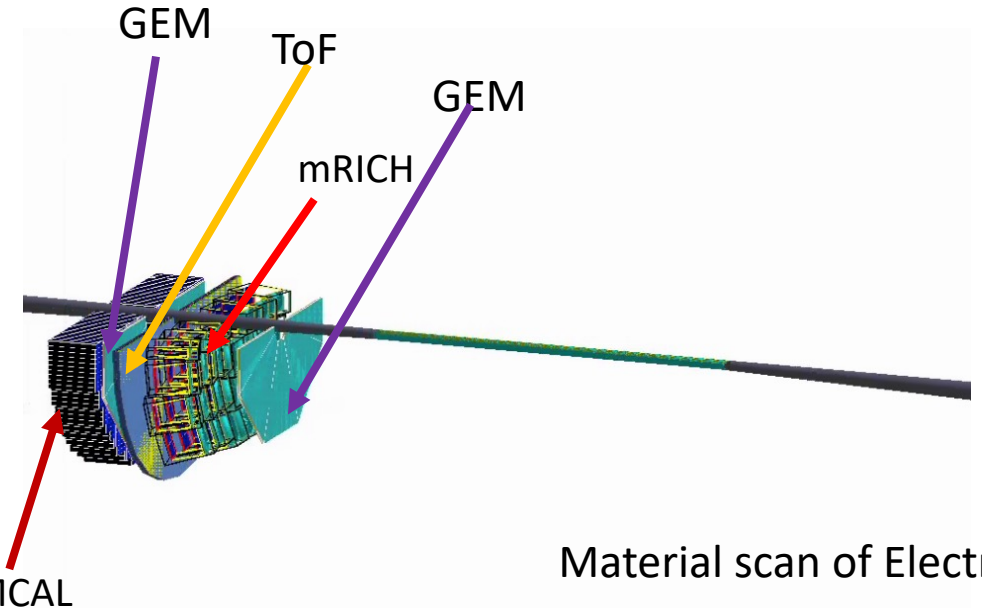
ECCE end cap MRPC ToF geometry
(Tracking performance with mRPC ToF+ GEM)

Sourav Tarafdar

Electron end cap mRPC TOF (single layer thickness with 12 gas gaps ~ 2.716 cm)

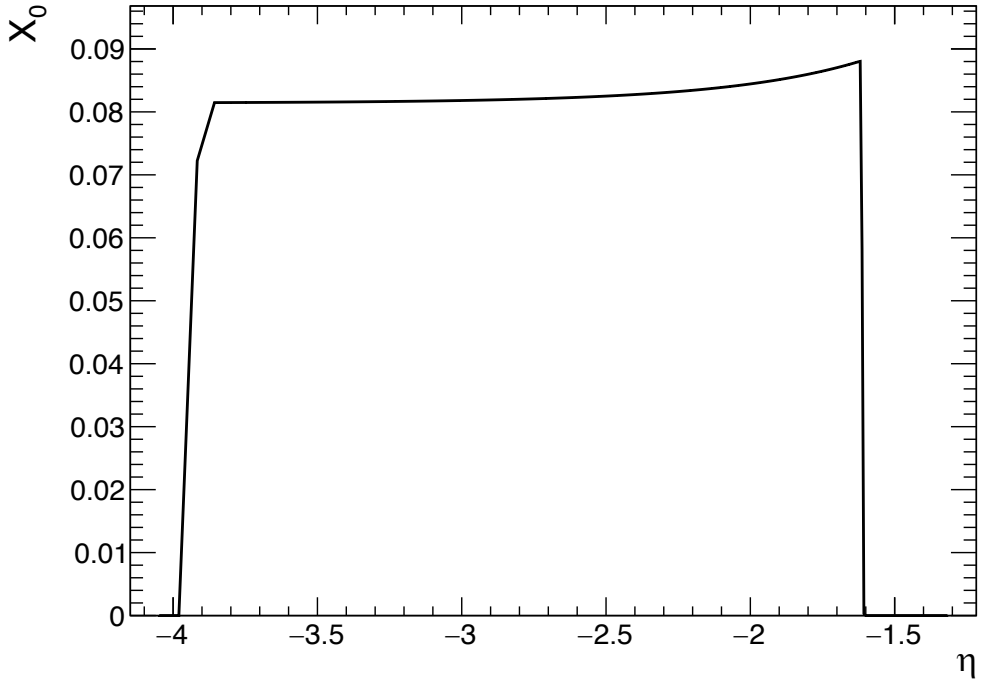


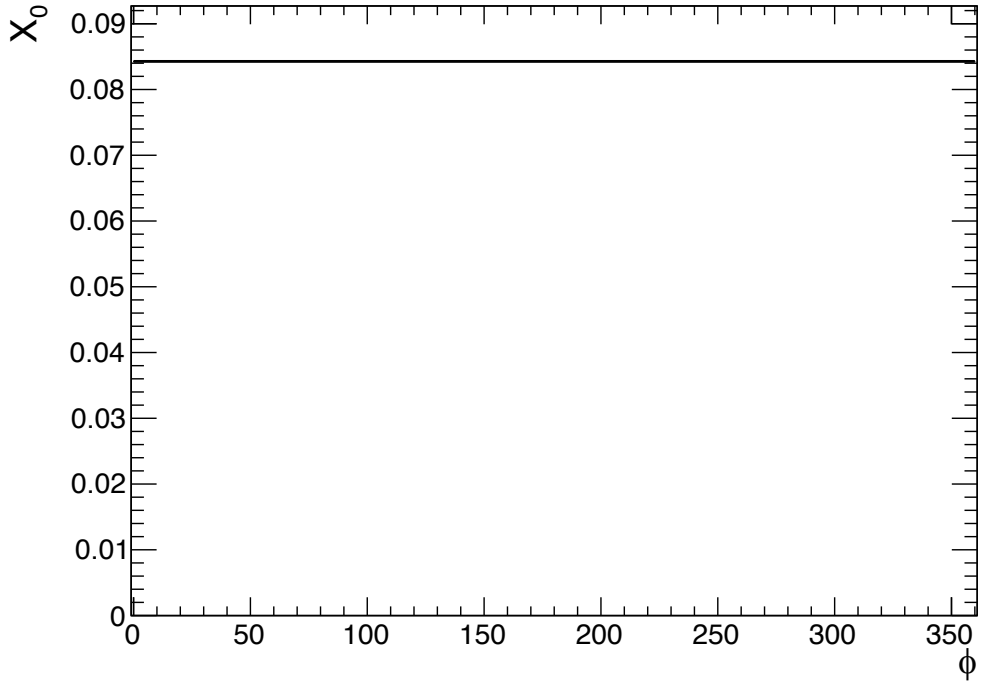
Electron end cap detector locations:

- 1st GEM @ z = -120 cm
- mRICH @ z = -125 cm
- mRPC ToF @ z = -162.3 cm , R = (6.5 – 68 cm)
- 2nd GEM @ z = -173.0 cm
- EMCAL @ z = -180.0 cm (hybrid EMCAL)

} ACLGAD in use for default set up

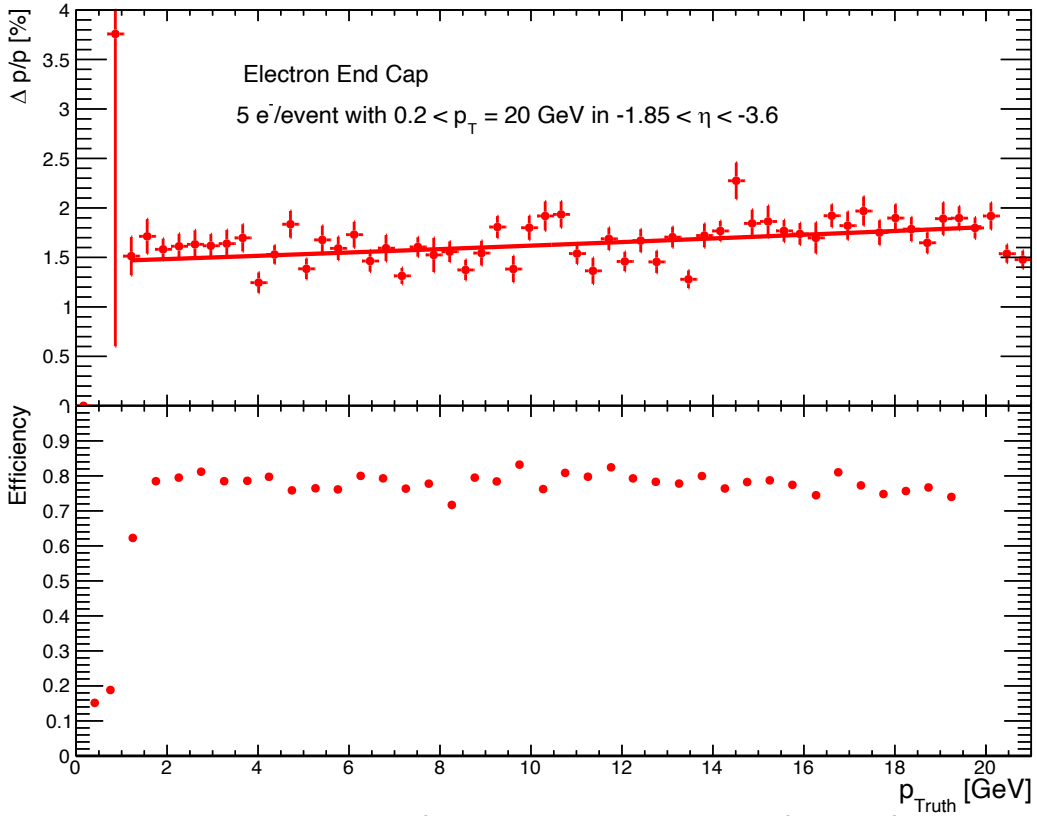
Material scan of Electron end cap mRPC TOF only



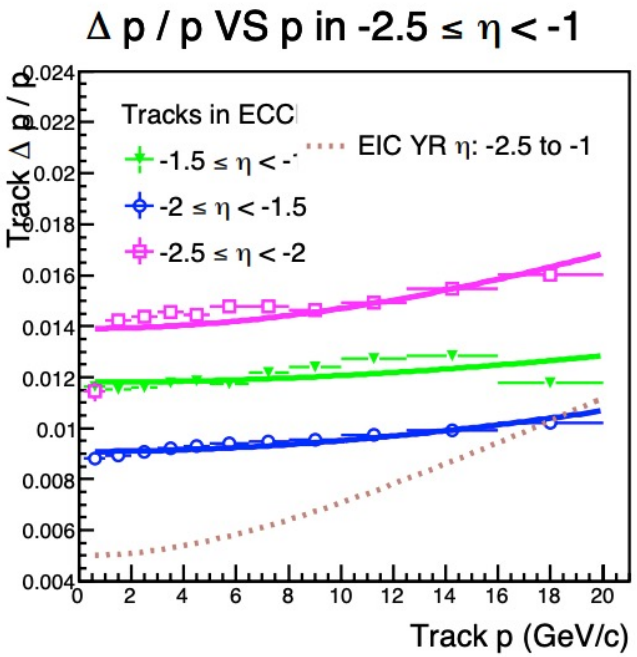


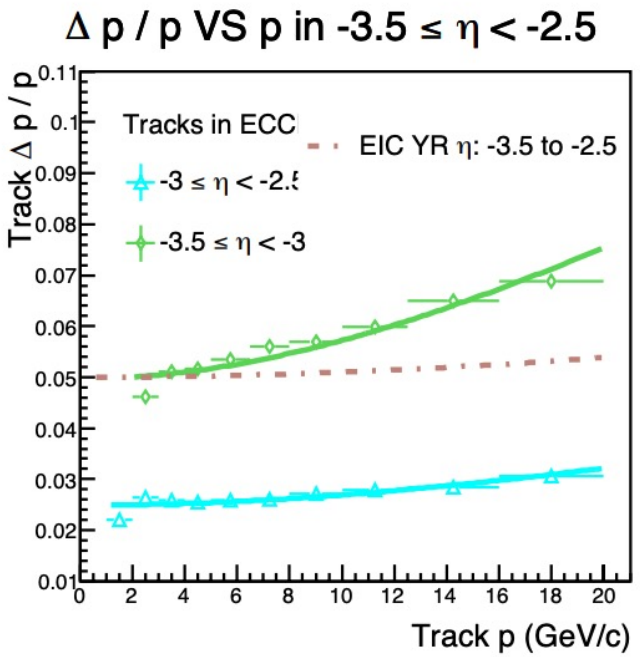
Tracking performance study in Electron End cap

- 5 e- per event with 0.2 <pT < 20 GeV in -1.85 < eta < -3.6 and 2.*pi in phi (eta coverage according to the last GEM eta coverage)
- Susbsystems used according to the previous slide in addition to magnet and Si disks at electron end cap.



2nd simulation campaign tracking evaluation (uses LGAD ToF) by Xuan Li

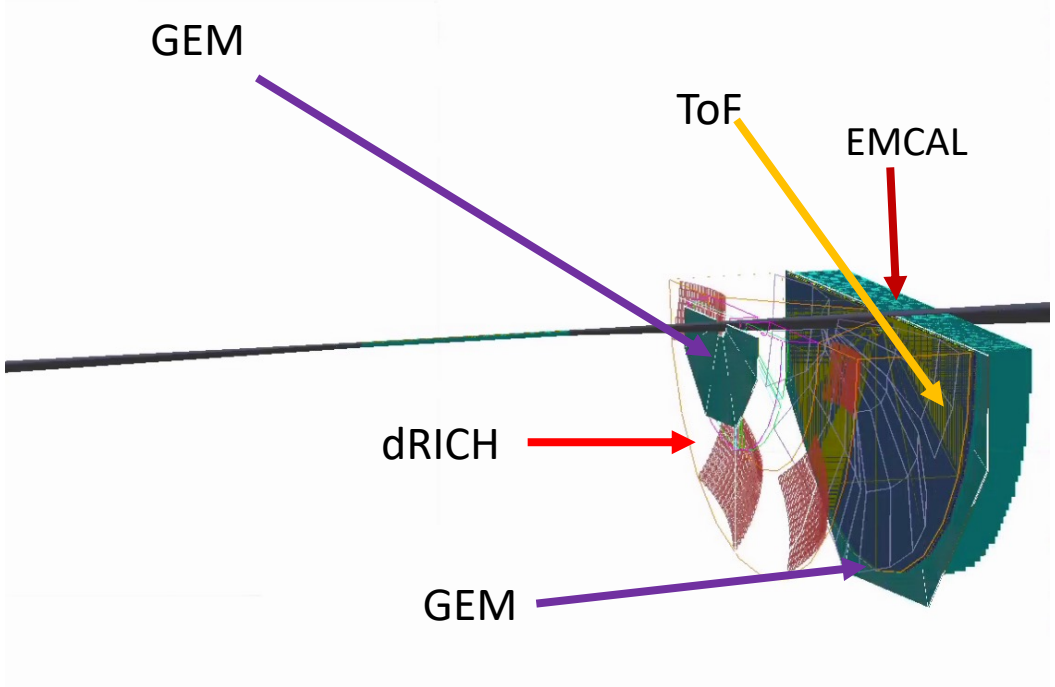




(ref: https://indico.bnl.gov/event/12860/contributions/54893/attachments/37316/61492/ECCE_tracking_20210924_XuanLi.pdf)

- Momentum resolution in integrated eta bins in current study not too much different than 2nd simulation campaign result.
- Need to do the current study in eta bins equivalent to the one used in 2nd simulation campaign evaluation

Hadron end cap mRPC TOF

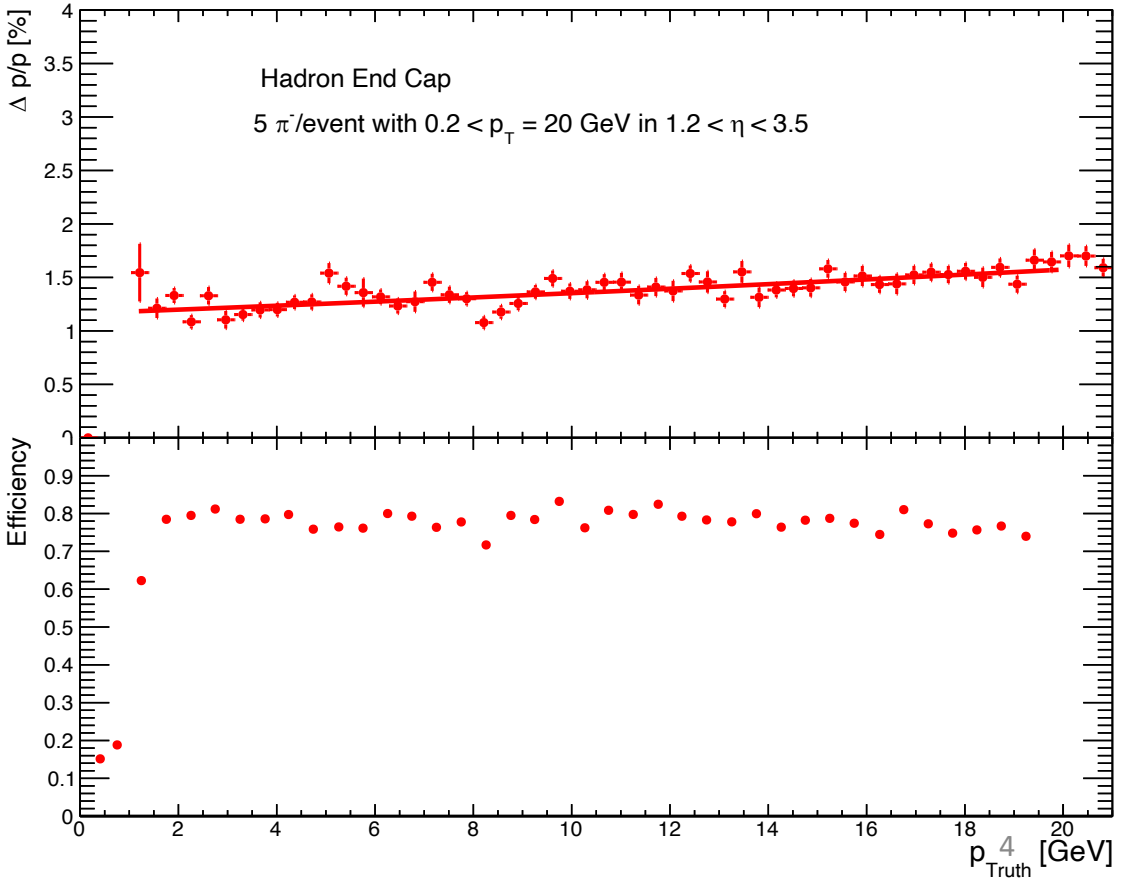


Hadron end cap detector locations:

- 1st GEM @ z = 175 cm
- dRICH @ z = 185 cm with length = 100 cm
- mRPC ToF @ z = 287.0 cm , R = (13.0 – 180 cm)
- 2nd GEM @ z = 292.0 cm
- EMCAL @ z = 305.0 cm

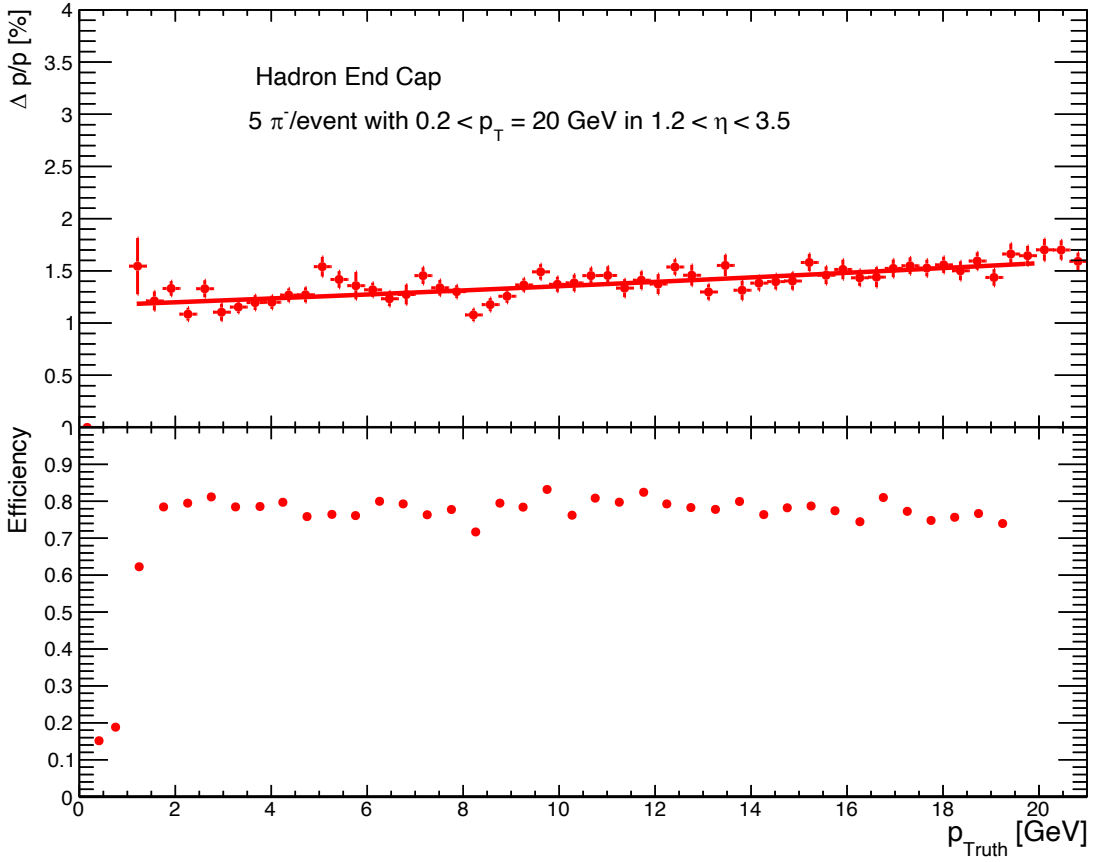
Tracking performance study in Hadron End cap

- 5 pions per event with 0.2 <pT < 20 GeV in 1.2 < eta < 3.5 and 2.*pi in phi(eta coverage according to the last GEM eta coverage)
- Susbsystems used according to the figure on left in addition to magnet and Si disks at hadron end cap

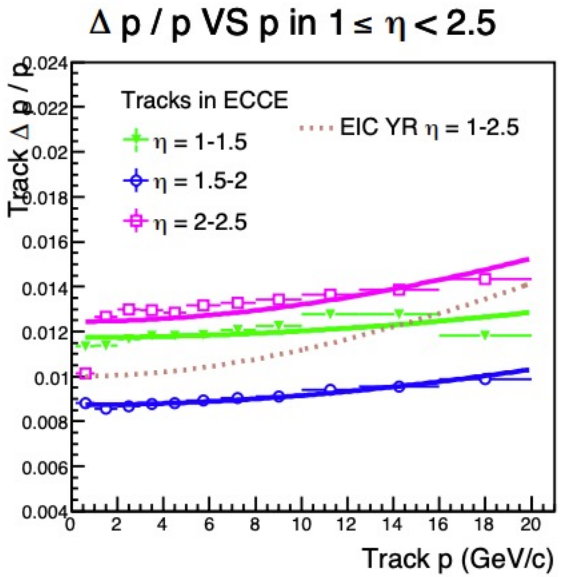


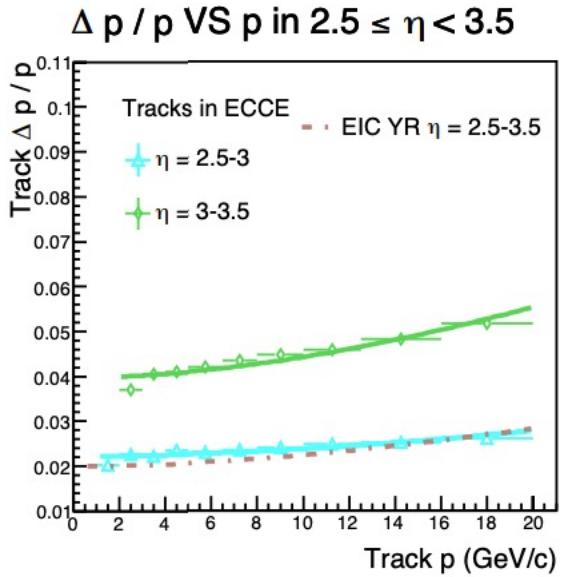
Comparison between current result and from 2nd simulation campaign

Tracking performance study in Hadron End cap



2nd simulation campaign tracking evaluation (uses LGAD ToF) by Xuan Li





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