

Status of the π^\pm, K^\pm analysis in the Xe+CsI run

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The main goal of the analysis

- Identifying π^\pm, K^\pm
- Estimation of the π, K mesons production cross section



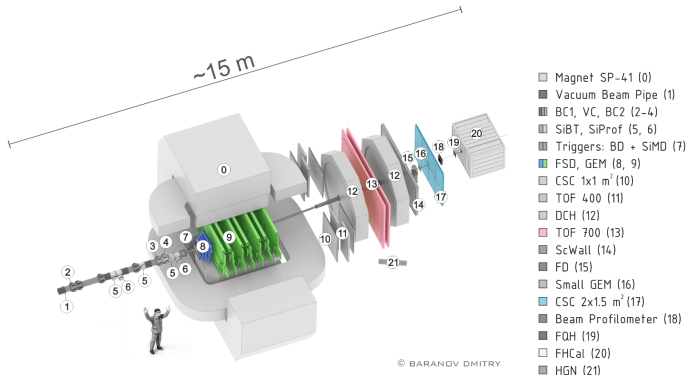
Outline

- **Track selection** algorithm
- **Filtering** experimental data
- **Comparison** of Monte Carlo data and experiment
- **Preliminary** signal distribution for **Pions and Kaons**



Current BM@N Run-8 geometry

FSD + GEM: Rigidity = ρ/q



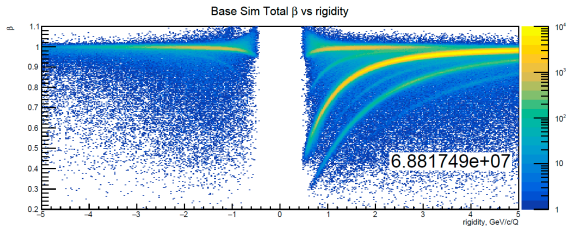
Time-Of-Flight detector TOF-700: $\beta = l/tc$



Information from global tracks

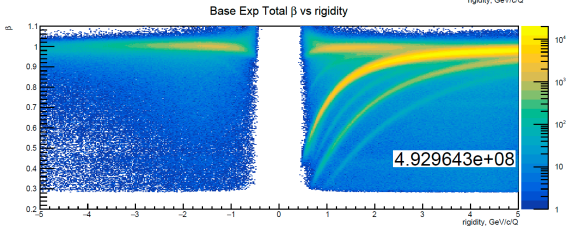
Monte Carlo

- Generator: DCMSMM
- System: Xe + CsI
- Energy: 3.9 AGeV



Exp data

- System: Xe + CsI
- Energy: 3.9 AGeV





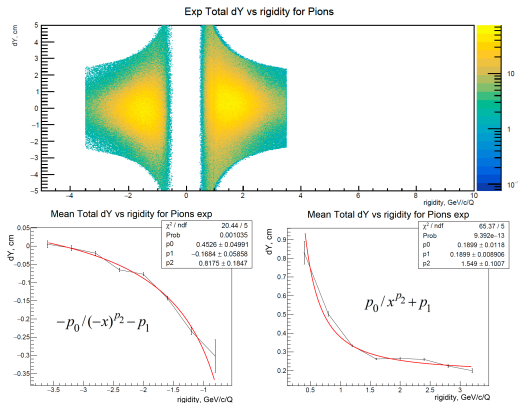
Selection criteria for reliable experimental tracks:

- **Minimum 5 hits** in FSD+GEM
- Z position of **TrackParamLast** is more than **200 cm** (last two GEM stations)
- **Impact factor** of track less than 1 cm
- **Re-extrapolation** of the track from the TOF hit to the vertex.
- Vertex in range
 $V_x \in (-1, 1.5)\text{cm}$; $V_y \in (-1, 1.2)\text{cm}$; $V_z \in (-0.5, 0.5)\text{cm}$.



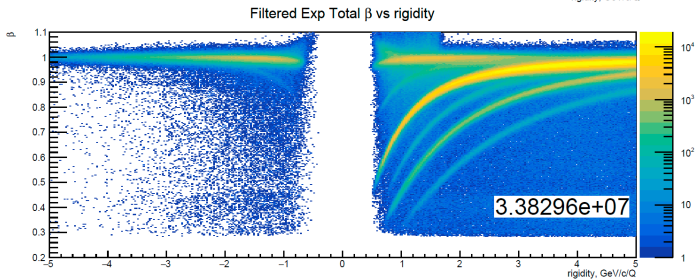
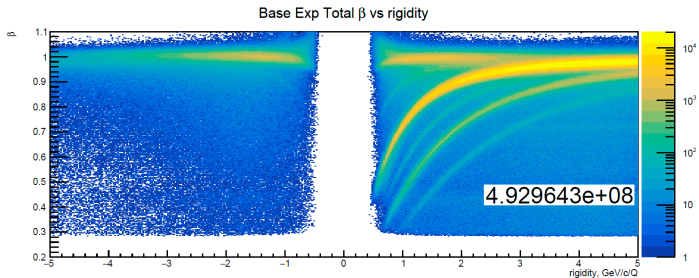
Alignment algorithm: momentum corrections

- Propagate each track to the detector plane
- Create histograms with all track-to-hit(track) connections from momentum
- Every 400 MeV, project the residuals onto the Y plane
- Fit distributions by gauss + pol2 to get $\mu_{D_x}(\rho/q)$ and $\sigma_{D_x}(\rho/q)$
- Fit all μ_{D_y} and σ_{D_y} by exponential function





Before/After





We will compare **MC (blue line)** and **Exp (red line)**
on the Xe+CsI data.

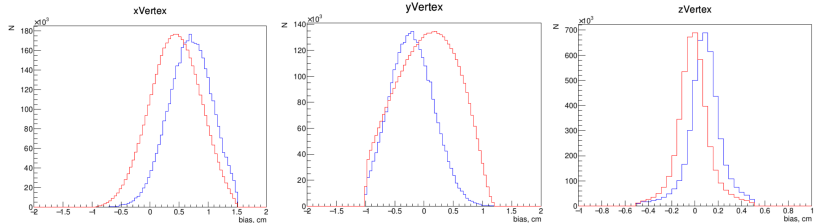
Data parameters

- Vertex distribution
- Number of tracks in event
- Number of hits in FSD + GEM tracks
- Residuals in TOF-700

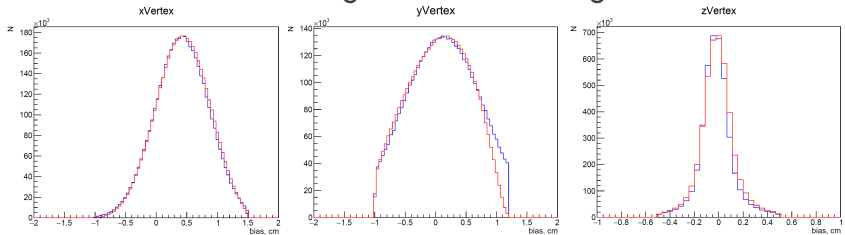


Smearing vertex

Initial values



Added gaussian smearing





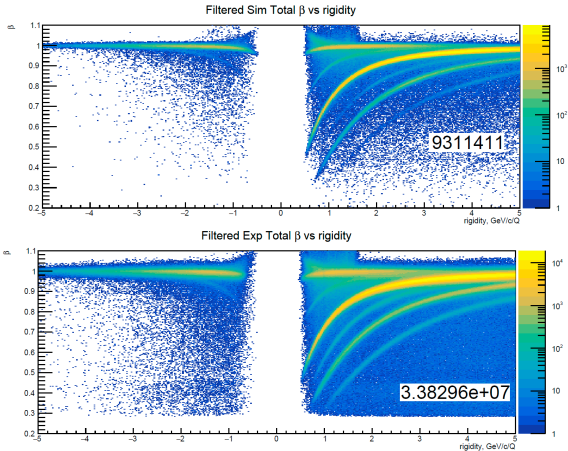
Filtered data

Monte Carlo

- Generator: DCMSMM
- System: Xe + CsI
- Energy: 3.9 AGeV
- Smearing Vertex

Exp data

- System: Xe + CsI
- Energy: 3.9 AGeV

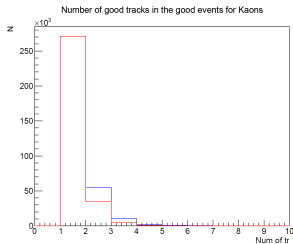
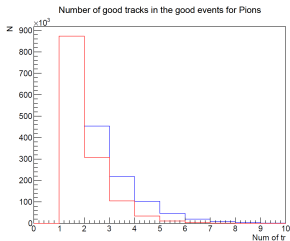
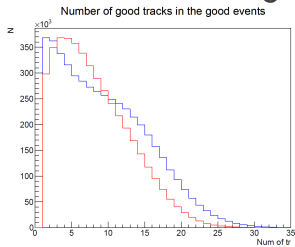




Number of tracks in event

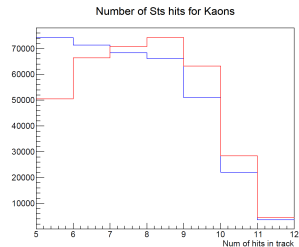
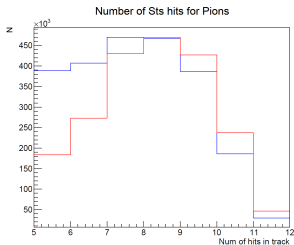
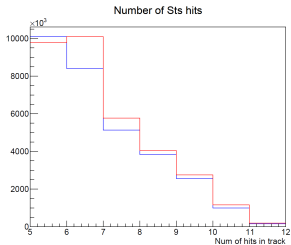
A **good track** is a track selected after **filtering procedures**
A **good event** is an experimental event that **has at least one good track**

The **vertex** of a good event **must be within a given range**





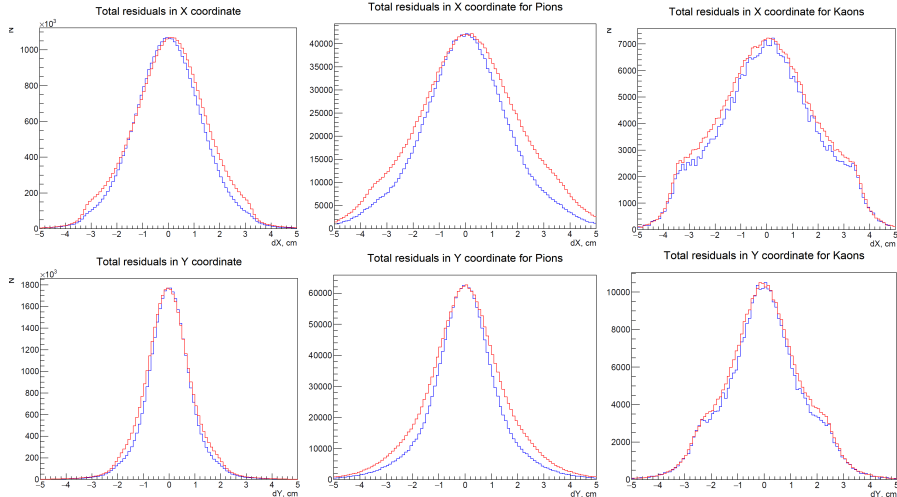
Number of hits in FSD + GEM tracks





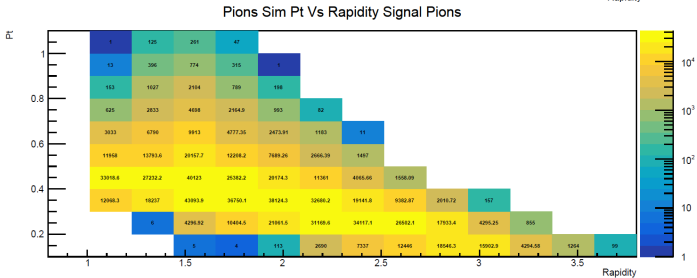
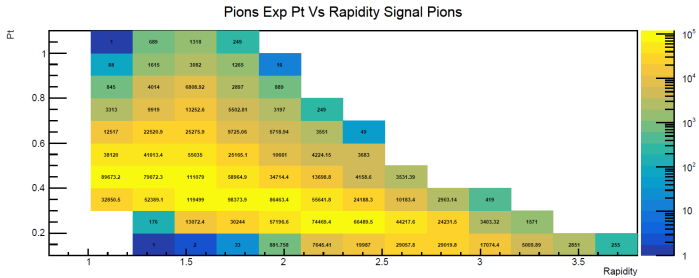
Residuals in TOF-700

In the future, it is planned to compare the residuals in individual modules





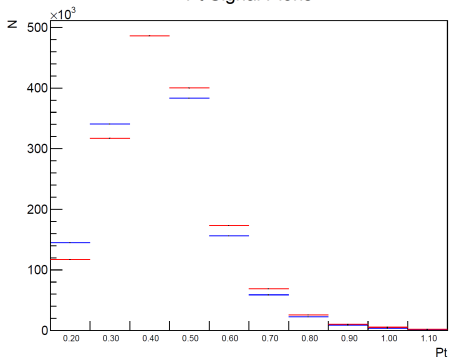
Preliminary signal distribution for Pions



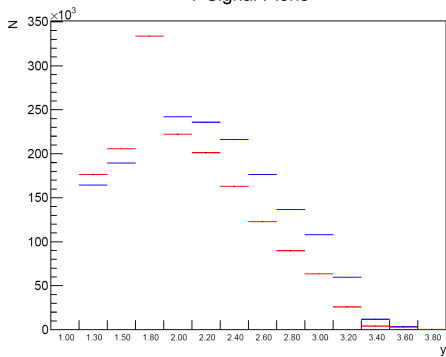


Preliminary signal distribution for Pions

Pt Signal Pions

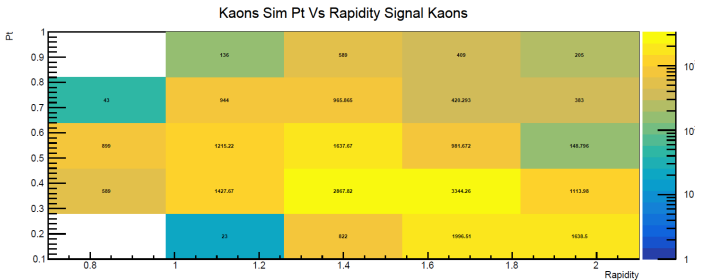
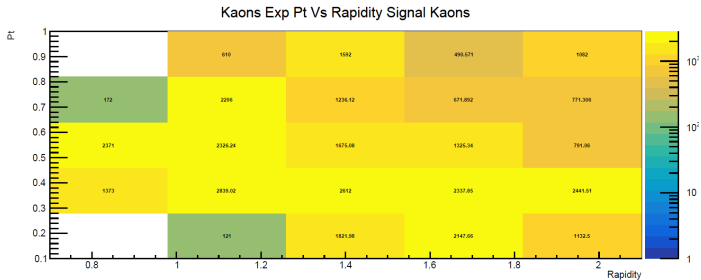


Y Signal Pions





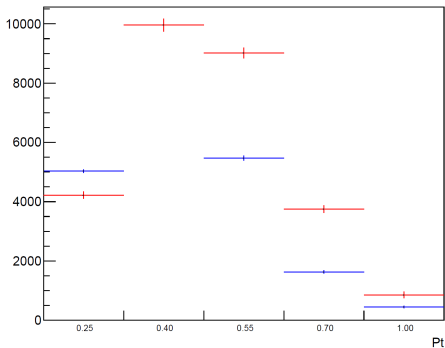
Preliminary signal distribution for Kaons



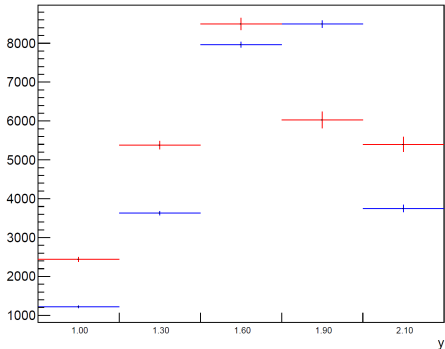


Preliminary signal distribution for Kaons

Pt Signal Kaons



Y Signal Kaons





- **Algorithms for filtering** experimental data have been implemented
- **The vertex smearing** parameters were selected
- Parameters of **MC** tracks in a good agreement with the **the experimental** data
- Preliminary signal distribution for Kaons and Pions were obtained

Thank you for the attention!



Backup