

# Very preliminary tracking efficiency estimates

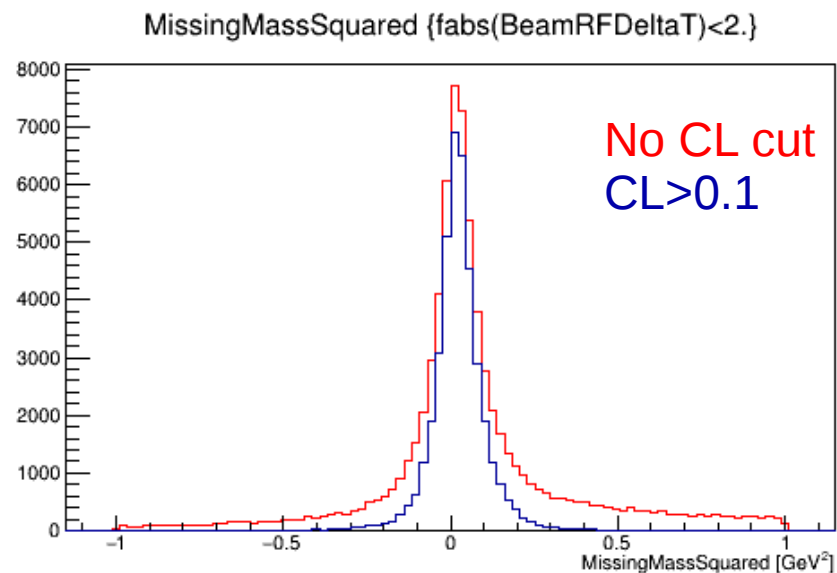
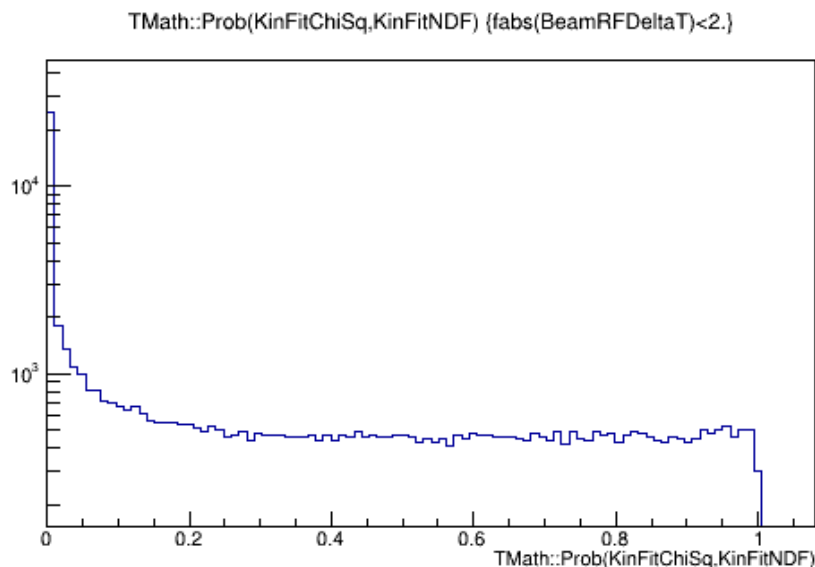
Simon Taylor / JLab

- Paul Mattione created a plugin that makes a tree for studying tracking efficiency:  
*src/plugins/Utilities/trackeff\_missing*
  - One missing particle:
    - $\rho\pi^+(\pi^-)$ ,  $\rho(\pi^+)\pi^-$ ,  $(\rho)\pi^+\pi^-$
    - $\rho\pi^+\pi^-\pi^+(\pi^-)$ ,  $\rho\pi^+\pi^-(\pi^+)\pi^-$ ,  $(\rho)\pi^+\pi^-\pi^+\pi^-$ , ...
  - Macros exist to deal with accidentals and side-band subtraction of background contributions.

I will show some results with some simple cuts – Alex A. is working on using Paul's more elaborate scheme...

# Data sample and fit quality

- Kinematic fits to  $\gamma p \rightarrow p\pi^+(\pi^-)$
- Beam energy: 3-11.6 GeV
- Tagger accidental subtraction: 2 side peaks
- No neutral particles

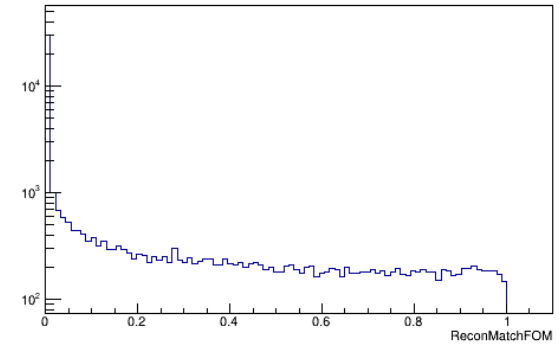


Will apply CL>0.1 cut on following slides

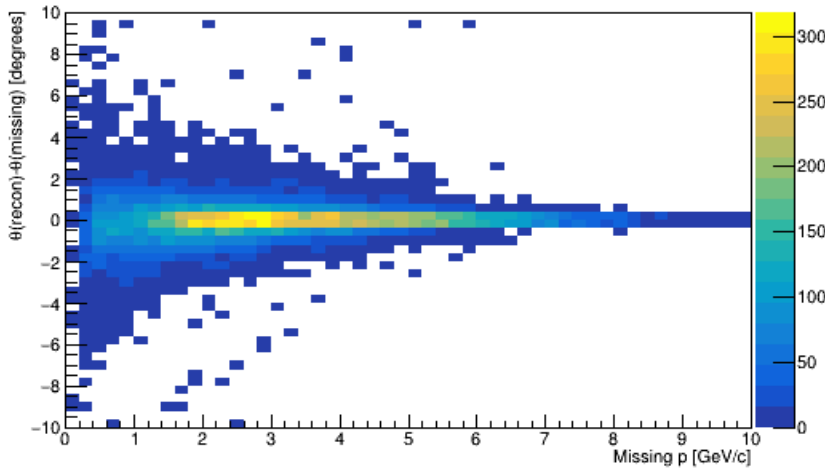
# Predicted/reconstructed matching for $\pi^-$

- Match between predicted and reconstructed track based on variances from results of kinematic fit for missing particle, converted to CL = "ReconMatchFOM"
- At most **1 extra track**

ReconMatchFOM (fabs(BeamRFDeltaT)<2.8&TMath:Prob(KinFitChiSq,KinFitNDF)>0.1)

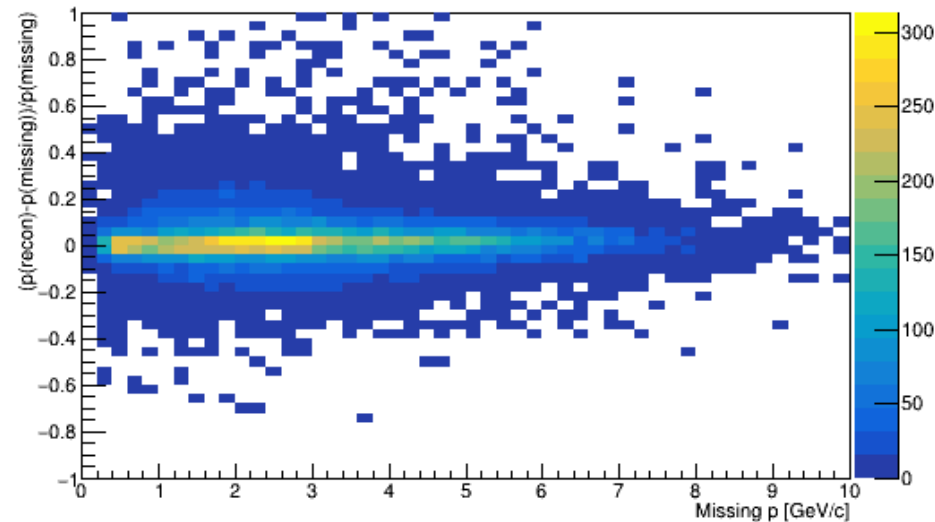


(ReconP3 Theta)-MissingP3 Theta(-180TMath:P(MissingP3 Mag)(fabs(BeamRFDeltaT)<2.8&TMath:Prob(KinFitChiSq,KinFitNDF)>0.1&&ReconMatchFOM>0.001)

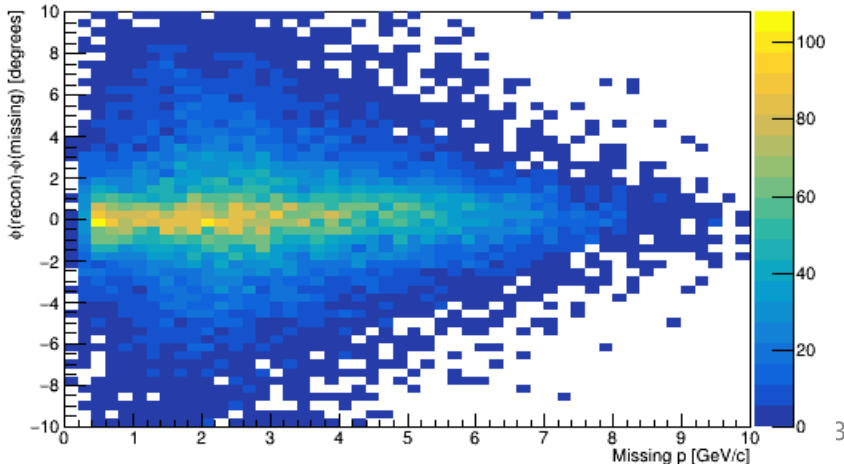


## Differences for ReconMatchFOM > 0.001

(ReconP3 Phi)-MissingP3 Phi(-180TMath:P(MissingP3 Mag)(fabs(BeamRFDeltaT)<2.8&TMath:Prob(KinFitChiSq,KinFitNDF)>0.1&&ReconMatchFOM>0.001)

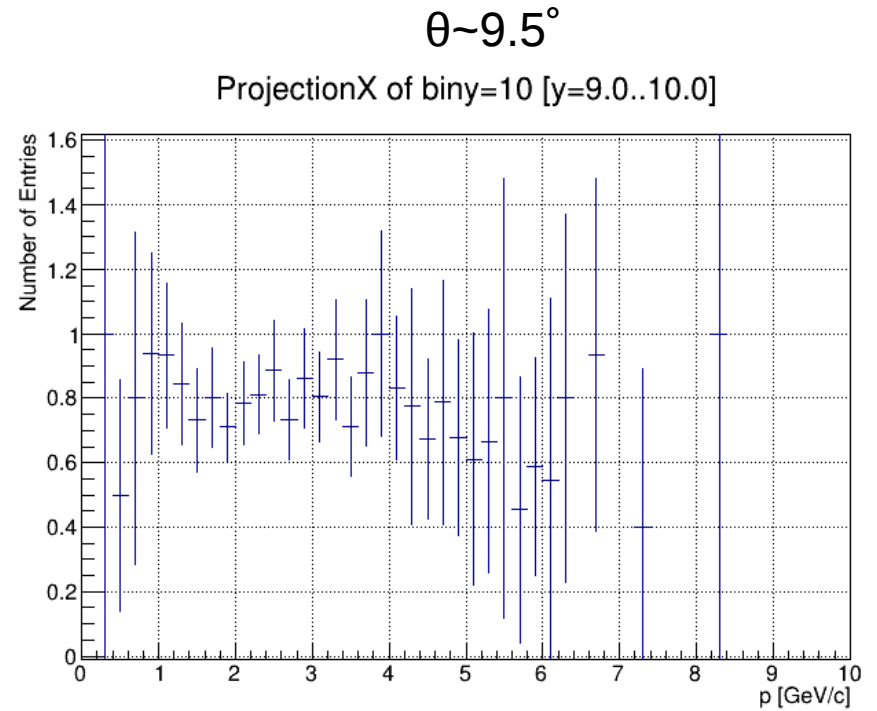
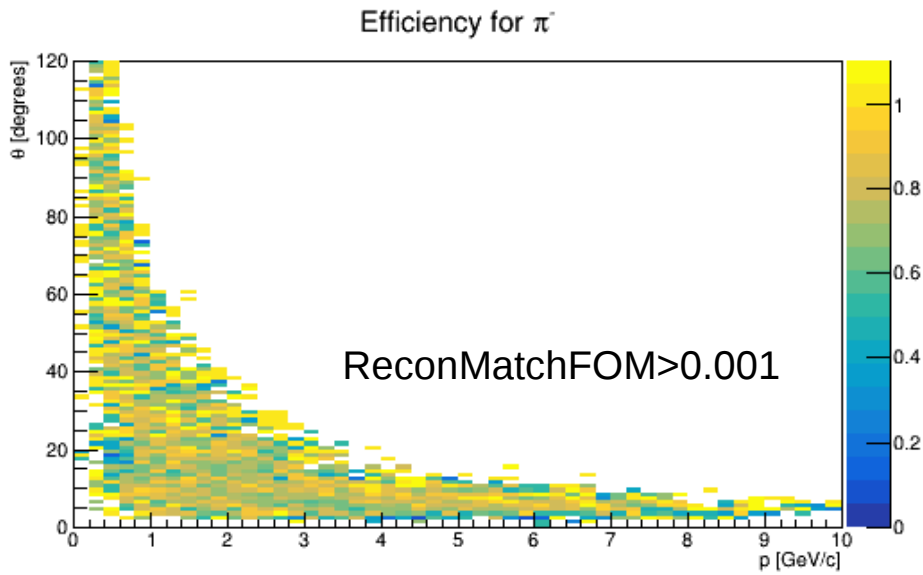


(ReconP3 Phi)-MissingP3 Phi(-180TMath:P(MissingP3 Mag)(fabs(BeamRFDeltaT)<2.8&TMath:Prob(KinFitChiSq,KinFitNDF)>0.1&&ReconMatchFOM>0.001)



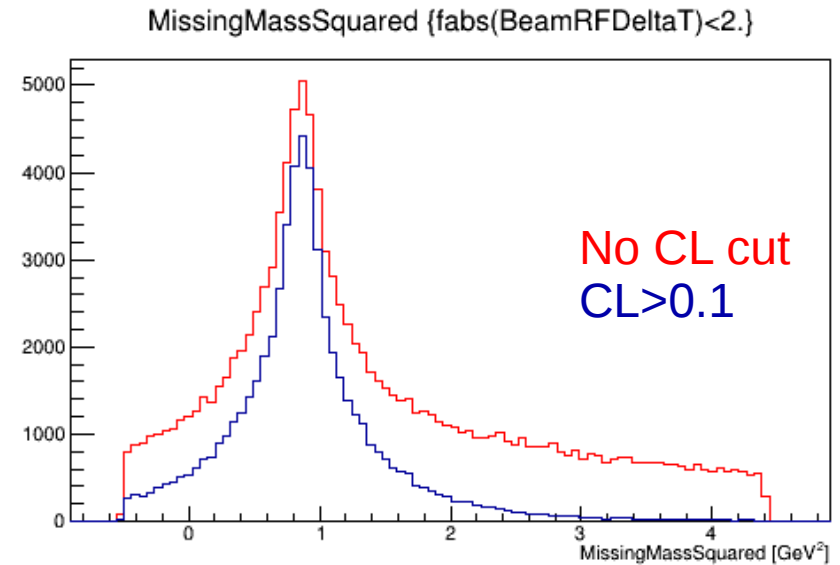
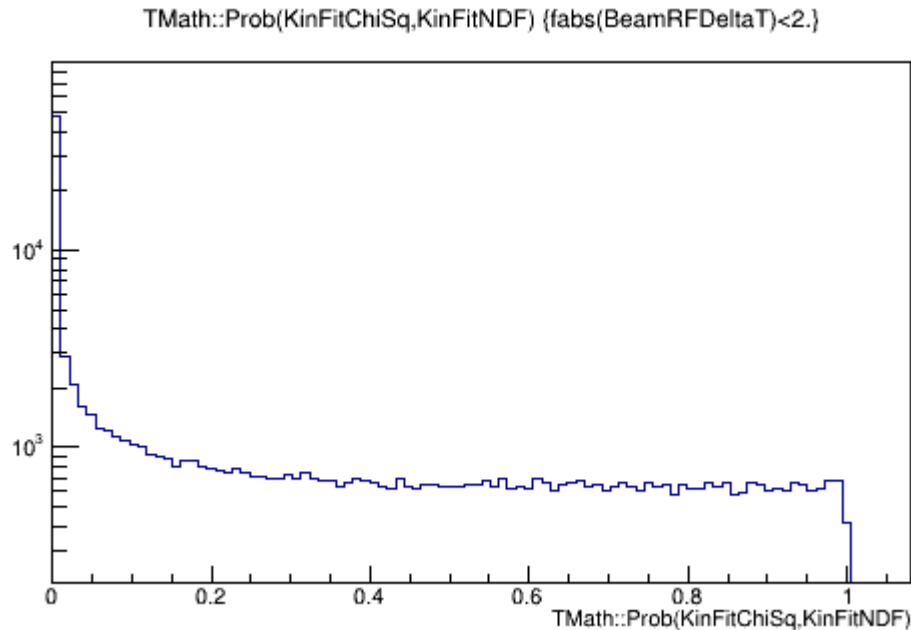
# Efficiency for $\pi^-$

- Require ReconMatchFOM > 0.001



# Data sample and fit quality for protons

- Kinematic fits to  $\gamma p \rightarrow (p)\pi^+\pi^-$
- Beam energy: 3-11.6 GeV
- Tagger accidental subtraction: 2 side peaks
- No neutral particles



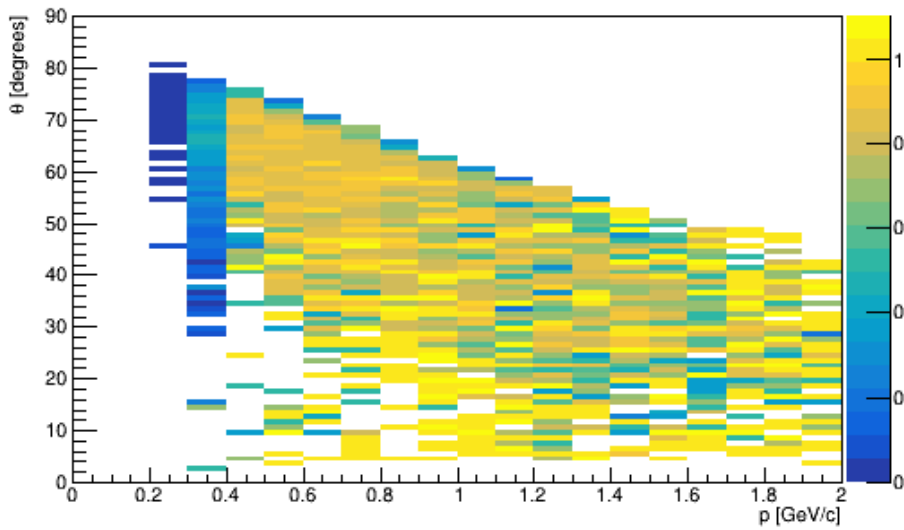
Will apply CL>0.1 cut on following slides

# Efficiency for protons

- Require ReconMatchFOM > 0.001

$\theta \sim 59.5^\circ$

Efficiency for proton



ProjectionX of biny=60 [ $y=59.0..60.0$ ]

