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Testing Left-Right Symmetry with trilepton channel

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We assess the sensitivity of the LHC, its high energy upgrade, and a prospective 100 TeV hadronic collider to the Dirac Yukawa coupling of the heavy neutrinos in left-right symmetric models (LRSMs). We focus specifically on the trilepton final state in regions of parameter space yielding prompt decays of the right-handed gauge bosons (W_R) and neutrinos (N_R). In the minimal LRSM, the Dirac Yukawa couplings are completely fixed in terms of the mass matrices for the heavy and light neutrinos. In this case, the trilepton signal provides a direct probe of the Dirac mass term for a fixed W_R and N_R mass. We find that while it is possible to discover the W_R at the LHC, probing the Dirac Yukawa couplings will require a 100 TeV pp collider. We also show that the observation of the trilepton signal at the LHC would indicate the presence of a non-minimal LRSM scenario.

Summary

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