

## March 2012

### Main Tasks for March 2012

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1. Prepare Slides for Tau ID Meeting - DONE on 10th March

1a. including new plot of PFGamma.

2. Prepare Slides for Jet faking lepton - send around. DONE on 11th March

3. Include mmet for electron & eemt for muon fake rate in the Analyzer and plotting script.

4. Understand tag and probe tree filling and structure.

5. Run Shape Analysis

6. Do TnP for electrons.

### 9th March 2012

Some of the codes are working fine. But still need to merge codes together such that they work in one go.

Installing ROOT again to run ROOFit. Existing root version can be configured for ROOTFIT using -

```
./configure --enable -ROOFIT  
make
```

Learning python lists and related stuff - Important links -

What is list and Yield [↗](#)

how to use csv - for reading column instead of row from text file [↗](#)

Note : import csv if you want to use csv. To use Yield later on for further processing typecast it to a list.

Working in jet faking lepton. Plot ready for data/MC comparison for loose and tight isolation working point.

Started working on Tag and Probe for Electron : Following instructions from Anil.

Tag And Probe

As a first attempt things working fine on MC. Have to edit cfg to calculate efficiency of -

Electron Reconstruction

Electron Tight (CiCTight)

Electron Isolation

Double Electron Triggers

## 10th March 2012

To do -

1. Prepare Slides for Tau ID Meeting including new plot of PFGamma.
2. Prepare Slides for Jet faking lepton - send around. DONE
3. Include mmet for electron & eemt for muon fake rate in the Analyzer and plotting script.

## 11th March 2012

Tag and Probe Follow up from Code -

1. Apply good electron selection (loose) on gsf and store them. User defined - as per understanding
2. On O/P of step one apply Required Cut - for which efficiency is to be estimated (may be wrong). User defined - as per understanding
3. Using O/P of one and two make combination (di-lepton) first one is Tag and second one is Probe. Done using CandViewShallowCloneCombiner from TnP official package.
4. Do some analysis using these dilepton pair and store required information. Done using TagProbeFitTreeProducer from TnP official package.

Above four steps are processed by following lines

```
process.p = cms.Path(  
    process.gsfElectron  
    +process.gsfWP90Cut  
    +process.tagProbe  
    +process.tpTree  
)
```

Made Slides for TES and set for comments.

Script to get Number of events for each sample is almost done.

## 12th March 2012

Slides presented for TES.

Script to get Number of events for each sample is DONE.

Script to get datacard for each mass point is done if method used is not shape analysis.

Updated numbers for signal and bkg after PU reweighting, cross cleaning and with errors and propagated to the limits.

Tag and Probe cfgs are understood better and trying to understand how tree is filled.

TagProbeFitTreeAnalyzer

## 13th March 2012

Tried to get certificate from DU and CSIR.

Added pt, eta of leading and subleading e and mu in code, Propagated to plotting script.

checked hits cut for muon and found bug, not accessing pixel hit properly. Now fixed.

Started on P-X - Worked for 2 hrs..

## 14th March 2012

Tried to get certificate from DU & CSIR

## 15th March 2012

Travelling to SINP Full day in travelling.

## 16th March 2012

Half day in travelling.

Trying to get PFGamma plot when gendecay is 1prong0pi0 and reco as 1prong1pi0. DONE.

Adding Pt, eta plot for e1,e2,mu1,mu2.

Trying to add data-MC/MC plots on same canvas with proper axis and other stuff.

## 17th March 2012

Try to get Strip Pt plot when gendecay is 1prong0pi0 and reco as 1prong1pi0.

Fit ratio histogram with straight line

How to fit?

Completed fitting of pt, eta, iso for leading and subleading e,mu but seeing ~20% less data.

Asked Ian to check his plots.

One reason can be loss of storage area at bari which may cause loss of some of data files.

Running pat-tupliZer on data again, Will take 3-4 days.

In the mean time looking at TnP for CiCtight id only and fake rate application realted script and Analyzer code.

Looked at Bhawna's Z peak code, didn't worked fine and couldn't find any bug even. 😞

## 18th March 2012

SUNDAY. Reached ~12.00hrs.

No work after lunch.:)

## 19th March 2012

For TES - Tried to fix code to get information of strips but can't be fixed in CMSSW\_4\_2\_5. So Set up code in 442 and submitted pat-tuplizer jobs in 442. Before submitting I tried for 100 events it is working fine in 442 atleast. Now waiting for jobs to finish. 😊

TES code is not working because to get new fuctions DataFormats/PatCandidates has to be updates and hence have to make new pat tuples. But I was trying on old pat tuples.

For HZZ - Check BR of DYJetsToLL sample, it may be a reason for seeing less fakerate for jet->lepton from MC. TODO

Start writting script to multiply all TnP weights to MC. TODO.

See TnP package how TnP uses cic in official package.

Change PU weights in HZZ analyzer, they seems to be a little different. Pile up Official page

Pile Up Reweight Utilities

For Tau POG meeting - Slides sent to Sascha and these are fine.

## 20th March 2012

Attended Tuesday Meeting & prepared slides for Sunanda Sir.

Not much work did today. Little bit about TES.

## 21th March 2012

1. mmtt mass plot when a. No tau iso - No ISO means - iso not passed or it can be anything you just don't check b. Iso on first applied. c. Iso on second applied 2. Do 1 a, 1b, 1c for loose and medium tau isolation for eett, mmtt. 1 & 2 are now added in analyzer

3. Add MC to jet->tau rate plot. NOT DONE YET.

4. mmmt & eemt mass when (for jet->mu)

1. No Iso on 3rd lepton b. When Loose Iso on third lepton c. When Tight Iso On 3rd letpon NOT DONE YET

5. Repeat 4a,4b,4c for eeet, mmet (for jet faking electron). NOT DONE YET

6. See how to estimate fit uncertainty as done by Abdollah. Abdollah will explain it on Friday. I tried something and that is working don't know how good it is :P

7. Run Analyzer on new Pat-Tuples and send plots to Christian. Make SignalPiZeroCandidate Pt in for the gen. 1Prong0pi0 taus which are reconstructed as 1Prong1pi0 ? It would actually be very useful if you could make the PFGamma Pt and the strip Pt plots also for the combination gendecay = oneProng1pi0 and reco decay mode = oneProng1pi0 --> Then we can see more clearly what would be a good Pt cut (the aim is to make the Pt cut high enough so that we reject low Pt PFGammas/strips in gen. oneProng0pi0, but at the same time low enough that we keep the PFGammas/strips gen. oneProng1pi0) Sent plots to Christian and recieved

his reply. Going to reconstruct tau after strip  $p_t > 2.5$  GeV and see the decay mode performance plots. Submitted jobs after changing the HPSPFTau\_cfi.py. Dificult to submit the jobs :P

## 22th March 2012

Attended Tracker DQM Shift Tutorial.

Checked crab status but jobs are failing with 8020 again and again. ☹️

Started writing the script to multiply TNP efficiency scale factors. Half done.

Attended 2l2tau internal meeting.

Attended EGAMMA meeting. Nice tutorial on PF Isolation by Florian.

## 23th March 2012

Read about TRACKER DQM SHIFT

TNP Meeting at 5.00 GVA IMPORTANT.

## 24th March 2012

Read about TRACKER DQM SHIFT

Plotted decay mode performance plots after decay mode finding only and we could find that -

## 25th March 2012

Read about TRACKER DQM SHIFT

And after lunch no work.

## 26th March 2012

TRACKER DQM SHIFT

Shift and shift tutorial took whole day.

## 27th March 2012

TRACKER DQM SHIFT

Energy Recovery Algorithm instructions by Christian -

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in today's Tau id. meeting there was the question for a recipe to run the tau energy recovery algorithm in CMSSW\_4\_2\_x .

I think that all you need to do is to check-out 2 additional files on top of the latest RecoTauTag tags for CMSSW\_4\_2\_x.

```
V01-02-11      RecoTauTag/Configuration
V01-02-16      RecoTauTag/RecoTau
V01-02-01      RecoTauTag/TauTagTools
cvs up -r 1.13 RecoTauTag/RecoTau/python/
```

```
RecoTauCombinatoricProducer_cfi.py
  cvs co -r 1.2 RecoTauTag/RecoTau/plugins/
RecoTauEnergyRecoveryPlugin.cc
```

If you then rerun the PFTau sequence, the `reco::PFTau->p4()` will return the four-vector set by the energy recovery algorithm (and will be returned by `pat::Tau->p4()` also)

What you should see after using the tau energy recovery algorithm is that the tail of `low tauJetPt/genVisTauPt` gets reduced significantly and the energy response becomes more Gaussian

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## 28th March 2012

### TRACKER DQM SHIFT

#### Important Links

DQM GUI [↗](#)

Run Registry [↗](#)

White Board

Tutorial Slide

#### Christian's comment on three prong efficiency with isolation -

it is interesting to investigate in a bit more detail the "interplay" between decay mode finding

How about you make a plot for true 3-prong decays on generator level:

```
(decay mode finding && recDecayMode = 3 prong && recTauJetPt > 15 GeV ) / (all gen 3 prong tau d
(decay mode finding && recDecayMode = 3 prong && HPS combined isolation Loose) / (all gen 3 pro
(decay mode finding && recDecayMode = 1 prong + Npi0) / (all gen 3 prong tau decays) --> blue da
(decay mode finding && recDecayMode = 1 prong + Npi0&& HPS combined isolation Loose) / (all gen
(decay mode finding && recDecayMode = 1 prong + 0pi0) / (all gen 3 prong tau decays) --> green d
(decay mode finding && recDecayMode = 1 prong + 0pi0 && HPS combined isolation Loose) / (all gen
```

--> 6 graphs on 1 plot

(`recTauJetPt`, `genTauJetPt` and `absTauJetEta` cuts are applied in the same way in all 6 cases, I just did not want to write it all the time ;o)

In this case we can see that the ratio of red dashed/red solid line provides a flat isolation eff while the ratios of blue dashed/blue solid and green dashed/green solid lines will be small, indicating that most of the 3-prongs which get erroneously reconstructed as 1-prongs (because 1 track get killed by the isolation criteria (because the 2nd track spoils the isolation)

If you like, you could redo the plot above also for generated 1-prong + 1pi0 and 1-prong + 2pi0 (that the efficiency to pass the isolation is low in case we reconstruct the decay mode wrong).

Added above comments in Analyzer for 3prong. And sent plot to Christian.

#### Christian's comment and plan of action -

What I see is the following:

About 60-70% of gen. 3-prong are reconstructed as 3-prongs. The other 30-40% are reconstructed as 1-prongs, so pass the `decayModeFinding` discriminator, but then fail the isolation (as

expected).

What I do not understand yet is the dip in the 3-prong decayModeFinding efficiency at around 60 GeV. Would it be possible for you to run a modified version of the tau reconstruction on ~1000 gen. 3-prong events ? What I have in mind is to edit

```
RecoTauTag/RecoTau/python/HPSPFRecoTauProducer_cfi.py
and set
threeProngMassWindow = cms.vdouble(0.8,2.0),
matchingCone= cms.double(0.5),
coneMetric = cms.string("DR"),
coneSizeFormula = cms.string("5.0/ET"),
minimumSignalCone = cms.double(0.15),
maximumSignalCone = cms.double(0.15)
```

And then make plots of  
tau.mass  
dR(tau, jet)  
dR(tau, signalPFChargedHadron[i]) // i = 0..2

This would tell us if there is a cut in the decay mode finding stage which causes 3-prongs to be reconstructed as 1-prongs in case either the invariant mass of the 3 tracks is too high or the distance between tau and jet/any of the tracks is too large.

Edited the reconstruction code accordingly and submitted crab jobs. Waiting for them to be done. 😞

Wrote code for scale factor calculation for mmtt and mmme channels. Have to include for other final states also.

## 29th March 2012

TRACKER DQM SHIFT

Higgs Production at LHC via Glu Glu fusion [↗](#)

To get CMSSW\_5\_2\_2 release set environment as following

```
In bash shell -
export SCRAM_ARCH=slc5_amd64_gcc462
```

## 30th March 2012

Worked on plots asked by Christian.

Plots done and sent to him.

Tried to submit condor in wisc, partly successful, don't know where will output file be saved.

## 31th March 2012

Some of the data jobs are done.

LumiCalc2

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This topic: Main > March2012

Topic revision: r21 - 2012-05-29 - RamanKhurana



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