

Speaker: Dr. Camilo Garcia Cely

Title: Velocity-Dependent Self-Interactions of Dark Matter and Their Astrophysical Implications



Date: 2025/09/18 (Thursday) 10:30

Place: Beijing Normal University South Campus, F108

Abstract:

Dark matter self-interactions can affect the structure and evolution of galaxies and clusters, offering a possible explanation for small-scale phenomena that challenge collisionless dark matter. A central question is how the interaction cross section depends on velocity.

In this talk, I will discuss how distinct particle-physics mechanisms—such as Yukawa-type interactions, Breit–Wigner resonances, or bound states—can lead to very similar velocity-dependent behavior. I will also discuss under which circumstances this gives rise to large cross sections at the low velocities relevant for galaxies, while remaining small at the much higher velocities of galaxy clusters. Finally, I will discuss the implications for the dynamics and structure of self-interacting dark matter halos.

