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Novel probes of sub-GeV dark matter

Although Dark matter (DM) is one of the cornerstones of fundamental physics and cosmology, so far it has evaded all the attempts to unveil its nature. A standard way to directly probe DM particles is to search for their scatterings with nucleons in underground detectors. However, in case of DM particles with sub-GeV masses, the direct-detection technique is hampered by the low nucleon recoil energies which are typically below the experimental sensitivity. In this talk, I will discuss a novel idea to probe sub-GeV DM particles. In particular, I will investigate the effects of the possible scatterings between cosmic-ray protons and sub-GeV DM particles in star-forming and starburst galaxies, which are well-motivated astrophysical emitters of high-energy neutrinos and gamma-rays through hadronic collisions. For this scenario, I will explore the phenomenological implications and discuss new constraints on the DM parameter space.

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