

Core–Halo Relation in Self-Interacting Scalar Field Dark Matter

Monday 10 November 2025 14:20 (20 minutes)

In this talk, I will explore the phenomenology of scalar field dark matter with both attractive and repulsive self-interactions. Using idealized simulations, I analyze the properties of halo cores across a wide range of interaction strengths, from the strongly attractive regime to the Thomas–Fermi limit. The numerical results are compared with analytical predictions for the core mass–size relation and with free-case scalings reported in the literature. I will also examine the core–halo connection across all interaction regimes and discuss how scaling relations vary with the total energy of the system. Finally, I will present the time evolution of the core mass, which exhibits a self-similar growth behavior.

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Session Classification: Parallel session - Cosmology I