Update on work with Z$\rightarrow \tau\tau$

TAU Meeting, November 15, 2002

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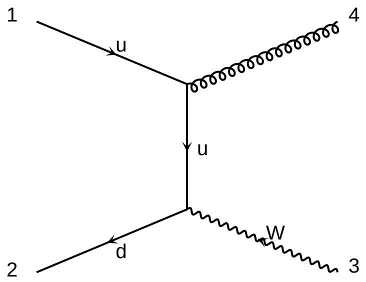
- Issues from last meeting
- Change cuts to reduce Dijet background
- Look for evidence of τ
  - Charged Track Multiplicity
  - Charge Product

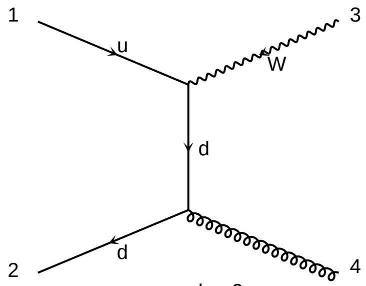
Issues from Last Meeting

- Lack of Z→ $\tau\tau$ Monte Carlo
  - Had 1,652 events from 4.5.2 of offline
  - Now Have 200,000 events from 4.7.0 of offline
- Look at W+Jets charge product asymmetry claims

Diagrams by MadGraph u d~ -> w+ g



graph 1



graph 2

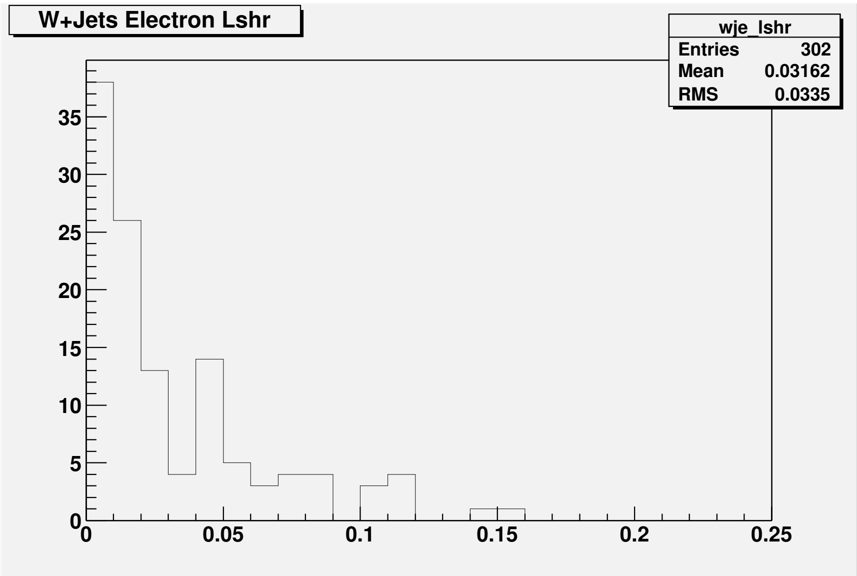
Changes in Cuts

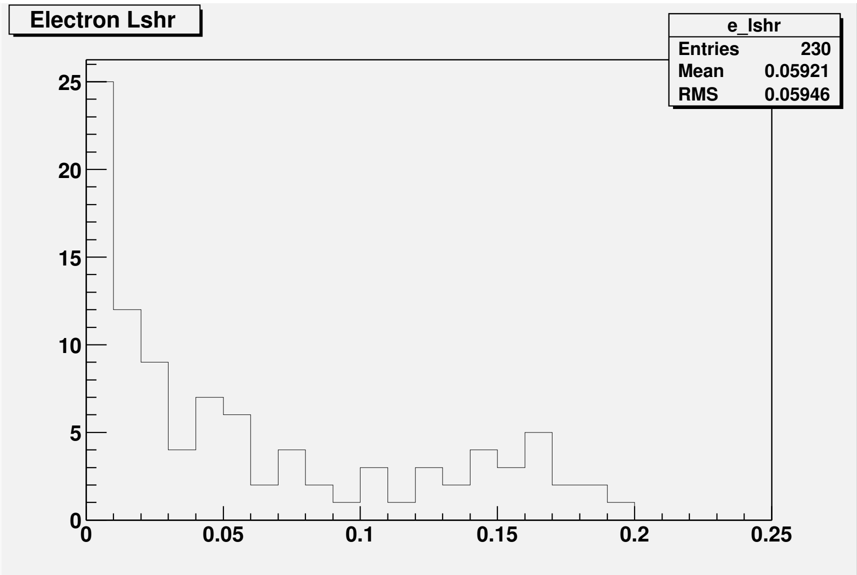
We know that we need to decrease our Dijet background in order to have hope of seeing a signal. We first take a look at tightening Electron Quality Cuts. In order to do this, we take a look at two samples from the data, one a sample that we think will be mostly QCD, Dijet background, and another sample where we attempt to purify the electron content using W+Jets

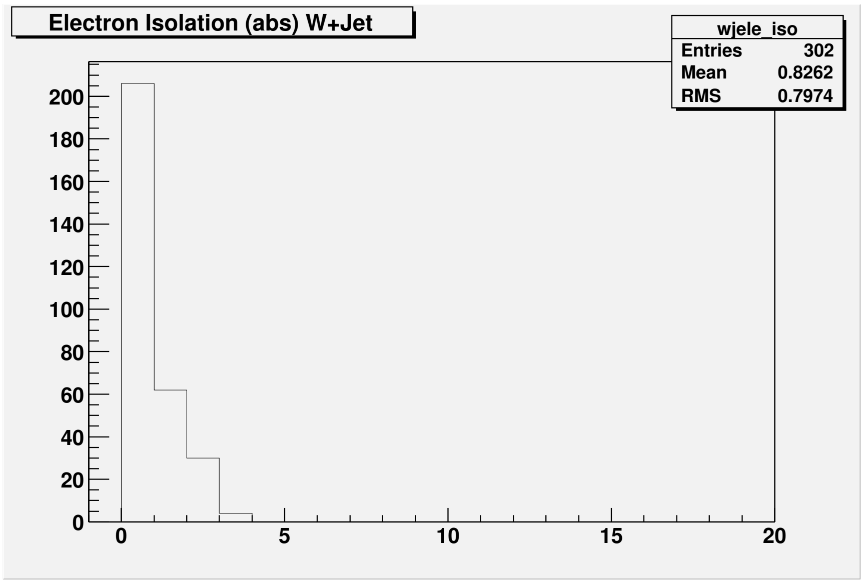
- Dijet Sample requirements:
  - Isolated Electron ($<$ 4GeV Had+EM in 0.4 Cone)
  - Tau Quality (same cuts as last week)
  - Em Fraction of Tau $<$ 0.95
  - Deltaϕ between "electron" and Jet $> \pi$ - 0.5
  - MET $<$ 10GeV
- W+Jets sample
  - Isolated Electron ($<$ 4GeV Had+EM in 0.4 Cone)
  - Tau Quality (same cuts as last week)
  - Em Fraction of Tau $<$ 0.95
  - Deltaϕ between "electron" and Jet $< \pi$ - 0.5
  - MET $>$ 30GeV

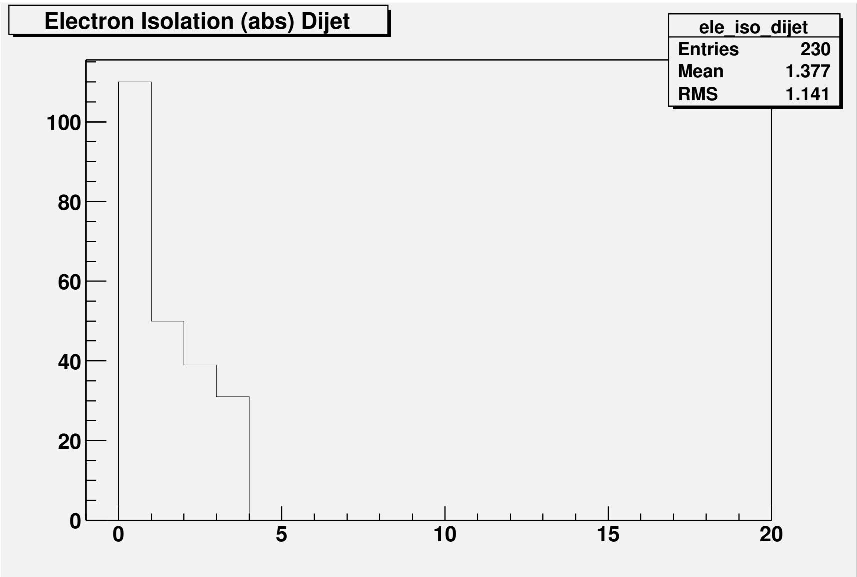
Results of Looking at Electron ID

We found two cuts that we felt could be tightened: lshr and Isolation





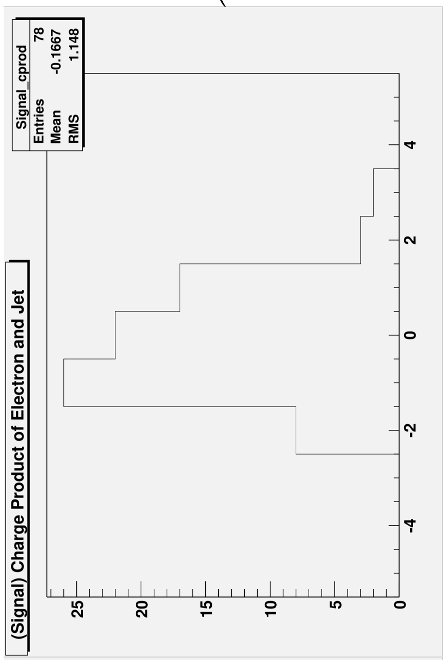

Electron Isolation (abs) W+Jet
wjele_iso
Entries 302
Mean 0.8262
RMS 0.7974
0
20
40
60
80
100
120
140
160
180
200
0
5
10
15
20

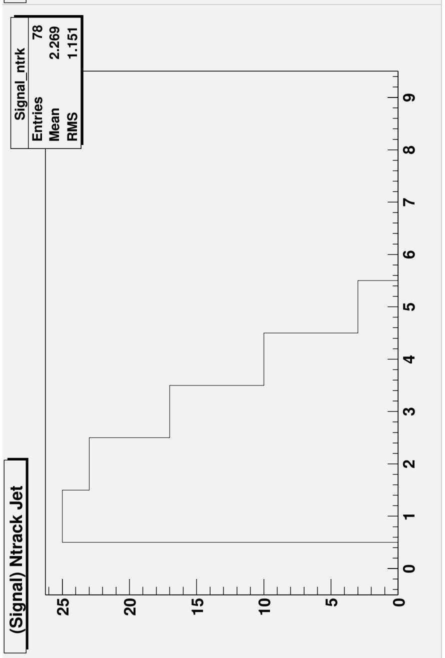

Electron Isolation (abs) Dijet
ele_iso_dijet
Entries 230
Mean 1.377
RMS 1.141
0
20
40
60
80
100
0
5
10
15
20

Other Issues

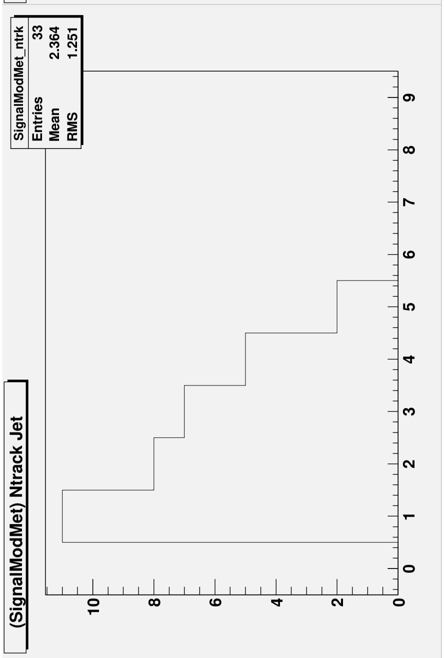
- We realized our Tau Isolation Cut wasn't having an effect
  - We were using absolute isolation
  - Saw Pasha's plot and decided to cut on Iso Ratio at 0.08
- Needed to examine our MET Cut
  - From MC, looked like the 20 GeV Cut cut out too much Signal
  - Look at signal region with three MET thresholds (10, 15, 20GeV)

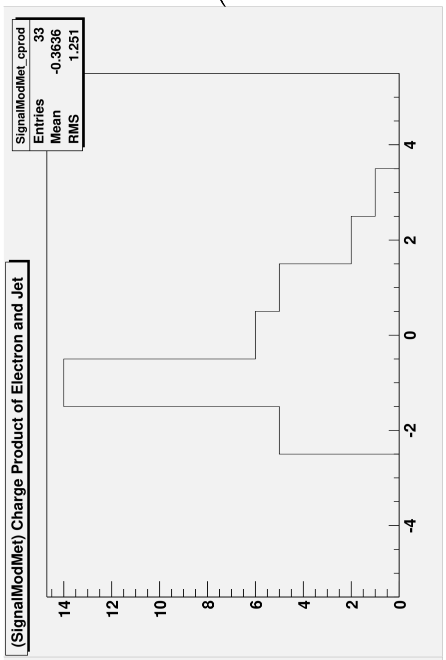
Low Met (MET Greater than 10GeV Cut)



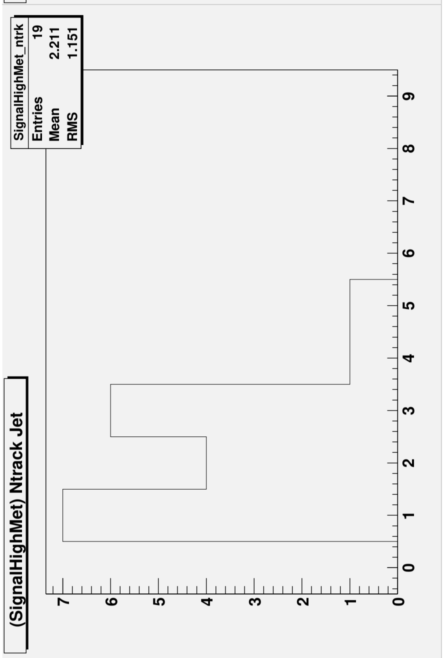


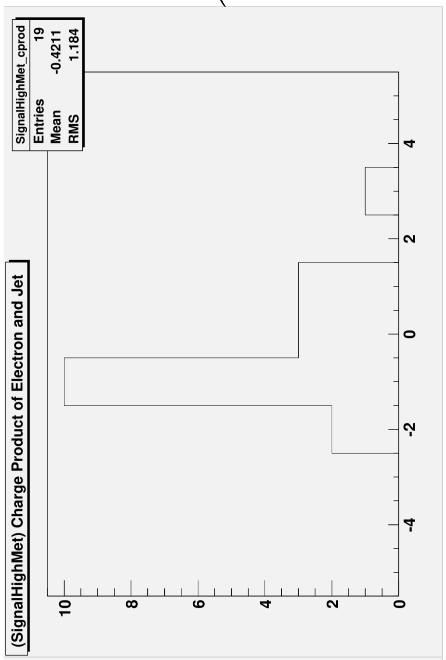
Low Met (MET Greater than 15GeV Cut)





Low Met (MET Greater than 20GeV Cut)





Plots:

- www.pas.rochester.edu/ demers/Signal-cprod-10GeVMet.gif
- www.pas.rochester.edu/ demers/Signal-cprod-15GeVMet.gif
- www.pas.rochester.edu/ demers/Signal-cprod-20GeVMet.gif
- www.pas.rochester.edu/ demers/Signal-ntrk-10GeVMet.gif
- www.pas.rochester.edu/ demers/Signal-ntrk-15GeVMet.gif
- www.pas.rochester.edu/ demers/Signal-ntrk-20GeVMet.gif