

Fernanda Psihas – HEP Seminar – December 8, 2022
FNAL

Title: DUNE as a multi-ton neutrino-less double beta decay experiment.

Abstract: The DUNE physics program primarily focuses on signals in the GeV energy range. In recent years, DUNE's potential as a low-energy experiment has been explored, specifically regarding its sensitivity to signals as low as 5-10 MeV such as those associated with supernova burst and solar neutrinos. In this presentation I discuss the requirements and modifications that could extend DUNE's sensitivity to energies as low as 2MeV and would enable us to further expand DUNE's physics program to searches for neutrino-less double-beta decay in xenon-doped liquid argon at the multi-ton scale. I will present the modifications we propose with corresponding sensitivity estimates for measurements of the absolute neutrino mass scale ($m\beta\beta$) beyond the what is expected from current and next generation neutrino-less double beta decay experiments.

A crucial component of this concept requires R&D focused on improved energy resolution for signals below 10 MeV, which would also enhance the physics reach of the nominal DUNE program. I will describe the rich and diverse R&D program that this research avenue would open for DUNE in the coming years.