

Search for the standard model Higgs boson in association with a bottom-quark pair (bbH)

DPG 2022

December 7, 2021

One of the main goals of the LHC experiment is the precise measurement of the Higgs boson production mechanisms to clarify its coupling structure. In the Standard Model of particle physics, the coupling of the Higgs boson to fermions is introduced via the Yukawa interaction. Up to now the Yukawa coupling to b-quarks (y_b) was measured only in the decay process, and not yet in the production mechanism due to the low cross-section and the overwhelming background processes.

This measurement aims at measuring the b-associated Higgs production (bbH) using data collected by the CMS experiment during Run 2. The study covers events where the Higgs boson is produced through the bbH channel and further decays into two tau leptons, subsequently fully leptonically ($\tau_e\tau_\mu$) or fully hadronically ($\tau_h\tau_h$). A machine learning approach has been used to classify the events into two Higgs signal classes and several background classes. First results on the sensitivity on the bbH production channel will be shown.