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Collider Mode. Reduced Magnetic Field.

Progress on task 2:
Particle identification determination of spectra using information about the energy losses (dE/dx) in the TPC and the Time-of-flight from the TOF detector.

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Dr. Ivonne Alicia Maldonado Cervantes
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PARAMETERS USED FOR ANALYSIS

Prodution-Generator

request 28 - UrQMD
BiBi@ 9.2 GeV reduced
magnetic
field.

Number of events

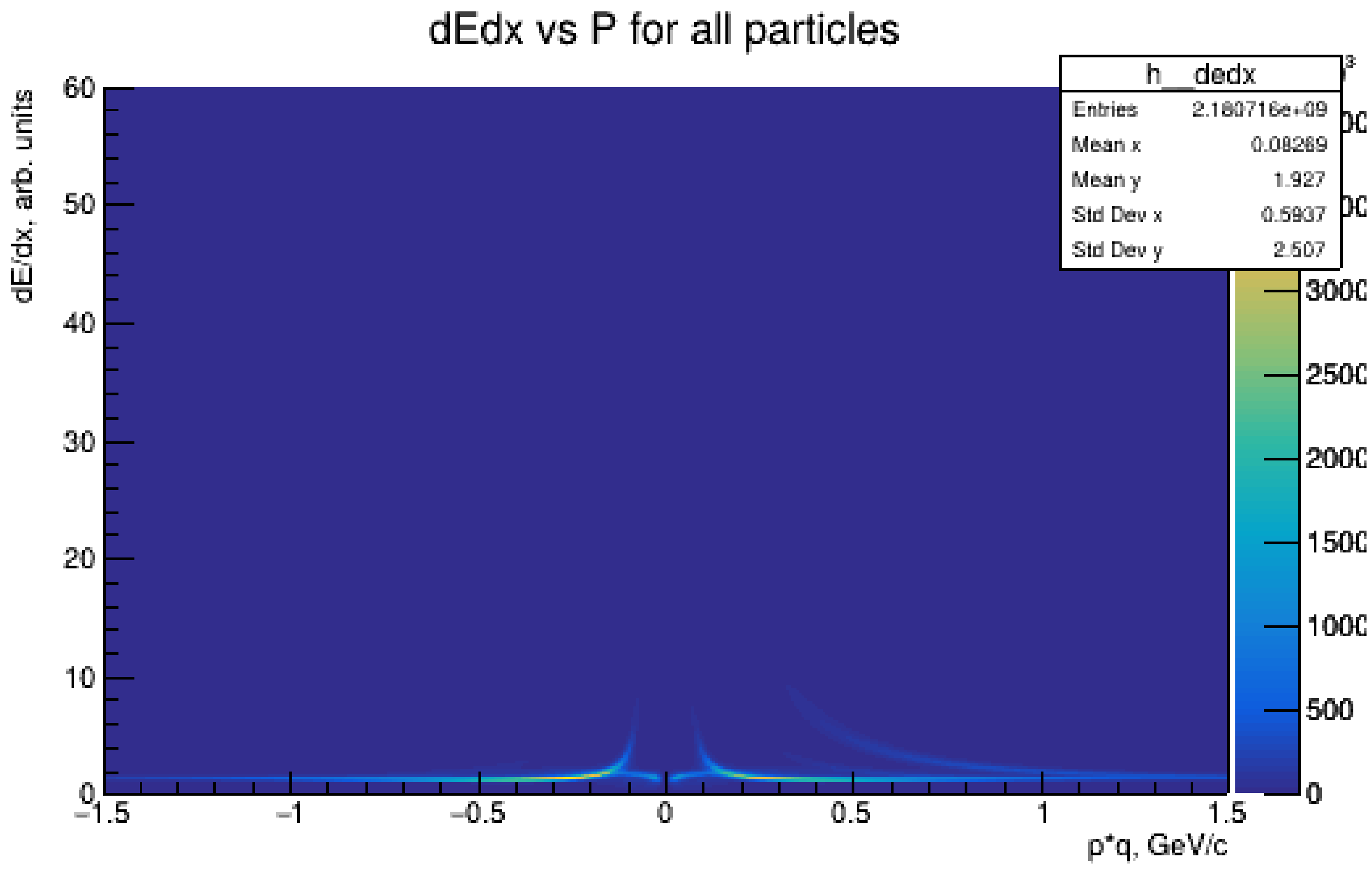
10,500,000

HISTOGRAMS OBTAINED

Selection criteria for events and identified tracks:

- NHits > 27
- Pseudorapidity -> has not been defined
- DCA -> has not been defined

Provided by task 1



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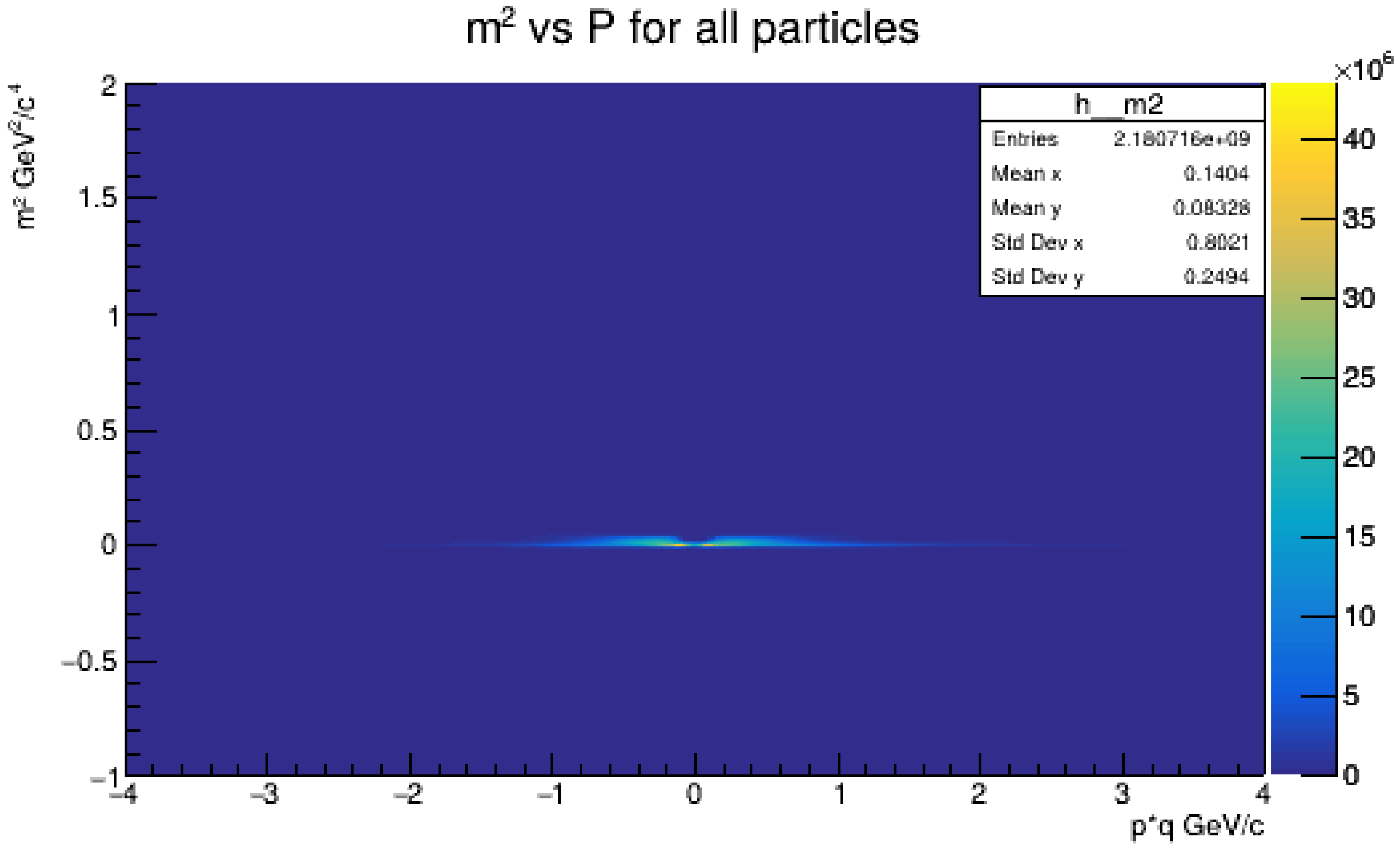


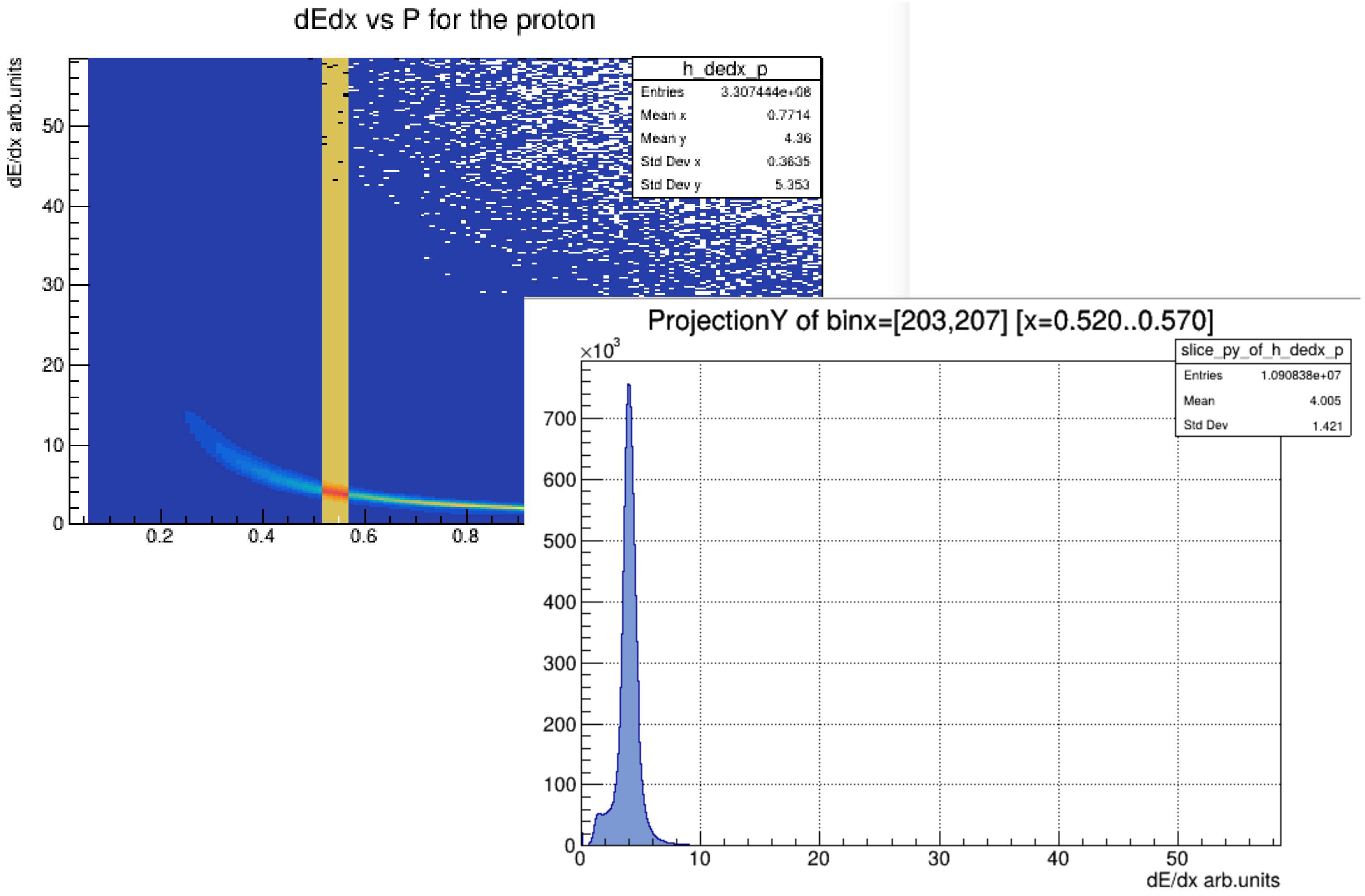
m^2 vs P for all particles

h__m2	
Entries	2.180716e+09
Mean x	0.1404
Mean y	0.08328
Std Dev x	0.8021
Std Dev y	0.2494

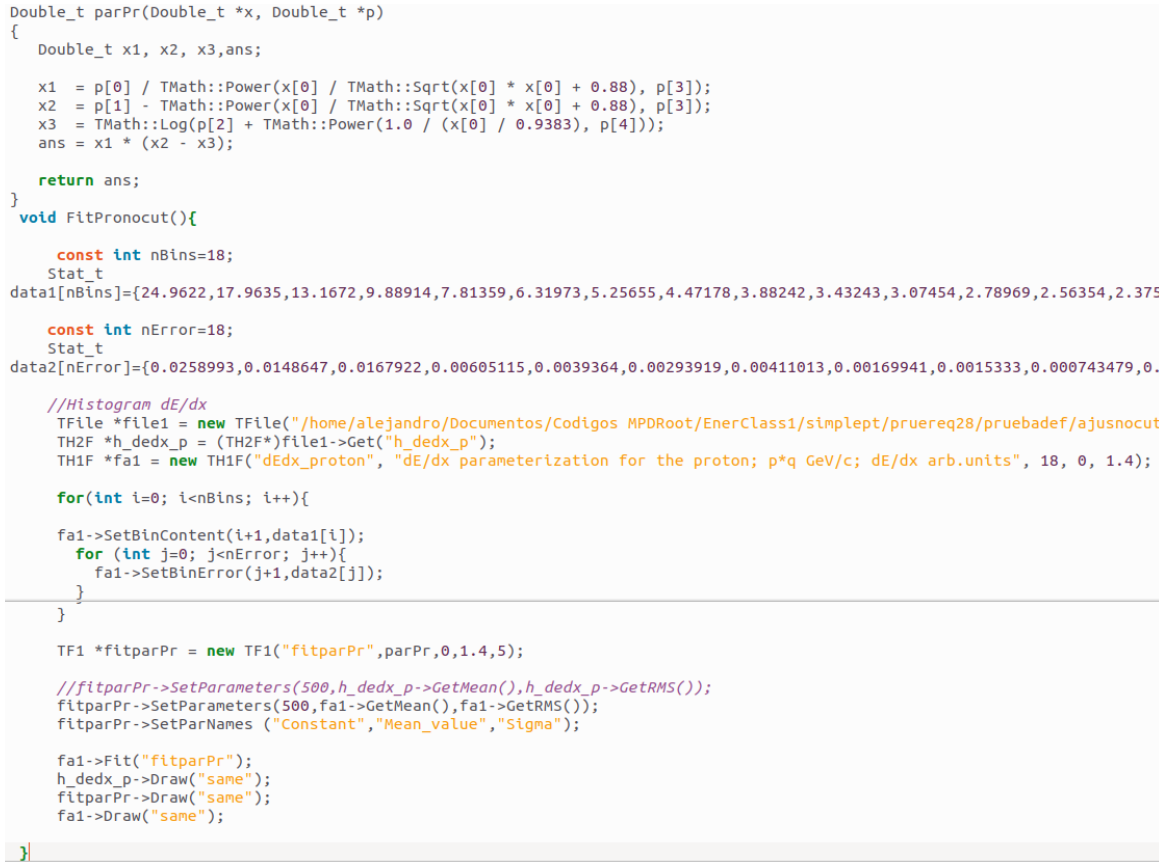
PID performance in TPC & TOF

Using the fit panel, cuts were made in the histograms for each particle in order to obtain the bin values. Taking into consideration:

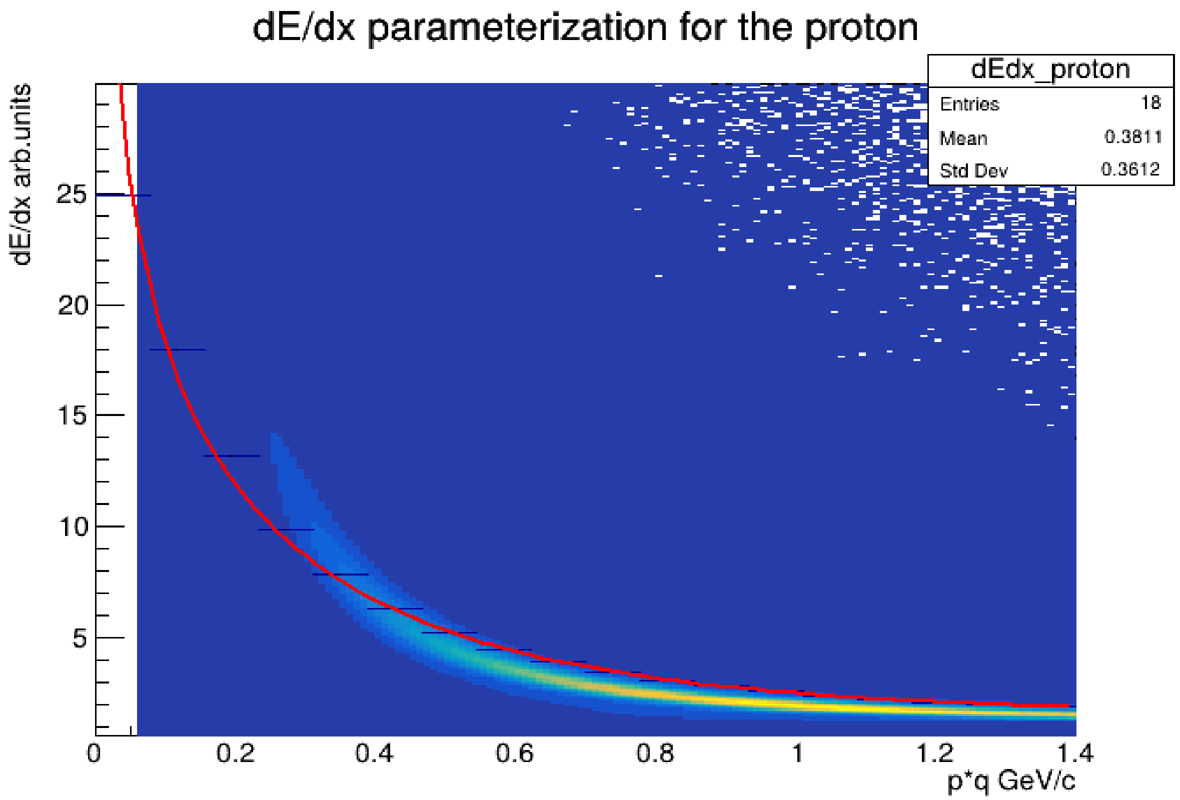
- Gaussian function for fitting
- Chi-squared per degree of freedom aproximately to one



RESULTS

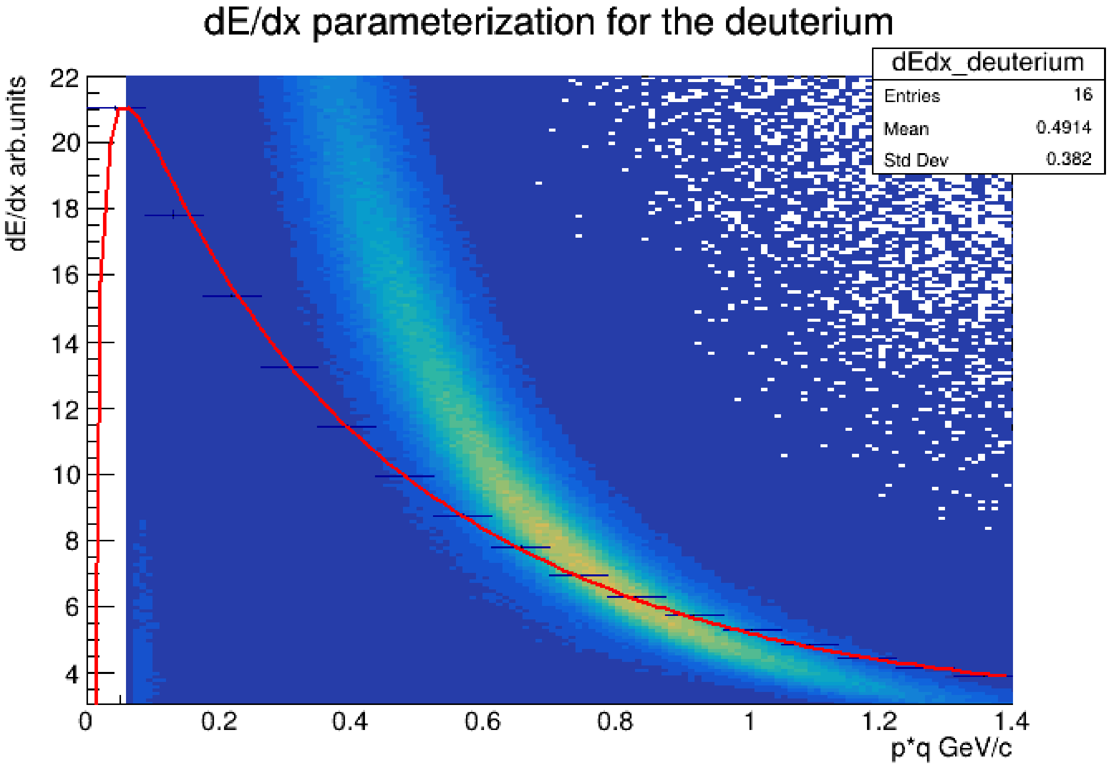


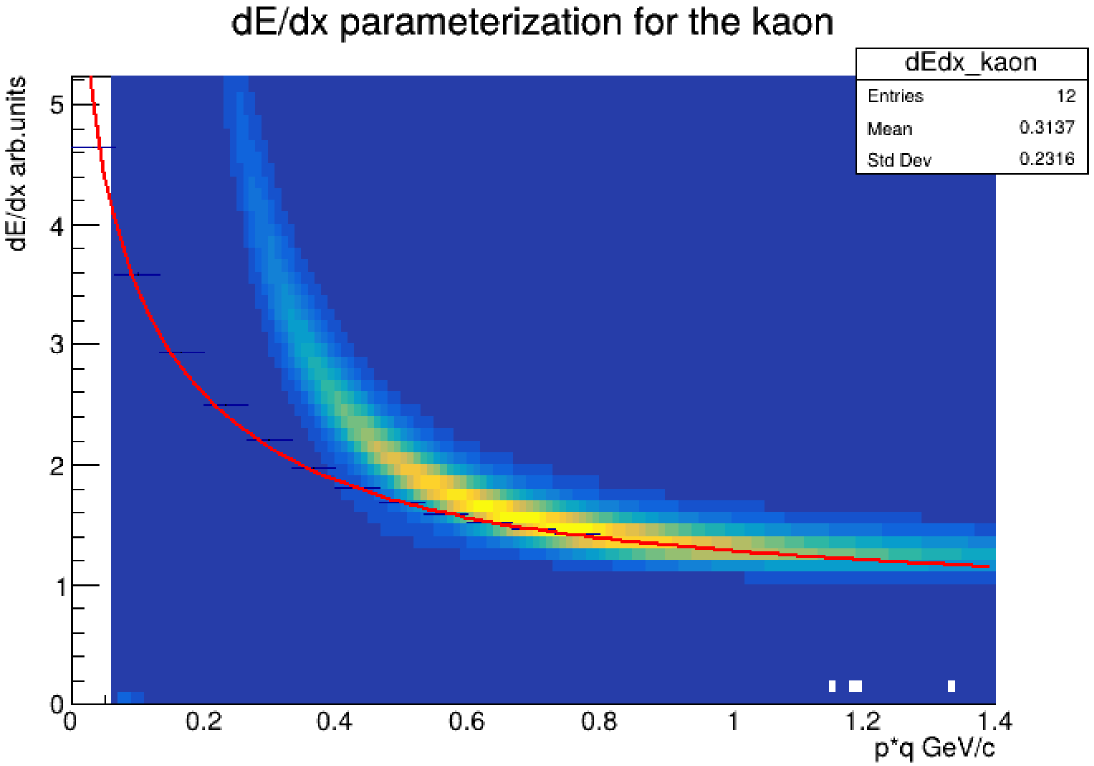
```
Double_t parPr(Double_t *x, Double_t *p)
{
   Double_t x1, x2, x3,ans;

   x1  = p[0] / TMath::Power(x[0] / TMath::Sqrt(x[0] * x[0] + 0.88), p[3]);
   x2  = p[1] - TMath::Power(x[0] / TMath::Sqrt(x[0] * x[0] + 0.88), p[3]);
   x3  = TMath::Log(p[2] + TMath::Power(1.0 / (x[0] / 0.9383), p[4]));
   ans = x1 * (x2 - x3);

   return ans;
}
 void FitPronocut(){

     const int nBins=18;
    Stat_t
data1[nBins]={24.9622,17.9635,13.1672,9.88914,7.81359,6.31973,5.25655,4.47178,3.88242,3.43243,3.07454,2.78969,2.56354,2.375

    const int nError=18;
    Stat_t
data2[nError]={0.0258993,0.0148647,0.0167922,0.00605115,0.0039364,0.00293919,0.00411013,0.00169941,0.0015333,0.000743479,0.

    //Histogram dE/dx
     TFile *file1 = new TFile("/home/alejandro/Documentos/Codigos MPDRoot/EnerClass1/simplept/puereq28/pruebadef/ajusnocut
     TH2F *h_dedx_p = (TH2F*)file1->Get("h_dedx_p");
     TH1F *fa1 = new TH1F("dEdx_proton", "dE/dx parameterization for the proton; p*q GeV/c; dE/dx arb.units", 18, 0, 1.4);

     for(int i=0; i<nBins; i++){

     fa1->SetBinContent(i+1,data1[i]);
       for (int j=0; j<nError; j++){
         fa1->SetBinError(j+1,data2[j]);
       }
     }

     TF1 *fitparPr = new TF1("fitparPr",parPr,0,1.4,5);

     //fitparPr->SetParameters(500,h_dedx_p->GetMean(),h_dedx_p->GetRMS());
     fitparPr->SetParameters(500,fa1->GetMean(),fa1->GetRMS());
     fitparPr->SetParNames ("Constant","Mean_value","Sigma");

     fa1->Fit("fitparPr");
     h_dedx_p->Draw("same");
     fitparPr->Draw("same");
     fa1->Draw("same");

  }
```



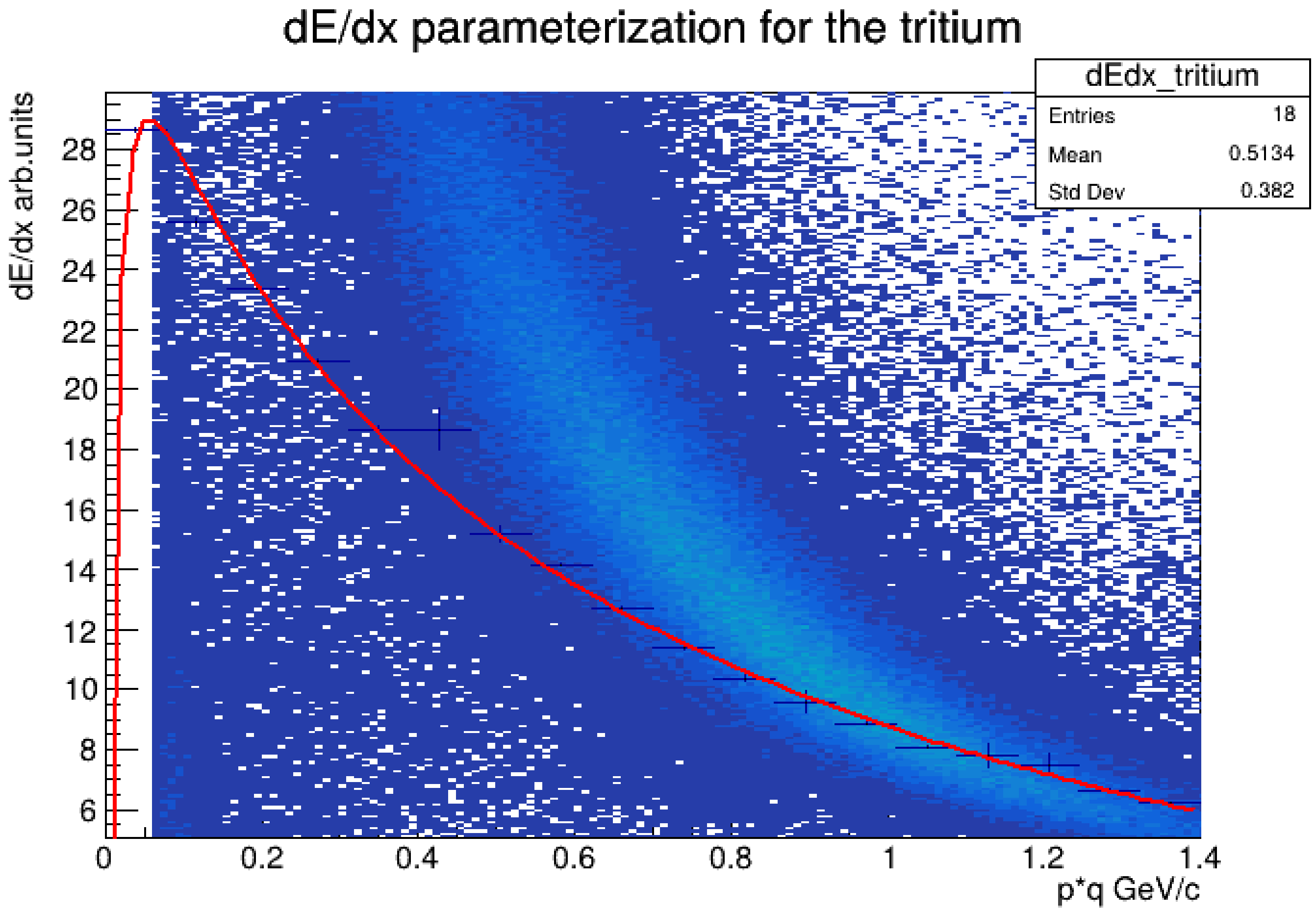
$$\langle\frac{dE}{dx}\rangle = \frac{P_0}{\beta^{P_3}}\left[P_2 - \beta^{P_3} - ln\{P_2 + \left(\frac{1}{\beta\gamma}\right)^{P_4}\}\right], \qquad \beta = \frac{P}{\sqrt{p^2 + M^2}}.$$

RESULTS


dE/dx parameterization for the deuterium
dEdx_deuterium
Entries 16
Mean 0.4914
Std Dev 0.382
dE/dx arb.units
22
20
18
16
14
12
10
8
6
4
0
0.2
0.4
0.6
0.8
1
1.2
1.4
p*q GeV/c


dE/dx parameterization for the kaon
dEdx_kaon
Entries 12
Mean 0.3137
Std Dev 0.2316
dE/dx arb.units
5
4
3
2
1
0
0
0.2
0.4
0.6
0.8
1
1.2
1.4
p*q GeV/c

RESULTS


dE/dx parameterization for the tritium
dEdx_tritium
Entries 18
Mean 0.5134
Std Dev 0.382
dE/dx arb.units
28
26
24
22
20
18
16
14
12
10
8
6
0
0.2
0.4
0.6
0.8
1
1.2
1.4
p*q GeV/c