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Tuesday, 20August

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.

Supervisors:

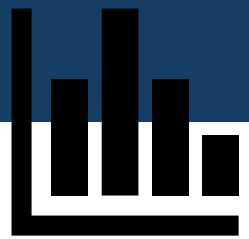
Dr. Vadim Kolesnikov

Dr. Ivonne Alicia Maldonado Cervantes

Viktar Kireyeu

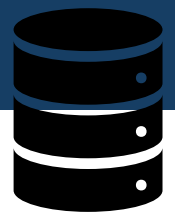
Natalia Kolomoyets

PARAMETERS USED FOR ANALYSIS



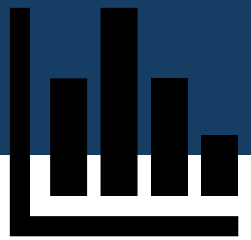
Prodution-Generator

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



Number of events

10,500,000

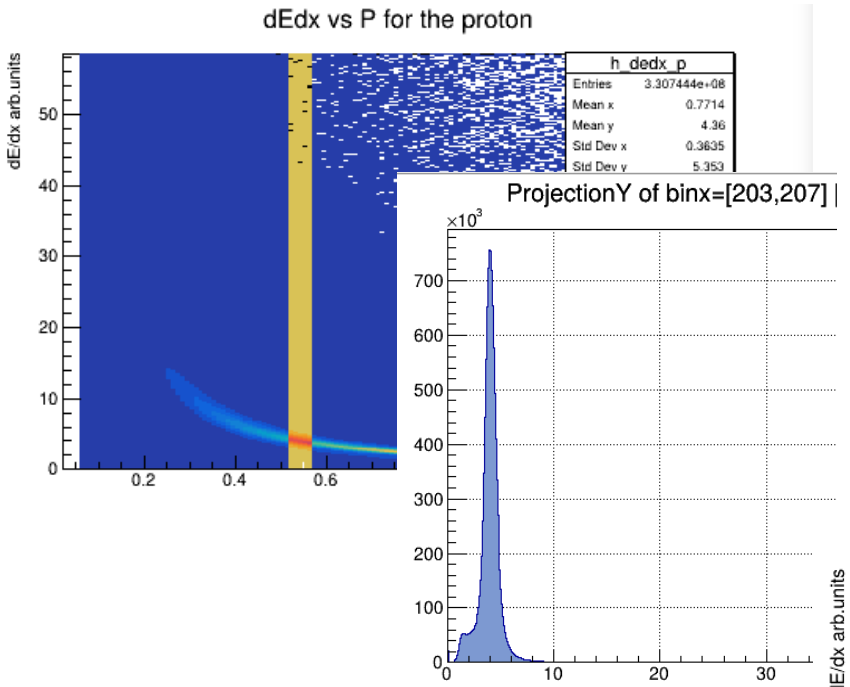


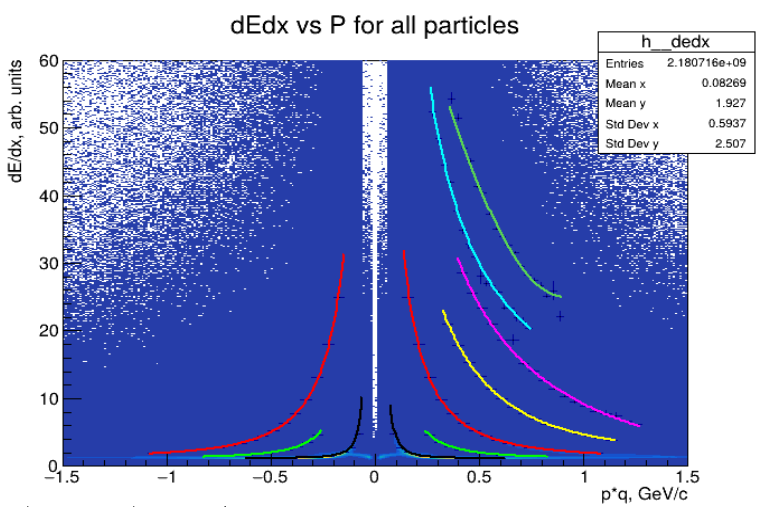
Selection criteria for events and identified tracks

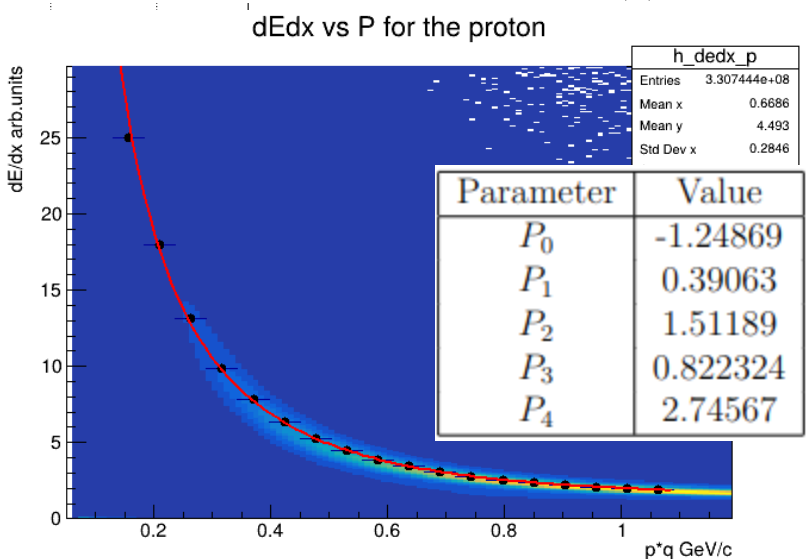
- Pt > 0.15 GeV
- η E (-1.5,1.5)
- Number of Hits > 27
- DCA > 1 cm

PREVIOUS ACTIVITIES

- Adjustments obtained for all particles
- Parameters of the Bethe-Bloch equation obtained for all particles







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

Parameter	Value
P_0	-1.24869
P_1	0.39063
P_2	1.51189
P_3	0.822324
P_4	2.74567

New activities

1. Bethe-Bloch parameterized fusions were included as dE/dx boundaries, to clean up the distribution.

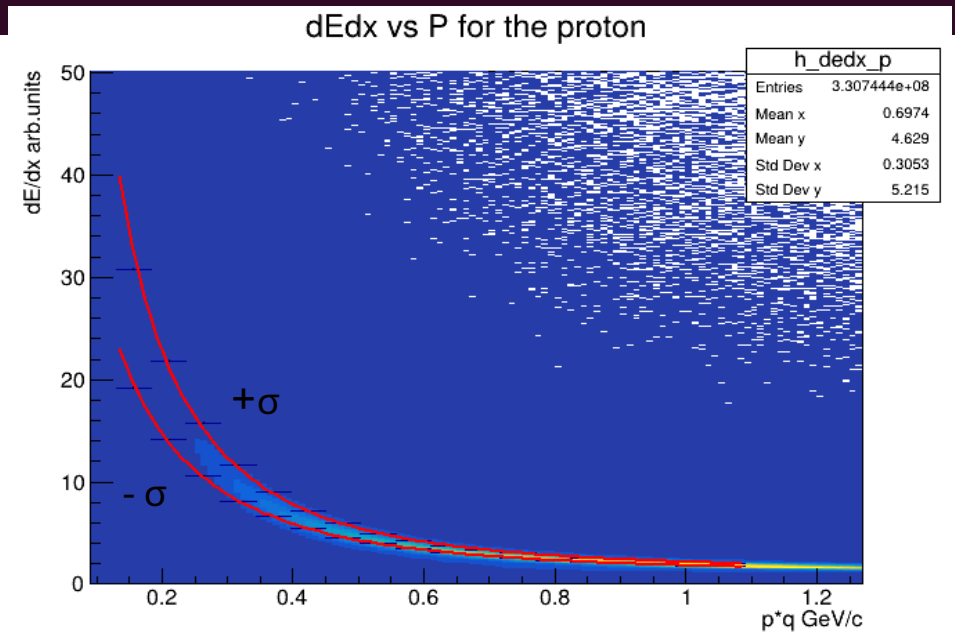
2. Pt histograms were obtained for three cases: with limits in dE/dx, limits in dE/dx + pdg, and pdg (monte carlo tracks).

3. Efficiency histograms were obtained for the following particles: Protons, pions and kaons

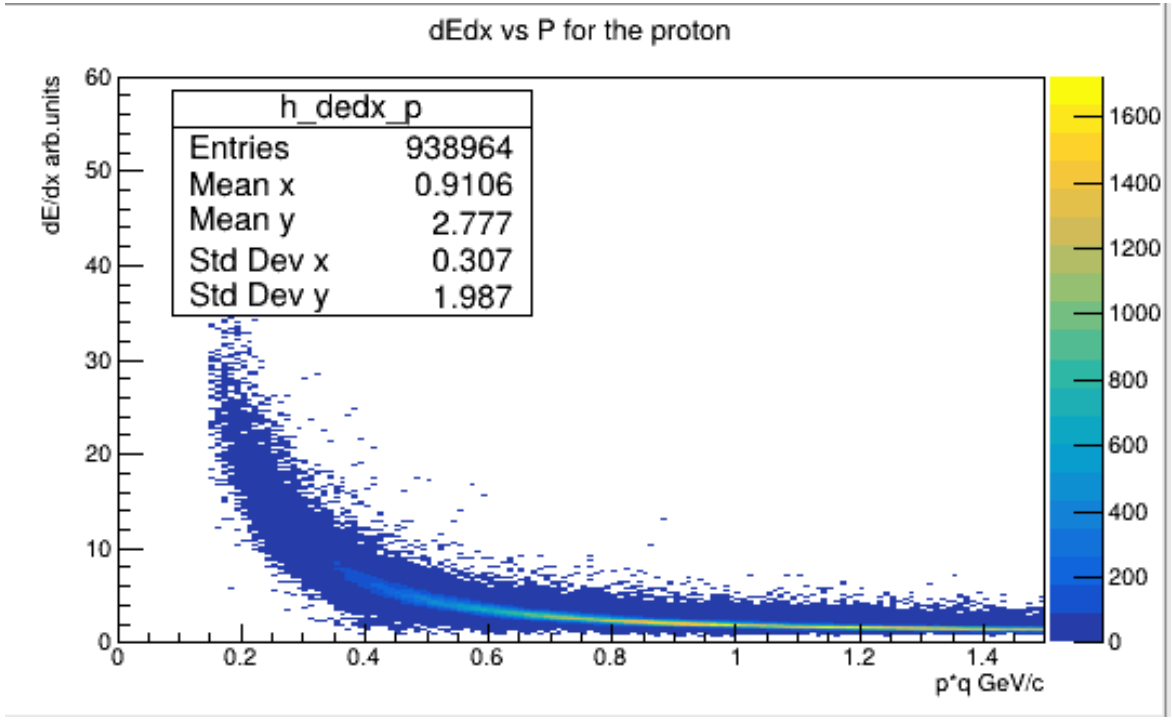
1. Bethe-Bloch parameterized fusions were included as dE/dx boundaries, to clean up the distribution.

```
//_____Bethe Bloch functions for each particle_________

//proton_sigma_____________________________________
  //double dedxp1=((-2.9144) / TMath::Power(p / TMath::Sqrt(p * p + 0.88), 0.82576))*((1.22346 - TMath::Power(p / TMath::Sqrt(p * p + 0.88), 0.82576))
-(TMath::Log(2.0642 + TMath::Power(1.0 / (p / 0.9383), 2.20544))));//proton+2sigma
  double dedxp1=((-2.58072) / TMath::Power(p / TMath::Sqrt(p * p + 0.88), 0.782313))*((1.16569 - TMath::Power(p / TMath::Sqrt(p * p + 0.88), 0.782313)
)-(TMath::Log(1.97189 + TMath::Power(1.0 / (p / 0.9383), 2.20629))));//proton+1sigma

  //double dedxp2=((-3.11222) / TMath::Power(p / TMath::Sqrt(p * p + 0.88), 0.214233))*((1.7496 - TMath::Power(p / TMath::Sqrt(p * p + 0.88), 0.214233
))-(TMath::Log(2.83206 + TMath::Power(1.0 / (p / 0.9383), 2.18993))));//proton-2sigma
  double dedxp2=((-3.70863) / TMath::Power(p / TMath::Sqrt(p * p + 0.88), 0.434546))*((1.70197 - TMath::Power(p / TMath::Sqrt(p * p + 0.88), 0.434546)
)-(TMath::Log(2.64031 + TMath::Power(1.0 / (p / 0.9383), 2.0007))));//proton-1sigma
```

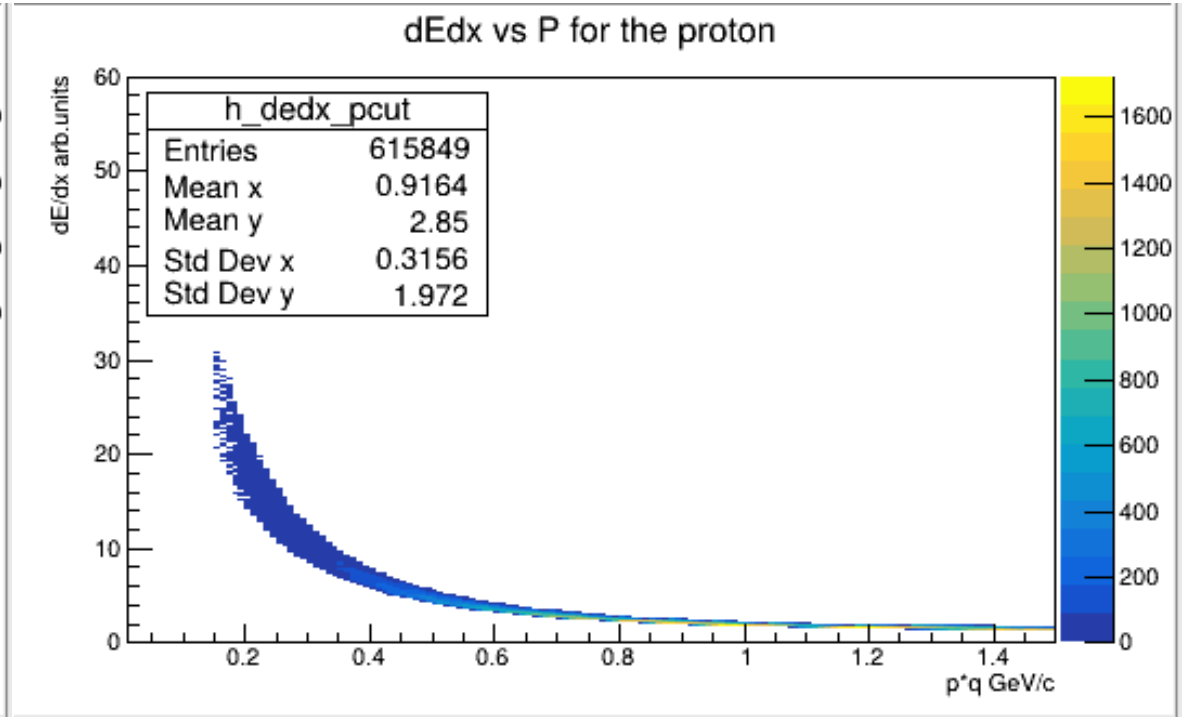
```
        }
//proton_dedx_____________________________________________
       if(dedx >= dedxp2 && dedx <= dedxp1 ){

         PtProreco1->Fill(pt_reco);
         if(pdg == 2212){
              h__dedxpcut->Fill(p,dedx);
              PtProreco2->Fill(pt_reco);

          }

       }
```



1. Bethe-Bloch parameterized fusions were included as dE/dx boundaries, to clean up the distribution.

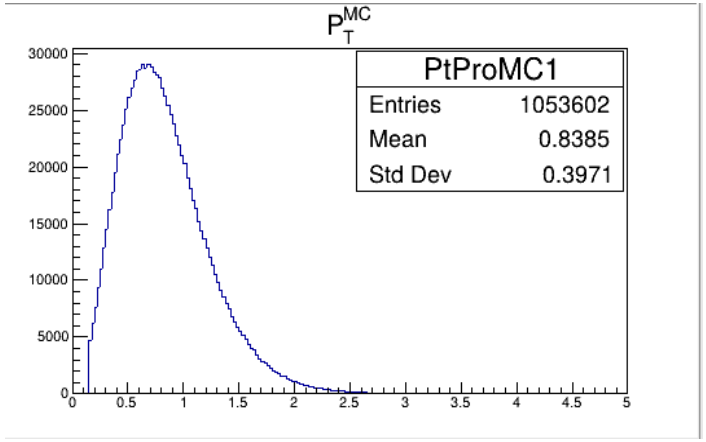


For reconstructed tracks with PDG

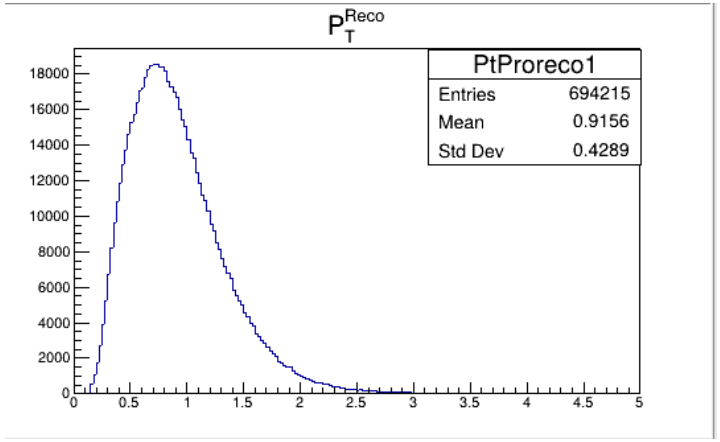


For reconstructed tracks with dE/dx + PDG

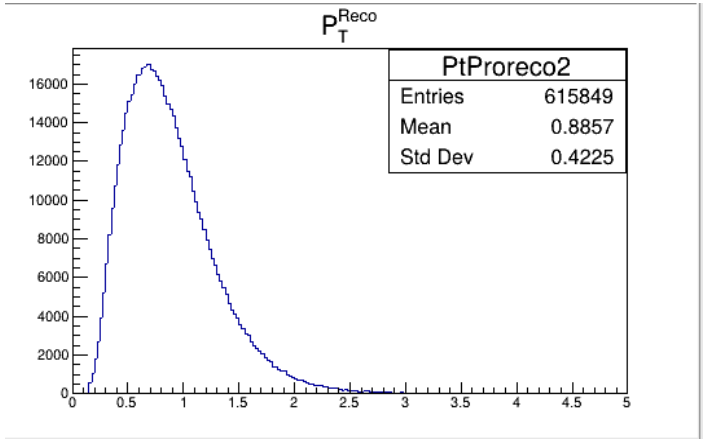
2. Pt histograms were obtained for three cases: with limits in dE/dx, limits in dE/dx + pdg, and pdg (monte carlo tracks).



With PDG in loop montecarlo



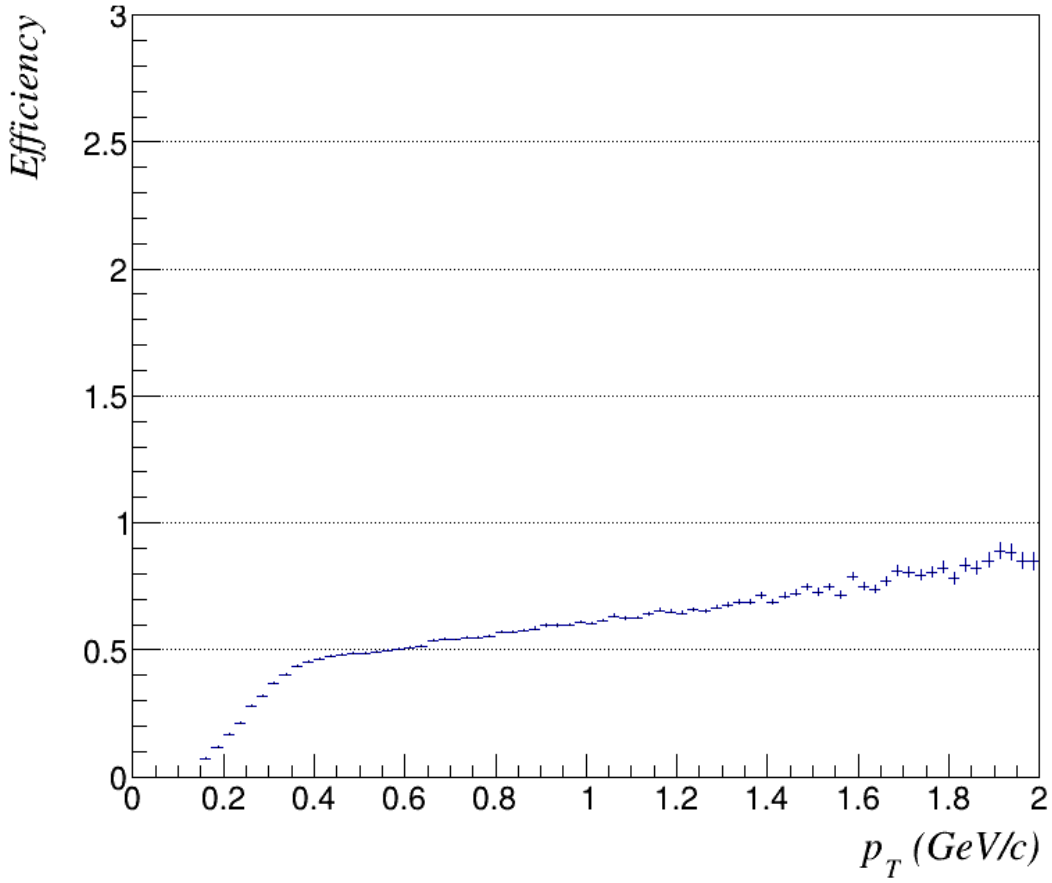
With limits on dE/dx in loop reconstructed



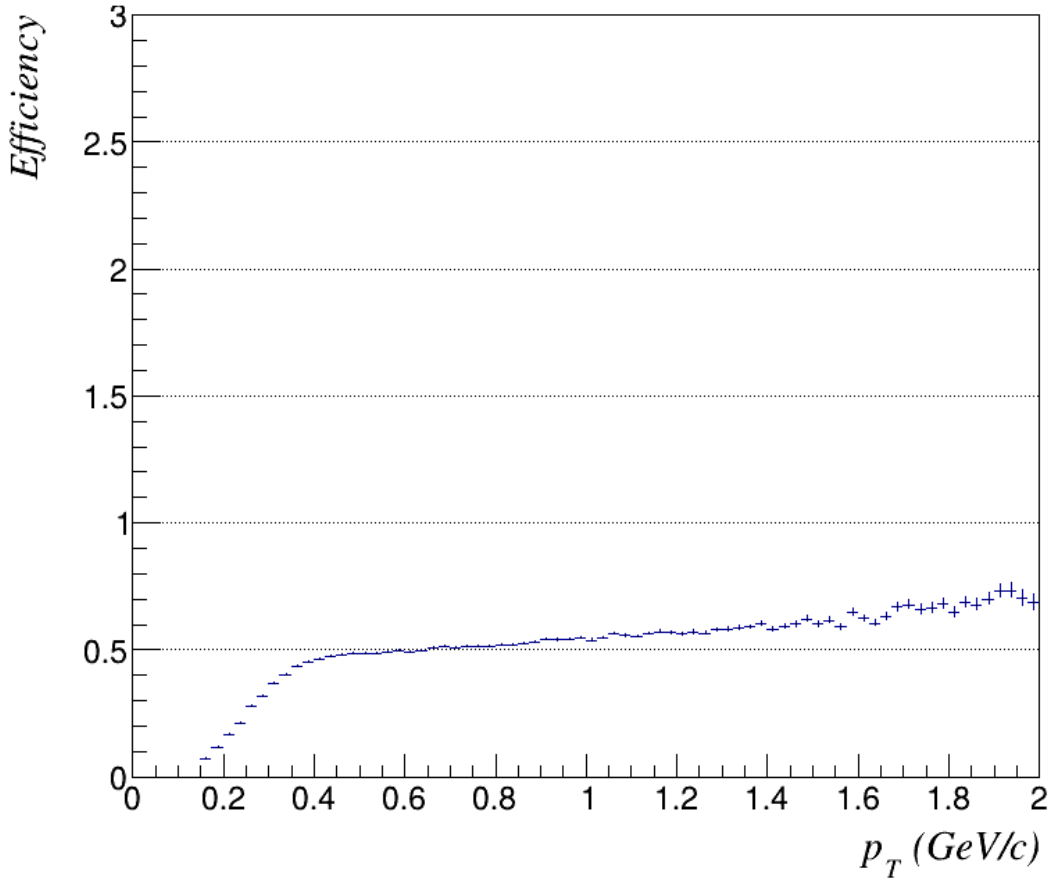
With limits on dE/dx + PDG in loop reconstructed

3. Efficiency histograms were obtained for the following particles: Protons, pions and kaons

Protons



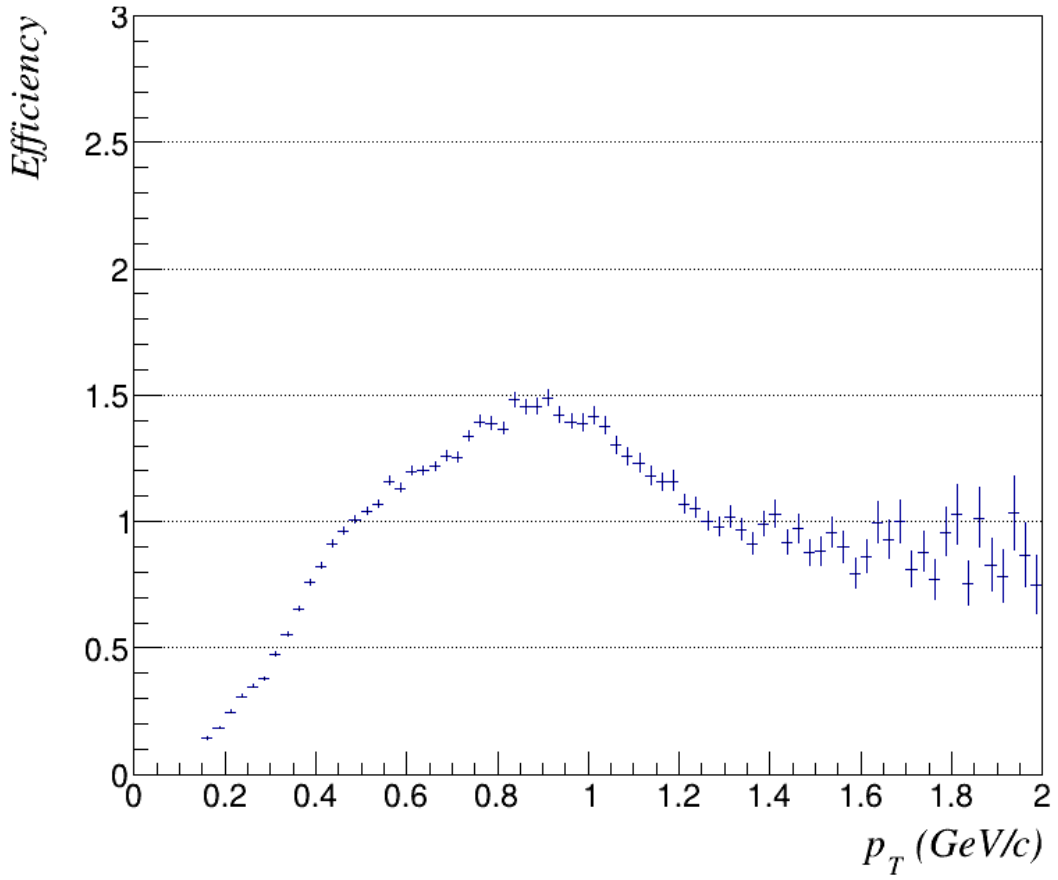
Pt_dEdx/Pt_MC



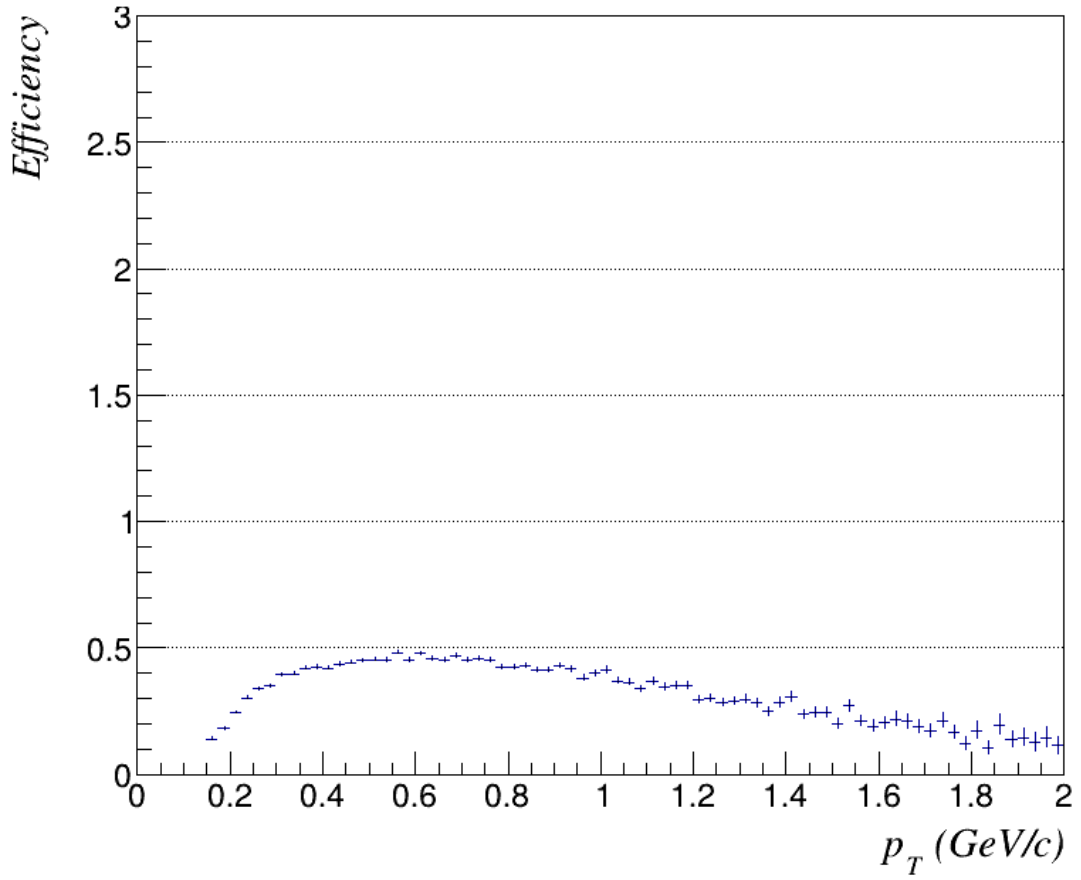
Pt_(dEdx+PDG)/Pt_MC

3. Efficiency histograms were obtained for the following particles: Protons, pions and kaons

Kaons



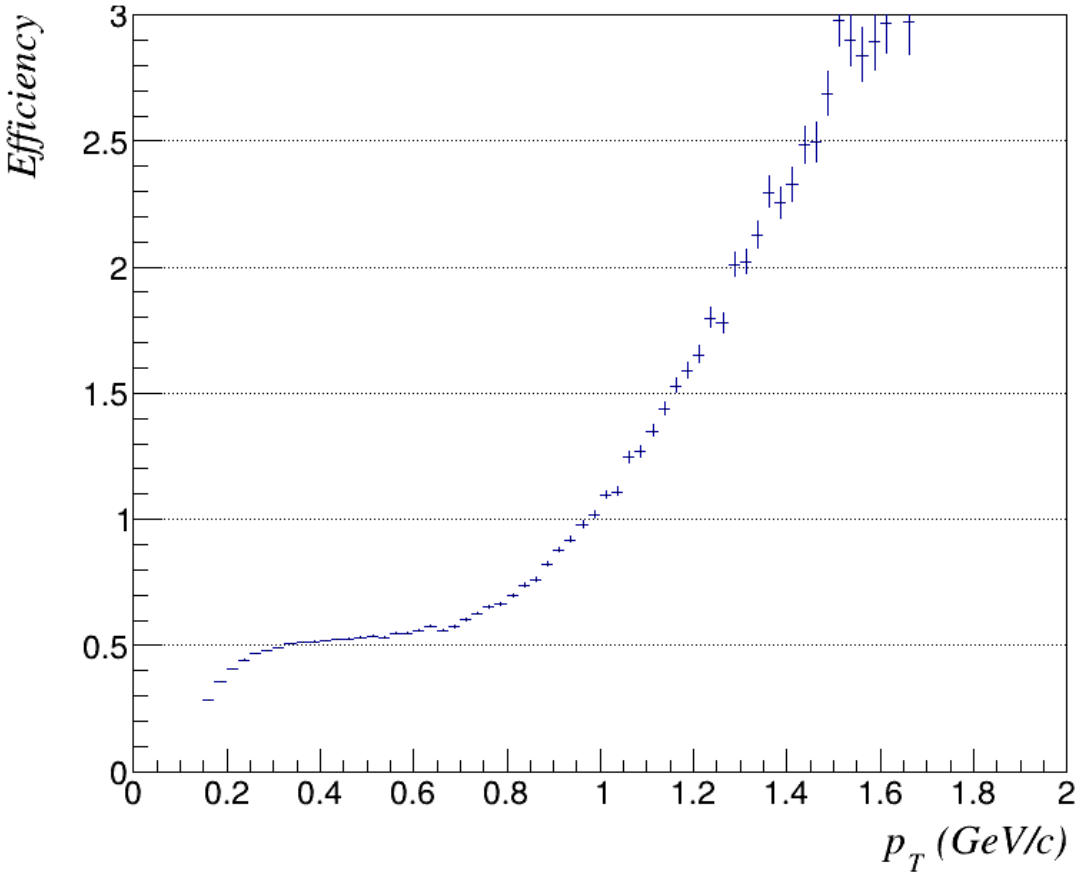
Pt_dEdx/Pt_MC



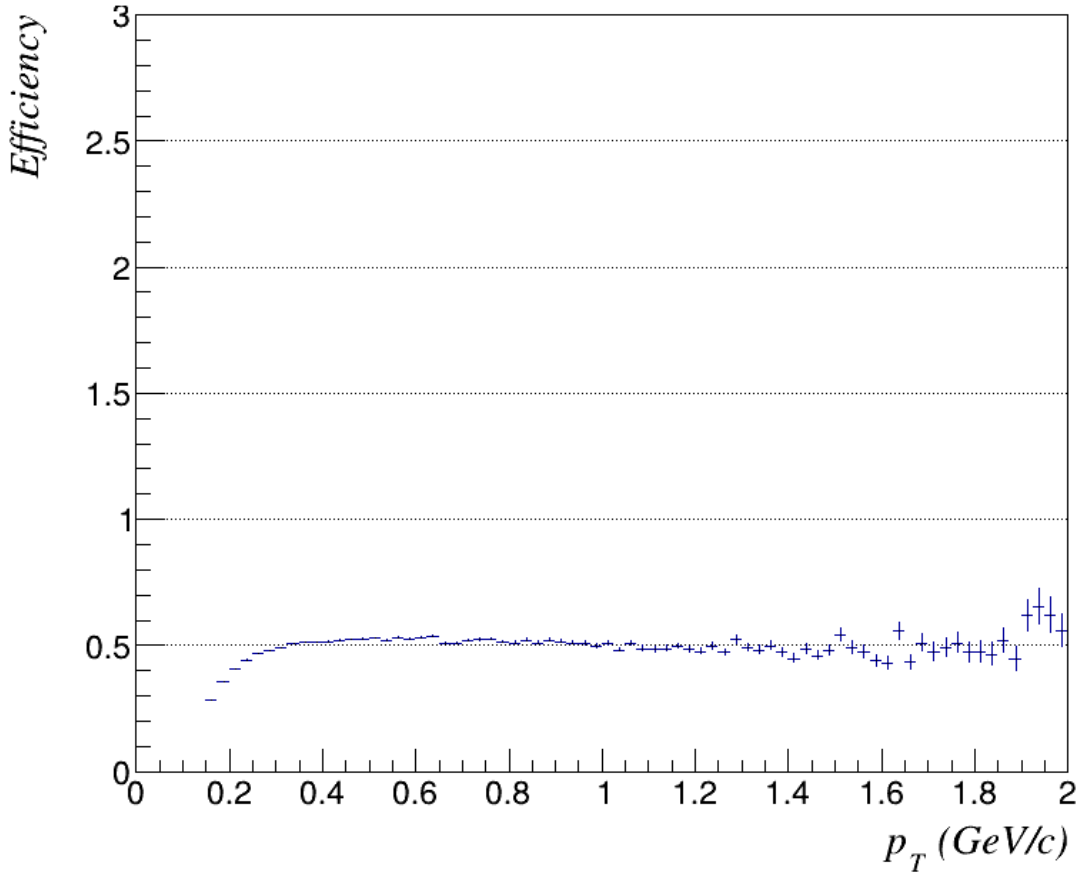
Pt_(dEdx+PDG)/Pt_MC

3. Efficiency histograms were obtained for the following particles: Protons, pions and kaons

Pions



Pt_dEdx/Pt_MC



Pt_(dEdx+PDG)/Pt_MC

Thank you all for your comments and support