



UW Future Colliders: Summer

ROOT Tutorial & Command Line Tools

CERN ROOT Tutorial for Summer Students
28th June 2015 at 09:54 Danilo Piparo, Olivier Couet

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Exercise Solution

```
root [0] TGraph g
root [1] g.SetTitle("My graph;myX;myY")
root [2] g.SetPoint(0,1,0)
root [3] g.SetPoint(1,2,3)
root [4] g.SetPoint(2,3,4)
root [5] g.SetMarkerStyle(kFullSquare)
root [6] g.SetMarkerColor(kRed)
root [7] g.SetLineColor(kOrange)
root [8] g.Draw("APL")
```

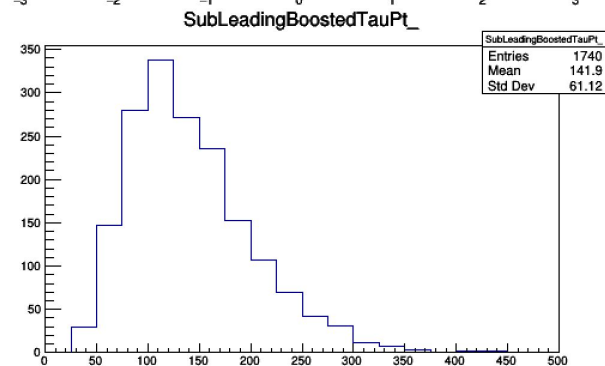
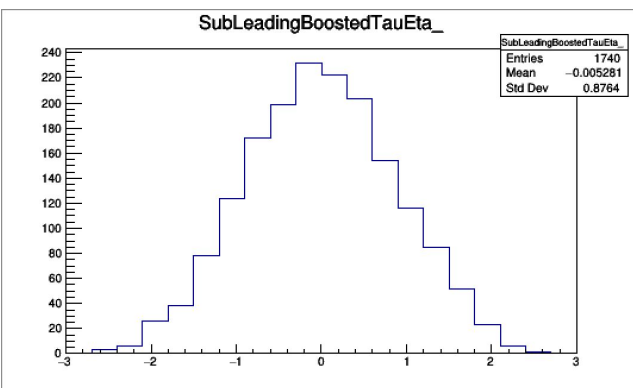
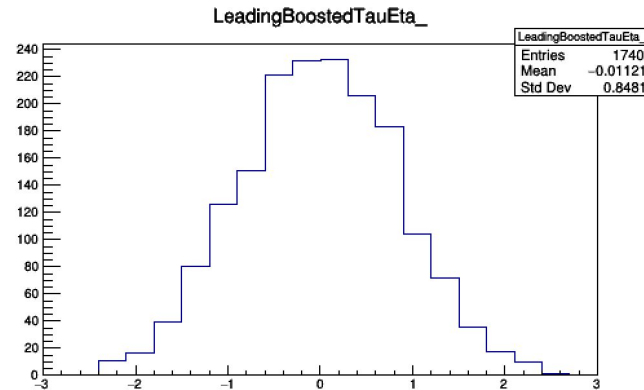
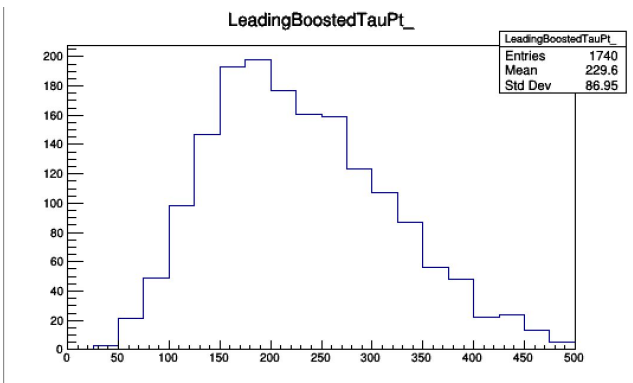
My graph

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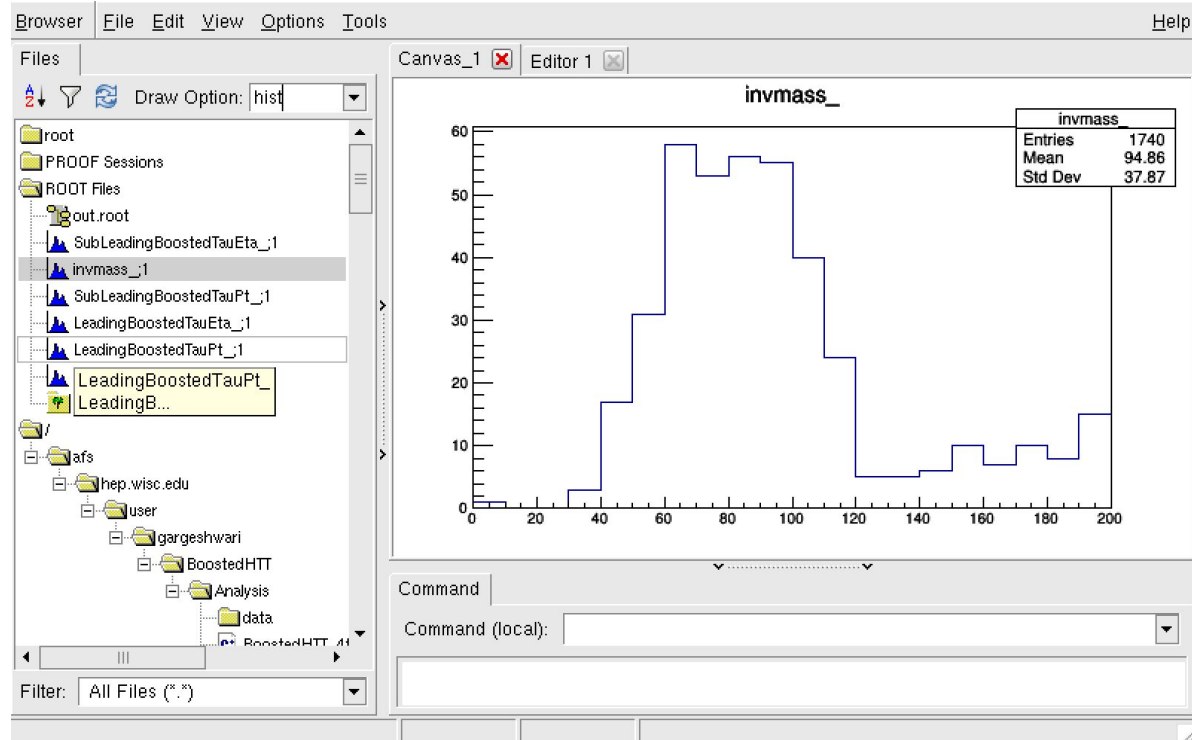
48 | 35s 49 | 6m 40s 50 | 9s 51 | 5m 56s 52 | 5m 53 | 17s 54 | 17s 55 | 11s

01:37:14 03:03:40

Mini Project - Plot Invariant mass of Muon and Tau



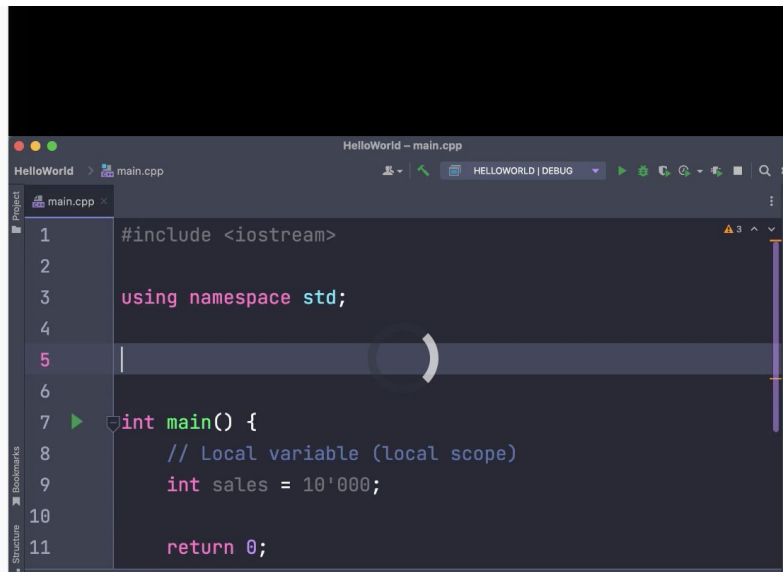
Mini Project - Plot Invariant mass of Muon and Tau



C++ Course

Functions (45m)

- ☒ 1- Introduction (0:35)
- ☐ 2- Defining and Calling Functions (8:55)
- ☒ 3- Parameters with a Default Value (2:41)
- ☒ 4- Overloading Functions (2:50)
- ☒ 5- Passing Arguments by Value or Reference (6:17)
- ☐ 6- Local vs Global Variables (3:06)
- ☐ 7- Declaring Functions (1:45)
- ☐ 8- Organizing Functions into Files (2:21)



```
1 #include <iostream>
2
3 using namespace std;
4
5
6
7 int main() {
8     // Local variable (local scope)
9     int sales = 10'000;
10
11     return 0;
}
```

by all functions. Here's an example. If a declare a variable

Root Exercise Z- $\rightarrow$ tautau

Step 5: Fill the visible mass of the muon and tau lepton pair

//

Now we need to fill two histograms-- one for Same Sign (SS) muTau and one for Opposite Sign (OS) muTau.

```
        if(MuIdIso1 && MuIdIso2 && OS)
            IsthereDiMuon=true;
    }
}
vector<float> EveBJetPt;
EveBJetPt.clear();

TLorentzVector Jet4Momentum;
for (int ijet= 0 ; ijet < nJet ; ijet++){

    Jet4Momentum.SetPtEtaPhiE( jetPt->at(ijet),
                                jetEta->at(ijet),
                                jetPhi->at(ijet),
                                jetEn->at(ijet));

    if (jetPt->at(ijet) > 20 && fabs(jetEta->at(ijet)) < 2.5 && Jet4Momentum.DeltaR(Tau4Momentum) > 0.5 && Jet4Momentum.DeltaR(Mu4Momentum) > 0.5 && jetCSV2BJetTags->at(ijet) > 0.8484){
        EveBJetPt.push_back(jetPt->at(ijet));
    }
}

//Check if there is an OS muTau pair with dR > 0.5 and TMass(mu.MET) < 40 and then fill the weighted histogram as below:
float PUWeight = 1;
float LumiWeight = 1;

//
visibleMassOS->SetDefaultSumw2();
visibleMassOS->Fill(Jet4Momentum.M(),LumiWeight*PUWeight);
//Check if there is a SS muTau pair with dR > 0.5 and TMass(mu.MET) < 40 and then fill the weighted histogram as below:
visibleMassSS->SetDefaultSumw2();
visibleMassSS->Fill(Jet4Momentum.M(),LumiWeight*PUWeight);

//end of analysis code, close and write histograms/file
fout->cd();
visibleMassOS->Write();
visibleMassSS->Write();
fout->Close();
```