Kaons in $e^+e^- \to b\bar{b}$ sample

Heavy Flavour working meeting

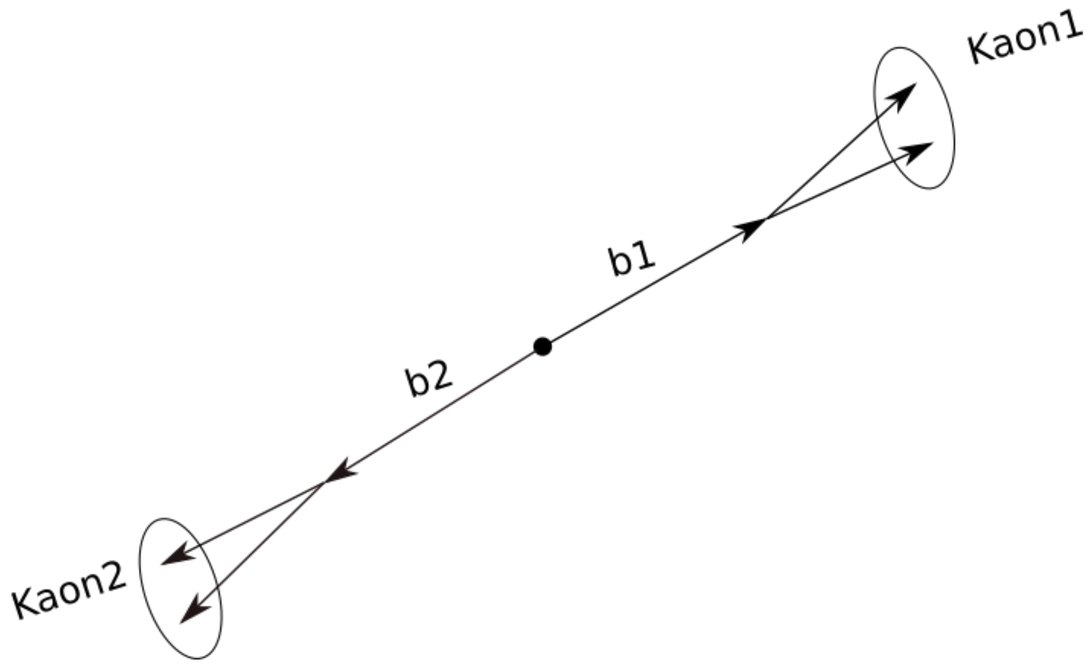
01/29/21 Yuichi Okugawa

Kaon ID using dEdx

Objective

Distinguish b and bbar with proper charge identification methods.

- Vertex charge measurement
- Kaon Identification
  - dEdx information acquired from TPC.
  - Kaon momentum and dEdx info can be used to separate other particles e.g. pion, proton etc.



Expected to shift this analysis to $e^+e^- \to s\bar{s}$ sample.

Sample:

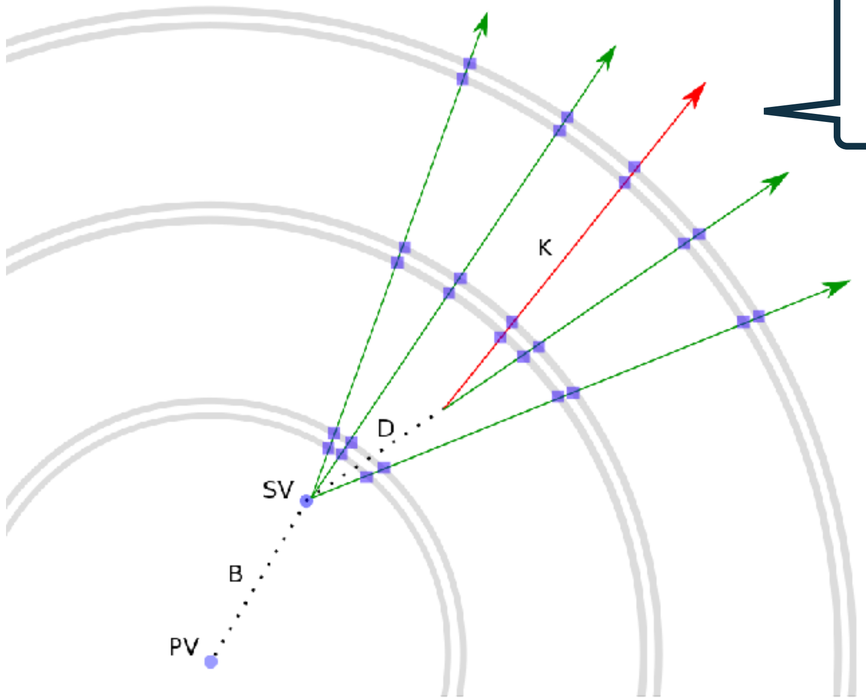
$\sqrt{s} = 250GeV$

Model: Large

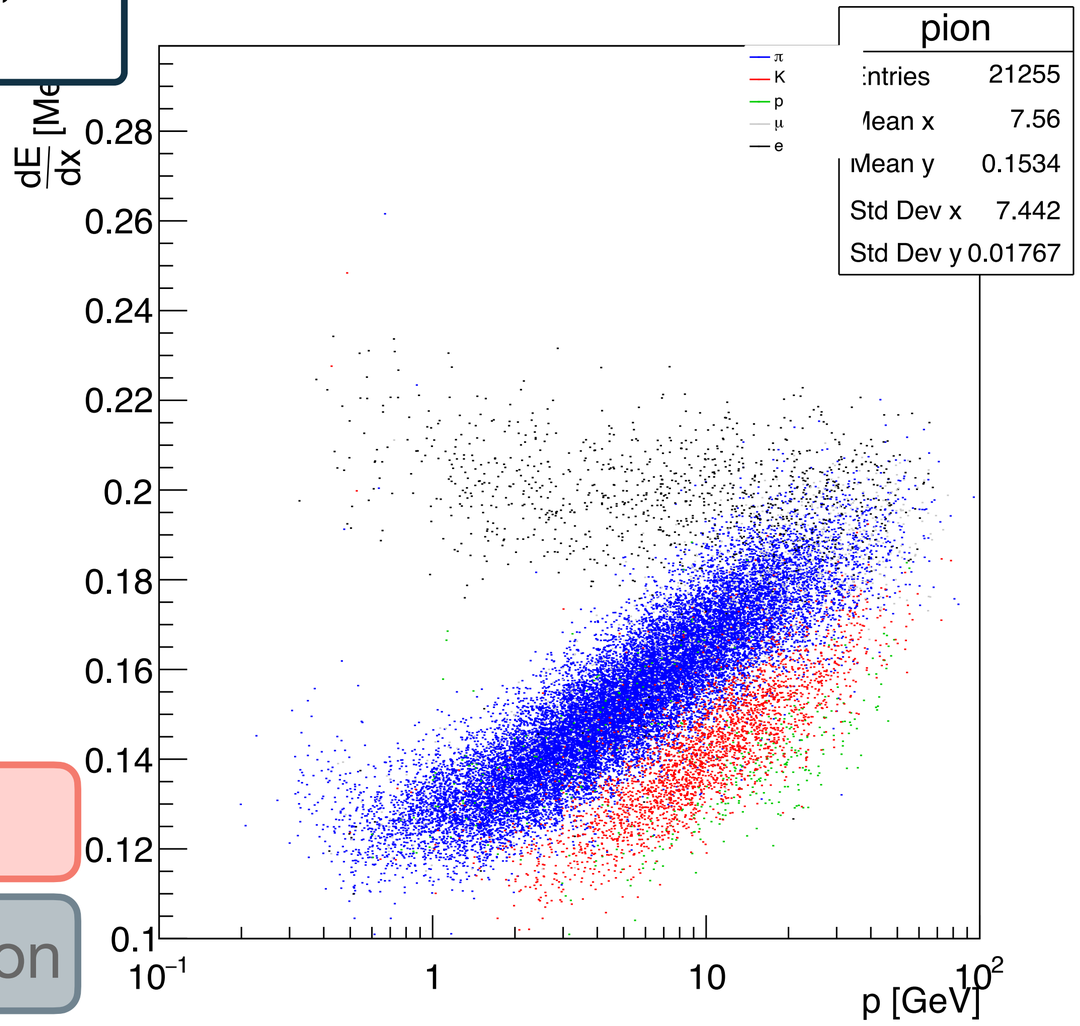
Polarization: eLpR

b-tag requirement: (0.8, 0.8)

Kaon ID using dEdx



π, K, p, μ, e

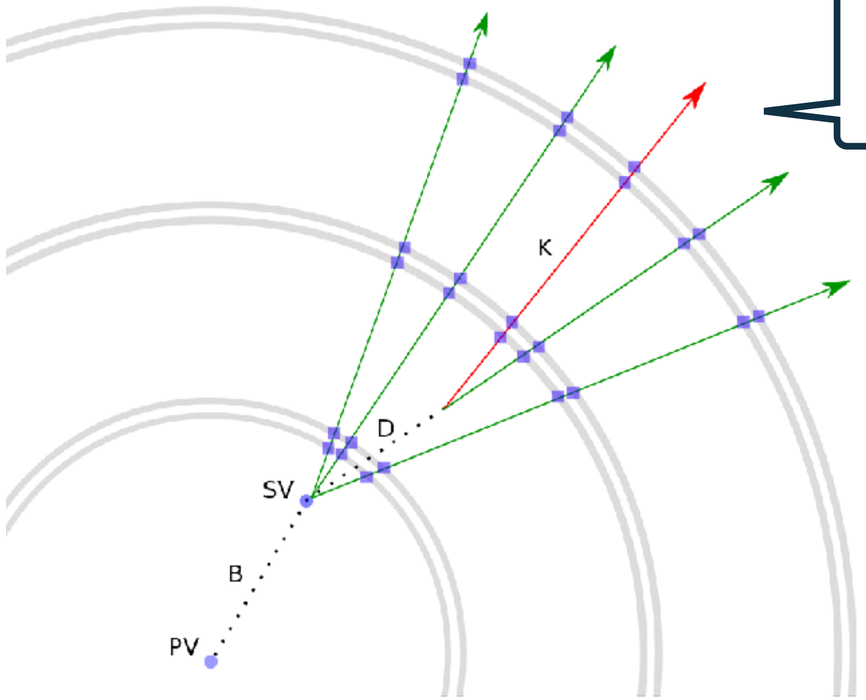


Cheat : Usage of MC pdg variable

No Cheat : Particle ID using dEdx information

the colors are separated using generated PID info

Kaon ID using dEdx



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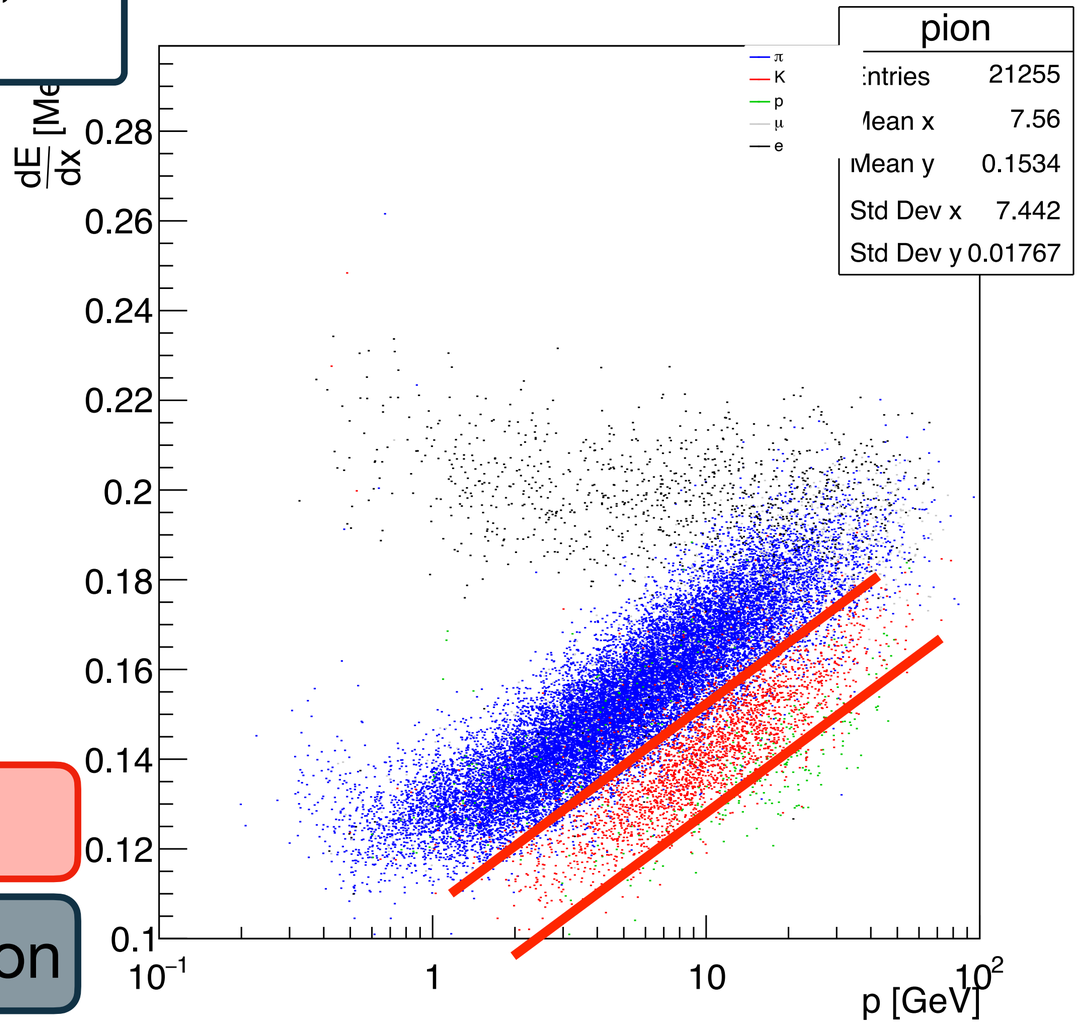

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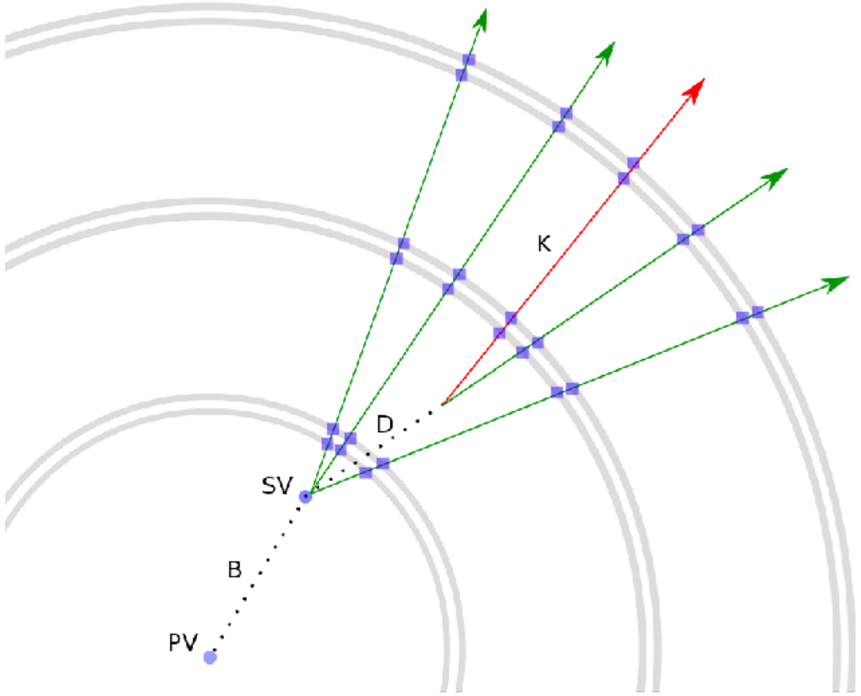
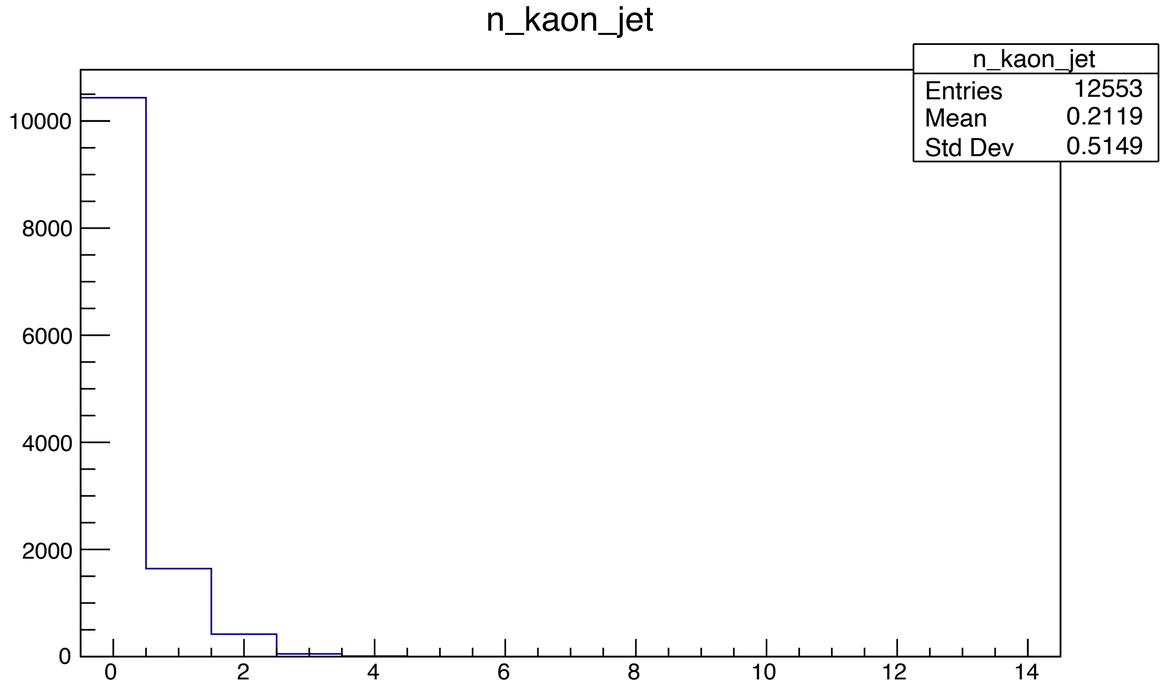
Kaon ID using dEdx

Kaon multiplicity per jets



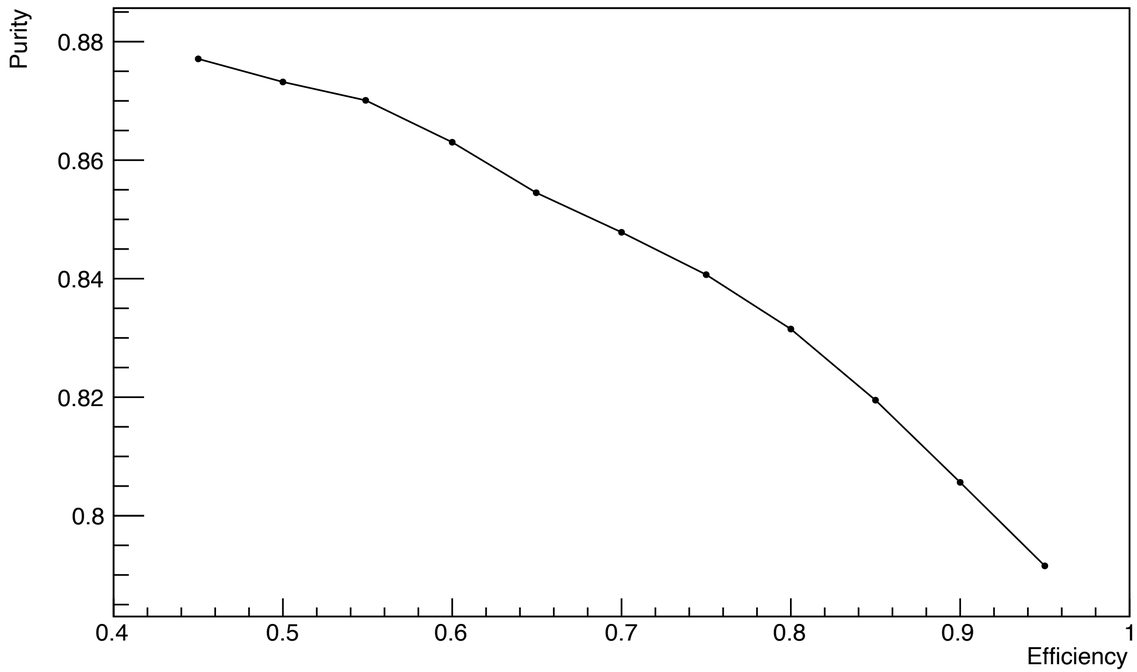


Kaon ID using dEdx

Kaon ID efficiency and purity

- The efficiency and purity are give and take.

Purity	Efficiency
0.854374	0.655535
0.847826	0.70127
0.840674	0.754084
0.831499	0.807804



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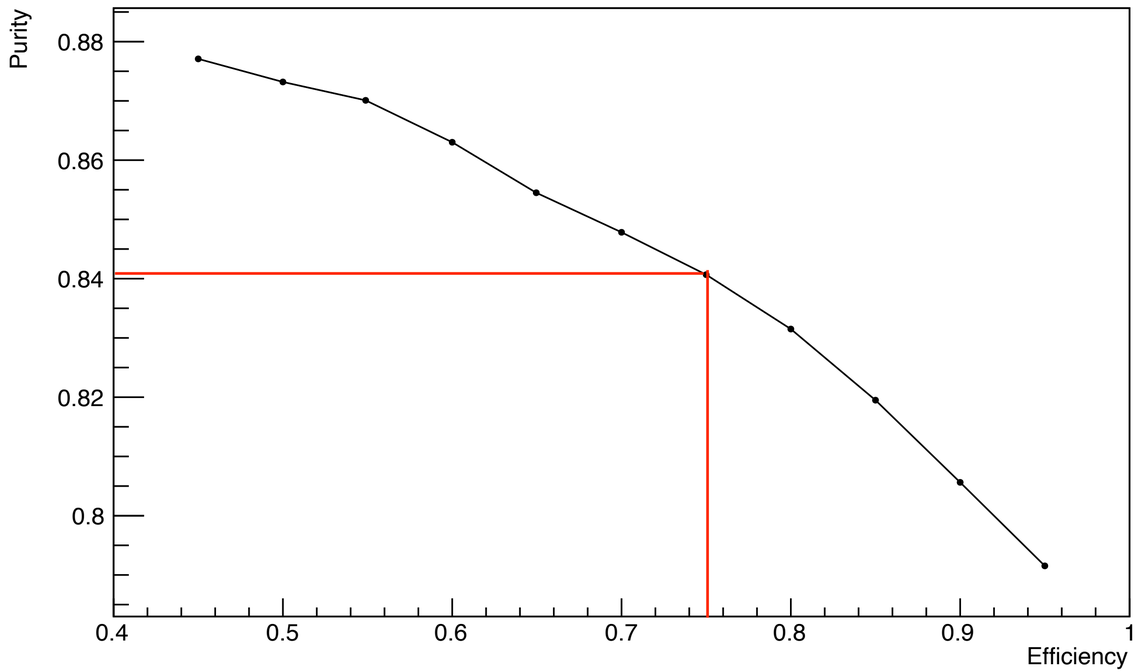
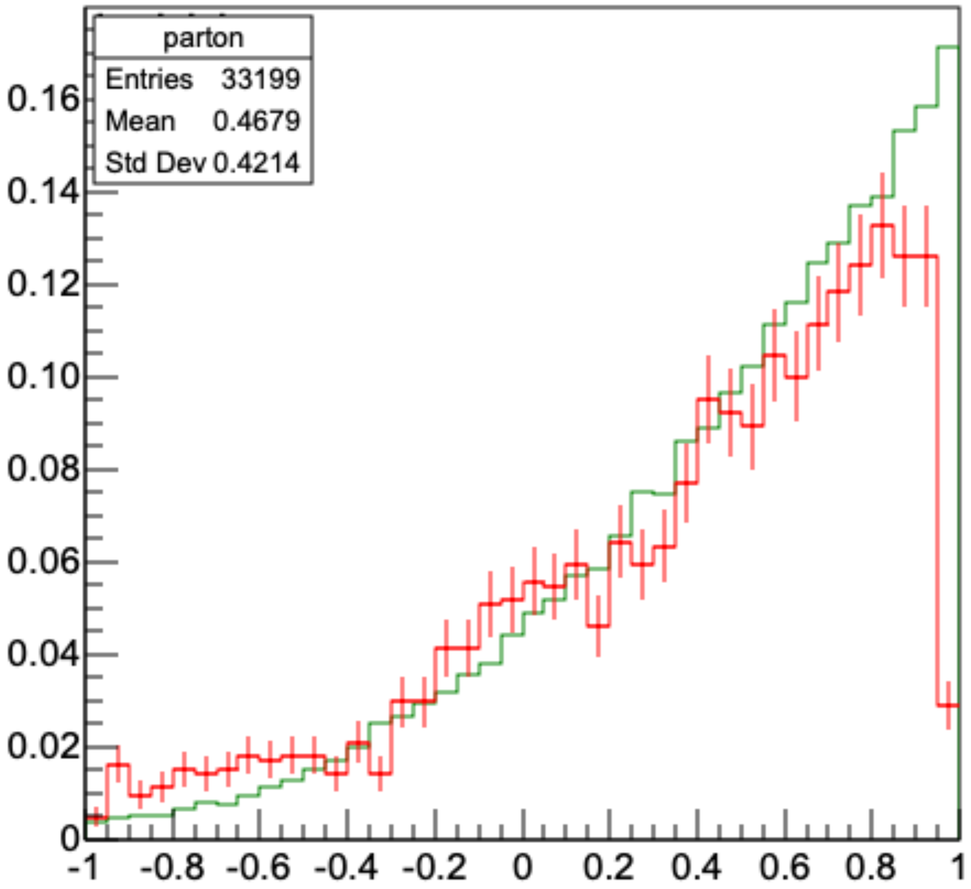
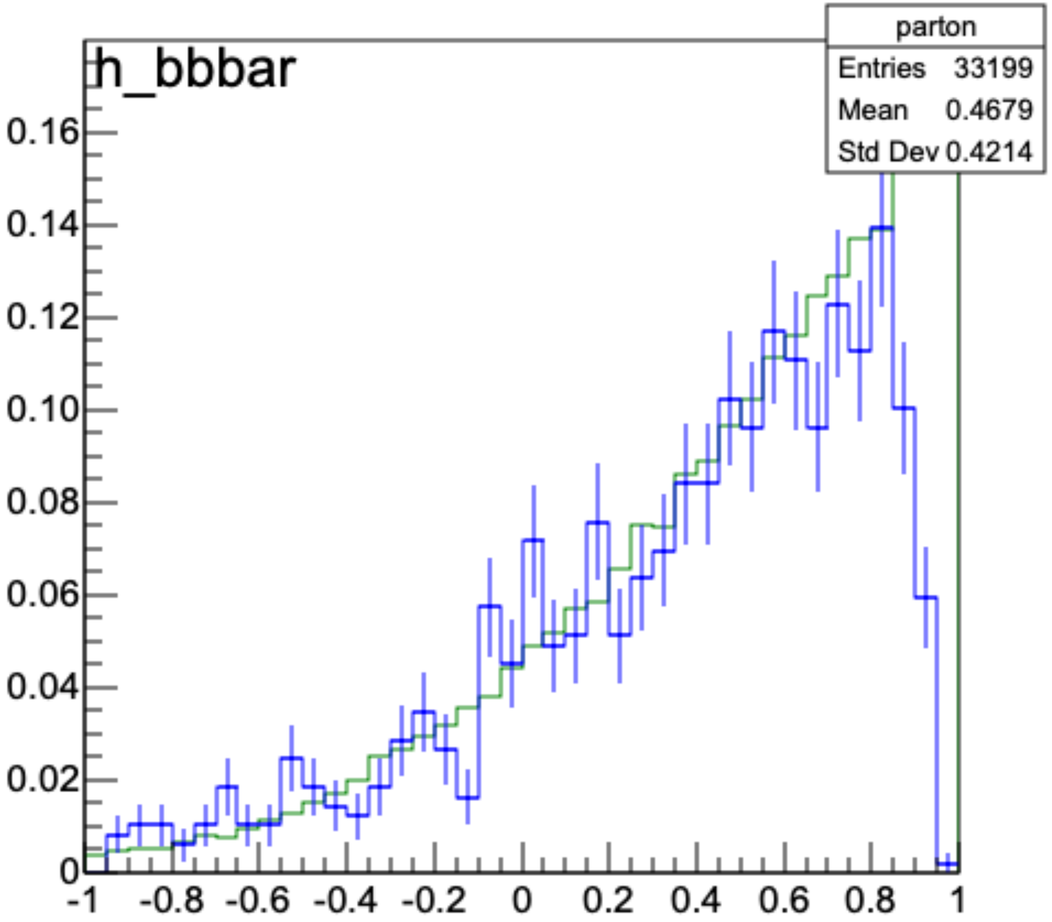


BcBc and KcKc Polar Angle (cheat)

BcBc

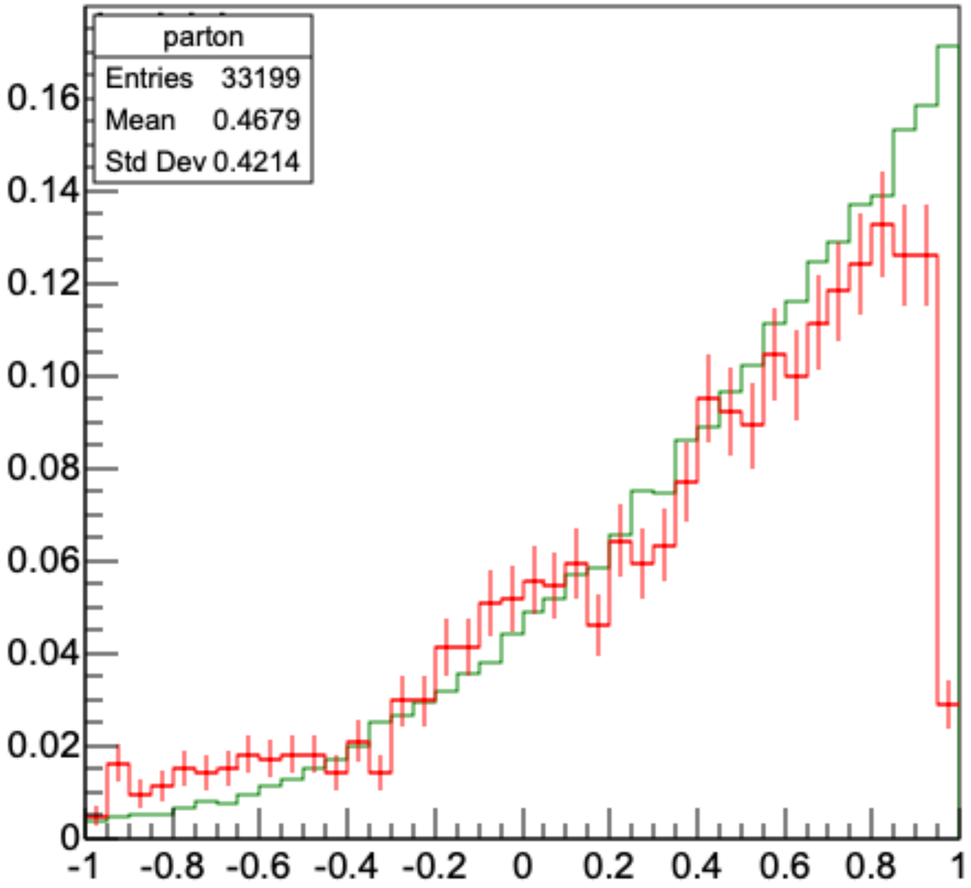


KcKc

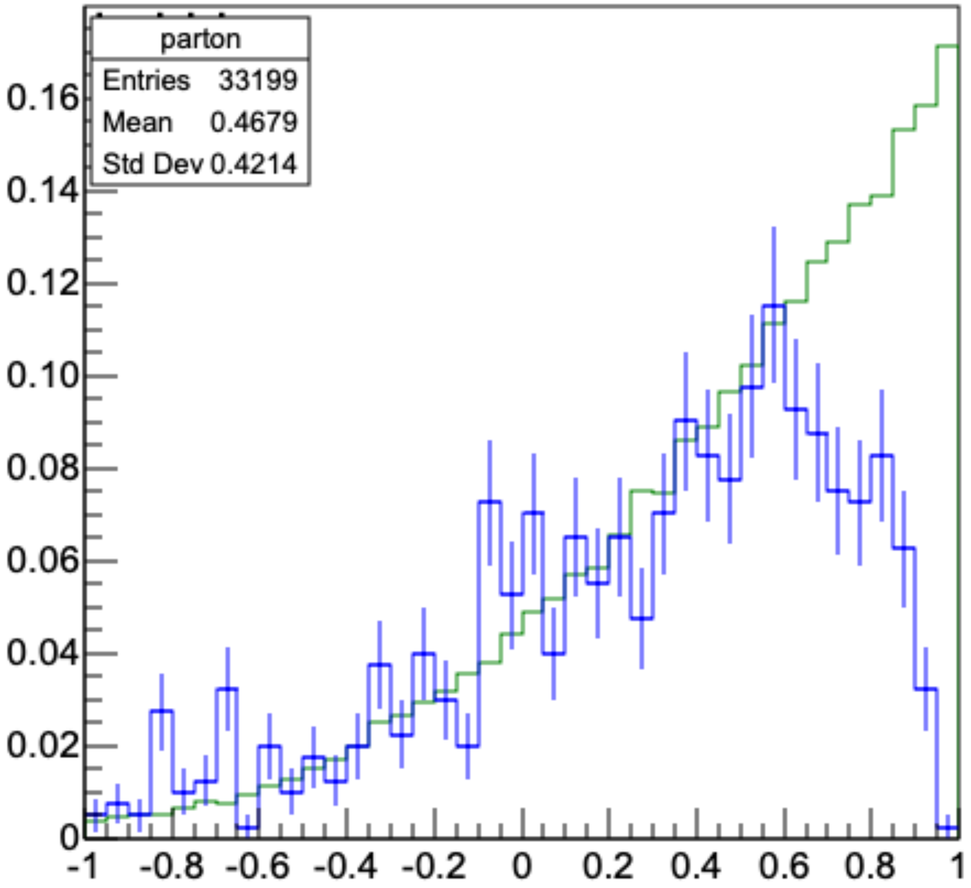


BcBc and KcKc Polar Angle (no cheat)

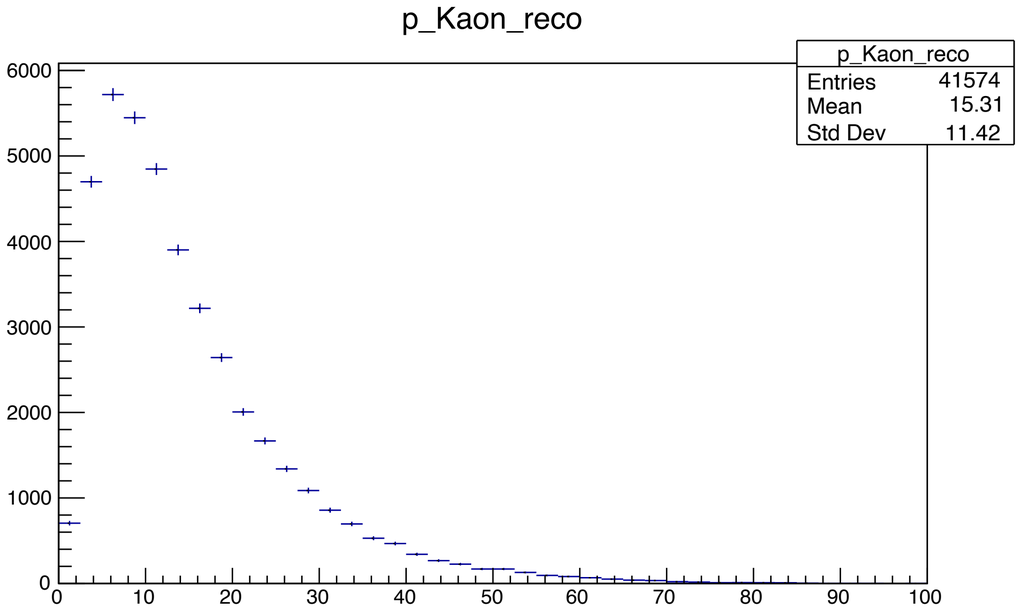
BcBc

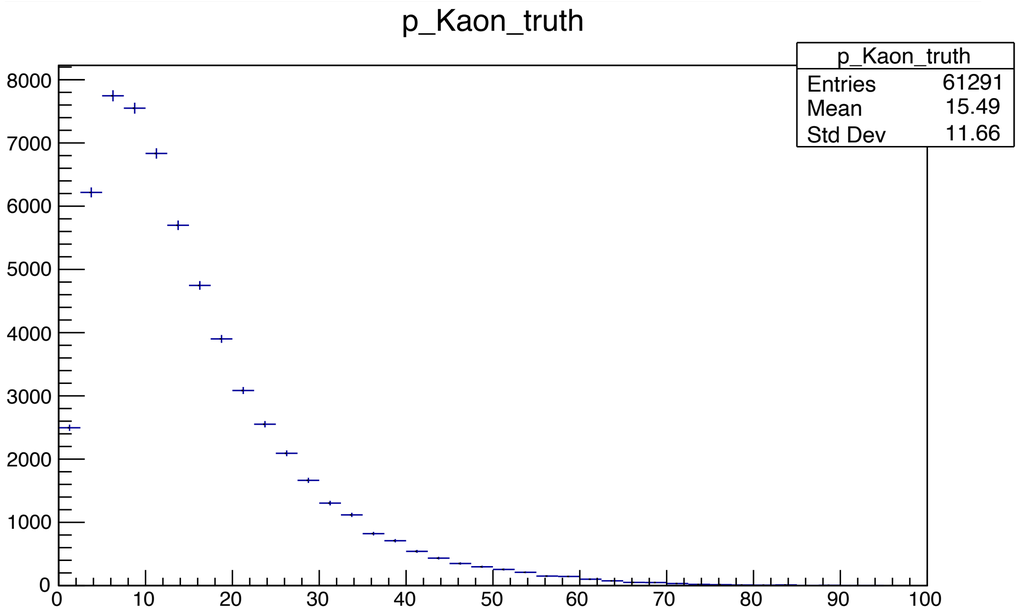


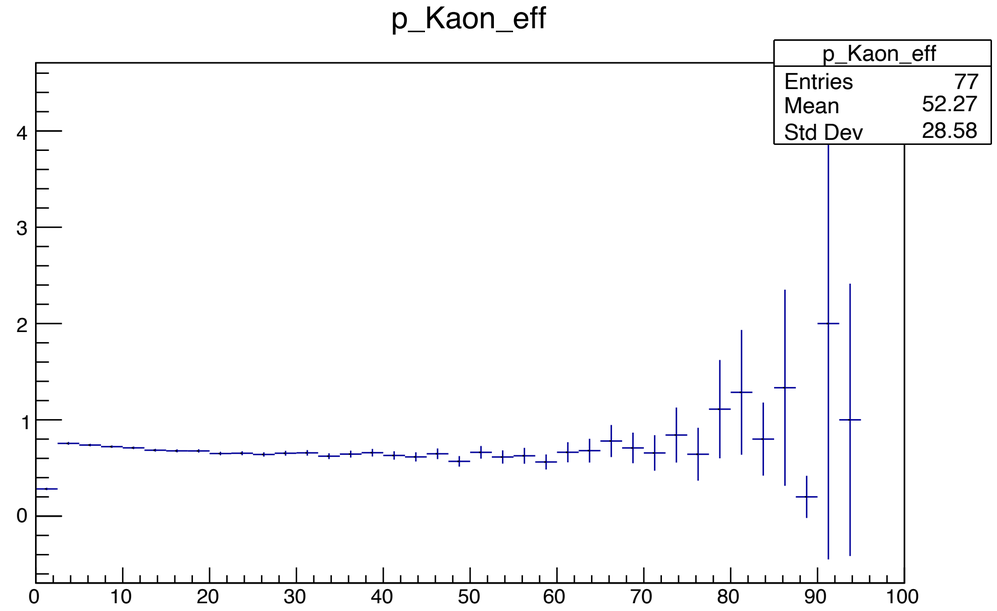
KcKc



Fraction of Kaon reconstruction







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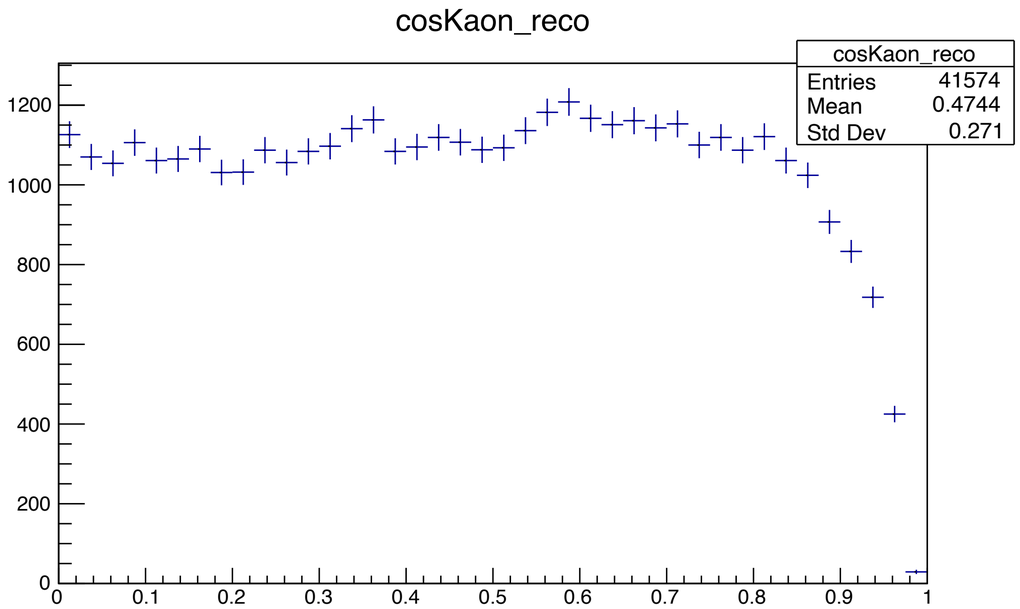

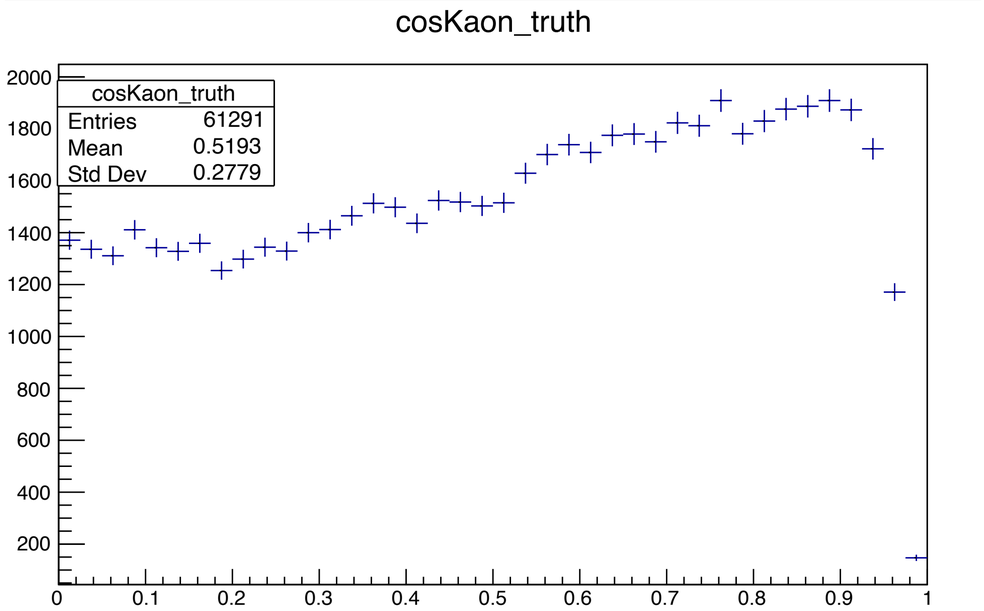

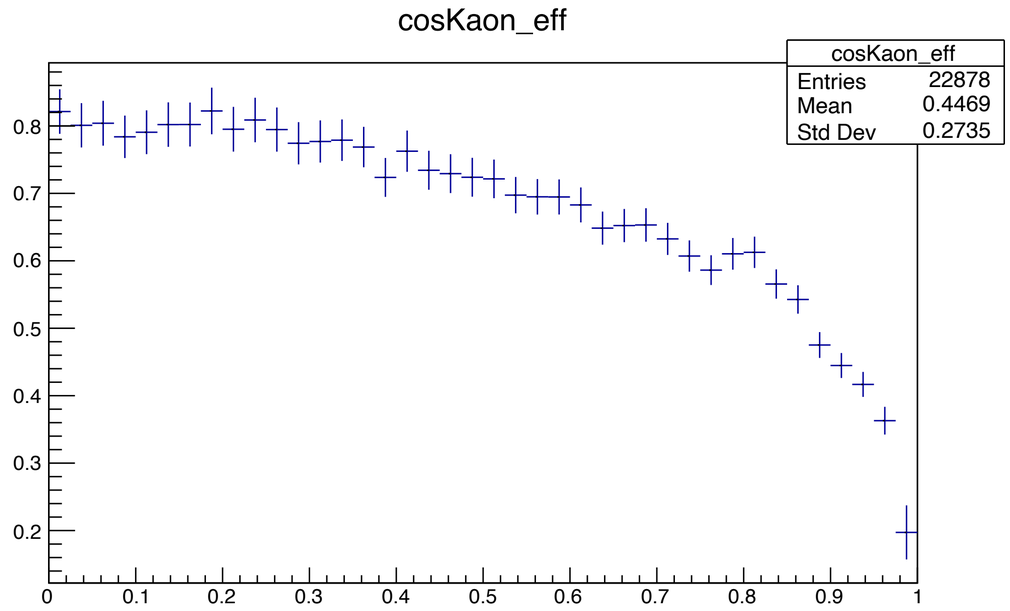

Summary

Summary

- First analysis to approach $e^+e^- \rightarrow b\bar{b}$ 250 GeV sample is performed.
- Kaon ID was done using selection from dEdx information
  - **Purity**: 0.840, **Efficiency**: 0.75
  - Weather this is feasible parameter is debatable.
- Polar angle dependency of Kaon ID is suggested from this analysis.

  ➡ Angular correction? (Included?)

Future Prospects

- Check consistency of kaon charge identification to distinguish both particles.
- Prepare for $s\bar{s}$ 250GeV sample.