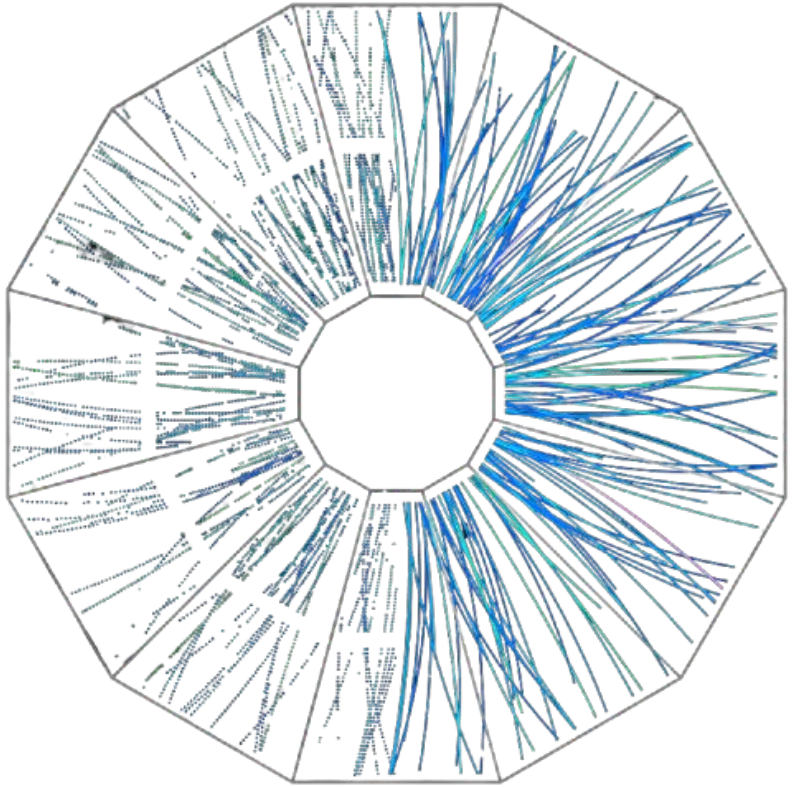
Jet Performance Plots



Dener De Souza Lemos (BNL)

Jets and HF Working Group Meeting

ePIC

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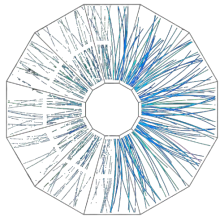
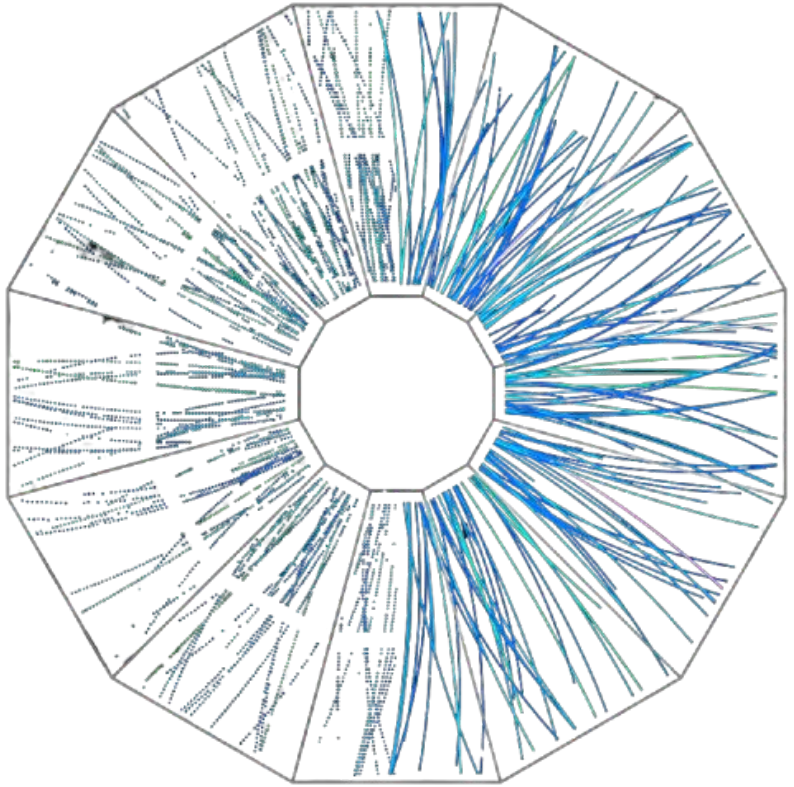


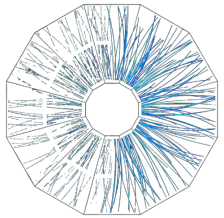
Simulation Details

- 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
    - Electron removed using true PID
    - Remove jets with 1 track inside
    - Cuts in the plots
  - anti-k_T with R = 1.0
  - Jet Tree maker:
    - https://github.com/denerslemos/CHJetTrees

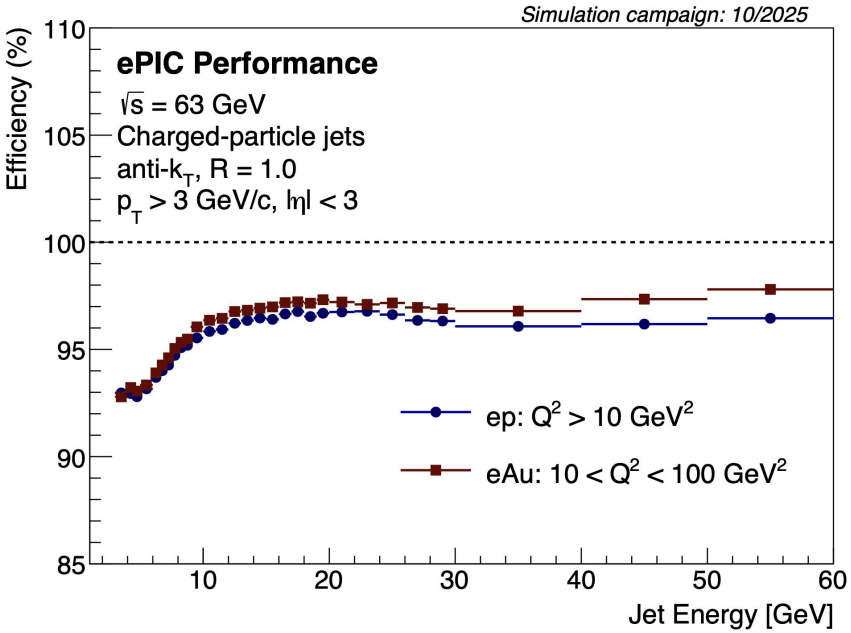
Efficiency and Fake Rate





Colliding system comparison: efficiency

$$\epsilon = \frac{N_{\text{matched}}}{N_{\text{generated}}}$$



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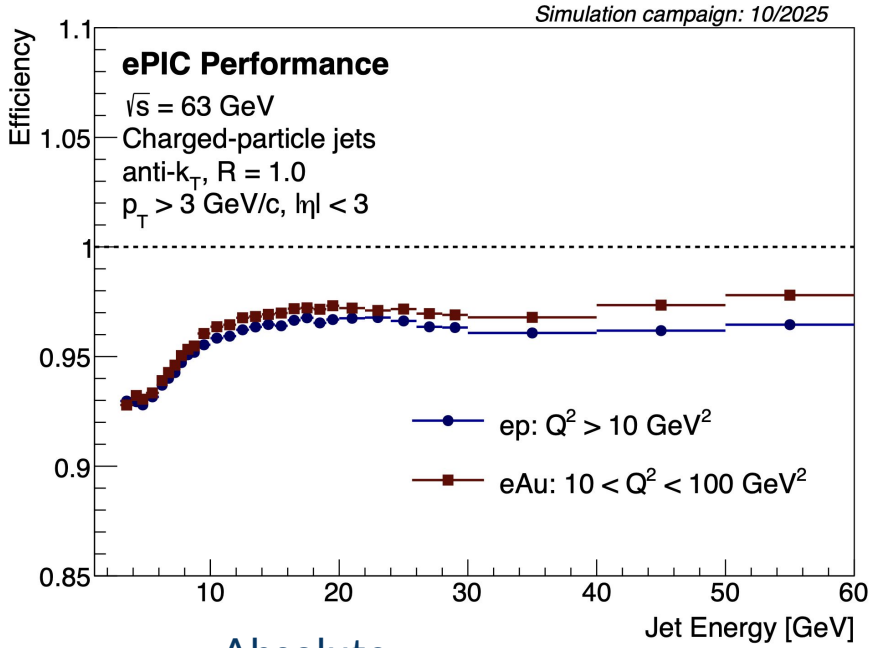

Absolute value

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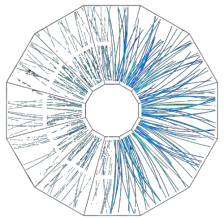
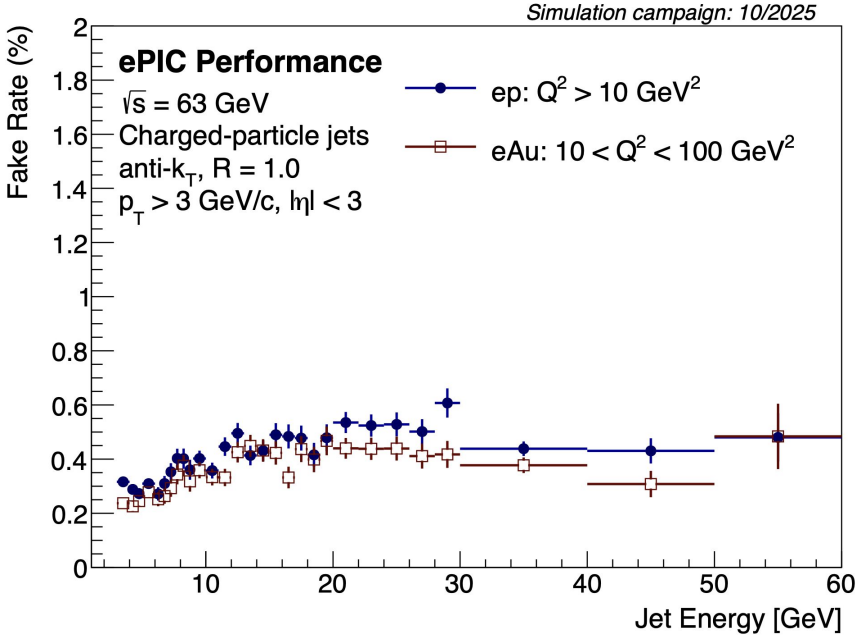


Colliding system comparison: fake rate

$$f = \frac{N_{\text{unmatched}}}{N_{\text{reconstructed}}}$$



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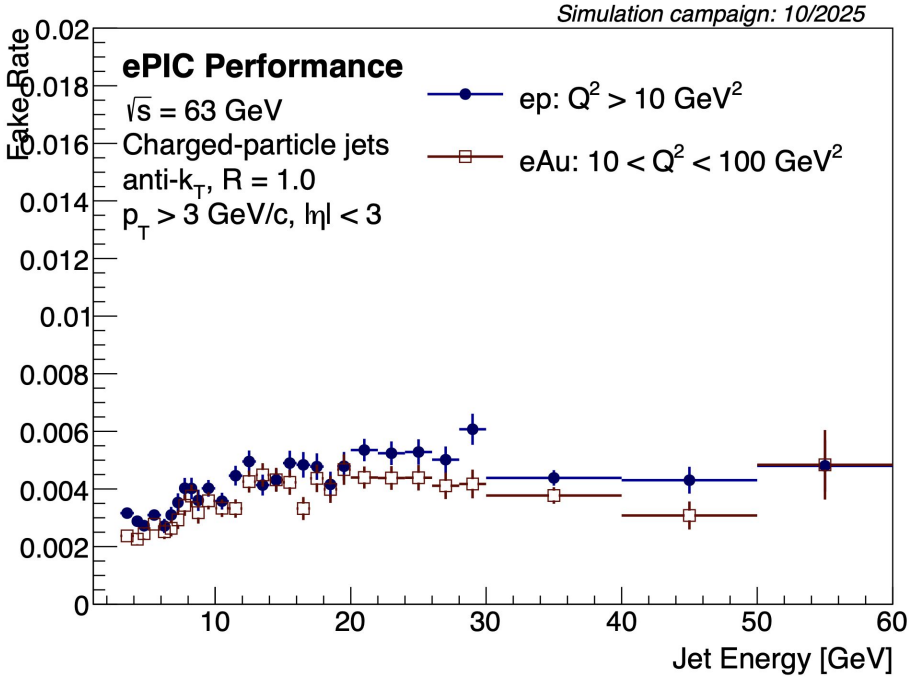

Absolute value

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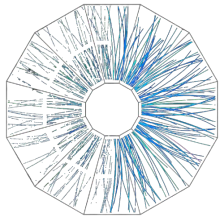
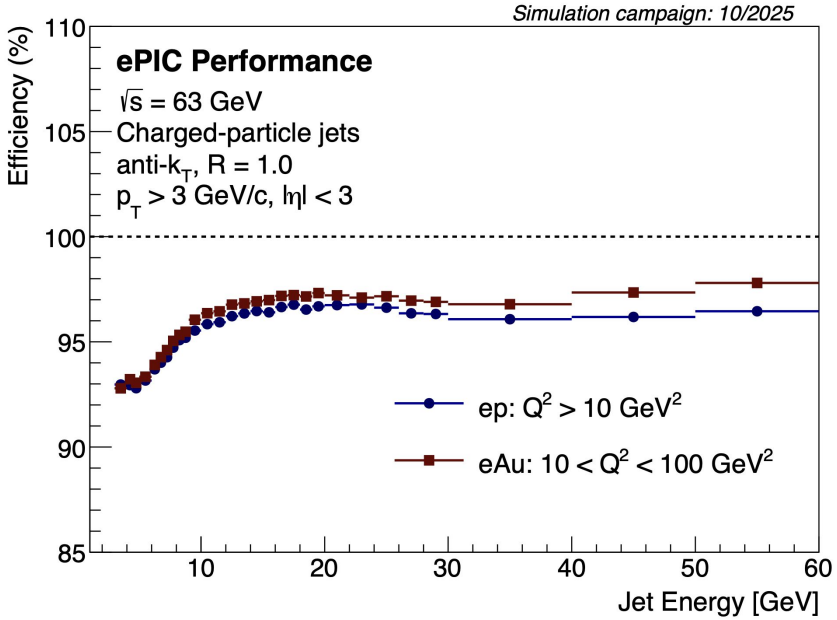
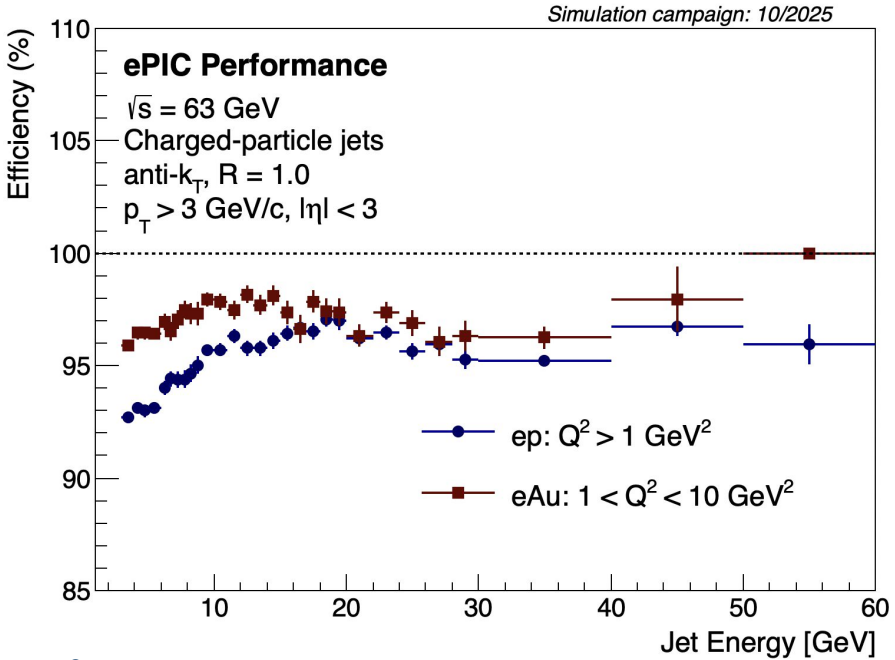


Q^2 dependency





→ ep seems to be similar, larger effect in eAu (high-Q^2 cut?)

→ Will use $Q^2 > 10$ for all additional studies because of statistics

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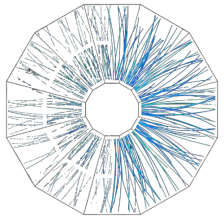
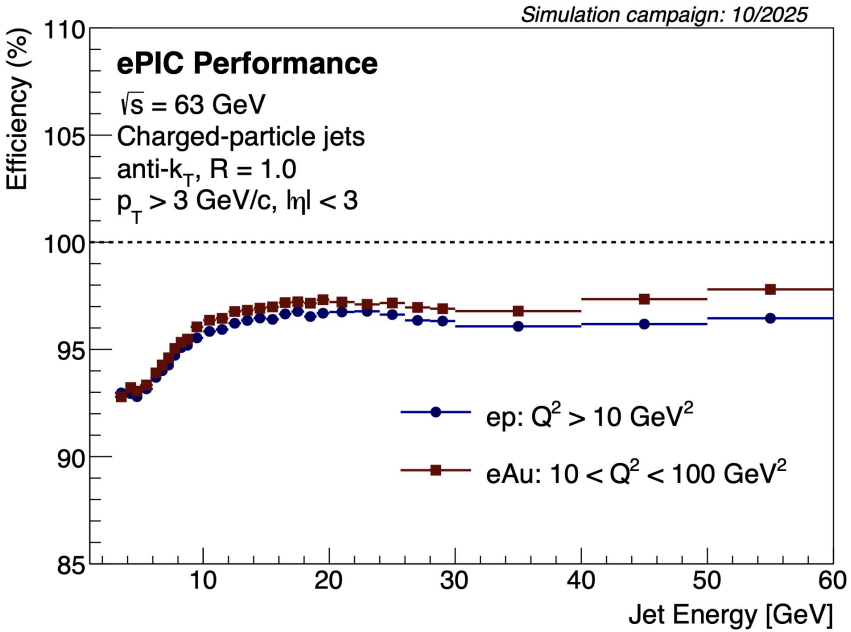
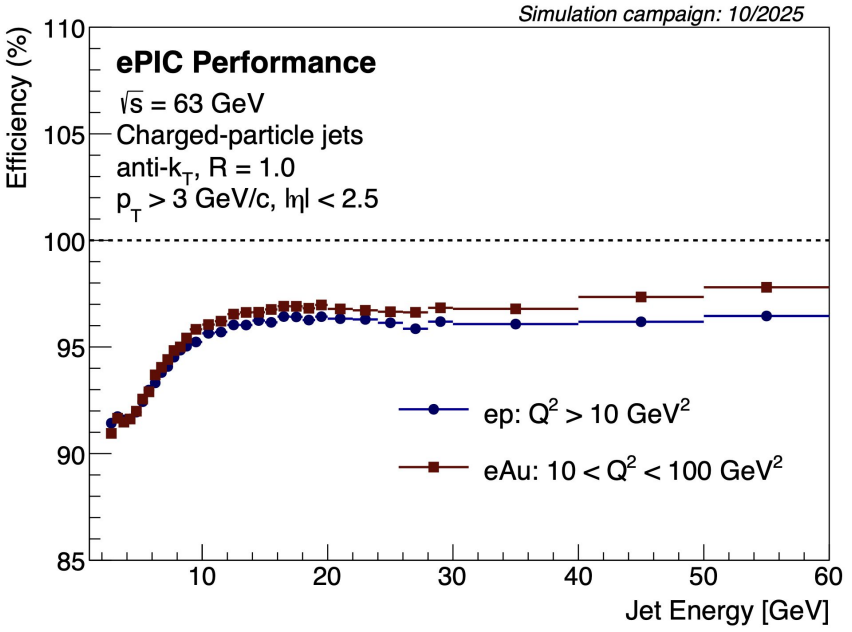


η dependency: efficiency





Small difference between 2.5 and 3 cut

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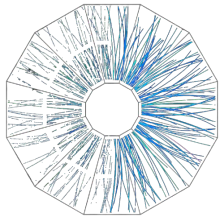
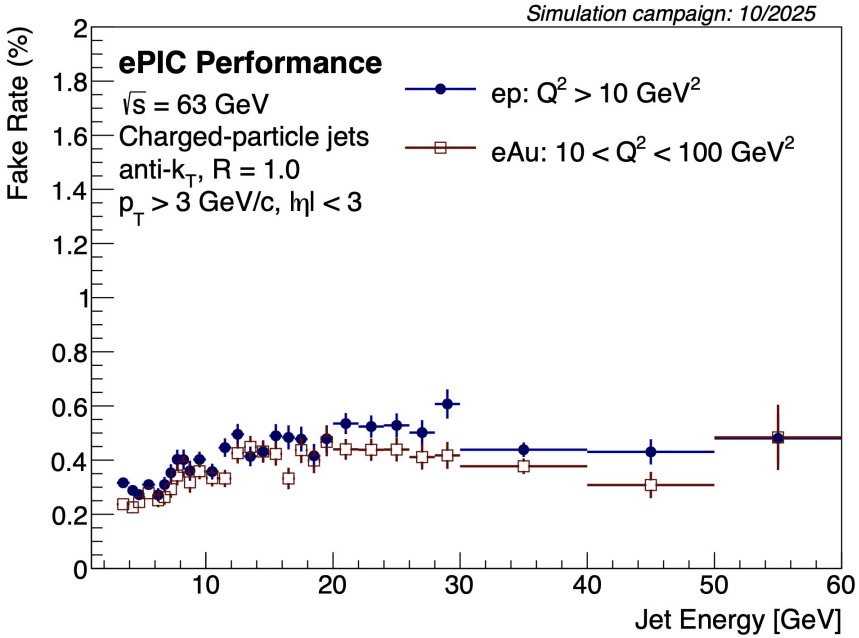
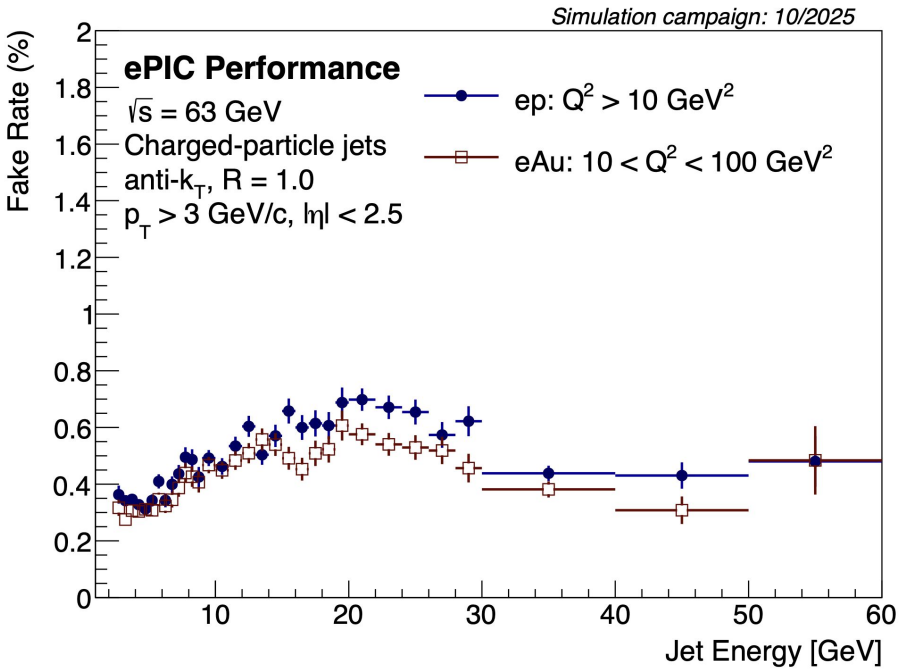


η dependency: fake rate





Some difference between 2.5 and 3 cut

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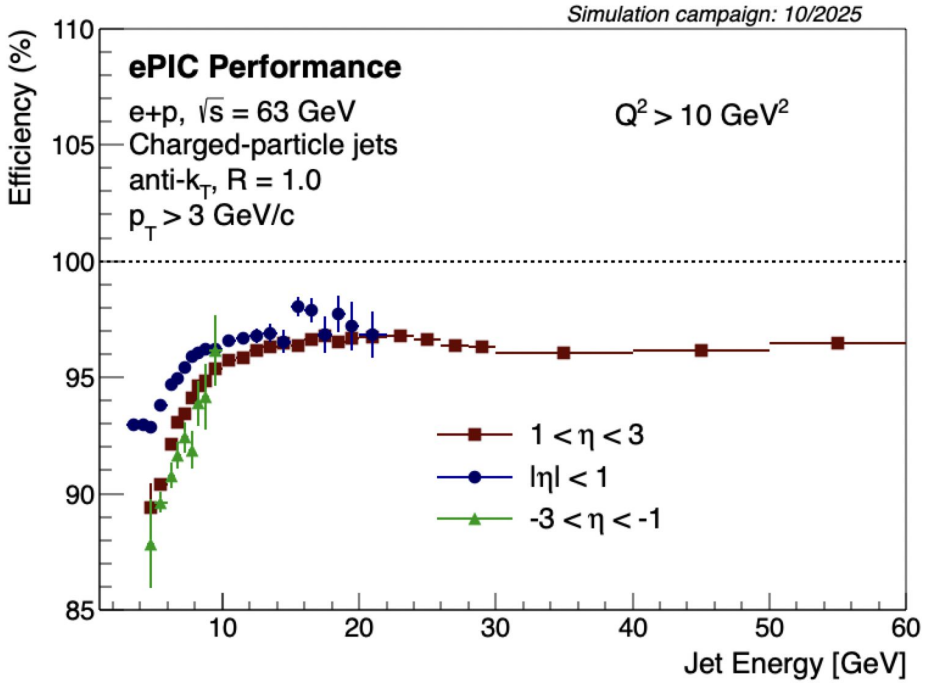
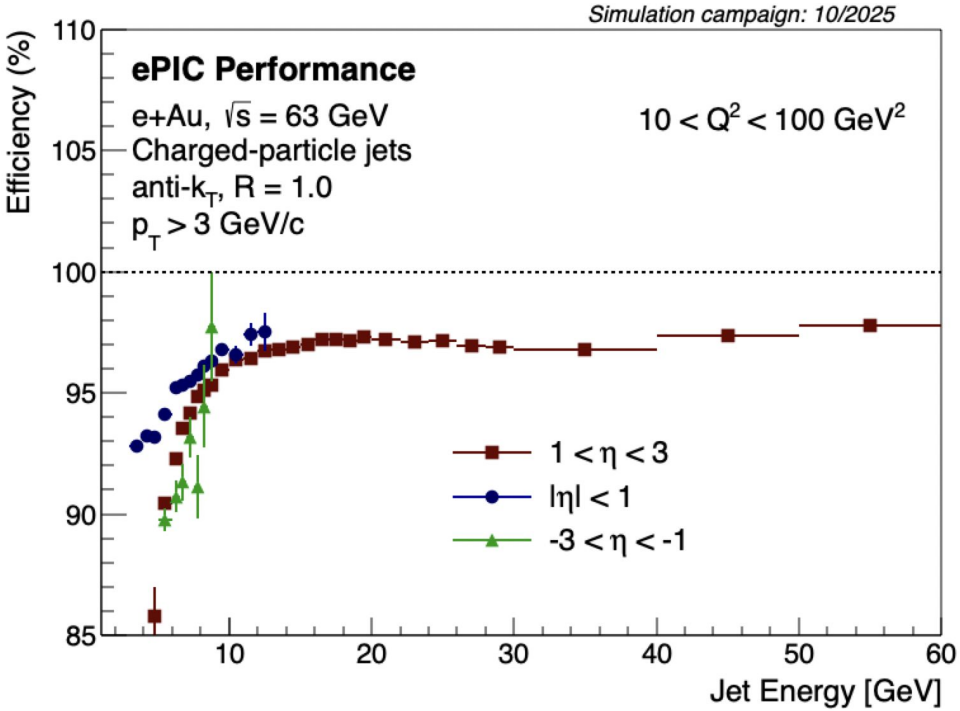
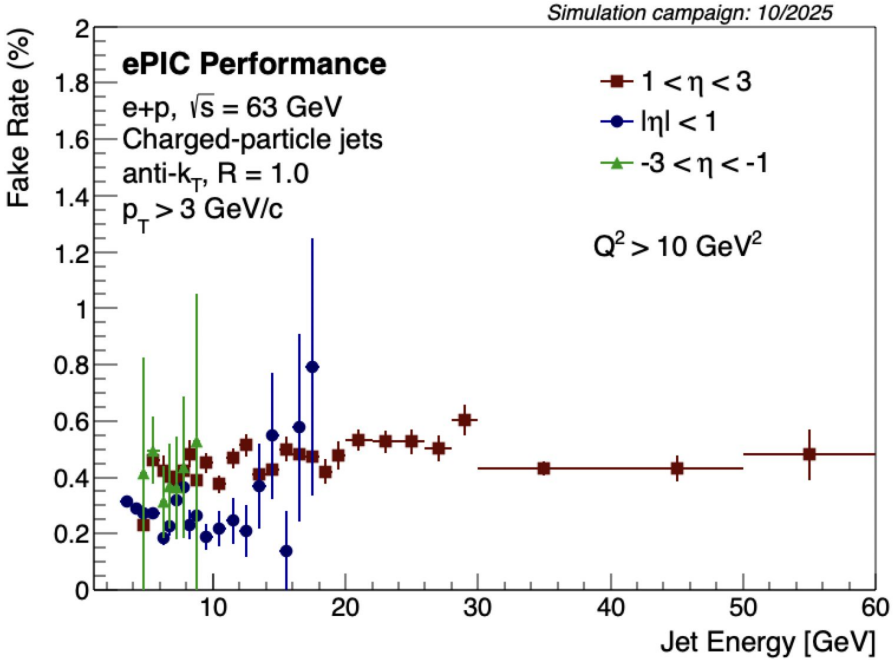
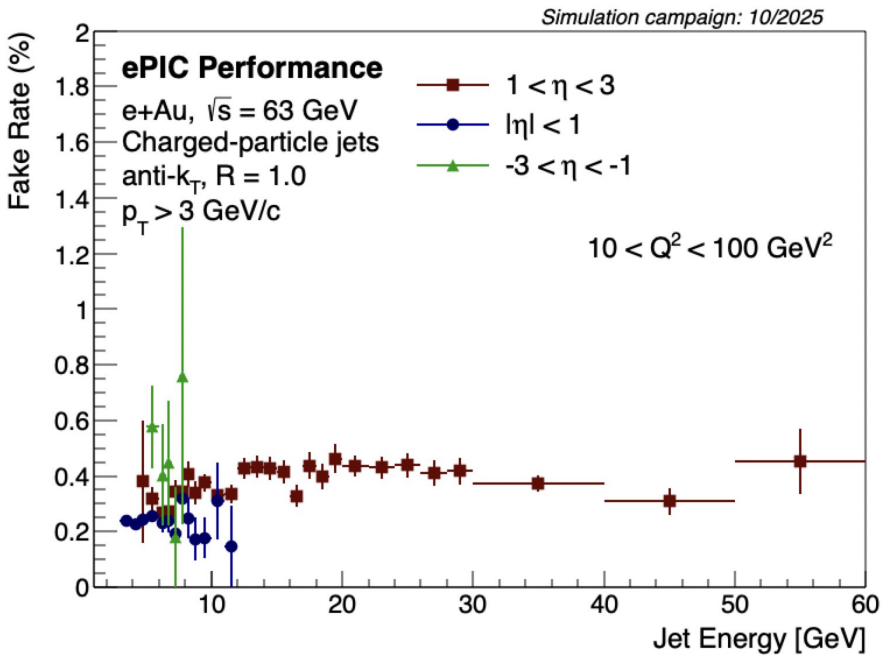
η dependency: efficiency





η dependency: fake rate





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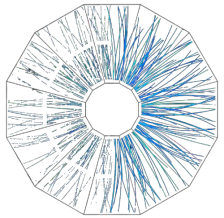
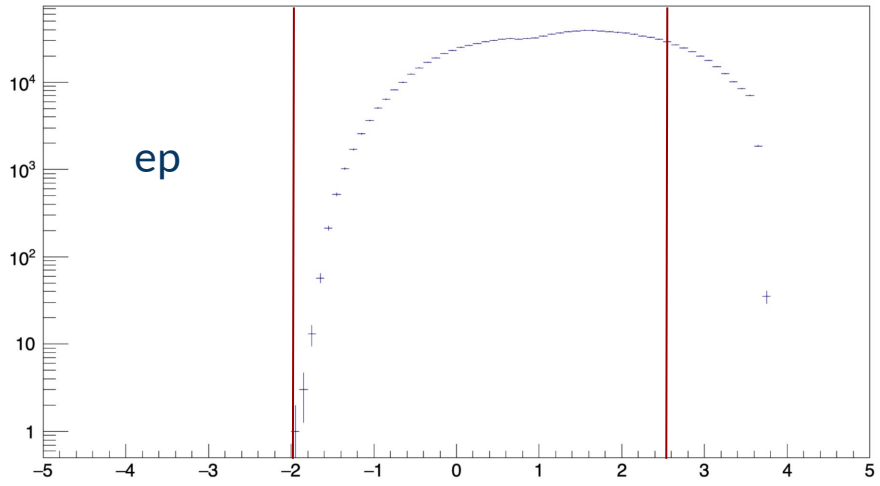
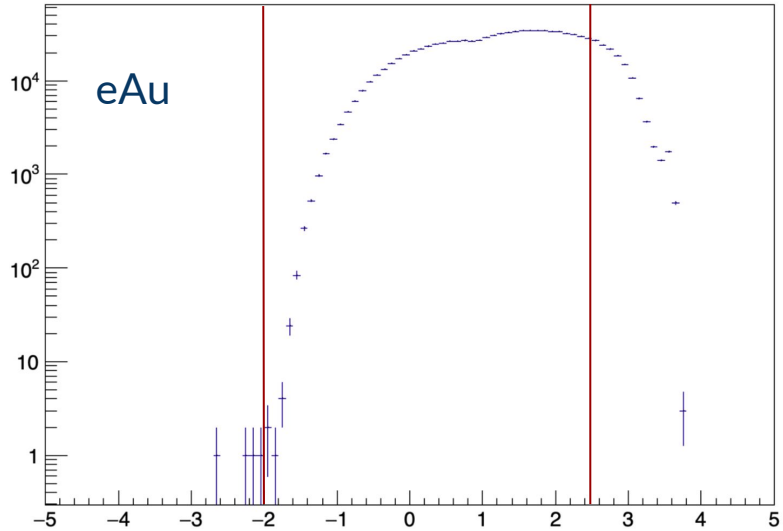


η distributions





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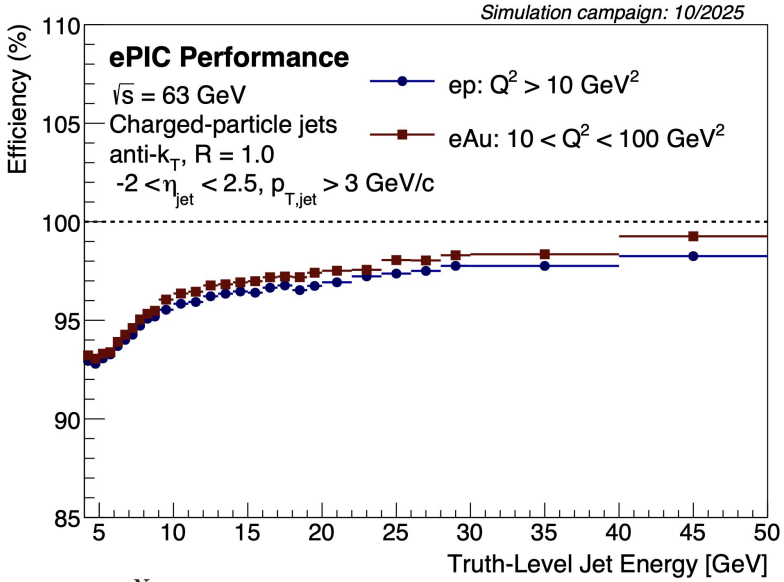
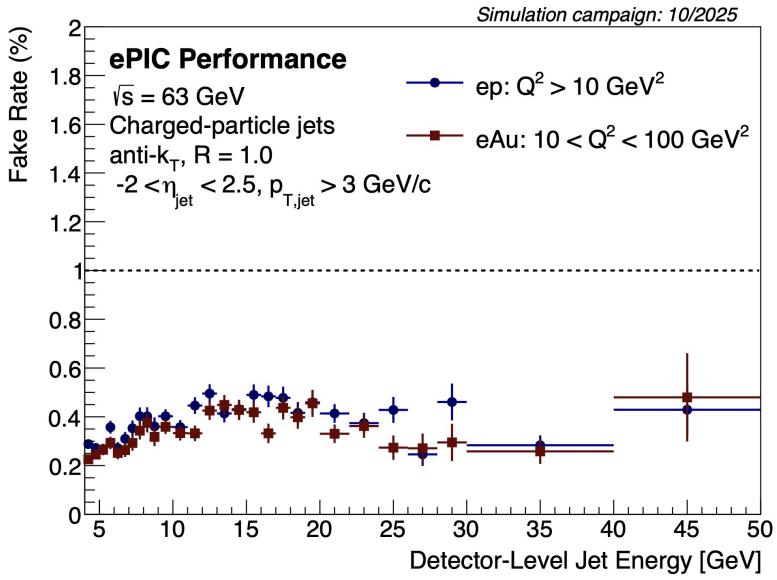
pTDR Final Plots



$$\epsilon = \frac{N_{\text{matched}}}{N_{\text{generated}}}$$



$$f = \frac{N_{\text{unmatched}}}{N_{\text{reconstructed}}}$$

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

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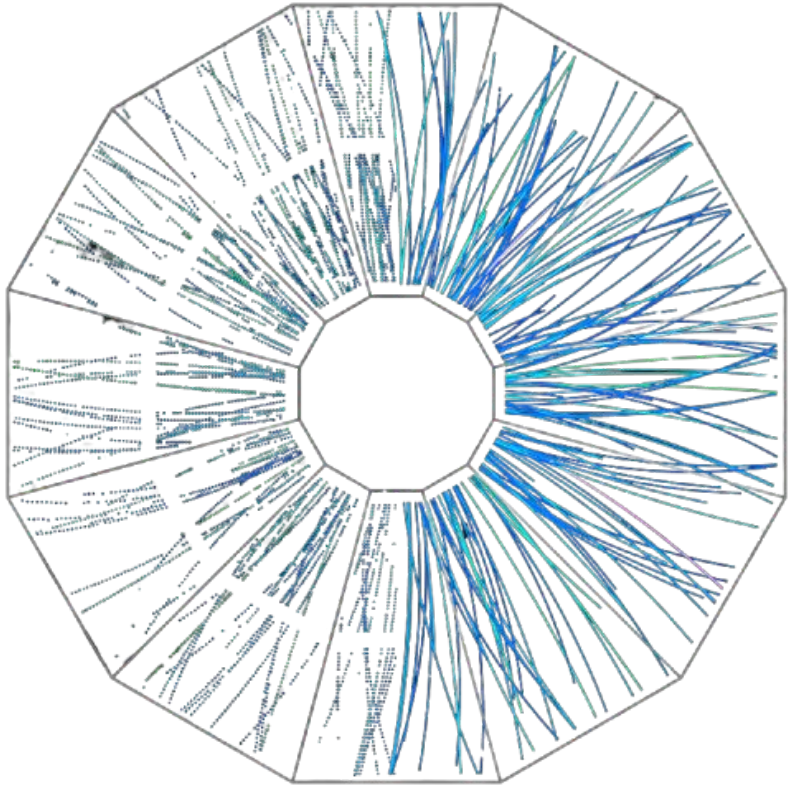
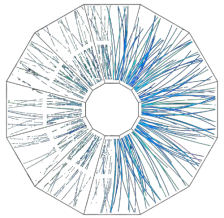
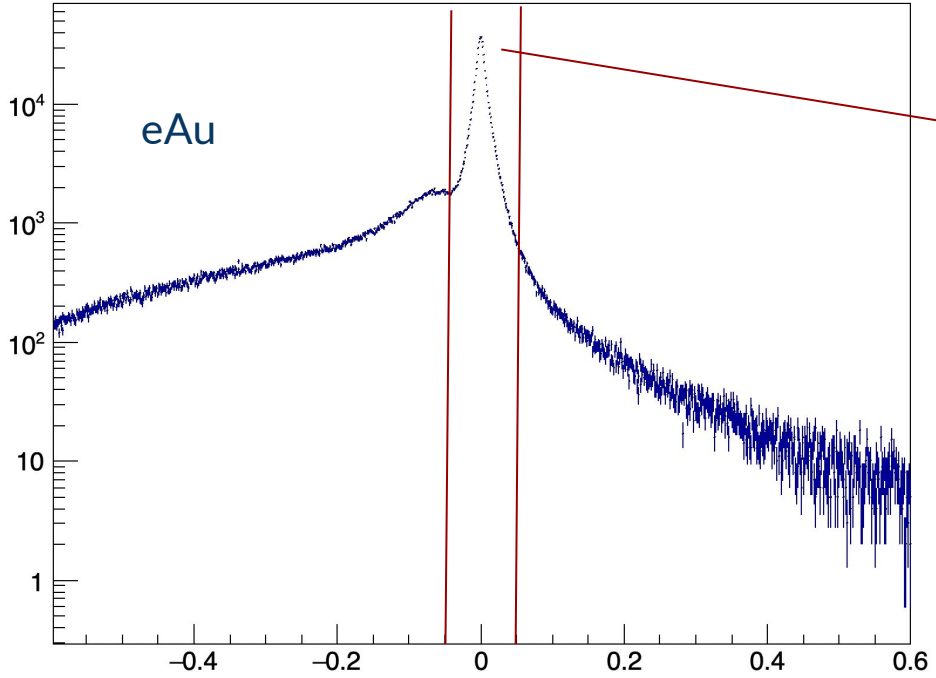
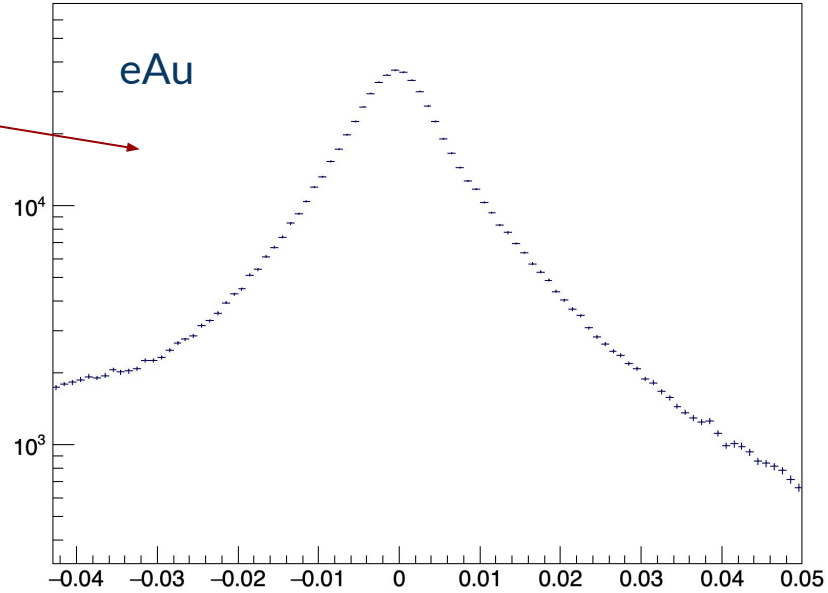
JER/JES





JES/JER Distributions





Similar in pp

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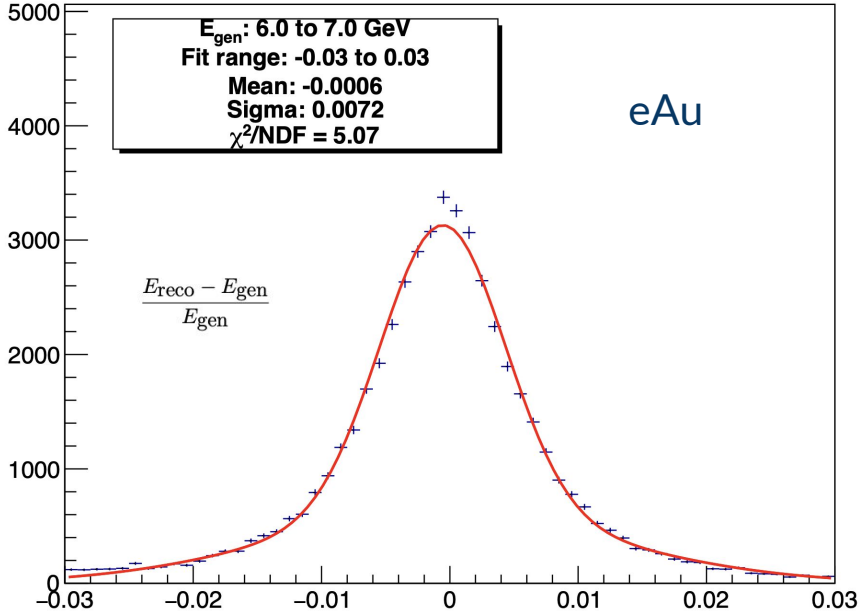
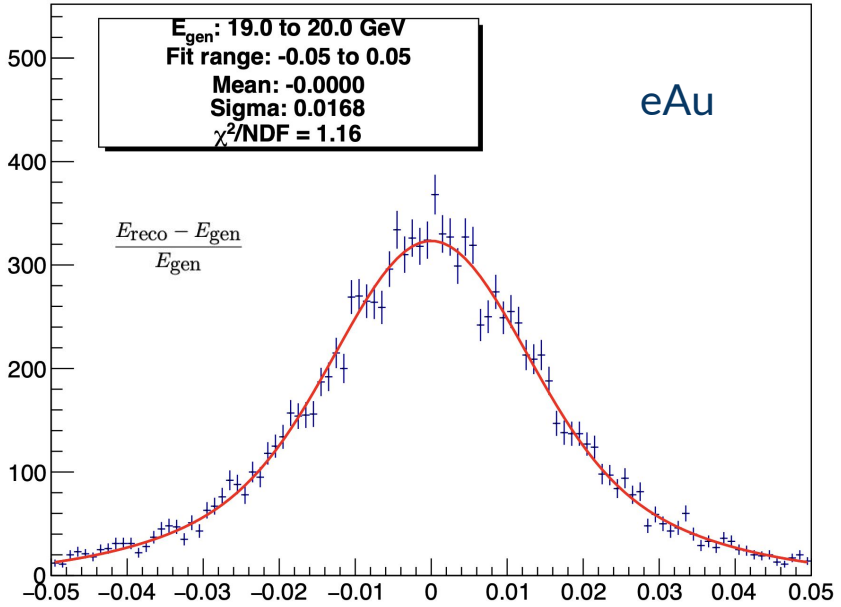
JES/JER Fits





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

$$\sigma = \sqrt{\frac{\mathrm{Y}_1}{\mathrm{Y}_1+\mathrm{Y}_2}\sigma_1^2 + \frac{\mathrm{Y}_2}{\mathrm{Y}_1+\mathrm{Y}_2}\sigma_2^2}$$

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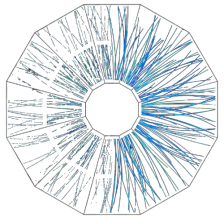
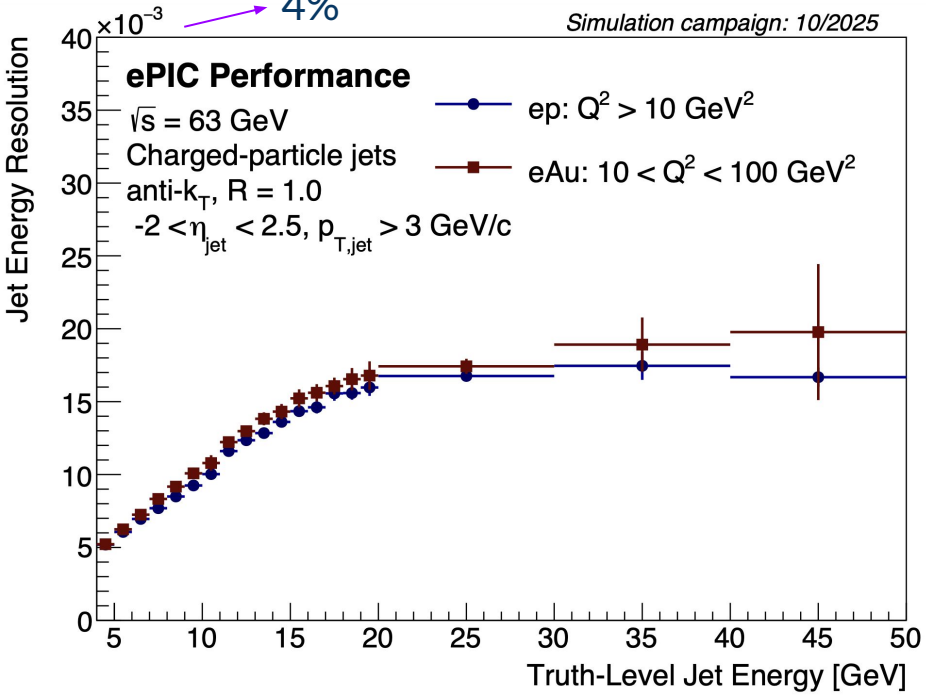
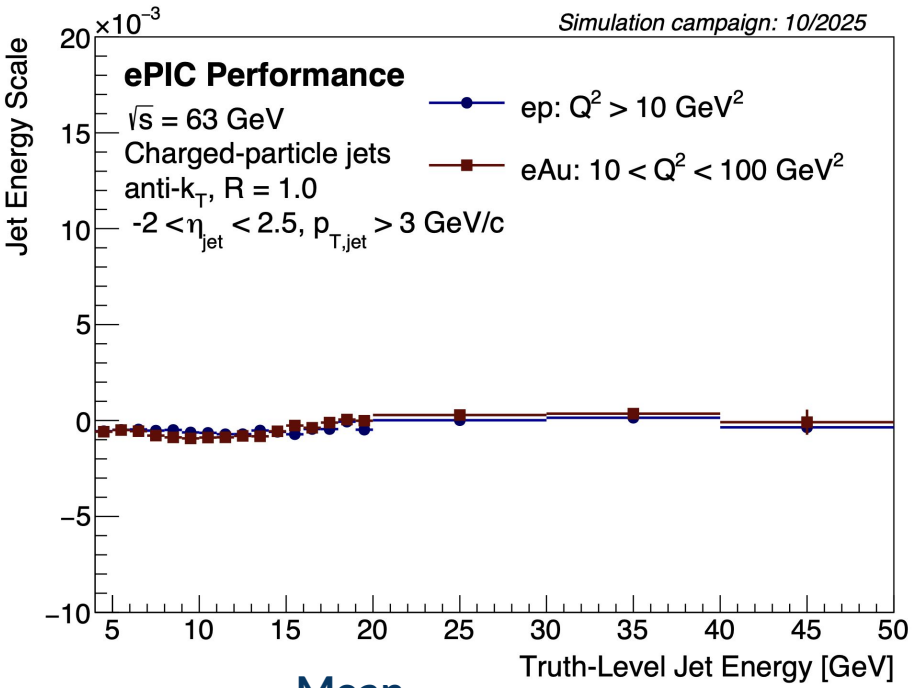


JES/JER pTDR

4%



Width



Mean

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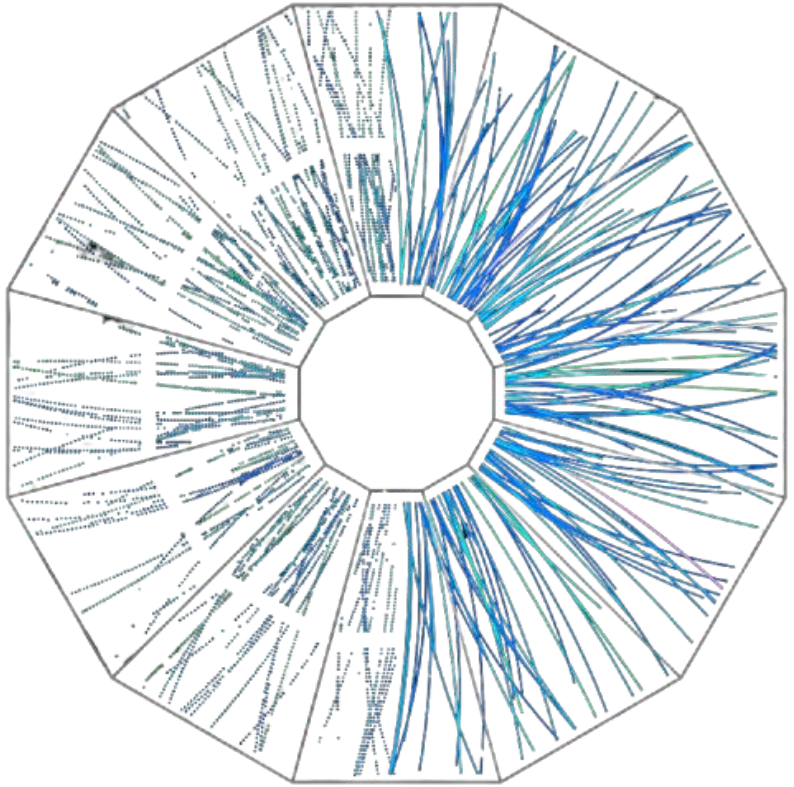
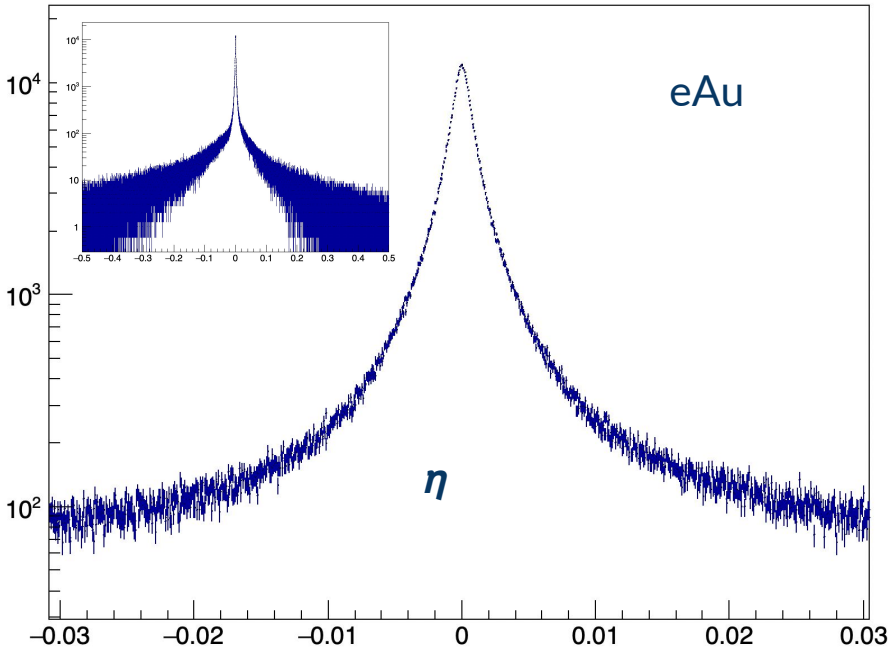
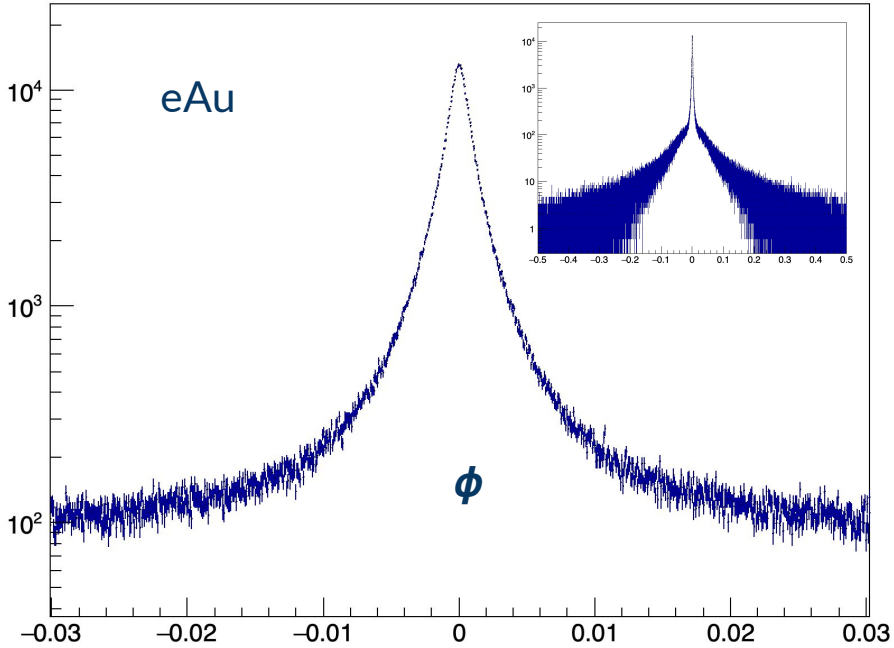
Angular Resolution



Distributions





Similar in pp

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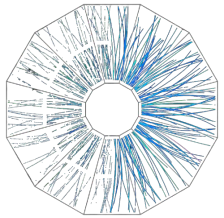
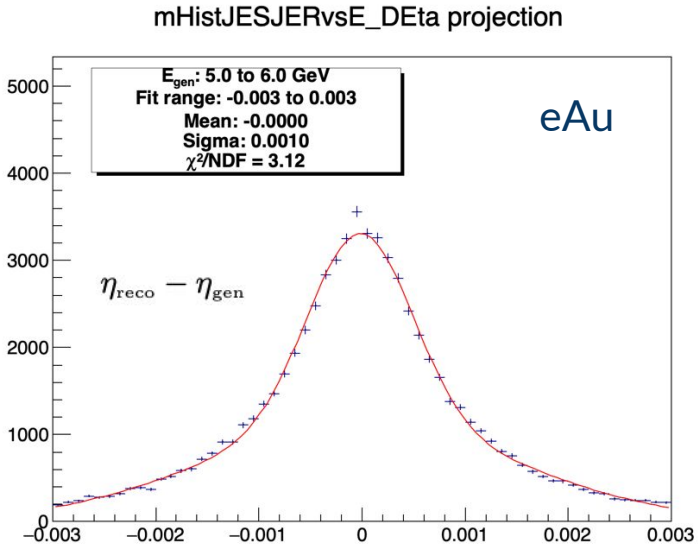
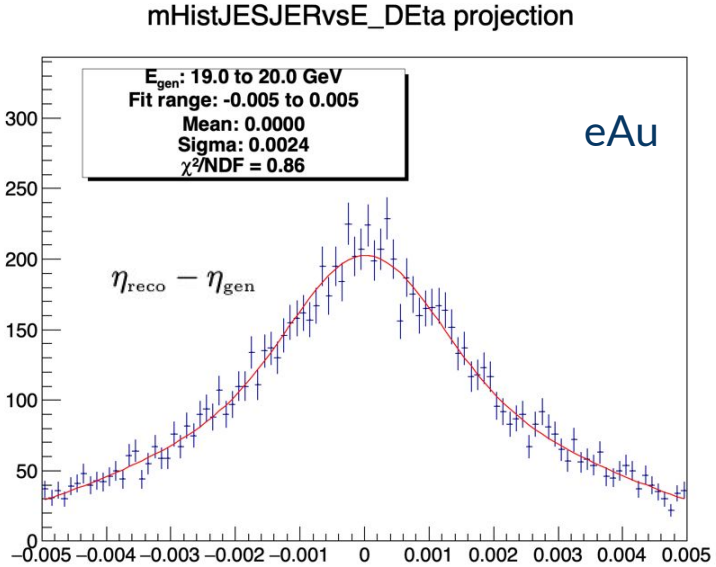


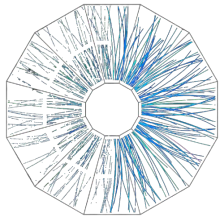
η Fits



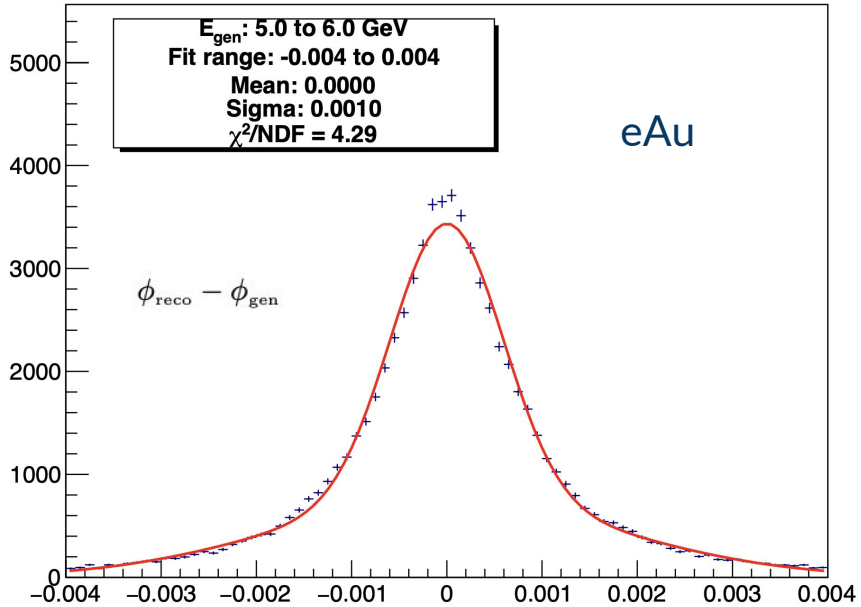


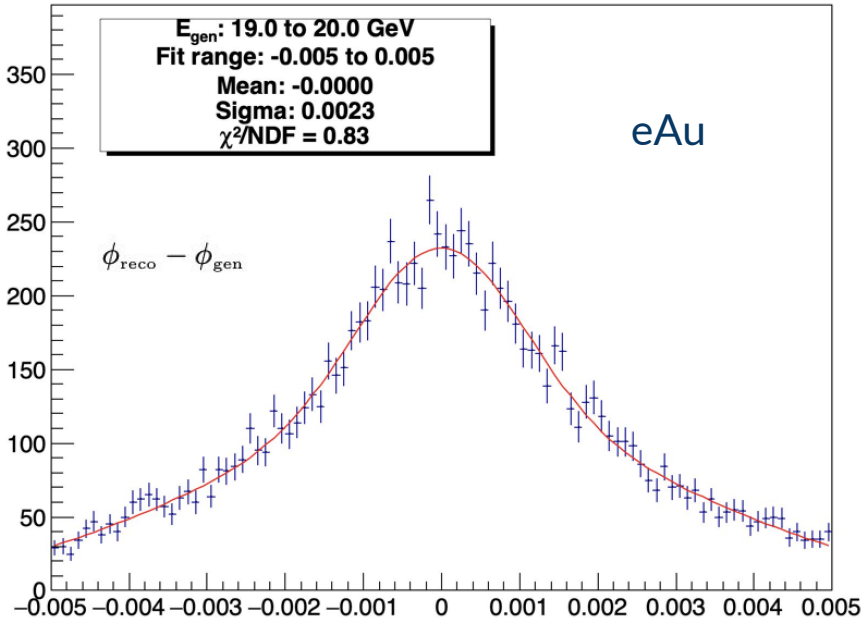
$$f(x) = \mathrm{Y}_1 \exp\left(-\frac{(x-\mu)^2}{2\sigma_1^2}\right) + \mathrm{Y}_2 \exp\left(-\frac{(x-\mu)^2}{2\sigma_2^2}\right)$$

$$\sigma = \sqrt{\frac{\mathrm{Y}_1}{\mathrm{Y}_1+\mathrm{Y}_2}\sigma_1^2 + \frac{\mathrm{Y}_2}{\mathrm{Y}_1+\mathrm{Y}_2}\sigma_2^2}$$



ϕ Fits





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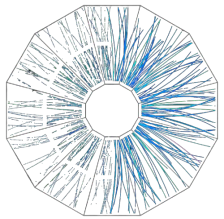
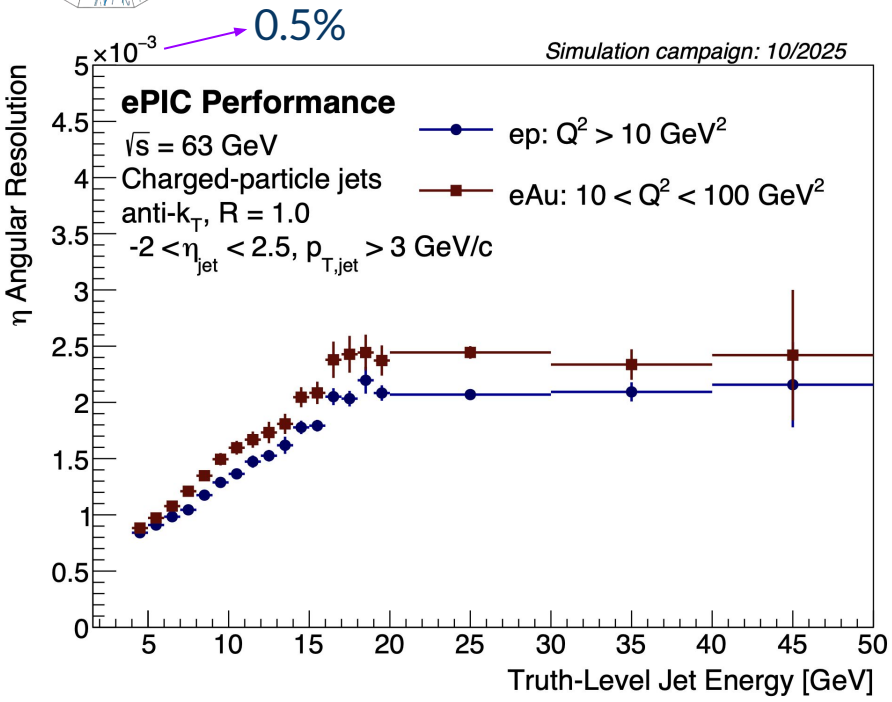
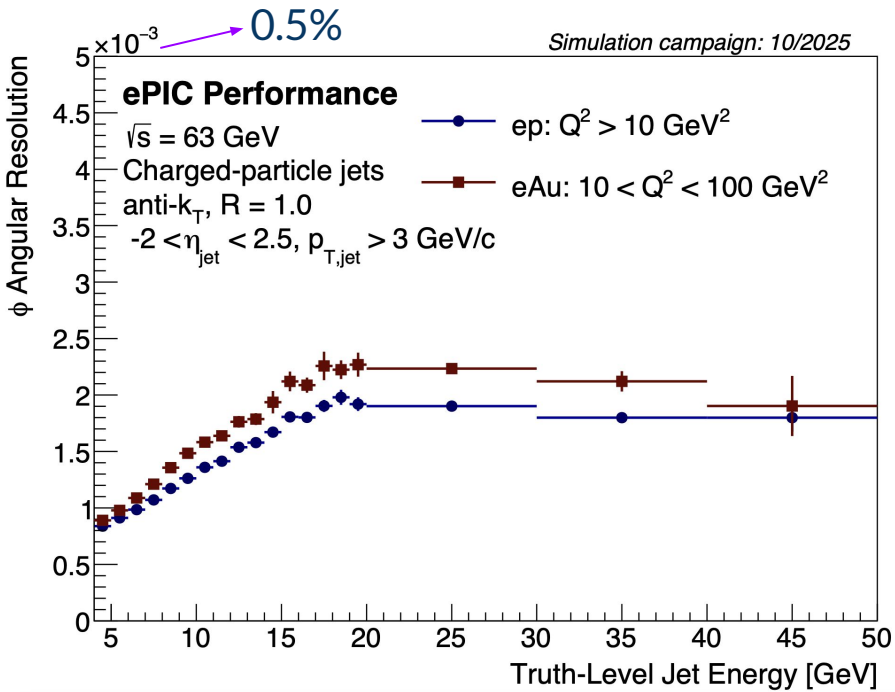


Angular resolution pTDR





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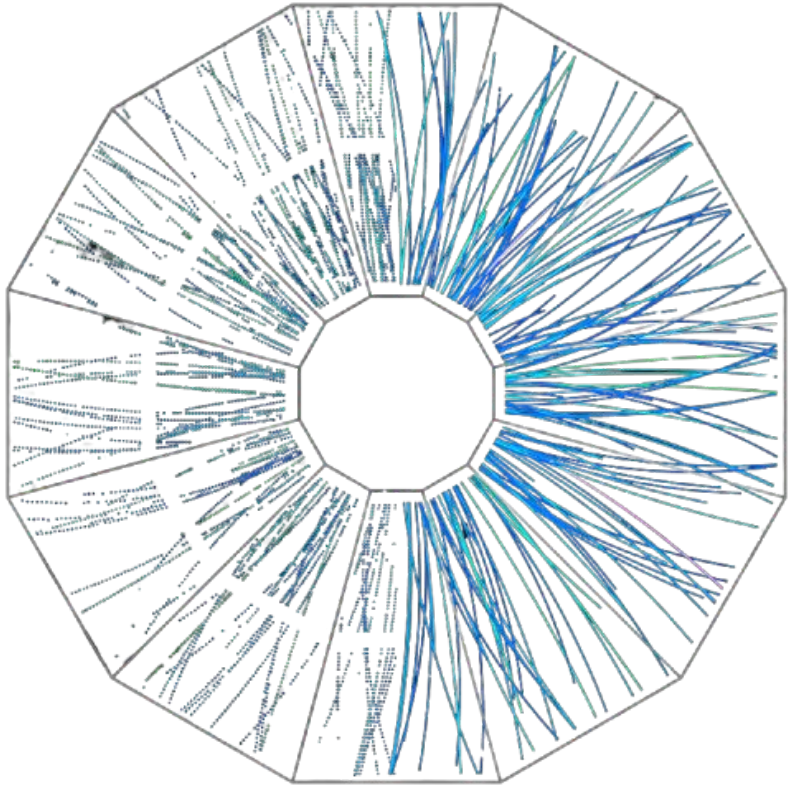
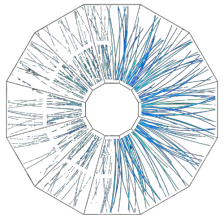
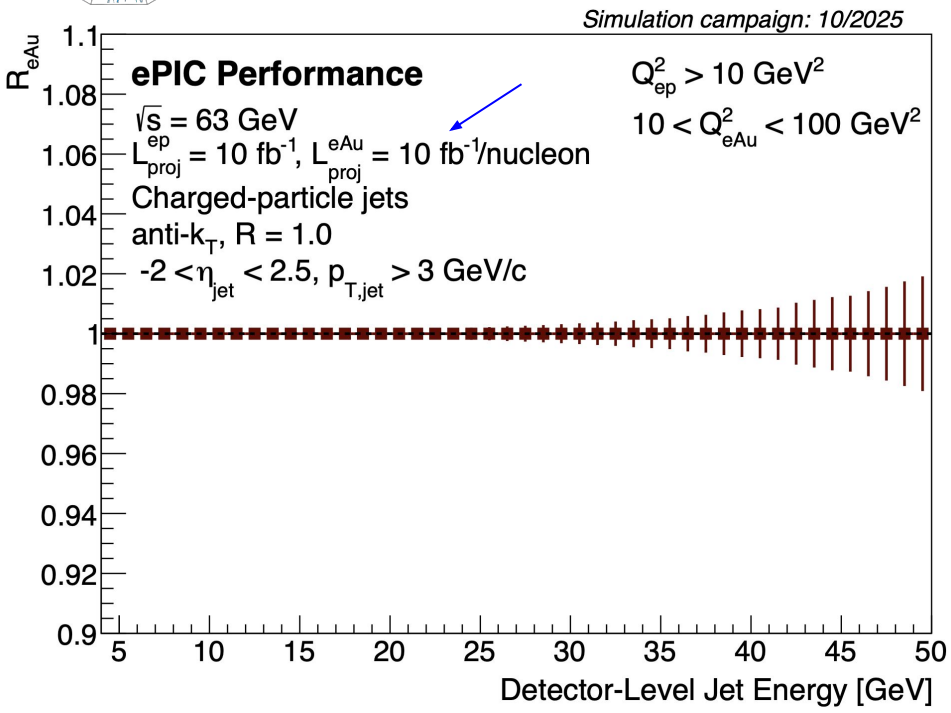
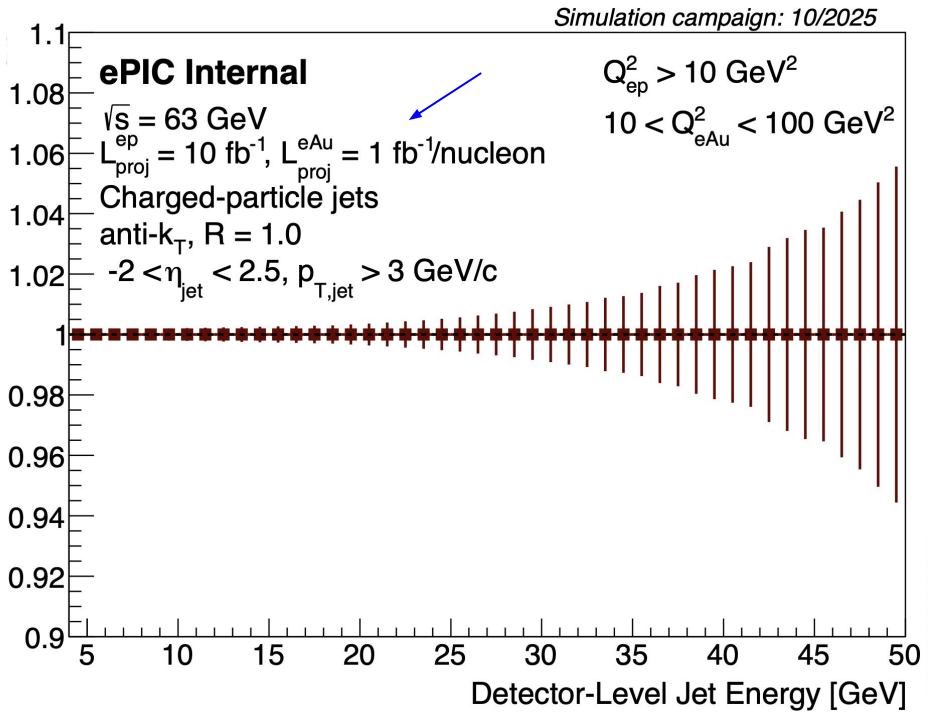
Physics: R_{eAu}





R_{eAu}





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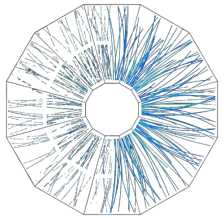

TODO's

- Double check the high-Q^2 cut for efficiency
- Triple check fits for JER/JES
- Rerun with background samples
- Work on physics results (Early Science?!)
  - R_{eAu} for different jet R
  - Fragmentation with and without PID (true)
  - Jet Shapes
  - Dijets

شكراً جزيلاً
ngiyabonga
рахмат
danke
謝謝
teşekkür ederim
spas
Баярлалаа
mersi
kia ora
barka
welalin
tack
mahalo
tapadh leat
спасибо
faafetai lava
vinaka
спасибі
blagodaram
dank je
misaotra
paldies
grazzi
matondo
thank you
gracias
kiitos
dankie
nanni
nandri
dhanyavad
māuruuru
köszönöm
açiū
dankon
akun
хвала
asante
manana
obrigada
murakoze
tenki
bedankt
bayarlalaa
gràcie
hvala
enkosi
dziękuję
djiere dieuf
tau
mochchakkeram
дякую
mamnun
chokrane
chnorakaloutioun
gratias ago
gràcies
sulpāy
taiku
go raibh maith agat
sobodi
dėkuji
obrigado
sağolun
sukriya
kop khun krap
takk
arigatô
dakujem
trugarez
mèsi
didi madloba
najis tuke
ありがとう
tanemirt
grazie
rahmet
terima kasih
kam sah hamnida
rahmat
ευχαριστώ
diolch
dhanyavadagalu
shukriya
merce
мерси
তোমাকে ধন্যবাদ
감사합니다
xièxie
merci