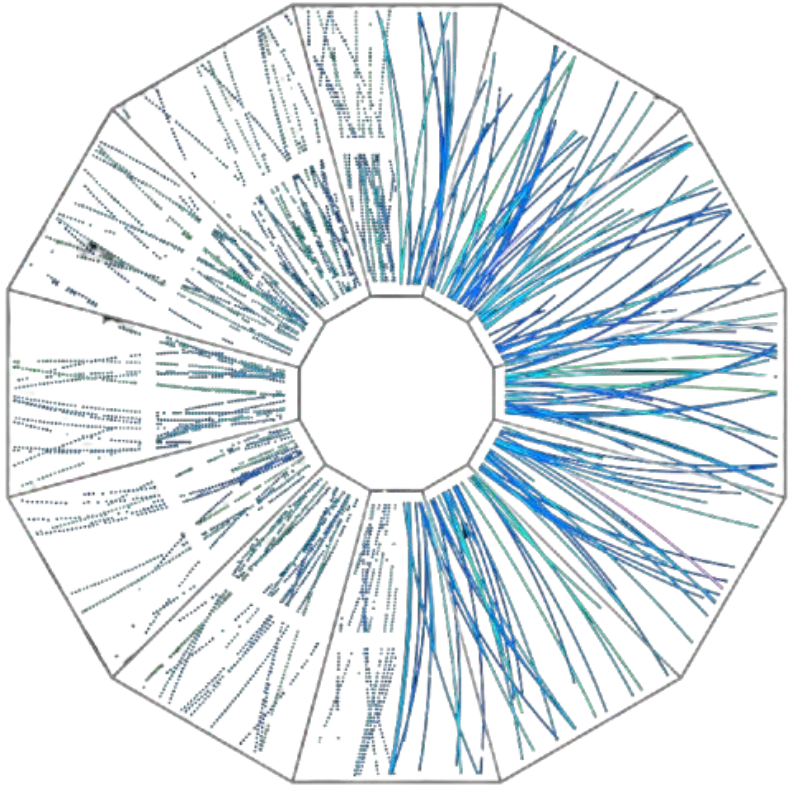
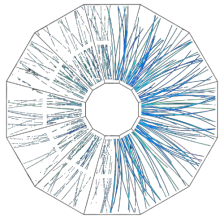
An update on jet studies



Dener De Souza Lemos (BNL)

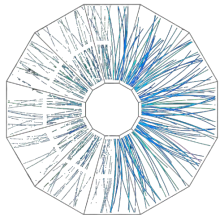
Jets & HF PWG Meeting



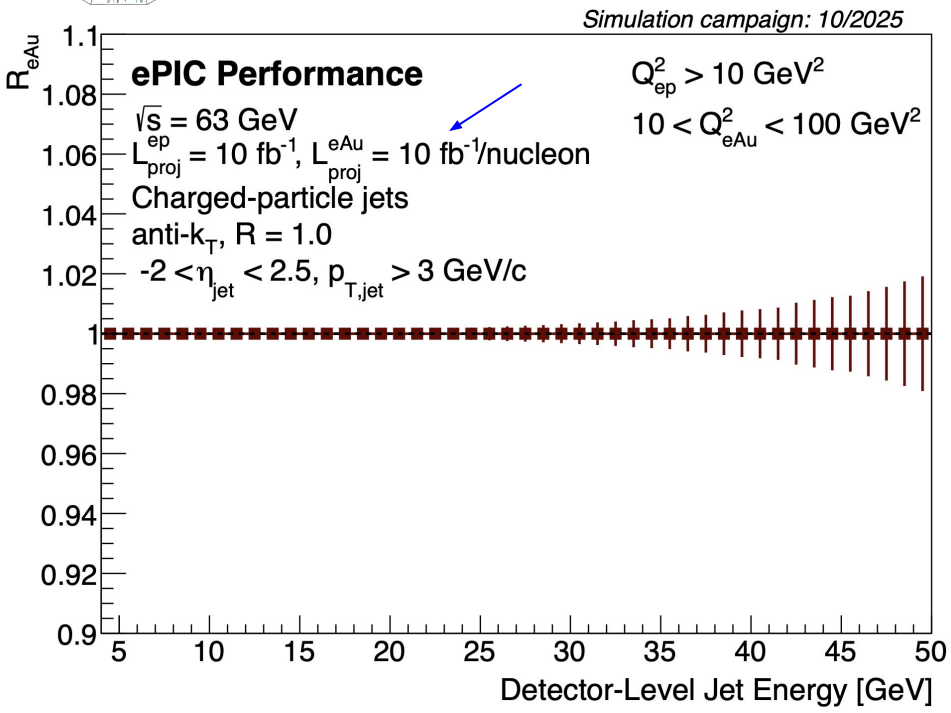
Simulation Details

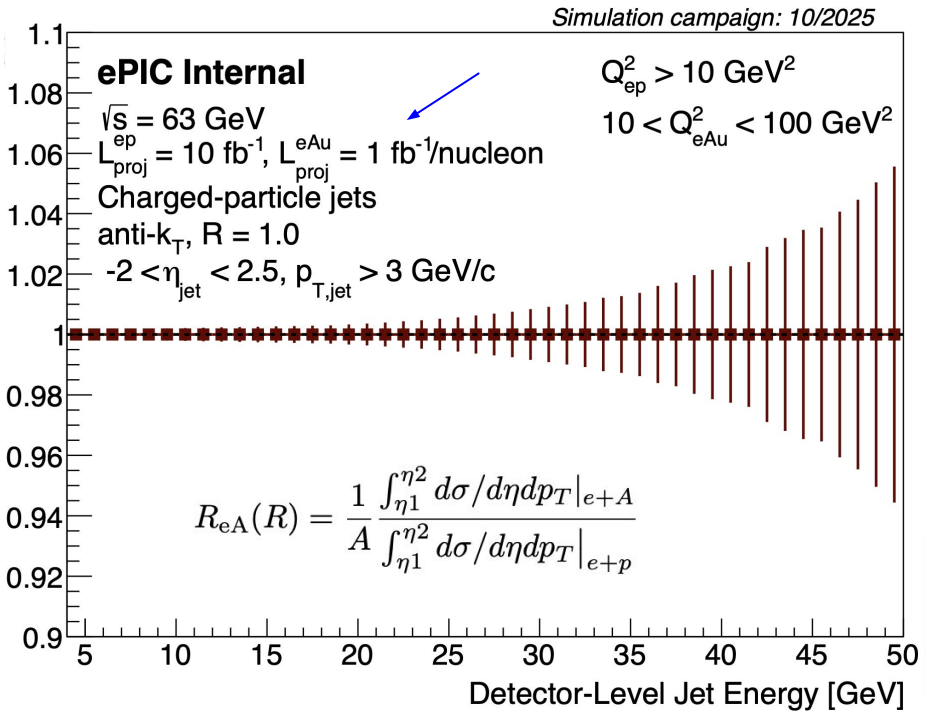
- Energy: 10x100
- Geometry: **25.10**
- ep: official production (NCDIS)
  - PYTHIA8.306
    - **q^2 min = 1 and q^2 min = 10**
- eAu: official production (DIS)
  - BeAGLE103
    - **$1 < q^2 < 10$ and $10 < q^2 < 100$**

- Jet reconstruction
  - Charged jets:
    - ReconstructedChargedJets
    - GeneratedChargedJets
    - Remove jets with 1 track inside
    - Cuts in the plots
    - Electron removed using true PID
    - Geometrical matching $\Delta R < 1.0$
  - Jet Tree makers (anti-k_T with R = 1.0):
    - https://github.com/denerslemos/CHJetsReCluster



Nuclear Modification Factor: R_{eAu}





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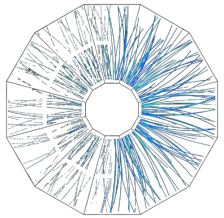
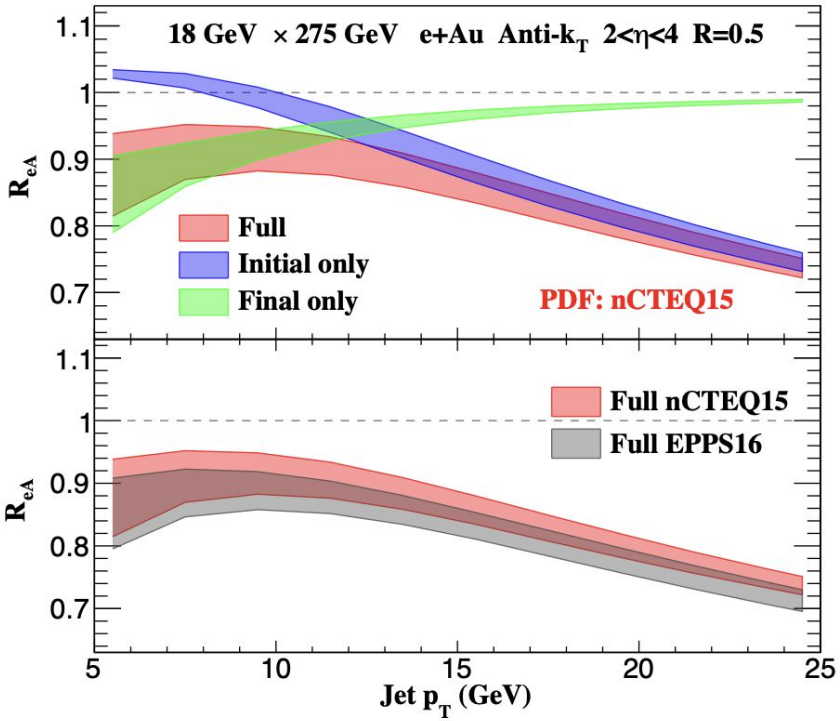
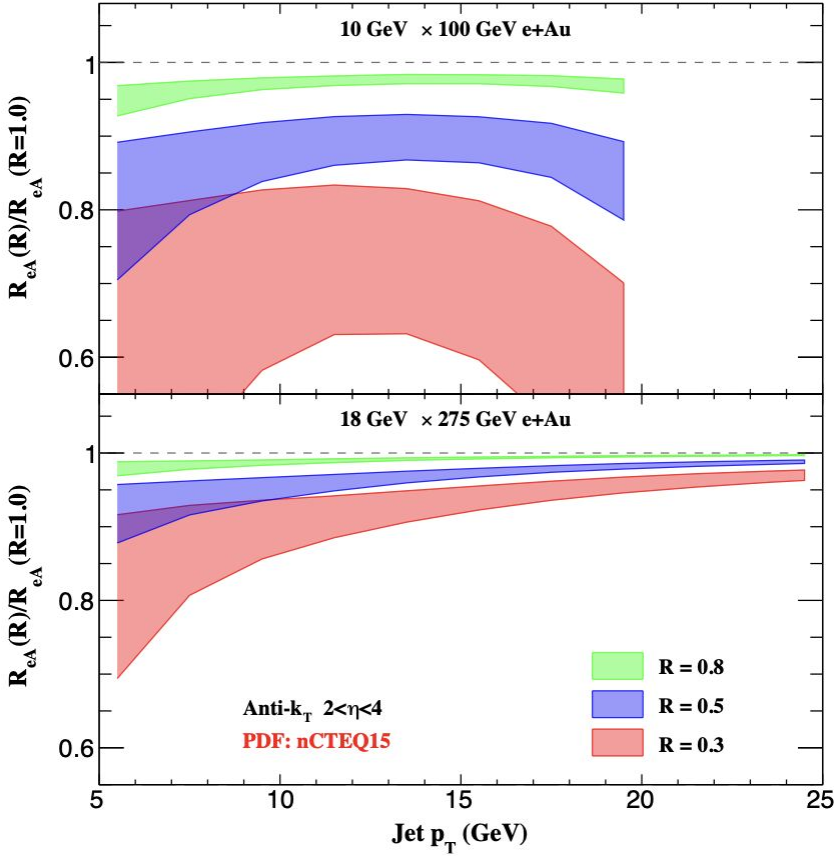


Different radii R_{eAu}





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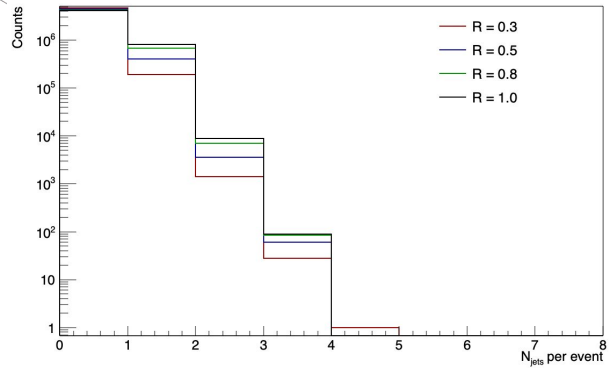
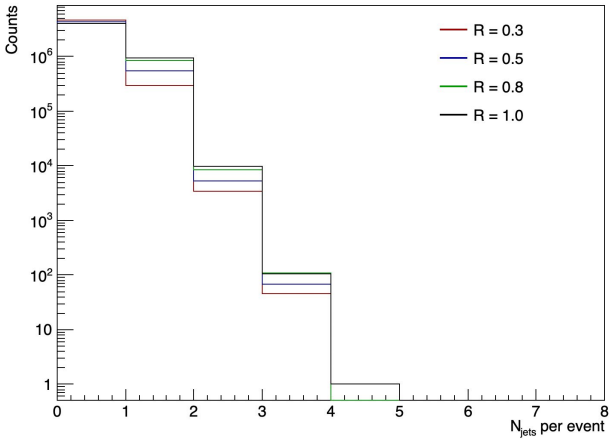
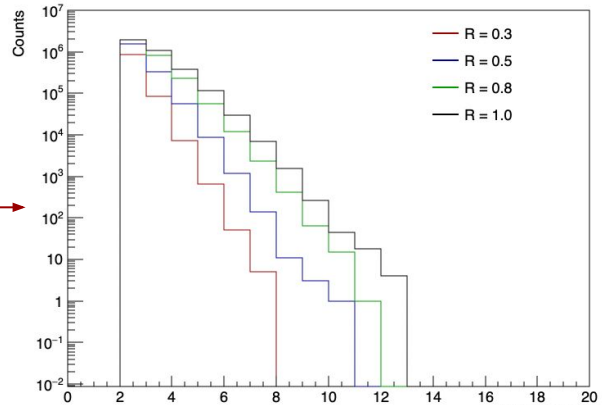
QA for different jet R (I)

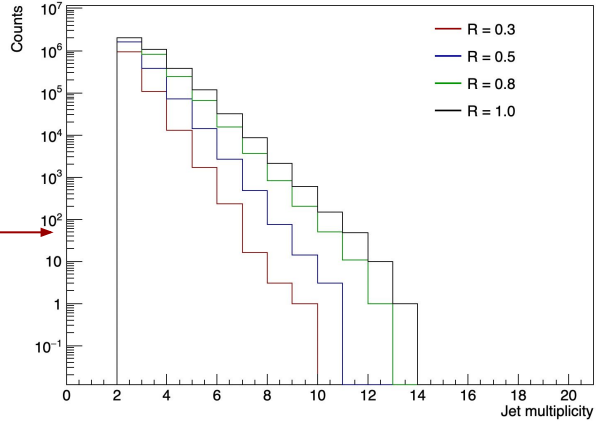




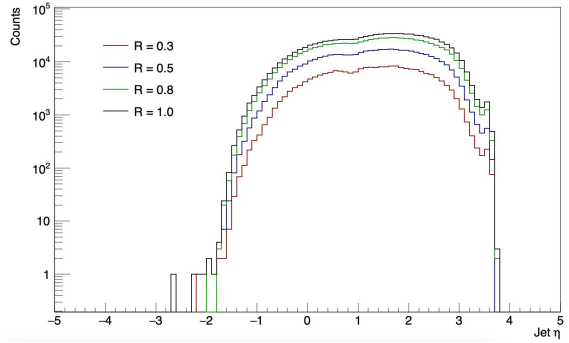
e+Au

e+p

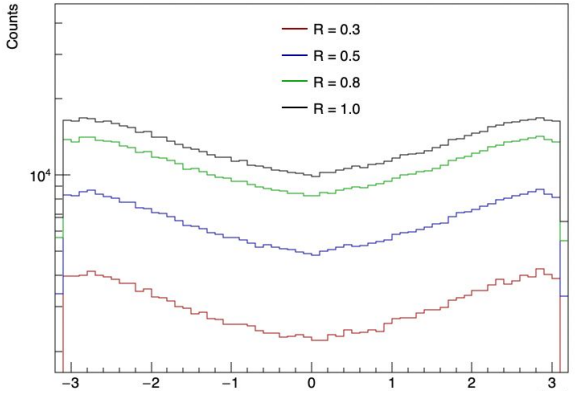


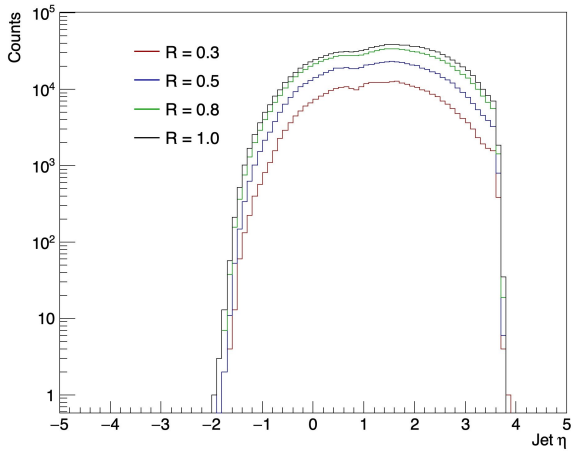


QA for different jet R (II)

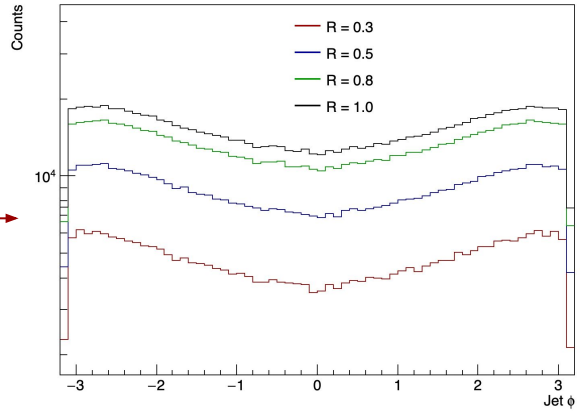


e+Au

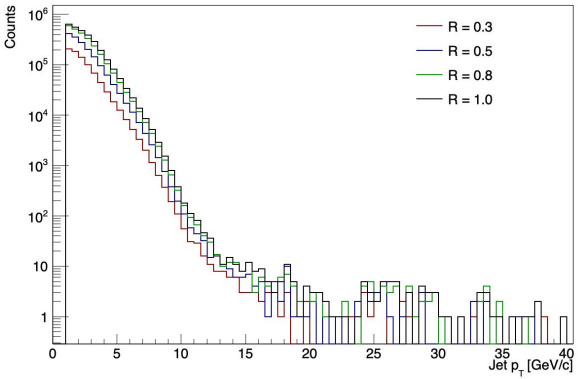




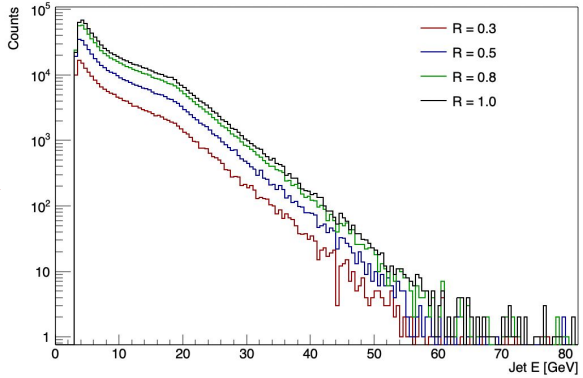
e+p

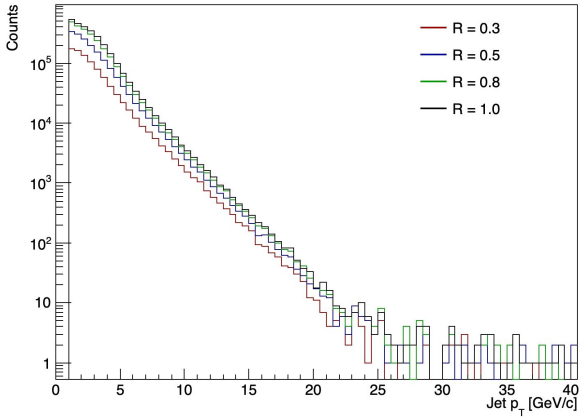


QA for different jet R (III)

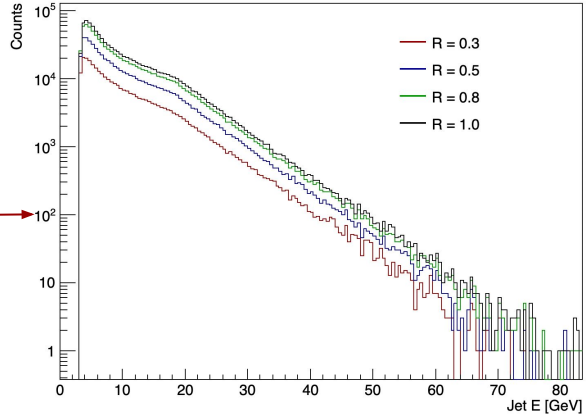


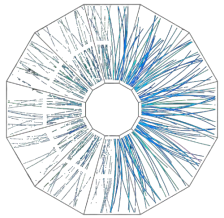
e+Au



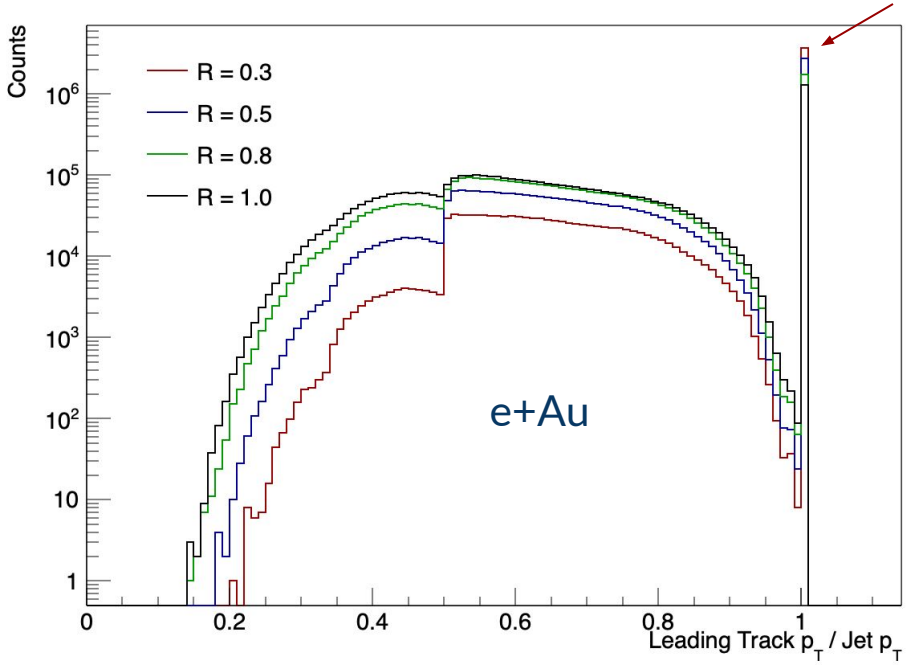


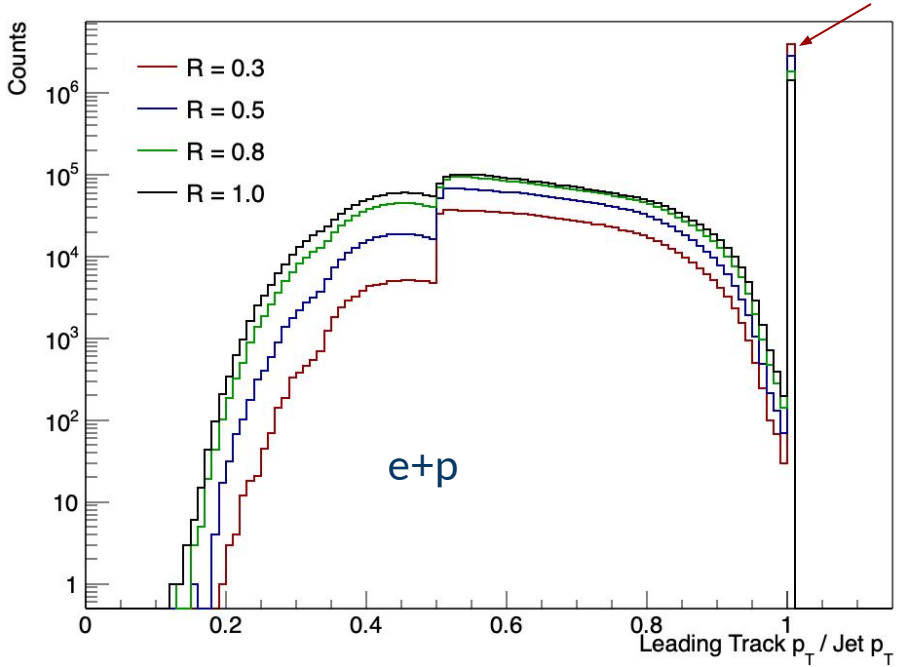
e+p





QA for different jet R (IV)





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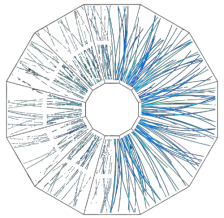
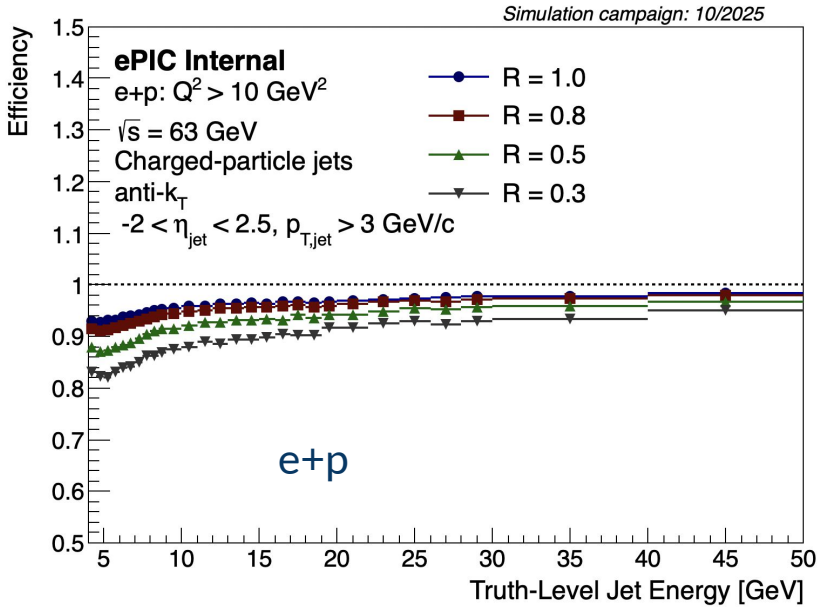
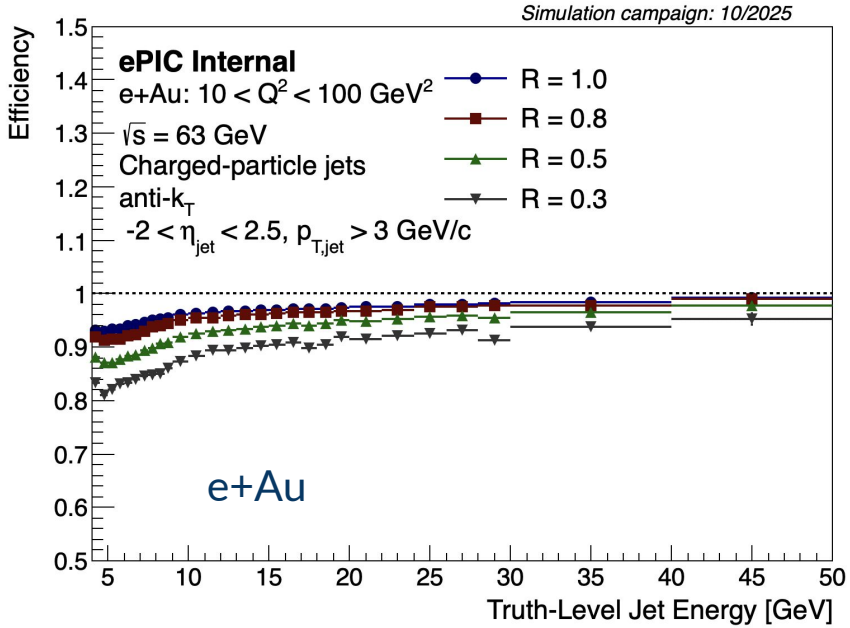


Efficiency





Efficiency drops for jets with smaller radius

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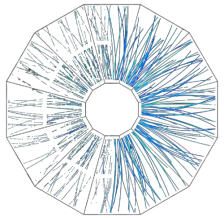
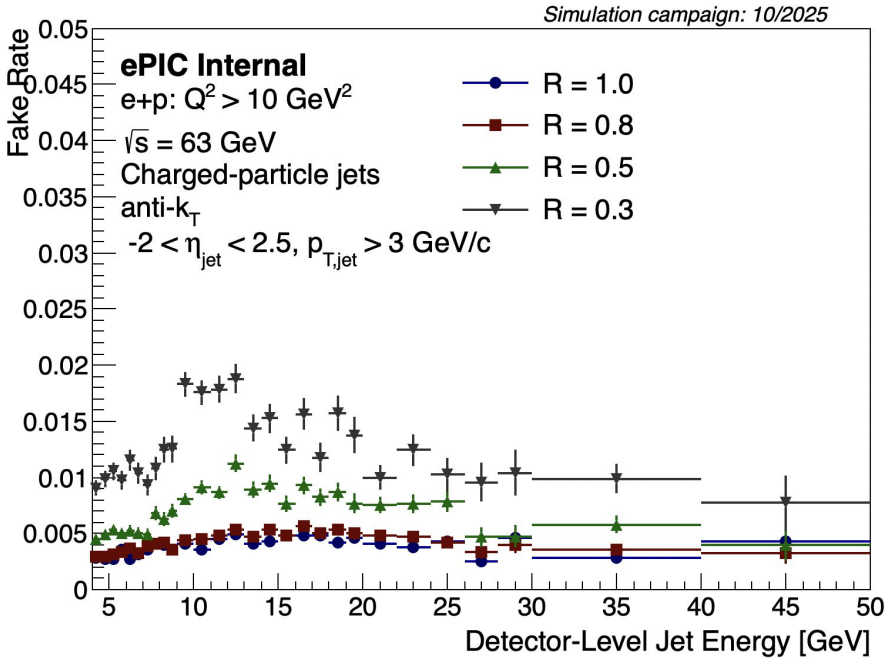
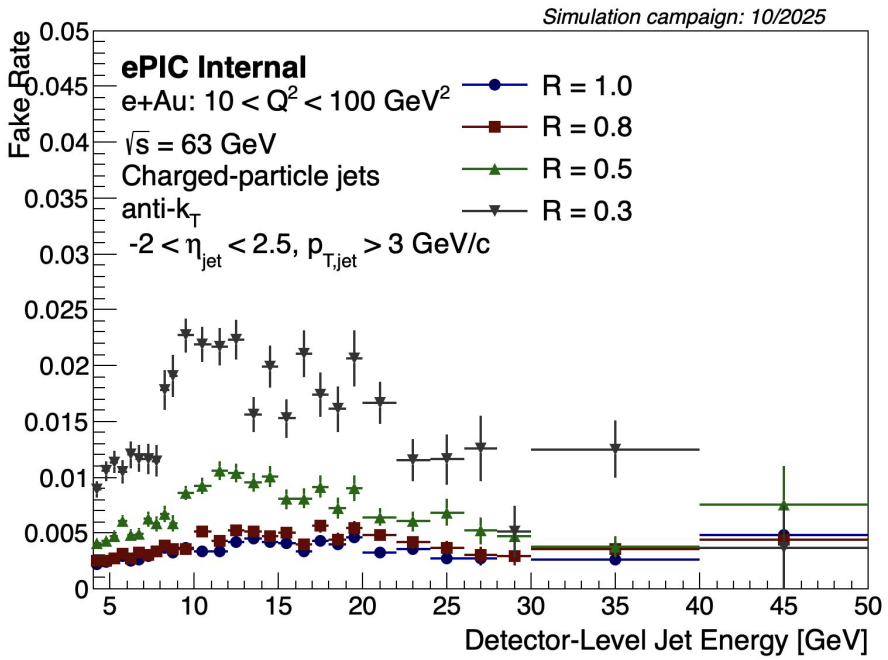


Fake Rate





Fake Rate increase for jets with smaller radius

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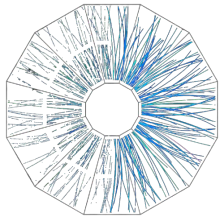
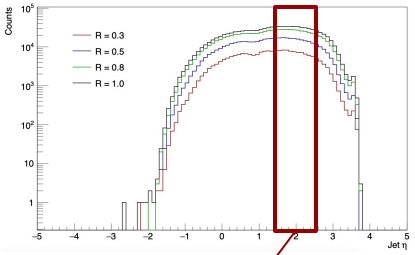
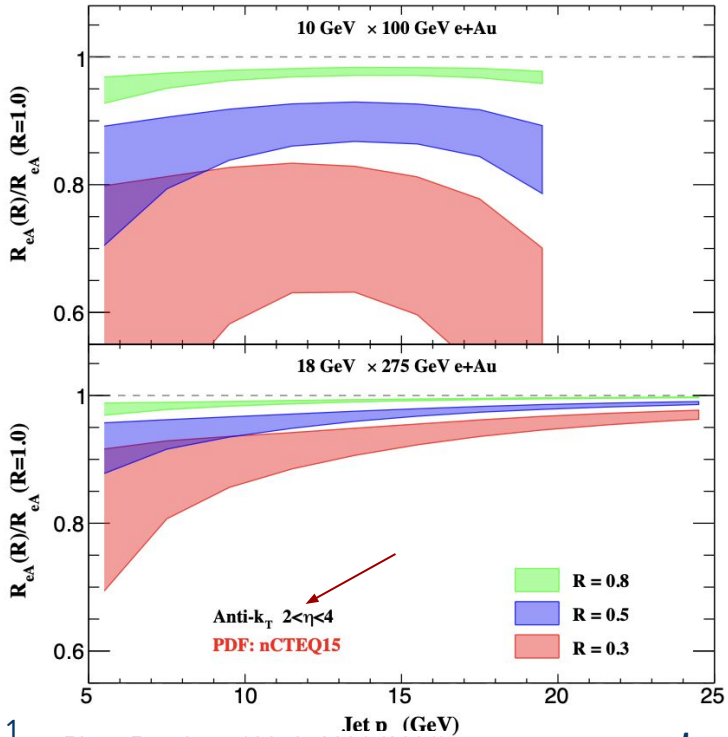
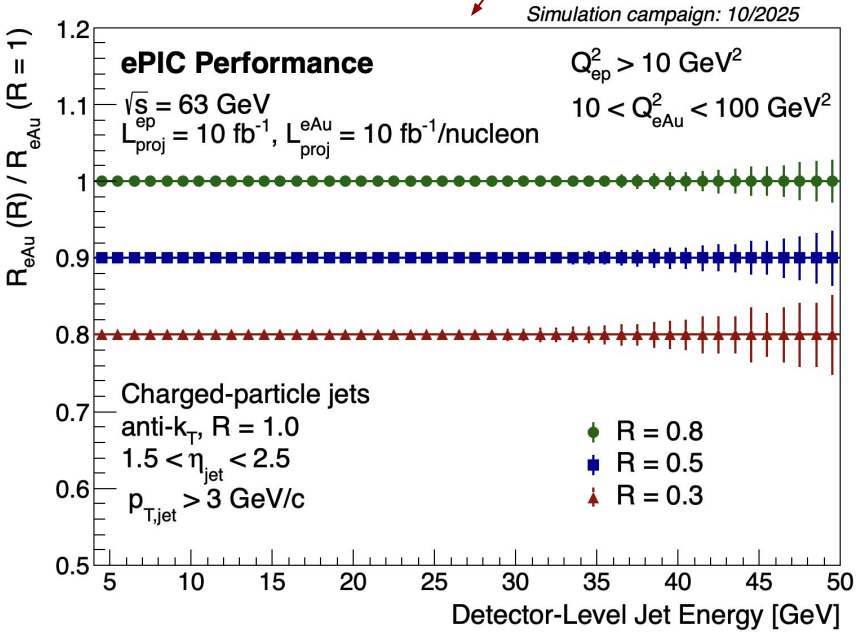


Different radii R_{eAu}







orange to apples comparison

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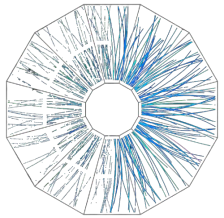
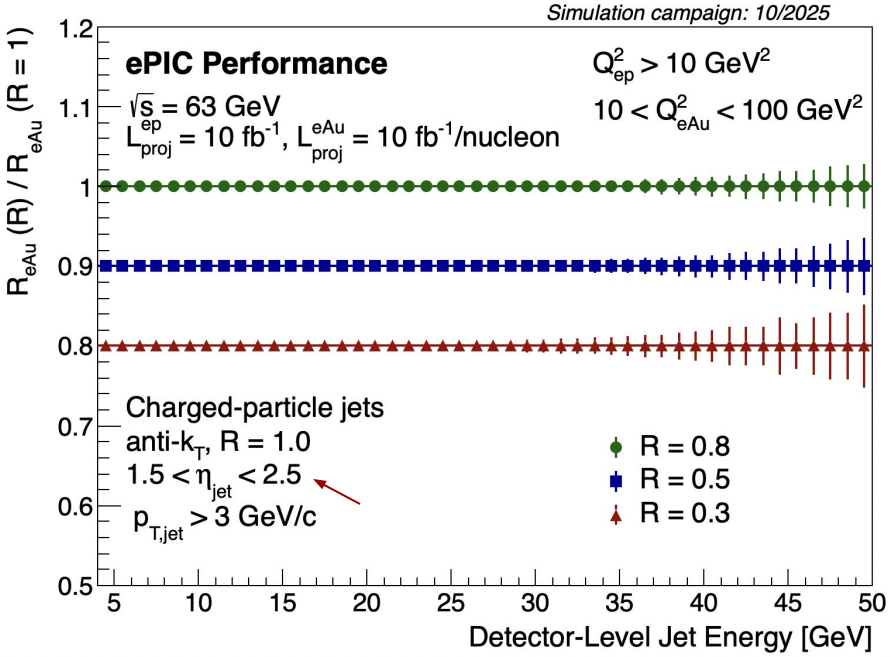
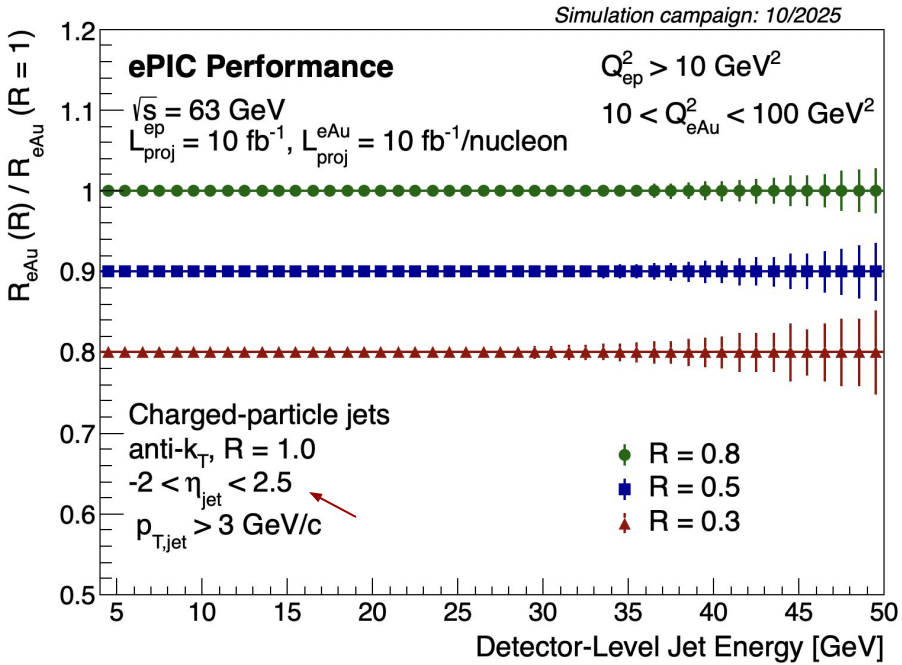


Different radii R_{eAu}





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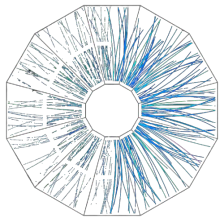
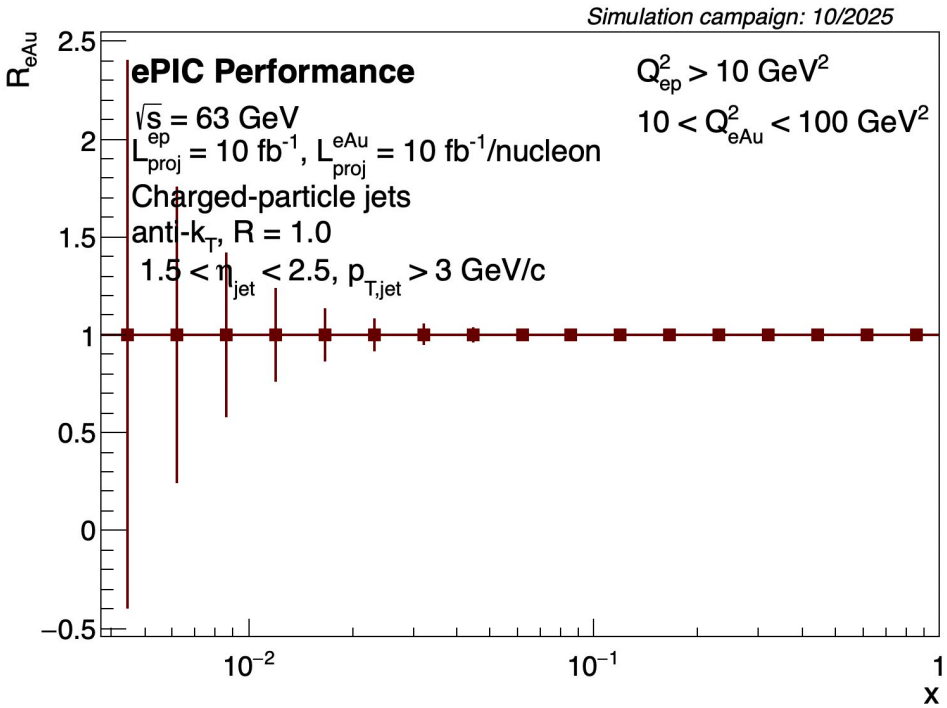


R_{eAu} as function of x



- Logarithmic bins
  - Have to double check
- Have to look at low-Q^2 samples
- Needs more studies on scattered electron removal

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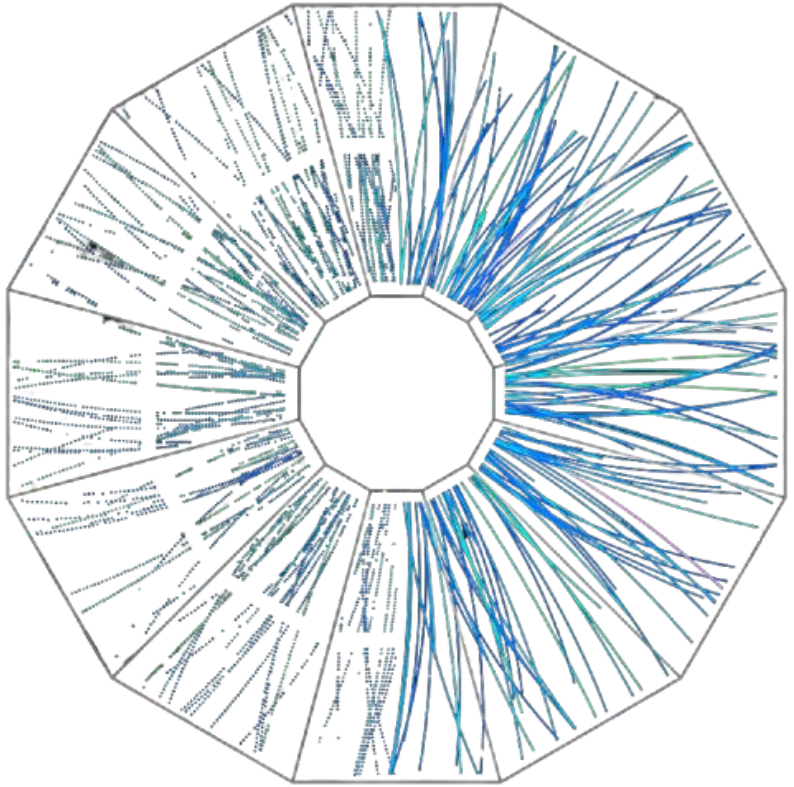
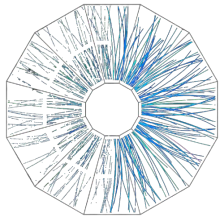
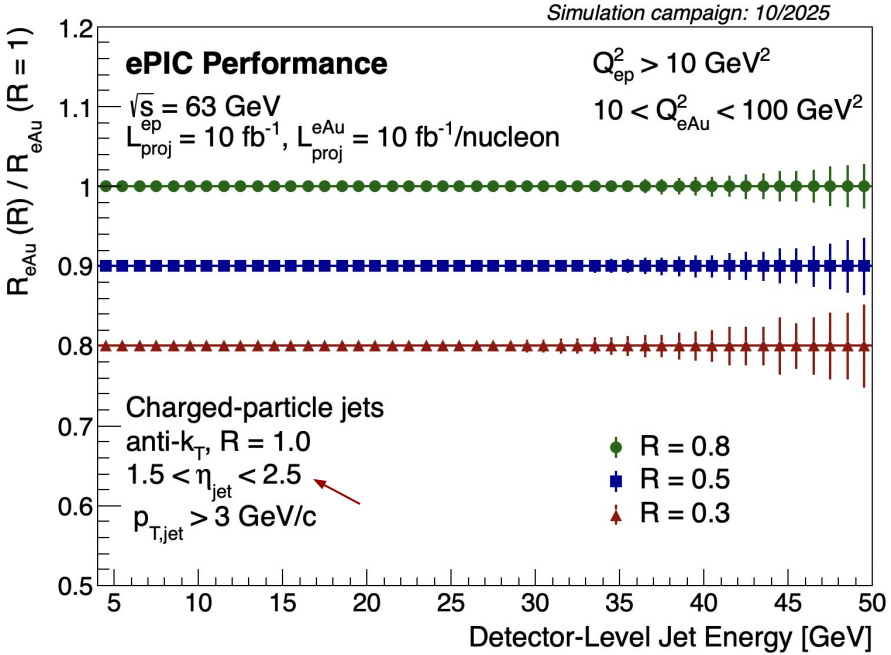
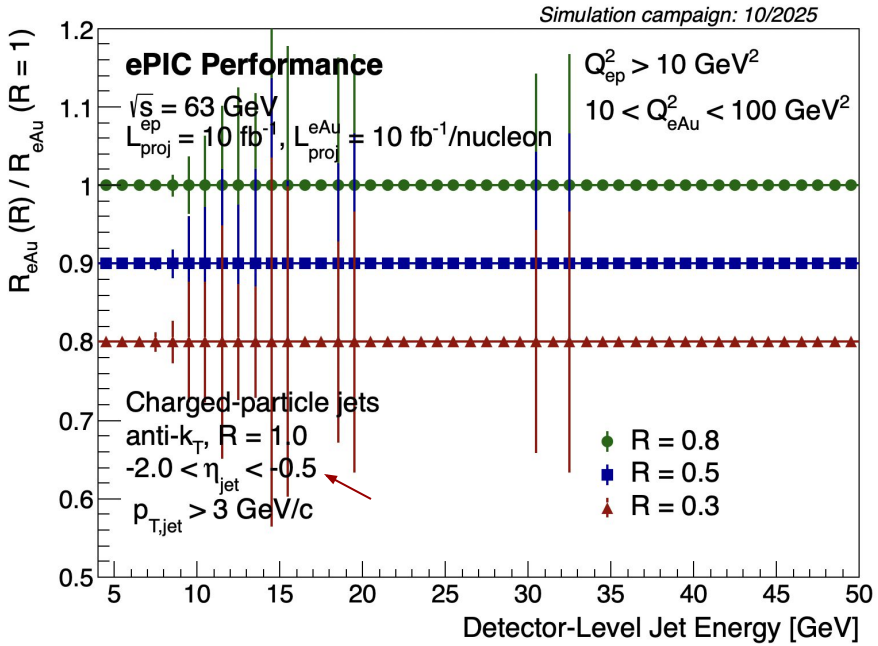
Backup





Different radii R_{eAu}





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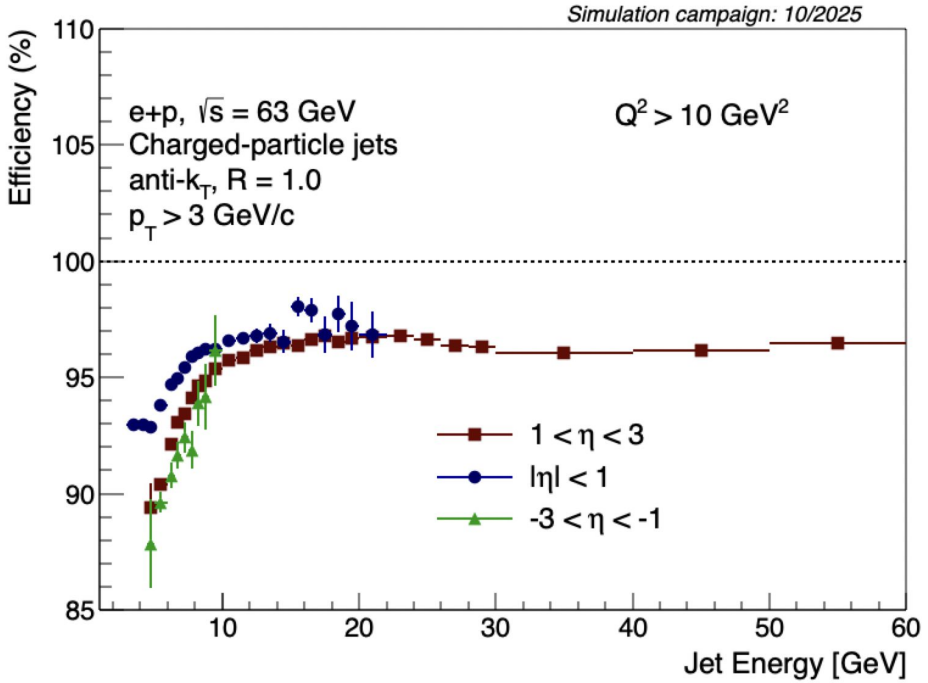
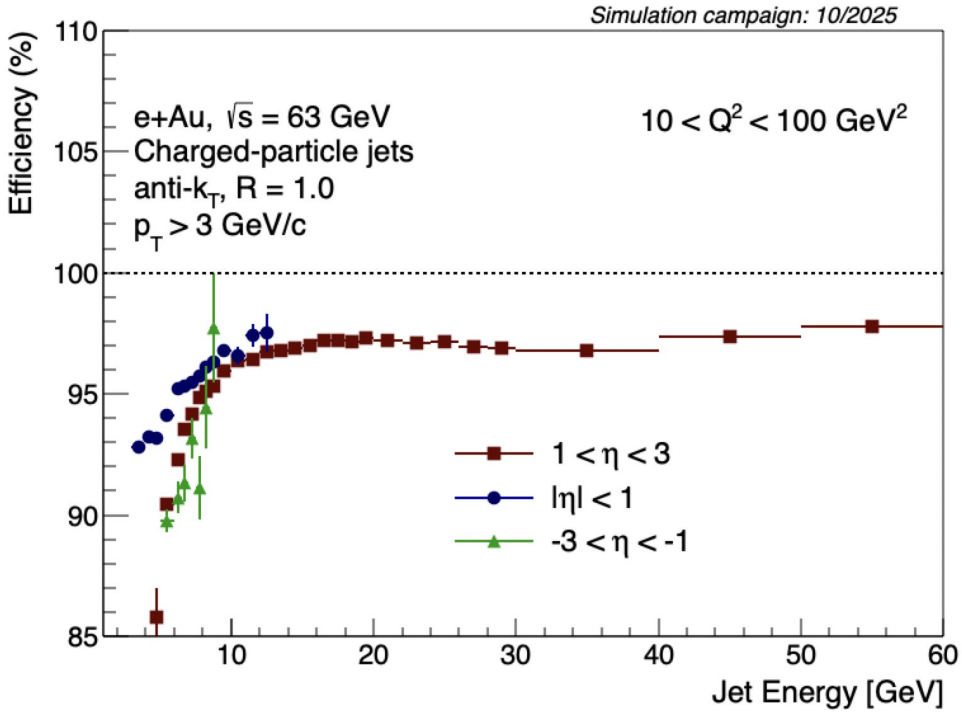
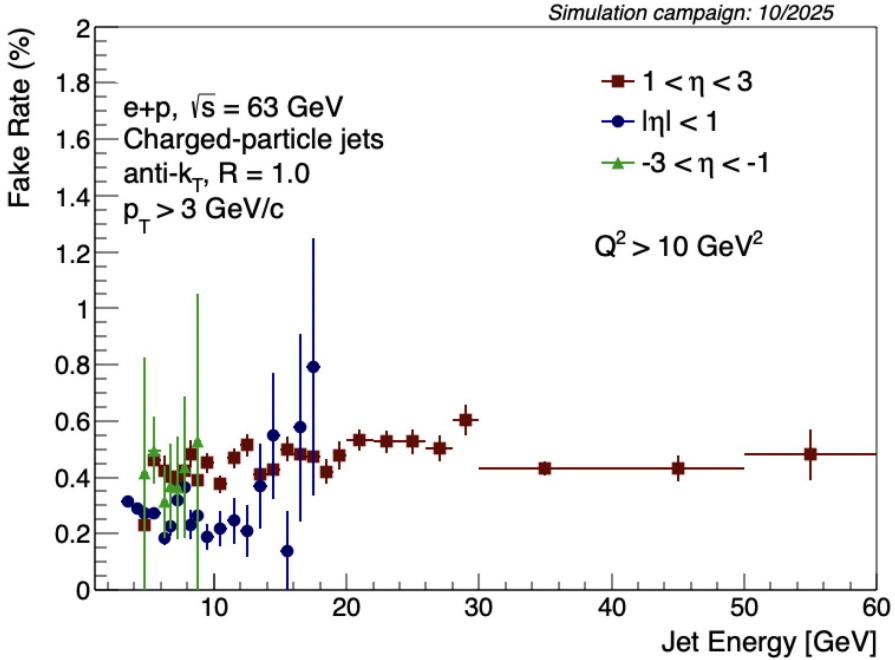
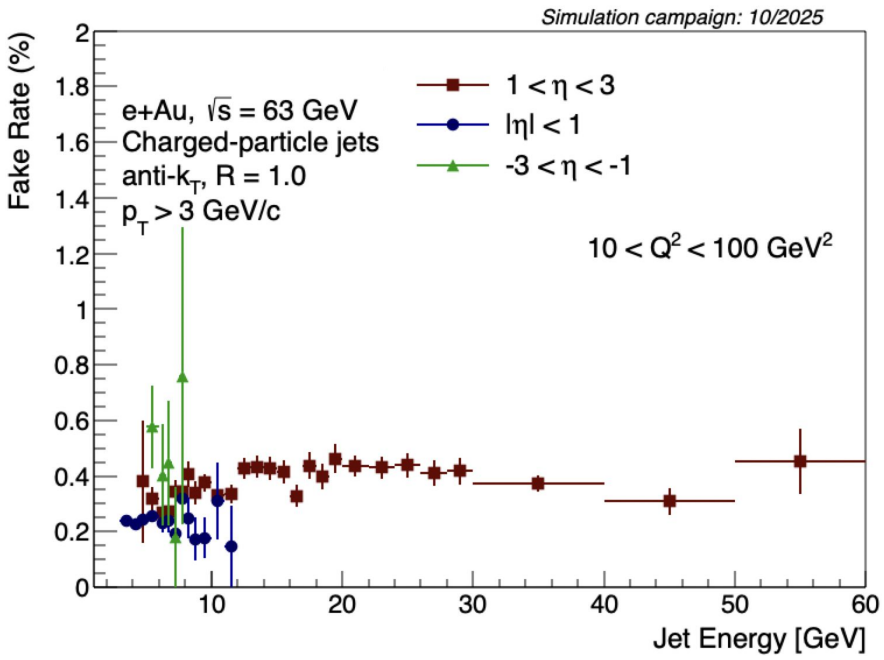
η dependency: efficiency





η dependency: fake rate





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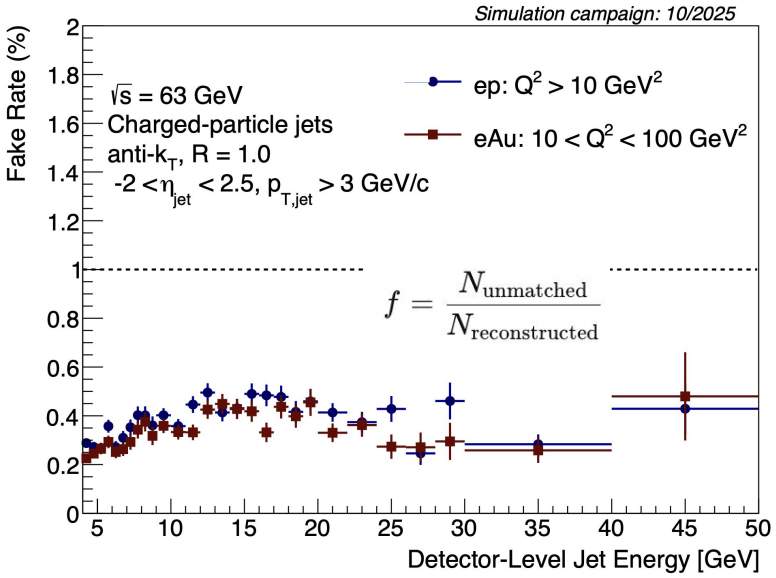
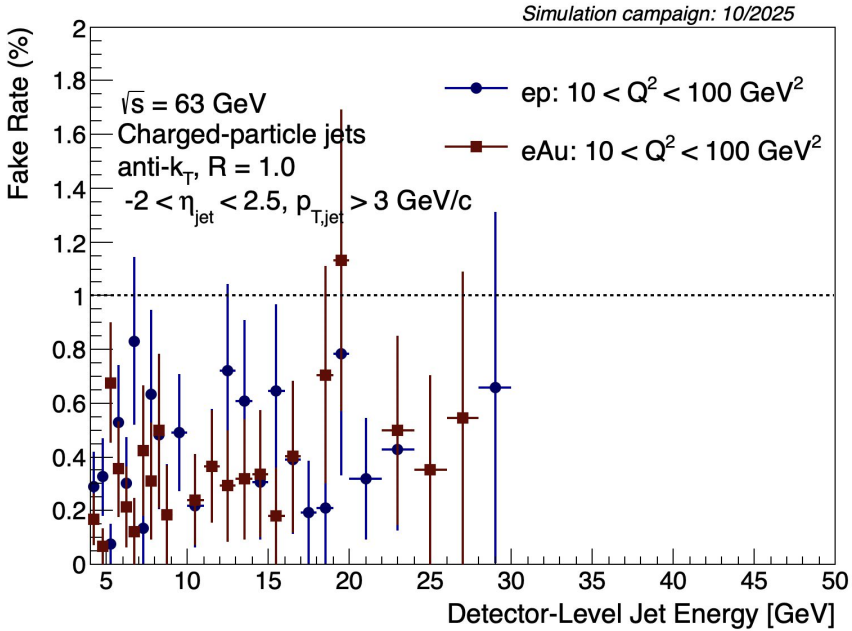
Jet finding performance (III)





Possible discrepancy due high-Q^2 cut (?)

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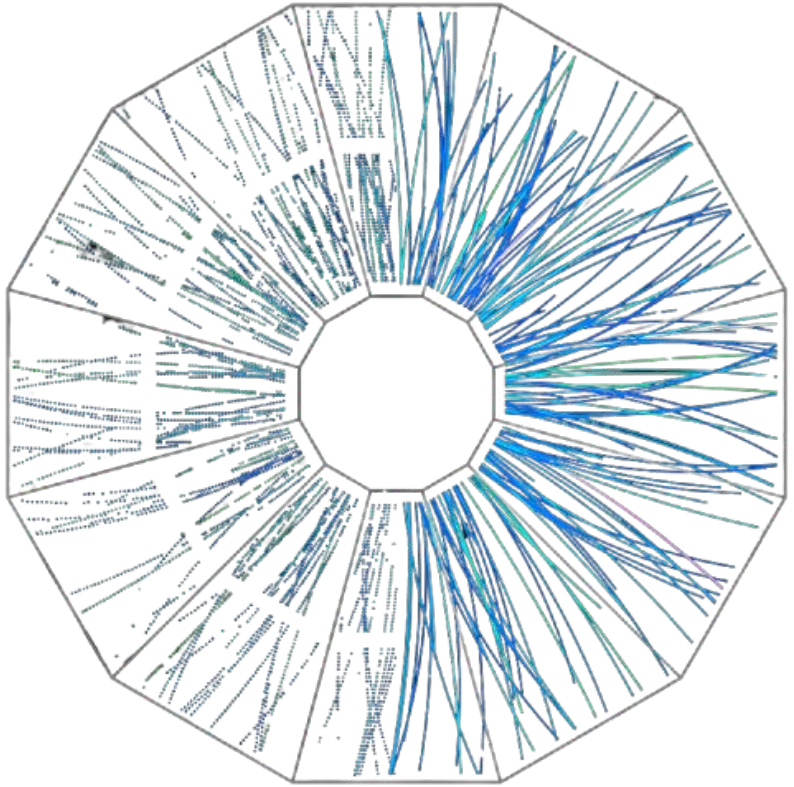
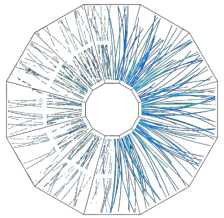
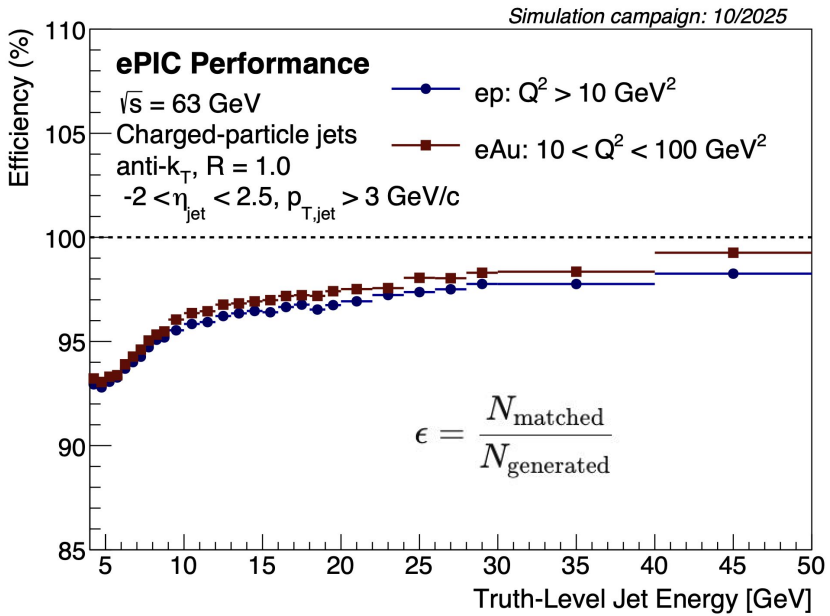
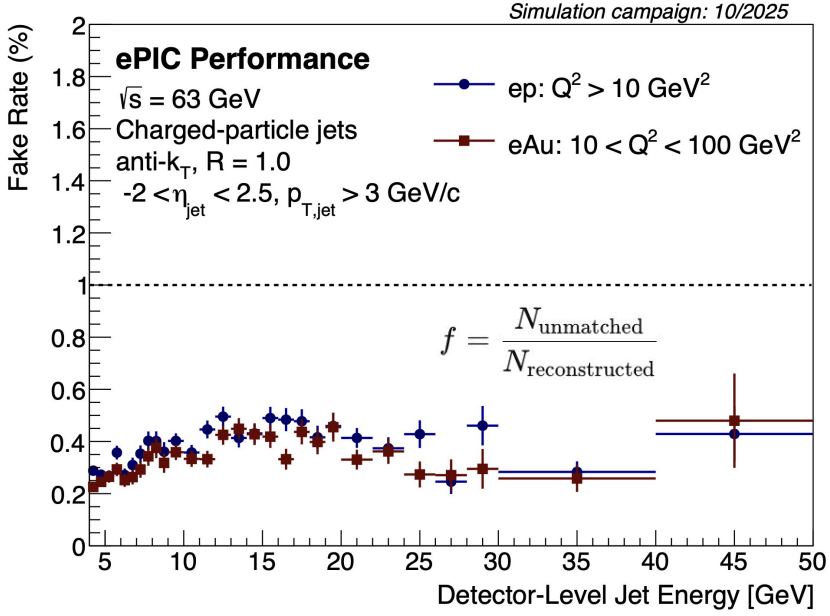
Charged Jet Performance (pTDR)





Jet finding performance (I)





Possible discrepancy due high-Q^2 cut (?)

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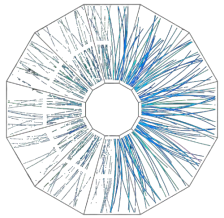
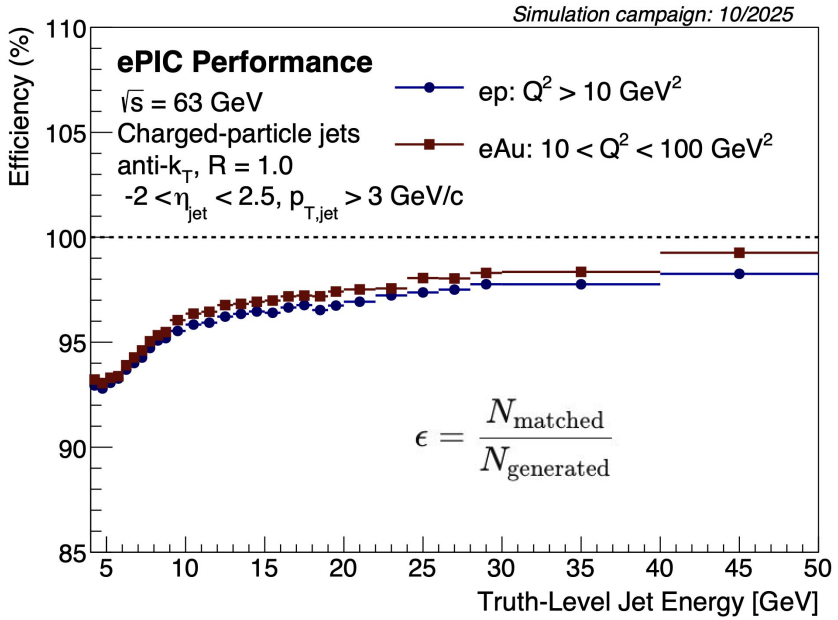
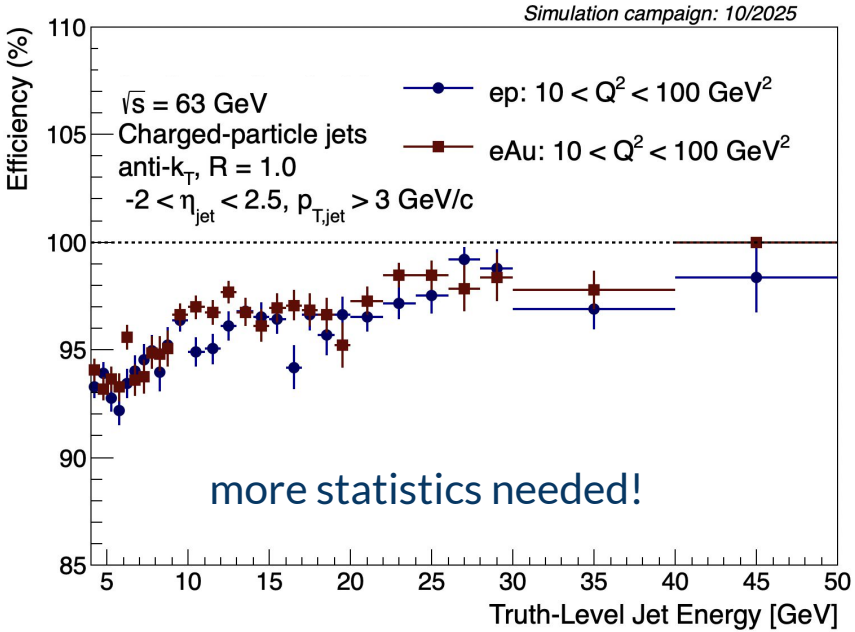


Jet finding performance (II)

Cut applied in Truth Q^2 (InclusiveKinematicsTruth.Q2)





~120k events

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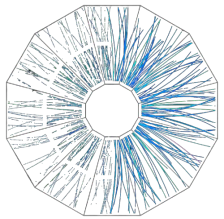
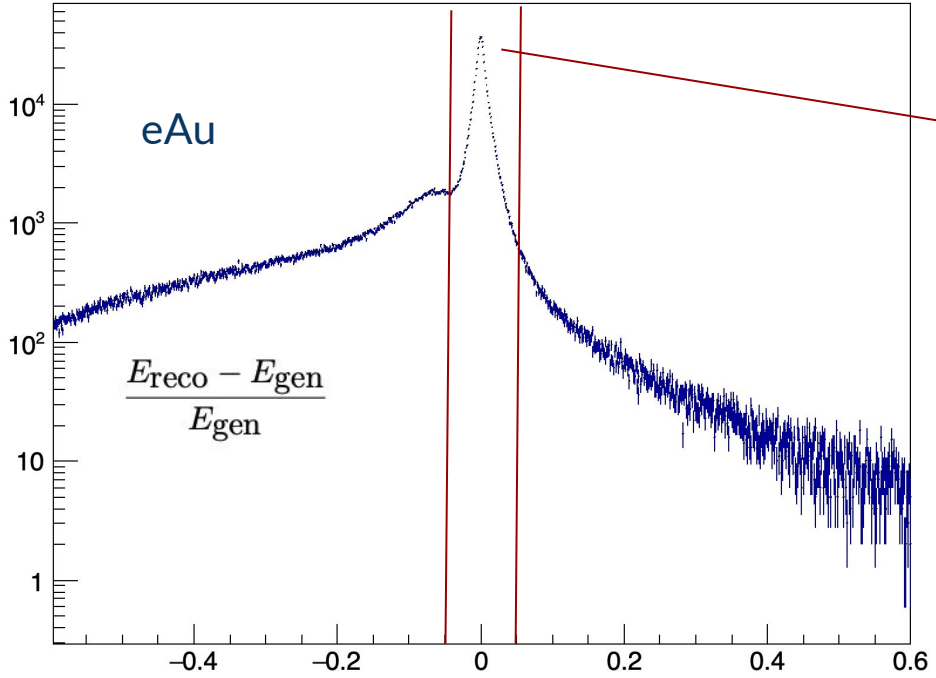
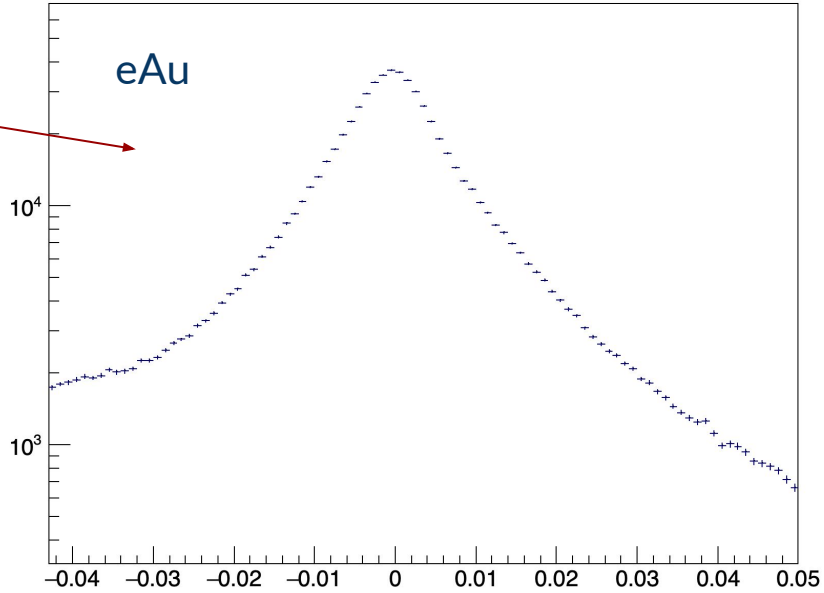


JES/JER Distributions





Similar in ep

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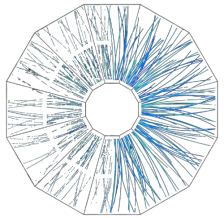
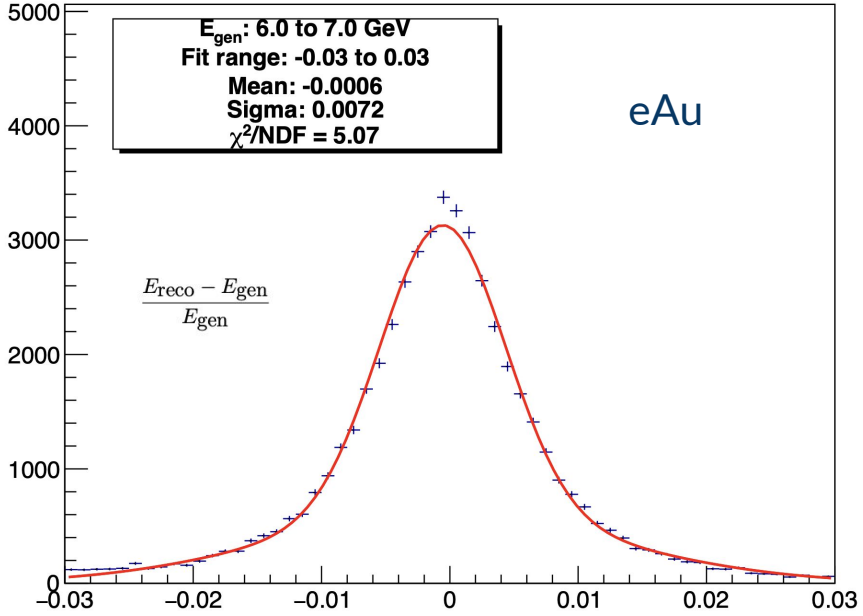
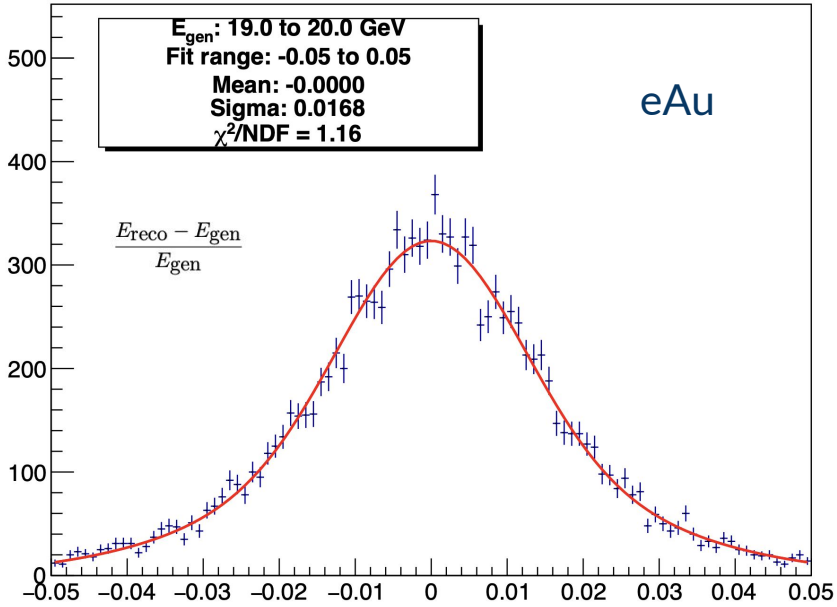


JES/JER Fits





$$f(x) = \mathrm{Y}_1 \exp\left(-\frac{(x-\mu)^2}{2\sigma_1^2}\right) + \mathrm{Y}_2 \exp\left(-\frac{(x-\mu)^2}{2\sigma_2^2}\right)$$

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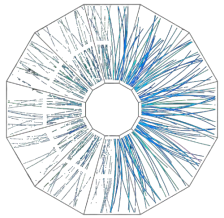
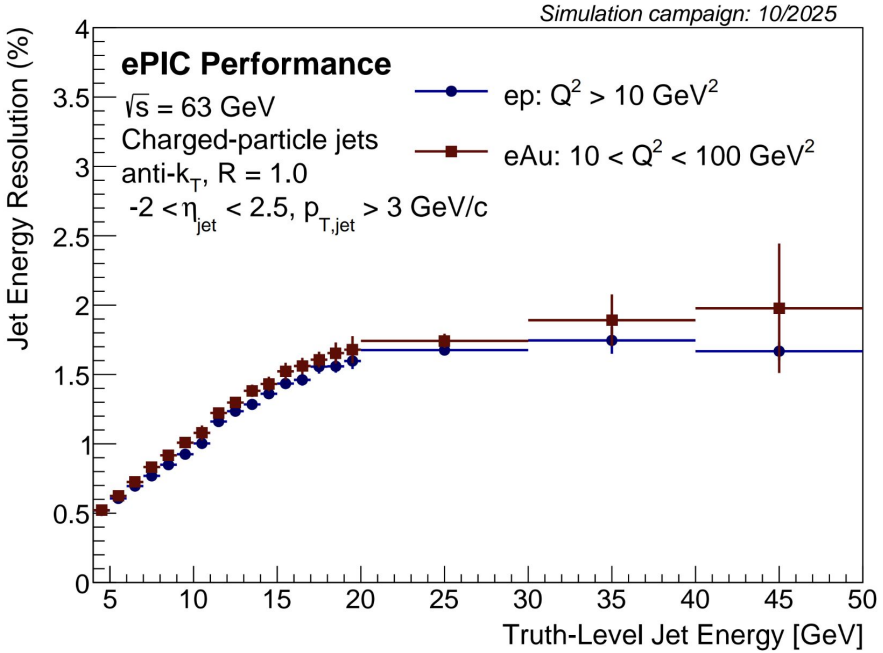
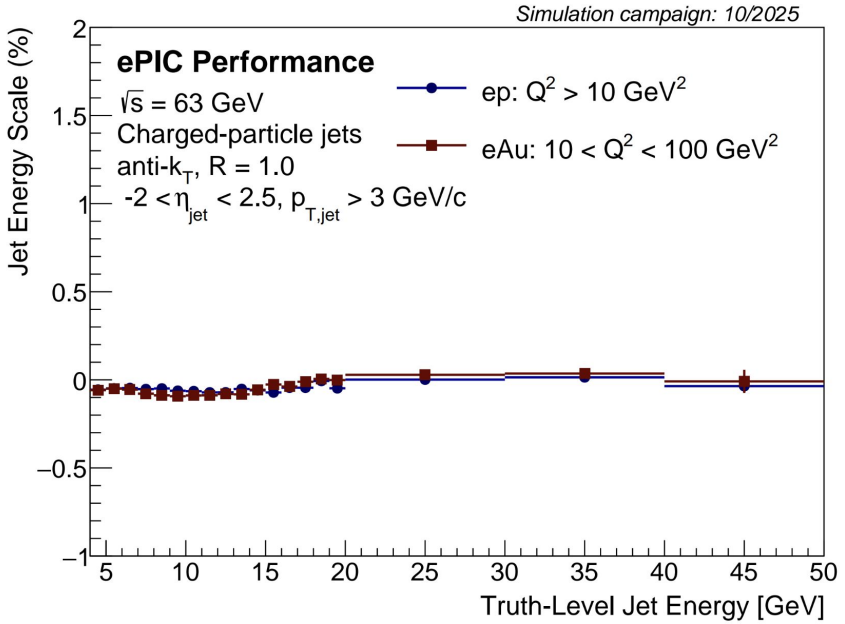


JES/JER pTDR



Width



Mean

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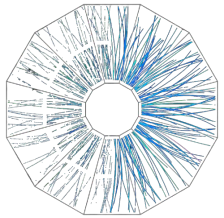
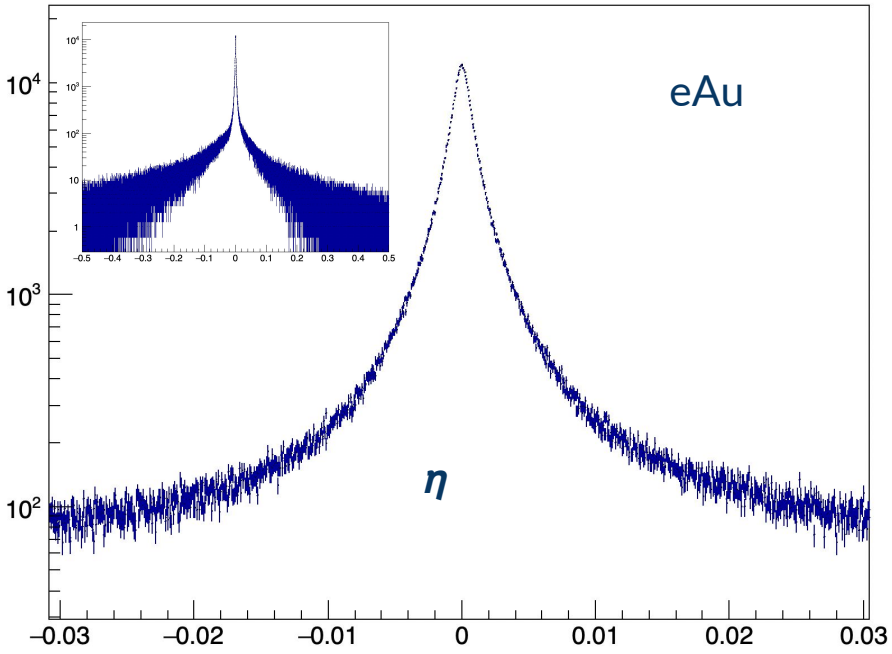
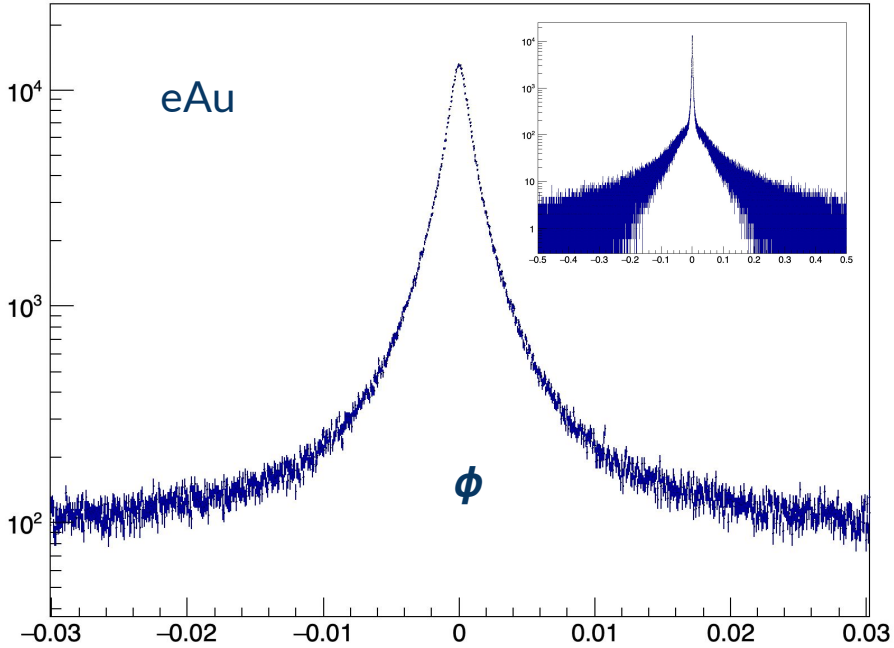


Angular Resolution





Similar in ep

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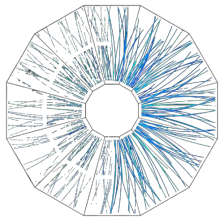
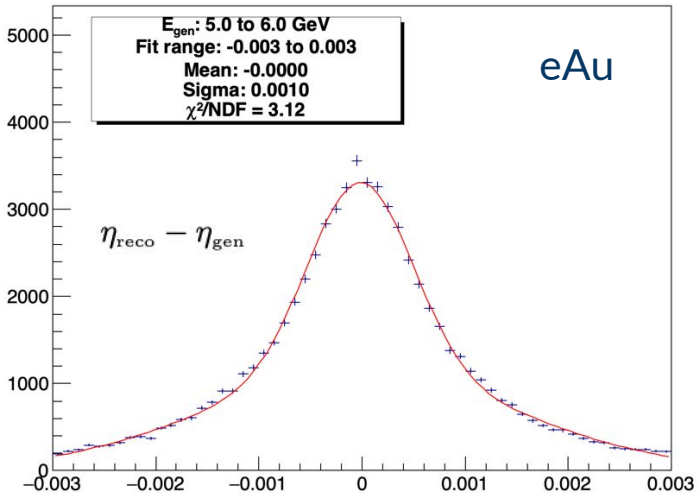
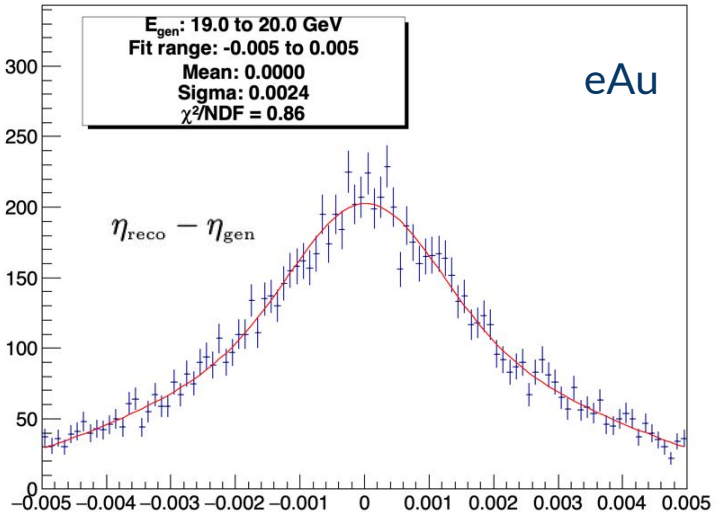


η Fits





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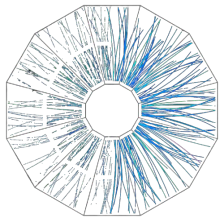
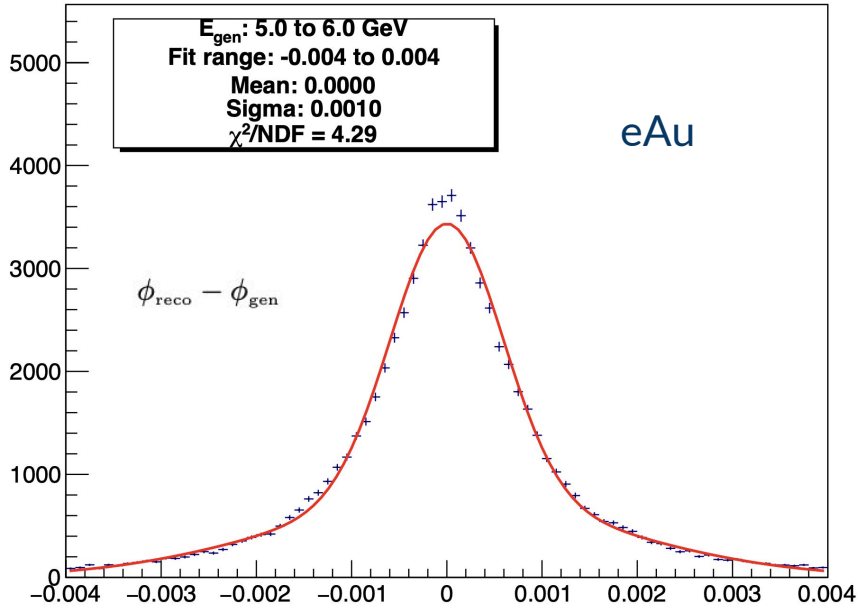
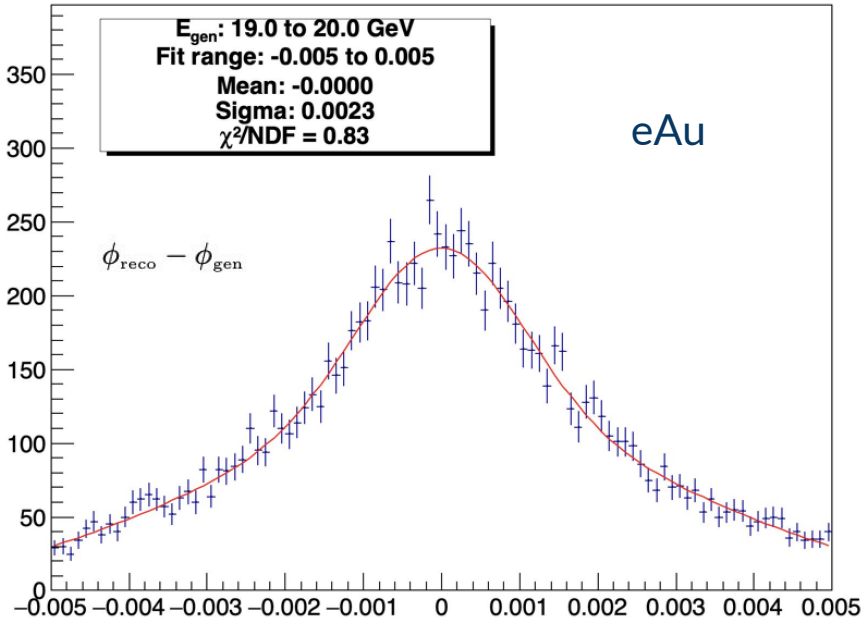


ϕ Fits





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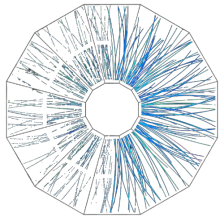
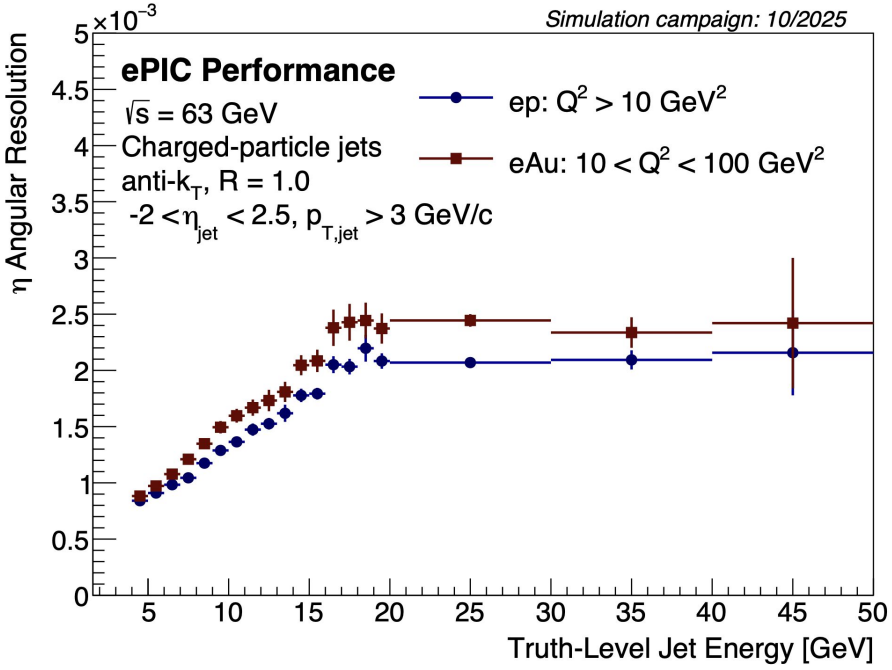
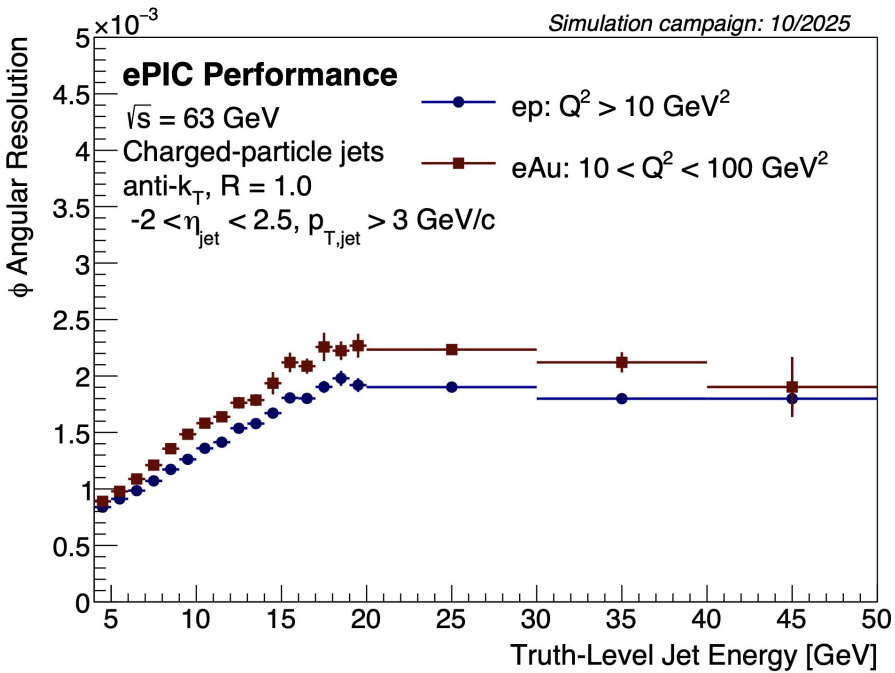


Angular resolution pTDR





Compatible with our tracking resolution (ep)

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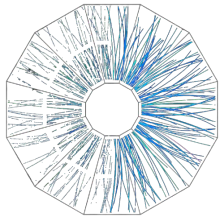
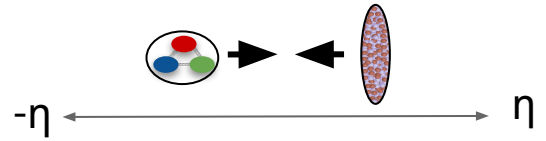
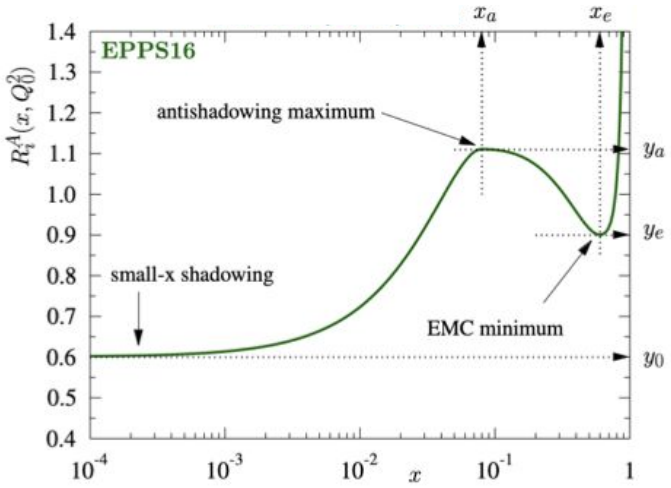
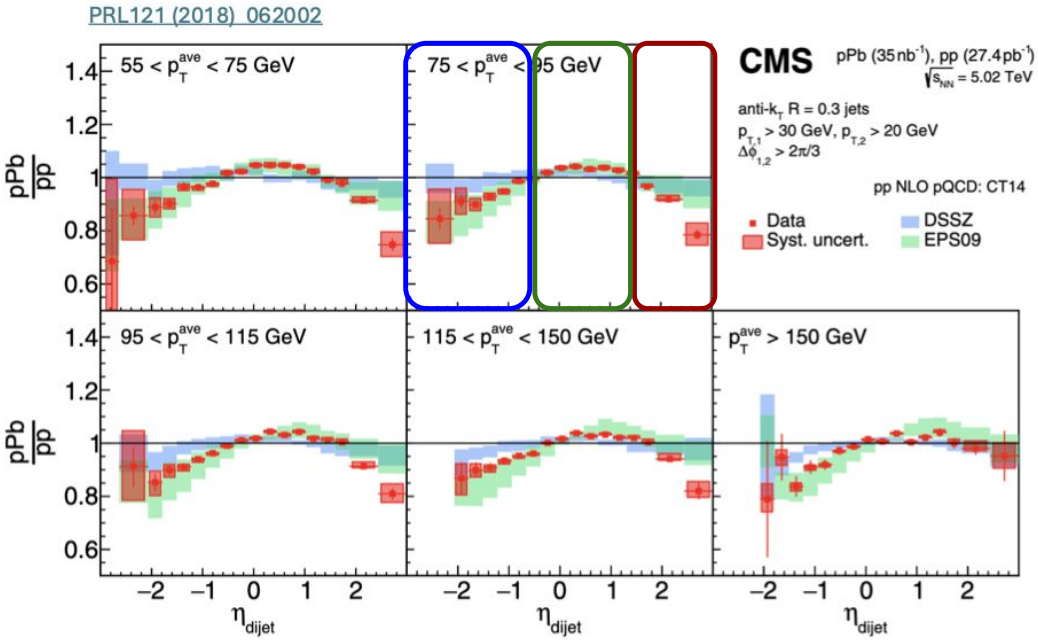


Exploring CNM with Jets



- Jets are useful tools to explore CNM and to constrain nPDFs
  - Shadowing, antishadowing, EMC





Map: (x, Q) ↔ (η_{dijet}, p_T^{ave})

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