

# Probing Dark Matter-Proton Interactions with Cosmic Reservoirs

*Thursday, September 21, 2023 12:00 PM (20 minutes)*

Dark Matter (DM) existence is a milestone of the cosmological standard model and, yet, its discovery still remains a complete conundrum. In this talk, I will investigate a unique and original way to probe properties of light dark matter candidates, exploiting the nature of the cosmic-ray (CR) transport inside starburst nuclei (SBNs). Indeed, SBNs are considered CR reservoirs, trapping them for  $\sim 10^5$  years up to about PeVs energies, leading to copious production of gamma-rays and neutrinos. As a result, interactions between DM and protons might indelibly change CR transport in these galaxies, perturbing the gamma-rays and neutrino production. I will show that current gamma-ray observations pose strict limits on the elastic cross section down to  $\sigma_{\chi p} \simeq 10^{-34} \text{ cm}^2$  for DM masses  $m_\chi \leq 10^{-3} \text{ MeV}$  and that they have considerable room for improvement with the future gamma-ray measurements in the 0.1-10 TeV range from the Cherenkov Telescope Array.

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