

## Displaced fat-jets and tracks to probe boosted right-handed neutrinos in the $U(1)_{B-L}$ model

Tuesday 16 August 2022 15:50 (20 minutes)

We investigate the pair-production of Right-Handed Neutrinos (RHNs) via a  $B - L Z'$  boson and present the sensitivity studies of the active-sterile neutrino mixing ( $|V_{\mu N}|$ ) at the High-Luminosity run of the LHC (HL-LHC) and a future  $pp$  collider (FCC-hh). We focus on RHN states with a mass of  $10 - 70$  GeV which naturally results in displaced vertices for small  $|V_{\mu N}|$ . Being produced through a mass resonance with  $M_{Z'} \geq 1$  TeV, the RHNs are heavily boosted, leading to collimated decay products that give rise to fat-jets. We investigate the detection prospect of dedicated signatures in the inner detector and the muon spectrometer, namely a pair of displaced fat-jets and the associated tracks, respectively. We find that both the HL-LHC and FCC-hh can be sensitive to  $|V_{\mu N}| > 10^{-6}$  and  $|V_{\mu N}| > 10^{-7}$  with the number of events reaching  $\mathcal{O}(10)$  and  $\mathcal{O}(10^3)$ , respectively. This allows probing the generation of light neutrino masses through the Seesaw mechanism.

**Author:** Ms PADHAN, ROJALIN (Institute of Physics, Bhubaneswar)

**Co-authors:** KULKARNI, Suchita (University of Graz); Prof. MITRA, Manimala (Institute of Physics, Bhubaneswar, India); DEPPISCH, Frank F

**Presenter:** Ms PADHAN, ROJALIN (Institute of Physics, Bhubaneswar)

**Session Classification:** Poster session