



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

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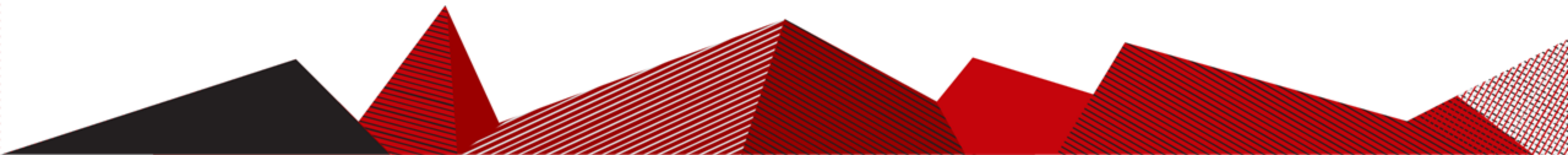
# 3TeV

- Signal:  $\mu^- + \mu^+ \rightarrow \nu_\mu + \bar{\nu}_\mu + H + H$  (0.0008182 pb)
- Background:
  - $\mu^- + \mu^+ \rightarrow \nu_\mu + \bar{\nu}_\mu + \mathbf{q} + \bar{\mathbf{q}} + Z$  (0.05685 pb)
  - $\mu^- + \mu^+ \rightarrow \nu_\mu + \bar{\nu}_\mu + b + \bar{b} + H$  (0.003771 pb)
  - $\mu^- + \mu^+ \rightarrow \nu_\mu + \bar{\nu}_\mu + b + \bar{b} + b + \bar{b}$  (0.0009237 pb)

100k for each

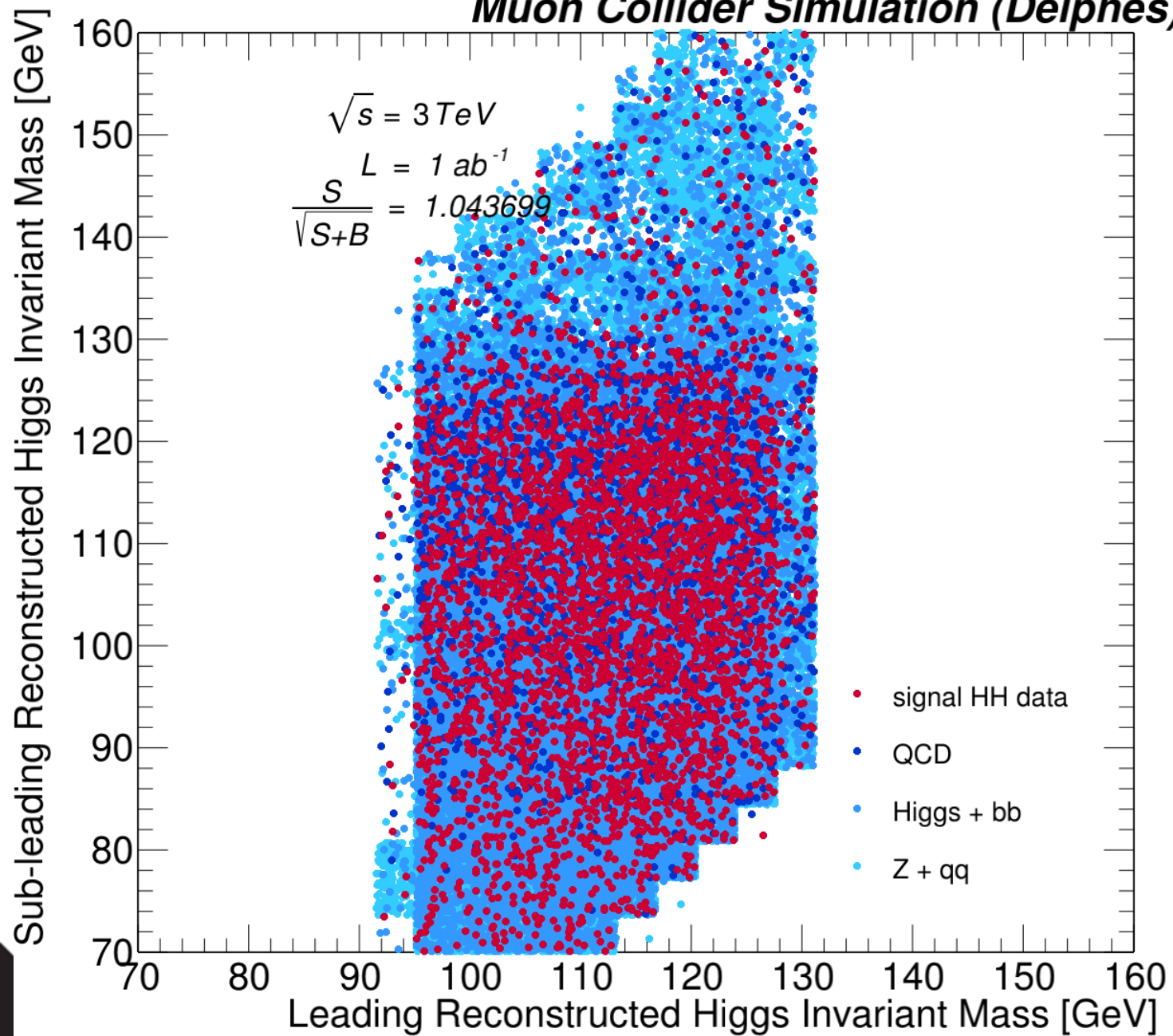


Here are original plot without signal enhancement:



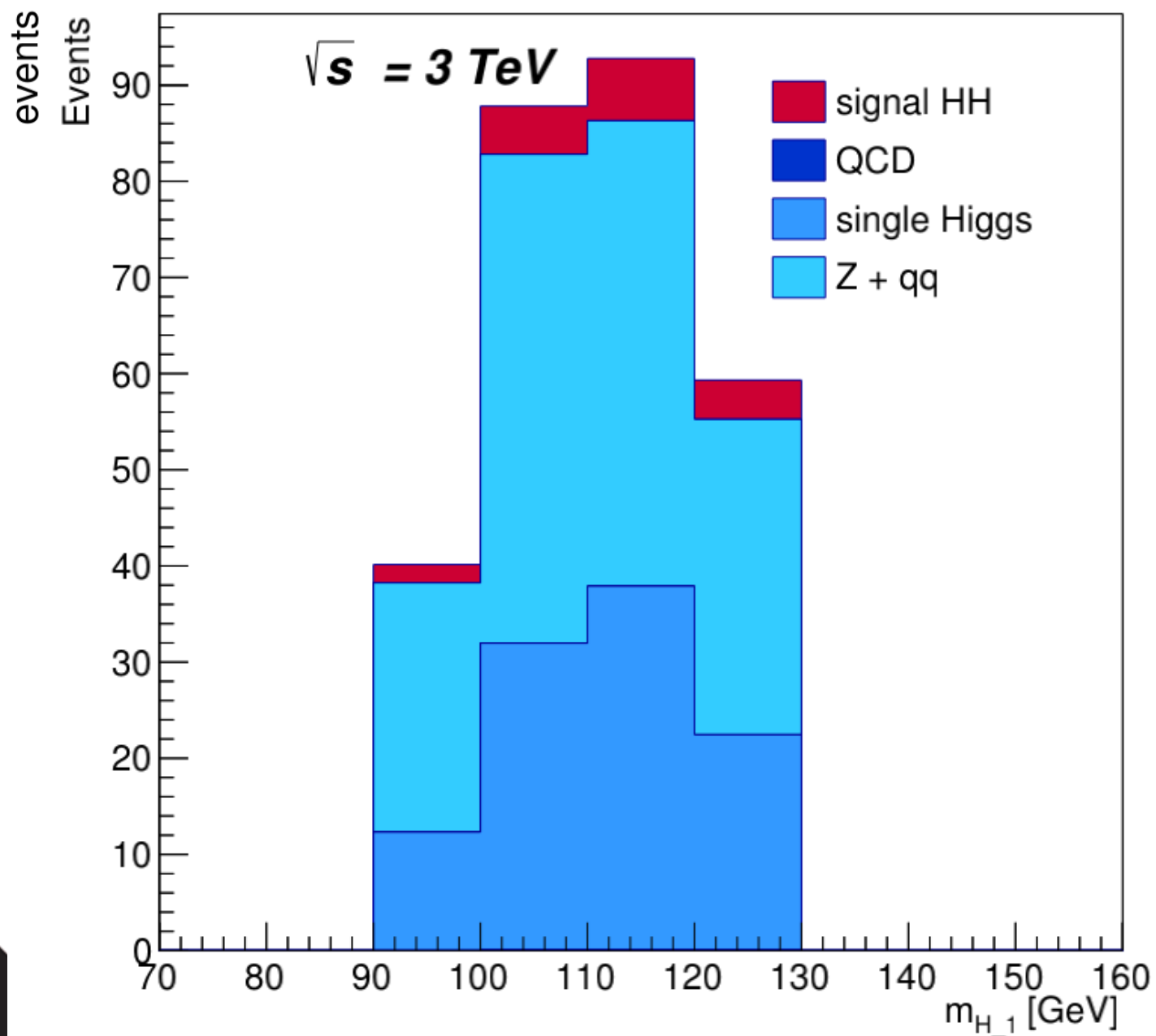


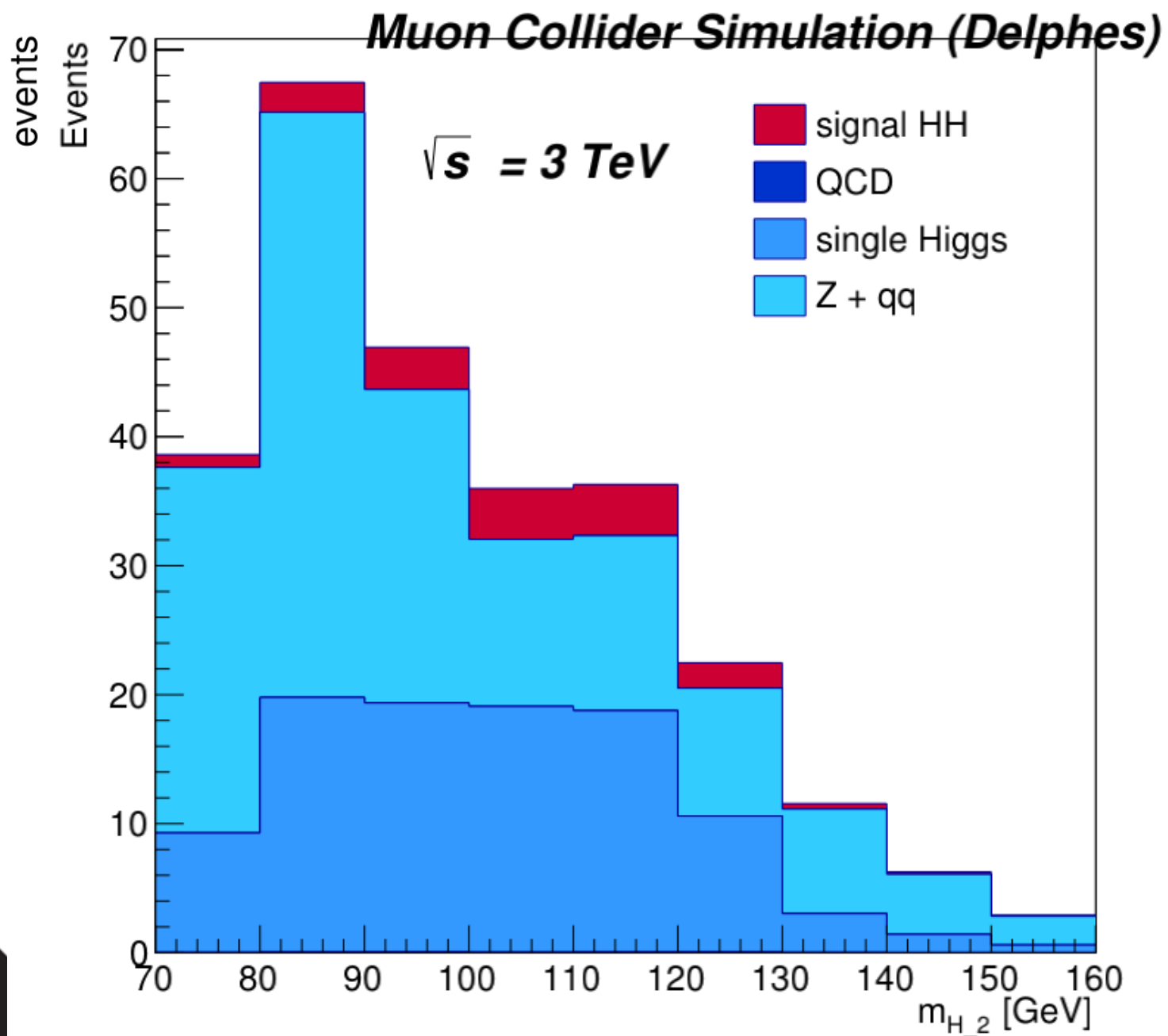
## Muon Collider Simulation (Delphes)





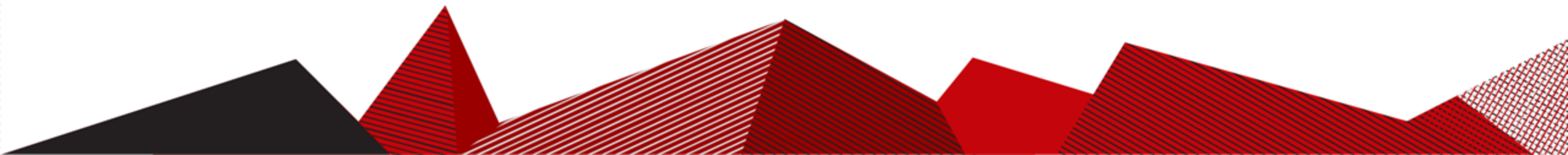
## Muon Collider Simulation (Delphes)







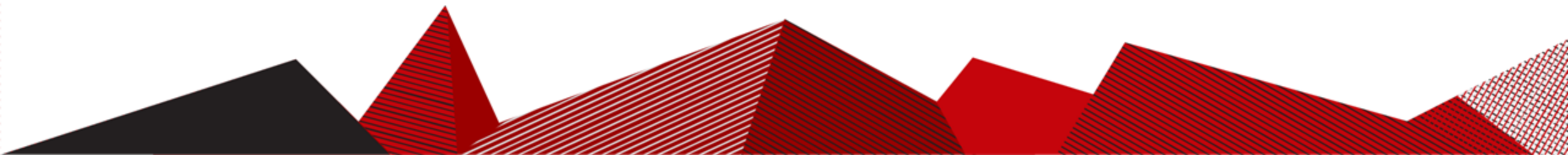
Fit function as a gaussian + exponential bkg + gaussian peak at 91GeV?





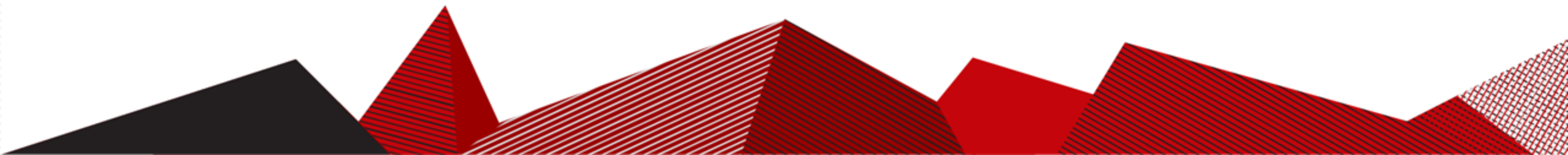
## 10 TeV and 30TeV

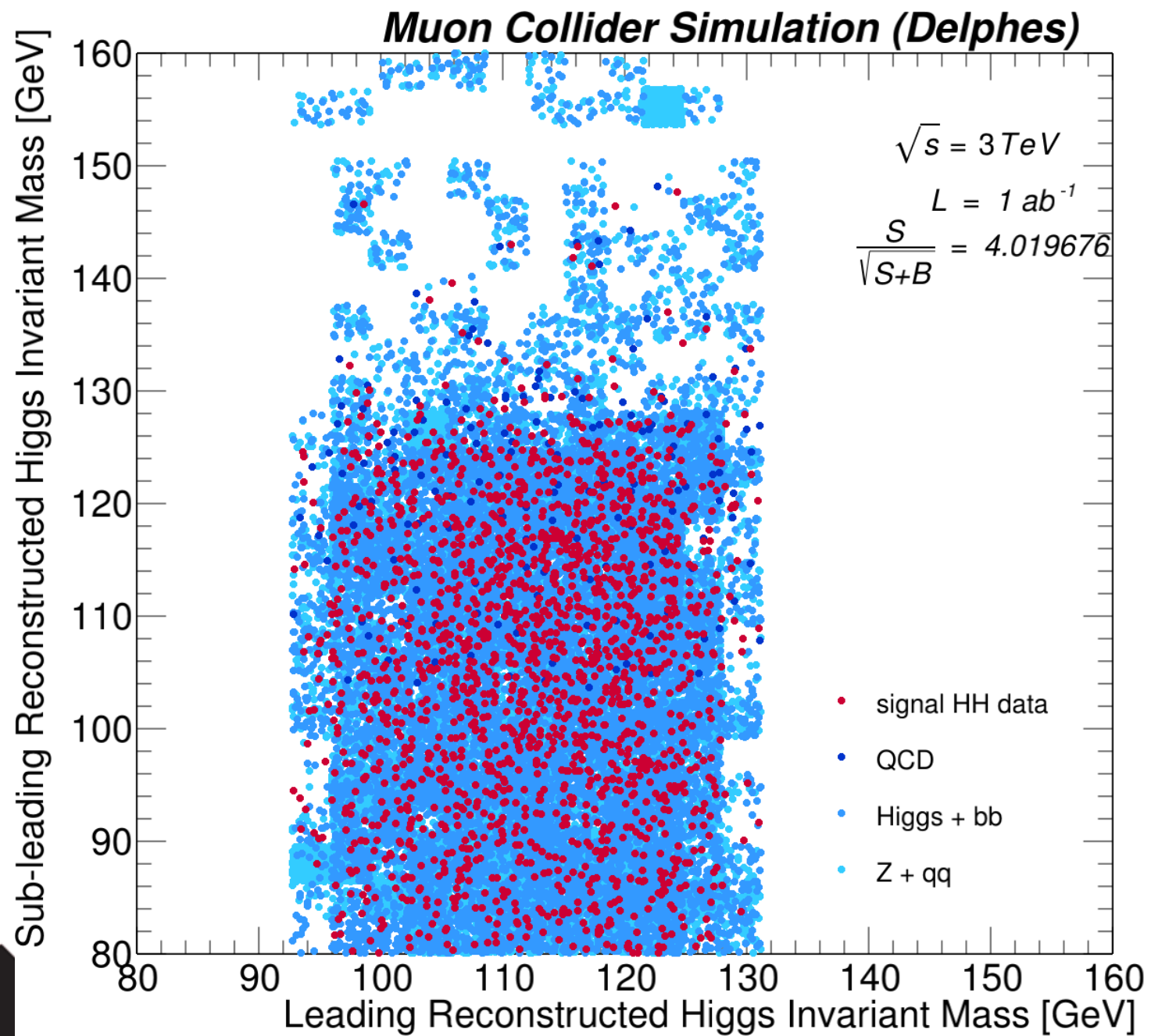
- Could successfully generate 100 event for each run
- Wrote the script for running 1000 jobs to condor
- Need to discussed choices of jet constraint parameter in MadGraph





Original plot with lack of  $vvqqz$  data(not smooth)







## Muon Collider Simulation (Delphes)

