



Feasibility Study of Measuring the Higgs Self-coupling Using the Muon Collider

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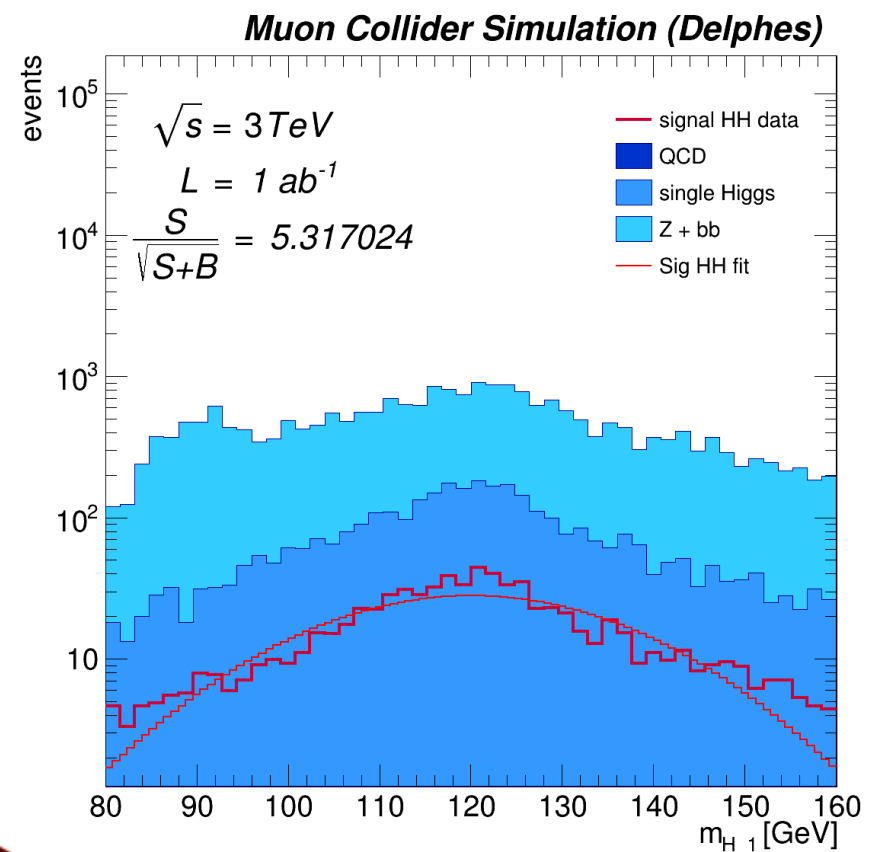
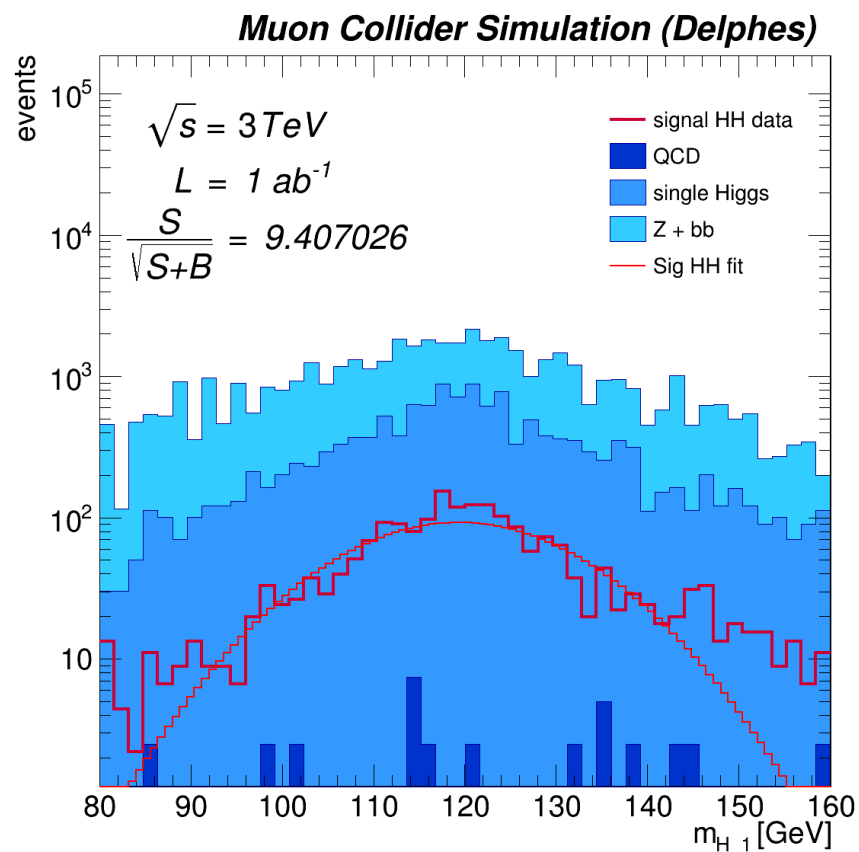


- Signal: $\mu^- + \mu^+ \rightarrow \nu_\mu + \bar{\nu}_\mu + H + H$ ($0.0008201 \pm 2.2e - 6$ pb)
- Background:
 - $\mu^- + \mu^+ \rightarrow \nu_\mu + \bar{\nu}_\mu + b + \bar{b} + Z$ (0.03168 ± 0.00027 pb)
 - $\mu^- + \mu^+ \rightarrow \nu_\mu + \bar{\nu}_\mu + b + \bar{b} + H$ ($0.003743 \pm 2.7e - 5$ pb)
 - $\mu^- + \mu^+ \rightarrow \nu_\mu + \bar{\nu}_\mu + b + \bar{b} + b + \bar{b}$ ($0.0009227 \pm 7.02e - 6$ pb)

10k for each



Btag=4 add to the cut





Trained variables

- Number of jets in the event
- p_T for all four jets, higgs, and di-Higgs system
- η and ϕ for all four jets, higgs, and di-Higgs system
- Invariant mass for Higgs and di-Higgs system
- B-Tagging for all four jets, number of b-tagged jets in the event
- MET, η and ϕ of MET
- deltaTheta between di-higgs and MET
- deltaPhi, deltaEta for higgs



How the BDT change

AUC dropped from 0.784 to 0.722

