

Probing the Nature of Heavy Neutral Leptons in Direct Searches and Neutrinoless Double Beta Decay

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Direct searches at fixed target experiments and searches for neutrinoless double beta ($0\nu\beta\beta$) decay can be used to probe the Majorana vs. pseudo-Dirac nature of a Heavy Neutral Lepton (HNL) pair. Firstly, I will outline a phenomenological parametrisation relating the active-sterile mixing strengths to the neutrino oscillation data, assuming that the HNL pair generates masses for two light neutrinos. I will then consider the possible constructive or destructive interference of the HNL pair with the light neutrino contribution in $0\nu\beta\beta$ decay and the production and decay of HNLs in fixed target experiments. Finally, I will explore how signals at LEGEND-1000 and DUNE constrain the HNL parameter space; in particular, the mass splitting between the HNL pair.

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