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Search for Long-Lived Heavy Neutrinos at the LHC with a VBF Trigger

The charged current production of long-lived heavy neutrinos at the LHC can use a prompt charged lepton for triggering the measurement of the process. However, in order to fully characterize the heavy neutrino interactions, it is necessary to also probe Higgs or Z mediated neutral current production. In this case the charged lepton is not available, so other means of triggering are required.

In this work, we explore the possibility of using a vector boson fusion trigger in the context of a GeV-scale Type I Seesaw model. We consider a minimal model, where both Higgs and Z -mediated contributions produce one heavy neutrino, as well as an extended model where the Higgs can decay into two heavy ones. Both scenarios are tested through displaced dilepton and displaced multitrack jet searches.

Mini-abstract

Heavy Neutrinos could be observed at the LHC via a VBF trigger with a multitrack search.

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