Admixed Background Effects on Tracking Reconstruction

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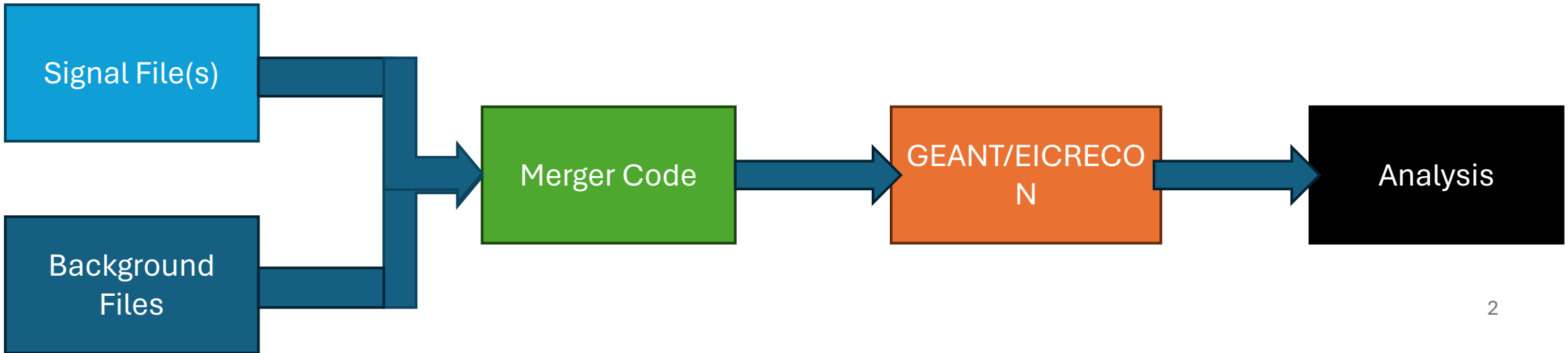
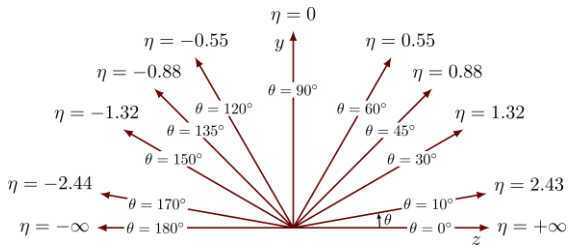
Tracking Reconstruction Effects of Backgrounds

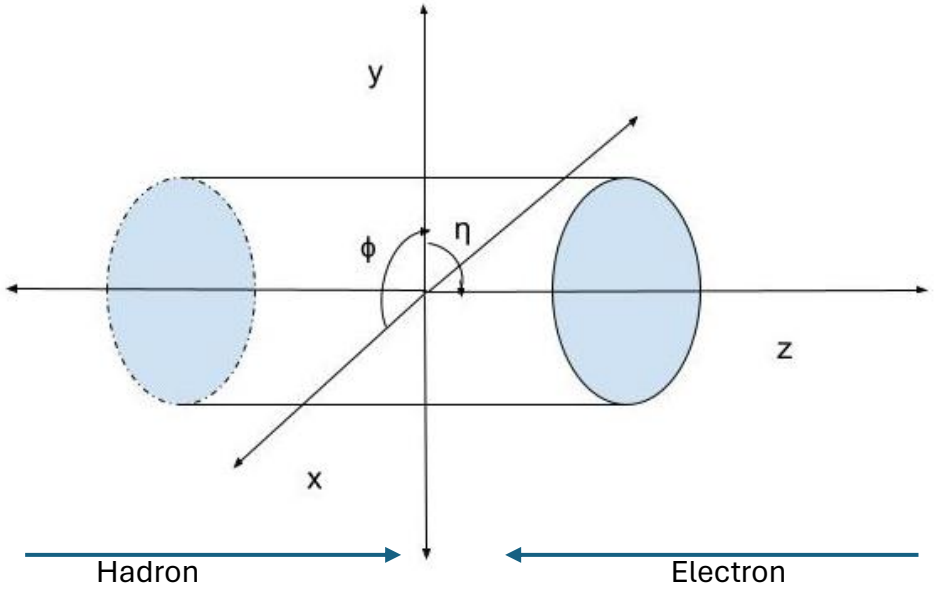
- Uses the HEPMC Admixing Code found at: https://github.com/eic/HEPMC_Merger/tree/koljadev
- Using DIS for the signal event
  - 10x100 GeV^2
- Three Main Background Types included in the study:
  - Synchrotron Radiation, Proton Beam Gas, and Electron Beam Gas
  - Currently focusing on Proton Beam Gas



Cuts Applied and Geometry Used

1. Pt Cut=200 MeV
2. Beam Energies: 10x100 GeV
3. Rudimentary Multiple Track Filtering:
   A. Parameters to reject nonmatched tracks:
      i. PDG=/=0 (Flag that the particle was matched)
4. Charge =/= 0 (Only Charged Particles)





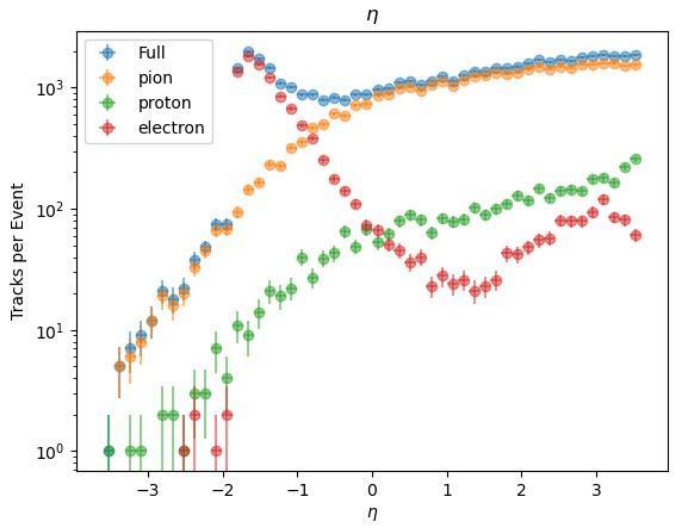
$$\eta = \operatorname{arctanh}\left(\frac{p_L}{|\boldsymbol{p}|}\right)$$

$$\varphi = arctan2\left(\frac{p_x}{p_y}\right)$$

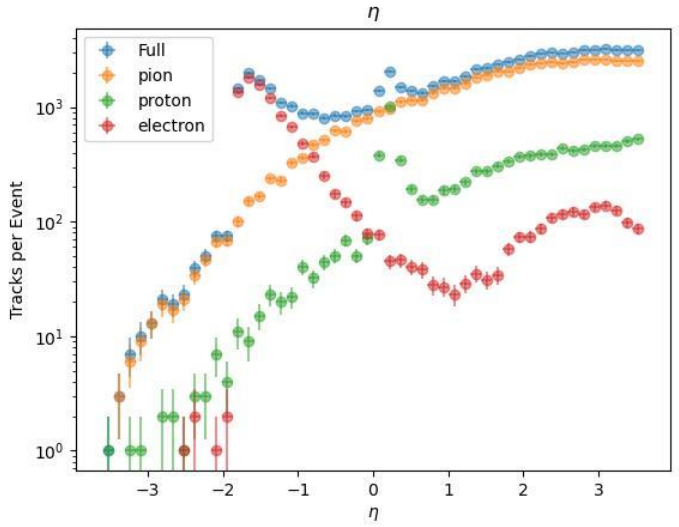
$$p_T = \sqrt{|p_x|^2 + |p_y|^2}$$

Observables (eta, pT, phi) (Q^2>10 GeV^2)

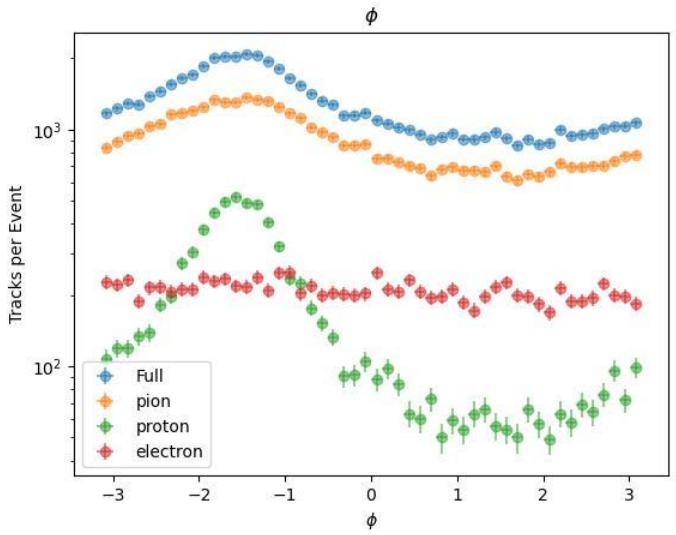
Pure Signal



Hadron Gas Admixed



Pure Signal



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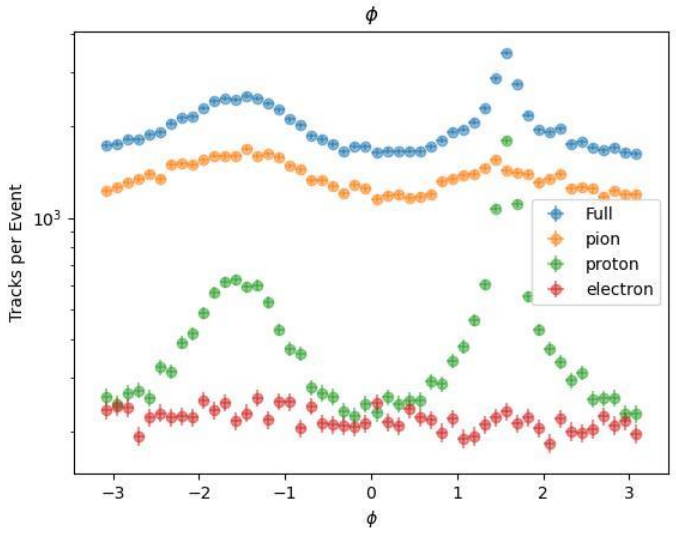
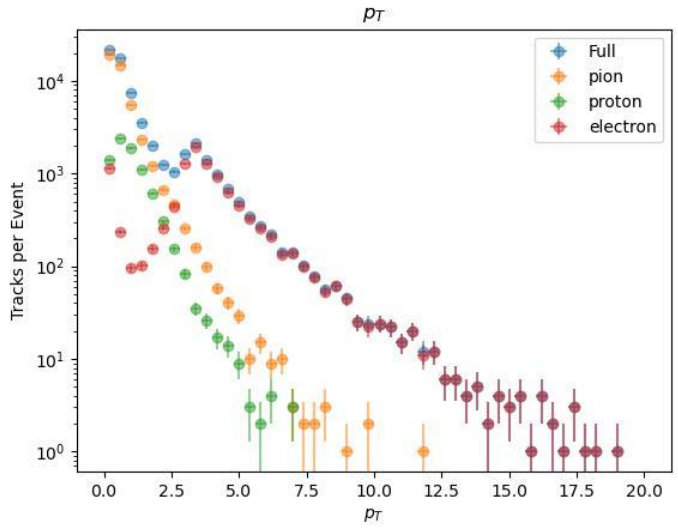
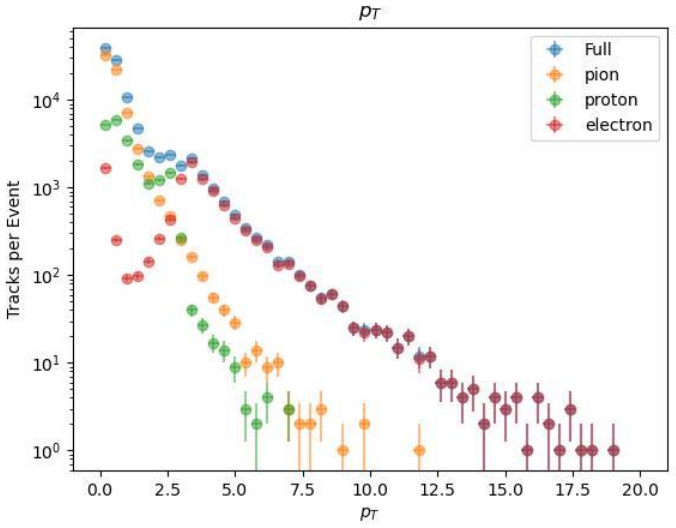


Pure Signal

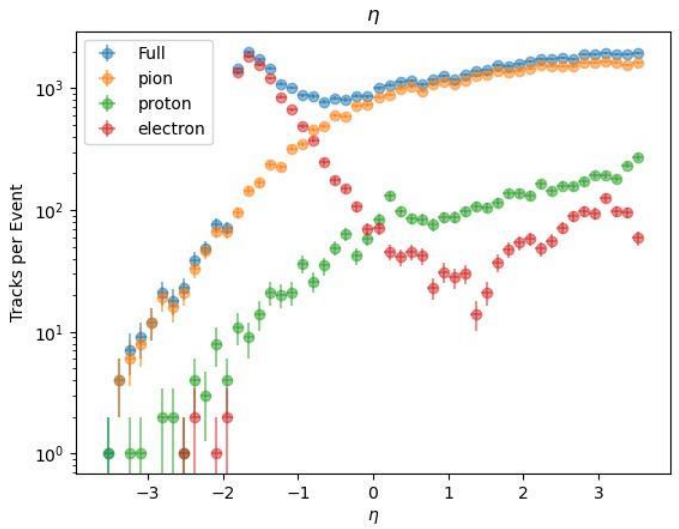


Hadron Gas Admixed



Observables (eta, pT, phi) (Q^2>10 GeV^2)

Old Admixed



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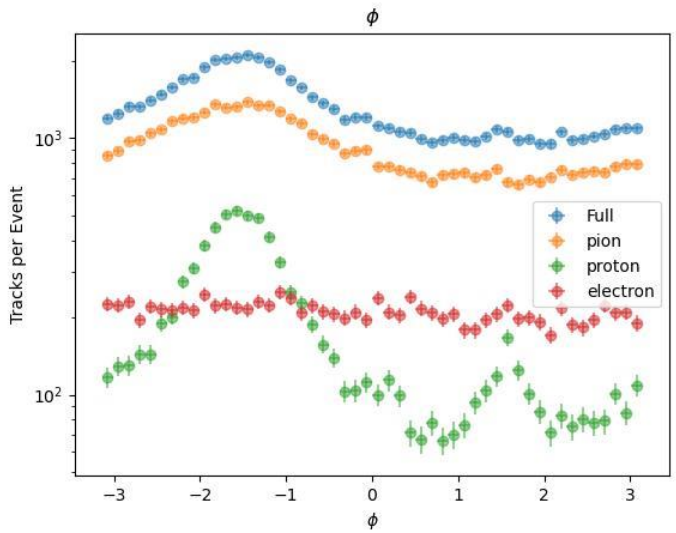

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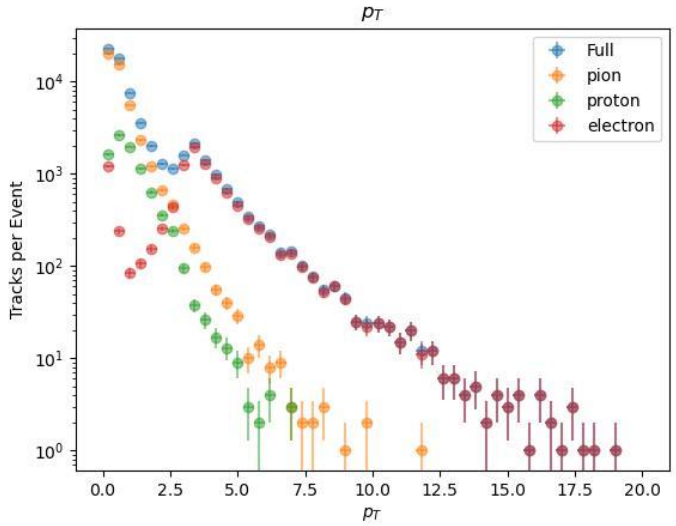

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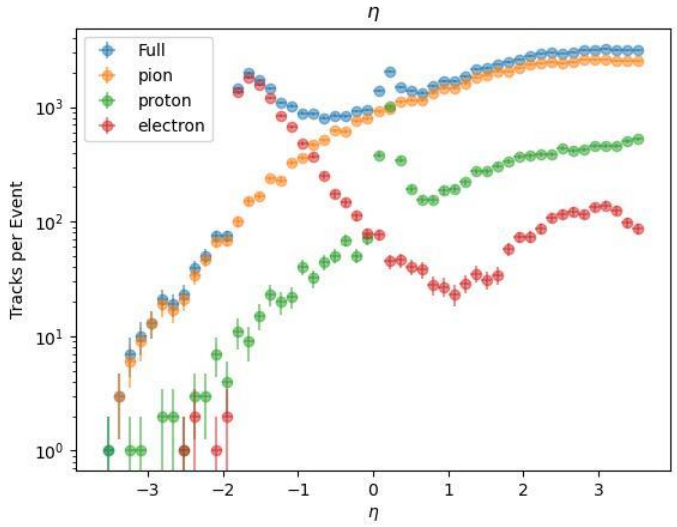

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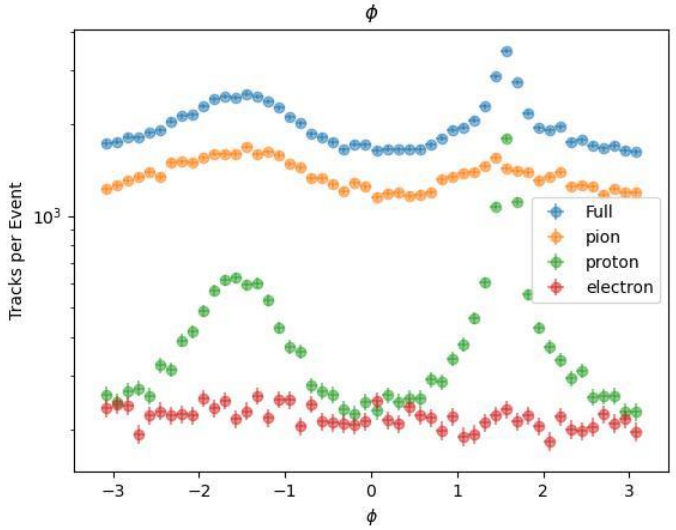
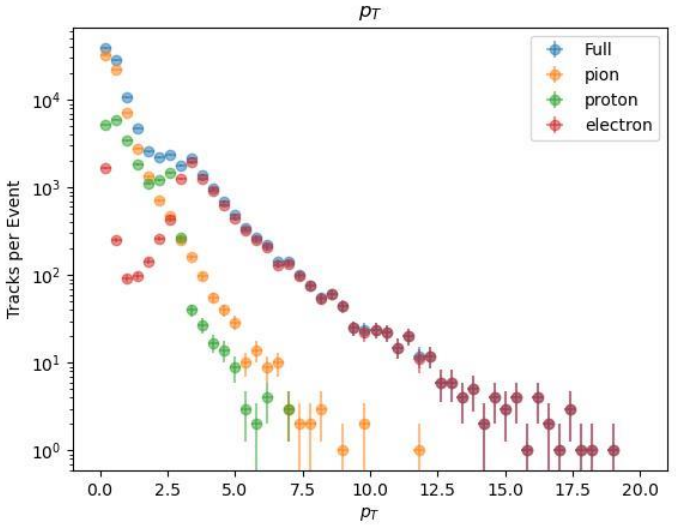


Hadron Gas Admixed

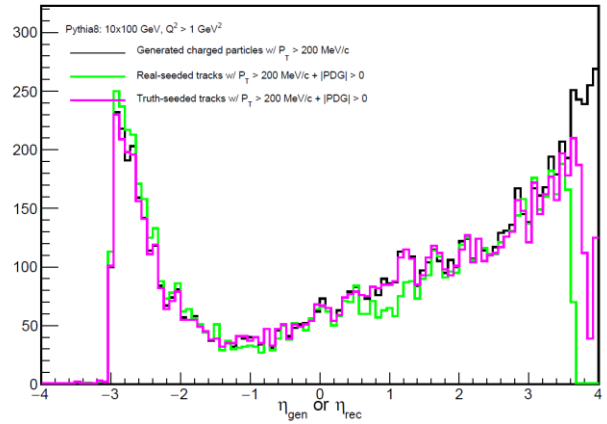


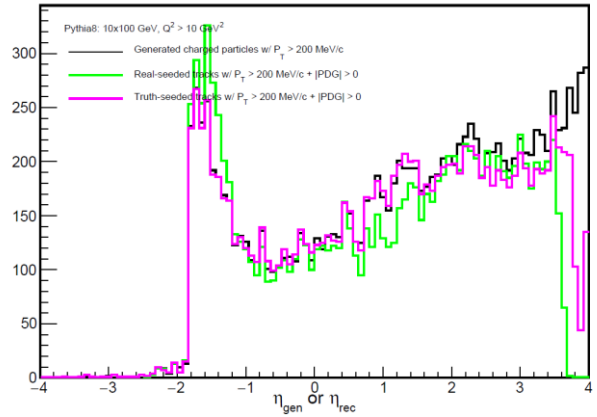
Q^2 > 1GeV^2

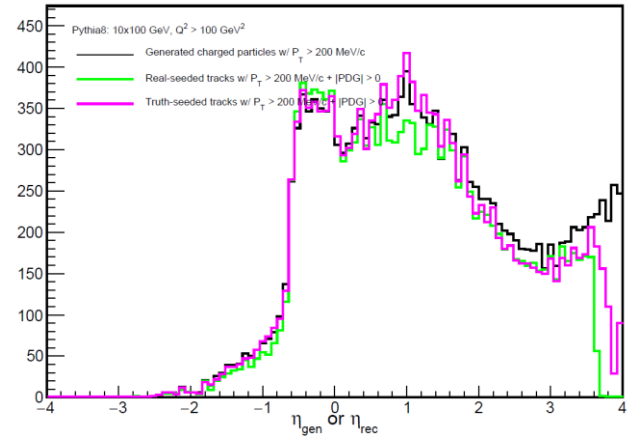
Q^2 > 10GeV^2

Q^2 > 100GeV^2

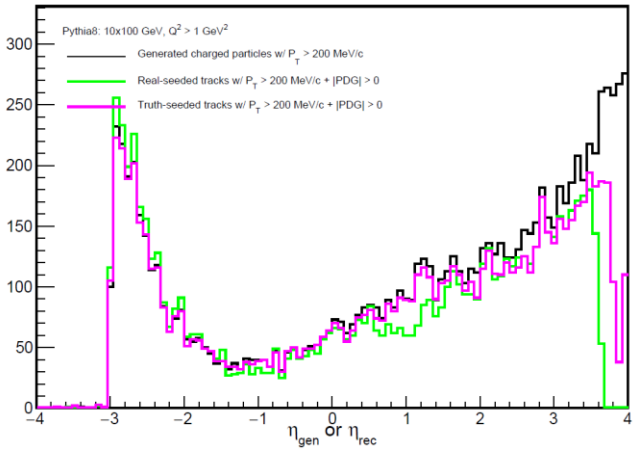
Pure Signal

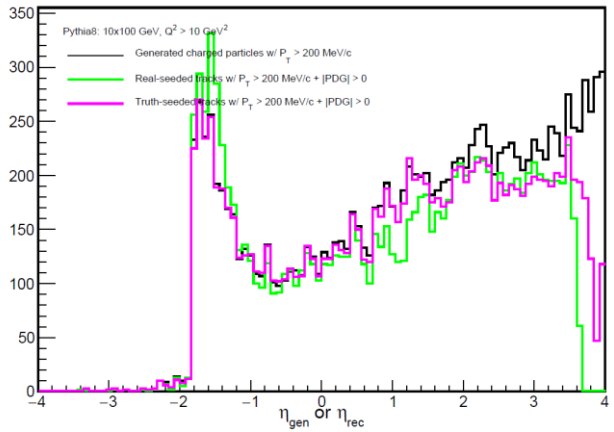


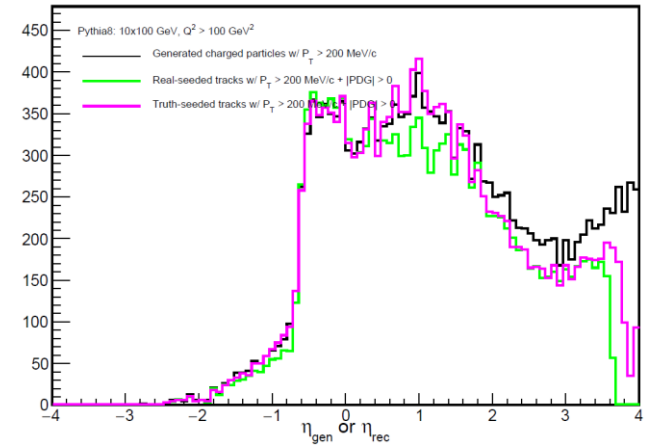




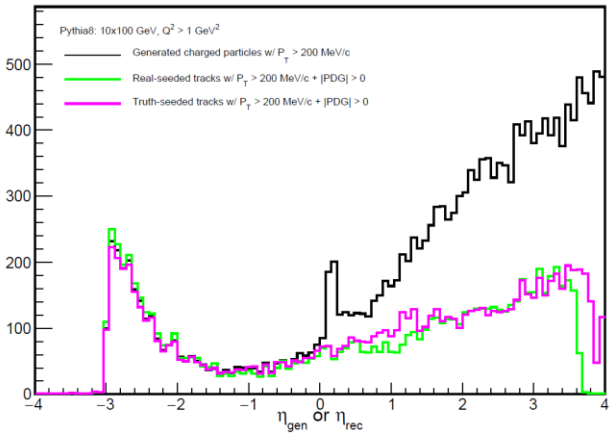
Realistic Admixing (Proton Gas)

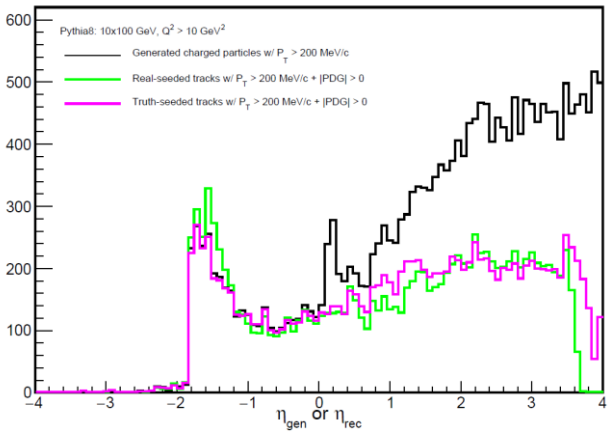


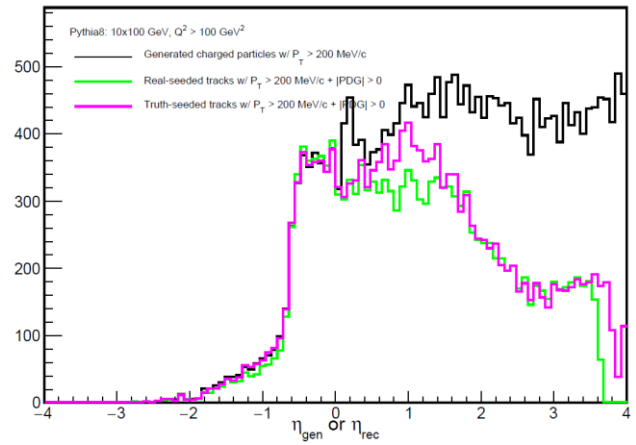




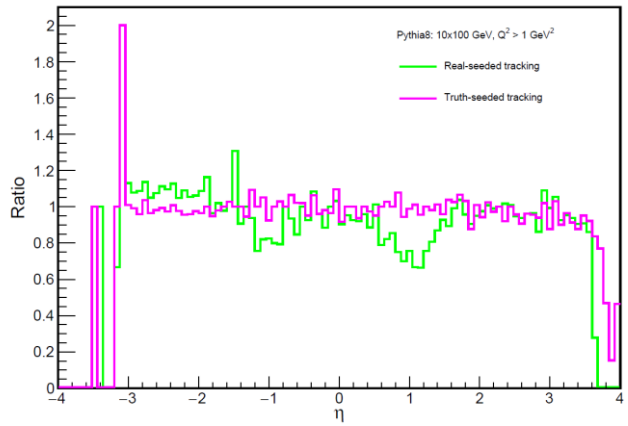
At Least One Admixed (Proton Gas)

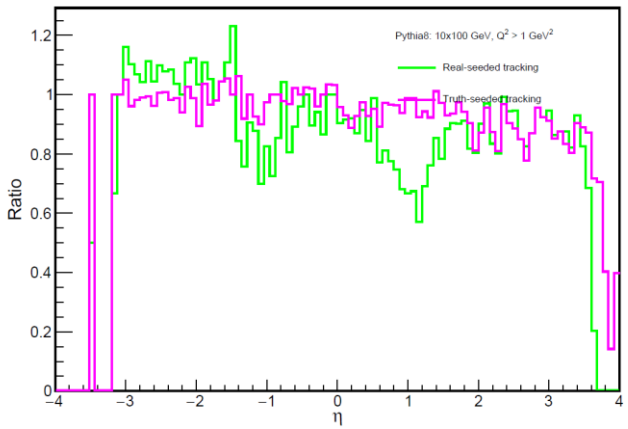


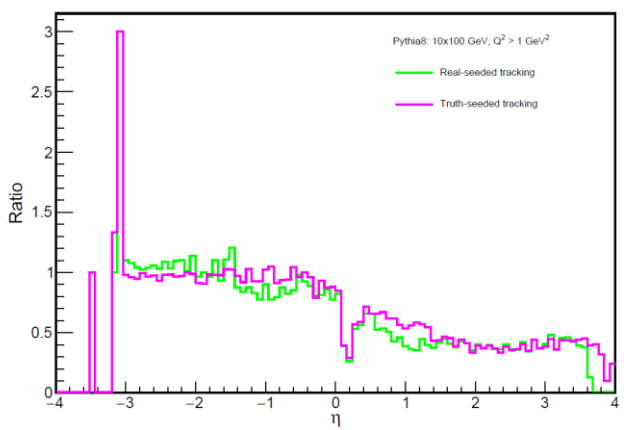




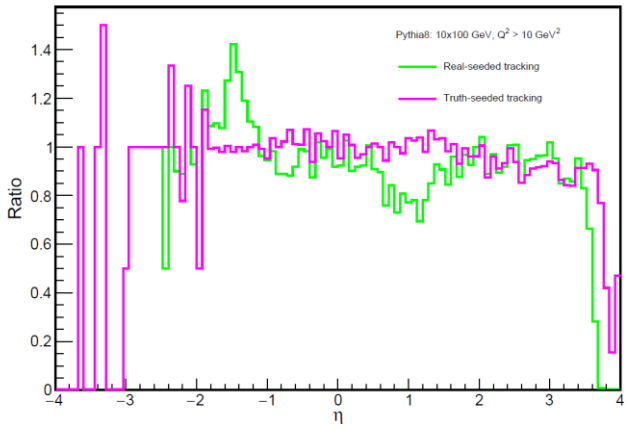
Q^2 > 1GeV^2

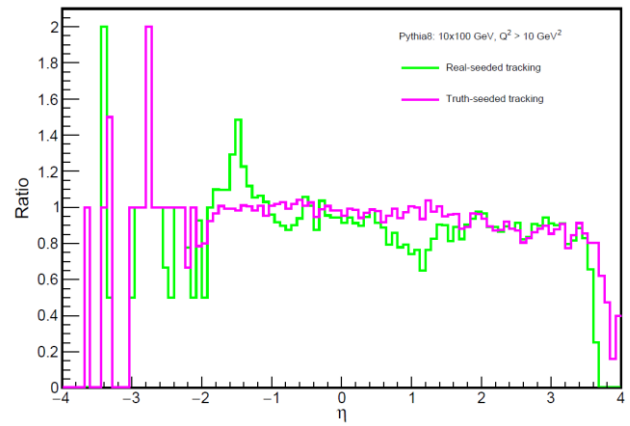


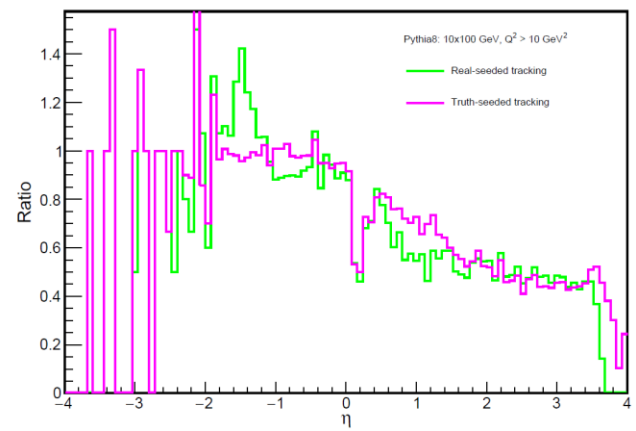




Q^2 > 10GeV^2







Q^2 > 100GeV^2