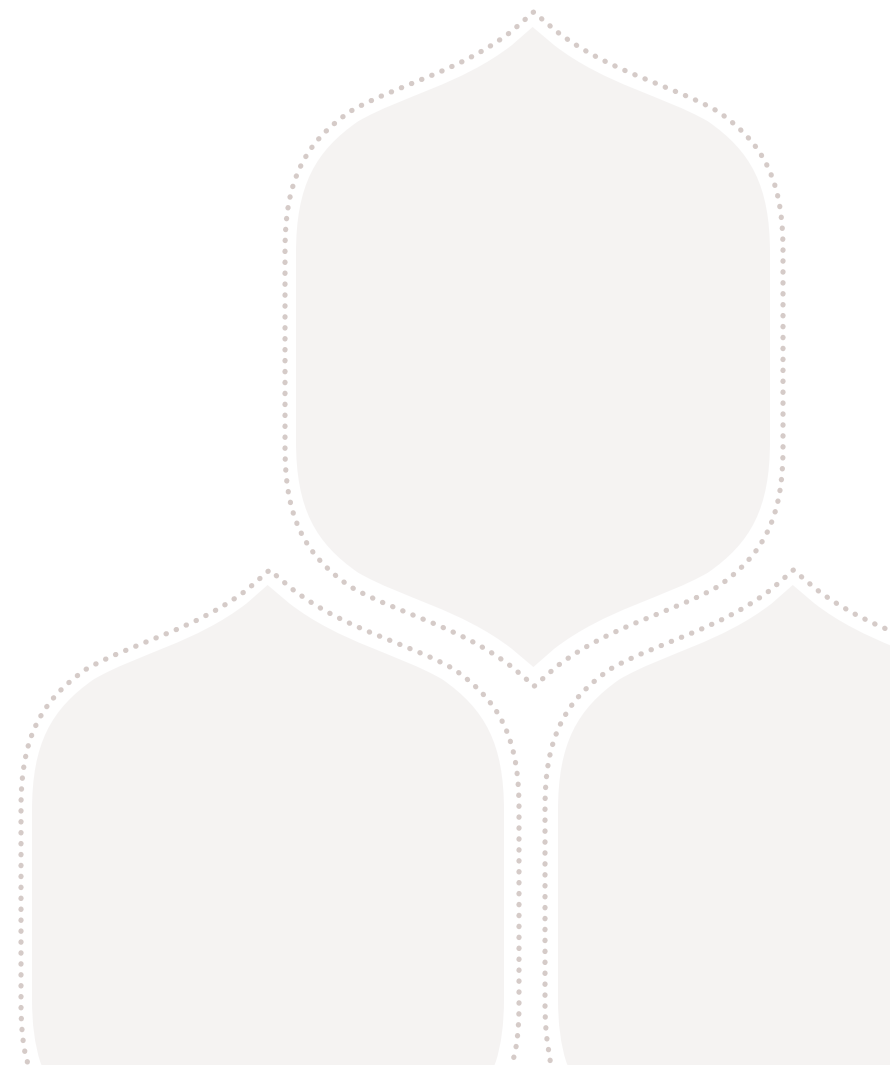


Update on Inc. DDIS

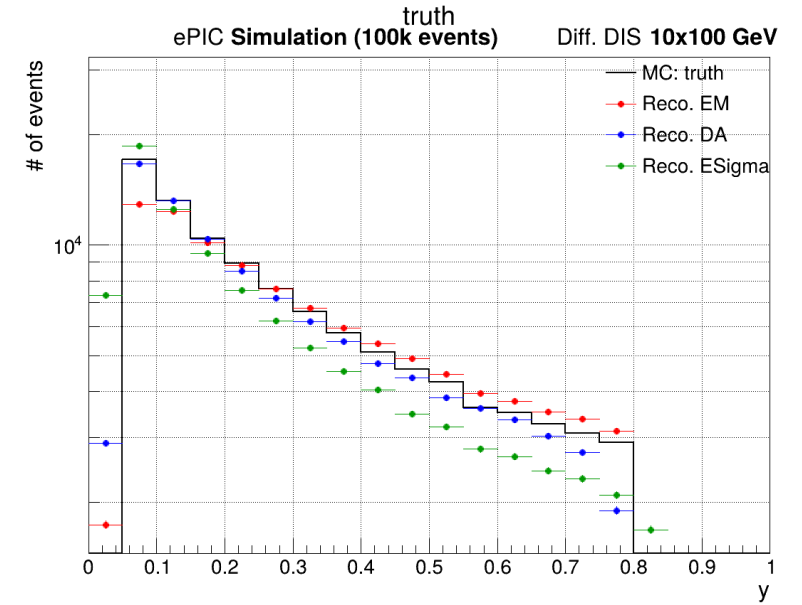
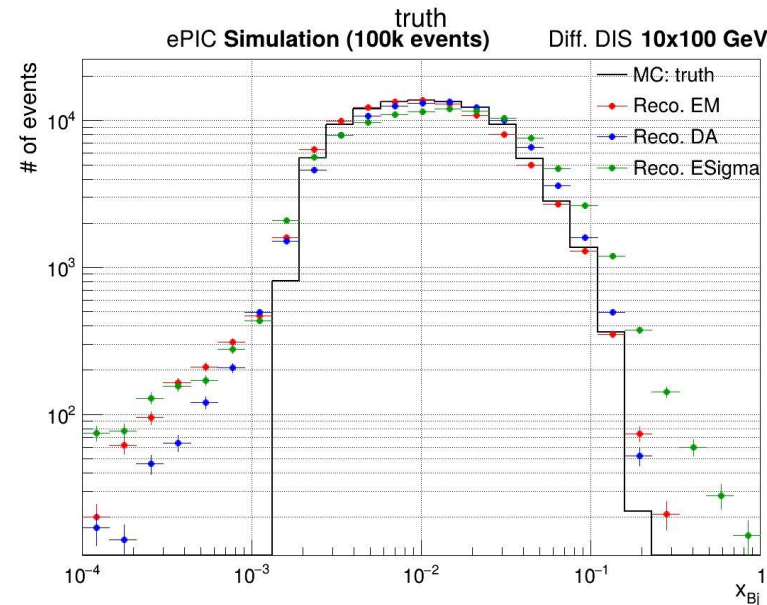
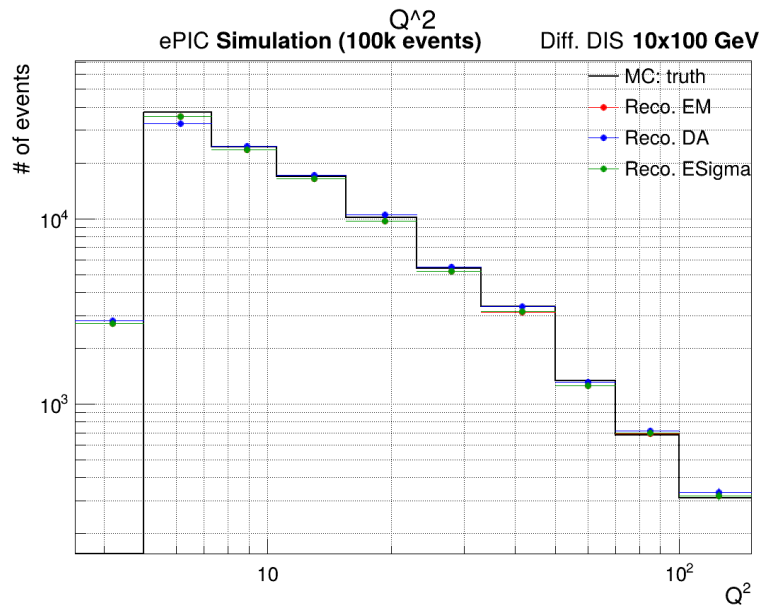
HADI HASHAMIPOUR

27TH OCT.



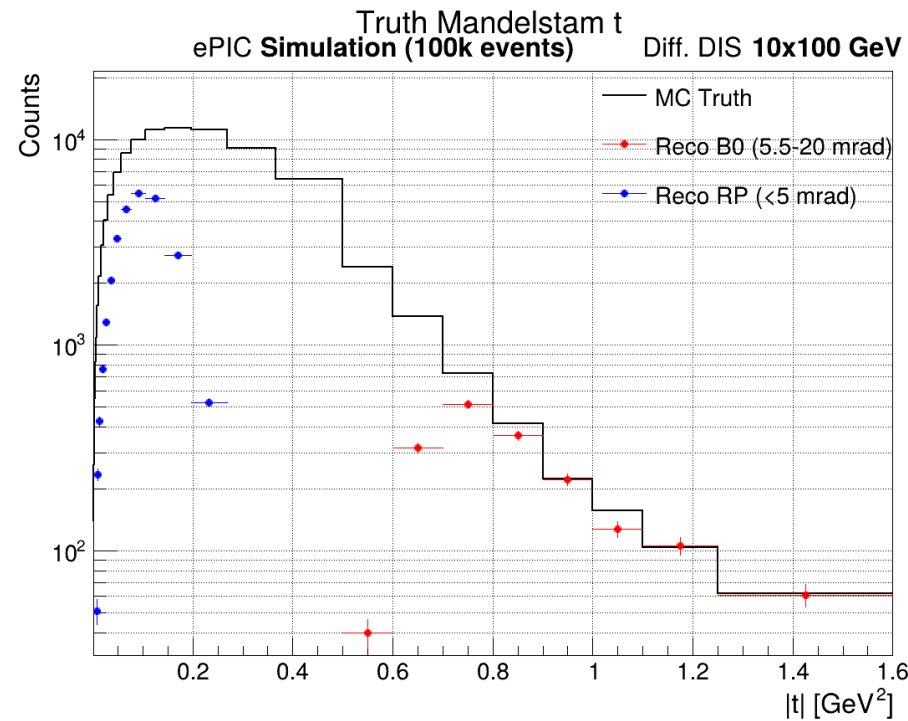
1: Overview – Kinematic Distributions

- Q^2 distributions (truth + 3 reco methods)
- Bjorken- x
- Inelasticity y distribution

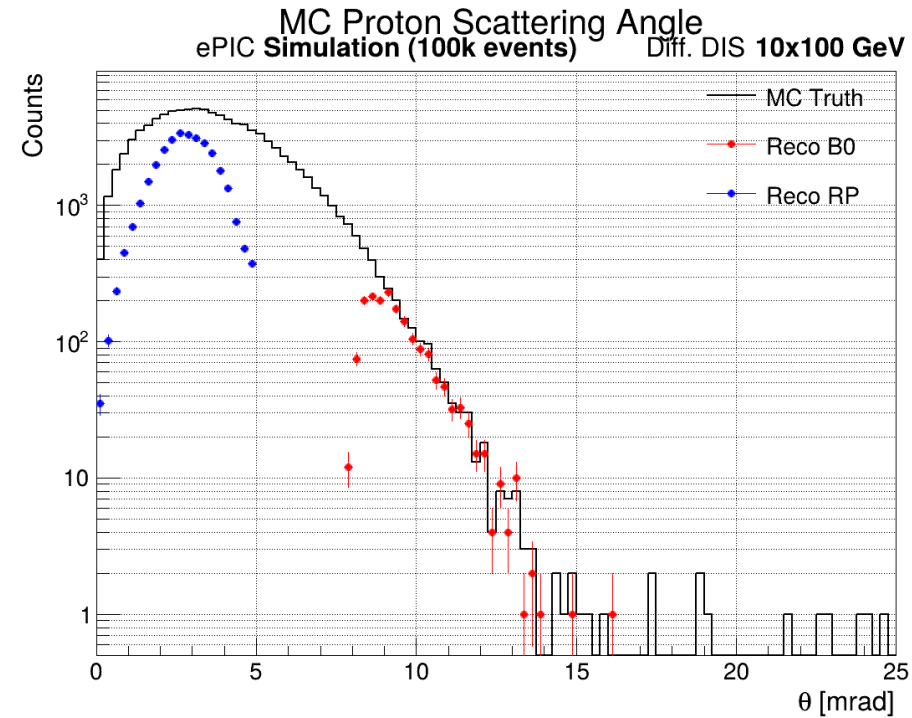


2: Overview – Diff. Kinematic Distributions

- $|t|$ histo
- Proton Scattering angle

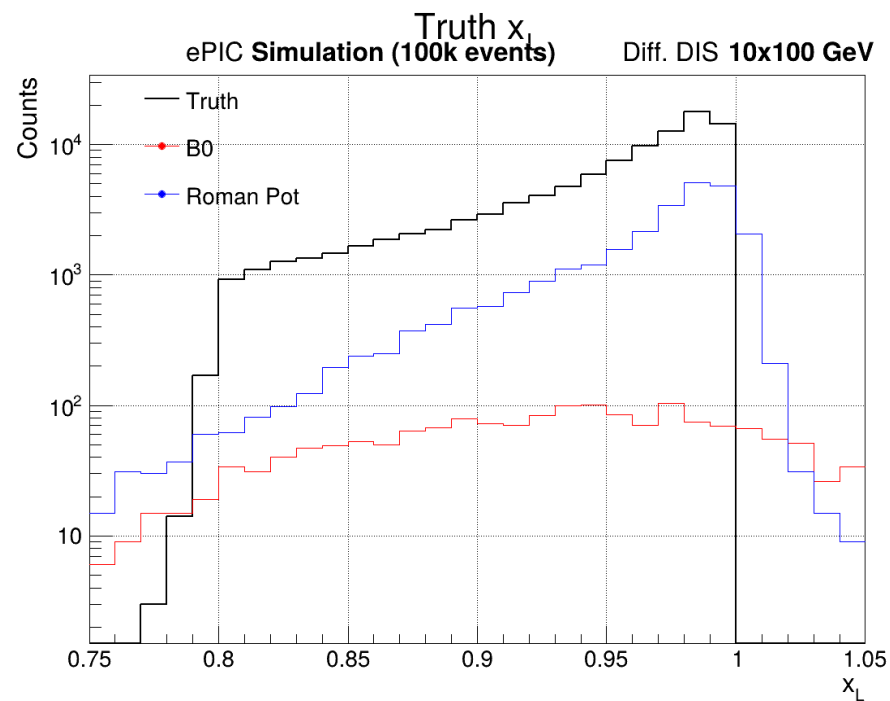


$$t = (P - P')^2$$

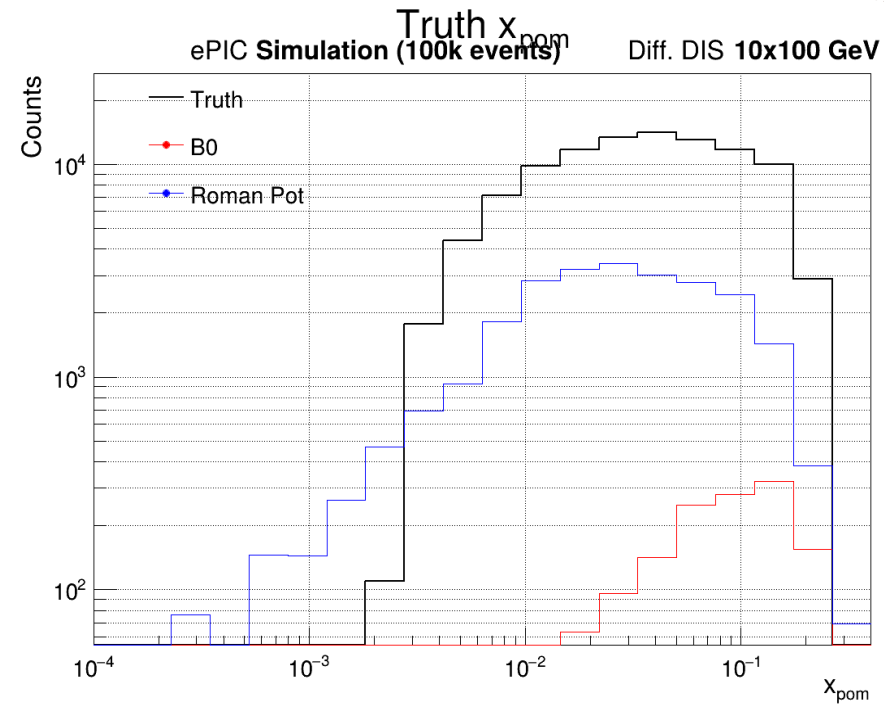


2: Overview – Diff. Kinematic Distributions

- Proton Longitudinal momentum fraction: x_L
- The momentum fraction of the colorless exchange: x_{pom}



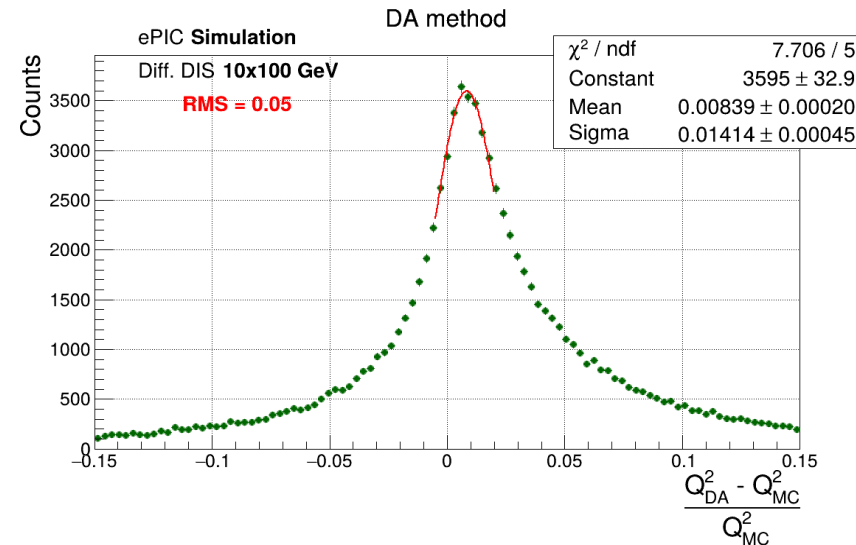
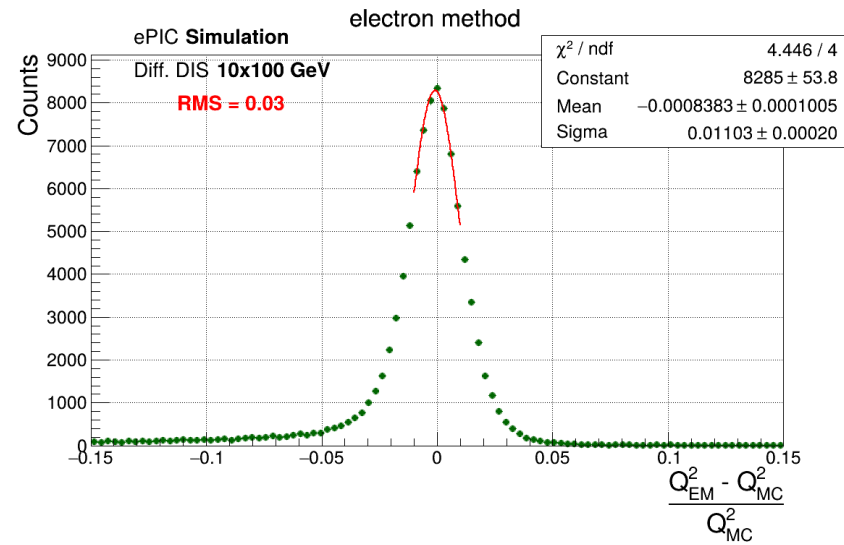
$$x_L = \frac{p_{z,\text{proton}}}{p_{z,\text{beam}}}$$



$$x_{\text{P}} \approx 1 - x_L$$

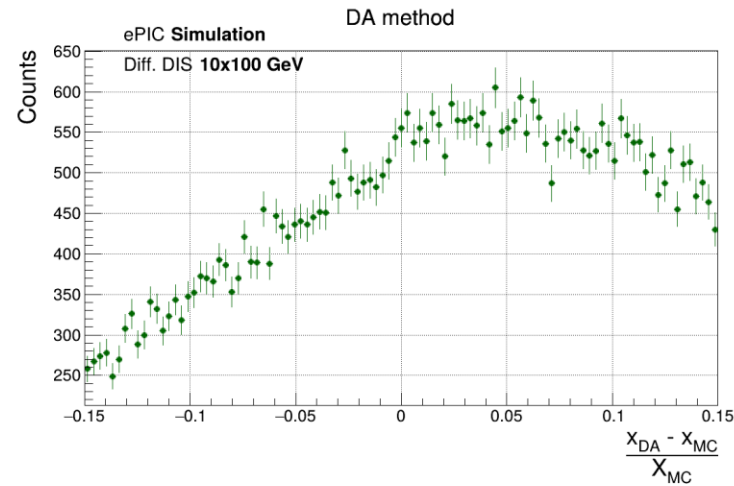
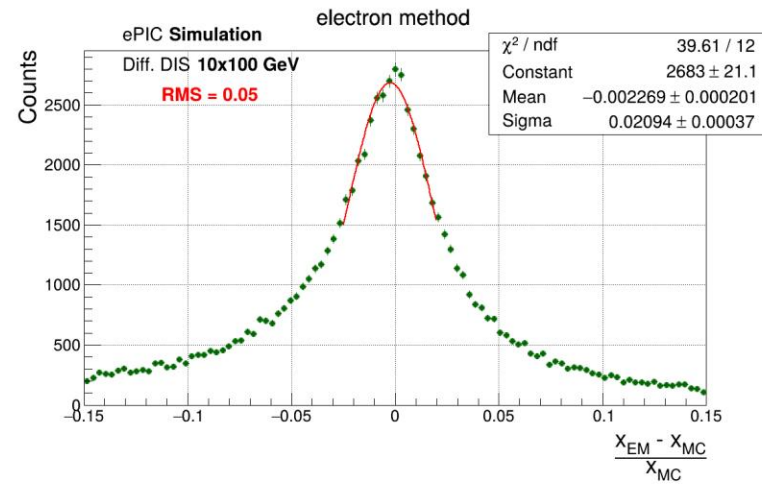
3: Detector Performance– Resolutions

- Q^2 relative resolution, over all bins



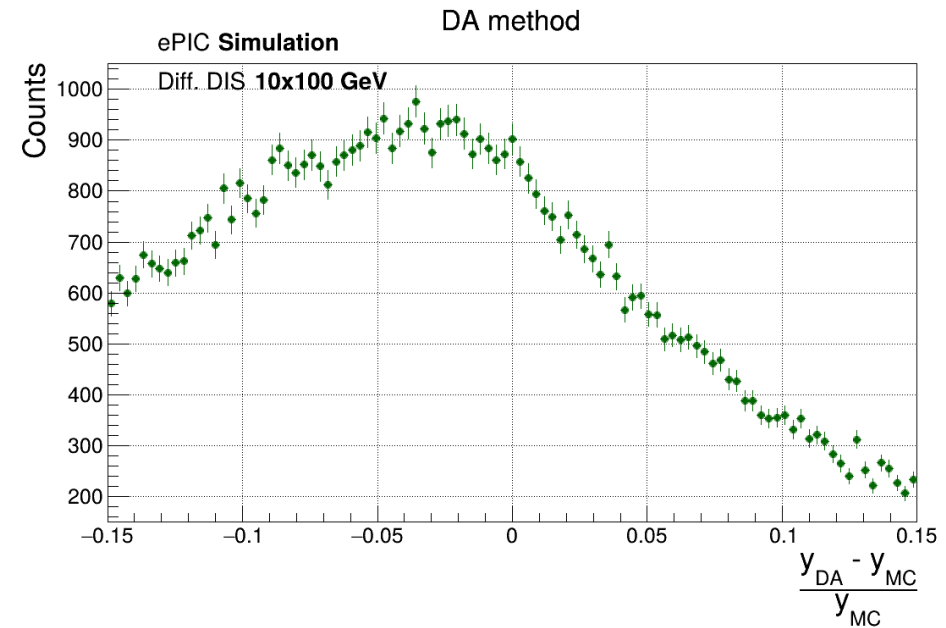
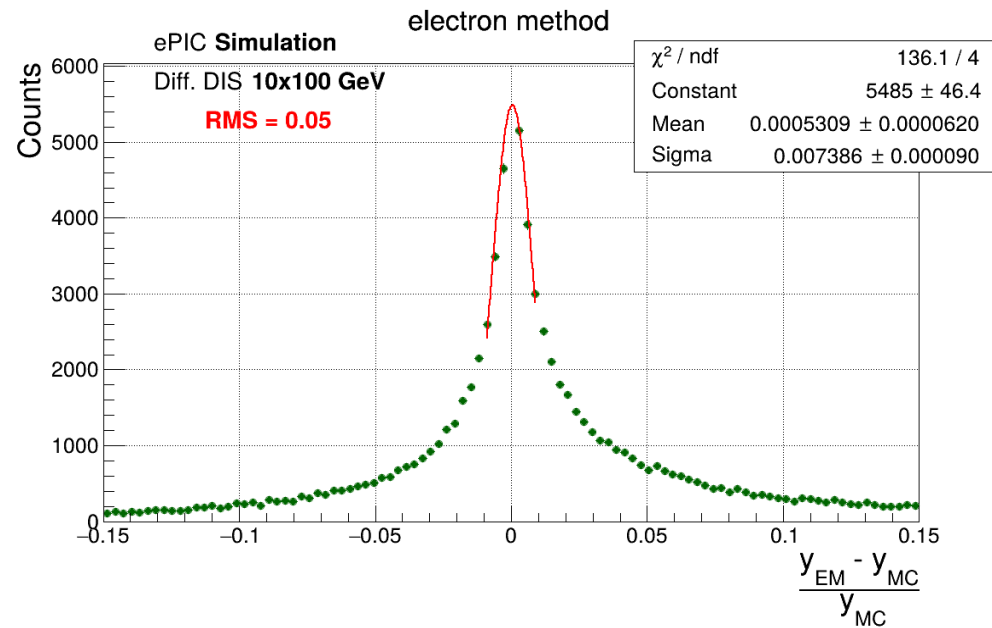
3: Detector Performance– Resolutions

- x_{Bj} relative resolution, over all bins



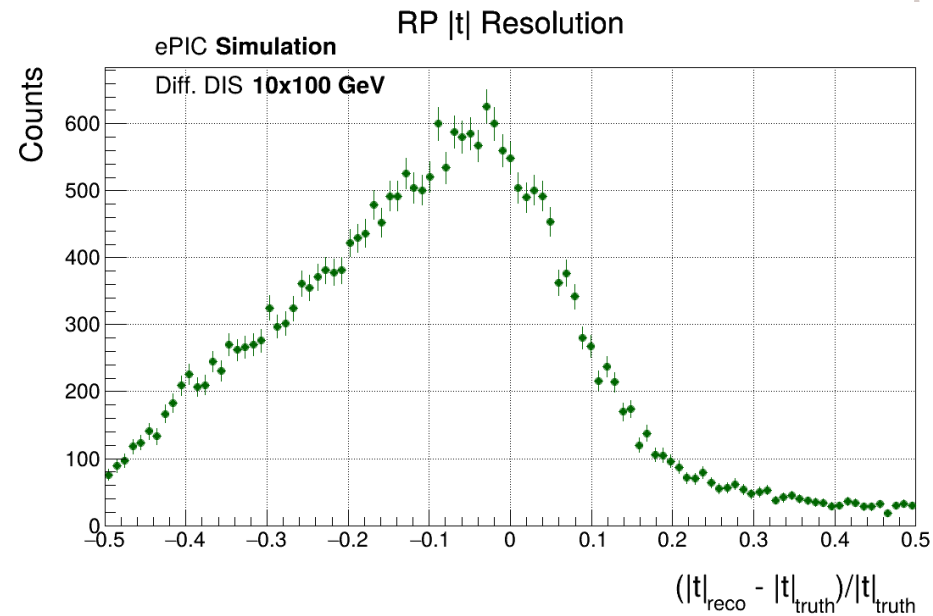
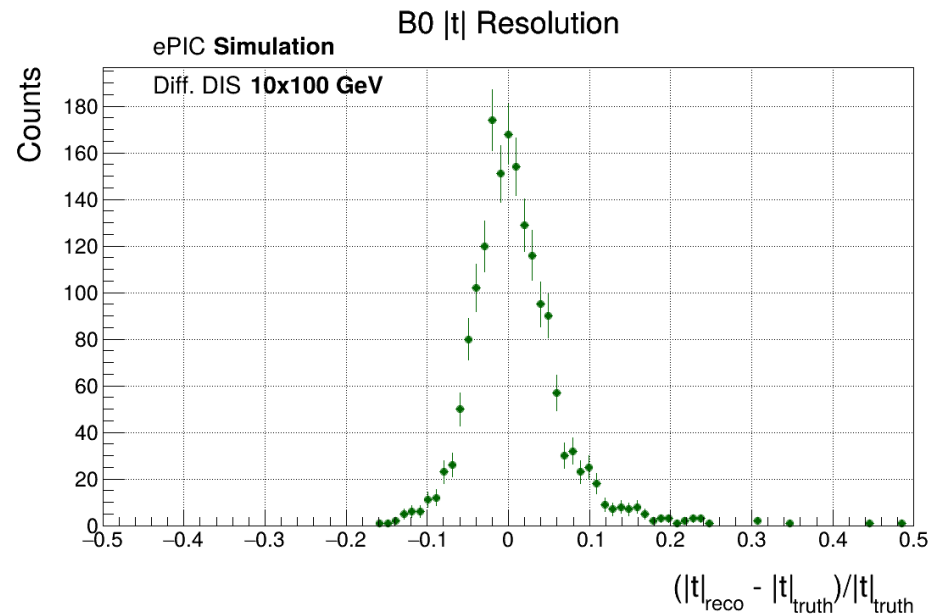
3: Detector Performance– Resolutions

- Inelasticity relative resolution



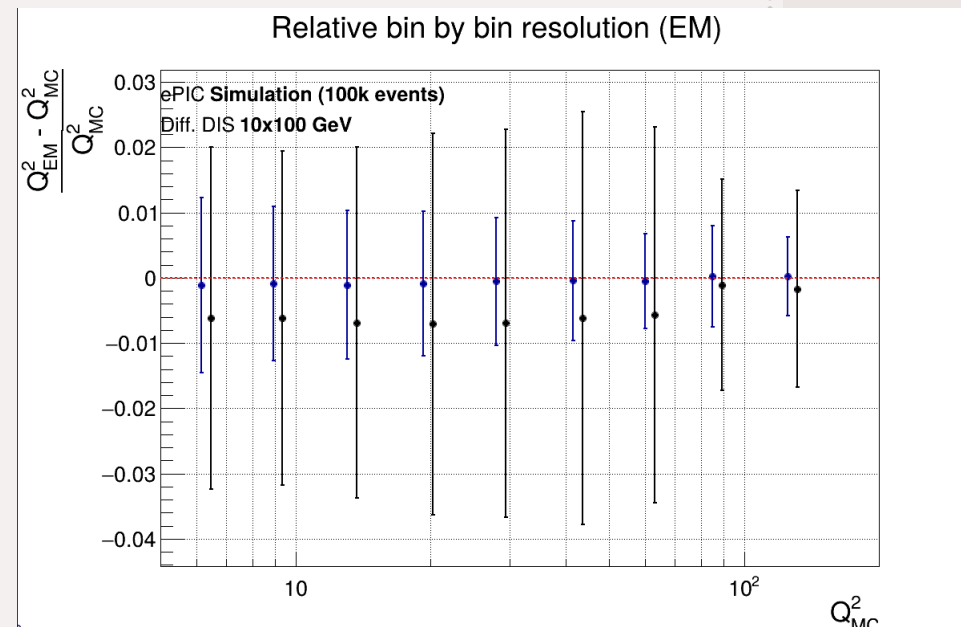
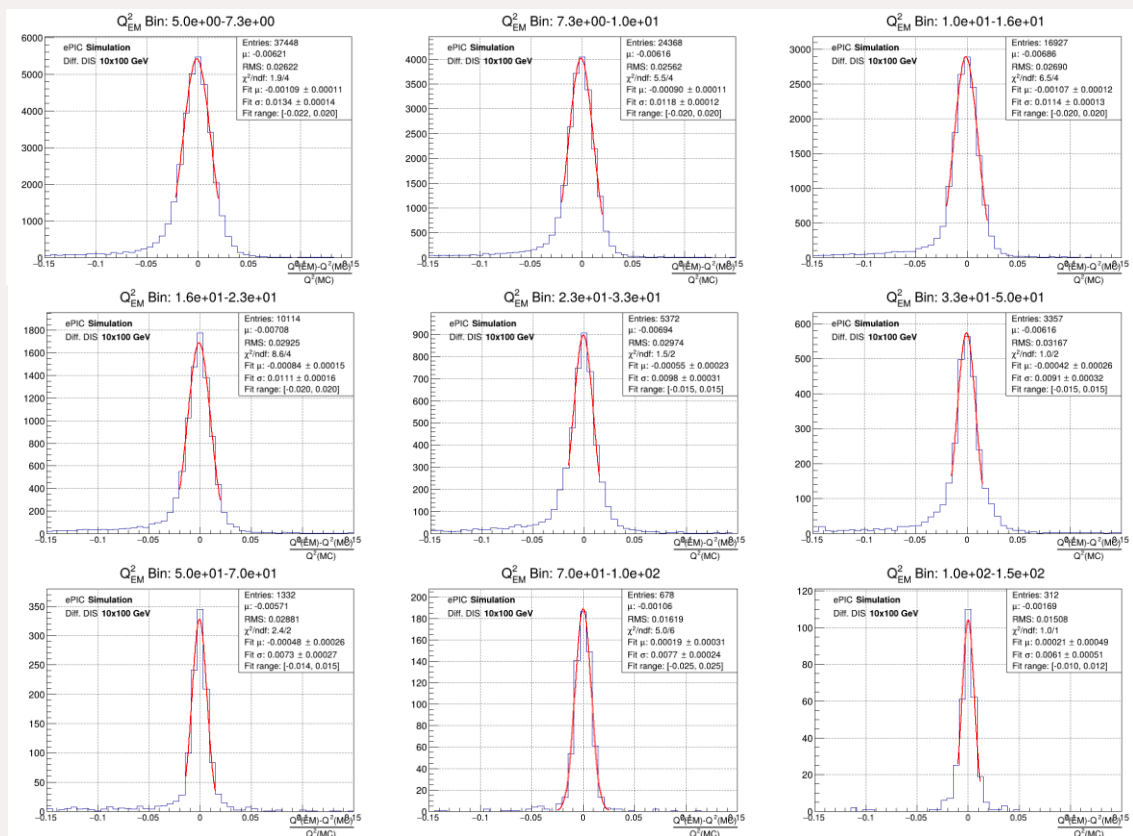
4: Detector Performance– Diff. Resolutions

- Mandelstam 't'
- Roman pots should have good precision, see Alex's talk: <https://indico.bnl.gov/event/26543/#4-rp-reconstruction>
- Reco method: *t*RECO BABE



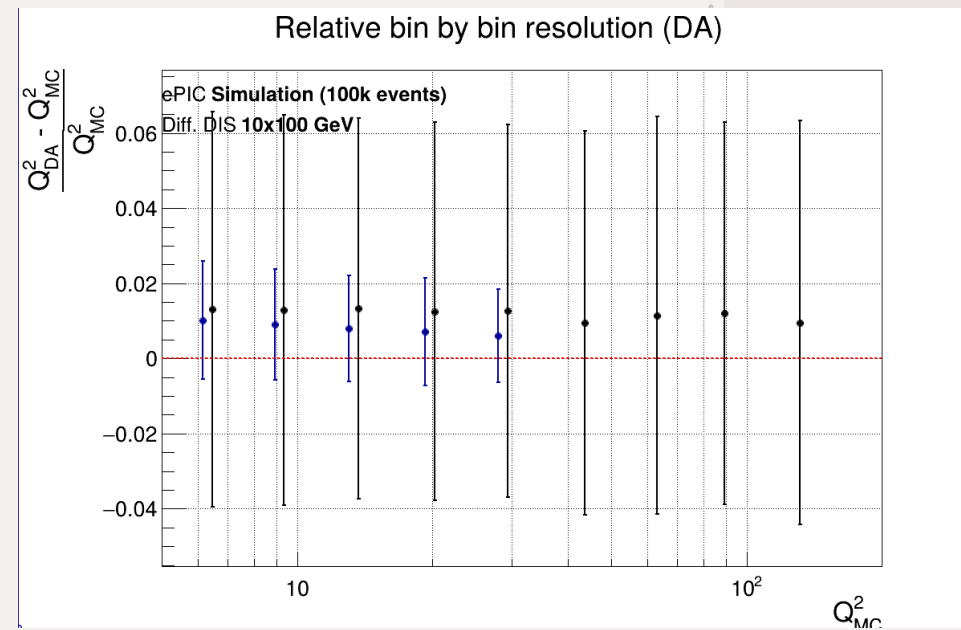
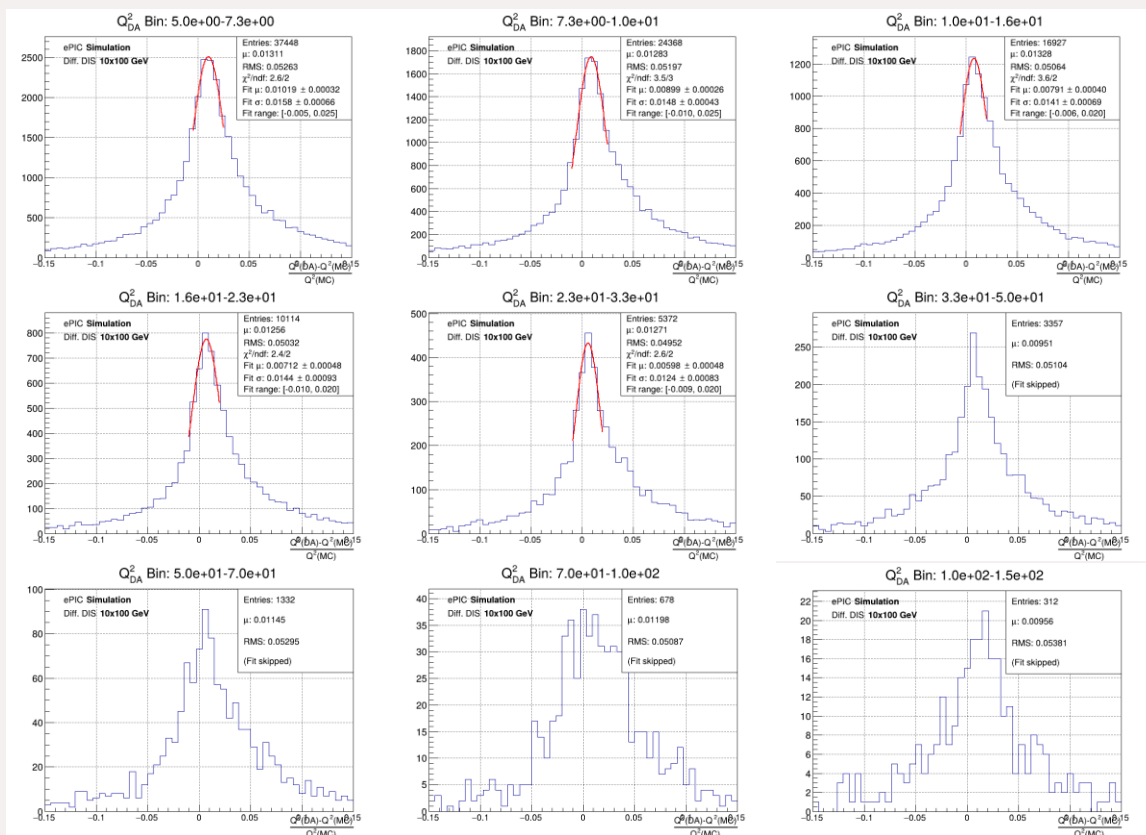
5 – Resolution vs Kinematics

- Q^2 binned resolutions : Electron Method
- **Blue:** Gaussian fit;
- **Black:** Average and std deviation from histo



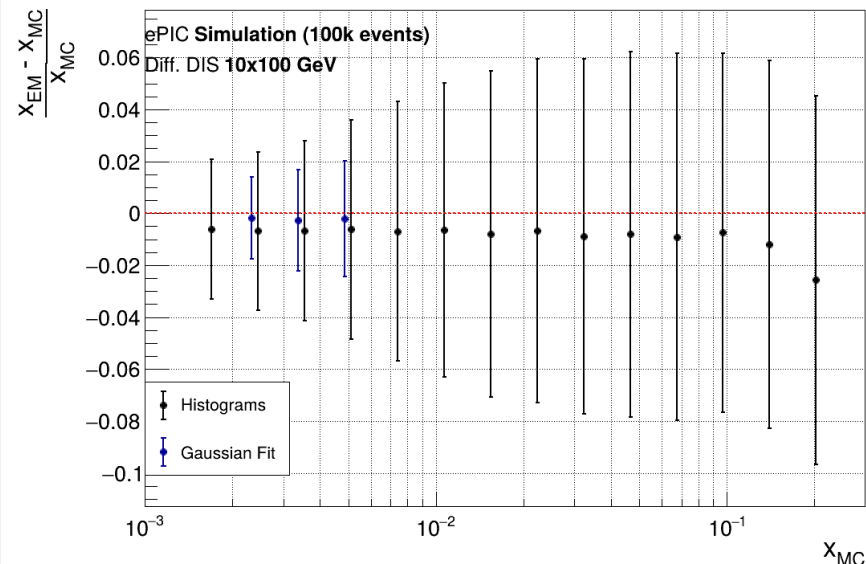
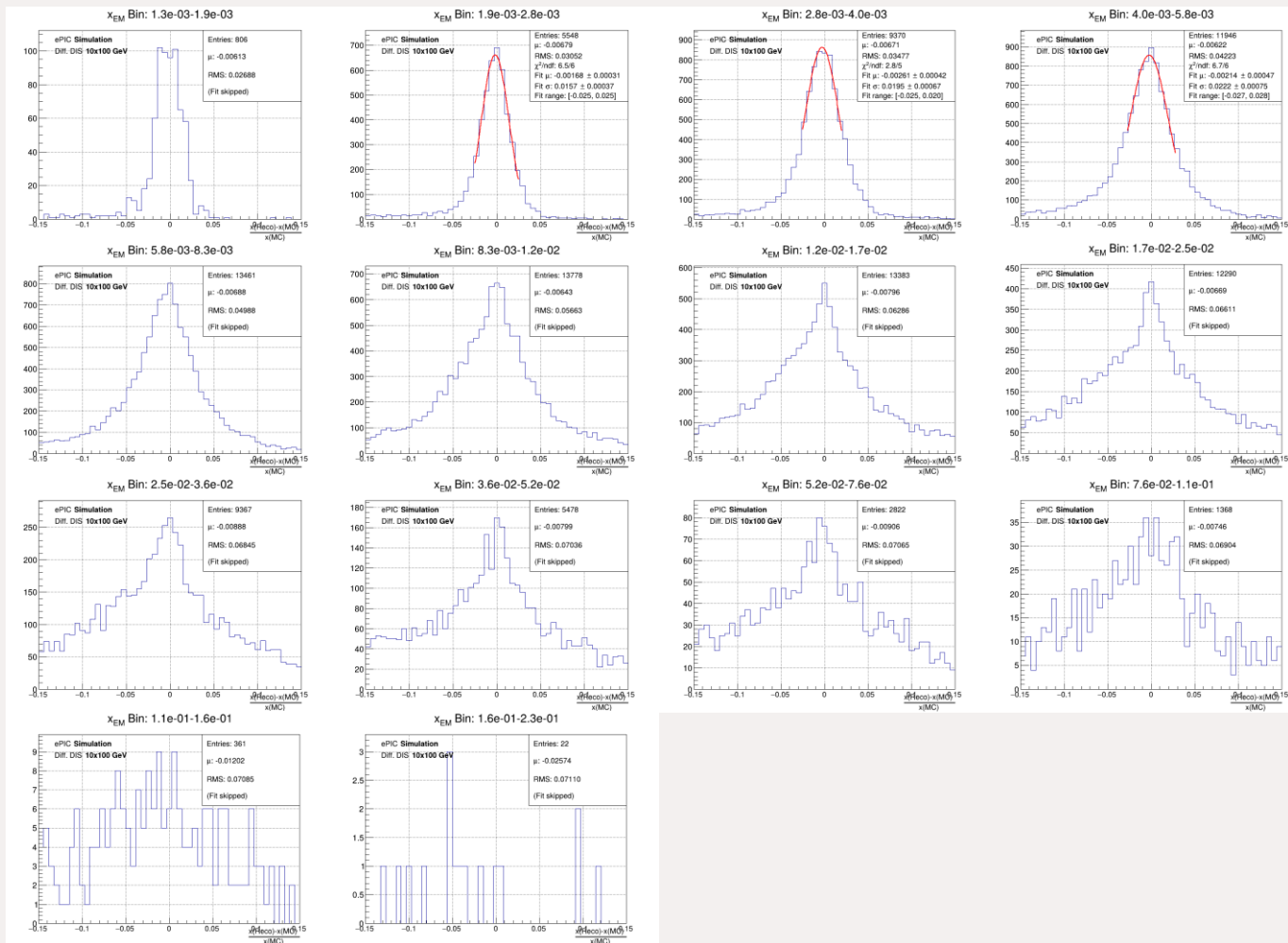
5 – Resolution vs Kinematics

- Q^2 binned resolutions : DA method
- **Blue:** Gaussian fit;
- **Black:** Average and std deviation from histo



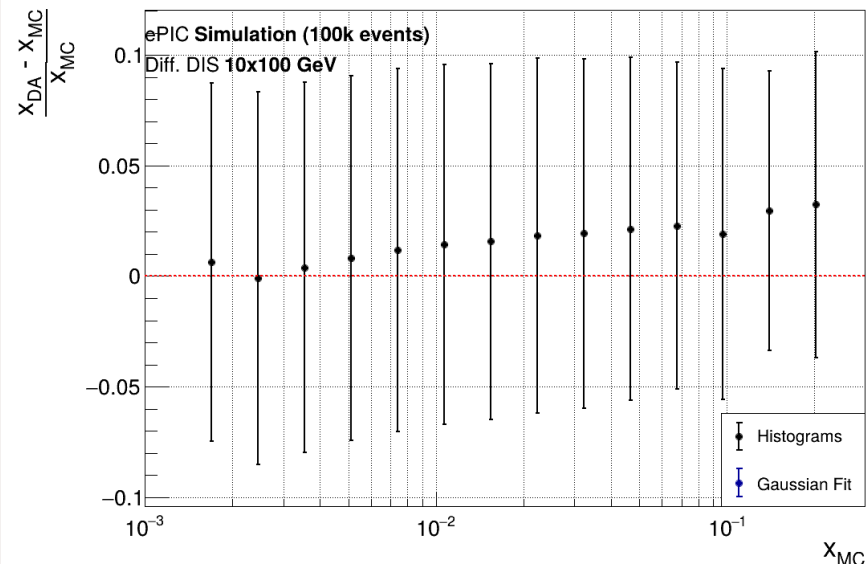
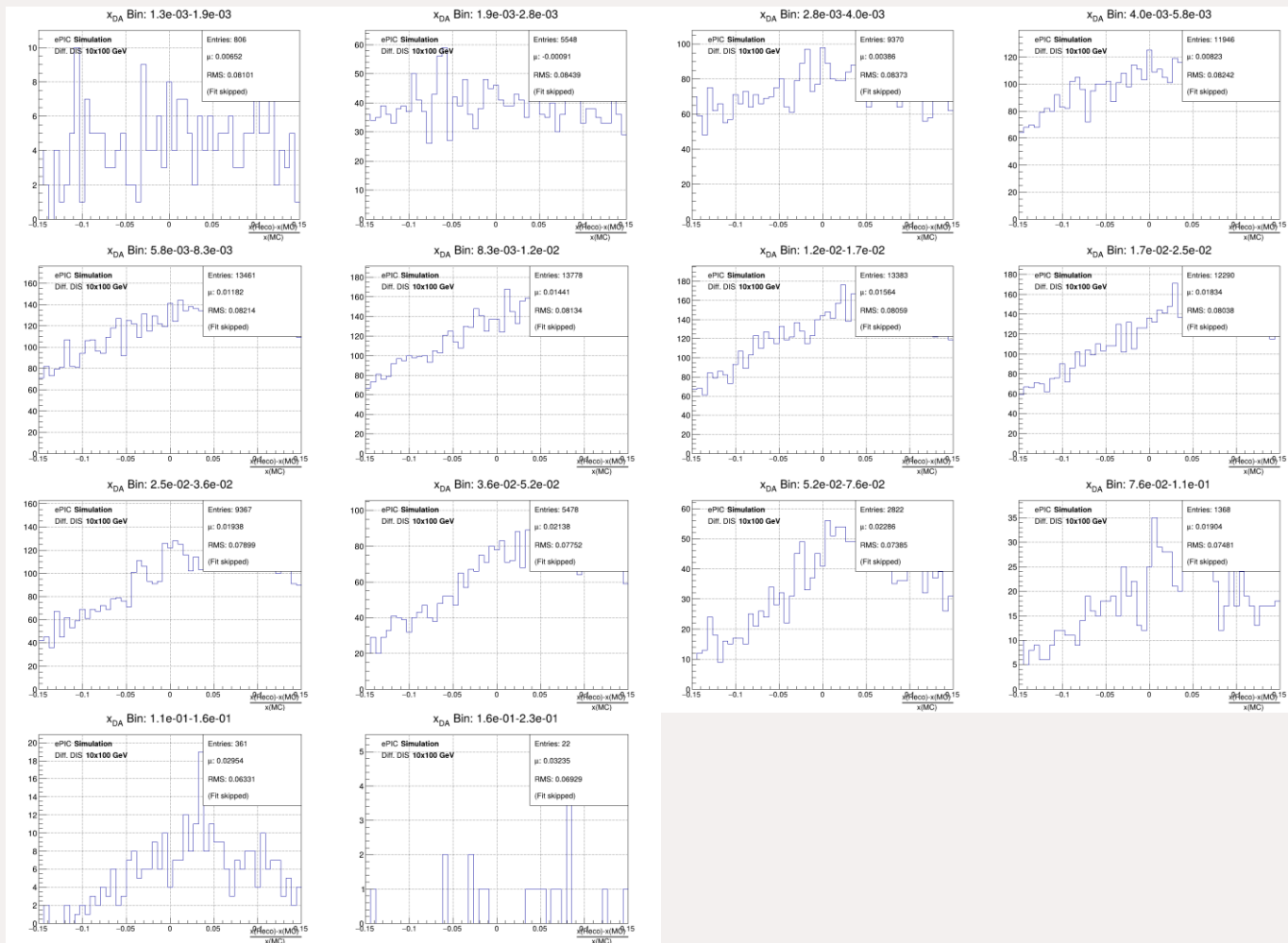
5 - Resolution vs Kinematics

- x_B binned resolutions : Electron method
- **Blue**: Gaussian fit; **Black**: Average and std deviation from histo



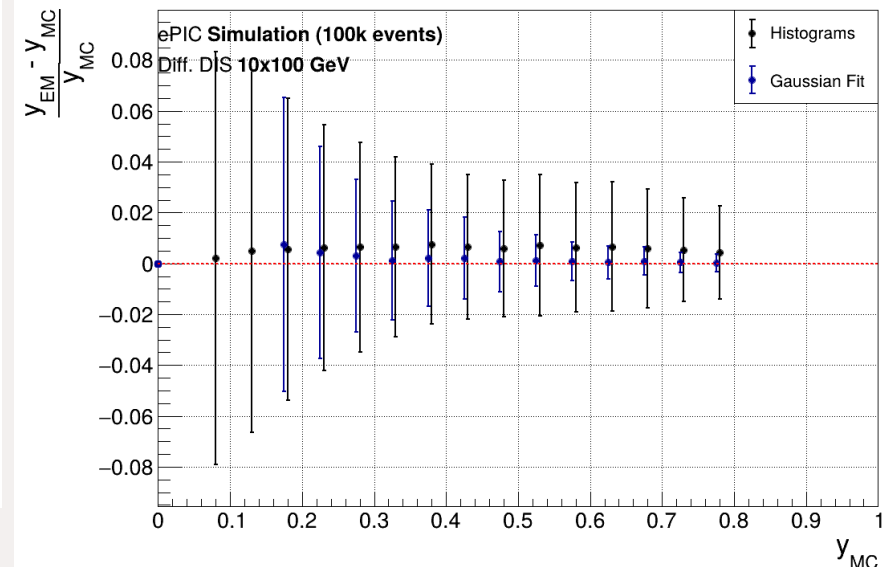
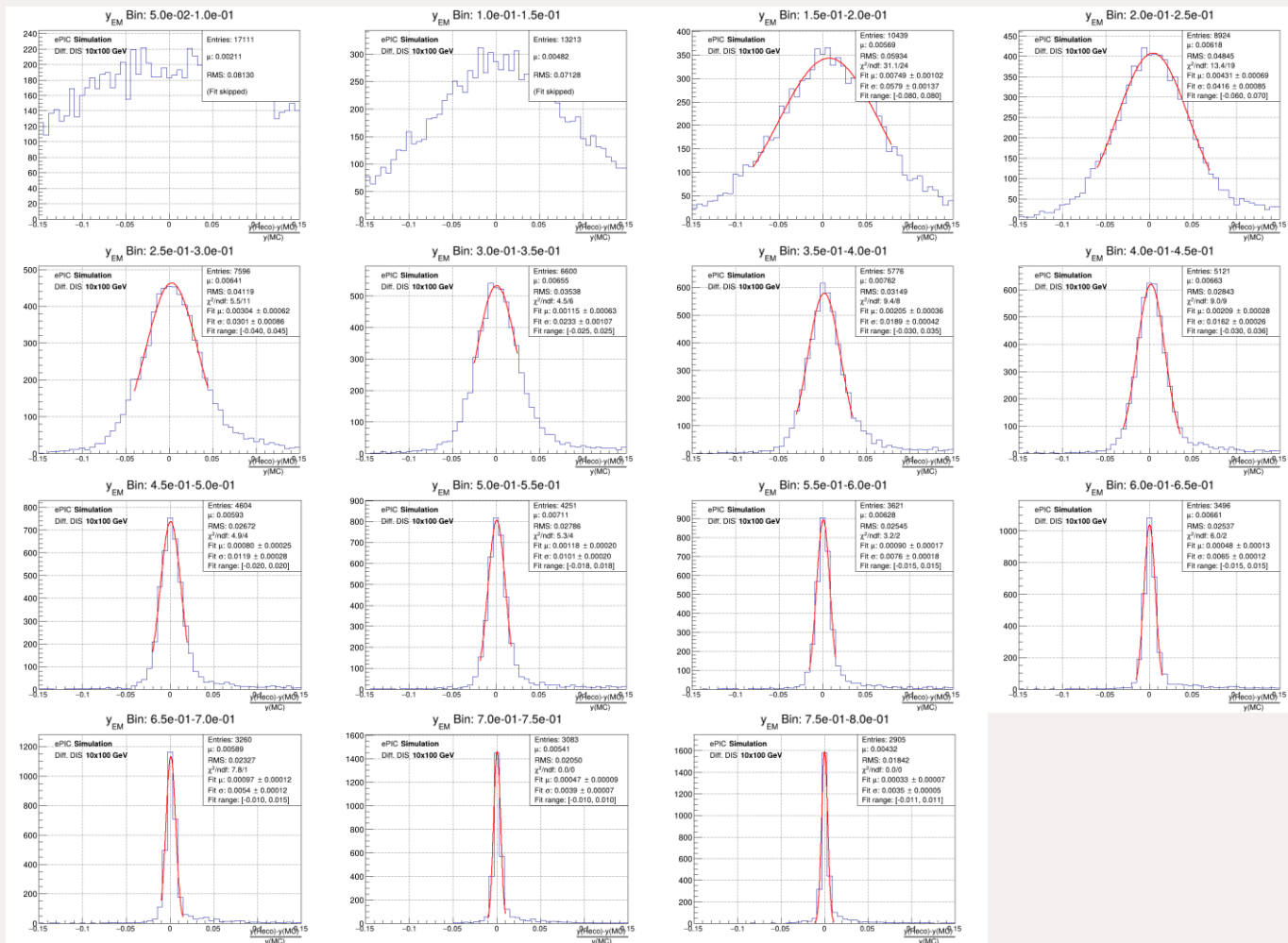
5 – Resolution vs Kinematics

- x_B binned resolutions : DA method
- **Blue**: Gaussian fit; **Black**: Average and std deviation from histo



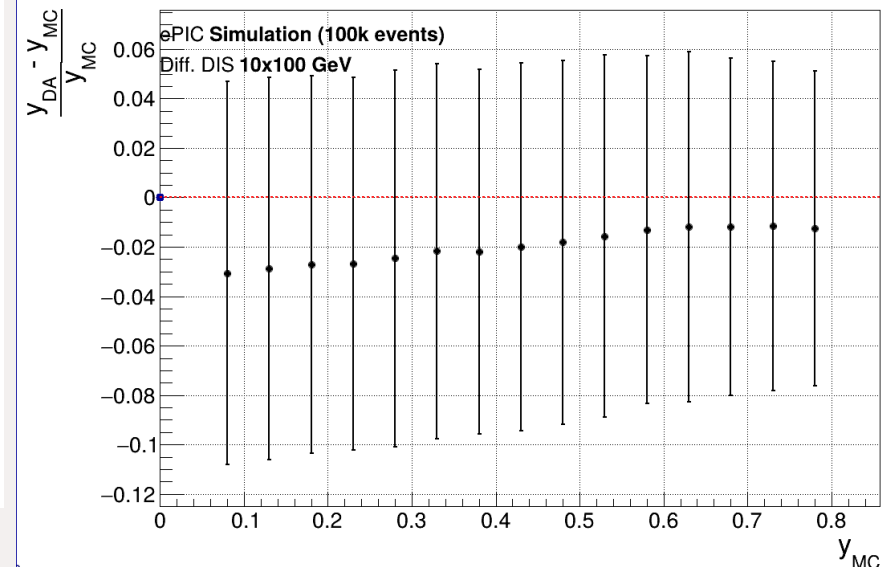
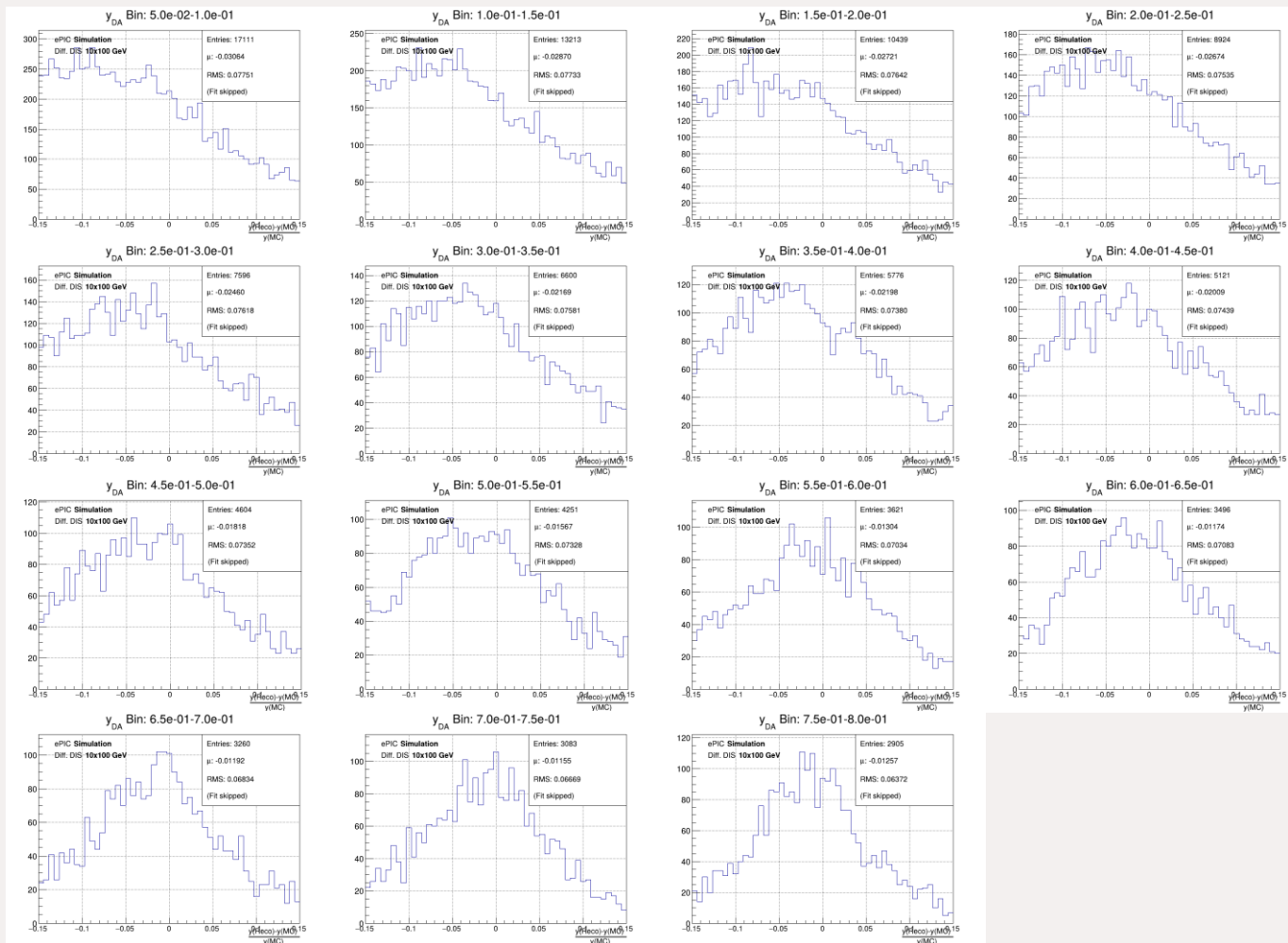
5 - Resolution vs Kinematics

- γ binned resolutions : Electron method
- **Blue**: Gaussian fit; **Black**: Average and std deviation from histo



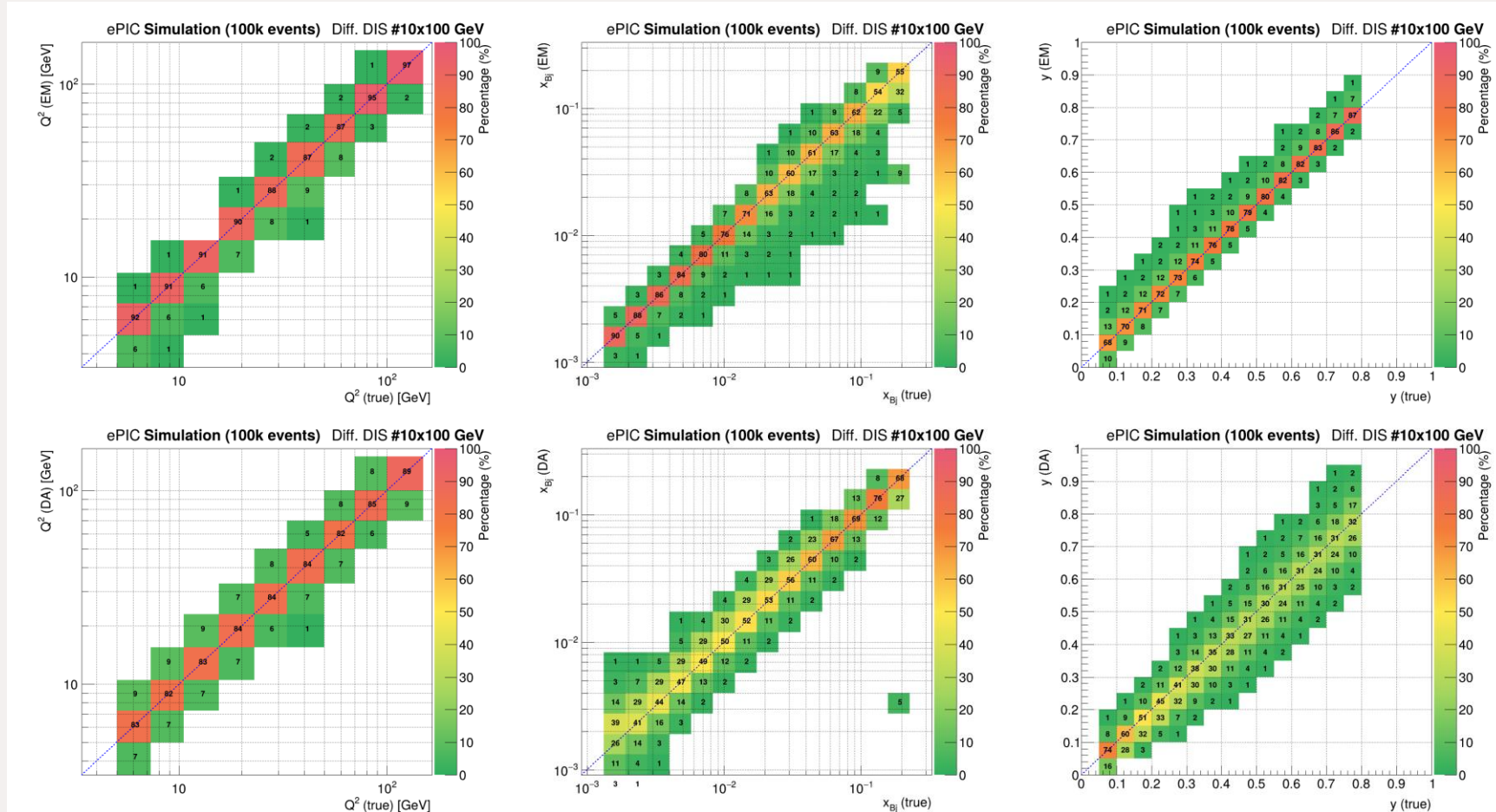
5 - Resolution vs Kinematics

- y binned resolutions : DA method
- **Blue:** Gaussian fit; **Black:** Average and std deviation from histo



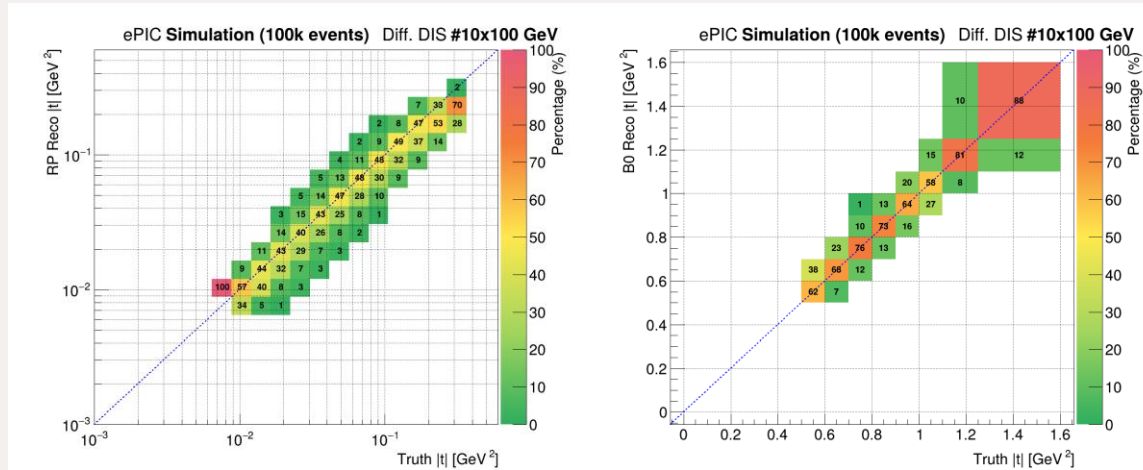
6 – Response matrices

- response matrix plots showing full 2D truth-reco correlations, bin migration effects, and reconstruction patterns



6 – Response matrices

- response matrix plots showing full 2D truth-reco correlations, bin migration effects, and reconstruction patterns



Outlook – Next Steps

- Study E-pz distributions and correlations
- Define, apply and study preliminary event selection cuts
- Begin work on triple differential reduced cross section

Simulation Campaign Request

- Generator validation successful – no issues observed with **RAPGAP**
- Requested samples: **RAPGAP** version: **v3.310**
- **10×130 GeV** Diffractive inclusive events with & without QED radiation (**Priority** – Early Science Study)
 - Target statistics: Considering a luminosity of $10\text{fb}^{-1} = 10^7\text{nb}^{-1}$, this corresponds to a number of events of: $4.22(\text{nb}) \times 10^7(\text{nb}^{-1}) \simeq 4.2 \times 10^7$ events
 - Original target: 42M events for full statistics → **Optimized**: Factor 10 reduction with statistical error rescaling
 - 4M events with radiative effects (pseudodata)
 - 4M events without radiative effects for study of rad corrections (also used MC for acceptance/efficiency)
 - Total: 8M events
- **18×275 GeV** (Saturation Studies) Diffractive inclusive events (with/without QED radiation)
 - Cross section: $\sigma \approx 7.38 \text{ nb}$
 - Request: 7.5M events with radiative effects (pseudodata)
 - Request: 7.5M events without radiative effects
 - Total: 15M events



THANK YOU

For Your Attention and Collaboration