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Indirect searches for realistic sub-GeV Dark Matter models in present and upcoming observations

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Indirect searches for Dark Matter (DM) particles with mass in the MeV - GeV scale have received significant attention lately. Pair-annihilations of such DM particles in the Galaxy can give rise to MeV - GeV gamma-rays via prompt emission, sub-GeV e^+e^- 's in cosmic-rays, as well as a broad photon spectrum ranging from X-rays to soft gamma-rays, produced by the secondary emissions from DM induced $e^-(e^+)$'s via inverse Compton scattering, bremsstrahlung and in-flight annihilation processes. In this talk I shall focus on two realistic sub-GeV DM models, namely, the vector-portal and the scalar-portal model, and present the corresponding indirect detection constraints from existing X-rays, gamma-rays and cosmic-ray observations, based on all of the above-mentioned signals. I shall also present the prospects of the upcoming MeV photon telescope COSI to probe such signals from these DM models. I shall show that for both types of DM models new unconstrained DM parameter space can be probed at the upcoming instruments like COSI.

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Classification de Session: Dark matter