HIGGS SELF-COUPLING ANALYSIS WITH H→WW*
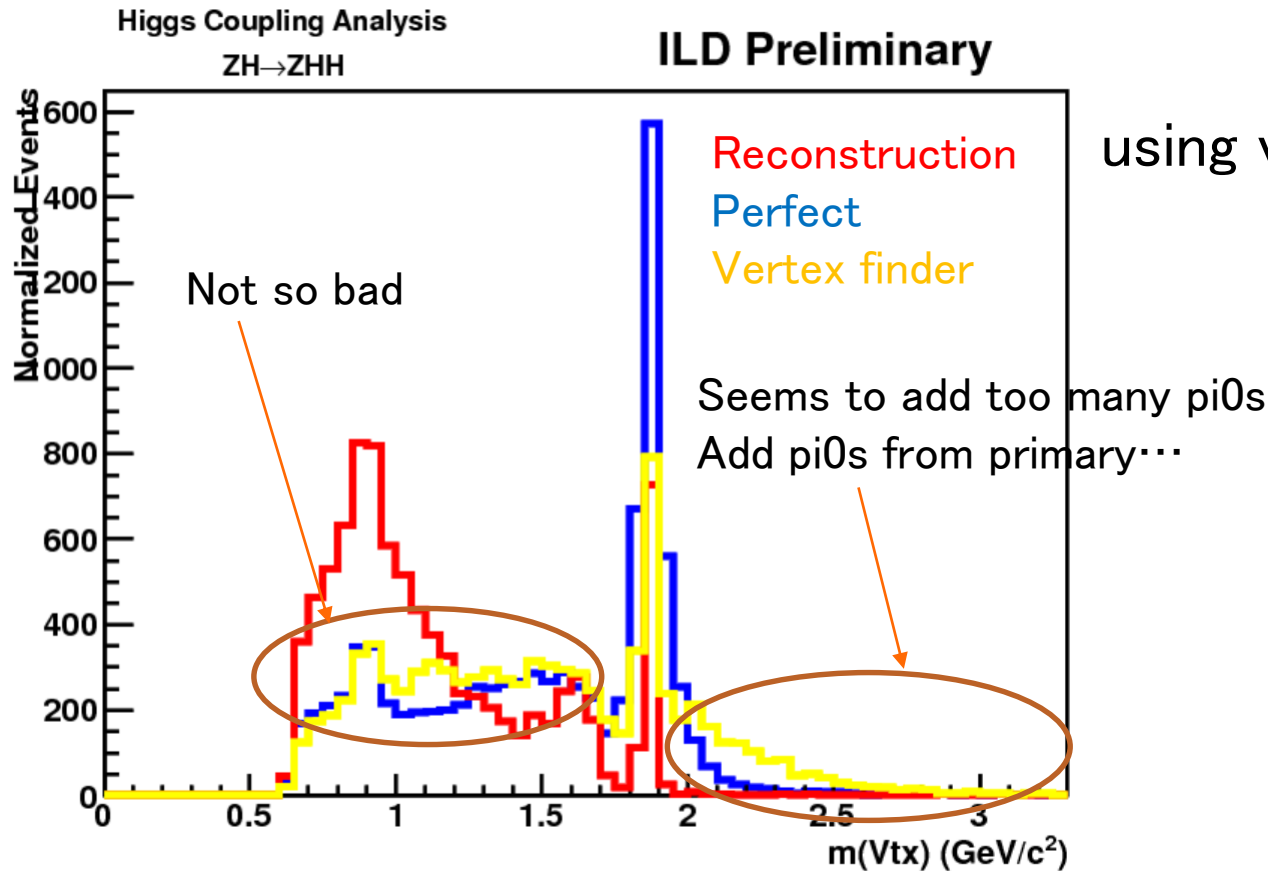
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STATUS

- For flavor tagging improvement
  - Check the possibility of attaching π^0s to (secondary, thirdary) vertex

- Building π^0 finder – many components are necessary
  - Gamma finder – using shower profile in calorimeters
  - π^0 finder – solving gamma pairing
  - Vertex finder – which vertex is the π^0 coming?

- Problems so far
  - Gamma pairing is bad – when gammas are located in small area
  - Does vertex finding work well?

- Today, can't show the detail···
  - Kekcc is down
  - make detail slides during /after downtime

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VERTEX FINDING

- Testing the vertex finding of pi0

- The case when gamma pairing is perfect within reconstructed gammas

- Forming vertex finding MVA and choose pi0s according to the MVA

- Comparing reco, perfect match, and vertex finding

using vertex with K+π

Higgs Coupling Analysis
ZH→ZHH
ILD Preliminary

Reconstruction
Perfect
Vertex finder

Not so bad

Seems to add too many pi0s
Add pi0s from primary…

UPDATE THIS WEEK

- Include vertex mass as an input variable of MVA
  - On D meson mass, no pi0 will be produced

- Checking π^0s from large energy to small energy
  - Arrange π^0s in descending order of energy

- When π^0 from the vertex is found(with high score MVA output), add the π^0 4-momentum to the vertex 4-momentum
  - update the vertex momentum and use it for next π^0 checking

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UPDATE VERTEX FINDING

- Testing the updated vertex finding of pi0

- Unbelievable… D meson peak can produce well!

- Difference between perfect and vertex finding is small

  - Medium vertex mass range is slightly different

- Needs many check!

Last week

Reconstruction
Perfect
Vertex finder
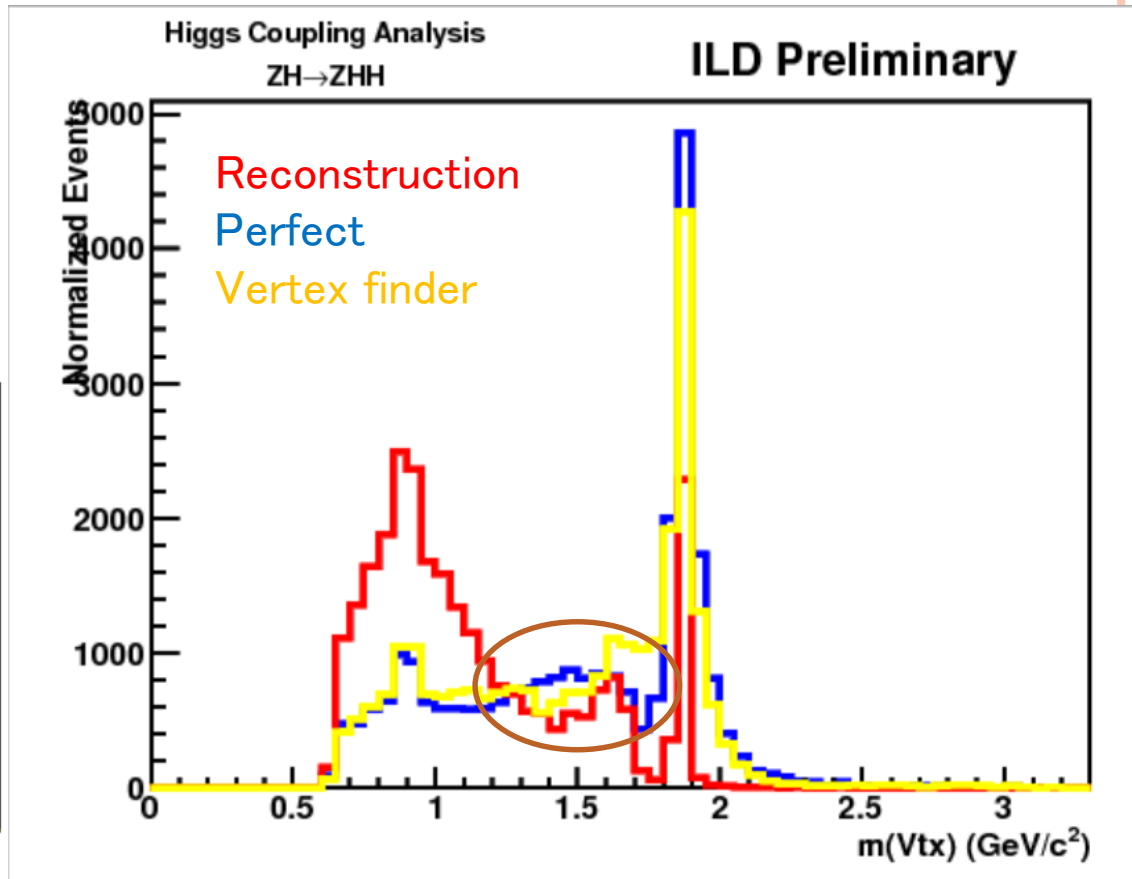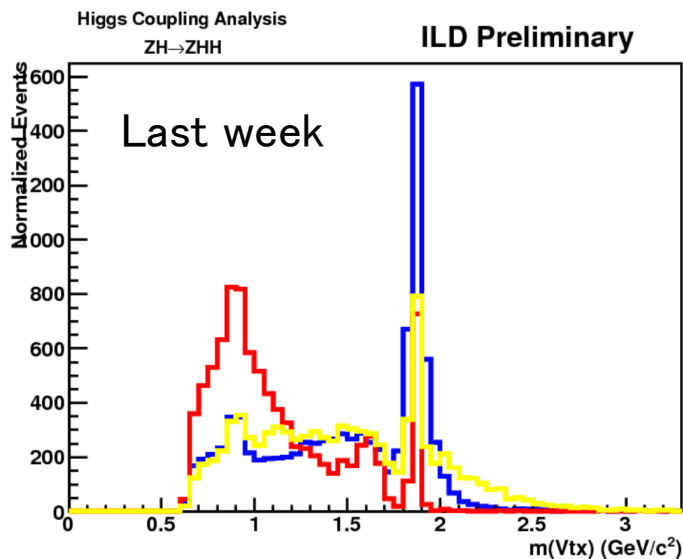
TODO

- Continue to check
  - Unfortunately, generality is lost due to vertex mass as an input variable – MVA is necessary for all the vertex patterns?
  - Need to check vertices with different particle patterns
    $\pi\pi$, KK, K$\pi\pi$ ···
  - Checking vertices in light flavor jets

- Checking vertex charge on vertex with each particle type
  - I forgot downtime starts today···