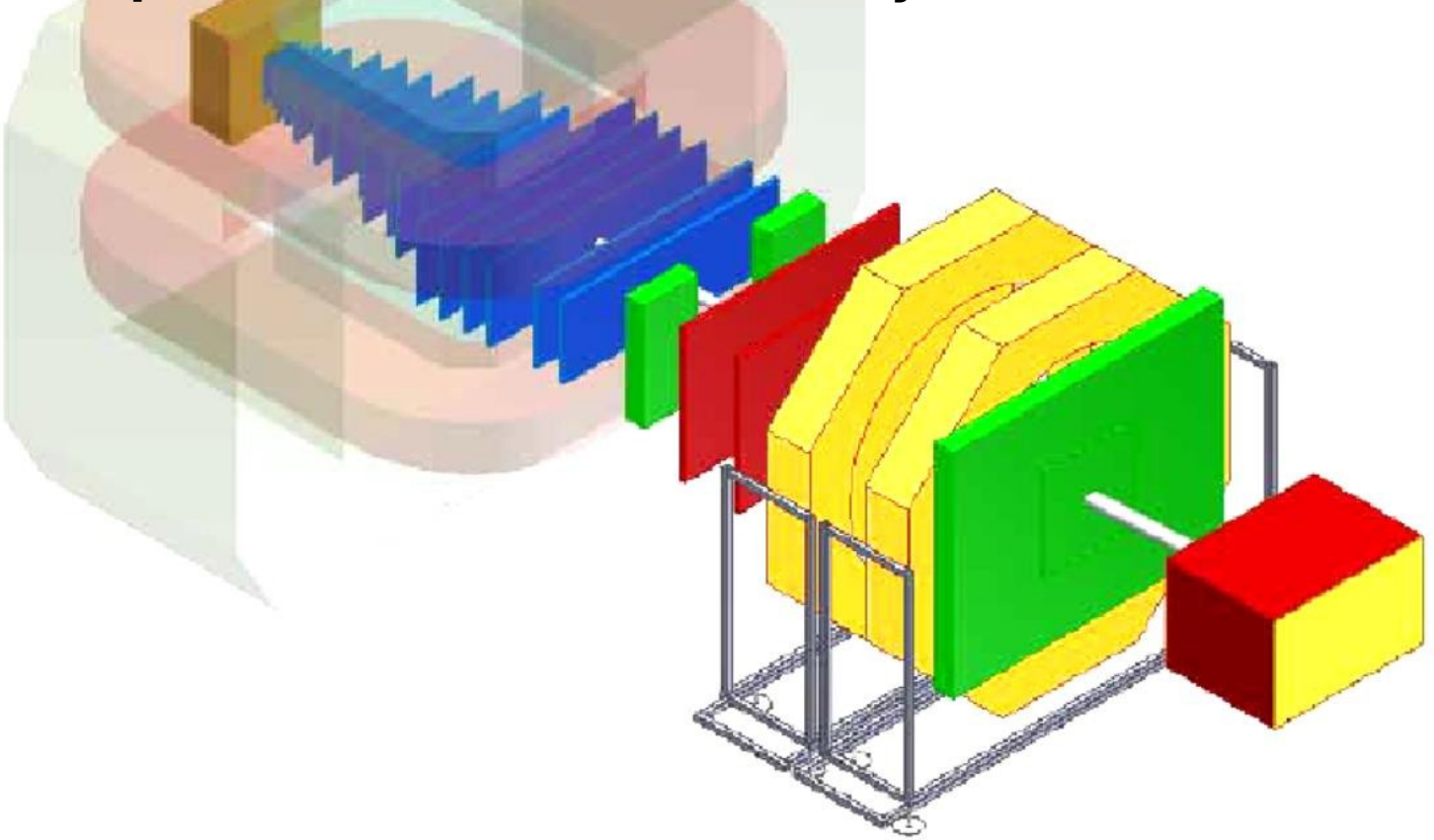
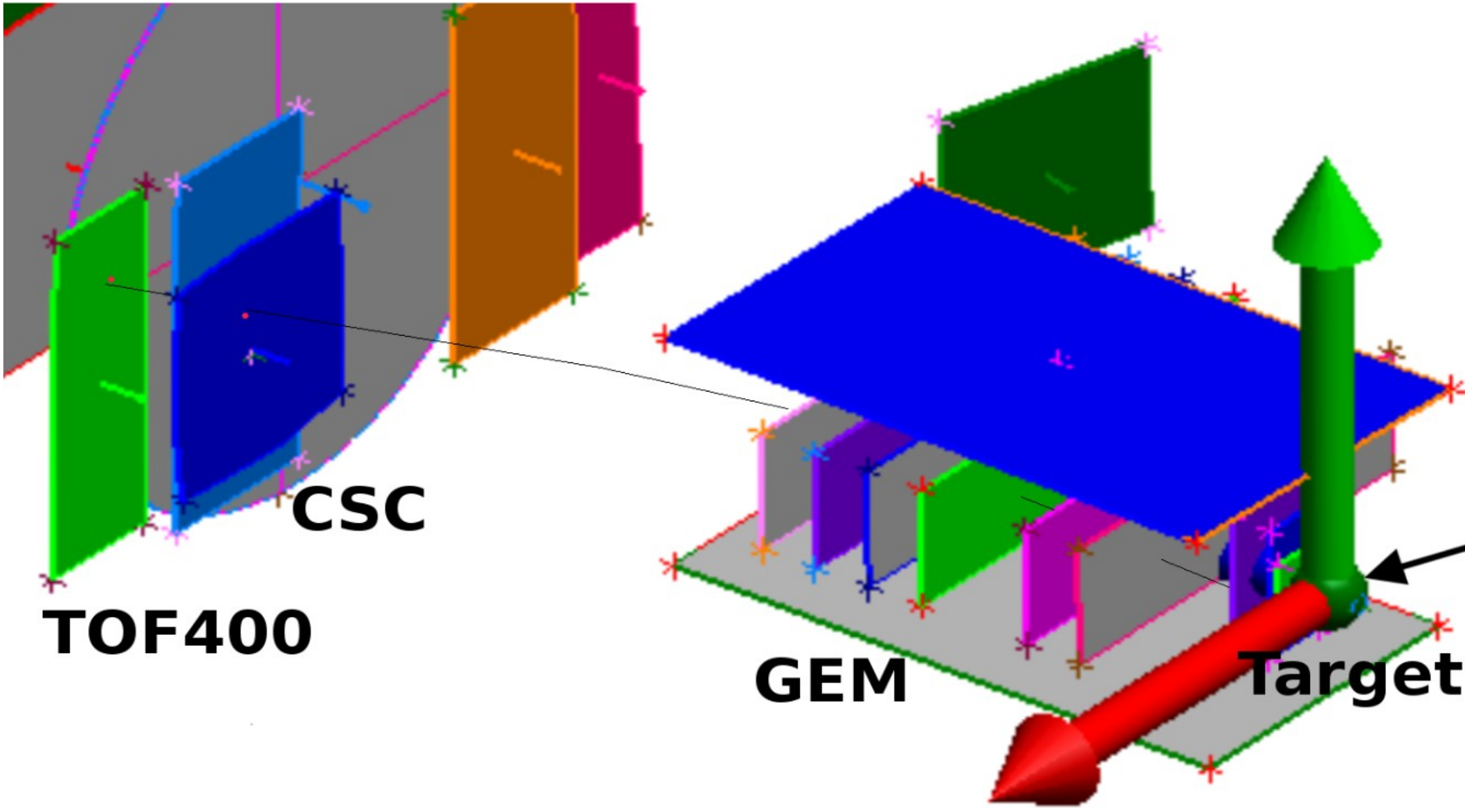
Status of K^+/π^+ identification and analysis

Kapishin M., Plotnikov V., Rumyantsev M.

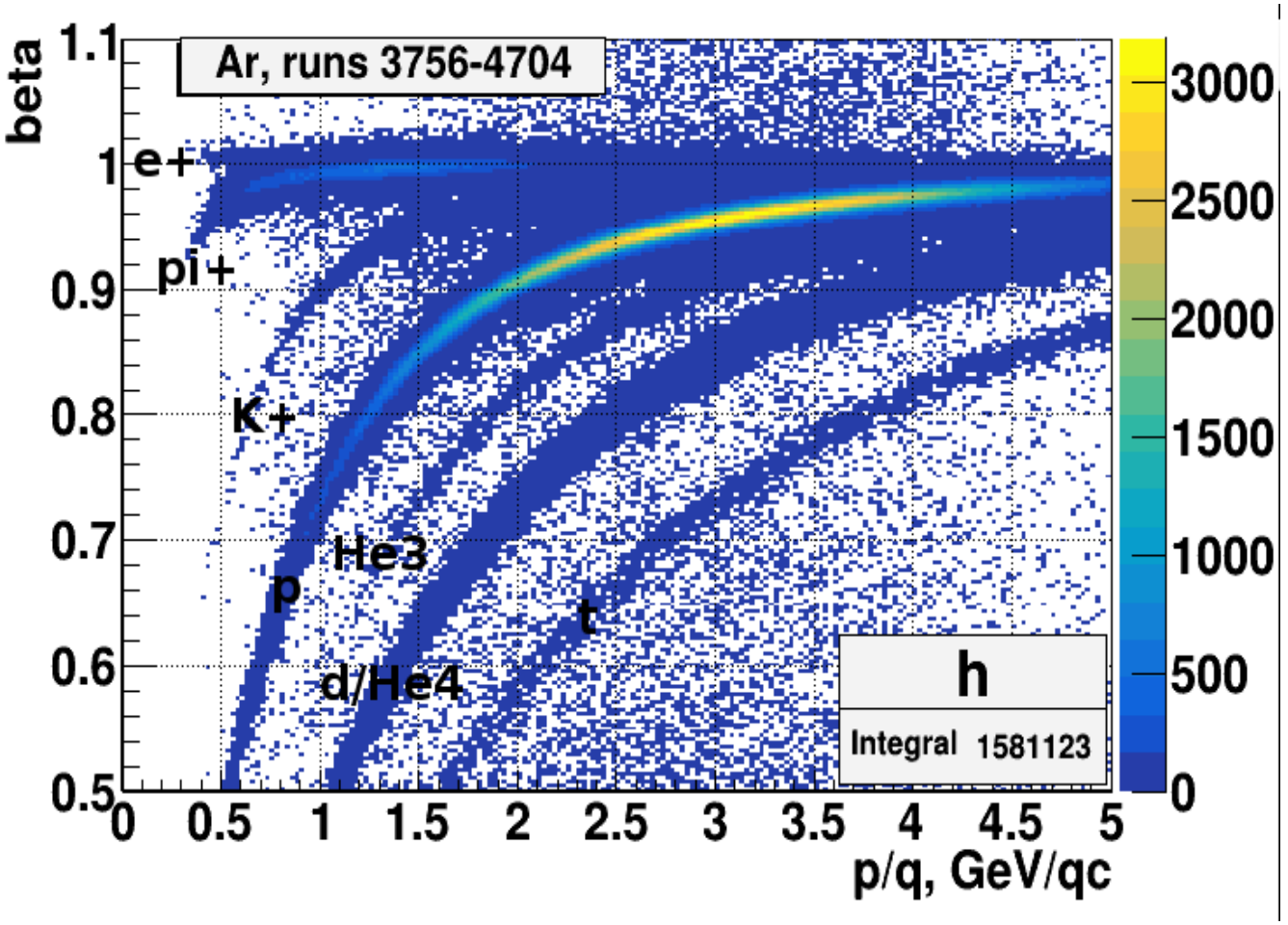


BM@N Detector Advisory Committee
18.06.2019

Identification method

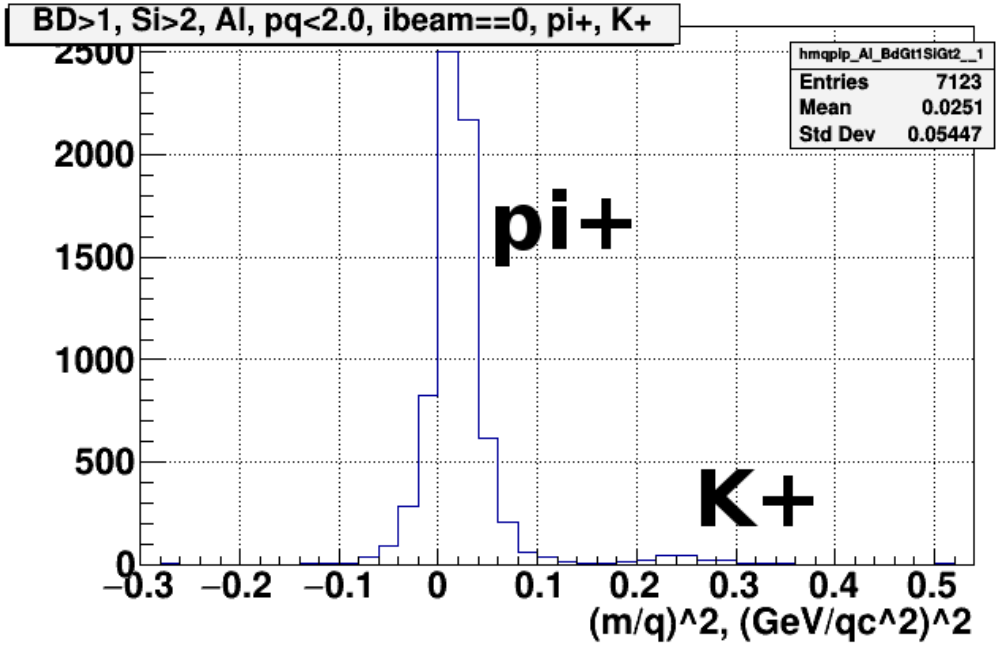


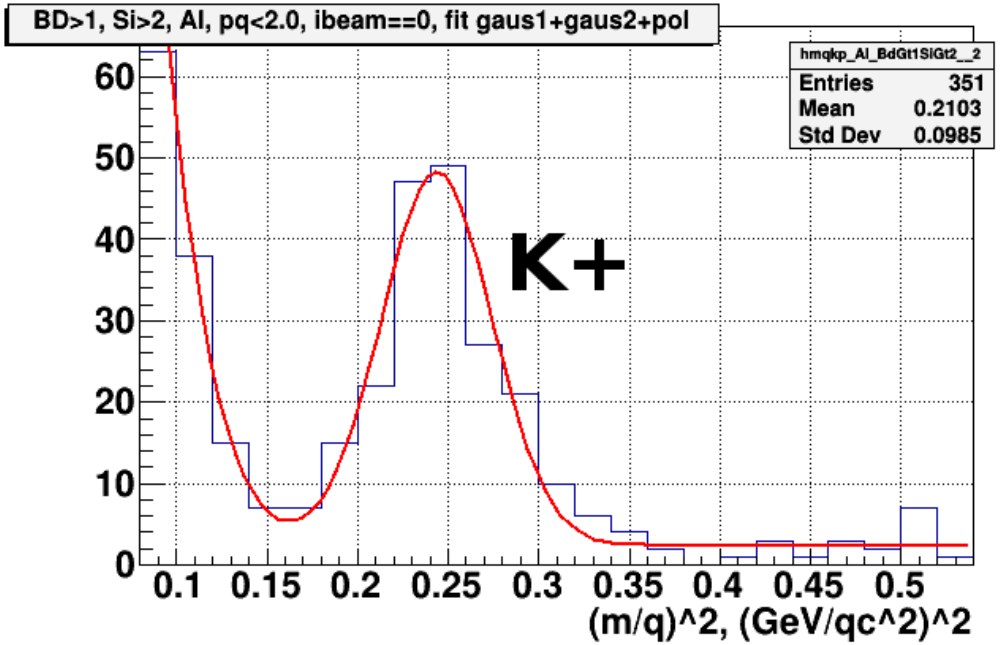
Identification for Ar



- For positive particles, all Ar data

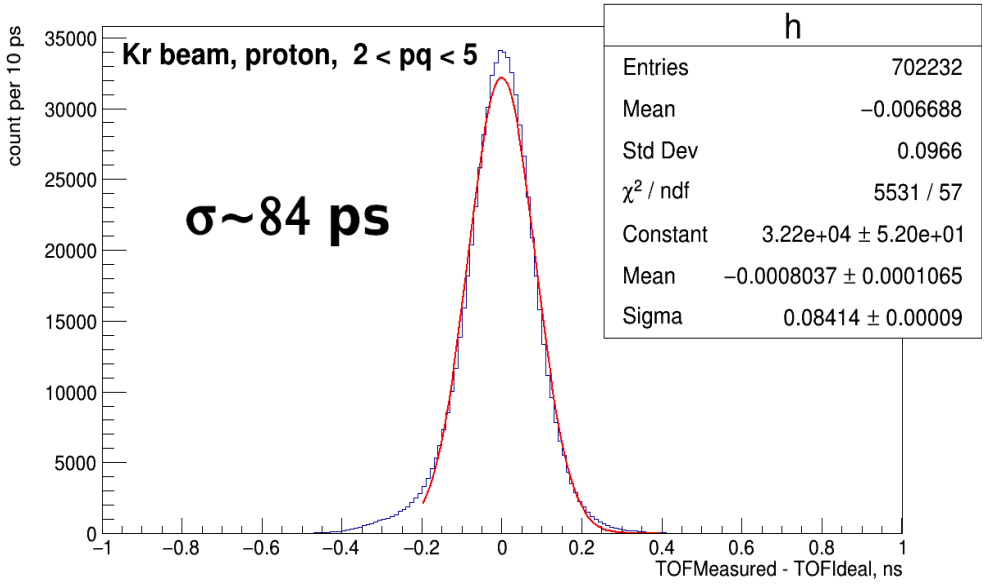
Kaon identification, Al

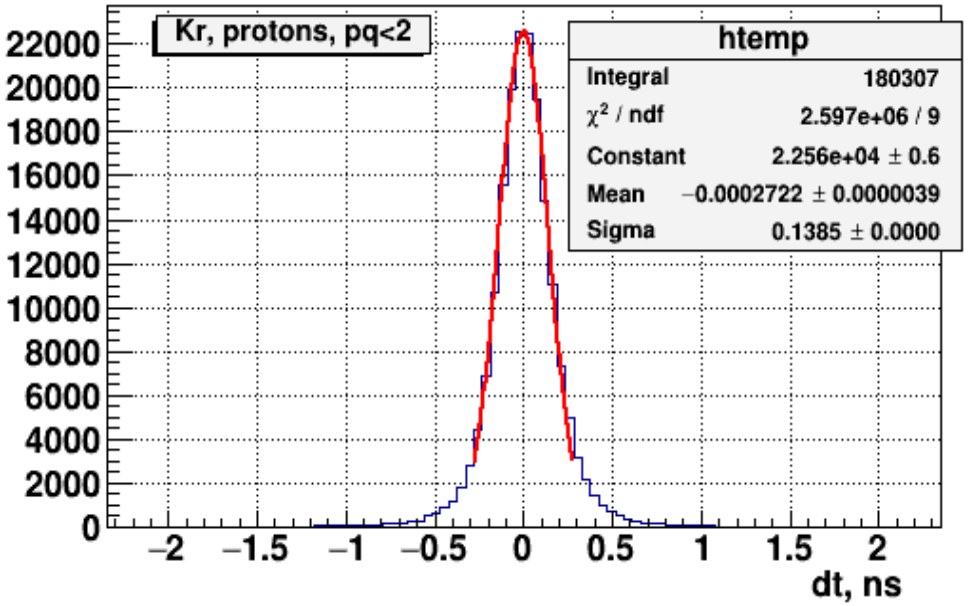




- Gaus2 – Kaon's peak
- Gaus1 – background from pions
- pol0 – background from misidentified particles

Time resolution for Kr



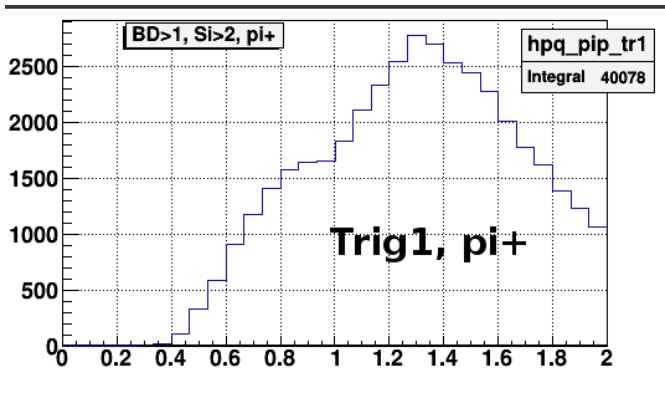


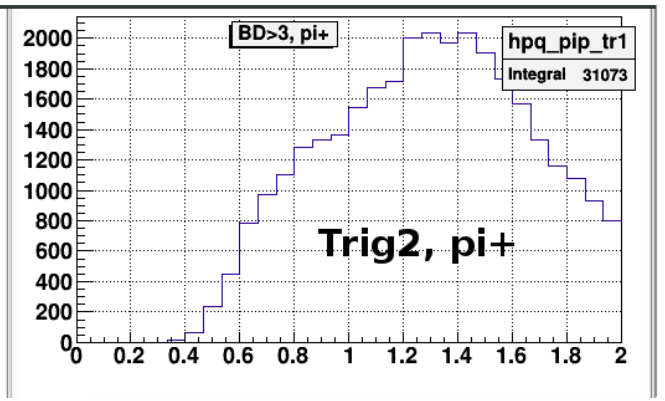
- Left – 2<p/q<5, right – p/q<2
- Time resolutions for Kr **~84 ps**
- It is similar to the **time resolution for Ar**

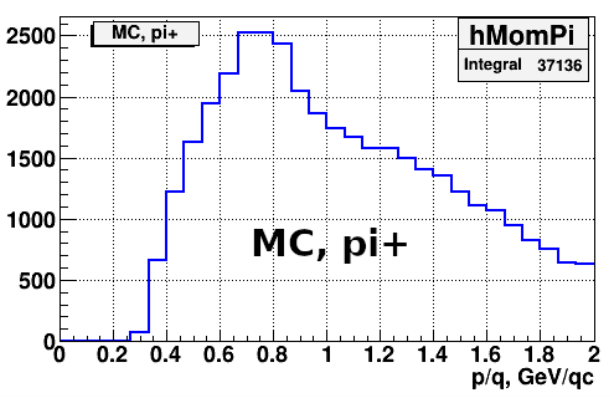
Content

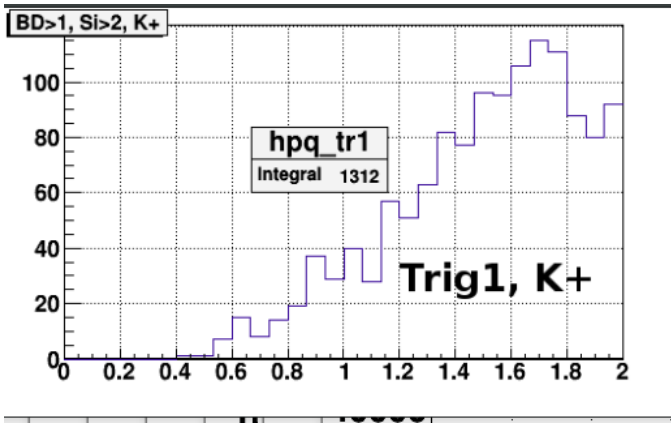
- p, pt and y spectra in Data and QGSM MC
- Efficiencies of detectors (GEM, CSC, TOF400)
- Primary vertex cuts
- Efficiency of triggers in pt bins
- pt slopes
- corrected pt slopes y bins for data and QGSM MC
- corrected y spectra from combined tr1 and tr2
- TODO

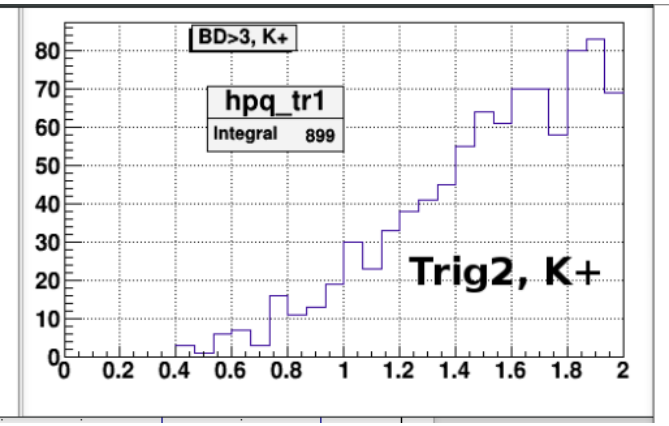
P spectra for Data/QGSM MC

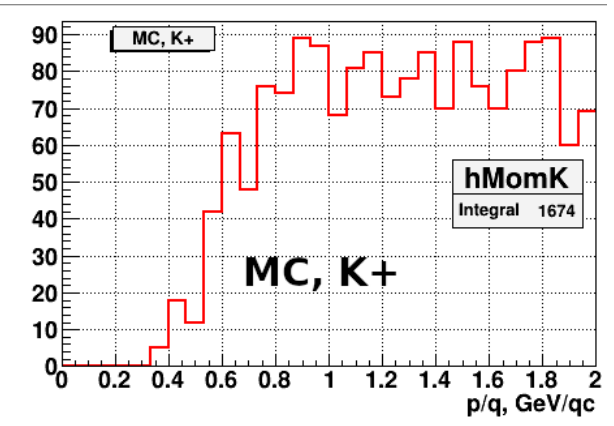






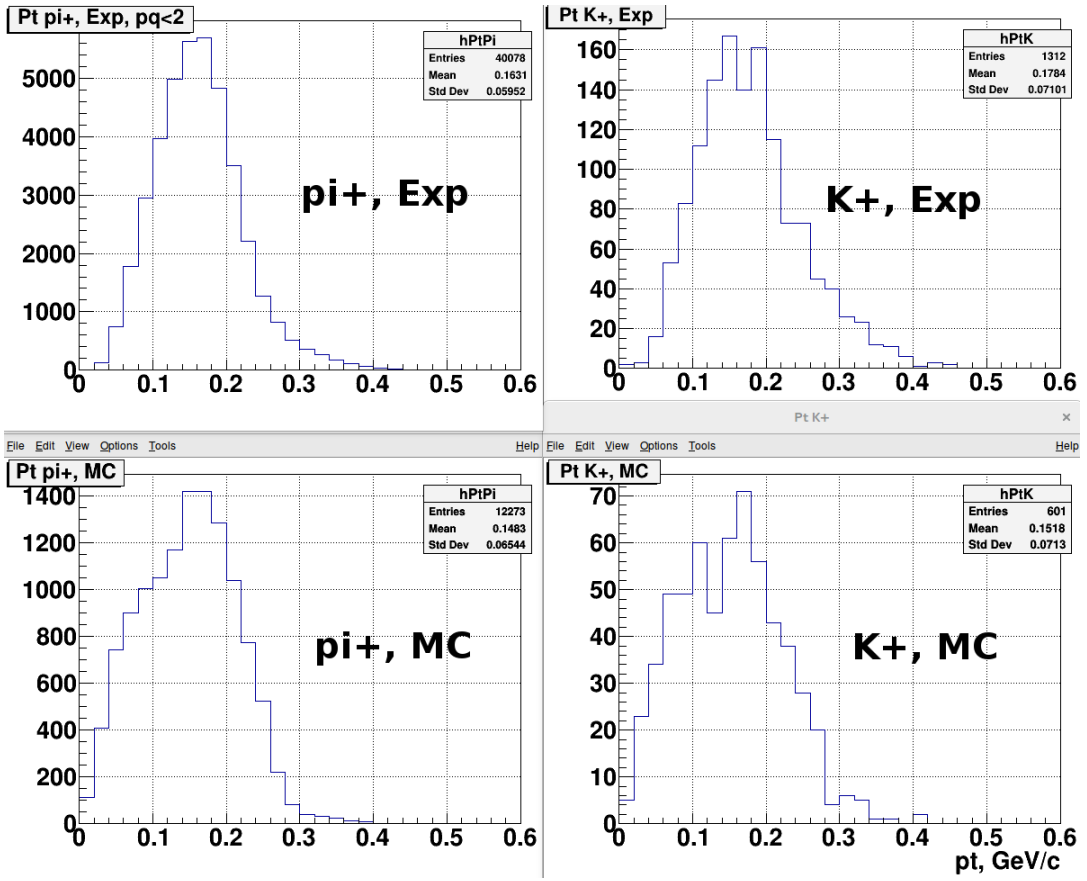






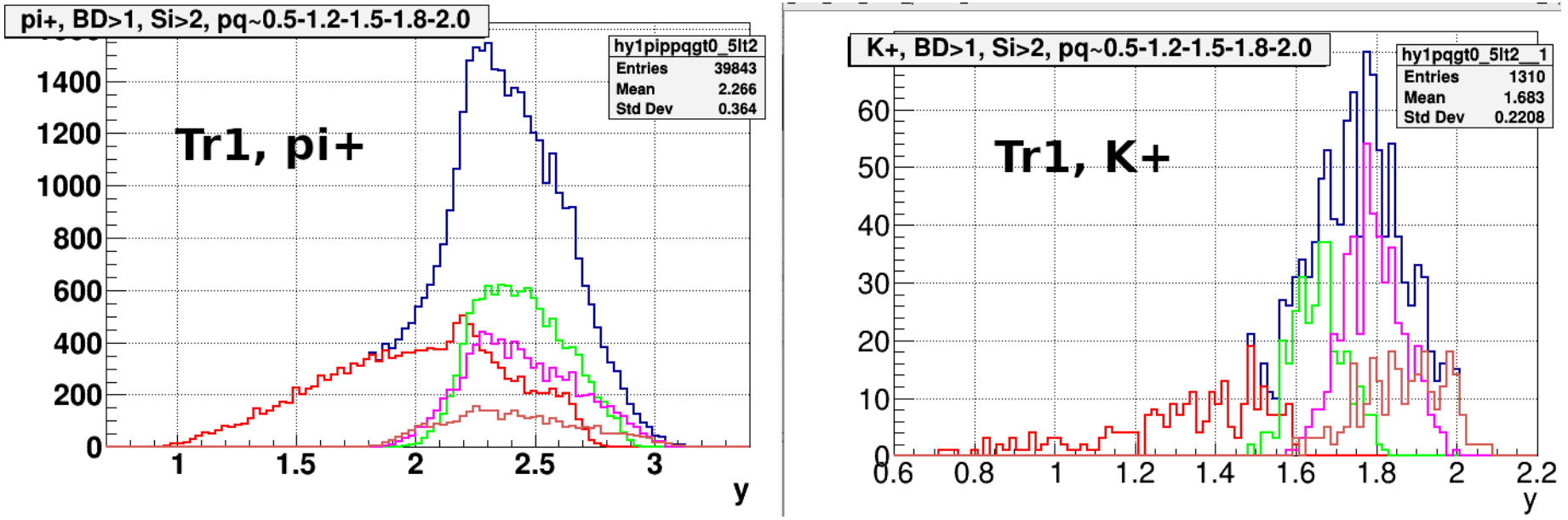
- Shapes of Data and MC spectra are different

Pt spectra for Data/QGSM MC



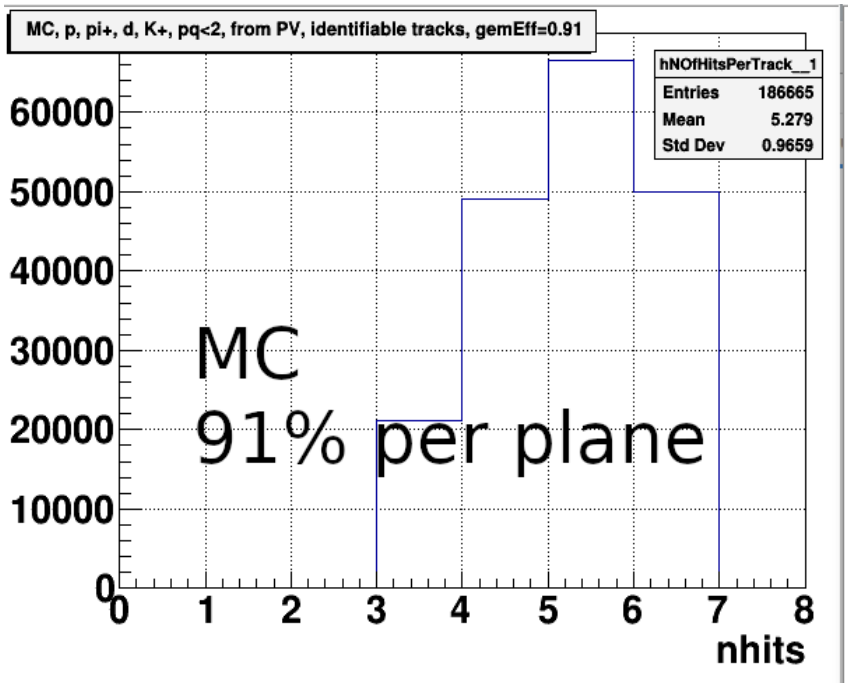
- Common pt interval 0-0.4 GeV/c

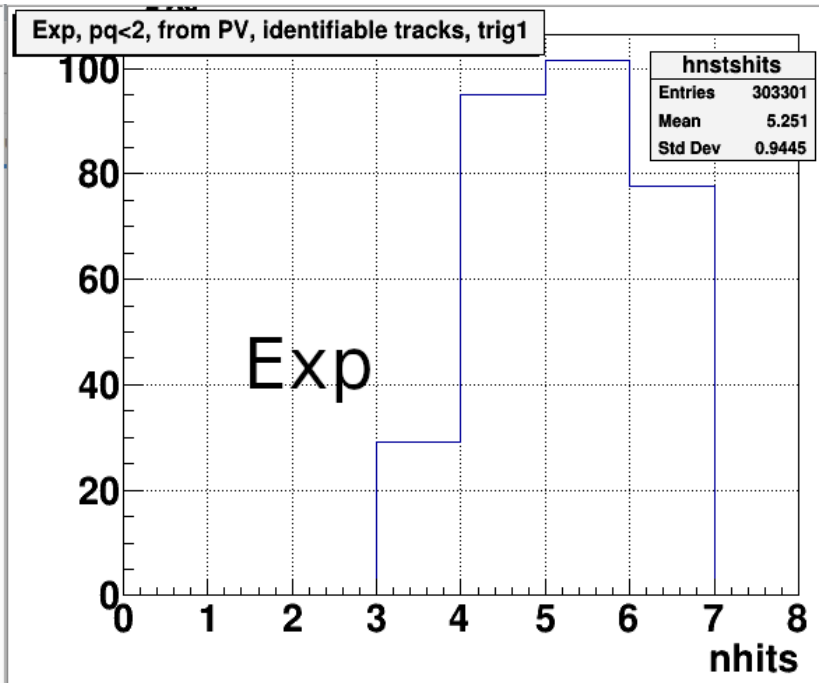
Y spectra for Data



- Color corresponds to p interval
- In the analysis we use 1.4<y<3 for π^+
- In the analysis we use 1.2<y<2 for K+

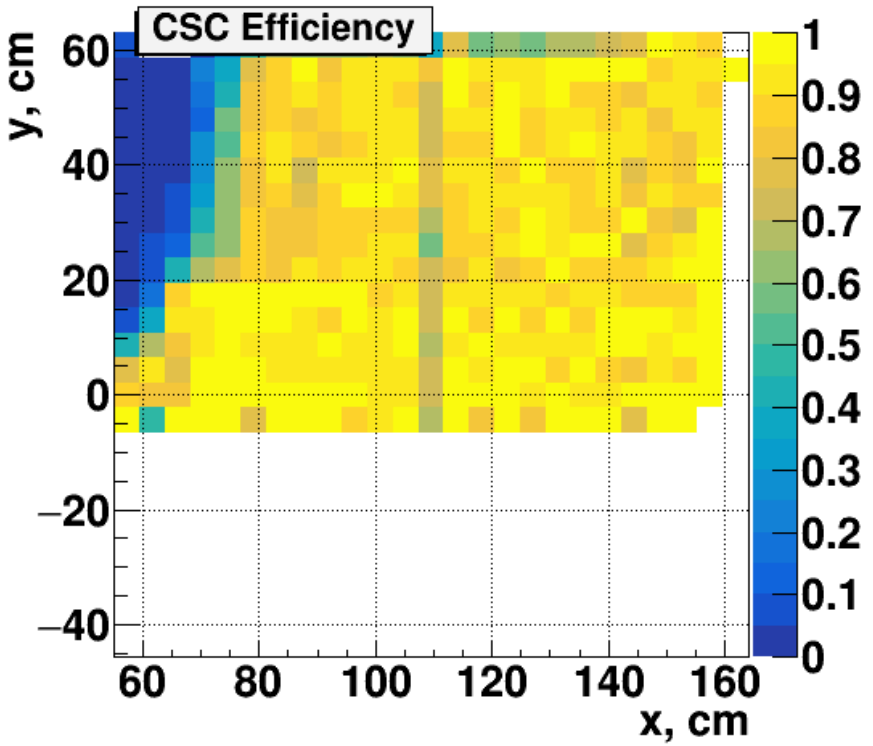
Efficiency of GEM

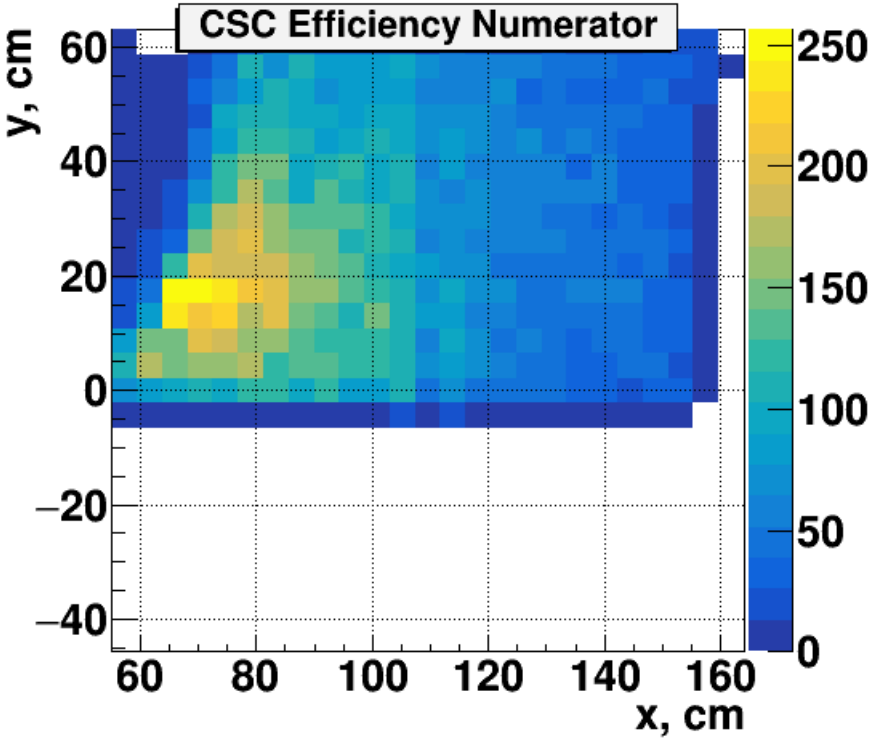




- MC efficiency was adjusted to describe the experimental distribution of number of GEM hits per track
- Closest shape at 91% per plane

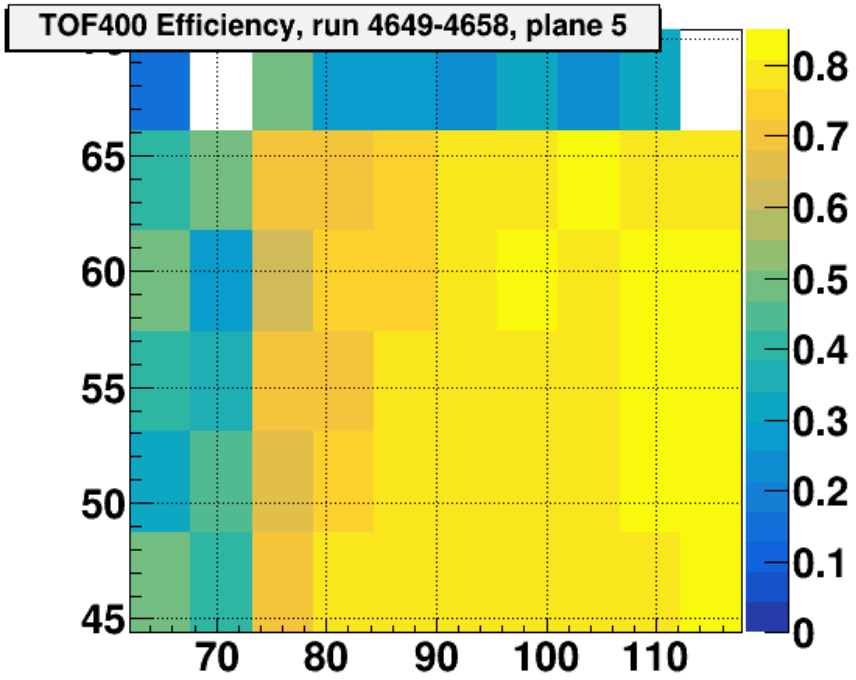
Efficiency of CSC

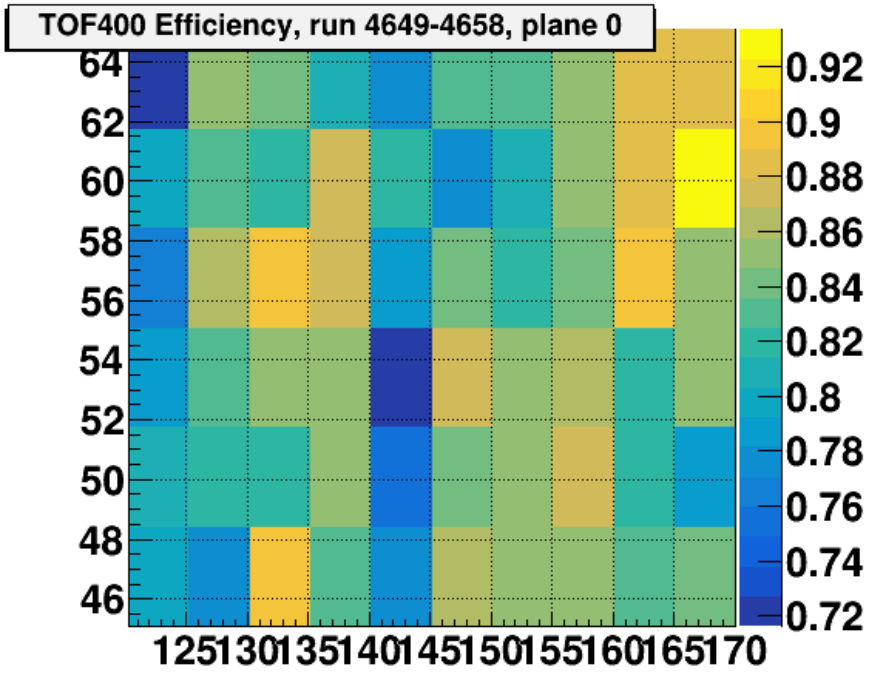




- From Exp
- Min 5 GEM + TOF400 hit + from Primary Vertex
- Low efficiency at low x, large y

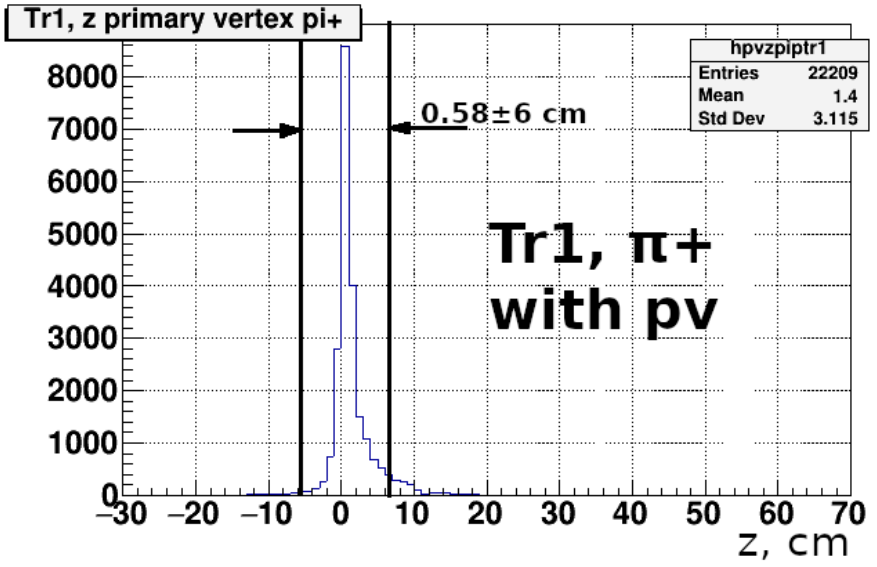
Efficiency of TOF400, planes 1, 6

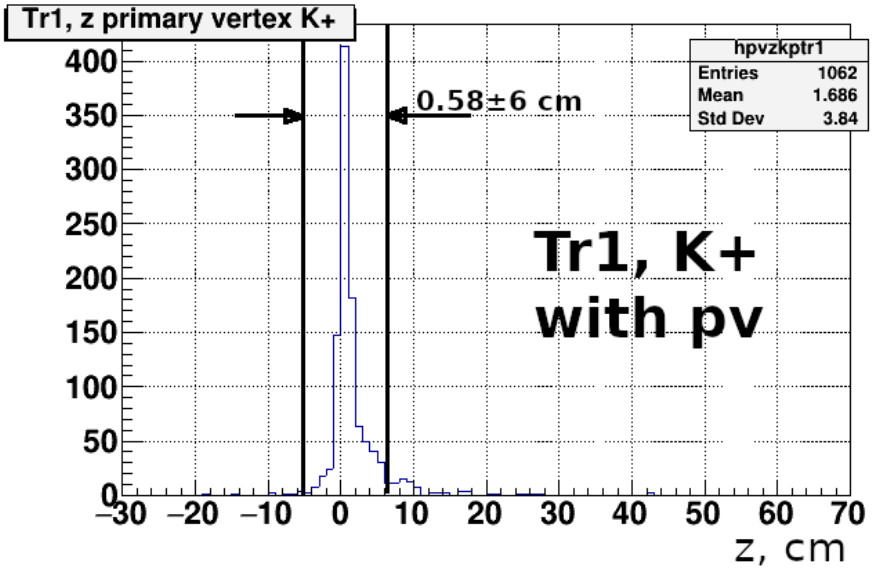




- From Exp, runs 4649-4658
- Min 5 GEM + CSC hit
- Low efficiency at low x

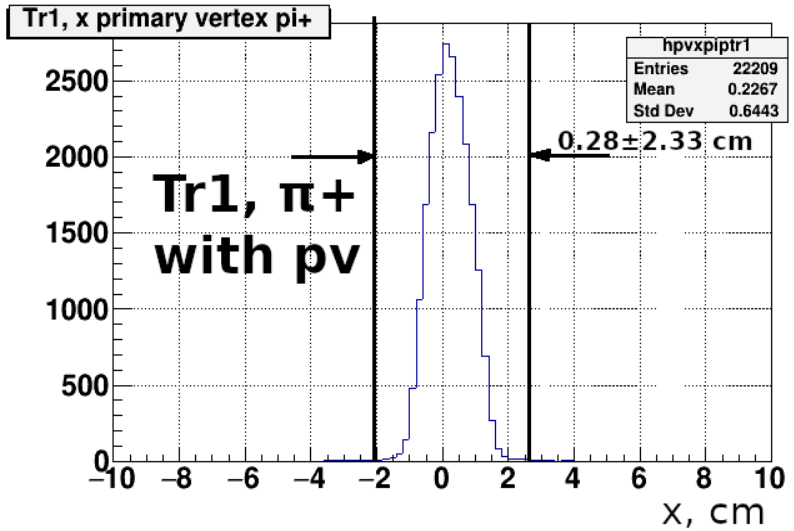
Primary vertex cuts

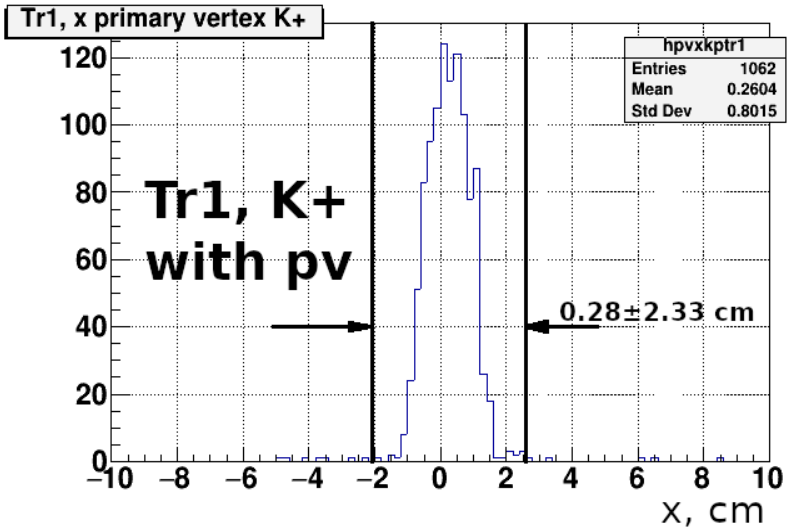


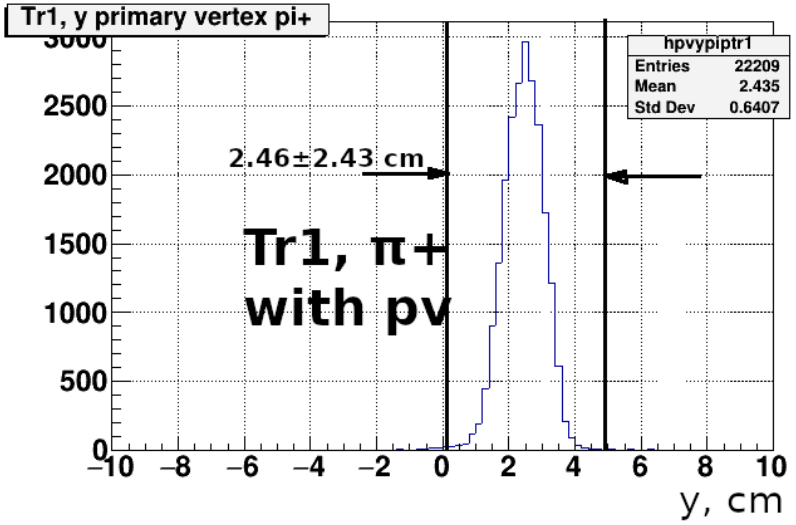


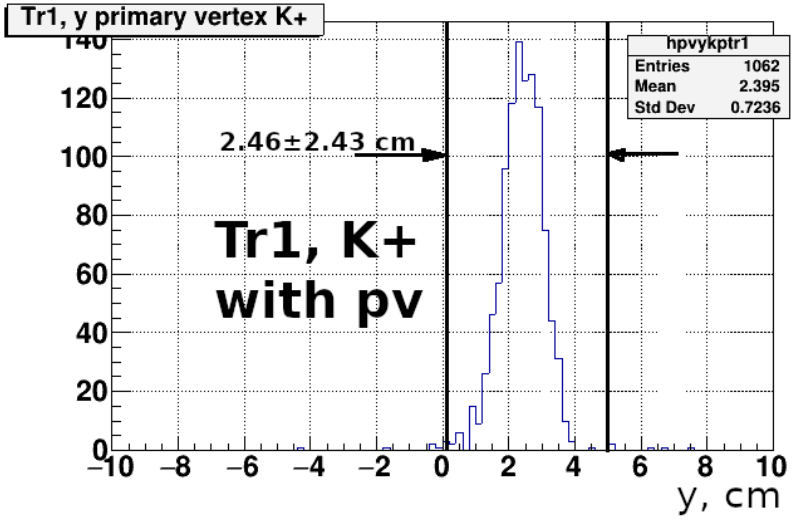
- PV with >=2 tracks
- dca < 1 cm

Primary vertex cuts

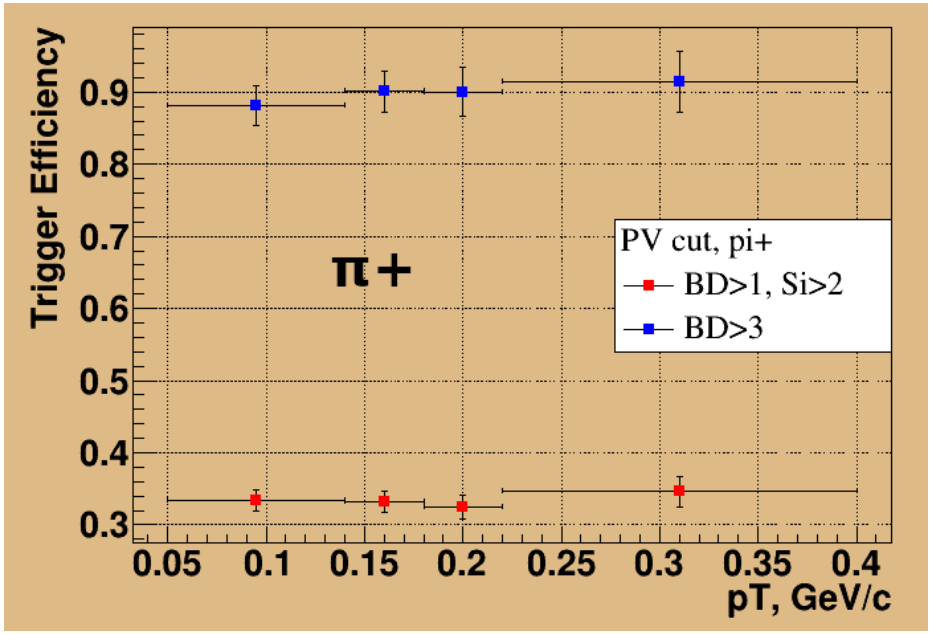


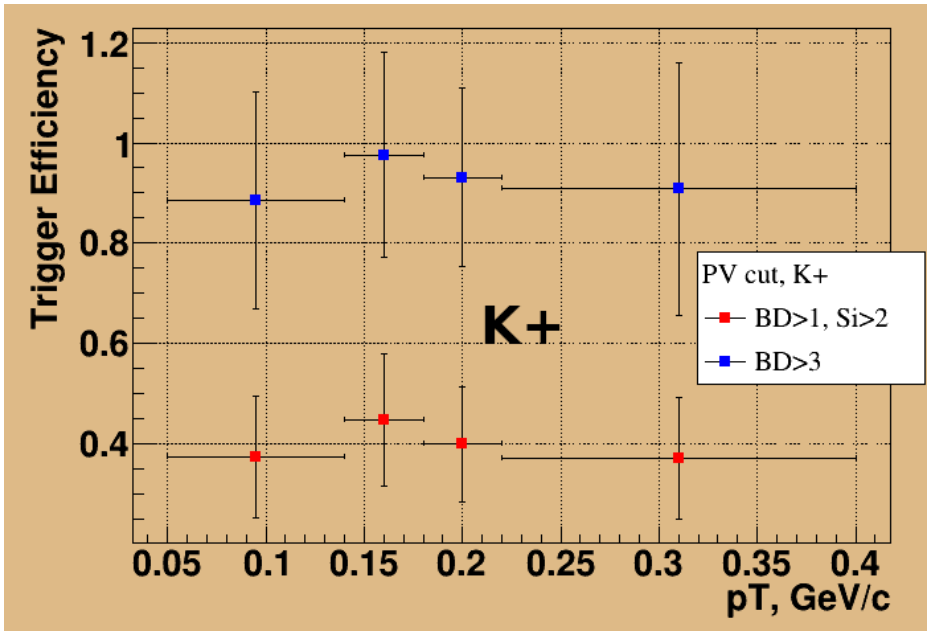






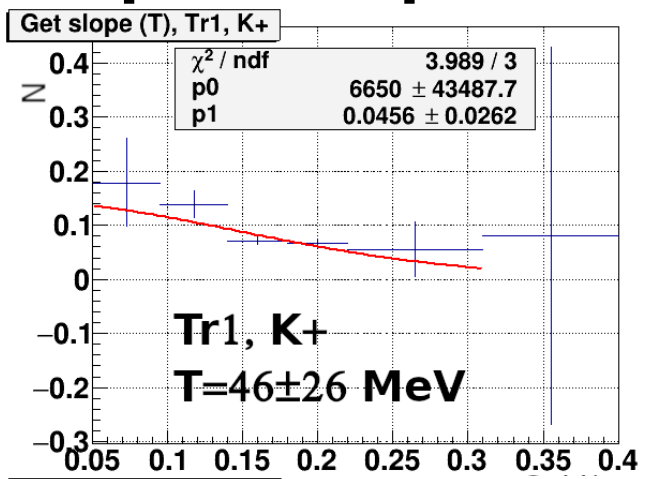
Efficiency of triggers in pt bins

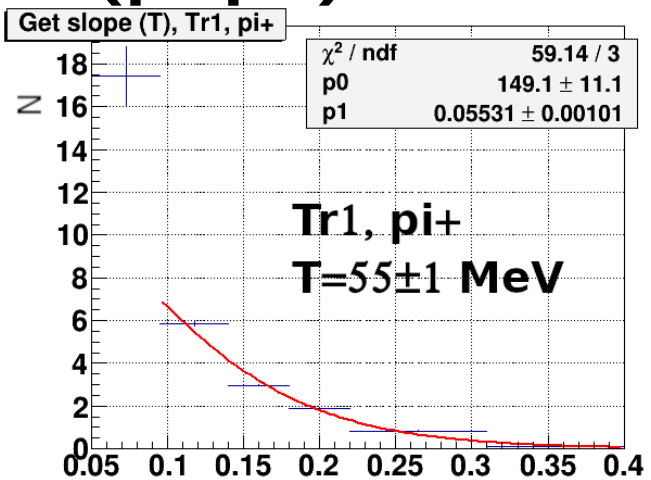


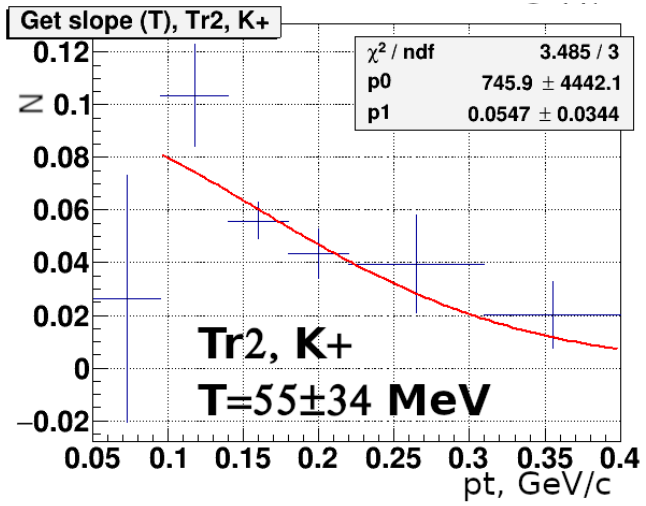


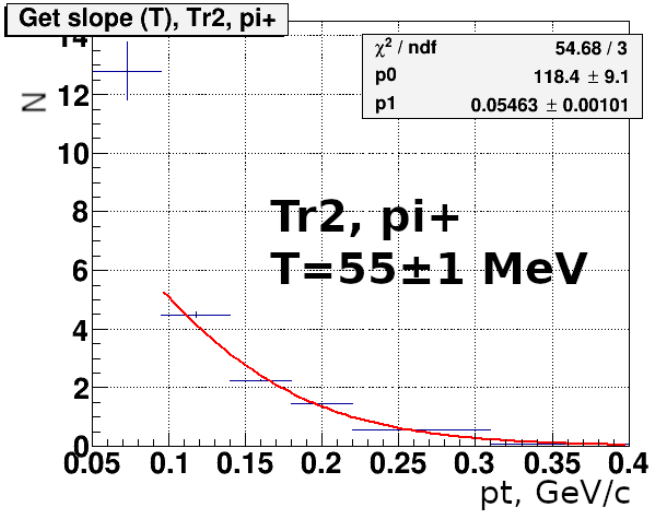
- Triggers efficiency does not depend on pt for π^+ and K^+
- For K+ triggers efficiency few percentages higher
- Triggers efficiency for trig1 (BD>1,Si>2) significantly less than for trig2 (BD>3)

pt slopes from (p,pt) bins









- $N(pt)=(C/(pt\cdot dpt))\cdot\sum_i[N_{data}(p_i,pt)/eff(p_i,pt)]$, C=normalization parameter
- Fit function [0]*exp(-√(m²+pt²)/[1]), T=[1]

pt slopes from (y,pt) bins

- $N(pt)=(C/(pt\cdot dpt))\cdot\sum_i[N_{data}(y_i,pt)/eff(y_i,pt)]$, C=normalization parameter
- Fit function [0]*exp(-√(m²+pt²)/[1]), T=[1]

$T_{Tr1\pi+}$= 73±2 MeV

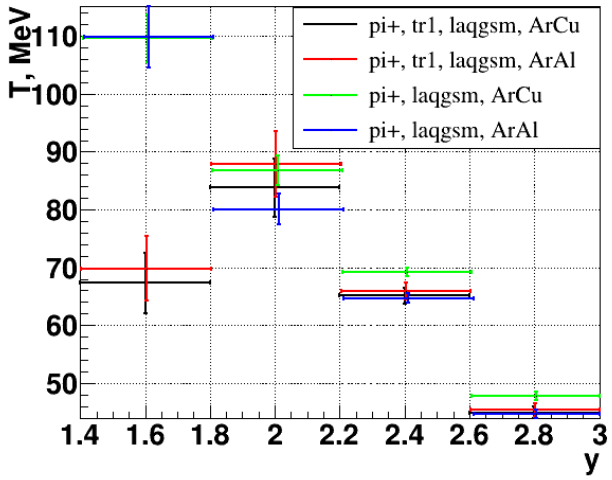
$T_{Tr2\pi+}$= 70±2 MeV

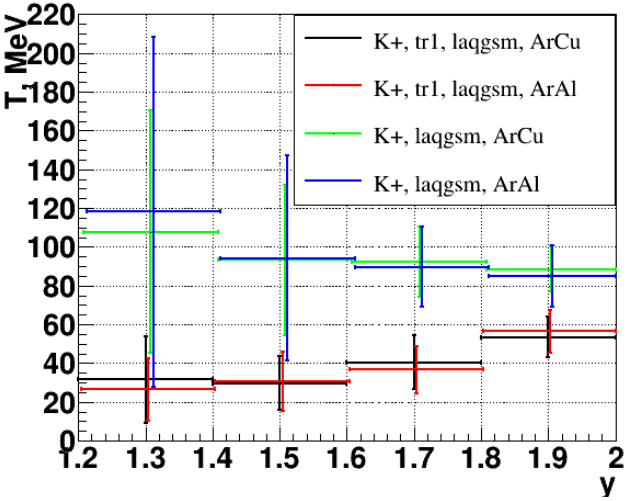
T_{Tr1K+} = 49±15 MeV

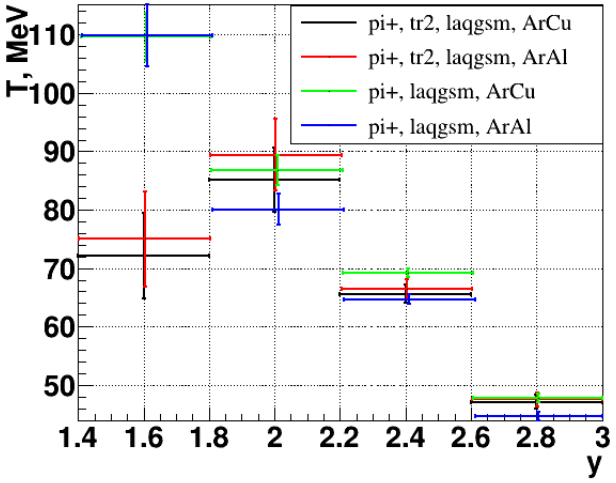
T_{Tr2K+} = 45±13 MeV

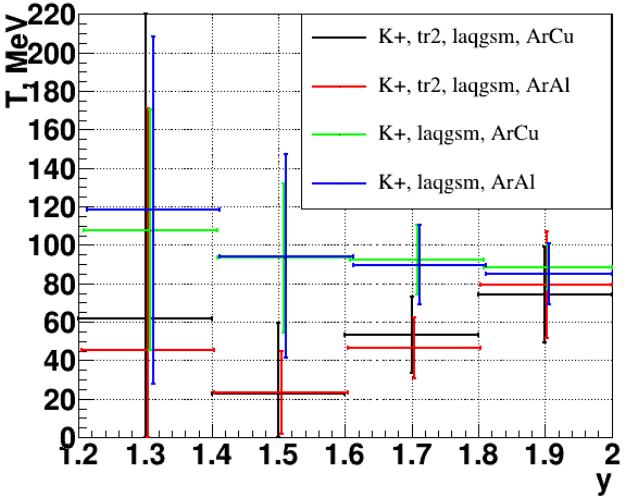
- For (y,pt) bins slopes slightly larger than for (p,pt) bins

pt slopes y bins in data and QGSM MC



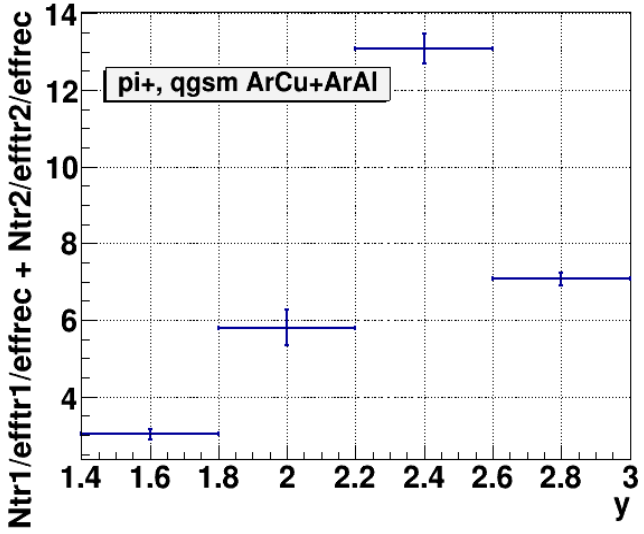


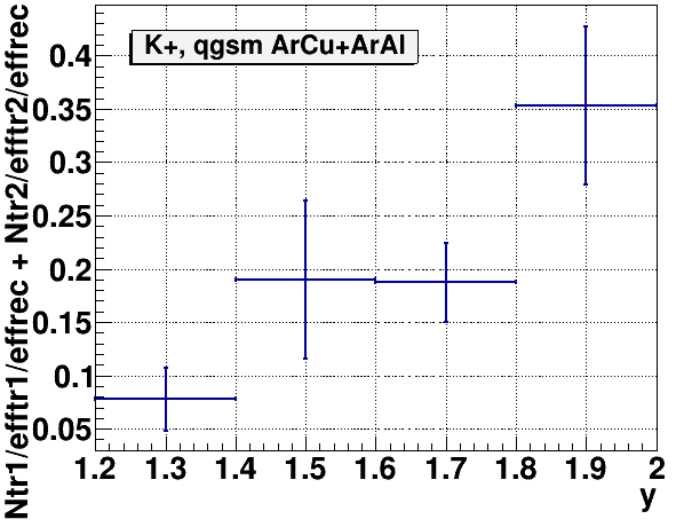


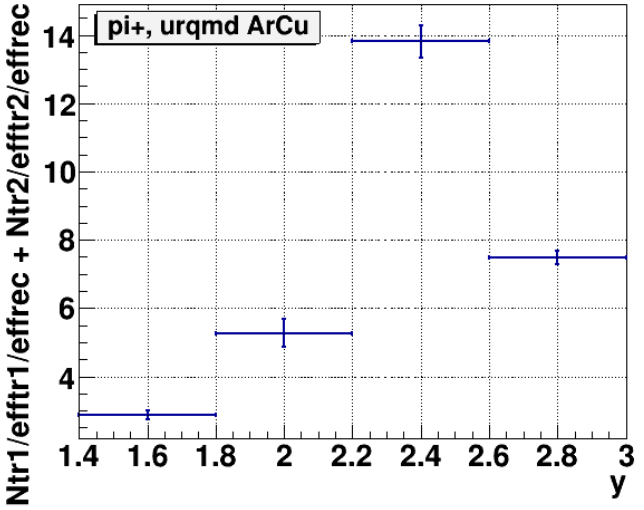


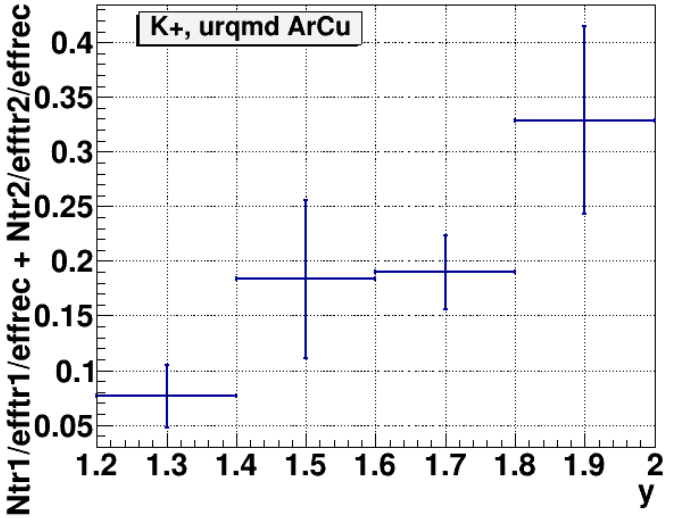
- For π^+ experimental and simulated slopes are close in 3 bins out of 4
- For K^+ discrepancy is large

y spectra from combined tr1 and tr2









- Spectra take into account triggers efficiency
- qgsm ArCu and ArAl are combined

TODO

- Get statistics 4 times larger for urqmd
- Build spectra (y,pt) and (p_{cm},pt)
- Build K^+/π^+ by pt, y, p_{cm}

Thank you!

Backup

Efficiency of TOF400, planes 2, 3, 7, 8