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.

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].

- 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.
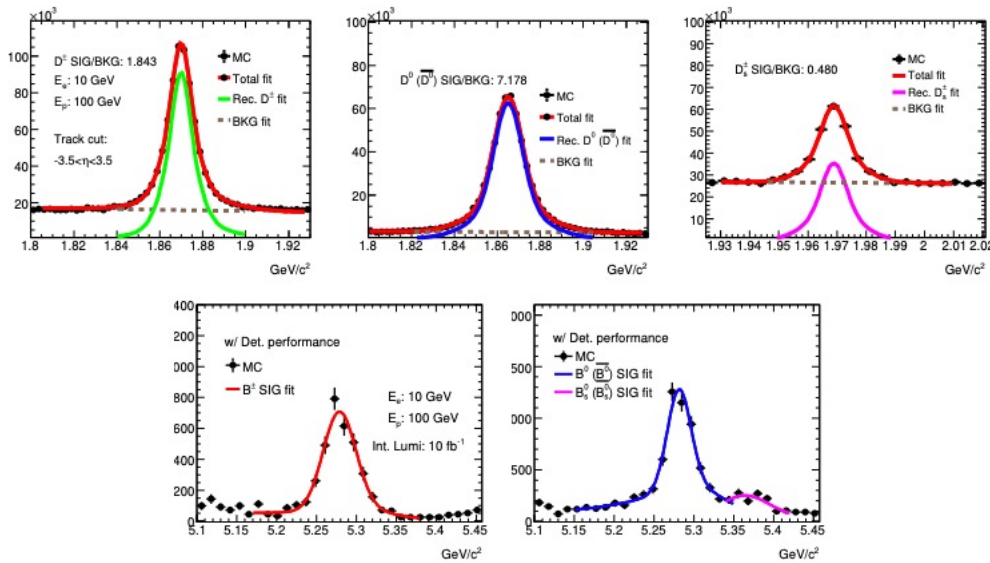
Figure 3: Reconstructed heavy flavor hadrons with the ECCE detector performance in 10+100 GeV $e + p$ collisions. The integrated luminosity is 10 fb^{-1}.
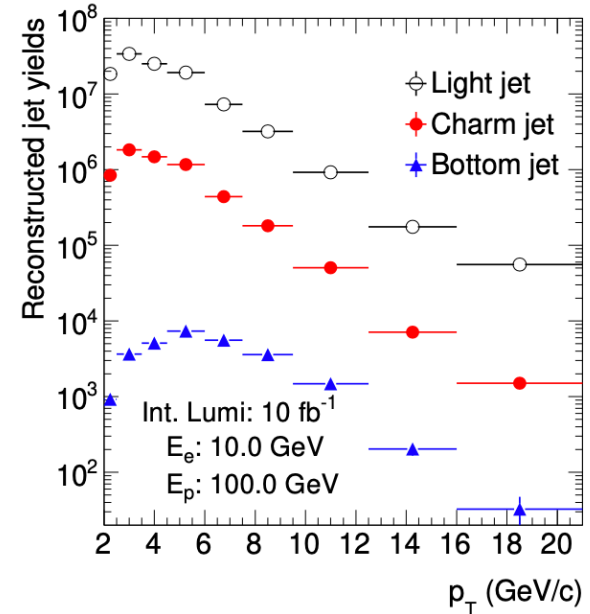
Figure 7: Reconstructed heavy flavor jet transverse momentum p_T distributions with the ECCE detector performance in 10+100 GeV $e + p$ collisions. The integrated luminosity is 10 fb^{-1}.

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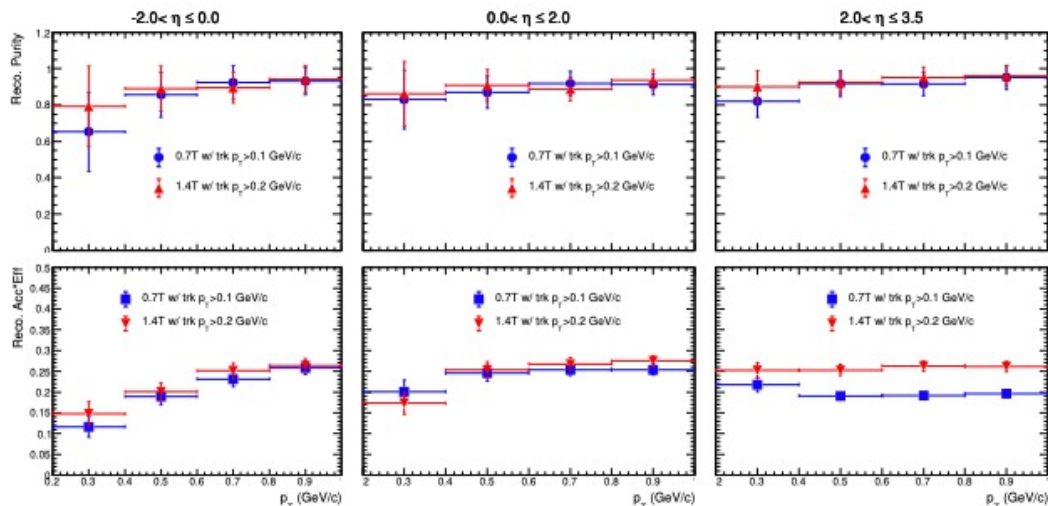
Figure 6: Transverse momentum p_T dependent purity (top) and acceptance*efficiency (bottom) for reconstructed D^0 ($\bar{D}^0$) in three different pseudo-rapidity regions with the ECCE detector performance in 10+100 GeV $e + p$ collisions. The transverse momentum for reconstructed D^0 ($\bar{D}^0$) is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

- Nuclear modification projection projection for reconstructed heavy flavor hadrons.

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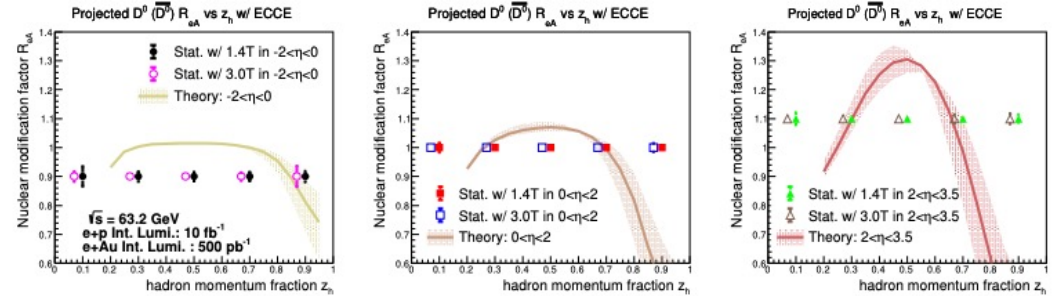
Figure 12: Hadron momentum fraction z_h dependent nuclear modification factor R_{eAu} for reconstructed D^0 ($\bar{D}^0$) with the ECCE detector performance in 10+100 GeV $e + p$ and $e + Au$ collisions. The integrated luminosity for $e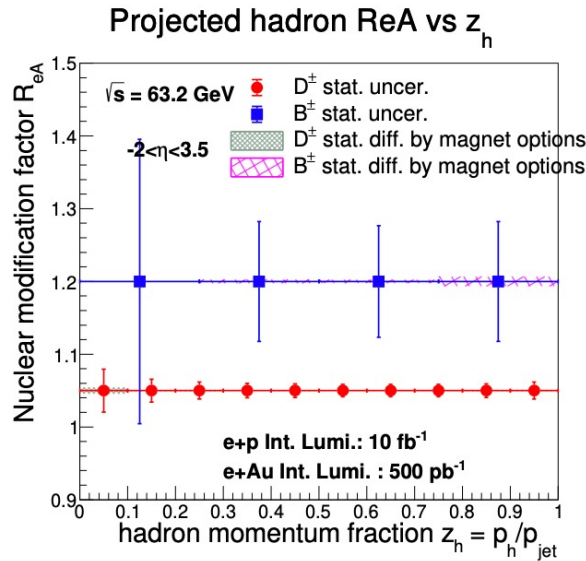 + p$ ($e + Au$) collisions is 10 fb^{-1} (500 pb^{-1}). The statistical uncertainties of the projected R_{eAu} with the ECCE detector performance using the 1.4 T Babar (3.0 T Beast) magnet are shown in closed (open) markers. The theoretical calculations are from [8].

Summary and Plan

- 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.