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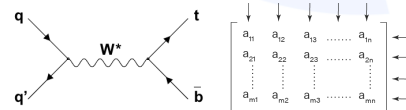
# Exclusive DVMP Analysis

BY

Olaiya Olokunboyo

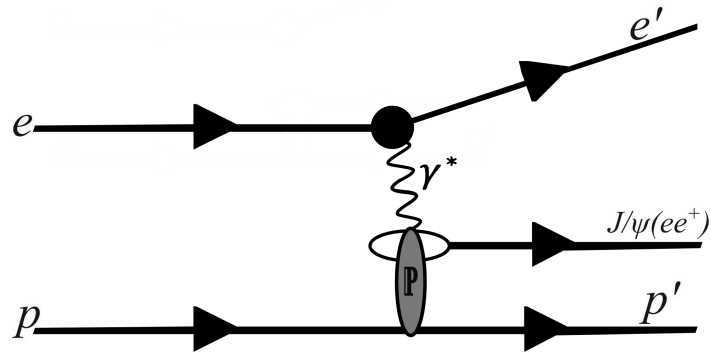
Supervisor: Prof. Nathaly

ePIC Collaboration  
01/23/2025

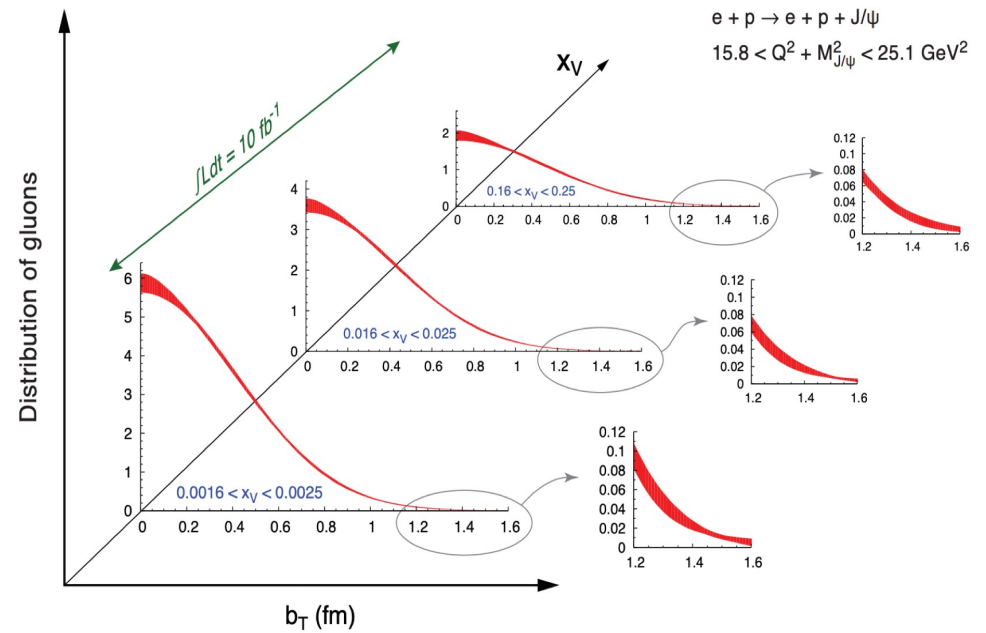


# Motivation

Typical Feynman diagram describing an exclusive ( $e + p$ ) beam collisions leading to the production of  $J/\psi$  mesons.

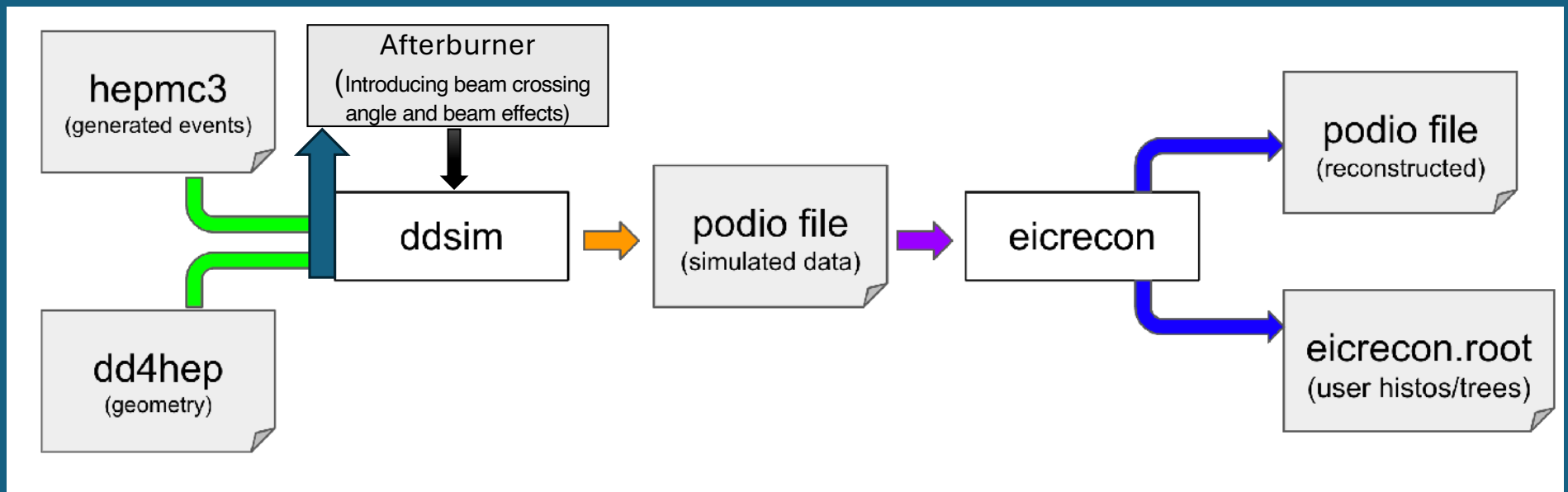
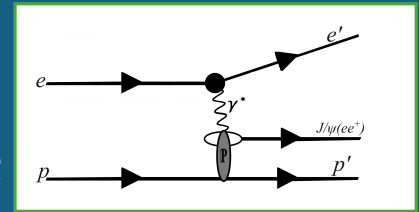


- ★ Explore heavy mesons like  $J/\psi$  essential for investigating gluon generalized parton distributions (GPDs).



- ★  $J/\psi$  production: transverse spatial distribution of gluons

# Data Acquisition Procedure



Data Set  $\left\{ \begin{array}{l} 1 < Q^2 < 10 \\ 1 < Q^2 < 10 \end{array} \right.$       Luminosity =  $10 \text{ fb}^{-1}$       18x275 GeV  
Luminosity =  $10 \text{ fb}^{-1}$       10x100 GeV

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# Cuts Applied

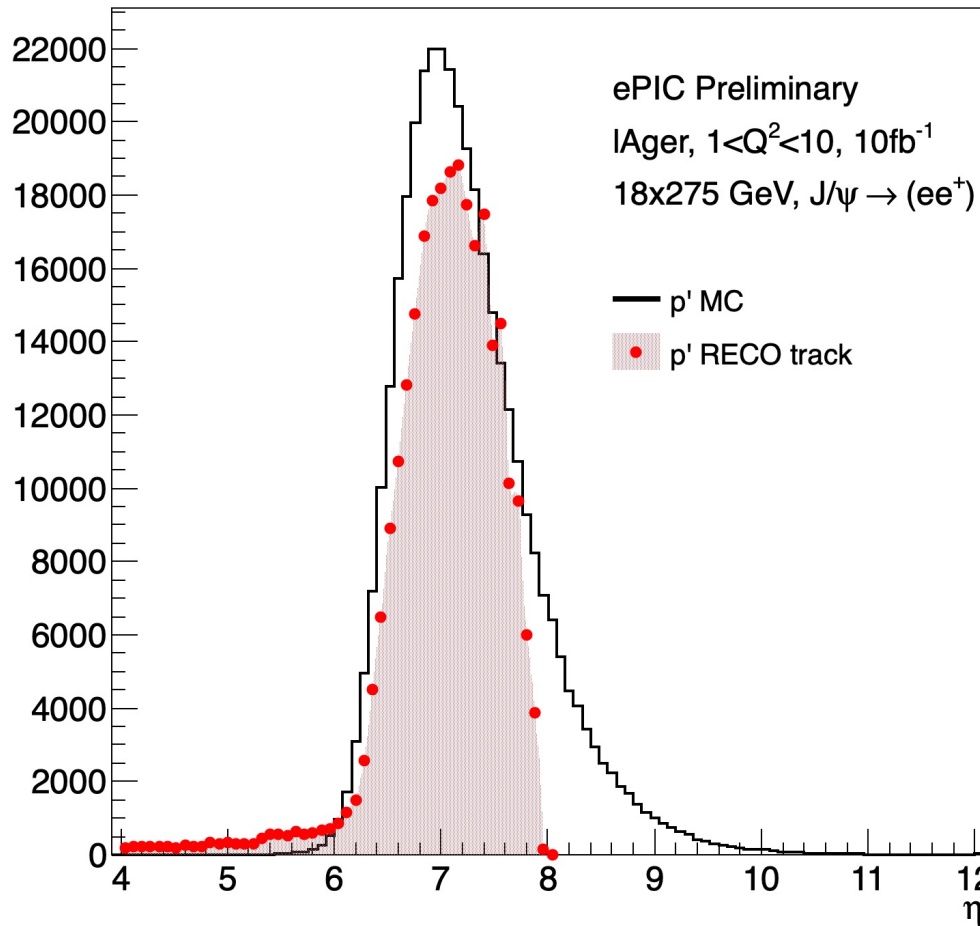
Cuts Protons	Cuts on scattered electrons selection
Placed $p_T$ cut of greater or equal to 200 MeV	Must have 3 tracks, greater $p_z$ , and smaller eta

$$0.001 < y < 1$$

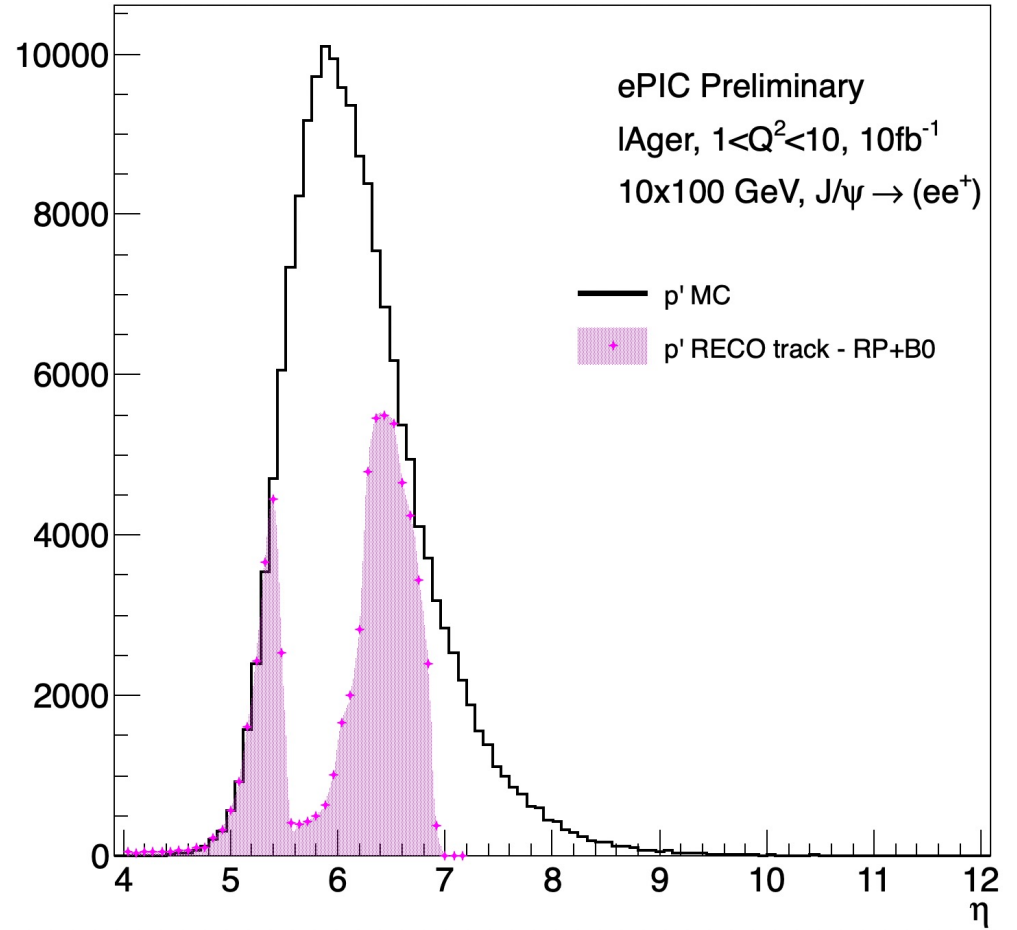


# Kinematic Variables

18x275

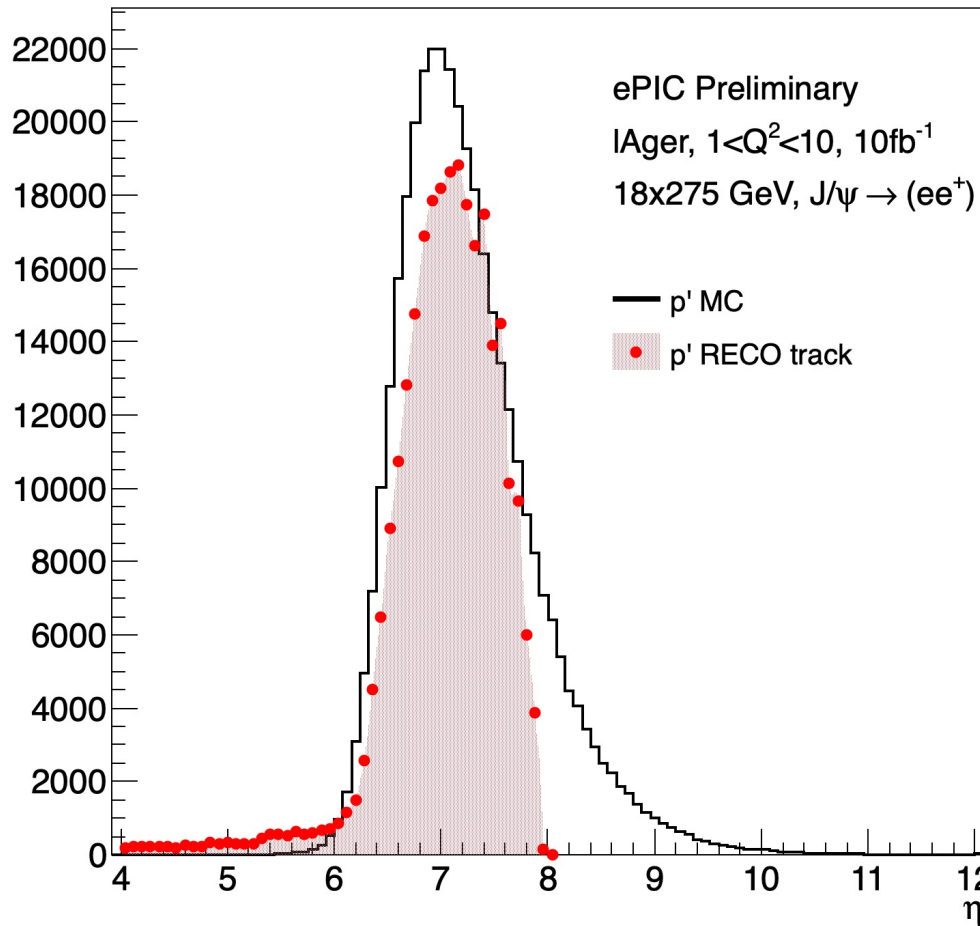


10x100

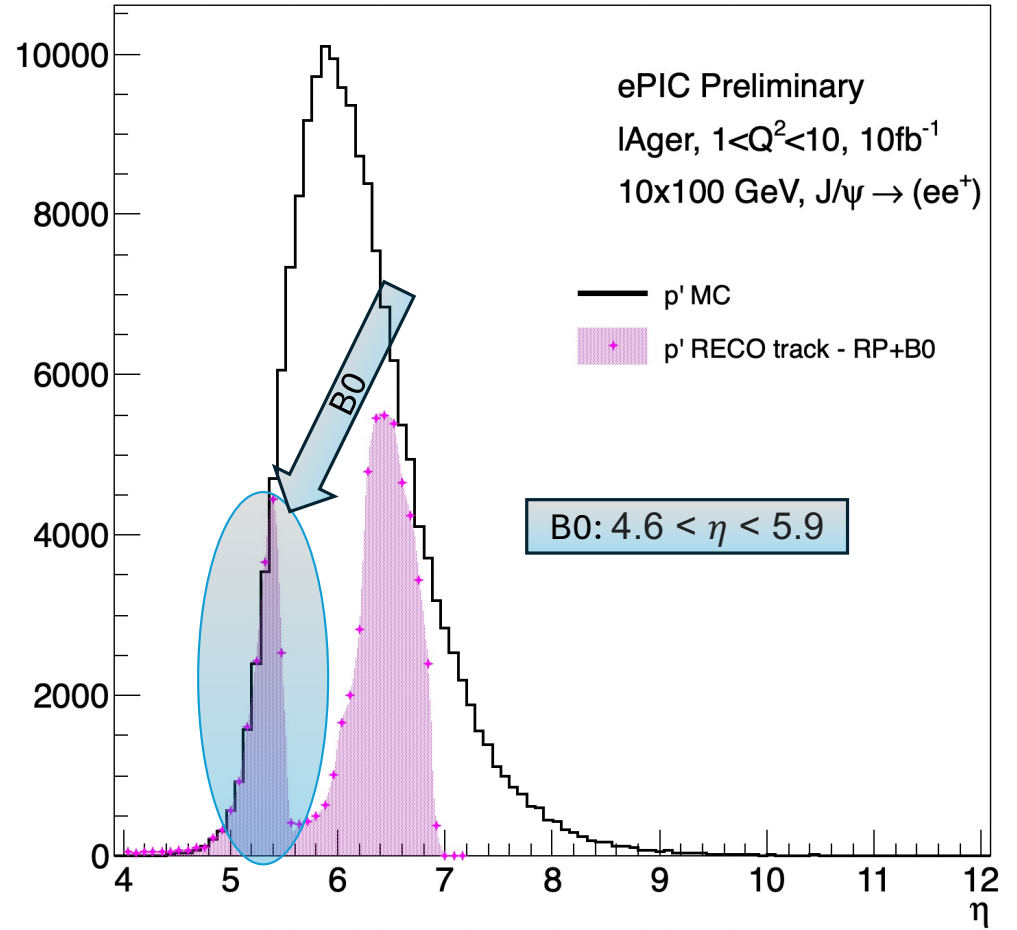


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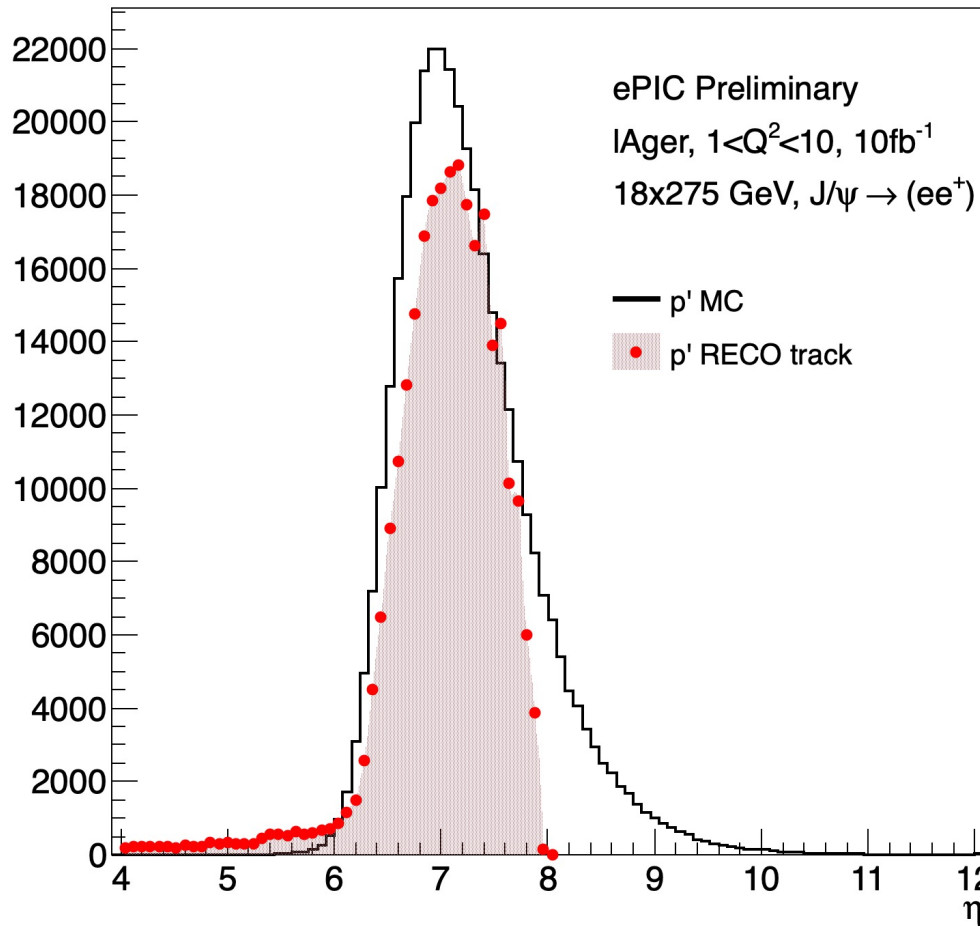


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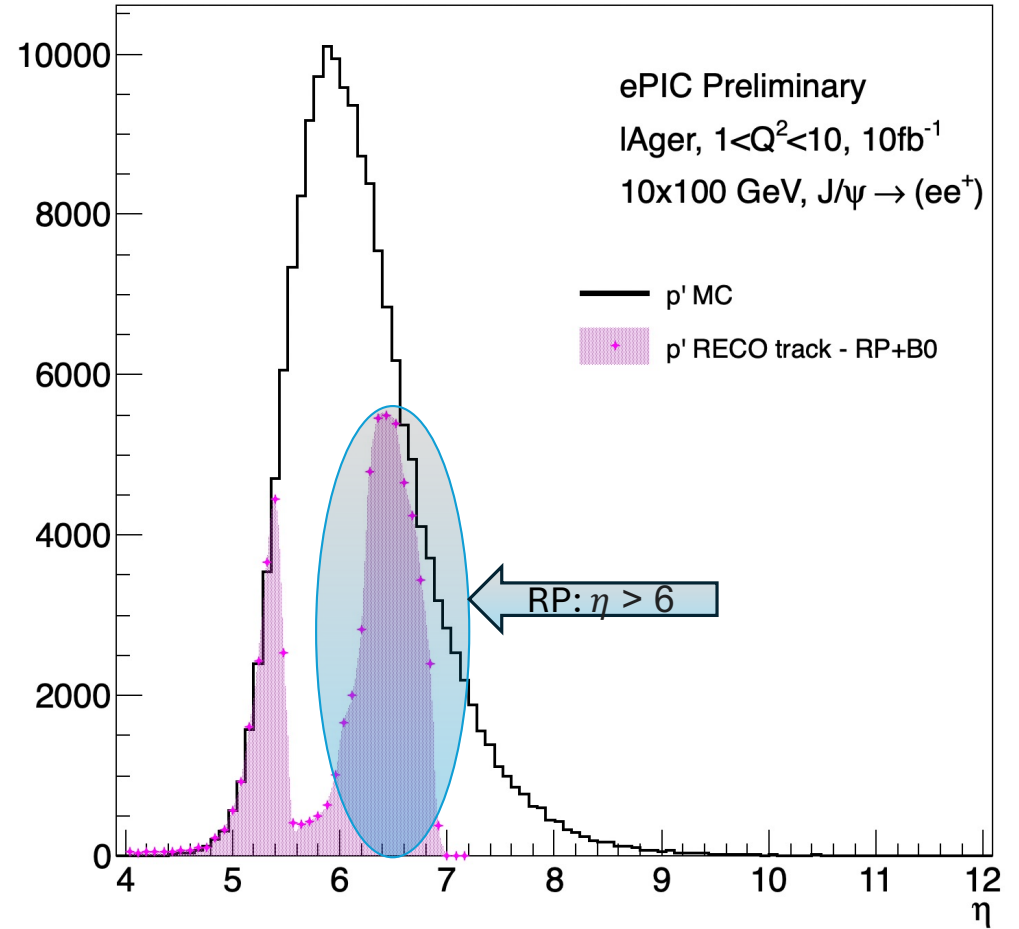


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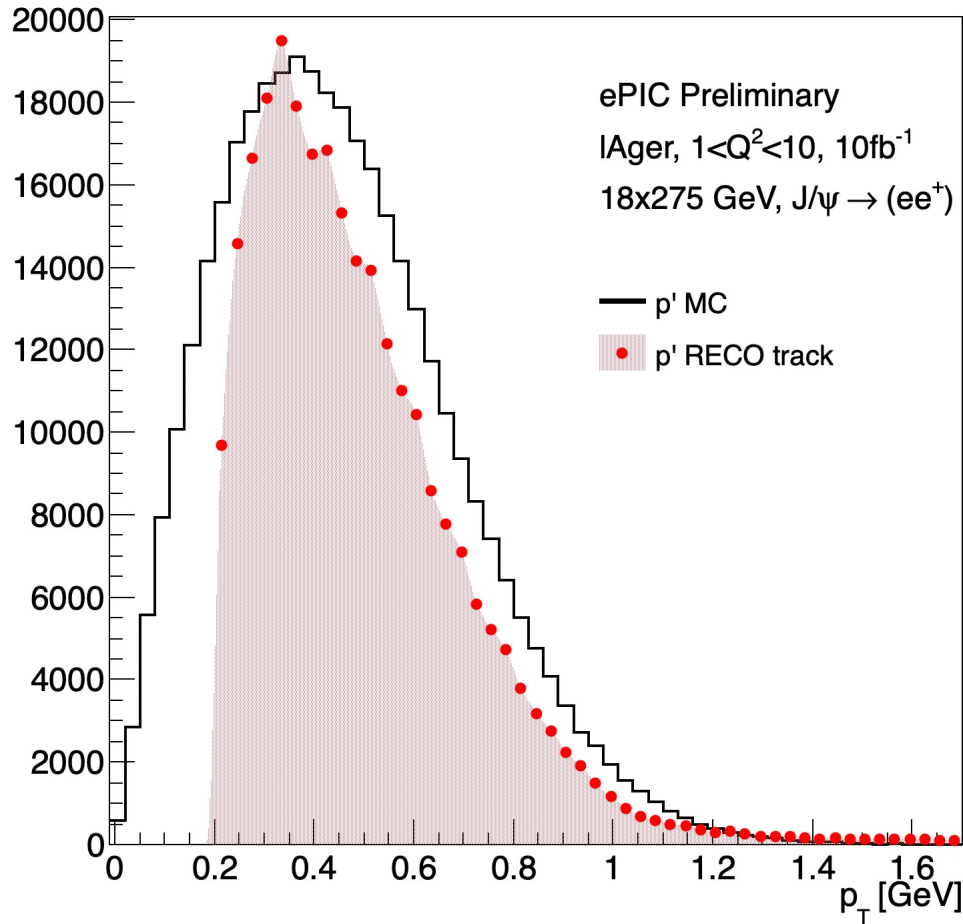


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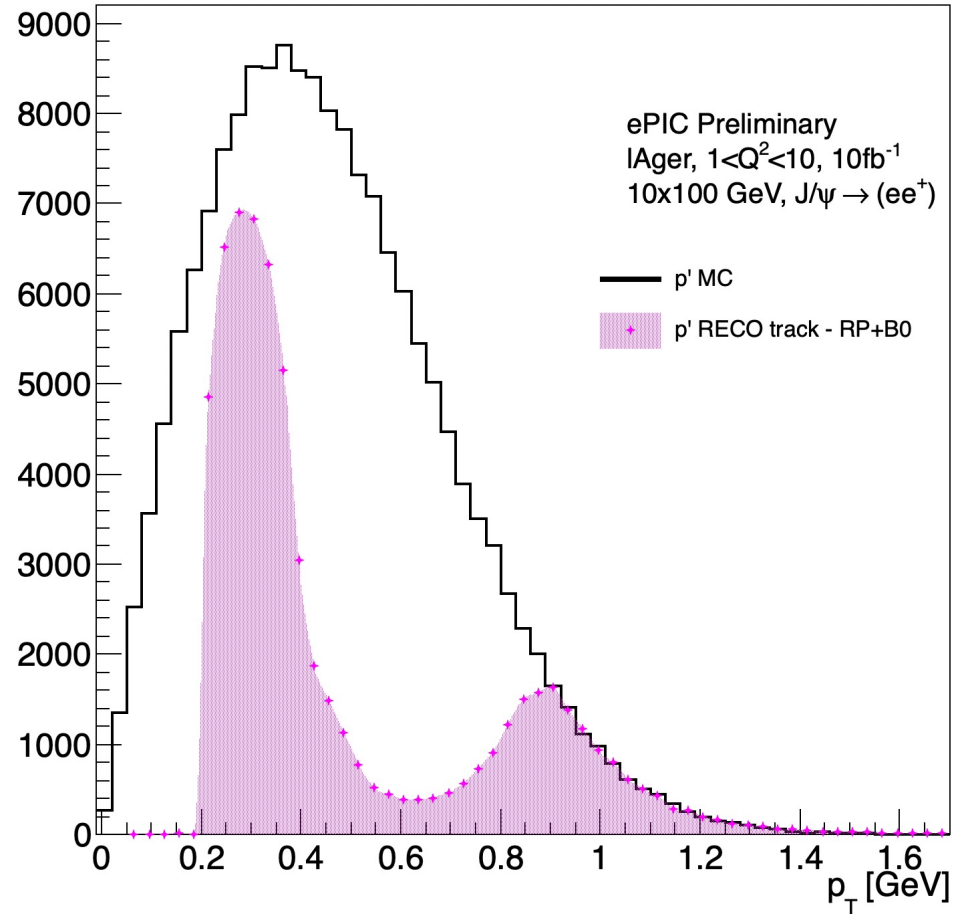


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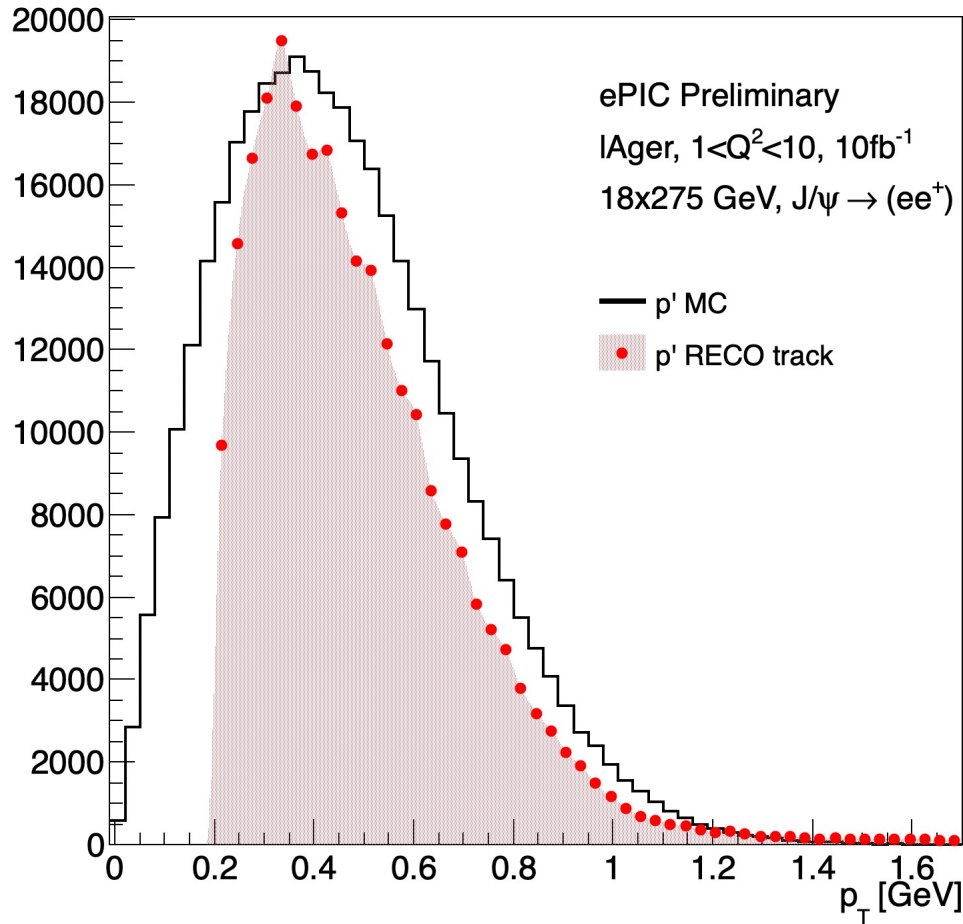
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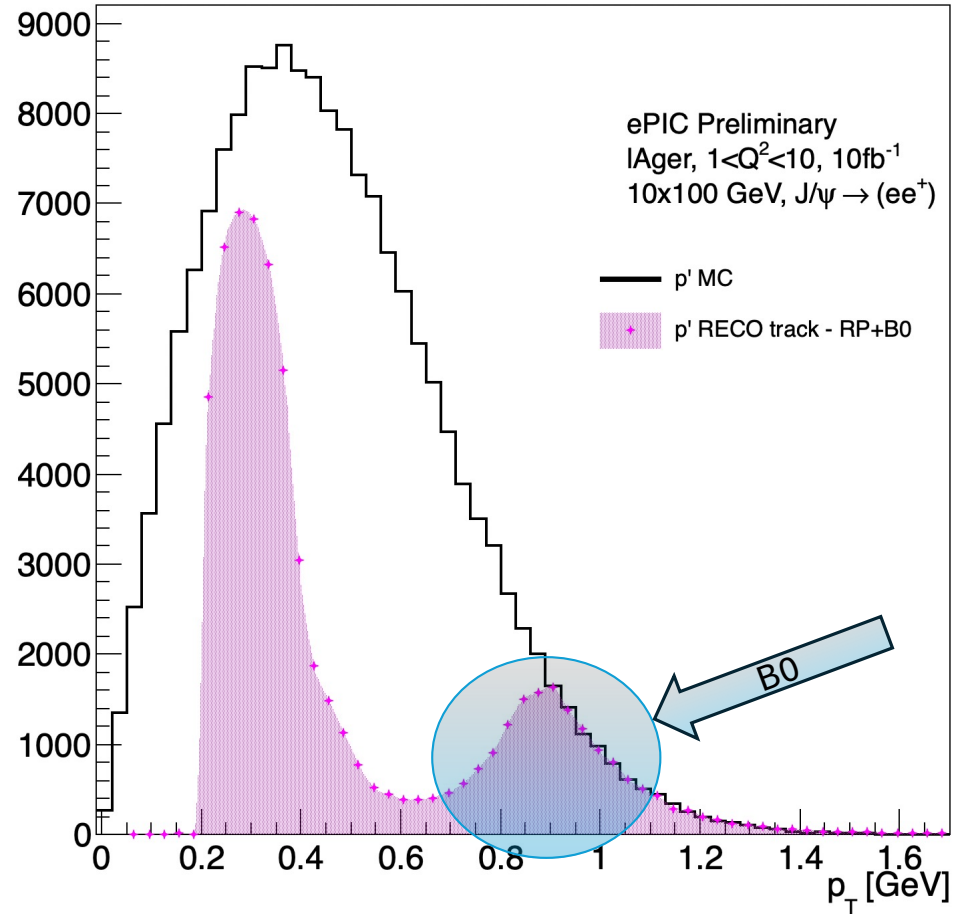


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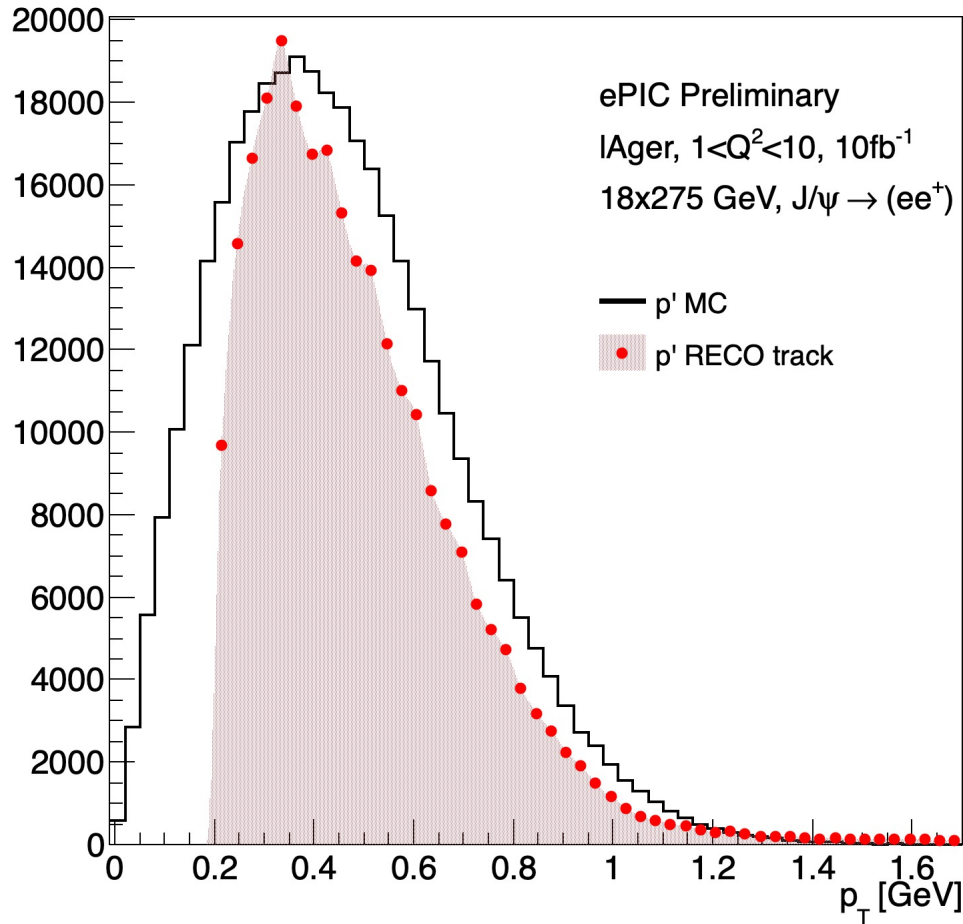


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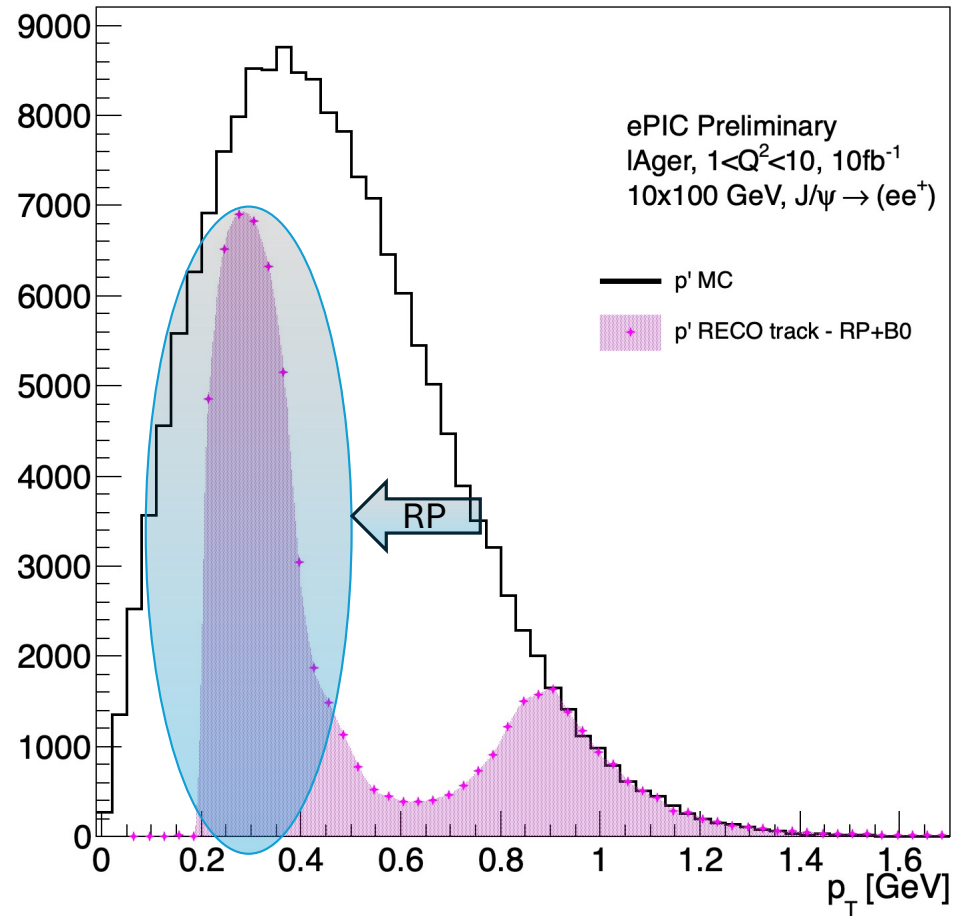


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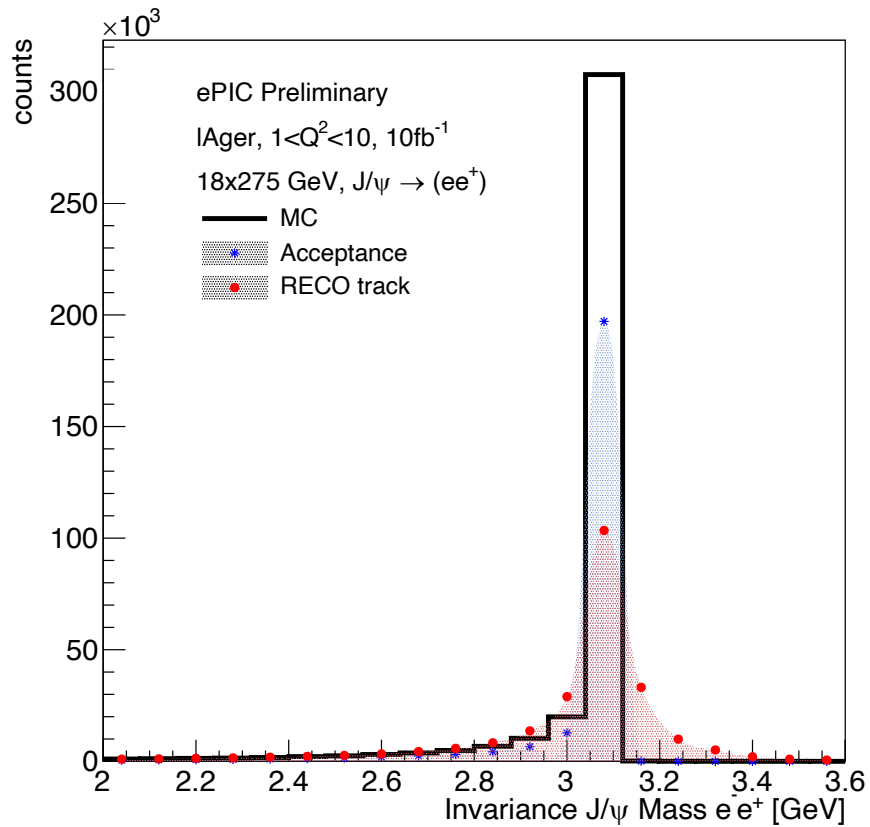


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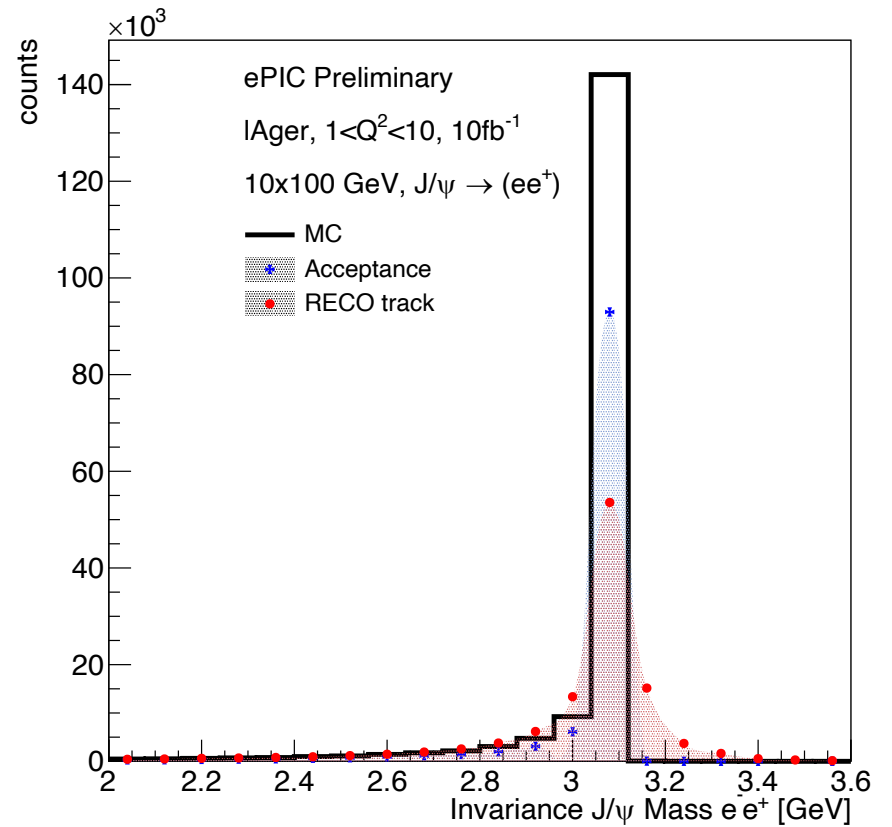


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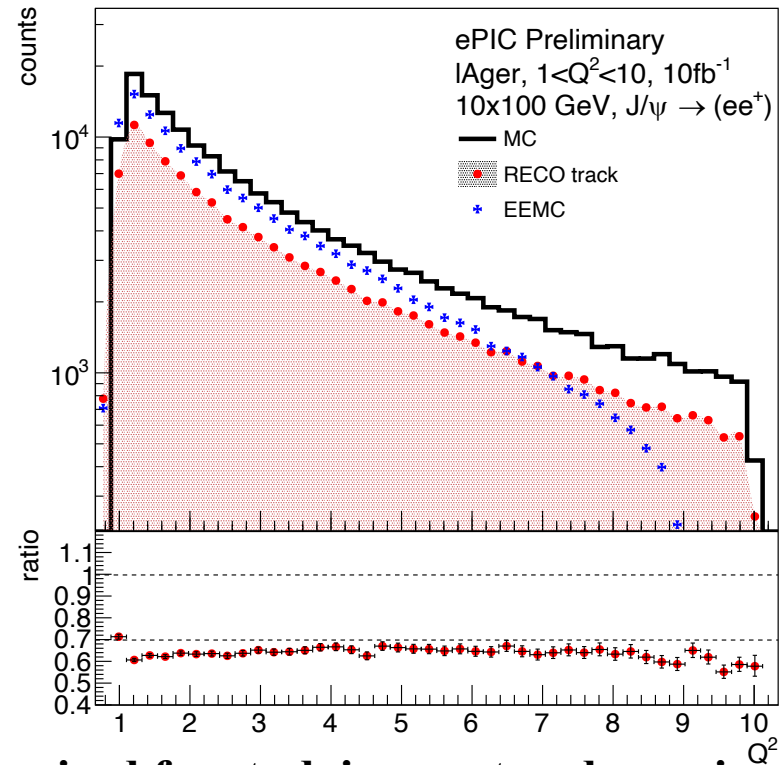
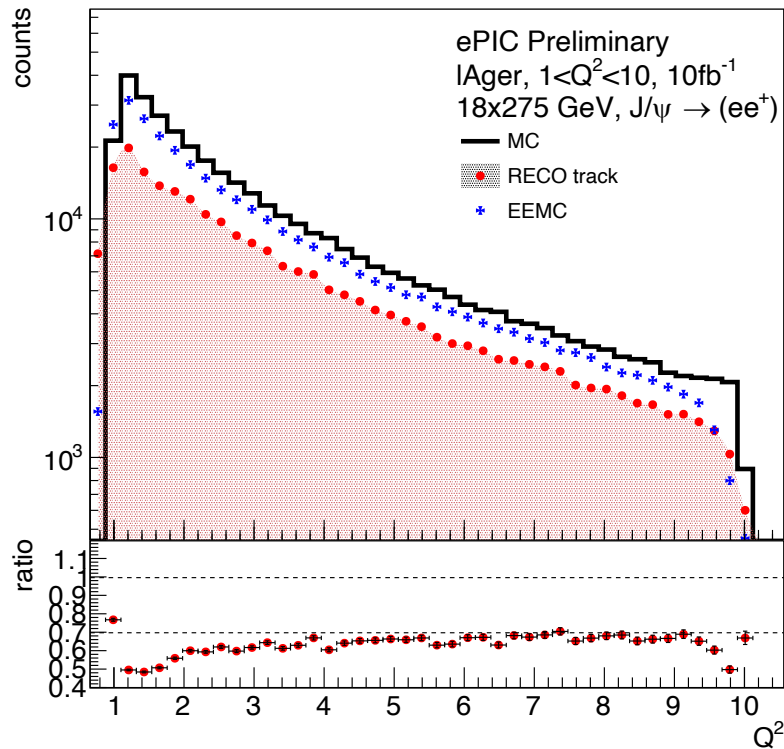


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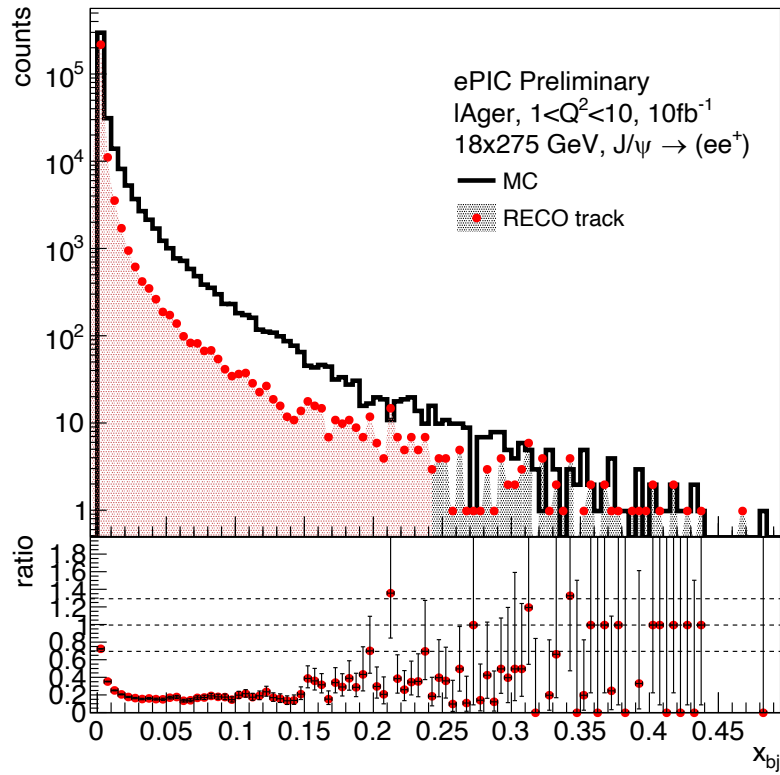
18x275 10x100



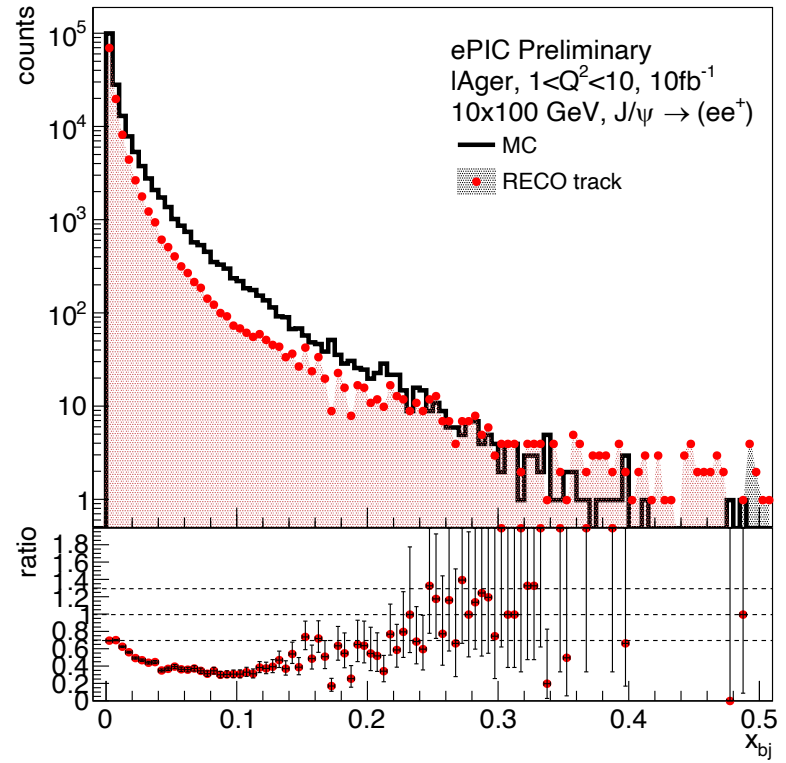
**Energy scaling distribution of electrons is required for studying parton dynamics at small distances, with notable discrepancies observed between tracking and calorimetry data.**

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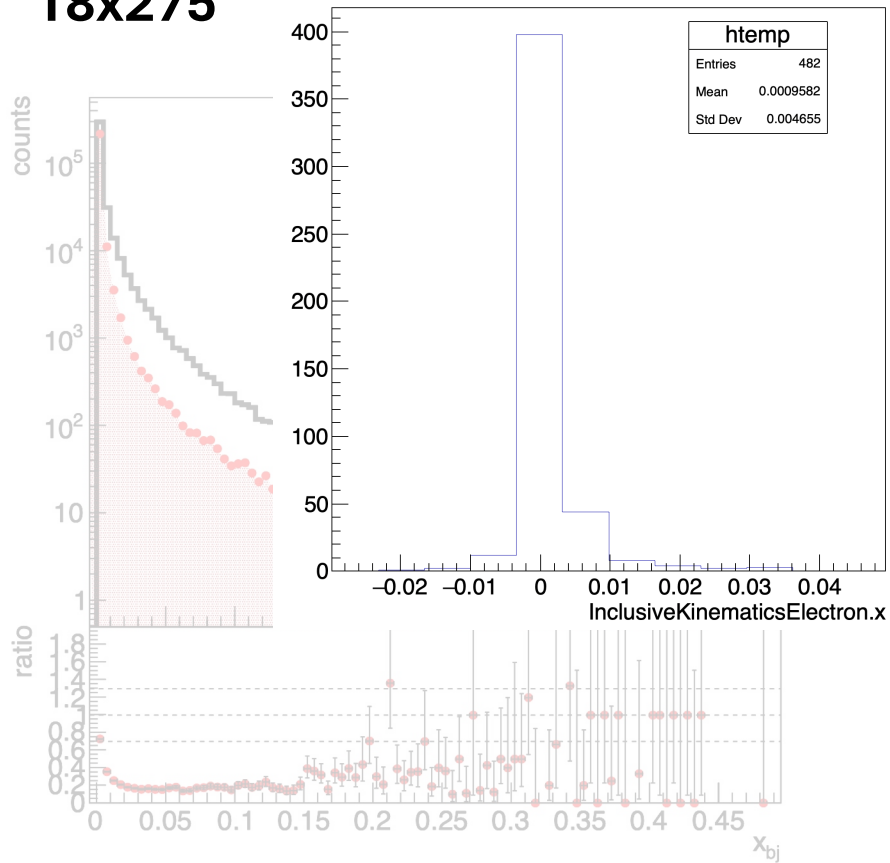


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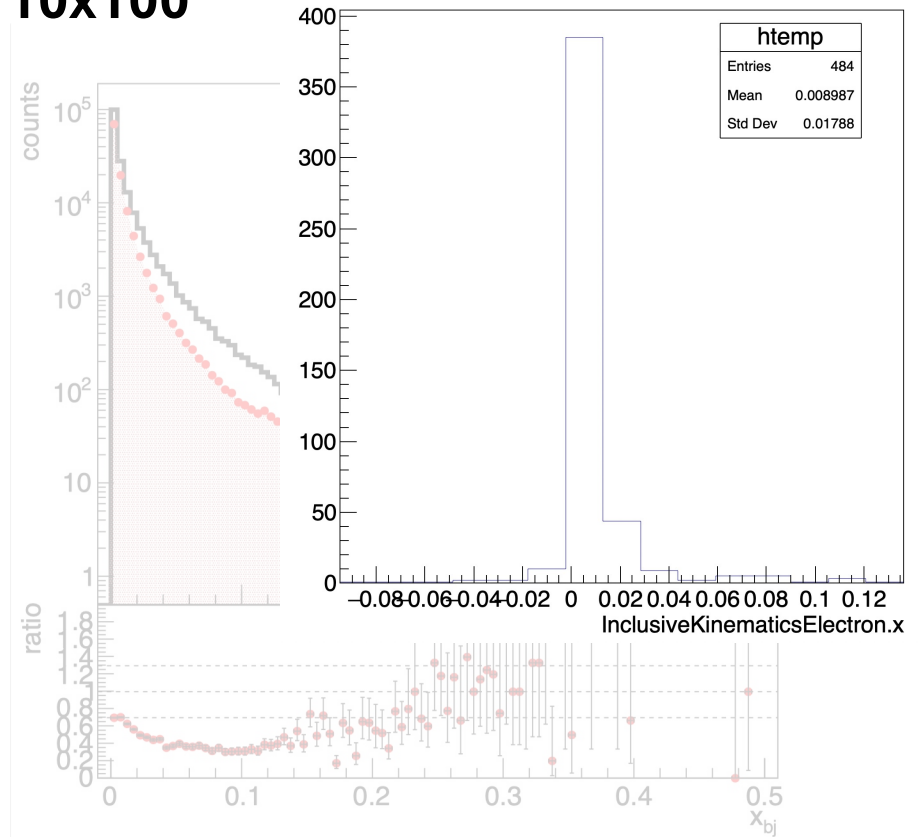


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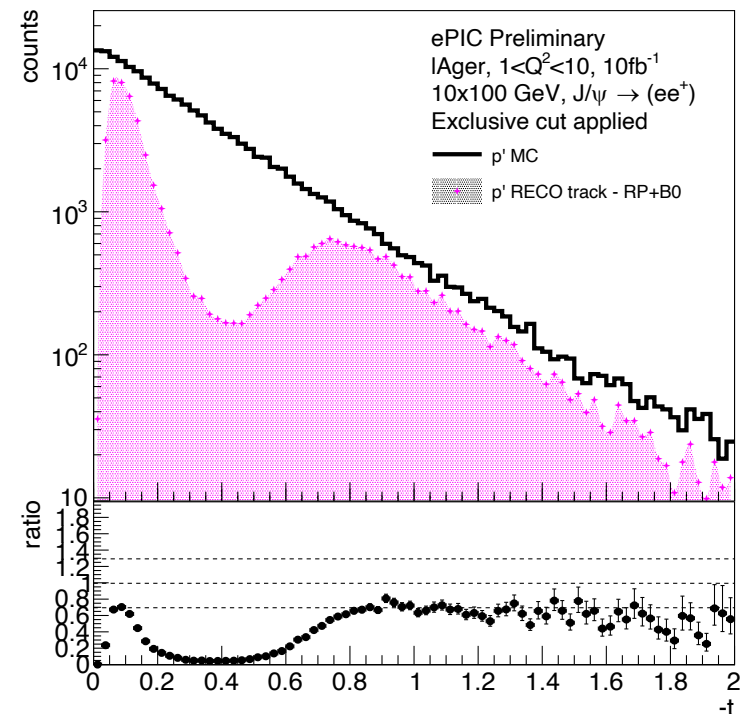
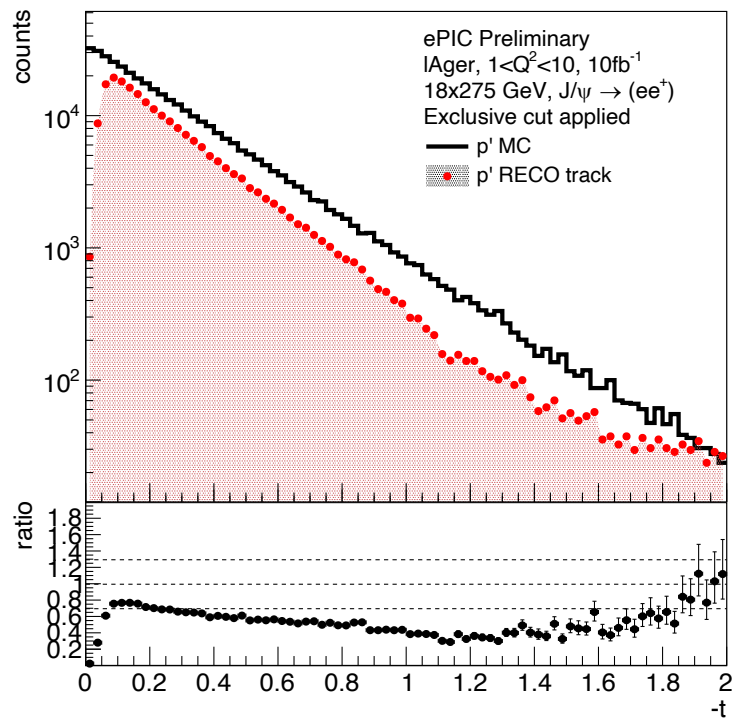


**The measure of the fraction momentum; losses resulting from low  $y$ .**

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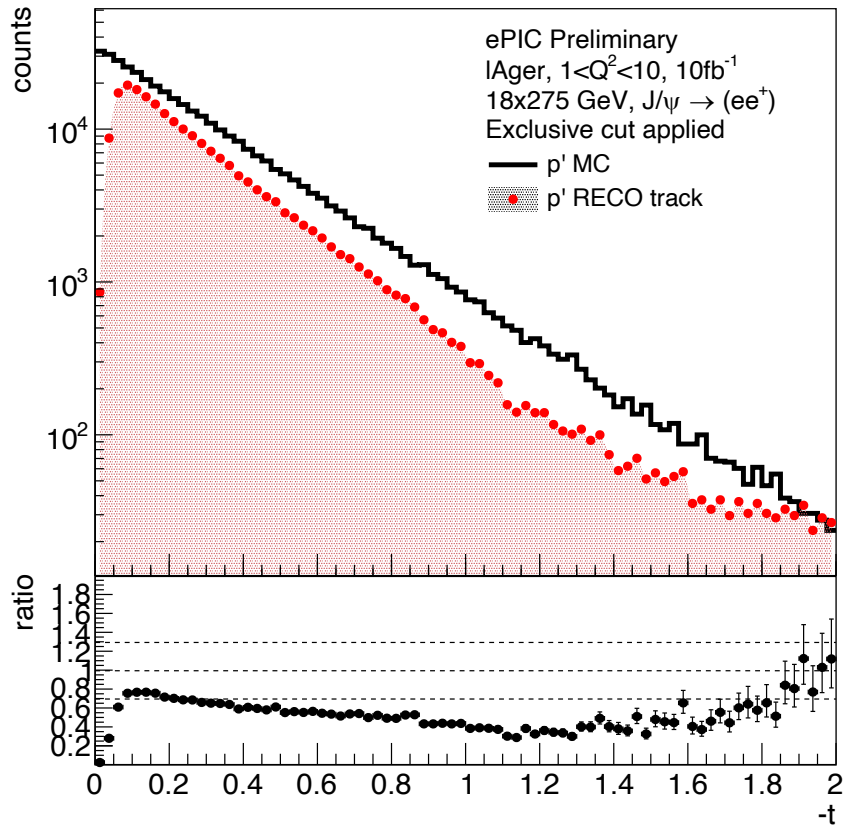
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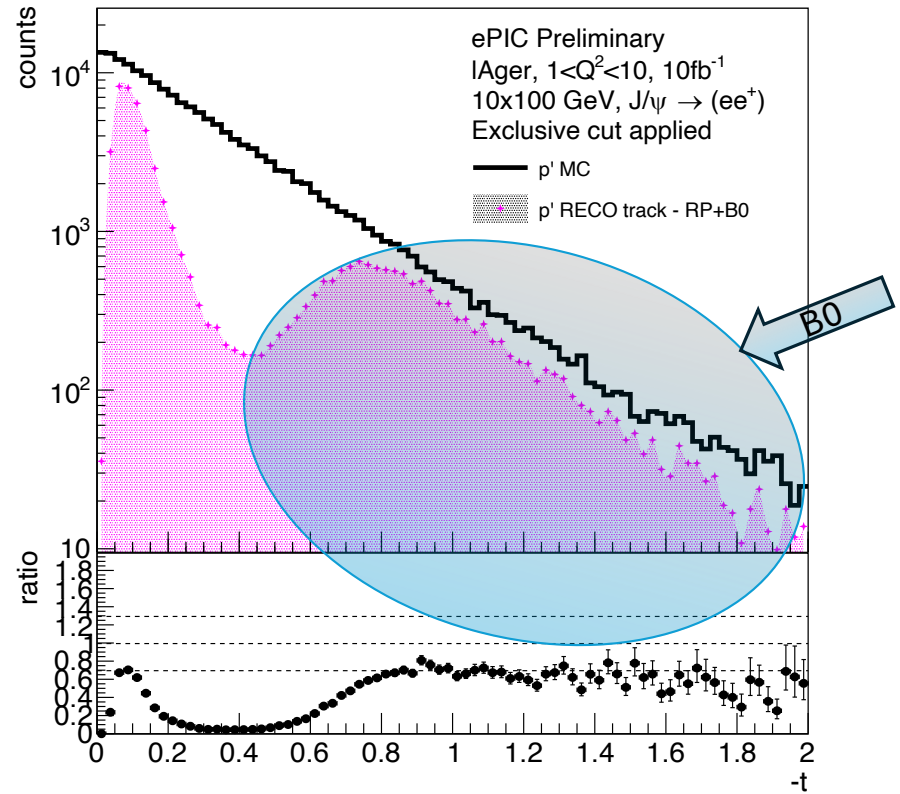
**Momentum transfer distribution with events losses arising from exclusivity thereby reducing the efficiency of the reconstruction.**

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18x275



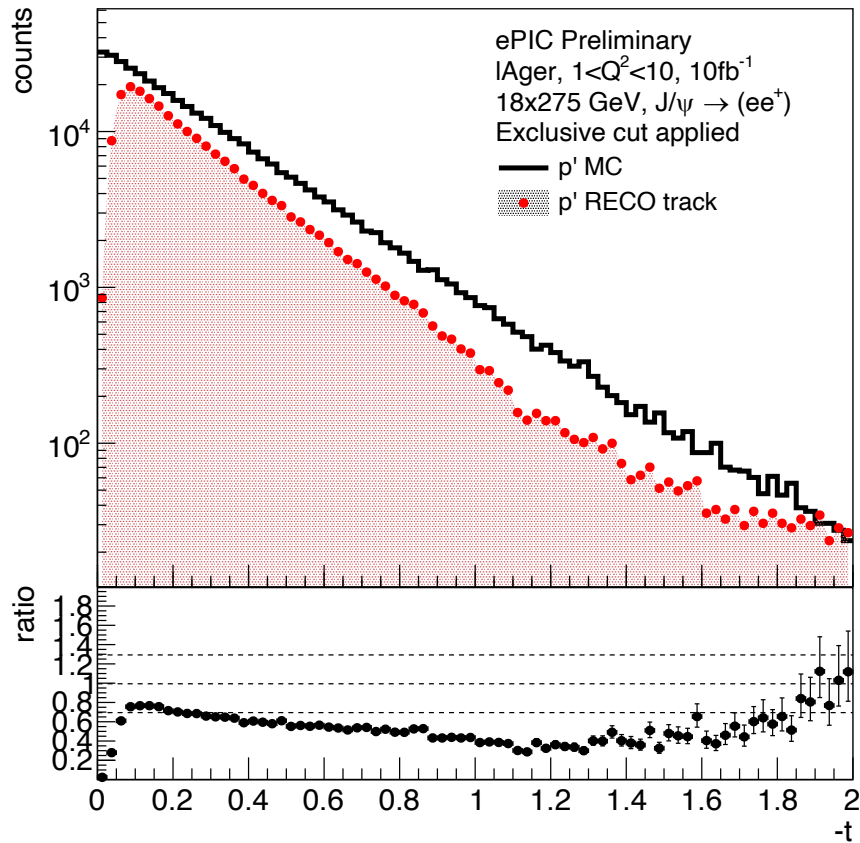
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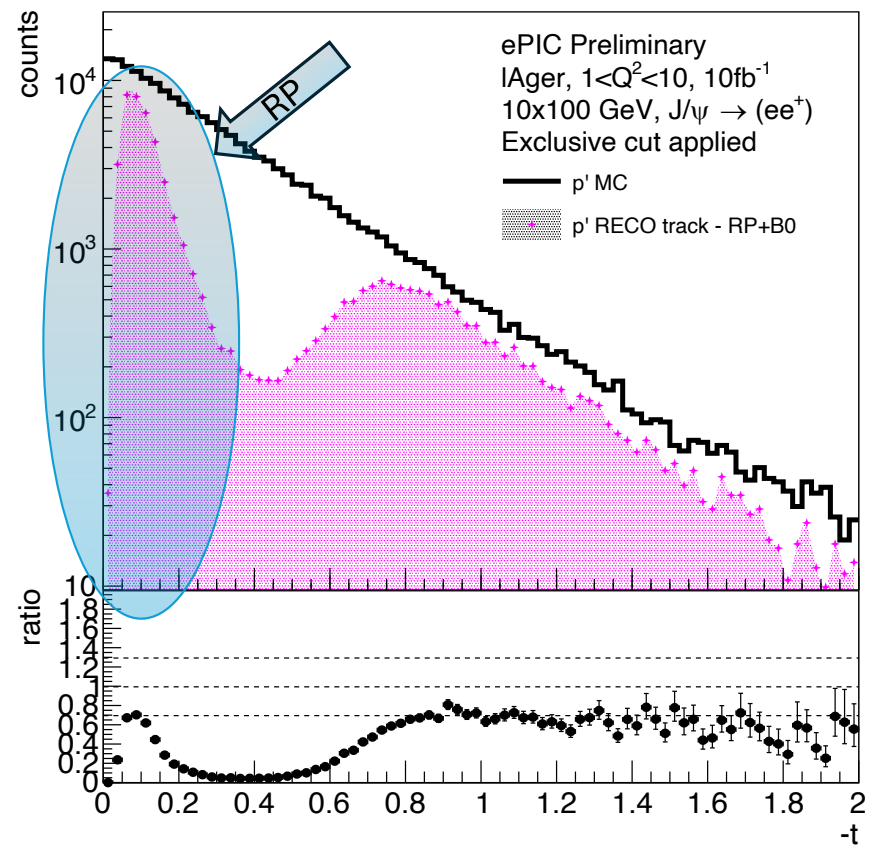


# Kinematic Variables

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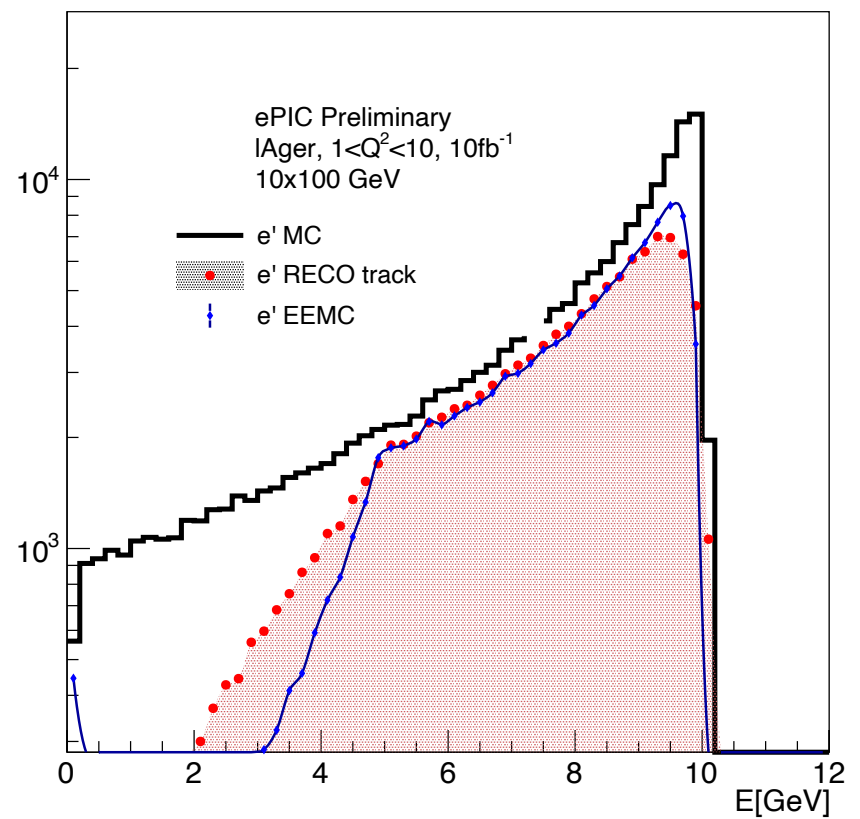
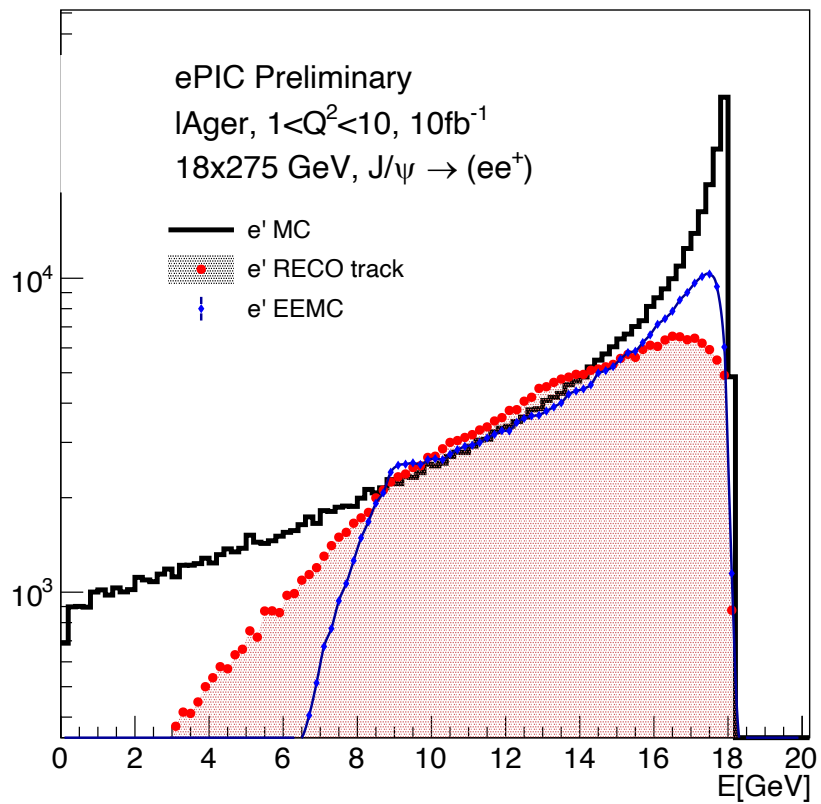
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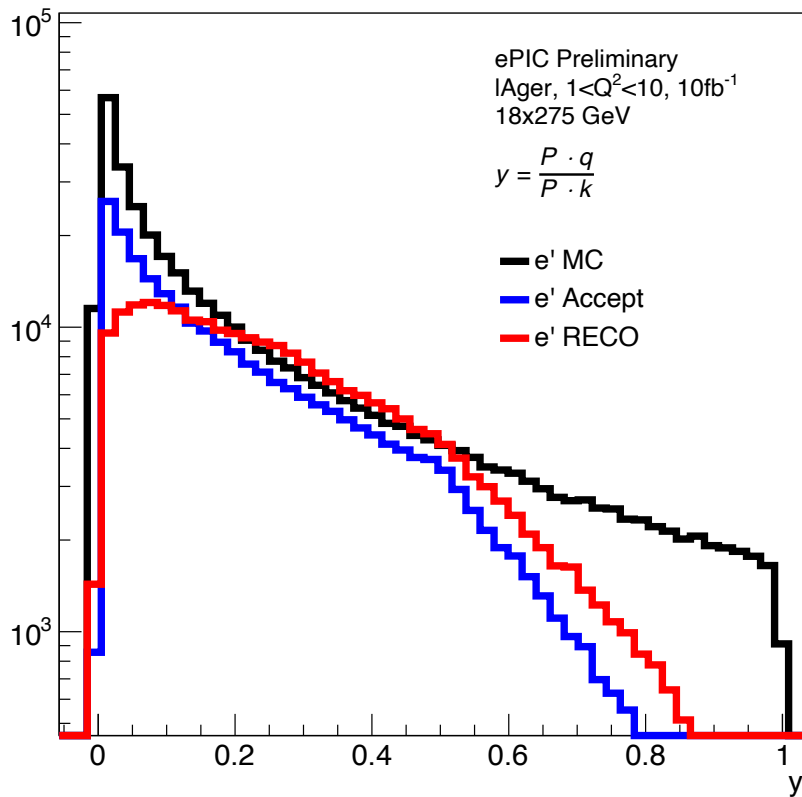
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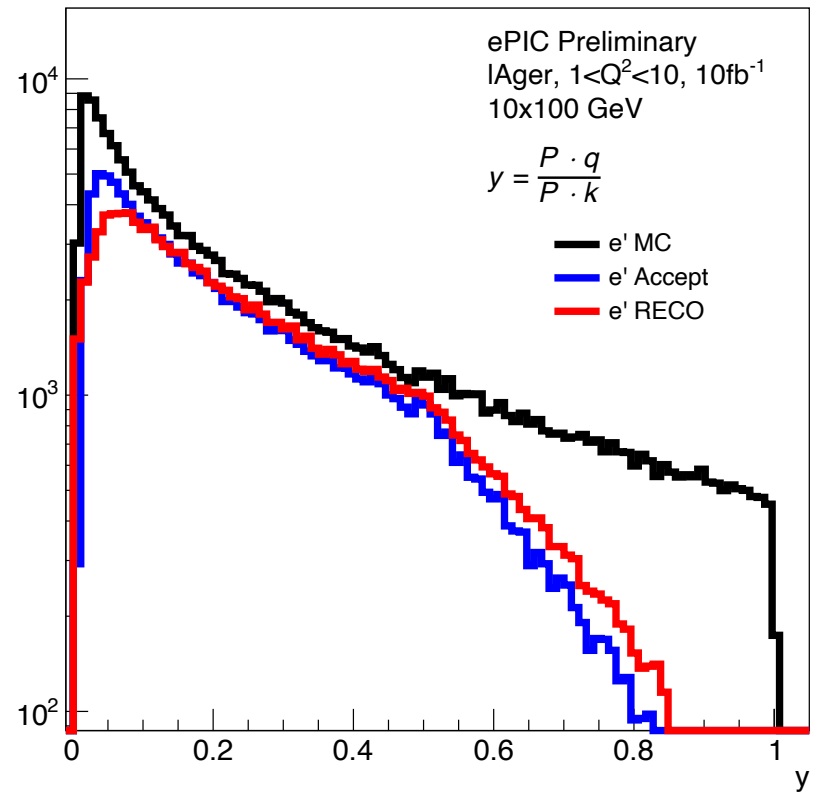


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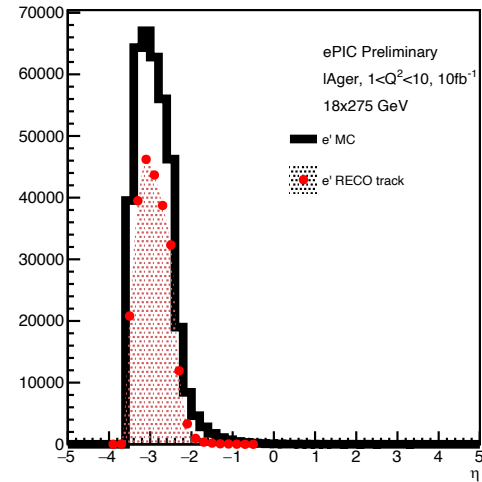
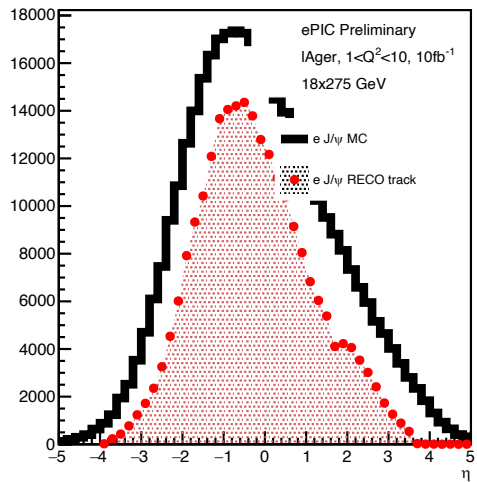
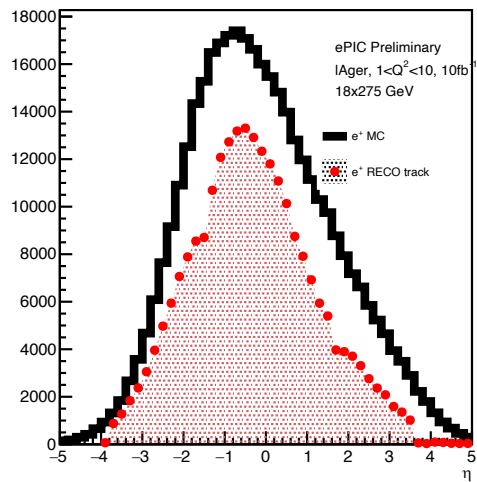
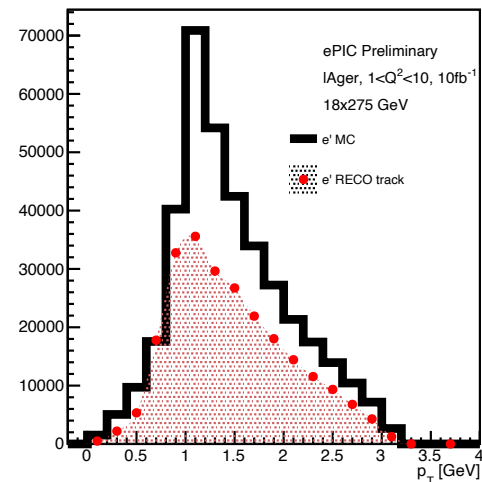
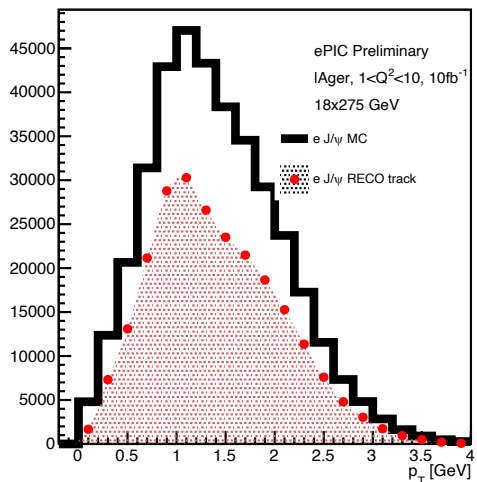
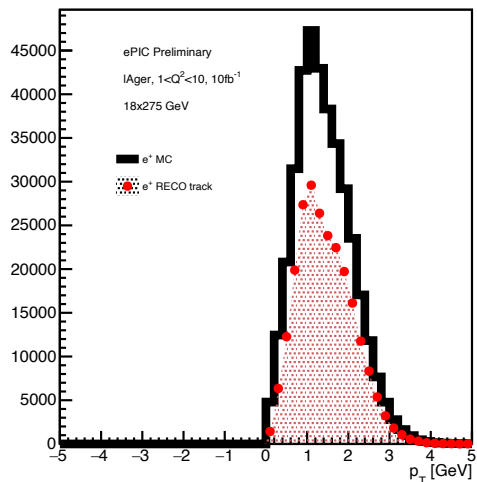


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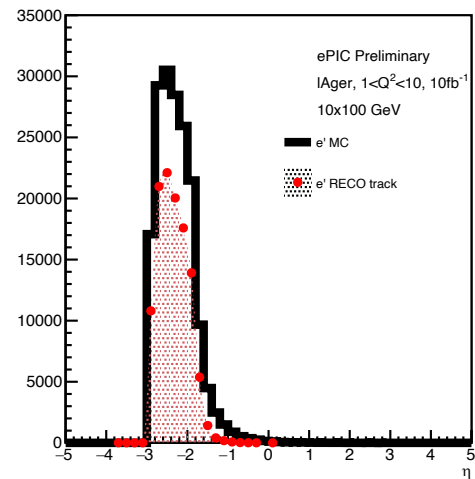
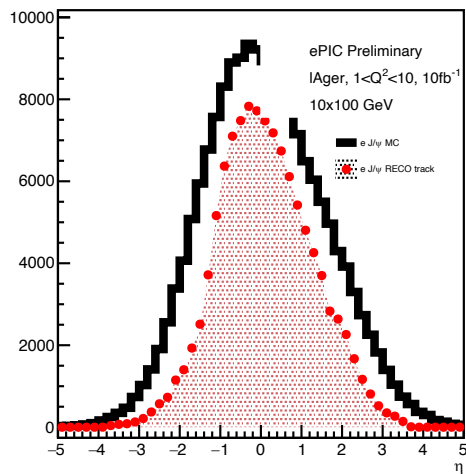
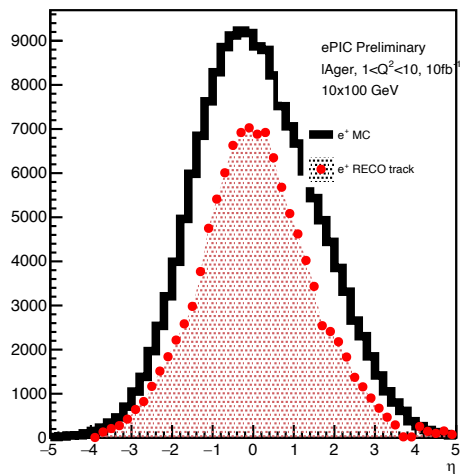
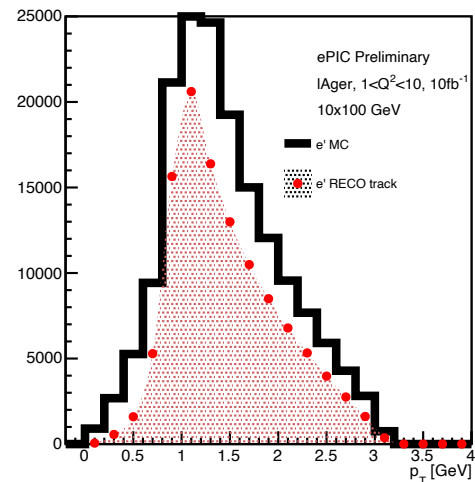
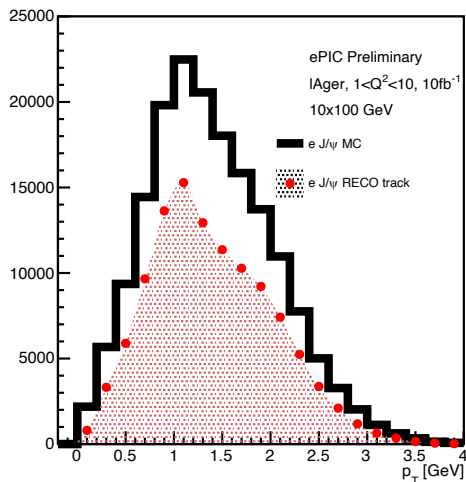
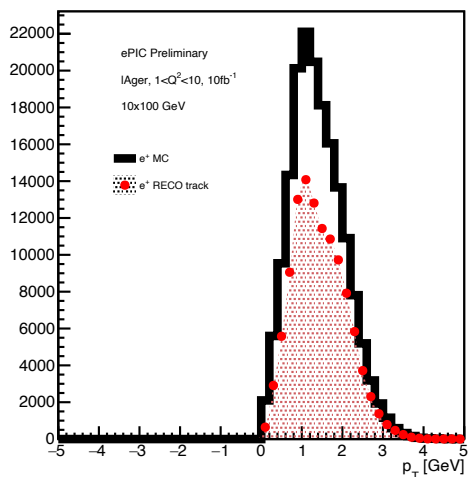
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# Kinematic Variables



10x100

# Kinematic Variables



# Summary

- **Probing the Gluon Structure of Nucleons and Nuclei**
- **Understanding the Spatial Distribution of Gluons**

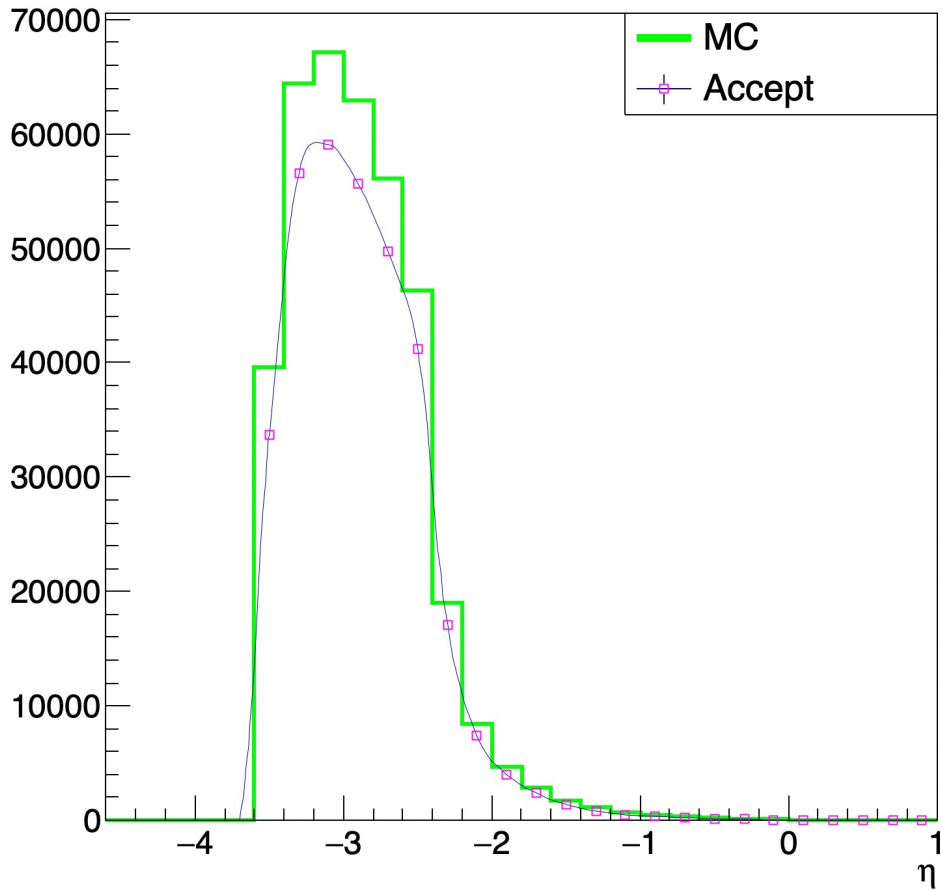
Exclusive  $J/\psi$  production at the **EIC** will provide **unprecedented insights into the gluon structure of matter**, test fundamental **QCD predictions**, and contribute to our understanding of **the strong force at high energies**.



**Thank  
You**

# Kinematic Variables

18x275



10x100

