MVTX Hit Loss Study

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Problem

- As summarized in Jamie's email on October 20th
  - "if in triggered mode with this latency the hits were lost for the range on the dEdx figure > 150 (arbitrarily chosen), then sPHENIX might have lower efficiency for kaons with p < 0.4 GeV (total momentum) and protons with p < 0.7 GeV (total momentum). For the open heavy flavor program (D0, D_s, Lambda_c) what would be the impact on the acceptance as a function of eta and pT for reconstruction of these decays?"
- This is a short truth only pythia simulation to attempt to answer the above question

Simulation

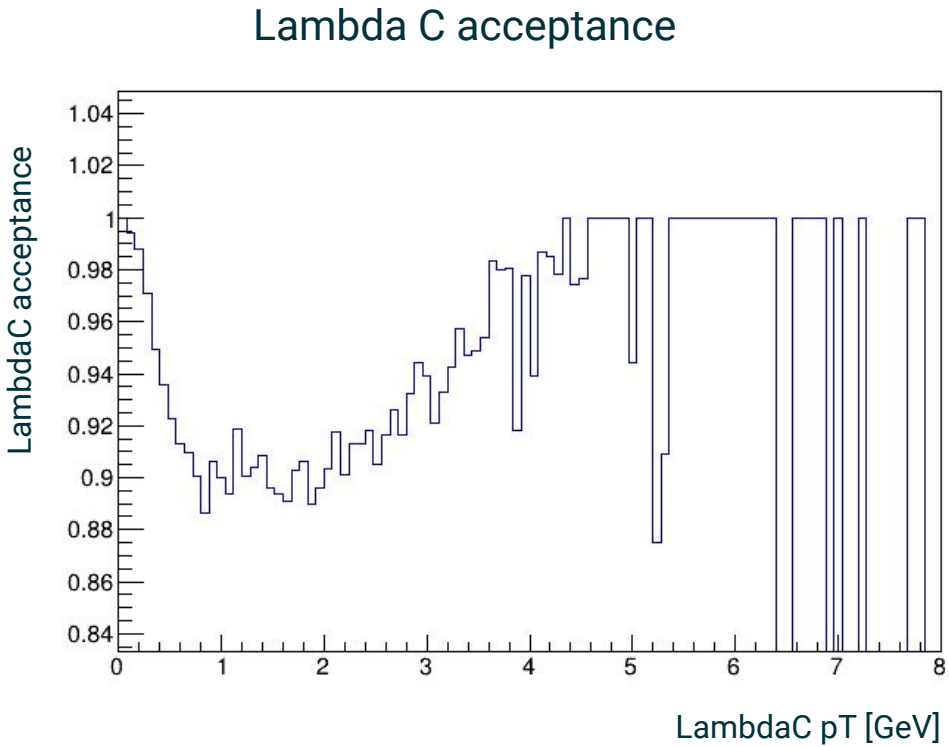
- Pythia8 simulation
  - 200 GeV pp collisions
  - 1 Million events
  - Run only open charm processes (qq->cc, gg->cc)
  - Force decay of hadrons
    - D0->Kpi
    - LambdaC->pKpi
- Acceptance calculations are all done with nominal fiducial cuts
  - pT > 100 MeV, |eta| < 1.0 (applied to numerator and denominator)
- For the numerator,
  - proton efficiency is assumed to be 0 below momentum 700 MeV
  - Kaon efficiency is assumed to be 0 below momentum 400 MeV

LambdaC

Lambda C acceptance
Decay: pKpi
Integral Acceptance: 91.4%

Numerator:
- pT all daughters > 100 MeV
- p proton > 700 MeV
- p kaon > 400 MeV
- |eta| all daughters > 1.0

Denominator:
- pT all daughters > 100 MeV
- |eta| all daughters > 1.0



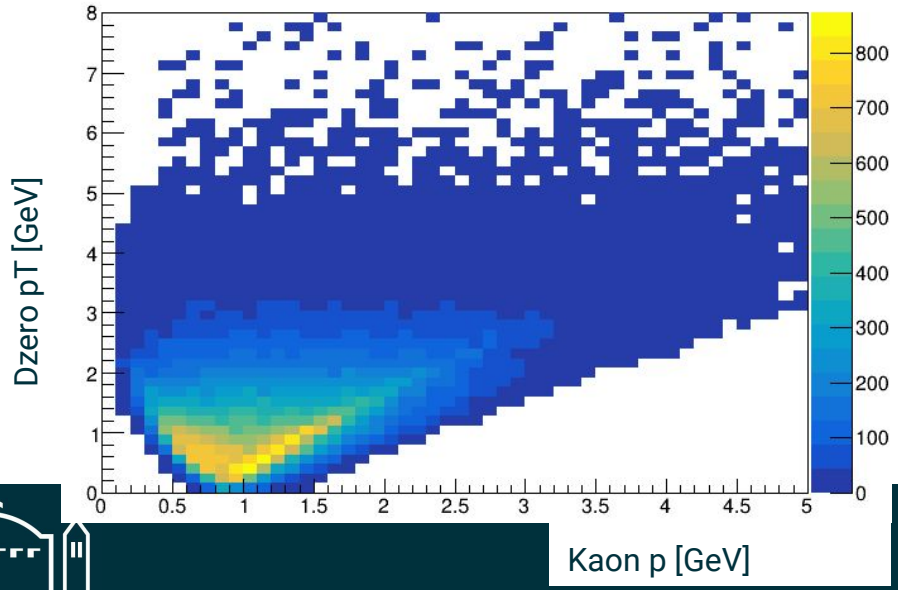
Dzero

Dzero acceptance
Decay: pKpi

Integral Acceptance: 98.3%

Numerator:
- pT all daughters > 100 MeV
- p kaon > 400 MeV
- |eta| all daughters > 1.0

Denominator:
- pT all daughters > 100 MeV
- |eta| all daughters > 1.0



Dzero acceptance