eID background study & $A_{\parallel}, A_{\perp}$ impact on spin structure

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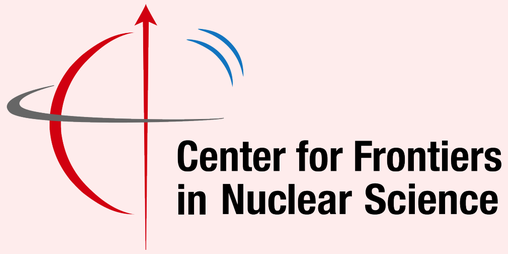
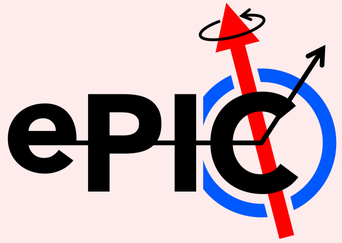
Stony Brook University

Joint inclusive/EW+BSM PWG Meeting
06/03/2026





Files for inclusive PWG studies

Available files for backgrounds in DIS electron finding and inclusive variable reconstruction studies:

- π background
  - Background sample: Pythia6 10x100 minQ2 > 0 (available in campaign 26.03.0)
  - Signal samples: Pythia 6 10x100 minQ2 > 1, > 10, > 100, > 1000 (available in campaign 26.04.1)

- Beam background
  - 1 DIS per $2\mu s$ background: 10x100 minQ2 > 1, > 10, > 100, > 1000 (available in campaign 26.04.1)
  - No DIS per $2\mu s$ background: ?

Files are mostly available for initial studies. Need 9 GeV electron samples in the future.

Analysis status:

- We just now have the files needed. We started the eID study with background. Will look at kinematic reconstruction soon.
- At first glance, beam background is not expected to dramatically affect eID performance, aside from causing track loss.
- Photoproduction is the bigger issue.

eID status

Skip E/p for now

"ReconstructedParticle Collection"

⇩

≥ 1 track & ≥ 1 cluster
Negatively charge

⇩

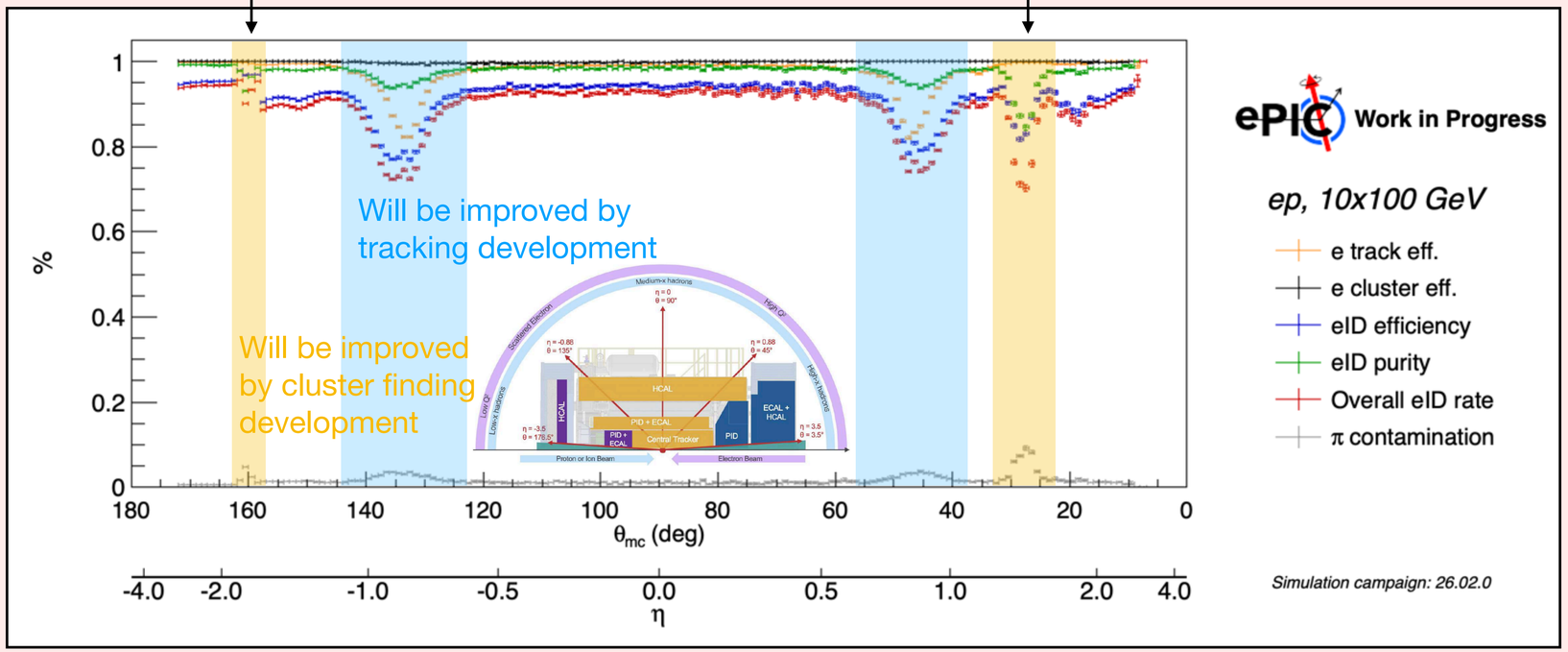
Isolated cluster:
$E_0/\Sigma E_{\delta R<0.7} > 0.9$

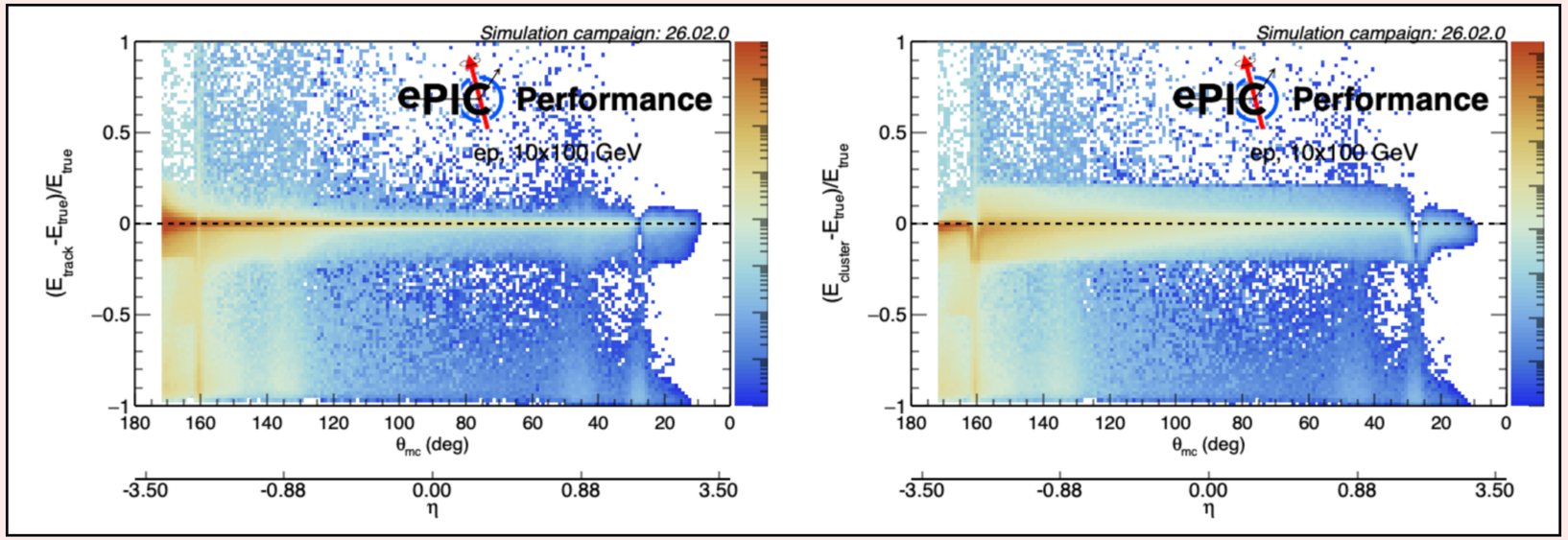
⇩

$0.8 < E/p < 1.2$

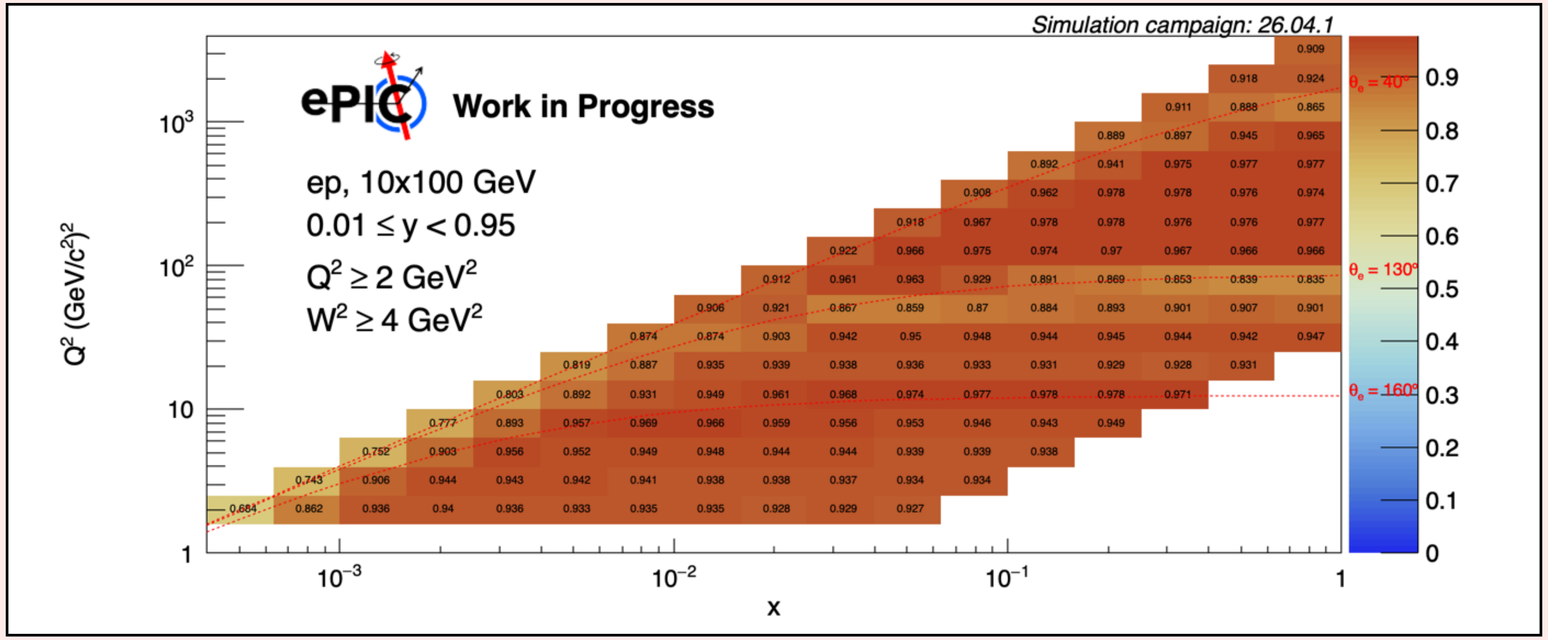
⇩

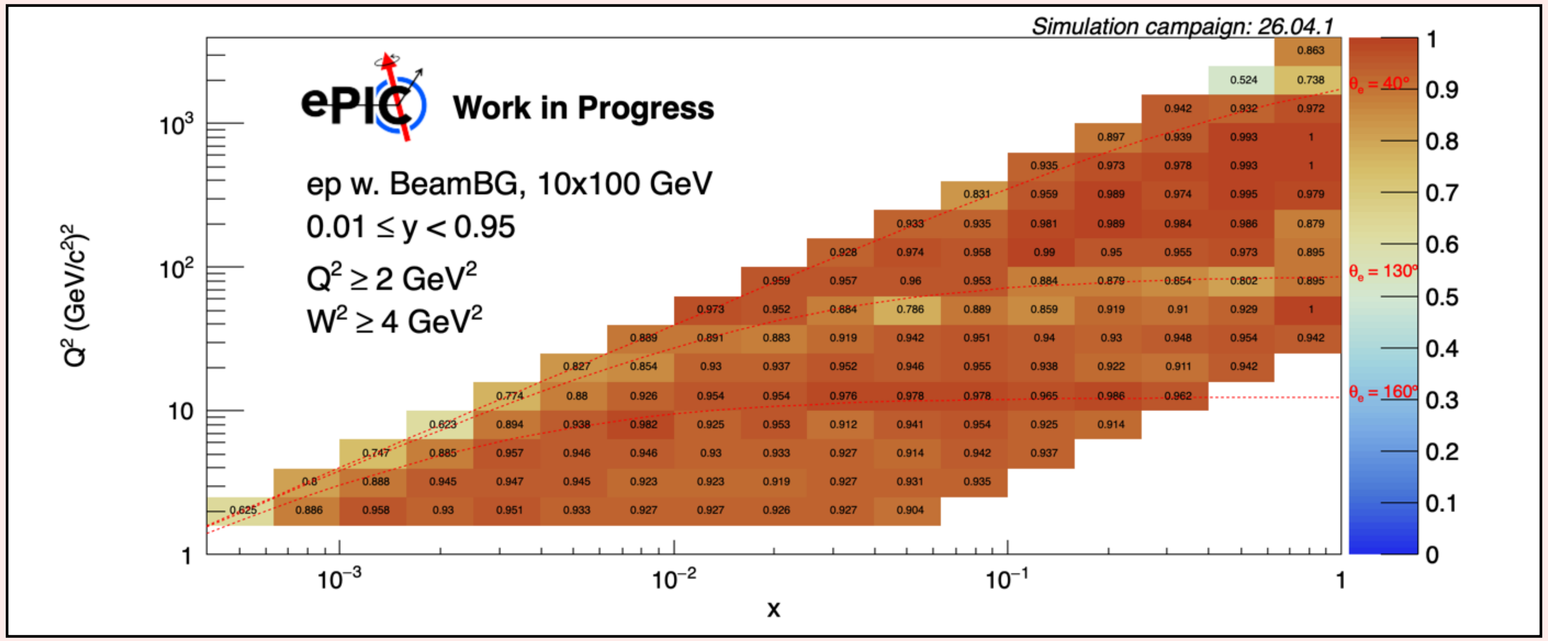
Highest p_T





Beam background - eID efficiency



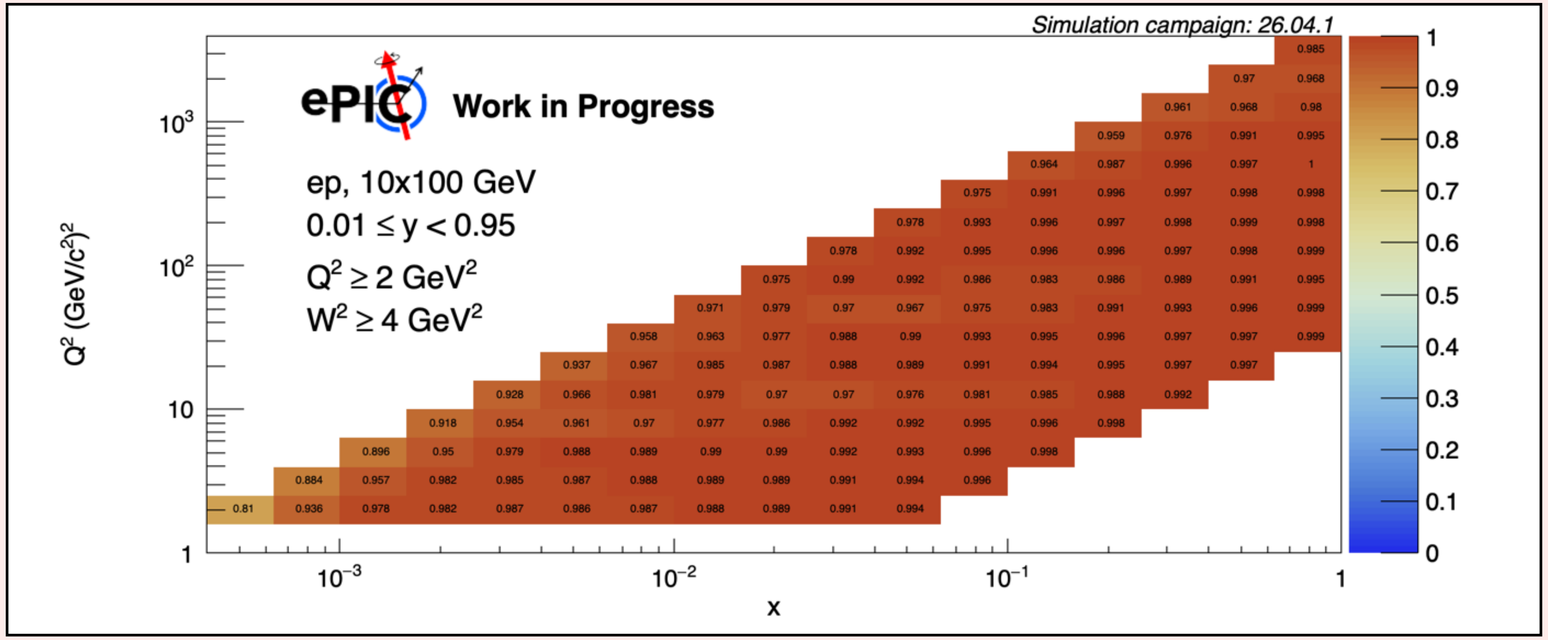


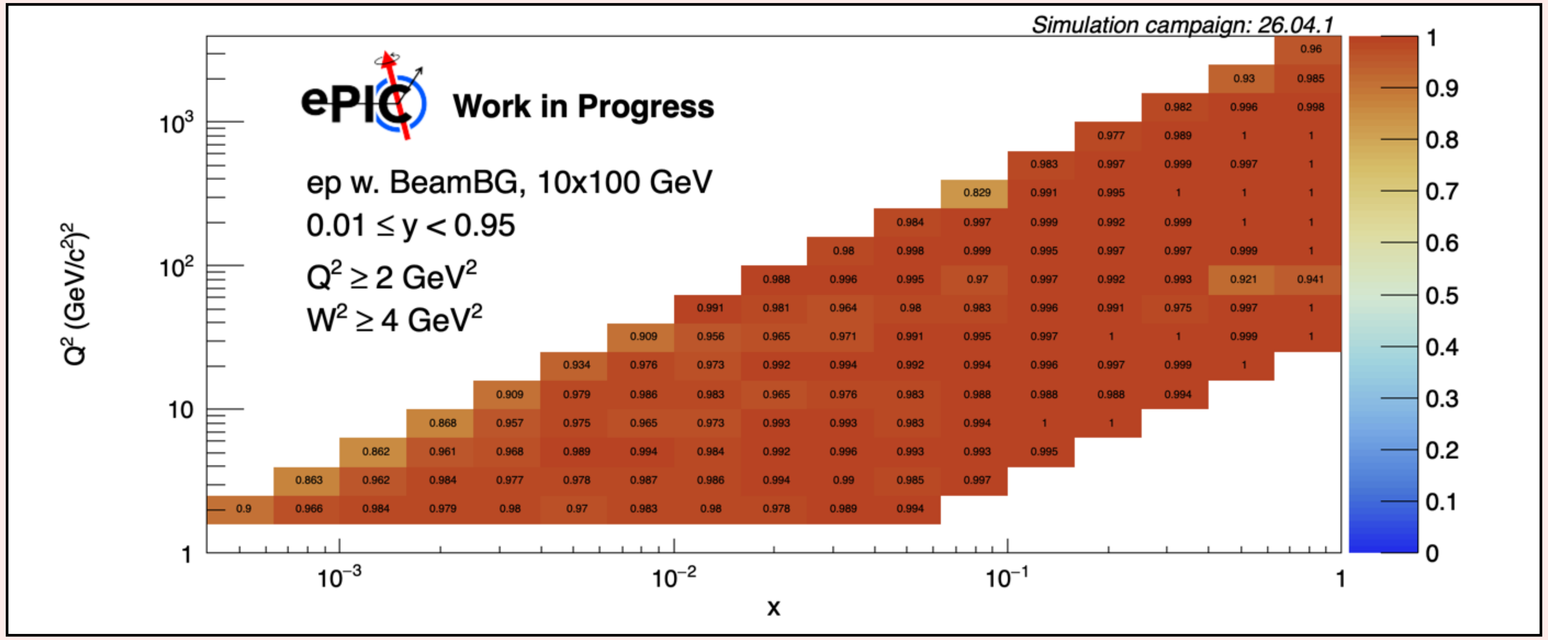
Very brief comparison:

1-2% change in eID efficiency

Likely due to track lost

Beam background - eID purity



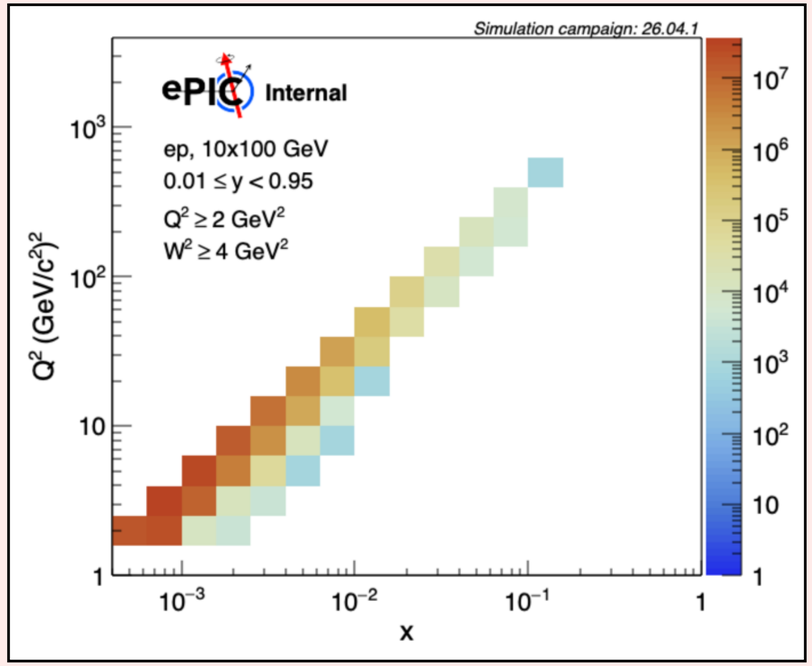


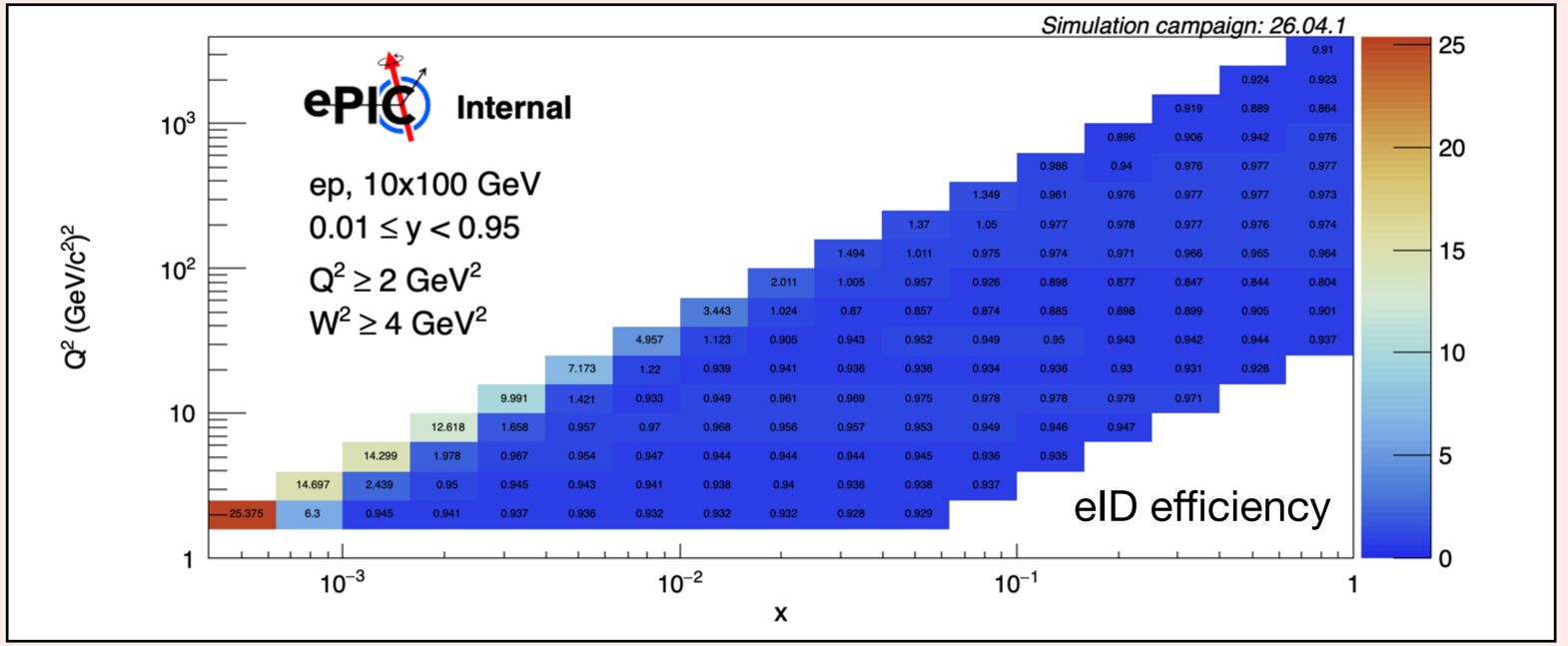
Very brief comparison:

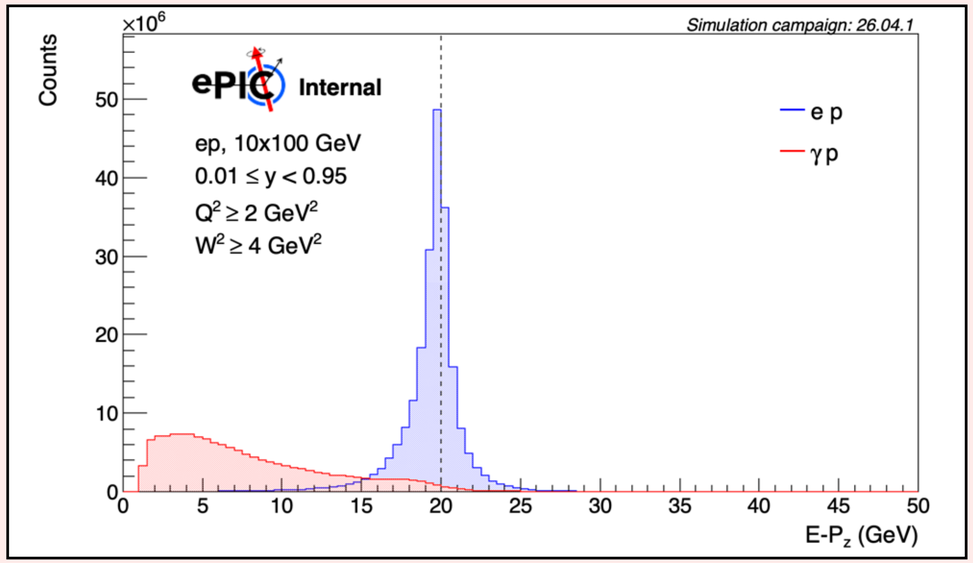
No big change in eID purity

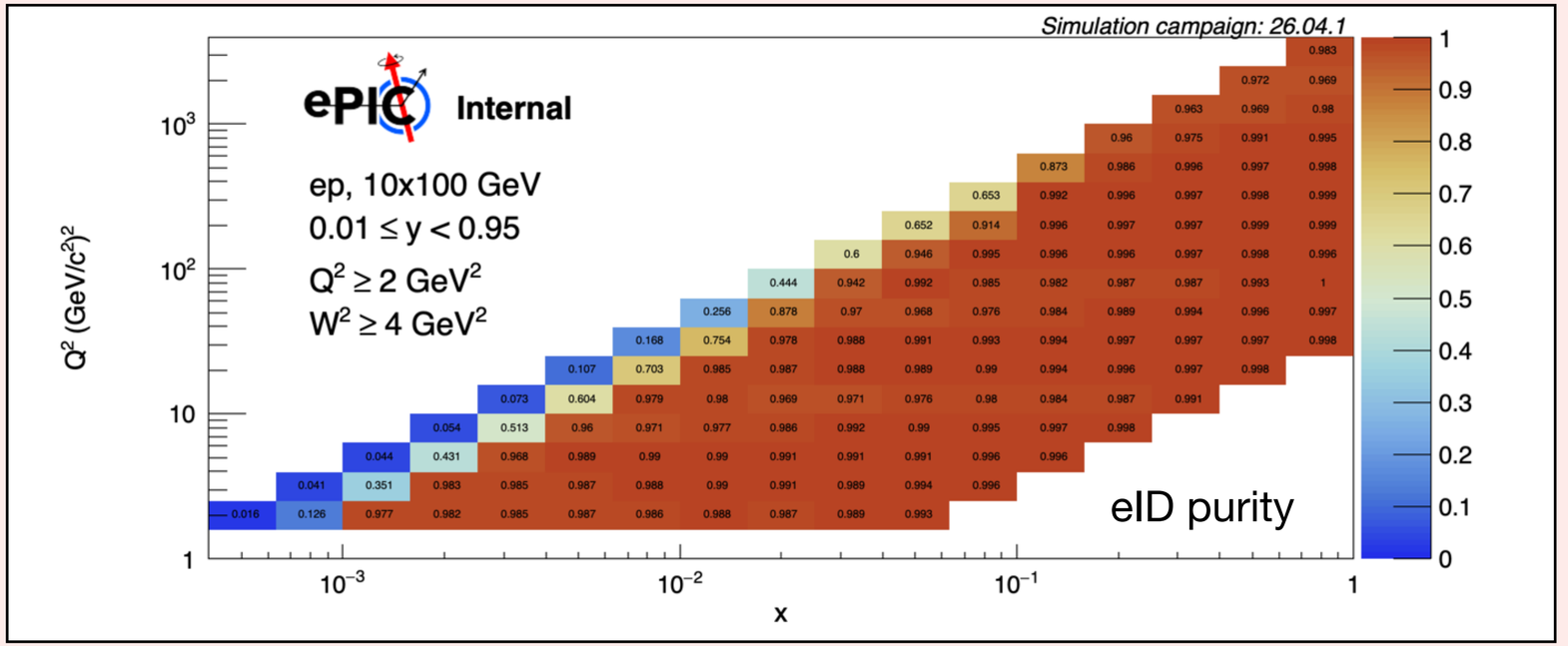
Photoproduction background

- For BG sample: x, Q^2, $y = x_{\mathrm{rec}}$, Q^2_{rec}, y_{rec}









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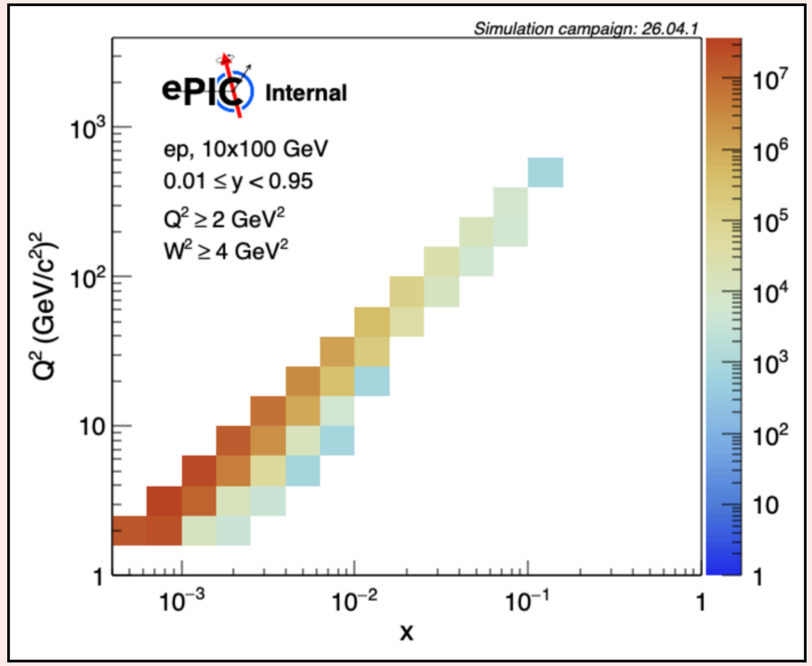

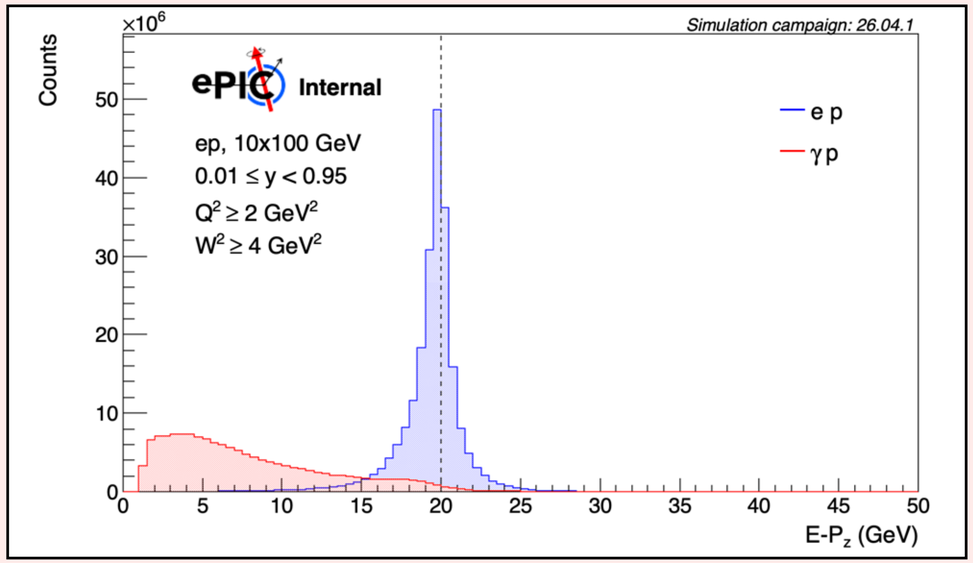

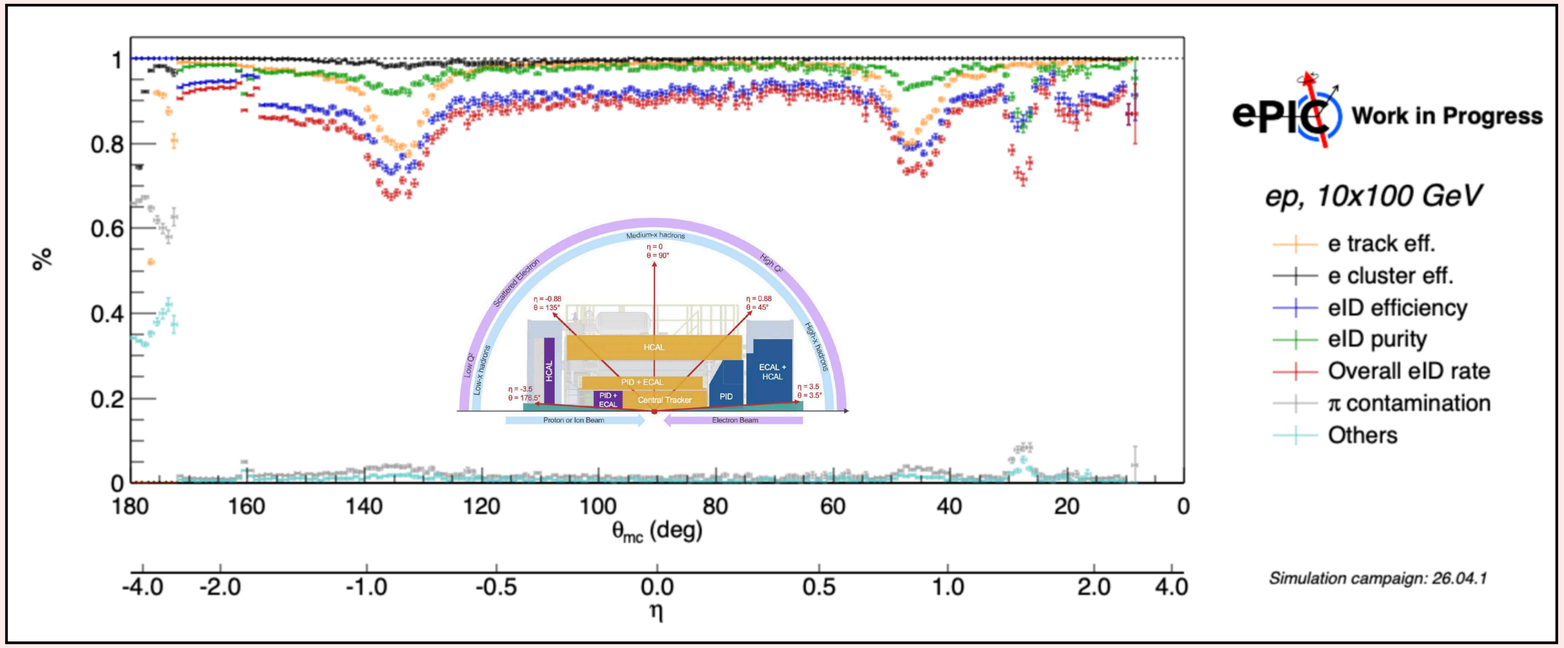

Photoproduction background

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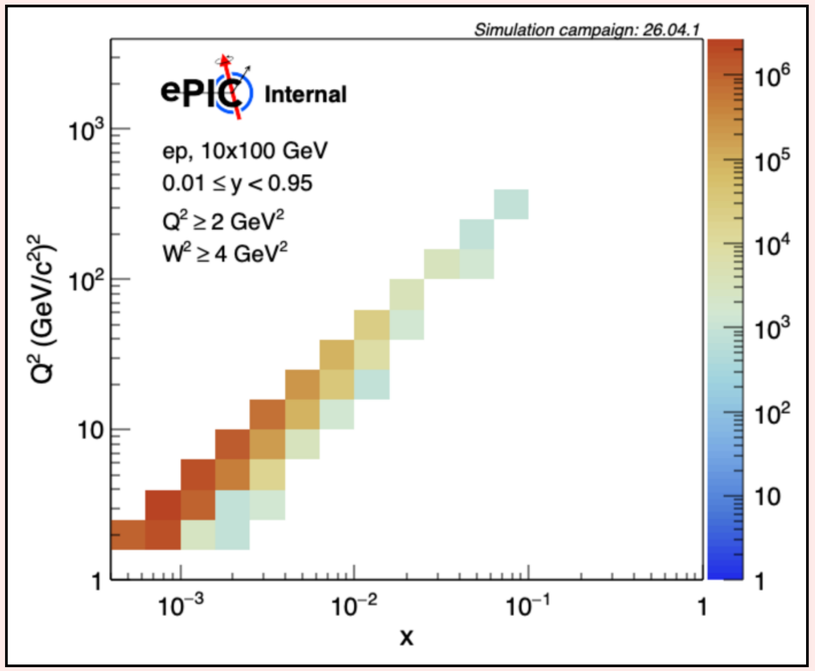
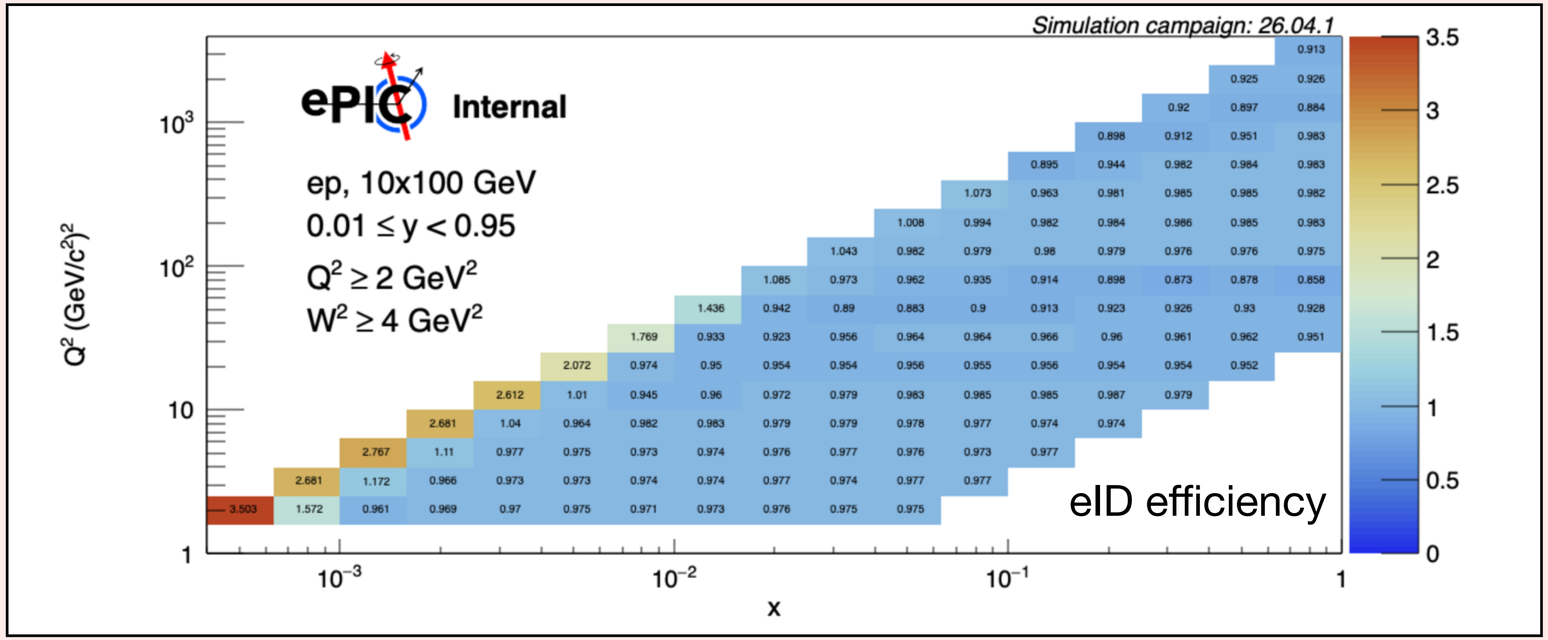
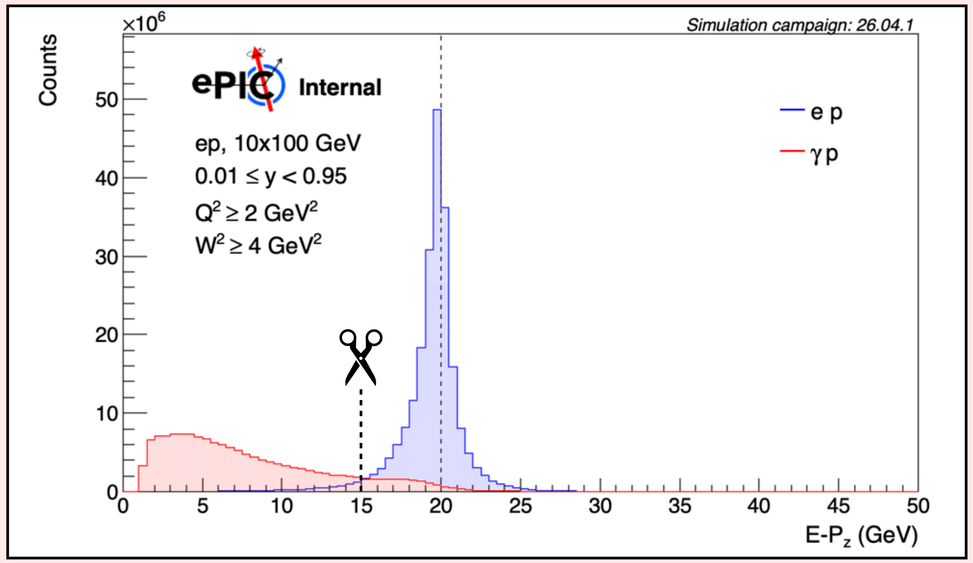
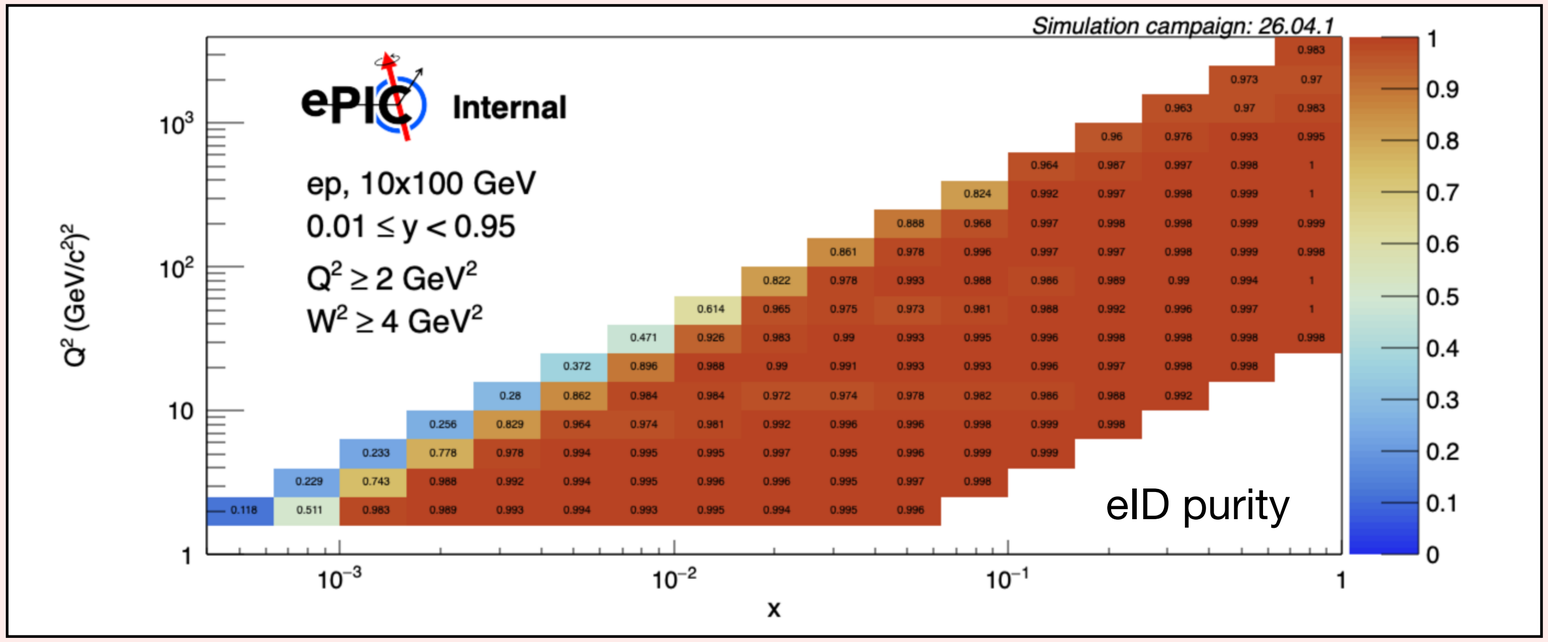
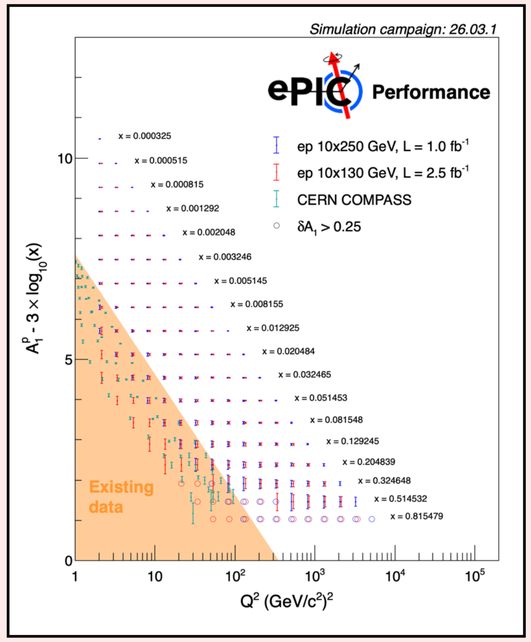




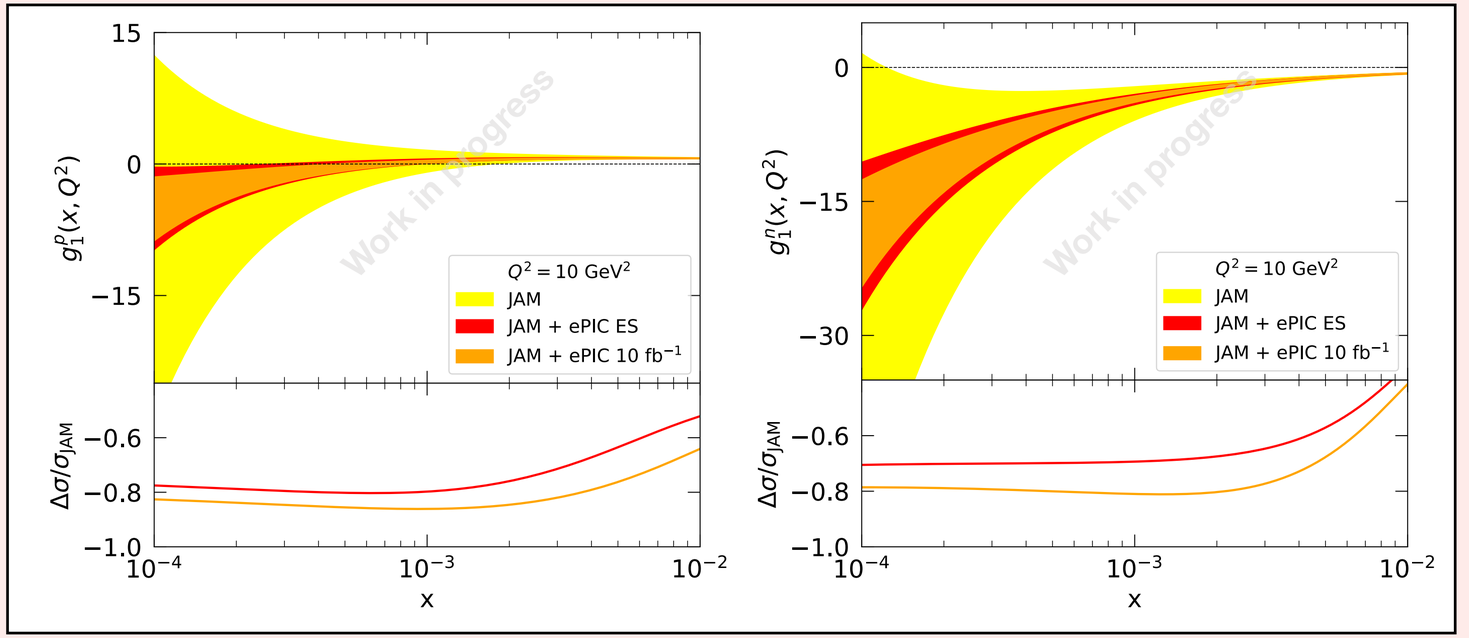


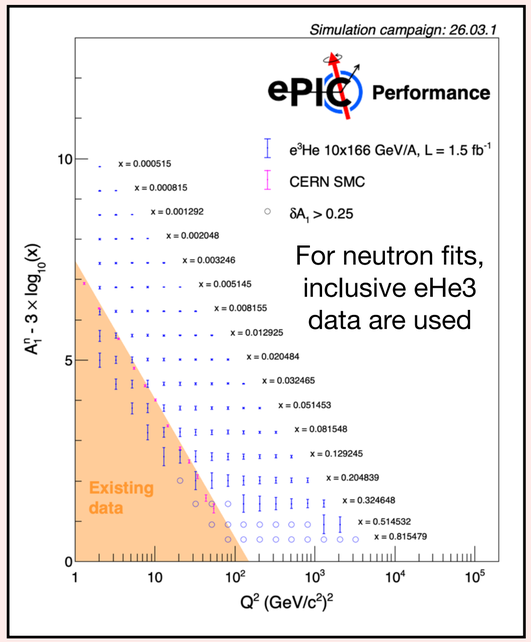


g_1 impact study

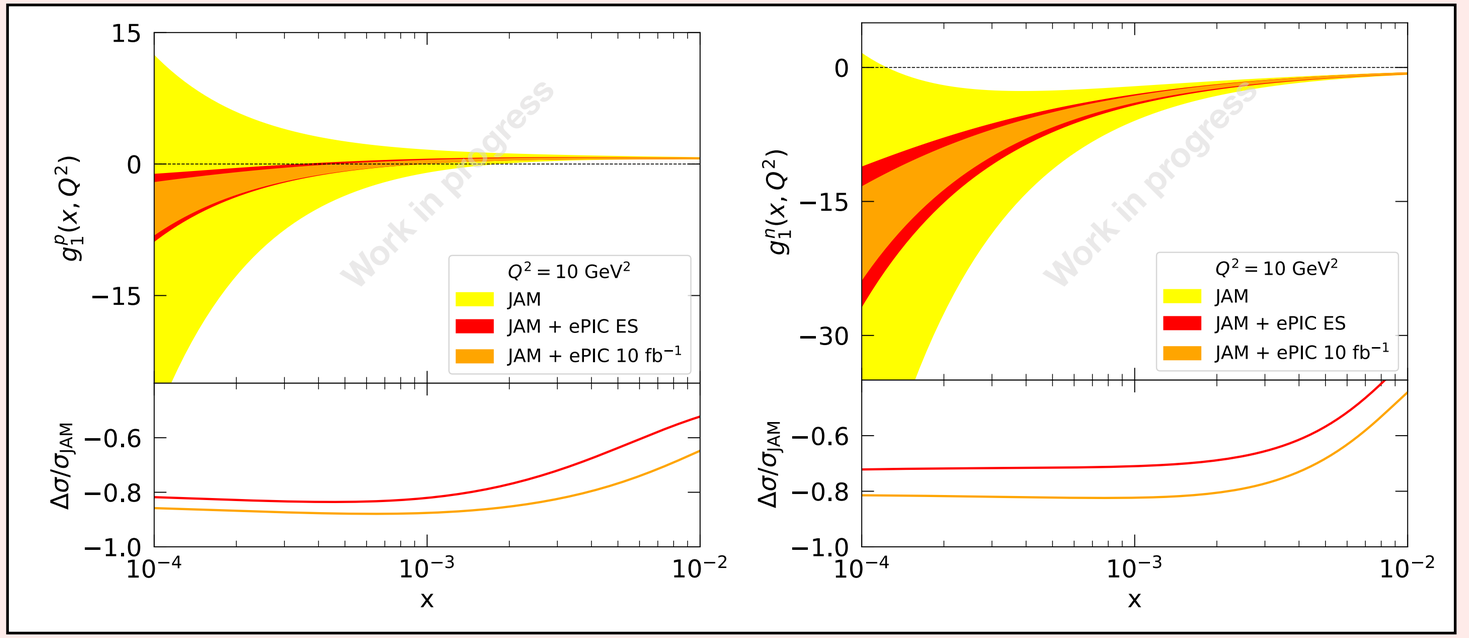


Fitted with $A_{\parallel}$ and $A_{\perp}$

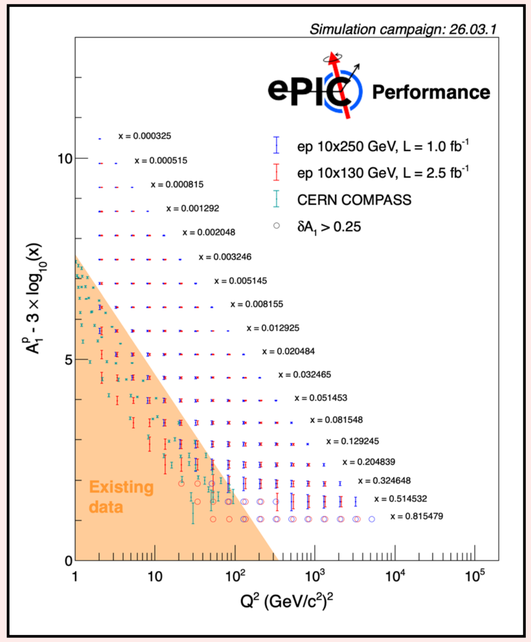




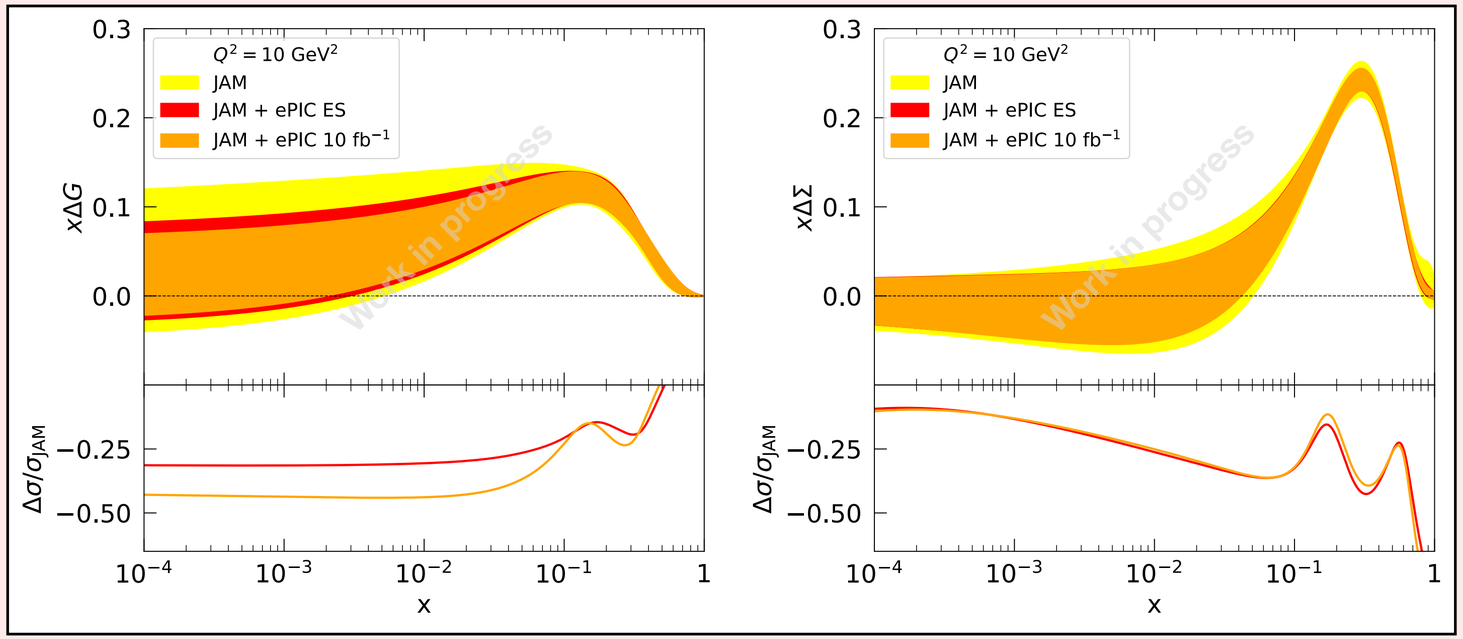
Fitted with $A_{\parallel}$

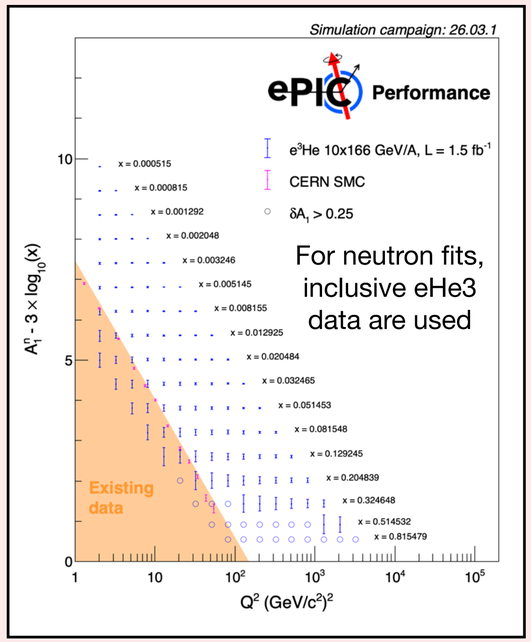


Gluon & quark singlet helicity distributions

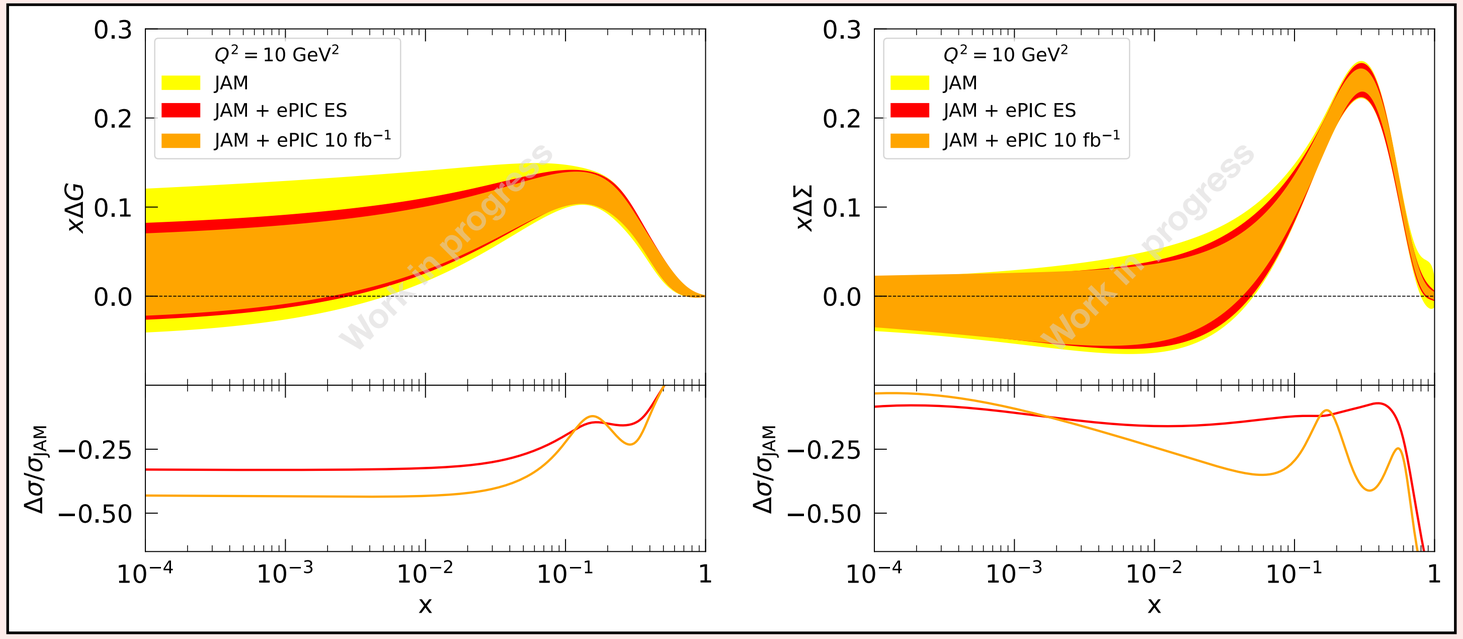


Fitted with $A_{\parallel}$ and $A_{\perp}$



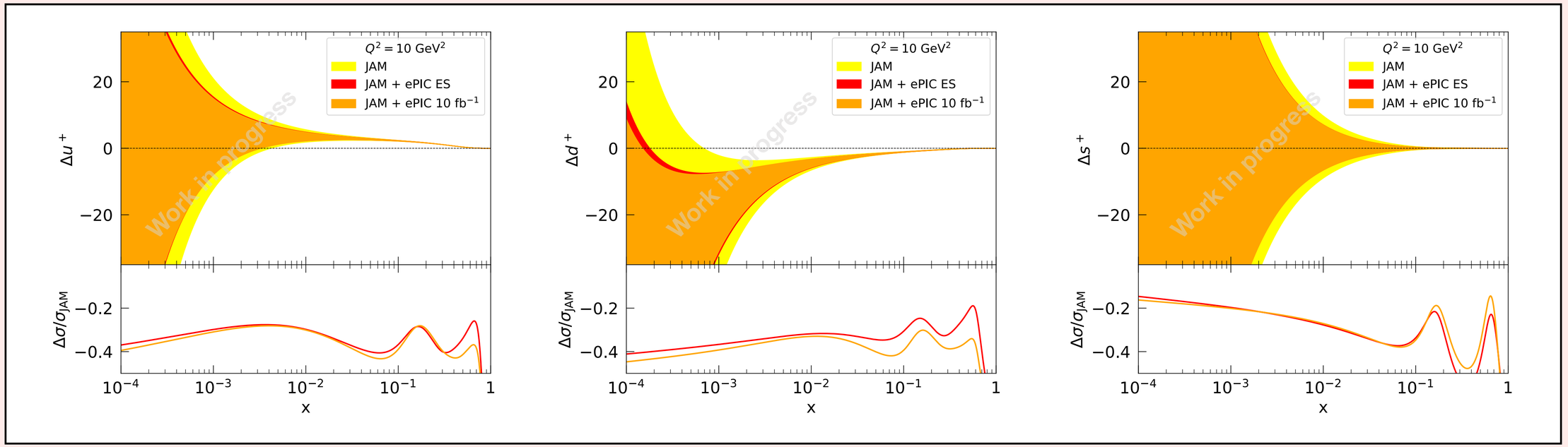


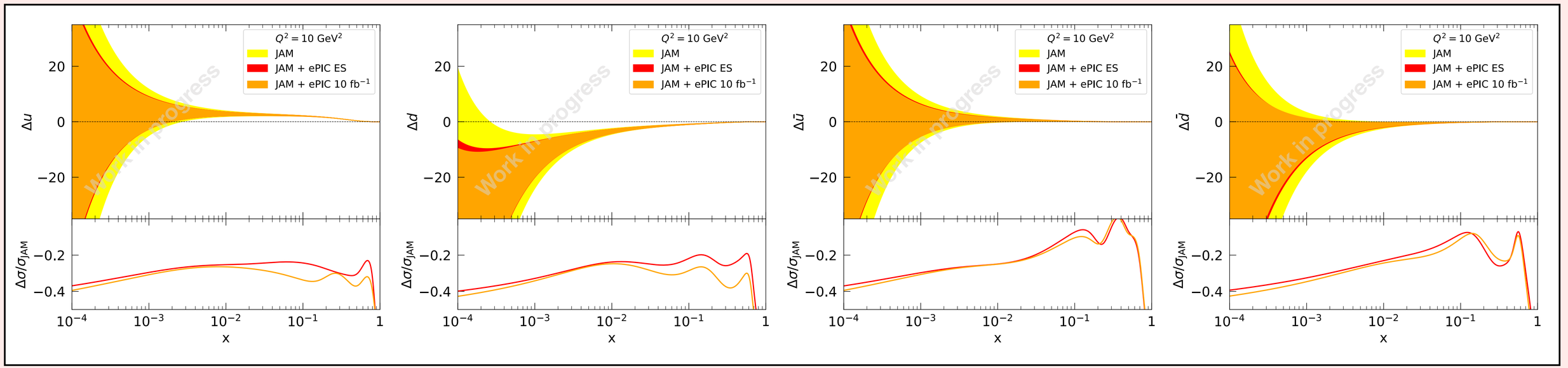
Fitted with $A_{\parallel}$



Quark helicity distributions

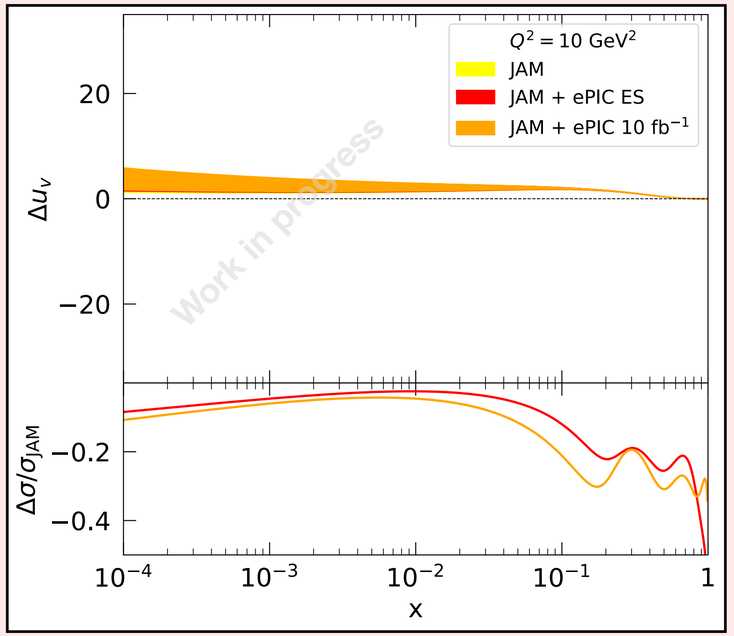
Fitted with $A_{\parallel}$ and $A_{\perp}$

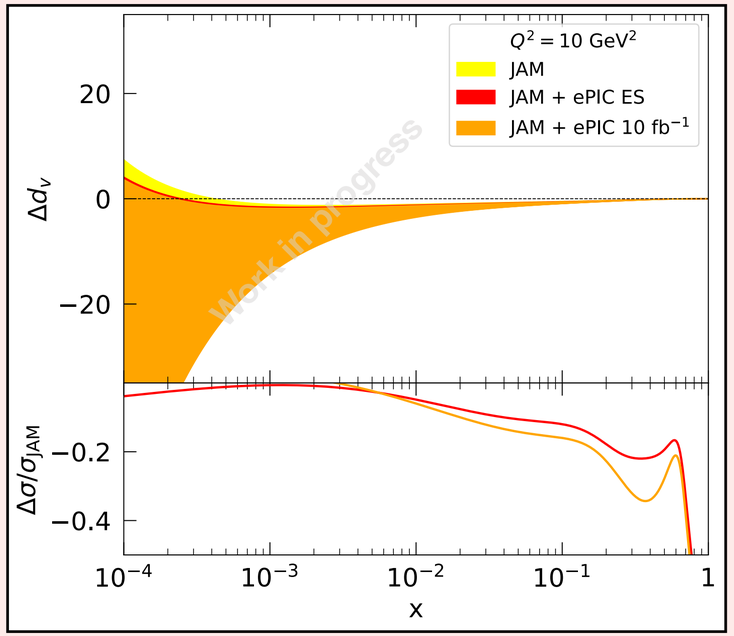


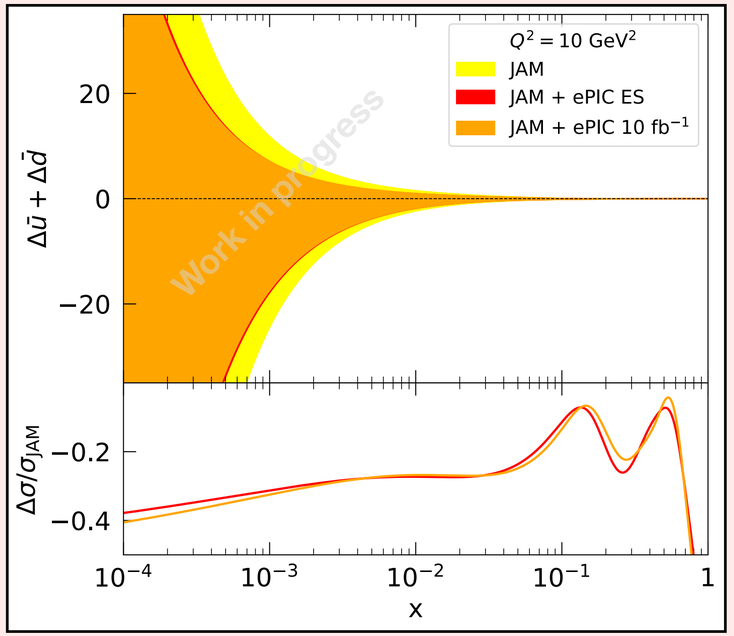


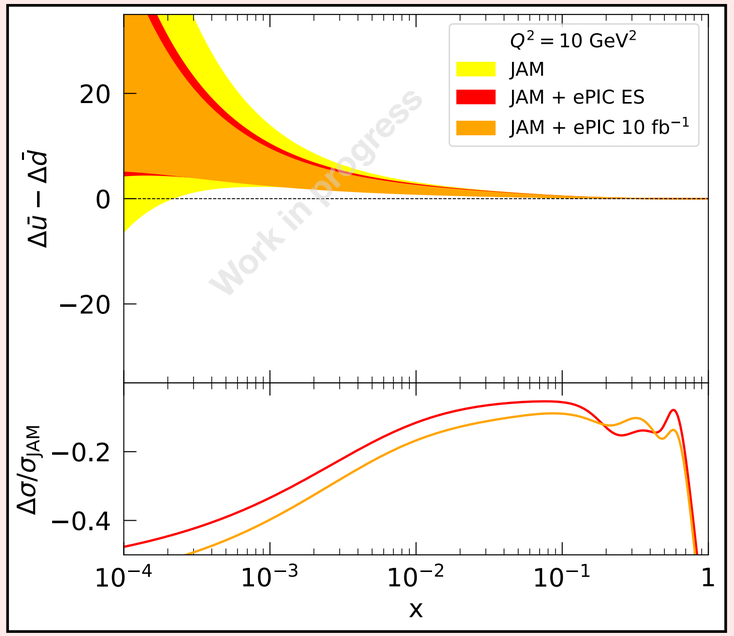
Quark helicity distributions

Fitted with $A_{\parallel}$ and $A_{\perp}$



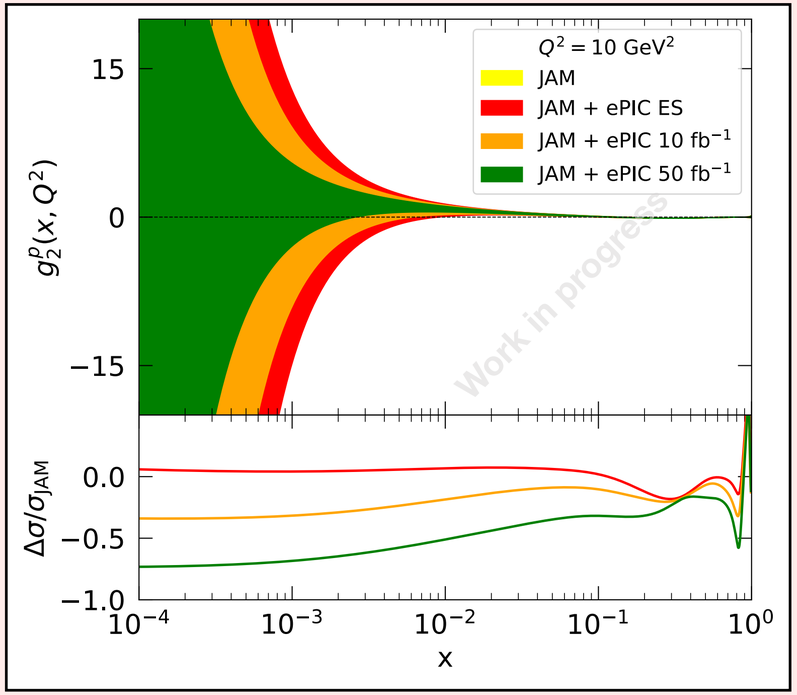






g_2 impact study

Fitted with
$A_{\parallel}$ and $A_{\perp}$



Work by Alexey V.
and Guillermo M.