

# Unveiling the role of dark matter subhalos for gamma-ray dark matter searches

At present, N-body cosmological simulations are the most powerful tool to understand the distribution and structural properties of dark matter (DM) halos and its subhalos in the Universe. Yet, these simulations fail in simulating the smallest predicted DM structures, as it becomes computationally very expensive if not impossible to entirely cover the whole DM subhalo mass range in the simulation. This population of low-mass subhalos is expected to have very important implications not only for understanding the building blocks of structure formation but also for DM search observational strategies that aim at detecting DM through their annihilation products (gamma rays, neutrinos, antimatter).

In this TFM, we will overcome the mass resolution issue in state-of-the-art N-body cosmological simulations of a Milky-Way-size galaxy, by repopulating the original simulations well below their formal mass resolution limits with low-mass subhalos using both bootstrapping techniques and semi-analytical prescriptions based on the standard cosmological model. The results will help us, among other things, to make detectability predictions of the DM subhalo population for current satellite- and ground-base gamma-ray experiments.