Look at Delphes CORE DIS Simulations

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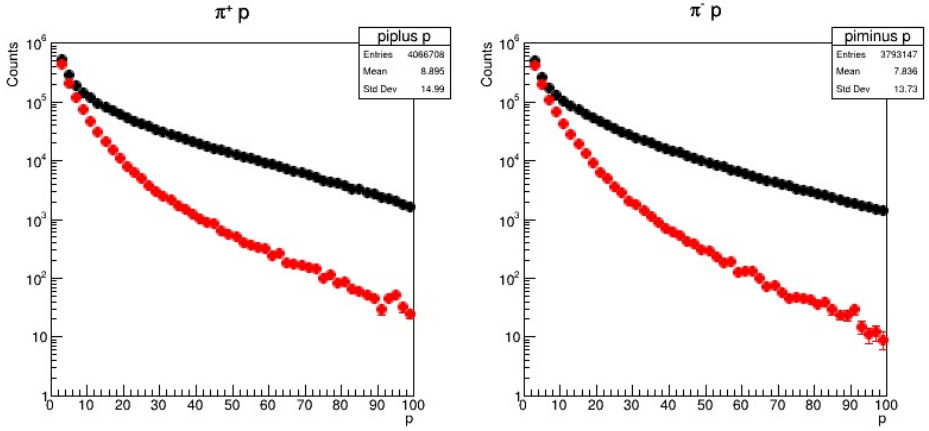
October 28, CORE WG Meeting

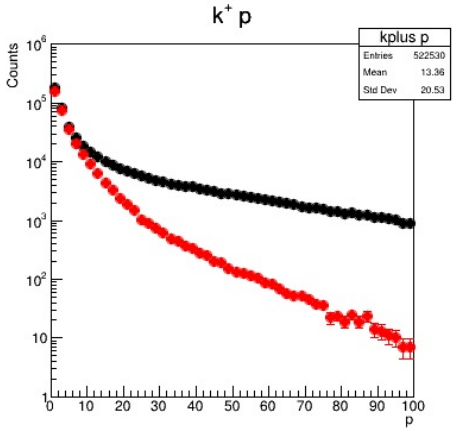
Book-keeping

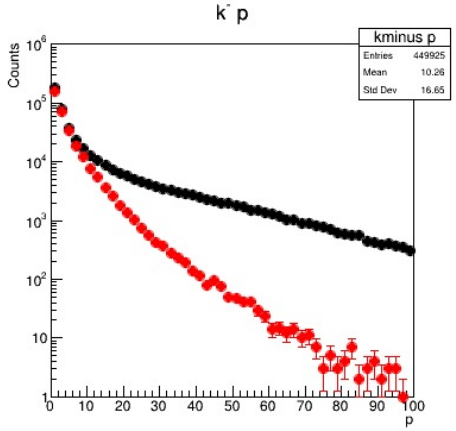
- Copied /work/eic/CORE/* to my own directory
  - /volatile/clas12/thayward/CORE/
- Took */dis/pythia.ep.**18x275**.1Mevents.RadCor=0.Q2=10.0-100.0.kT=1.0_1.root file
- Following guide from C. Hyde in the Slack converted to hepmc and then ran through delphes with */cards/Delphes_EIC_CORE_3T.tcl control card on jlab ifarm (never got it working on my MacBook…)
- Plots produced with the script
  - /volatile/clas12/thayward/CORE/DELPHES/delphes/dis_analyzer_hayward.cpp

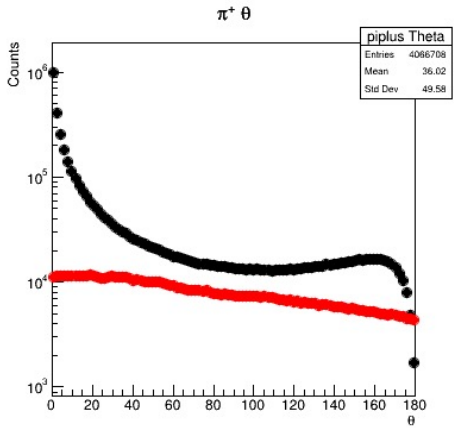
Generated

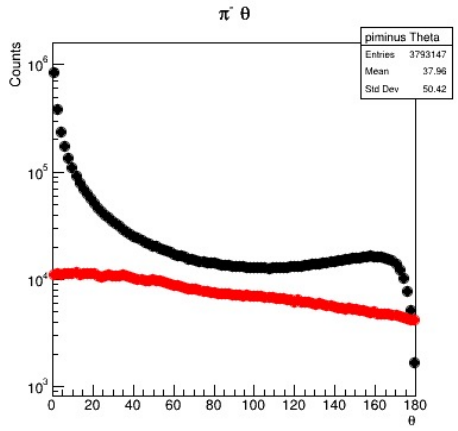
Reconstructed

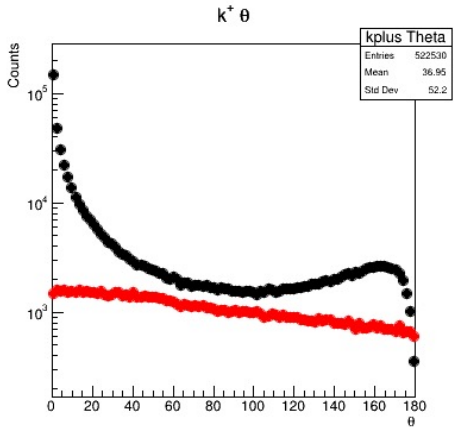


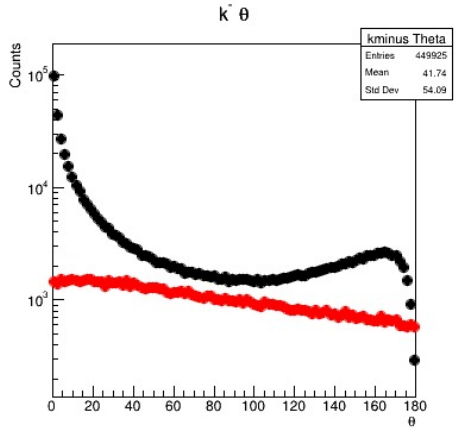












Generated

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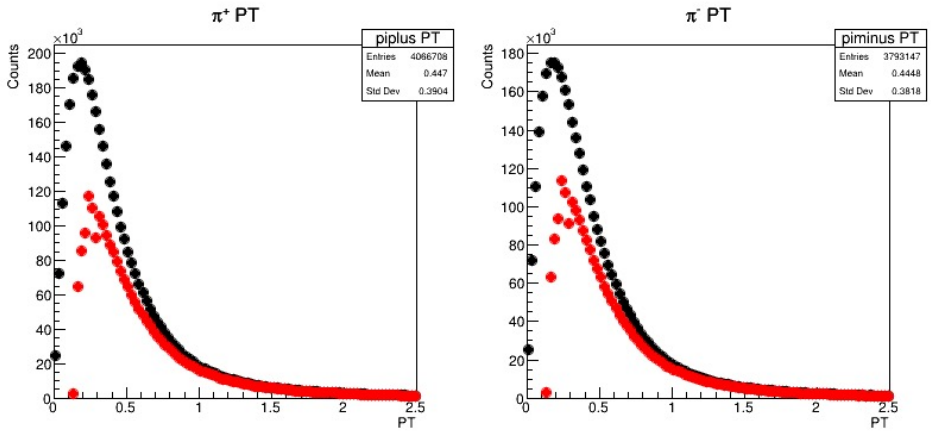
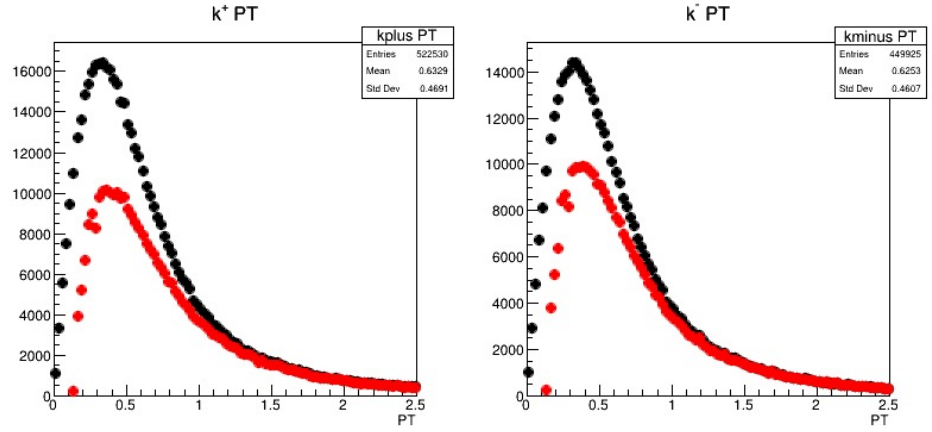
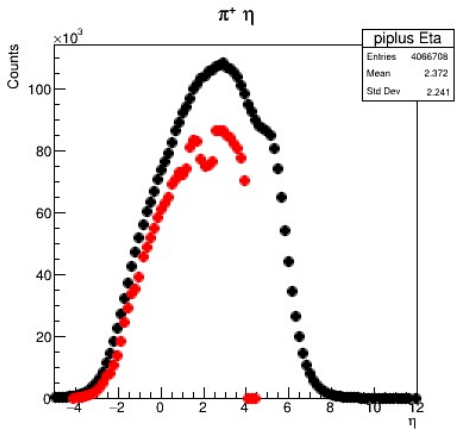
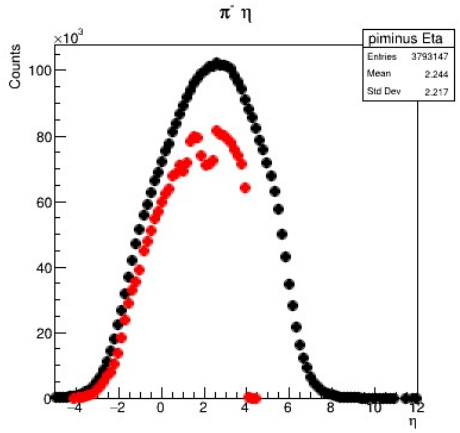
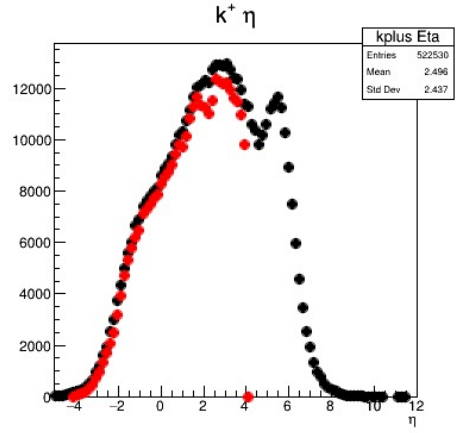
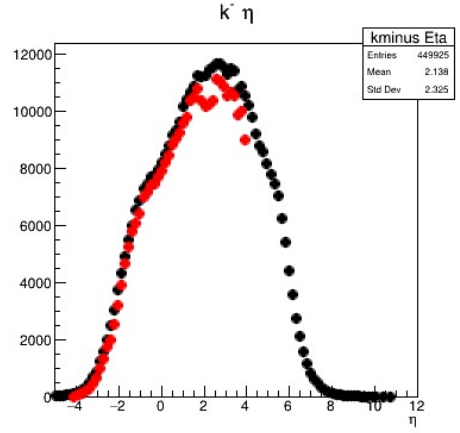










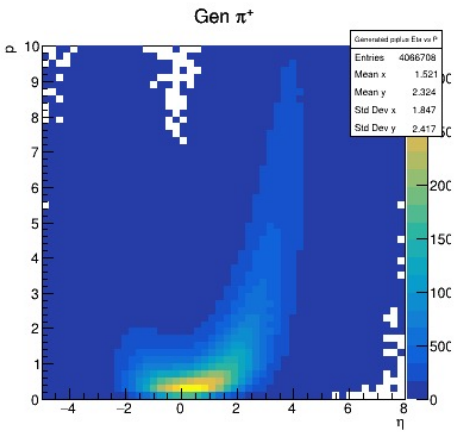


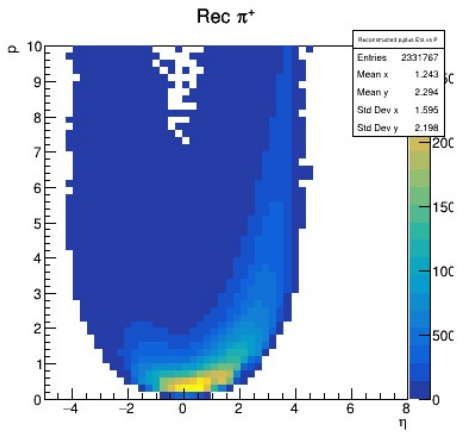
Pions

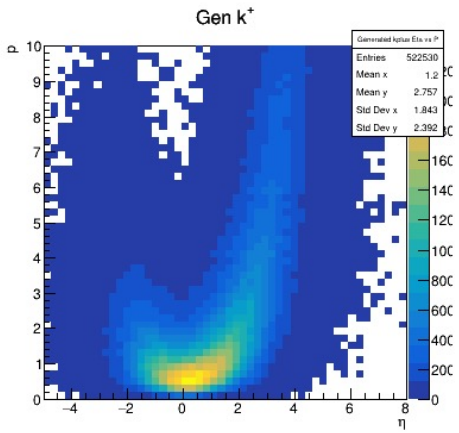
Kaons

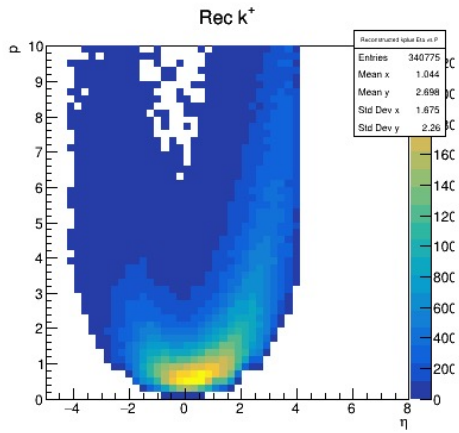
Positive

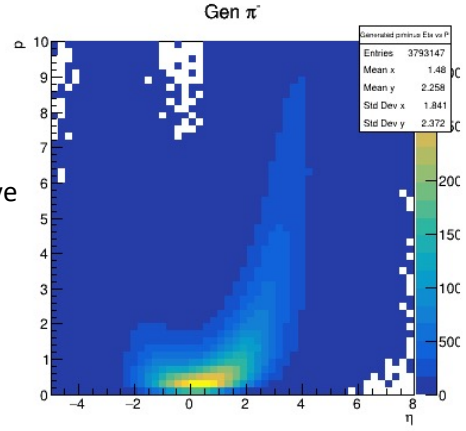
Negative

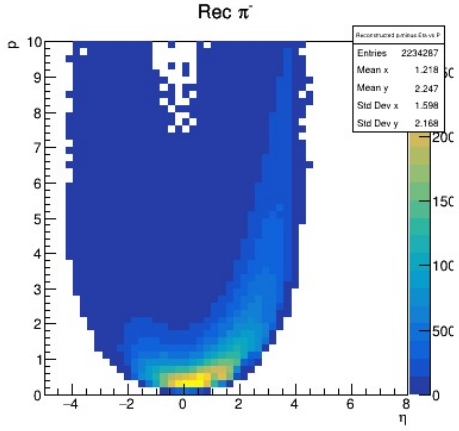


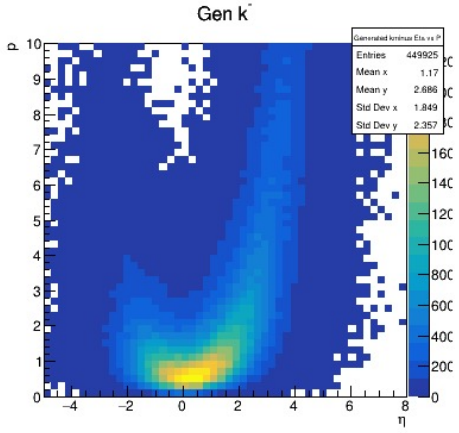


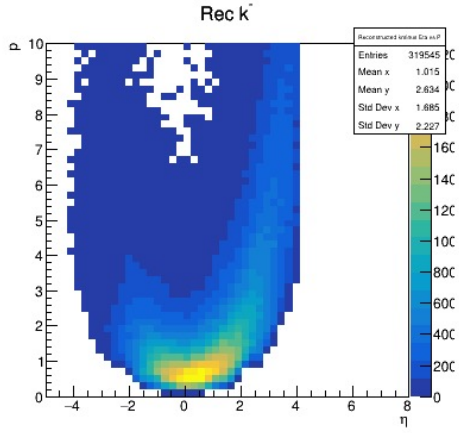












Pions

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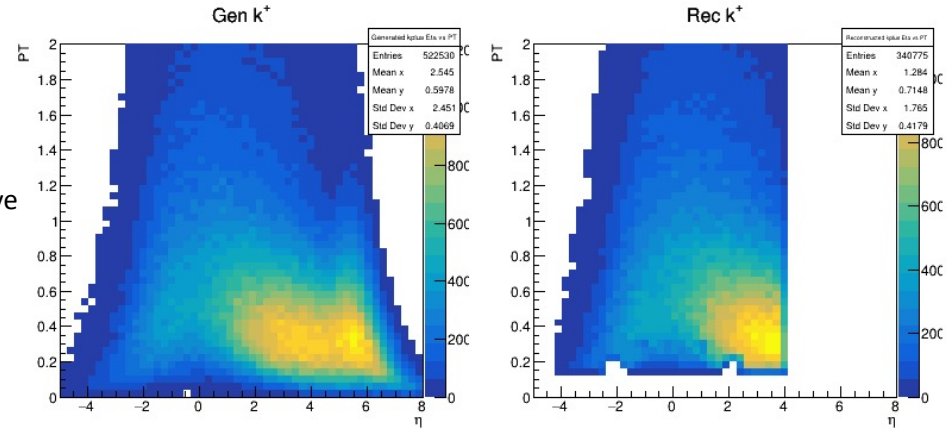
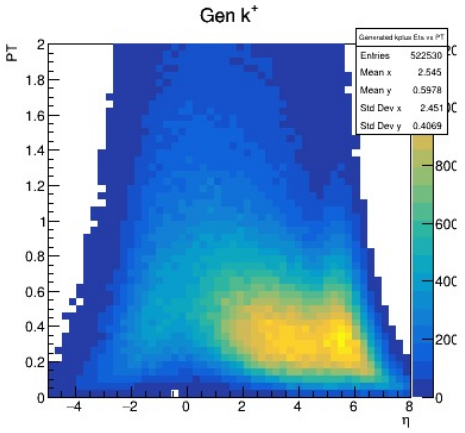
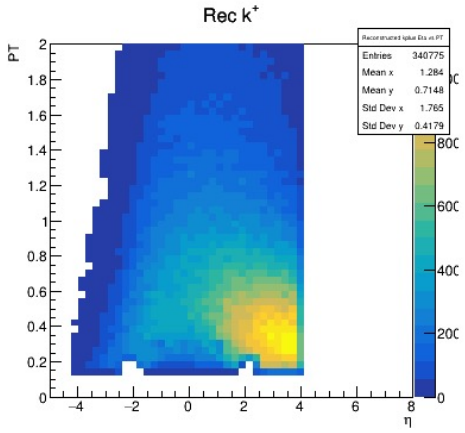
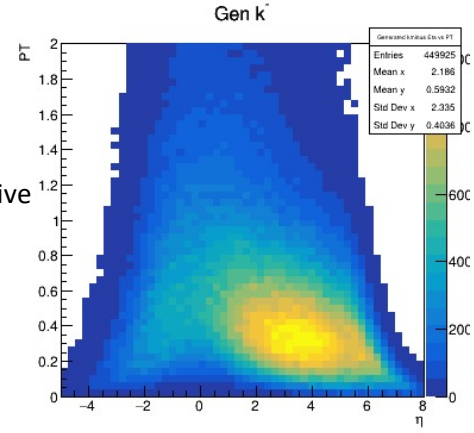
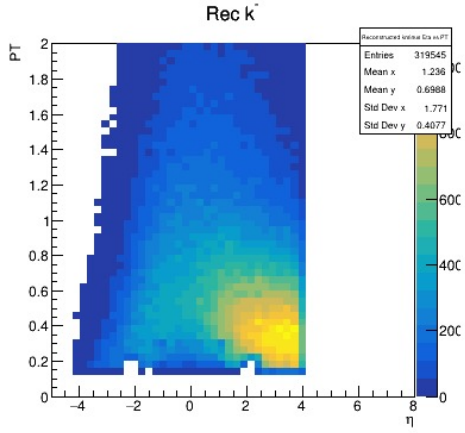
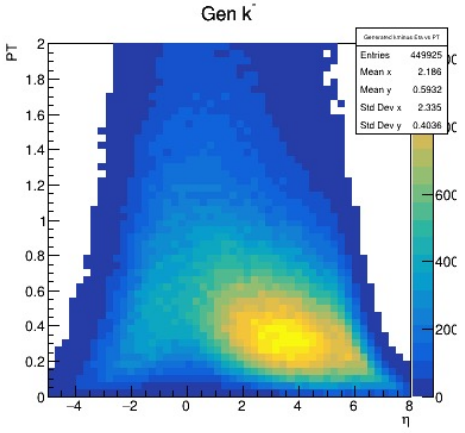


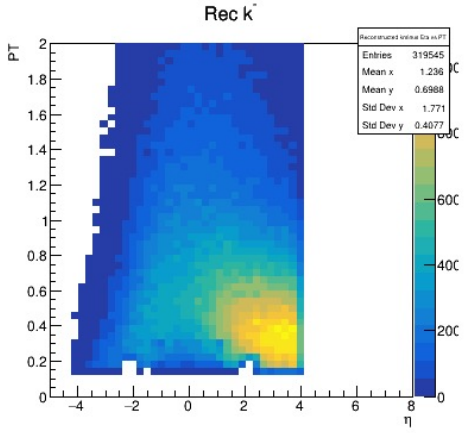












Available classes/variables: generated

class GenParticle		
PID	particle HEP ID number	hepevt.idhep[number]
Status	particle status	hepevt.isthep[number]
IsPU	0 or 1 for particles from pile-up interactions	
M1	particle 1st mother	hepevt.jmohep[number][0] - 1
M2	particle 2nd mother	hepevt.jmohep[number][1] - 1
D1	particle 1st daughter	hepevt.jdahep[number][0] - 1
D2	particle last daughter	hepevt.jdahep[number][1] - 1
Charge	particle charge	
Mass	particle mass	
E	particle energy	hepevt.phep[number][3]
Px	particle momentum vector (x component)	hepevt.phep[number][0]
Py	particle momentum vector (y component)	hepevt.phep[number][1]
Pz	particle momentum vector (z component)	hepevt.phep[number][2]
P	particle momentum	
PT	particle transverse momentum	
Eta	particle pseudorapidity	
Phi	particle azimuthal angle	
Rapidity	particle rapidity	
CtgTheta	particle cotangent of theta	
D0	particle transverse impact parameter	
DZ	particle longitudinal impact parameter	
T	particle vertex position (t component)	hepevt.vhep[number][3]
X	particle vertex position (x component)	hepevt.vhep[number][0]
Y	particle vertex position (y component)	hepevt.vhep[number][1]
Z	particle vertex position (z component)	hepevt.vhep[number][2]

Available classes/variables: track (reconstructed)

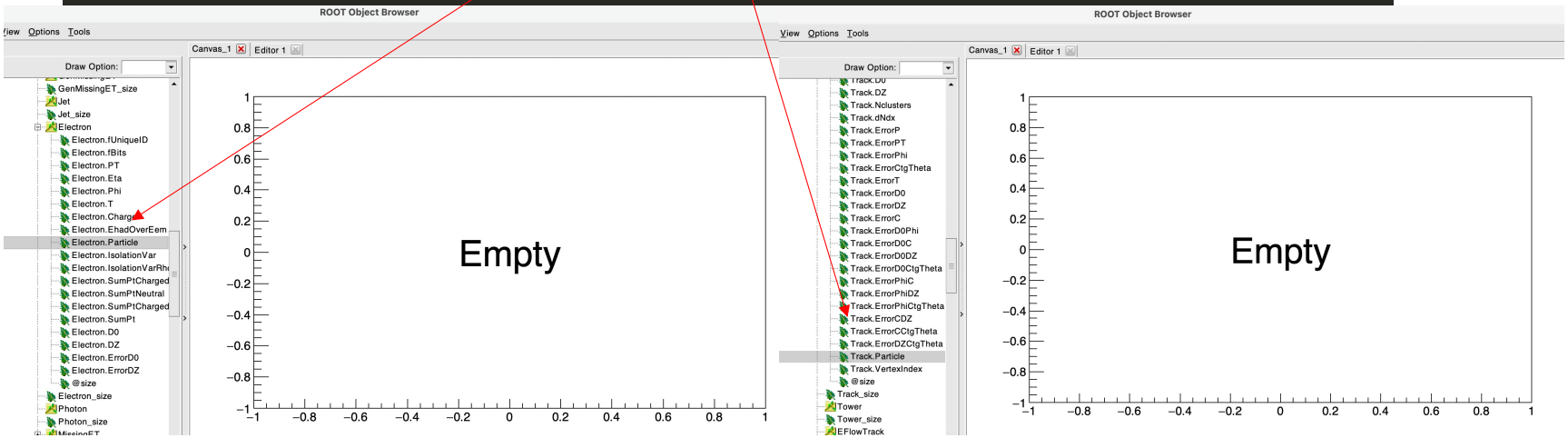
class GenParticle		
PID	particle HEP ID number	hepevt.idhep[number]
Status	particle status	hepevt.isthep[number]
IsPU	0 or 1 for particles from pile-up interactions	
M1	particle 1st mother	hepevt.jmohep[number][0] - 1
M2	particle 2nd mother	hepevt.jmohep[number][1] - 1
D1	particle 1st daughter	hepevt.jdahep[number][0] - 1
D2	particle last daughter	hepevt.jdahep[number][1] - 1
Charge	particle charge	
Mass	particle mass	
E	particle energy	hepevt.phep[number][3]
Px	particle momentum vector (x component)	hepevt.phep[number][0]
Py	particle momentum vector (y component)	hepevt.phep[number][1]
Pz	particle momentum vector (z component)	hepevt.phep[number][2]
P	particle momentum	
PT	particle transverse momentum	
Eta	particle pseudorapidity	
Phi	particle azimuthal angle	
Rapidity	particle rapidity	
CtgTheta	particle cotangent of theta	
D0	particle transverse impact parameter	
DZ	particle longitudinal impact parameter	
T	particle vertex position (t component)	hepevt.vhep[number][3]
X	particle vertex position (x component)	hepevt.vhep[number][0]
Y	particle vertex position (y component)	hepevt.vhep[number][1]
Z	particle vertex position (z component)	hepevt.vhep[number][2]

Some variables are empty…

- Wanted to study resolutions, like *examples/Example3.C

```
// Loop over all electrons in event
for(i = 0; i < branchElectron->GetEntriesFast(); ++i)
{
  electron = (Electron*) branchElectron->At(i);
  particle = (GenParticle*) electron->Particle.GetObject();

  plots->fElectronDeltaPT->Fill((particle->PT - electron->PT)/particle->PT);
  plots->fElectronDeltaEta->Fill((particle->Eta - electron->Eta)/particle->Eta);
}
```



Some variables are all zero…

- Wanted to study electron/hadron discrimination
- Unclear if there is any “energy” variable from calorimeter to study E/p sampling fractions?

class Electron	
PT	electron transverse momentum
Eta	electron pseudorapidity
Phi	electron azimuthal angle
T	particle arrival time of flight
Charge	electron charge
EhadOverEem	ratio of the hadronic versus electromagnetic energy deposited in the calorimeter
Particle	reference to generated particle
IsolationVar	isolation variable
IsolationVarRhoCorr	isolation variable
SumPtCharged	isolation variable
SumPtNeutral	isolation variable
SumPtChargedPU	isolation variable
SumPt	isolation variable