Contribution ID: **371** Type: **Poster**

Searches for Dark Sector Mediators in the DUNE Multi-Purpose Near Detector

Starting in the late 2020s, DUNE will usher the neutrino physics community into a precision era. While its long baseline (1300 km) and large far detector mass (40 kt fiducial) are the focus of many interesting studies, its Near Detector hall offers an intense neutrino flux, rich for interesting studies. One component in the ND hall is the Multi-Purpose Near Detector (MPD), a gaseous argon time-projection chamber situated in an electromagnetic calorimeter and magnet. Because of its low density, neutrino scattering signatures are less common in the MPD, but new physics signatures, like decays of beyond-the-Standard-Model particles could have large signal rates. This poster presents the results that demonstrate the power of the MPD in searching for a number of new physics scenarios: Dark Photons, Dark Higgs Bosons, and Heavy Neutral Leptons, all of which could connect the Standard Model to a rich Dark Sector.

Mini-abstract

Hunting Dark Sector Mediators in the DUNE Near Detector

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Session Classification: Poster Session 1