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Searching for 100 GeV Majorana Neutrinos at the LHC Using Same Sign Dilepton Final State WARREN CLARIDA, YASAR ONEL, TAYLAN YETKIN, U. of Iowa, RICK VIDAL, WEIMIN WU, Fermilab, TAO HAN, U. of Wisconsin, HAIFENG PI, UCSD, EFE YAZGEN, TTU, CMS COLLABORATION — The Standard Model can be extended to include massive neutrinos as observed in the recent oscillation experiments. One model introduces a new neutrino with a Majorana nature with an unknown mass. In this study we presented the potential for the discovery of a Majorana neutrino during the first year of data collection from the Large Hadron Collider. We considered the production of a muon and Majorana neutrino that subsequently decays into a muon and W boson. Since the muons have the same sign and there is no missing energy this signal's signature is a lepton number violating final state, which cannot occur in the Standard Model. The signal and background events were produced and analyzed by using CMS software. In the analysis we used muon triggers, muon isolation, jet energy corrections, b-tagging, and an examination of the combinatorial background. The neutrino mass was found by using one of the muons with the partons from the W decay. We found that the mass can be reconstructed reasonably well using one of the isolated muons and two jets with proper jet corrections; whereas the contribution from the various backgrounds was small. We concluded that discovery potential can be reached in the first year of running at the LHC.

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