

# Search for heavy neutral leptons with the CMS detector

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*The smallness of neutrino masses provides a tantalizing allusion to physics beyond the standard model (SM). Heavy neutral leptons (HNL), such as hypothetical sterile neutrinos, accommodate a way to explain this observation, through the see-saw mechanism. If they exist, HNL could also provide answers about the dark matter nature, and baryon asymmetry of the universe. Searches for the production of HNL at the LHC, originating from leptonic W boson decays through the mixing of the HNL with SM neutrinos, are presented. The sample of pp collisions collected by the CMS detector throughout 2016 is used, amounting to a volume of 35.9/fb. The final results are presented in the plane of the mixing parameter of HNL to their SM counterparts, versus their mass, and are the first such result at a hadron collider for masses below 40 GeV and the first direct result for masses above 500 GeV.*

## References

- [1] CMS Collaboration, "Search for Heavy Neutral Leptons in Events with Three Charged Leptons in Proton-Proton Collisions at  $\sqrt{s} = 13$  TeV", *Phys. Rev. Lett.*, **120**, no 22., 2018.