L3 Tau - Status and Plans

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Cristina Galea
University of Nijmegen

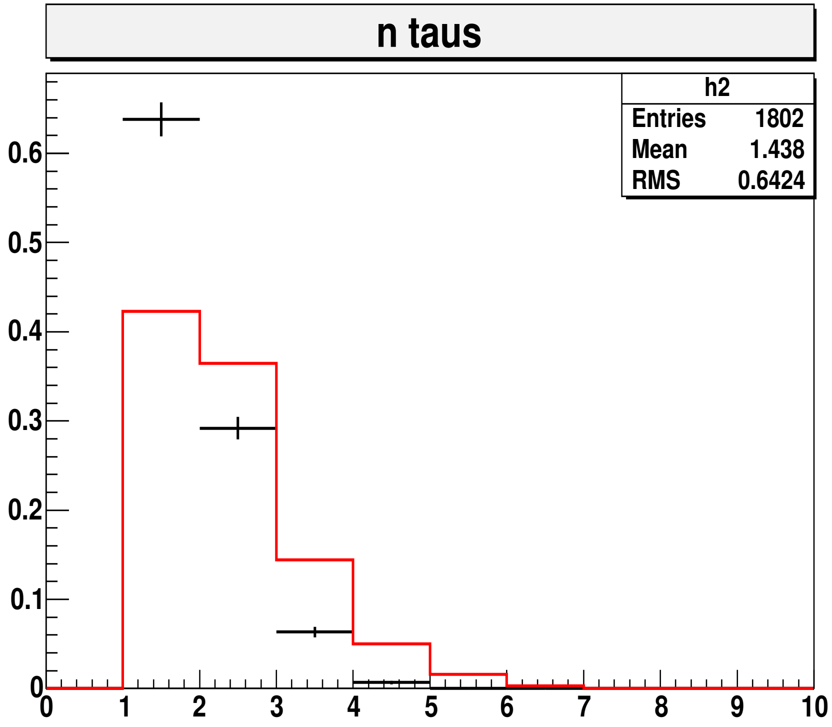
Outline

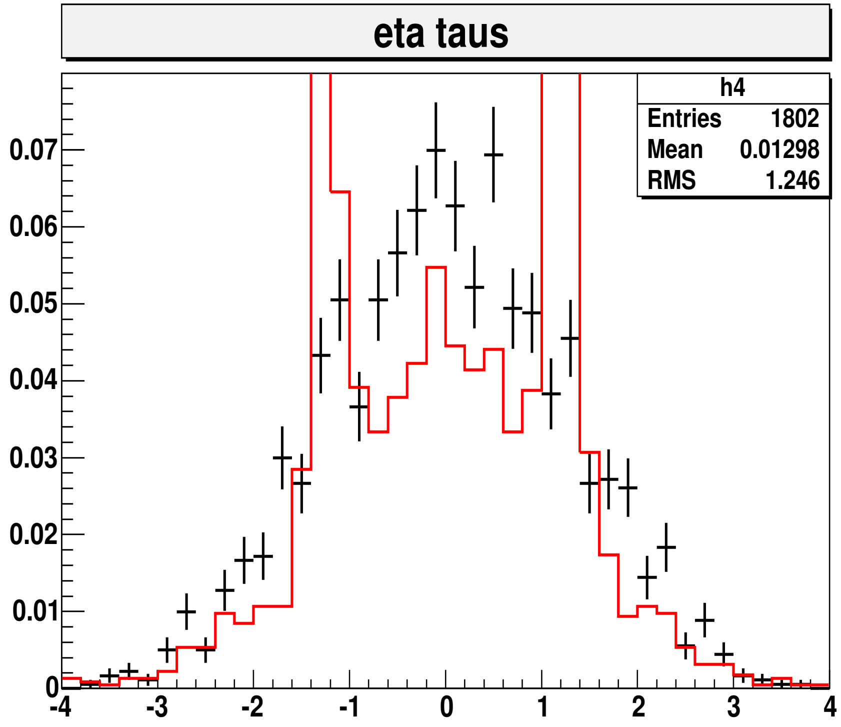
- status of the L3 Tau Tool in p16.03.00
- short term improvements for p17
- conceivable longer term improvements

Status of the L3 Tau Tool in p16.03.00

- for certification details please see
  - http://www-d0.fnal.gov/computing/algorithms/level3/taus/taus.html
- the newest training of the L3 NN (with eta as input variable) was put in p16.03.00 and tested
- same algorithm is now in the test release as well
- still didn't get to write the note about the tool, as things keep on changing ...

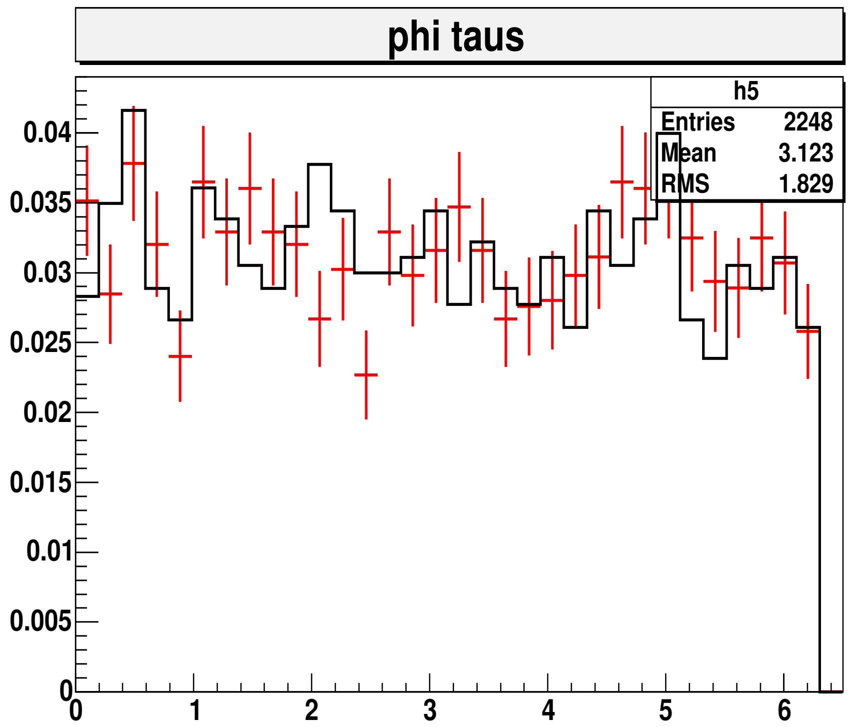
p14.05.02 W$\rightarrow \tau\nu$ MC vs p13.08.00 W$\rightarrow \tau\nu$ MC

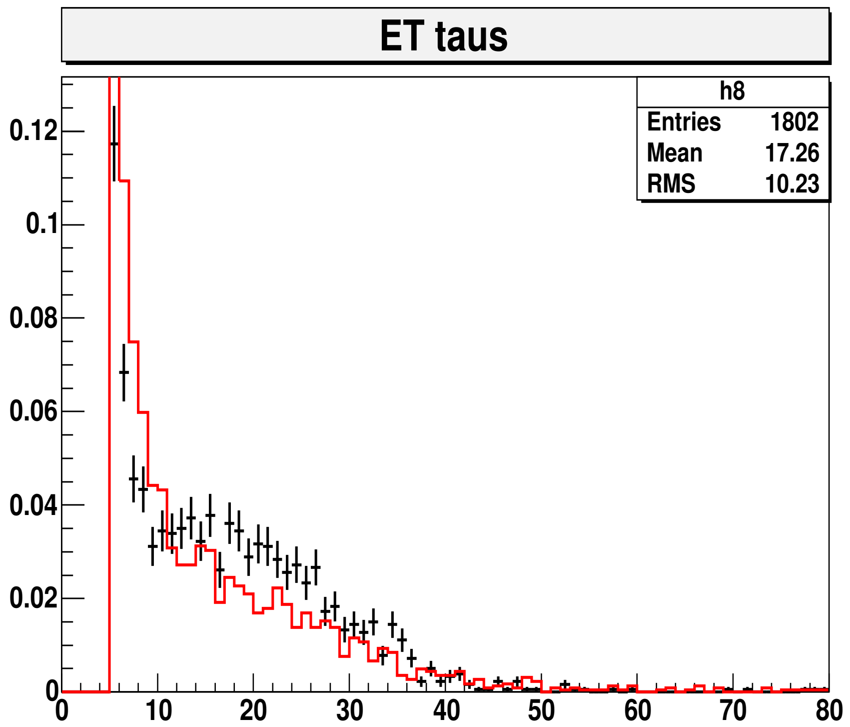




- red: p13.08 MC taus trigsimed with my private version of p16.03.00 (NN_BASED algo, nn_cut = 0.1)
- black: p14.05.02 MC taus trigsimed with p16.03.00 out of the box (same algorithm)

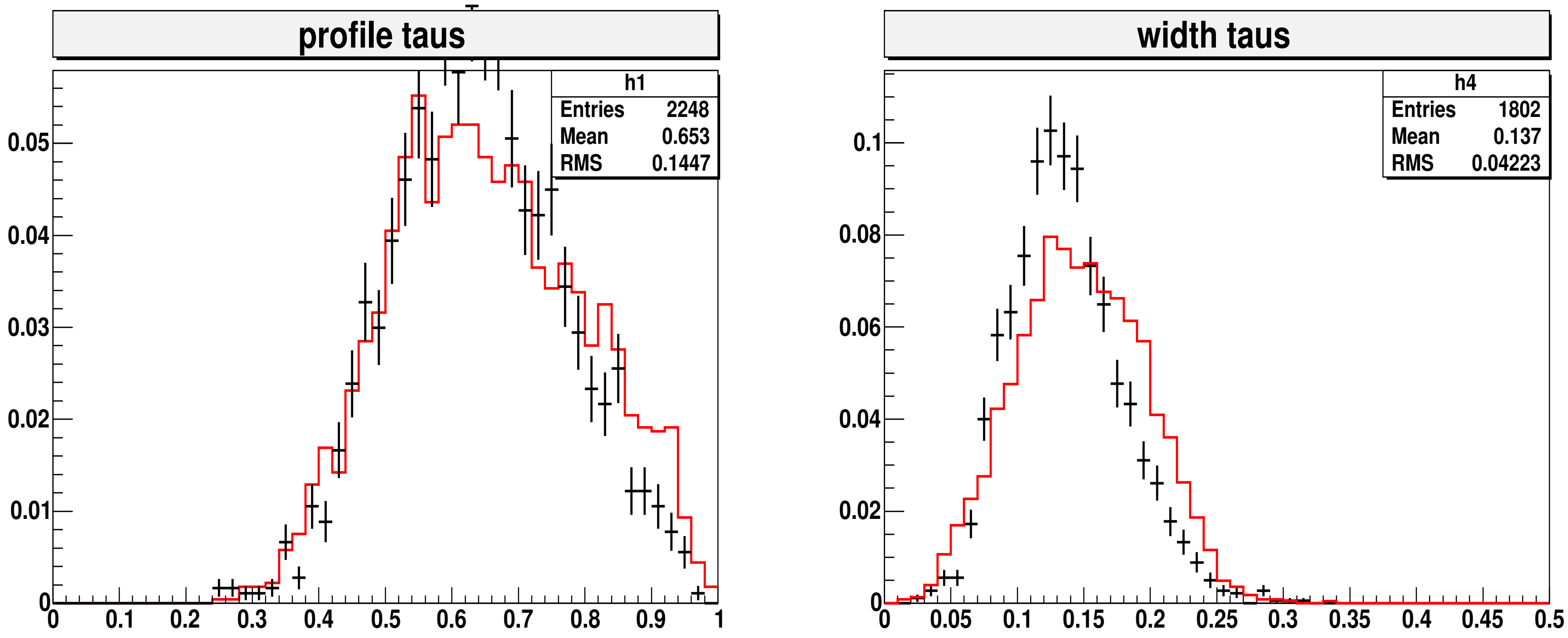
p14.05.02 W$\rightarrow \tau\nu$ MC vs p13.08.00 W$\rightarrow \tau\nu$ MC (continued)

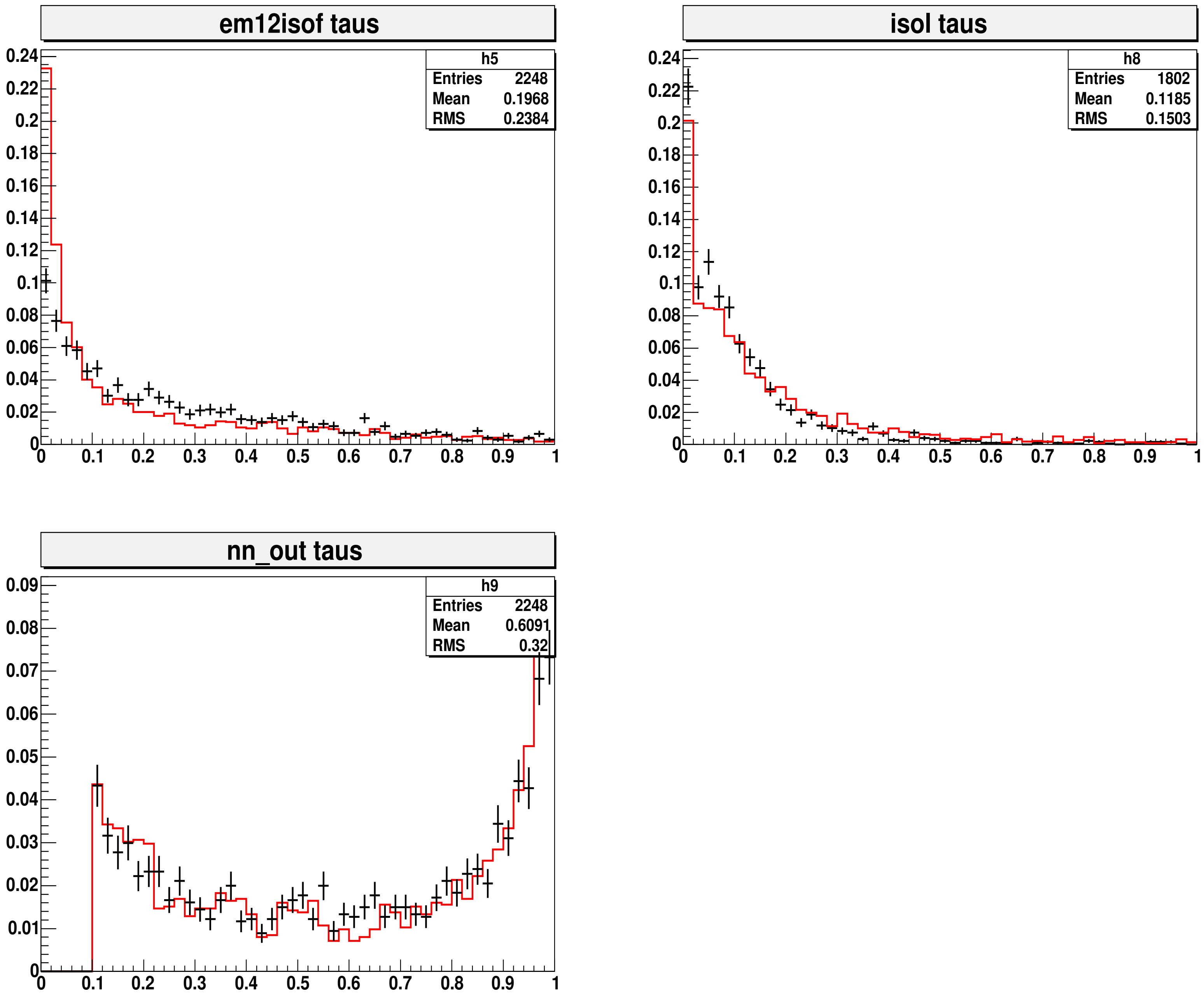




p14.05.02 W$\rightarrow\tau\nu$ MC vs p13.08.00 W$\rightarrow\tau\nu$ MC (continued)

– other useful distributions:

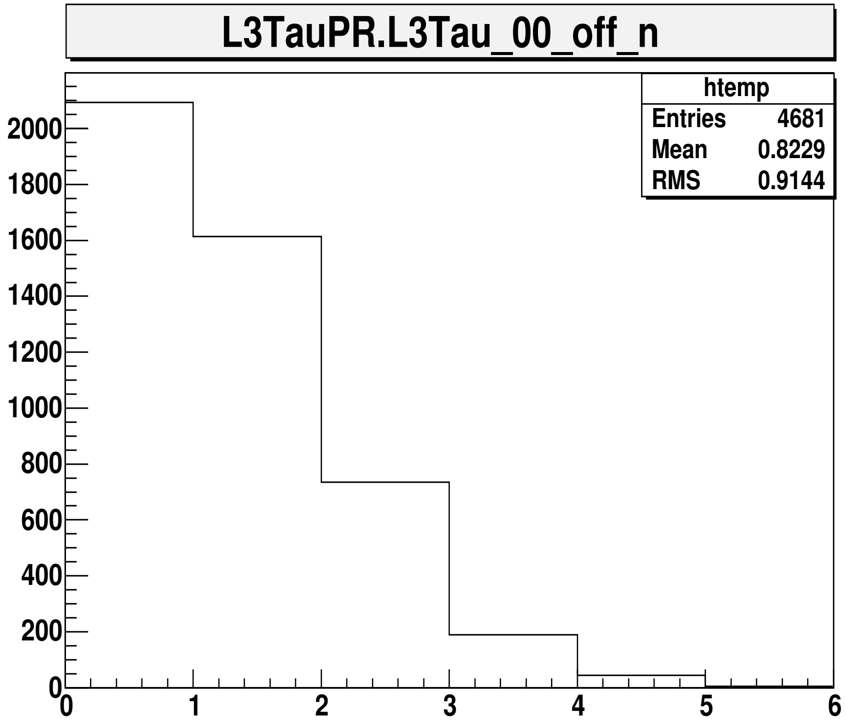


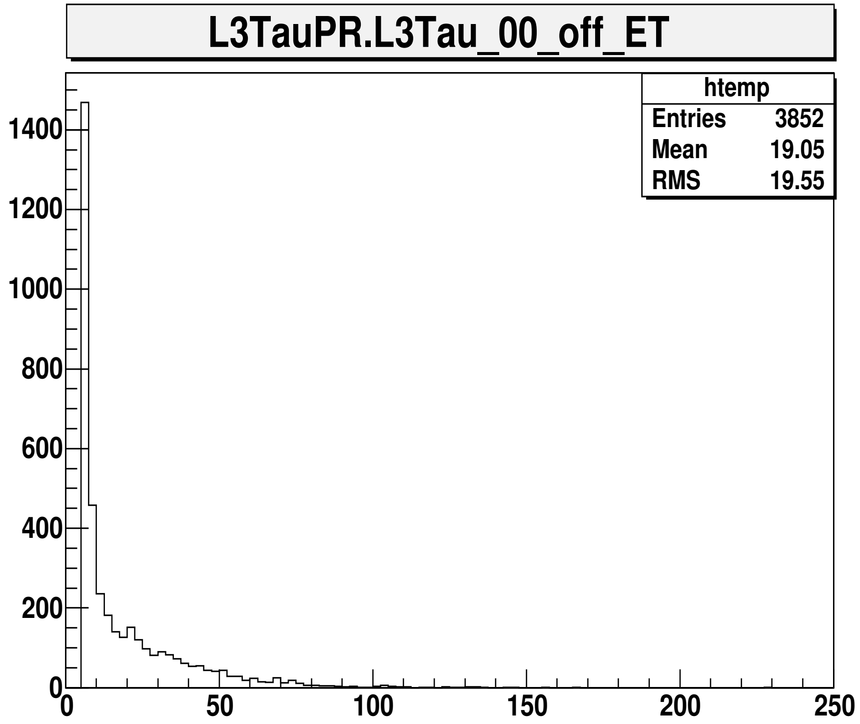


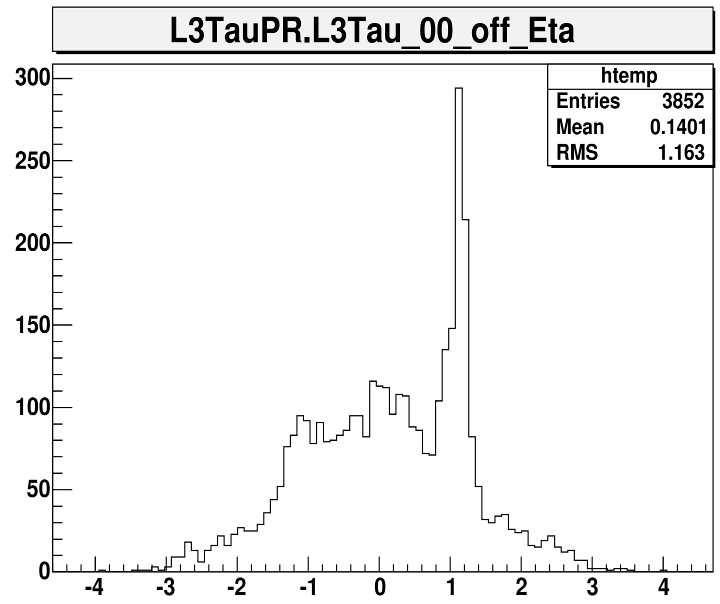
em12isof taus
h5
Entries 2248
Mean 0.1968
RMS 0.2384
isol taus
h8
Entries 1802
Mean 0.1185
RMS 0.1503
nn_out taus
h9
Entries 2248
Mean 0.6091
RMS 0.32

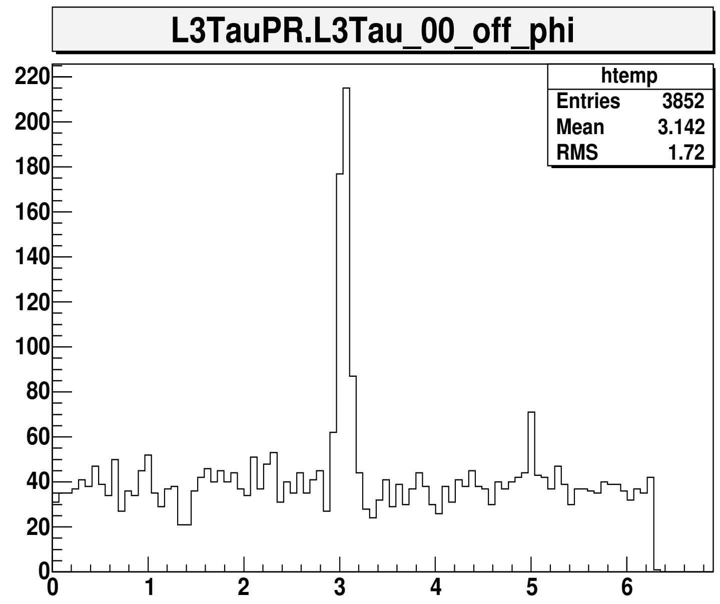
Monitor Data trigsimed with p16.03.00 (out of the box)

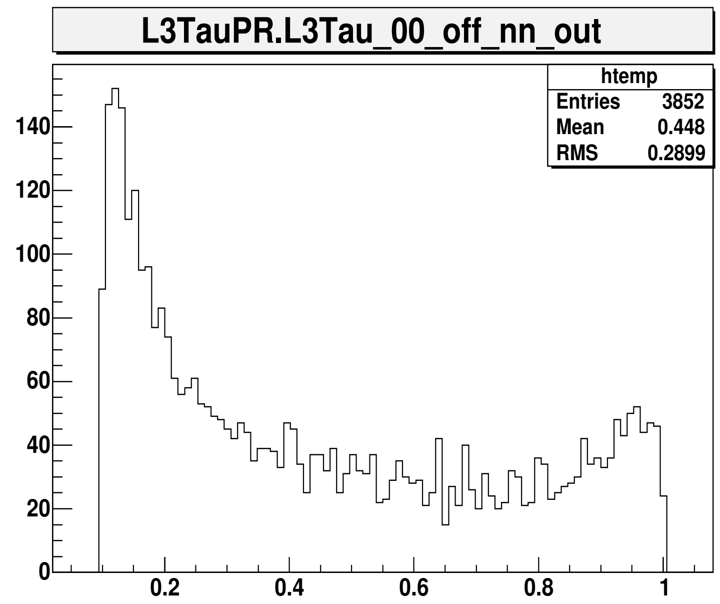
– monitor stream events from Run 193156 (20th May 2004)



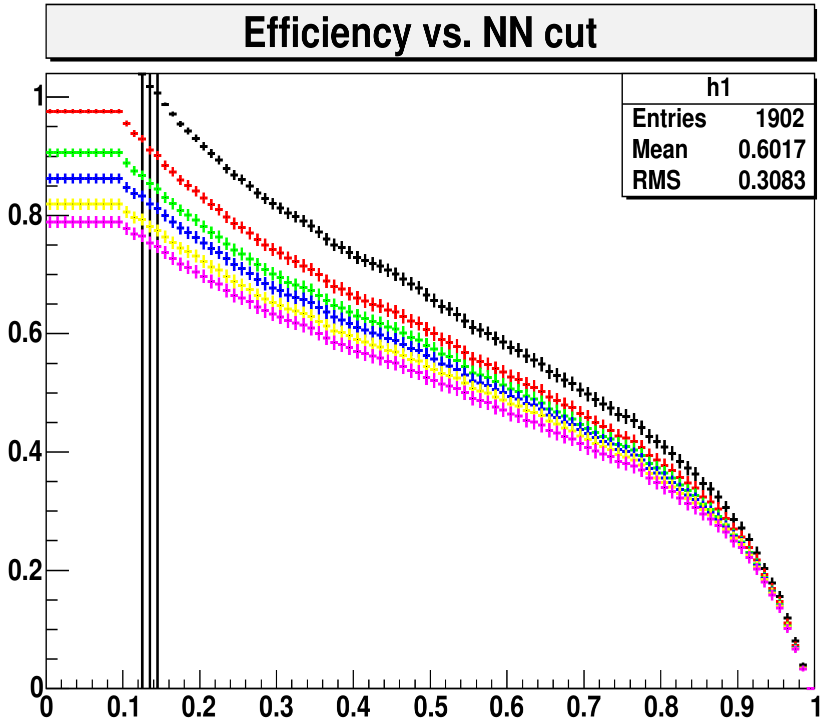


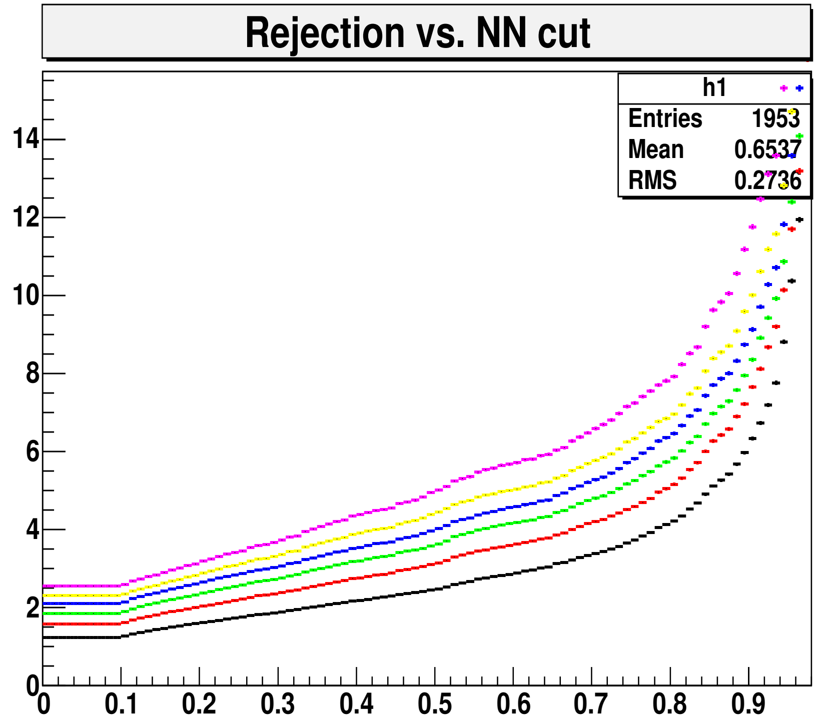

L3TauPR.L3Tau_00_off_Eta
htemp
Entries 3852
Mean 0.1401
RMS 1.163


L3TauPR.L3Tau_00_off_phi
htemp
Entries 3852
Mean 3.142
RMS 1.72


L3TauPR.L3Tau_00_off_nn_out
htemp
Entries 3852
Mean 0.448
RMS 0.2899

Efficiency and Rejection in p16.03.00





– efficiency studied on a sample of 2000 p14 W$\rightarrow \tau\nu$ MC

– rejection done using events from the EB run 191322 that passed the TAU_1 trigger

– different colors represent different cuts on tau pT (btw. 5 and 10 GeV)

Short term improvements for p17:

– look at different variables that have the functionality of ieta and pick the one less sensitive to vertexing

– maybe an idea would be to use 1/ the integer number that designates a certain calorimeter tower (most energetic one of the cluster)

– needs retraining, but the code change is minimum

Long term improvements:

– design a new tool to be used only in the central region, which uses the tracking information

– look for the highest momentum track in a cone around the CAL cluster and put the pT of the track and the phi separation btw. the track and the cluster as input parameters in the NN

– involves retraining, change of code, studies of efficiency/rejection, respectively timing, which might become an issue