

# **EIC Heavy Flavor updated studies with the ECCE tracking performance**

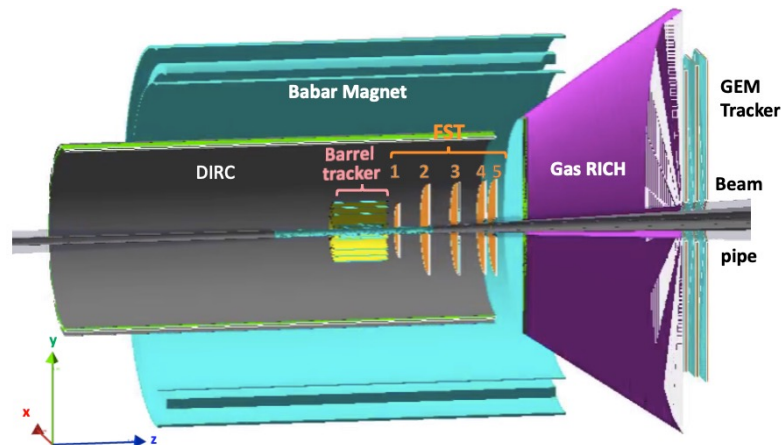
Xuan Li (xuanli@lanl.gov)  
Los Alamos National Laboratory

# Outline

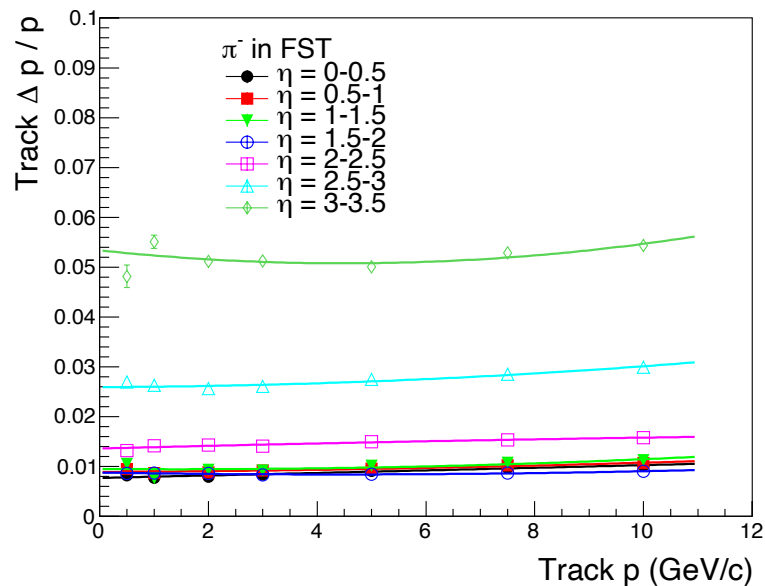
- Updated heavy flavor hadron reconstruction with the first order ECCE tracking performance.
- Projection of nuclear modification factor  $R_{eA}$  in 10+100 GeV e+Au collisions.
- Conclusions and Outlook.

# Updated Tracking performance for ECCE

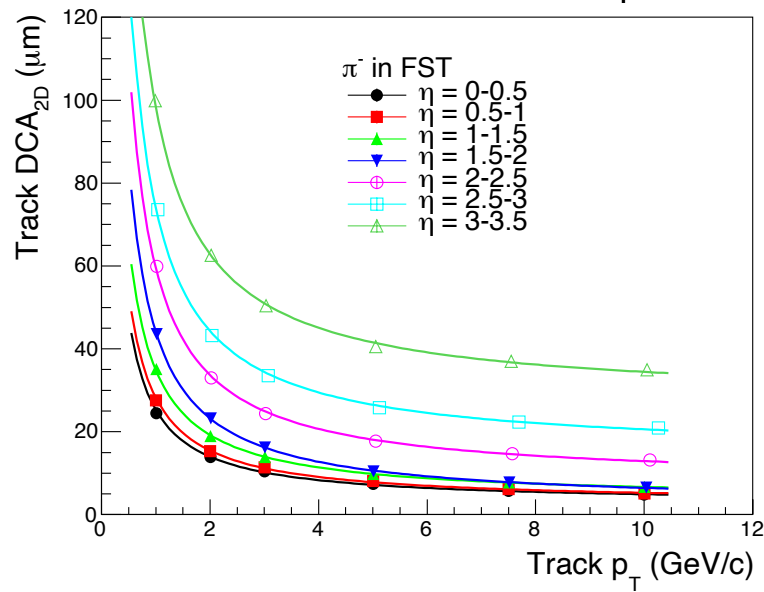
- Will be updated with optimized detector geometries and integration.
- Detector subsystems: LBNL Silicon Barrel (6 layers) + LANL FST (5 planes) + DRICH + Forward GEM Tracker (3 planes)



$\Delta p / p$  VS  $p$



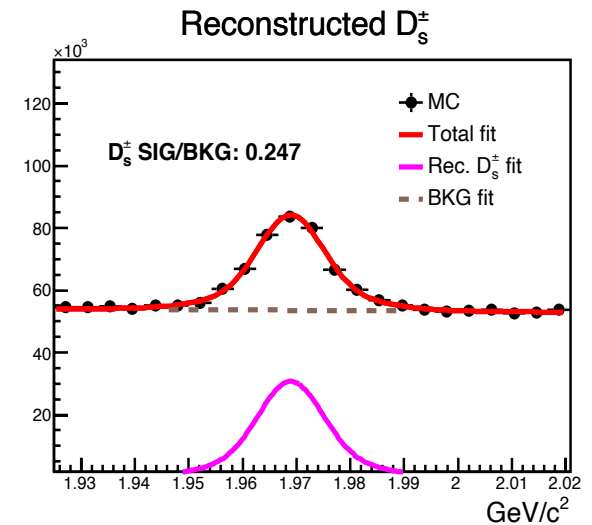
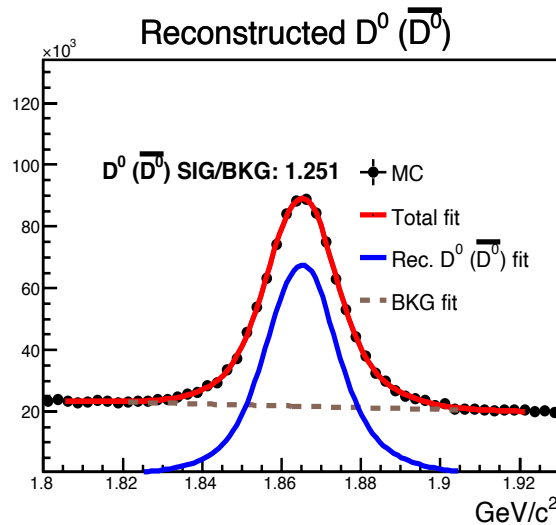
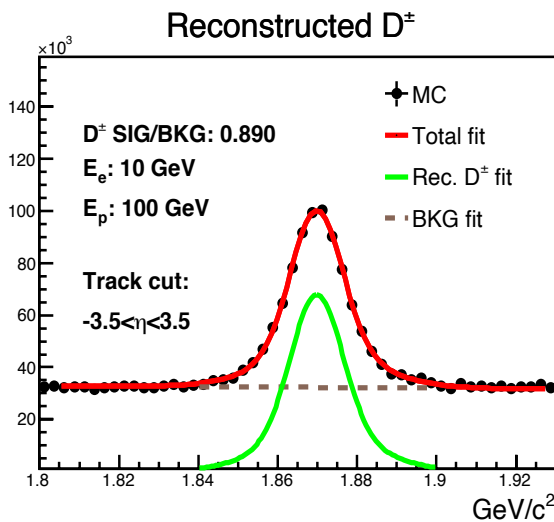
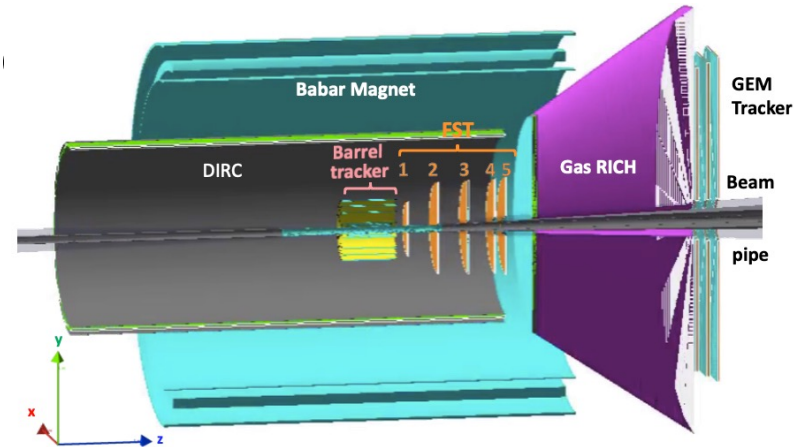
$DCA_{2D}$  resolution VS  $p_T$



# Reconstructed D-meson in 10+100 GeV e+p collisions

- D-meson reconstruction with current tracking configuration inside the Babar Magnet.
- Clear  $D^\pm$ ,  $D^0(\bar{D}^0)$  and  $D_s^\pm$  signals found in 10 GeV electron and 100 GeV proton collisions.

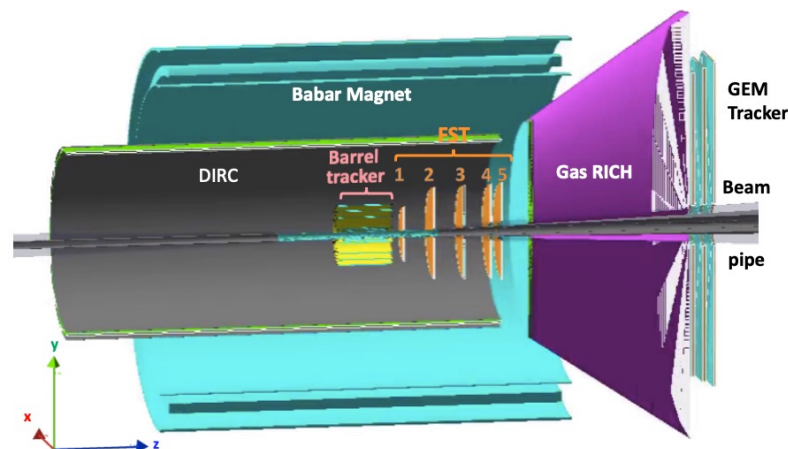
LANL FST in Babar magnet



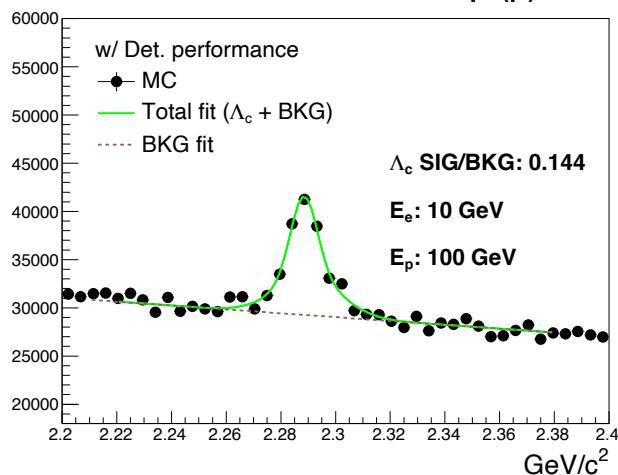
# Reconstructed heavy flavor hadrons in 10+100 GeV e+p collisions

- Heavy flavor hadron reconstruction with current tracking configuration inside the Babar Magnet.
- Clear  $\Lambda_c^\pm$ ,  $B^\pm$ ,  $B^0$  ( $\bar{B}^0$ ) and  $B_s^0$  ( $\bar{B}_s^0$ ) signals found in 10 GeV electron and 100 GeV proton collisions.

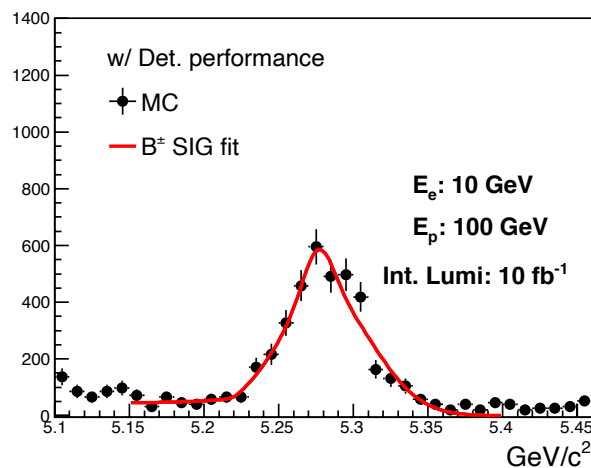
LANL FST in Babar magnet



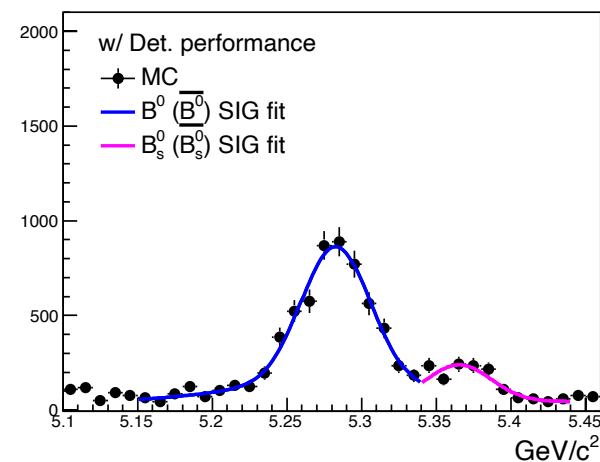
Cluster mass of  $\pi^\pm + K^\mp + p$  ( $\bar{p}$ )



Reconstructed B meson

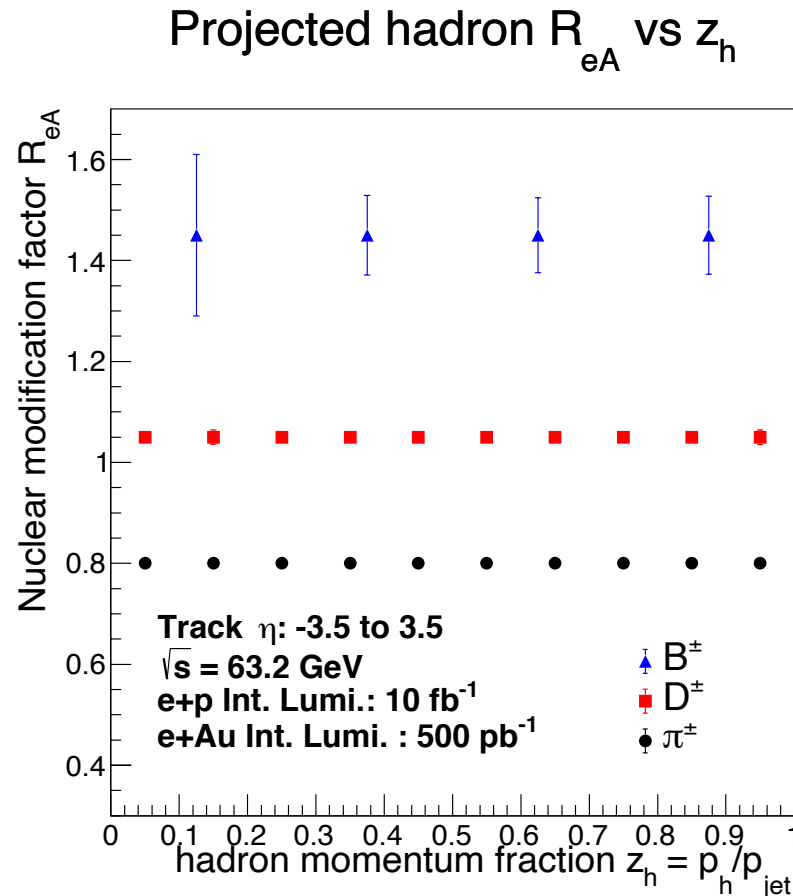


Reconstructed B meson



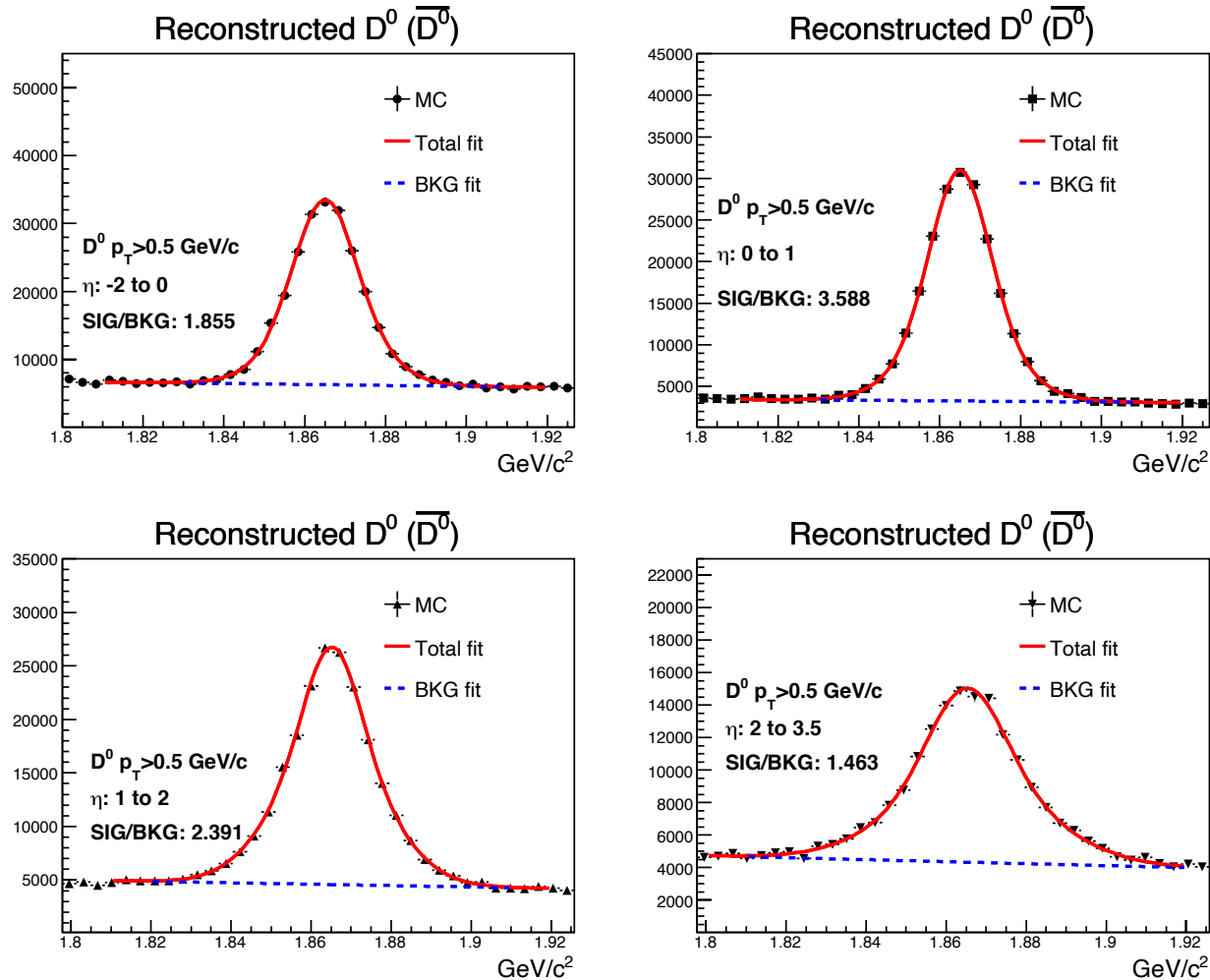
# Projection of nuclear modification factor $R_{eA}$ in 10+100 GeV e+p/Au collisions

- Flavor dependent  $R_{eA}$  statistical uncertainties versus hadron momentum fraction  $z_h$  in 10+100 e+Au collisions.



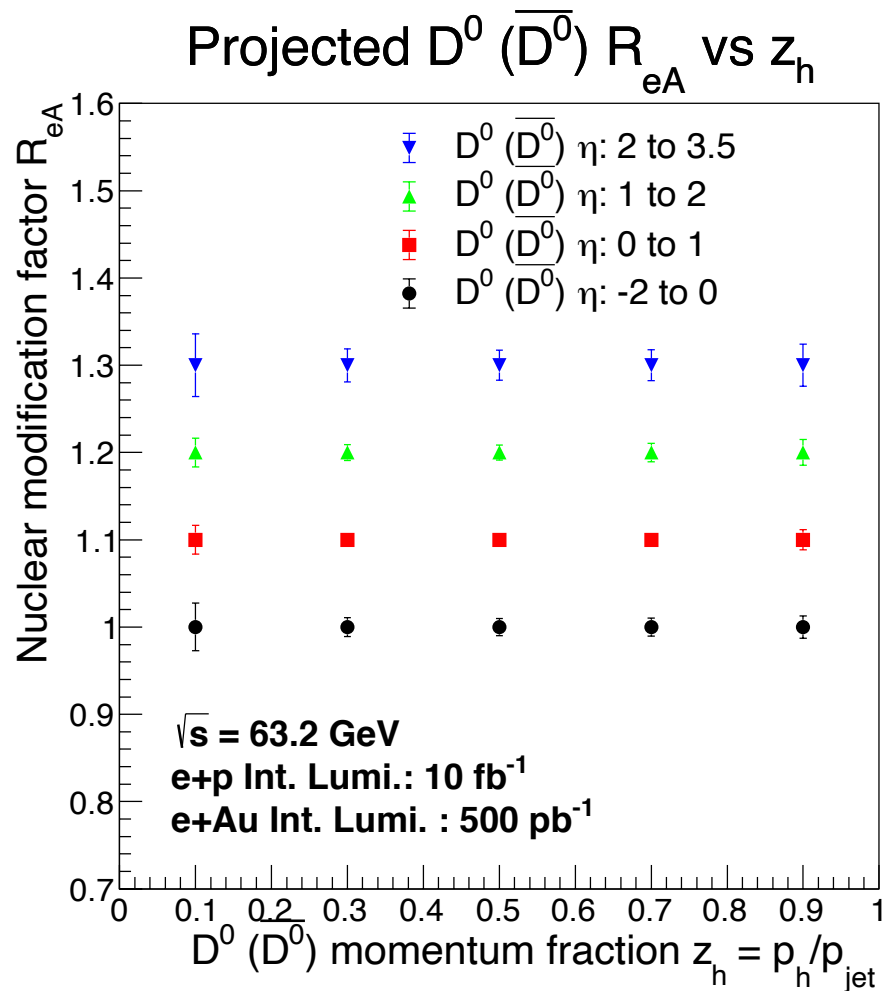
# Reconstructed $D^0(\bar{D}^0)$ in 10+100 GeV e+p collisions

- Pseudorapidity dependent  $D^0(\bar{D}^0)$  meson reconstruction with current tracking configuration inside the Babar Magnet.



# Projection of reconstructed $D^0(\bar{D}^0)$ nuclear modification factor $R_{eA}$ in 10+100 GeV e+p/Au collisions

- Pseudorapidity dependent reconstructed  $R_{eA}$  statistical uncertainties versus hadron momentum fraction  $z_h$  in 10+100 e+Au collisions.



# Conclusions and Outlook

- The ECCE tracking concept is under updating in the Fun4All framework.
- Clear reconstructed heavy flavor hadron signals have been obtained with the initial ECCE tracking performance.
- The projected nuclear modification factor can explore the hadronization process in the nuclear medium with good precisions.
- Will carry out similar studies with updated detector geometry/performance, in the other collision energies and compare with theoretical predications.