way dwarf galaxies and nearby Milky Way analogues. Finally, I will discuss how future large-volume cosmological simulations will provide new understanding on the formation of the first and faintest galaxies at the epoch of reionization which will be tested with upcoming generation of telescopes (JWST) and other deep surveys exploring the faintest galaxies (e.g. Dragonfly Telephoto Array).

**Monday, April 4th**

3:30 - 4:30 p.m.

See website for zoom details

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