Contribution ID: **86**                                                                                      Type: **Talk**

# Mapping out Dark Matter in the Milky Way

*Tuesday 25 March 2025 11:15 (15 minutes)*

In this talk, I will explore the interfacing of simulations, observations, and machine learning techniques to construct a detailed map of Dark Matter in the Milky Way, focusing on the Galactic Center/Halo and dwarf galaxies. For the Galactic Halo, I will present a recent work that reveals a decline in the stellar circular velocity, inducing tensions with established estimates of the Milky Way's mass and Dark Matter content. I will discuss how the underestimated systematic errors in such a common methodology necessitates a revised approach that combines theory, observations, and machine learning. In dwarf galaxies, I will present a novel Graph Neural Network methodology that facilitates the accurate extraction of Dark Matter density profiles, validated against realistic simulations. I will conclude with a discussion on the future trajectory of astroparticle physics, emphasizing the need for the integration of astrophysical probes with experimental Dark Matter research, potentially leading to a better understanding of the nature of Dark Matter.

**Author:**   NECIB, Lina (MIT)

**Presenter:**   NECIB, Lina (MIT)

**Session Classification:**   SESSION 6: Astrophysics and Cosmology-2