UNIVERSITY OF BIRMINGHAM | SCHOOL OF PHYSICS AND ASTRONOMY

First Look at files on S3

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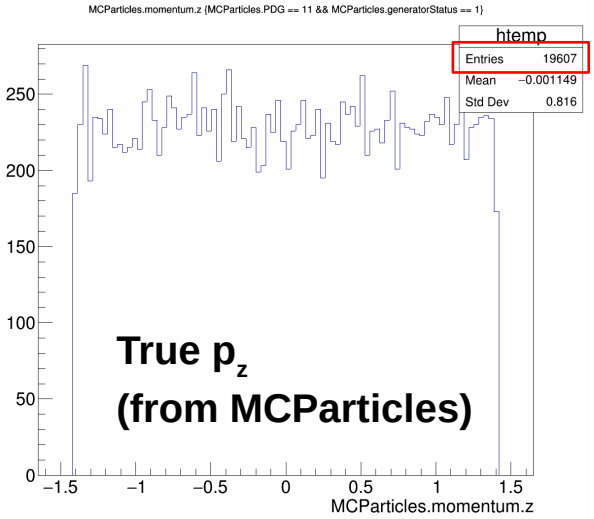
Overview

- Some reconstruction files have been made available on S3 (EICRecon used for reconstruction)
  - Single Particle events
    - e-, γ, and π- ranging from 100MeV to 20GeV
    - 3-45°, 45-135°, 130-177°
  - NC DIS events
    - 5x41, 10x100, 18x275 GeV^2
    - $Q^2 > 1, 10, 100, 1000\ GeV^2$

eictest/EPIC/RECO/22.11.0/epic_brycecanyon/SINGLE/e-/2GeV/45to135deg/

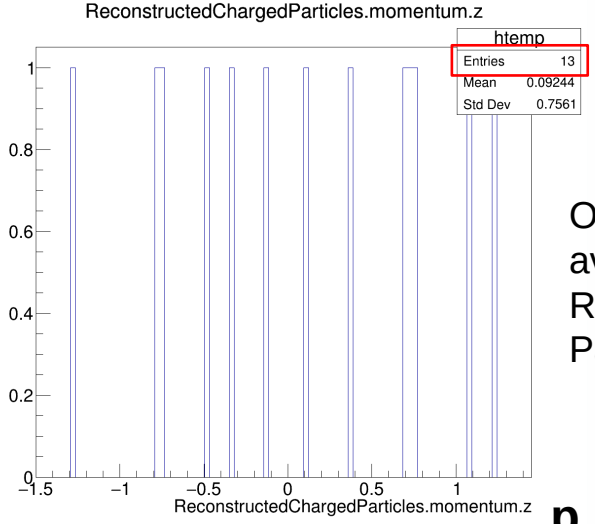
Single Particle Files

(2GeV electrons in range 45 < theta < 135 degrees)



True p_z (from MCParticles)

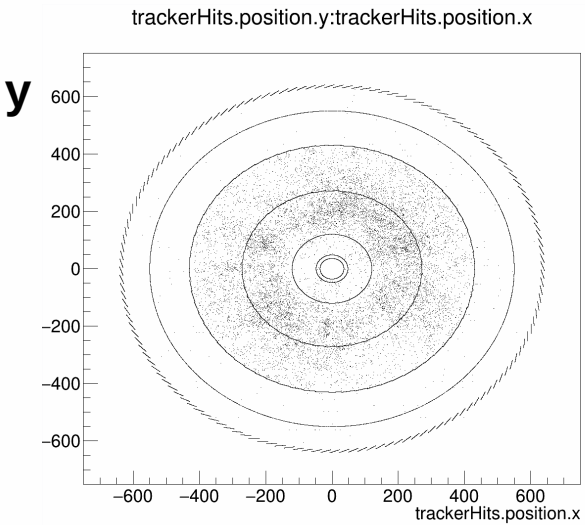
File contained ~20k generated electrons



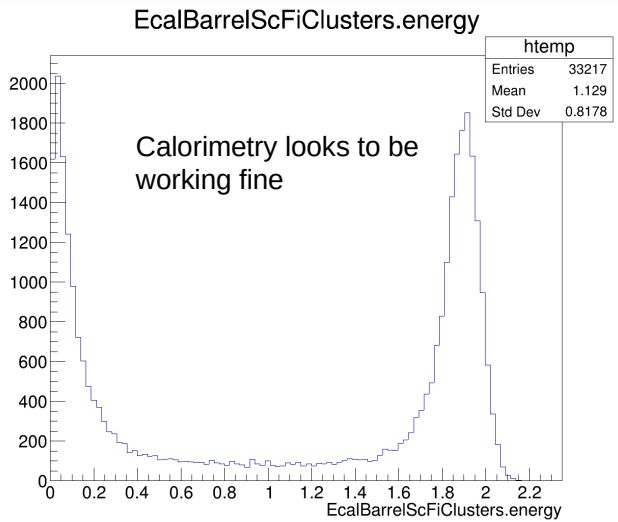
Only 13 events available in ReconstructedCharged Particles (for this file)

p_z

Hits look reasonable → problem probably occurs when converting hits into a reconstructed track



x

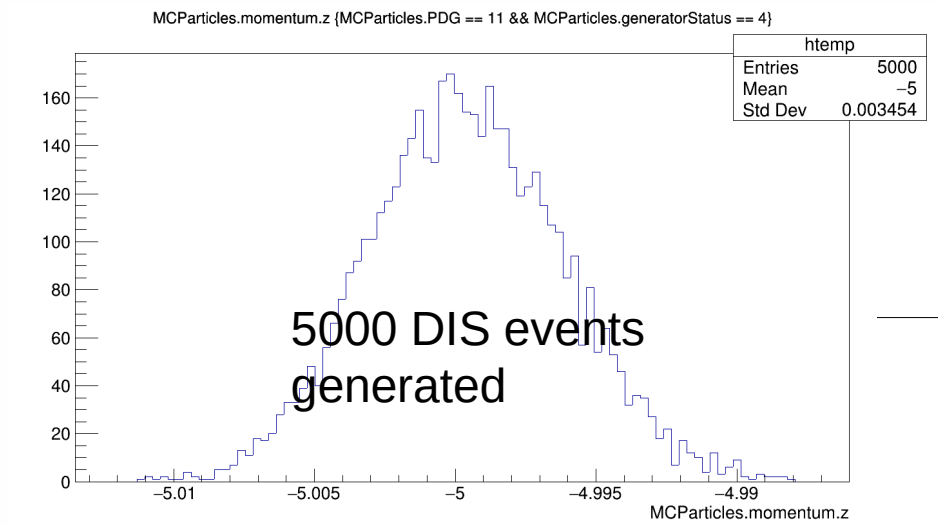


Energy of clusters in SciFi

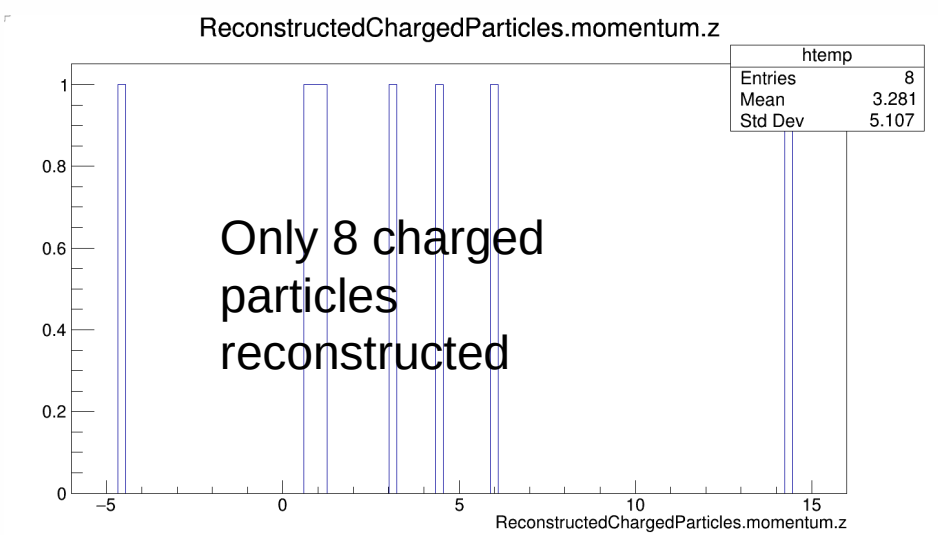
eictest/EPIC/RECO/22.11.0/epic_brycecanyon/DIS/NC/5x41/minQ2=1/

NC-DIS Files

(5x41GeV^2, Q^2>1GeV^2)

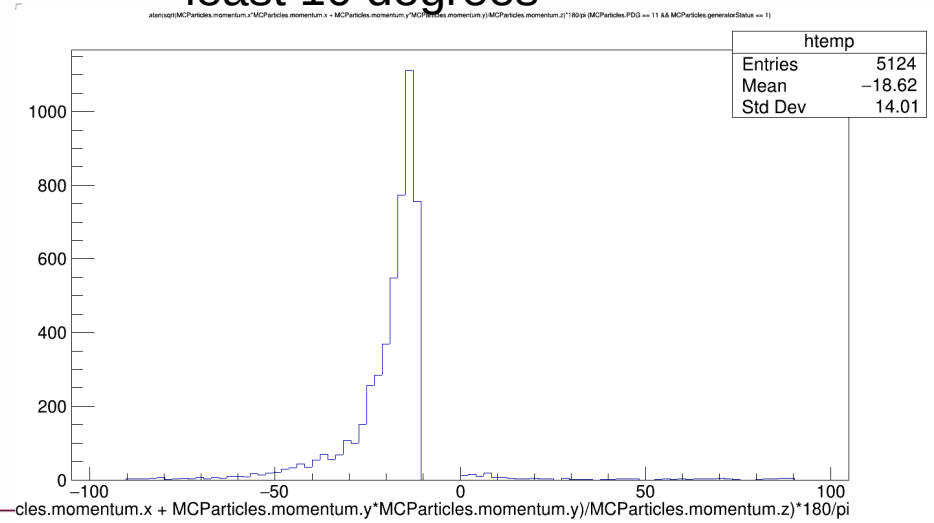


5000 DIS events generated

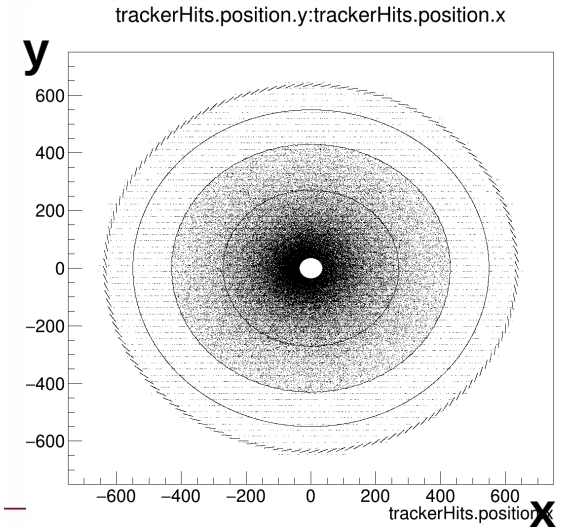


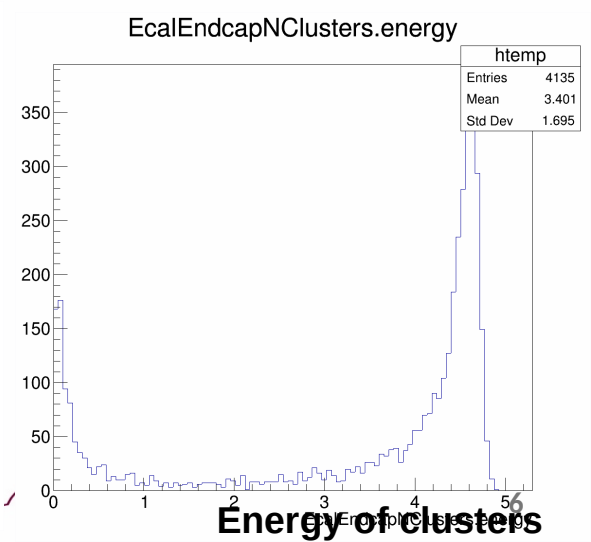
Only 8 charged particles reconstructed

Electrons scattered by at least 10 degrees



Hits and clusters look fine for DIS too



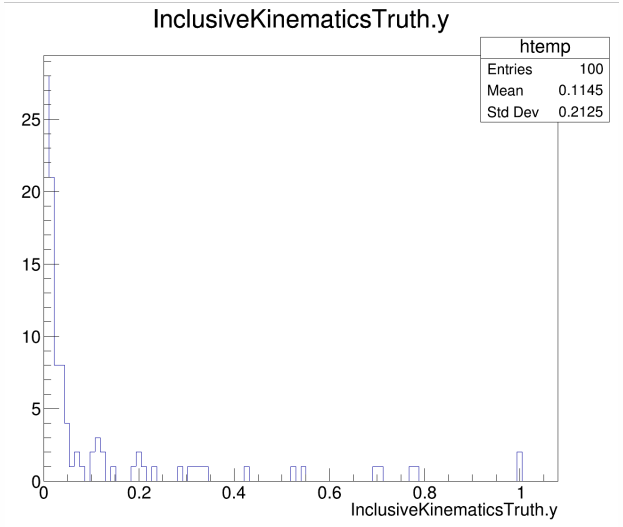


Energy of clusters

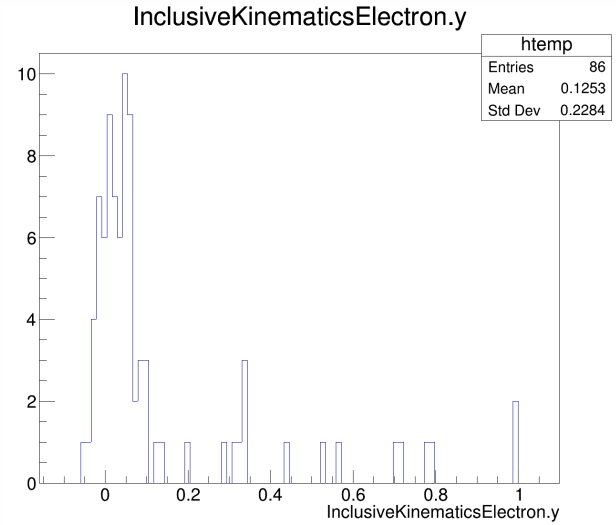
My Simulation – EPIC Nightly build + Juggler

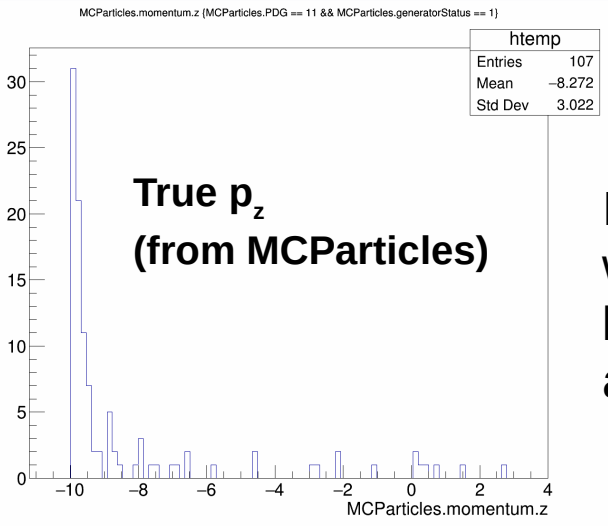
(10x100GeV^2, Q^2>1GeV^2, 100 events)

I believe the nightly build used was the “arches” config – includes MPGD-DIRC



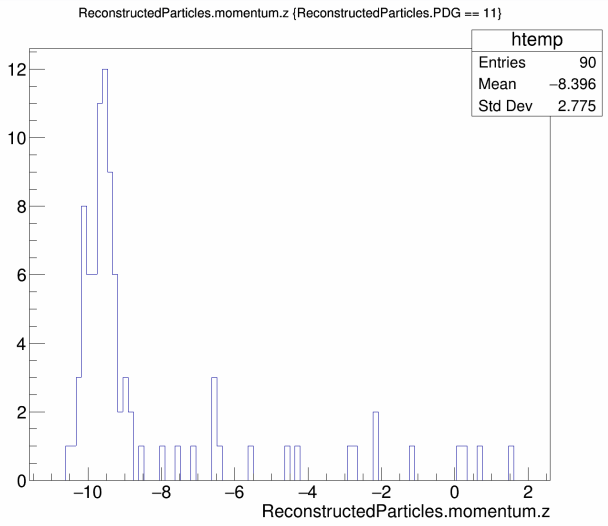
100 events → 86 scattered electrons found and reconstructed



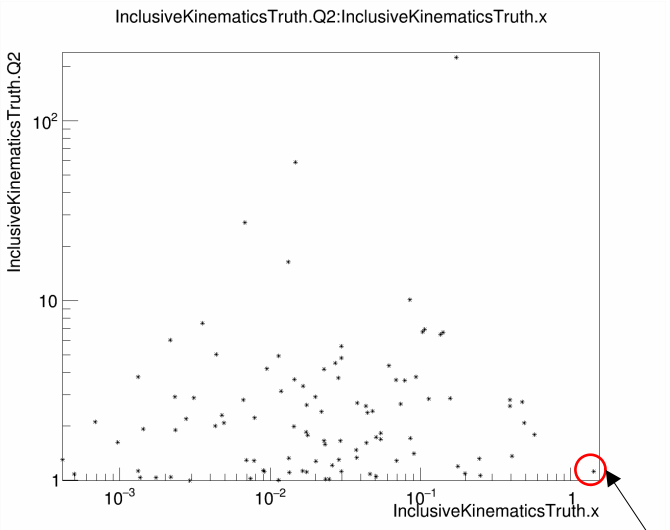


True p_z (from MCParticles)

In general tracking is working in juggler → losses due to tracking acceptance

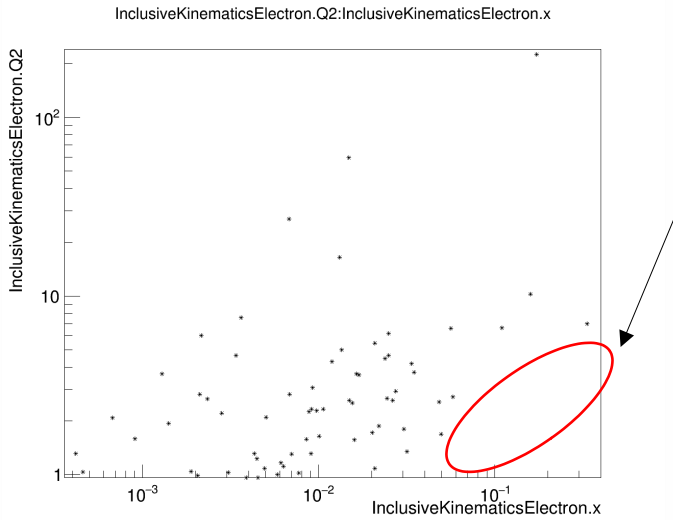


True x-Q2



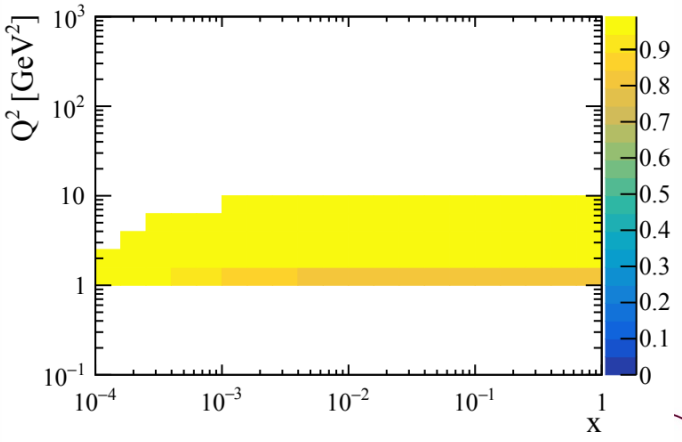
Questionable

E-method x-Q2



Reconstructed events mostly missing from this, lower acceptance, region (also consider e-method resolution in this region → would be better to compare η)

Note: Acceptance of EPIC in DD4hep is worse than in this plot (due to larger disk opening) also this is 18x275GeV² beam config

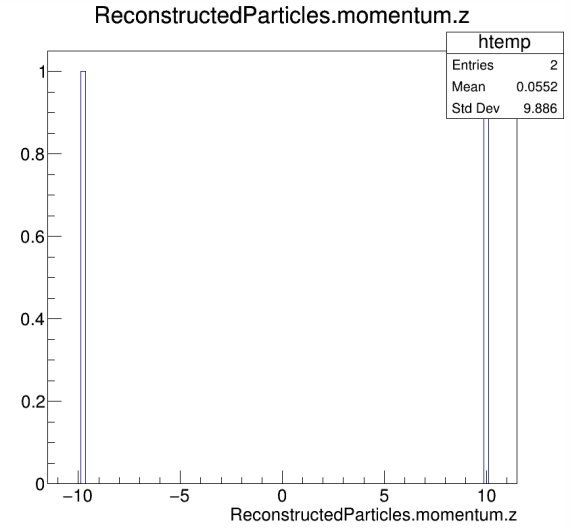


My Simulation – EPIC Nightly build + EICRecon

(10x100GeV^2, Q^2>1GeV^2, 100 events)

Ran EICRecon on same files as I ran juggler on → Successful run (no errors) → 100 events ran, only 2 reconstructed

→ Apparent that strange behaviour occurs during track reconstruction in EICRecon.



Conclusion

- Files present on S3 reconstruct far fewer events than expected
  - Narrowed down problem to track reconstruction in EICRecon