Revisiting dE/dx

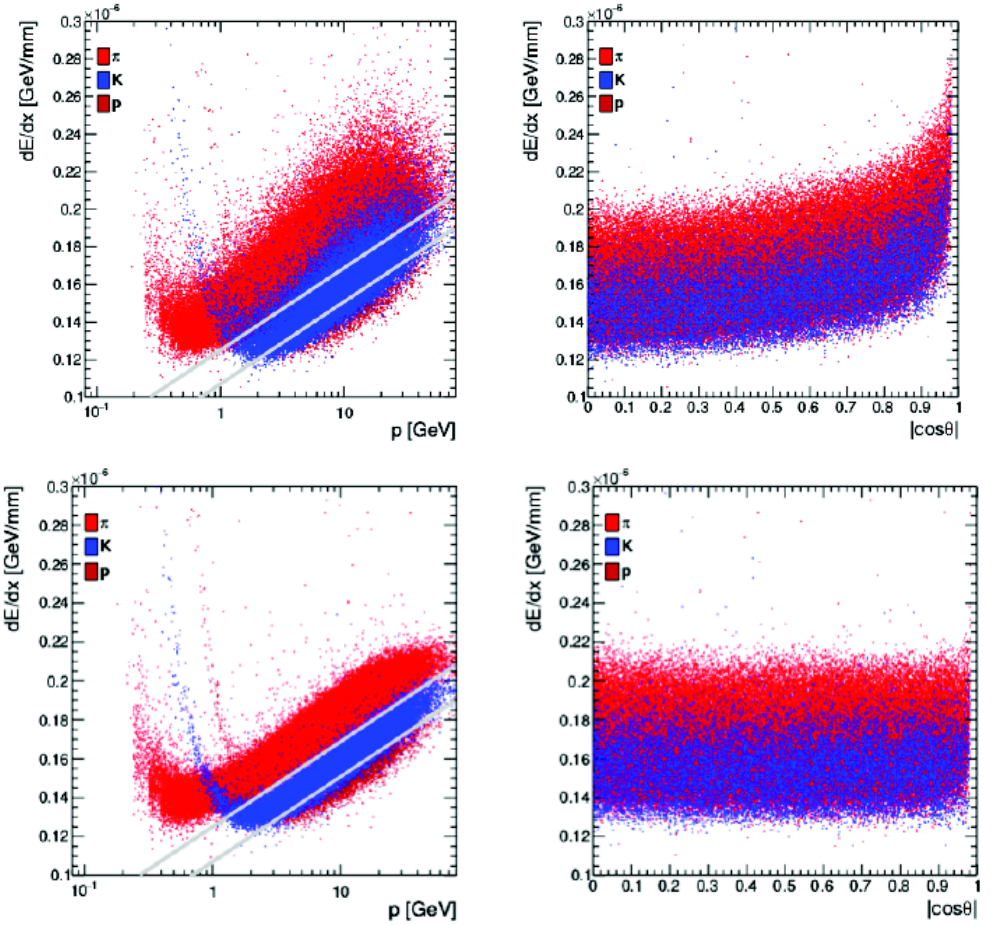
A. Irles, 16th Nov 2018

Analysis group meeting

ParticleTagger Processor

- ParticleTagger processor developped during S. Bilokin thesis https://github.com/QQbarAnalysis/ParticleTagger
- Angular correction: $\frac{dE}{dx} \rightarrow \frac{dE}{dx}\theta^{0.15}$,
- Plots from S.B. thesis (page 88)

Generated \ Reconstructed	π	K	p
p	223	252	1249
K	1342	14693	713
π	97911	215	22



ParticleTagger Processor

- ParticleTagger is not used in the analysis, but its results are used for “cheating”
- From the table in the precedent slide, we calculate
  - 88% eff
  - 95% purity
  - Values calculated using 250GeV bb REC samples

- We use this to simulate our kaon identification efficiency but we are doing it not fully correctly:
  - The efficiency is correctly applied.
  - The purity value is used to flip the sign in the 5% of cases (although the 5% from purity stands for the contamiantion of pions and protons….)

dEdx in the new samples

- dEdx info is now available in the DST samples.
- Even more, dEdx pid algorithm information is in there:

```
collection name : PandoraPFOs
parameters:

-------------- print out of ReconstructedParticle collection --------------

 flag:  0x0
parameter PIDAlgorithmTypeID [int]: 0, 3, 4, 2, 5, 6, 7, 1,
parameter PIDAlgorithmTypeName [string]: BasicVariablePID, LikelihoodPID, LowMomMuID, ShowerShapesPID, TOFEstimators0ps, TOFEstimators10ps, TOFEstimators50ps, dEdxPID,
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obability, pionProbability, kaonProbability, protonProbability, hadronProbability, electron_dEdxdistance, muon_dEdxdistance, pion_dEdxdistance, kaon_dEdxdistance, proton_dEdxdistance,
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```

```
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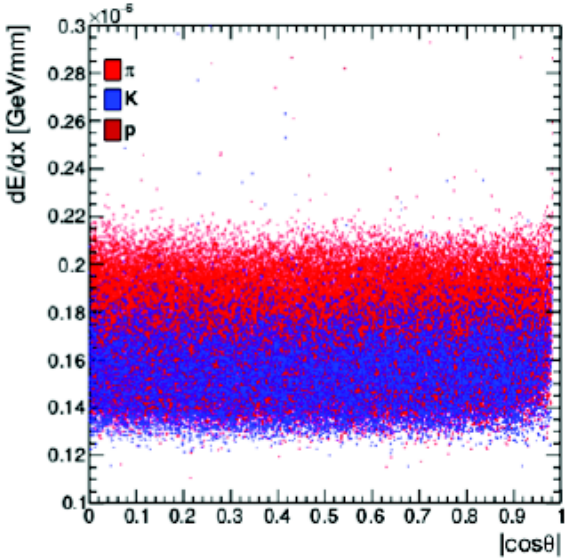
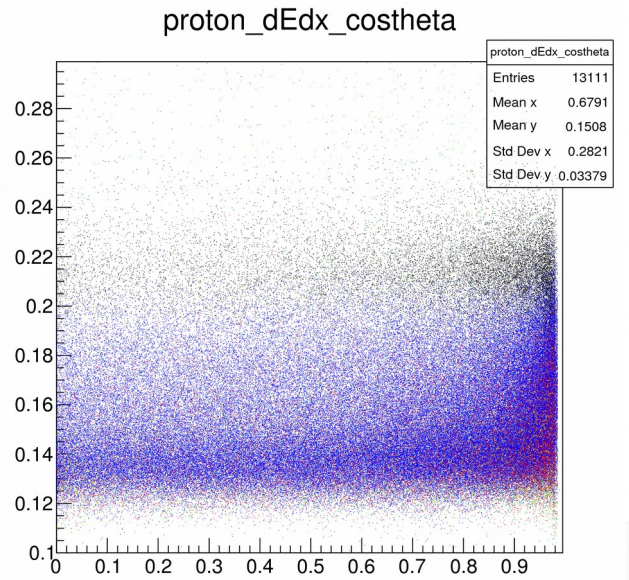
dEdx in the new samples

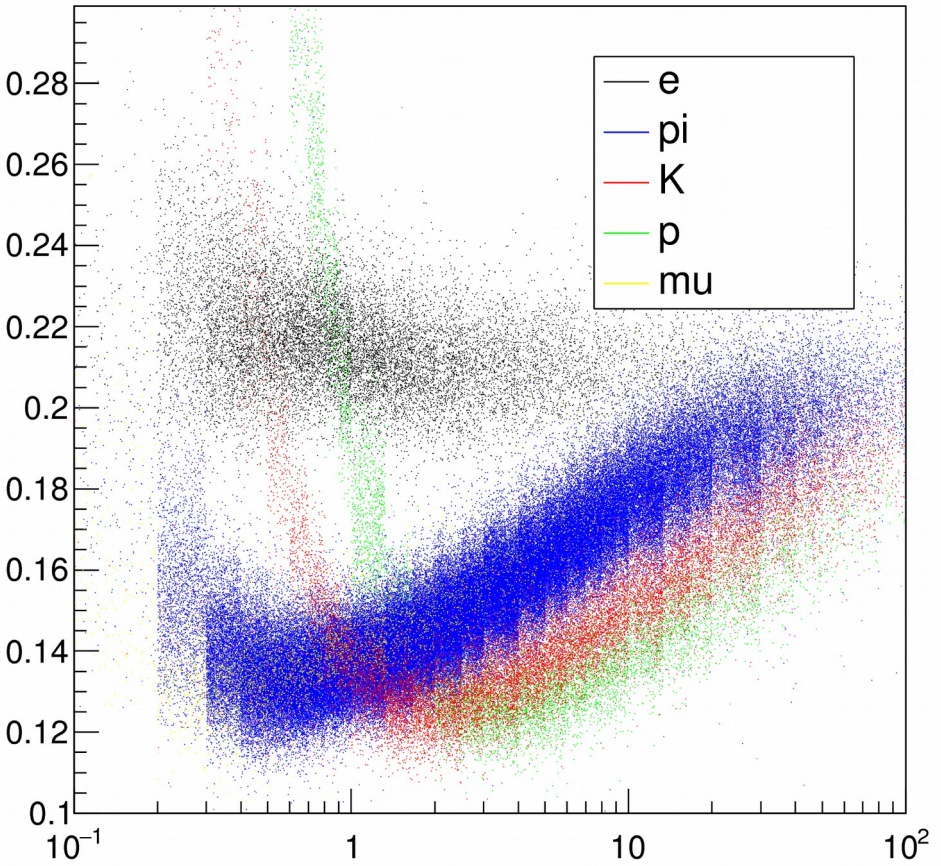
- What is in there? How do we use it? If it is there, there is no need to reinvent the wheel…
- But first we check if the information there agrees with the estimation made by Sviatosla, using DST for l5, 500GeV, bbbar
- First step, repeat Sviatoslav plots
  - I found out that applying the angular correction from Sviatoslav, the results are worst… the angle correction is already included? It is different? I may be doing some mistake….





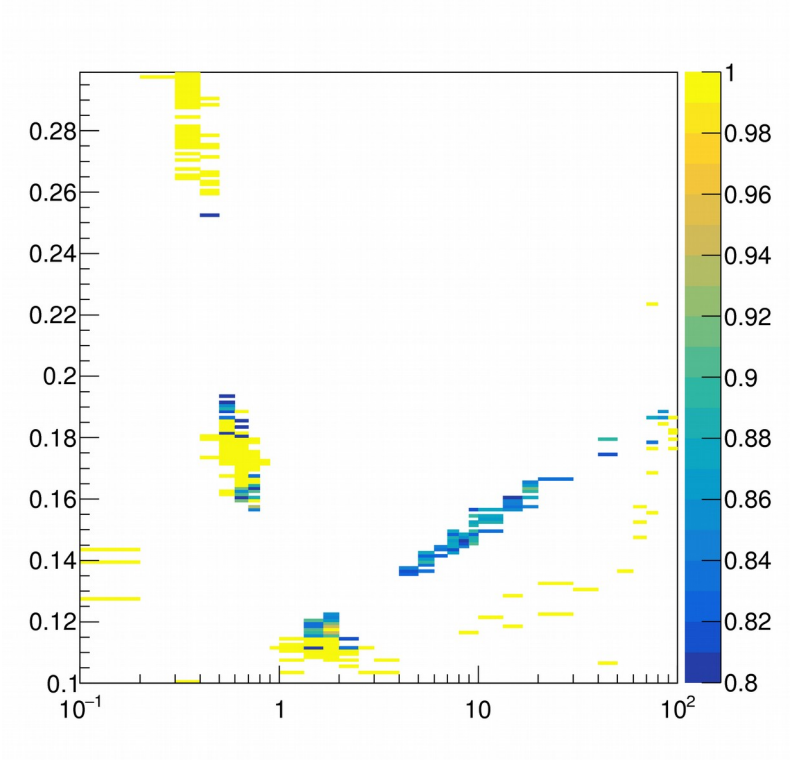
dEdx in the new samples

- dEdx vs p without extra angular correction

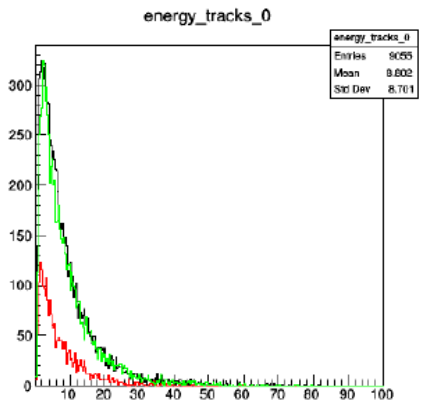


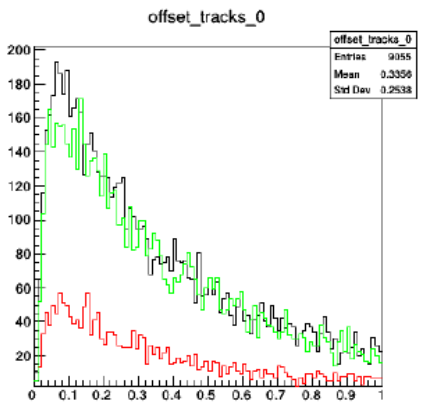
dEdx in the new samples

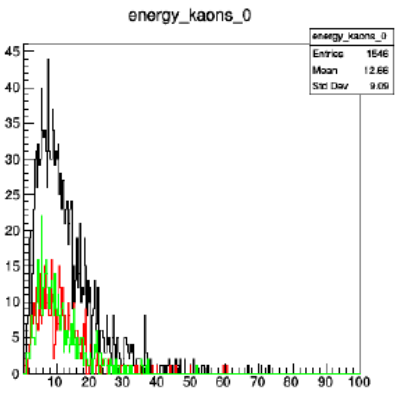
- Density of kaons per bin.
- To be compared with the likelihood and probabilities from the PID in the PandoraPFOs objects.

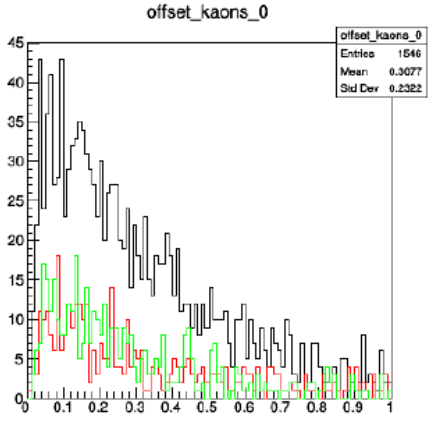


Back-up slides



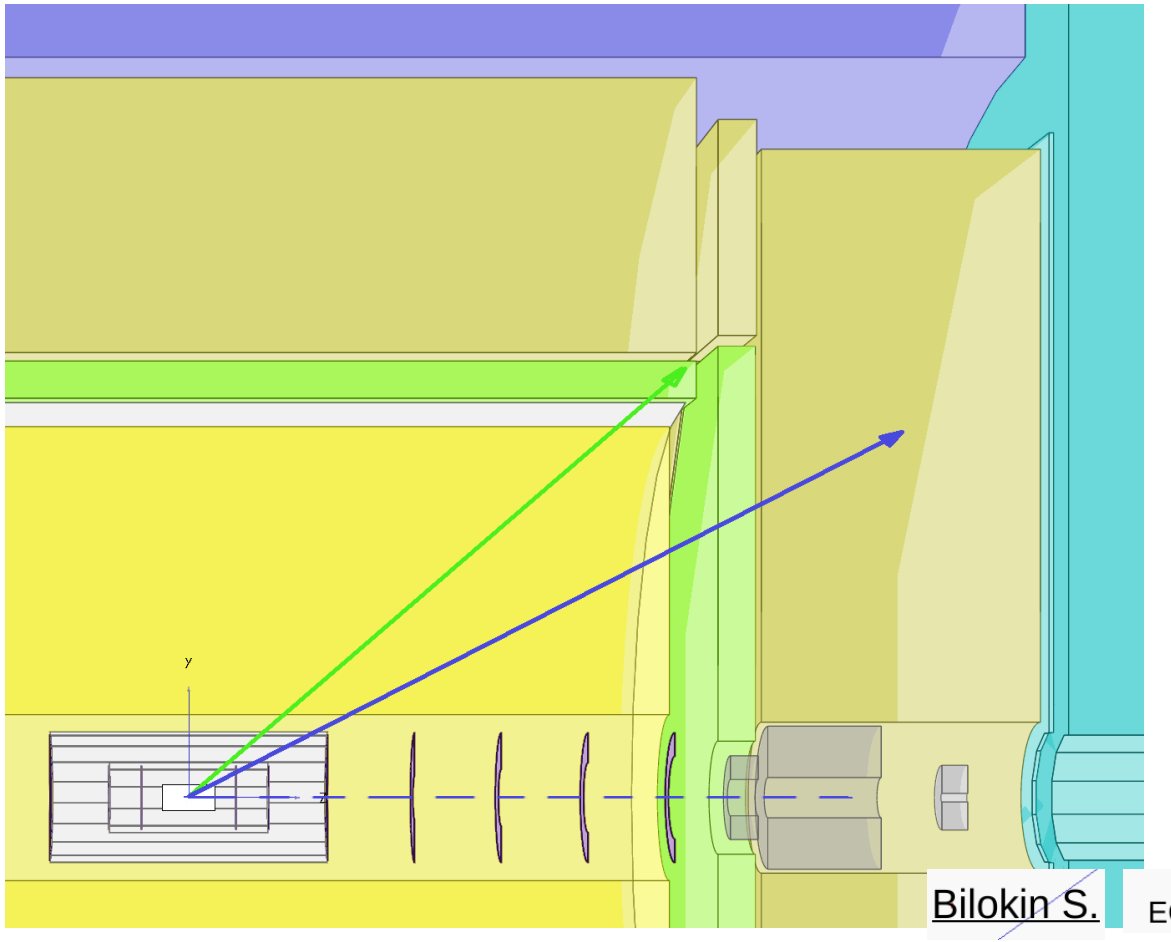






Tracks (kaon) information for Jets with right, wrong, zero charge measurement

ILD geometry



Bilokin S. ECFA LC Workshop 04/06/16