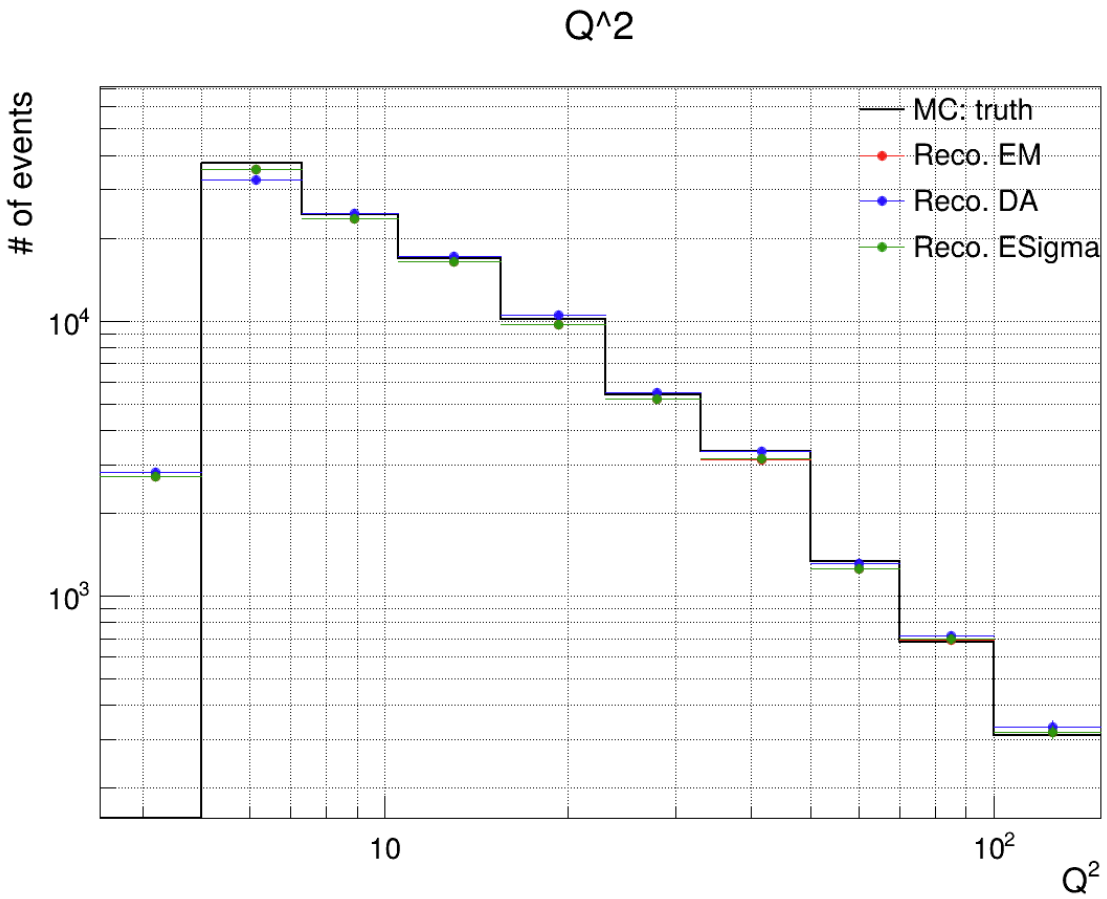
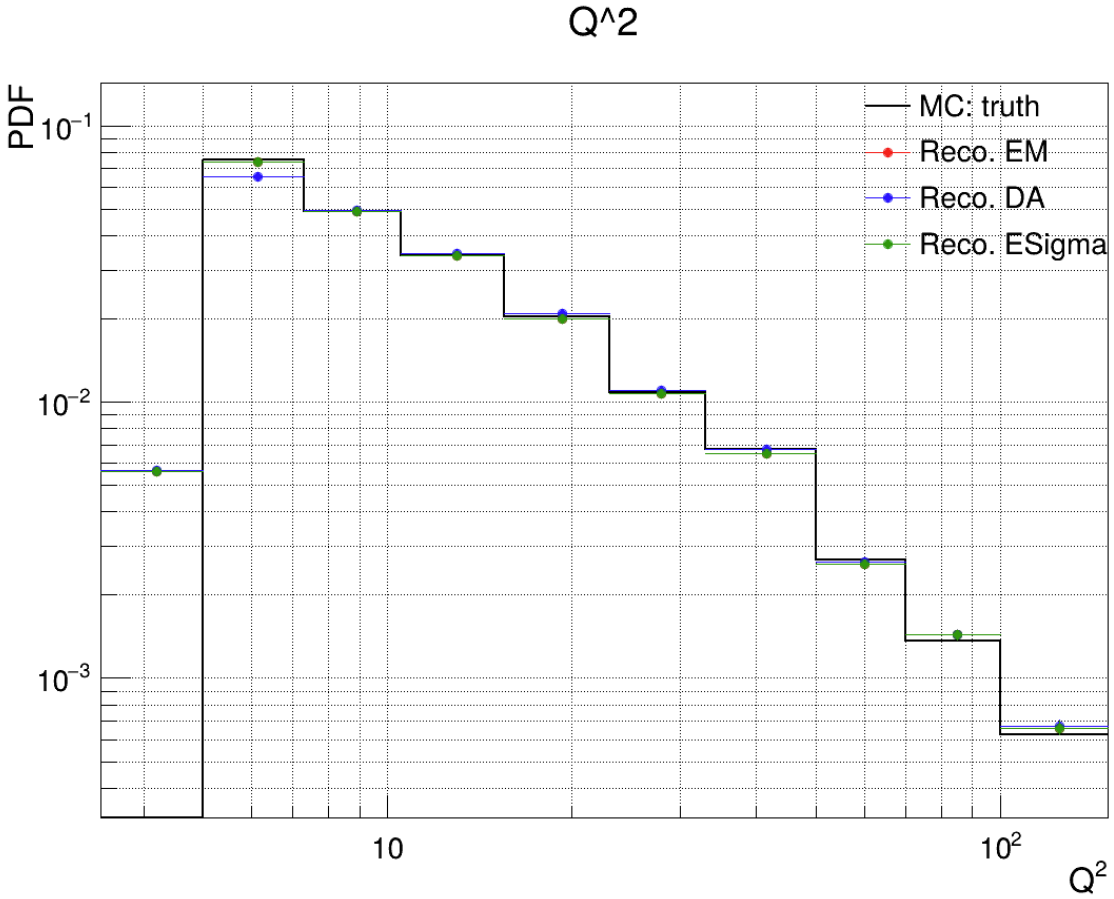
DPDF Meetings

Oct. 7th

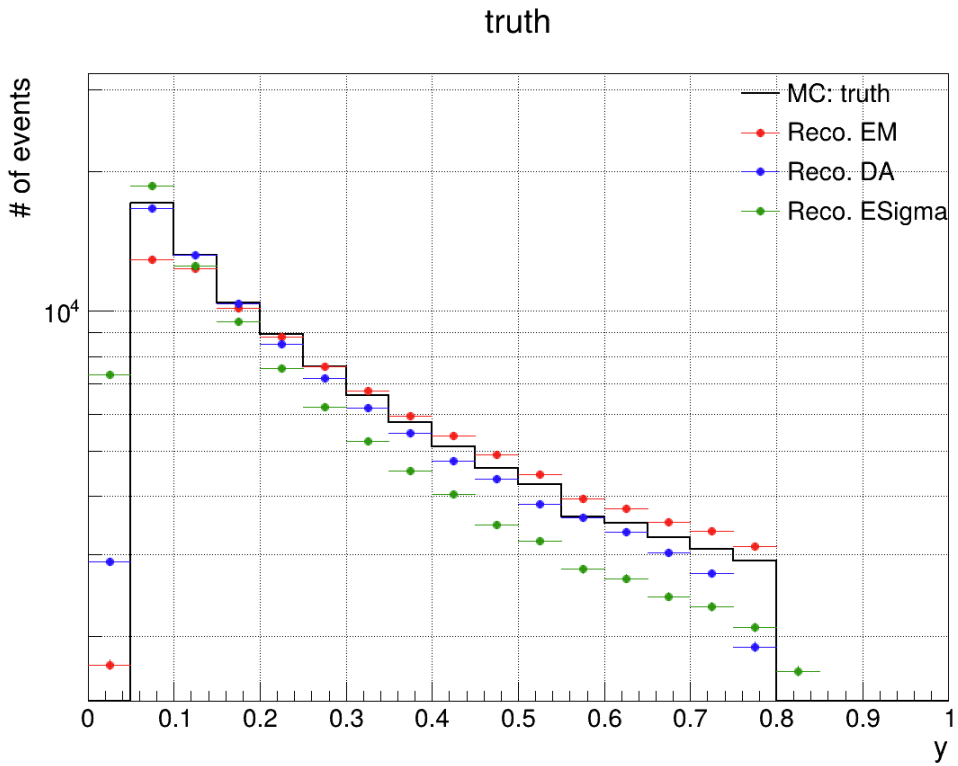
Hadi Hashamipour

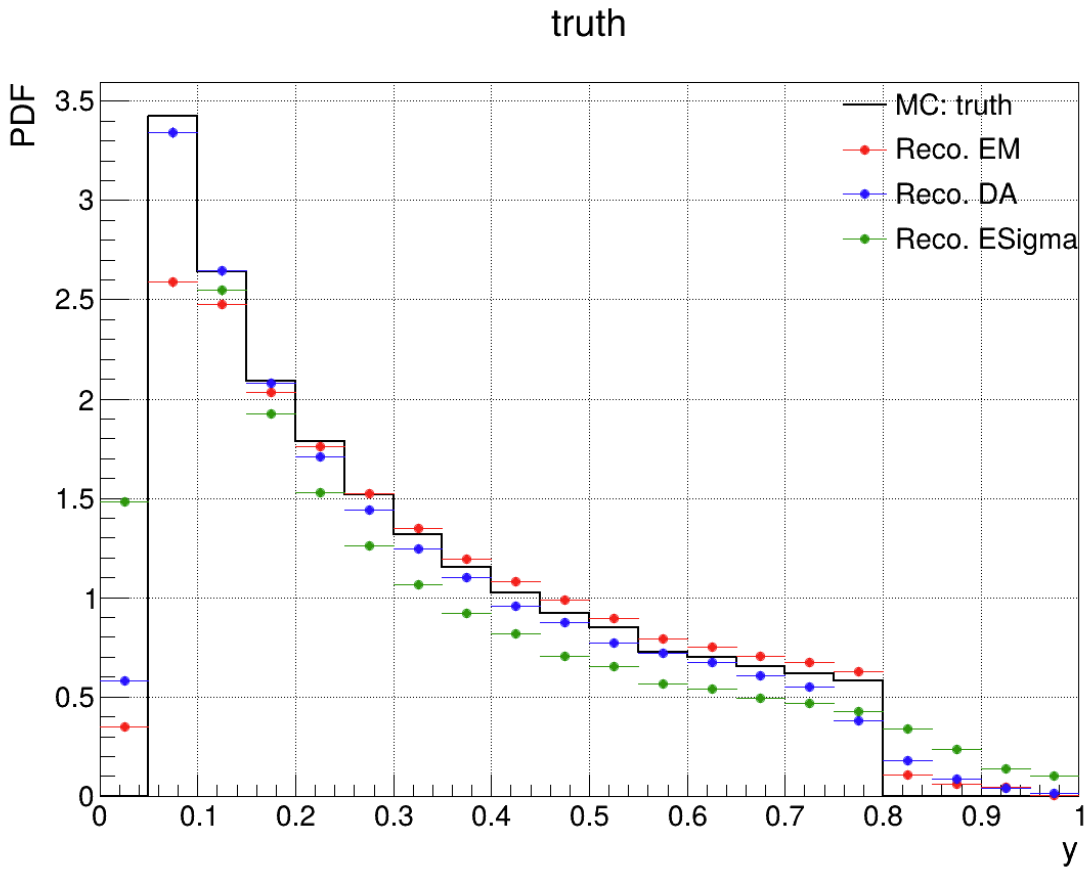
10x100 100K Inclusive



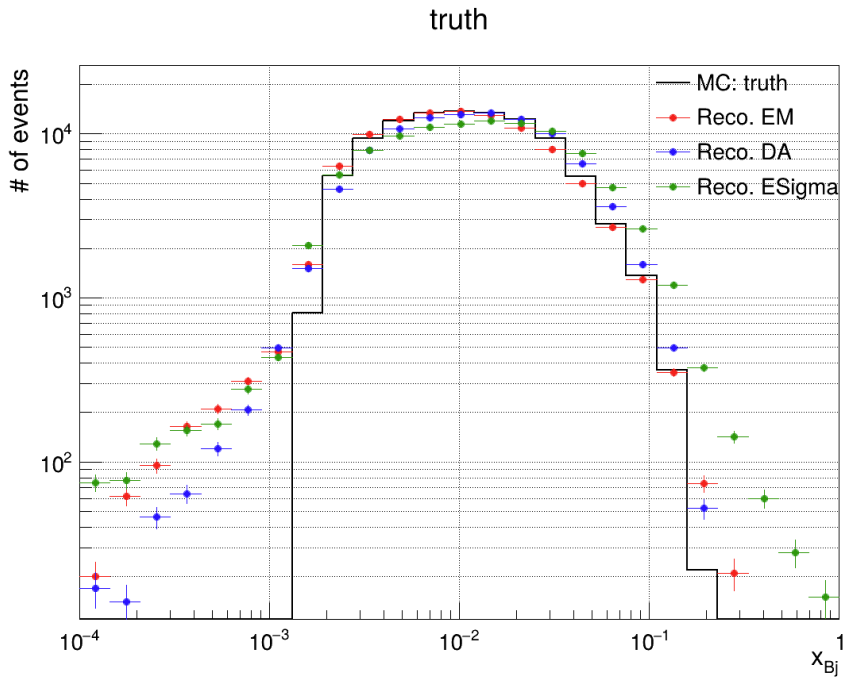


inelasticity





x_Bj


truth
# of events
MC: truth
Reco. EM
Reco. DA
Reco. ESigma
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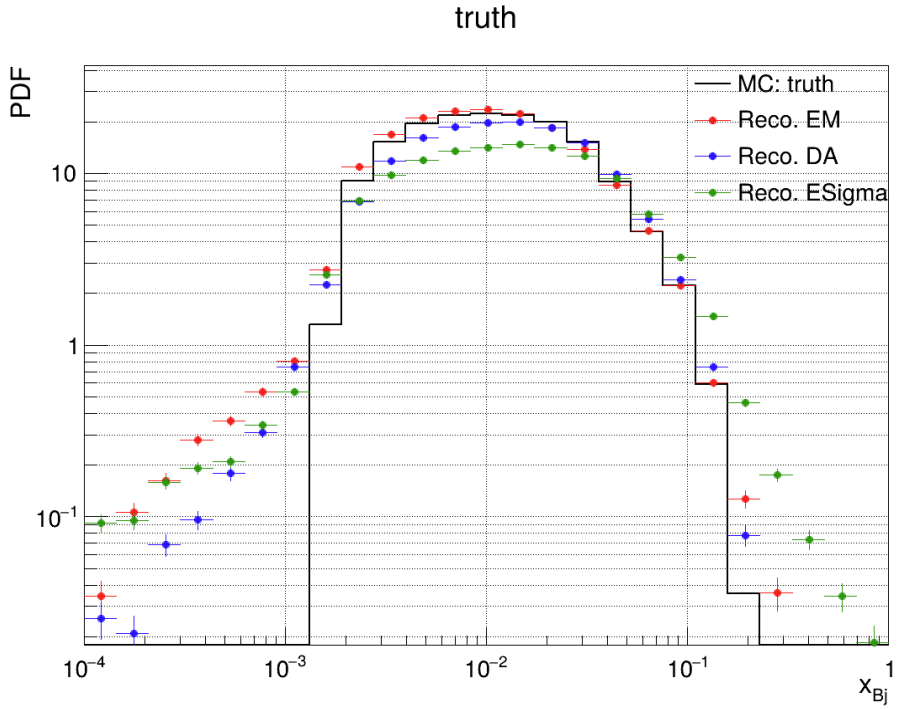
10^3
10^2
10^{-4}
10^{-3}
10^{-2}
10^{-1}
1
x_{Bj}


truth
PDF
MC: truth
Reco. EM
Reco. DA
Reco. ESigma
10
1
10^{-1}
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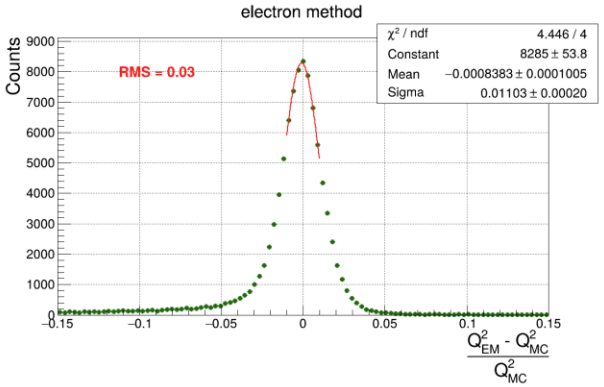
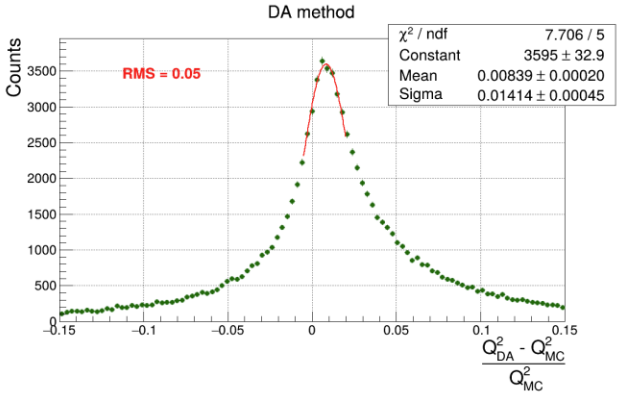
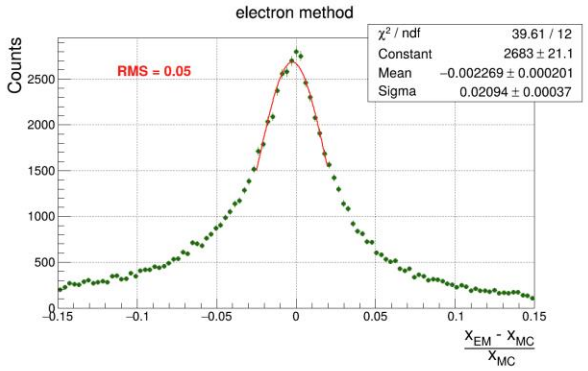
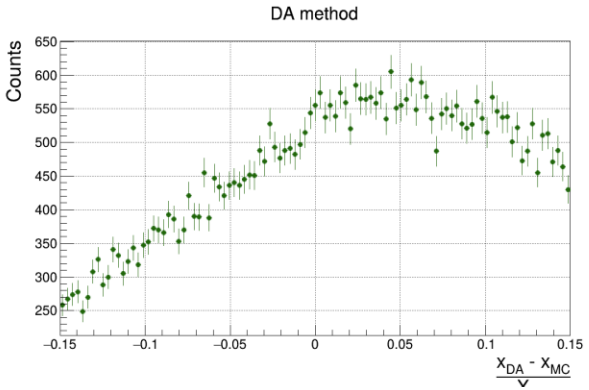
10^{-3}
10^{-2}
10^{-1}
1
x_{Bj}

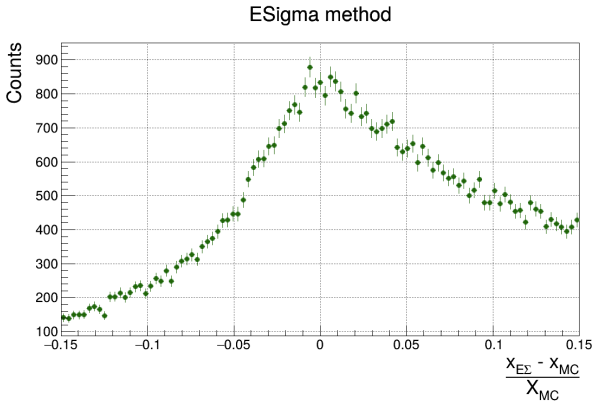
Overall resolution

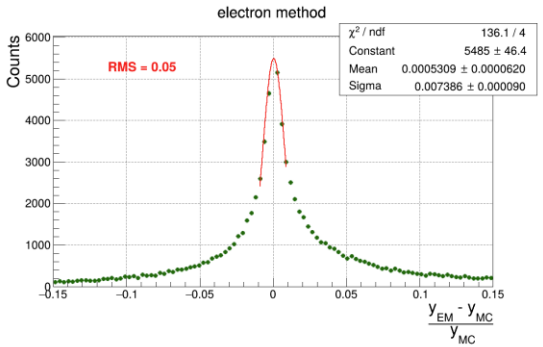


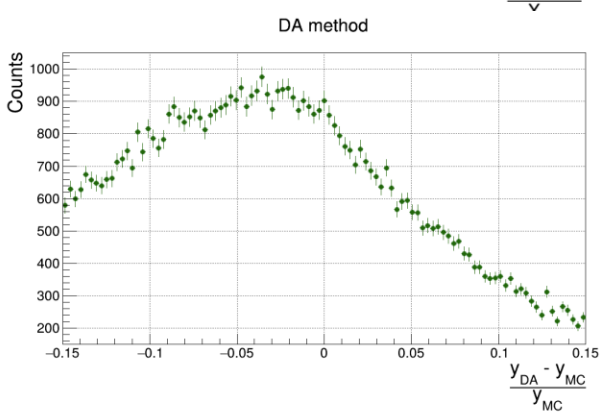


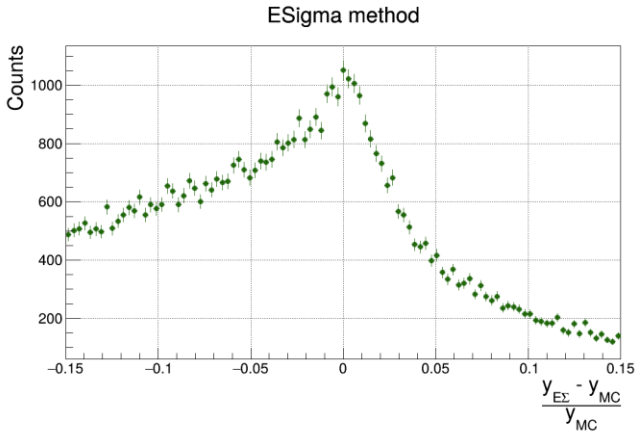








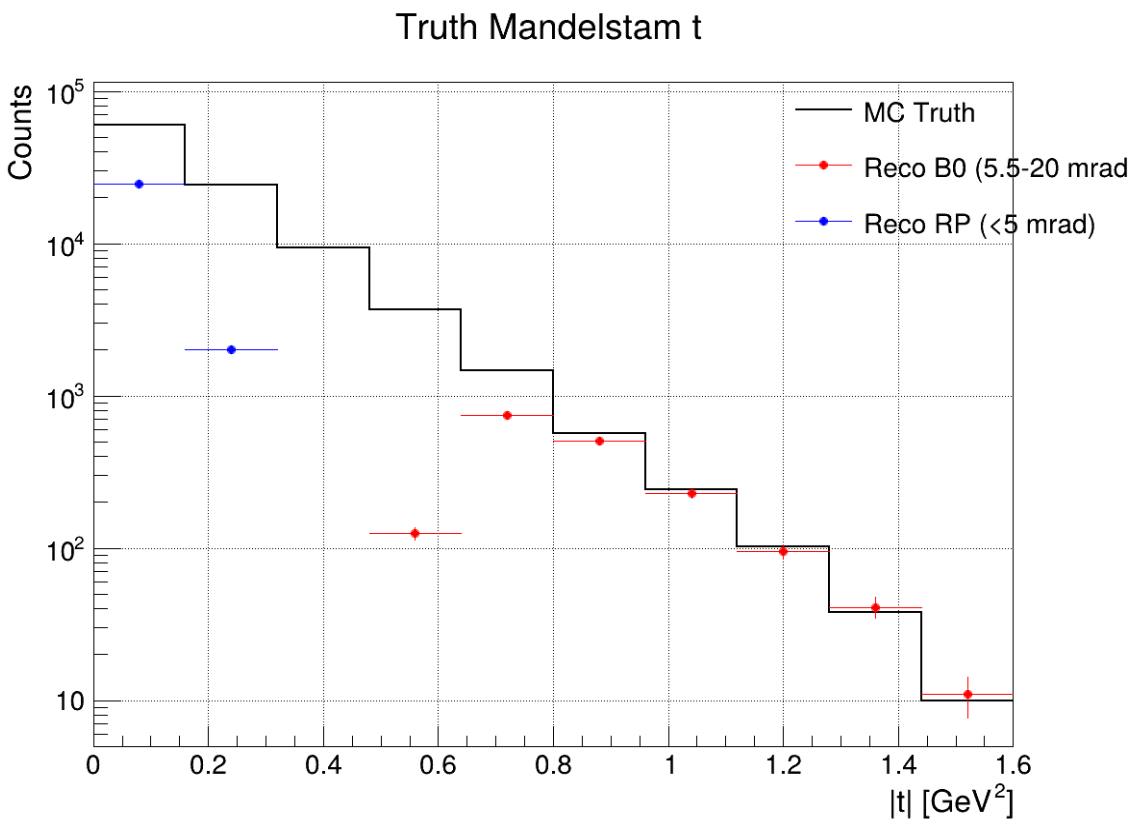


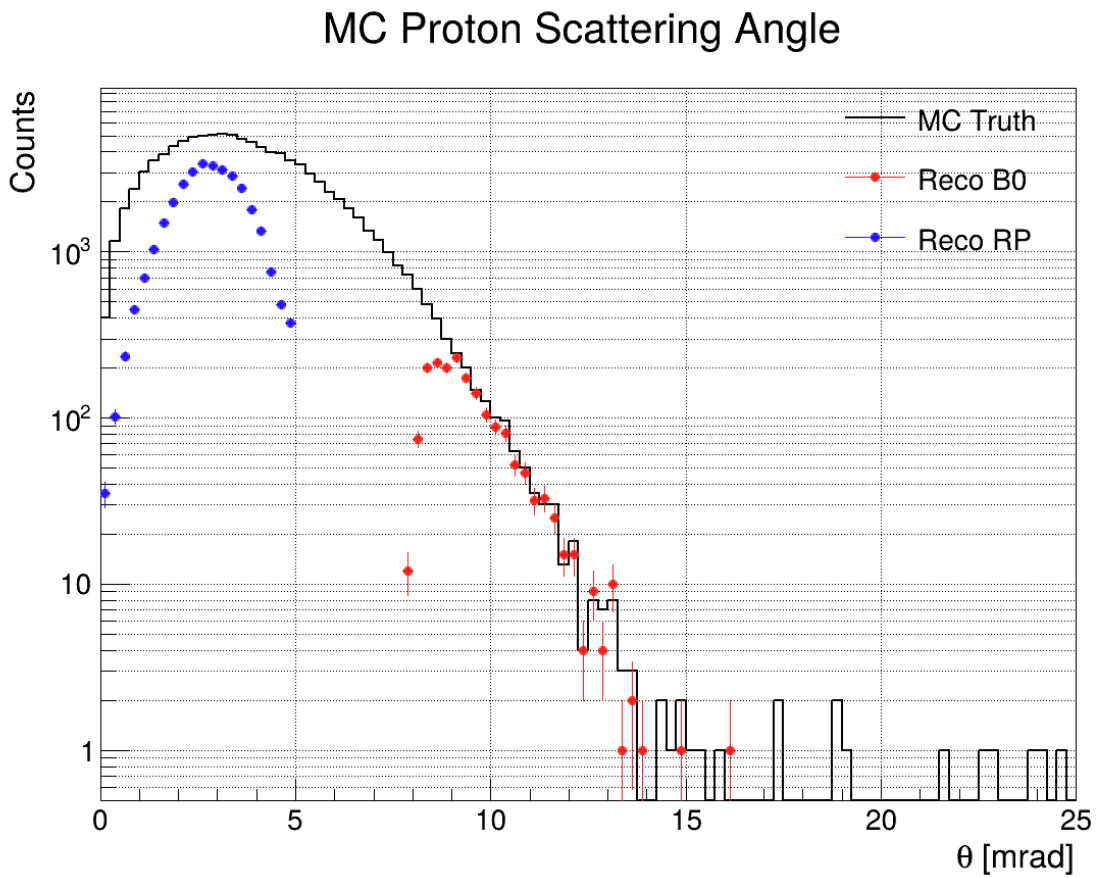


tReco convention

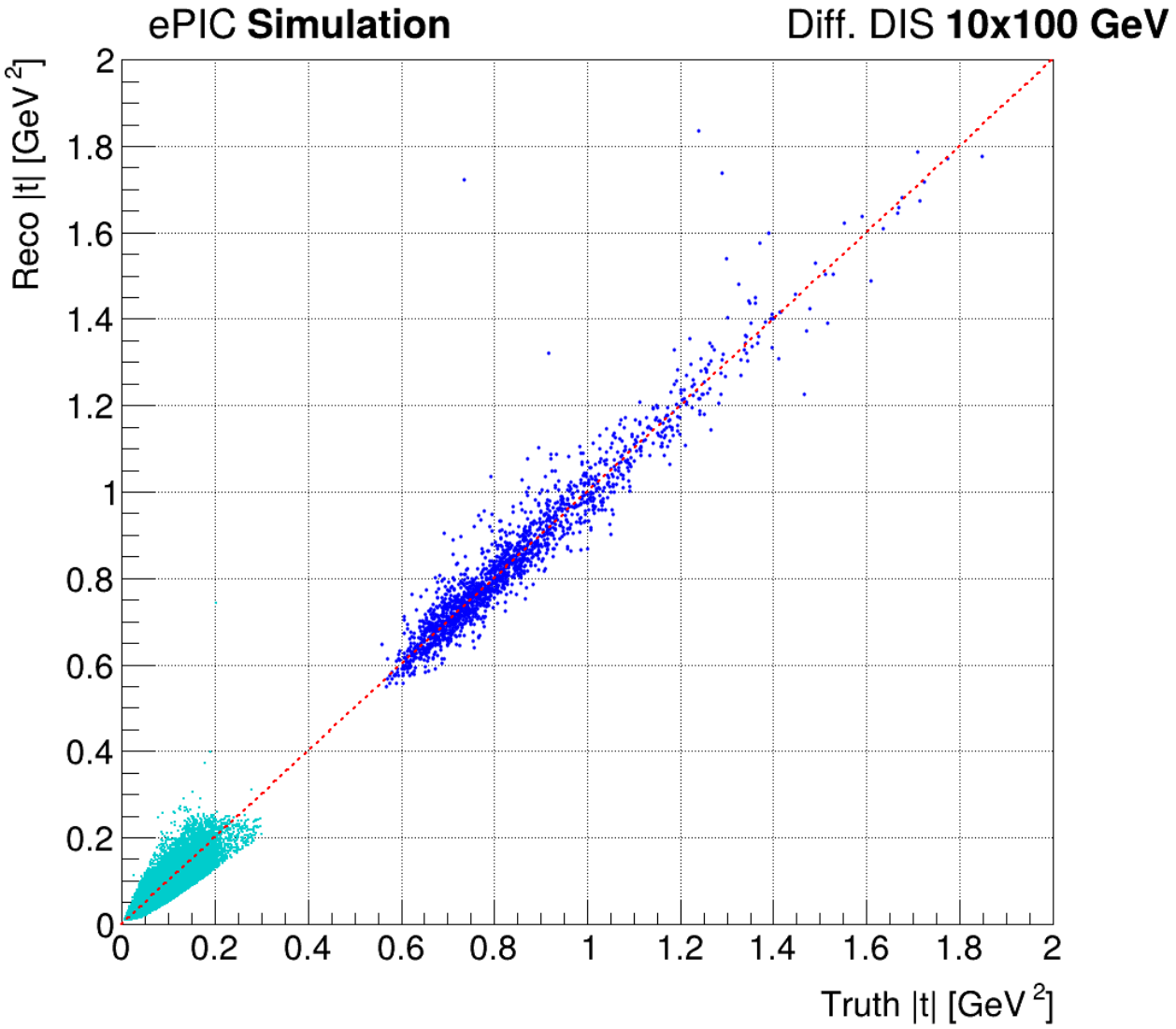
Class name	Observables used	Example(s)
BABE	p^μ_{BA}, p^μ_{BE}	$-t = (p^\mu_{\mathrm{BA}} - p^\mu_{\mathrm{BE}})^2$ or $t = \lvert\vec{p}^{\,\mathrm{T}}_{\mathrm{BA}}\rvert^2$
eX	$p^\mu_{\gamma^*}$, p^μ_{X}	$-t = (p^\mu_{\gamma^*} - p^\mu_{\mathrm{X}})^2$ or $t = \lvert\vec{p}^{\,\mathrm{T}}_{\mathrm{X}} + \vec{p}^{\,\mathrm{T}}_{e'}\rvert^2$
eXBA	$p^\mu_{\gamma^*}$, p^μ_{X}, p^μ_{BA}	$-t = (p^\mu_{\mathrm{corr}} - p^\mu_{\mathrm{X}})^2$
		$p^\mu_{\mathrm{corr}} = (\frac{\Sigma_{\mathrm{XBA}}}{2} - \frac{E_{e'}}{2}(1+\cos\theta_{e'}), p^\mu_{\gamma^*}[1], p^\mu_{\gamma^*}[2], -\frac{\Sigma_{\mathrm{XBA}}}{2} - \frac{E_{e'}}{2}(1+\cos\theta_{e'}))$
		$\Sigma_{\mathrm{XBA}} := (E_{\mathrm{X}} - p^z_{\mathrm{X}}) + (E_{\mathrm{BA}} - p^z_{\mathrm{BA}})$
eXBE	$p^\mu_{\gamma^*}$, p^μ_{X}, p^μ_{BE}	$-t = (p^\mu_{\mathrm{corr}} - p^\mu_{\mathrm{BE}})^2$ or $t = \lvert\vec{p}^{\,\mathrm{T}}_{\mathrm{miss}}\rvert^2$
		$p^\mu_{\mathrm{corr}} = \left[\sqrt{\lvert\vec{p}_{\mathrm{miss}}\rvert^2 + m^2_{\mathrm{BA}}}, \lvert\vec{p}_{\mathrm{miss}}\rvert\hat{n}(\theta_{\mathrm{miss}}, \phi_{\mathrm{miss}})\right]$
		$p^\mu_{\mathrm{miss}} = p^\mu_{\gamma^*} + p^\mu_{\mathrm{BE}} - p^\mu_{\mathrm{X}} = [E_{\mathrm{miss}}, \lvert\vec{p}_{\mathrm{miss}}\rvert\hat{n}(\theta_{\mathrm{miss}}, \phi_{\mathrm{miss}})]$
eBABE	$p^\mu_{\gamma^*}$, p^μ_{BA}, p^μ_{BE}	$-t = (p^\mu_{\mathrm{corr}} - p^\mu_{\mathrm{BE}})^2$
		$p^\mu_{\mathrm{corr}} = (p^\mu_{\mathrm{BA}}[0], -p^\mu_{\gamma^*}[1], -p^\mu_{\gamma^*}[2], p^\mu_{\mathrm{BA}}[3])$
XBABE	p^μ_{X}, p^μ_{BA}, p^μ_{BE}	$-t = (p^\mu_{\mathrm{corr}} - p^\mu_{\mathrm{BE}})^2$
		$p^\mu_{\mathrm{corr}} = (p^\mu_{\mathrm{BA}}[0], -p^\mu_{\mathrm{X}}[1], -p^\mu_{\mathrm{X}}[2], p^\mu_{\mathrm{BA}}[3])$
eXBABE	$p^\mu_{\gamma^*}$, p^μ_{X}, p^μ_{BA}, p^μ_{BE}	$-t = (p^\mu_{\mathrm{corr}} - p^\mu_{\mathrm{BE}})^2$
		$p^\mu_{\mathrm{corr}} = \left[\sqrt{\lvert\vec{p}_{\mathrm{miss}}\rvert^2 + m^2_{\mathrm{BA}}}, \lvert\vec{p}_{\mathrm{miss}}\rvert\hat{n}(\theta_{\mathrm{BA}}, \phi_{\mathrm{BA}})\right]$
		$p^\mu_{\mathrm{miss}} = p^\mu_{\gamma^*} + p^\mu_{\mathrm{BE}} - p^\mu_{\mathrm{X}} = [E_{\mathrm{miss}}, \lvert\vec{p}_{\mathrm{miss}}\rvert\hat{n}(\theta_{\mathrm{miss}}, \phi_{\mathrm{miss}})]$

Mandelstam 't' - BABE Method

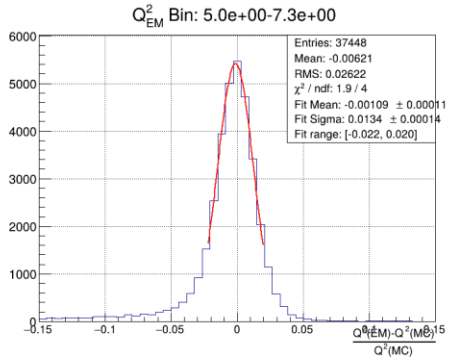


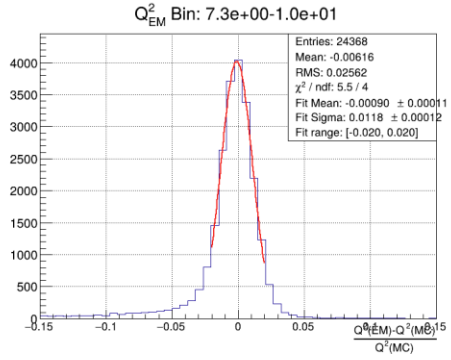


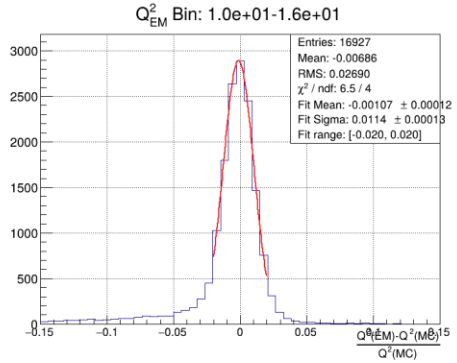
't' correlation plot
cyan = RP
blue = B0

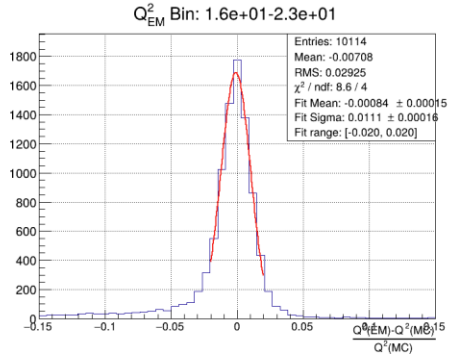


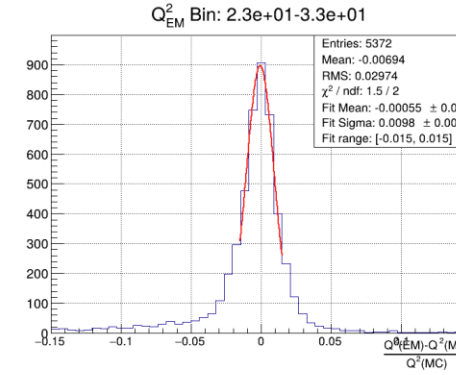
Resolution plots – Electron Method

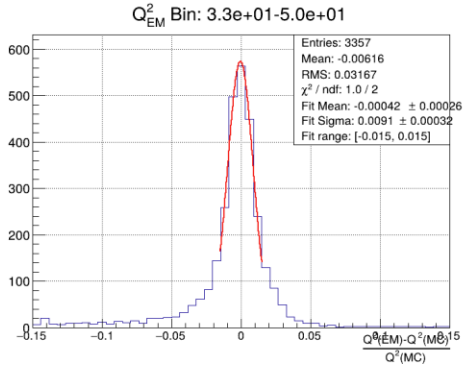


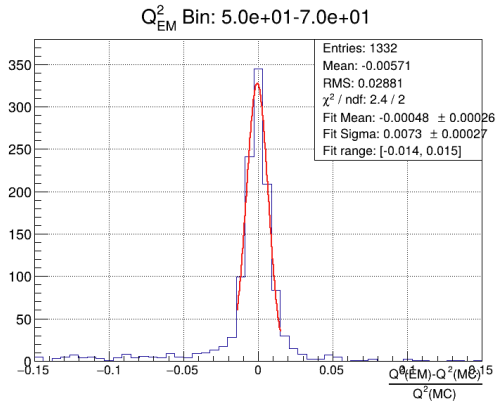


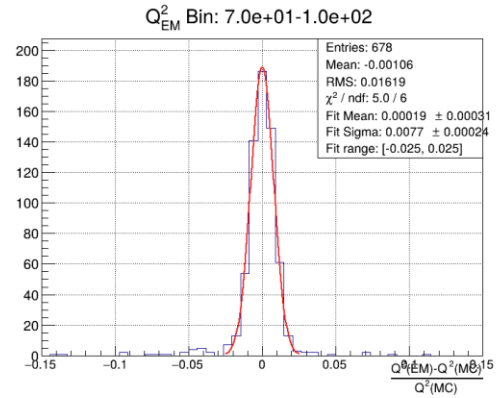


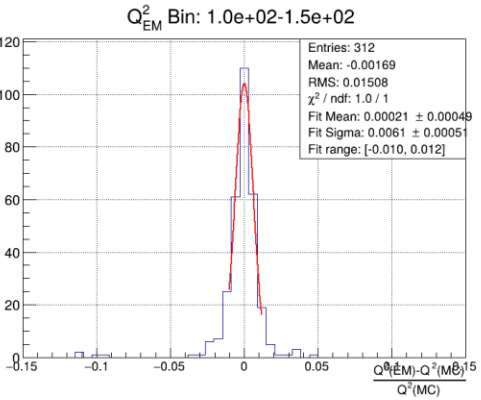




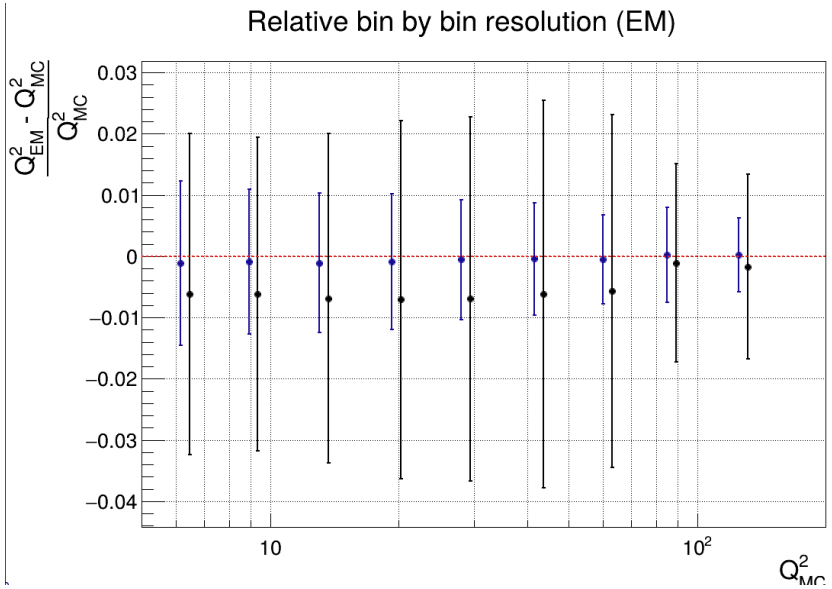




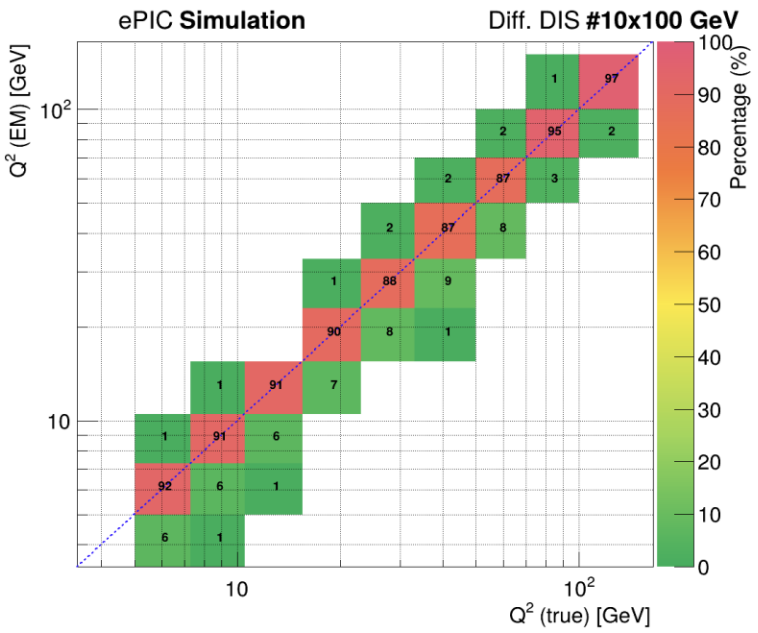


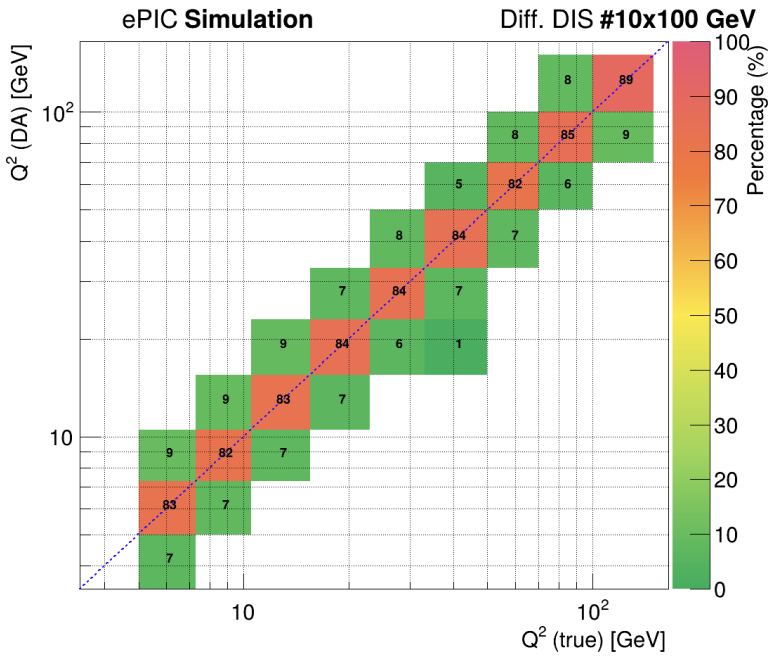


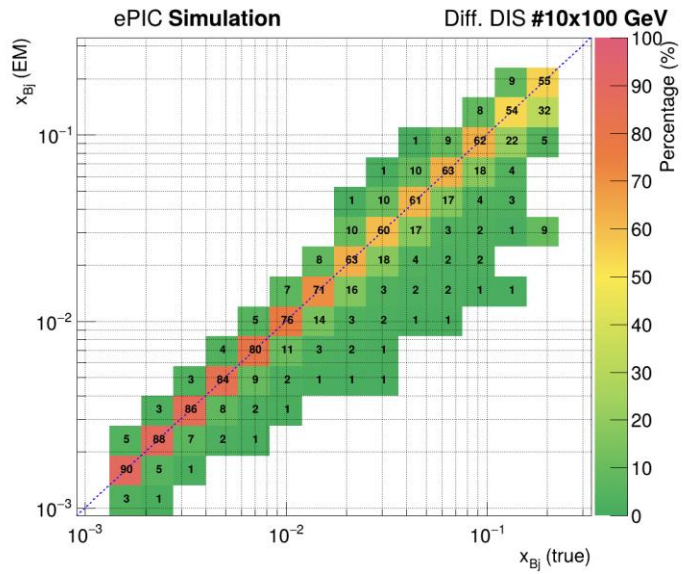
Resolution plots EM

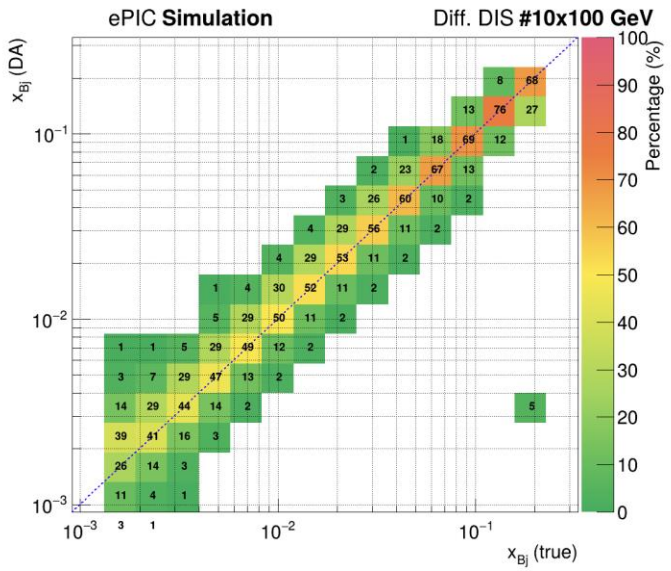


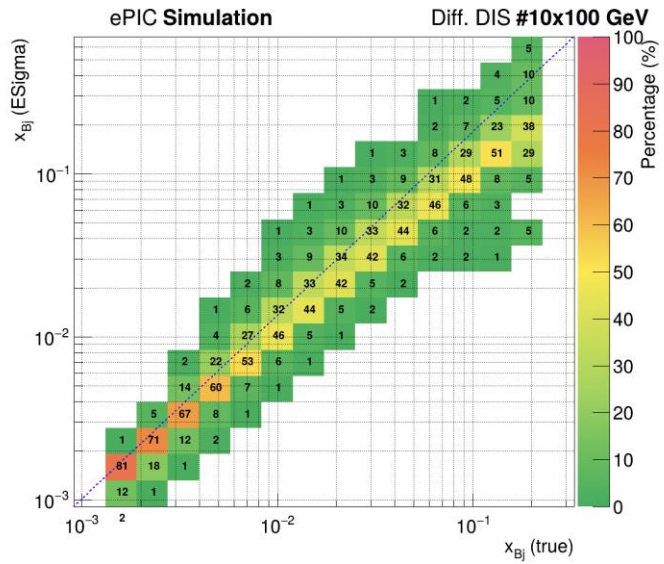
Response Matrices



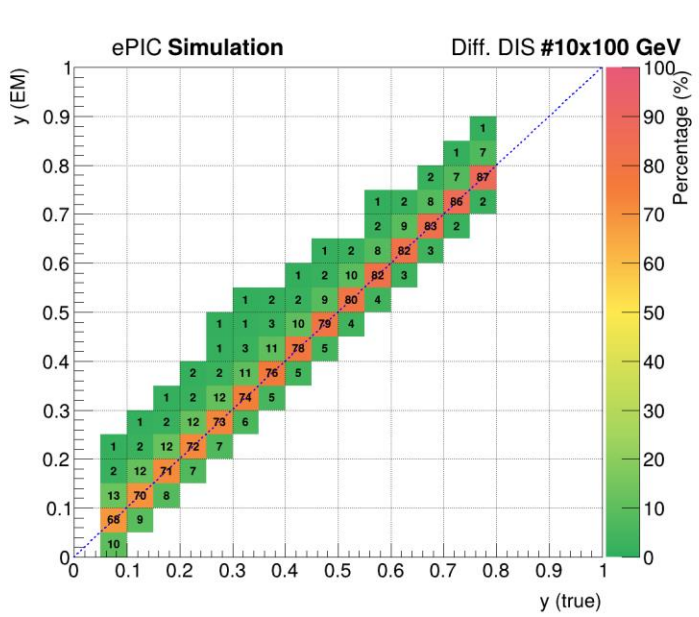


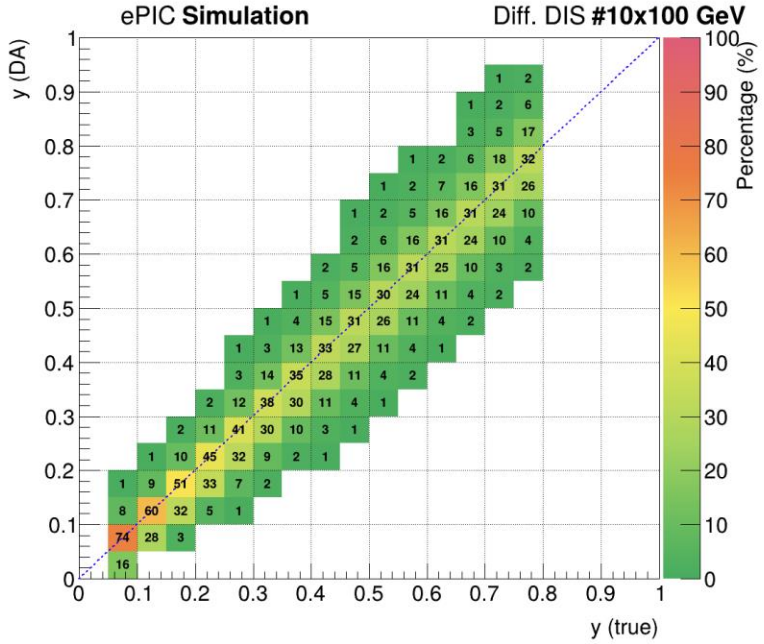


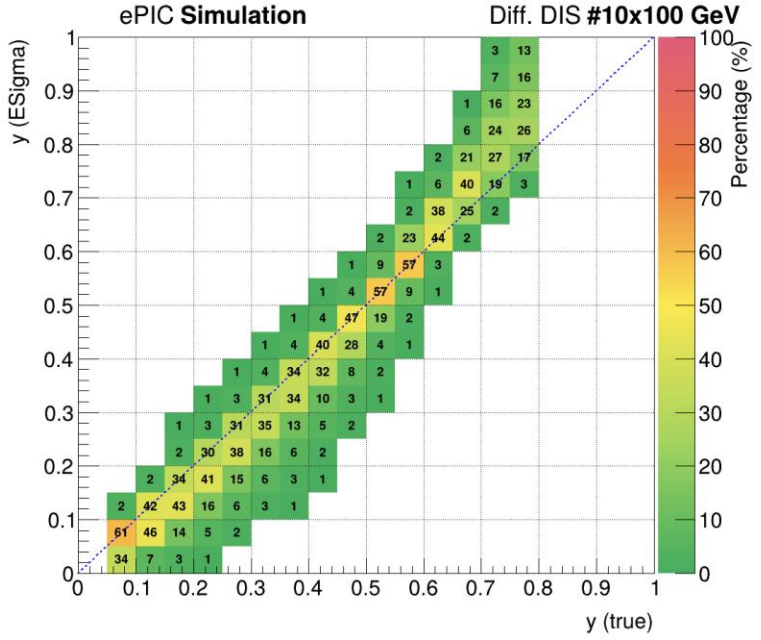




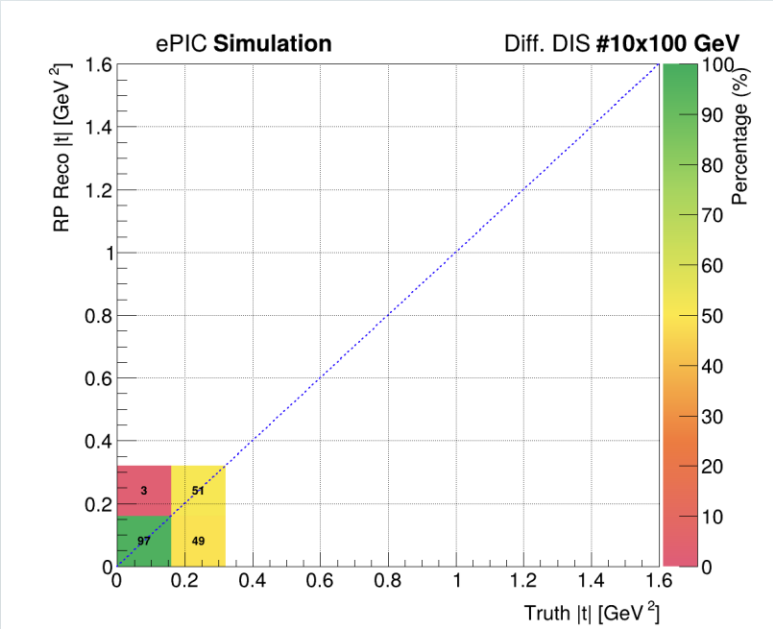
Response Matrices - 2

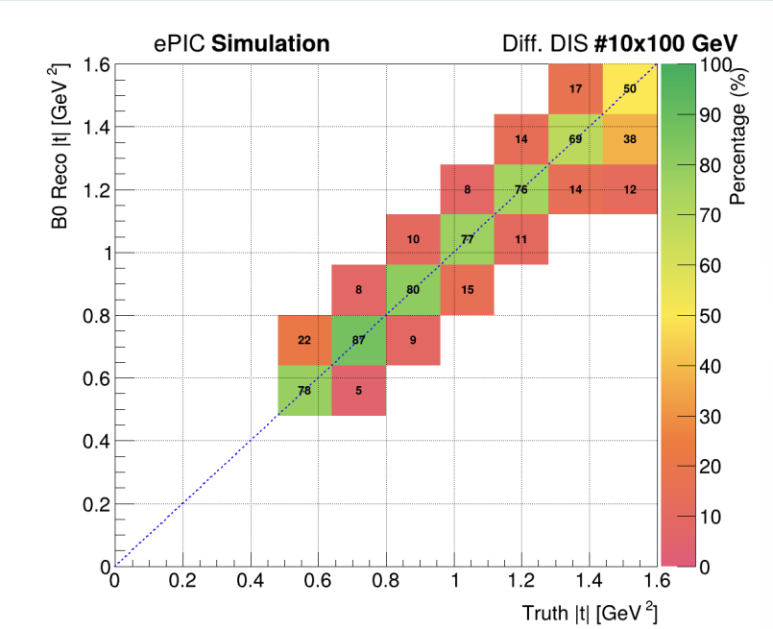


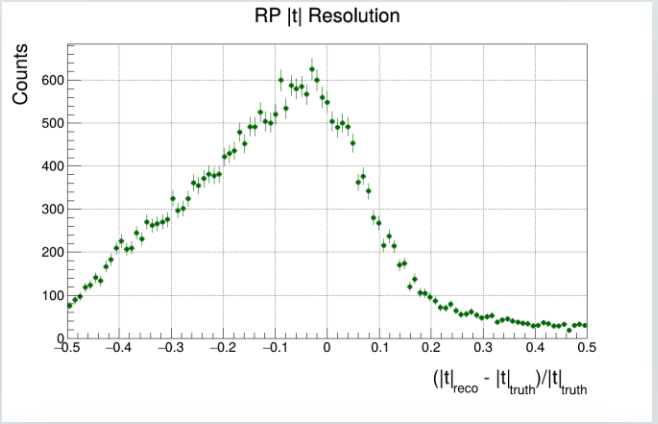


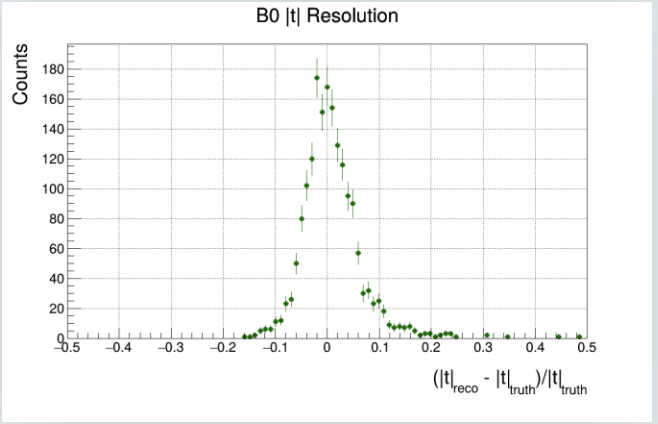


't' resolution BABE and Res. Mat.









MX^2 and x_L (0812.2003)

In the LPS analysis, the longitudinal (p_Z) and transverse (p_X, p_Y) momenta of the scattered proton were measured. The fractional energy of the outgoing proton, x_L, was defined as $x_L = p_Z/E_p$, where E_p is the incoming proton energy. The variable t is given by

$$t = -\frac{p_T^2}{x_L} - \frac{(1-x_L)^2}{x_L} M_p^2 \ , \tag{5}$$

The four-momentum of the system X was determined from both calorimeter and tracking information. The energy deposits in the CAL and the track momenta measured in the CTD were combined into energy flow objects (EFOs) [25,26] to obtain the best momentum resolution. The EFOs were corrected for energy losses due to the material of the detector. The mass M_X was evaluated as

$$M_{X,\mathrm{EFO}}^2 = \left(\sum E_i\right)^2 - \left(\sum p_{X,i}\right)^2 - \left(\sum p_{Y,i}\right)^2 - \left(\sum p_{Z,i}\right)^2 \ ,$$

where (E_i, $p_{X,i}$, $p_{Y,i}$, $p_{Z,i}$) is the momentum four-vector of the i^{th} EFO and the sum runs over all EFOs not assigned to the scattered positron.

In the LPS analysis, the mass M_X was also determined from the outgoing proton momentum as reconstructed in the LPS,

$$M_{X,\mathrm{LPS}}^2 \approx [1 - x_L(1+x)]W^2 \ .$$

$$x_{I\!P} = \frac{(P-P')\cdot q}{P\cdot q} = \frac{Q^2 + M_X^2 - t}{Q^2 + W^2 - M_p^2} \ ,$$

$$\beta = \frac{Q^2}{2(P-P')\cdot q} = \frac{Q^2}{Q^2 + M_X^2 - t} \ .$$

MX^2 and x_L (PRD 65 052001)