

Phenomenology 2021 Symposium



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Phenomenology of Inelastic Dark Matter at the SBN Experiments

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We study the prospects for probing models of inelastic dark matter (iDM) at the Fermilab-based Short Baseline Neutrino (SBN) experiments. In iDM models, elastic scattering of dark matter is suppressed, but the dark matter has an inelastic interaction with a slightly heavier excited dark sector state. The high-intensity Booster and NuMI proton beams can produce dark sector states in the MeV to GeV mass range that can then be detected at the SBN experiments. If the splitting between the two dark matter states is small, then excited dark sector states can propagate into the detectors and decay there. We demonstrate that the SBN experiments can probe new parts of iDM parameter space. Our study notably includes a simulation of iDM production and decay in the detectors, with a comparison to simulated backgrounds from neutrino scattering.

Summary

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