



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:
 - $\mu^- + \mu^+ \rightarrow \nu_\mu + \bar{\nu}_\mu + q + \bar{q} + Z$ (0.05685 pb)
 - ~~$\mu^- + \mu^+ \rightarrow \nu_\mu + \bar{\nu}_\mu + Z + Z$ (0.081 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

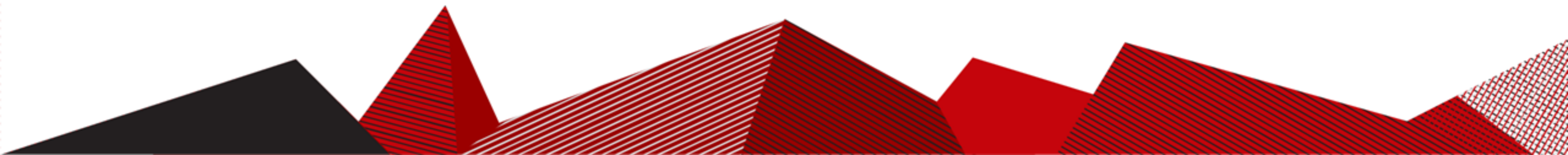


3 TeV

- Remove ZZ as qqZ double counting them

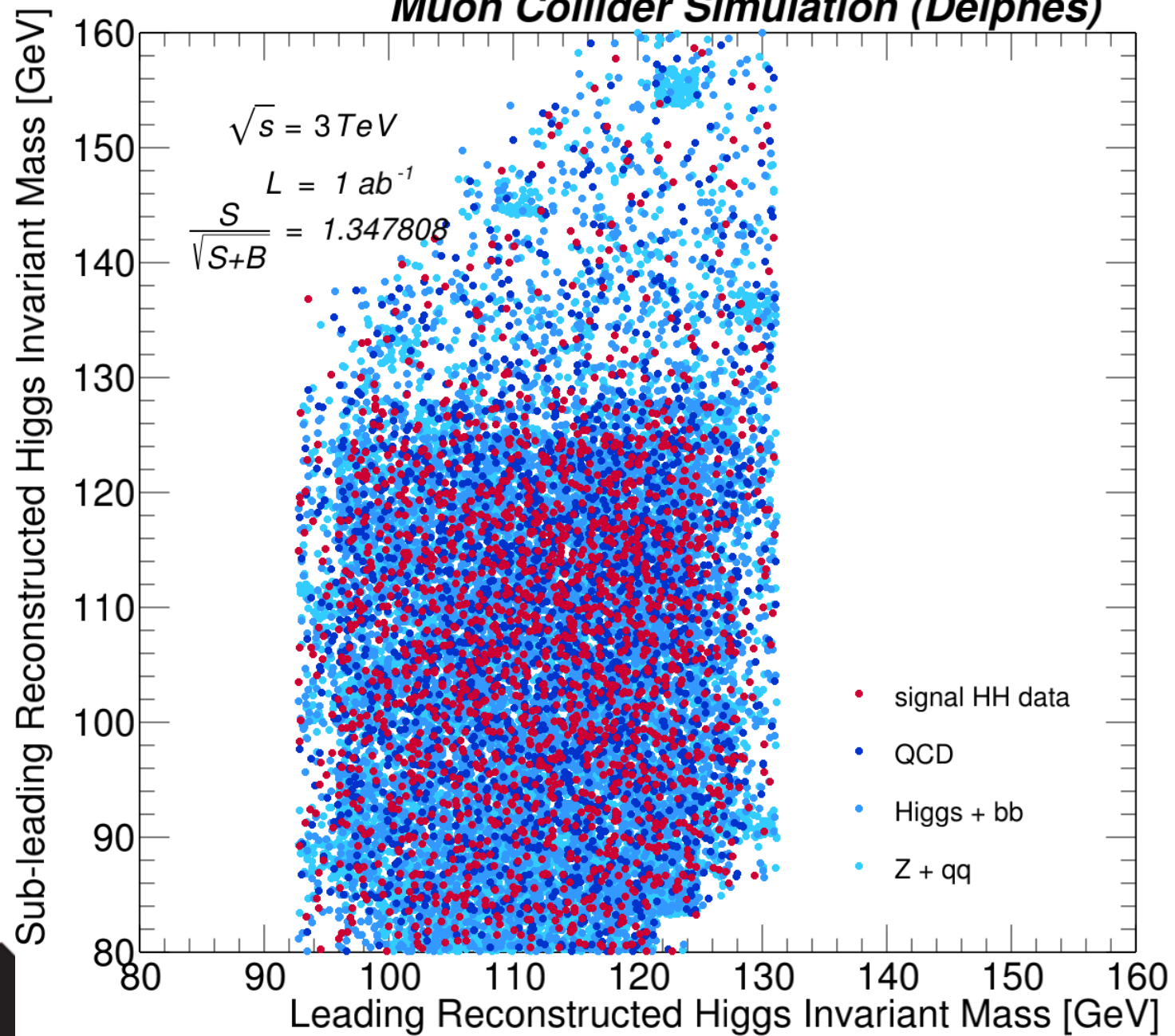


Here are original plot without signal enhancement:



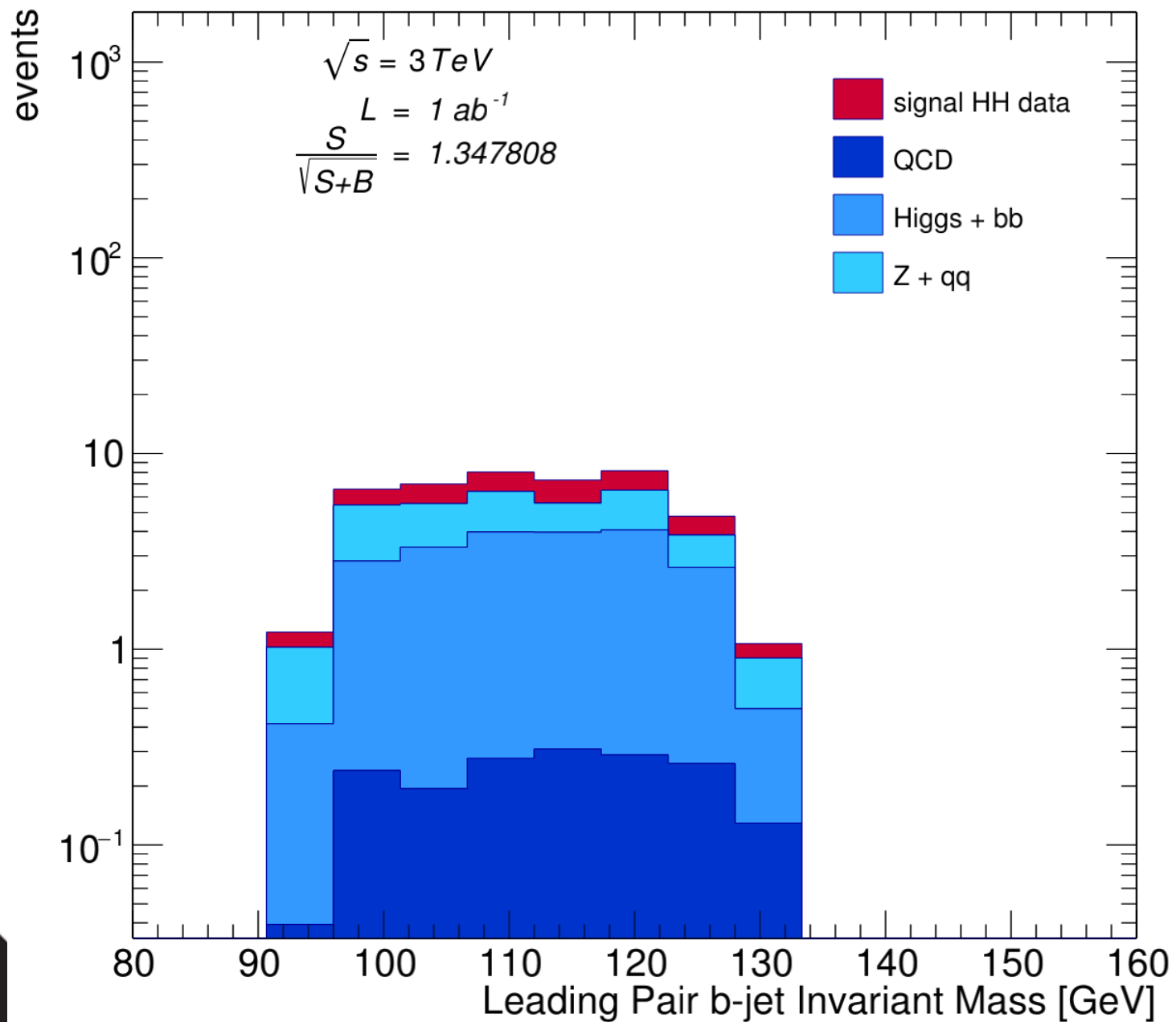


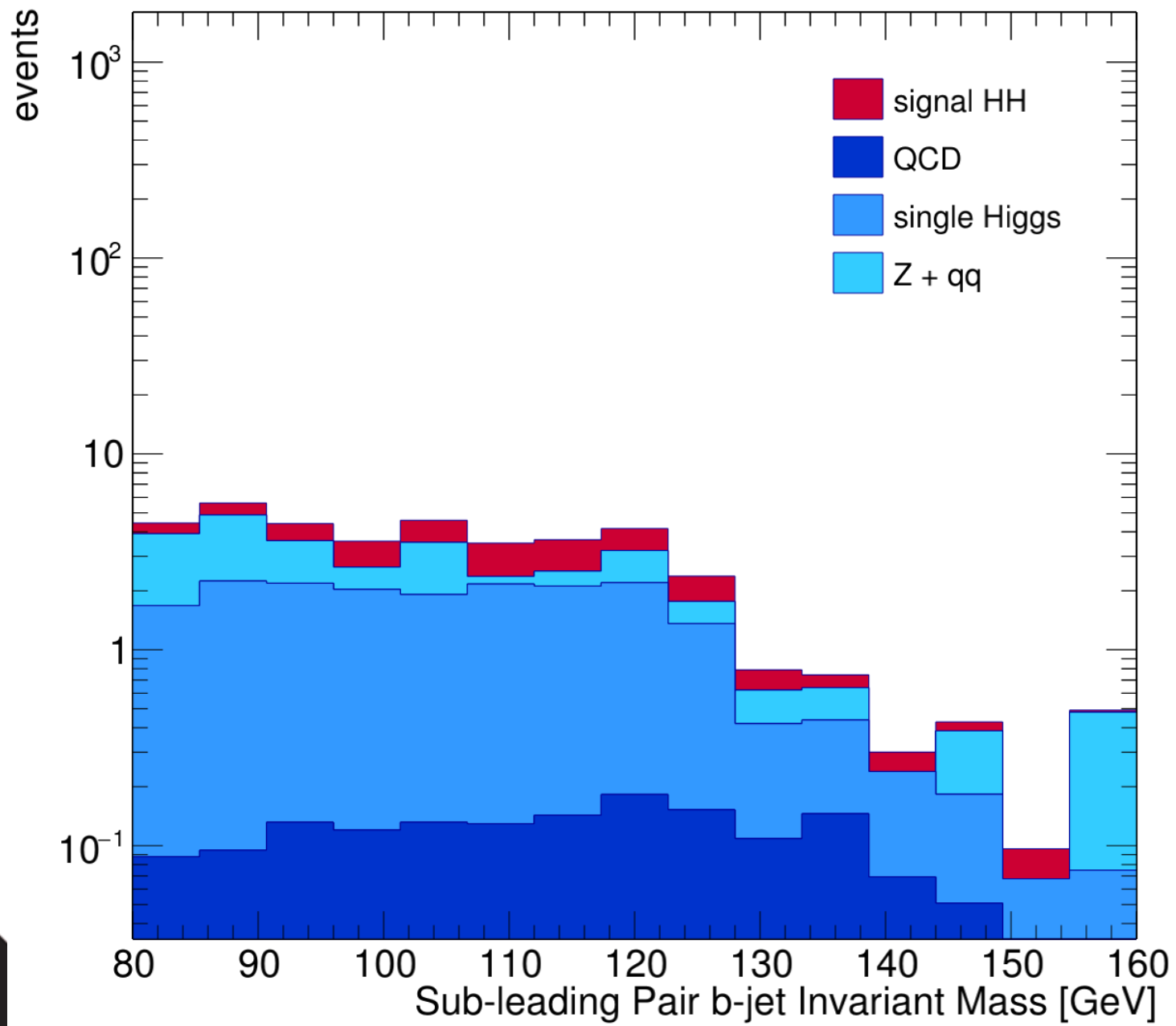
Muon Collider Simulation (Delphes)

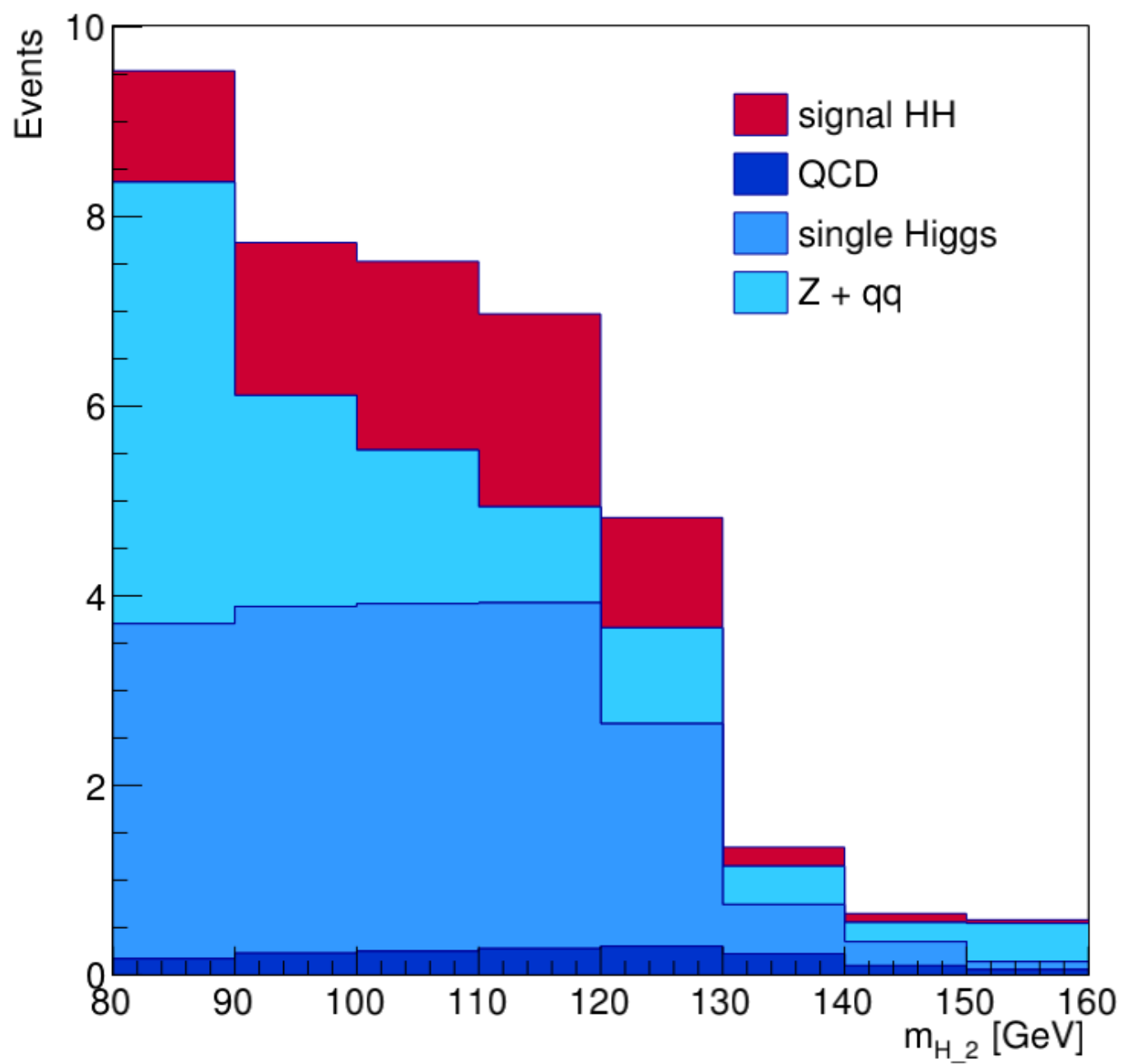




Muon Collider Simulation (Delphes)

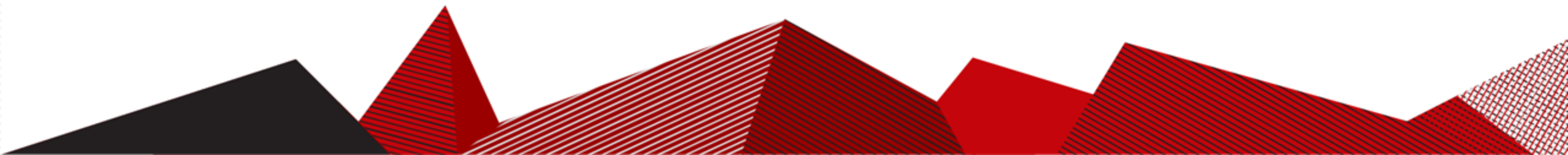








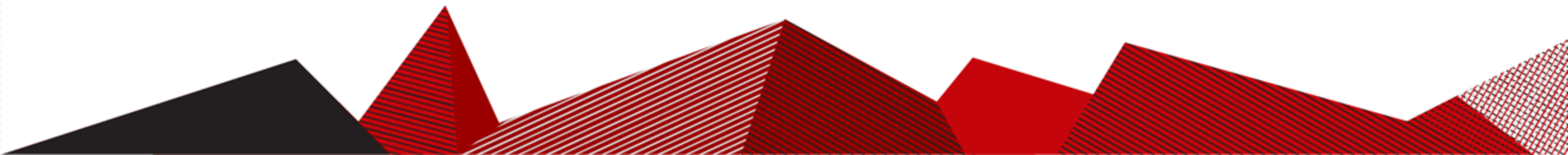
- Adjust bin and seems the $m_{\{H2\}}$ graph is ready for a exponential background with gaussian peak fit





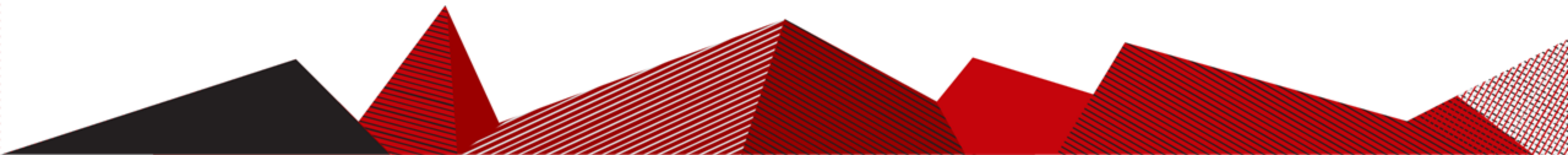
10 TeV and 30TeV

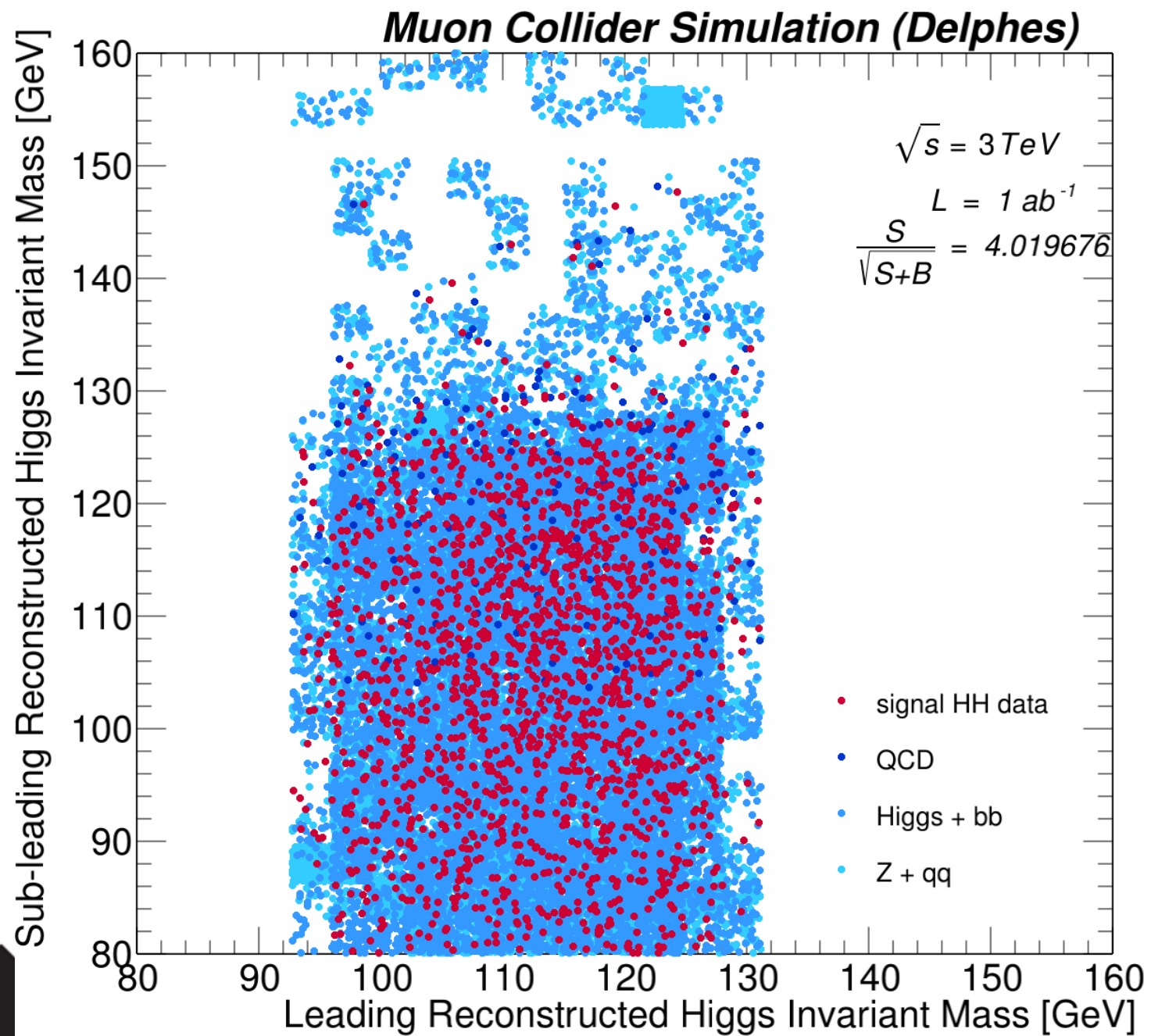
- The $vvqqz$ background needs more data
- Dr. Vuosalo help me a lot on using the Condor. But we still need some help. Currently I am contacting Prof. Herndon.





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







Muon Collider Simulation (Delphes)

