Top/Heavy Flavor Meeting

SSbar 250 GeV Analysis

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Objectives

- **Efficiency Correction**
  - Calculate the correction factor for Kaon reconstruction efficiency due to the detector acceptance.
  - Retrieve the loss in efficiency at the backward region.
- **Leading Pion Identification**
  - Use pion as a signature of the event.
  - uu/dd identification can be realized.
  - Same method as Kaon ID.

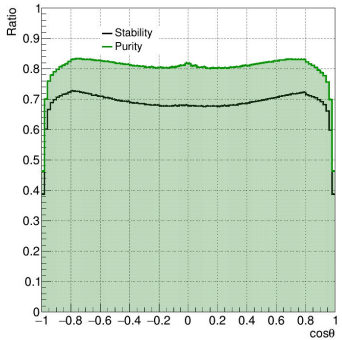
Efficiency Correction

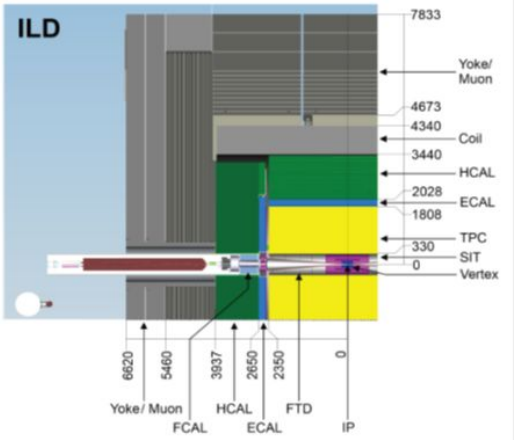
Efficiency Correction

- Detector acceptance
  - Ability to extend the particle reconstruction at the far edge of the detector?
  - One requires reconstruction efficiency correction.

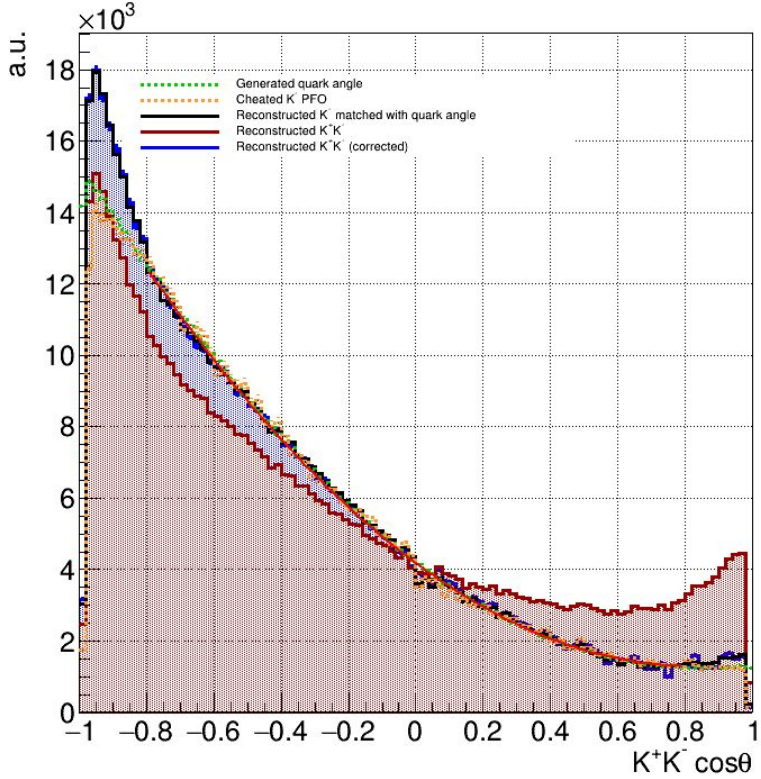
$$\text{Efficiency} = \frac{N_{reco}}{N_{gen}}$$

    - Throughout the entire polar angle.

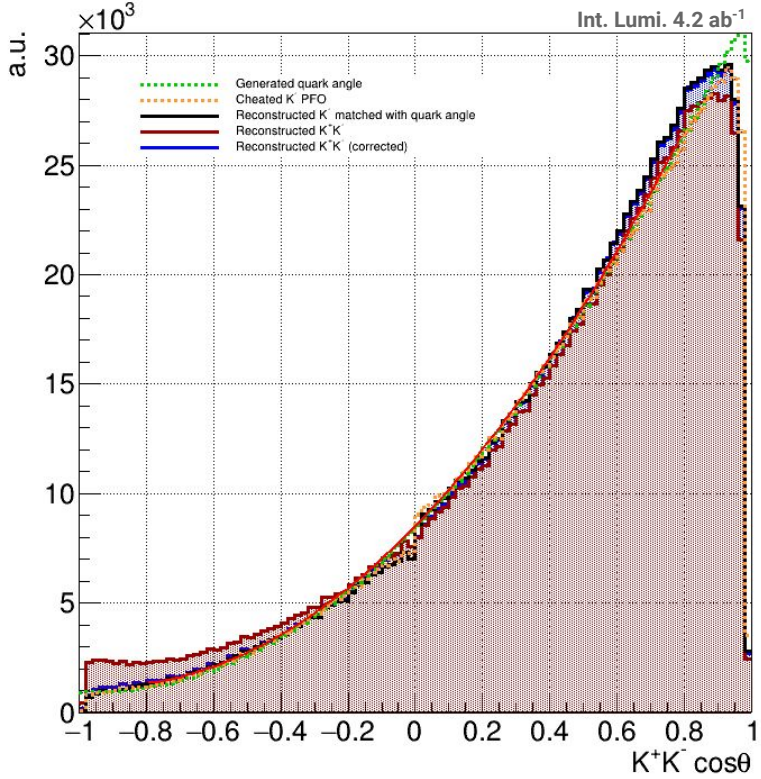




Polar Angle (w/o Efficiency corr.)

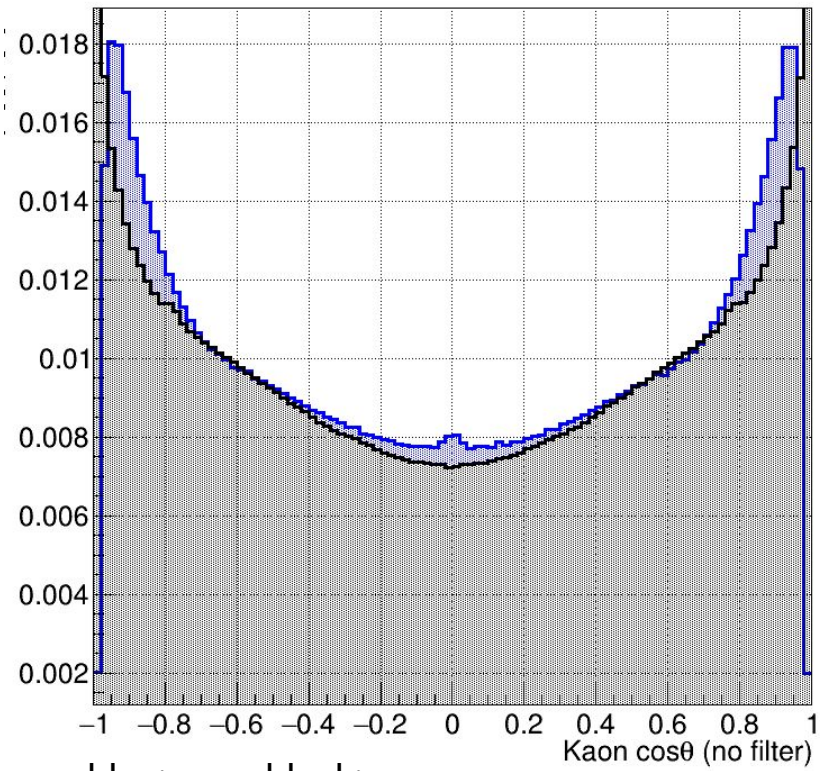


uu

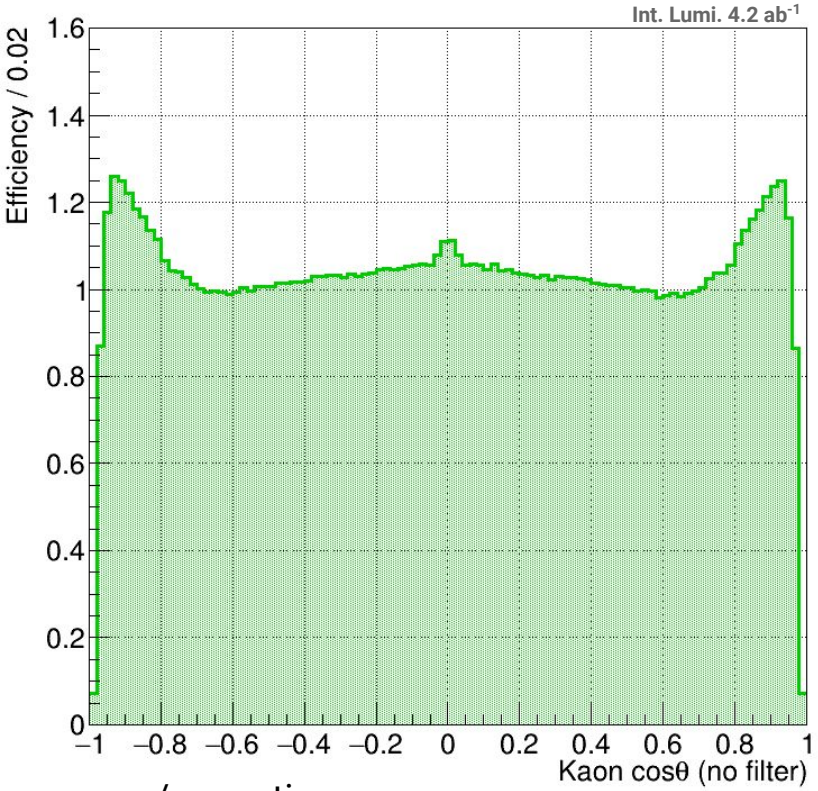


ss

Cosθ Gen & Reco (uu)

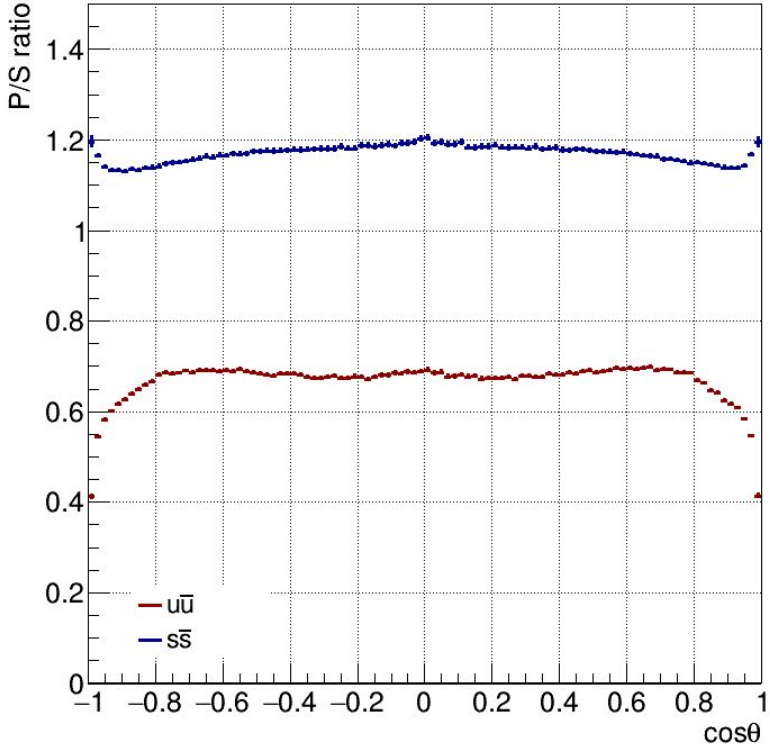


blue: reco, black: gen

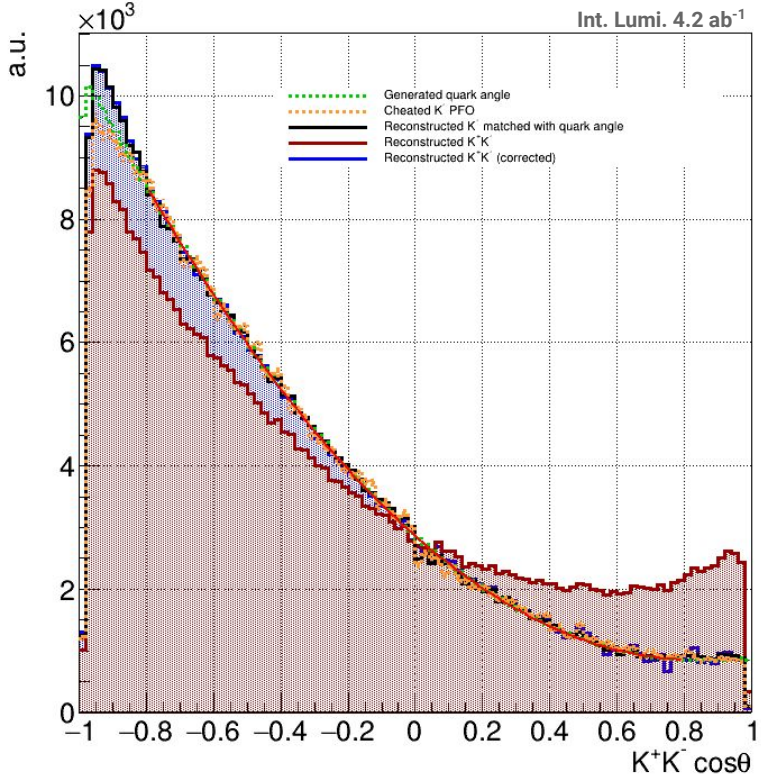


reco/gen ratio

Polar Angle (w/o S/P corr.)

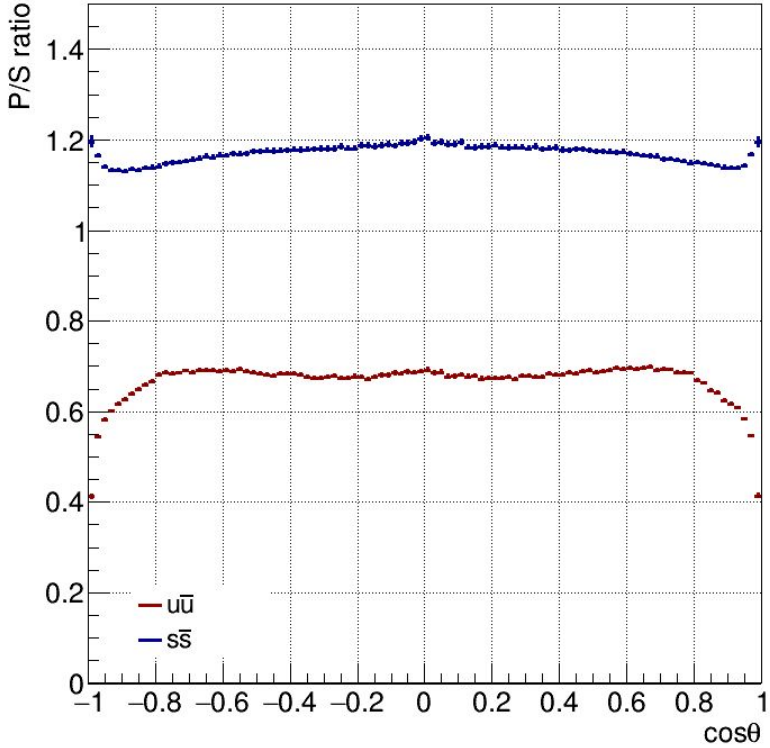


P/S ratio used for correction



uu polar after correction

Polar Angle (w/o S/P corr.)



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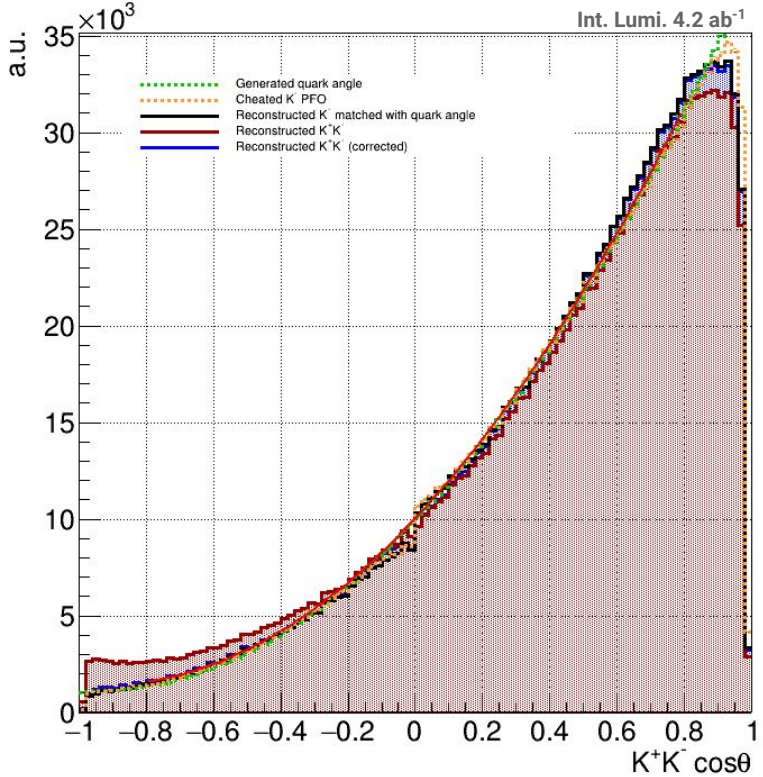
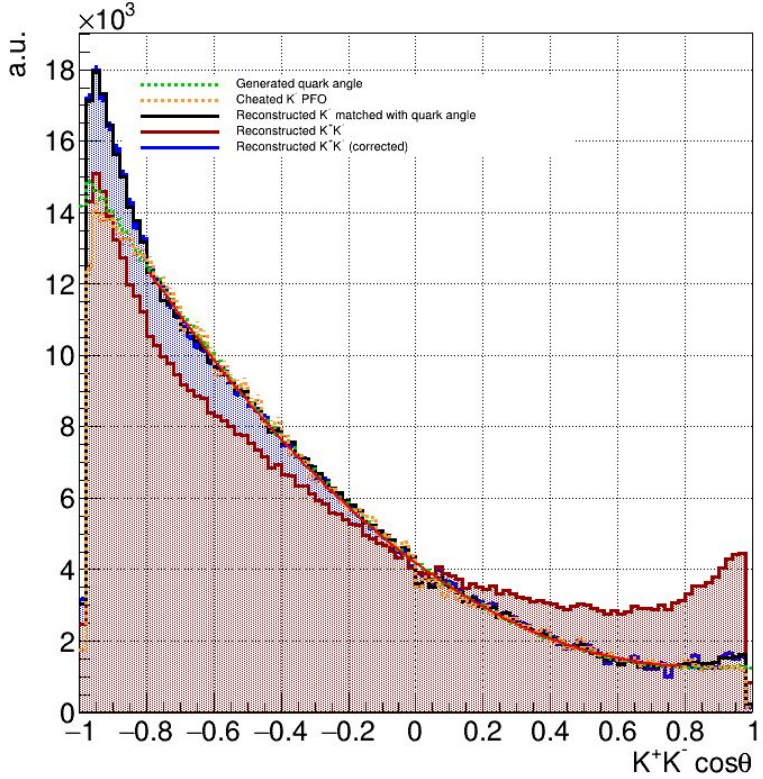
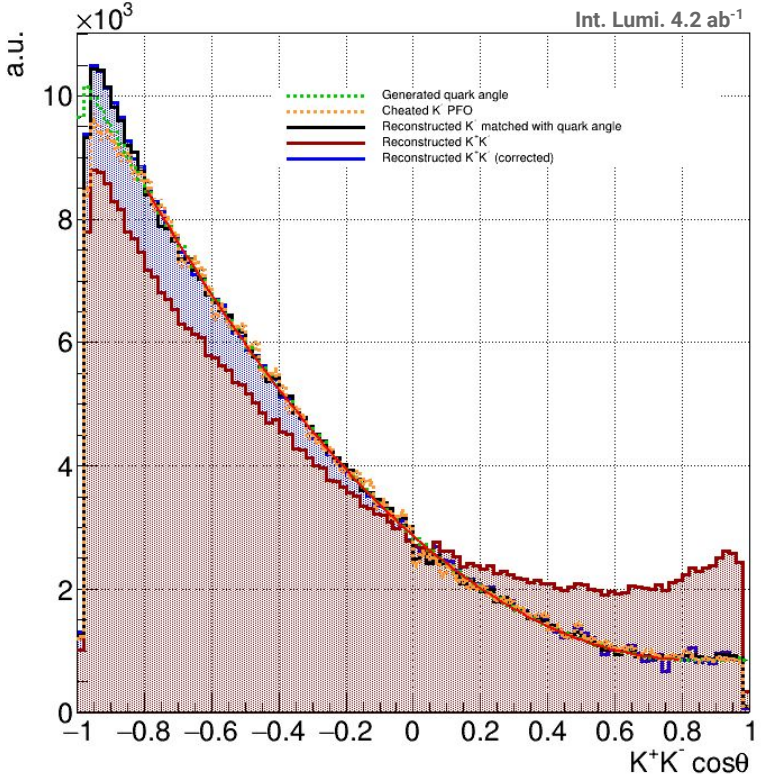


ss polar after correction

Polar Angle (w/o S/P corr.)

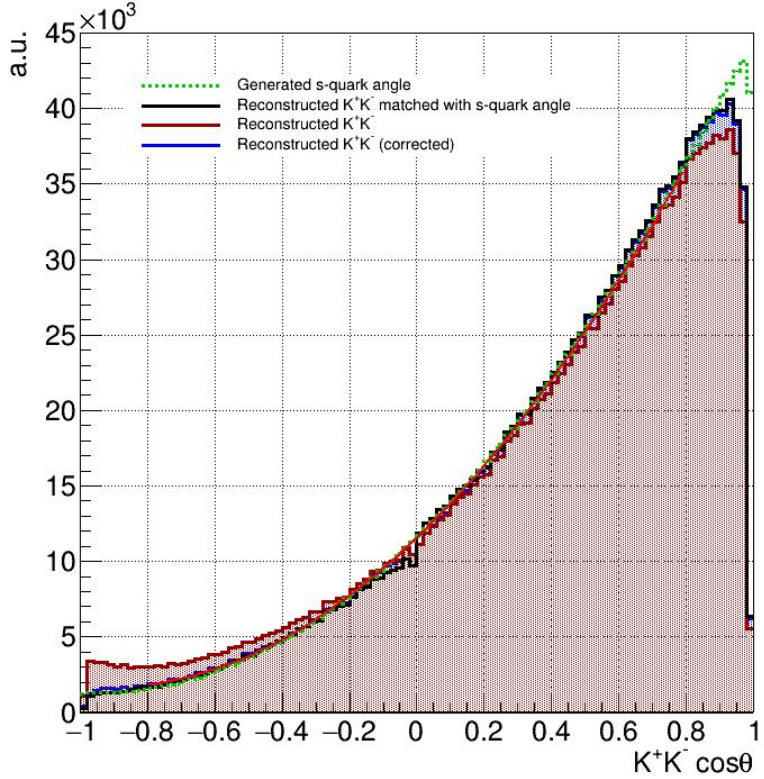


uu polar before correction

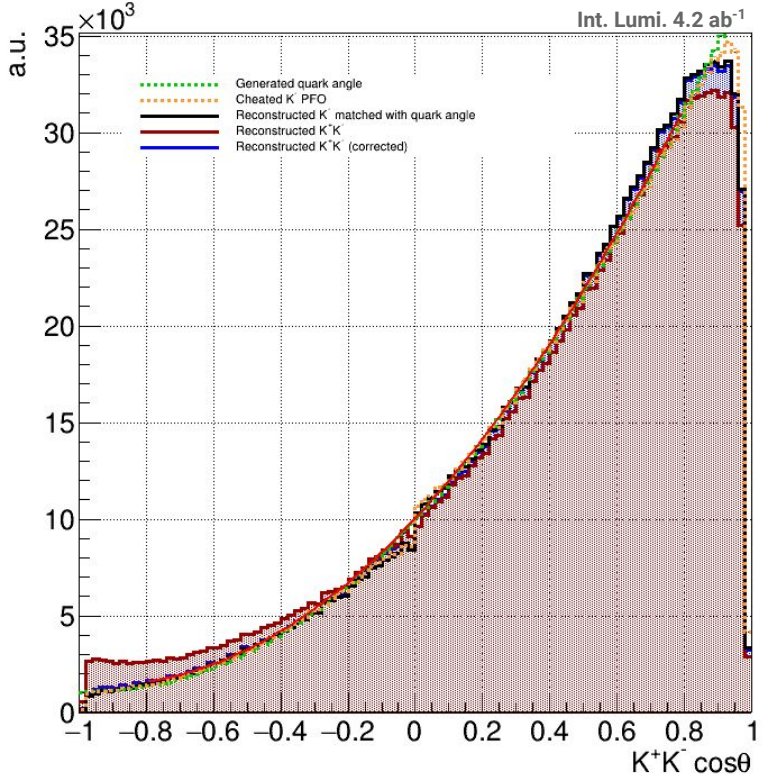


uu polar after correction

Polar Angle (w/o S/P corr.)



ss polar before correction



ss polar after correction

Leading Pion Analysis

Event Structure

s-tag

Charged Kaon track will give the original quark information. Kaon ID becomes the key.

u/d-tag

Charged Pion track will dominate throughout the entire polar angle. Pion ID becomes the key.

- Can distinguish well from Kaon (not bothered by proton or other competitors.)

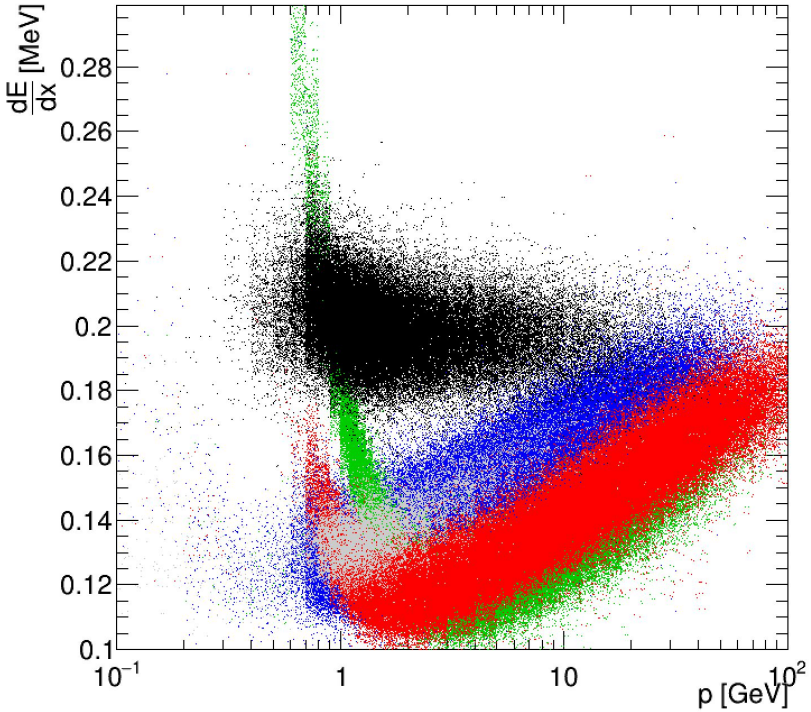
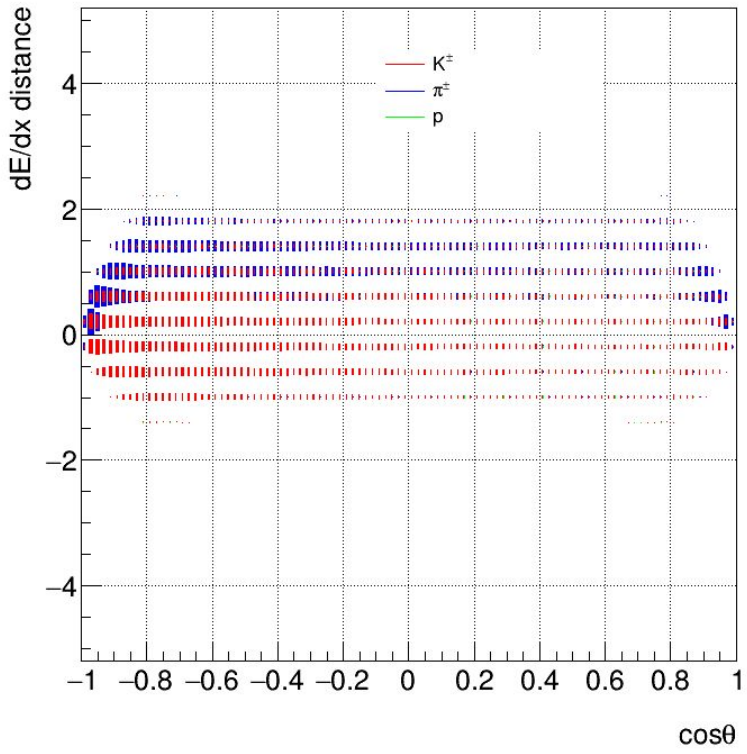
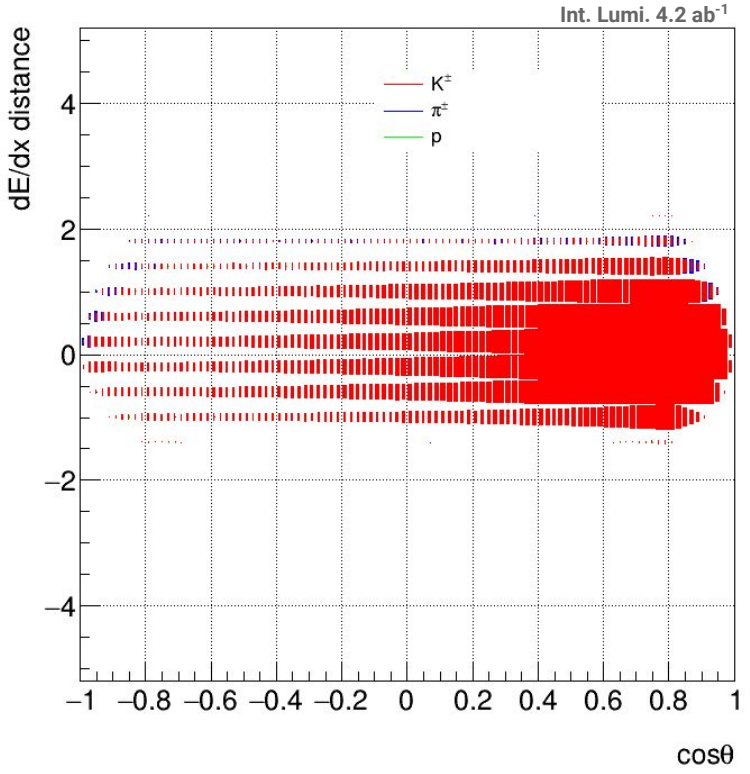


Figure: dE/dx vs p for ssbar sample

dE/dx distance vs cos θ (Kaon)



uu



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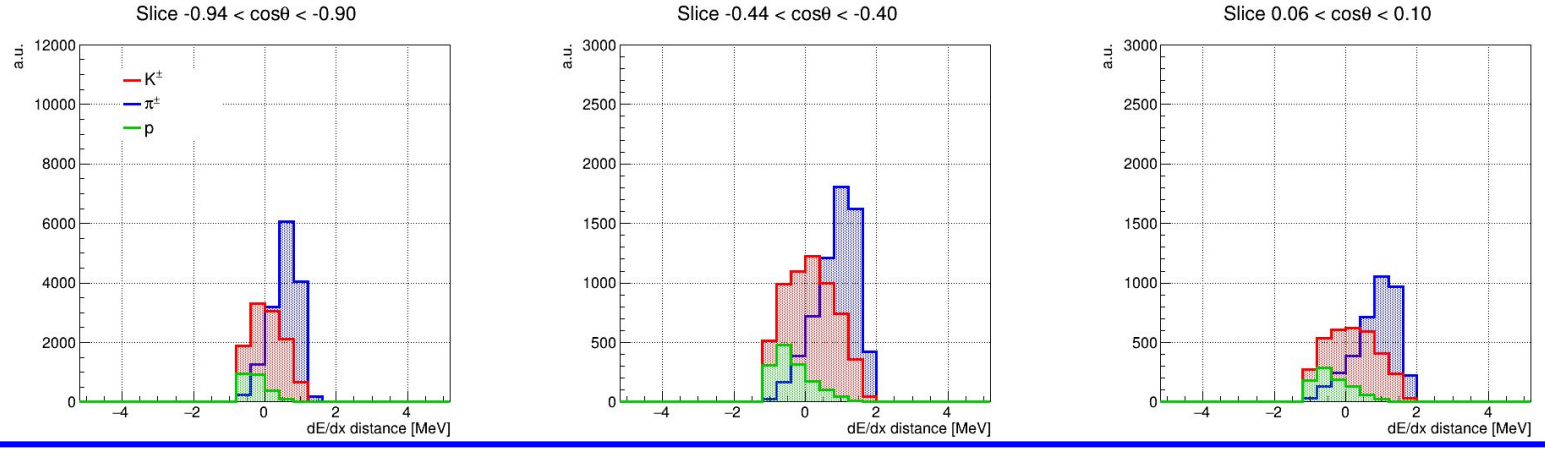
dE/dx distances (Kaon)

uu



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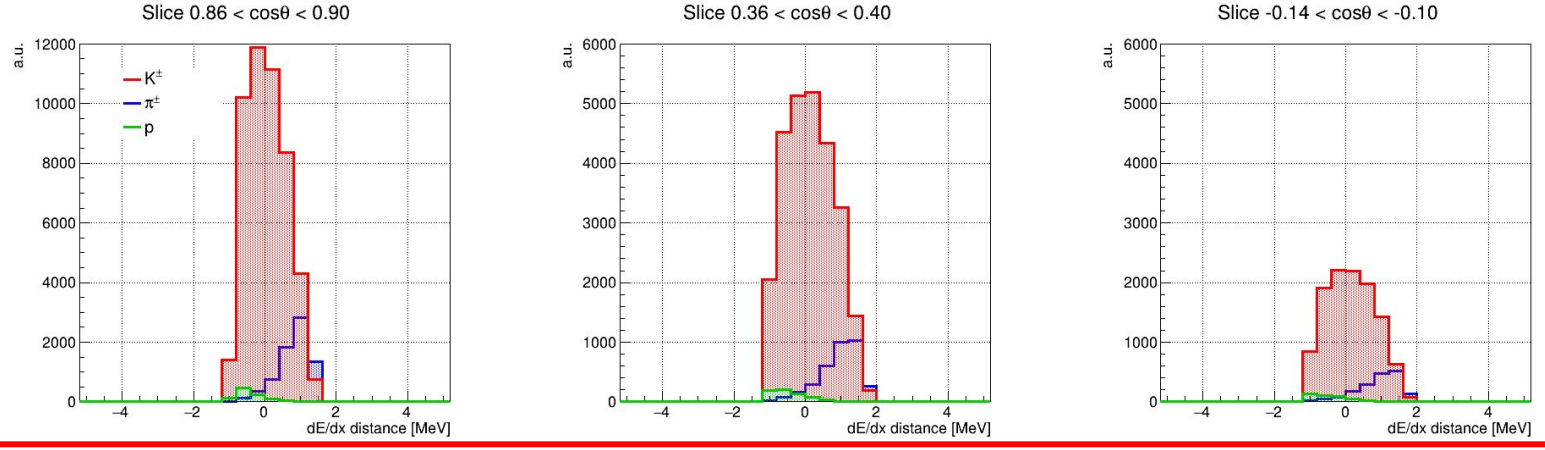
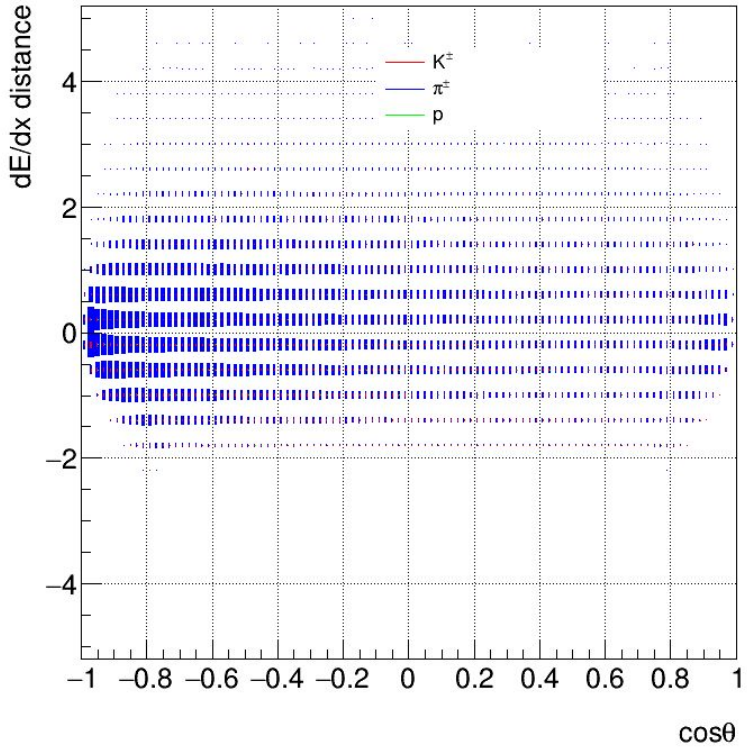


dE/dx distance vs cos θ (Pion)



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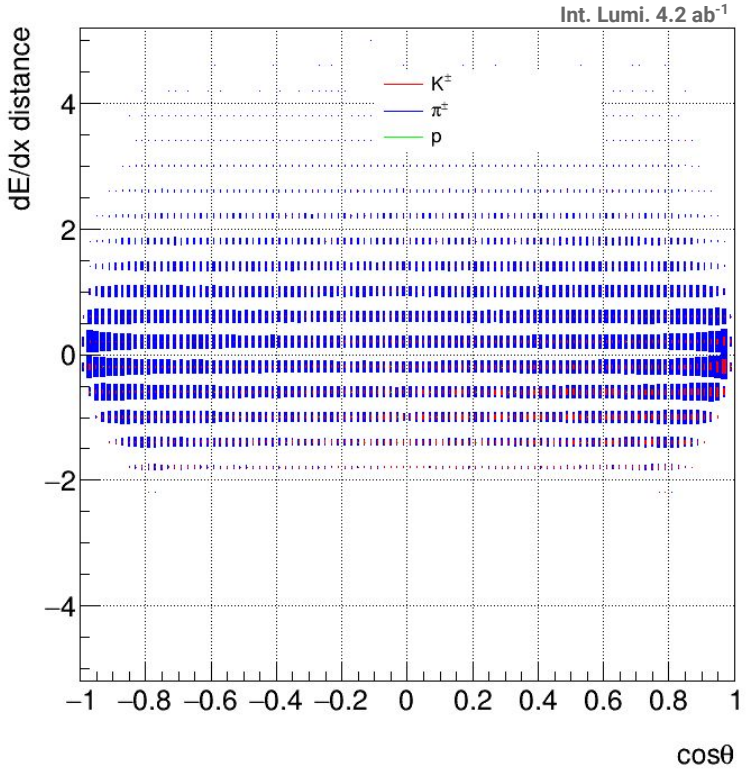

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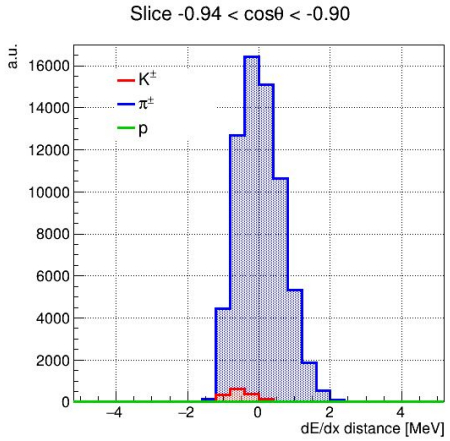
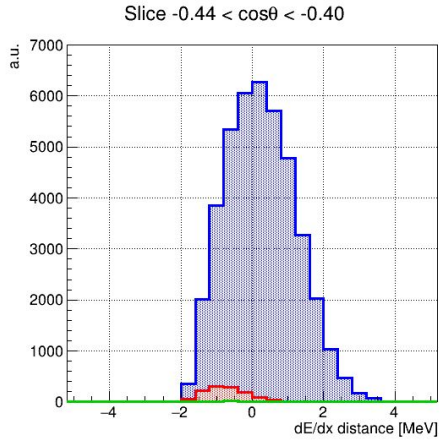
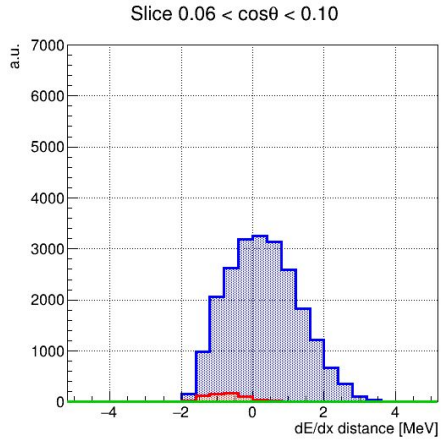
dE/dx distances (Pion)

uu







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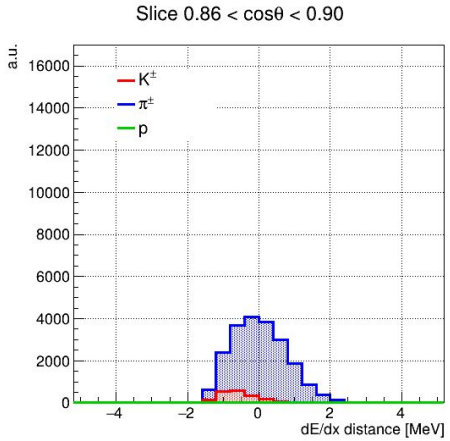
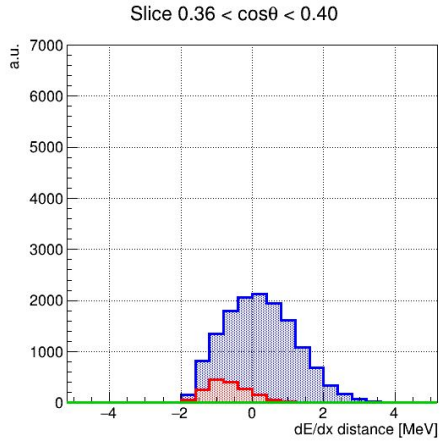
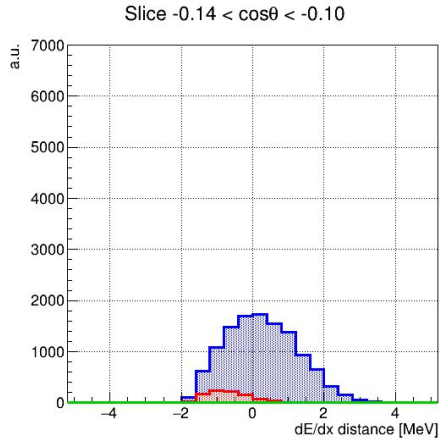
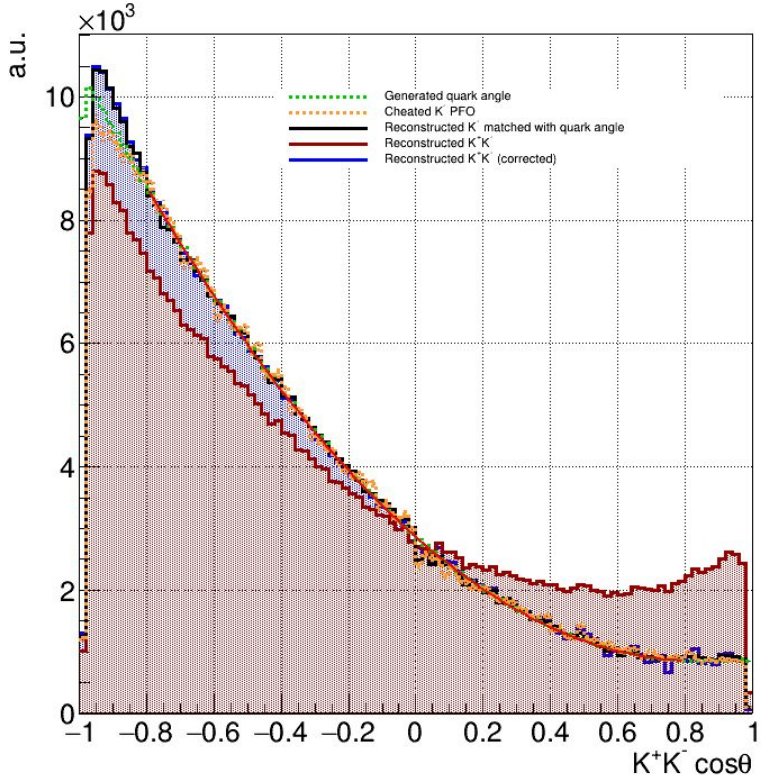


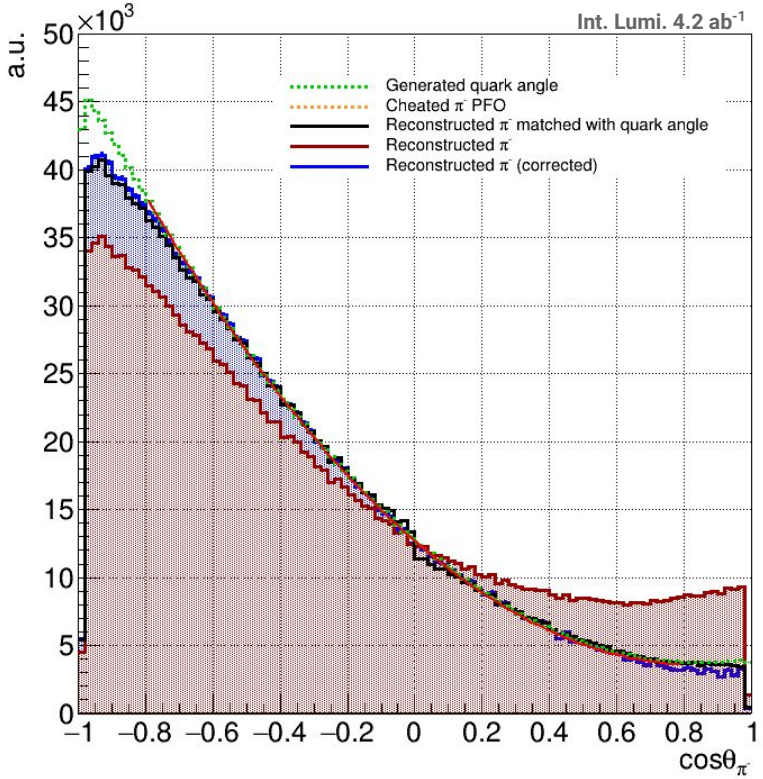




Polar Angle (PiLPFO)

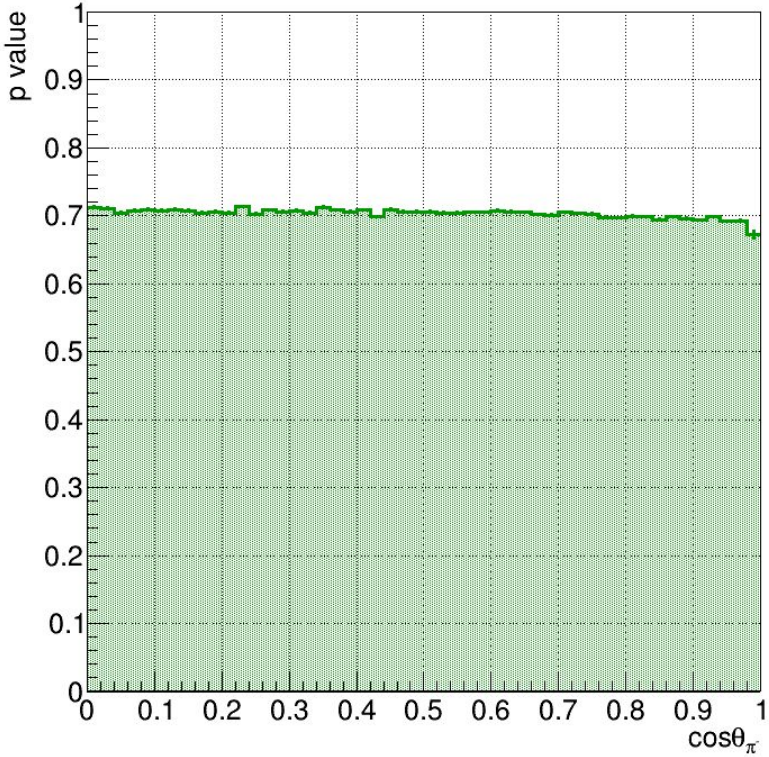


uu KLPFO polar angle (after eff. correction)

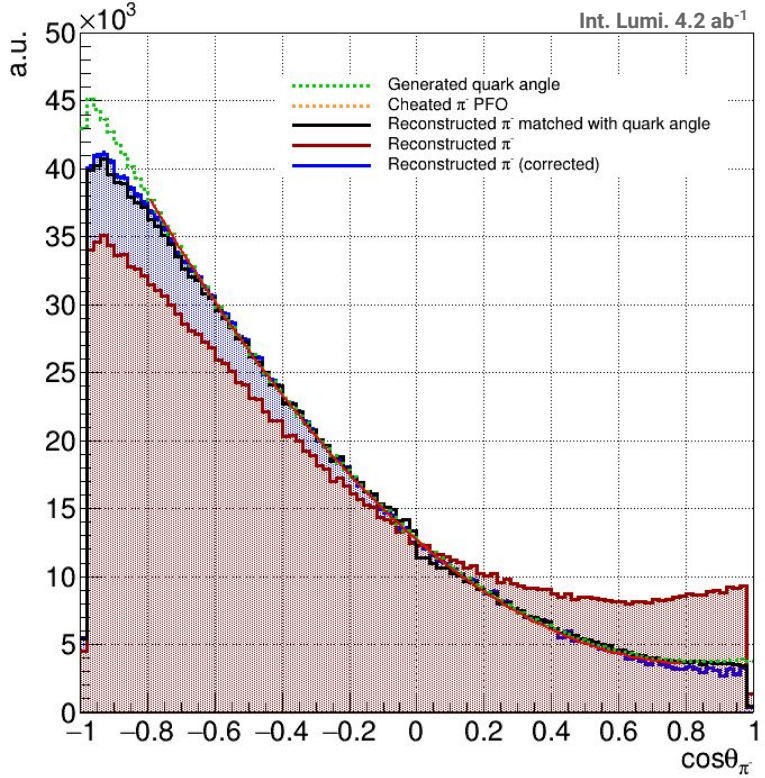


uu PiLPFO polar angle (no eff. corr)

Polar Angle (PiLPFO)

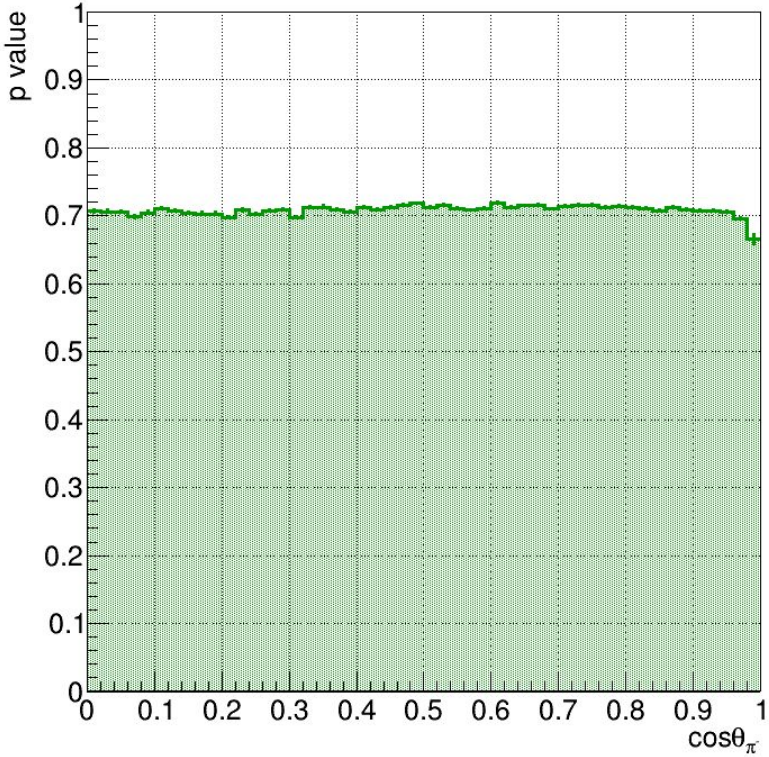


uu PiLPFO p value

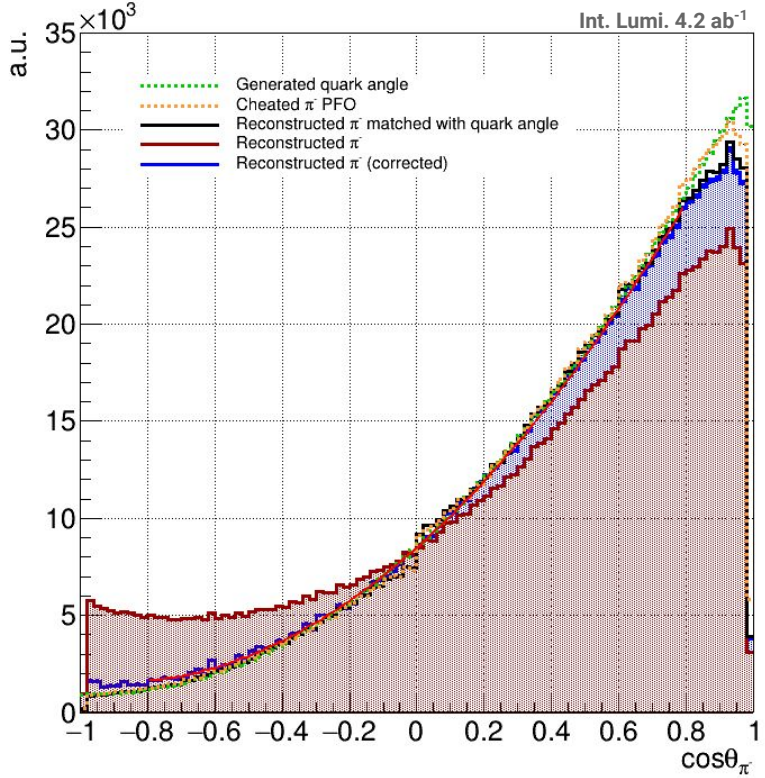


uu polar PiLPFO polar angle (no eff. corr)

Polar Angle (PiLPFO)

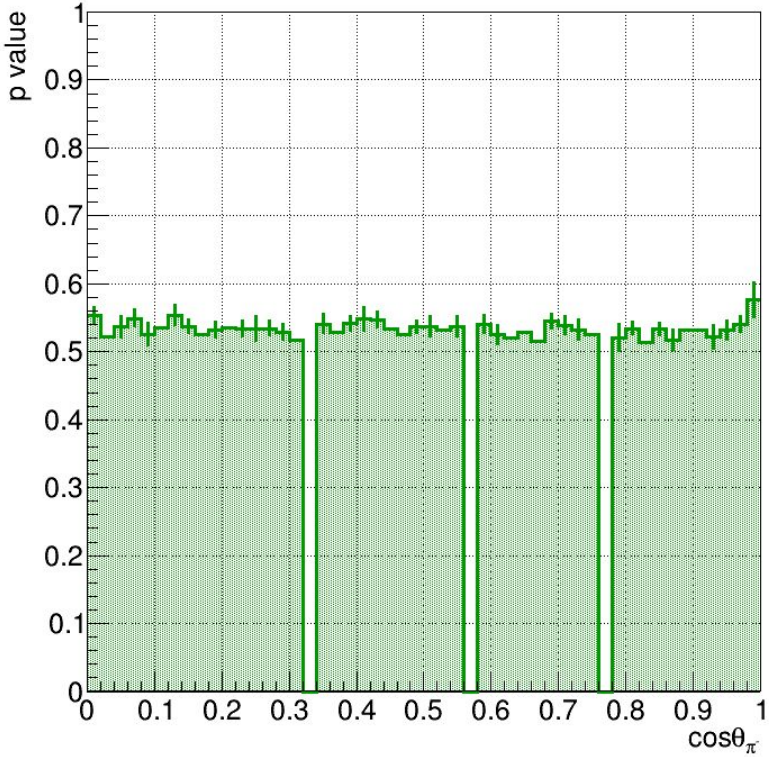


dd PiLPFO p value

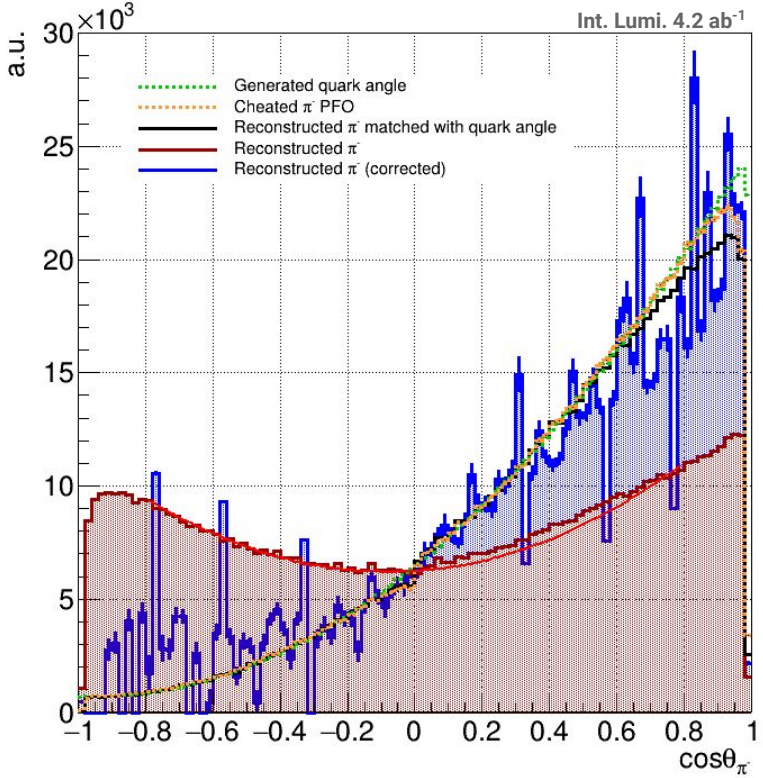


dd polar PiLPFO polar angle (no eff. corr)

Polar Angle (PiLPFO)

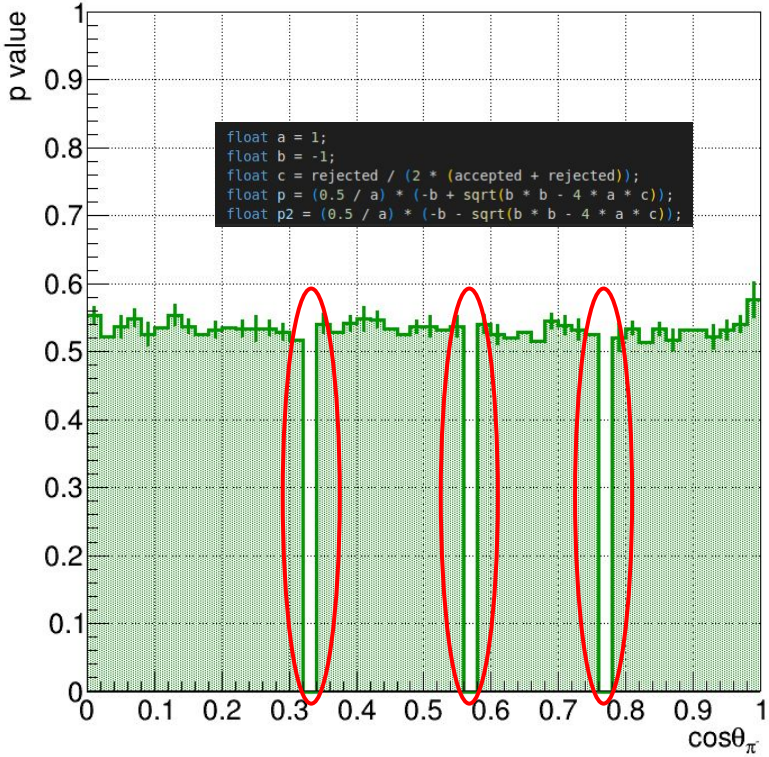


ss PiLPFO p value

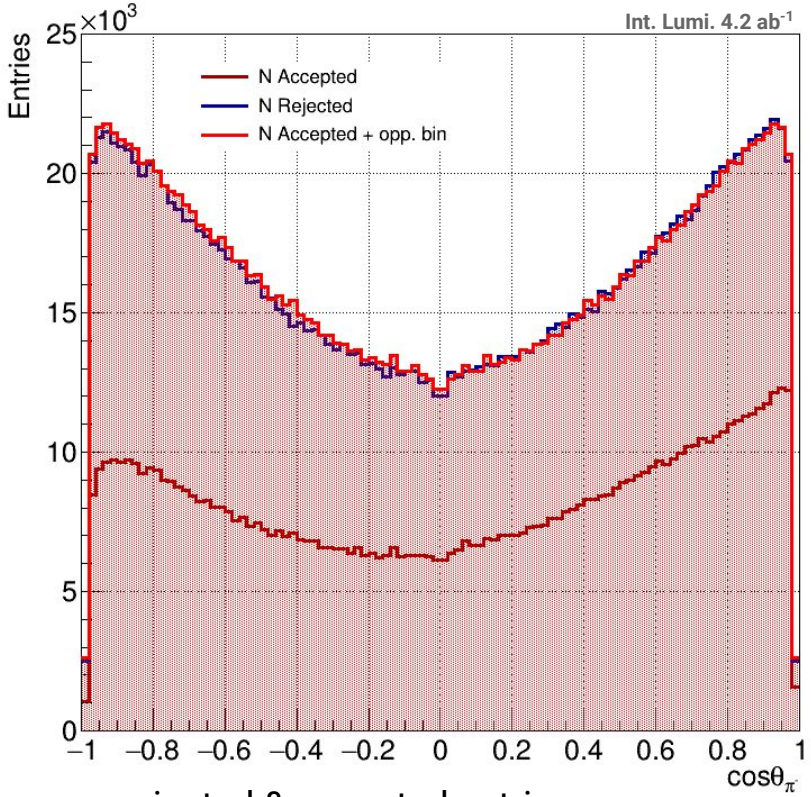


ss polar PiLPFO polar angle (no eff. corr)

Polar Angle (PiLPFO)

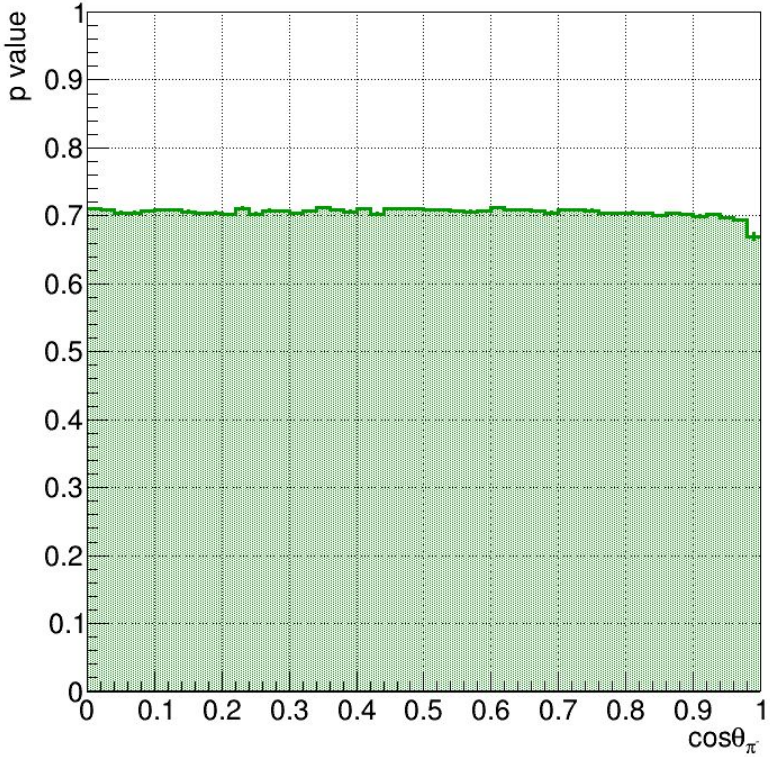


ss PiLPFO p value

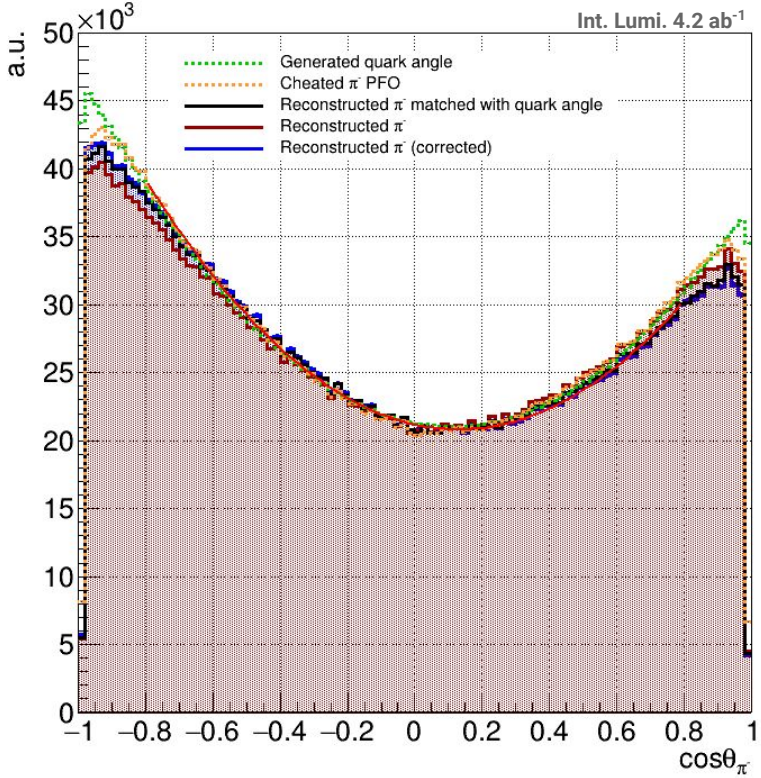


ss rejected & accepted entries

Polar Angle (PiLPFO)



ud PiLPFO p value



ud polar PiLPFO polar angle (no eff. corr)

Summary & Prospects

Summary

- **Efficiency Correction**
  - Apply correction based on the reconstruction efficiency
  - Correction for acceptance
- **Leading Pion Identification**
  - Effective way to identify u/d process
  - Works very well throughout the entire polar angle.
  - u/d mix sample tested

Prospects

- Finally mix **uds** sample?
  a. Implement both Kaon and Pion ID
- Fit and subtract distirbutions (discussion)
  a. Extract histogram from the uds mixture using Pi LPFO
  b. Extract histogram from the uds mixture using K LPFO
  c. Fit both histograms
  d. Subtract PiLPFO fit function from KLPFO histogram
  e. Compare the result with b)?