

MSSM Higgs search via bb decay at CMS experiment with Run 2 proton proton collision data

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This analysis note serves as an archive of searching for MSSM Higgs bosons decaying to a pair of bottom quarks ($H \rightarrow bb$) using approximately 150 fb^{-1} of CMS Run2 proton-proton collision data collected at a center-of-mass energy of 13 TeV between 2015 and 2018.

With the evolution of time, around 40 fb^{-1} data have been taken by CMS collaboration according to the initial design of Run2 MSSM Hbb triggers from year 2015 to 2016. Modified trigger versions have been committed online for year 2017 and 2018. For these later years, high-level trigger (HLT) bias-free datasets were utilized to evaluate the performance of the updated MSSM Hbb trigger design and to project its behavior under higher pile-up conditions.

No significant MSSM Hbb signal was observed in the 2016 dataset. Upper limits on the MSSM Higgs production cross section were set for $m(A)$ mass range of $[400, 1600] \text{ GeV}$, with the latest CMS Ultra-Legacy data analysis framework setting for Run2.

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