Update on D^0 in Isobar collisions

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Data sets and event selection

Production picoDst Summary from FileCatalog by stream data

Generated on 2022-05-17 03:05:04

production_isobar_2018	st_hf	ZrZr/RuRu200	year2018	P21id	SL21d	166971810	25446	23032	18780	25446	90.5
	st_hf_adc	ZrZr/RuRu200	year2018	P21id	SL21d	1648561	13051	11899	189	13051	91.2

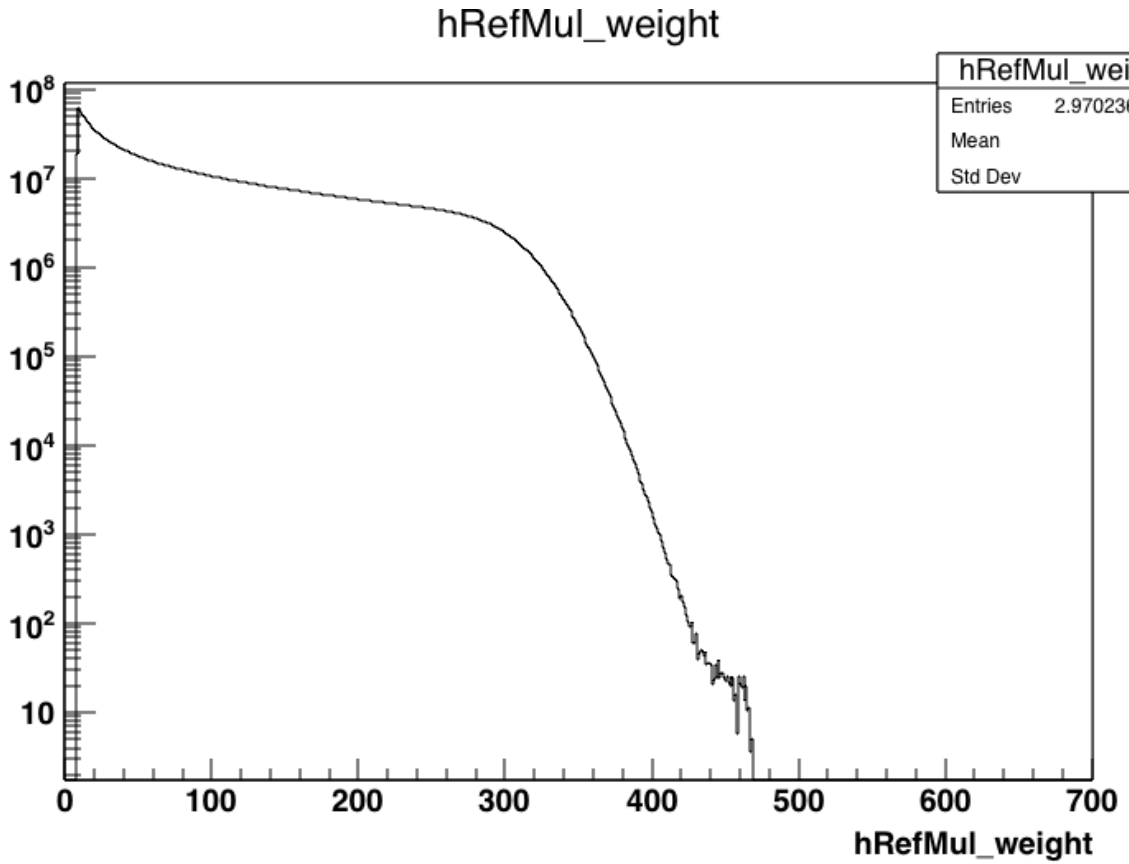
Trigger: 600001, 600011, 600021,600031 (MB)

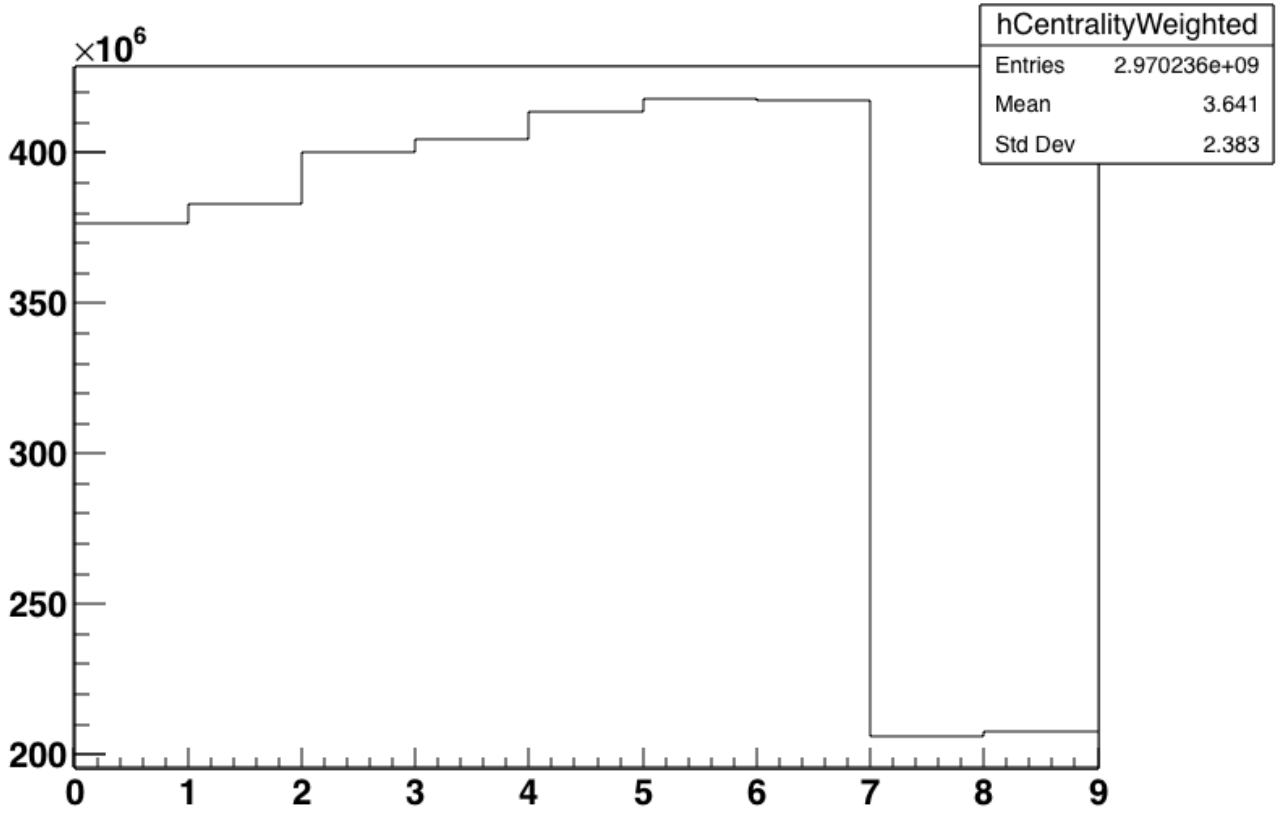
Embedding Request ID: 20201503 (5M events for each for pi+, pi- and 1M events each for K+/K-)

Badrunlist: Ru+Ru Zr+Zr

19086038,19086050,19086052,19089047,19090019,19090021,19093042,19093043,19095061,19096002,
19096005,19096006,19098005,19098017,19098018,19098020,19102020,19102023,19103041,19104012,
19107045,19111038,19111051,19112012,19112029,19113030,19114007,19114022,19116035,19120047,
19120048,19122054,19124025,19126015,19127045,19128002, 19084053,19084055,19086060,19086061,
19086062, 19086063,19086064,19086066,19087038,19087042,19110015,19116002,19125044,19125049,
19126008,19126011,19127047;19083050,19084032,19084033,19085039,19086016,19086026,19088052,
19088053,19088055,19089005,19095031,19097001,19097005,19097040,19097046,19100054,19102055,
19103007,19103022,19107002,19115020,19117030,19122004,19122005,19122010,19126043,19088051,
19097057,19110051,19117036, 19120021, 19120025

Data sets and event selection

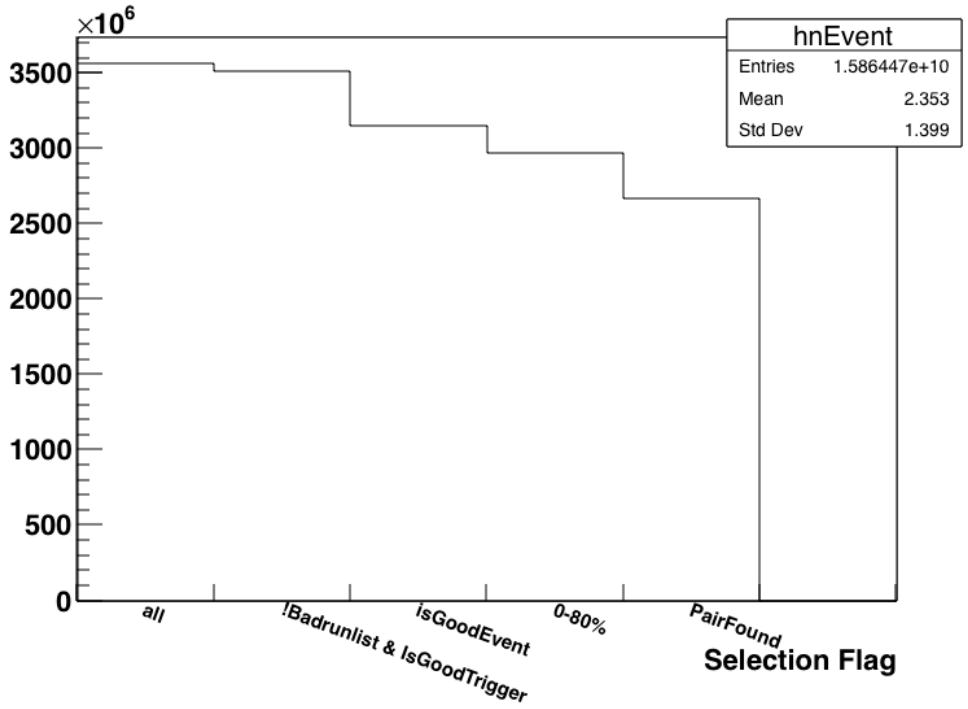




Analysis cuts

Event Level cuts	
Cuts	Value
$\|V_z\|$	(-35,25) cm
V_r	< 2. cm
VzDiff	< 3. cm
!Badrun_list	
GoodTrigger	
!isBadRun()	
passnTofMatchRefmultCut()	
0-80%	
# Events	2.2B

Track quality cuts	
Cuts	Value
p_T (GeV/c)	> 0.6
TPC Nhits	>=20
nHits/HitsMax	[0.52, 1.2]
gDCA	<= 2. cm
|η|	< 1.
nHitsDedx	> 10.
charge	±1
Primary tracks	



PID cuts

PID cuts	
Cuts	Value
btofYLocal (TOF matched)	[-1.8, 1.8]
p < 1.6 && β > 0	Functions (1,2)
p >= 1.6 && β > 0 (Pion)	Functions (1,2)
p >= 1.6 && !TofisAvailble	$\lvert n\sigma_K\rvert < 2.$ && $\lvert n\sigma_\pi\rvert < 2.$
$\lvert y\rvert_{D^0}$	< 1.

$D^0 \rightarrow K^- + \pi^+$

$\overline{D}^0 \rightarrow K^+ + \pi^-$

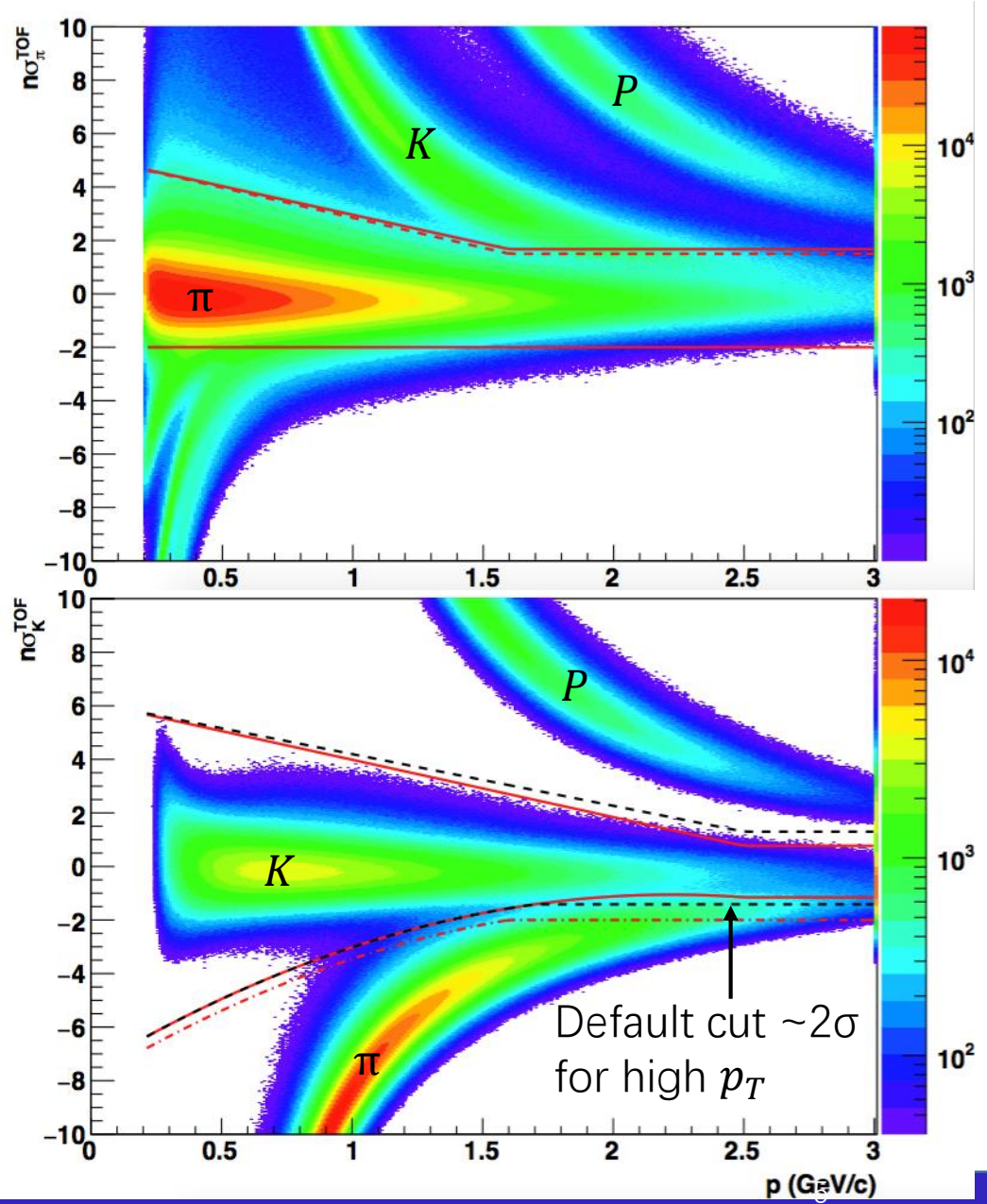
$$n\sigma_X^{dE/dx} = \frac{\ln \frac{\langle dE/dx\rangle^{\mathrm{mea}}}{dE/dx_X^{\mathrm{th}}}}{R_{dE/dx}},$$

$$n\sigma_X^{\mathrm{TOF}} = \frac{\frac{1}{\beta^{\mathrm{mea}}} - \frac{1}{\beta_X^{\mathrm{th}}}}{R_{1/\beta}},$$

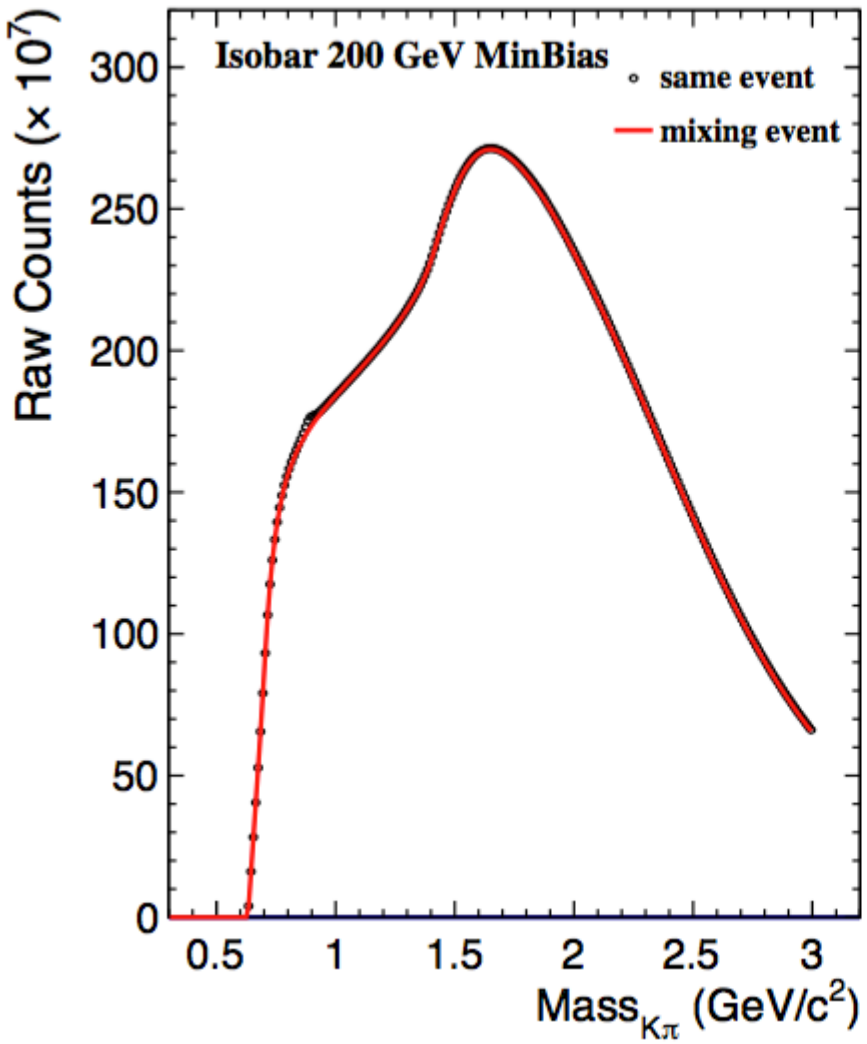
hybrid PID

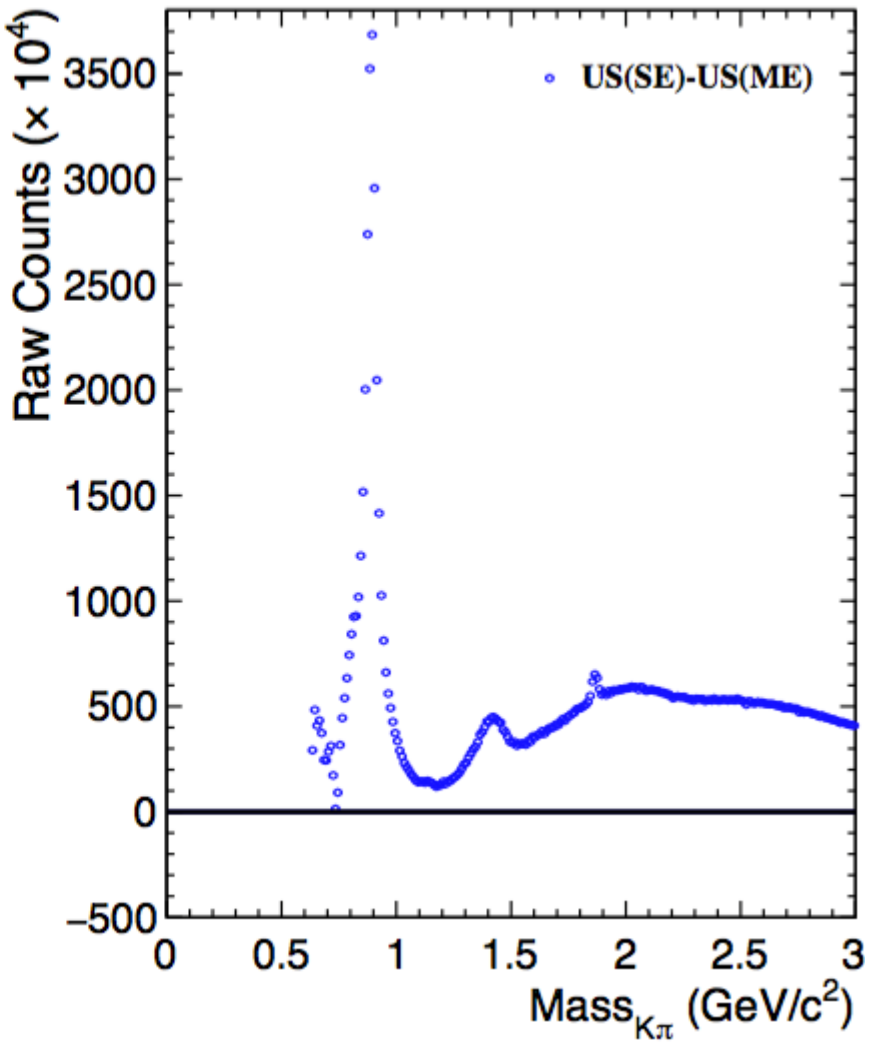
Piecewise function of Function 1:
The lower limit of Kaon: (x <= 1.7) * (-7.54 + 5.83 * x – 1.31 * x * x) +\ (x > 1.7) * (-1.4149)
The lower limit of Pion : -2

Piecewise function of Function 2:
The upper limit of Kaon: (x <= 2.5) * (6.129 – 1.9316 * x) +\ (x > 2.5) * (1.3)
The upper limit of Pion: (x <= 1.6) * (5.1 – 2.25 * x) +\ (x > 1.6) * 1.5

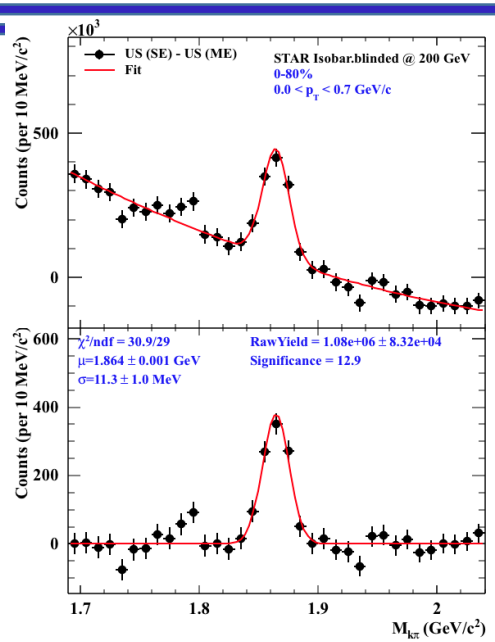


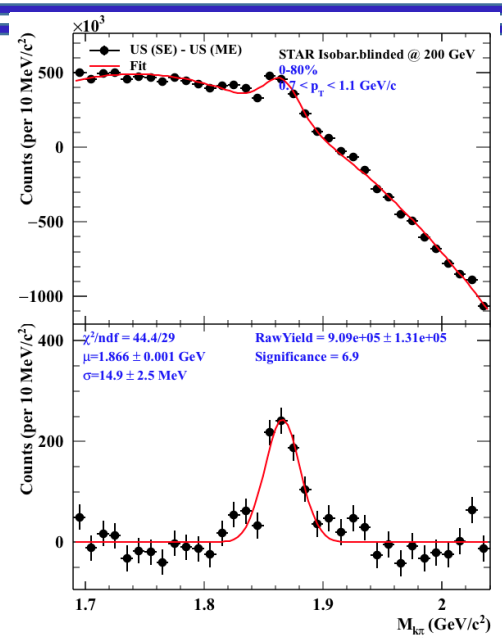
Raw yield signal (0-80%)

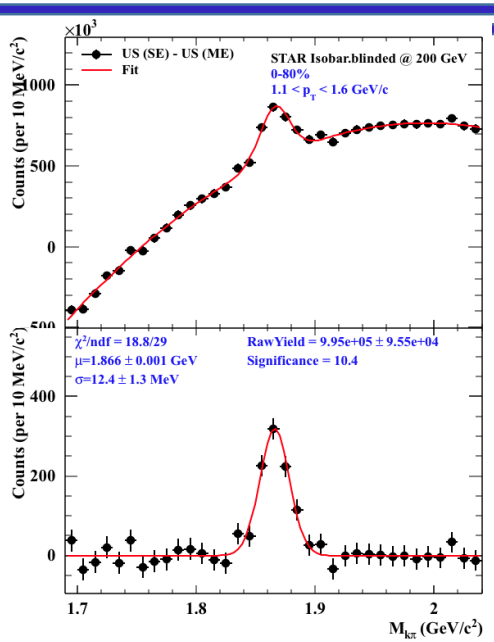


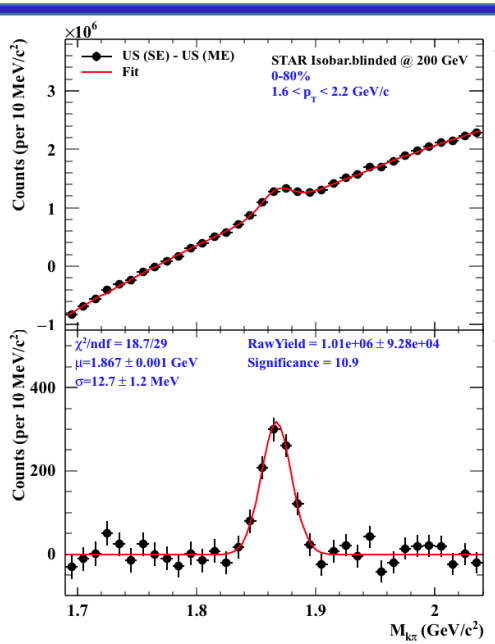


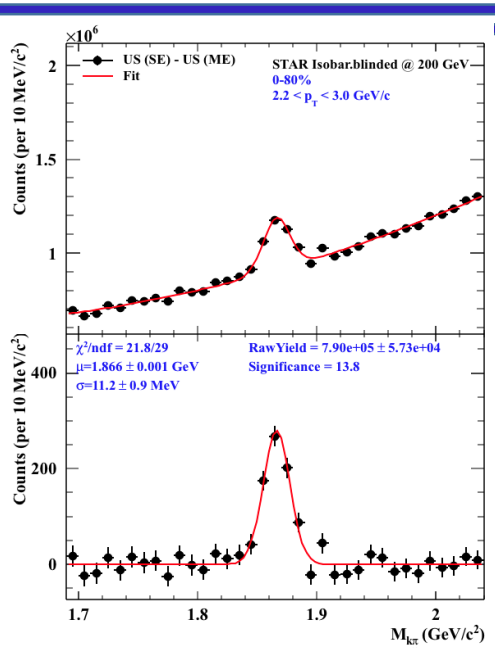
Raw yield signal (0-80%)

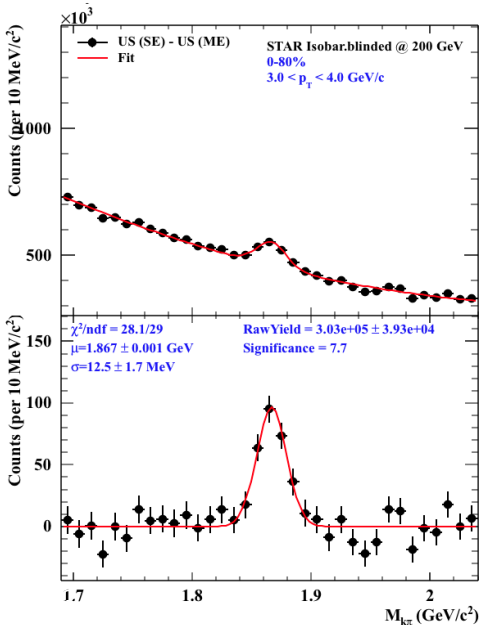


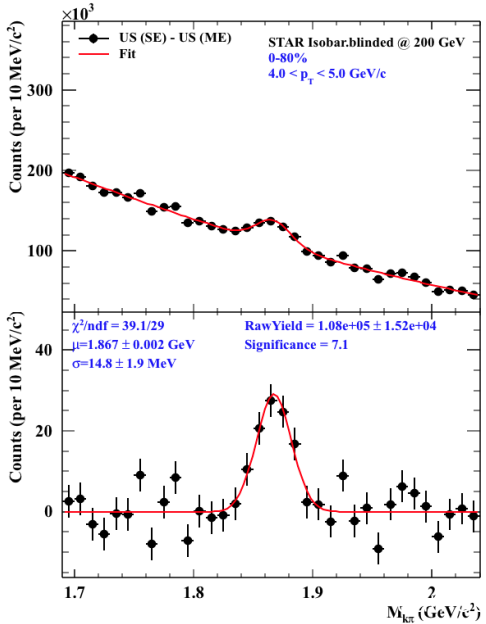


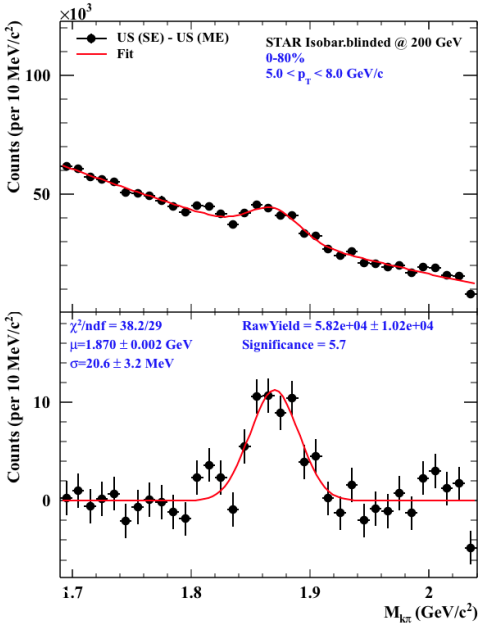


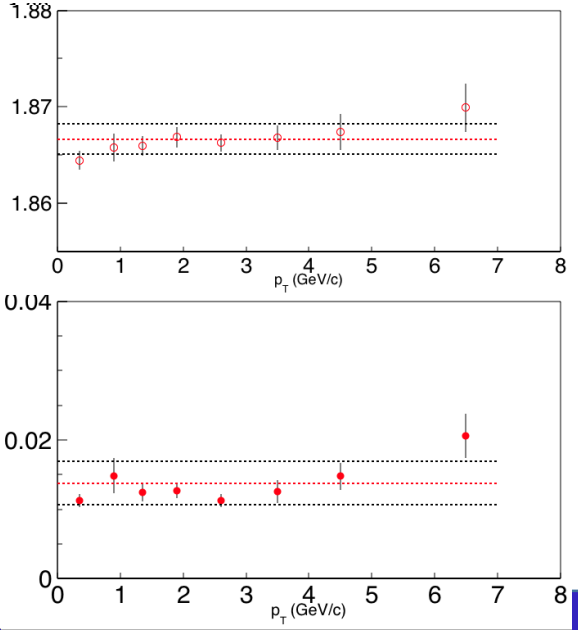






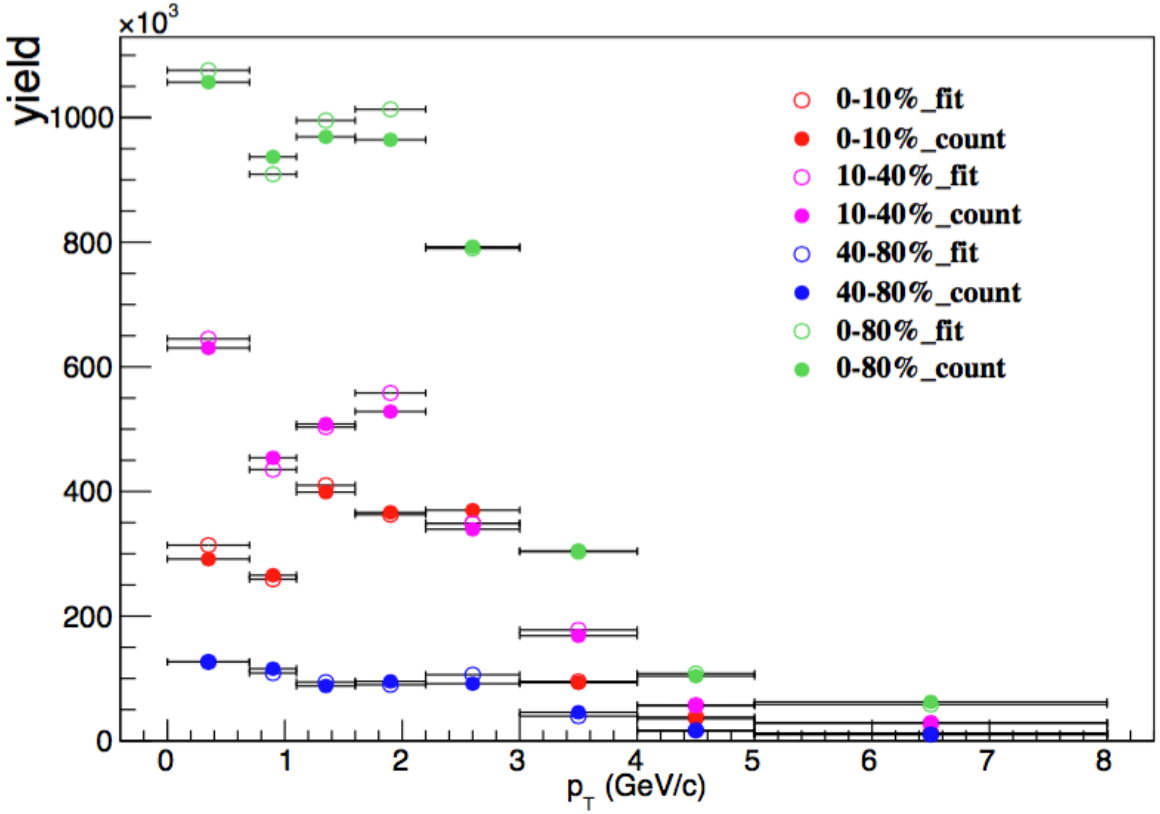


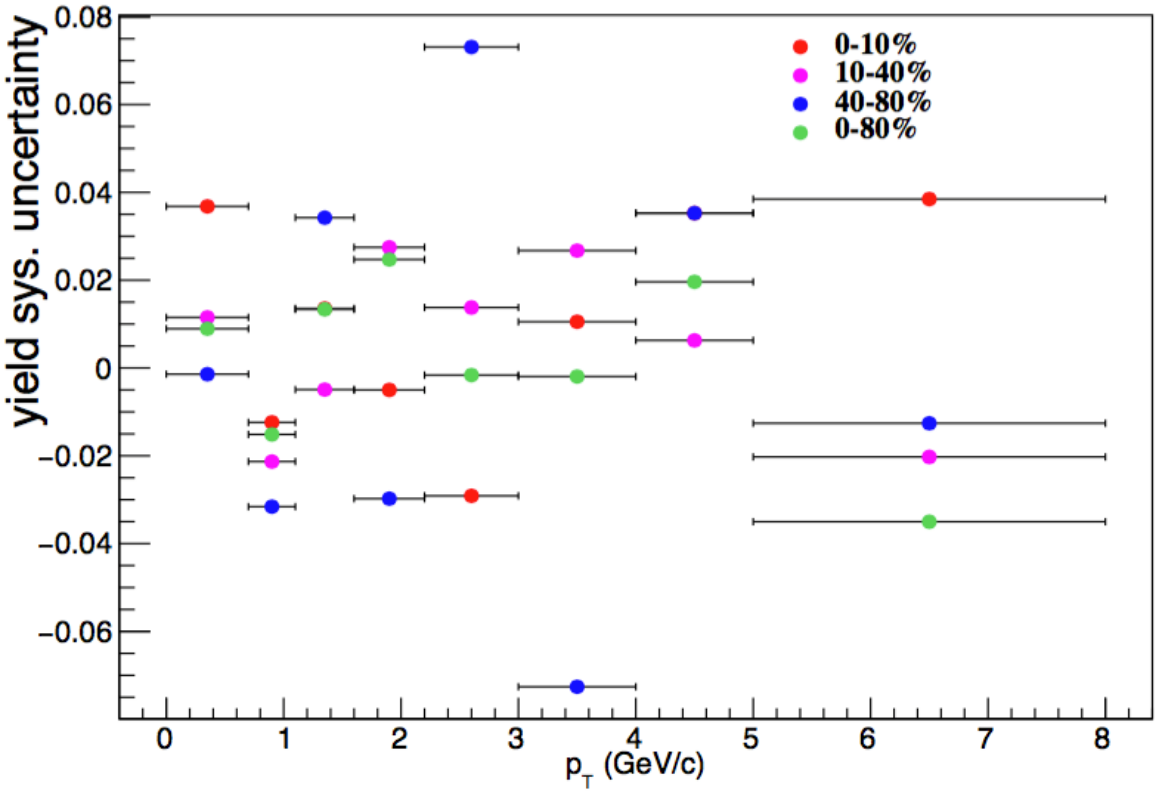




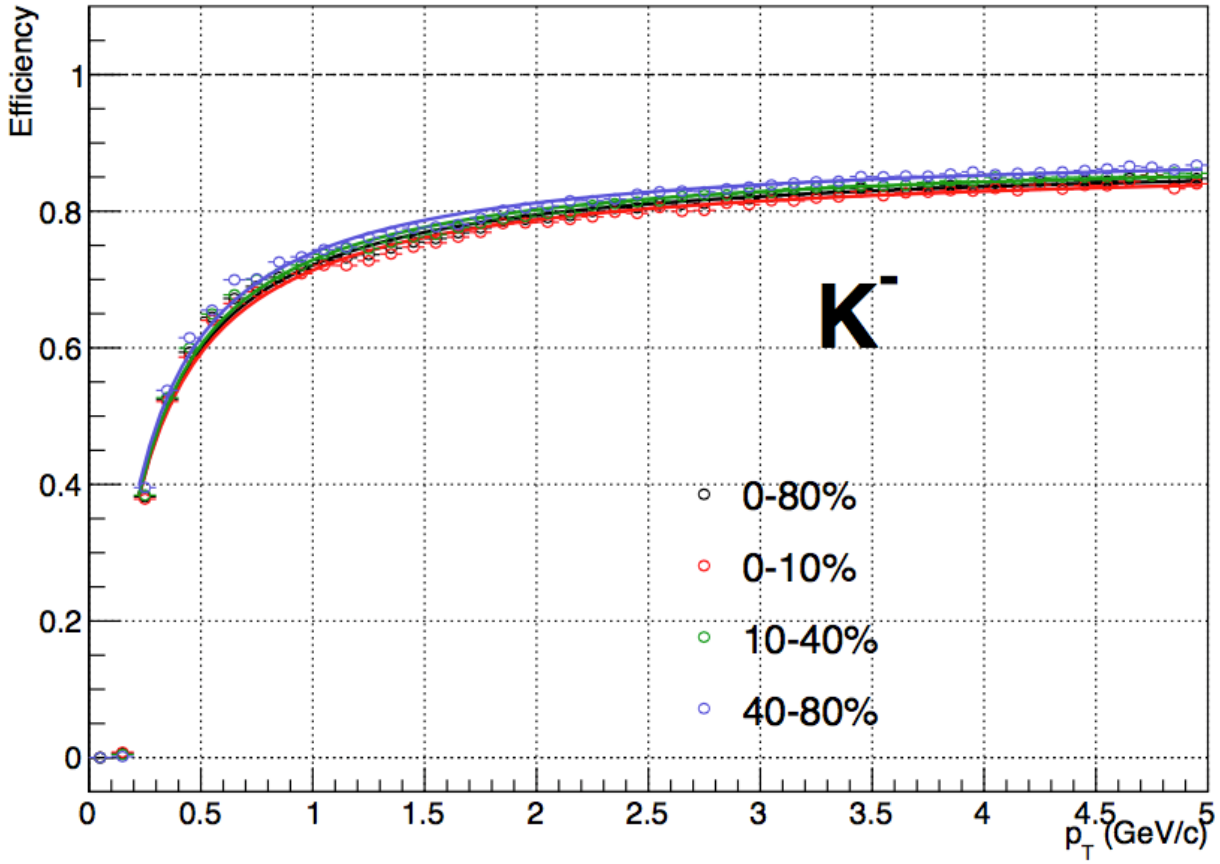
@ HF

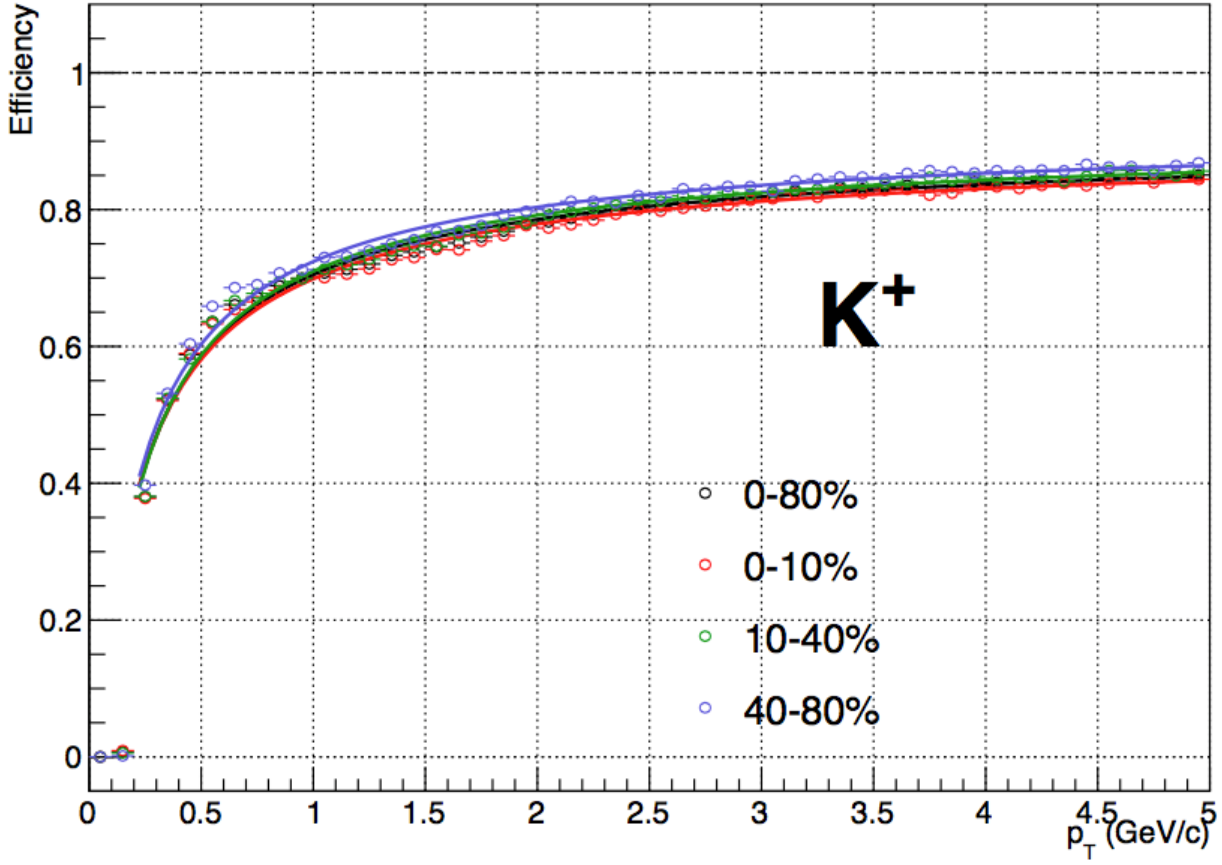
Systematical uncertainties for D^0 raw yield extraction



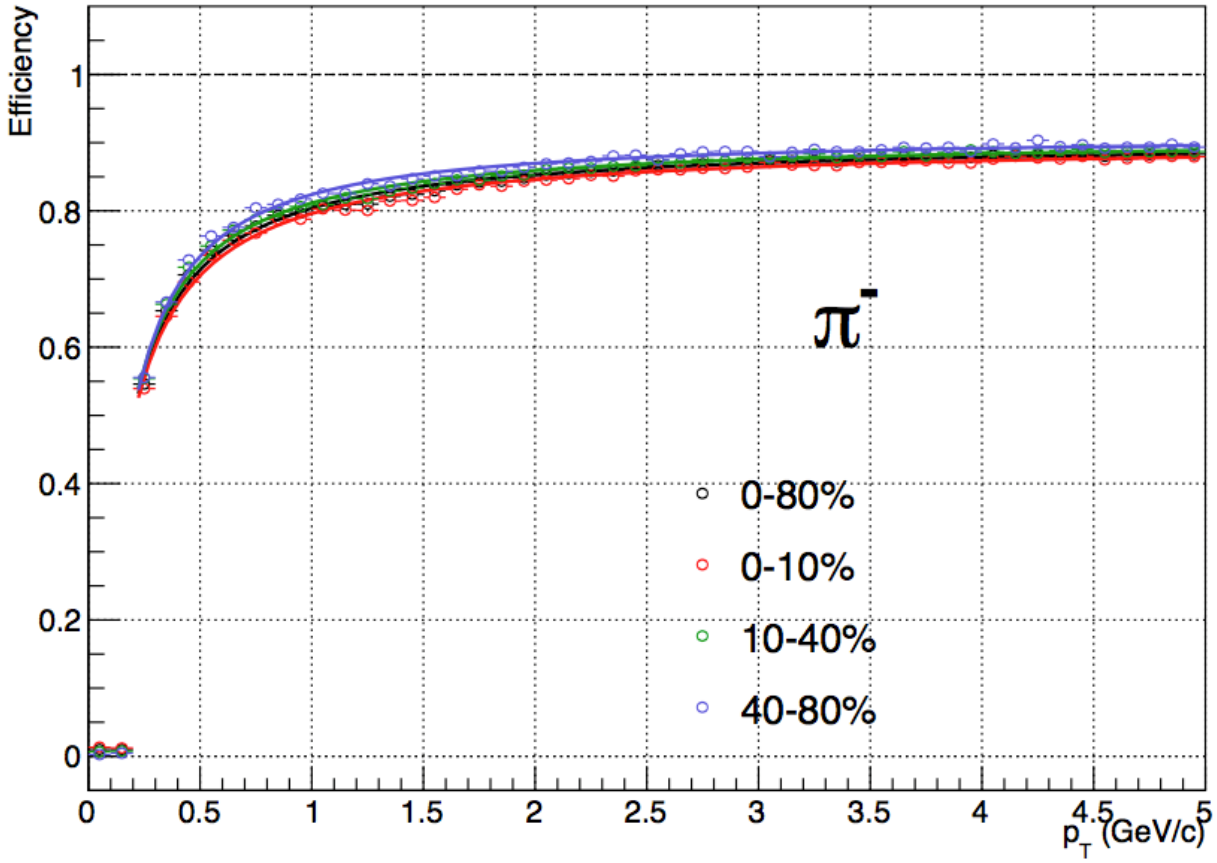


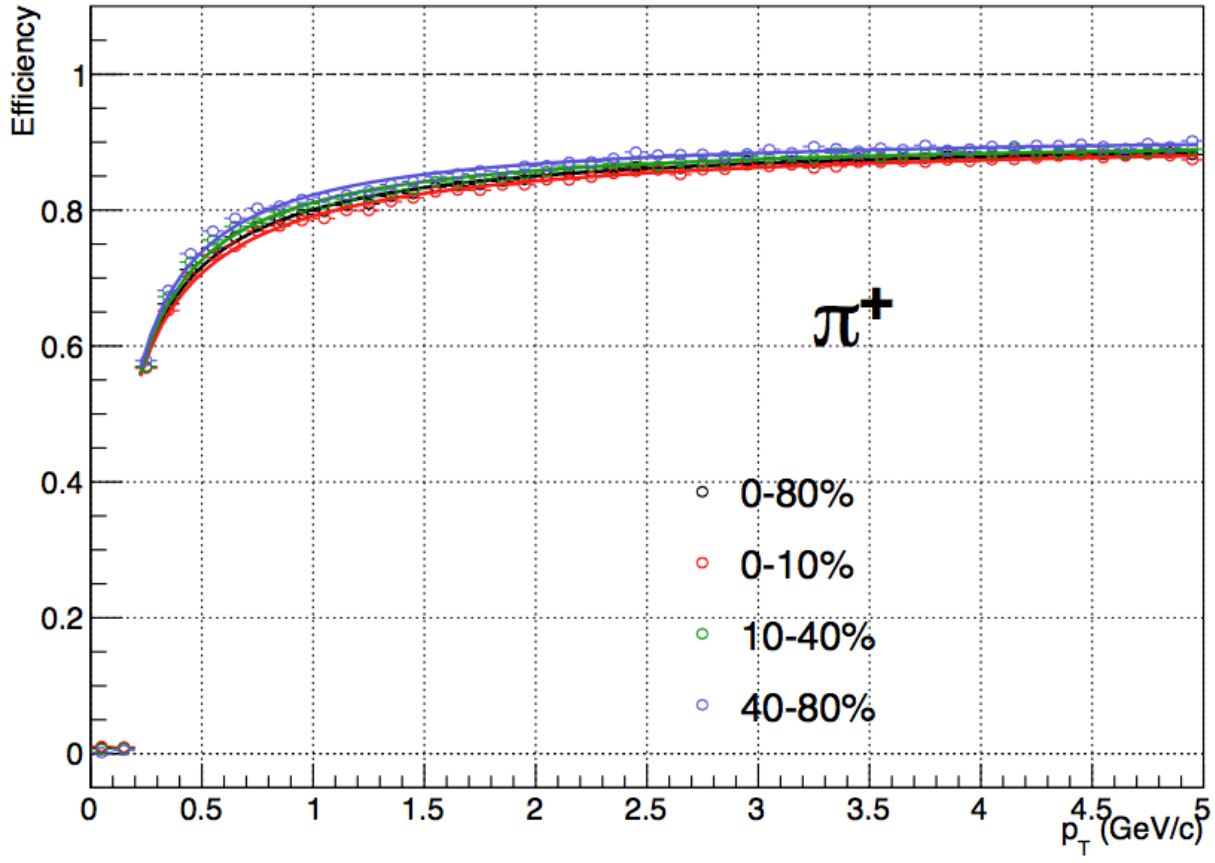
TPC tracking efficiency



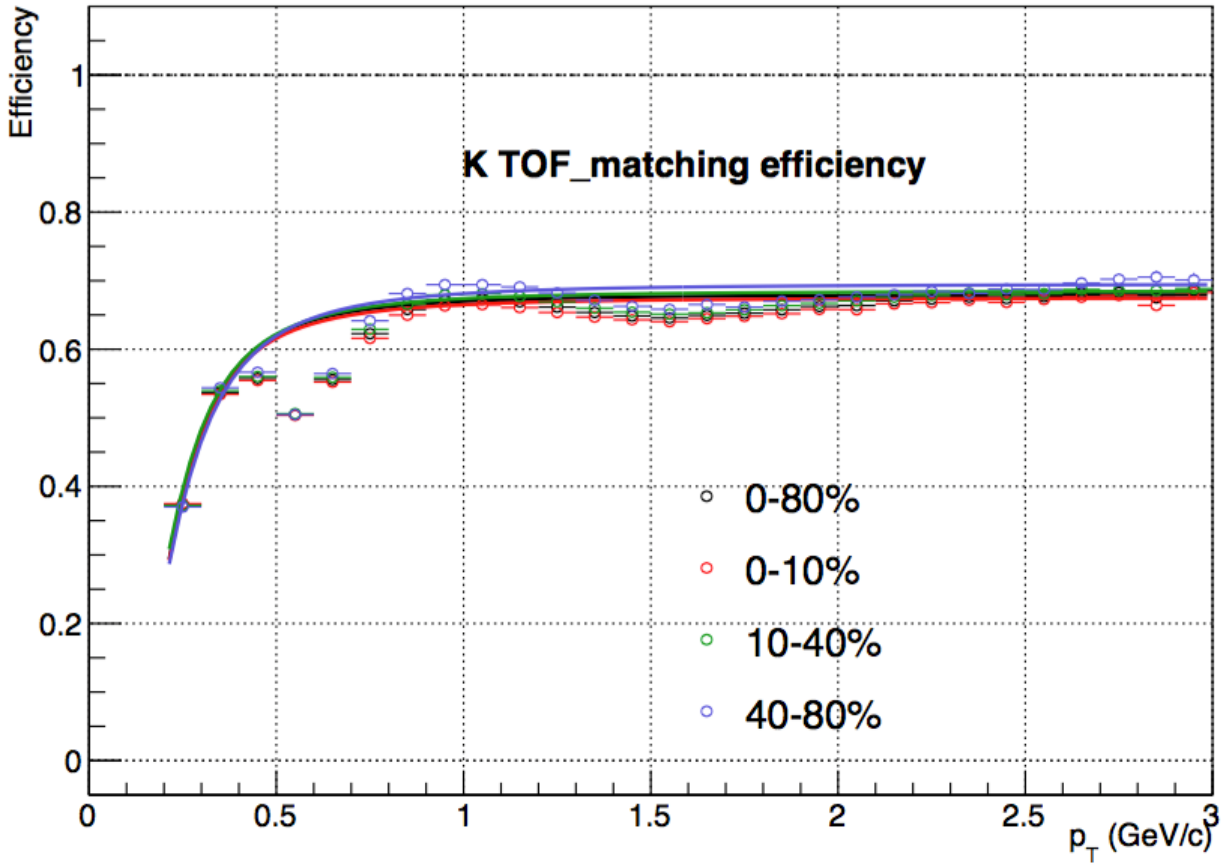


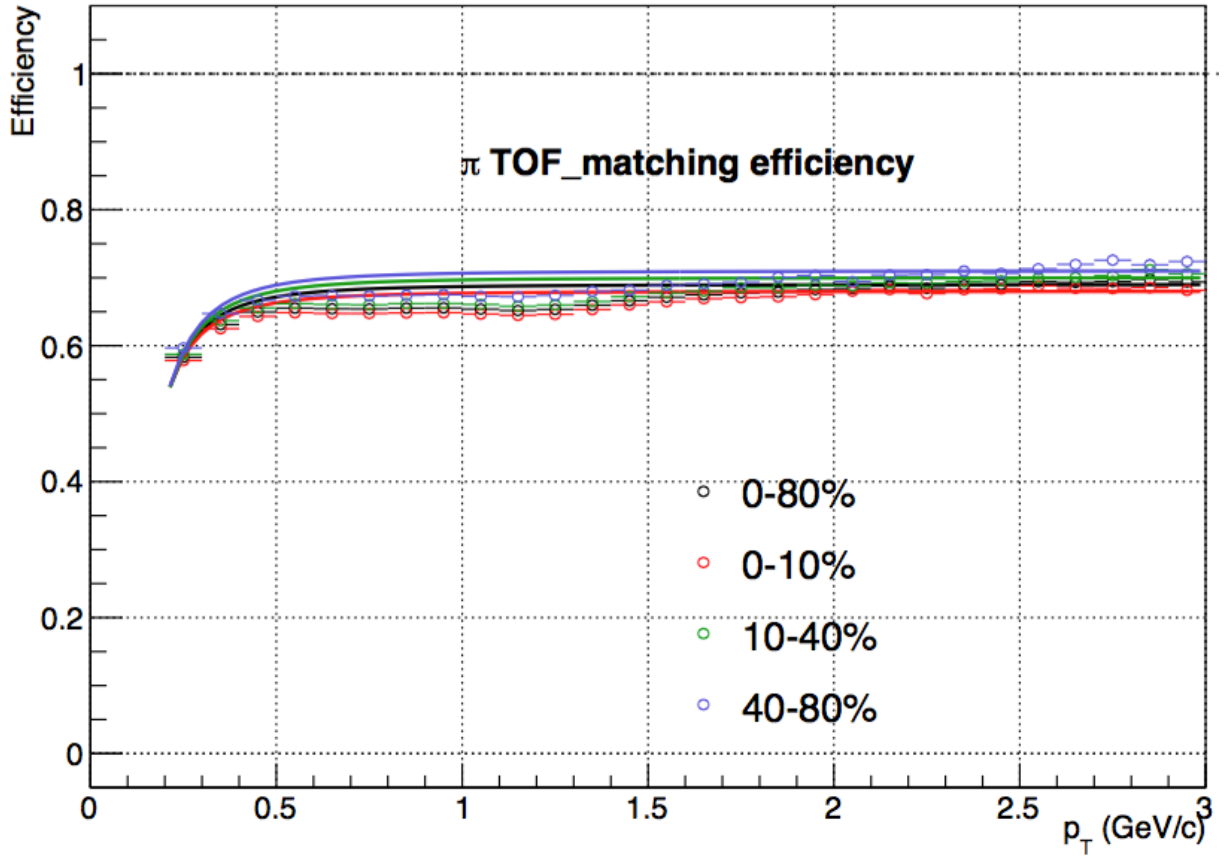
TPC tracking efficiency





TOF matching efficiency





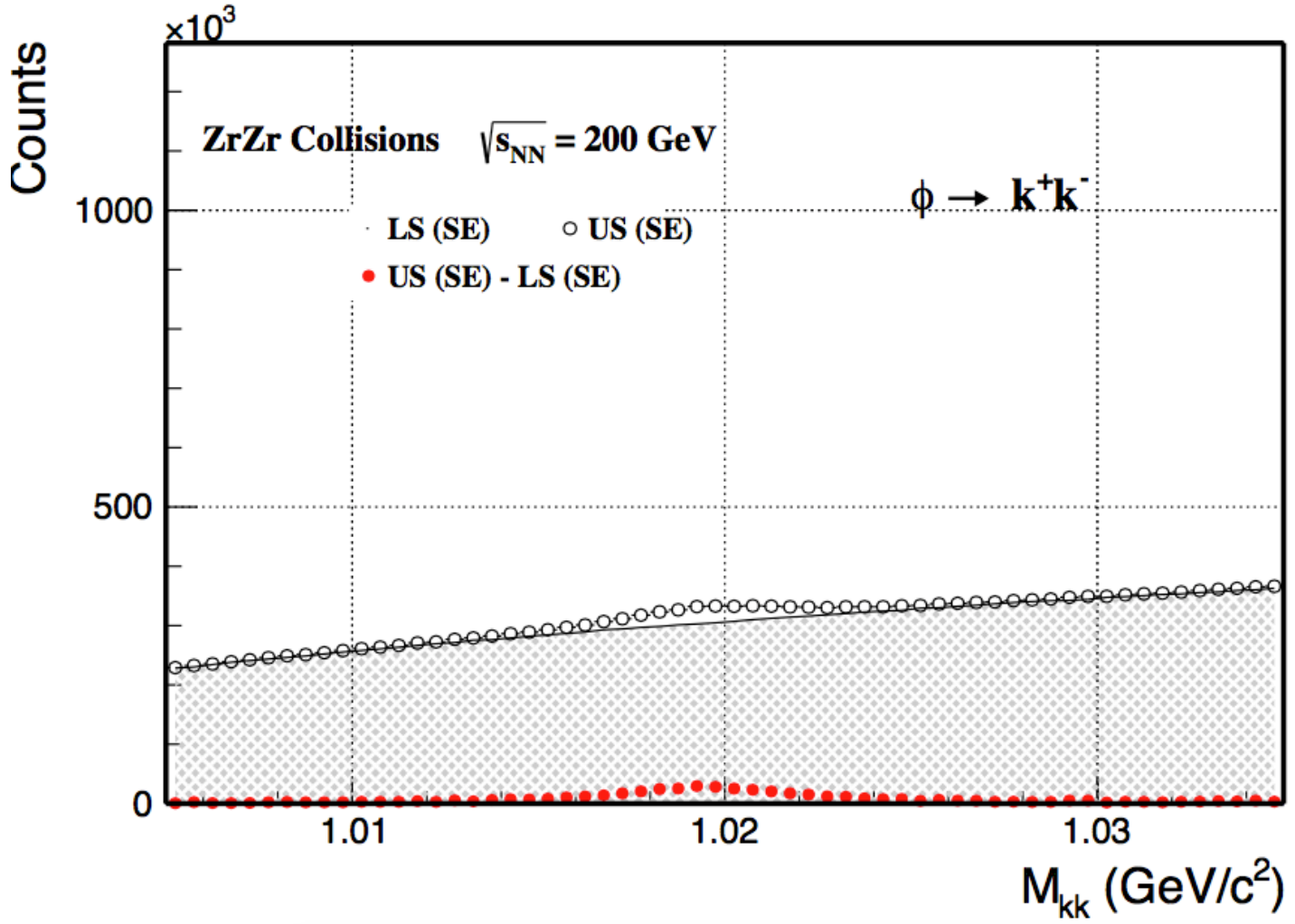
Kaon PID and efficiency

Target k

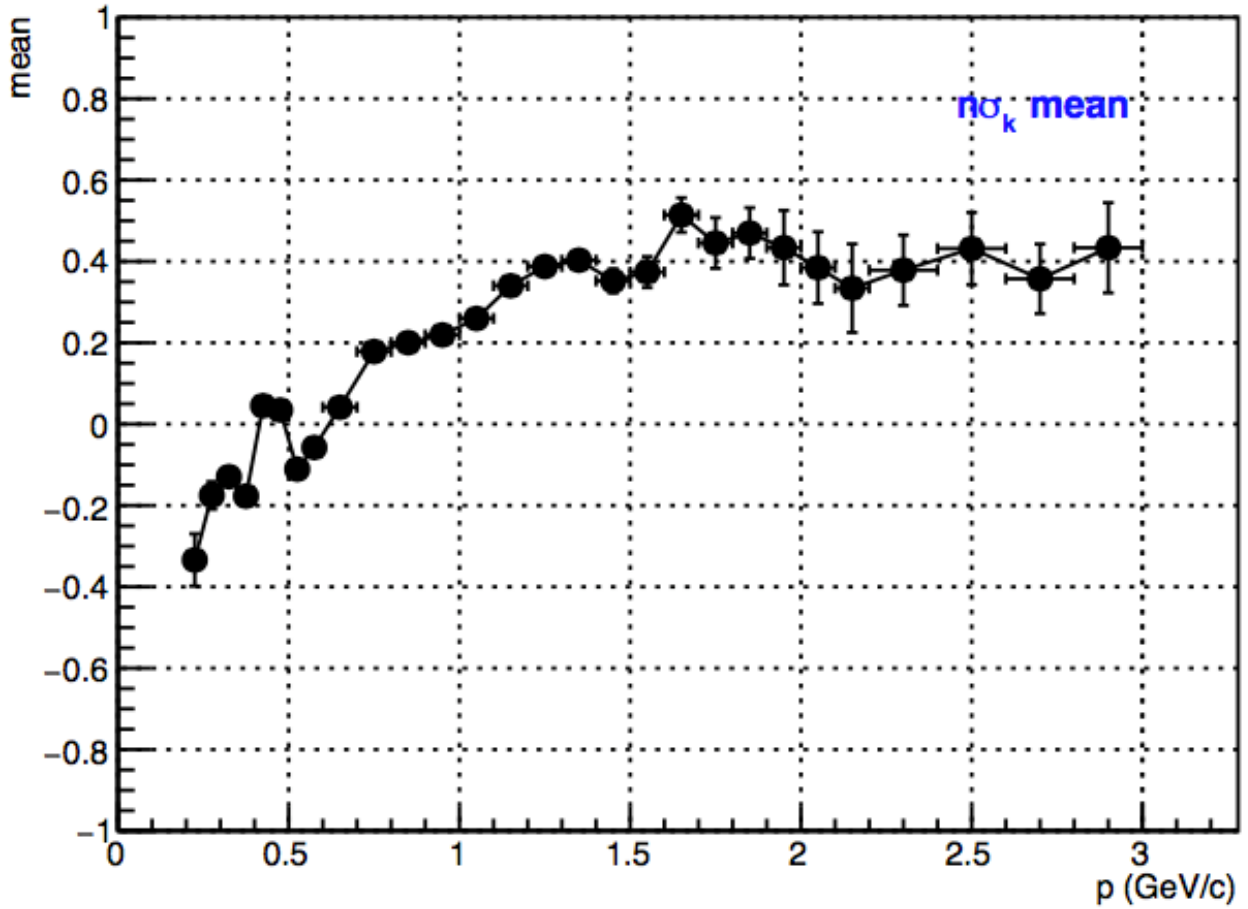
- $p_T > 0.5$
- $|\eta| < 1$
- nHitsFit ≥ 20
- ndEdx > 15
- gDca < 2
- $|n\sigma_\pi| < 2.0$
- $|n\sigma_\pi^{TOF}| < 2.0$

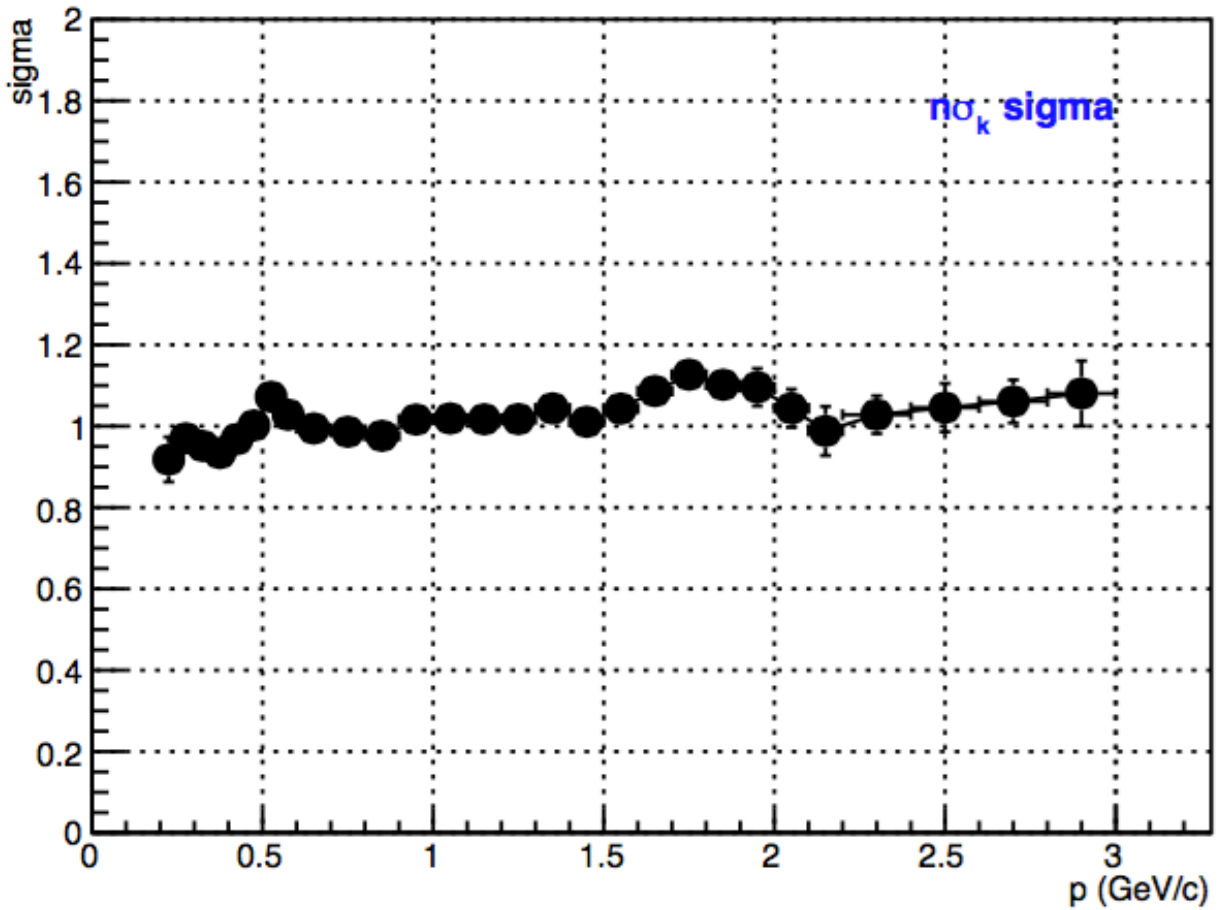
Partner k

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

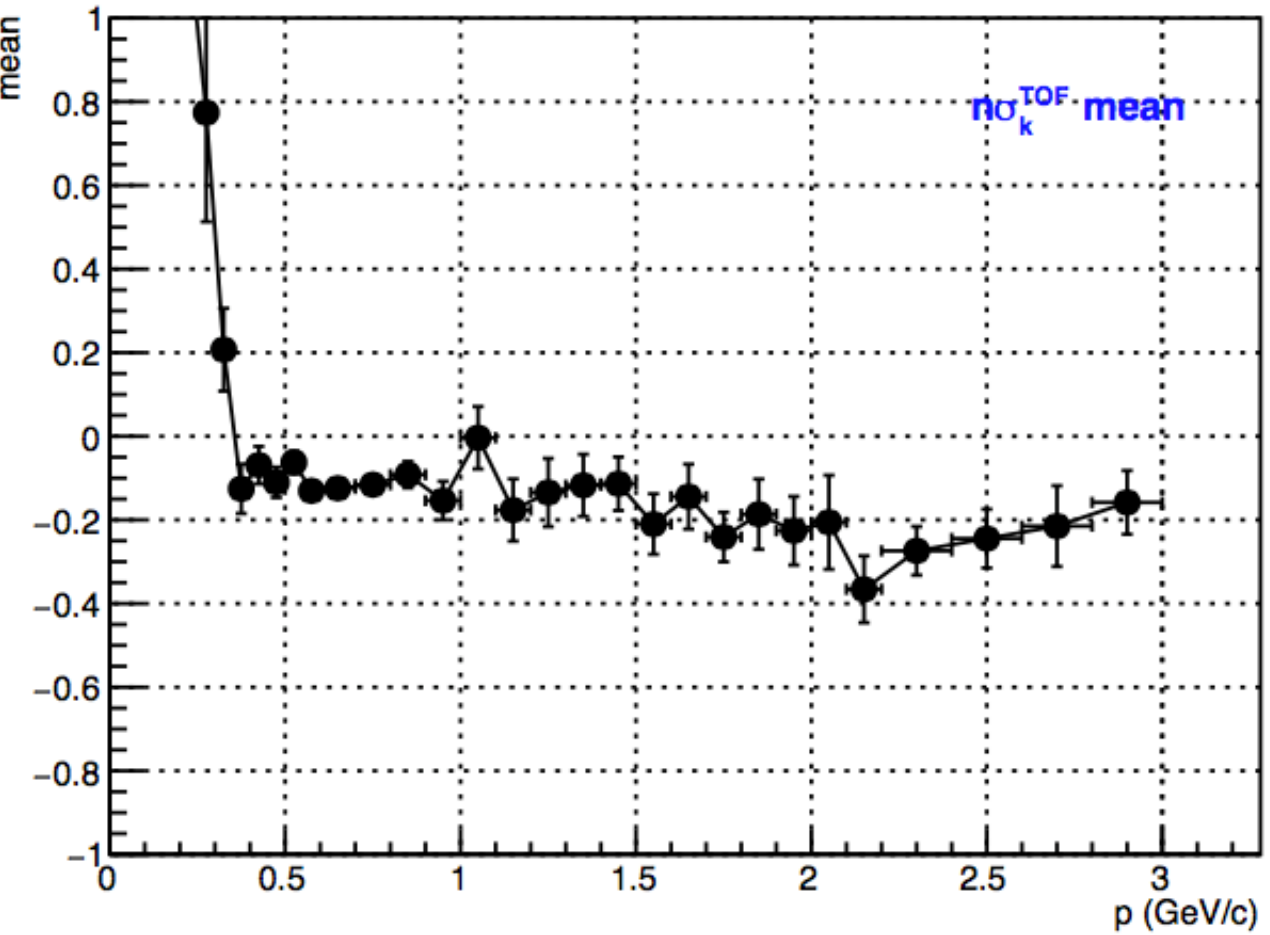


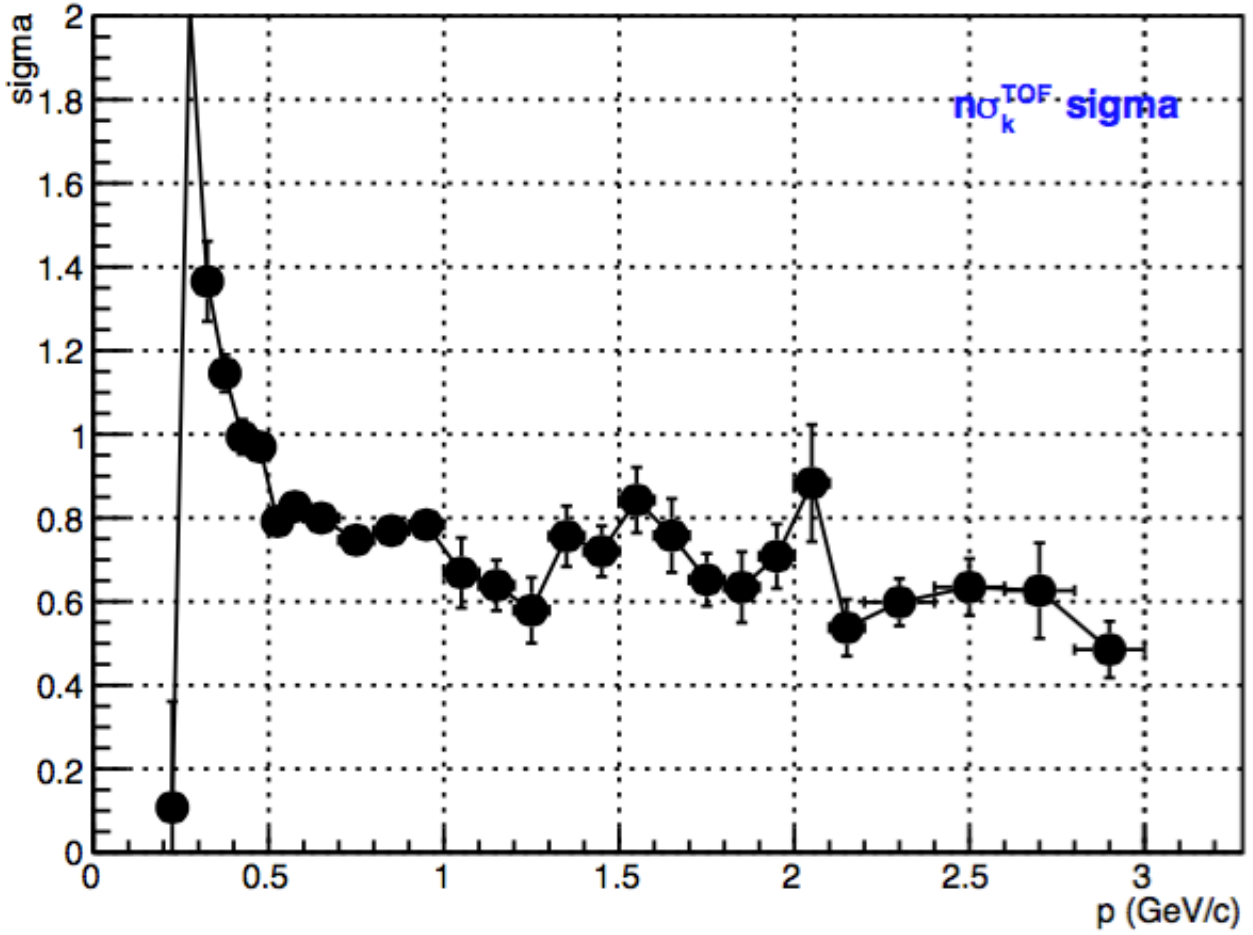
Kaon PID and efficiency



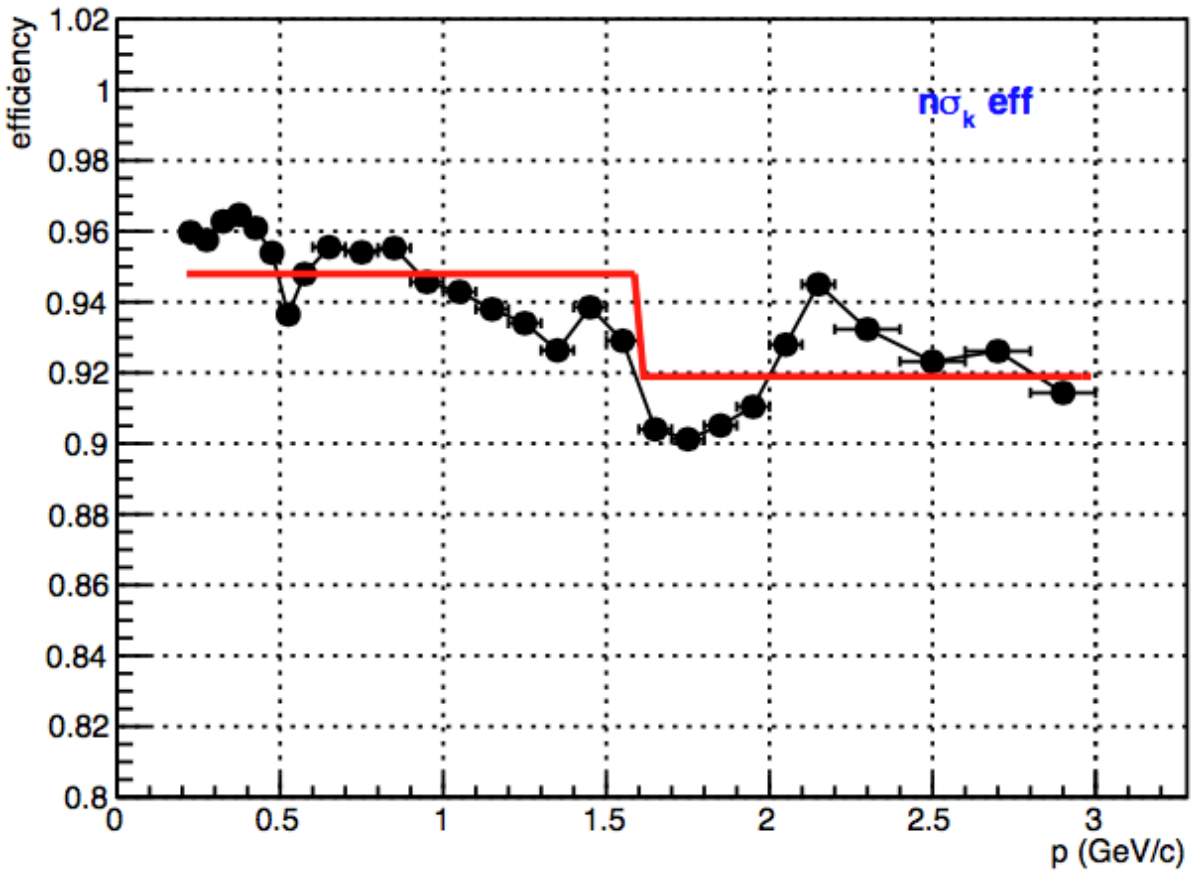


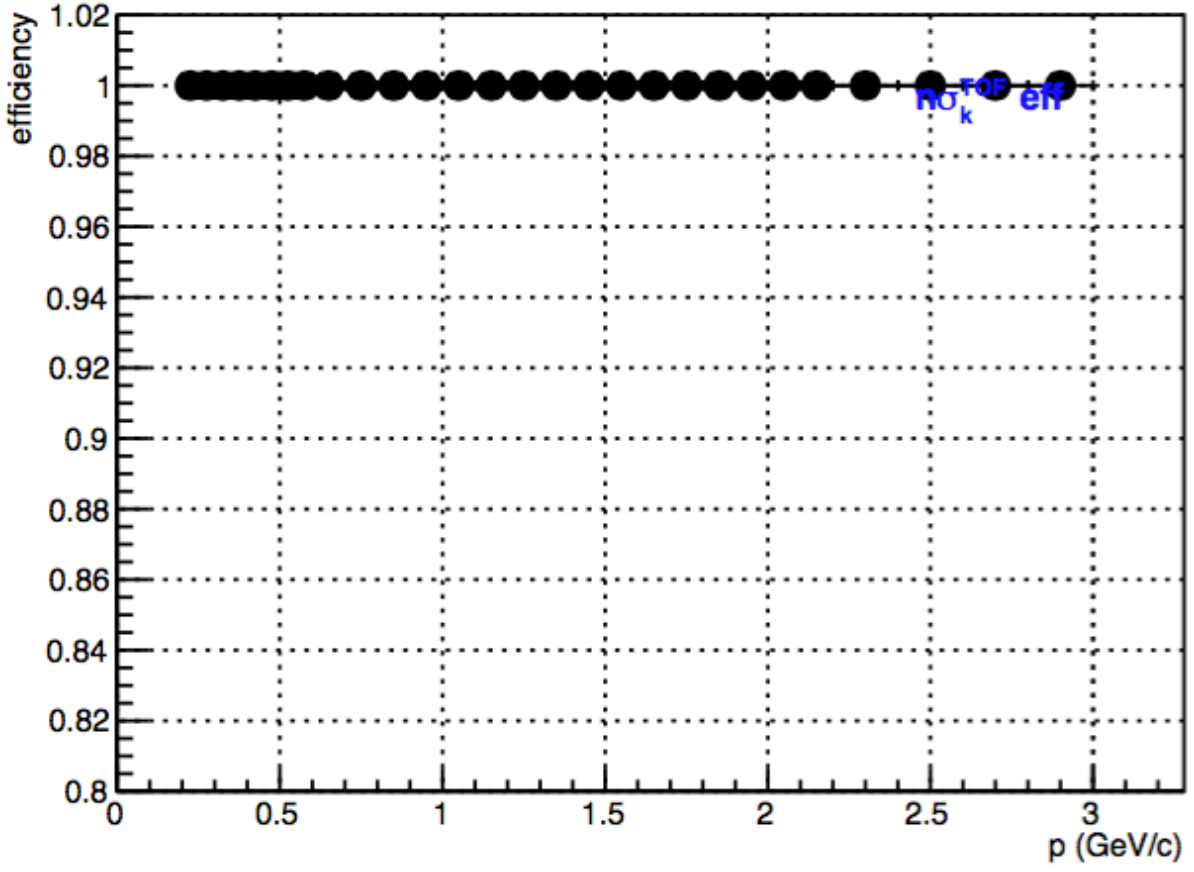
Kaon PID and efficiency





Kaon PID and efficiency





Pion PID and efficiency

Target π

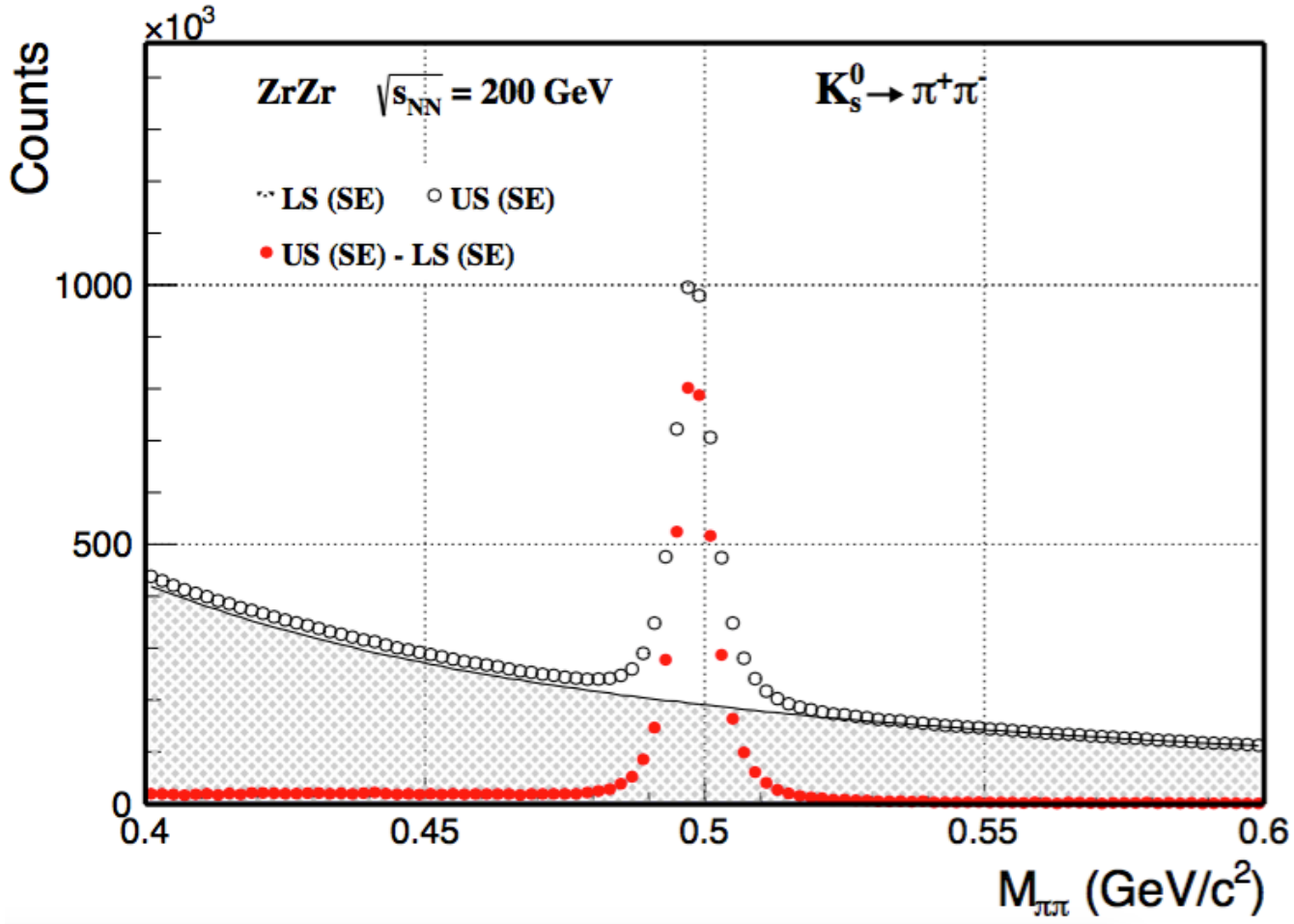
- $p_T > 0.5$
- $|\eta| < 1$
- nHitsFit ≥ 20
- ndEdx > 15
- gDca > 0.1
- $|n\sigma_\pi| < 2.0$
- $|n\sigma_\pi^{TOF}| < 2.0$

Partner π

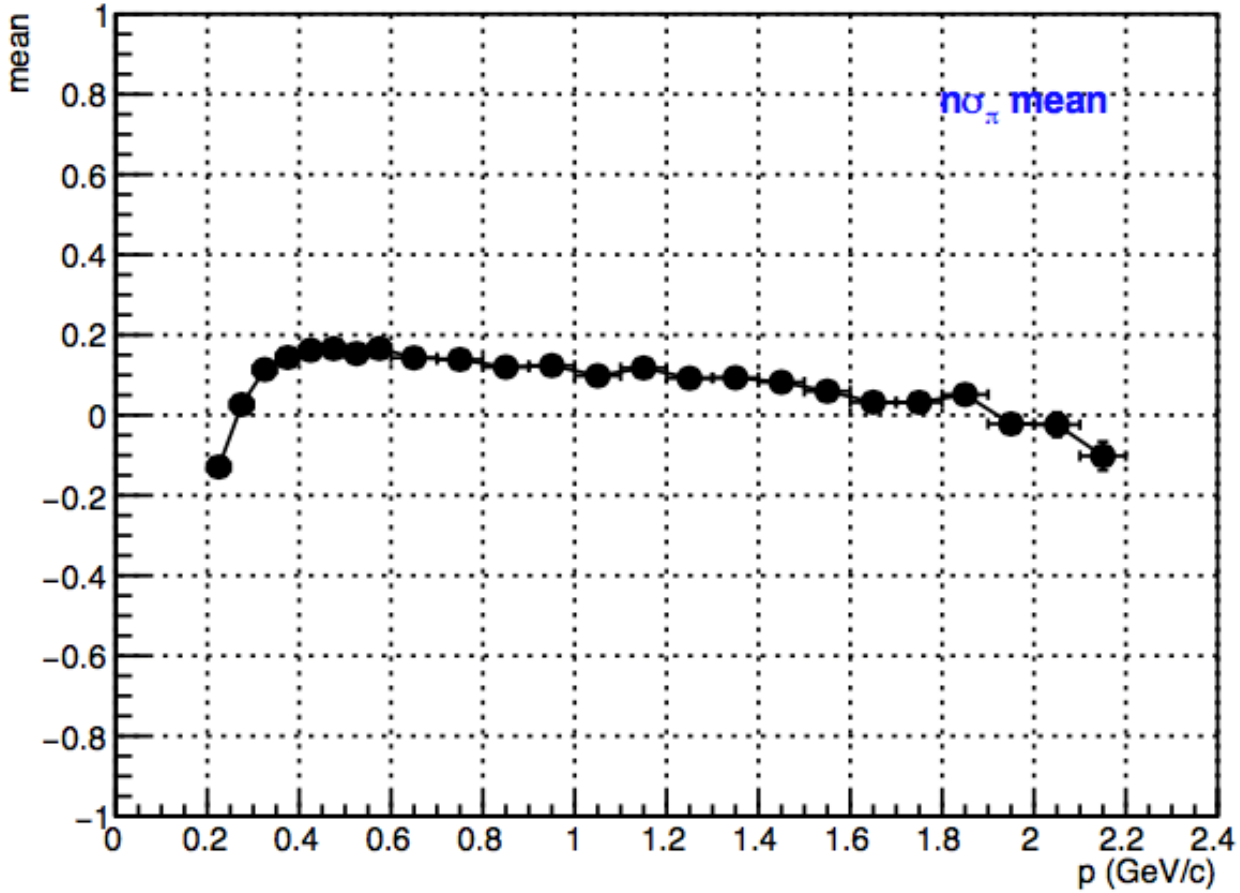
- $p_T > 0.2$
- $|\eta| < 1$
- nHitsFit ≥ 20
- ndEdx > 15
- gDca > 0.1
- $|n\sigma_\pi| < 4.0$
- $|n\sigma_\pi^{TOF}| < 4.0$

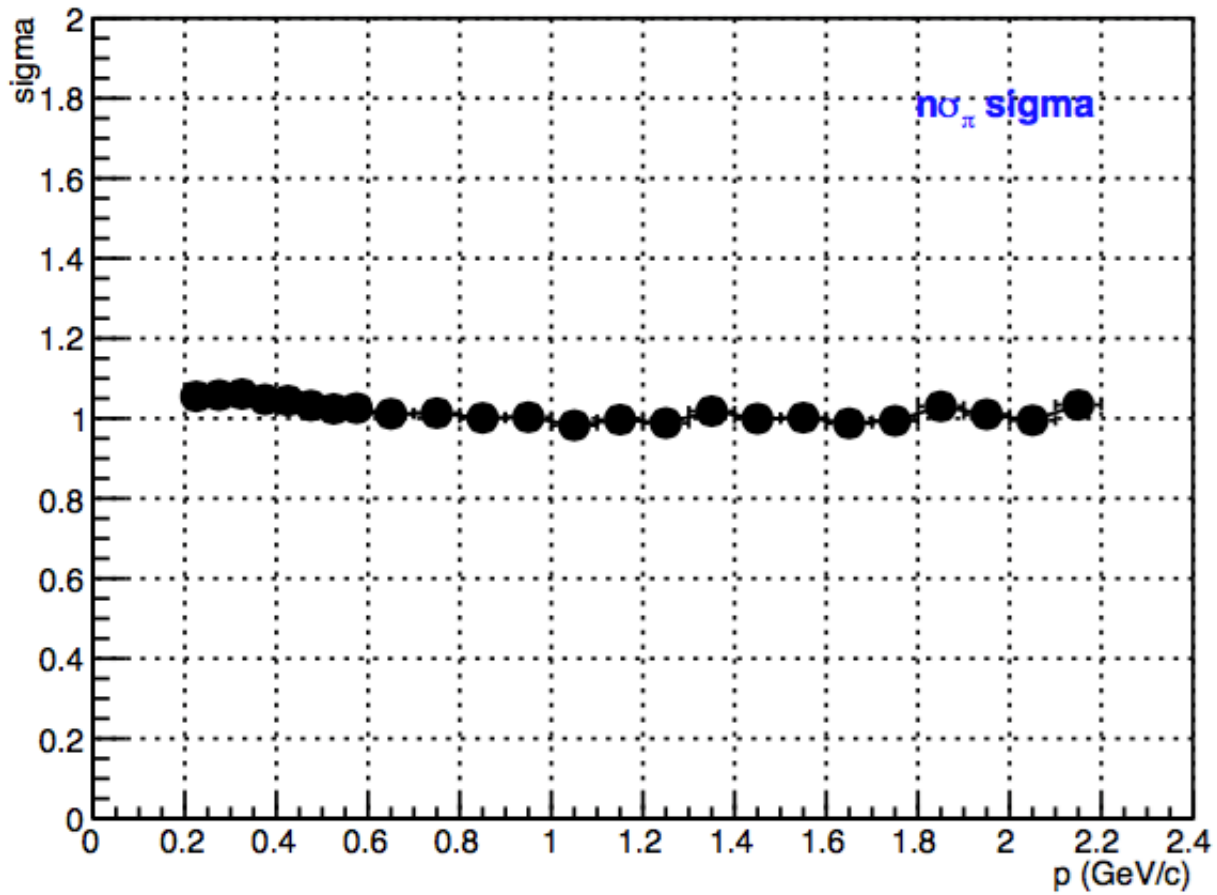
k_s^0 reconstruction cuts:

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

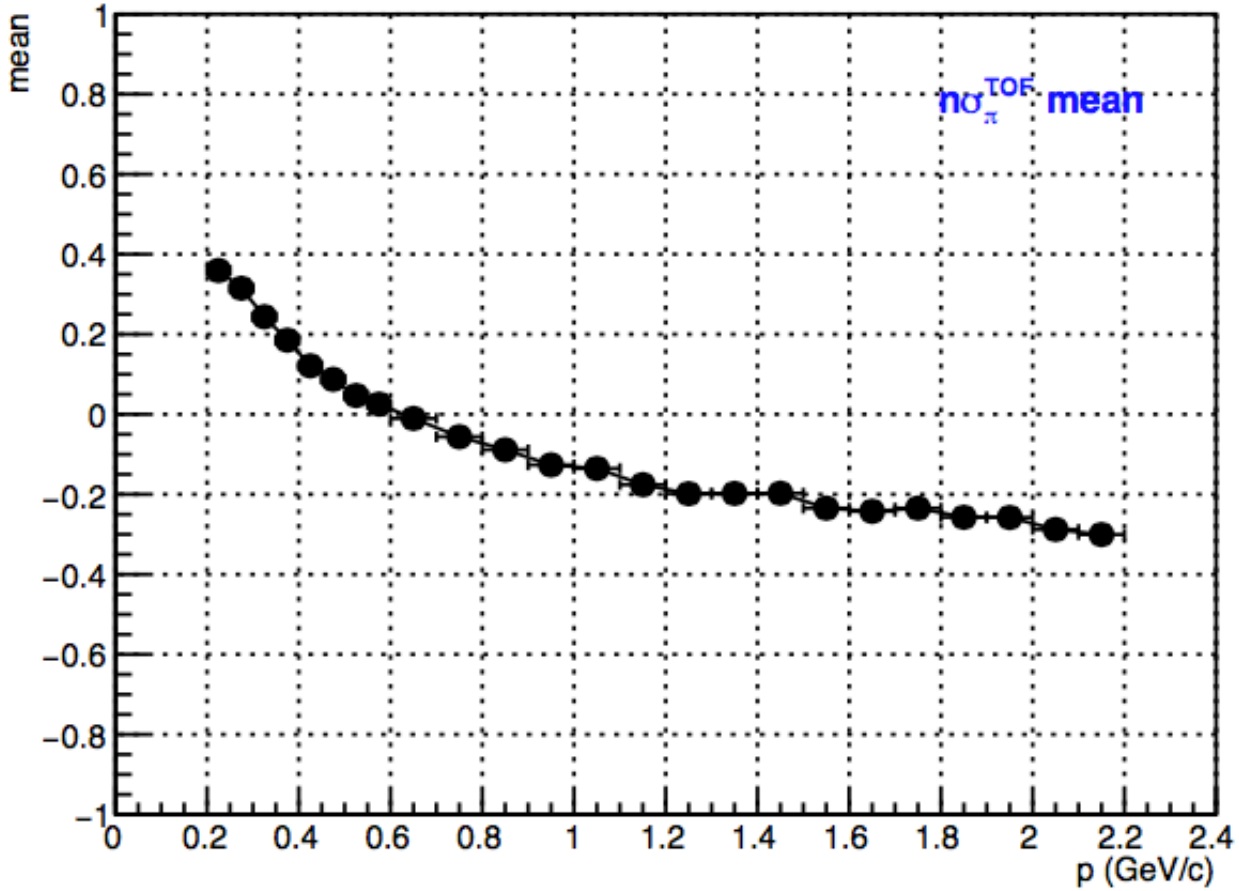


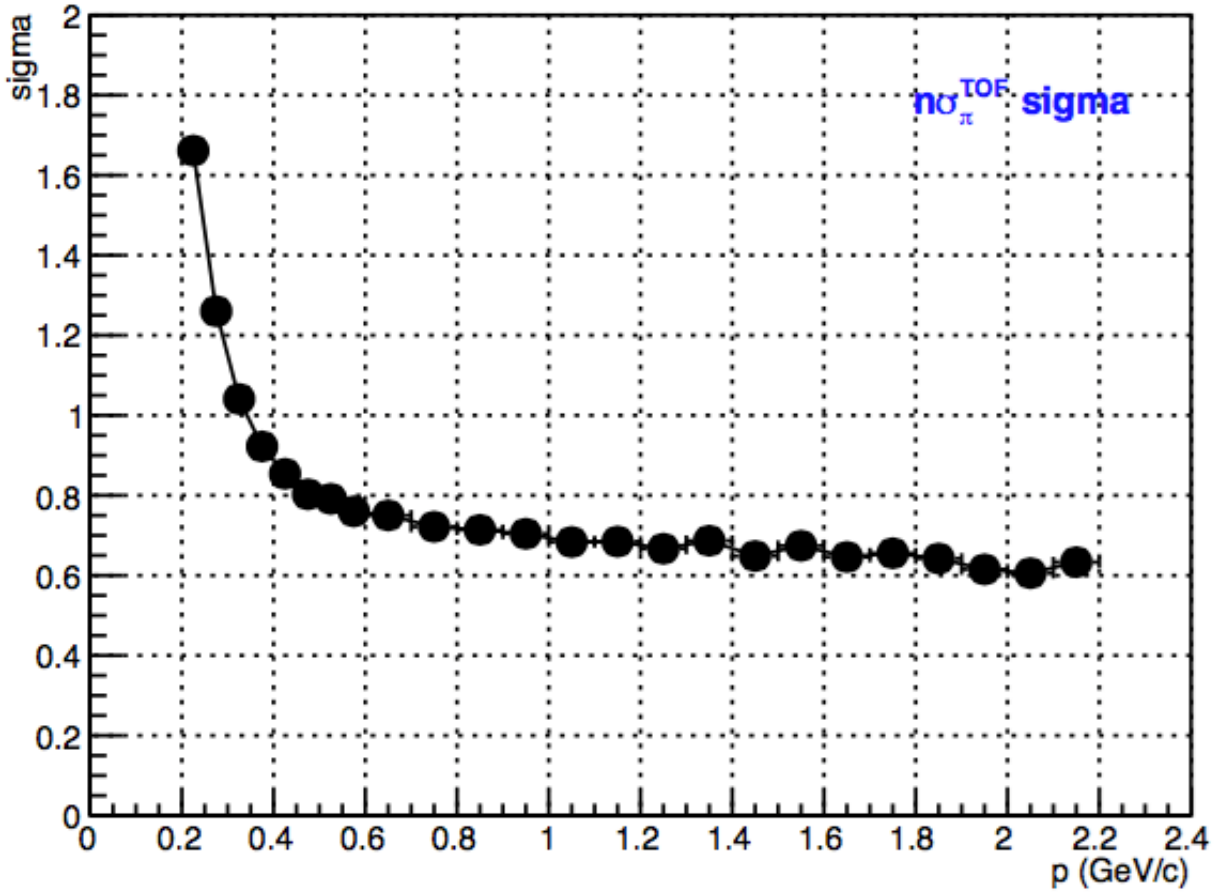
Pion PID and efficiency



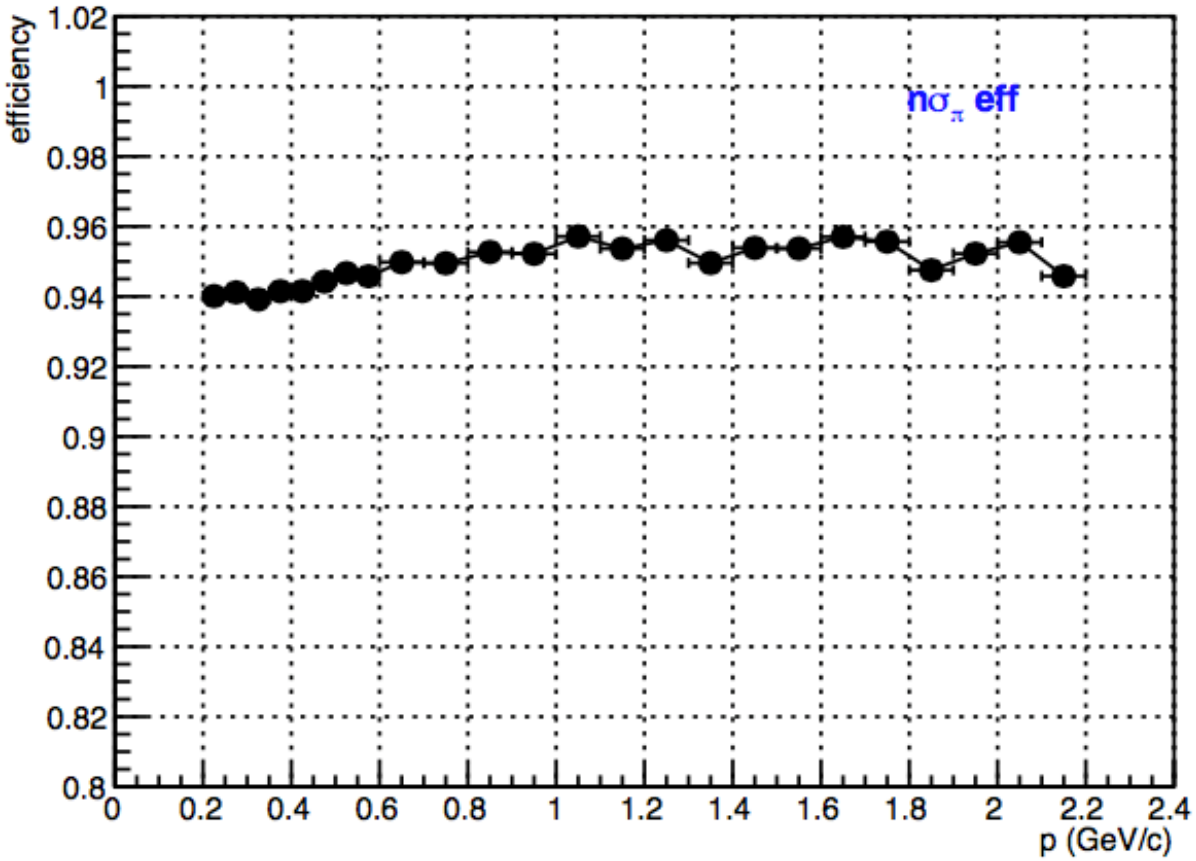


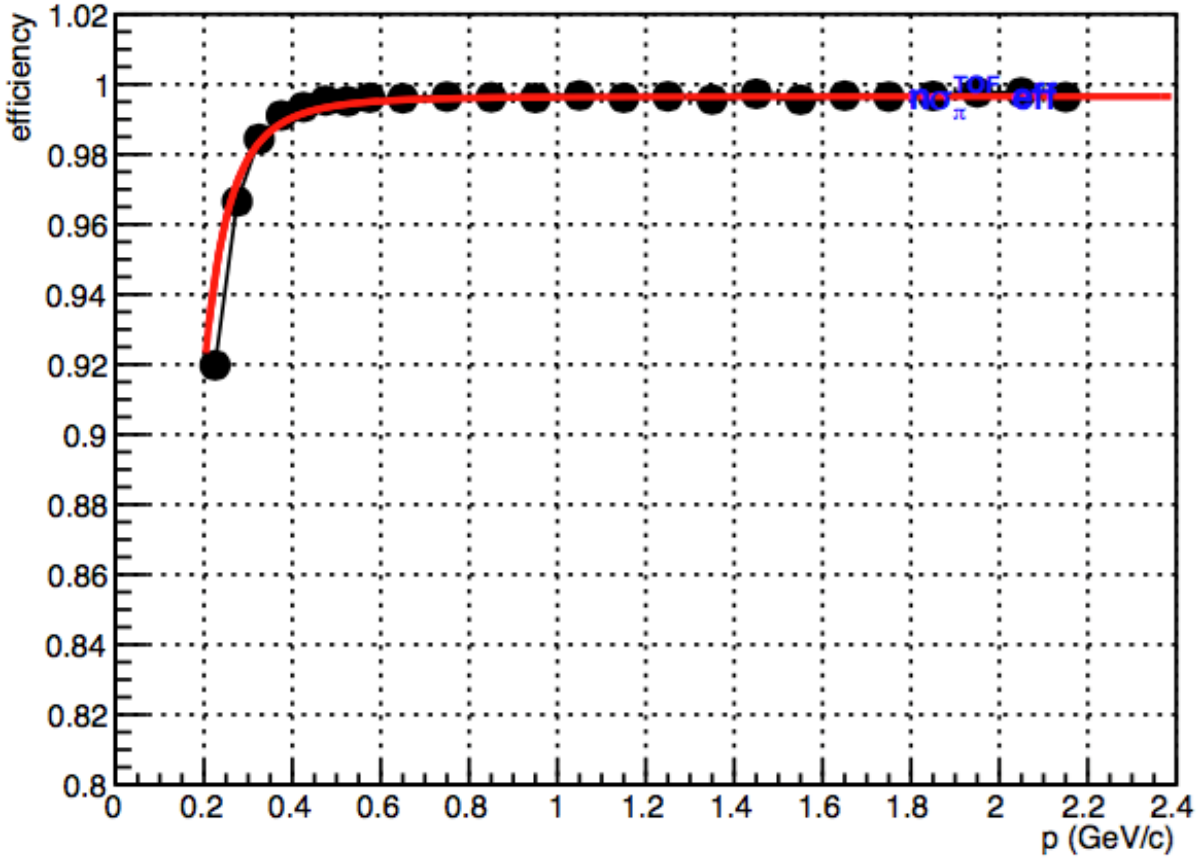
Pion PID and efficiency



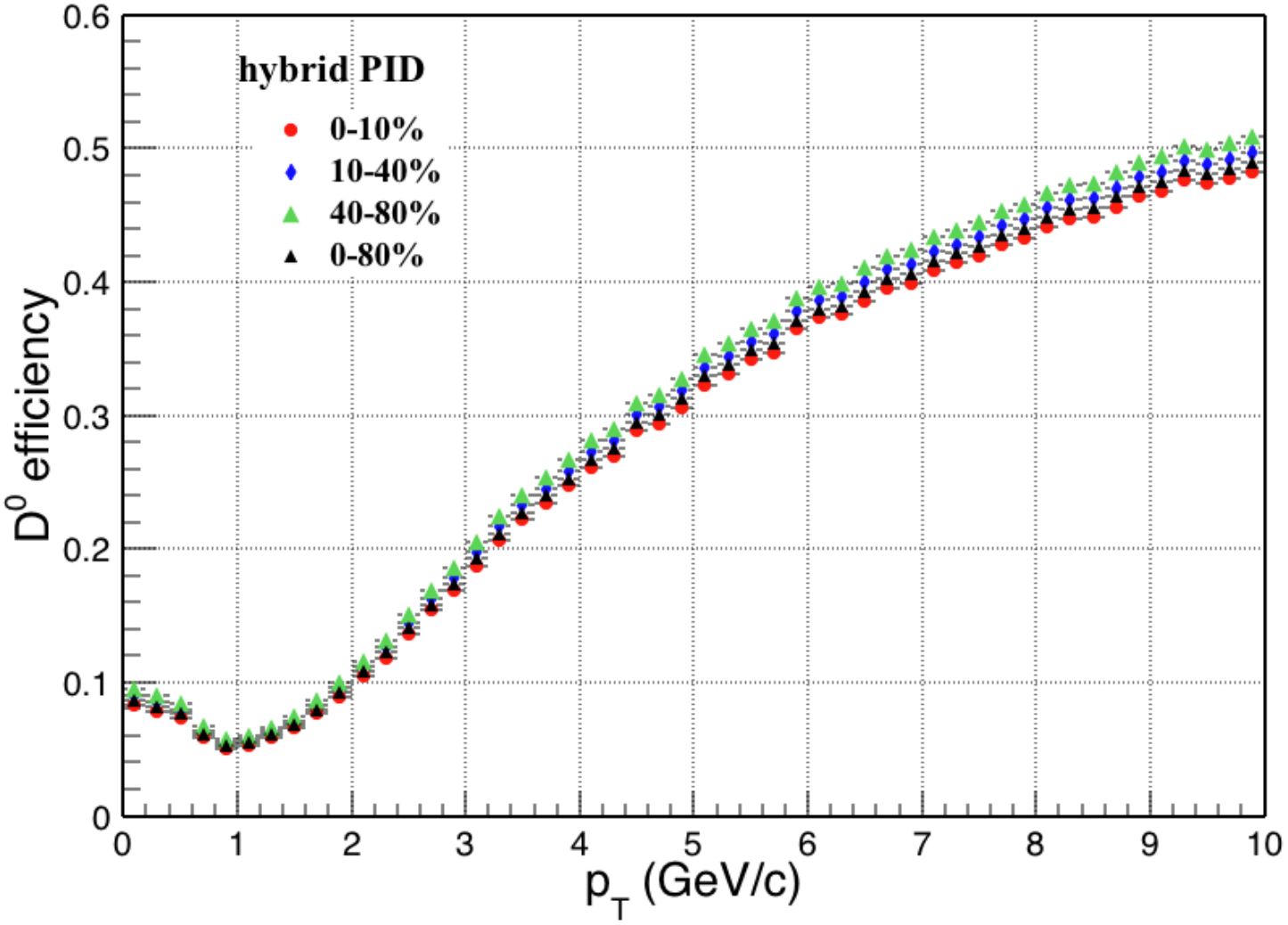


Pion PID and efficiency





D^0efficiency



A fast simulation (PYTHIA) is applied for the efficiency study.

$$\epsilon_{D^0}^{reco} = \epsilon_{Accept} \otimes \epsilon_{Track}$$

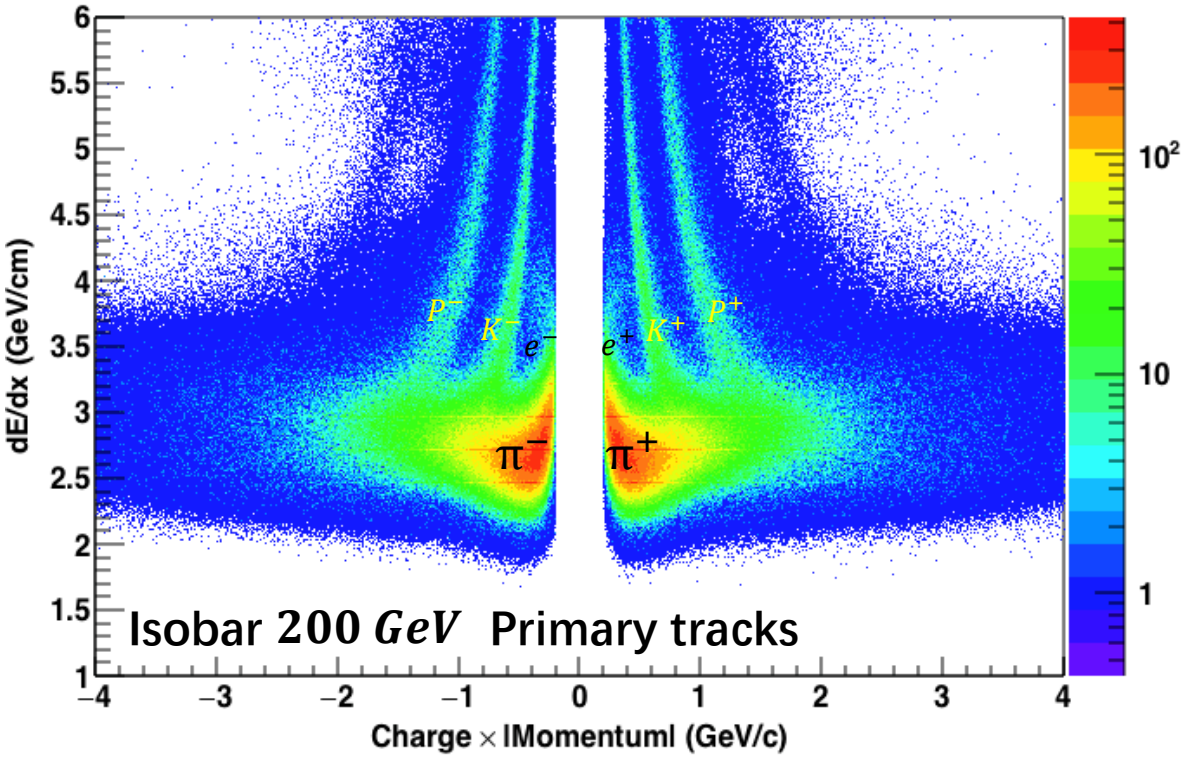
$$\epsilon_{Track} = \epsilon_{TPC} \otimes \epsilon_{PID}$$

$$\epsilon_{PID\_clean} = \epsilon_{n\sigma_X} \cdot \epsilon_{TOF} \cdot \epsilon_{\Delta\frac{1}{\beta}}$$

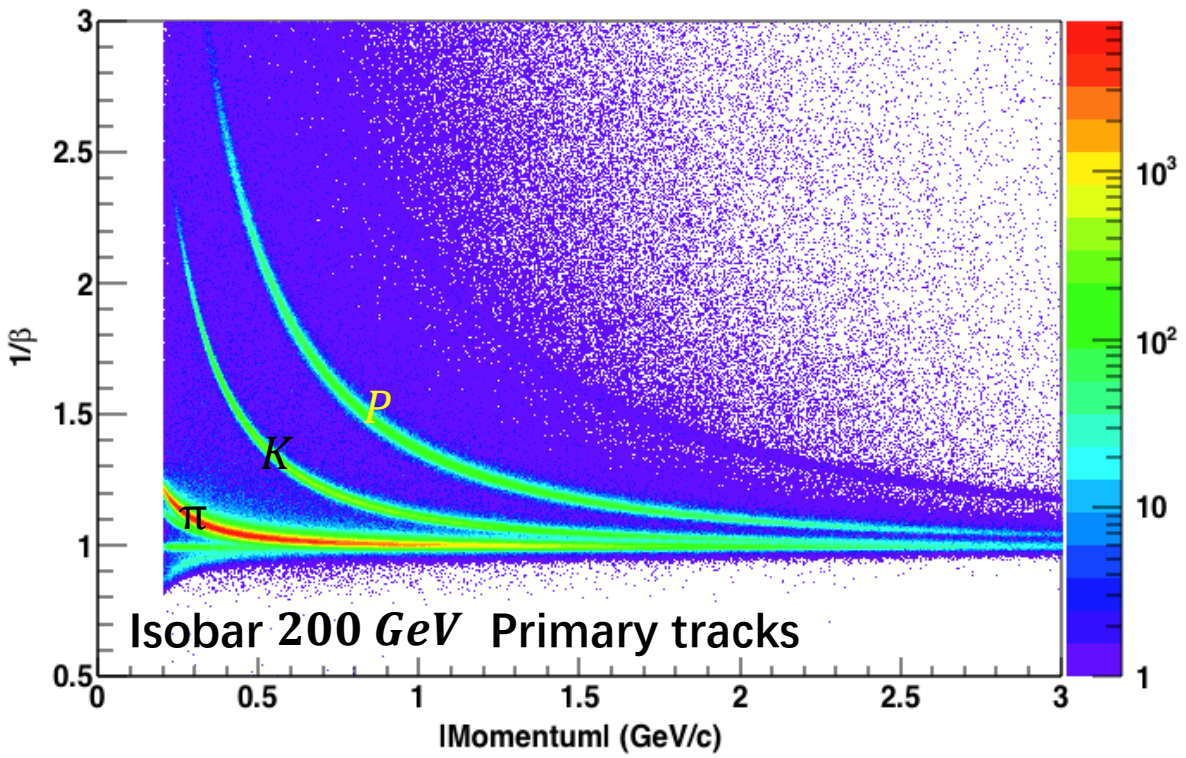
$$\epsilon_{PID\_hybrid} = \epsilon_{n\sigma_X} \cdot \epsilon_{TOF} \cdot \epsilon_{\Delta\frac{1}{\beta}} + \epsilon_{n\sigma_X} \cdot (1 - \epsilon_{TOF})$$

Double-counting Due to MisPID

Isobar $\sqrt{S_{NN}} = 200\ GeV$ Primary tracks

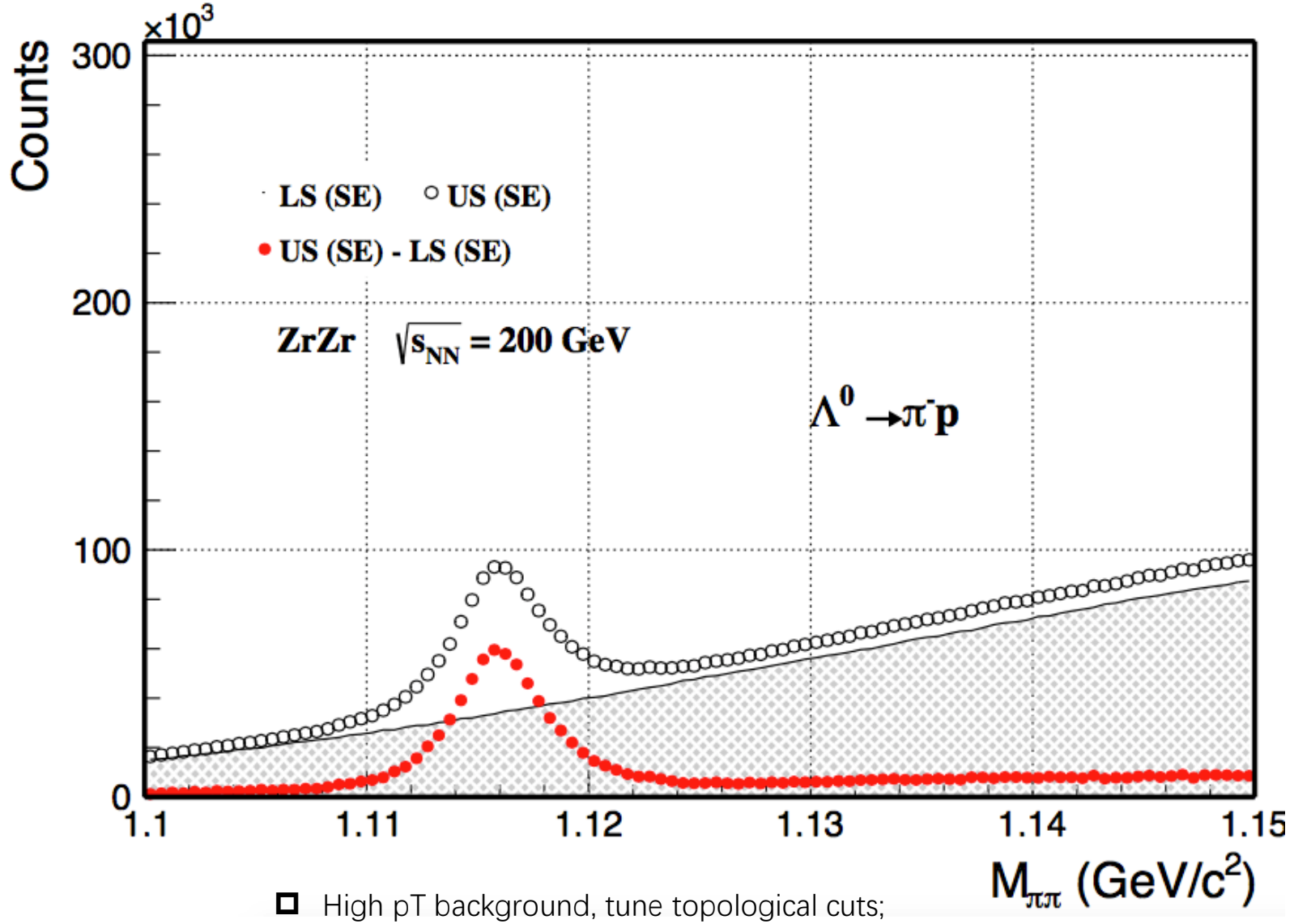


TPC PID



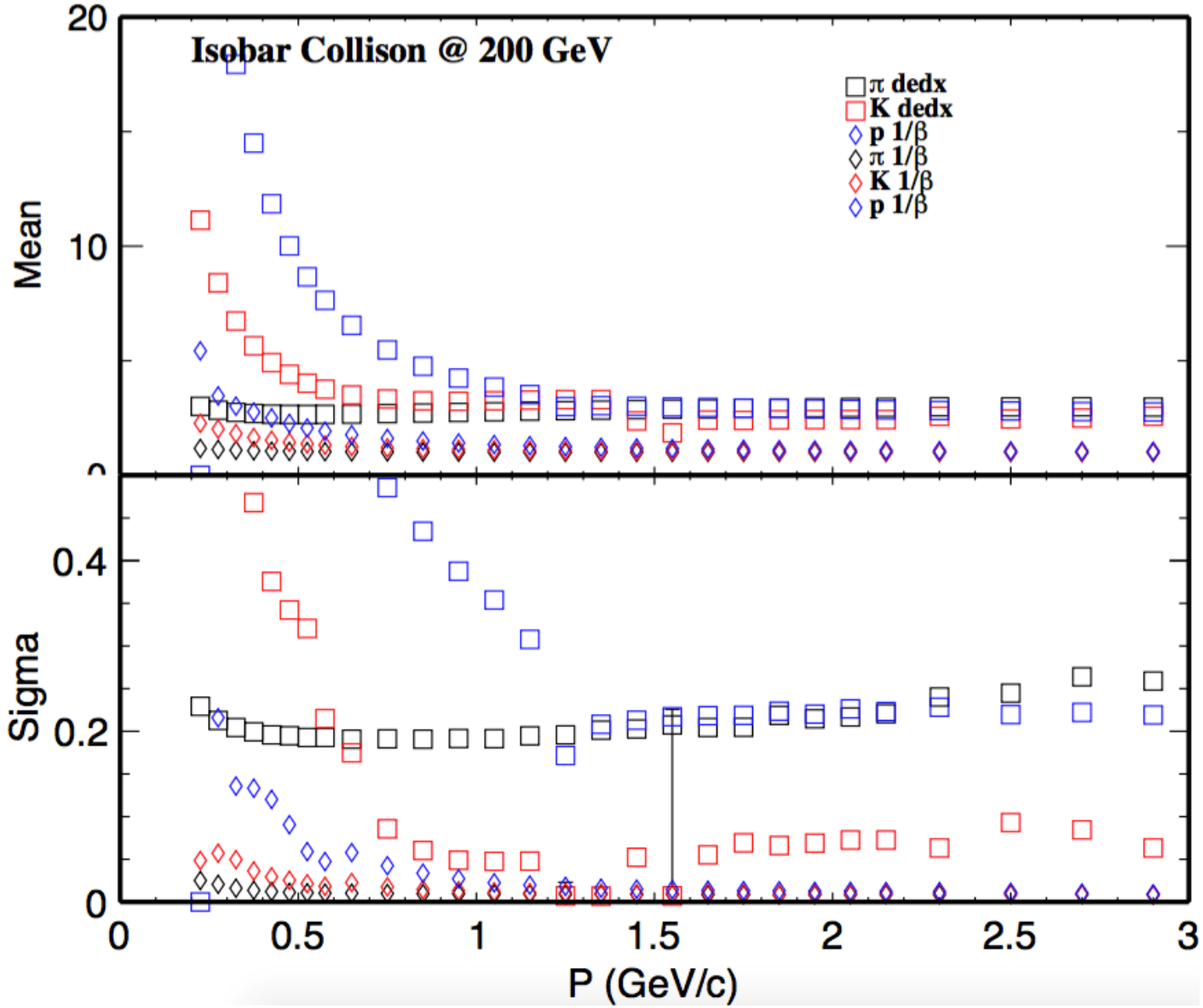
TOF PID: $\beta=\frac{L}{ct}$

proton sample from Λ^0 decay



- High pT background, tune topological cuts;
- P>1.0 GeV/c with mass window;
- Polarization measurement.

dE/dx and 1/β distributions

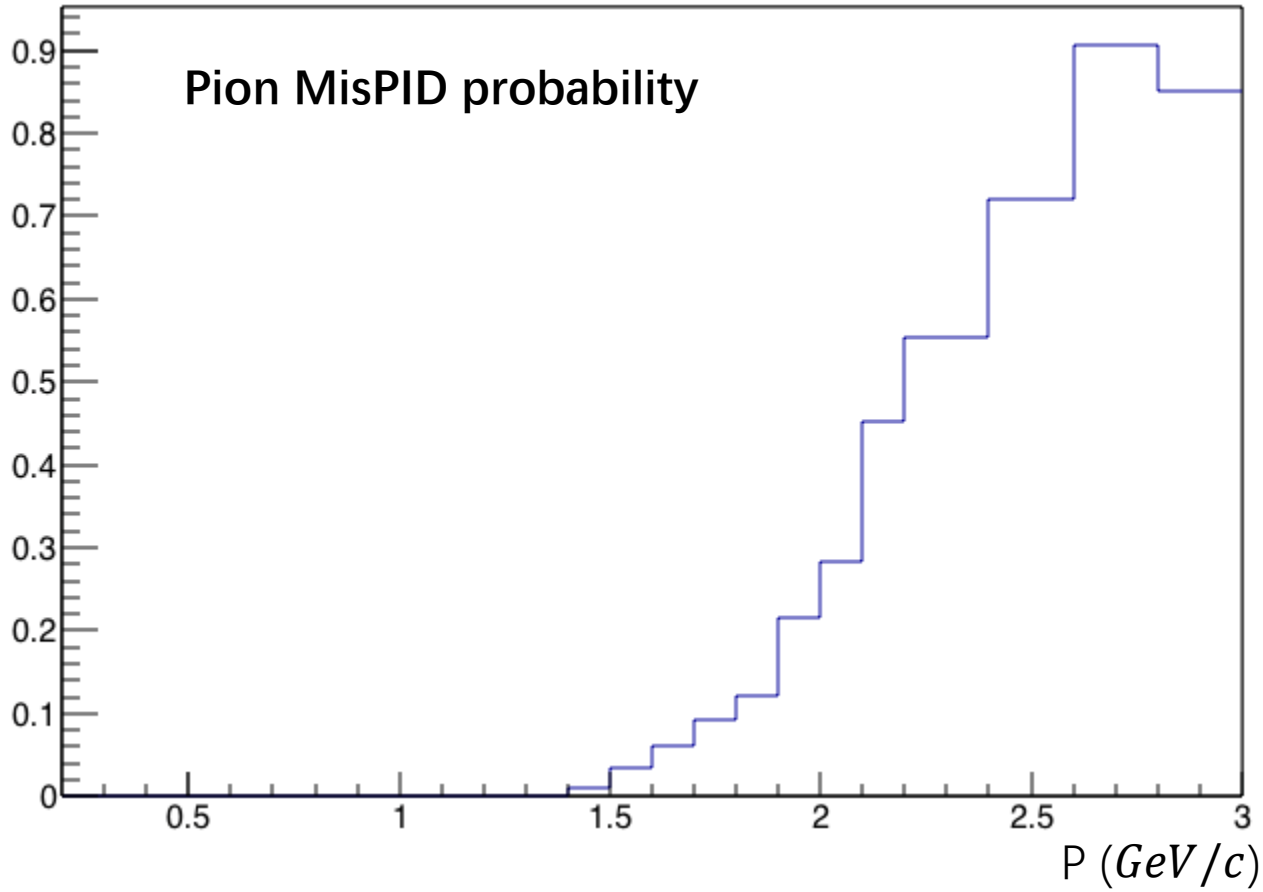


MisPID Probability for Pion/Kaon Daughters

- $X_1 \sim N(\mu_1, \sigma_1^2)$ with pdf $f_1(x_1)$ and cdf $F_1(x_1)$ and
- $X_2 \sim N(\mu_2, \sigma_2^2)$ with pdf $f_2(x_2)$ and cdf $F_2(x_2)$

- $C = \frac{\mu_2\sigma_1^2 - \sigma_2(\mu_1\sigma_2 + \sigma_1\sqrt{(\mu_1-\mu_2)^2 + 2(\sigma_1^2-\sigma_2^2)\log(\frac{\sigma_1}{\sigma_2})})}{\sigma_1^2-\sigma_2^2}$

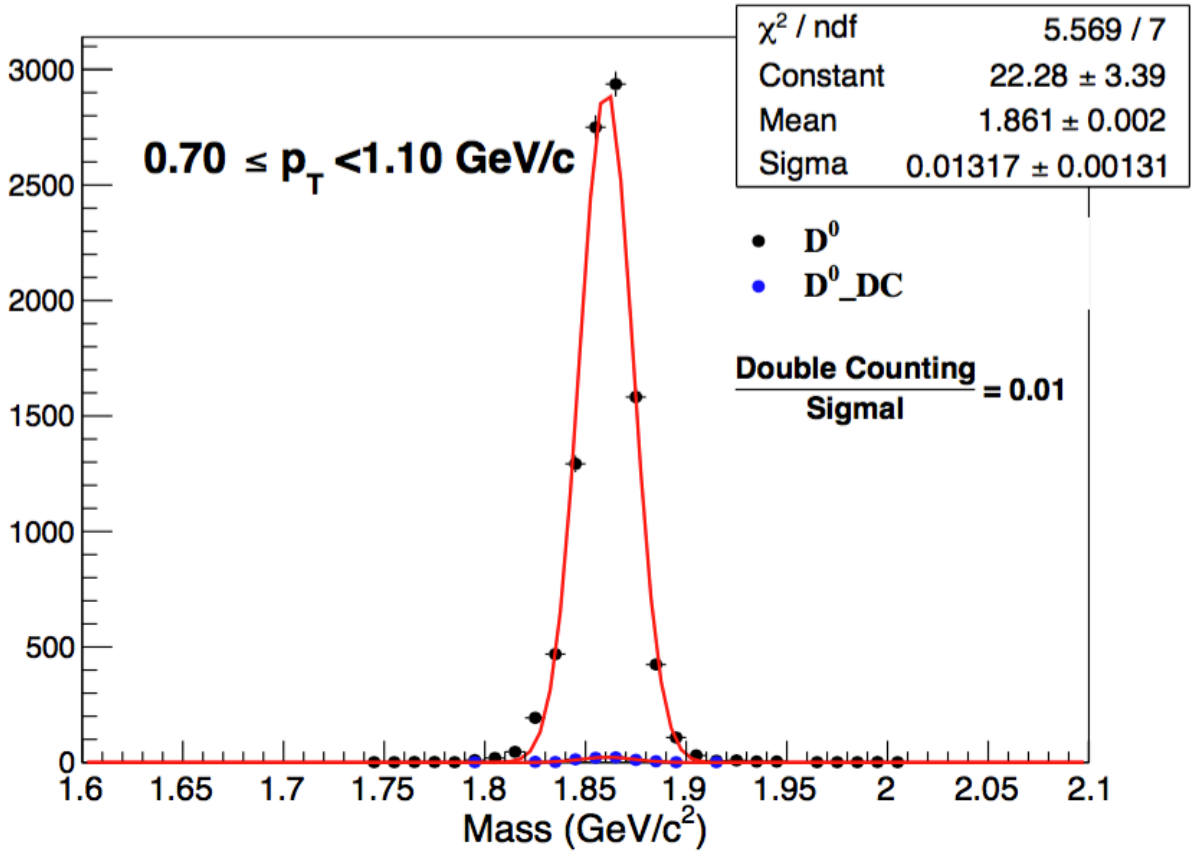
- $P(X_1>C)+P(X_2<C)=1-F_1(C)+F_2(C)=1-\frac{1}{2}\mathrm{erf}\left(\frac{C-\mu_1}{\sqrt{2}\sigma_1}\right)+\frac{1}{2}\mathrm{erf}\left(\frac{C-\mu_2}{\sqrt{2}\sigma_2}\right)$

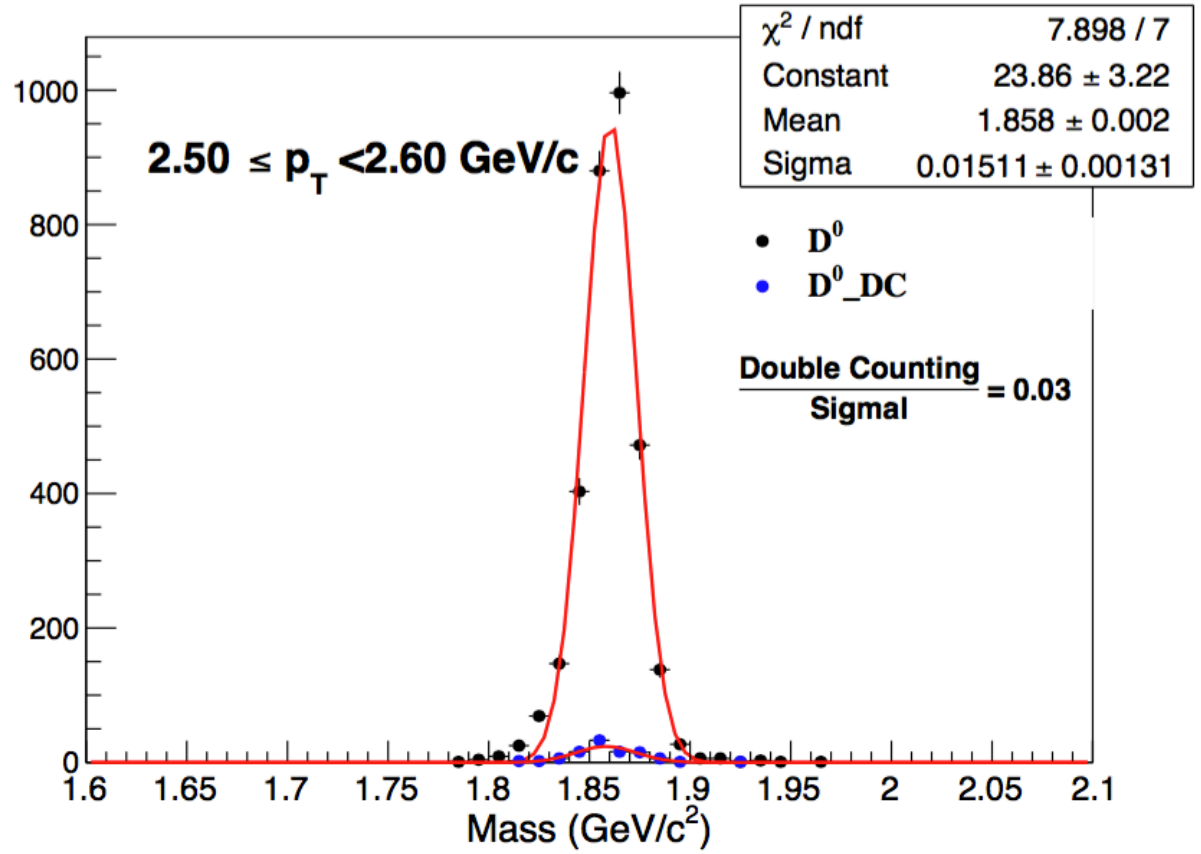


Note: Pion MisPID probability without proton distribution and Kaon distribution is tuned at present.

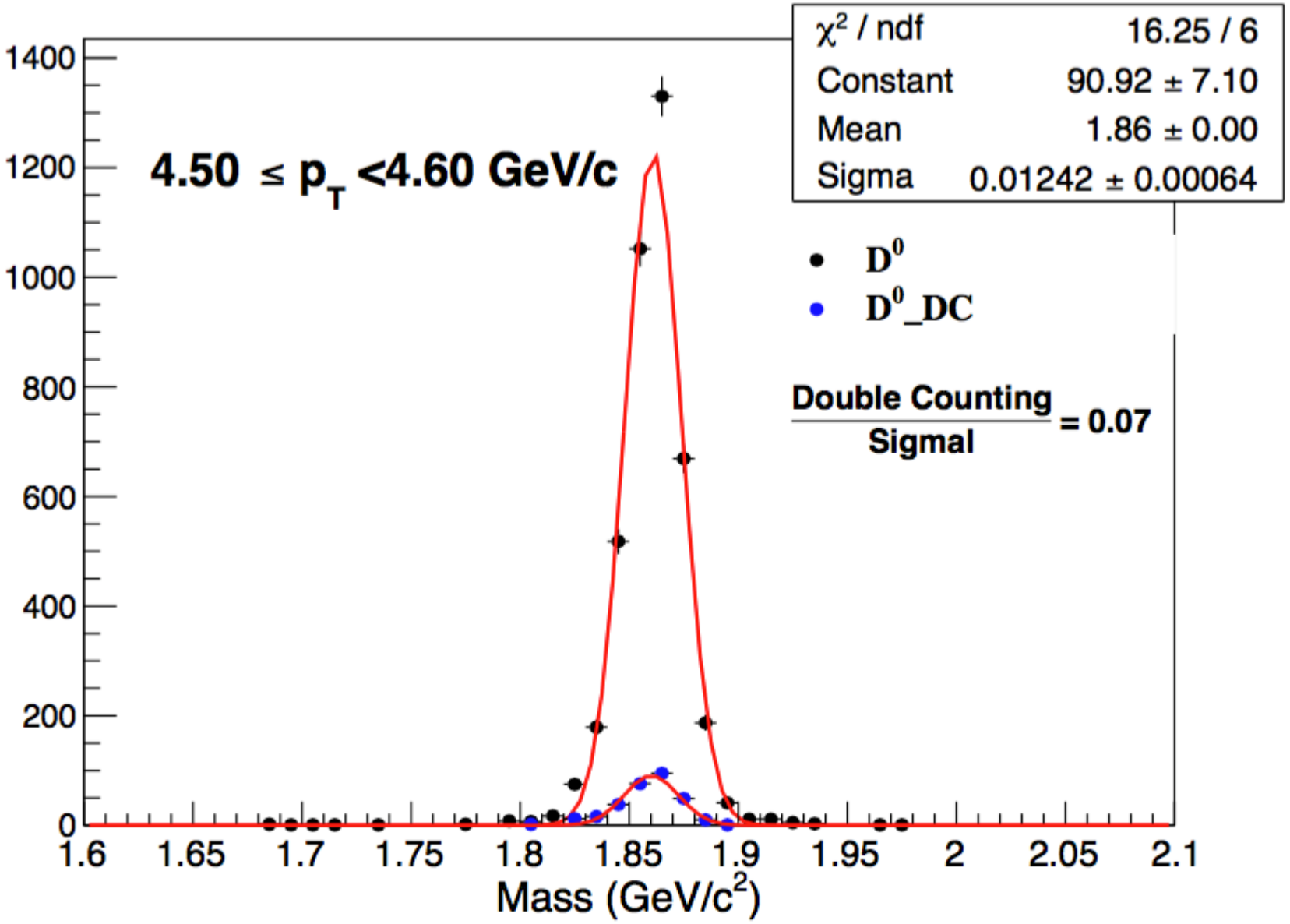
D0 Double-counting Estimation

- Same momentum resolution smearing used in Fast_simulation
- Fold in the mis-PID probability into the D0 decay kinematics by PYTHIA
- Signals and double-counting entries were counted within 1.6~2.1 GeV/c2.

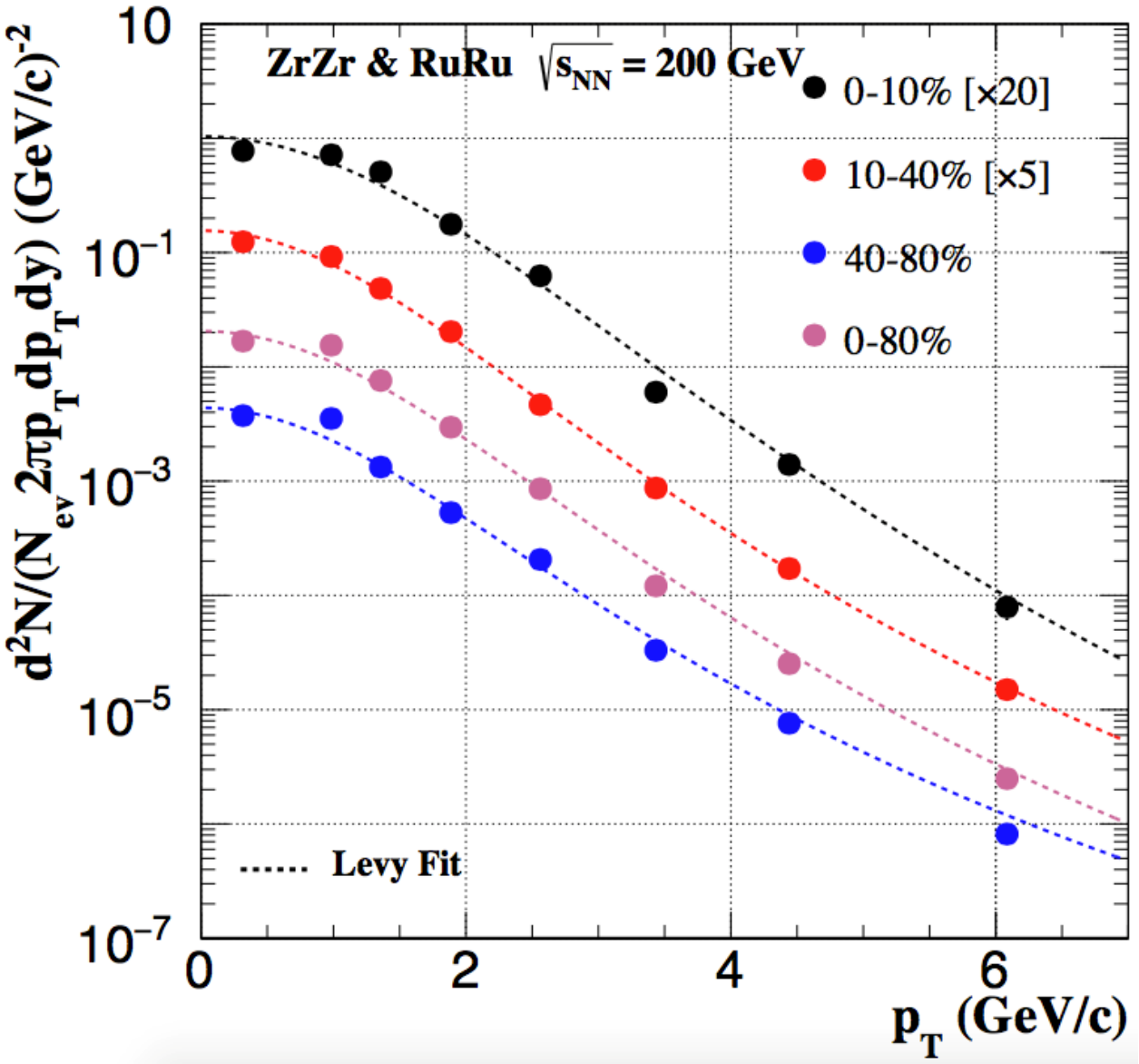




Double-counting Rate vs. D0 pT



D^0 invariant yield and cross section

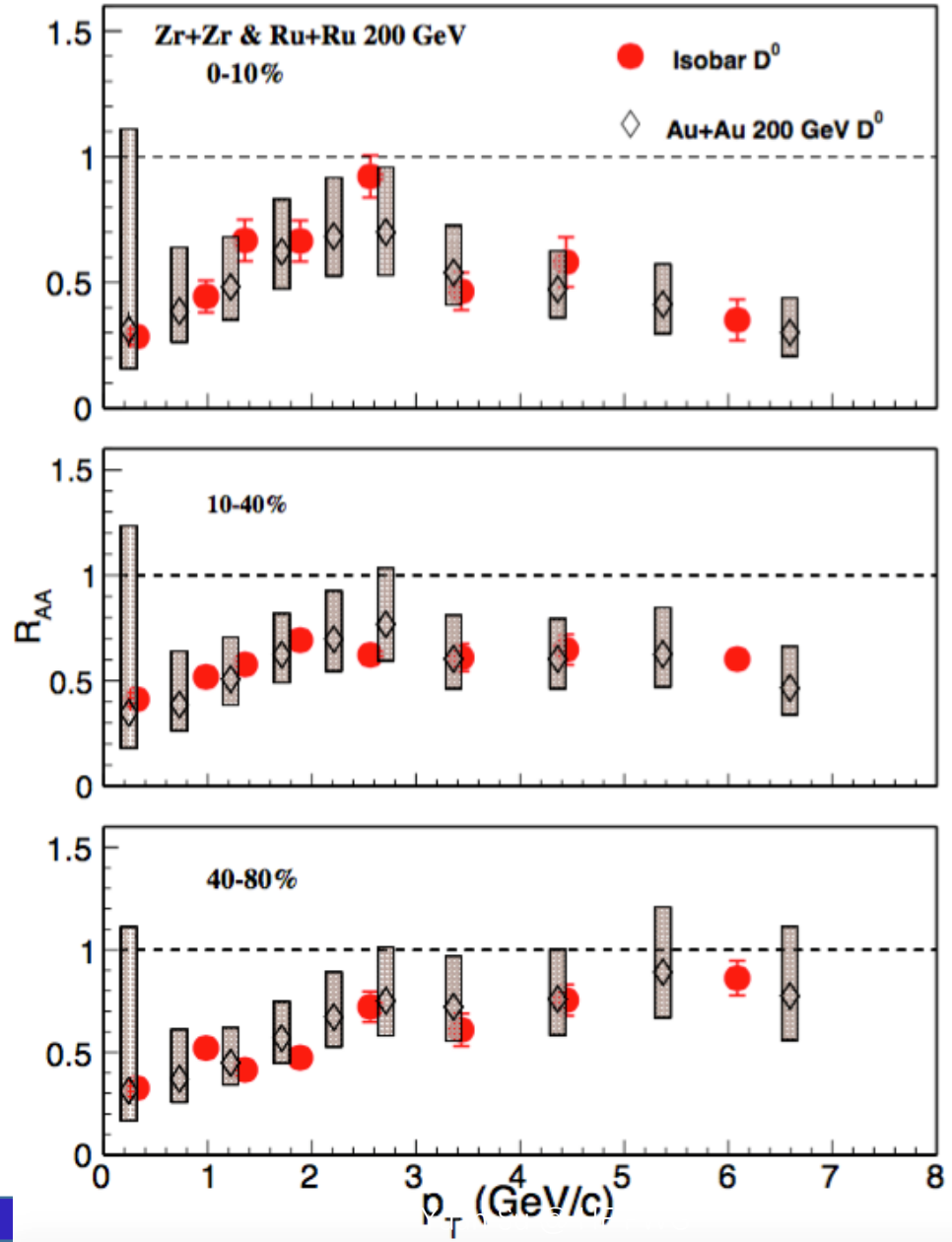


$$\frac{d^2N}{2\pi p_T dp_T dy} = \frac{\Delta N^{raw}/\epsilon_{D^0}^{tot}/2}{2\pi p_T \Delta p_T \Delta y \times N_{events} \times B.R.} = \frac{\Delta N_{D^0}^{AA}}{2\pi p_T \Delta p_T \Delta y} = E\frac{d^3\sigma_{D^0}^{AA}}{dp^3}$$

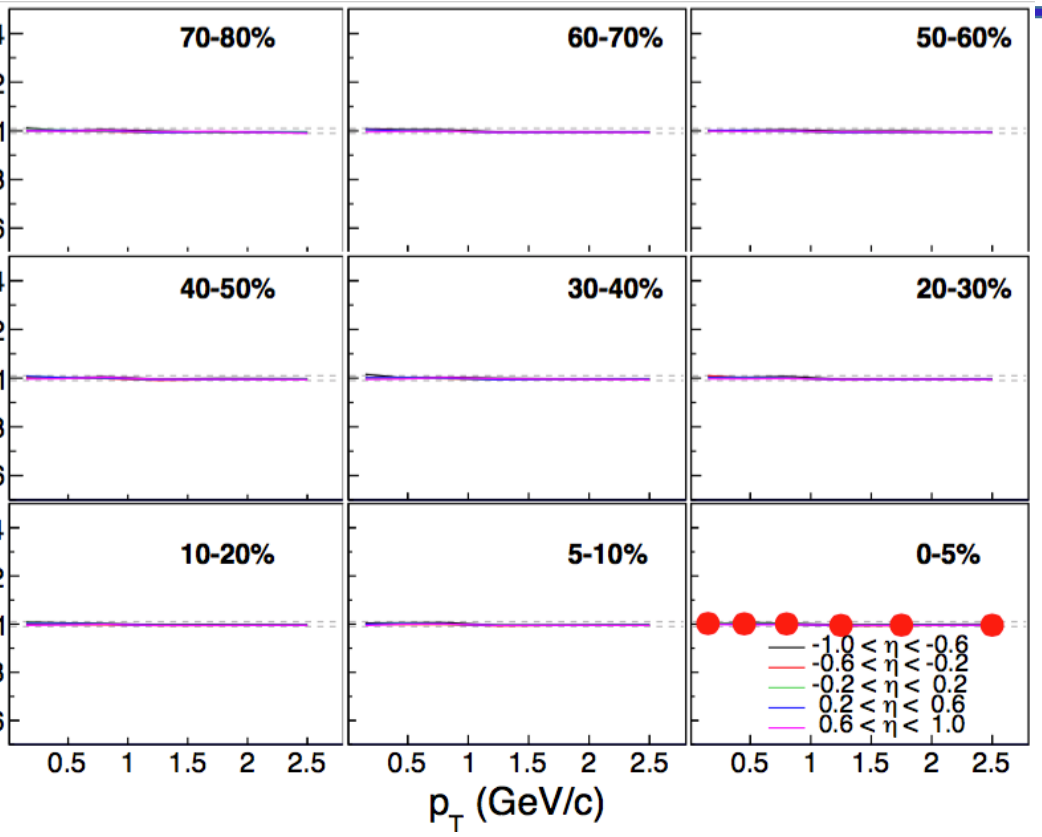
$$\frac{dN_{D^0}^{AA}}{dy}|_{y=0} = \frac{\Delta N^{raw}/\epsilon_{D^0}^{tot}/2}{\Delta y \times N_{events} \times B.R.}$$

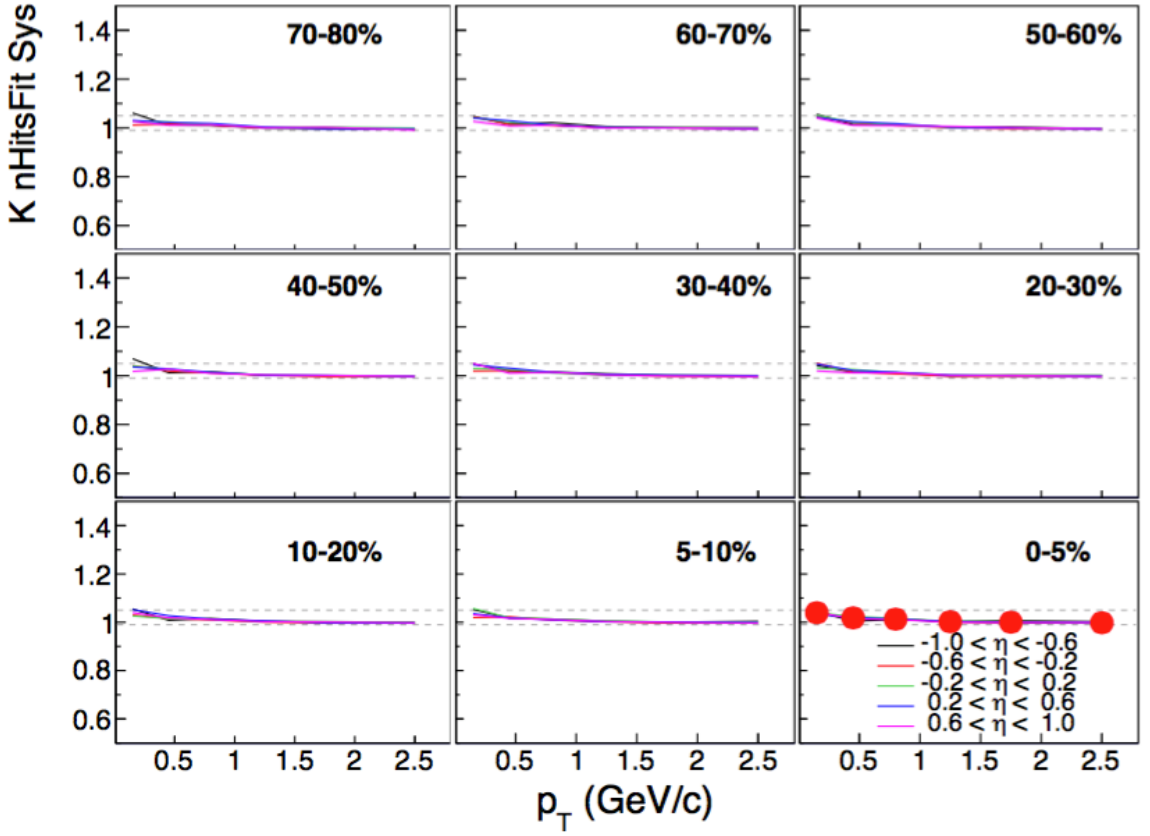
$$\frac{d\sigma_{D^0}^{NN}}{dy}|_{y=0} = \frac{dN_{D^0}^{AA}}{dy}|_{y=0} \times \frac{\sigma_{inel}^{pp}}{< N_{bin} >}$$

D^0 R_{AA}


Zr+Zr & Ru+Ru 200 GeV
0-10%
Isobar D0
Au+Au 200 GeV D0
10-40%
40-80%
RAA
pT (GeV/c)

TPC tracking systematic uncertainty





$$R(nHitsFit) = \frac{N_{data}(nHitsFit > 15)/N_{data}(nHitsFit > 20)}{N_{emb}^{MC}(nHitsFit > 15)/N_{emb}^{MC}(nHitsFit > 20)}$$

(-1%, 5%) for Kaon ±1% for Pion

$$R(DCA) = \frac{N_{data}(DCA < 2)/N_{data}(DCA < 3)}{N_{emb}^{MC}(DCA < 2)/N_{emb}^{MC}(DCA < 3)}$$

~0 primary tracks, so its effect is negligible.

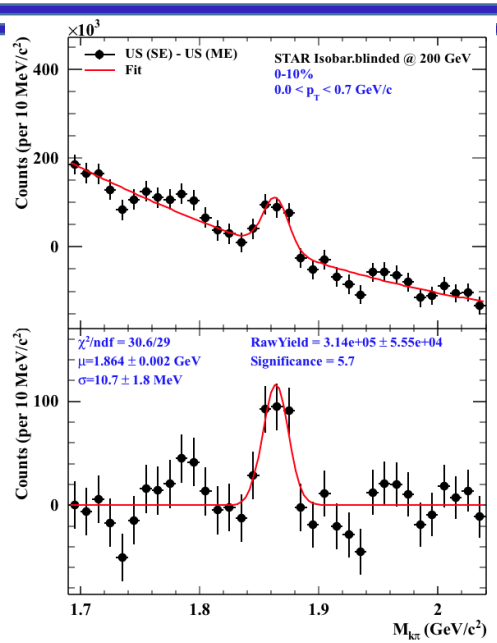
Future plan

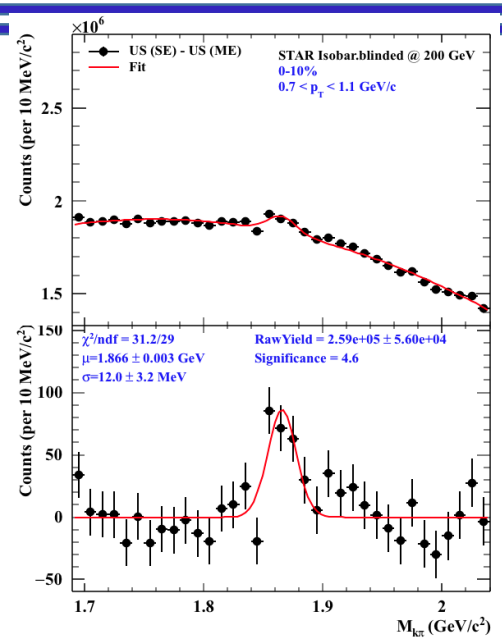
Continue double_counting and systematic uncertainty analysis;

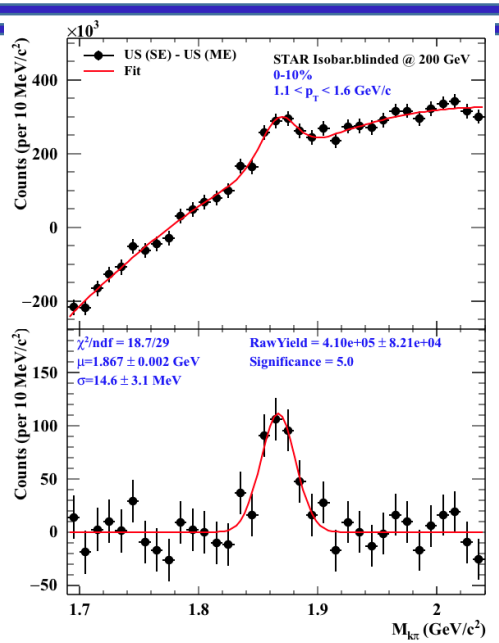
Tune $\boldsymbol{D^0}$ v_2 analysis cuts in Isobar collisions and obtain systematic uncertainty.

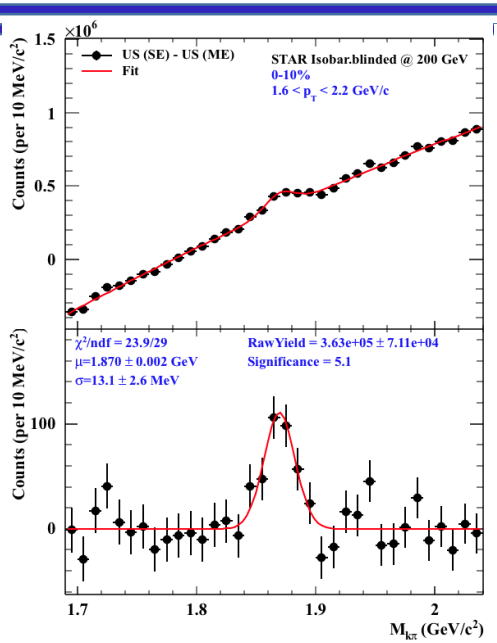
0-10%

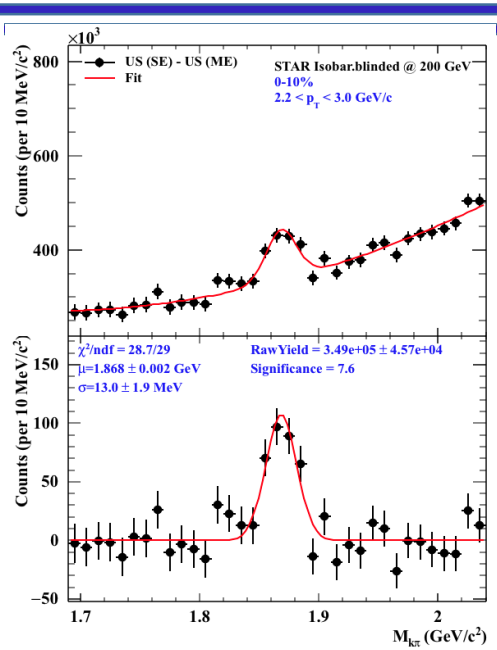
Back up

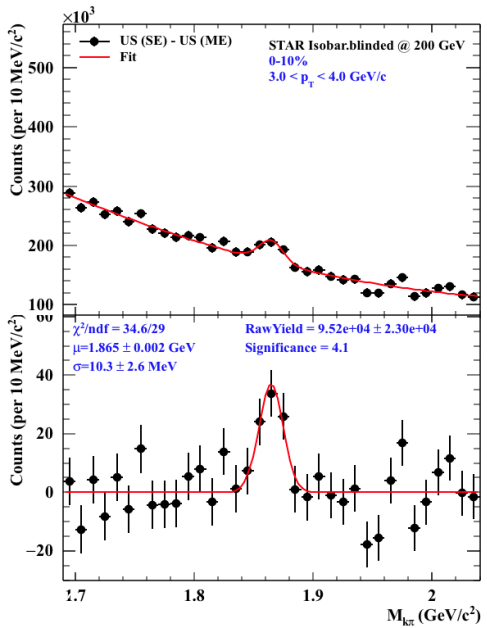

US (SE) - US (ME)
Fit
STAR Isobar.blinded @ 200 GeV
0-10%
0.0 < p_T < 0.7 GeV/c
χ²/ndf = 30.6/29
μ=1.864 ± 0.002 GeV
σ=10.7 ± 1.8 MeV
RawYield = 3.14e+05 ± 5.55e+04
Significance = 5.7
Counts (per 10 MeV/c²)
M_kπ (GeV/c²)

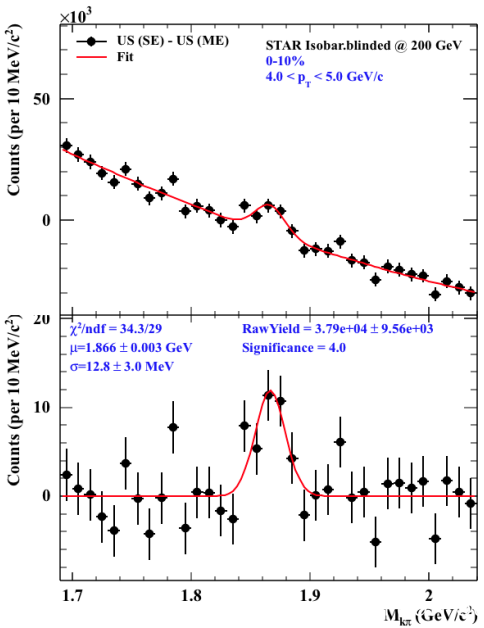

US (SE) - US (ME)
Fit
STAR Isobar.blinded @ 200 GeV
0-10%
0.7 < p_T < 1.1 GeV/c
χ²/ndf = 31.2/29
μ=1.866 ± 0.003 GeV
σ=12.0 ± 3.2 MeV
RawYield = 2.59e+05 ± 5.60e+04
Significance = 4.6
Counts (per 10 MeV/c²)
M_kπ (GeV/c²)

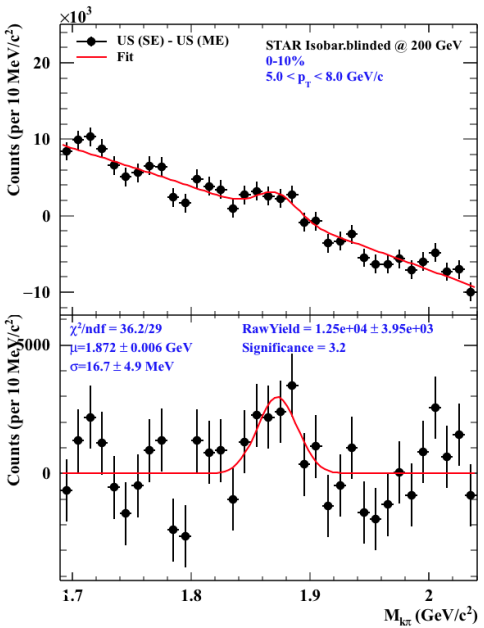

US (SE) - US (ME)
Fit
STAR Isobar.blinded @ 200 GeV
0-10%
1.1 < p_T < 1.6 GeV/c
χ²/ndf = 18.7/29
μ=1.867 ± 0.002 GeV
σ=14.6 ± 3.1 MeV
RawYield = 4.10e+05 ± 8.21e+04
Significance = 5.0
Counts (per 10 MeV/c²)
M_kπ (GeV/c²)

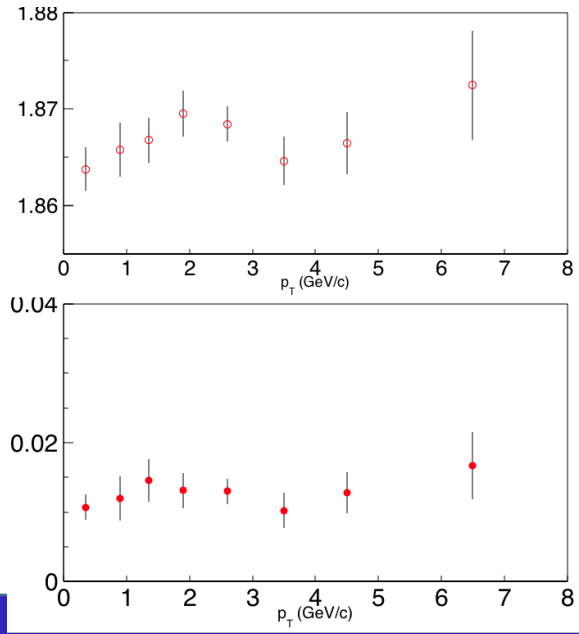

US (SE) - US (ME)
Fit
STAR Isobar.blinded @ 200 GeV
0-10%
1.6 < p_T < 2.2 GeV/c
χ²/ndf = 23.9/29
μ=1.870 ± 0.002 GeV
σ=13.1 ± 2.6 MeV
RawYield = 3.63e+05 ± 7.11e+04
Significance = 5.1
Counts (per 10 MeV/c²)
M_kπ (GeV/c²)


US (SE) - US (ME)
Fit
STAR Isobar.blinded @ 200 GeV
0-10%
2.2 < p_T < 3.0 GeV/c
χ²/ndf = 28.7/29
μ=1.868 ± 0.002 GeV
σ=13.0 ± 1.9 MeV
RawYield = 3.49e+05 ± 4.57e+04
Significance = 7.6
Counts (per 10 MeV/c²)
M_kπ (GeV/c²)


US (SE) - US (ME)
Fit
STAR Isobar.blinded @ 200 GeV
0-10%
3.0 < p_T < 4.0 GeV/c
χ²/ndf = 34.6/29
μ=1.865 ± 0.002 GeV
σ=10.3 ± 2.6 MeV
RawYield = 9.52e+04 ± 2.30e+04
Significance = 4.1
Counts (per 10 MeV/c²)
M_kπ (GeV/c²)

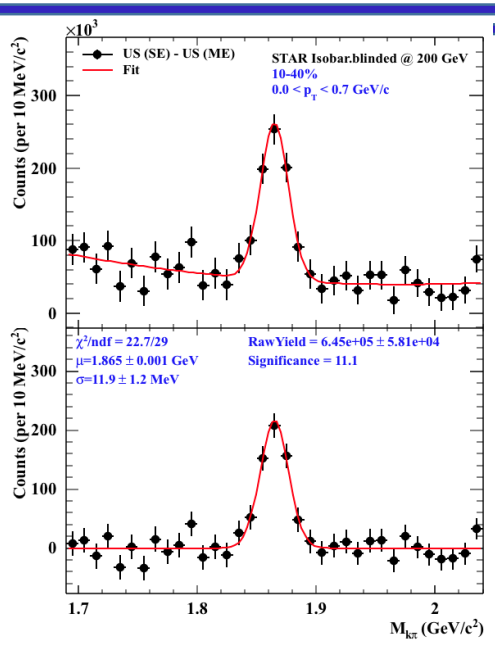

US (SE) - US (ME)
Fit
STAR Isobar.blinded @ 200 GeV
0-10%
4.0 < p_T < 5.0 GeV/c
χ²/ndf = 34.3/29
μ=1.866 ± 0.003 GeV
σ=12.8 ± 3.0 MeV
RawYield = 3.79e+04 ± 9.56e+03
Significance = 4.0
Counts (per 10 MeV/c²)
M_kπ (GeV/c²)

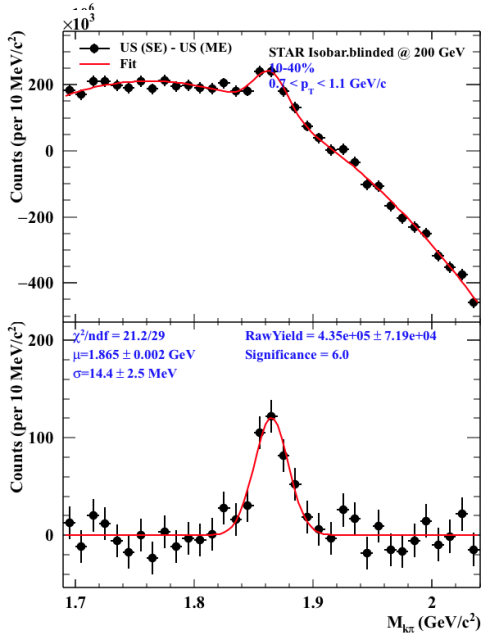

US (SE) - US (ME)
Fit
STAR Isobar.blinded @ 200 GeV
0-10%
5.0 < p_T < 8.0 GeV/c
χ²/ndf = 36.2/29
μ=1.872 ± 0.006 GeV
σ=16.7 ± 4.9 MeV
RawYield = 1.25e+04 ± 3.95e+03
Significance = 3.2
Counts (per 10 MeV/c²)
M_kπ (GeV/c²)

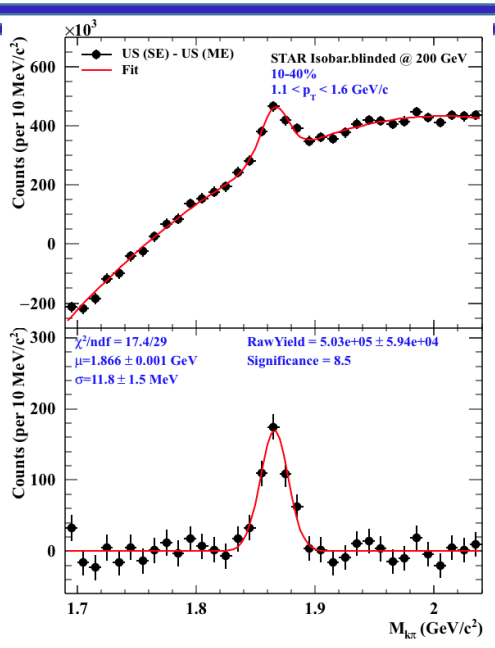

p_T (GeV/c)
p_T (GeV/c)

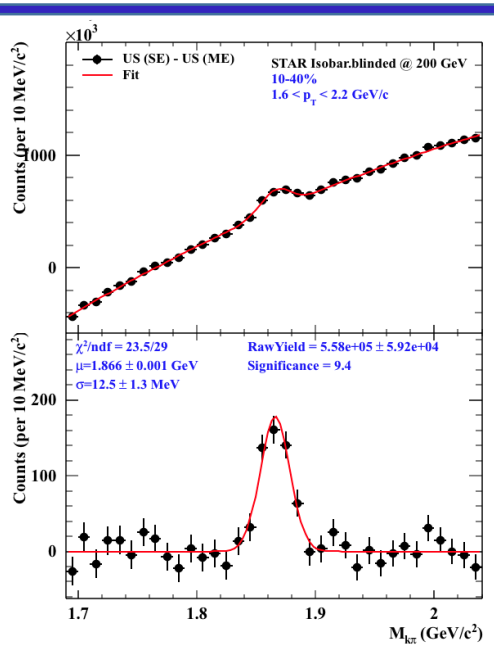
10-40%

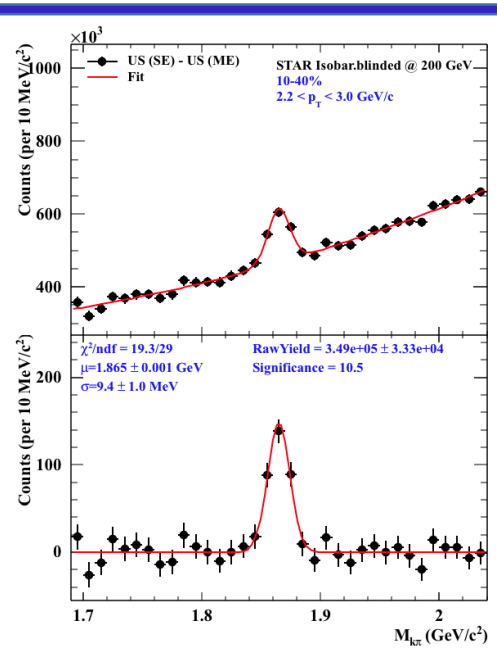
Back up

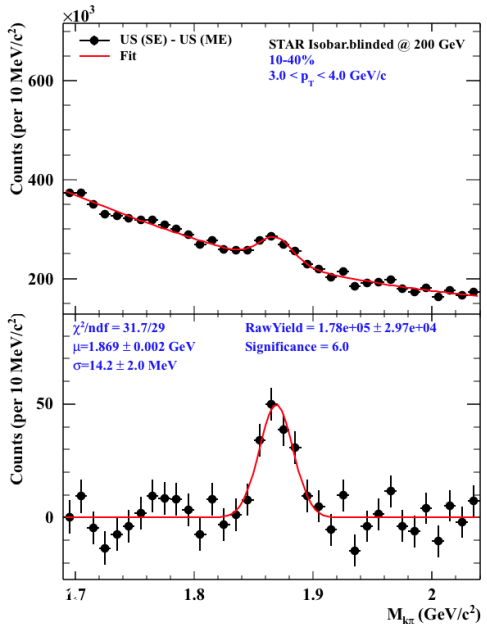


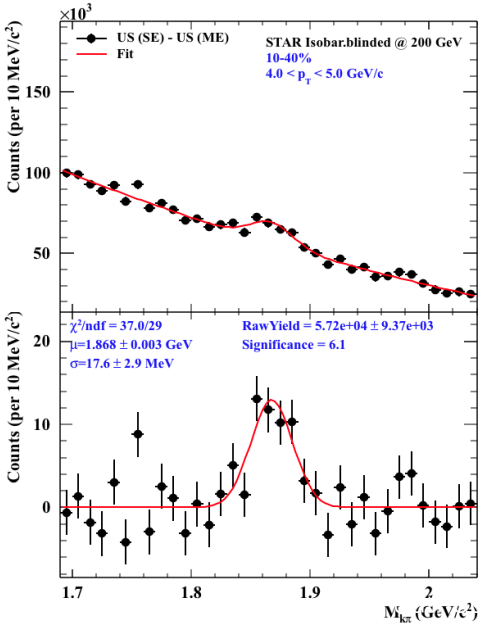


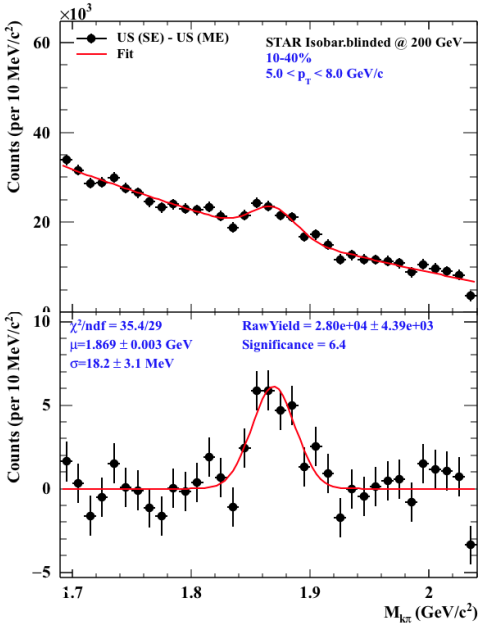


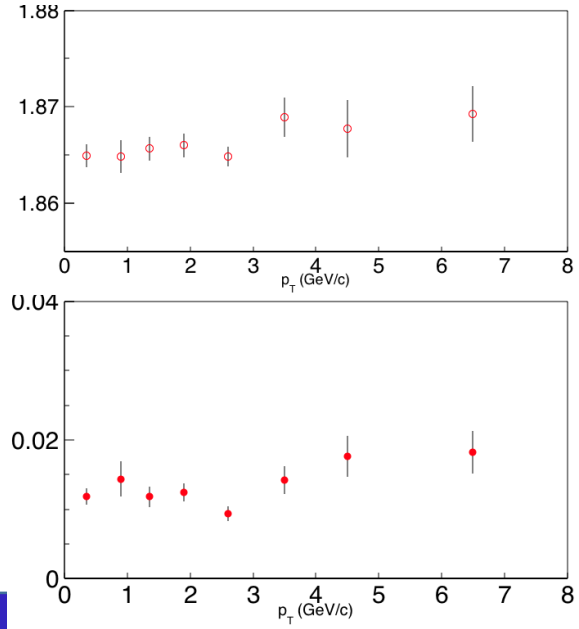








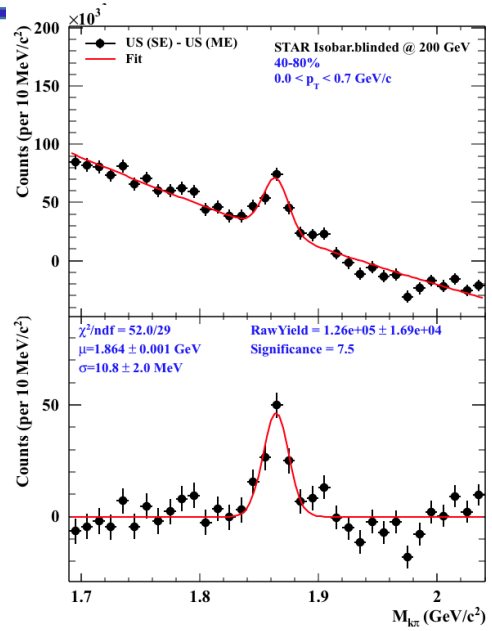


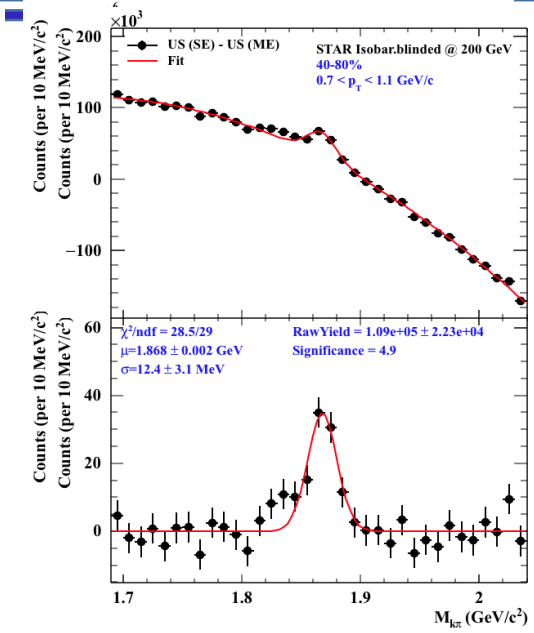


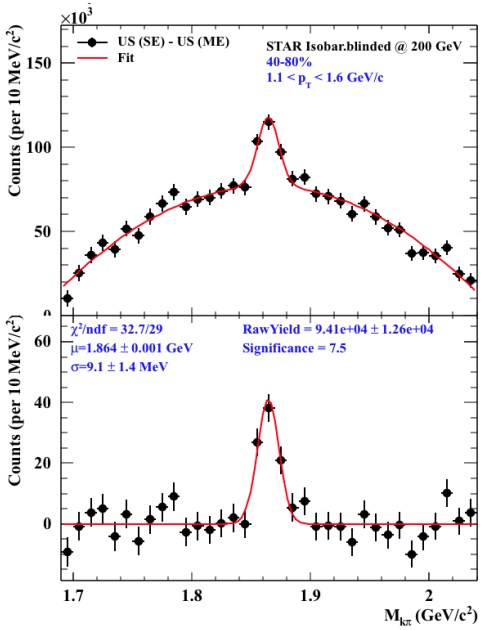
@ HF

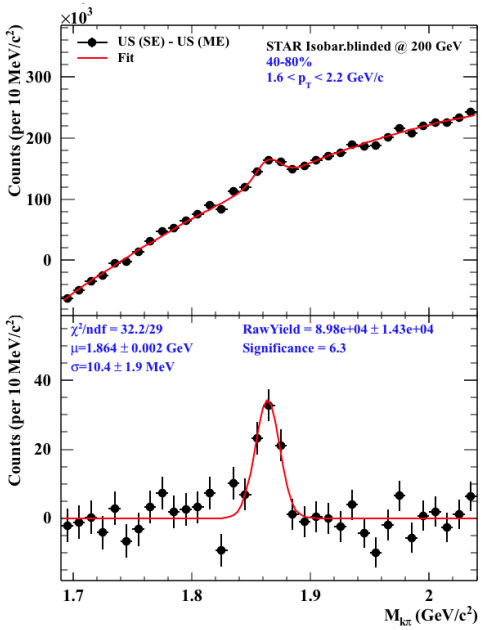
40-80%

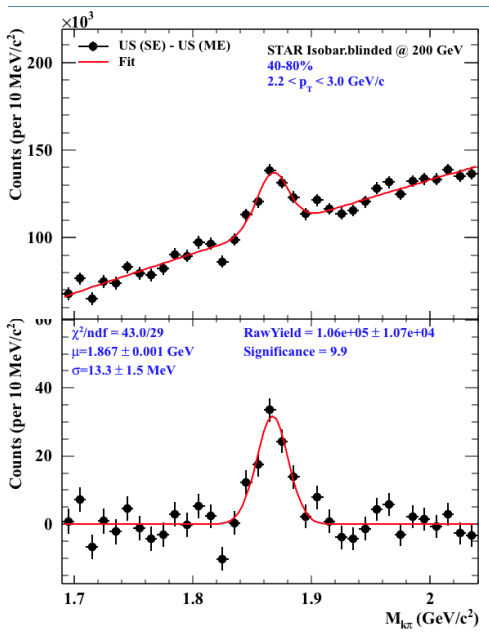
Back up

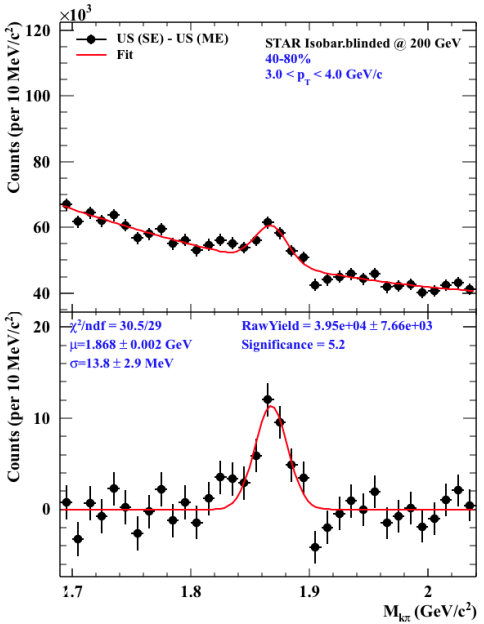

US (SE) - US (ME)
Fit
STAR Isobar.blinded @ 200 GeV
40-80%
0.0 < p_T < 0.7 GeV/c
χ²/ndf = 52.0/29
μ=1.864 ± 0.001 GeV
σ=10.8 ± 2.0 MeV
RawYield = 1.26e+05 ± 1.69e+04
Significance = 7.5
Counts (per 10 MeV/c²)
M_kπ (GeV/c²)

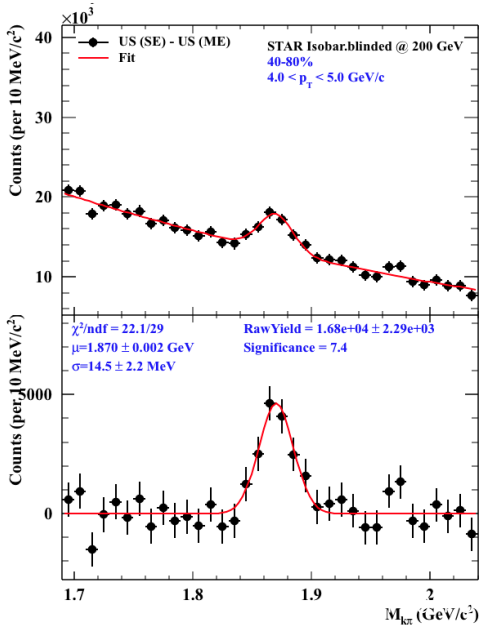

US (SE) - US (ME)
Fit
STAR Isobar.blinded @ 200 GeV
40-80%
0.7 < p_T < 1.1 GeV/c
χ²/ndf = 28.5/29
μ=1.868 ± 0.002 GeV
σ=12.4 ± 3.1 MeV
RawYield = 1.09e+05 ± 2.23e+04
Significance = 4.9
Counts (per 10 MeV/c²)
M_kπ (GeV/c²)

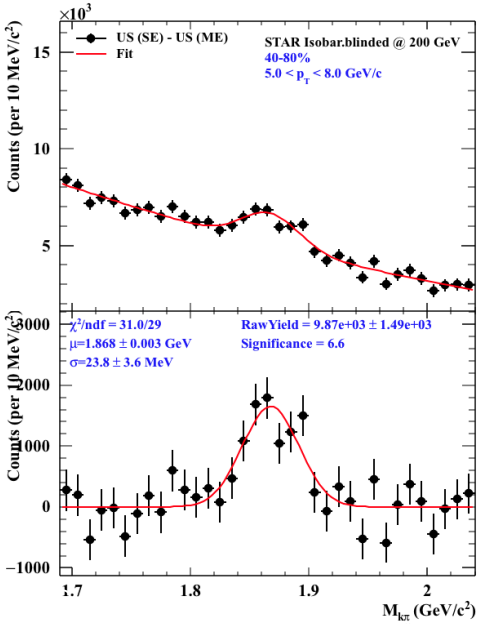

US (SE) - US (ME)
Fit
STAR Isobar.blinded @ 200 GeV
40-80%
1.1 < p_T < 1.6 GeV/c
χ²/ndf = 32.7/29
μ=1.864 ± 0.001 GeV
σ=9.1 ± 1.4 MeV
RawYield = 9.41e+04 ± 1.26e+04
Significance = 7.5
Counts (per 10 MeV/c²)
M_kπ (GeV/c²)

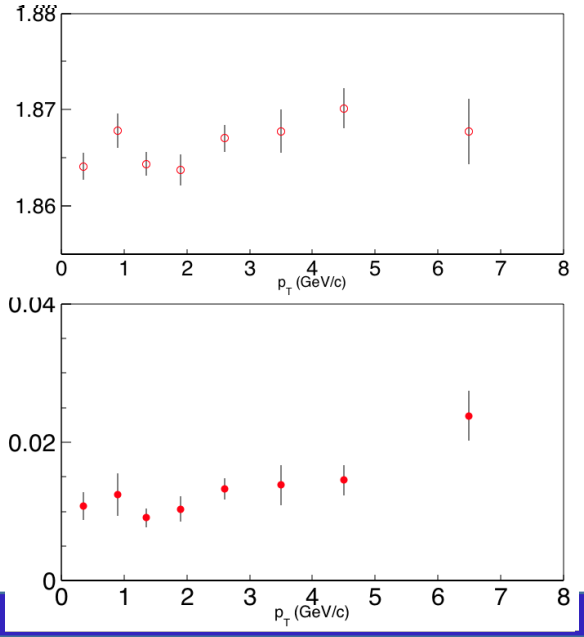

US (SE) - US (ME)
Fit
STAR Isobar.blinded @ 200 GeV
40-80%
1.6 < p_T < 2.2 GeV/c
χ²/ndf = 32.2/29
μ=1.864 ± 0.002 GeV
σ=10.4 ± 1.9 MeV
RawYield = 8.98e+04 ± 1.43e+04
Significance = 6.3
Counts (per 10 MeV/c²)
M_kπ (GeV/c²)


US (SE) - US (ME)
Fit
STAR Isobar.blinded @ 200 GeV
40-80%
2.2 < p_T < 3.0 GeV/c
χ²/ndf = 43.0/29
μ=1.867 ± 0.001 GeV
σ=13.3 ± 1.5 MeV
RawYield = 1.06e+05 ± 1.07e+04
Significance = 9.9
Counts (per 10 MeV/c²)
M_kπ (GeV/c²)

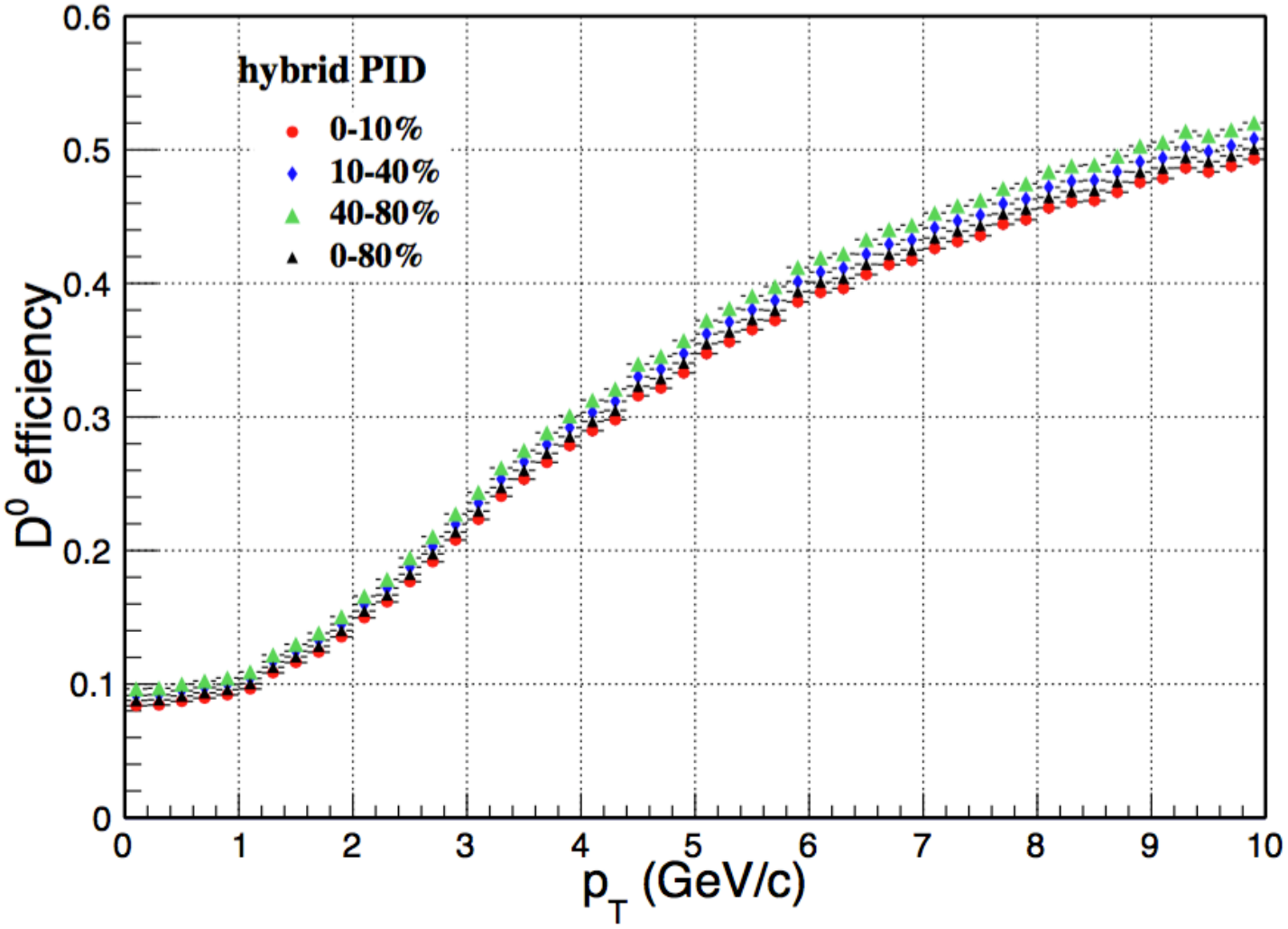

US (SE) - US (ME)
Fit
STAR Isobar.blinded @ 200 GeV
40-80%
3.0 < p_T < 4.0 GeV/c
χ²/ndf = 30.5/29
μ=1.868 ± 0.002 GeV
σ=13.8 ± 2.9 MeV
RawYield = 3.95e+04 ± 7.66e+03
Significance = 5.2
Counts (per 10 MeV/c²)
M_kπ (GeV/c²)


US (SE) - US (ME)
Fit
STAR Isobar.blinded @ 200 GeV
40-80%
4.0 < p_T < 5.0 GeV/c
χ²/ndf = 22.1/29
μ=1.870 ± 0.002 GeV
σ=14.5 ± 2.2 MeV
RawYield = 1.68e+04 ± 2.29e+03
Significance = 7.4
Counts (per 10 MeV/c²)
M_kπ (GeV/c²)


US (SE) - US (ME)
Fit
STAR Isobar.blinded @ 200 GeV
40-80%
5.0 < p_T < 8.0 GeV/c
χ²/ndf = 31.0/29
μ=1.868 ± 0.003 GeV
σ=23.8 ± 3.6 MeV
RawYield = 9.87e+03 ± 1.49e+03
Significance = 6.6
Counts (per 10 MeV/c²)
M_kπ (GeV/c²)


p_T (GeV/c)
p_T (GeV/c)

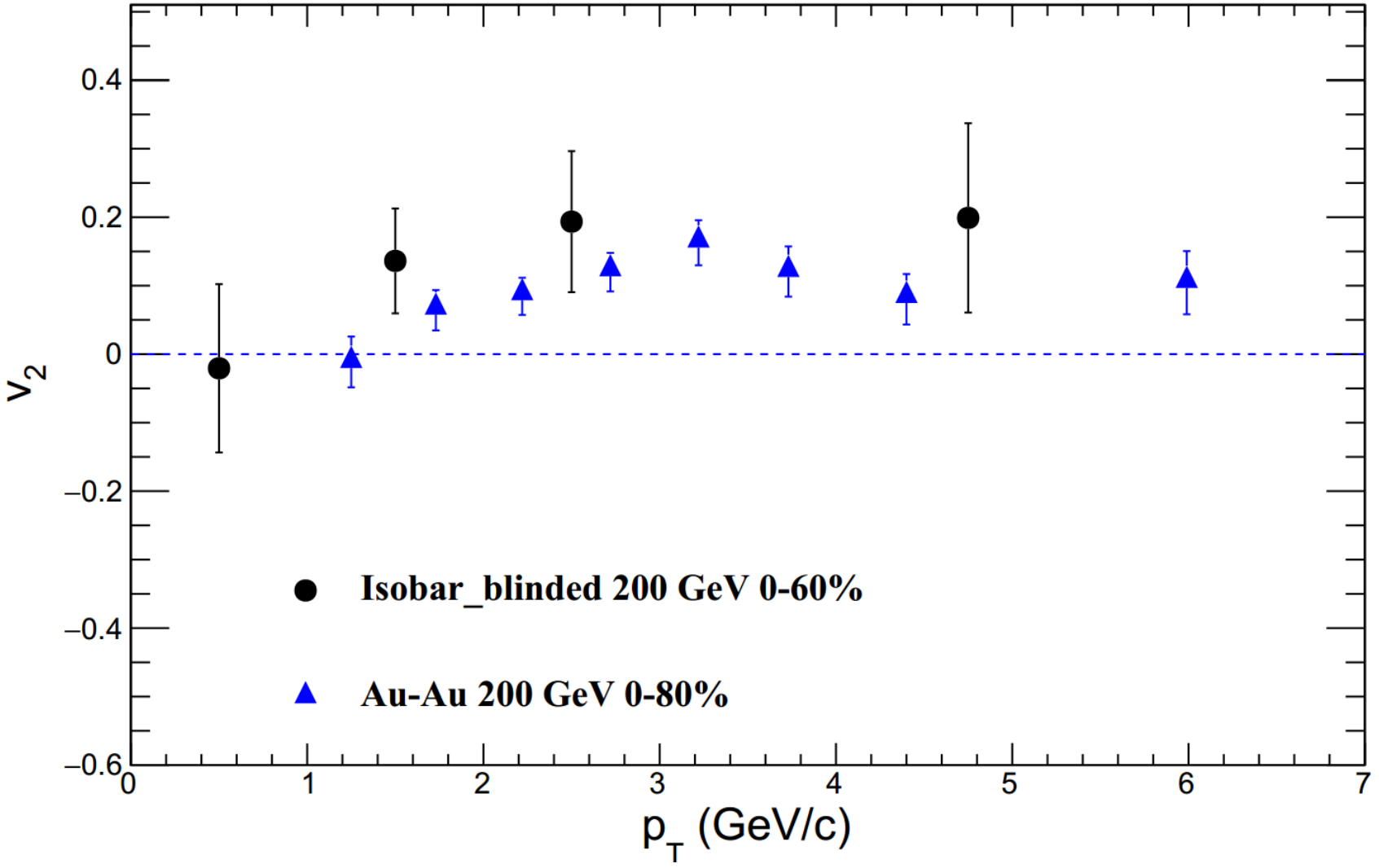
Back up



$p_T > 0.2\ GeV/c$

Back up

D^0 v_2 in Isobar



K^- embedding QA 200 GeV Isobar Run18

/star/embed/embedding/*/st_physics_adc_*.MuDst.root

Number of events: 615140 / 389191

5 K^- per event

Event Cuts:

$-35 < V_Z < 25$ cm, $|\Delta V_Z| < 3$ cm

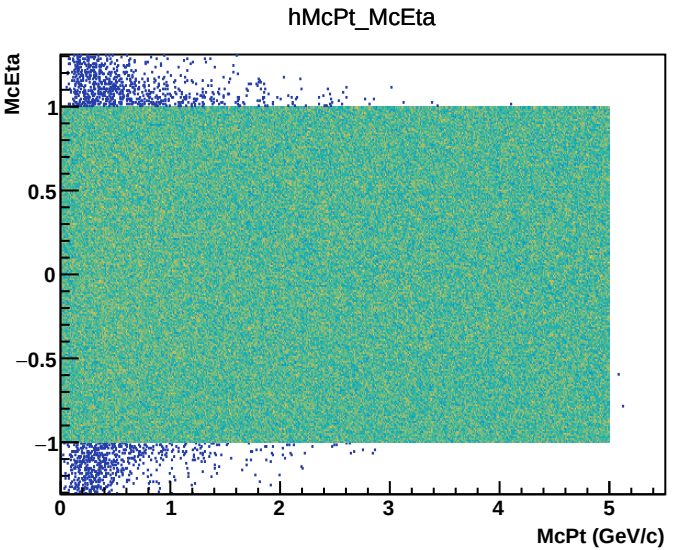
Track Cuts:

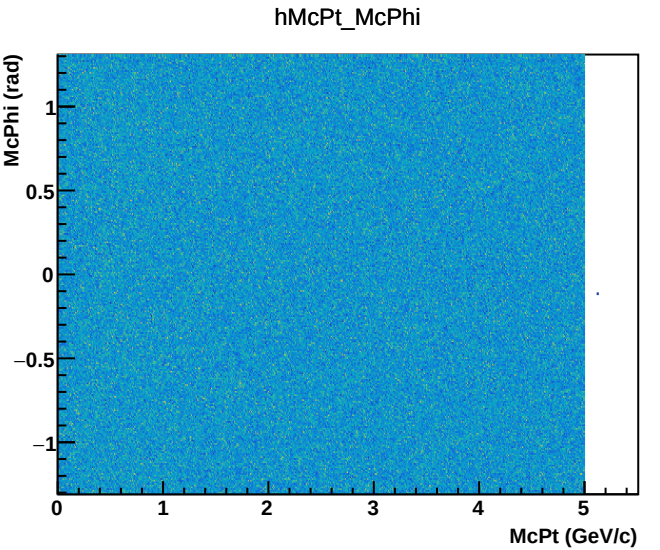
Primary tracks

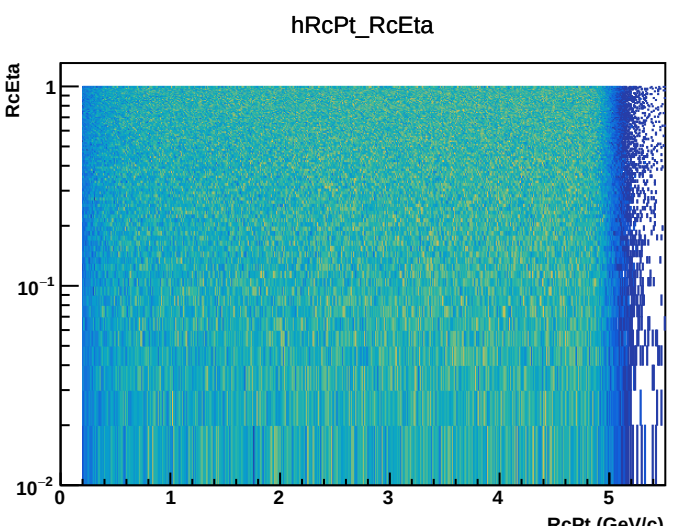
$p_T > 0.2$ GeV, $|\eta| < 1$

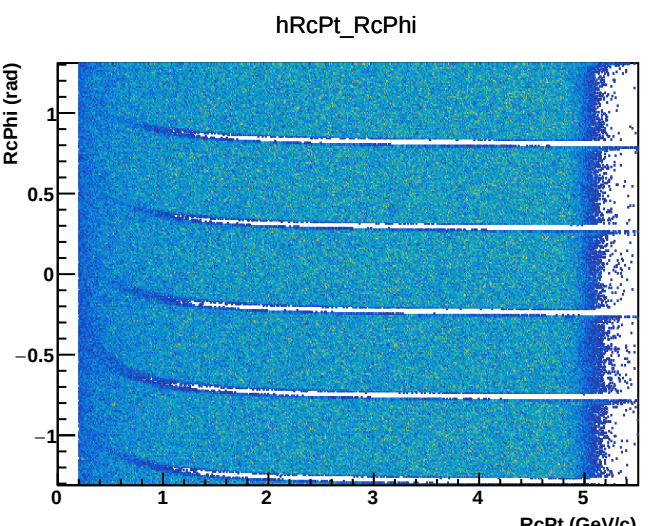
nHits > 15, nHitdedx > 10, nHits/nPoss > 0.52

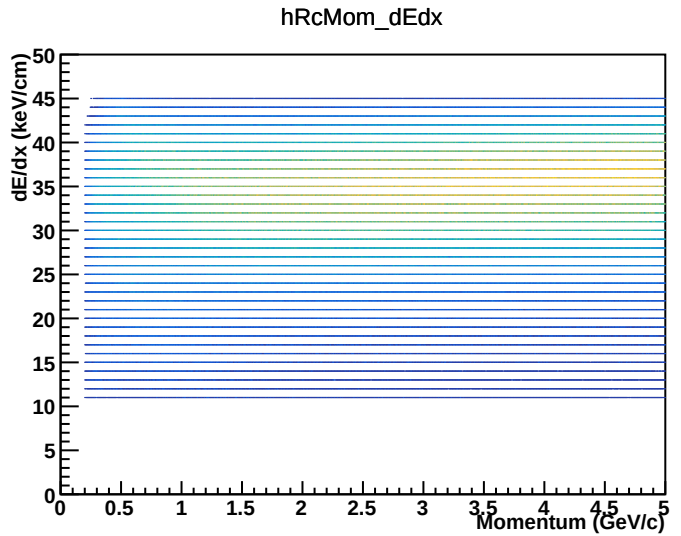
gDca < 2.0 cm

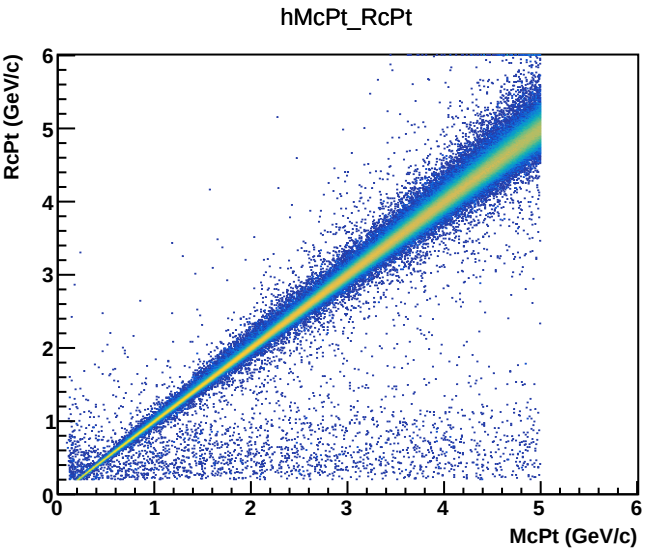

hMcPt_McEta
McEta
1
0.5
0
−0.5
−1
0
1
2
3
4
5
McPt (GeV/c)

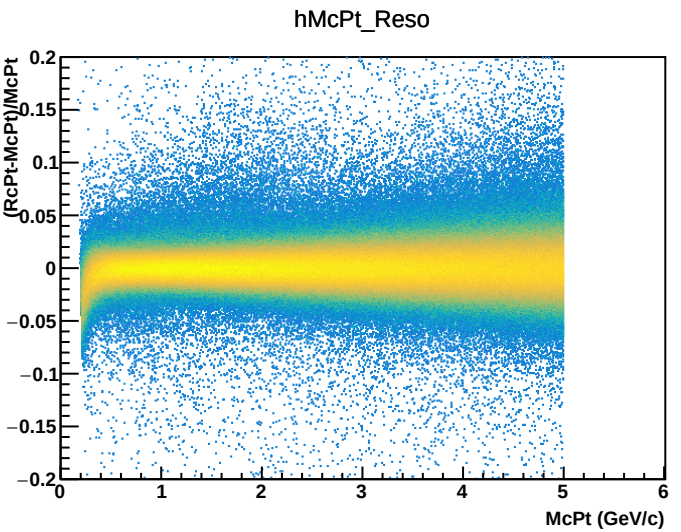

hMcPt_McPhi
McPhi (rad)
1
0.5
0
−0.5
−1
0
1
2
3
4
5
McPt (GeV/c)

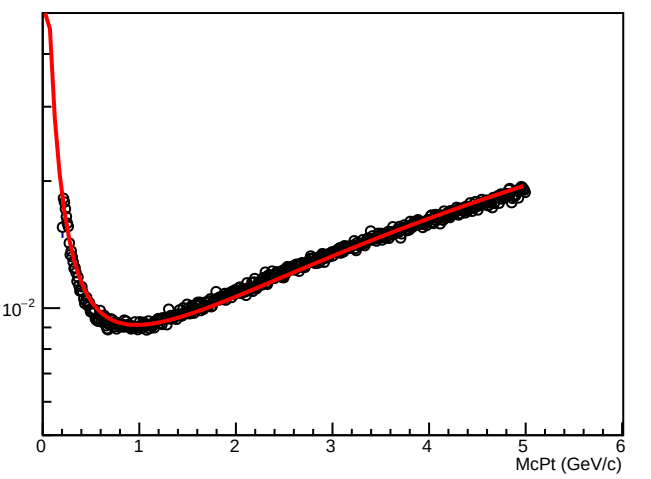

hRcPt_RcEta
RcEta
1
10^{-1}
10^{-2}
0
1
2
3
4
5
RcPt (GeV/c)

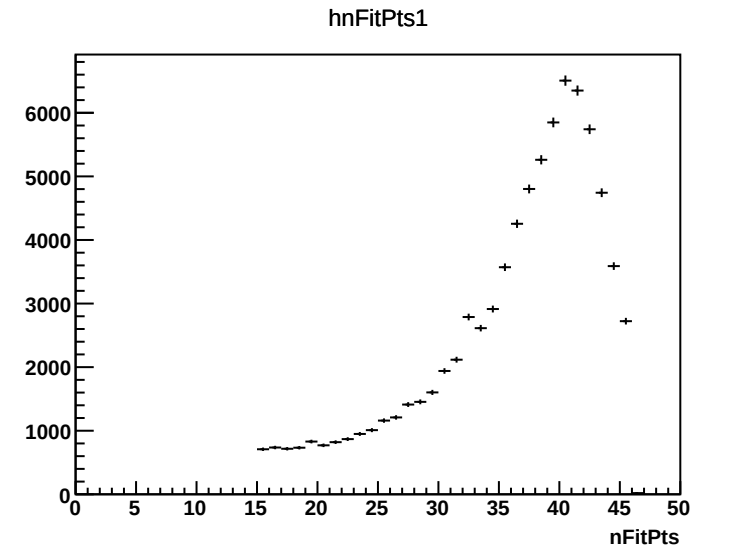

hRcPt_RcPhi
RcPhi (rad)
1
0.5
0
−0.5
−1
0
1
2
3
4
5
RcPt (GeV/c)

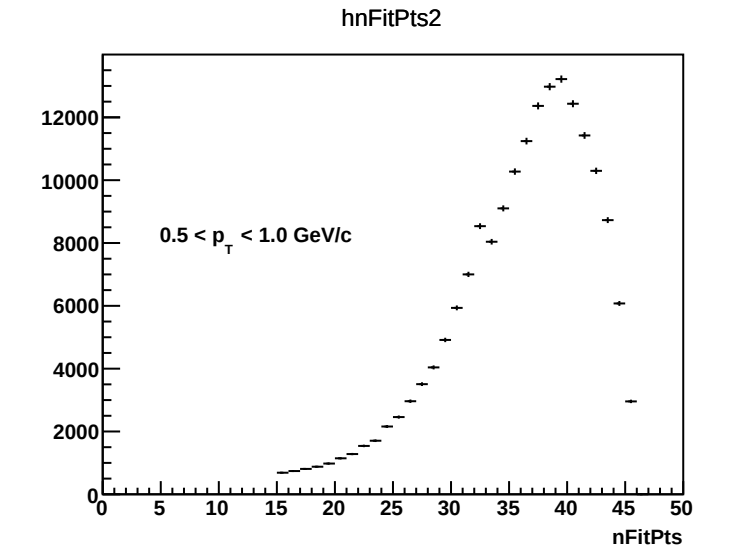

hRcMom_dEdx
dE/dx (keV/cm)
Momentum (GeV/c)

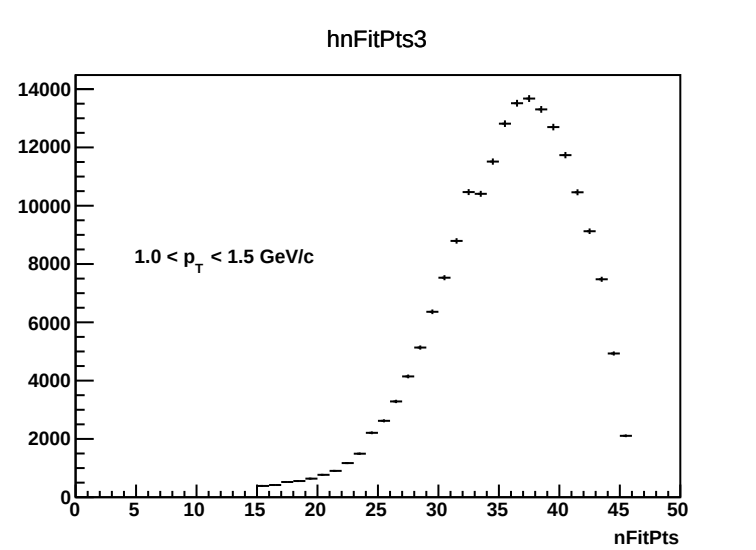

hMcPt_RcPt
RcPt (GeV/c)
McPt (GeV/c)

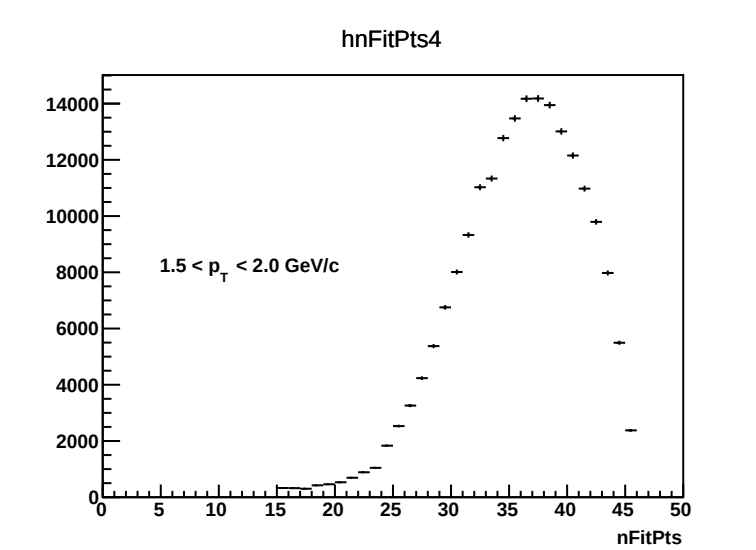

hMcPt_Reso
(RcPt-McPt)/McPt
McPt (GeV/c)


10^{-2}
McPt (GeV/c)

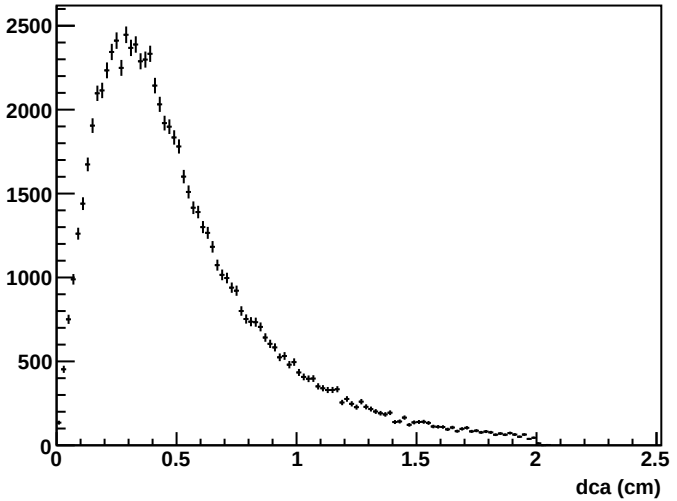

hnFitPts1
nFitPts


hnFitPts2
0.5 < p_T < 1.0 GeV/c
nFitPts

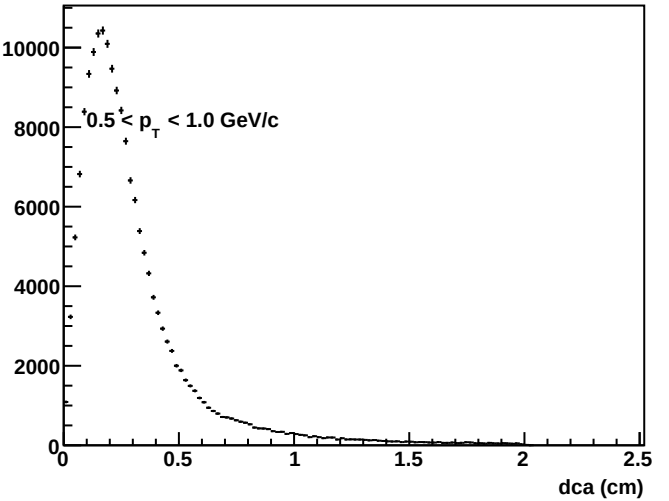

hnFitPts3
1.0 < p_T < 1.5 GeV/c
nFitPts


hnFitPts4
1.5 < p_T < 2.0 GeV/c
nFitPts

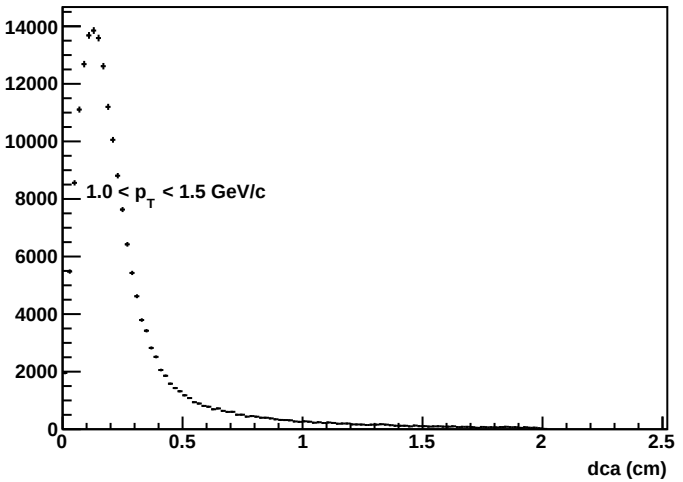
hdca1



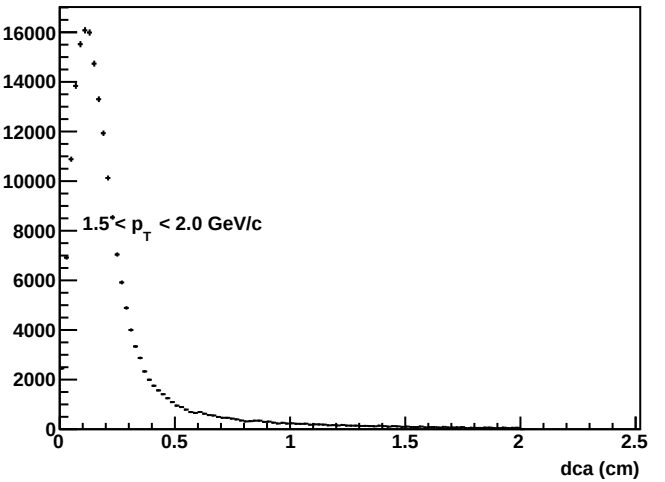
hdca2

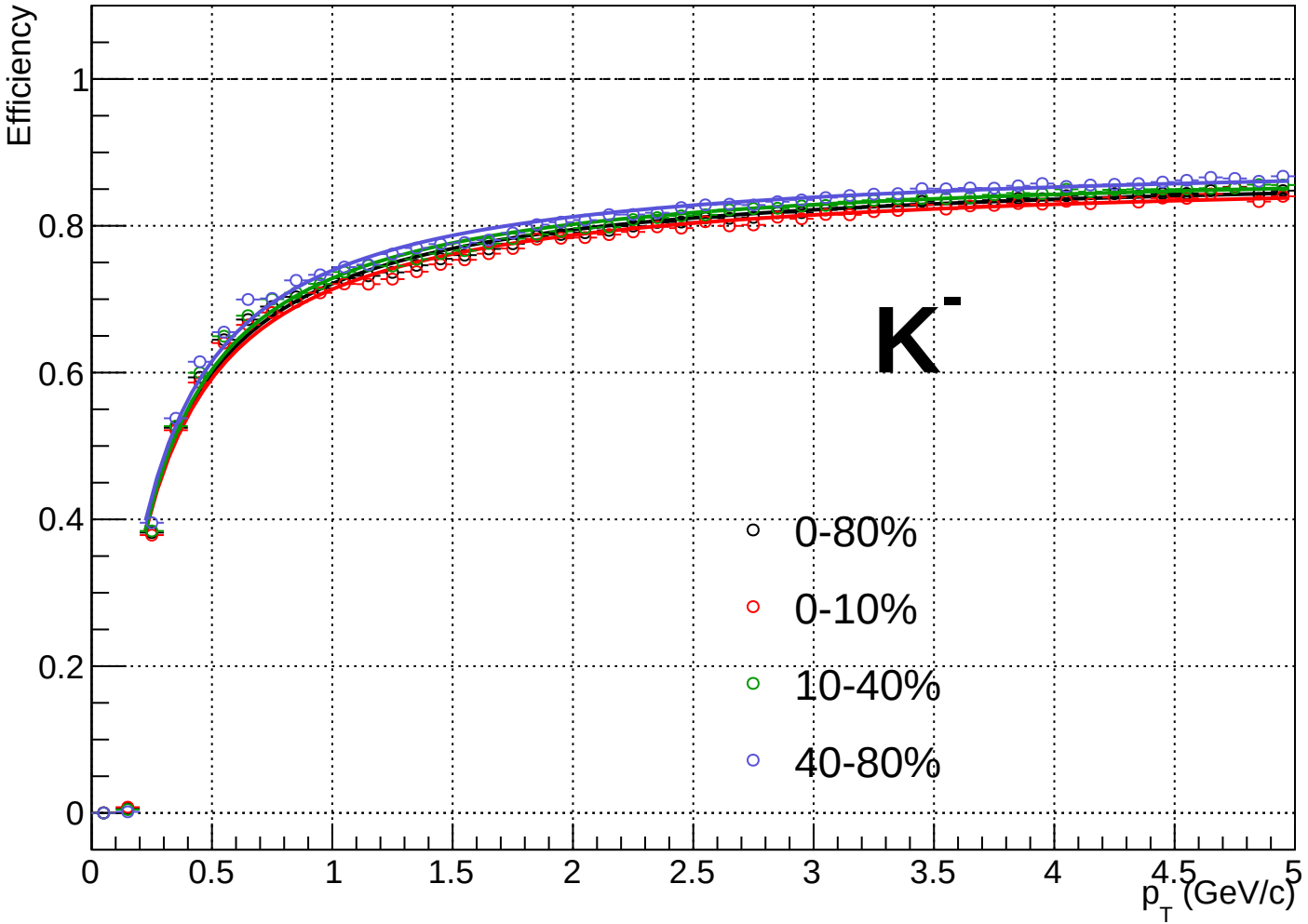


hdca3



hdca4




Efficiency
1
0.8
0.6
0.4
0.2
0
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
p_T (GeV/c)
K^-
0-80%
0-10%
10-40%
40-80%

π^+ embedding QA 200 GeV Isobar Run18

/star/embed/embedding/*/st_physics_adc_*.MuDst.root

Number of events: 614245 / 388602

5 π^+ per event

Event Cuts:

$-35 < V_z < 25$ cm, $|\Delta V_z| < 3$ cm

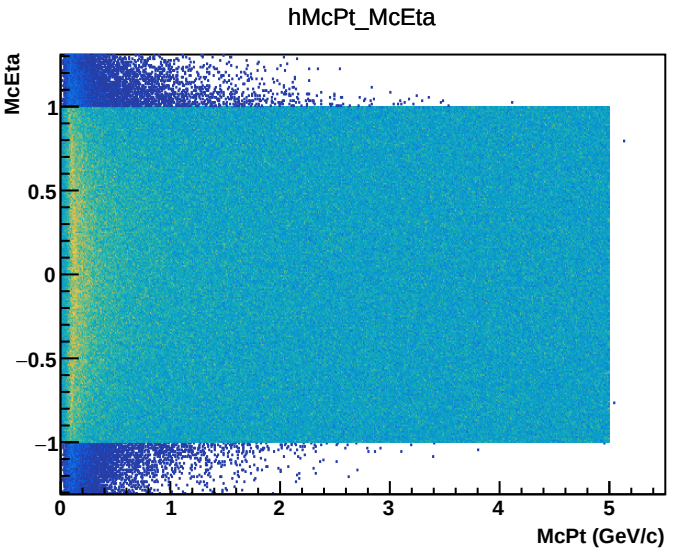
Track Cuts:

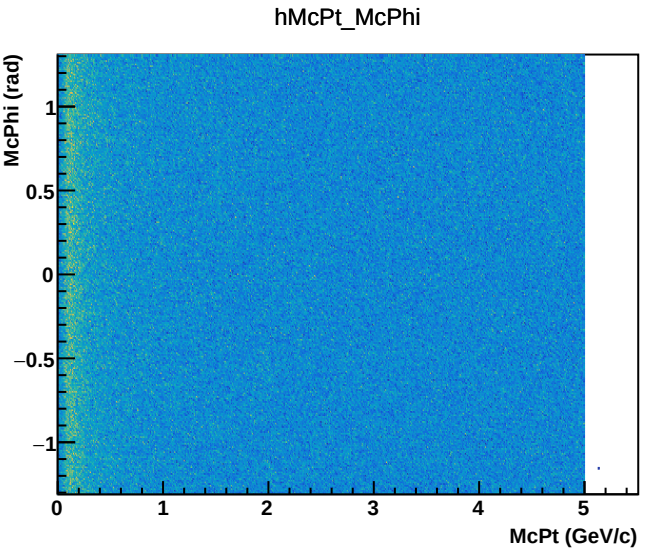
Primary tracks

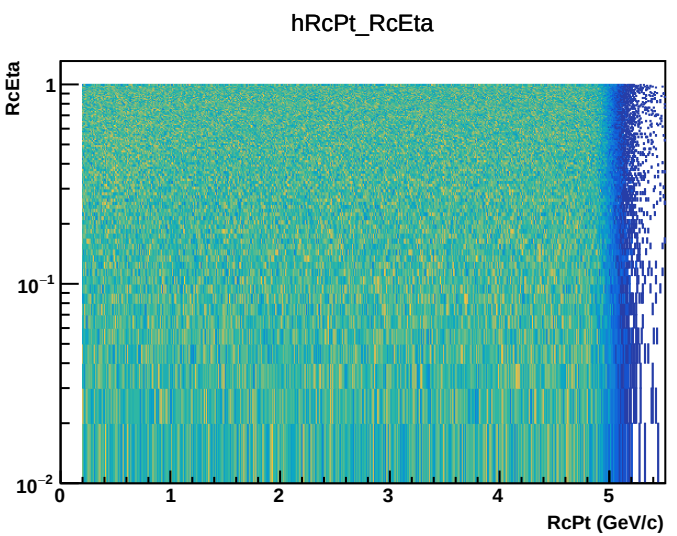
$p_T > 0.2$ GeV, $|\eta| < 1$

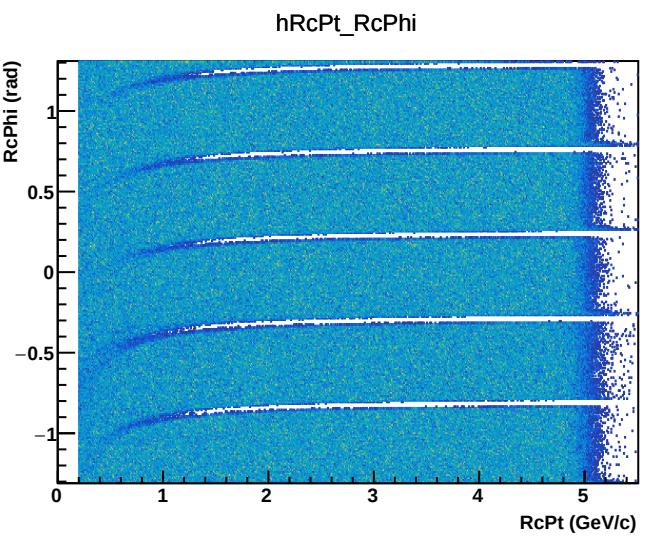
nHits > 15, nHitdedx > 10, nHits/nPoss > 0.52

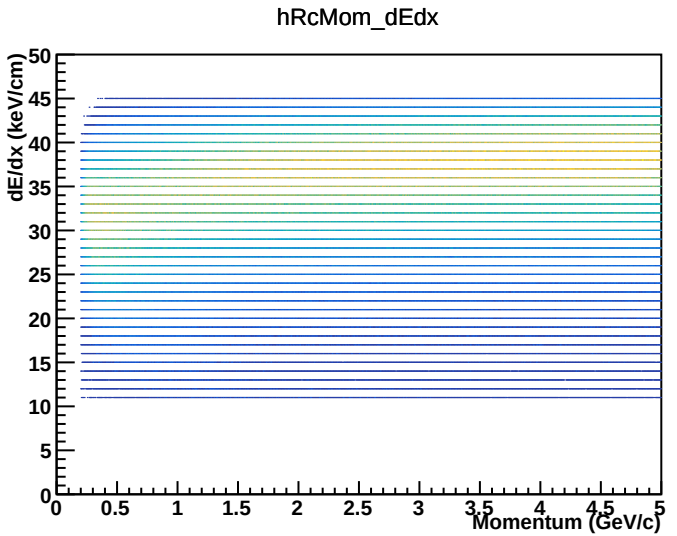
gDca < 2.0 cm

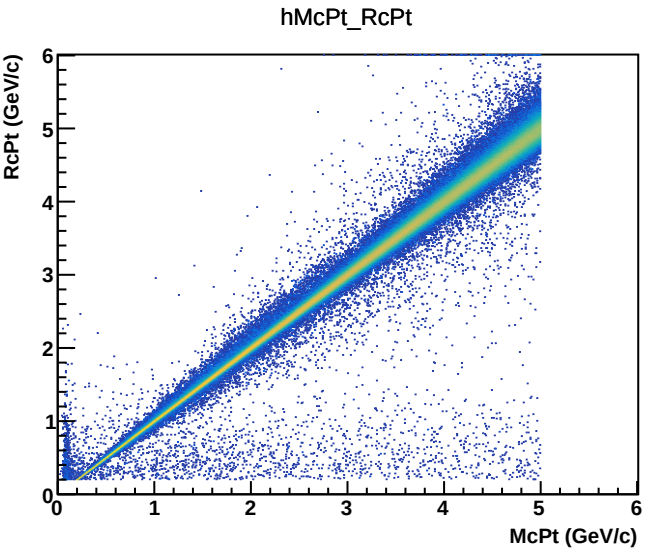

hMcPt_McEta
McEta
1
0.5
0
−0.5
−1
0
1
2
3
4
5
McPt (GeV/c)

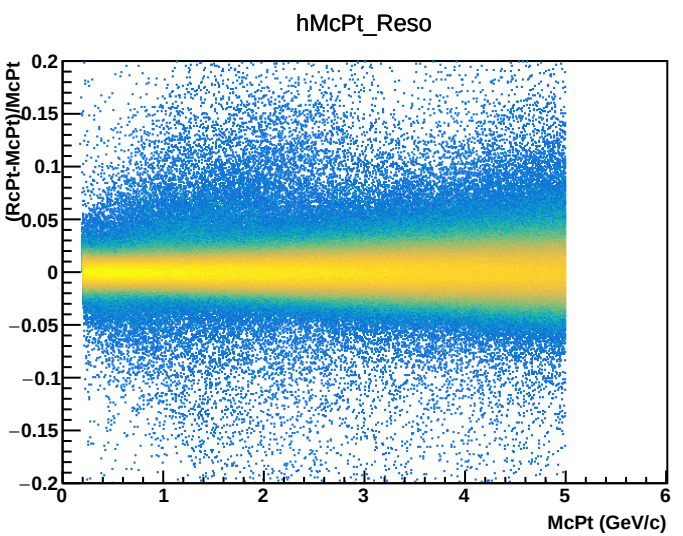

hMcPt_McPhi
McPhi (rad)
1
0.5
0
−0.5
−1
0
1
2
3
4
5
McPt (GeV/c)

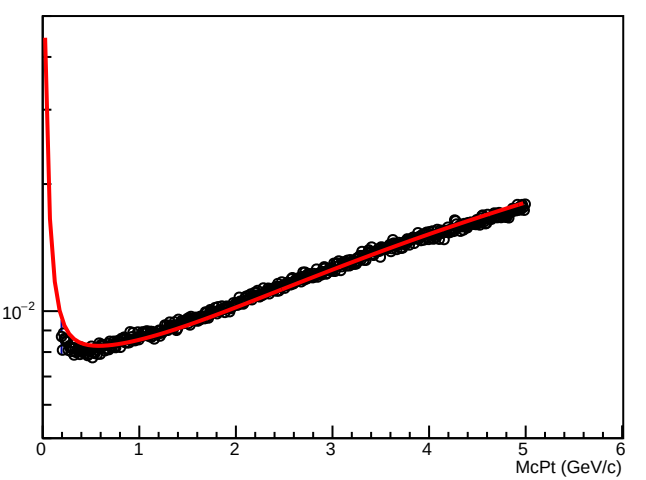

hRcPt_RcEta
RcEta
1
10^{-1}
10^{-2}
0
1
2
3
4
5
RcPt (GeV/c)

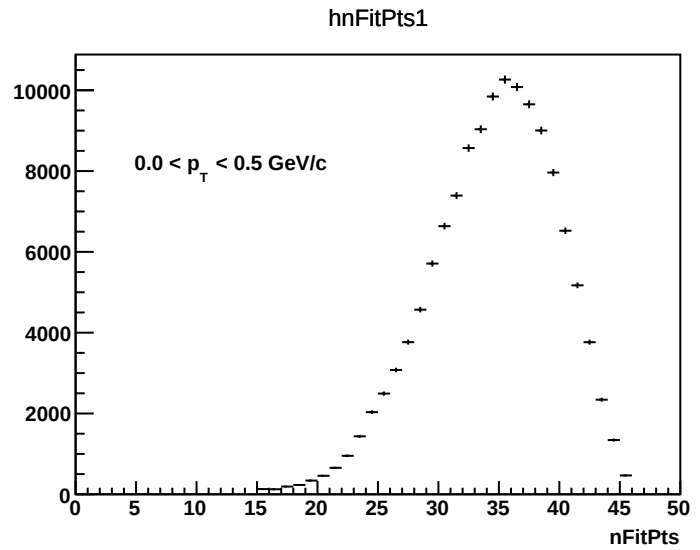

hRcPt_RcPhi
RcPhi (rad)
1
0.5
0
−0.5
−1
0
1
2
3
4
5
RcPt (GeV/c)

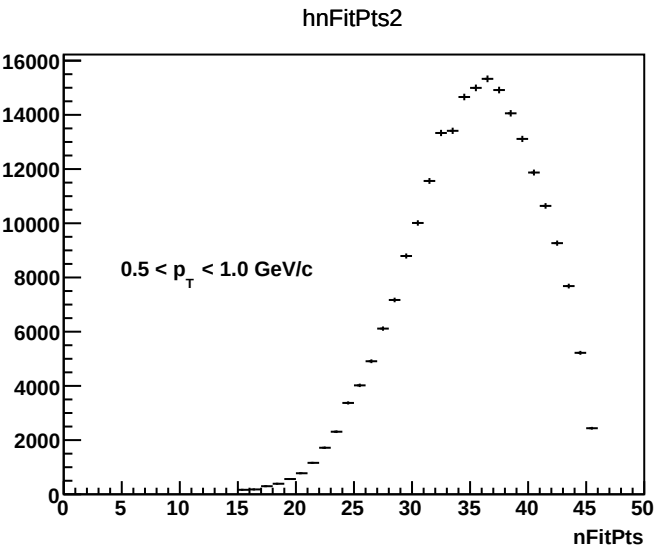

hRcMom_dEdx
dE/dx (keV/cm)
Momentum (GeV/c)

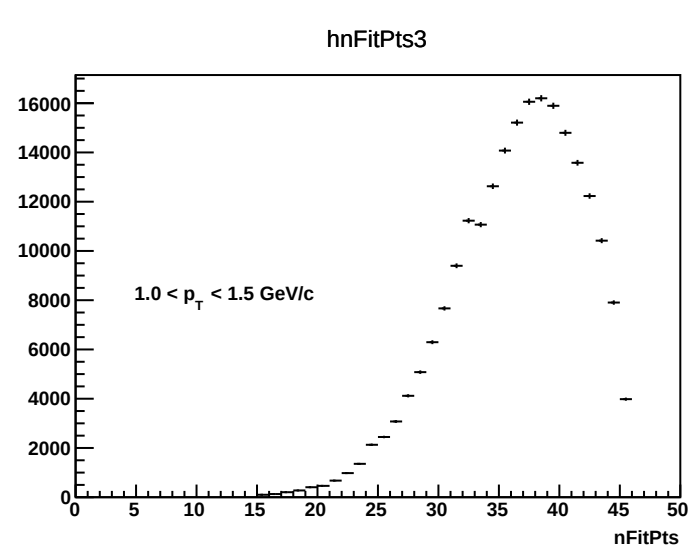

hMcPt_RcPt
RcPt (GeV/c)
McPt (GeV/c)

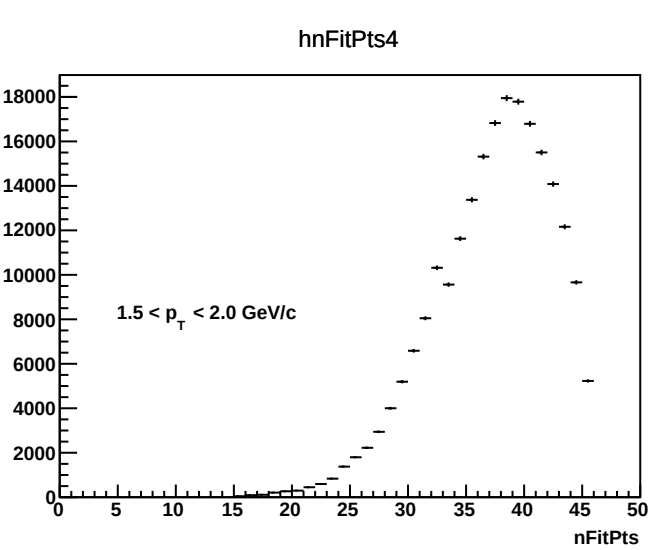

hMcPt_Reso
(RcPt-McPt)/McPt
McPt (GeV/c)

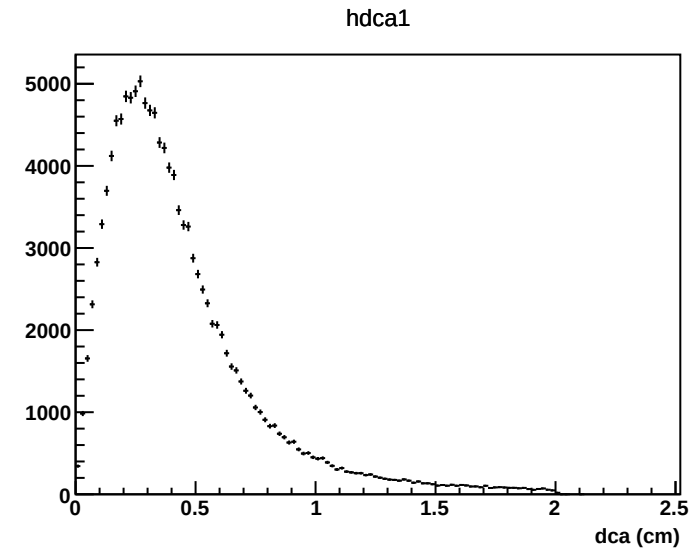

10^{-2}
McPt (GeV/c)

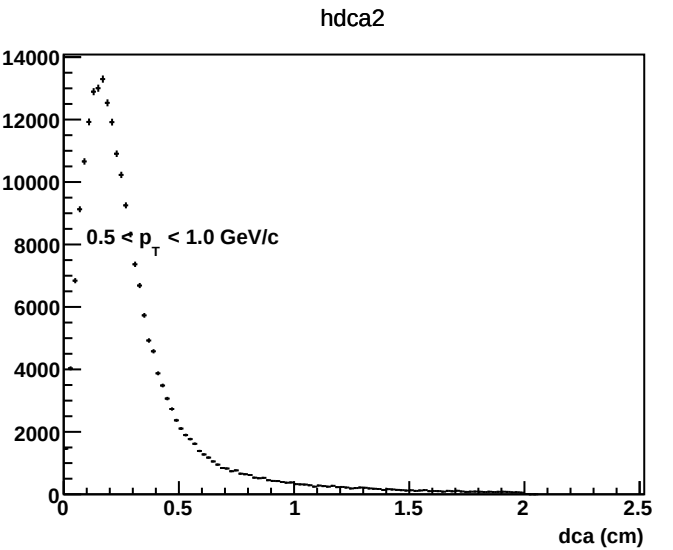

hnFitPts1
0.0 < p_T < 0.5 GeV/c
nFitPts

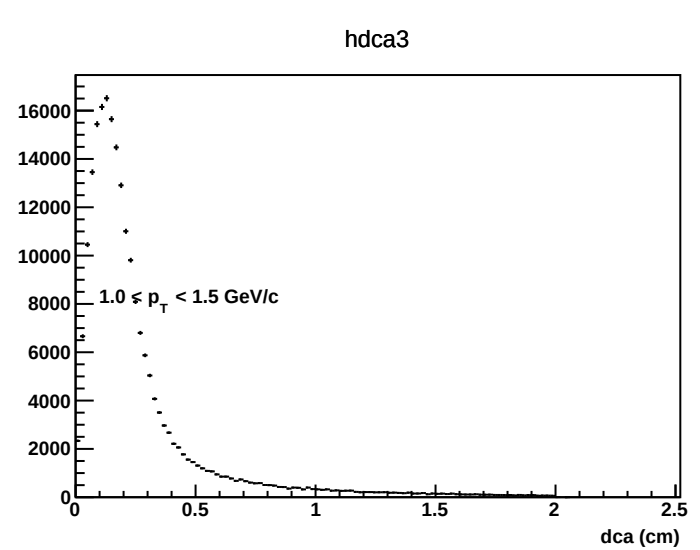

hnFitPts2
0.5 < p_T < 1.0 GeV/c
nFitPts

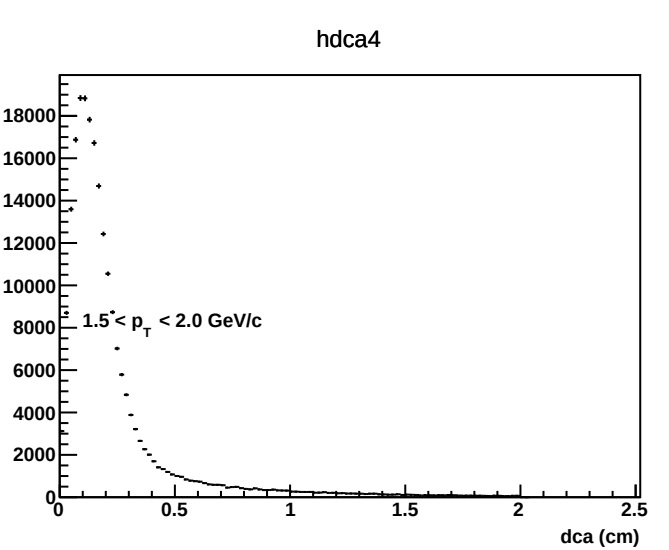

hnFitPts3
1.0 < p_T < 1.5 GeV/c
nFitPts

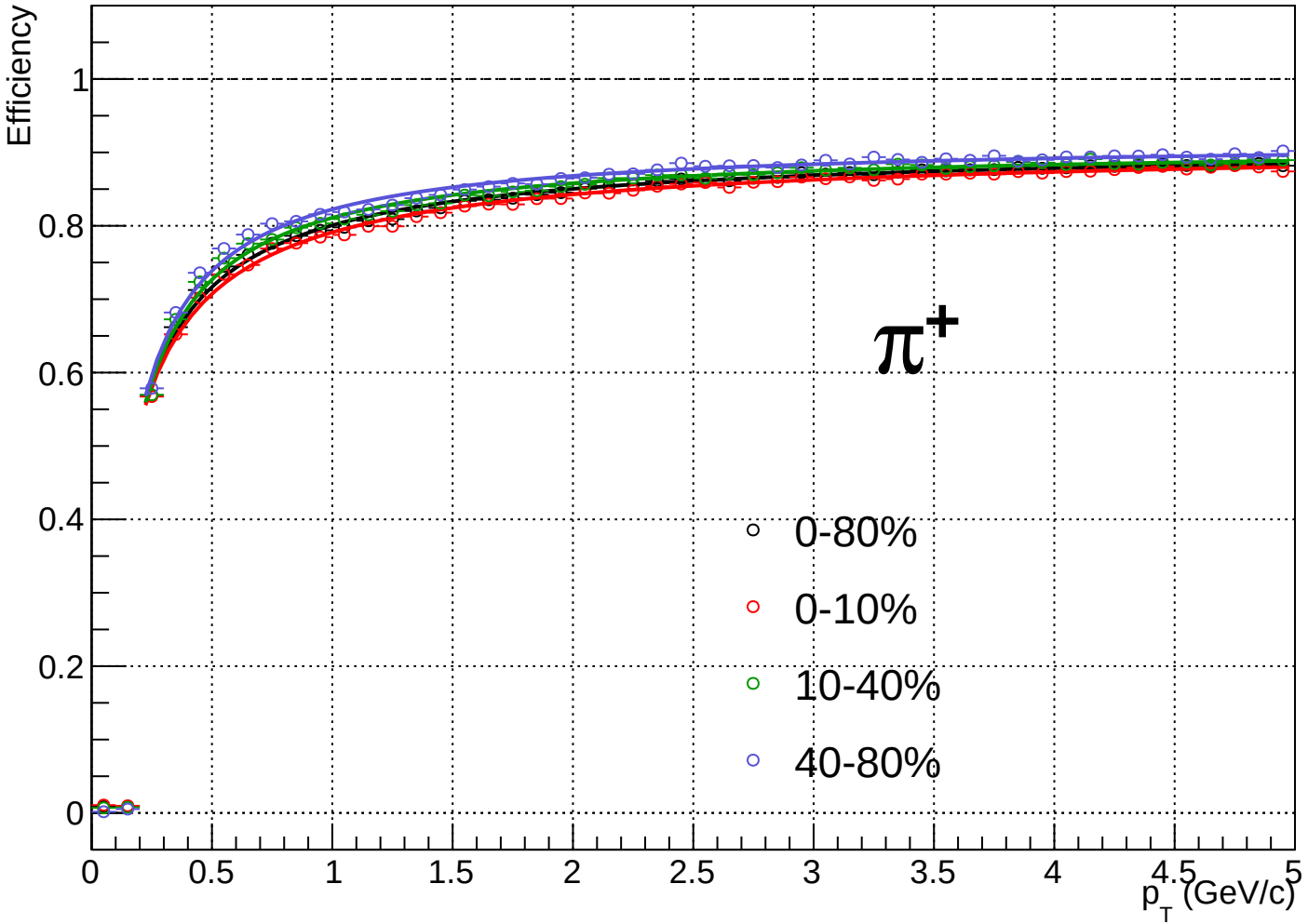

hnFitPts4
1.5 < p_T < 2.0 GeV/c
nFitPts


hdca1
5000
4000
3000
2000
1000
0
0
0.5
1
1.5
2
2.5
dca (cm)


hdca2
14000
12000
10000
8000
6000
4000
2000
0
0.5 < p_T < 1.0 GeV/c
0
0.5
1
1.5
2
2.5
dca (cm)


hdca3
16000
14000
12000
10000
8000
6000
4000
2000
0
1.0 < p_T < 1.5 GeV/c
0
0.5
1
1.5
2
2.5
dca (cm)


hdca4
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
1.5 < p_T < 2.0 GeV/c
0
0.5
1
1.5
2
2.5
dca (cm)


Efficiency
1
0.8
0.6
0.4
0.2
0
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
p_T (GeV/c)
π^+
0-80%
0-10%
10-40%
40-80%

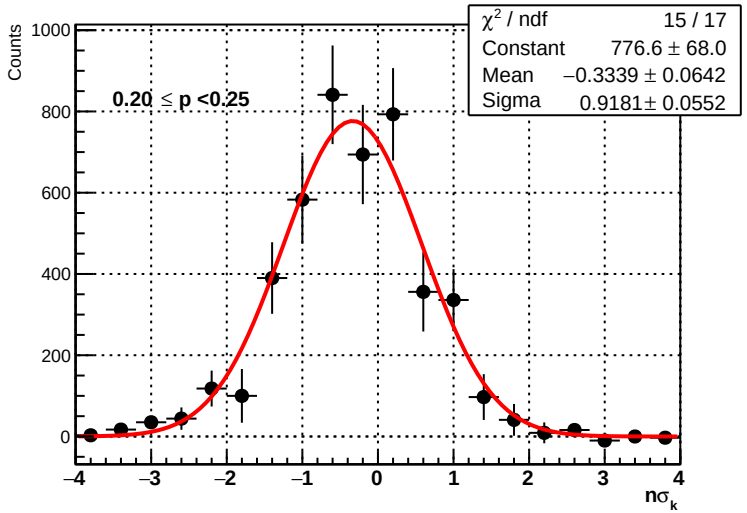
k PID and efficiency in Zr+Zr 200 GeV

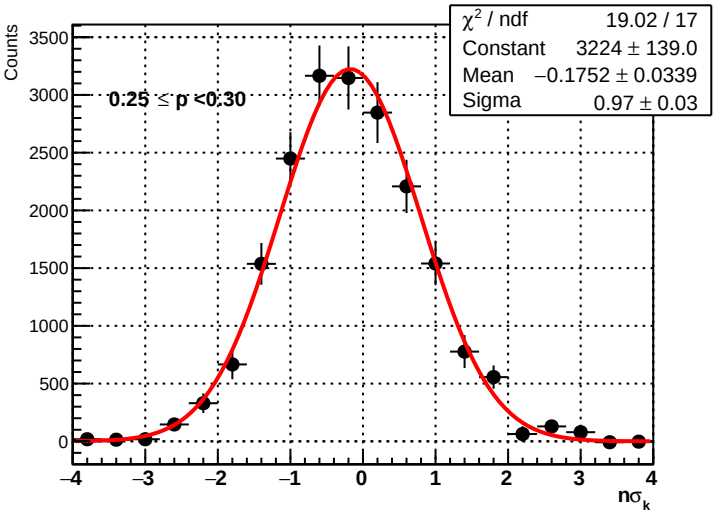
Target k

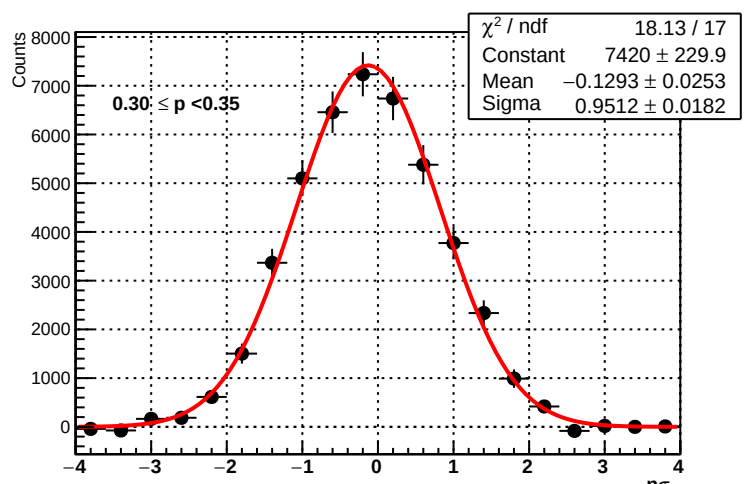
- $p_T > 0.5$
- $|\eta| < 1$
- nHitsFit ≥ 20
- ndEdx > 15
- gDca < 2
- $|n\sigma_\pi| < 2.0$
- $|n\sigma_\pi^{TOF}| < 2.0$

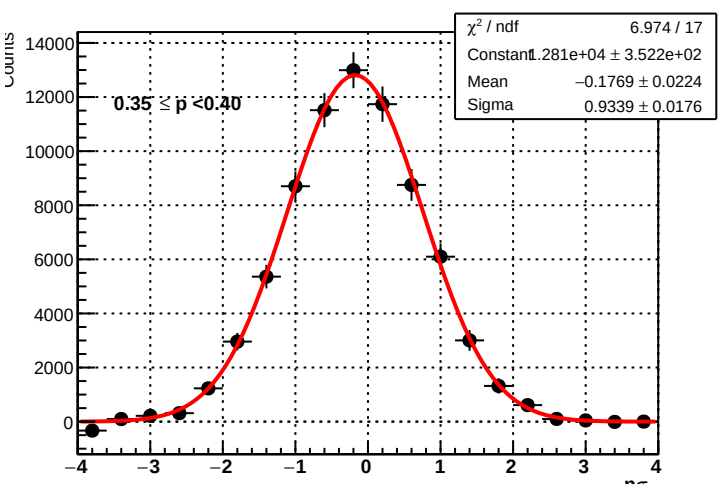
Partner k

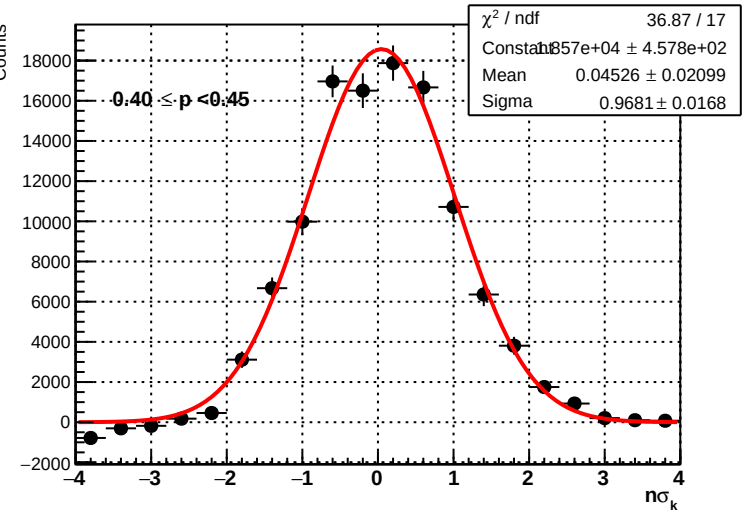
- $p_T > 0.2$
- $|\eta| < 1$
- nHitsFit ≥ 20
- ndEdx > 15
- gDca < 2.
- $|n\sigma_\pi| < 4.0$
- $|n\sigma_\pi^{TOF}| < 4.0$

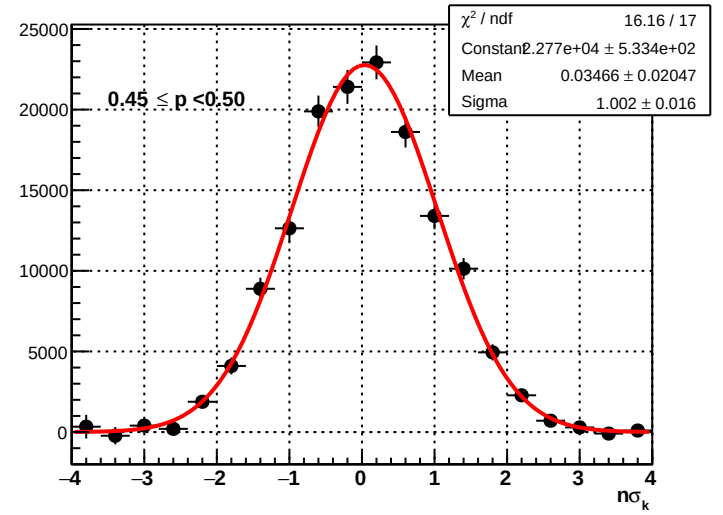

Counts
0.20 ≤ p <0.25
χ² / ndf 15 / 17
Constant 776.6 ± 68.0
Mean −0.3339 ± 0.0642
Sigma 0.9181± 0.0552
nσ_k

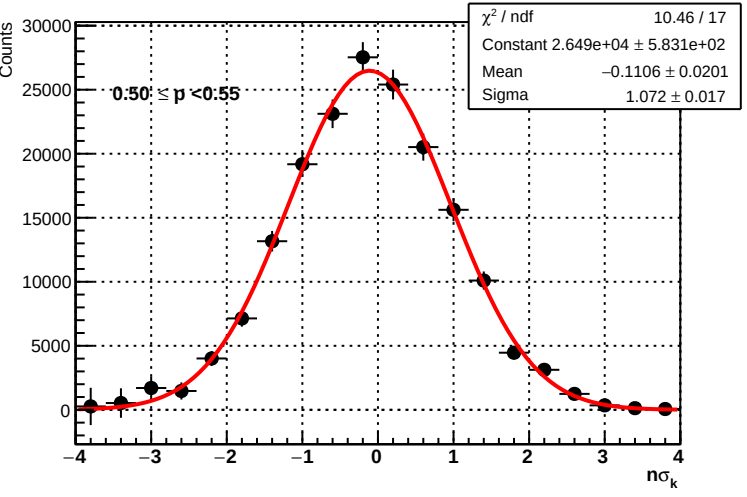

Counts
0.25 ≤ p <0.30
χ² / ndf 19.02 / 17
Constant 3224 ± 139.0
Mean −0.1752 ± 0.0339
Sigma 0.97 ± 0.03
nσ_k

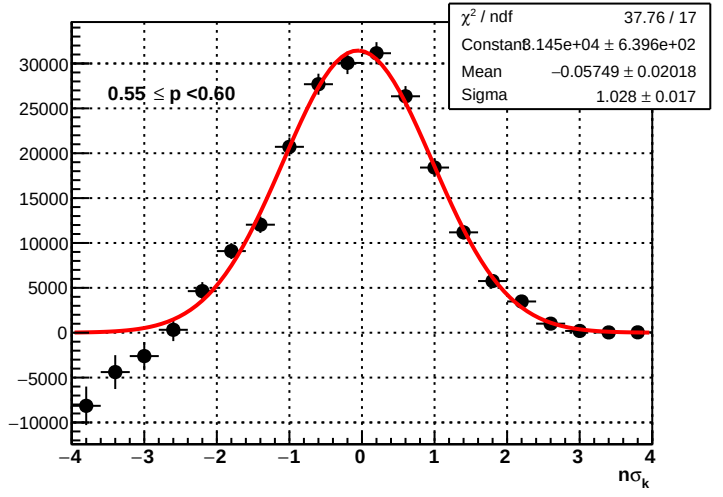

Counts
0.30 ≤ p <0.35
χ² / ndf 18.13 / 17
Constant 7420 ± 229.9
Mean −0.1293 ± 0.0253
Sigma 0.9512 ± 0.0182
nσ_k

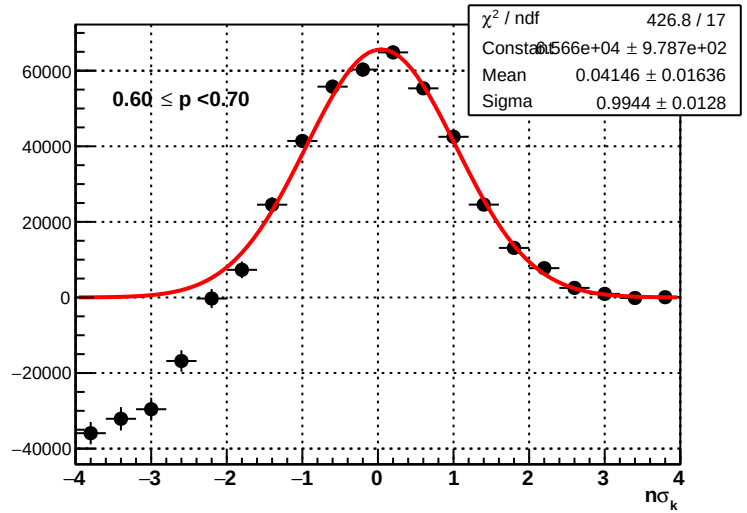

Counts
0.35 ≤ p <0.40
χ² / ndf 6.974 / 17
Constant 1.281e+04 ± 3.522e+02
Mean −0.1769 ± 0.0224
Sigma 0.9339 ± 0.0176
nσ_k

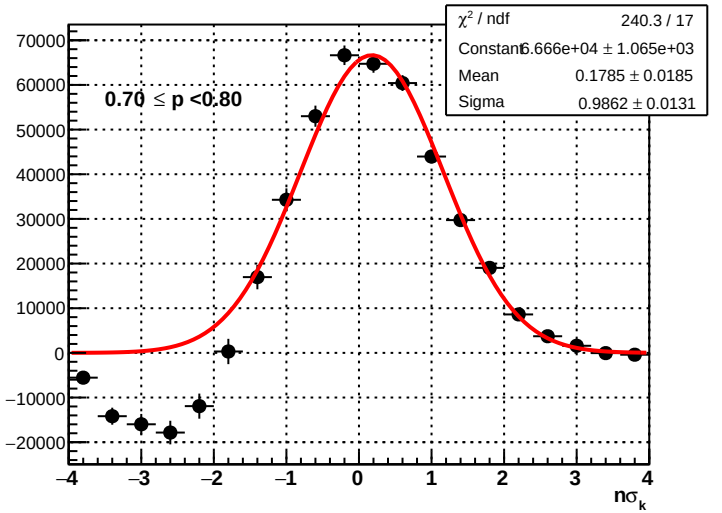

Counts
0.40 ≤ p <0.45
χ² / ndf 36.87 / 17
Constant 1.857e+04 ± 4.578e+02
Mean 0.04526 ± 0.02099
Sigma 0.9681 ± 0.0168
nσk

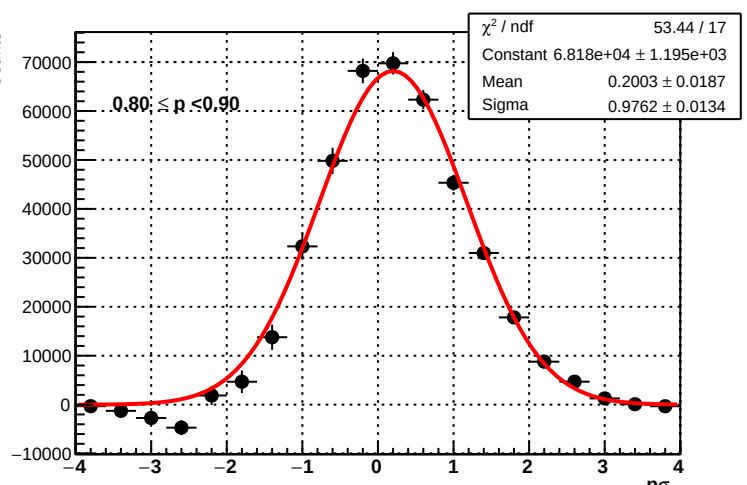

0.45 ≤ p <0.50
χ² / ndf 16.16 / 17
Constant 2.277e+04 ± 5.334e+02
Mean 0.03466 ± 0.02047
Sigma 1.002 ± 0.016
nσk

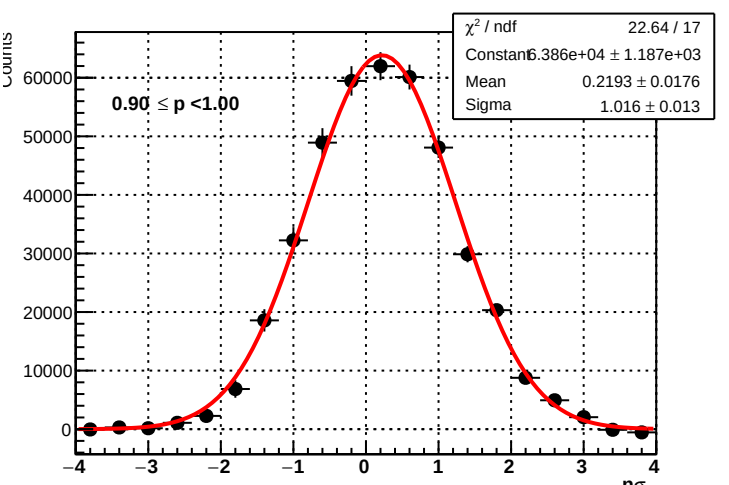

Counts
0.50 ≤ p <0.55
χ² / ndf 10.46 / 17
Constant 2.649e+04 ± 5.831e+02
Mean −0.1106 ± 0.0201
Sigma 1.072 ± 0.017
nσk

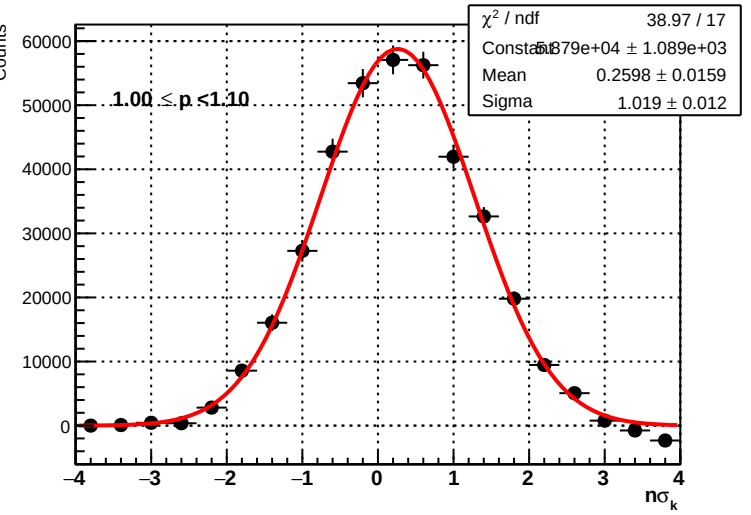

0.55 ≤ p <0.60
χ² / ndf 37.76 / 17
Constant 8.145e+04 ± 6.396e+02
Mean −0.05749 ± 0.02018
Sigma 1.028 ± 0.017
nσk

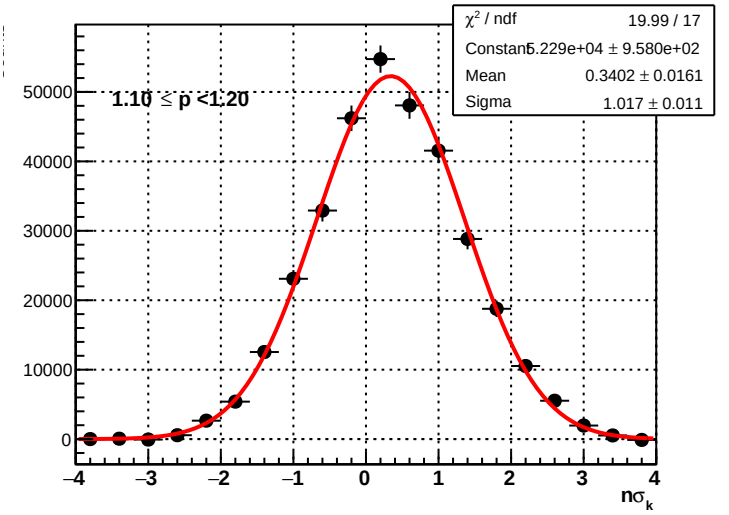

χ² / ndf 426.8 / 17
Constant 6.566e+04 ± 9.787e+02
Mean 0.04146 ± 0.01636
Sigma 0.9944 ± 0.0128
0.60 ≤ p <0.70
nσk

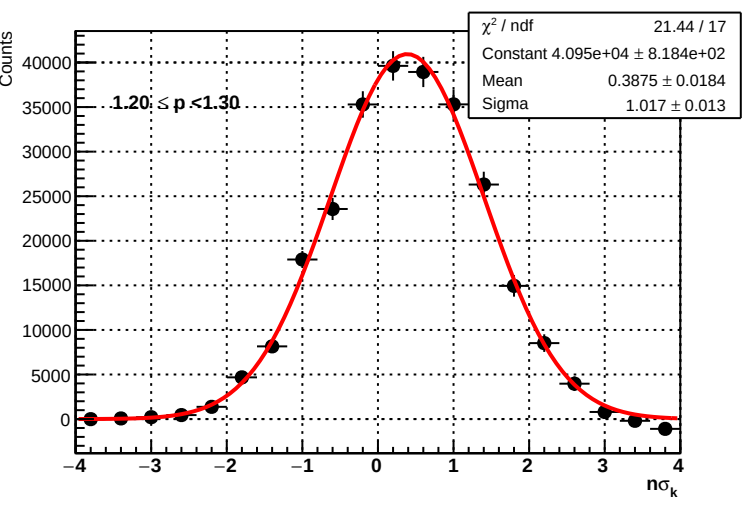

χ² / ndf 240.3 / 17
Constant 6.666e+04 ± 1.065e+03
Mean 0.1785 ± 0.0185
Sigma 0.9862 ± 0.0131
0.70 ≤ p <0.80
nσk

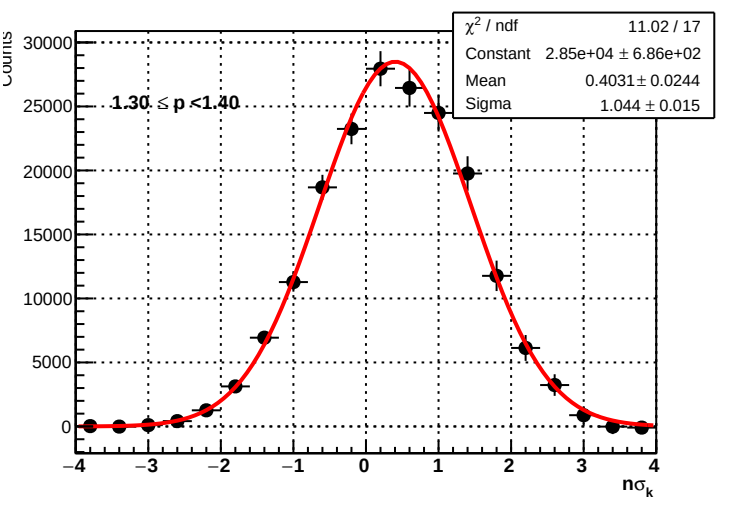

χ² / ndf 53.44 / 17
Constant 6.818e+04 ± 1.195e+03
Mean 0.2003 ± 0.0187
Sigma 0.9762 ± 0.0134
0.80 ≤ p <0.90
nσk

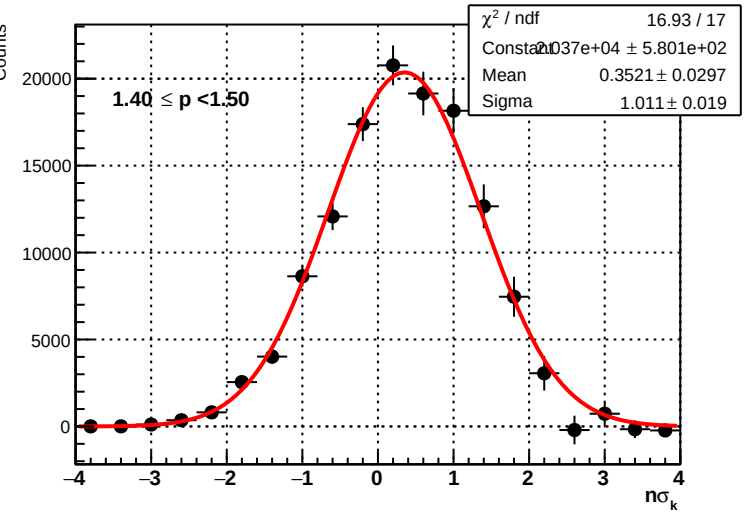

χ² / ndf 22.64 / 17
Constant 6.386e+04 ± 1.187e+03
Mean 0.2193 ± 0.0176
Sigma 1.016 ± 0.013
0.90 ≤ p <1.00
nσk

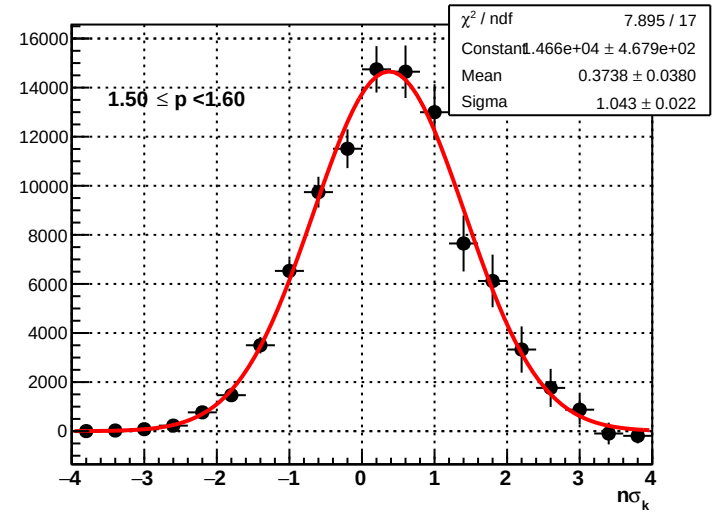

1.00 ≤ p <1.10
χ² / ndf 38.97 / 17
Constant 5.879e+04 ± 1.089e+03
Mean 0.2598 ± 0.0159
Sigma 1.019 ± 0.012
Counts
nσk

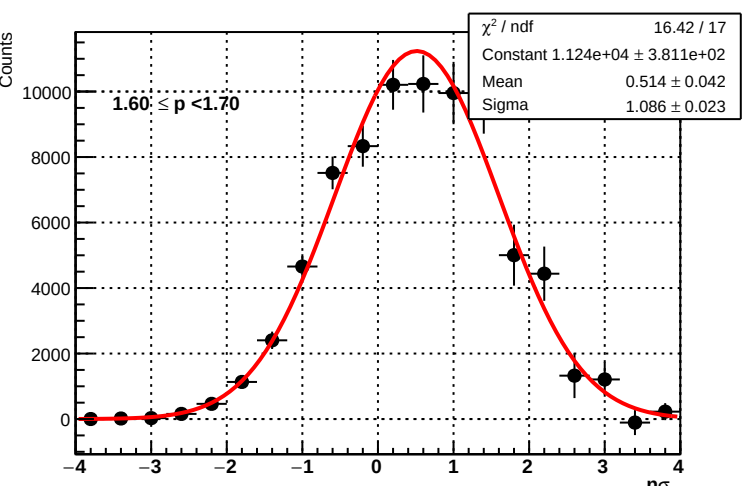

1.10 ≤ p <1.20
χ² / ndf 19.99 / 17
Constant 5.229e+04 ± 9.580e+02
Mean 0.3402 ± 0.0161
Sigma 1.017 ± 0.011
nσk

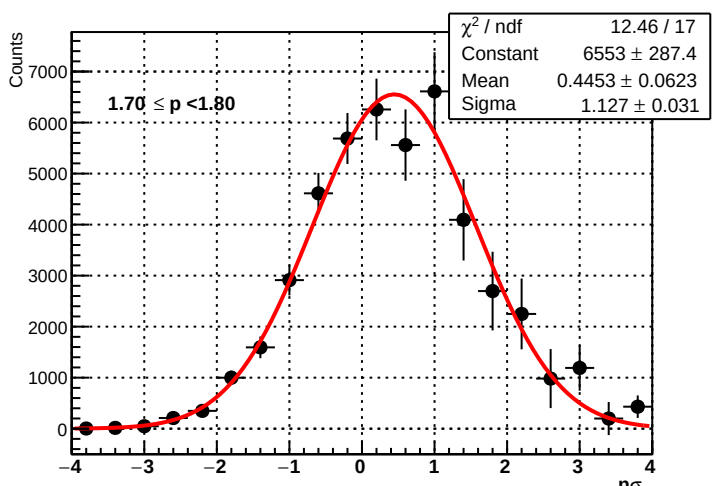

1.20 ≤ p <1.30
χ² / ndf 21.44 / 17
Constant 4.095e+04 ± 8.184e+02
Mean 0.3875 ± 0.0184
Sigma 1.017 ± 0.013
Counts
nσk

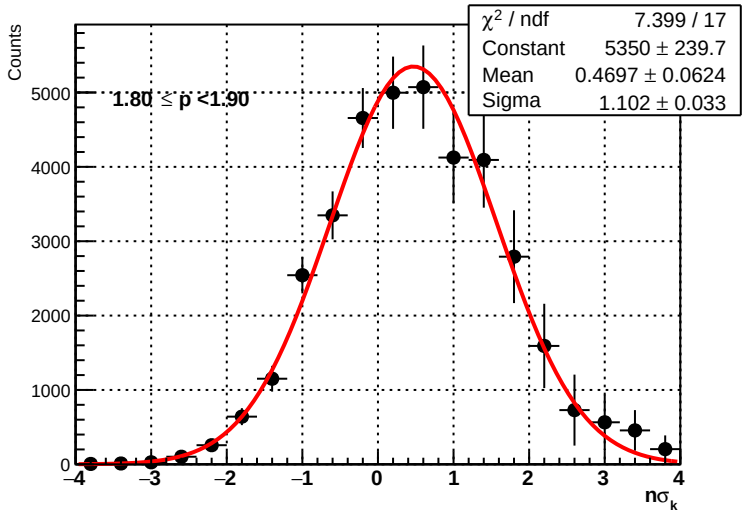

1.30 ≤ p <1.40
χ² / ndf 11.02 / 17
Constant 2.85e+04 ± 6.86e+02
Mean 0.4031 ± 0.0244
Sigma 1.044 ± 0.015
Counts
nσk

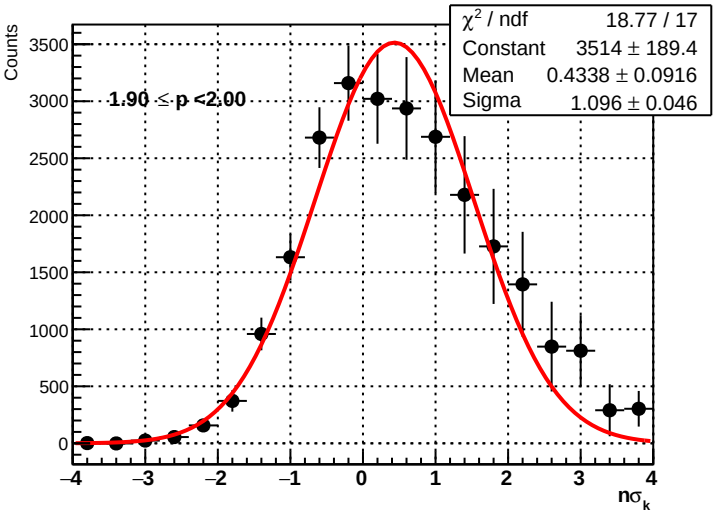

Counts
χ^2 / ndf 16.93 / 17
Constant 2.037e+04 ± 5.801e+02
Mean 0.3521 ± 0.0297
Sigma 1.011 ± 0.019
1.40 ≤ p <1.50
nσ$_k$

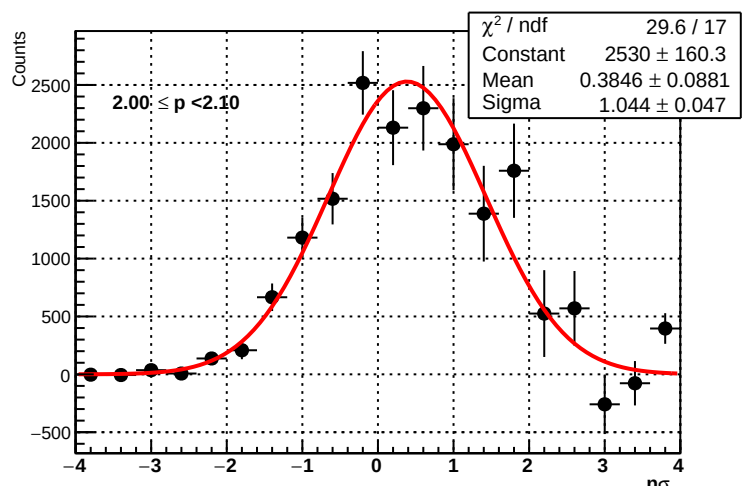

χ^2 / ndf 7.895 / 17
Constant 1.466e+04 ± 4.679e+02
Mean 0.3738 ± 0.0380
Sigma 1.043 ± 0.022
1.50 ≤ p <1.60
nσ$_k$

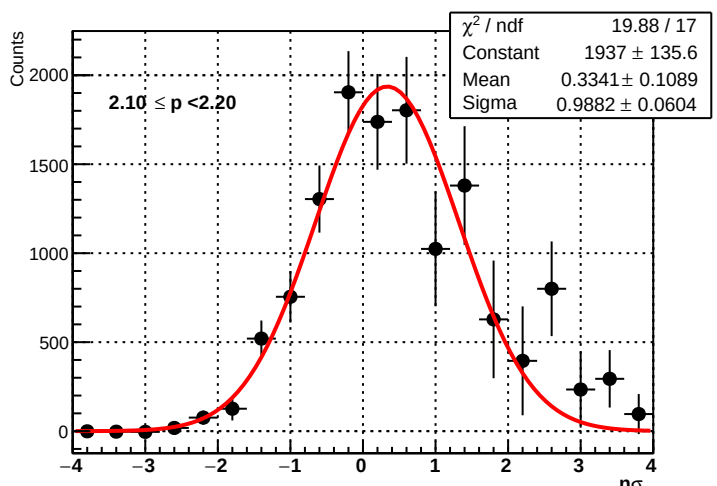

Counts
χ^2 / ndf 16.42 / 17
Constant 1.124e+04 ± 3.811e+02
Mean 0.514 ± 0.042
Sigma 1.086 ± 0.023
1.60 ≤ p <1.70
nσ$_k$

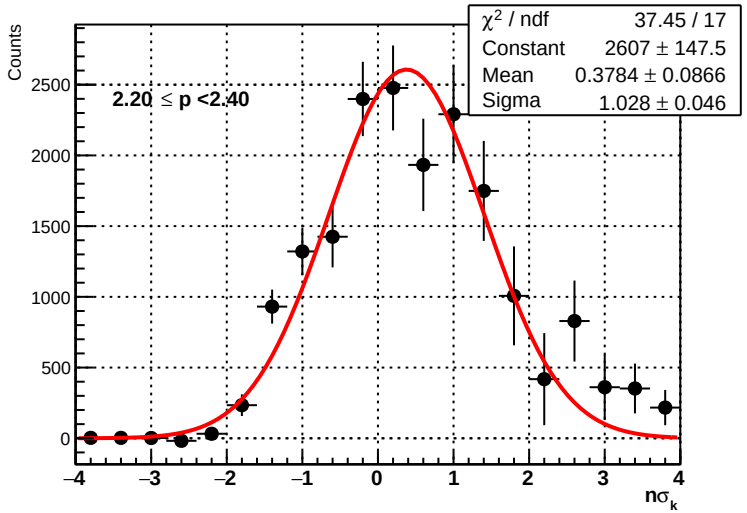

Counts
χ^2 / ndf 12.46 / 17
Constant 6553 ± 287.4
Mean 0.4453 ± 0.0623
Sigma 1.127 ± 0.031
1.70 ≤ p <1.80
nσ$_k$

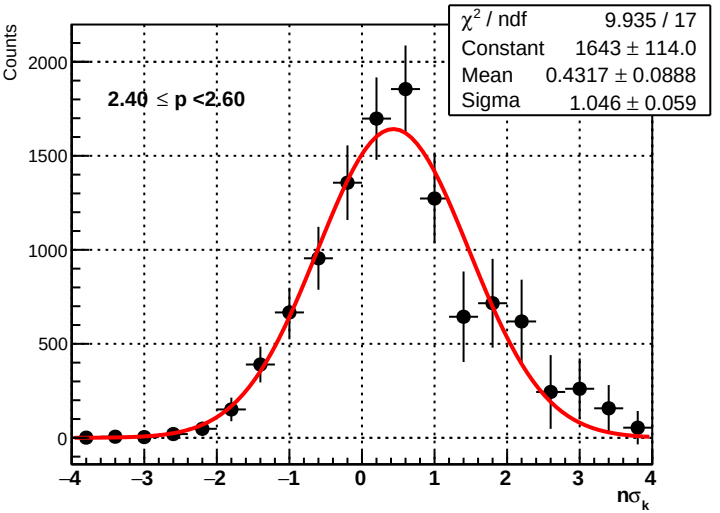

Counts
1.80 ≤ p <1.90
χ² / ndf 7.399 / 17
Constant 5350 ± 239.7
Mean 0.4697 ± 0.0624
Sigma 1.102 ± 0.033
nσ_k

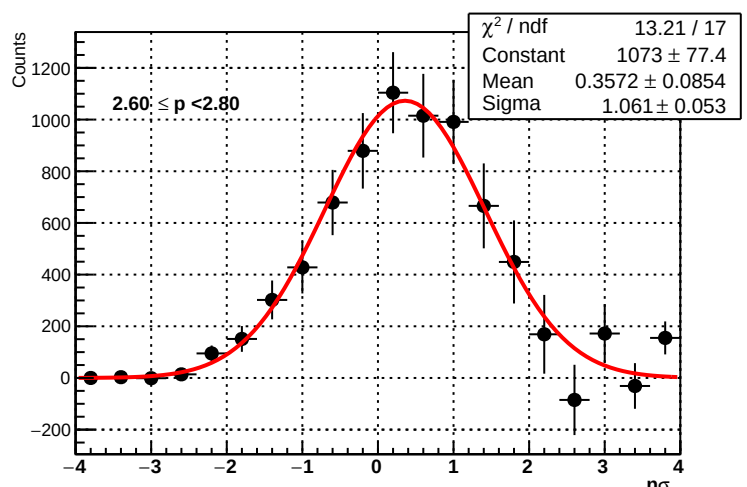

Counts
1.90 ≤ p <2.00
χ² / ndf 18.77 / 17
Constant 3514 ± 189.4
Mean 0.4338 ± 0.0916
Sigma 1.096 ± 0.046
nσ_k

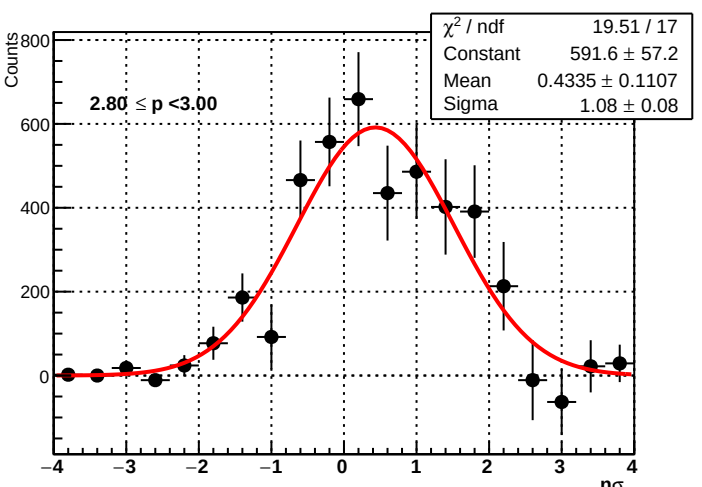

Counts
2.00 ≤ p <2.10
χ² / ndf 29.6 / 17
Constant 2530 ± 160.3
Mean 0.3846 ± 0.0881
Sigma 1.044 ± 0.047
nσ_k

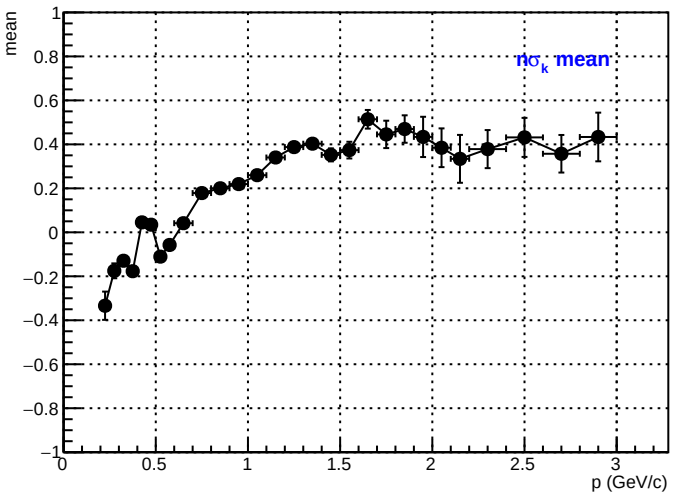

Counts
2.10 ≤ p <2.20
χ² / ndf 19.88 / 17
Constant 1937 ± 135.6
Mean 0.3341± 0.1089
Sigma 0.9882 ± 0.0604
nσ_k

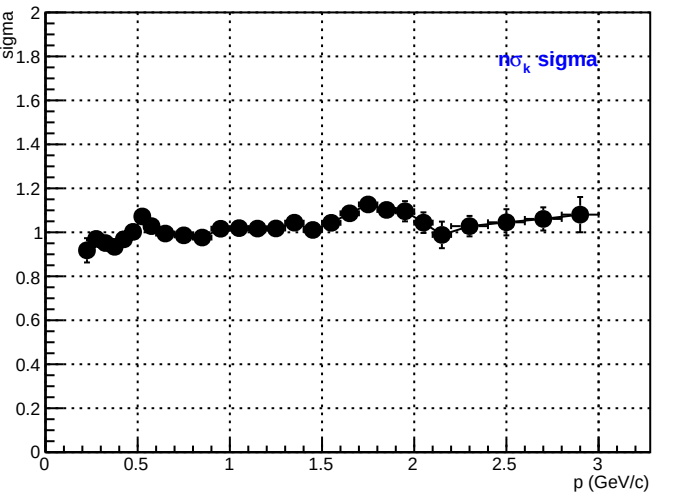

χ^2 / ndf 37.45 / 17
Constant 2607 ± 147.5
Mean 0.3784 ± 0.0866
Sigma 1.028 ± 0.046
2.20 ≤ p <2.40
Counts
nσ$_k$

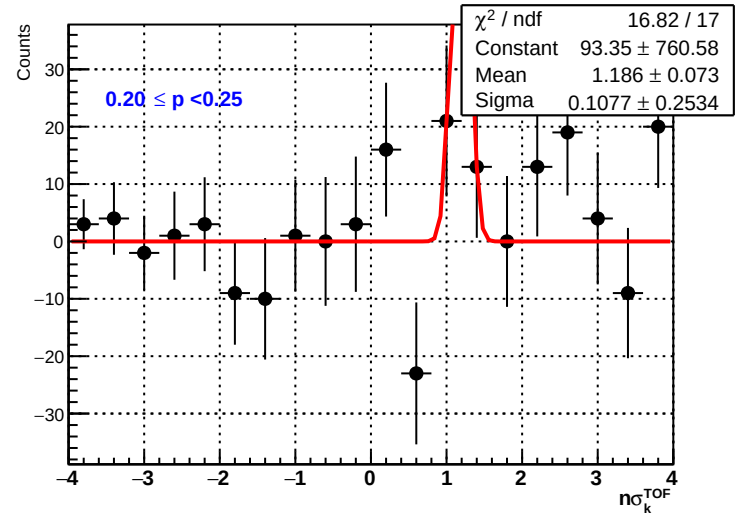

χ^2 / ndf 9.935 / 17
Constant 1643 ± 114.0
Mean 0.4317 ± 0.0888
Sigma 1.046 ± 0.059
2.40 ≤ p <2.60
Counts
nσ$_k$

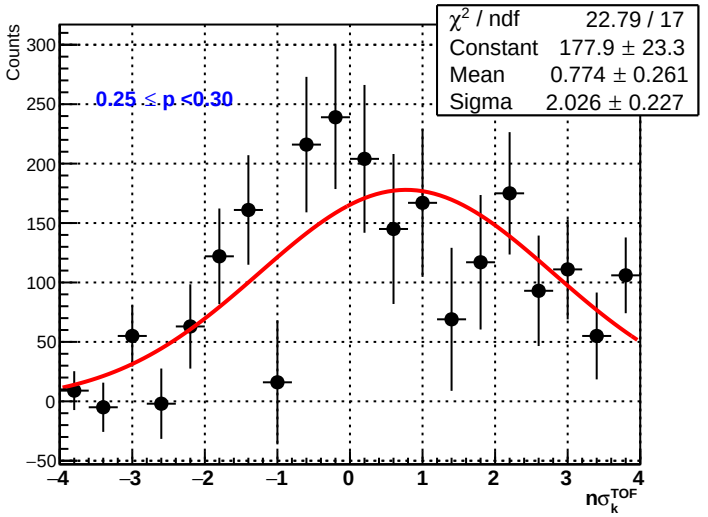

χ^2 / ndf 13.21 / 17
Constant 1073 ± 77.4
Mean 0.3572 ± 0.0854
Sigma 1.061 ± 0.053
2.60 ≤ p <2.80
Counts
nσ$_k$

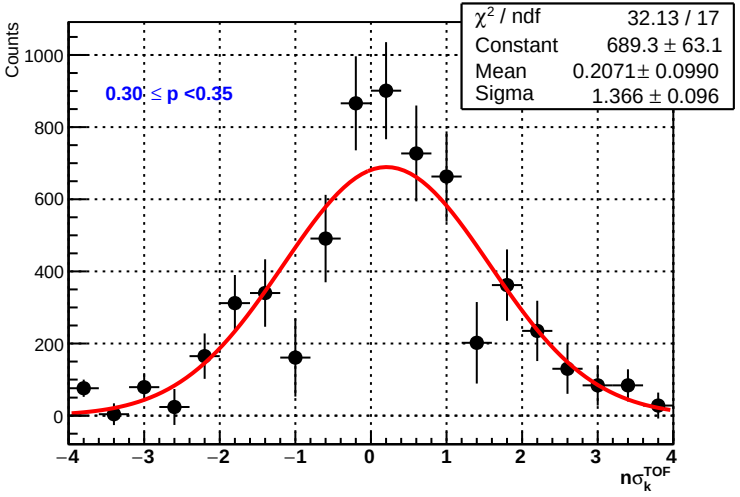

χ^2 / ndf 19.51 / 17
Constant 591.6 ± 57.2
Mean 0.4335 ± 0.1107
Sigma 1.08 ± 0.08
2.80 ≤ p <3.00
Counts
nσ$_k$

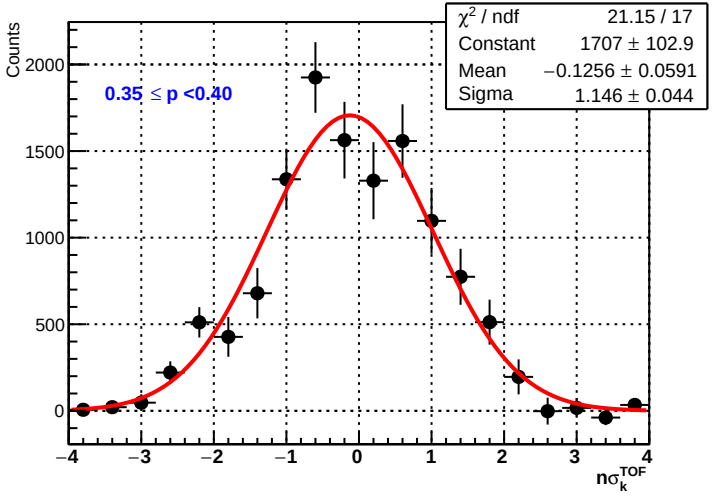

mean
nσ_K mean
p (GeV/c)

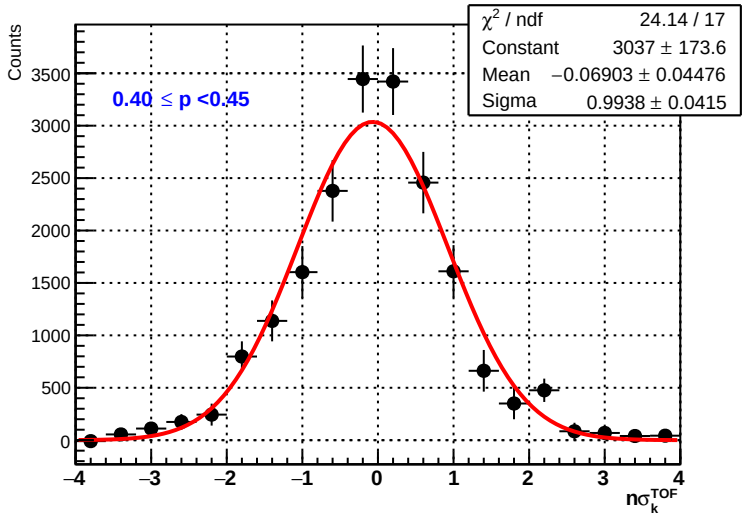

sigma
nσ_K sigma
p (GeV/c)

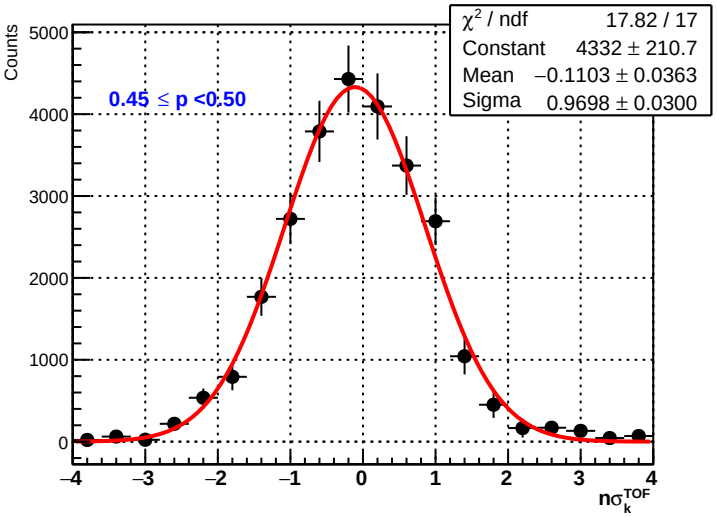

χ² / ndf 16.82 / 17
Constant 93.35 ± 760.58
Mean 1.186 ± 0.073
Sigma 0.1077 ± 0.2534
0.20 ≤ p <0.25
Counts
nσ_k^TOF

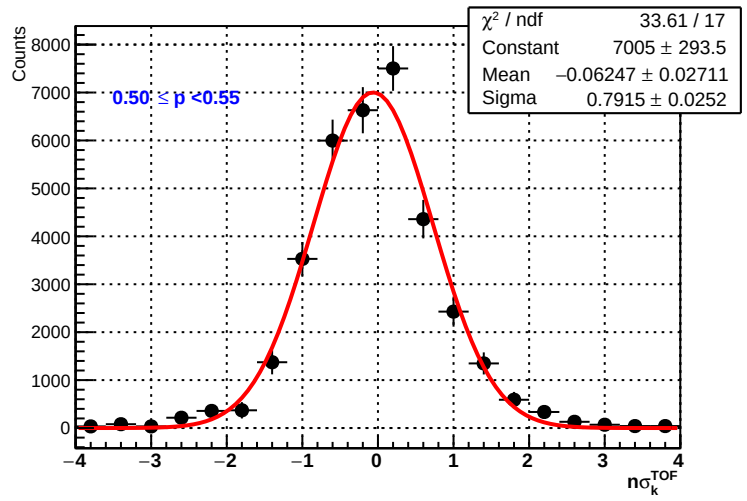

χ² / ndf 22.79 / 17
Constant 177.9 ± 23.3
Mean 0.774 ± 0.261
Sigma 2.026 ± 0.227
0.25 ≤ p <0.30
Counts
nσ_k^TOF

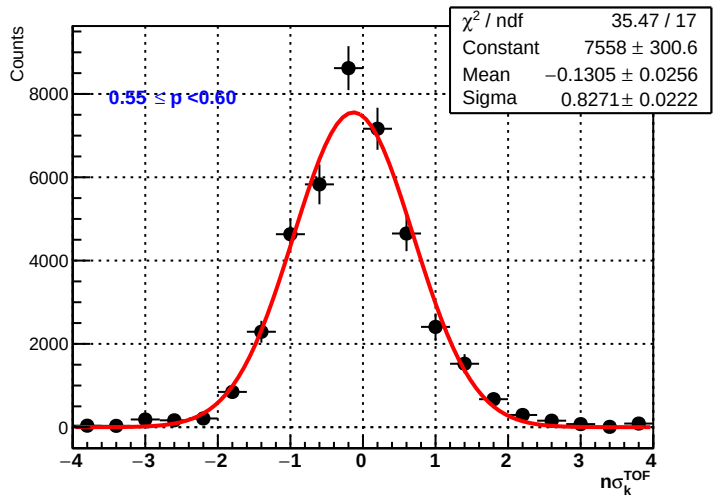

χ² / ndf 32.13 / 17
Constant 689.3 ± 63.1
Mean 0.2071± 0.0990
Sigma 1.366 ± 0.096
0.30 ≤ p <0.35
Counts
nσ_k^TOF

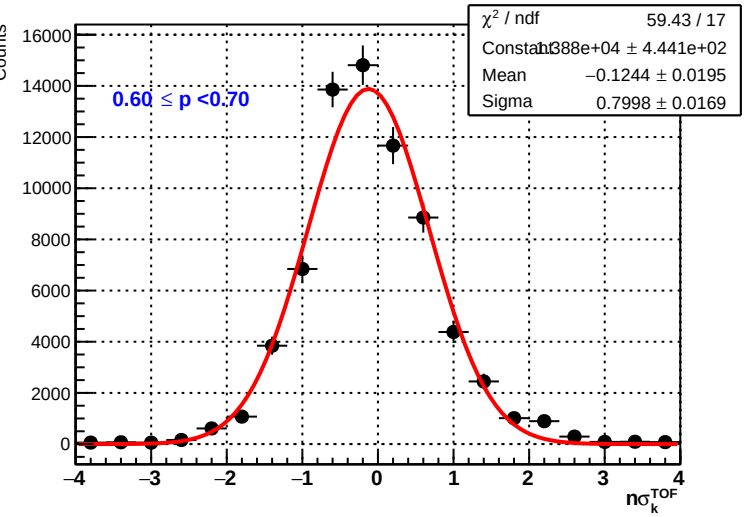

χ² / ndf 21.15 / 17
Constant 1707 ± 102.9
Mean −0.1256 ± 0.0591
Sigma 1.146 ± 0.044
0.35 ≤ p <0.40
Counts
nσ_k^TOF

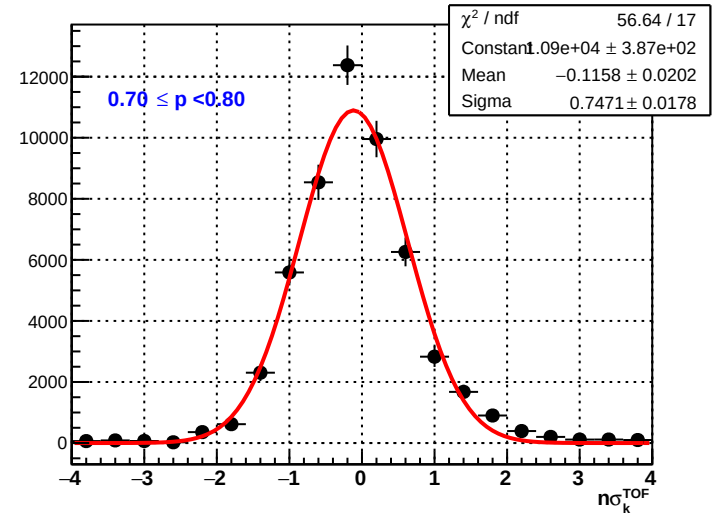

χ² / ndf 24.14 / 17
Constant 3037 ± 173.6
Mean −0.06903 ± 0.04476
Sigma 0.9938 ± 0.0415
0.40 ≤ p <0.45
Counts
nσ_k^TOF

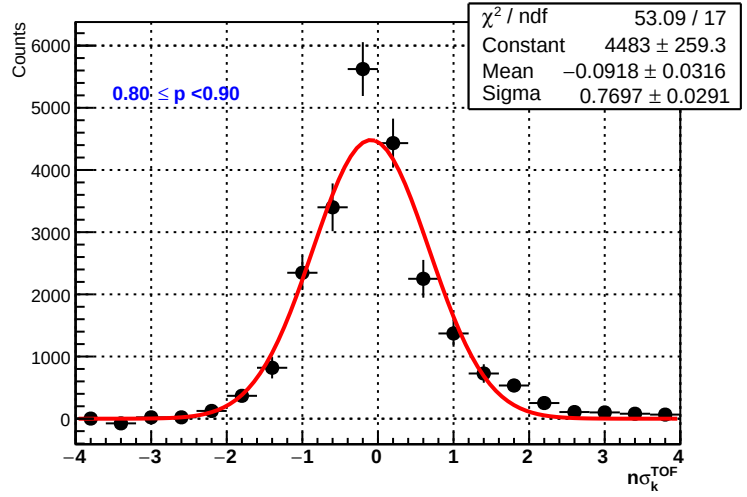

χ² / ndf 17.82 / 17
Constant 4332 ± 210.7
Mean −0.1103 ± 0.0363
Sigma 0.9698 ± 0.0300
0.45 ≤ p <0.50
Counts
nσ_k^TOF

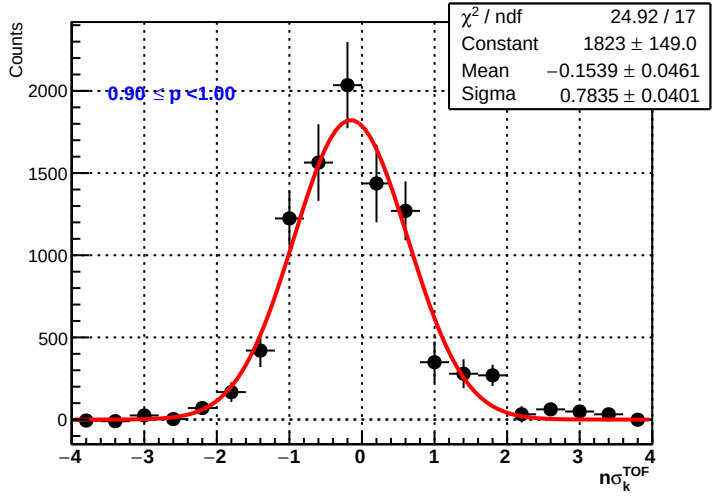

χ² / ndf 33.61 / 17
Constant 7005 ± 293.5
Mean −0.06247 ± 0.02711
Sigma 0.7915 ± 0.0252
0.50 ≤ p <0.55
Counts
nσ_k^TOF

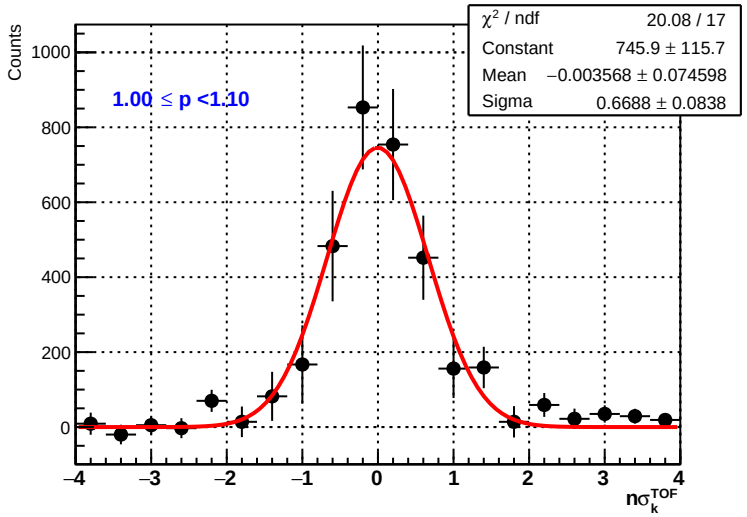

χ² / ndf 35.47 / 17
Constant 7558 ± 300.6
Mean −0.1305 ± 0.0256
Sigma 0.8271± 0.0222
0.55 ≤ p <0.60
Counts
nσ_k^TOF

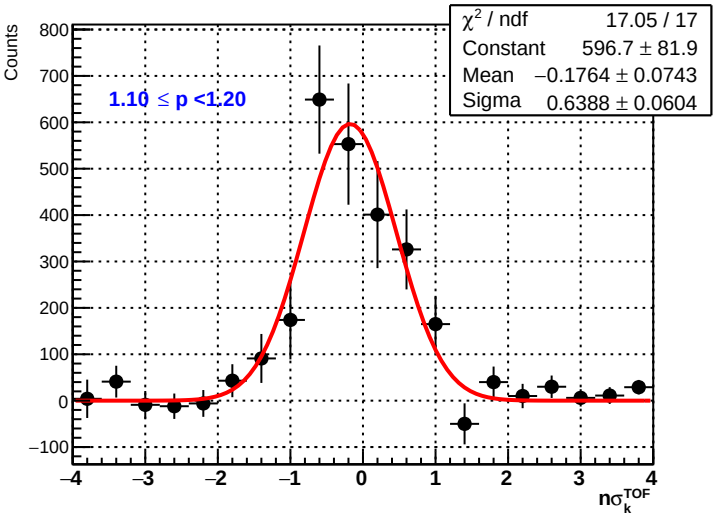

0.60 ≤ p <0.70
χ² / ndf 59.43 / 17
Constant 1.388e+04 ± 4.441e+02
Mean −0.1244 ± 0.0195
Sigma 0.7998 ± 0.0169
Counts
nσ_k^TOF

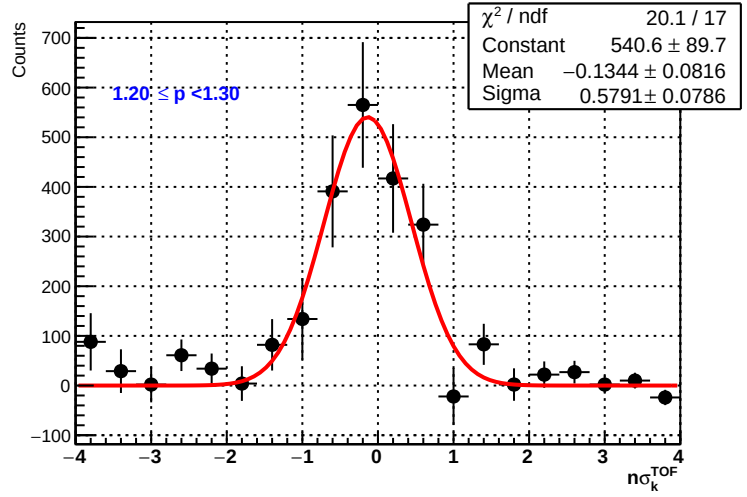

0.70 ≤ p <0.80
χ² / ndf 56.64 / 17
Constant 1.09e+04 ± 3.87e+02
Mean −0.1158 ± 0.0202
Sigma 0.7471 ± 0.0178
nσ_k^TOF

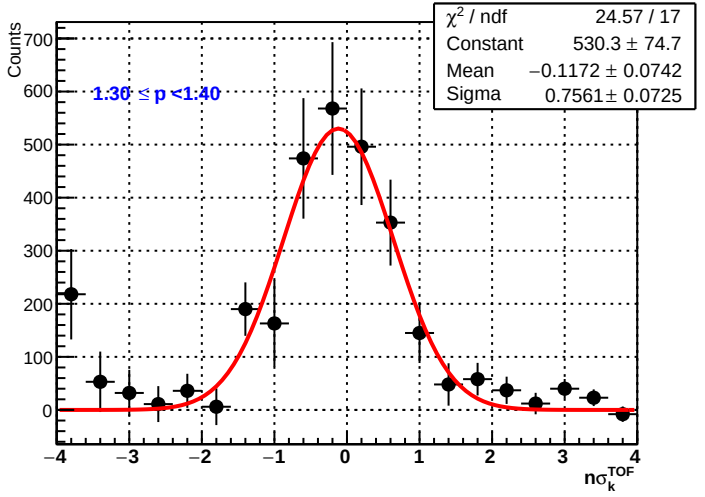

0.80 ≤ p <0.90
χ² / ndf 53.09 / 17
Constant 4483 ± 259.3
Mean −0.0918 ± 0.0316
Sigma 0.7697 ± 0.0291
Counts
nσ_k^TOF

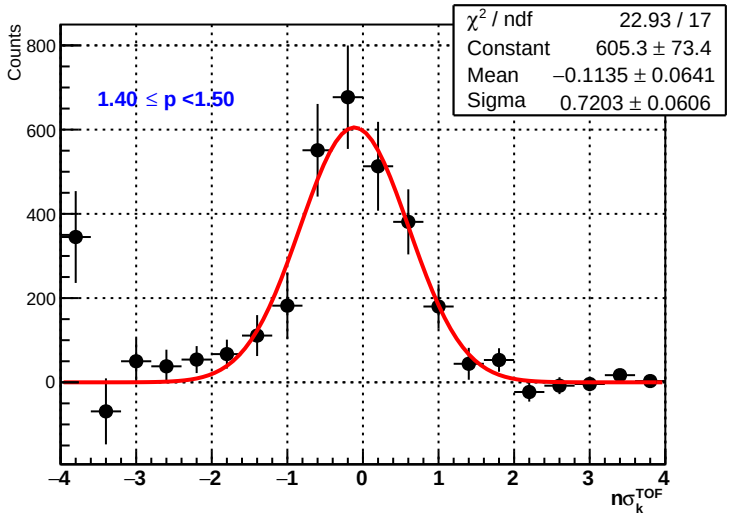

0.90 ≤ p <1.00
χ² / ndf 24.92 / 17
Constant 1823 ± 149.0
Mean −0.1539 ± 0.0461
Sigma 0.7835 ± 0.0401
Counts
nσ_k^TOF

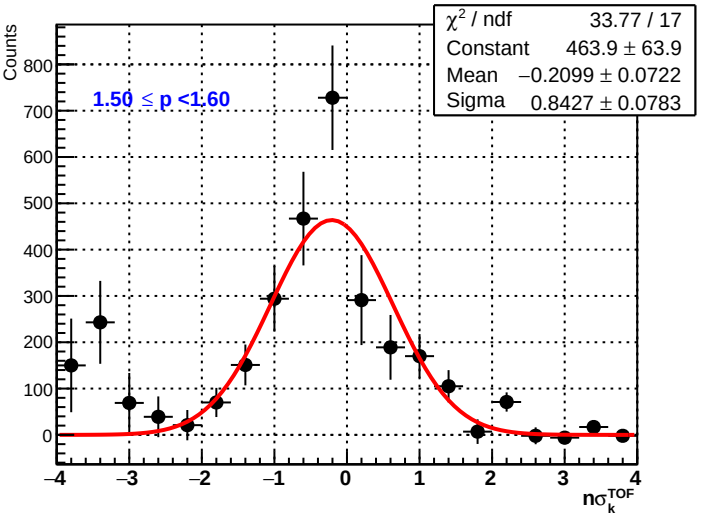

Counts
1.00 ≤ p <1.10
χ² / ndf 20.08 / 17
Constant 745.9 ± 115.7
Mean −0.003568 ± 0.074598
Sigma 0.6688 ± 0.0838
nσ_k^TOF

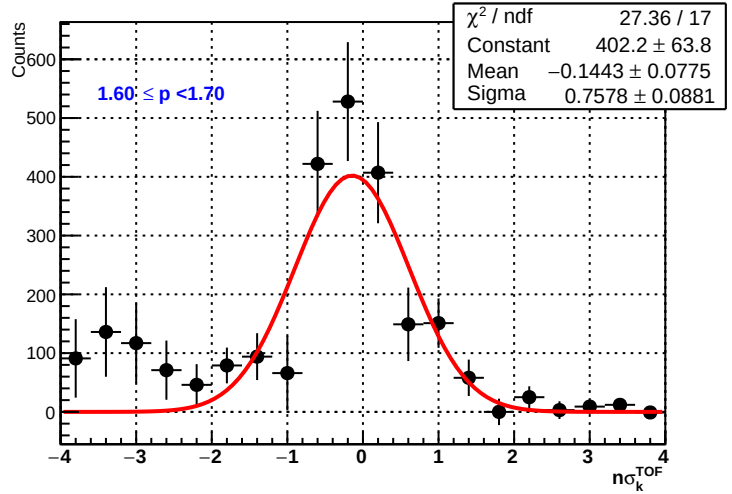

Counts
1.10 ≤ p <1.20
χ² / ndf 17.05 / 17
Constant 596.7 ± 81.9
Mean −0.1764 ± 0.0743
Sigma 0.6388 ± 0.0604
nσ_k^TOF

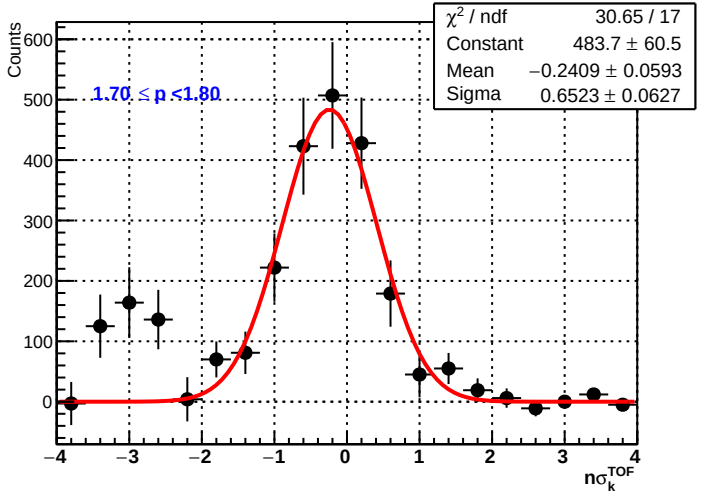

Counts
1.20 ≤ p <1.30
χ² / ndf 20.1 / 17
Constant 540.6 ± 89.7
Mean −0.1344 ± 0.0816
Sigma 0.5791± 0.0786
nσ_k^TOF

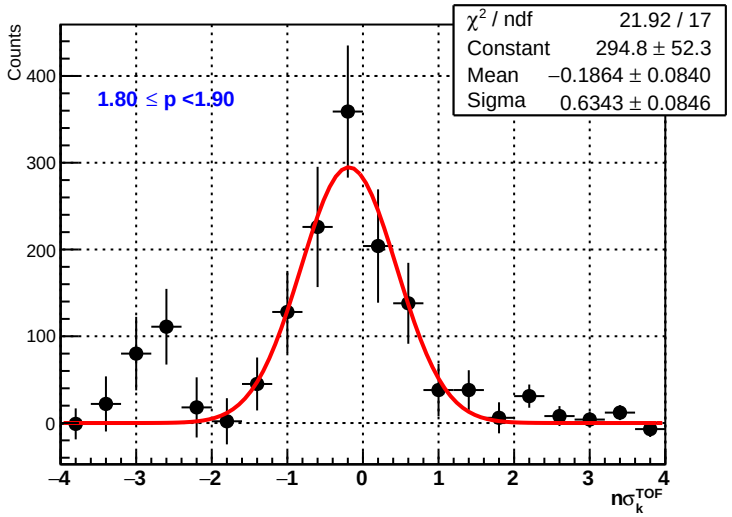

Counts
1.30 ≤ p <1.40
χ² / ndf 24.57 / 17
Constant 530.3 ± 74.7
Mean −0.1172 ± 0.0742
Sigma 0.7561± 0.0725
nσ_k^TOF

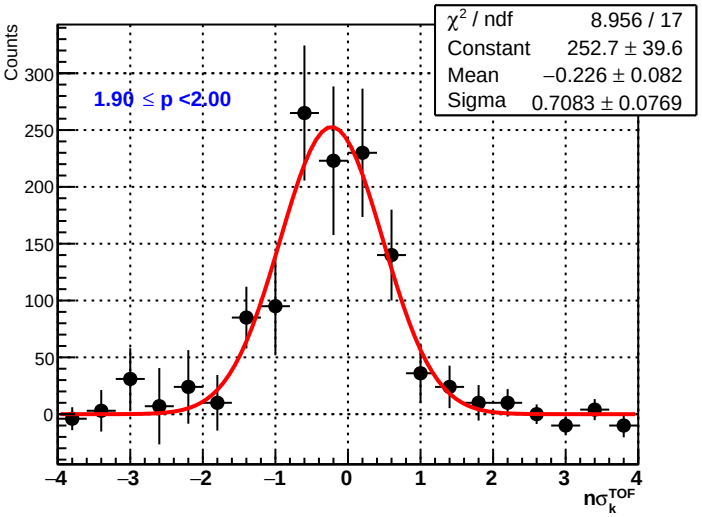

χ^2 / ndf 22.93 / 17
Constant 605.3 ± 73.4
Mean −0.1135 ± 0.0641
Sigma 0.7203 ± 0.0606
1.40 ≤ p <1.50
Counts
$n\sigma_k^{TOF}$

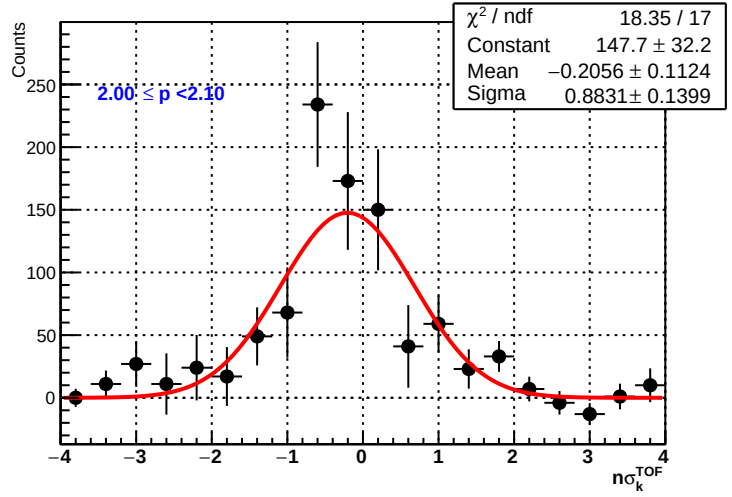

χ^2 / ndf 33.77 / 17
Constant 463.9 ± 63.9
Mean −0.2099 ± 0.0722
Sigma 0.8427 ± 0.0783
1.50 ≤ p <1.60
Counts
$n\sigma_k^{TOF}$

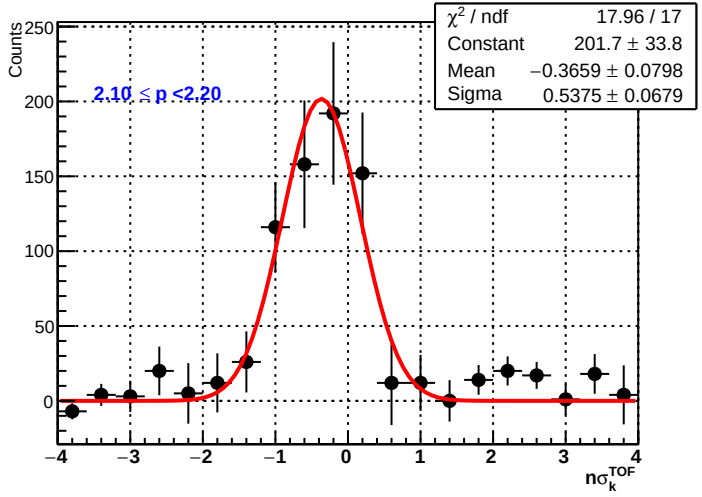

χ^2 / ndf 27.36 / 17
Constant 402.2 ± 63.8
Mean −0.1443 ± 0.0775
Sigma 0.7578 ± 0.0881
1.60 ≤ p <1.70
Counts
$n\sigma_k^{TOF}$

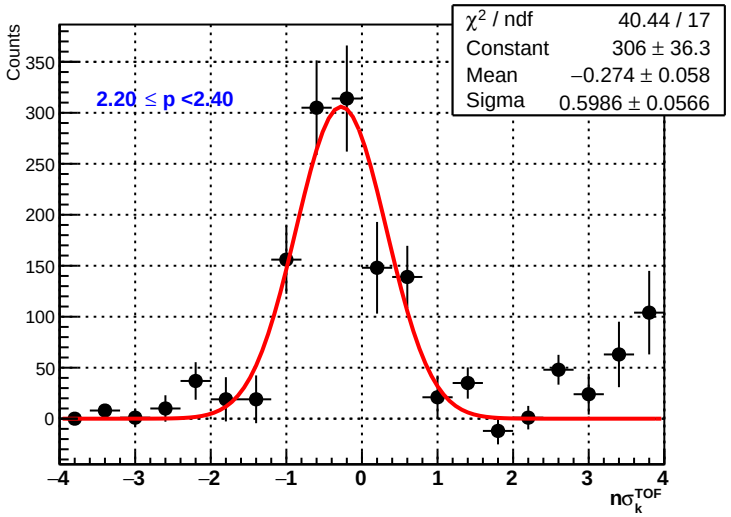

χ^2 / ndf 30.65 / 17
Constant 483.7 ± 60.5
Mean −0.2409 ± 0.0593
Sigma 0.6523 ± 0.0627
1.70 ≤ p <1.80
Counts
$n\sigma_k^{TOF}$

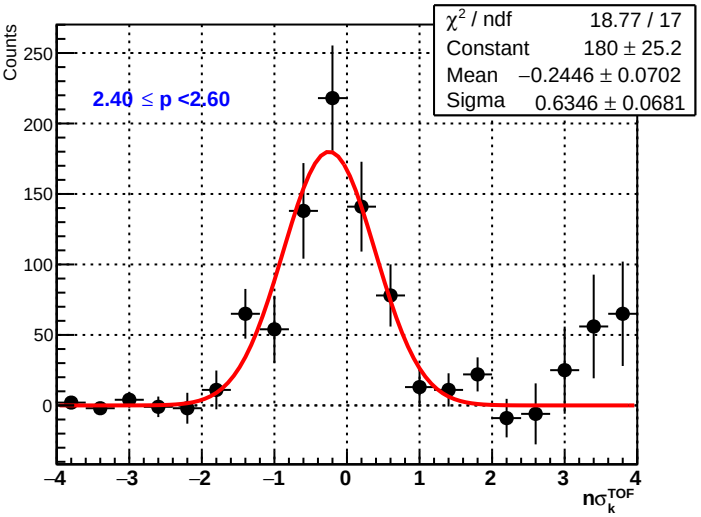

χ^2 / ndf 21.92 / 17
Constant 294.8 ± 52.3
Mean −0.1864 ± 0.0840
Sigma 0.6343 ± 0.0846
1.80 ≤ p <1.90
Counts
$n\sigma_k^{TOF}$

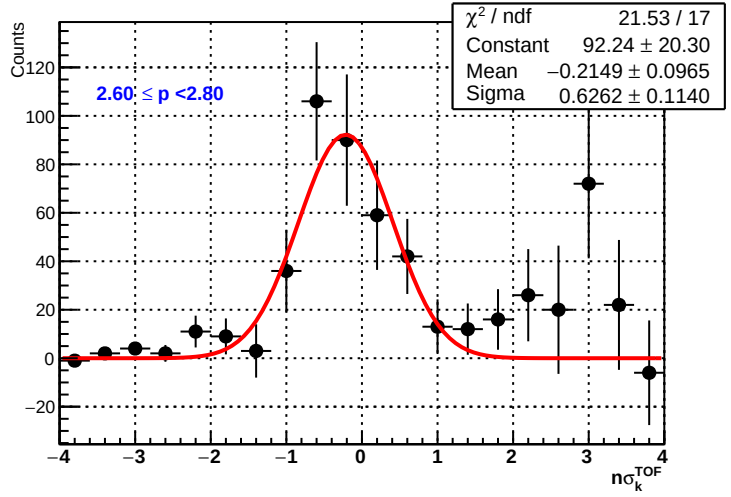

χ^2 / ndf 8.956 / 17
Constant 252.7 ± 39.6
Mean −0.226 ± 0.082
Sigma 0.7083 ± 0.0769
1.90 ≤ p <2.00
Counts
$n\sigma_k^{TOF}$

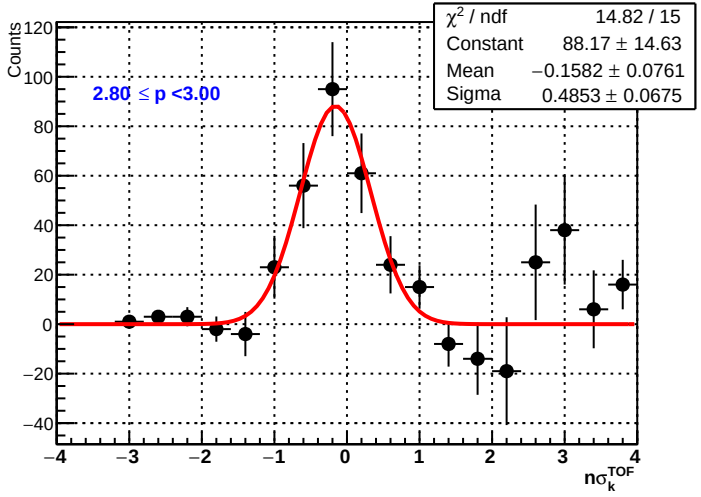

χ^2 / ndf 18.35 / 17
Constant 147.7 ± 32.2
Mean −0.2056 ± 0.1124
Sigma 0.8831± 0.1399
2.00 ≤ p <2.10
Counts
$n\sigma_k^{TOF}$

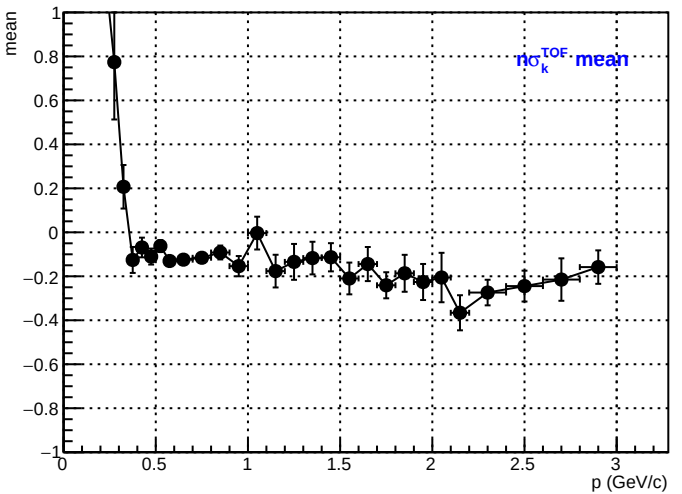

χ^2 / ndf 17.96 / 17
Constant 201.7 ± 33.8
Mean −0.3659 ± 0.0798
Sigma 0.5375 ± 0.0679
2.10 ≤ p <2.20
Counts
$n\sigma_k^{TOF}$

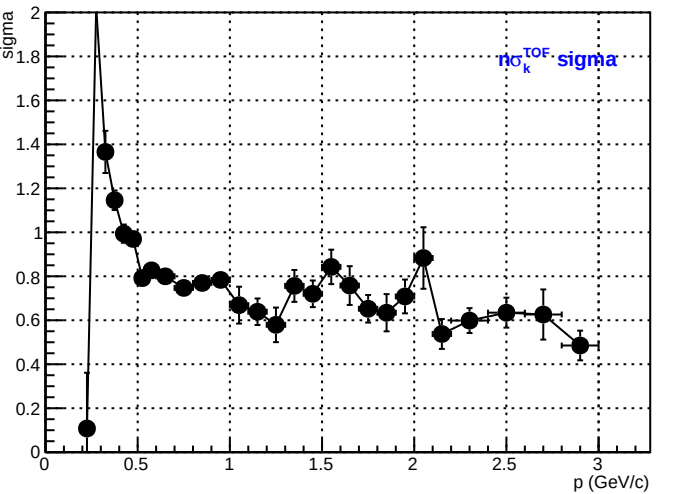

χ^2 / ndf 40.44 / 17
Constant 306 ± 36.3
Mean −0.274 ± 0.058
Sigma 0.5986 ± 0.0566
2.20 ≤ p <2.40
Counts
$n\sigma_k^{TOF}$

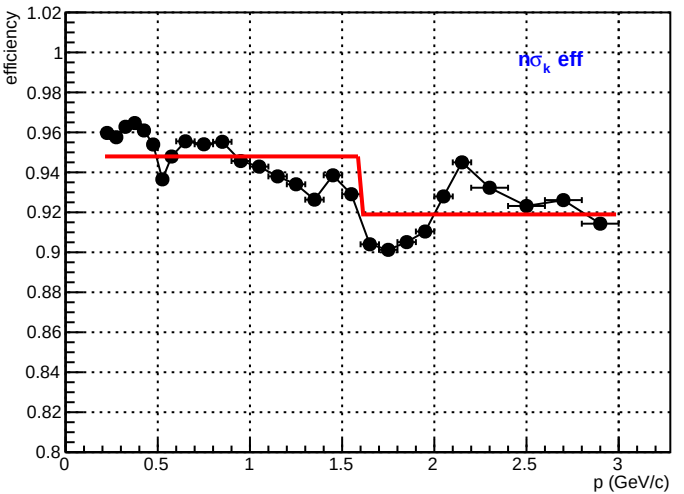

χ^2 / ndf 18.77 / 17
Constant 180 ± 25.2
Mean −0.2446 ± 0.0702
Sigma 0.6346 ± 0.0681
2.40 ≤ p <2.60
Counts
$n\sigma_k^{TOF}$

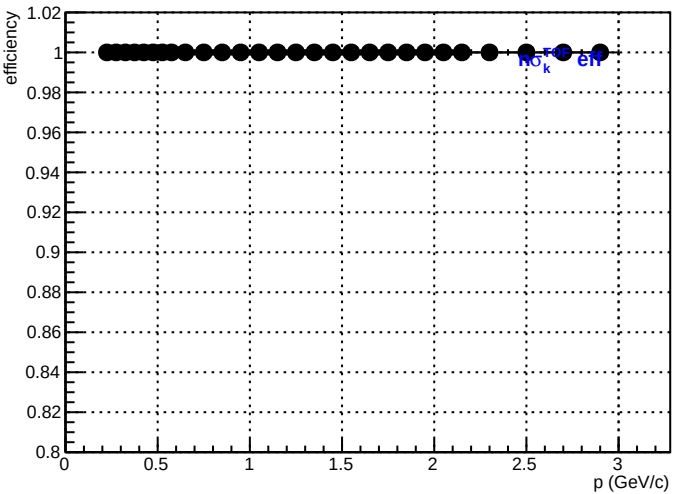

χ^2 / ndf 21.53 / 17
Constant 92.24 ± 20.30
Mean −0.2149 ± 0.0965
Sigma 0.6262 ± 0.1140
2.60 ≤ p <2.80
Counts
$n\sigma_k^{TOF}$

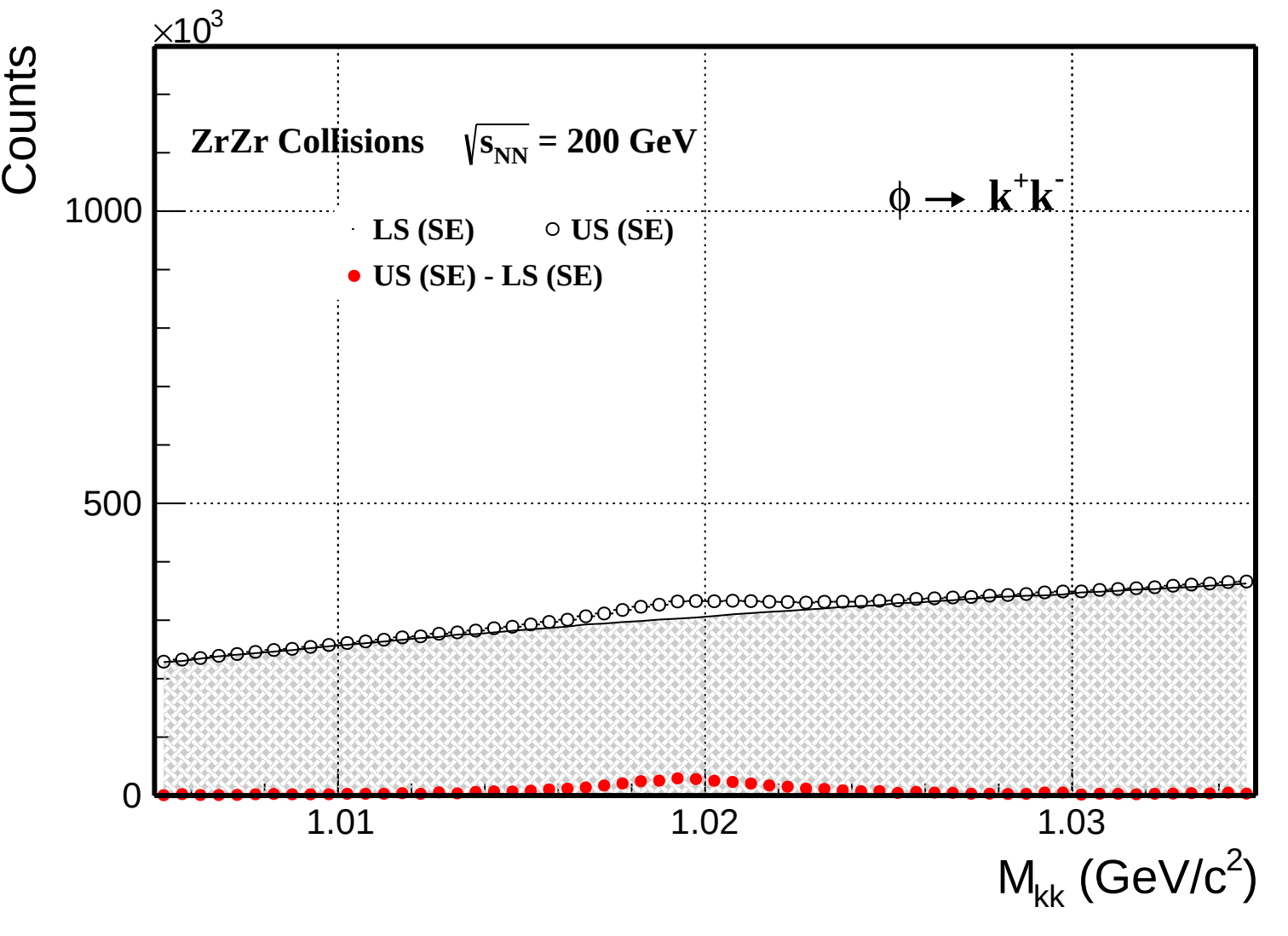

χ^2 / ndf 14.82 / 15
Constant 88.17 ± 14.63
Mean −0.1582 ± 0.0761
Sigma 0.4853 ± 0.0675
2.80 ≤ p <3.00
Counts
$n\sigma_k^{TOF}$


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


sigma
$n\sigma_k^{TOF}$ 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)

π PID and efficiency in Zr+Zr 200 GeV

Target π

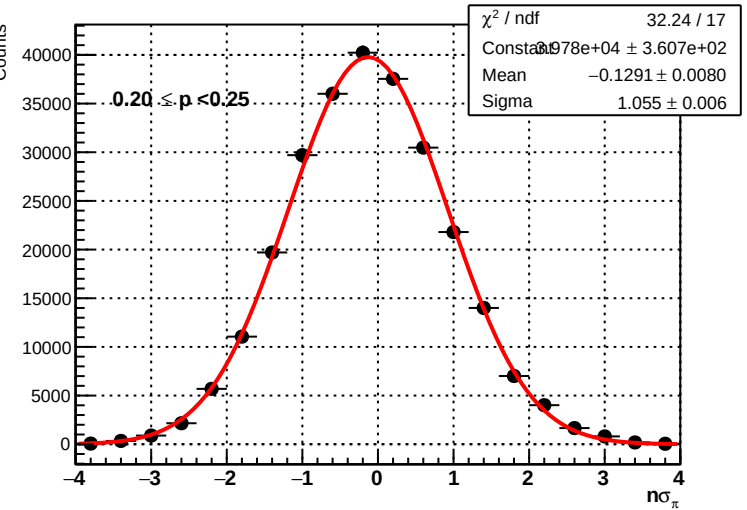
- $p_T > 0.5$
- $|\eta| < 1$
- nHitsFit ≥ 20
- ndEdx > 15
- gDca > 0.1
- $|n\sigma_\pi| < 2.0$
- $|n\sigma_\pi^{TOF}| < 2.0$

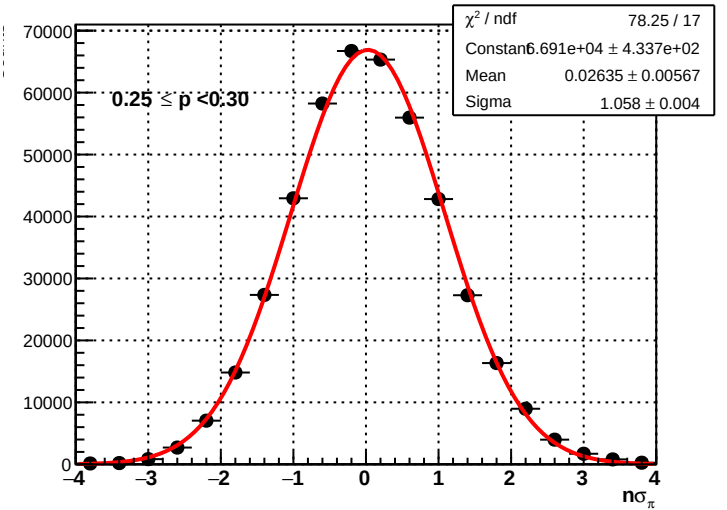
Partner π

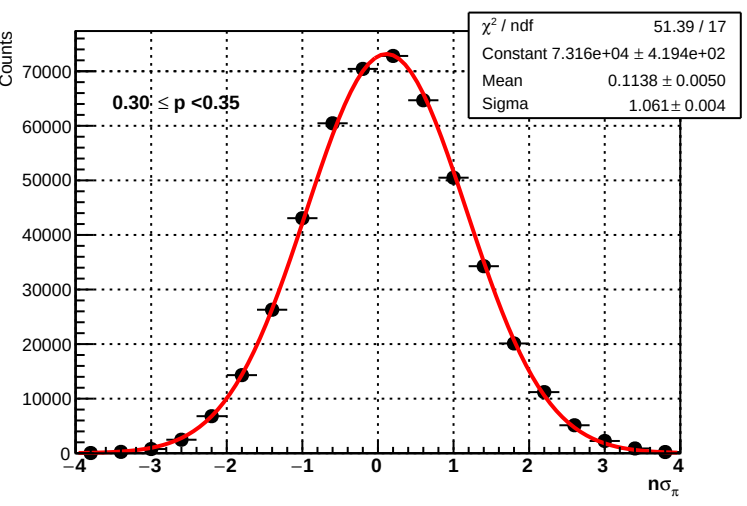
- $p_T > 0.2$
- $|\eta| < 1$
- nHitsFit ≥ 20
- ndEdx > 15
- gDca > 0.1
- $|n\sigma_\pi| < 4.0$
- $|n\sigma_\pi^{TOF}| < 4.0$

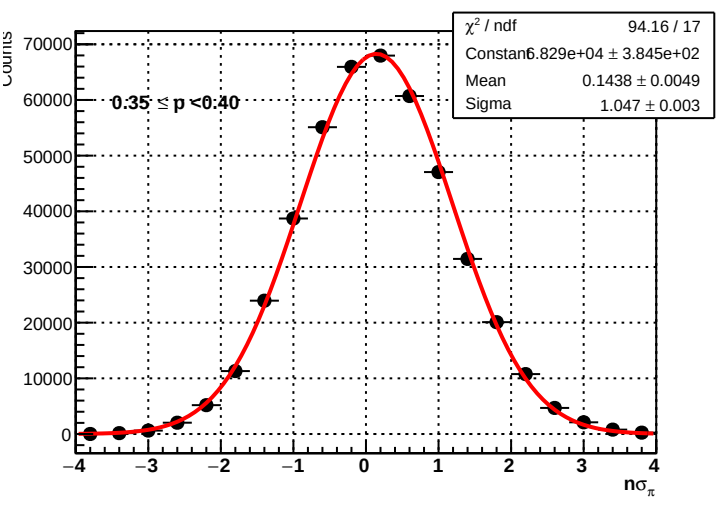
k_s^0 reconstruction cuts:

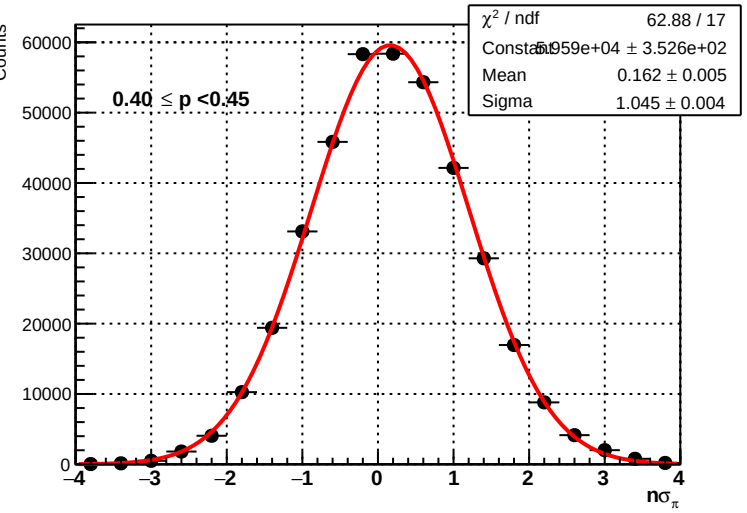
- 0.5 < DecayL < 25
- Dca < 0.4
- pairDca < 0.5
- $\cos\theta > 0.999$

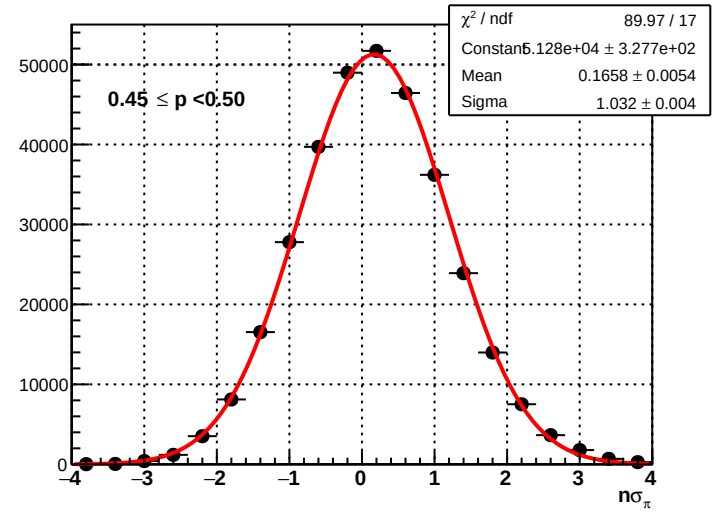

0.20 ≤ p <0.25
χ² / ndf 32.24 / 17
Constant 3.978e+04 ± 3.607e+02
Mean −0.1291 ± 0.0080
Sigma 1.055 ± 0.006
Counts
nσπ

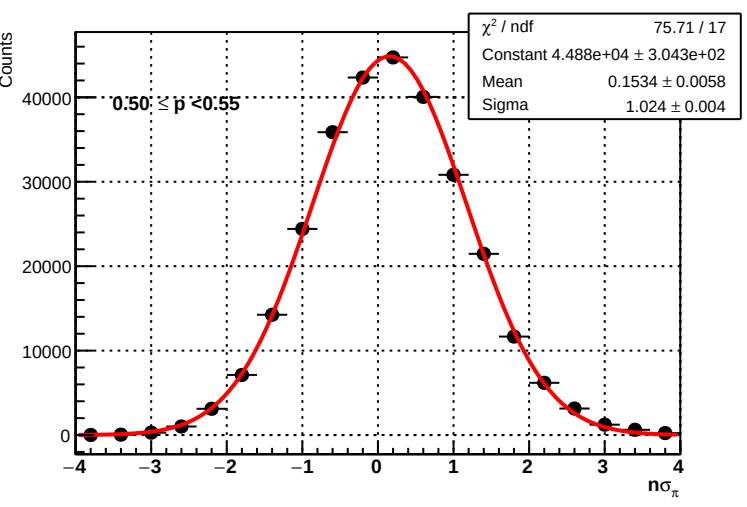

0.25 ≤ p <0.30
χ² / ndf 78.25 / 17
Constant 6.691e+04 ± 4.337e+02
Mean 0.02635 ± 0.00567
Sigma 1.058 ± 0.004
nσπ

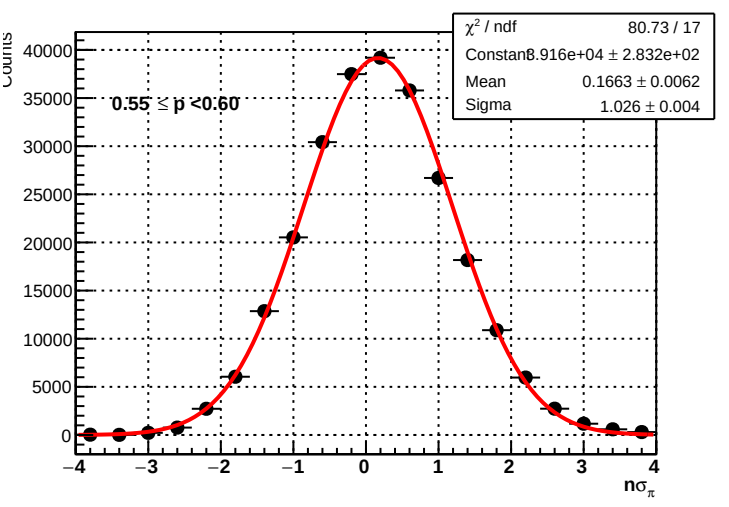

0.30 ≤ p <0.35
χ² / ndf 51.39 / 17
Constant 7.316e+04 ± 4.194e+02
Mean 0.1138 ± 0.0050
Sigma 1.061 ± 0.004
Counts
nσπ

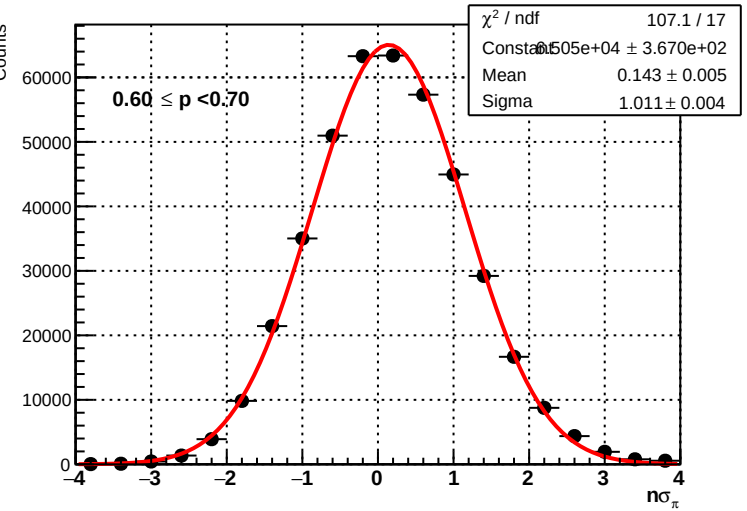

0.35 ≤ p <0.40
χ² / ndf 94.16 / 17
Constant 6.829e+04 ± 3.845e+02
Mean 0.1438 ± 0.0049
Sigma 1.047 ± 0.003
Counts
nσπ

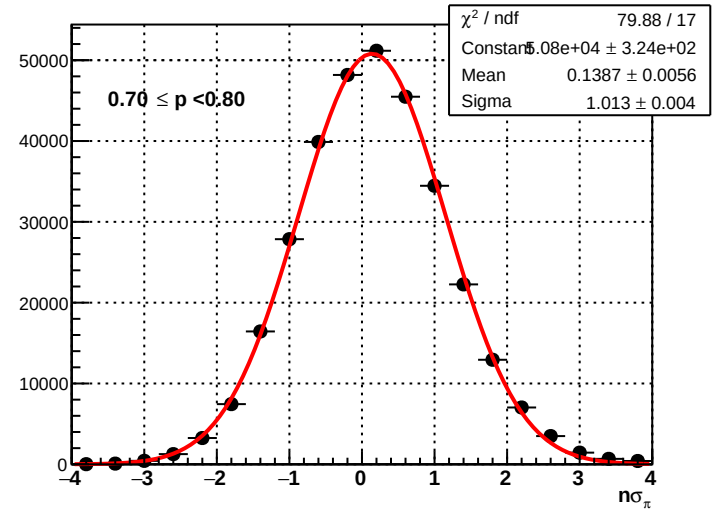

Counts
χ^2 / ndf 62.88 / 17
Constant 5.959e+04 ± 3.526e+02
Mean 0.162 ± 0.005
Sigma 1.045 ± 0.004
0.40 ≤ p <0.45
60000
50000
40000
30000
20000
10000
0
−4 −3 −2 −1 0 1 2 3 4
$n\sigma_\pi$

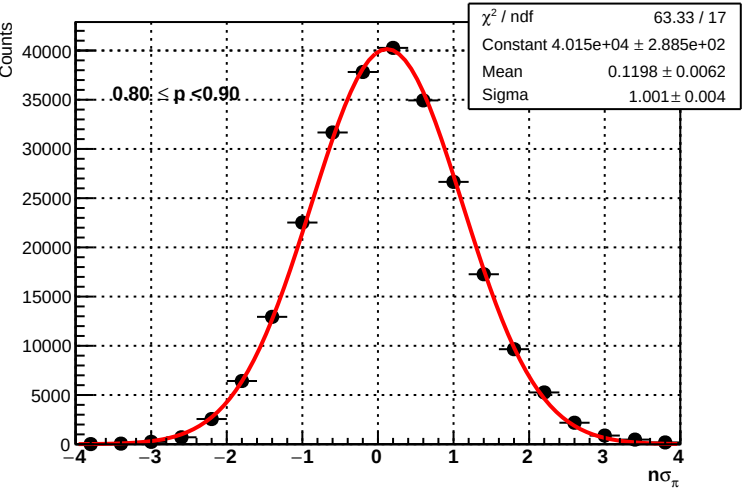

χ^2 / ndf 89.97 / 17
Constant 5.128e+04 ± 3.277e+02
Mean 0.1658 ± 0.0054
Sigma 1.032 ± 0.004
0.45 ≤ p <0.50
50000
40000
30000
20000
10000
0
−4 −3 −2 −1 0 1 2 3 4
$n\sigma_\pi$

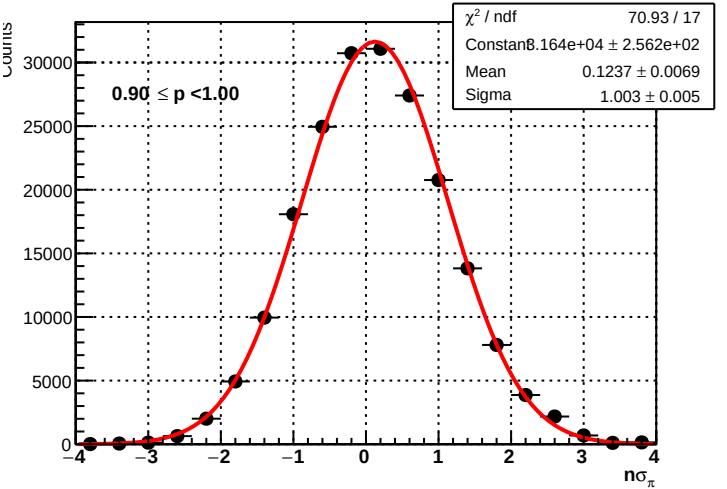

Counts
χ^2 / ndf 75.71 / 17
Constant 4.488e+04 ± 3.043e+02
Mean 0.1534 ± 0.0058
Sigma 1.024 ± 0.004
0.50 ≤ p <0.55
40000
30000
20000
10000
0
−4 −3 −2 −1 0 1 2 3 4
$n\sigma_\pi$

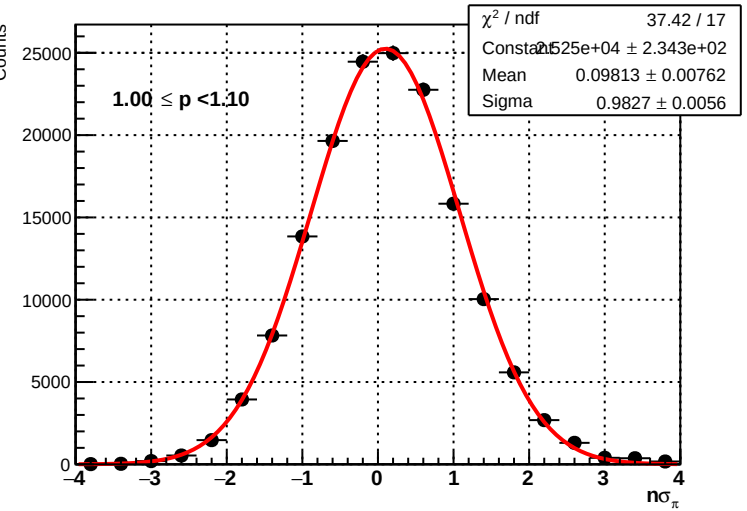

Counts
χ^2 / ndf 80.73 / 17
Constant 8.916e+04 ± 2.832e+02
Mean 0.1663 ± 0.0062
Sigma 1.026 ± 0.004
0.55 ≤ p <0.60
40000
35000
30000
25000
20000
15000
10000
5000
0
−4 −3 −2 −1 0 1 2 3 4
$n\sigma_\pi$

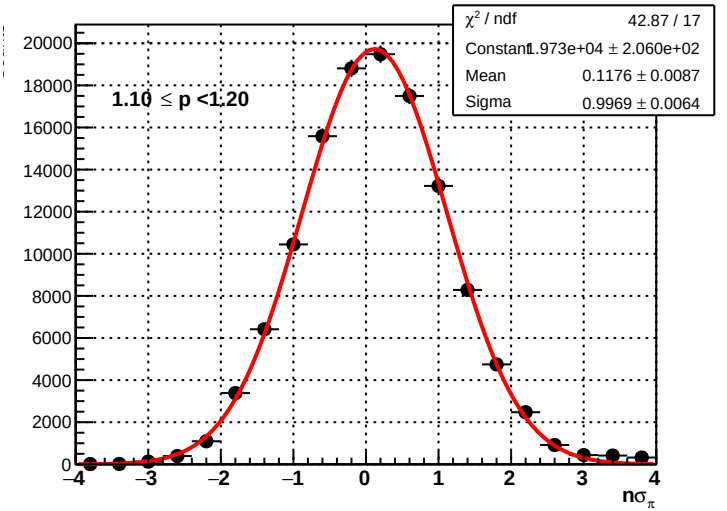

χ² / ndf 107.1 / 17
Constant 6.505e+04 ± 3.670e+02
Mean 0.143 ± 0.005
Sigma 1.011 ± 0.004
0.60 ≤ p <0.70
Counts
nσπ

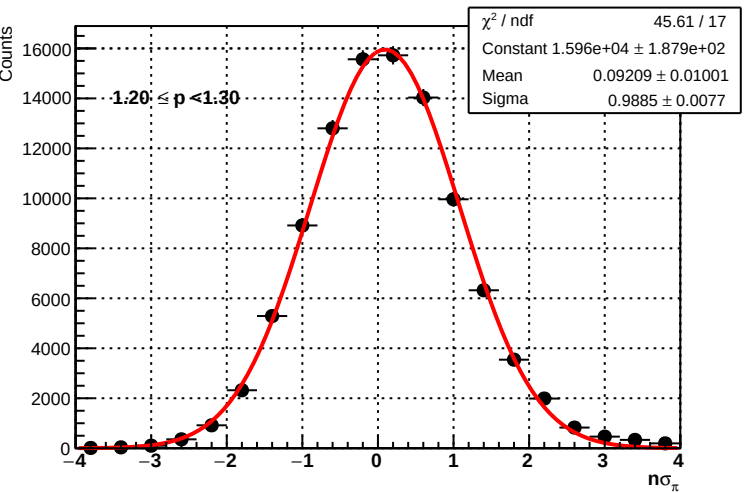

χ² / ndf 79.88 / 17
Constant 5.08e+04 ± 3.24e+02
Mean 0.1387 ± 0.0056
Sigma 1.013 ± 0.004
0.70 ≤ p <0.80
nσπ

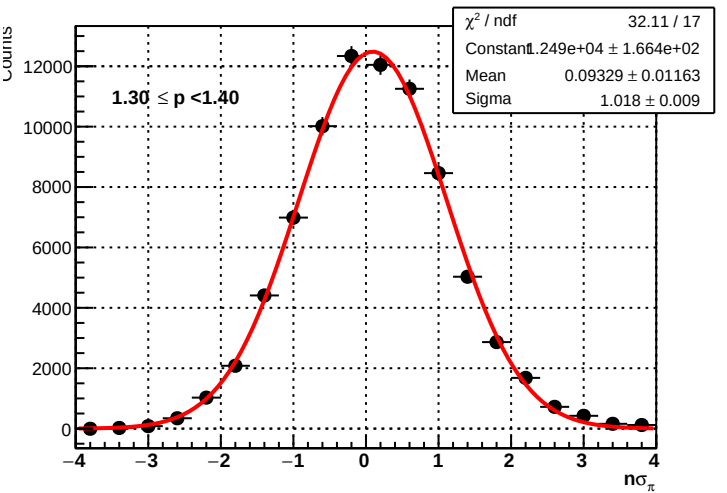

χ² / ndf 63.33 / 17
Constant 4.015e+04 ± 2.885e+02
Mean 0.1198 ± 0.0062
Sigma 1.001 ± 0.004
0.80 ≤ p <0.90
Counts
nσπ

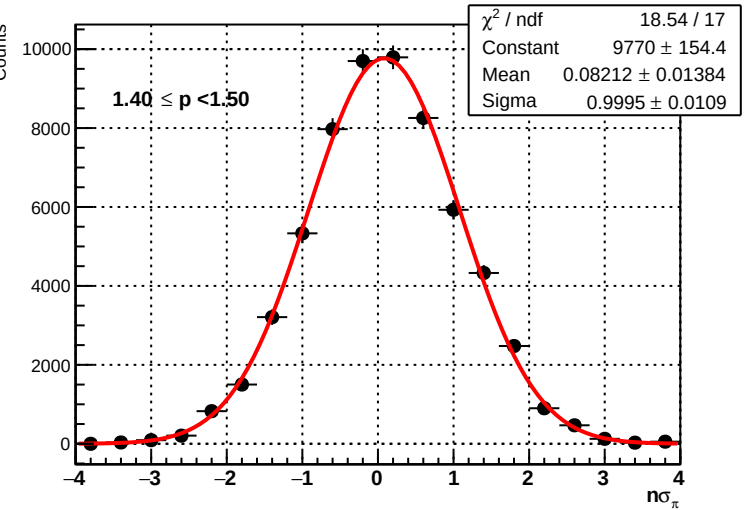

χ² / ndf 70.93 / 17
Constant 3.164e+04 ± 2.562e+02
Mean 0.1237 ± 0.0069
Sigma 1.003 ± 0.005
0.90 ≤ p <1.00
Counts
nσπ

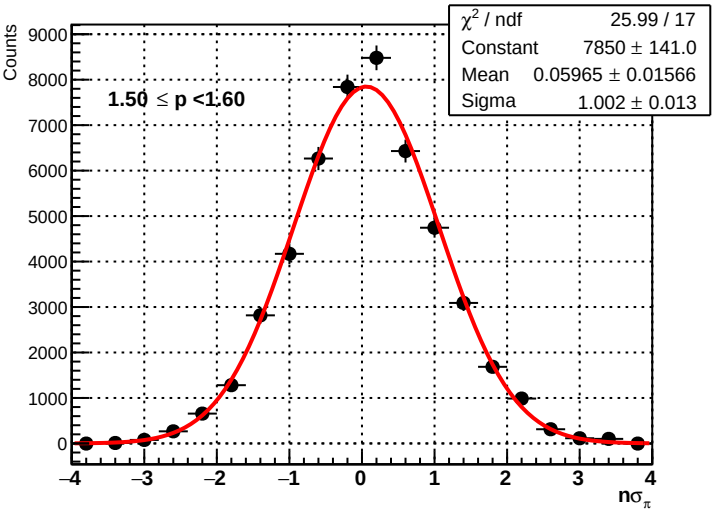

Counts
χ^2 / ndf 37.42 / 17
Constant 2.525e+04 ± 2.343e+02
Mean 0.09813 ± 0.00762
Sigma 0.9827 ± 0.0056
1.00 ≤ p <1.10
nσ$_\pi$

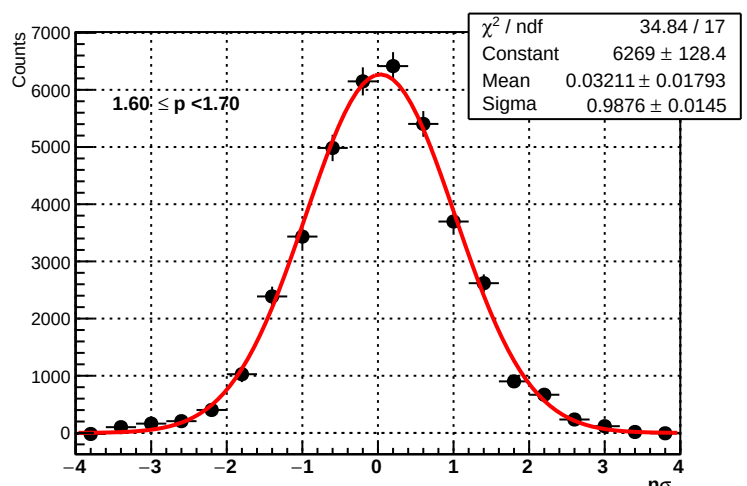

χ^2 / ndf 42.87 / 17
Constant 1.973e+04 ± 2.060e+02
Mean 0.1176 ± 0.0087
Sigma 0.9969 ± 0.0064
1.10 ≤ p <1.20
nσ$_\pi$

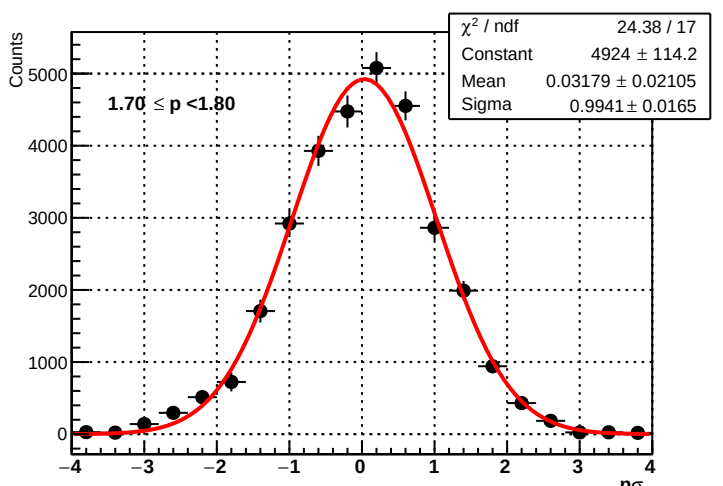

Counts
χ^2 / ndf 45.61 / 17
Constant 1.596e+04 ± 1.879e+02
Mean 0.09209 ± 0.01001
Sigma 0.9885 ± 0.0077
1.20 ≤ p <1.30
nσ$_\pi$

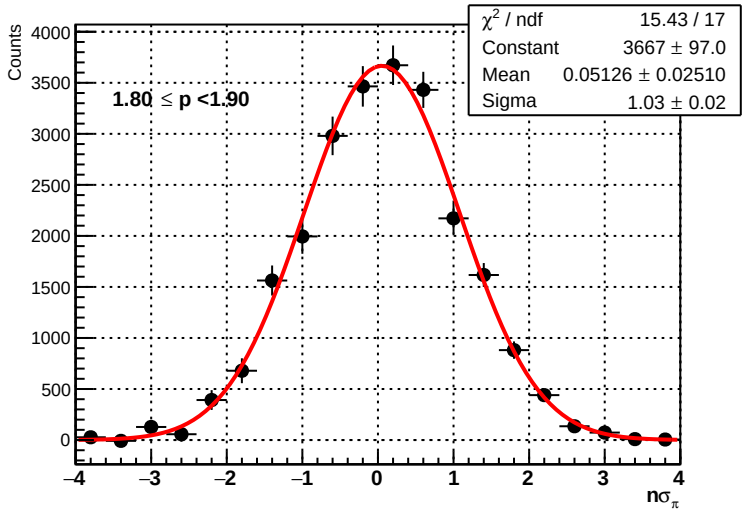

Counts
χ^2 / ndf 32.11 / 17
Constant 1.249e+04 ± 1.664e+02
Mean 0.09329 ± 0.01163
Sigma 1.018 ± 0.009
1.30 ≤ p <1.40
nσ$_\pi$

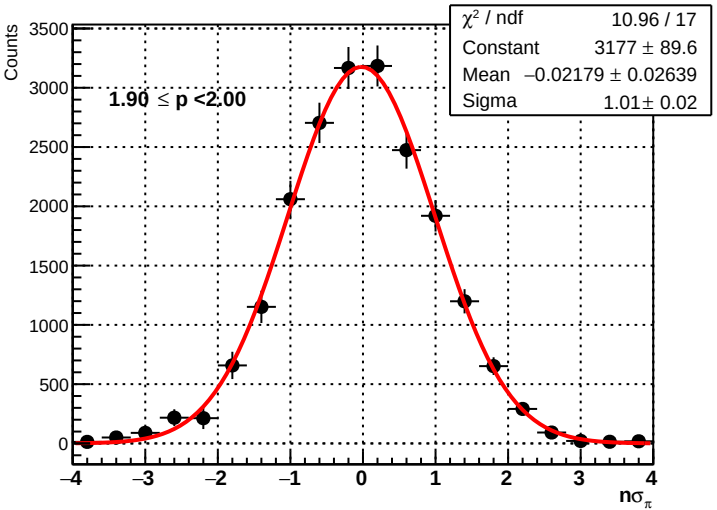

Counts
χ^2 / ndf 18.54 / 17
Constant 9770 ± 154.4
Mean 0.08212 ± 0.01384
Sigma 0.9995 ± 0.0109
1.40 ≤ p <1.50
nσ$_\pi$

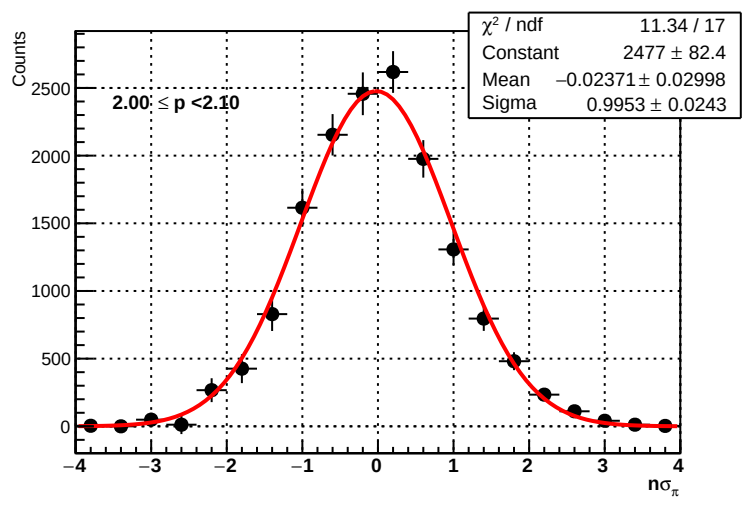

Counts
χ^2 / ndf 25.99 / 17
Constant 7850 ± 141.0
Mean 0.05965 ± 0.01566
Sigma 1.002 ± 0.013
1.50 ≤ p <1.60
nσ$_\pi$

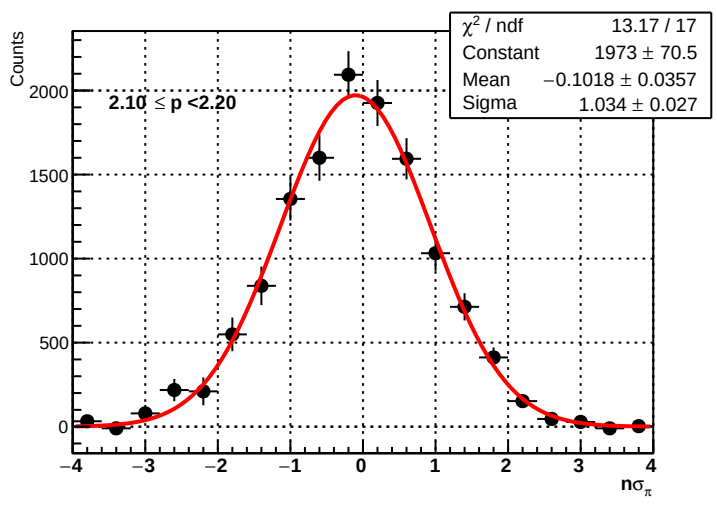

Counts
χ^2 / ndf 34.84 / 17
Constant 6269 ± 128.4
Mean 0.03211 ± 0.01793
Sigma 0.9876 ± 0.0145
1.60 ≤ p <1.70
nσ$_\pi$

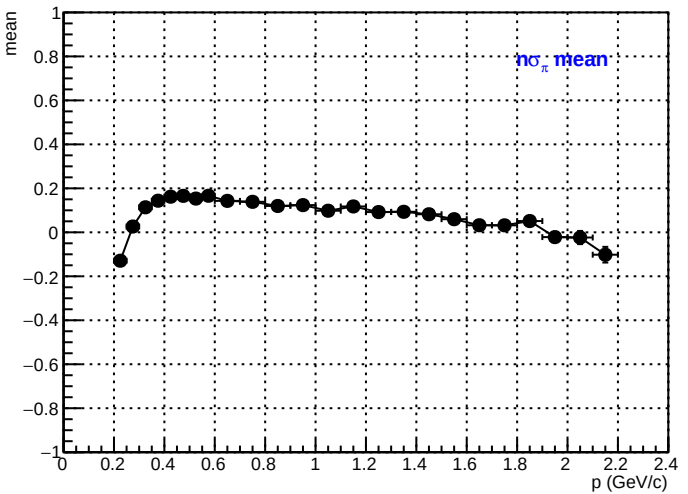

Counts
χ^2 / ndf 24.38 / 17
Constant 4924 ± 114.2
Mean 0.03179 ± 0.02105
Sigma 0.9941 ± 0.0165
1.70 ≤ p <1.80
nσ$_\pi$

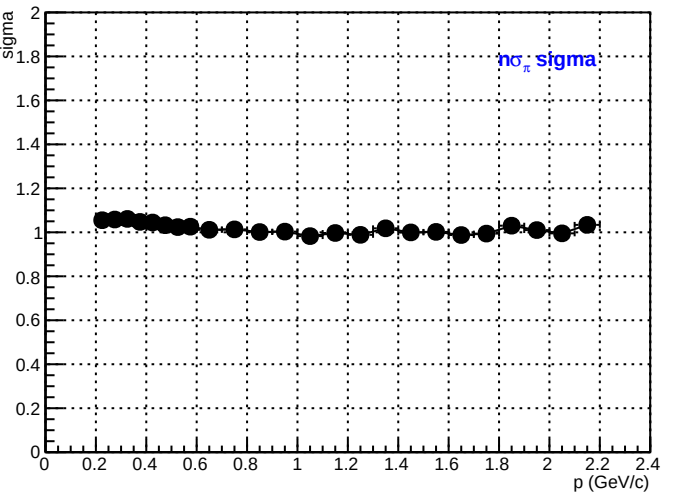

χ² / ndf 15.43 / 17
Constant 3667 ± 97.0
Mean 0.05126 ± 0.02510
Sigma 1.03 ± 0.02
1.80 ≤ p <1.90
Counts
nσπ

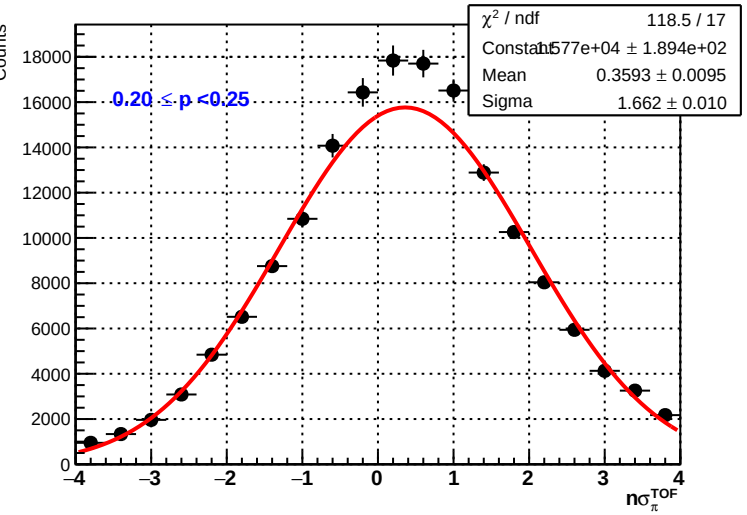

χ² / ndf 10.96 / 17
Constant 3177 ± 89.6
Mean −0.02179 ± 0.02639
Sigma 1.01± 0.02
1.90 ≤ p <2.00
Counts
nσπ

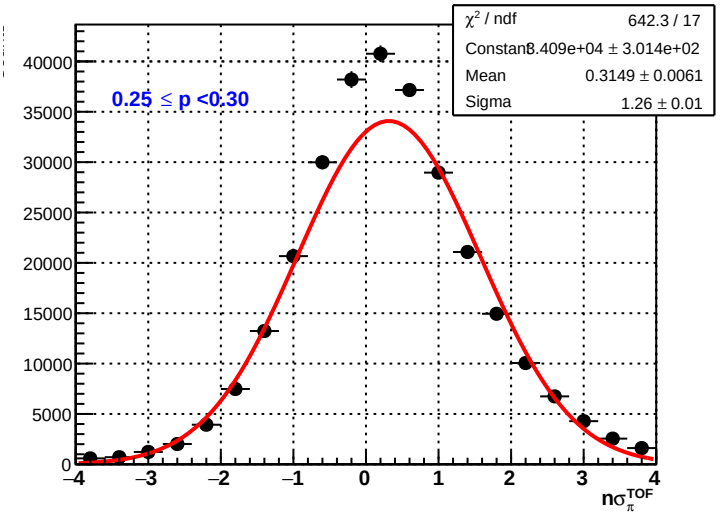

χ² / ndf 11.34 / 17
Constant 2477 ± 82.4
Mean −0.02371± 0.02998
Sigma 0.9953 ± 0.0243
2.00 ≤ p <2.10
Counts
nσπ

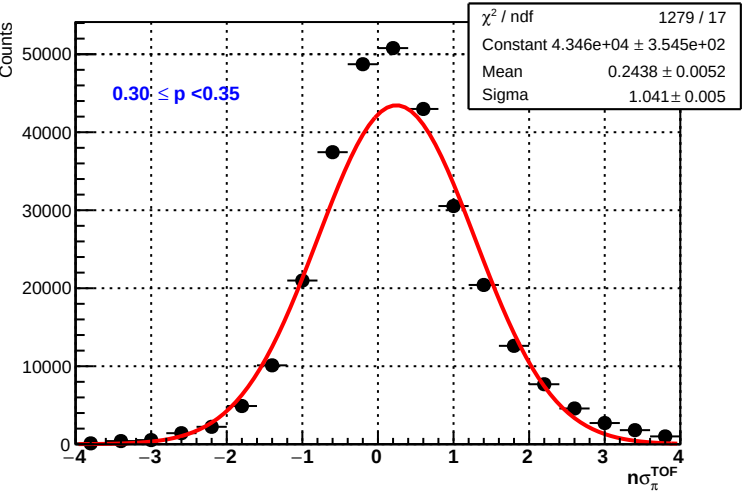

χ² / ndf 13.17 / 17
Constant 1973 ± 70.5
Mean −0.1018 ± 0.0357
Sigma 1.034 ± 0.027
2.10 ≤ p <2.20
Counts
nσπ

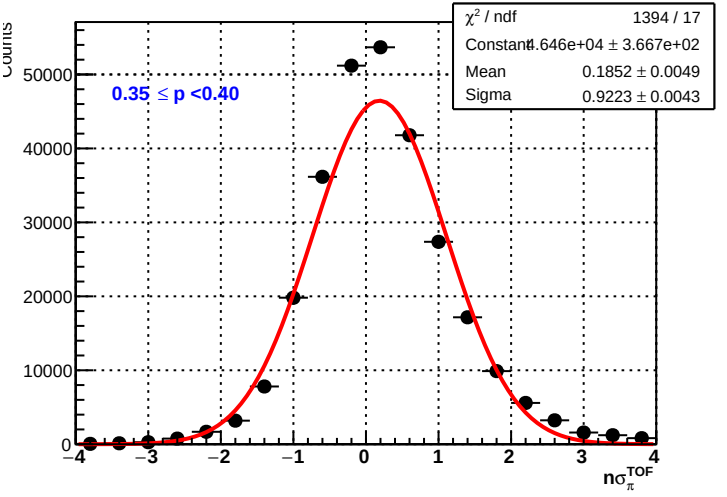

mean
nσ_π mean
p (GeV/c)

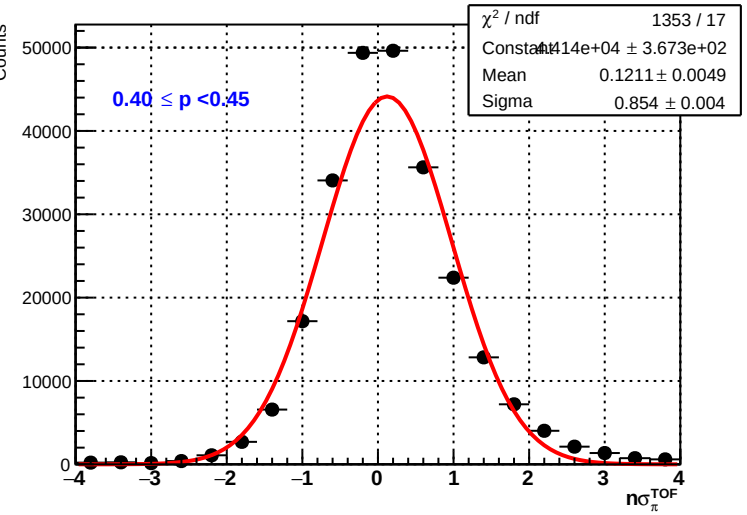

sigma
nσ_π sigma
p (GeV/c)

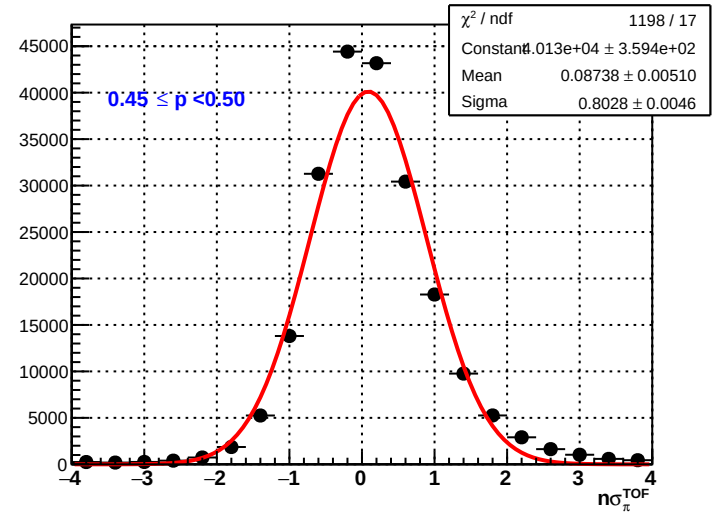

χ² / ndf 118.5 / 17
Constant 1.577e+04 ± 1.894e+02
Mean 0.3593 ± 0.0095
Sigma 1.662 ± 0.010
0.20 ≤ p <0.25
Counts
nσ_π^TOF

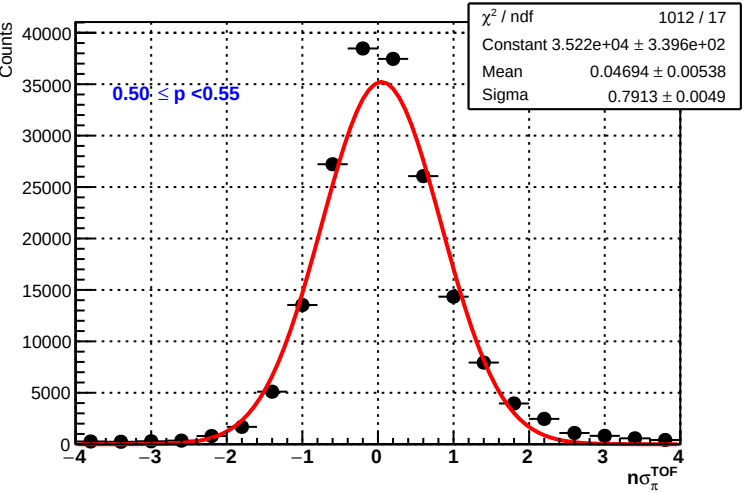

χ² / ndf 642.3 / 17
Constant 8.409e+04 ± 3.014e+02
Mean 0.3149 ± 0.0061
Sigma 1.26 ± 0.01
0.25 ≤ p <0.30
nσ_π^TOF

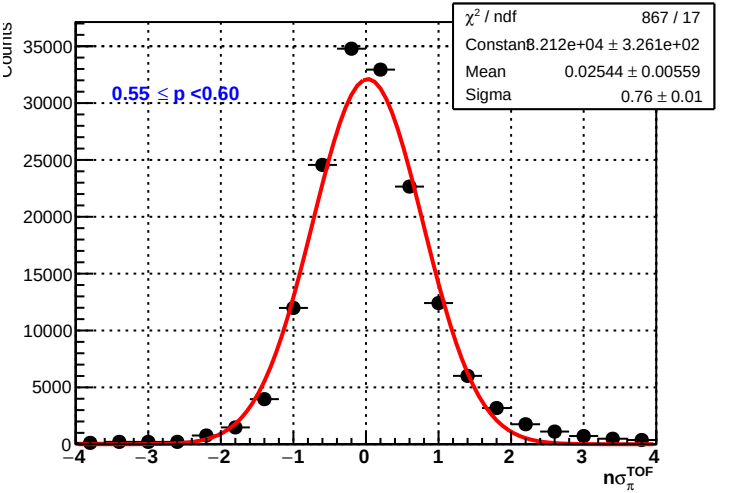

χ² / ndf 1279 / 17
Constant 4.346e+04 ± 3.545e+02
Mean 0.2438 ± 0.0052
Sigma 1.041 ± 0.005
0.30 ≤ p <0.35
Counts
nσ_π^TOF

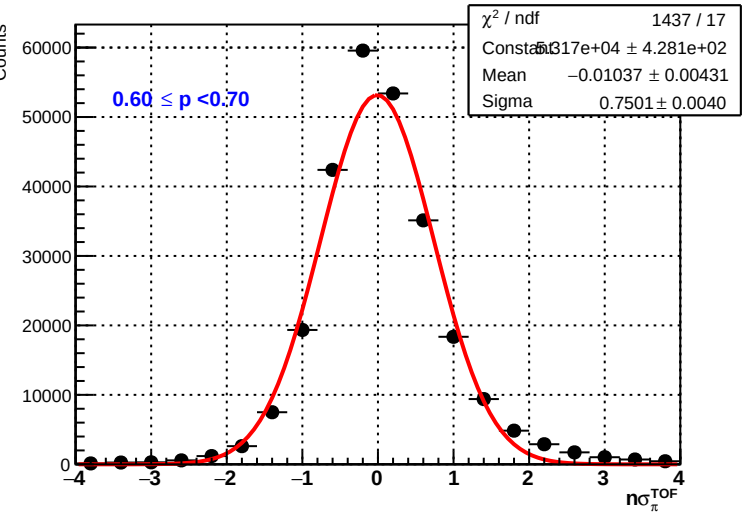

χ² / ndf 1394 / 17
Constant 4.646e+04 ± 3.667e+02
Mean 0.1852 ± 0.0049
Sigma 0.9223 ± 0.0043
0.35 ≤ p <0.40
Counts
nσ_π^TOF

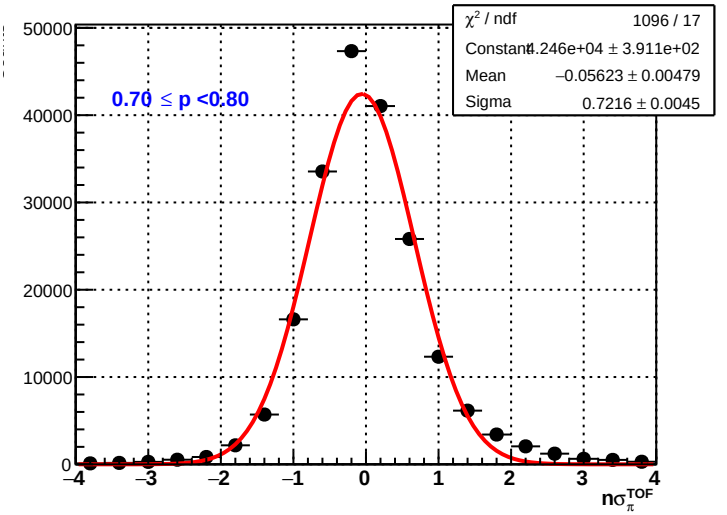

χ^2 / ndf 1353 / 17
Constant 4.414e+04 ± 3.673e+02
Mean 0.1211 ± 0.0049
Sigma 0.854 ± 0.004
0.40 ≤ p <0.45
Counts
$n\sigma_\pi^{TOF}$

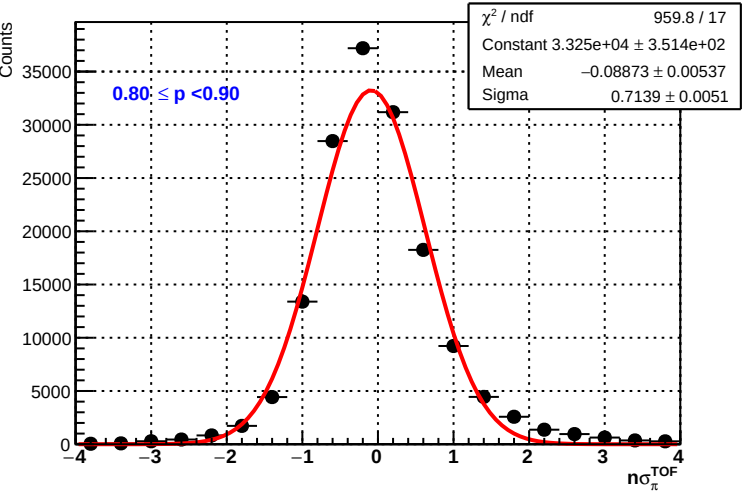

χ^2 / ndf 1198 / 17
Constant 4.013e+04 ± 3.594e+02
Mean 0.08738 ± 0.00510
Sigma 0.8028 ± 0.0046
0.45 ≤ p <0.50
$n\sigma_\pi^{TOF}$

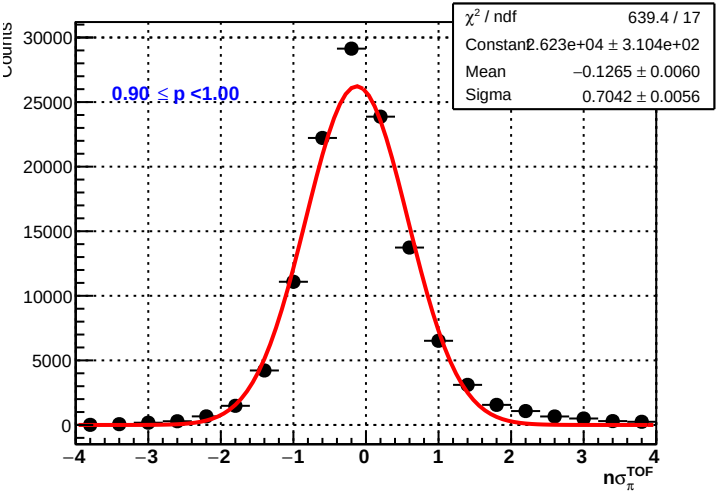

χ^2 / ndf 1012 / 17
Constant 3.522e+04 ± 3.396e+02
Mean 0.04694 ± 0.00538
Sigma 0.7913 ± 0.0049
0.50 ≤ p <0.55
Counts
$n\sigma_\pi^{TOF}$

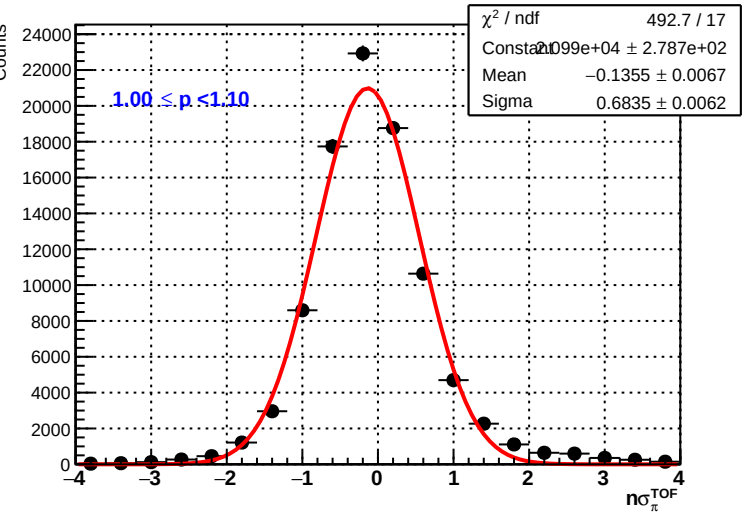

χ^2 / ndf 867 / 17
Constant 3.212e+04 ± 3.261e+02
Mean 0.02544 ± 0.00559
Sigma 0.76 ± 0.01
0.55 ≤ p <0.60
Counts
$n\sigma_\pi^{TOF}$

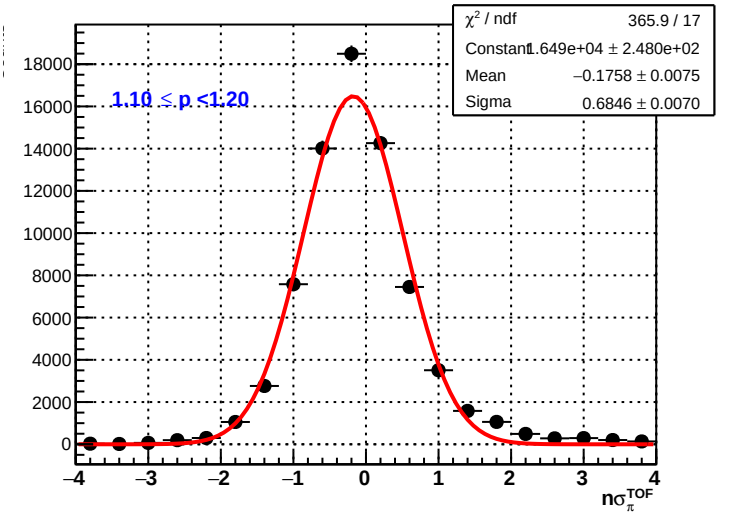

0.60 ≤ p <0.70
χ² / ndf 1437 / 17
Constant 5.317e+04 ± 4.281e+02
Mean −0.01037 ± 0.00431
Sigma 0.7501 ± 0.0040
Counts
nσ_π^TOF

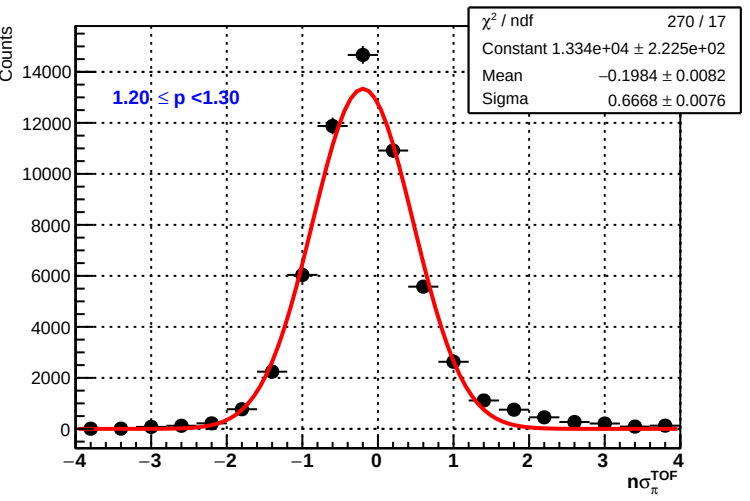

0.70 ≤ p <0.80
χ² / ndf 1096 / 17
Constant 4.246e+04 ± 3.911e+02
Mean −0.05623 ± 0.00479
Sigma 0.7216 ± 0.0045
nσ_π^TOF

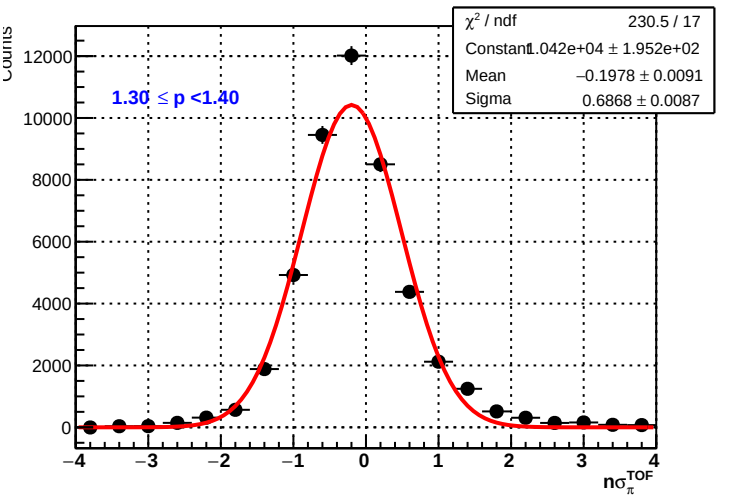

0.80 ≤ p <0.90
χ² / ndf 959.8 / 17
Constant 3.325e+04 ± 3.514e+02
Mean −0.08873 ± 0.00537
Sigma 0.7139 ± 0.0051
Counts
nσ_π^TOF

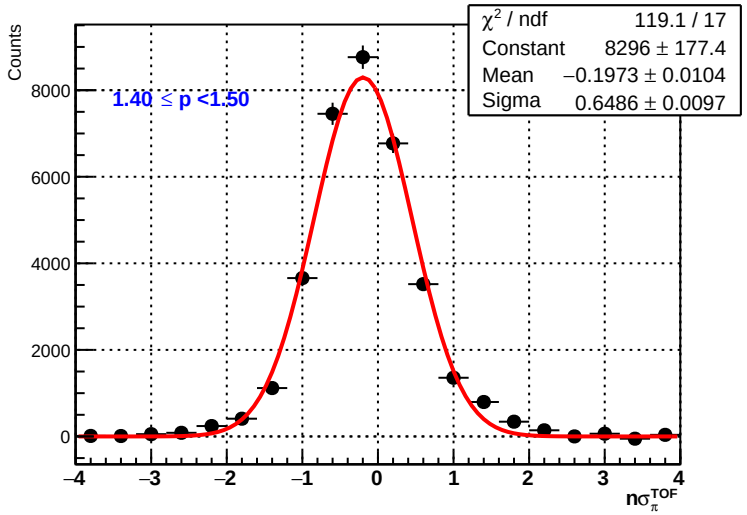

0.90 ≤ p <1.00
χ² / ndf 639.4 / 17
Constant 2.623e+04 ± 3.104e+02
Mean −0.1265 ± 0.0060
Sigma 0.7042 ± 0.0056
Counts
nσ_π^TOF

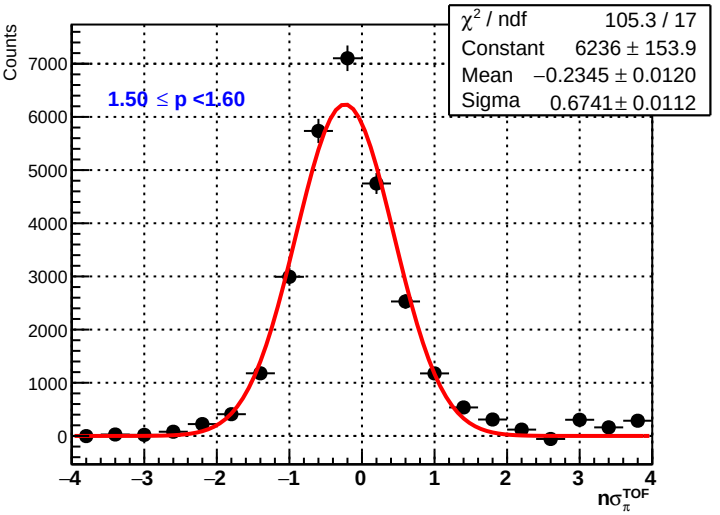

χ² / ndf 492.7 / 17
Constant 2.099e+04 ± 2.787e+02
Mean −0.1355 ± 0.0067
Sigma 0.6835 ± 0.0062
1.00 ≤ p <1.10
Counts
nσ_π^TOF

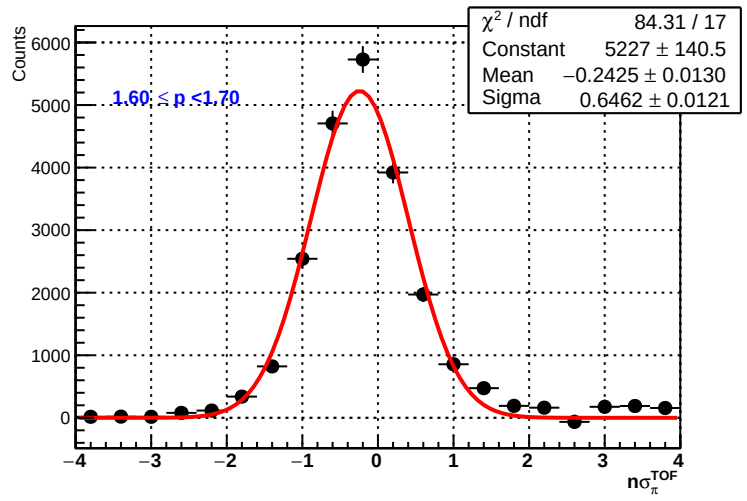

χ² / ndf 365.9 / 17
Constant 1.649e+04 ± 2.480e+02
Mean −0.1758 ± 0.0075
Sigma 0.6846 ± 0.0070
1.10 ≤ p <1.20
nσ_π^TOF

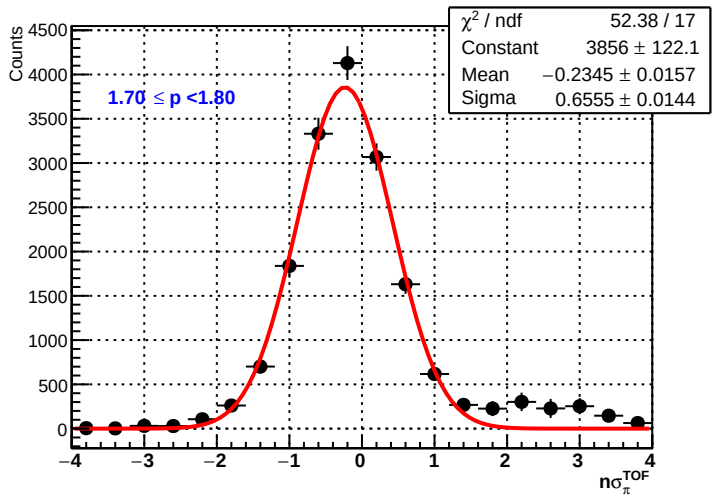

χ² / ndf 270 / 17
Constant 1.334e+04 ± 2.225e+02
Mean −0.1984 ± 0.0082
Sigma 0.6668 ± 0.0076
1.20 ≤ p <1.30
Counts
nσ_π^TOF

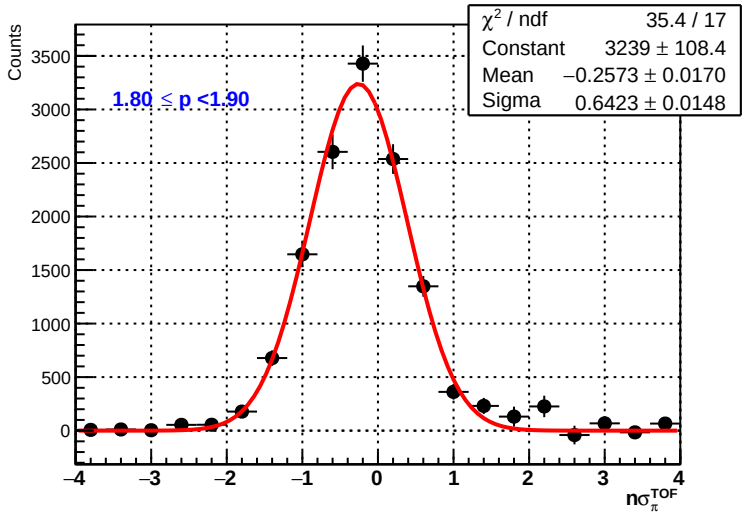

χ² / ndf 230.5 / 17
Constant 1.042e+04 ± 1.952e+02
Mean −0.1978 ± 0.0091
Sigma 0.6868 ± 0.0087
1.30 ≤ p <1.40
Counts
nσ_π^TOF

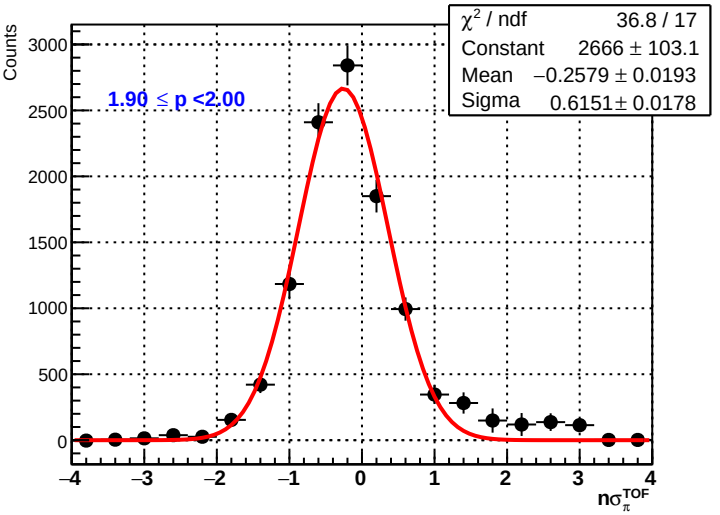

Counts
1.40 ≤ p <1.50
χ² / ndf 119.1 / 17
Constant 8296 ± 177.4
Mean −0.1973 ± 0.0104
Sigma 0.6486 ± 0.0097
nσ_π^TOF

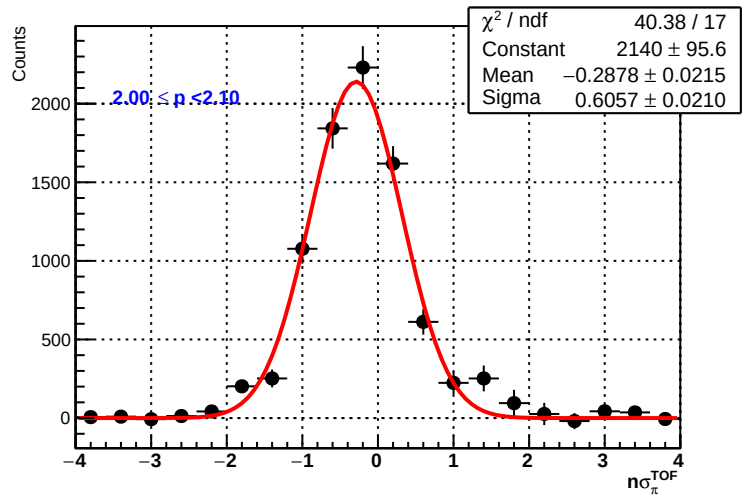

Counts
1.50 ≤ p <1.60
χ² / ndf 105.3 / 17
Constant 6236 ± 153.9
Mean −0.2345 ± 0.0120
Sigma 0.6741 ± 0.0112
nσ_π^TOF

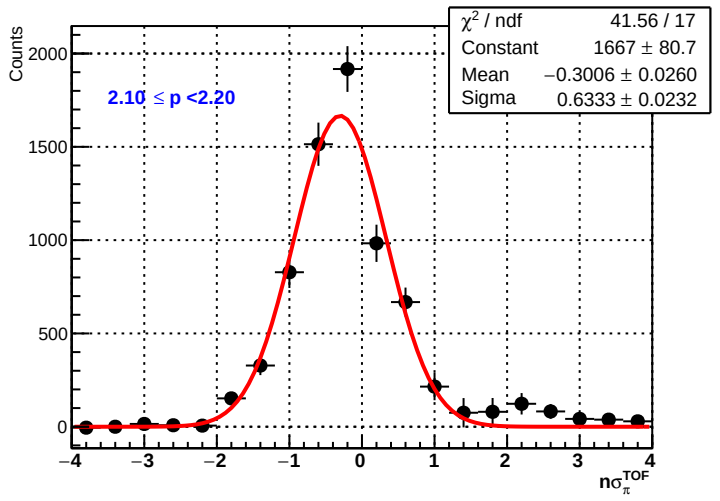

Counts
1.60 ≤ p <1.70
χ² / ndf 84.31 / 17
Constant 5227 ± 140.5
Mean −0.2425 ± 0.0130
Sigma 0.6462 ± 0.0121
nσ_π^TOF

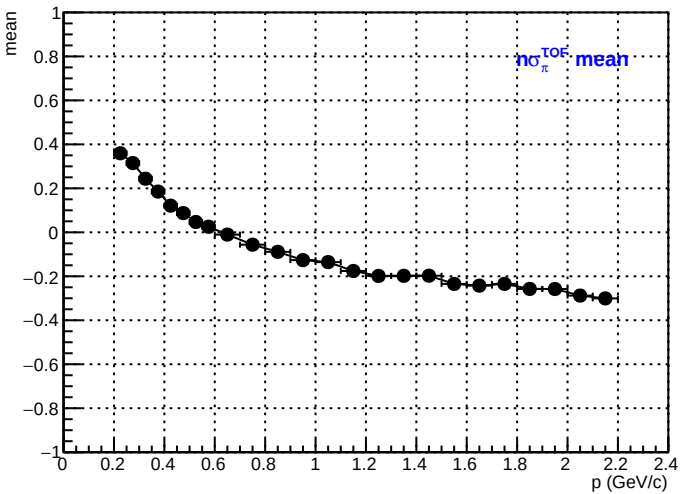

Counts
1.70 ≤ p <1.80
χ² / ndf 52.38 / 17
Constant 3856 ± 122.1
Mean −0.2345 ± 0.0157
Sigma 0.6555 ± 0.0144
nσ_π^TOF

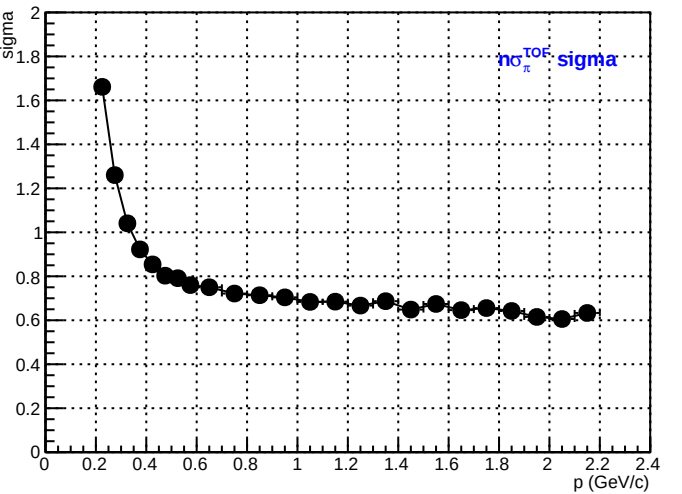

Counts
1.80 ≤ p <1.90
χ² / ndf 35.4 / 17
Constant 3239 ± 108.4
Mean −0.2573 ± 0.0170
Sigma 0.6423 ± 0.0148
nσ_π^TOF

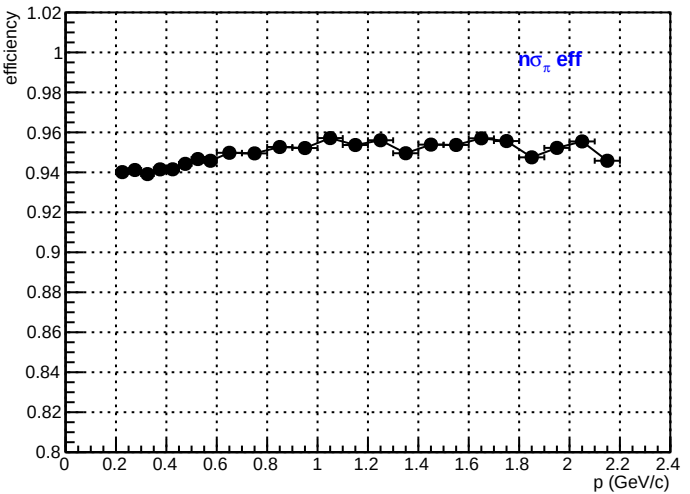

Counts
1.90 ≤ p <2.00
χ² / ndf 36.8 / 17
Constant 2666 ± 103.1
Mean −0.2579 ± 0.0193
Sigma 0.6151 ± 0.0178
nσ_π^TOF

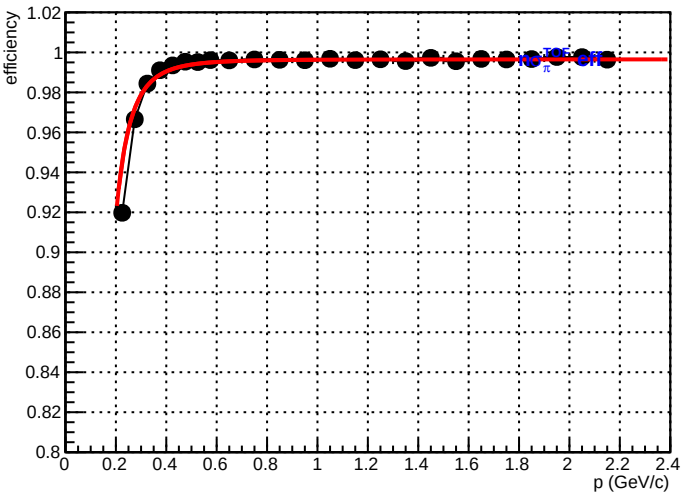

Counts
2.00 ≤ p <2.10
χ² / ndf 40.38 / 17
Constant 2140 ± 95.6
Mean −0.2878 ± 0.0215
Sigma 0.6057 ± 0.0210
nσ_π^TOF

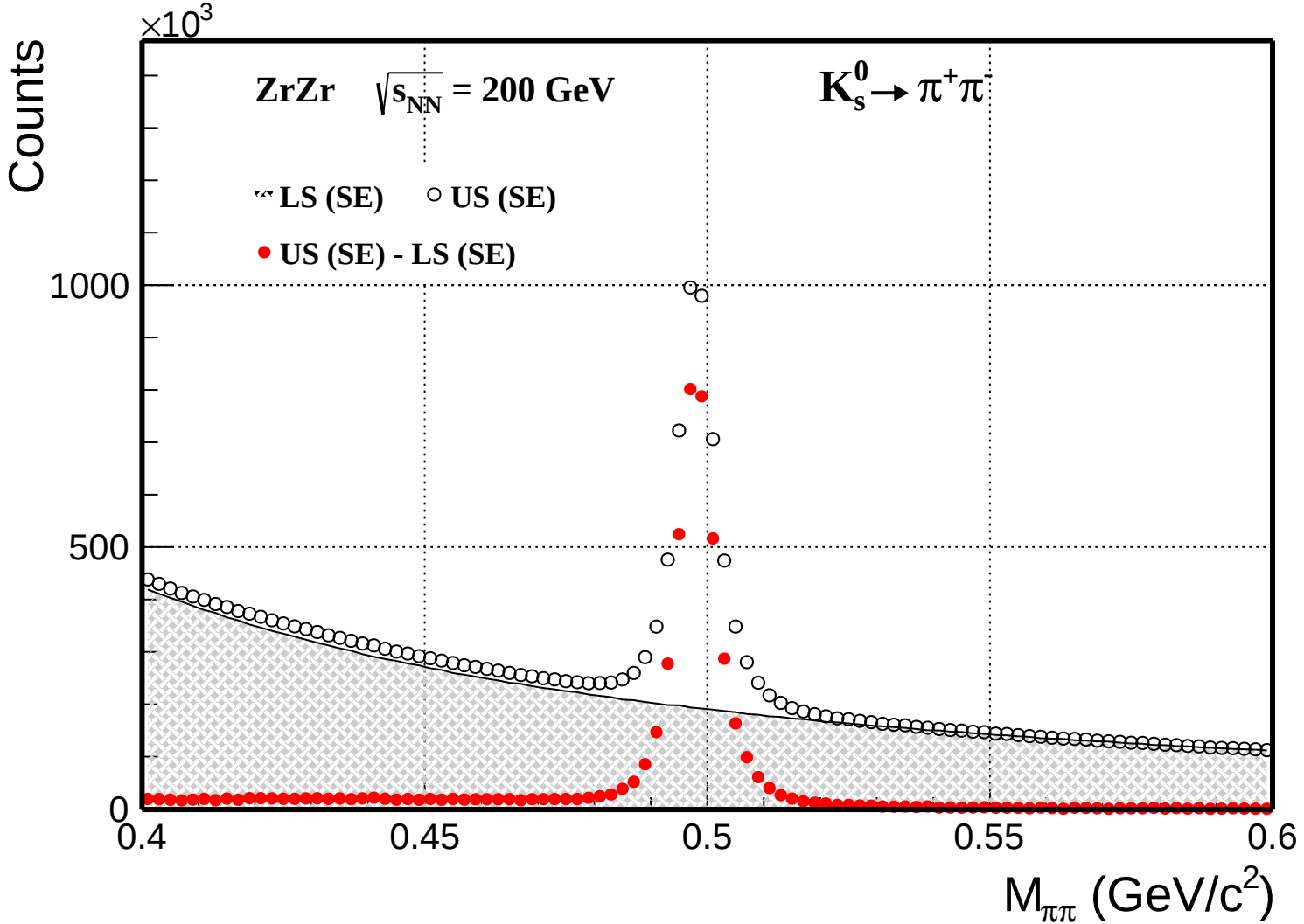

Counts
2.10 ≤ p <2.20
χ² / ndf 41.56 / 17
Constant 1667 ± 80.7
Mean −0.3006 ± 0.0260
Sigma 0.6333 ± 0.0232
nσ_π^TOF


mean
1
0.8
0.6
0.4
0.2
0
−0.2
−0.4
−0.6
−0.8
−1
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
2.2
2.4
p (GeV/c)
nσ_π^TOF mean


sigma
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
2.2
2.4
p (GeV/c)
nσ_π^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
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
2.2
2.4
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
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
2.2
2.4
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)

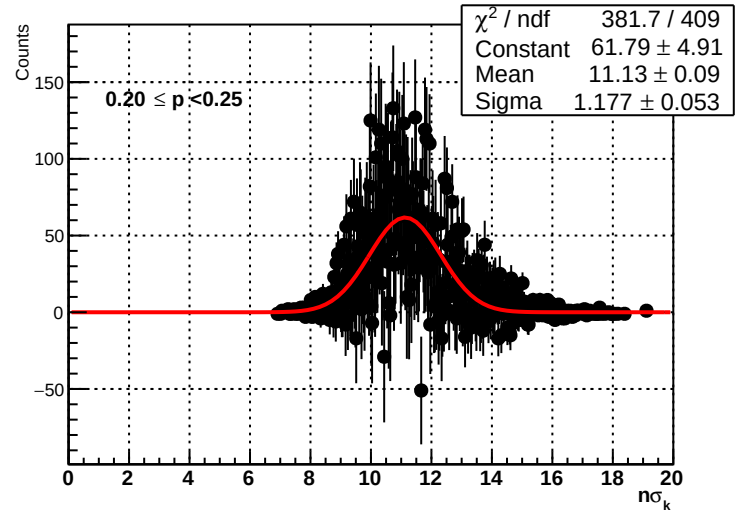
k PID and efficiency in Zr+Zr 200 GeV

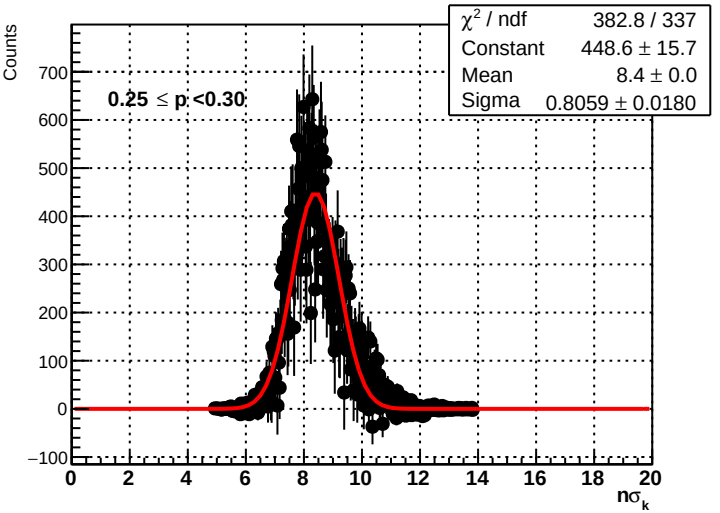
Target k

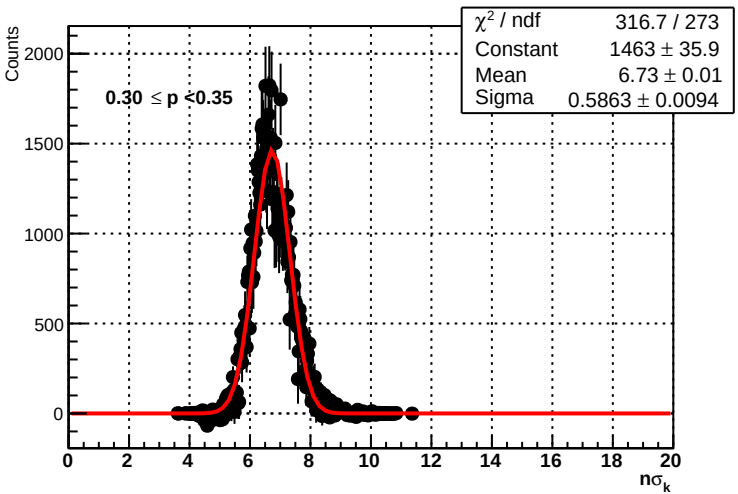
- $p_T > 0.5$
- $|\eta| < 1$
- nHitsFit ≥ 20
- ndEdx > 15
- gDca < 2
- $|n\sigma_\pi| < 2.0$
- $|n\sigma_\pi^{TOF}| < 2.0$

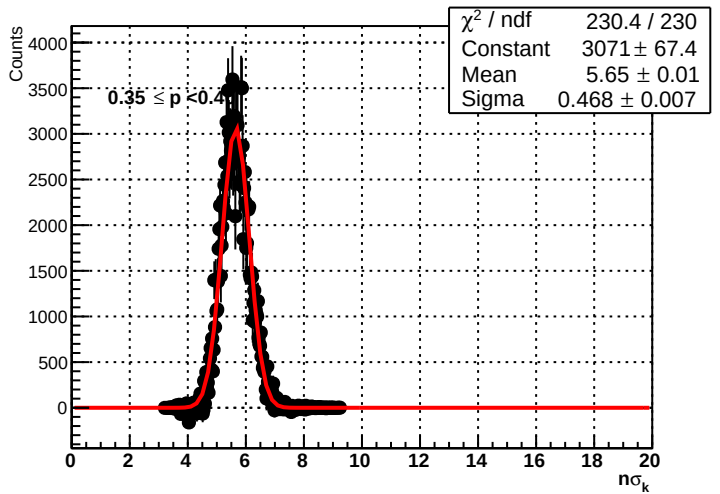
Partner k

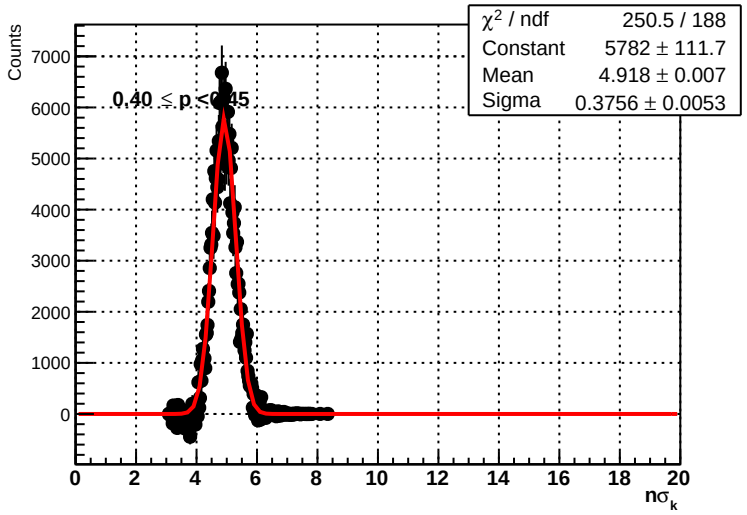
- $p_T > 0.2$
- $|\eta| < 1$
- nHitsFit ≥ 20
- ndEdx > 15
- gDca < 2.
- $|n\sigma_\pi| < 4.0$
- $|n\sigma_\pi^{TOF}| < 4.0$

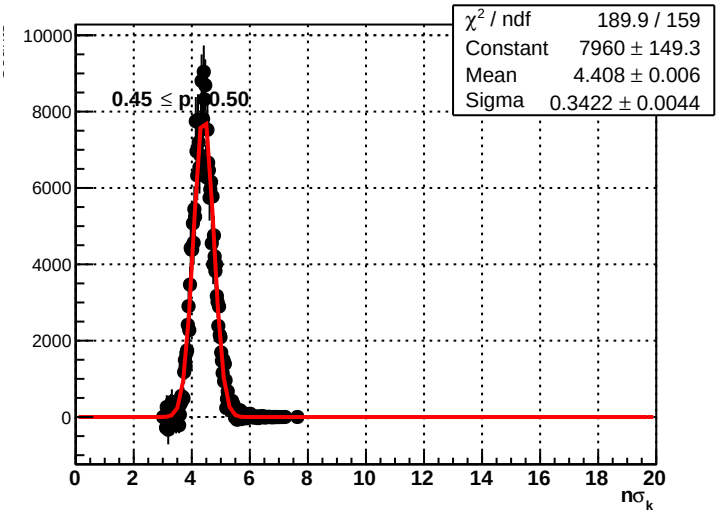

χ^2 / ndf 381.7 / 409
Constant 61.79 ± 4.91
Mean 11.13 ± 0.09
Sigma 1.177 ± 0.053
0.20 ≤ p <0.25
Counts
nσ_k

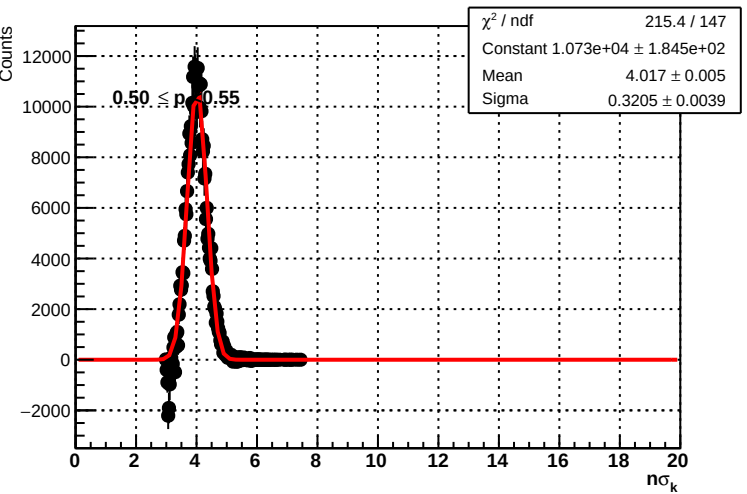

χ^2 / ndf 382.8 / 337
Constant 448.6 ± 15.7
Mean 8.4 ± 0.0
Sigma 0.8059 ± 0.0180
0.25 ≤ p <0.30
Counts
nσ_k

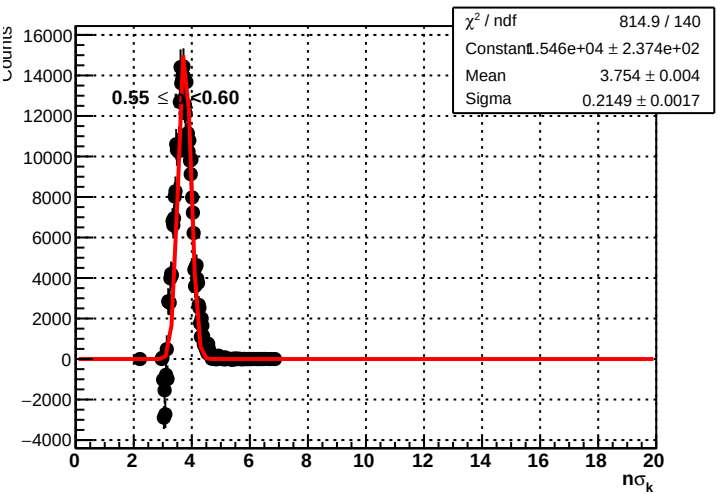

χ^2 / ndf 316.7 / 273
Constant 1463 ± 35.9
Mean 6.73 ± 0.01
Sigma 0.5863 ± 0.0094
0.30 ≤ p <0.35
Counts
nσ_k

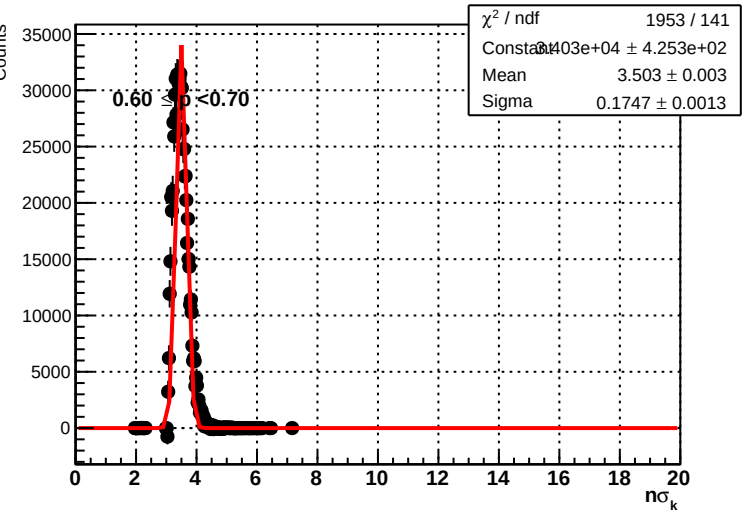

χ^2 / ndf 230.4 / 230
Constant 3071 ± 67.4
Mean 5.65 ± 0.01
Sigma 0.468 ± 0.007
0.35 ≤ p <0.4
Counts
nσ_k

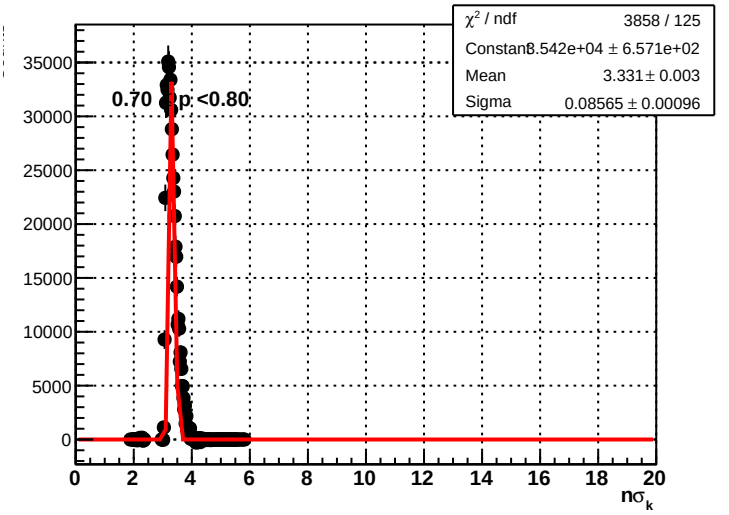

χ² / ndf 250.5 / 188
Constant 5782 ± 111.7
Mean 4.918 ± 0.007
Sigma 0.3756 ± 0.0053
0.40 ≤ p < 0.45
Counts
nσ_k

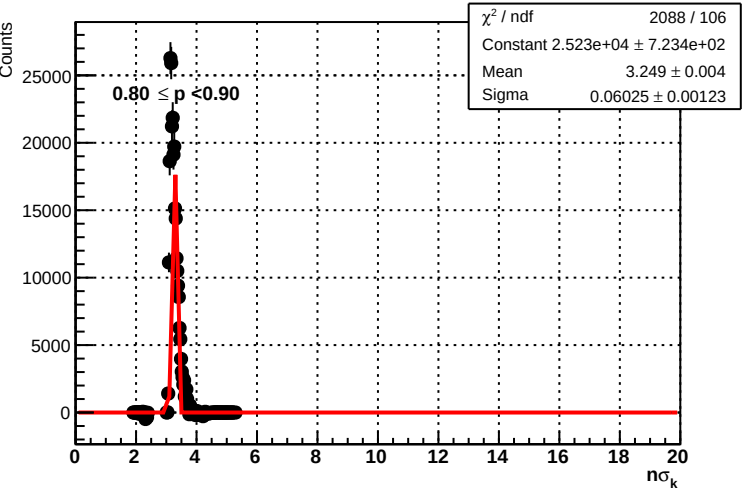

χ² / ndf 189.9 / 159
Constant 7960 ± 149.3
Mean 4.408 ± 0.006
Sigma 0.3422 ± 0.0044
0.45 ≤ p < 0.50
nσ_k

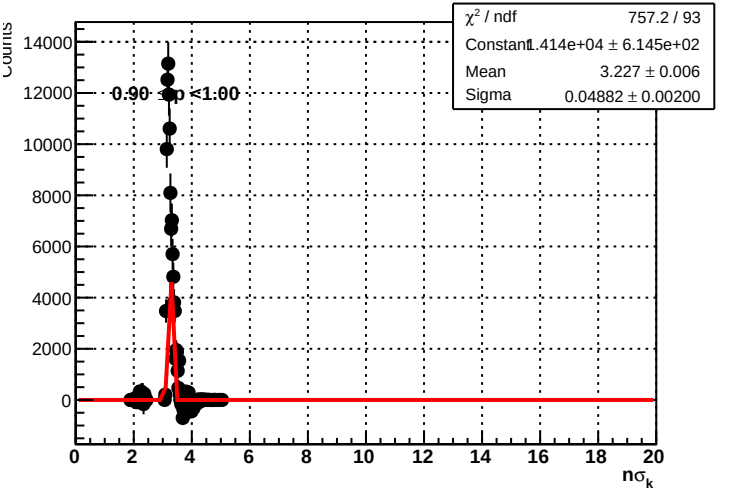

χ² / ndf 215.4 / 147
Constant 1.073e+04 ± 1.845e+02
Mean 4.017 ± 0.005
Sigma 0.3205 ± 0.0039
0.50 ≤ p < 0.55
Counts
nσ_k

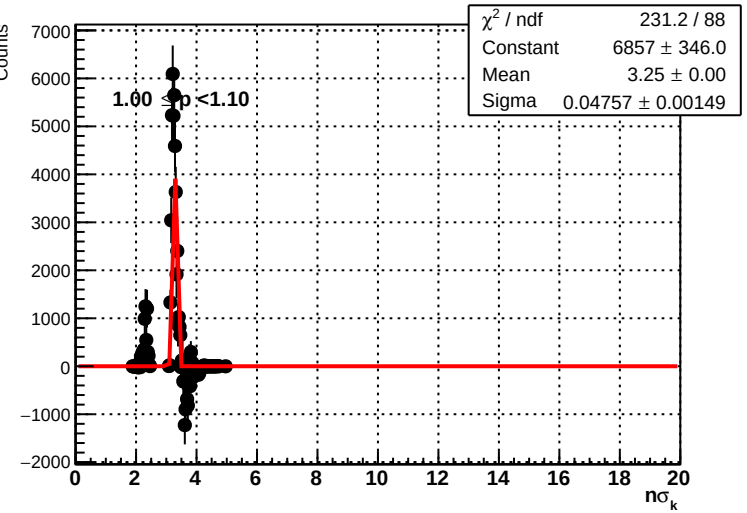

χ² / ndf 814.9 / 140
Constant 1.546e+04 ± 2.374e+02
Mean 3.754 ± 0.004
Sigma 0.2149 ± 0.0017
0.55 ≤ p < 0.60
Counts
nσ_k

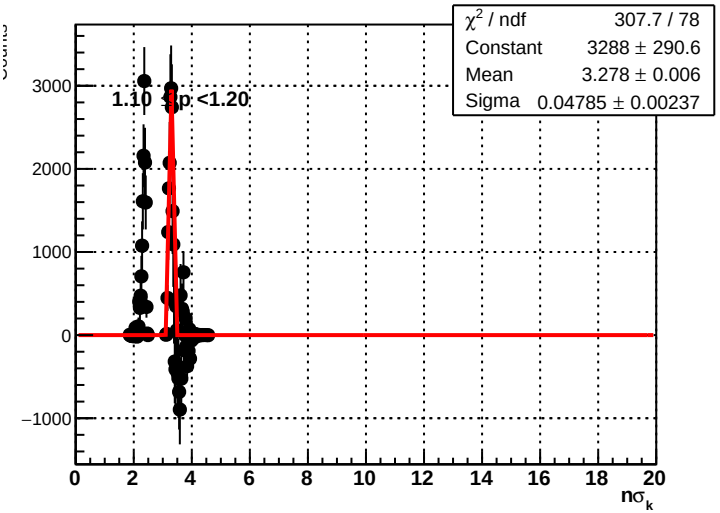

0.60 ≤ p <0.70
χ² / ndf 1953 / 141
Constant 3.403e+04 ± 4.253e+02
Mean 3.503 ± 0.003
Sigma 0.1747 ± 0.0013
Counts
nσk

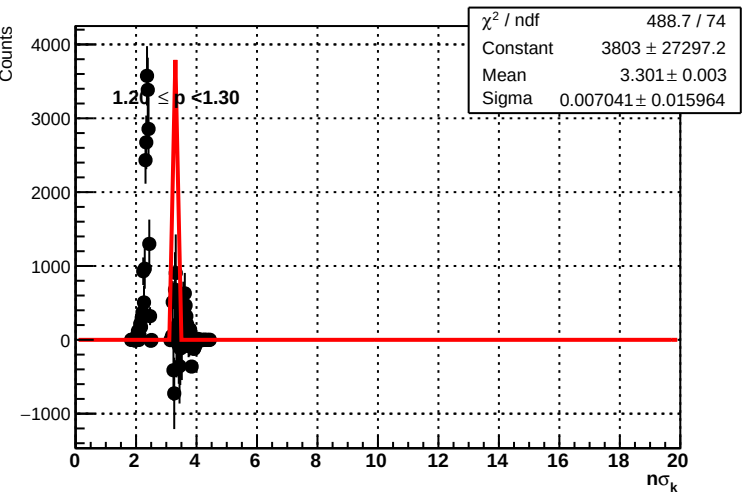

0.70 ≤ p <0.80
χ² / ndf 3858 / 125
Constant 3.542e+04 ± 6.571e+02
Mean 3.331 ± 0.003
Sigma 0.08565 ± 0.00096
nσk

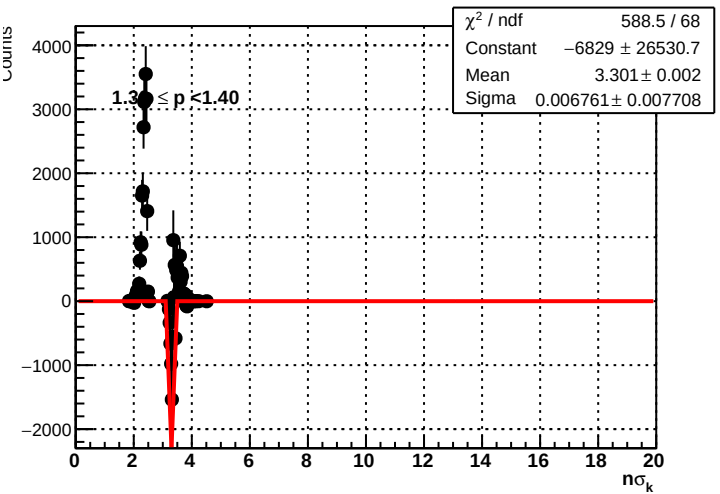

0.80 ≤ p <0.90
χ² / ndf 2088 / 106
Constant 2.523e+04 ± 7.234e+02
Mean 3.249 ± 0.004
Sigma 0.06025 ± 0.00123
Counts
nσk

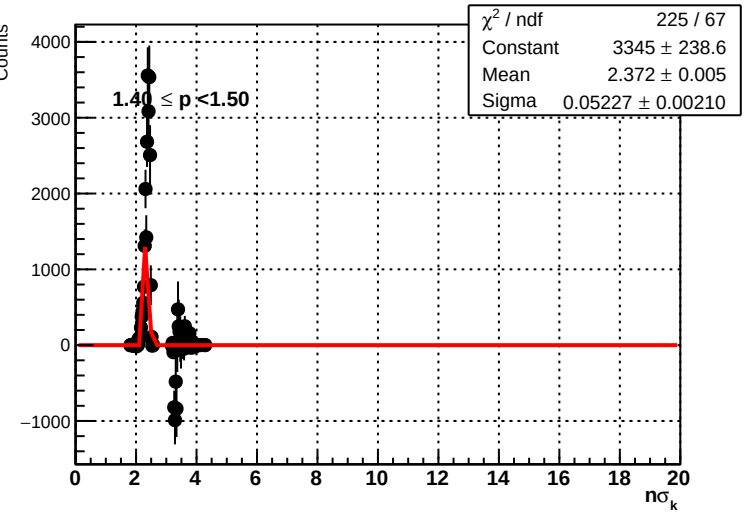

0.90 ≤ p <1.00
χ² / ndf 757.2 / 93
Constant 1.414e+04 ± 6.145e+02
Mean 3.227 ± 0.006
Sigma 0.04882 ± 0.00200
Counts
nσk

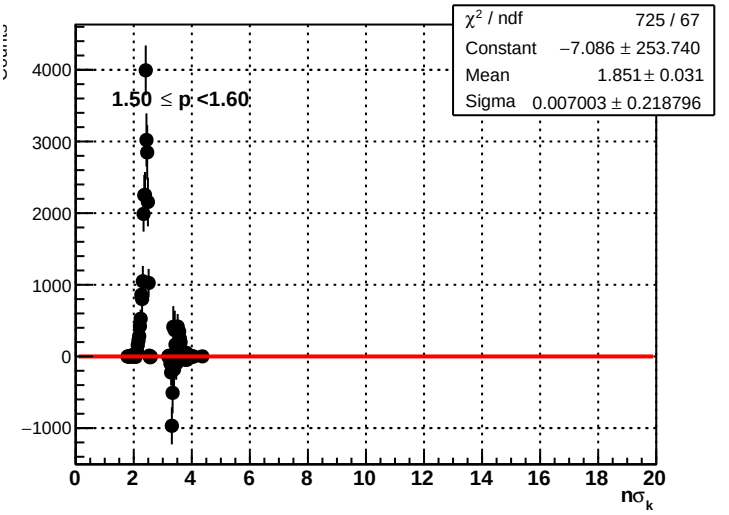

Counts
χ^2 / ndf 231.2 / 88
Constant 6857 ± 346.0
Mean 3.25 ± 0.00
Sigma 0.04757 ± 0.00149
1.00 ≤ p <1.10
nσ$_k$

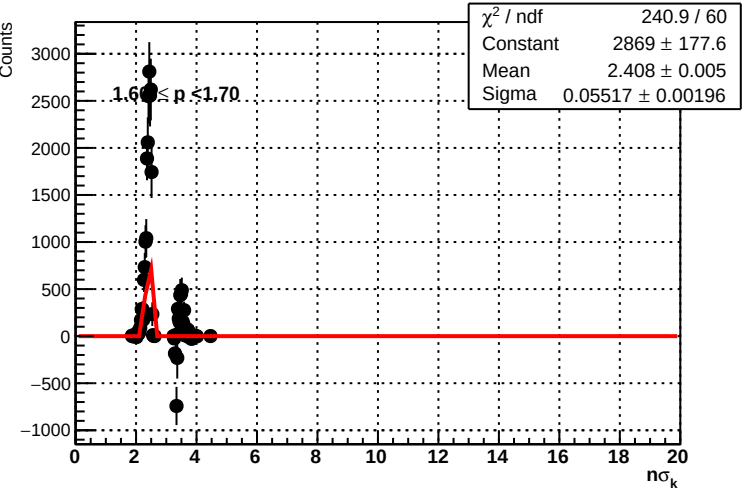

χ^2 / ndf 307.7 / 78
Constant 3288 ± 290.6
Mean 3.278 ± 0.006
Sigma 0.04785 ± 0.00237
1.10 ≤ p <1.20
nσ$_k$

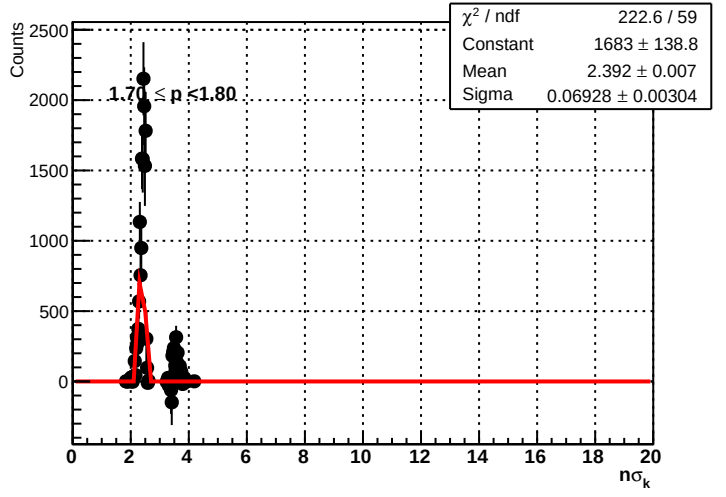

Counts
χ^2 / ndf 488.7 / 74
Constant 3803 ± 27297.2
Mean 3.301 ± 0.003
Sigma 0.007041 ± 0.015964
1.20 ≤ p <1.30
nσ$_k$

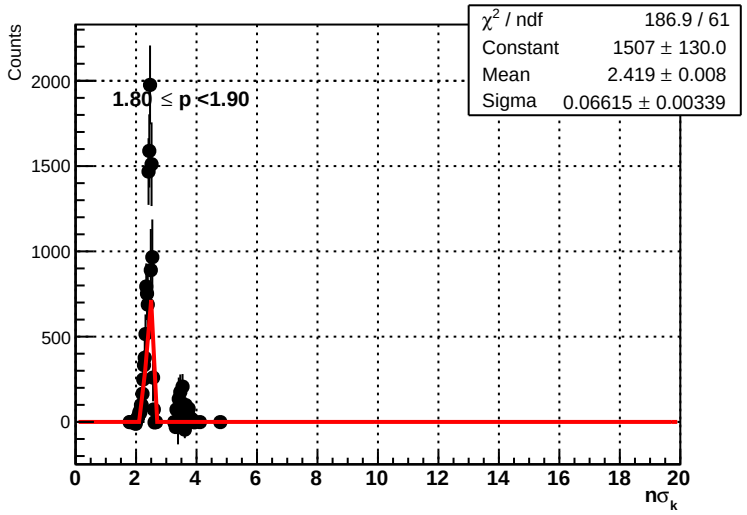

Counts
χ^2 / ndf 588.5 / 68
Constant −6829 ± 26530.7
Mean 3.301 ± 0.002
Sigma 0.006761 ± 0.007708
1.30 ≤ p <1.40
nσ$_k$

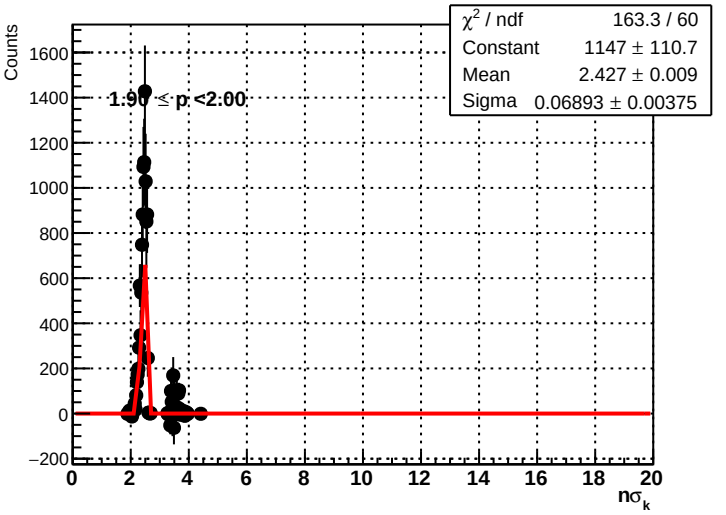

Counts
1.40 ≤ p <1.50
χ² / ndf 225 / 67
Constant 3345 ± 238.6
Mean 2.372 ± 0.005
Sigma 0.05227 ± 0.00210
nσ_k

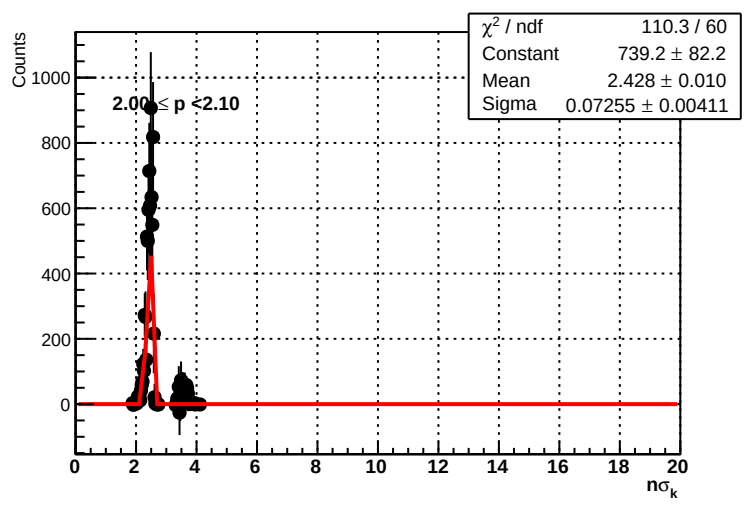

1.50 ≤ p <1.60
χ² / ndf 725 / 67
Constant −7.086 ± 253.740
Mean 1.851 ± 0.031
Sigma 0.007003 ± 0.218796
nσ_k

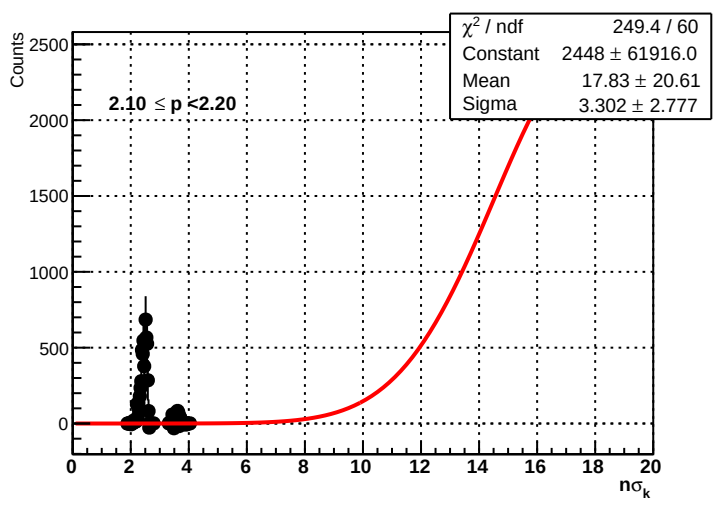

Counts
1.60 ≤ p <1.70
χ² / ndf 240.9 / 60
Constant 2869 ± 177.6
Mean 2.408 ± 0.005
Sigma 0.05517 ± 0.00196
nσ_k

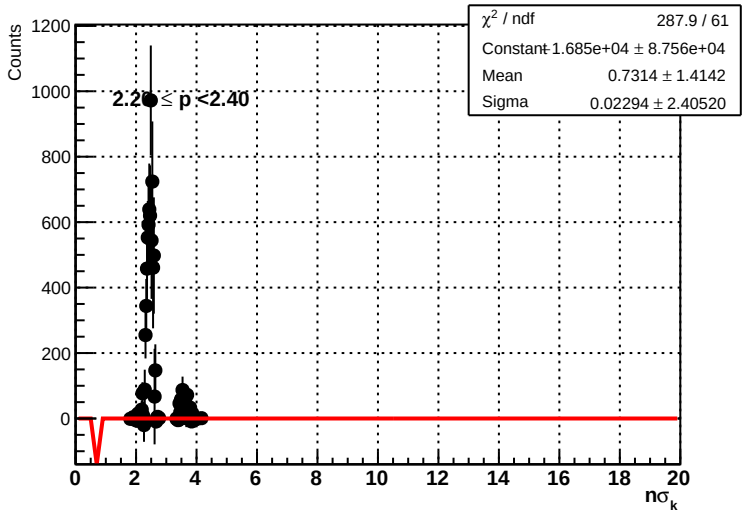

Counts
1.70 ≤ p <1.80
χ² / ndf 222.6 / 59
Constant 1683 ± 138.8
Mean 2.392 ± 0.007
Sigma 0.06928 ± 0.00304
nσ_k

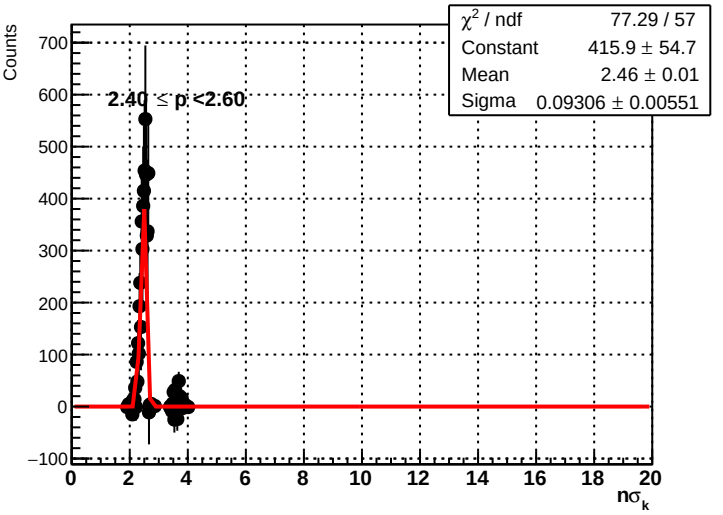

Counts
1.80 ≤ p <1.90
χ² / ndf 186.9 / 61
Constant 1507 ± 130.0
Mean 2.419 ± 0.008
Sigma 0.06615 ± 0.00339
nσ_k

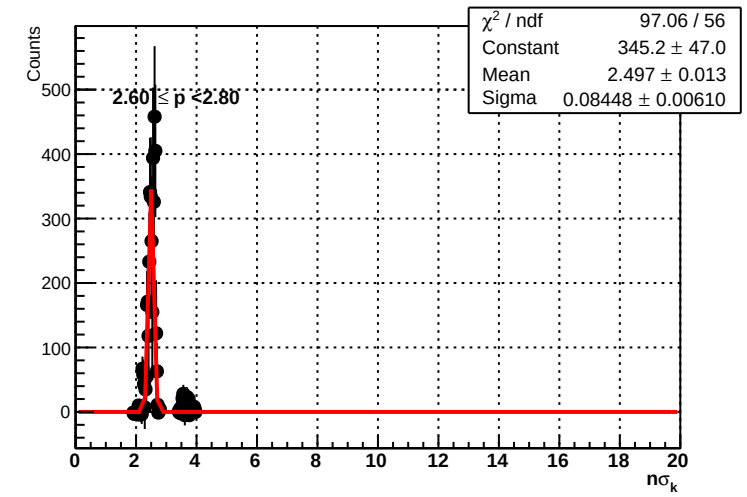

Counts
1.90 ≤ p <2.00
χ² / ndf 163.3 / 60
Constant 1147 ± 110.7
Mean 2.427 ± 0.009
Sigma 0.06893 ± 0.00375
nσ_k

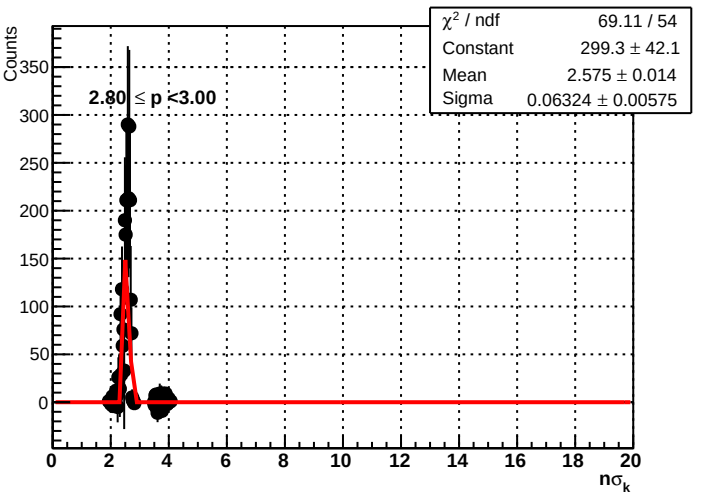

Counts
2.00 ≤ p <2.10
χ² / ndf 110.3 / 60
Constant 739.2 ± 82.2
Mean 2.428 ± 0.010
Sigma 0.07255 ± 0.00411
nσ_k

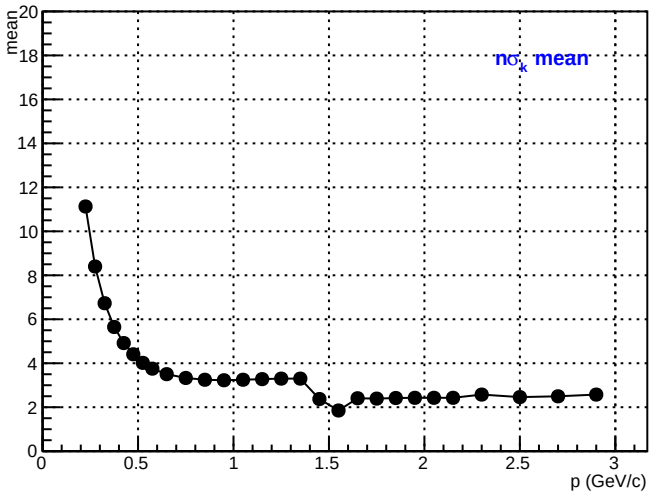

Counts
2.10 ≤ p <2.20
χ² / ndf 249.4 / 60
Constant 2448 ± 61916.0
Mean 17.83 ± 20.61
Sigma 3.302 ± 2.777
nσ_k

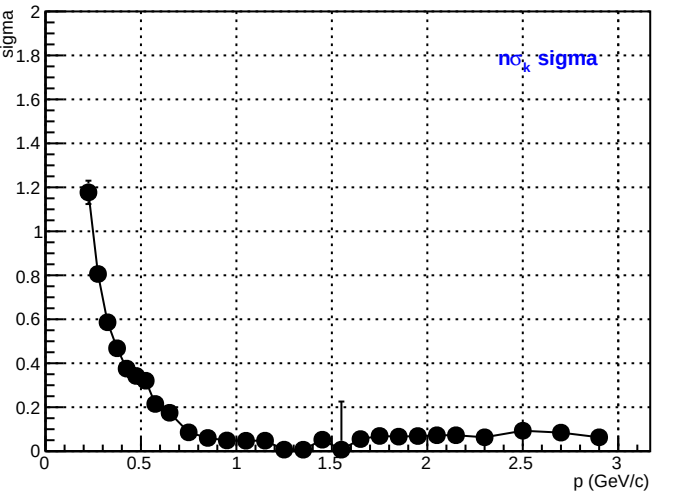

2.20 ≤ p <2.40
χ² / ndf 287.9 / 61
Constant 1.685e+04 ± 8.756e+04
Mean 0.7314 ± 1.4142
Sigma 0.02294 ± 2.40520
Counts
nσk

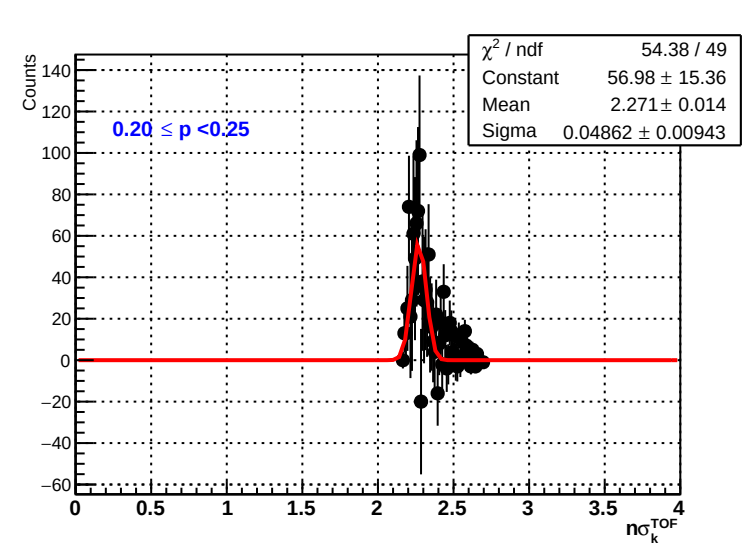

2.40 ≤ p <2.60
χ² / ndf 77.29 / 57
Constant 415.9 ± 54.7
Mean 2.46 ± 0.01
Sigma 0.09306 ± 0.00551
Counts
nσk

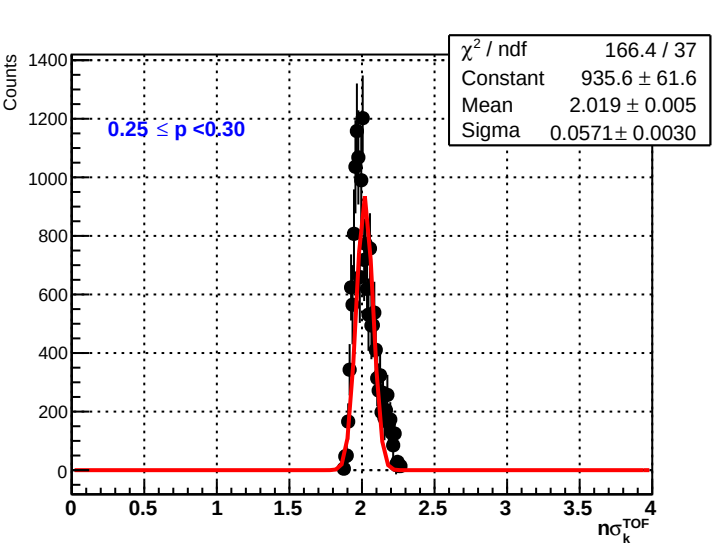

2.60 ≤ p <2.80
χ² / ndf 97.06 / 56
Constant 345.2 ± 47.0
Mean 2.497 ± 0.013
Sigma 0.08448 ± 0.00610
Counts
nσk

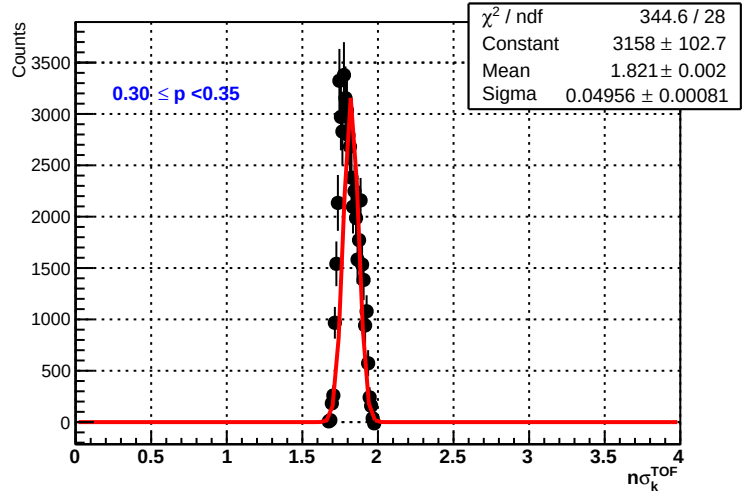

2.80 ≤ p <3.00
χ² / ndf 69.11 / 54
Constant 299.3 ± 42.1
Mean 2.575 ± 0.014
Sigma 0.06324 ± 0.00575
Counts
nσk

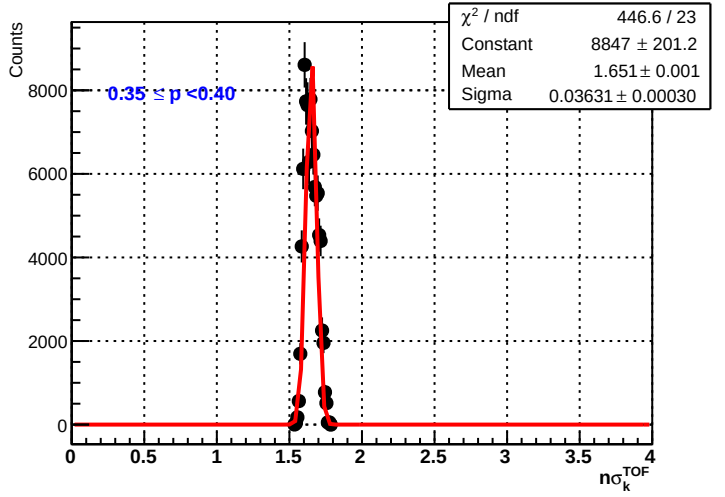

mean
nσ_K mean
p (GeV/c)

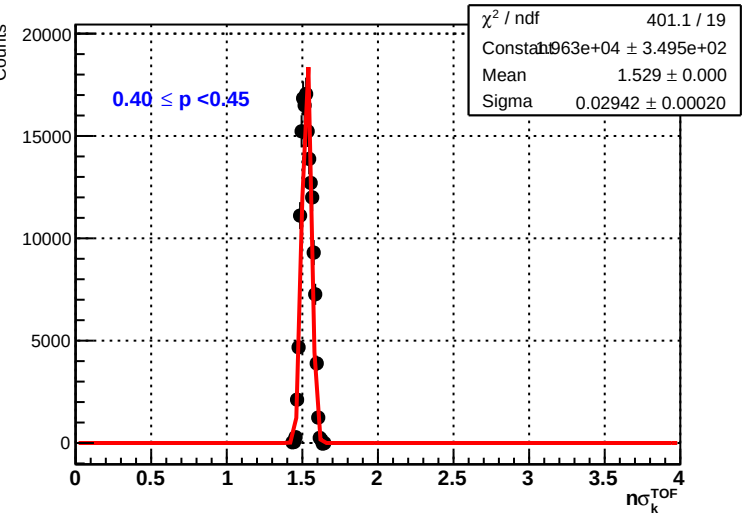

sigma
nσ_K sigma
p (GeV/c)

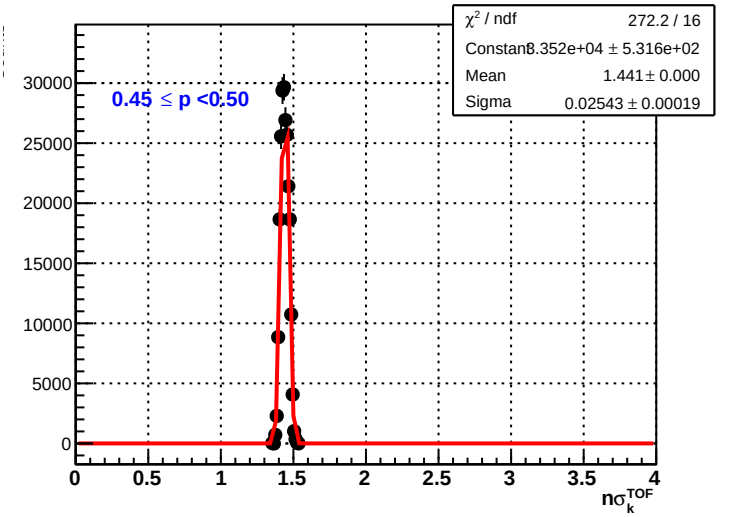

0.20 ≤ p <0.25
χ² / ndf 54.38 / 49
Constant 56.98 ± 15.36
Mean 2.271 ± 0.014
Sigma 0.04862 ± 0.00943
Counts
nσ_k^TOF

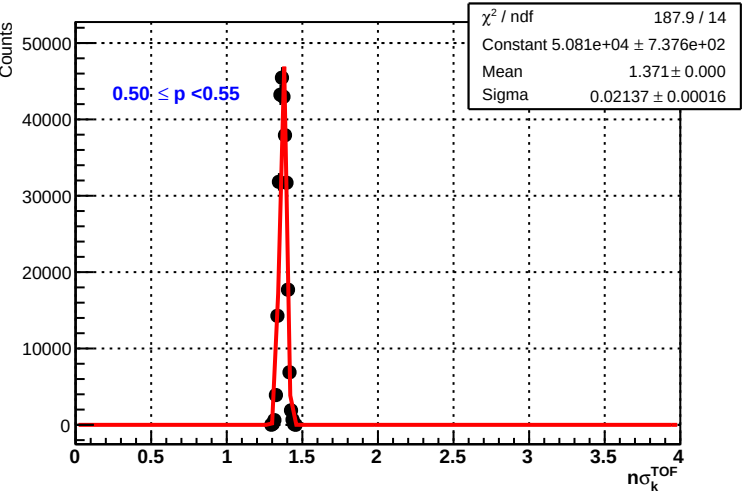

0.25 ≤ p <0.30
χ² / ndf 166.4 / 37
Constant 935.6 ± 61.6
Mean 2.019 ± 0.005
Sigma 0.0571 ± 0.0030
Counts
nσ_k^TOF

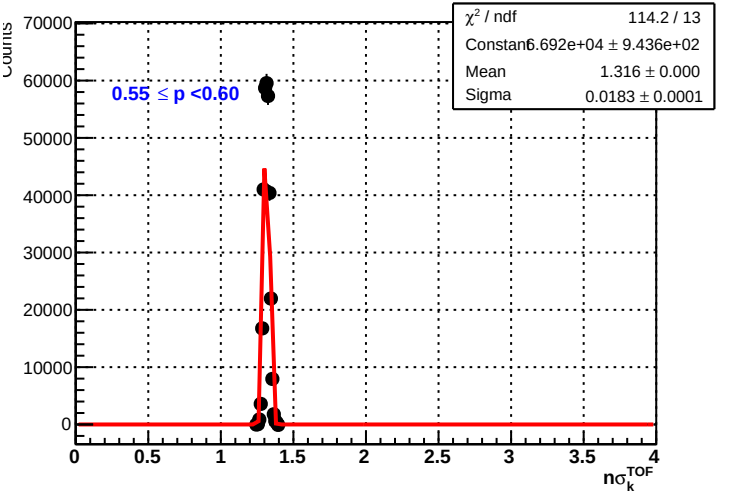

0.30 ≤ p <0.35
χ² / ndf 344.6 / 28
Constant 3158 ± 102.7
Mean 1.821 ± 0.002
Sigma 0.04956 ± 0.00081
Counts
nσ_k^TOF

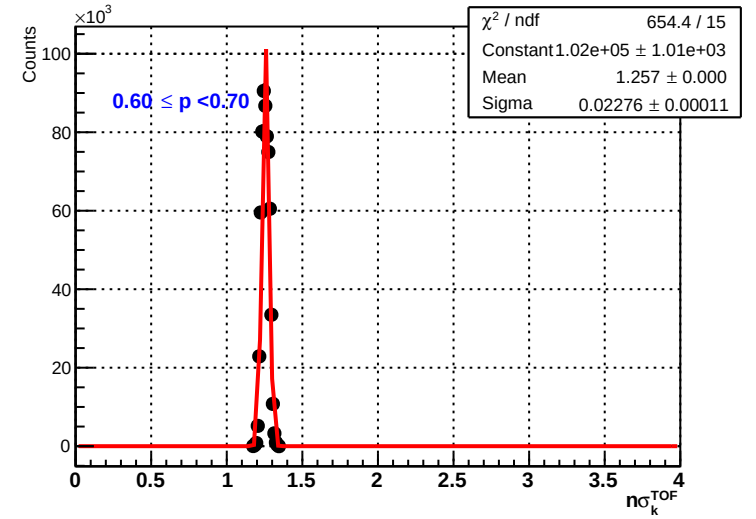

0.35 ≤ p <0.40
χ² / ndf 446.6 / 23
Constant 8847 ± 201.2
Mean 1.651 ± 0.001
Sigma 0.03631 ± 0.00030
Counts
nσ_k^TOF

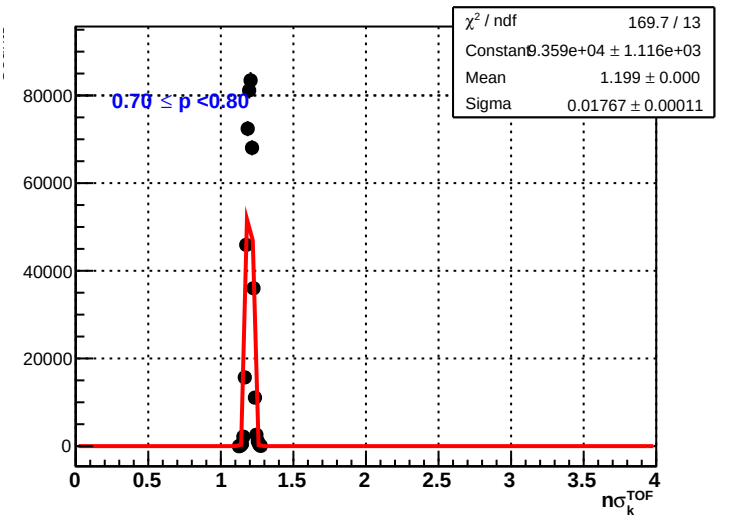

χ² / ndf 401.1 / 19
Constant 1.963e+04 ± 3.495e+02
Mean 1.529 ± 0.000
Sigma 0.02942 ± 0.00020
0.40 ≤ p <0.45
Counts
nσ_k^TOF

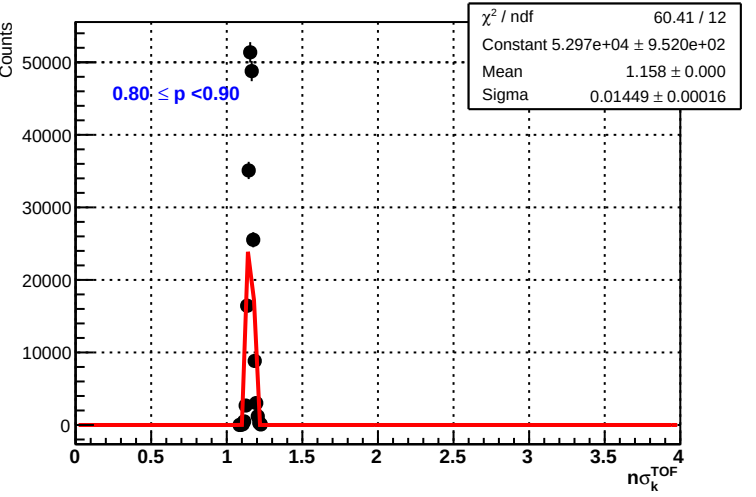

χ² / ndf 272.2 / 16
Constant 8.352e+04 ± 5.316e+02
Mean 1.441 ± 0.000
Sigma 0.02543 ± 0.00019
0.45 ≤ p <0.50
nσ_k^TOF

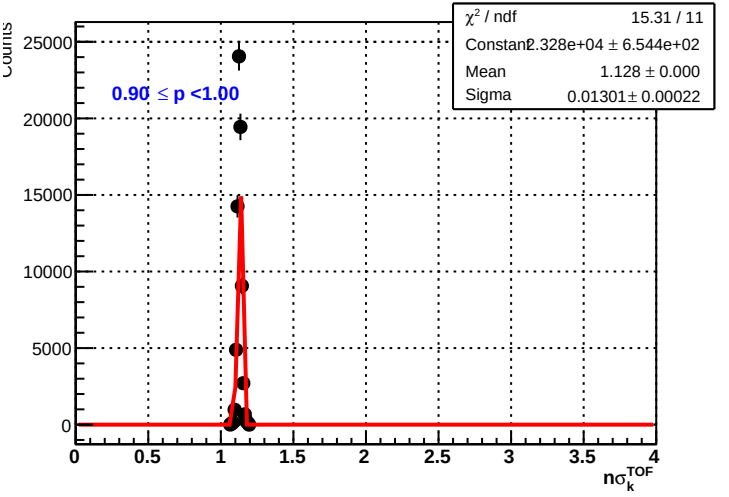

χ² / ndf 187.9 / 14
Constant 5.081e+04 ± 7.376e+02
Mean 1.371 ± 0.000
Sigma 0.02137 ± 0.00016
0.50 ≤ p <0.55
Counts
nσ_k^TOF

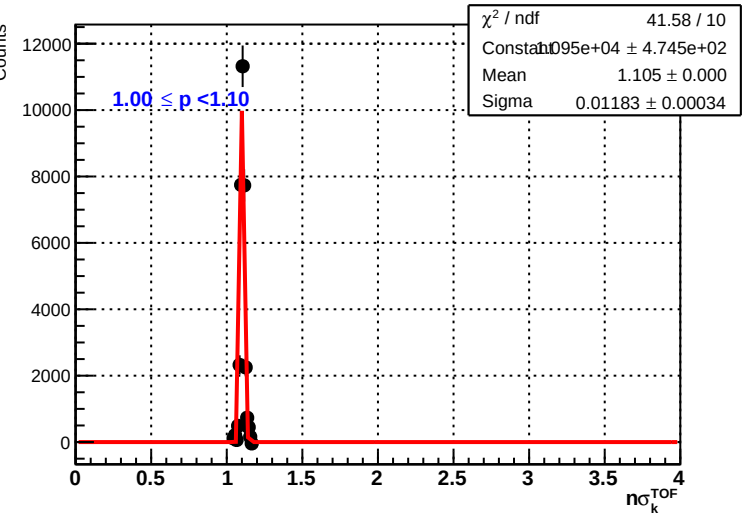

χ² / ndf 114.2 / 13
Constant 6.692e+04 ± 9.436e+02
Mean 1.316 ± 0.000
Sigma 0.0183 ± 0.0001
0.55 ≤ p <0.60
Counts
nσ_k^TOF

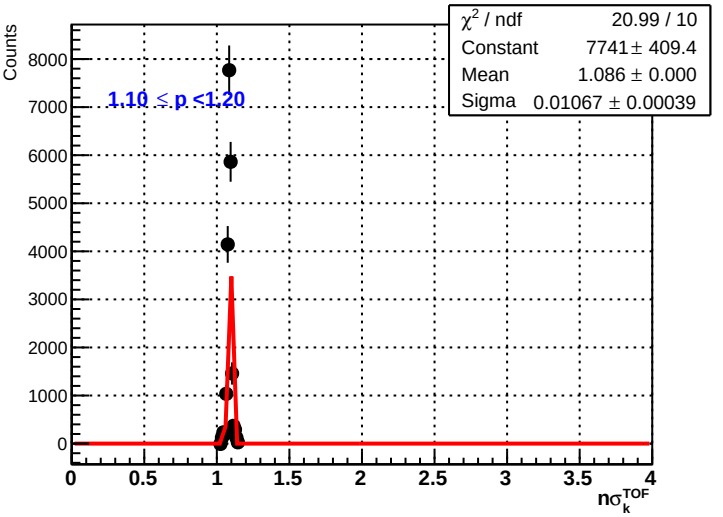

Counts
×10^3
0.60 ≤ p <0.70
χ² / ndf 654.4 / 15
Constant 1.02e+05 ± 1.01e+03
Mean 1.257 ± 0.000
Sigma 0.02276 ± 0.00011
nσ_k^TOF

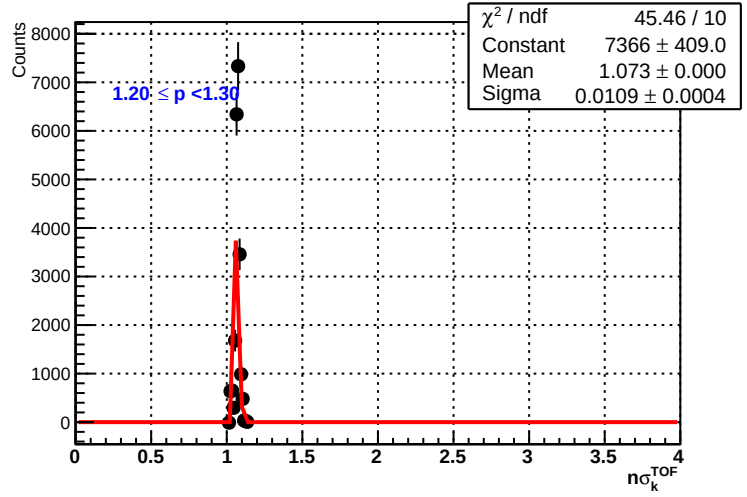

0.70 ≤ p <0.80
χ² / ndf 169.7 / 13
Constant 9.359e+04 ± 1.116e+03
Mean 1.199 ± 0.000
Sigma 0.01767 ± 0.00011
nσ_k^TOF

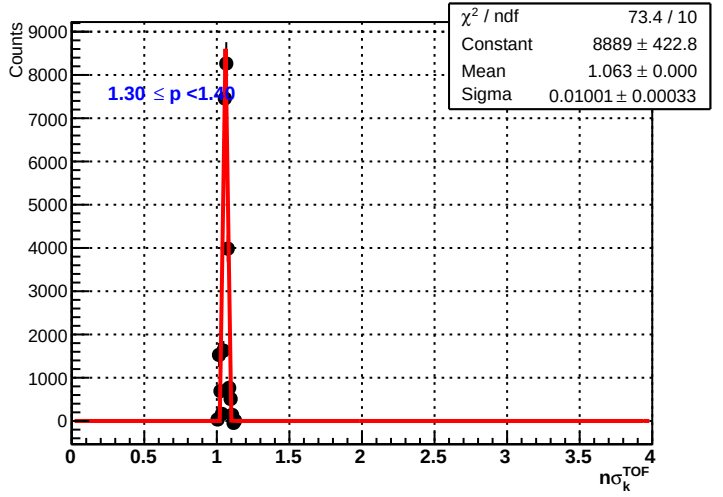

Counts
0.80 ≤ p <0.90
χ² / ndf 60.41 / 12
Constant 5.297e+04 ± 9.520e+02
Mean 1.158 ± 0.000
Sigma 0.01449 ± 0.00016
nσ_k^TOF

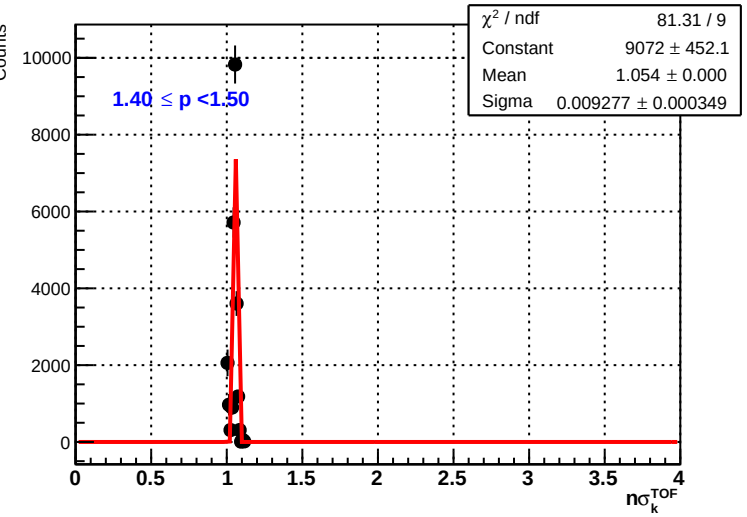

Counts
0.90 ≤ p <1.00
χ² / ndf 15.31 / 11
Constant 2.328e+04 ± 6.544e+02
Mean 1.128 ± 0.000
Sigma 0.01301 ± 0.00022
nσ_k^TOF

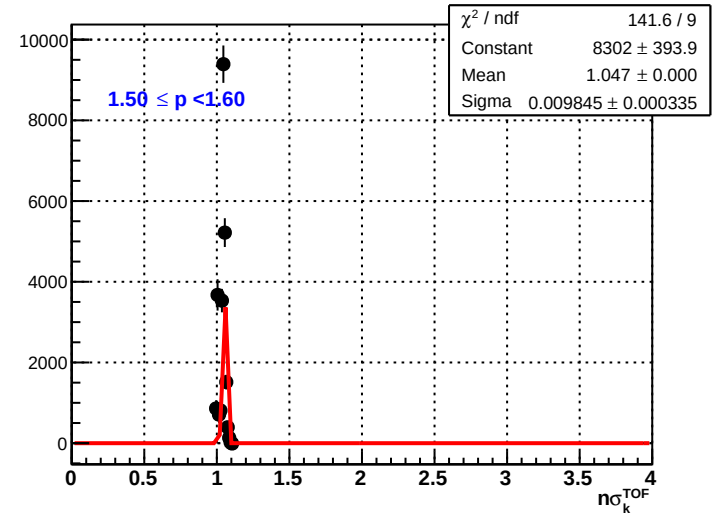

Counts
1.00 ≤ p <1.10
χ² / ndf 41.58 / 10
Constant 1.095e+04 ± 4.745e+02
Mean 1.105 ± 0.000
Sigma 0.01183 ± 0.00034
nσ_k^TOF

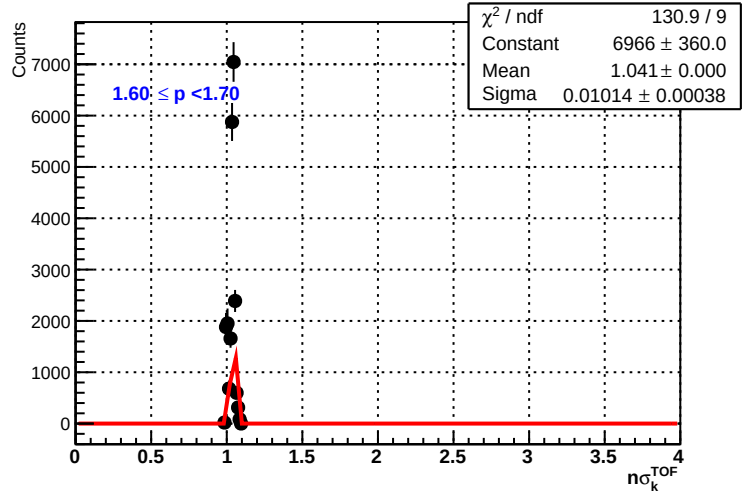

Counts
1.10 ≤ p <1.20
χ² / ndf 20.99 / 10
Constant 7741 ± 409.4
Mean 1.086 ± 0.000
Sigma 0.01067 ± 0.00039
nσ_k^TOF

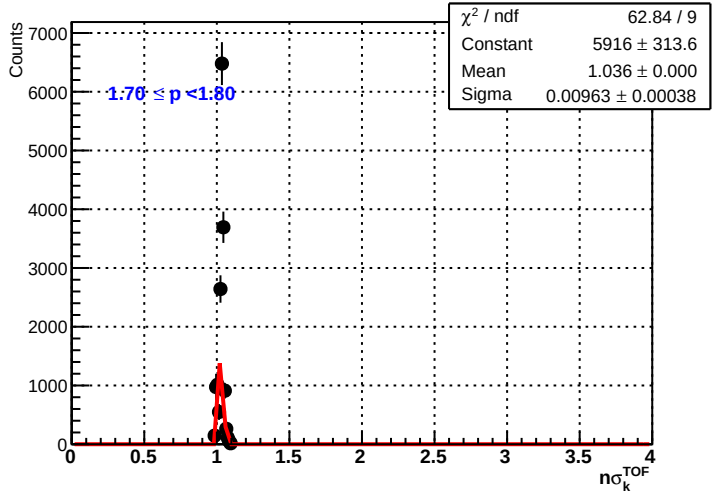

Counts
1.20 ≤ p <1.30
χ² / ndf 45.46 / 10
Constant 7366 ± 409.0
Mean 1.073 ± 0.000
Sigma 0.0109 ± 0.0004
nσ_k^TOF

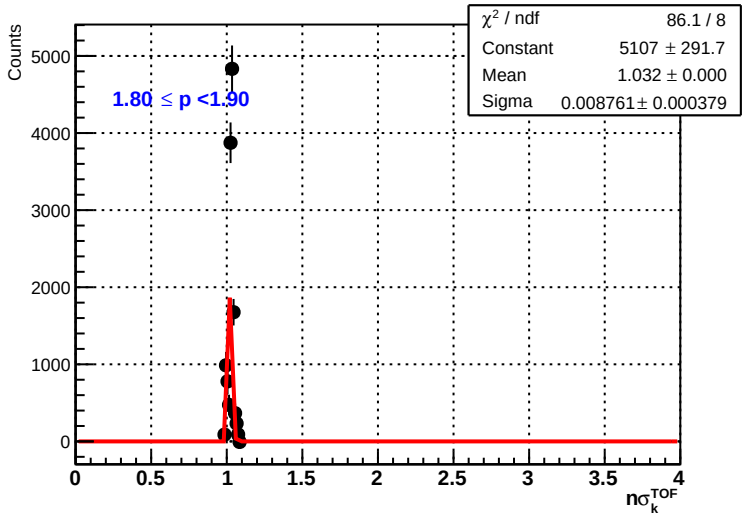

Counts
1.30 ≤ p <1.40
χ² / ndf 73.4 / 10
Constant 8889 ± 422.8
Mean 1.063 ± 0.000
Sigma 0.01001 ± 0.00033
nσ_k^TOF

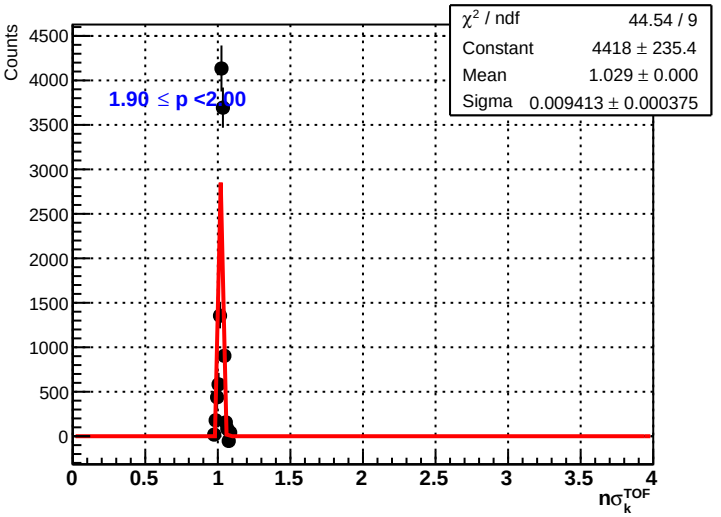

Counts
χ^2 / ndf 81.31 / 9
Constant 9072 ± 452.1
Mean 1.054 ± 0.000
Sigma 0.009277 ± 0.000349
1.40 ≤ p <1.50
$n\sigma_k^{TOF}$

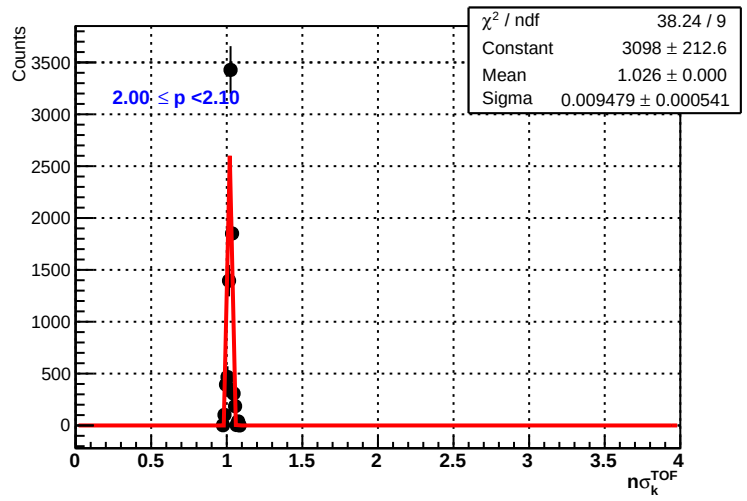

χ^2 / ndf 141.6 / 9
Constant 8302 ± 393.9
Mean 1.047 ± 0.000
Sigma 0.009845 ± 0.000335
1.50 ≤ p <1.60
$n\sigma_k^{TOF}$

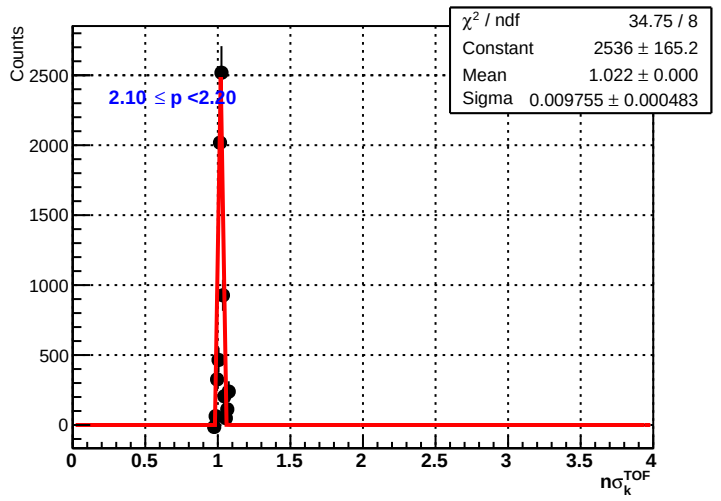

Counts
χ^2 / ndf 130.9 / 9
Constant 6966 ± 360.0
Mean 1.041± 0.000
Sigma 0.01014 ± 0.00038
1.60 ≤ p <1.70
$n\sigma_k^{TOF}$

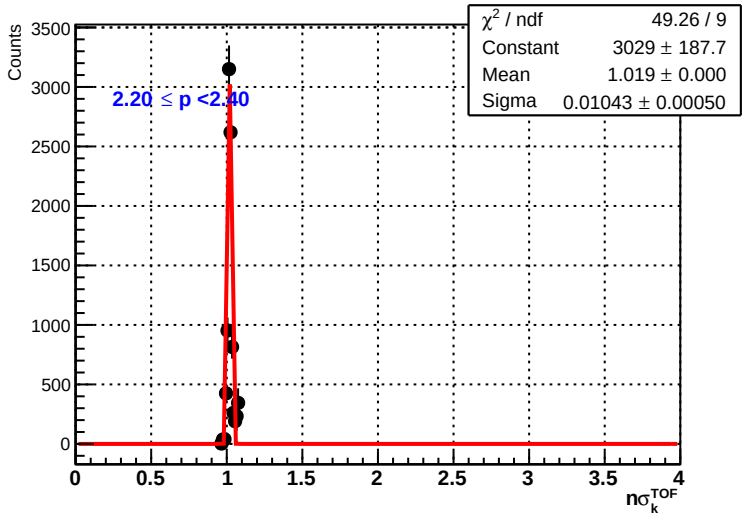

Counts
χ^2 / ndf 62.84 / 9
Constant 5916 ± 313.6
Mean 1.036 ± 0.000
Sigma 0.00963 ± 0.00038
1.70 ≤ p <1.80
$n\sigma_k^{TOF}$

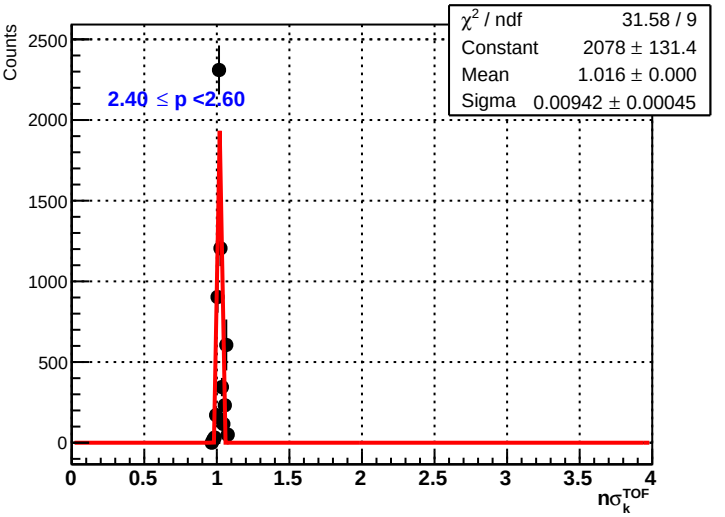

Counts
1.80 ≤ p <1.90
χ² / ndf 86.1 / 8
Constant 5107 ± 291.7
Mean 1.032 ± 0.000
Sigma 0.008761 ± 0.000379
nσ_k^TOF

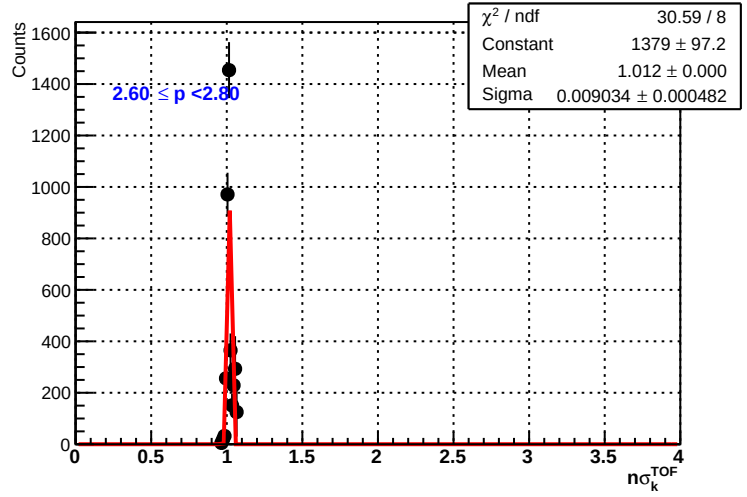

Counts
1.90 ≤ p <2.00
χ² / ndf 44.54 / 9
Constant 4418 ± 235.4
Mean 1.029 ± 0.000
Sigma 0.009413 ± 0.000375
nσ_k^TOF

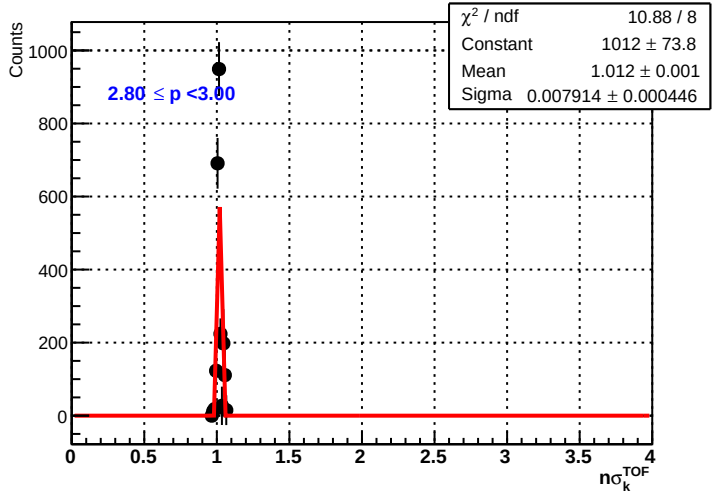

Counts
2.00 ≤ p <2.10
χ² / ndf 38.24 / 9
Constant 3098 ± 212.6
Mean 1.026 ± 0.000
Sigma 0.009479 ± 0.000541
nσ_k^TOF

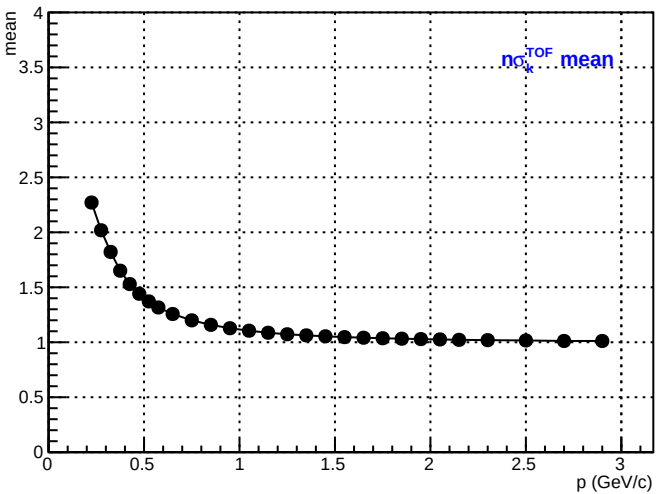

Counts
2.10 ≤ p <2.20
χ² / ndf 34.75 / 8
Constant 2536 ± 165.2
Mean 1.022 ± 0.000
Sigma 0.009755 ± 0.000483
nσ_k^TOF

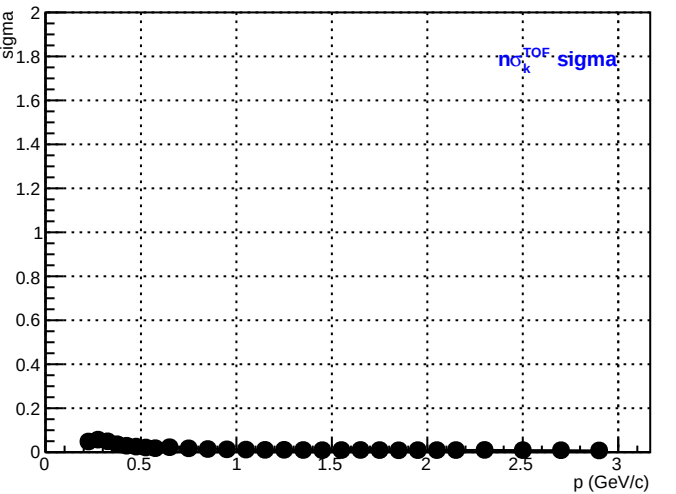

Counts
3500
3000
2500
2000
1500
1000
500
0
0
0.5
1
1.5
2
2.5
3
3.5
4
$n\sigma_k^{TOF}$
2.20 ≤ p <2.40
χ^2 / ndf 49.26 / 9
Constant 3029 ± 187.7
Mean 1.019 ± 0.000
Sigma 0.01043 ± 0.00050

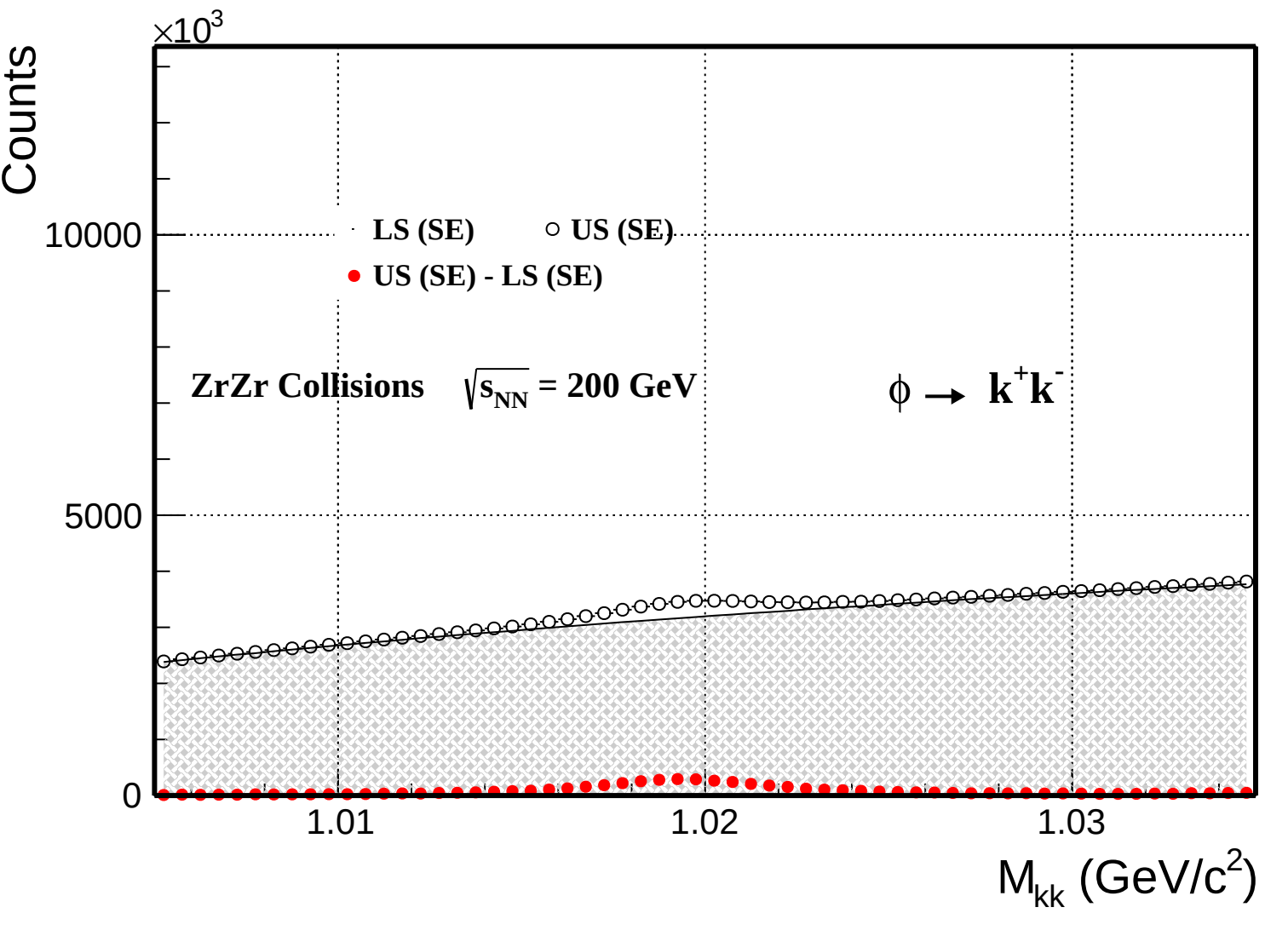

Counts
2500
2000
1500
1000
500
0
0
0.5
1
1.5
2
2.5
3
3.5
4
$n\sigma_k^{TOF}$
2.40 ≤ p <2.60
χ^2 / ndf 31.58 / 9
Constant 2078 ± 131.4
Mean 1.016 ± 0.000
Sigma 0.00942 ± 0.00045


Counts
1600
1400
1200
1000
800
600
400
200
0
0
0.5
1
1.5
2
2.5
3
3.5
4
$n\sigma_k^{TOF}$
2.60 ≤ p <2.80
χ^2 / ndf 30.59 / 8
Constant 1379 ± 97.2
Mean 1.012 ± 0.000
Sigma 0.009034 ± 0.000482


Counts
1000
800
600
400
200
0
0
0.5
1
1.5
2
2.5
3
3.5
4
$n\sigma_k^{TOF}$
2.80 ≤ p <3.00
χ^2 / ndf 10.88 / 8
Constant 1012 ± 73.8
Mean 1.012 ± 0.001
Sigma 0.007914 ± 0.000446


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


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


×10^3
Counts
10000
5000
0
LS (SE)
US (SE)
US (SE) - LS (SE)
ZrZr Collisions
√s_NN = 200 GeV
ϕ → k^+k^-
1.01
1.02
1.03
M_kk (GeV/c^2)

π PID and efficiency in Zr+Zr 200 GeV

Target π

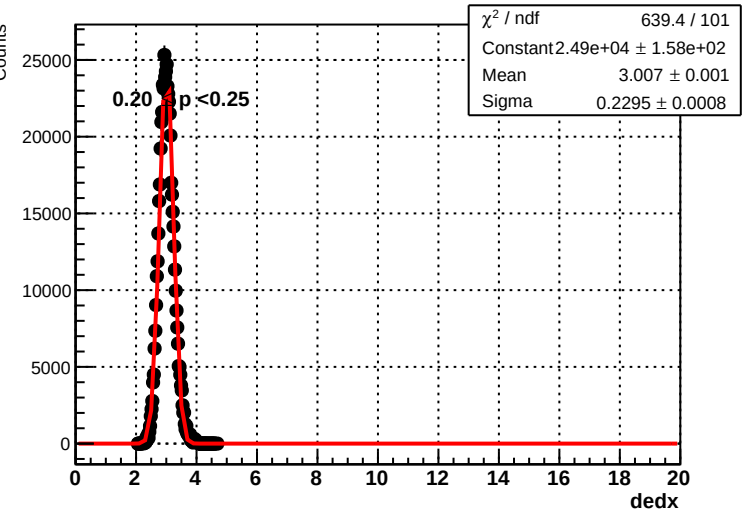
- $p_T > 0.5$
- $|\eta| < 1$
- nHitsFit ≥ 20
- ndEdx > 15
- gDca > 0.1
- $|n\sigma_\pi| < 2.0$
- $|n\sigma_\pi^{TOF}| < 2.0$

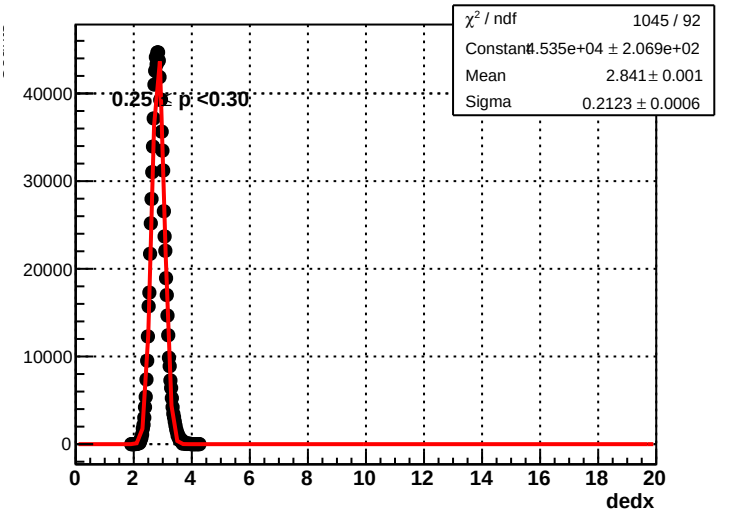
Partner π

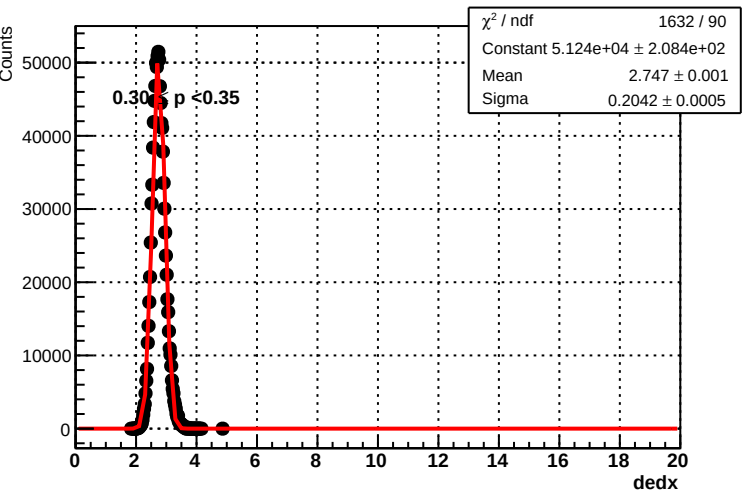
- $p_T > 0.2$
- $|\eta| < 1$
- nHitsFit ≥ 20
- ndEdx > 15
- gDca > 0.1
- $|n\sigma_\pi| < 4.0$
- $|n\sigma_\pi^{TOF}| < 4.0$

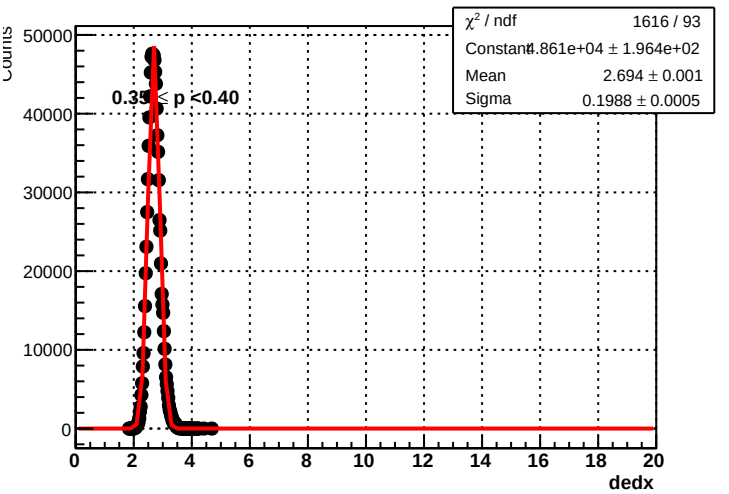
k_s^0 reconstruction cuts:

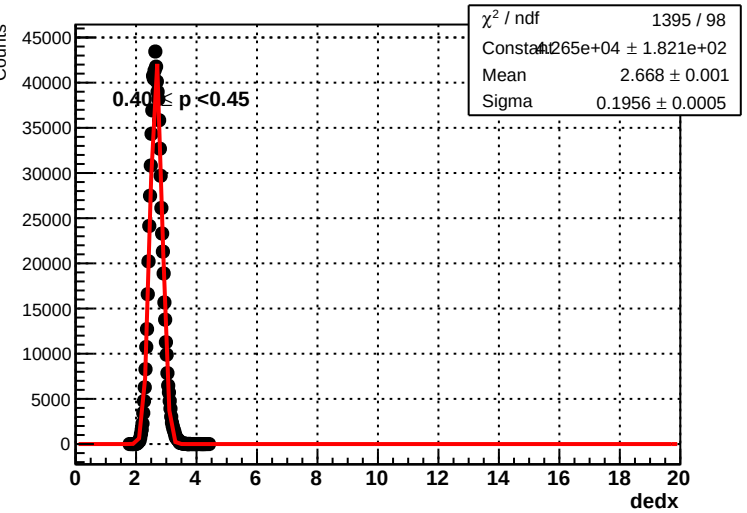
- 0.5 < DecayL < 25
- Dca < 0.4
- pairDca < 0.5
- $\cos\theta > 0.999$

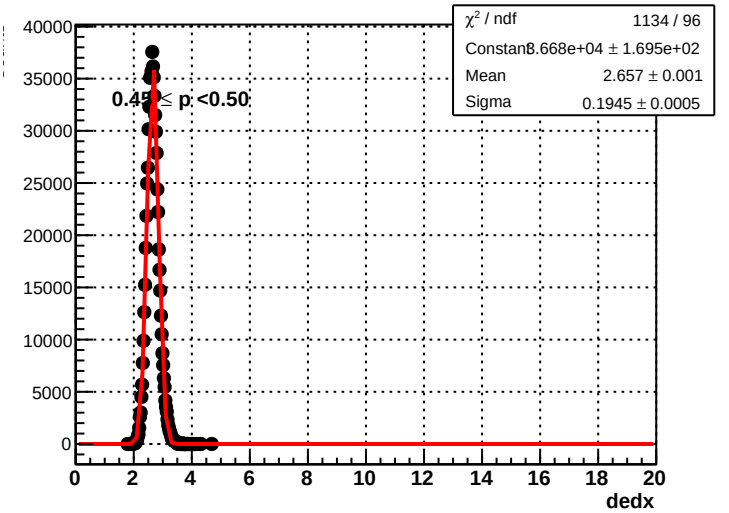

χ² / ndf 639.4 / 101
Constant 2.49e+04 ± 1.58e+02
Mean 3.007 ± 0.001
Sigma 0.2295 ± 0.0008
0.20 < p <0.25
Counts
dedx

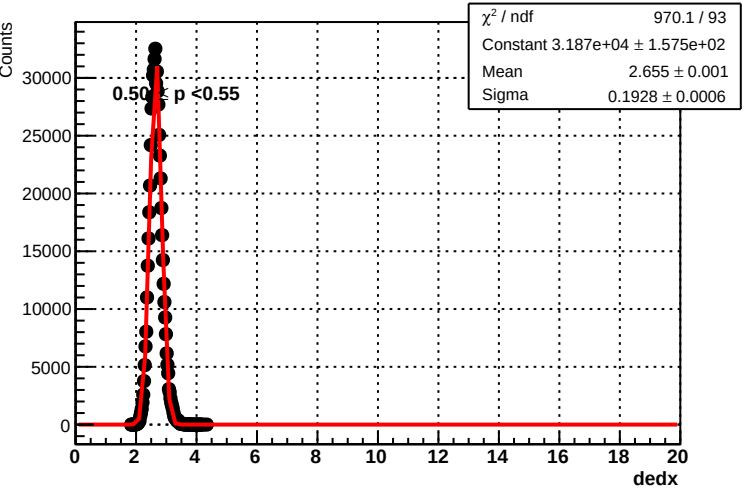

χ² / ndf 1045 / 92
Constant 4.535e+04 ± 2.069e+02
Mean 2.841 ± 0.001
Sigma 0.2123 ± 0.0006
0.25 < p <0.30
dedx

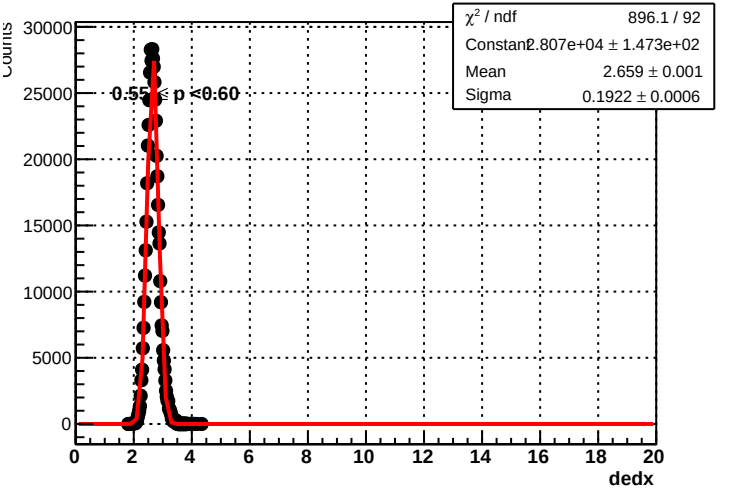

χ² / ndf 1632 / 90
Constant 5.124e+04 ± 2.084e+02
Mean 2.747 ± 0.001
Sigma 0.2042 ± 0.0005
0.30 < p <0.35
Counts
dedx

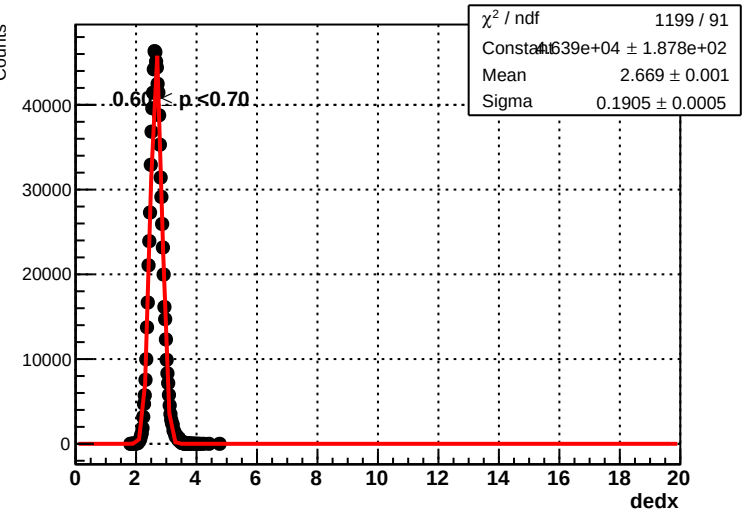

χ² / ndf 1616 / 93
Constant 4.861e+04 ± 1.964e+02
Mean 2.694 ± 0.001
Sigma 0.1988 ± 0.0005
0.35 < p <0.40
Counts
dedx

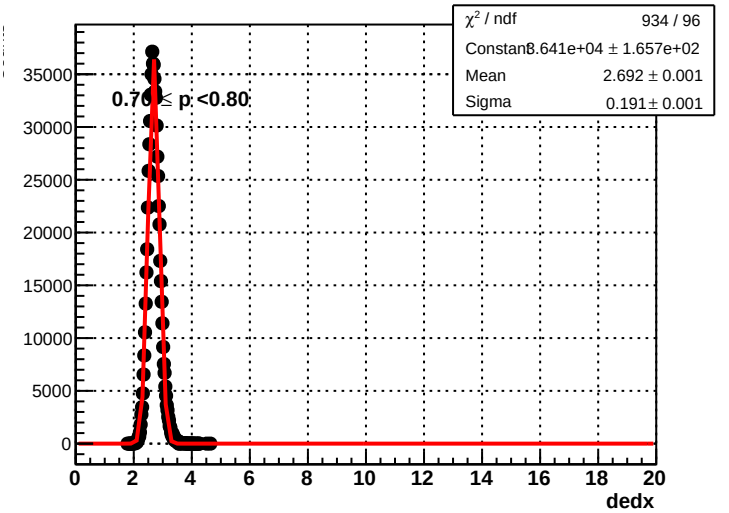

Counts
χ^2 / ndf 1395 / 98
Constant 4.265e+04 ± 1.821e+02
Mean 2.668 ± 0.001
Sigma 0.1956 ± 0.0005
0.40 ≤ p <0.45
dedx

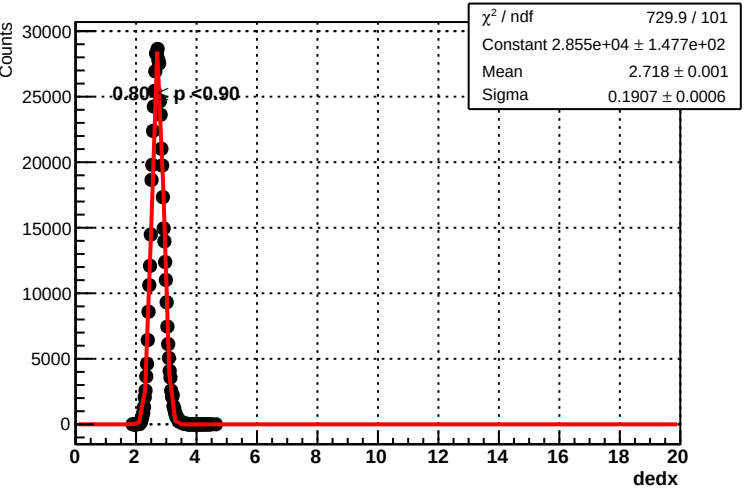

χ^2 / ndf 1134 / 96
Constant 3.668e+04 ± 1.695e+02
Mean 2.657 ± 0.001
Sigma 0.1945 ± 0.0005
0.45 ≤ p <0.50
dedx

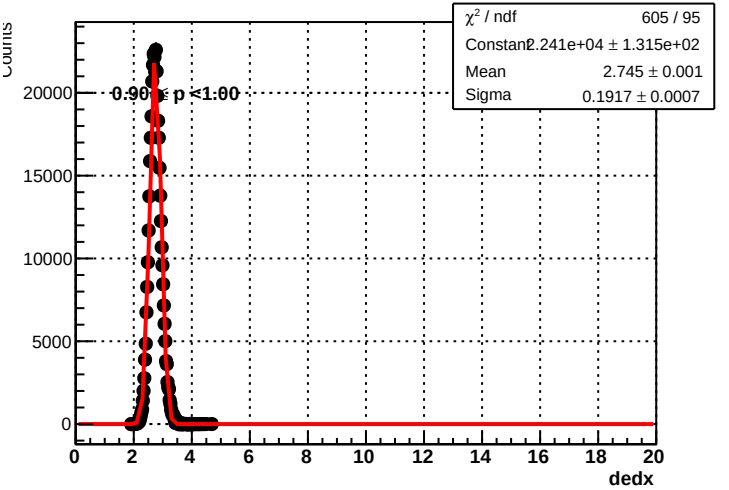

Counts
χ^2 / ndf 970.1 / 93
Constant 3.187e+04 ± 1.575e+02
Mean 2.655 ± 0.001
Sigma 0.1928 ± 0.0006
0.50 ≤ p <0.55
dedx

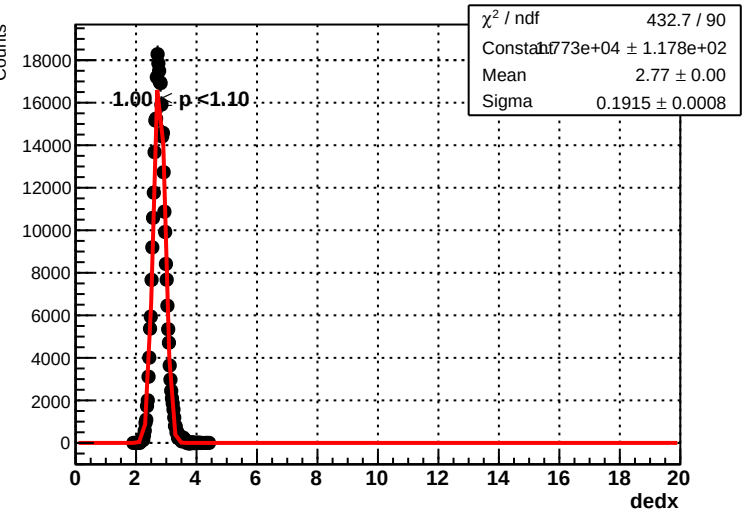

Counts
χ^2 / ndf 896.1 / 92
Constant 2.807e+04 ± 1.473e+02
Mean 2.659 ± 0.001
Sigma 0.1922 ± 0.0006
0.55 ≤ p <0.60
dedx

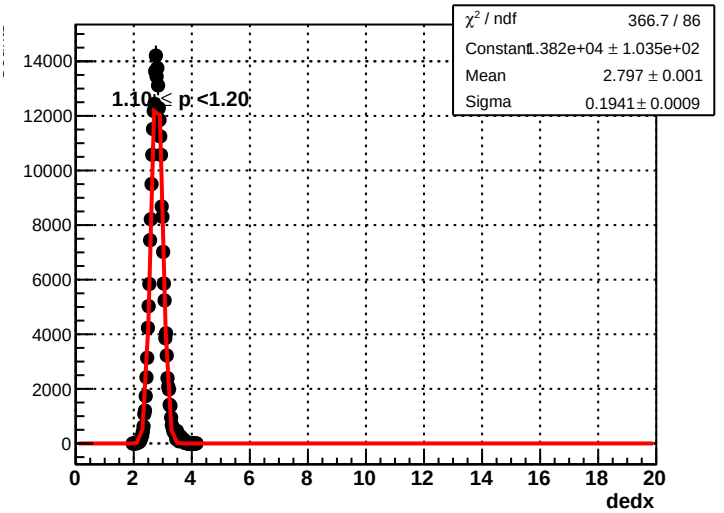

χ² / ndf 1199 / 91
Constant 4.639e+04 ± 1.878e+02
Mean 2.669 ± 0.001
Sigma 0.1905 ± 0.0005
0.60 ≤ p <0.70
Counts
dedx

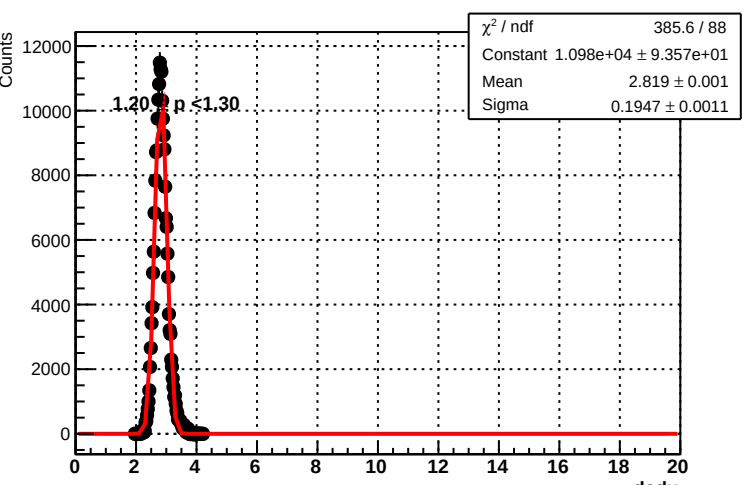

χ² / ndf 934 / 96
Constant 8.641e+04 ± 1.657e+02
Mean 2.692 ± 0.001
Sigma 0.191 ± 0.001
0.70 ≤ p <0.80
dedx

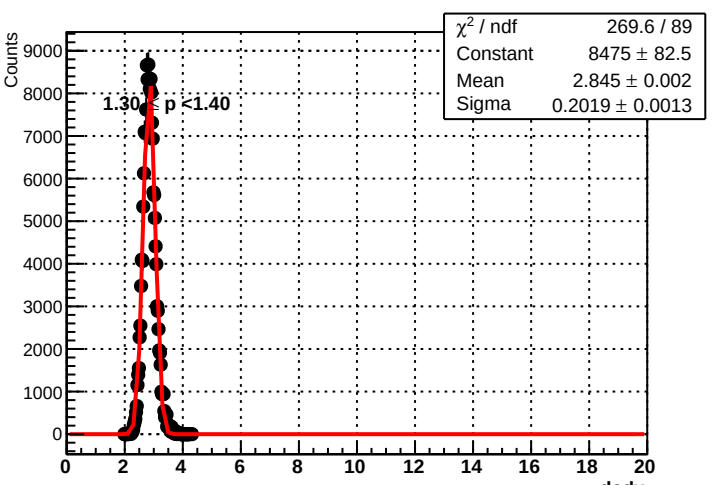

χ² / ndf 729.9 / 101
Constant 2.855e+04 ± 1.477e+02
Mean 2.718 ± 0.001
Sigma 0.1907 ± 0.0006
0.80 ≤ p <0.90
Counts
dedx

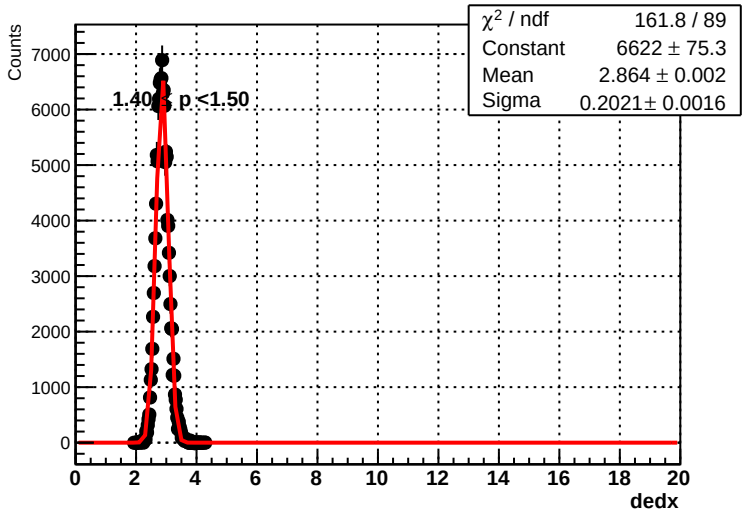

χ² / ndf 605 / 95
Constant 2.241e+04 ± 1.315e+02
Mean 2.745 ± 0.001
Sigma 0.1917 ± 0.0007
0.90 ≤ p <1.00
Counts
dedx

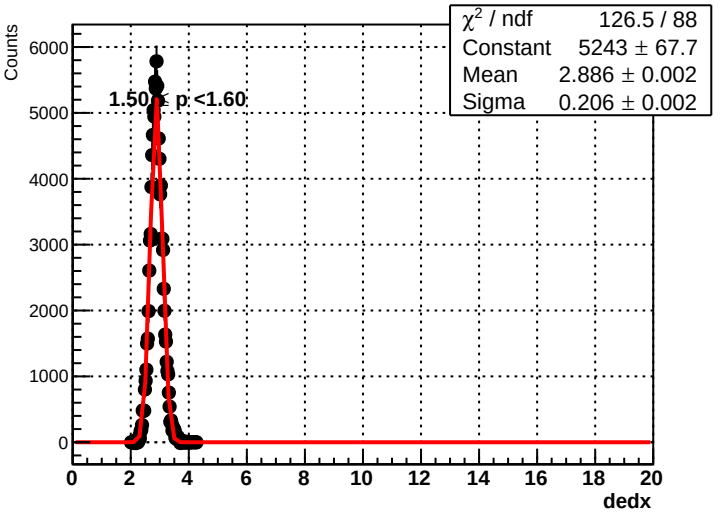

Counts
1.00 < p <1.10
χ² / ndf 432.7 / 90
Constant 1.773e+04 ± 1.178e+02
Mean 2.77 ± 0.00
Sigma 0.1915 ± 0.0008
dedx

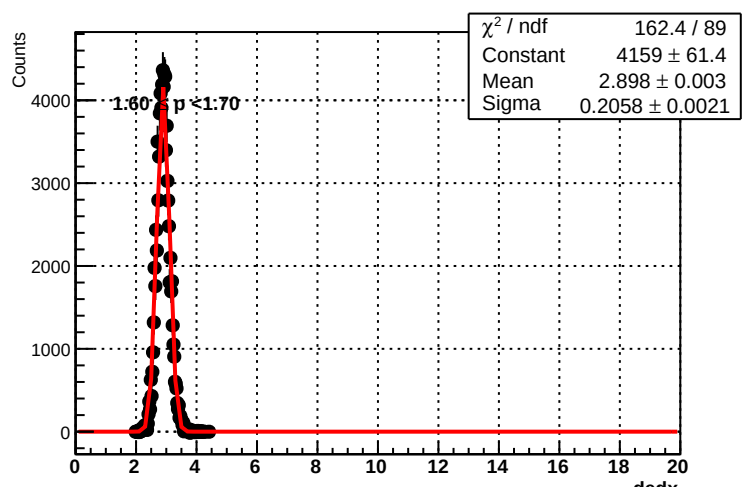

1.10 < p <1.20
χ² / ndf 366.7 / 86
Constant 1.382e+04 ± 1.035e+02
Mean 2.797 ± 0.001
Sigma 0.1941 ± 0.0009
dedx

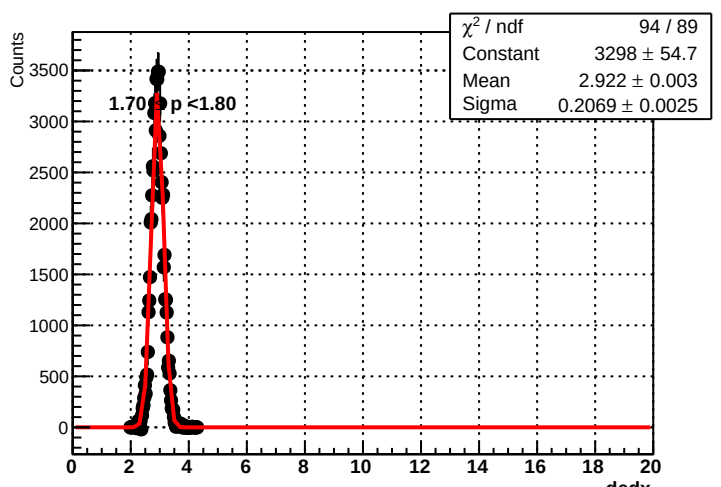

Counts
1.20 < p <1.30
χ² / ndf 385.6 / 88
Constant 1.098e+04 ± 9.357e+01
Mean 2.819 ± 0.001
Sigma 0.1947 ± 0.0011
dedx

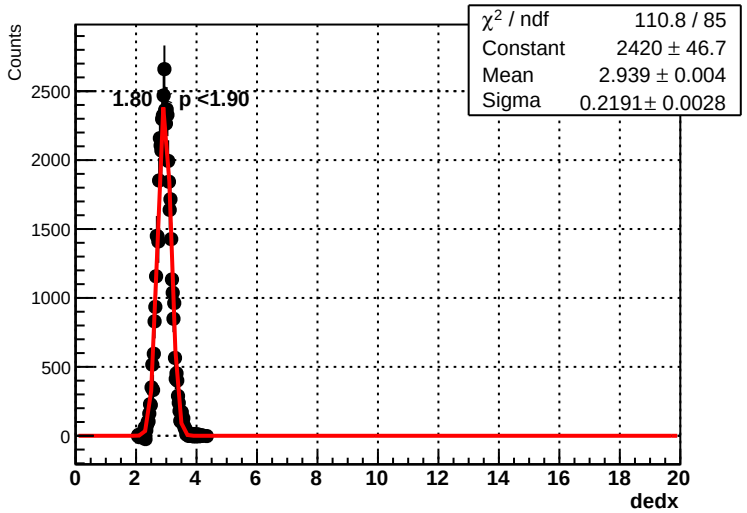

Counts
1.30 < p <1.40
χ² / ndf 269.6 / 89
Constant 8475 ± 82.5
Mean 2.845 ± 0.002
Sigma 0.2019 ± 0.0013
dedx

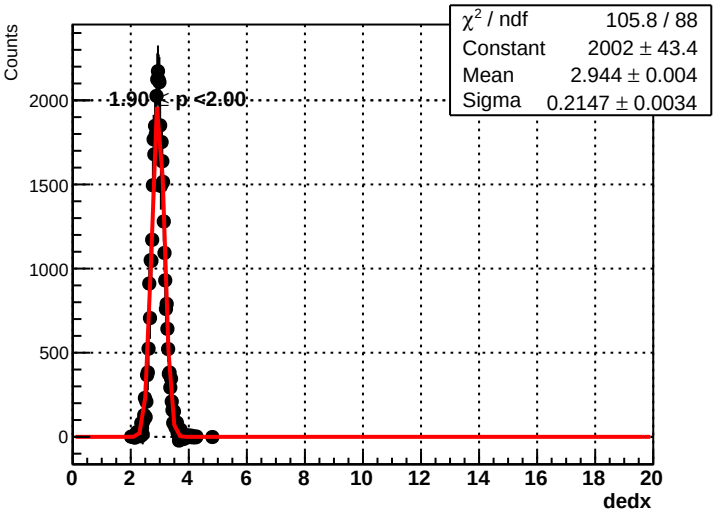

Counts
dedx
1.40 < p <1.50
χ² / ndf 161.8 / 89
Constant 6622 ± 75.3
Mean 2.864 ± 0.002
Sigma 0.2021± 0.0016

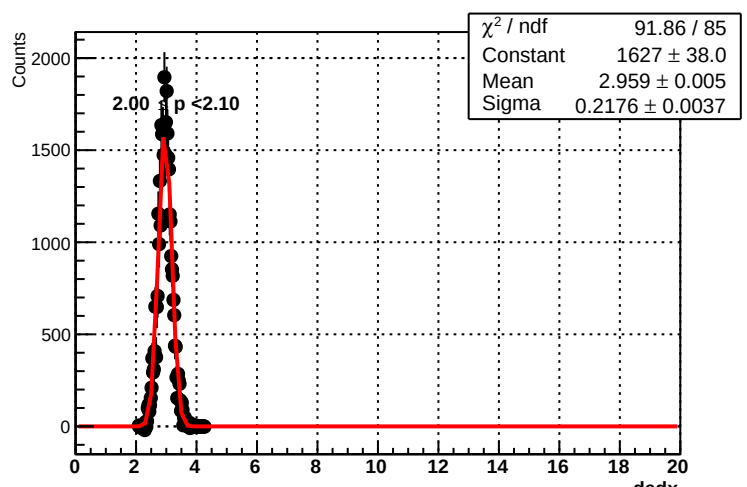

Counts
dedx
1.50 < p <1.60
χ² / ndf 126.5 / 88
Constant 5243 ± 67.7
Mean 2.886 ± 0.002
Sigma 0.206 ± 0.002

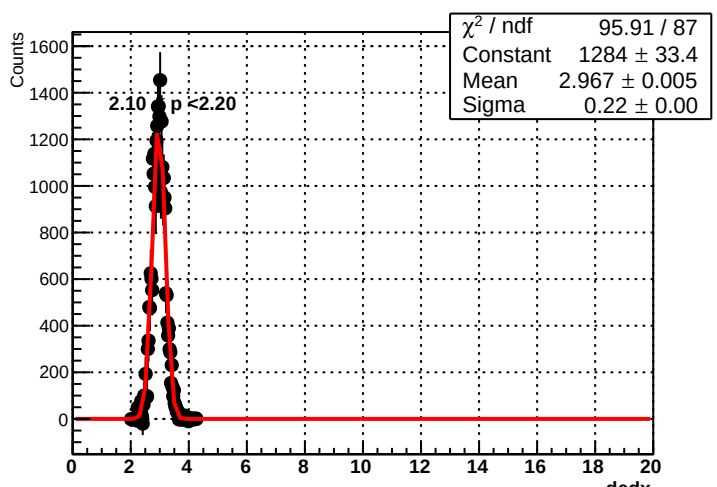

Counts
dedx
1.60 < p <1.70
χ² / ndf 162.4 / 89
Constant 4159 ± 61.4
Mean 2.898 ± 0.003
Sigma 0.2058 ± 0.0021

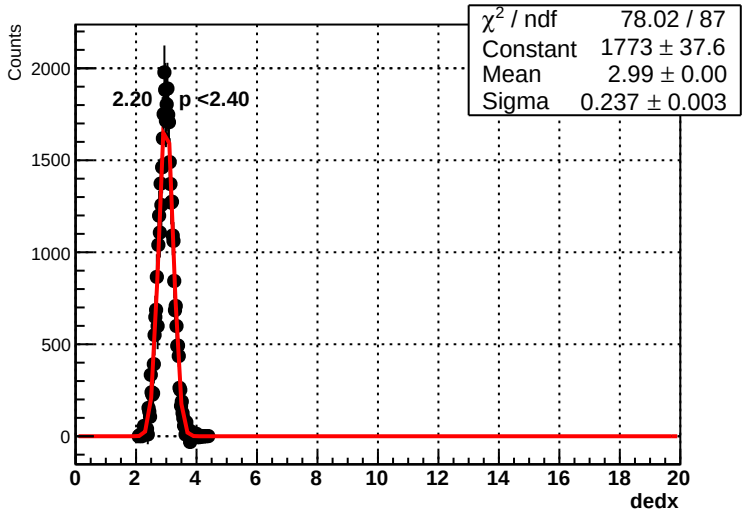

Counts
dedx
1.70 < p <1.80
χ² / ndf 94 / 89
Constant 3298 ± 54.7
Mean 2.922 ± 0.003
Sigma 0.2069 ± 0.0025

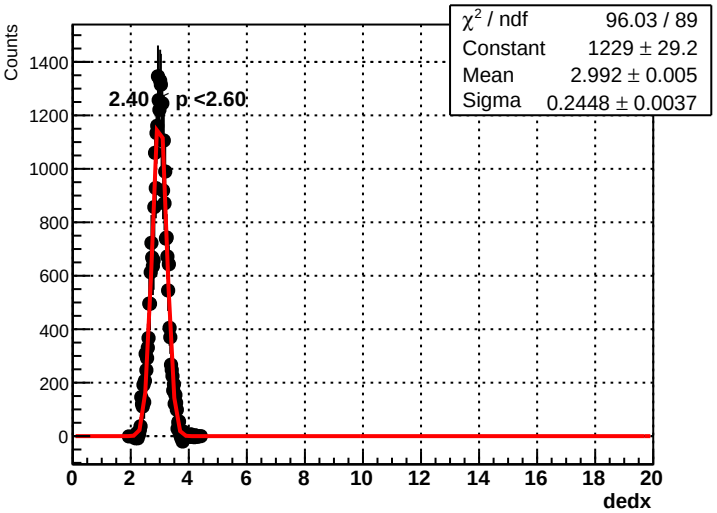

Counts
1.80 < p <1.90
χ² / ndf 110.8 / 85
Constant 2420 ± 46.7
Mean 2.939 ± 0.004
Sigma 0.2191± 0.0028
dedx

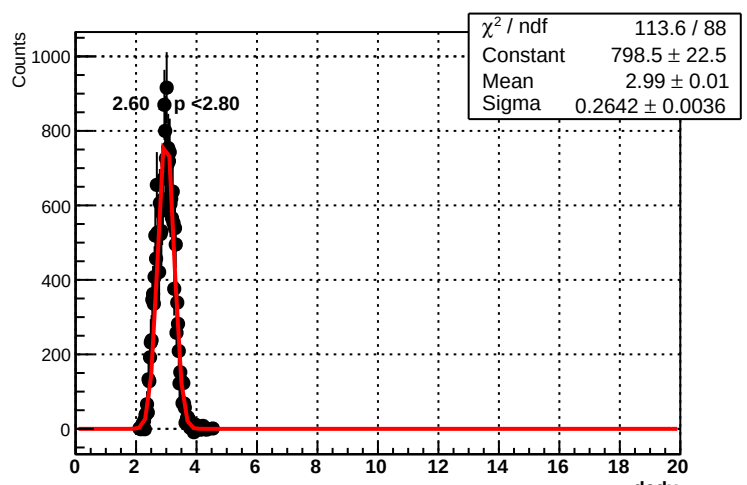

Counts
1.90 < p <2.00
χ² / ndf 105.8 / 88
Constant 2002 ± 43.4
Mean 2.944 ± 0.004
Sigma 0.2147 ± 0.0034
dedx

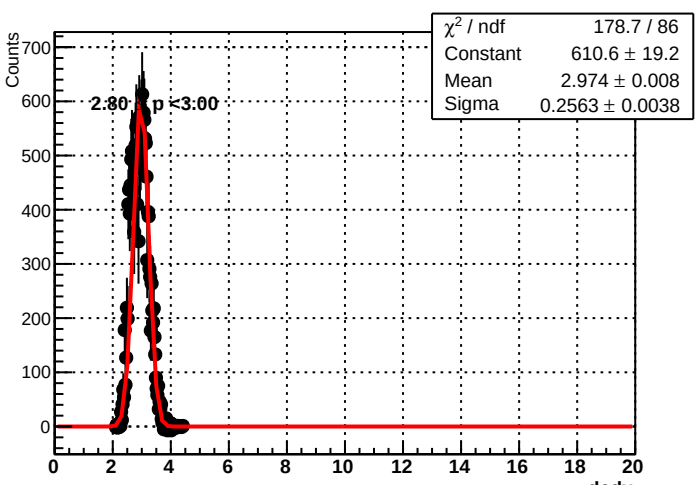

Counts
2.00 < p <2.10
χ² / ndf 91.86 / 85
Constant 1627 ± 38.0
Mean 2.959 ± 0.005
Sigma 0.2176 ± 0.0037
dedx

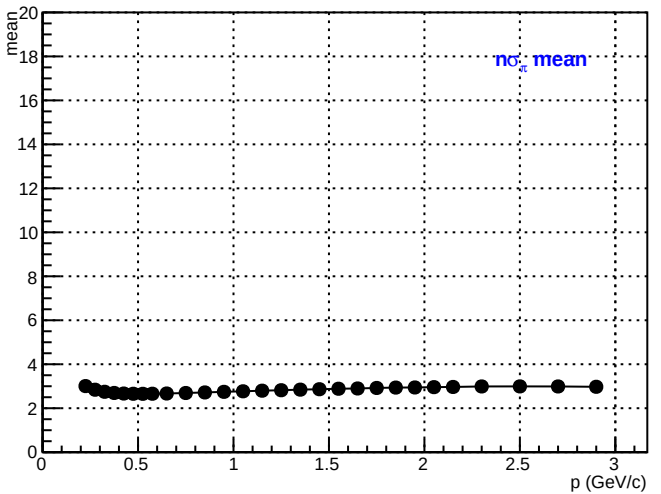

Counts
2.10 < p <2.20
χ² / ndf 95.91 / 87
Constant 1284 ± 33.4
Mean 2.967 ± 0.005
Sigma 0.22 ± 0.00
dedx

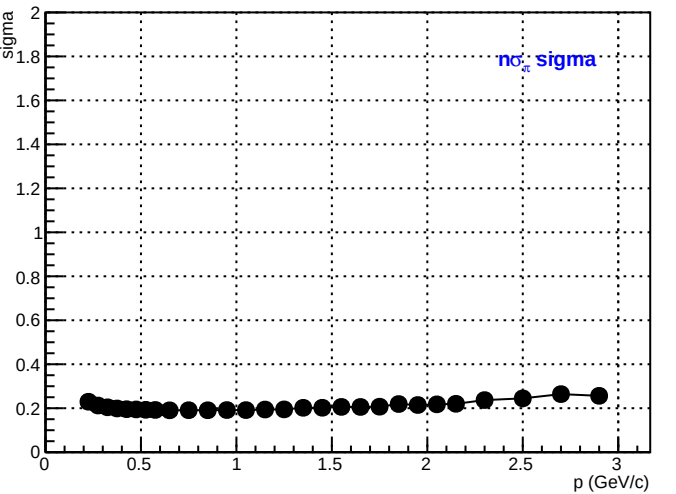

χ² / ndf 78.02 / 87
Constant 1773 ± 37.6
Mean 2.99 ± 0.00
Sigma 0.237 ± 0.003
2.20 p <2.40
Counts
dedx

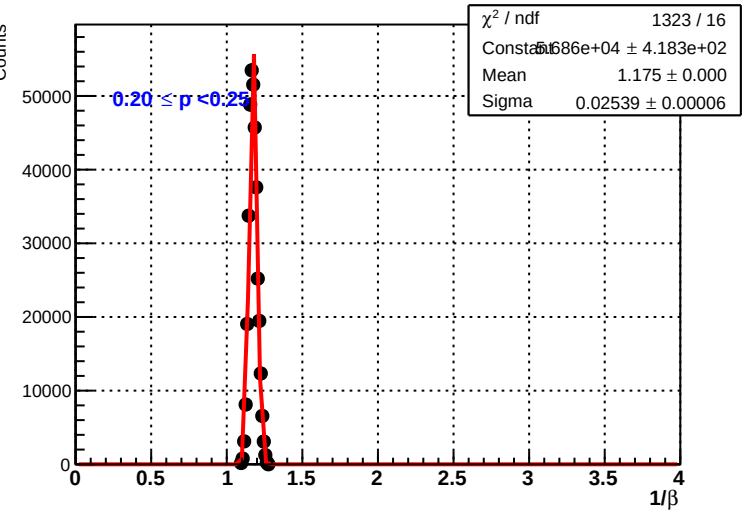

χ² / ndf 96.03 / 89
Constant 1229 ± 29.2
Mean 2.992 ± 0.005
Sigma 0.2448 ± 0.0037
2.40 p <2.60
Counts
dedx

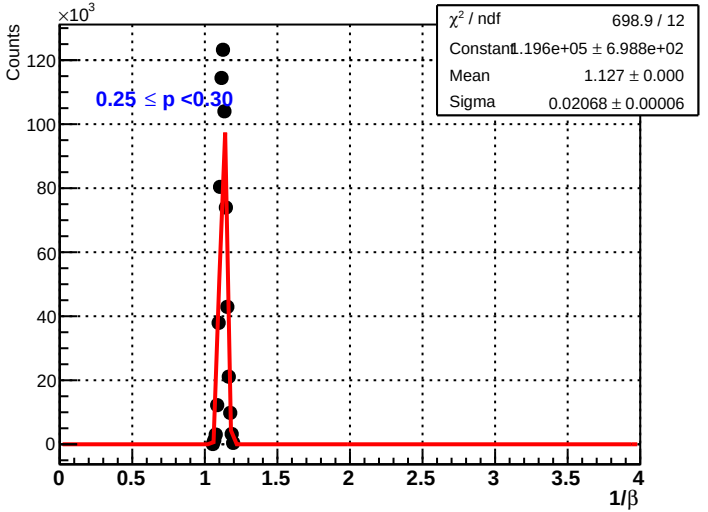

χ² / ndf 113.6 / 88
Constant 798.5 ± 22.5
Mean 2.99 ± 0.01
Sigma 0.2642 ± 0.0036
2.60 p <2.80
Counts
dedx

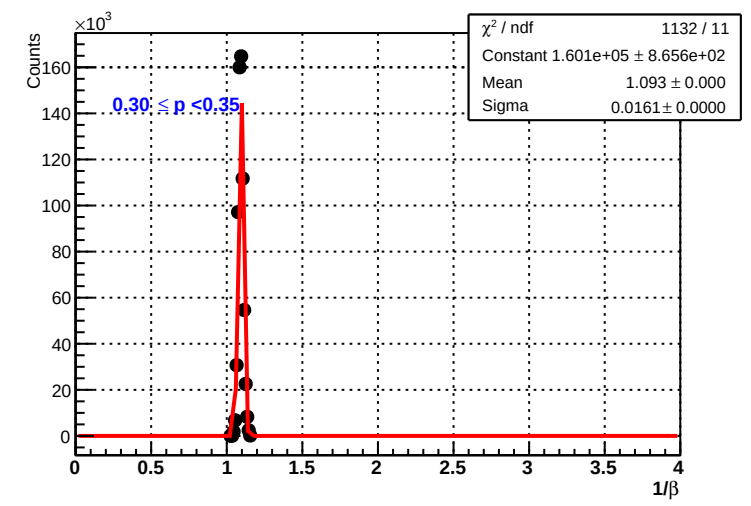

χ² / ndf 178.7 / 86
Constant 610.6 ± 19.2
Mean 2.974 ± 0.008
Sigma 0.2563 ± 0.0038
2.80 p <3.00
Counts
dedx

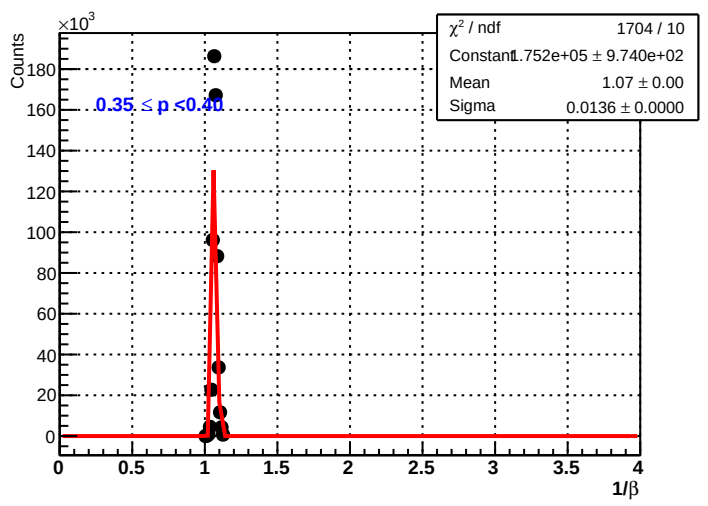

mean
20
18
16
14
12
10
8
6
4
2
0
0
0.5
1
1.5
2
2.5
3
p (GeV/c)
nσ_π mean

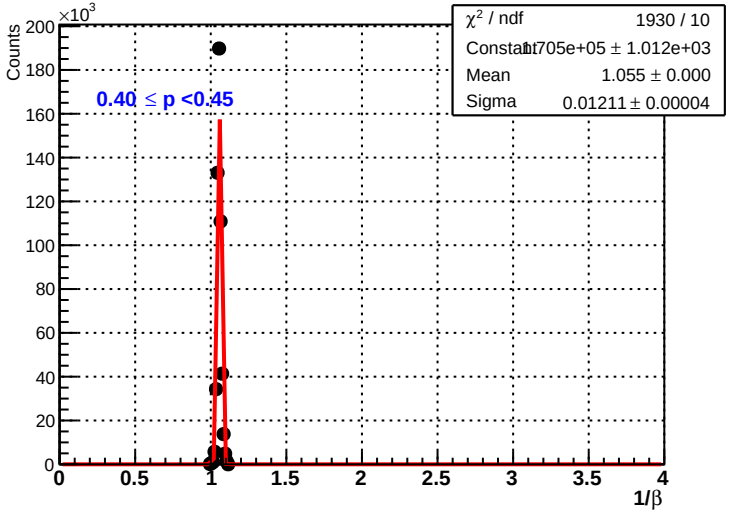

sigma
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0
0.5
1
1.5
2
2.5
3
p (GeV/c)
nσ_π sigma

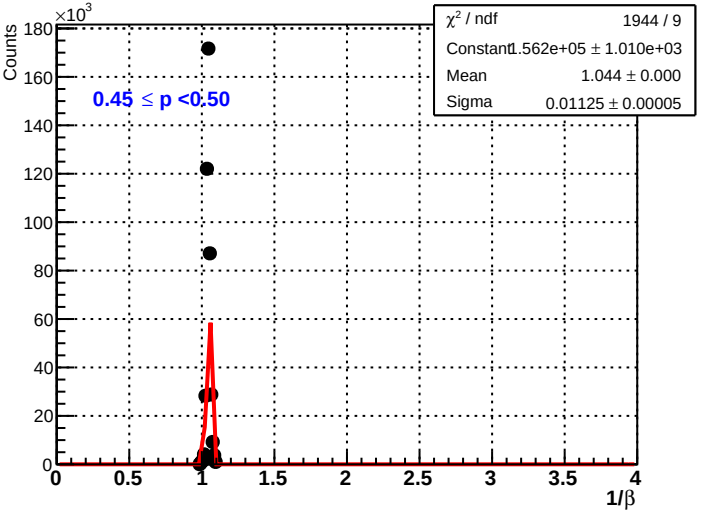

Counts
χ^2 / ndf 1323 / 16
Constant 5.686e+04 ± 4.183e+02
Mean 1.175 ± 0.000
Sigma 0.02539 ± 0.00006
0.20 ≤ p <0.25
1/β

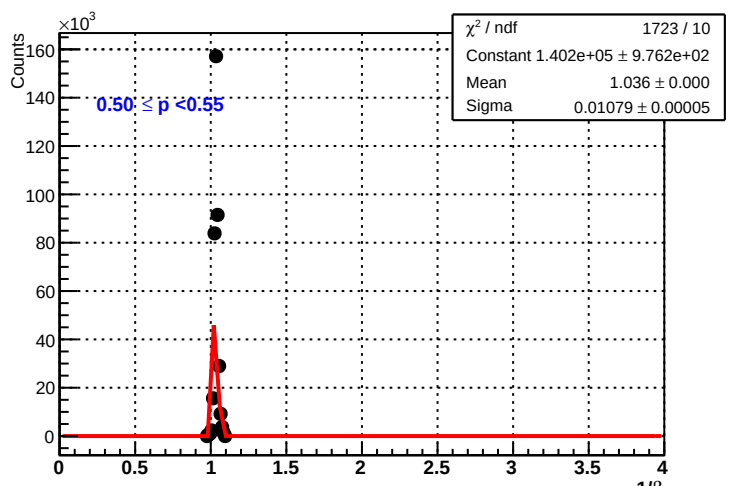

×10^3
Counts
χ^2 / ndf 698.9 / 12
Constant 1.196e+05 ± 6.988e+02
Mean 1.127 ± 0.000
Sigma 0.02068 ± 0.00006
0.25 ≤ p <0.30
1/β

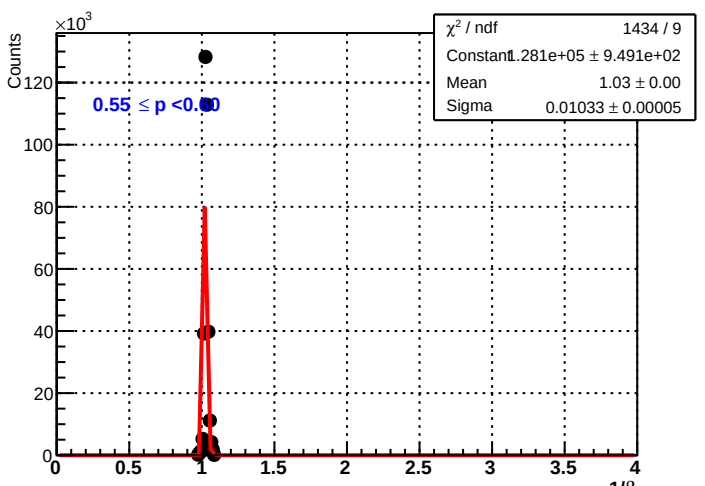

×10^3
Counts
χ^2 / ndf 1132 / 11
Constant 1.601e+05 ± 8.656e+02
Mean 1.093 ± 0.000
Sigma 0.0161 ± 0.0000
0.30 ≤ p <0.35
1/β

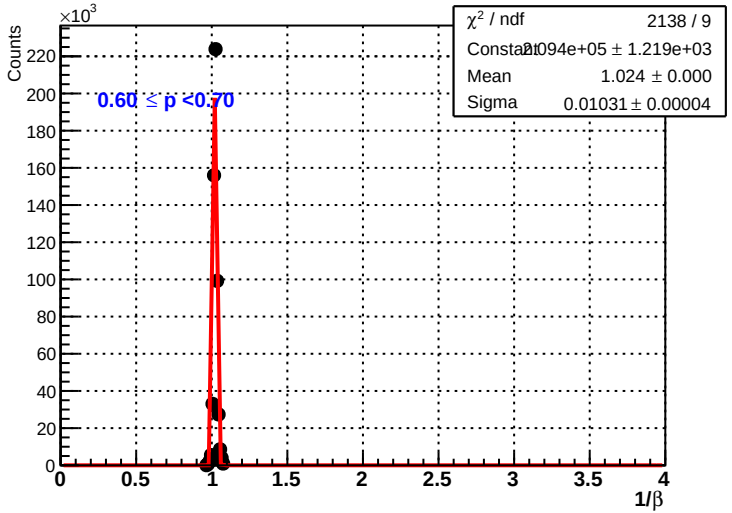

×10^3
Counts
χ^2 / ndf 1704 / 10
Constant 1.752e+05 ± 9.740e+02
Mean 1.07 ± 0.00
Sigma 0.0136 ± 0.0000
0.35 ≤ p <0.40
1/β

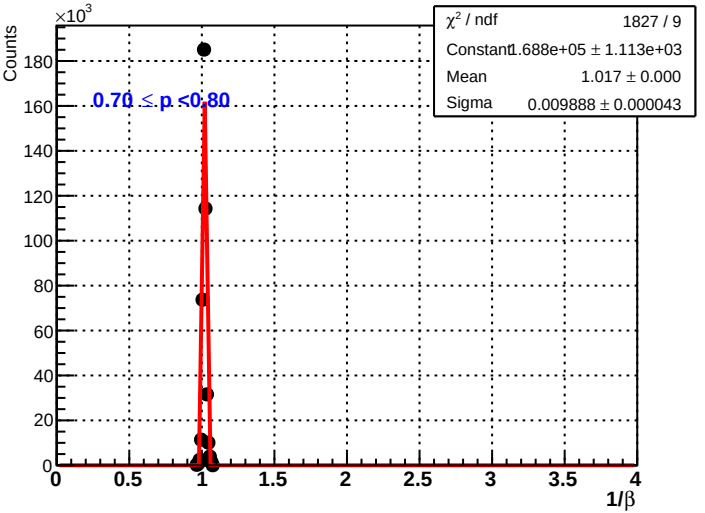

Counts
×10^3
0.40 ≤ p <0.45
χ² / ndf 1930 / 10
Constant 1.705e+05 ± 1.012e+03
Mean 1.055 ± 0.000
Sigma 0.01211 ± 0.00004
1/β

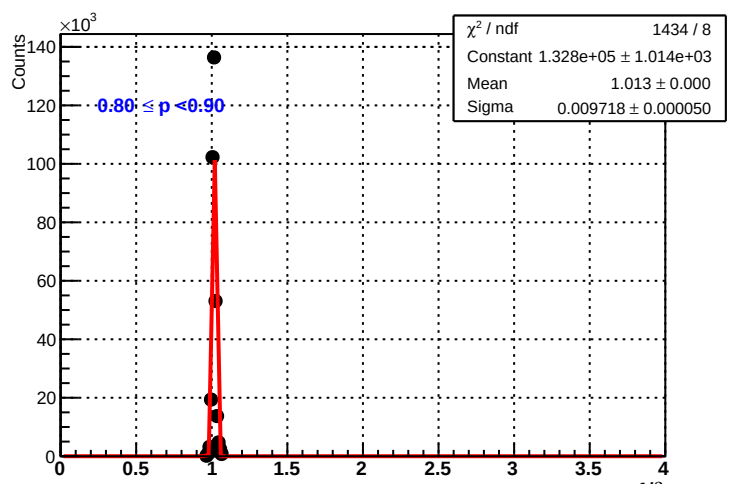

Counts
×10^3
0.45 ≤ p <0.50
χ² / ndf 1944 / 9
Constant 1.562e+05 ± 1.010e+03
Mean 1.044 ± 0.000
Sigma 0.01125 ± 0.00005
1/β

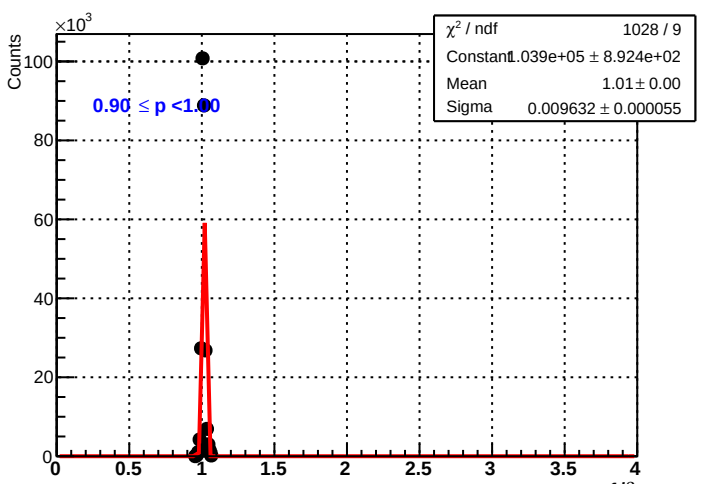

Counts
×10^3
0.50 ≤ p <0.55
χ² / ndf 1723 / 10
Constant 1.402e+05 ± 9.762e+02
Mean 1.036 ± 0.000
Sigma 0.01079 ± 0.00005
1/β

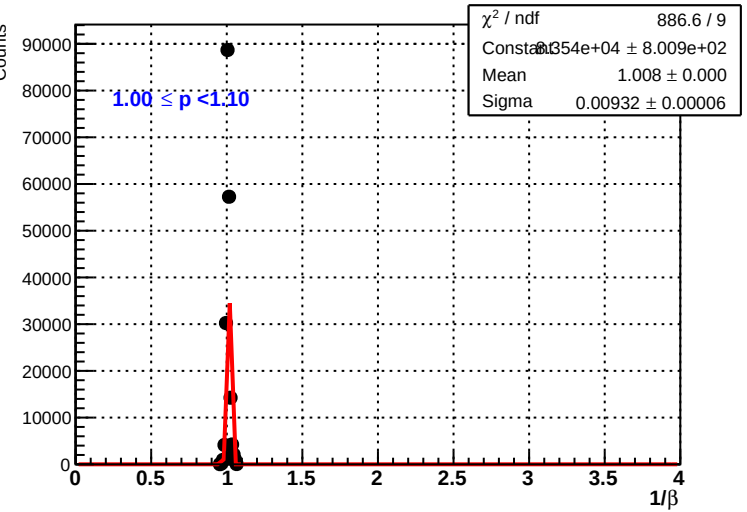

Counts
×10^3
0.55 ≤ p <0.60
χ² / ndf 1434 / 9
Constant 1.281e+05 ± 9.491e+02
Mean 1.03 ± 0.00
Sigma 0.01033 ± 0.00005
1/β

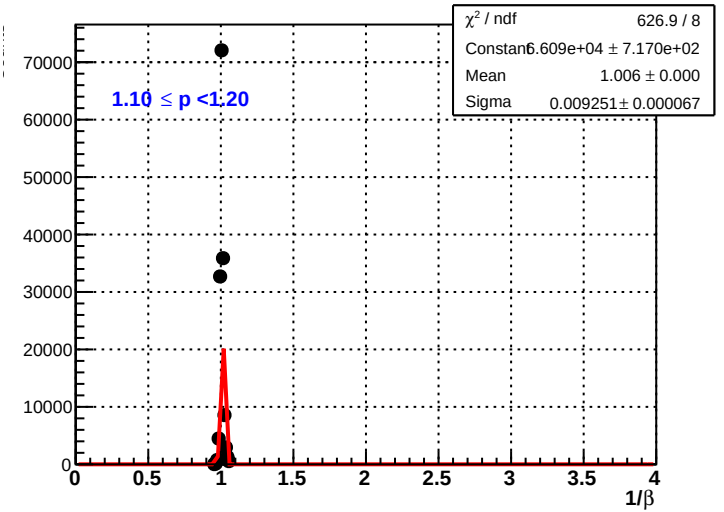

×10^3
Counts
0.60 ≤ p <0.70
χ² / ndf 2138 / 9
Constant 2.094e+05 ± 1.219e+03
Mean 1.024 ± 0.000
Sigma 0.01031 ± 0.00004
1/β

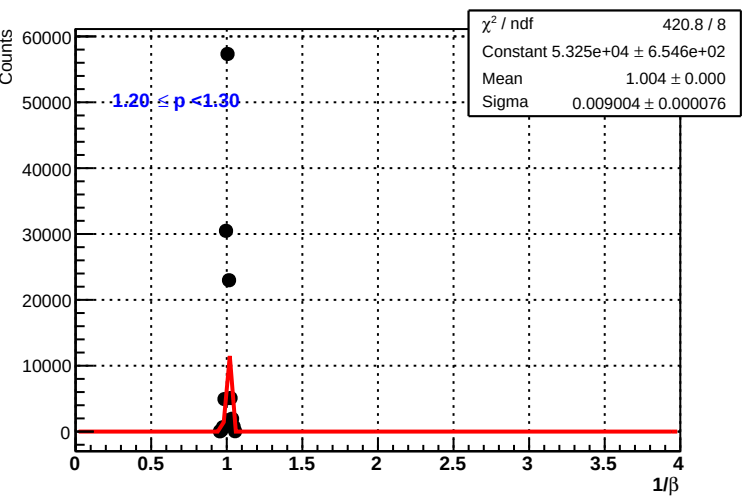

×10^3
Counts
0.70 ≤ p <0.80
χ² / ndf 1827 / 9
Constant 1.688e+05 ± 1.113e+03
Mean 1.017 ± 0.000
Sigma 0.009888 ± 0.000043
1/β

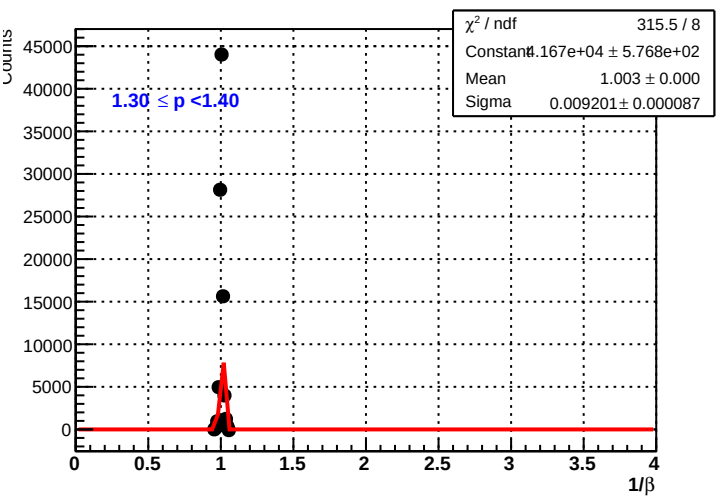

×10^3
Counts
0.80 ≤ p <0.90
χ² / ndf 1434 / 8
Constant 1.328e+05 ± 1.014e+03
Mean 1.013 ± 0.000
Sigma 0.009718 ± 0.000050
1/β

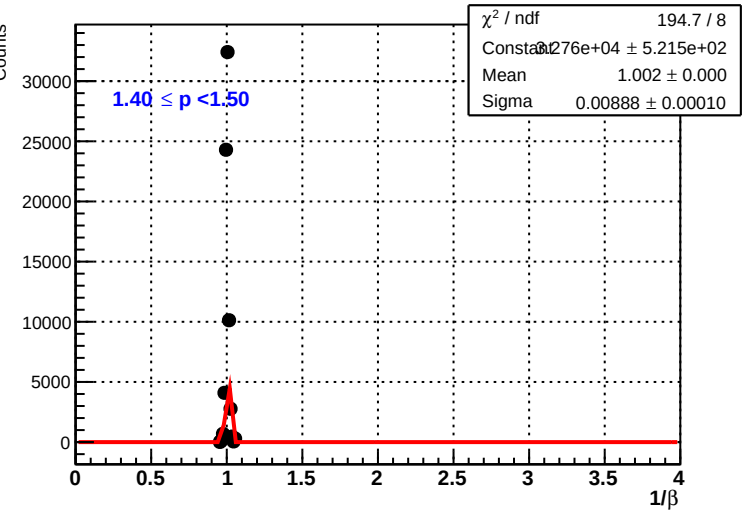

×10^3
Counts
0.90 ≤ p <1.00
χ² / ndf 1028 / 9
Constant 1.039e+05 ± 8.924e+02
Mean 1.01 ± 0.00
Sigma 0.009632 ± 0.000055
1/β

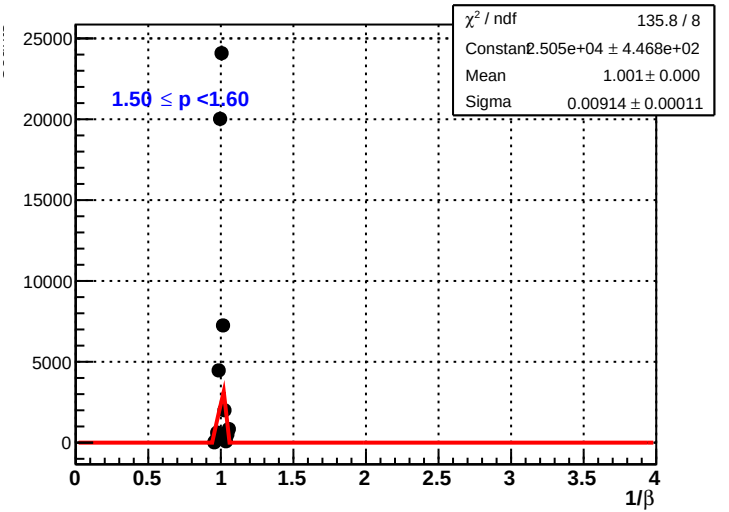

Counts
1.00 ≤ p <1.10
χ² / ndf 886.6 / 9
Constant 8.354e+04 ± 8.009e+02
Mean 1.008 ± 0.000
Sigma 0.00932 ± 0.00006
1/β

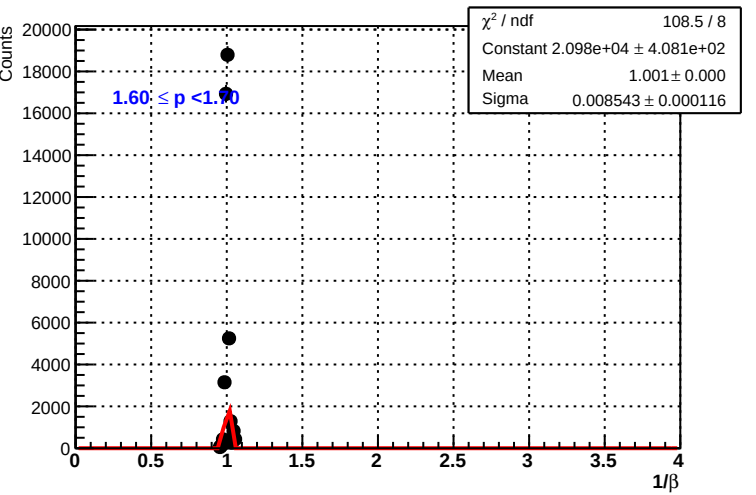

1.10 ≤ p <1.20
χ² / ndf 626.9 / 8
Constant 6.609e+04 ± 7.170e+02
Mean 1.006 ± 0.000
Sigma 0.009251 ± 0.000067
1/β

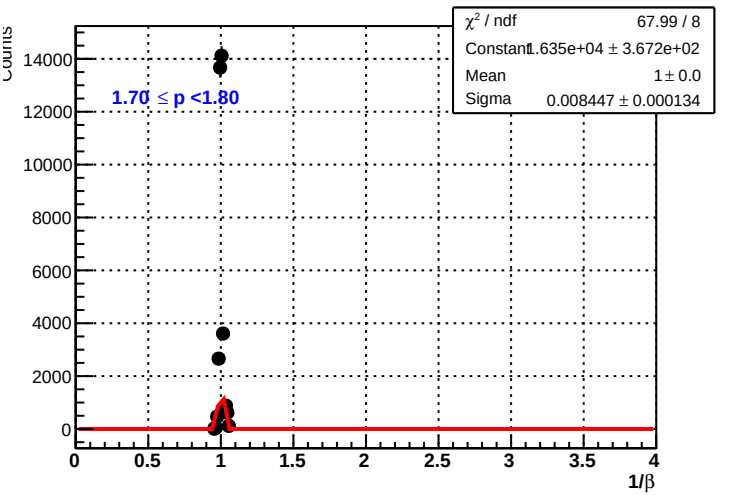

Counts
1.20 ≤ p <1.30
χ² / ndf 420.8 / 8
Constant 5.325e+04 ± 6.546e+02
Mean 1.004 ± 0.000
Sigma 0.009004 ± 0.000076
1/β

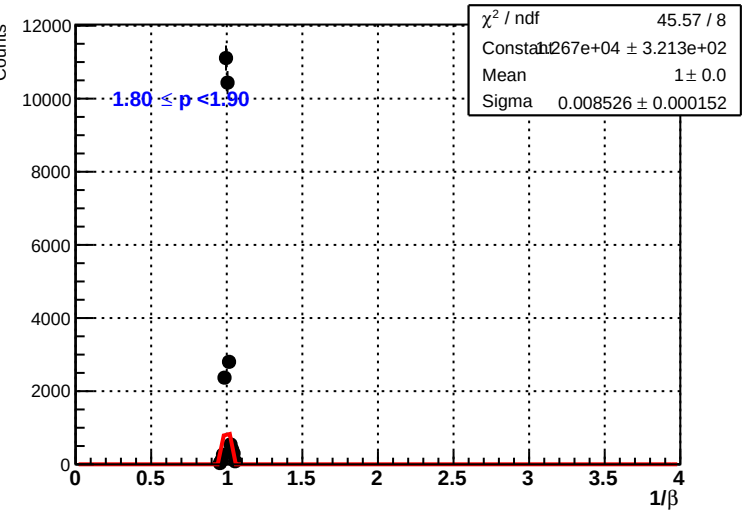

Counts
1.30 ≤ p <1.40
χ² / ndf 315.5 / 8
Constant 4.167e+04 ± 5.768e+02
Mean 1.003 ± 0.000
Sigma 0.009201 ± 0.000087
1/β

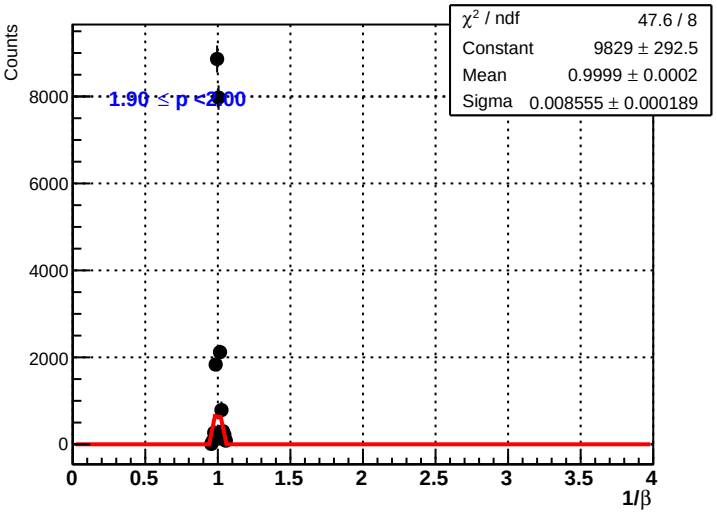

Counts
χ^2 / ndf 194.7 / 8
Constant 3.276e+04 ± 5.215e+02
Mean 1.002 ± 0.000
Sigma 0.00888 ± 0.00010
1.40 ≤ p <1.50
1/β

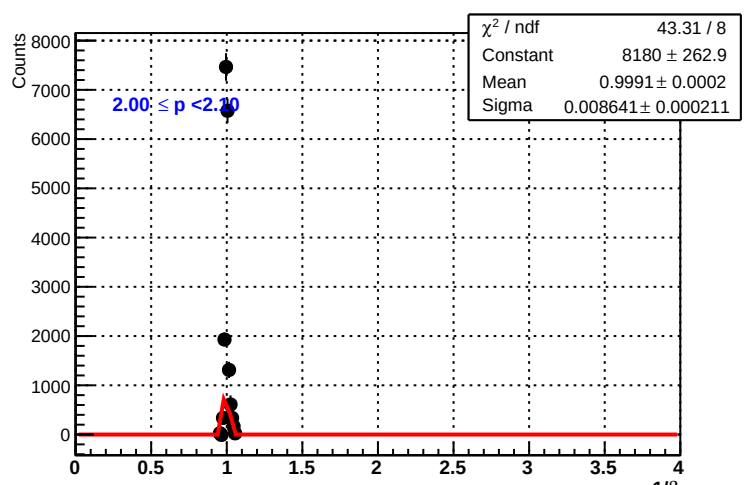

χ^2 / ndf 135.8 / 8
Constant 2.505e+04 ± 4.468e+02
Mean 1.001 ± 0.000
Sigma 0.00914 ± 0.00011
1.50 ≤ p <1.60
1/β

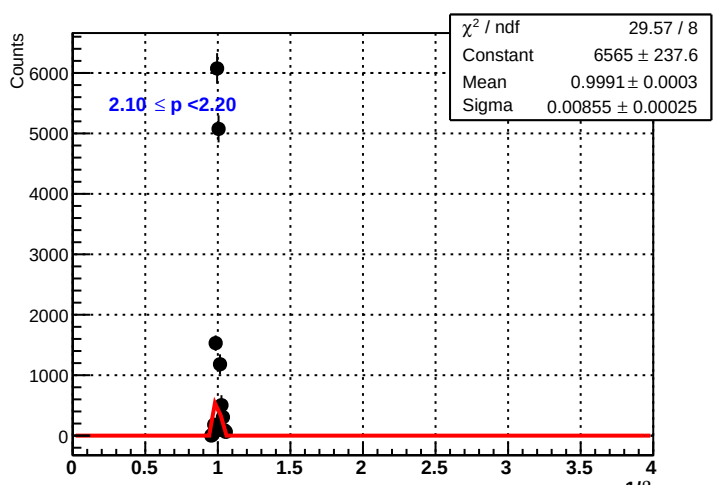

Counts
χ^2 / ndf 108.5 / 8
Constant 2.098e+04 ± 4.081e+02
Mean 1.001 ± 0.000
Sigma 0.008543 ± 0.000116
1.60 ≤ p <1.70
1/β

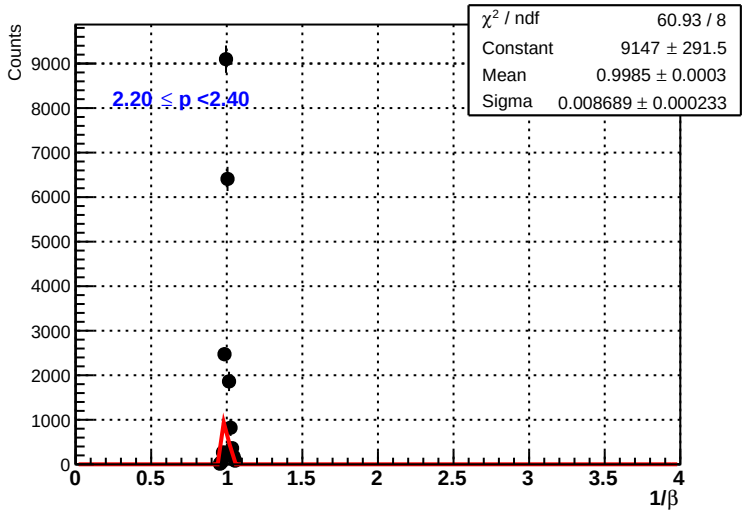

Counts
χ^2 / ndf 67.99 / 8
Constant 1.635e+04 ± 3.672e+02
Mean 1 ± 0.0
Sigma 0.008447 ± 0.000134
1.70 ≤ p <1.80
1/β

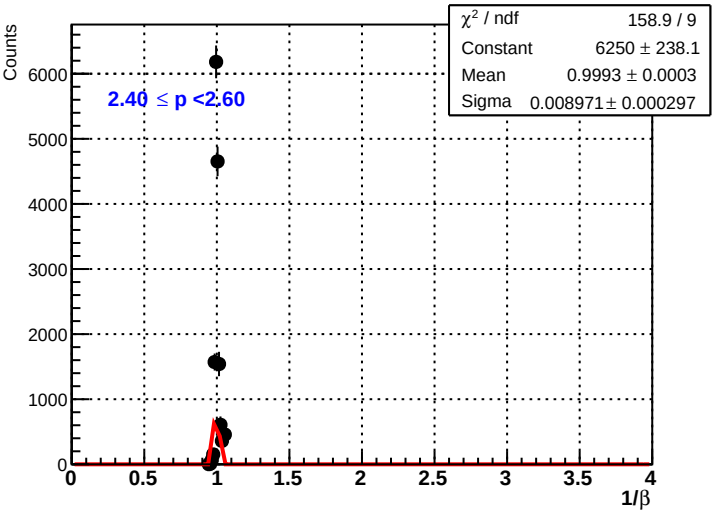

Counts
1.80 ≤ p <1.90
χ² / ndf 45.57 / 8
Constant 1.267e+04 ± 3.213e+02
Mean 1 ± 0.0
Sigma 0.008526 ± 0.000152
1/β

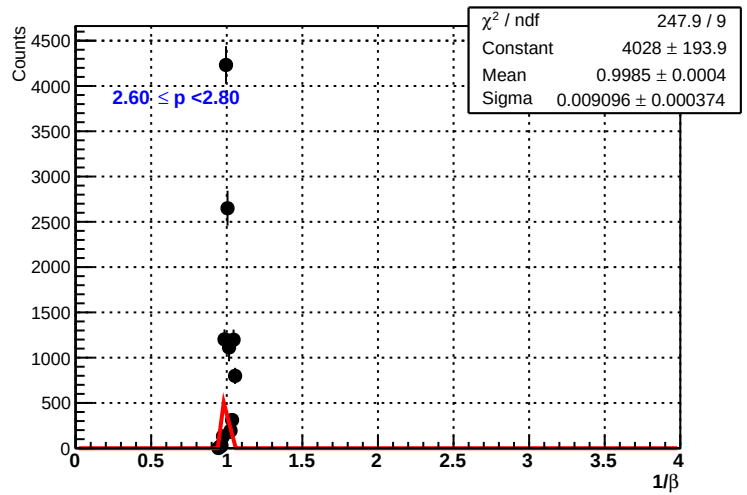

Counts
1.90 ≤ p <2.00
χ² / ndf 47.6 / 8
Constant 9829 ± 292.5
Mean 0.9999 ± 0.0002
Sigma 0.008555 ± 0.000189
1/β

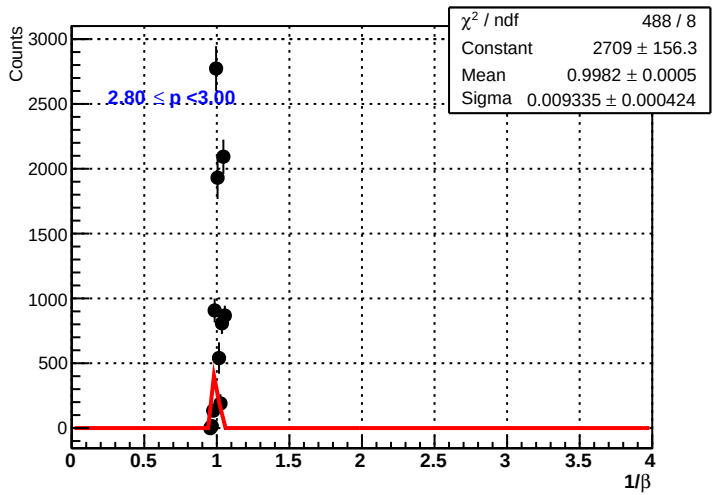

Counts
2.00 ≤ p <2.10
χ² / ndf 43.31 / 8
Constant 8180 ± 262.9
Mean 0.9991 ± 0.0002
Sigma 0.008641 ± 0.000211
1/β

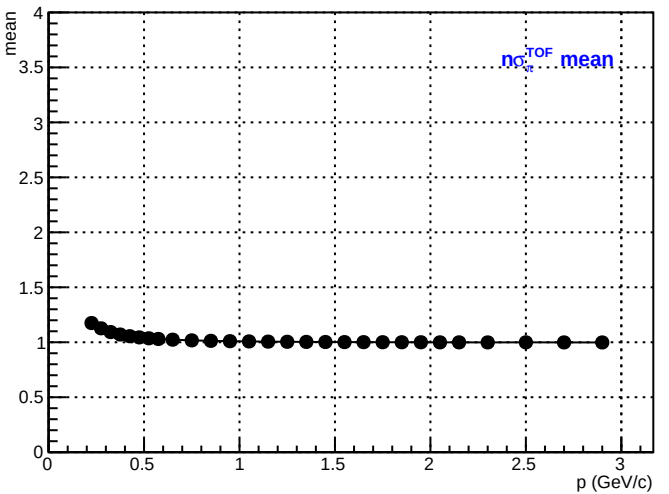

Counts
2.10 ≤ p <2.20
χ² / ndf 29.57 / 8
Constant 6565 ± 237.6
Mean 0.9991 ± 0.0003
Sigma 0.00855 ± 0.00025
1/β

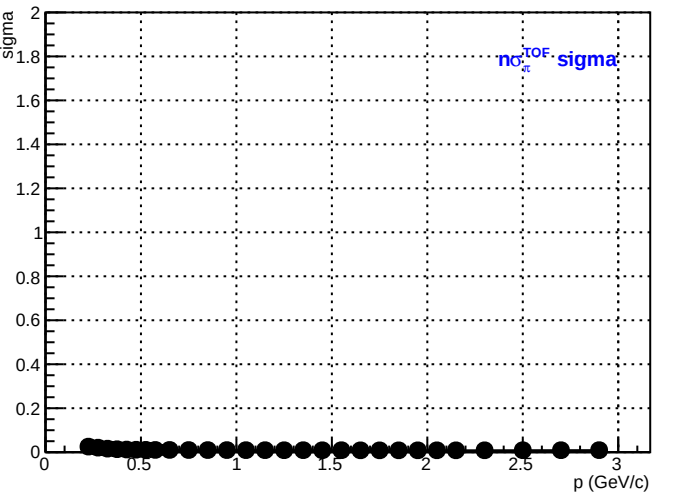

χ² / ndf 60.93 / 8
Constant 9147 ± 291.5
Mean 0.9985 ± 0.0003
Sigma 0.008689 ± 0.000233
2.20 ≤ p <2.40
Counts
1/β

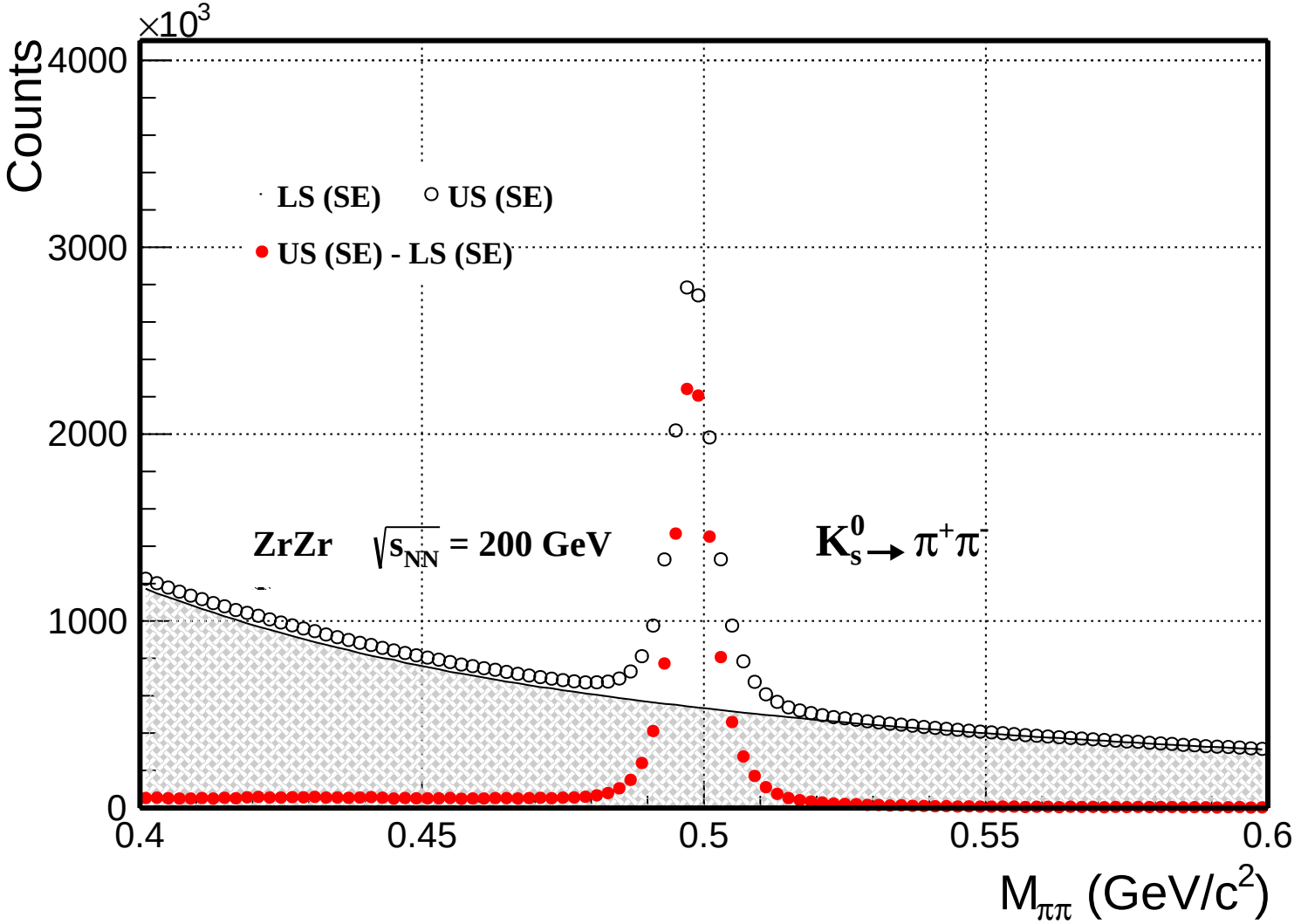

χ² / ndf 158.9 / 9
Constant 6250 ± 238.1
Mean 0.9993 ± 0.0003
Sigma 0.008971 ± 0.000297
2.40 ≤ p <2.60
Counts
1/β


χ² / ndf 247.9 / 9
Constant 4028 ± 193.9
Mean 0.9985 ± 0.0004
Sigma 0.009096 ± 0.000374
2.60 ≤ p <2.80
Counts
1/β


χ² / ndf 488 / 8
Constant 2709 ± 156.3
Mean 0.9982 ± 0.0005
Sigma 0.009335 ± 0.000424
2.80 ≤ p <3.00
Counts
1/β


mean
$n\sigma_{\pi}^{TOF}$ mean
p (GeV/c)
0
0.5
1
1.5
2
2.5
3
3.5
4


sigma
$n\sigma_{\pi}^{TOF}$ sigma
p (GeV/c)
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2


×10^3
Counts
4000
3000
2000
1000
0
LS (SE)
US (SE)
US (SE) - LS (SE)
ZrZr
√s_NN = 200 GeV
K^0_s → π^+π^-
0.4
0.45
0.5
0.55
0.6
M_ππ (GeV/c^2)

proton PID and efficiency in Zr+Zr 200 GeV

Target π

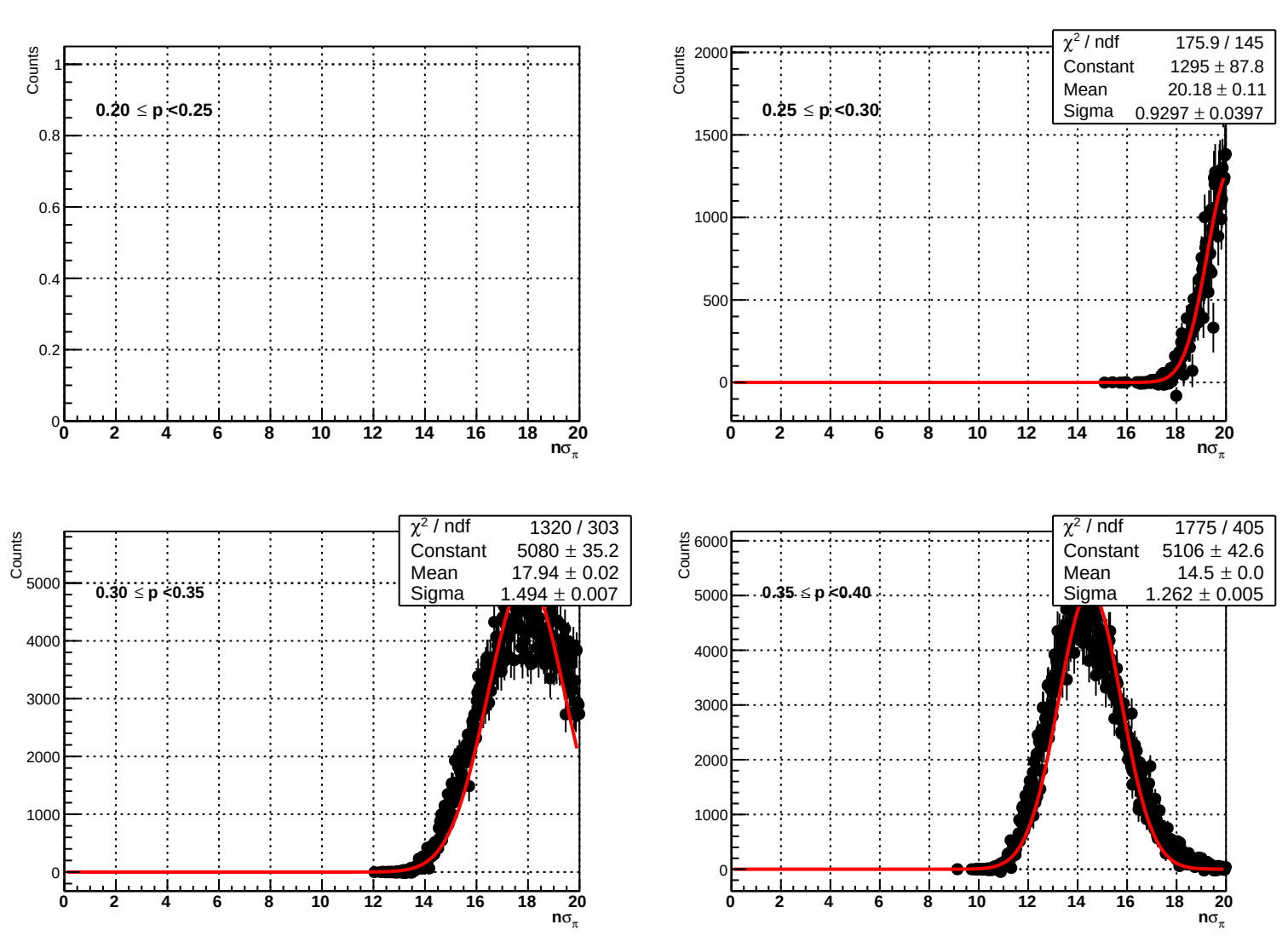
- $p_T > 0.5$
- $|\eta| < 1$
- nHitsFit ≥ 20
- ndEdx > 15
- gDca > 0.1
- $|n\sigma_\pi| < 2.0$
- $|n\sigma_\pi^{TOF}| < 2.0$

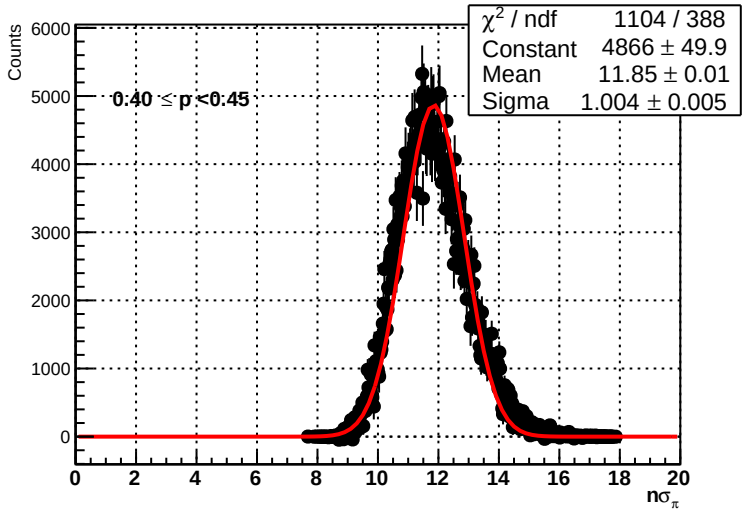
Partner proton

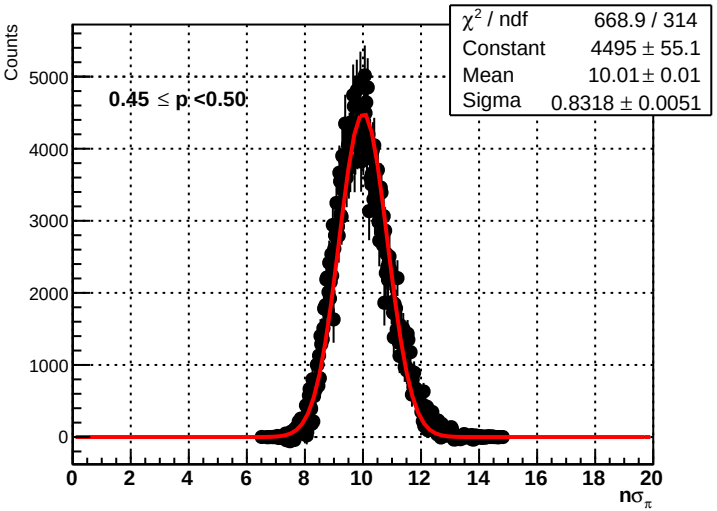
- $p_T > 0.2$
- $|\eta| < 1$
- nHitsFit ≥ 20
- ndEdx > 15
- gDca > 0.1
- $|n\sigma_\pi| < 3.0$
- $0.5 < |p*p*(1.0/\beta/\beta\text{-}1.0)| < 1.5$

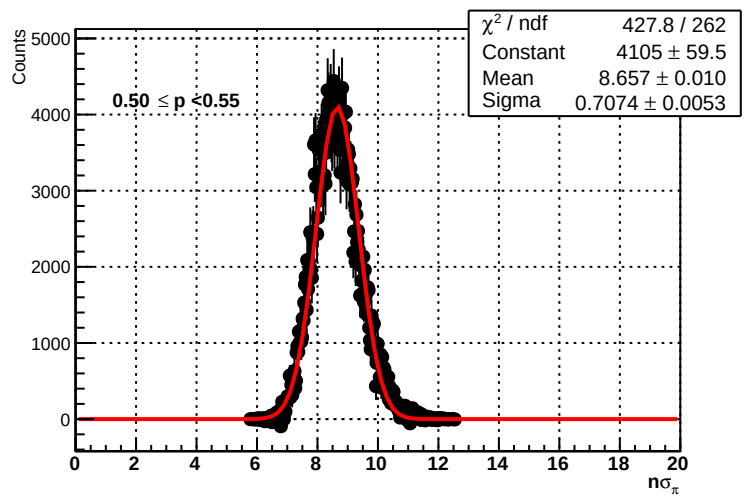
Λ^0 reconstruction cuts:

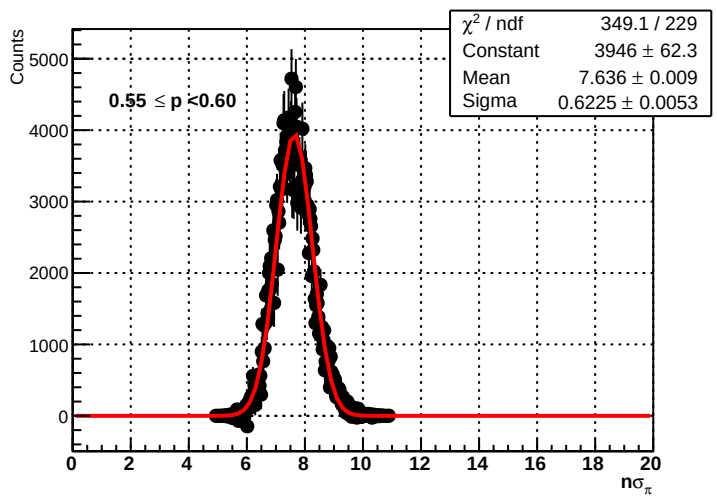
- DecayL > 4.0
- Dca < 2.5
- pairDca < 0.8
- $\cos\theta < 1.2$

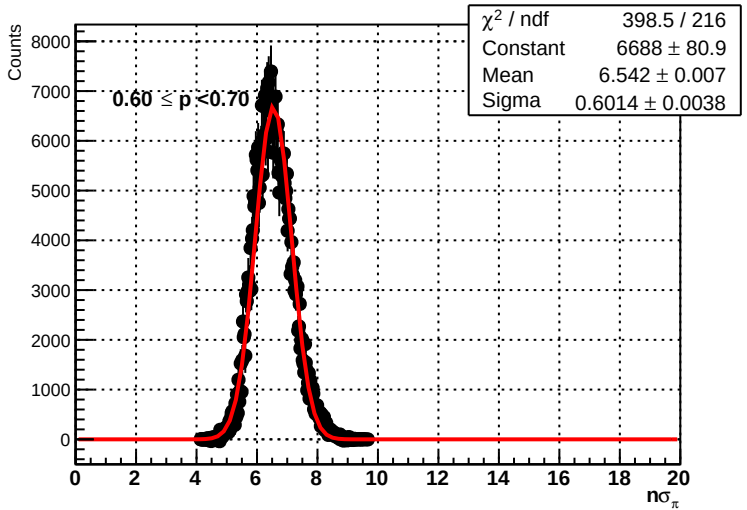

Counts
0.20 ≤ p <0.25
nσπ
Counts
0.25 ≤ p <0.30
χ2 / ndf 175.9 / 145
Constant 1295 ± 87.8
Mean 20.18 ± 0.11
Sigma 0.9297 ± 0.0397
nσπ
Counts
0.30 ≤ p <0.35
χ2 / ndf 1320 / 303
Constant 5080 ± 35.2
Mean 17.94 ± 0.02
Sigma 1.494 ± 0.007
nσπ
Counts
0.35 ≤ p <0.40
χ2 / ndf 1775 / 405
Constant 5106 ± 42.6
Mean 14.5 ± 0.0
Sigma 1.262 ± 0.005
nσπ

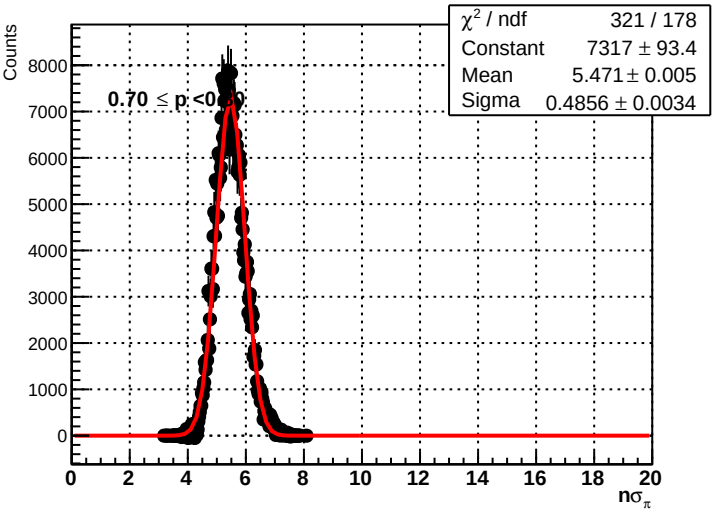

0.40 ≤ p <0.45
χ² / ndf 1104 / 388
Constant 4866 ± 49.9
Mean 11.85 ± 0.01
Sigma 1.004 ± 0.005
Counts
nσπ

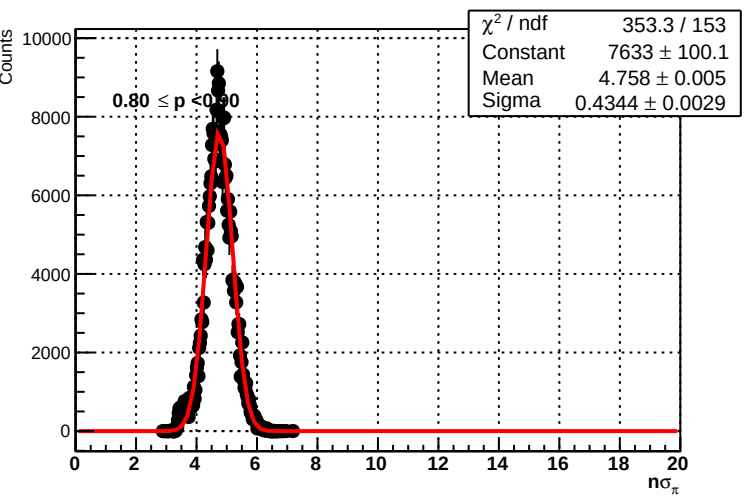

0.45 ≤ p <0.50
χ² / ndf 668.9 / 314
Constant 4495 ± 55.1
Mean 10.01 ± 0.01
Sigma 0.8318 ± 0.0051
Counts
nσπ

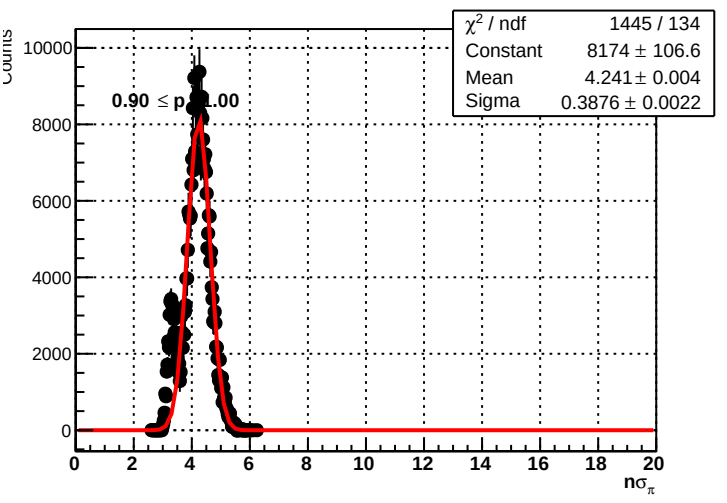

0.50 ≤ p <0.55
χ² / ndf 427.8 / 262
Constant 4105 ± 59.5
Mean 8.657 ± 0.010
Sigma 0.7074 ± 0.0053
Counts
nσπ

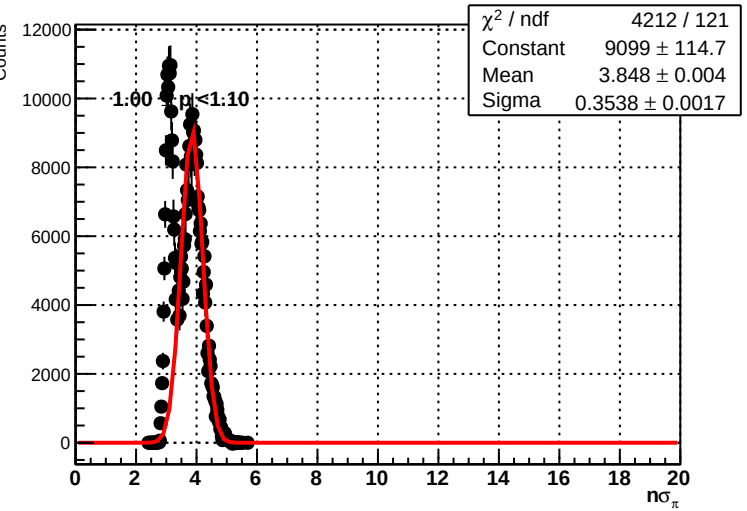

0.55 ≤ p <0.60
χ² / ndf 349.1 / 229
Constant 3946 ± 62.3
Mean 7.636 ± 0.009
Sigma 0.6225 ± 0.0053
Counts
nσπ

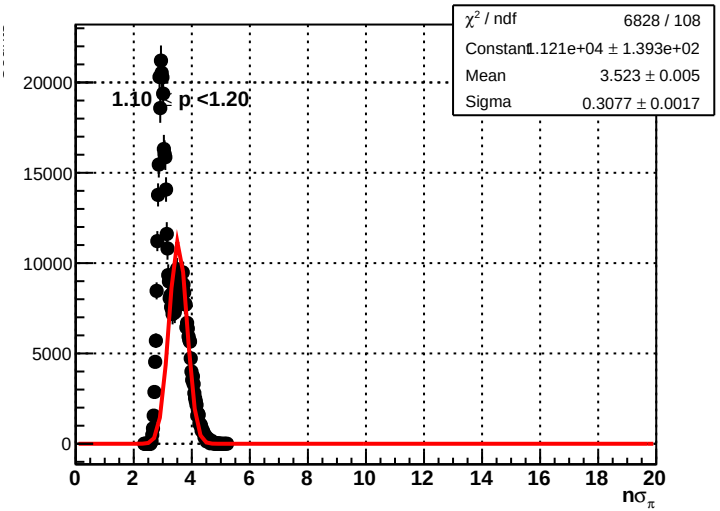

Counts
0.60 ≤ p <0.70
χ² / ndf 398.5 / 216
Constant 6688 ± 80.9
Mean 6.542 ± 0.007
Sigma 0.6014 ± 0.0038
nσπ

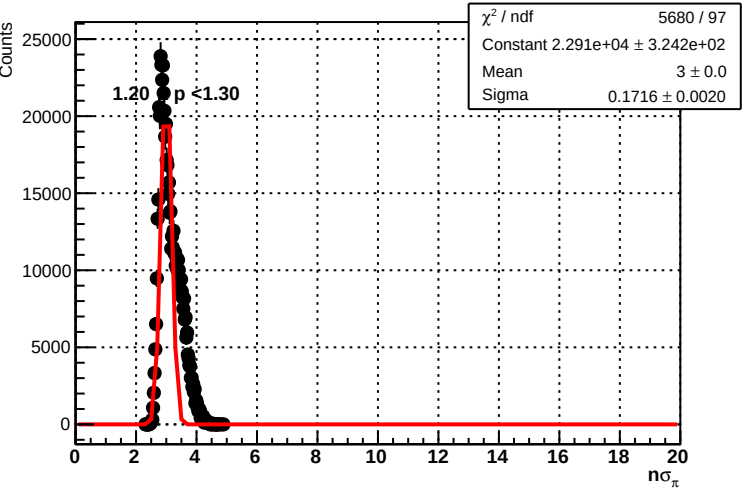

Counts
0.70 ≤ p <0.80
χ² / ndf 321 / 178
Constant 7317 ± 93.4
Mean 5.471 ± 0.005
Sigma 0.4856 ± 0.0034
nσπ

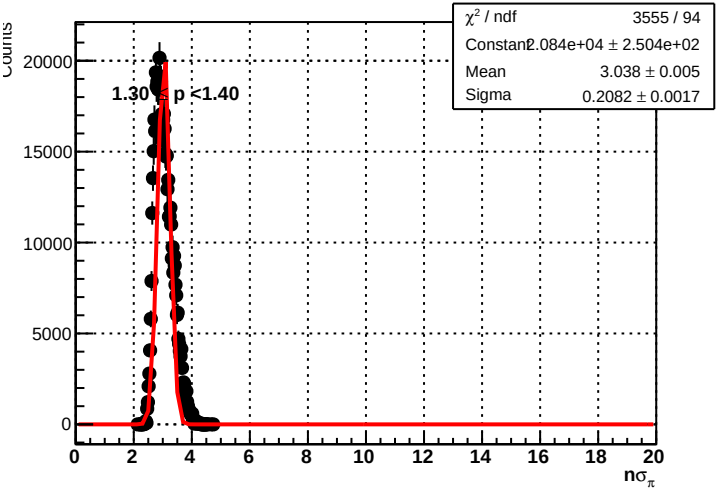

Counts
0.80 ≤ p <0.90
χ² / ndf 353.3 / 153
Constant 7633 ± 100.1
Mean 4.758 ± 0.005
Sigma 0.4344 ± 0.0029
nσπ

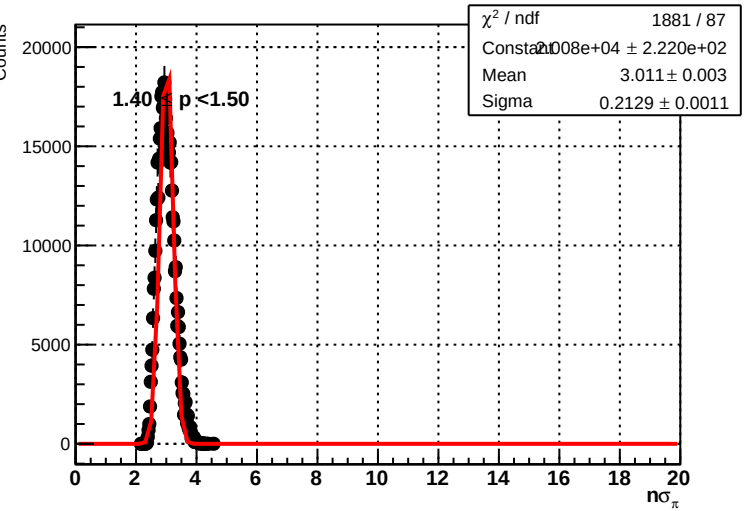

Counts
0.90 ≤ p <1.00
χ² / ndf 1445 / 134
Constant 8174 ± 106.6
Mean 4.241 ± 0.004
Sigma 0.3876 ± 0.0022
nσπ

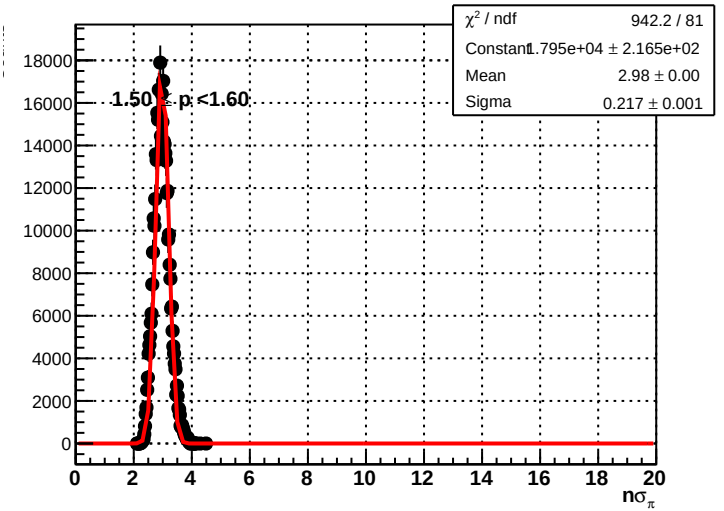

χ² / ndf 4212 / 121
Constant 9099 ± 114.7
Mean 3.848 ± 0.004
Sigma 0.3538 ± 0.0017
1.00 < p <1.10
Counts
nσπ

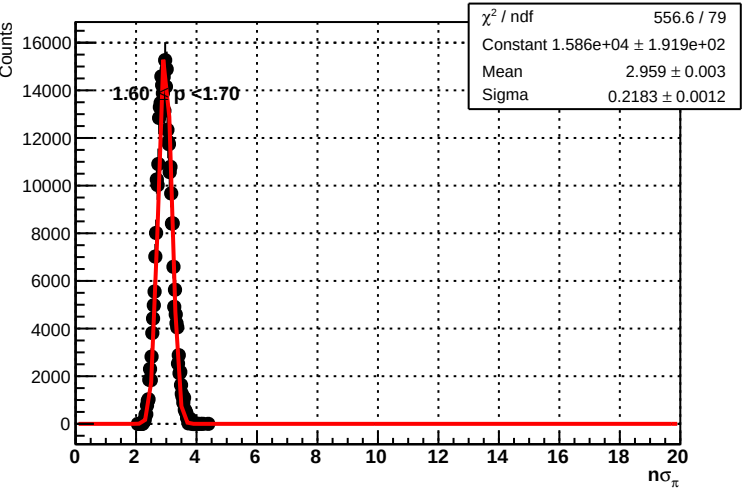

χ² / ndf 6828 / 108
Constant 1.121e+04 ± 1.393e+02
Mean 3.523 ± 0.005
Sigma 0.3077 ± 0.0017
1.10 < p <1.20
nσπ

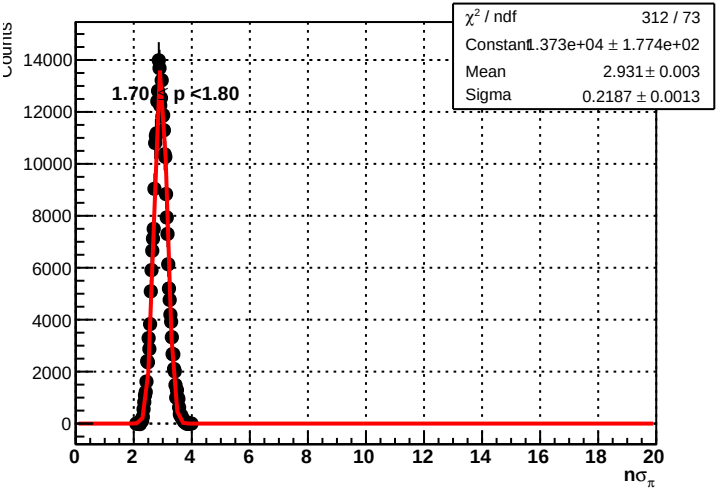

χ² / ndf 5680 / 97
Constant 2.291e+04 ± 3.242e+02
Mean 3 ± 0.0
Sigma 0.1716 ± 0.0020
1.20 < p <1.30
Counts
nσπ

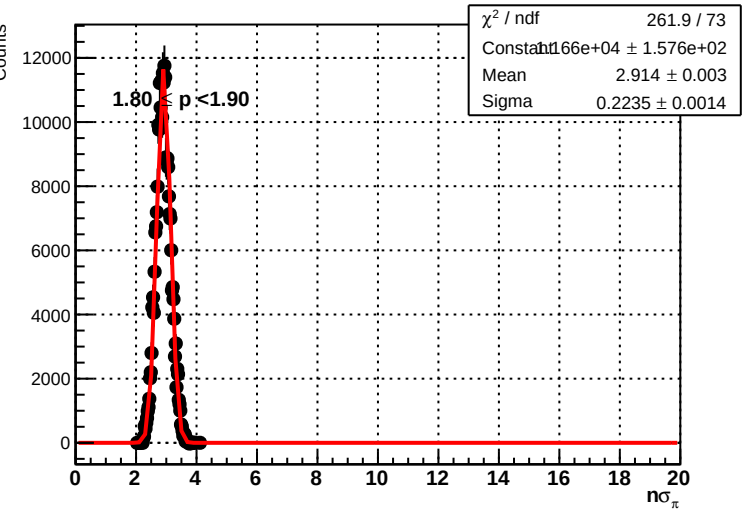

χ² / ndf 3555 / 94
Constant 2.084e+04 ± 2.504e+02
Mean 3.038 ± 0.005
Sigma 0.2082 ± 0.0017
1.30 < p <1.40
Counts
nσπ

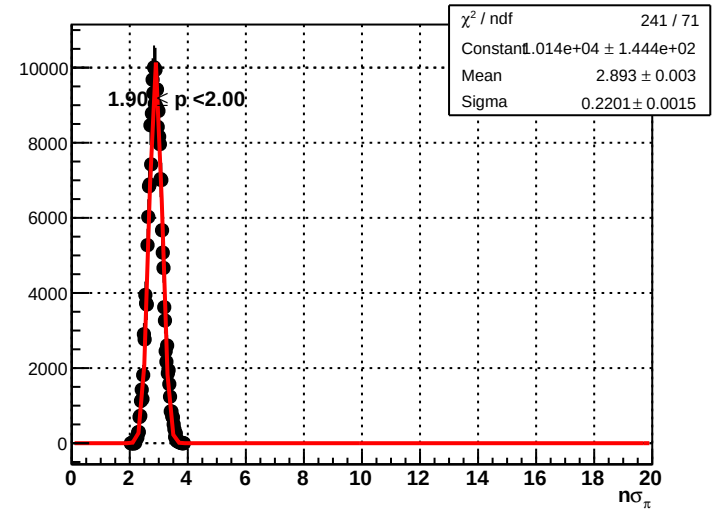

Counts
1.40 < p <1.50
χ² / ndf 1881 / 87
Constant 2.008e+04 ± 2.220e+02
Mean 3.011 ± 0.003
Sigma 0.2129 ± 0.0011
nσπ

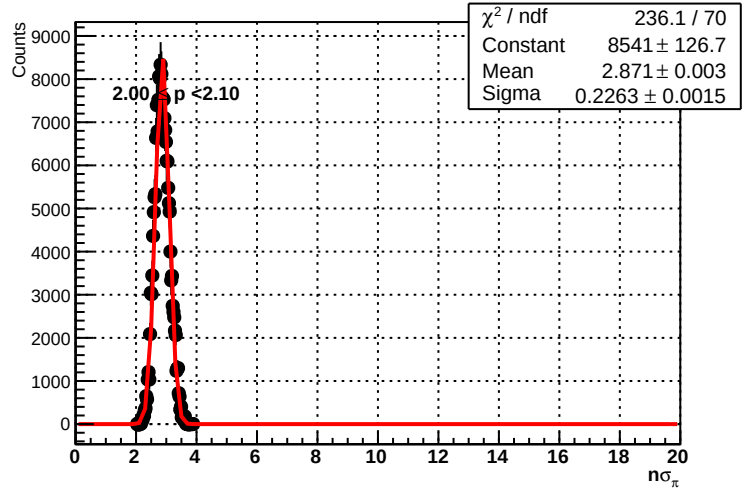

1.50 < p <1.60
χ² / ndf 942.2 / 81
Constant 1.795e+04 ± 2.165e+02
Mean 2.98 ± 0.00
Sigma 0.217 ± 0.001
nσπ

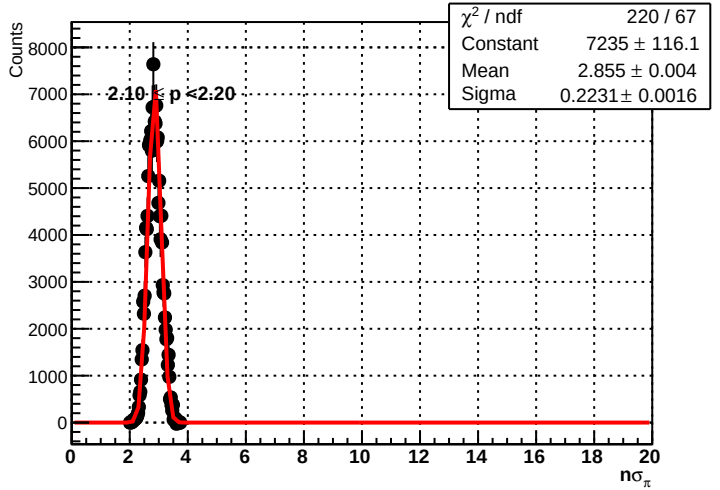

Counts
1.60 < p <1.70
χ² / ndf 556.6 / 79
Constant 1.586e+04 ± 1.919e+02
Mean 2.959 ± 0.003
Sigma 0.2183 ± 0.0012
nσπ

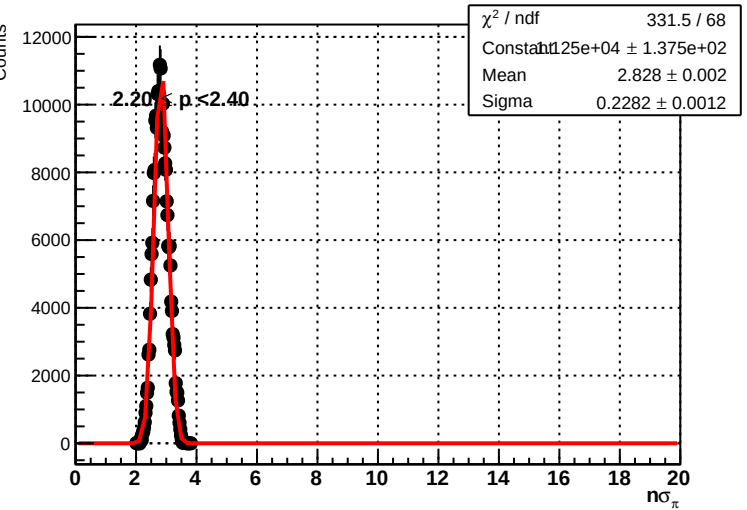

Counts
1.70 < p <1.80
χ² / ndf 312 / 73
Constant 1.373e+04 ± 1.774e+02
Mean 2.931 ± 0.003
Sigma 0.2187 ± 0.0013
nσπ

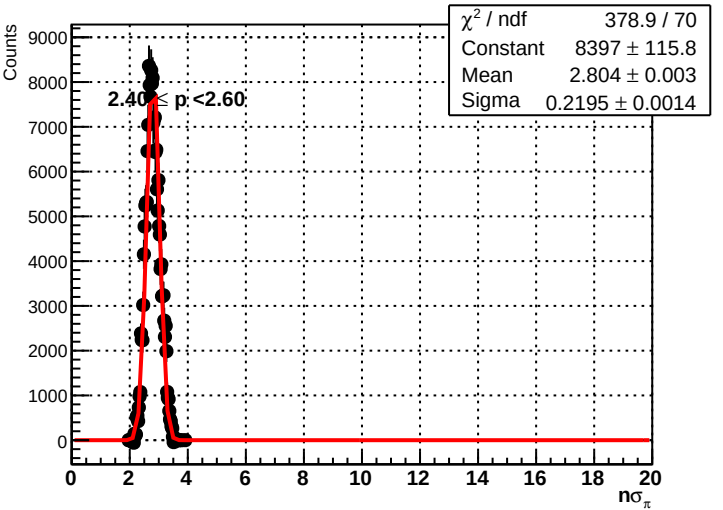

χ² / ndf 261.9 / 73
Constant 1.166e+04 ± 1.576e+02
Mean 2.914 ± 0.003
Sigma 0.2235 ± 0.0014
1.80 ≤ p <1.90
Counts
nσπ

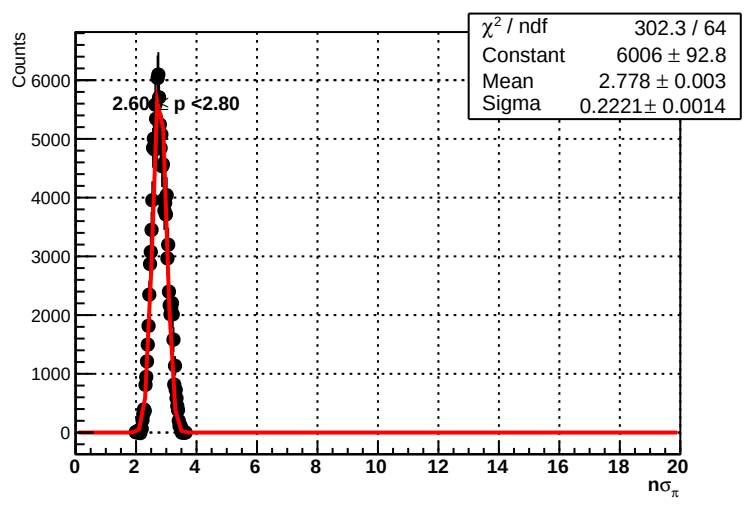

χ² / ndf 241 / 71
Constant 1.014e+04 ± 1.444e+02
Mean 2.893 ± 0.003
Sigma 0.2201 ± 0.0015
1.90 ≤ p <2.00
nσπ

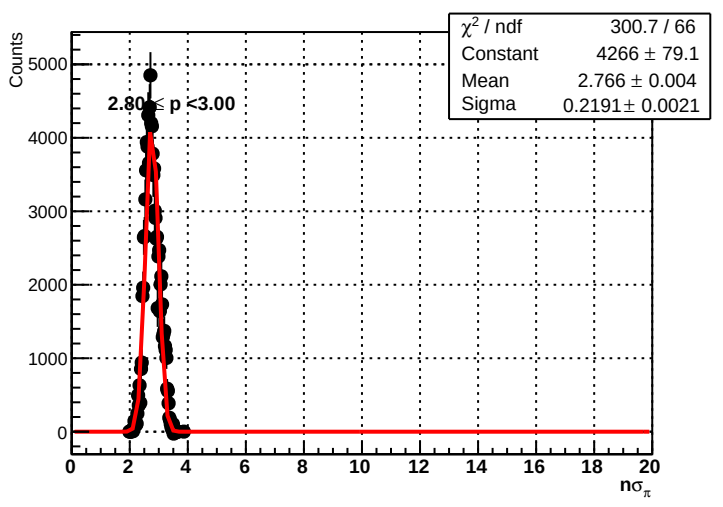

χ² / ndf 236.1 / 70
Constant 8541 ± 126.7
Mean 2.871 ± 0.003
Sigma 0.2263 ± 0.0015
2.00 ≤ p <2.10
Counts
nσπ

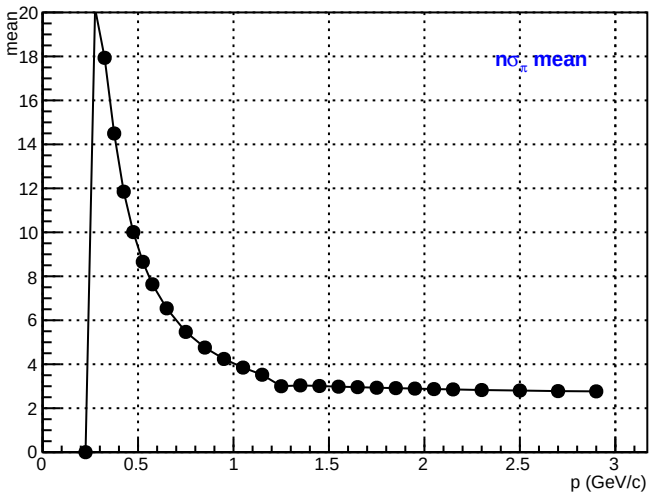

χ² / ndf 220 / 67
Constant 7235 ± 116.1
Mean 2.855 ± 0.004
Sigma 0.2231 ± 0.0016
2.10 ≤ p <2.20
Counts
nσπ

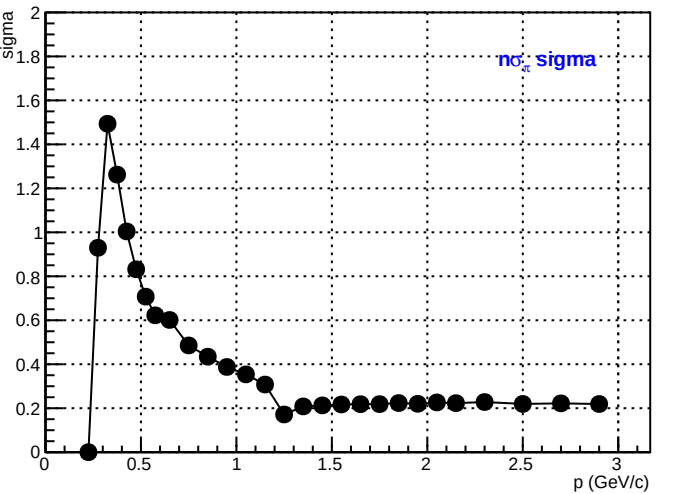

Counts
2.20 < p <2.40
χ² / ndf 331.5 / 68
Constant 1.125e+04 ± 1.375e+02
Mean 2.828 ± 0.002
Sigma 0.2282 ± 0.0012
nσπ

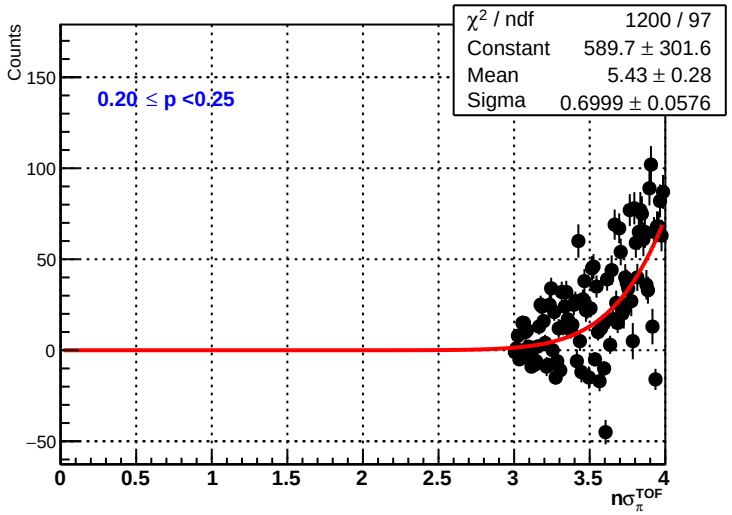

Counts
2.40 < p <2.60
χ² / ndf 378.9 / 70
Constant 8397 ± 115.8
Mean 2.804 ± 0.003
Sigma 0.2195 ± 0.0014
nσπ

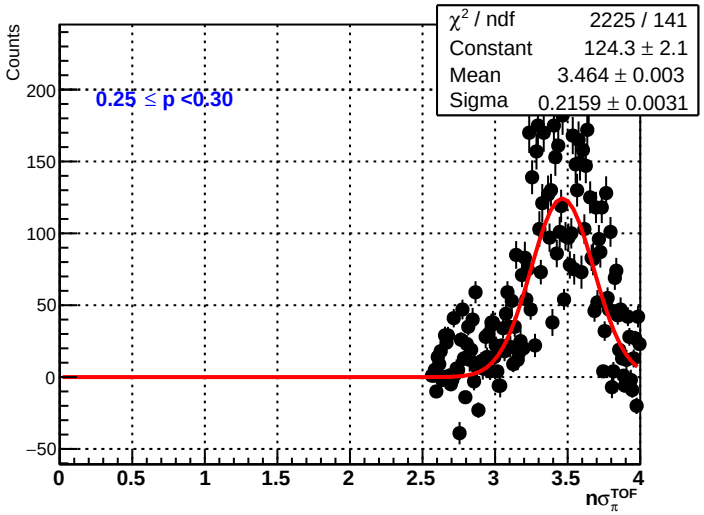

Counts
2.60 < p <2.80
χ² / ndf 302.3 / 64
Constant 6006 ± 92.8
Mean 2.778 ± 0.003
Sigma 0.2221± 0.0014
nσπ

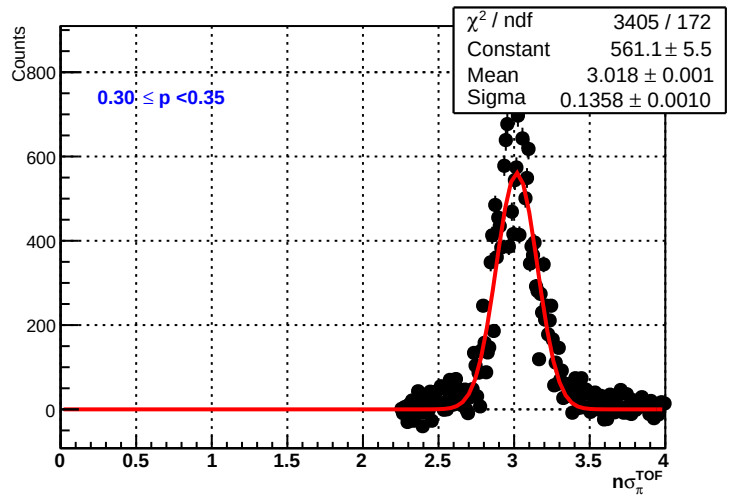

Counts
2.80 < p <3.00
χ² / ndf 300.7 / 66
Constant 4266 ± 79.1
Mean 2.766 ± 0.004
Sigma 0.2191± 0.0021
nσπ

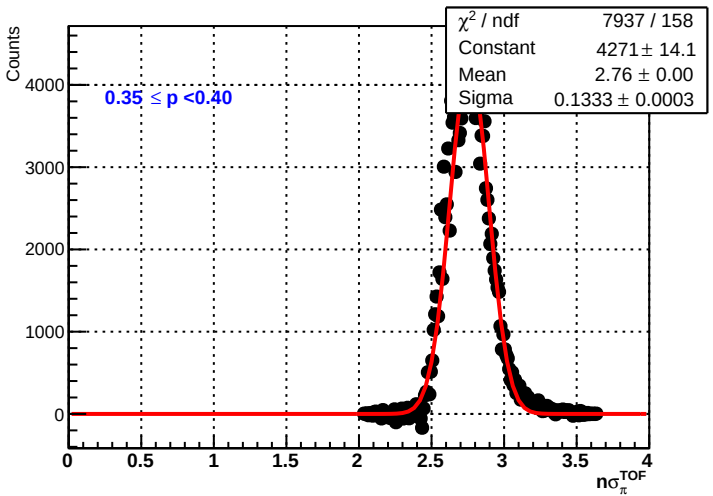

mean
20
18
16
14
12
10
8
6
4
2
0
0
0.5
1
1.5
2
2.5
3
p (GeV/c)
$n\sigma_{\pi}$ mean

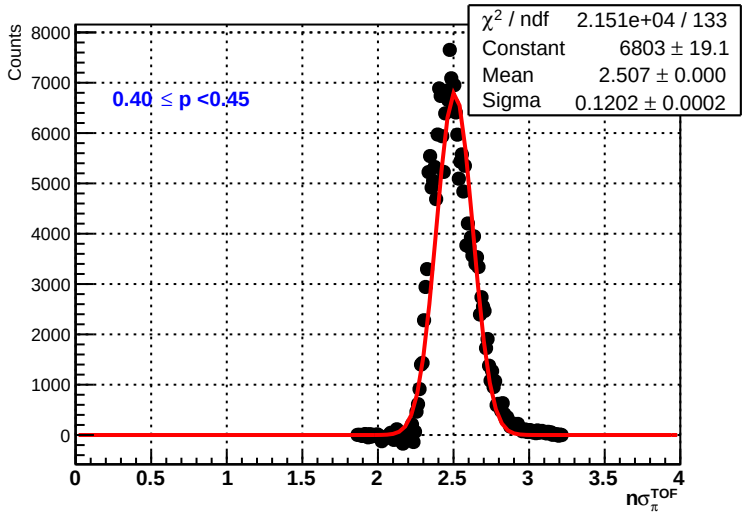

sigma
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0
0.5
1
1.5
2
2.5
3
p (GeV/c)
$n\sigma_{\pi}$ sigma

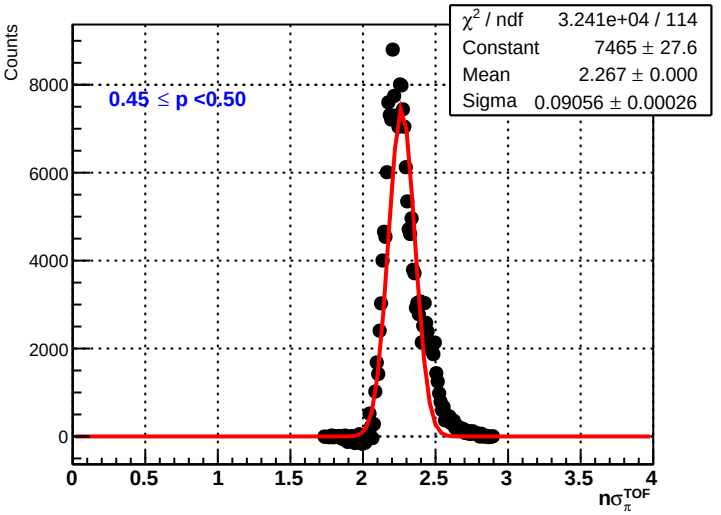

χ^2 / ndf 1200 / 97
Constant 589.7 ± 301.6
Mean 5.43 ± 0.28
Sigma 0.6999 ± 0.0576
0.20 ≤ p <0.25
Counts
$n\sigma_\pi^{TOF}$

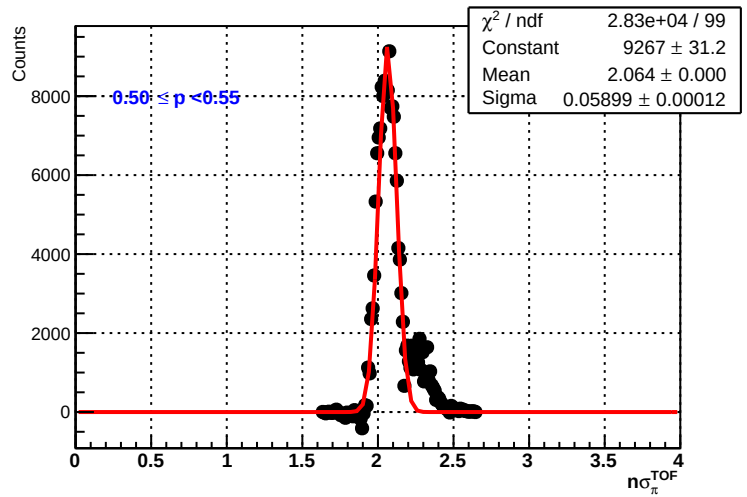

χ^2 / ndf 2225 / 141
Constant 124.3 ± 2.1
Mean 3.464 ± 0.003
Sigma 0.2159 ± 0.0031
0.25 ≤ p <0.30
Counts
$n\sigma_\pi^{TOF}$

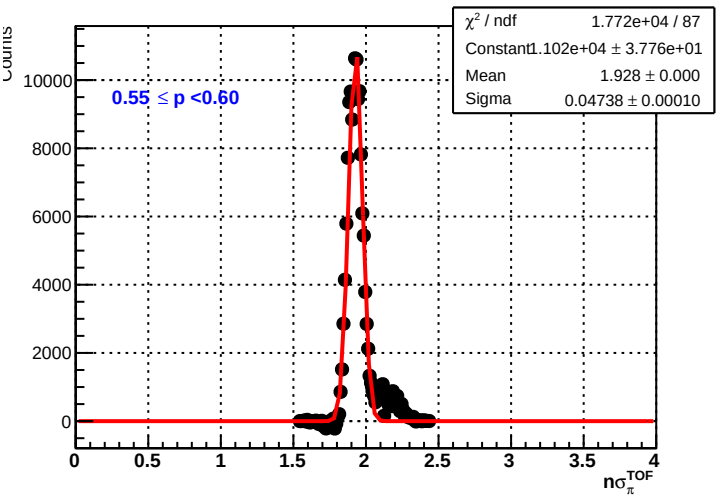

χ^2 / ndf 3405 / 172
Constant 561.1± 5.5
Mean 3.018 ± 0.001
Sigma 0.1358 ± 0.0010
0.30 ≤ p <0.35
Counts
$n\sigma_\pi^{TOF}$

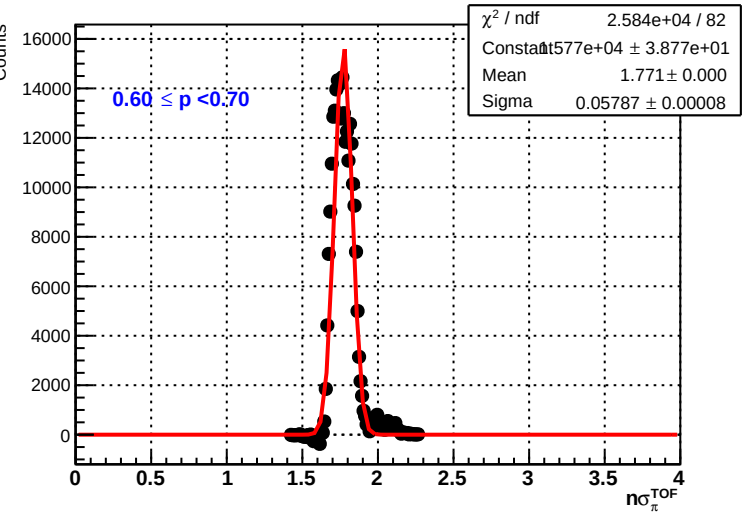

χ^2 / ndf 7937 / 158
Constant 4271± 14.1
Mean 2.76 ± 0.00
Sigma 0.1333 ± 0.0003
0.35 ≤ p <0.40
Counts
$n\sigma_\pi^{TOF}$

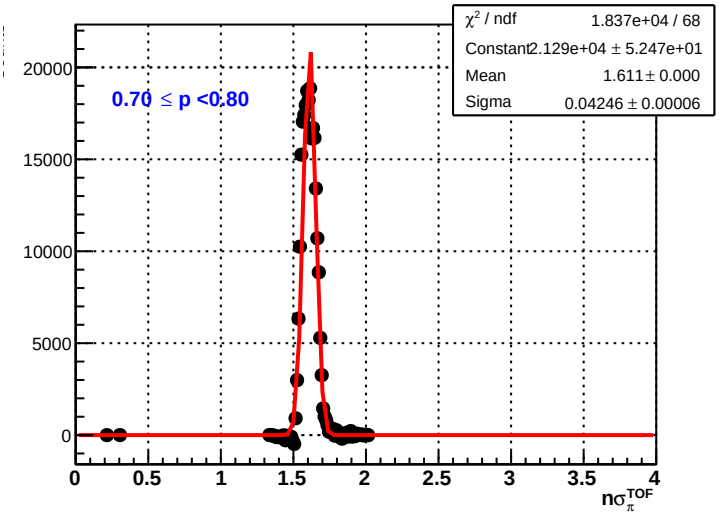

Counts
0.40 ≤ p <0.45
χ² / ndf 2.151e+04 / 133
Constant 6803 ± 19.1
Mean 2.507 ± 0.000
Sigma 0.1202 ± 0.0002
nσ_π^TOF

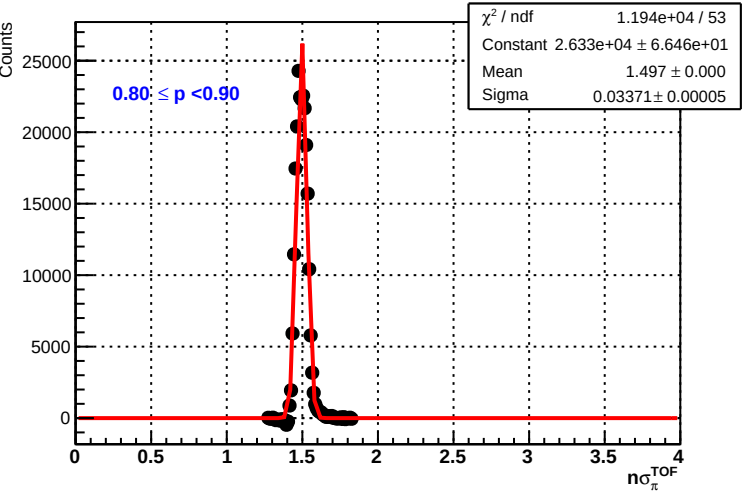

Counts
0.45 ≤ p <0.50
χ² / ndf 3.241e+04 / 114
Constant 7465 ± 27.6
Mean 2.267 ± 0.000
Sigma 0.09056 ± 0.00026
nσ_π^TOF

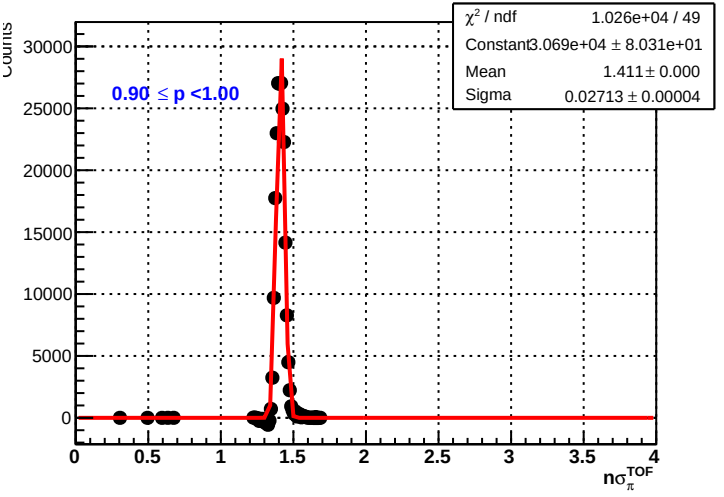

Counts
0.50 ≤ p <0.55
χ² / ndf 2.83e+04 / 99
Constant 9267 ± 31.2
Mean 2.064 ± 0.000
Sigma 0.05899 ± 0.00012
nσ_π^TOF

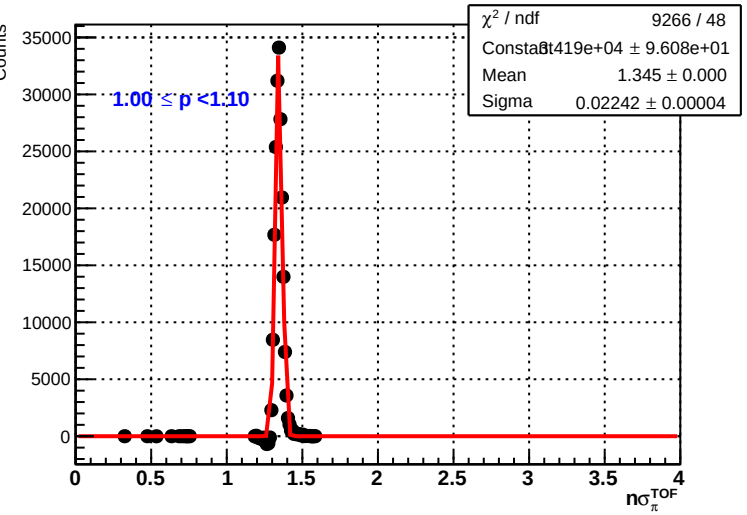

Counts
0.55 ≤ p <0.60
χ² / ndf 1.772e+04 / 87
Constant 1.102e+04 ± 3.776e+01
Mean 1.928 ± 0.000
Sigma 0.04738 ± 0.00010
nσ_π^TOF

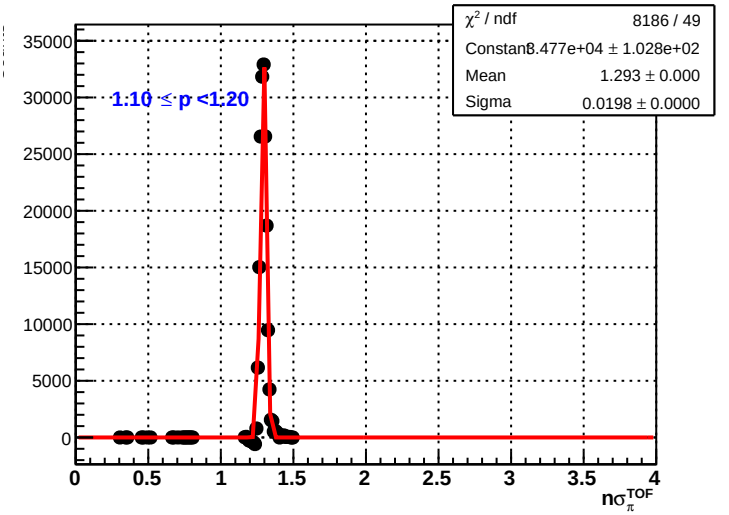

0.60 ≤ p <0.70
χ² / ndf 2.584e+04 / 82
Constant 1.577e+04 ± 3.877e+01
Mean 1.771 ± 0.000
Sigma 0.05787 ± 0.00008
Counts
nσ_π^TOF

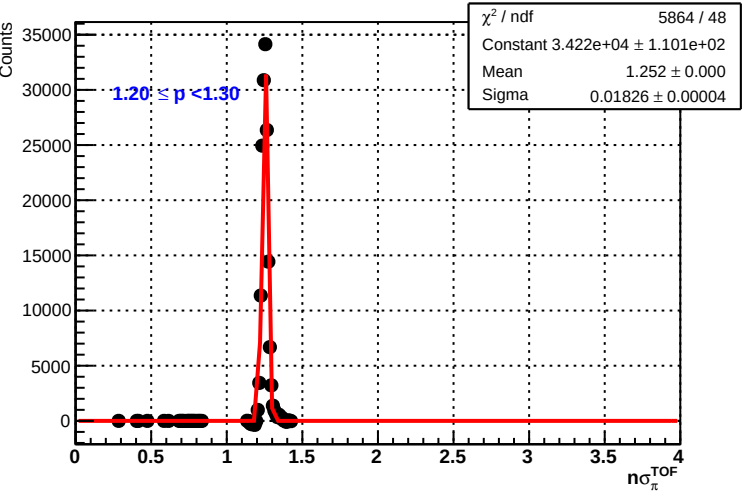

0.70 ≤ p <0.80
χ² / ndf 1.837e+04 / 68
Constant 2.129e+04 ± 5.247e+01
Mean 1.611 ± 0.000
Sigma 0.04246 ± 0.00006
nσ_π^TOF

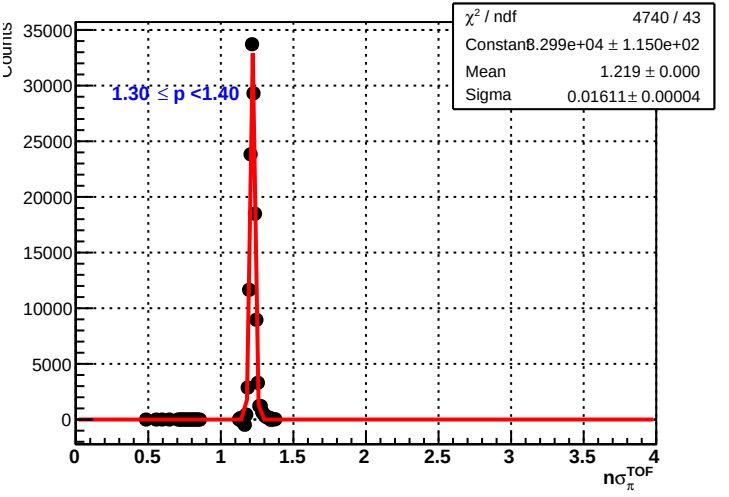

0.80 ≤ p <0.90
χ² / ndf 1.194e+04 / 53
Constant 2.633e+04 ± 6.646e+01
Mean 1.497 ± 0.000
Sigma 0.03371 ± 0.00005
Counts
nσ_π^TOF

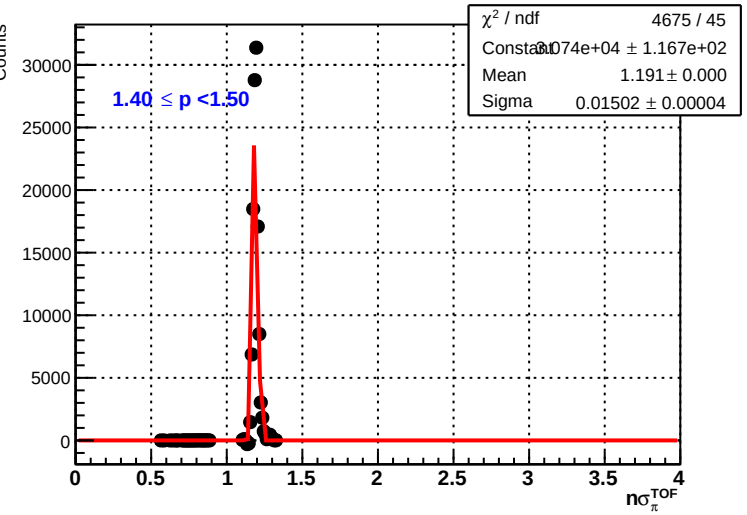

0.90 ≤ p <1.00
χ² / ndf 1.026e+04 / 49
Constant 3.069e+04 ± 8.031e+01
Mean 1.411 ± 0.000
Sigma 0.02713 ± 0.00004
Counts
nσ_π^TOF

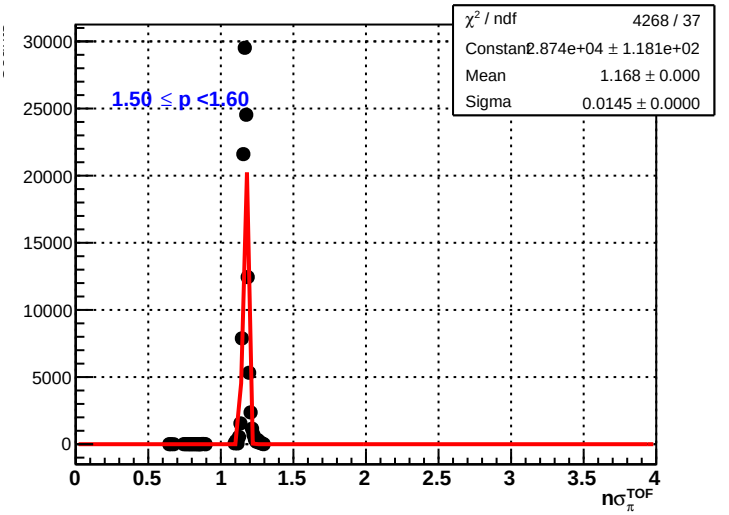

1.00 ≤ p <1.10
χ² / ndf 9266 / 48
Constant 3.419e+04 ± 9.608e+01
Mean 1.345 ± 0.000
Sigma 0.02242 ± 0.00004
Counts
nσ_π^TOF

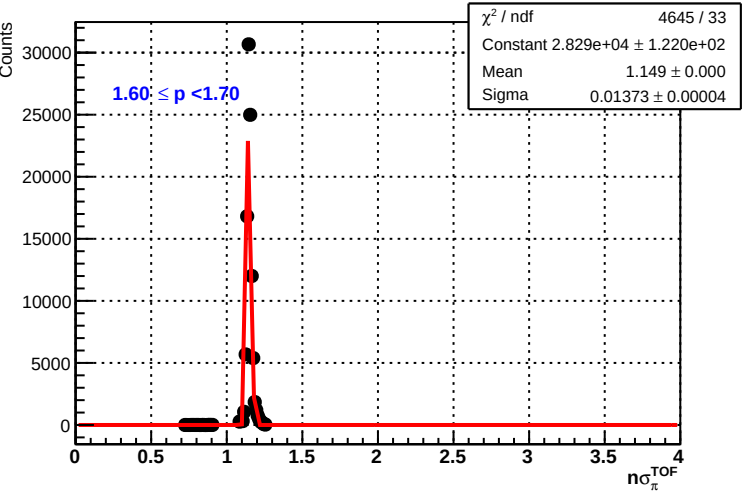

1.10 ≤ p <1.20
χ² / ndf 8186 / 49
Constant 8.477e+04 ± 1.028e+02
Mean 1.293 ± 0.000
Sigma 0.0198 ± 0.0000
nσ_π^TOF

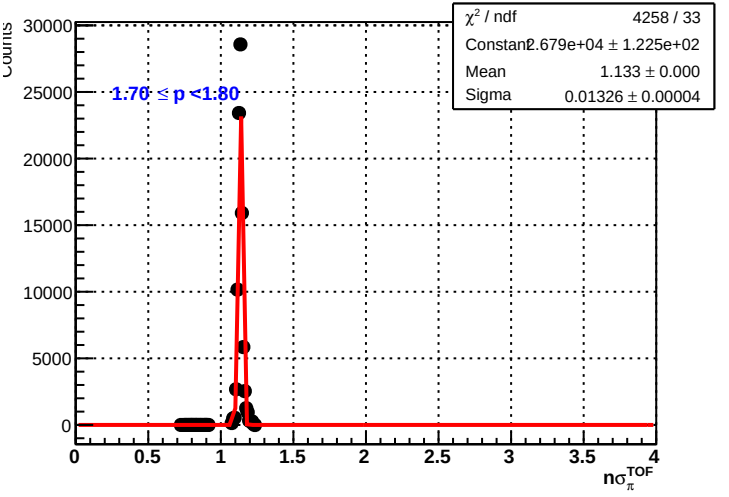

1.20 ≤ p <1.30
χ² / ndf 5864 / 48
Constant 3.422e+04 ± 1.101e+02
Mean 1.252 ± 0.000
Sigma 0.01826 ± 0.00004
Counts
nσ_π^TOF

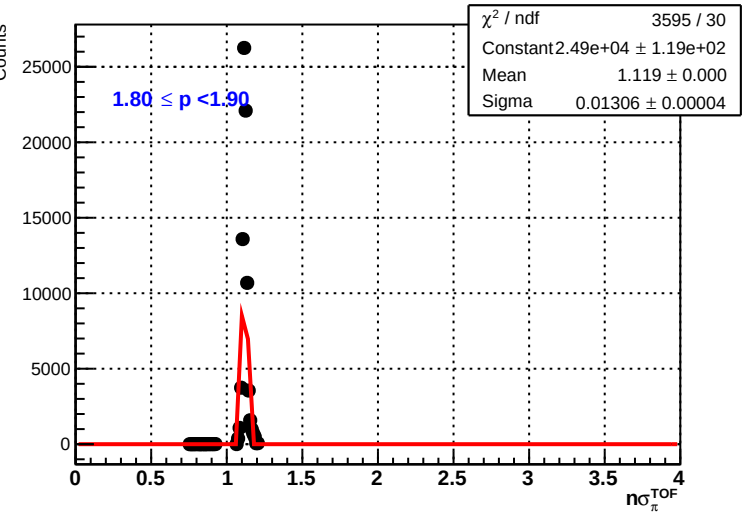

1.30 ≤ p <1.40
χ² / ndf 4740 / 43
Constant 8.299e+04 ± 1.150e+02
Mean 1.219 ± 0.000
Sigma 0.01611 ± 0.00004
Counts
nσ_π^TOF

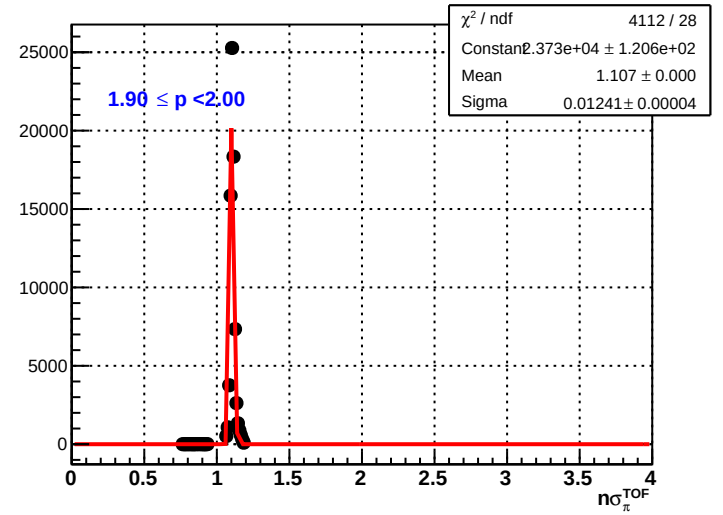

χ² / ndf 4675 / 45
Constant 3.074e+04 ± 1.167e+02
Mean 1.191 ± 0.000
Sigma 0.01502 ± 0.00004
1.40 ≤ p <1.50
Counts
nσ_π^TOF

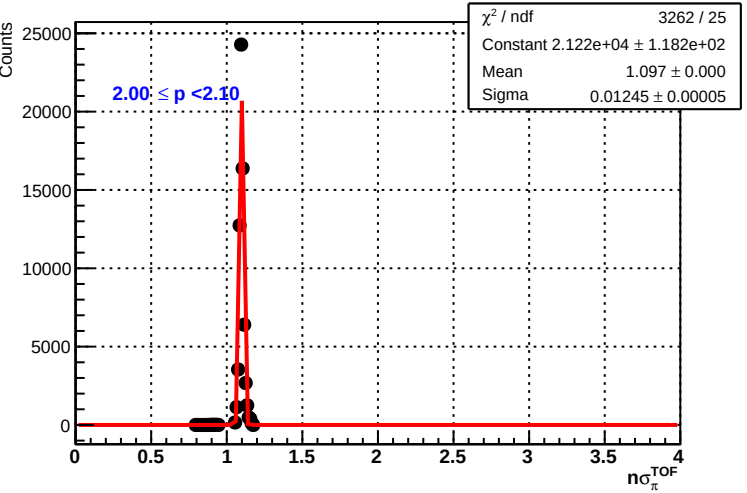

χ² / ndf 4268 / 37
Constant 2.874e+04 ± 1.181e+02
Mean 1.168 ± 0.000
Sigma 0.0145 ± 0.0000
1.50 ≤ p <1.60
nσ_π^TOF

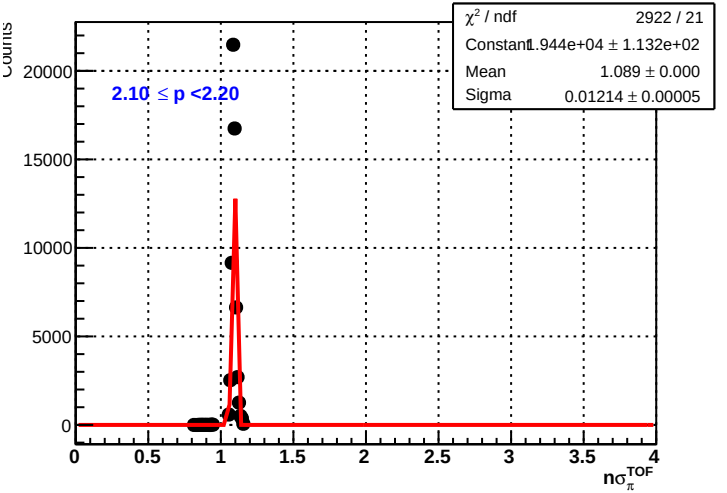

χ² / ndf 4645 / 33
Constant 2.829e+04 ± 1.220e+02
Mean 1.149 ± 0.000
Sigma 0.01373 ± 0.00004
1.60 ≤ p <1.70
Counts
nσ_π^TOF

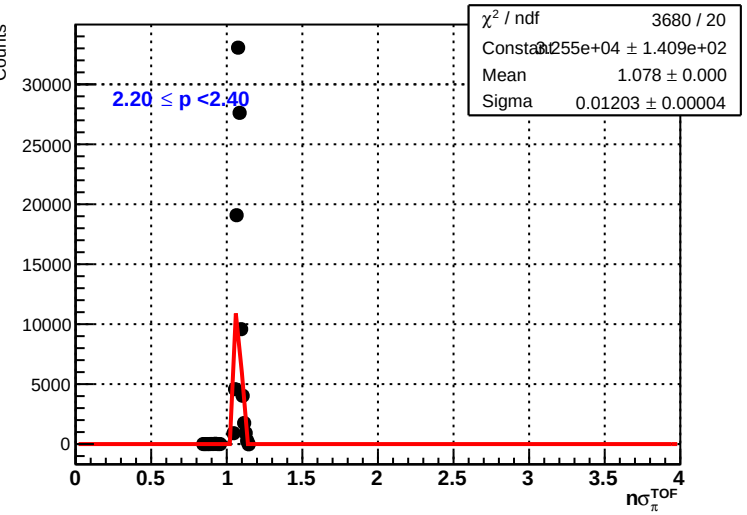

χ² / ndf 4258 / 33
Constant 2.679e+04 ± 1.225e+02
Mean 1.133 ± 0.000
Sigma 0.01326 ± 0.00004
1.70 ≤ p <1.80
Counts
nσ_π^TOF

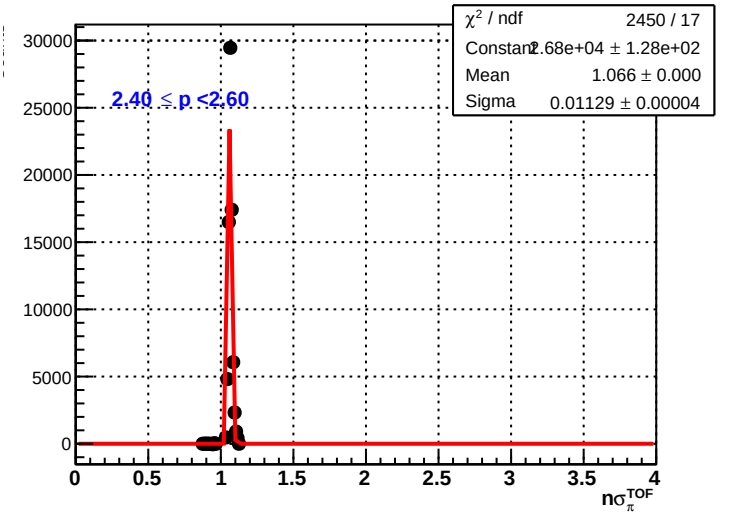

χ² / ndf 3595 / 30
Constant 2.49e+04 ± 1.19e+02
Mean 1.119 ± 0.000
Sigma 0.01306 ± 0.00004
1.80 ≤ p <1.90
Counts
nσ_π^TOF

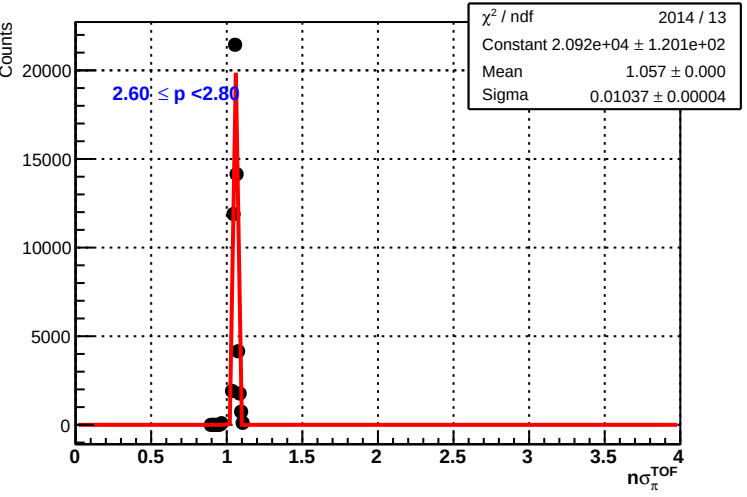

χ² / ndf 4112 / 28
Constant 2.373e+04 ± 1.206e+02
Mean 1.107 ± 0.000
Sigma 0.01241 ± 0.00004
1.90 ≤ p <2.00
nσ_π^TOF

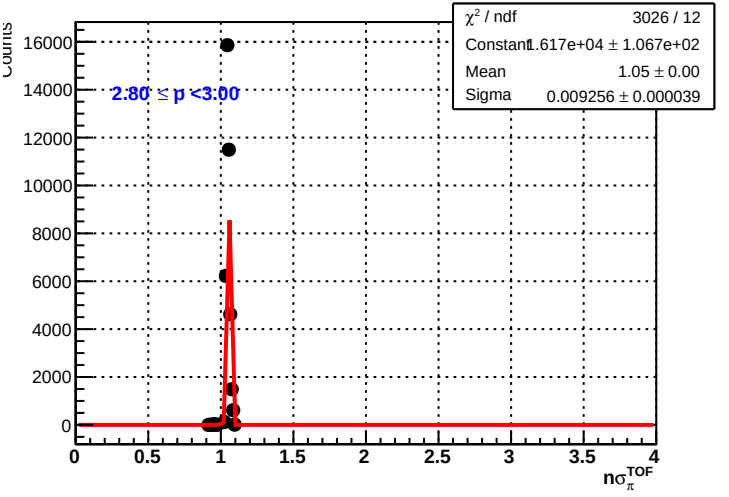

χ² / ndf 3262 / 25
Constant 2.122e+04 ± 1.182e+02
Mean 1.097 ± 0.000
Sigma 0.01245 ± 0.00005
2.00 ≤ p <2.10
Counts
nσ_π^TOF

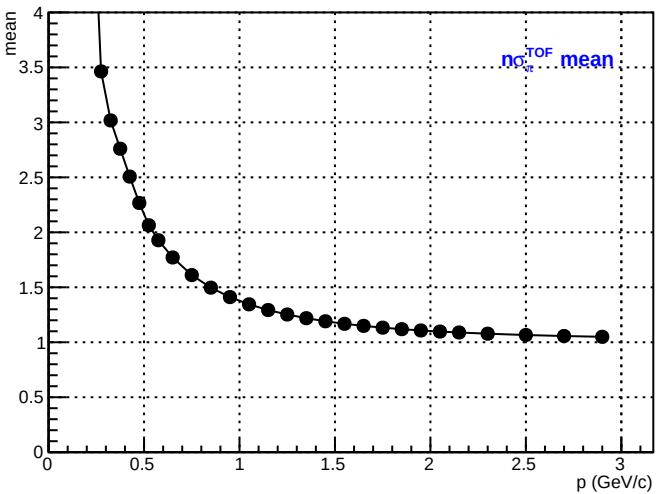

χ² / ndf 2922 / 21
Constant 1.944e+04 ± 1.132e+02
Mean 1.089 ± 0.000
Sigma 0.01214 ± 0.00005
2.10 ≤ p <2.20
Counts
nσ_π^TOF

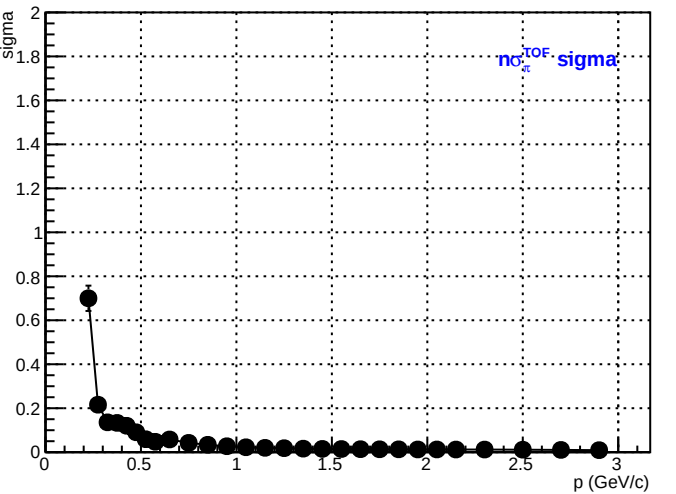

2.20 ≤ p <2.40
χ² / ndf 3680 / 20
Constant 3.255e+04 ± 1.409e+02
Mean 1.078 ± 0.000
Sigma 0.01203 ± 0.00004
Counts
nσ_π^TOF

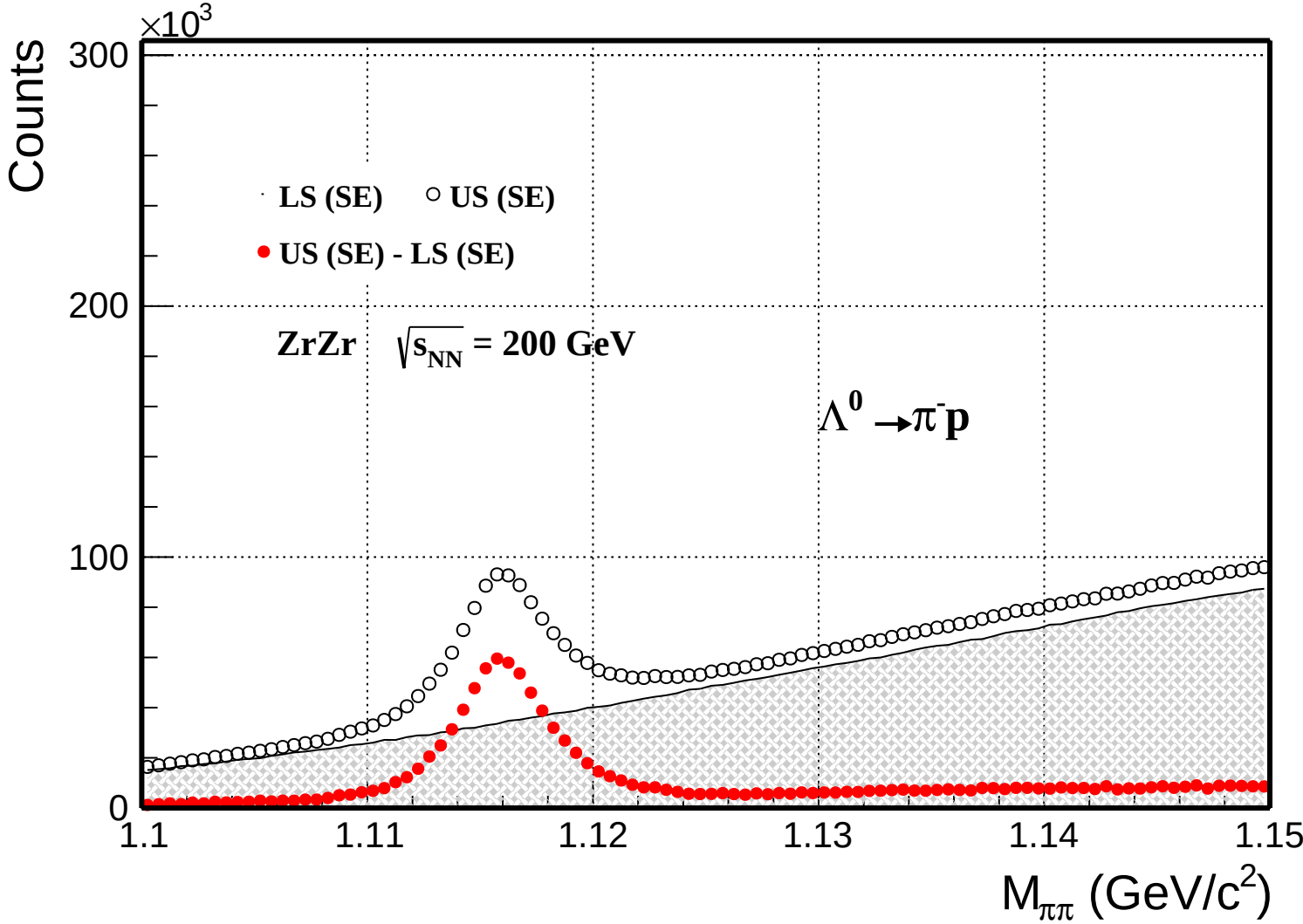

2.40 ≤ p <2.60
χ² / ndf 2450 / 17
Constant 2.68e+04 ± 1.28e+02
Mean 1.066 ± 0.000
Sigma 0.01129 ± 0.00004
nσ_π^TOF


2.60 ≤ p <2.80
χ² / ndf 2014 / 13
Constant 2.092e+04 ± 1.201e+02
Mean 1.057 ± 0.000
Sigma 0.01037 ± 0.00004
Counts
nσ_π^TOF


2.80 ≤ p <3.00
χ² / ndf 3026 / 12
Constant 1.617e+04 ± 1.067e+02
Mean 1.05 ± 0.00
Sigma 0.009256 ± 0.000039
Counts
nσ_π^TOF


mean
$n\sigma_{\pi}^{TOF}$ mean
p (GeV/c)
0
0.5
1
1.5
2
2.5
3
3.5
4


sigma
$n\sigma_{\pi}^{TOF}$ sigma
p (GeV/c)
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2


×10^3
300
200
100
0
Counts
LS (SE)
US (SE)
US (SE) - LS (SE)
ZrZr
√s_NN = 200 GeV
Λ^0 → π^- p
1.1
1.11
1.12
1.13
1.14
1.15
M_ππ (GeV/c^2)