

DPF-PHENO 2024

Contribution ID: 647

Type: **not specified**

Utilizing the Iron Dump at Short Baseline Neutrino Facilities to Probe Heavy Neutral Lepton and Dark Matter

Tuesday 14 May 2024 17:00 (15 minutes)

In the ongoing Short-Baseline Neutrino facilities such as the Short-Baseline Near Detector (SBND), Micro-BooNE and ICARUS, there exists an iron dump positioned ~ 45.79 m from the Fermilab Booster Neutrino Beam (BNB)'s beryllium target. The neutrinos produced from charged pion and kaon decays can undergo up-scattering off iron nuclei resulting in the production of MeV mass scale heavy neutral leptons (HNLs). These HNLs then travel to the respective detectors and decay into Standard Model neutrinos, photons, e^+e^- , etc. While previous studies have predominantly focused on the production of HNLs without considering the iron dump, the inclusion of it significantly enhances sensitivity allowing us to probe more unconstrained parameter space of HNL coupling versus mass. Additionally, distinctive signatures indicating the production origin of HNLs have also been observed in the energy and angular spectra of the final states. Furthermore, we also investigated the effects of the dump in the case of inelastic dark matter thereby probing unexplored regions of the parameter space.

Mini Symposia (Invited Talks Only)

Primary authors: KARTHIKEYAN, Aparajitha (Department of Physics and Astronomy, Texas A&M University); DUTTA, Bhaskar; GOSWAMI, Debopam (Department of Physics & Astronomy, Texas A&M University); KELLY, Kevin James (Texas A&M University)

Presenter: GOSWAMI, Debopam (Department of Physics & Astronomy, Texas A&M University)

Session Classification: Physics Beyond the Standard Model

Track Classification: Other BSM