

Physics Opportunities in the Near DUNE Detector hall: PONDD



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Fixed-Target Minicharge Searches: FerMINI and Neutrino Experiments

Tuesday, 4 December 2018 11:30 (30 minutes)

We propose a dedicated search for minicharged particles (MCP) and light dark matter at Fermilab utilizing proton-fixed target facilities. First, we present the constraints and sensitivity projections considering the MCP scattering with the electrons in the neutrino detectors, including SBND, MiniBooBE, MicroBooNE, DUNE, and SHiP.

Then we present a new proposal, FerMINI, to place a new detector to further improve the sensitivity. The potential sites include MINOS hall downstream of NuMI beamline and the proposed DUNE near detector hall downstream of the LBNF beamline. The setup could drastically improve the sensitivity of MCPs in the MeV to 5 GeV mass regime and will be discussed in detail in this talk.

I will also talk about the probes of other weakly interacting particles, including light scalars, dark photons, and dipole portal HNL (an explanation of MiniBooNE anomaly) if time allows.

This talk is based on:

[1] arXiv:1806.03310, PRL 2018

[2] arXiv:1803.03262, PRD 2018

[3] arXiv:1706.00424, PLB 2018

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Session Classification: Light Dark Matter I