

Ecce-paper-phy-2022-04 paper status

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- Near final paper draft implemented in the overleaf link.
Thank Peter, Rosi and Carlos for the nice setup.

Open Heavy Flavor Studies for the ECCE Detector at the Electron Ion Collider

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Figure of Merit example:

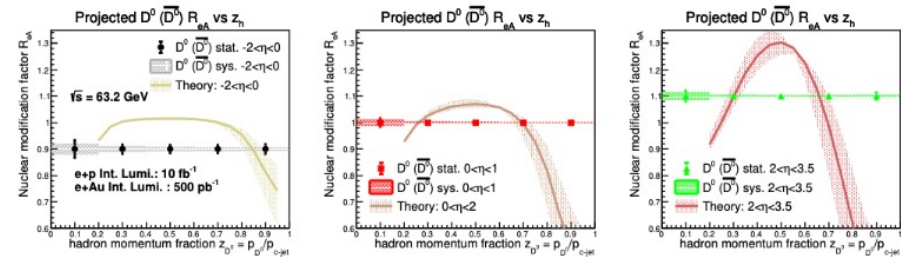


Figure 11: Hadron momentum fraction z_h dependent nuclear modification factor R_{eAu} for reconstructed D^0 (\bar{D}^0) with the ECCE detector performance in 10+100 GeV $e + p$ and $e + Au$ collisions. The integrated luminosity for $e + p$ ($e + Au$) collisions is 10 fb^{-1} (500 pb^{-1}). The systematical uncertainties come from different detector design and magnet options. The theoretical calculations are from [5].

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- The paper consist of 13 figures and 7 pages.
- Paper outline:
 - Introduction (polished)
 - Simulation Setup (under polishing)
 - Results (will polish)
 - Acknowledgements (will work on)
- We plan to release the 1st paper draft this week for consortium review.

- Heavy flavor hadron and jet reconstruction with the ECCE detector performance.

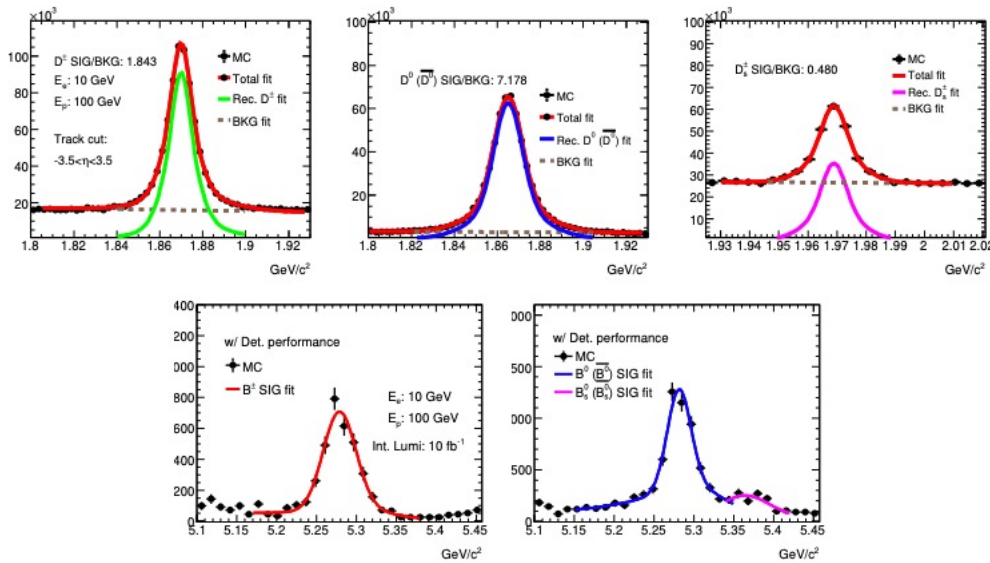


Figure 3: Reconstructed heavy flavor hadrons with the ECCE detector performance in 10+100 GeV $e + p$ collisions. The integrated luminosity is 10 fb^{-1} .

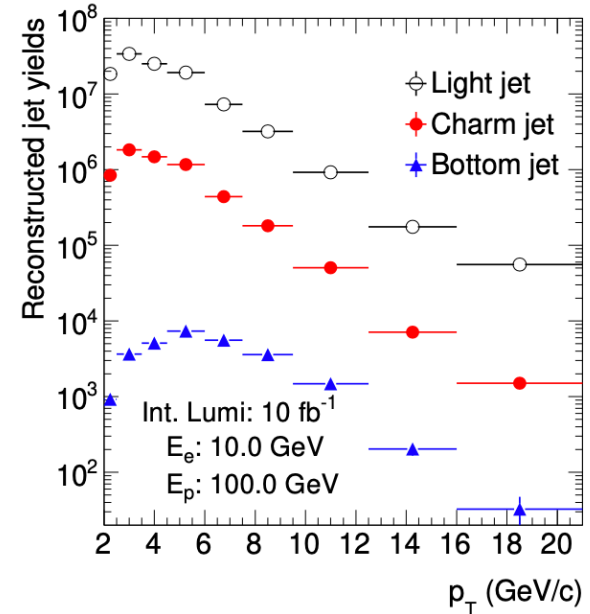


Figure 7: Reconstructed heavy flavor jet transverse momentum p_T distributions with the ECCE detector performance in 10+100 GeV $e + p$ collisions. The integrated luminosity is 10 fb^{-1} .

Main message from this paper (II)



- D meson reconstruction purity and efficiency evaluated.

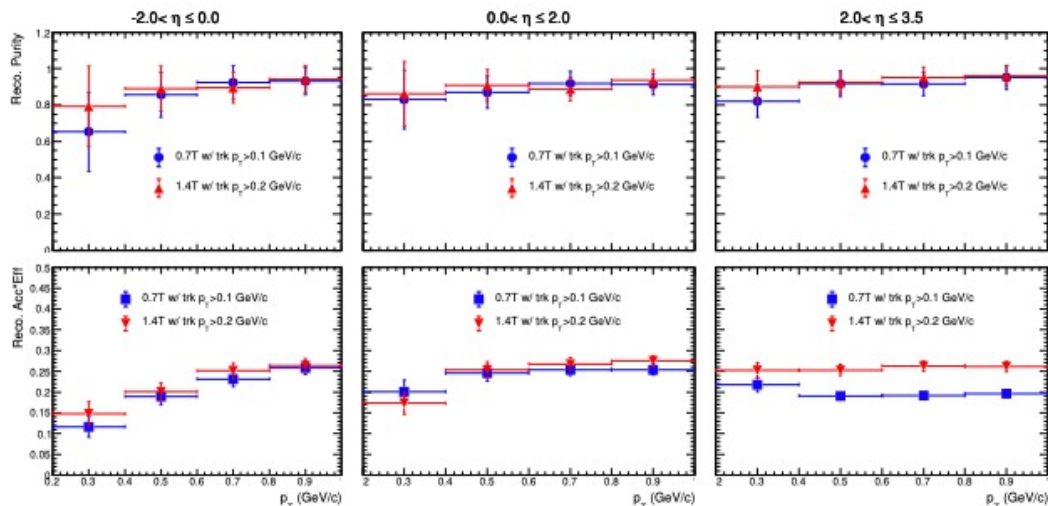


Figure 6: Transverse momentum p_T dependent purity (top) and acceptance*efficiency (bottom) for reconstructed D^0 (\bar{D}^0) in three different pseudo-rapidity regions with the ECCE detector performance in 10+100 GeV $e + p$ collisions. The transverse momentum for reconstructed D^0 (\bar{D}^0) is within 0.2 GeV/c to 1 GeV/c region. The integrated luminosity is 10 fb^{-1} .

Main message from this paper (III)



- Nuclear modification projection projection for reconstructed heavy flavor hadrons.

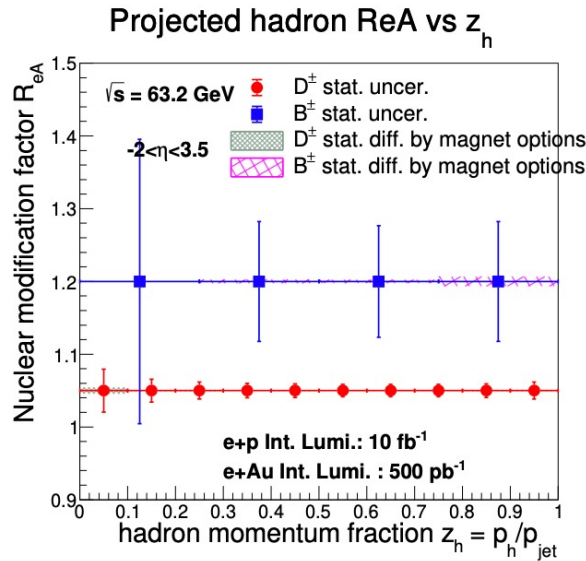


Figure 10: Reconstructed hadron momentum fraction z_h dependent nuclear modification factor R_{eAu} for π^\pm , D^\pm and B^\pm with the ECCE detector performance in 10+100 GeV $e + p$ and $e + Au$ collisions.

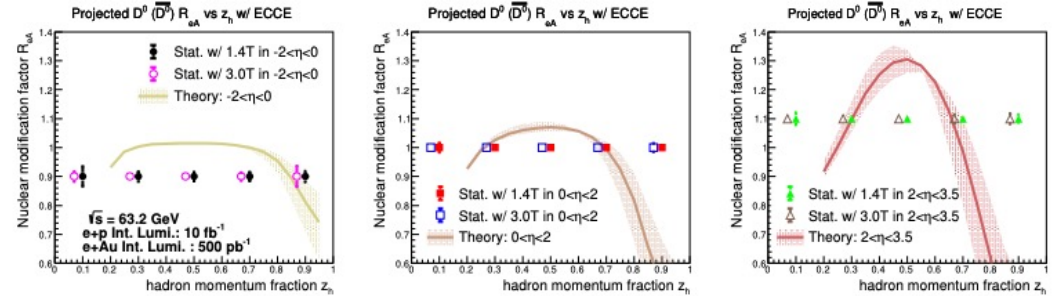


Figure 12: Hadron momentum fraction z_h dependent nuclear modification factor R_{eAu} for reconstructed D^0 (\bar{D}^0) with the ECCE detector performance in 10+100 GeV $e + p$ and $e + Au$ collisions. The integrated luminosity for $e + p$ ($e + Au$) collisions is 10 fb^{-1} (500 pb^{-1}). The statistical uncertainties of the projected R_{eAu} with the ECCE detector performance using the 1.4 T Babar (3.0 T Beast) magnet are shown in closed (open) markers. The theoretical calculations are from [8].

- This heavy flavor paper demonstrates the performance of the ECCE detector especially the tracking subsystem meet the EIC yellow report physics requirement in exploring the hadronization.
- Figures are final and will go through the text descriptions and work on expansion.
- Plan to release the paper this week.