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Phenomenology of the Zee model for Dirac neutrinos and general neutrino interactions

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The Zee model for Dirac neutrinos is one of the simplest models featuring one-loop Dirac neutrino masses. The interactions between the new scalars (two singly-charged fields) and neutrinos induce general neutrino interactions (GNI) which, as a generalisation of the non standard neutrino interactions, constitute an additional tool to probe models beyond the SM like this. In this work, we consider a $U(1)_{B-L}$ gauge symmetry as the responsible for the Diracness of the neutrinos and the radiative character of the neutrino masses. We determine the viable parameter space consistent with neutrino oscillation data, leptonic rare decays and collider constraints, and establish the most relevant experimental prospects regarding lepton flavor violation searches and GNI in future solar neutrino experiments.

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