



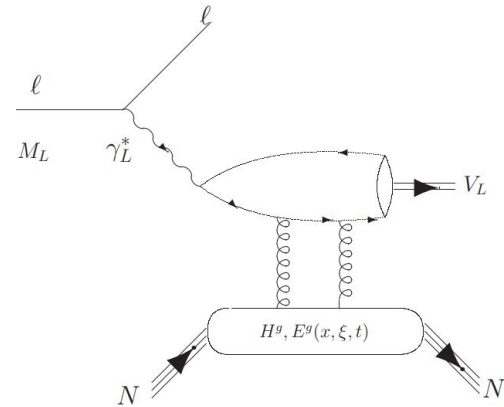
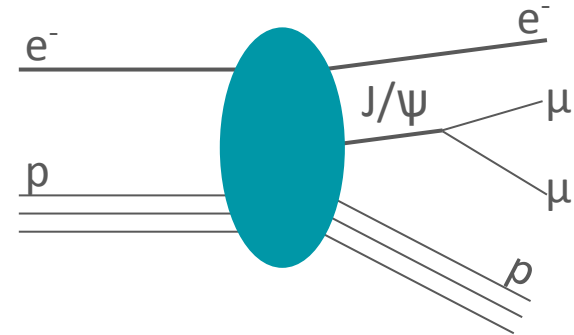
Deeply Virtual $J/\psi \rightarrow \mu\mu$

EDT Meeting 29/06/26

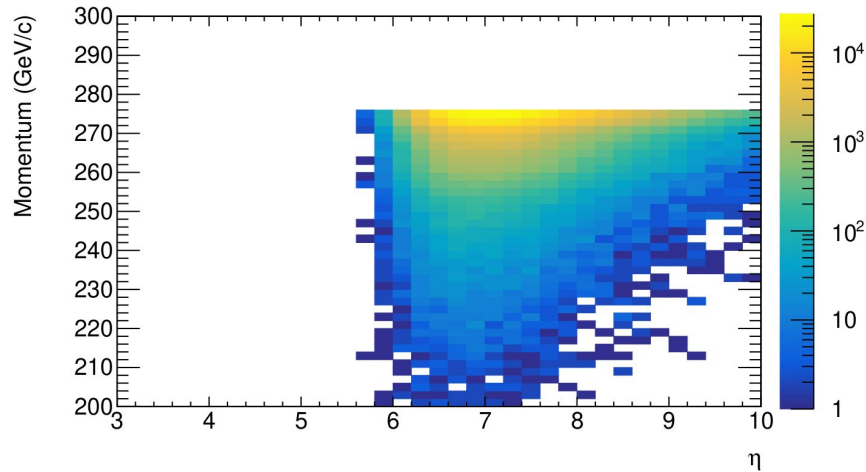
Alex Smith
University of York
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Channel Summary:

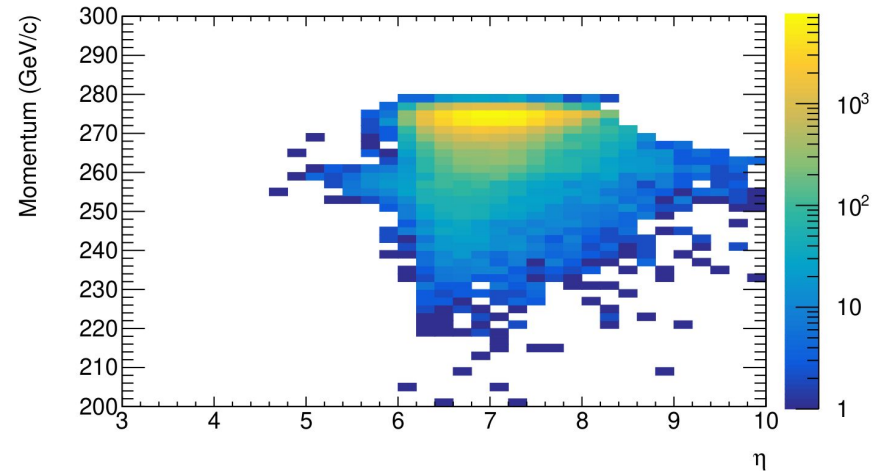
- DVJ/ ψ P with $J/\psi \rightarrow \mu\mu$.
- Deeply virtual $\Rightarrow Q^2 > 1 \text{ GeV}$.
- Provides information about gluonic behaviour in the proton.
- Detecting the decay muons is the primary challenge.



Proton η

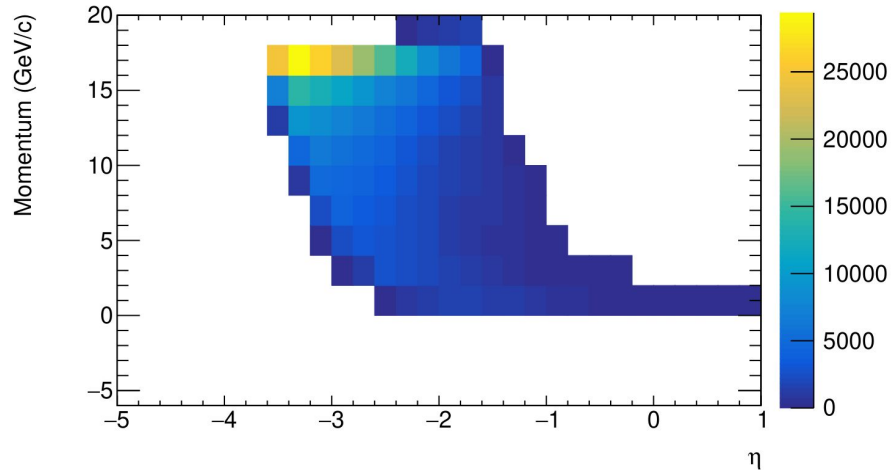


True scattered protons

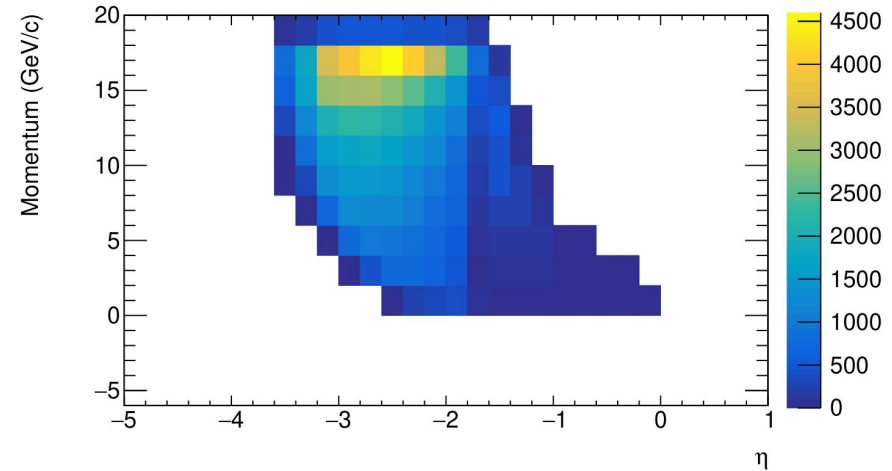


Reconstructed scattered protons

Electron η p

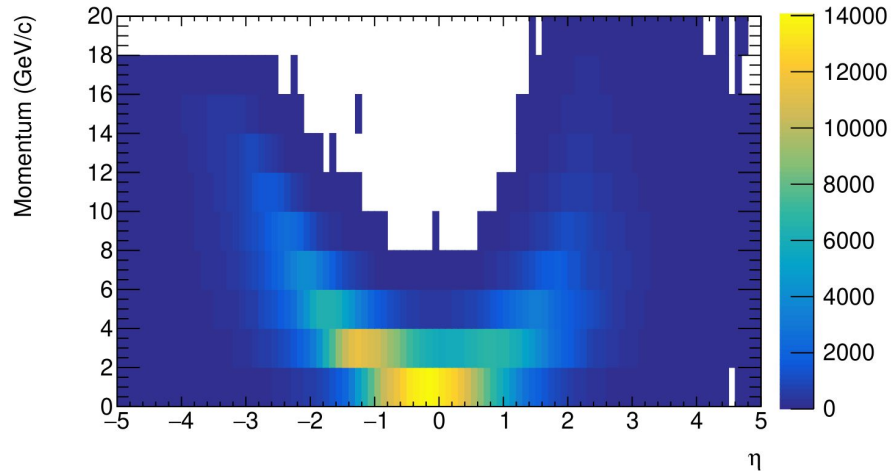


True scattered electrons

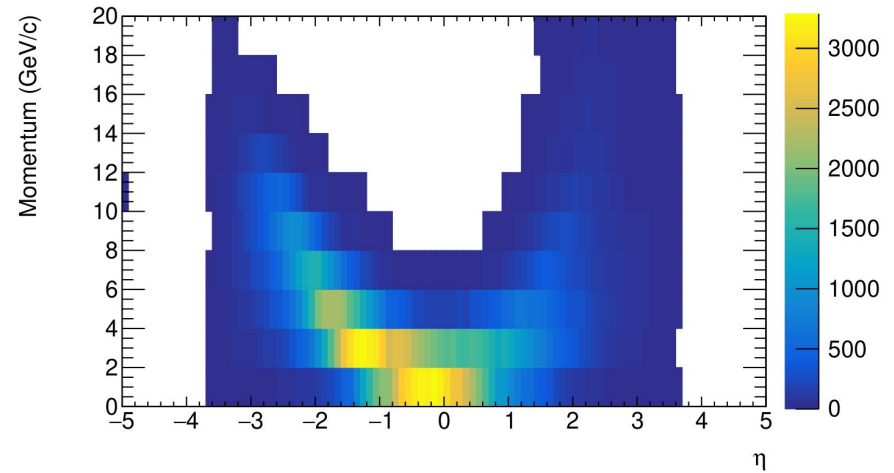


Reconstructed scattered electrons

Muon η p

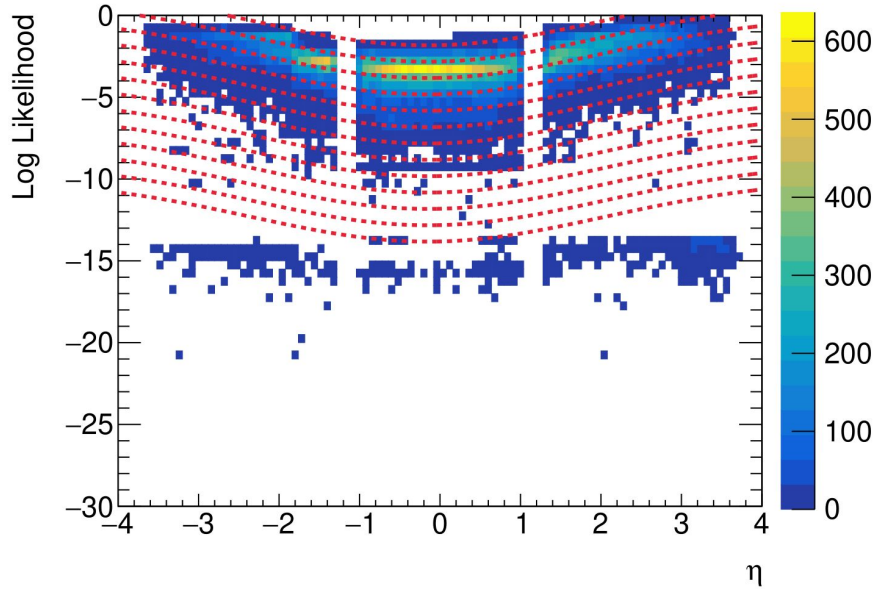


True decay muons

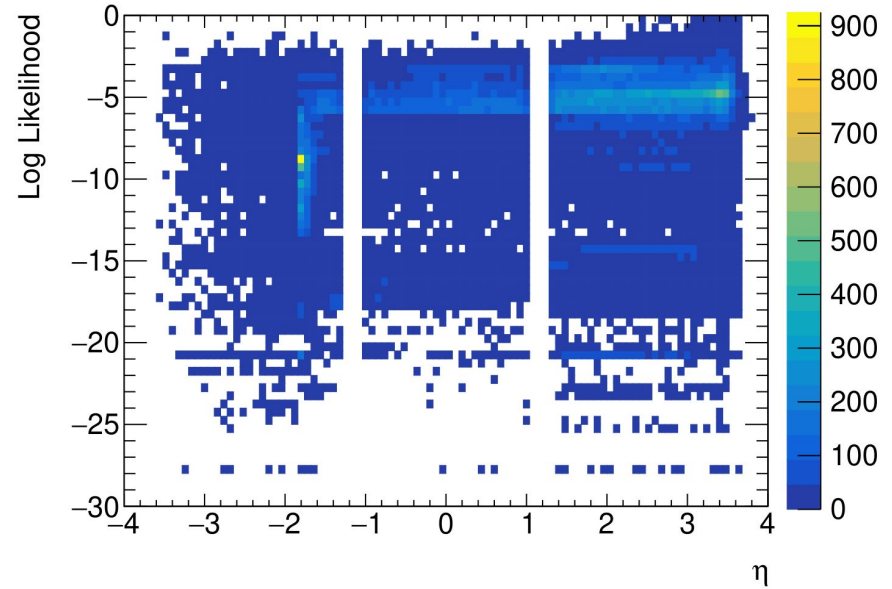


Reconstructed decay muons

Muon η

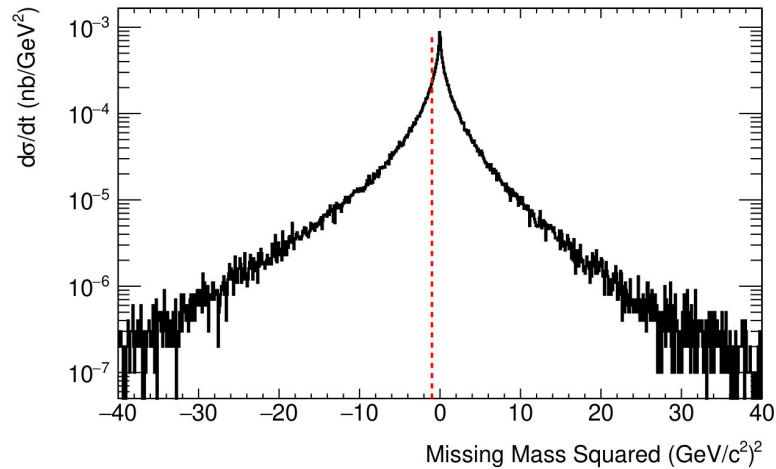
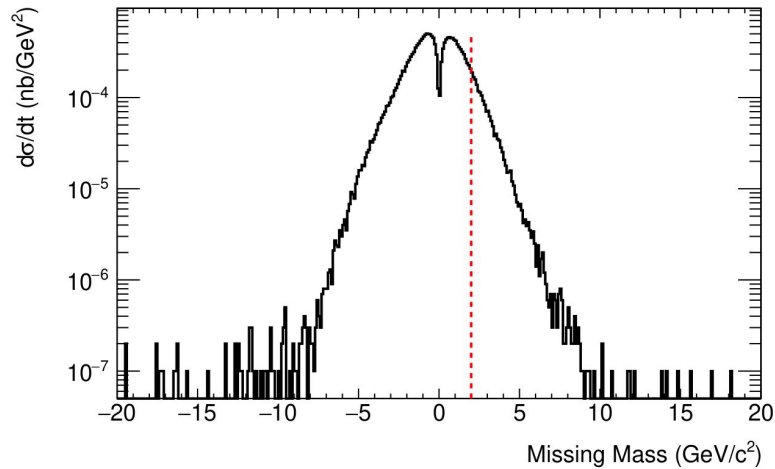
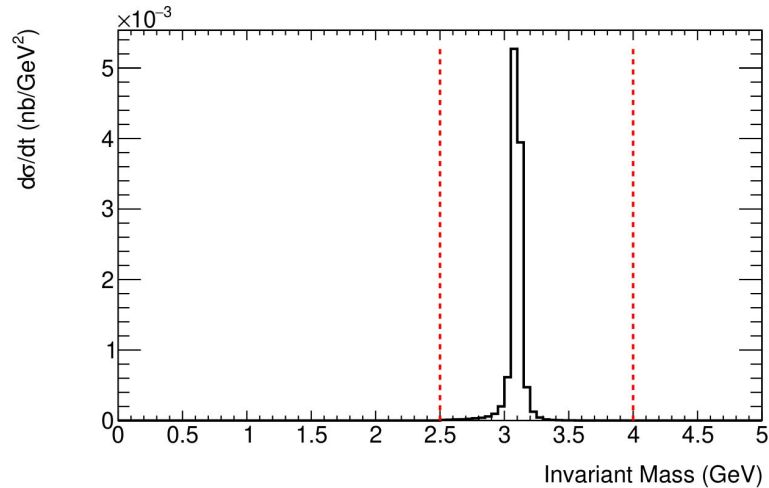
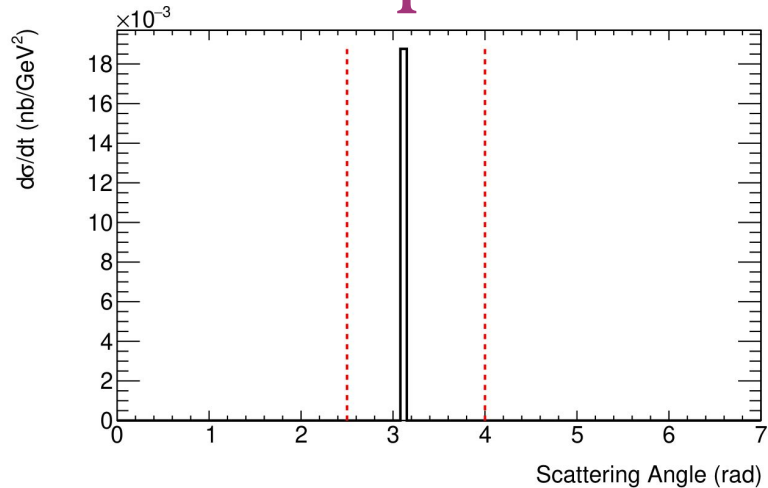


DVJ/ ψ P muons

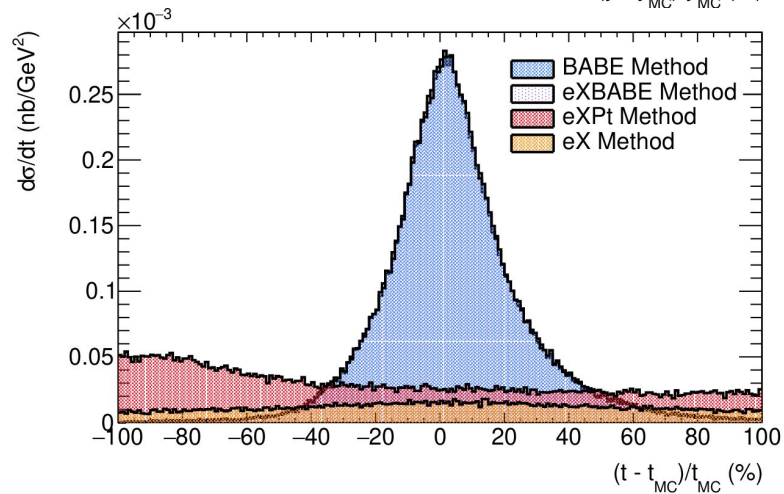
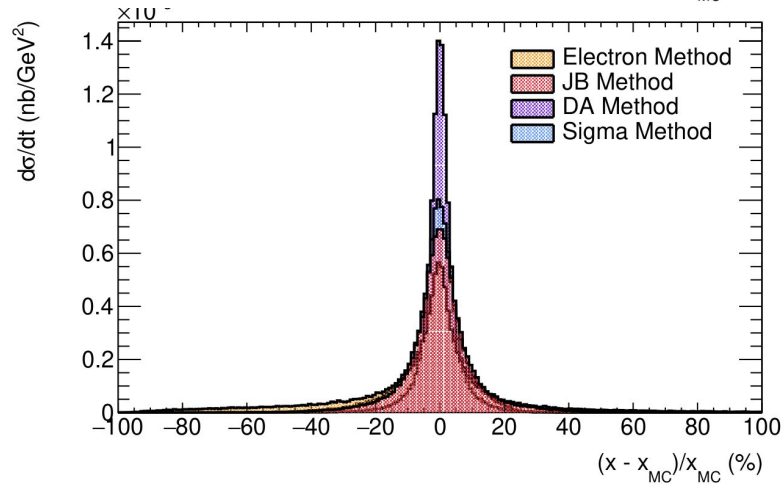
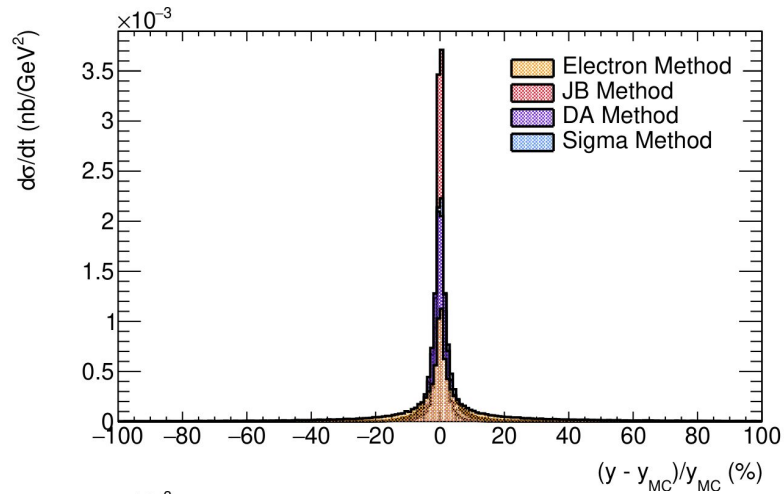
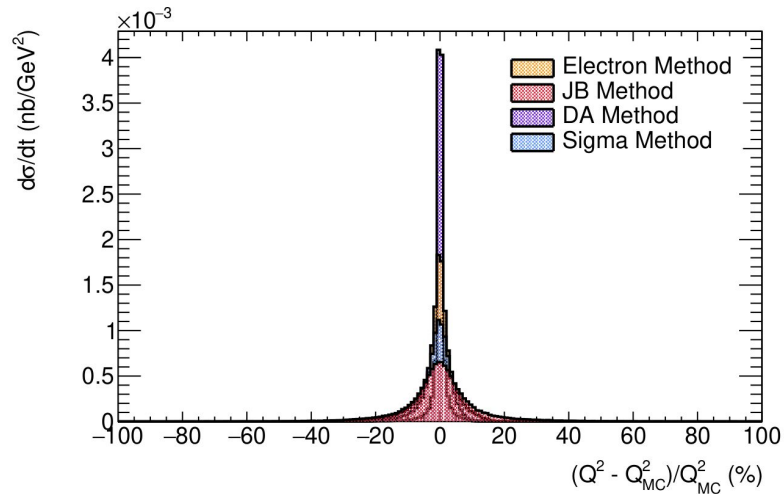


DIS non-muons

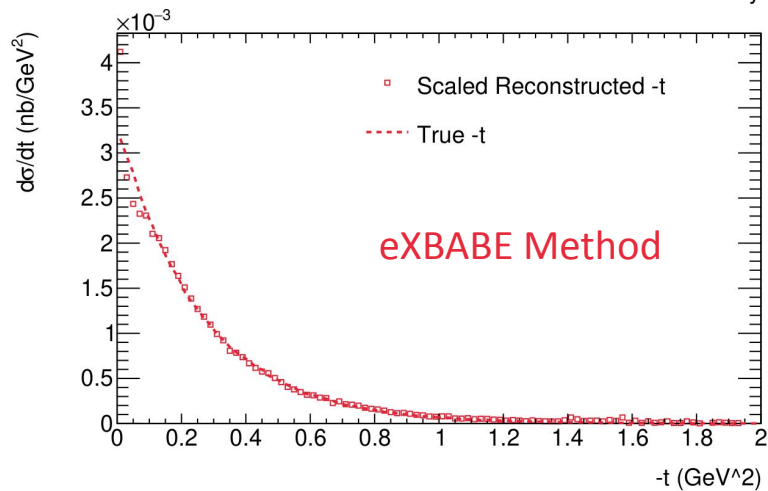
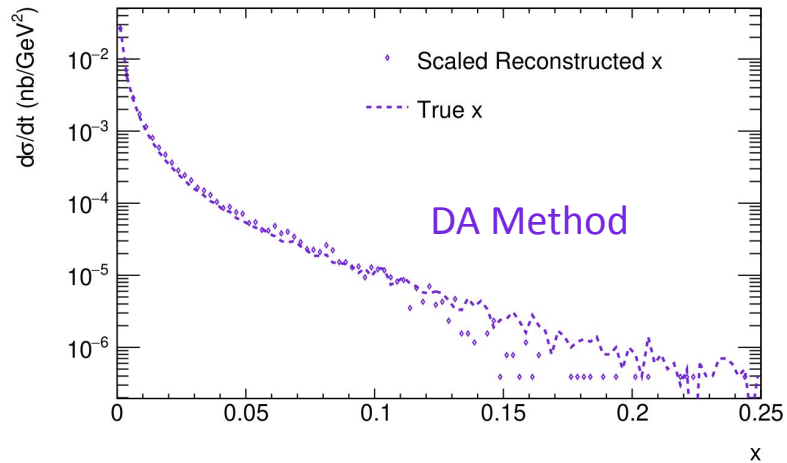
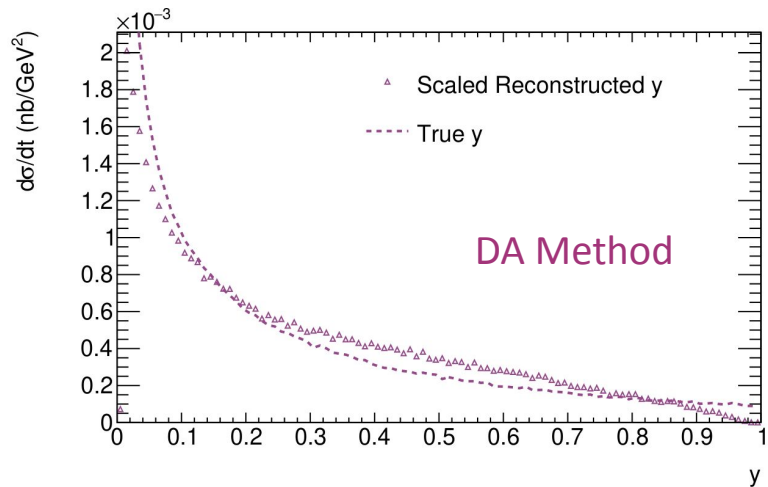
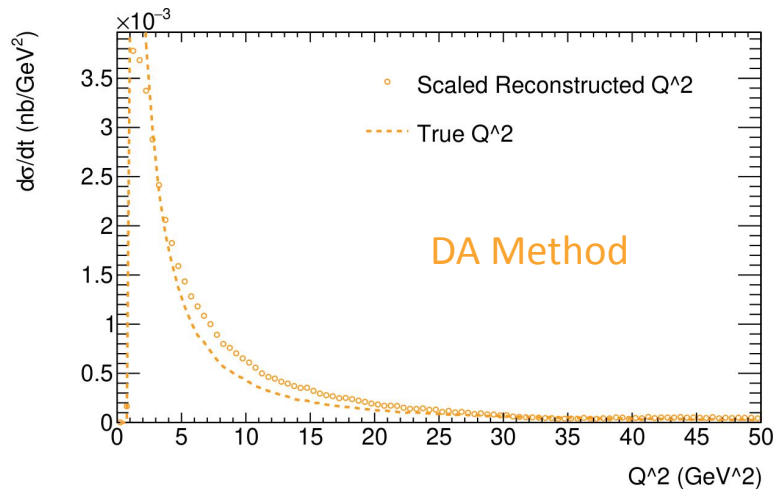
Channel Specific Cuts



Kinematics Methods

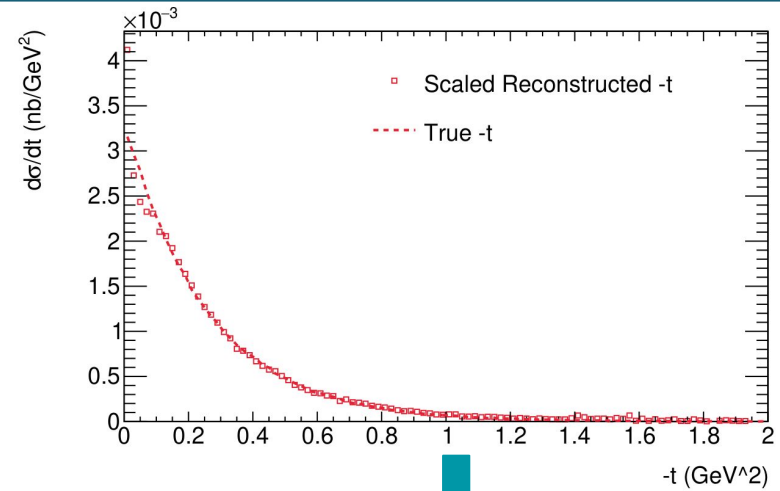


Kinematics

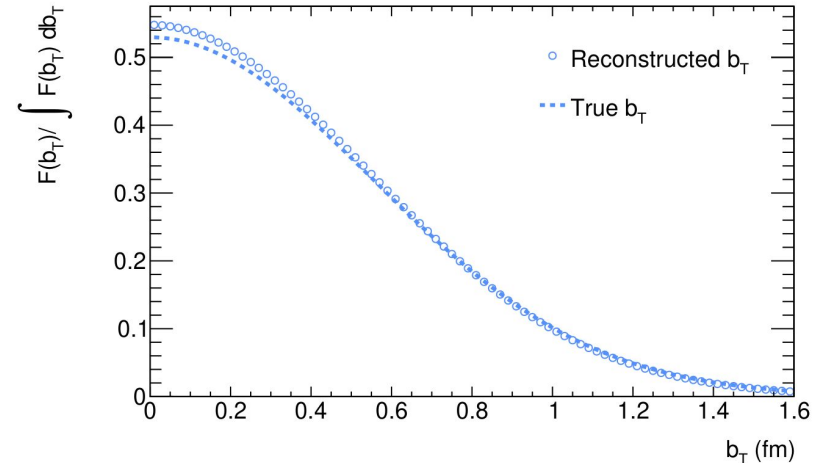


Impact parameter

- Performing a Fourier transform on the $-t$ distribution moves to position space.
- This gives the distance of the struck gluon from the centre perpendicular to its momentum.
- Distribution is normalised to 1.

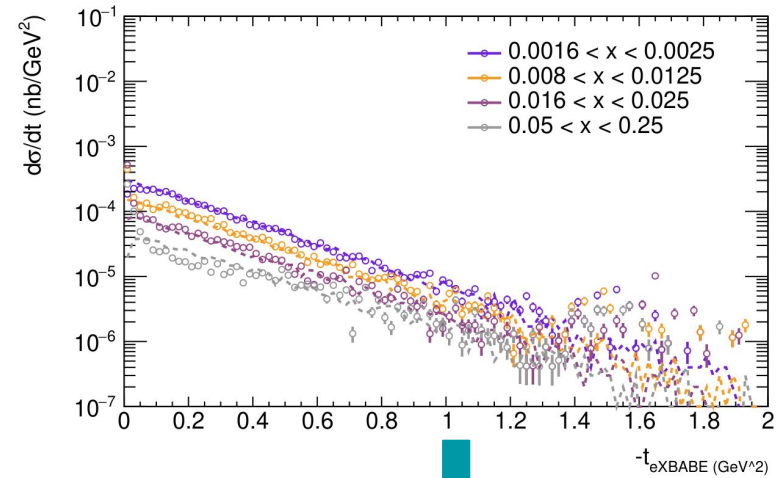


2D Fourier Transform

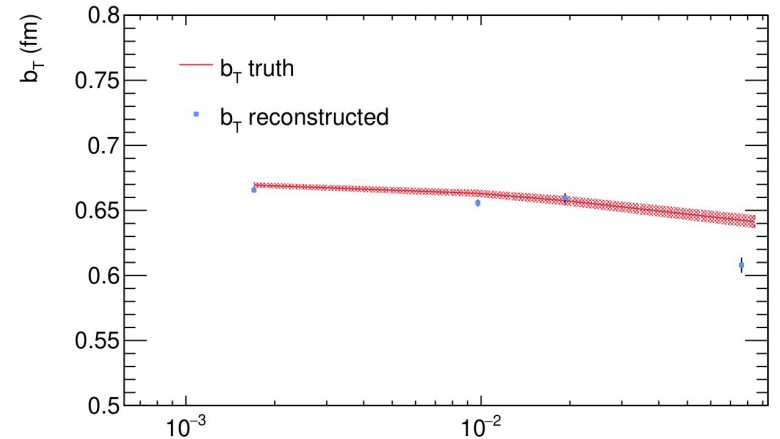


Impact parameter b_T

- $-t$ can be binned in x to study how the impact parameter changes with x .
- x bins were chosen to have similar number of statistics.
- b_T is shown to get smaller with larger x .
 - Issues number of statistics

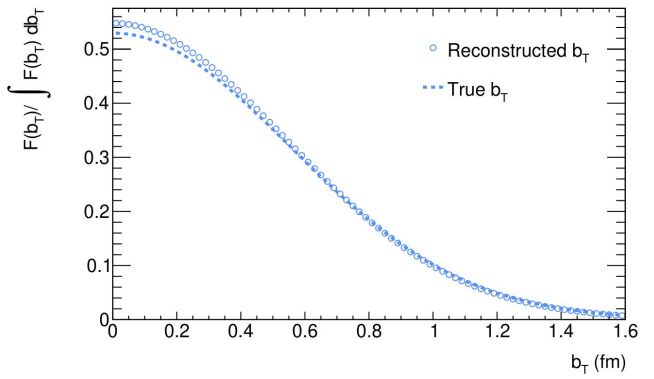
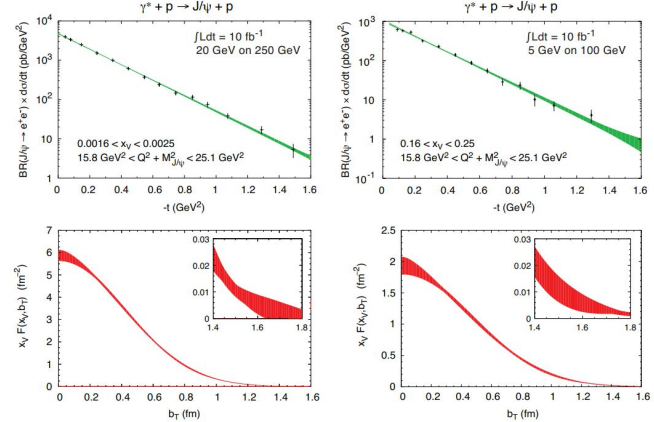


2D Fourier Transform



Conclusion:

- Able to extract b_T from the $-t$ distribution.
- Study of DIS background separation is ongoing but early results are promising.
- Need to consider and include other sources of uncertainty.
 - Machine background
 - Luminosity



-t Acceptance Corrected

- -t is scaled by the accepted truth distribution rather than the counts.
- This deals with issues related to the B0 and RP overlap.
- Issue is more significant for the 10x130ep configuration.

