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Constraining the SMEFT with Right-Handed Neutrinos at FCC-ee

The existence of right-handed neutrinos (RHNs), or heavy neutral leptons (HNLs), is strongly motivated by the observation of small but finite neutrino masses and mixings. In this work, we have extended the Standard Model (SM) particle content with a pair of gauge-singlet fermions, which can be either Dirac or Majorana in nature. Adopting a model-independent effective field theory (EFT) framework, more specifically N_R SMEFT, we consider all possible operators of different Lorentz structures i.e., scalar (S), vector (V), and tensor (T) types upto mass dimension 6. With these operators, we analyze the future electron positron circular collider (FCC-ee) prospects and constrain the corresponding new physics (NP) cut-off scale Λ_{NP} in the monophoton channel with $\sqrt{s} = 91.2$ GeV at 100 ab^{-1} as well as $\sqrt{s} = 240$ GeV at 5 ab^{-1} integrated luminosities.

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