BERKELEY LAB

Bringing Science Solutions to the World

Tracking performance with the tagged Brycecanyon geometry

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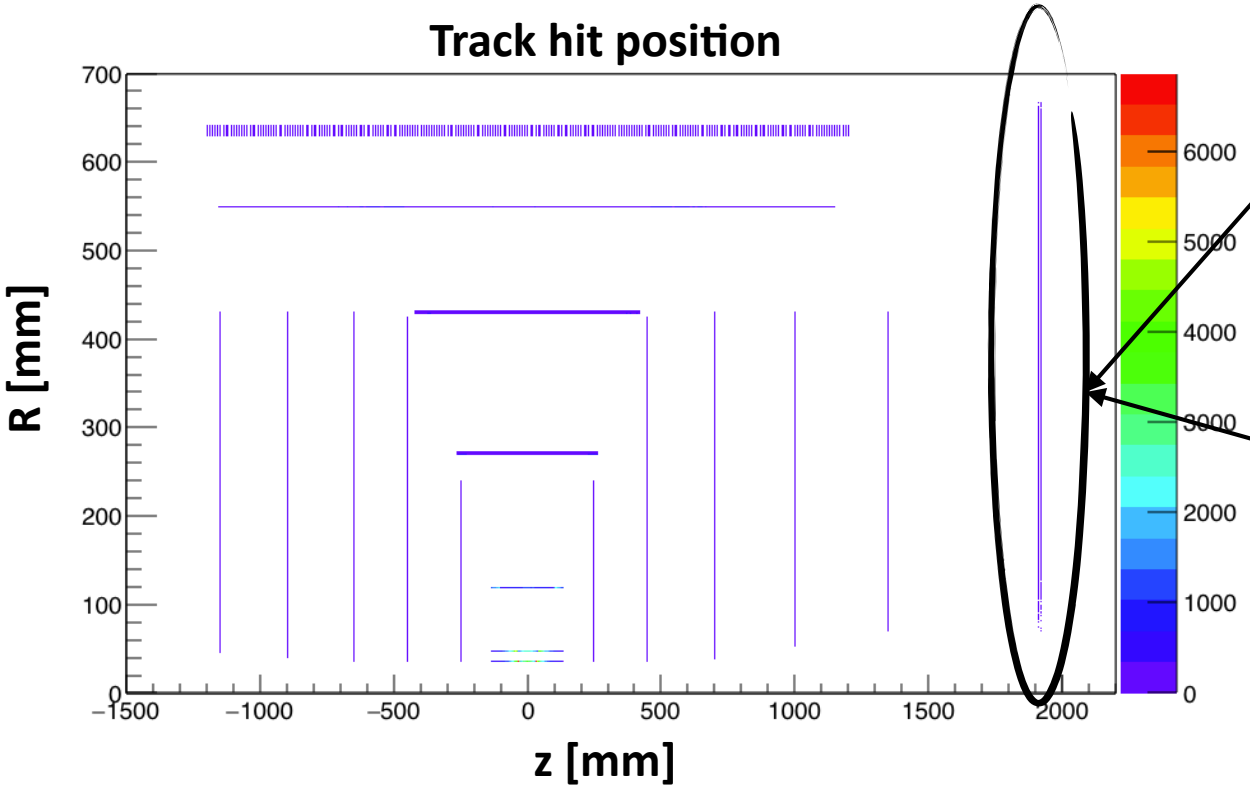
EPIC tracking meeting, 12/01/2022

Tagged geometry + new MARCO field map

- Geometry tag: Brycecanyon
  - 5 barrel silicon: spatial resolution 10μm/sqrt(12), r = 3.6, 4.8, 12, 27, 42cm
  - 1 barrel MPGD: spatial resolution 150μm, r = 55cm
  - 1 barrel TOF: spatial resolution 30x3000μm, r = 64.6cm
  - 10 endcap silicon: spatial resolution 10μm/sqrt(12), z = -115, -90, -65, -45, 25, 25, 45, 70, 100, 135cm
  - 1 endcap TOF: spatial resolution 30μm, z = 192cm

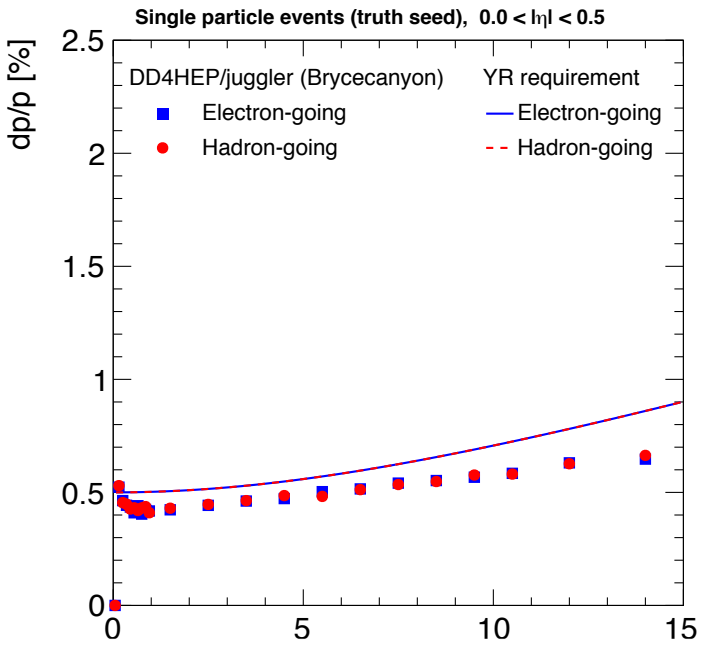


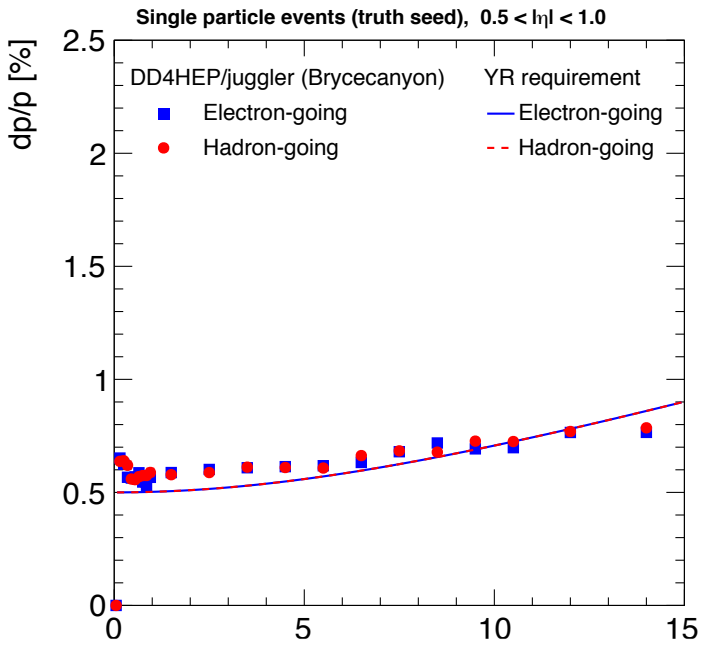
NOT in track reconstruction with juggler (code crushes at random event)

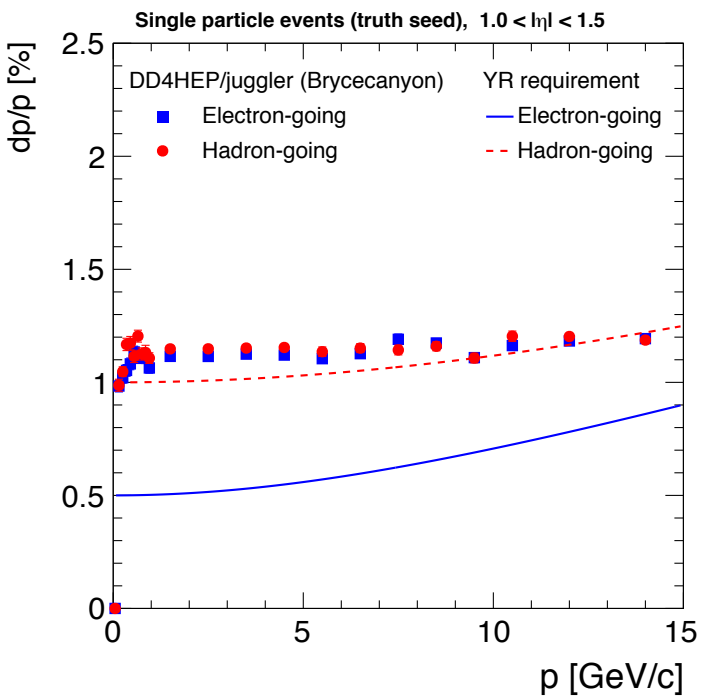
NOT in track reconstruction with EICrecon

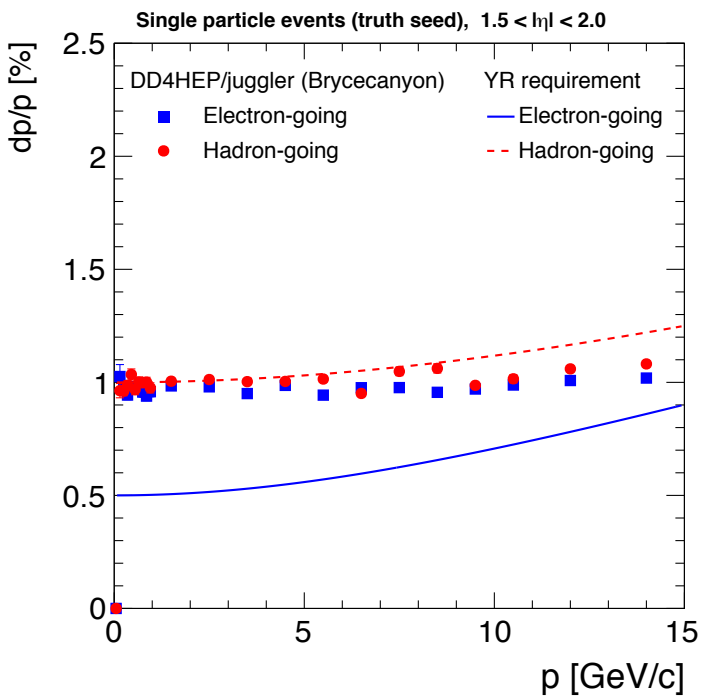
Momentum resolution

Same/similar performance in the electron and hadron going direction



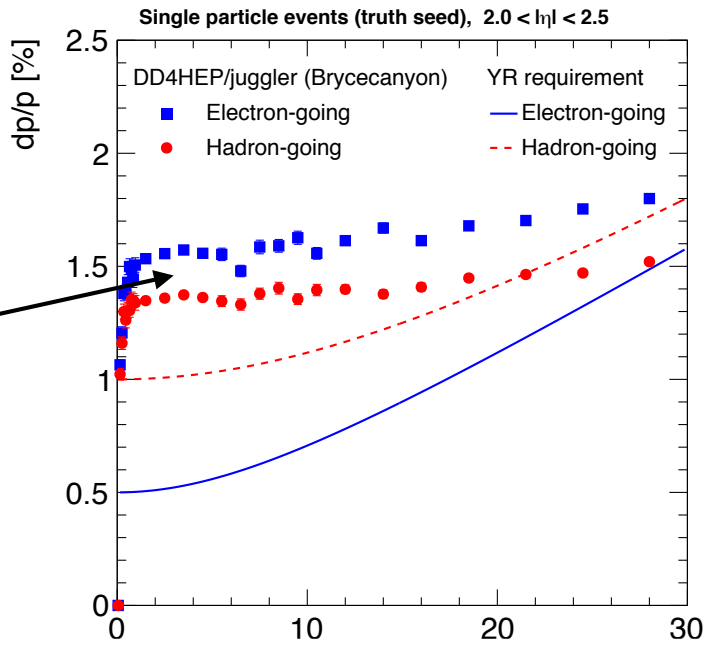


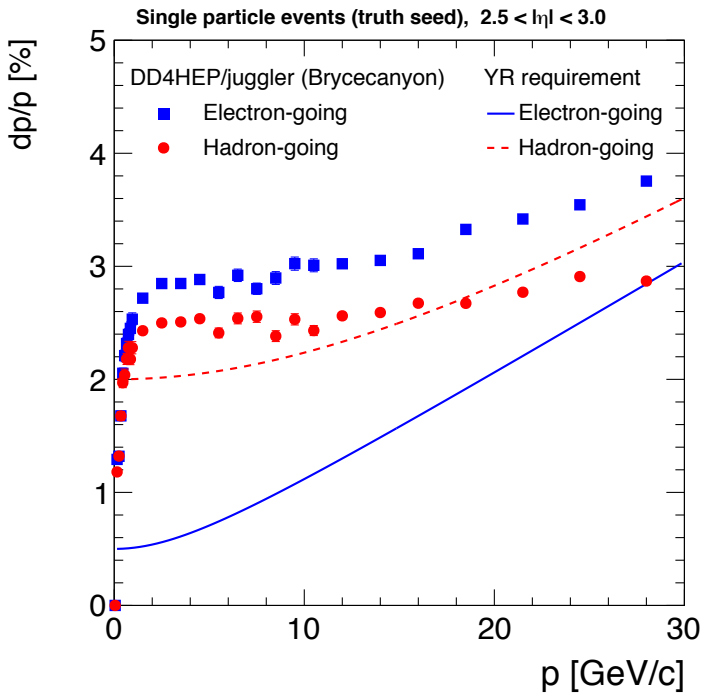


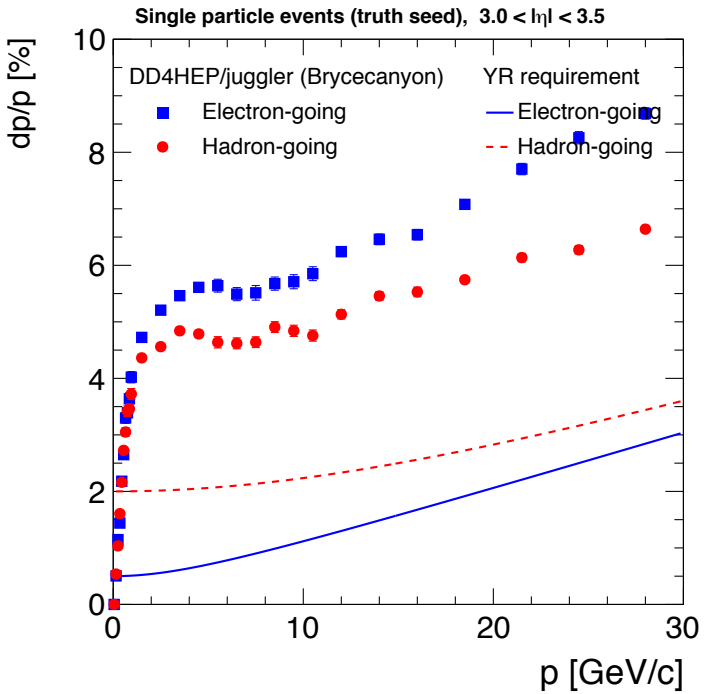


Momentum resolution

10-20% better performance at hadron-going direction due to the longer level arm





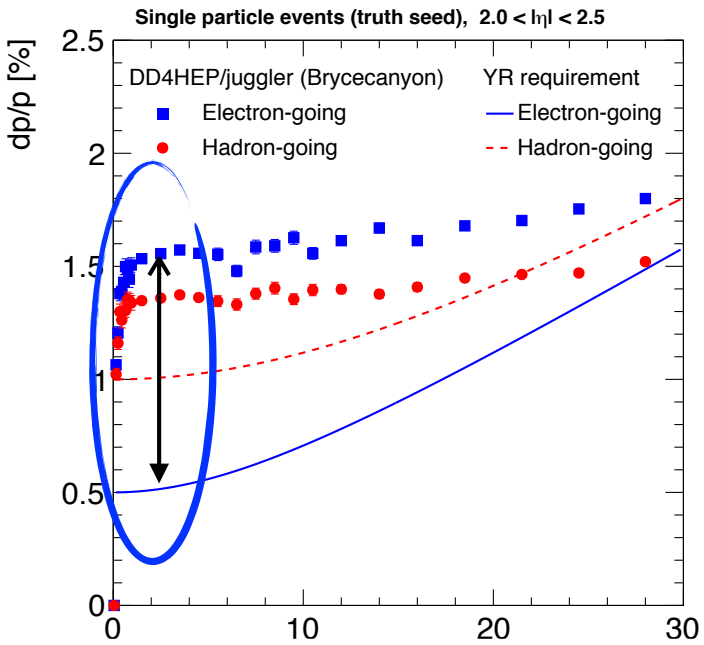


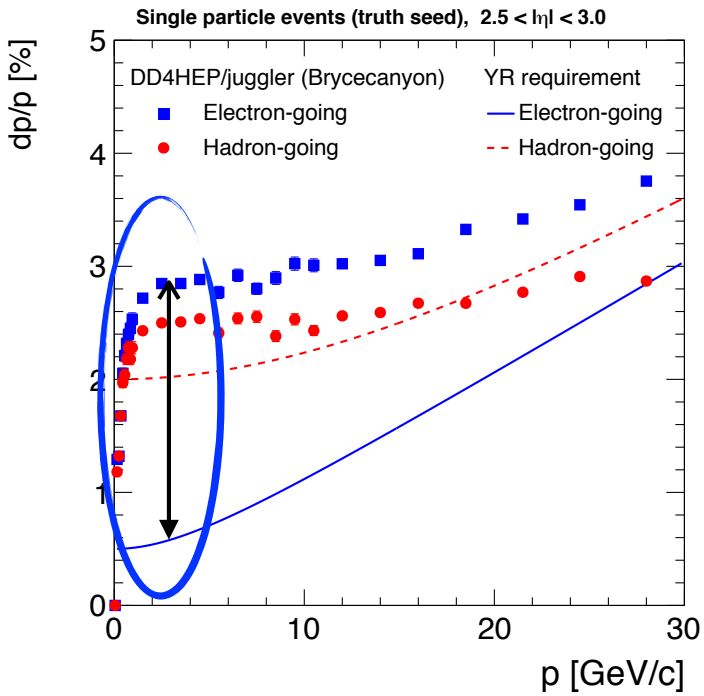
Tracking performance at the electron-going direction

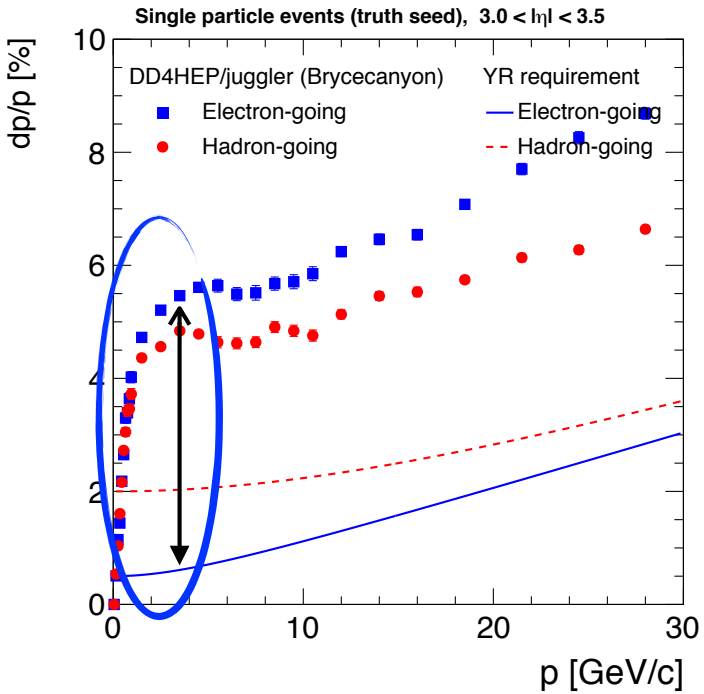
Electron reconstruction mainly relies on tracking <5 GeV

Tracking resolution in -3.5 < η < -2 significantly worse than YR

Need to evaluate physics impact



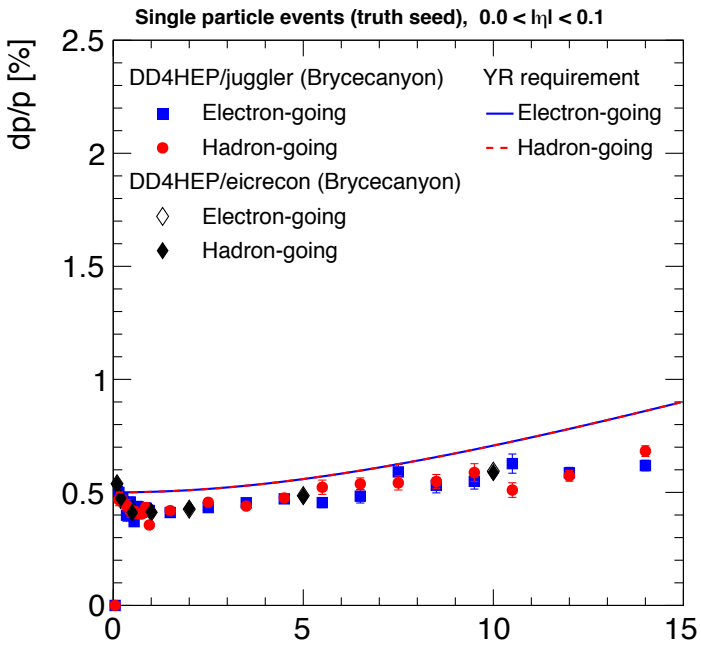


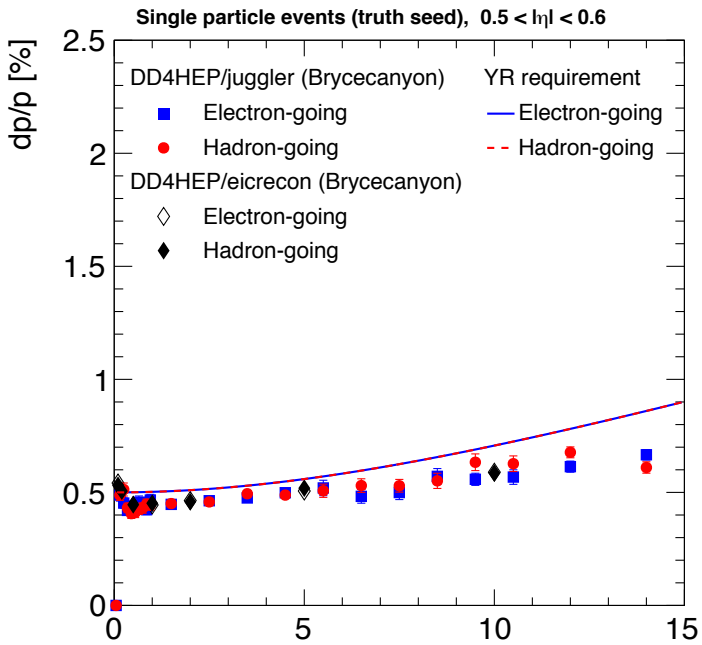


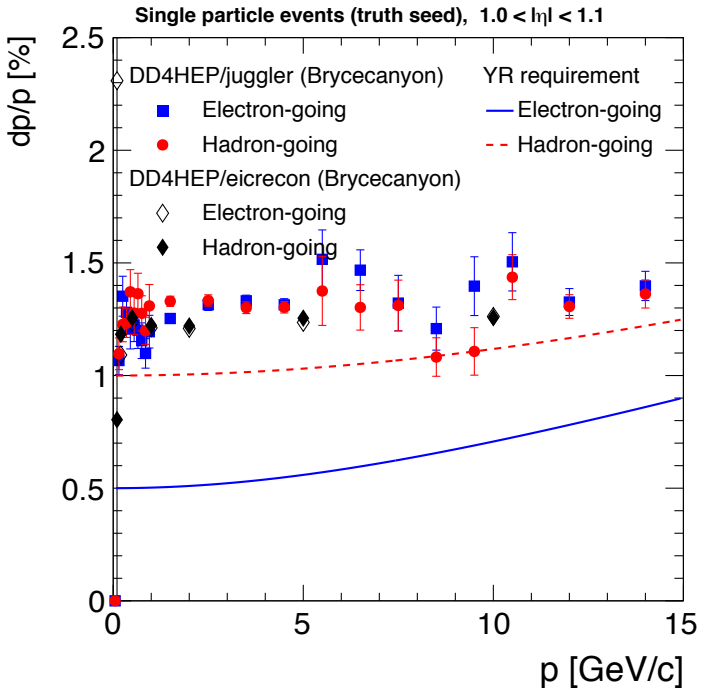
Comparison with EICrecon results (from S3 storage)

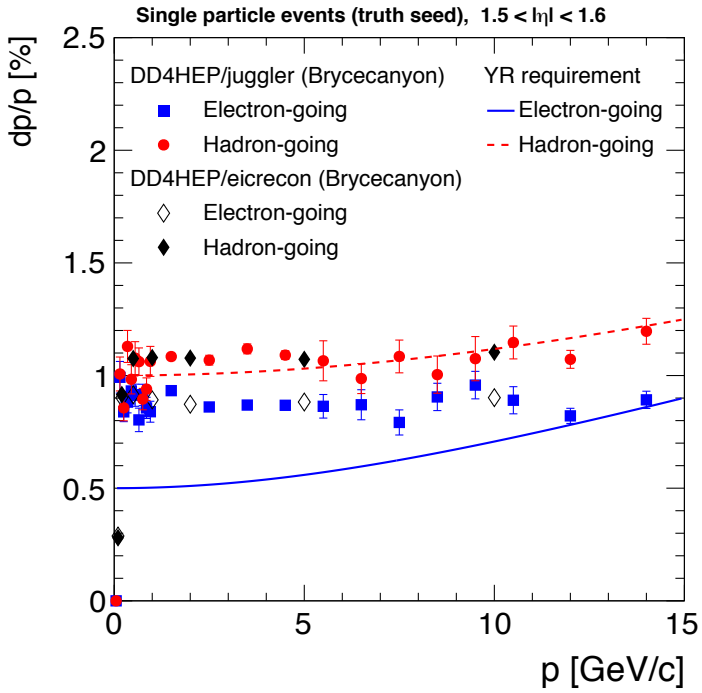
- EICrecon results from official simulation campaign output
  - EPIC/RECO/ 22.11.2/ epic_brycecanyon/ SINGLE/pi-

Consistent results between juggler and eicrecon









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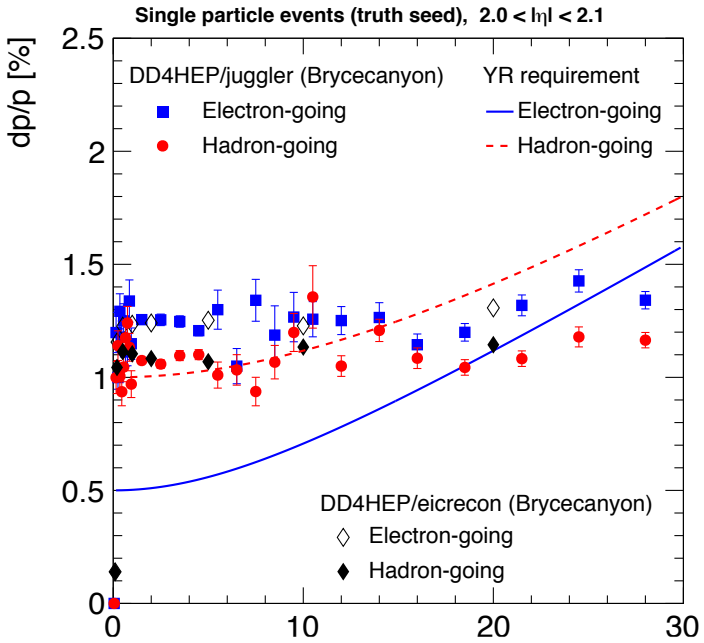

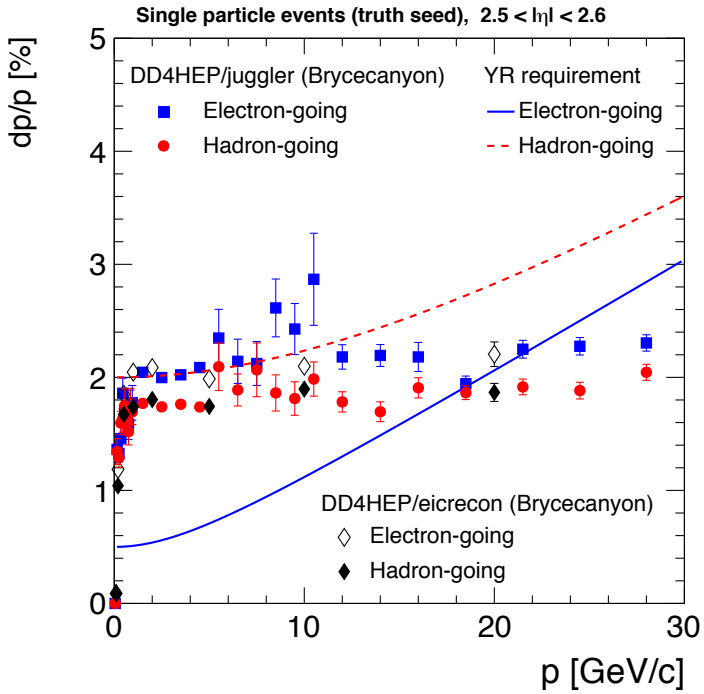

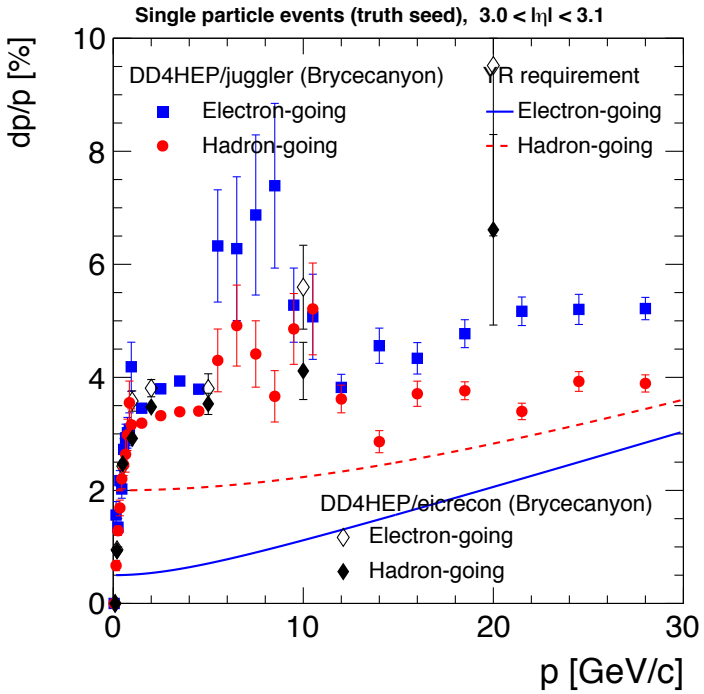

Summary

- Looked at the momrentum resolution with the Brycecanyon geometry + new MARCO field map
  - Results look reasonable
  - 10-20% worse performance at very backward rapidity comparing to very forward rapidity
  - Tracking resolution in $-3.5 < \eta < -2$ significantly worse than YR, need to evaluate physics impact
- Consistent result between juggler and EICrecon