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Root

basic technique & information

Draw option

- same & histo hist->Draw("samehisto")

Fitting

- Fit option "N" --> Do not store the graphics function, do not draw
- If you want to get histogram, you should not use ->Eval(center value in a bin). The bin has a slope, so you should accommodate event weight in the bin. 1. GetMean(# of bin), you can get true center value. 2. f->GetRandom() => Fill it in a histogram.(When you get a value of f, you should set f->SetNpx(1000<).)

Disable "display TCanvas"

- root -b xxx.cxx
- gROOT->SetBatch();

()

- DrawFrame() is TH1 function, and then new TH1 object create and draw. If you'd like to add title(or xtitle, ytitle) in the canvas, you should set argument in DrawFrame().
c1->DrawFrame(xmin,ymin,xmax,ymax,"title;xtitle;ytitle")

Integral() vs()

- GetEntries() show "all" entries.
- Integral() show summed entries in each bins (limited by max bin).

Disable Info message

- If you are annoyed by the output state coming from "SaveAs()" etc... , you can disable outputting those statements.
#include "TError.h"
gErrorIgnoreLevel = kWarning;

uncertainties

- Must do Sumw2() before Fill("",weight), if you store statistical uncertainties for each bin including in weight effect.

xAOD

- check containers and key names in xAOD

```
checkxAOD.py xAOD.pool.root
```

- check variables inside the containers

```
root xAOD.root  
root [1] CollectionTree->Print("ContainerName*")
```

Analysis

Xsec

- Xsec list [↗](#)

For

Boosted Jet Tagging

- We can select NLARGEJETTTRESSTTAU32_N or NLARGEJETTTRESSTMASS_N
- In default setting smooth cut (WP 80%) is applied.
- In this selection Lepton is required (Get the highest pT narrow jet "near" the lepton = selJet)
- "good" large jet have "pT > 300 GeV", "letal < 2.0", "std::fabs(top::deltaPhi(*largeJet, *lep)) > 2.3", "top::deltaR(*largeJet, *selJet) > 1.5"

How to get variables of ungroomed Jet

- AntiKt10LCTopoTrimmedPtFrac5SmallR20JetsAuxDyn.Parent can be used. (you can ignore "AuxDyn")
- AntiKt10LCTopoTrimmedPtFrac5SmallR20Jets : DataVector<xAOD::Jet_v1>
- you can get the object Ungroomed Jet.

```
const ElementLink<xAOD::JetContainer>& linkToUngroomed =  
    jetPtr->getAttribute<ElementLink<xAOD::JetContainer> >("Parent");  
const xAOD::Jet* ungroomedJet1 = *linkToUngroomed;
```

- In the case "AntiKt10LCTopoJets" is Ungroomed Jet, so you should add "AntiKt10LCTopoJets" container in DxAOD.
- check # of ungroomed track jet. whether the variable is true or false.(2015.12.08)

optimization of selection

- There are some kinds of equation for sensitivity. I should choice the best equation for each situation.
- One of sensitivity equation is $1/\sigma = S/(Q/2 + \sqrt{B})$. (S : Signal yields, B : Background yields, Q : Quality of sensitivity = signal intensity) The equation is stable even if B = 0;
- I should not use selection if the selection is at steep sloop. The errors at steep sloop are very big.
- Selected equation : $= S_i/\sqrt{S_i + B_i + (\Delta*B_i)^2}$. (Δ =systematic uncertainty)

Lepton Veto in EXOT7

- electron: skimmed pass tight selection && pT>30GeV && letal<2.4 && # of electron >= 1
- muon : skimmed pass DFCommonGoodMuon selection && pT>30GeV && letal<2.4 && # of electron >= 1
- It seems to be small effect. (2016.01.15)

Event Selections

Preselection

- Trigger : HLT_ht_850
- Fat jet selection :
 - ◆ JetContainer : AntiKt10LCTopoTrimmedPtFrac5SmallR20Jets
 - ◆ mass > 100 GeV
 - ◆ pT > 200 GeV
 - ◆ |l| < 2.0
- track-bjet selection :
 - ◆ TrackJetContainer : AntiKt2PV0TrackJets
 - ◆ pT > 25 GeV
 - ◆ |l| < 2.5
 - ◆ MV2c20 70% WP(-0.3098) pass = "-0.3098 < MV2c20"
 - ◆ fatjet dR < 1.5 (if I count btagged jets in fatjet)
- ttbar reconstruction
 - ◆ # of fatjets == 2
 - ◆ # of b-jets >= 2
 - ◆ # of b-jets in (2nd)leading fat jet >= 1
 - ◆ tau32_wta < 0.71

Best Selection(provisional)

- For 2.5 TeV
 - ◆ leading fatjet mass < 210 GeV
 - ◆ 2nd leading fatjet mass < 190 GeV
 - ◆ leading fat jet track width < 0.7
 - ◆ 2nd leading fat jet track width < 0.4
 - ◆ # ghost tracks(leading)< 80
 - ◆ # ghost tracks(2nd leading)< 110
 - ◆ pt_balance < 0.6
 - ◆ sensitivity = 0.344802(sig : 11.8689, bg : 1083.88)
- For 1.5 TeV
 - ◆ leading fatjet mass < 210 GeV
 - ◆ 2nd leading fatjet mass < 190 GeV
 - ◆ leading fat jet track width < 0.6
 - ◆ 2nd leading fat jet track width < 0.6
 - ◆ # ghost tracks(leading)< 80
 - ◆ # ghost tracks(2nd leading)< 110
 - ◆ d_eta < 2
 - ◆ 2.5 < d_phi
 - ◆ pt_balance < 0.5
 - ◆ sensitivity = 5.03436(sig : 150.18, bg : 802.466)
- latest selection is not divide(2016.1.12)

Systematics and Statistic uncertainty

- In QCD_JZ3W events passed event selections are only "8", but # of events should be "O(100)" when events scaled for luminosity(3.34fb⁻¹). As the result of this, the sample has large uncertainty.

For Data

- Trigger menu
- For Trigger : TRIGDEC HLT_ht850_L1J100 (TRIGDEC = trigger passed, TRIGMATCH =?)

Note

- sensitivity used # of ghost tracks is better than not used.
- # of tracks in ungroomed jet -> bat
- pbook command : `retry(RUN#,retryBuild=True,newSite=True)`

To do List

- Check the method of tau32 selection whether I should use pT dependency cuts or not.
- Check `top::deltaPhi(*largeJet, *lep)` and `top::deltaR(*largeJet, *selJet)`
- Check the procedure of HepTopTagger.

-- ShotaSuzuki - 2015-11-18

This topic: Main > ROOTMemo

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