Charged jet EEC using ePIC e+p and e+Au simulation

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Outline

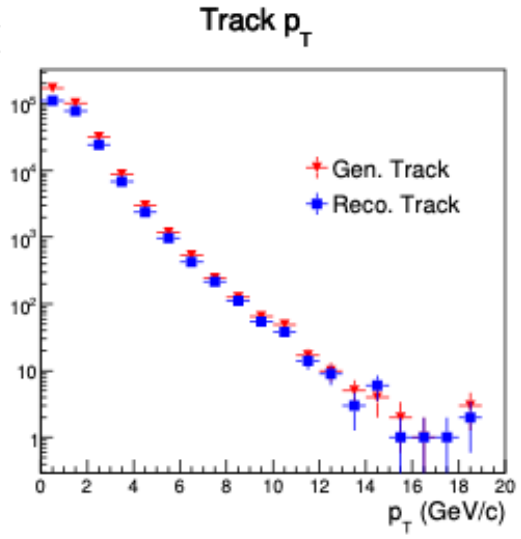
- Simulation samples and cut selections.
- Charged jet kinematics and EEC distributions in 10+100 GeV e+p simulation.
- Charged jet kinematics and EEC distributions in 10+100 GeV e+Au simulation.
- Summary

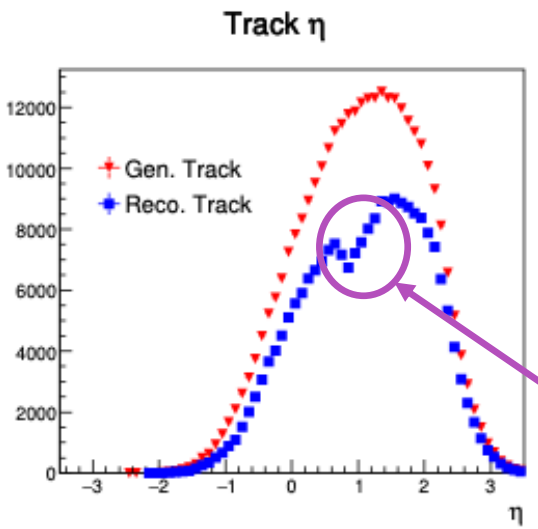
Simulation sample and cut selection

- Simulation samples
  - Jet tree produced by Dener for 10+100 GeV e+p and e+Au simulation. Further divided into Q^2 1-10 GeV^2 and Q^2 10-100 GeV^2 subsamples.
  - Charged jet only, formed from tracks and jet R=1.0.
- Cut selection at the Truth and Reco. Level.
  - Jet is not from a single electron.
  - Jet $p_T > 3$ GeV/c
  - Jet $|\eta| \leq 2.5$
  - No. of constituents in jets ≥ 3
  - Track $p_T > 0.2$ GeV/c

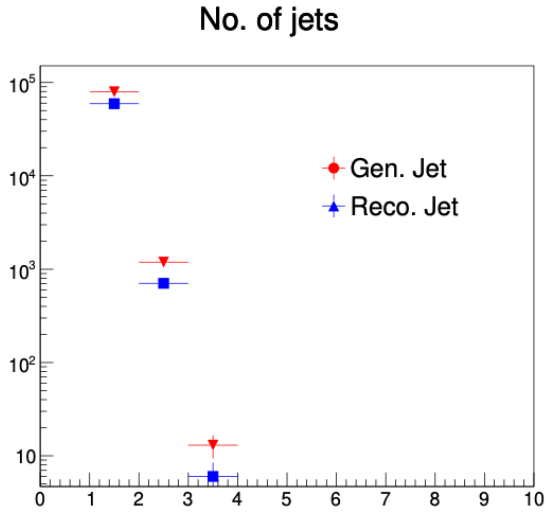
63.2 GeV e+p simulation $Q^2 > 1$ GeV^2

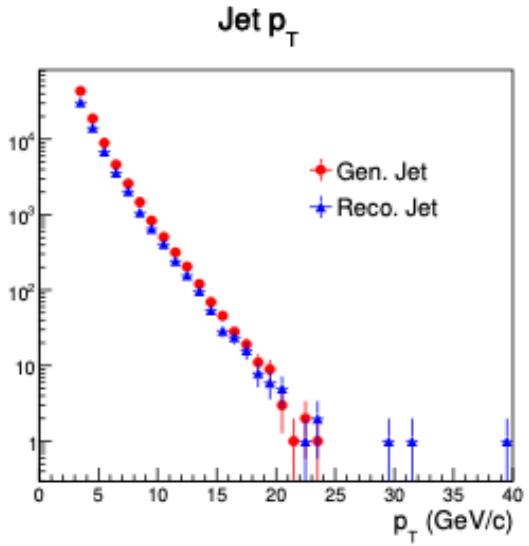
- Track in jet kinematics:

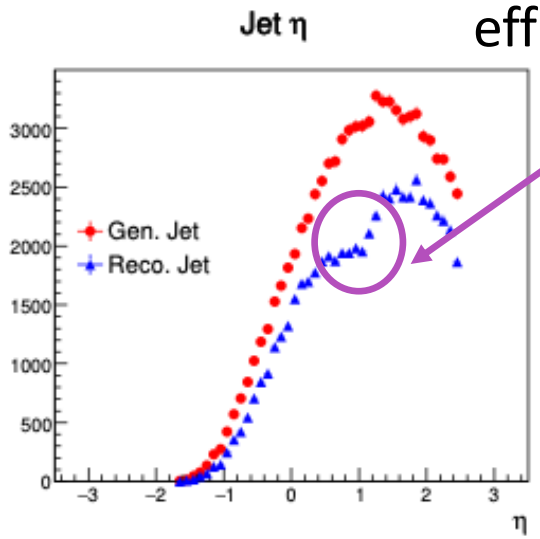




- Jet kinematics:



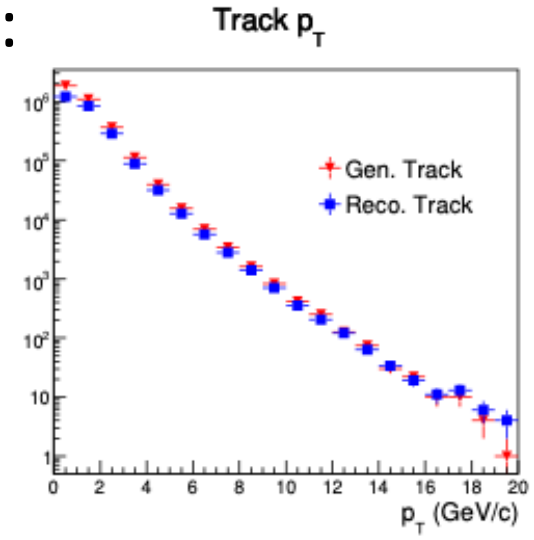


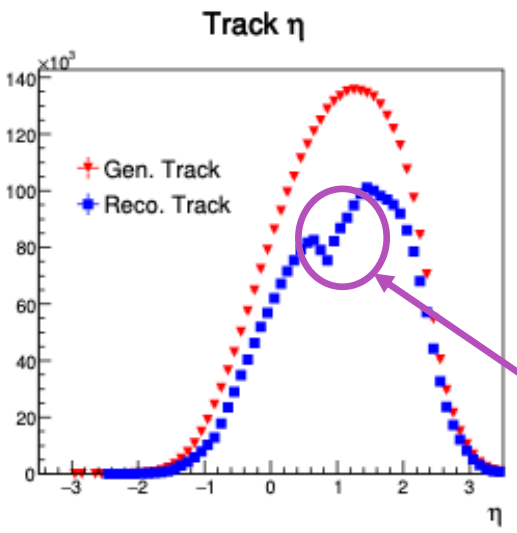


Low track reconstruction efficiency in this region?

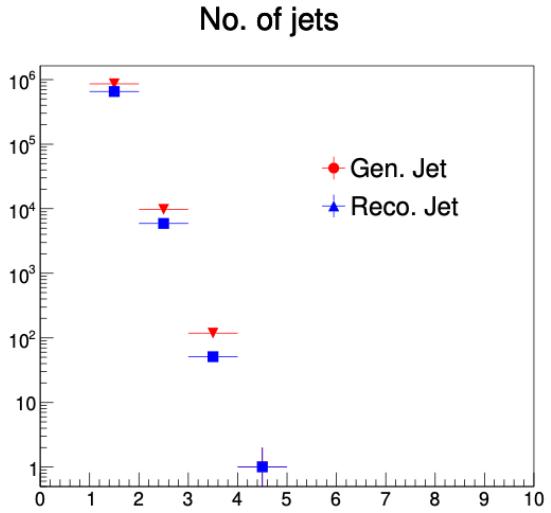
63.2 GeV e+p simulation $Q^2 > 10\ GeV^2$

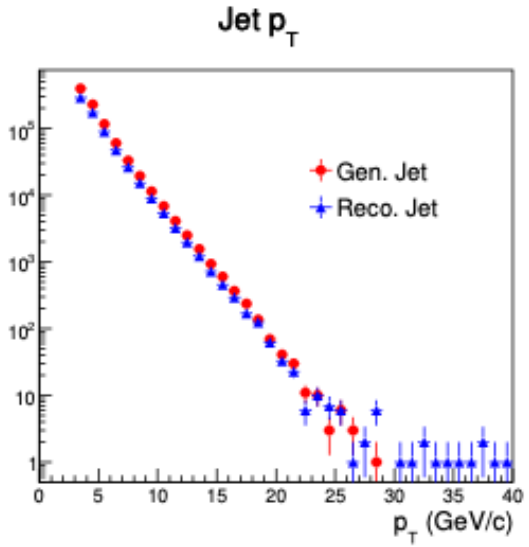
- Track in jet kinematics:

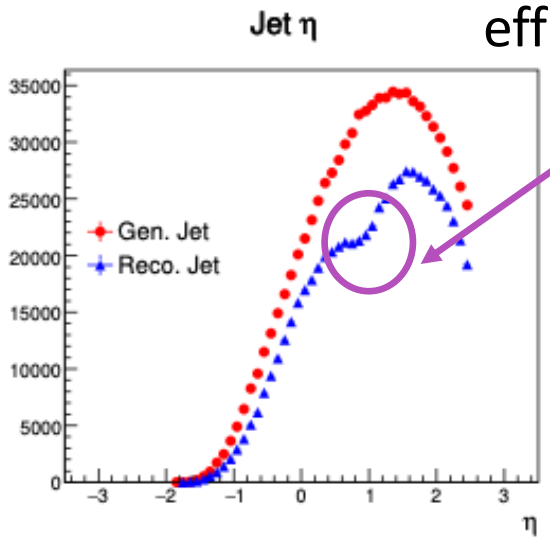




- Jet kinematics:



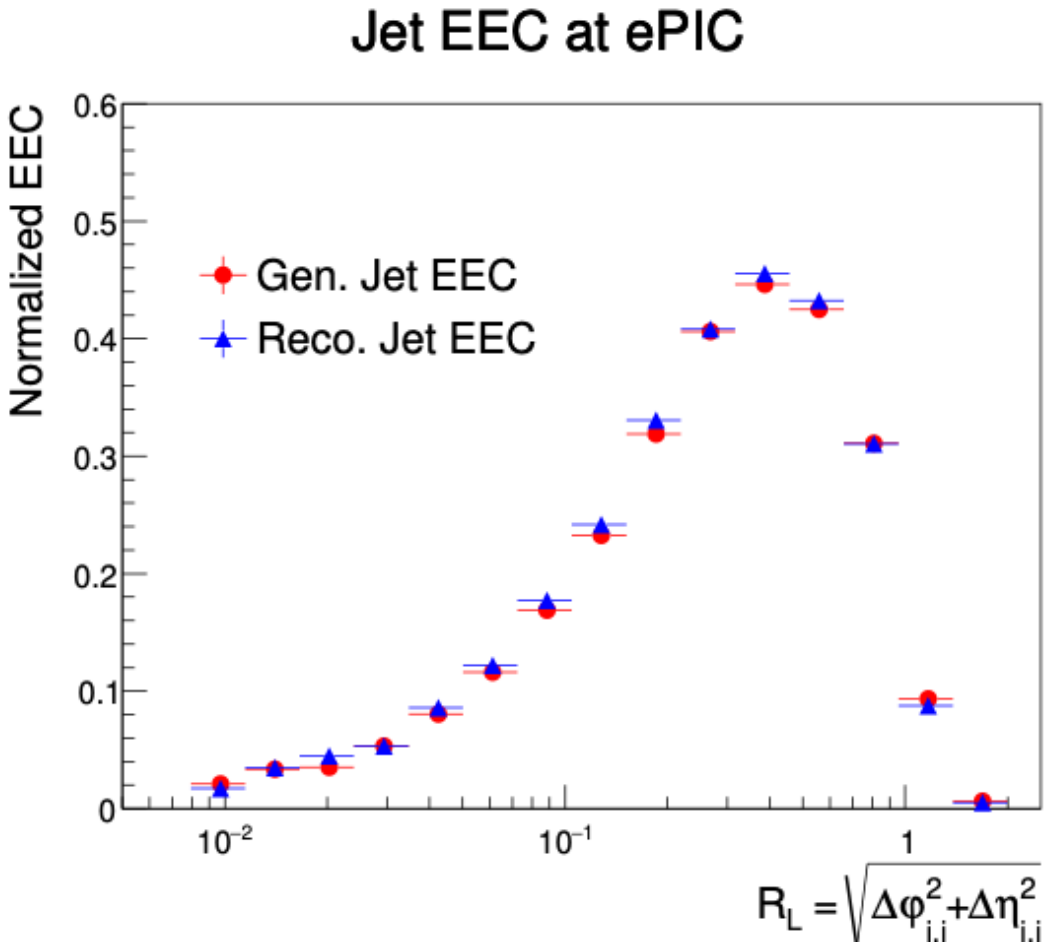


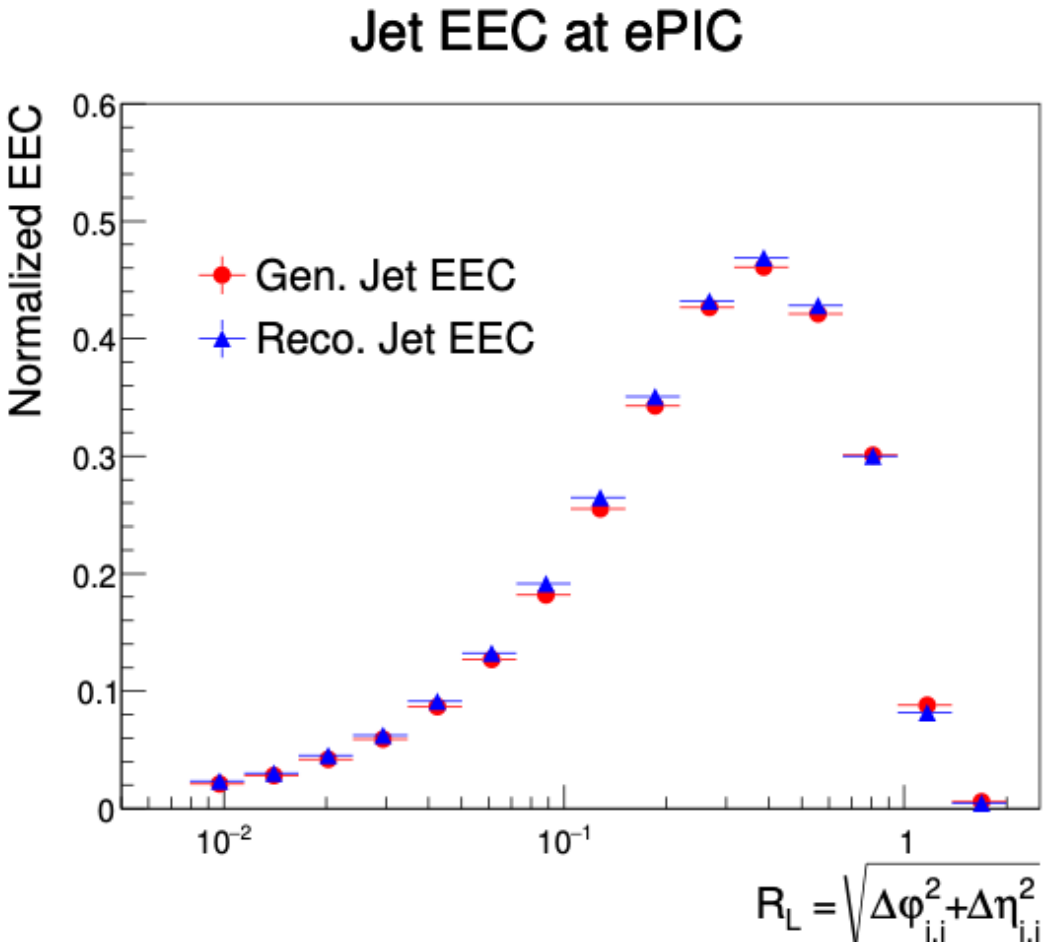


Low track reconstruction efficiency in this region?

Charged Jet EEC in 63.2 e+p simulation

- Left: Q^2>1 GeV^2, right: Q^2 >10 GeV^2.

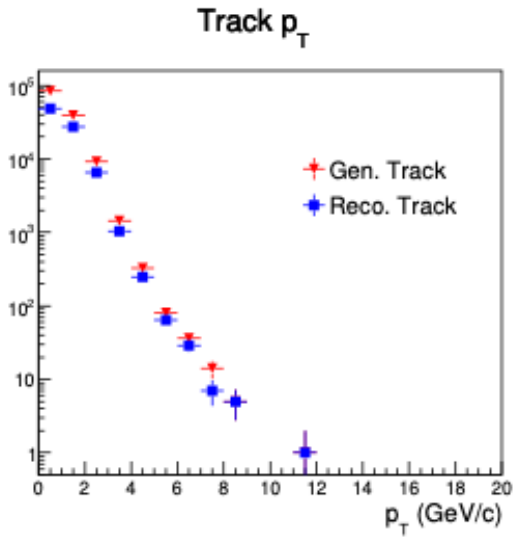


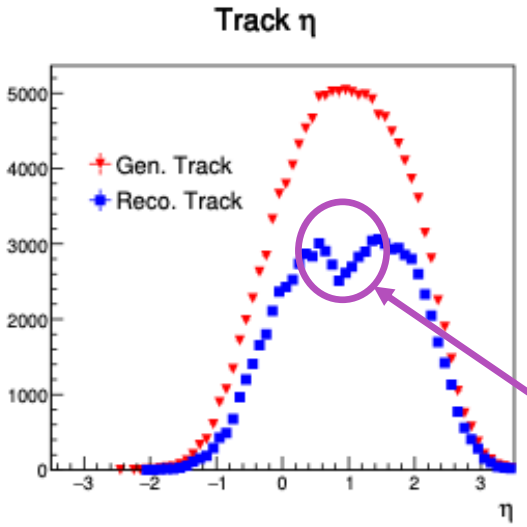


- It sems the charge jet EEC has less dependence on Q^2.

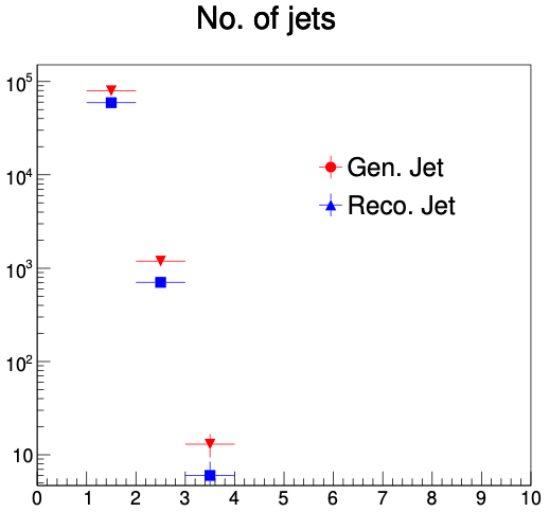
63.2 GeV e+Au simulation Q^2 1-10 GeV^2

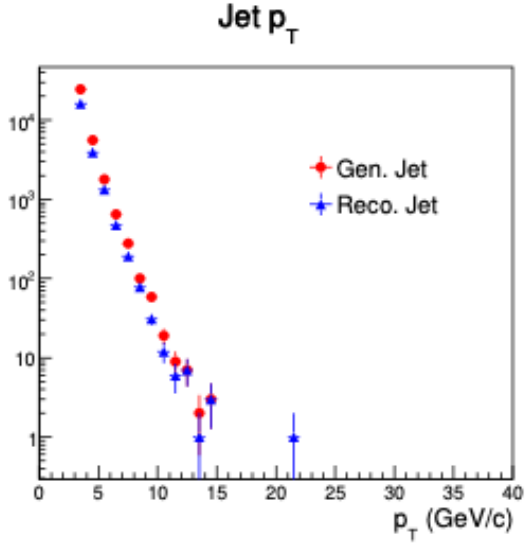
- Track in jet kinematics:

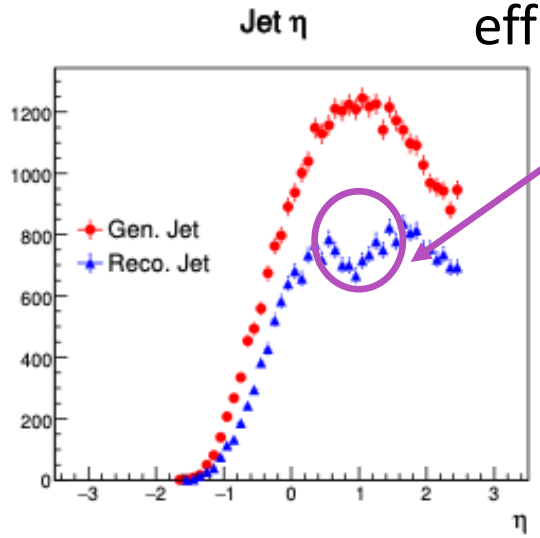




- Jet kinematics:



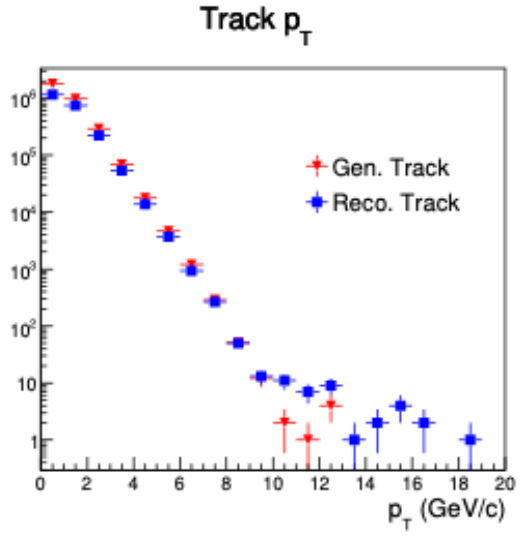


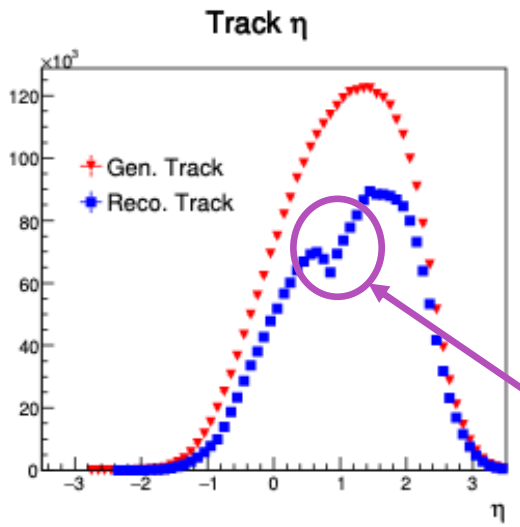


Low track reconstruction efficiency in this region?

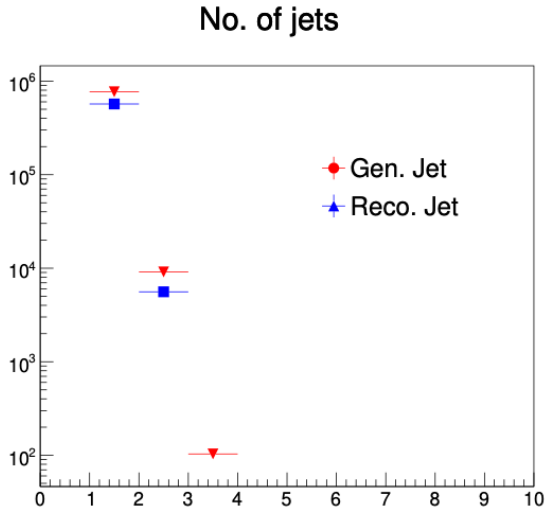
63.2 GeV e+Au simulation Q^2 10-100 GeV^2

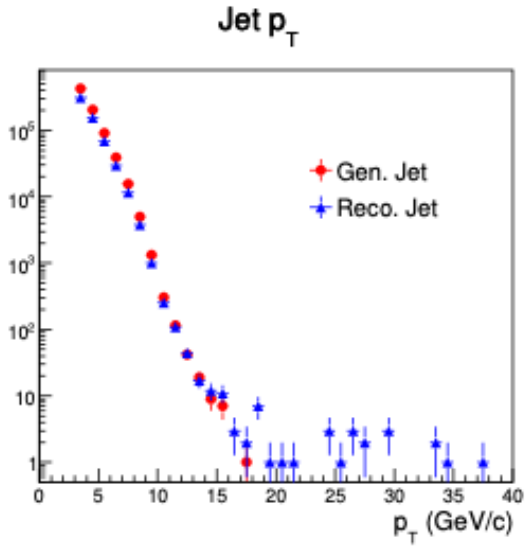
- Track in jet kinematics:

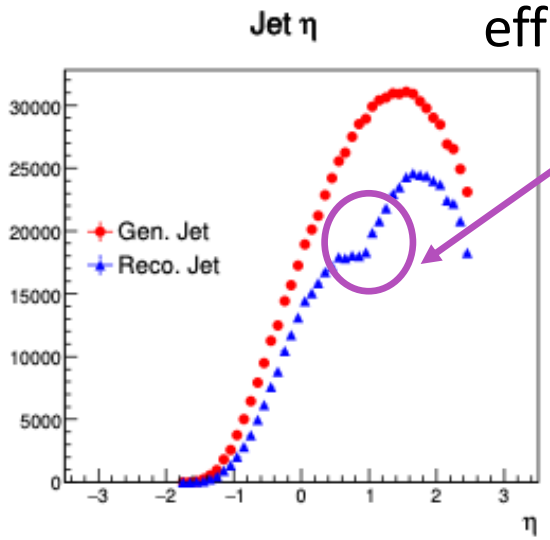




- Jet kinematics:



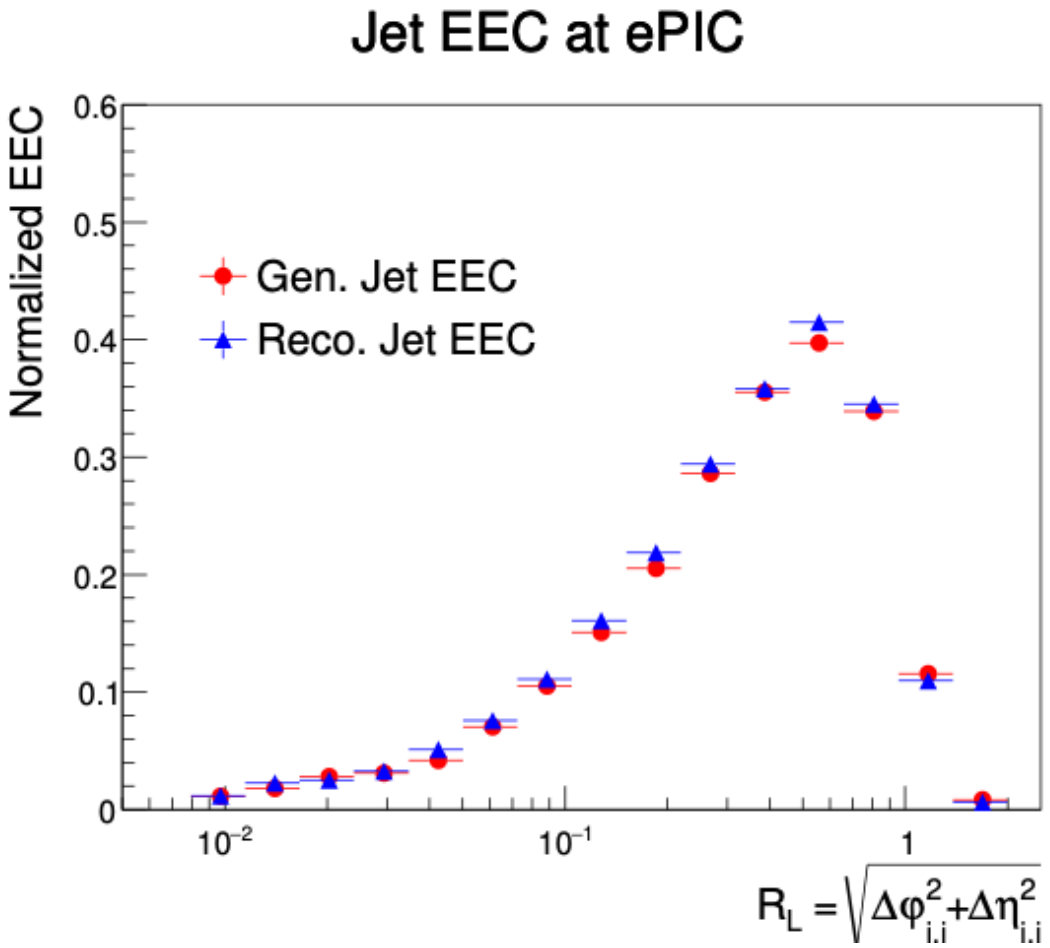


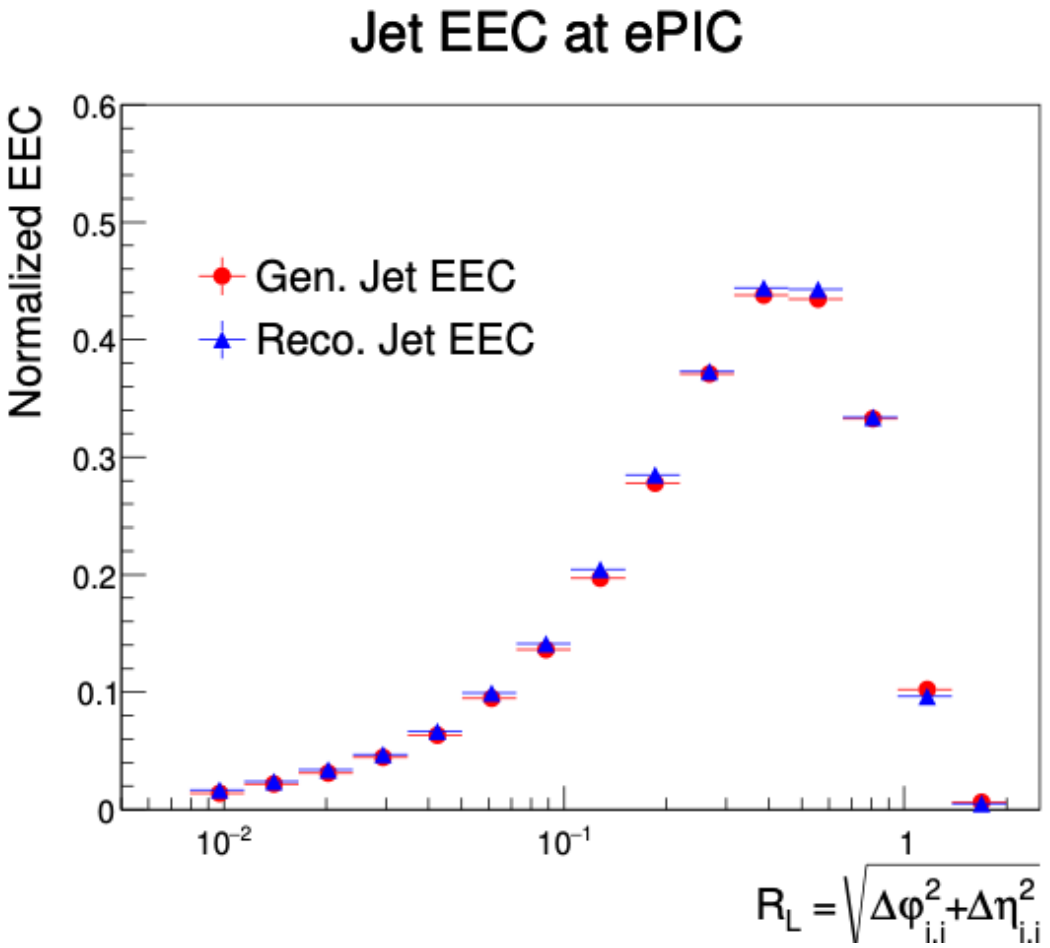


Low track reconstruction efficiency in this region?

Charged Jet EEC in 63.2 e+Au simulation

- Left: Q^2 1-10 GeV^2, right: Q^2 10-100 GeV^2.

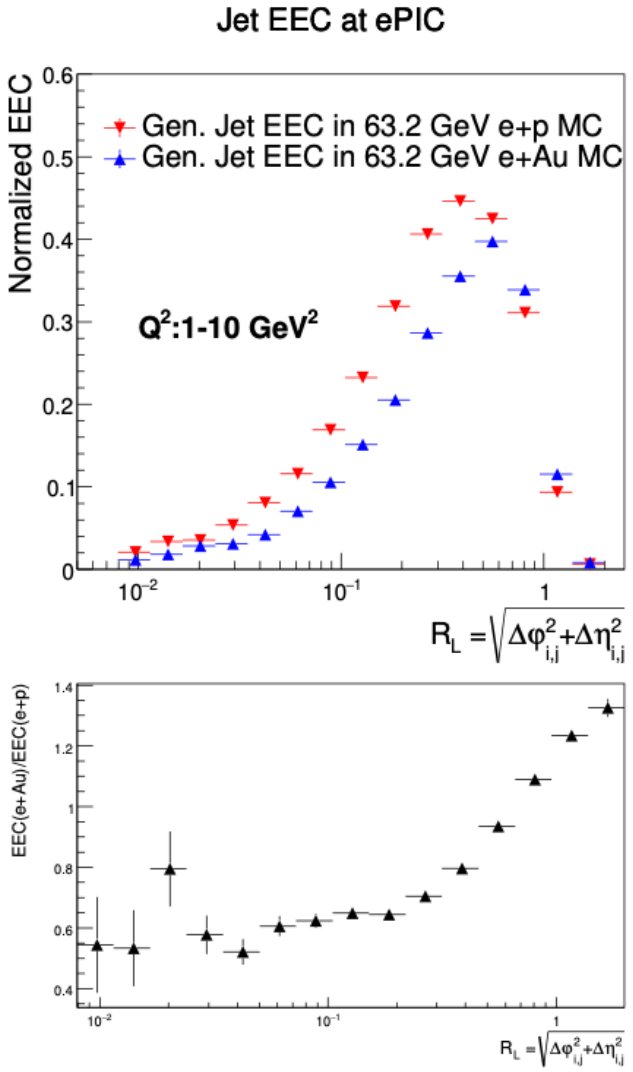


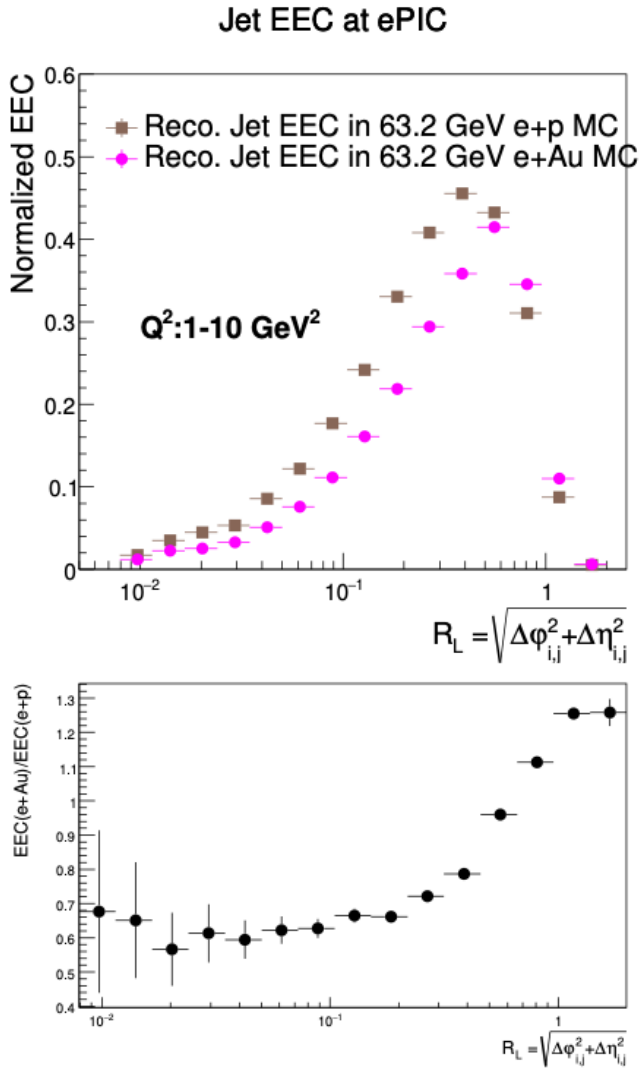


- It sems the charge jet EEC has some dependence on Q^2 in e+Au collisions.

Charged jet EEC ration between e+p and e+Au collisions (Q^2 1-10 GeV^2)

- Left: generation level: reconstruction level.

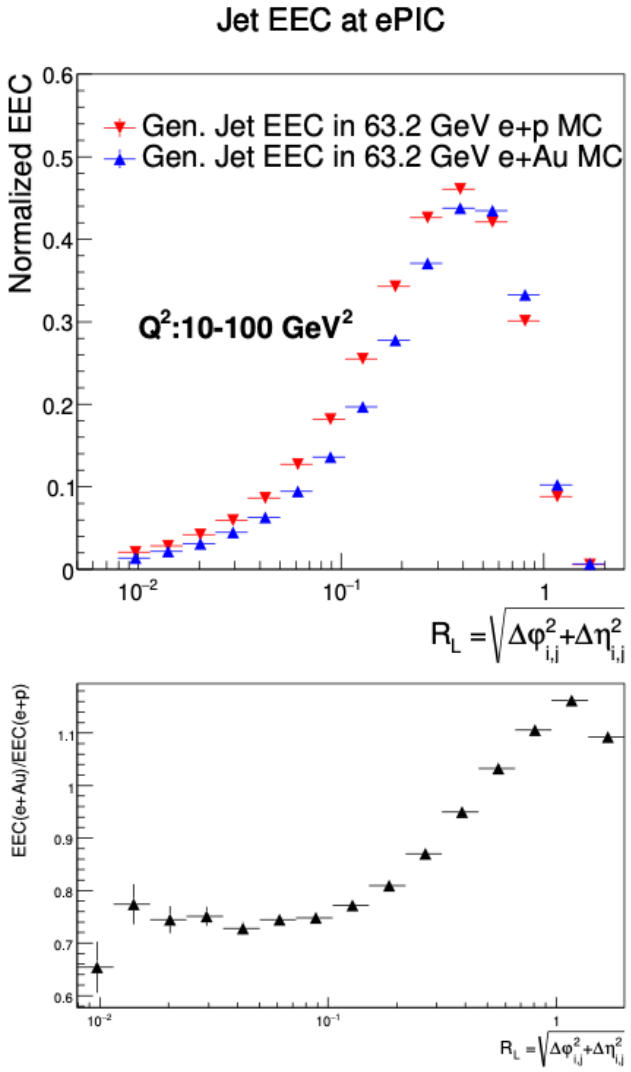


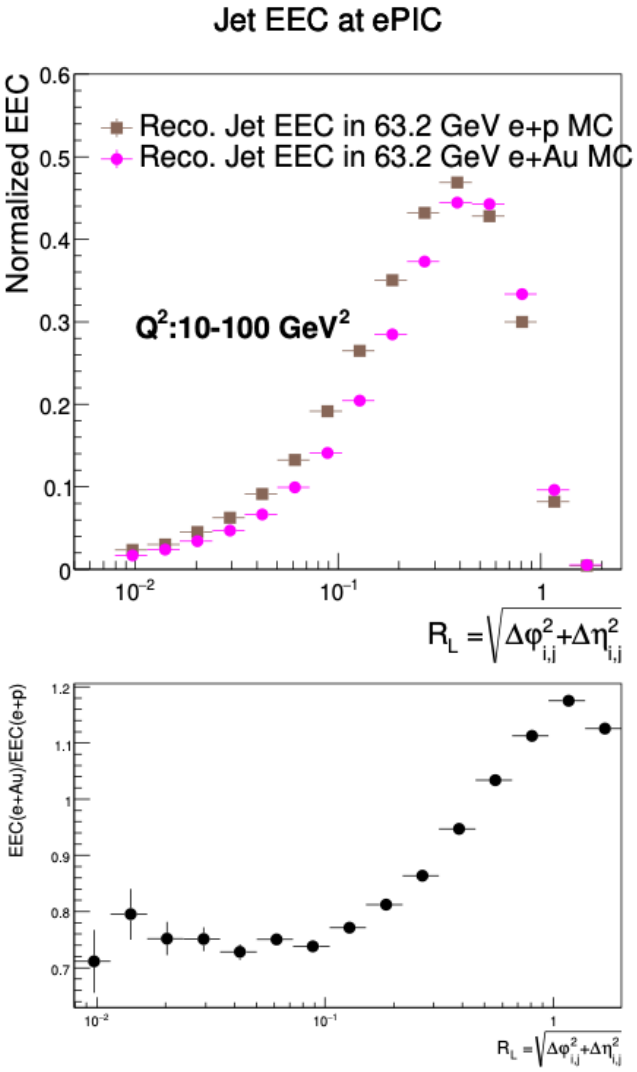


- Jet EEC in e+Au collisions is suppressed in the small angel region and gets enhanced in the large angle region.

Charged jet EEC ration between e+p and e+Au collisions (Q^2 10-100 GeV^2)

- Left: generation level: reconstruction level.



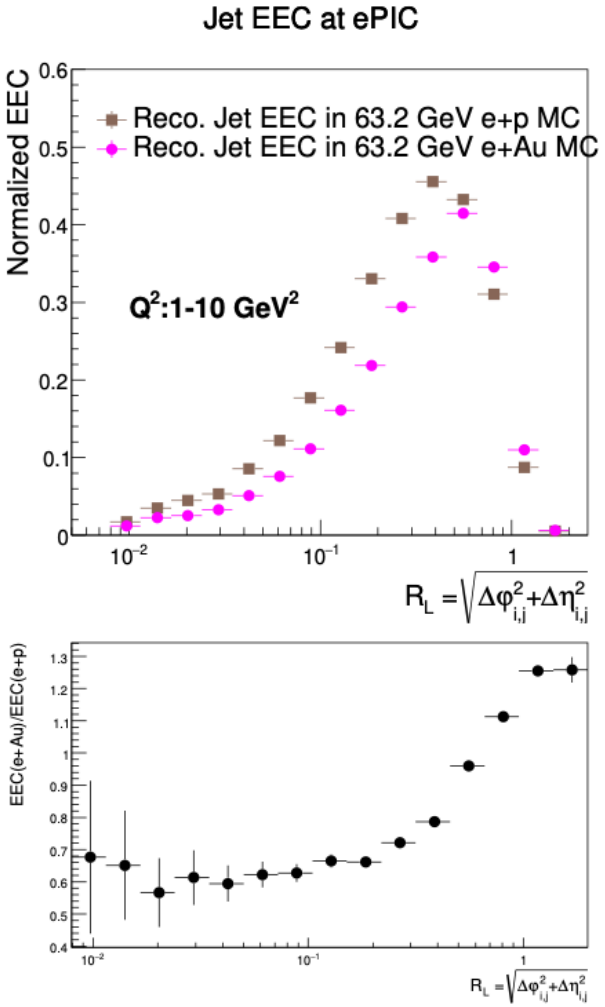


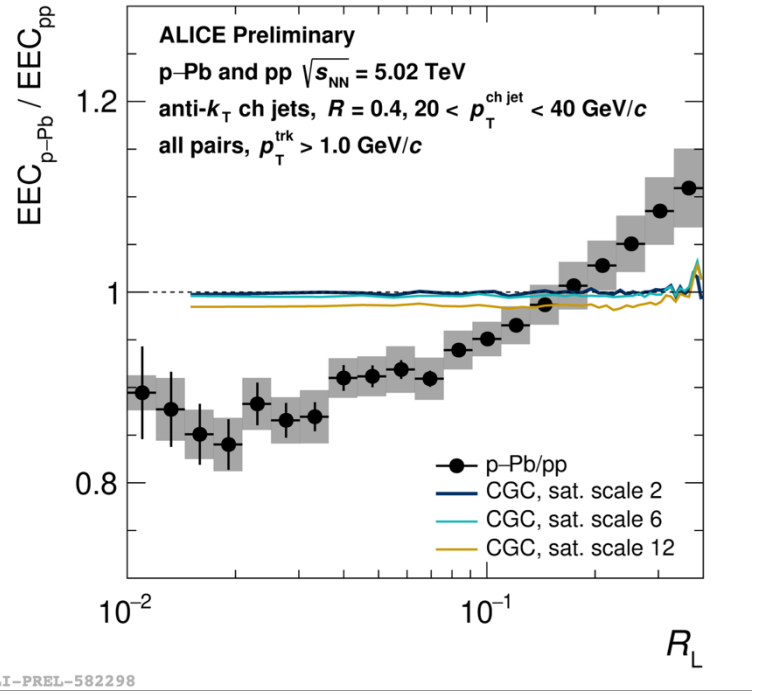
- The magnitude of suppression or enhancement in the jet EEC in e+Au collisions.

Charged jet EEC ration between e+p and e+Au collisions

- Charged jet EEC e+Au yields over e+p yields (left), charged jet EEC p+Pb yields over p+p yields measured by ALICE.

- Initial-state effects?
- Final-state effects?
- Track and jet selections?





Summary

- First check of charge jet EEC using the ePIC simulation has been performed.
- Need to investigate the track/jet yield drop in η=~0.8.
- Open to work on other EEC related observables for the early science report.