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Searching for neutrinos and photons from sub-GeV dark matter interacting with quarks

In this work, we look at a model of sub-GeV dark matter interacting with quarks via a vector current coupling. In the present day, these low-energy interactions are implemented using the chiral Lagrangian framework and result in effective couplings to light mesons. We have calculated the rates of dark matter annihilation into these mesons, and obtained the expected secondary photon and neutrino spectrum using publicly available tools. We have evaluated the limits from existing gamma ray telescopes as well as large volume neutrino experiments. We also forecast the sensitivity of future experiments in both channels, highlighting the discovery reach for such dark matter models in the multi-messenger era.

Field of contribution

Theory

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