Strategy for studying fEMC acceptance reduction

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General ePIC meeting October 22, 2026

Studies performed so far

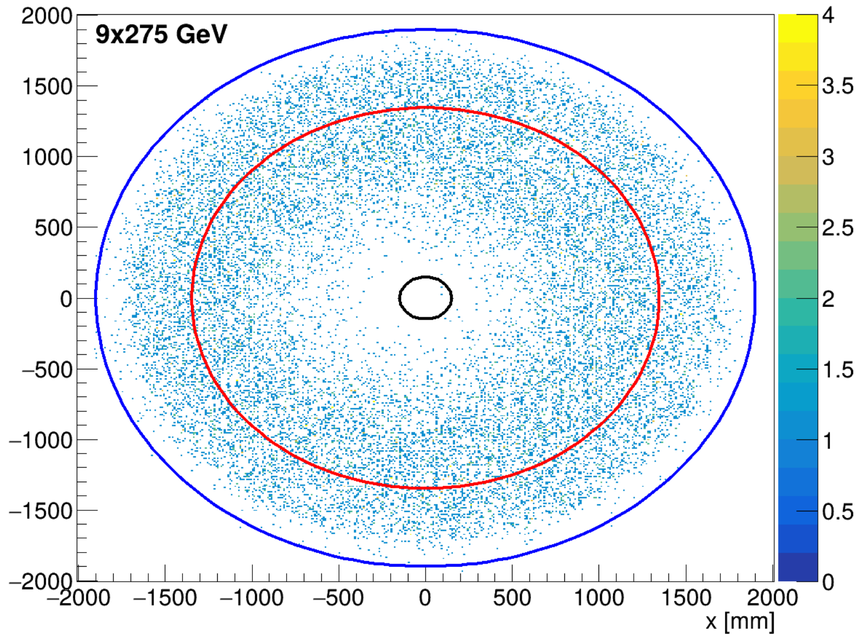
- Using existing ePIC MC simulations
- Processes: DVCS, exclusive π^0, exclusive Υ
- Purely based on acceptance:
  reject event if γ, $e^{\pm}$ hit detector part considered to be removed

DVCS

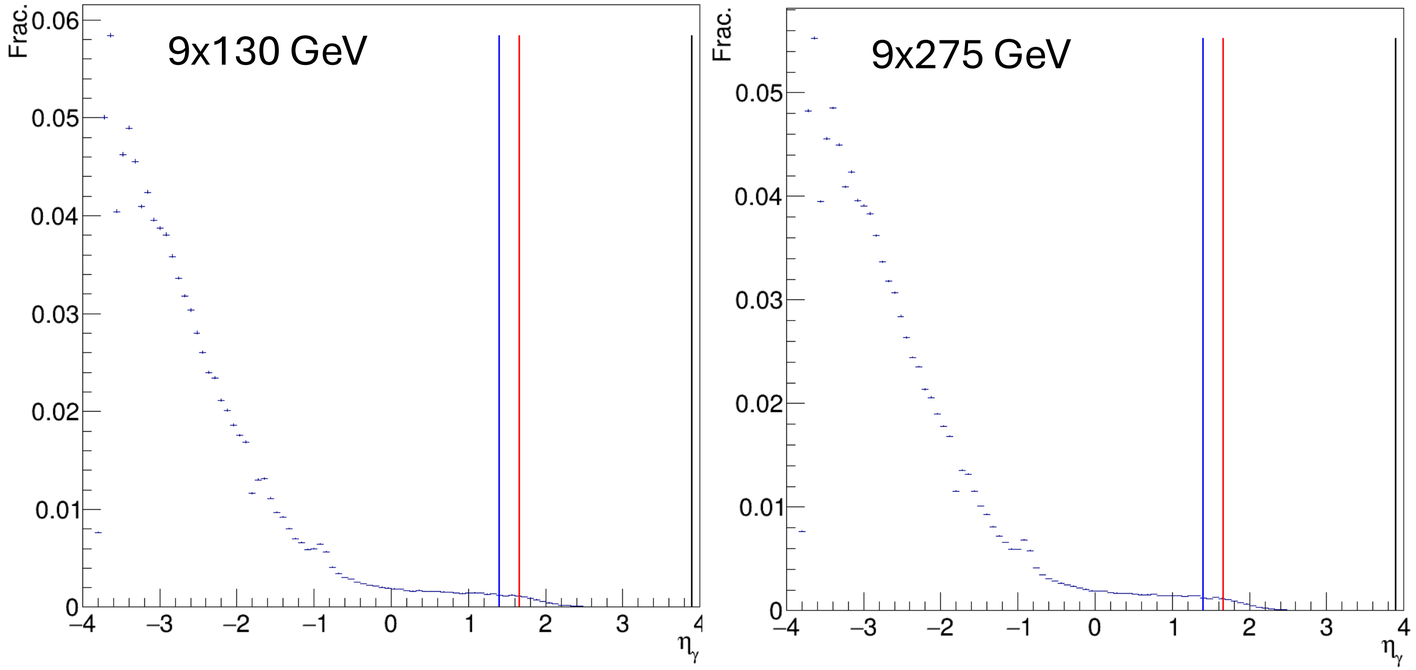
Studies by O. Jevons

- 2 scenarios are considered:
  - inner half of fEMC removed $(1.68 < \eta_\gamma < 3.90)$
  - outer half of fEMC removed $(1.40 < \eta_\gamma < 1.68)$

Neutral fEMC clusters



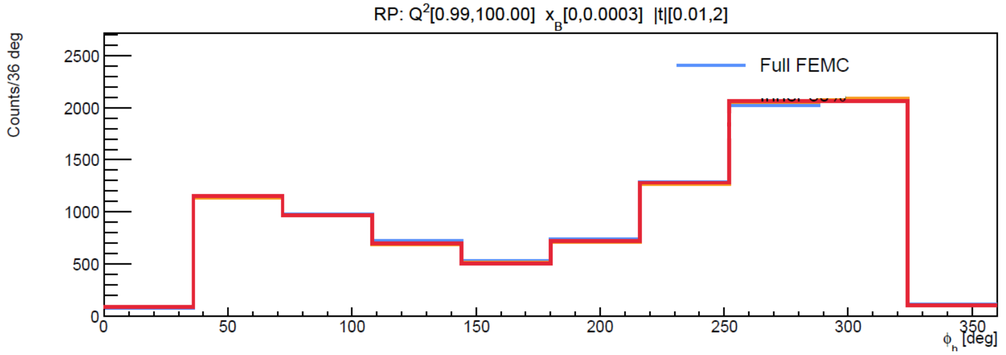
Pseudo-rapidity distribution of all reconstructed photons

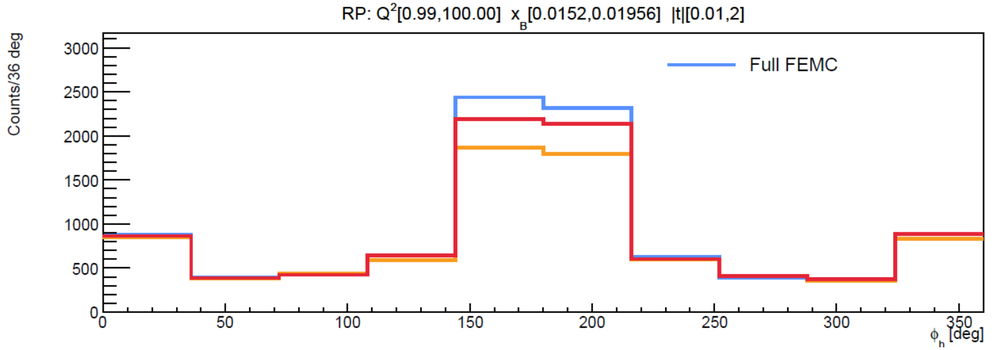


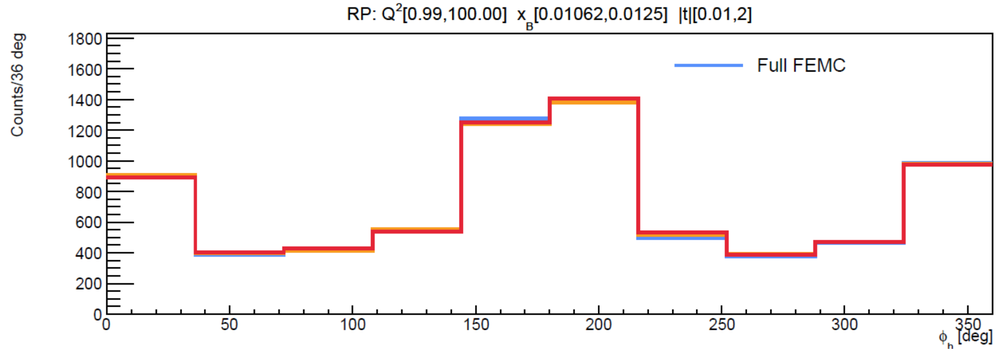
DVCS

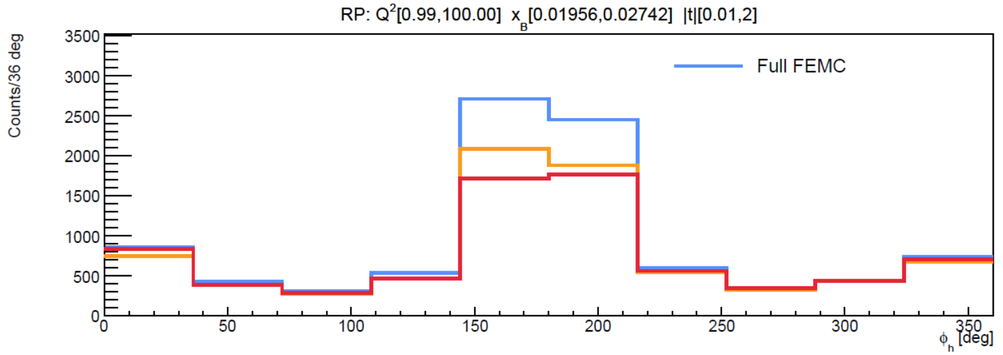
- inner half of fEMC removed
- outer half of fEMC removed

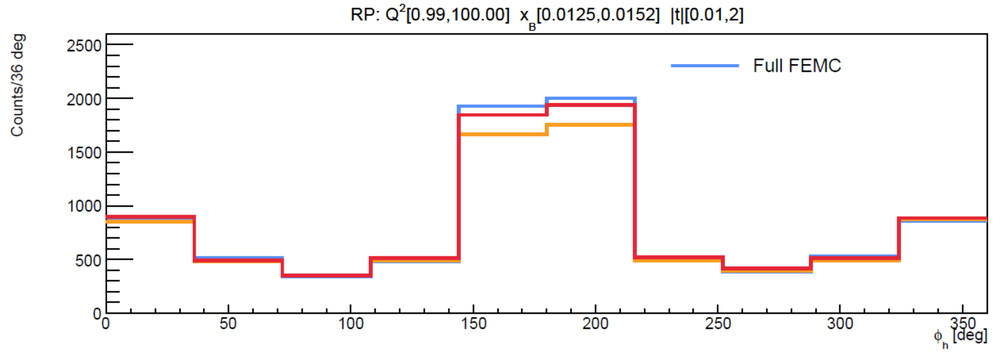
Studies by O. Jevons

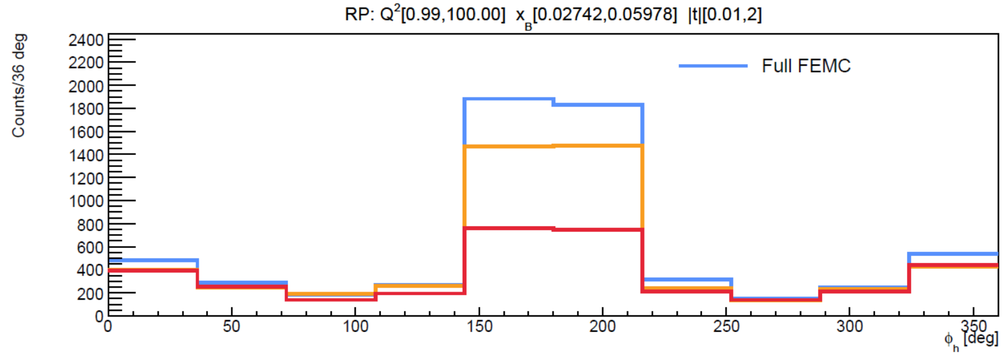












BH DVCS/$\mathcal{I}$ BH

- Removing outer: effect visible for $x_B > 1.3 \cdot 10^{-2}$
- Removing inner: effect visible for $x_B > 1.5 \cdot 10^{-2}$
- Losses of up to 43% (remove inner) 18% (remove outer)

Exclusive π^0

Studies by Li Xu

- 2 scenarios are considered:
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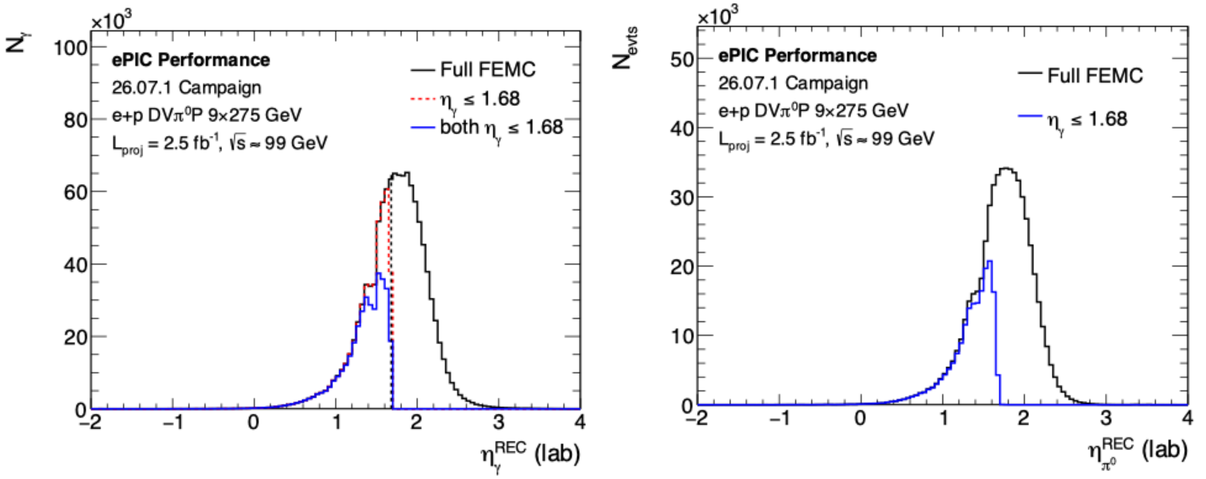
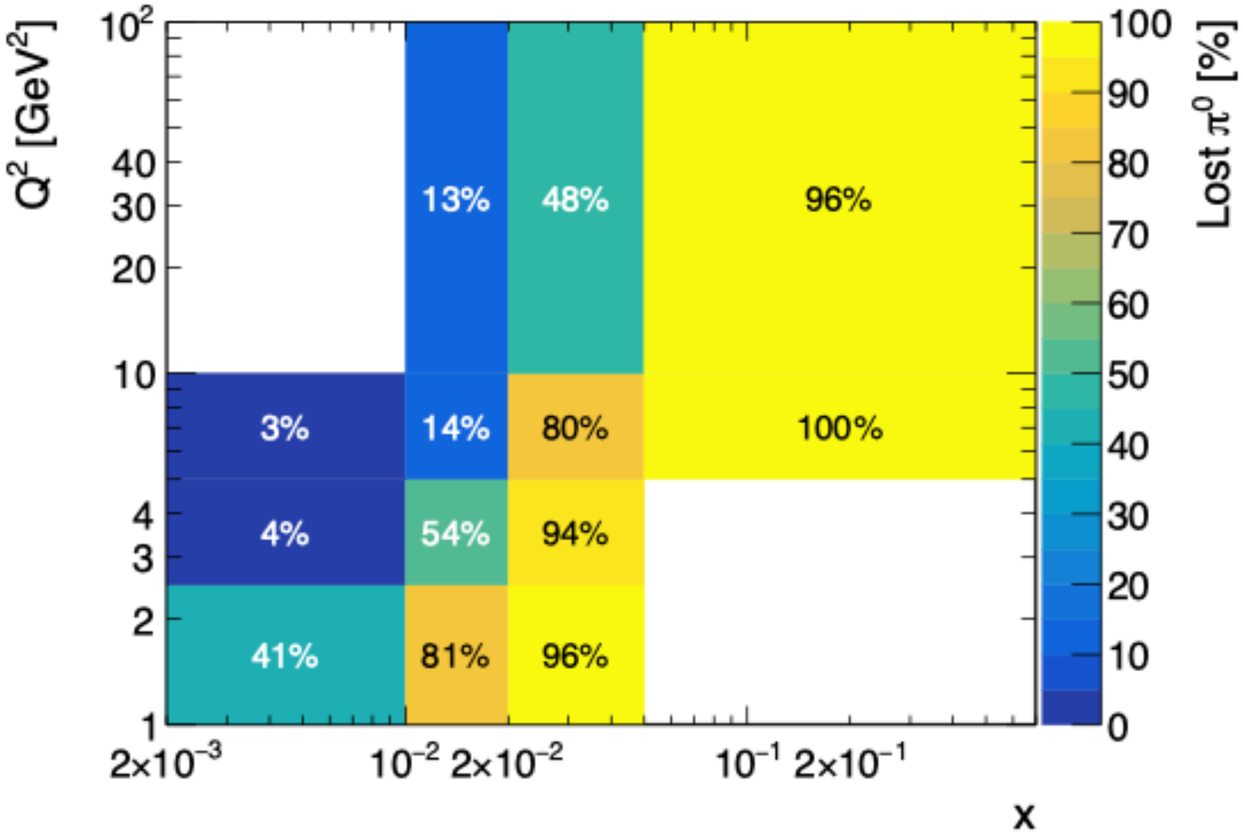


- 9 GeV × 275 GeV : 67% π^0 lost
- 9 GeV × 130 GeV : 63% π^0 lost

9 GeV × 275 GeV



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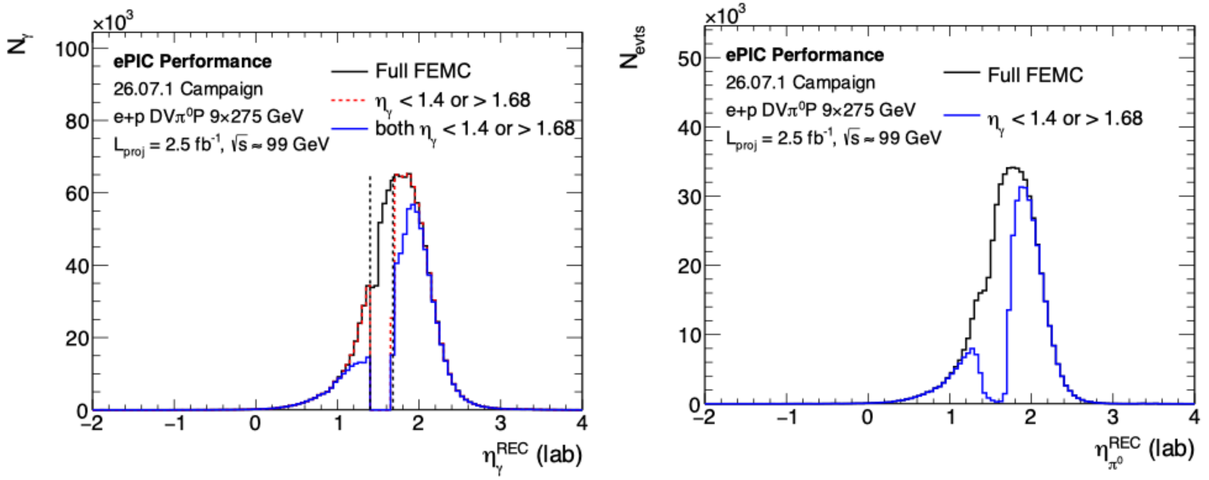
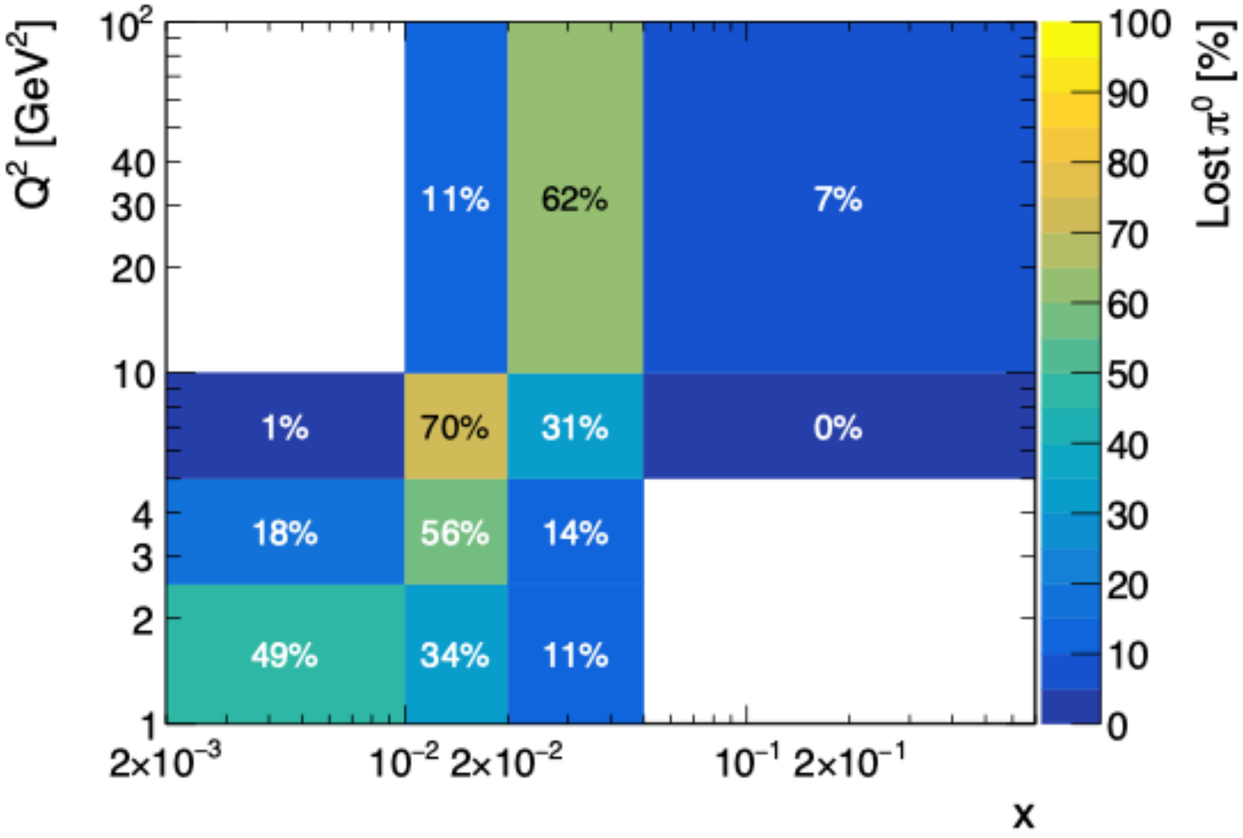


- 9 GeV × 275 GeV : 38% π^0 lost
- 9 GeV × 130 GeV : 39% π^0 lost

9 GeV × 275 GeV



Studies by G. Krintiras

Exclusive $\Upsilon(1S)$ production

- 2 scenarios are considered:
  - inner fEMC removed
  - y>0 removed

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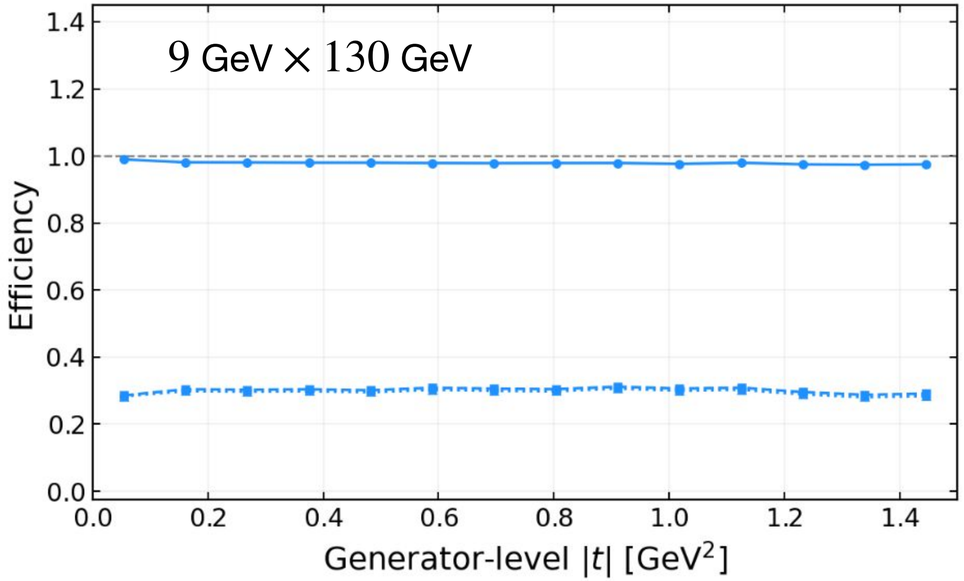
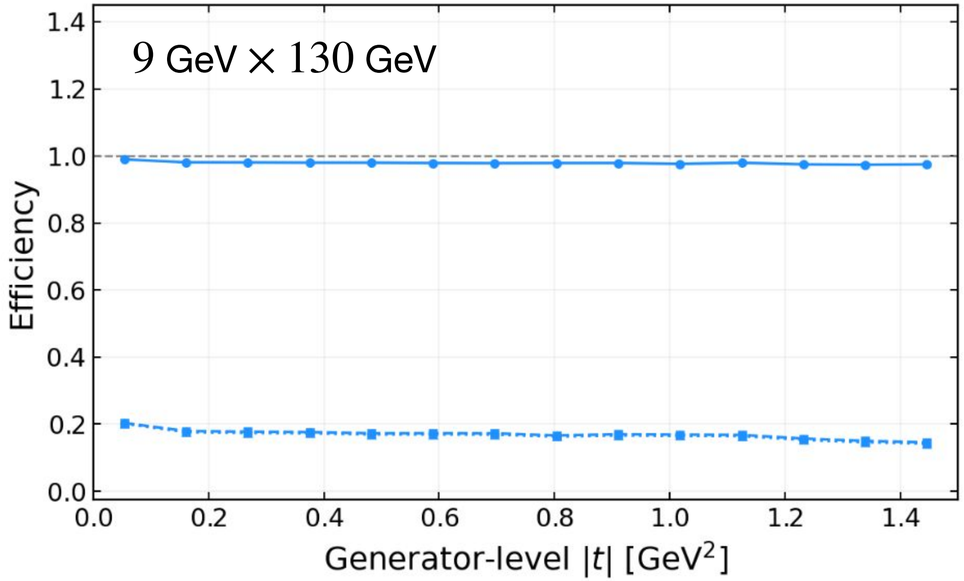
full fEMC



loss of 40% of excl. Υ events

remove inner



acceptance

reconstruction and selection efficiency

acceptance x reconstruction and selection efficiency

Exclusive $\Upsilon(1S)$ production

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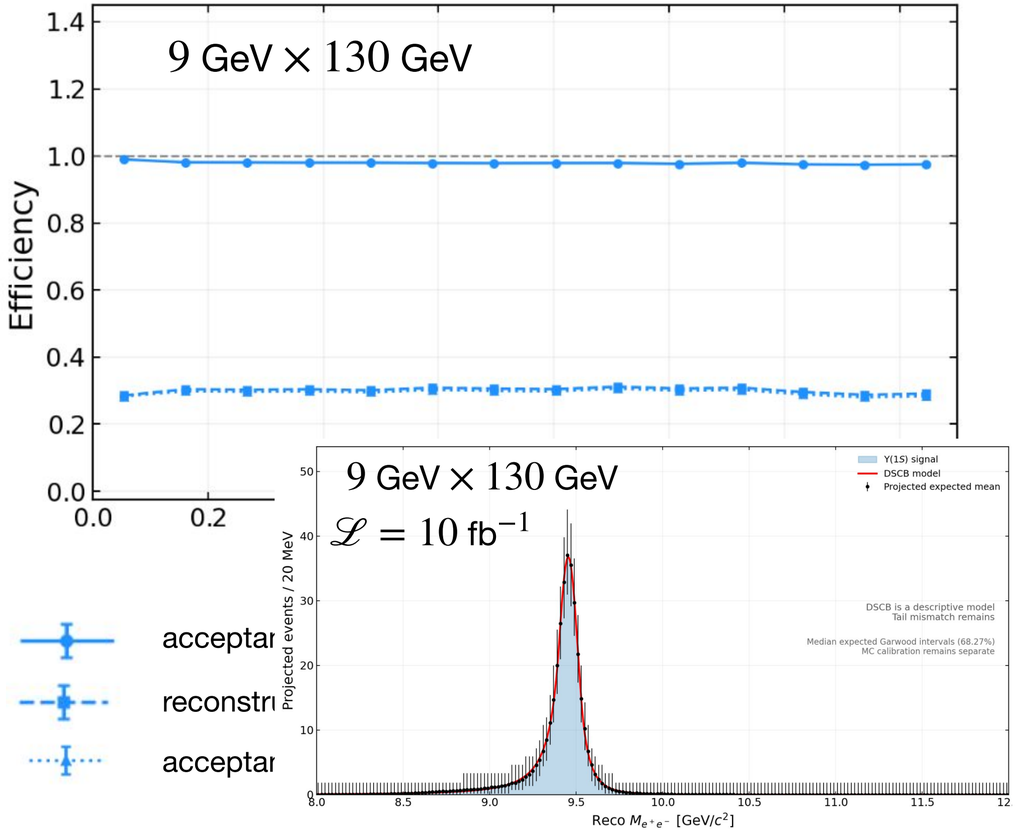

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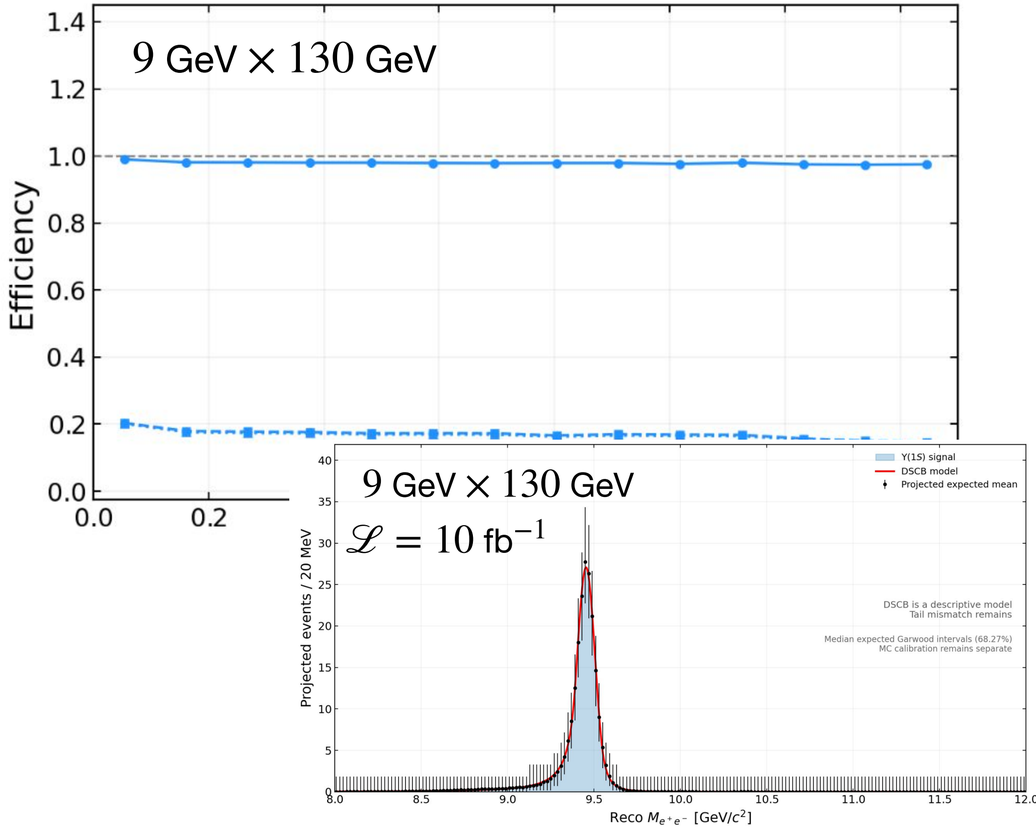

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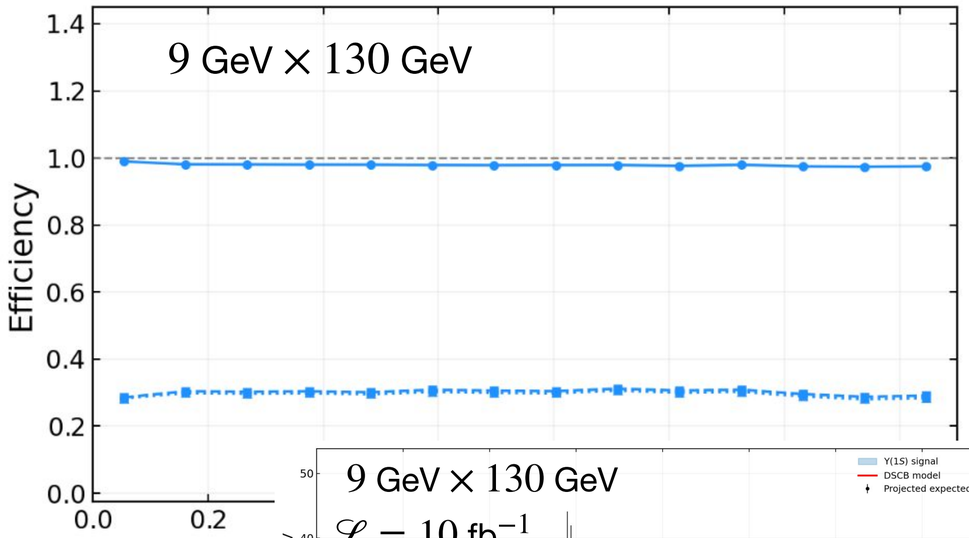

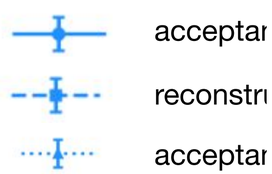

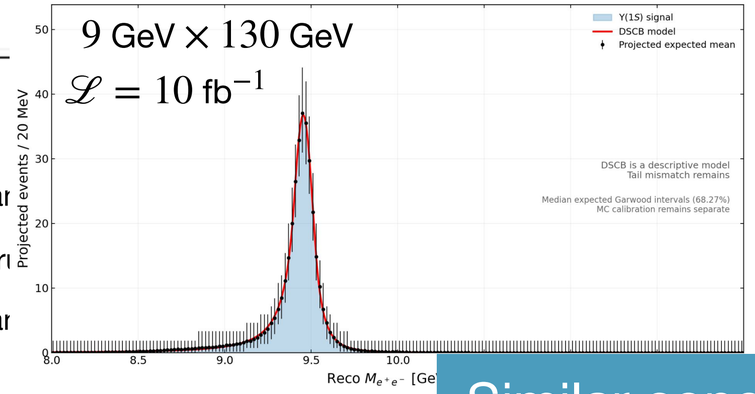

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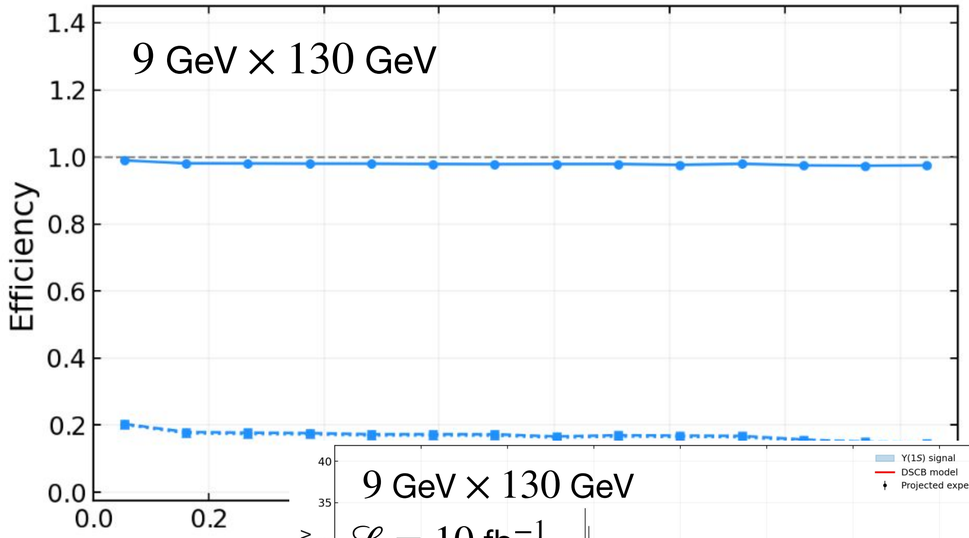

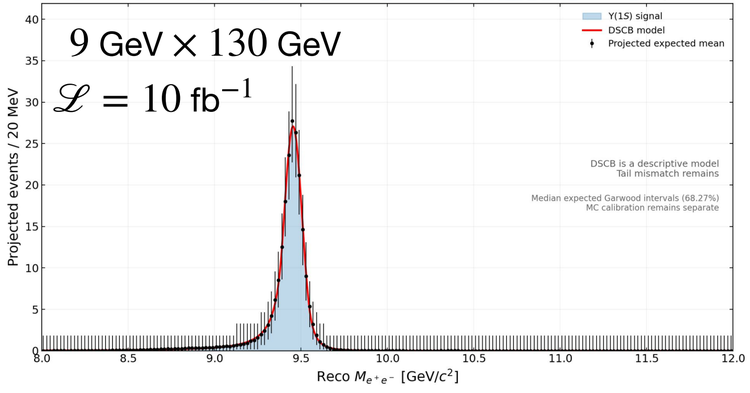

Similar conclusions for 9 GeV $\times$ 275 GeV

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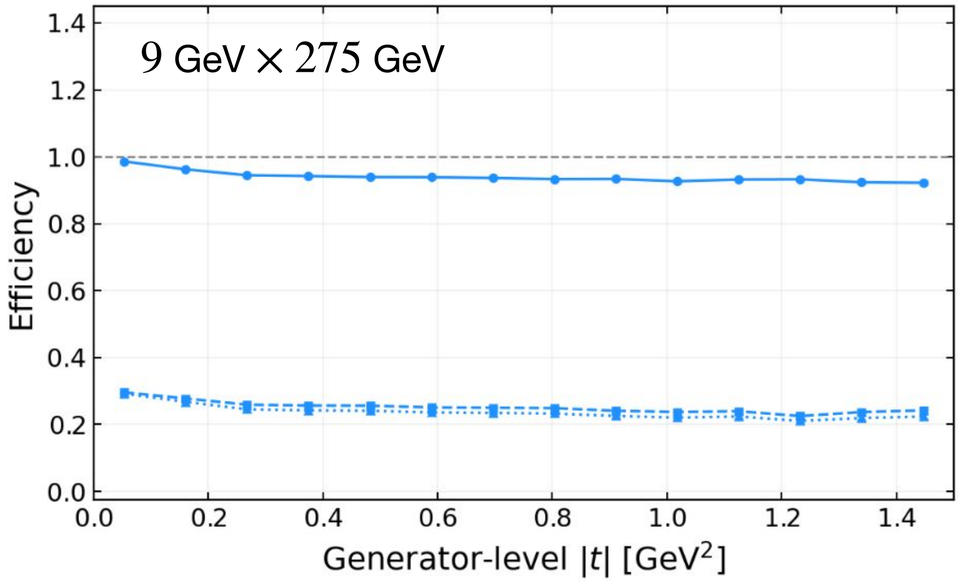
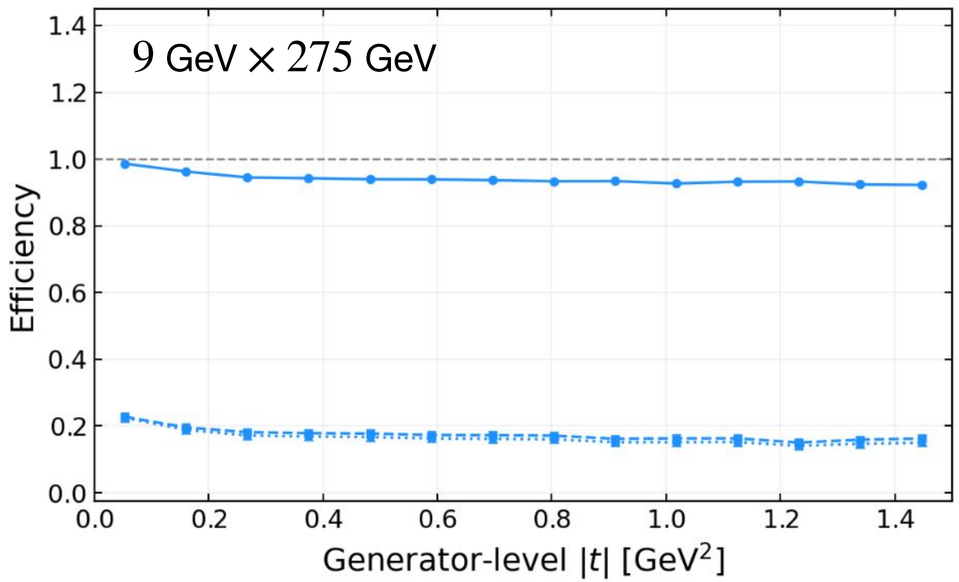
full fEMC



loss of 30% of excl. Υ events

remove inner



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Exclusive $\Upsilon(1S)$ production

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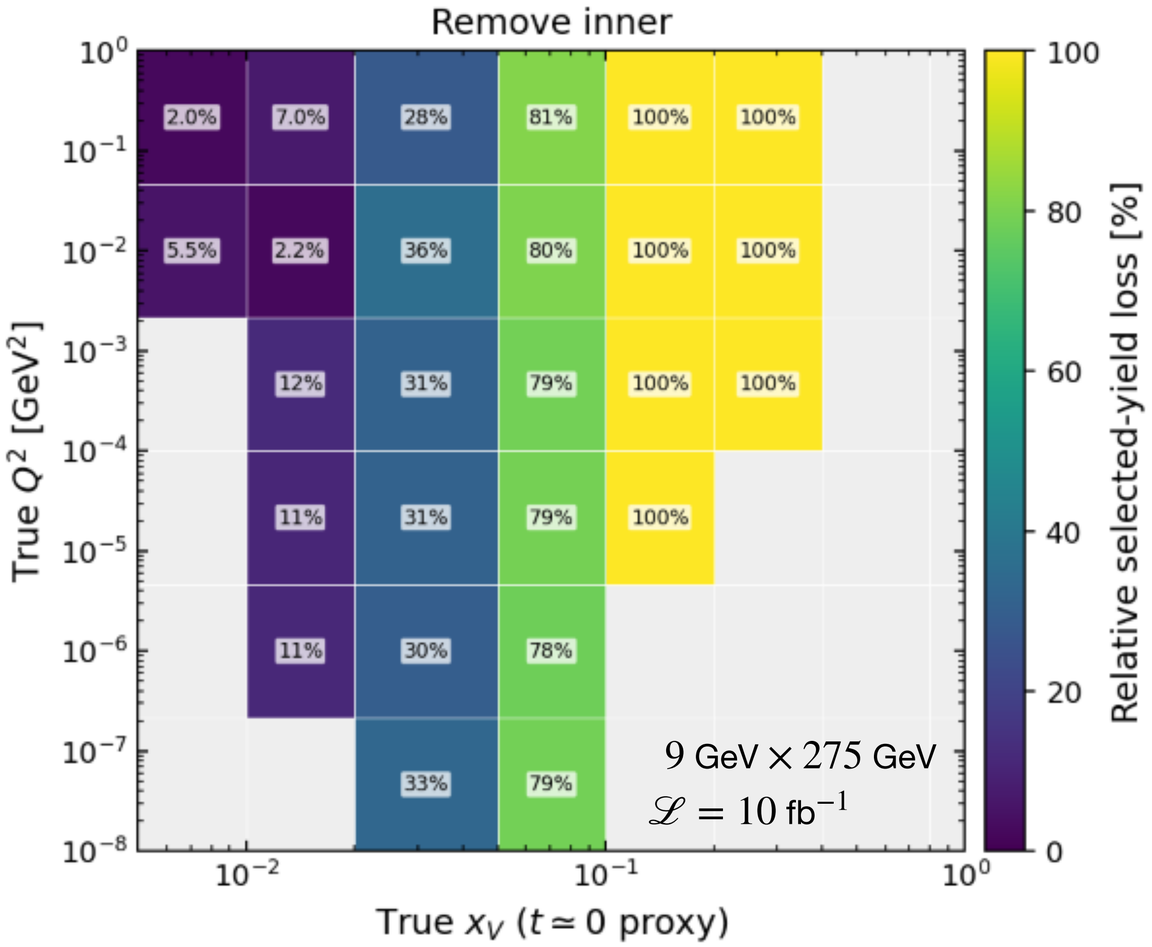

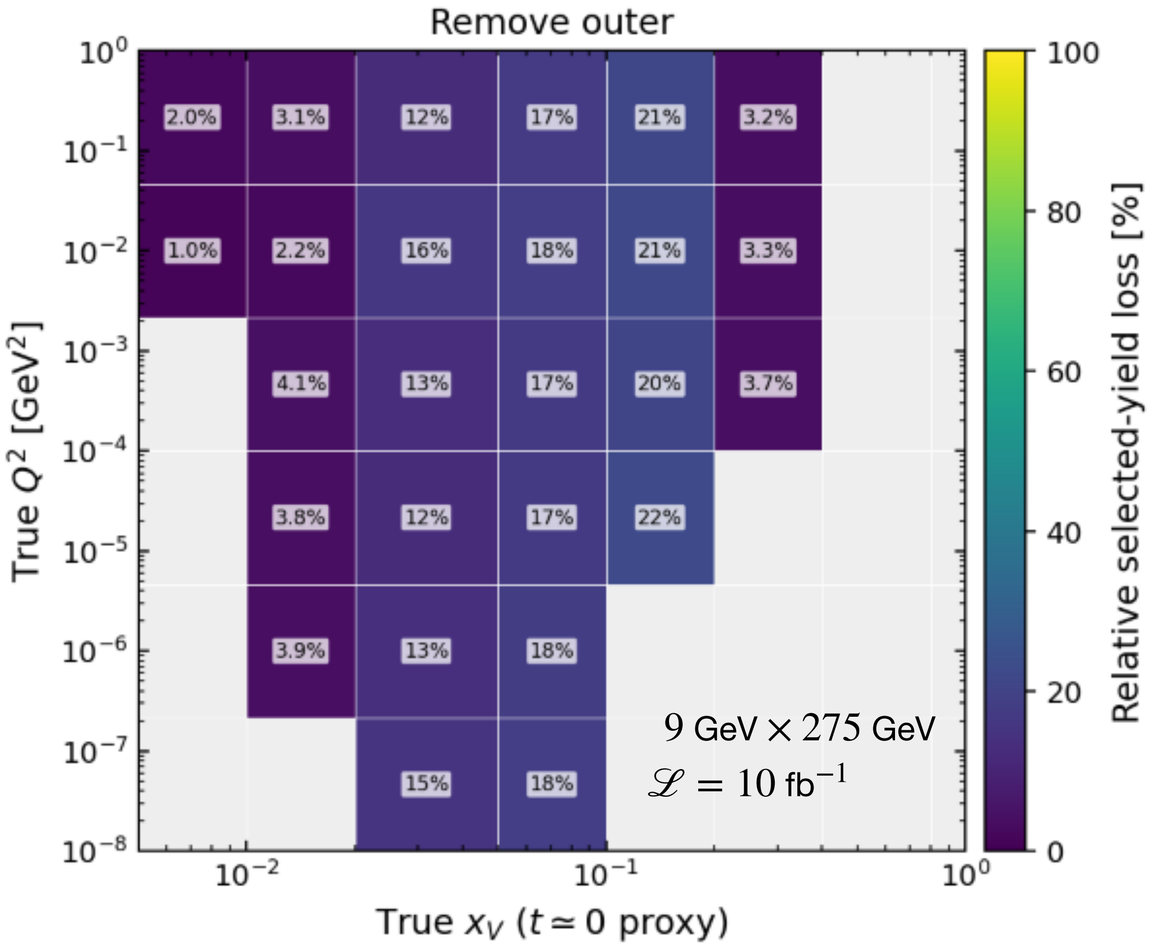

Ongoing and further plans

- Task force has been set up:
  Ch. Chatterjee, A. Jentsch, S. Kay, O. Tsai, J. Vanek and PAC
- Extension of acceptance studies:
  left/right and top/bottom half removal, exclusive J/ψ
- Study reconstruction with background contribution (strong contribution from A. Jentsch)
- Determine impact on electron PID (Ch. Chatterjee)
- Impact on timing resolution? dRICH can take over part of timing determination
  but need collaboration-wide effort to understand global timing integration. Longer time-scale effort.
- Identify other, also non-exclusive, potentially affected channels
- Consider usage of hadronic calorimeter to help: need of new simulations