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## Search for Higgs Boson pair production in the $HH \rightarrow b\bar{b}ll + MET$ final states with ATLAS detector at LHC

A search for Higgs Boson pair production via vector boson fusion and decaying to b-quarks and  $WW/ZZ/\gamma\gamma$  final states is underway using the Run-2 dataset collected by ATLAS at  $\sqrt{s} = 13$  TeV, corresponding to 139 fb of 2015-2018 providing a completely new signature in the Higgs sector. This search can give constraints on the parameters of the Higgs coupling with vector bosons, especially the quadruple coupling of  $VVhh$ , using a non-resonant signature. In this analysis a VBF selection is added to the ggF-analysis selection and optimized by comparing the backgrounds and newly produced VBF signal MCs. In this talk we will present an overview of the analysis, Event definition/selection and the classification results of ggF signal and VBF varied coupling modifiers with a Neural network method and will show also some results from the previously published papers (related to HH production).

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