
# DVCS on ep Analysis Update

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Exclusive, Diffractive and Tagging PWG meeting

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# This presentation

- DVCS at ePIC
- Updates since last presentation (10th November)
  - TDR plots
  - Still looking at differences between t-distributions.

# Deeply Virtual Compton Scattering

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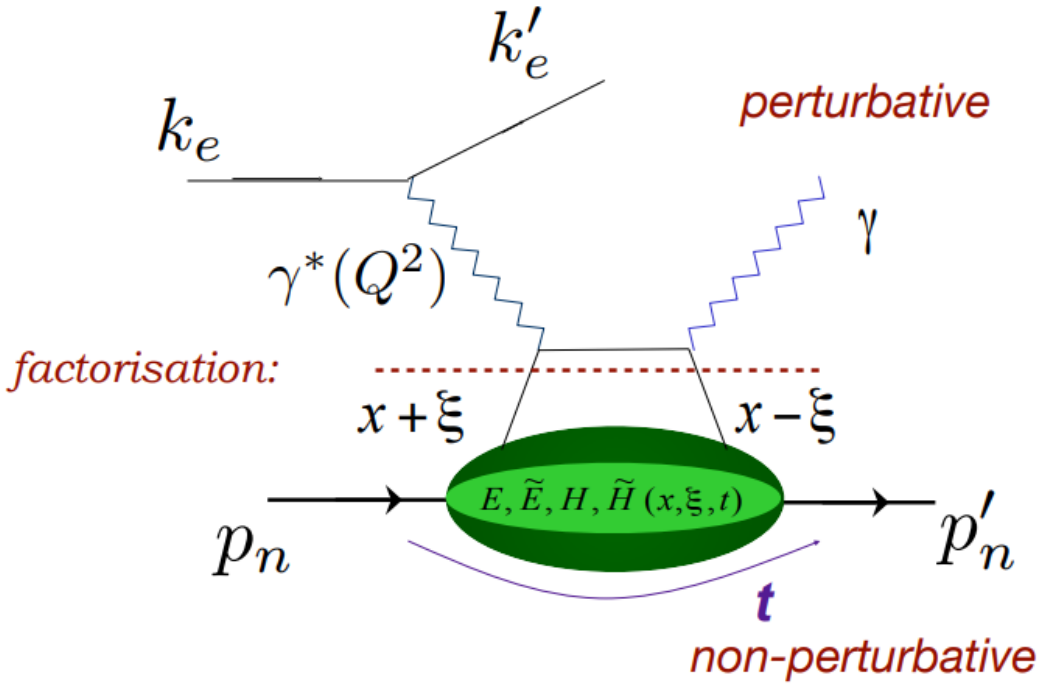
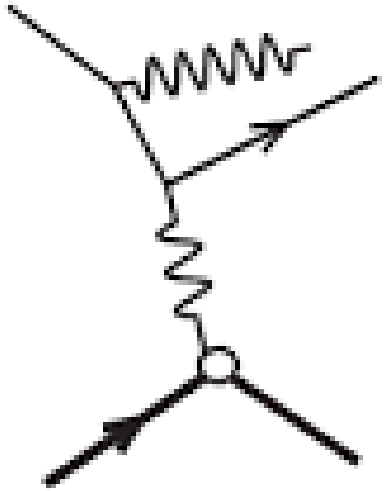


- DVCS: electroproduction of a photon off a hadron target
- QM interference: Bethe-Heitler ($e^-$ radiates final state photon.

# Deeply Virtual Compton Scattering: kinematics

- Default kinematics:
  - $e(k) + p(p) \rightarrow e'(k') + p'(p') + \gamma$

- Inclusive kinematics: scattered electron only ("Electron method" in EICrecon)

$$Q^2 = -q^2 = -(k - k')^2 \qquad y = \frac{q.p}{k.p} \qquad x = \frac{Q^2}{2q.p} \qquad \xi = \frac{x}{2 - x} \approx \frac{x}{2}$$

- Mandelstam *t*: beam and scattered proton (BABE method in *tRECO* convention)

$$t = (p - p')^2$$

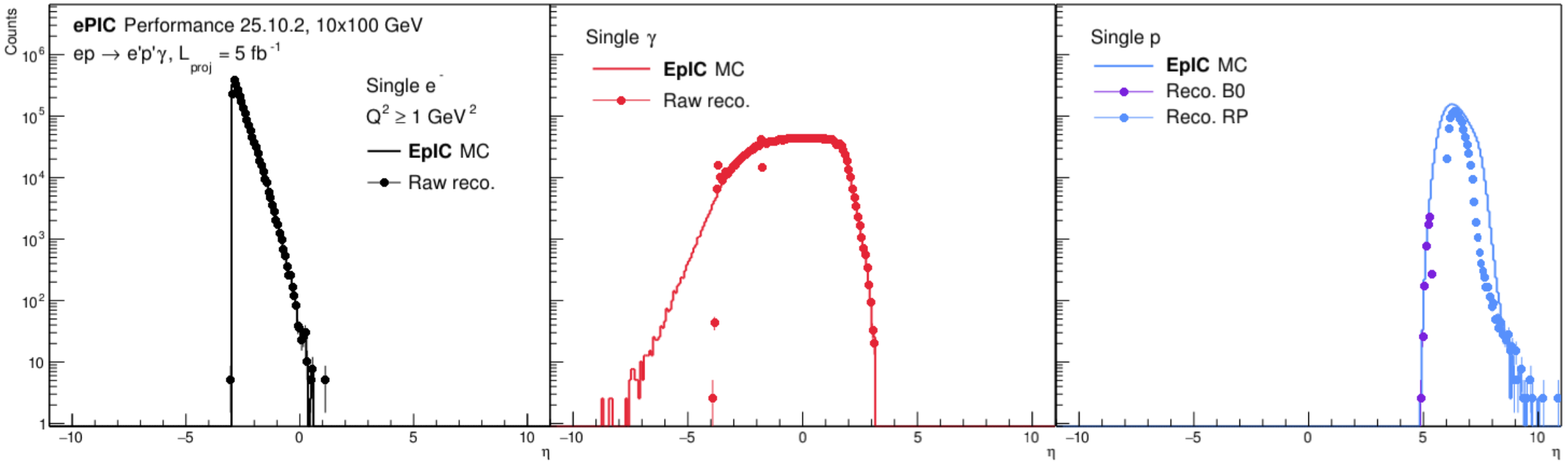
# TDR plots

# TDR plots

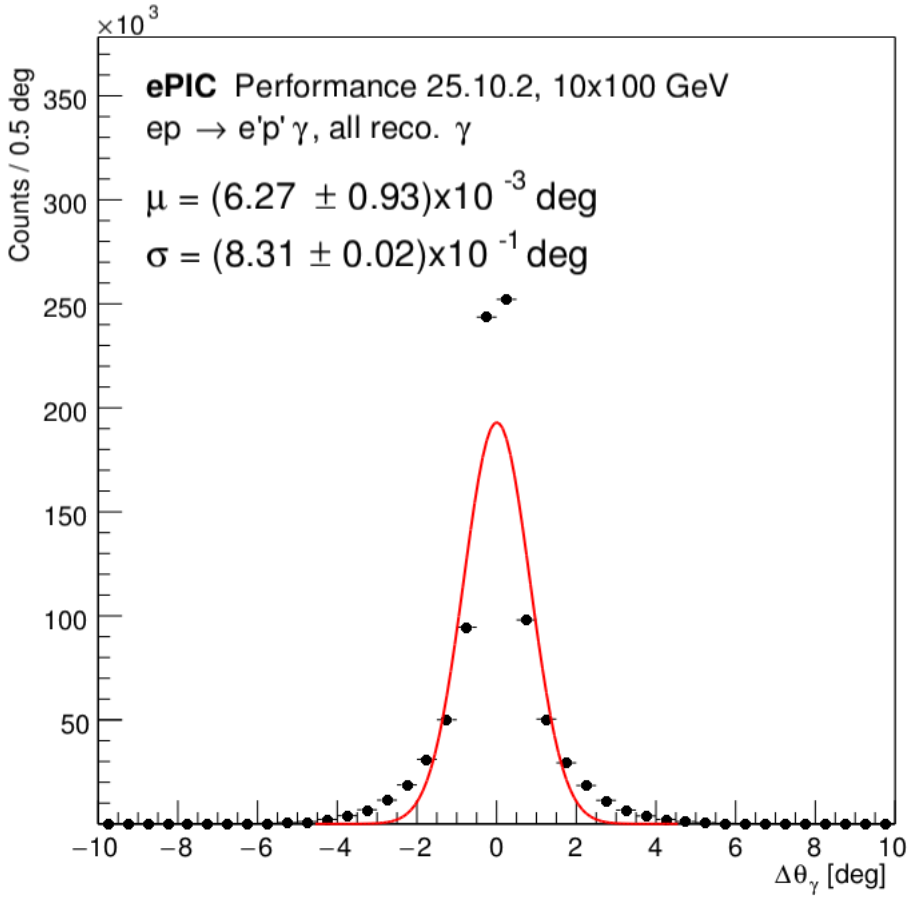
- Less productive week due to other commitments.

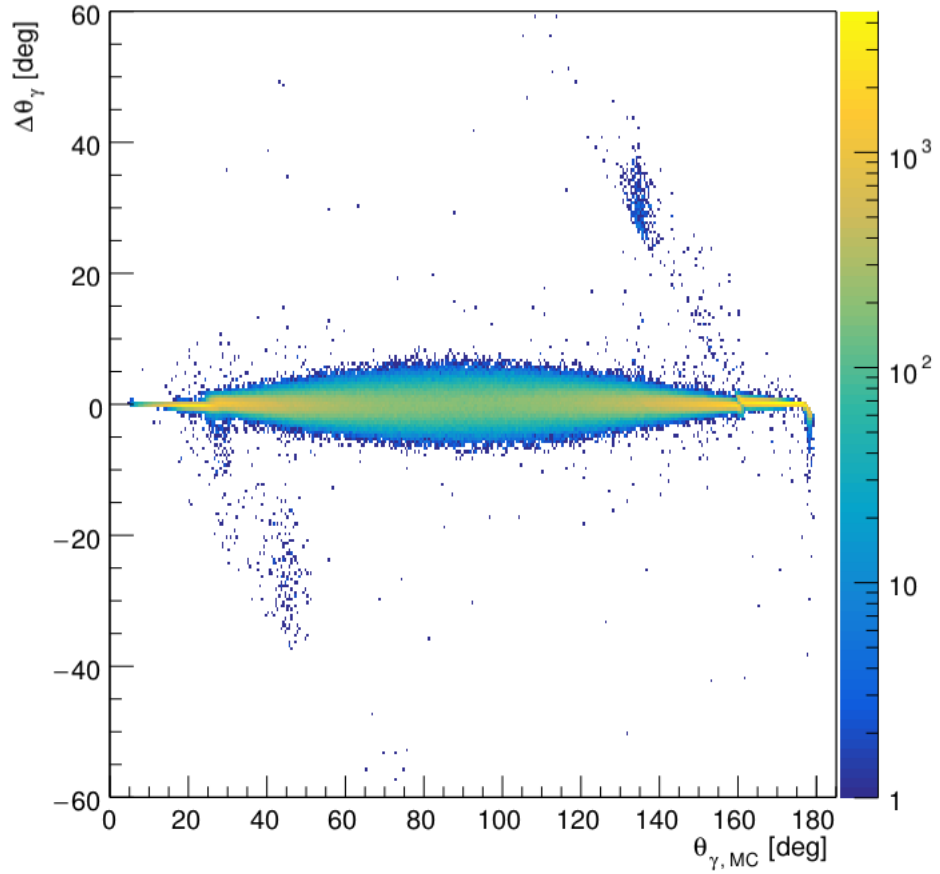
- Put together plots for TDR based on last week and offline discussion.

# TDR plots (1) – η distributions

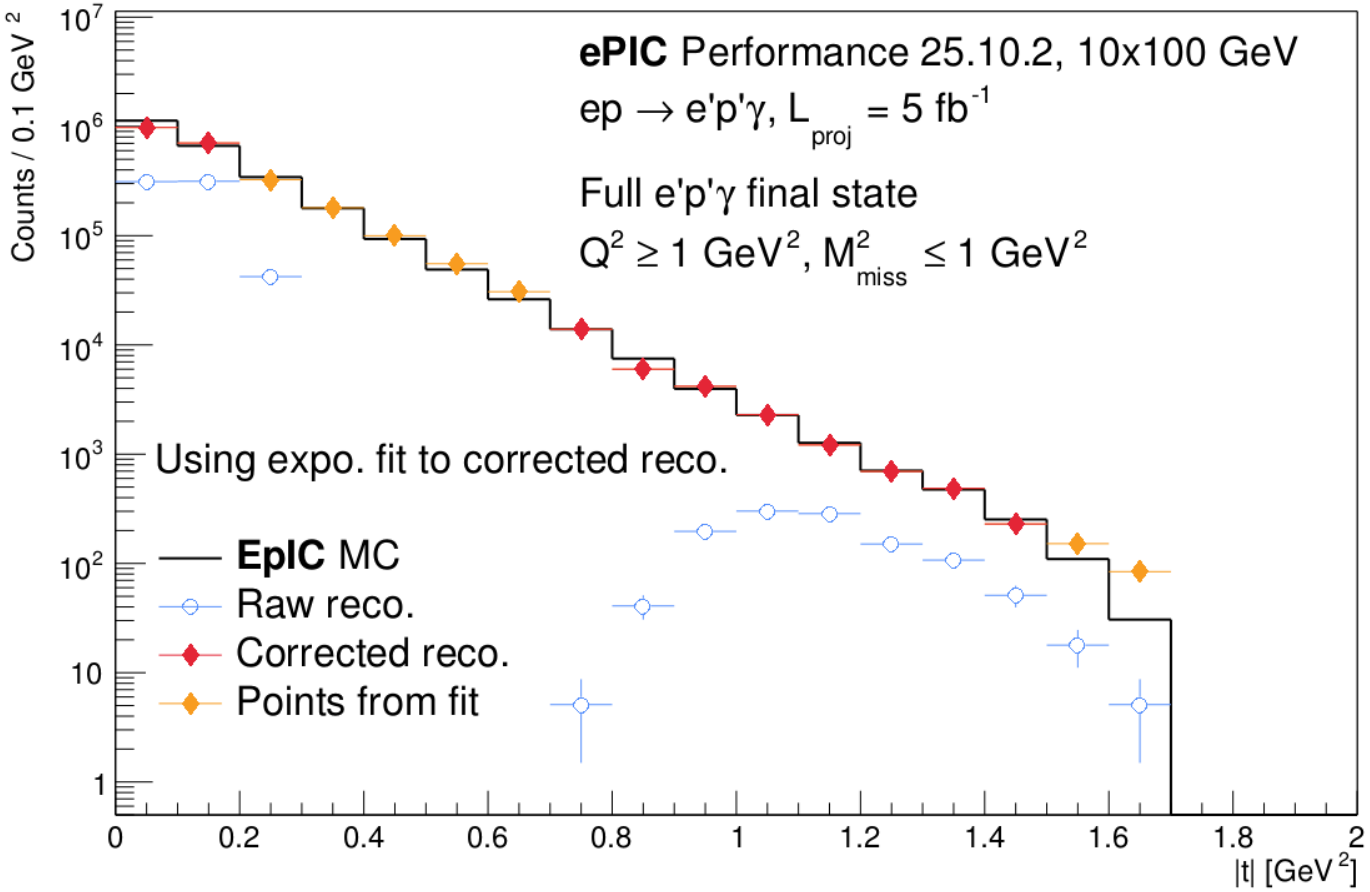


# TDR plots (2) – γ angular resolution

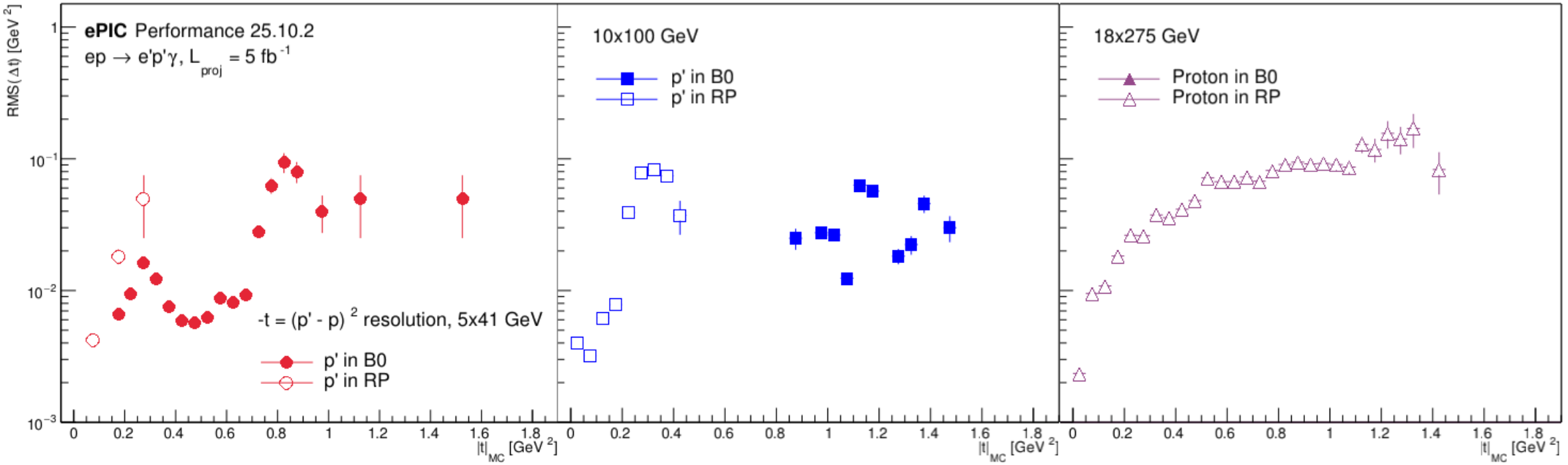


# TDR plots (3) – t-distribution



# TDR plots (4) – t-resolution



# Reconstructing Mandelstam t

Still comparing between different analyses.

# Reconstructing Mandelstam t (repeat from last week)

- Trying to compare t-reconstructions with DV$\pi^0$P and J/ψ analyses.
  - These have significantly better agreement between MC and reco. with the proton missing.

- What is the difference in analysis methods?

# 1) DVπ⁰P

- Now have Jihee's code (modified for DVCS channel).
  - Ignore $\pi^0$ reconstruction.
  - Require 3 final state particles (MC), not 4.
  - Require exactly 1 real photon.

- Raw reco. distributions seem to show similar trends between the 2 channels.
  - Semi-inclusive calculation for t starts x ~2 below MC @ low-t.
  - Raw reco. crosses over MC at t ~ 0.6 $GeV^2$
  - Hard to tell more yet; only ~10k events looked at.

# Concluding remarks

# Summary of this update

- New TDR plots made (expect yet more comments/changes in the coming week).

- Still trying to understand differences between DVCS and DV$\pi^0$P / J/ψ analyses.
  - Why does DVCS t-distribution look so poor without the proton being detected?
  - Not immediately obvious; need to test Jihee's code on larger subset of DVCS files.

# Thank you for listening!

Any questions?

Offline questions? Ping me an email!

# Backup