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Search for heavy Majorana neutrinos in same-sign dilepton channels in proton-proton collisions at $\sqrt{s}=13$ TeV (Article) [\(Open Access\)](#)

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Abstract

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A search is performed for a heavy Majorana neutrino (N), produced in leptonic decay of a W boson propagator and decaying into a W boson and a lepton, with the CMS detector at the LHC. The signature used in this search consists of two same-sign leptons, in any flavor combination of electrons and muons, and at least one jet. The data were collected during 2016 in proton-proton collisions at a center-of-mass energy of 13 TeV, corresponding to an integrated luminosity of 35.9 fb^{-1} . The results are found to be consistent with the expected standard model background. Upper limits are set in the mass range between 20 and 1600 GeV in the context of a Type-I seesaw mechanism, on $|V_{eN}|^2$, $|V_{\mu N}|^2$, and $|V_{eN} V_{\mu N}^*|^2 / (|V_{eN}|^2 + |V_{\mu N}|^2)$, where $V_{\ell N}$ is the matrix element describing the mixing of N with the standard model neutrino of flavor $\ell = e, \mu$. For N masses between 20 and 1600 GeV, the upper limits on $|V_{\ell N}|^2$ range between 2.3×10^{-5} and unity. These are the most restrictive direct limits for heavy Majorana neutrino masses above 430 GeV.[Figure not available: see fulltext.] © 2019, The Author(s).

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