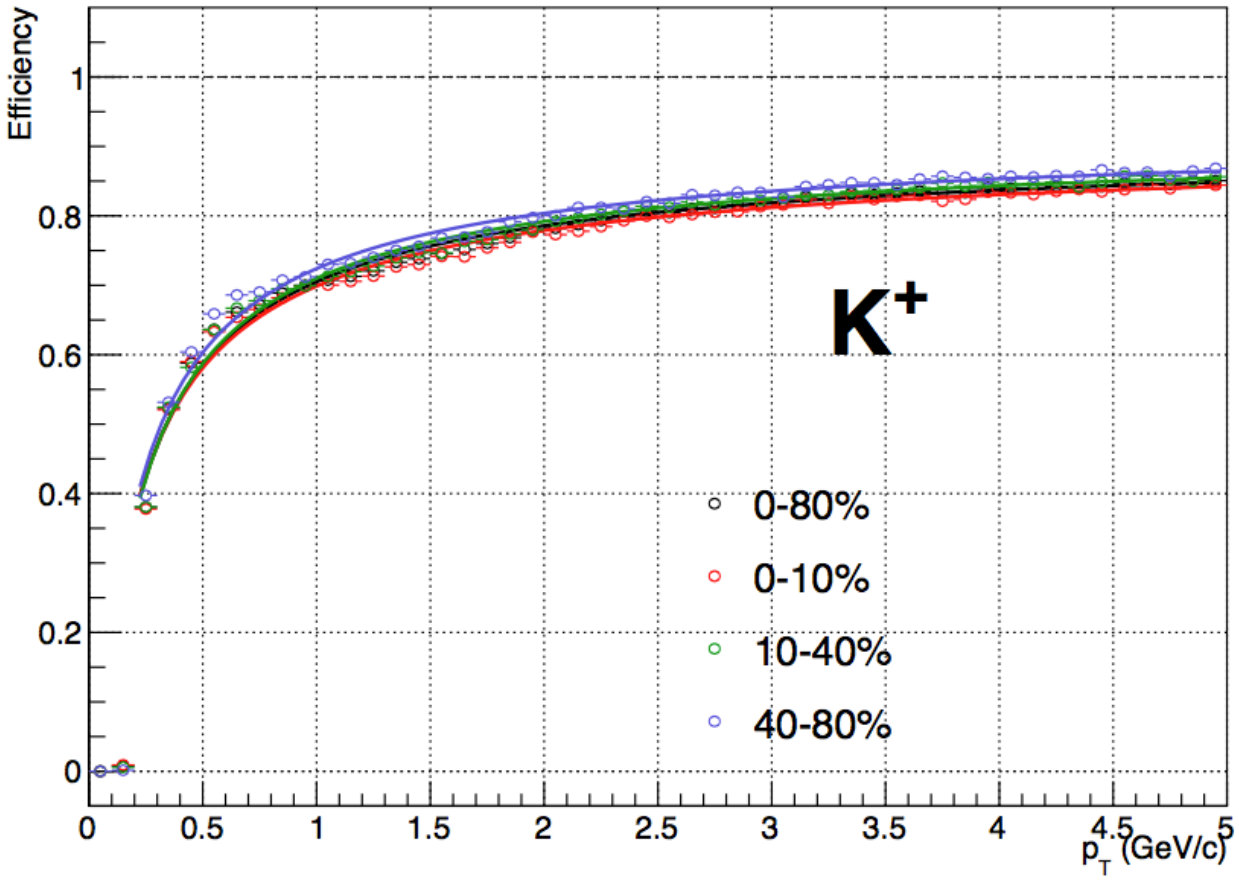
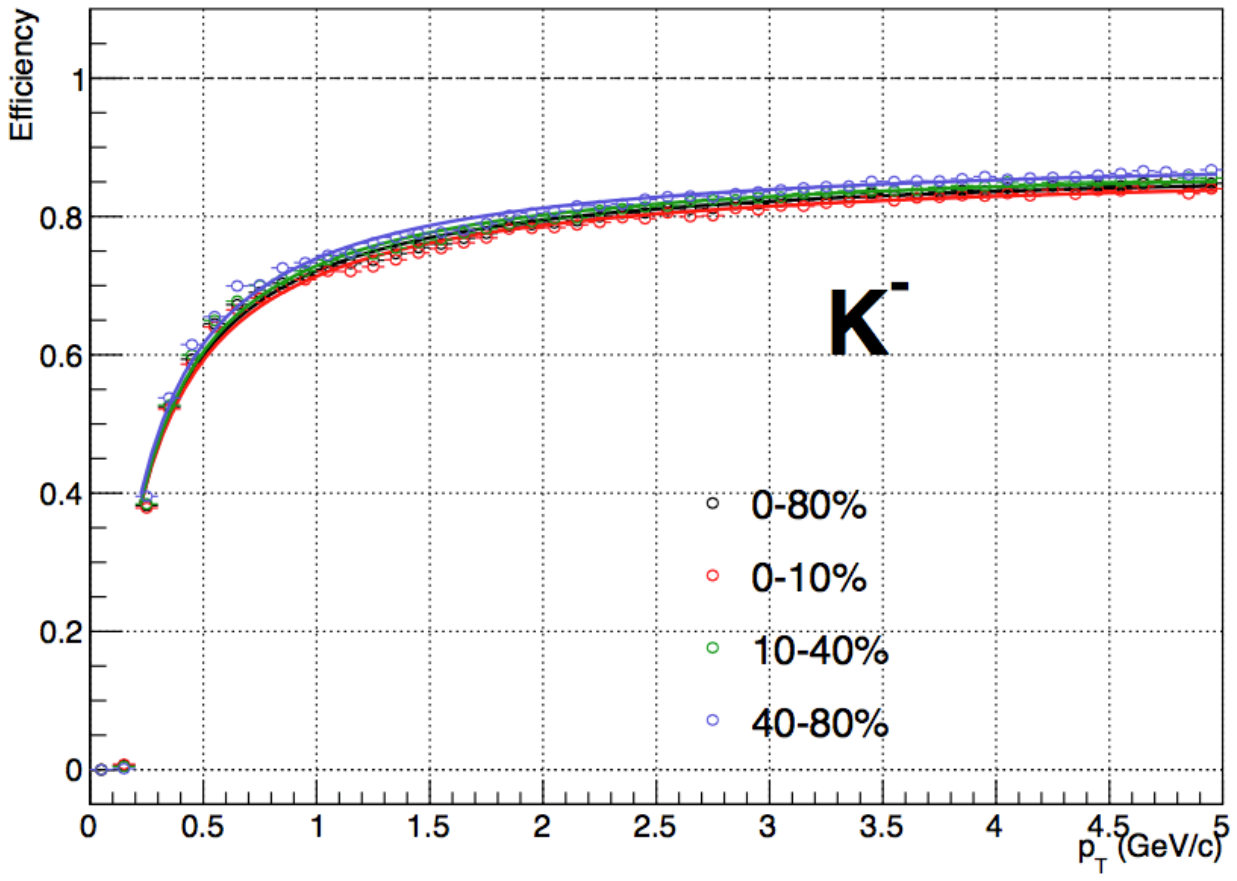
# $D^0$ efficiency and $R_{AA}$ in ZrZr

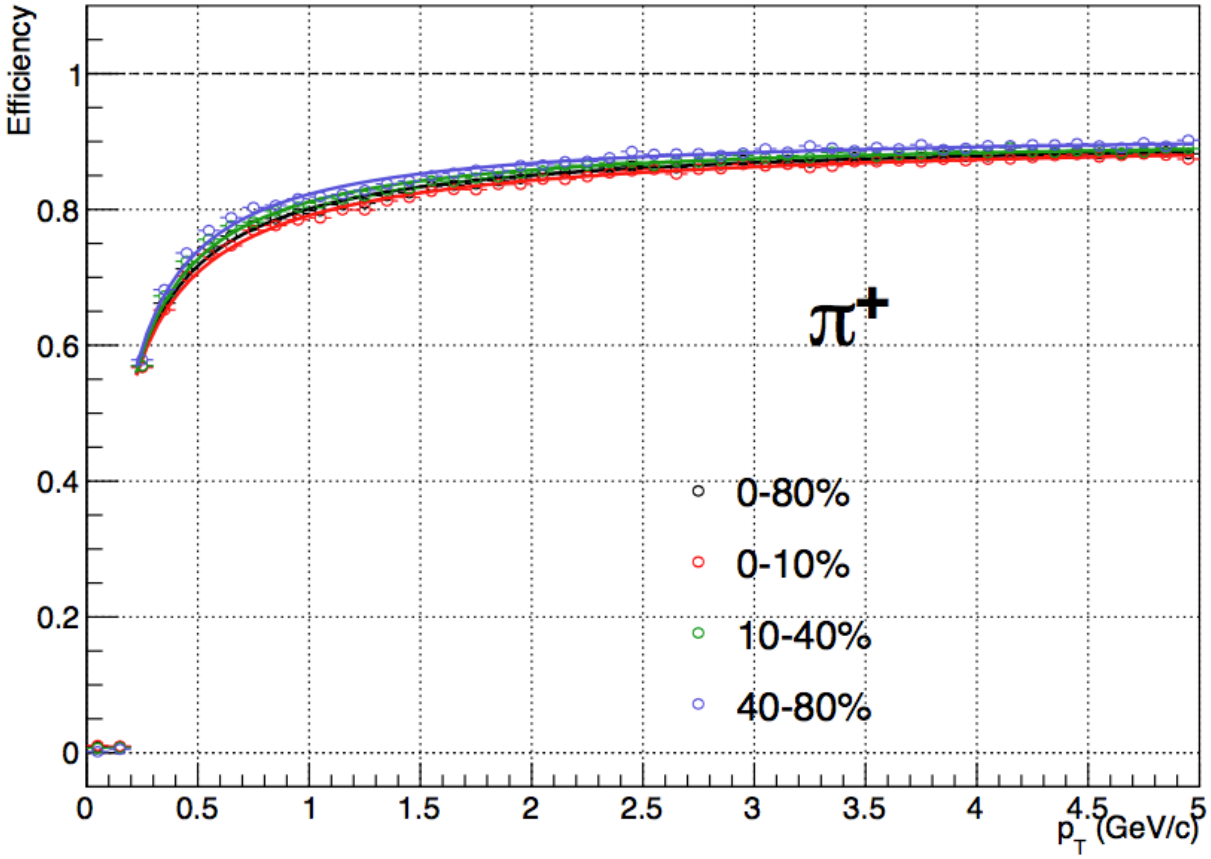
2022.3.21

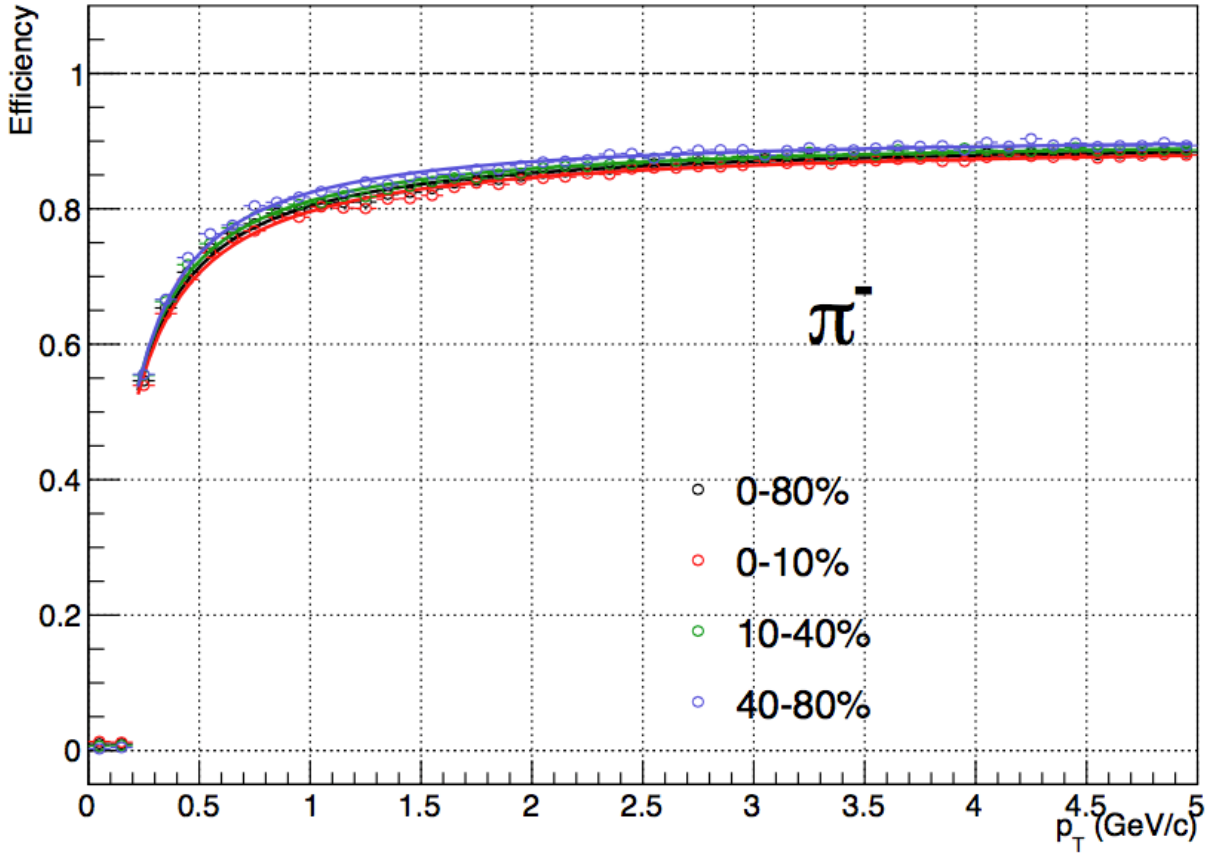
# TPC tracking efficiency



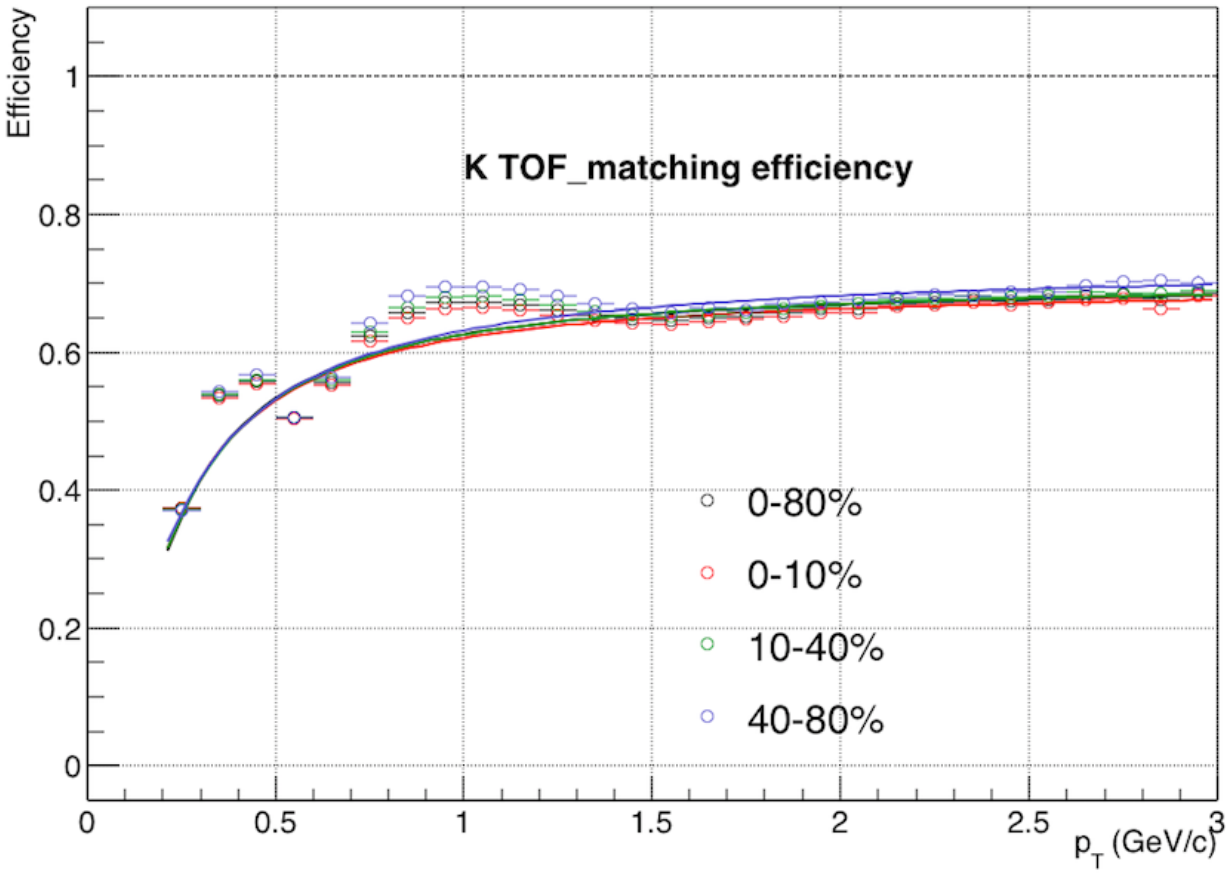



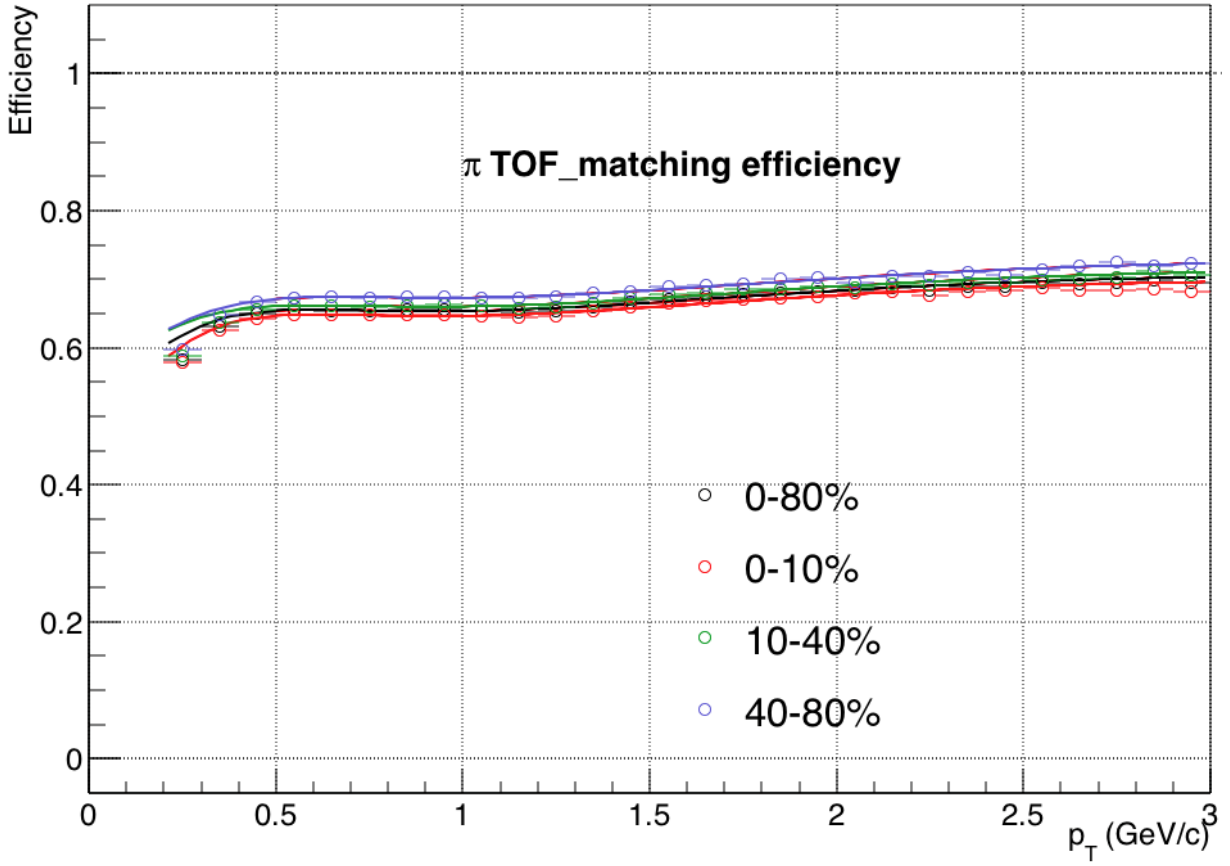
# TPC tracking efficiency



# TOF matching efficiency




TPC $|\eta|$~1, acceptance effect

$p_T$<0.3, minus 0.03

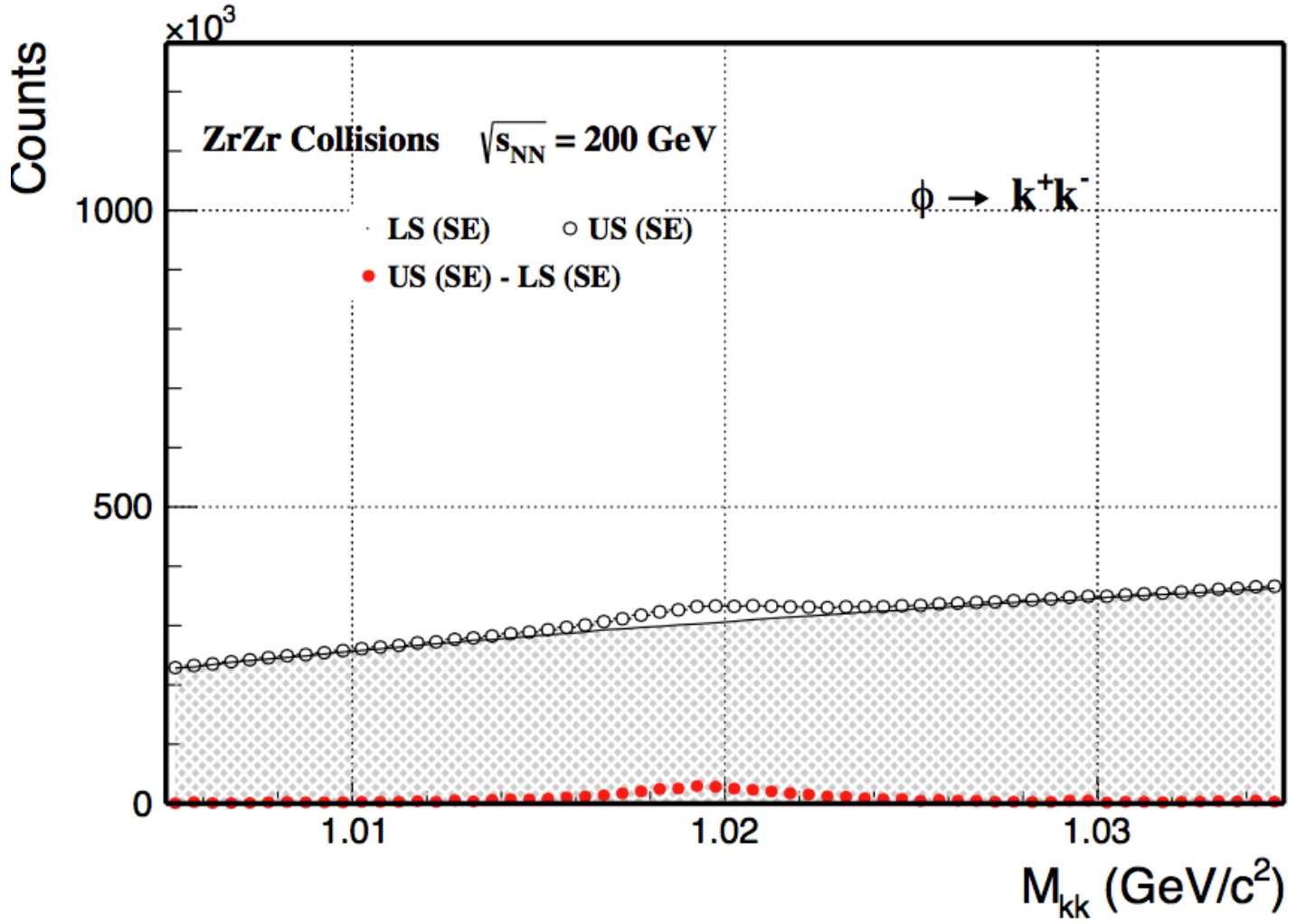
# Kaon PID and efficiency

**Target k**

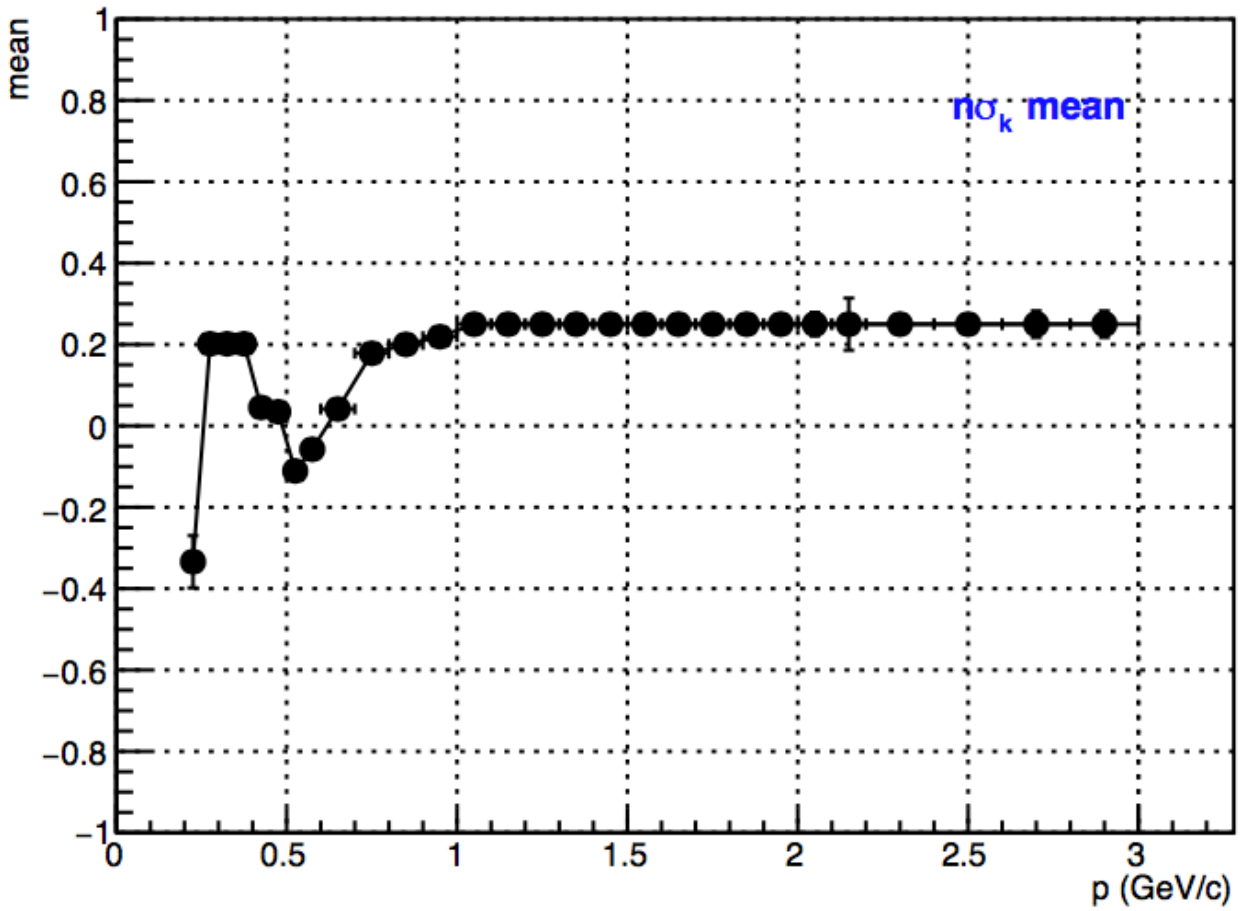
- $p_T > 0.5$
- $|\eta| < 1$
- nHitsFit ≥ 20
- ndEdx > 15
- gDca < 2
- $|n\sigma_\pi| < 2.0$
- $|n\sigma_\pi^{TOF}| < 2.0$

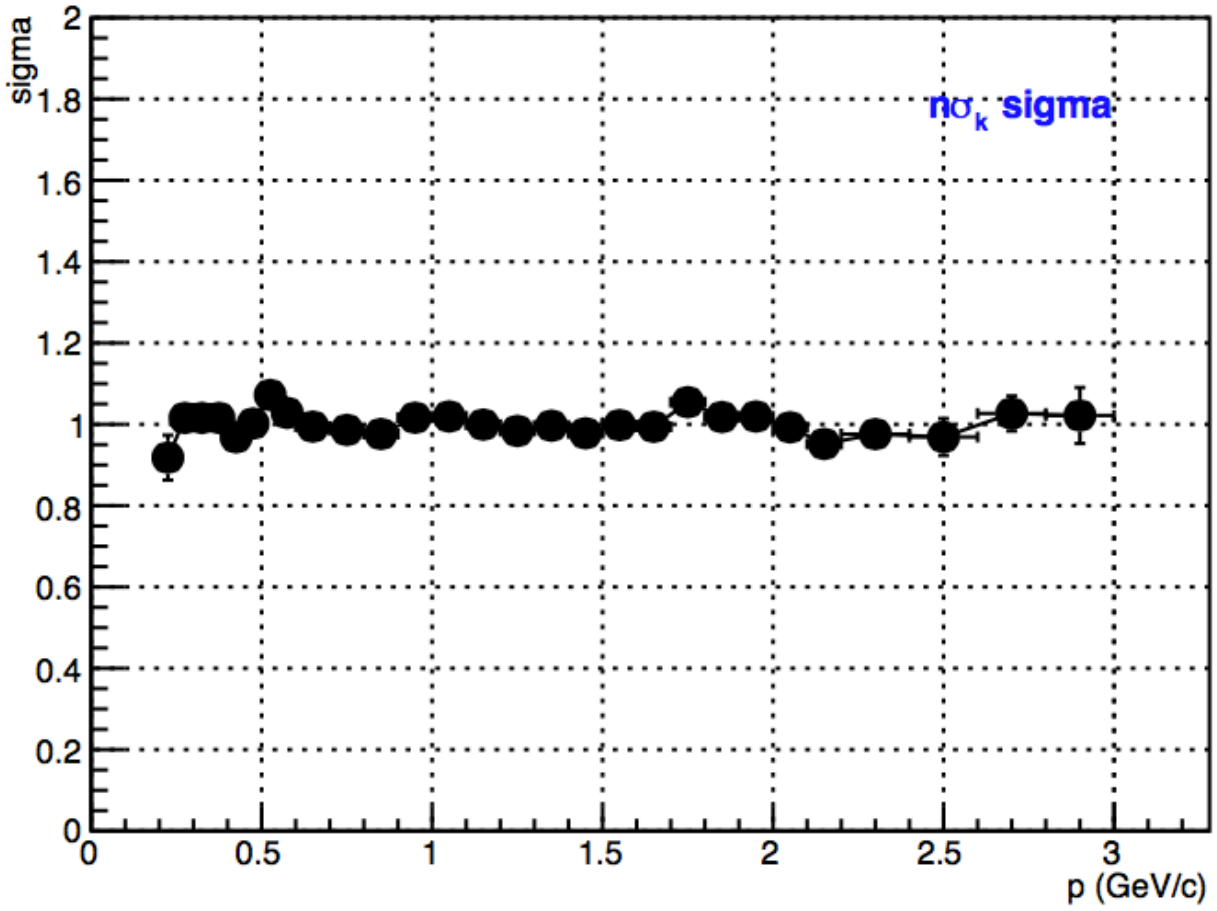
**Partner k**

- $p_T > 0.2$
- $|\eta| < 1$
- nHitsFit ≥ 20
- ndEdx > 15
- gDca < 2.
- $|n\sigma_\pi| < 4.0$
- $|n\sigma_\pi^{TOF}| < 4.0$

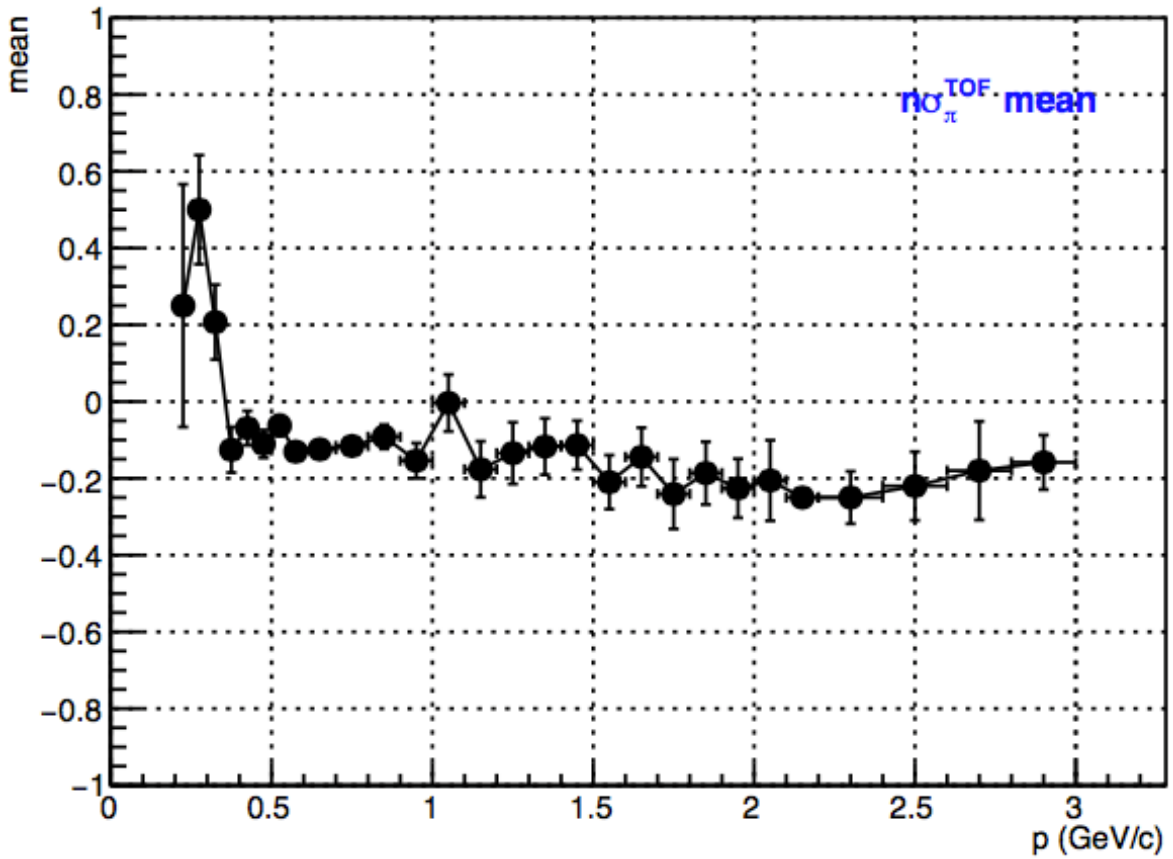


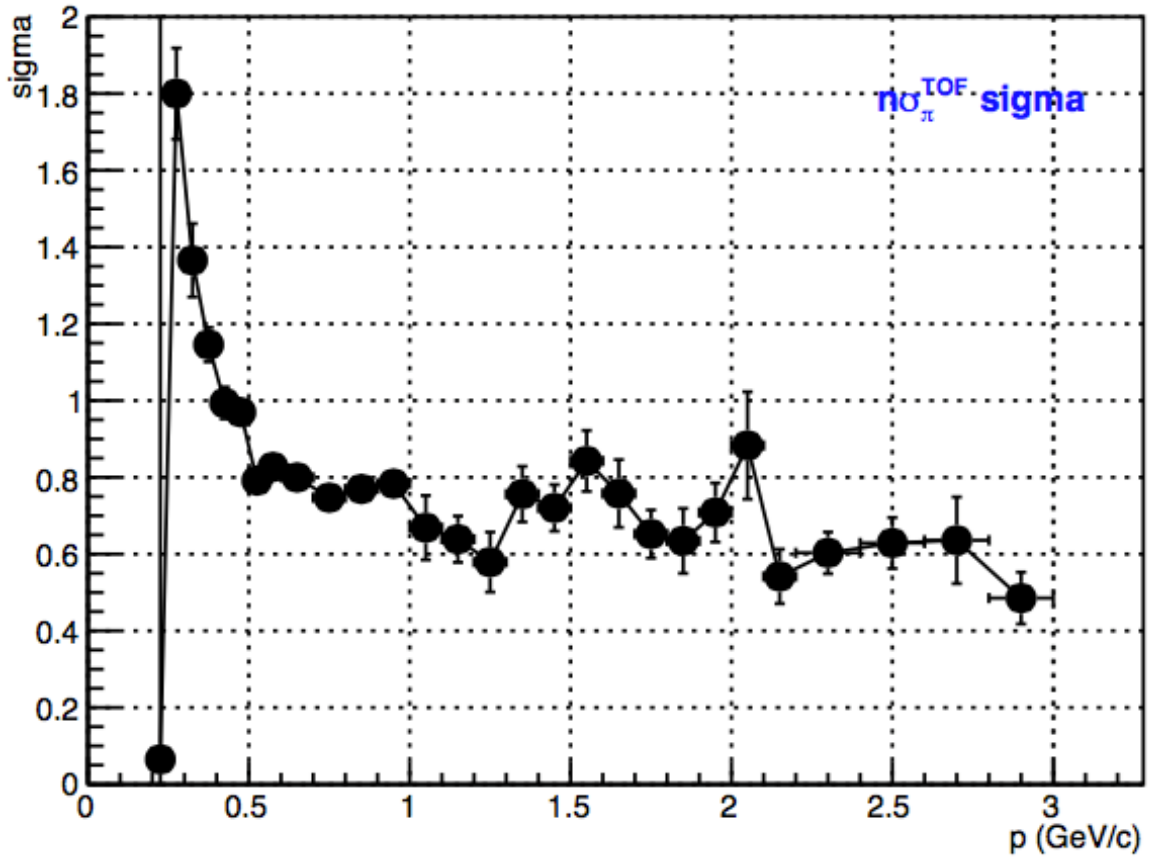
# Kaon PID and efficiency



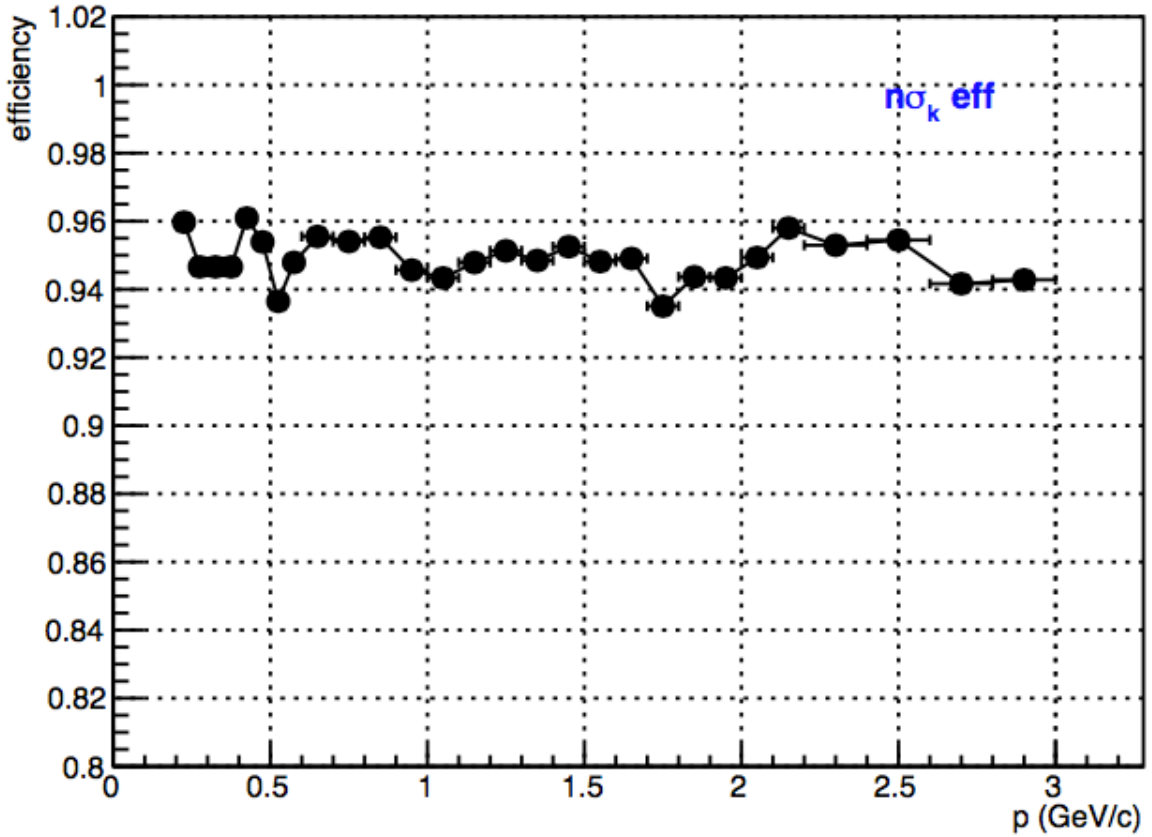



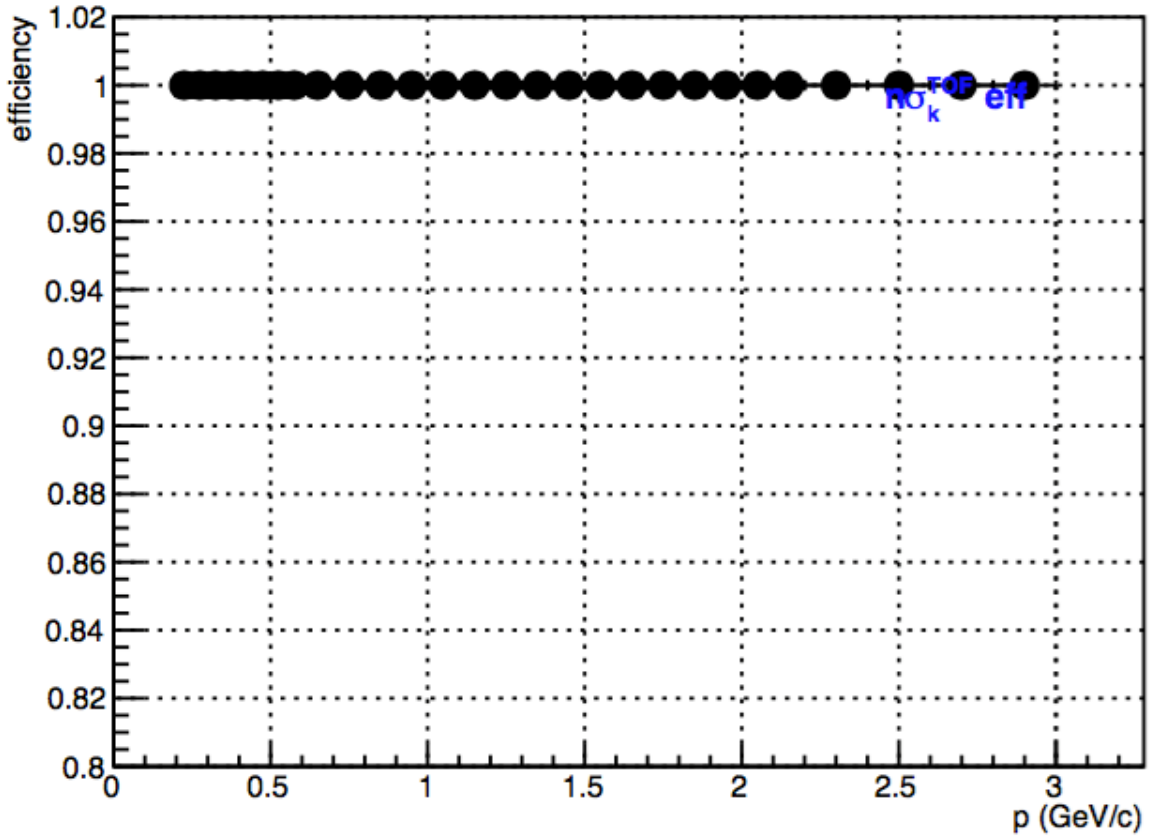
# Kaon PID and efficiency



# Kaon PID and efficiency



# Pion PID and efficiency

**Target $\pi$**

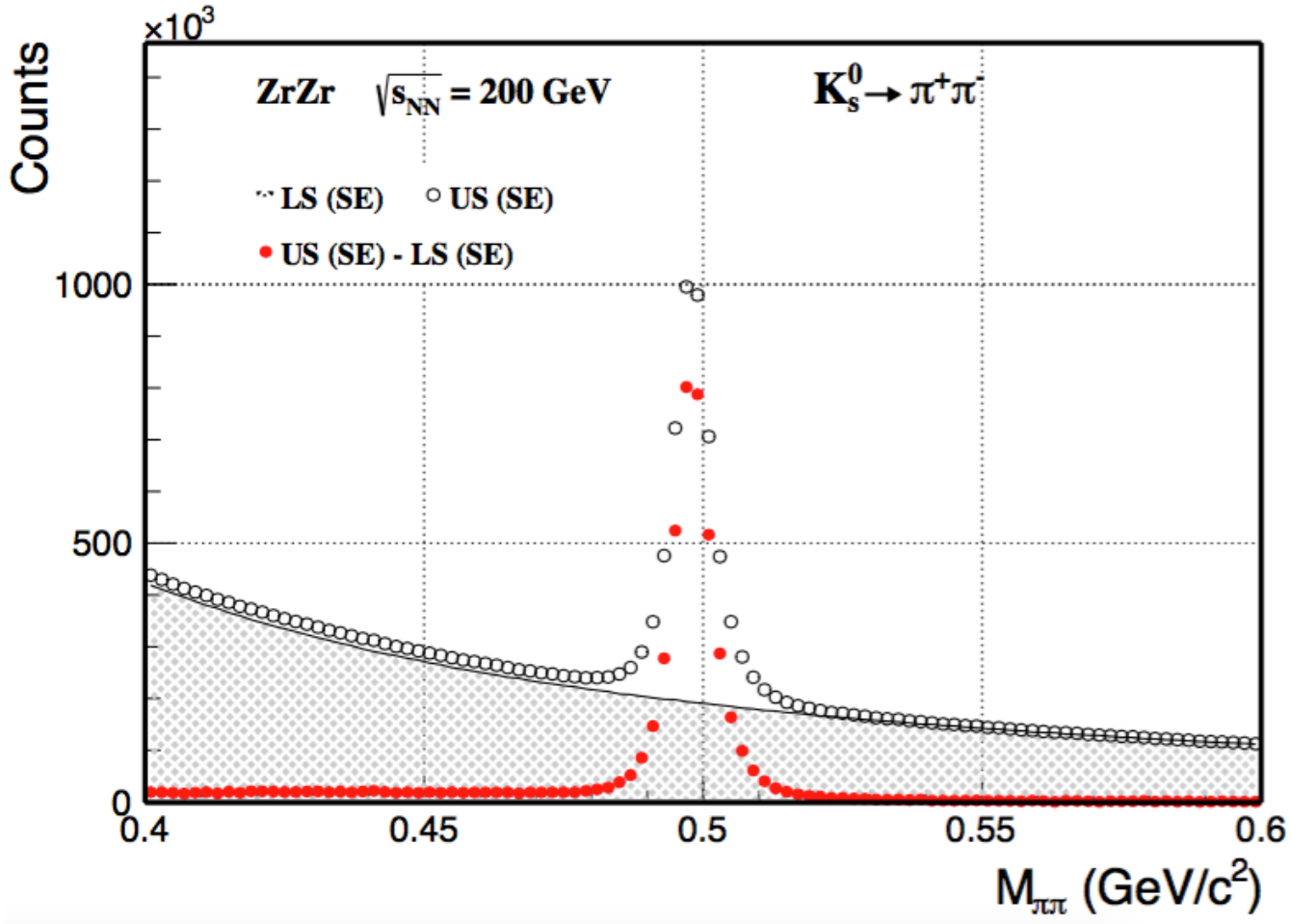
- $p_T > 0.5$
- $|\eta| < 1$
- nHitsFit $\geq 20$
- ndEdx > 15
- gDca > 0.1
- $|n\sigma_\pi| < 2.0$
- $|n\sigma_\pi^{TOF}| < 2.0$

**Partner $\pi$**

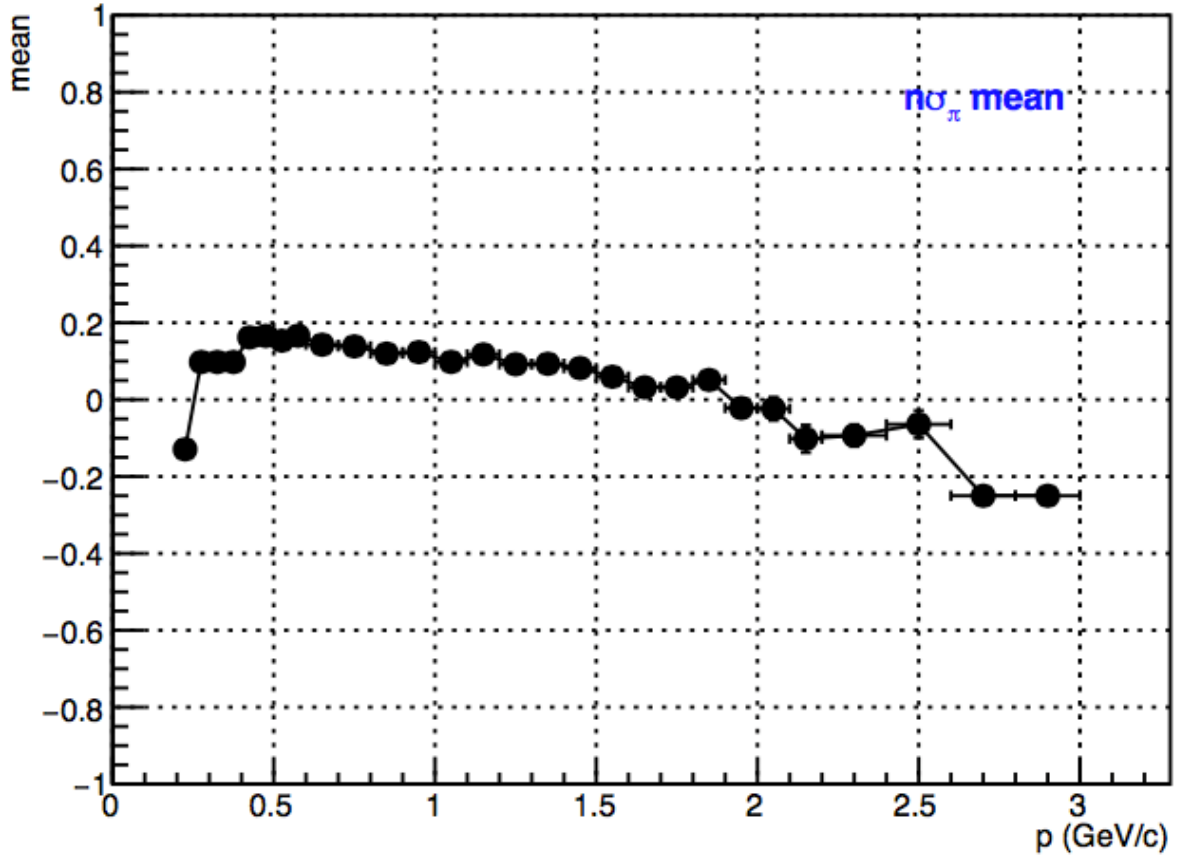
- $p_T > 0.2$
- $|\eta| < 1$
- nHitsFit $\geq 20$
- ndEdx > 15
- gDca > 0.1
- $|n\sigma_\pi| < 4.0$
- $|n\sigma_\pi^{TOF}| < 4.0$

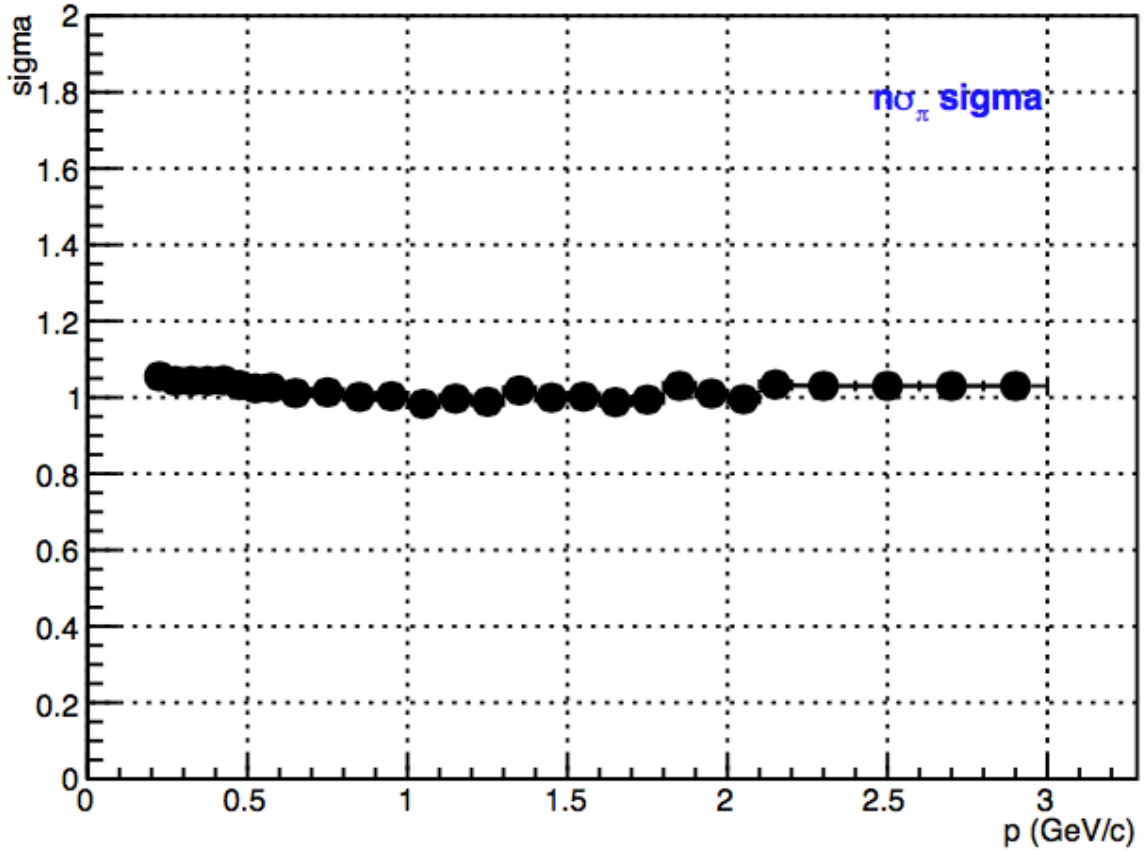
**$k_s^0$ reconstruction cuts:**

- 0.5 < DecayL < 25
- Dca < 0.4
- pairDca < 0.5
- $\cos\theta > 0.999$

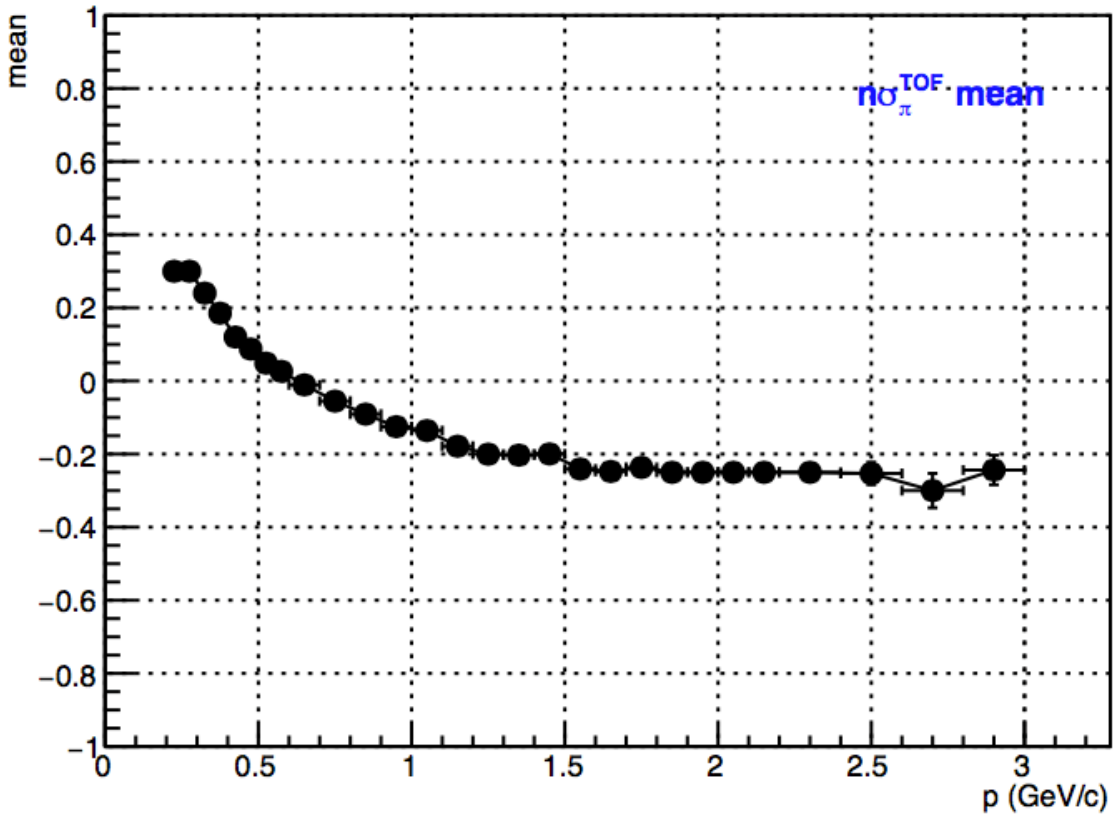


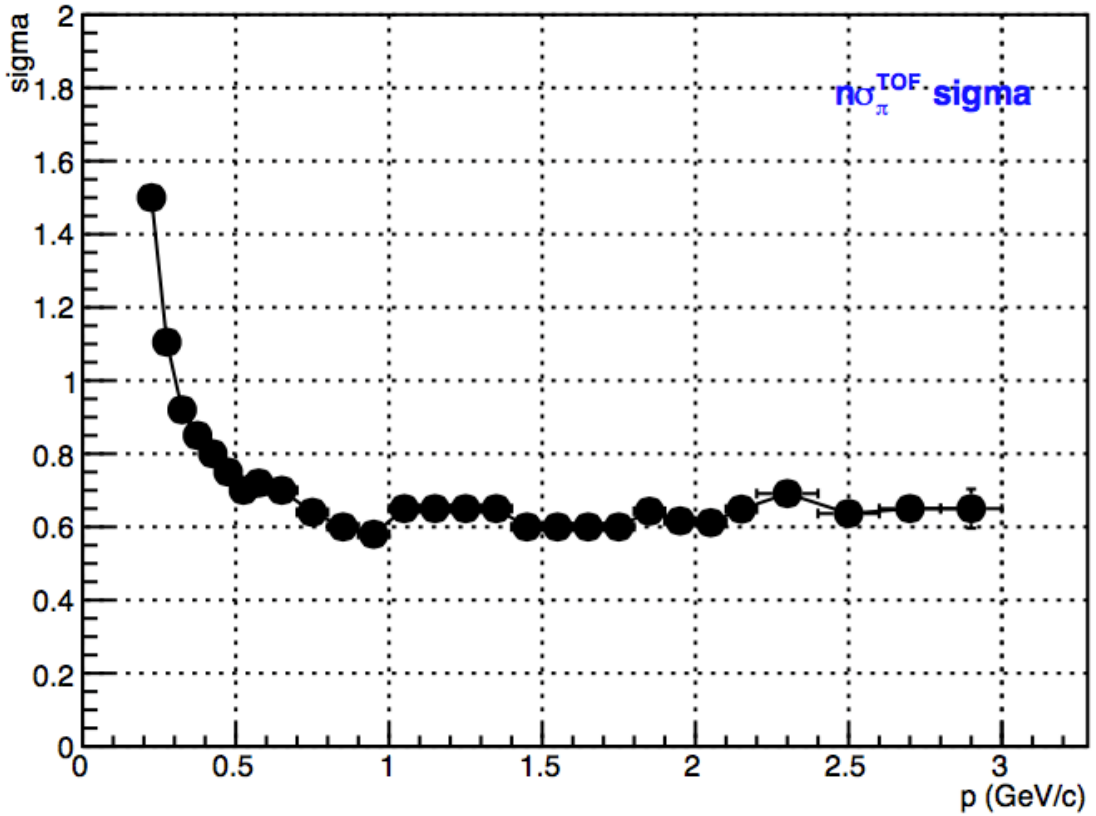
# Pion PID and efficiency



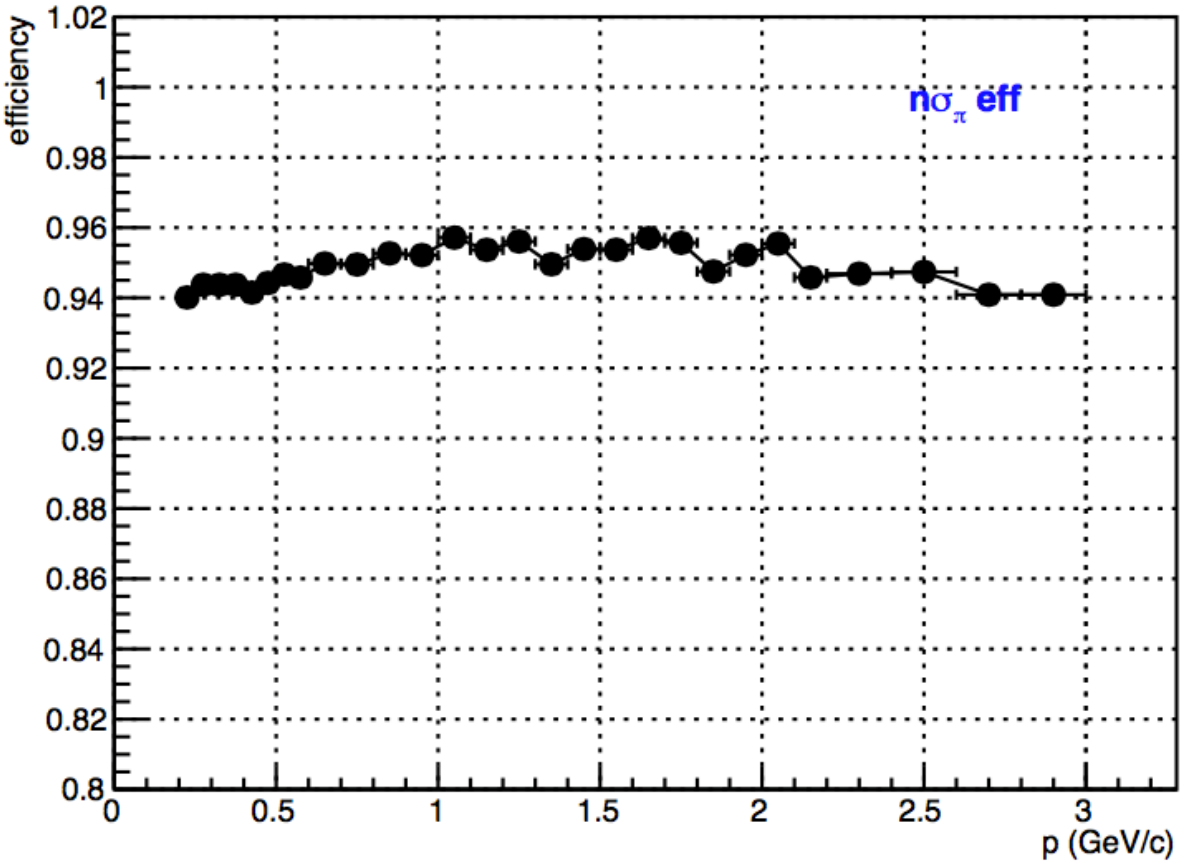



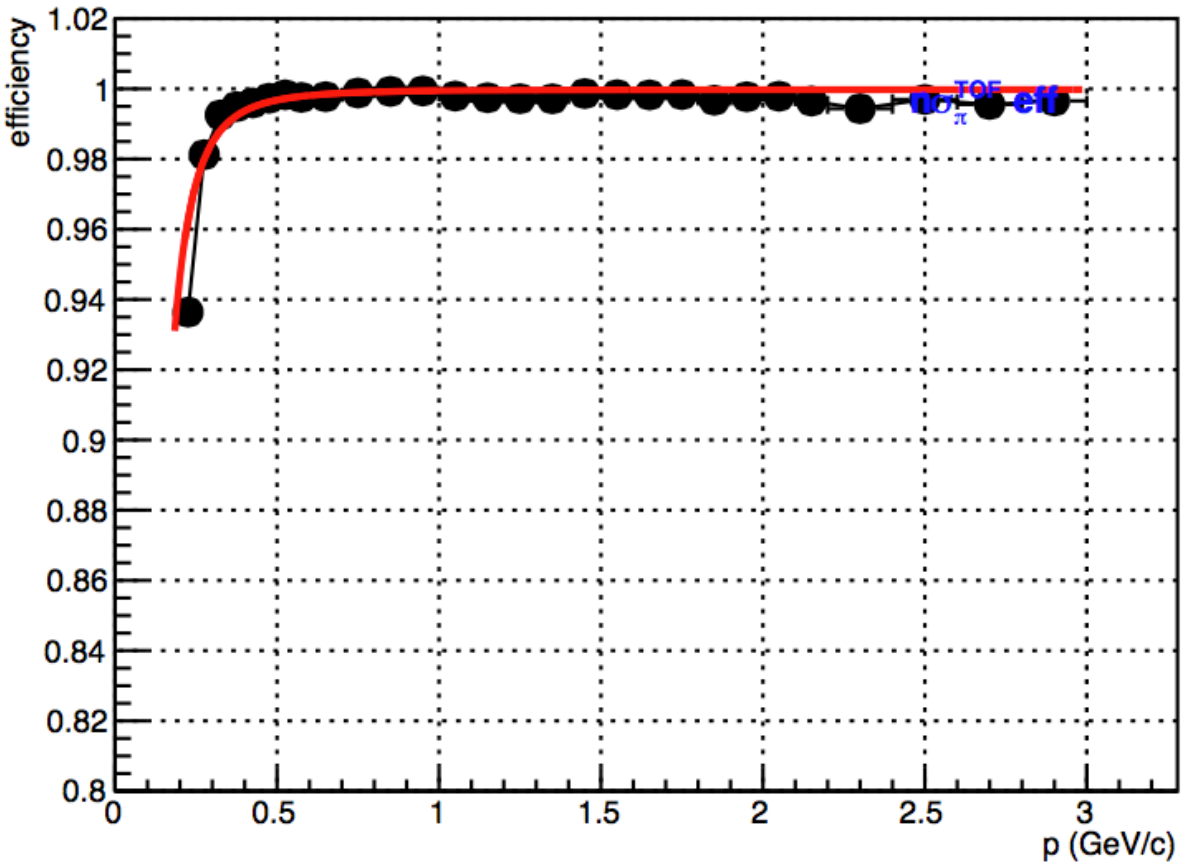
# Pion PID and efficiency



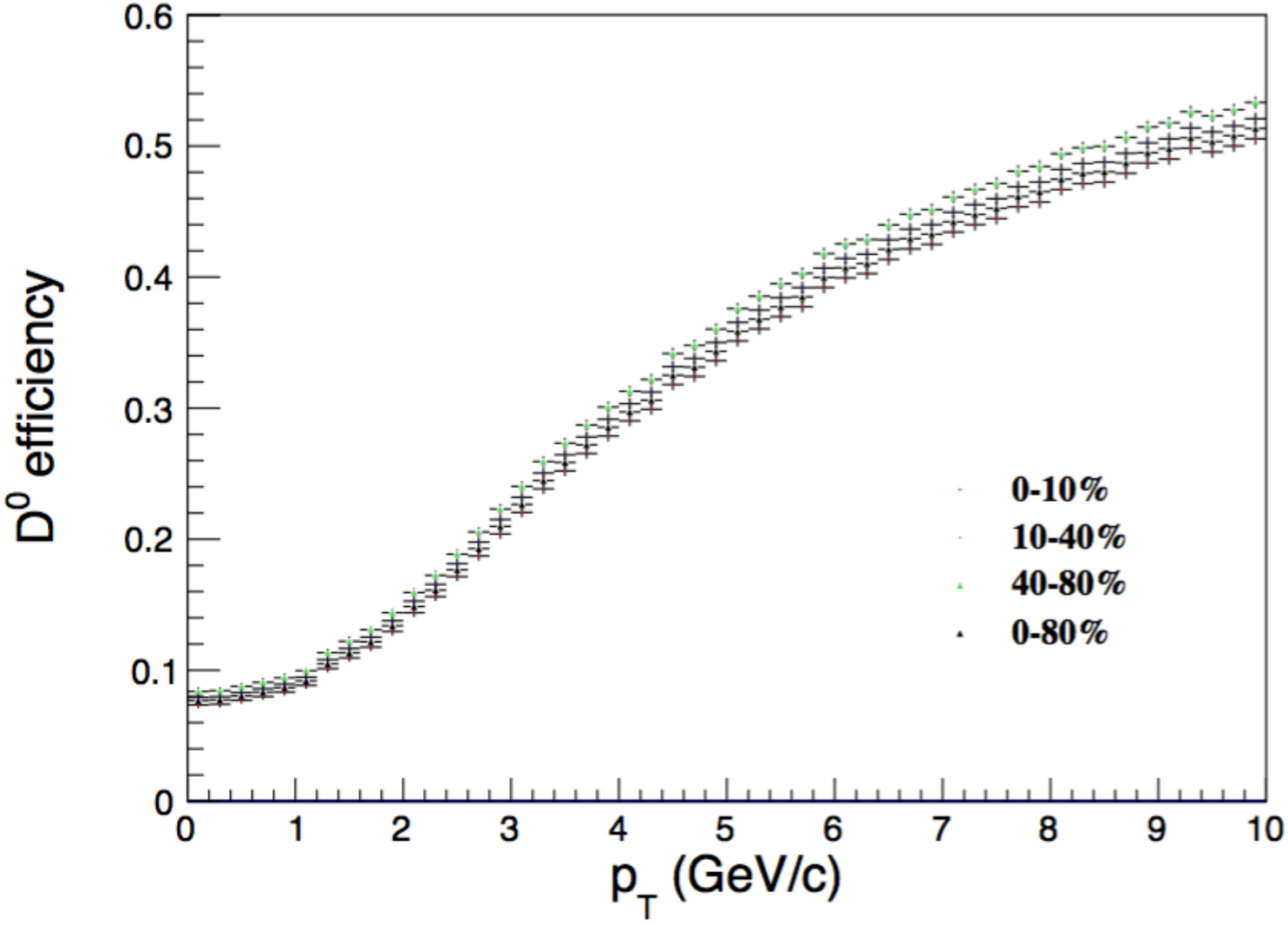



# Pion PID and efficiency

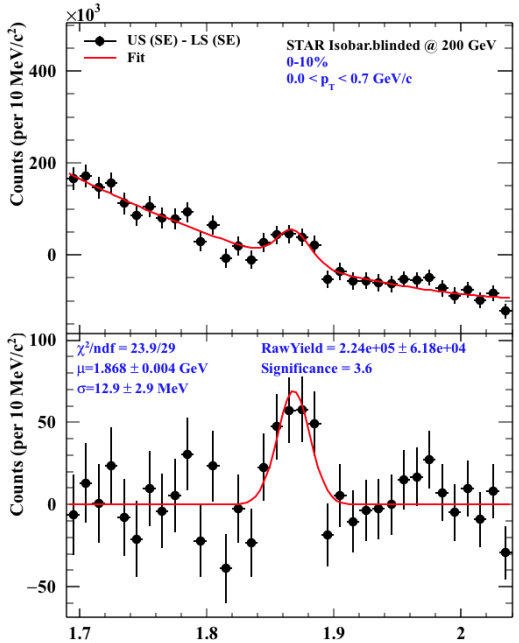


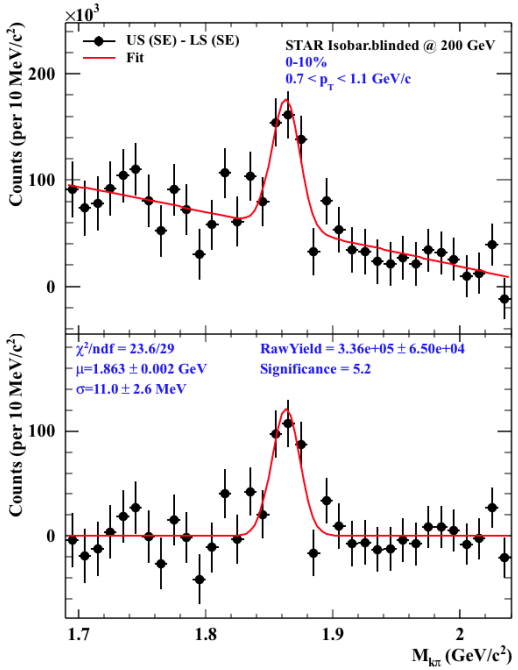



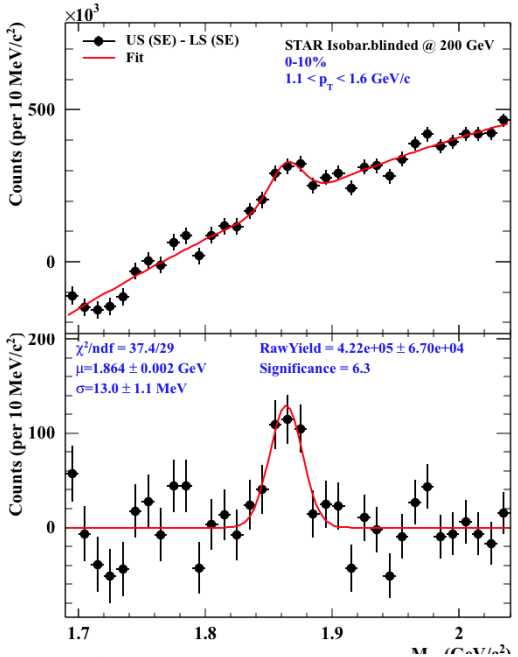
# $D^0$efficiency

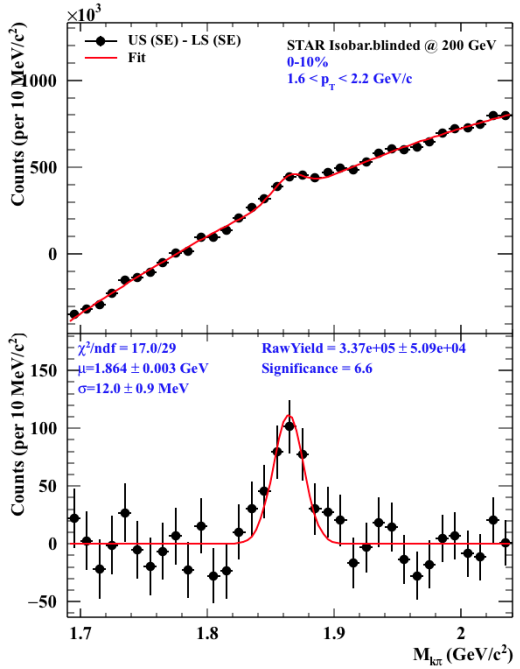


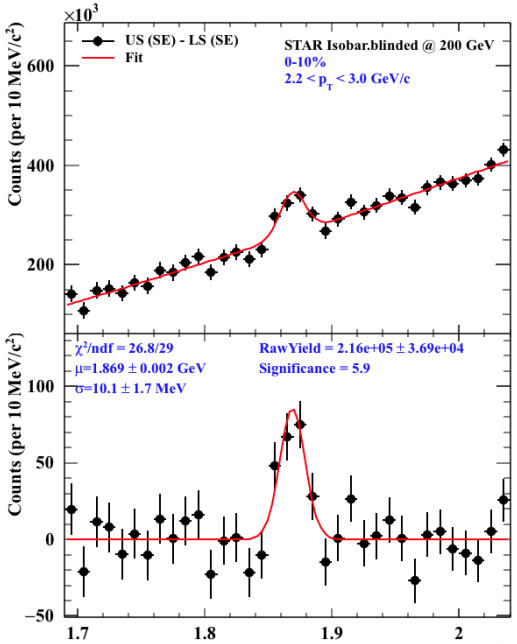
# $D^0$ production at 0-10%

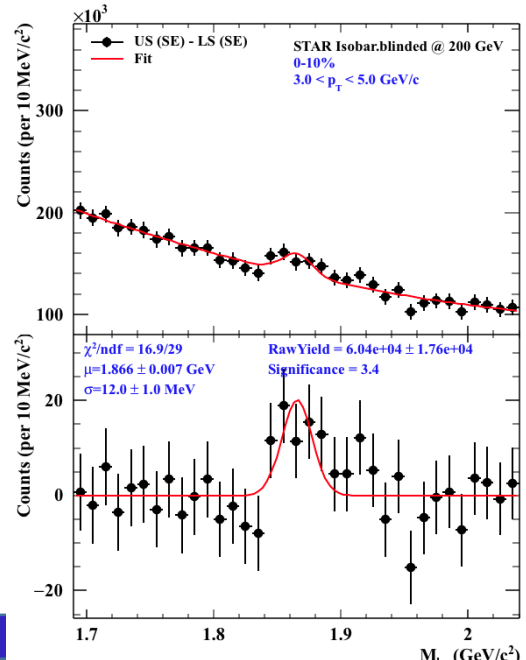


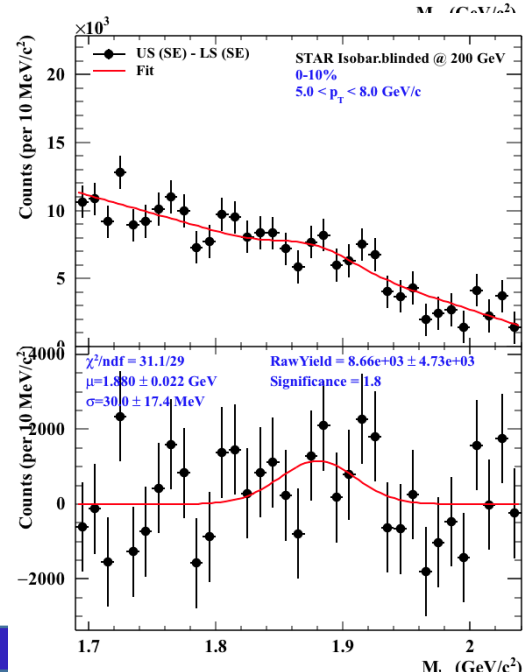



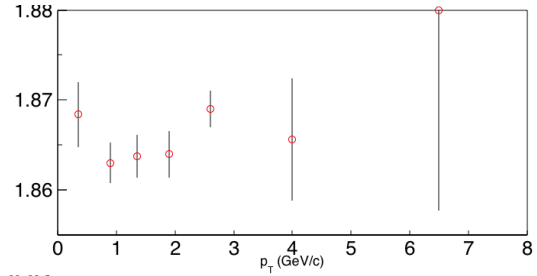



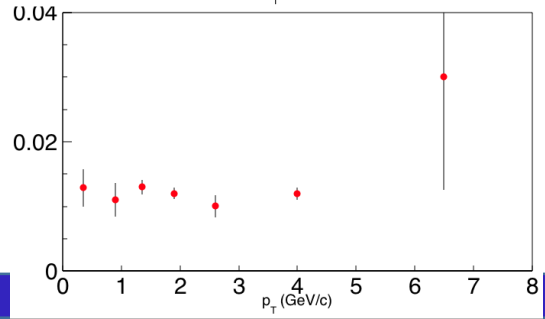



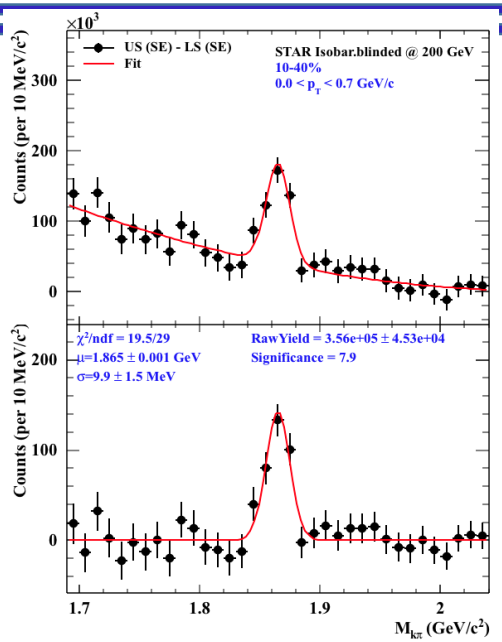



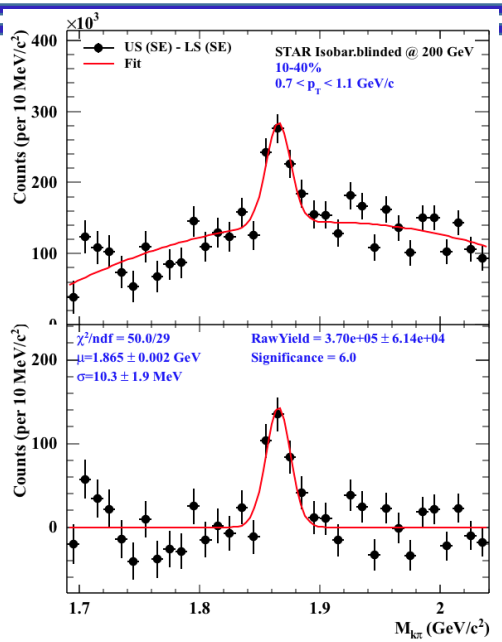



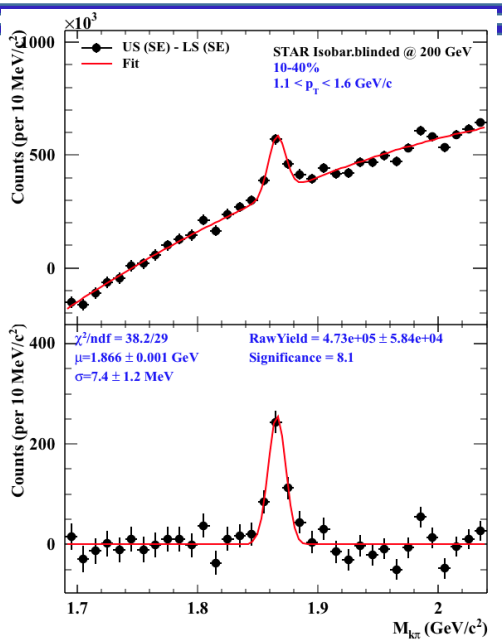



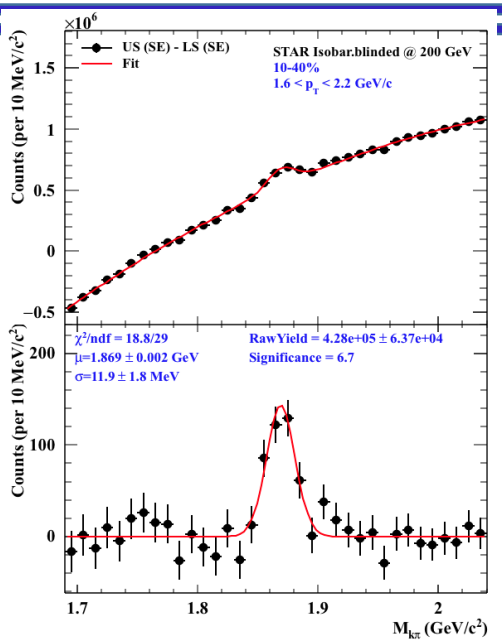



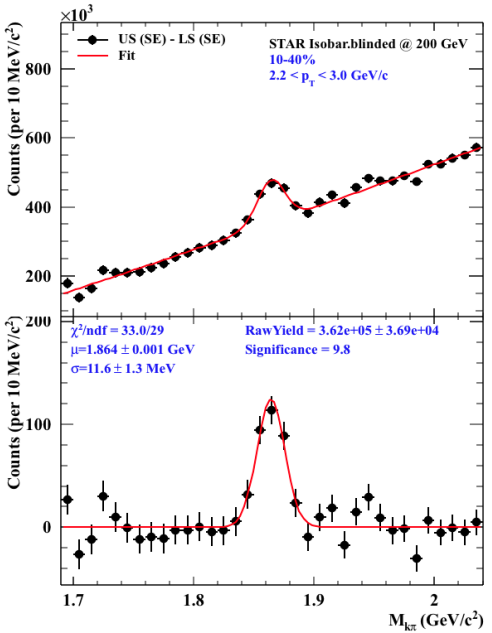
# $D^0$ production at 10-40%

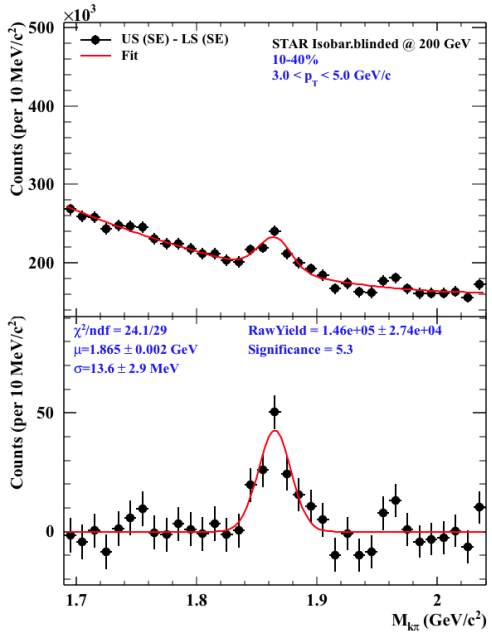


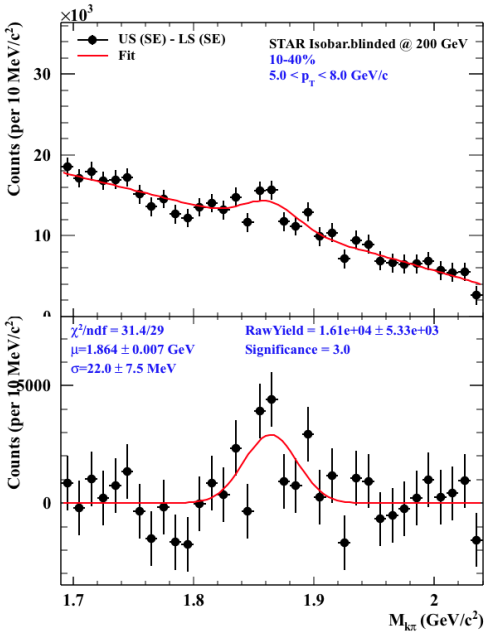



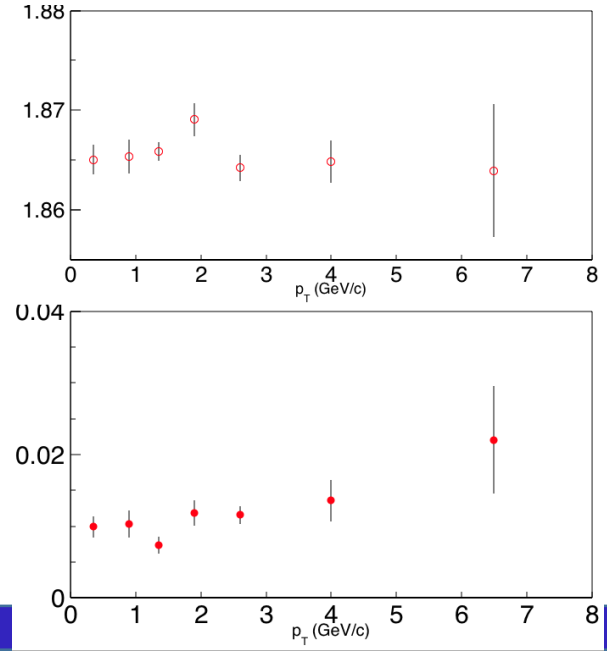



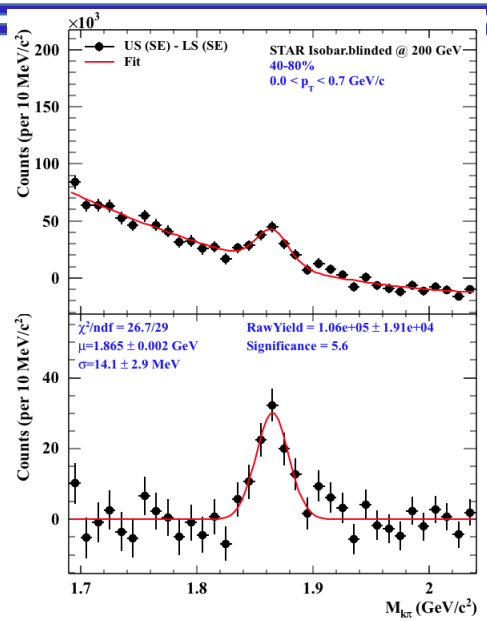



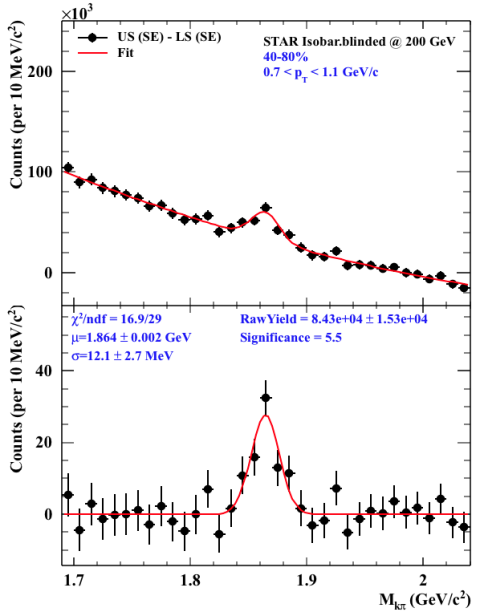



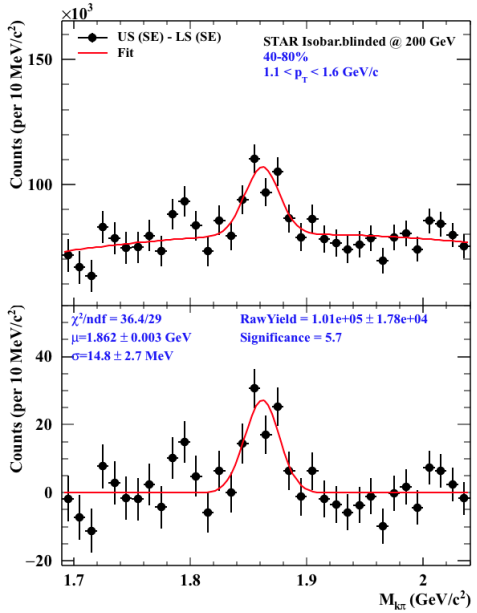



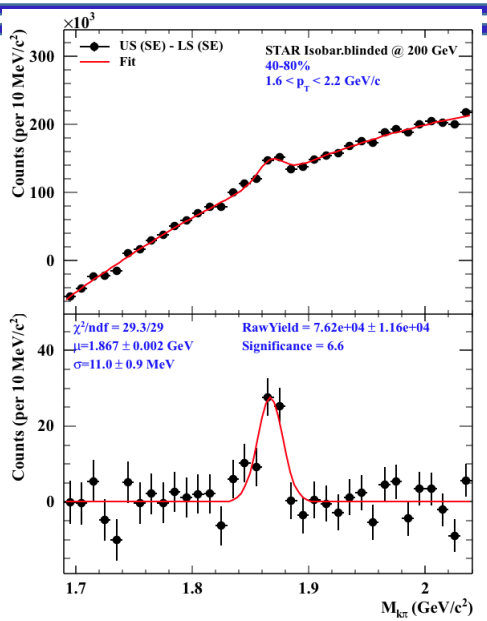



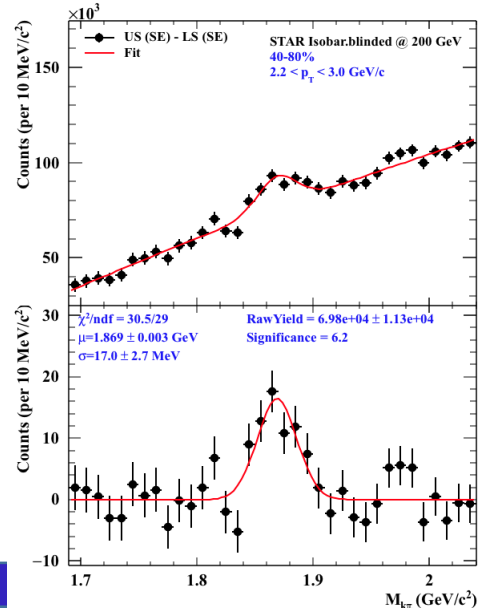
# $D^0$ production at 40-80%

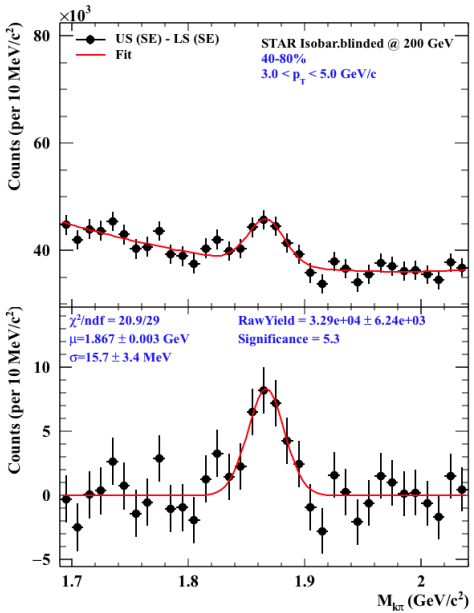


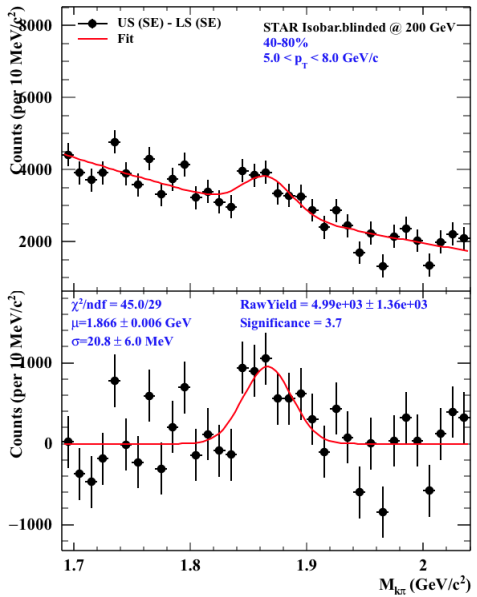



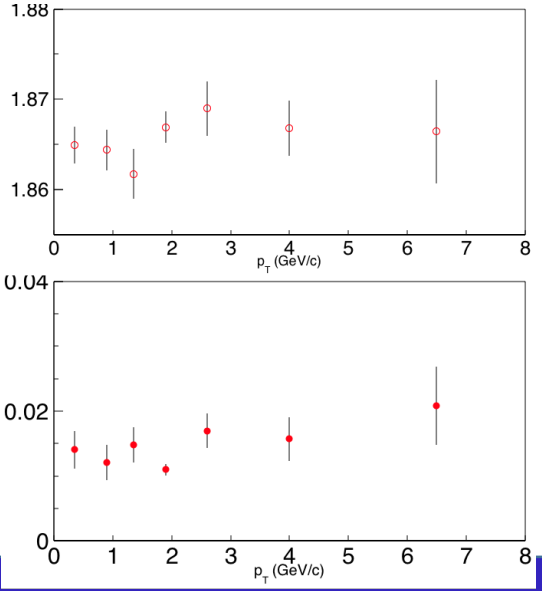



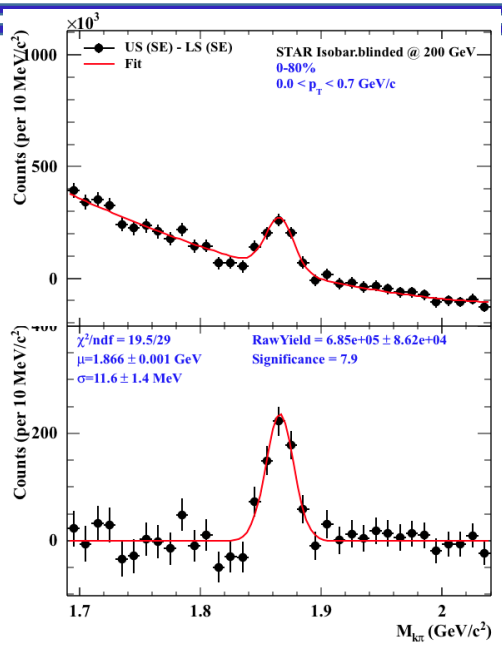



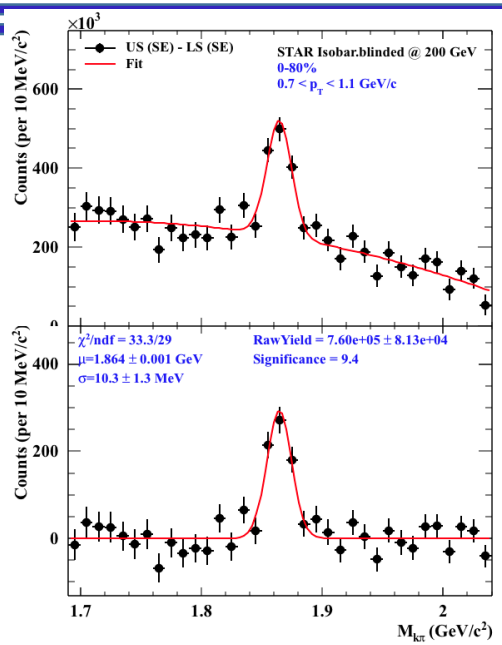



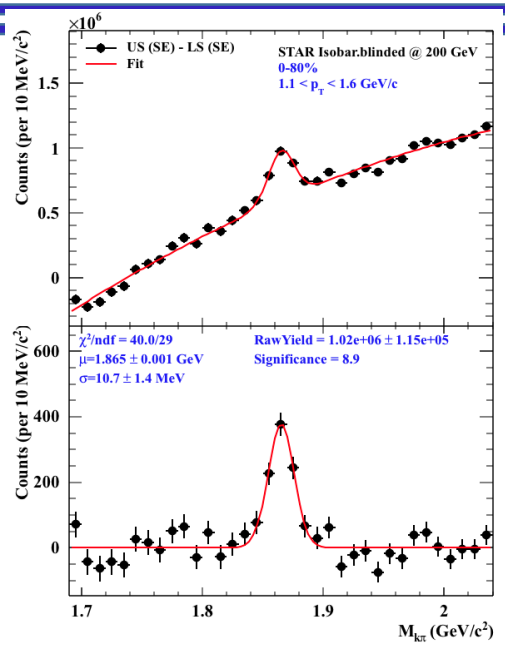



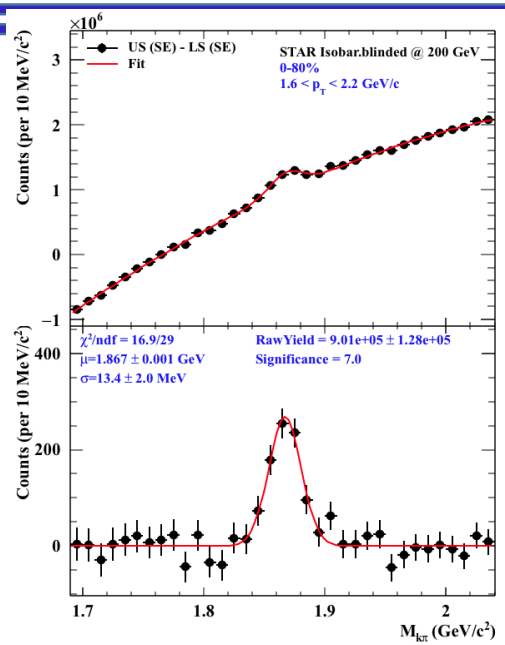



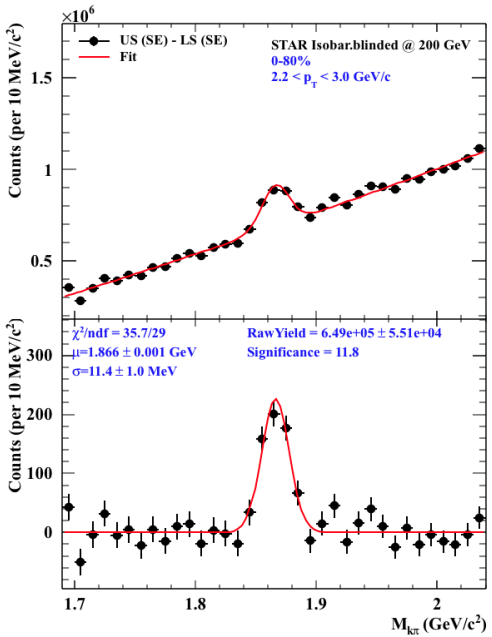
# $D^0$ production at 0-80%

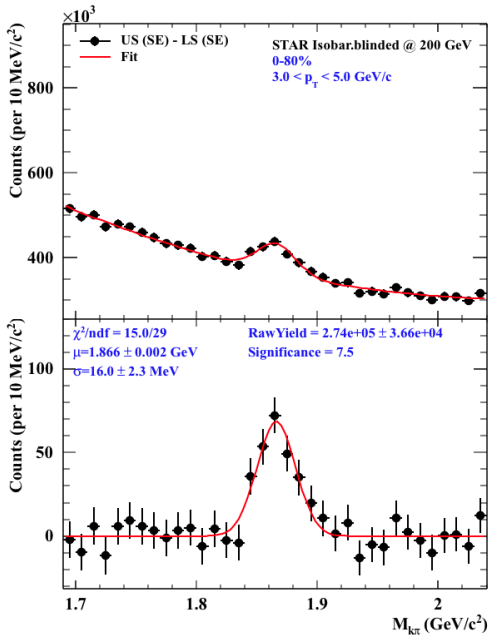


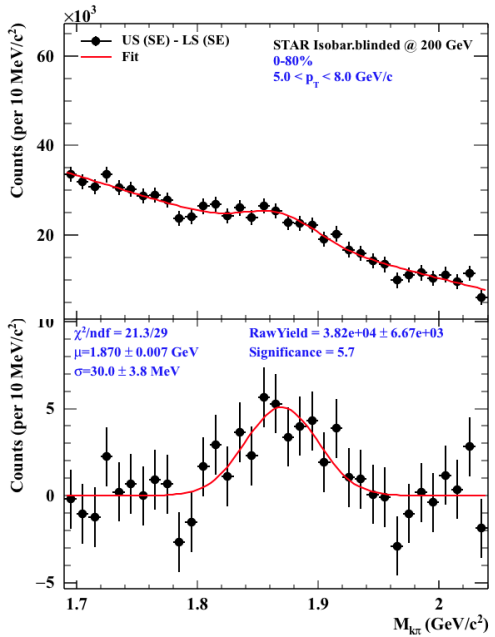



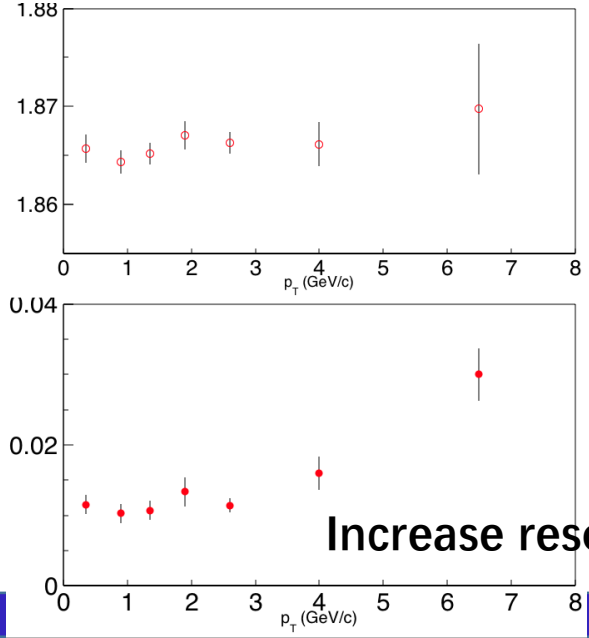



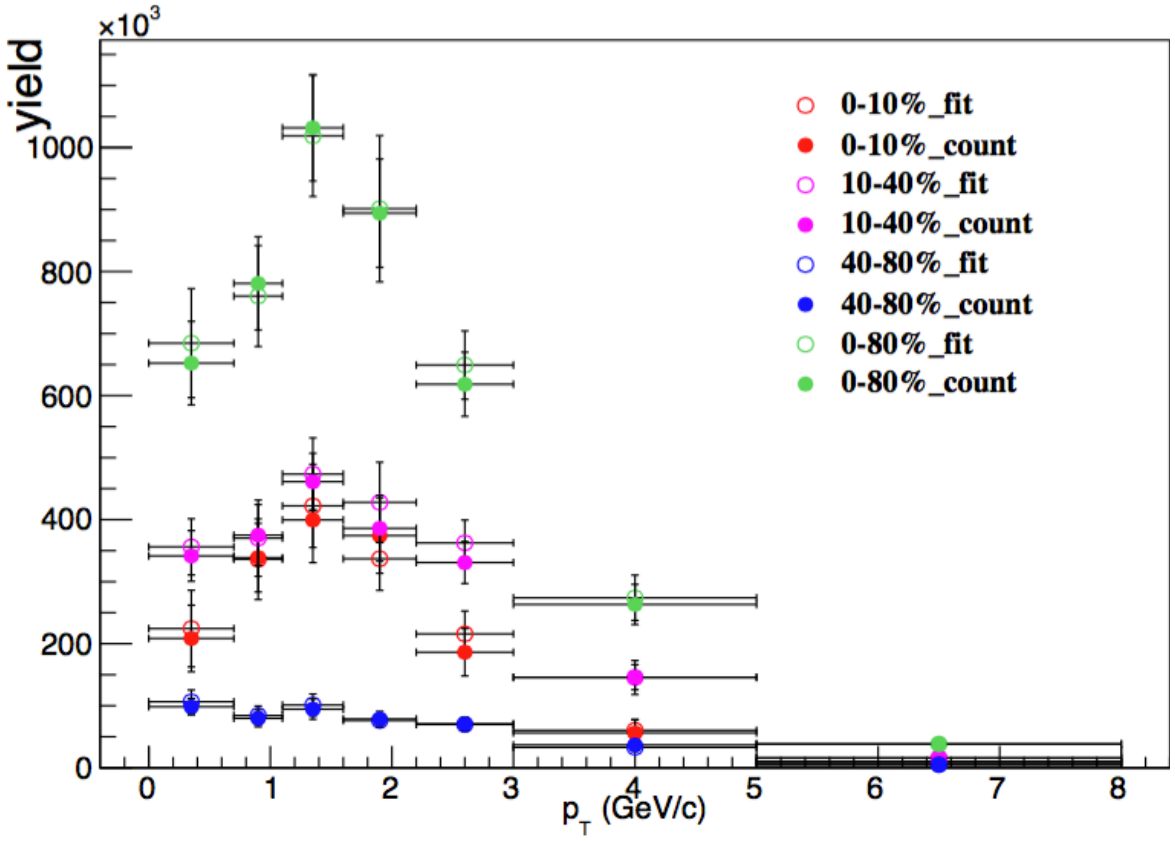



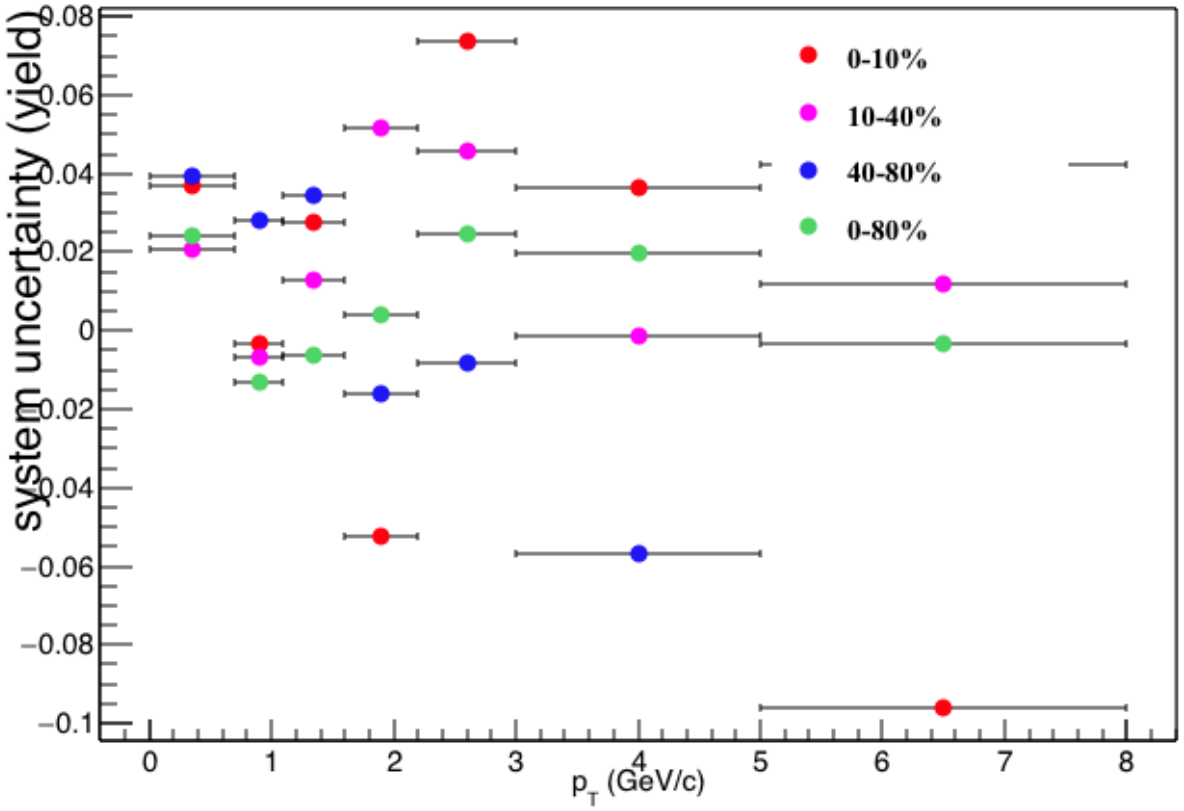



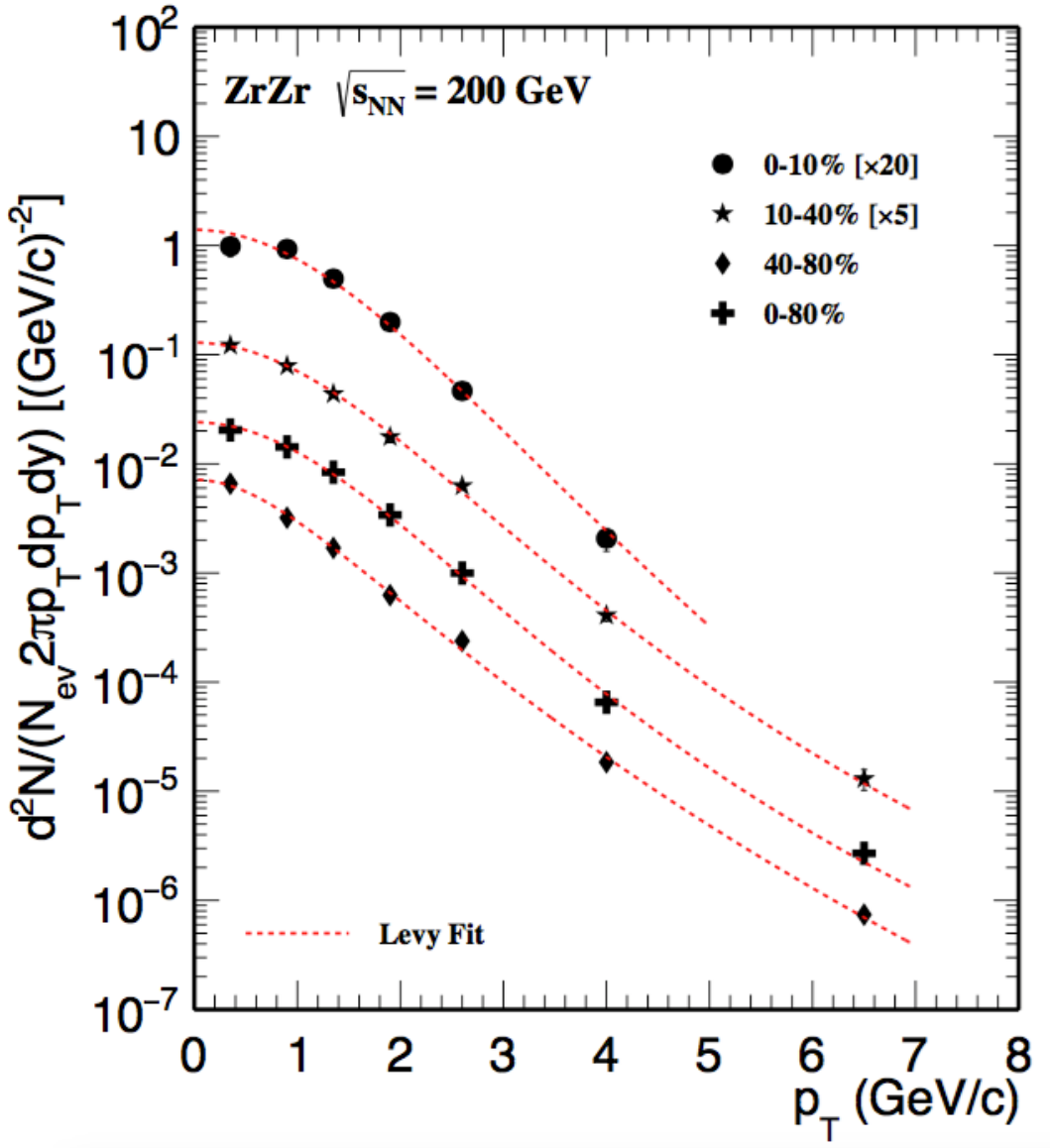

Increase resolution

# $D^0$ raw count and system uncertainty from extracting yields



# $D^0$ spectra in ZrZr

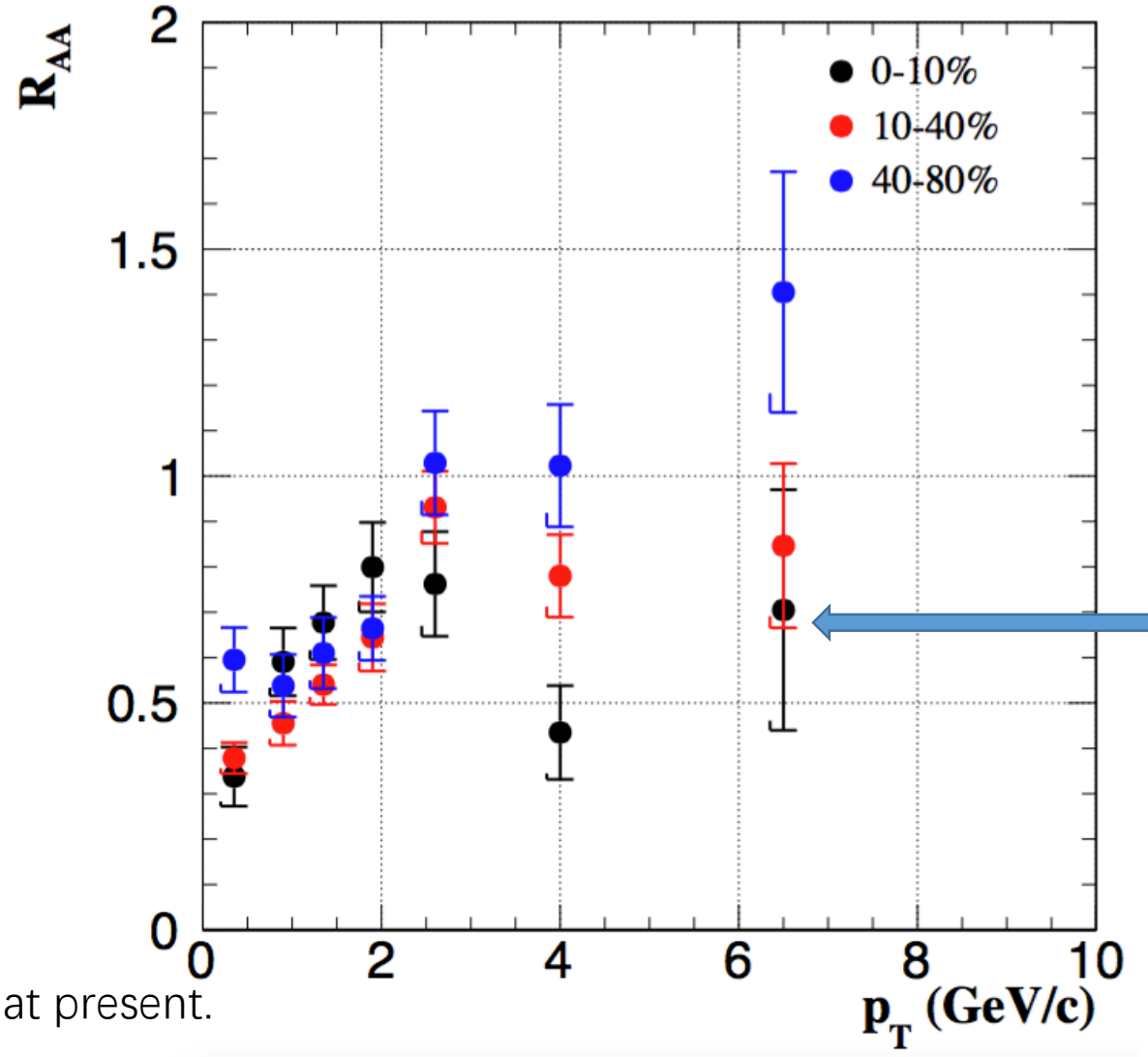



TODO:

ptShift

system uncertainty

# $D^0$ $R_{AA}$



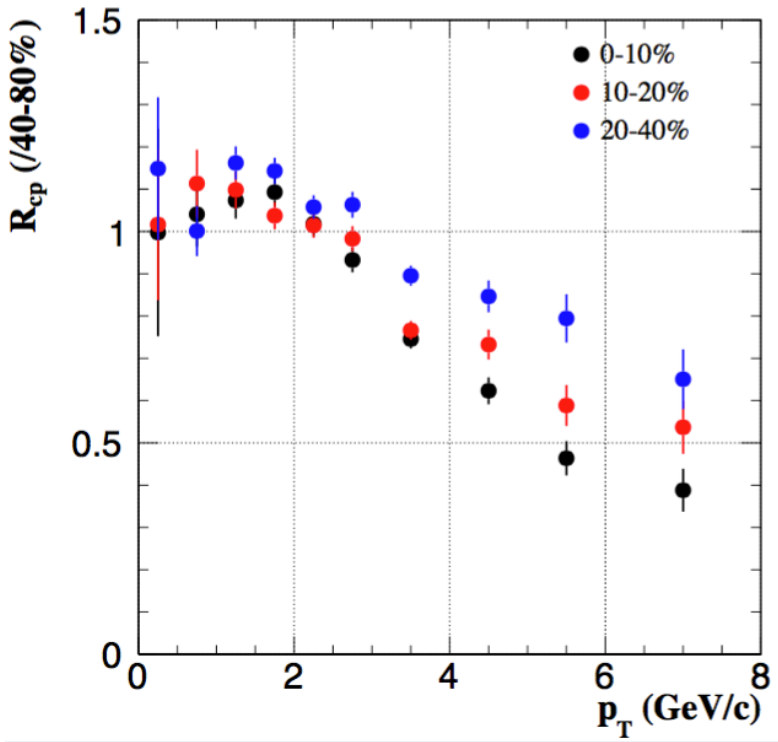

Remove?

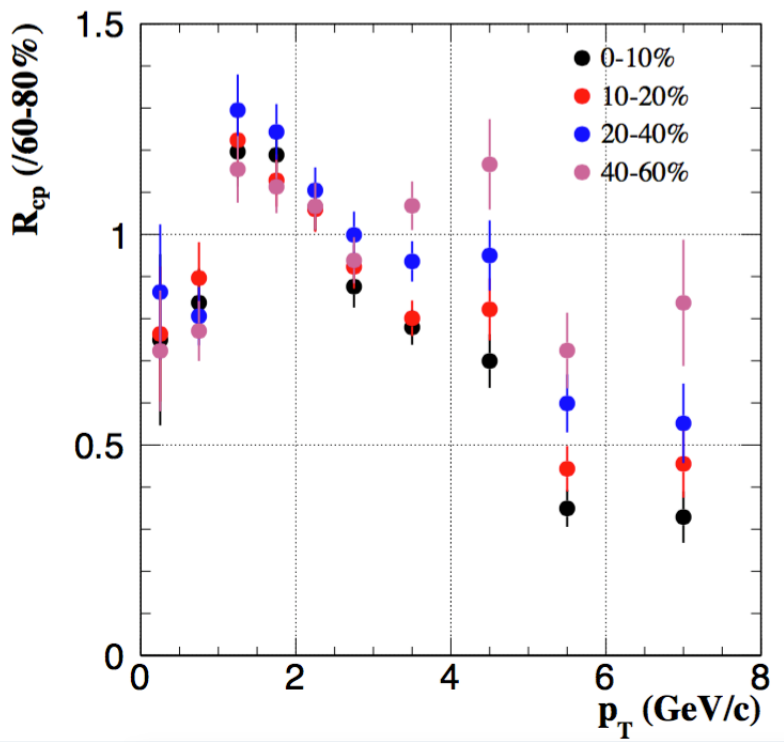
Sys_err replaced by stat_err at present.

TODO:

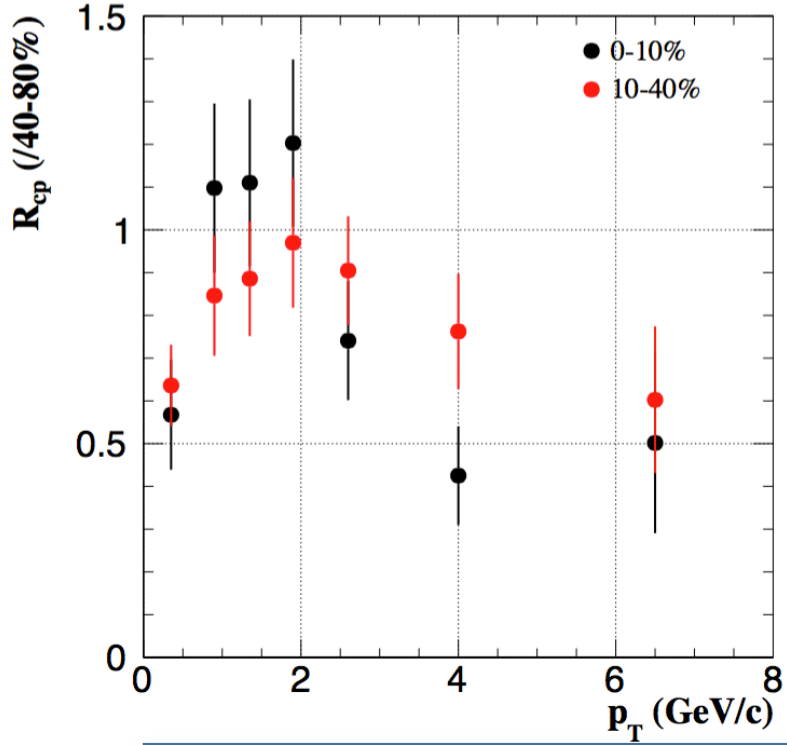
$R_{AA}$ err recalculation.

# $D^0$ $R_{cp}$



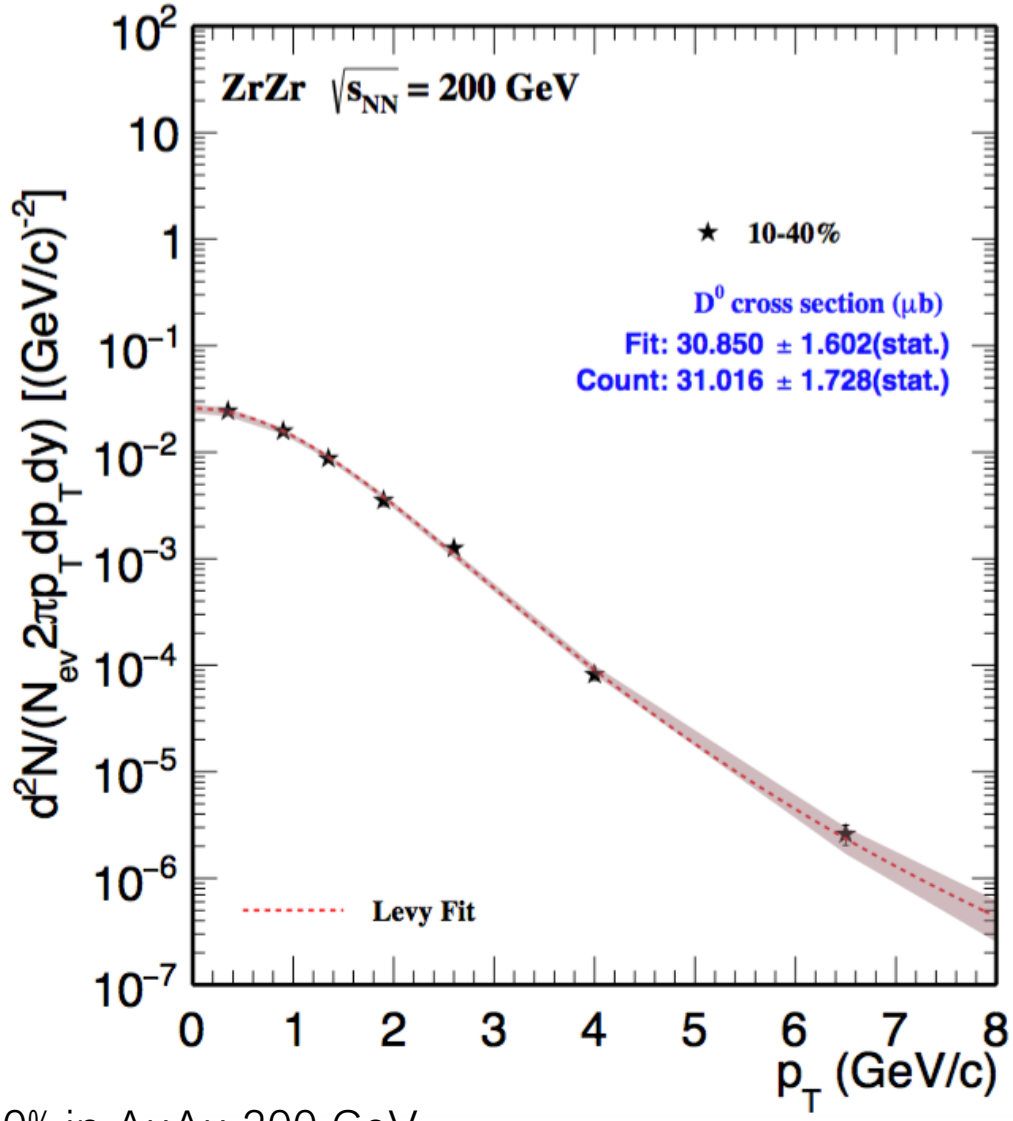

AuAu 200 GeV




ZrZr 200 GeV

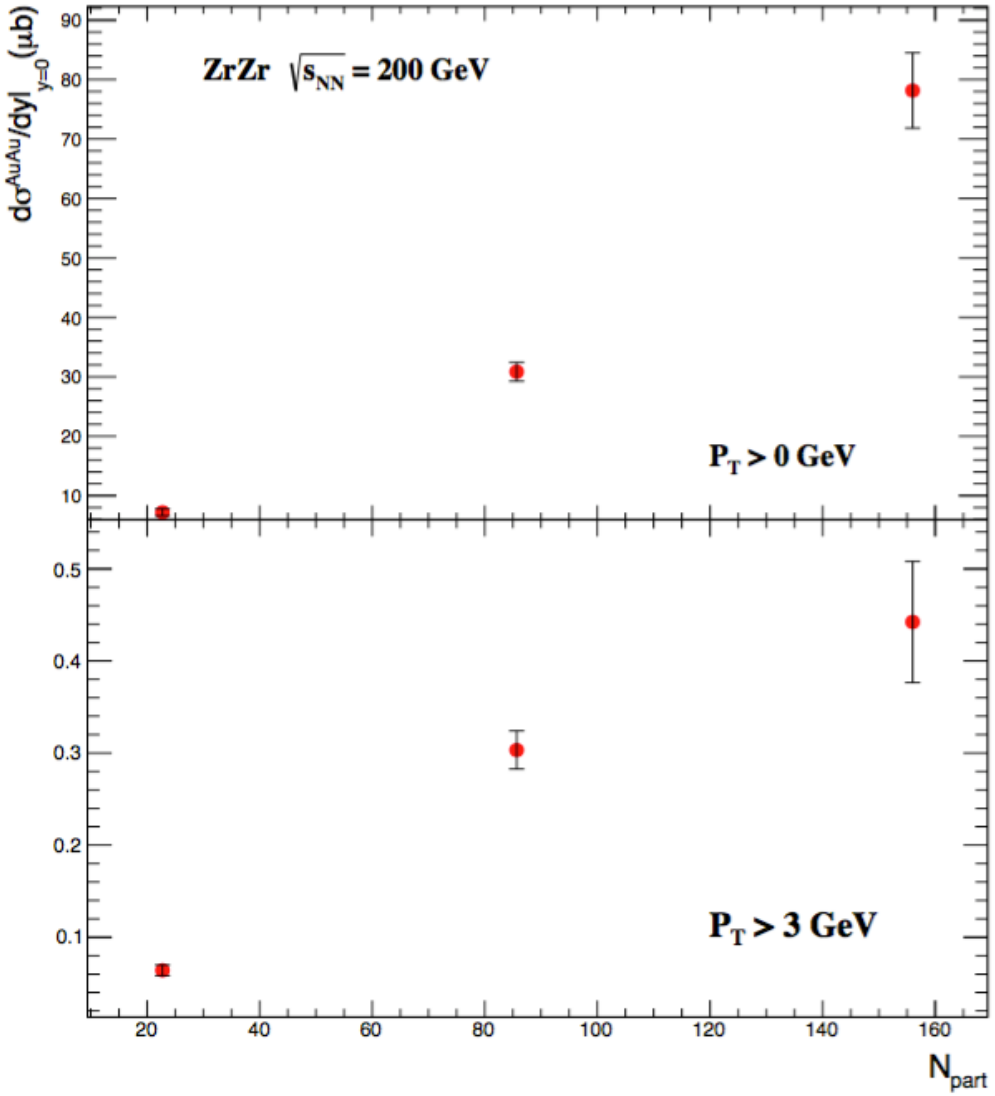
Periperal collision in ZrZr has significant lower “medium effect” compared to AuAu 200 GeV.

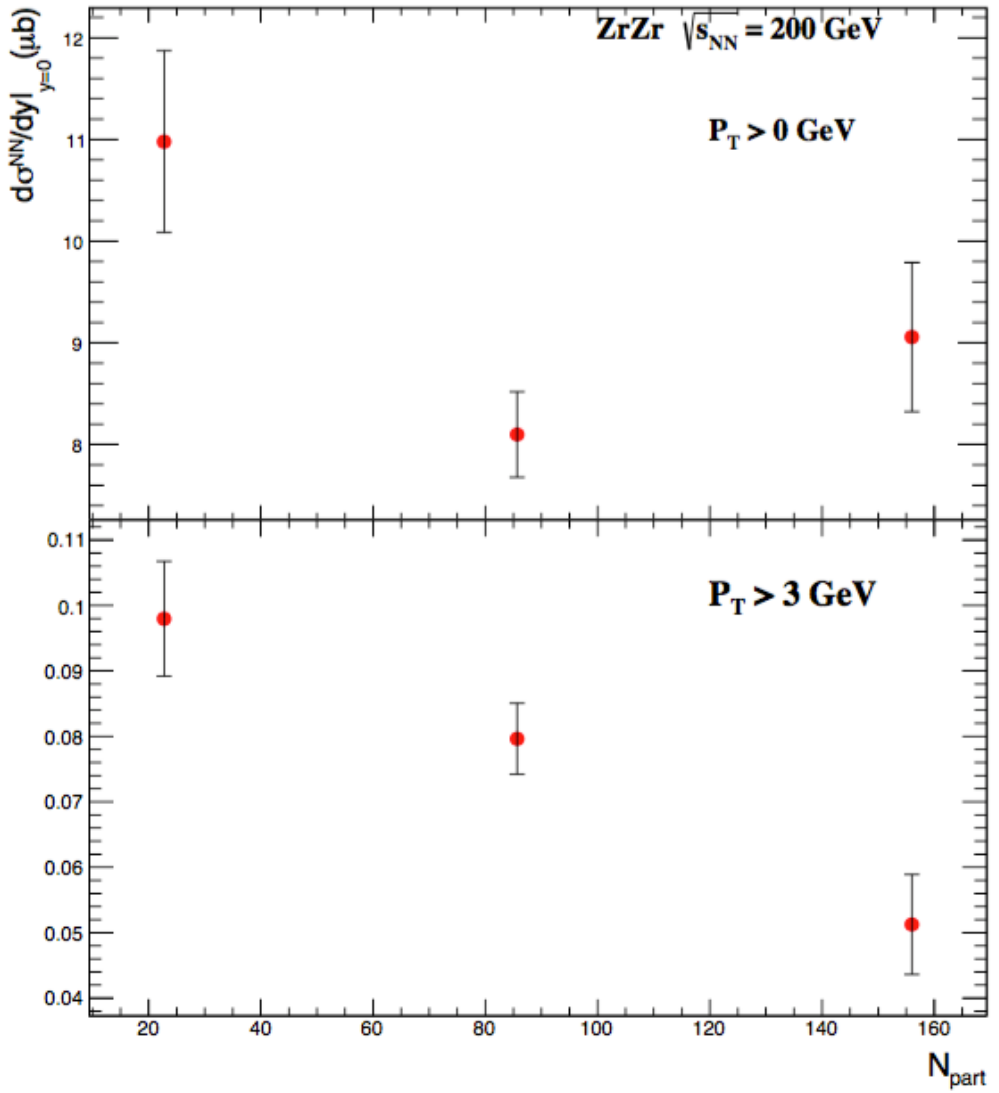
# $D^0$ cross section at mid-centrality




Less than 41 ub at 10-40% in AuAu 200 GeV
System uncertainty will be added.

# $D^0$ cross section as a function of $N_{part}$



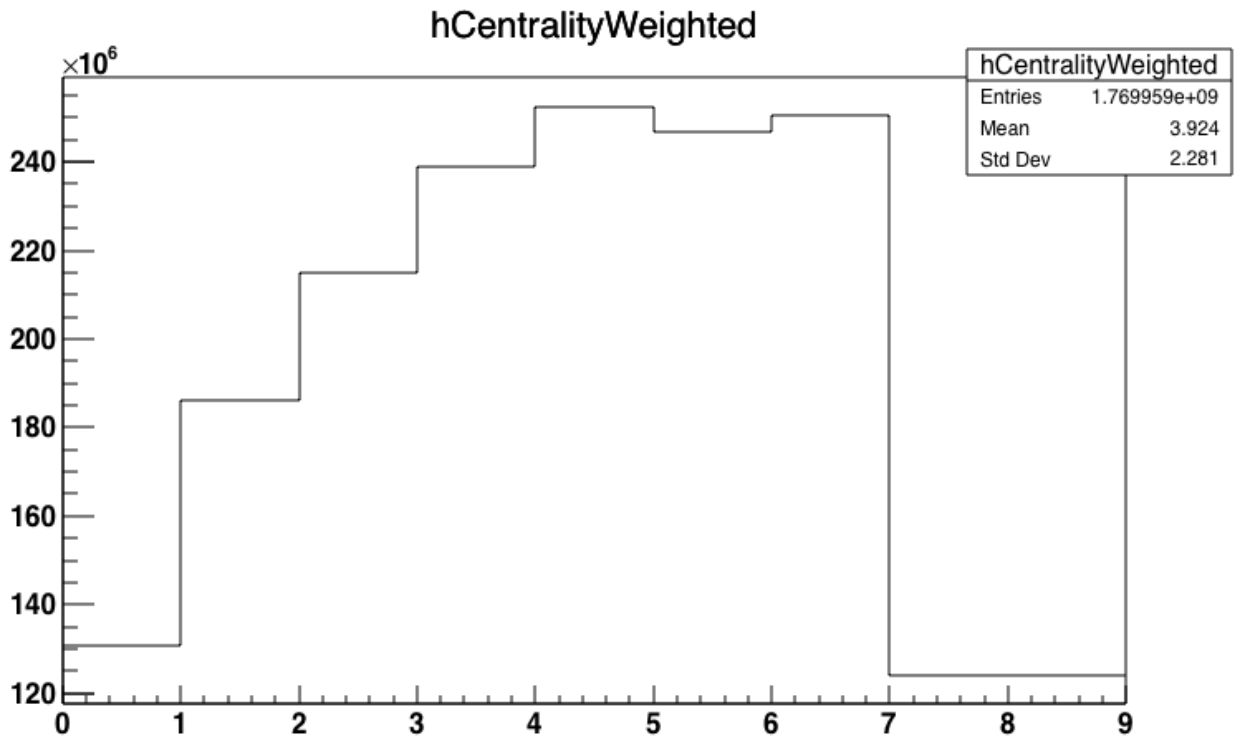



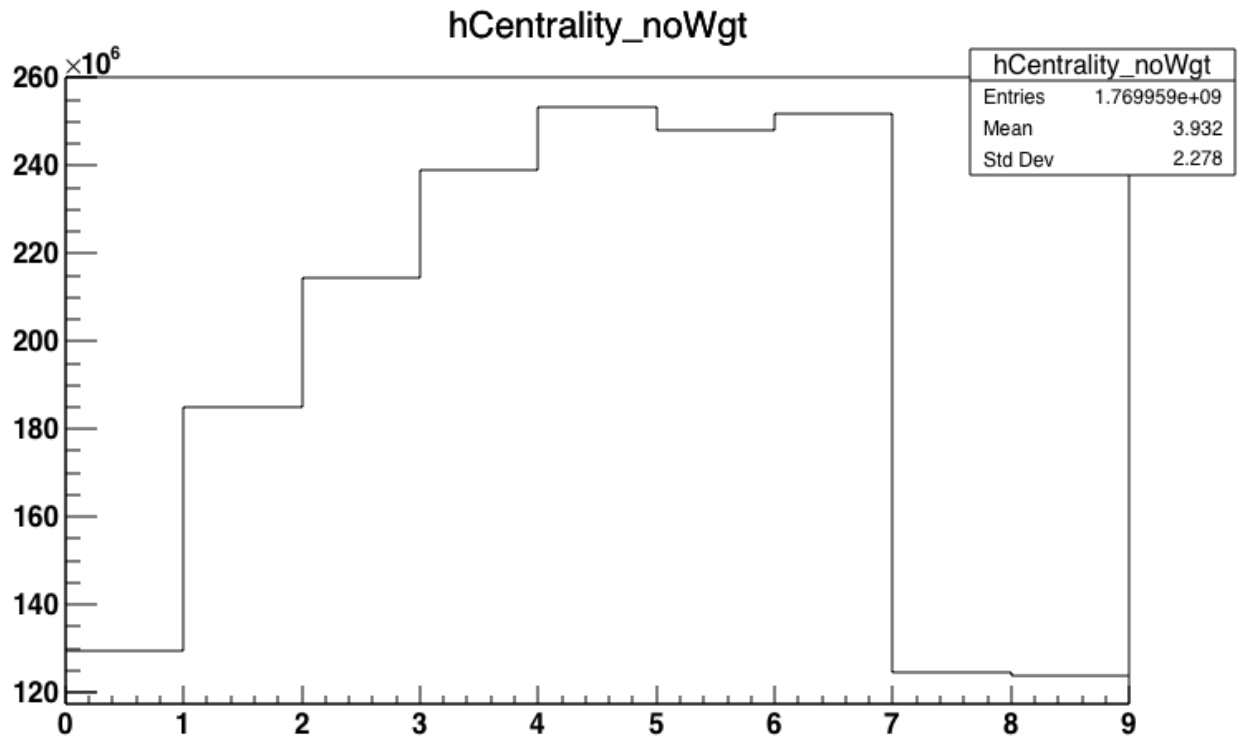

$$\frac{d\sigma_{D^0}^{nn}}{dy} = \frac{1}{N_{bin}} \frac{dN_{D^0}^{AuAu}}{dy} \times \sigma_{inel.}^{pp}$$

# $R_u R_u$

Run RuRu data and get physical result prelimilary;

Do a ratio between ZrZr and RuRu.



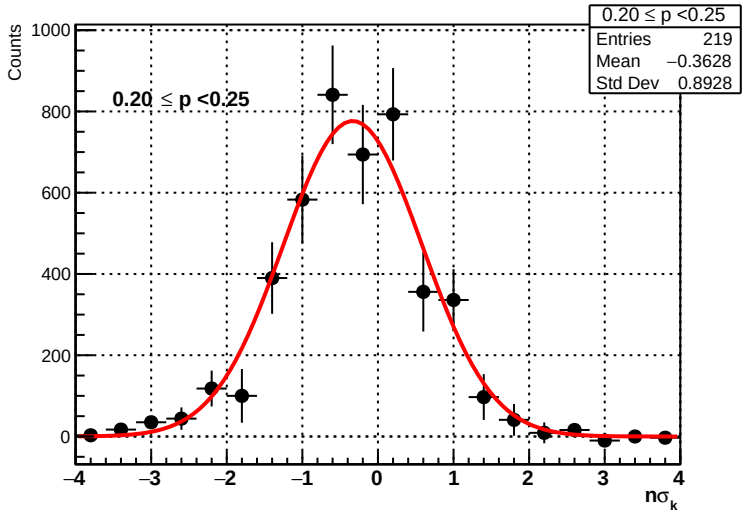
# k PID and efficiency in ZrZr

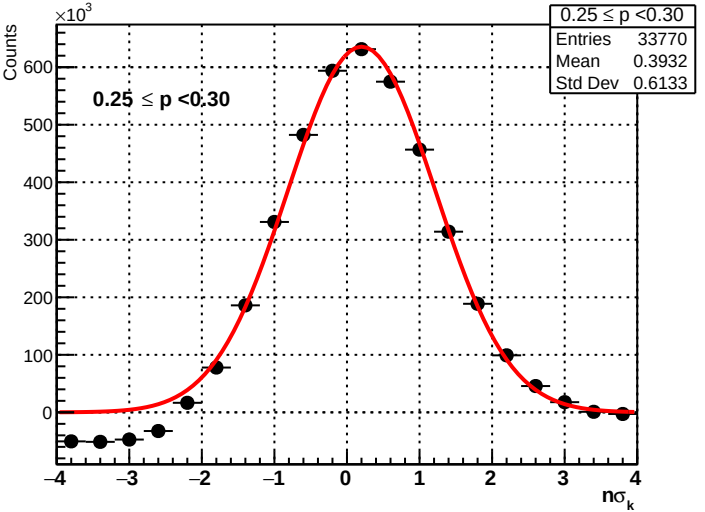
**Target k**

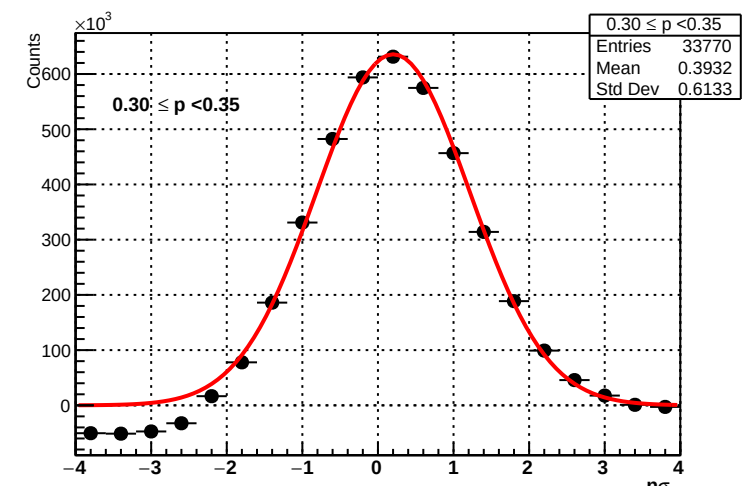
- $p_T > 0.5$
- $|\eta| < 1$
- nHitsFit $\geq 20$
- ndEdx > 15
- gDca < 2
- $|n\sigma_\pi| < 2.0$
- $|n\sigma_\pi^{TOF}| < 2.0$

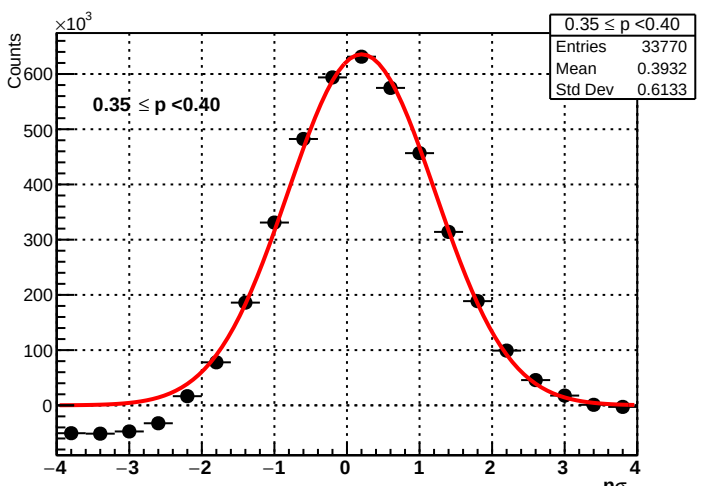
**Partner k**

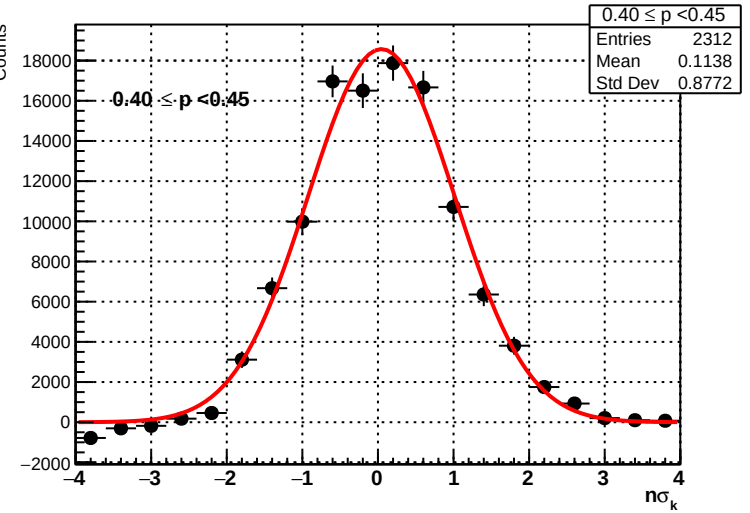
- $p_T > 0.2$
- $|\eta| < 1$
- nHitsFit $\geq 20$
- ndEdx > 15
- gDca < 2.
- $|n\sigma_\pi| < 4.0$
- $|n\sigma_\pi^{TOF}| < 4.0$

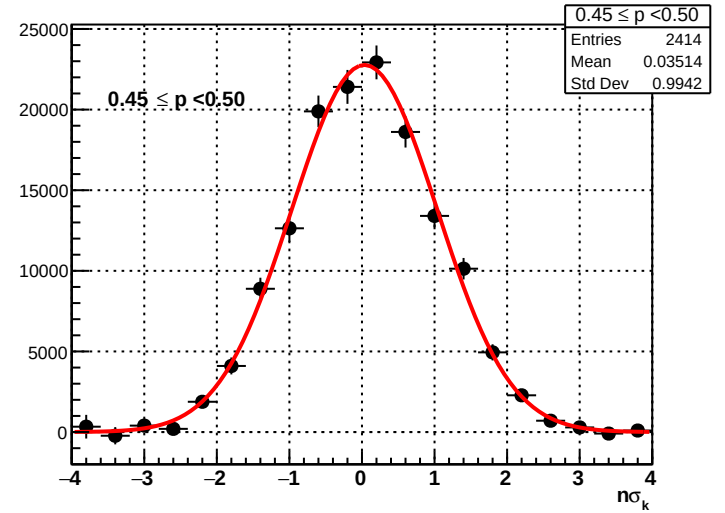

0.20 ≤ p <0.25
Entries 219
Mean −0.3628
Std Dev 0.8928
0.20 ≤ p <0.25
Counts
nσk

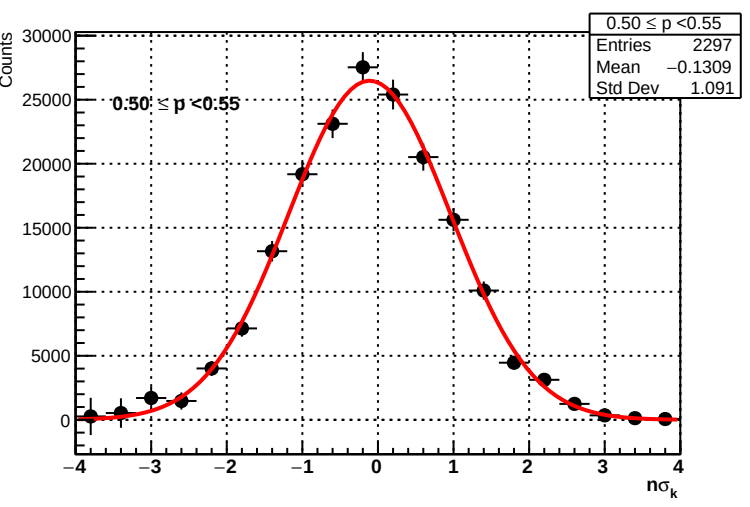

0.25 ≤ p <0.30
Entries 33770
Mean 0.3932
Std Dev 0.6133
0.25 ≤ p <0.30
×10^3
Counts
nσk

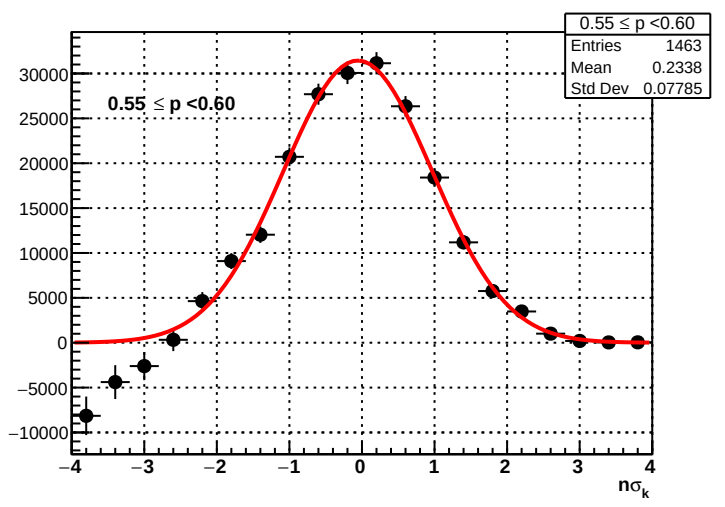

0.30 ≤ p <0.35
Entries 33770
Mean 0.3932
Std Dev 0.6133
0.30 ≤ p <0.35
×10^3
Counts
nσk

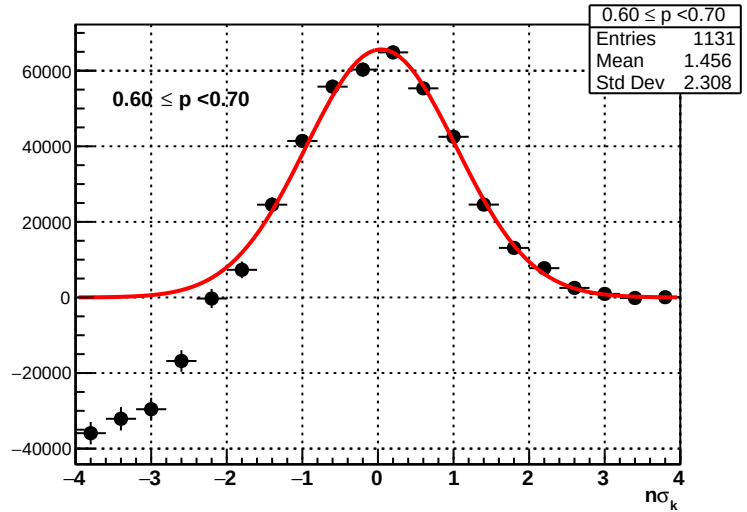

0.35 ≤ p <0.40
Entries 33770
Mean 0.3932
Std Dev 0.6133
0.35 ≤ p <0.40
×10^3
Counts
nσk

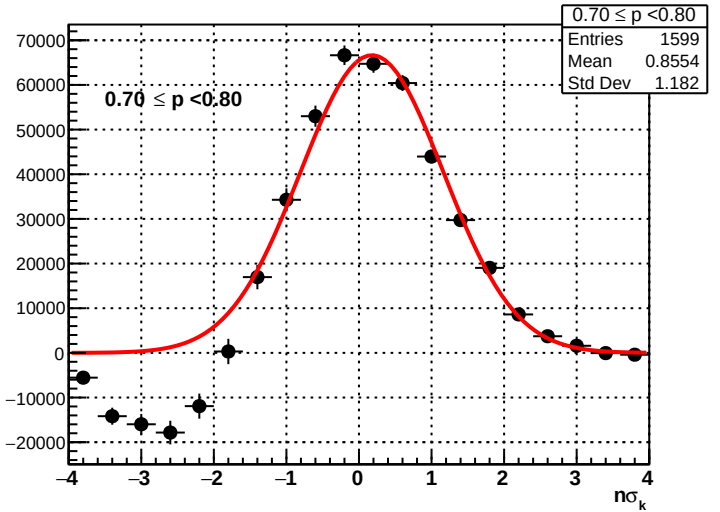

0.40 ≤ p <0.45
Entries 2312
Mean 0.1138
Std Dev 0.8772
0.40 ≤ p <0.45
Counts
nσ_k

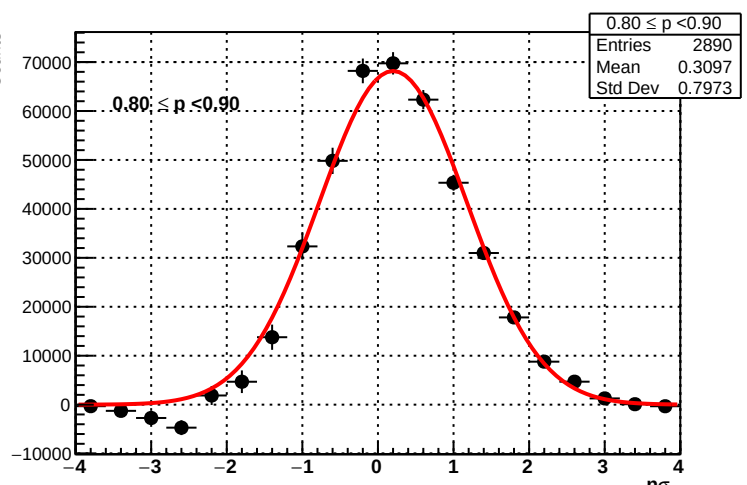

0.45 ≤ p <0.50
Entries 2414
Mean 0.03514
Std Dev 0.9942
0.45 ≤ p <0.50
nσ_k

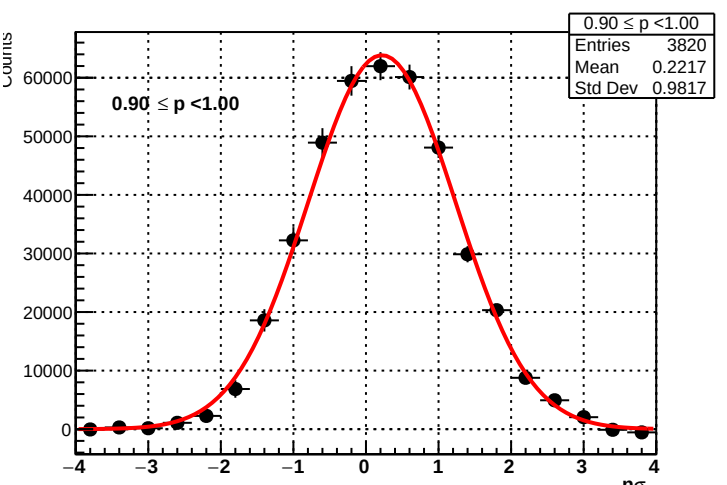

0.50 ≤ p <0.55
Entries 2297
Mean −0.1309
Std Dev 1.091
0.50 ≤ p <0.55
Counts
nσ_k

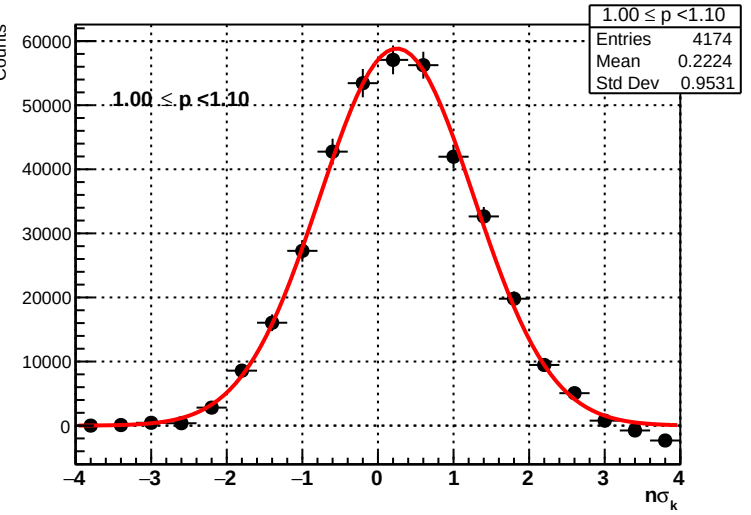

0.55 ≤ p <0.60
Entries 1463
Mean 0.2338
Std Dev 0.07785
0.55 ≤ p <0.60
nσ_k

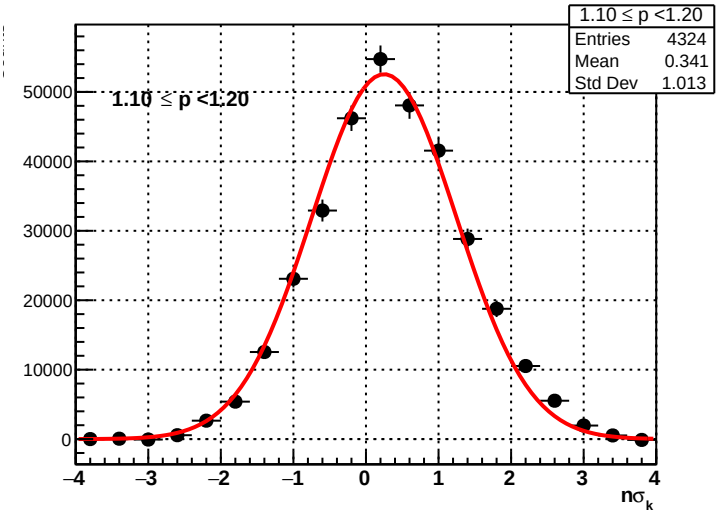

0.60 ≤ p <0.70
Entries 1131
Mean 1.456
Std Dev 2.308
0.60 ≤ p <0.70
nσ_k

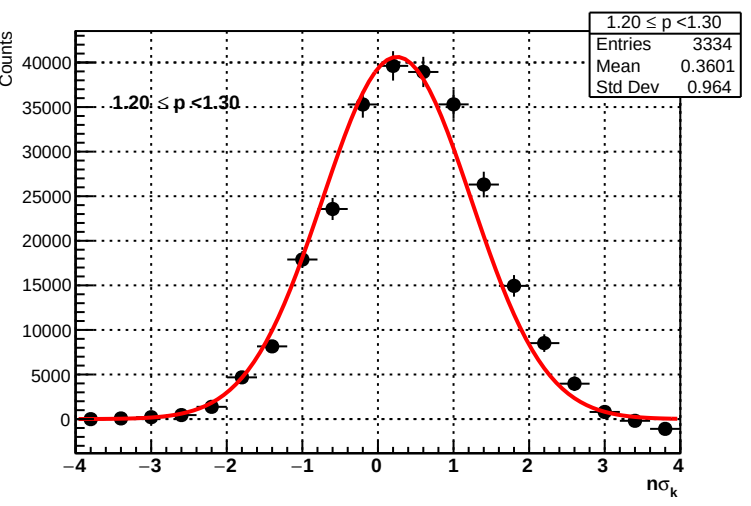

0.70 ≤ p <0.80
Entries 1599
Mean 0.8554
Std Dev 1.182
0.70 ≤ p <0.80
nσ_k

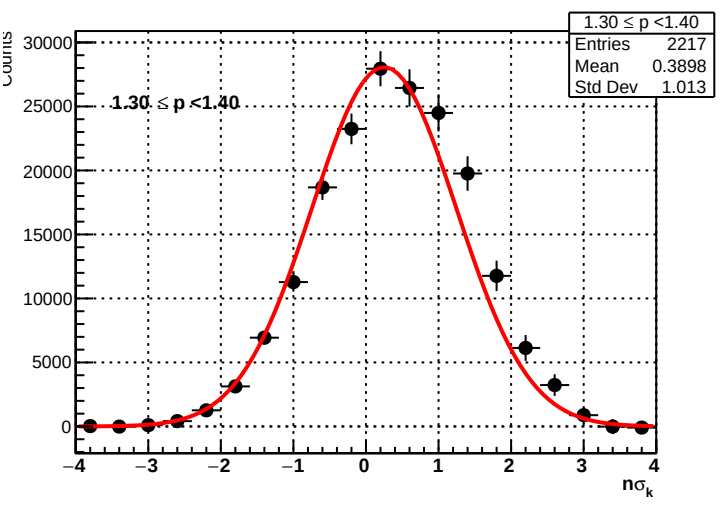

0.80 ≤ p <0.90
Entries 2890
Mean 0.3097
Std Dev 0.7973
0.80 ≤ p <0.90
nσ_k

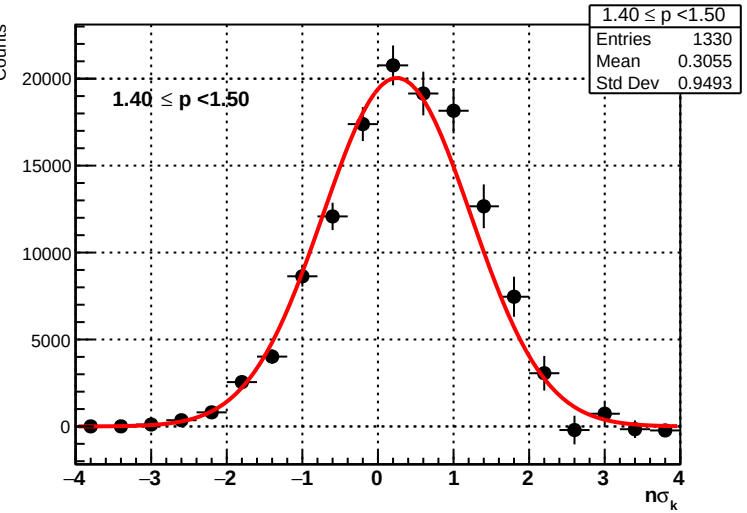

0.90 ≤ p <1.00
Entries 3820
Mean 0.2217
Std Dev 0.9817
0.90 ≤ p <1.00
nσ_k

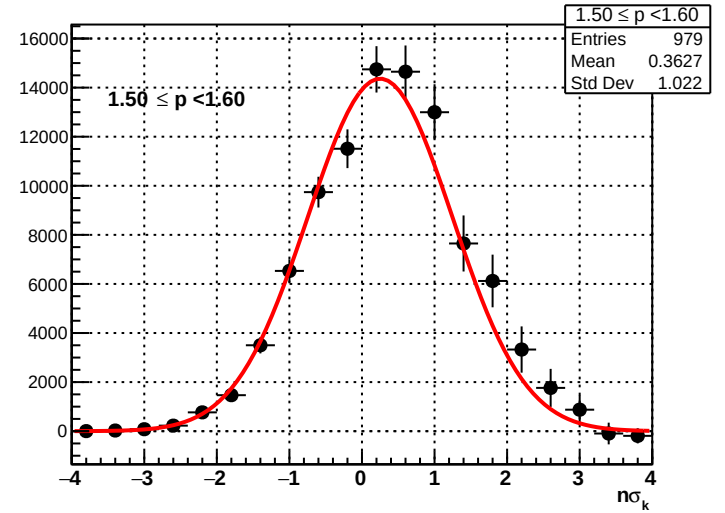

1.00 ≤ p <1.10
Entries 4174
Mean 0.2224
Std Dev 0.9531
1.00 ≤ p <1.10
Counts
nσ_k

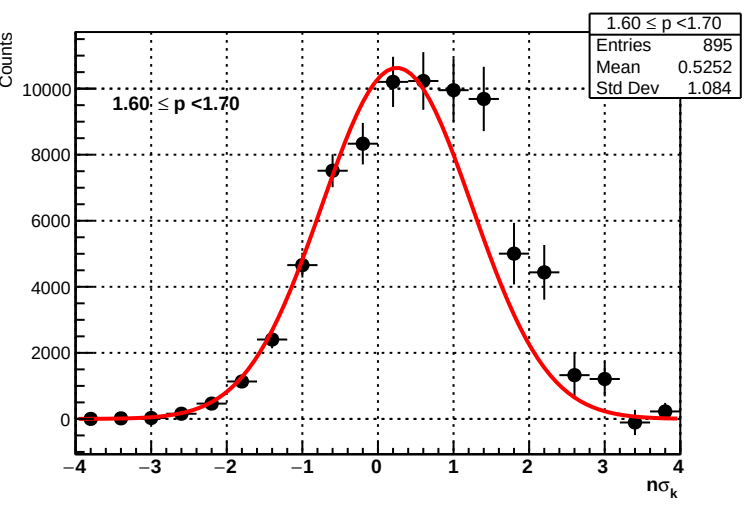

1.10 ≤ p <1.20
Entries 4324
Mean 0.341
Std Dev 1.013
1.10 ≤ p <1.20
nσ_k

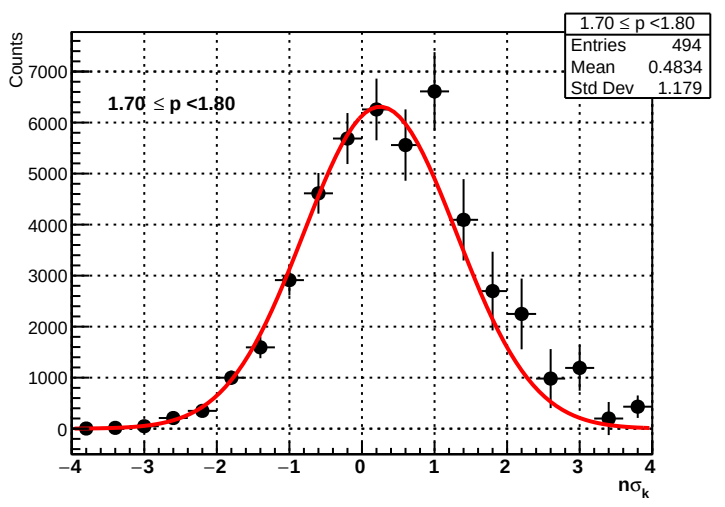

1.20 ≤ p <1.30
Entries 3334
Mean 0.3601
Std Dev 0.964
1.20 ≤ p <1.30
Counts
nσ_k

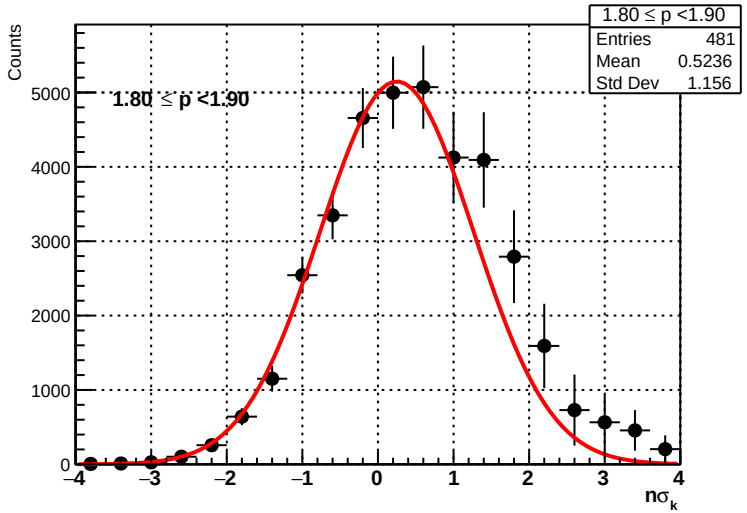

1.30 ≤ p <1.40
Entries 2217
Mean 0.3898
Std Dev 1.013
1.30 ≤ p <1.40
Counts
nσ_k

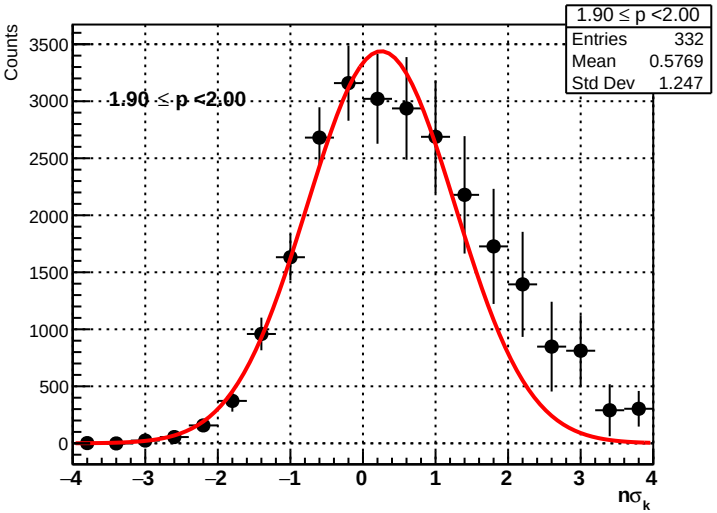

1.40 ≤ p <1.50
Entries 1330
Mean 0.3055
Std Dev 0.9493
1.40 ≤ p <1.50
Counts
nσk

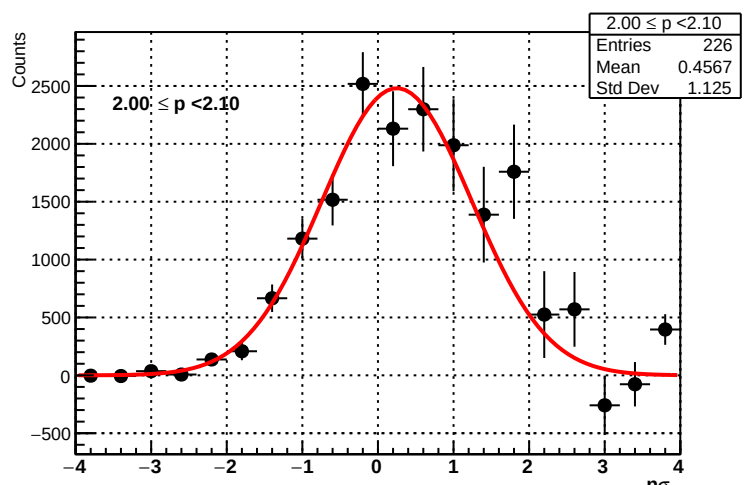

1.50 ≤ p <1.60
Entries 979
Mean 0.3627
Std Dev 1.022
1.50 ≤ p <1.60
nσk

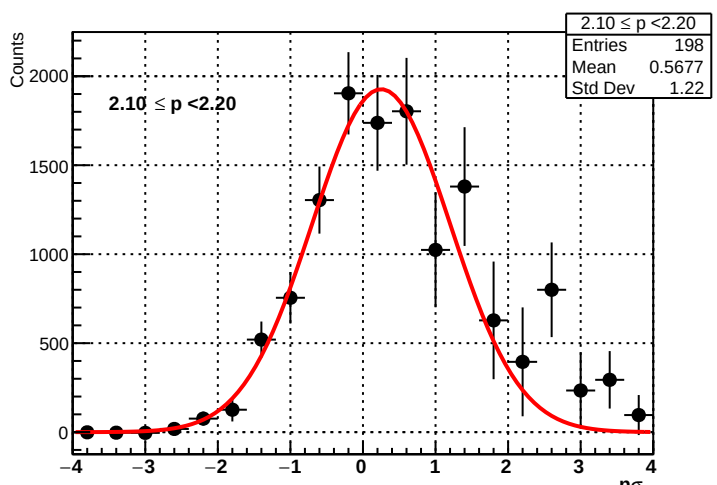

1.60 ≤ p <1.70
Entries 895
Mean 0.5252
Std Dev 1.084
1.60 ≤ p <1.70
Counts
nσk

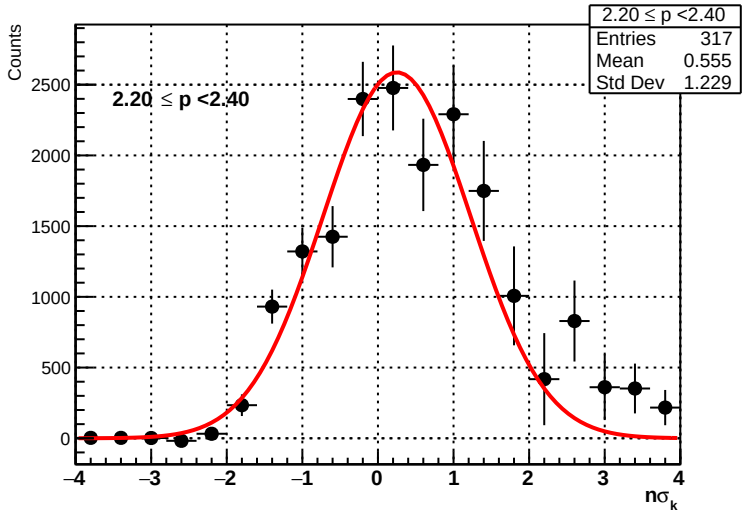

1.70 ≤ p <1.80
Entries 494
Mean 0.4834
Std Dev 1.179
1.70 ≤ p <1.80
Counts
nσk

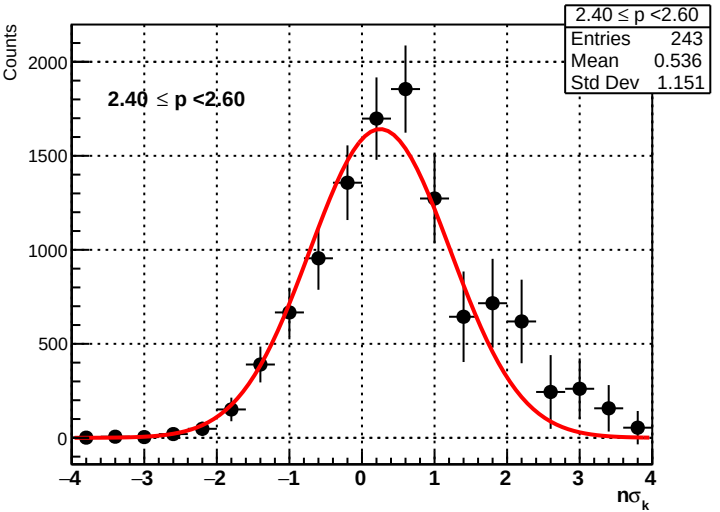

1.80 ≤ p <1.90
Entries 481
Mean 0.5236
Std Dev 1.156
1.80 ≤ p <1.90
Counts
nσ_k

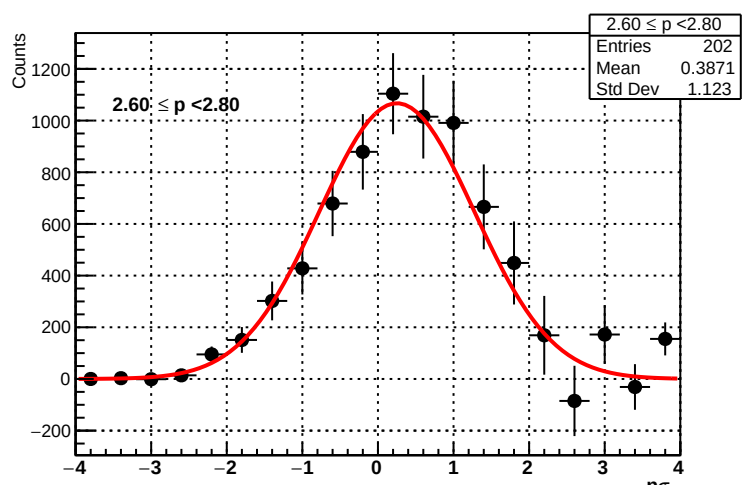

1.90 ≤ p <2.00
Entries 332
Mean 0.5769
Std Dev 1.247
1.90 ≤ p <2.00
Counts
nσ_k

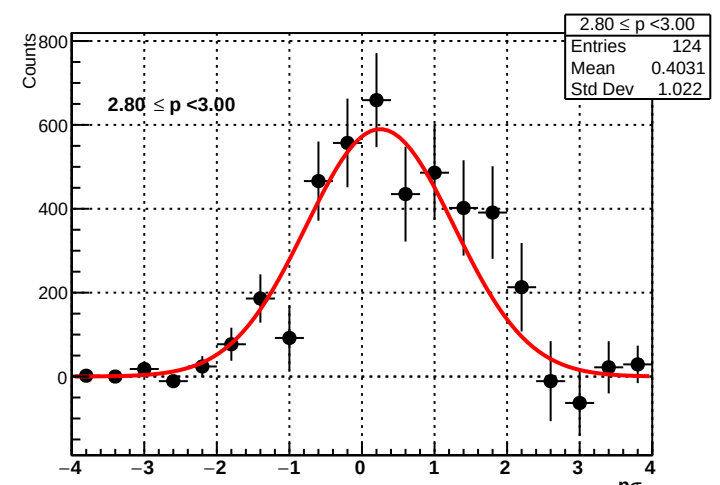

2.00 ≤ p <2.10
Entries 226
Mean 0.4567
Std Dev 1.125
2.00 ≤ p <2.10
Counts
nσ_k

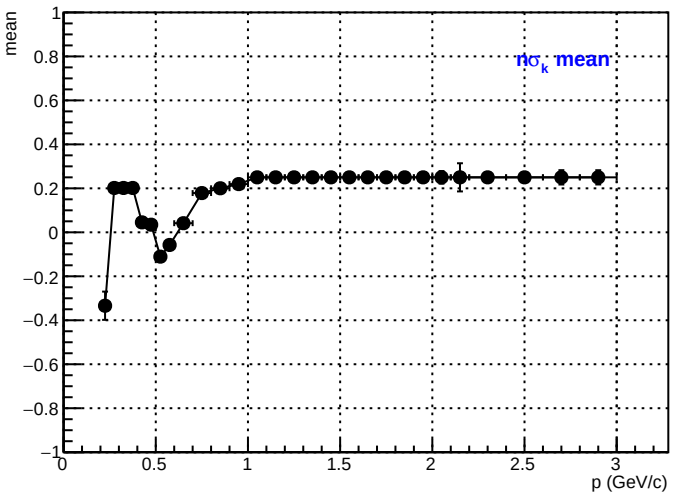

2.10 ≤ p <2.20
Entries 198
Mean 0.5677
Std Dev 1.22
2.10 ≤ p <2.20
Counts
nσ_k

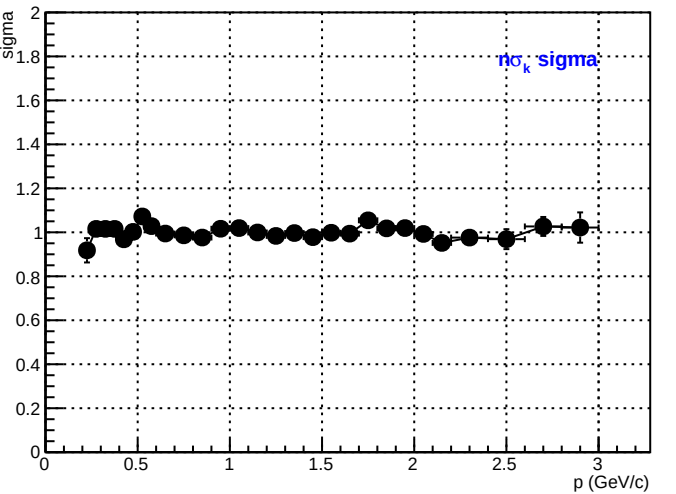

2.20 ≤ p <2.40
Entries 317
Mean 0.555
Std Dev 1.229
2.20 ≤ p <2.40
Counts
nσk

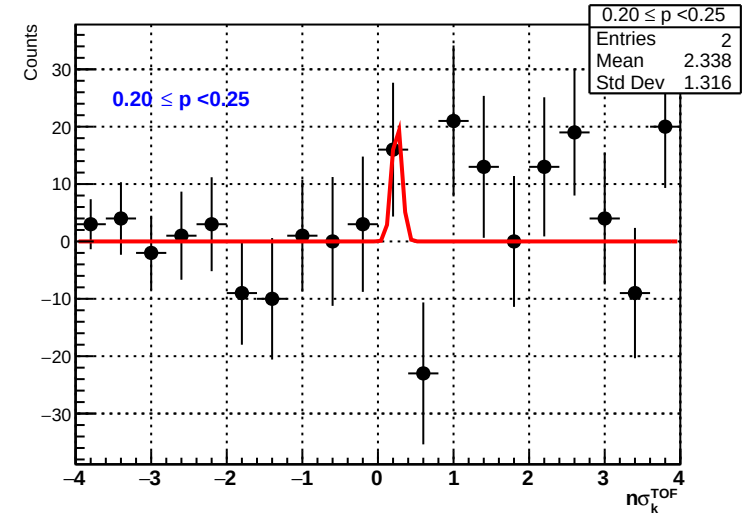

2.40 ≤ p <2.60
Entries 243
Mean 0.536
Std Dev 1.151
2.40 ≤ p <2.60
Counts
nσk

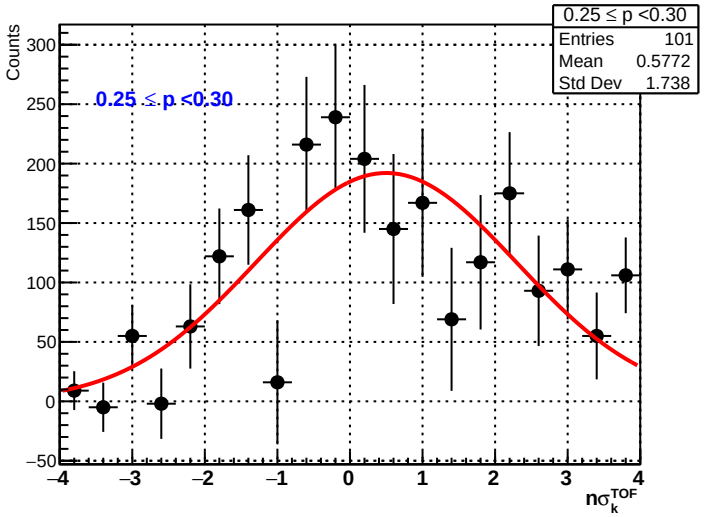

2.60 ≤ p <2.80
Entries 202
Mean 0.3871
Std Dev 1.123
2.60 ≤ p <2.80
Counts
nσk

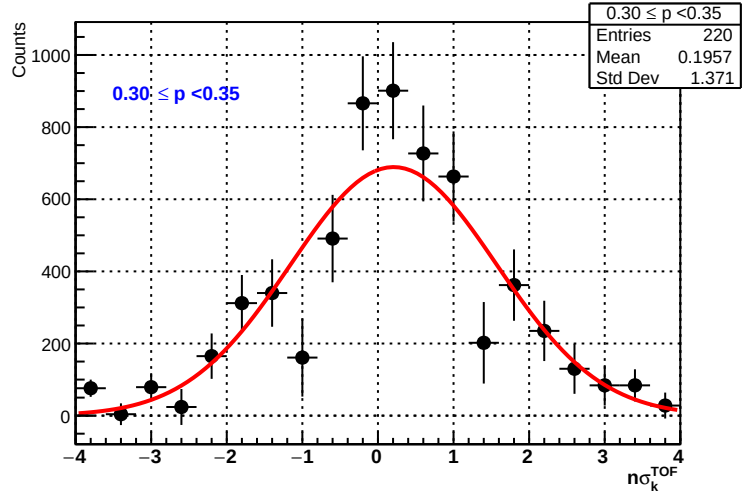

2.80 ≤ p <3.00
Entries 124
Mean 0.4031
Std Dev 1.022
2.80 ≤ p <3.00
Counts
nσk

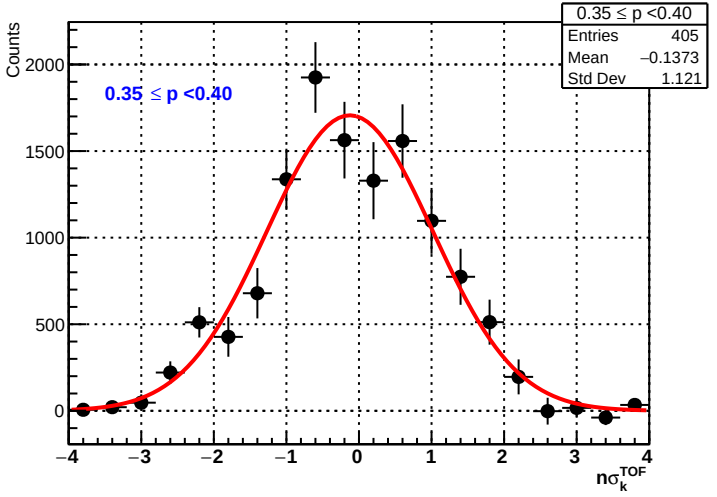

mean
nσ_K mean
p (GeV/c)

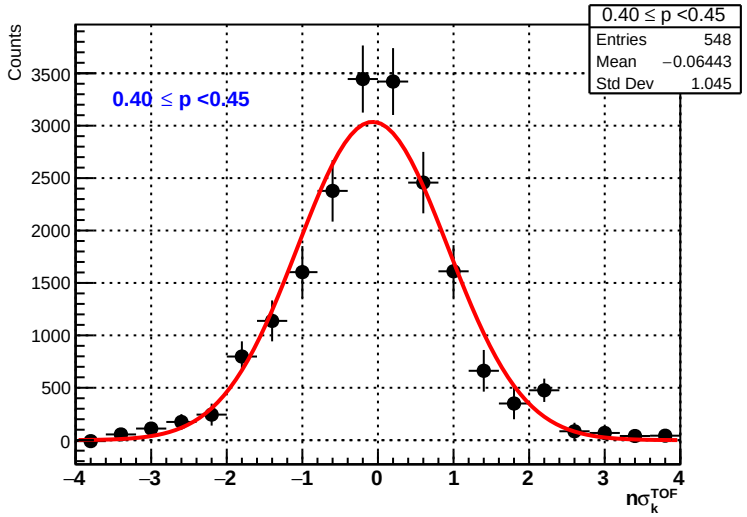

sigma
nσ_K sigma
p (GeV/c)

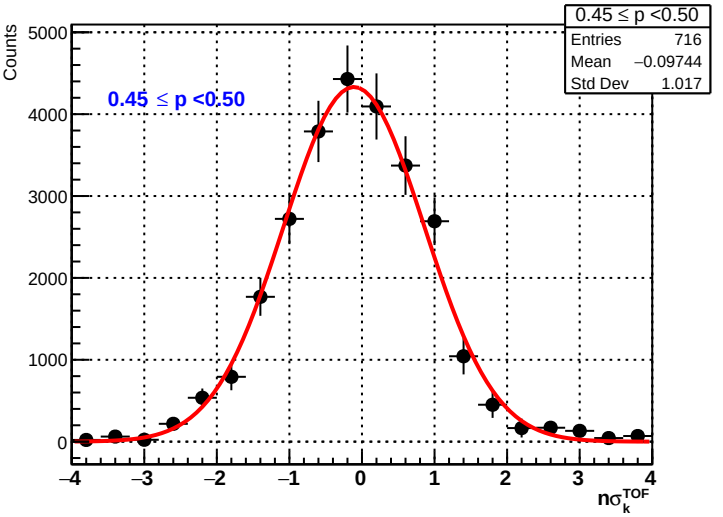

0.20 ≤ p <0.25
Entries 2
Mean 2.338
Std Dev 1.316
0.20 ≤ p <0.25
Counts
nσ_k^TOF

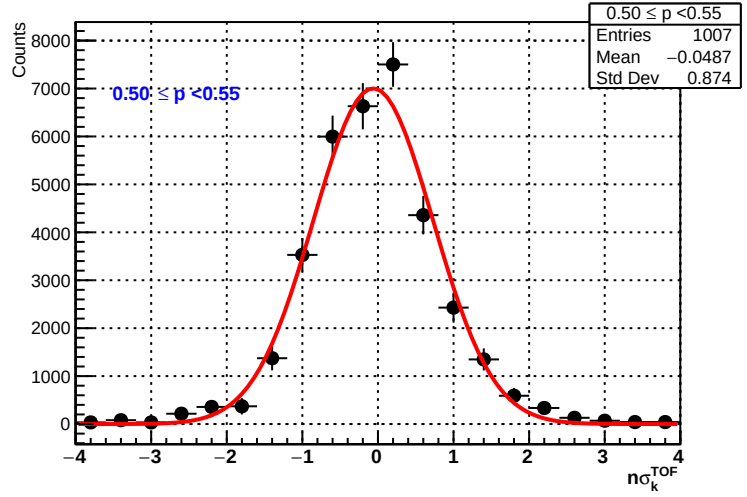

0.25 ≤ p <0.30
Entries 101
Mean 0.5772
Std Dev 1.738
0.25 ≤ p <0.30
Counts
nσ_k^TOF

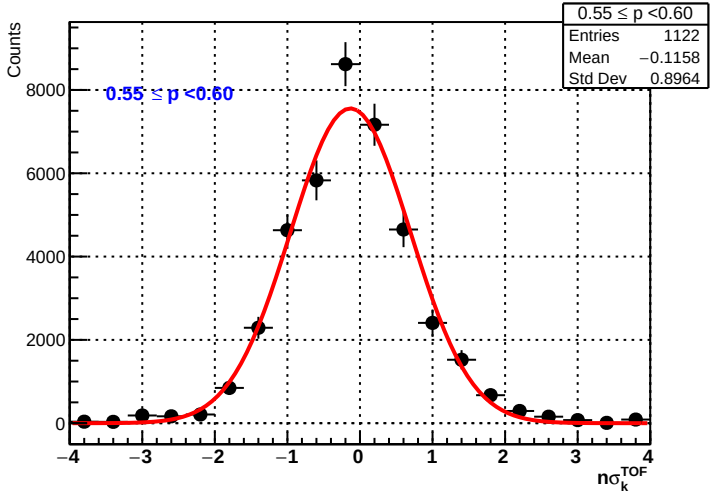

0.30 ≤ p <0.35
Entries 220
Mean 0.1957
Std Dev 1.371
0.30 ≤ p <0.35
Counts
nσ_k^TOF

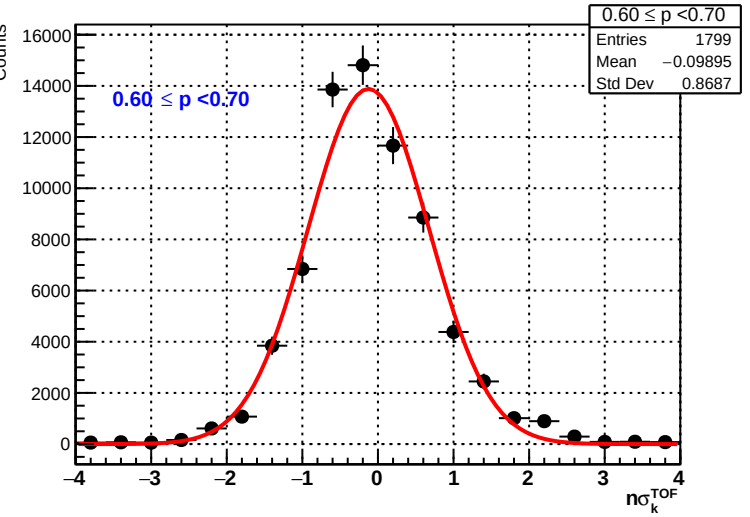

0.35 ≤ p <0.40
Entries 405
Mean −0.1373
Std Dev 1.121
0.35 ≤ p <0.40
Counts
nσ_k^TOF

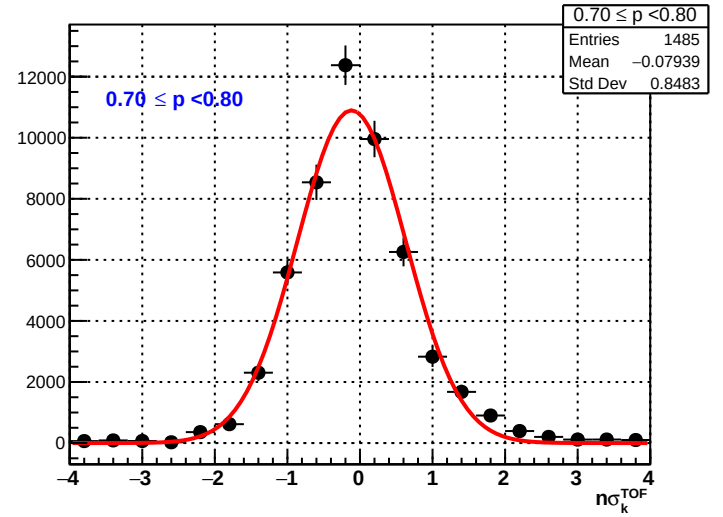

0.40 ≤ p <0.45
Entries 548
Mean −0.06443
Std Dev 1.045
0.40 ≤ p <0.45
Counts
$n\sigma_k^{TOF}$

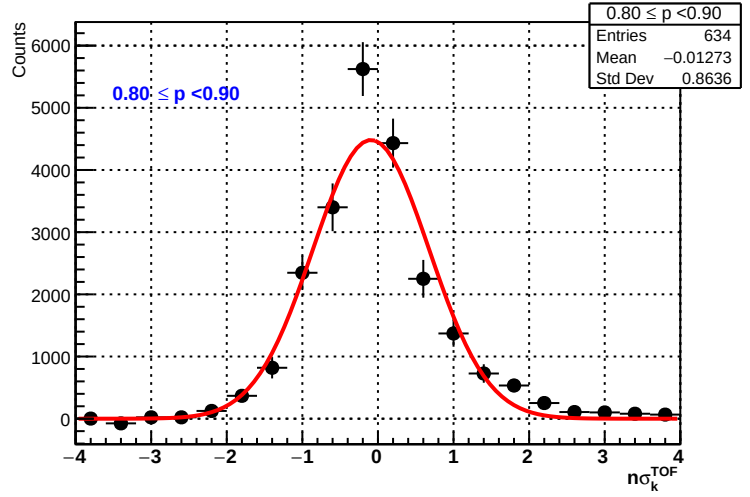

0.45 ≤ p <0.50
Entries 716
Mean −0.09744
Std Dev 1.017
0.45 ≤ p <0.50
Counts
$n\sigma_k^{TOF}$

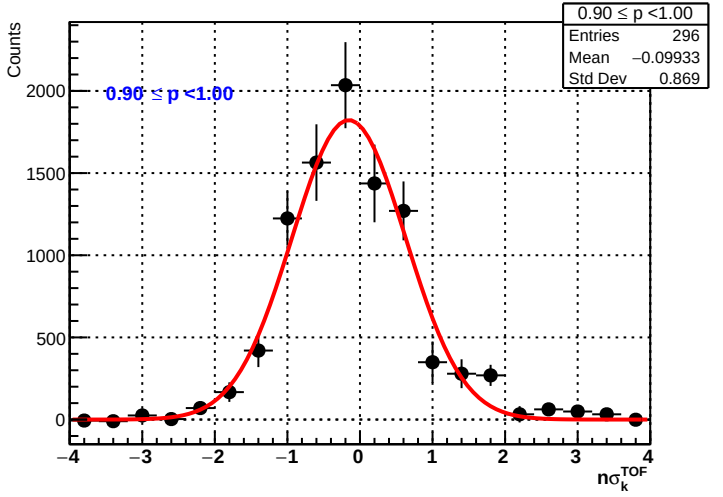

0.50 ≤ p <0.55
Entries 1007
Mean −0.0487
Std Dev 0.874
0.50 ≤ p <0.55
Counts
$n\sigma_k^{TOF}$

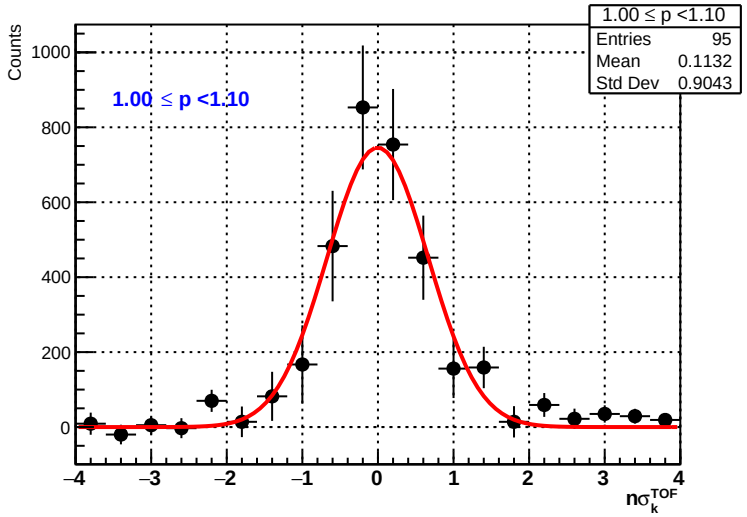

0.55 ≤ p <0.60
Entries 1122
Mean −0.1158
Std Dev 0.8964
0.55 ≤ p <0.60
Counts
$n\sigma_k^{TOF}$

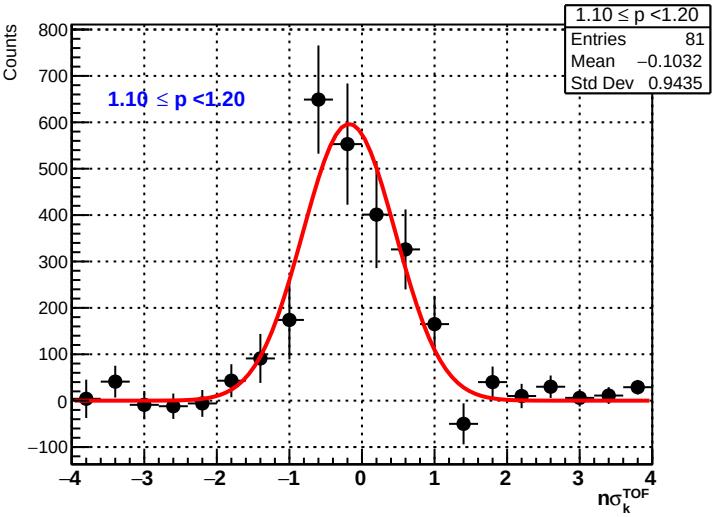

0.60 ≤ p <0.70
Entries 1799
Mean −0.09895
Std Dev 0.8687
0.60 ≤ p <0.70
Counts
$n\sigma_k^{TOF}$

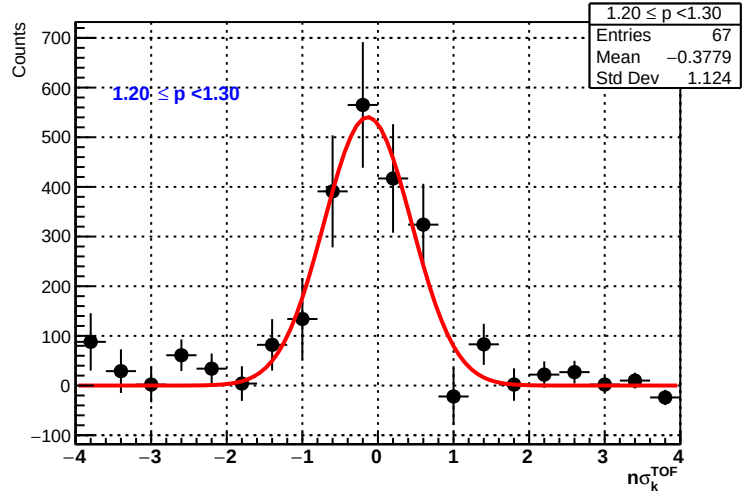

0.70 ≤ p <0.80
Entries 1485
Mean −0.07939
Std Dev 0.8483
0.70 ≤ p <0.80
$n\sigma_k^{TOF}$

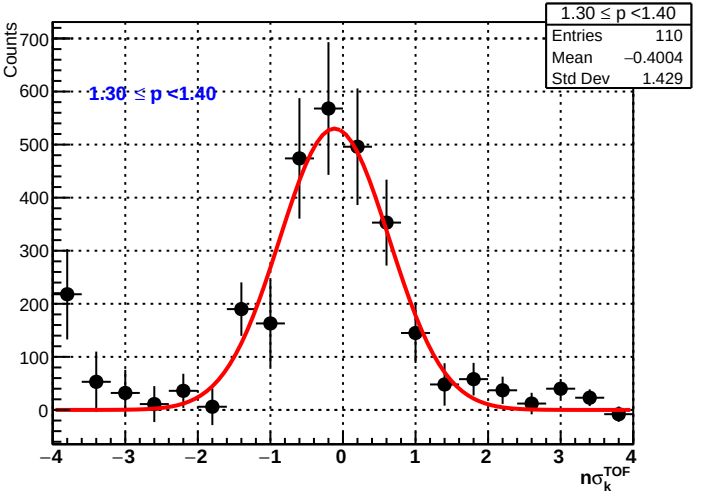

0.80 ≤ p <0.90
Entries 634
Mean −0.01273
Std Dev 0.8636
0.80 ≤ p <0.90
Counts
$n\sigma_k^{TOF}$

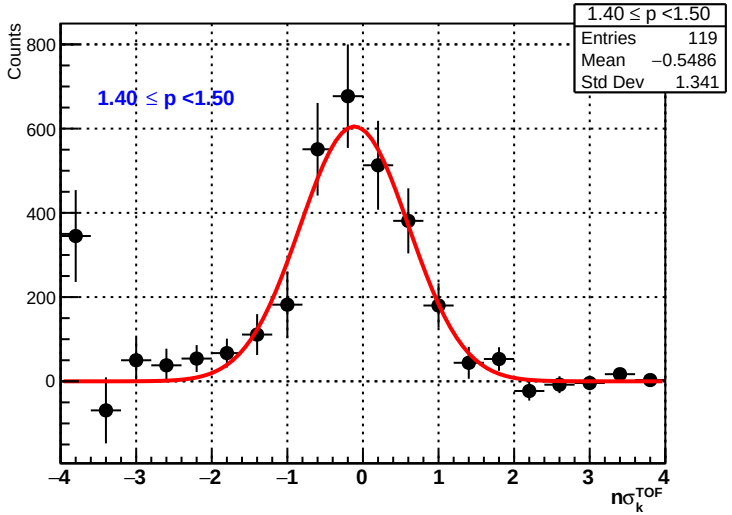

0.90 ≤ p <1.00
Entries 296
Mean −0.09933
Std Dev 0.869
0.90 ≤ p <1.00
Counts
$n\sigma_k^{TOF}$

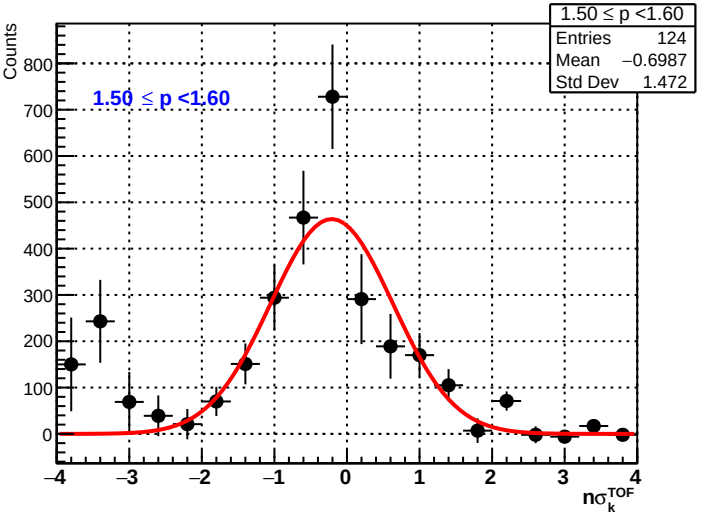

1.00 ≤ p <1.10
Entries 95
Mean 0.1132
Std Dev 0.9043
1.00 ≤ p <1.10
Counts
nσ_k^TOF

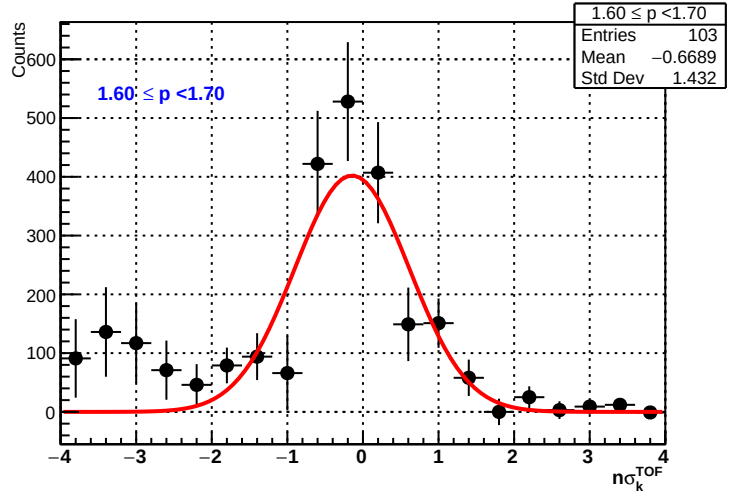

1.10 ≤ p <1.20
Entries 81
Mean −0.1032
Std Dev 0.9435
1.10 ≤ p <1.20
Counts
nσ_k^TOF

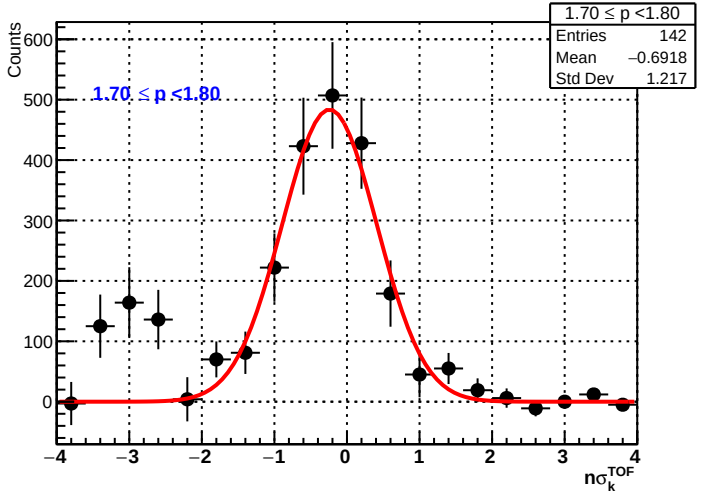

1.20 ≤ p <1.30
Entries 67
Mean −0.3779
Std Dev 1.124
1.20 ≤ p <1.30
Counts
nσ_k^TOF

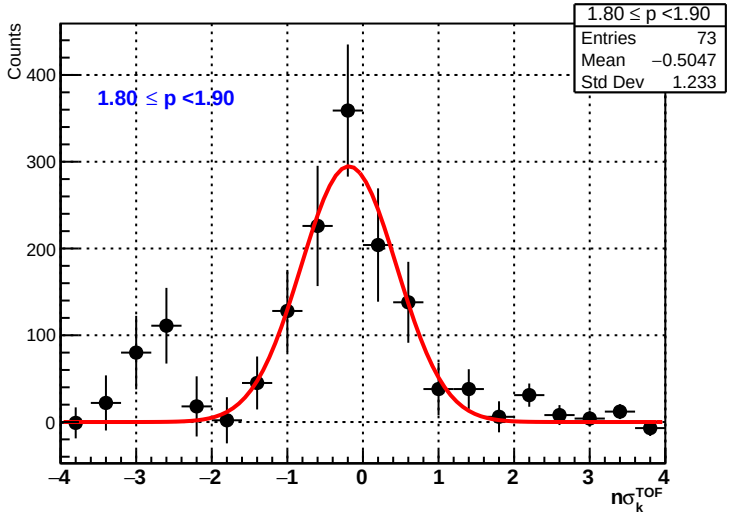

1.30 ≤ p <1.40
Entries 110
Mean −0.4004
Std Dev 1.429
1.30 ≤ p <1.40
Counts
nσ_k^TOF

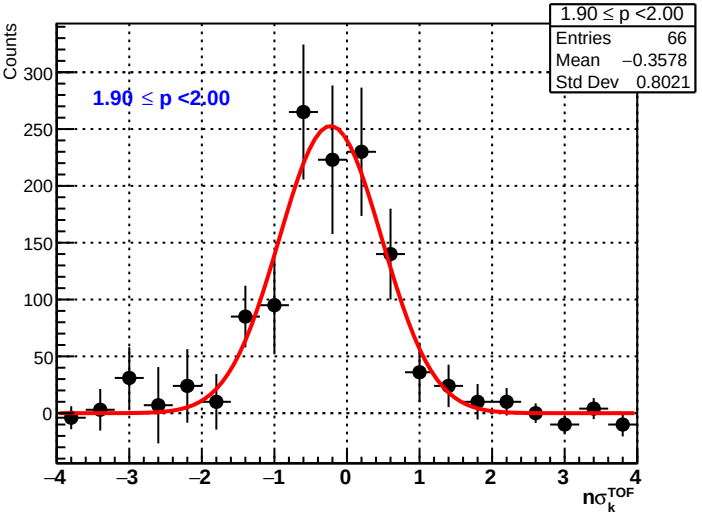

1.40 ≤ p <1.50
Entries 119
Mean −0.5486
Std Dev 1.341
1.40 ≤ p <1.50
Counts
nσ_k^TOF

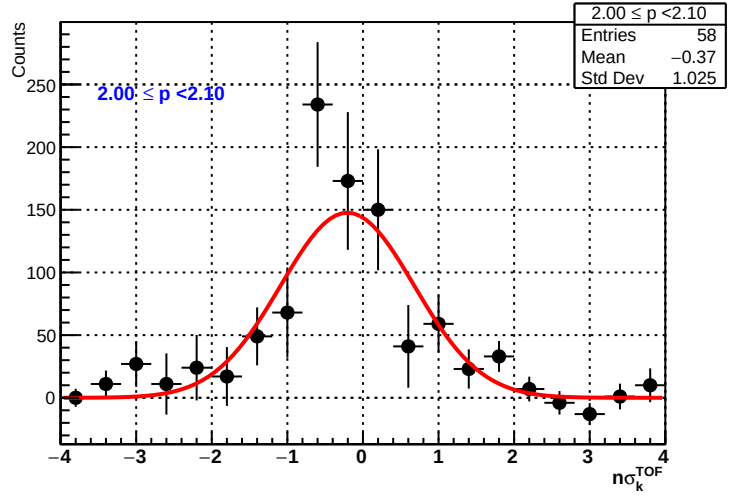

1.50 ≤ p <1.60
Entries 124
Mean −0.6987
Std Dev 1.472
1.50 ≤ p <1.60
Counts
nσ_k^TOF

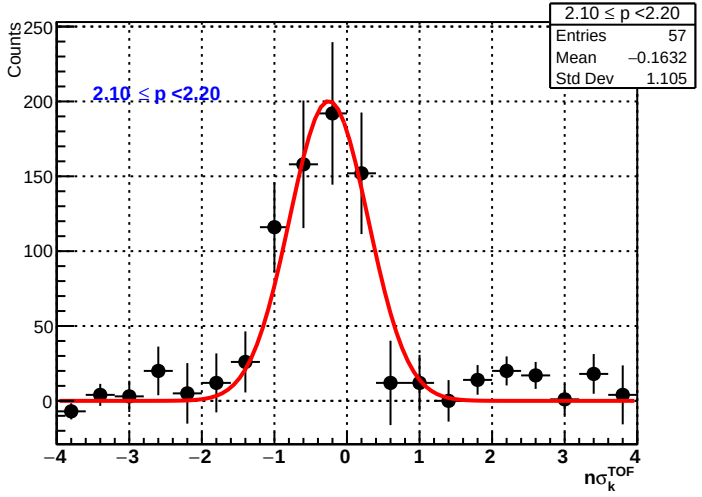

1.60 ≤ p <1.70
Entries 103
Mean −0.6689
Std Dev 1.432
1.60 ≤ p <1.70
Counts
nσ_k^TOF

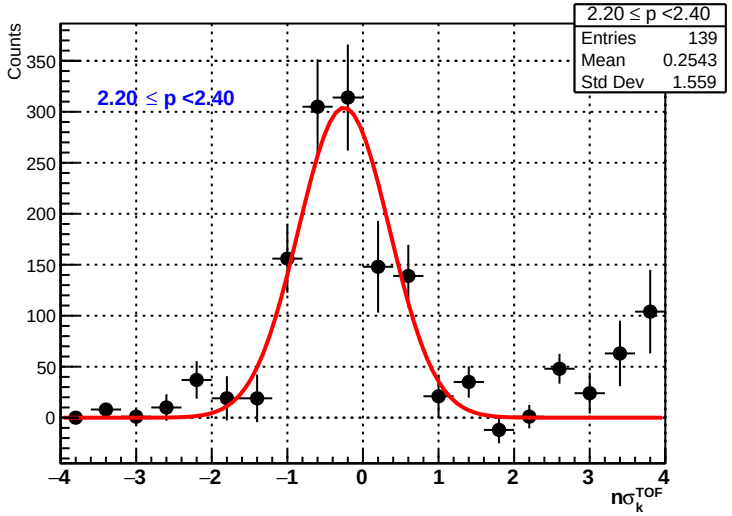

1.70 ≤ p <1.80
Entries 142
Mean −0.6918
Std Dev 1.217
1.70 ≤ p <1.80
Counts
nσ_k^TOF

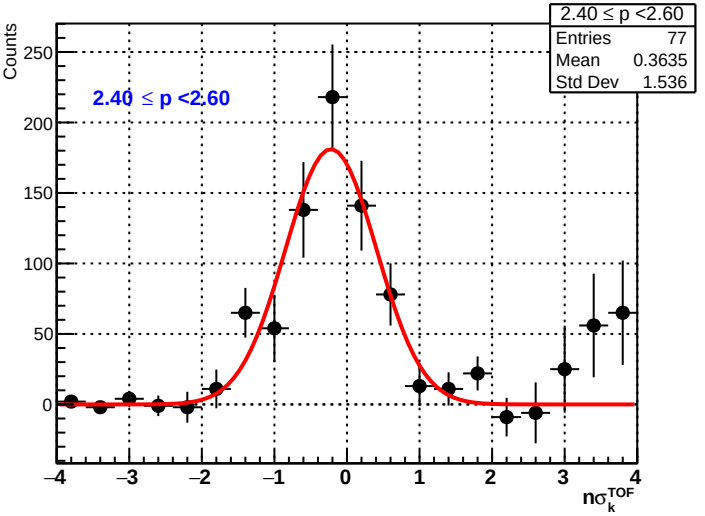

1.80 ≤ p <1.90
Entries 73
Mean −0.5047
Std Dev 1.233
1.80 ≤ p <1.90
Counts
nσ_k^TOF

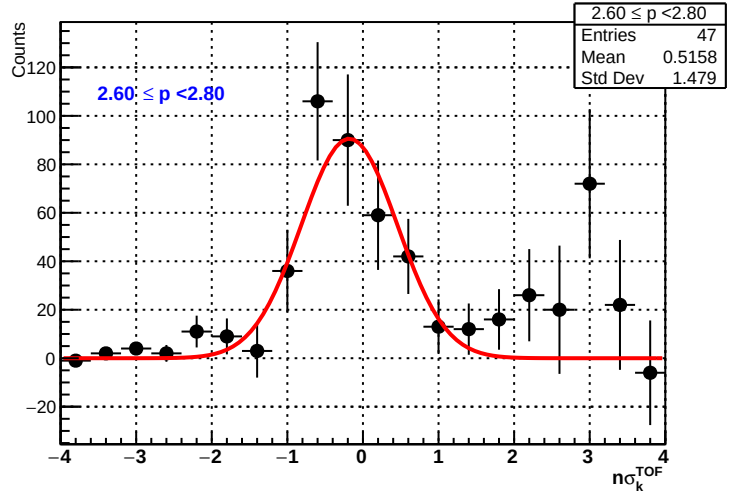

1.90 ≤ p <2.00
Entries 66
Mean −0.3578
Std Dev 0.8021
1.90 ≤ p <2.00
Counts
nσ_k^TOF

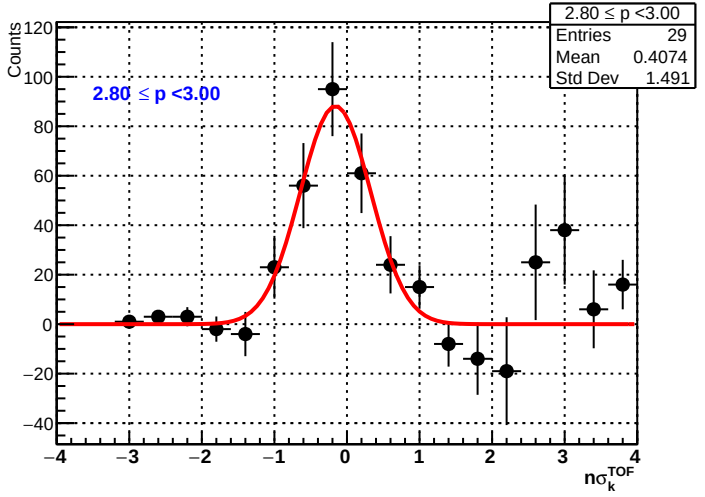

2.00 ≤ p <2.10
Entries 58
Mean −0.37
Std Dev 1.025
2.00 ≤ p <2.10
Counts
nσ_k^TOF

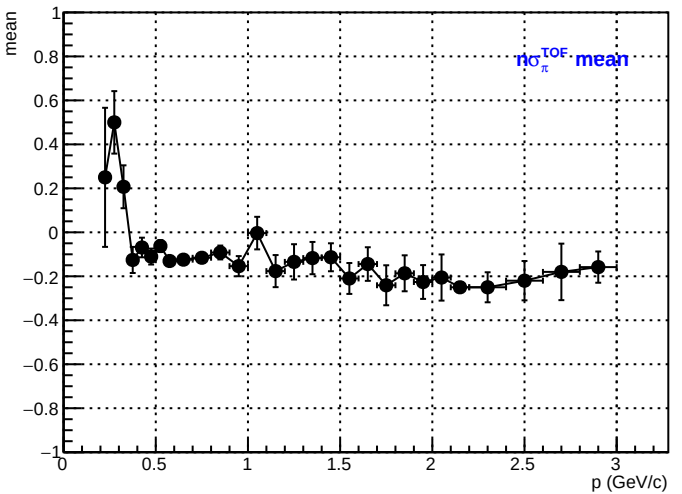

2.10 ≤ p <2.20
Entries 57
Mean −0.1632
Std Dev 1.105
2.10 ≤ p <2.20
Counts
nσ_k^TOF

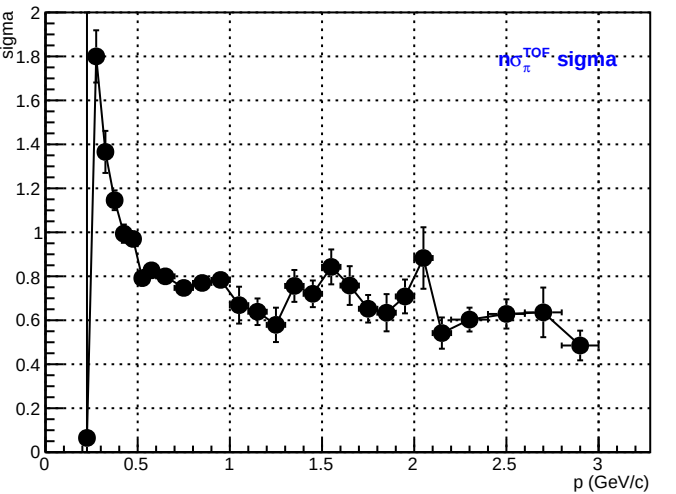

2.20 ≤ p <2.40
Entries 139
Mean 0.2543
Std Dev 1.559
2.20 ≤ p <2.40
Counts
nσ_k^TOF

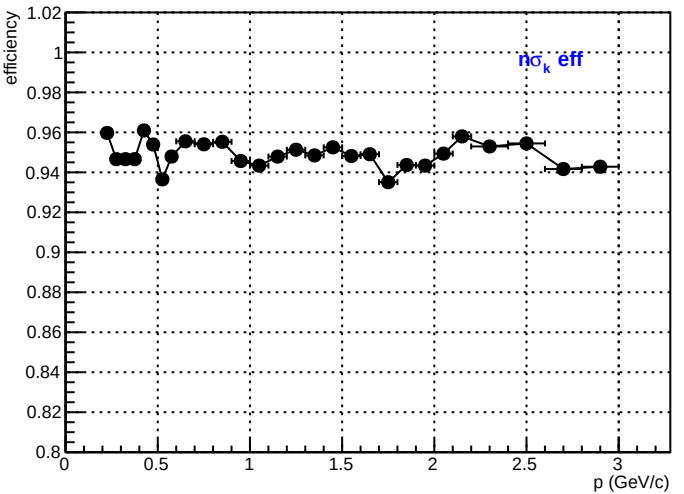

2.40 ≤ p <2.60
Entries 77
Mean 0.3635
Std Dev 1.536
2.40 ≤ p <2.60
Counts
nσ_k^TOF

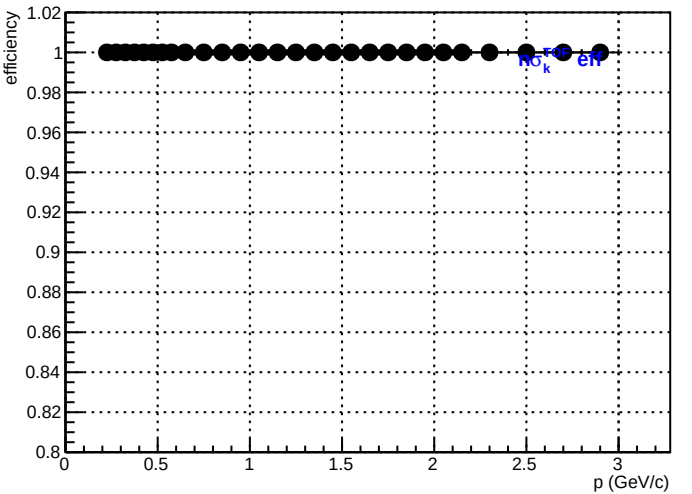

2.60 ≤ p <2.80
Entries 47
Mean 0.5158
Std Dev 1.479
2.60 ≤ p <2.80
Counts
nσ_k^TOF

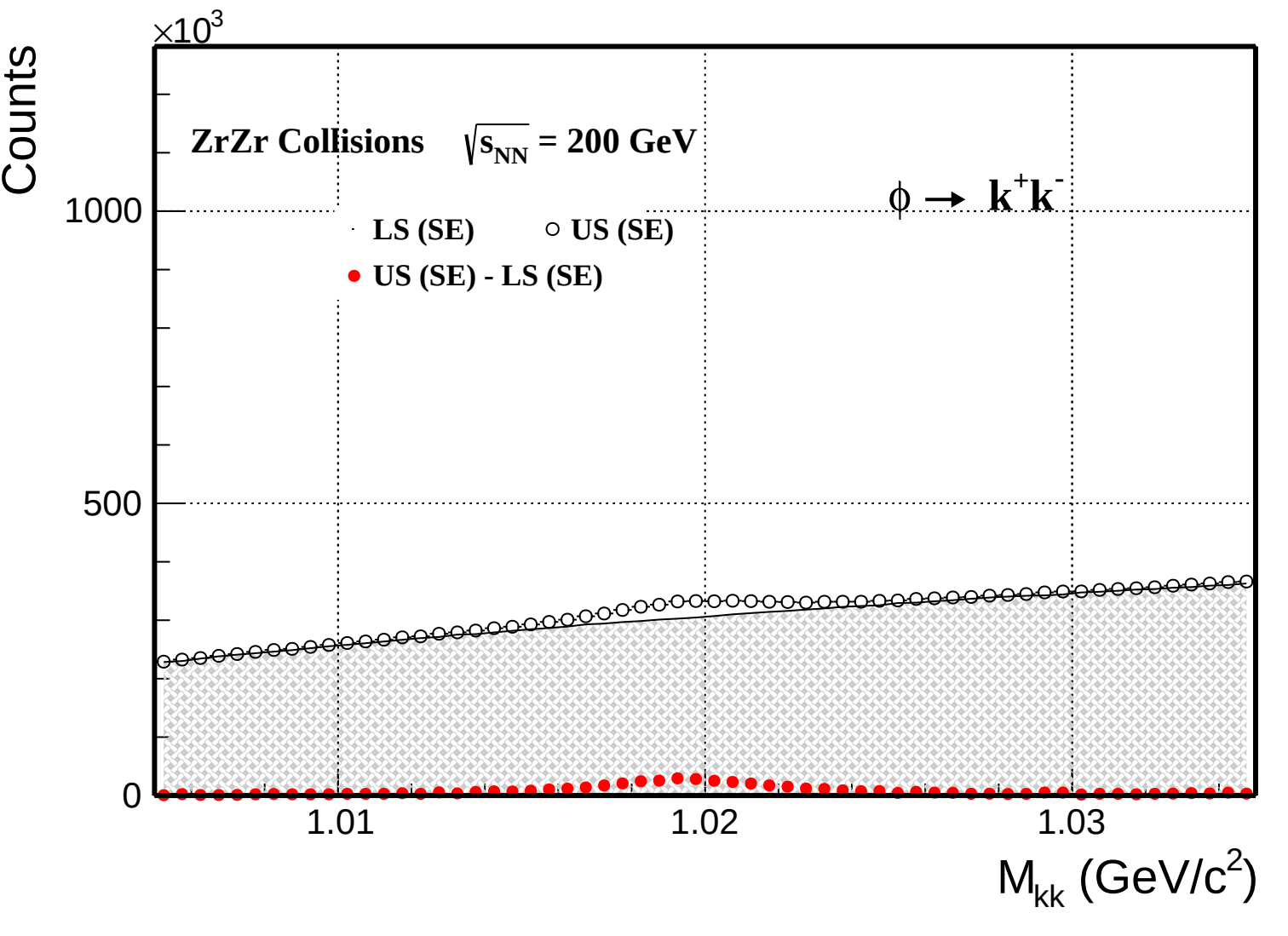

2.80 ≤ p <3.00
Entries 29
Mean 0.4074
Std Dev 1.491
2.80 ≤ p <3.00
Counts
nσ_k^TOF


mean
$n\sigma_{\pi}^{TOF}$ mean
p (GeV/c)


sigma
$n\sigma_{\pi}^{TOF}$ sigma
p (GeV/c)


efficiency
1.02
1
0.98
0.96
0.94
0.92
0.9
0.88
0.86
0.84
0.82
0.8
0
0.5
1
1.5
2
2.5
3
p (GeV/c)
nσ_K eff


efficiency
1.02
1
0.98
0.96
0.94
0.92
0.9
0.88
0.86
0.84
0.82
0.8
0
0.5
1
1.5
2
2.5
3
p (GeV/c)
nσ_K eff


×10^3
Counts
ZrZr Collisions √s_NN = 200 GeV
φ → k+k-
LS (SE)
US (SE)
US (SE) - LS (SE)
1000
500
0
1.01
1.02
1.03
M_kk (GeV/c^2)

# $\pi$ PID and efficiency in ZrZr

**Target $\pi$**

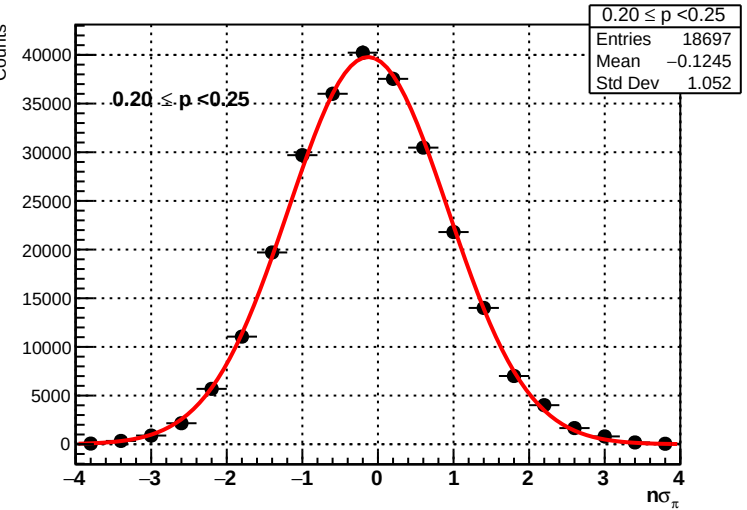
- $p_T > 0.5$
- $|\eta| < 1$
- nHitsFit $\geq 20$
- ndEdx > 15
- gDca > 0.1
- $|n\sigma_\pi| < 2.0$
- $|n\sigma_\pi^{TOF}| < 2.0$

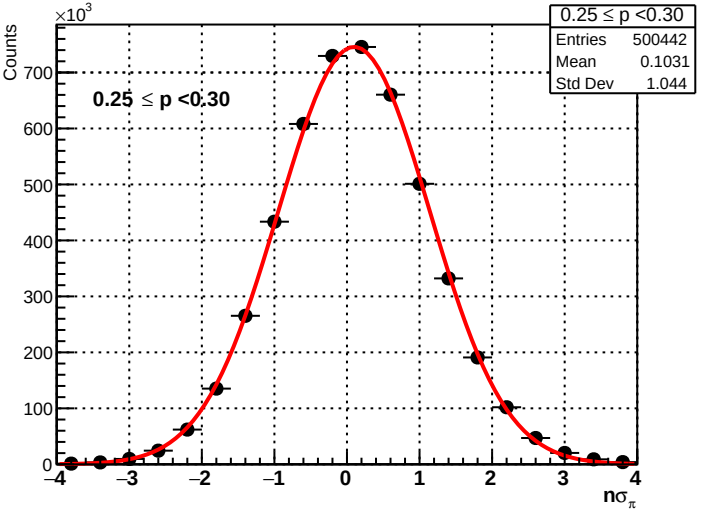
**Partner $\pi$**

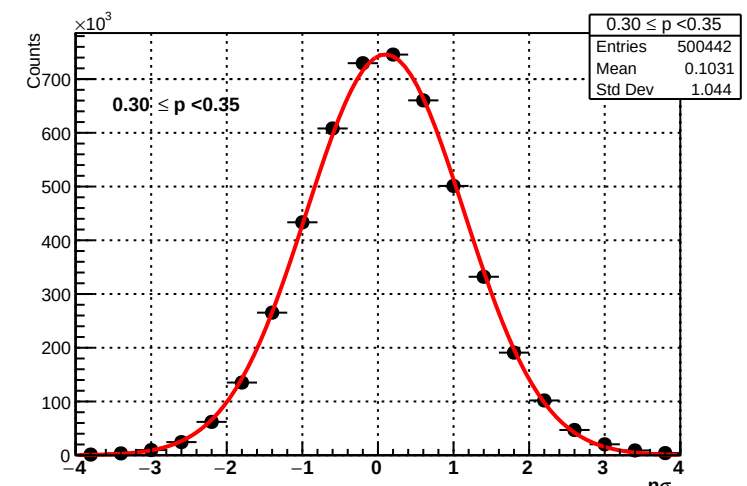
- $p_T > 0.2$
- $|\eta| < 1$
- nHitsFit $\geq 20$
- ndEdx > 15
- gDca > 0.1
- $|n\sigma_\pi| < 4.0$
- $|n\sigma_\pi^{TOF}| < 4.0$

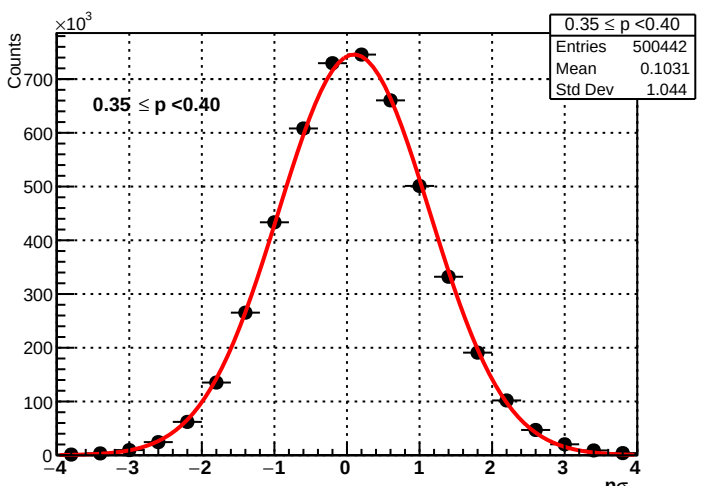
**$k_s^0$ reconstruction cuts:**

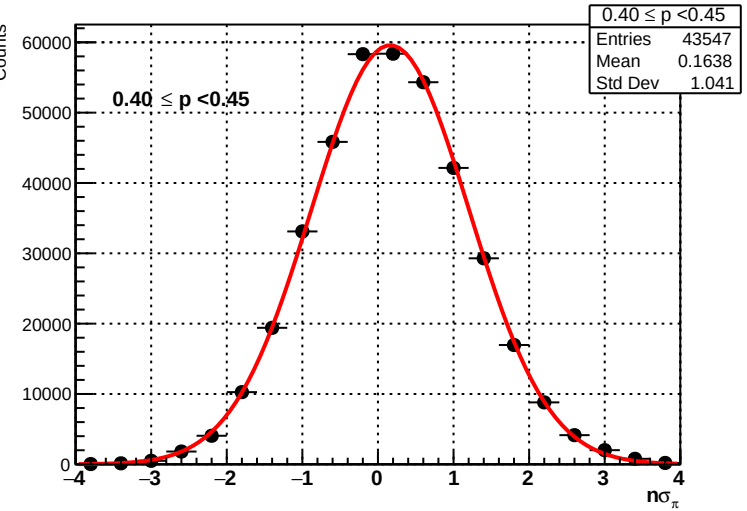
- 0.5 < DecayL < 25
- Dca < 0.4
- pairDca < 0.5
- $\cos\theta > 0.999$

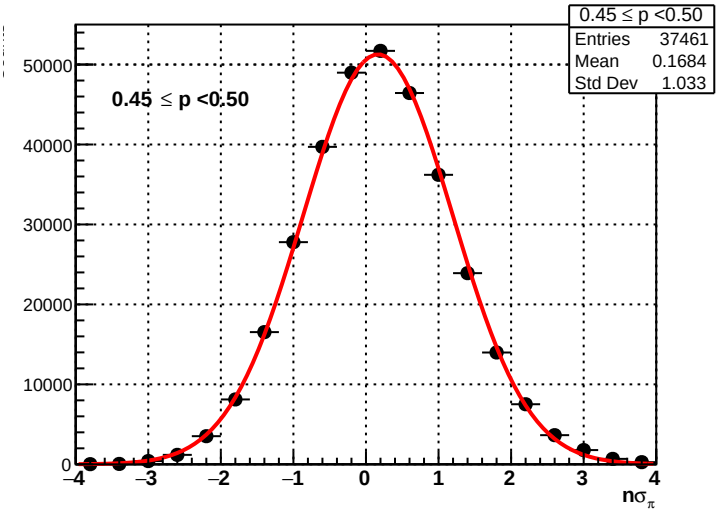

0.20 ≤ p <0.25
Entries 18697
Mean −0.1245
Std Dev 1.052
0.20 ≤ p <0.25
Counts
nσ_π

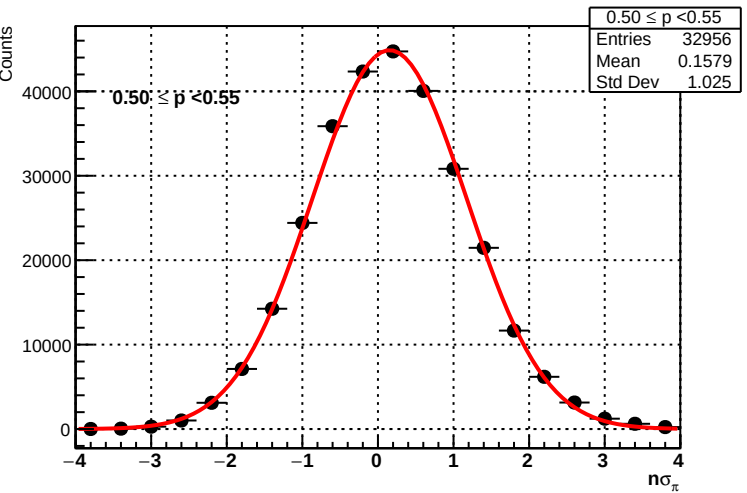

×10^3
0.25 ≤ p <0.30
Entries 500442
Mean 0.1031
Std Dev 1.044
0.25 ≤ p <0.30
Counts
nσ_π

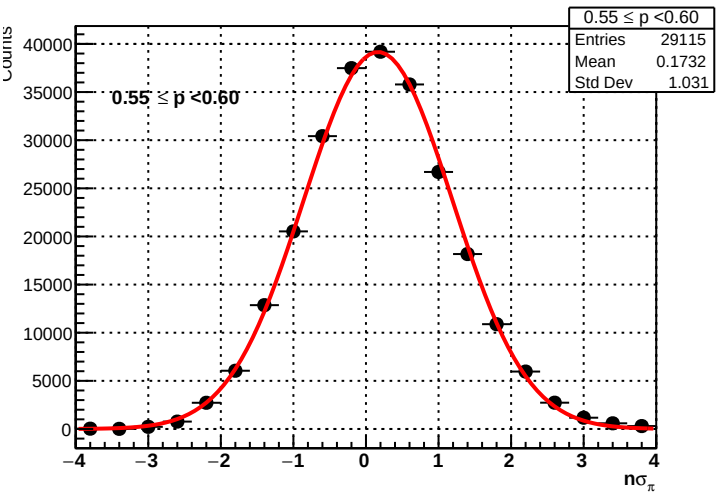

×10^3
0.30 ≤ p <0.35
Entries 500442
Mean 0.1031
Std Dev 1.044
0.30 ≤ p <0.35
Counts
nσ_π

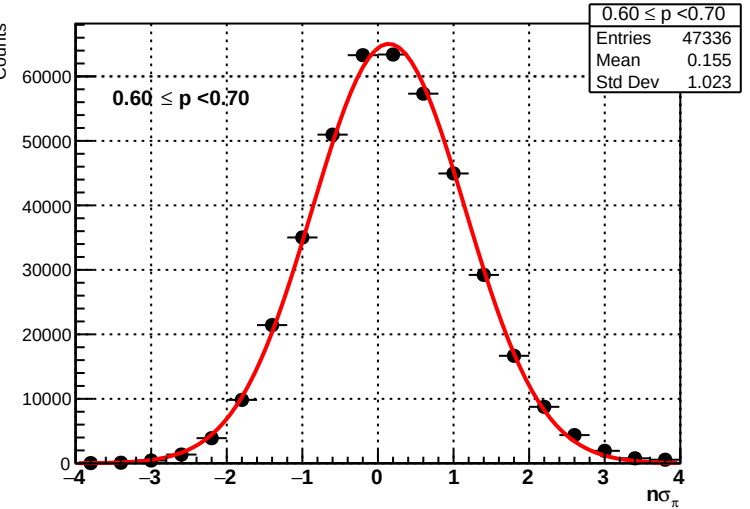

×10^3
0.35 ≤ p <0.40
Entries 500442
Mean 0.1031
Std Dev 1.044
0.35 ≤ p <0.40
Counts
nσ_π

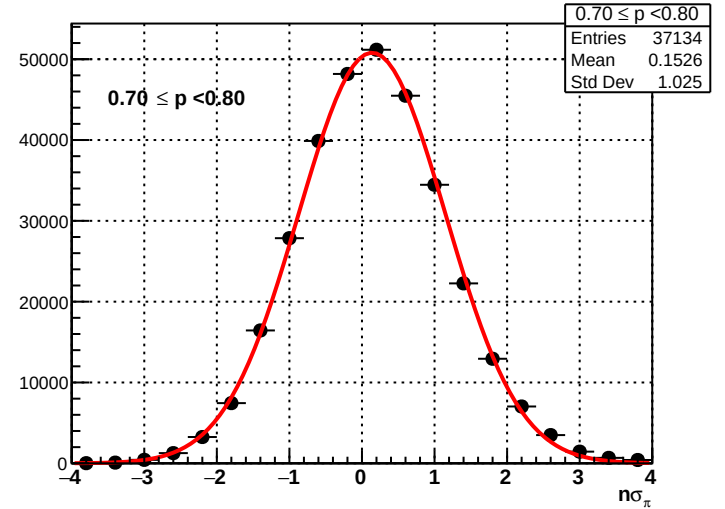

0.40 ≤ p <0.45
Entries 43547
Mean 0.1638
Std Dev 1.041
0.40 ≤ p <0.45
Counts
nσπ

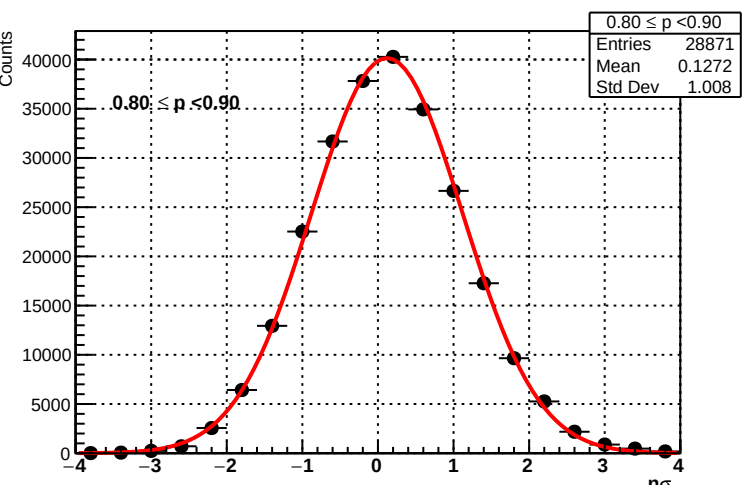

0.45 ≤ p <0.50
Entries 37461
Mean 0.1684
Std Dev 1.033
0.45 ≤ p <0.50
nσπ

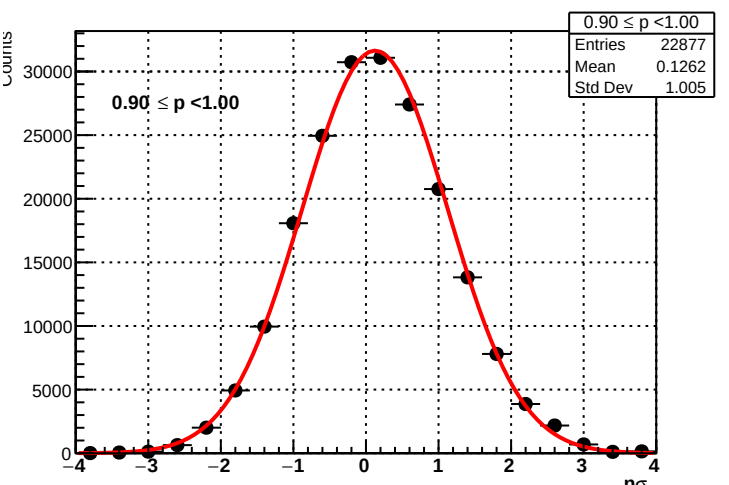

0.50 ≤ p <0.55
Entries 32956
Mean 0.1579
Std Dev 1.025
0.50 ≤ p <0.55
Counts
nσπ

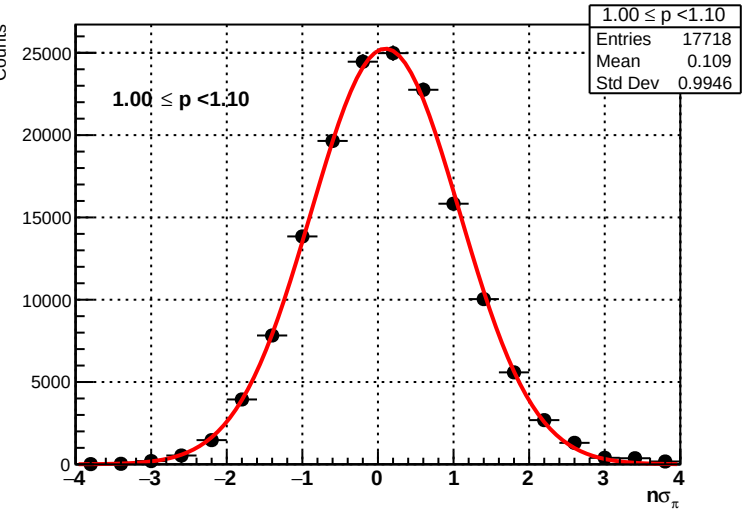

0.55 ≤ p <0.60
Entries 29115
Mean 0.1732
Std Dev 1.031
0.55 ≤ p <0.60
Counts
nσπ

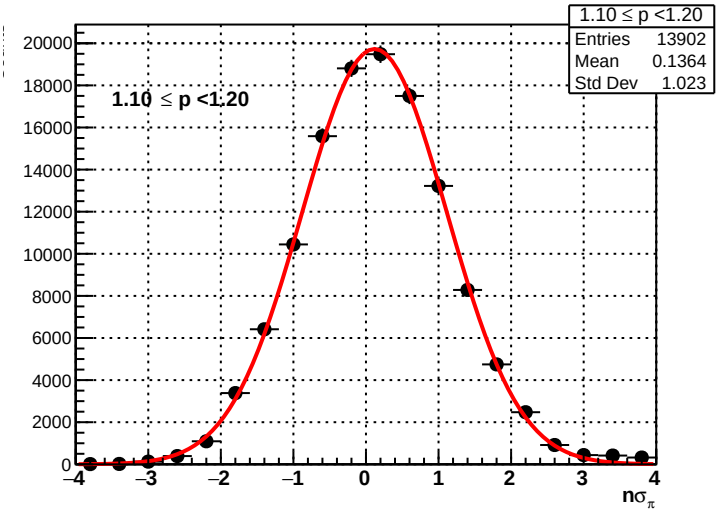

0.60 ≤ p <0.70
Entries 47336
Mean 0.155
Std Dev 1.023
0.60 ≤ p <0.70
Counts
nσπ

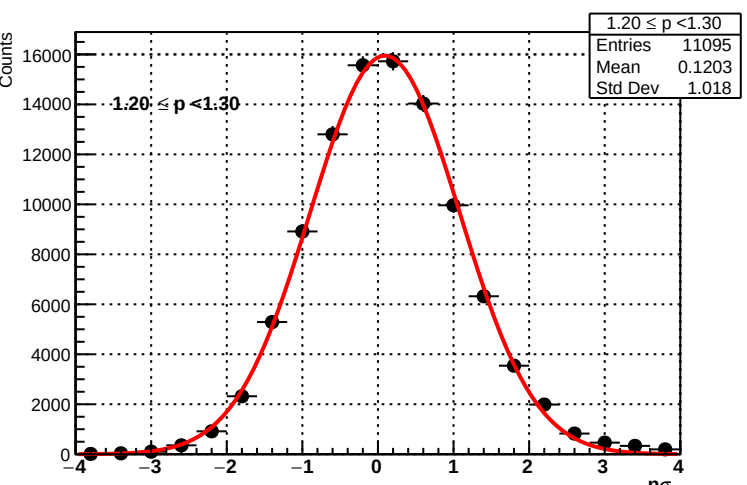

0.70 ≤ p <0.80
Entries 37134
Mean 0.1526
Std Dev 1.025
0.70 ≤ p <0.80
nσπ

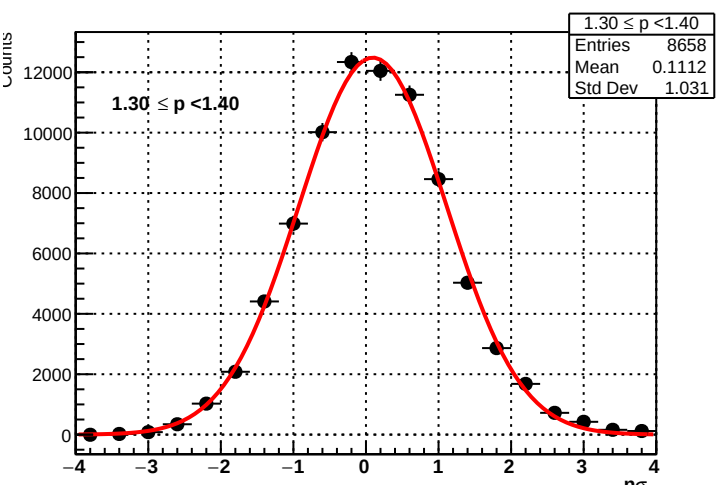

0.80 ≤ p <0.90
Entries 28871
Mean 0.1272
Std Dev 1.008
0.80 ≤ p <0.90
Counts
nσπ

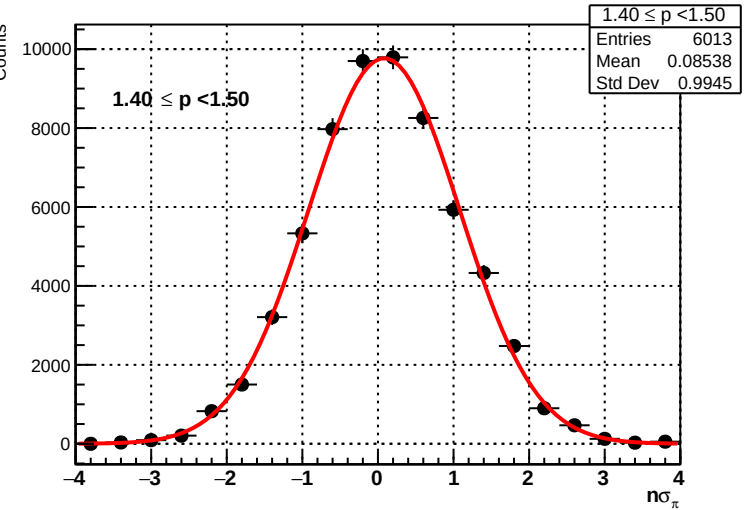

0.90 ≤ p <1.00
Entries 22877
Mean 0.1262
Std Dev 1.005
0.90 ≤ p <1.00
Counts
nσπ

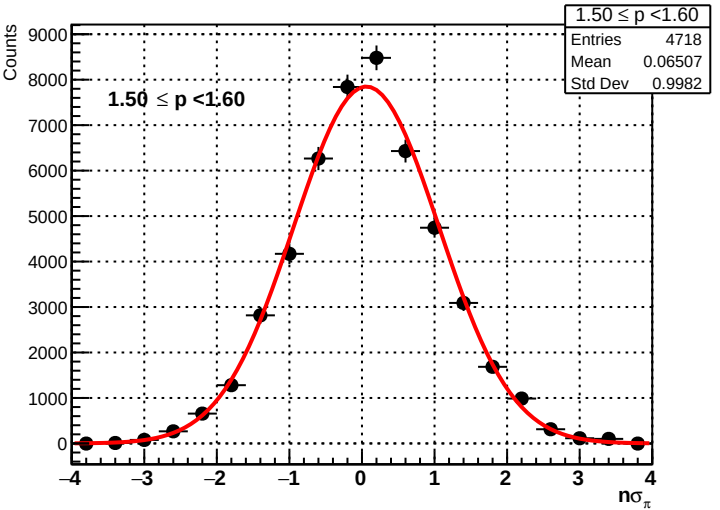

1.00 ≤ p <1.10
Entries 17718
Mean 0.109
Std Dev 0.9946
1.00 ≤ p <1.10
Counts
nσπ

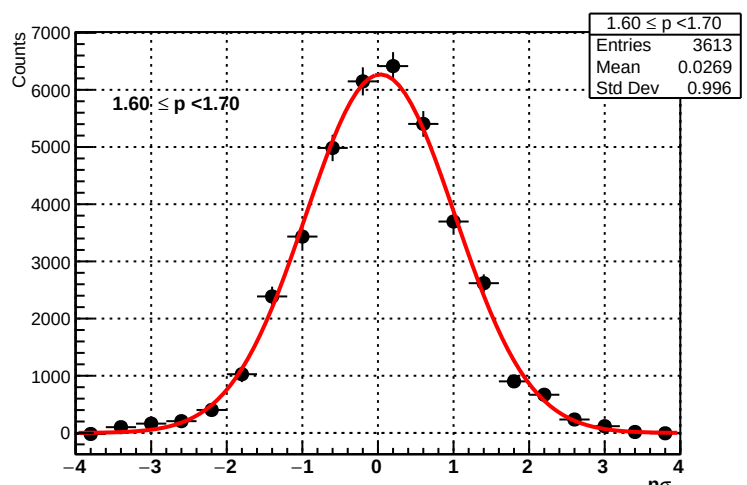

1.10 ≤ p <1.20
Entries 13902
Mean 0.1364
Std Dev 1.023
1.10 ≤ p <1.20
nσπ

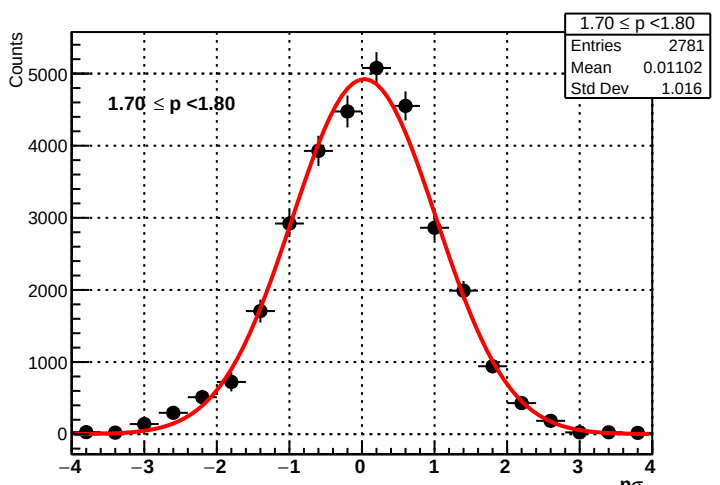

1.20 ≤ p <1.30
Entries 11095
Mean 0.1203
Std Dev 1.018
1.20 ≤ p <1.30
Counts
nσπ

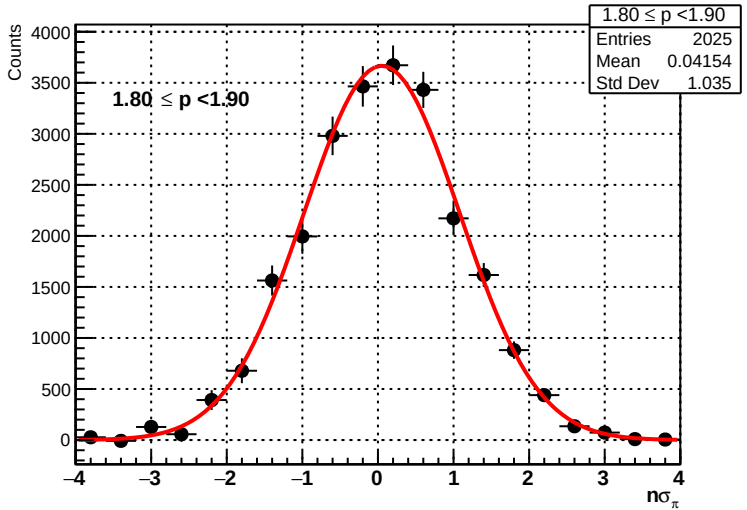

1.30 ≤ p <1.40
Entries 8658
Mean 0.1112
Std Dev 1.031
1.30 ≤ p <1.40
Counts
nσπ

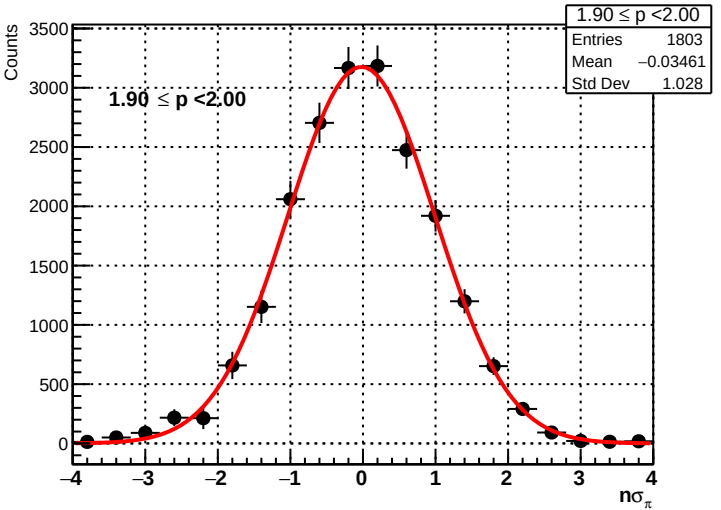

1.40 ≤ p <1.50
Entries 6013
Mean 0.08538
Std Dev 0.9945
1.40 ≤ p <1.50
Counts
nσπ

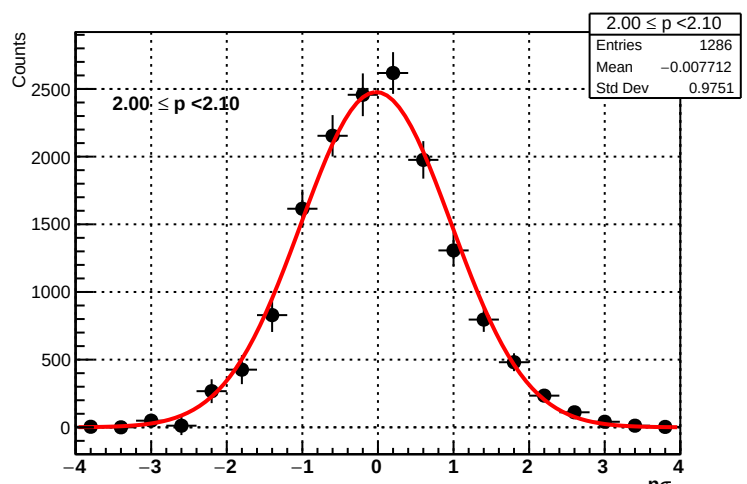

1.50 ≤ p <1.60
Entries 4718
Mean 0.06507
Std Dev 0.9982
1.50 ≤ p <1.60
Counts
nσπ

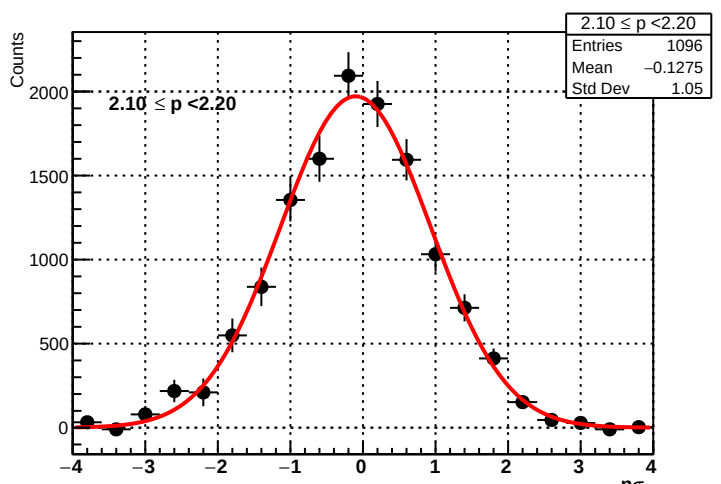

1.60 ≤ p <1.70
Entries 3613
Mean 0.0269
Std Dev 0.996
1.60 ≤ p <1.70
Counts
nσπ

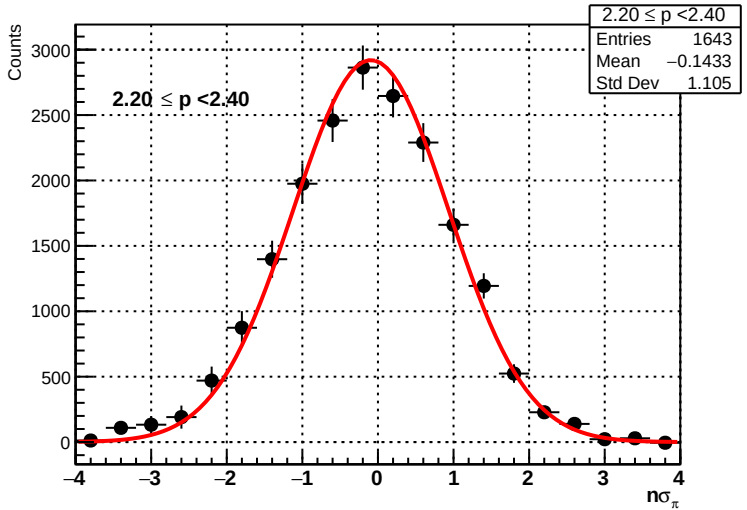

1.70 ≤ p <1.80
Entries 2781
Mean 0.01102
Std Dev 1.016
1.70 ≤ p <1.80
Counts
nσπ

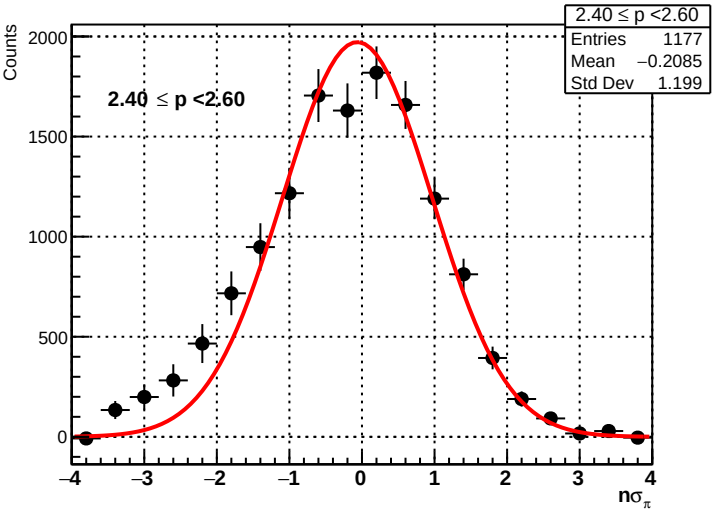

1.80 ≤ p <1.90
Entries 2025
Mean 0.04154
Std Dev 1.035
1.80 ≤ p <1.90
Counts
nσπ

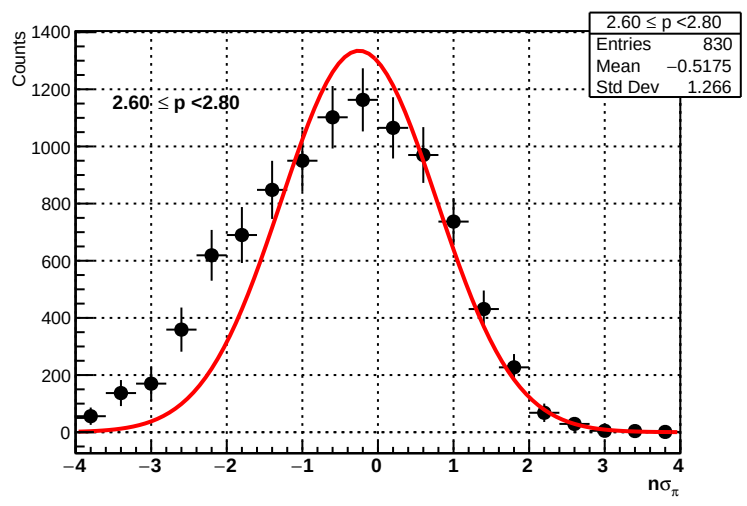

1.90 ≤ p <2.00
Entries 1803
Mean −0.03461
Std Dev 1.028
1.90 ≤ p <2.00
Counts
nσπ

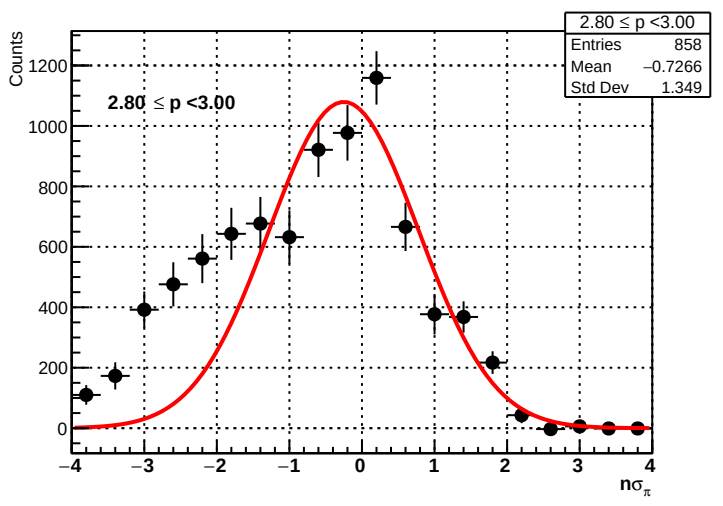

2.00 ≤ p <2.10
Entries 1286
Mean −0.007712
Std Dev 0.9751
2.00 ≤ p <2.10
Counts
nσπ

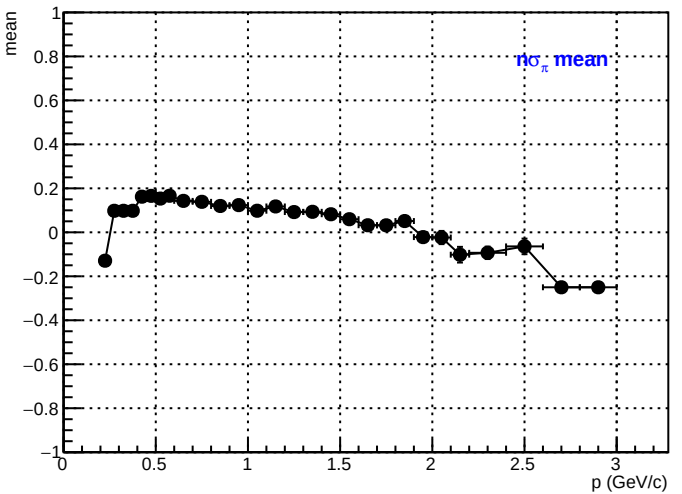

2.10 ≤ p <2.20
Entries 1096
Mean −0.1275
Std Dev 1.05
2.10 ≤ p <2.20
Counts
nσπ

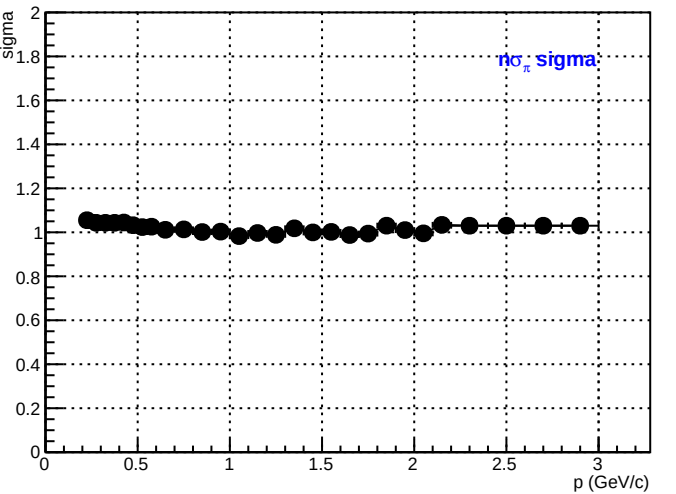

2.20 ≤ p <2.40
Entries 1643
Mean −0.1433
Std Dev 1.105
2.20 ≤ p <2.40
Counts
nσ_π

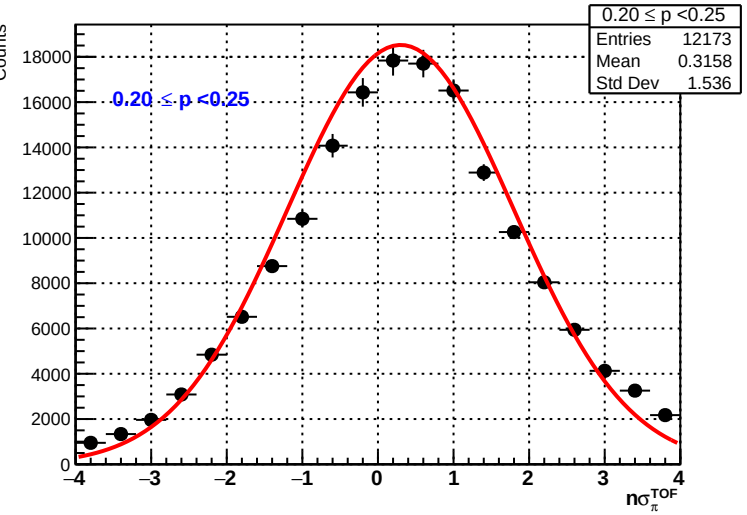

2.40 ≤ p <2.60
Entries 1177
Mean −0.2085
Std Dev 1.199
2.40 ≤ p <2.60
Counts
nσ_π

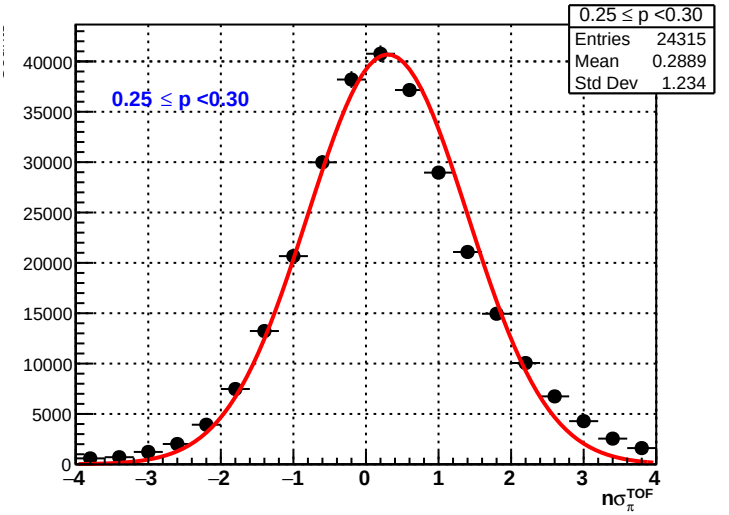

2.60 ≤ p <2.80
Entries 830
Mean −0.5175
Std Dev 1.266
2.60 ≤ p <2.80
Counts
nσ_π

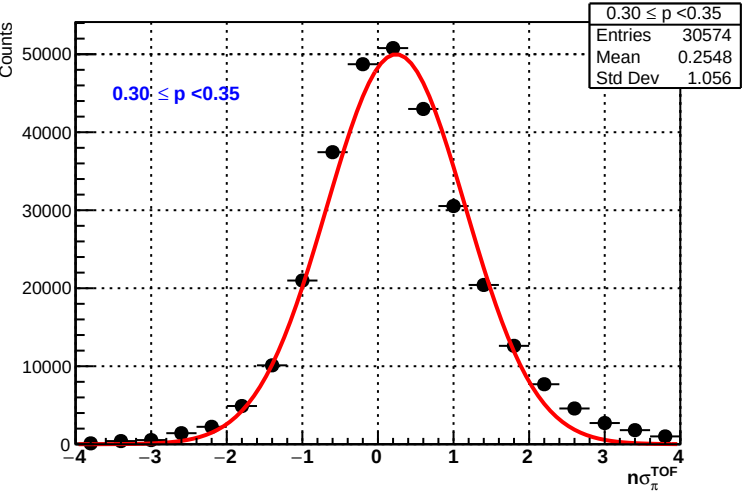

2.80 ≤ p <3.00
Entries 858
Mean −0.7266
Std Dev 1.349
2.80 ≤ p <3.00
Counts
nσ_π

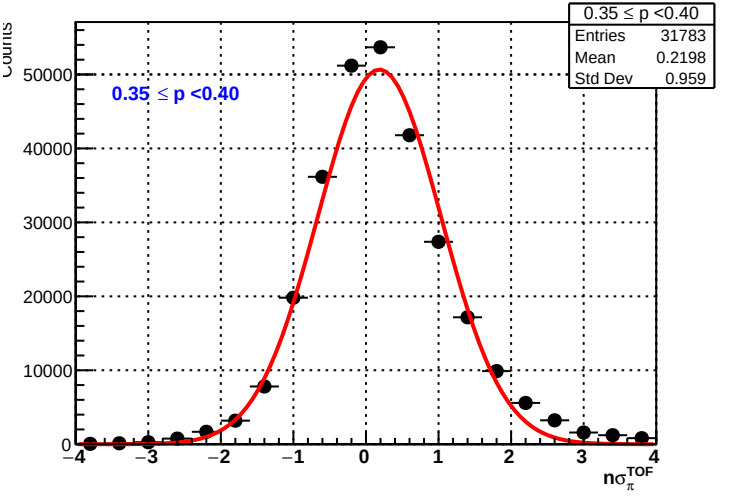

mean
nσ_π mean
p (GeV/c)

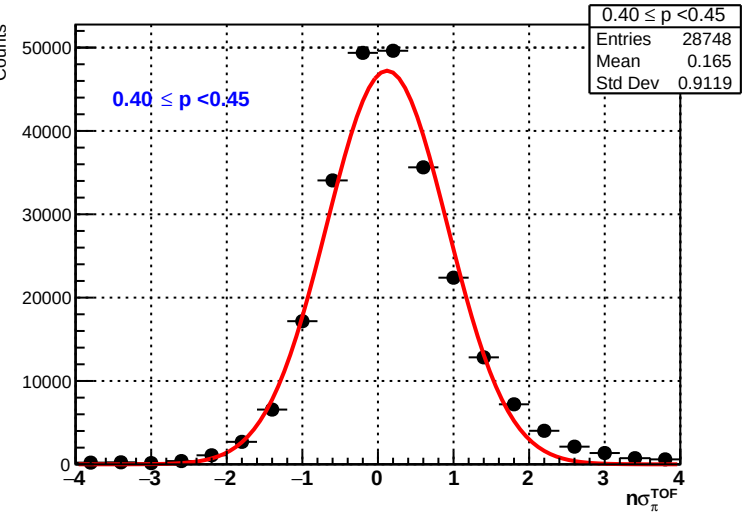

sigma
nσ_π sigma
p (GeV/c)

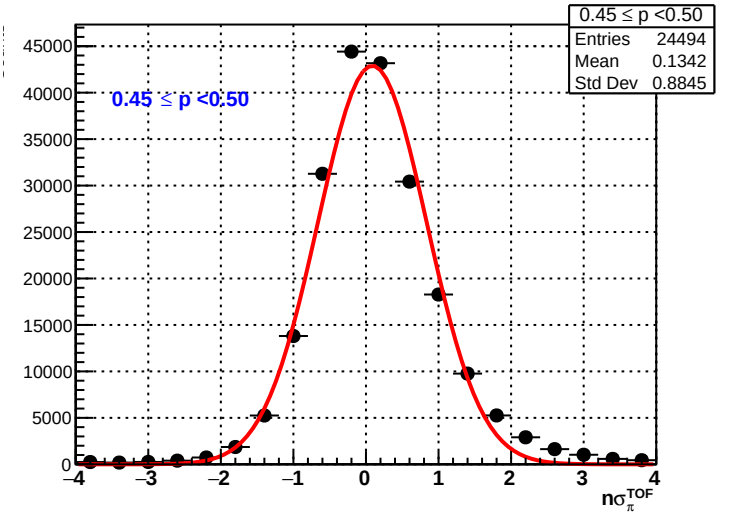

0.20 ≤ p <0.25
Entries 12173
Mean 0.3158
Std Dev 1.536
0.20 ≤ p <0.25
Counts
nσ$_\pi^{TOF}$

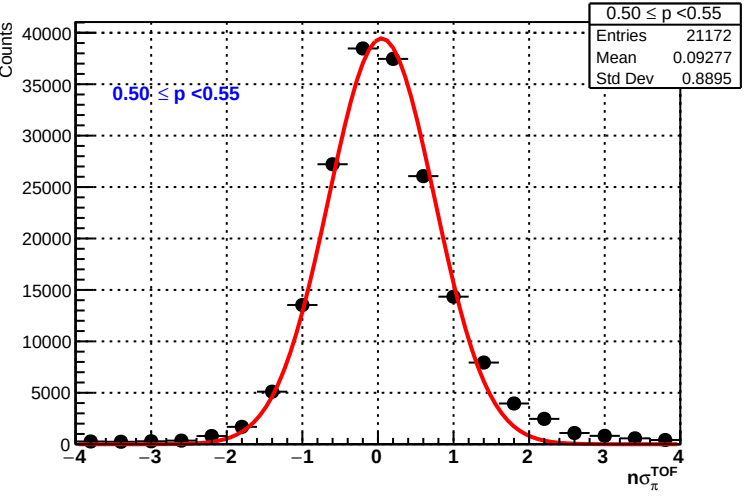

0.25 ≤ p <0.30
Entries 24315
Mean 0.2889
Std Dev 1.234
0.25 ≤ p <0.30
nσ$_\pi^{TOF}$

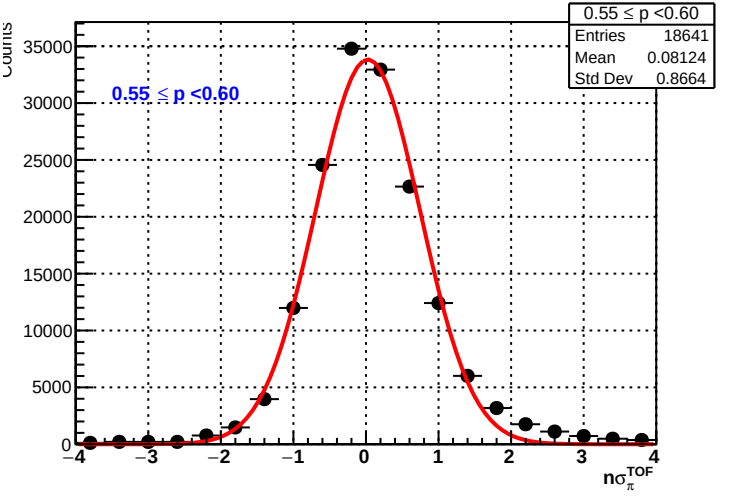

0.30 ≤ p <0.35
Entries 30574
Mean 0.2548
Std Dev 1.056
0.30 ≤ p <0.35
Counts
nσ$_\pi^{TOF}$

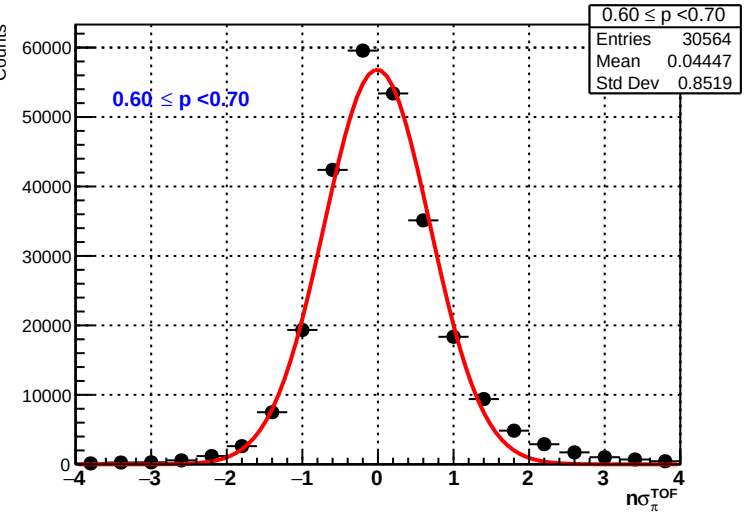

0.35 ≤ p <0.40
Entries 31783
Mean 0.2198
Std Dev 0.959
0.35 ≤ p <0.40
Counts
nσ$_\pi^{TOF}$

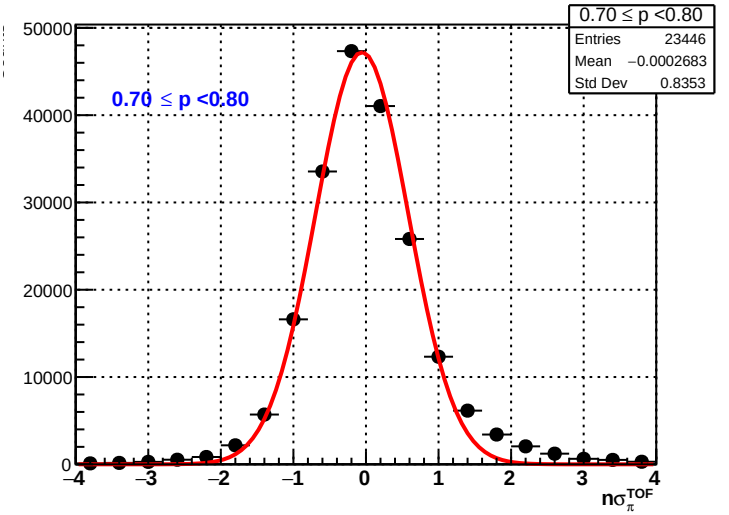

0.40 ≤ p <0.45
Entries 28748
Mean 0.165
Std Dev 0.9119
0.40 ≤ p <0.45
Counts
$n\sigma_{\pi}^{TOF}$

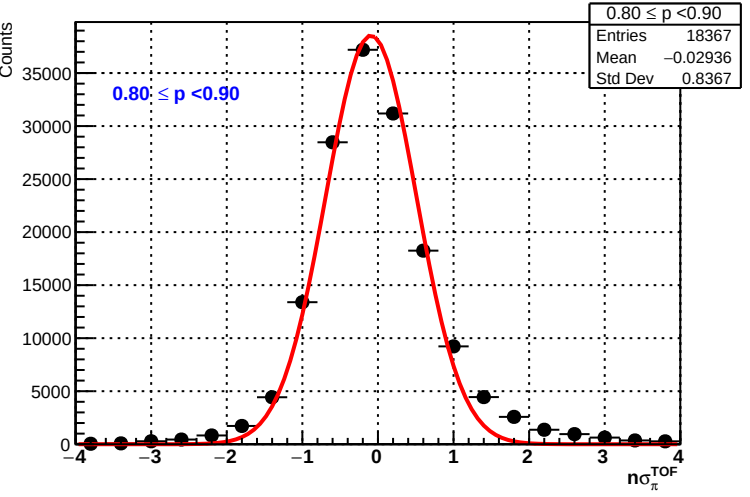

0.45 ≤ p <0.50
Entries 24494
Mean 0.1342
Std Dev 0.8845
0.45 ≤ p <0.50
$n\sigma_{\pi}^{TOF}$

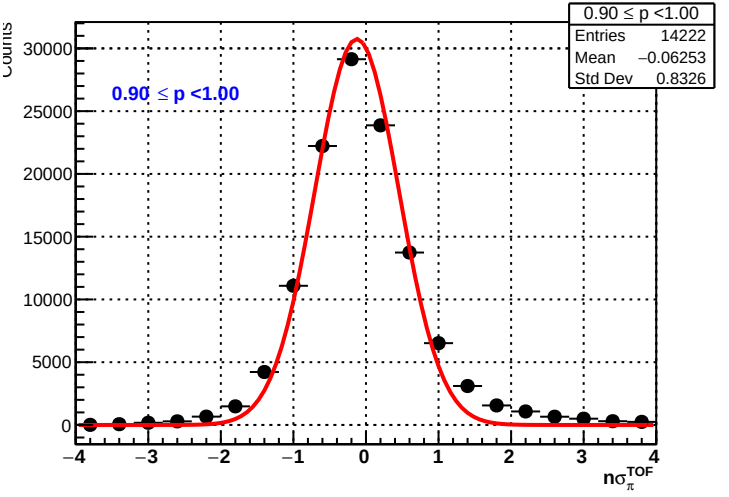

0.50 ≤ p <0.55
Entries 21172
Mean 0.09277
Std Dev 0.8895
0.50 ≤ p <0.55
Counts
$n\sigma_{\pi}^{TOF}$

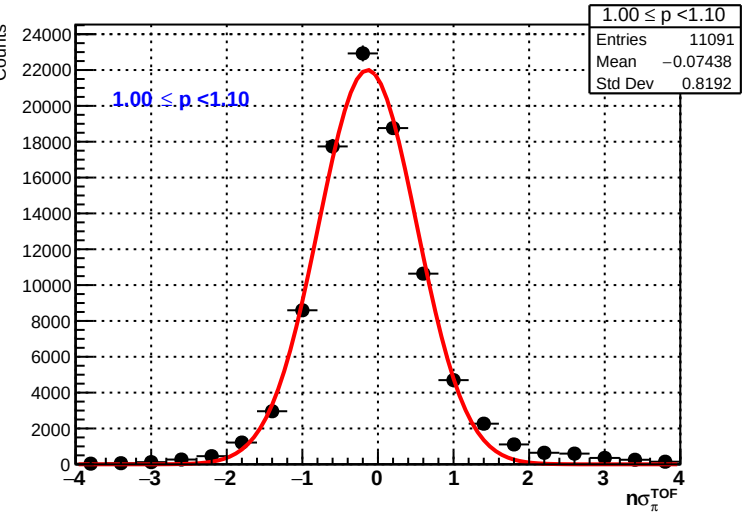

0.55 ≤ p <0.60
Entries 18641
Mean 0.08124
Std Dev 0.8664
0.55 ≤ p <0.60
Counts
$n\sigma_{\pi}^{TOF}$

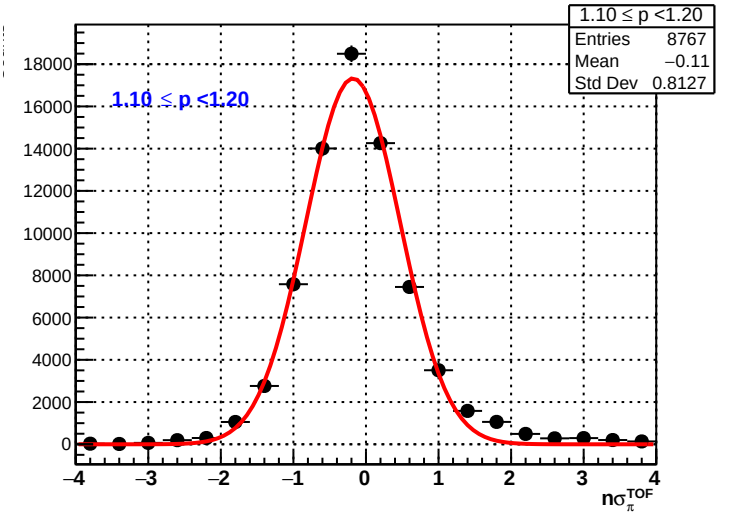

0.60 ≤ p <0.70
Entries 30564
Mean 0.04447
Std Dev 0.8519
0.60 ≤ p <0.70
Counts
nσ$_\pi^{TOF}$

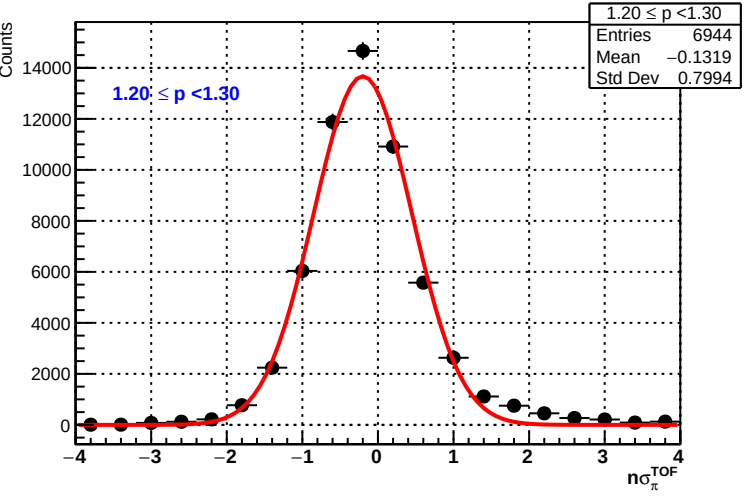

0.70 ≤ p <0.80
Entries 23446
Mean −0.0002683
Std Dev 0.8353
0.70 ≤ p <0.80
nσ$_\pi^{TOF}$

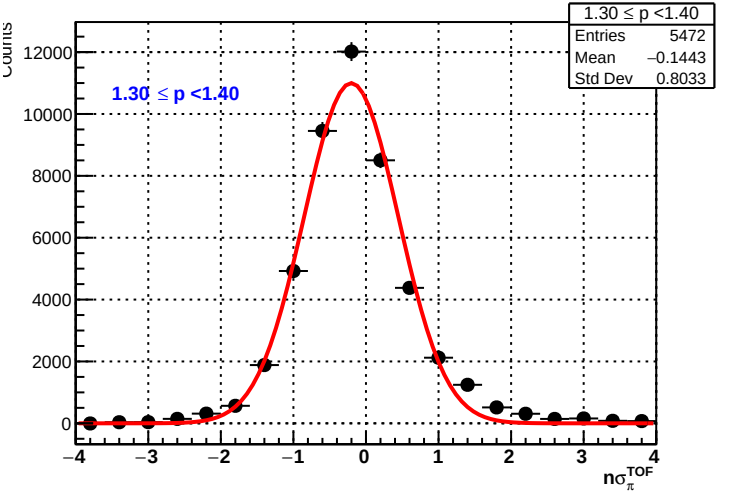

0.80 ≤ p <0.90
Entries 18367
Mean −0.02936
Std Dev 0.8367
0.80 ≤ p <0.90
Counts
nσ$_\pi^{TOF}$

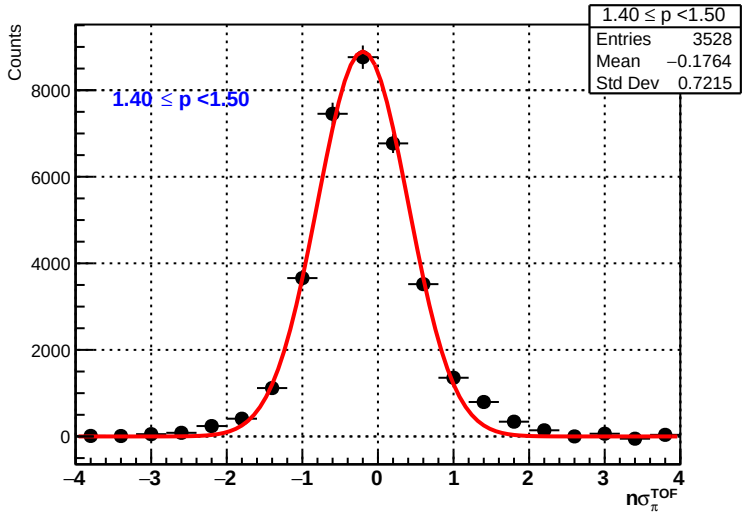

0.90 ≤ p <1.00
Entries 14222
Mean −0.06253
Std Dev 0.8326
0.90 ≤ p <1.00
Counts
nσ$_\pi^{TOF}$

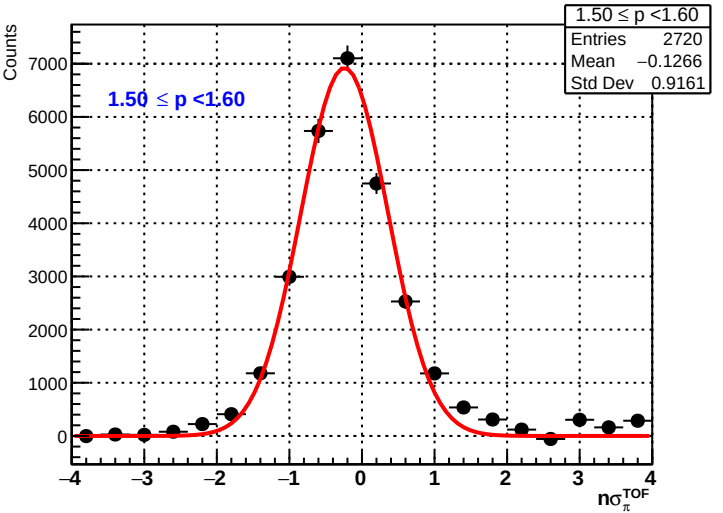

1.00 ≤ p <1.10
Entries 11091
Mean −0.07438
Std Dev 0.8192
1.00 ≤ p <1.10
Counts
$n\sigma_{\pi}^{TOF}$

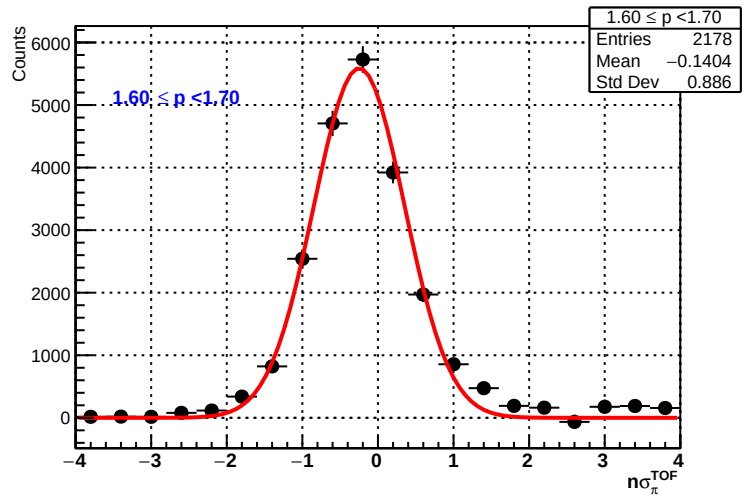

1.10 ≤ p <1.20
Entries 8767
Mean −0.11
Std Dev 0.8127
1.10 ≤ p <1.20
$n\sigma_{\pi}^{TOF}$

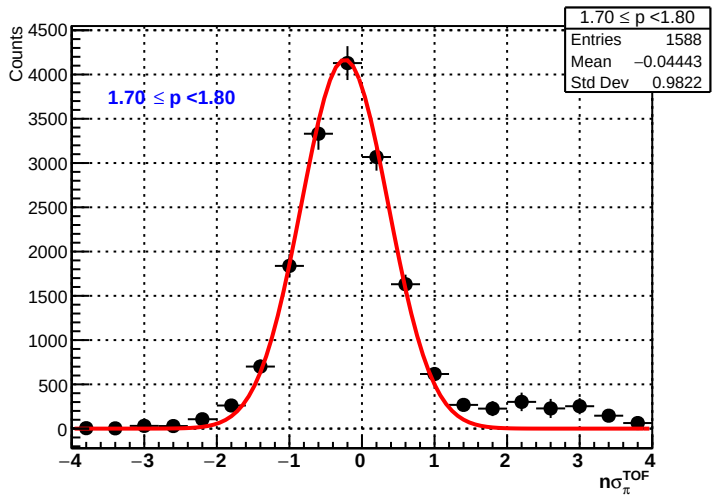

1.20 ≤ p <1.30
Entries 6944
Mean −0.1319
Std Dev 0.7994
1.20 ≤ p <1.30
Counts
$n\sigma_{\pi}^{TOF}$

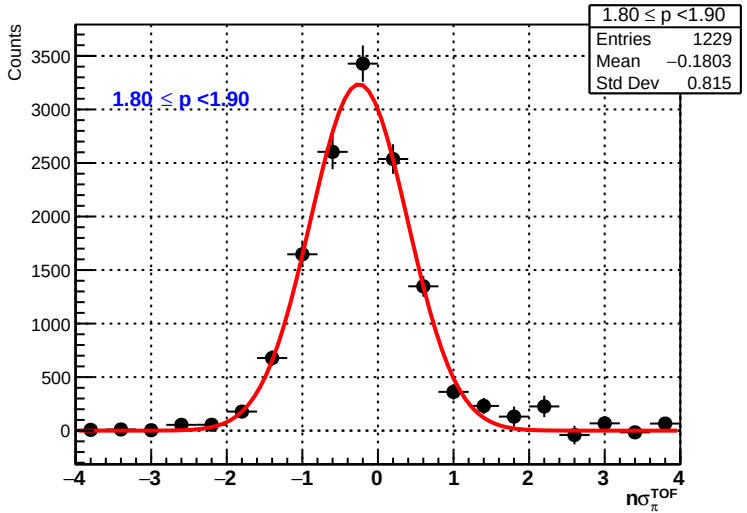

1.30 ≤ p <1.40
Entries 5472
Mean −0.1443
Std Dev 0.8033
1.30 ≤ p <1.40
Counts
$n\sigma_{\pi}^{TOF}$

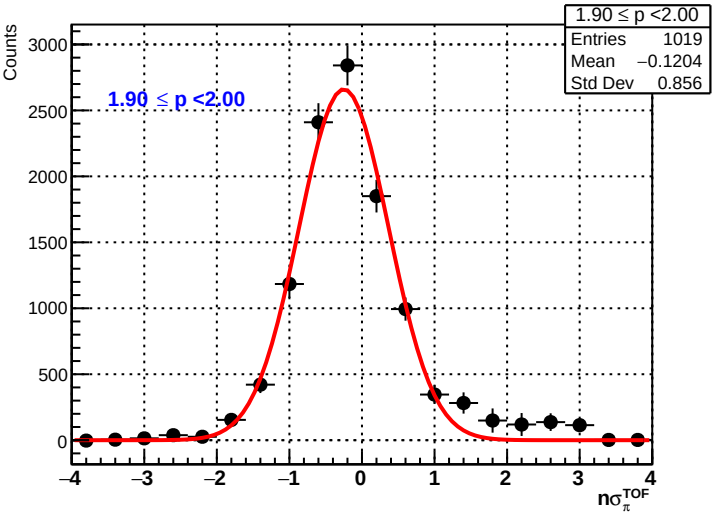

1.40 ≤ p <1.50
Entries 3528
Mean −0.1764
Std Dev 0.7215
1.40 ≤ p <1.50
Counts
nσ$_\pi^{TOF}$

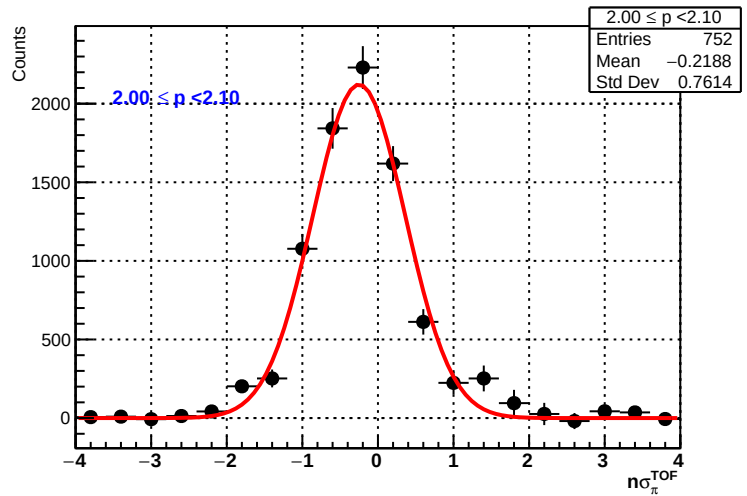

1.50 ≤ p <1.60
Entries 2720
Mean −0.1266
Std Dev 0.9161
1.50 ≤ p <1.60
Counts
nσ$_\pi^{TOF}$

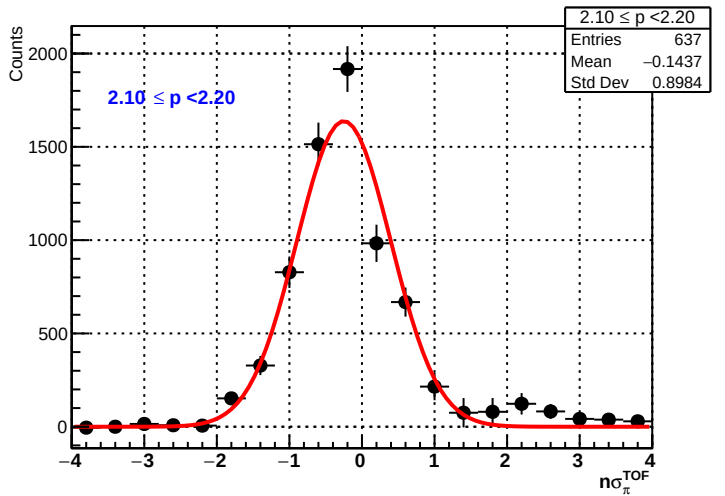

1.60 ≤ p <1.70
Entries 2178
Mean −0.1404
Std Dev 0.886
1.60 ≤ p <1.70
Counts
nσ$_\pi^{TOF}$

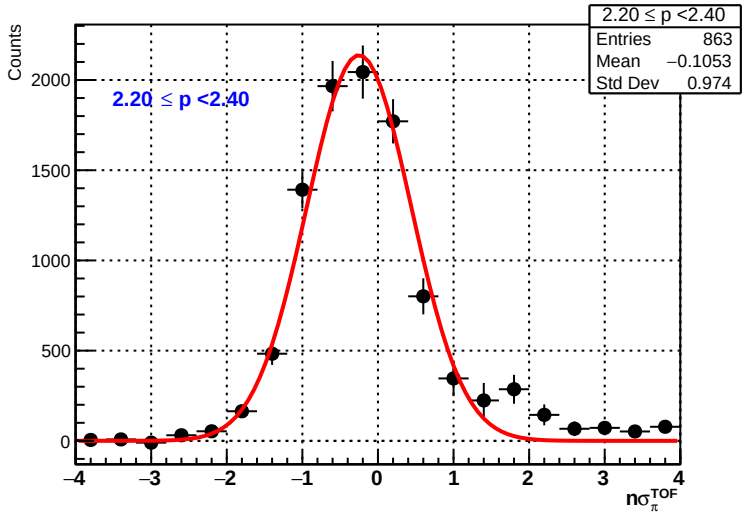

1.70 ≤ p <1.80
Entries 1588
Mean −0.04443
Std Dev 0.9822
1.70 ≤ p <1.80
Counts
nσ$_\pi^{TOF}$

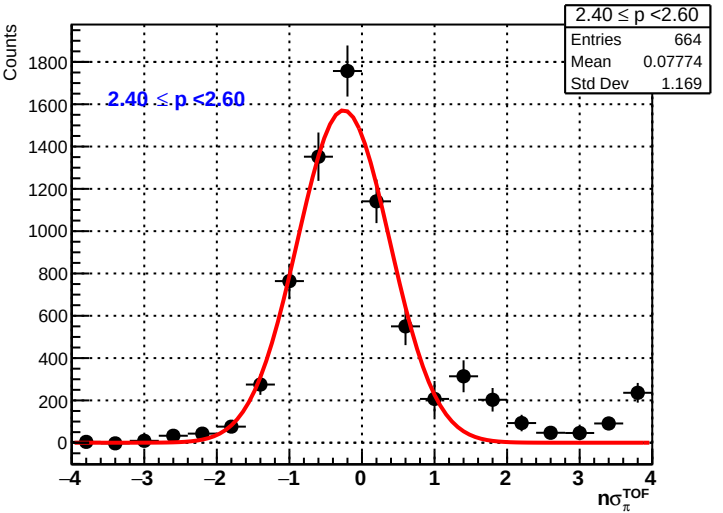

1.80 ≤ p <1.90
Entries 1229
Mean −0.1803
Std Dev 0.815
1.80 ≤ p <1.90
Counts
$n\sigma_{\pi}^{TOF}$

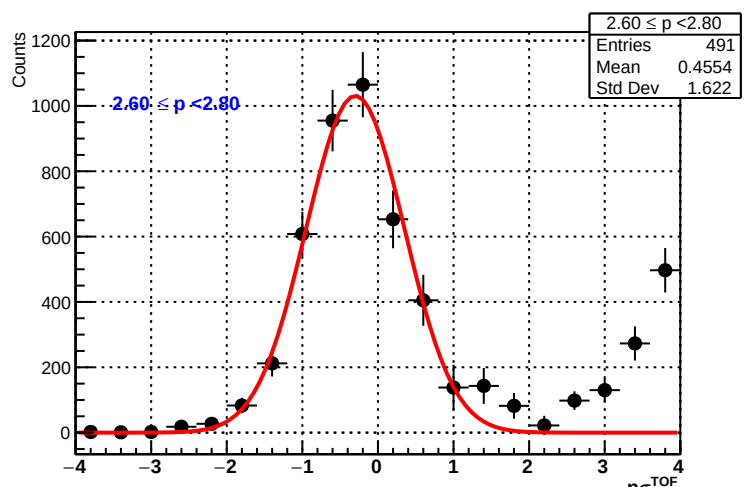

1.90 ≤ p <2.00
Entries 1019
Mean −0.1204
Std Dev 0.856
1.90 ≤ p <2.00
Counts
$n\sigma_{\pi}^{TOF}$

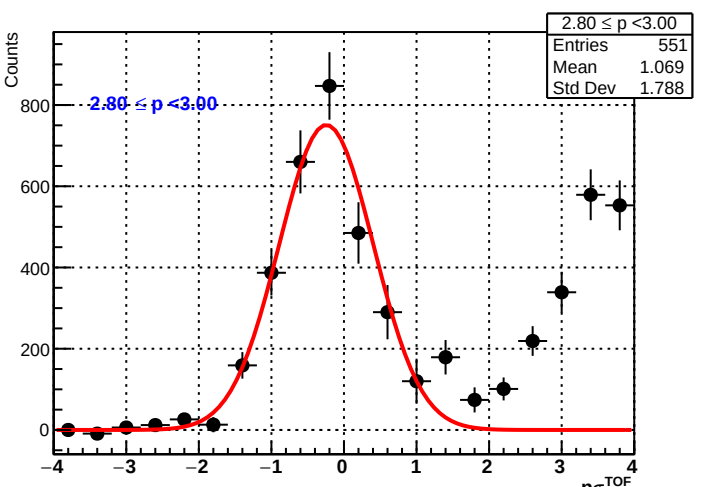

2.00 ≤ p <2.10
Entries 752
Mean −0.2188
Std Dev 0.7614
2.00 ≤ p <2.10
Counts
$n\sigma_{\pi}^{TOF}$

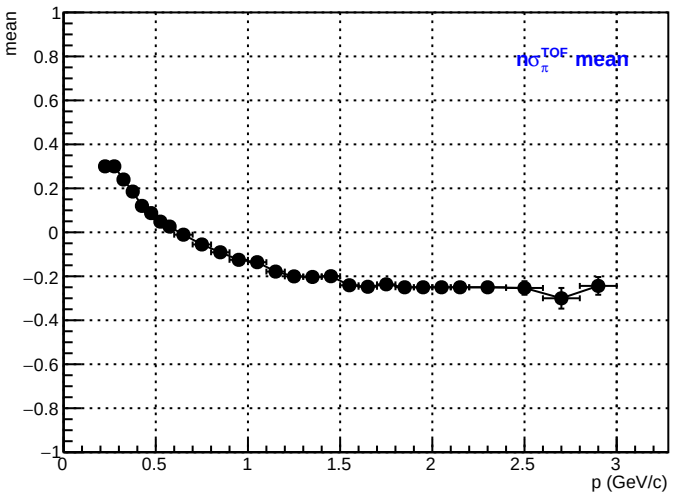

2.10 ≤ p <2.20
Entries 637
Mean −0.1437
Std Dev 0.8984
2.10 ≤ p <2.20
Counts
$n\sigma_{\pi}^{TOF}$

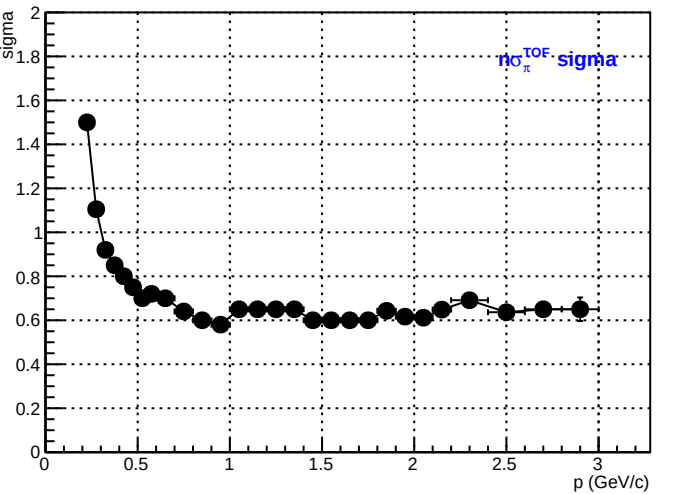

2.20 ≤ p <2.40
Entries 863
Mean −0.1053
Std Dev 0.974
2.20 ≤ p <2.40
Counts
nσ$_\pi^{TOF}$

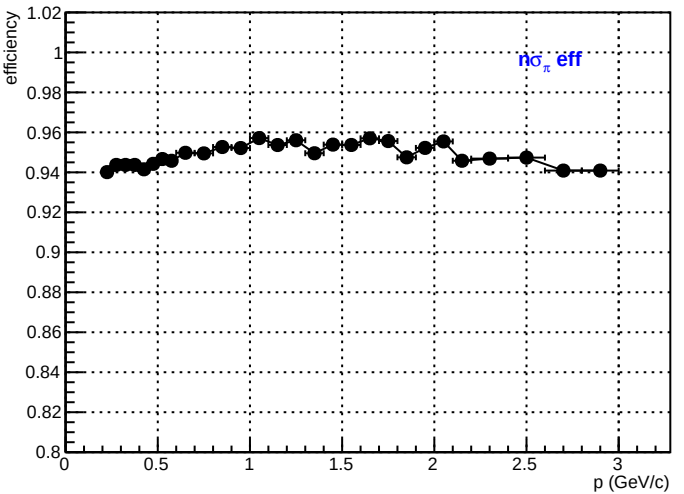

2.40 ≤ p <2.60
Entries 664
Mean 0.07774
Std Dev 1.169
2.40 ≤ p <2.60
Counts
nσ$_\pi^{TOF}$

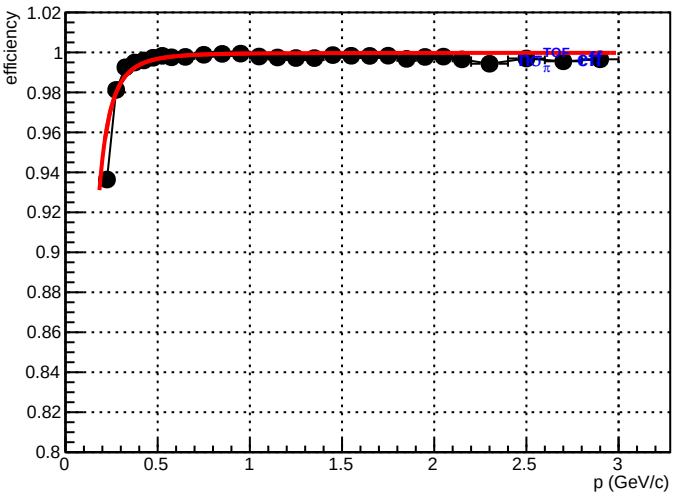

2.60 ≤ p <2.80
Entries 491
Mean 0.4554
Std Dev 1.622
2.60 ≤ p <2.80
Counts
nσ$_\pi^{TOF}$

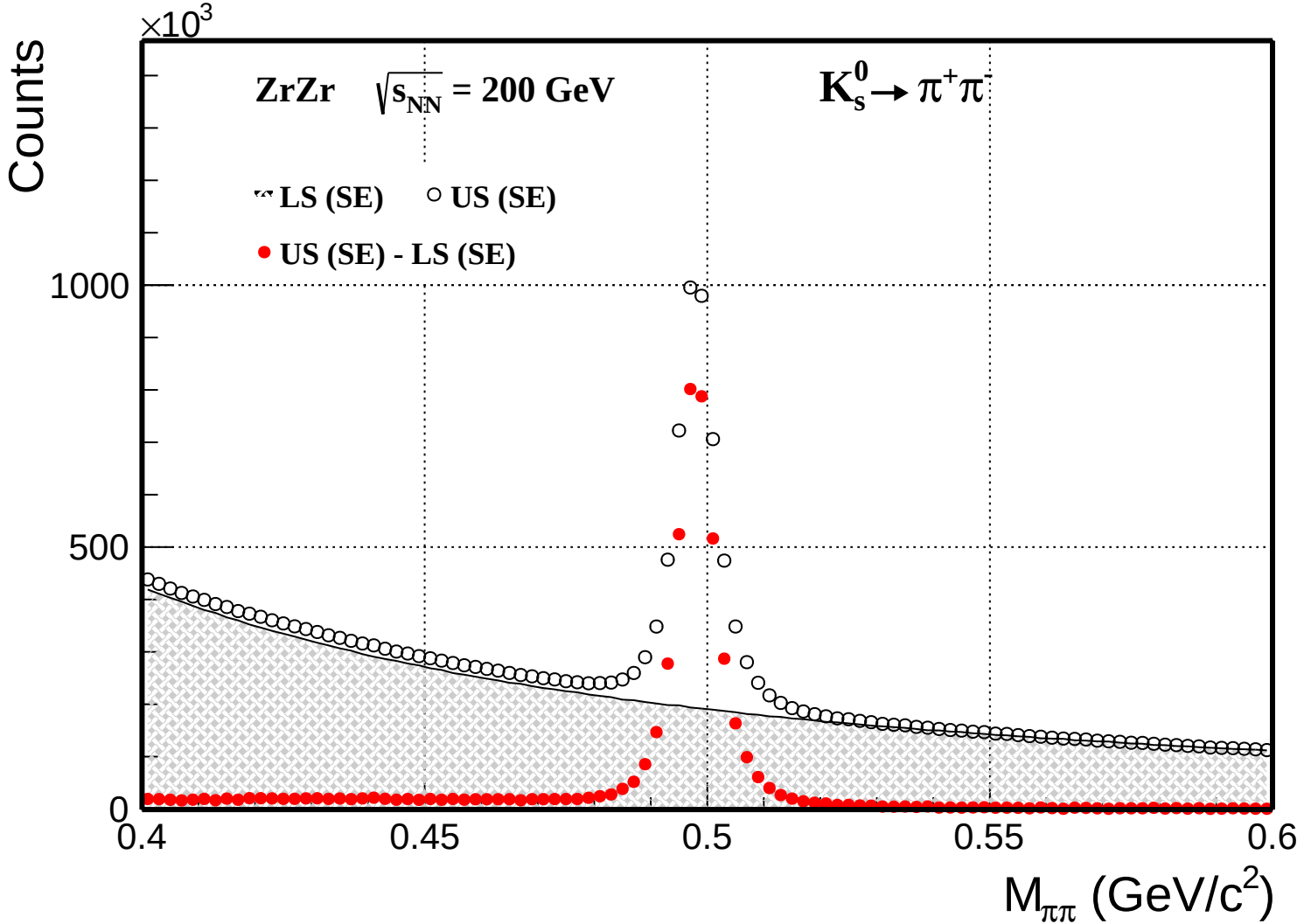

2.80 ≤ p <3.00
Entries 551
Mean 1.069
Std Dev 1.788
2.80 ≤ p <3.00
Counts
nσ$_\pi^{TOF}$


mean
1
0.8
0.6
0.4
0.2
0
−0.2
−0.4
−0.6
−0.8
−1
0
0.5
1
1.5
2
2.5
3
p (GeV/c)
nσ$_\pi^{TOF}$ mean


sigma
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0
0.5
1
1.5
2
2.5
3
p (GeV/c)
nσ$_\pi^{TOF}$ sigma


efficiency
1.02
1
0.98
0.96
0.94
0.92
0.9
0.88
0.86
0.84
0.82
0.8
0
0.5
1
1.5
2
2.5
3
p (GeV/c)
nσ_π eff


efficiency
1.02
1
0.98
0.96
0.94
0.92
0.9
0.88
0.86
0.84
0.82
0.8
0
0.5
1
1.5
2
2.5
3
p (GeV/c)
nσ_π eff


×10^3
Counts
ZrZr $\sqrt{s_{NN}}$ = 200 GeV
$K^0_s \rightarrow \pi^+\pi^-$
LS (SE)
US (SE)
US (SE) - LS (SE)
1000
500
0
0.4
0.45
0.5
0.55
0.6
$M_{\pi\pi}$ (GeV/$c^2$)