Embedding request for D^0 and D* analysis in p+p 510 GeV from Run 17 data

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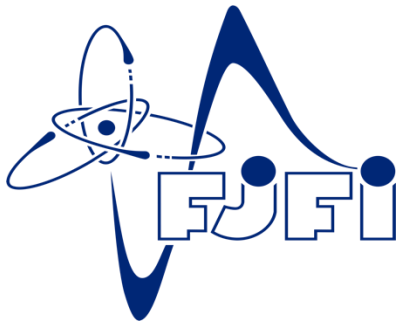
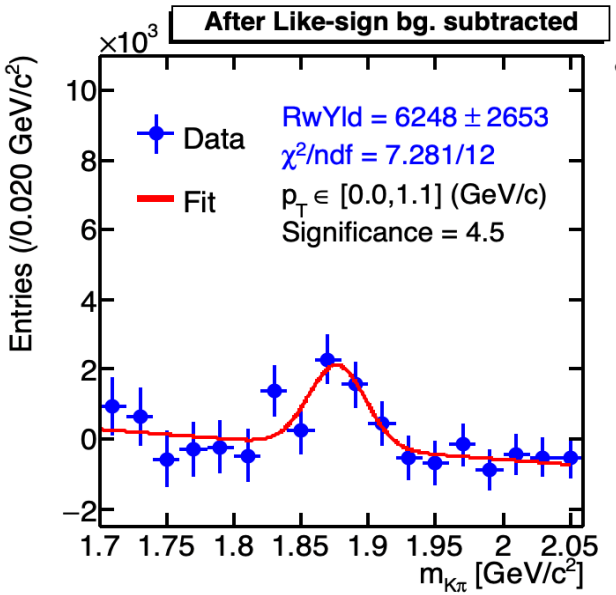
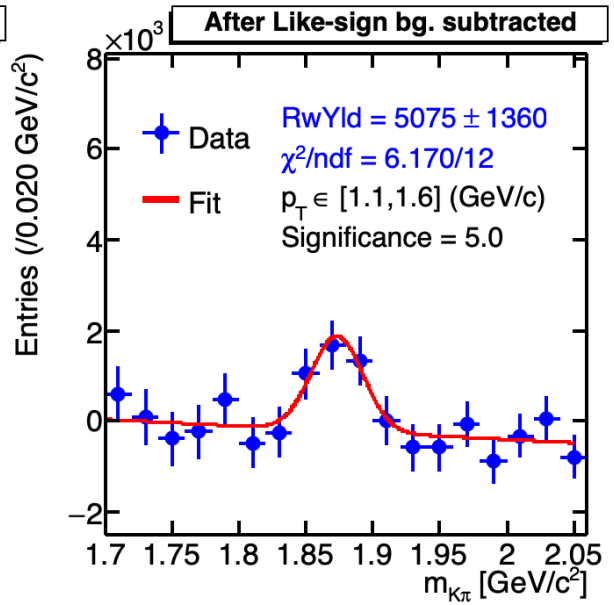
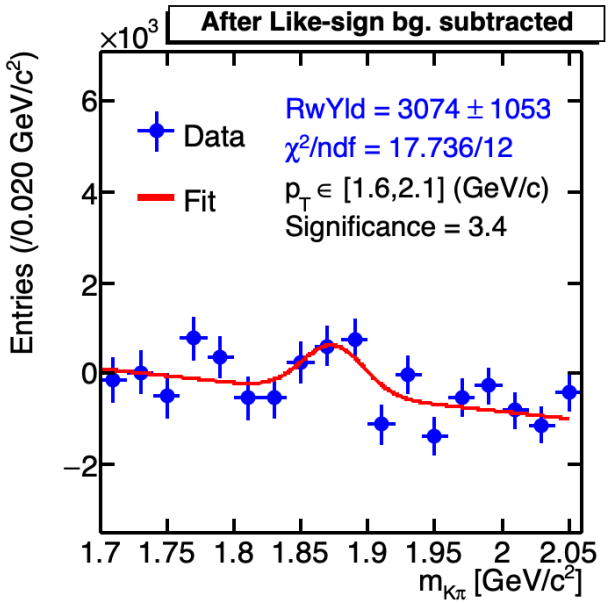


Hard Probes PWG Meeting; 21st November, 2024

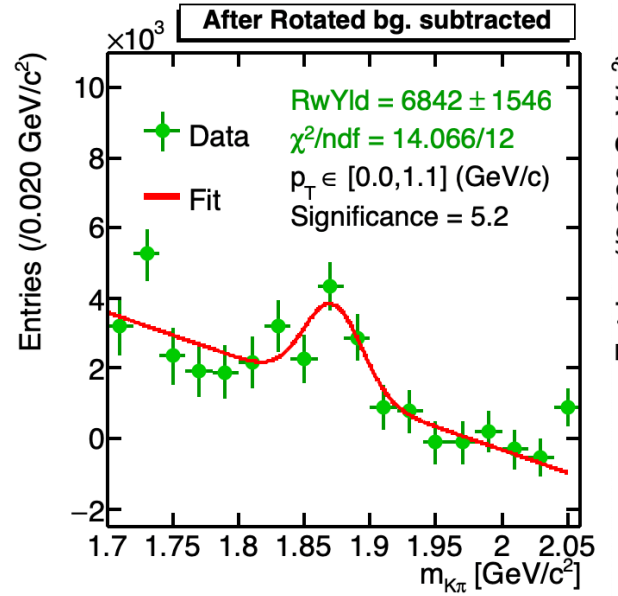
D^0 Analysis - Invariant Mass Distribution

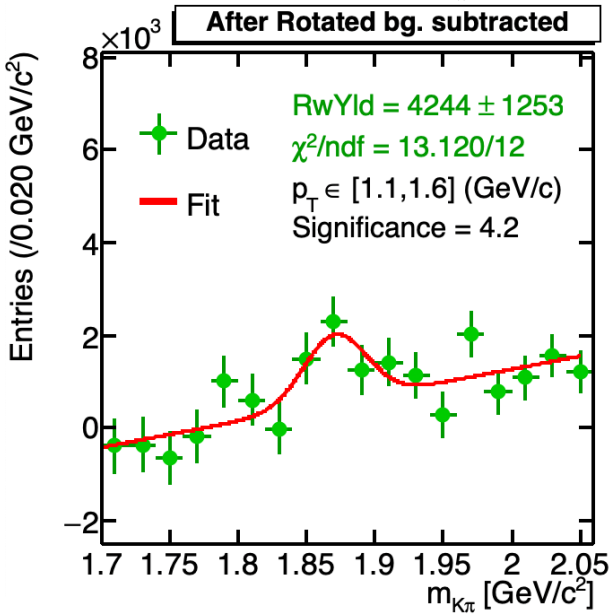


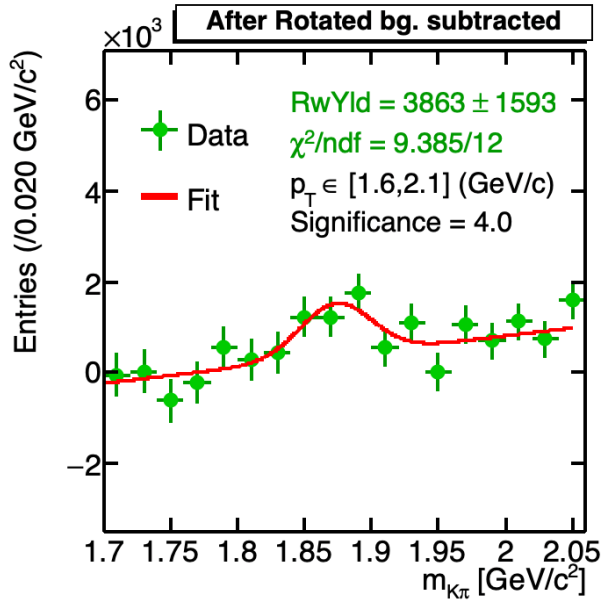




Less residual background



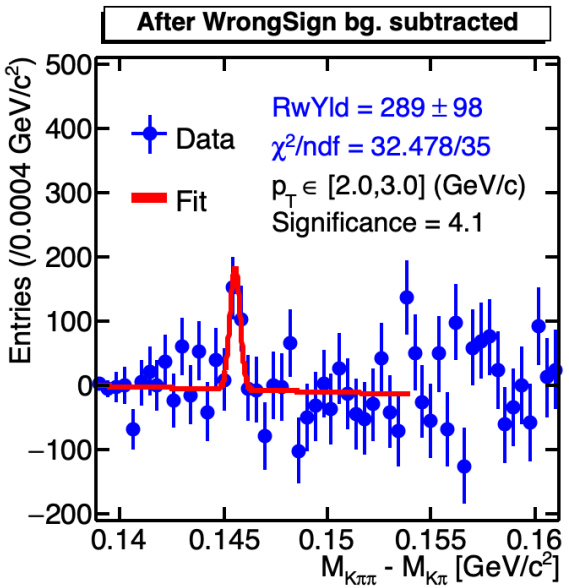


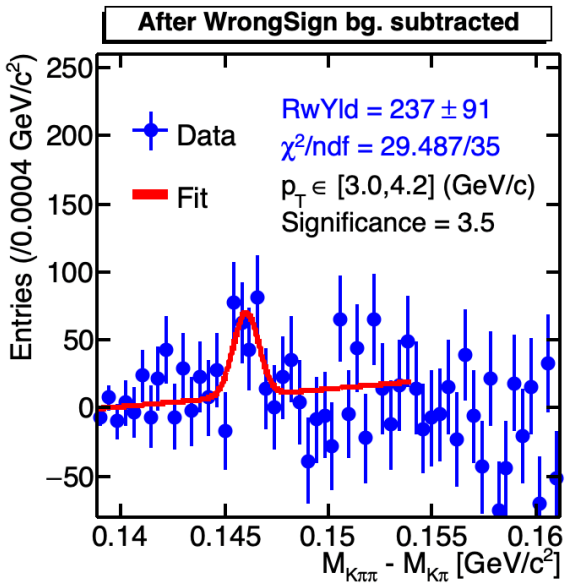


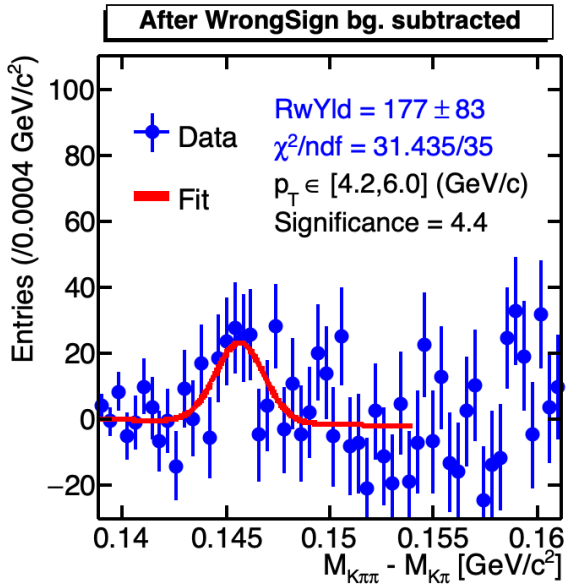
More residual background

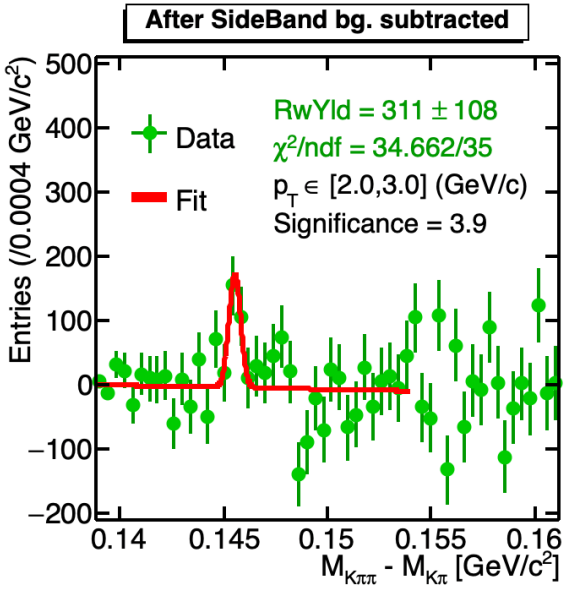
https://drupal.star.bnl.gov/STAR/system/files/STARHPPWG_spal.pdf

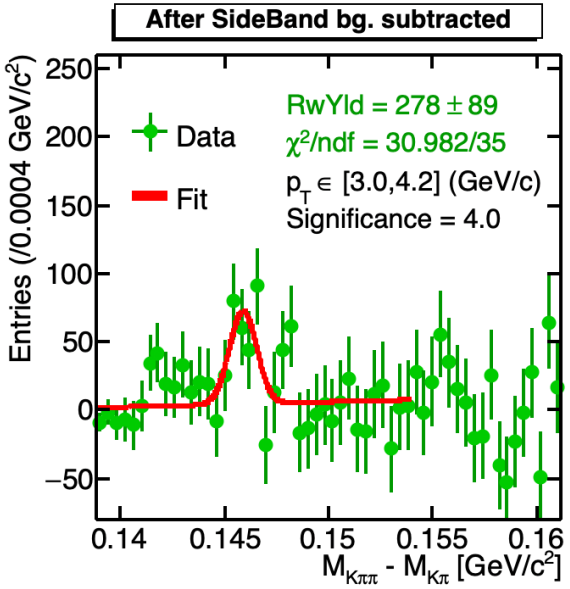
D* reconstruction – ΔM distributions (Minimum Bias)

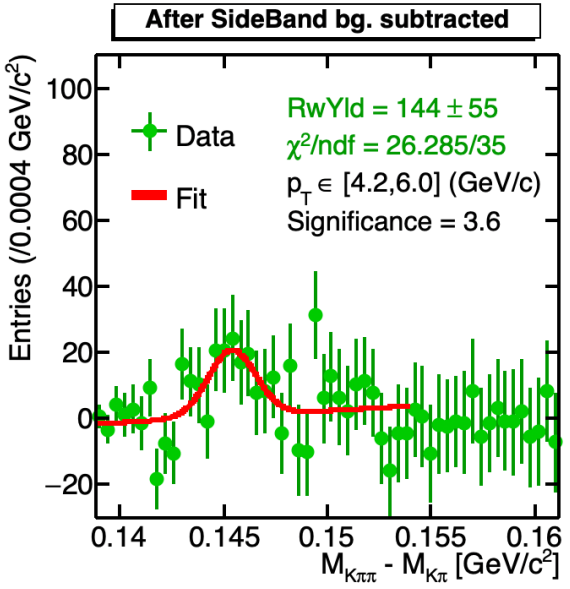




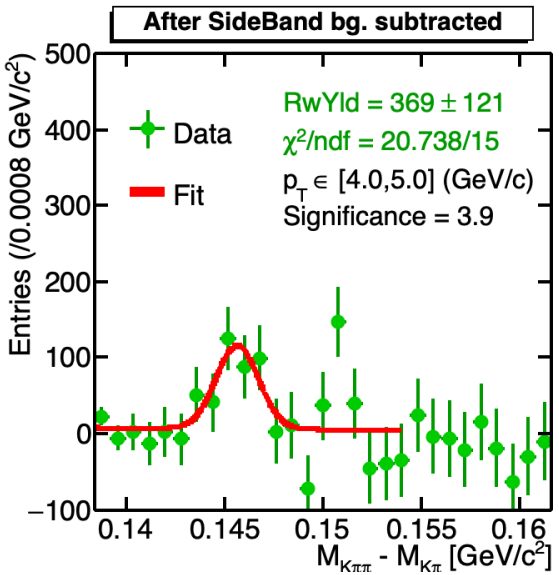


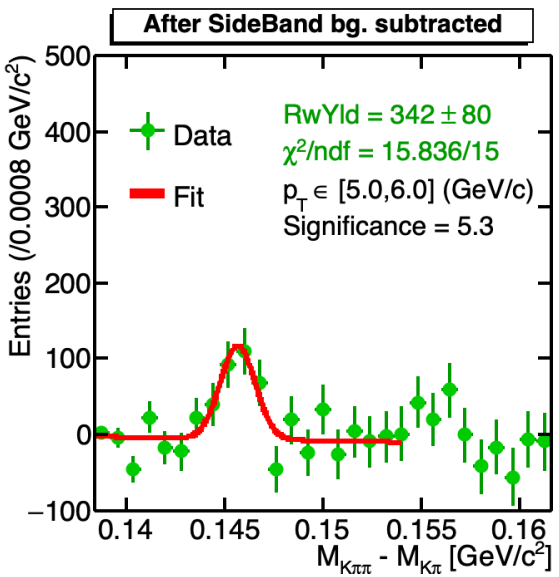


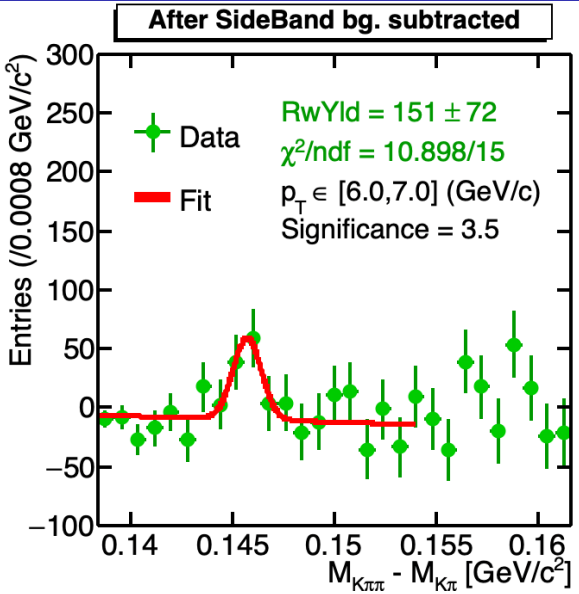


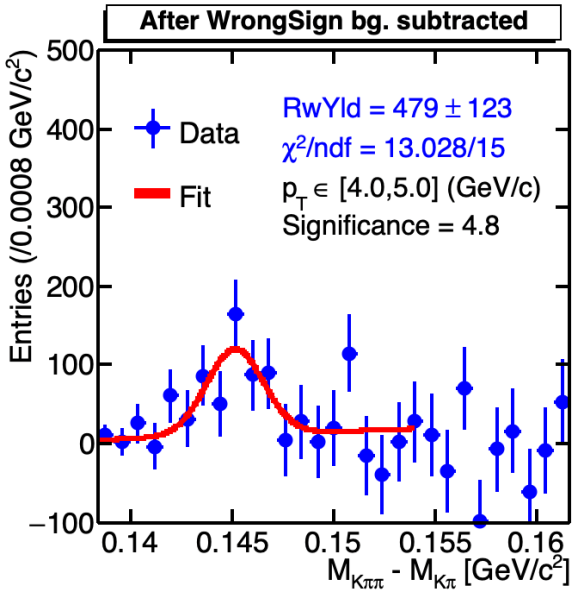


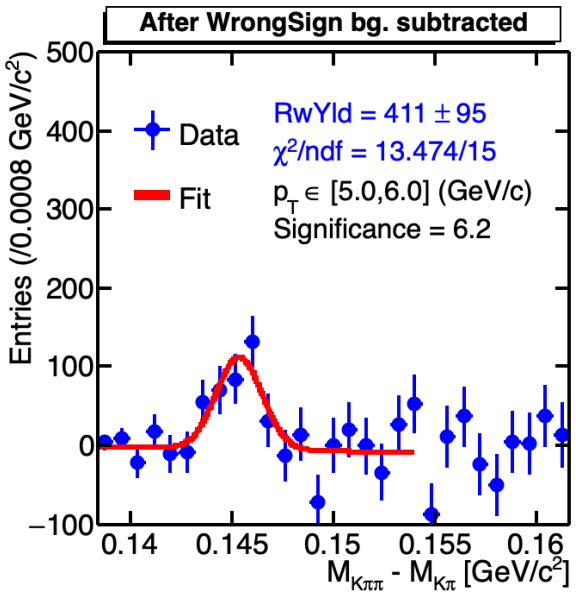
D* reconstruction – ΔM distributions (BHT1)

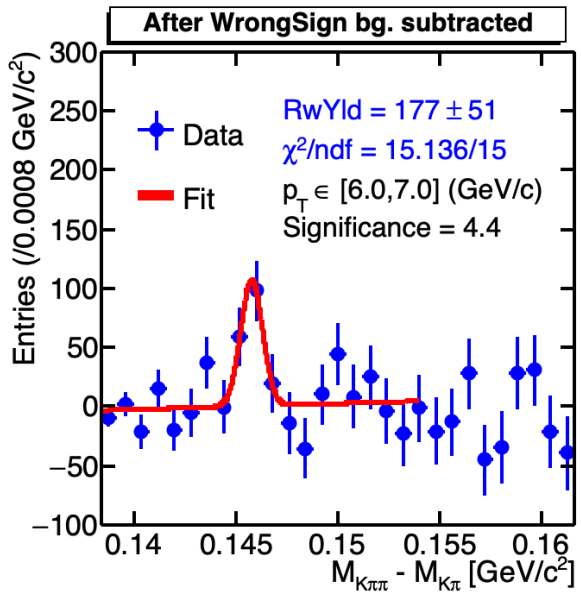




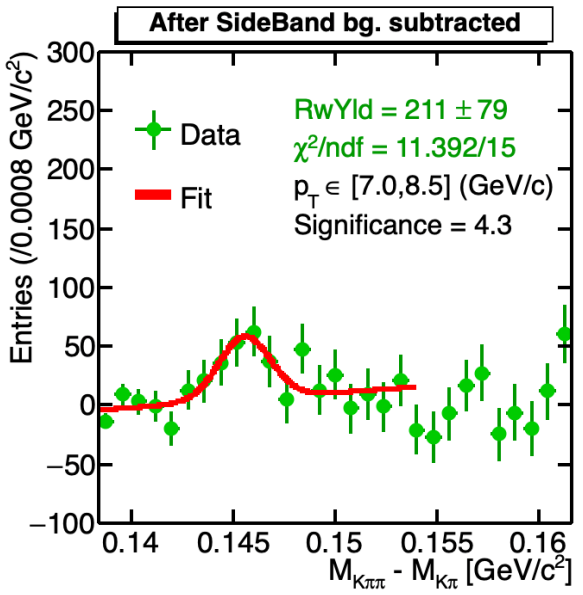


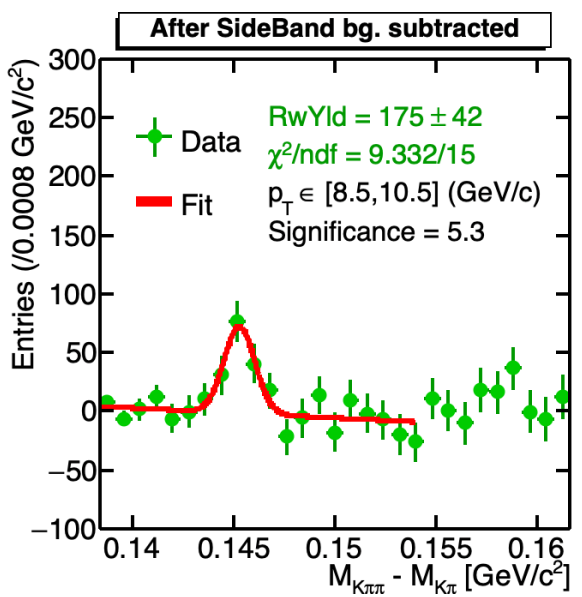


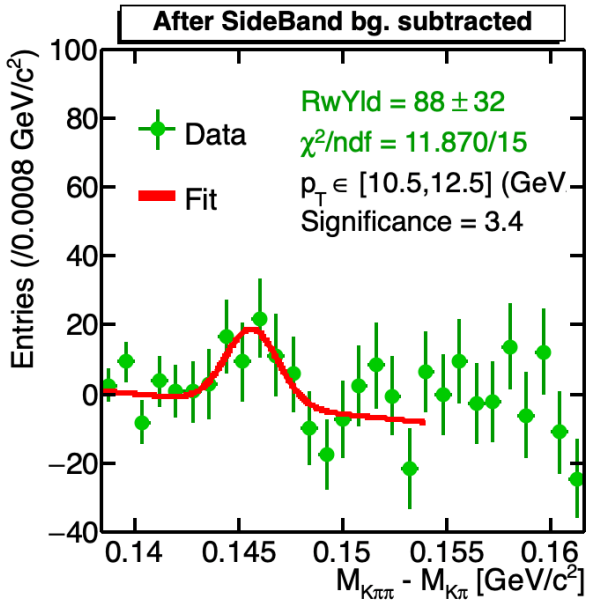


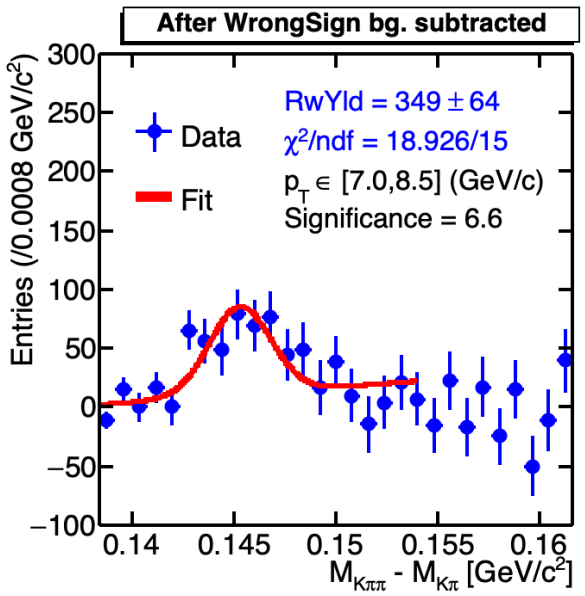


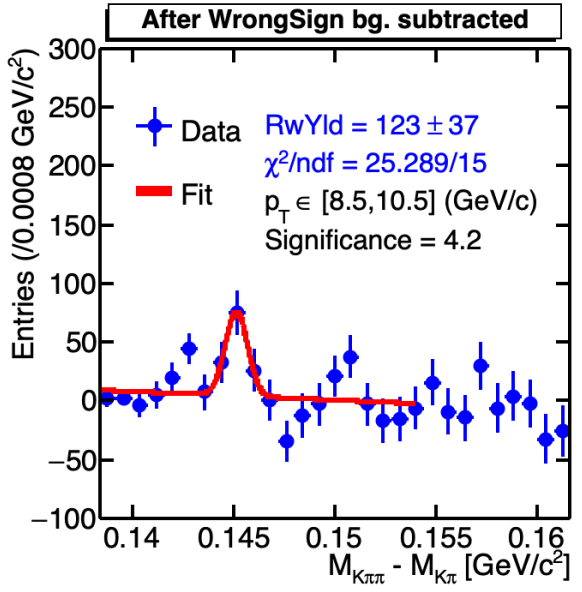
D* reconstruction – ΔM distributions (BHT1)

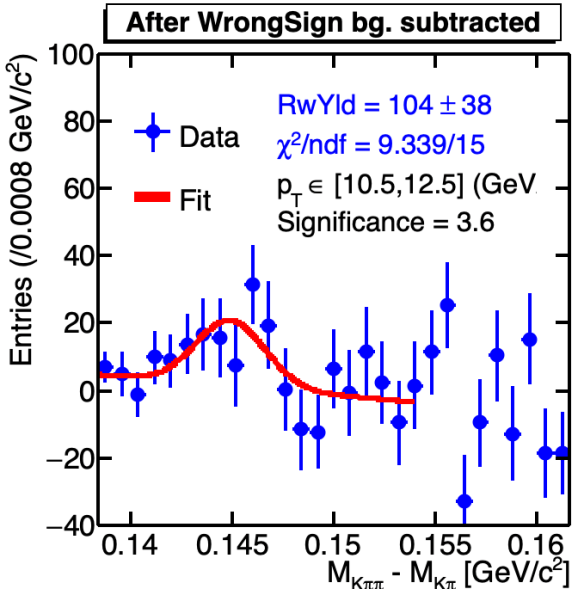




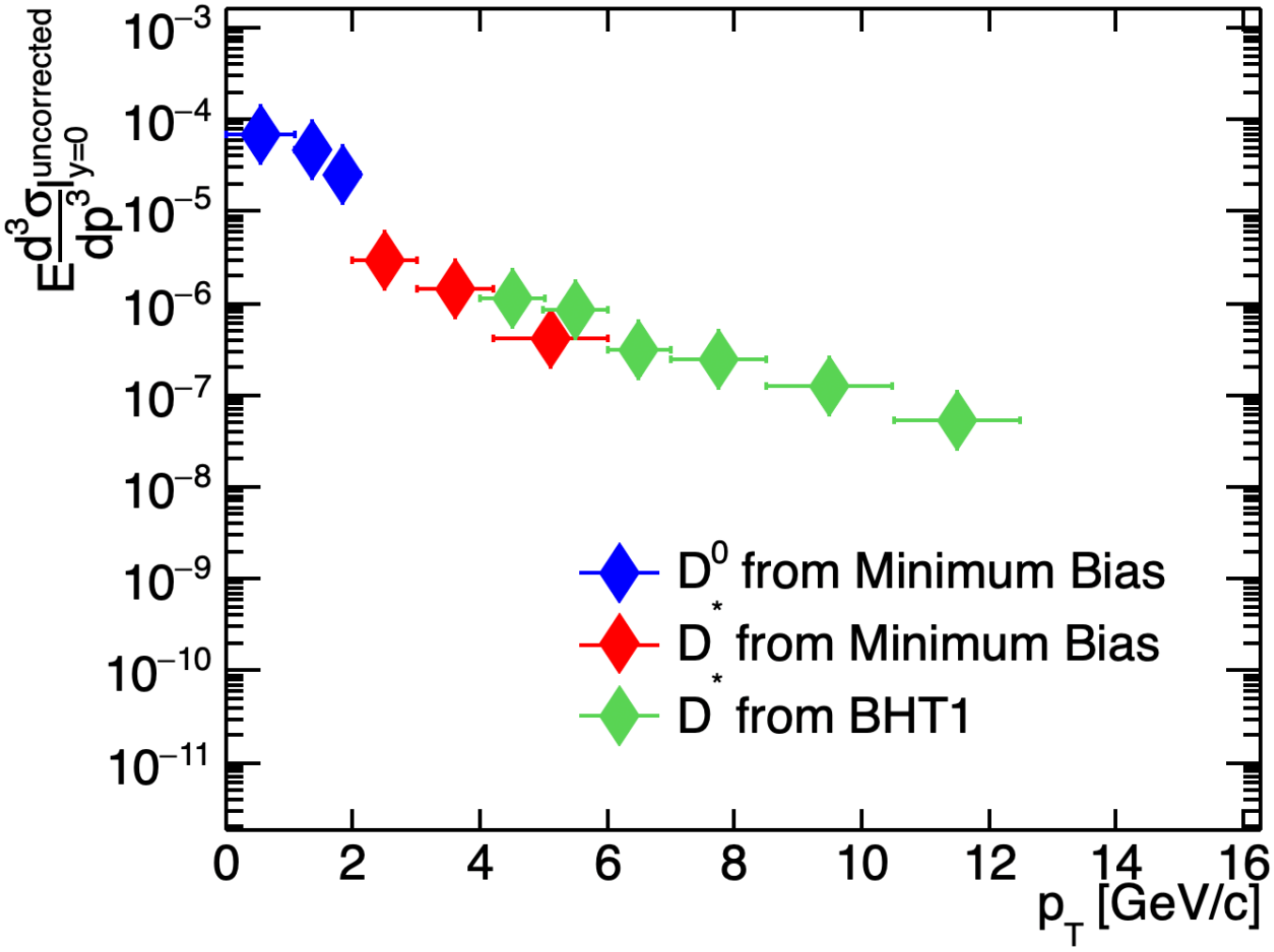








Uncorrected Spectra



$$E\frac{d^3\sigma}{dp^3}\Big|_{y=0}^{uncorrected} = \frac{d^2\sigma}{2\pi p_T dp_T dy}\Big|_{y=0}^{uncorrected} = \frac{1}{2}\frac{1}{2\pi}\frac{\sigma^{NSD}\beta}{N f_c \Gamma}\frac{Y}{p_T \Delta p_T \Delta y}\frac{1}{\varepsilon}$$

- D^0 and D^* signals were extracted upto p_T = 12.5 GeV using Minimum Bias and BHT1 triggered data.
- Analysis was performed with two independent background estimation methods for both.
- Efficiency and systematics to be done next for cross-section calculation.

Embedding Request

Details of Data

- Data Set: 2017 p+p pp500_production_2017
- Stream: st_physics
- Configuration: pp500_production_2017
- Production tag: P20ic
- Library: SL22b
- Run range: 18095052-18132032
- Trigger ID: 570001 (VPDMB-30)
- Vertex cut: -100 cm < V_z < 100 cm

Details for Simulation and Reconstruction

- Particle types: π^+, π^-, K^+, K^-
- p_T: (0, 20) GeV/c, flat
- Pseudorapidity (η): (-1, 1), flat
- ϕ: ($-\pi$, π), flat
- Number of MC particles per event: 5
- Number of Events: 100k

BadRun List

18053100 18053101 18053102 18053103 18053104 18053105 18053110 18053117 18053120 18053121 18053122 18053124 18053128 18054003
18054004 18054005 18054006 18054009 18054010 18054011 18054012 18054013 18054014 18054017 18054019 18054020 18054042 18054043
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18137025 18137027 18137028 18137029 18142024 18143057 18146003 18146005 18146031 18146032 18146033 18146035 18146036 18147011

336 in total

QA

Event Selection

- Events pass the minimum bias trigger VPDMB-30 [570001]

- $|V_z^{TPC}| < 100$ cm
- $|V_z^{VPD} - V_z^{TPC}| < 6$ cm
- $|V_r| \leq 2$ cm
- $|V_x, V_y, V_z| > 10^{-5}$ cm

Track Quality Cuts

Primary tracks

- nHitsFit $\geqslant 15$
- nHitsRatio $\geqslant 0.51$
- nHitsDedx $\geqslant 5$
- $p_T > 0.06$ GeV/c
- $|\eta| < 1.0$
- gDca < 3.0

Pion Candidates

$$-5.0 < n\sigma_{\pi}^{dE/dx} < 5.0$$

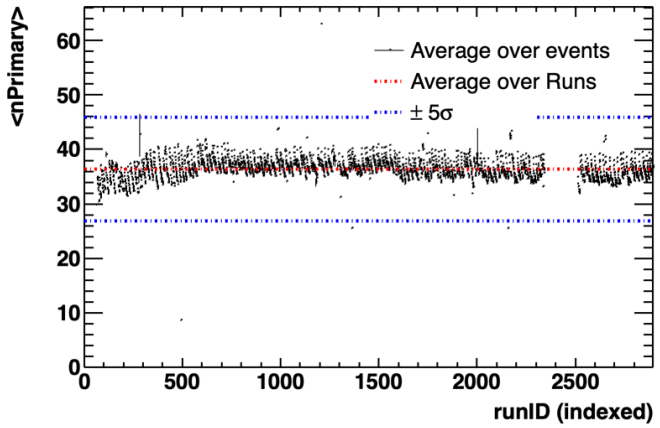
$$-5.0 < n\sigma_{\pi}^{1/\beta} < 5.0$$

Kaon Candidates

$$-5.0 < n\sigma_{K}^{dE/dx} < 5.0$$

$$-5.0 < n\sigma_{K}^{1/\beta} < 5.0$$

QA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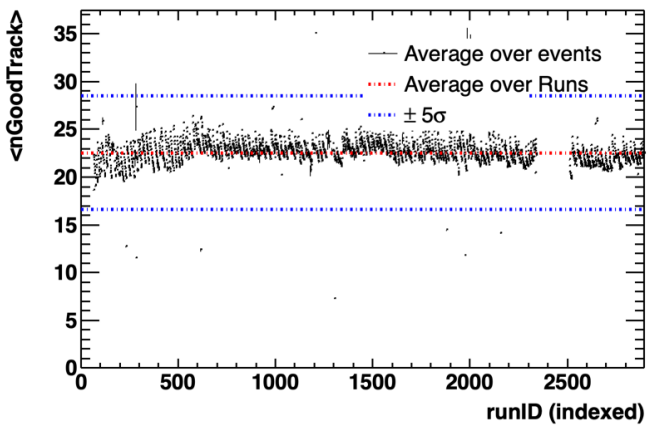
Average over events
Average over Runs
± 5σ
runID (indexed)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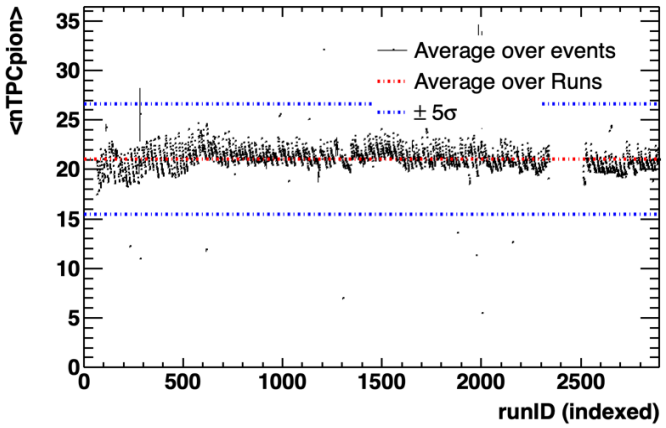
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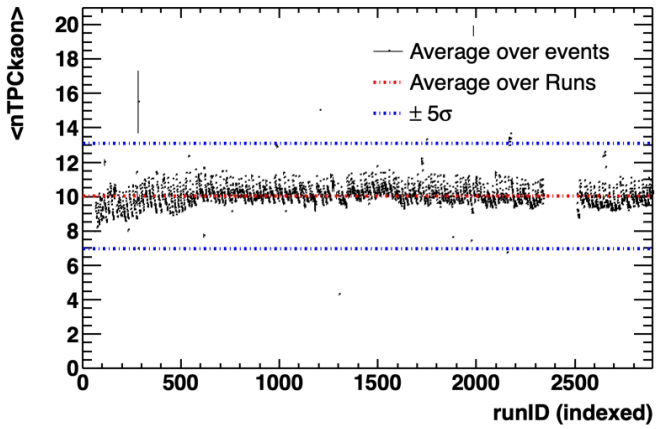
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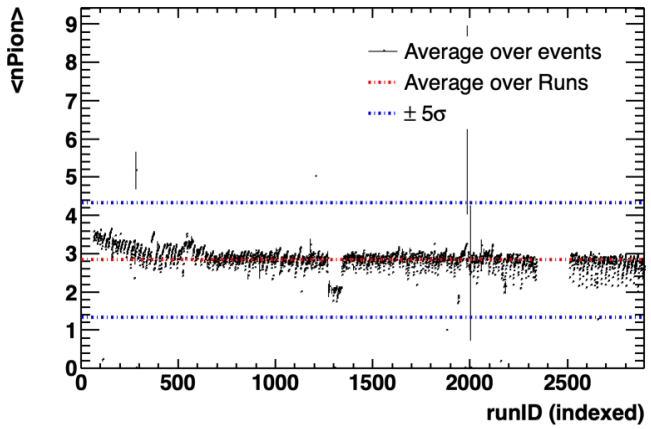
runID (indexed)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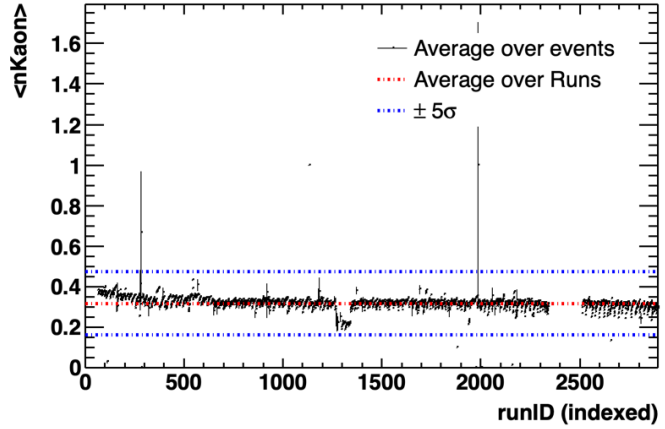
Average over Runs
± 5σ
runID (indexed)


<nKaon>
Average over events
Average over Runs
± 5σ
runID (indexed)

Thank you