Los Alamos NATIONAL LABORATORY

Purity and efficiency of open heavy-flavor

01-03-2021

G-4: charm tagging:
Provide estimates for charm acceptance, efficiency, and purity in different regions of pseudorapidity. Which are your expectations for measuring charm cross sections in addition to asymmetries?

Simulation Configuration

- Event generation: PYTHIA8
  - With the 25 mrad beam crossing angle
  - Q2 min = 10 GeV/c2
  - Scaled with the Q2 min = 1 GeV/c2 events
  - Total number of events: 60M, scaled the projections with the 10 fb-1 e+p luminosity
- Detector performance:
  - Using the evaluated tracking performance from the 2nd ECCE simulation campion See latest studies in https://indico.bnl.gov/event/12860/contributions/54893/attachments/37316/61492/ECCE_tracking_20210924_XuanLi.pdf
  - Other detector performance listed in the EIC yellow report. • Particle momentum, space and energy response smeared by the detector performance

Purity

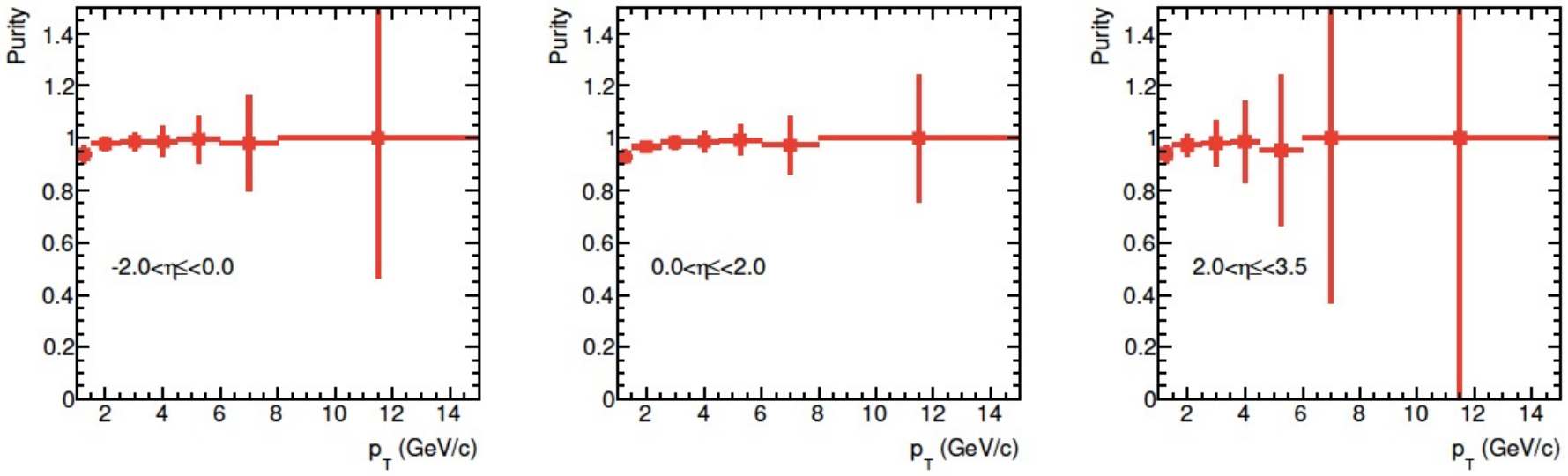

Figure 5: Transverse momentum p_T dependent purity for reconstructed D^0 ($bar D^0$) in three different pseudorapidity regions with the ECCE detector performance in 10+100 GeV $e+p$ collisions. The integrated luminosity is 10 fb^{-1}.

Efficiency

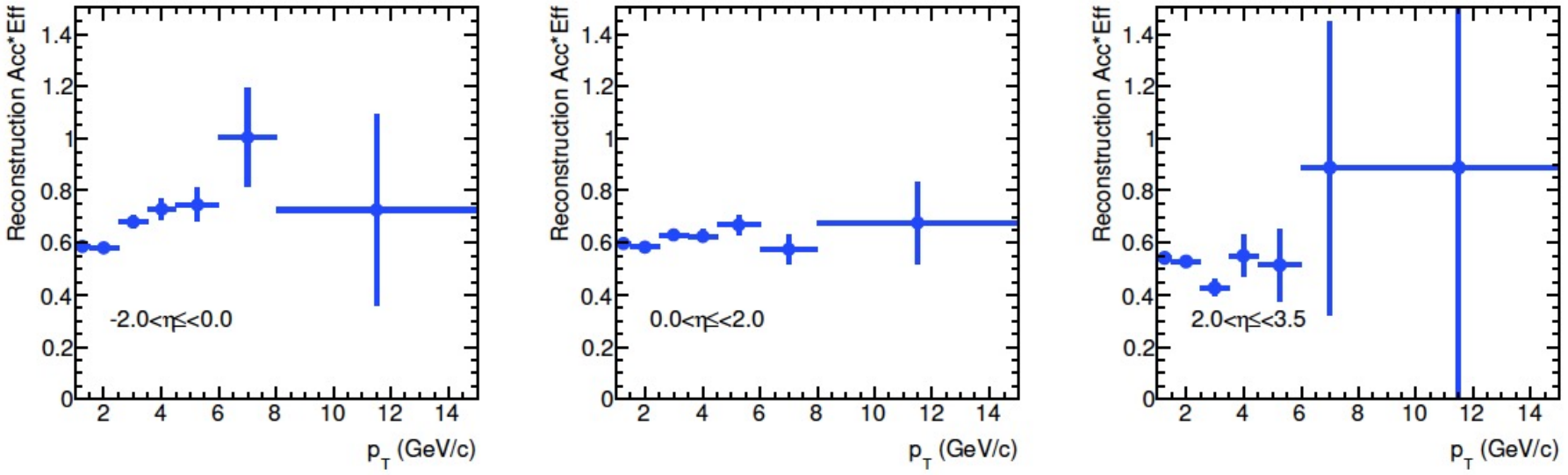

Figure 6: Transverse momentum p_T dependent acceptance*efficiency for reconstructed D^0 ($barD^0$) in three different pseudorapidity regions with the ECCE detector performance in 10+100 GeV $e + p$ collisions. The integrated luminosity is 10 fb^{-1}.