

Ntuple code and Truth B jet analysis

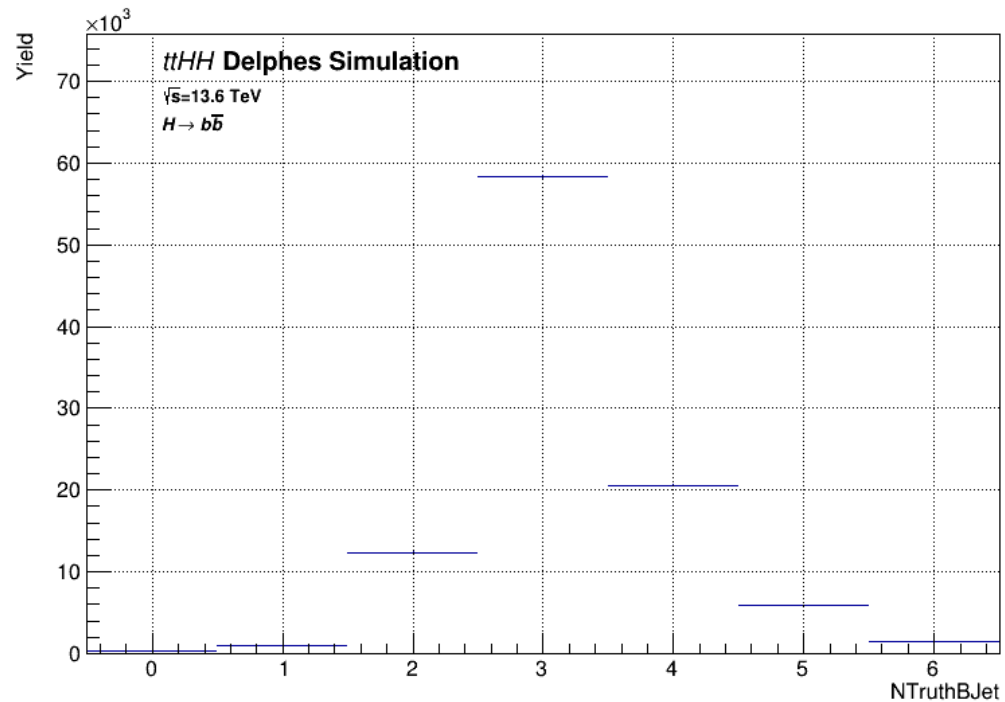
Yang Tianyi

Truth level b-jet study

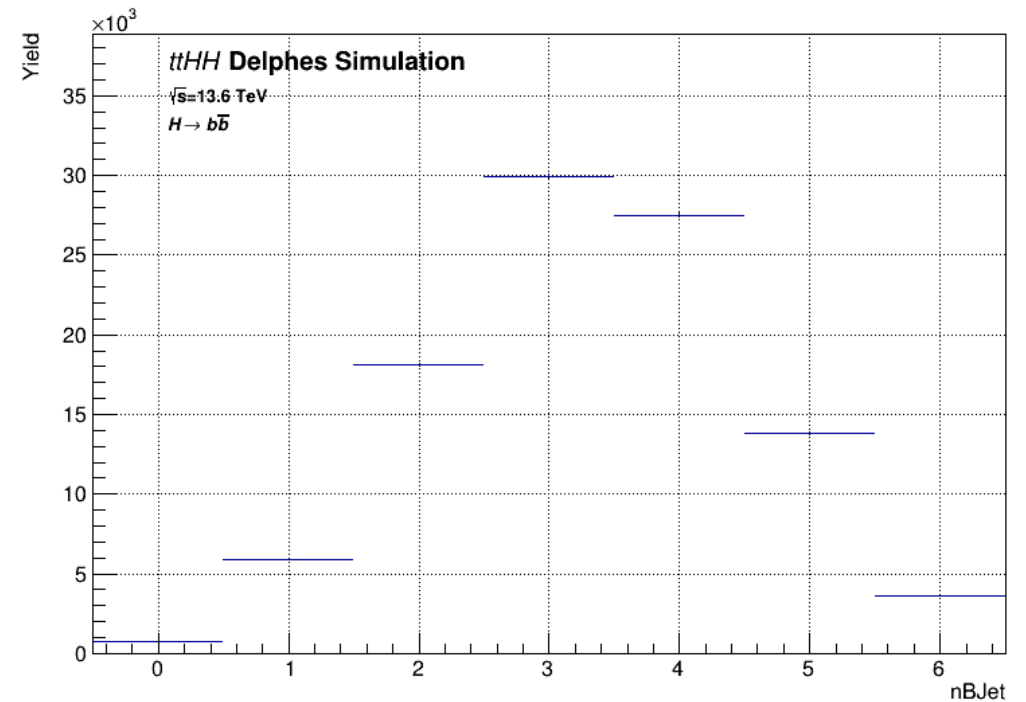
- B jet multiplicity < matrix element b-quark count.
 - Truth level check might give us some hints.
 - My ntuple code on truth analysis is done, will share later.
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- This check is based on my $ttHH$ generation using Delphes simulation.
 - Note that **Delphes only does fast simulation**, and does not process dedicated jet reconstruction and b-tagging.
 - The idea needs to be tested again on dedicated simulated MC samples (ideally official generations).

B jet multiplicity

Truth



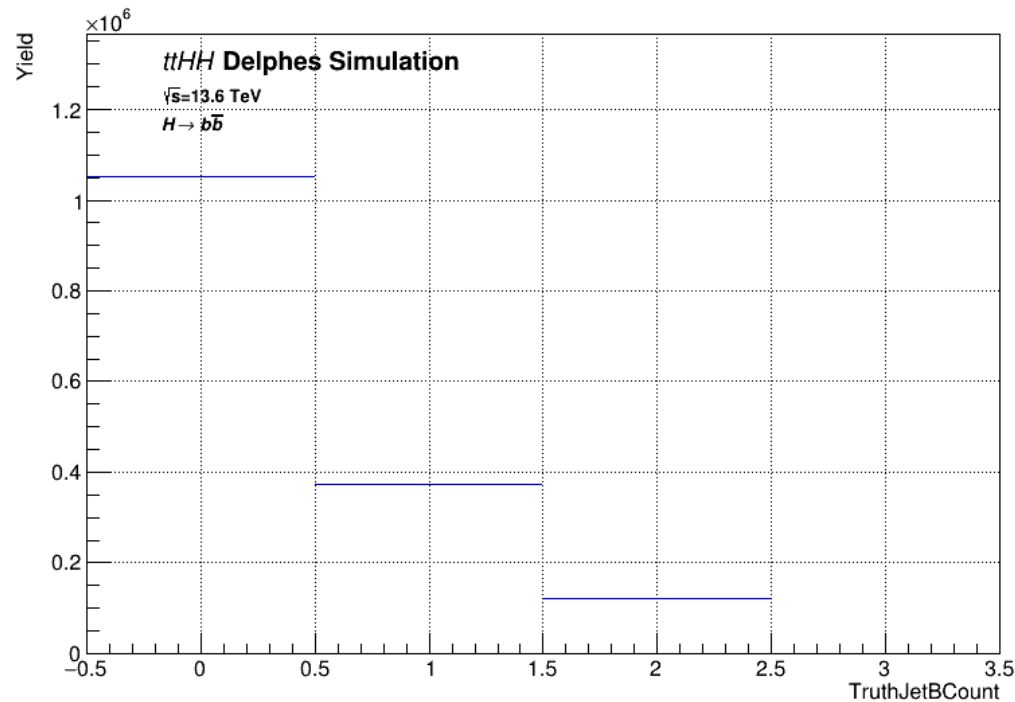
Reco



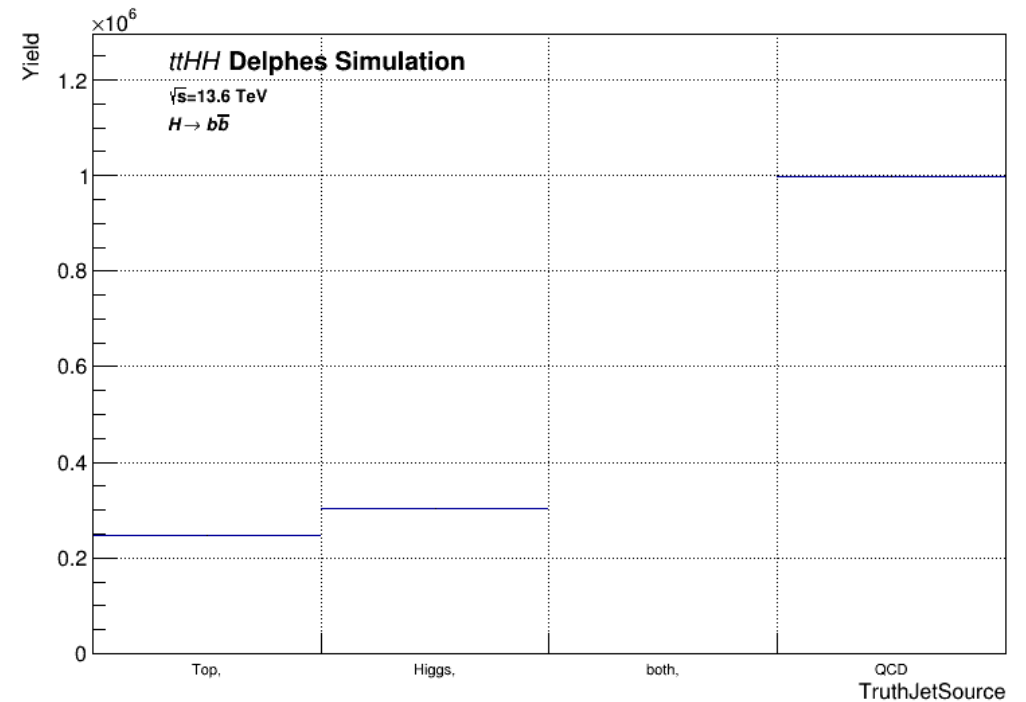
- Eventwise B jet multiplicity **peaks at 3 at the Truth level.**
- B jet loss not only comes from B-tagging nor reconstruction.

B quark in jets

B quark count forming a Truth jet



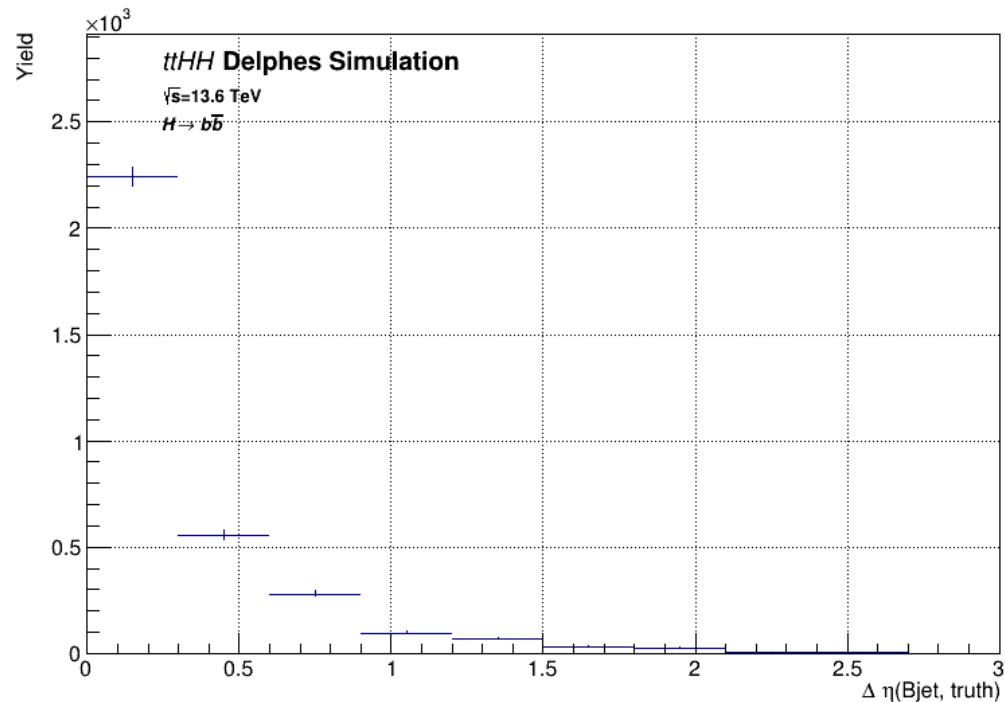
Truth jet source



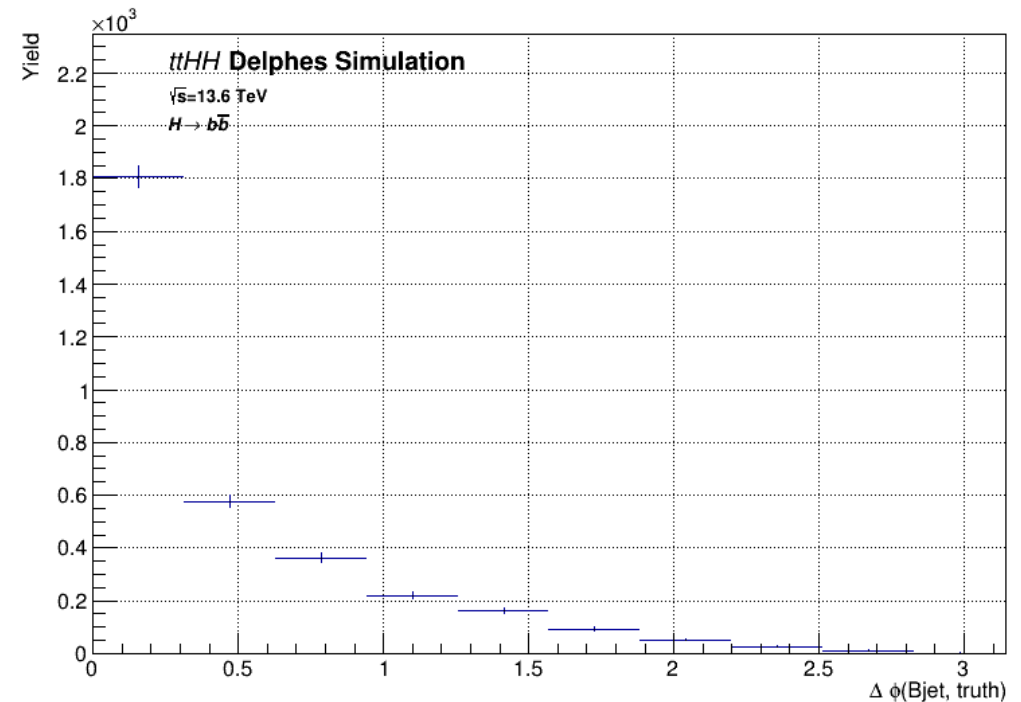
- Quite a lot of B jets from the **hadronization of two b quarks**.
- No jet comes from Higgs and top together.

B-tagged jet's closest distance from truth jets

$\Delta\eta$



$\Delta\phi$



- Some B-jets are far away from truth jets.
- Will check B-tagging efficiency as well.

TODO list

- Analysis:
 - Build up a `ntuple` code. ✓
 - Find any Run 3 CMS $ttHH$ samples, and look at their behavior.
 - Build up a workspace code and demonstrate a likelihood fit.
- EPR:
 - Join GEM group work after the meeting.
 - Will meet Jeremie today.