Abstract Submitted
for the TSS21 Meeting of
The American Physical Society

A Concept of Neutral Rich Horn Focusing System for Low-Mass Dark Matter Search in Future Neutrino Experiments. AAYUSH BHATTARAI, University of Texas at Arlington — Next-generation neutrino experiments like the Deep Underground Neutrino Experiment (DUNE) can also help exploring the physics Beyond the Standard Model (BSM) thanks to high intensity proton beams and capable detectors. The concept of a Neutral Rich Horn Focusing system (NRHF) makes it possible for precision neutrino experiments and beam-dump style experiments to coexist. This system helps to reduce background from neutrinos to searches of BSM particles such as low-mass dark matter, axions like particles, heavy neutral leptons, and other charge-neutral particles. The most essential component of this system is the three-dimensional sign selecting dipole that provides a magnetic kick guiding the focused charged particles towards the neutrino experiment, leaving the neutral particles on their way to the beam dump. With this system, we can enhance the signal to background ratio by several orders of magnitudes. This presentation will describe the working principles of NRHF, technical issues concerning sign selecting 3D dipole, and the resulting enhancement of the signal to background ratio dependent on the parameters of the system.

Aayush Bhattarai
University of Texas at Arlington

Date submitted: 15 Mar 2021

Electronic form version 1.4