

# Embedding QA

## embedding + real

**Color code for embedding and real data**

—— MC (black)

—— Reconstructed embedding tracks\* (red)

—— Real\*\* (blue)

\* matched pairs or contaminated pairs

\*\* black is also used, see legend for each pad

## Event & track selections

### \*\*\* Event selections

z-vertex cut :  $|v_z| < 35.0 \text{ cm}$

trigger id cut : id = 580001, 580021

*NOTE: Trigger id cut for real data has to be made manually in doEmbeddingQAMaker.C*

### \*\*\* Track selections

$0.1 < p_T < 8.0 \text{ GeV/c}$

$|\eta| < 1.00$

$|y| < 1.00$

nHitsFit > 20

nHitsFit/nHitsPoss > 0.51

global Dca < 1.5 cm

$|n\sigma| < 2.0$ , using TPC dE/dx

*NOTE1: Rapidity cut for real data has to be made manually in doEmbeddingQAMaker.C*

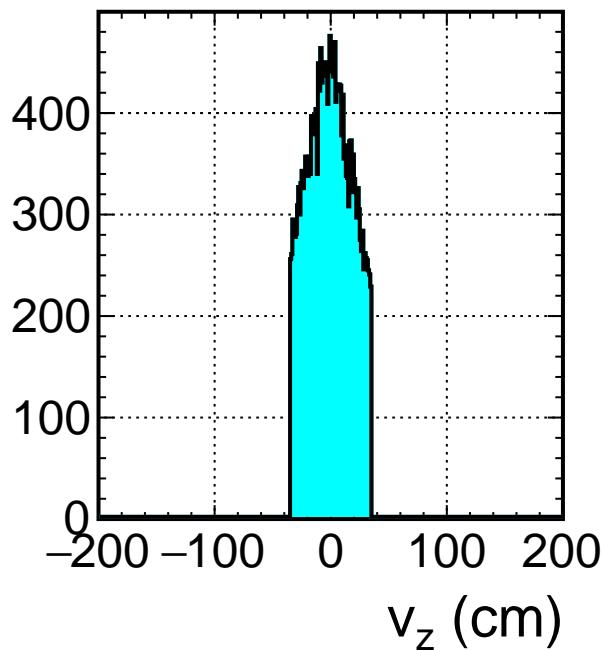
*NOTE2: Cut on its own variable is currently disabled, e.x. no dca cut for dca histogram*

$N_{\text{events}}=24.83$  K, MC=e-, embeddingQa.mc, (0)

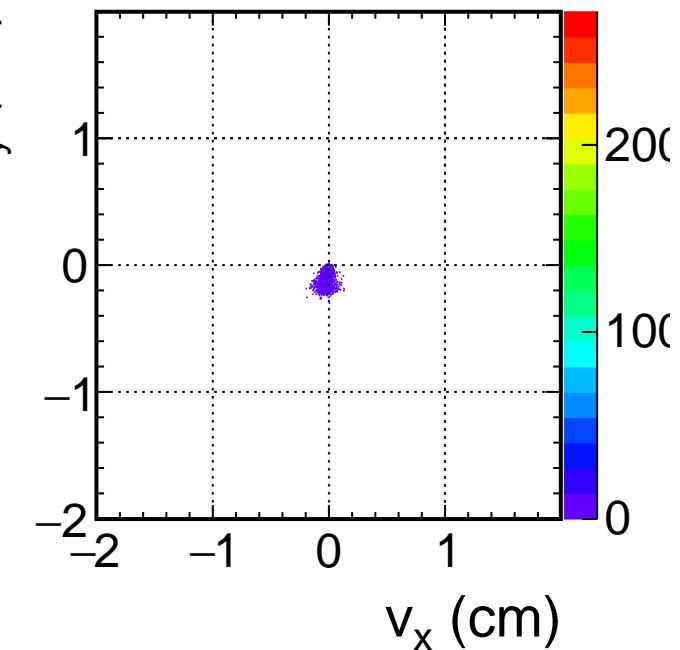
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Event vertices, offline cuts:  $-35.0 < v_z < 35.0$  cm

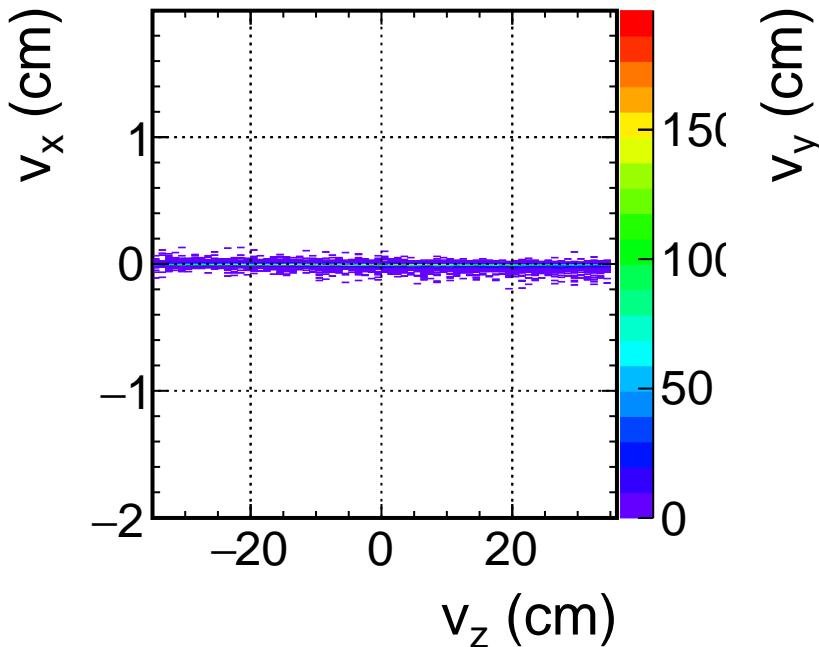
z-vertex



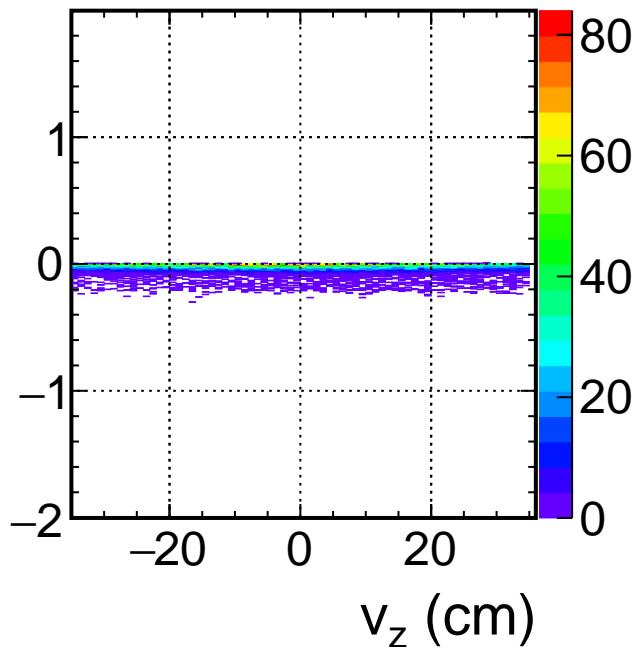
$v_y$  vs  $v_x$



$v_x$  vs  $v_z$

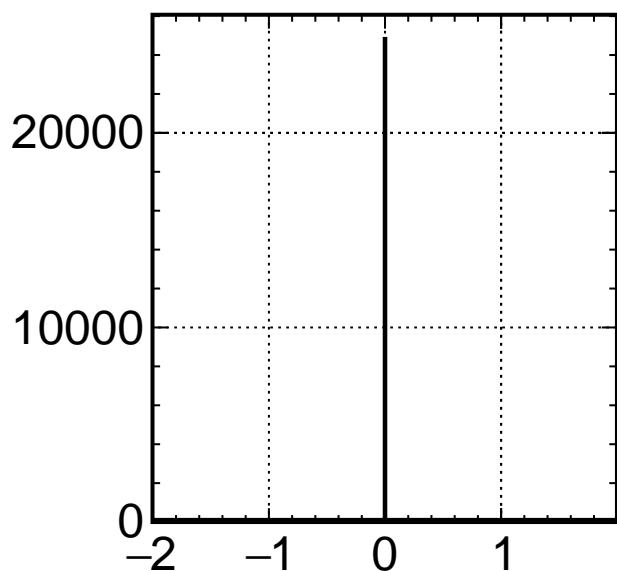


$v_y$  vs  $v_z$



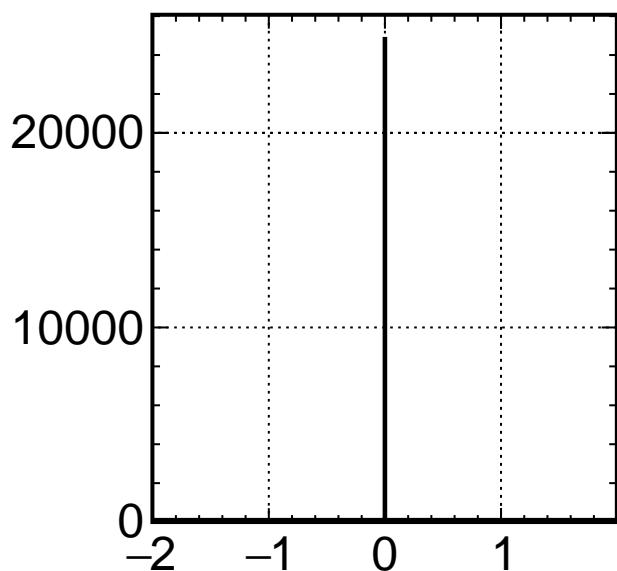
Event vertices,  $\Delta v = v(\text{Data}) - v(\text{MC})$ 

$$\Delta x = v_x - v_x(\text{MC})$$



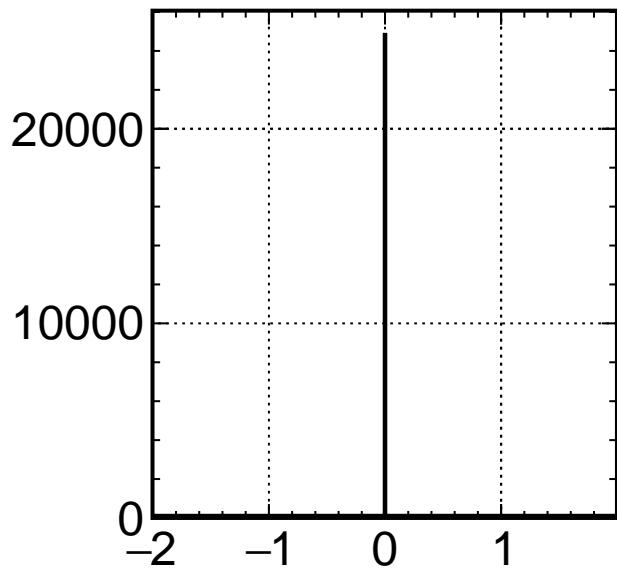
$$\Delta v_x = v_x - v_x(\text{MC}) \text{ (cm)}$$

$$\Delta y = v_y - v_y(\text{MC})$$



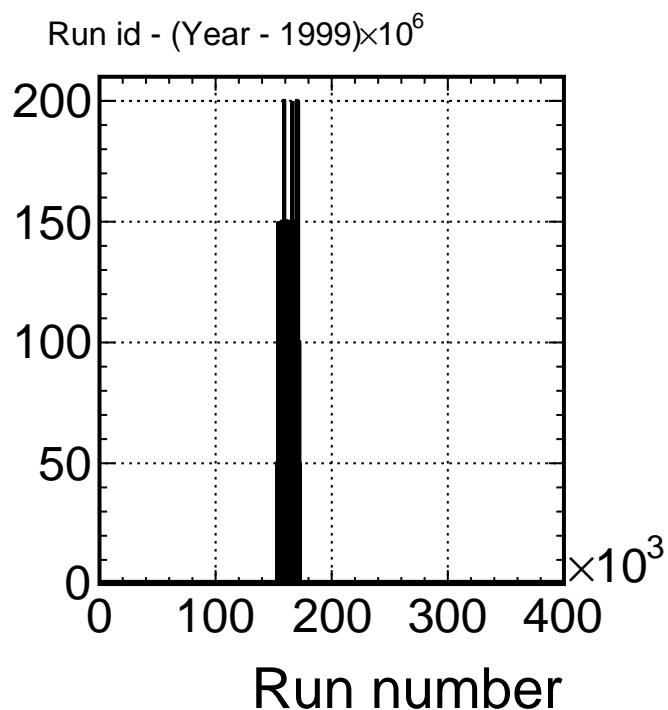
$$\Delta v_y = v_y - v_y(\text{MC}) \text{ (cm)}$$

$$\Delta z = v_z - v_z(\text{MC})$$

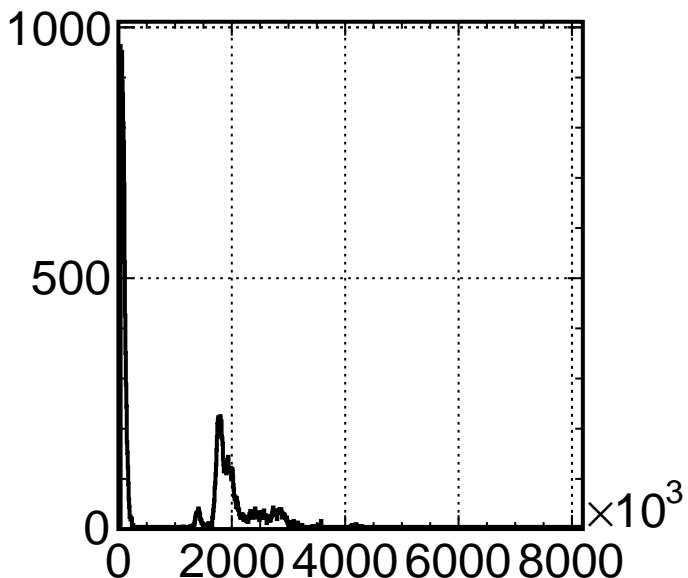


$$\Delta v_z = v_z - v_z(\text{MC}) \text{ (cm)}$$

### Run and event id

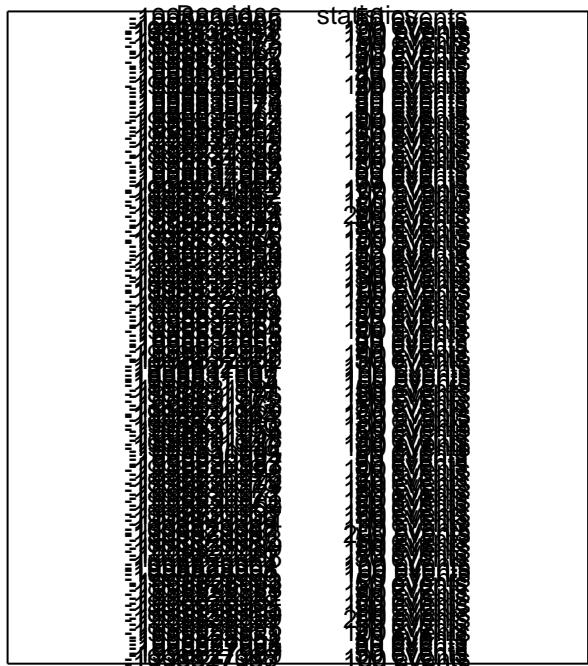
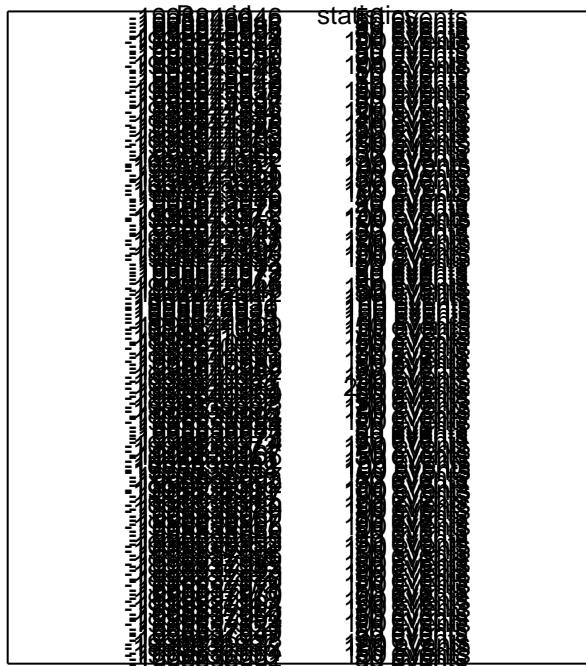


### Event id

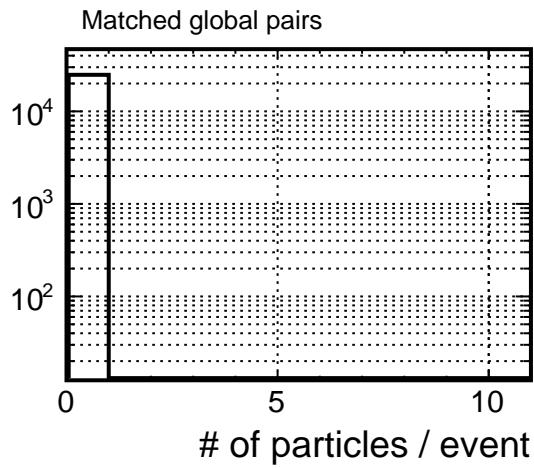
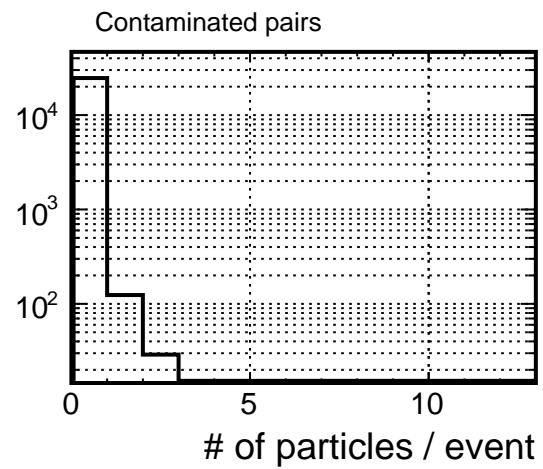
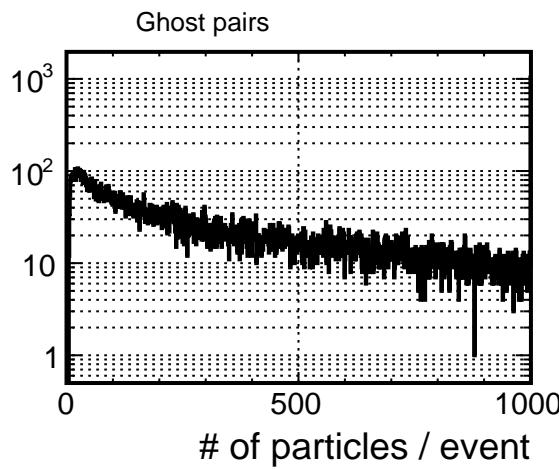
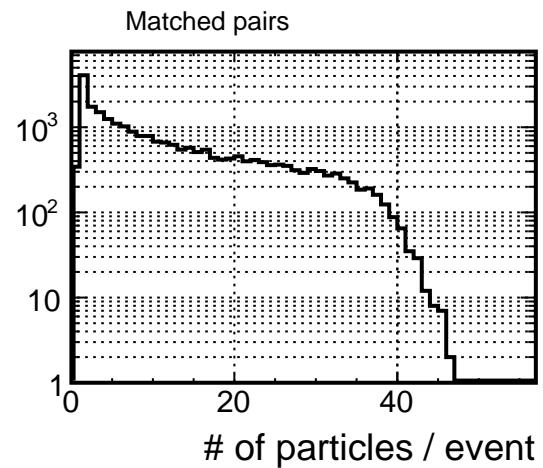
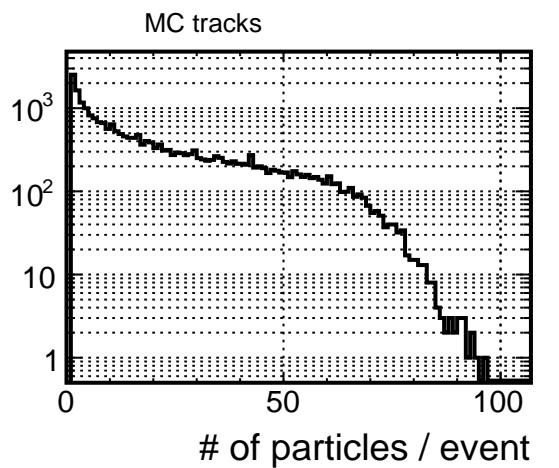


### Run number

### Event id



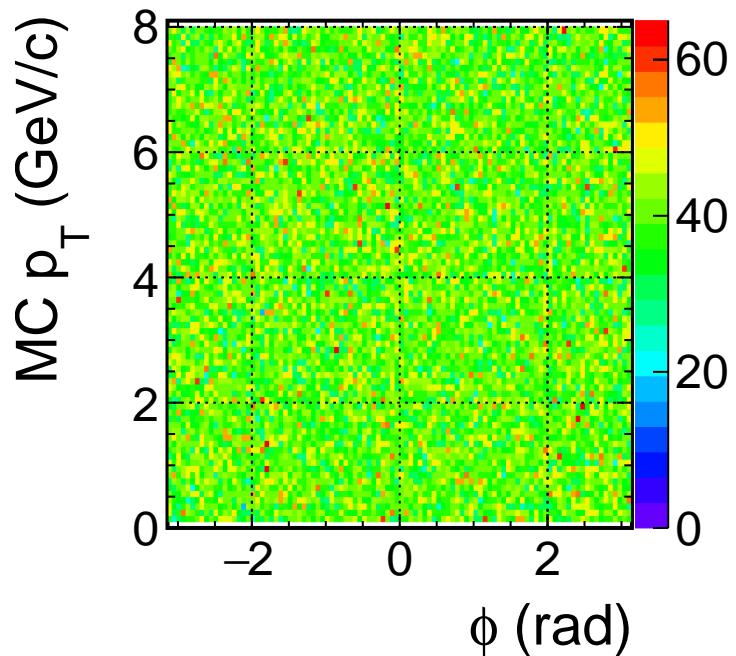
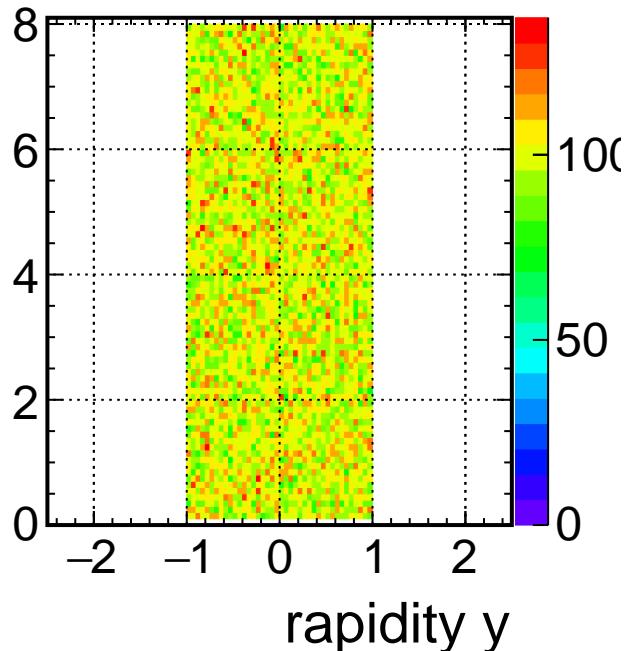
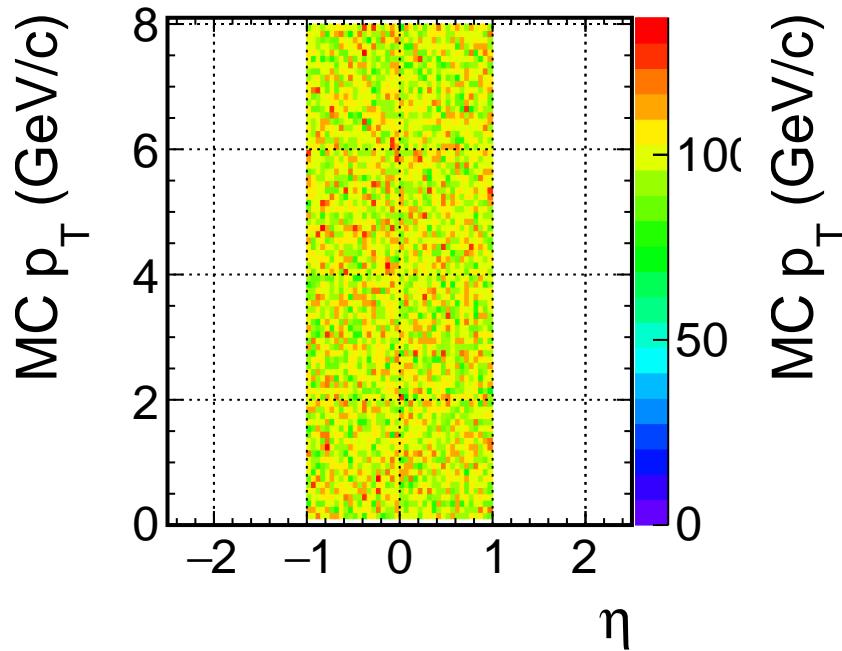
## Multiplicity distribution



$N_{\text{events}}=24.83$  K, MC=e-, embeddingQa.mc, (0)

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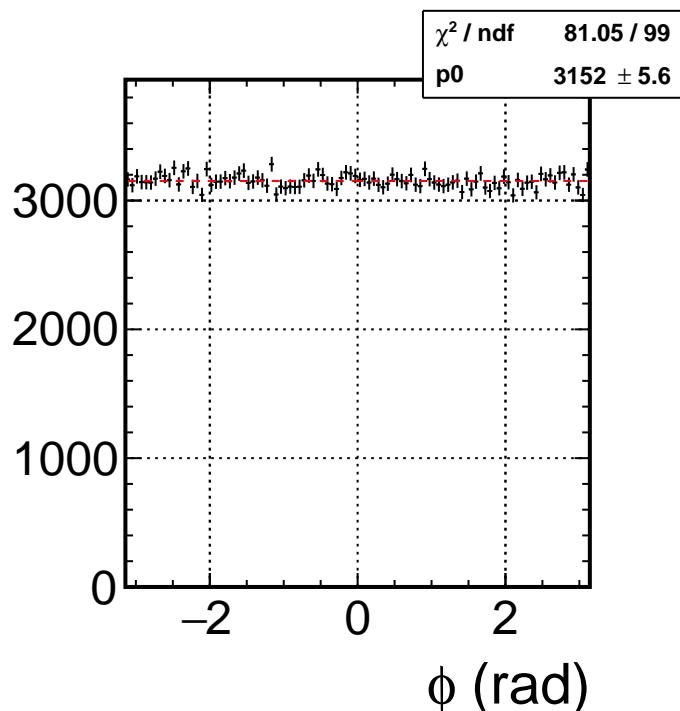
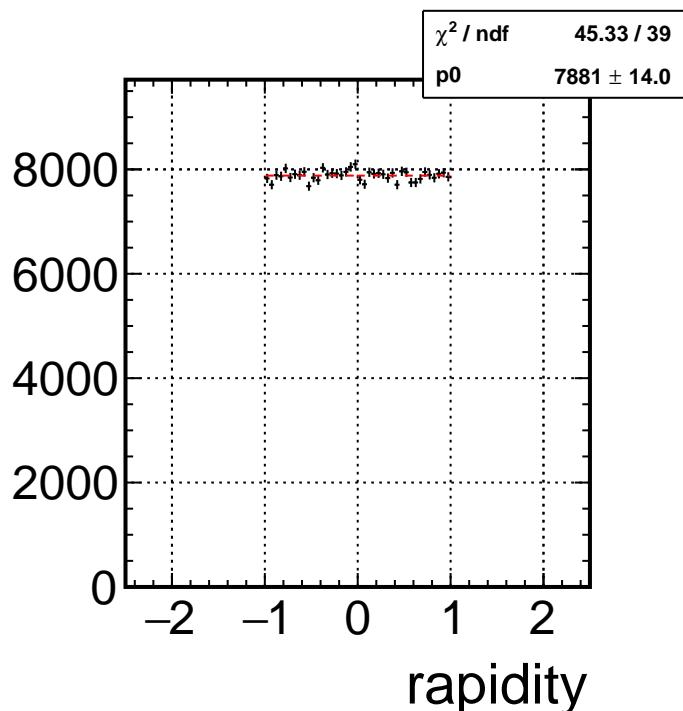
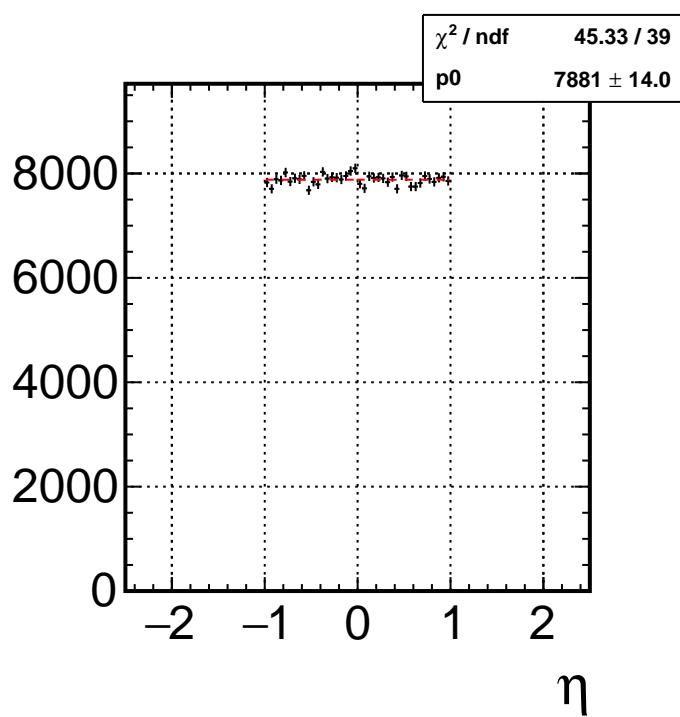
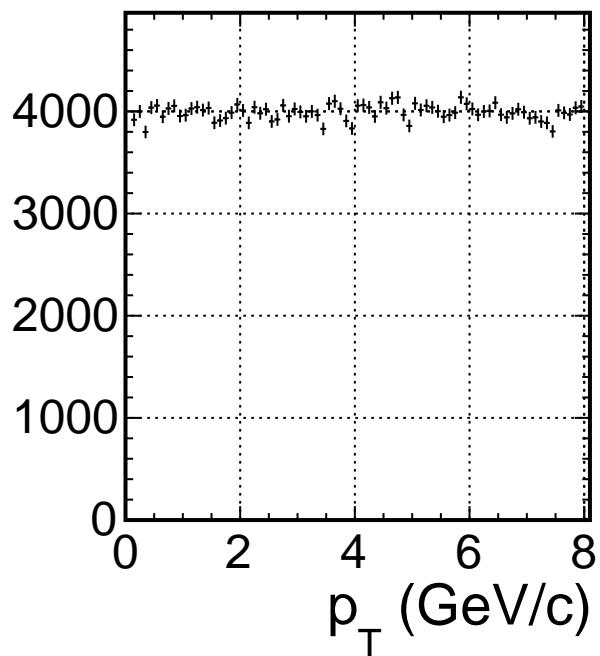
### MC track QA (2D)



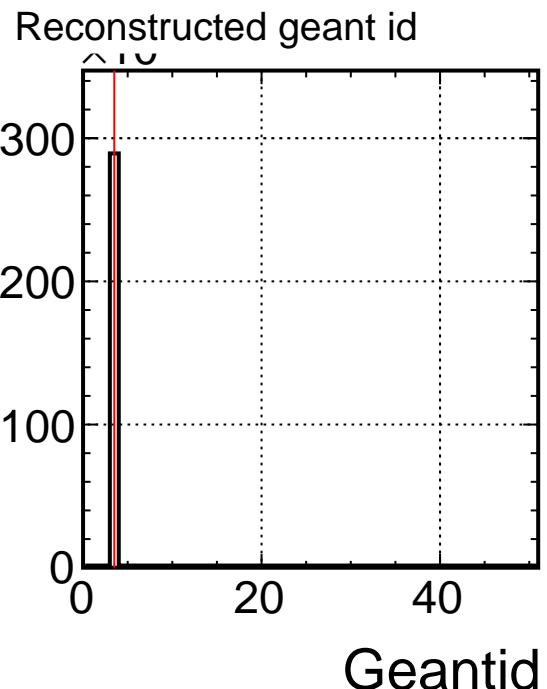
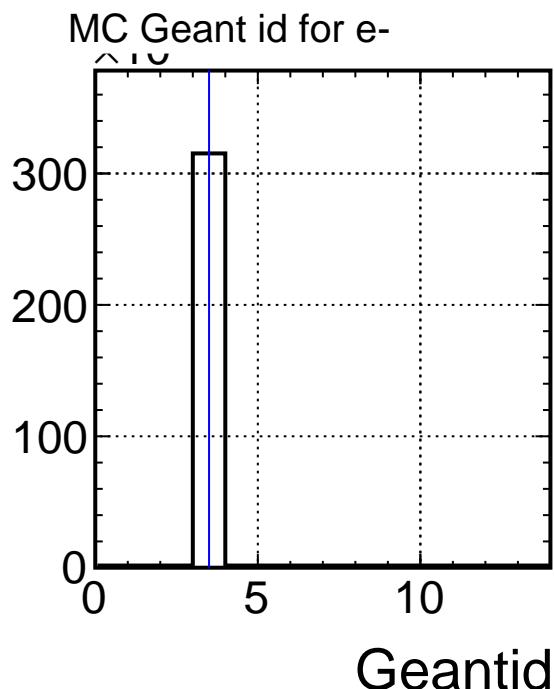
$N_{\text{events}}=24.83$  K, MC=e-, embeddingQa.mc, (0)

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### MC track QA (1D)



### Geant id

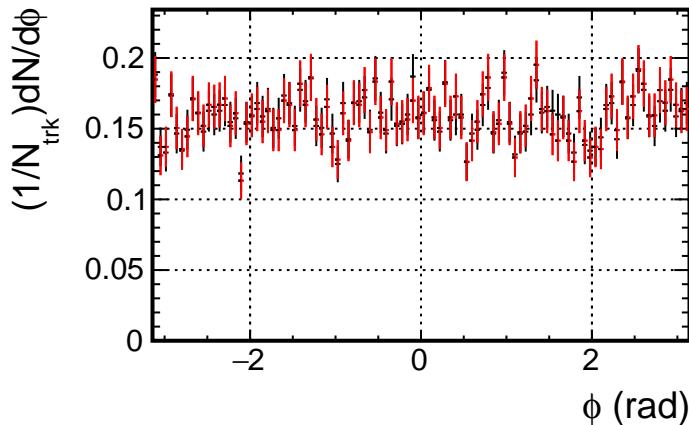
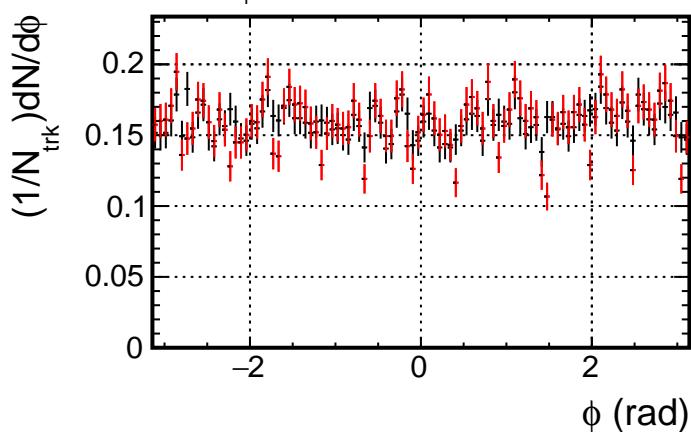
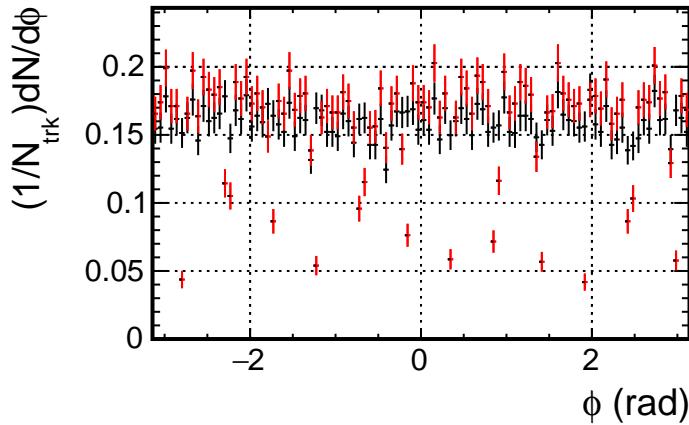
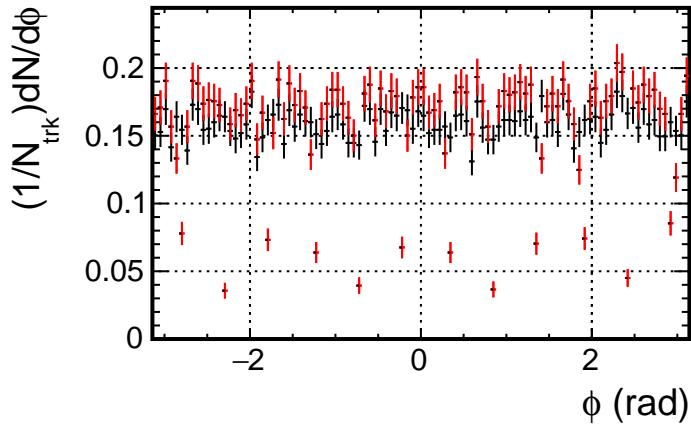
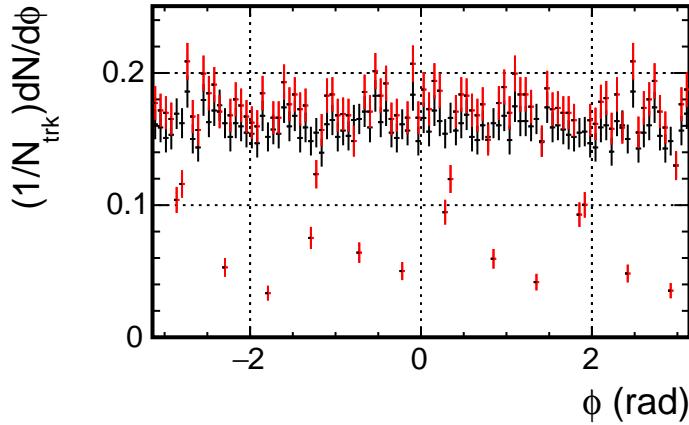


### Particle informations

— e- (MC, geantid=3)

— e- (MATCHED, geantid=3)

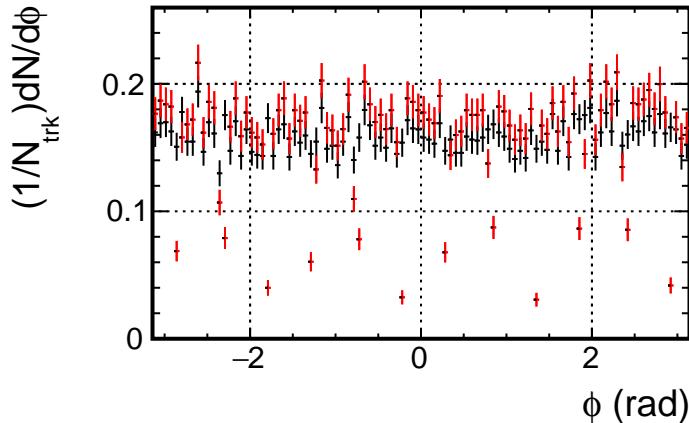
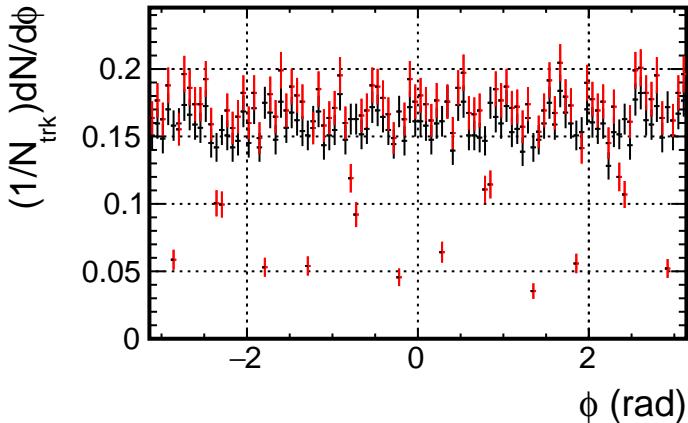
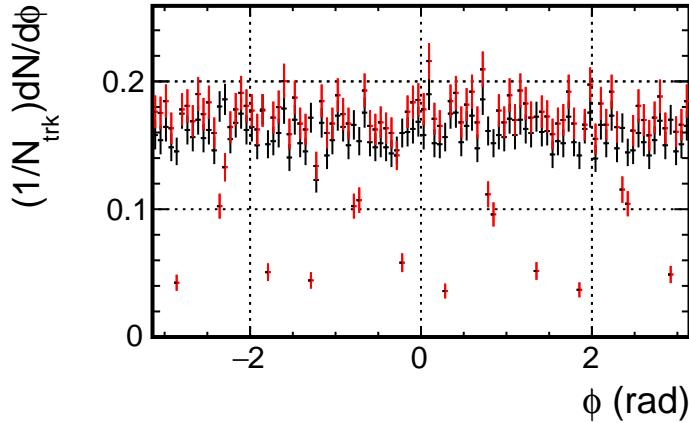
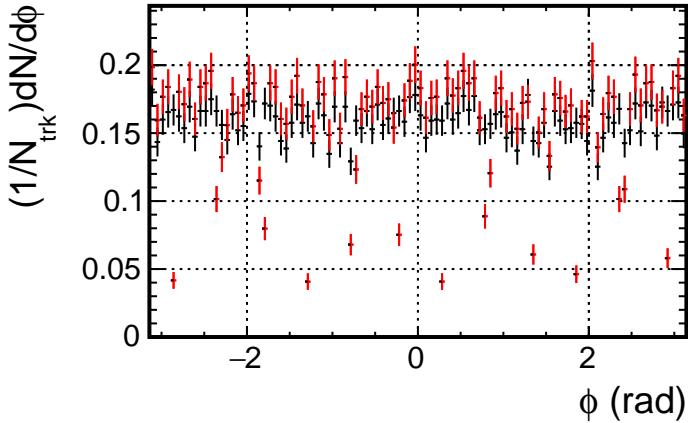
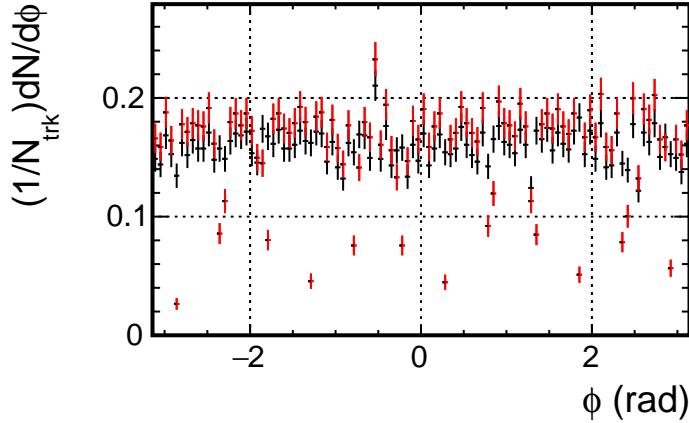
# Projection of $\phi$ for each $p_T$ bin

0.2 <  $p_T$  < 0.5 (GeV/c)0.5 <  $p_T$  < 1.0 (GeV/c)1.0 <  $p_T$  < 1.5 (GeV/c)1.5 <  $p_T$  < 2.0 (GeV/c)2.0 <  $p_T$  < 2.5 (GeV/c)

e-  
(MATCHED, geantid=3)

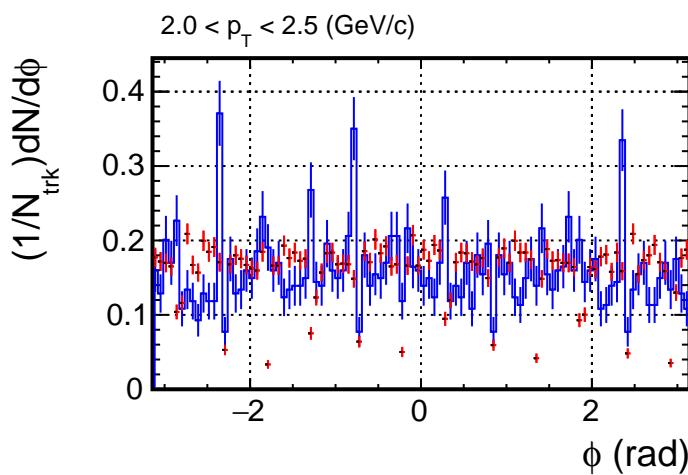
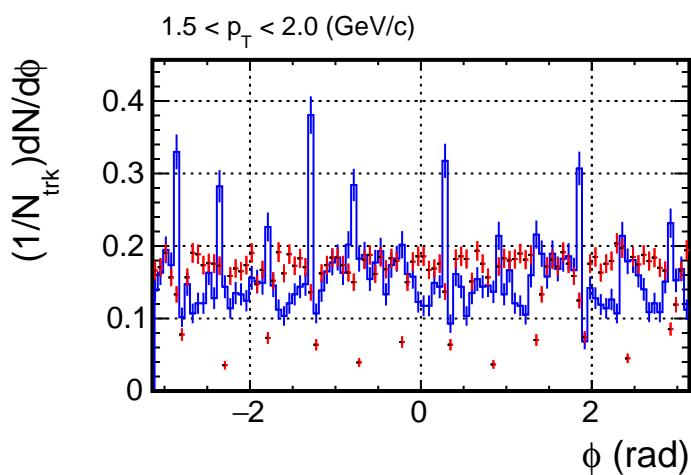
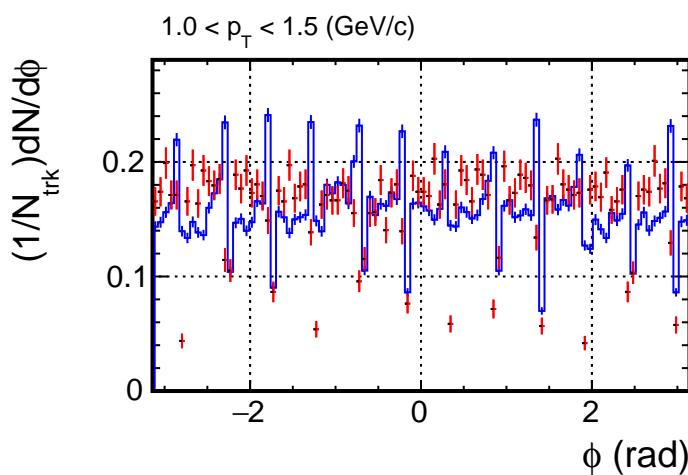
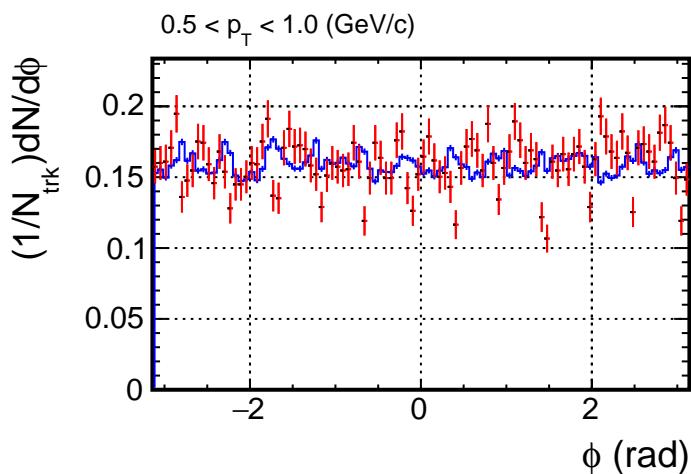
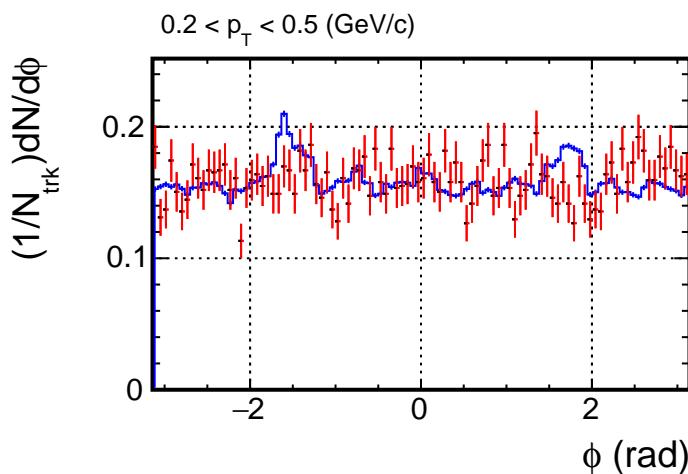
e- (MC, geantid=3)

# Projection of $\phi$ for each $p_T$ bin

2.5 <  $p_T$  < 3.0 (GeV/c)3.0 <  $p_T$  < 3.5 (GeV/c)3.5 <  $p_T$  < 4.0 (GeV/c)4.0 <  $p_T$  < 4.5 (GeV/c)4.5 <  $p_T$  < 5.0 (GeV/c)

e-  
(MATCHED, geantid=3)

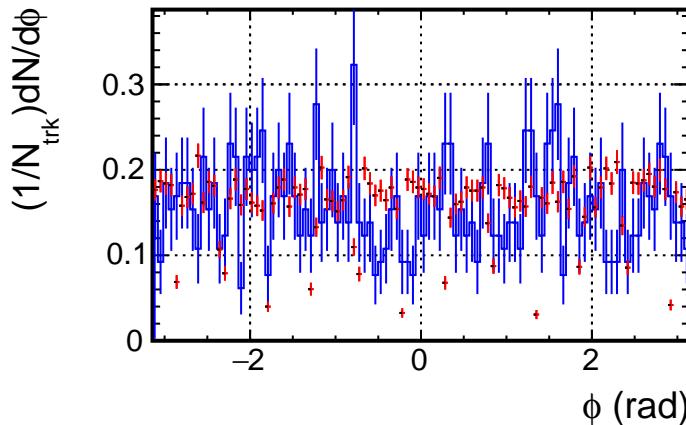
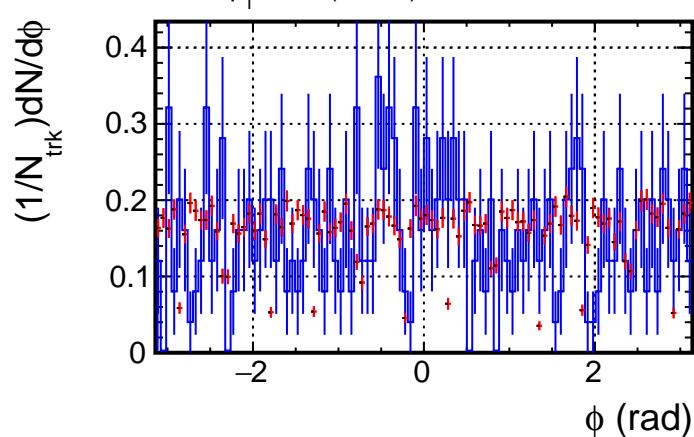
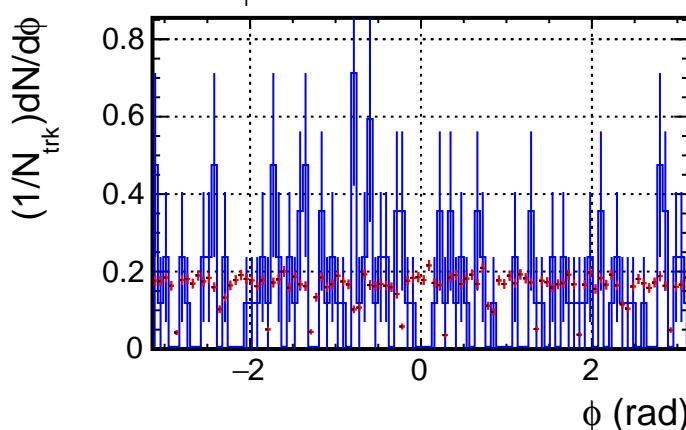
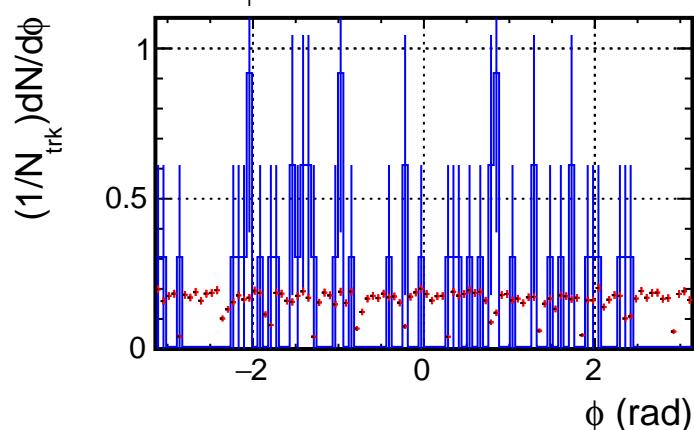
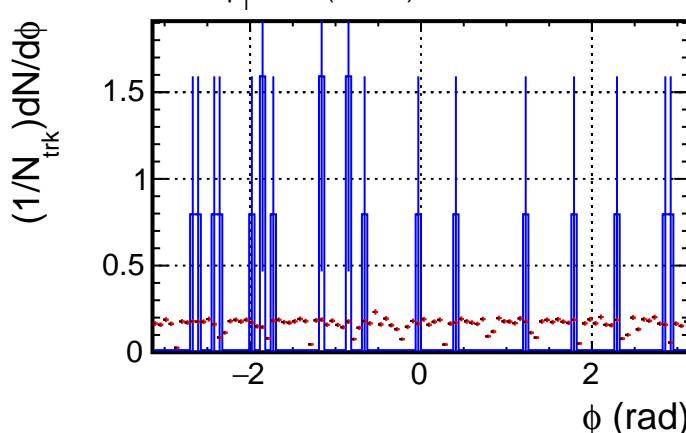
e- (MC, geantid=3)

Projection of  $\phi$  for each  $p_T$  bin

e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|\eta \sigma_e| < 2$  TPC)

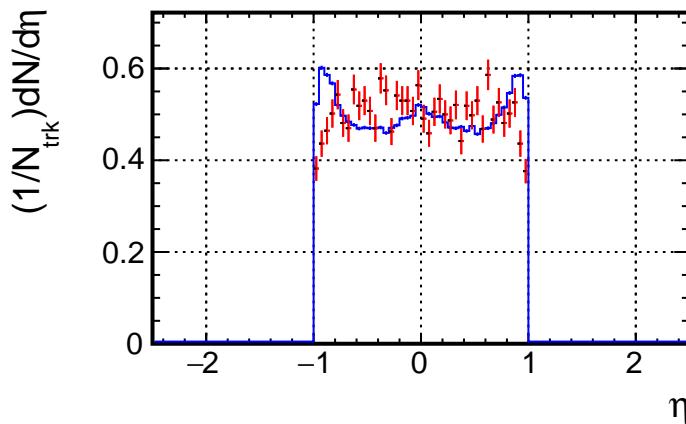
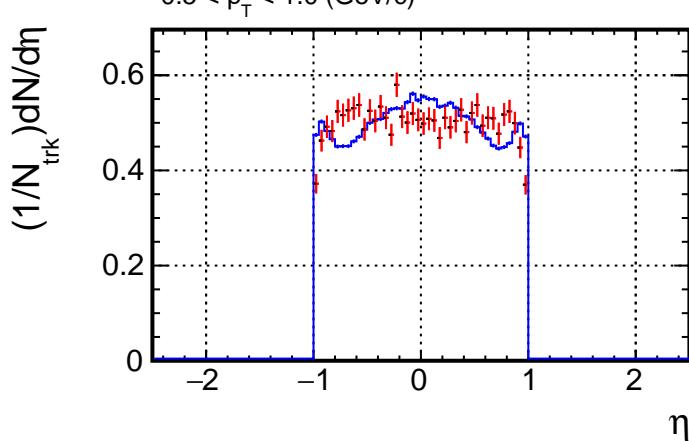
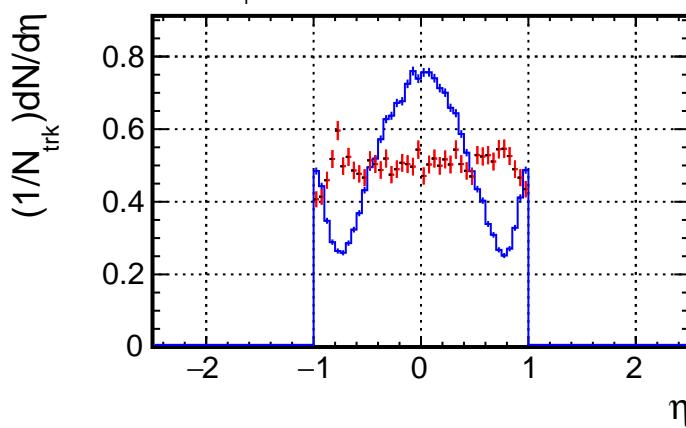
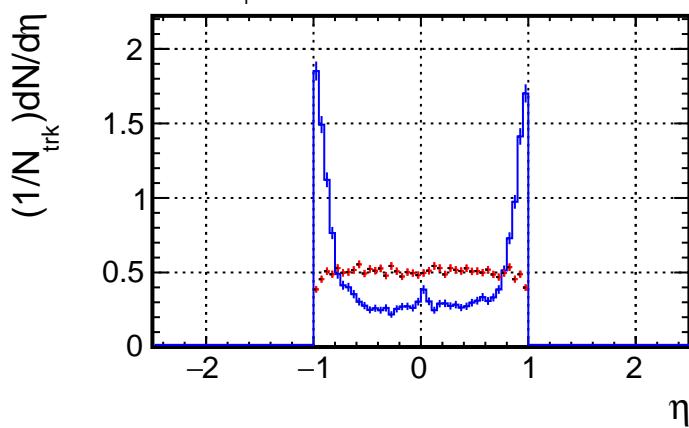
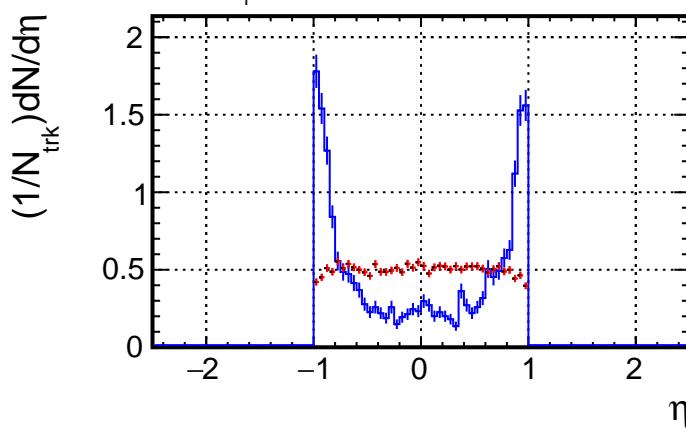
# Projection of $\phi$ for each $p_T$ bin

2.5 <  $p_T$  < 3.0 (GeV/c)3.0 <  $p_T$  < 3.5 (GeV/c)3.5 <  $p_T$  < 4.0 (GeV/c)4.0 <  $p_T$  < 4.5 (GeV/c)4.5 <  $p_T$  < 5.0 (GeV/c)

e-  
(MATCHED, geantid=3)

e-  
(PRIMARY, | $n \sigma_{e^-}| < 2$  TPC)

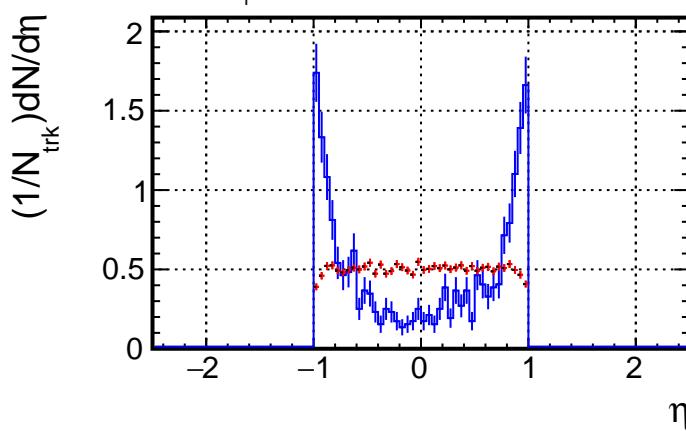
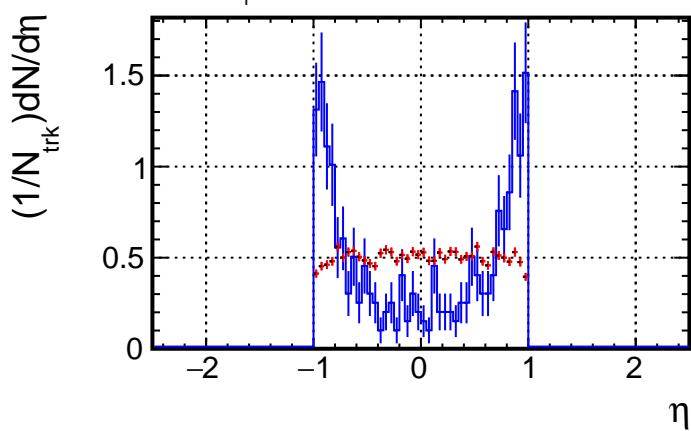
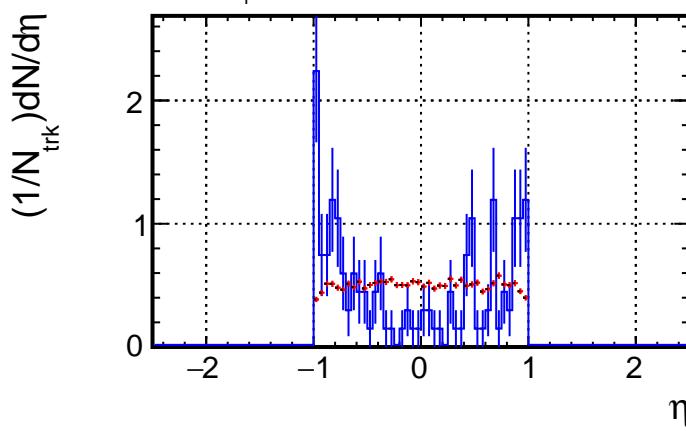
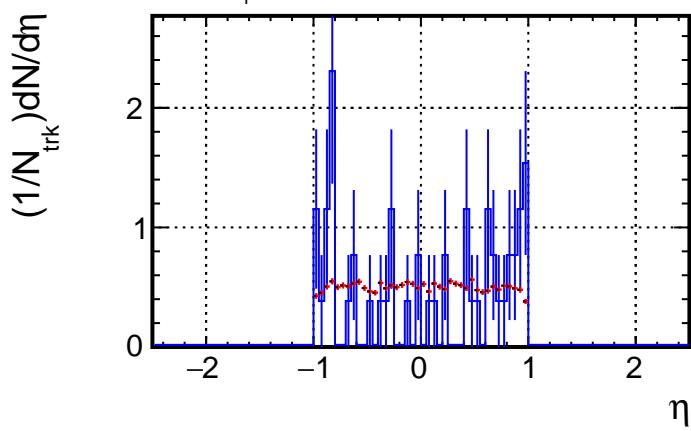
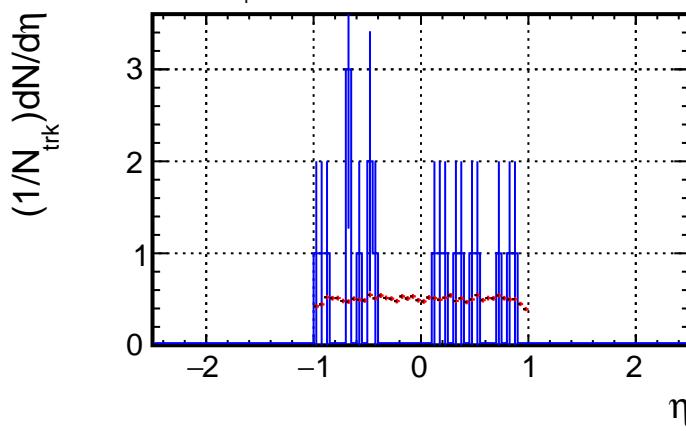
# Projection of $\eta$ for each $p_T$ bin

0.2 <  $p_T$  < 0.5 (GeV/c)0.5 <  $p_T$  < 1.0 (GeV/c)1.0 <  $p_T$  < 1.5 (GeV/c)1.5 <  $p_T$  < 2.0 (GeV/c)2.0 <  $p_T$  < 2.5 (GeV/c)

e-  
(MATCHED, geantid=3)

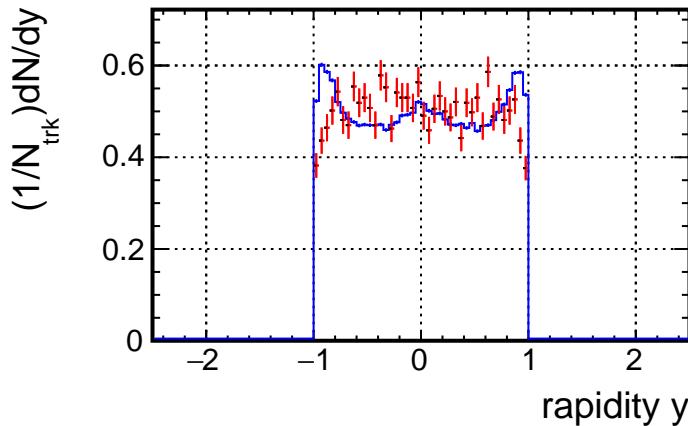
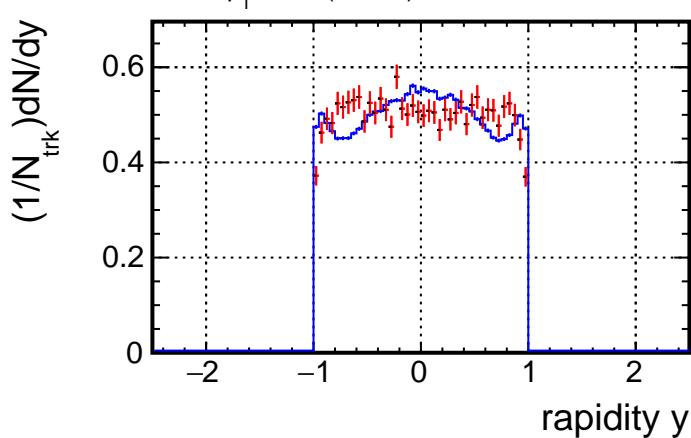
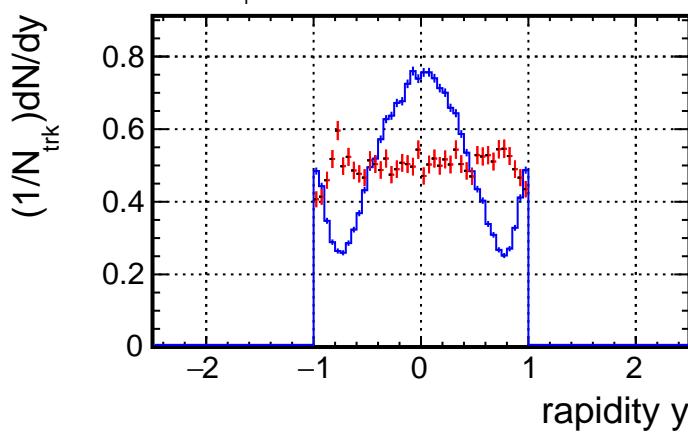
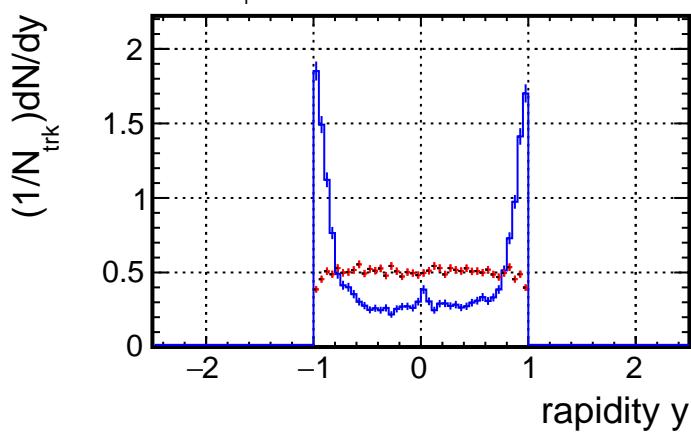
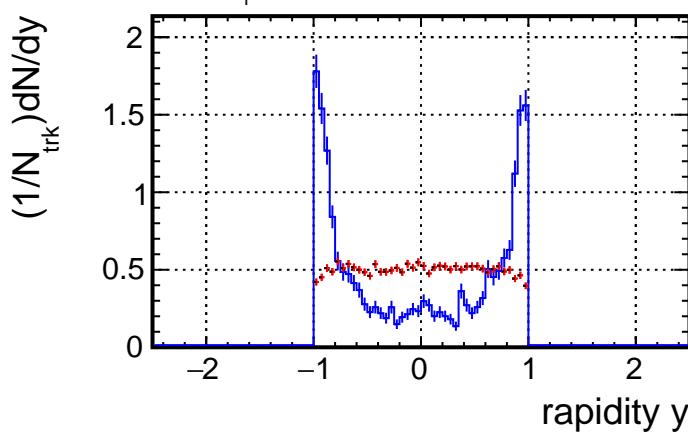
e-  
(PRIMARY, | $n \sigma_{e^-}| < 2$  TPC)

# Projection of $\eta$ for each $p_T$ bin

2.5 <  $p_T$  < 3.0 (GeV/c)3.0 <  $p_T$  < 3.5 (GeV/c)3.5 <  $p_T$  < 4.0 (GeV/c)4.0 <  $p_T$  < 4.5 (GeV/c)4.5 <  $p_T$  < 5.0 (GeV/c)

- e-  
(MATCHED, geantid=3)
- e-  
(PRIMARY, |n  $\sigma_{e^-}| < 2$  TPC)

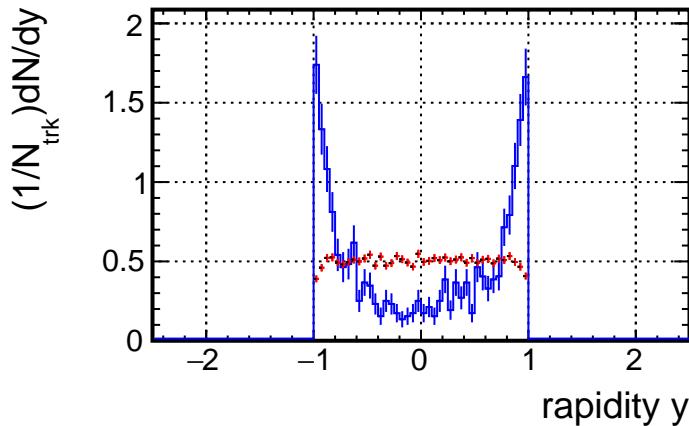
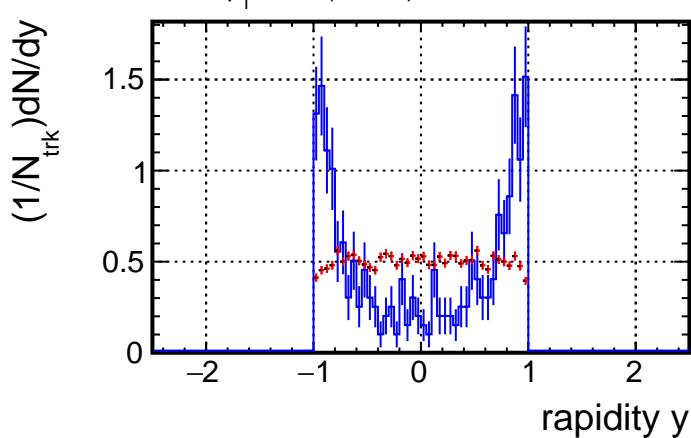
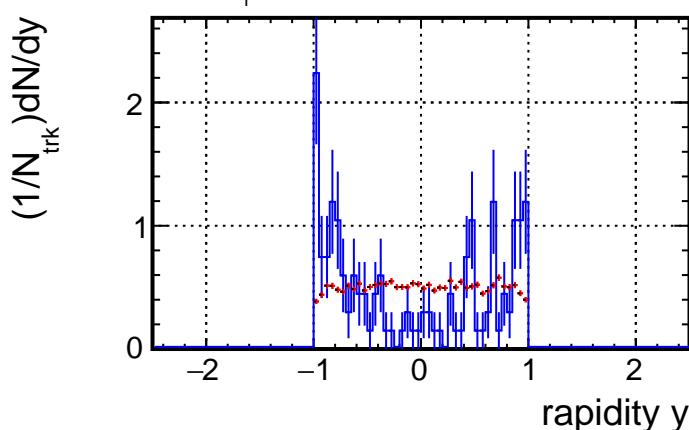
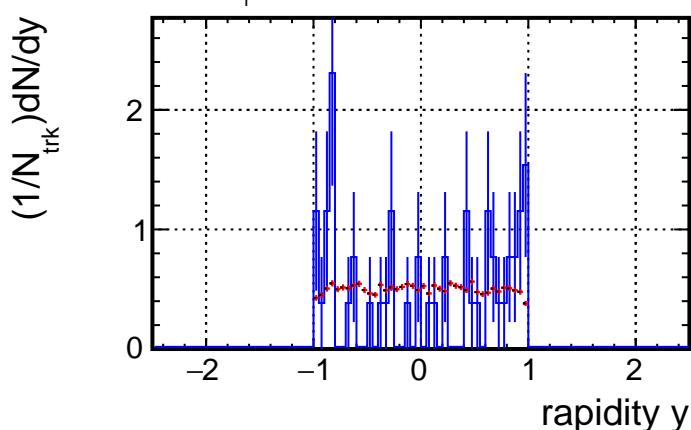
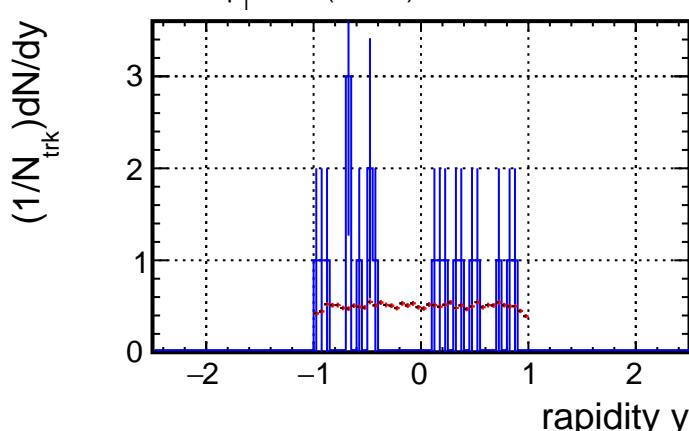
# Projection of $y$ for each $p_T$ bin

0.2 <  $p_T$  < 0.5 (GeV/c)0.5 <  $p_T$  < 1.0 (GeV/c)1.0 <  $p_T$  < 1.5 (GeV/c)1.5 <  $p_T$  < 2.0 (GeV/c)2.0 <  $p_T$  < 2.5 (GeV/c)

e-  
(MATCHED, geantid=3)

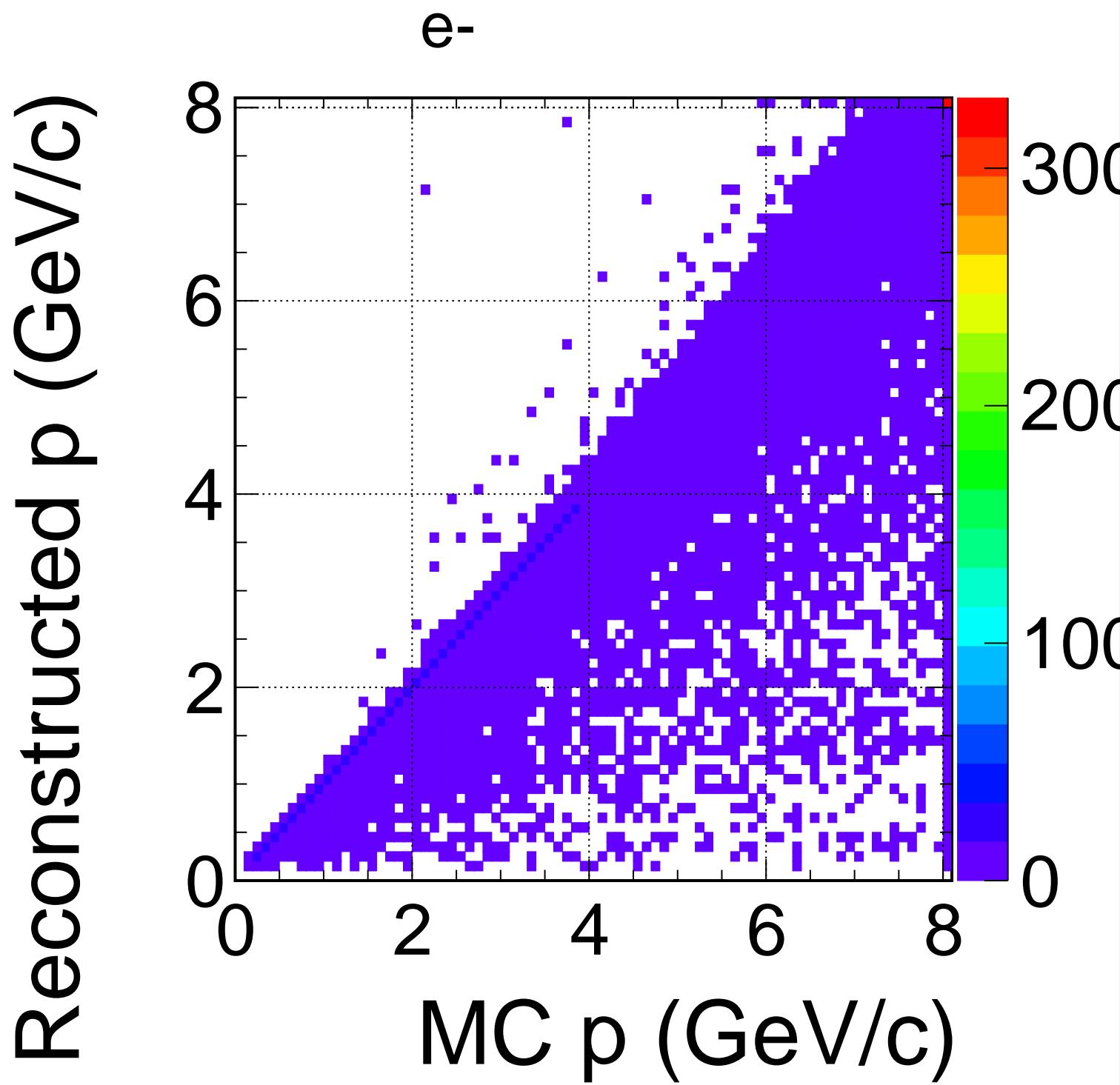
e-  
(PRIMARY,  $|\eta \sigma_{e^-}| < 2$  TPC)

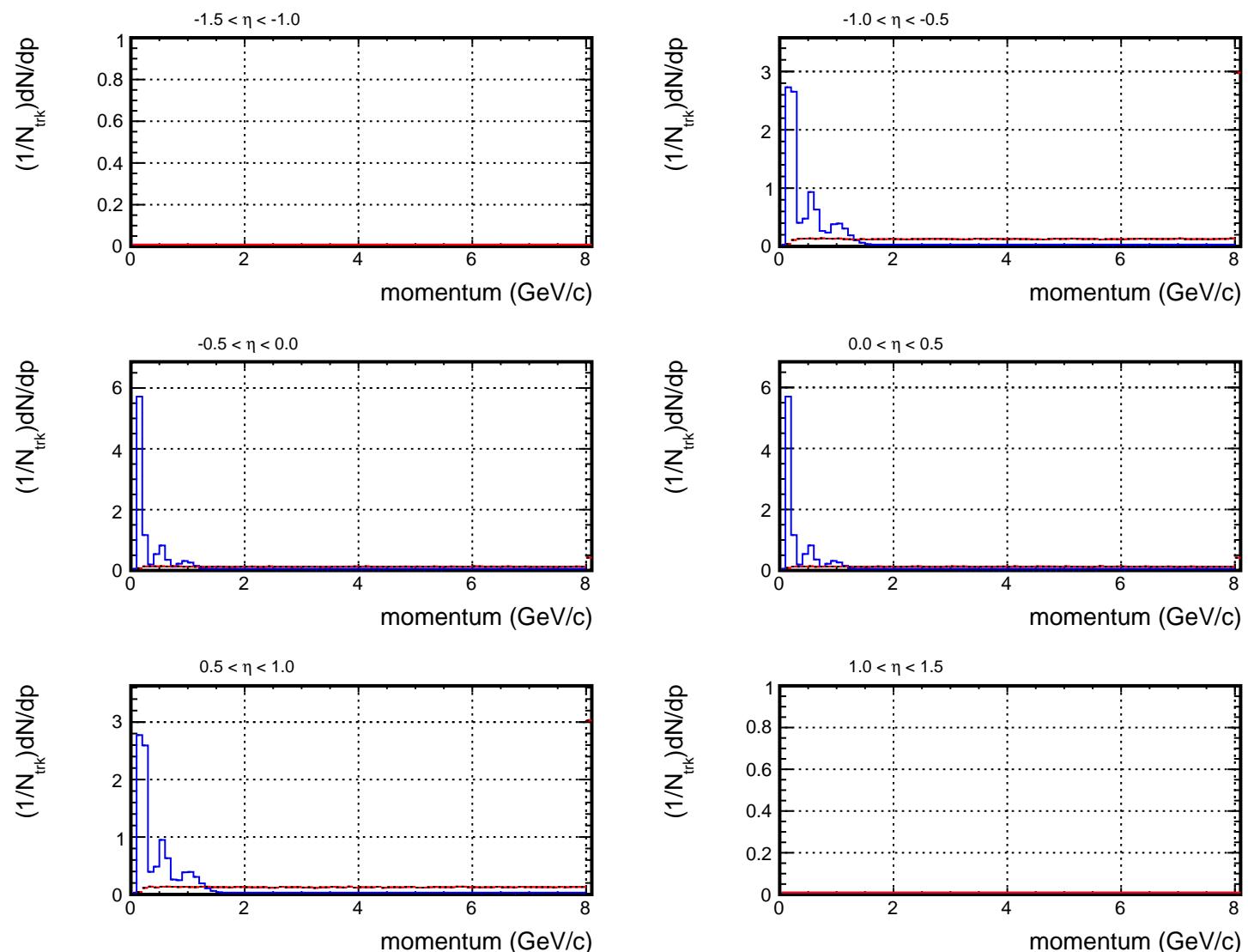
# Projection of $y$ for each $p_T$ bin

2.5 <  $p_T$  < 3.0 (GeV/c)3.0 <  $p_T$  < 3.5 (GeV/c)3.5 <  $p_T$  < 4.0 (GeV/c)4.0 <  $p_T$  < 4.5 (GeV/c)4.5 <  $p_T$  < 5.0 (GeV/c)

- e- (MATCHED, geantid=3)
- e- (PRIMARY, | $n \sigma_{e^-}| < 2$  TPC)

Reconstructed momentum vs MC momentum



Projection of p for each  $\eta$  bin

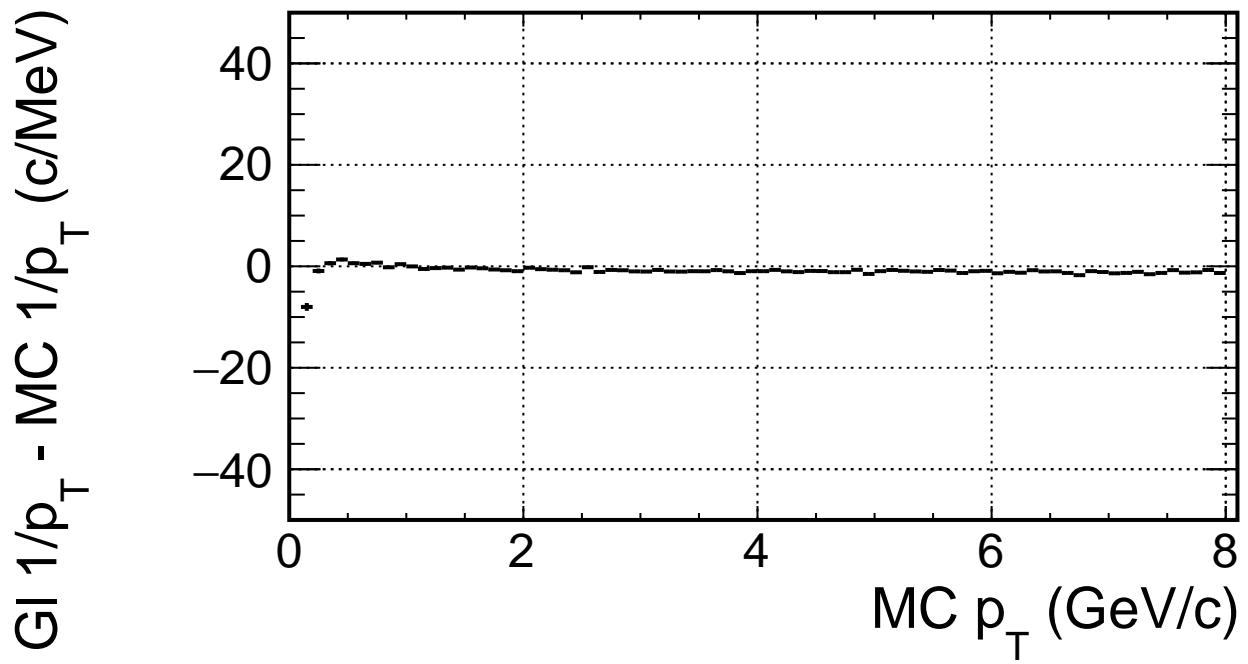
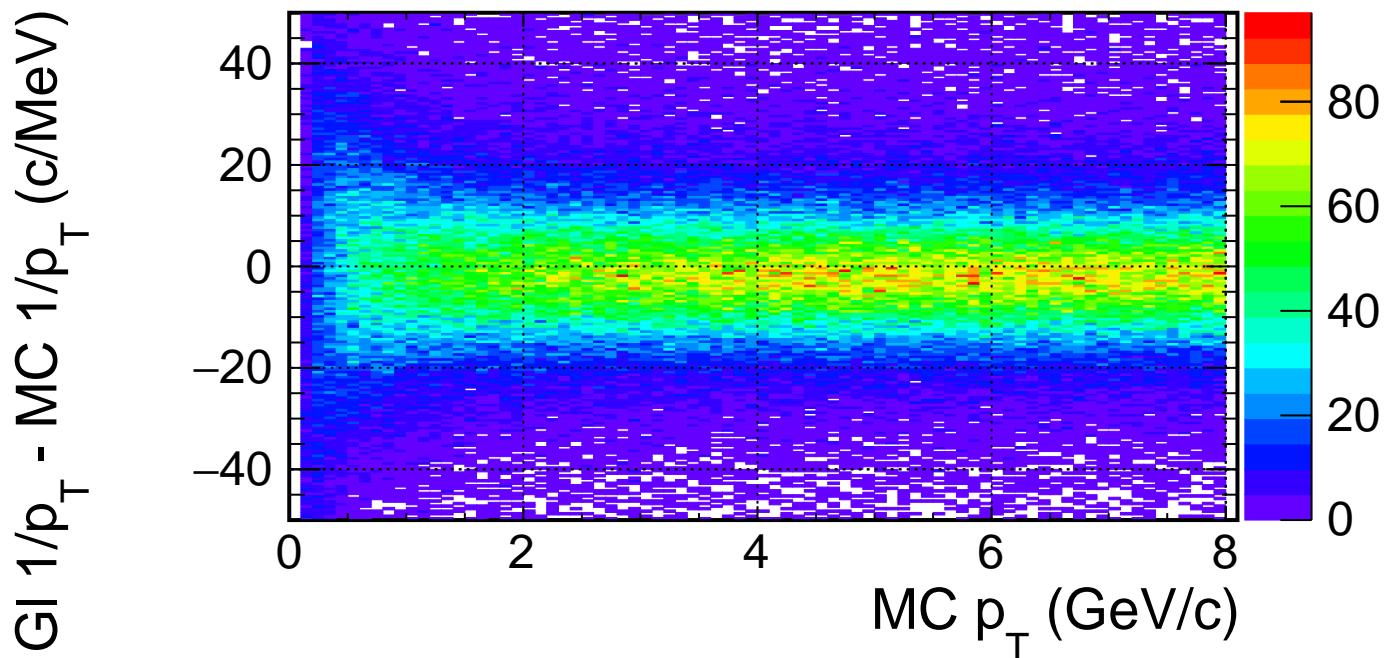
e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|n \sigma_e| < 2$  TPC)

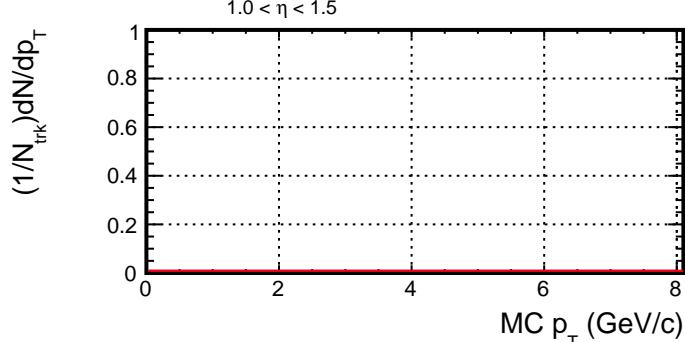
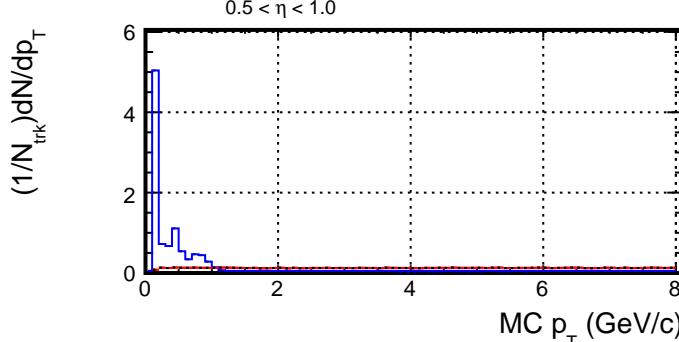
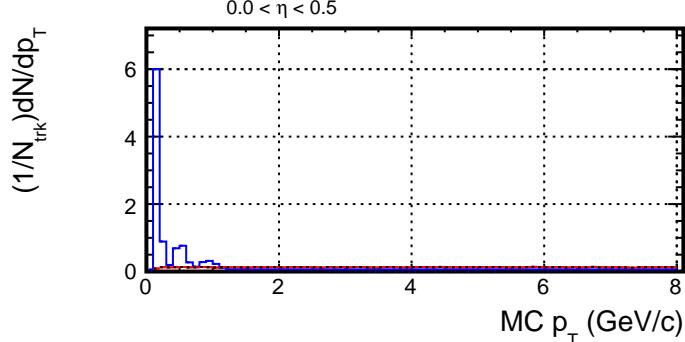
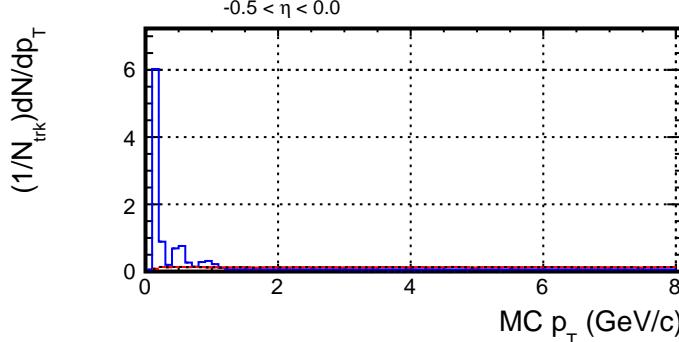
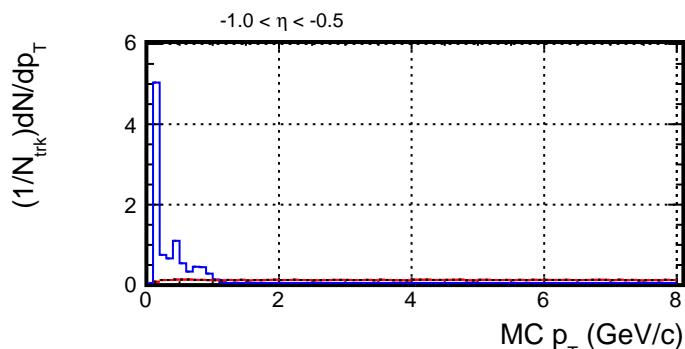
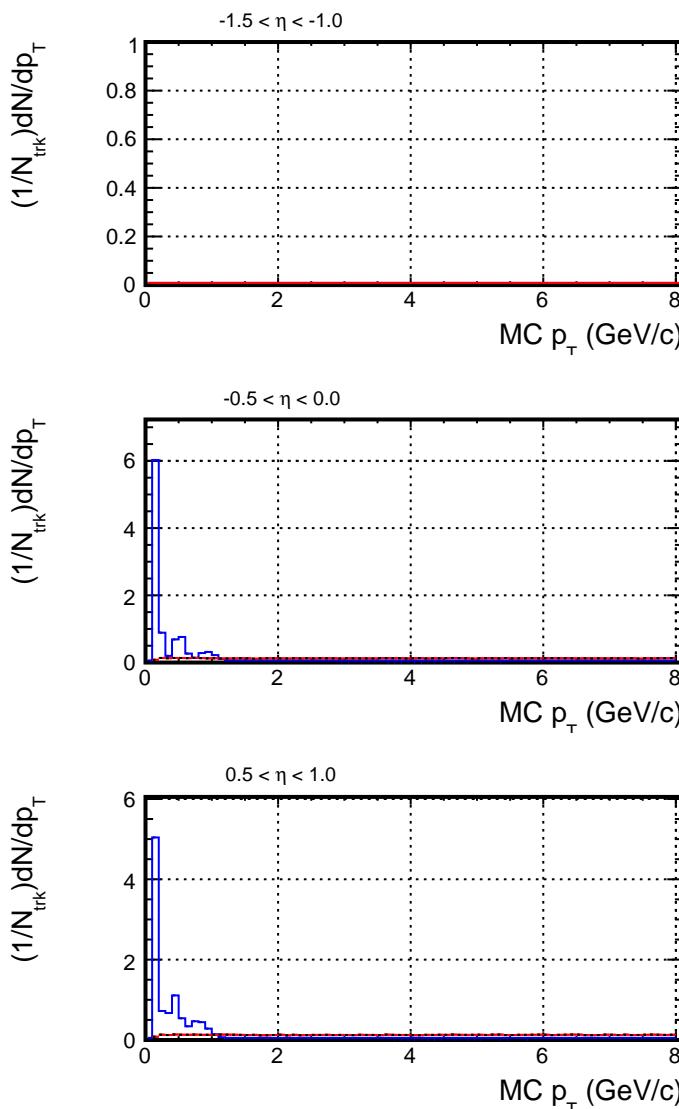
$N_{\text{events}}=24.83$  K, MC=e-, embeddingQa.mc, (0)

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$1/p_T (\text{GI}) - 1/p_T (\text{MC})$  vs  $p_T (\text{MC})$  (e-)

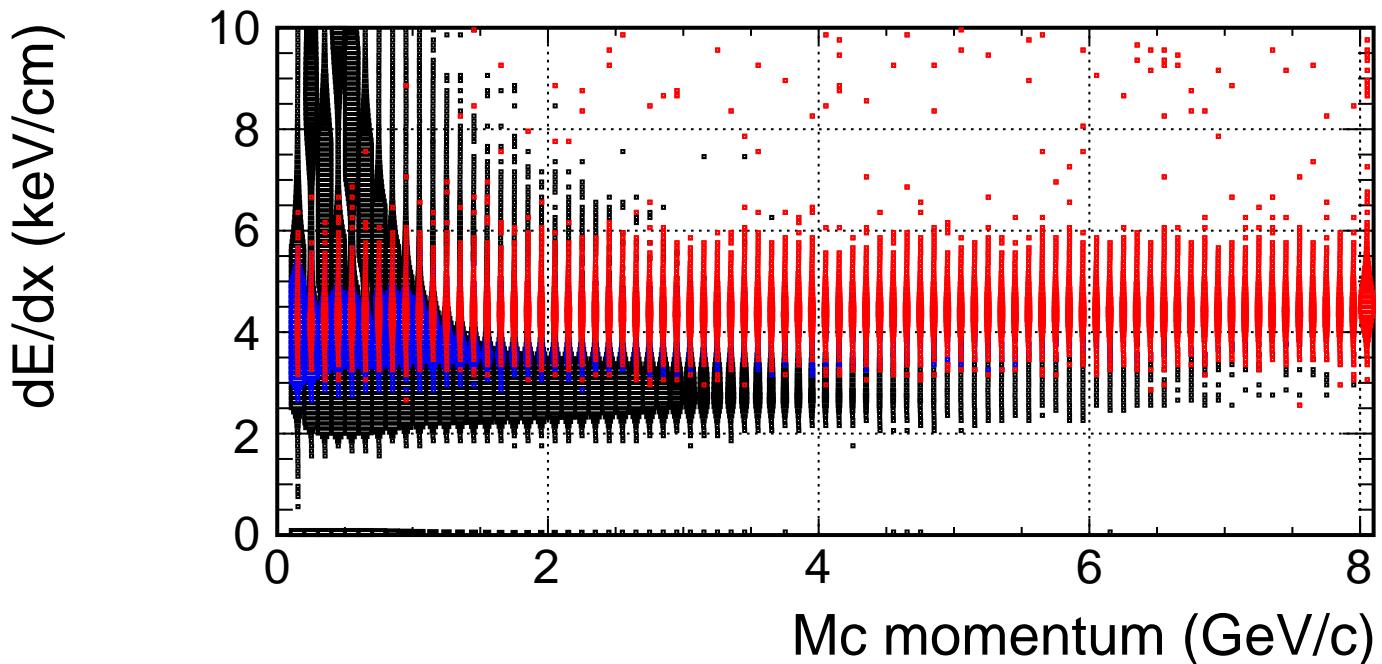


# Projection of $p_T$ for each $\eta$ bin



— e-  
 (MATCHED, geantid=3)  
  
— e-  
 (PRIMARY,  $|\eta \sigma_e| < 2$  TPC)

## dE/dx vs momentum (Embedding:e-, Real:e-)

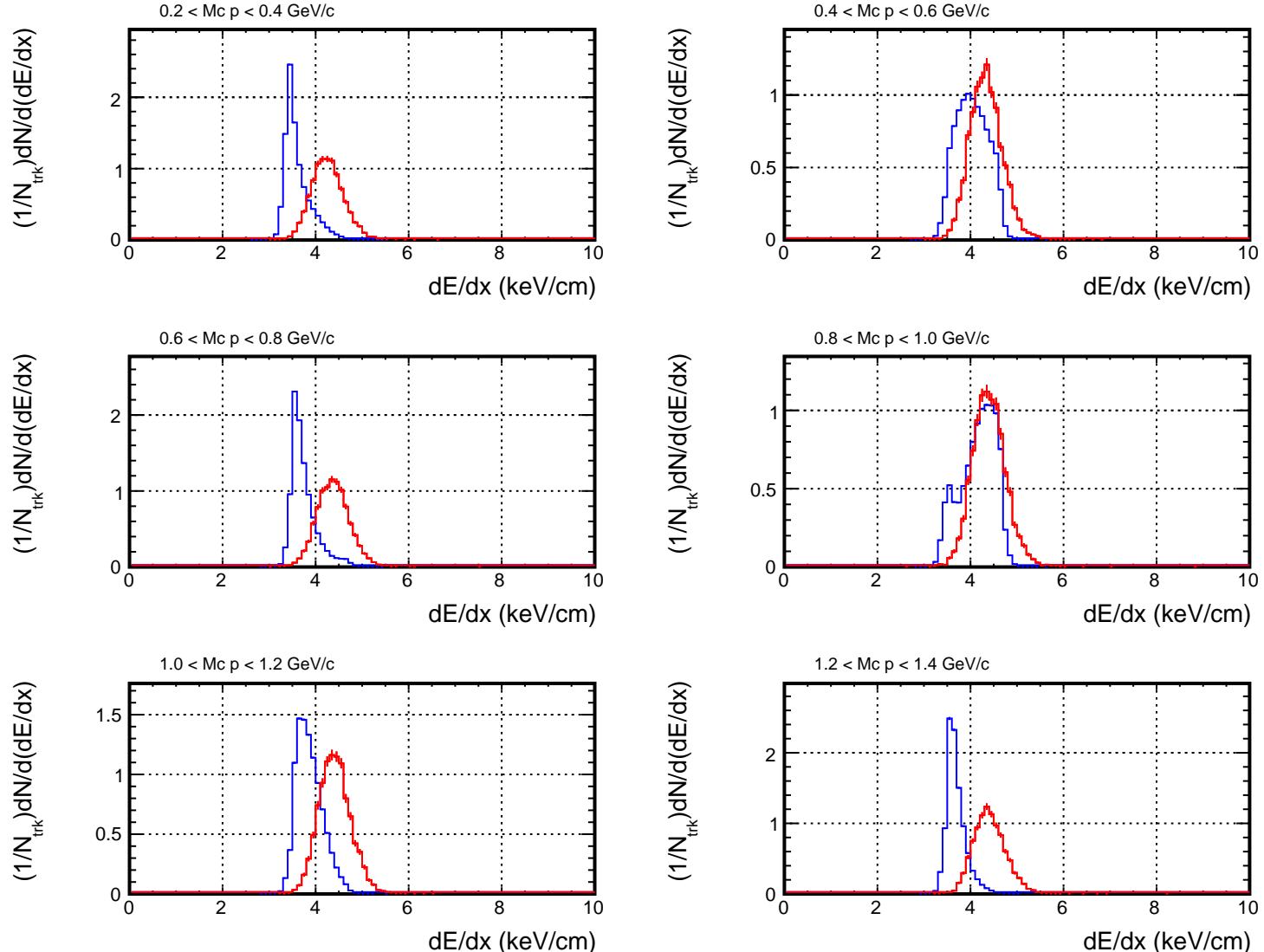


— e- (MATCHED, geantid=3)

— Real data

— Real data with PID cut ( $\sigma < 2$ ) TPC

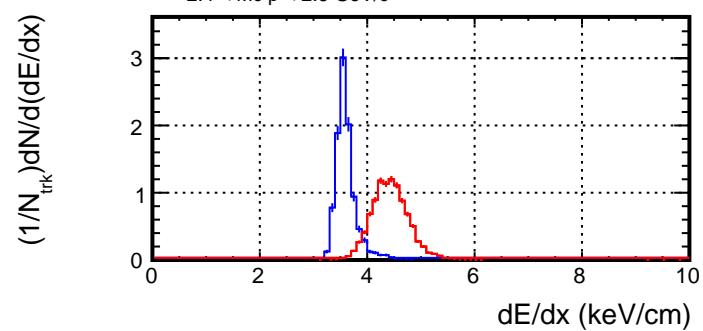
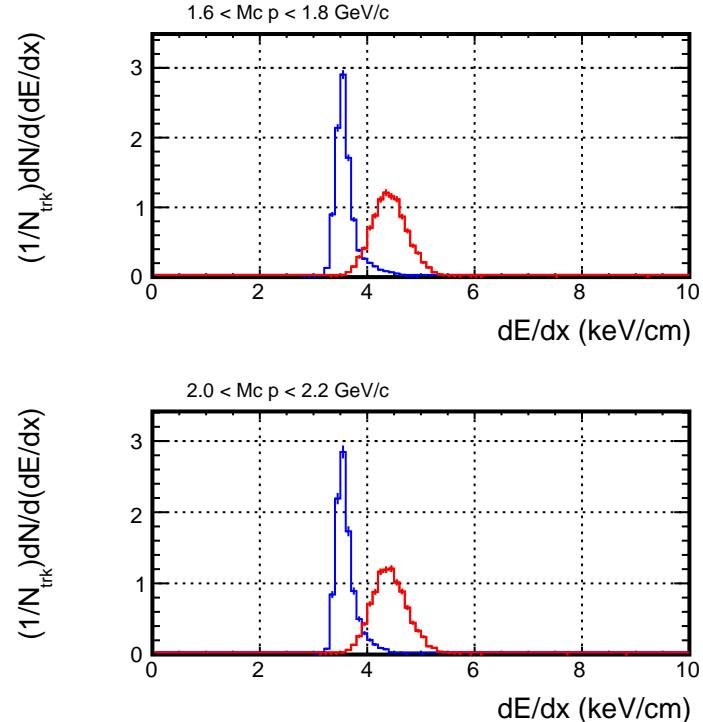
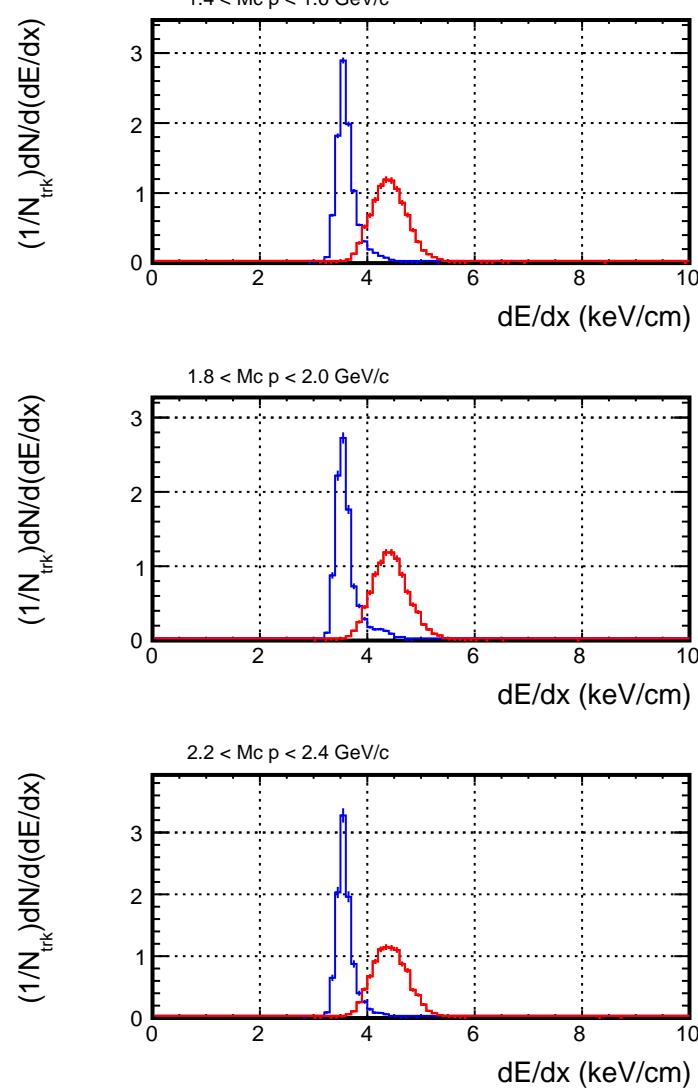
## Projection of dE/dx for each p bin



e-  
(MATCHED, geantid=3)

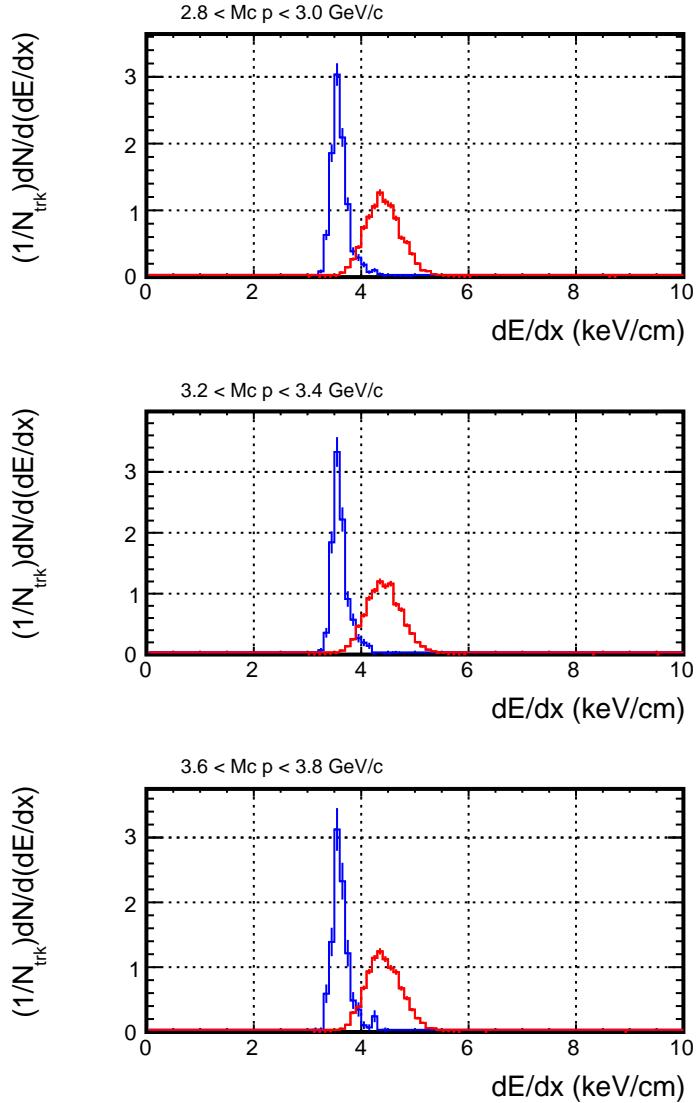
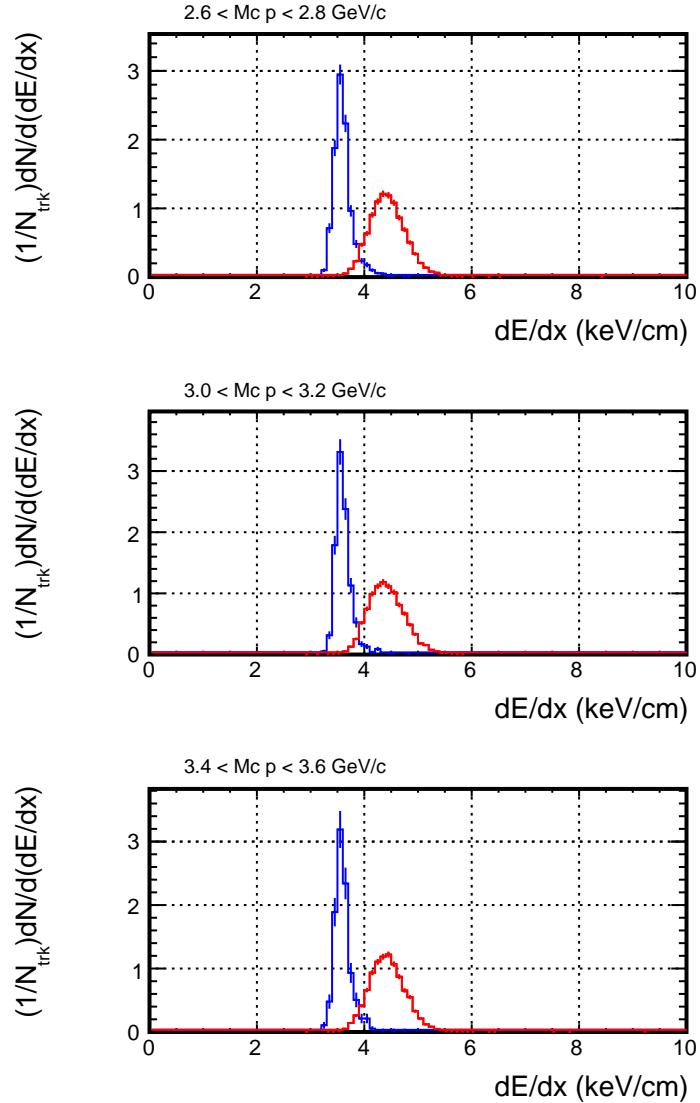
e-  
(PRIMARY,  $|n\sigma_e| < 2$  TPC)

## Projection of dE/dx for each p bin



e-  
— (MATCHED, geantid=3)

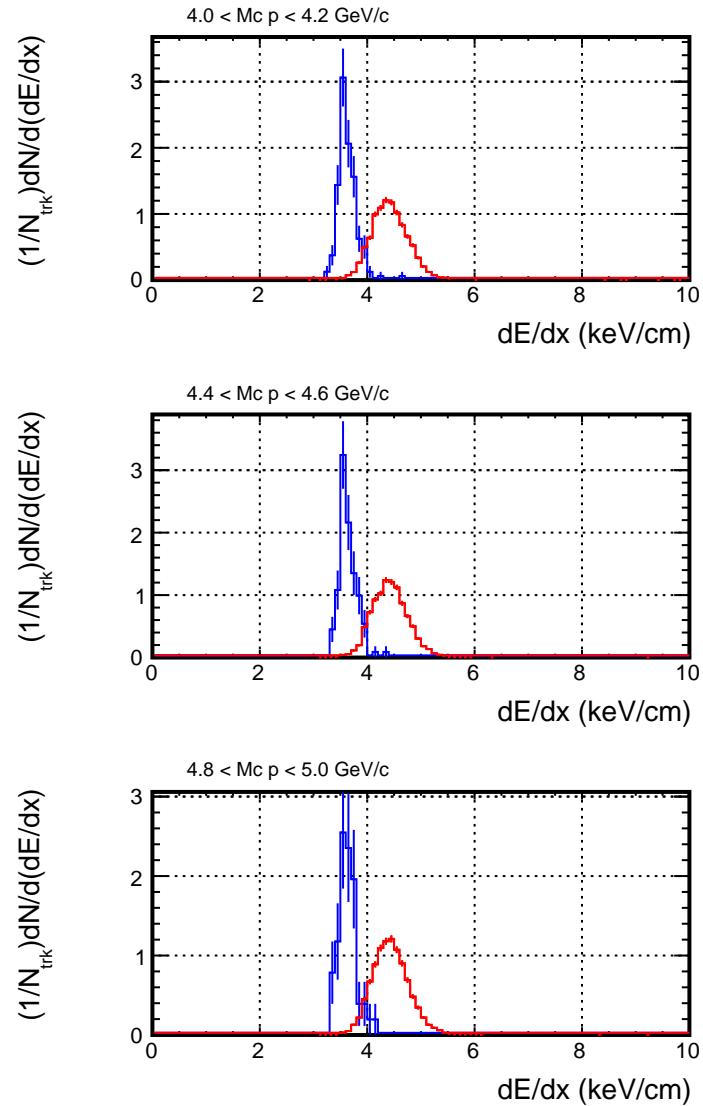
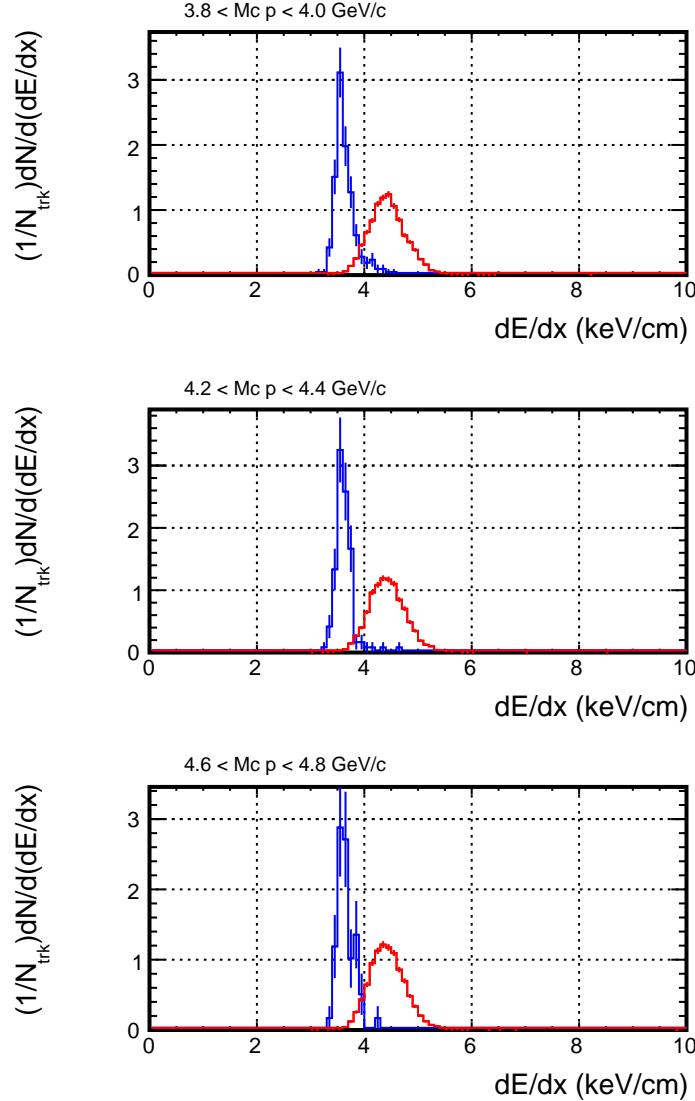
e-  
— (PRIMARY,  $|\eta \sigma_e| < 2$  TPC)

Projection of  $dE/dx$  for each p bin

e-  
(MATCHED, geantid=3)

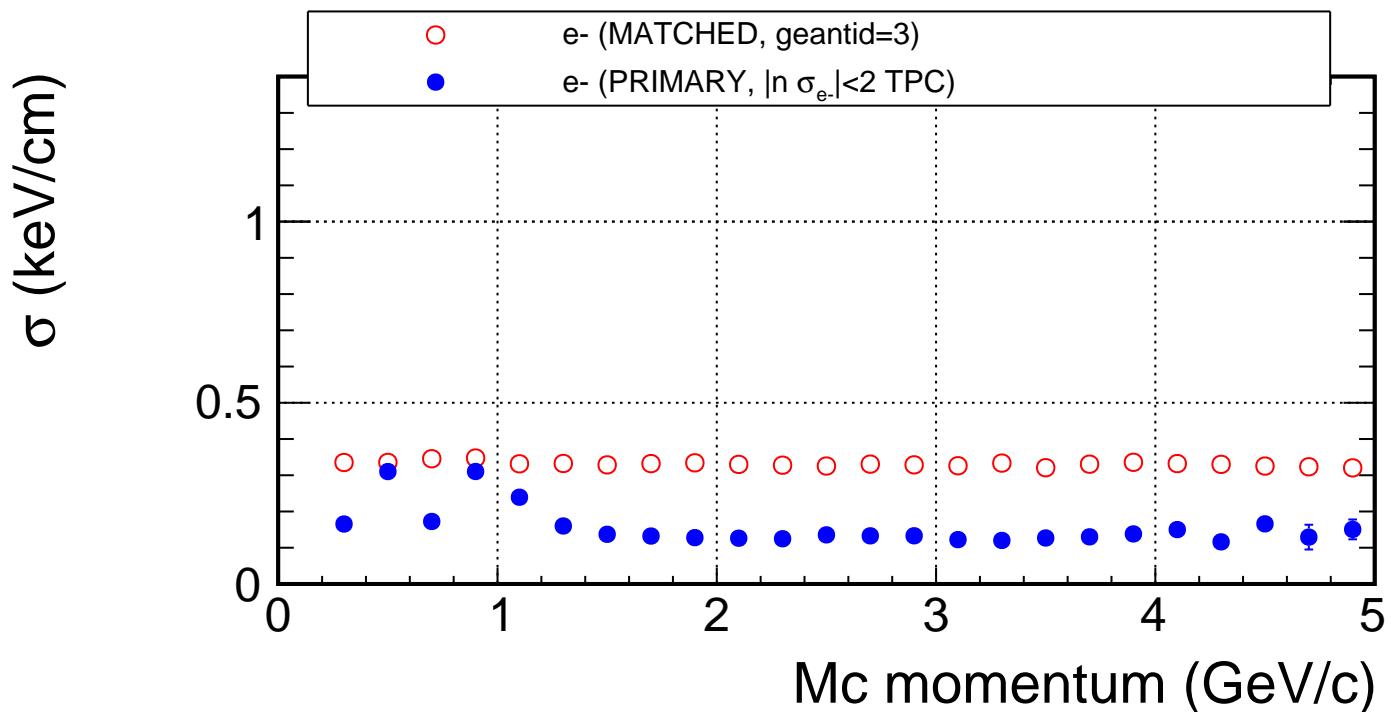
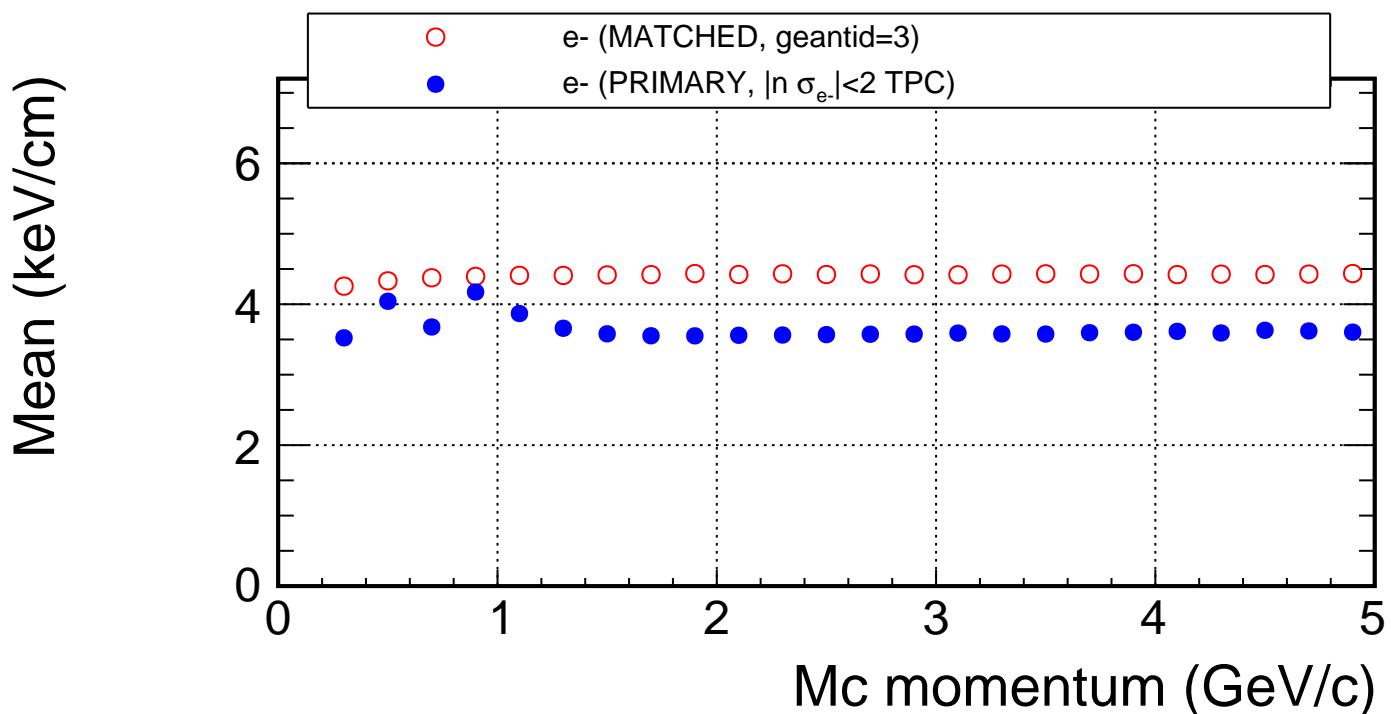
e-  
(PRIMARY,  $|\eta \sigma_e| < 2$  TPC)

## Projection of dE/dx for each p bin

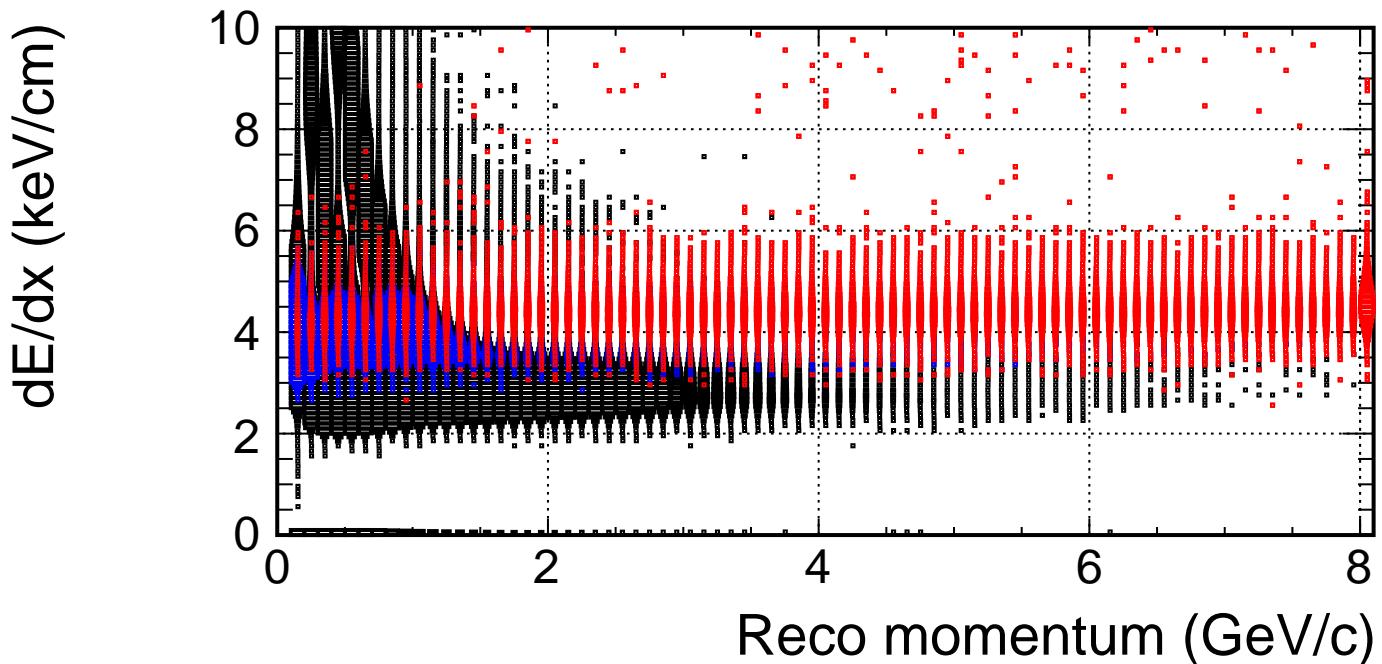


e-  
 (MATCHED, geantid=3)

e-  
 (PRIMARY,  $|\eta \sigma_e| < 2$  TPC)

Mean/ $\sigma$  of dE/dx vs momentum

## dE/dx vs momentum (Embedding:e-, Real:e-)

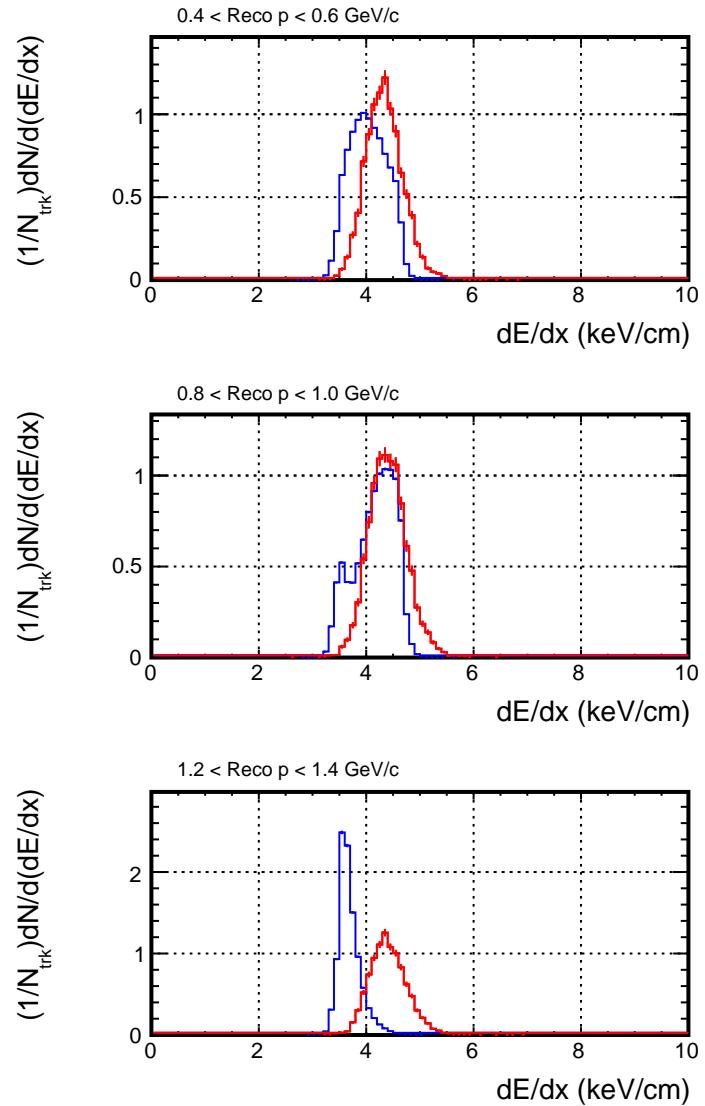
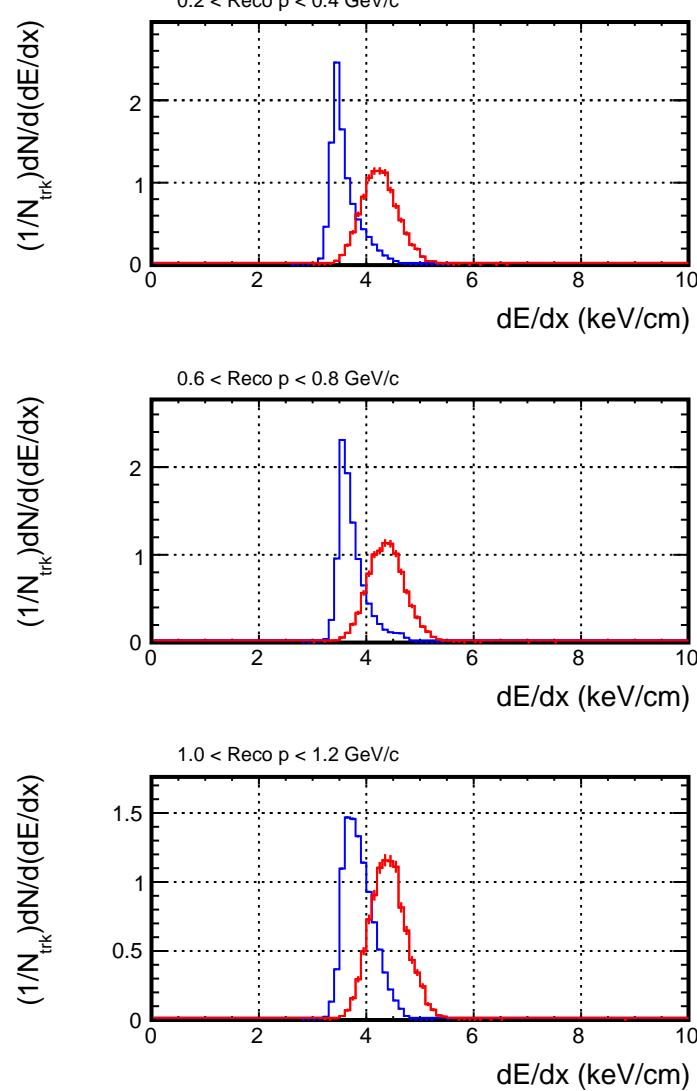


— e- (MATCHED, geantid=3)

— Real data

— Real data with PID cut ( $\sigma < 2$ ) TPC

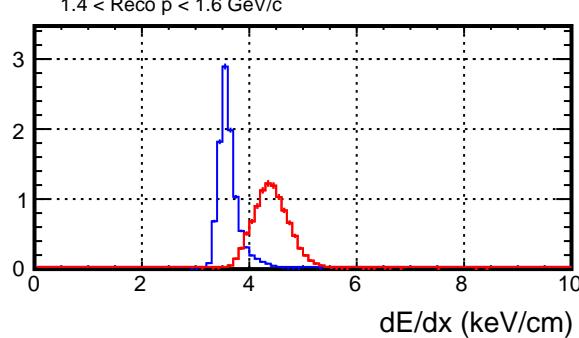
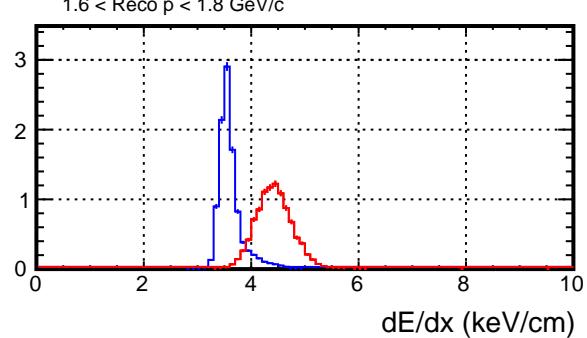
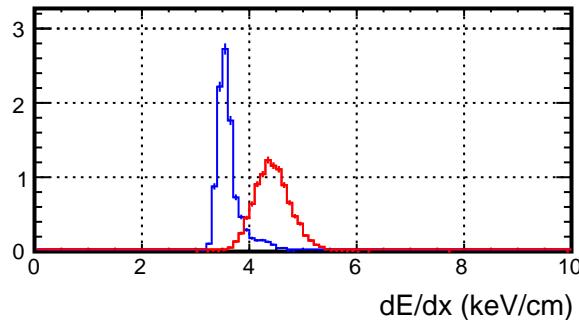
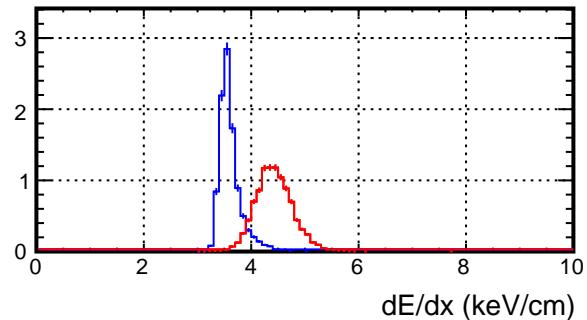
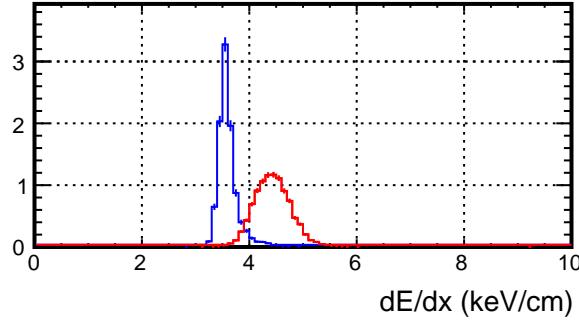
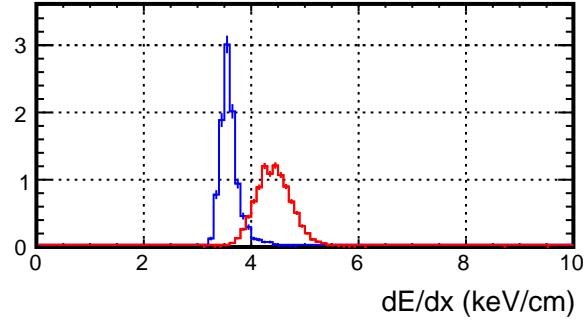
## Projection of dE/dx for each p bin



e-  
(MATCHED, geantid=3)

e-  
(PRIMARY, |n σ<sub>e</sub>|<2 TPC)

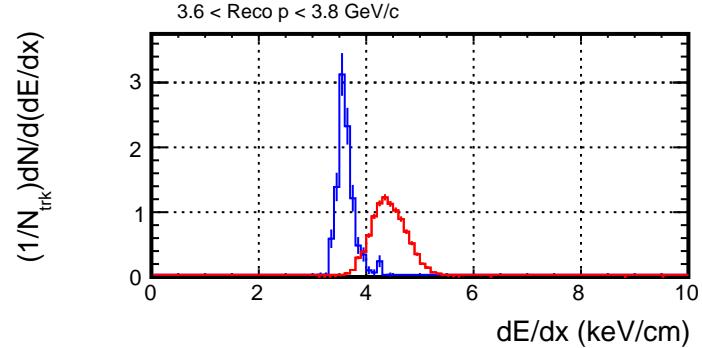
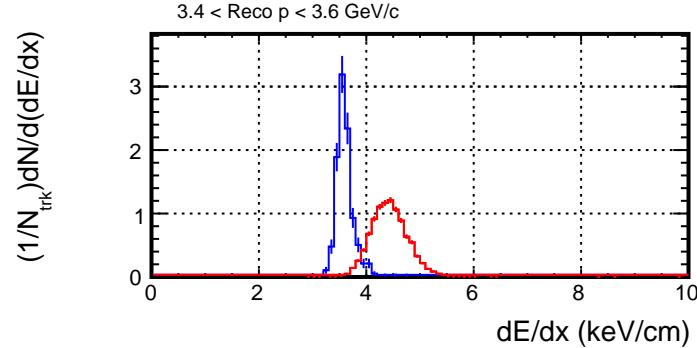
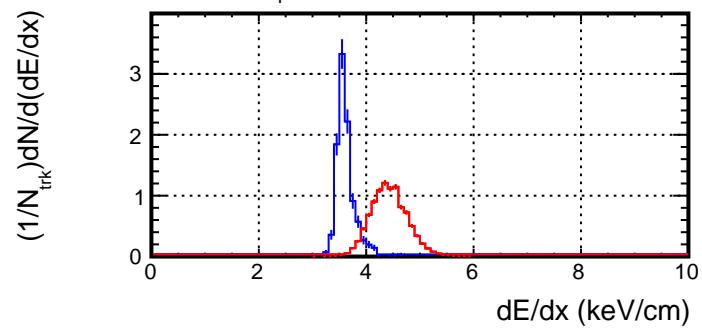
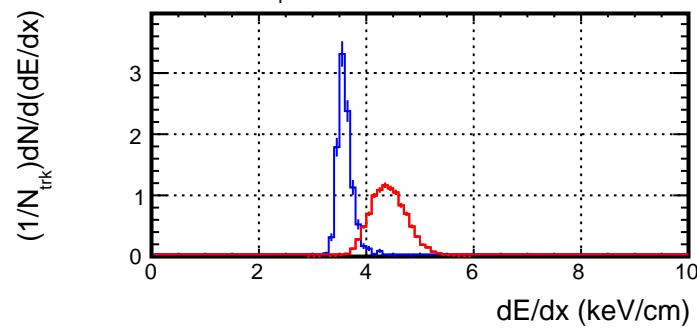
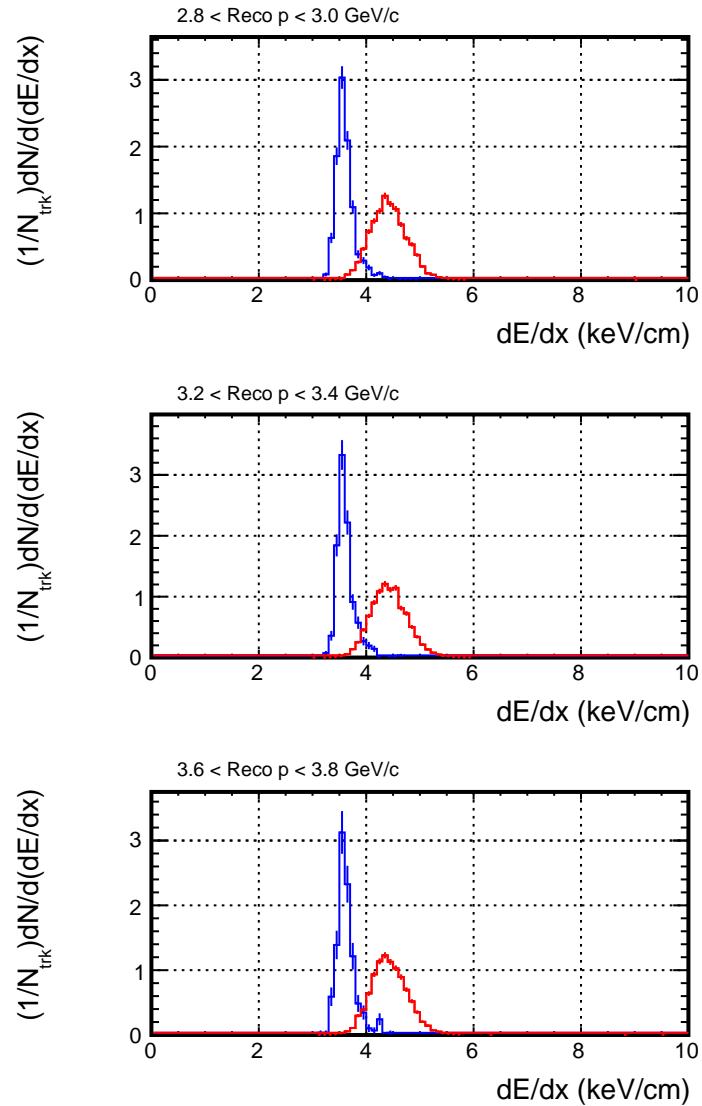
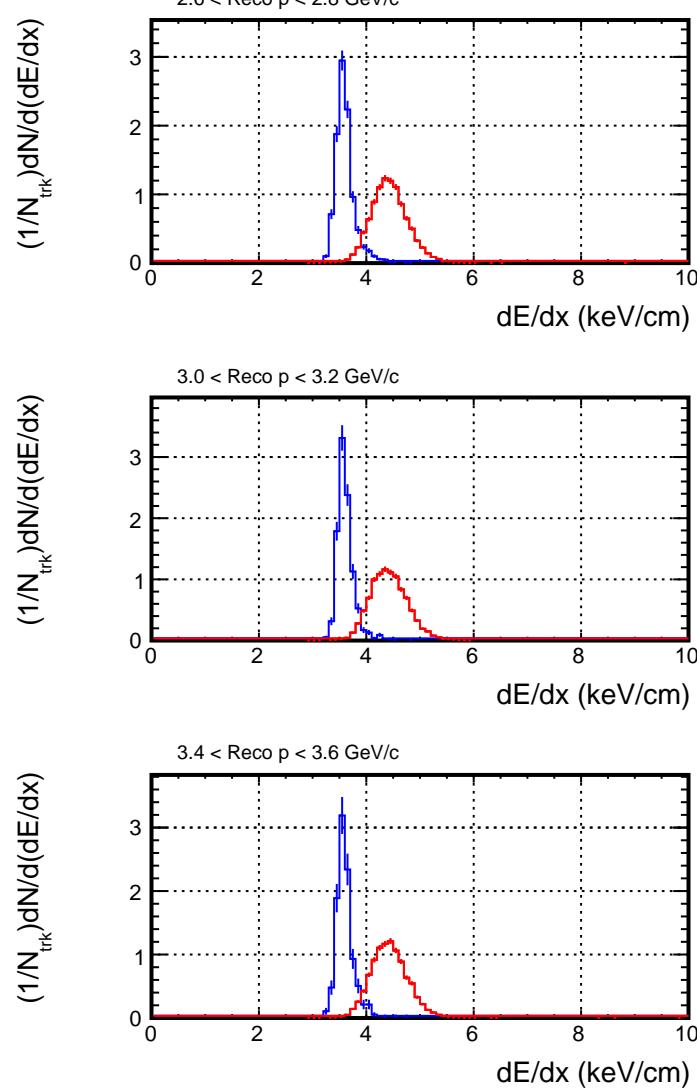
## Projection of dE/dx for each p bin

 $(1/N_{\text{trk}})dN/d(dE/dx)$  $1.4 < \text{Reco } p < 1.6 \text{ GeV}/c$  $(1/N_{\text{trk}})dN/d(dE/dx)$  $1.6 < \text{Reco } p < 1.8 \text{ GeV}/c$  $(1/N_{\text{trk}})dN/d(dE/dx)$  $1.8 < \text{Reco } p < 2.0 \text{ GeV}/c$  $(1/N_{\text{trk}})dN/d(dE/dx)$  $2.0 < \text{Reco } p < 2.2 \text{ GeV}/c$  $(1/N_{\text{trk}})dN/d(dE/dx)$  $2.2 < \text{Reco } p < 2.4 \text{ GeV}/c$  $(1/N_{\text{trk}})dN/d(dE/dx)$  $2.4 < \text{Reco } p < 2.6 \text{ GeV}/c$ 

e-  
 (MATCHED, geantid=3)

e-  
 (PRIMARY,  $|\eta \sigma_e| < 2$  TPC)

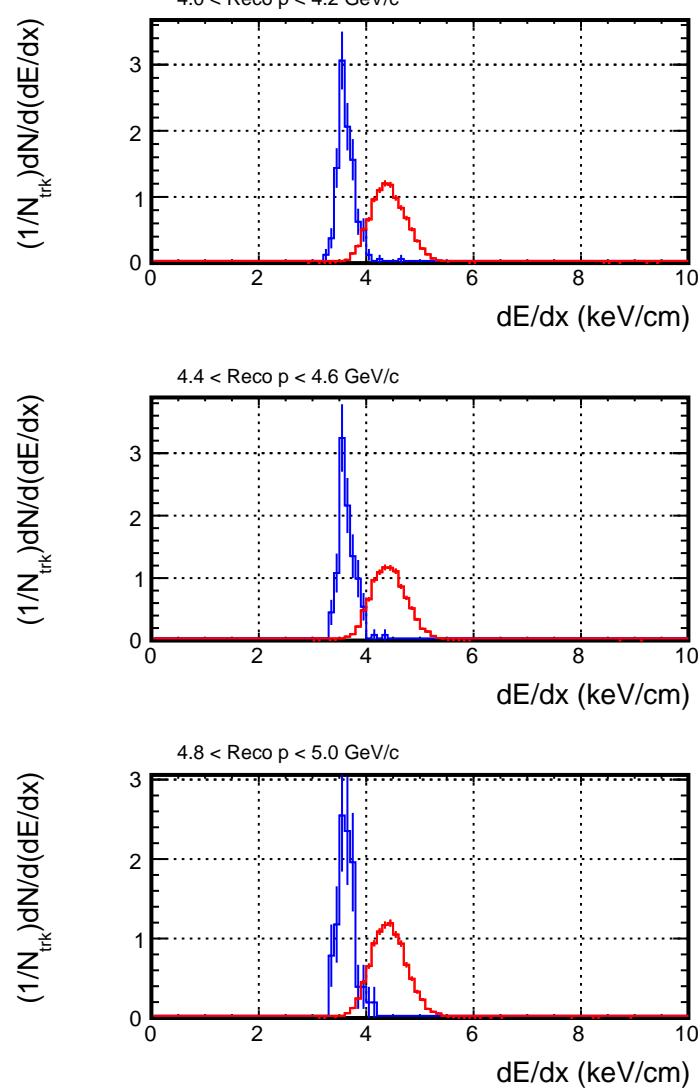
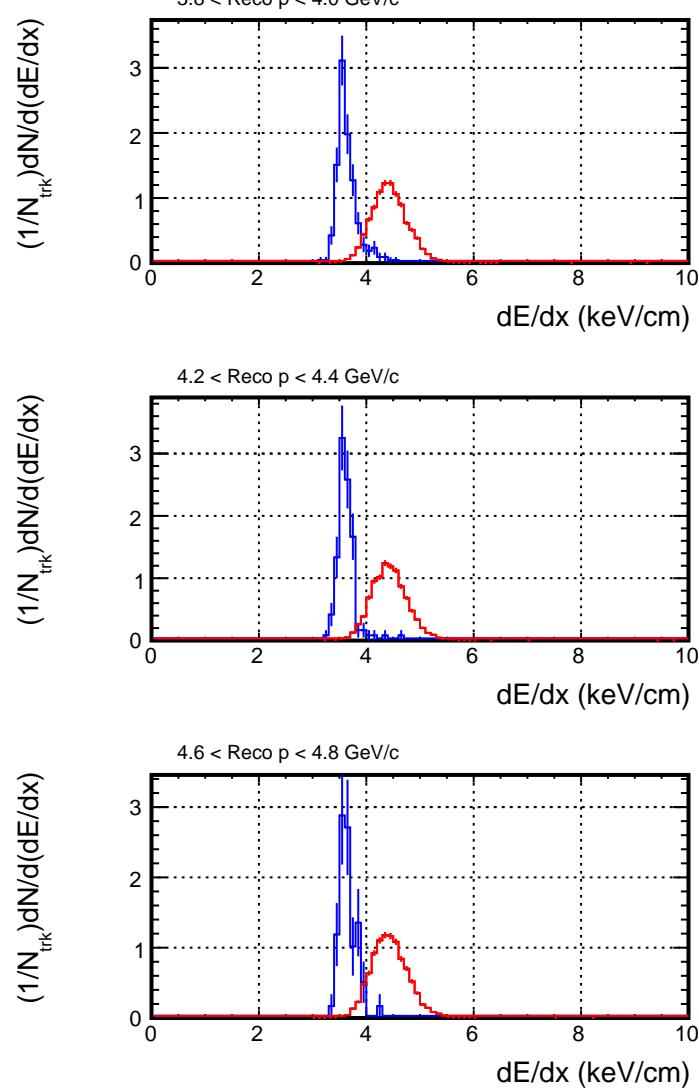
## Projection of dE/dx for each p bin



e-  
(MATCHED, geantid=3)

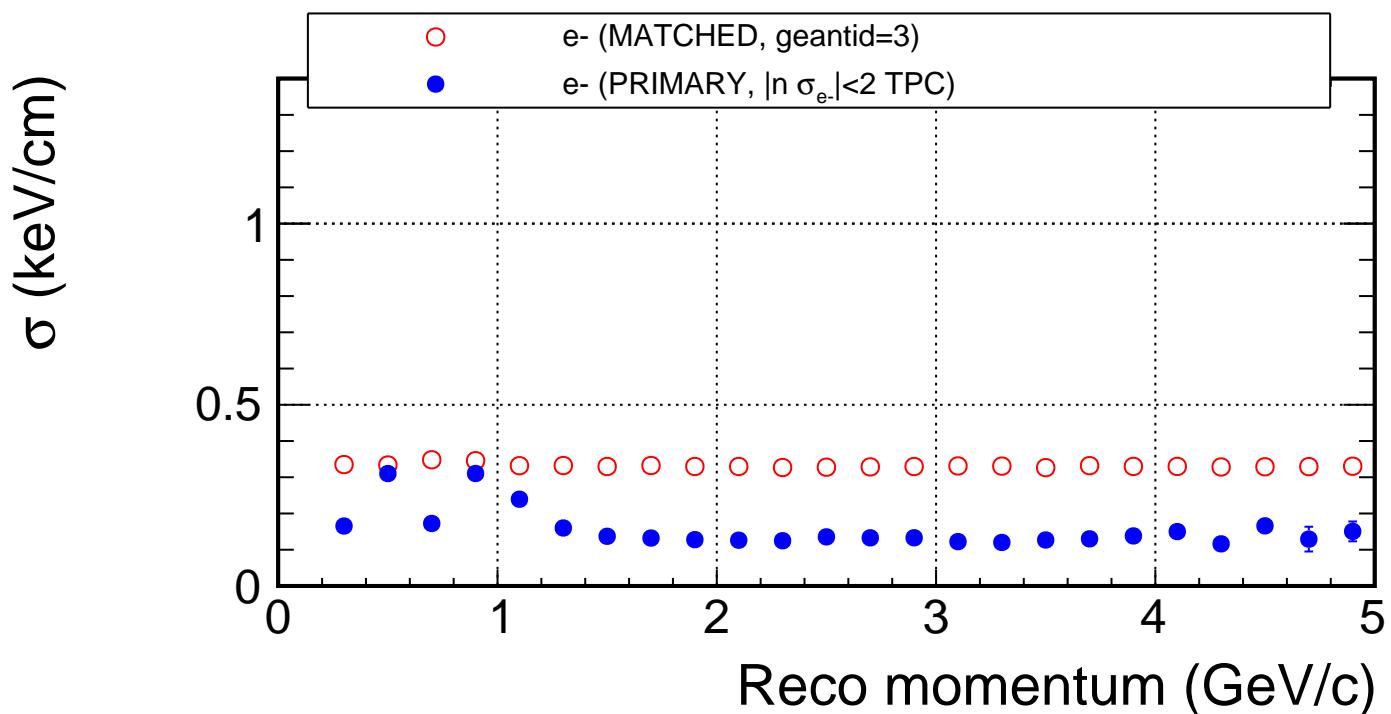
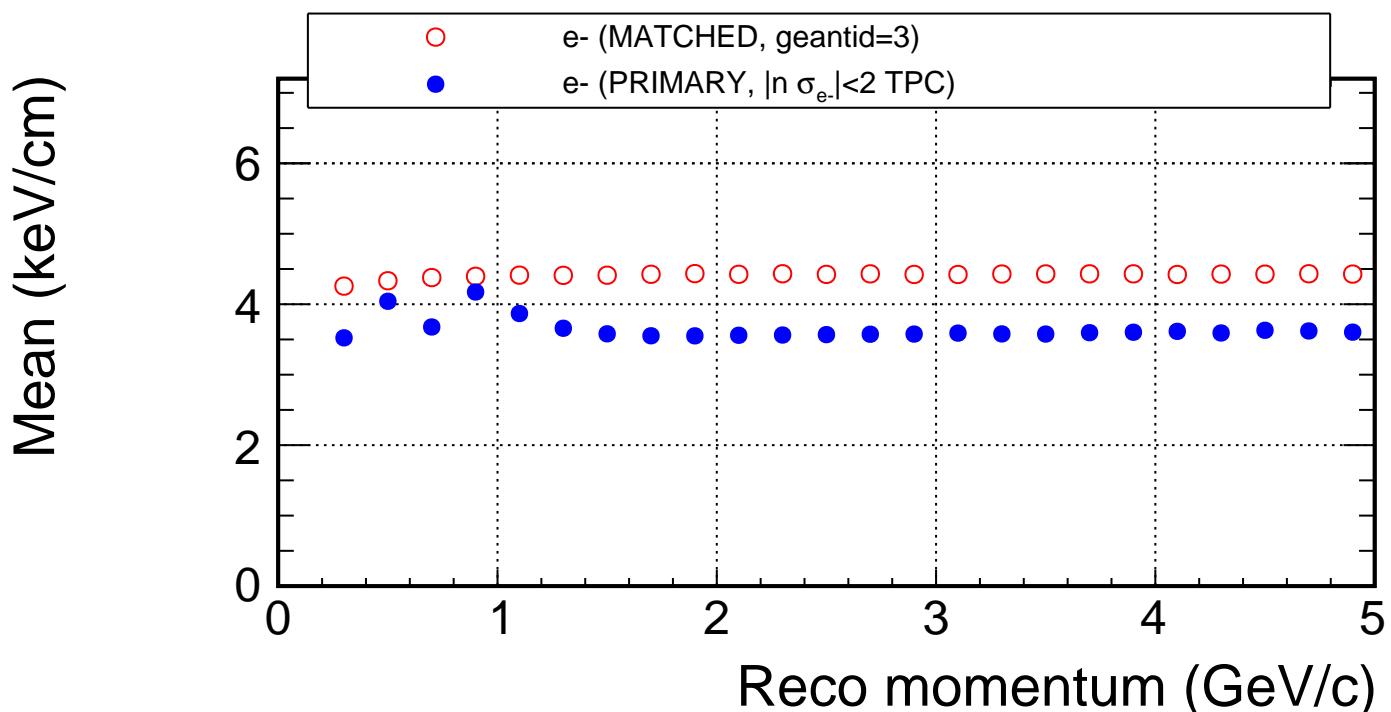
e-  
(PRIMARY, | $\sigma_e$ |<2 TPC)

## Projection of dE/dx for each p bin

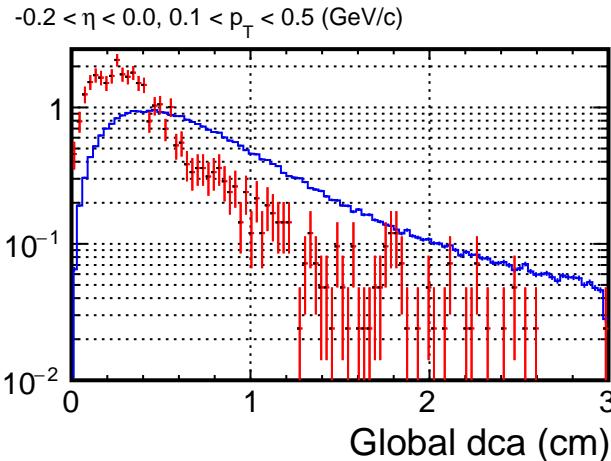
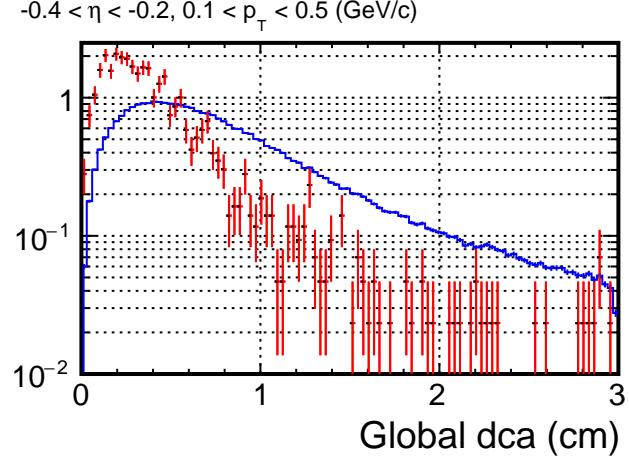
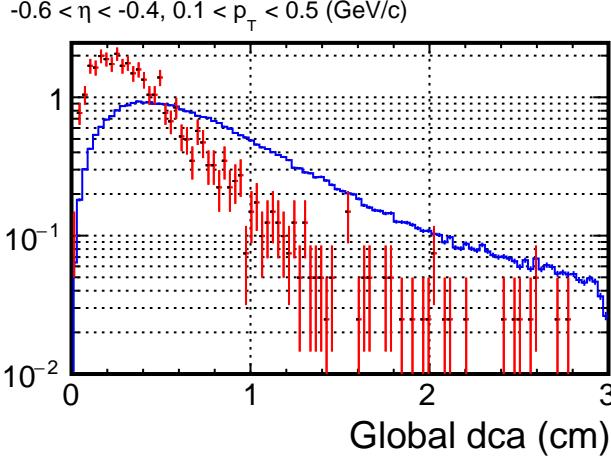
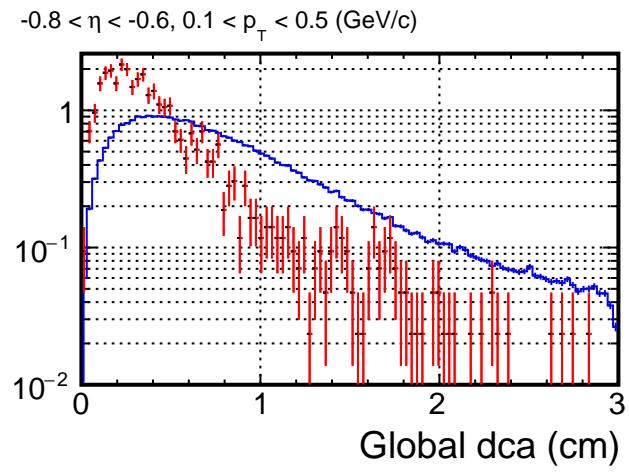
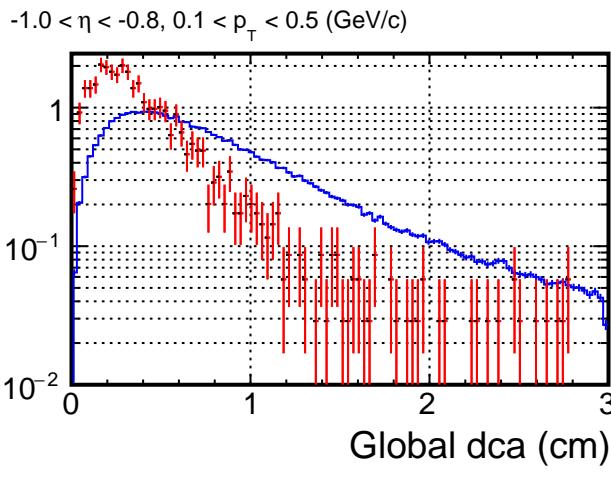


e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|n \sigma_e| < 2 \text{ TPC}$ )

Mean/ $\sigma$  of dE/dx vs momentum

## Dca distribution for ( $p_T$ , $\eta$ ) slices

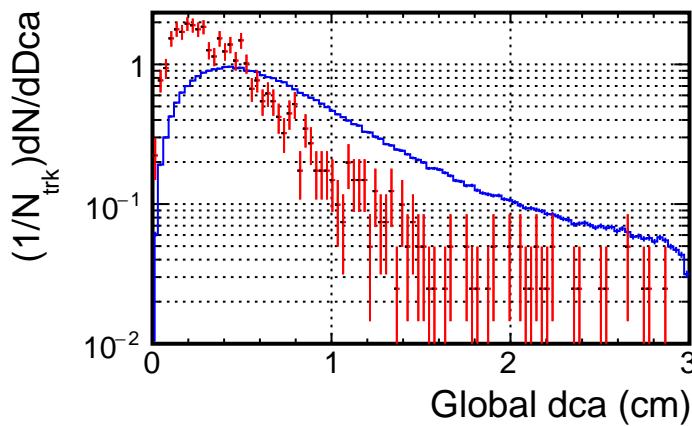


e-  
(MATCHED, geantid=3)

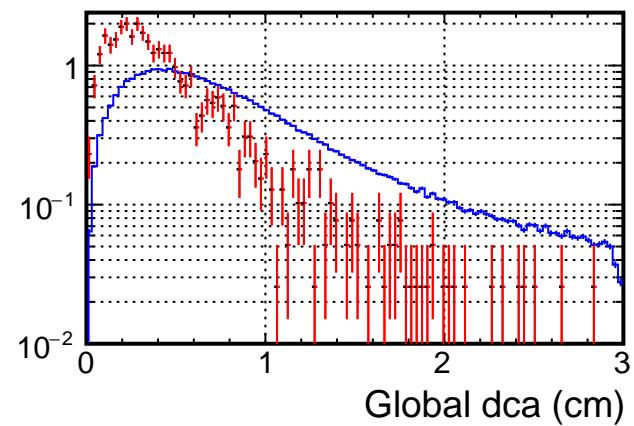
e-  
(PRIMARY, |n  $\sigma_{e^-}| < 2$  TPC)

## Dca distribution for ( $p_T$ , $\eta$ ) slices

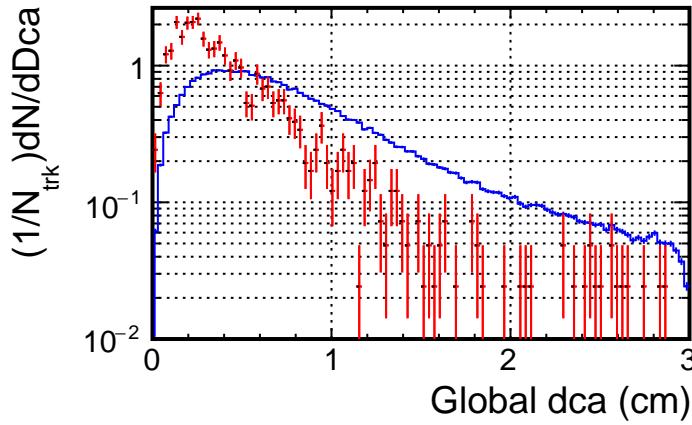
$0.0 < \eta < 0.2, 0.1 < p_T < 0.5$  (GeV/c)



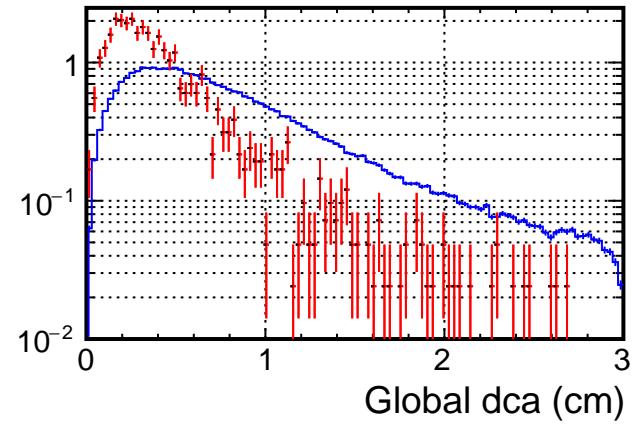
$0.2 < \eta < 0.4, 0.1 < p_T < 0.5$  (GeV/c)



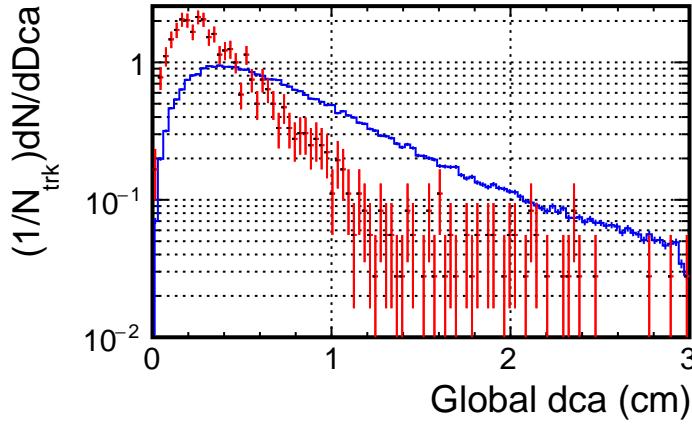
$0.4 < \eta < 0.6, 0.1 < p_T < 0.5$  (GeV/c)



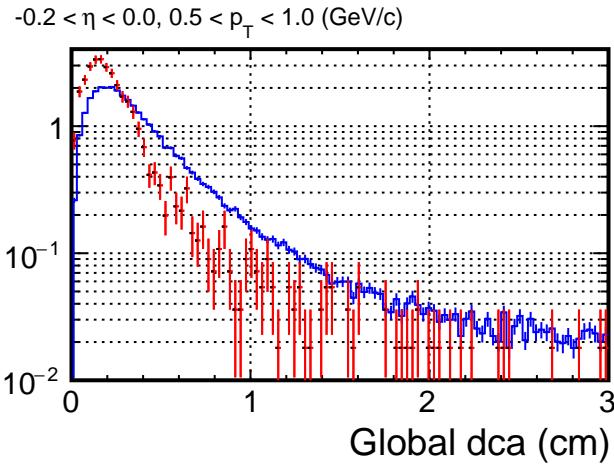
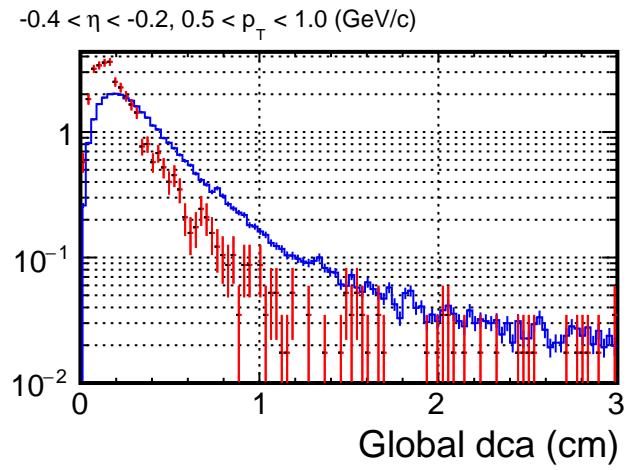
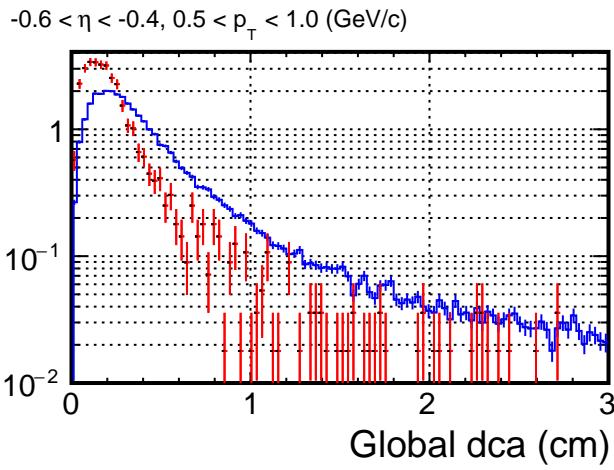
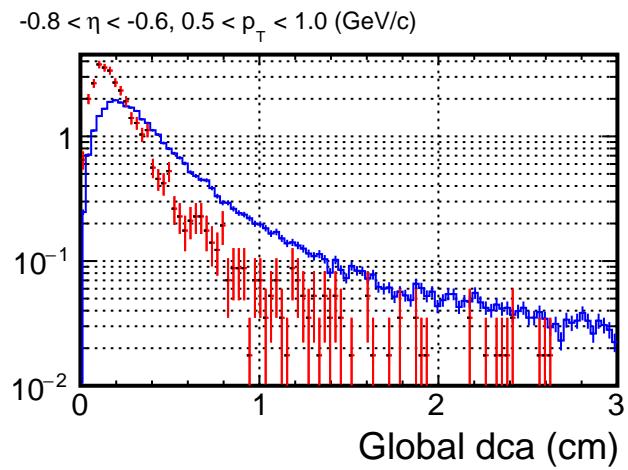
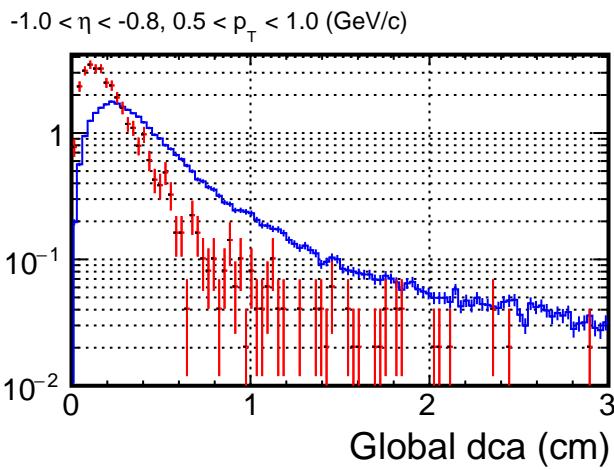
$0.6 < \eta < 0.8, 0.1 < p_T < 0.5$  (GeV/c)



$0.8 < \eta < 1.0, 0.1 < p_T < 0.5$  (GeV/c)



— e-  
(MATCHED, geantid=3)
  
— e-  
(PRIMARY,  $|n\sigma_{e^-}| < 2$  TPC)

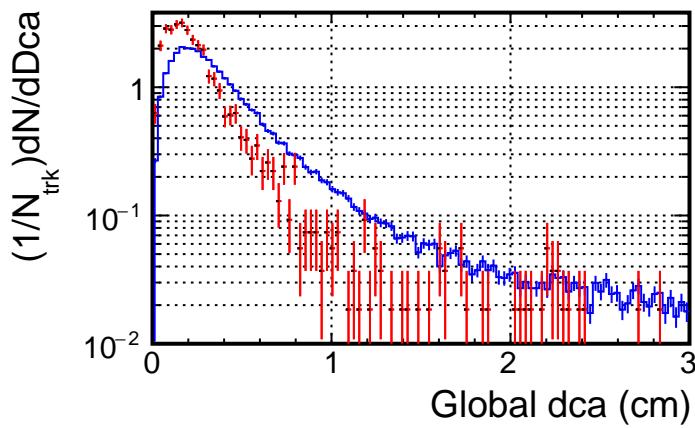
Dca distribution for ( $p_T$ ,  $\eta$ ) slices

e-  
(MATCHED, geantid=3)

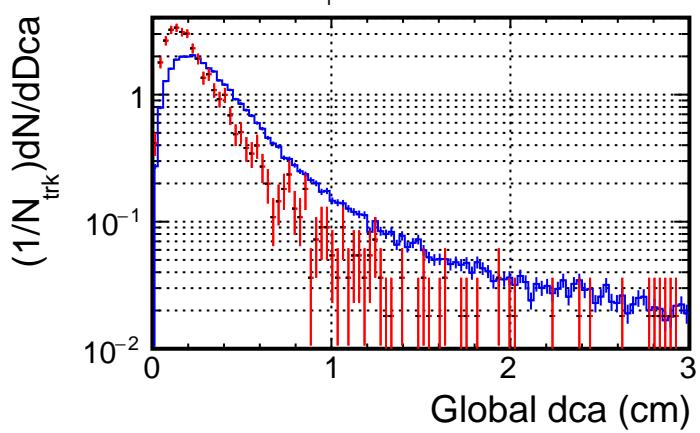
e-  
(PRIMARY, |n  $\sigma_{e^-}| < 2$  TPC)

## Dca distribution for ( $p_T$ , $\eta$ ) slices

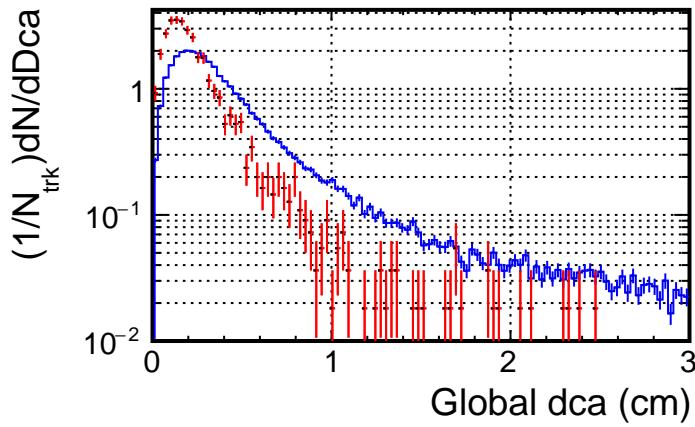
$0.0 < \eta < 0.2, 0.5 < p_T < 1.0$  (GeV/c)



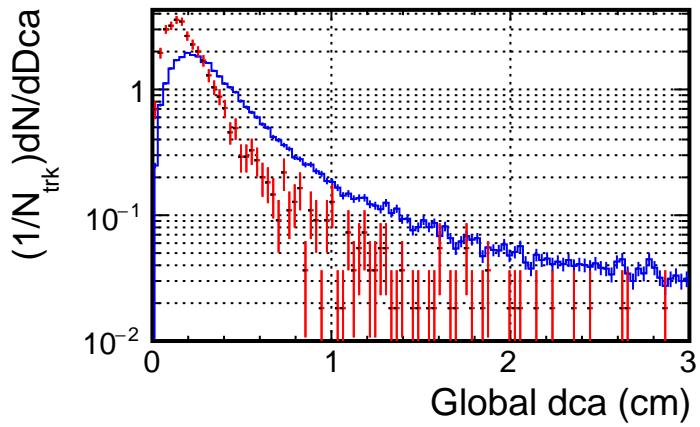
$0.2 < \eta < 0.4, 0.5 < p_T < 1.0$  (GeV/c)



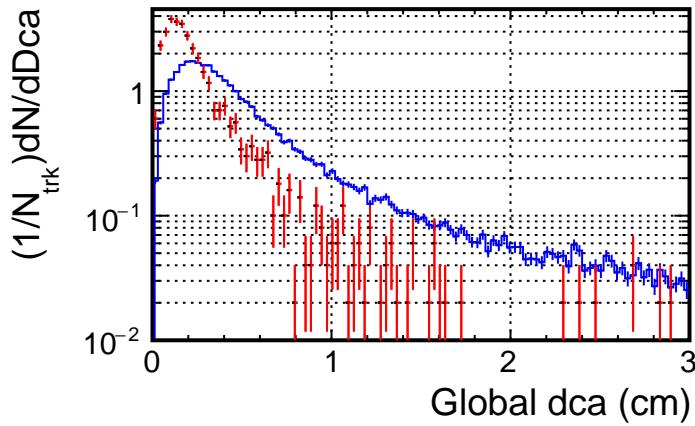
$0.4 < \eta < 0.6, 0.5 < p_T < 1.0$  (GeV/c)



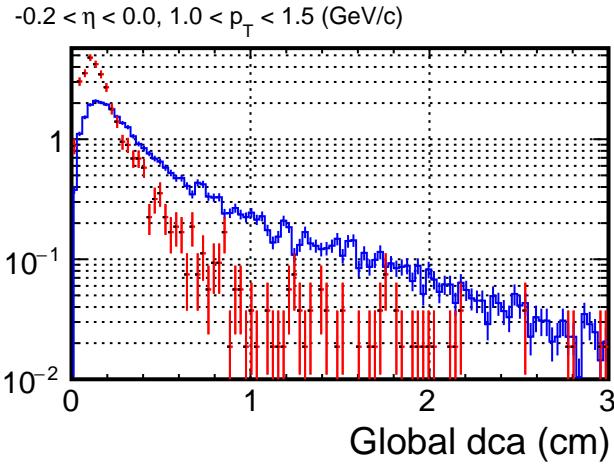
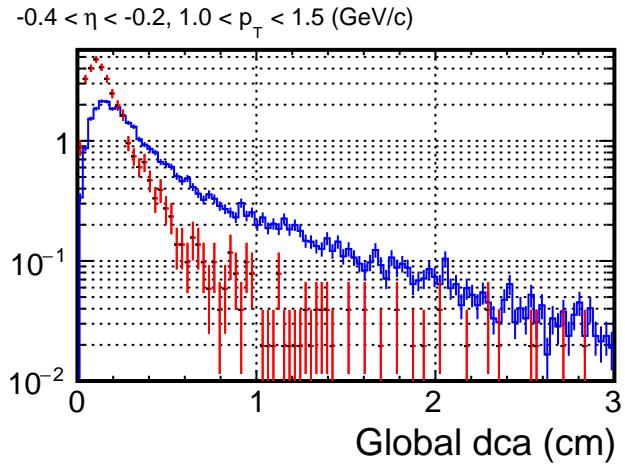
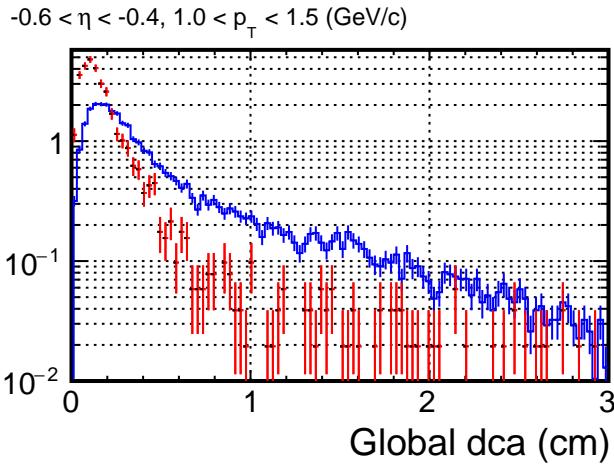
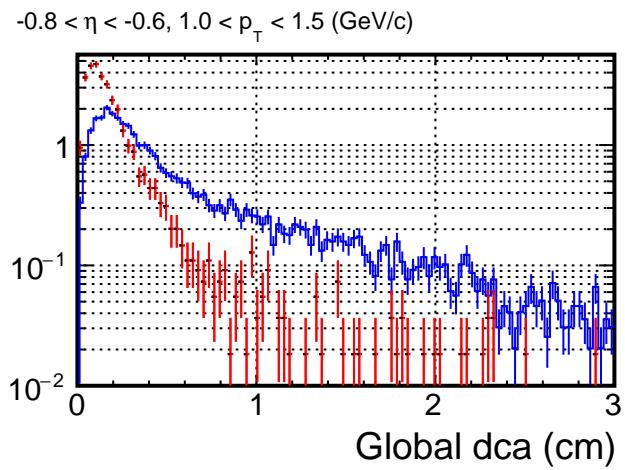
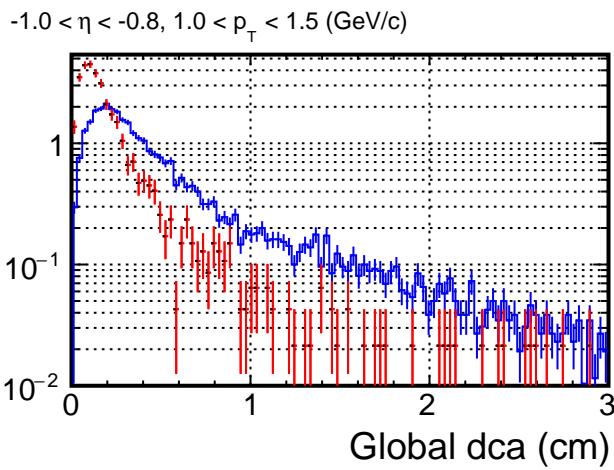
$0.6 < \eta < 0.8, 0.5 < p_T < 1.0$  (GeV/c)



$0.8 < \eta < 1.0, 0.5 < p_T < 1.0$  (GeV/c)



— e-  
 (MATCHED, geantid=3)  
  
— e-  
 (PRIMARY,  $|\eta \sigma_{e^-}| < 2$  TPC)

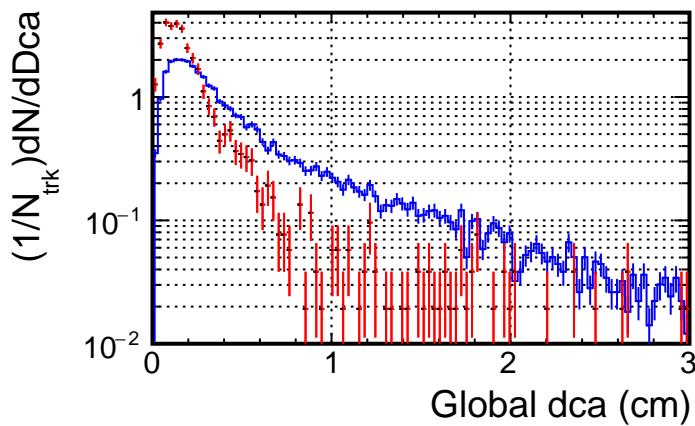
Dca distribution for ( $p_T$ ,  $\eta$ ) slices

e-  
(MATCHED, geantid=3)

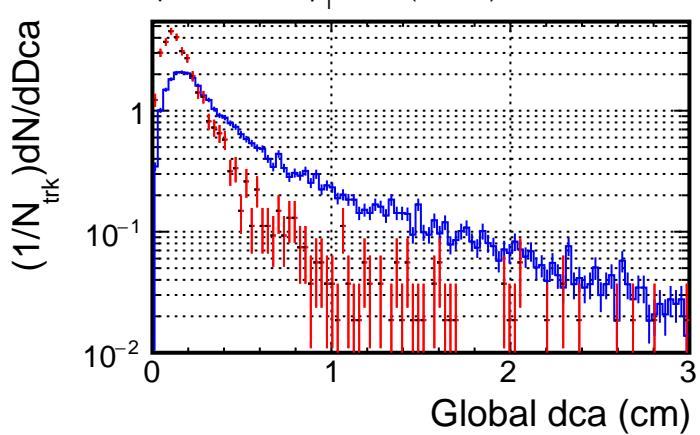
e-  
(PRIMARY,  $|\eta \sigma_{e^-}| < 2 \text{ TPC}$ )

## Dca distribution for ( $p_T$ , $\eta$ ) slices

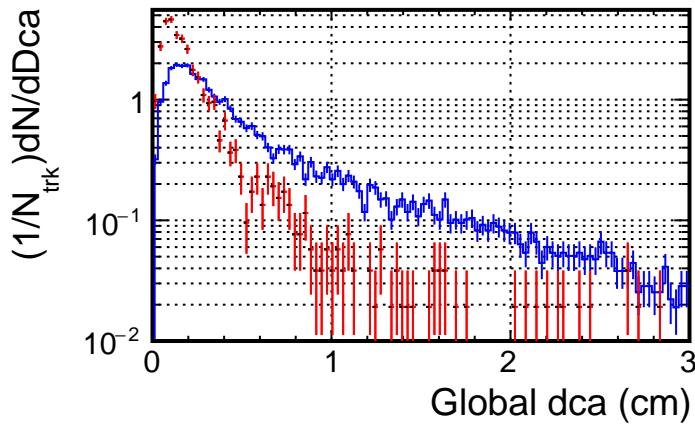
$0.0 < \eta < 0.2, 1.0 < p_T < 1.5$  (GeV/c)



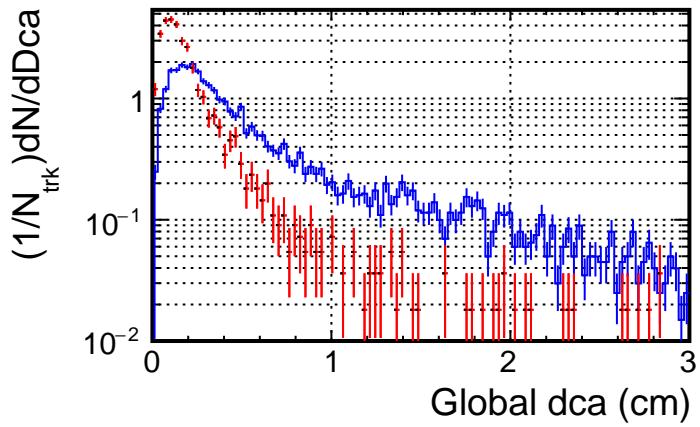
$0.2 < \eta < 0.4, 1.0 < p_T < 1.5$  (GeV/c)



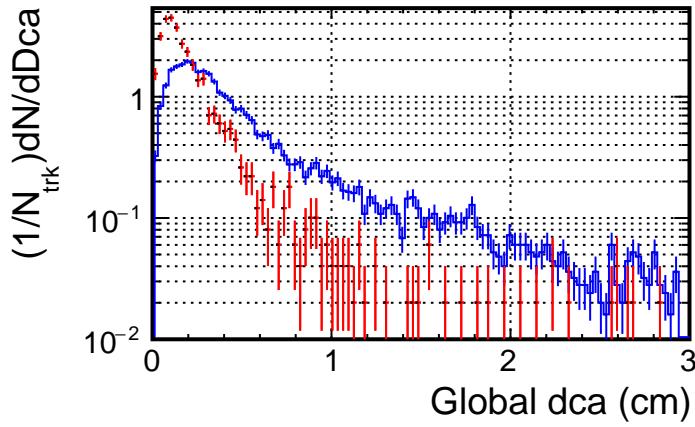
$0.4 < \eta < 0.6, 1.0 < p_T < 1.5$  (GeV/c)



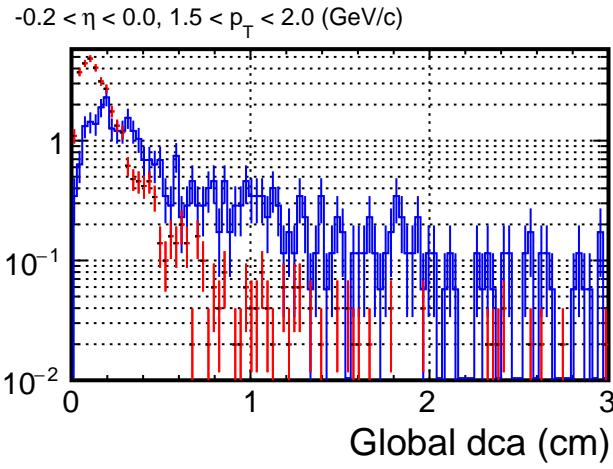
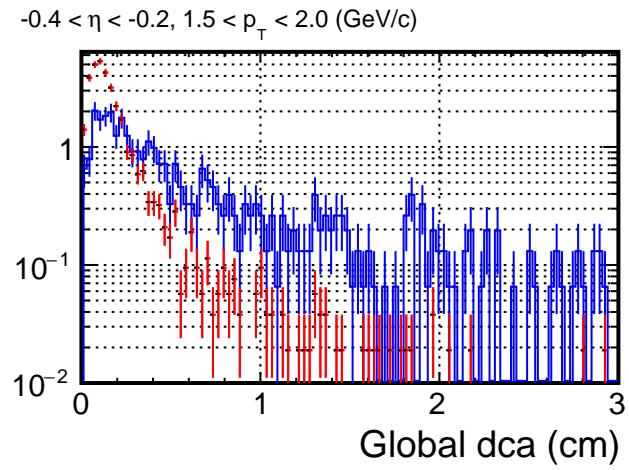
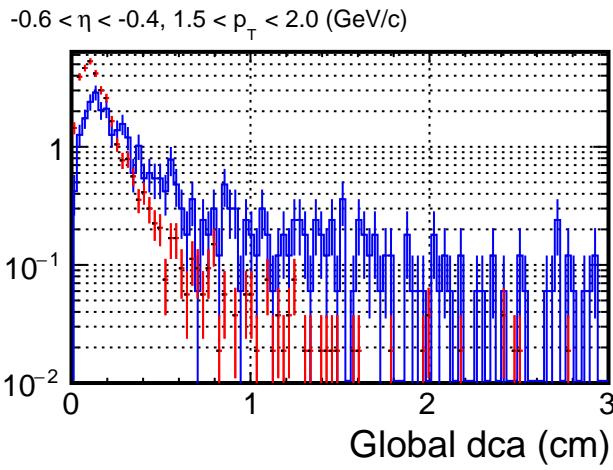
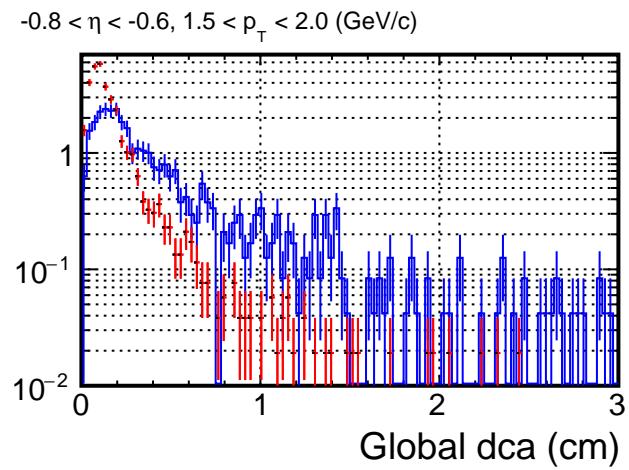
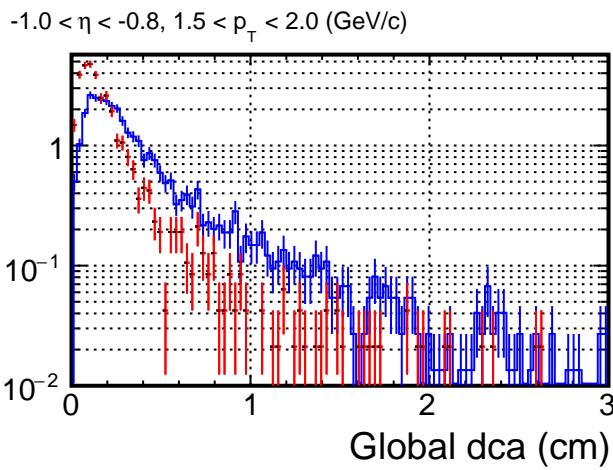
$0.6 < \eta < 0.8, 1.0 < p_T < 1.5$  (GeV/c)



$0.8 < \eta < 1.0, 1.0 < p_T < 1.5$  (GeV/c)



— e-  
 (MATCHED, geantid=3)  
  
— e-  
 (PRIMARY,  $|n \sigma_{e^-}| < 2$  TPC)

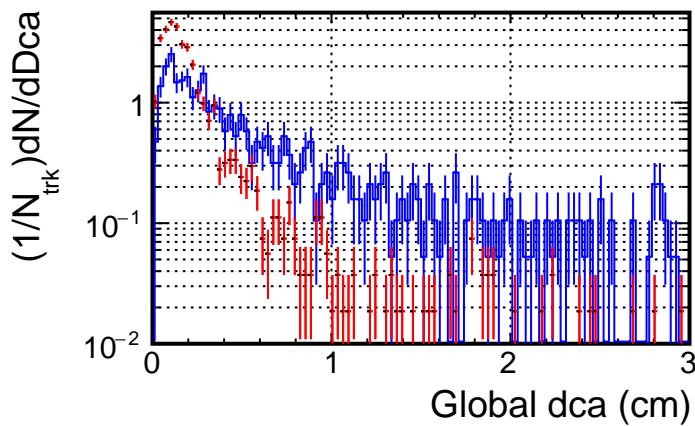
Dca distribution for ( $p_T$ ,  $\eta$ ) slices

e-  
(MATCHED, geantid=3)

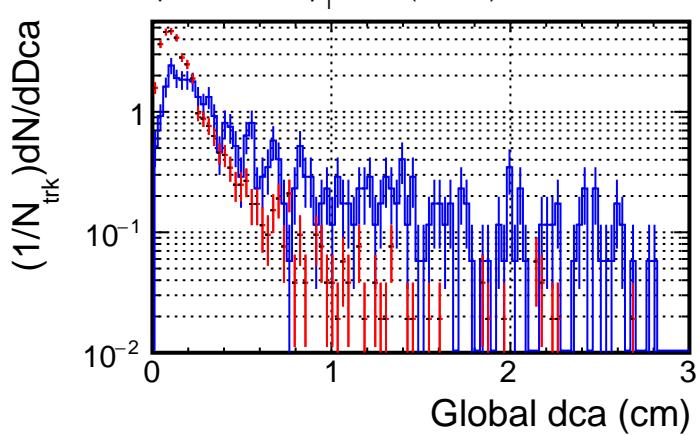
e-  
(PRIMARY,  $|\eta \sigma_{e^-}| < 2$  TPC)

## Dca distribution for ( $p_T$ , $\eta$ ) slices

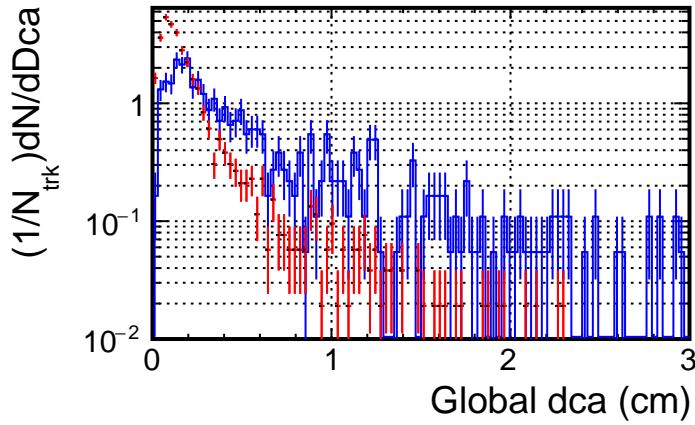
$0.0 < \eta < 0.2, 1.5 < p_T < 2.0$  (GeV/c)



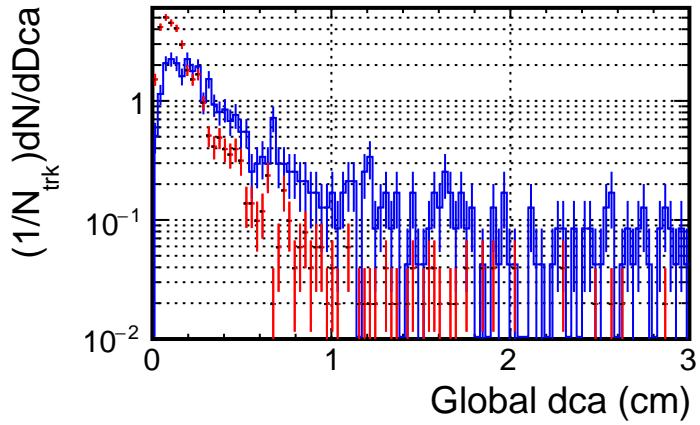
$0.2 < \eta < 0.4, 1.5 < p_T < 2.0$  (GeV/c)



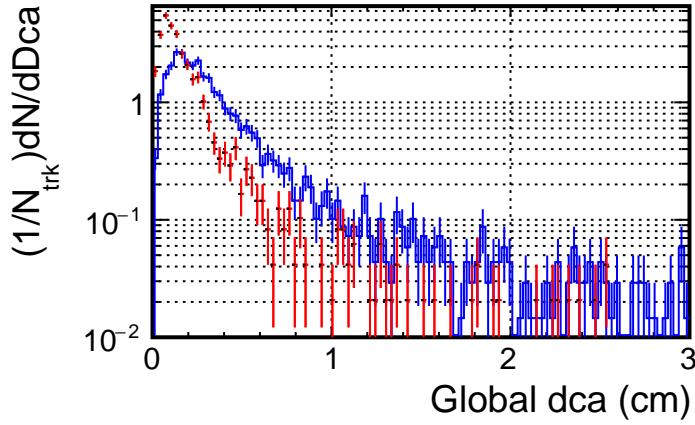
$0.4 < \eta < 0.6, 1.5 < p_T < 2.0$  (GeV/c)



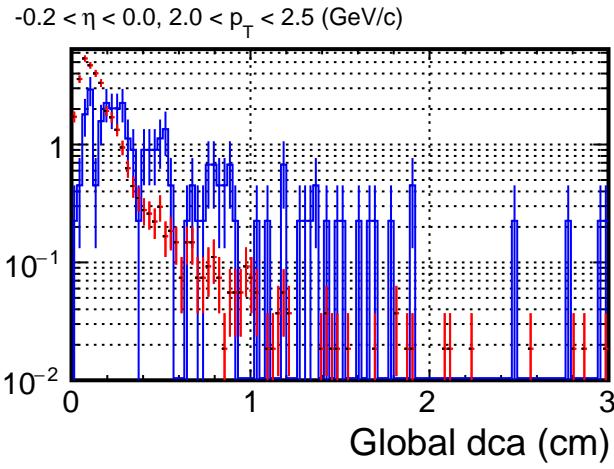
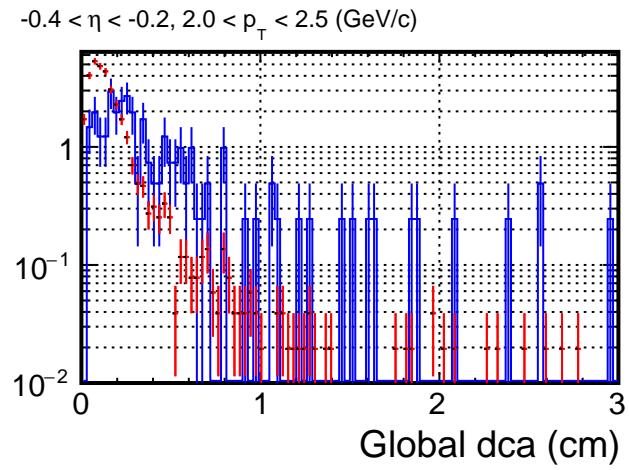
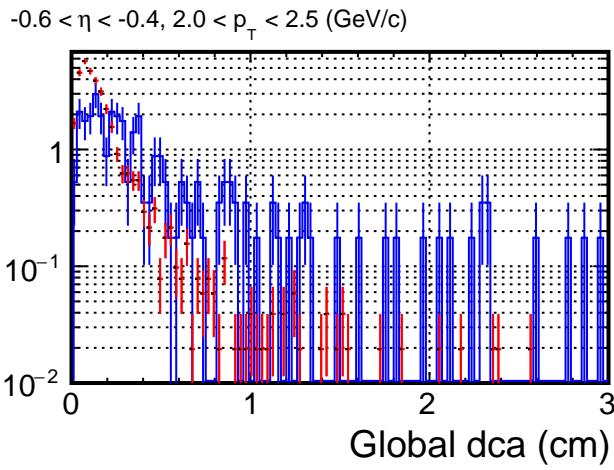
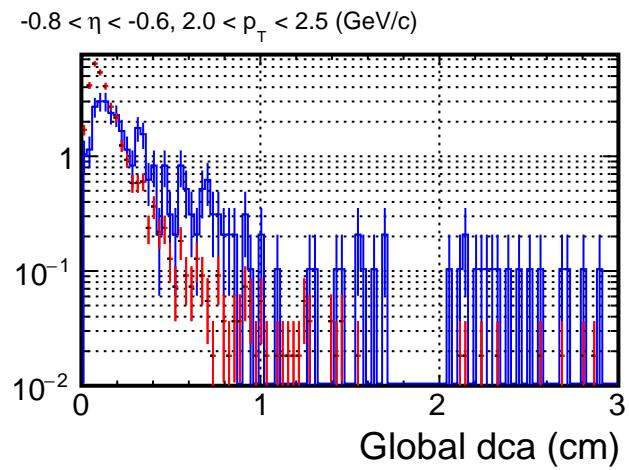
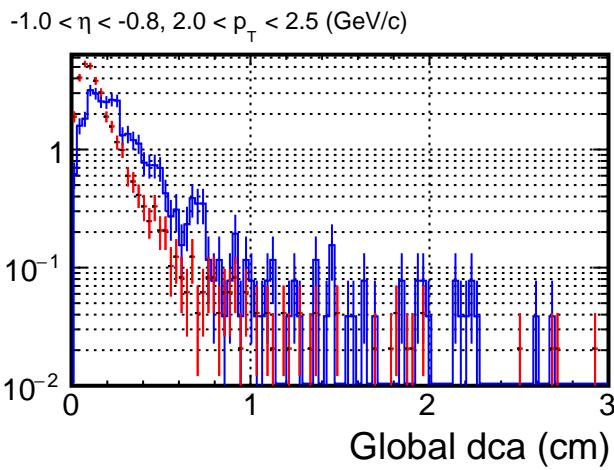
$0.6 < \eta < 0.8, 1.5 < p_T < 2.0$  (GeV/c)



$0.8 < \eta < 1.0, 1.5 < p_T < 2.0$  (GeV/c)



— e-  
 (MATCHED, geantid=3)  
  
— e-  
 (PRIMARY,  $|\eta \sigma_{e^-}| < 2$  TPC)

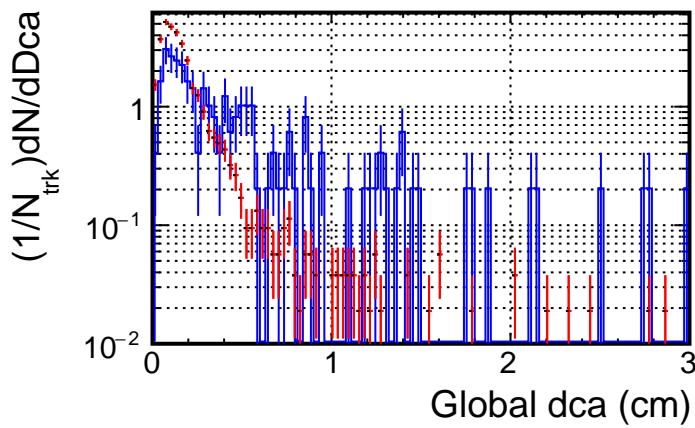
Dca distribution for ( $p_T$ ,  $\eta$ ) slices

e-  
(MATCHED, geantid=3)

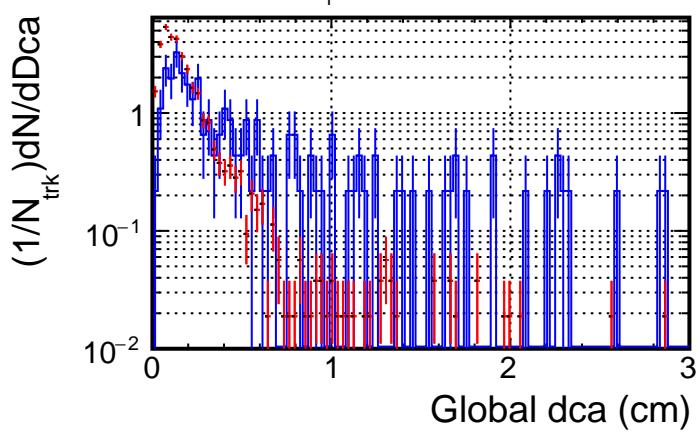
e-  
(PRIMARY,  $|\eta \sigma_{e^-}| < 2$  TPC)

## Dca distribution for ( $p_T$ , $\eta$ ) slices

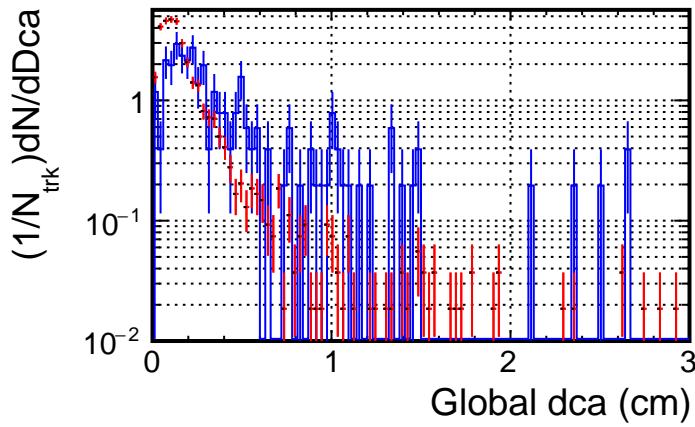
$0.0 < \eta < 0.2, 2.0 < p_T < 2.5$  (GeV/c)



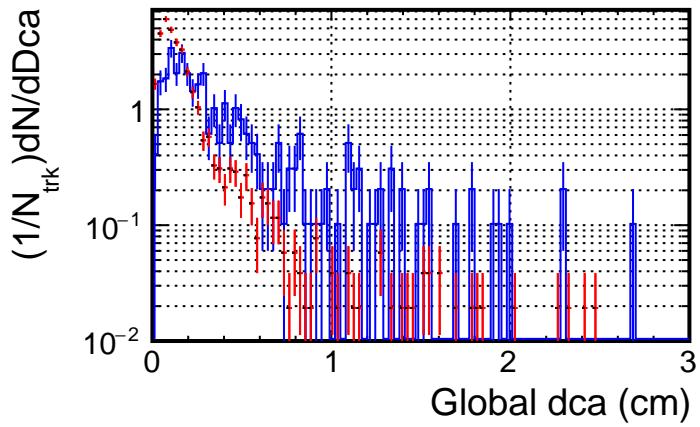
$0.2 < \eta < 0.4, 2.0 < p_T < 2.5$  (GeV/c)



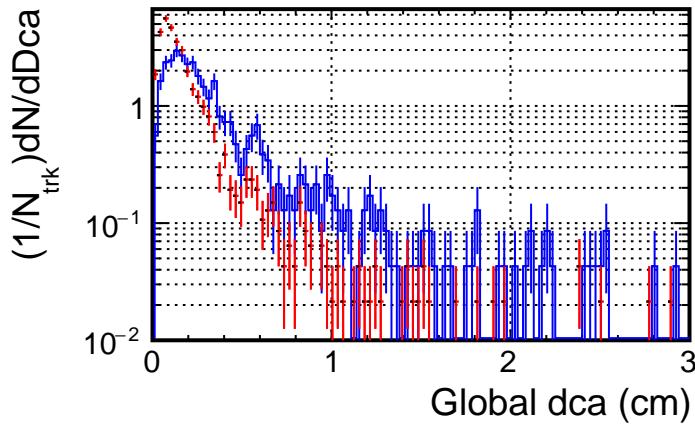
$0.4 < \eta < 0.6, 2.0 < p_T < 2.5$  (GeV/c)



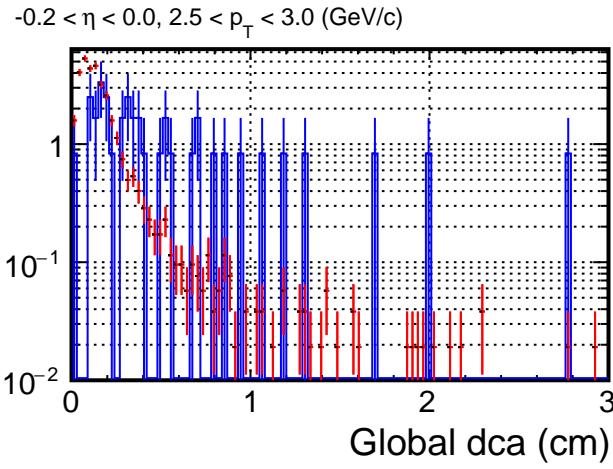
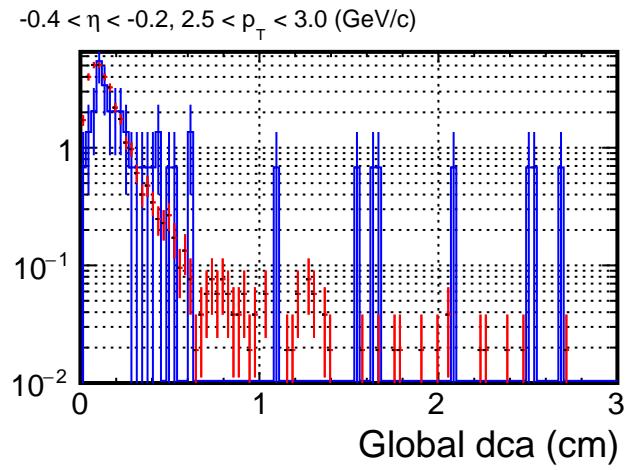
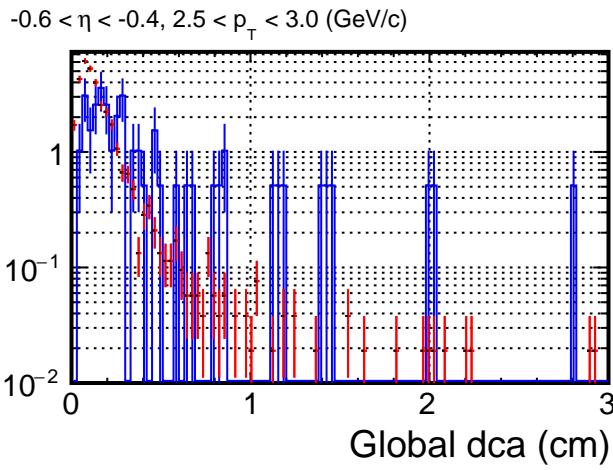
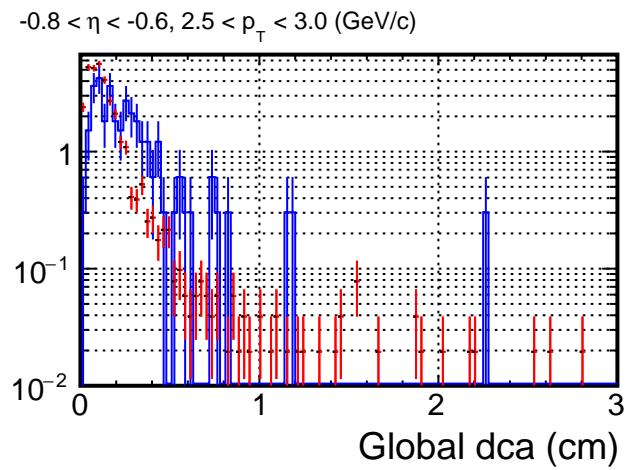
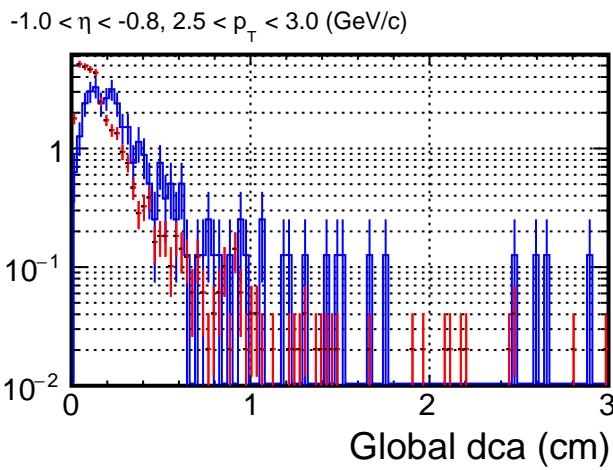
$0.6 < \eta < 0.8, 2.0 < p_T < 2.5$  (GeV/c)



$0.8 < \eta < 1.0, 2.0 < p_T < 2.5$  (GeV/c)



— e-  
 (MATCHED, geantid=3)  
  
— e-  
 (PRIMARY,  $|\eta \sigma_e| < 2$  TPC)

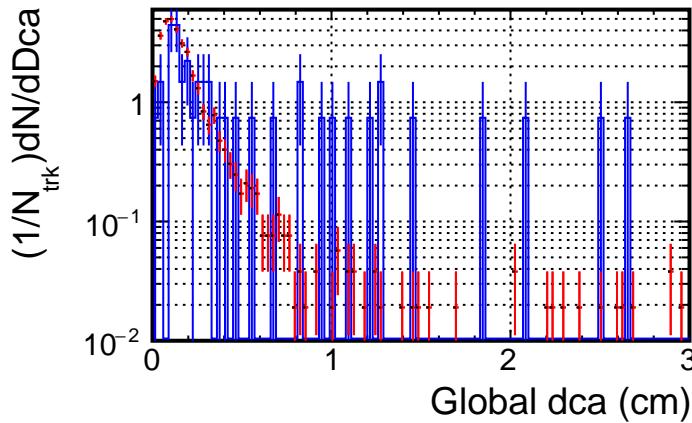
Dca distribution for ( $p_T$ ,  $\eta$ ) slices

e-  
(MATCHED, geantid=3)

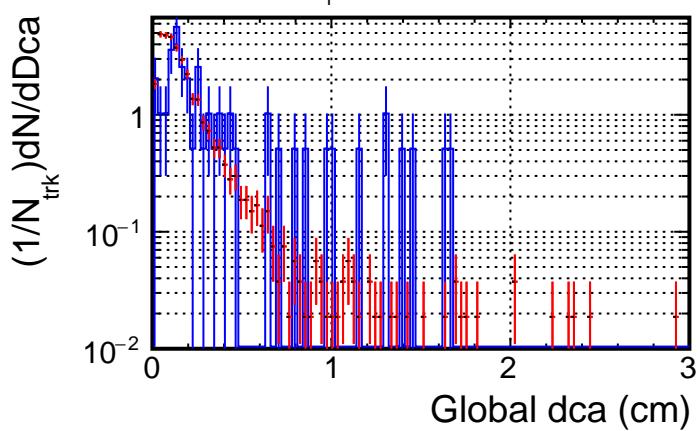
e-  
(PRIMARY,  $|\eta \sigma_{e^-}| < 2$  TPC)

## Dca distribution for ( $p_T$ , $\eta$ ) slices

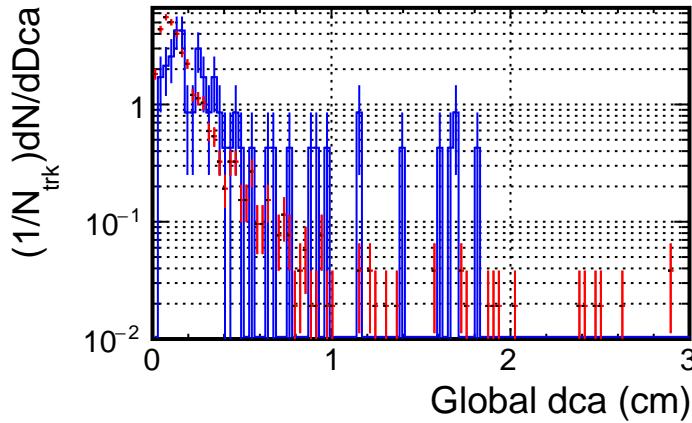
$0.0 < \eta < 0.2, 2.5 < p_T < 3.0$  (GeV/c)



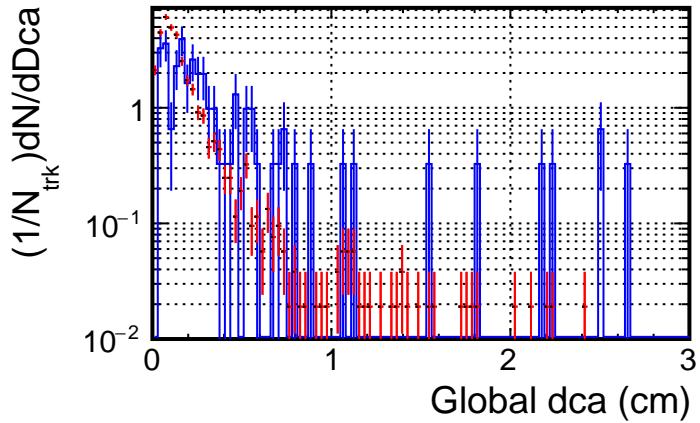
$0.2 < \eta < 0.4, 2.5 < p_T < 3.0$  (GeV/c)



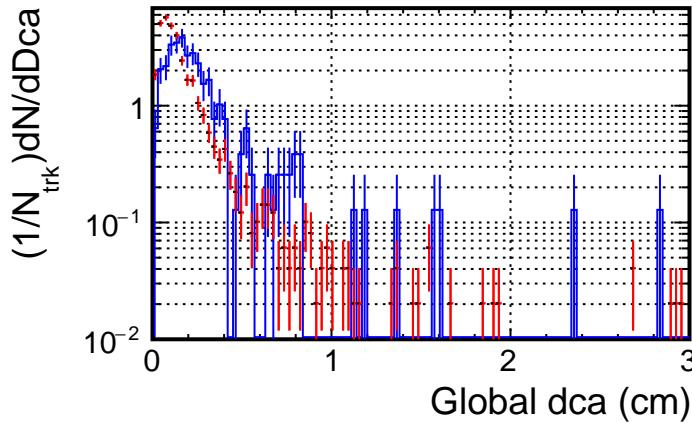
$0.4 < \eta < 0.6, 2.5 < p_T < 3.0$  (GeV/c)



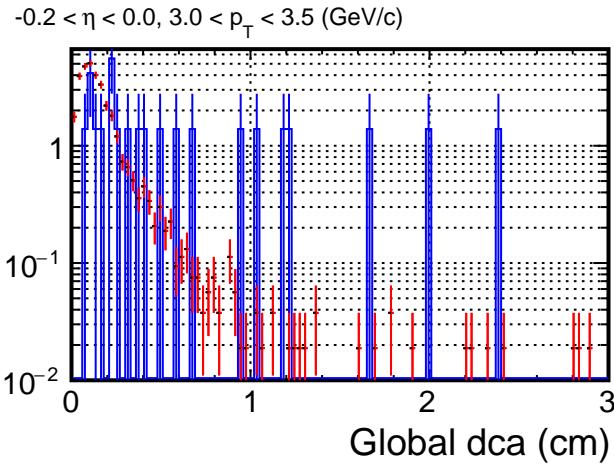
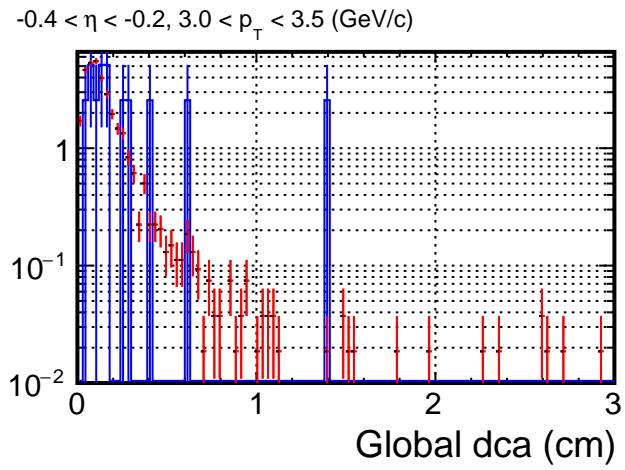
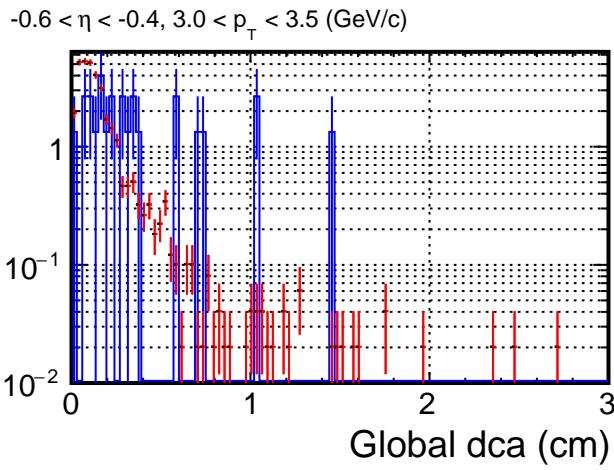
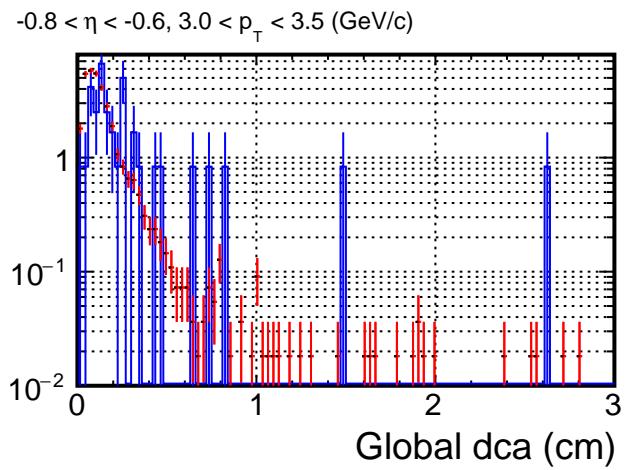
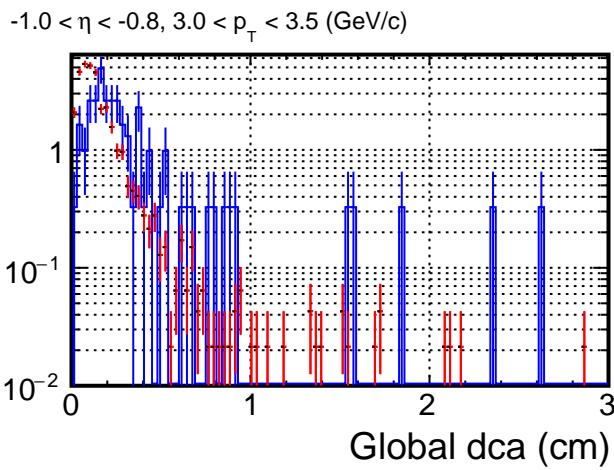
$0.6 < \eta < 0.8, 2.5 < p_T < 3.0$  (GeV/c)



$0.8 < \eta < 1.0, 2.5 < p_T < 3.0$  (GeV/c)



— e-  
(MATCHED, geantid=3)  
  
— e-  
(PRIMARY,  $|\eta| < 2$  TPC)

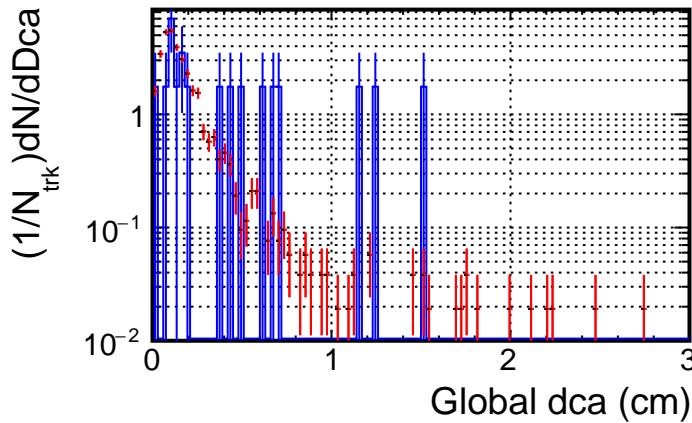
Dca distribution for ( $p_T$ ,  $\eta$ ) slices

e-  
(MATCHED, geantid=3)

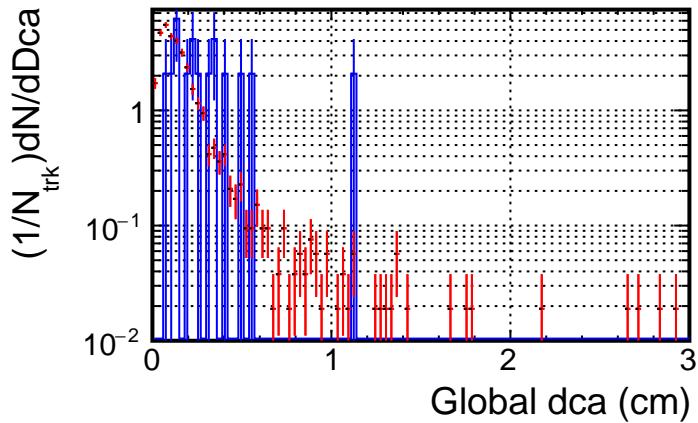
e-  
(PRIMARY,  $|\eta \sigma_{e^-}| < 2$  TPC)

## Dca distribution for ( $p_T$ , $\eta$ ) slices

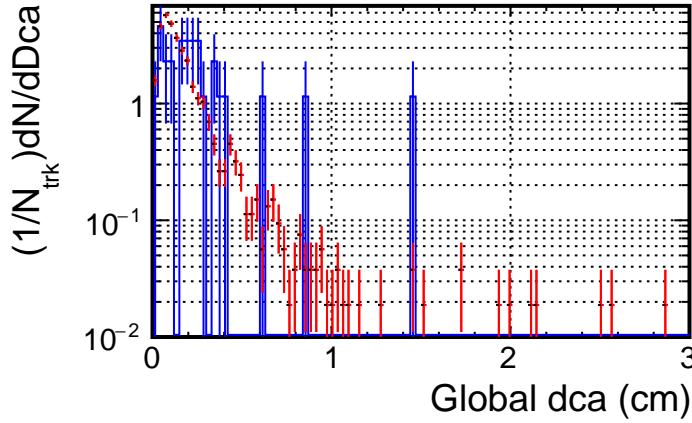
$0.0 < \eta < 0.2, 3.0 < p_T < 3.5$  (GeV/c)



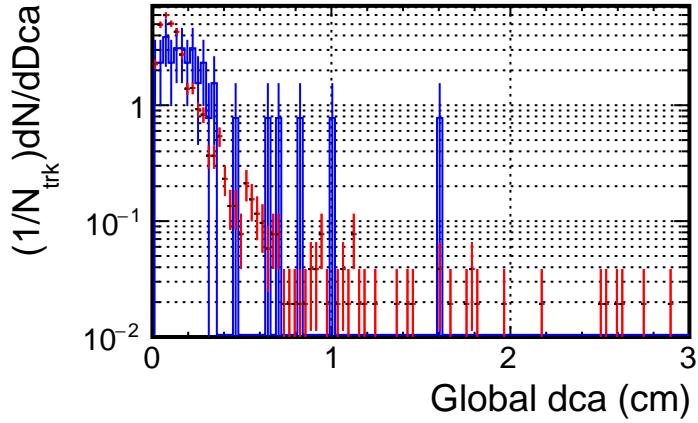
$0.2 < \eta < 0.4, 3.0 < p_T < 3.5$  (GeV/c)



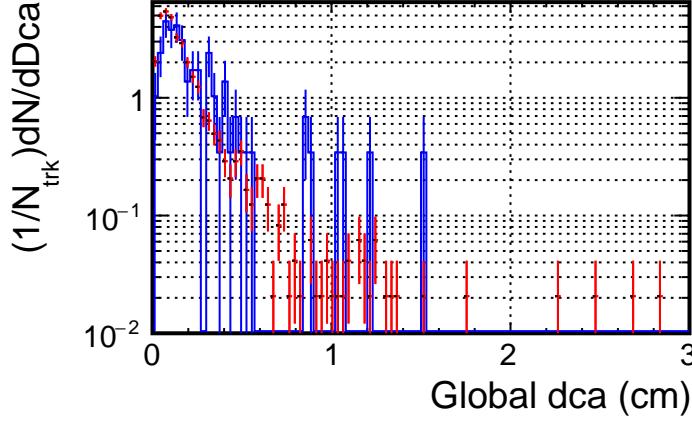
$0.4 < \eta < 0.6, 3.0 < p_T < 3.5$  (GeV/c)



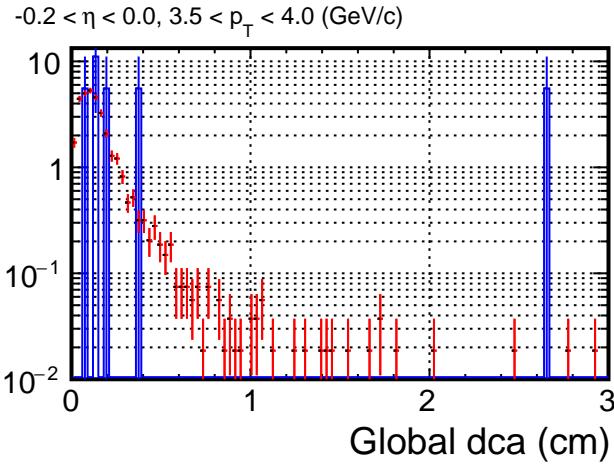
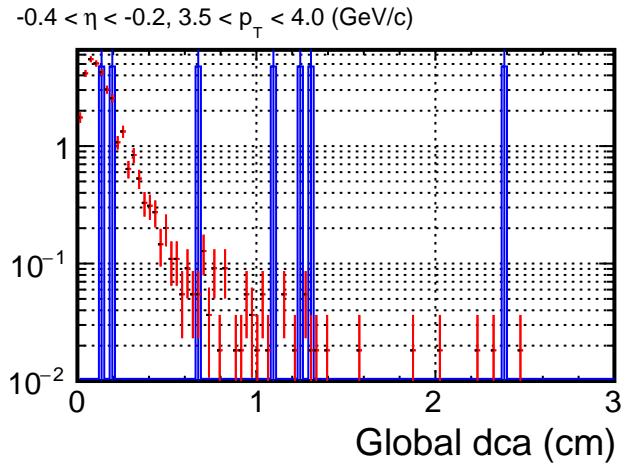
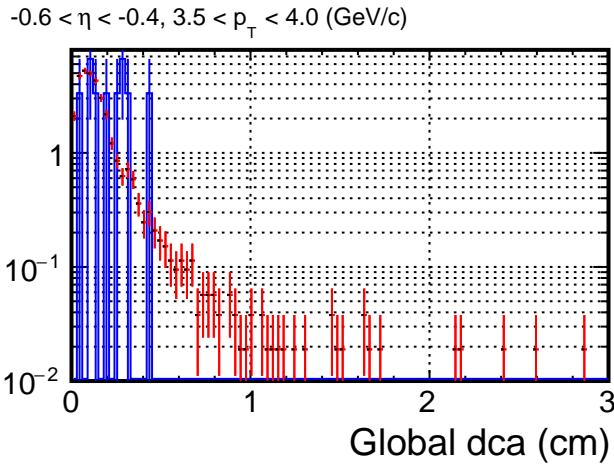
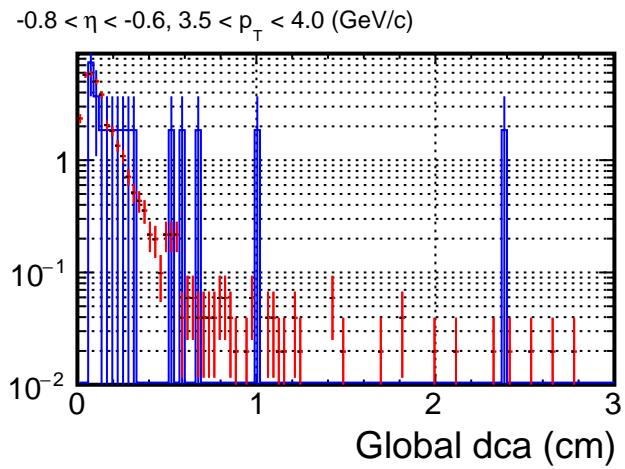
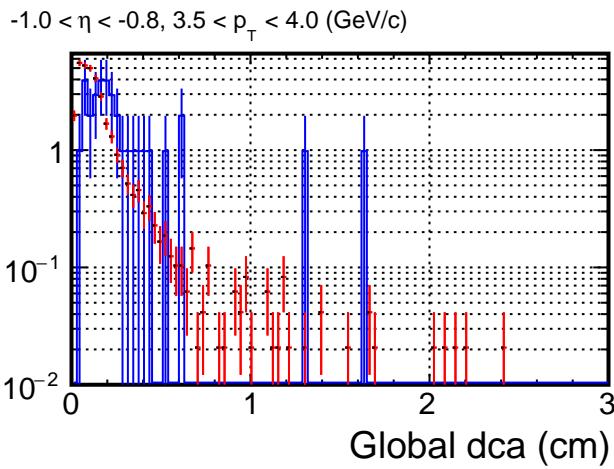
$0.6 < \eta < 0.8, 3.0 < p_T < 3.5$  (GeV/c)



$0.8 < \eta < 1.0, 3.0 < p_T < 3.5$  (GeV/c)



— e-  
 (MATCHED, geantid=3)  
  
— e-  
 (PRIMARY,  $|\eta \sigma_{e^-}| < 2$  TPC)

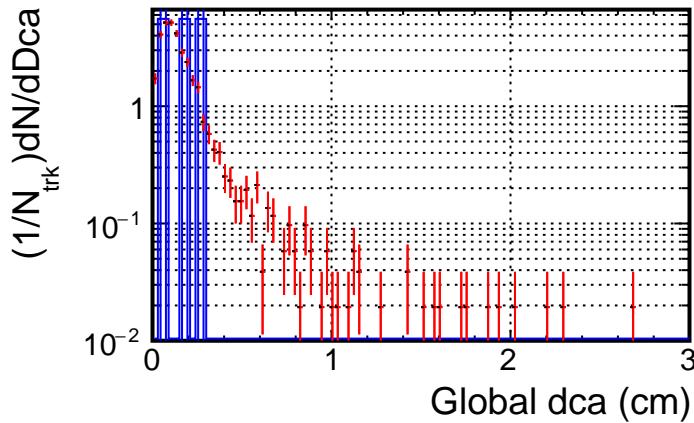
Dca distribution for  $(p_T, \eta)$  slices

e-  
(MATCHED, geantid=3)

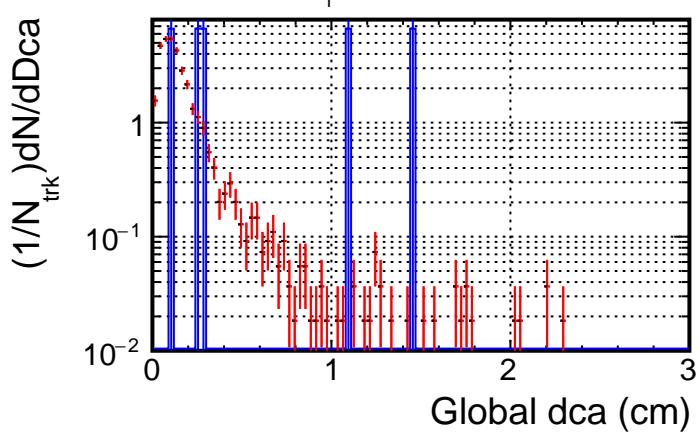
e-  
(PRIMARY,  $|n \sigma_{e^-}| < 2$  TPC)

## Dca distribution for ( $p_T$ , $\eta$ ) slices

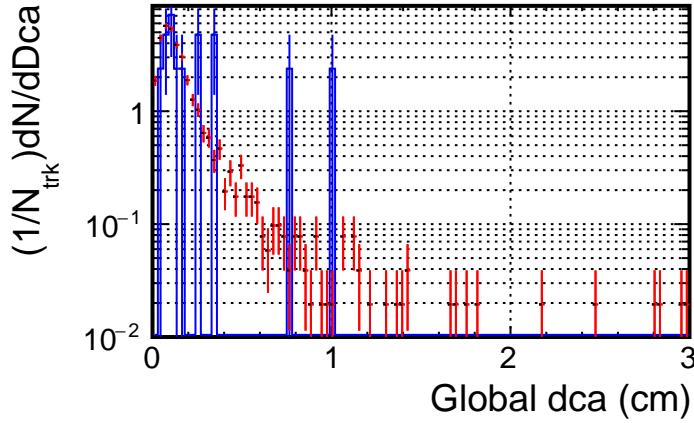
$0.0 < \eta < 0.2, 3.5 < p_T < 4.0$  (GeV/c)



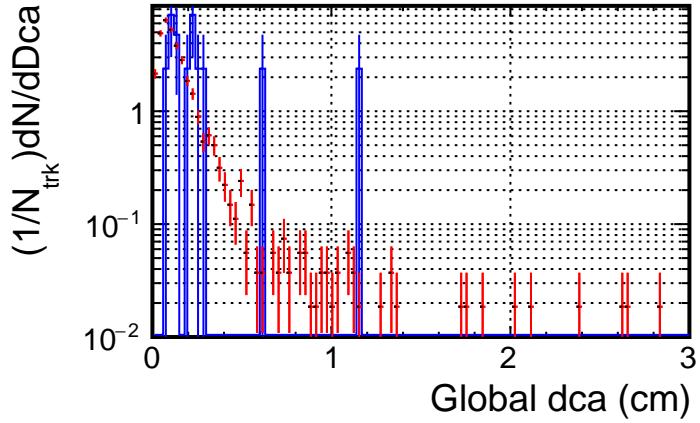
$0.2 < \eta < 0.4, 3.5 < p_T < 4.0$  (GeV/c)



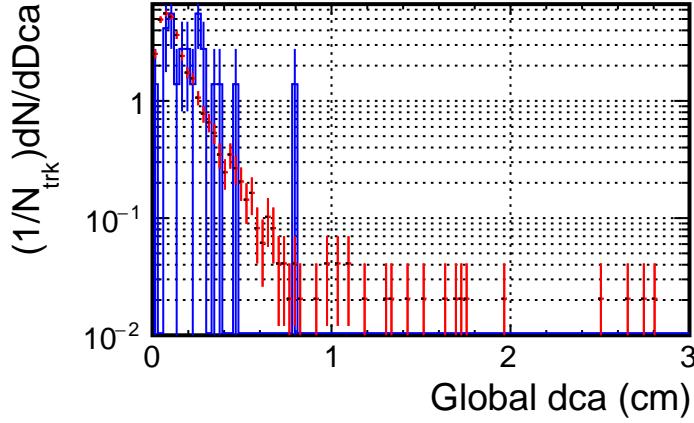
$0.4 < \eta < 0.6, 3.5 < p_T < 4.0$  (GeV/c)



$0.6 < \eta < 0.8, 3.5 < p_T < 4.0$  (GeV/c)

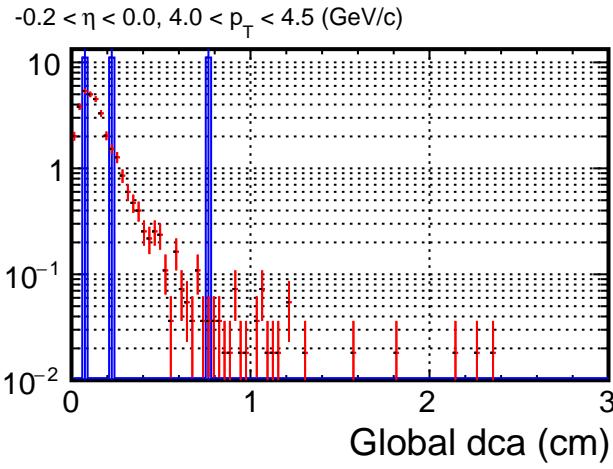
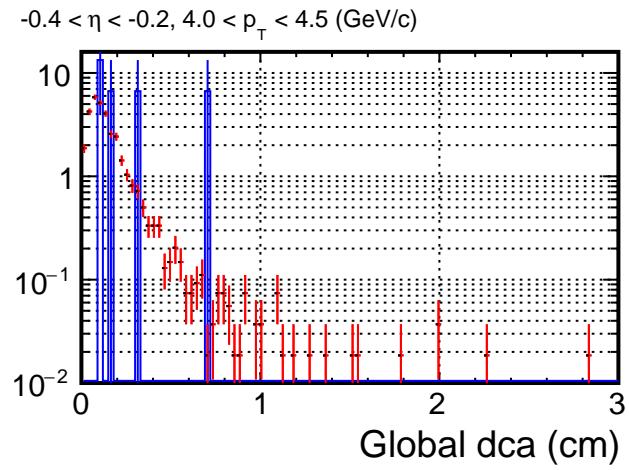
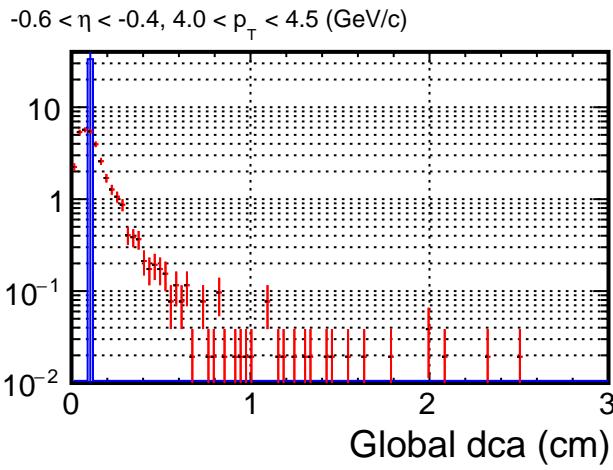
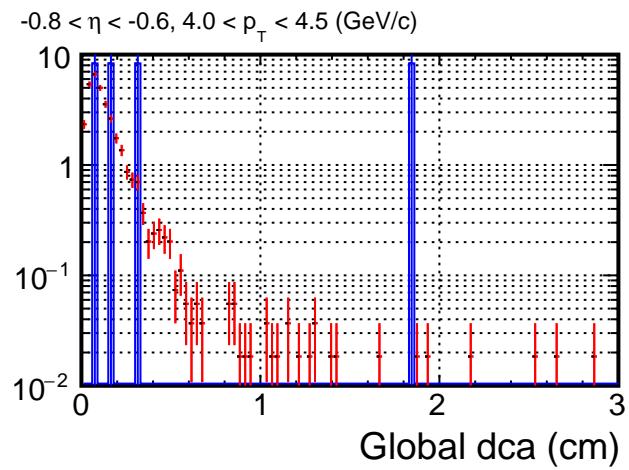
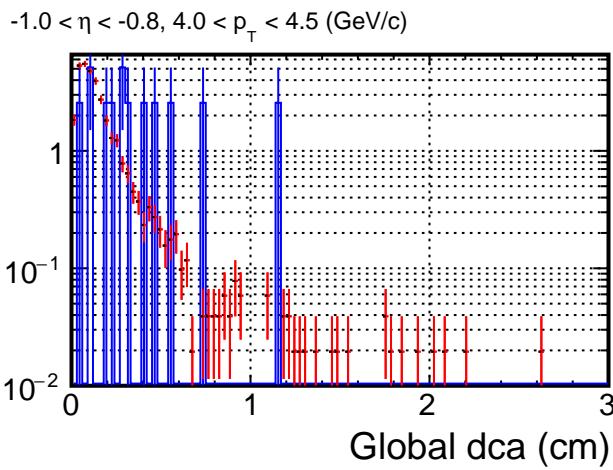


$0.8 < \eta < 1.0, 3.5 < p_T < 4.0$  (GeV/c)



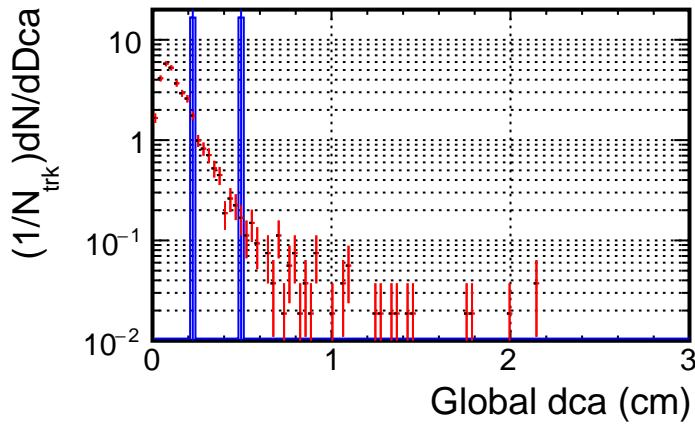
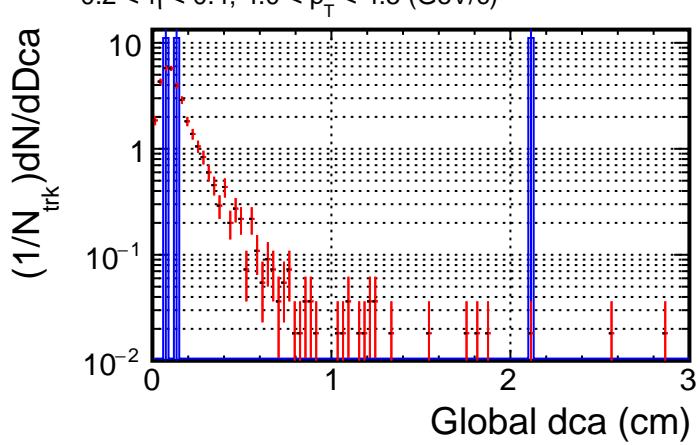
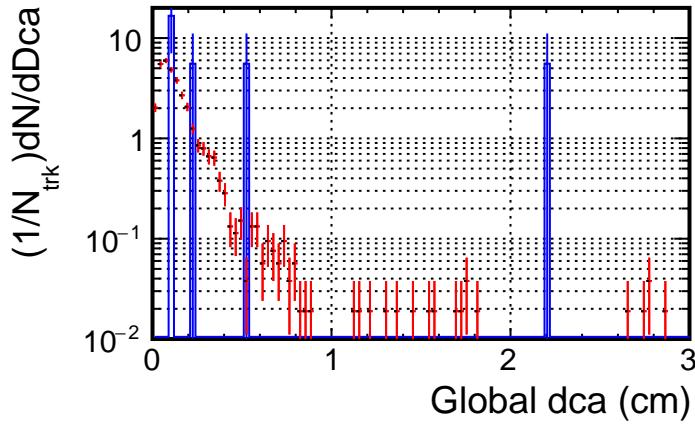
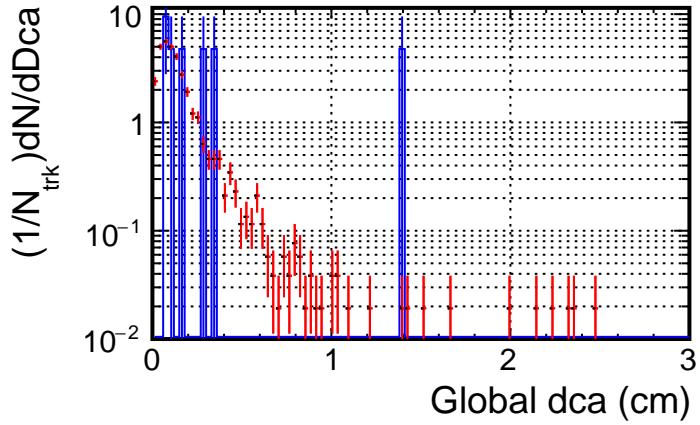
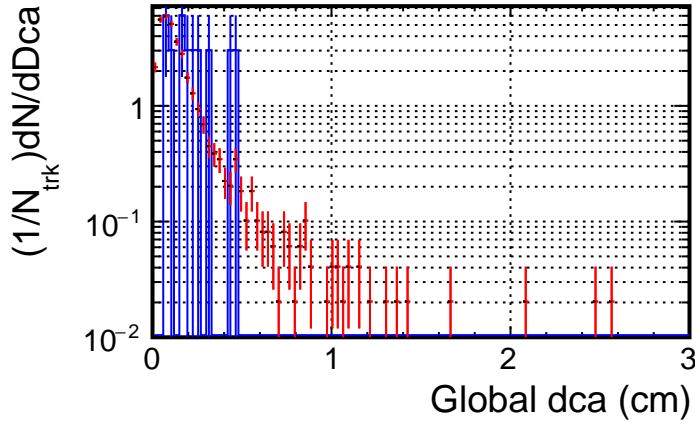
e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|\eta \sigma_{e^-}| < 2$  TPC)

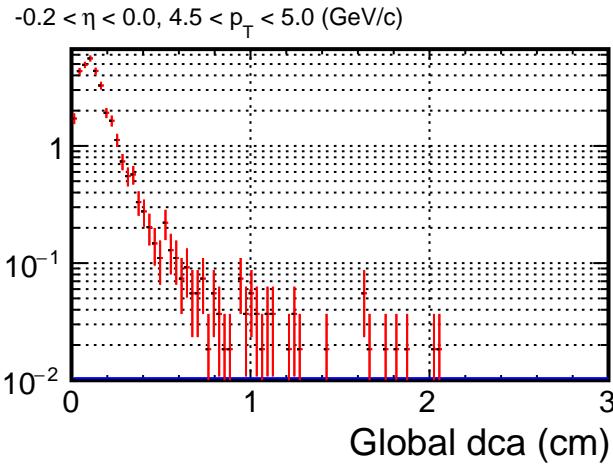
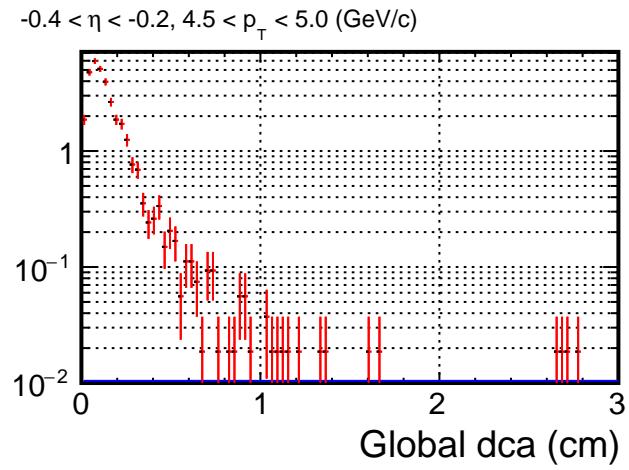
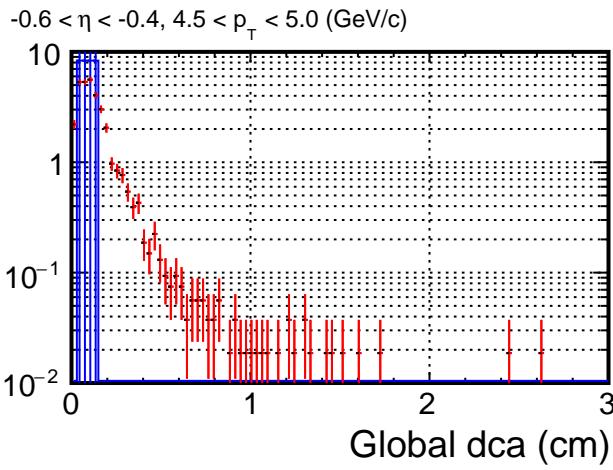
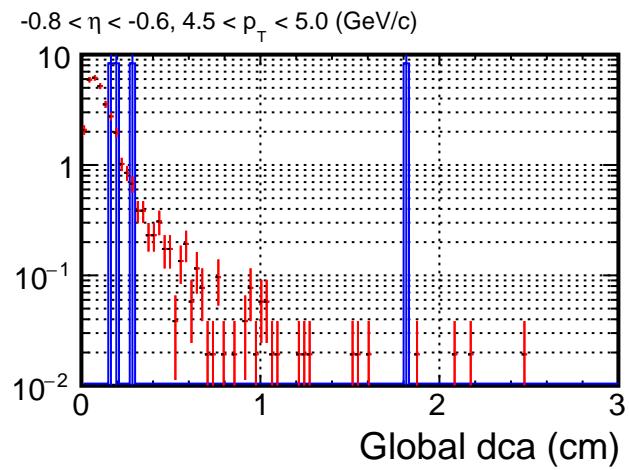
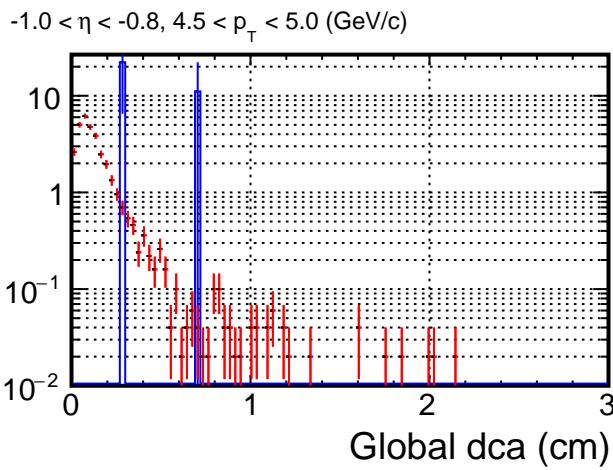
Dca distribution for ( $p_T$ ,  $\eta$ ) slices

e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|\eta \sigma_{e^-}| < 2$  TPC)

Dca distribution for  $(p_T, \eta)$  slices $0.0 < \eta < 0.2, 4.0 < p_T < 4.5 \text{ (GeV/c)}$  $0.2 < \eta < 0.4, 4.0 < p_T < 4.5 \text{ (GeV/c)}$  $0.4 < \eta < 0.6, 4.0 < p_T < 4.5 \text{ (GeV/c)}$  $0.6 < \eta < 0.8, 4.0 < p_T < 4.5 \text{ (GeV/c)}$  $0.8 < \eta < 1.0, 4.0 < p_T < 4.5 \text{ (GeV/c)}$ 

e-  
(MATCHED, geantid=3)  
e-  
(PRIMARY,  $|\eta \sigma_{e^-}| < 2 \text{ TPC}$ )

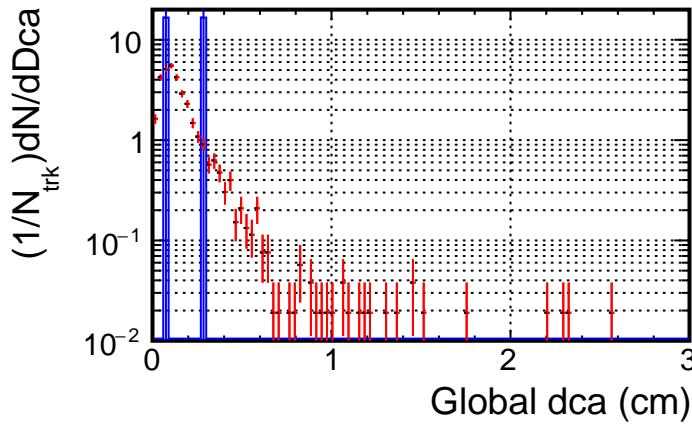
Dca distribution for ( $p_T$ ,  $\eta$ ) slices

e-  
(MATCHED, geantid=3)

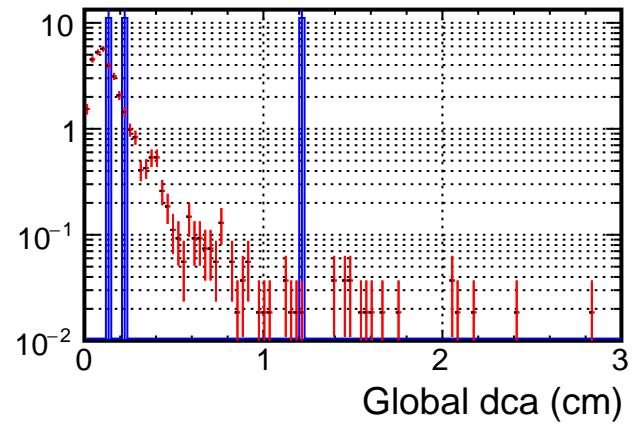
e-  
(PRIMARY,  $|\eta \sigma_{e^-}| < 2$  TPC)

## Dca distribution for ( $p_T$ , $\eta$ ) slices

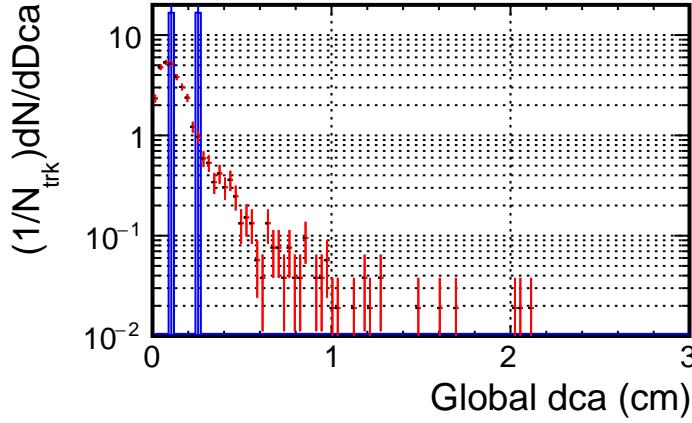
$0.0 < \eta < 0.2, 4.5 < p_T < 5.0$  (GeV/c)



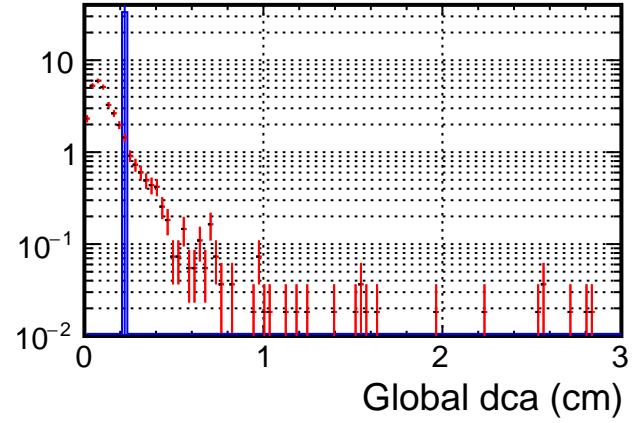
$0.2 < \eta < 0.4, 4.5 < p_T < 5.0$  (GeV/c)



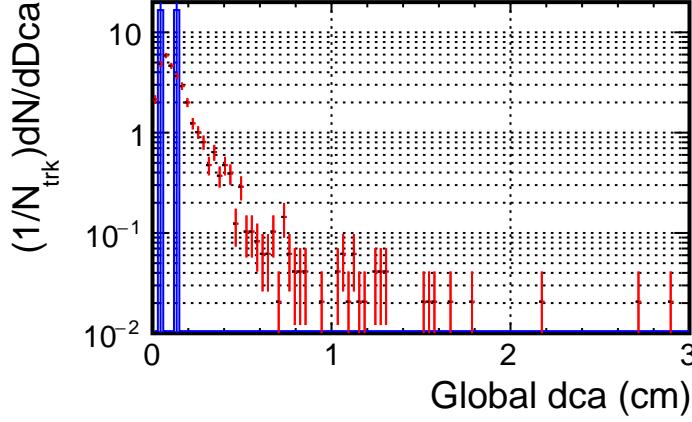
$0.4 < \eta < 0.6, 4.5 < p_T < 5.0$  (GeV/c)



$0.6 < \eta < 0.8, 4.5 < p_T < 5.0$  (GeV/c)



$0.8 < \eta < 1.0, 4.5 < p_T < 5.0$  (GeV/c)



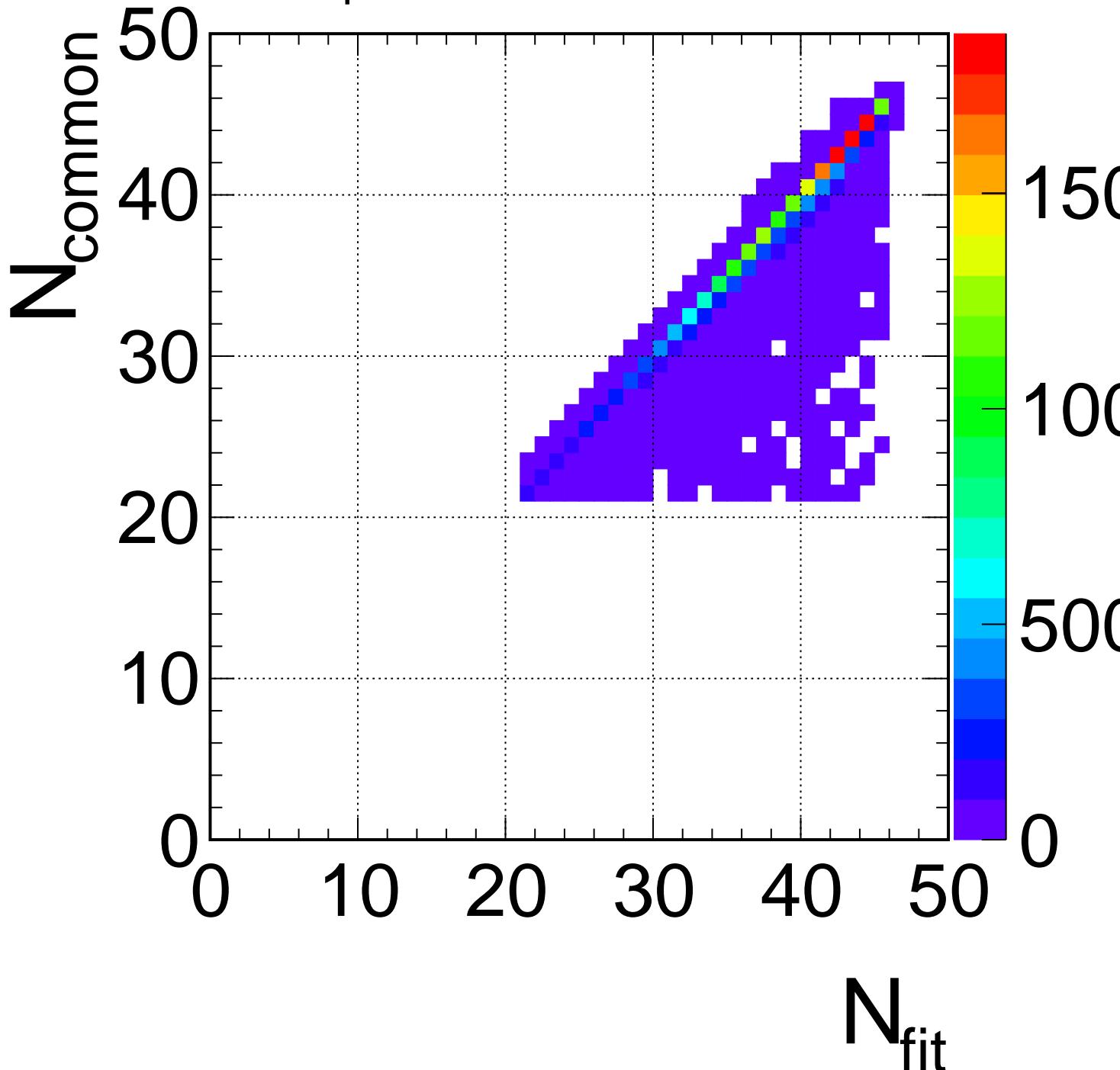
e-  
(MATCHED, geantid=3)  
e-  
(PRIMARY,  $|\eta \sigma_{e^-}| < 2$  TPC)

$N_{\text{events}}=24.83$  K, MC=e-, embeddingQa.mc, (0)

Tue Jul 23 01:44:06 2019

$N_{\text{common}}$  vs  $N_{\text{hit}}$  (Embedding:e-, Real:e-)

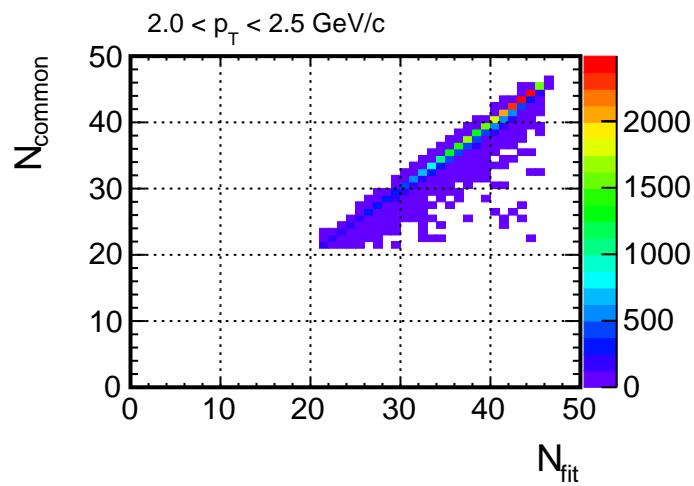
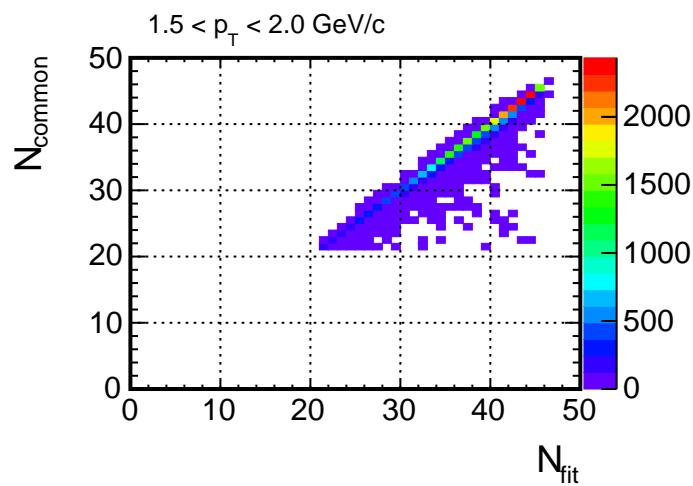
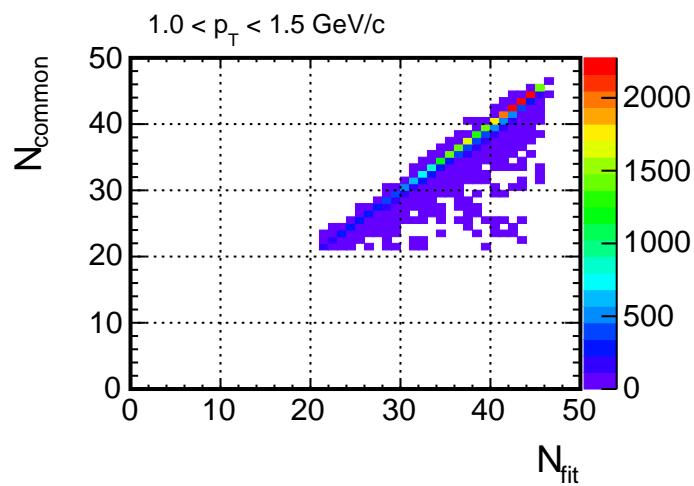
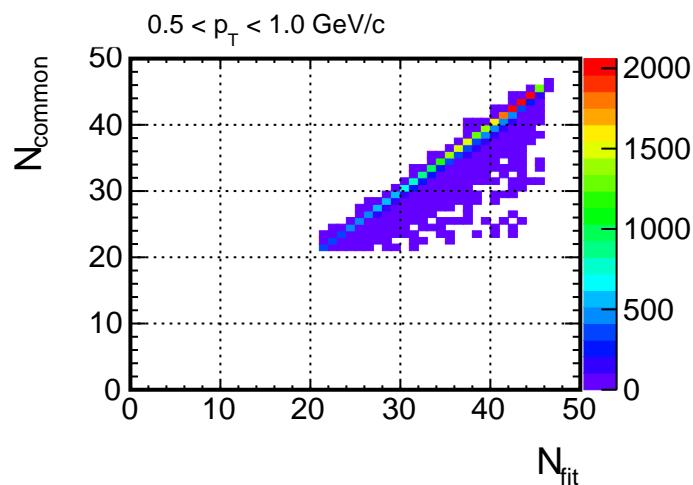
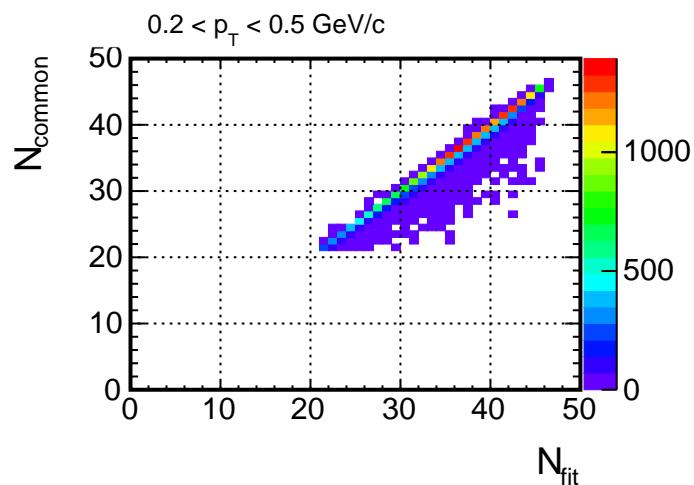
$0.2 < p_T < 5.0 \text{ GeV}/c$



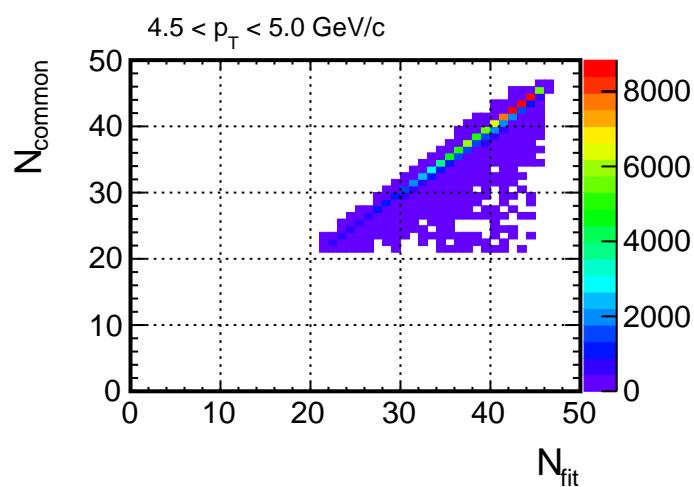
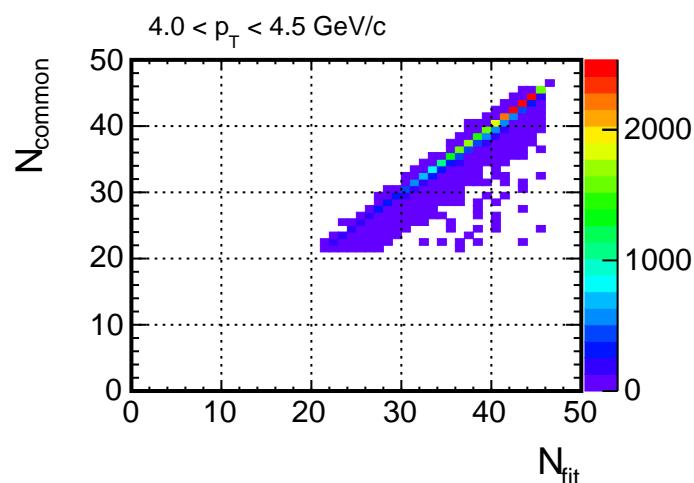
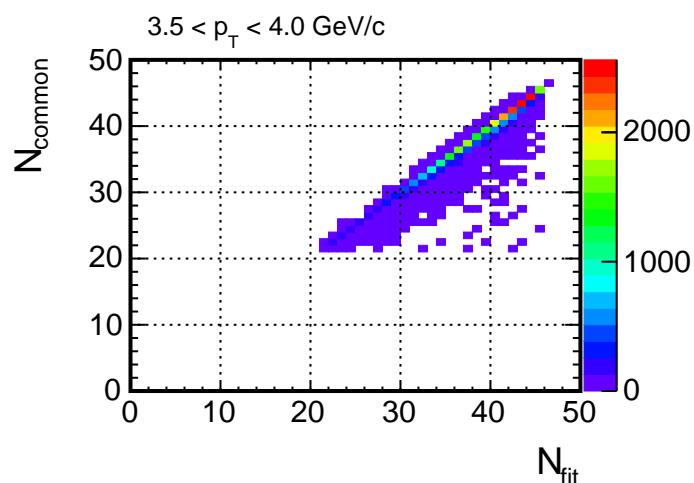
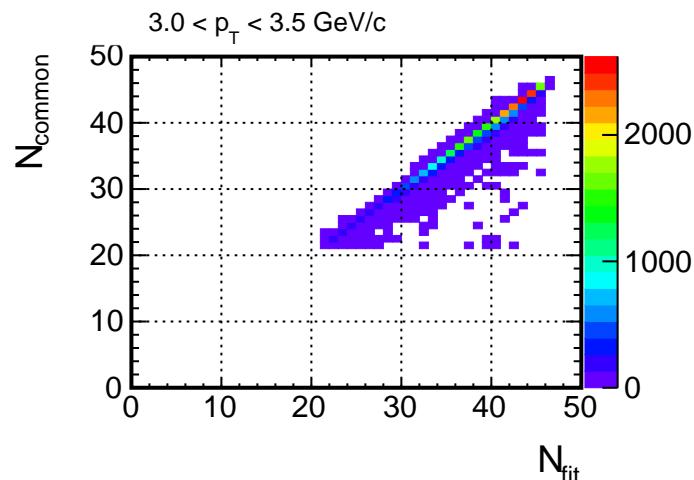
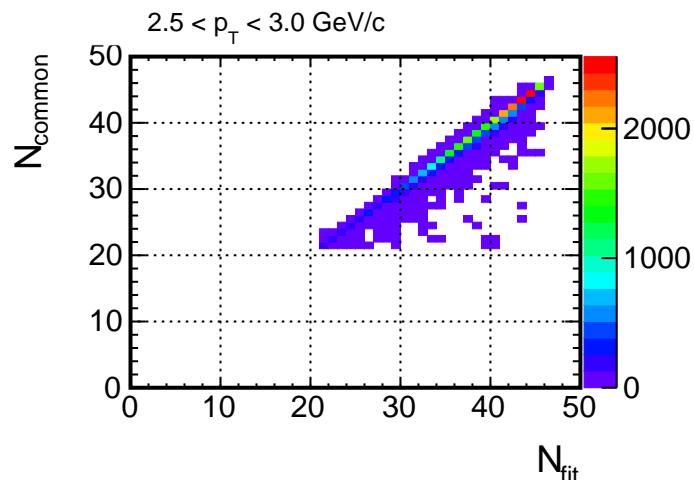
N<sub>events</sub>=24.83 K, MC=e-, embeddingQa.mc, (0)

Tue Jul 23 01:44:06 2019

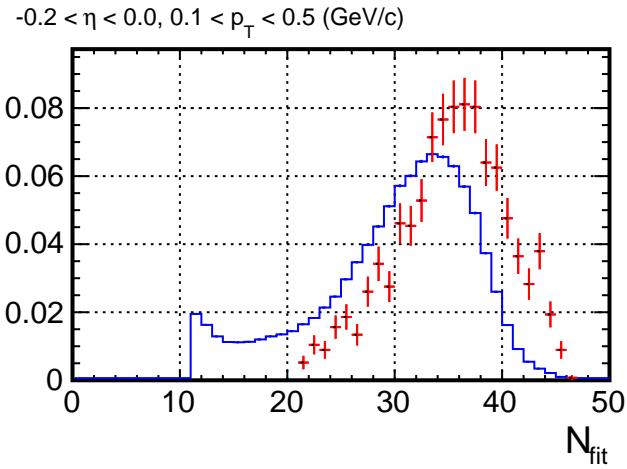
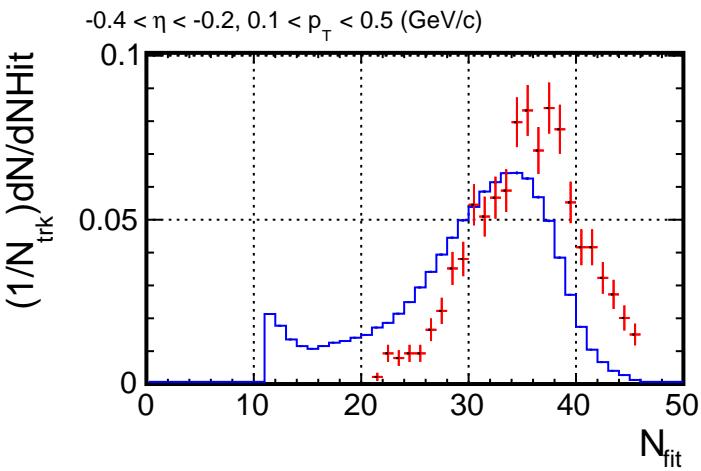
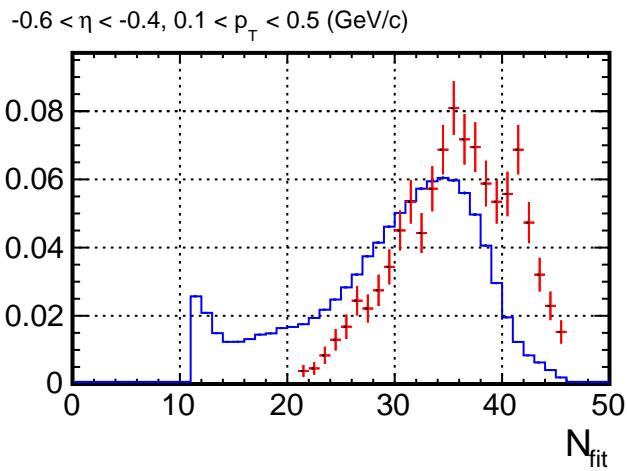
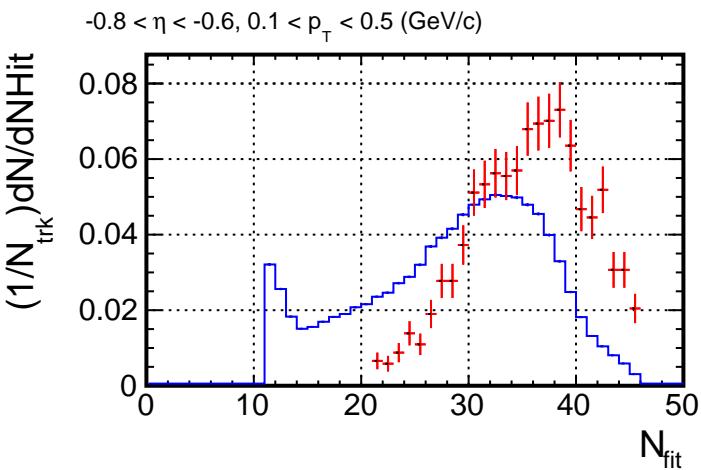
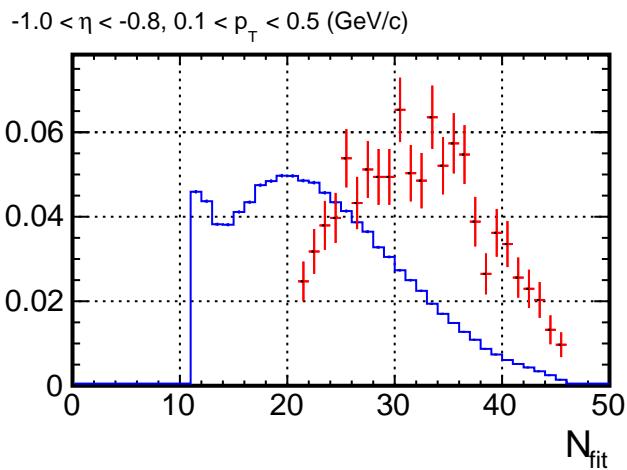
### N<sub>common</sub> vs N<sub>hit</sub>, p<sub>T</sub> dependence (Embedding:e-, Real:e-)



### $N_{\text{common}}$ vs $N_{\text{hit}}$ , $p_T$ dependence (Embedding:e-, Real:e-)



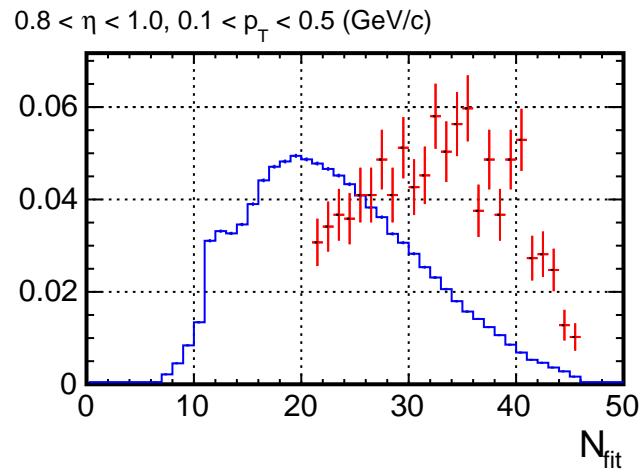
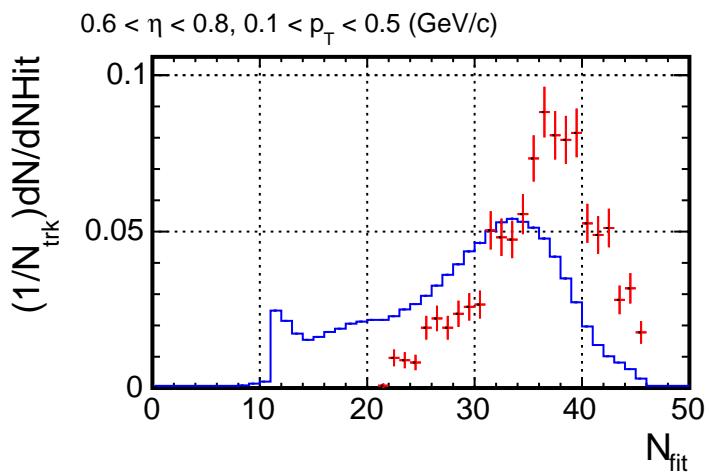
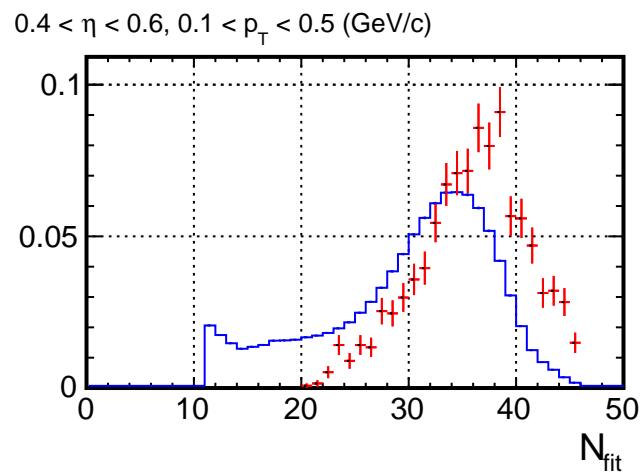
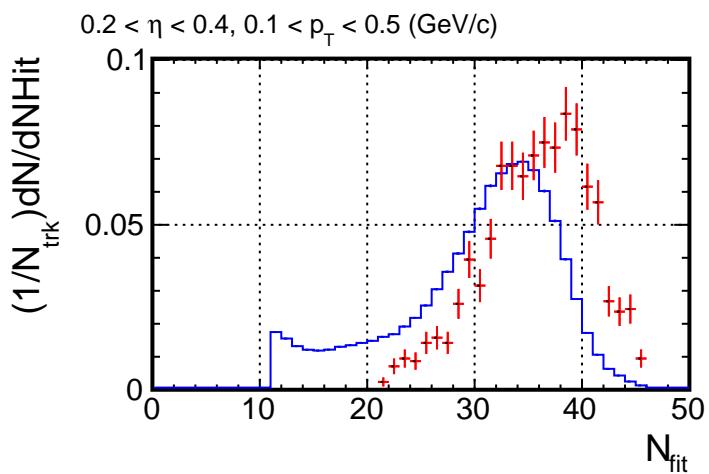
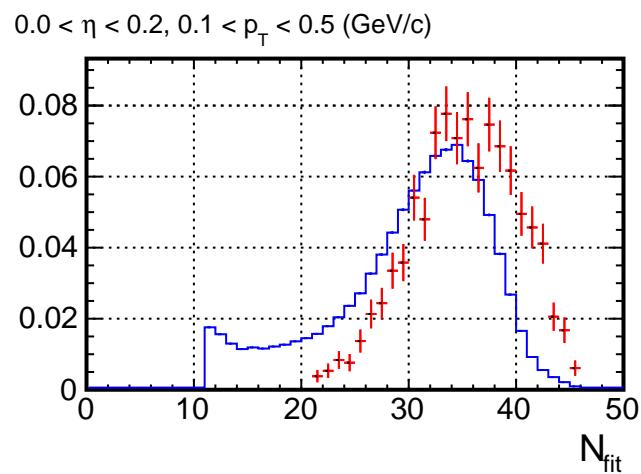
## NHit distribution for ( $p_T$ , $\eta$ ) slices



e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|n\sigma_e| < 2$  TPC)

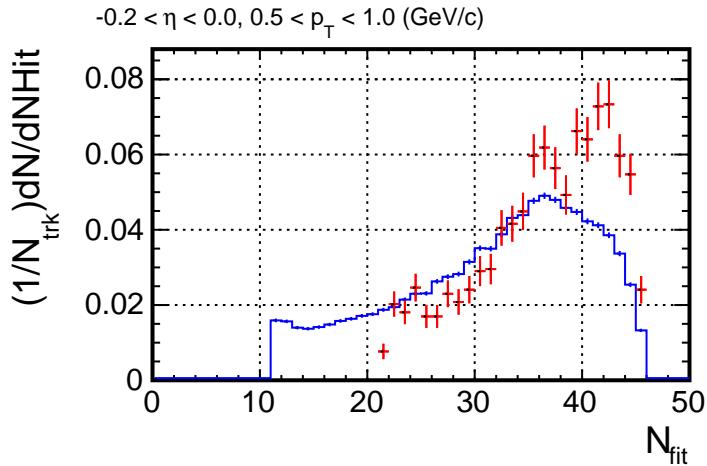
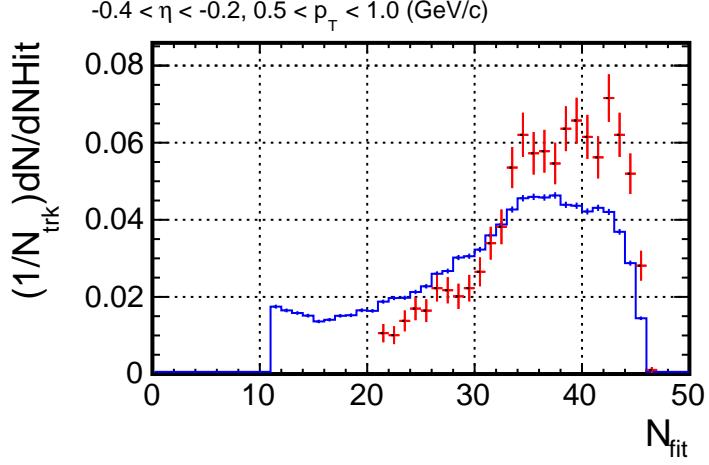
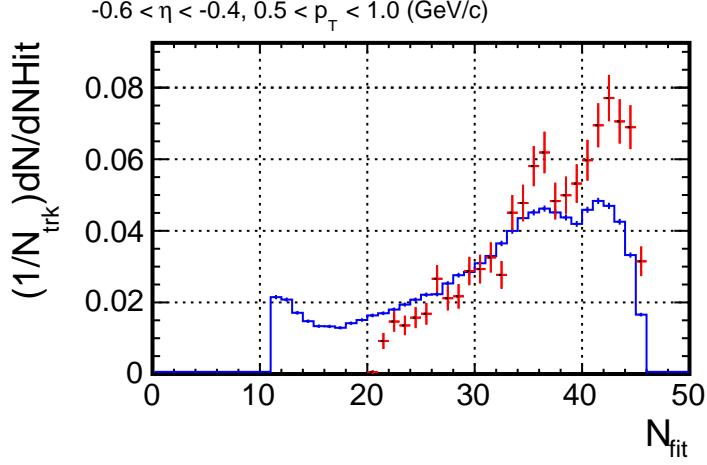
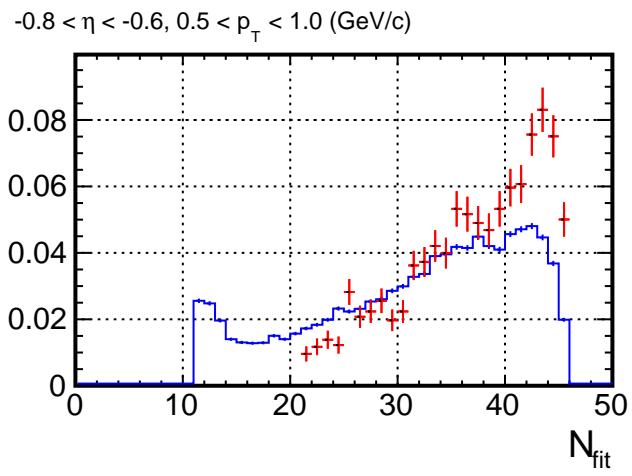
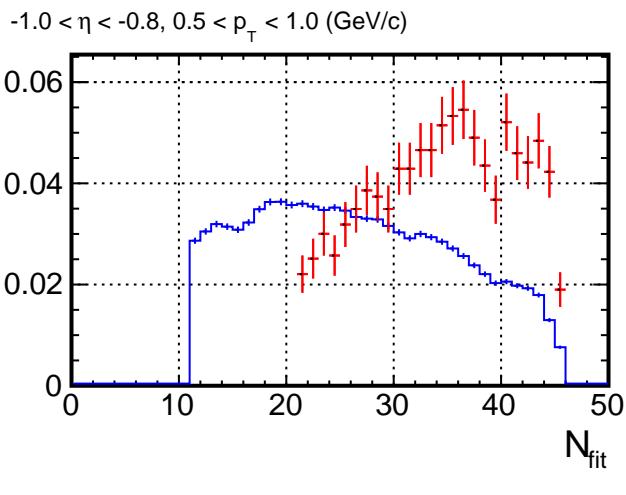
## NHit distribution for ( $p_T$ , $\eta$ ) slices



e-  
(MATCHED, geantid=3)

e-  
(PRIMARY, |n  $\sigma_{e^-}| < 2$  TPC)

## NHit distribution for ( $p_T$ , $\eta$ ) slices

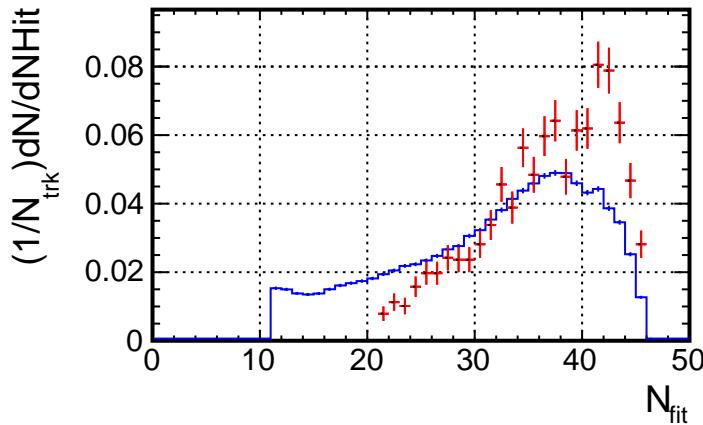


e-  
(MATCHED, geantid=3)

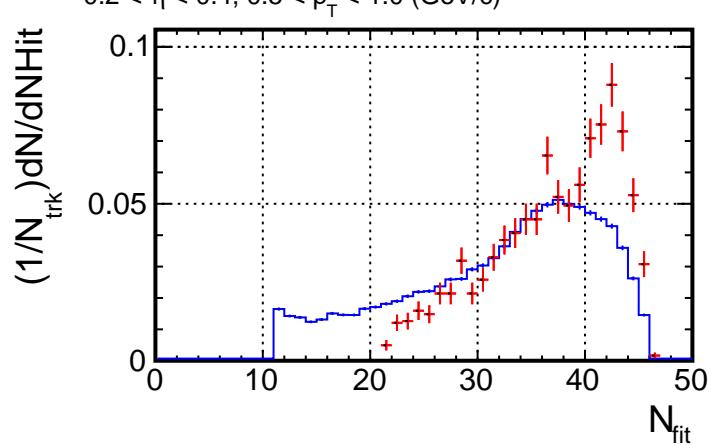
e-  
(PRIMARY,  $|n\sigma_{e^-}| < 2$  TPC)

## NHit distribution for ( $p_T$ , $\eta$ ) slices

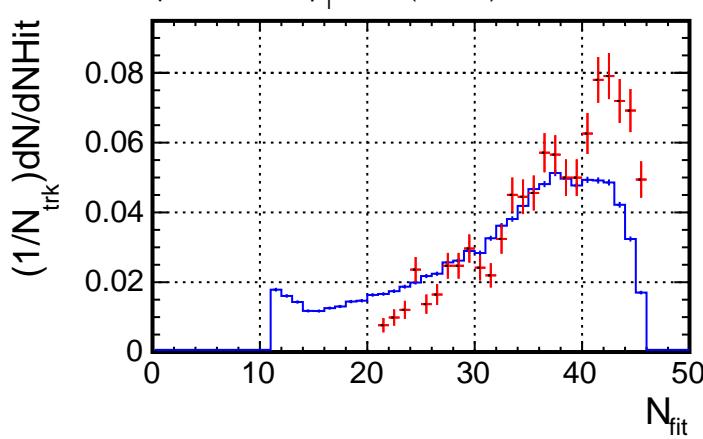
$0.0 < \eta < 0.2, 0.5 < p_T < 1.0$  (GeV/c)



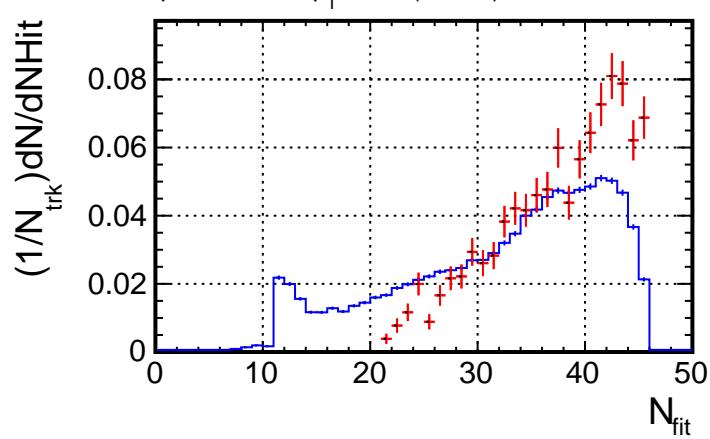
$0.2 < \eta < 0.4, 0.5 < p_T < 1.0$  (GeV/c)



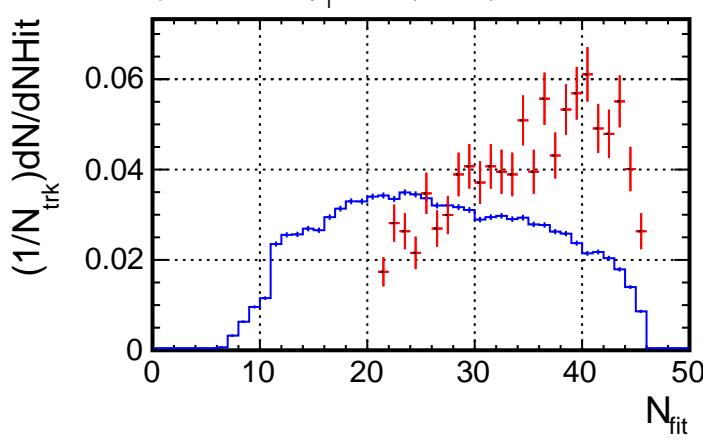
$0.4 < \eta < 0.6, 0.5 < p_T < 1.0$  (GeV/c)



$0.6 < \eta < 0.8, 0.5 < p_T < 1.0$  (GeV/c)



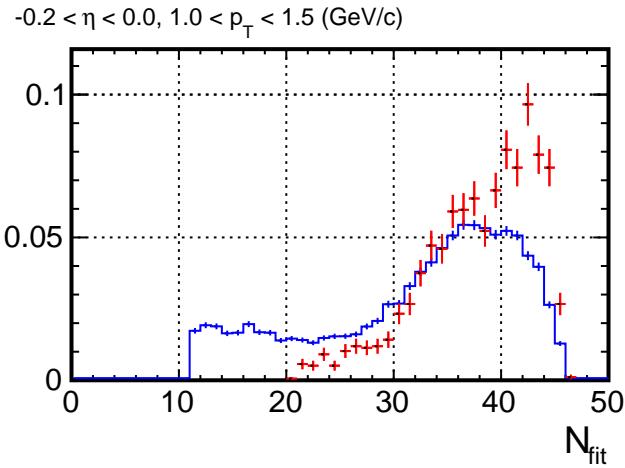
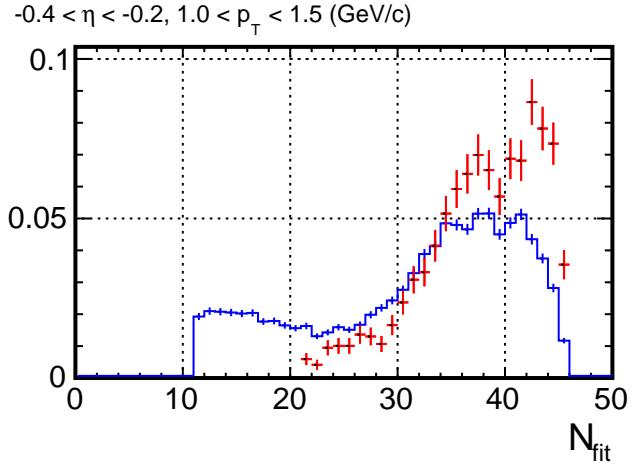
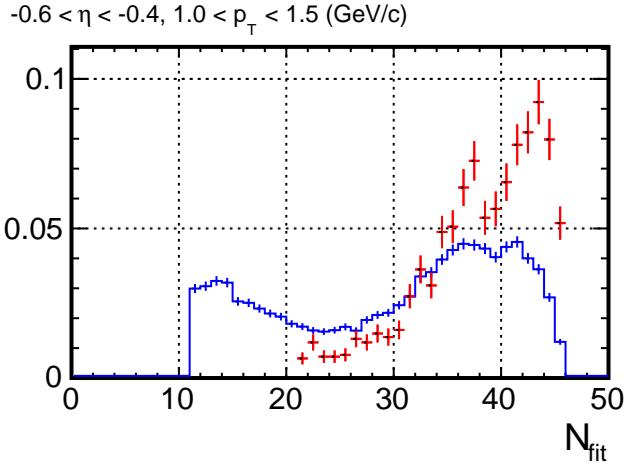
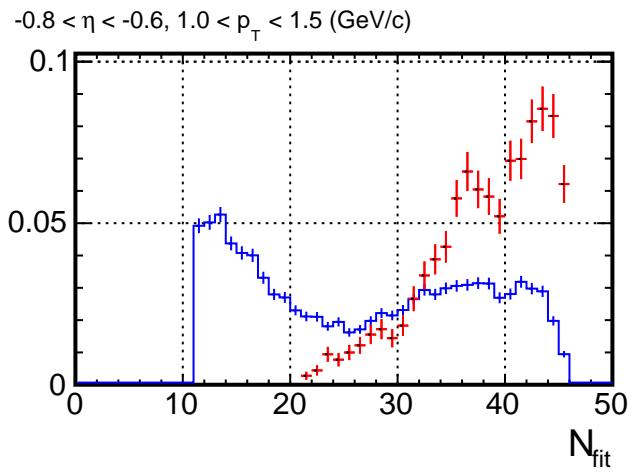
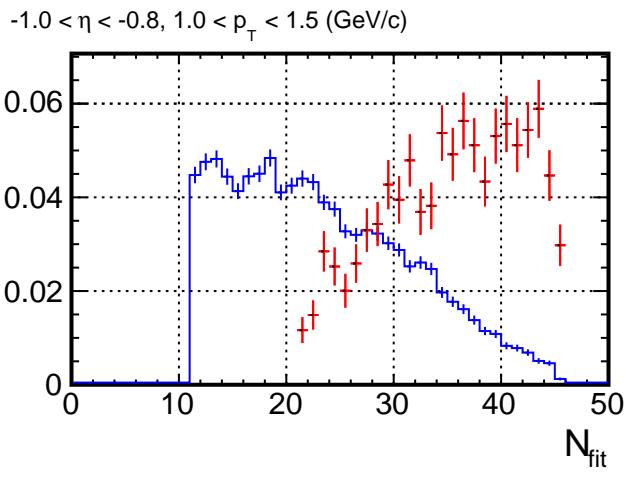
$0.8 < \eta < 1.0, 0.5 < p_T < 1.0$  (GeV/c)



e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|n \sigma_{e^-}| < 2$  TPC)

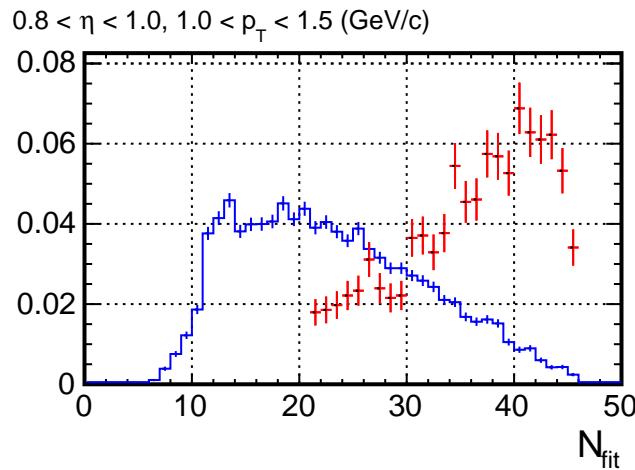
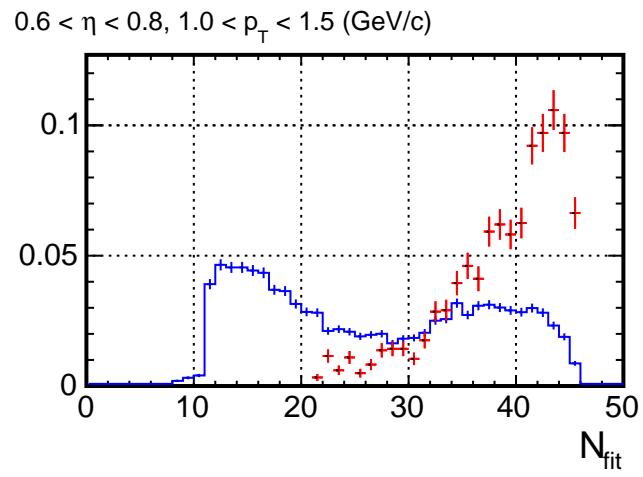
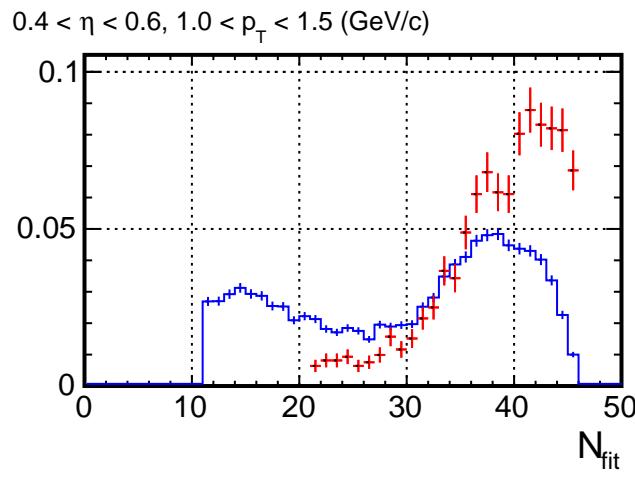
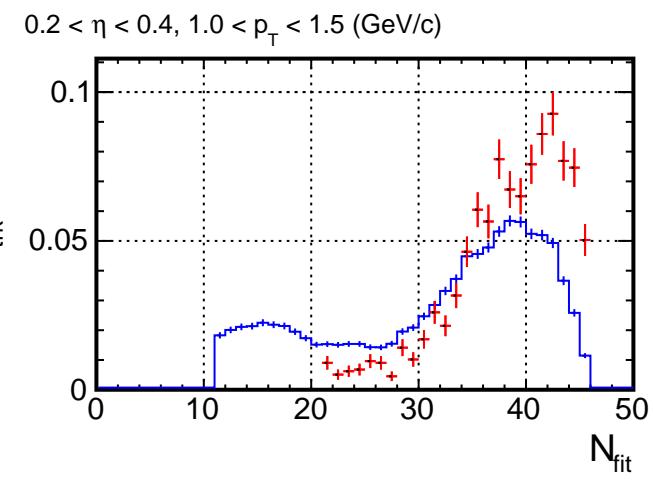
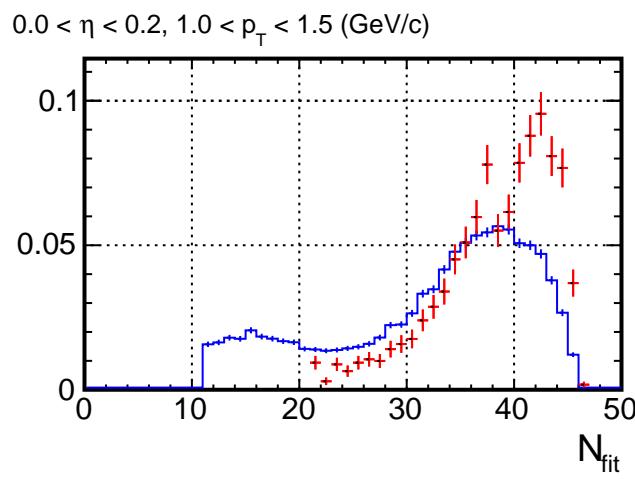
## NHit distribution for ( $p_T$ , $\eta$ ) slices



e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|n\sigma_{e^-}| < 2$  TPC)

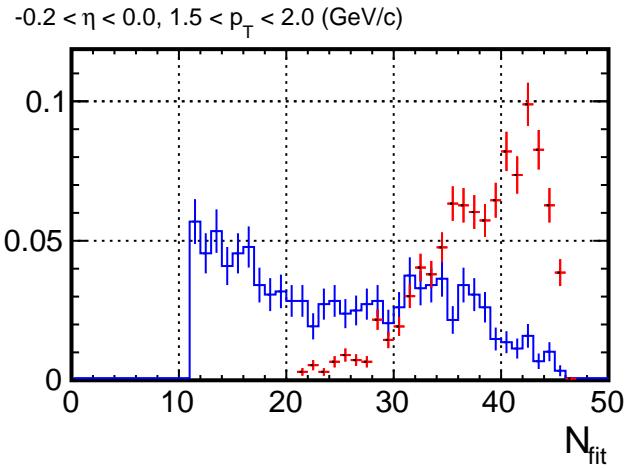
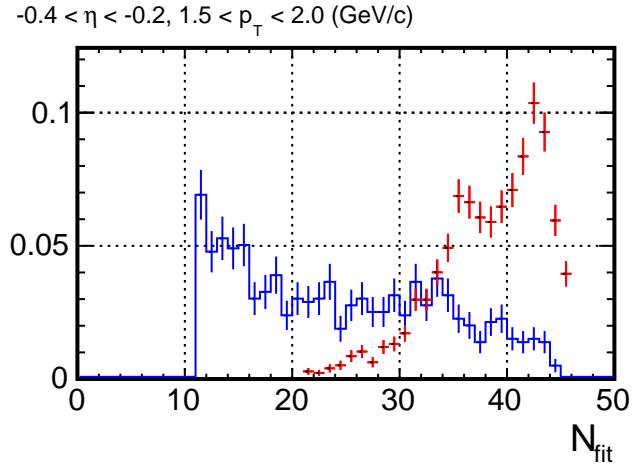
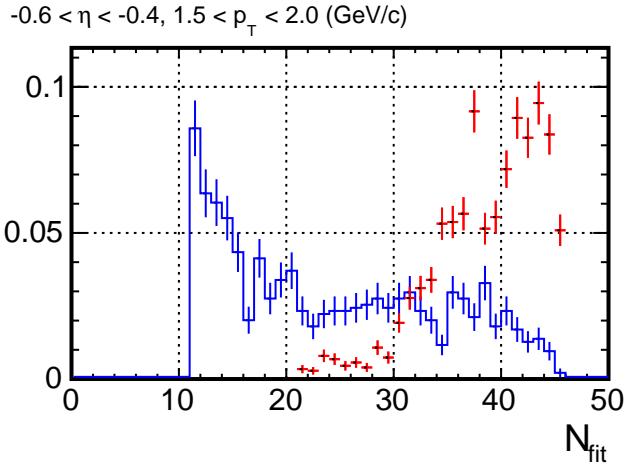
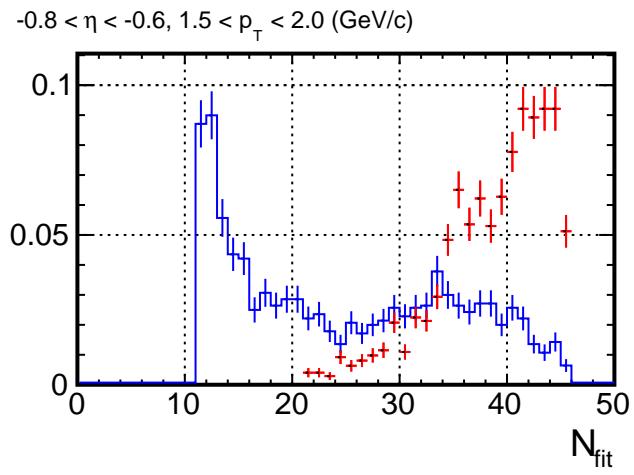
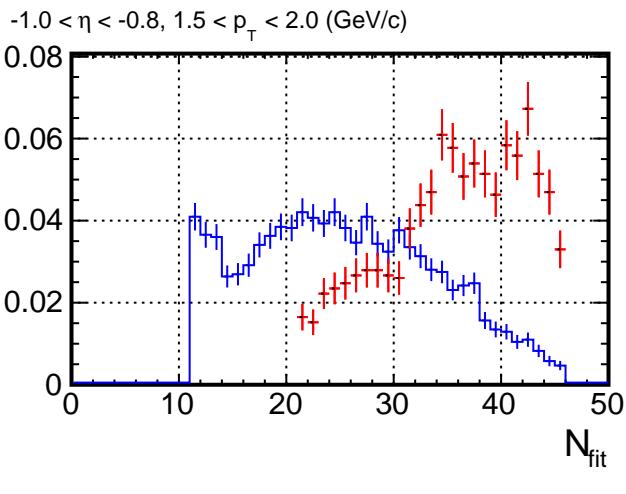
## NHit distribution for ( $p_T$ , $\eta$ ) slices



e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|n\sigma_e| < 2 \text{ TPC}$ )

## NHit distribution for ( $p_T$ , $\eta$ ) slices

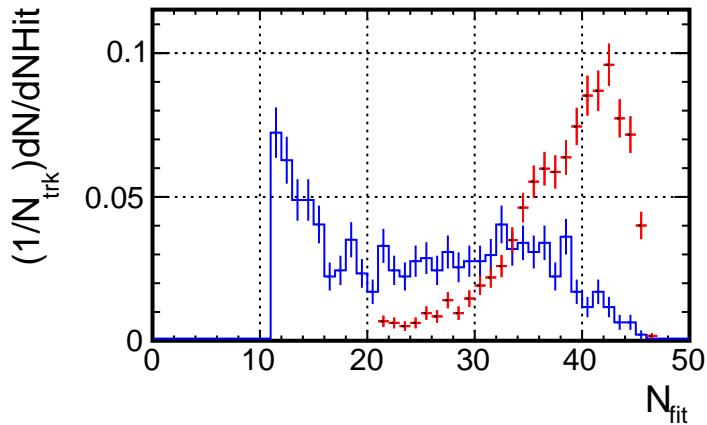


e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|n\sigma_{e^-}| < 2$  TPC)

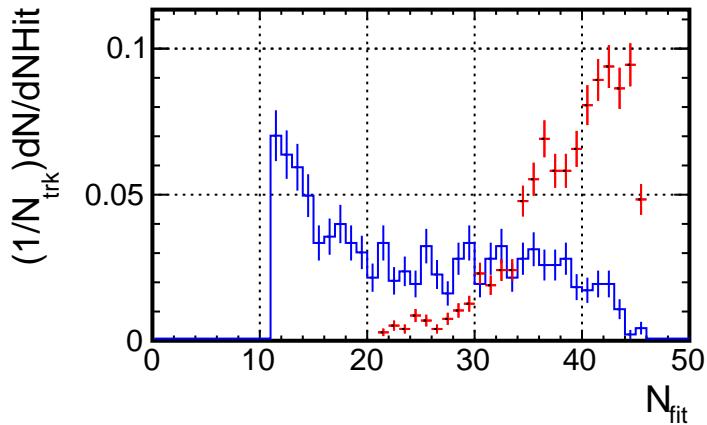
## NHit distribution for ( $p_T$ , $\eta$ ) slices

$0.0 < \eta < 0.2, 1.5 < p_T < 2.0$  (GeV/c)



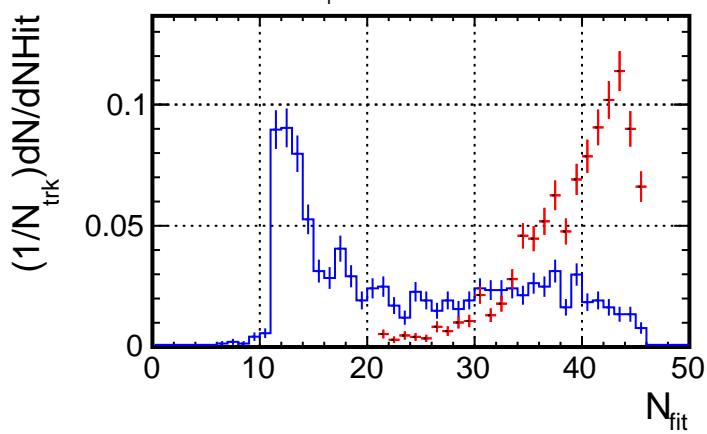
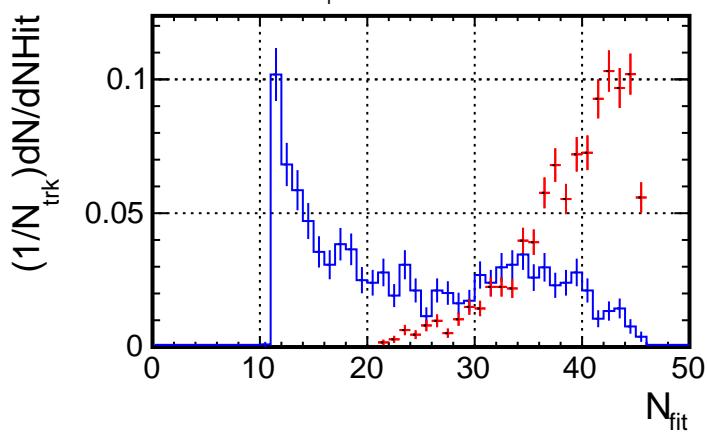
$0.2 < \eta < 0.4, 1.5 < p_T < 2.0$  (GeV/c)

$0.2 < \eta < 0.4, 1.5 < p_T < 2.0$  (GeV/c)

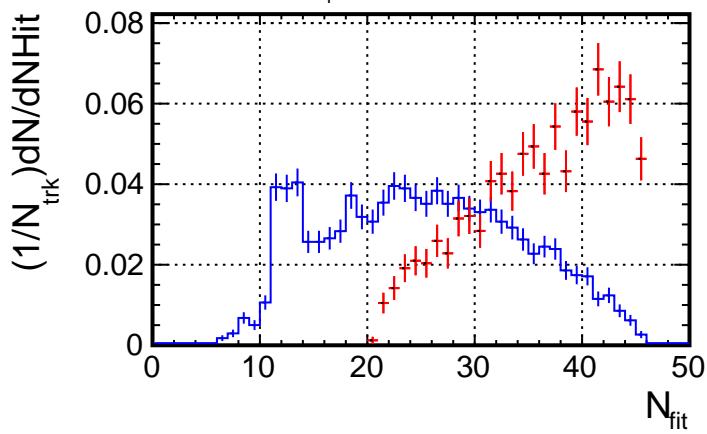


$0.4 < \eta < 0.6, 1.5 < p_T < 2.0$  (GeV/c)

$0.6 < \eta < 0.8, 1.5 < p_T < 2.0$  (GeV/c)

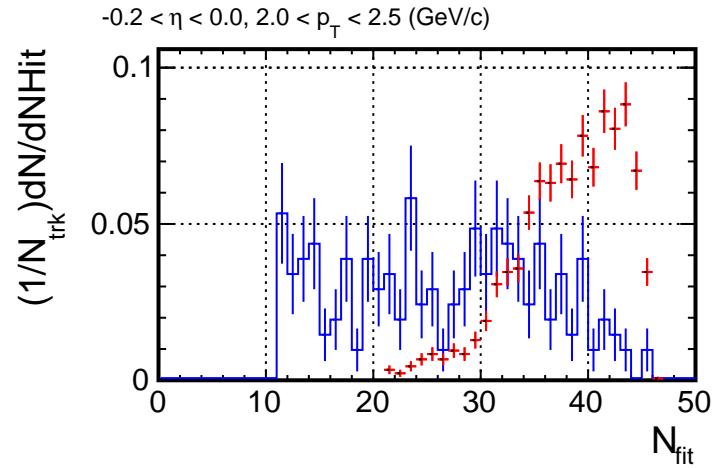
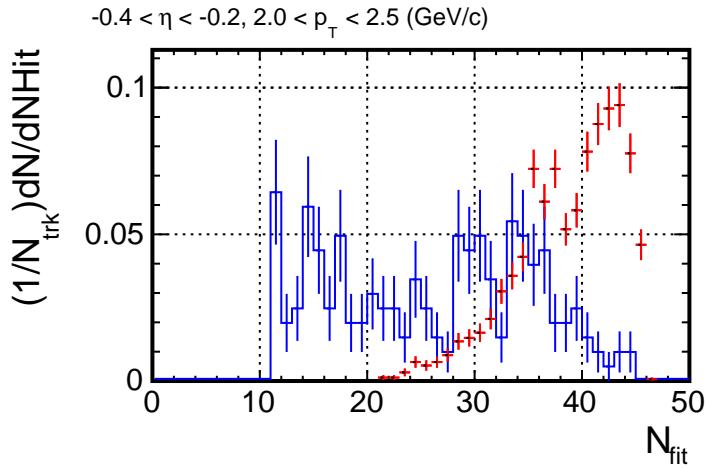
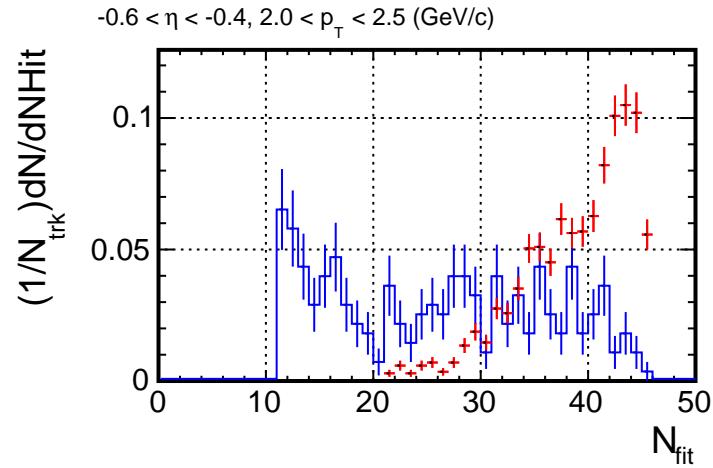
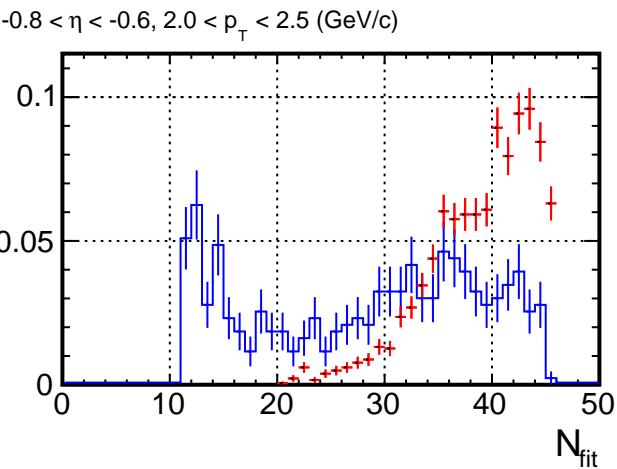
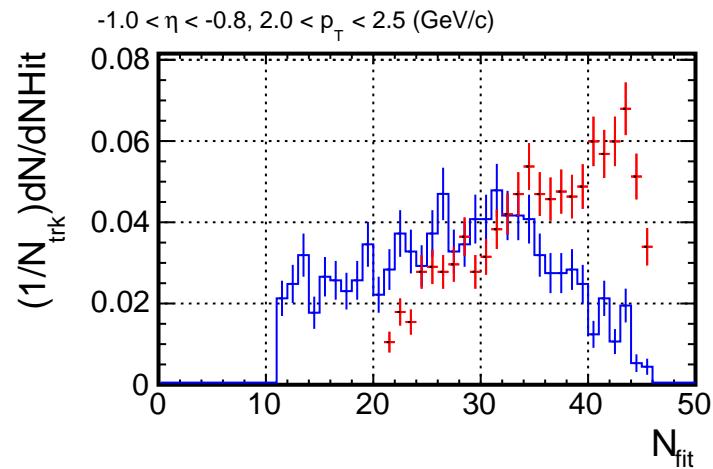


$0.8 < \eta < 1.0, 1.5 < p_T < 2.0$  (GeV/c)



e-  
(MATCHED, geantid=3)  
e-  
(PRIMARY,  $|n \sigma_{e^-}| < 2$  TPC)

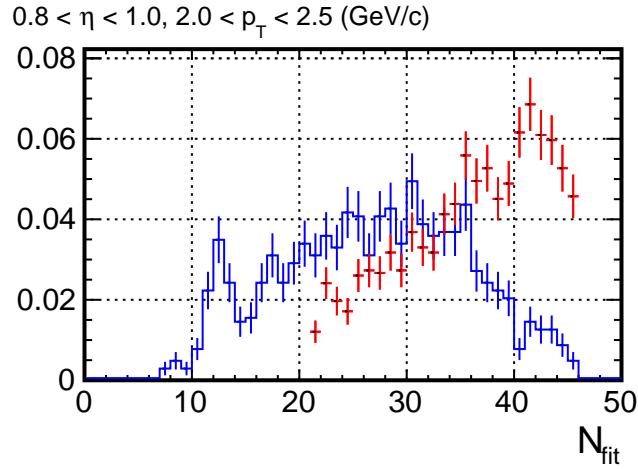
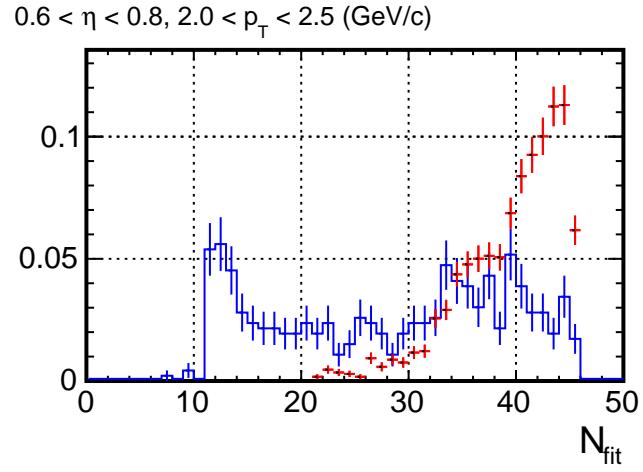
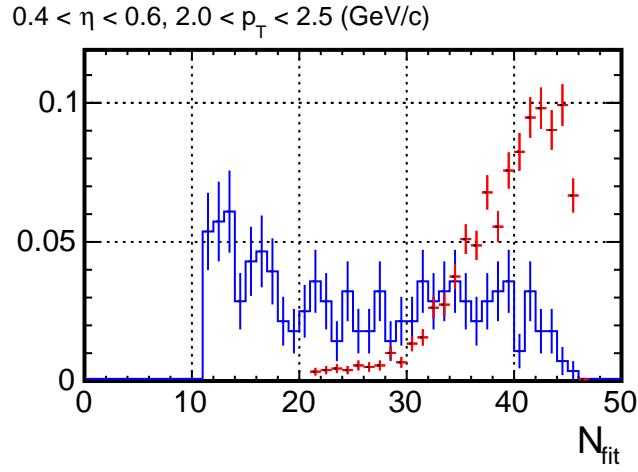
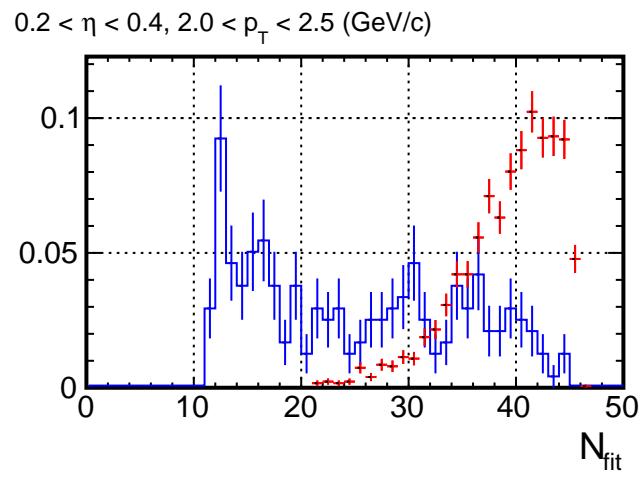
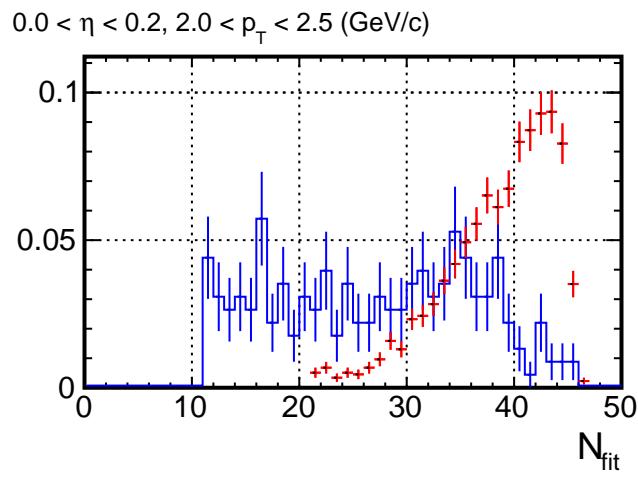
## NHit distribution for ( $p_T$ , $\eta$ ) slices



e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|n\sigma_{e^-}| < 2$  TPC)

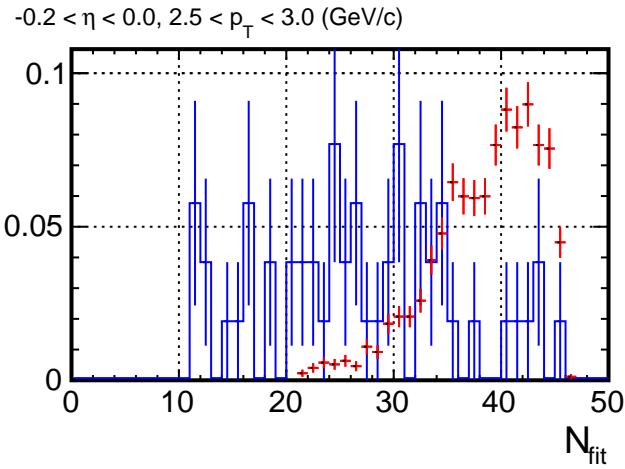
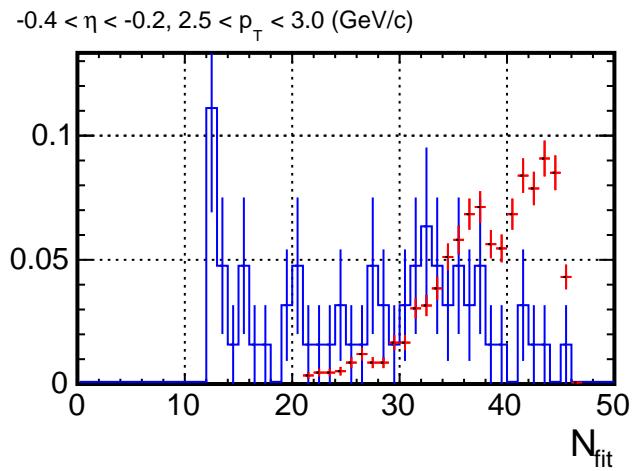
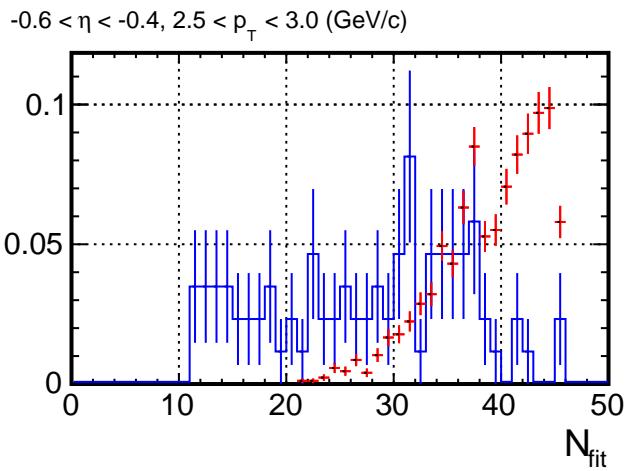
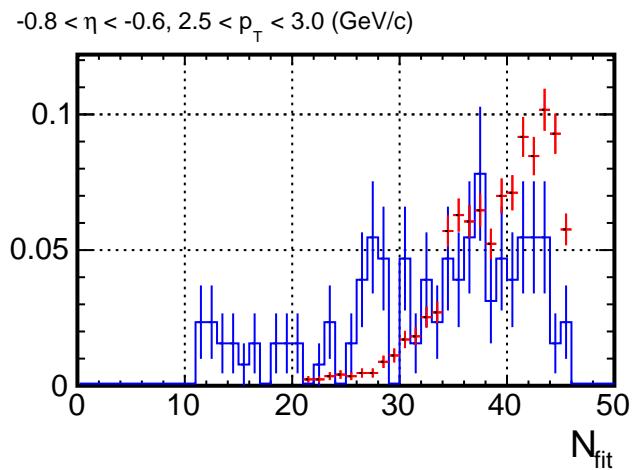
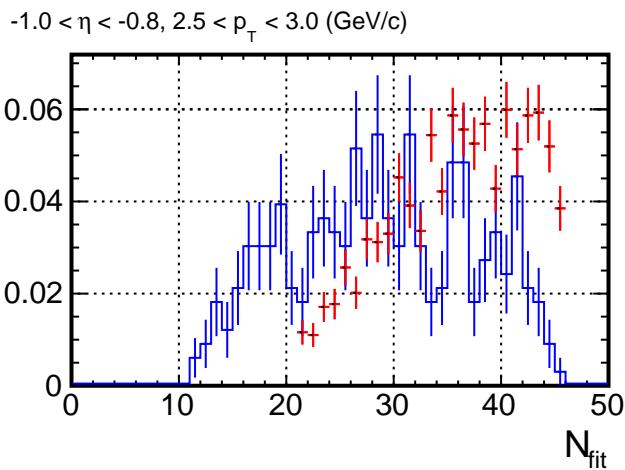
## NHit distribution for ( $p_T$ , $\eta$ ) slices



e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|\eta \sigma_{e^-}| < 2 \text{ TPC}$ )

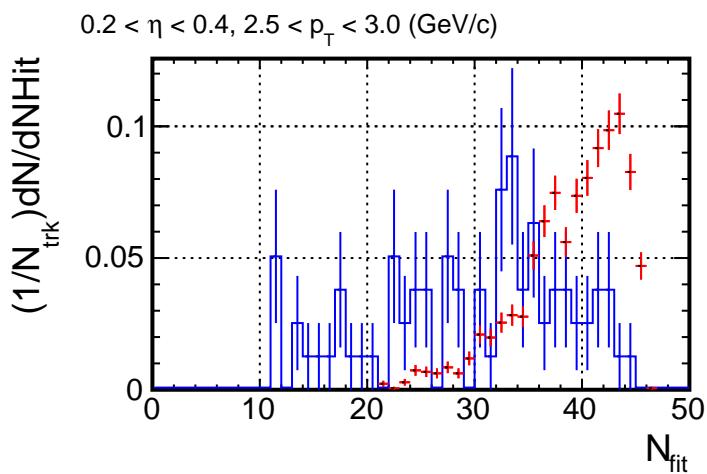
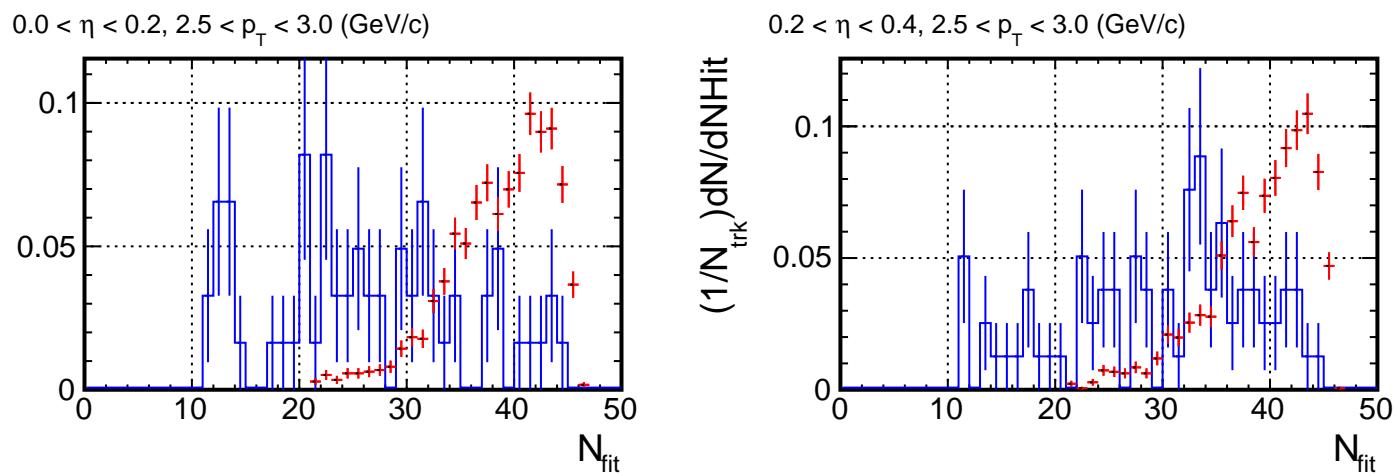
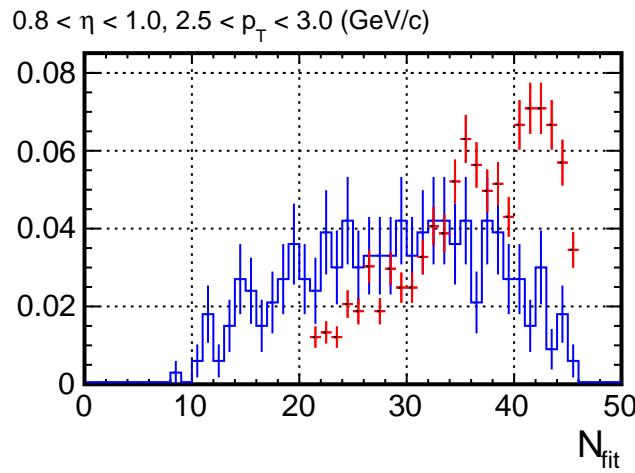
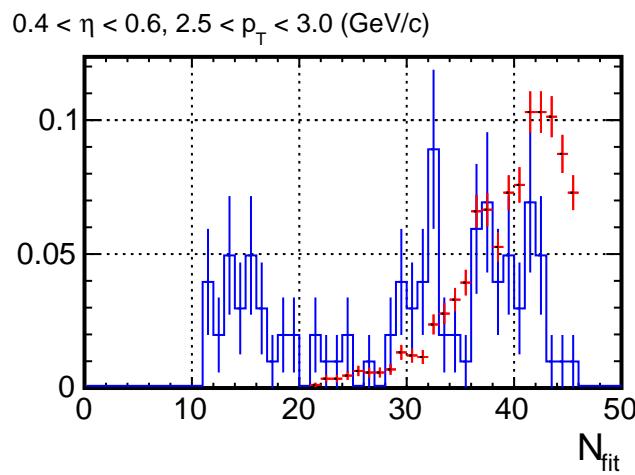
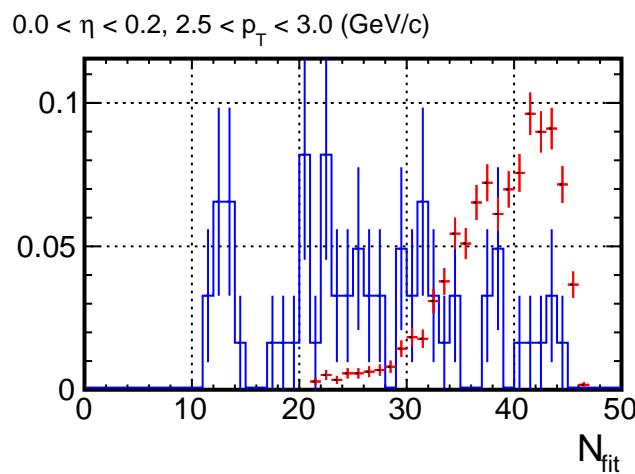
## NHit distribution for ( $p_T$ , $\eta$ ) slices



e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|n\sigma_{e^-}| < 2$  TPC)

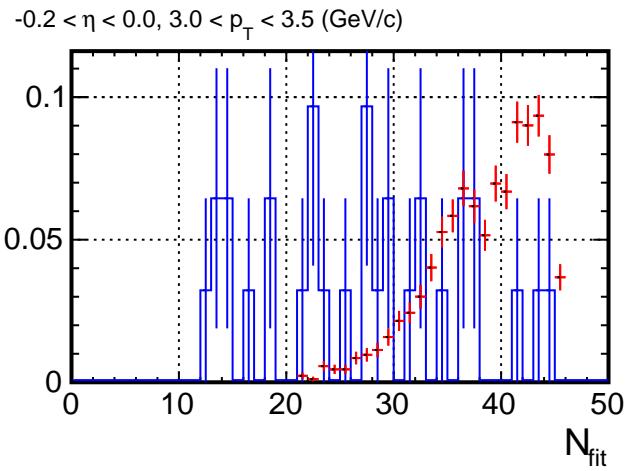
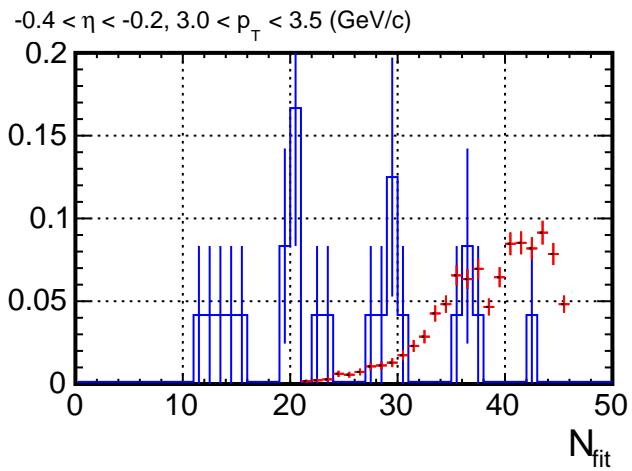
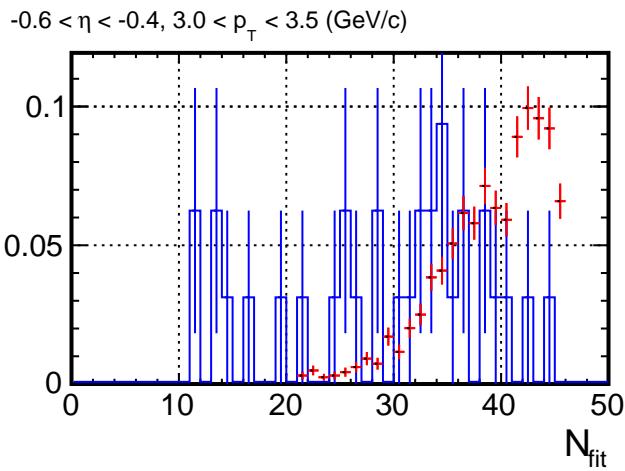
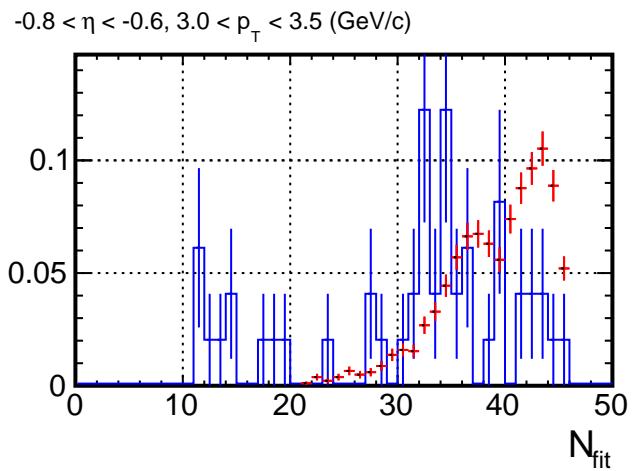
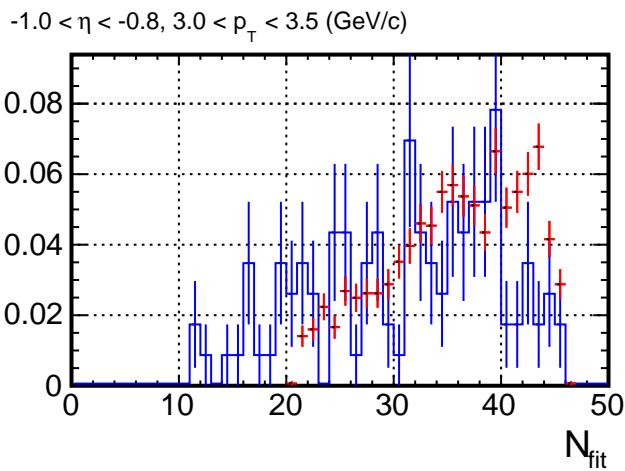
## NHit distribution for ( $p_T$ , $\eta$ ) slices



e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|n\sigma_{e^-}| < 2$  TPC)

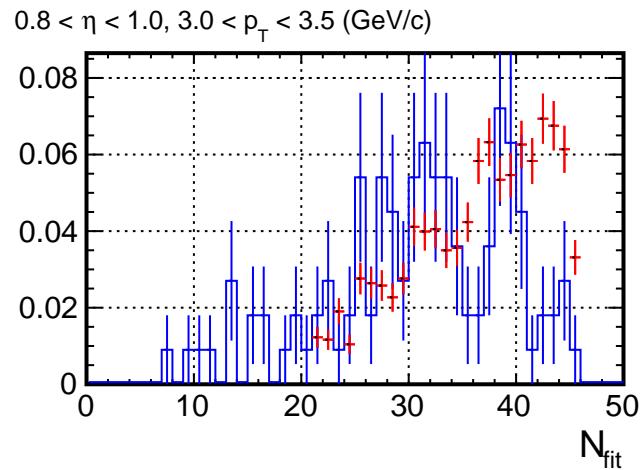
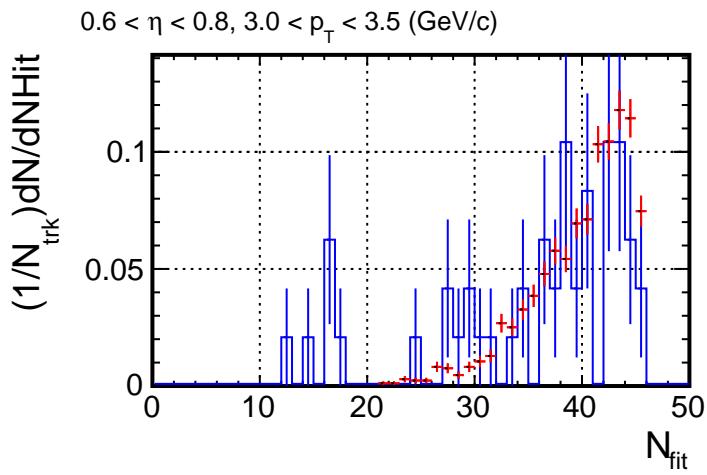
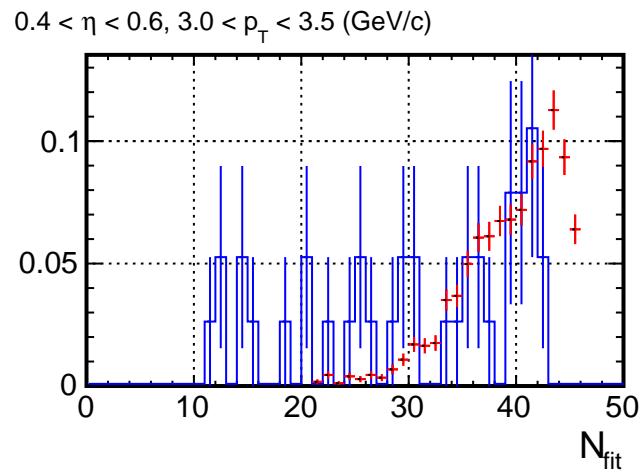
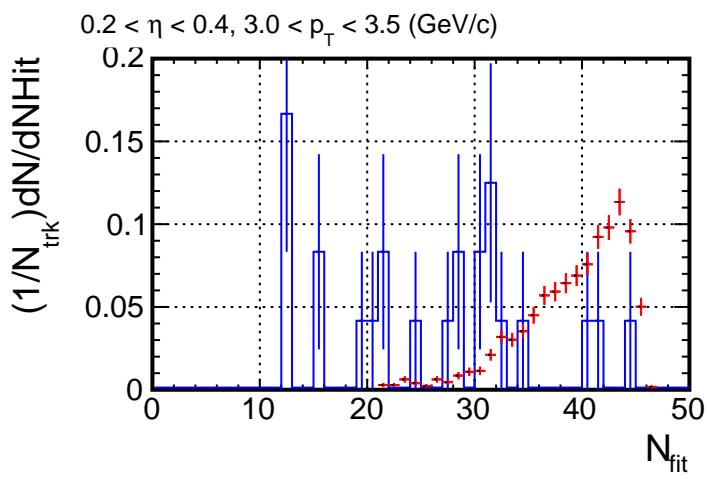
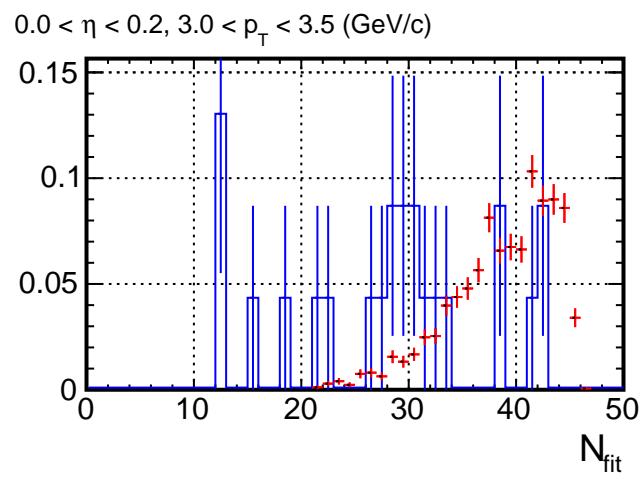
## NHit distribution for ( $p_T$ , $\eta$ ) slices



e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|n\sigma_{e^-}| < 2$  TPC)

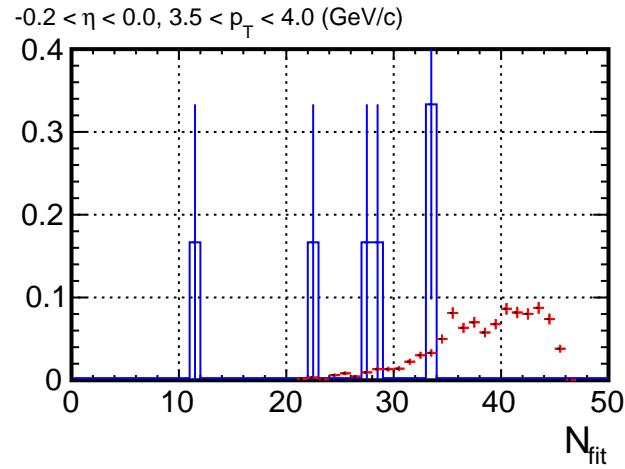
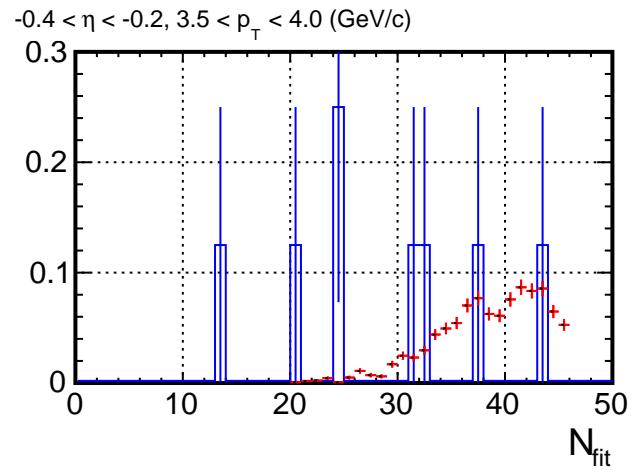
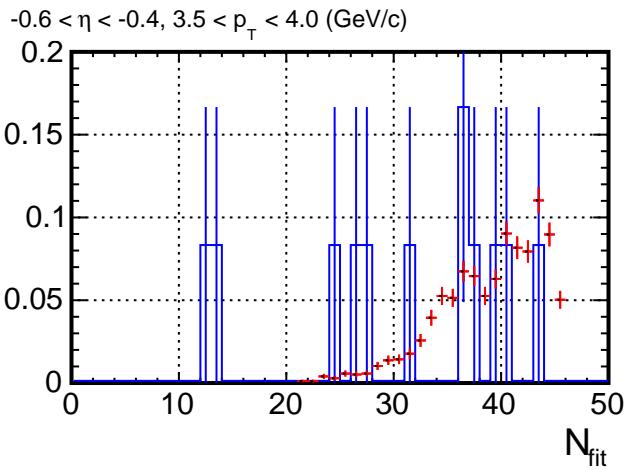
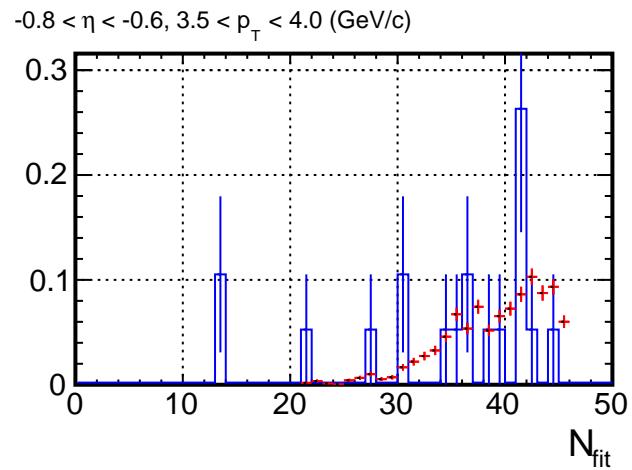
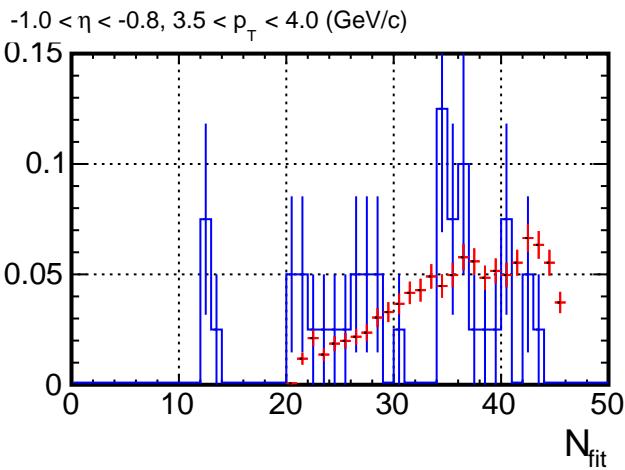
## NHit distribution for ( $p_T$ , $\eta$ ) slices



e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|n\sigma_{e^-}| < 2 \text{ TPC}$ )

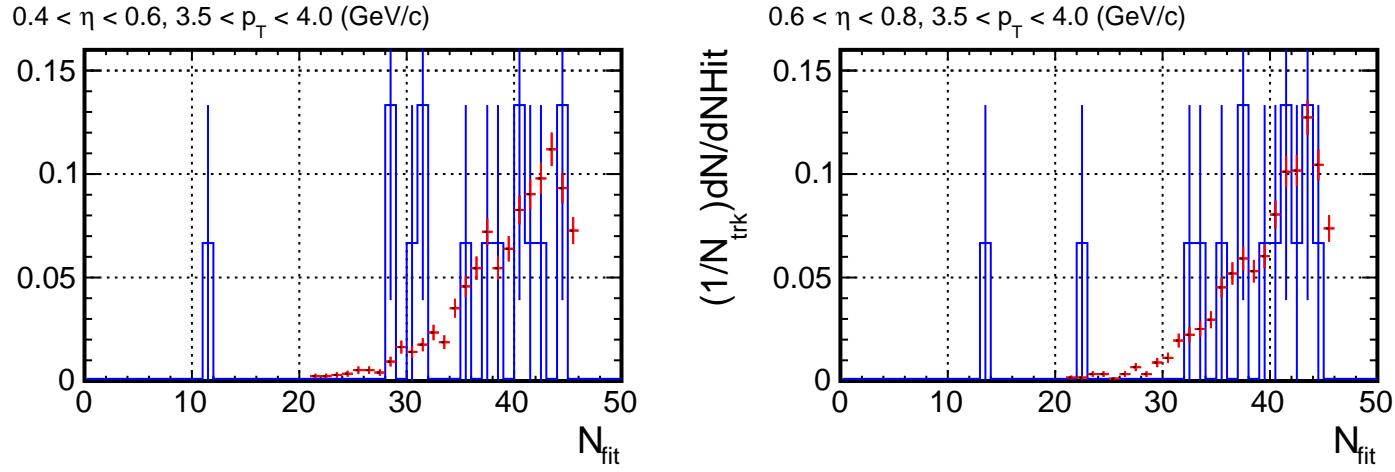
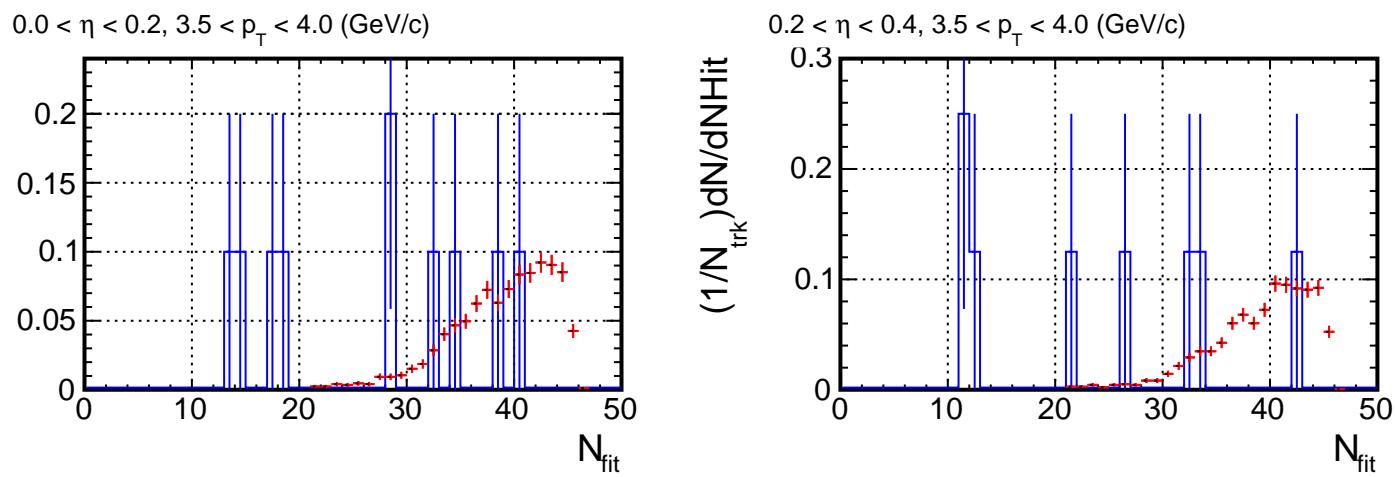
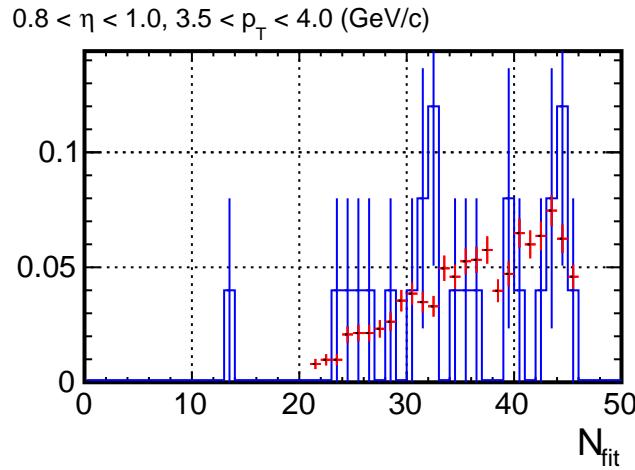
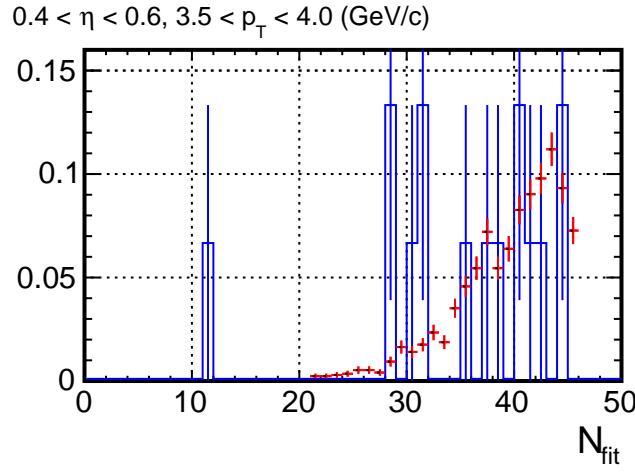
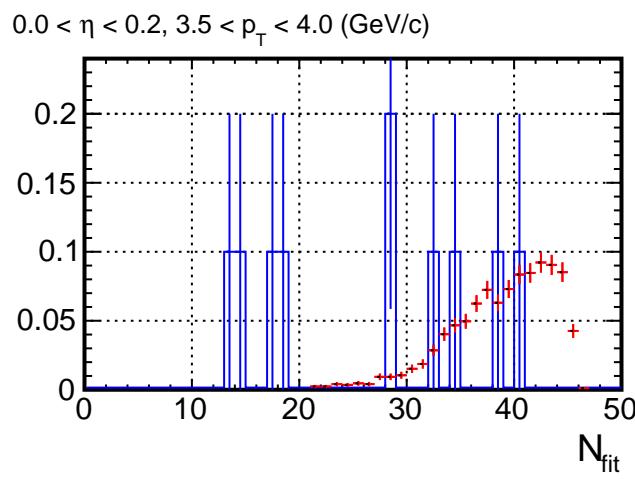
## NHit distribution for ( $p_T$ , $\eta$ ) slices



e-  
(MATCHED, geantid=3)

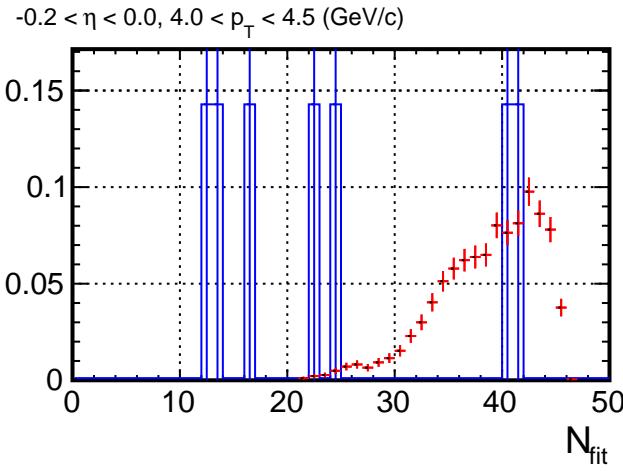
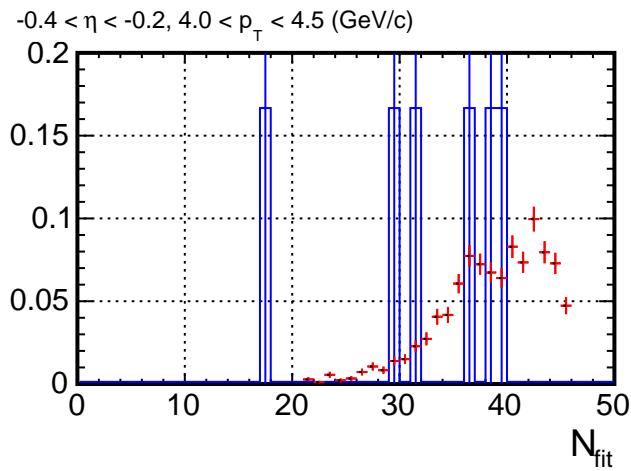
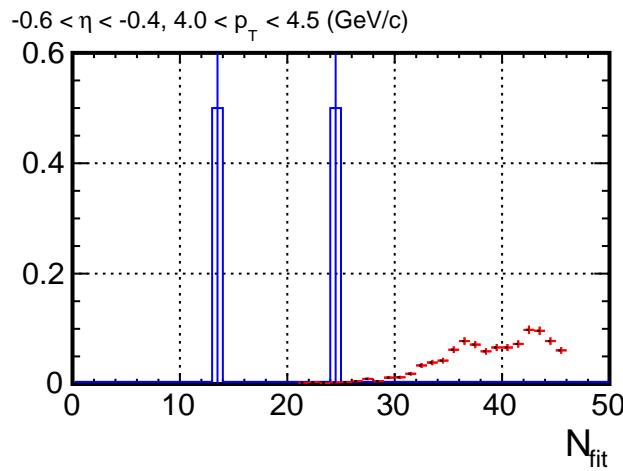
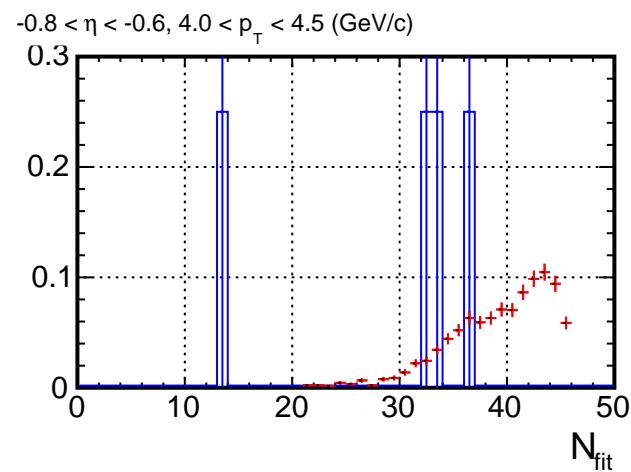
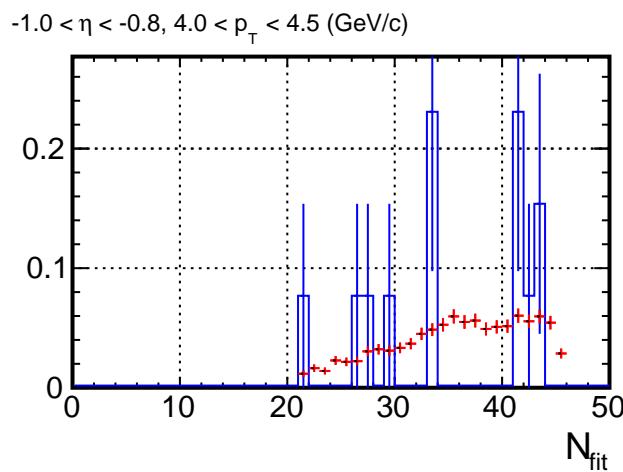
e-  
(PRIMARY,  $|n\sigma_{e^-}| < 2$  TPC)

## NHit distribution for ( $p_T$ , $\eta$ ) slices



— e-  
 (MATCHED, geantid=3)  
  
— e-  
 (PRIMARY,  $|n\sigma_e| < 2 \text{ TPC}$ )

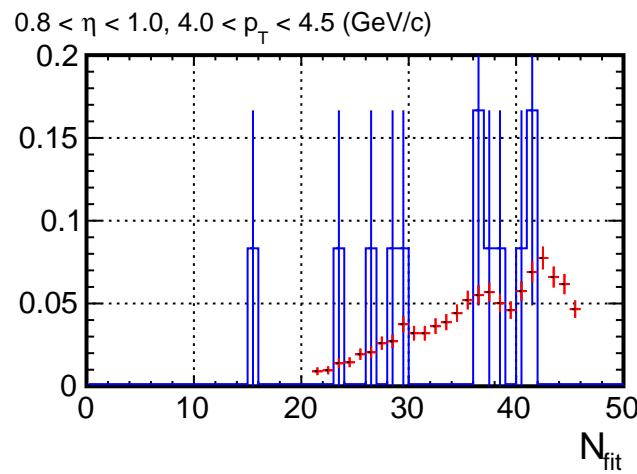
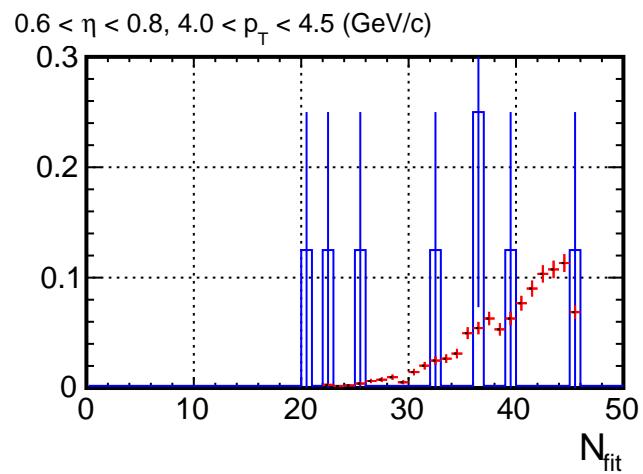
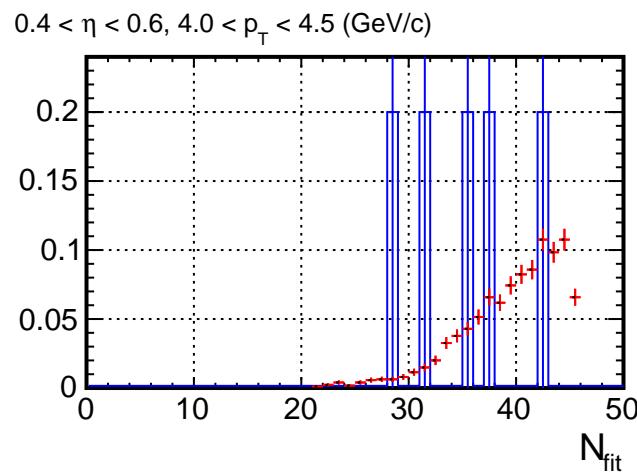
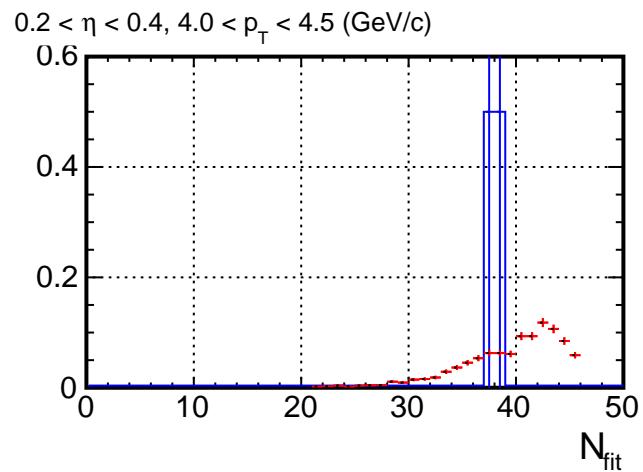
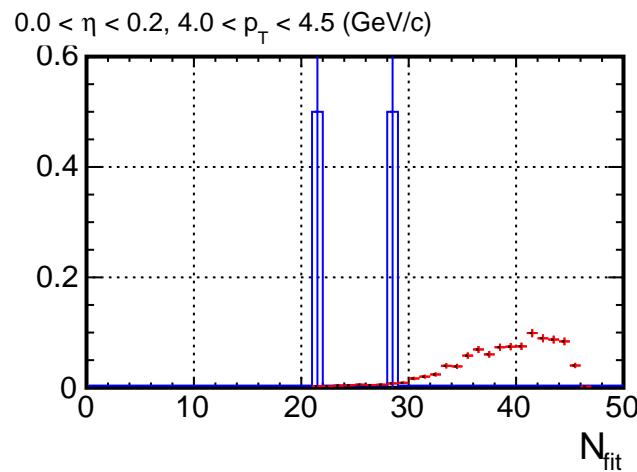
## NHit distribution for ( $p_T$ , $\eta$ ) slices



e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|n \sigma_{e^-}| < 2$  TPC)

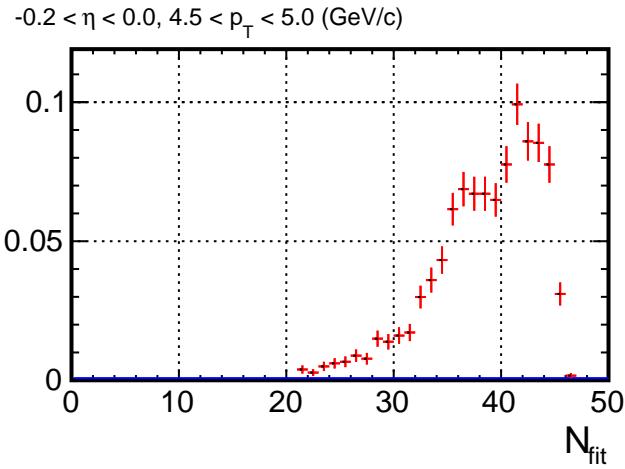
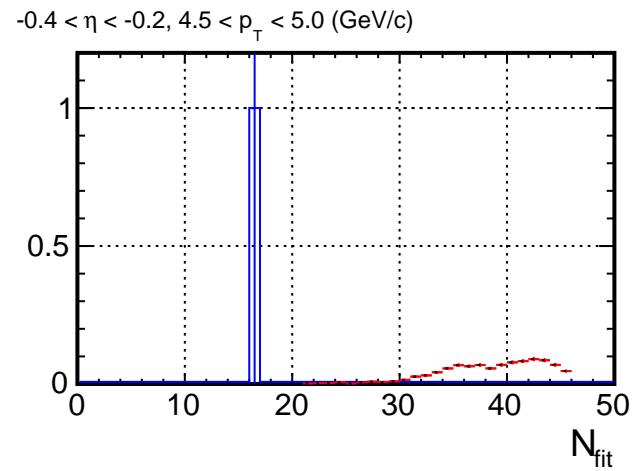
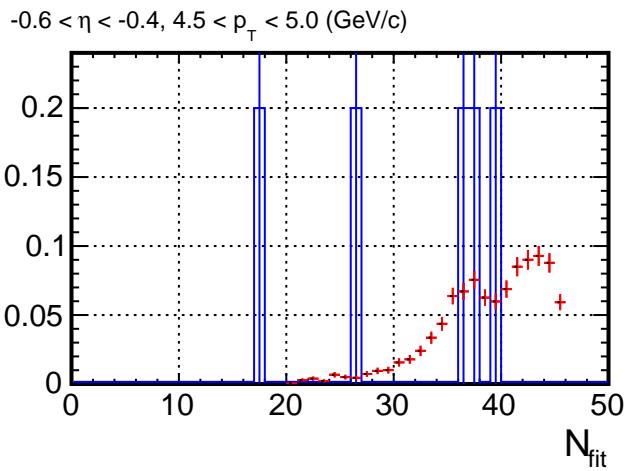
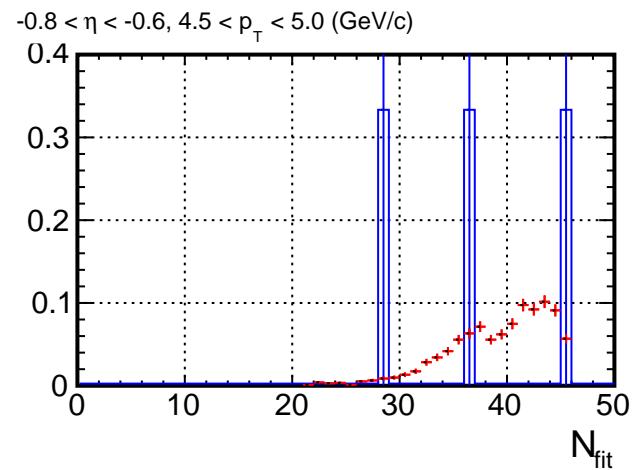
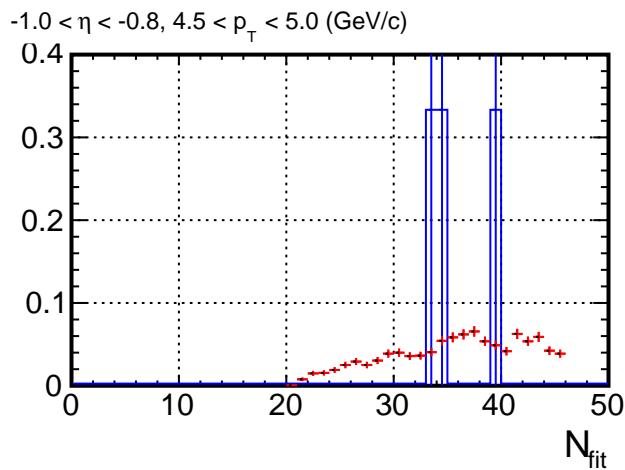
## NHit distribution for ( $p_T$ , $\eta$ ) slices



e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|n\sigma_e| < 2 \text{ TPC}$ )

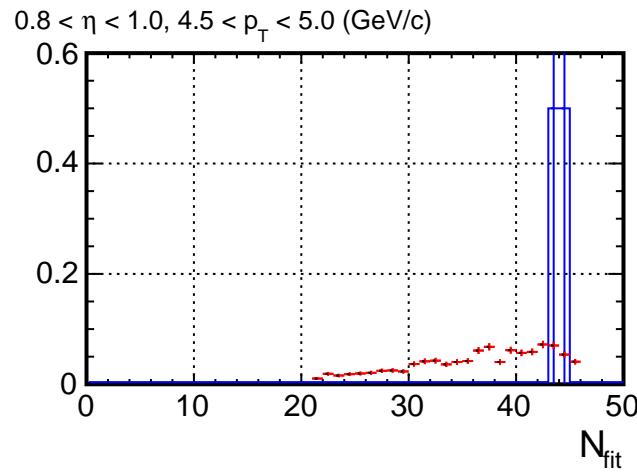
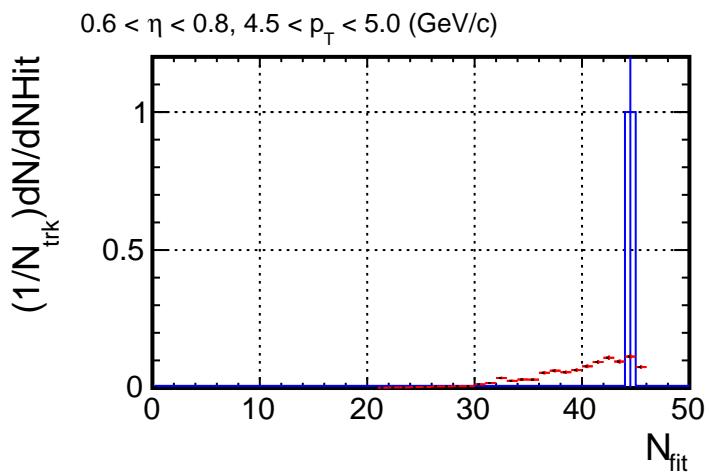
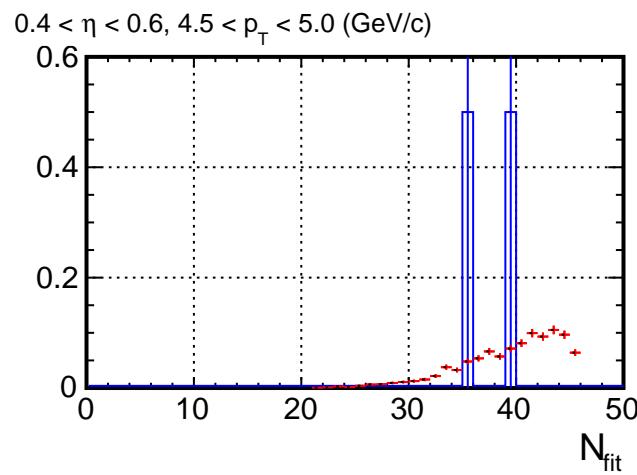
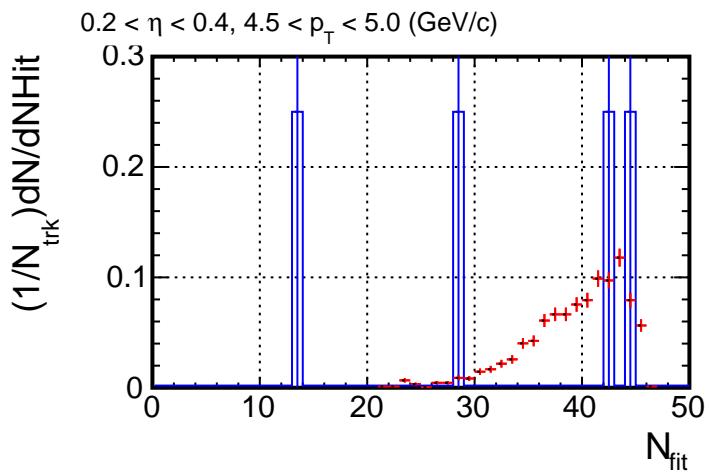
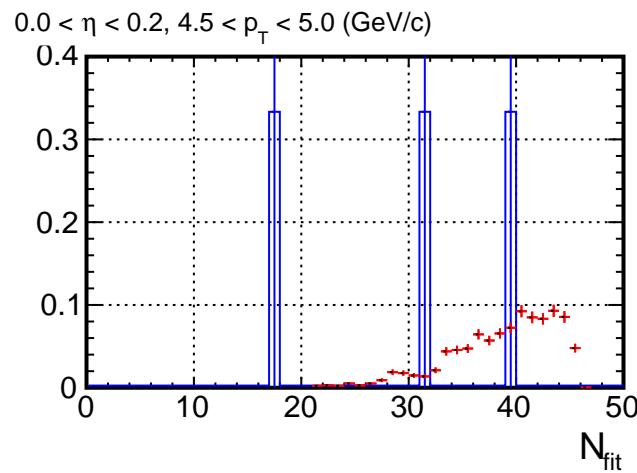
## NHit distribution for ( $p_T$ , $\eta$ ) slices



e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|n\sigma_{e^-}| < 2$  TPC)

## NHit distribution for ( $p_T$ , $\eta$ ) slices



e-  
(MATCHED, geantid=3)

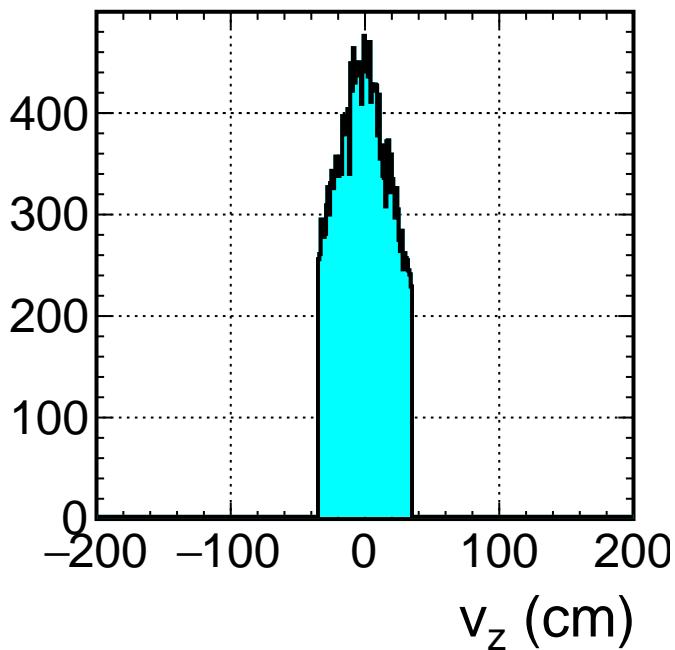
e-  
(PRIMARY,  $|n\sigma_{e^-}| < 2 \text{ TPC}$ )

$N_{\text{events}}=24.83$  K, MC=e-, embeddingQa.mc, (0)

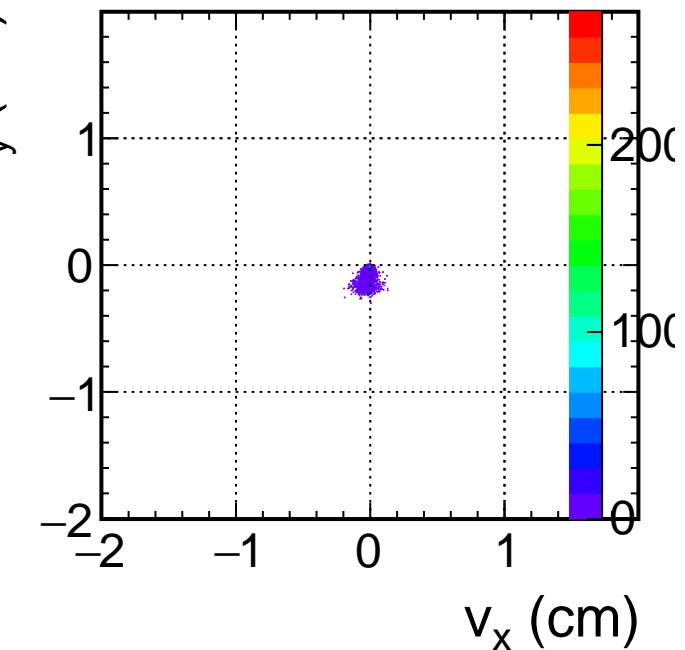
Tue Jul 23 01:44:07 2019

Event vertices, offline cuts:  $-35.0 < v_z < 35.0$  cm

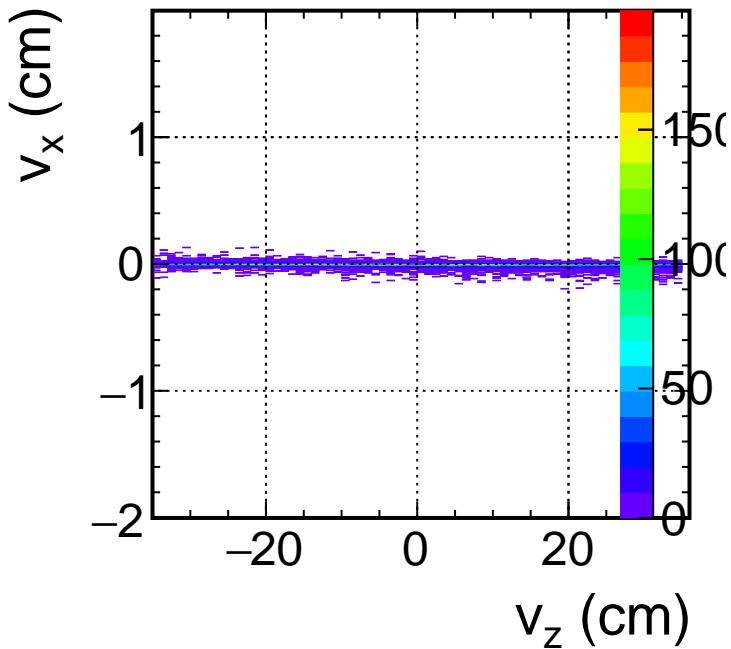
z-vertex



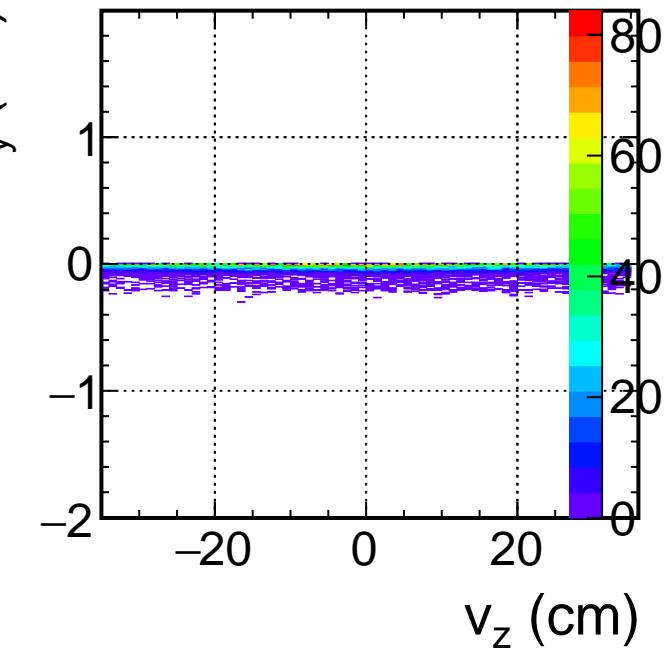
$v_y$  vs  $v_x$



$v_x$  vs  $v_z$

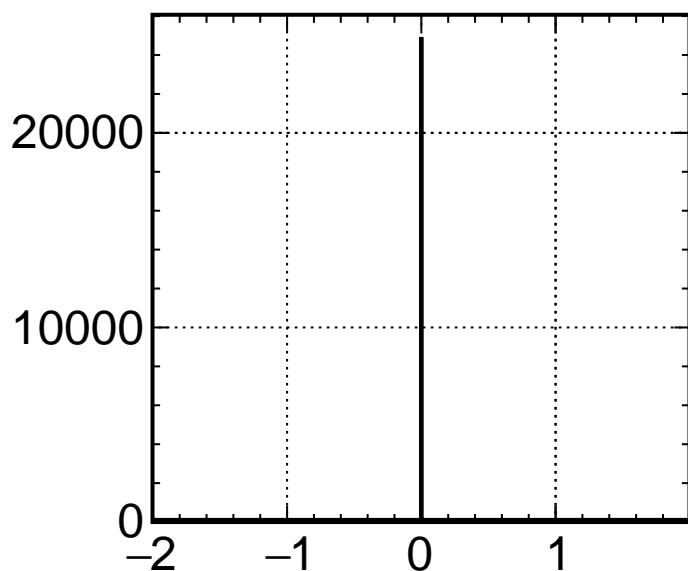


$v_y$  vs  $v_z$



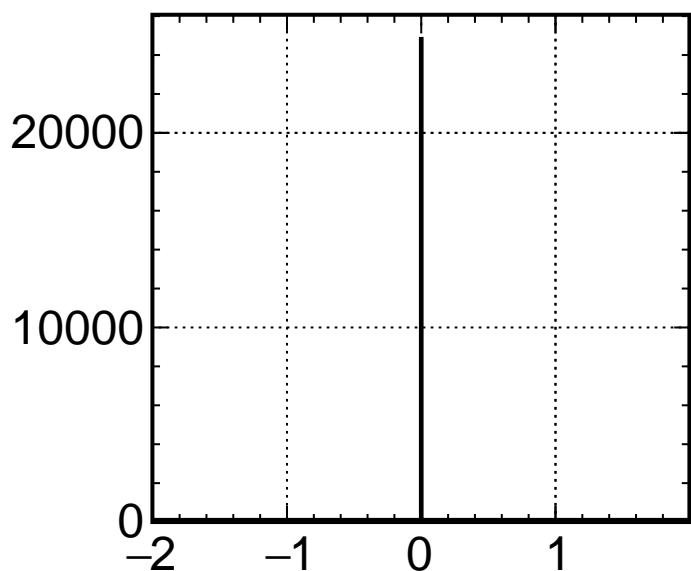
Event vertices,  $\Delta v = v(\text{Data}) - v(\text{MC})$ 

$$\Delta x = v_x - v_x(\text{MC})$$



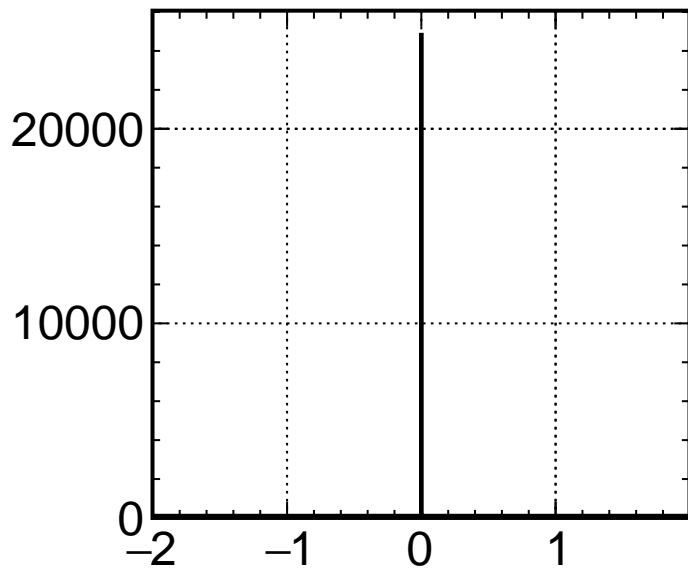
$$\Delta v_x = v_x - v_x(\text{MC}) \text{ (cm)}$$

$$\Delta y = v_y - v_y(\text{MC})$$



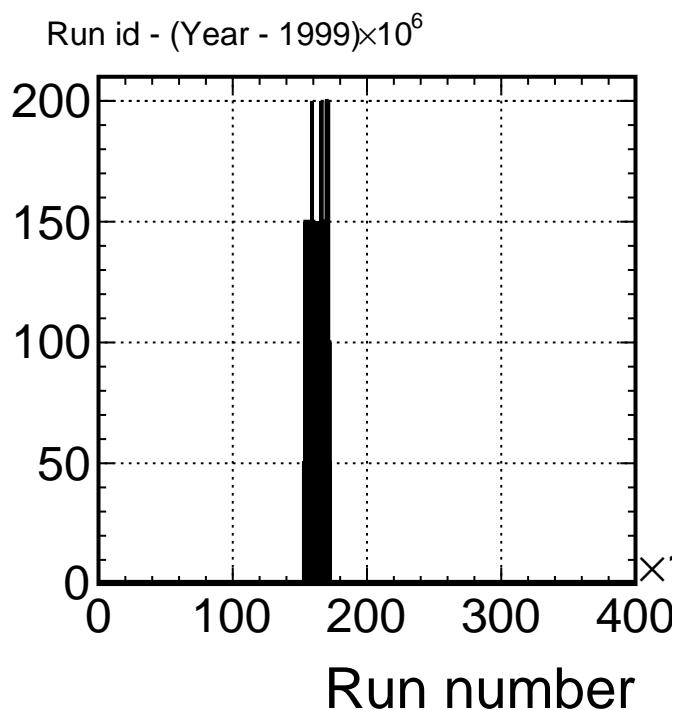
$$\Delta v_y = v_y - v_y(\text{MC}) \text{ (cm)}$$

$$\Delta z = v_z - v_z(\text{MC})$$

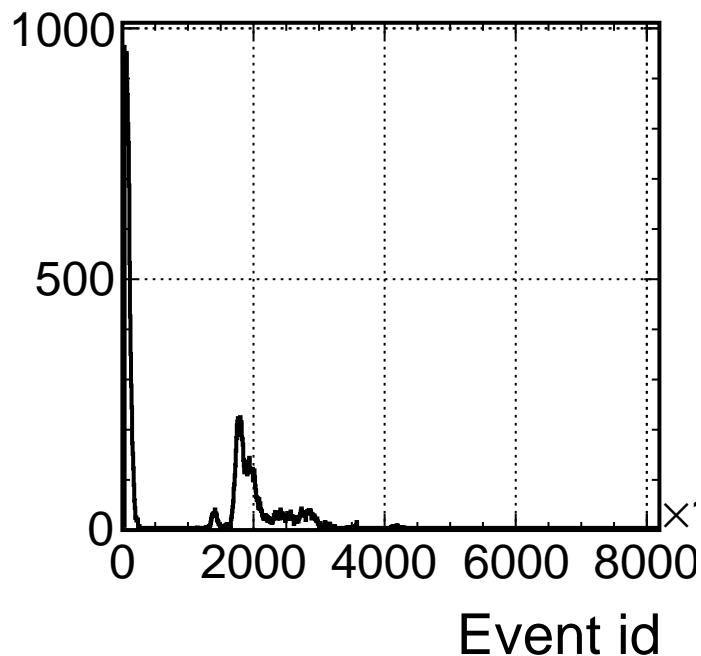


$$\Delta v_z = v_z - v_z(\text{MC}) \text{ (cm)}$$

### Run and event id

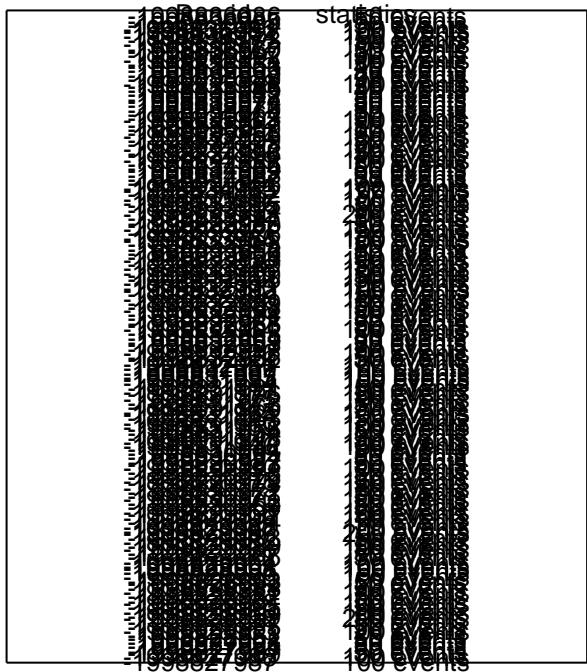
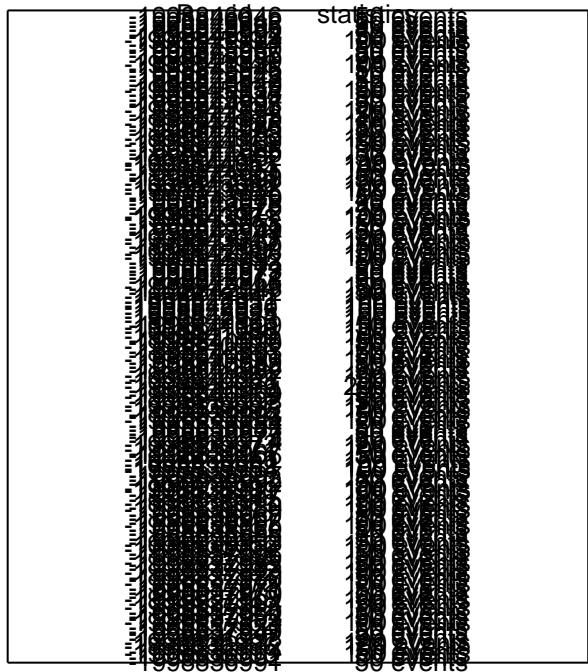


Event id

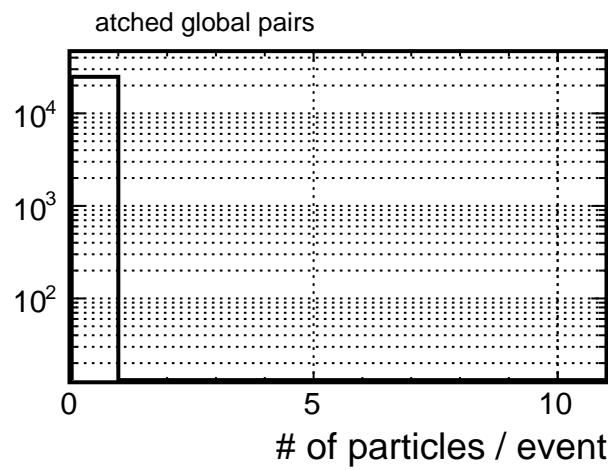
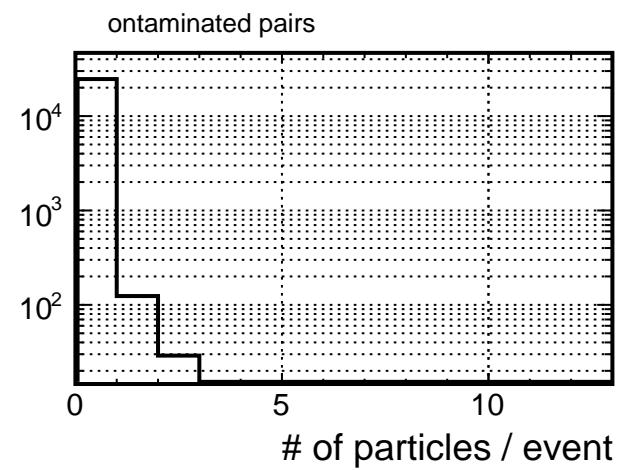
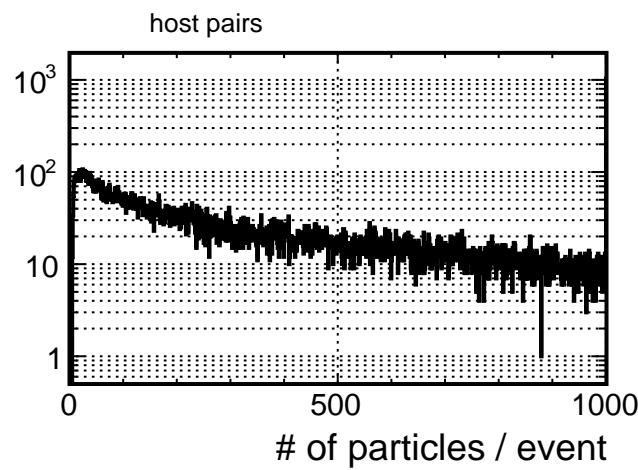
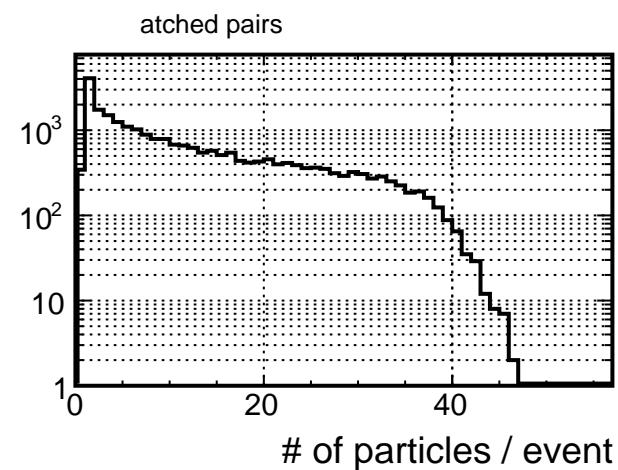
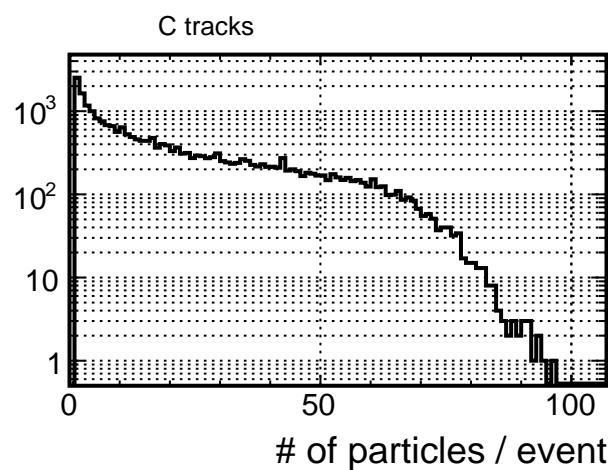


Run number

Event id



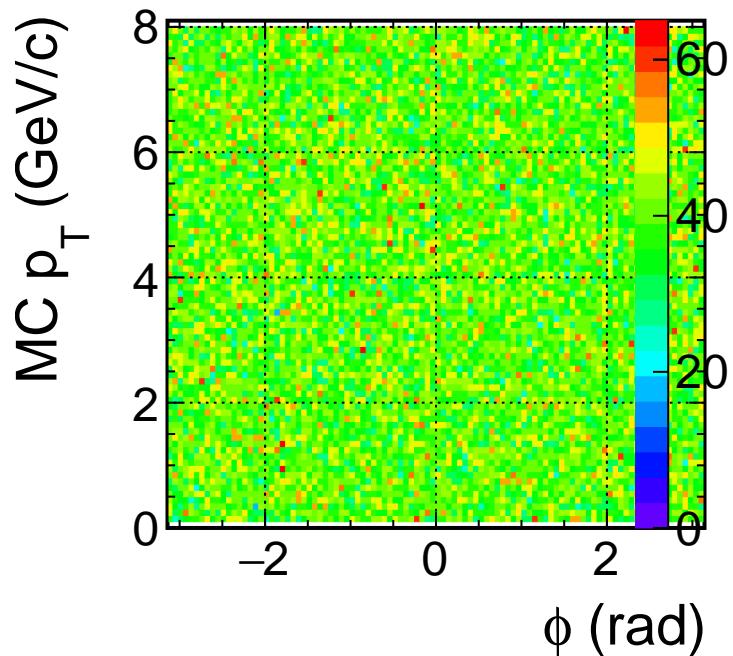
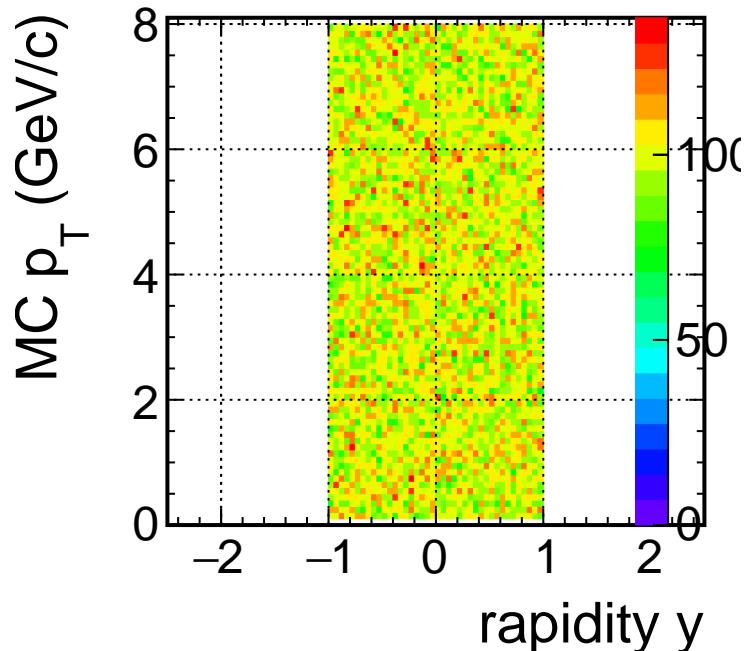
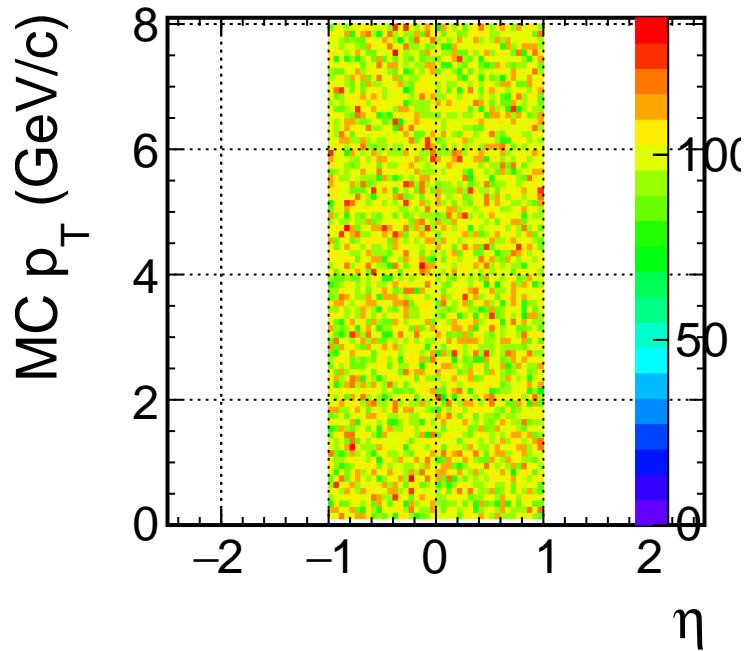
## Multiplicity distribution



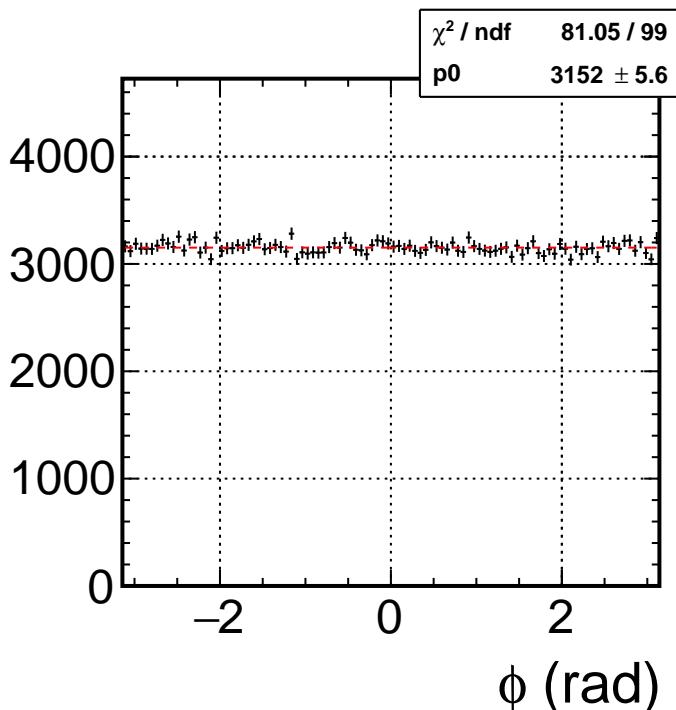
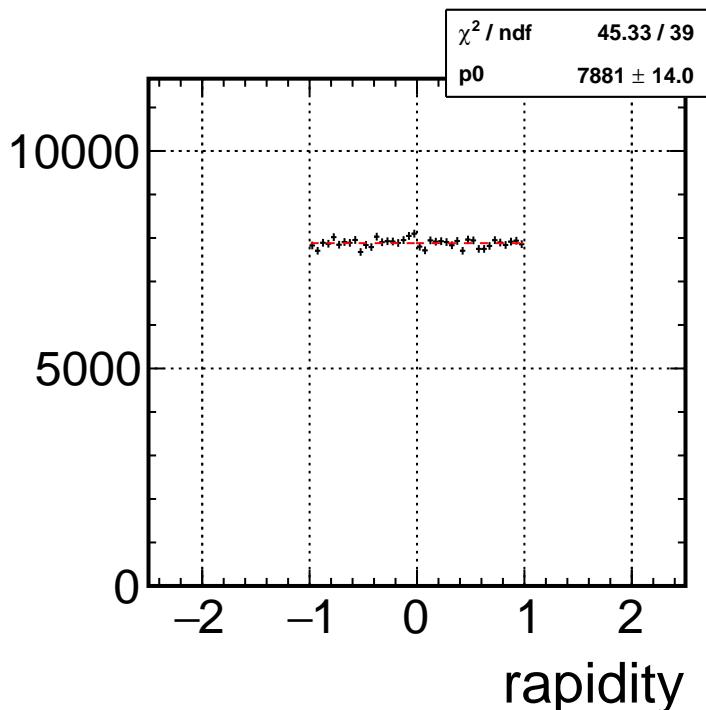
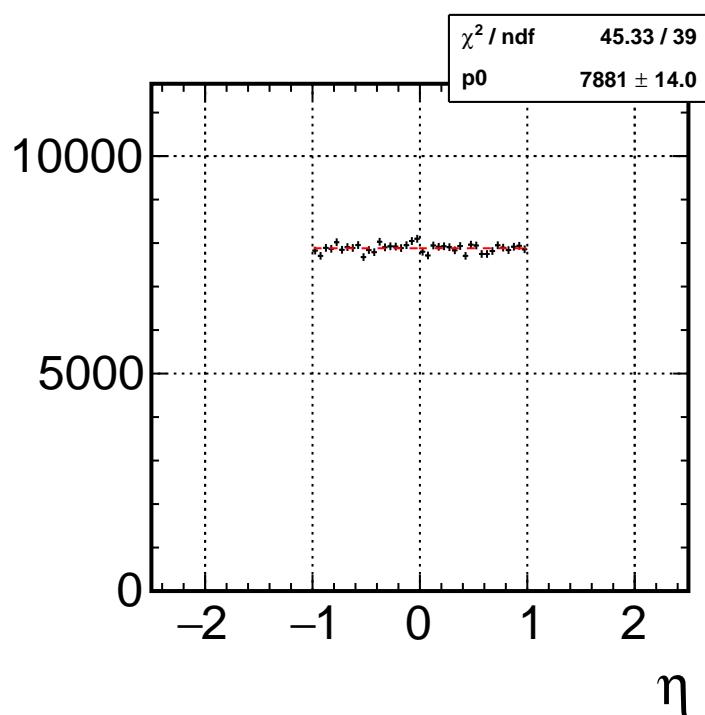
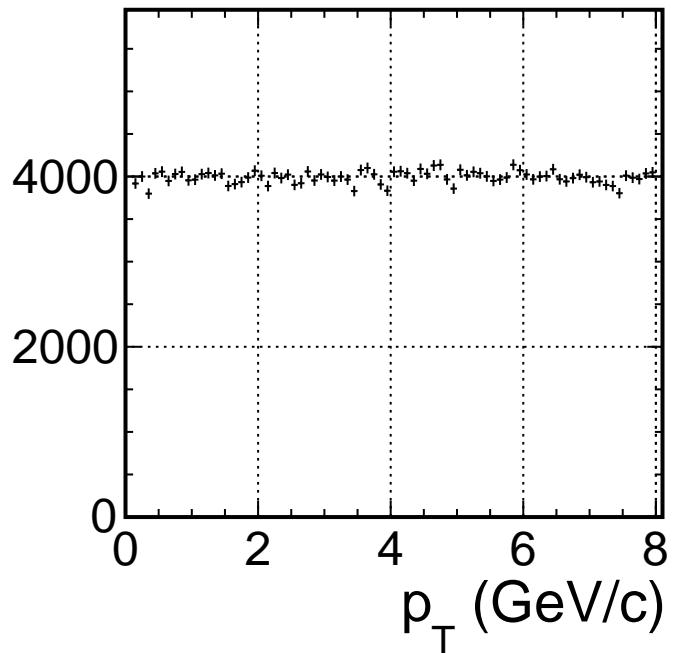
$N_{\text{events}}=24.83$  K, MC=e-, embeddingQa.mc, (0)

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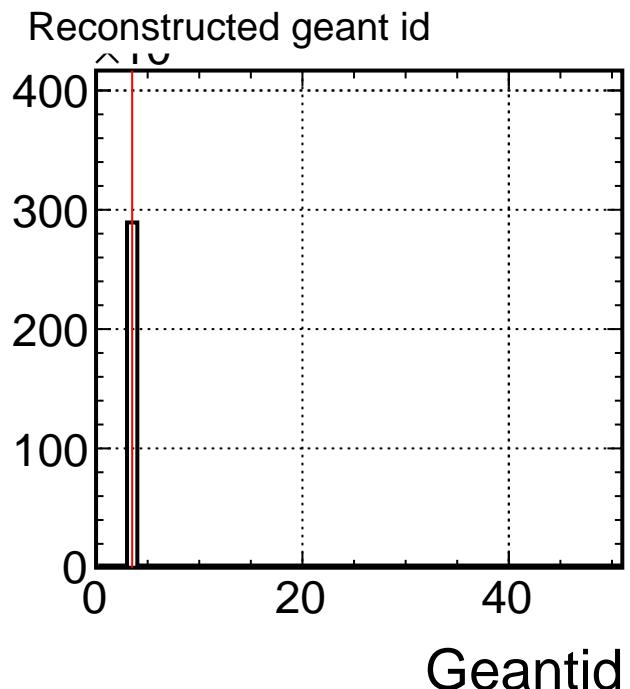
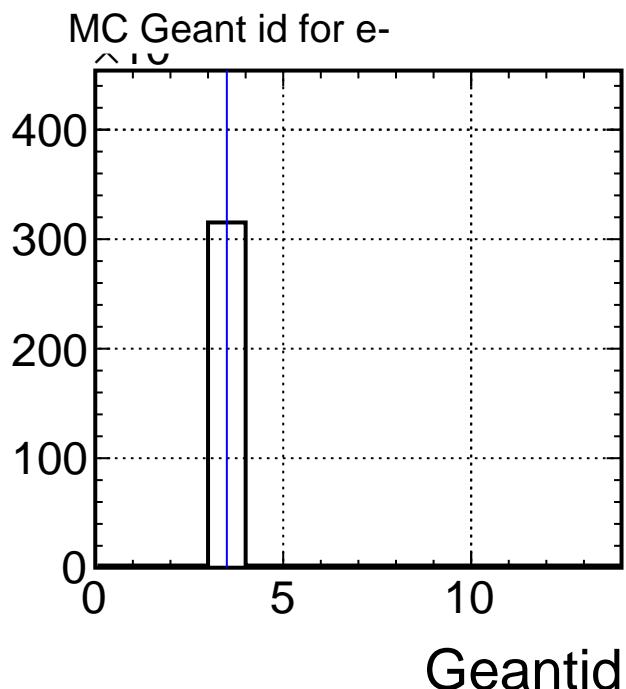
### MC track QA (2D)



## MC track QA (1D)



### Geant id

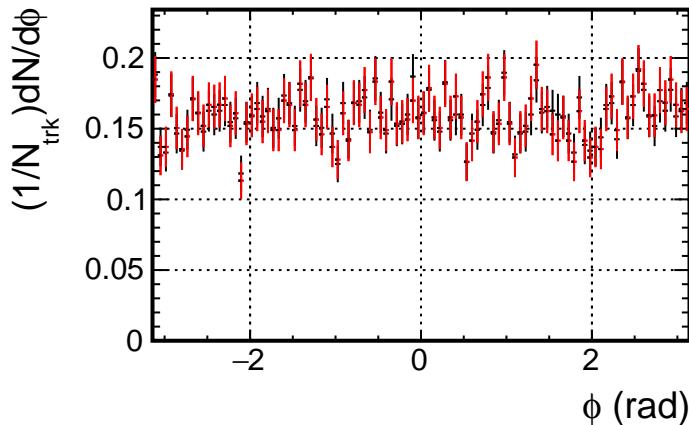
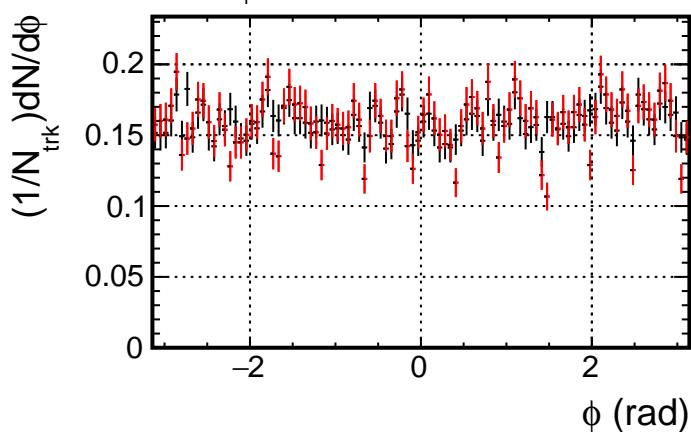
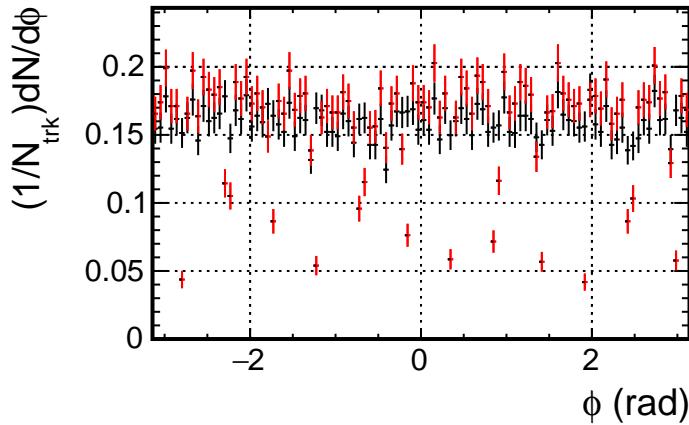
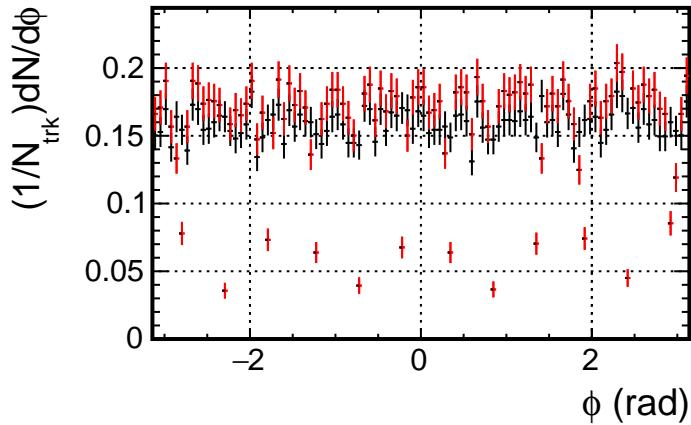
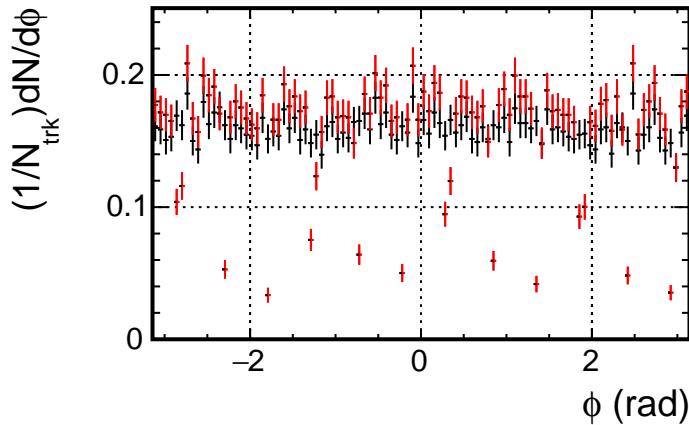


### Particle informations

— e- (MC, geantid=3)

— e- (MATCHED, geantid=3)

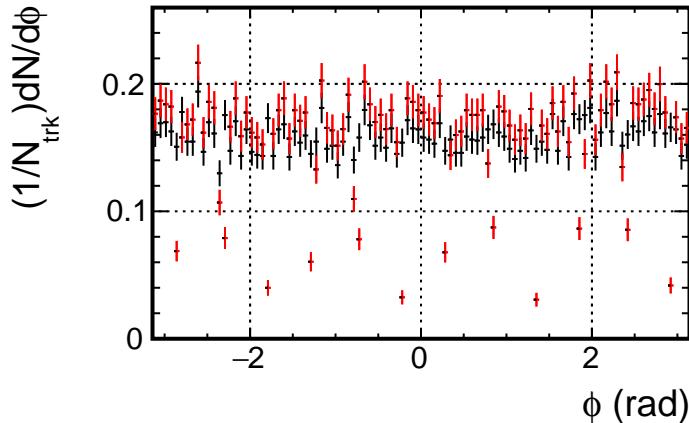
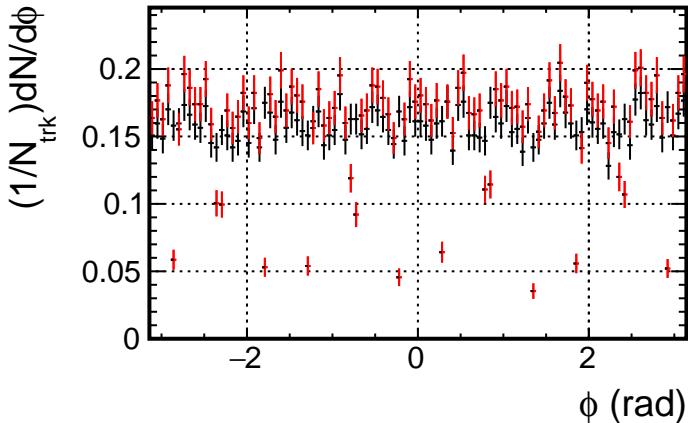
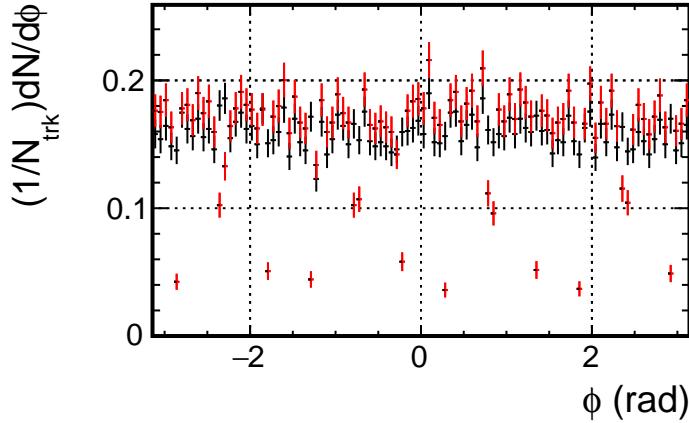
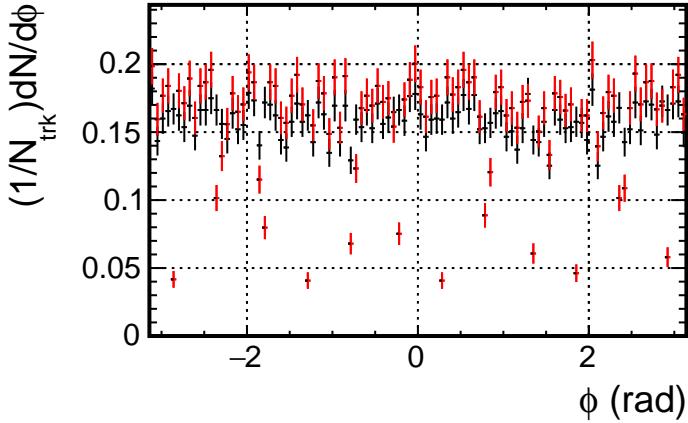
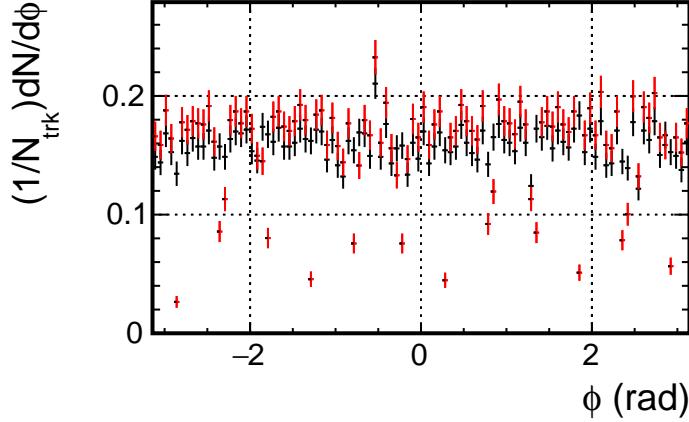
# Projection of $\phi$ for each $p_T$ bin

0.2 <  $p_T$  < 0.5 (GeV/c)0.5 <  $p_T$  < 1.0 (GeV/c)1.0 <  $p_T$  < 1.5 (GeV/c)1.5 <  $p_T$  < 2.0 (GeV/c)2.0 <  $p_T$  < 2.5 (GeV/c)

e-  
(MATCHED, geantid=3)

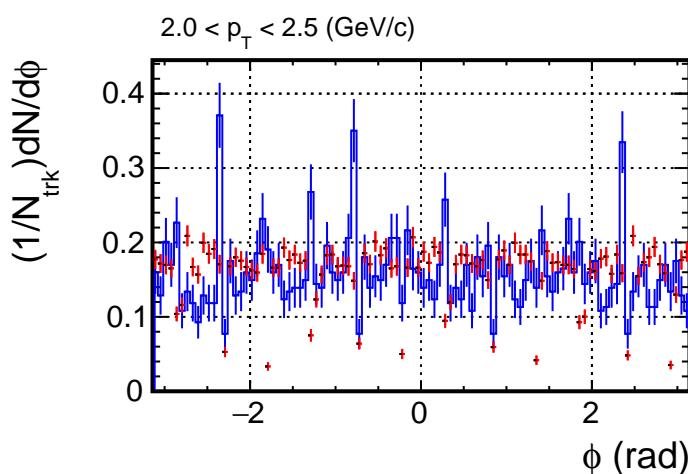
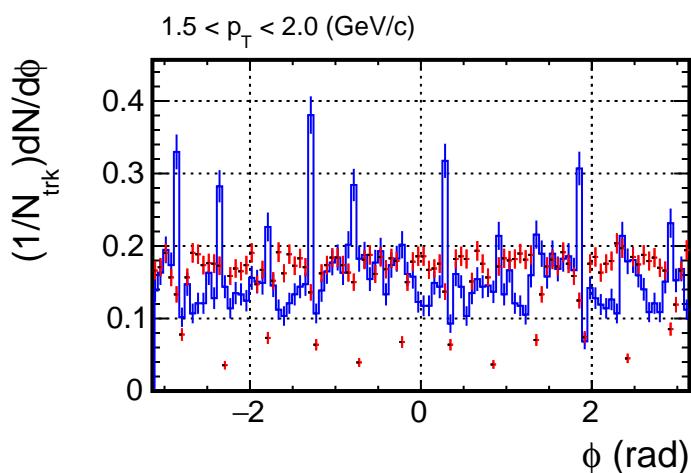
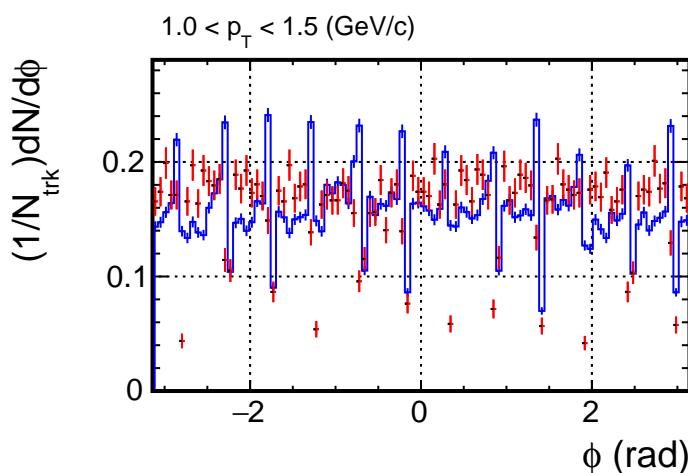
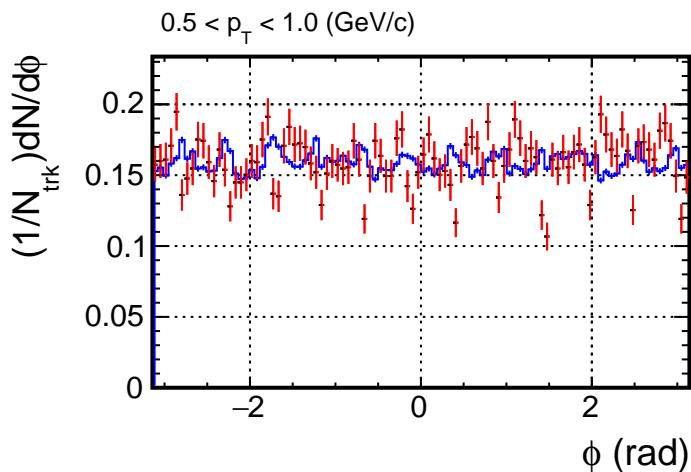
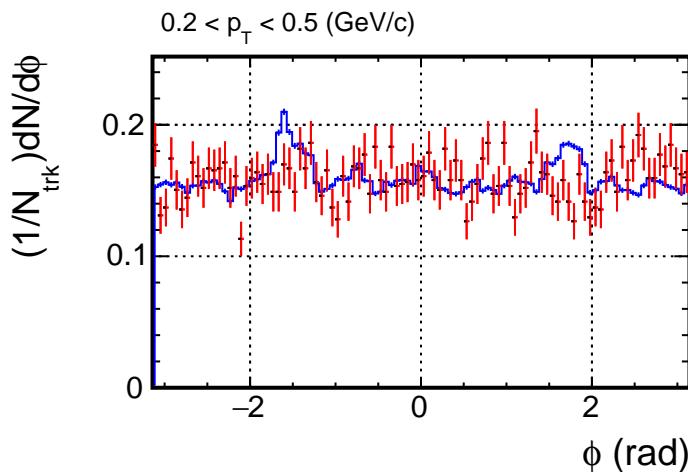
e- (MC, geantid=3)

# Projection of $\phi$ for each $p_T$ bin

2.5 <  $p_T$  < 3.0 (GeV/c)3.0 <  $p_T$  < 3.5 (GeV/c)3.5 <  $p_T$  < 4.0 (GeV/c)4.0 <  $p_T$  < 4.5 (GeV/c)4.5 <  $p_T$  < 5.0 (GeV/c)

e-  
(MATCHED, geantid=3)

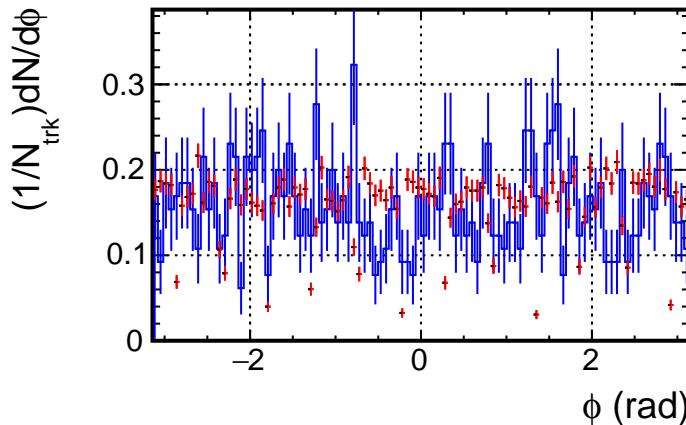
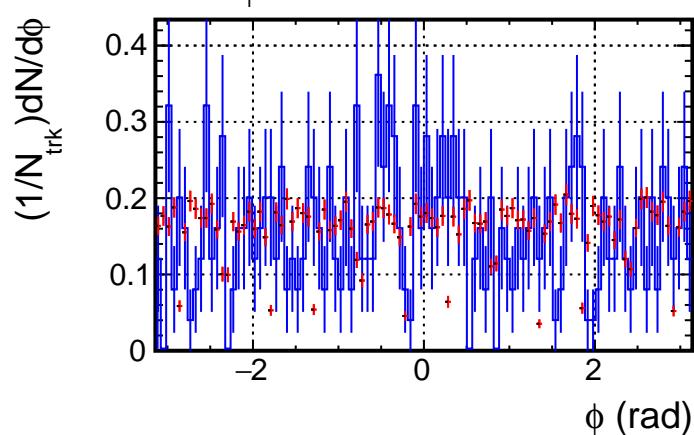
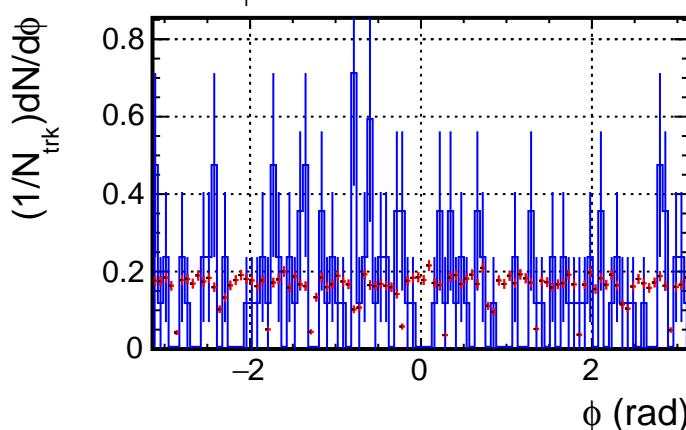
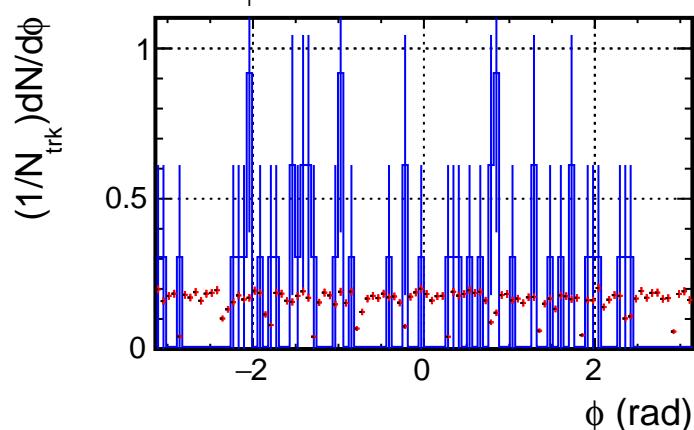
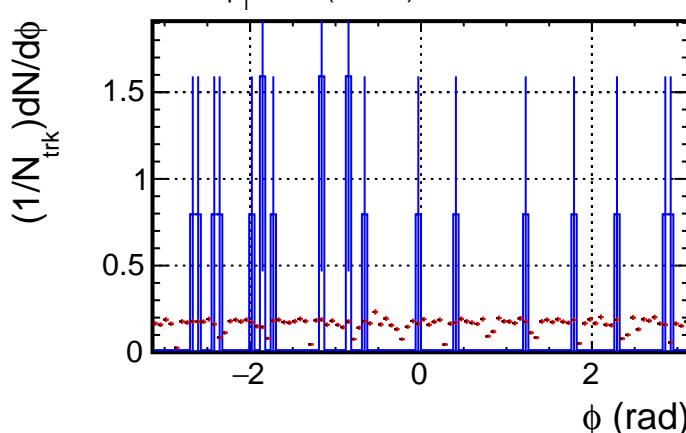
e- (MC, geantid=3)

Projection of  $\phi$  for each  $p_T$  bin

e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|\eta \sigma_e| < 2$  TPC)

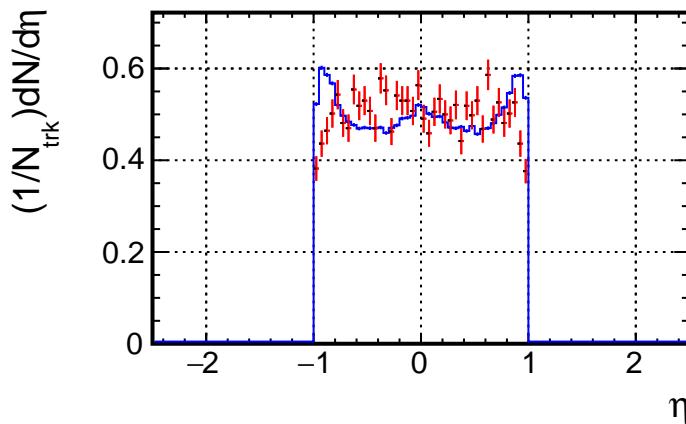
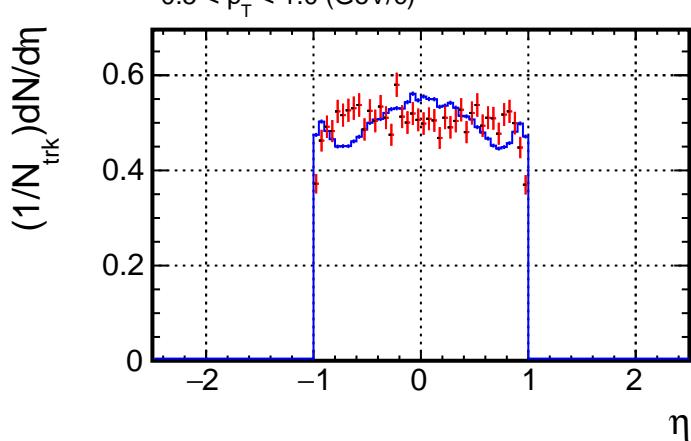
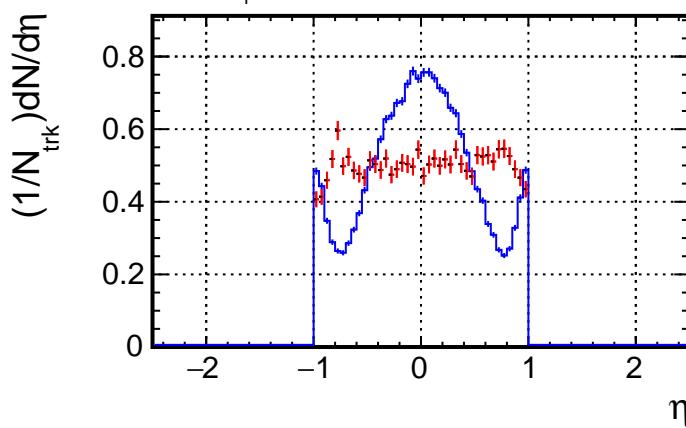
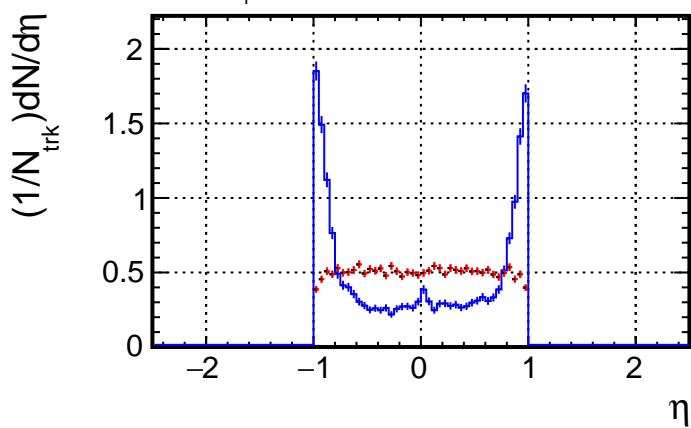
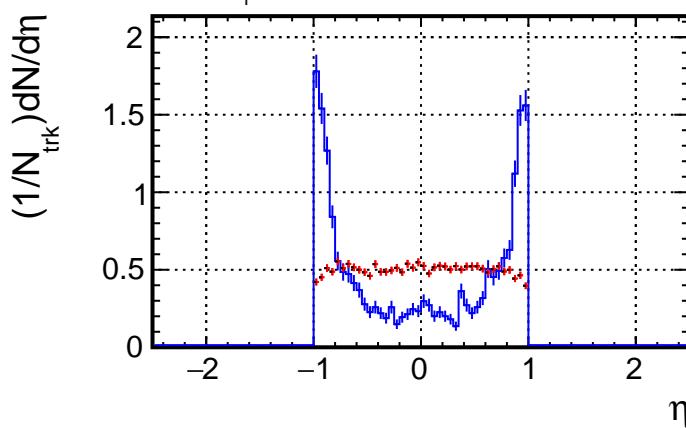
# Projection of $\phi$ for each $p_T$ bin

2.5 <  $p_T$  < 3.0 (GeV/c)3.0 <  $p_T$  < 3.5 (GeV/c)3.5 <  $p_T$  < 4.0 (GeV/c)4.0 <  $p_T$  < 4.5 (GeV/c)4.5 <  $p_T$  < 5.0 (GeV/c)

e-  
(MATCHED, geantid=3)

e-  
(PRIMARY, | $n \sigma_{e^-}| < 2$  TPC)

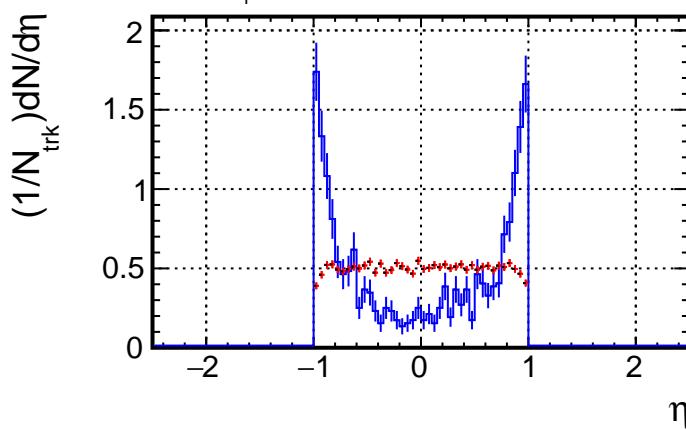
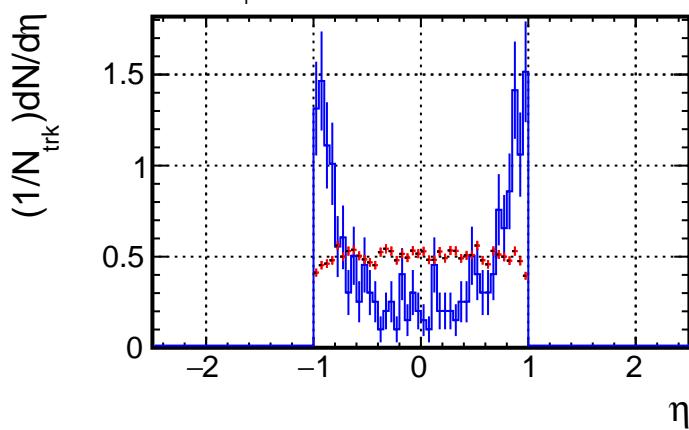
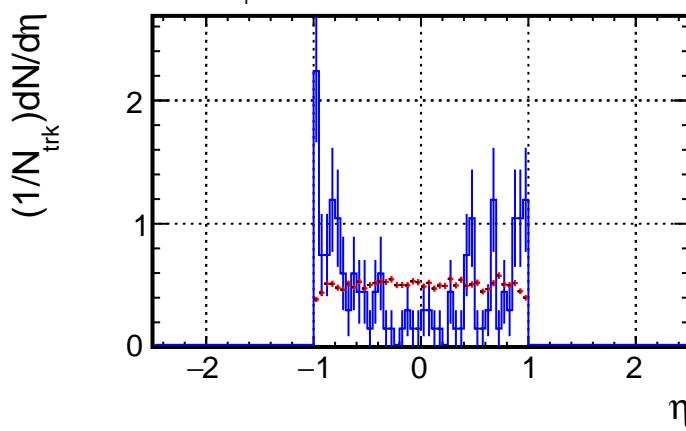
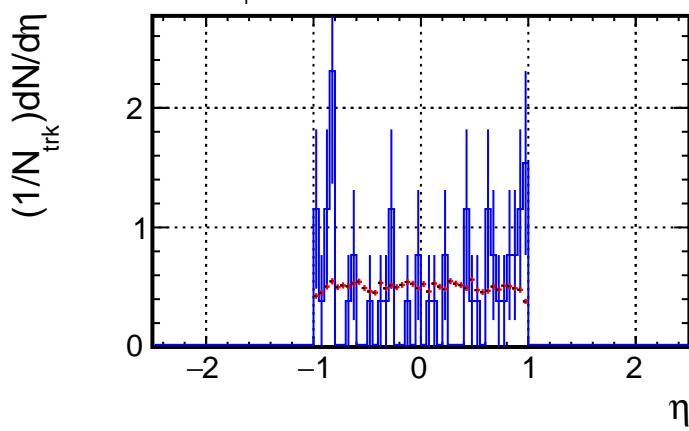
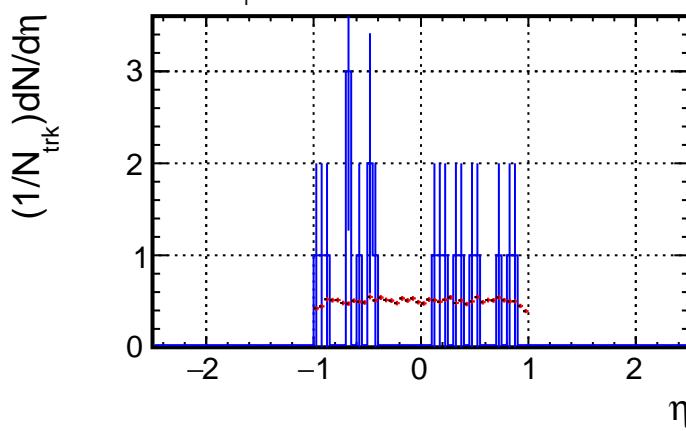
# Projection of $\eta$ for each $p_T$ bin

0.2 <  $p_T$  < 0.5 (GeV/c)0.5 <  $p_T$  < 1.0 (GeV/c)1.0 <  $p_T$  < 1.5 (GeV/c)1.5 <  $p_T$  < 2.0 (GeV/c)2.0 <  $p_T$  < 2.5 (GeV/c)

e-  
(MATCHED, geantid=3)

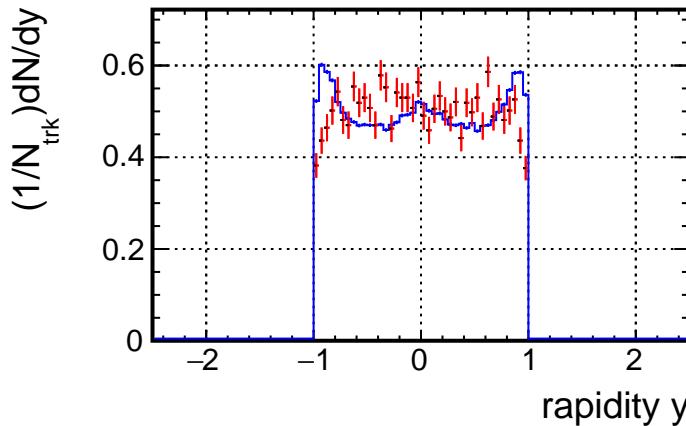
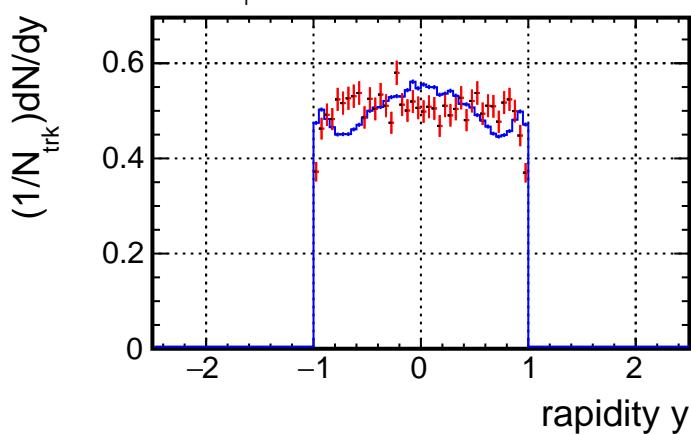
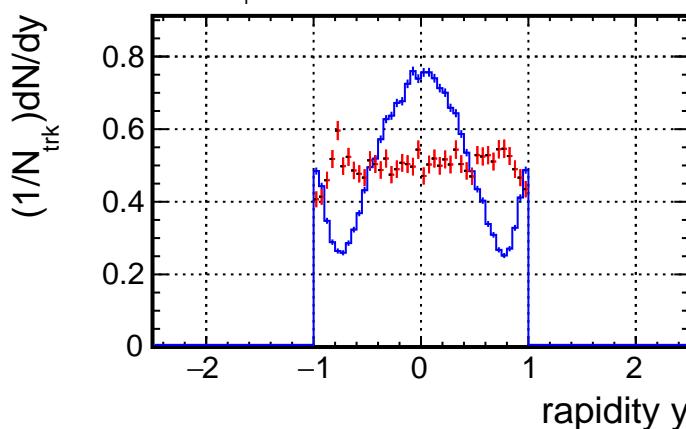
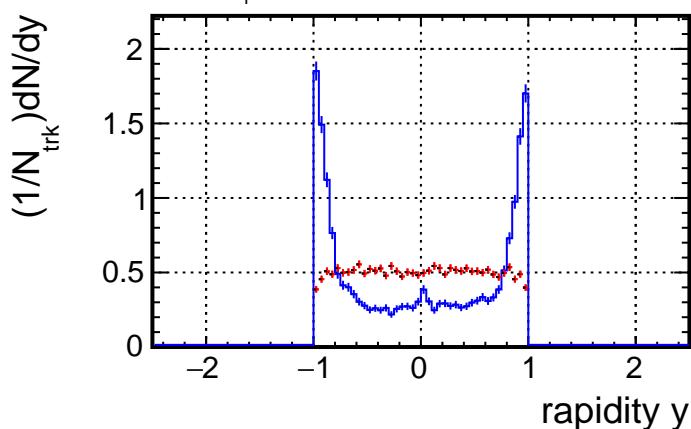
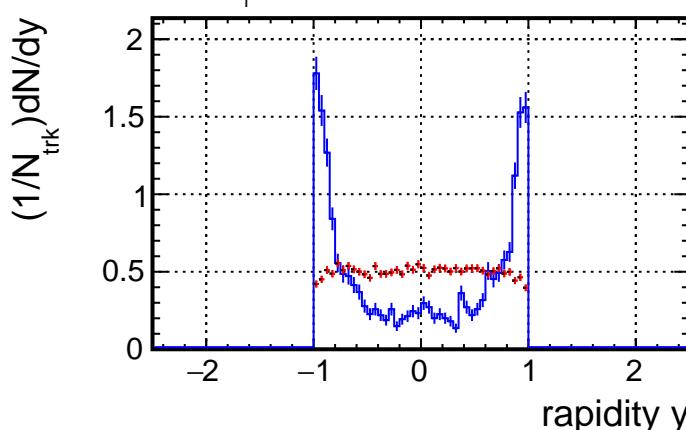
e-  
(PRIMARY, | $n \sigma_{e^-}| < 2$  TPC)

# Projection of $\eta$ for each $p_T$ bin

2.5 <  $p_T$  < 3.0 (GeV/c)3.0 <  $p_T$  < 3.5 (GeV/c)3.5 <  $p_T$  < 4.0 (GeV/c)4.0 <  $p_T$  < 4.5 (GeV/c)4.5 <  $p_T$  < 5.0 (GeV/c)

- e-  
(MATCHED, geantid=3)
- e-  
(PRIMARY, |n  $\sigma_{e^-}| < 2$  TPC)

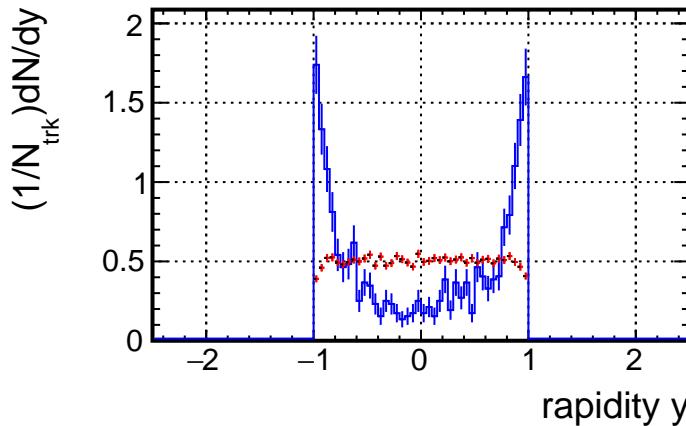
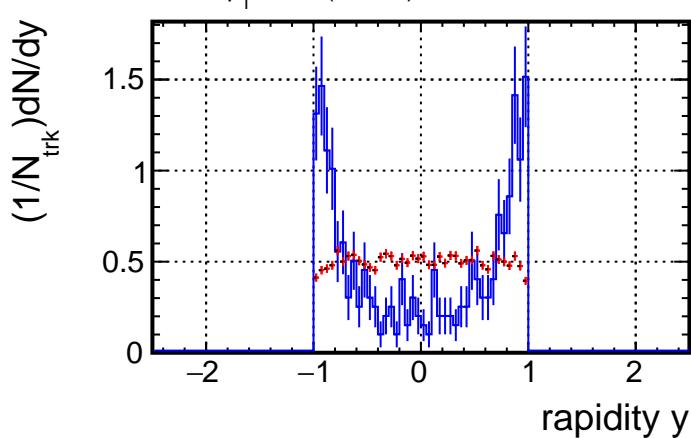
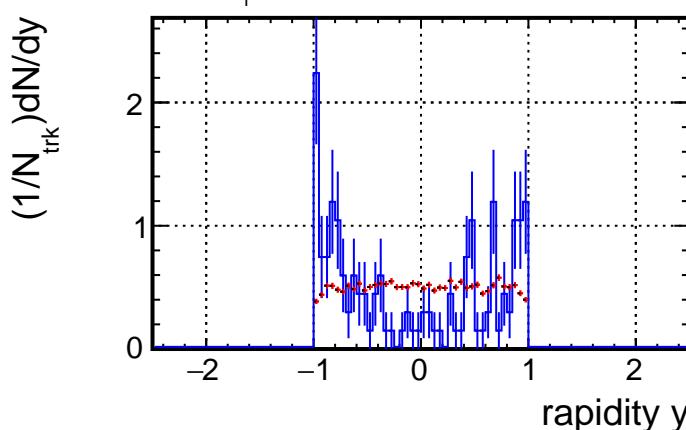
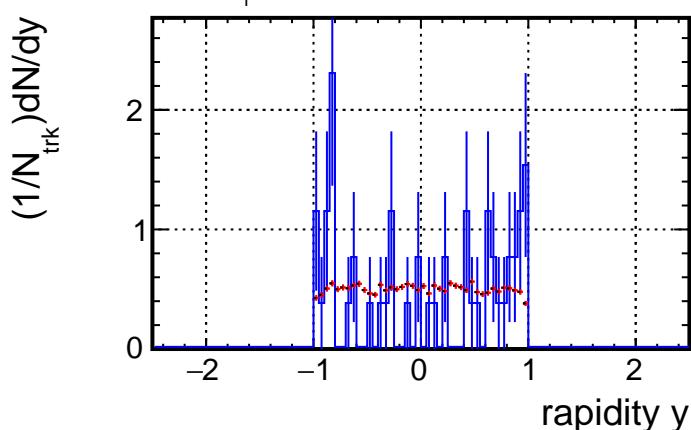
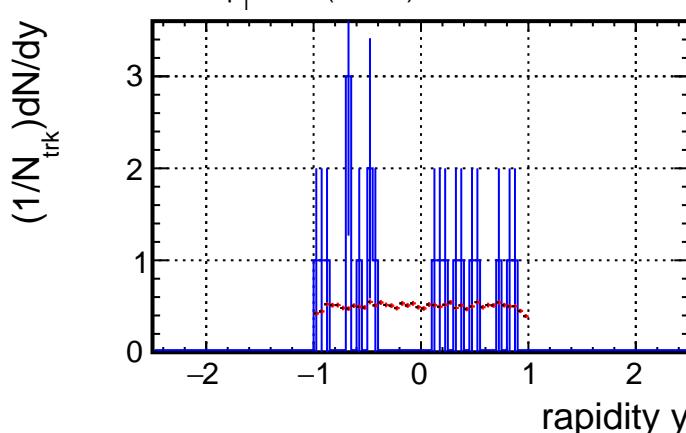
# Projection of $y$ for each $p_T$ bin

0.2 <  $p_T$  < 0.5 (GeV/c)0.5 <  $p_T$  < 1.0 (GeV/c)1.0 <  $p_T$  < 1.5 (GeV/c)1.5 <  $p_T$  < 2.0 (GeV/c)2.0 <  $p_T$  < 2.5 (GeV/c)

e-  
(MATCHED, geantid=3)

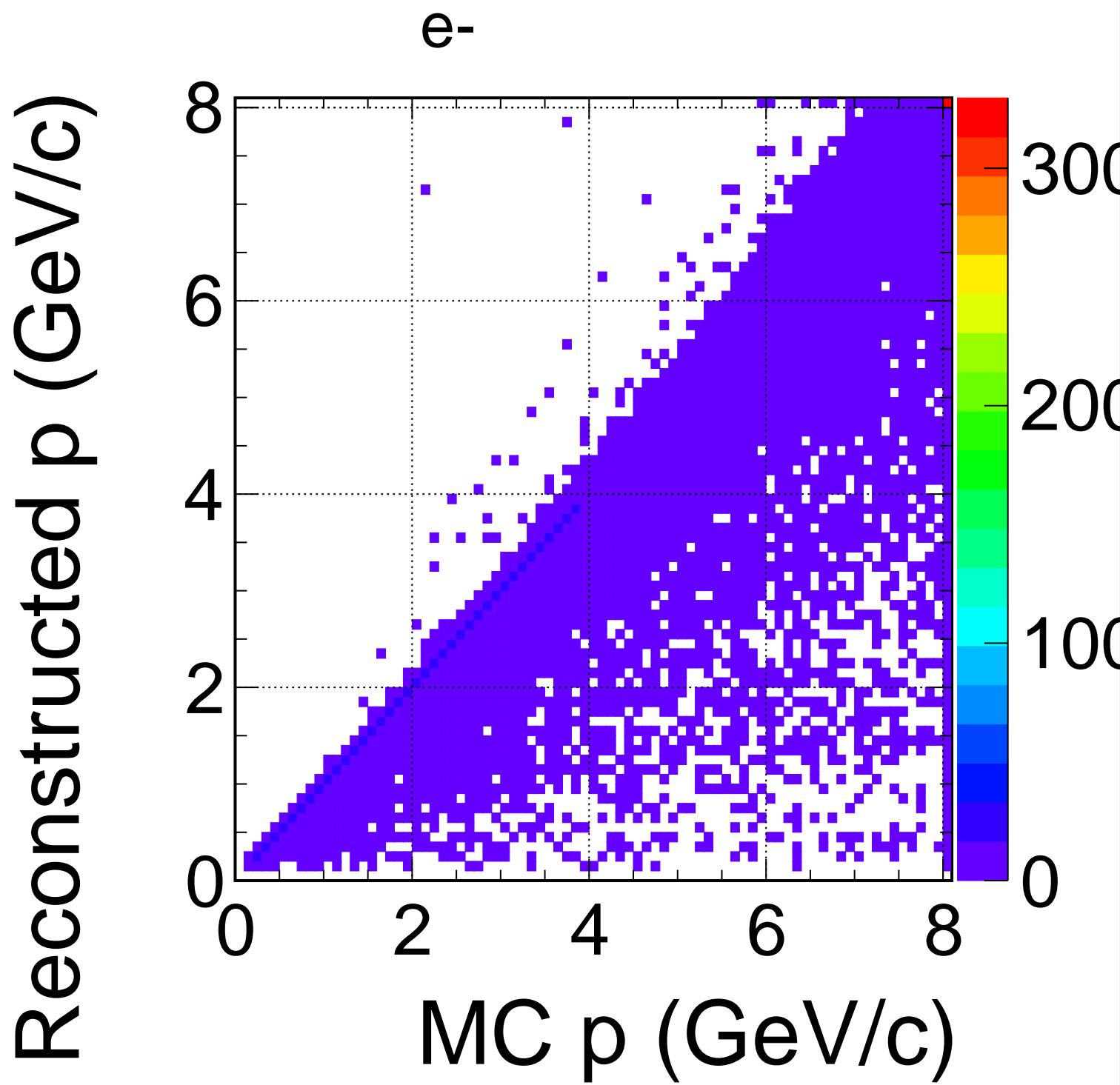
e-  
(PRIMARY, | $n \sigma_{e^-}| < 2$  TPC)

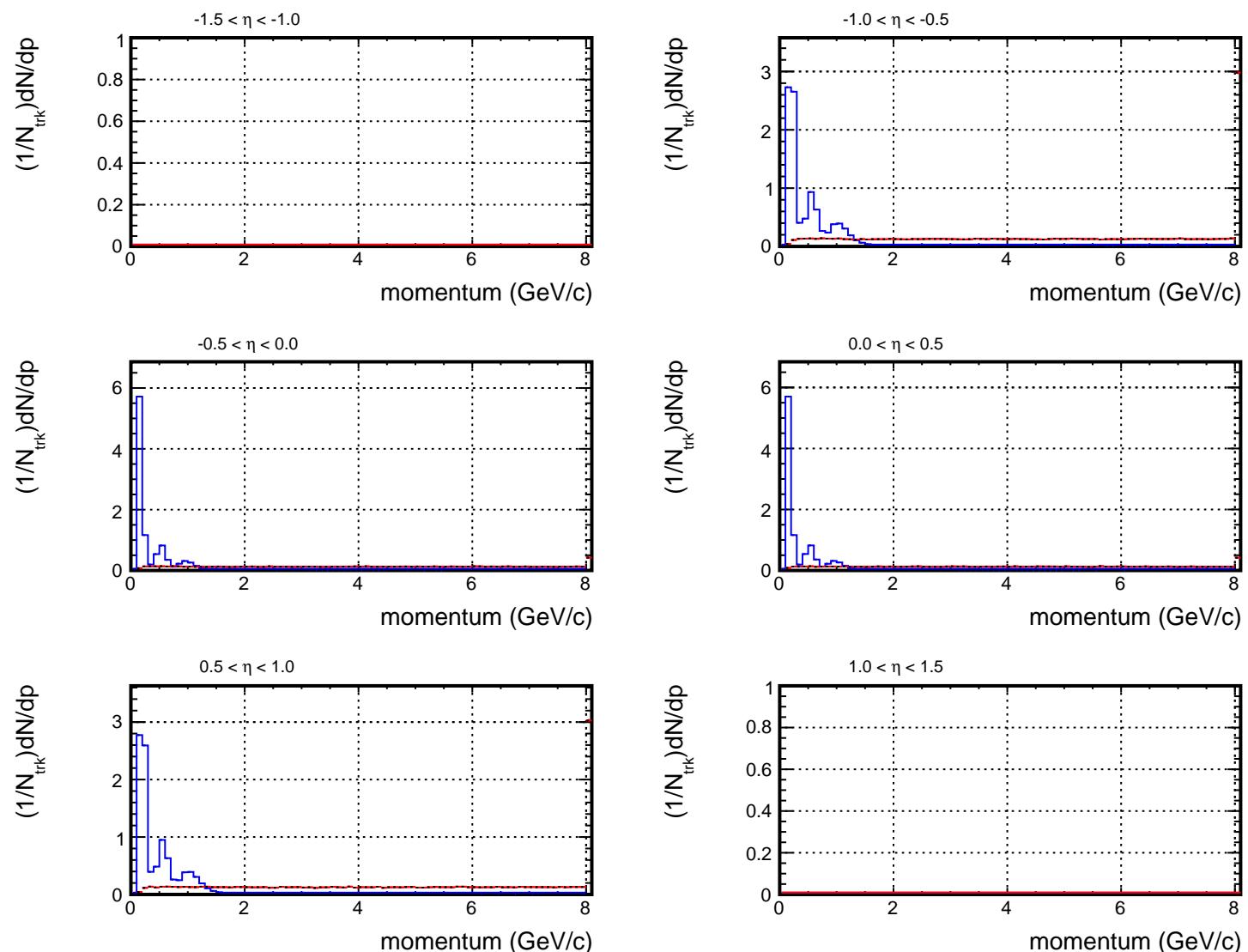
# Projection of $y$ for each $p_T$ bin

2.5 <  $p_T$  < 3.0 (GeV/c)3.0 <  $p_T$  < 3.5 (GeV/c)3.5 <  $p_T$  < 4.0 (GeV/c)4.0 <  $p_T$  < 4.5 (GeV/c)4.5 <  $p_T$  < 5.0 (GeV/c)

- e- (MATCHED, geantid=3)
- e- (PRIMARY, | $n \sigma_{e^-}| < 2$  TPC)

## Reconstructed momentum vs MC momentum



Projection of p for each  $\eta$  bin

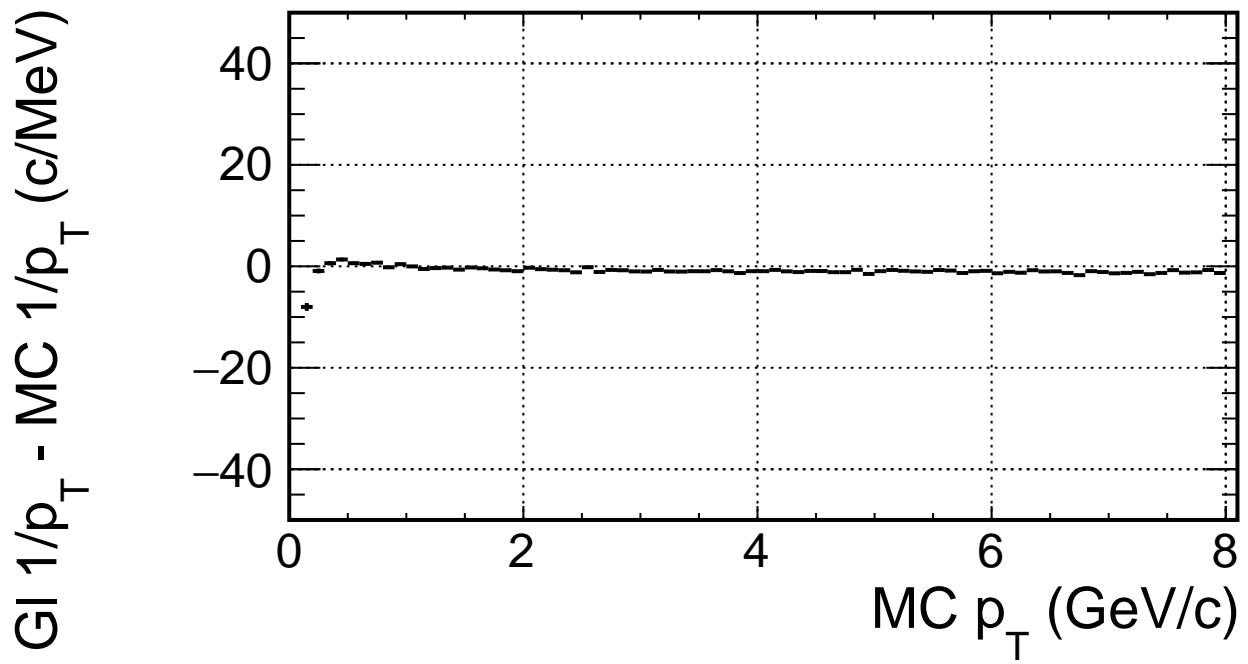
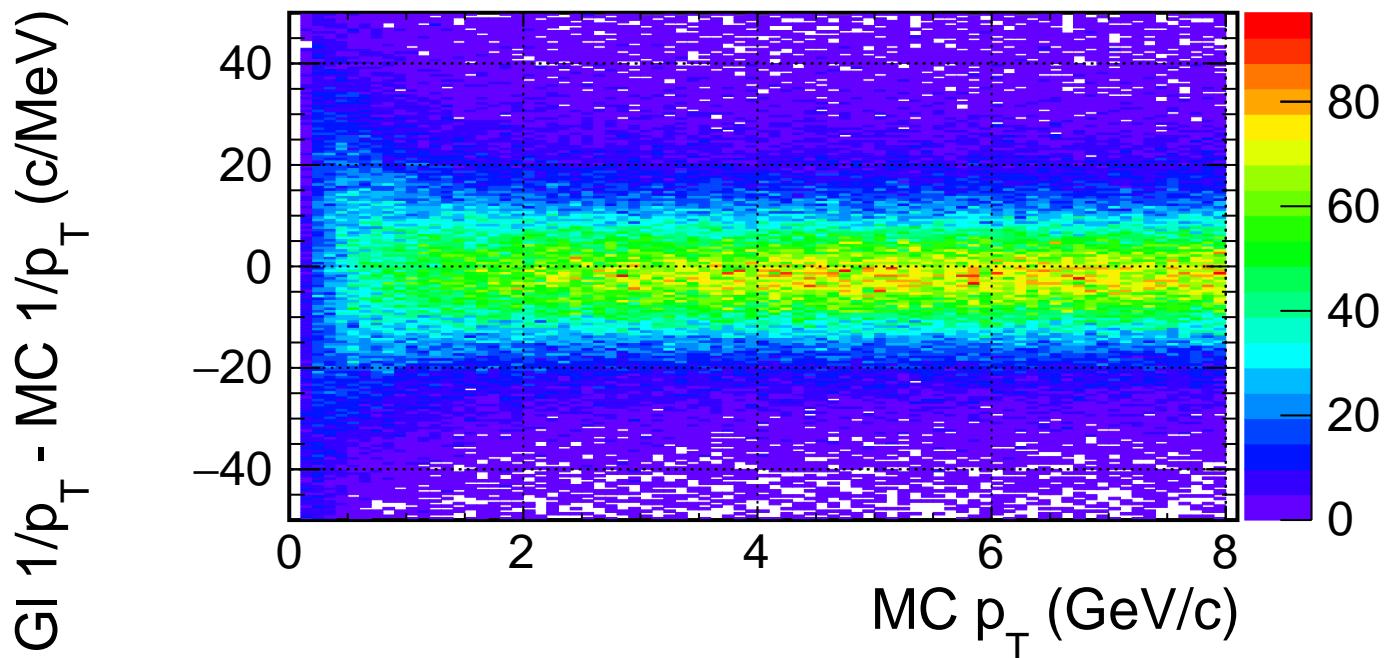
e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|n \sigma_e| < 2$  TPC)

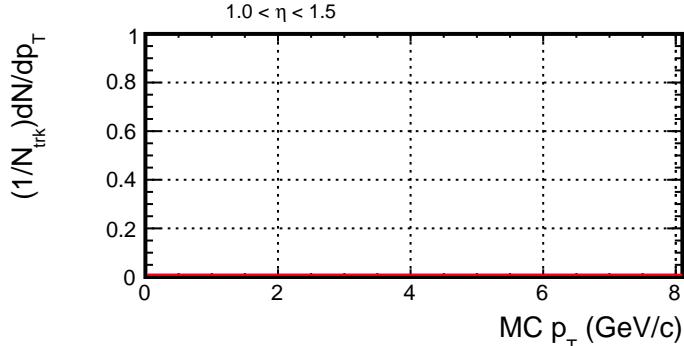
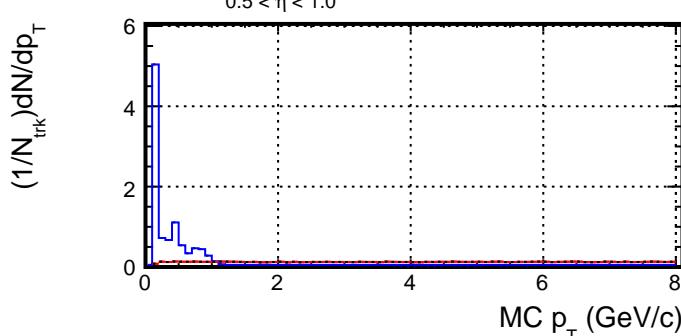
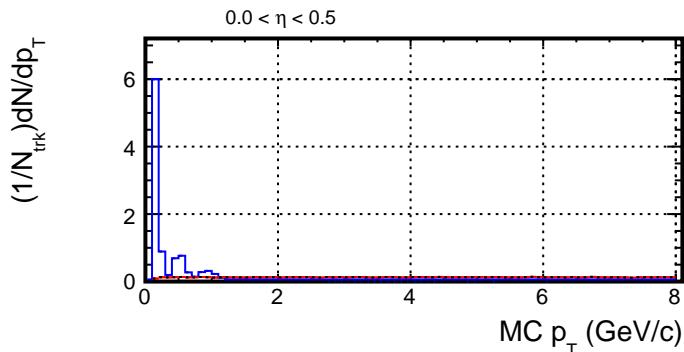
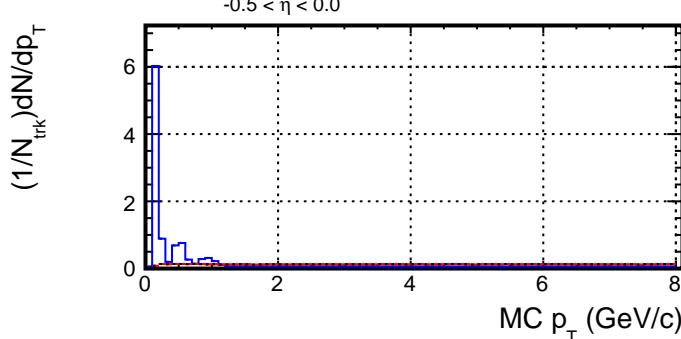
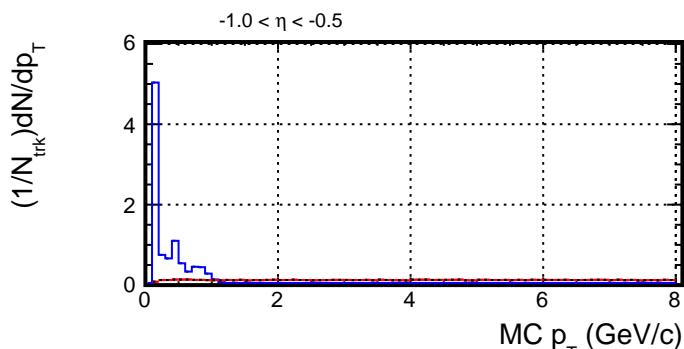
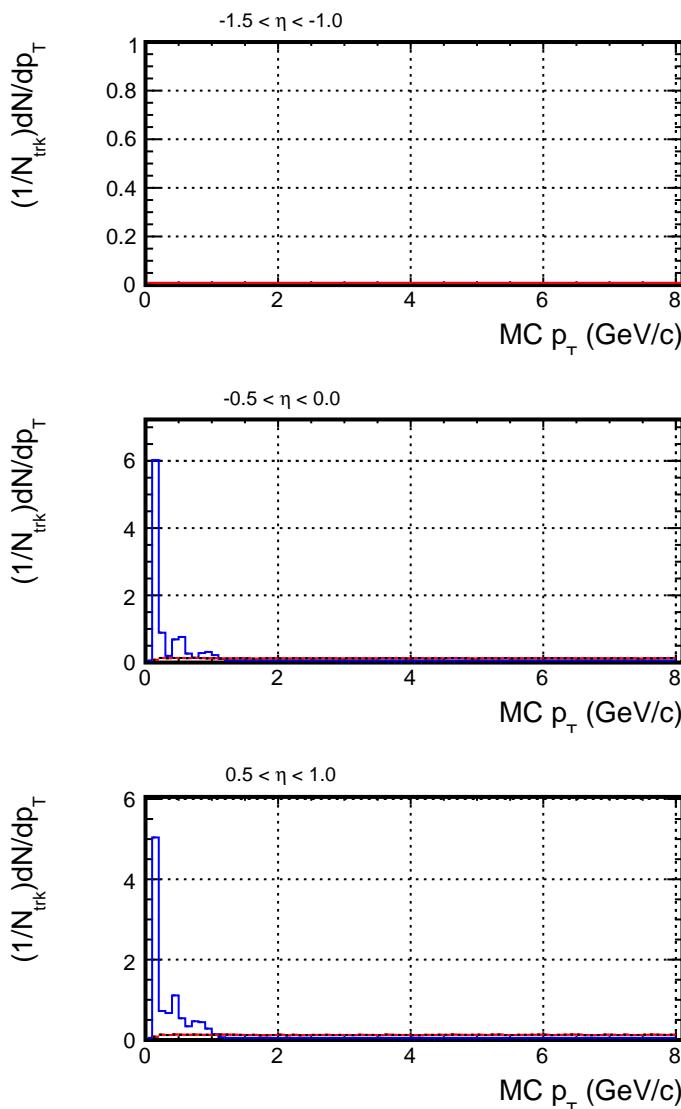
$N_{\text{events}}=24.83$  K, MC=e-, embeddingQa.mc, (0)

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1/ $p_T$  (GI) - 1/ $p_T$  (MC) vs  $p_T$  (MC) (e-)

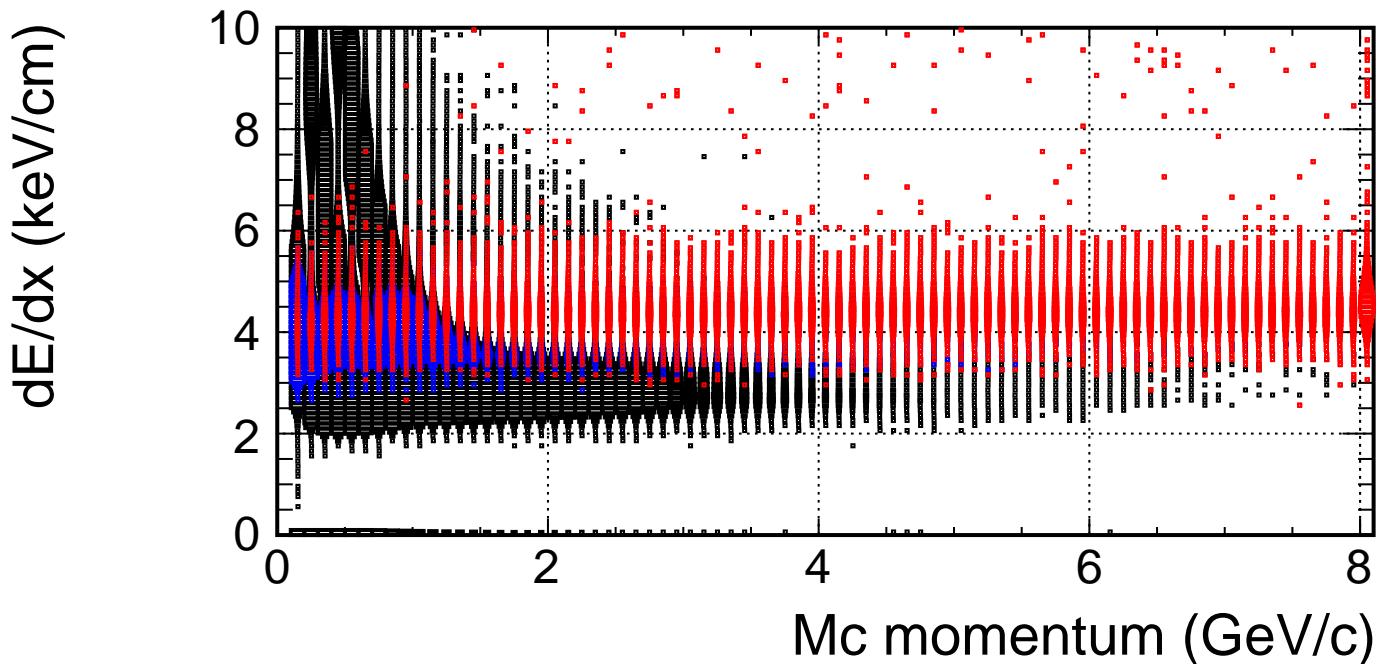


# Projection of $p_T$ for each $\eta$ bin



— e-  
 (MATCHED, geantid=3)  
  
— e-  
 (PRIMARY,  $|\eta \sigma_e| < 2$  TPC)

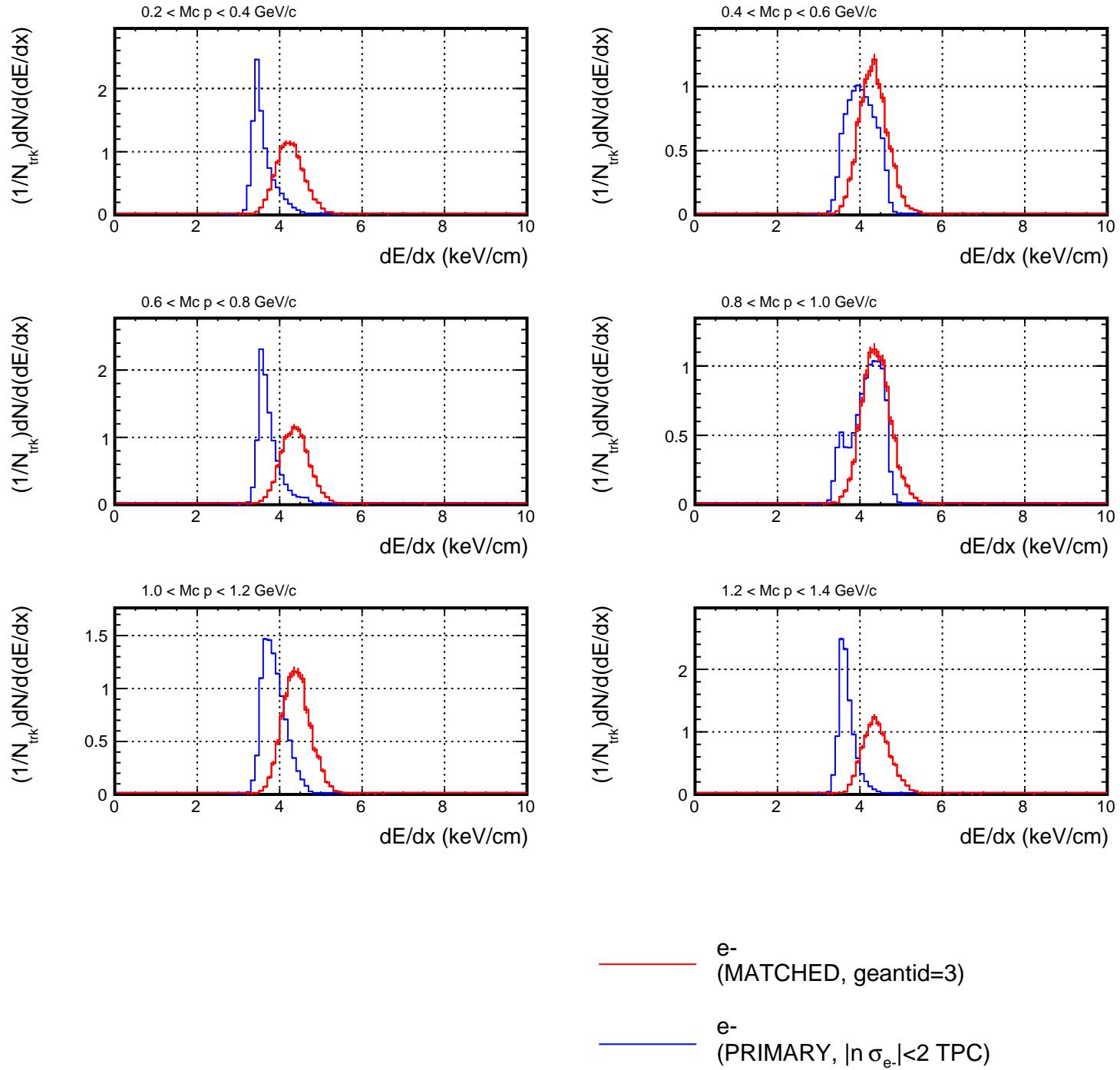
## dE/dx vs momentum (Embedding:e-, Real:e-)



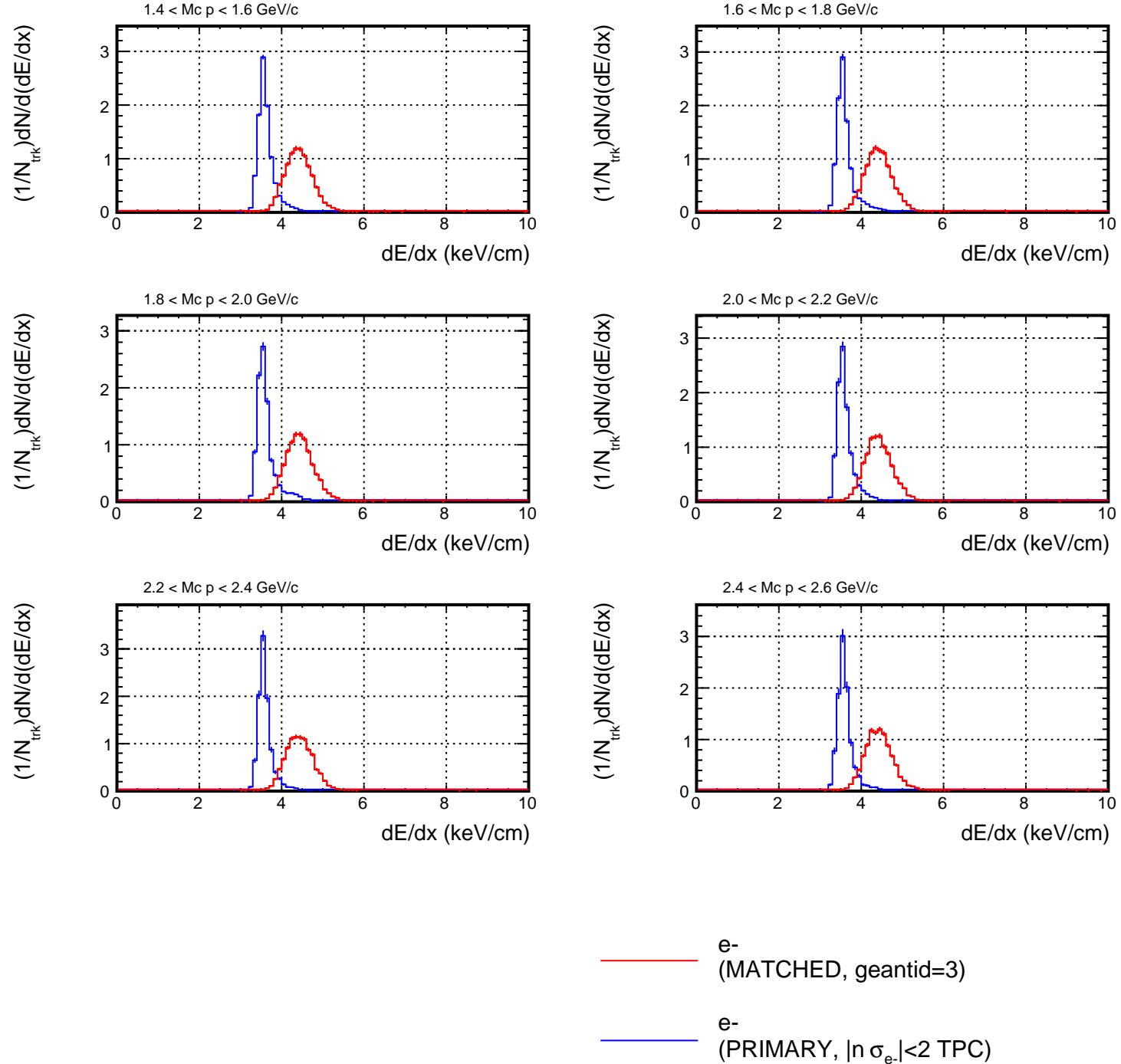
— e- (MATCHED, geantid=3)

— Real data

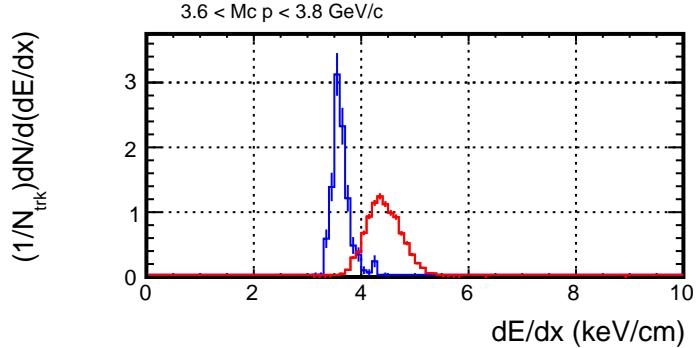
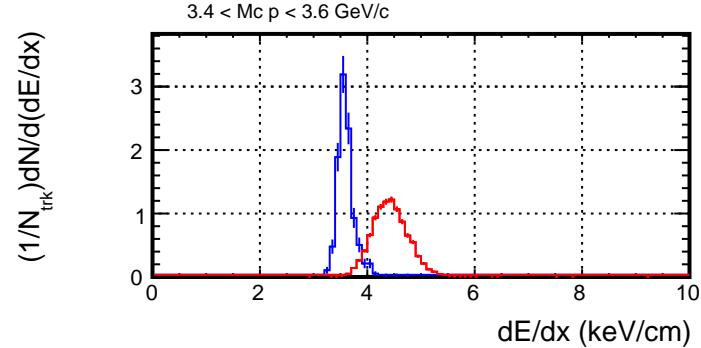
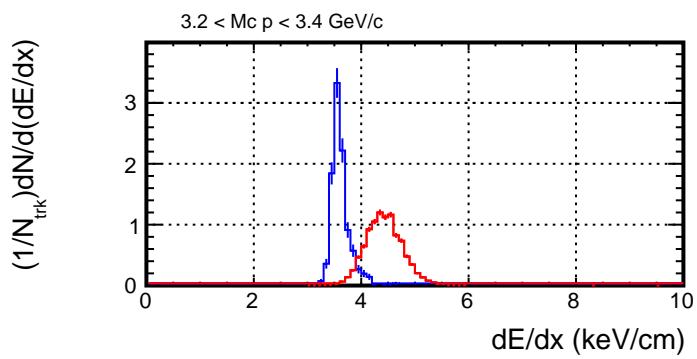
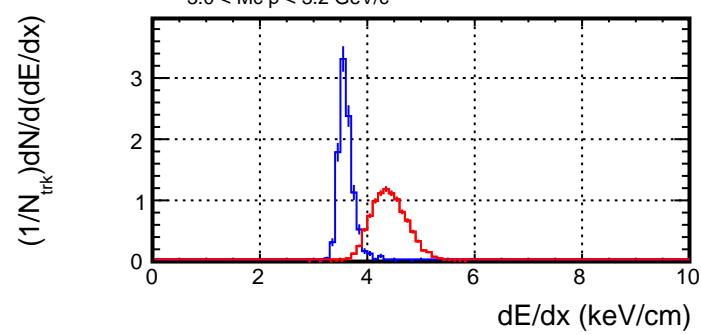
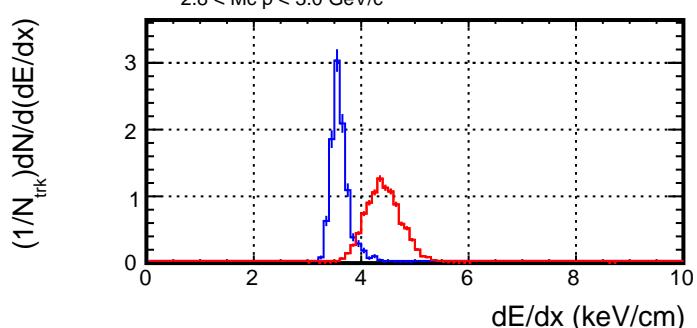
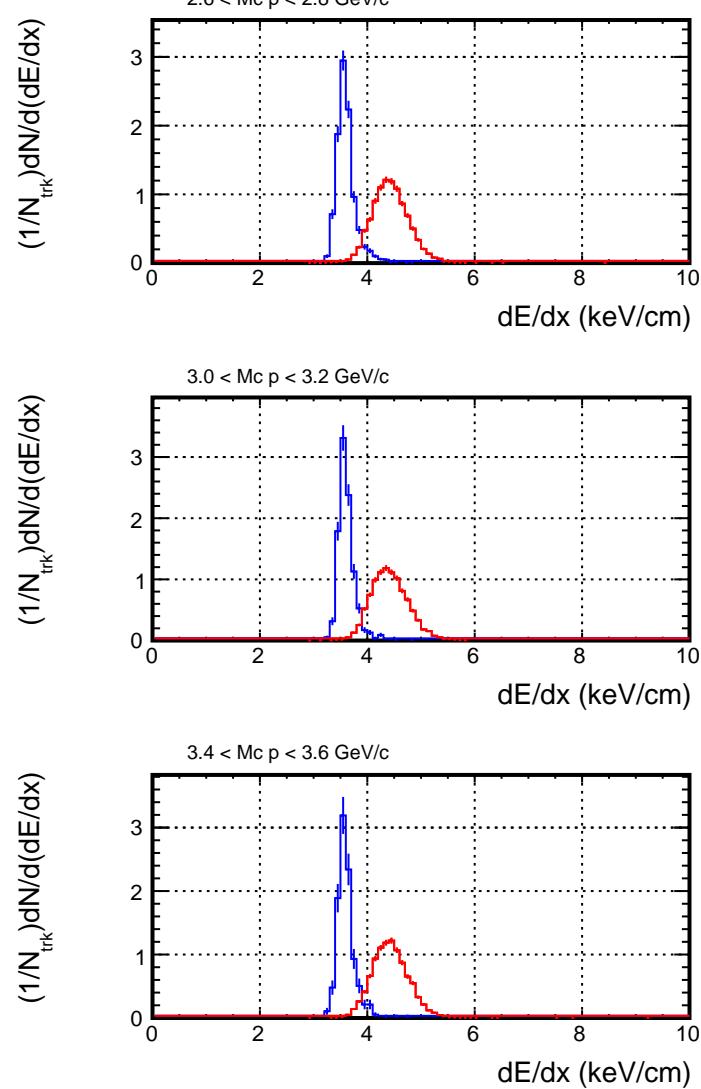
— Real data with PID cut ( $\sigma < 2$ ) TPC

Projection of  $dE/dx$  for each p bin

## Projection of dE/dx for each p bin

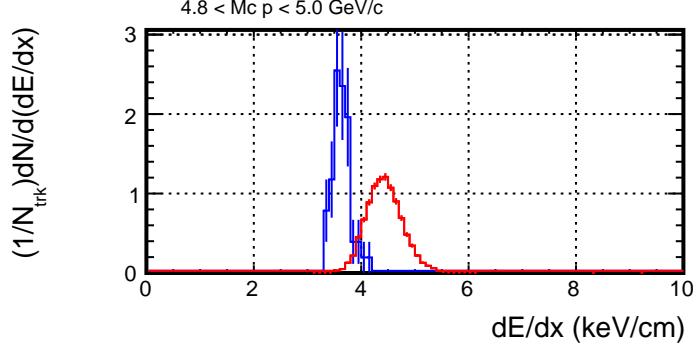
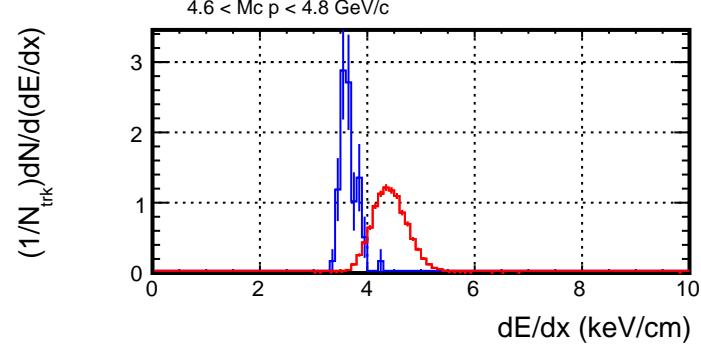
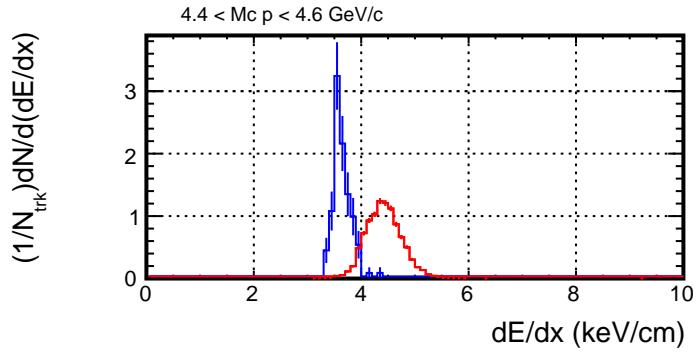
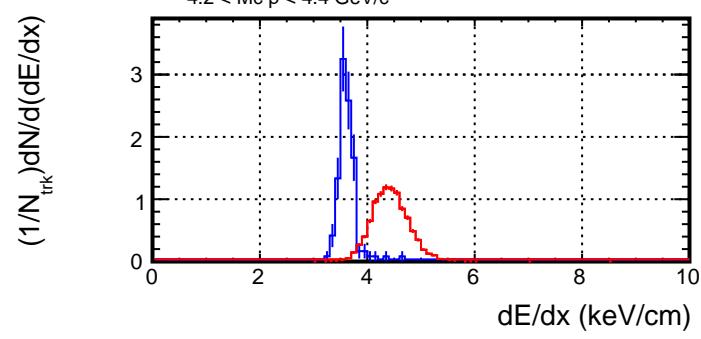
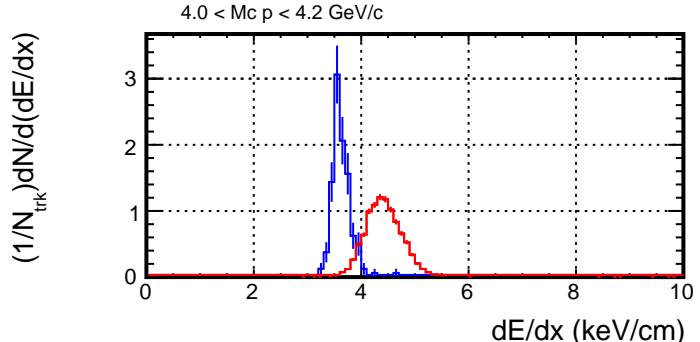
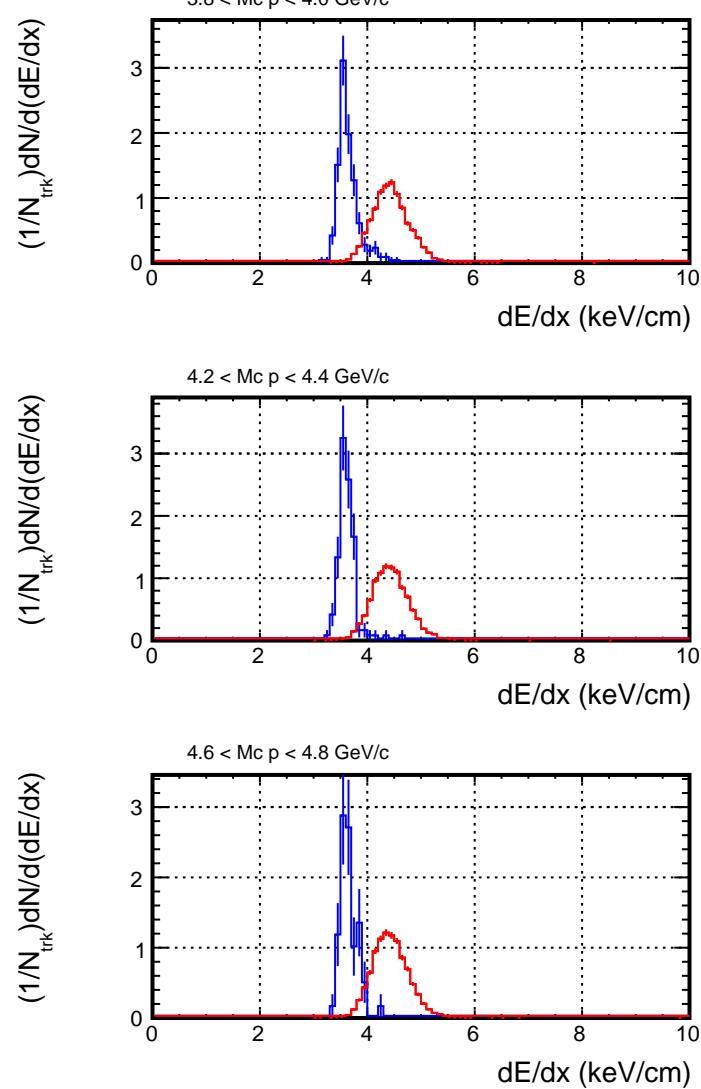


# Projection of dE/dx for each p bin



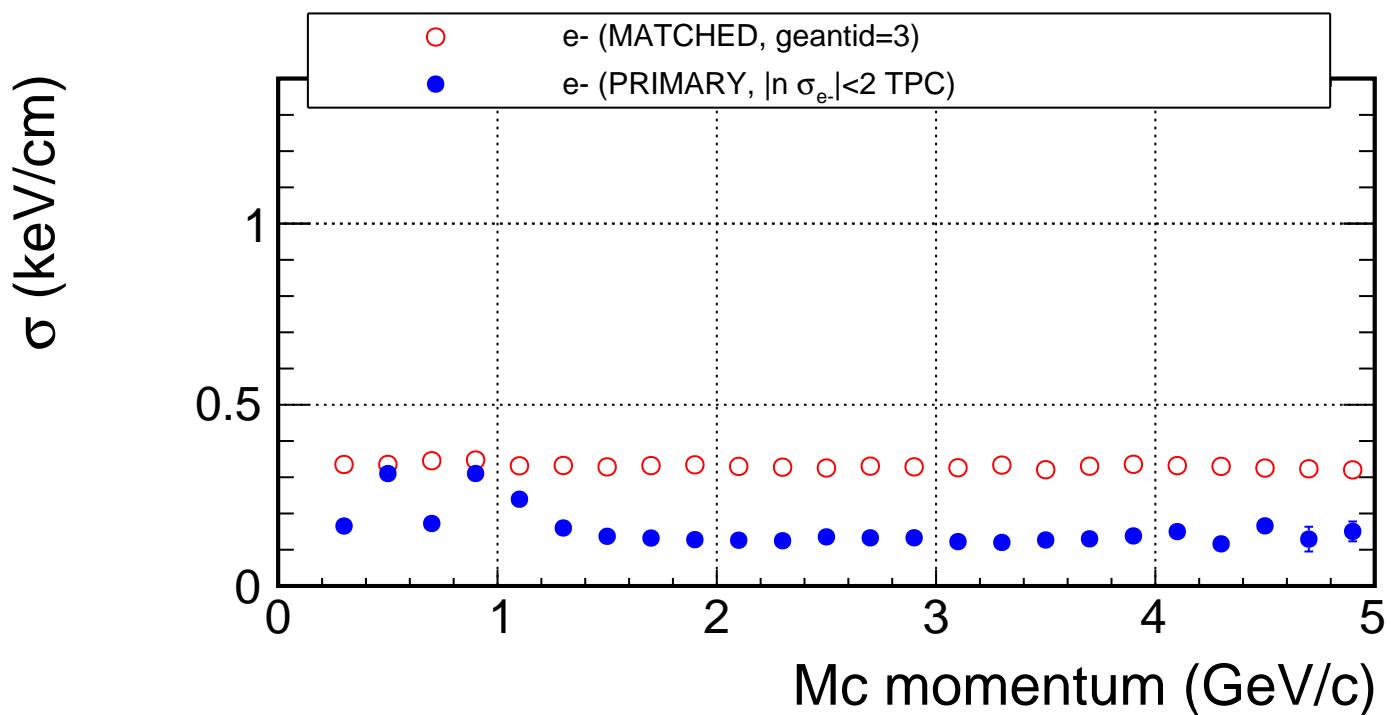
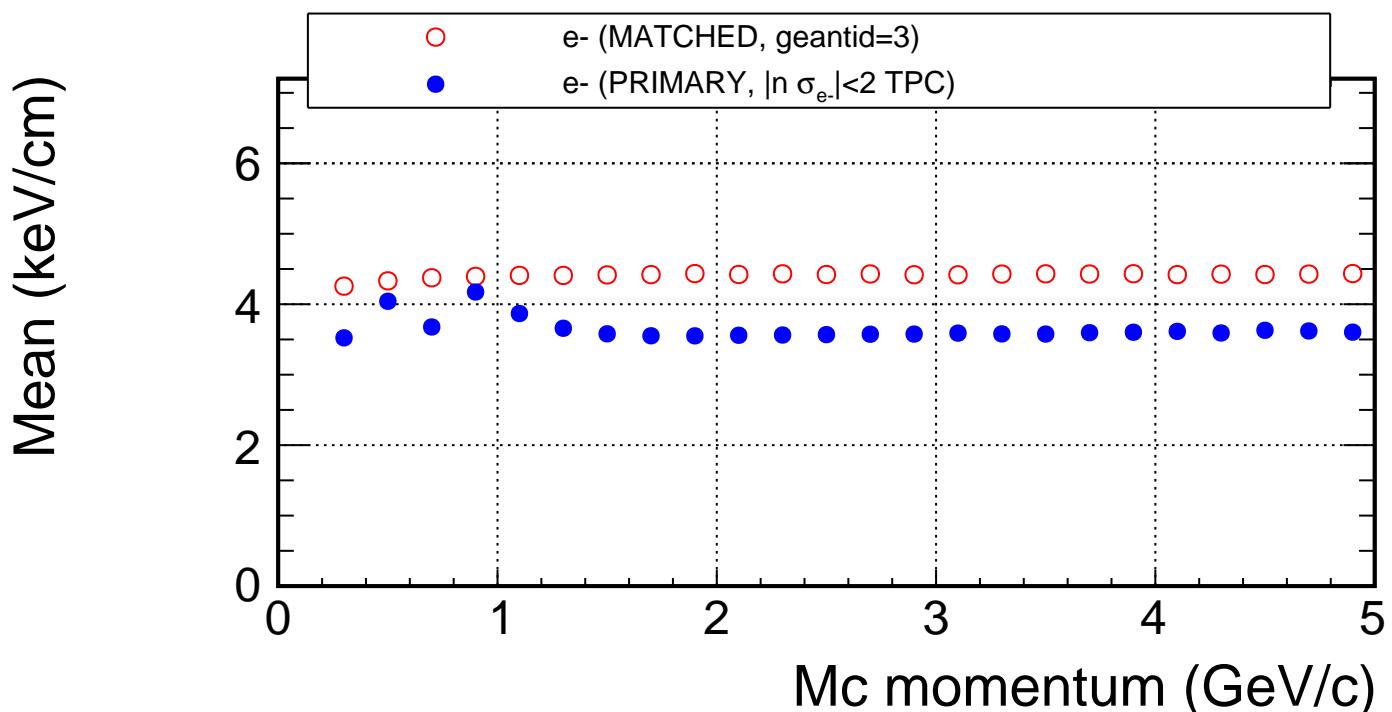
e-  
— (MATCHED, geantid=3)  
e-  
— (PRIMARY,  $|\eta \sigma_e| < 2$  TPC)

## Projection of dE/dx for each p bin

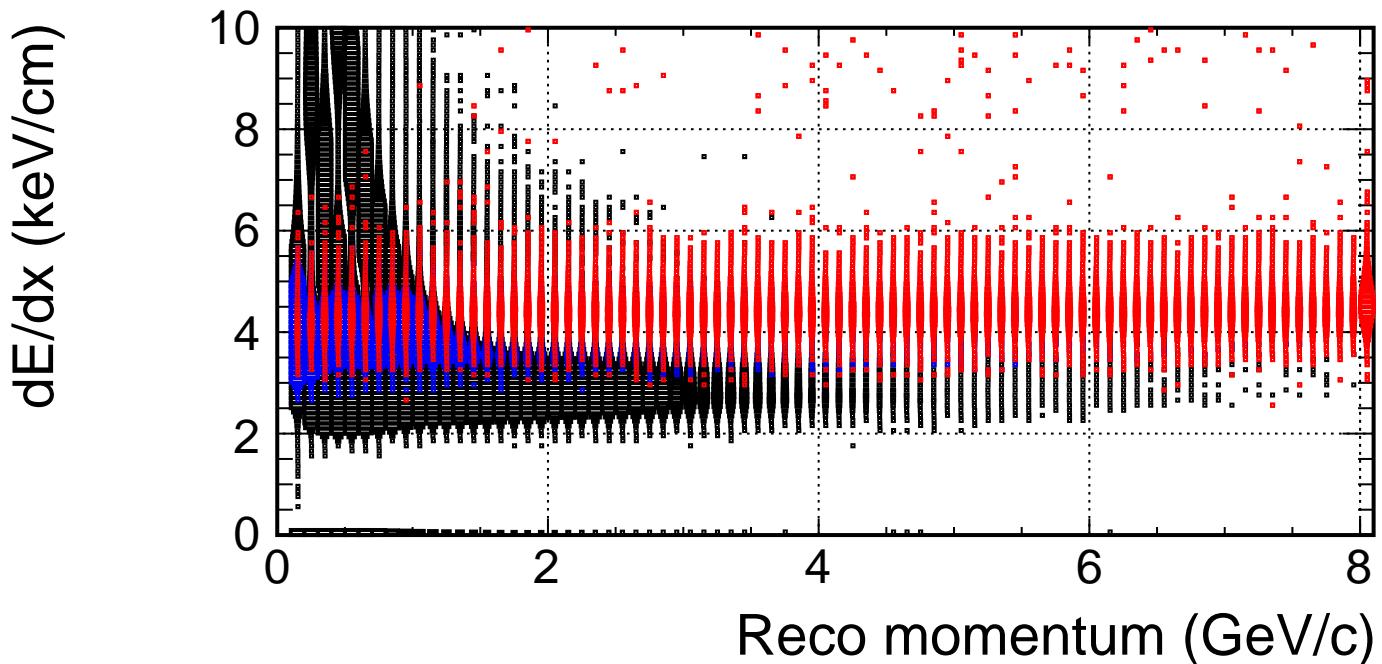


e-  
— (MATCHED, geantid=3)

e-  
— (PRIMARY, | $\eta \sigma_e$ | < 2 TPC)

Mean/ $\sigma$  of dE/dx vs momentum

## dE/dx vs momentum (Embedding:e-, Real:e-)

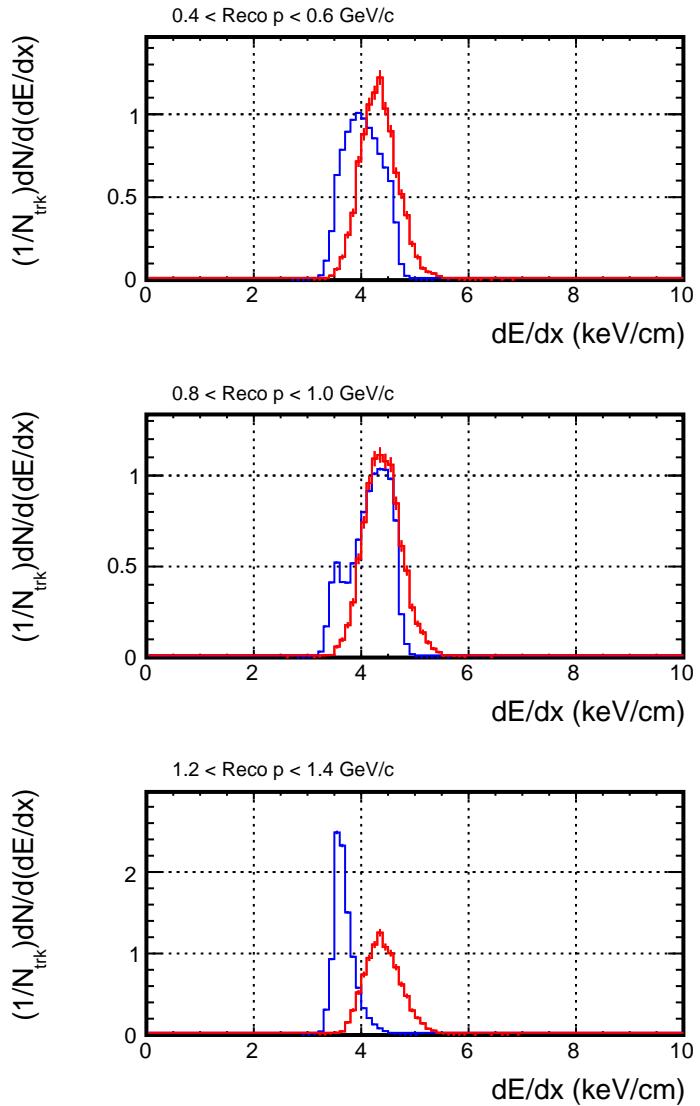
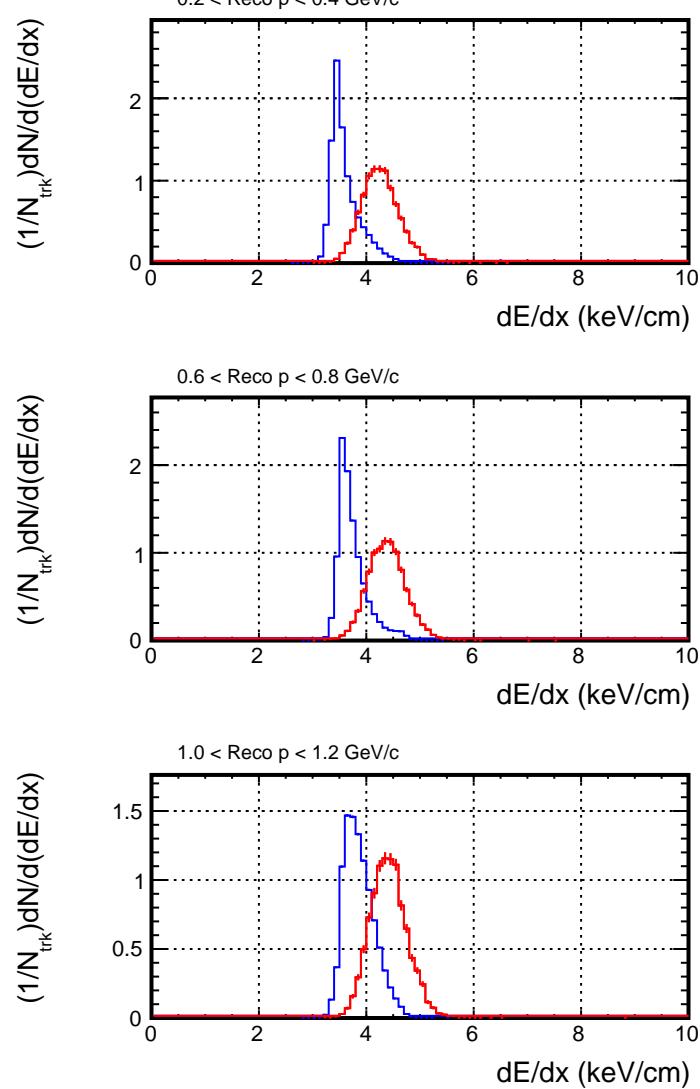


— e- (MATCHED, geantid=3)

— Real data

— Real data with PID cut ( $\sigma < 2$ ) TPC

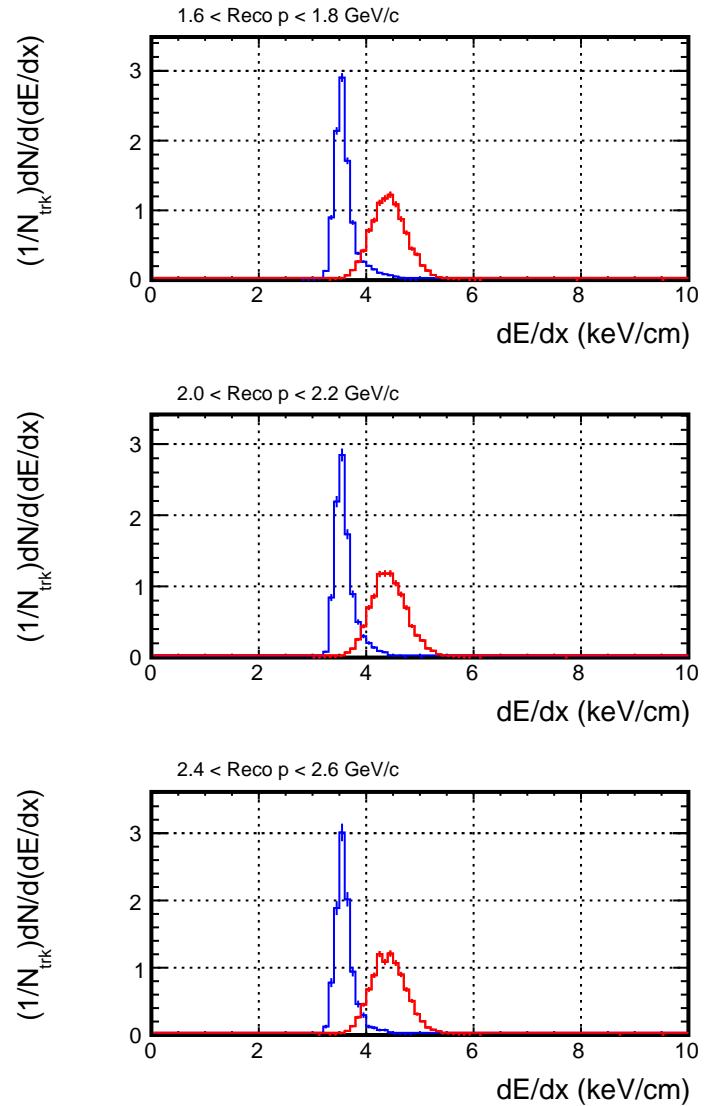
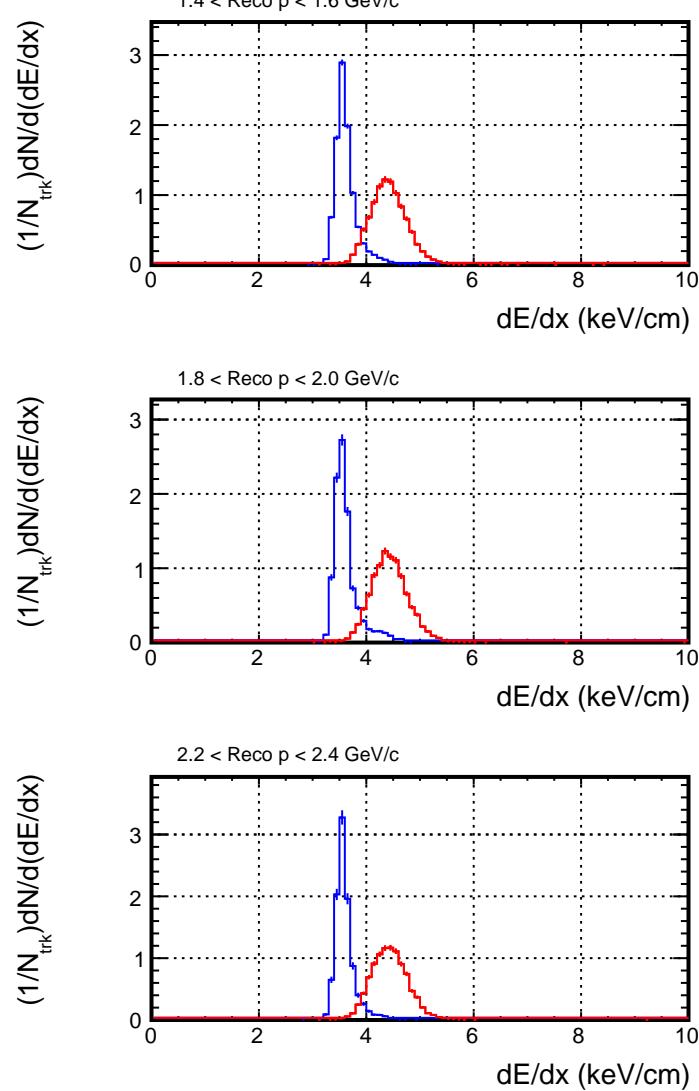
## Projection of dE/dx for each p bin



e-  
(MATCHED, geantid=3)

e-  
(PRIMARY, |n σ<sub>e</sub>|<2 TPC)

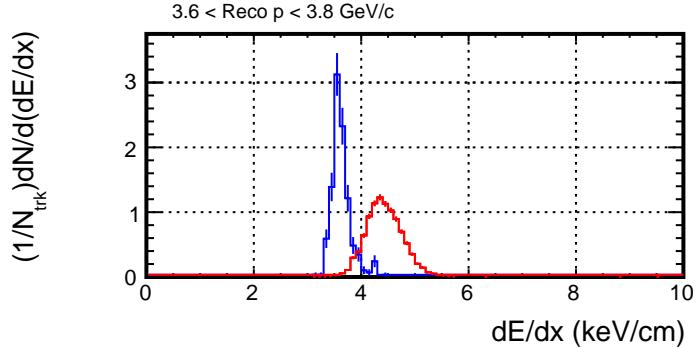
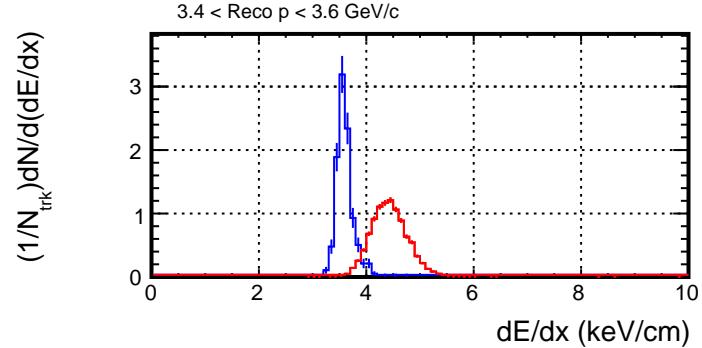
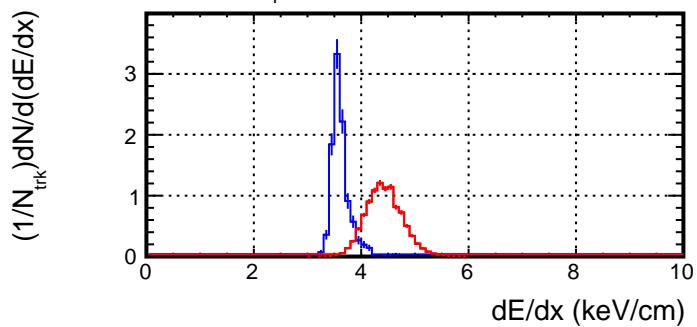
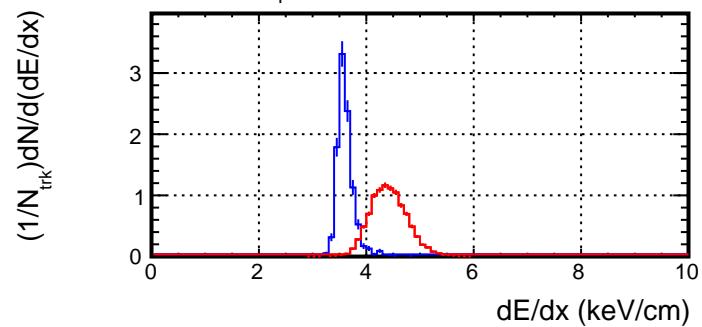
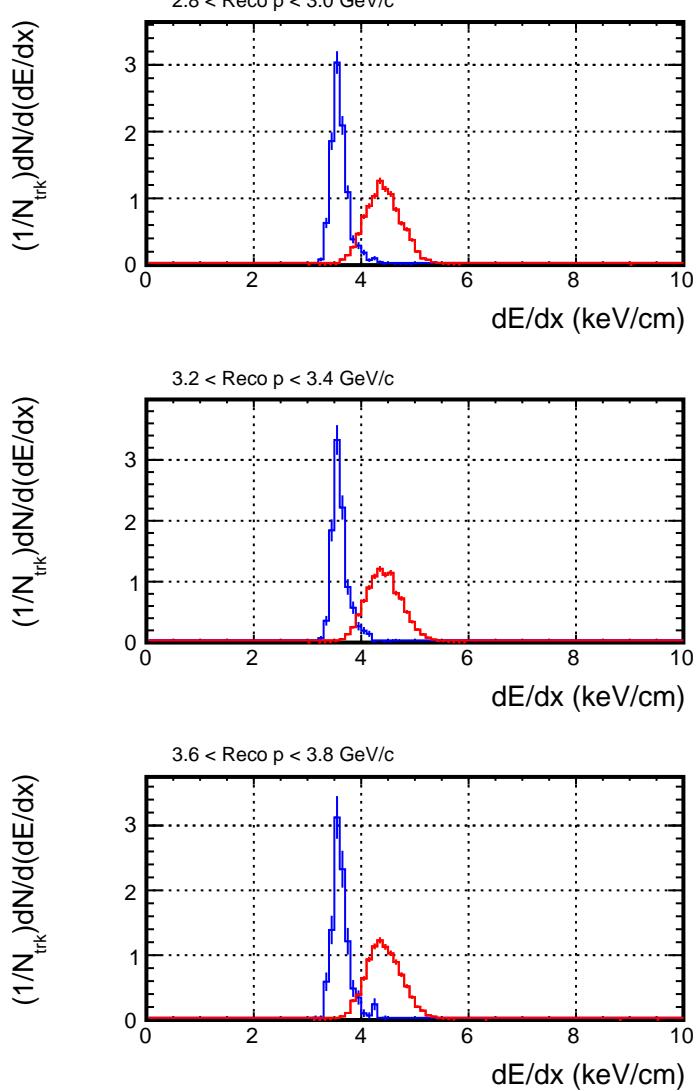
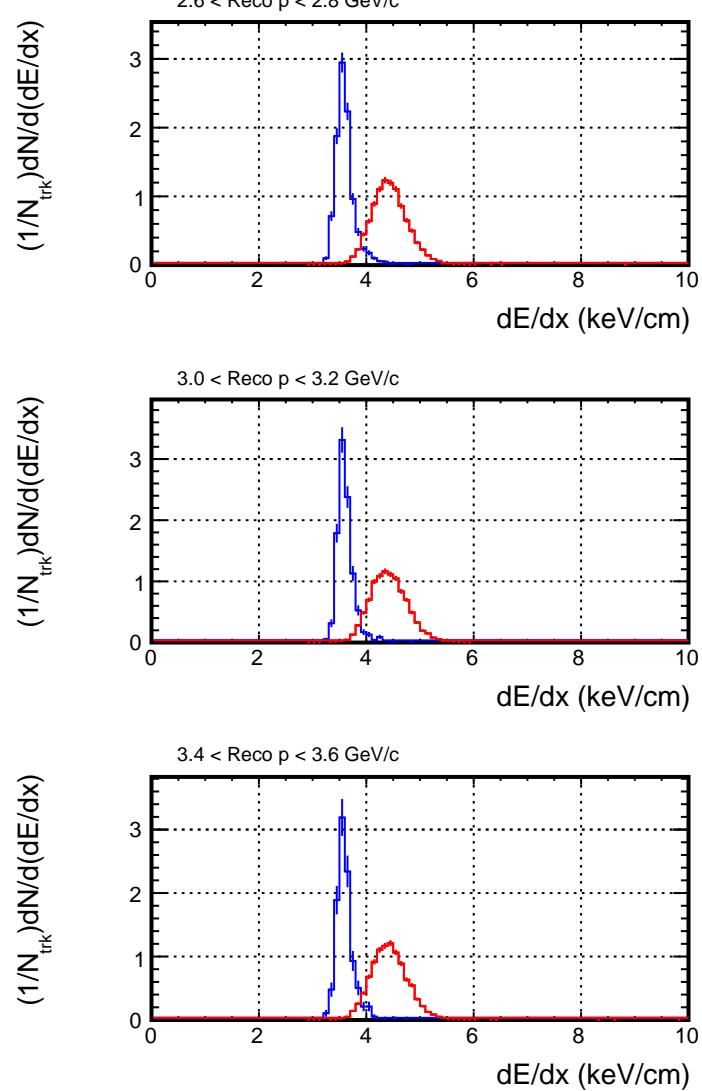
## Projection of dE/dx for each p bin



e-  
(MATCHED, geantid=3)

e-  
(PRIMARY, |n σ<sub>e</sub>| < 2 TPC)

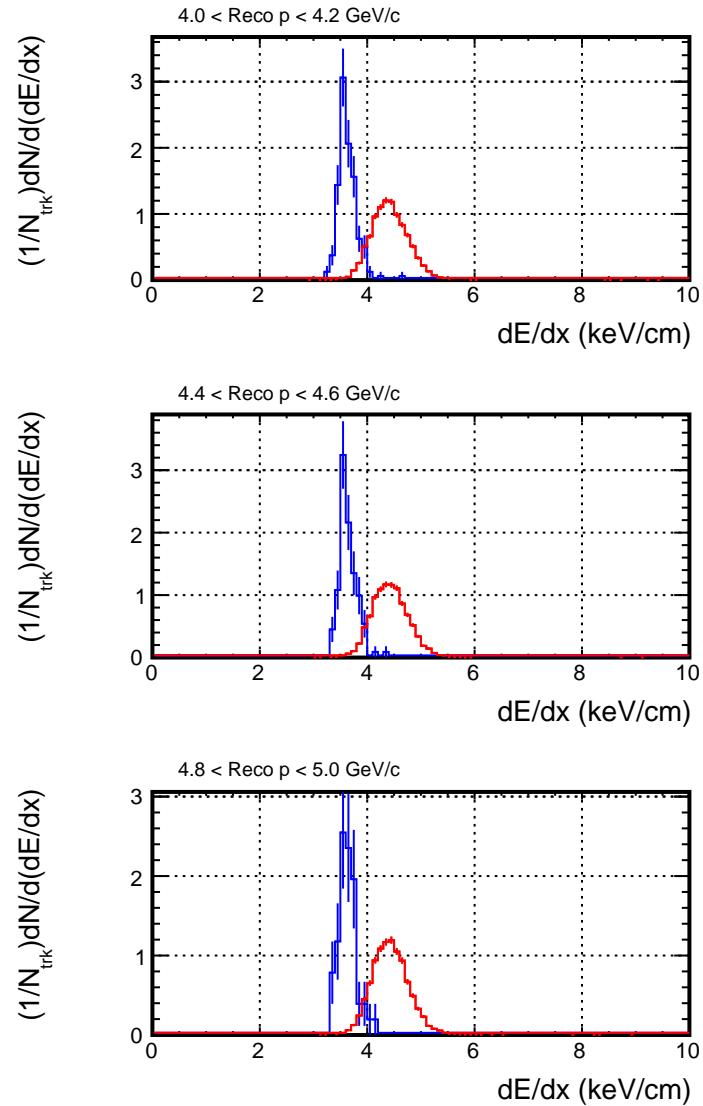
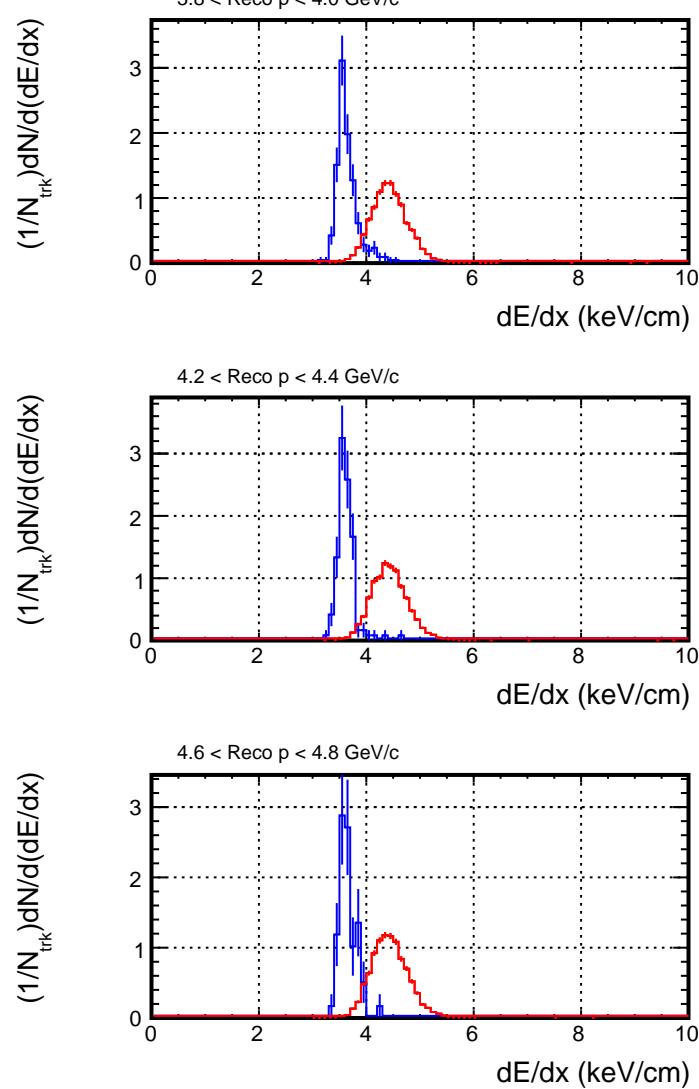
## Projection of dE/dx for each p bin



e-  
(MATCHED, geantid=3)

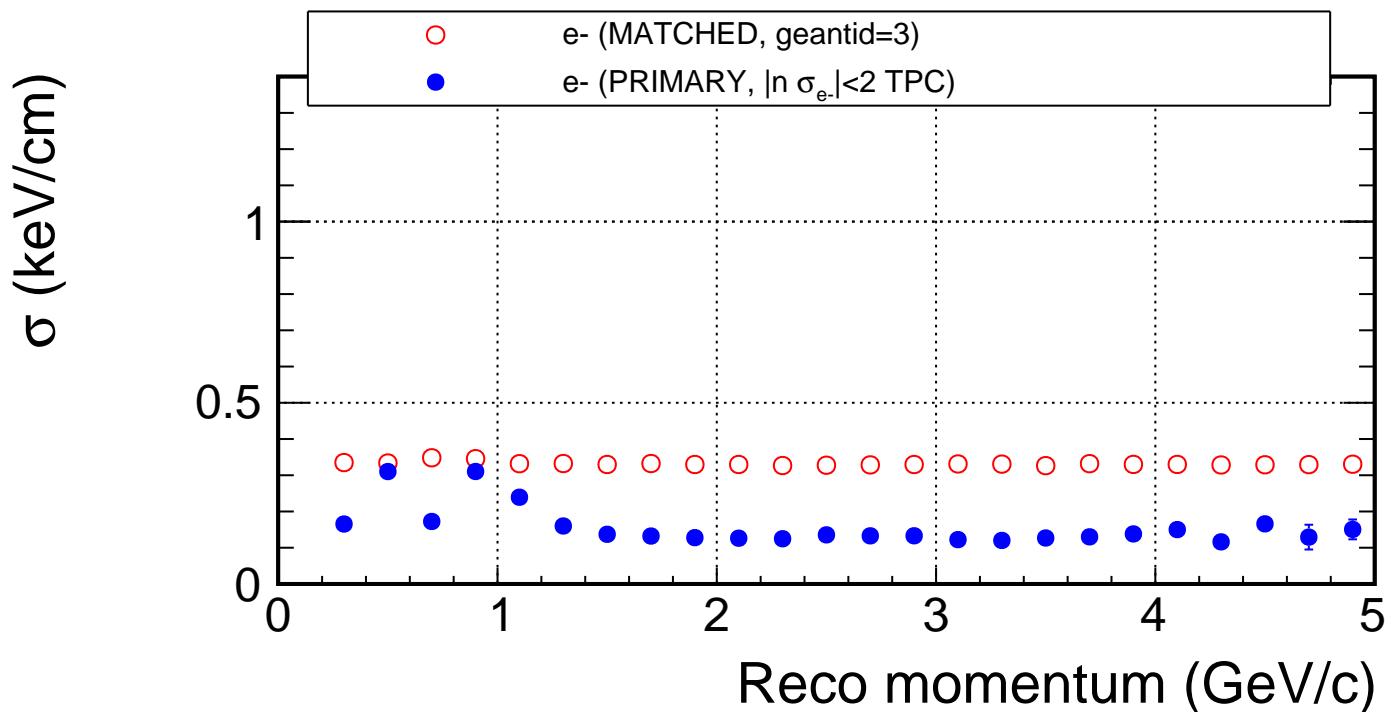
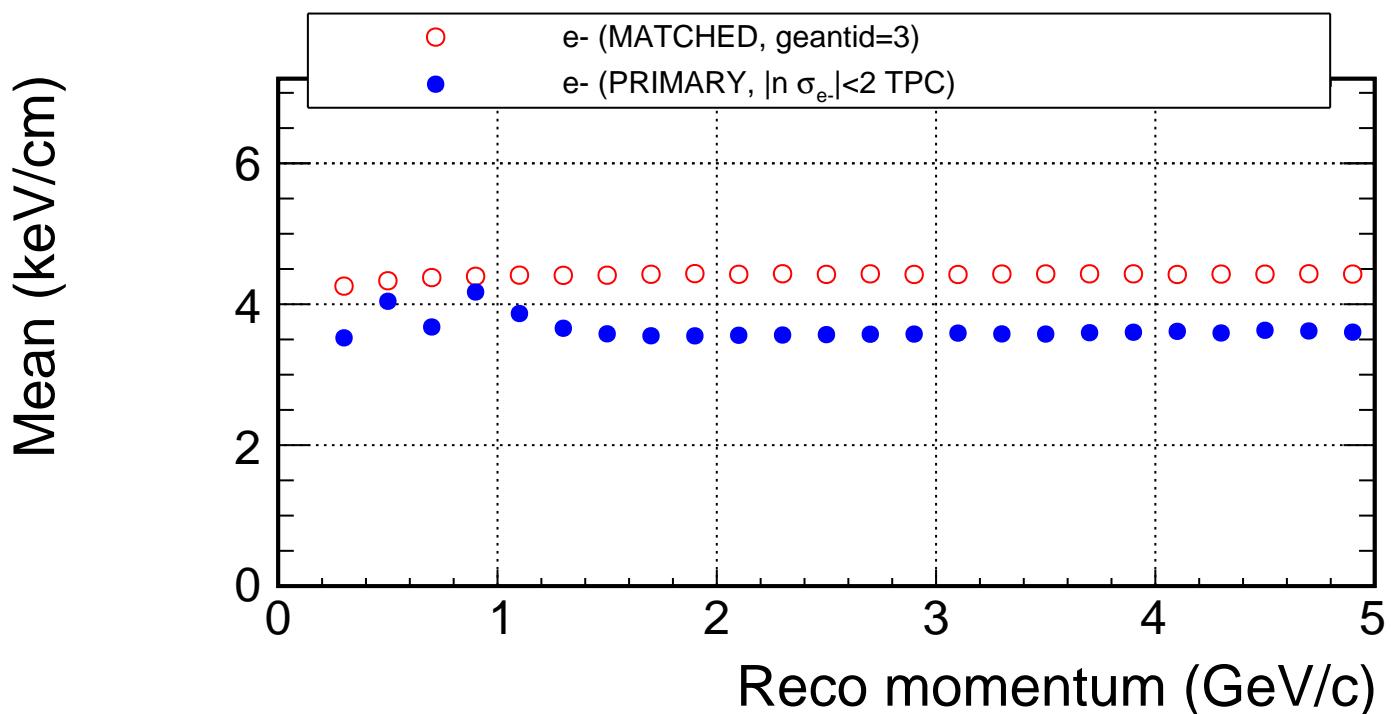
e-  
(PRIMARY, | $\sigma_e$ |<2 TPC)

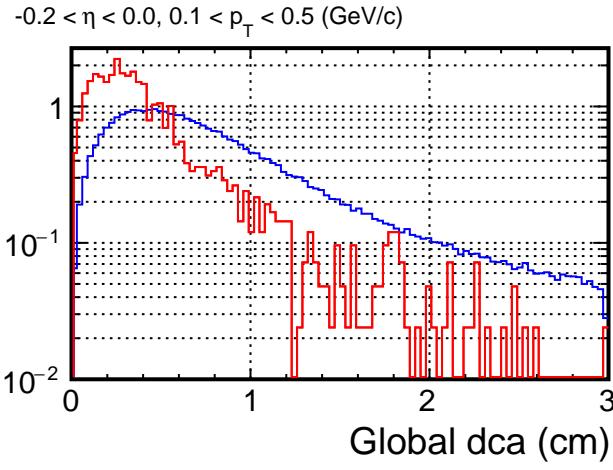
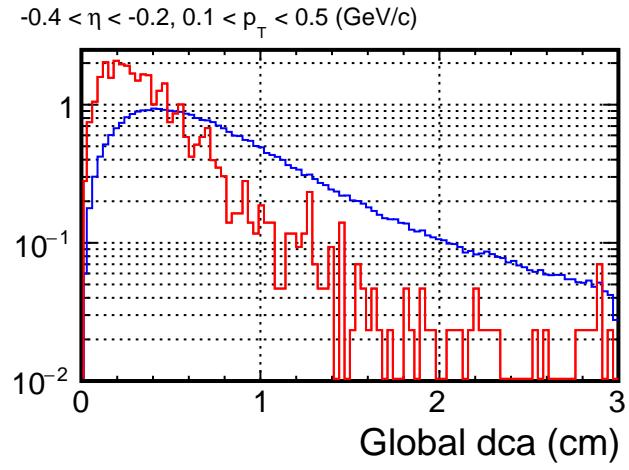
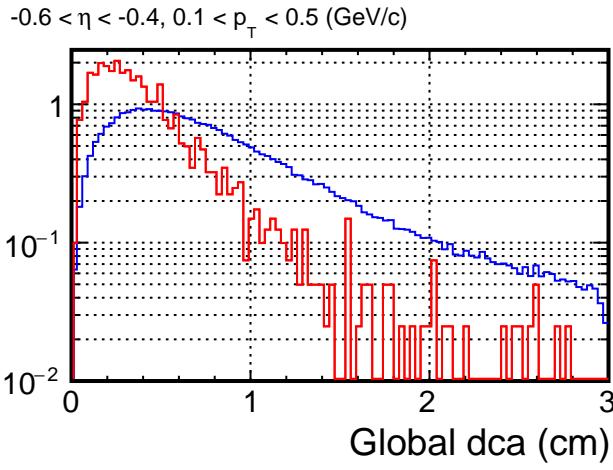
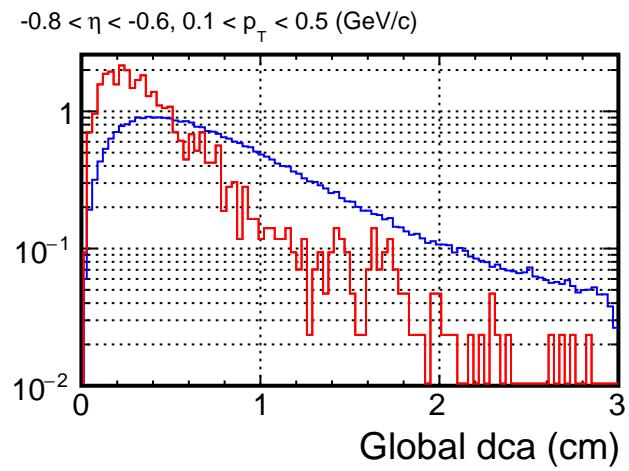
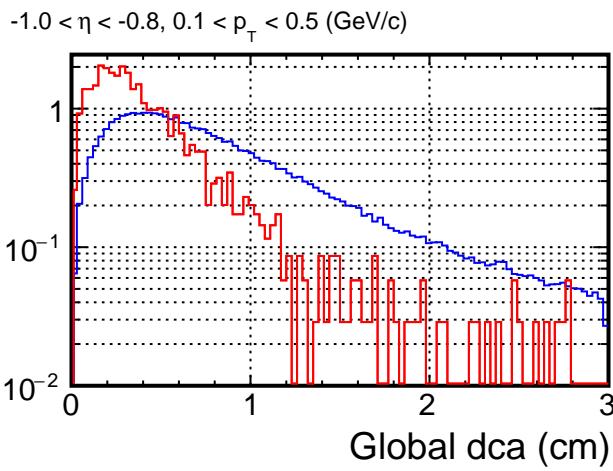
## Projection of dE/dx for each p bin



e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|n \sigma_e| < 2$  TPC)

Mean/ $\sigma$  of dE/dx vs momentum

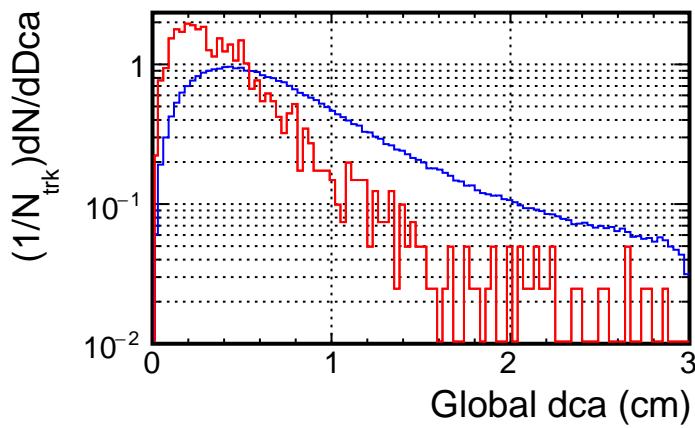
Dca distribution for ( $p_T$ ,  $\eta$ ) slices

e-  
(MATCHED, geantid=3)

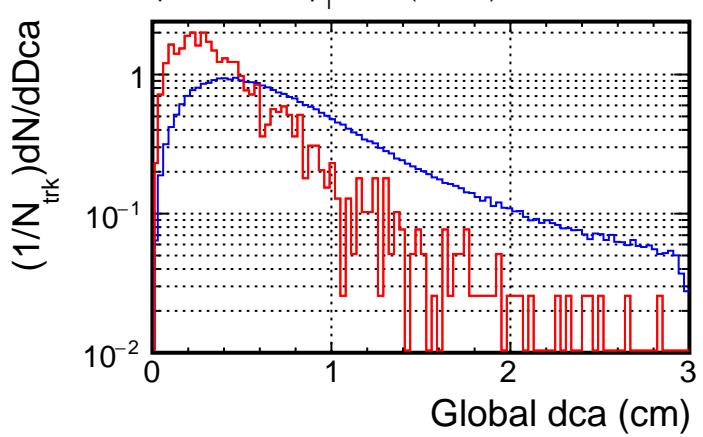
e-  
(PRIMARY,  $|n \sigma_{e^-}| < 2$  TPC)

## Dca distribution for ( $p_T$ , $\eta$ ) slices

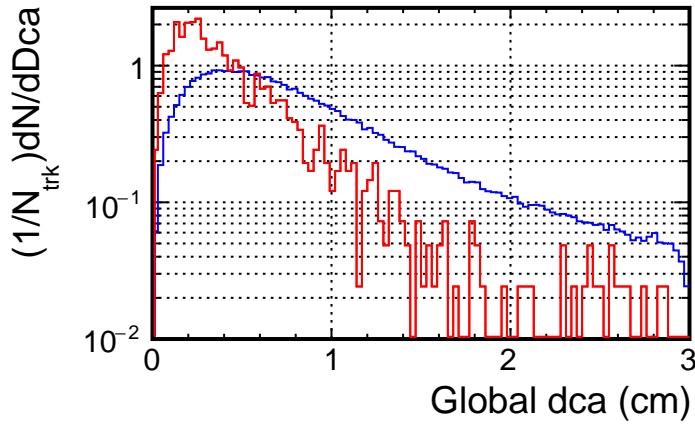
$0.0 < \eta < 0.2, 0.1 < p_T < 0.5$  (GeV/c)



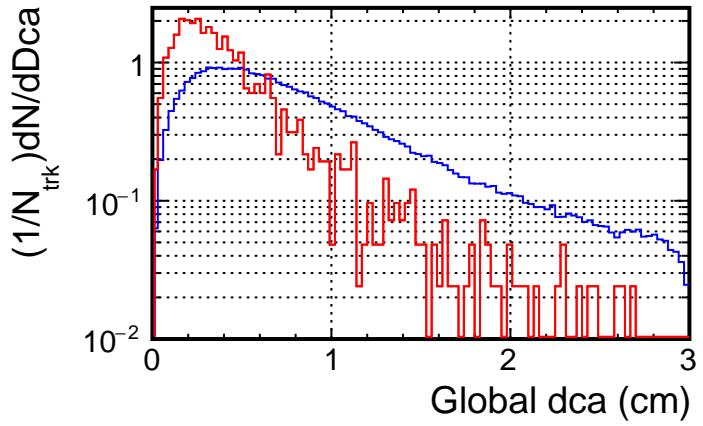
$0.2 < \eta < 0.4, 0.1 < p_T < 0.5$  (GeV/c)



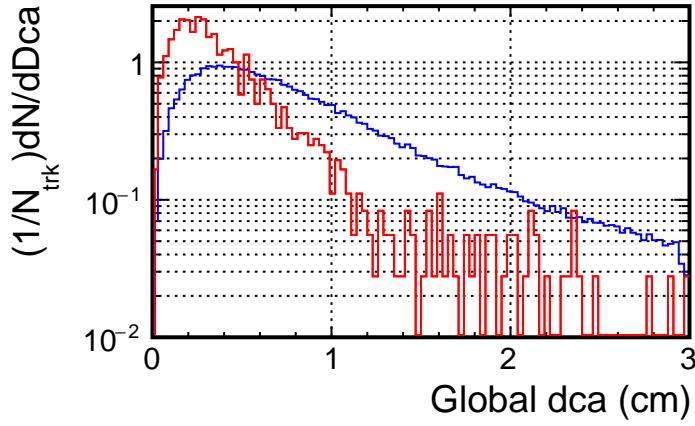
$0.4 < \eta < 0.6, 0.1 < p_T < 0.5$  (GeV/c)



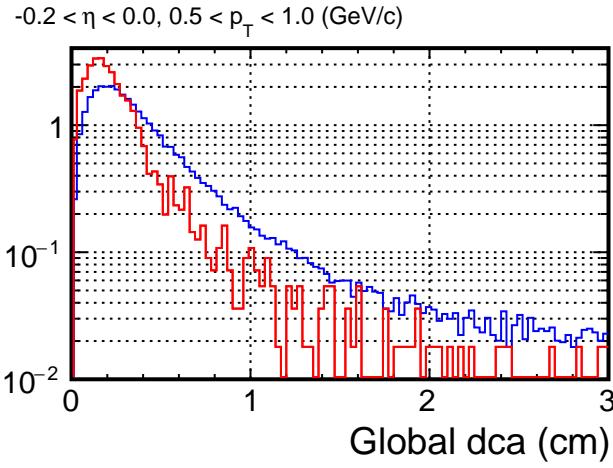
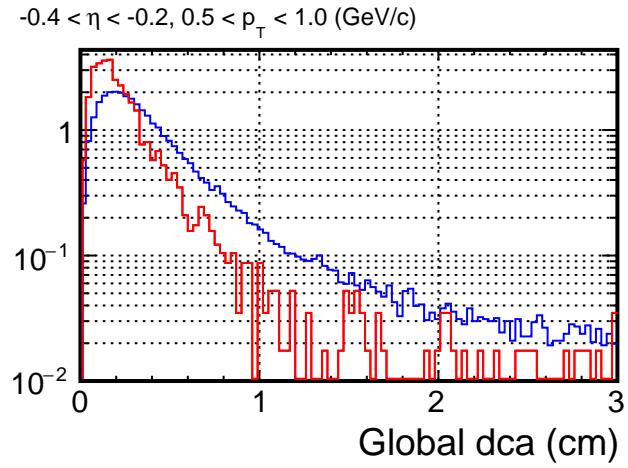
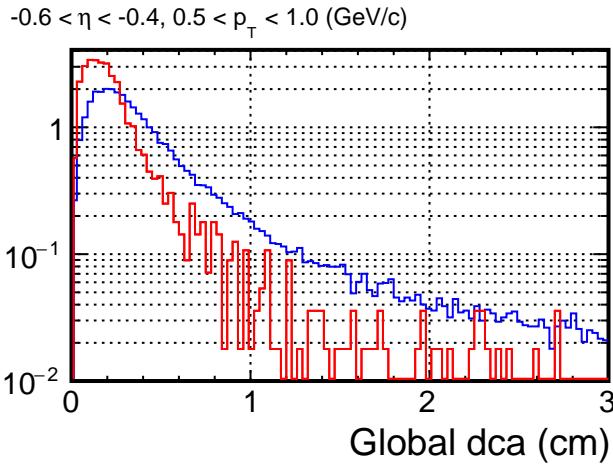
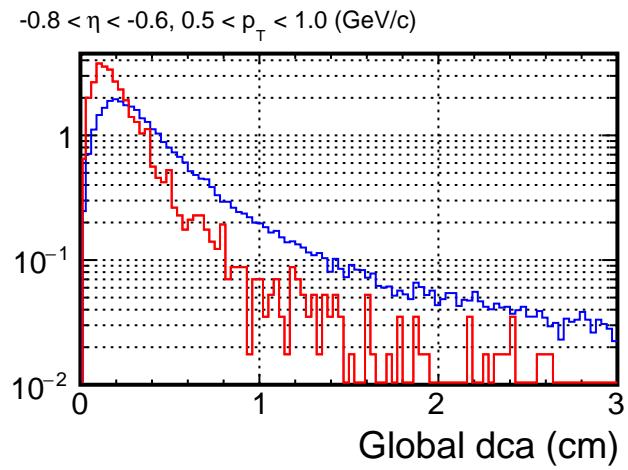
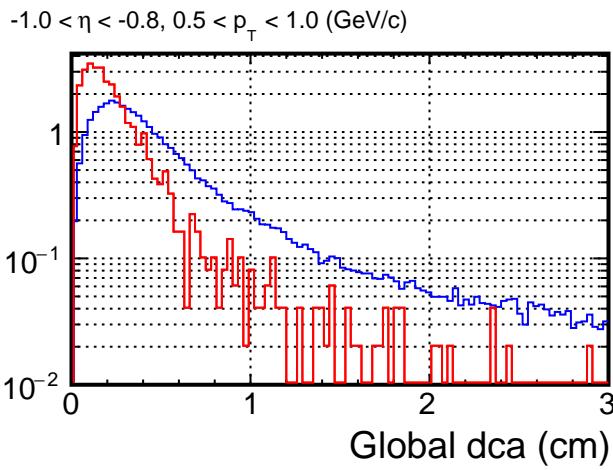
$0.6 < \eta < 0.8, 0.1 < p_T < 0.5$  (GeV/c)



$0.8 < \eta < 1.0, 0.1 < p_T < 0.5$  (GeV/c)



— e-  
(MATCHED, geantid=3)
  
— e-  
(PRIMARY, |n  $\sigma_{e^-}| < 2$  TPC)

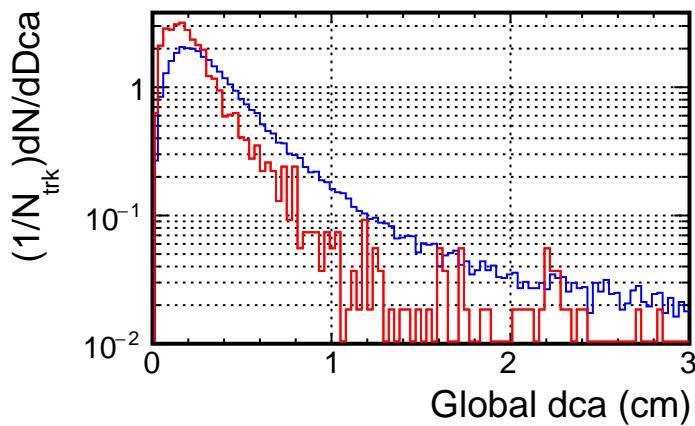
Dca distribution for ( $p_T$ ,  $\eta$ ) slices

e-  
(MATCHED, geantid=3)

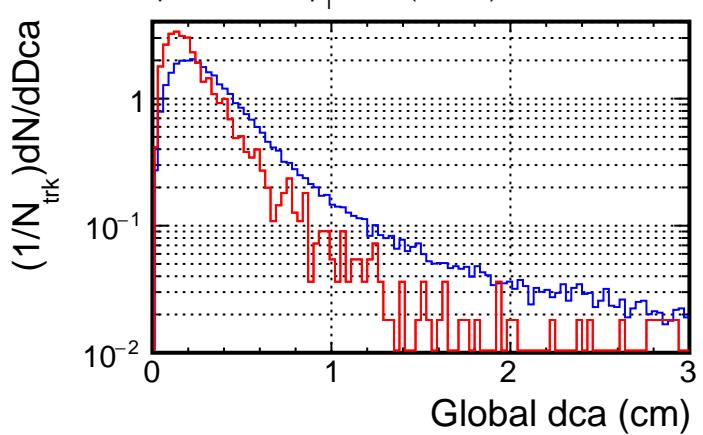
e-  
(PRIMARY,  $|n \sigma_{e^-}| < 2$  TPC)

## Dca distribution for ( $p_T$ , $\eta$ ) slices

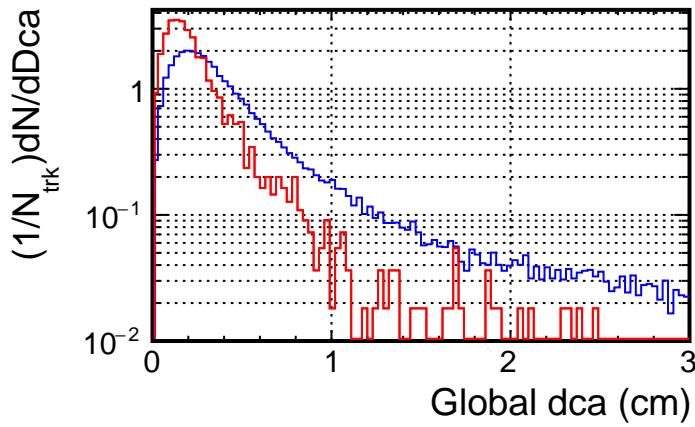
$0.0 < \eta < 0.2, 0.5 < p_T < 1.0$  (GeV/c)



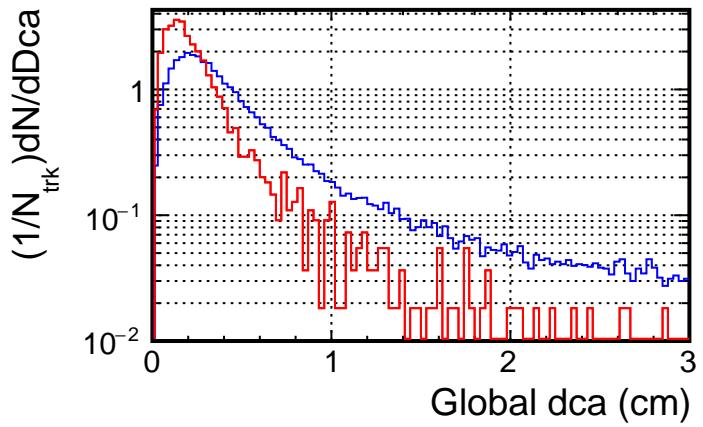
$0.2 < \eta < 0.4, 0.5 < p_T < 1.0$  (GeV/c)



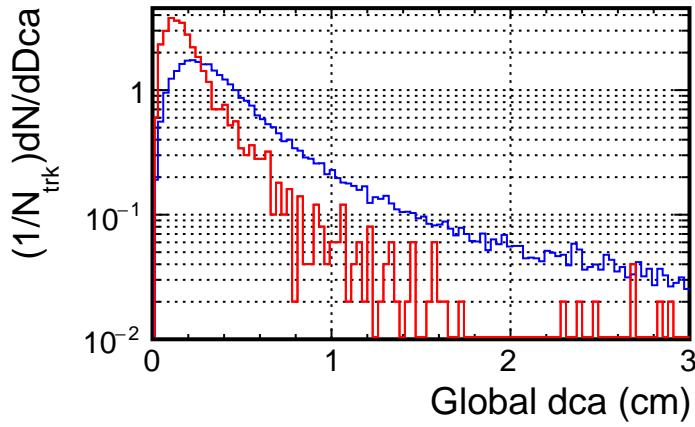
$0.4 < \eta < 0.6, 0.5 < p_T < 1.0$  (GeV/c)



$0.6 < \eta < 0.8, 0.5 < p_T < 1.0$  (GeV/c)



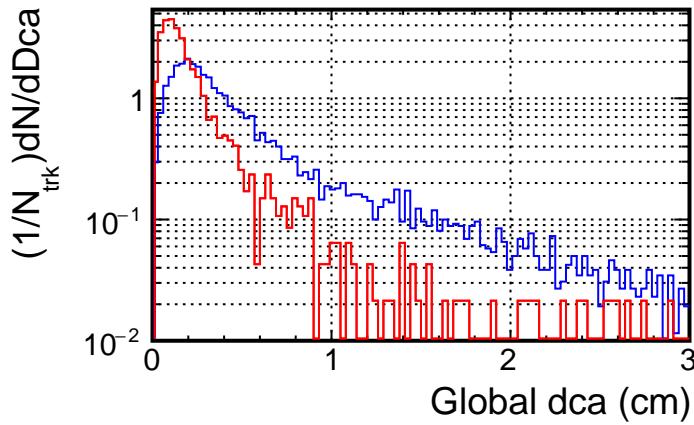
$0.8 < \eta < 1.0, 0.5 < p_T < 1.0$  (GeV/c)



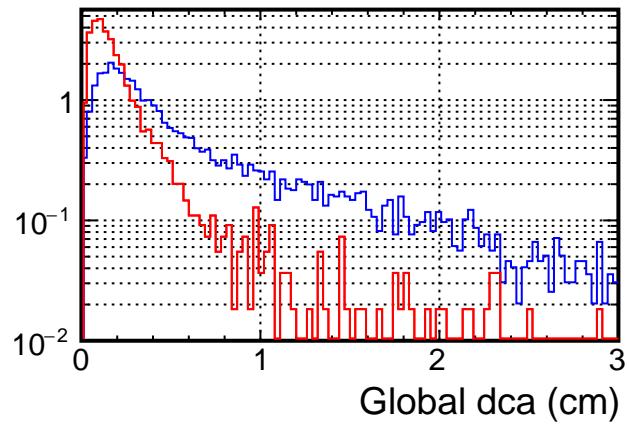
— e-  
(MATCHED, geantid=3)  
  
— e-  
(PRIMARY, |n  $\sigma_{e^-}| < 2$  TPC)

## Dca distribution for ( $p_T$ , $\eta$ ) slices

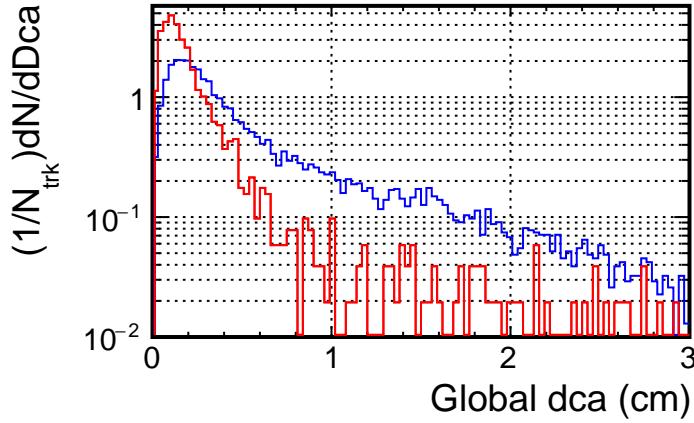
$-1.0 < \eta < -0.8, 1.0 < p_T < 1.5$  (GeV/c)



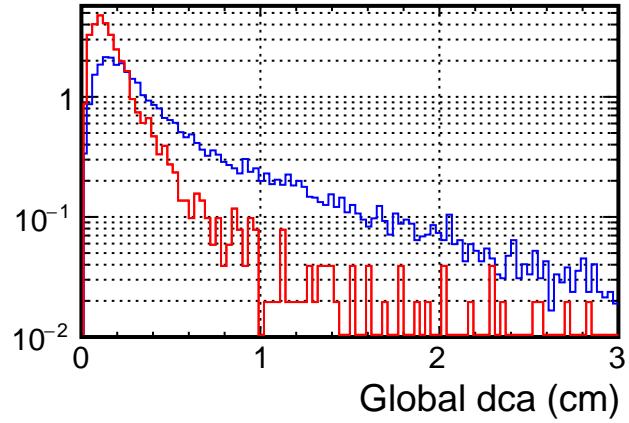
$-0.8 < \eta < -0.6, 1.0 < p_T < 1.5$  (GeV/c)



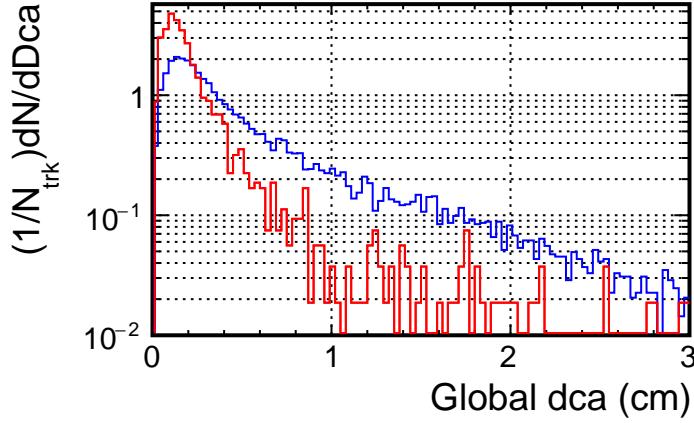
$-0.6 < \eta < -0.4, 1.0 < p_T < 1.5$  (GeV/c)



$-0.4 < \eta < -0.2, 1.0 < p_T < 1.5$  (GeV/c)



$-0.2 < \eta < 0.0, 1.0 < p_T < 1.5$  (GeV/c)

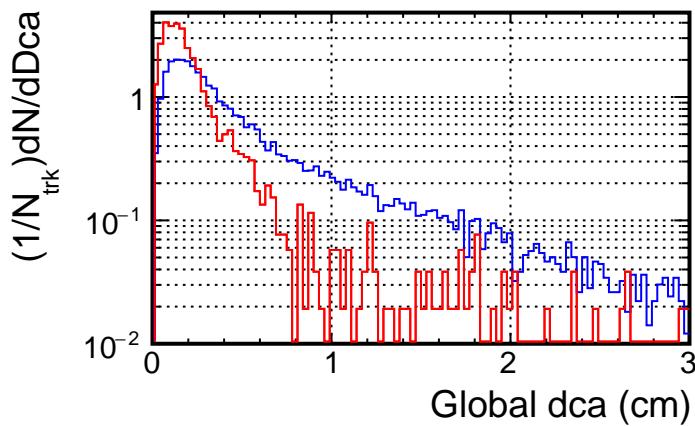


e-  
(MATCHED, geantid=3)

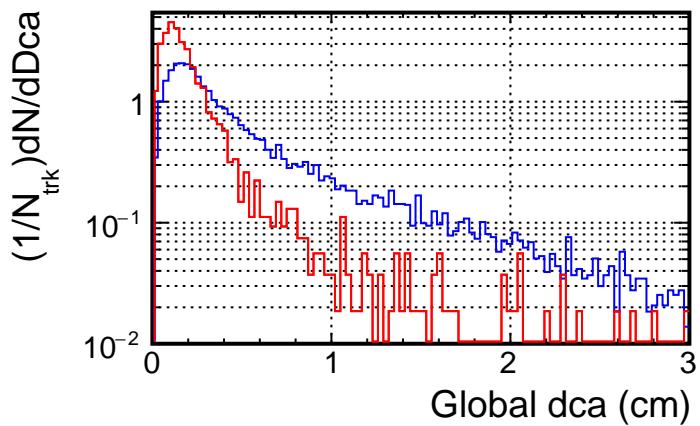
e-  
(PRIMARY,  $|n \sigma_{e^-}| < 2$  TPC)

## Dca distribution for ( $p_T$ , $\eta$ ) slices

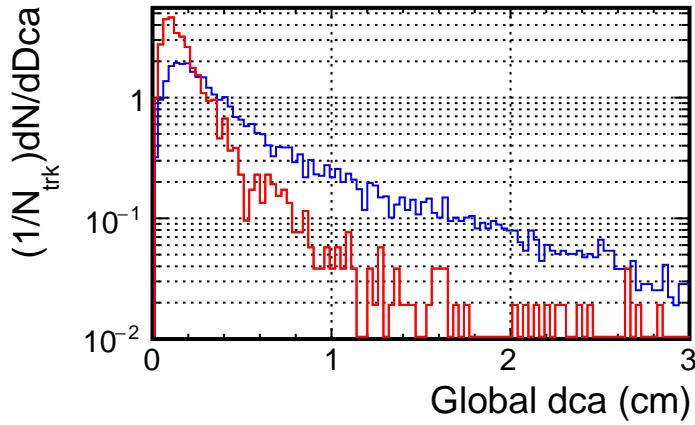
$0.0 < \eta < 0.2, 1.0 < p_T < 1.5$  (GeV/c)



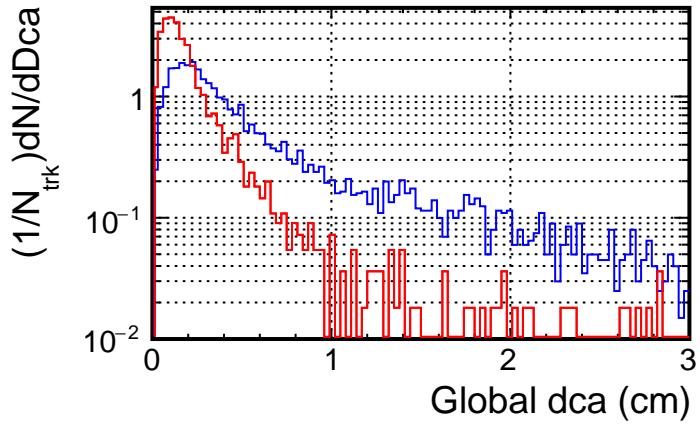
$0.2 < \eta < 0.4, 1.0 < p_T < 1.5$  (GeV/c)



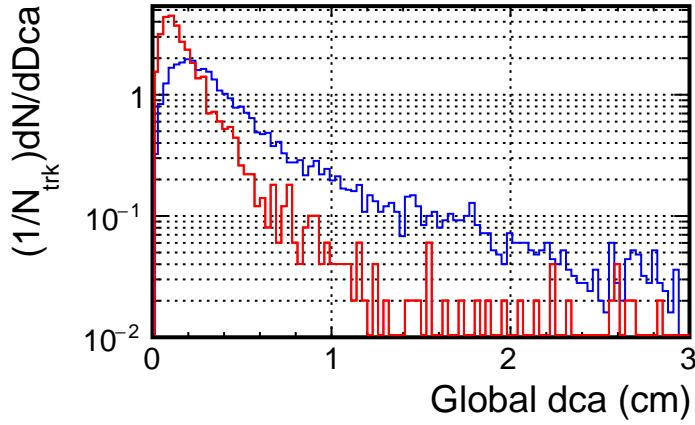
$0.4 < \eta < 0.6, 1.0 < p_T < 1.5$  (GeV/c)



$0.6 < \eta < 0.8, 1.0 < p_T < 1.5$  (GeV/c)

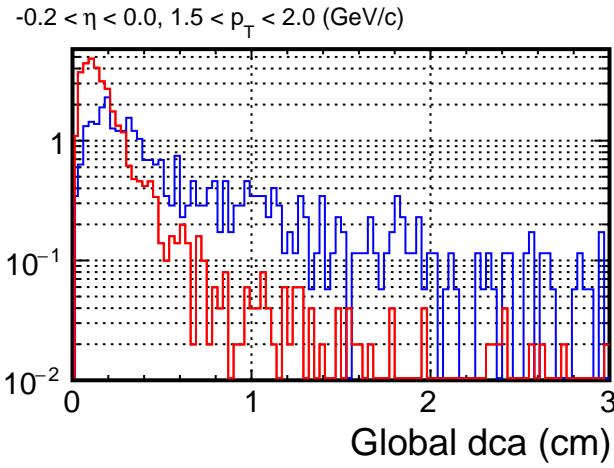
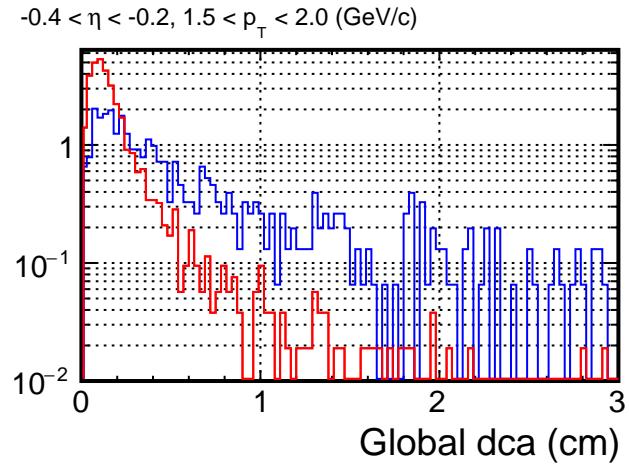
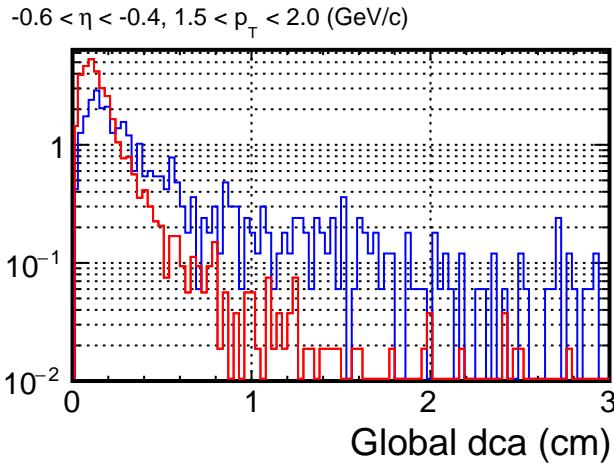
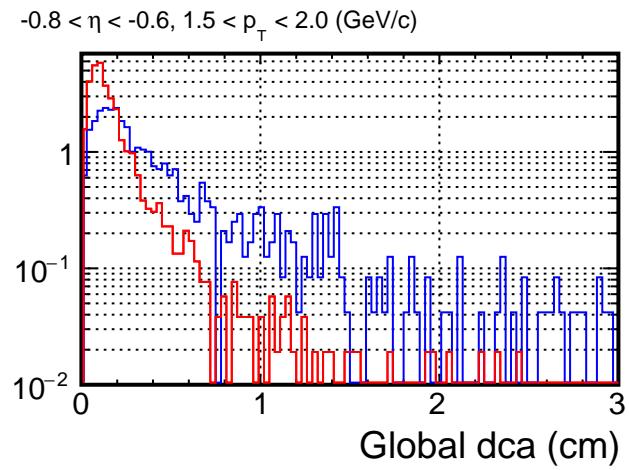
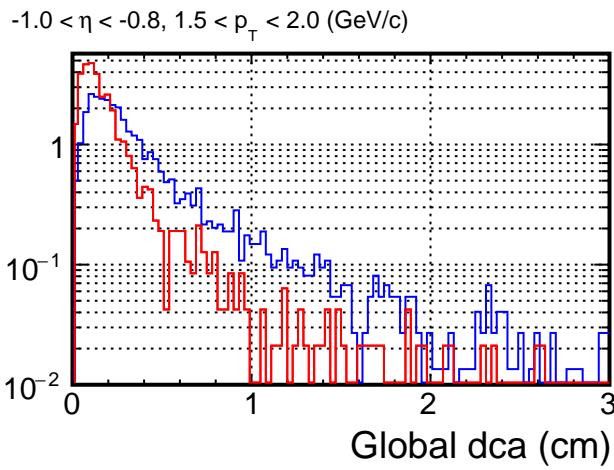


$0.8 < \eta < 1.0, 1.0 < p_T < 1.5$  (GeV/c)



e-  
(MATCHED, geantid=3)

e-  
(PRIMARY, |n  $\sigma_{e^-}| < 2$  TPC)

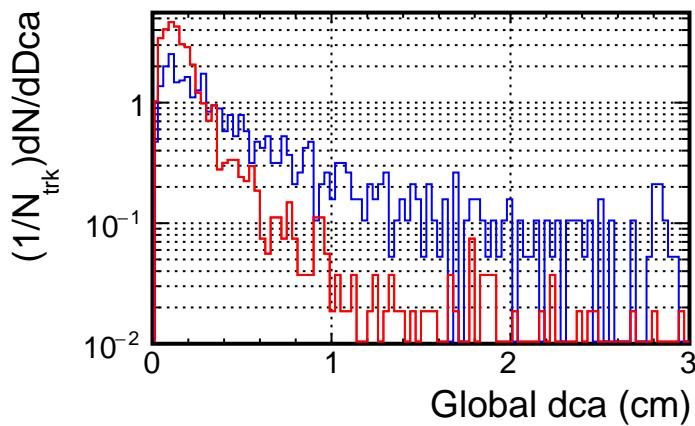
Dca distribution for ( $p_T$ ,  $\eta$ ) slices

e-  
(MATCHED, geantid=3)

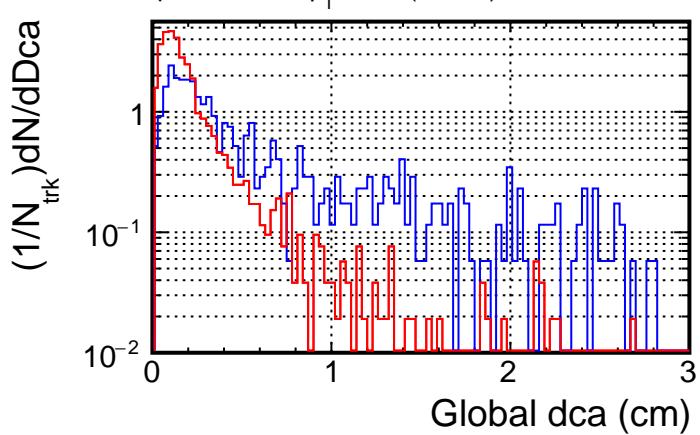
e-  
(PRIMARY,  $|n \sigma_{e^-}| < 2$  TPC)

## Dca distribution for ( $p_T$ , $\eta$ ) slices

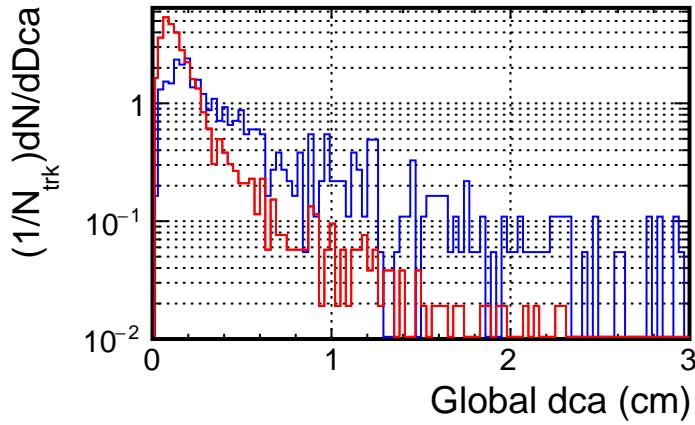
$0.0 < \eta < 0.2, 1.5 < p_T < 2.0$  (GeV/c)



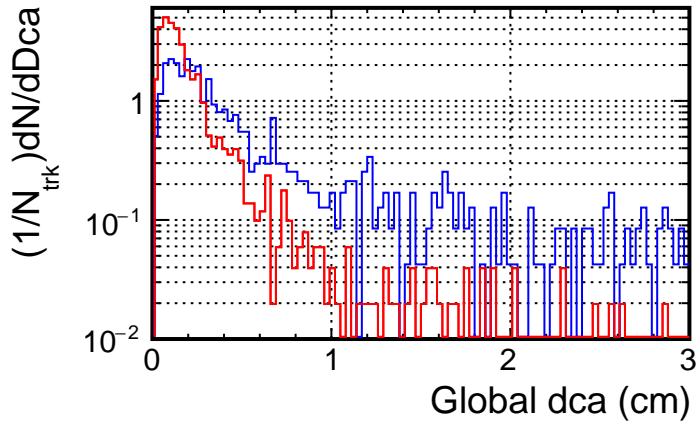
$0.2 < \eta < 0.4, 1.5 < p_T < 2.0$  (GeV/c)



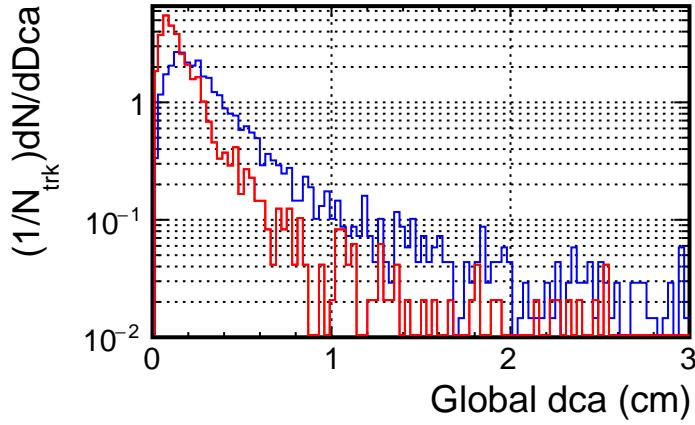
$0.4 < \eta < 0.6, 1.5 < p_T < 2.0$  (GeV/c)



$0.6 < \eta < 0.8, 1.5 < p_T < 2.0$  (GeV/c)

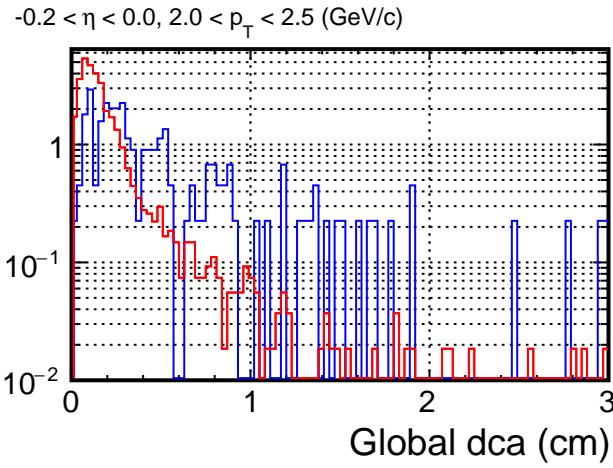
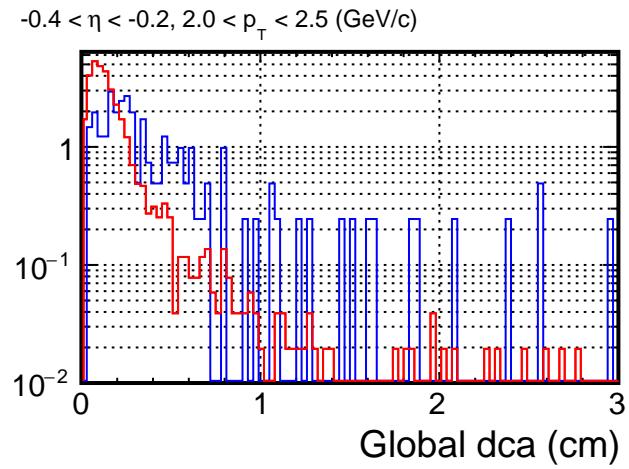
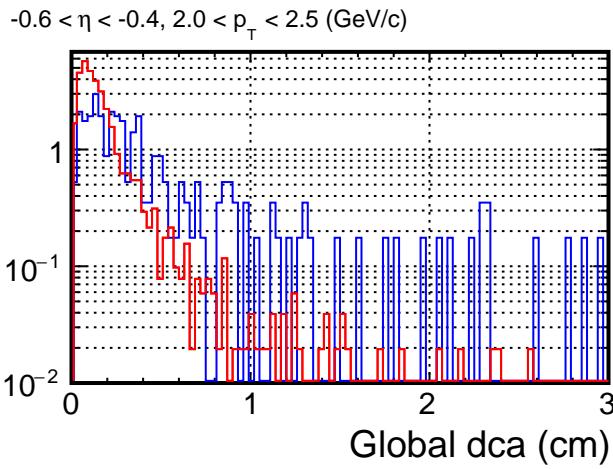
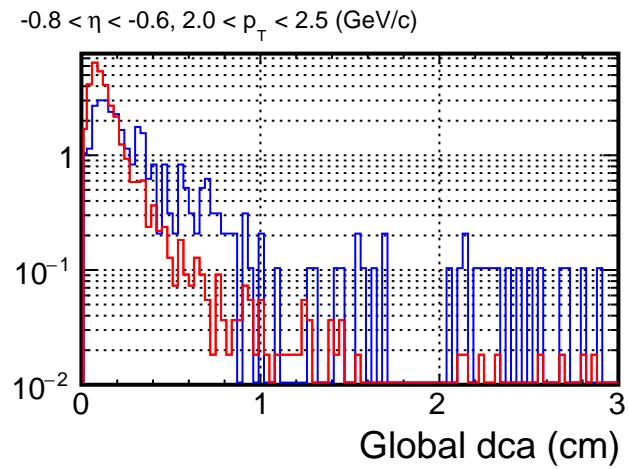
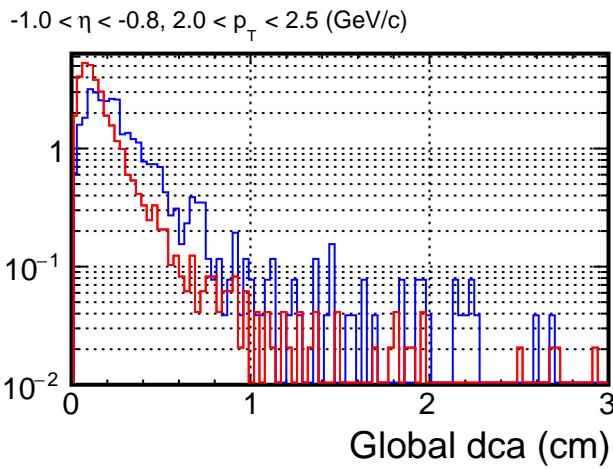


$0.8 < \eta < 1.0, 1.5 < p_T < 2.0$  (GeV/c)



e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|\eta| < 2$  TPC)

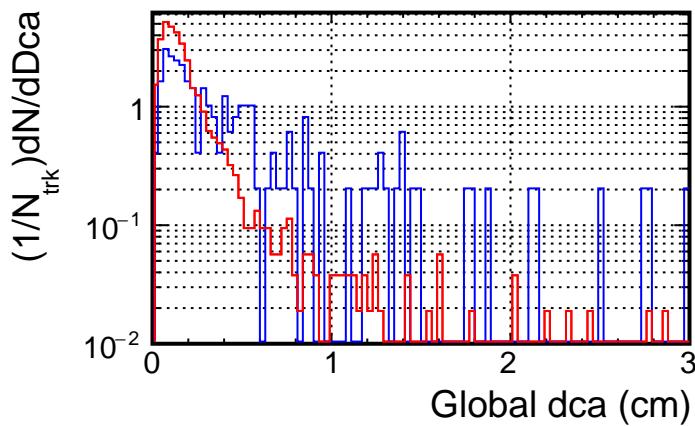
Dca distribution for ( $p_T$ ,  $\eta$ ) slices

e-  
(MATCHED, geantid=3)

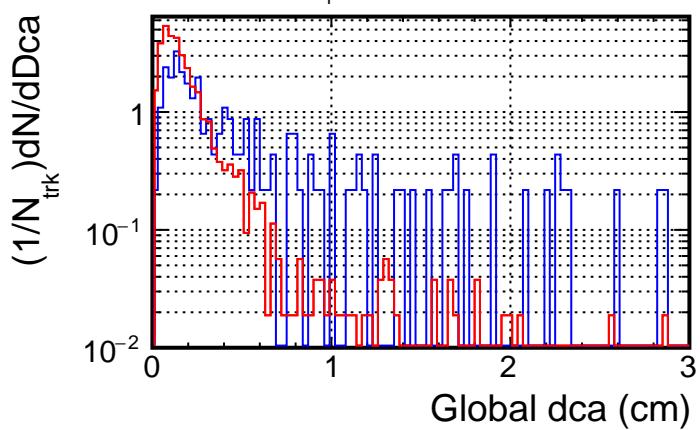
e-  
(PRIMARY,  $|n \sigma_{e^-}| < 2$  TPC)

## Dca distribution for ( $p_T$ , $\eta$ ) slices

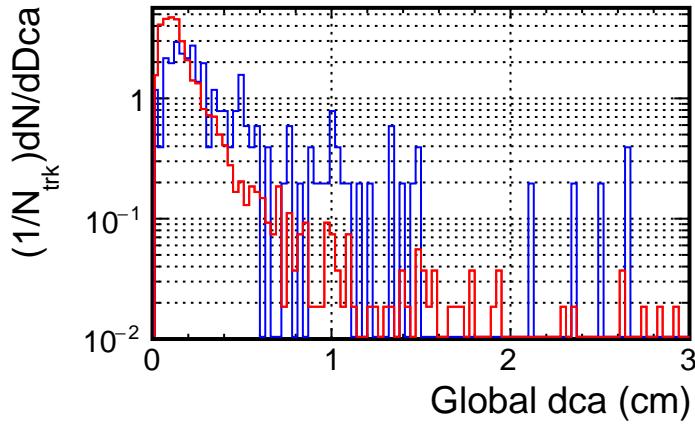
$0.0 < \eta < 0.2, 2.0 < p_T < 2.5$  (GeV/c)



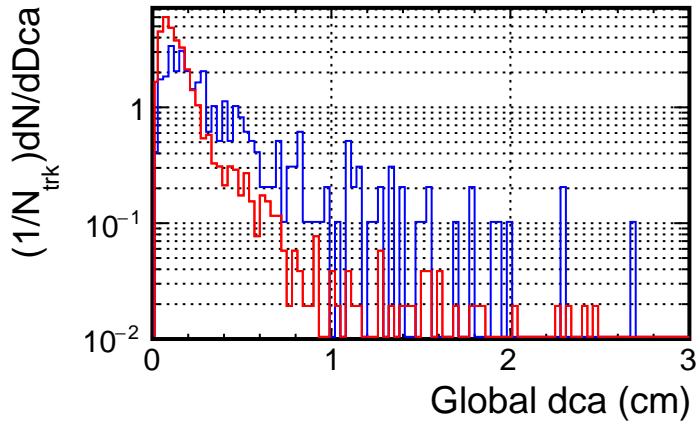
$0.2 < \eta < 0.4, 2.0 < p_T < 2.5$  (GeV/c)



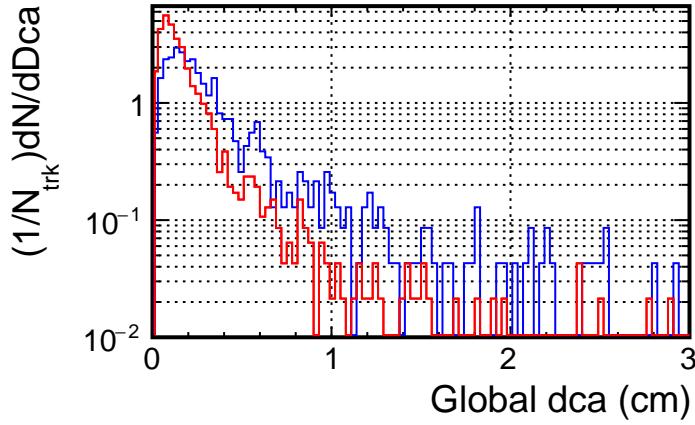
$0.4 < \eta < 0.6, 2.0 < p_T < 2.5$  (GeV/c)



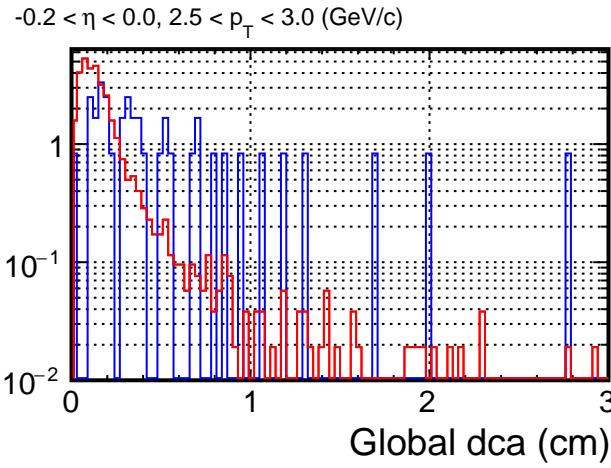
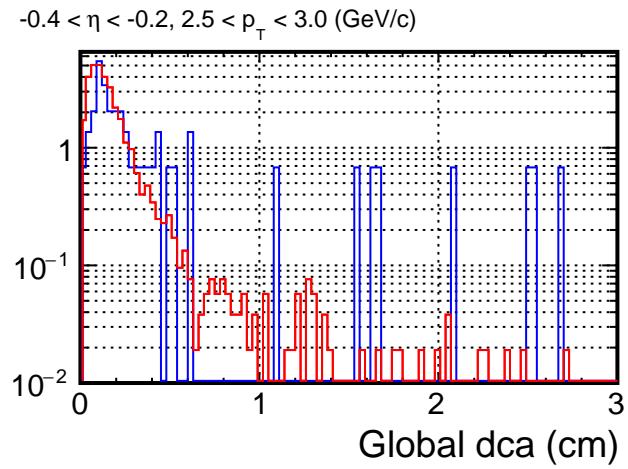
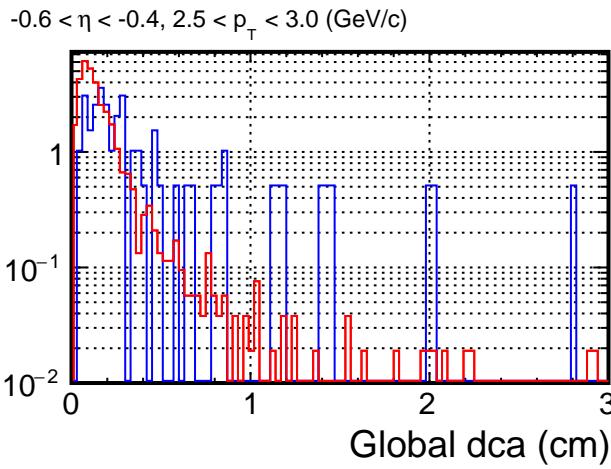
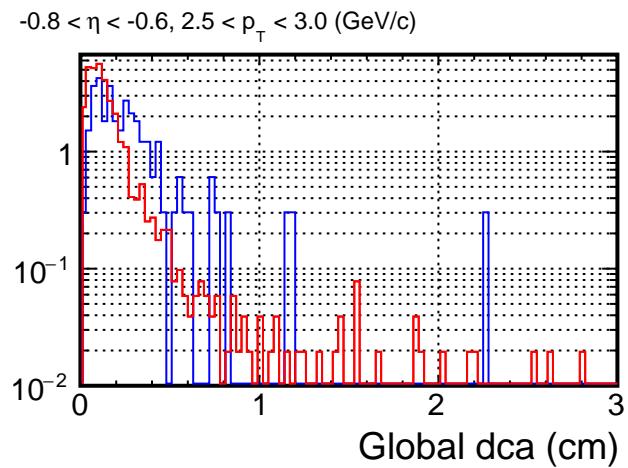
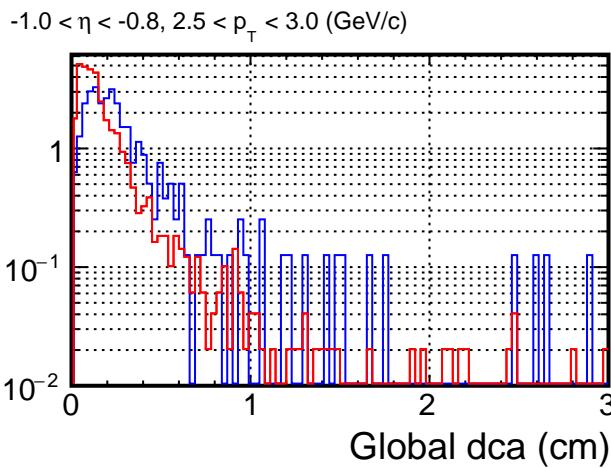
$0.6 < \eta < 0.8, 2.0 < p_T < 2.5$  (GeV/c)



$0.8 < \eta < 1.0, 2.0 < p_T < 2.5$  (GeV/c)



— e-  
(MATCHED, geantid=3)  
  
— e-  
(PRIMARY,  $|\eta| < 2$  TPC)

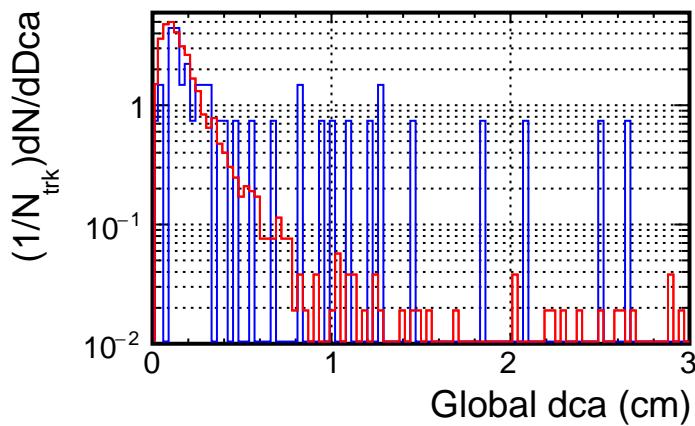
Dca distribution for ( $p_T$ ,  $\eta$ ) slices

e-  
(MATCHED, geantid=3)

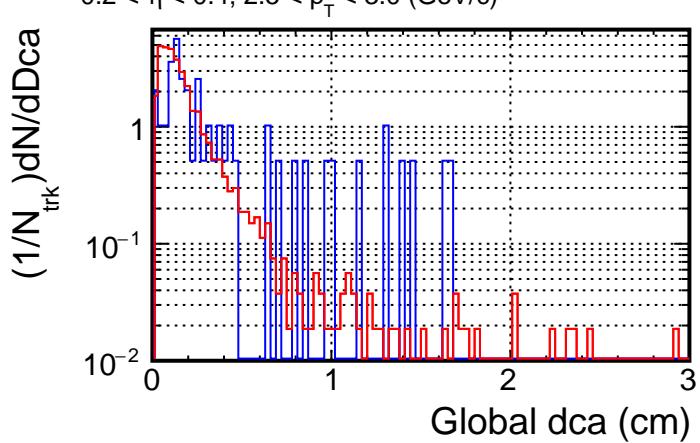
e-  
(PRIMARY,  $|\eta \sigma_{e^-}| < 2$  TPC)

## Dca distribution for ( $p_T$ , $\eta$ ) slices

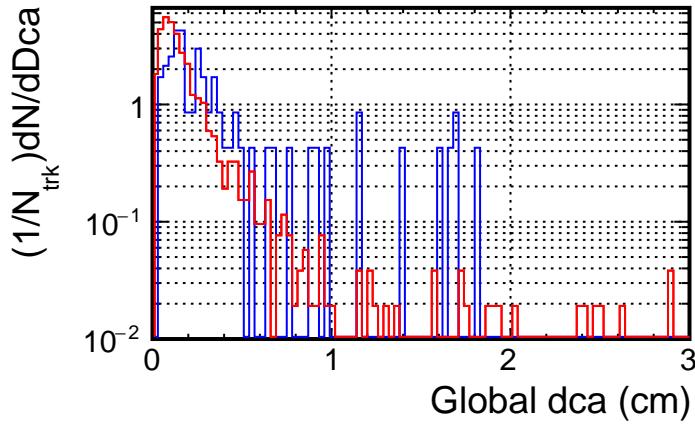
$0.0 < \eta < 0.2, 2.5 < p_T < 3.0$  (GeV/c)



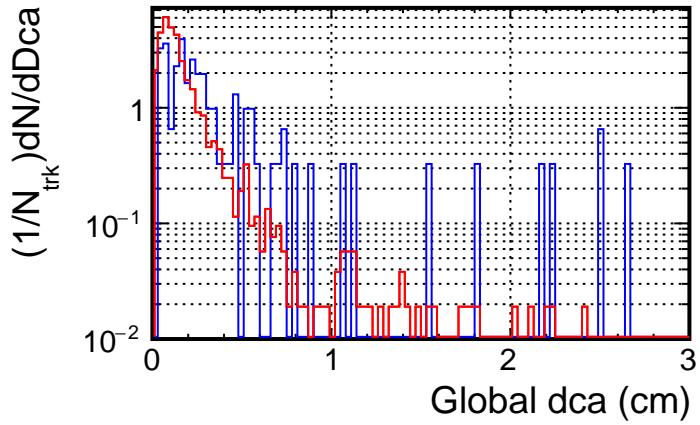
$0.2 < \eta < 0.4, 2.5 < p_T < 3.0$  (GeV/c)



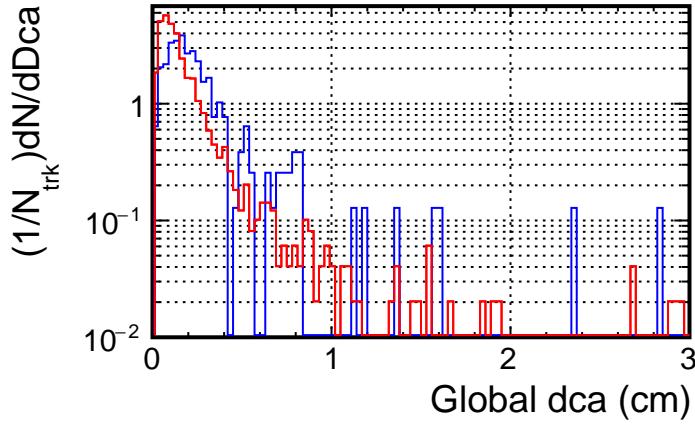
$0.4 < \eta < 0.6, 2.5 < p_T < 3.0$  (GeV/c)



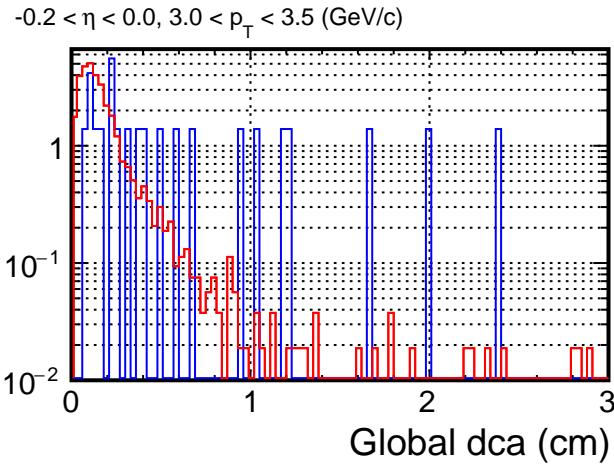
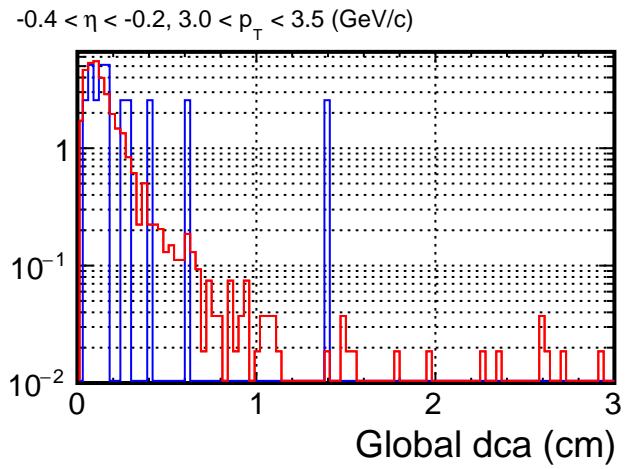
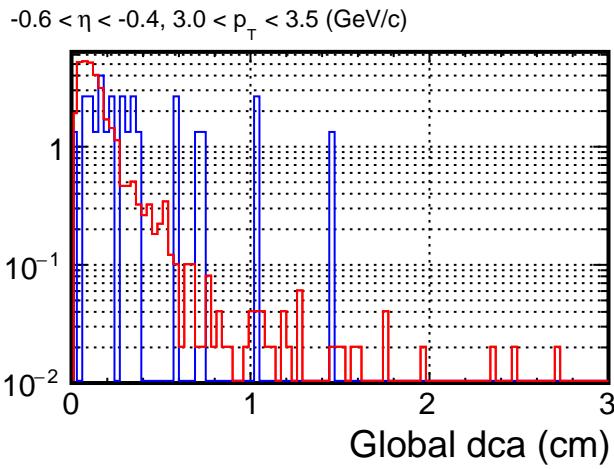
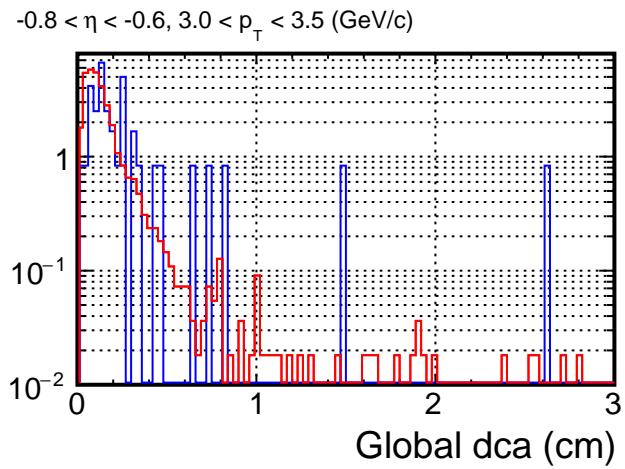
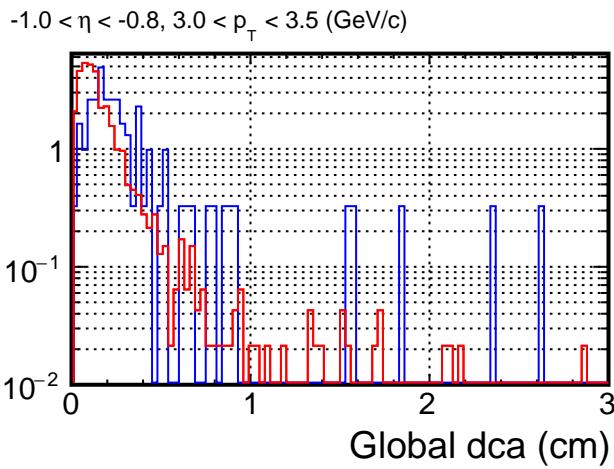
$0.6 < \eta < 0.8, 2.5 < p_T < 3.0$  (GeV/c)



$0.8 < \eta < 1.0, 2.5 < p_T < 3.0$  (GeV/c)



— e-  
(MATCHED, geantid=3)
  
— e-  
(PRIMARY,  $|\eta| < 2$  TPC)

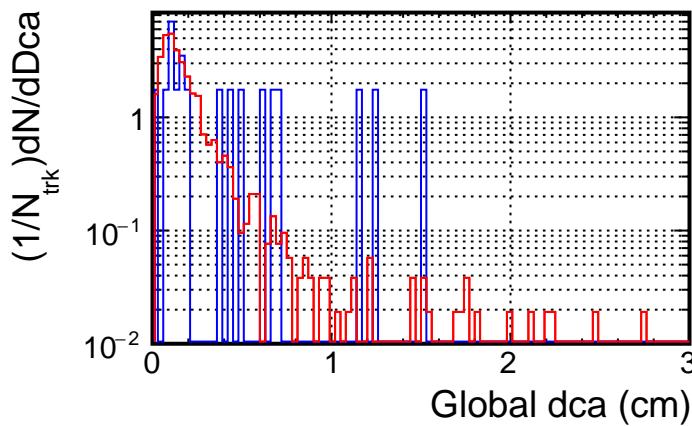
Dca distribution for ( $p_T$ ,  $\eta$ ) slices

e-  
(MATCHED, geantid=3)

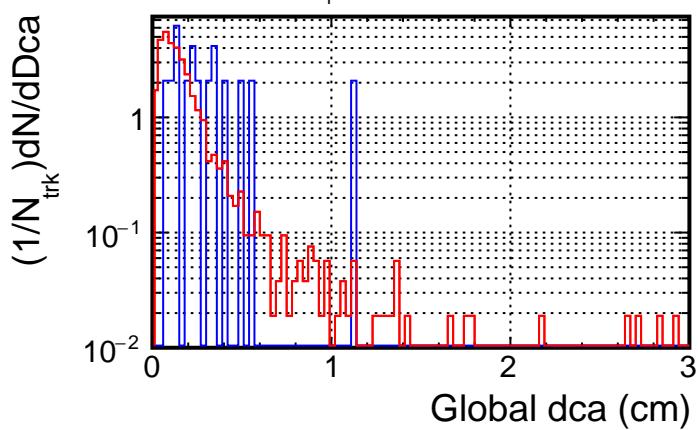
e-  
(PRIMARY,  $|n \sigma_{e^-}| < 2$  TPC)

## Dca distribution for ( $p_T$ , $\eta$ ) slices

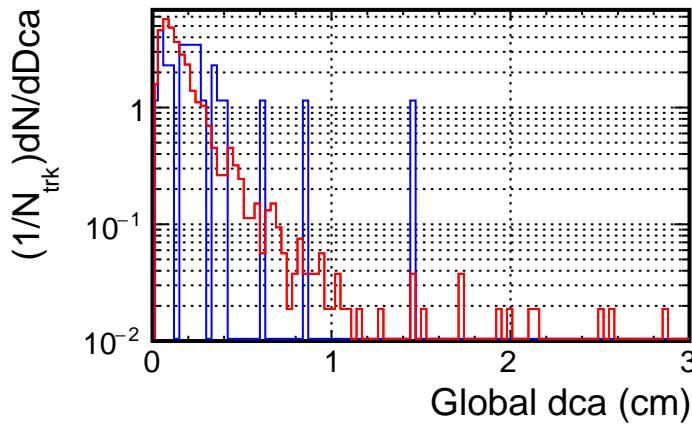
$0.0 < \eta < 0.2, 3.0 < p_T < 3.5$  (GeV/c)



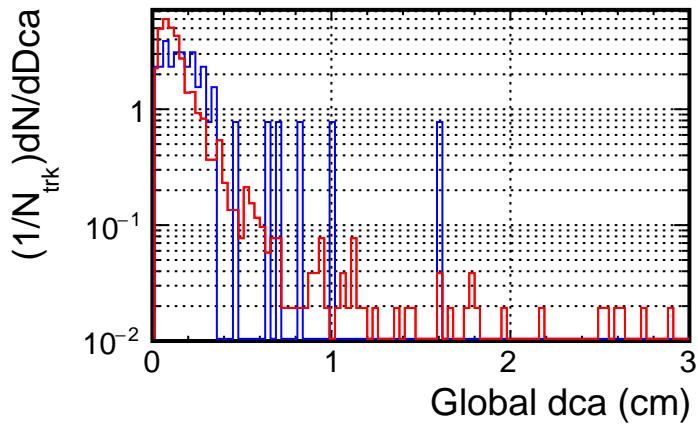
$0.2 < \eta < 0.4, 3.0 < p_T < 3.5$  (GeV/c)



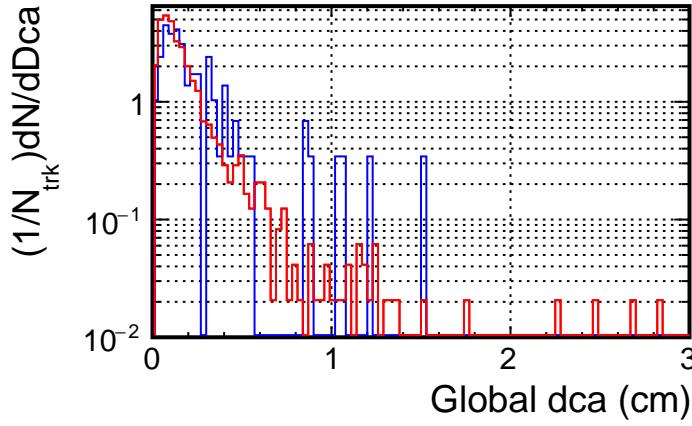
$0.4 < \eta < 0.6, 3.0 < p_T < 3.5$  (GeV/c)



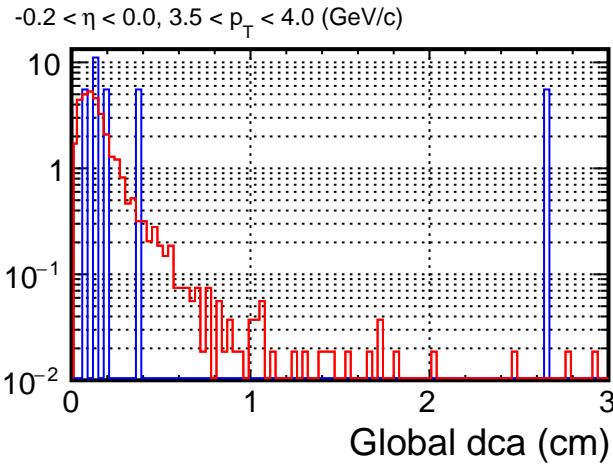
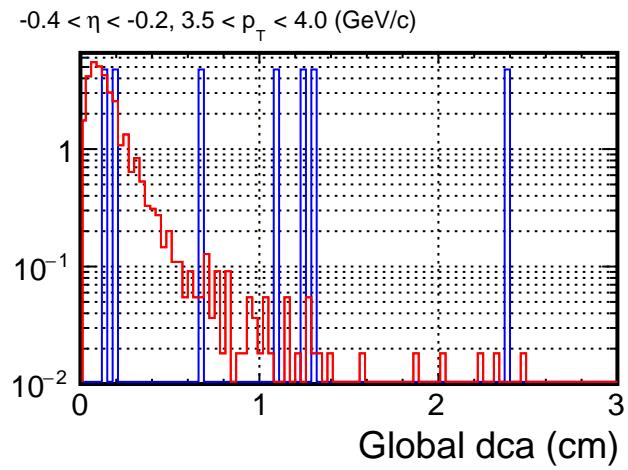
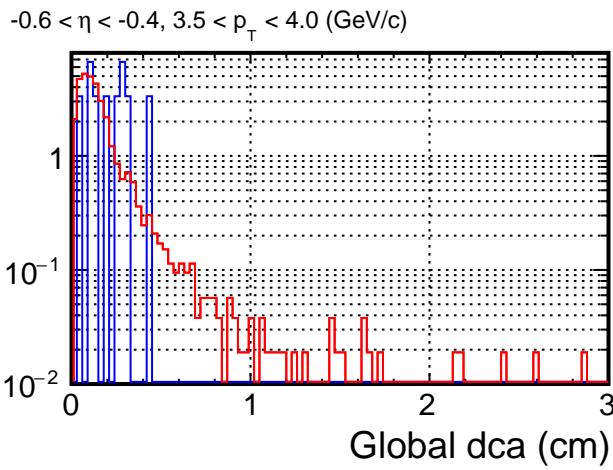
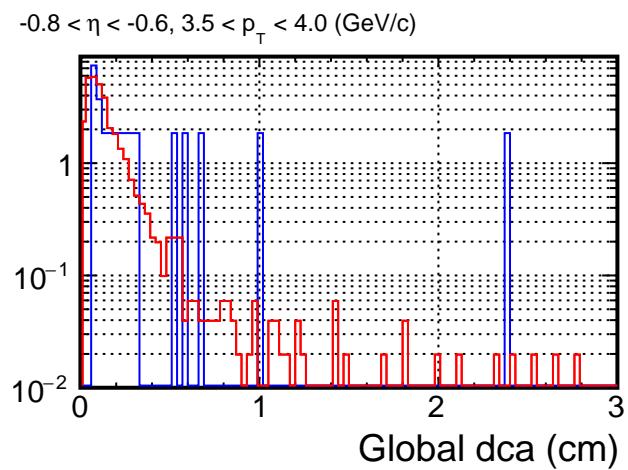
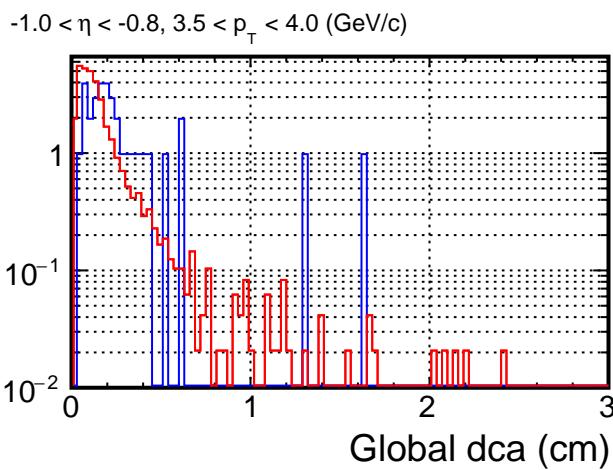
$0.6 < \eta < 0.8, 3.0 < p_T < 3.5$  (GeV/c)



$0.8 < \eta < 1.0, 3.0 < p_T < 3.5$  (GeV/c)



— e-  
(MATCHED, geantid=3)  
  
— e-  
(PRIMARY,  $|\eta| < 2$  TPC)

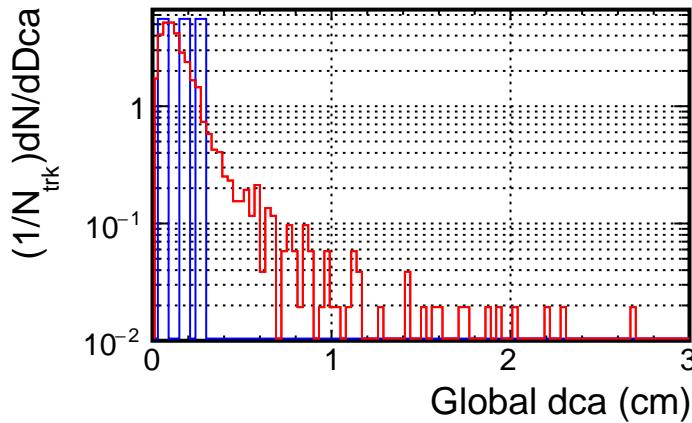
Dca distribution for ( $p_T$ ,  $\eta$ ) slices

e-  
(MATCHED, geantid=3)

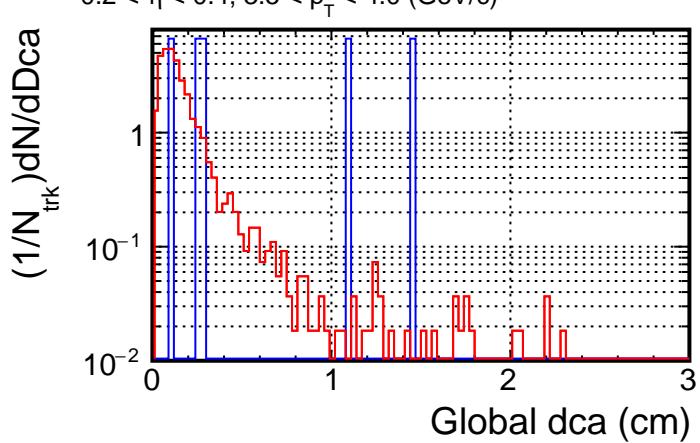
e-  
(PRIMARY,  $|n \sigma_{e^-}| < 2$  TPC)

## Dca distribution for ( $p_T$ , $\eta$ ) slices

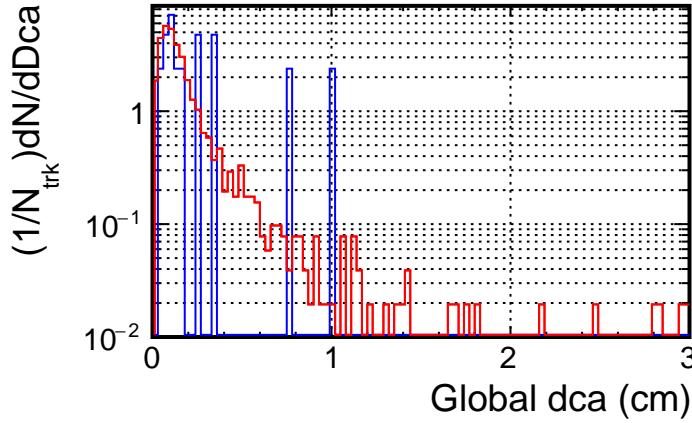
$0.0 < \eta < 0.2, 3.5 < p_T < 4.0$  (GeV/c)



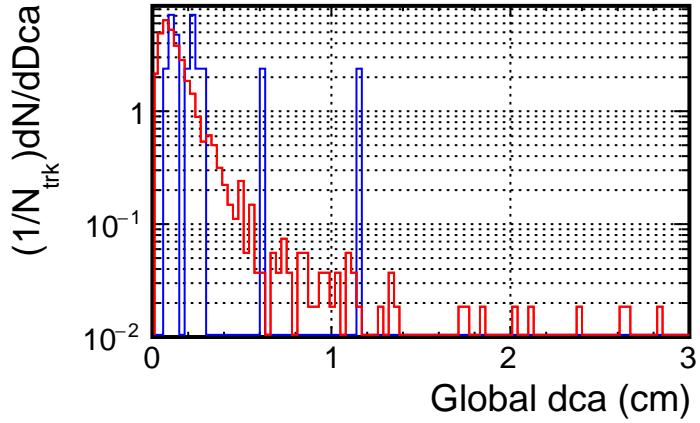
$0.2 < \eta < 0.4, 3.5 < p_T < 4.0$  (GeV/c)



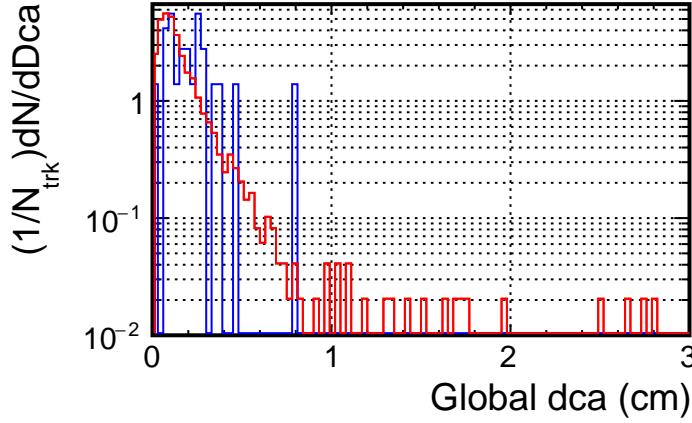
$0.4 < \eta < 0.6, 3.5 < p_T < 4.0$  (GeV/c)



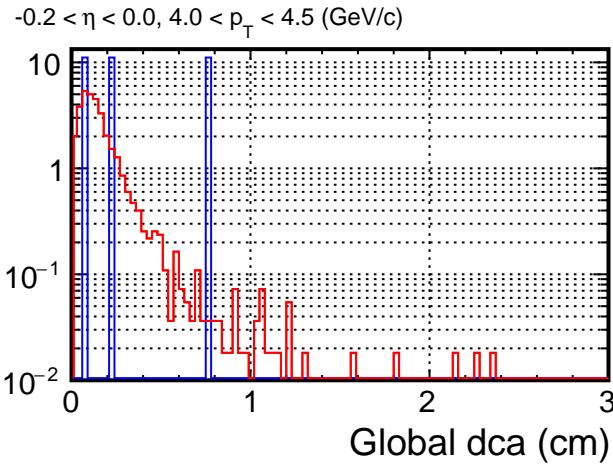
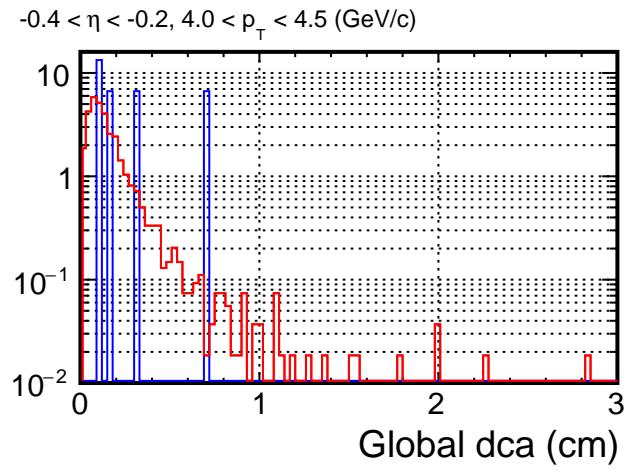
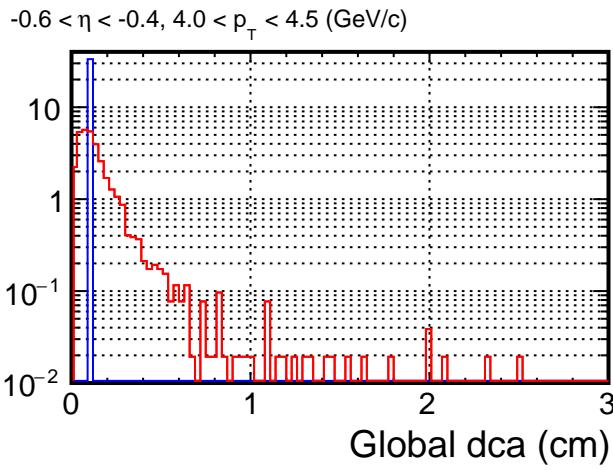
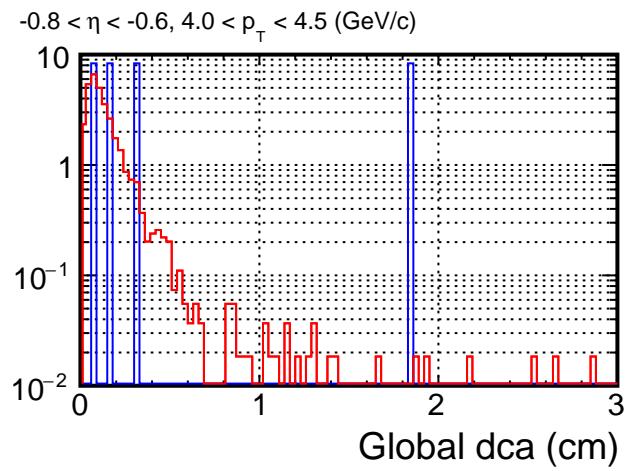
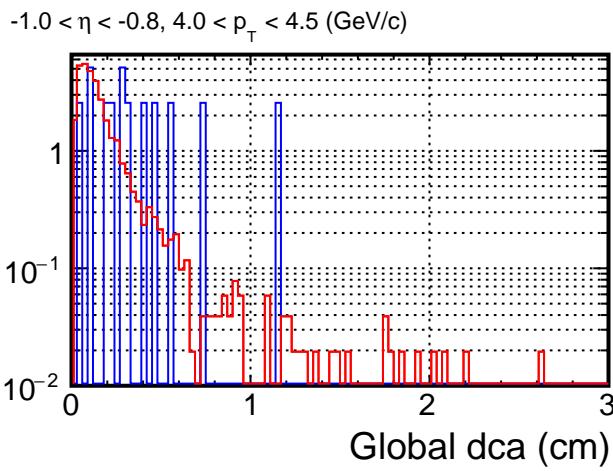
$0.6 < \eta < 0.8, 3.5 < p_T < 4.0$  (GeV/c)



$0.8 < \eta < 1.0, 3.5 < p_T < 4.0$  (GeV/c)



— e-  
(MATCHED, geantid=3)
  
— e-  
(PRIMARY,  $|\eta \sigma_{e^-}| < 2$  TPC)

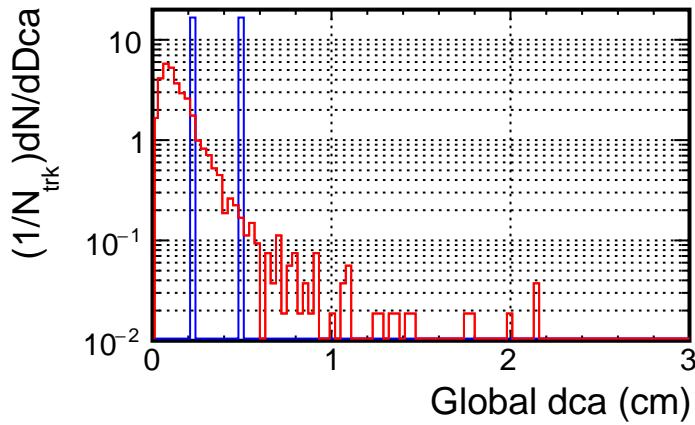
Dca distribution for  $(p_T, \eta)$  slices

e-  
(MATCHED, geantid=3)

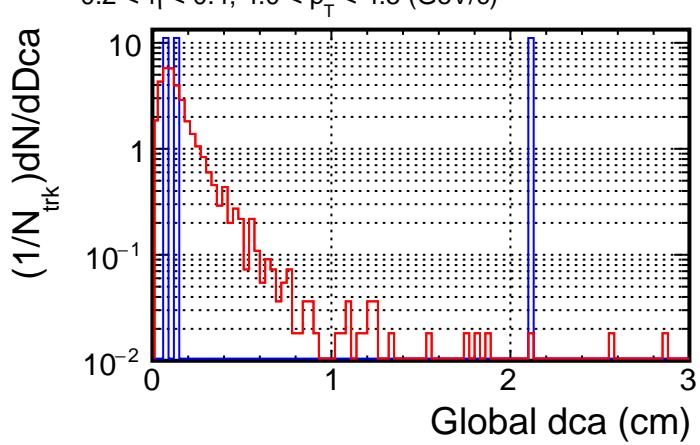
e-  
(PRIMARY,  $|\eta \sigma_{e^-}| < 2$  TPC)

## Dca distribution for ( $p_T$ , $\eta$ ) slices

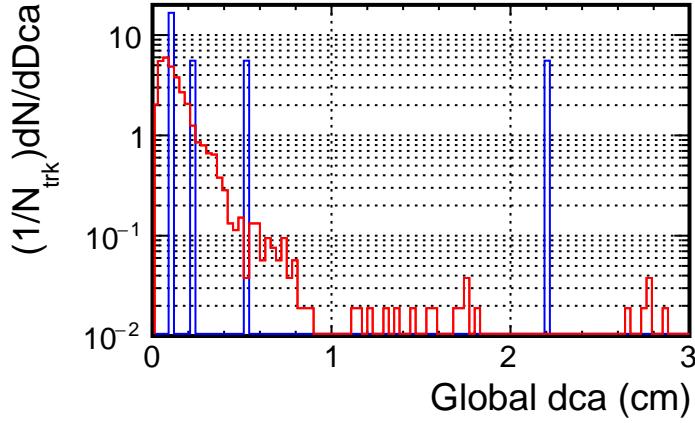
$0.0 < \eta < 0.2, 4.0 < p_T < 4.5$  (GeV/c)



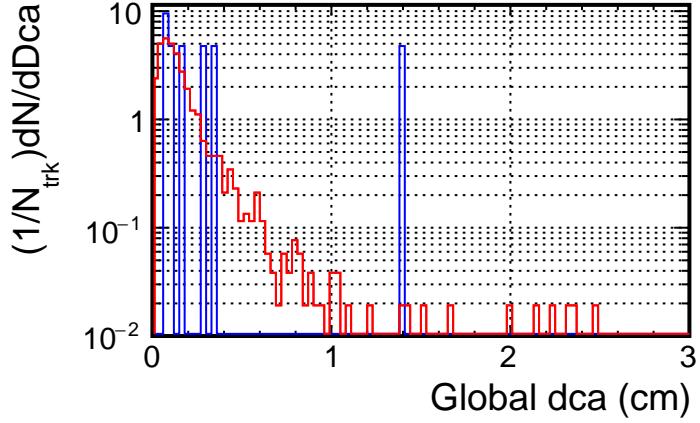
$0.2 < \eta < 0.4, 4.0 < p_T < 4.5$  (GeV/c)



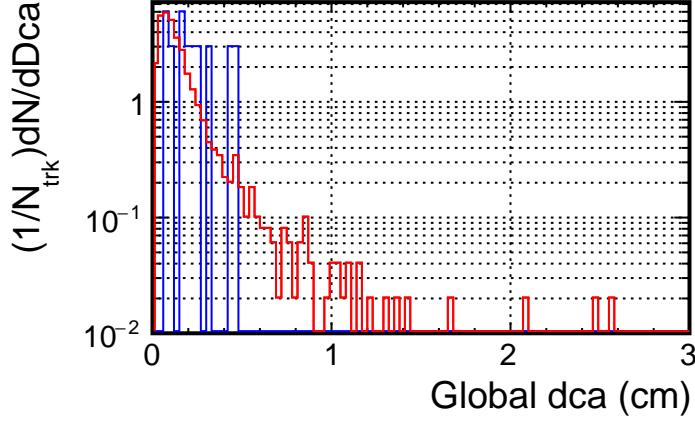
$0.4 < \eta < 0.6, 4.0 < p_T < 4.5$  (GeV/c)



$0.6 < \eta < 0.8, 4.0 < p_T < 4.5$  (GeV/c)

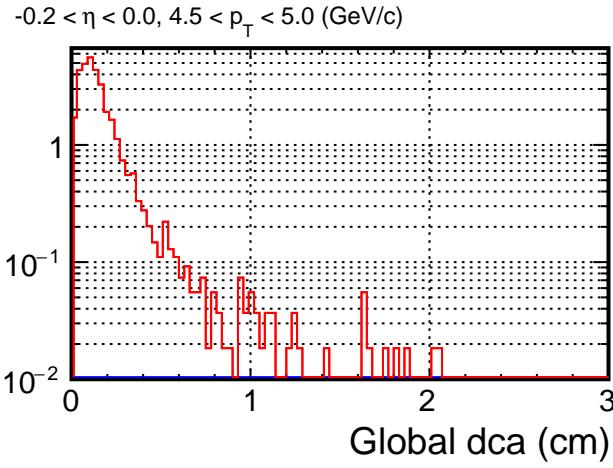
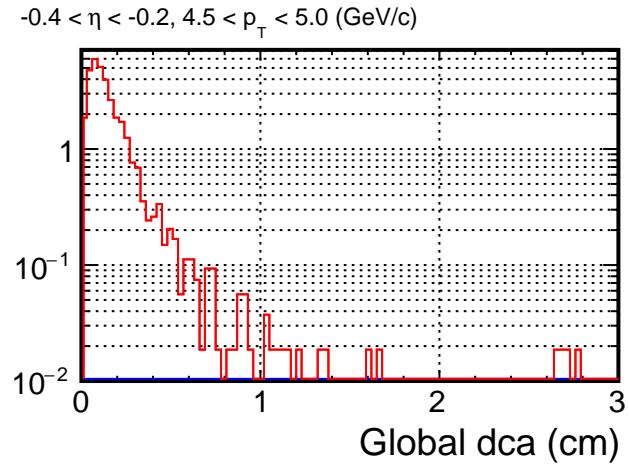
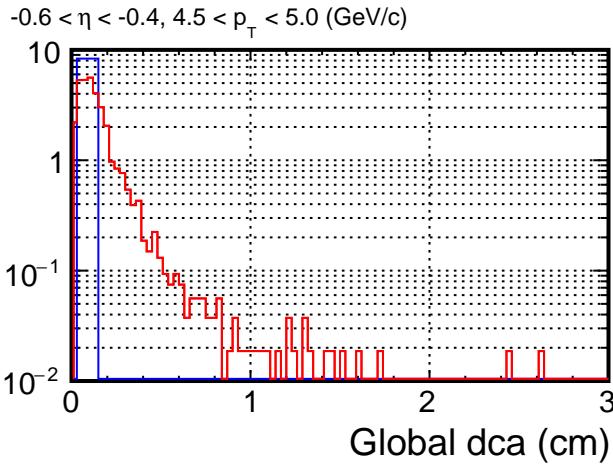
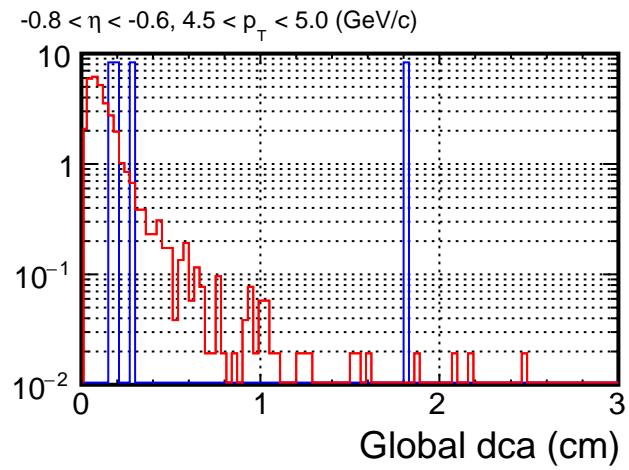
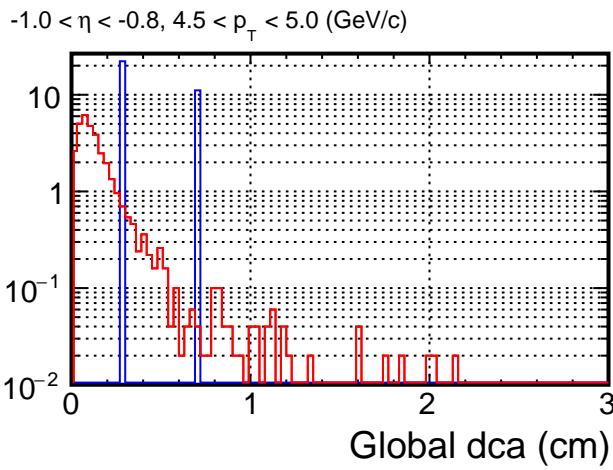


$0.8 < \eta < 1.0, 4.0 < p_T < 4.5$  (GeV/c)



— e-  
(MATCHED, geantid=3)
  
— e-  
(PRIMARY,  $|\eta \sigma_{e^-}| < 2$  TPC)

## Dca distribution for ( $p_T$ , $\eta$ ) slices

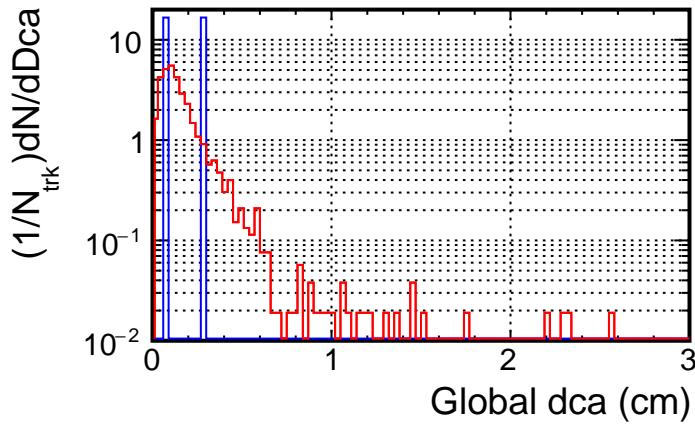


— e-  
 (MATCHED, geantid=3)

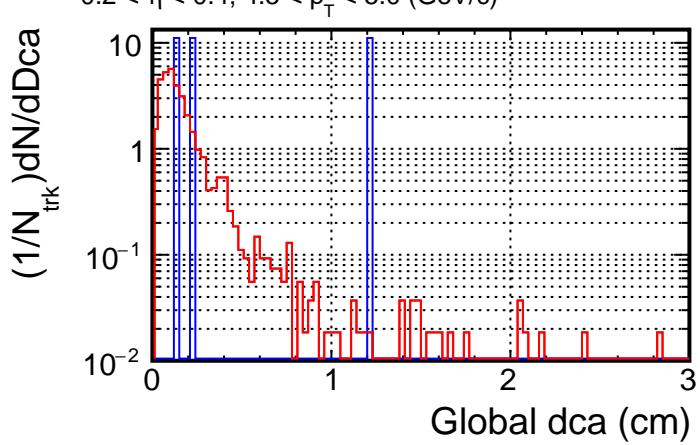
— e-  
 (PRIMARY,  $|\eta \sigma_{e^-}| < 2$  TPC)

## Dca distribution for ( $p_T$ , $\eta$ ) slices

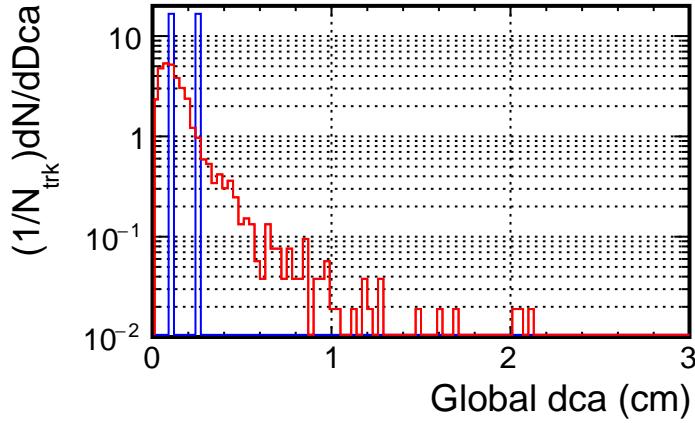
$0.0 < \eta < 0.2, 4.5 < p_T < 5.0$  (GeV/c)



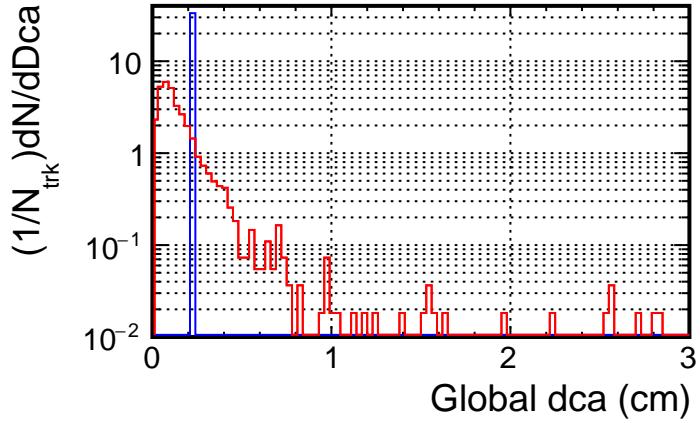
$0.2 < \eta < 0.4, 4.5 < p_T < 5.0$  (GeV/c)



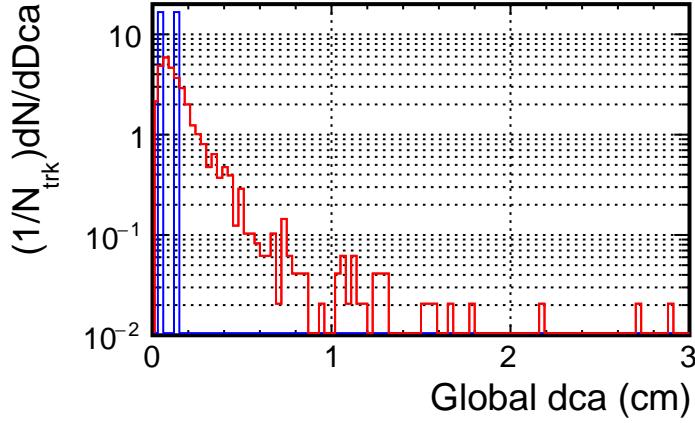
$0.4 < \eta < 0.6, 4.5 < p_T < 5.0$  (GeV/c)



$0.6 < \eta < 0.8, 4.5 < p_T < 5.0$  (GeV/c)



$0.8 < \eta < 1.0, 4.5 < p_T < 5.0$  (GeV/c)



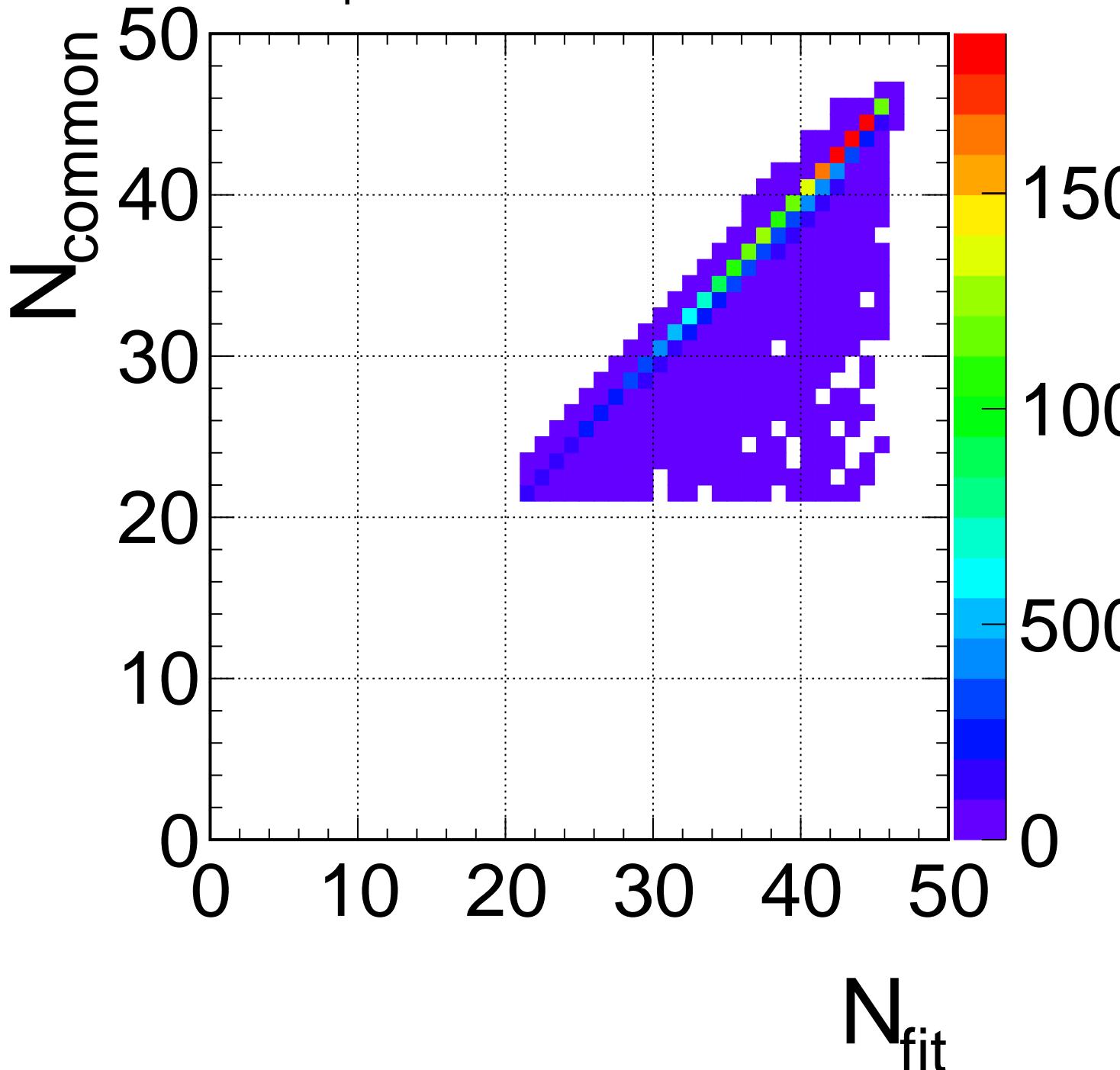
— e-  
(MATCHED, geantid=3)  
  
— e-  
(PRIMARY,  $|\eta \sigma_{e^-}| < 2$  TPC)

$N_{\text{events}}=24.83$  K, MC=e-, embeddingQa.mc, (0)

Tue Jul 23 01:44:11 2019

$N_{\text{common}}$  vs  $N_{\text{hit}}$  (Embedding:e-, Real:e-)

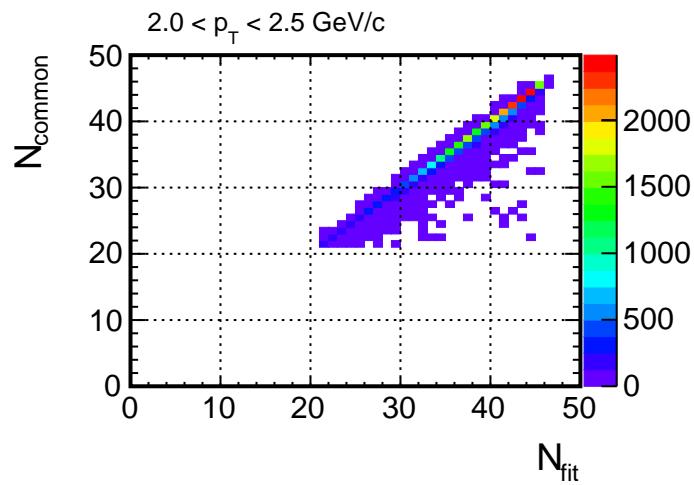
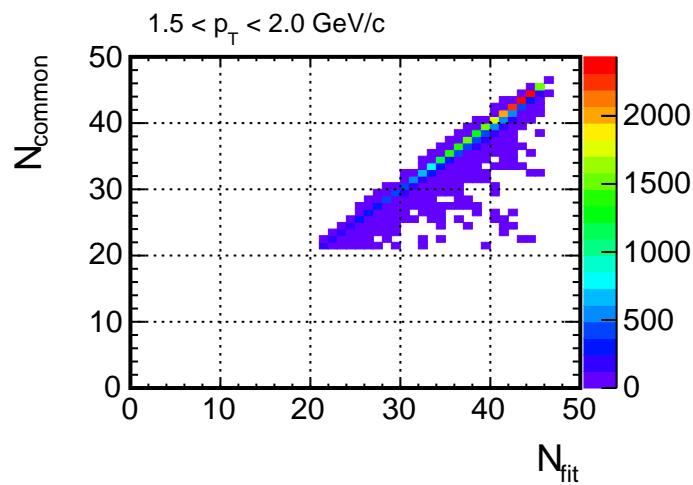
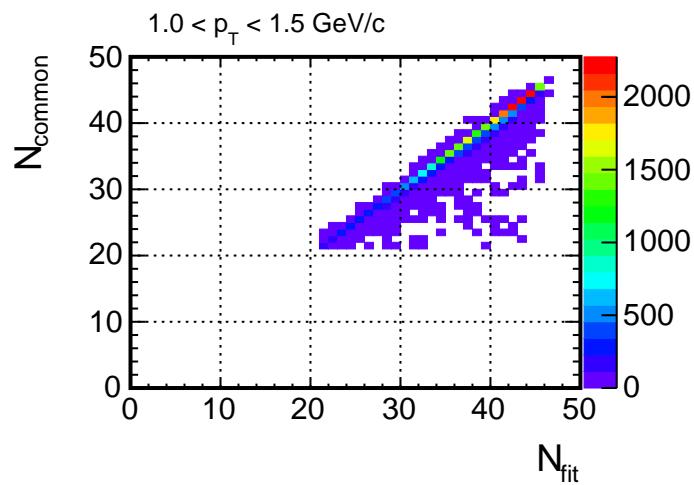
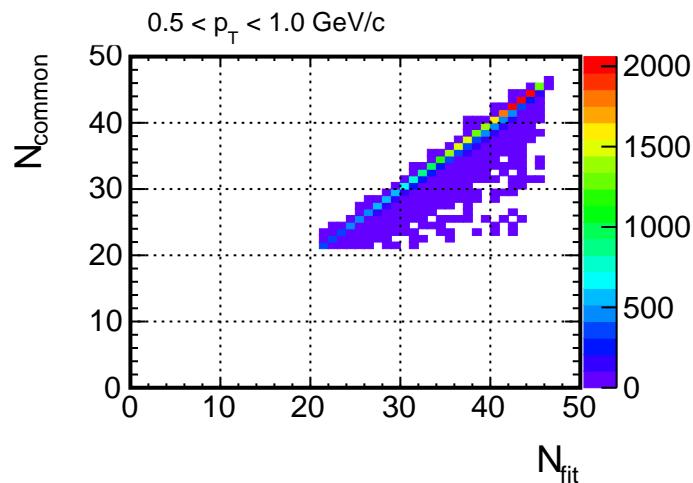
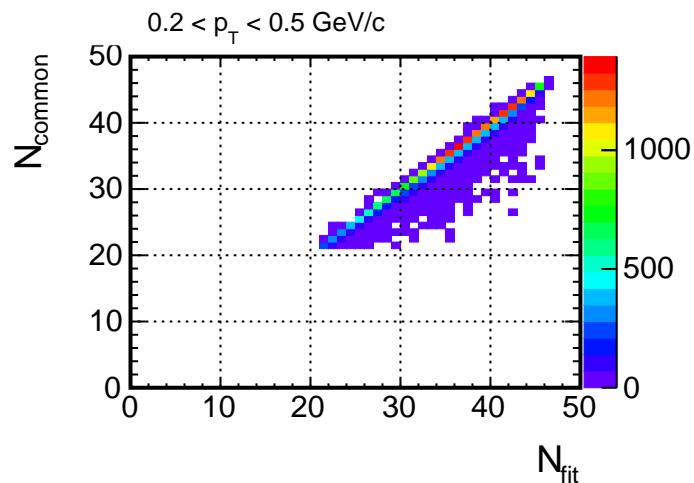
$0.2 < p_T < 5.0 \text{ GeV}/c$



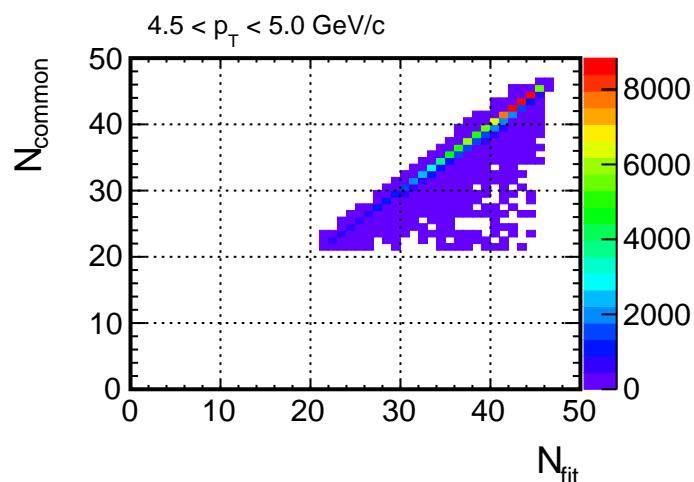
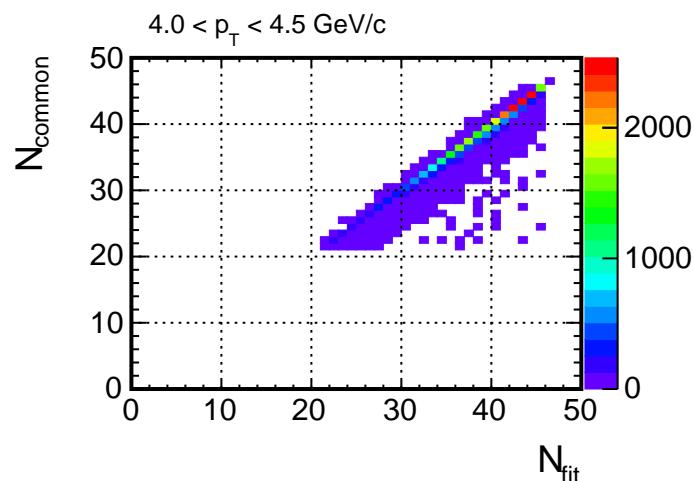
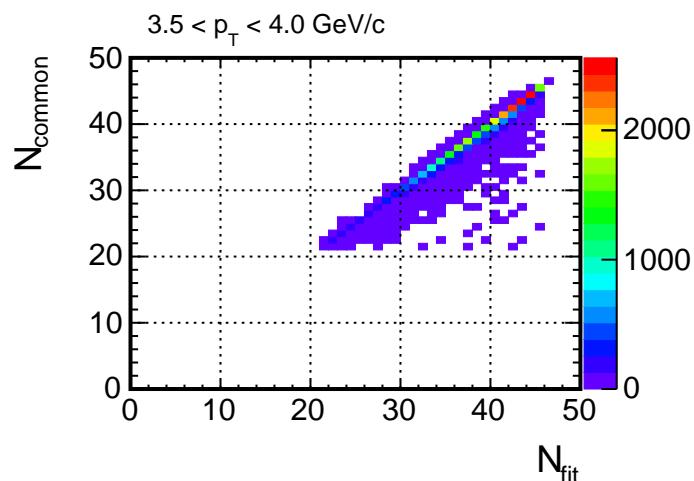
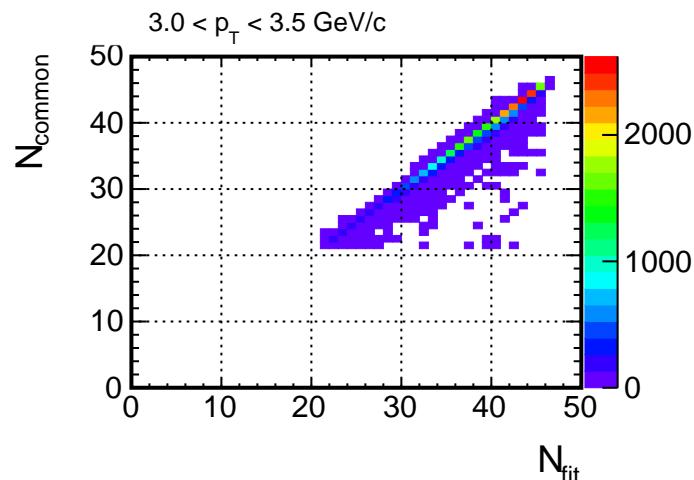
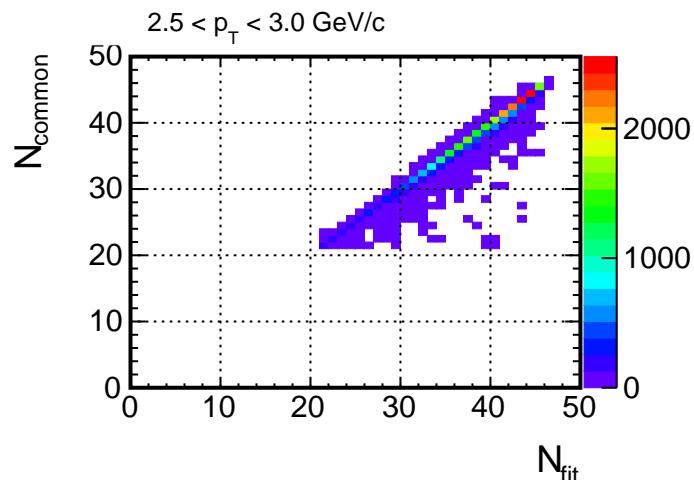
$N_{\text{events}}=24.83$  K, MC=e-, embeddingQa.mc, (0)

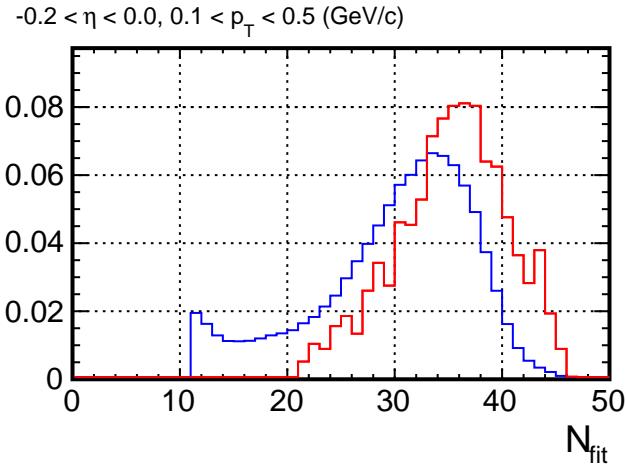
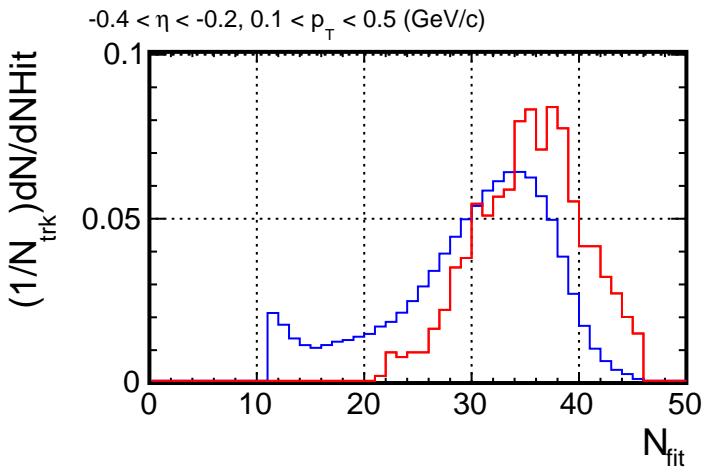
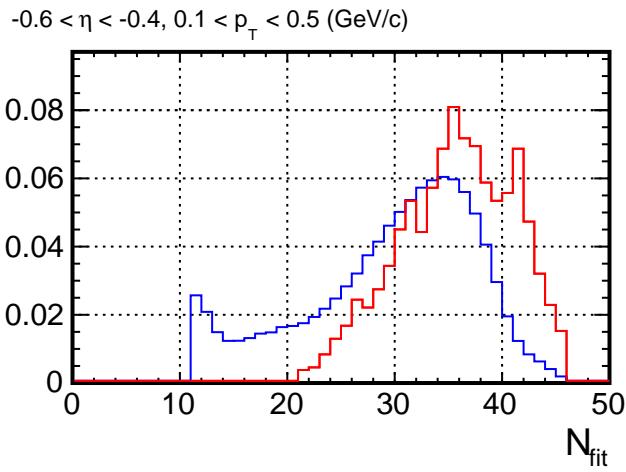
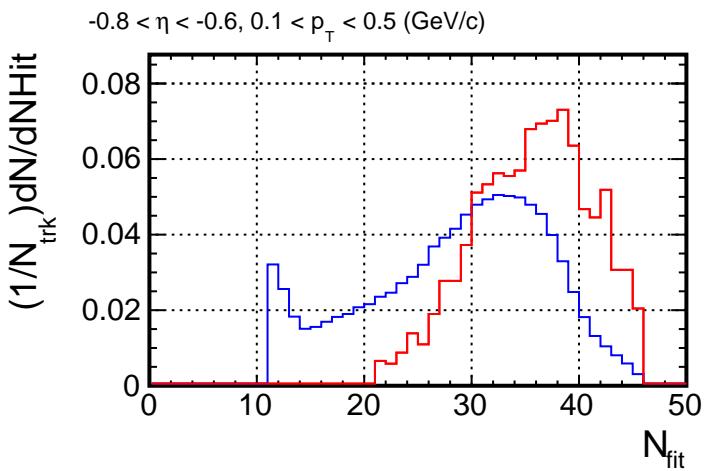
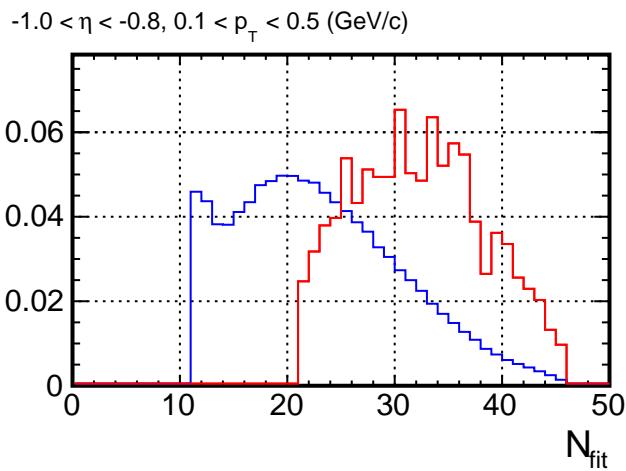
Tue Jul 23 01:44:11 2019

### $N_{\text{common}}$ vs $N_{\text{hit}}$ , $p_T$ dependence (Embedding:e-, Real:e-)



### $N_{\text{common}}$ vs $N_{\text{hit}}$ , $p_T$ dependence (Embedding:e-, Real:e-)

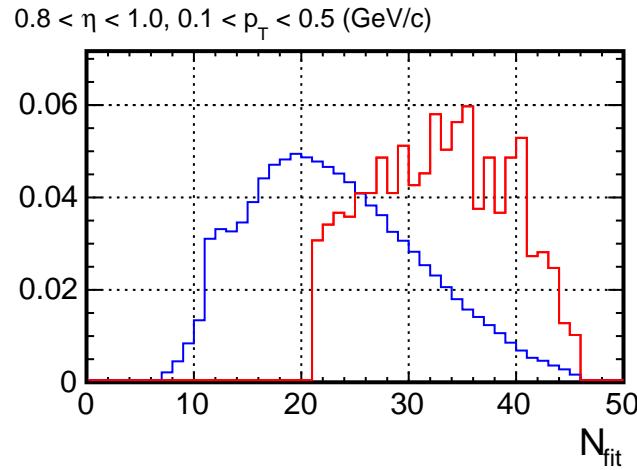
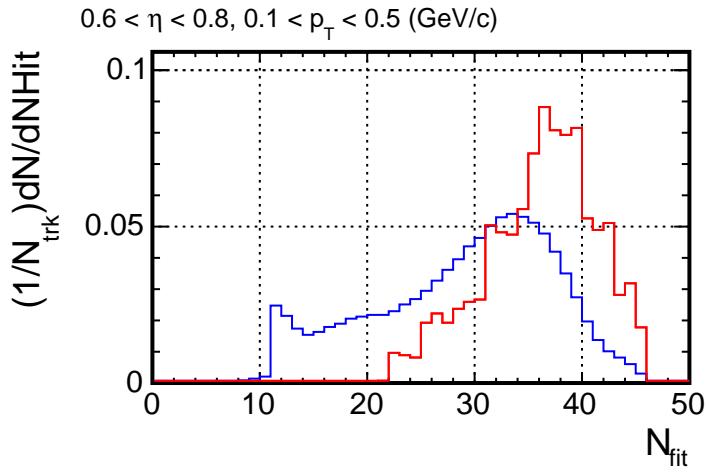
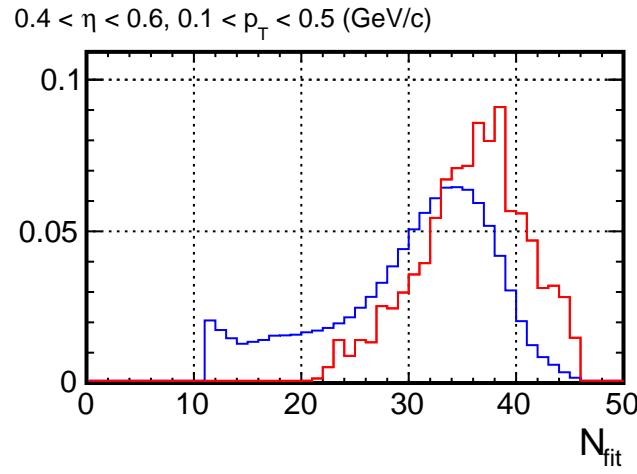
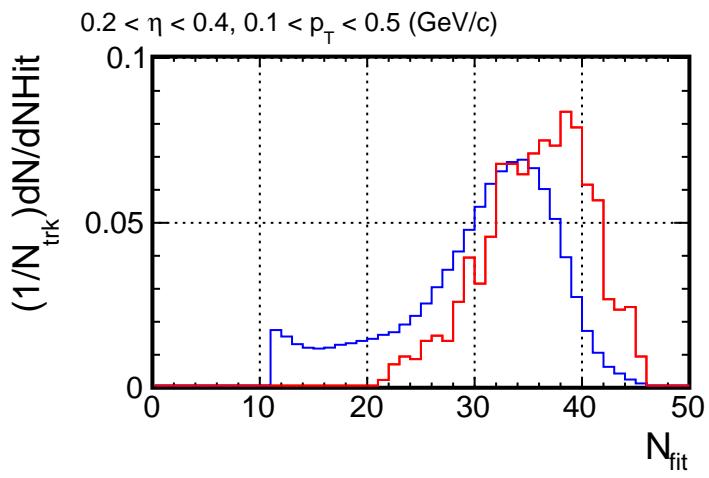
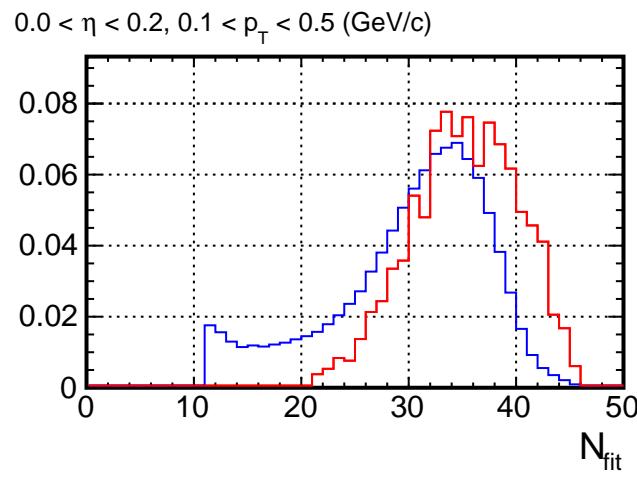


NHit distribution for ( $p_T$ ,  $\eta$ ) slices

e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|n \sigma_e| < 2$  TPC)

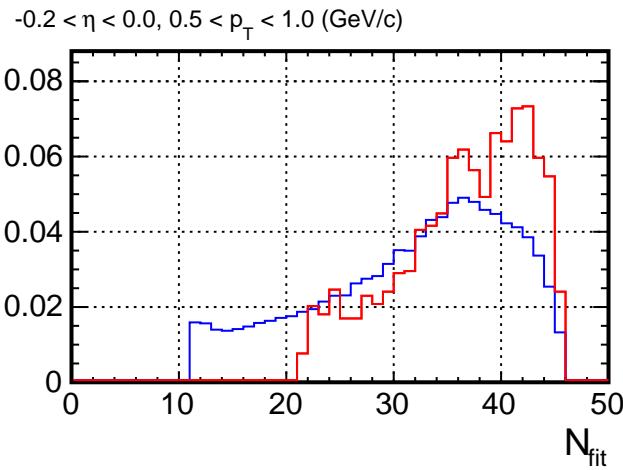
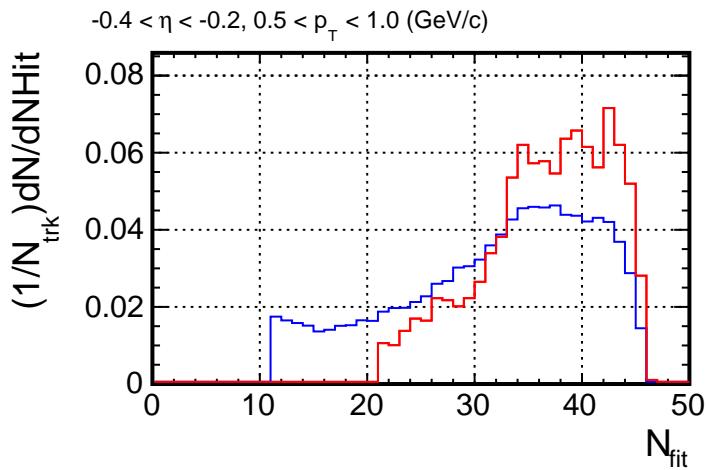
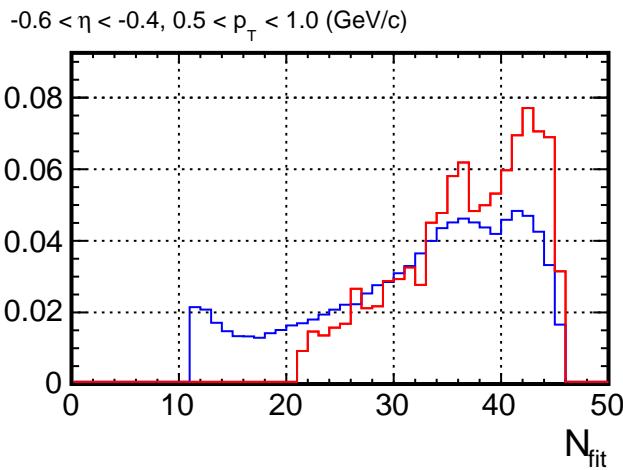
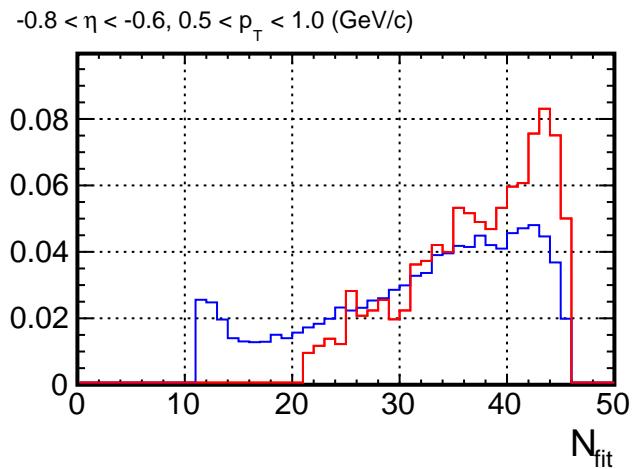
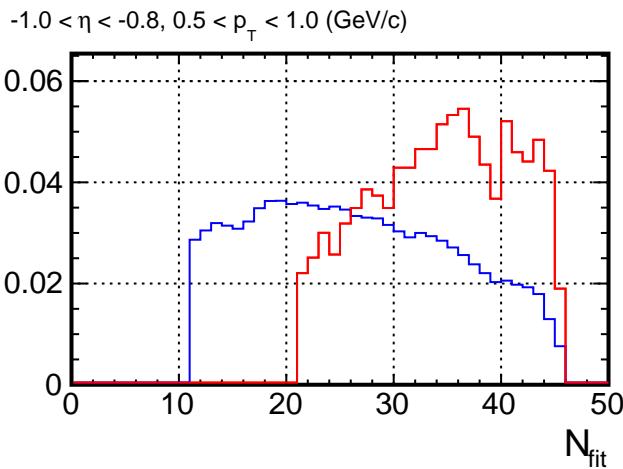
## NHit distribution for ( $p_T$ , $\eta$ ) slices



e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|n \sigma_e| < 2$  TPC)

## NHit distribution for ( $p_T$ , $\eta$ ) slices

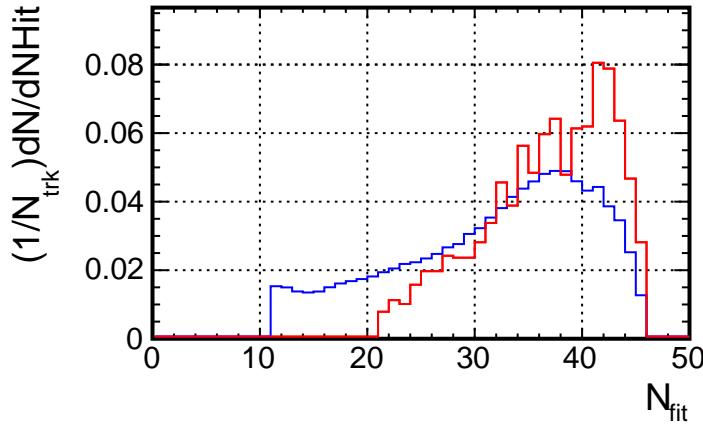


e-  
 (MATCHED, geantid=3)

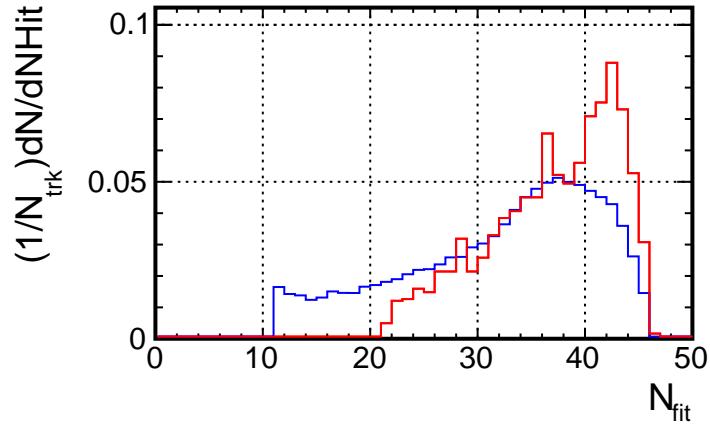
e-  
 (PRIMARY,  $|n\sigma_e| < 2$  TPC)

## NHit distribution for ( $p_T$ , $\eta$ ) slices

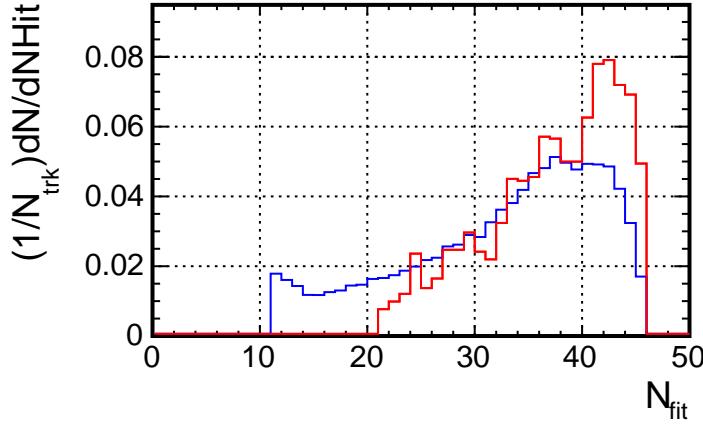
$0.0 < \eta < 0.2, 0.5 < p_T < 1.0$  (GeV/c)



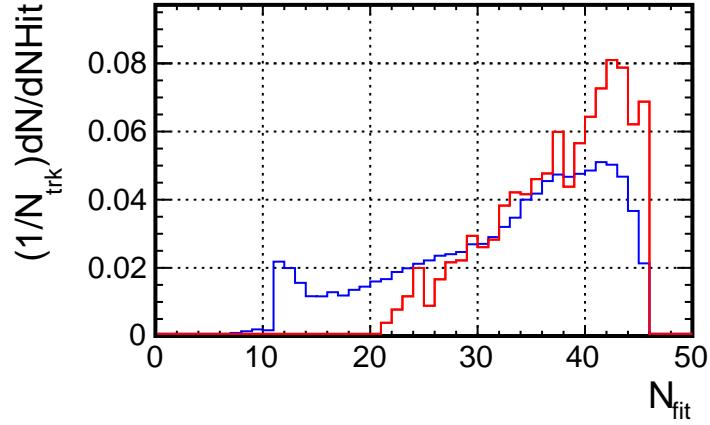
$0.2 < \eta < 0.4, 0.5 < p_T < 1.0$  (GeV/c)



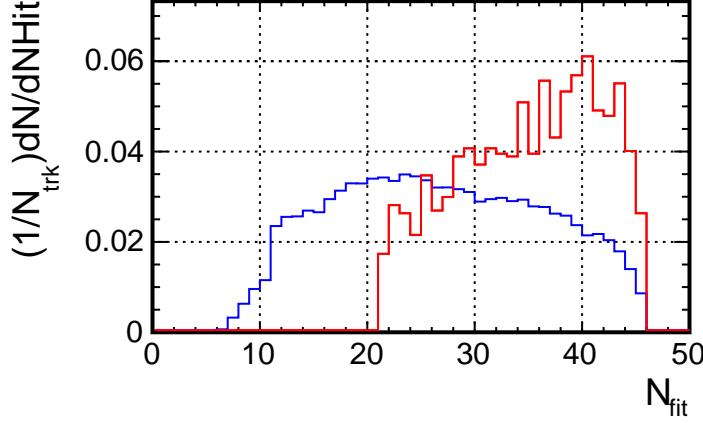
$0.4 < \eta < 0.6, 0.5 < p_T < 1.0$  (GeV/c)



$0.6 < \eta < 0.8, 0.5 < p_T < 1.0$  (GeV/c)



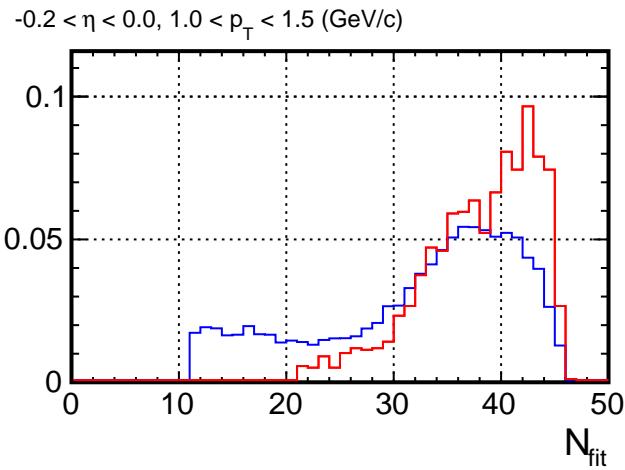
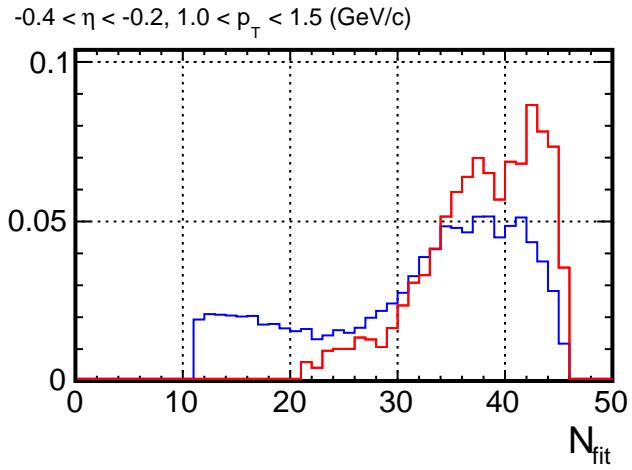
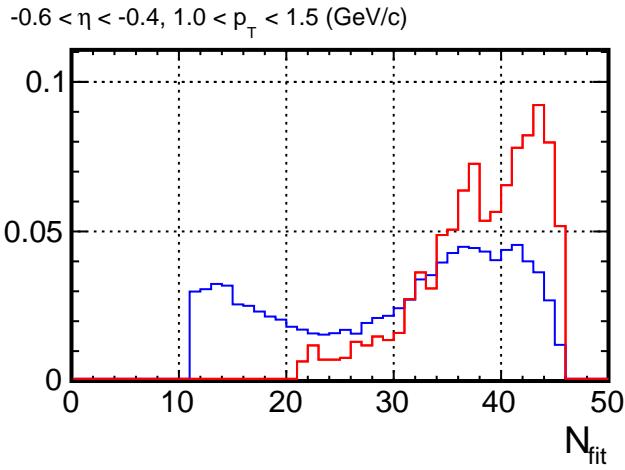
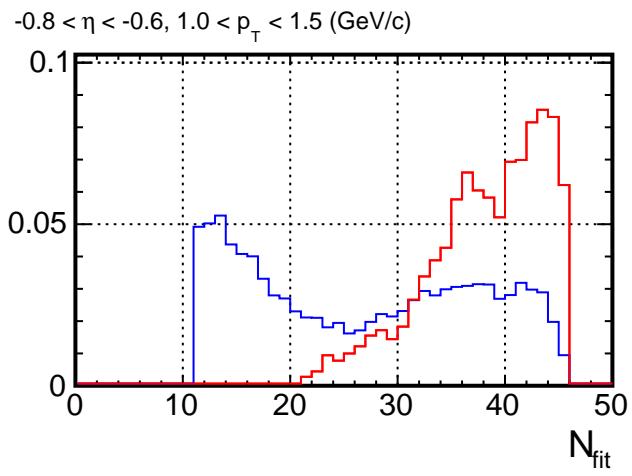
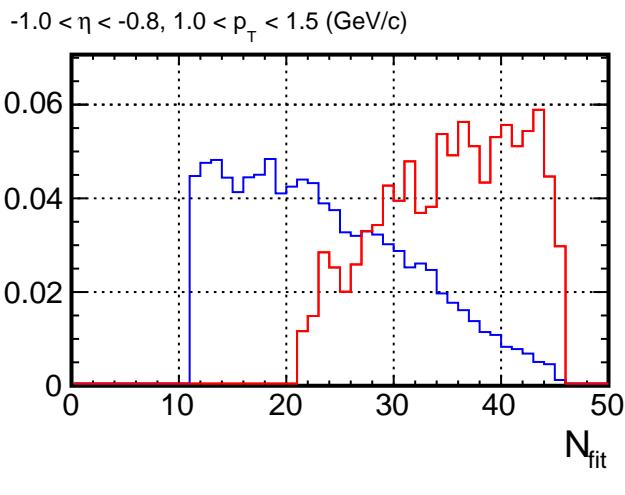
$0.8 < \eta < 1.0, 0.5 < p_T < 1.0$  (GeV/c)



e-  
(MATCHED, geantid=3)

e-  
(PRIMARY, |n  $\sigma_{e^-}| < 2$  TPC)

## NHit distribution for ( $p_T$ , $\eta$ ) slices

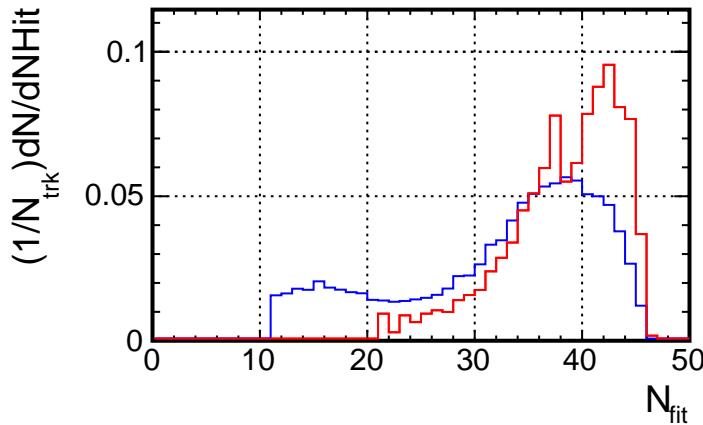


e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|n\sigma_{e^-}| < 2$  TPC)

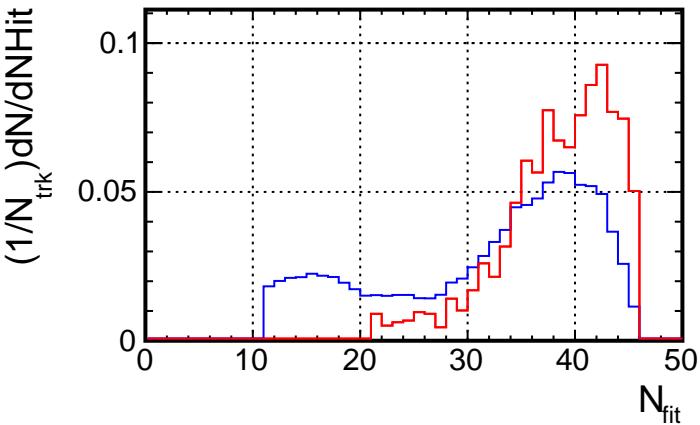
## NHit distribution for ( $p_T$ , $\eta$ ) slices

$0.0 < \eta < 0.2, 1.0 < p_T < 1.5$  (GeV/c)

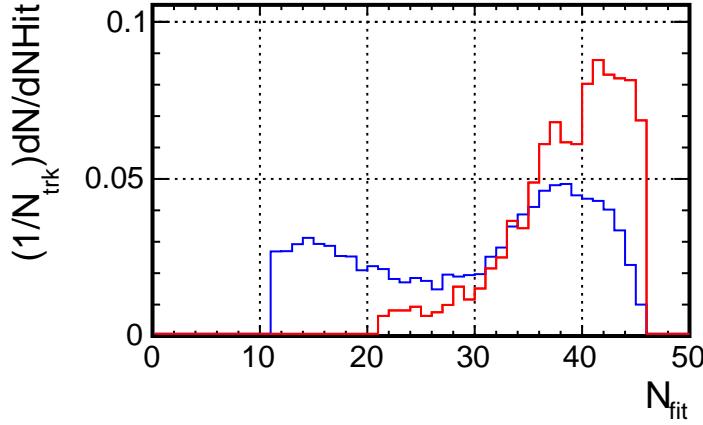


$0.2 < \eta < 0.4, 1.0 < p_T < 1.5$  (GeV/c)

$0.2 < \eta < 0.4, 1.0 < p_T < 1.5$  (GeV/c)

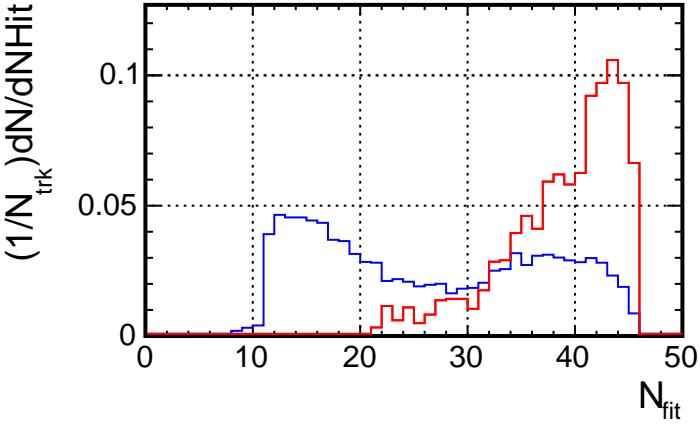


$0.4 < \eta < 0.6, 1.0 < p_T < 1.5$  (GeV/c)

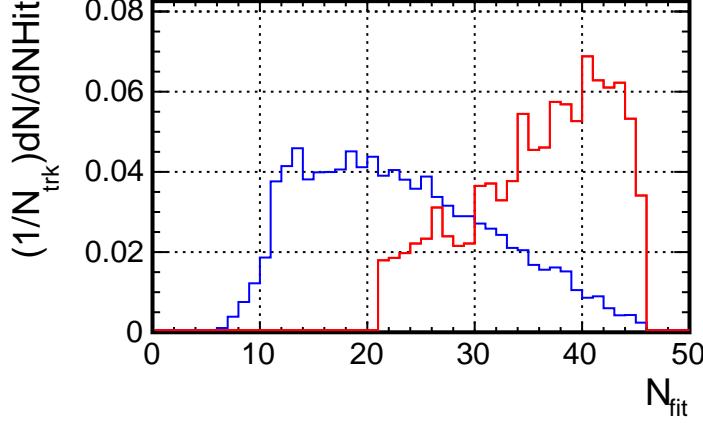


$0.6 < \eta < 0.8, 1.0 < p_T < 1.5$  (GeV/c)

$0.6 < \eta < 0.8, 1.0 < p_T < 1.5$  (GeV/c)

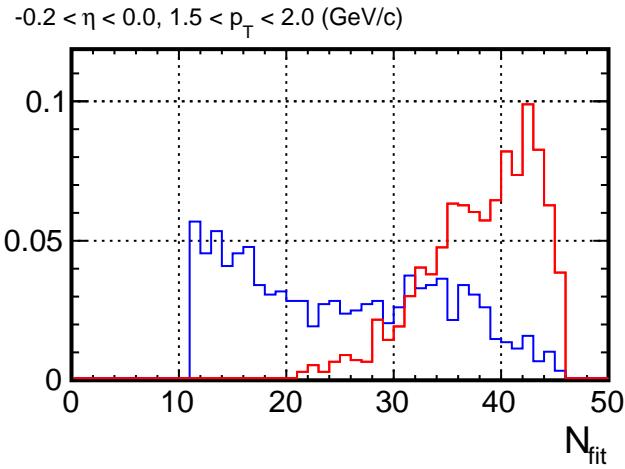
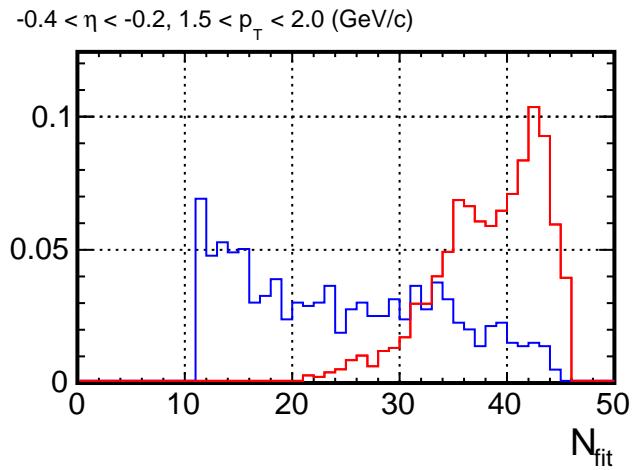
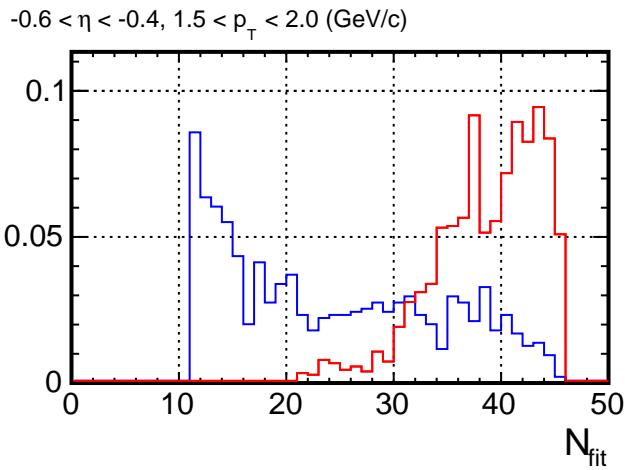
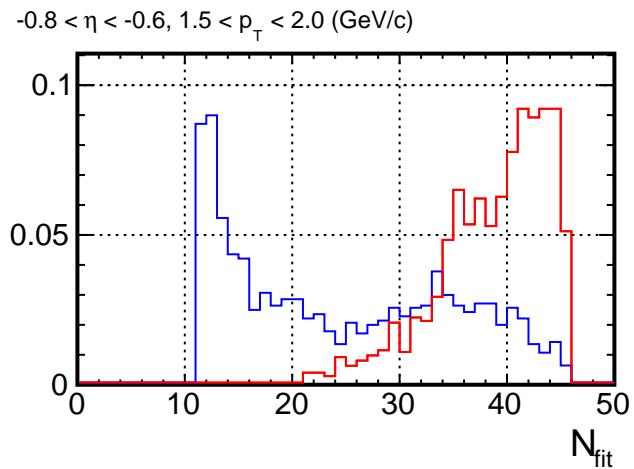
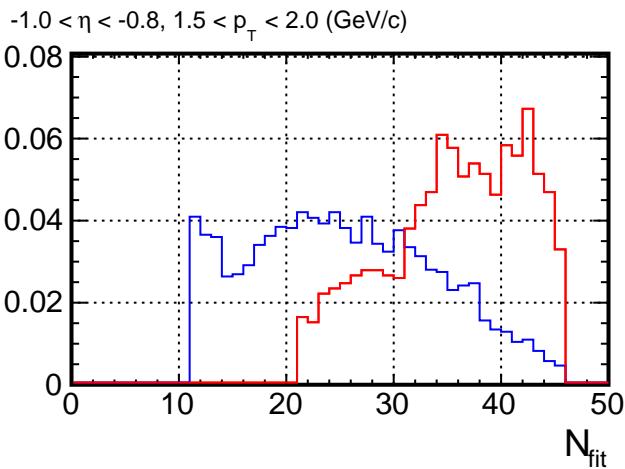


$0.8 < \eta < 1.0, 1.0 < p_T < 1.5$  (GeV/c)



e-  
(MATCHED, geantid=3)  
e-  
(PRIMARY, |n σ<sub>e-</sub>|<2 TPC)

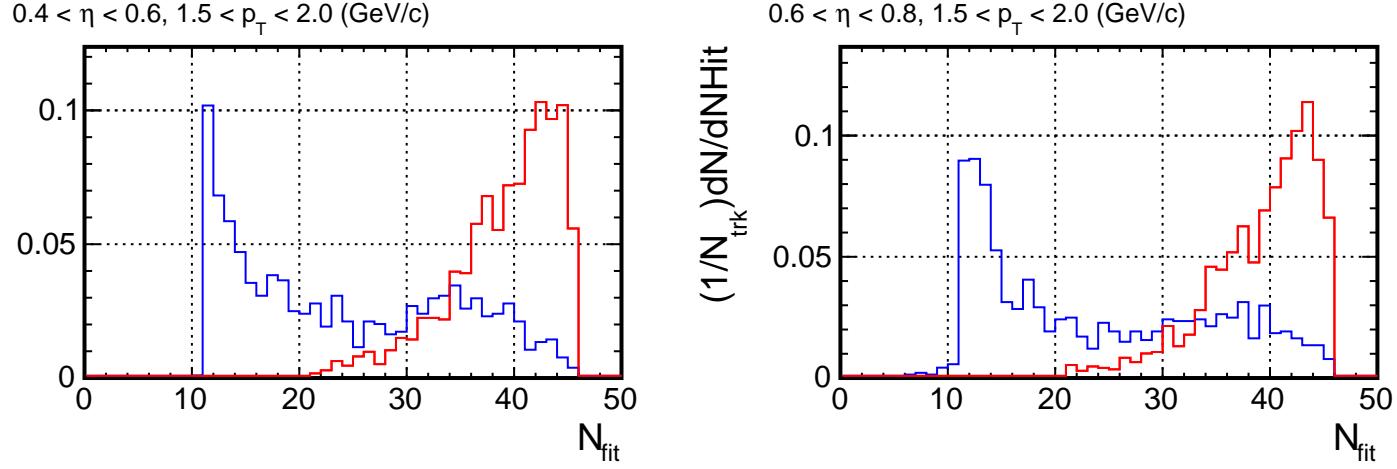
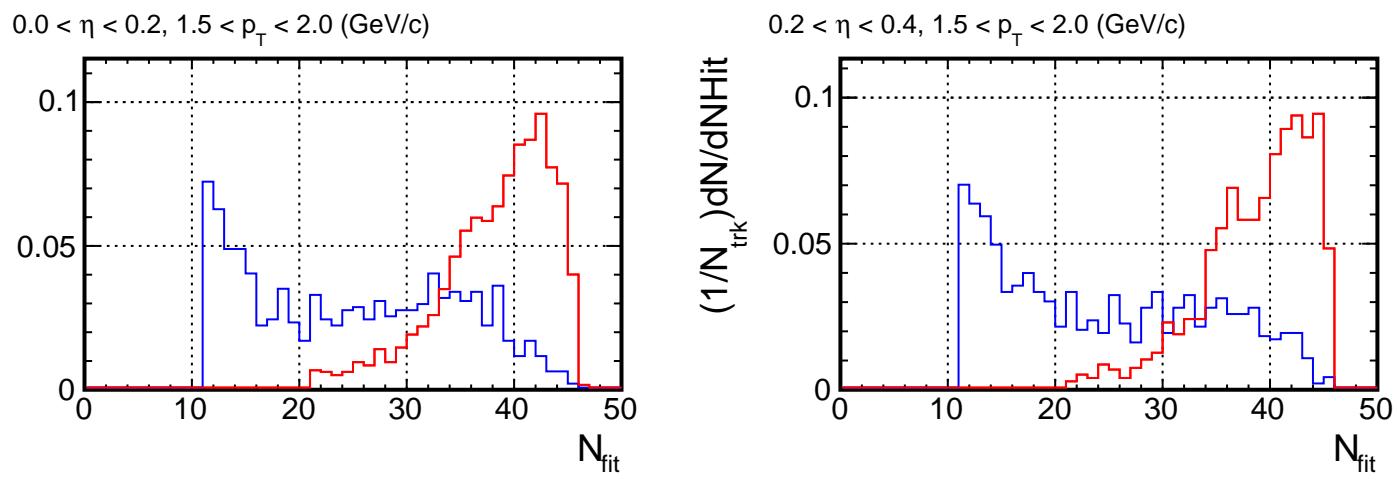
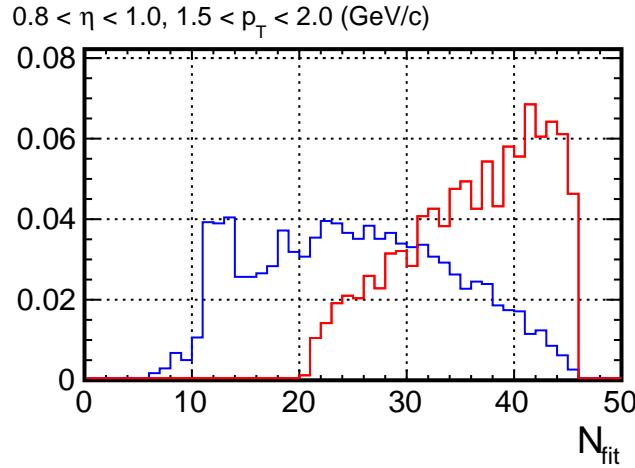
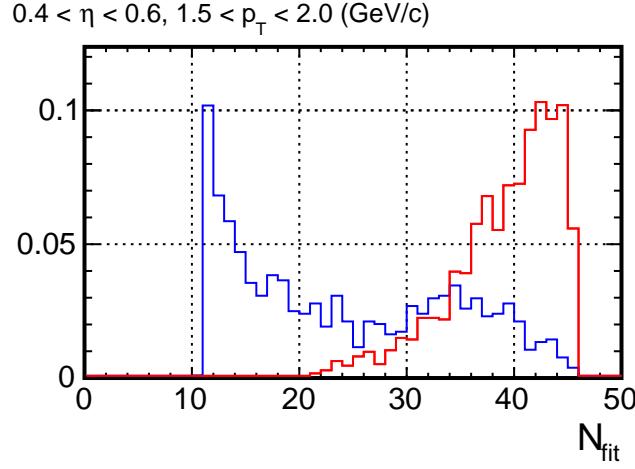
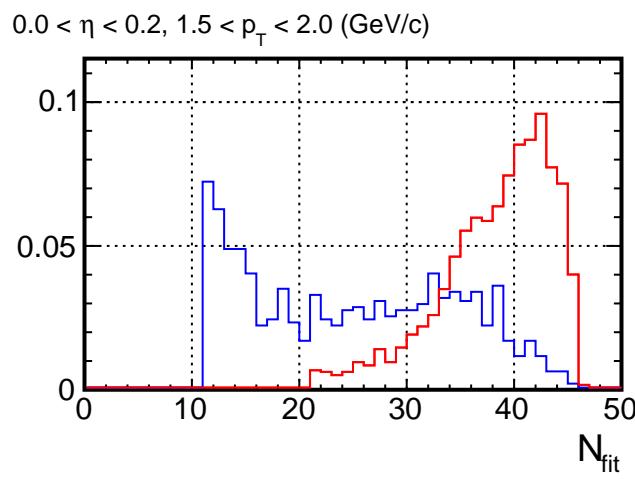
## NHit distribution for ( $p_T$ , $\eta$ ) slices



e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|n \sigma_{e^-}| < 2$  TPC)

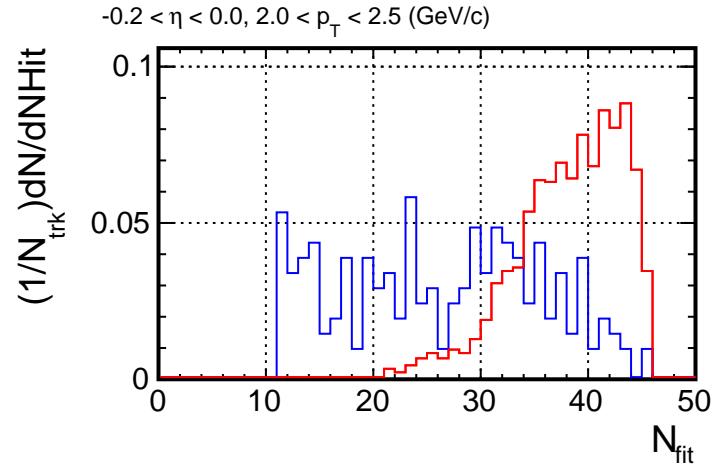
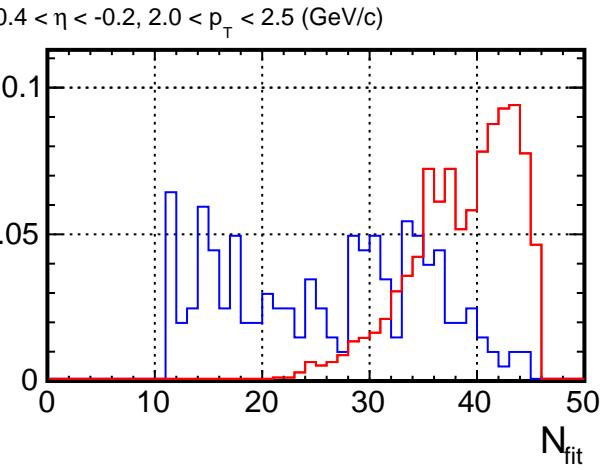
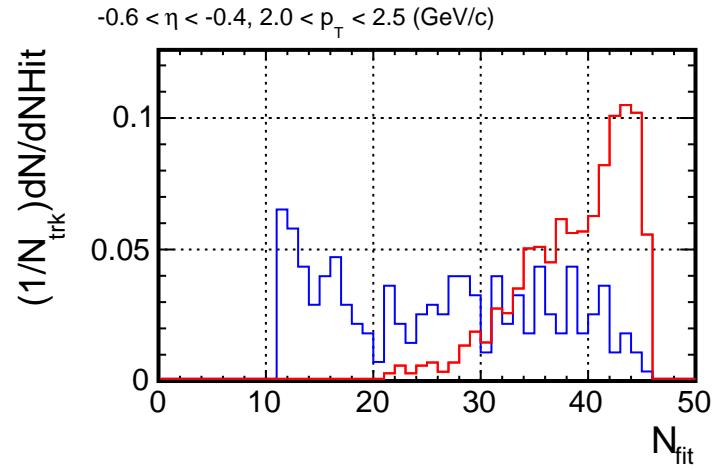
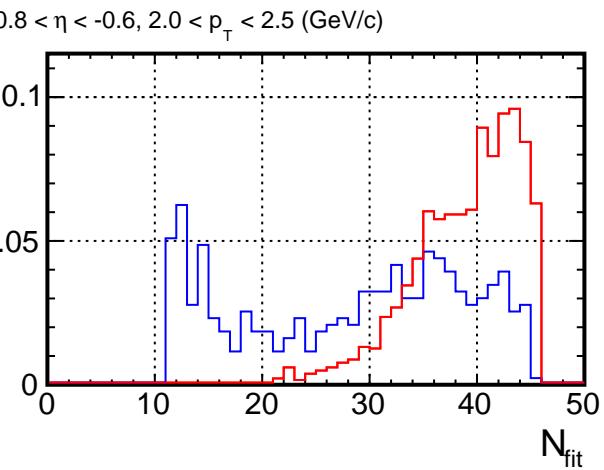
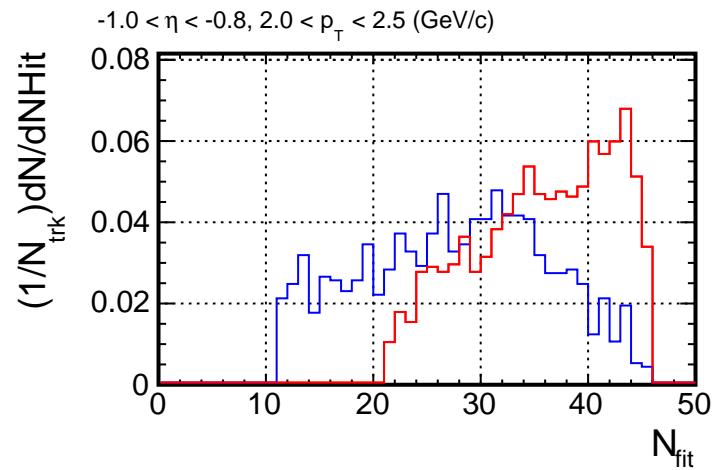
## NHit distribution for ( $p_T$ , $\eta$ ) slices



e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|n \sigma_e| < 2$  TPC)

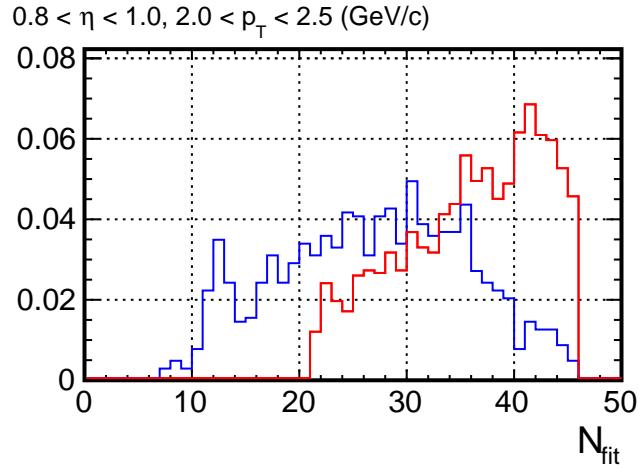
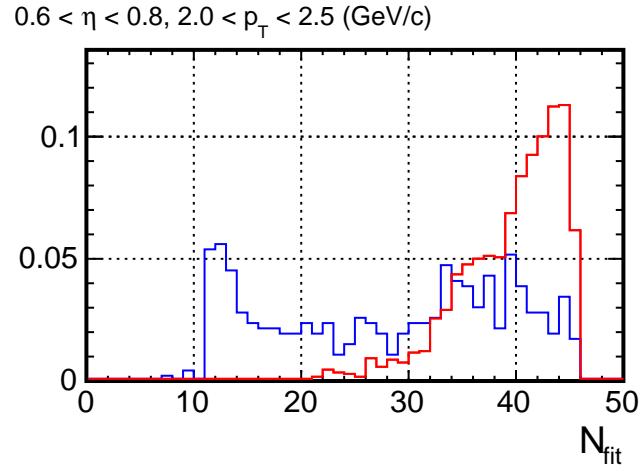
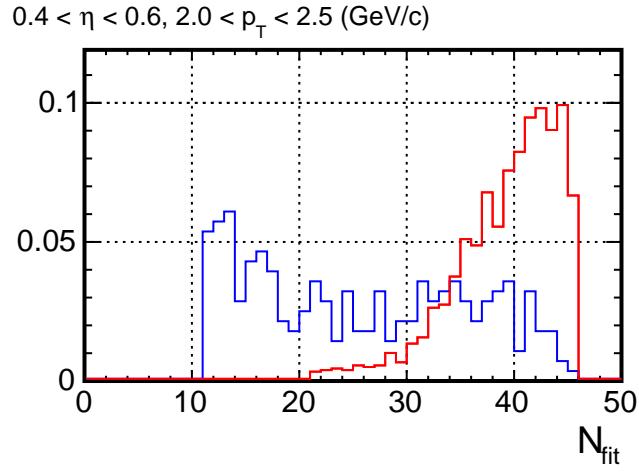
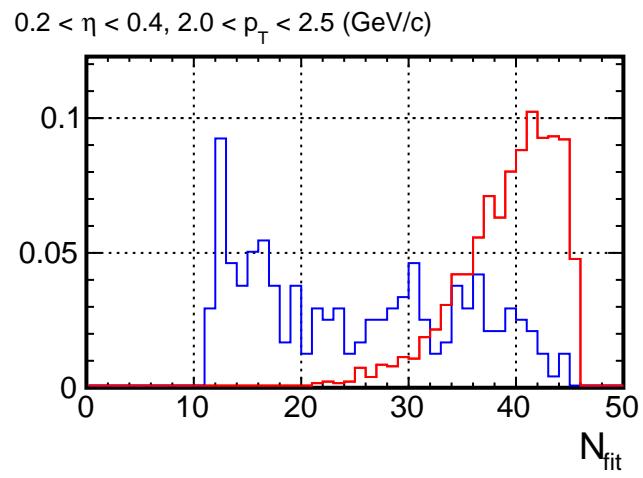
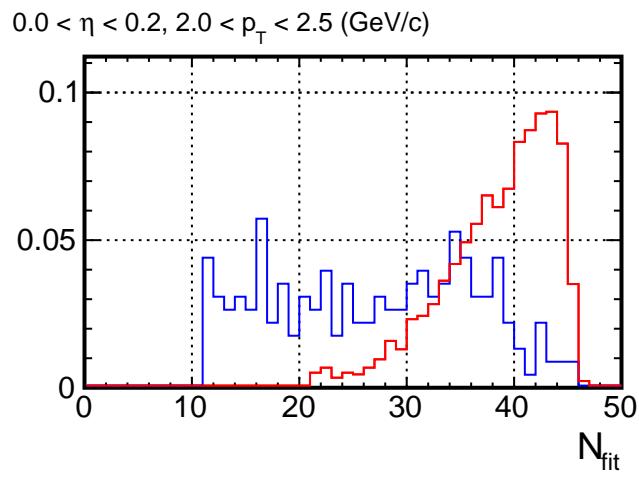
## NHit distribution for ( $p_T$ , $\eta$ ) slices



e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|n\sigma_{e^-}| < 2$  TPC)

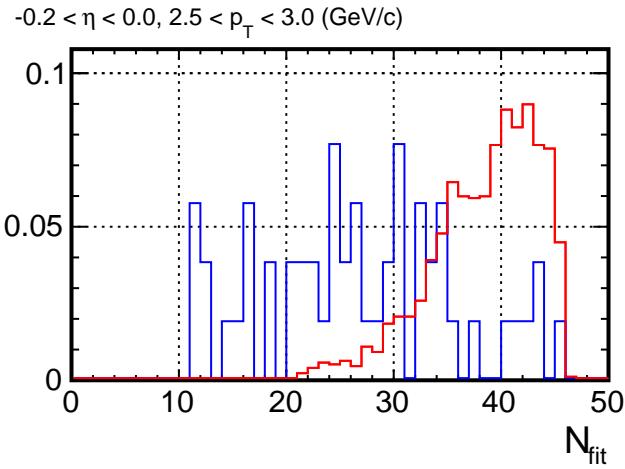
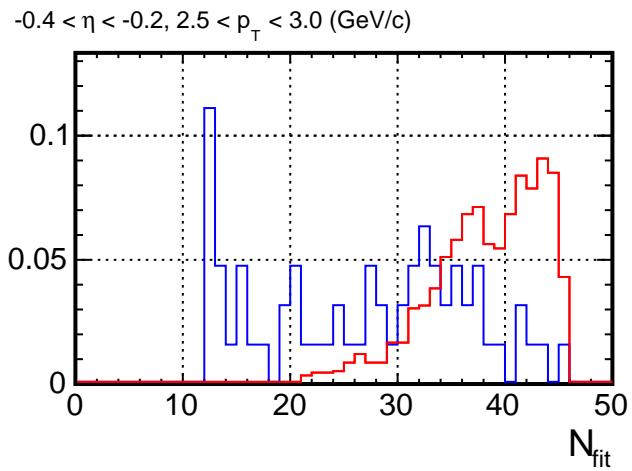
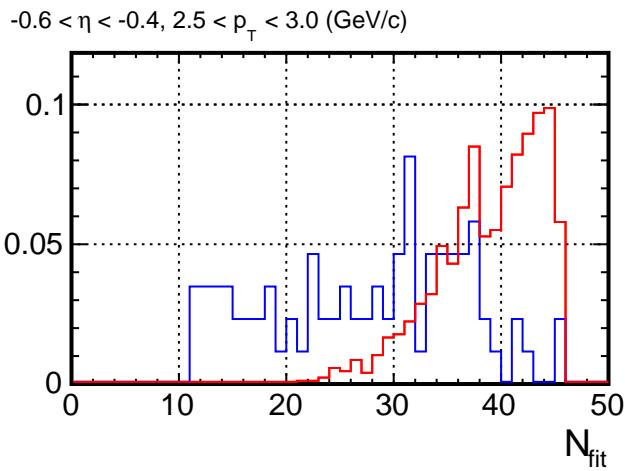
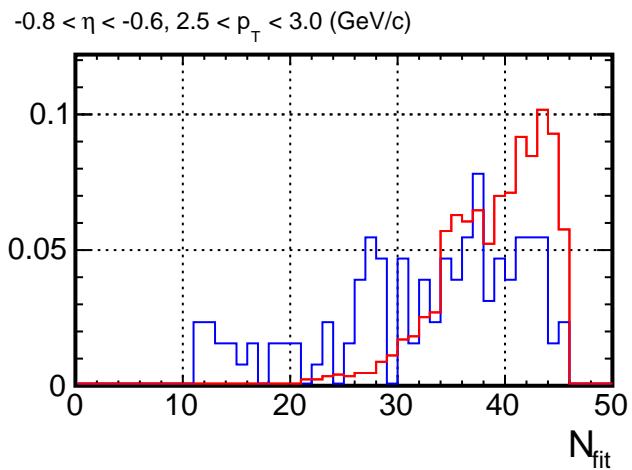
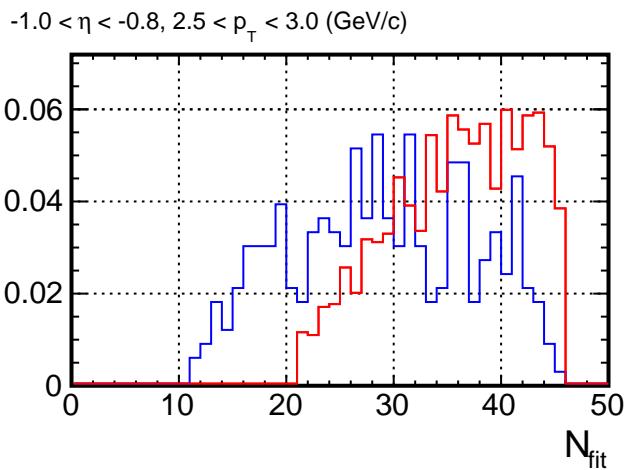
## NHit distribution for ( $p_T$ , $\eta$ ) slices



e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|\eta \sigma_e| < 2 \text{ TPC}$ )

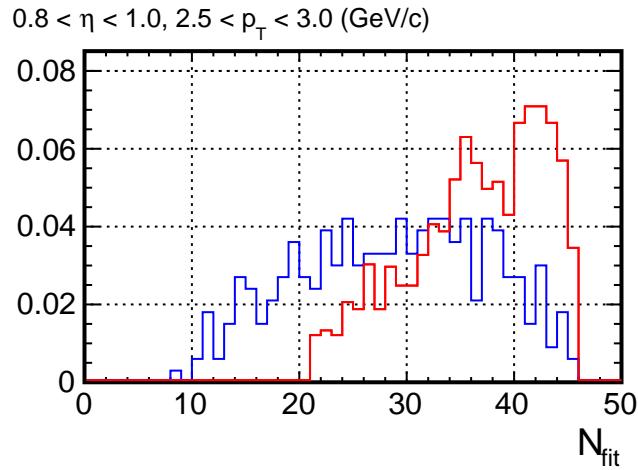
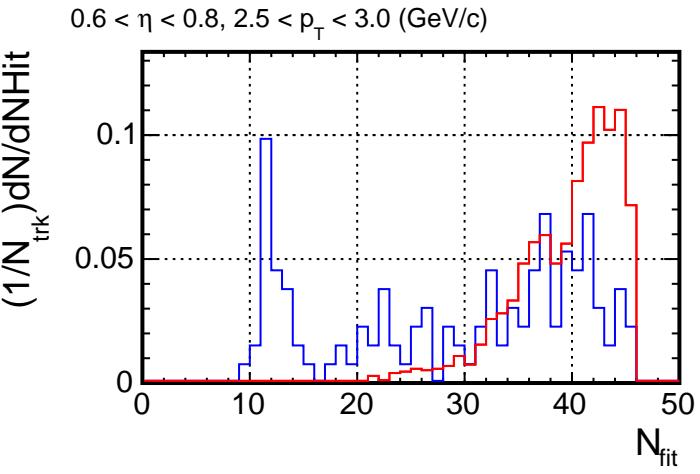
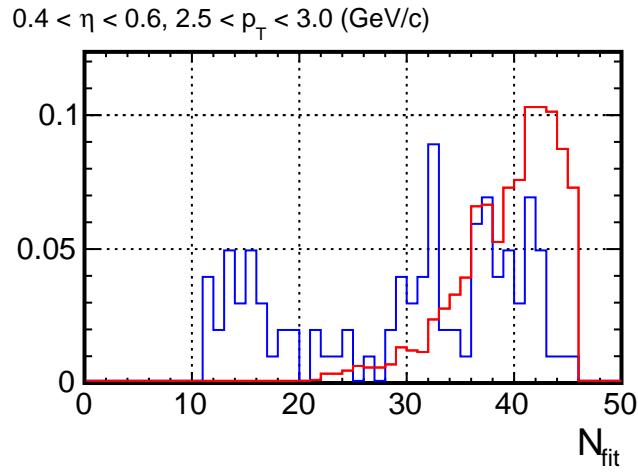
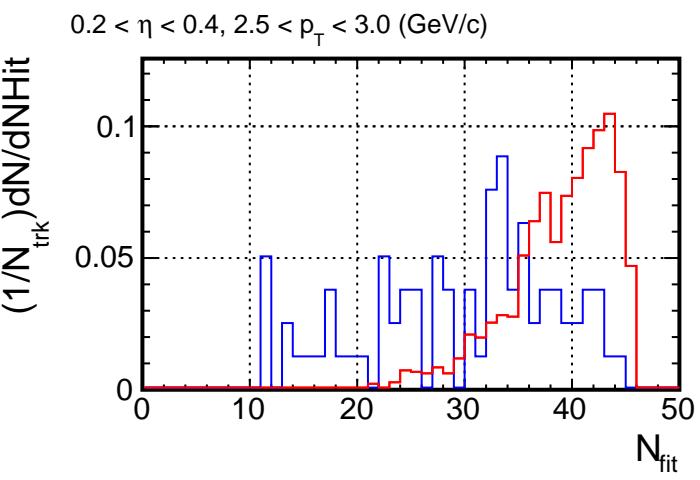
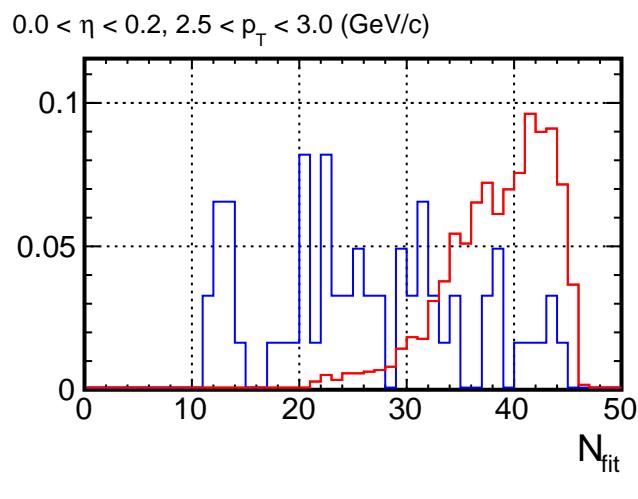
## NHit distribution for ( $p_T$ , $\eta$ ) slices



e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|n\sigma_{e^-}| < 2$  TPC)

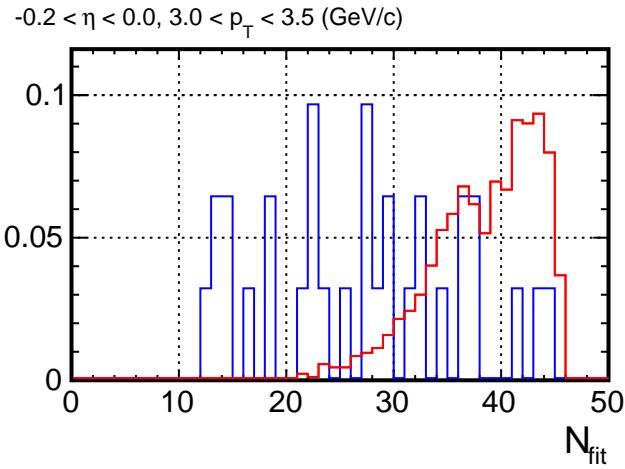
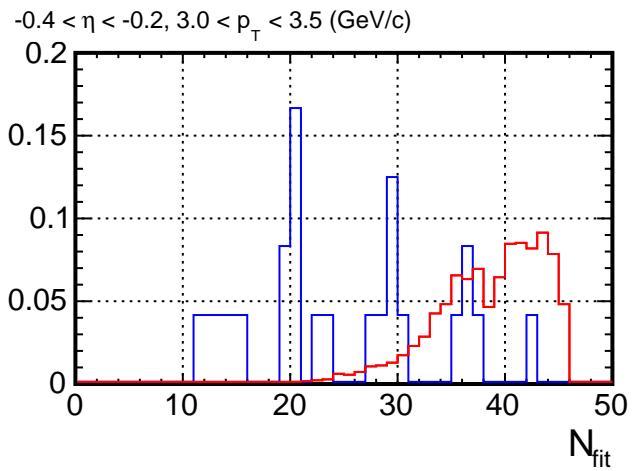
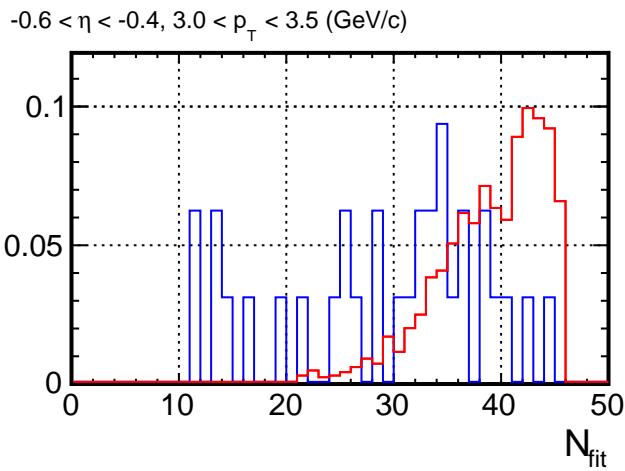
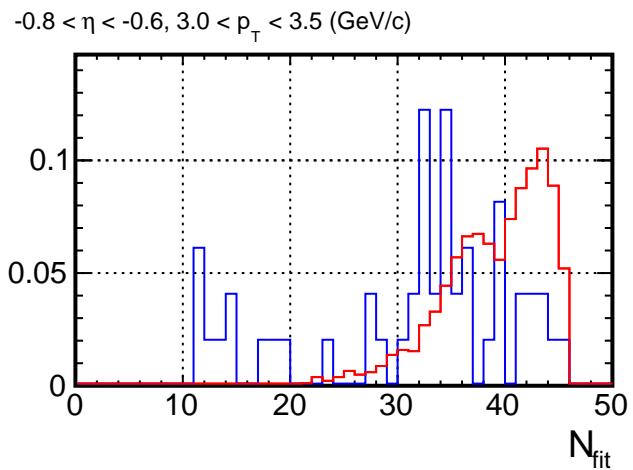
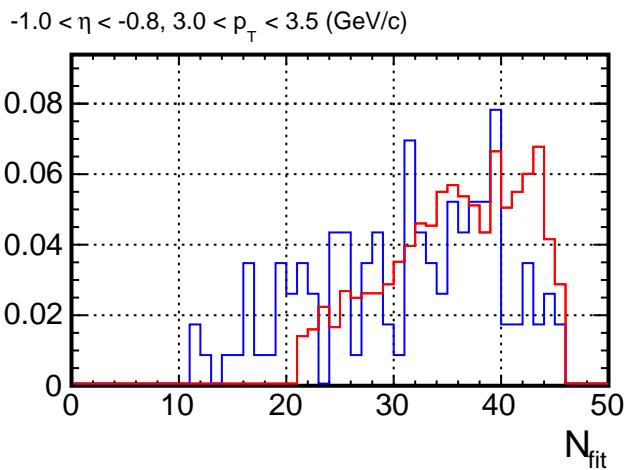
## NHit distribution for ( $p_T$ , $\eta$ ) slices



e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|n\sigma_e| < 2$  TPC)

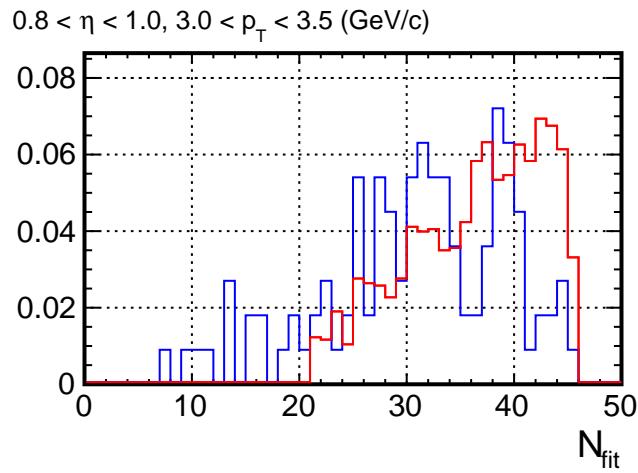
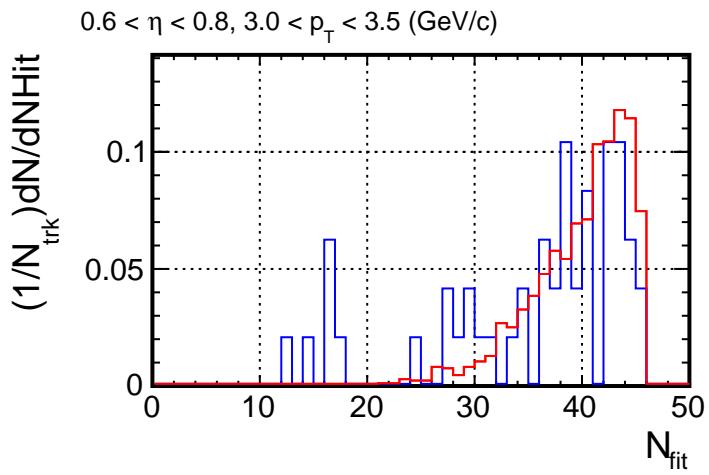
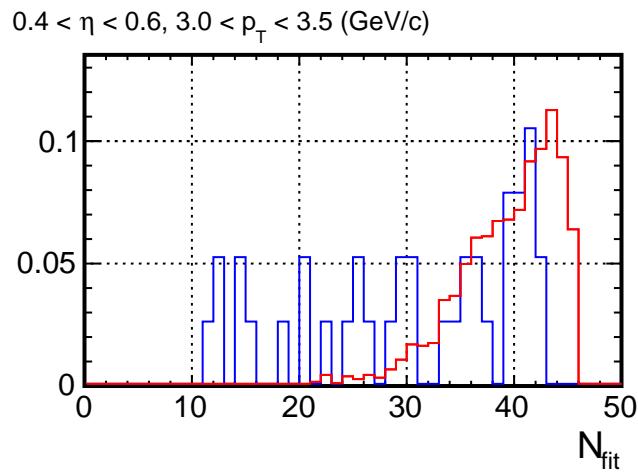
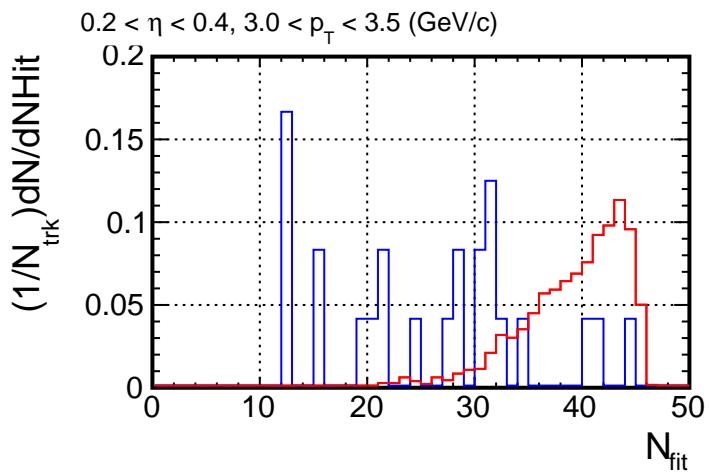
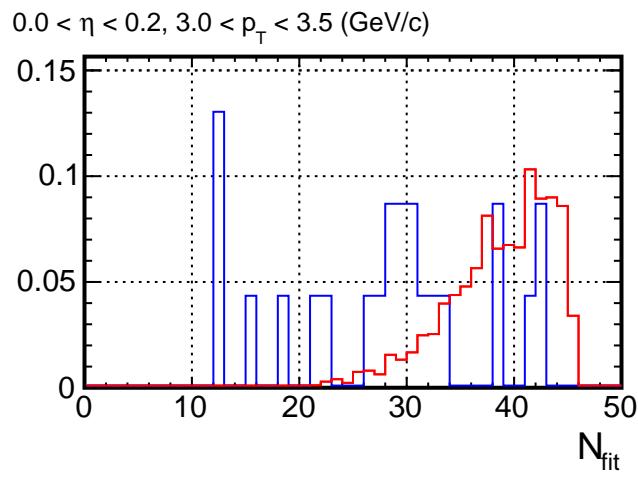
## NHit distribution for ( $p_T$ , $\eta$ ) slices



e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|n\sigma_{e^-}| < 2$  TPC)

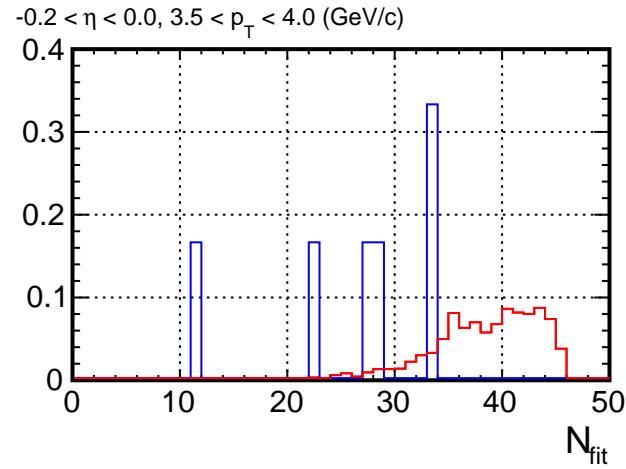
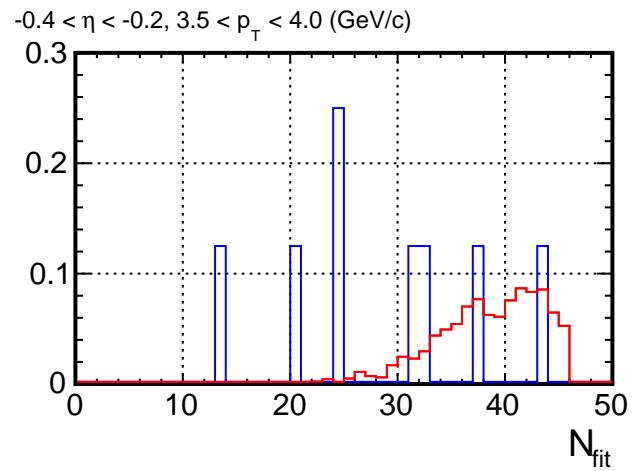
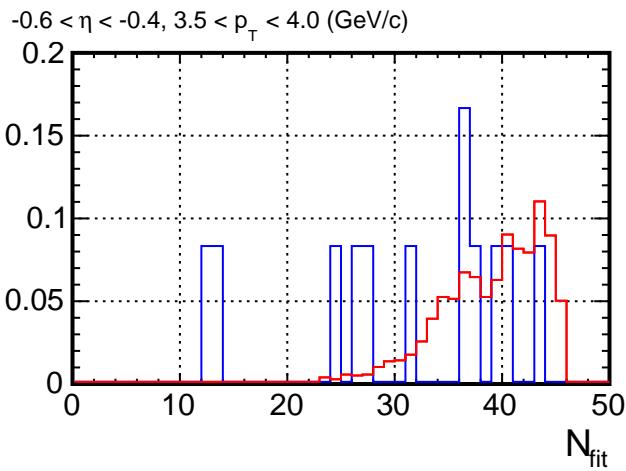
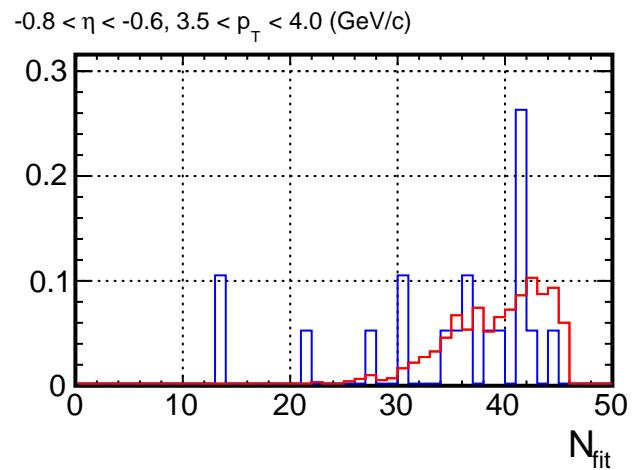
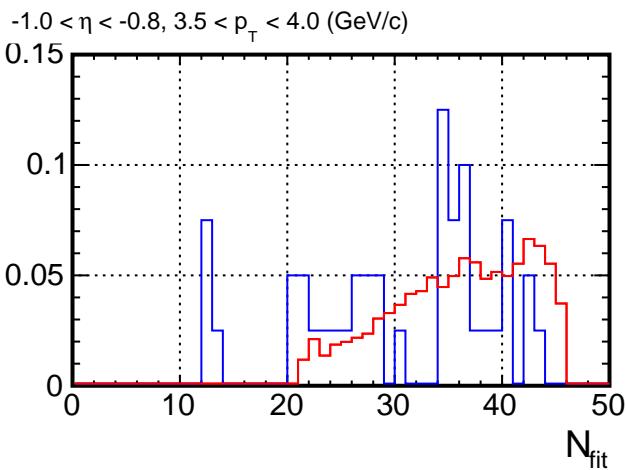
## NHit distribution for ( $p_T$ , $\eta$ ) slices



e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|n \sigma_{e^-}| < 2 \text{ TPC}$ )

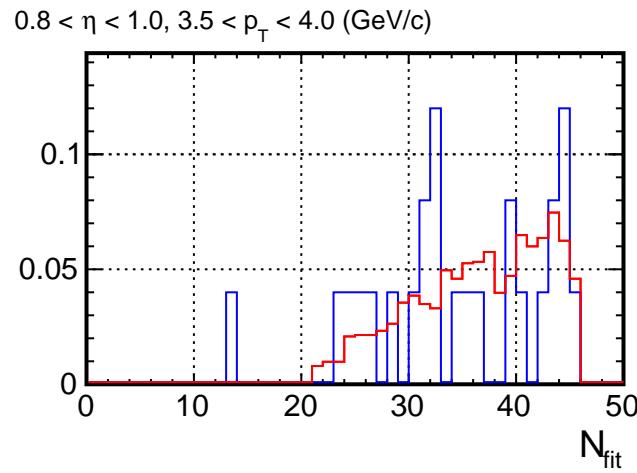
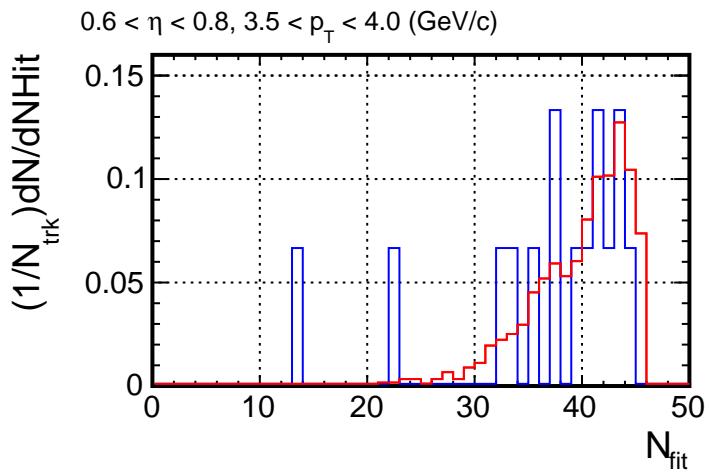
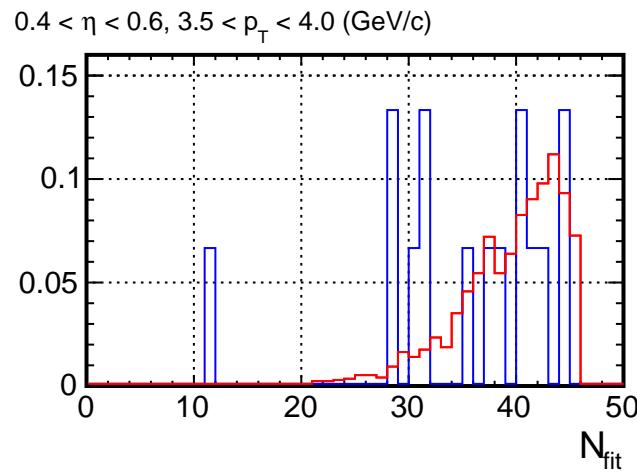
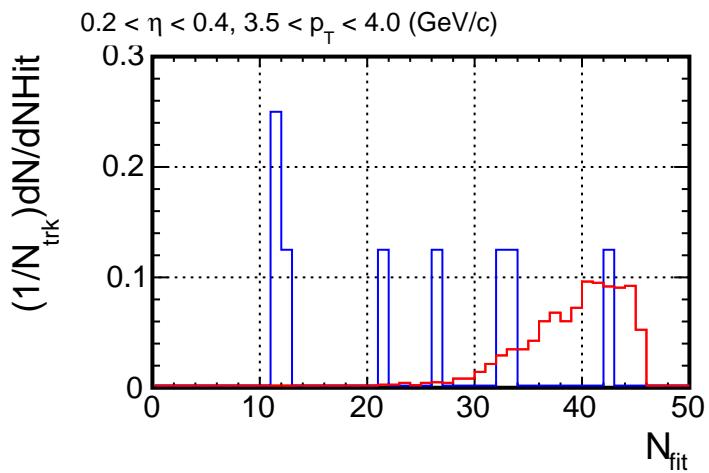
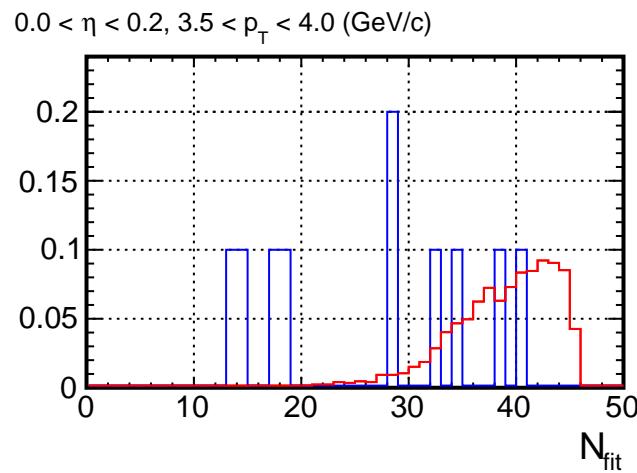
## NHit distribution for ( $p_T$ , $\eta$ ) slices



e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|n\sigma_{e^-}| < 2$  TPC)

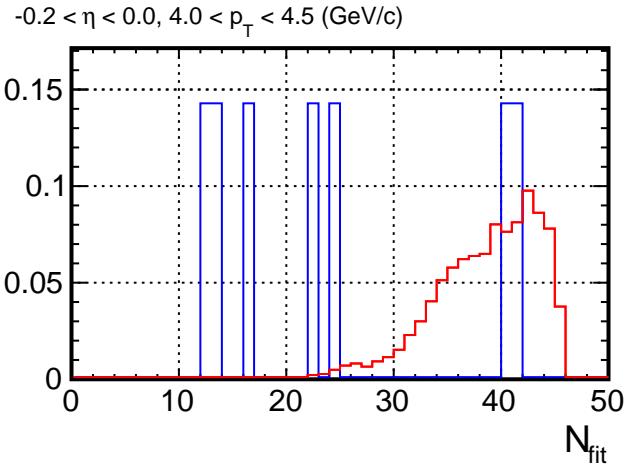
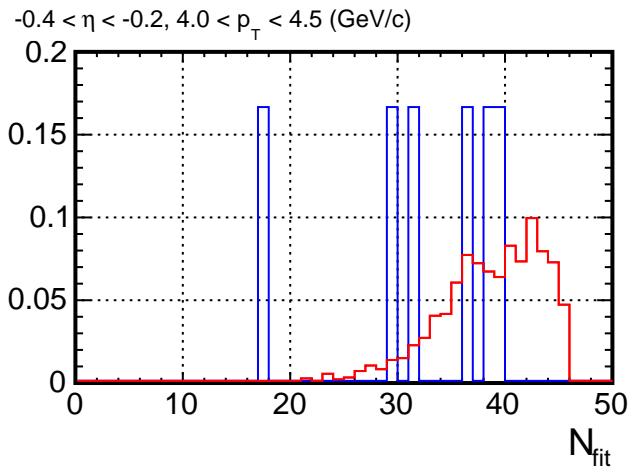
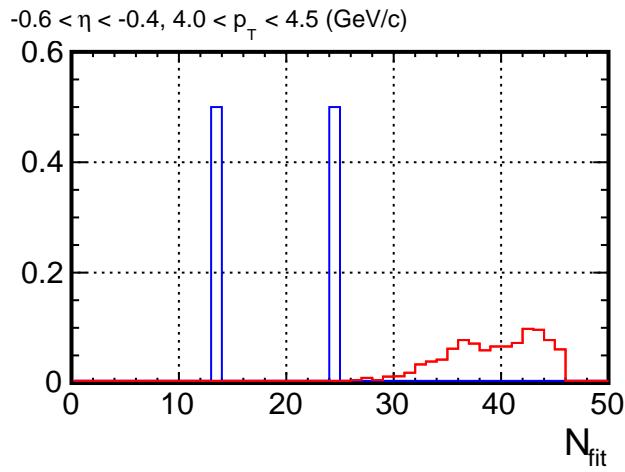
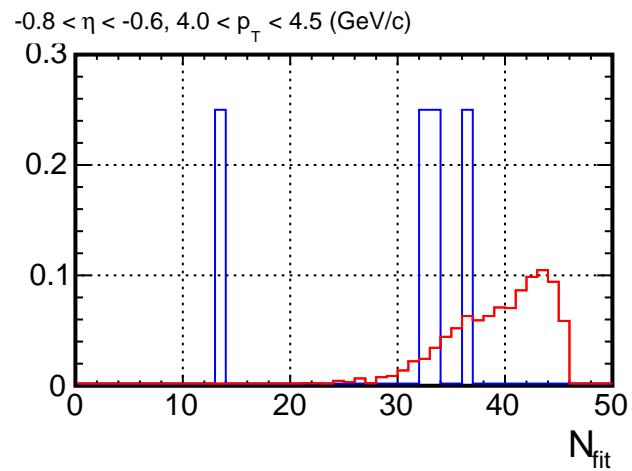
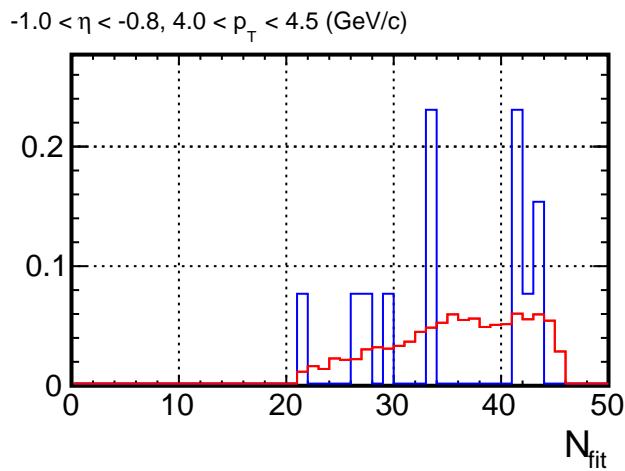
## NHit distribution for ( $p_T$ , $\eta$ ) slices



e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|n \sigma_{e^-}| < 2 \text{ TPC}$ )

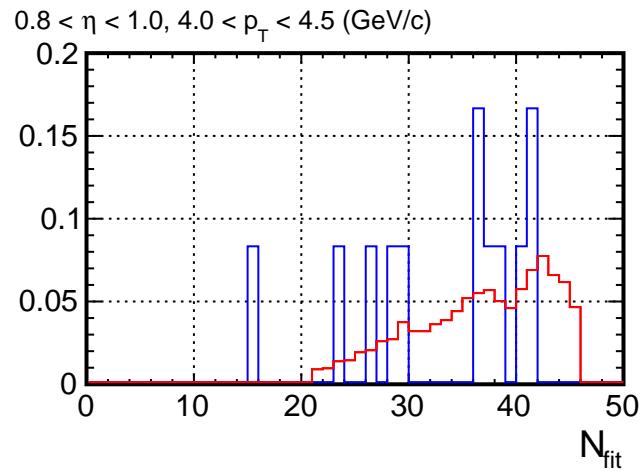
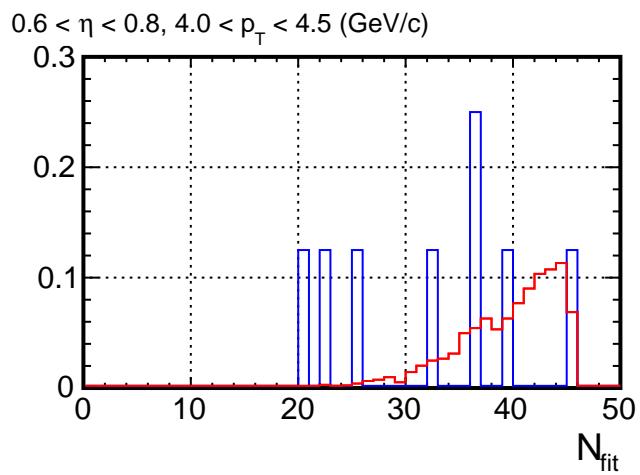
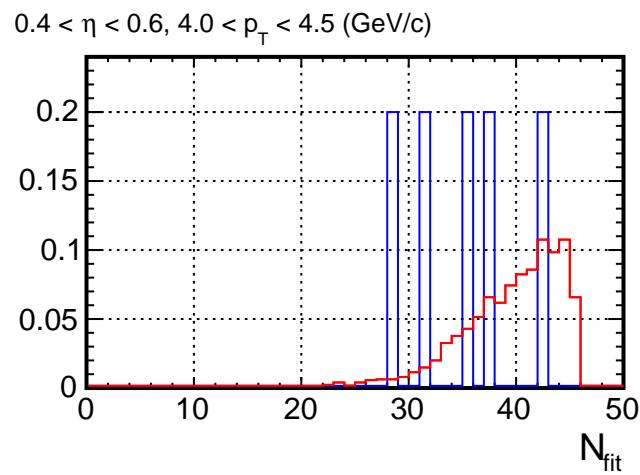
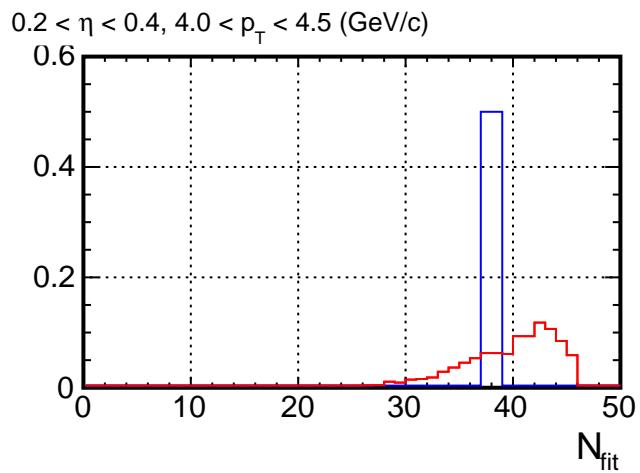
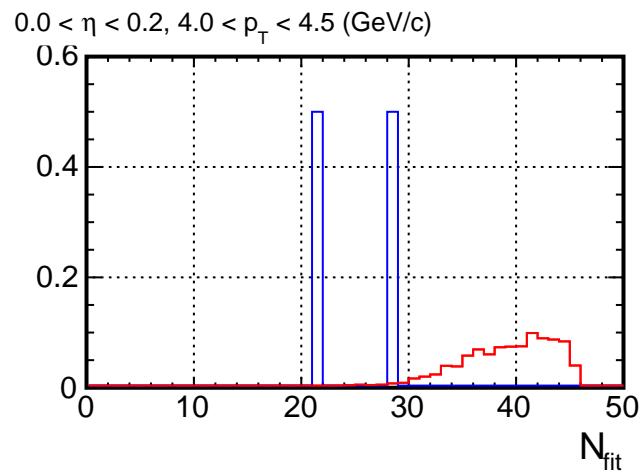
## NHit distribution for ( $p_T$ , $\eta$ ) slices



e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|n\sigma_e| < 2$  TPC)

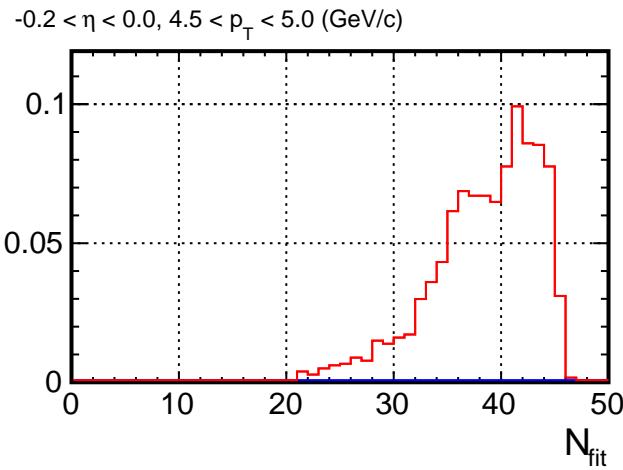
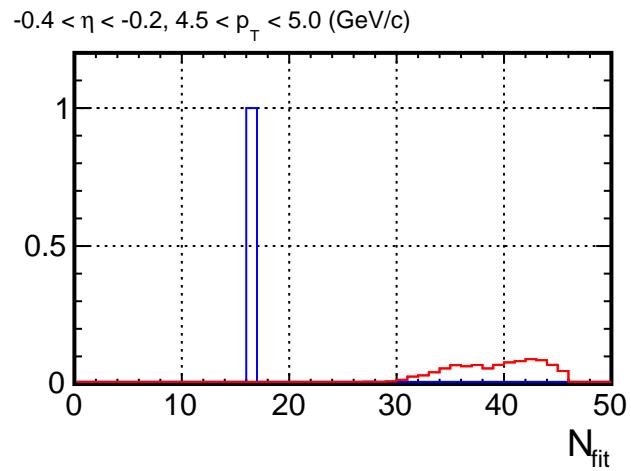
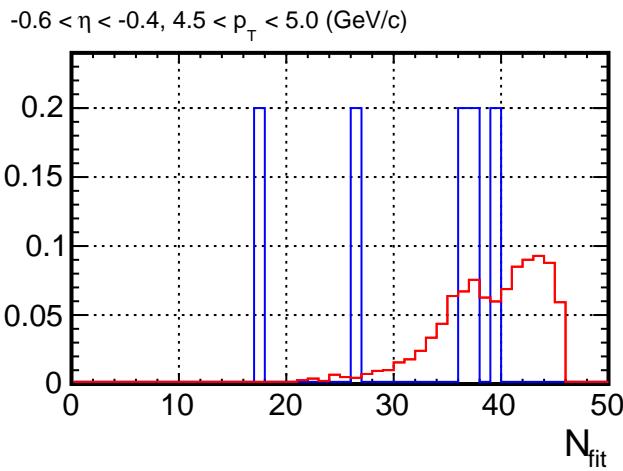
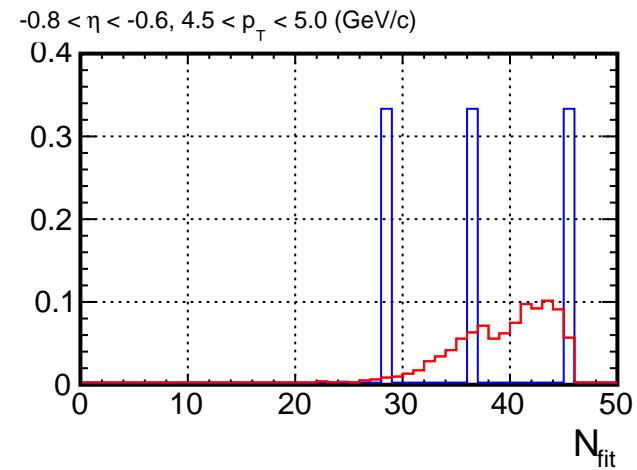
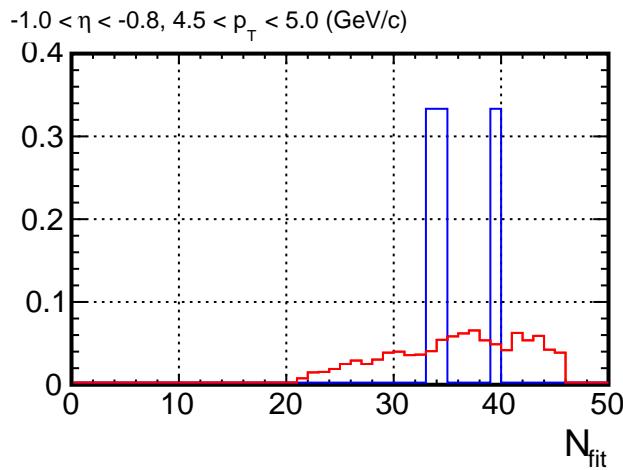
## NHit distribution for ( $p_T$ , $\eta$ ) slices



e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|n\sigma_{e^-}| < 2 \text{ TPC}$ )

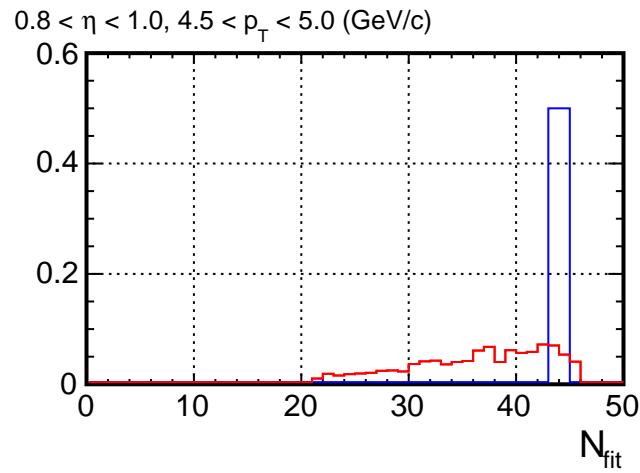
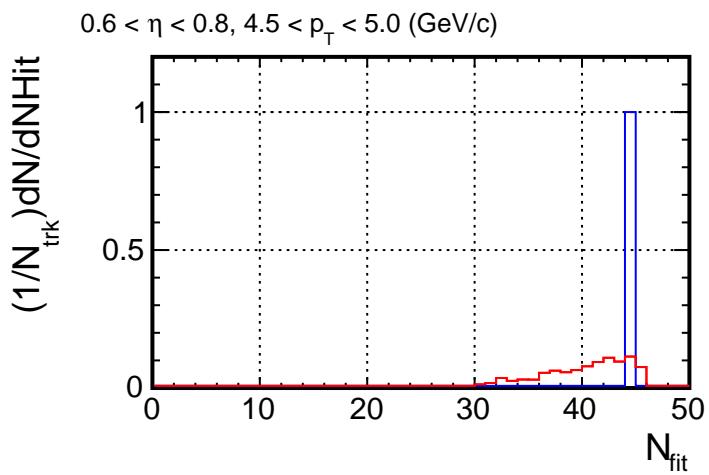
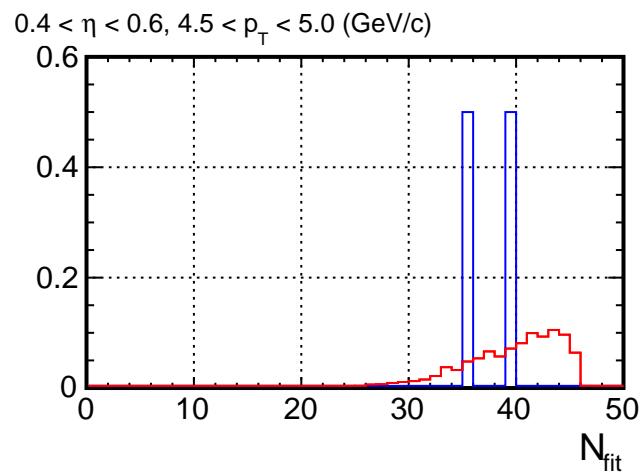
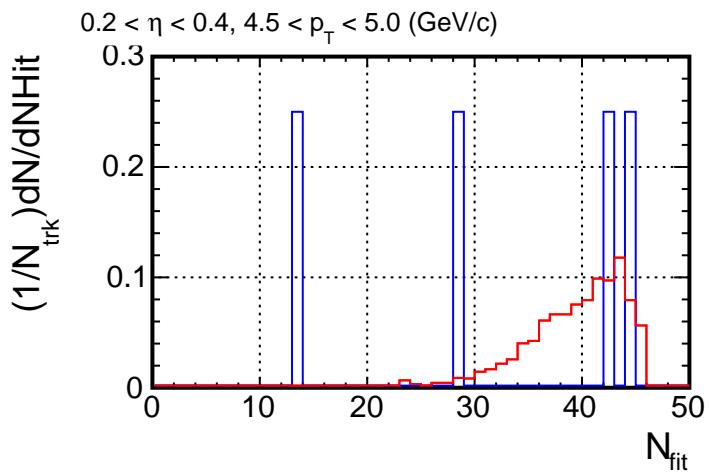
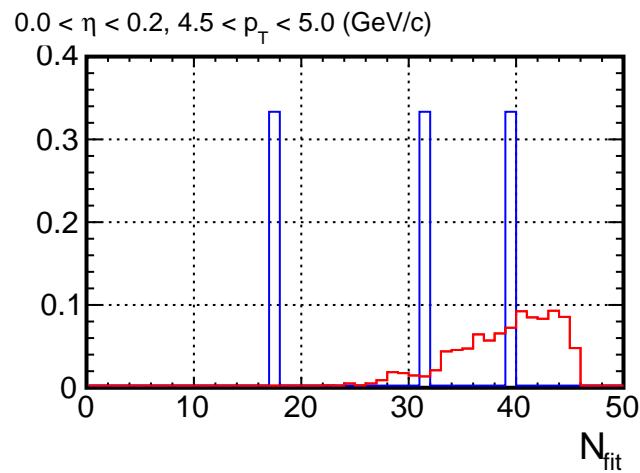
## NHit distribution for ( $p_T$ , $\eta$ ) slices



e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|n \sigma_e| < 2$  TPC)

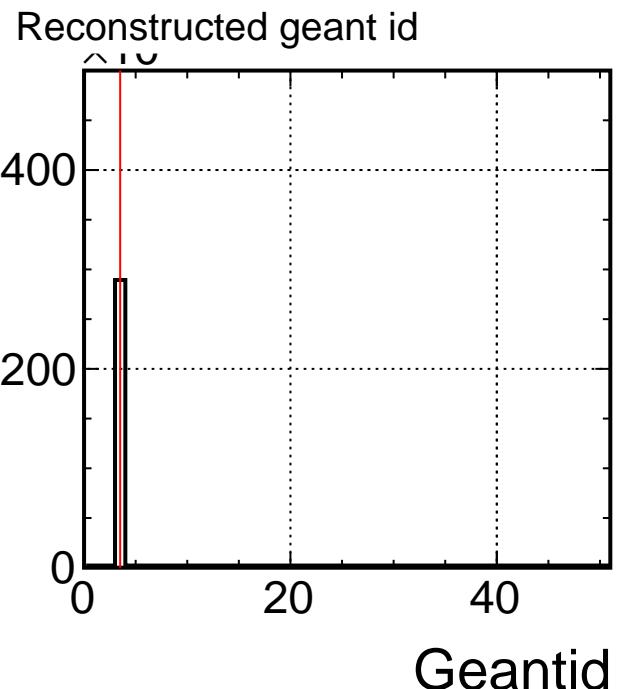
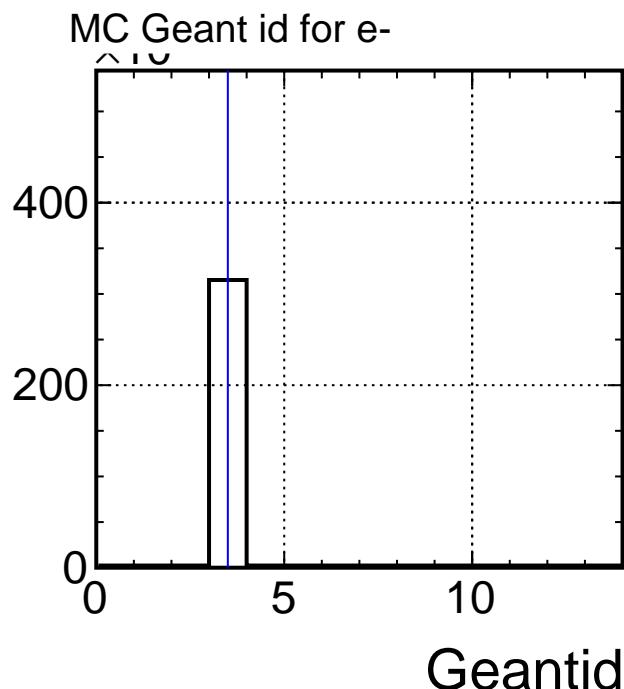
## NHit distribution for ( $p_T$ , $\eta$ ) slices



e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|\eta \sigma_e| < 2 \text{ TPC}$ )

### Geant id

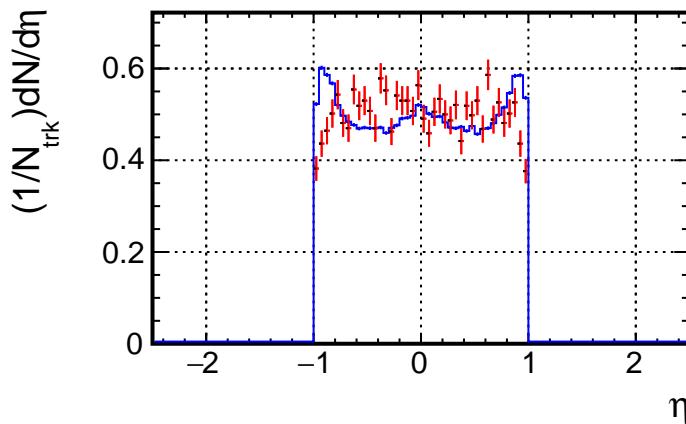
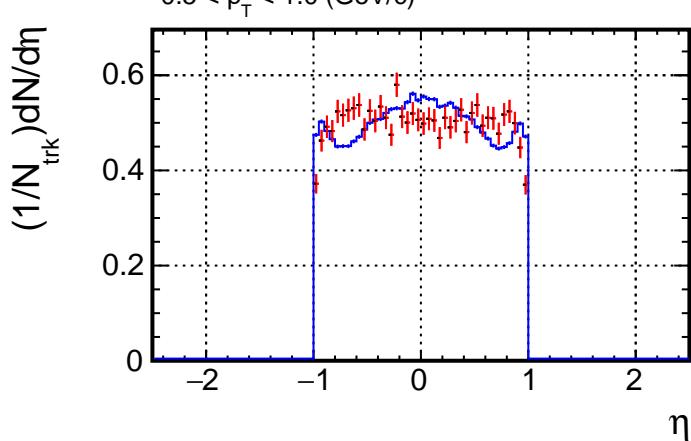
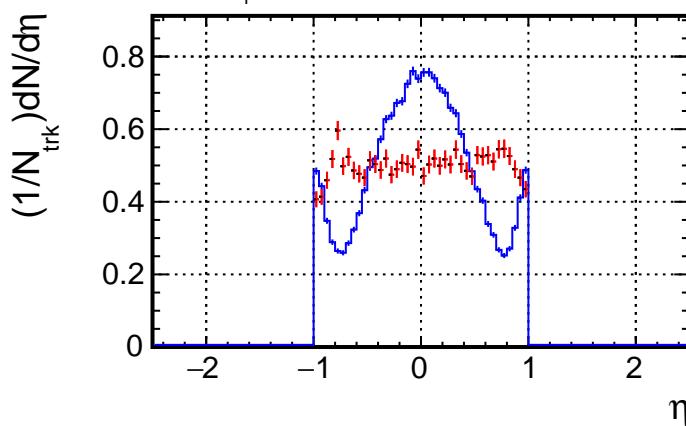
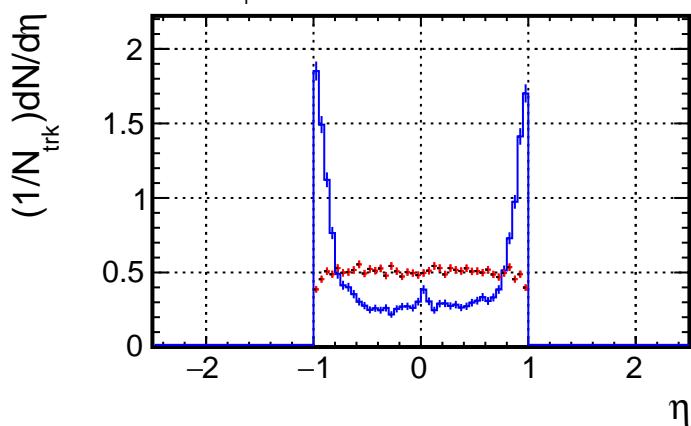
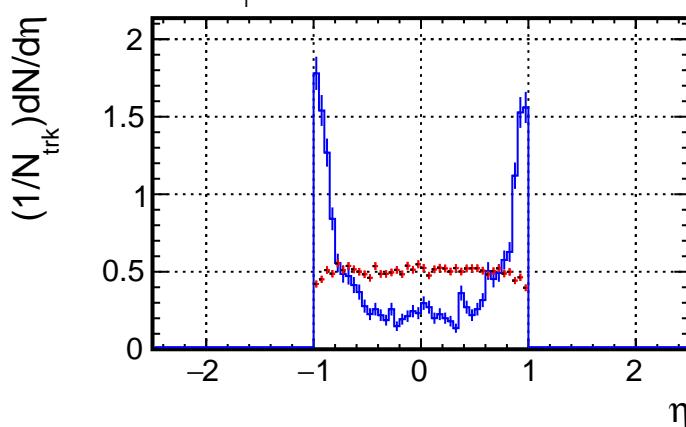


### Particle informations

— e- (MC, geantid=3)

— e- (MATCHED, geantid=3)

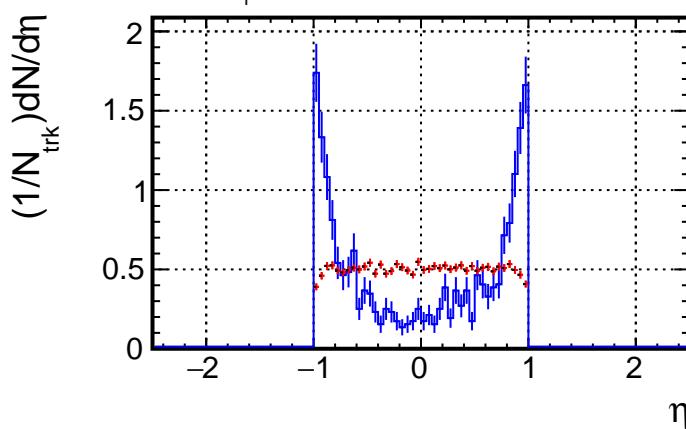
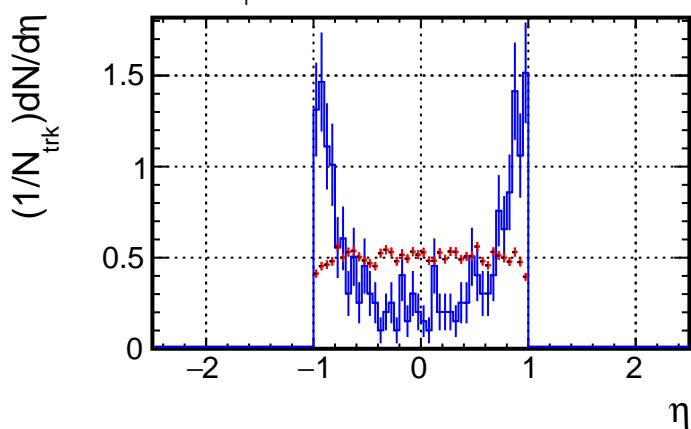
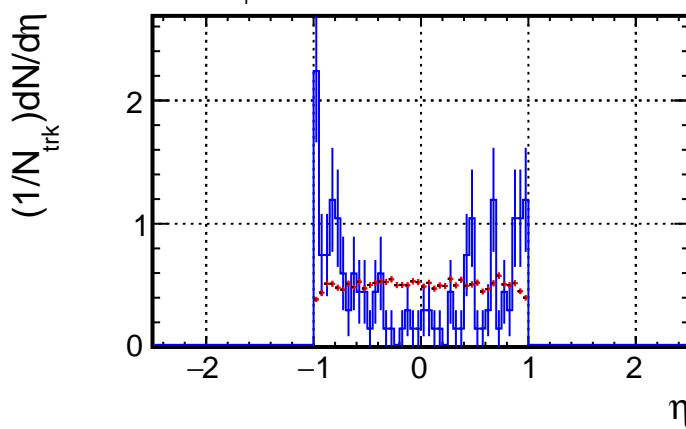
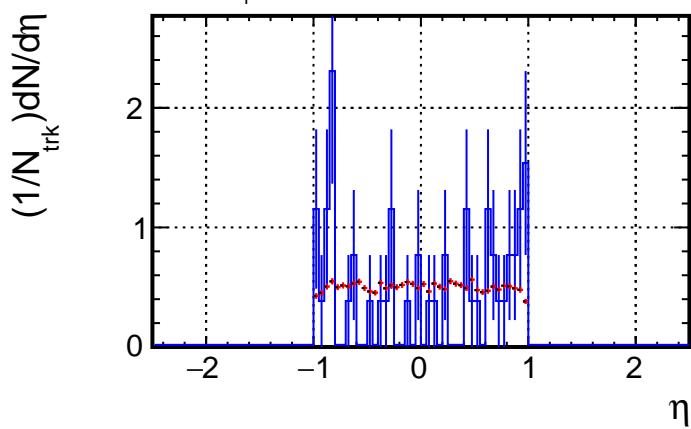
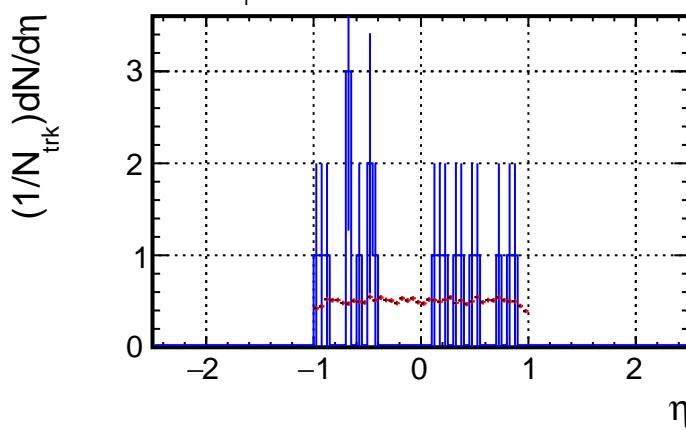
# Projection of $\eta$ for each $p_T$ bin

0.2 <  $p_T$  < 0.5 (GeV/c)0.5 <  $p_T$  < 1.0 (GeV/c)1.0 <  $p_T$  < 1.5 (GeV/c)1.5 <  $p_T$  < 2.0 (GeV/c)2.0 <  $p_T$  < 2.5 (GeV/c)

e-  
(MATCHED, geantid=3)

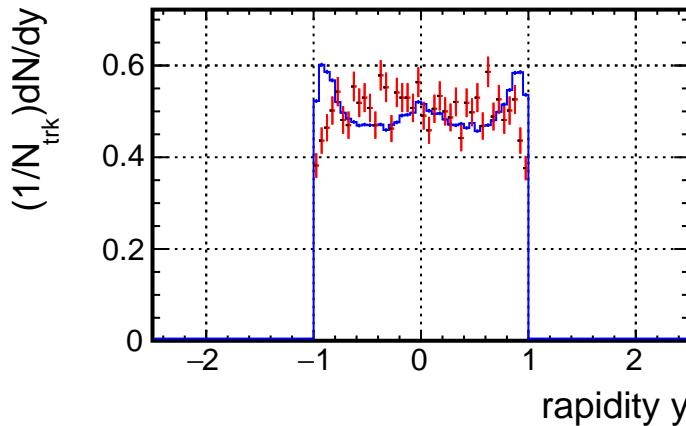
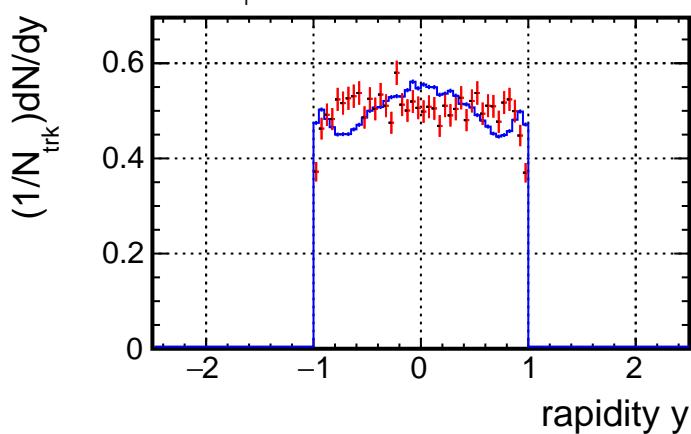
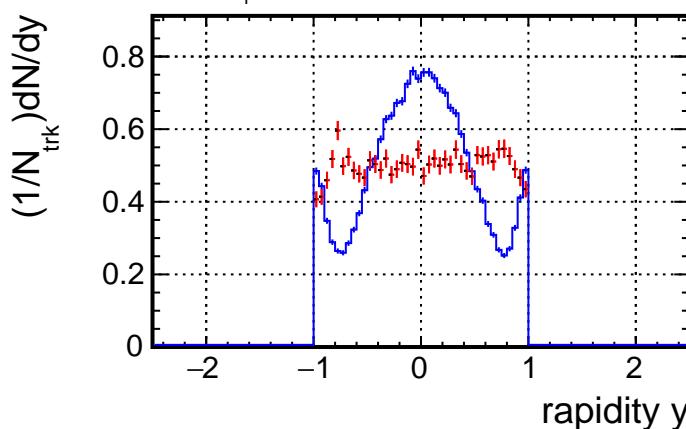
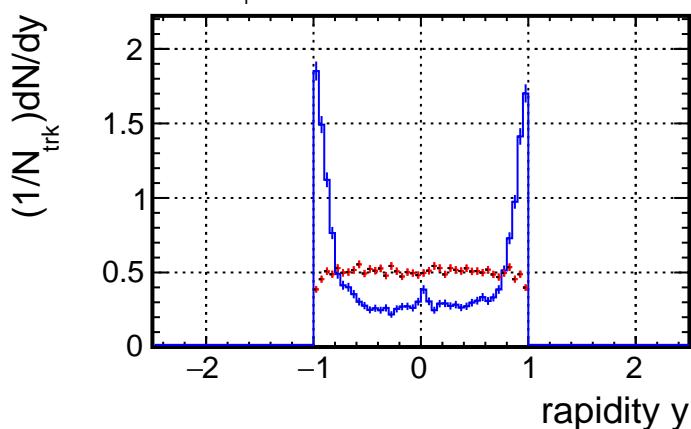
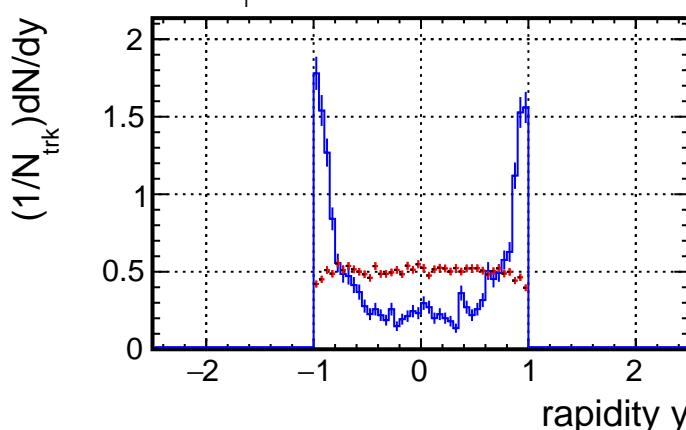
e-  
(PRIMARY, | $n \sigma_{e^-}| < 2$  TPC)

# Projection of $\eta$ for each $p_T$ bin

2.5 <  $p_T$  < 3.0 (GeV/c)3.0 <  $p_T$  < 3.5 (GeV/c)3.5 <  $p_T$  < 4.0 (GeV/c)4.0 <  $p_T$  < 4.5 (GeV/c)4.5 <  $p_T$  < 5.0 (GeV/c)

- e-  
(MATCHED, geantid=3)
- e-  
(PRIMARY,  $|n \sigma_{e^-}| < 2$  TPC)

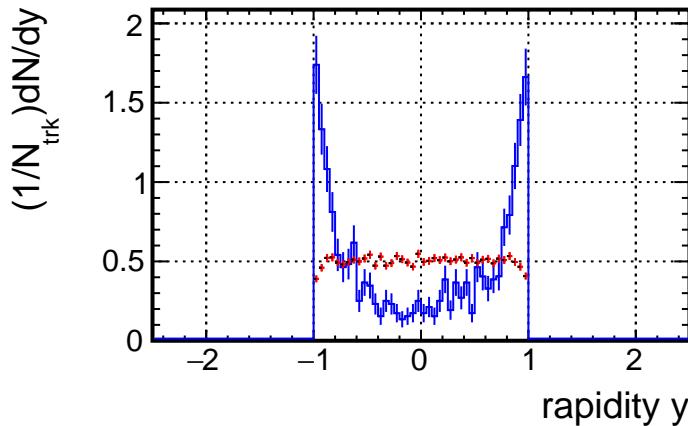
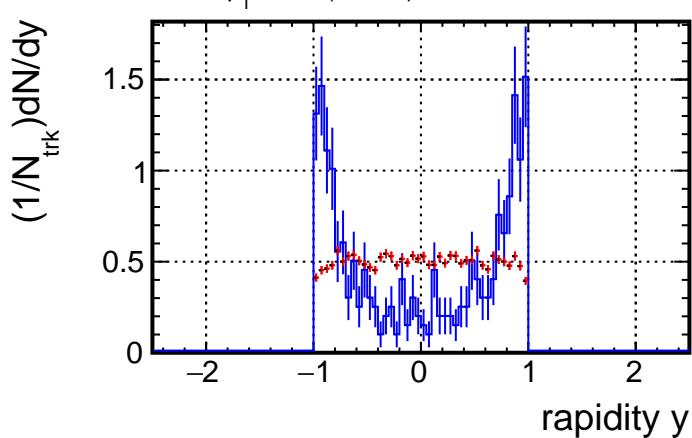
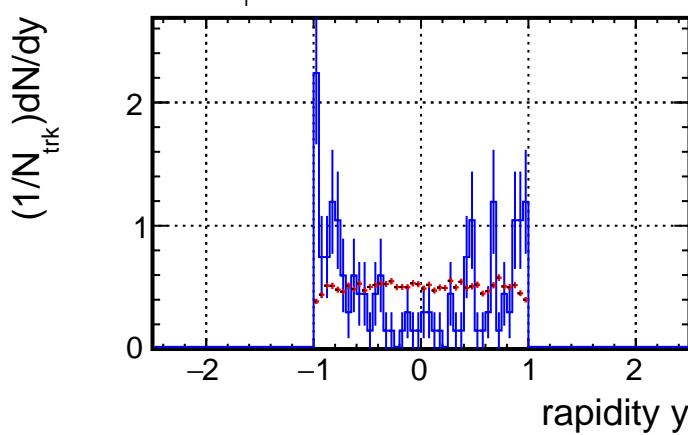
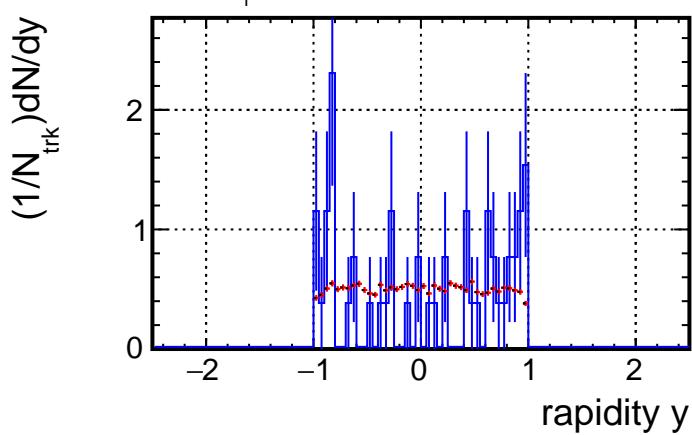
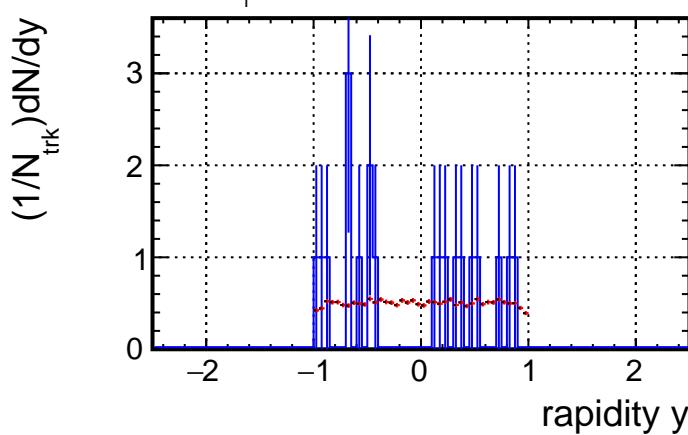
# Projection of $y$ for each $p_T$ bin

0.2 <  $p_T$  < 0.5 (GeV/c)0.5 <  $p_T$  < 1.0 (GeV/c)1.0 <  $p_T$  < 1.5 (GeV/c)1.5 <  $p_T$  < 2.0 (GeV/c)2.0 <  $p_T$  < 2.5 (GeV/c)

e-  
(MATCHED, geantid=3)

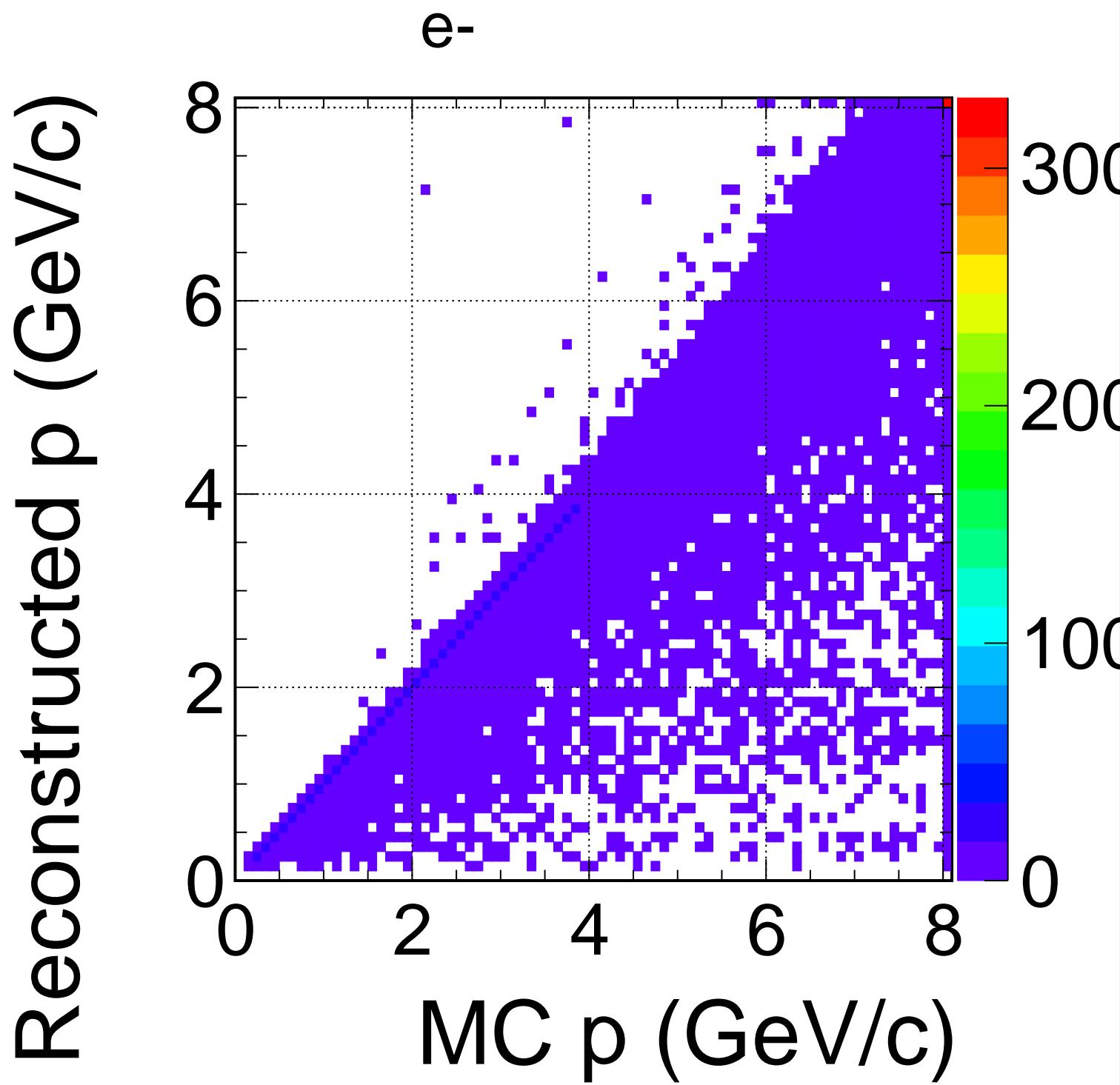
e-  
(PRIMARY, | $n \sigma_{e^-}| < 2$  TPC)

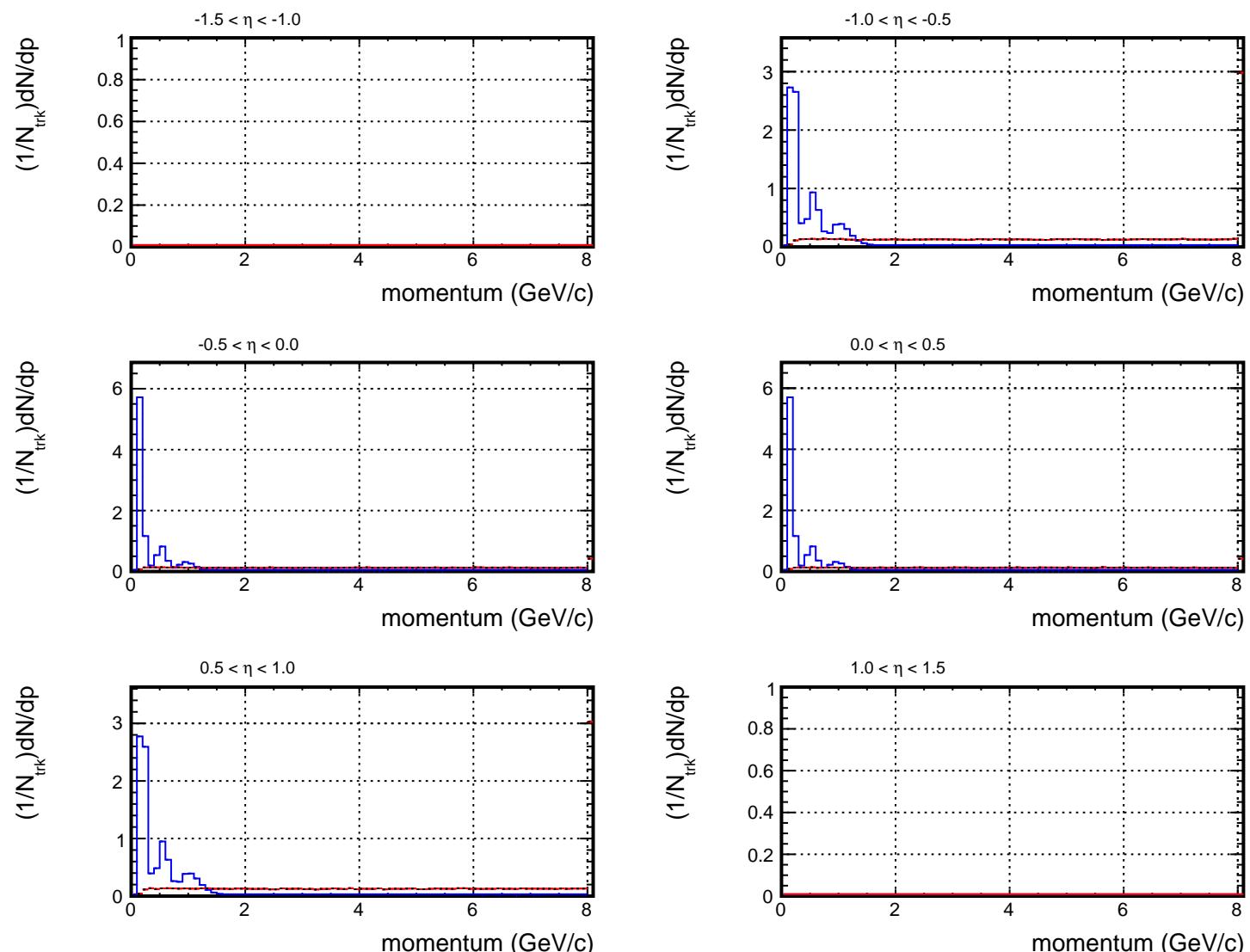
# Projection of $y$ for each $p_T$ bin

2.5 <  $p_T$  < 3.0 (GeV/c)3.0 <  $p_T$  < 3.5 (GeV/c)3.5 <  $p_T$  < 4.0 (GeV/c)4.0 <  $p_T$  < 4.5 (GeV/c)4.5 <  $p_T$  < 5.0 (GeV/c)

- e- (MATCHED, geantid=3)
- e- (PRIMARY, | $n \sigma_{e^-}| < 2$  TPC)

Reconstructed momentum vs MC momentum



Projection of p for each  $\eta$  bin

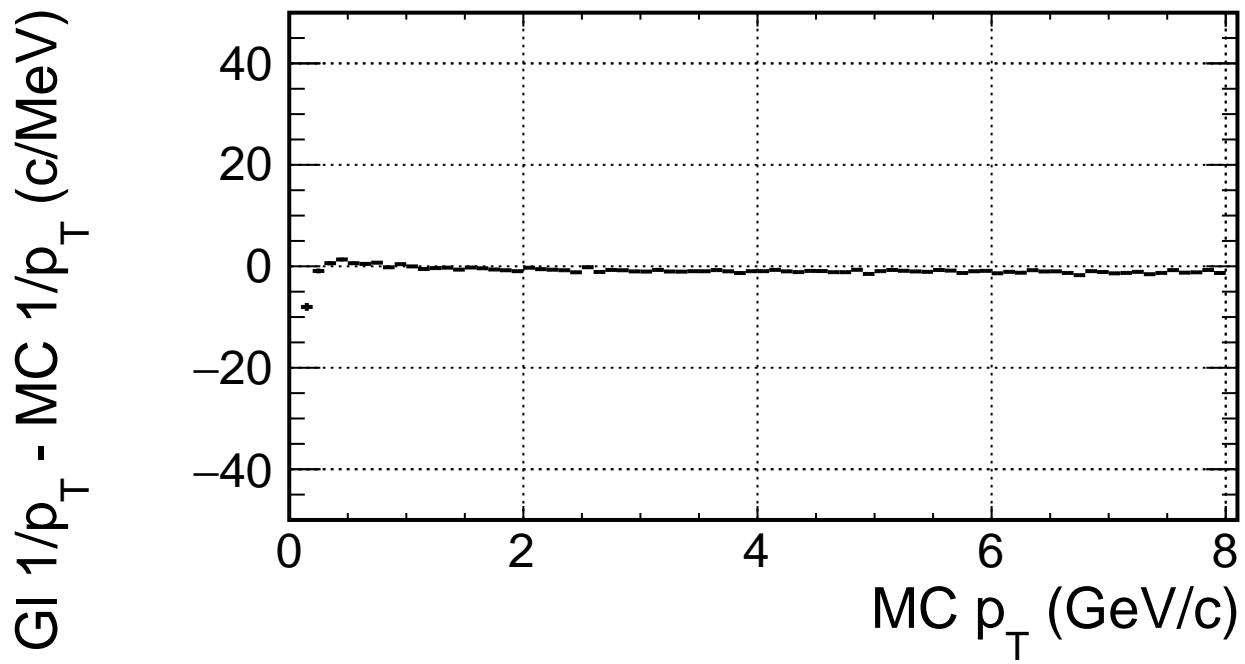
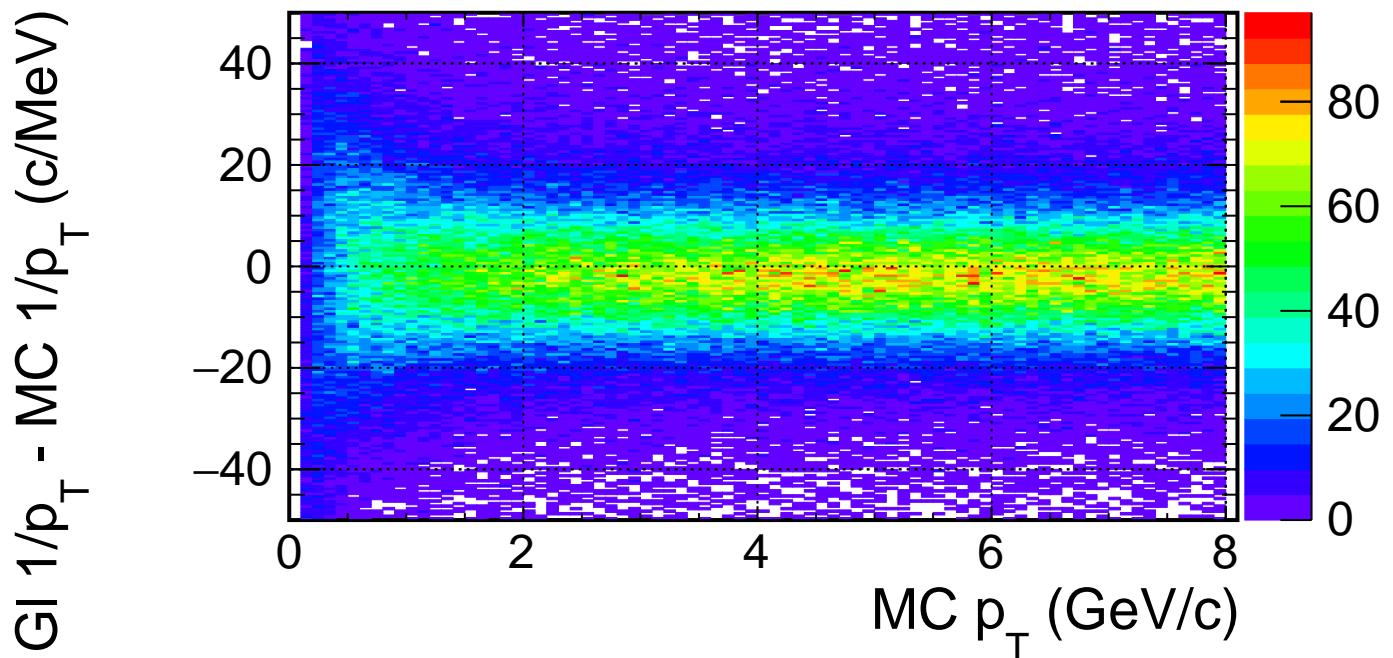
e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|\eta \sigma_e| < 2$  TPC)

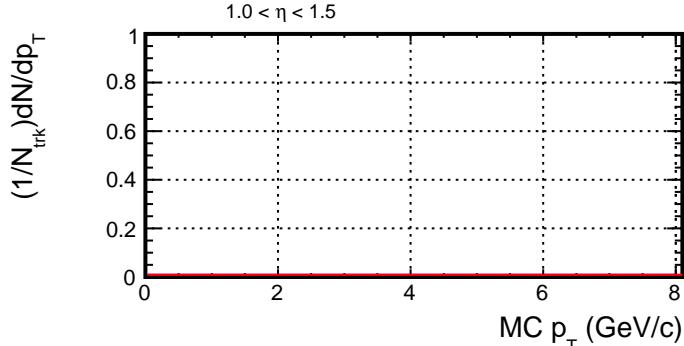
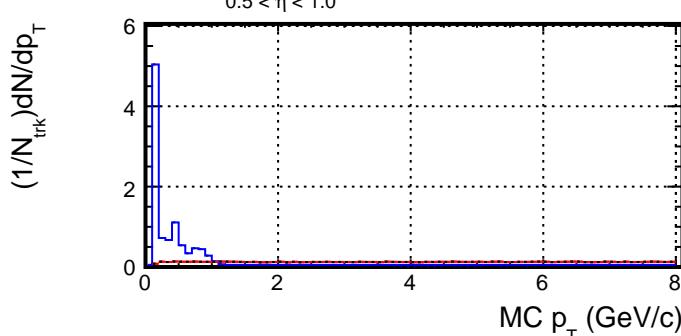
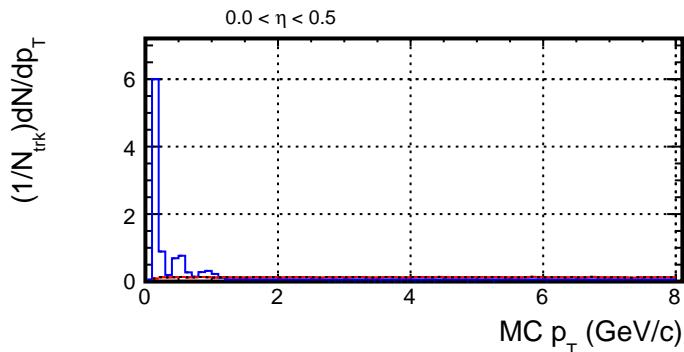
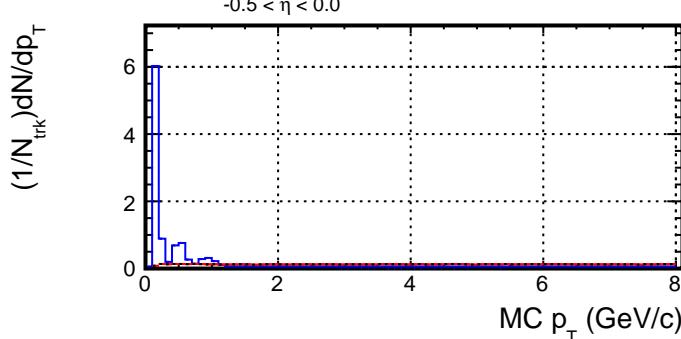
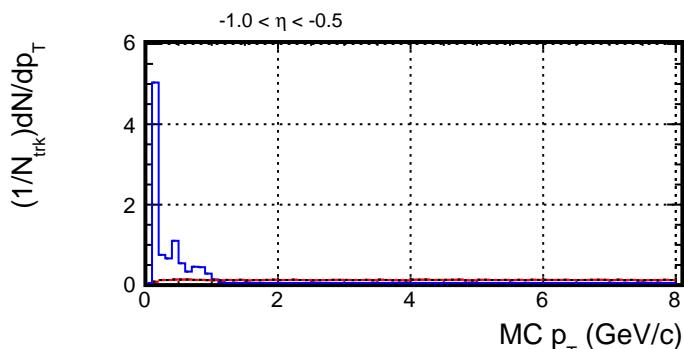
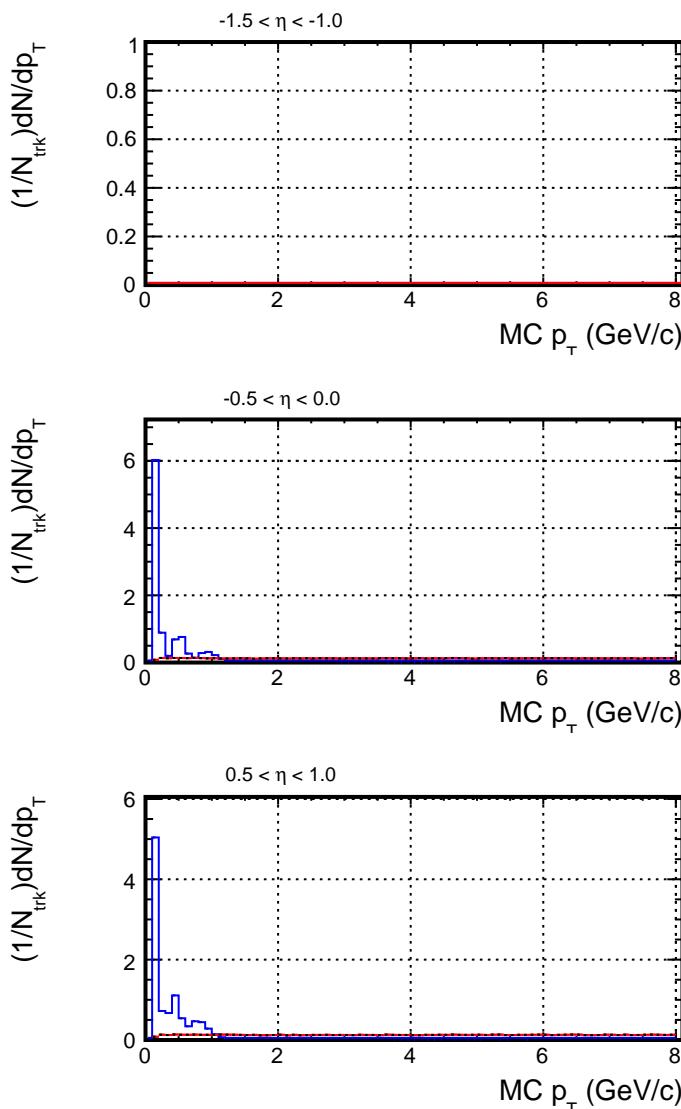
$N_{\text{events}}=24.83$  K, MC=e-, embeddingQa.mc, (0)

Tue Jul 23 01:44:12 2019

$1/p_T (\text{GI}) - 1/p_T (\text{MC})$  vs  $p_T (\text{MC})$  (e-)



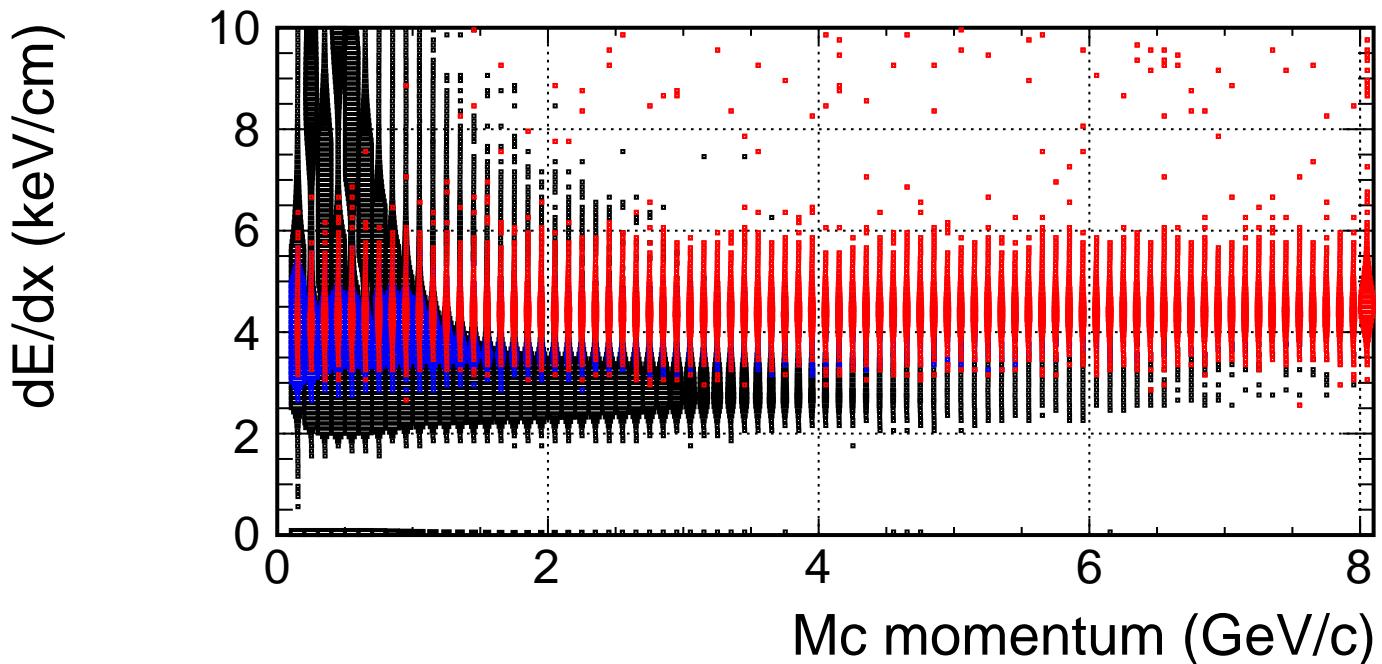
# Projection of $p_T$ for each $\eta$ bin



— e-  
 (MATCHED, geantid=3)

— e-  
 (PRIMARY,  $|n \sigma_e| < 2$  TPC)

## dE/dx vs momentum (Embedding:e-, Real:e-)

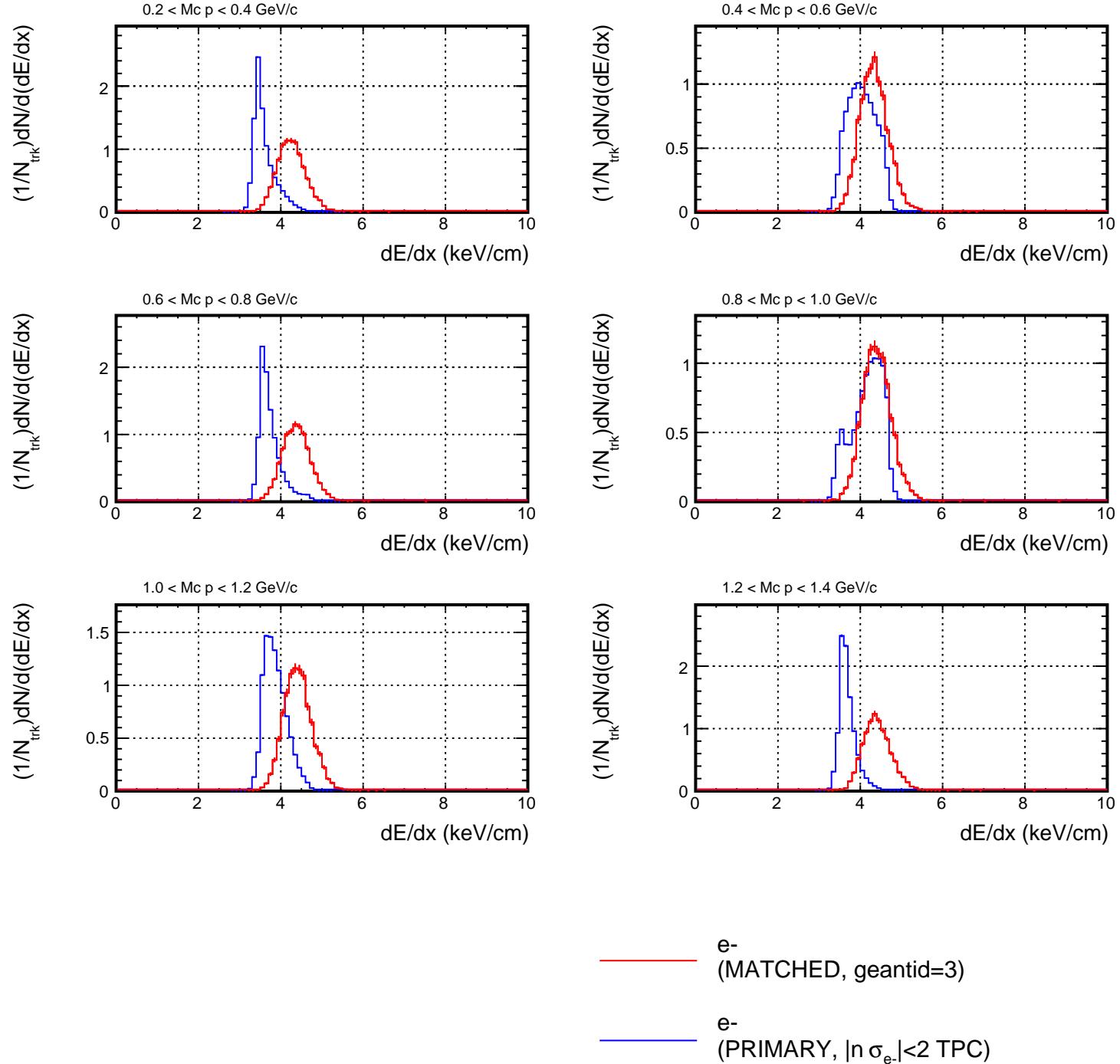


— e- (MATCHED, geantid=3)

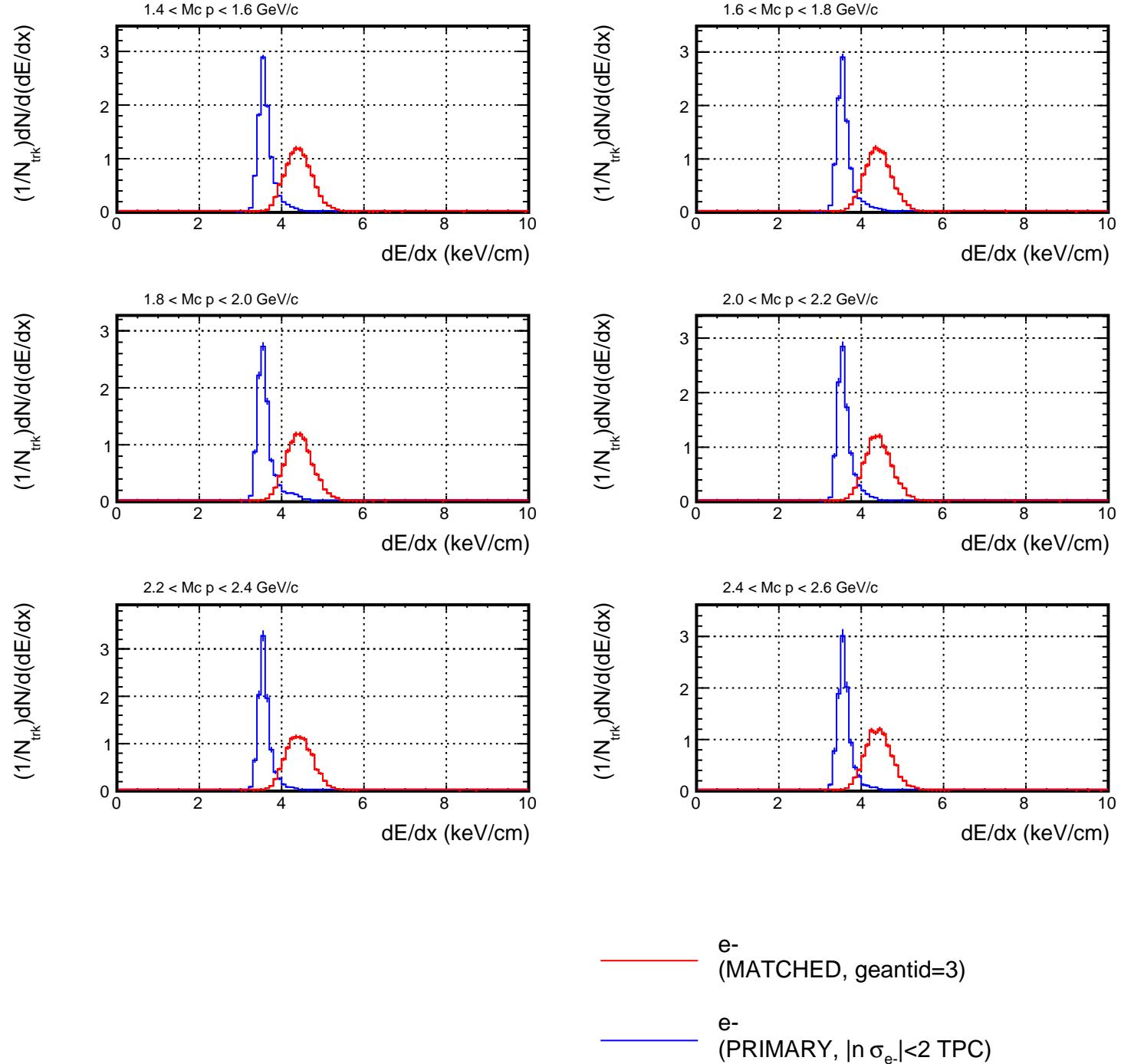
— Real data

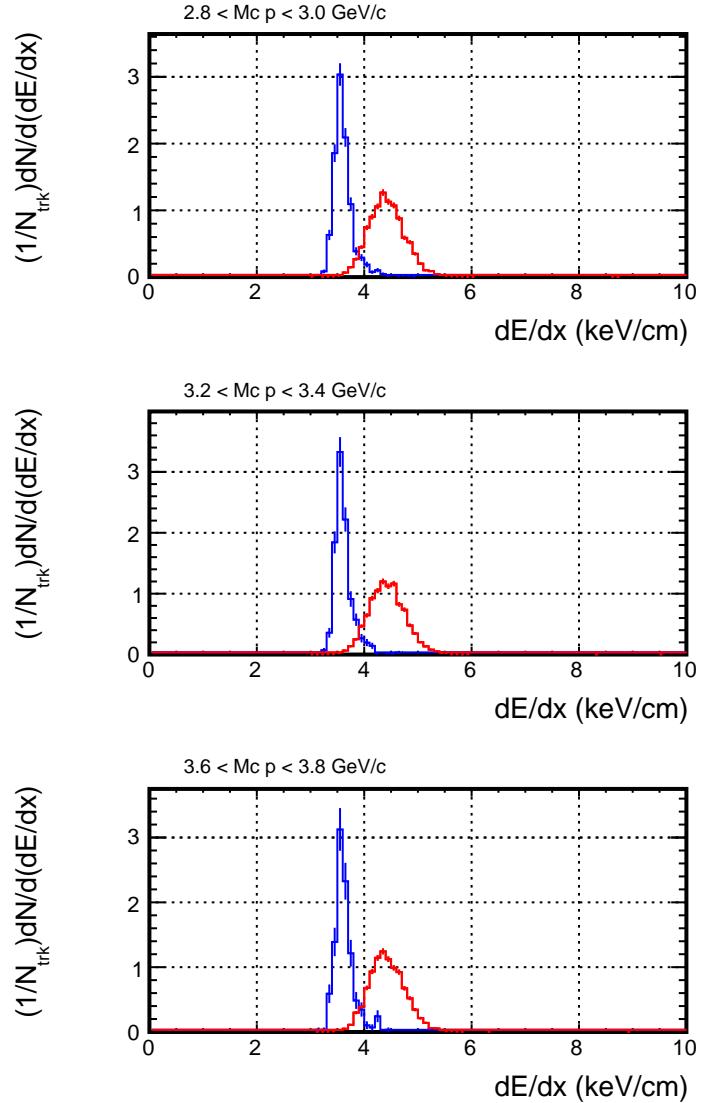
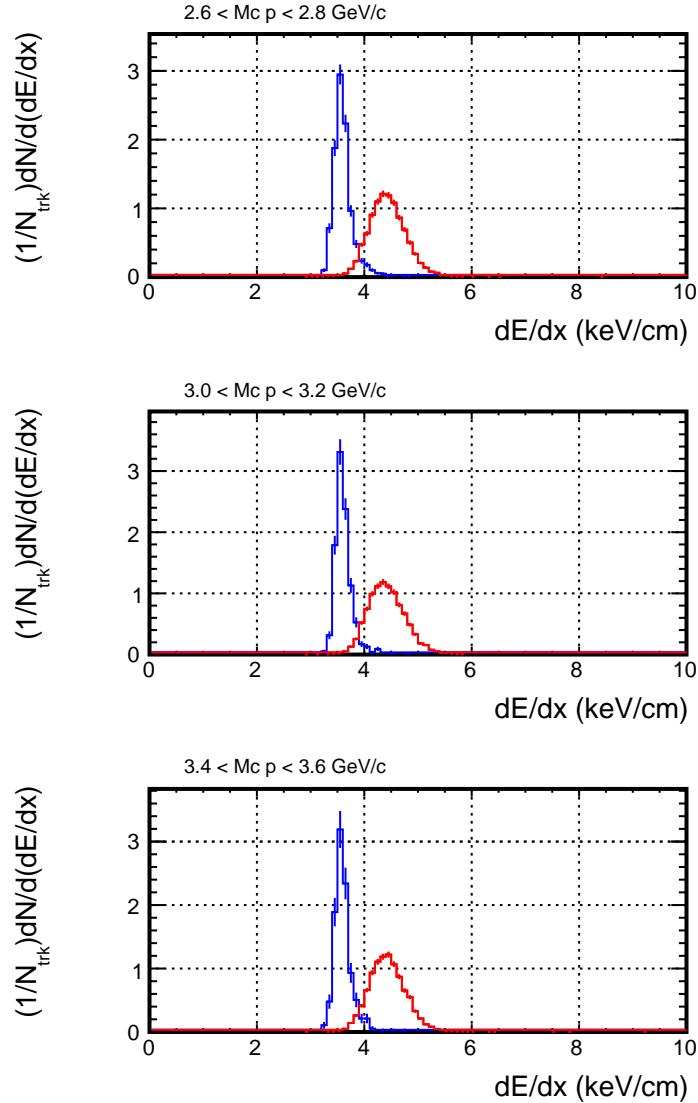
— Real data with PID cut ( $\sigma < 2$ ) TPC

## Projection of dE/dx for each p bin



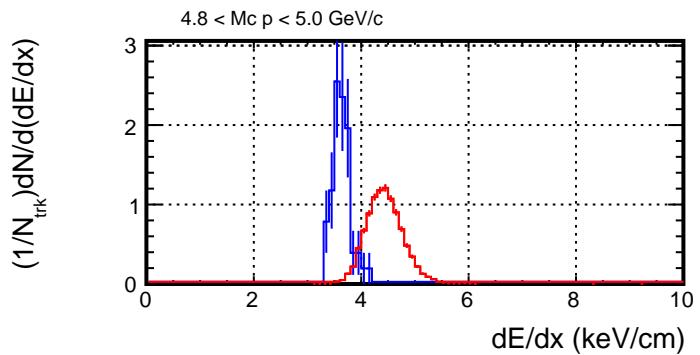
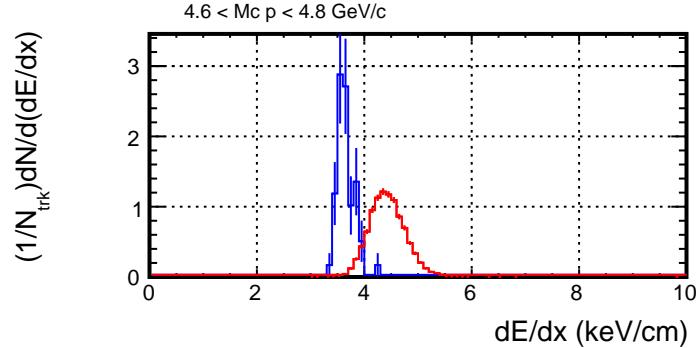
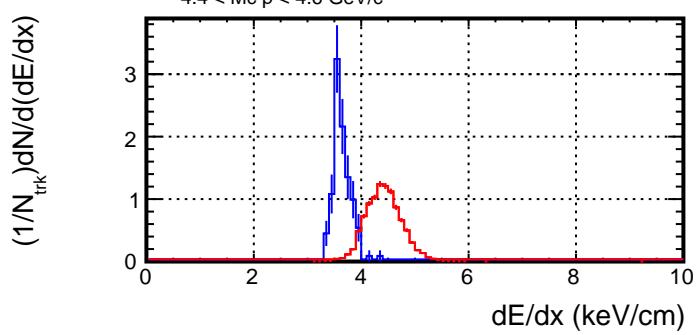
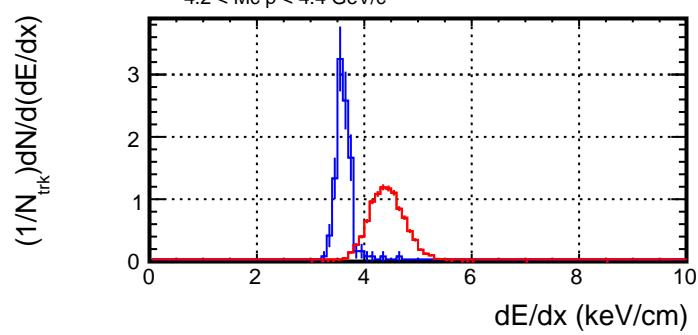
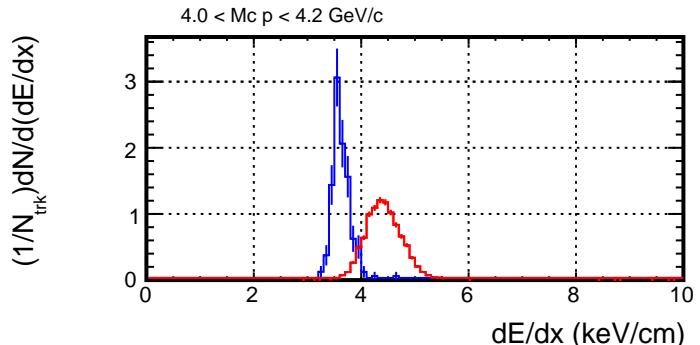
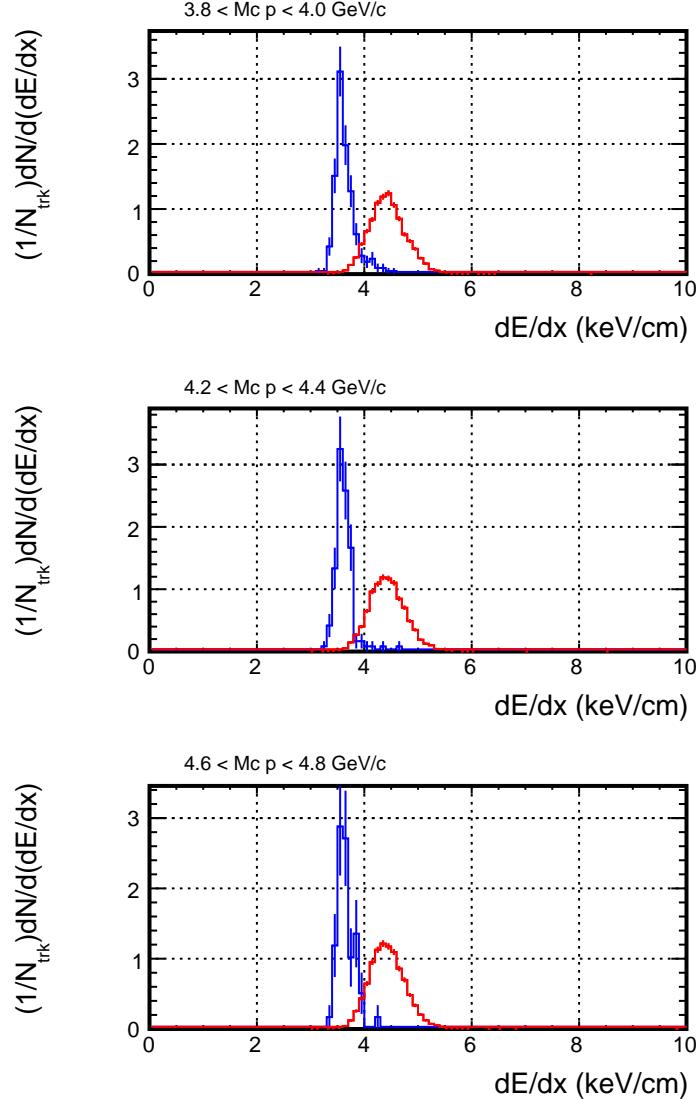
## Projection of dE/dx for each p bin



Projection of  $dE/dx$  for each p bin

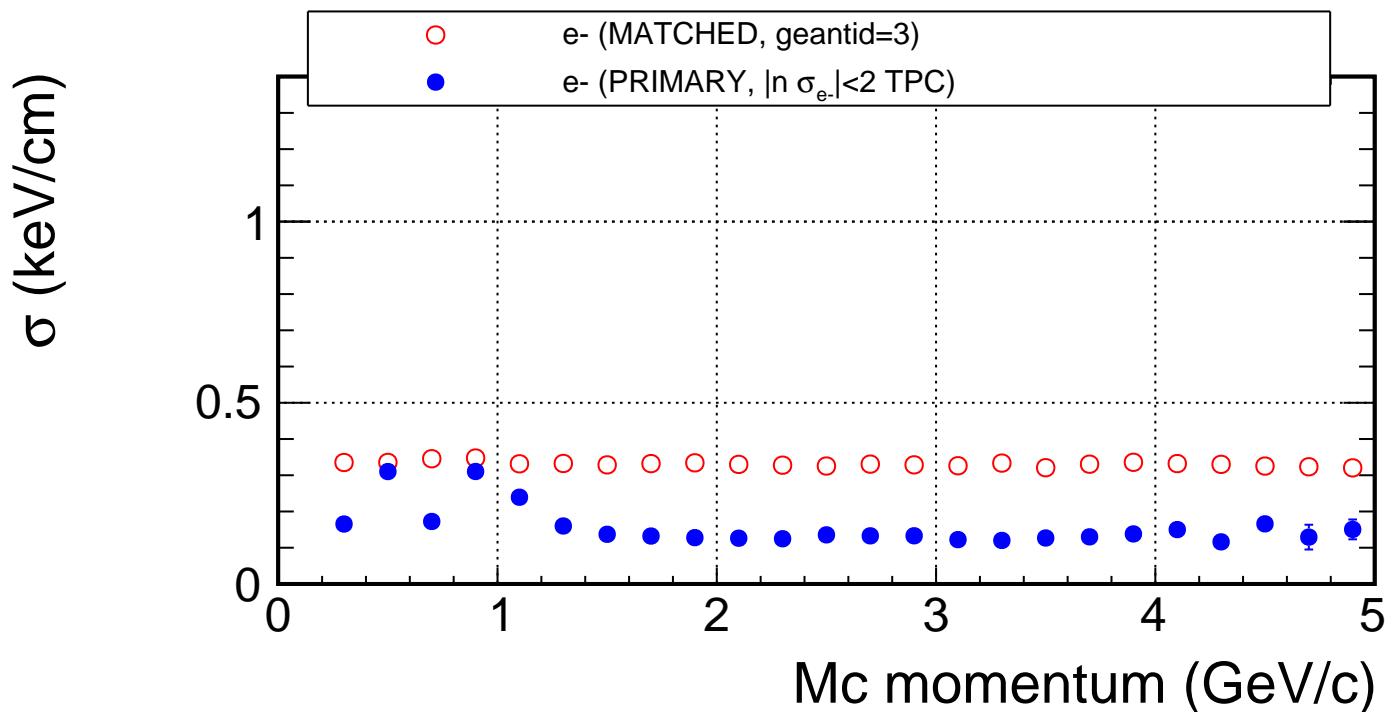
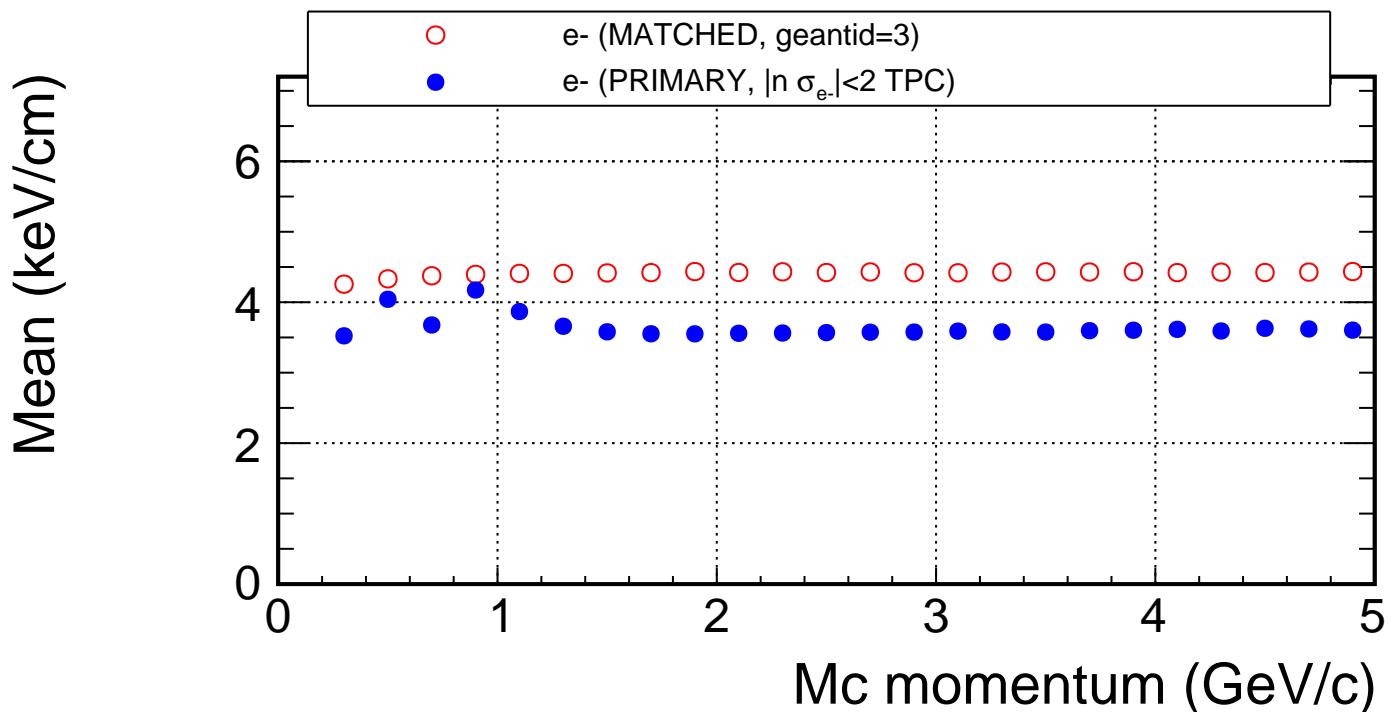
e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|\eta \sigma_e| < 2$  TPC)

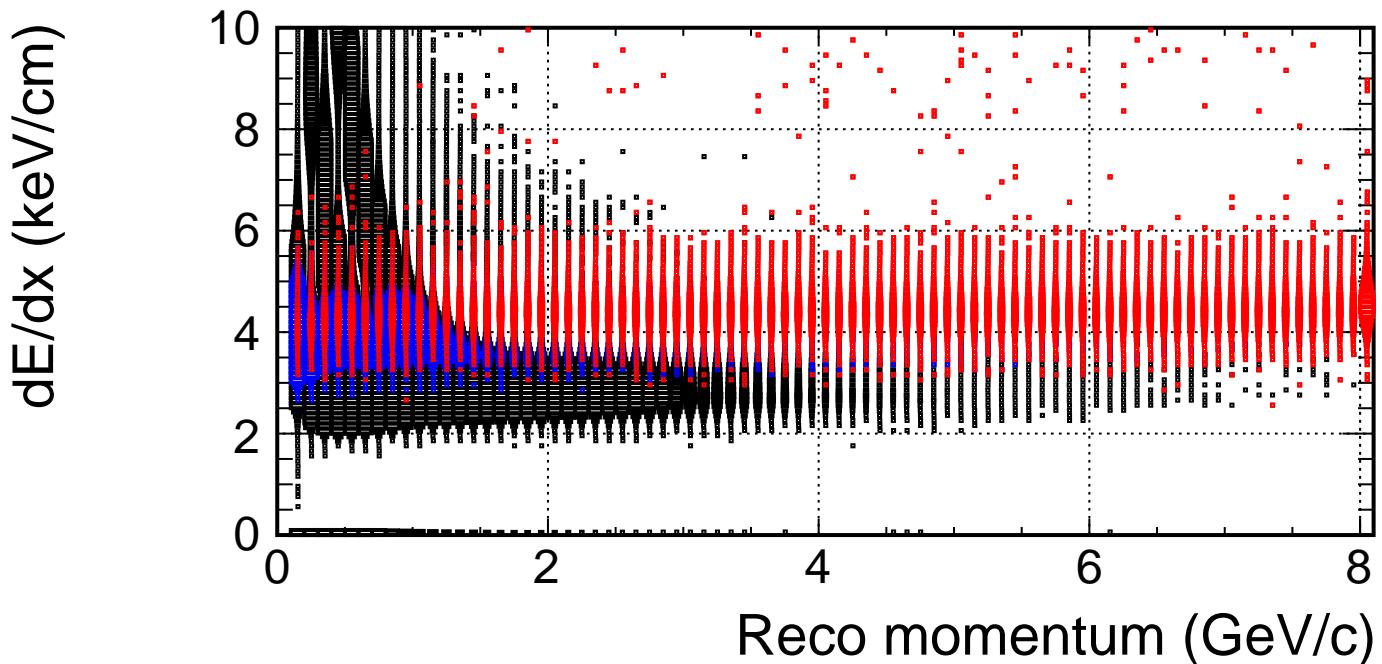
Projection of  $dE/dx$  for each p bin

e-  
— (MATCHED, geantid=3)

e-  
— (PRIMARY,  $|\eta \sigma_e| < 2$  TPC)

Mean/ $\sigma$  of dE/dx vs momentum

## dE/dx vs momentum (Embedding:e-, Real:e-)

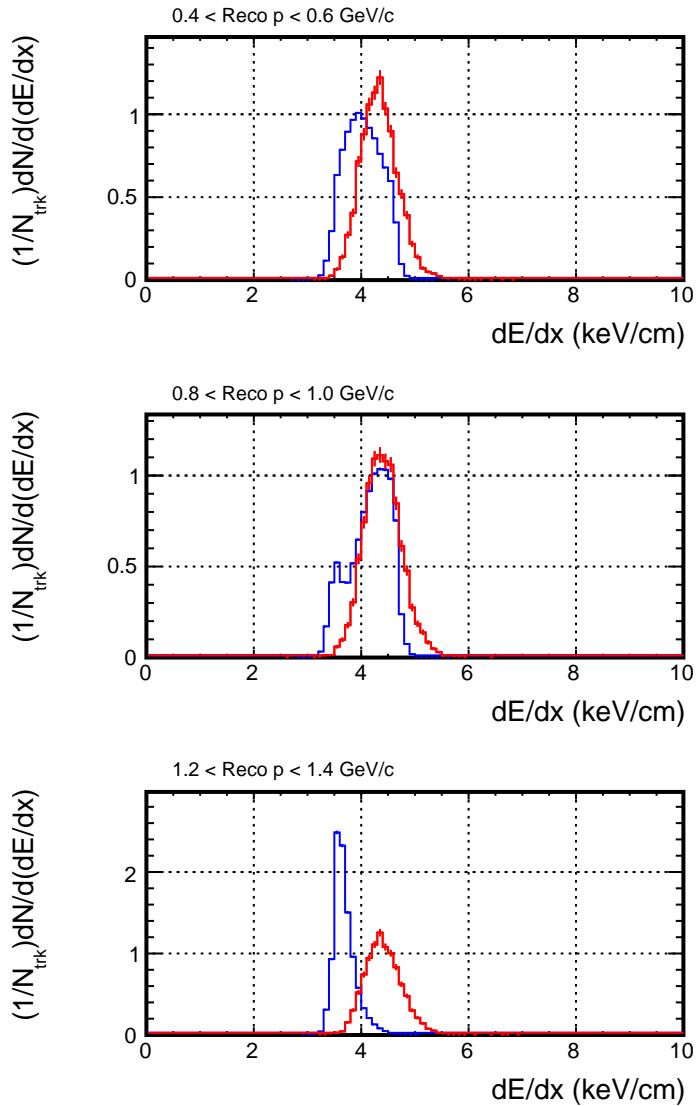
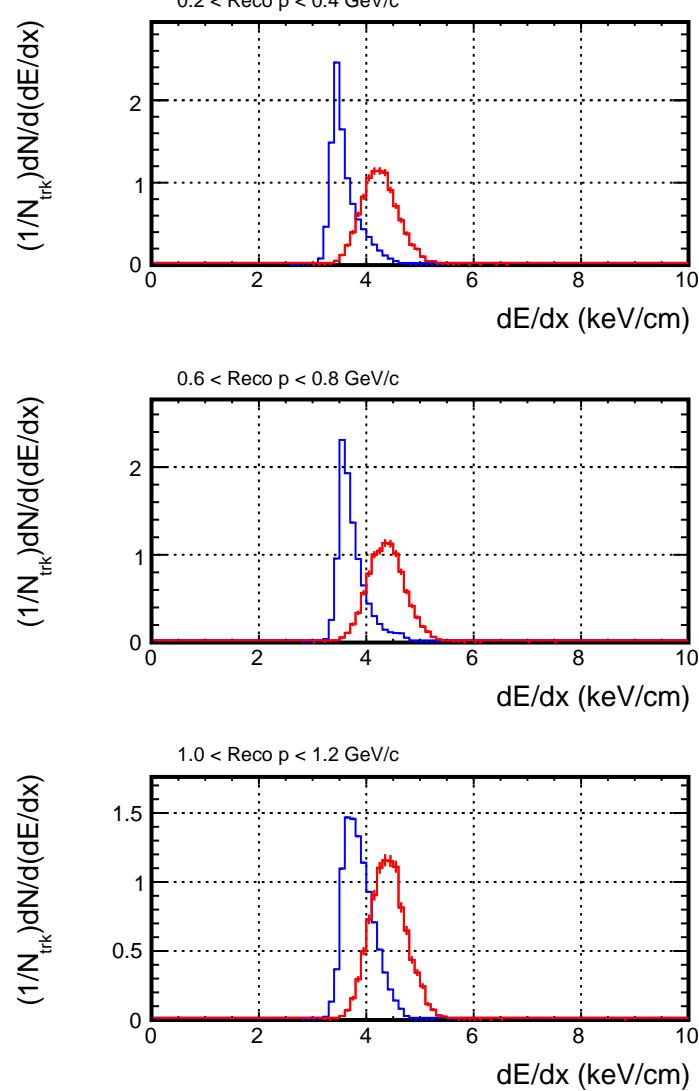


— e- (MATCHED, geantid=3)

— Real data

— Real data with PID cut ( $\sigma < 2$ ) TPC

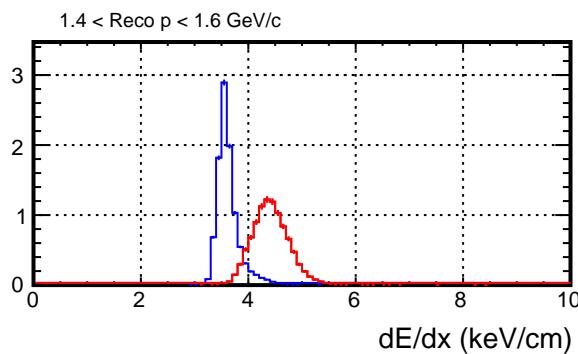
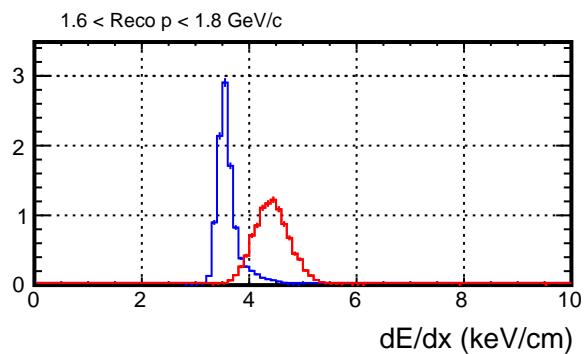
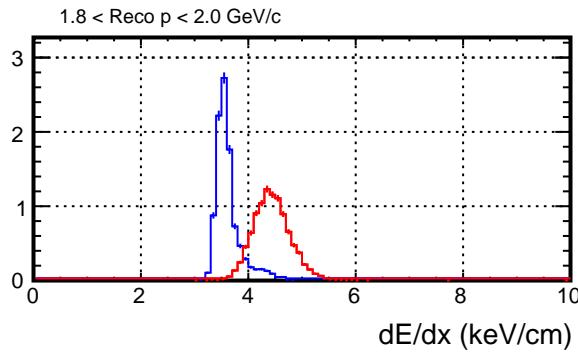
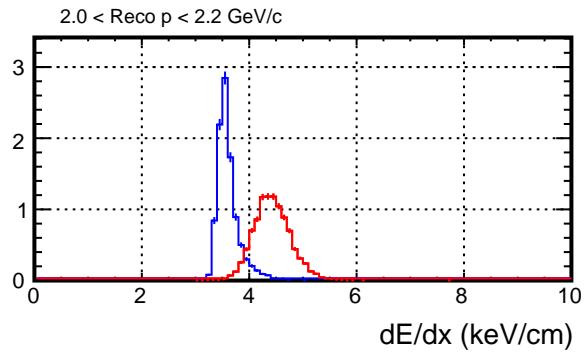
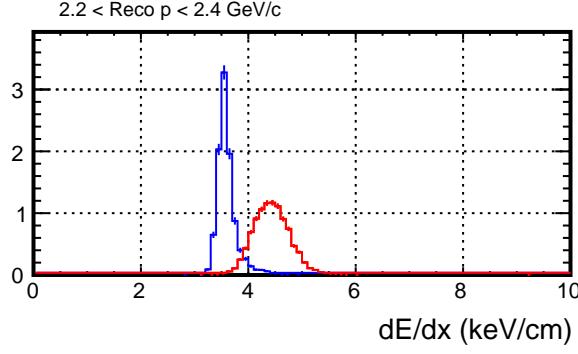
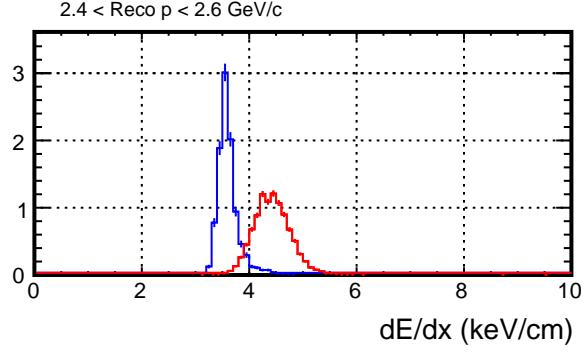
## Projection of dE/dx for each p bin



e-  
(MATCHED, geantid=3)

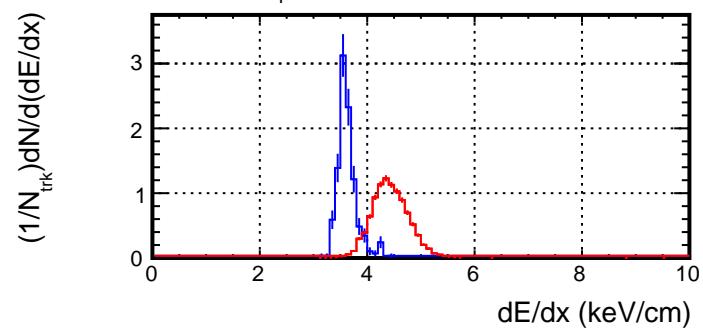
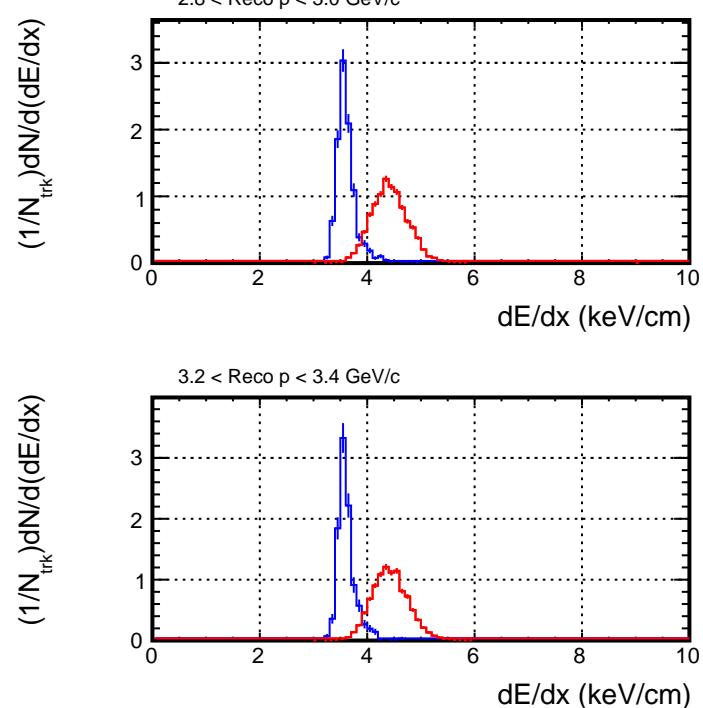
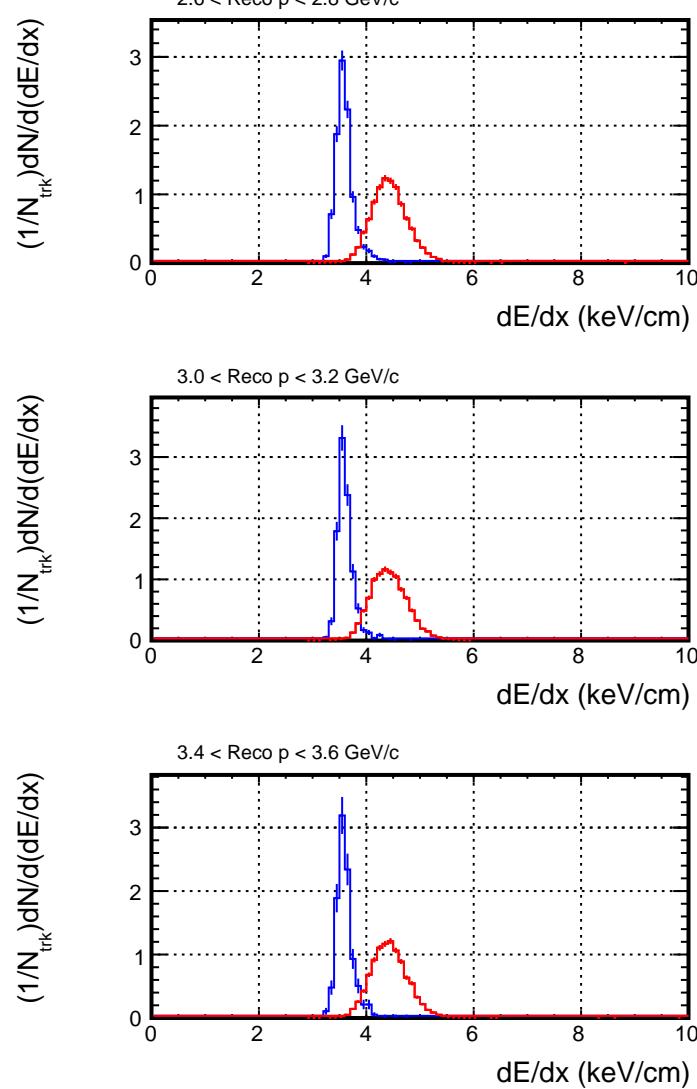
e-  
(PRIMARY, | $n \sigma_e| < 2$  TPC)

## Projection of dE/dx for each p bin

 $(1/N_{\text{trk}})dN/d(dE/dx)$  $(1/N_{\text{trk}})dN/d(dE/dx)$  $(1/N_{\text{trk}})dN/d(dE/dx)$  $(1/N_{\text{trk}})dN/d(dE/dx)$  $(1/N_{\text{trk}})dN/d(dE/dx)$  $(1/N_{\text{trk}})dN/d(dE/dx)$ 

- e-  
(MATCHED, geantid=3)
- e-  
(PRIMARY,  $|\eta \sigma_e| < 2$  TPC)

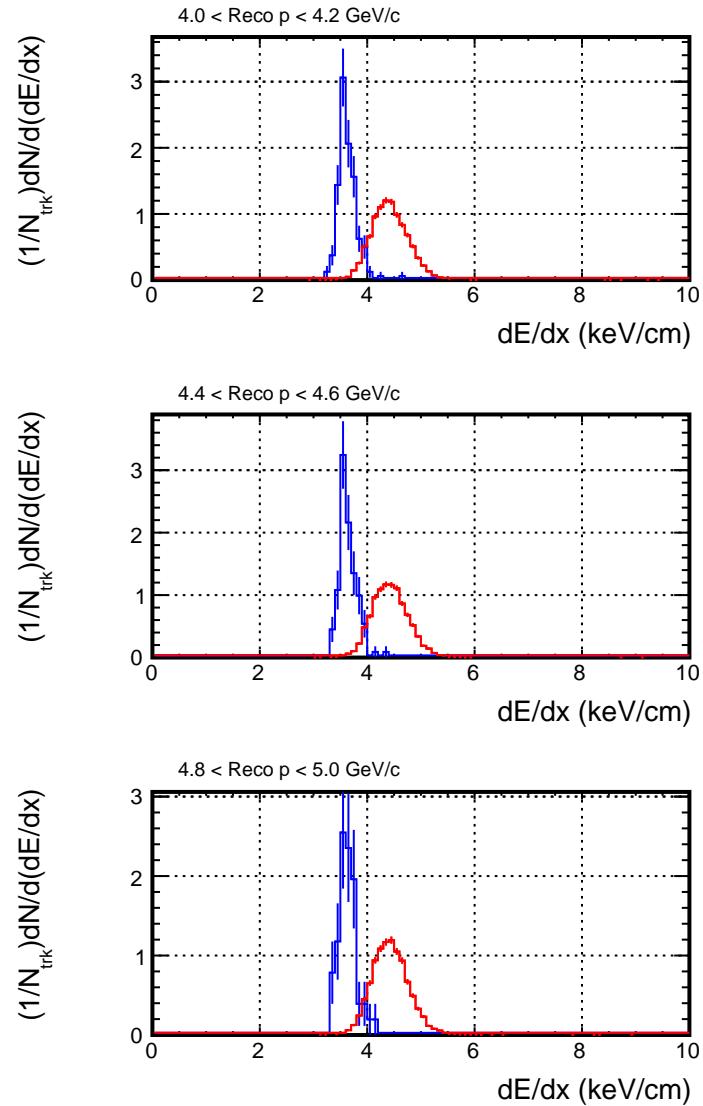
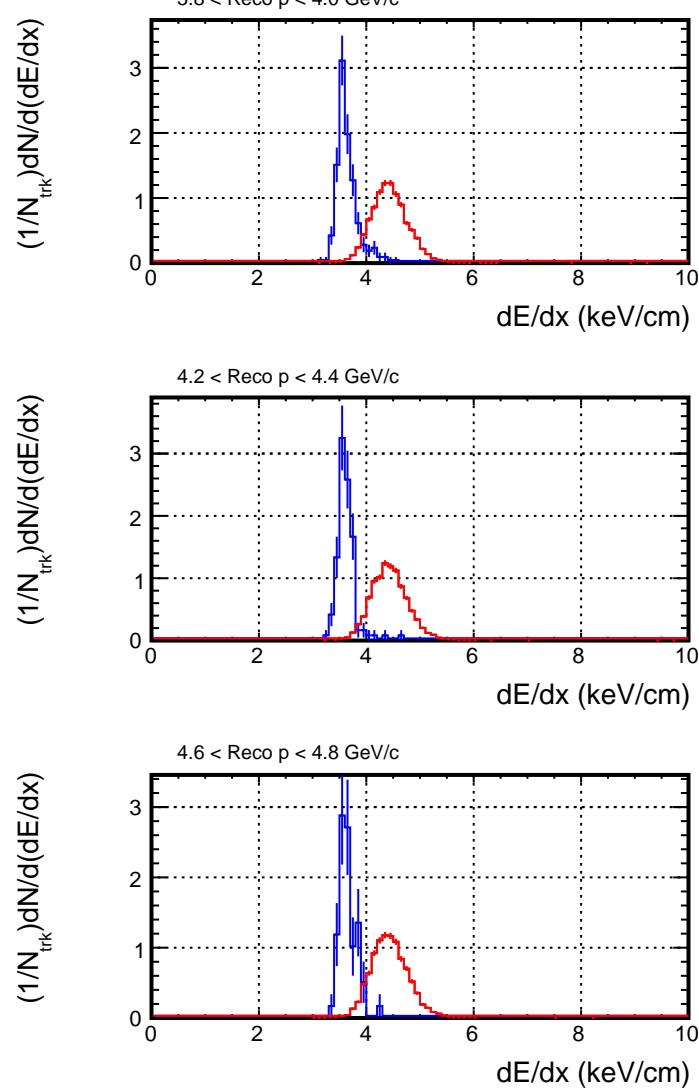
## Projection of dE/dx for each p bin



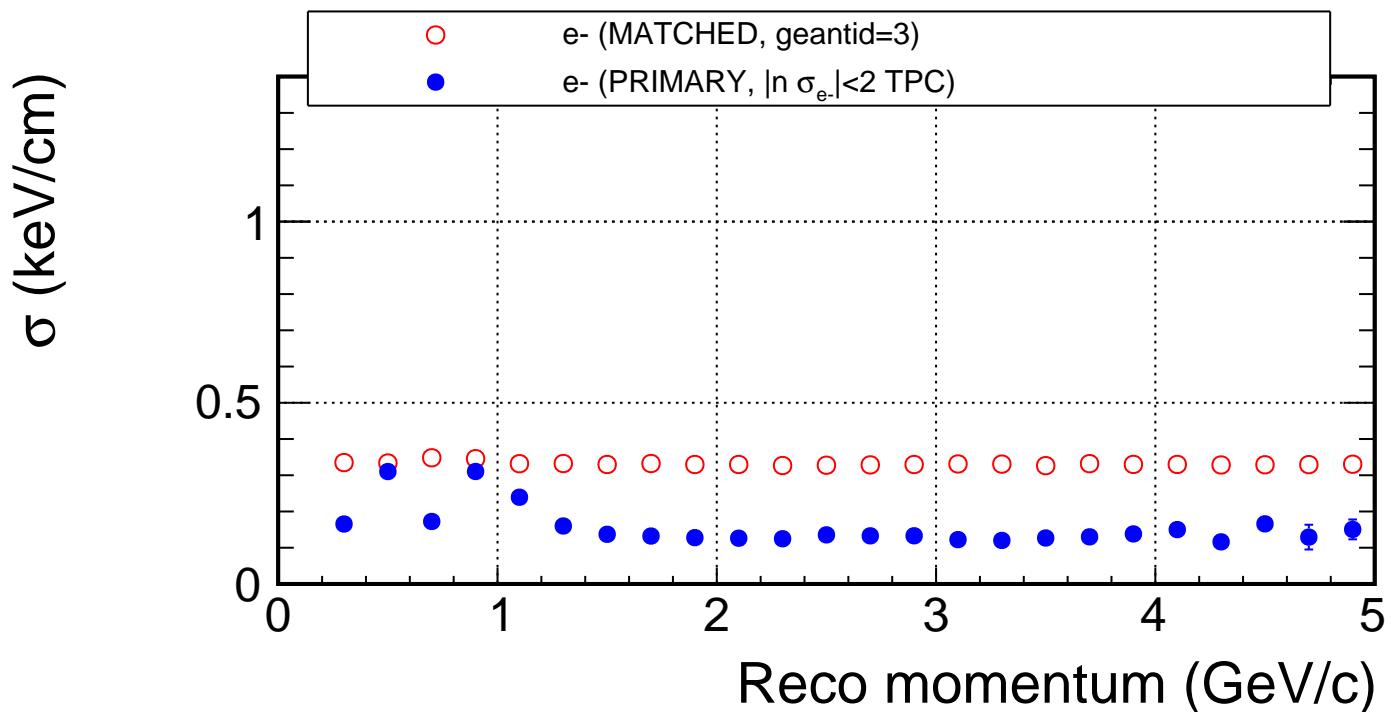
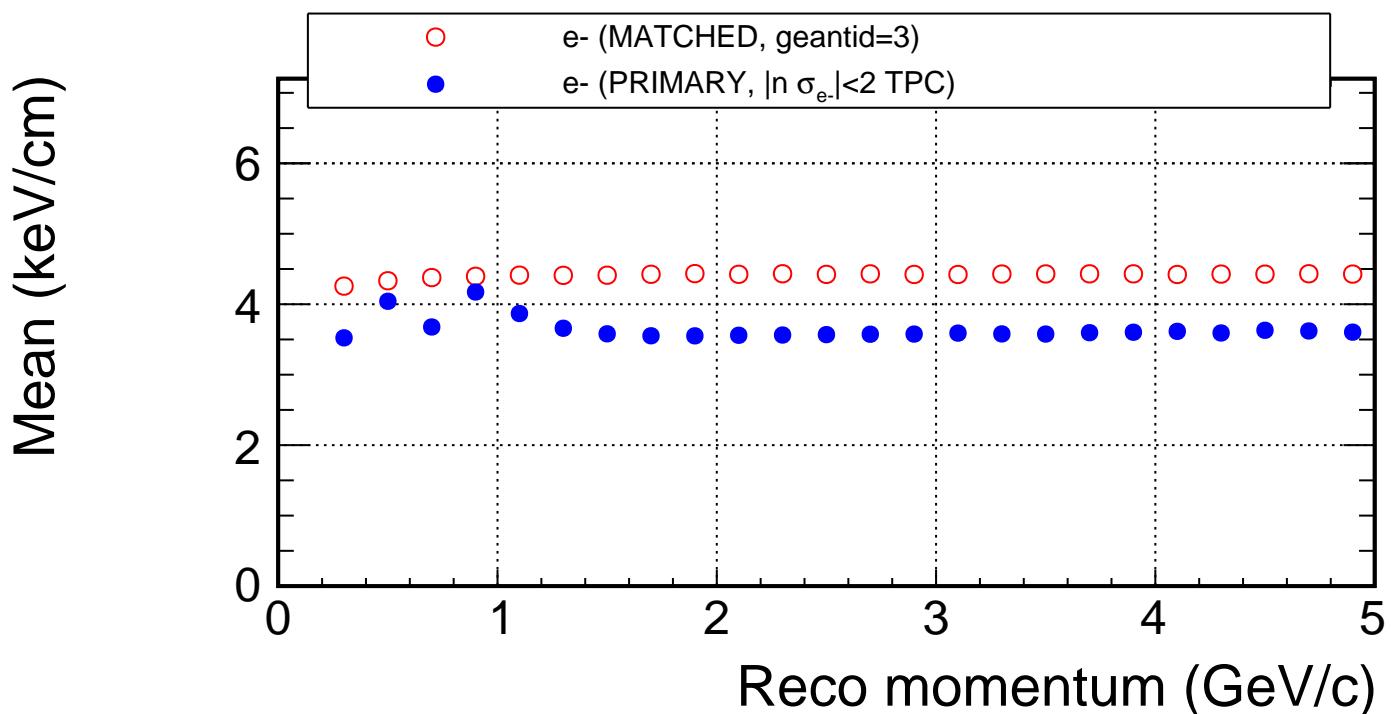
e-  
(MATCHED, geantid=3)

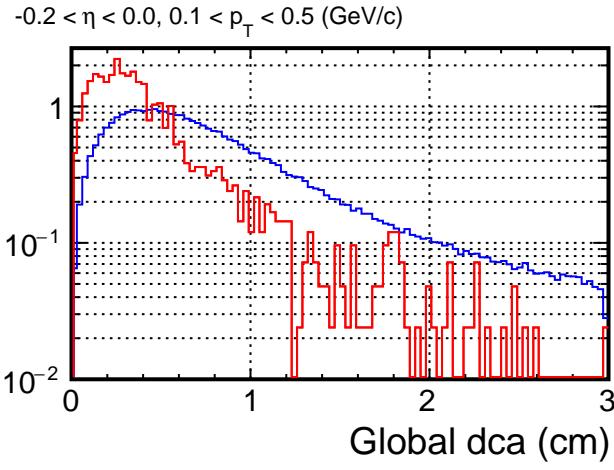
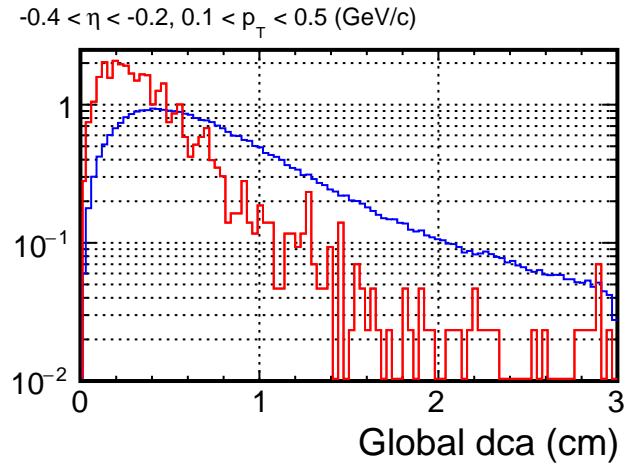
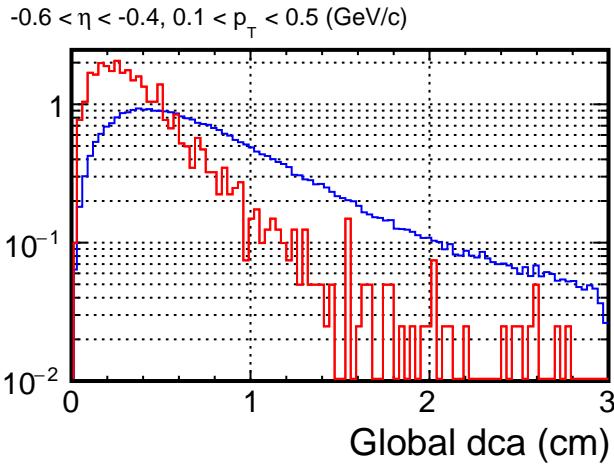
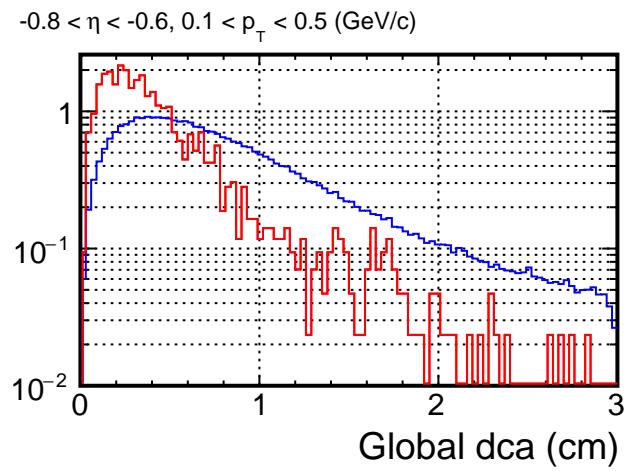
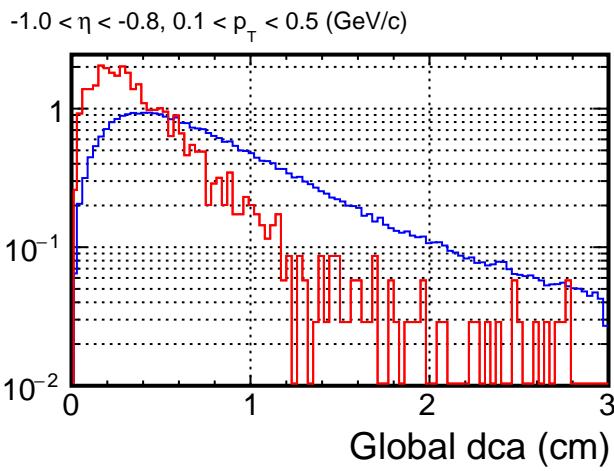
e-  
(PRIMARY,  $|\eta \sigma_e| < 2$  TPC)

## Projection of dE/dx for each p bin



e-  
— (MATCHED, geantid=3)  
e-  
— (PRIMARY,  $|n \sigma_e| < 2$  TPC)

Mean/ $\sigma$  of dE/dx vs momentum

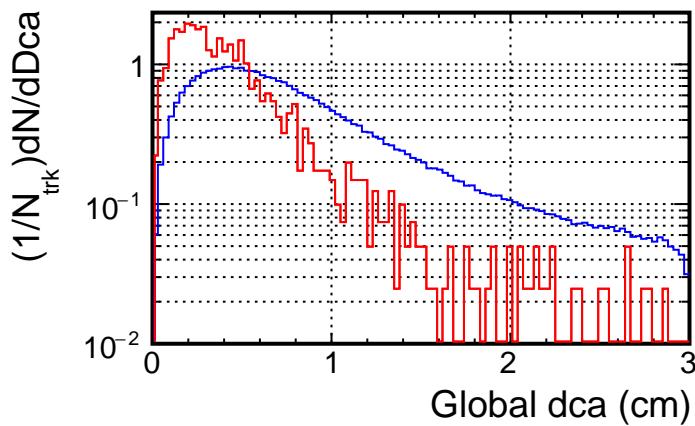
Dca distribution for ( $p_T$ ,  $\eta$ ) slices

e-  
(MATCHED, geantid=3)

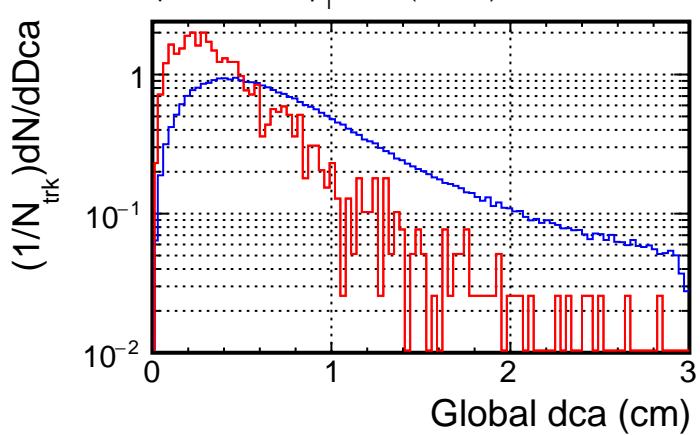
e-  
(PRIMARY,  $|n \sigma_{e^-}| < 2$  TPC)

## Dca distribution for ( $p_T$ , $\eta$ ) slices

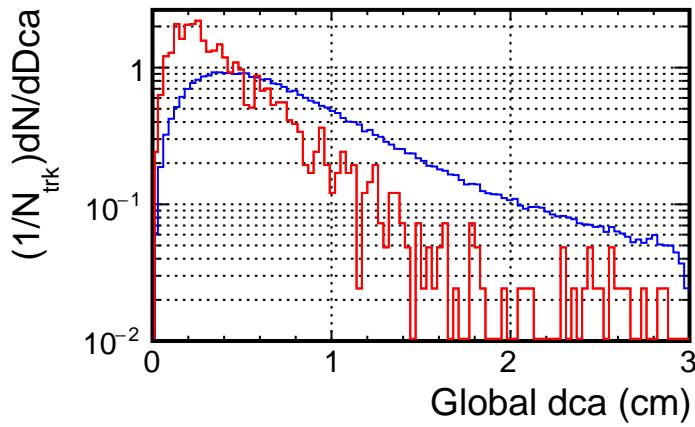
$0.0 < \eta < 0.2, 0.1 < p_T < 0.5$  (GeV/c)



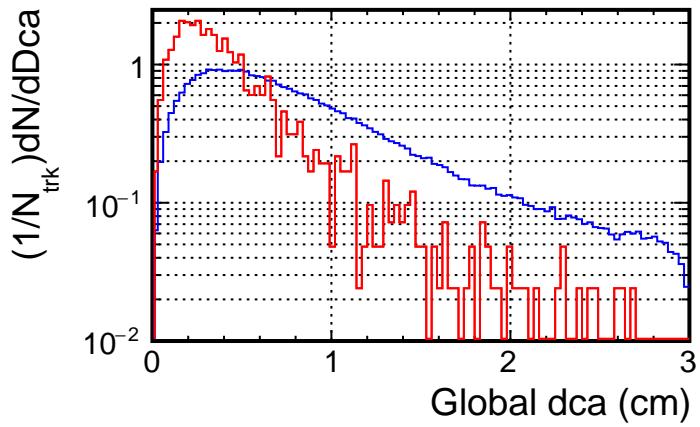
$0.2 < \eta < 0.4, 0.1 < p_T < 0.5$  (GeV/c)



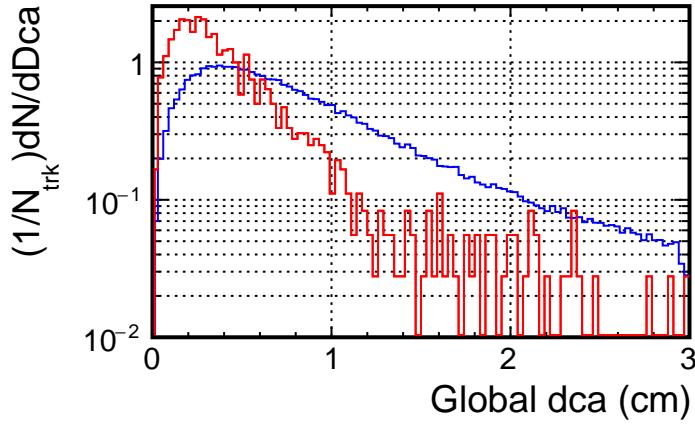
$0.4 < \eta < 0.6, 0.1 < p_T < 0.5$  (GeV/c)



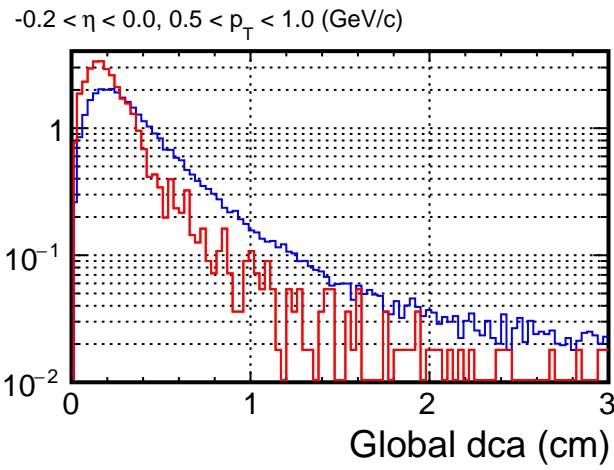
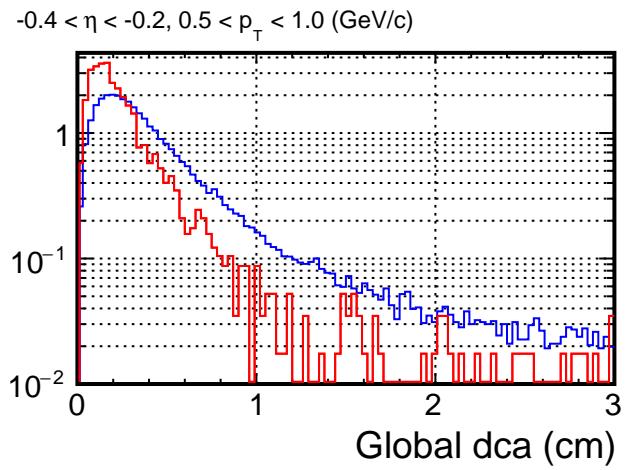
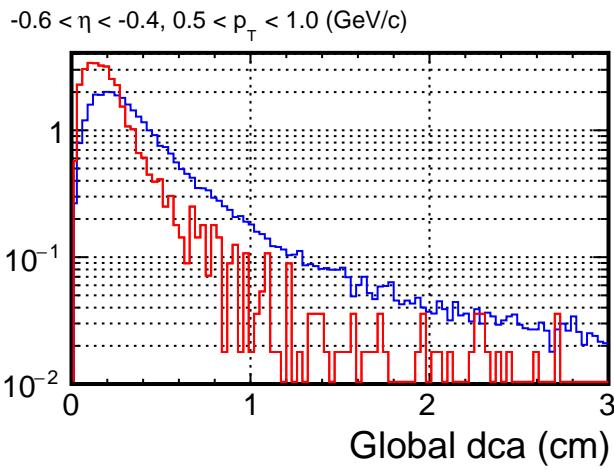
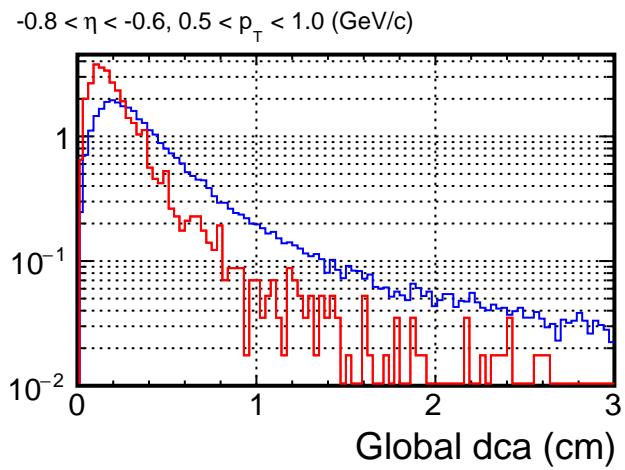
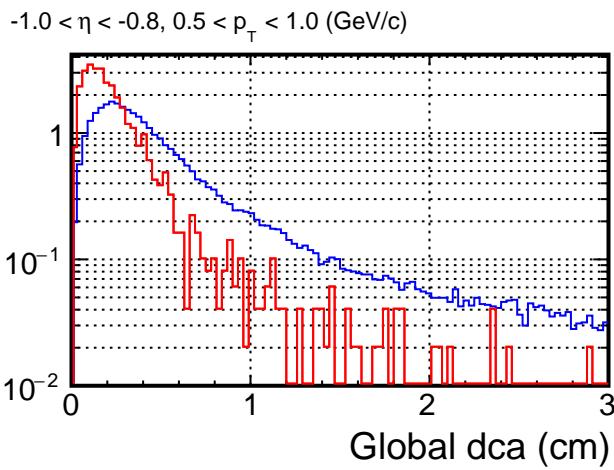
$0.6 < \eta < 0.8, 0.1 < p_T < 0.5$  (GeV/c)



$0.8 < \eta < 1.0, 0.1 < p_T < 0.5$  (GeV/c)



— e-  
 (MATCHED, geantid=3)  
  
— e-  
 (PRIMARY,  $|n\sigma_{e^-}| < 2$  TPC)

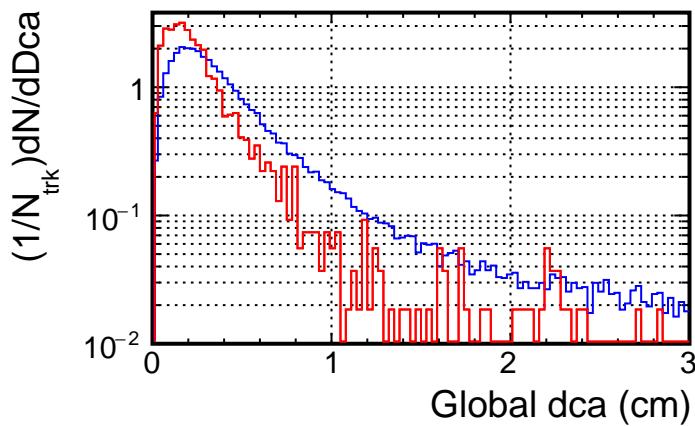
Dca distribution for ( $p_T$ ,  $\eta$ ) slices

e-  
(MATCHED, geantid=3)

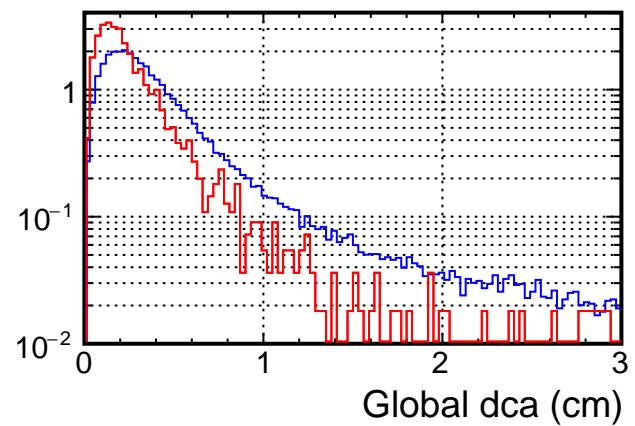
e-  
(PRIMARY,  $|n\sigma_{e^-}| < 2$  TPC)

## Dca distribution for ( $p_T$ , $\eta$ ) slices

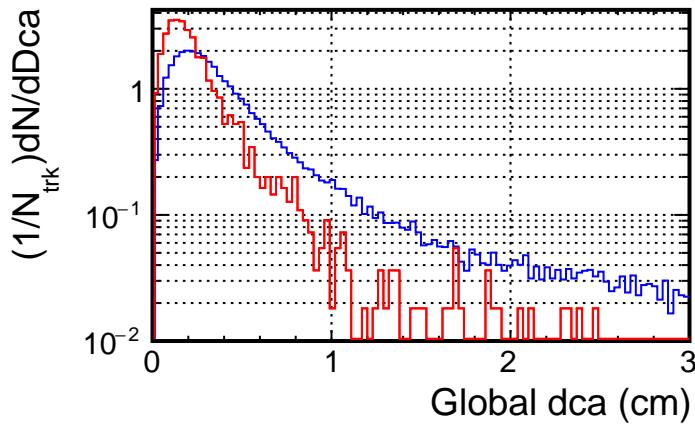
$0.0 < \eta < 0.2, 0.5 < p_T < 1.0$  (GeV/c)



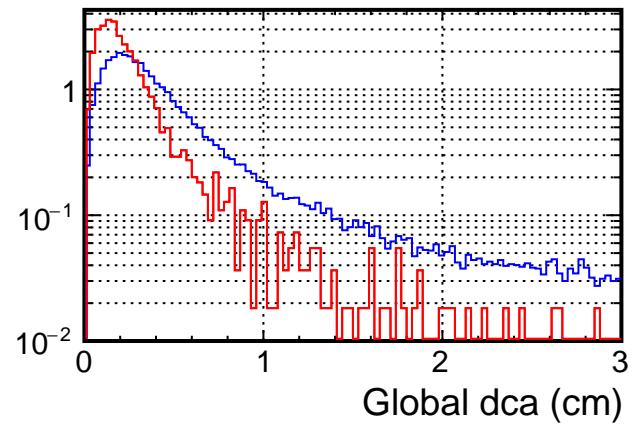
$0.2 < \eta < 0.4, 0.5 < p_T < 1.0$  (GeV/c)



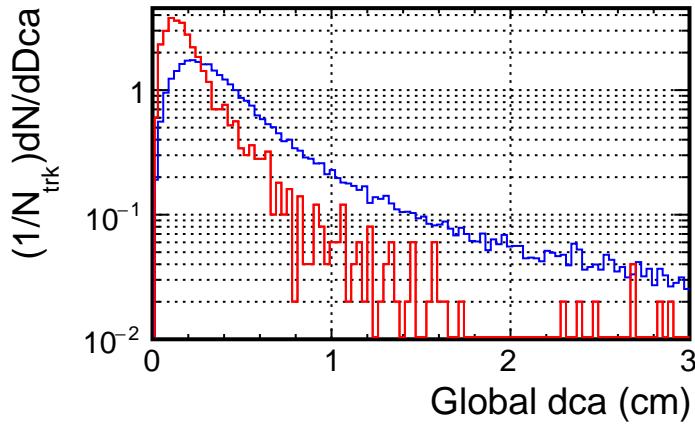
$0.4 < \eta < 0.6, 0.5 < p_T < 1.0$  (GeV/c)



$0.6 < \eta < 0.8, 0.5 < p_T < 1.0$  (GeV/c)

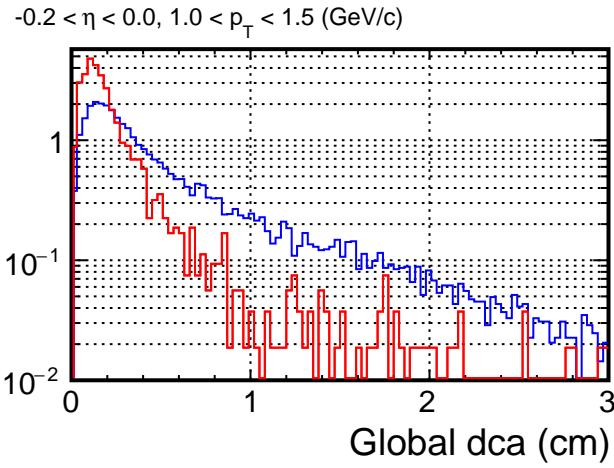
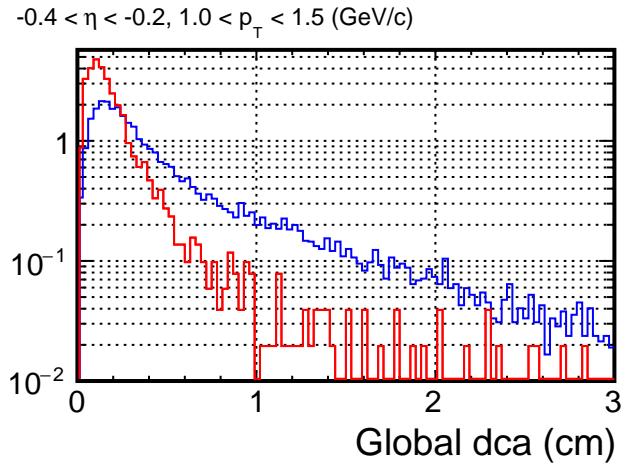
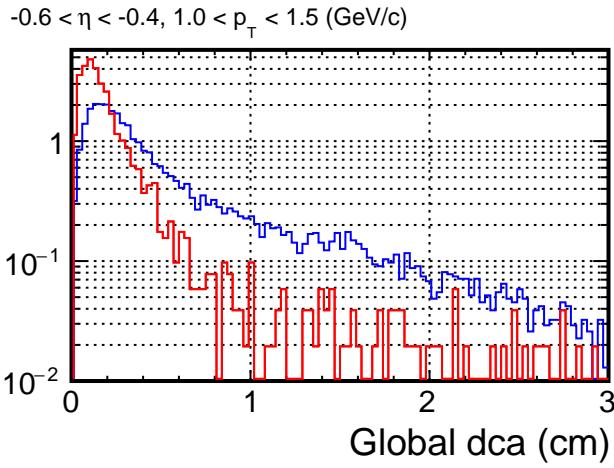
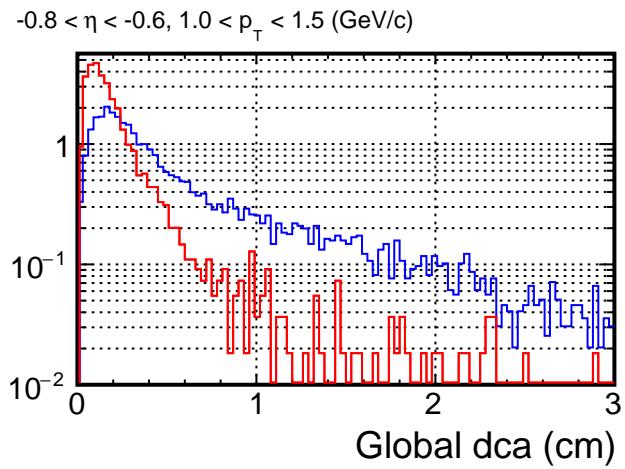
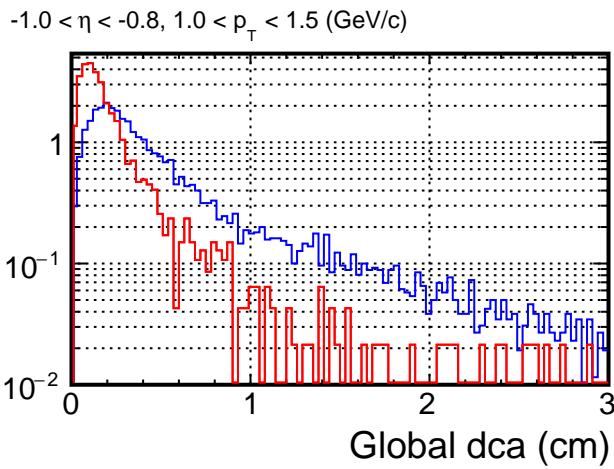


$0.8 < \eta < 1.0, 0.5 < p_T < 1.0$  (GeV/c)



e-  
(MATCHED, geantid=3)

e-  
(PRIMARY, | $n\sigma_{e^-}| < 2$  TPC)

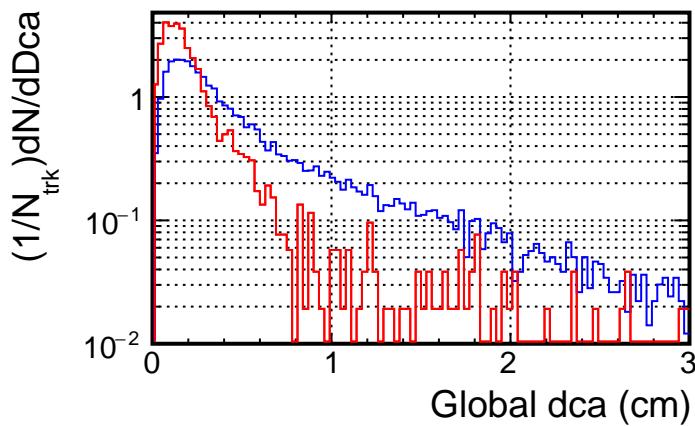
Dca distribution for ( $p_T$ ,  $\eta$ ) slices

e-  
(MATCHED, geantid=3)

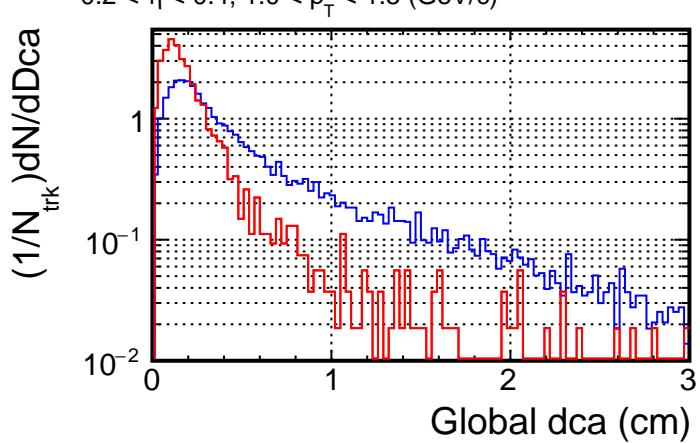
e-  
(PRIMARY,  $|n \sigma_{e^-}| < 2 \text{ TPC}$ )

## Dca distribution for ( $p_T$ , $\eta$ ) slices

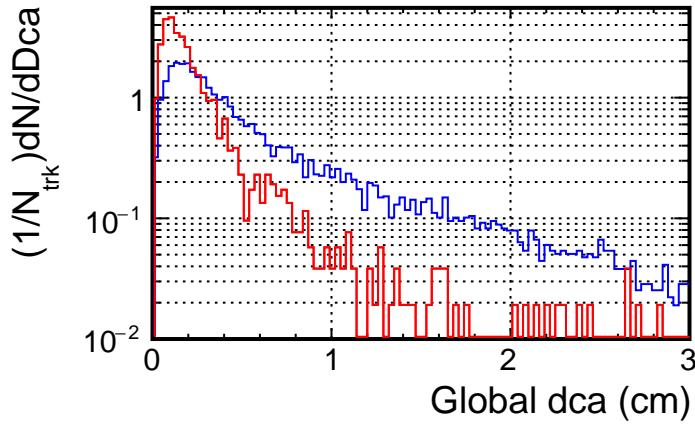
$0.0 < \eta < 0.2, 1.0 < p_T < 1.5 \text{ (GeV/c)}$



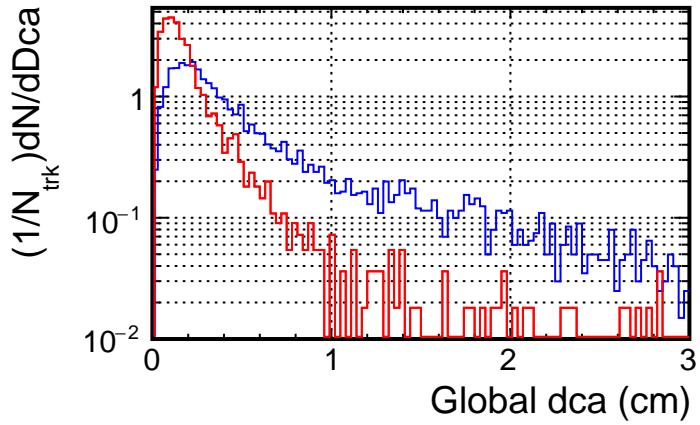
$0.2 < \eta < 0.4, 1.0 < p_T < 1.5 \text{ (GeV/c)}$



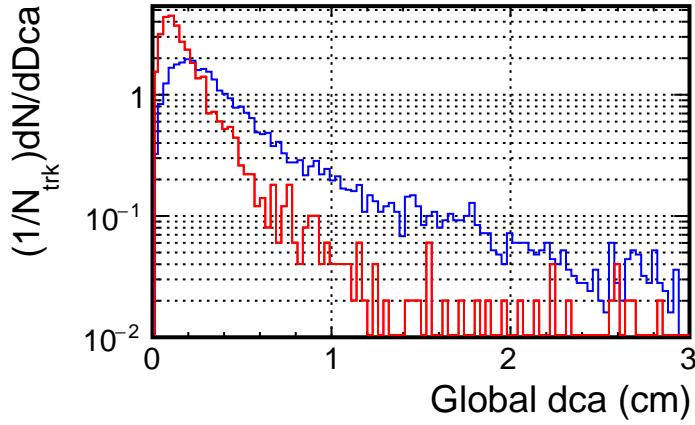
$0.4 < \eta < 0.6, 1.0 < p_T < 1.5 \text{ (GeV/c)}$



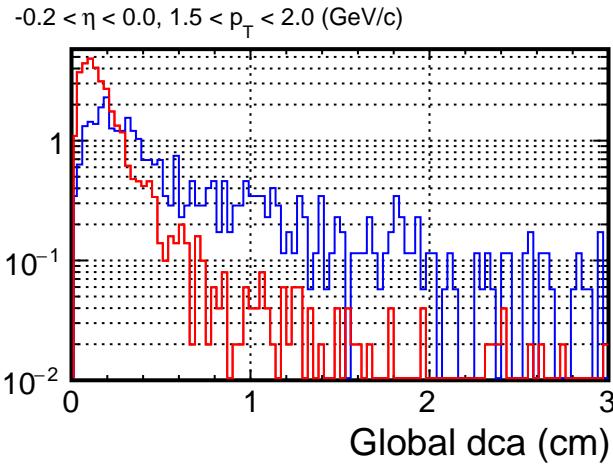
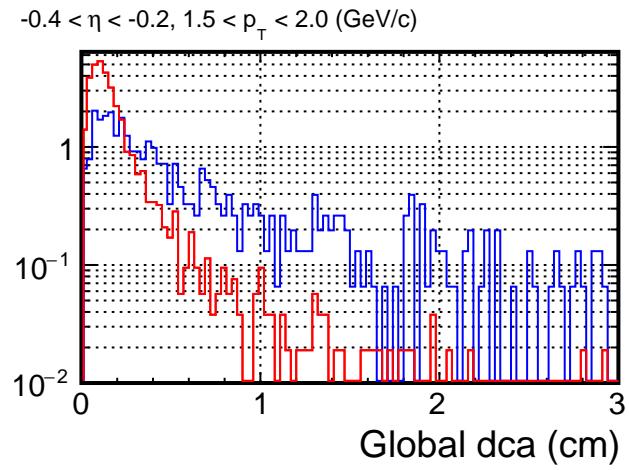
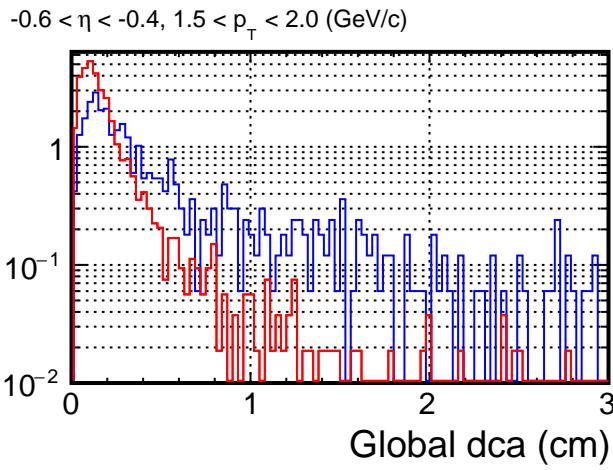
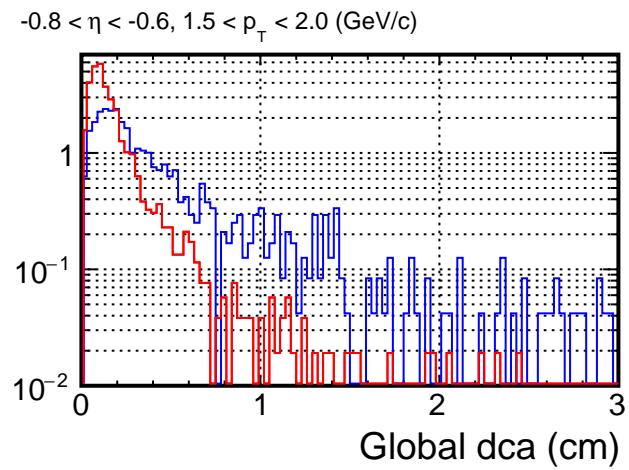
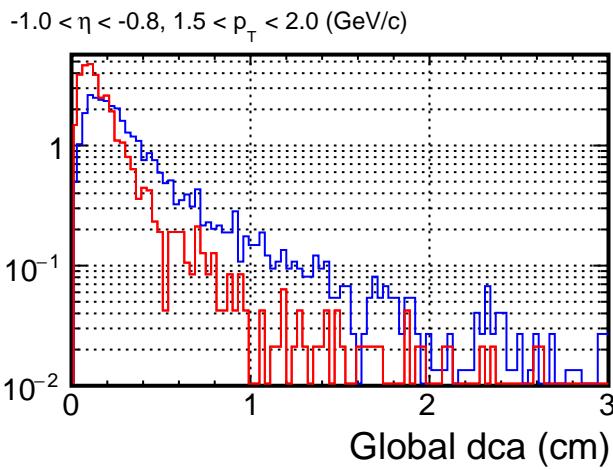
$0.6 < \eta < 0.8, 1.0 < p_T < 1.5 \text{ (GeV/c)}$



$0.8 < \eta < 1.0, 1.0 < p_T < 1.5 \text{ (GeV/c)}$



e-  
 (MATCHED, geantid=3)  
  
 e-  
 (PRIMARY,  $|\eta \sigma_{e^-}| < 2 \text{ TPC}$ )

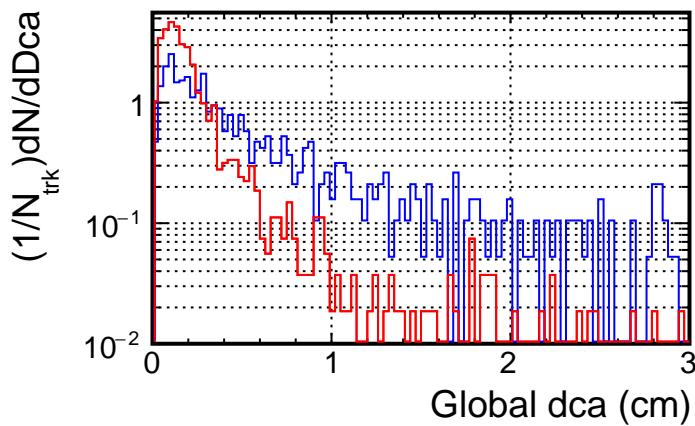
Dca distribution for ( $p_T$ ,  $\eta$ ) slices

e-  
(MATCHED, geantid=3)

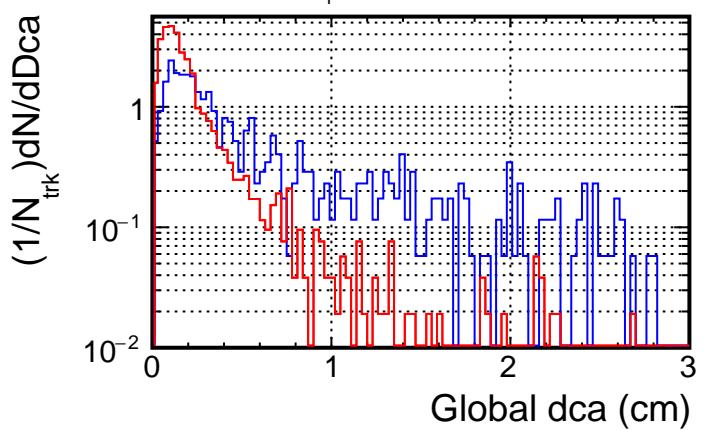
e-  
(PRIMARY, |n  $\sigma_{e^-}| < 2$  TPC)

## Dca distribution for ( $p_T$ , $\eta$ ) slices

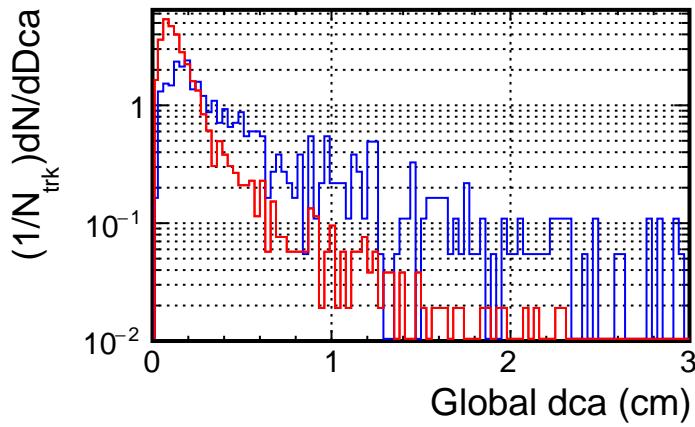
$0.0 < \eta < 0.2, 1.5 < p_T < 2.0$  (GeV/c)



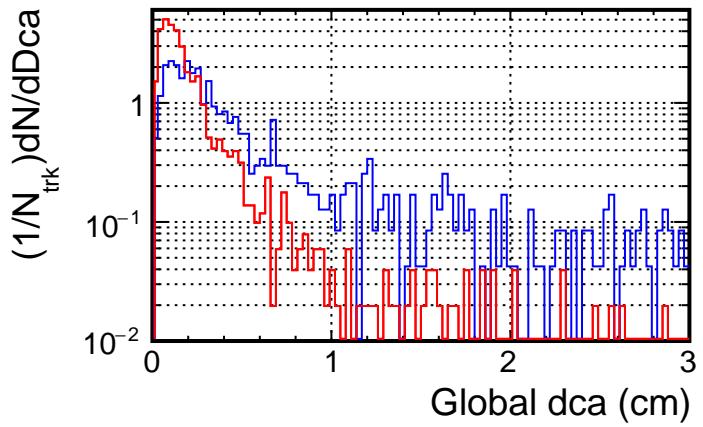
$0.2 < \eta < 0.4, 1.5 < p_T < 2.0$  (GeV/c)



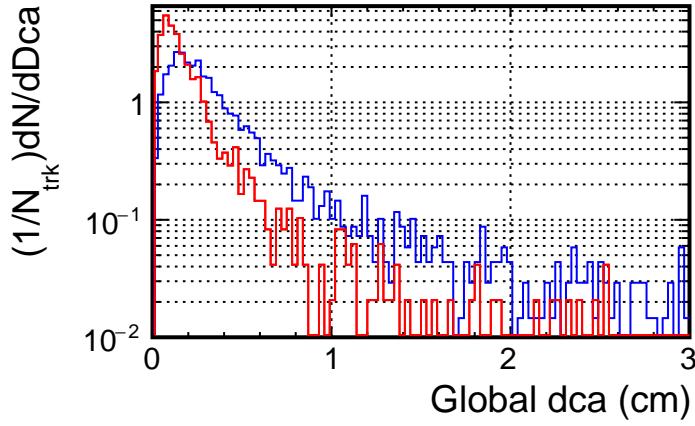
$0.4 < \eta < 0.6, 1.5 < p_T < 2.0$  (GeV/c)



$0.6 < \eta < 0.8, 1.5 < p_T < 2.0$  (GeV/c)

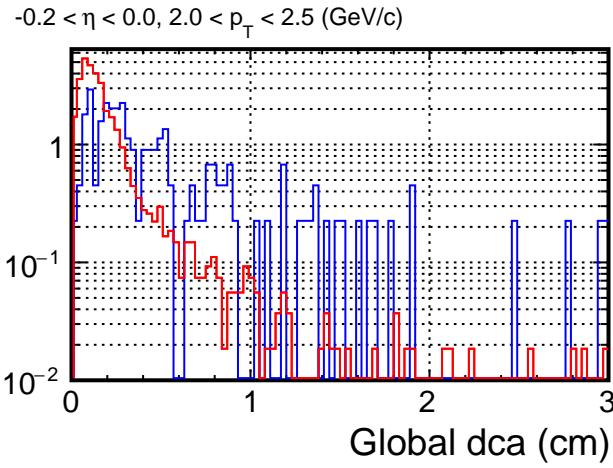
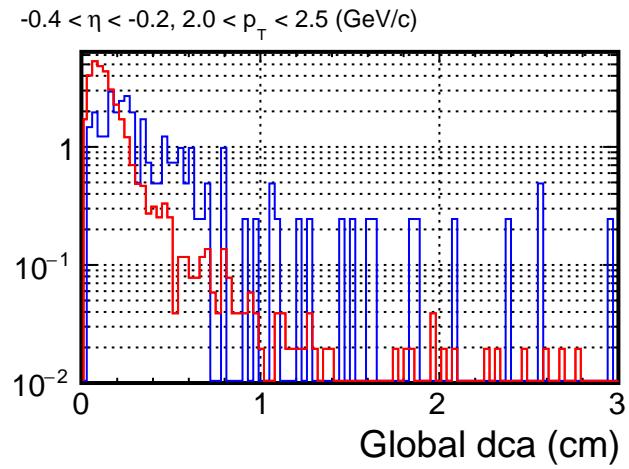
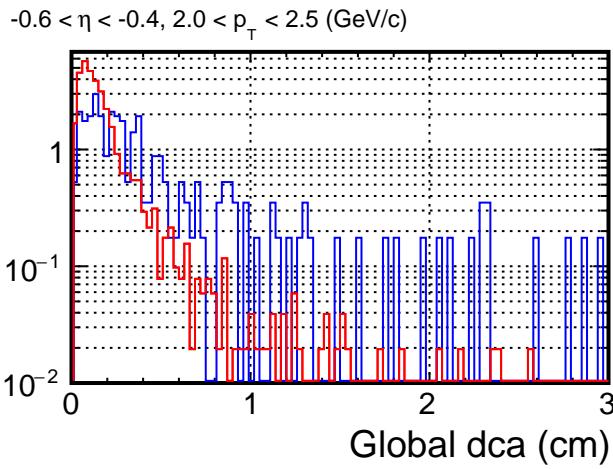
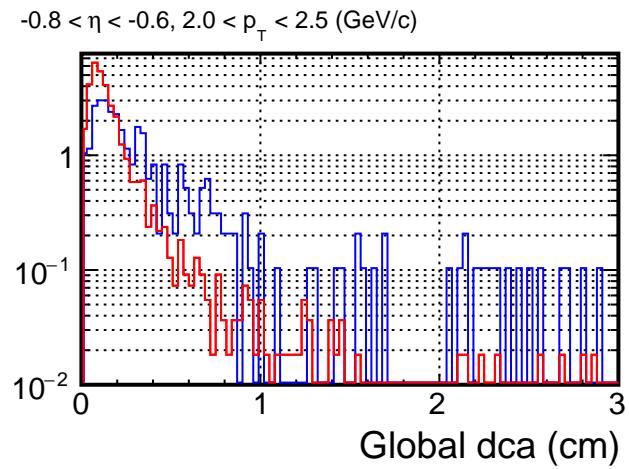
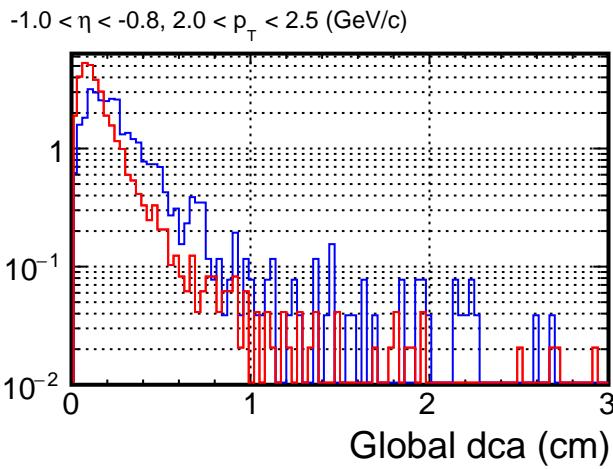


$0.8 < \eta < 1.0, 1.5 < p_T < 2.0$  (GeV/c)



e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|\eta| < 2$  TPC)

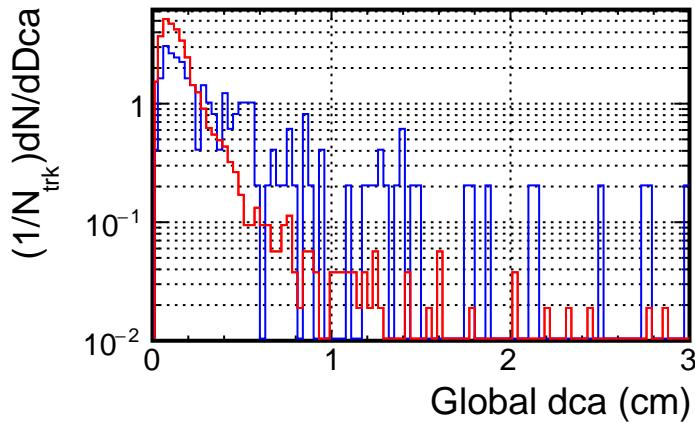
Dca distribution for ( $p_T$ ,  $\eta$ ) slices

e-  
(MATCHED, geantid=3)

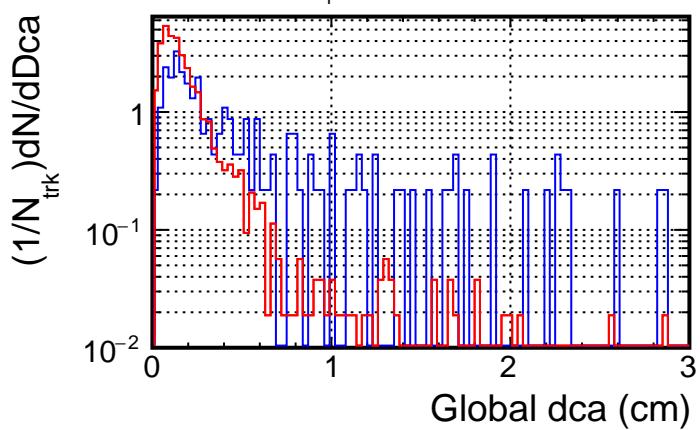
e-  
(PRIMARY,  $|\eta \sigma_{e^-}| < 2$  TPC)

## Dca distribution for ( $p_T$ , $\eta$ ) slices

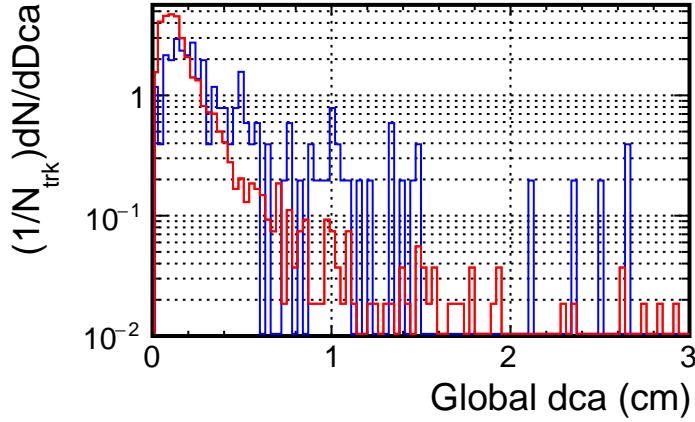
$0.0 < \eta < 0.2, 2.0 < p_T < 2.5$  (GeV/c)



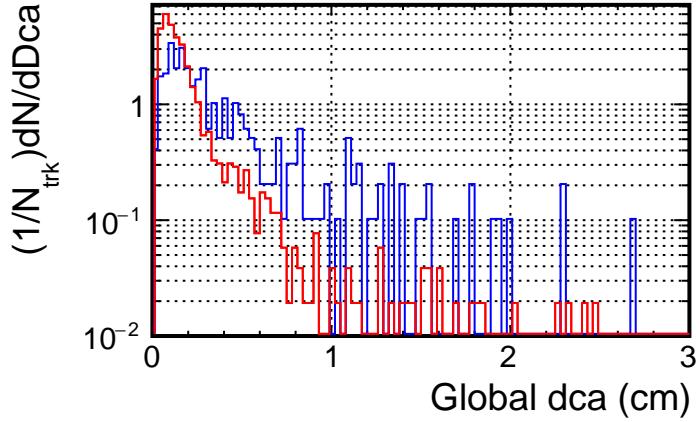
$0.2 < \eta < 0.4, 2.0 < p_T < 2.5$  (GeV/c)



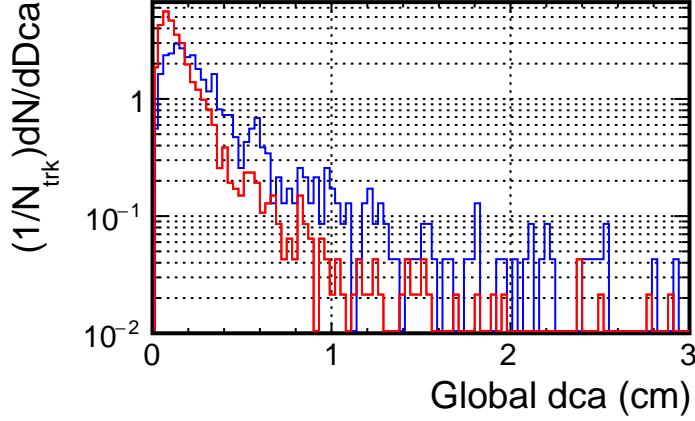
$0.4 < \eta < 0.6, 2.0 < p_T < 2.5$  (GeV/c)



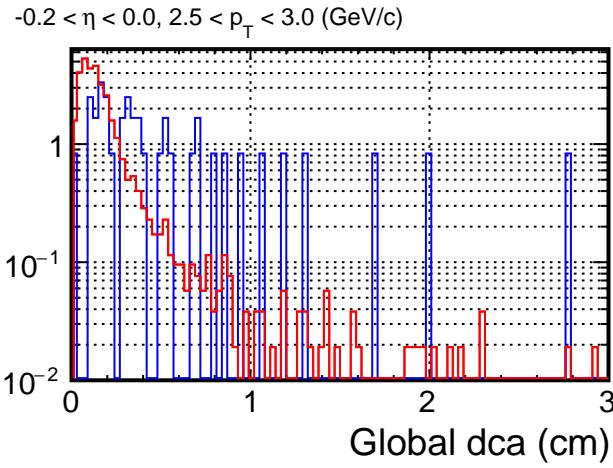
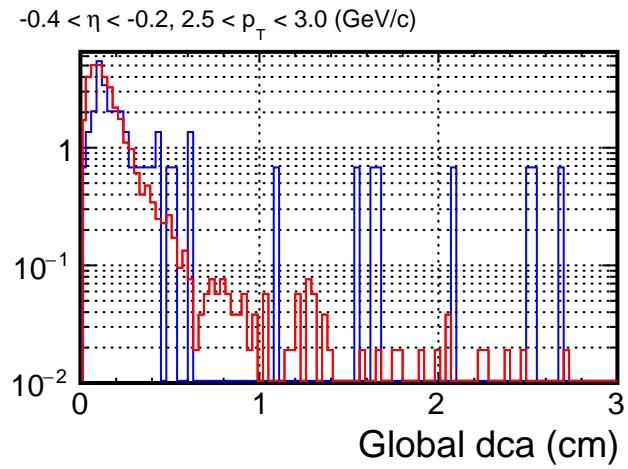
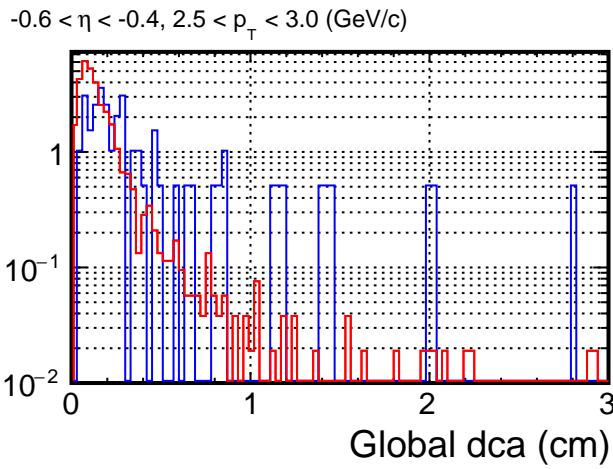
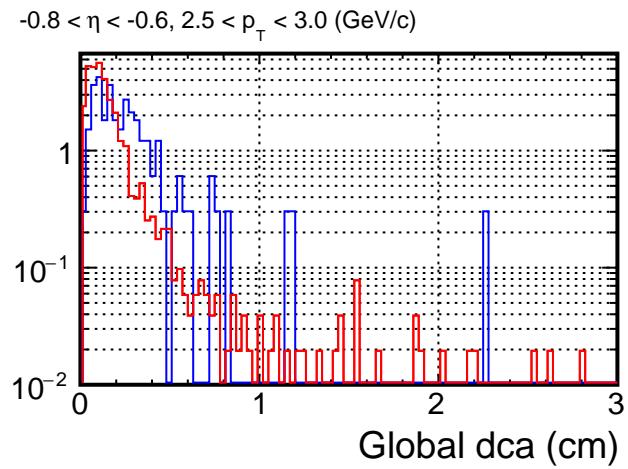
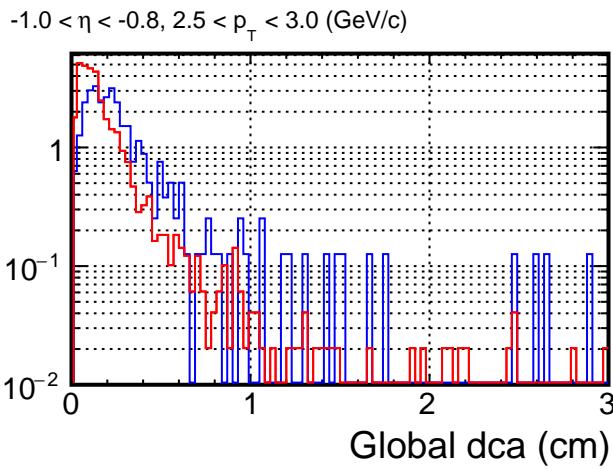
$0.6 < \eta < 0.8, 2.0 < p_T < 2.5$  (GeV/c)



$0.8 < \eta < 1.0, 2.0 < p_T < 2.5$  (GeV/c)



— e-  
(MATCHED, geantid=3)  
  
— e-  
(PRIMARY,  $|\eta| < 2$  TPC)

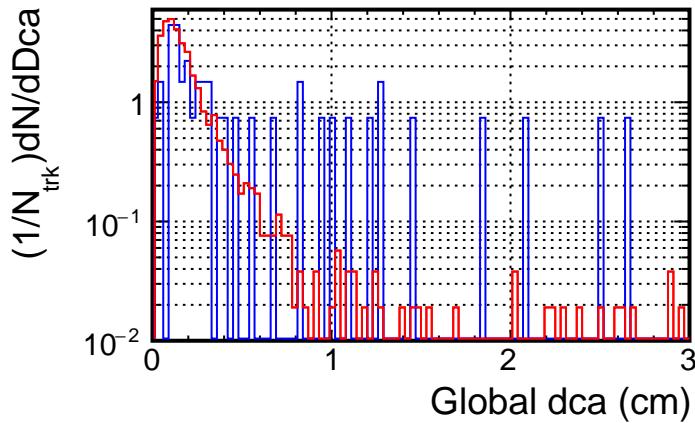
Dca distribution for ( $p_T$ ,  $\eta$ ) slices

e-  
(MATCHED, geantid=3)

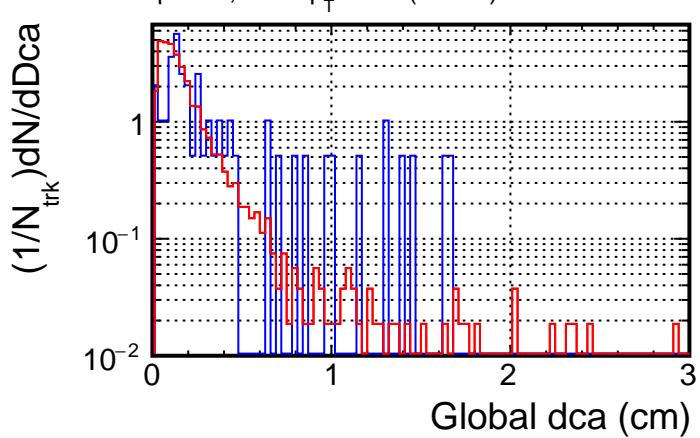
e-  
(PRIMARY,  $|n \sigma_{e^-}| < 2$  TPC)

## Dca distribution for ( $p_T$ , $\eta$ ) slices

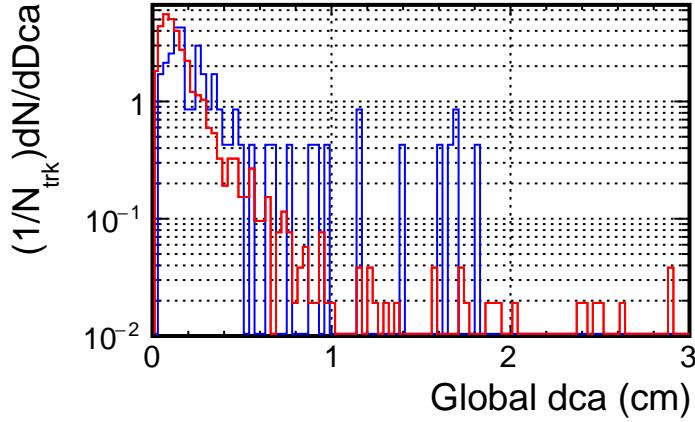
$0.0 < \eta < 0.2, 2.5 < p_T < 3.0$  (GeV/c)



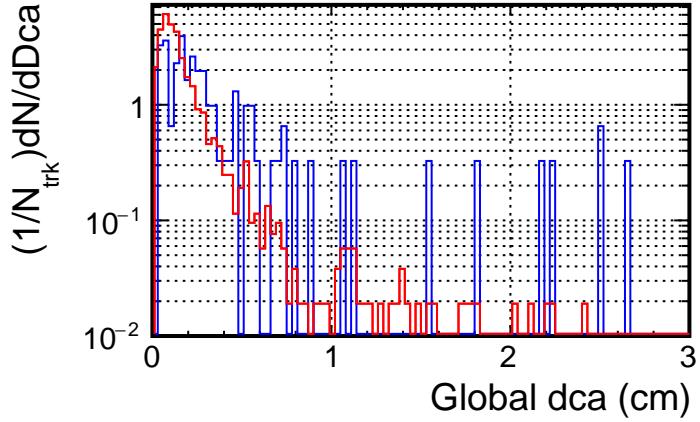
$0.2 < \eta < 0.4, 2.5 < p_T < 3.0$  (GeV/c)



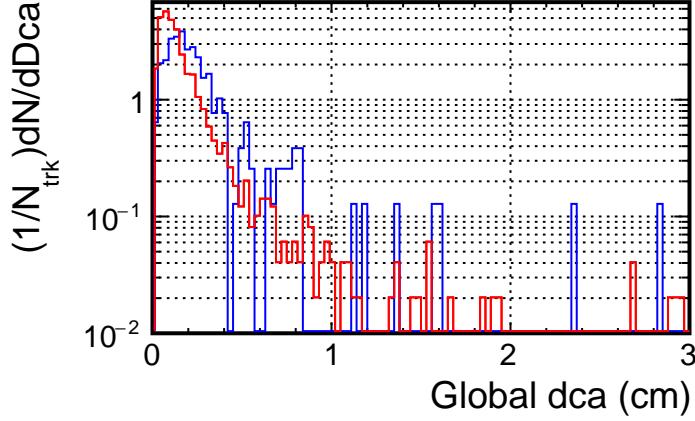
$0.4 < \eta < 0.6, 2.5 < p_T < 3.0$  (GeV/c)



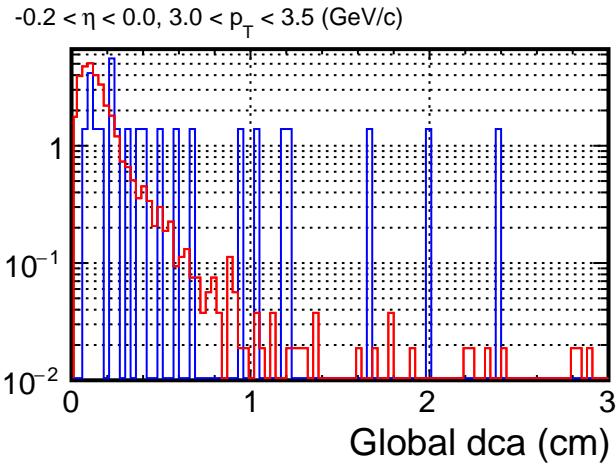
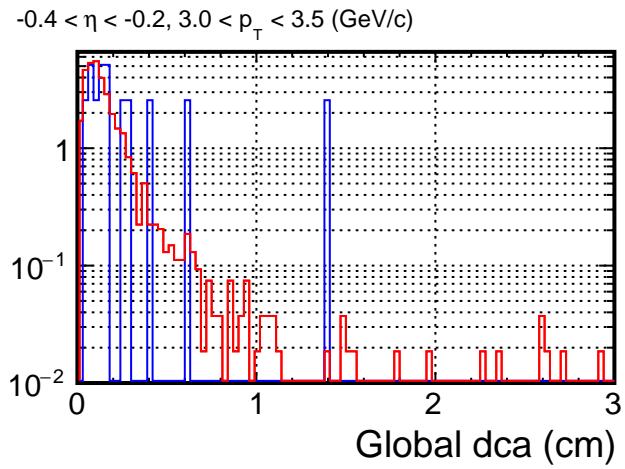
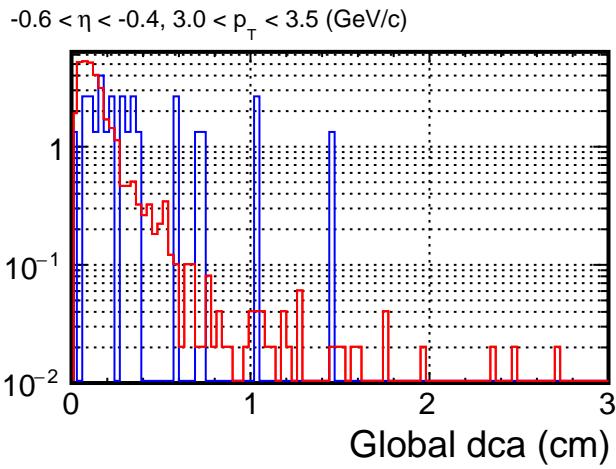
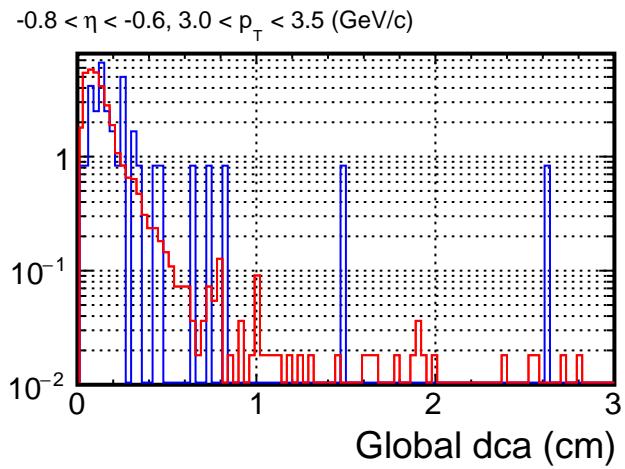
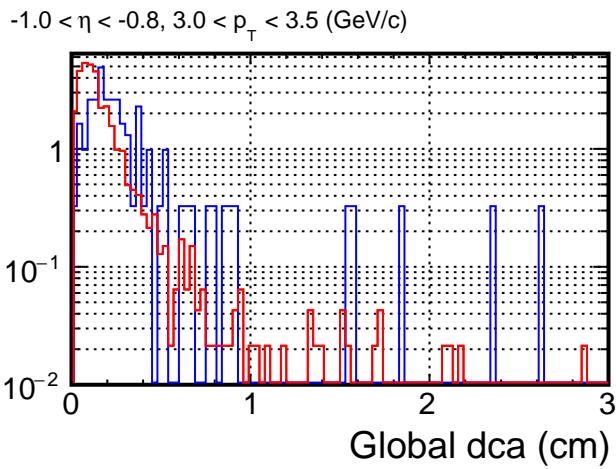
$0.6 < \eta < 0.8, 2.5 < p_T < 3.0$  (GeV/c)



$0.8 < \eta < 1.0, 2.5 < p_T < 3.0$  (GeV/c)



— e-  
(MATCHED, geantid=3)
  
— e-  
(PRIMARY,  $|\eta| < 2$  TPC)

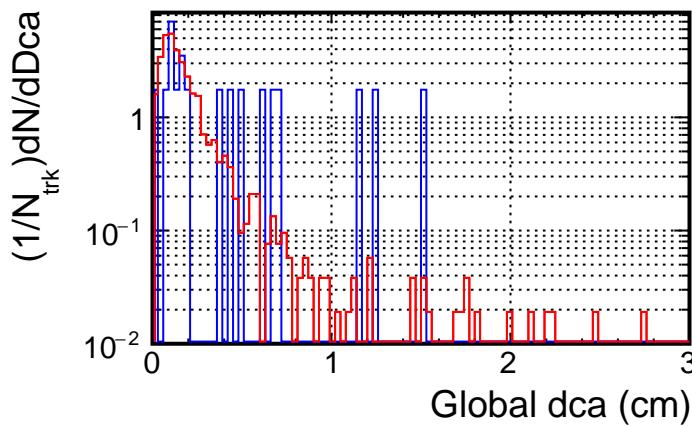
Dca distribution for ( $p_T$ ,  $\eta$ ) slices

e-  
(MATCHED, geantid=3)

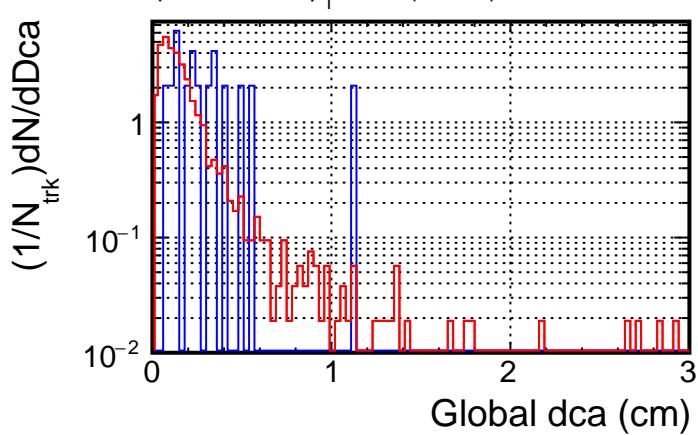
e-  
(PRIMARY,  $|\eta \sigma_{e^-}| < 2$  TPC)

## Dca distribution for ( $p_T$ , $\eta$ ) slices

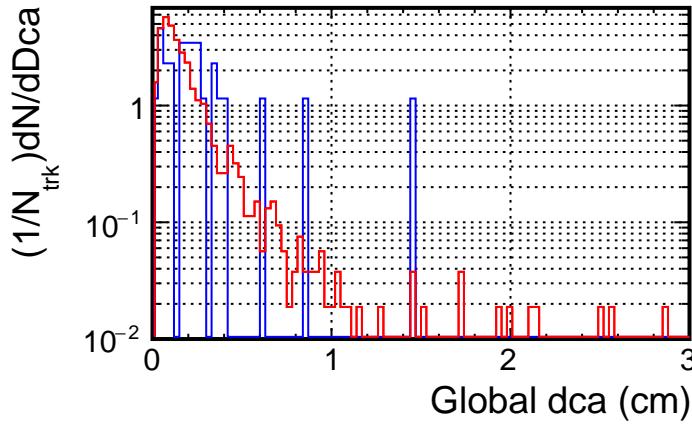
$0.0 < \eta < 0.2, 3.0 < p_T < 3.5$  (GeV/c)



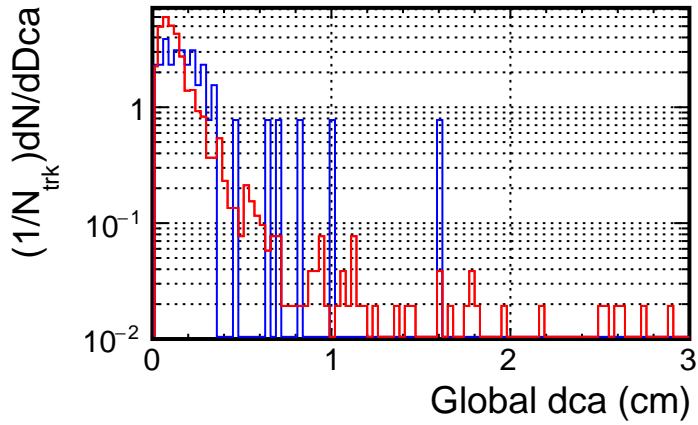
$0.2 < \eta < 0.4, 3.0 < p_T < 3.5$  (GeV/c)



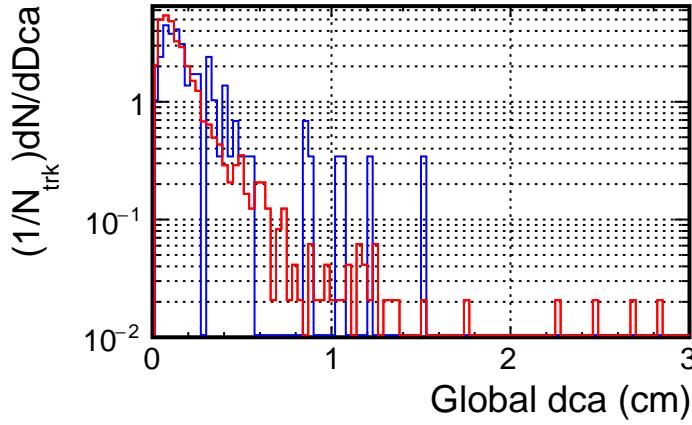
$0.4 < \eta < 0.6, 3.0 < p_T < 3.5$  (GeV/c)



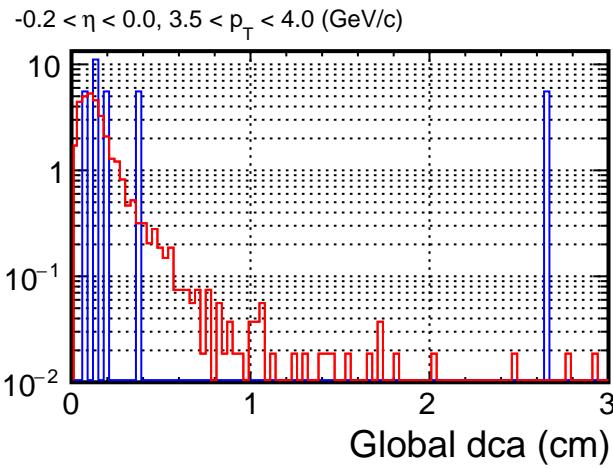
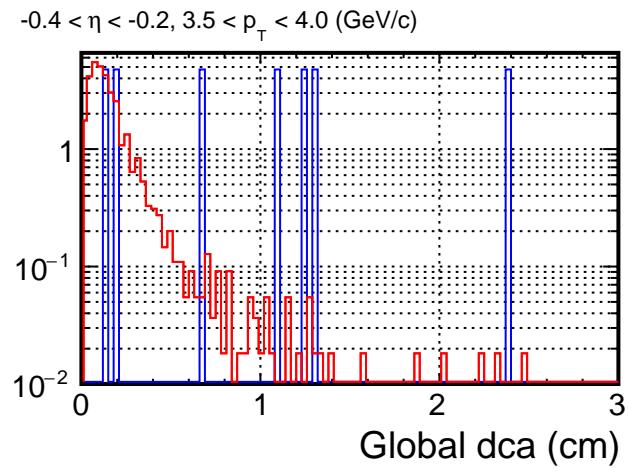
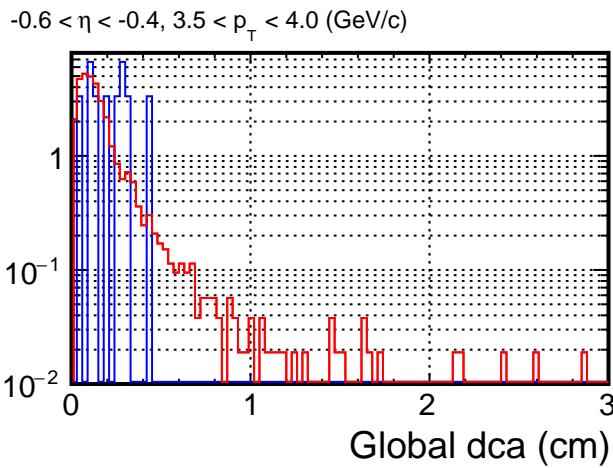
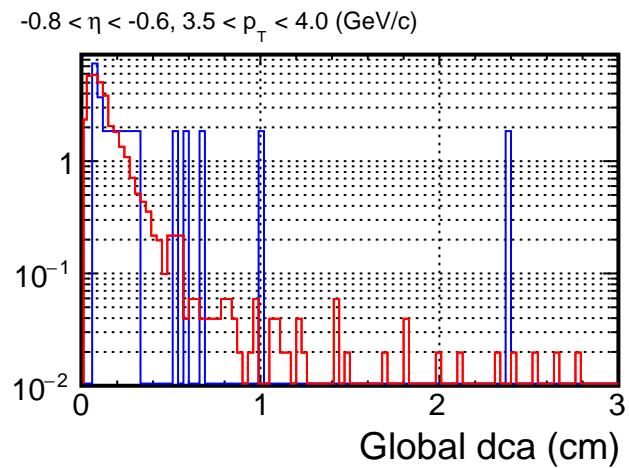
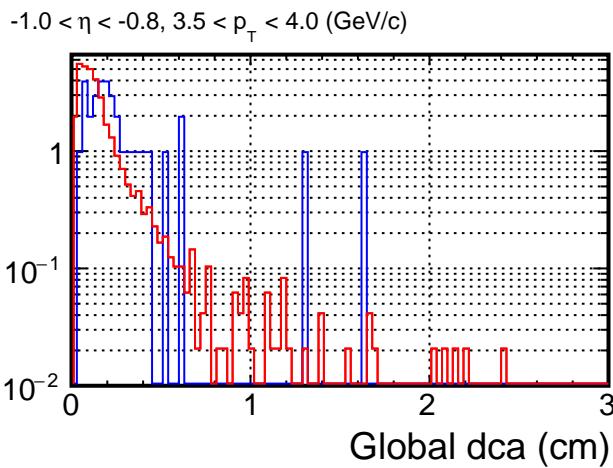
$0.6 < \eta < 0.8, 3.0 < p_T < 3.5$  (GeV/c)



$0.8 < \eta < 1.0, 3.0 < p_T < 3.5$  (GeV/c)



— e-  
(MATCHED, geantid=3)
  
— e-  
(PRIMARY,  $|\eta| < 2$  TPC)

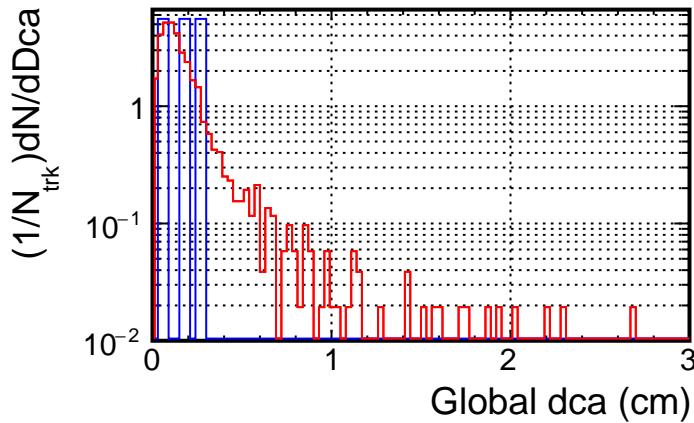
Dca distribution for ( $p_T$ ,  $\eta$ ) slices

e-  
(MATCHED, geantid=3)

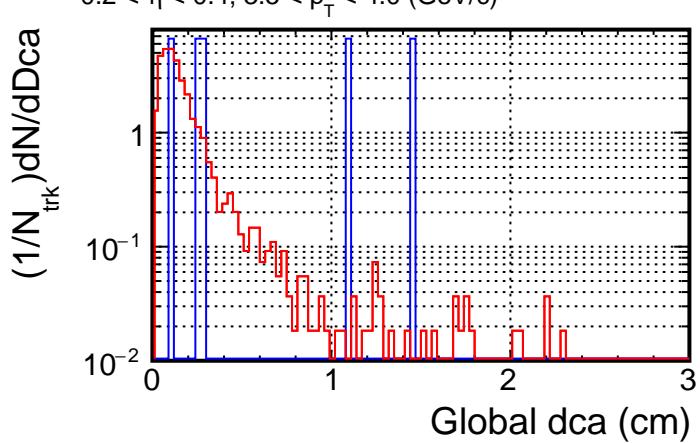
e-  
(PRIMARY,  $|n \sigma_{e^-}| < 2$  TPC)

## Dca distribution for ( $p_T$ , $\eta$ ) slices

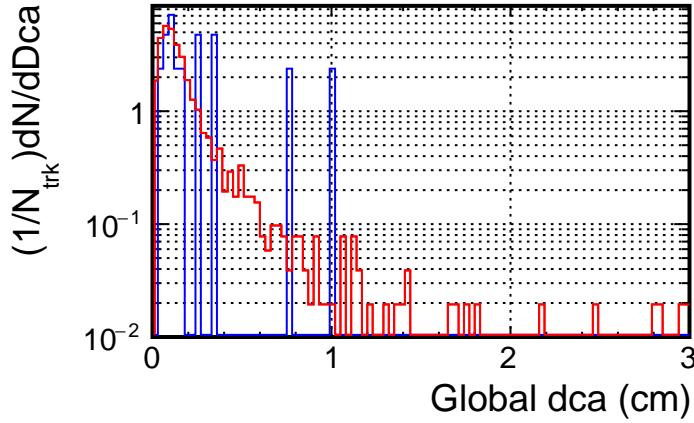
$0.0 < \eta < 0.2, 3.5 < p_T < 4.0$  (GeV/c)



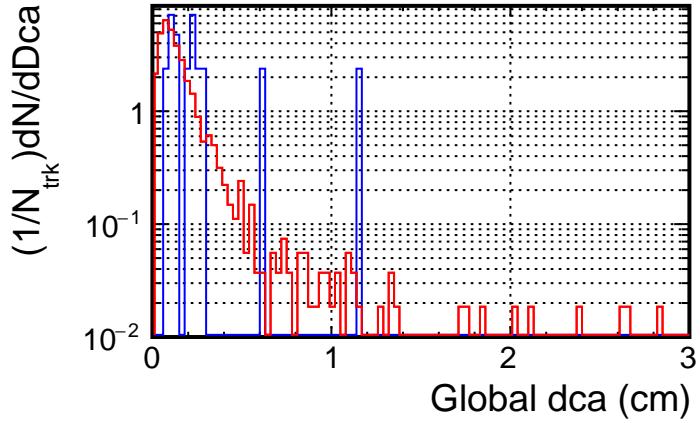
$0.2 < \eta < 0.4, 3.5 < p_T < 4.0$  (GeV/c)



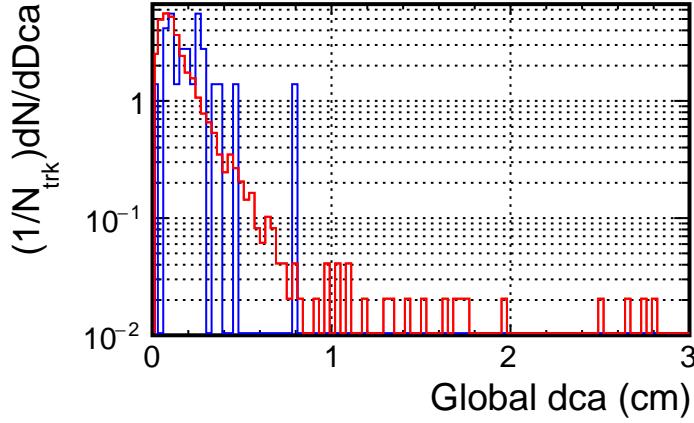
$0.4 < \eta < 0.6, 3.5 < p_T < 4.0$  (GeV/c)



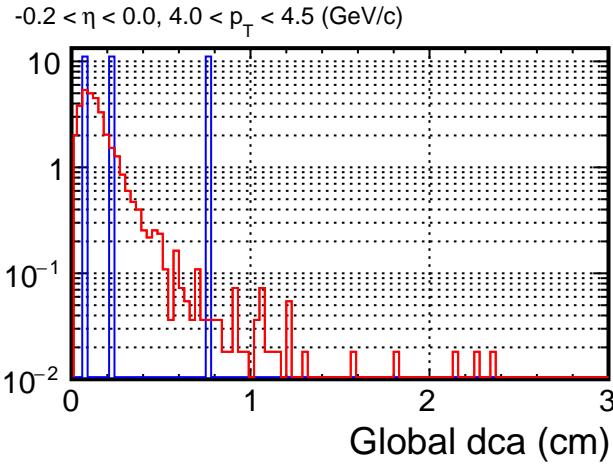
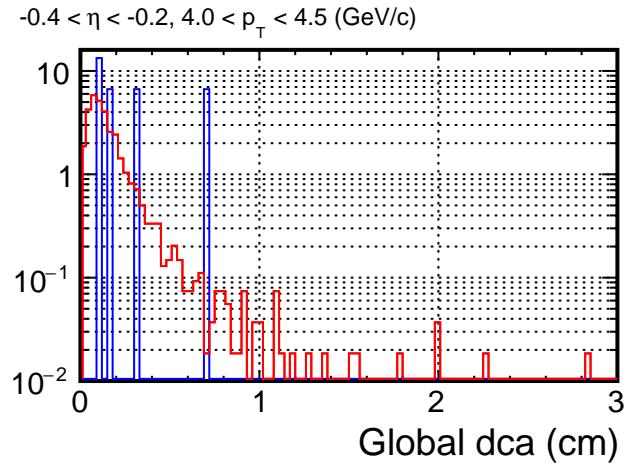
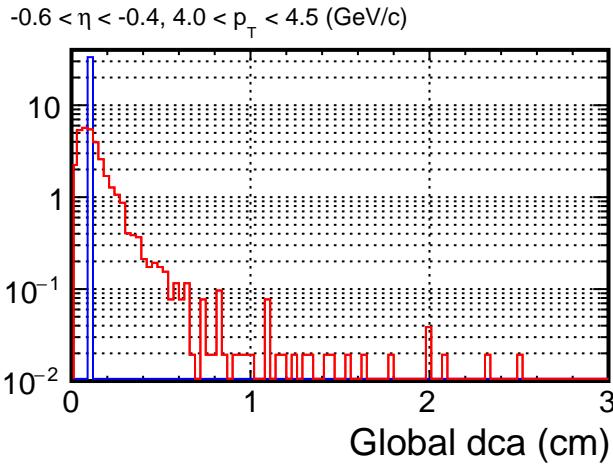
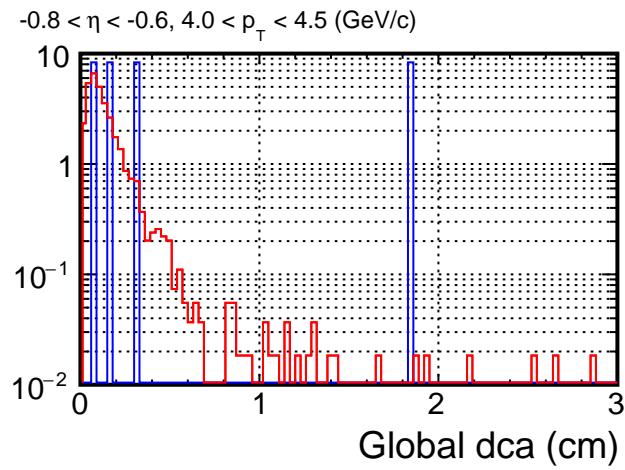
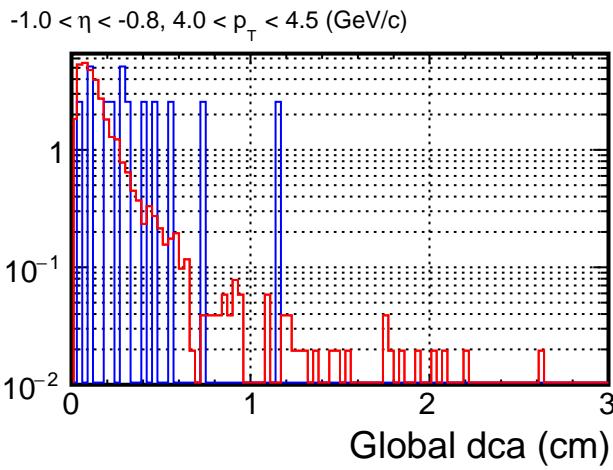
$0.6 < \eta < 0.8, 3.5 < p_T < 4.0$  (GeV/c)



$0.8 < \eta < 1.0, 3.5 < p_T < 4.0$  (GeV/c)



— e-  
(MATCHED, geantid=3)
  
— e-  
(PRIMARY,  $|\eta \sigma_{e^-}| < 2$  TPC)

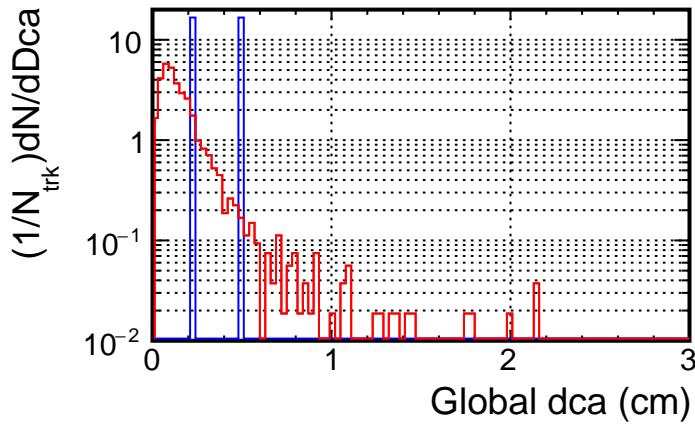
Dca distribution for  $(p_T, \eta)$  slices

e-  
(MATCHED, geantid=3)

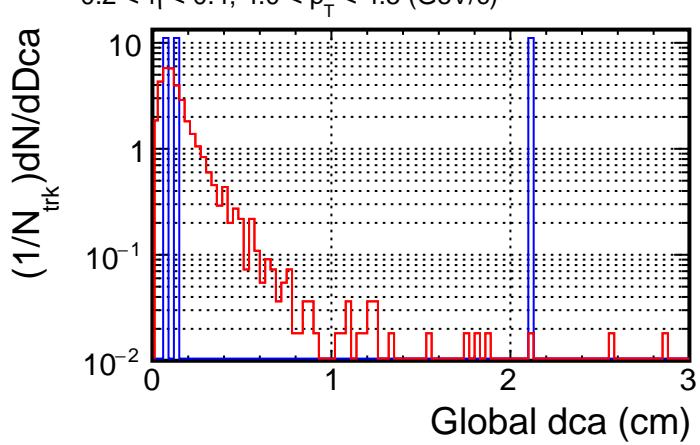
e-  
(PRIMARY,  $|\eta \sigma_{e^-}| < 2$  TPC)

## Dca distribution for ( $p_T$ , $\eta$ ) slices

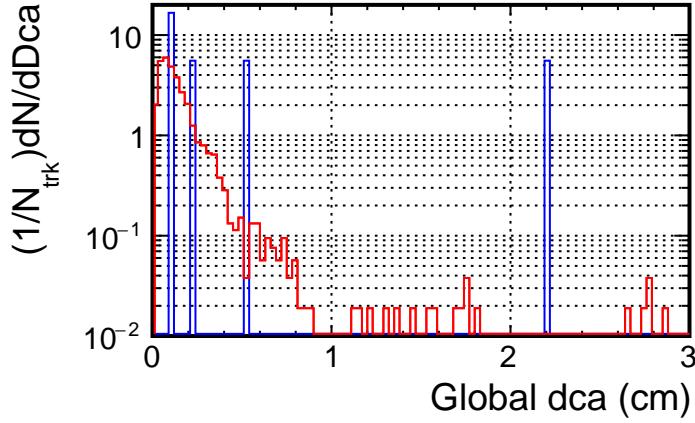
$0.0 < \eta < 0.2, 4.0 < p_T < 4.5$  (GeV/c)



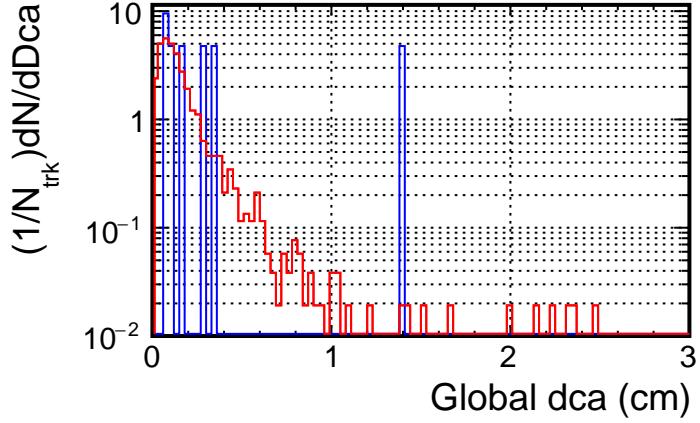
$0.2 < \eta < 0.4, 4.0 < p_T < 4.5$  (GeV/c)



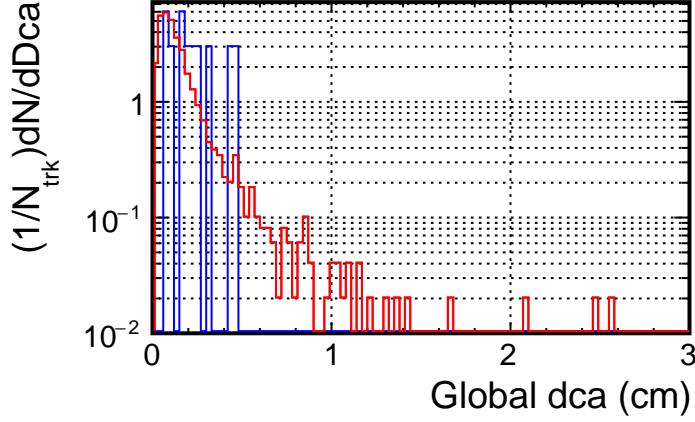
$0.4 < \eta < 0.6, 4.0 < p_T < 4.5$  (GeV/c)



$0.6 < \eta < 0.8, 4.0 < p_T < 4.5$  (GeV/c)

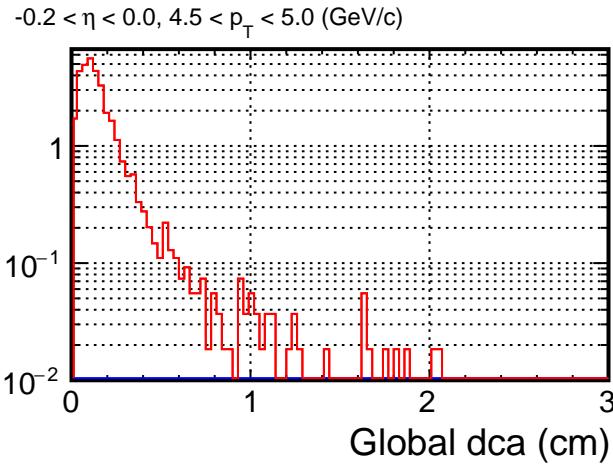
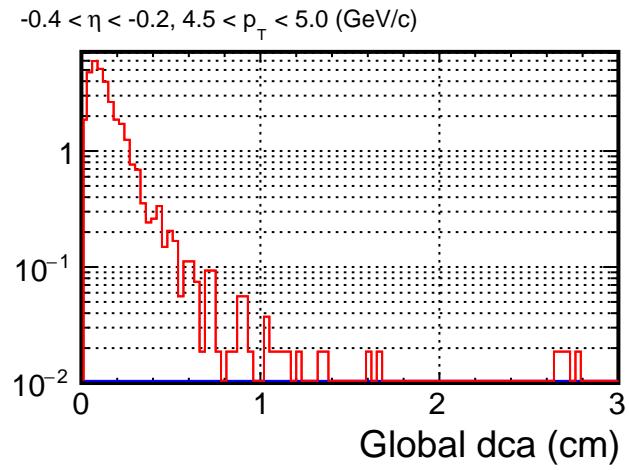
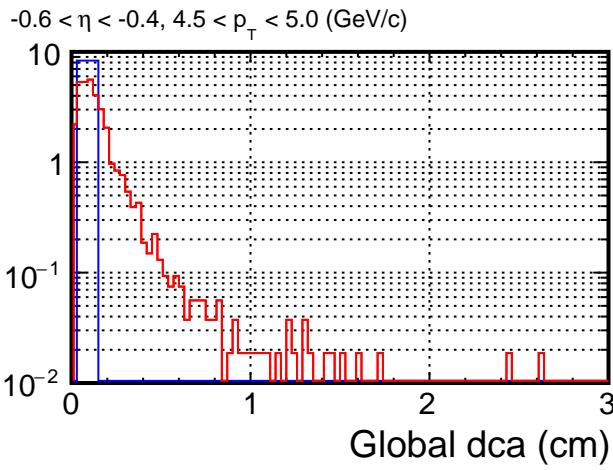
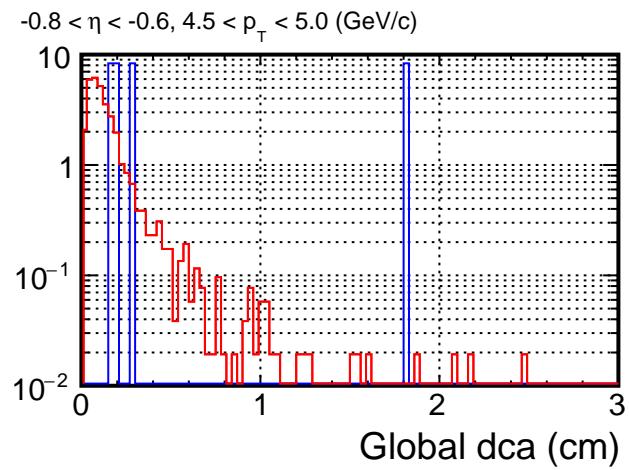
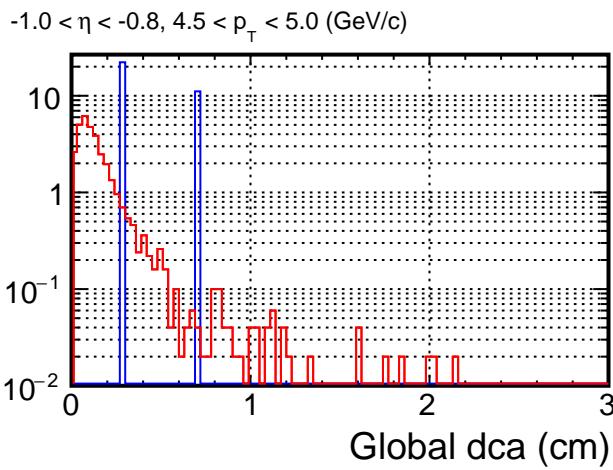


$0.8 < \eta < 1.0, 4.0 < p_T < 4.5$  (GeV/c)



e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|\eta \sigma_{e^-}| < 2$  TPC)

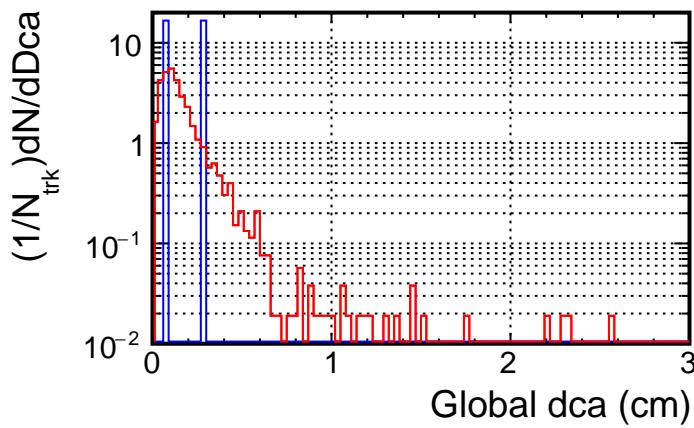
Dca distribution for ( $p_T$ ,  $\eta$ ) slices

e-  
(MATCHED, geantid=3)

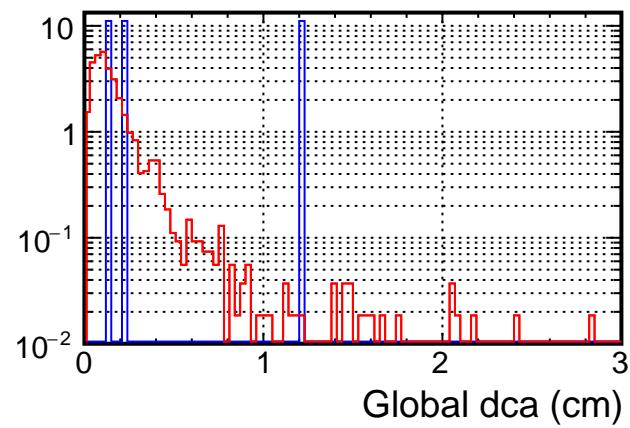
e-  
(PRIMARY,  $|n \sigma_{e^-}| < 2$  TPC)

## Dca distribution for ( $p_T$ , $\eta$ ) slices

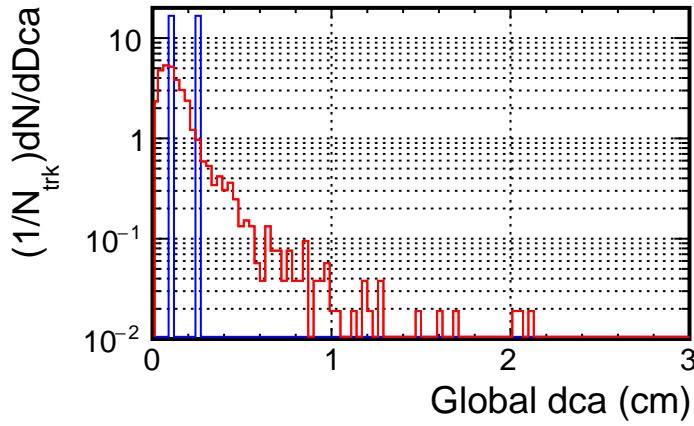
$0.0 < \eta < 0.2, 4.5 < p_T < 5.0$  (GeV/c)



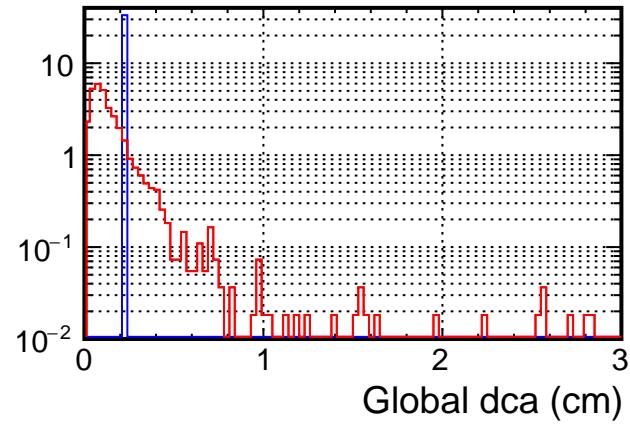
$0.2 < \eta < 0.4, 4.5 < p_T < 5.0$  (GeV/c)



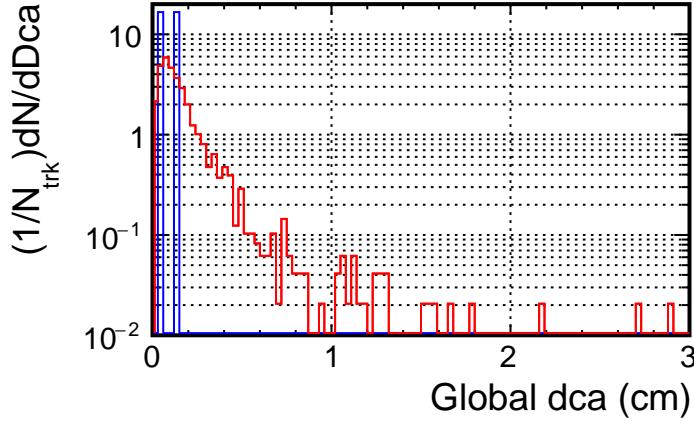
$0.4 < \eta < 0.6, 4.5 < p_T < 5.0$  (GeV/c)



$0.6 < \eta < 0.8, 4.5 < p_T < 5.0$  (GeV/c)



$0.8 < \eta < 1.0, 4.5 < p_T < 5.0$  (GeV/c)



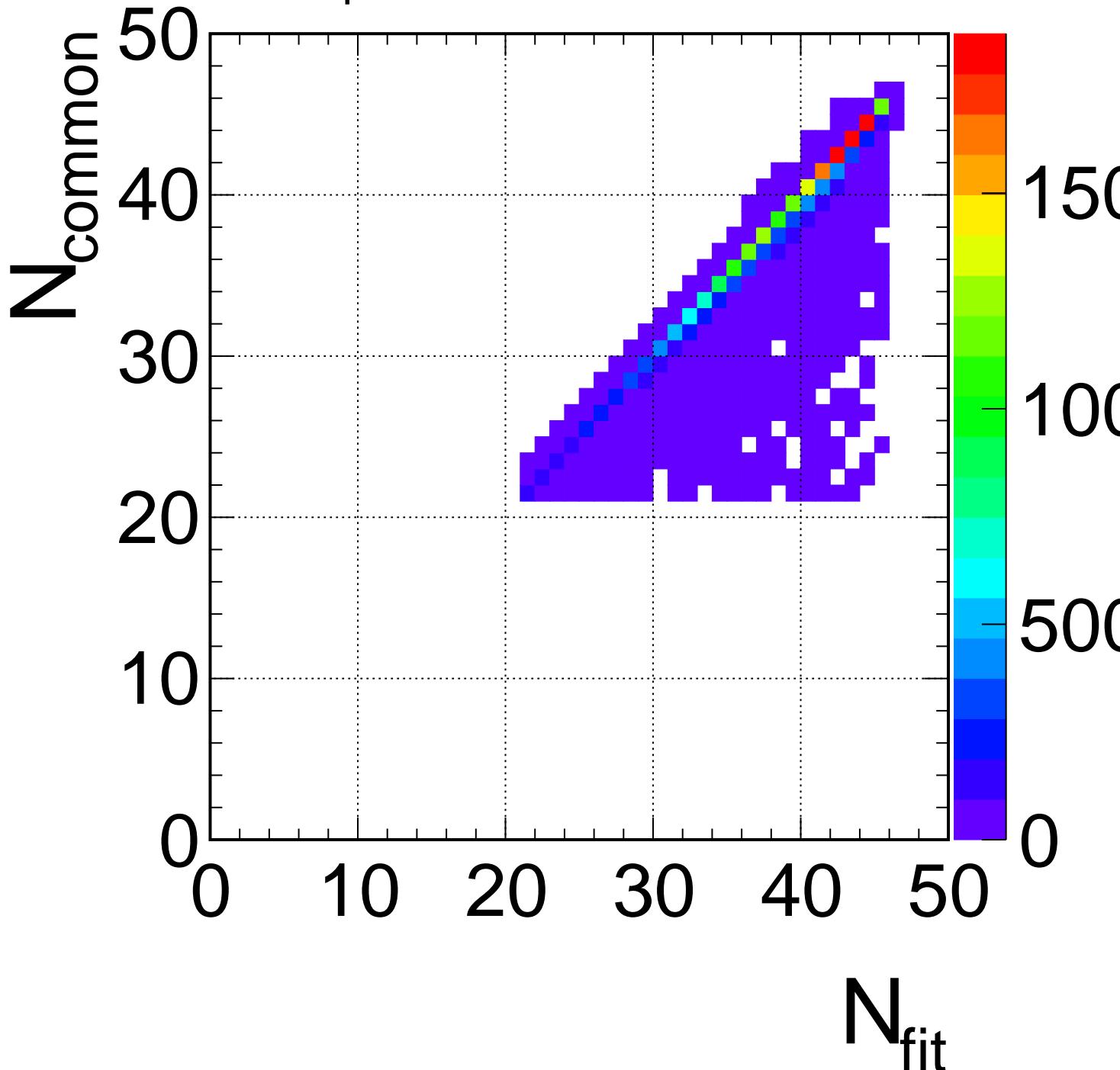
— e-  
(MATCHED, geantid=3)
  
— e-  
(PRIMARY,  $|\eta \sigma_{e^-}| < 2$  TPC)

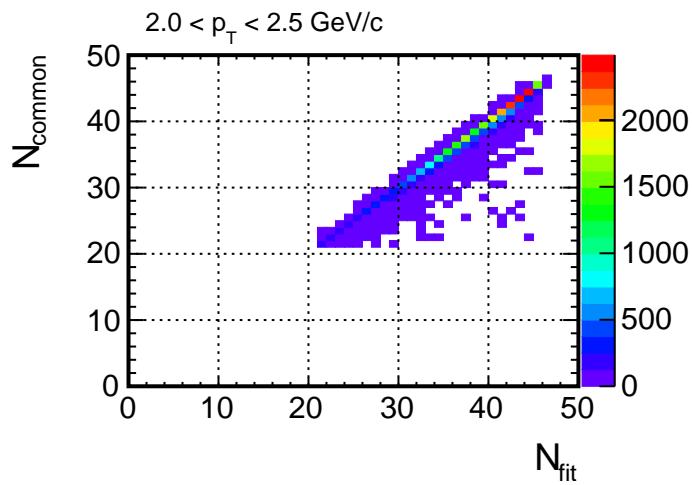
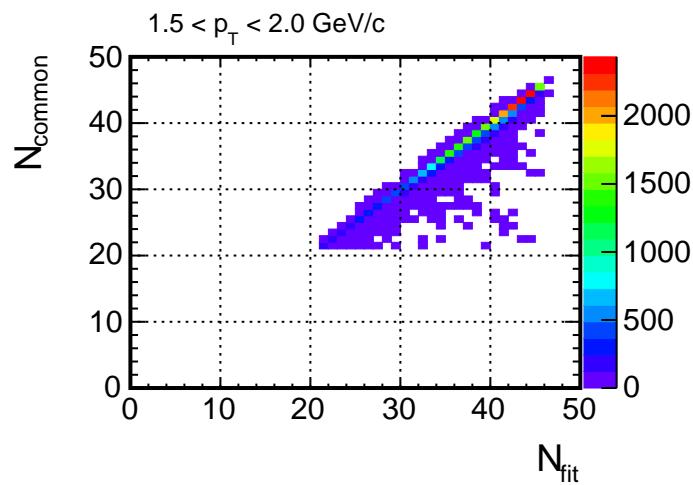
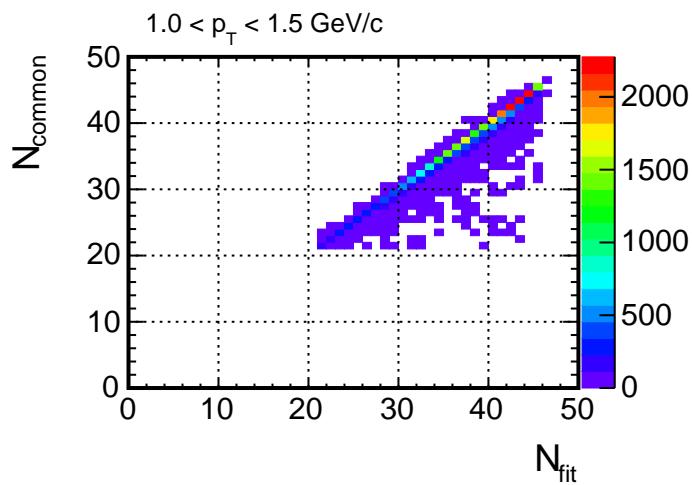
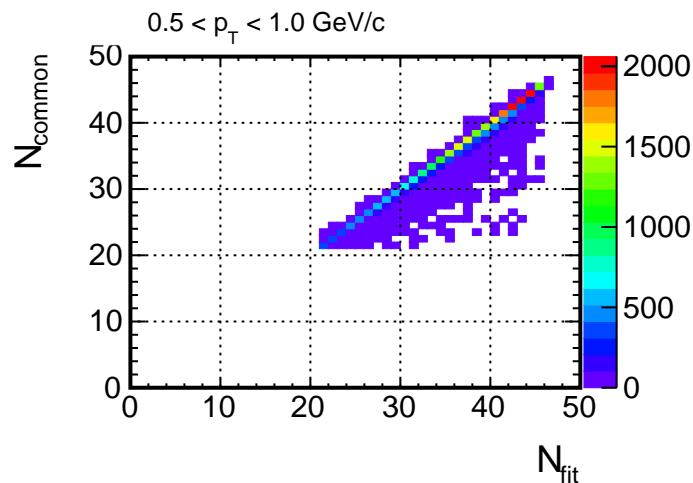
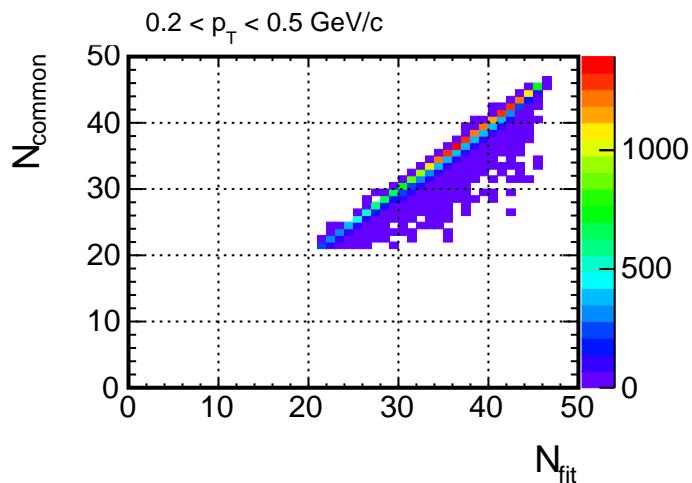
$N_{\text{events}}=24.83$  K, MC=e-, embeddingQa.mc, (0)

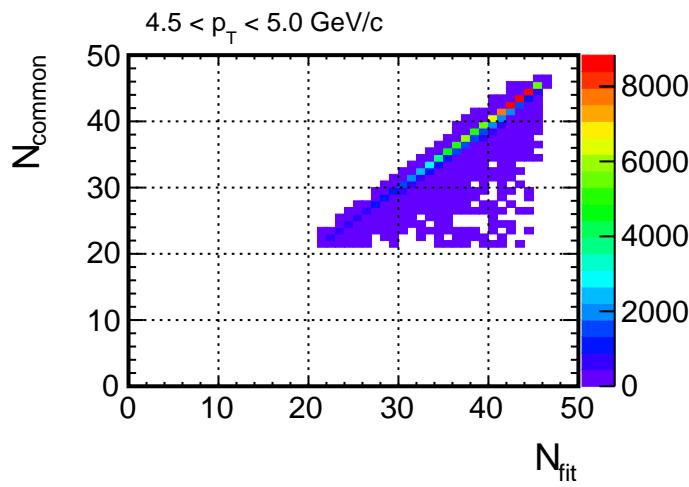
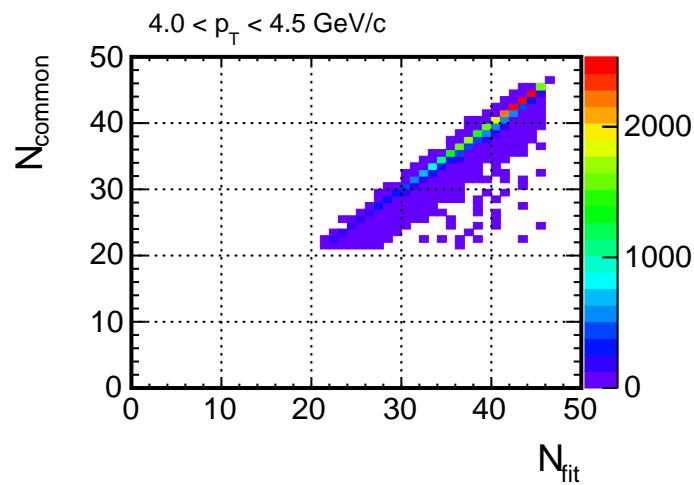
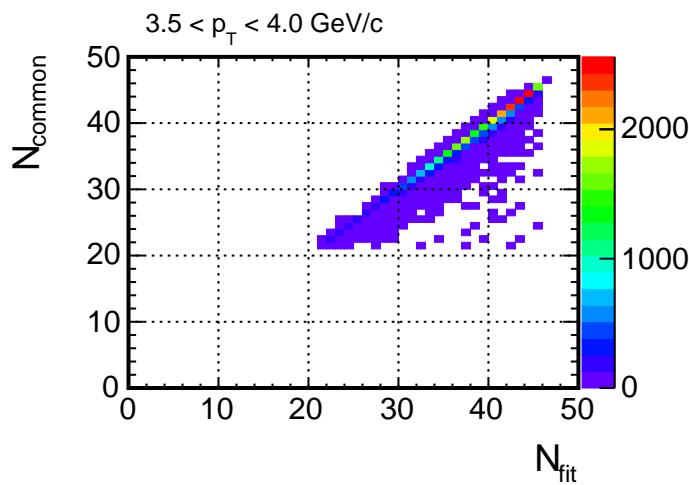
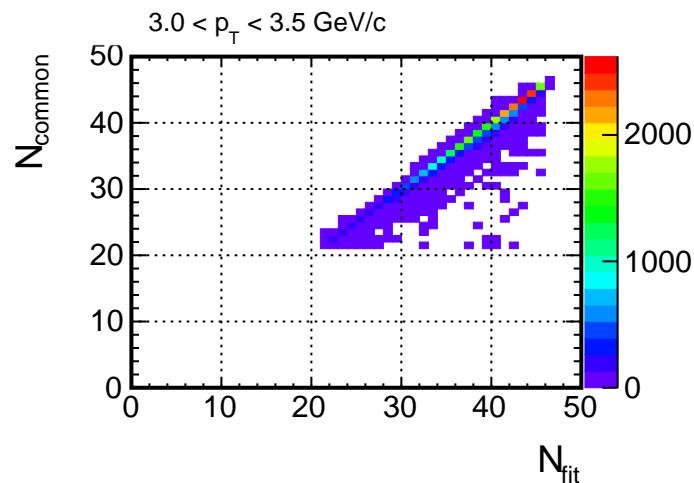
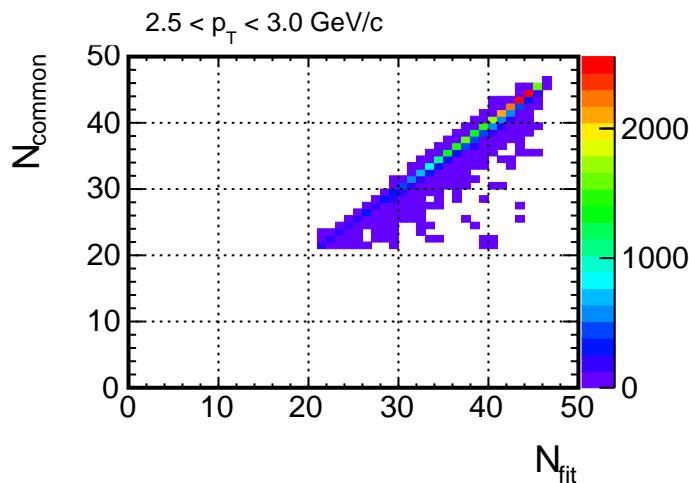
Tue Jul 23 01:44:14 2019

$N_{\text{common}}$  vs  $N_{\text{hit}}$  (Embedding:e-, Real:e-)

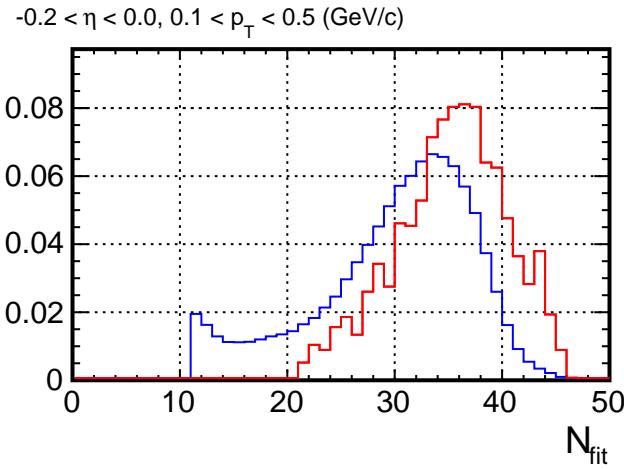
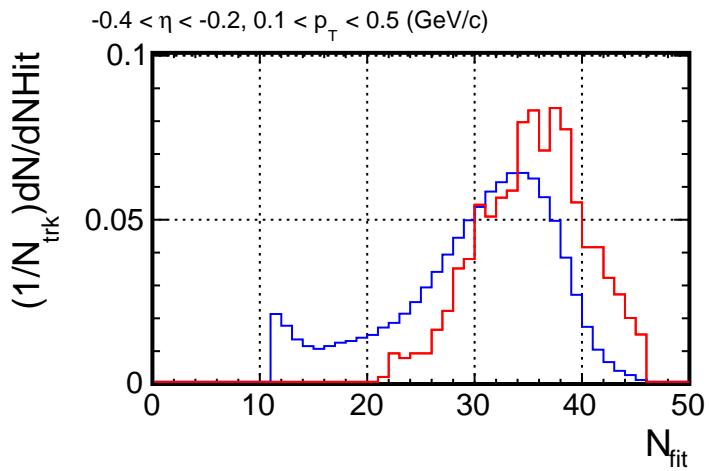
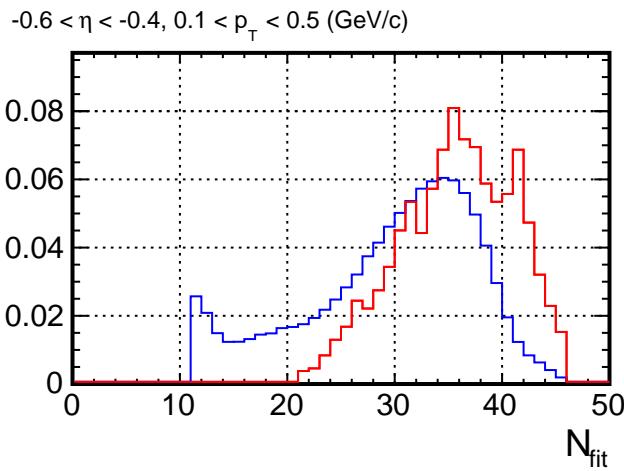
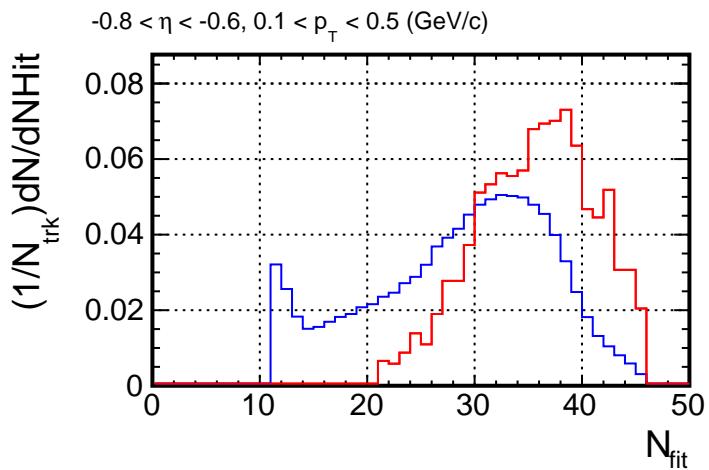
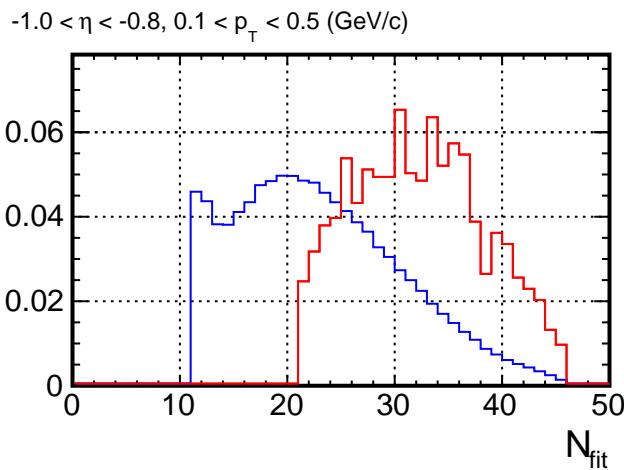
$0.2 < p_T < 5.0 \text{ GeV}/c$



N<sub>common</sub> vs N<sub>hit</sub>, p<sub>T</sub> dependence (Embedding:e-, Real:e-)

N<sub>common</sub> vs N<sub>hit</sub>, p<sub>T</sub> dependence (Embedding:e-, Real:e-)

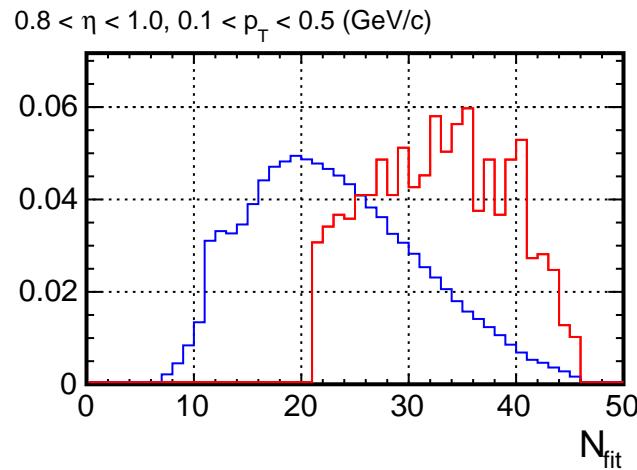
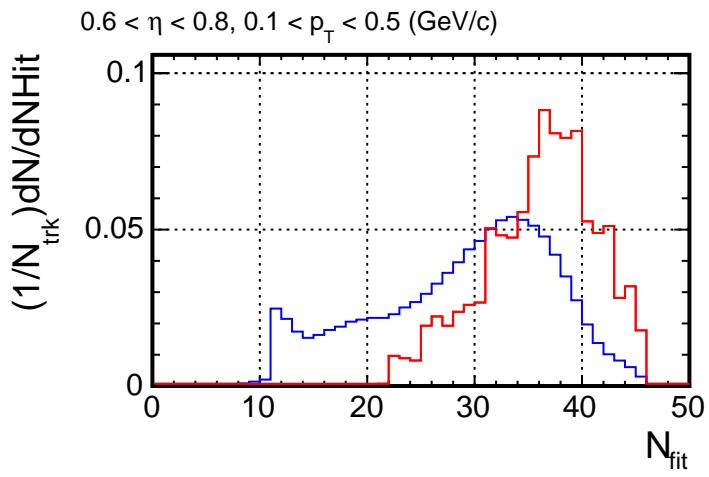
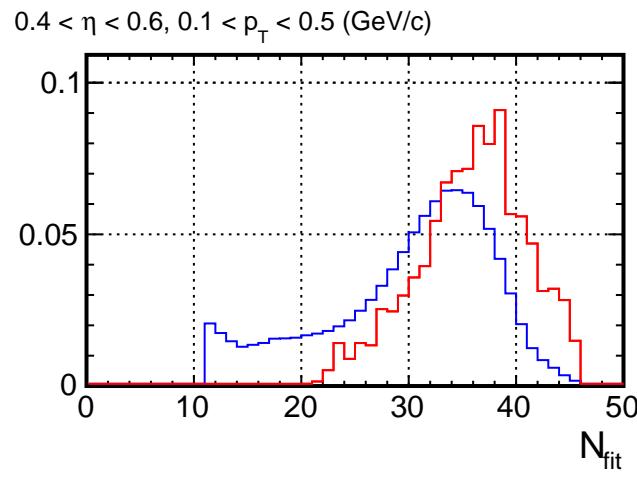
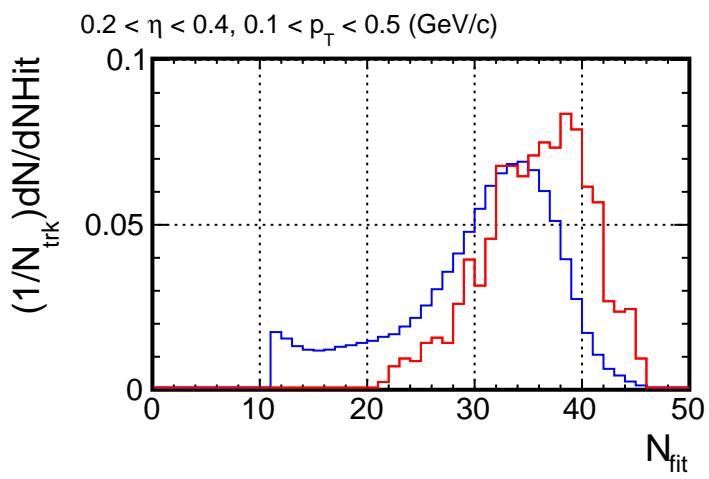
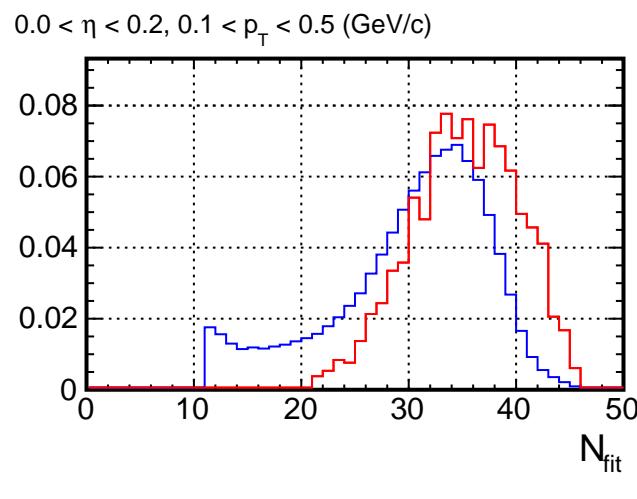
## NHit distribution for ( $p_T$ , $\eta$ ) slices



e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|n \sigma_e| < 2$  TPC)

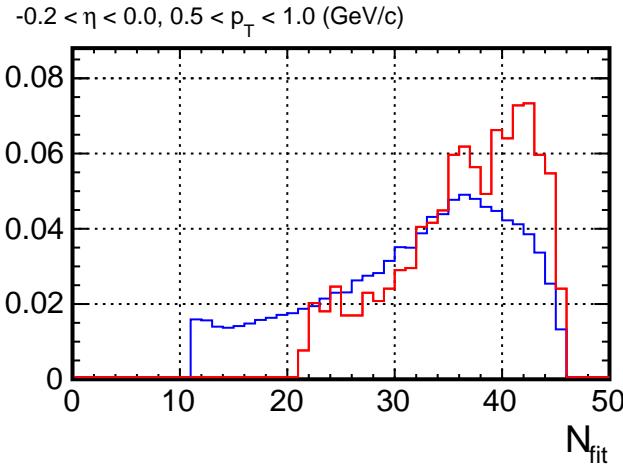
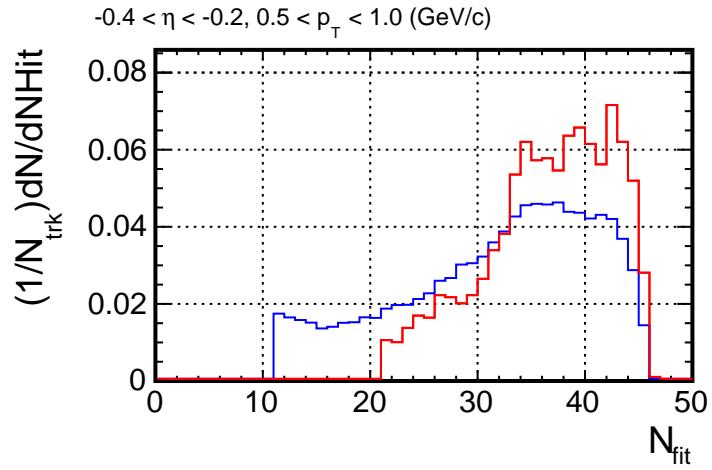
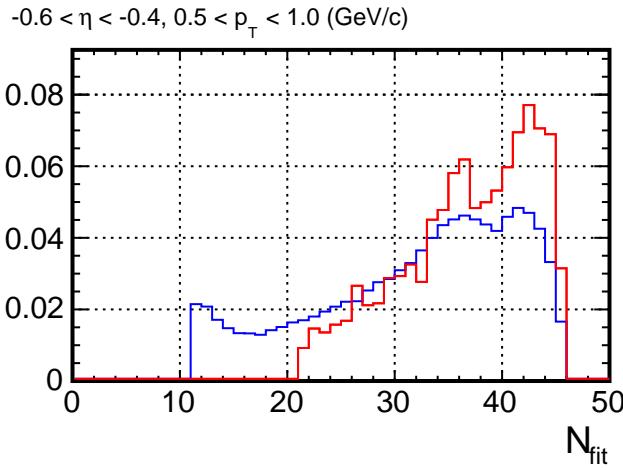
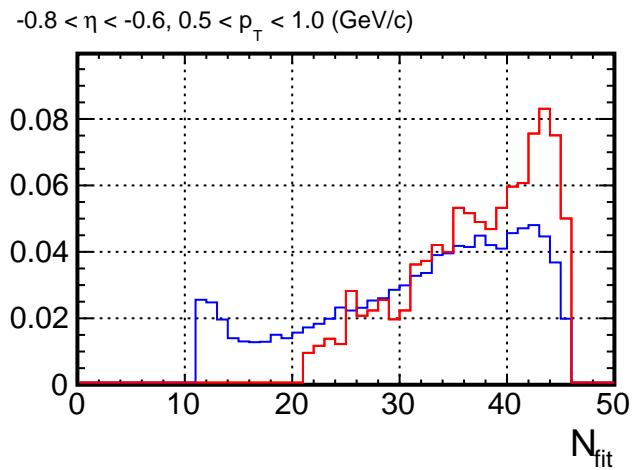
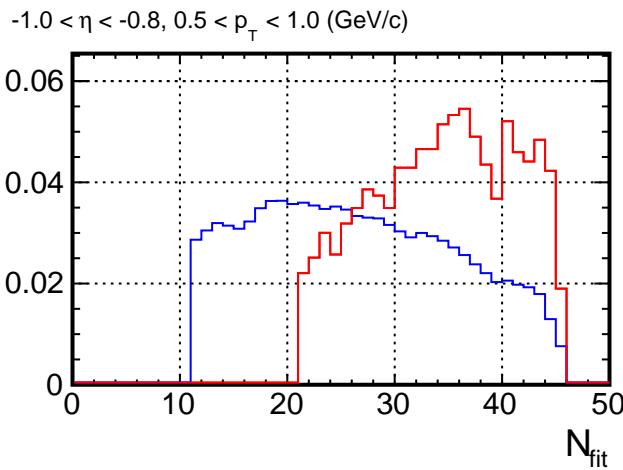
## NHit distribution for ( $p_T$ , $\eta$ ) slices



e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|n \sigma_e| < 2$  TPC)

## NHit distribution for ( $p_T$ , $\eta$ ) slices

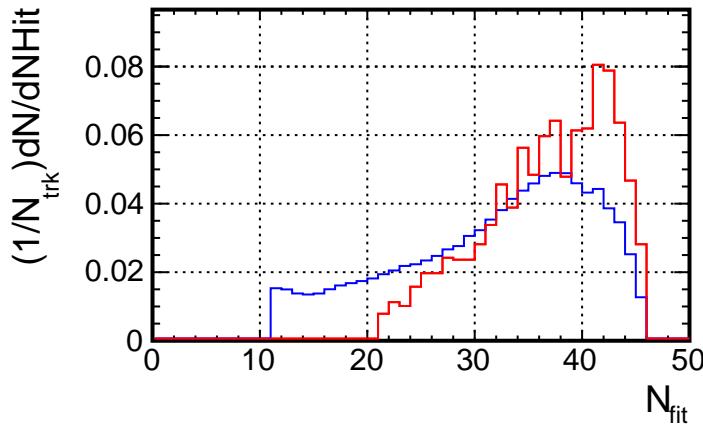


e-  
 (MATCHED, geantid=3)

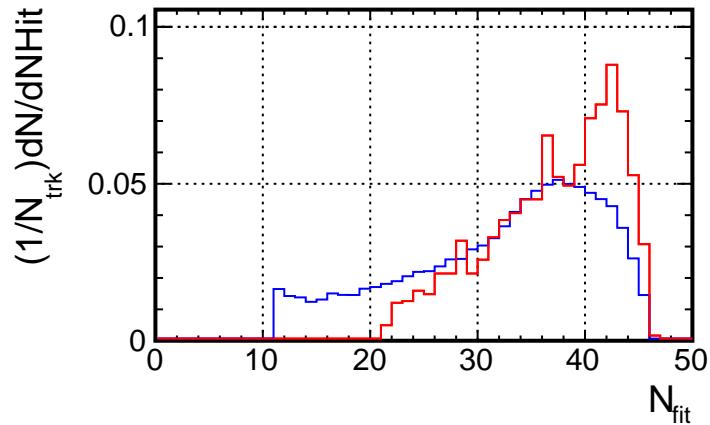
e-  
 (PRIMARY,  $|n\sigma_e| < 2$  TPC)

## NHit distribution for ( $p_T$ , $\eta$ ) slices

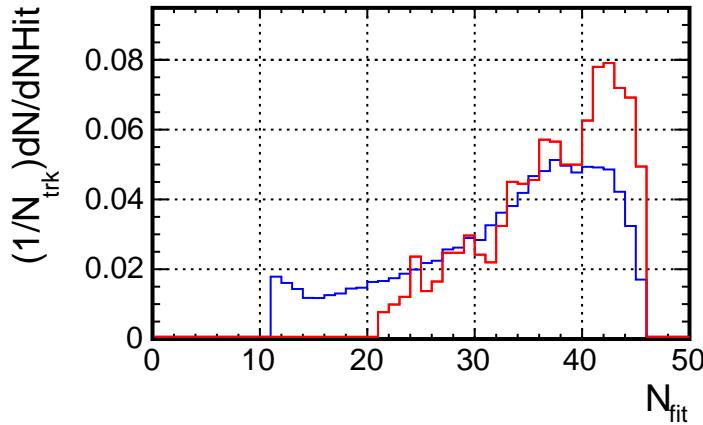
$0.0 < \eta < 0.2, 0.5 < p_T < 1.0$  (GeV/c)



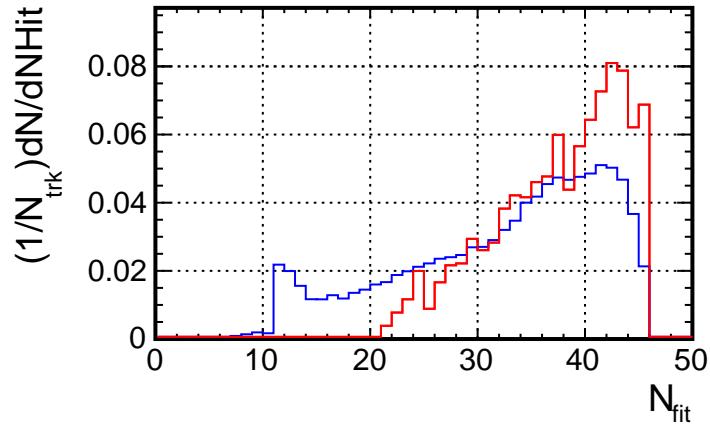
$0.2 < \eta < 0.4, 0.5 < p_T < 1.0$  (GeV/c)



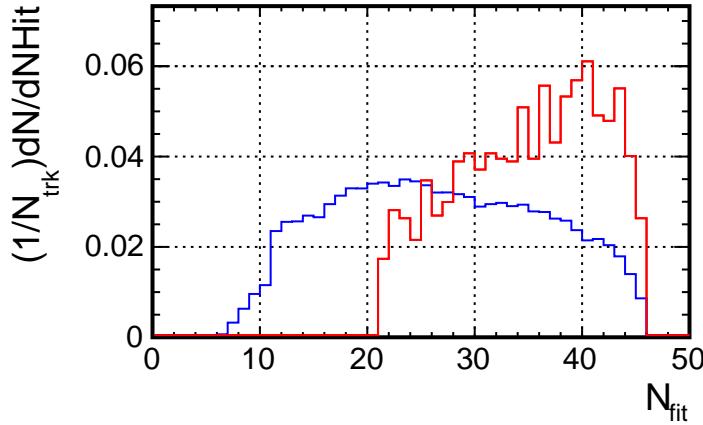
$0.4 < \eta < 0.6, 0.5 < p_T < 1.0$  (GeV/c)



$0.6 < \eta < 0.8, 0.5 < p_T < 1.0$  (GeV/c)

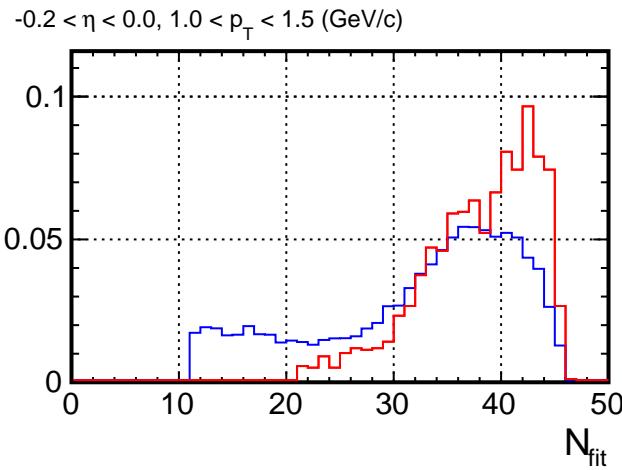
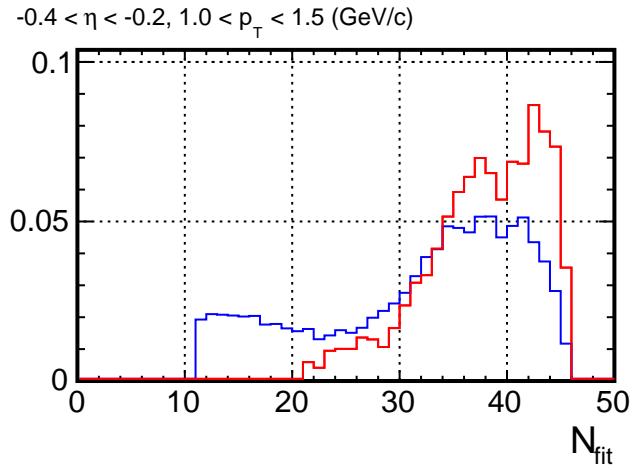
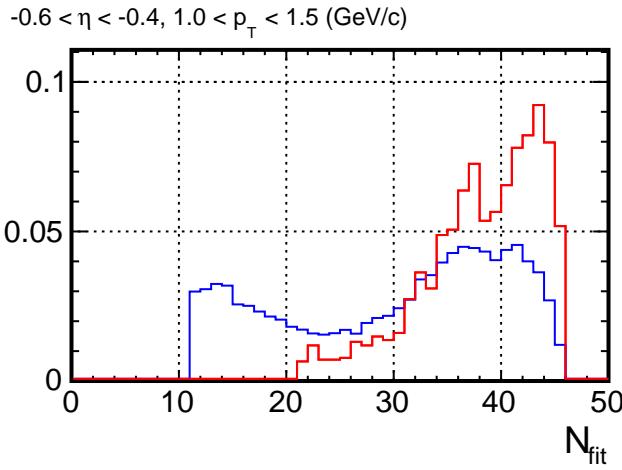
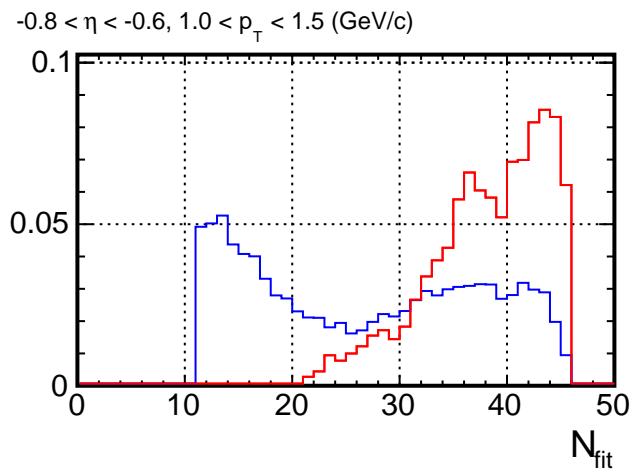
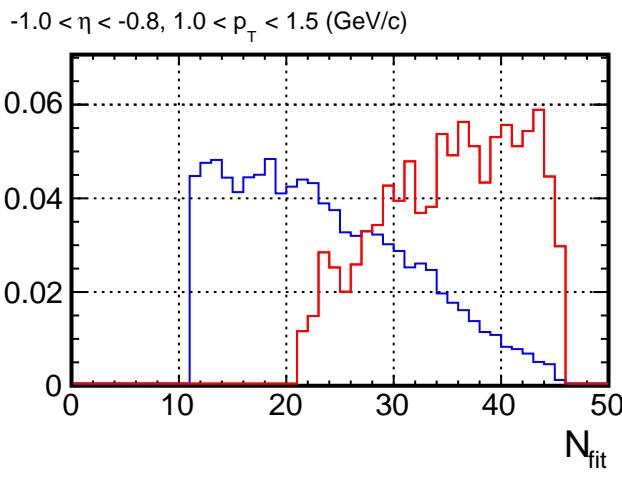


$0.8 < \eta < 1.0, 0.5 < p_T < 1.0$  (GeV/c)



e-  
(MATCHED, geantid=3)  
e-  
(PRIMARY, |n  $\sigma_{e^-}| < 2$  TPC)

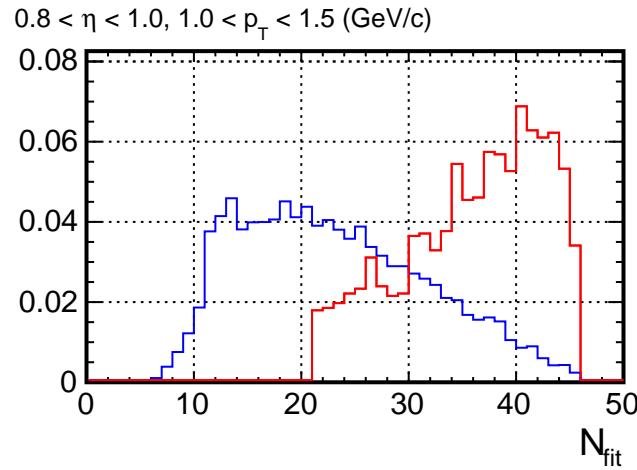
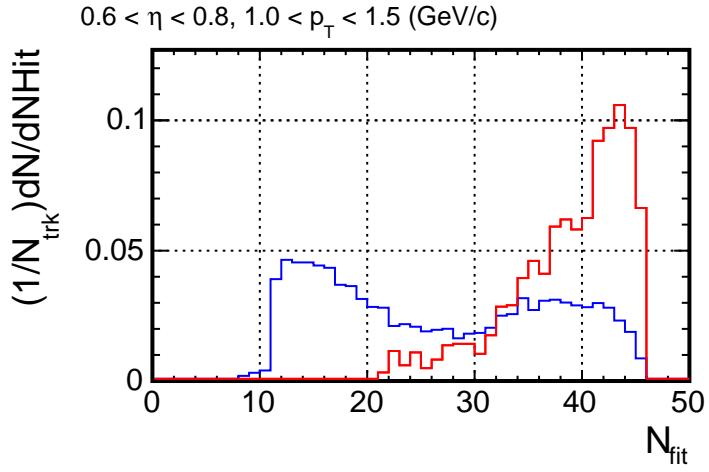
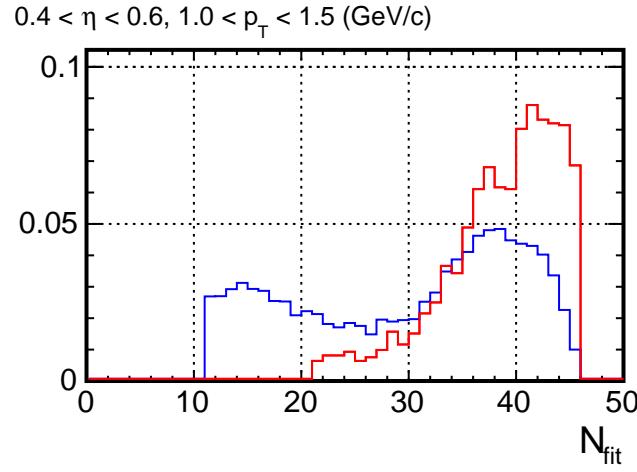
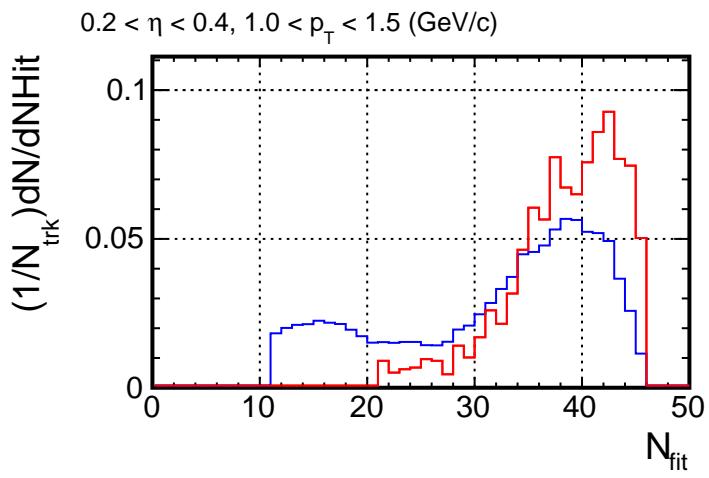
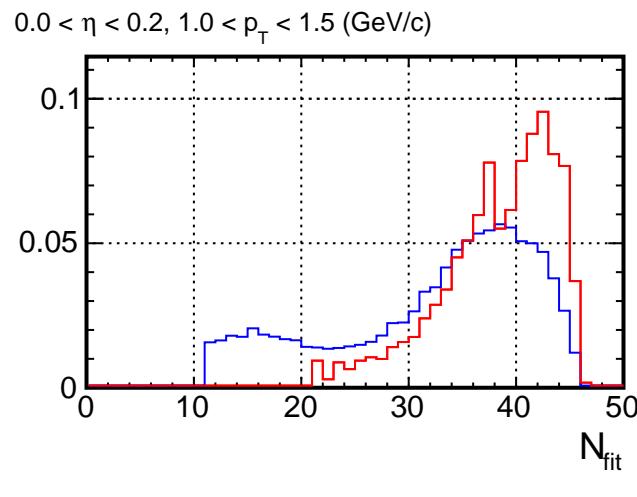
## NHit distribution for ( $p_T$ , $\eta$ ) slices



e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|n\sigma_{e^-}| < 2$  TPC)

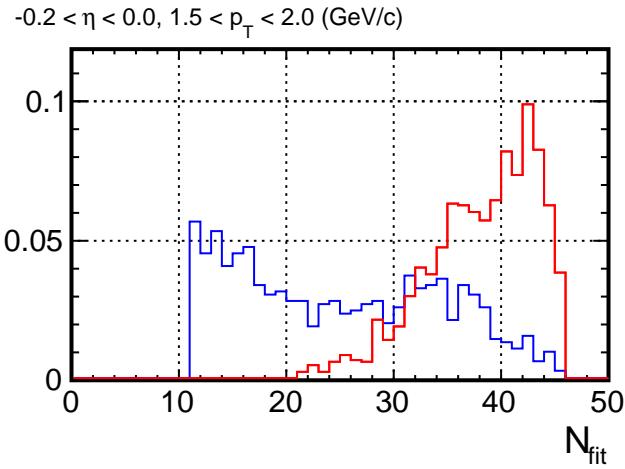
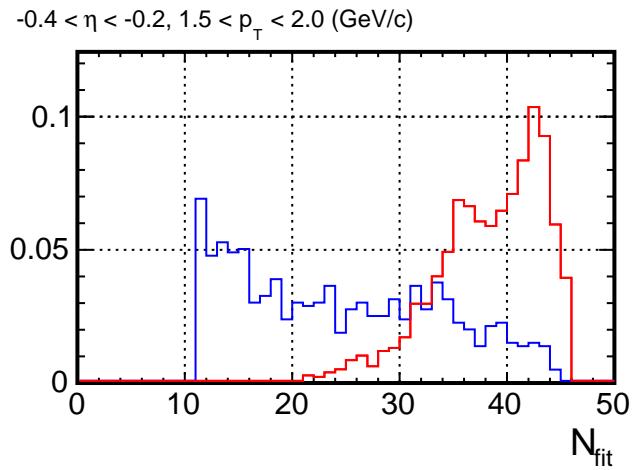
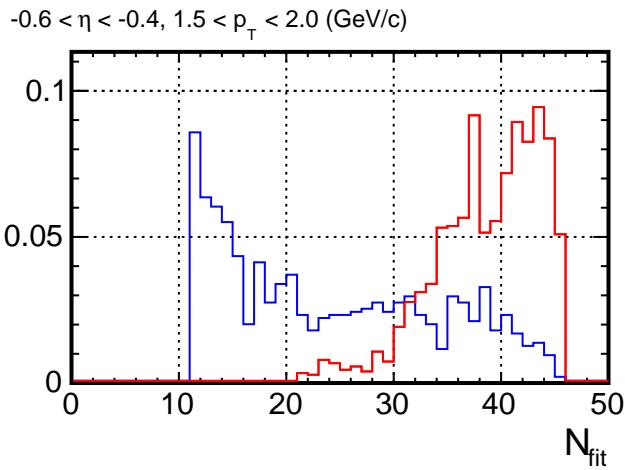
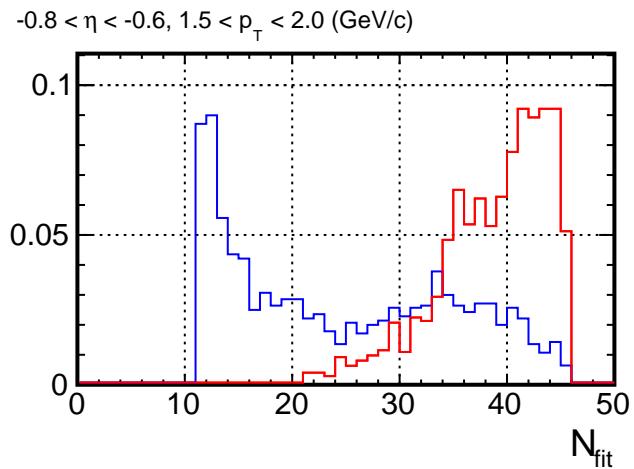
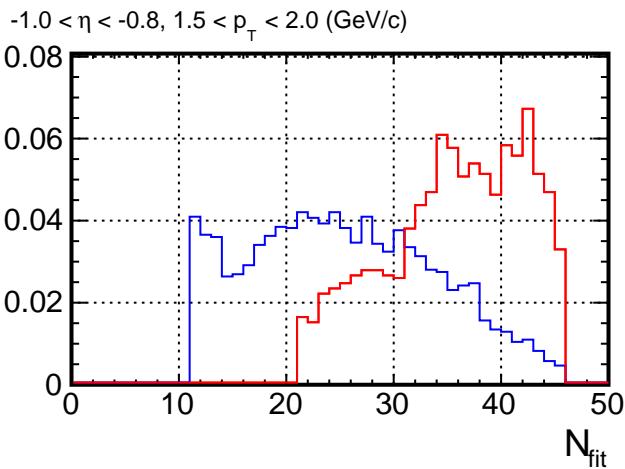
## NHit distribution for ( $p_T$ , $\eta$ ) slices



e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|n\sigma_e| < 2$  TPC)

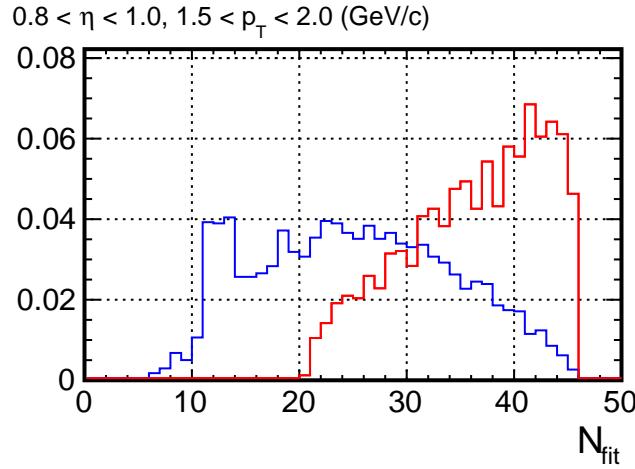
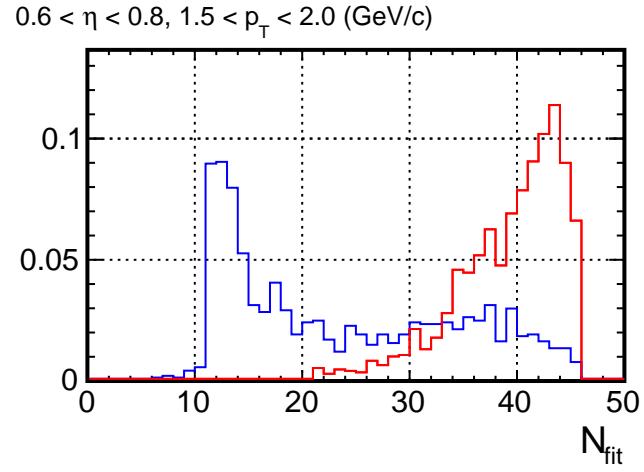
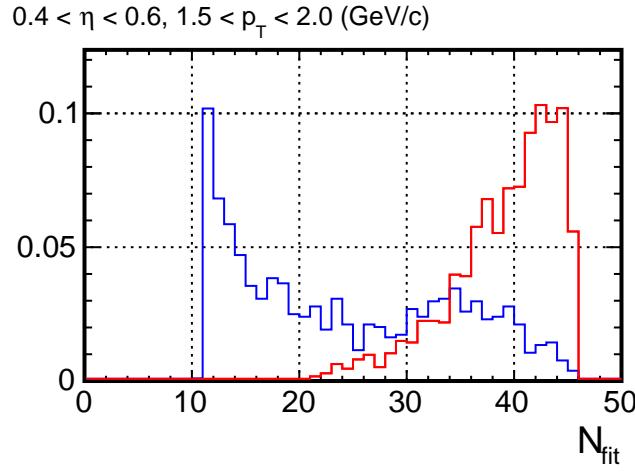
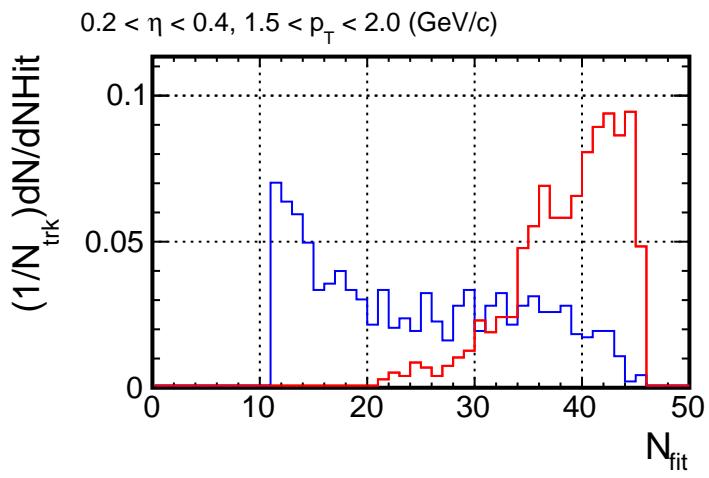
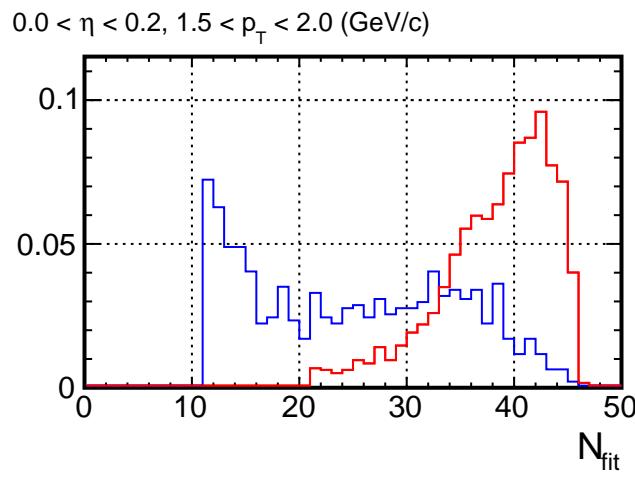
## NHit distribution for ( $p_T$ , $\eta$ ) slices



e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|n \sigma_{e^-}| < 2$  TPC)

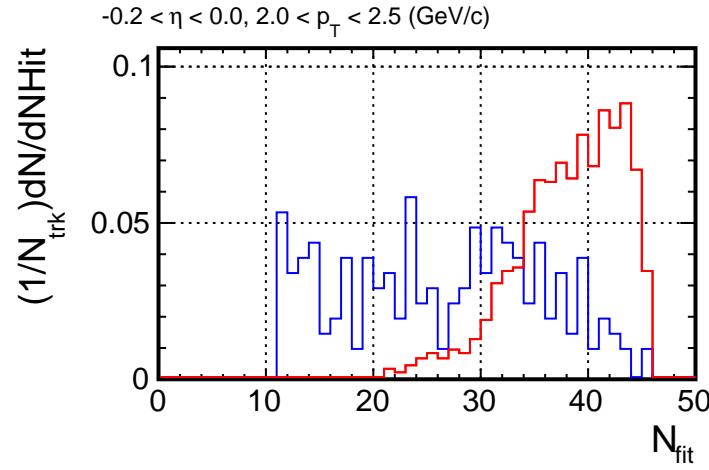
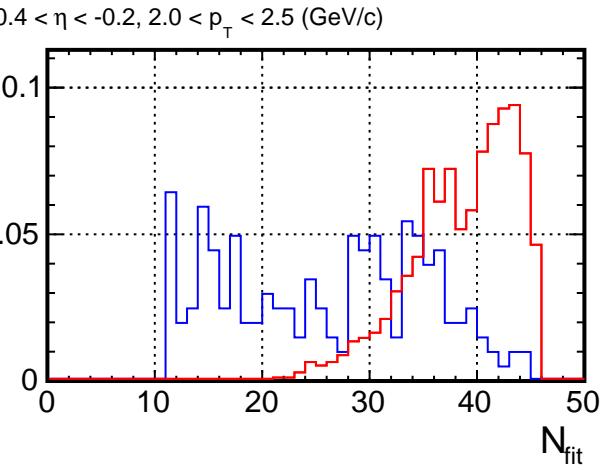
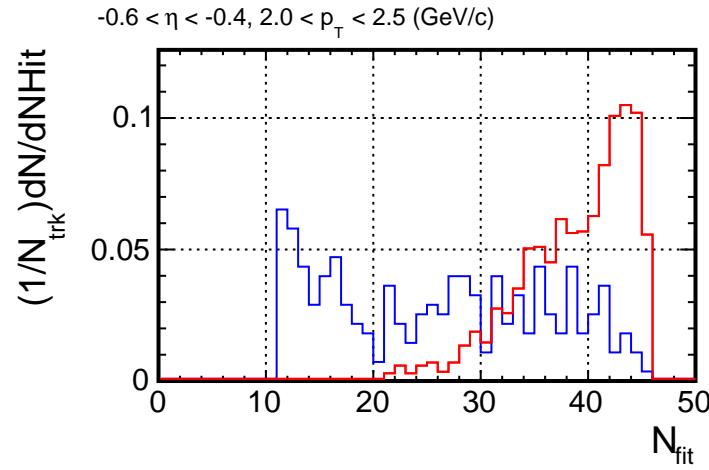
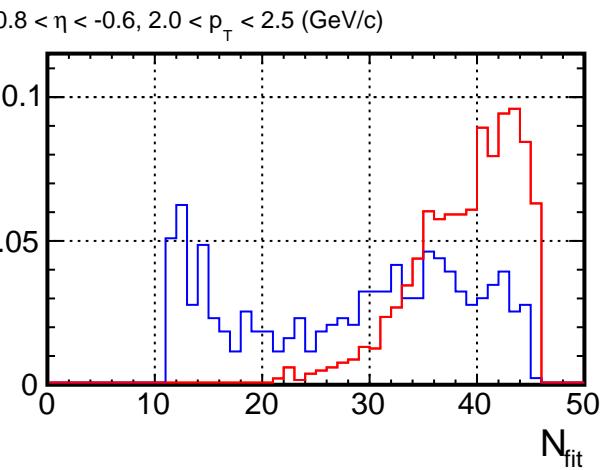
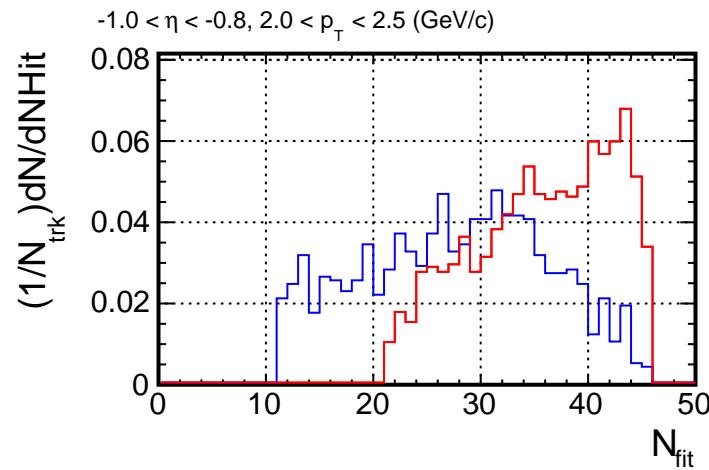
## NHit distribution for ( $p_T$ , $\eta$ ) slices



e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|n\sigma_e| < 2$  TPC)

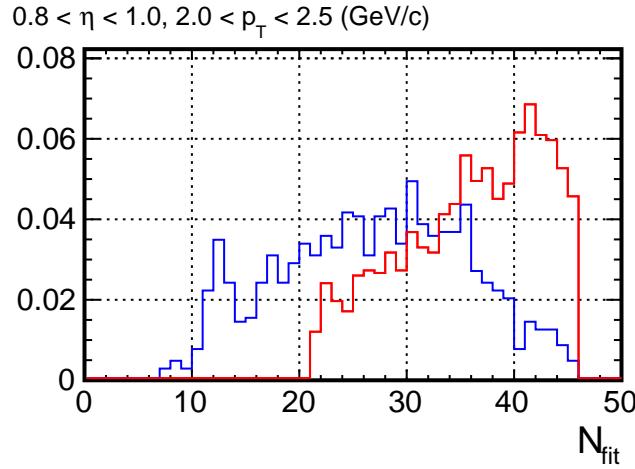
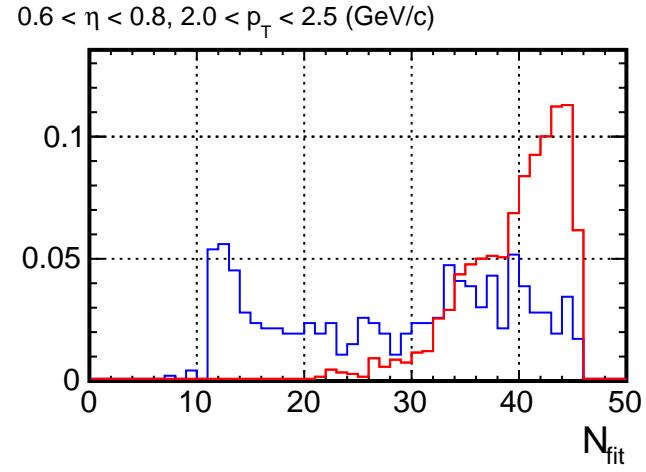
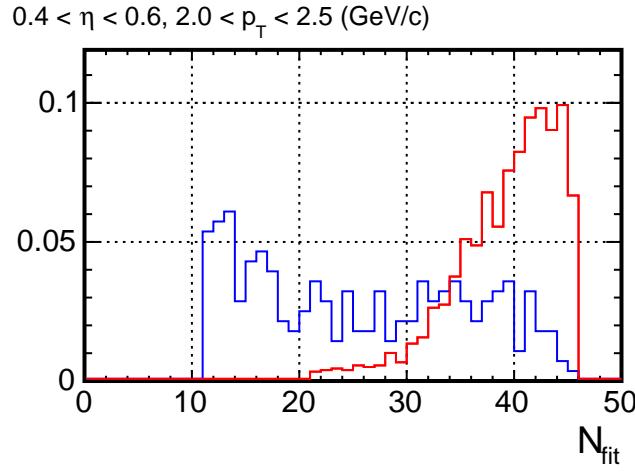
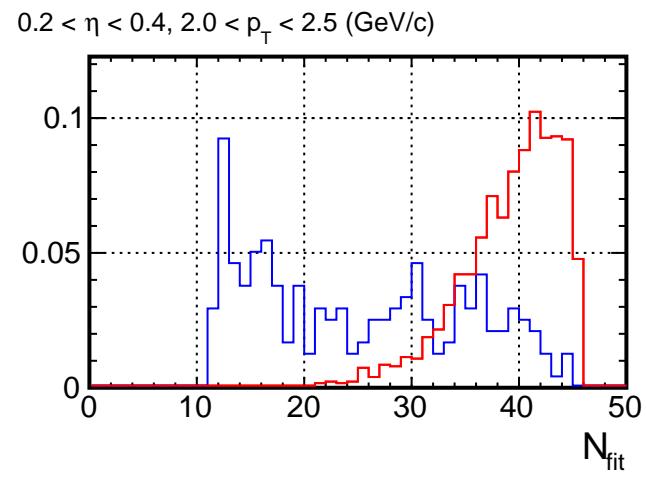
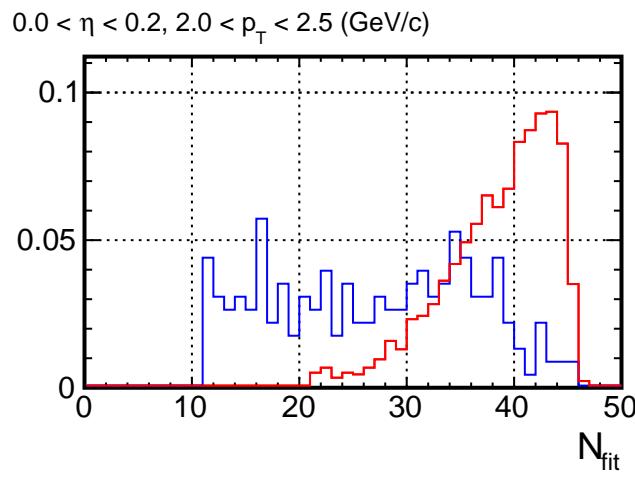
## NHit distribution for ( $p_T$ , $\eta$ ) slices



e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|n\sigma_{e^-}| < 2$  TPC)

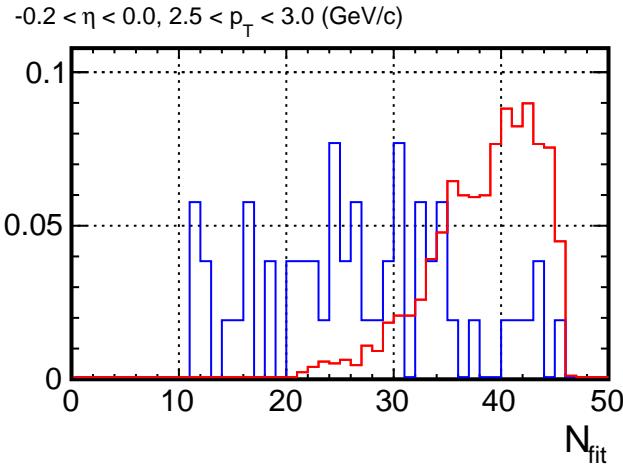
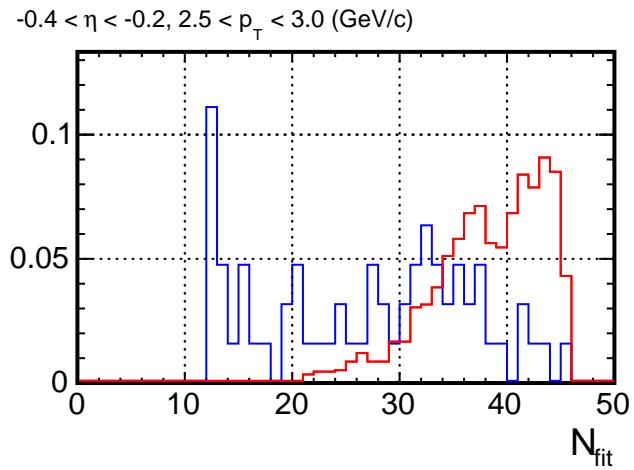
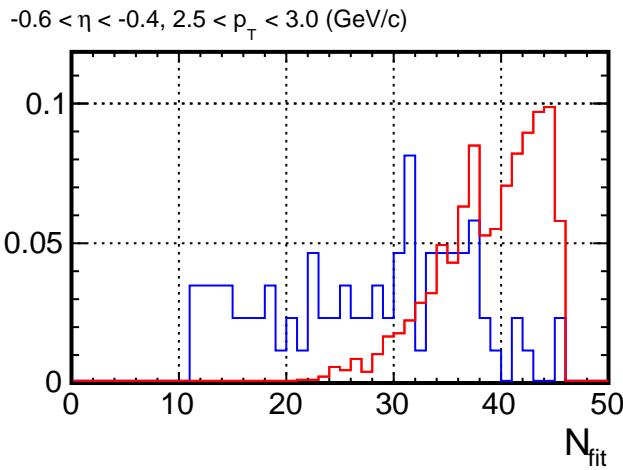
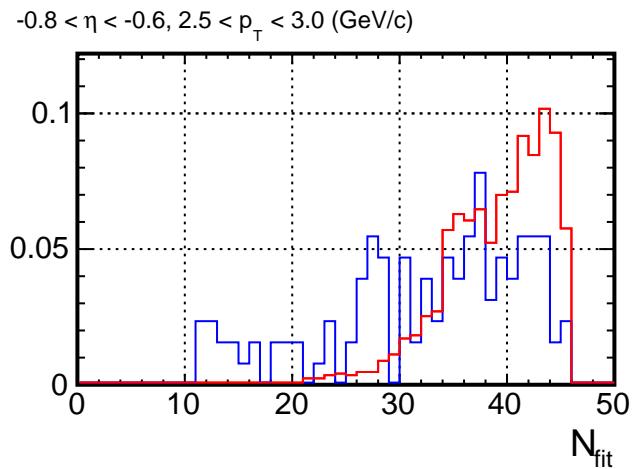
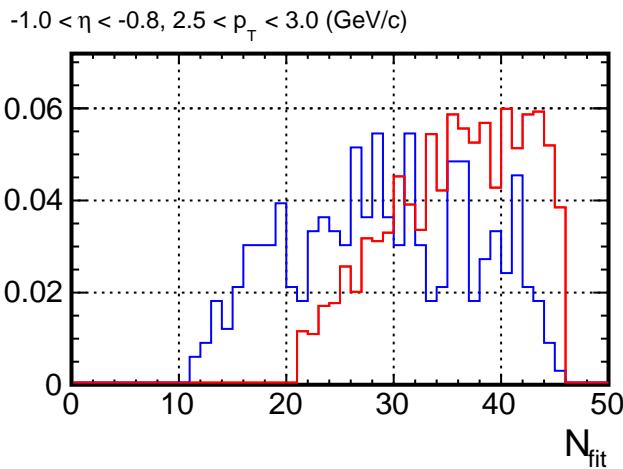
## NHit distribution for ( $p_T$ , $\eta$ ) slices



e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|\eta \sigma_e| < 2 \text{ TPC}$ )

## NHit distribution for ( $p_T$ , $\eta$ ) slices

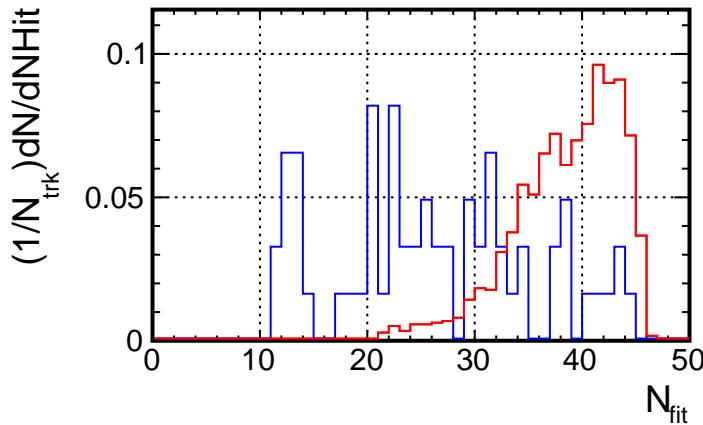


e-  
(MATCHED, geantid=3)

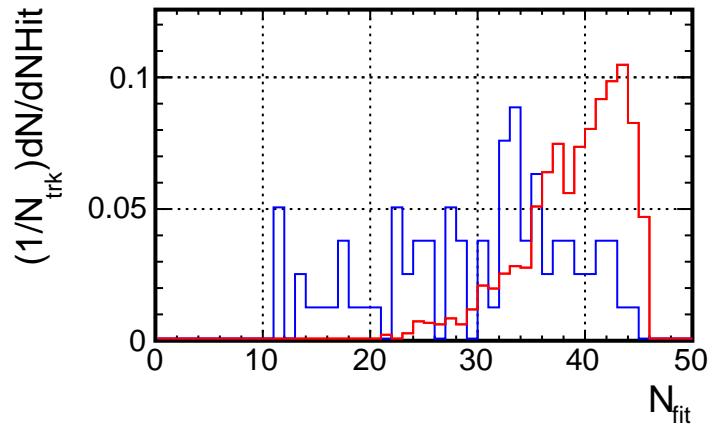
e-  
(PRIMARY,  $|n\sigma_{e^-}| < 2$  TPC)

## NHit distribution for ( $p_T$ , $\eta$ ) slices

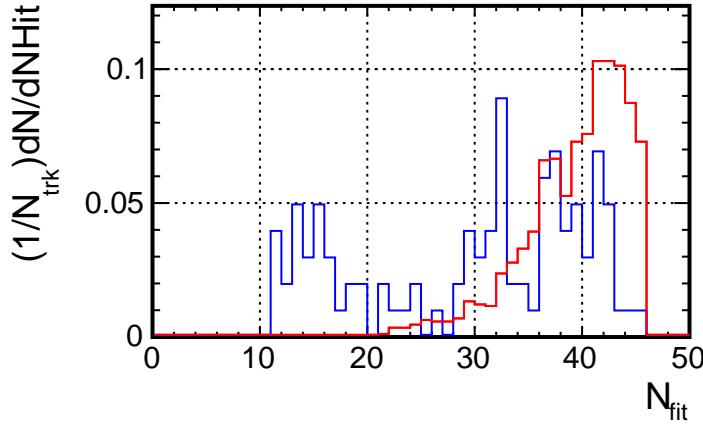
$0.0 < \eta < 0.2, 2.5 < p_T < 3.0$  (GeV/c)



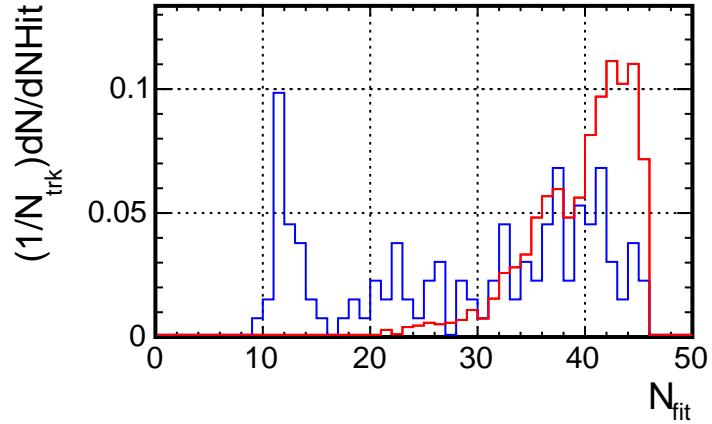
$0.2 < \eta < 0.4, 2.5 < p_T < 3.0$  (GeV/c)



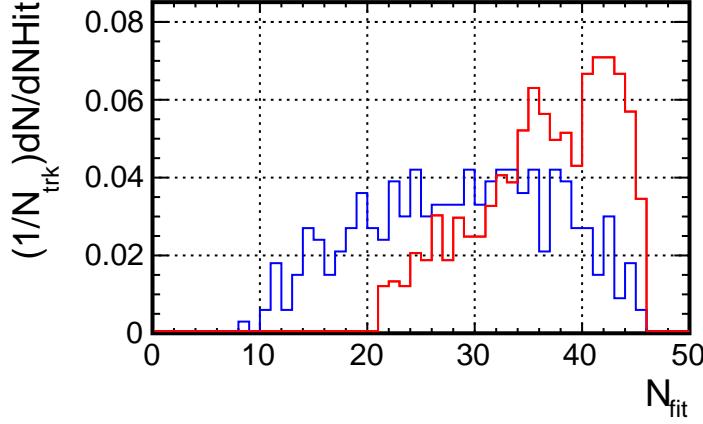
$0.4 < \eta < 0.6, 2.5 < p_T < 3.0$  (GeV/c)



$0.6 < \eta < 0.8, 2.5 < p_T < 3.0$  (GeV/c)



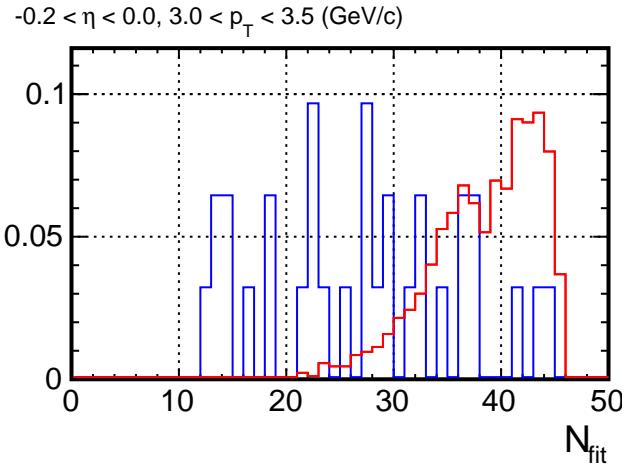
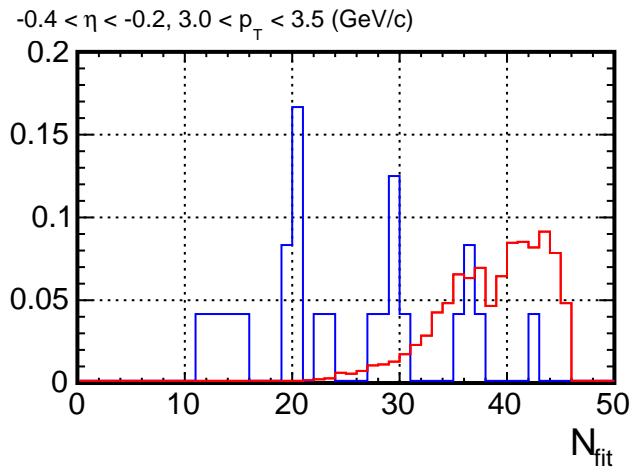
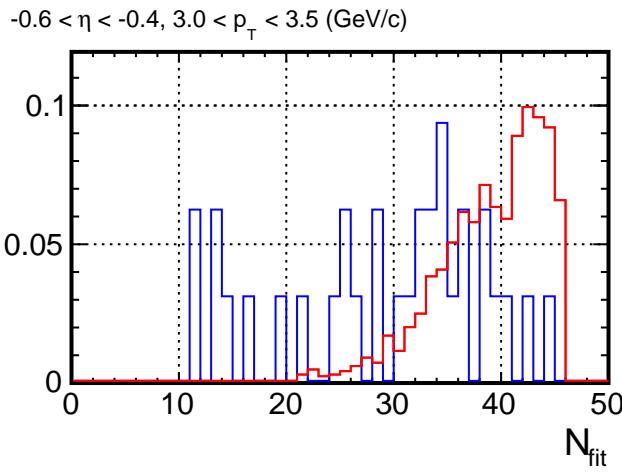
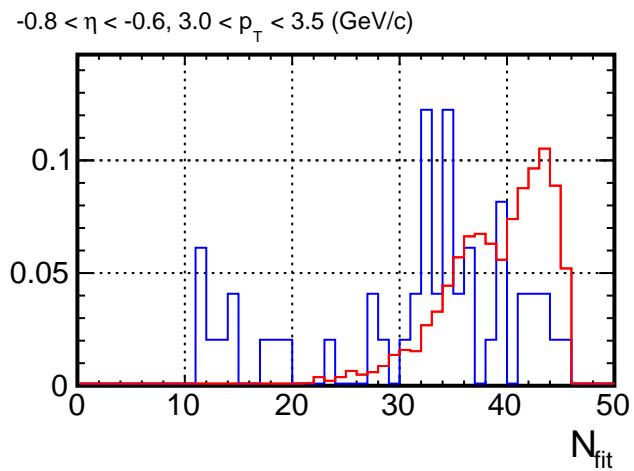
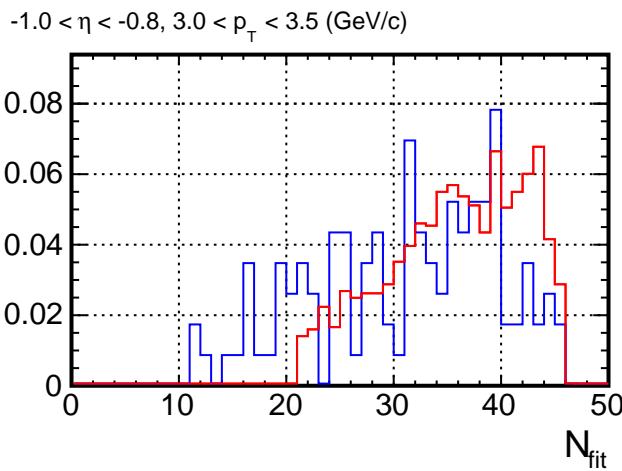
$0.8 < \eta < 1.0, 2.5 < p_T < 3.0$  (GeV/c)



e-  
(MATCHED, geantid=3)

e-  
(PRIMARY, |n σ<sub>e-</sub>|<2 TPC)

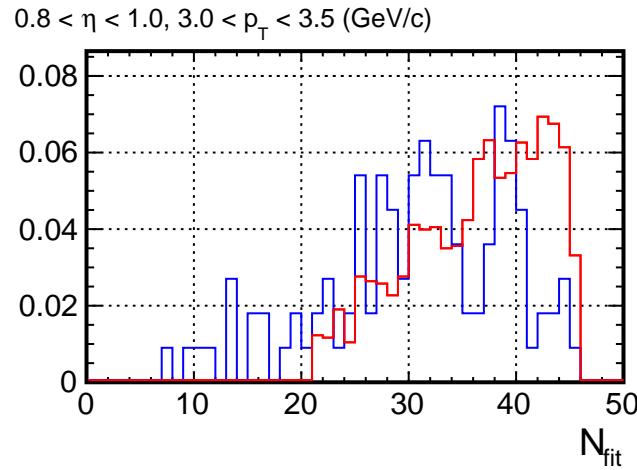
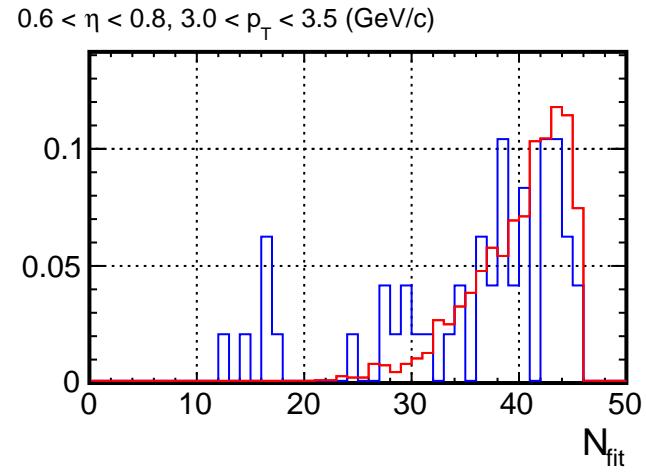
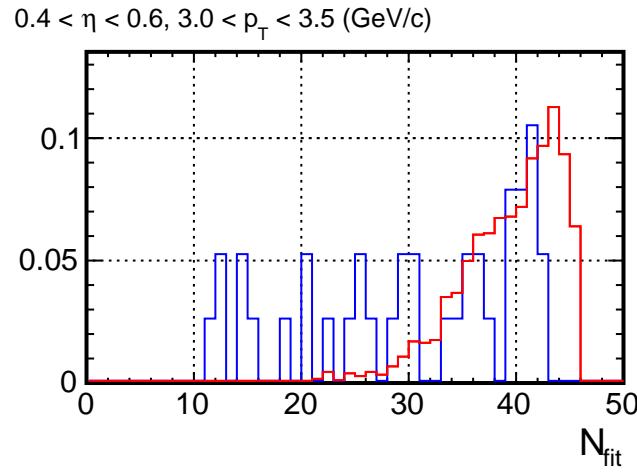
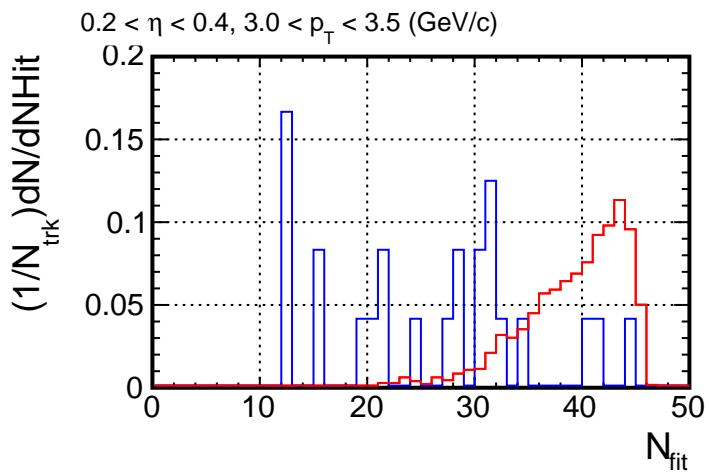
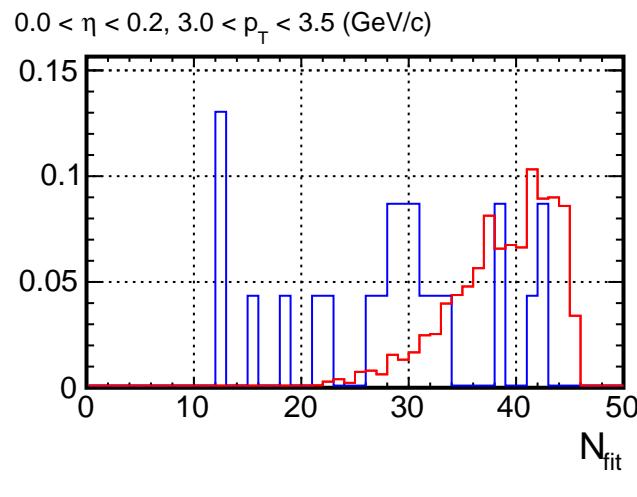
## NHit distribution for ( $p_T$ , $\eta$ ) slices



e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|n\sigma_{e^-}| < 2$  TPC)

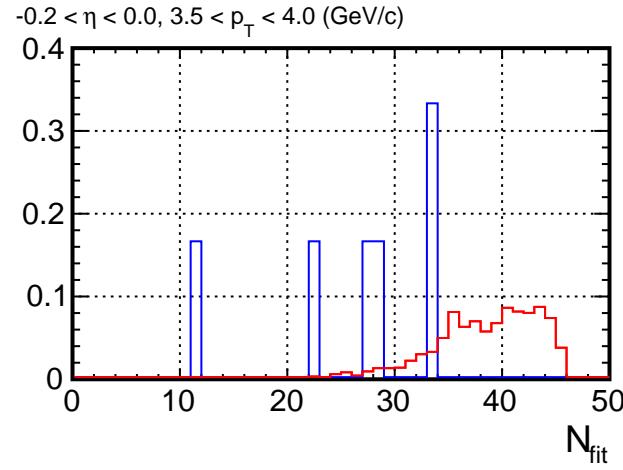
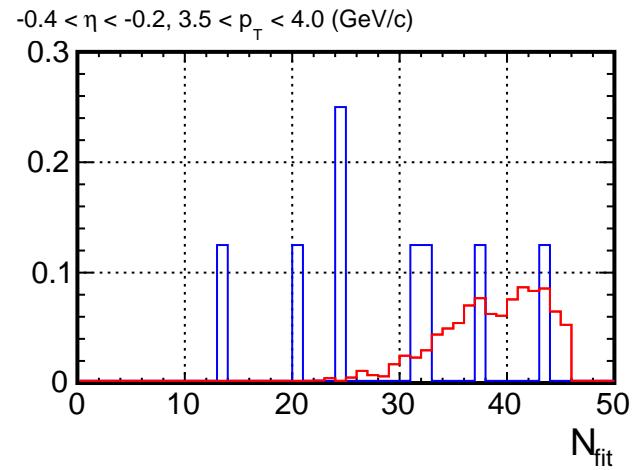
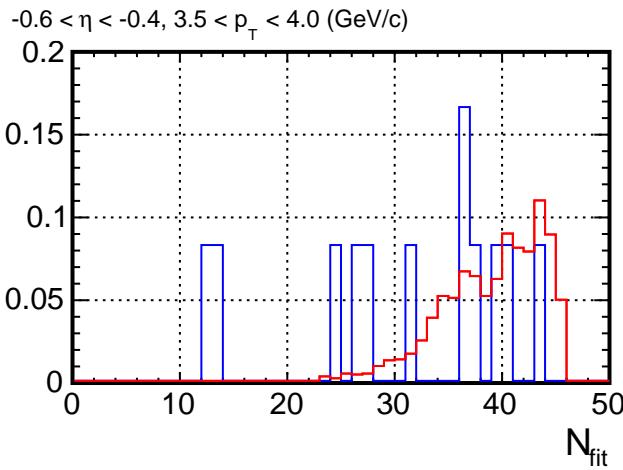
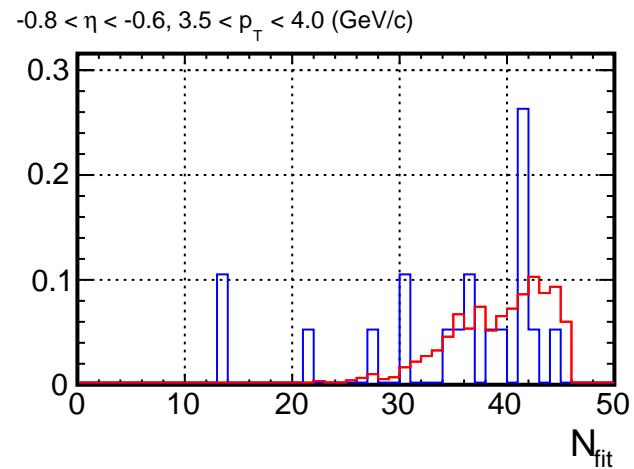
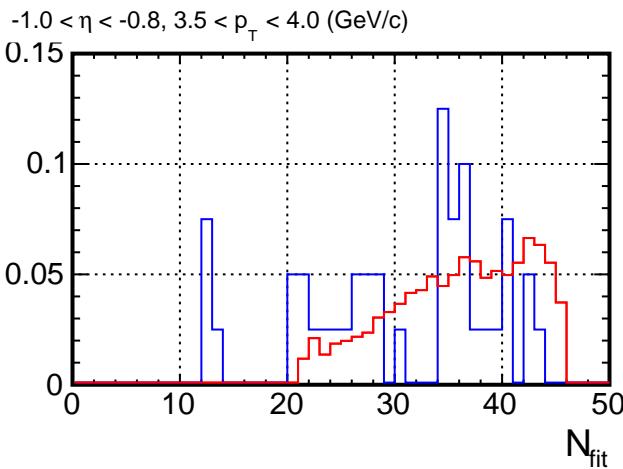
## NHit distribution for ( $p_T$ , $\eta$ ) slices



e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|n \sigma_e| < 2 \text{ TPC}$ )

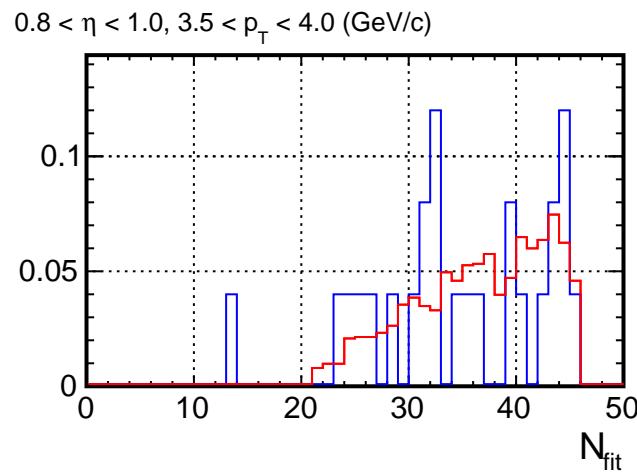
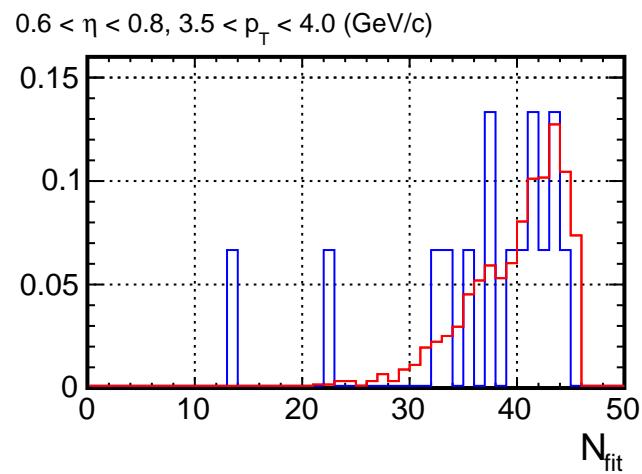
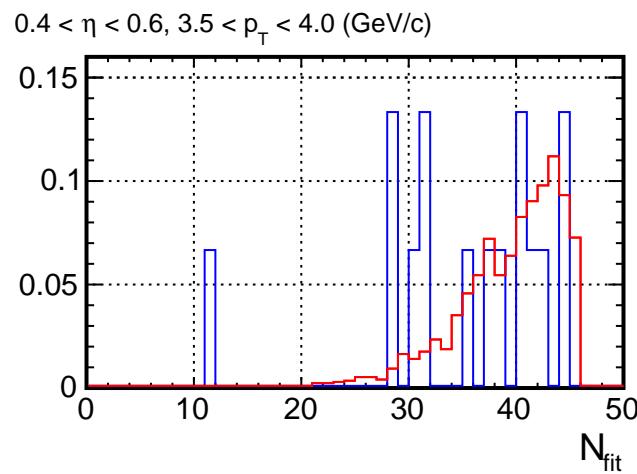
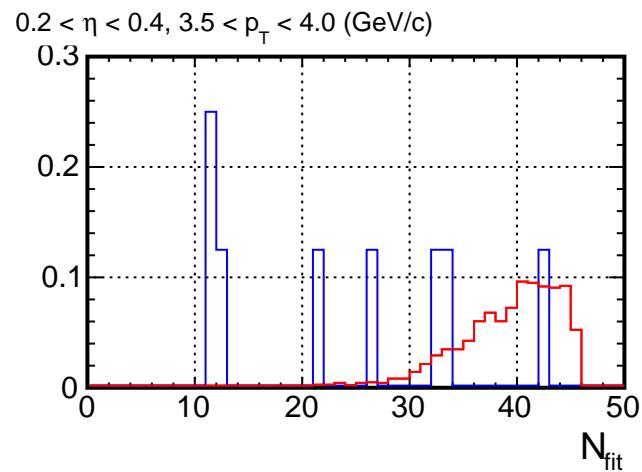
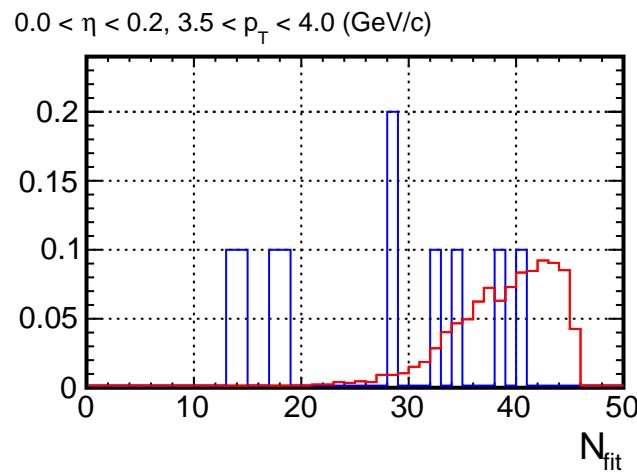
## NHit distribution for ( $p_T$ , $\eta$ ) slices



e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|n \sigma_{e^-}| < 2$  TPC)

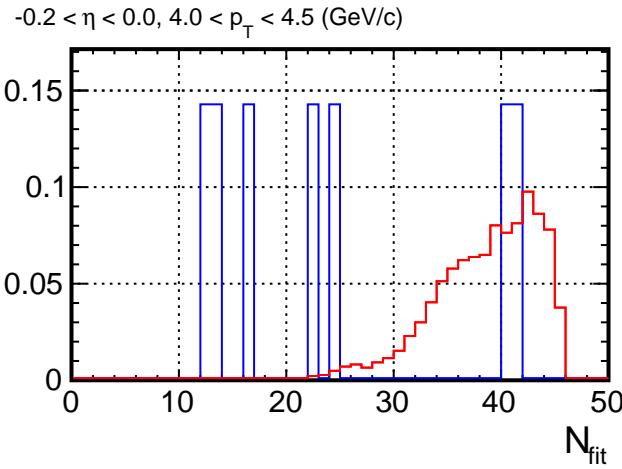
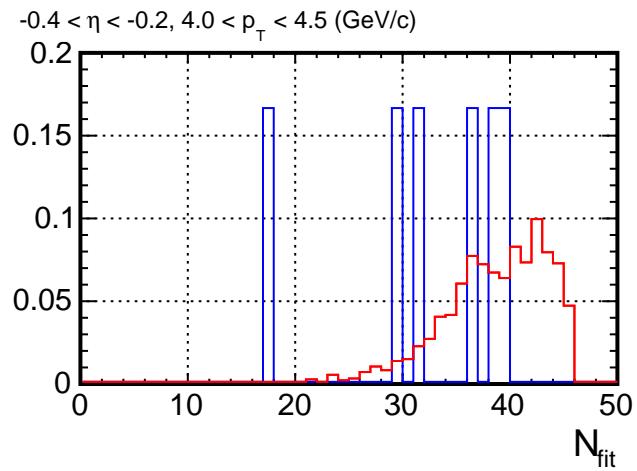
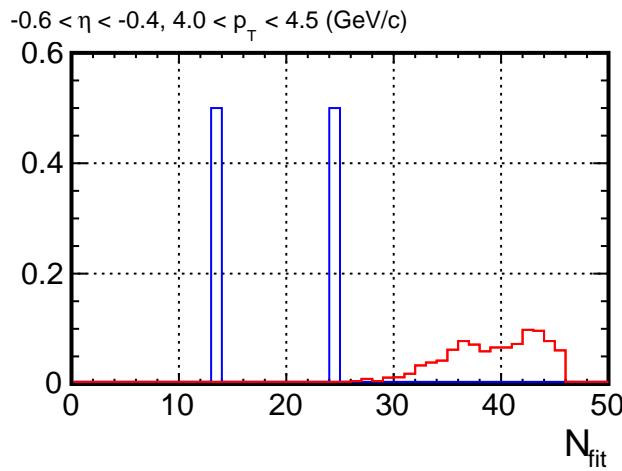
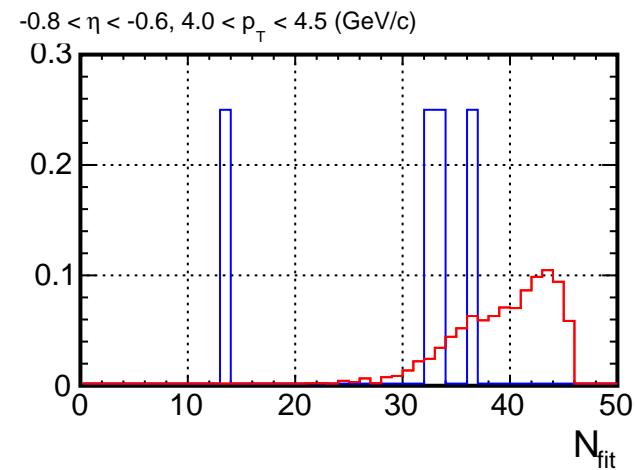
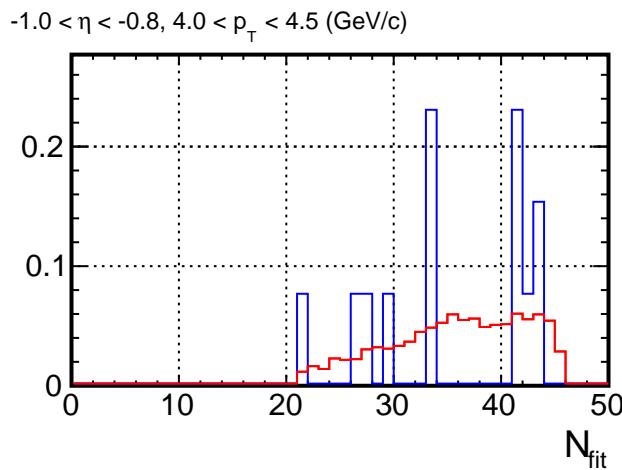
## NHit distribution for ( $p_T$ , $\eta$ ) slices



e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|n\sigma_e| < 2$  TPC)

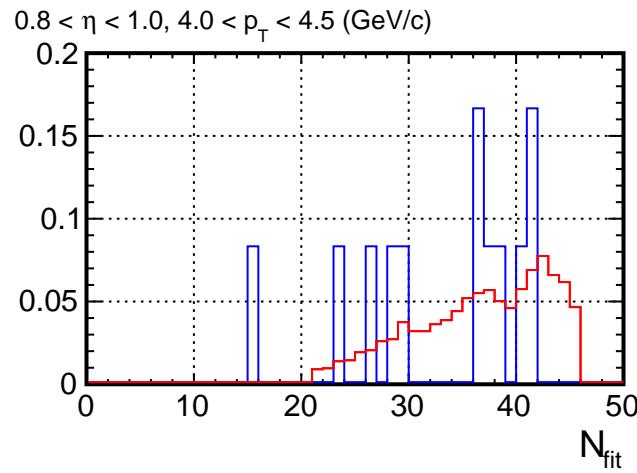
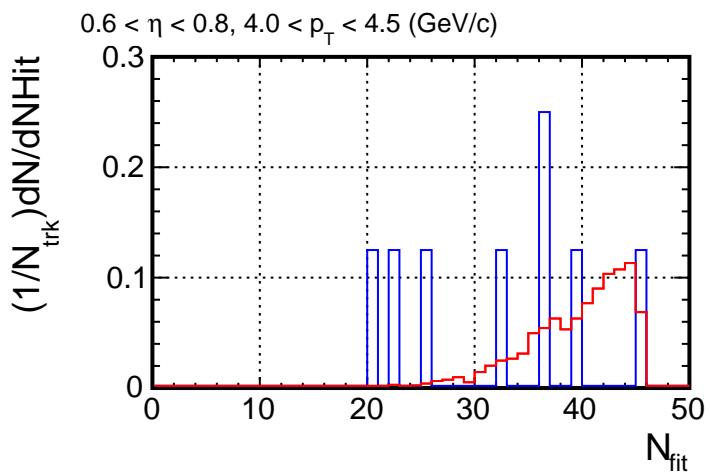
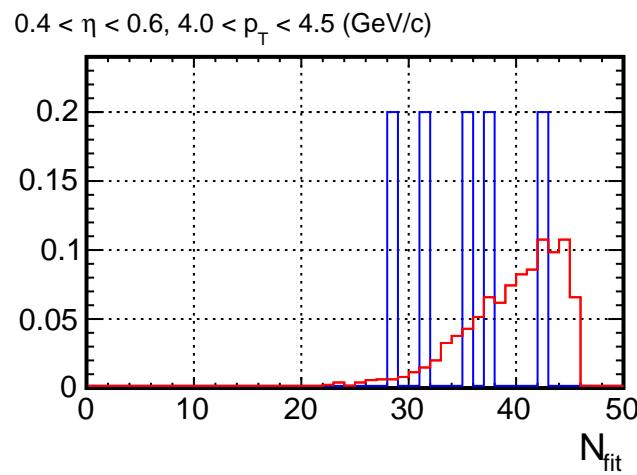
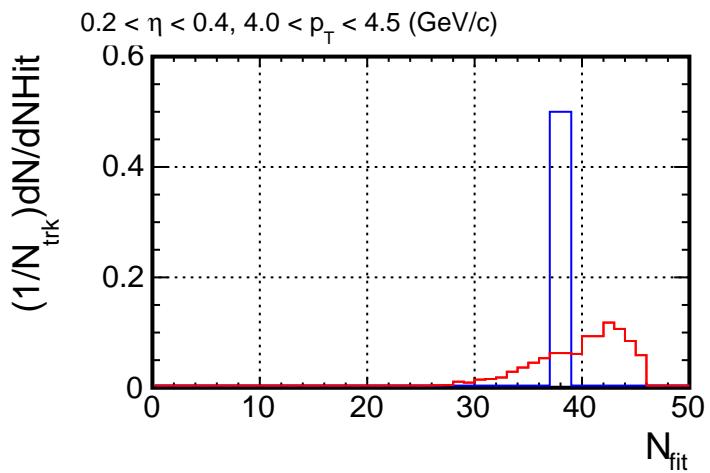
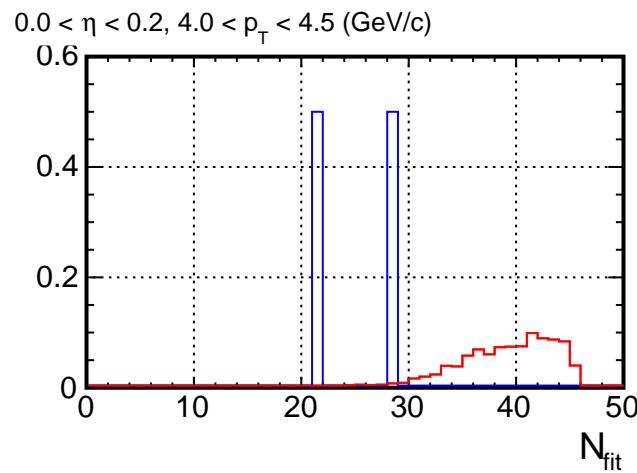
## NHit distribution for ( $p_T$ , $\eta$ ) slices



e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|n\sigma_e| < 2$  TPC)

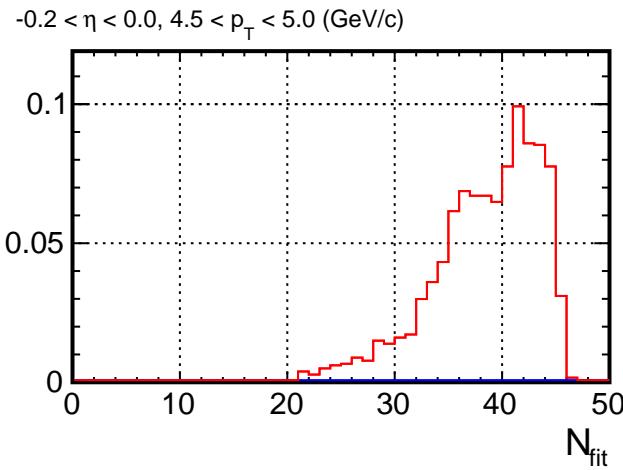
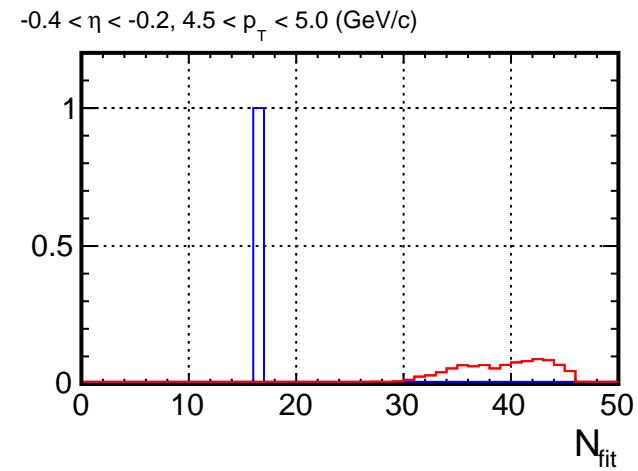
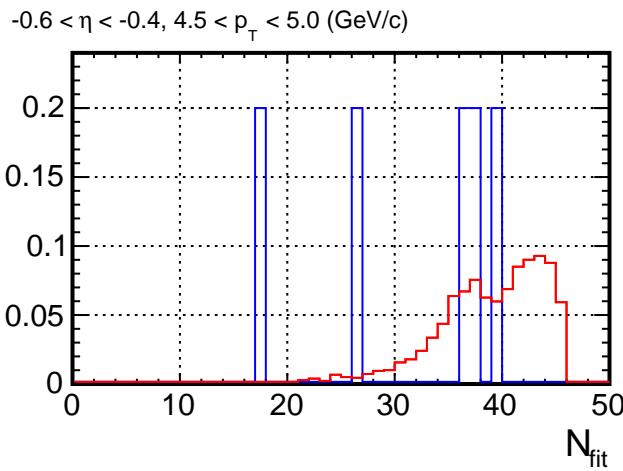
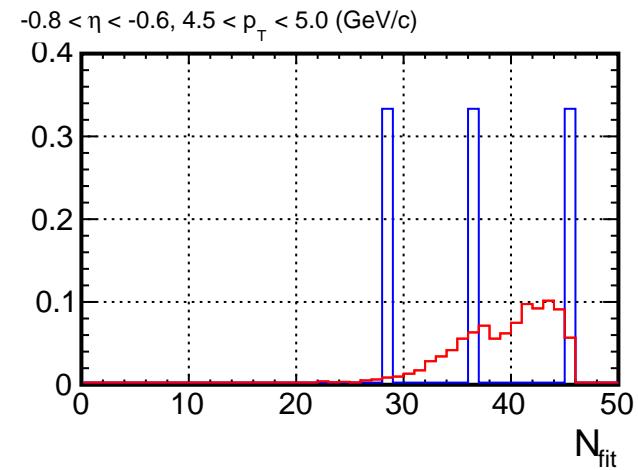
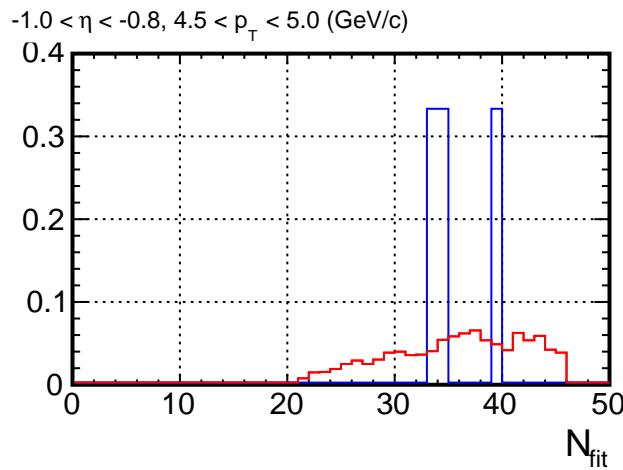
## NHit distribution for ( $p_T$ , $\eta$ ) slices



e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|n \sigma_{e^-}| < 2 \text{ TPC}$ )

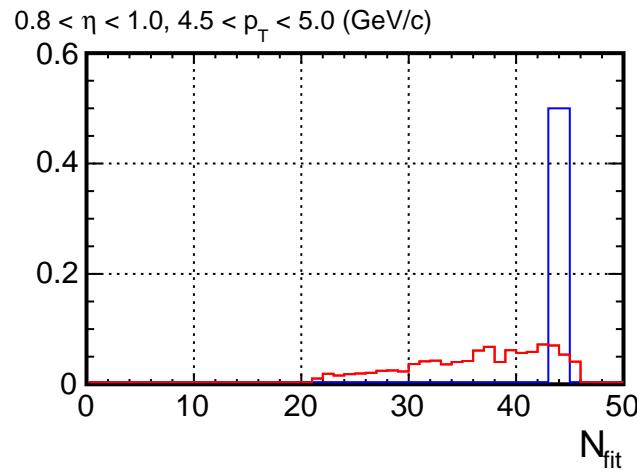
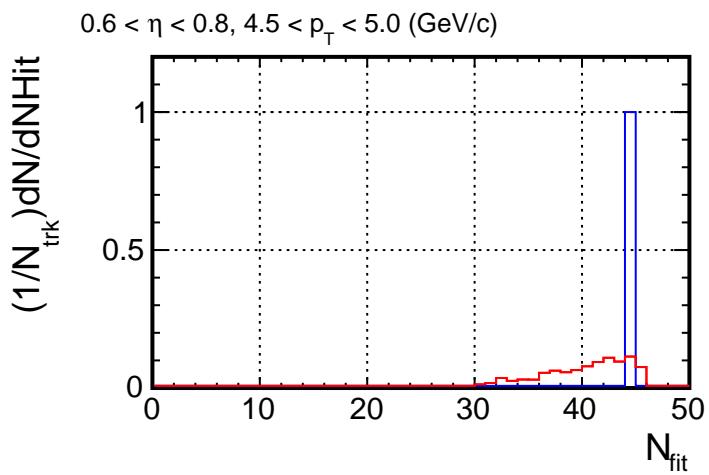
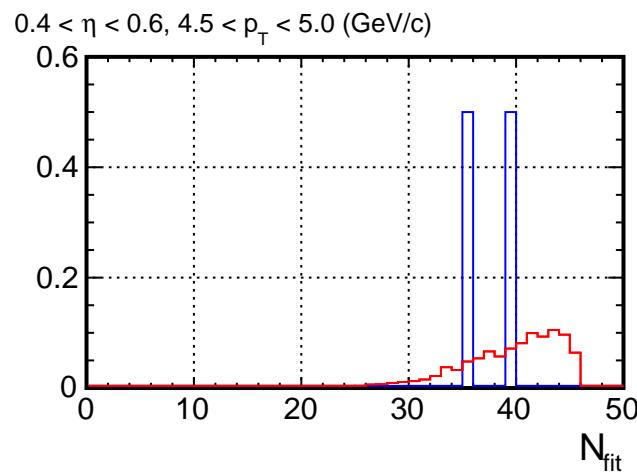
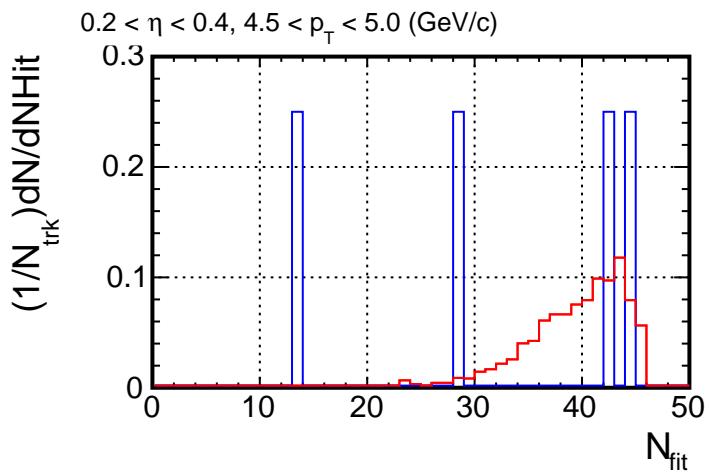
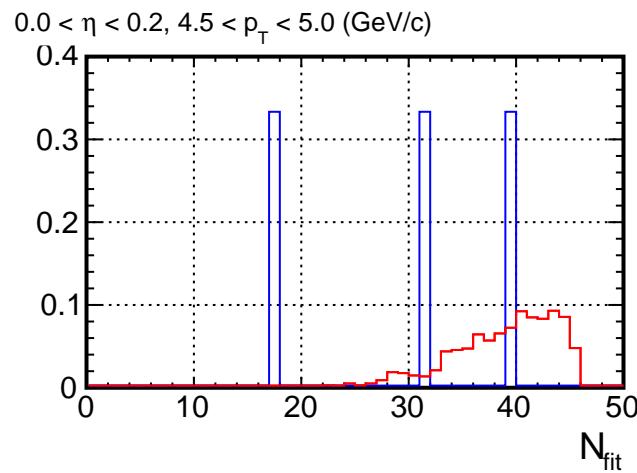
## NHit distribution for ( $p_T$ , $\eta$ ) slices



e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|n\sigma_e| < 2$  TPC)

## NHit distribution for ( $p_T$ , $\eta$ ) slices



e-  
(MATCHED, geantid=3)

e-  
(PRIMARY,  $|n\sigma_{e^-}| < 2 \text{ TPC}$ )

**End of QA**