PROGRESS OF TASK 2: MPD PID PERFORMANCE BY MEANS OF IONIZATION LOSS DE/DX

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PREVIOUSLY

```
{
case EGenerators::BOX: // Box generator

  gRandom->SetSeed(0);
  FairBoxGenerator *boxGen = new FairBoxGenerator(partPdgC[5], 100);
  //FairBoxGenerator *boxGen = new FairBoxGenerator(13, 100); // 13 = mu
   oxGen->SetPRange(0.0, 5.0);                                  // GeV/c, set
   xGen->SetPhiRange(0, 360);                                   // Azimuth a
    xGen->SetThetaRange(0, 180);                                // Polar ang
     Gen->SetXYZ(0., 0., 0.);                                   // mm o cm
    Gen->AddGenerator(boxGen);
    k;
```

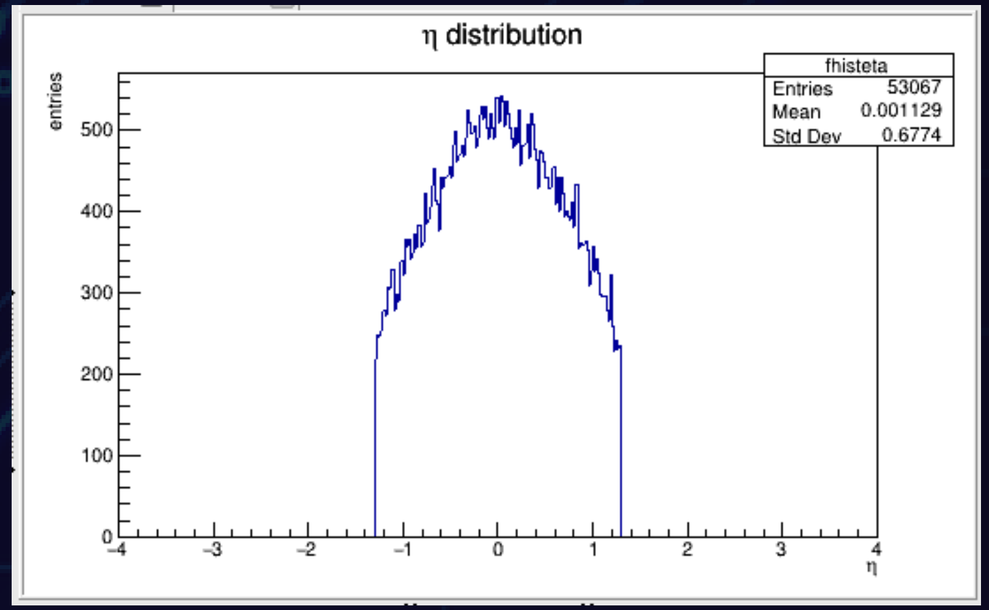
He3

For the runMC.C macro

01

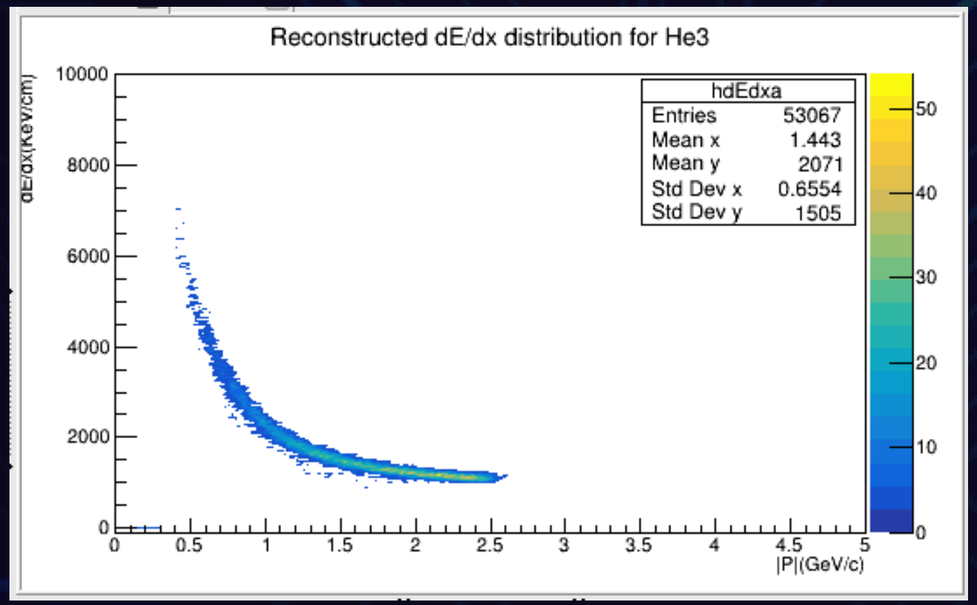
In the BOX generator I selected the pdg code for helium 3 with a multiplicity of 100. Also, I need to run 1000 events to get the following histograms.

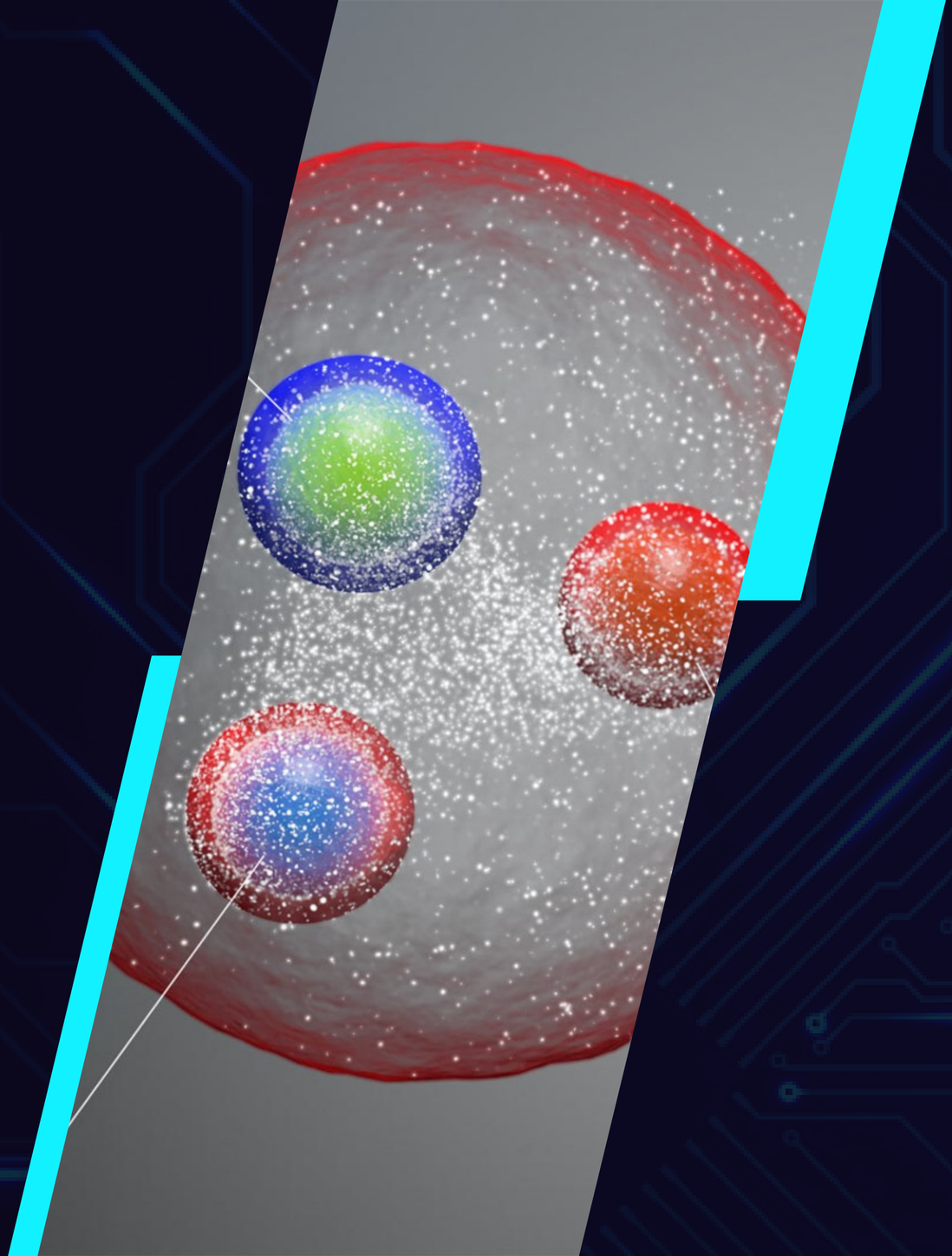
HISTOGRAMS FOR TRACKS RECONSTRUCTED BY MC ASSOCIATION



Distribution of pseudorapidity

Distribution of ionization energy loss





DE/DX FOR DIFERENT HADRONS

To achieve this I had to add a For loop in the runMC.C macro, with this the pdg code of each particle would be changing.

For the runMC.C macro

```
for (Int_t i = 0; i < 6; i++)
    {
    switch (generator)
    {
    case EGenerators::BOX: // Box generator
    {
    //for (Int_t i = 0; i < 6; i++)
    //{
       gRandom->SetSeed(0);
       FairBoxGenerator *boxGen = new FairBoxGenerator(partPdgC[i], 100);
       //FairBoxGenerator *boxGen = new FairBoxGenerator(partPdgC[4], 100);
       //FairBoxGenerator *boxGen = new FairBoxGenerator(13, 100); // 13 = muon; 1 = multipl.
       boxGen->SetPRange(0.0, 5.0);                              // GeV/c, setPRange vs setPtRange
       boxGen->SetPhiRange(0, 360);                               // Azimuth angle range [degree]
       boxGen->SetThetaRange(0, 180);                             // Polar angle in lab system range [degree]
       boxGen->SetXYZ(0., 0., 0.);                                // mm o cm ??
       primGen->AddGenerator(boxGen);
       break;
      //}
    }
```

```
Int_t partPdgC[] = {211, 11, 2212,321,1000010020,1000020030};//pi, e, p, K, d, He3
```

pdg code

For the macro MpdPtMCAnalysisTask.cxx

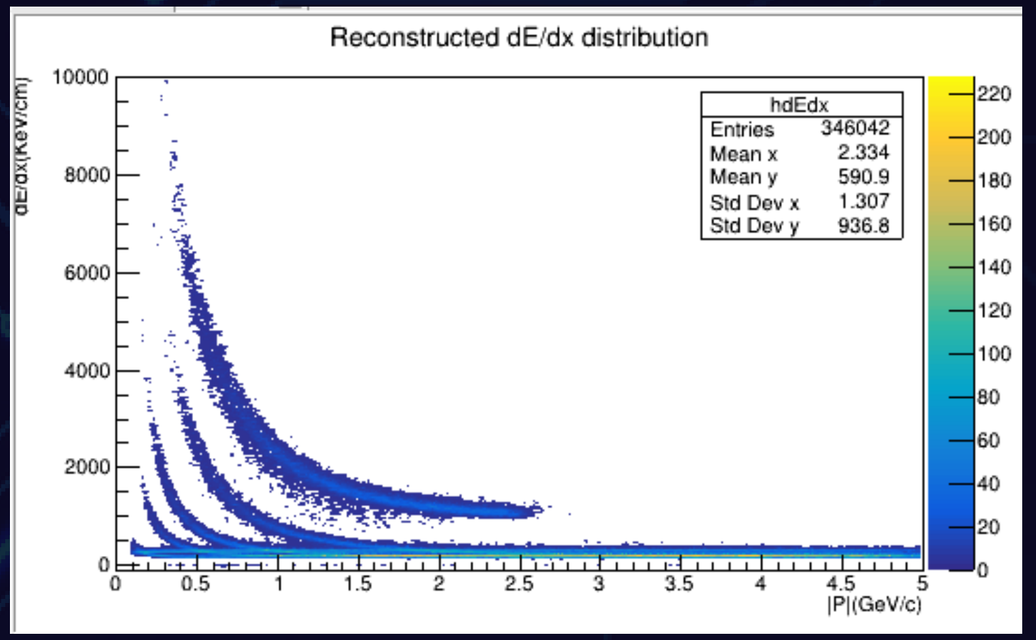
```
Double_t ptmc=track->GetPt();
fhistPt->Fill(ptmc);


Double_t etamc=track->GetEta();
//if(etamc > 1.3) continue;
//if(etamc < -1.3) continue;
fhisteta->Fill(etamc);

Double_t Enpos=mcTr->GetEnergy();
fhistEnpos->Fill(Enpos);

Int_t nhits  = track->GetNofHits();

if (TMath::Abs(ptmc) < 0.1) continue;
if (TMath::Abs(etamc) > 1.3) continue;
if (nhits < 16) continue;
```

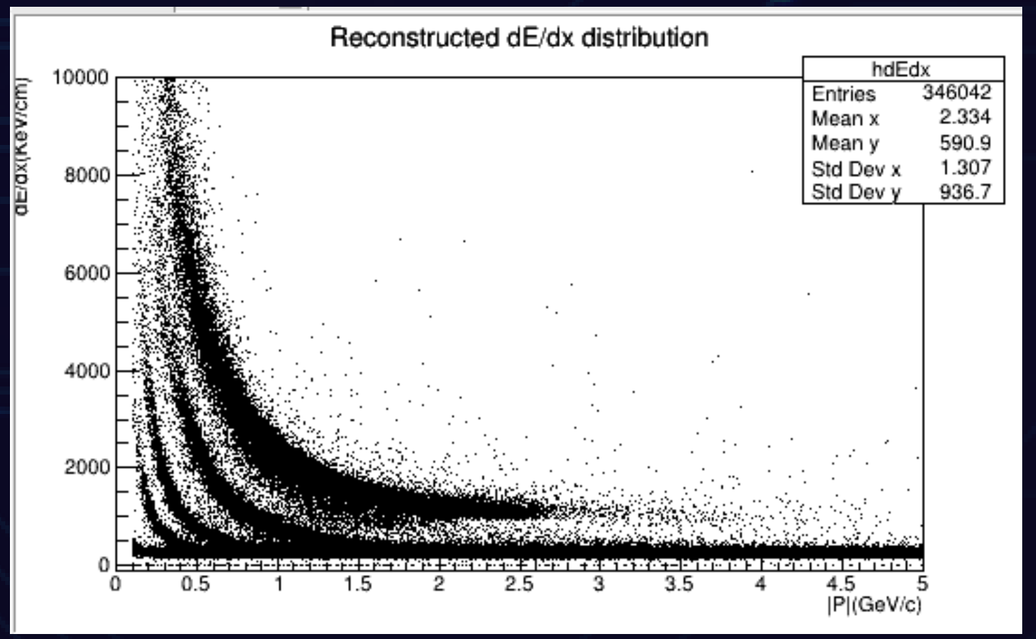
Code for cuts

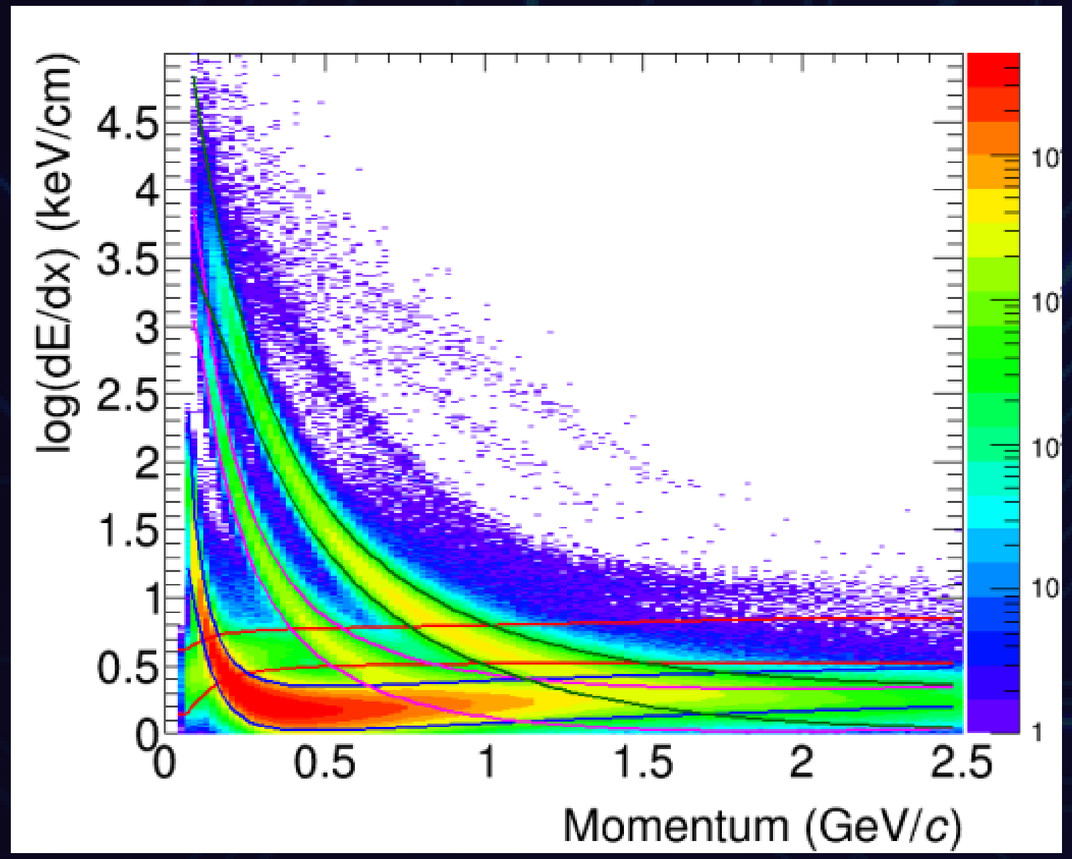
NEW HISTOGRAM

01 This histogram represents the dE/dx distribution of hadrons before decaying to other particles.

02 To obtain the histogram the macros runMC.C and runReco.C took approximately between 16 hrs and 7 hrs to run







NEXT TASKS TO DO

01 Parametrize dE/dx bands for particle specie (i.e. positions and width at every p/q)

02 Define selection regions, calculate purity, efficiency, and contamination