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A Search of Dark Tridents Using the MicroBooNE Detector

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In this poster, we present the development of an ongoing search of dark matter particles with sub-GeV masses using the MicroBooNE detector. The MicroBooNE experiment is a liquid argon time projection chamber with great calorimetry and particle identification capacities located at Fermilab. We consider dark matter particles that would be produced through neutral meson decay by mesons coming from the NuMI beam. These particles can travel uninterruptedly to the MicroBooNE detector where they might scatter off an argon nucleus producing a lepton-antilepton pair. This distinguishable final state produced by the dark matter scattering has been named as the dark trident interaction. We explore two event selection strategies, one using a traditional boosted decision tree and a second one applying state of the art deep learning techniques. We make a performance comparison of both selection methods, working independently and combined. Finally, we present an estimated sensitivity of the MicroBooNE experiment to this dark matter interaction channel.

In-person participation

Yes

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