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Probing Lepton Number Violation and Majorana Nature of Neutrinos at the LHC

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Observation of lepton number (L) violation by two units at colliders would provide evidence for the Majorana nature of neutrinos. We study signals of L-violation in the context of two popular models of neutrino masses, the type-II seesaw model and the Zee model, wherein small neutrino masses arise at the tree-level and one-loop level, respectively. We focus on L-violation signals at the LHC arising through the same-sign dilepton plus jets within these frameworks. We obtain sensitivity to L-violation in the type-II seesaw model for triplet scalar masses up to 700 GeV and in the Zee model for charged scalar masses up to 4.8 TeV at the high-luminosity LHC with an integrated luminosity of 3 ab−1

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