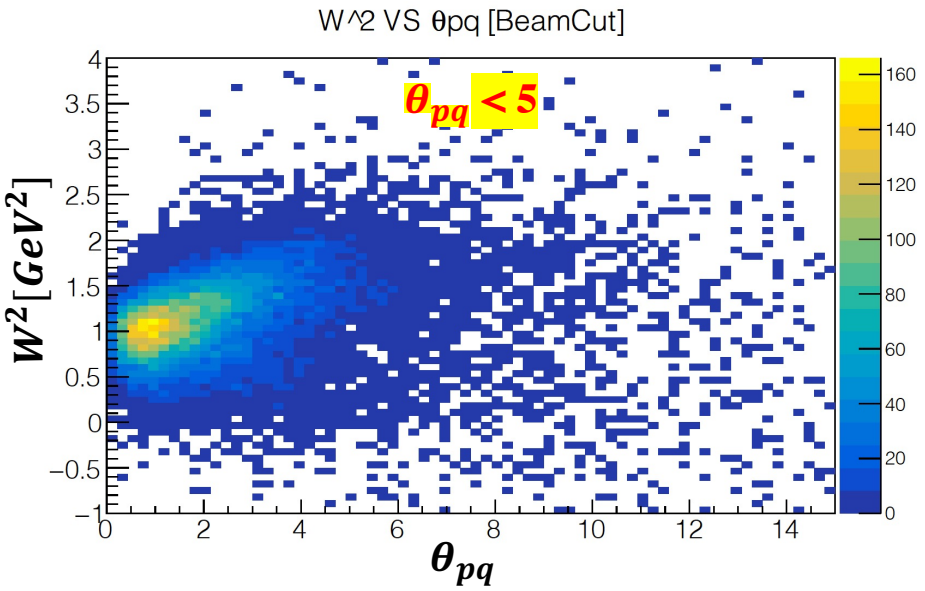
Electron Momentum Correction...

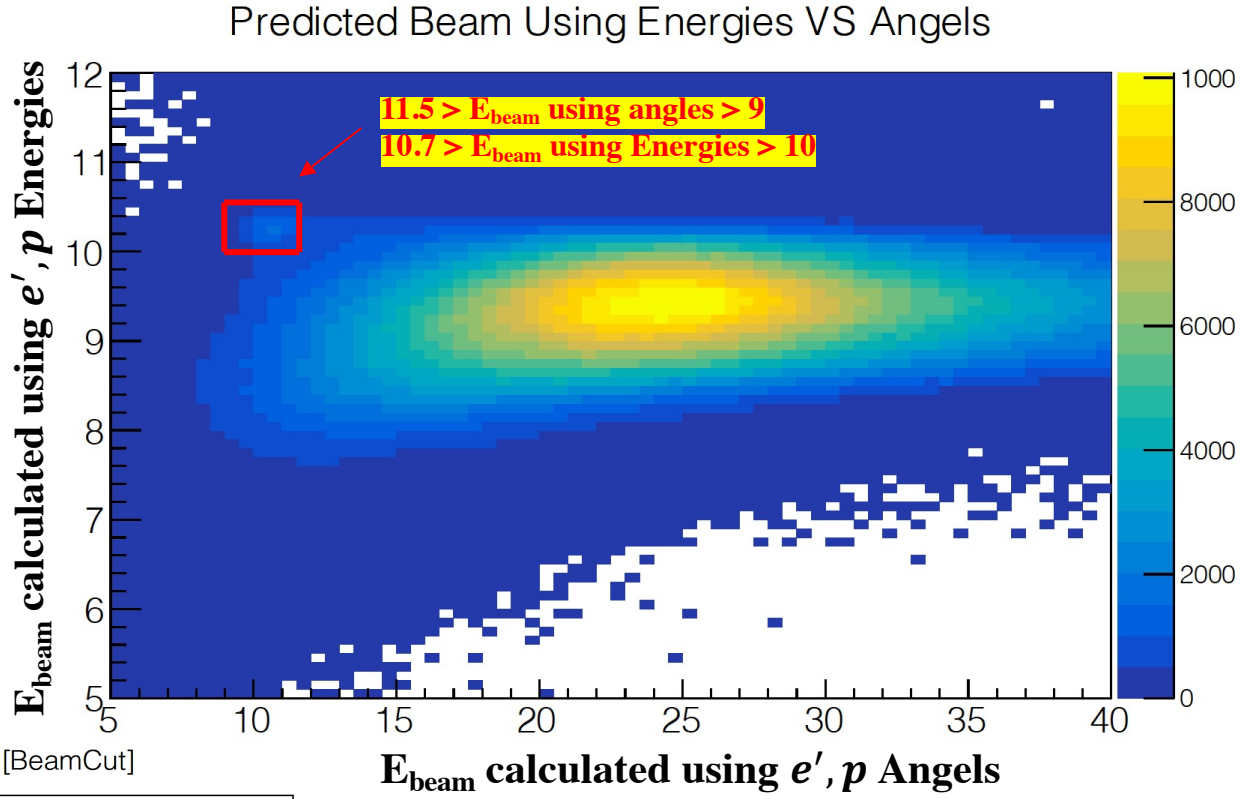
Data Set used in this talk:

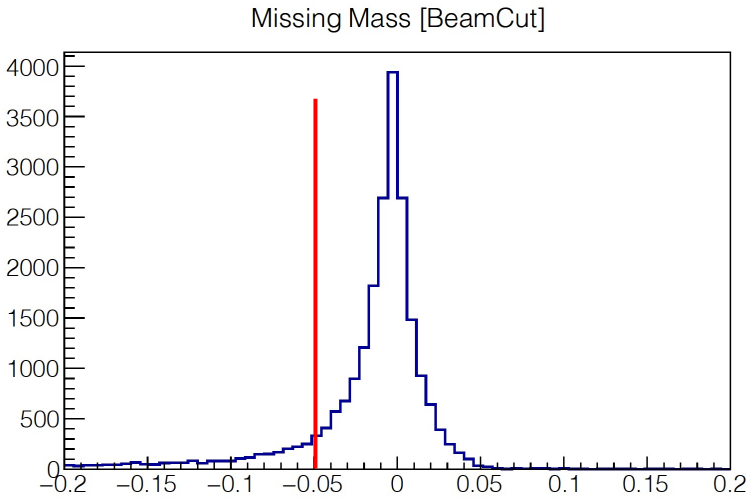
RGB ep event ~107 runs = 5,809,240 / 376,988,554

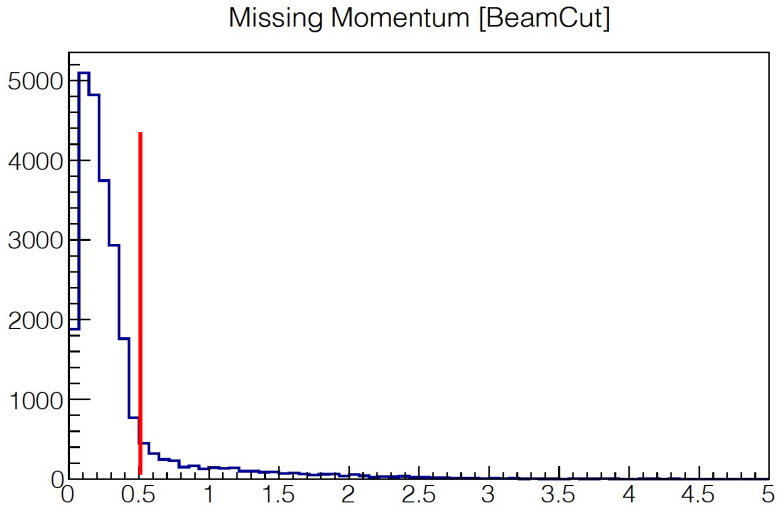
/lustre19/expphy/cache/clas12/rg-b/production/recon/fall2019/torus+1/pass1/v1/dst/train/gmn

Cut Applied to select quasi-elastic ep peak

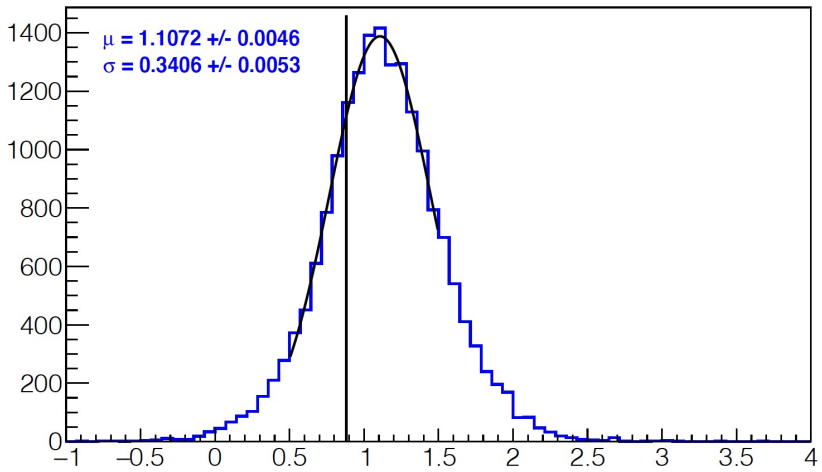


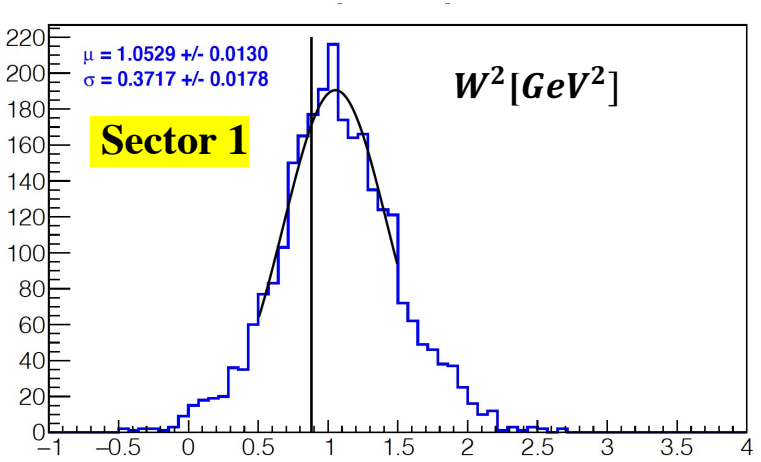


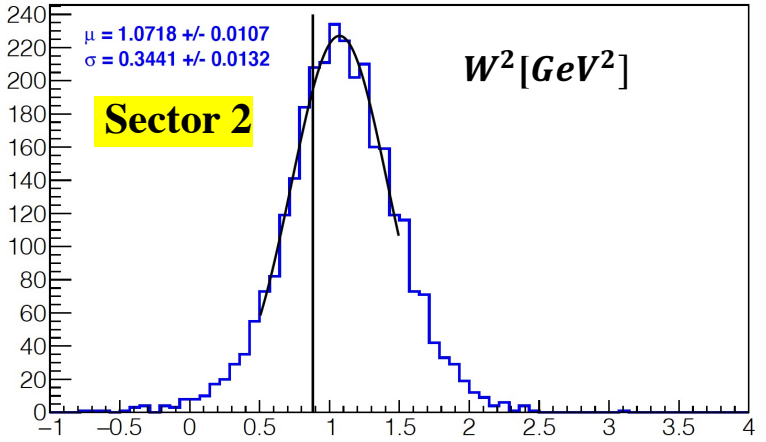


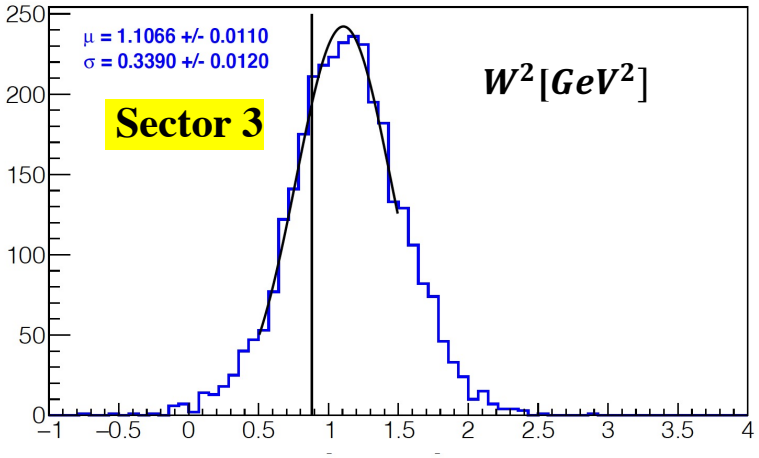


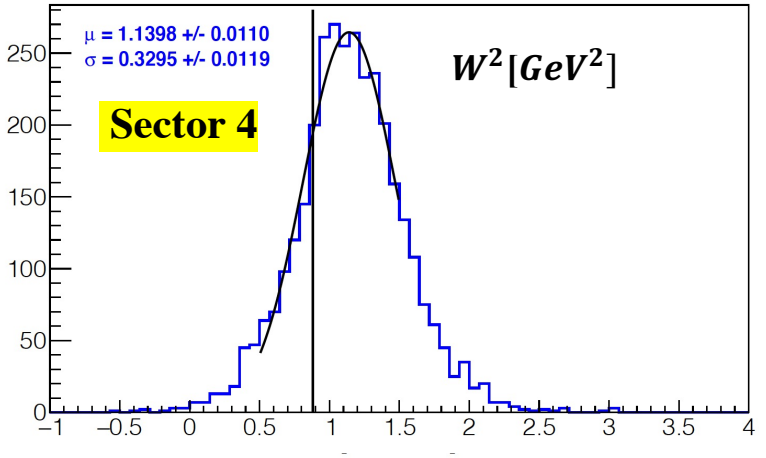
$W^2[GeV^2]$

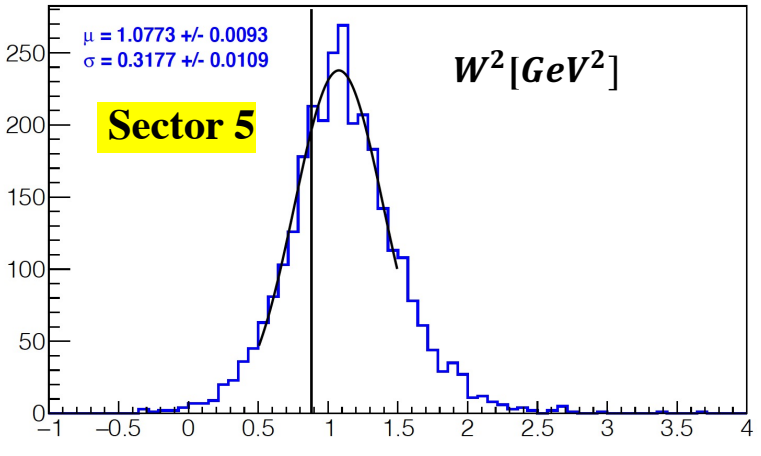

μ = 1.1072 +/- 0.0046
σ = 0.3406 +/- 0.0053

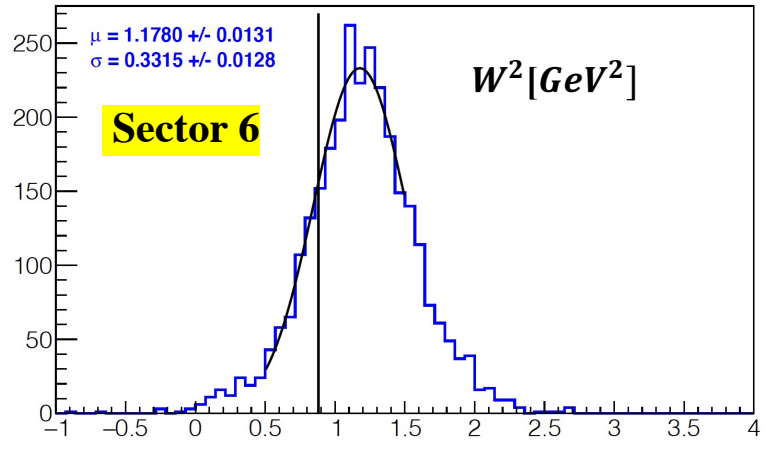

μ = 1.0529 +/- 0.0130
σ = 0.3717 +/- 0.0178
Sector 1
$W^2[GeV^2]$


μ = 1.0718 +/- 0.0107
σ = 0.3441 +/- 0.0132
Sector 2
$W^2[GeV^2]$


μ = 1.1066 +/- 0.0110
σ = 0.3390 +/- 0.0120
Sector 3
$W^2[GeV^2]$


μ = 1.1398 +/- 0.0110
σ = 0.3295 +/- 0.0119
Sector 4
$W^2[GeV^2]$

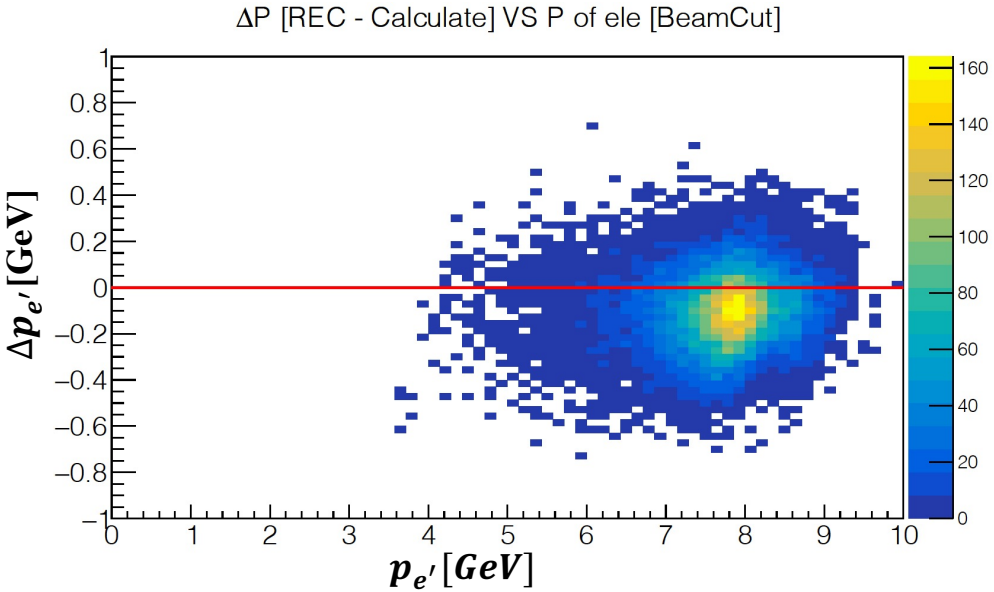

μ = 1.0773 +/- 0.0093
σ = 0.3177 +/- 0.0109
Sector 5
$W^2[GeV^2]$

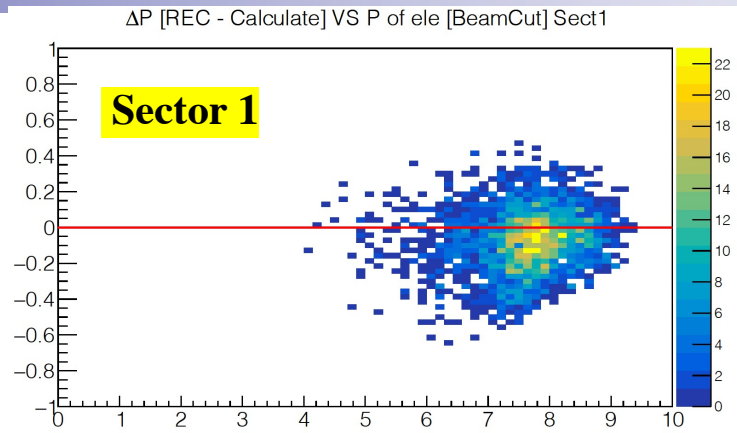

μ = 1.1780 +/- 0.0131
σ = 0.3315 +/- 0.0128
Sector 6
$W^2[GeV^2]$

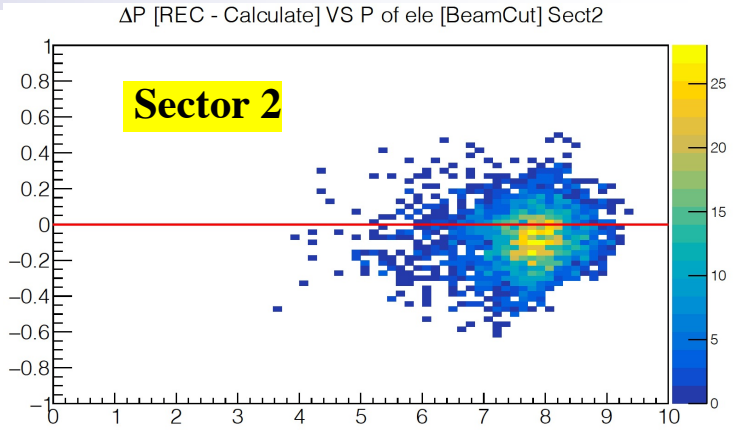
Momentum Corrections

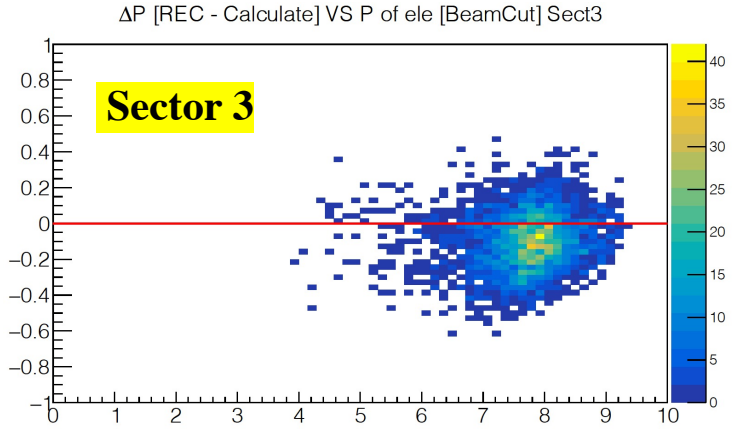
$$p_e^{calc} = \frac{E_{beam}}{1 + 2E_{beam} sin^2\left(\frac{\theta_{e\prime}}{2}\right)/M_p}$$

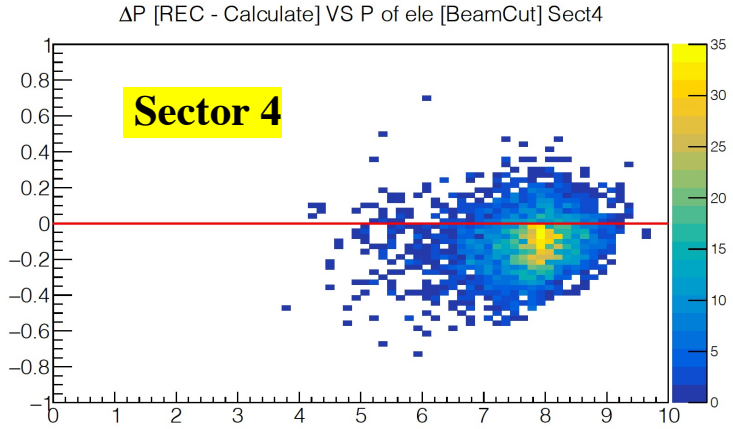
$$\Delta p_{e\prime} = p_e^{REC} - p_e^{calc}$$

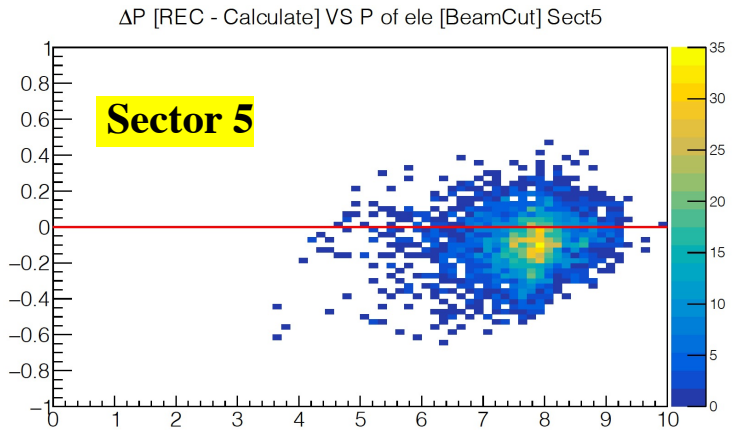


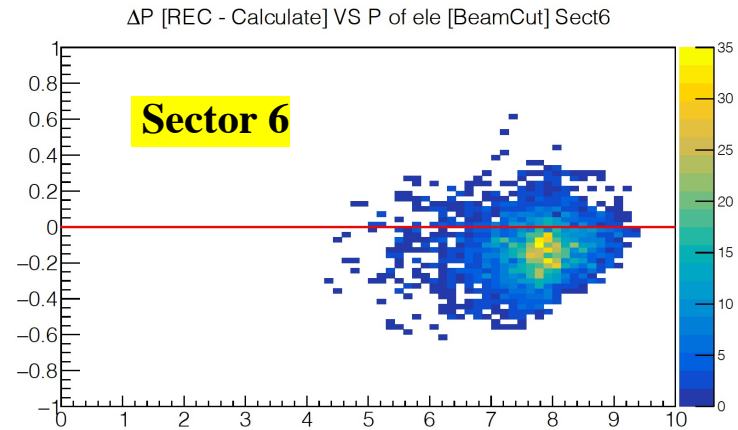


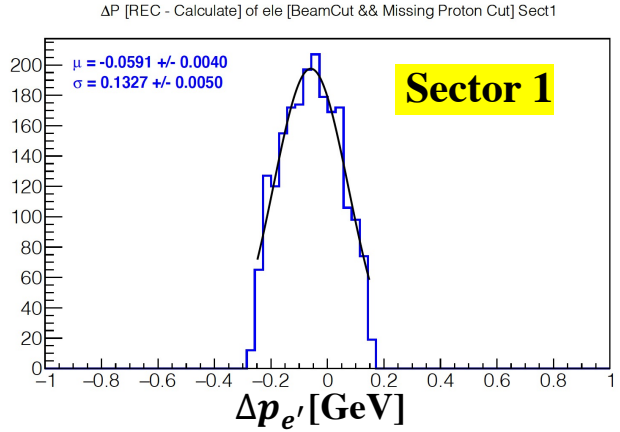


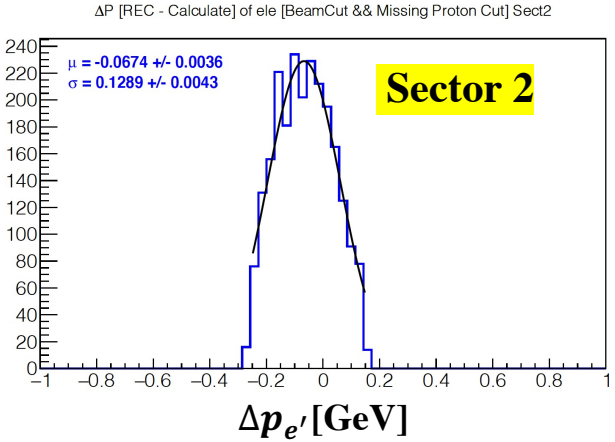


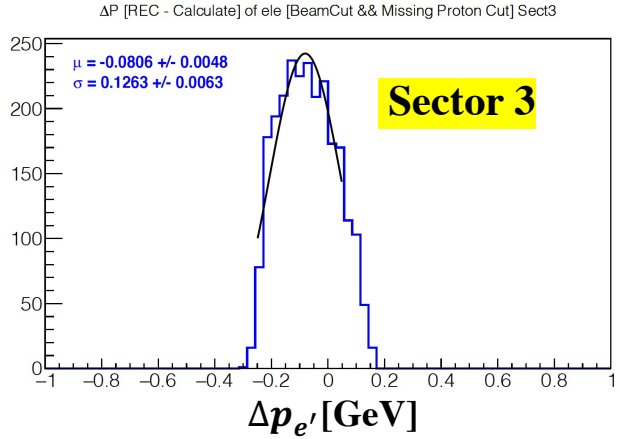


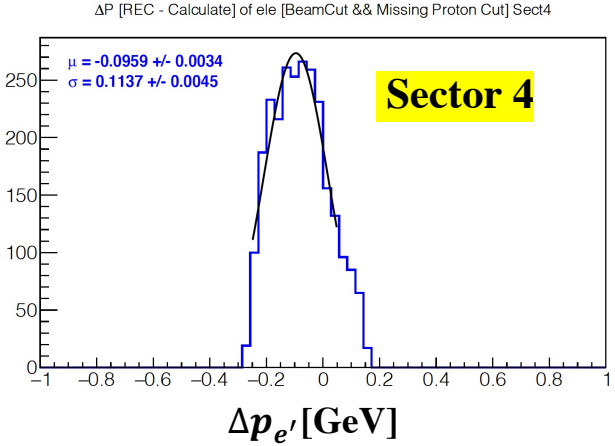


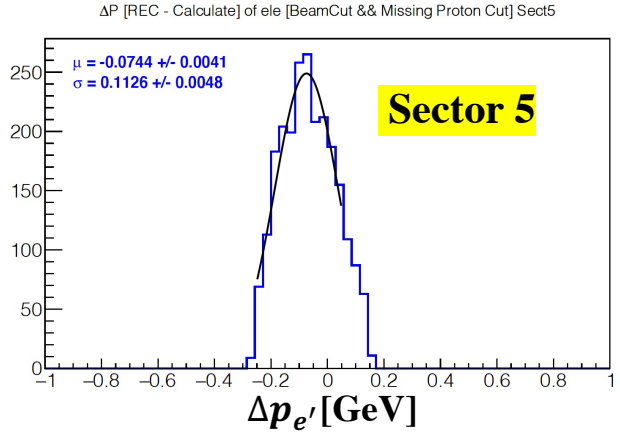


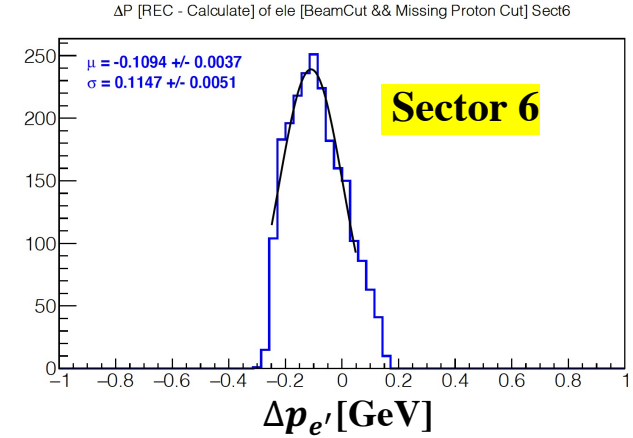

ΔP [REC - Calculate] of ele [BeamCut && Missing Proton Cut] Sect1
μ = -0.0591 +/- 0.0040
σ = 0.1327 +/- 0.0050
Sector 1
$\Delta p_{e'}$ [GeV]

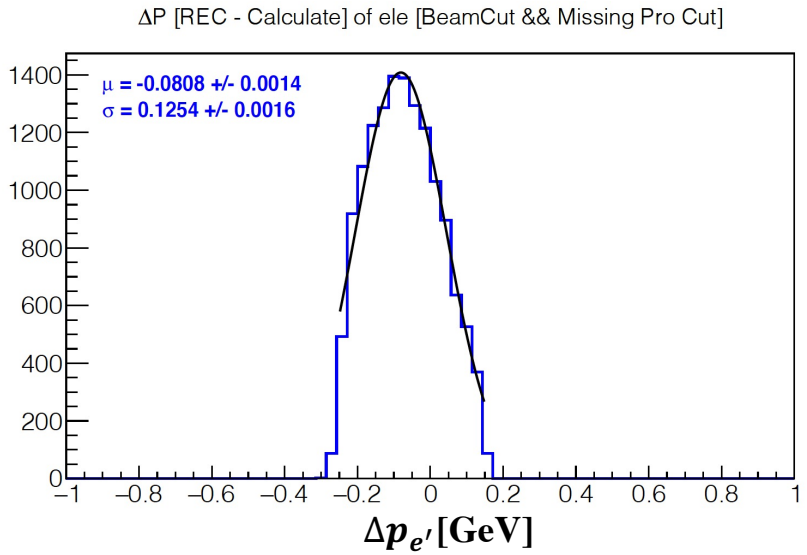

ΔP [REC - Calculate] of ele [BeamCut && Missing Proton Cut] Sect2
μ = -0.0674 +/- 0.0036
σ = 0.1289 +/- 0.0043
Sector 2
$\Delta p_{e'}$ [GeV]

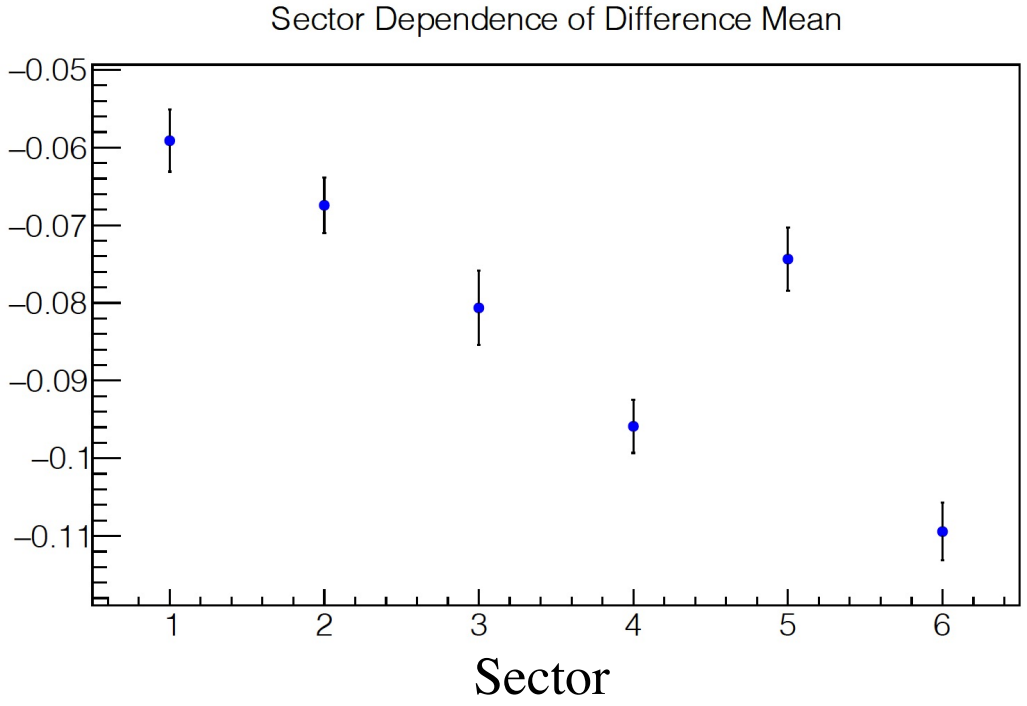

ΔP [REC - Calculate] of ele [BeamCut && Missing Proton Cut] Sect3
μ = -0.0806 +/- 0.0048
σ = 0.1263 +/- 0.0063
Sector 3
$\Delta p_{e'}$ [GeV]


ΔP [REC - Calculate] of ele [BeamCut && Missing Proton Cut] Sect4
μ = -0.0959 +/- 0.0034
σ = 0.1137 +/- 0.0045
Sector 4
$\Delta p_{e'}$ [GeV]

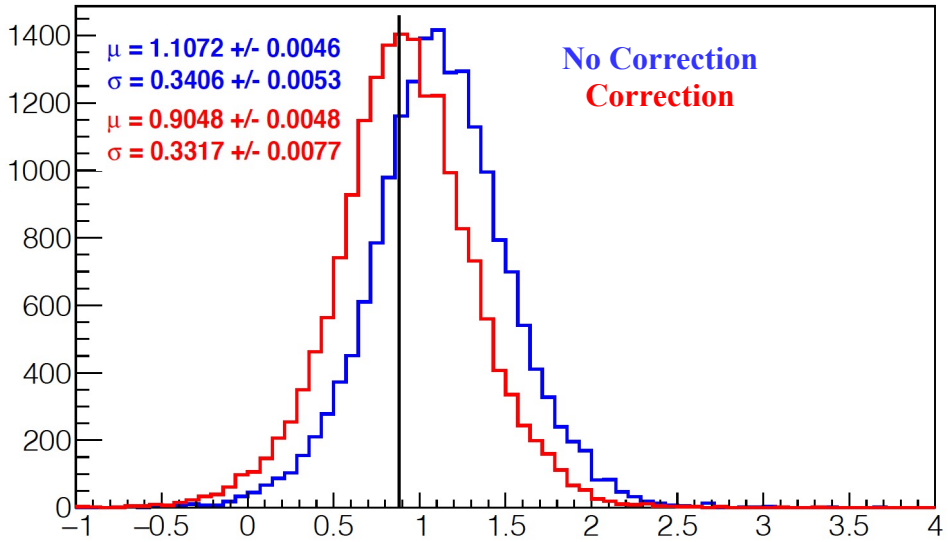

ΔP [REC - Calculate] of ele [BeamCut && Missing Proton Cut] Sect5
μ = -0.0744 +/- 0.0041
σ = 0.1126 +/- 0.0048
Sector 5
$\Delta p_{e'}$ [GeV]

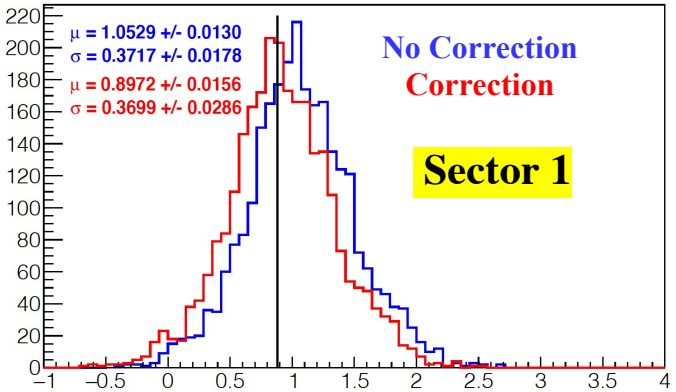

ΔP [REC - Calculate] of ele [BeamCut && Missing Proton Cut] Sect6
μ = -0.1094 +/- 0.0037
σ = 0.1147 +/- 0.0051
Sector 6
$\Delta p_{e'}$ [GeV]

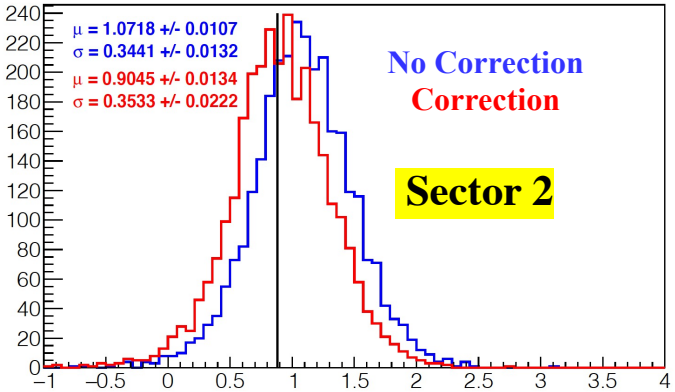

ΔP [REC - Calculate] of ele [BeamCut && Missing Pro Cut]
μ = -0.0808 +/- 0.0014
σ = 0.1254 +/- 0.0016
$\Delta p_{e'}$ [GeV]

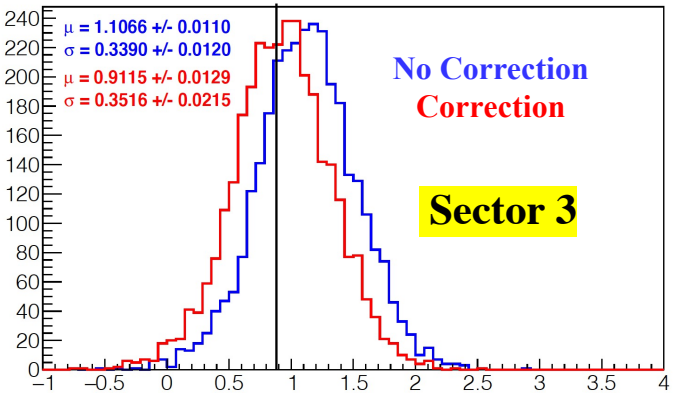

Sector Dependence of Difference Mean
Sector

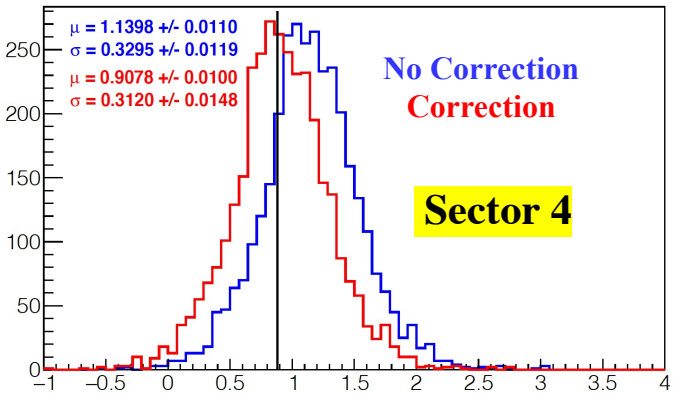
$W^2\ [GeV^2]$

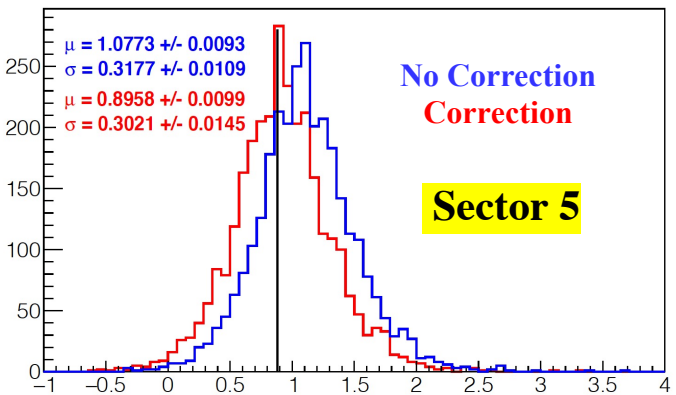

μ = 1.1072 +/- 0.0046
σ = 0.3406 +/- 0.0053
μ = 0.9048 +/- 0.0048
σ = 0.3317 +/- 0.0077
No Correction
Correction

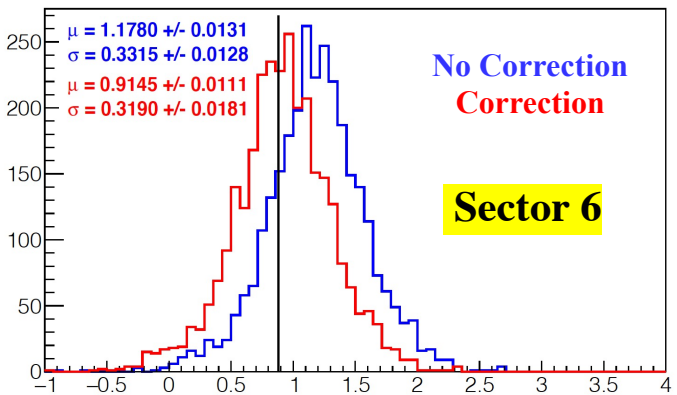

μ = 1.0529 +/- 0.0130
σ = 0.3717 +/- 0.0178
μ = 0.8972 +/- 0.0156
σ = 0.3699 +/- 0.0286
No Correction
Correction
Sector 1

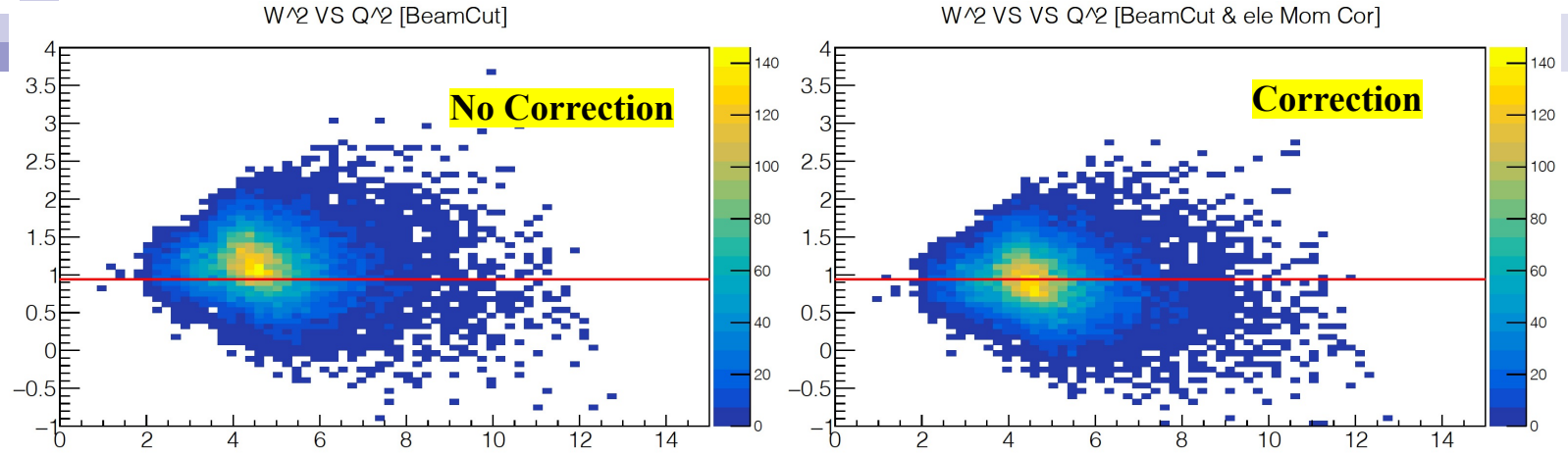

μ = 1.0718 +/- 0.0107
σ = 0.3441 +/- 0.0132
μ = 0.9045 +/- 0.0134
σ = 0.3533 +/- 0.0222
No Correction
Correction
Sector 2


μ = 1.1066 +/- 0.0110
σ = 0.3390 +/- 0.0120
μ = 0.9115 +/- 0.0129
σ = 0.3516 +/- 0.0215
No Correction
Correction
Sector 3

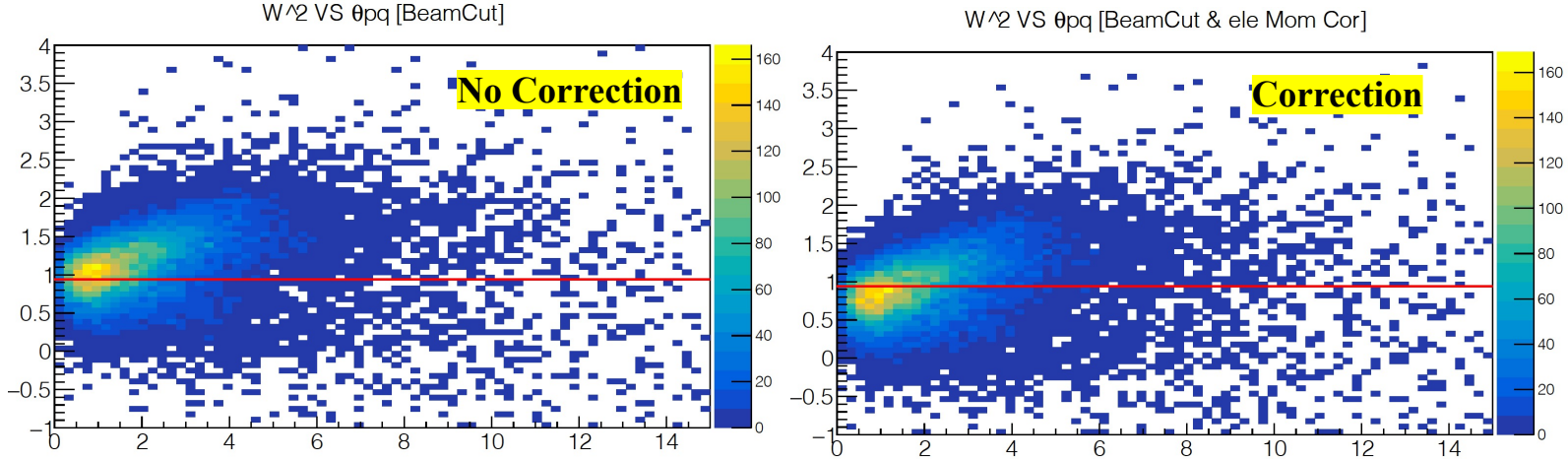

μ = 1.1398 +/- 0.0110
σ = 0.3295 +/- 0.0119
μ = 0.9078 +/- 0.0100
σ = 0.3120 +/- 0.0148
No Correction
Correction
Sector 4


μ = 1.0773 +/- 0.0093
σ = 0.3177 +/- 0.0109
μ = 0.8958 +/- 0.0099
σ = 0.3021 +/- 0.0145
No Correction
Correction
Sector 5

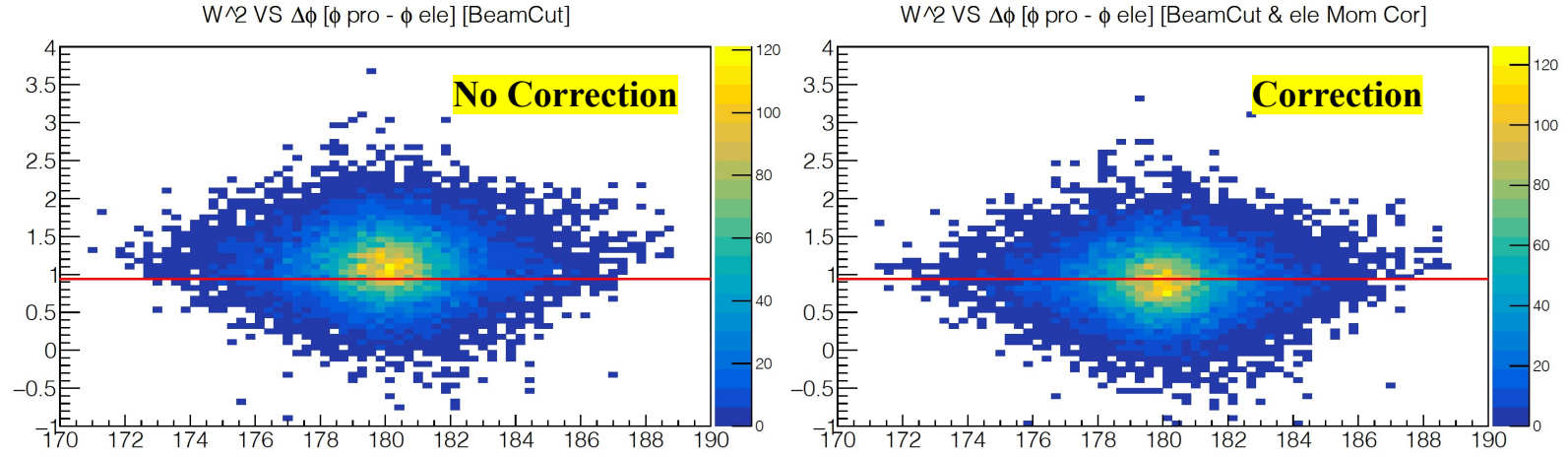

μ = 1.1780 +/- 0.0131
σ = 0.3315 +/- 0.0128
μ = 0.9145 +/- 0.0111
σ = 0.3190 +/- 0.0181
No Correction
Correction
Sector 6



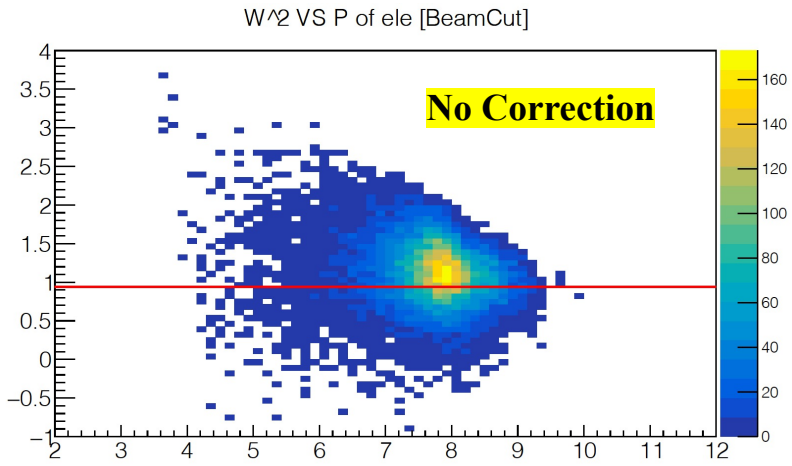
$W^2 vs\ Q^2$

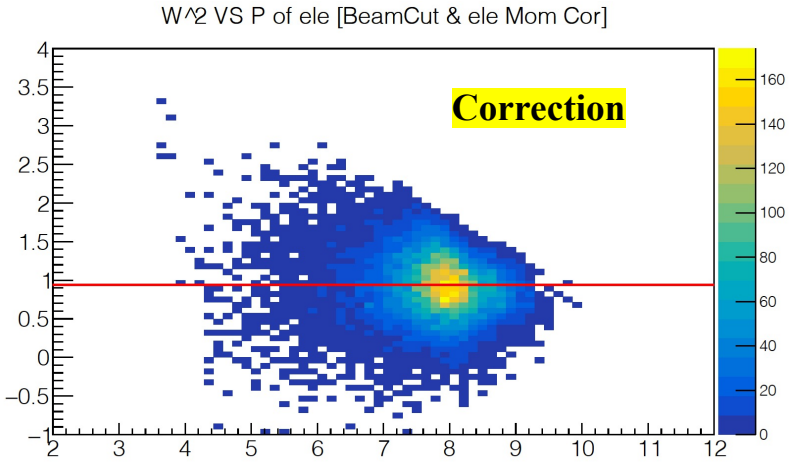


$W^2 vs\ \theta_{pq}$

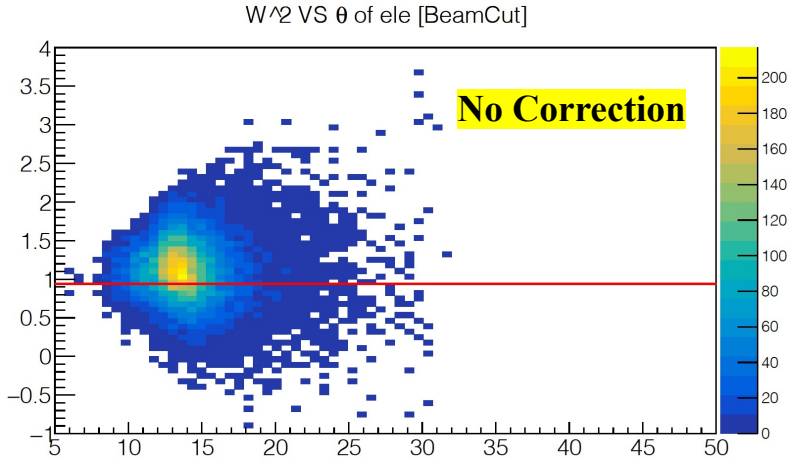


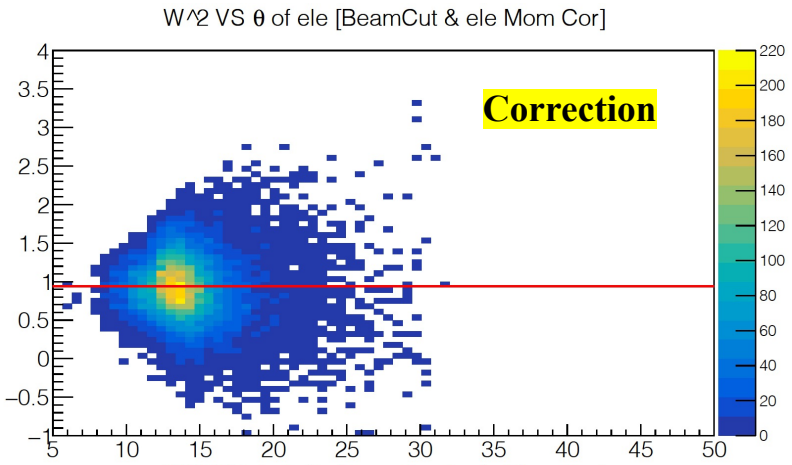
$W^2 vs\ \Delta\varphi_{p-e'}$



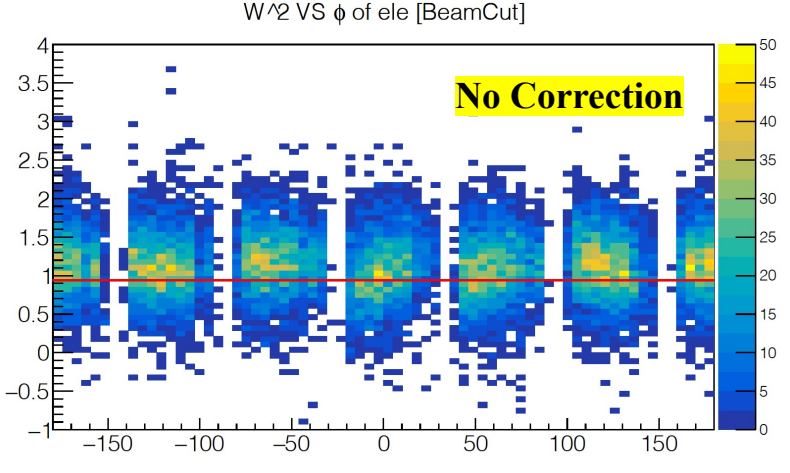


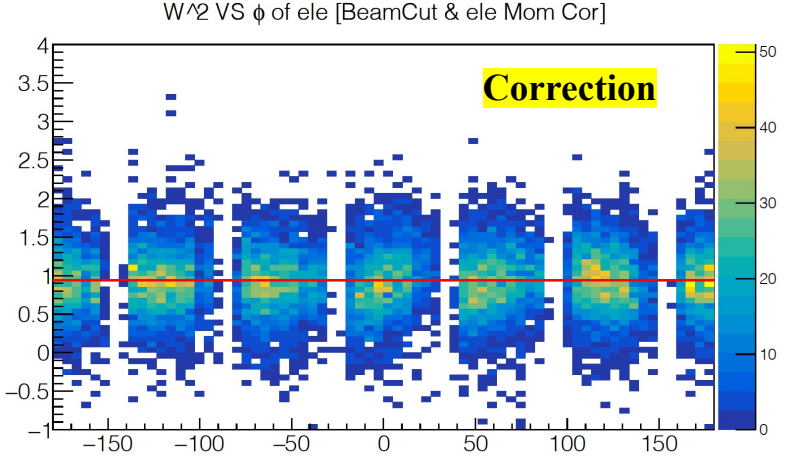
$W^2 vs\ p_{e'}$



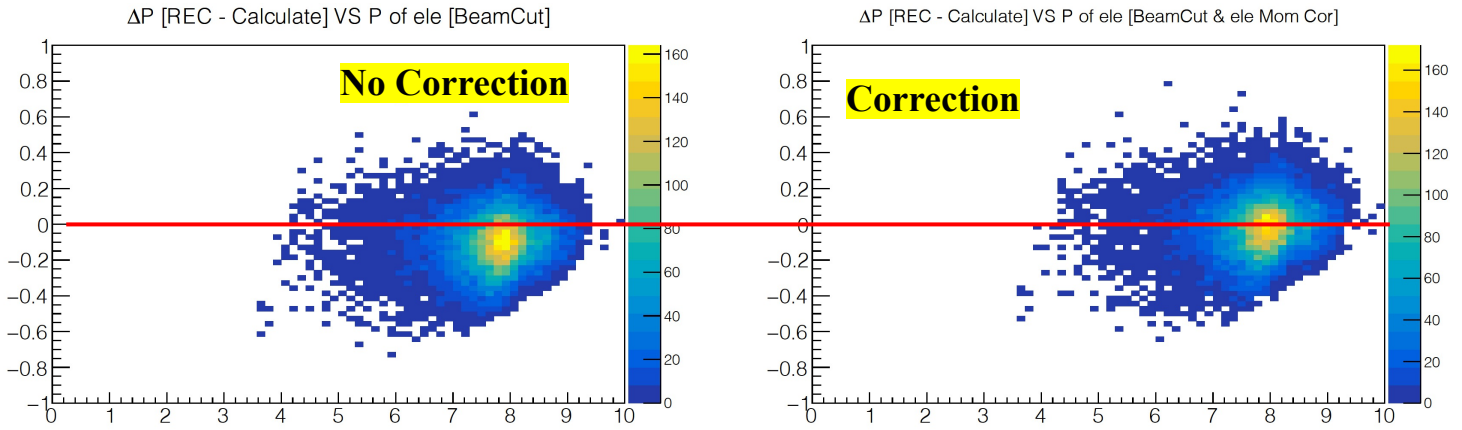


$W^2 vs\ \theta_{e'}$

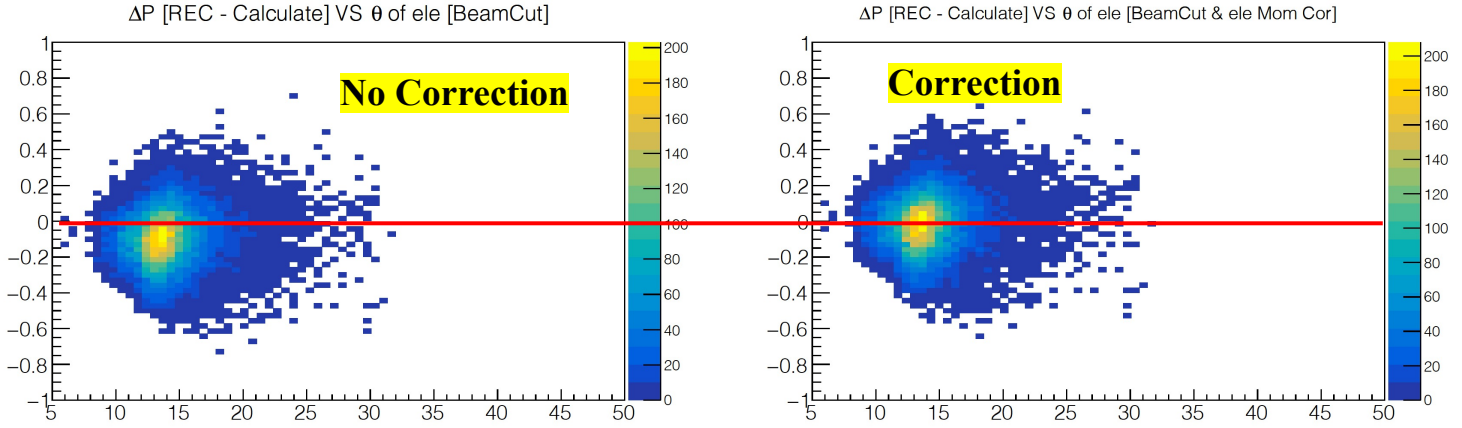




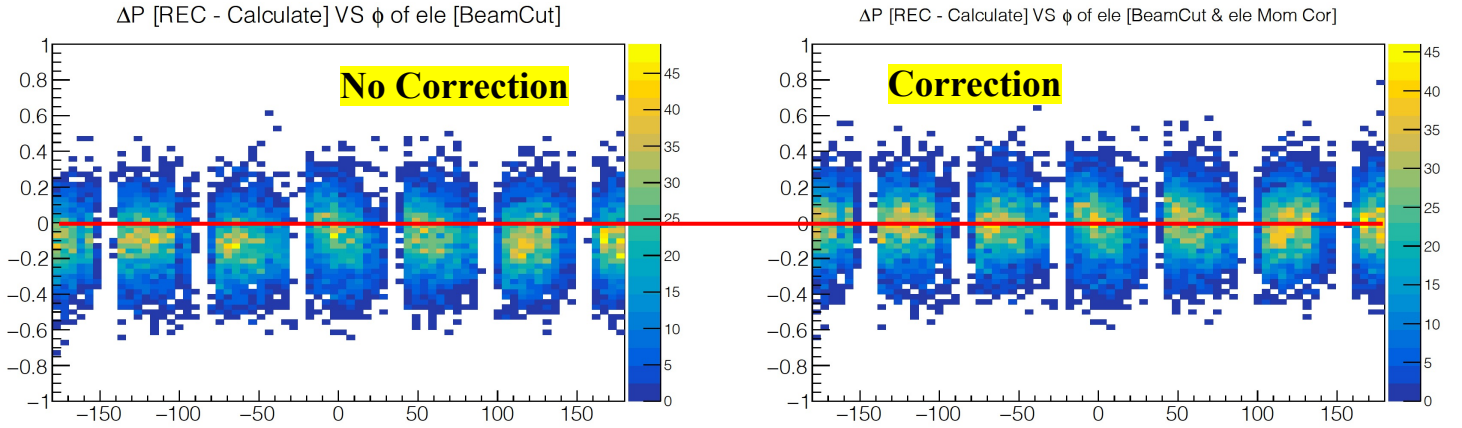
$W^2 vs\ \varphi_{e'}$



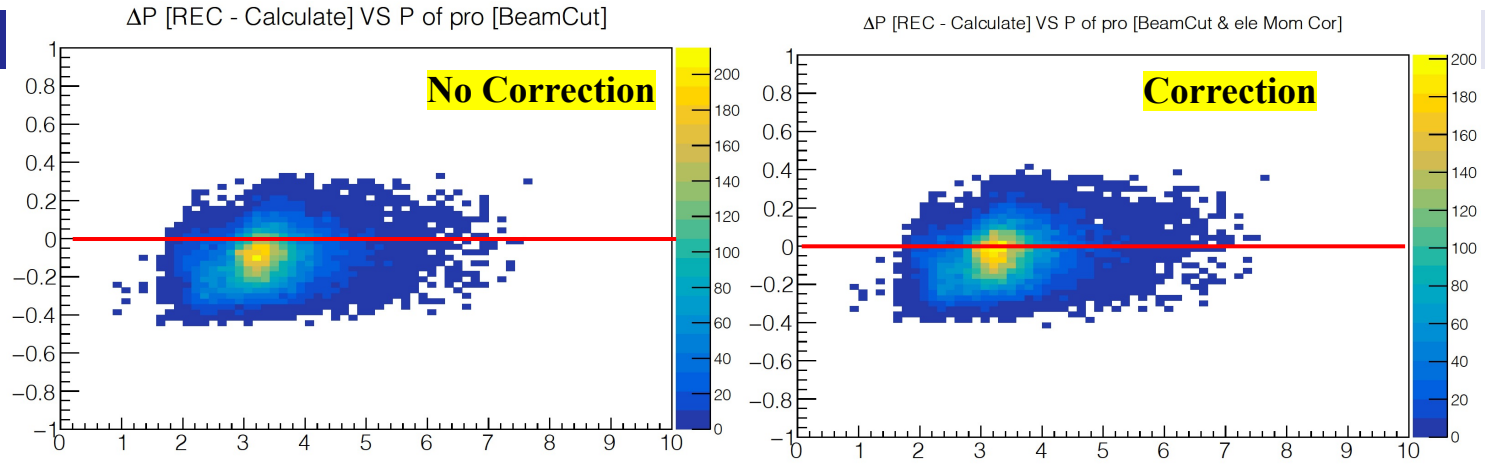
$\Delta p_{e'}$ *vs* $p_{e'}$



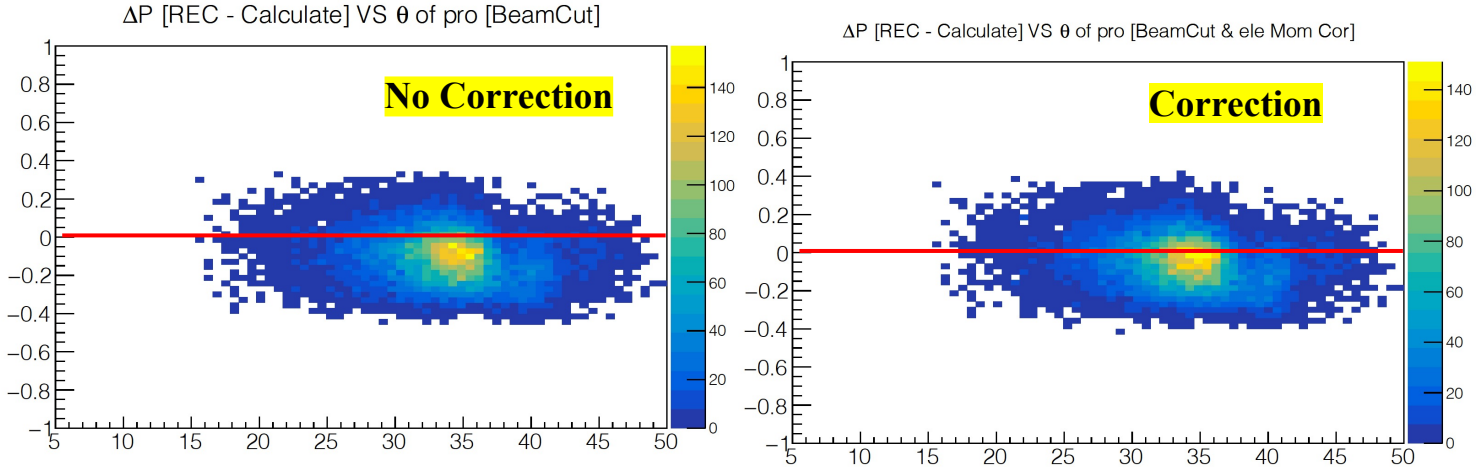
$\Delta p_{e'}$ *vs* $\theta_{e'}$



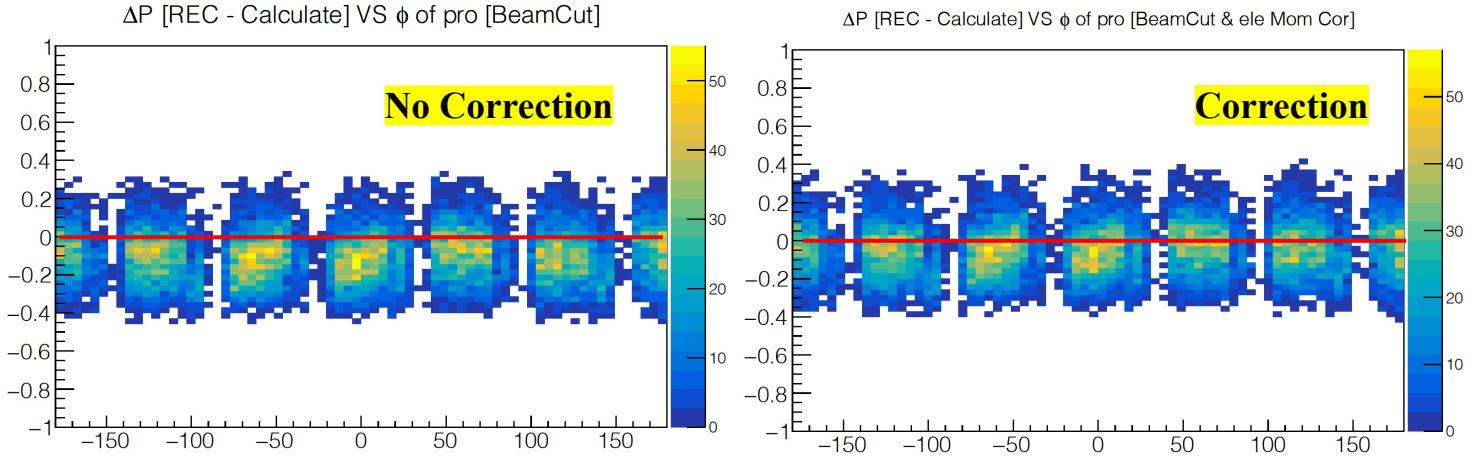
$\Delta p_{e'}$ *vs*$\varphi_{e'}$



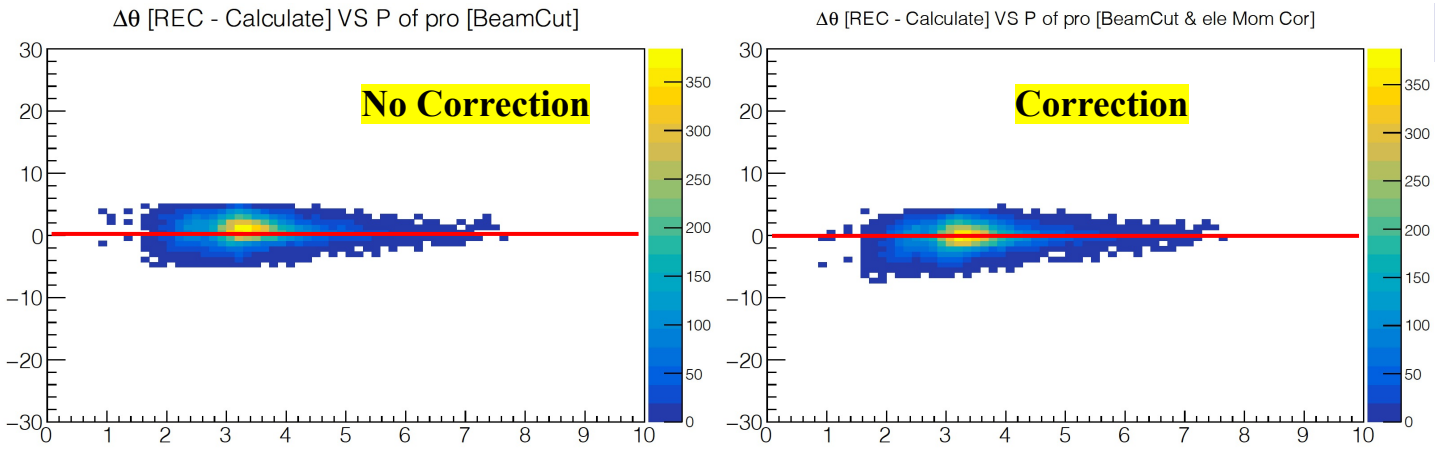
$\Delta p_p \; vs \; p_p$



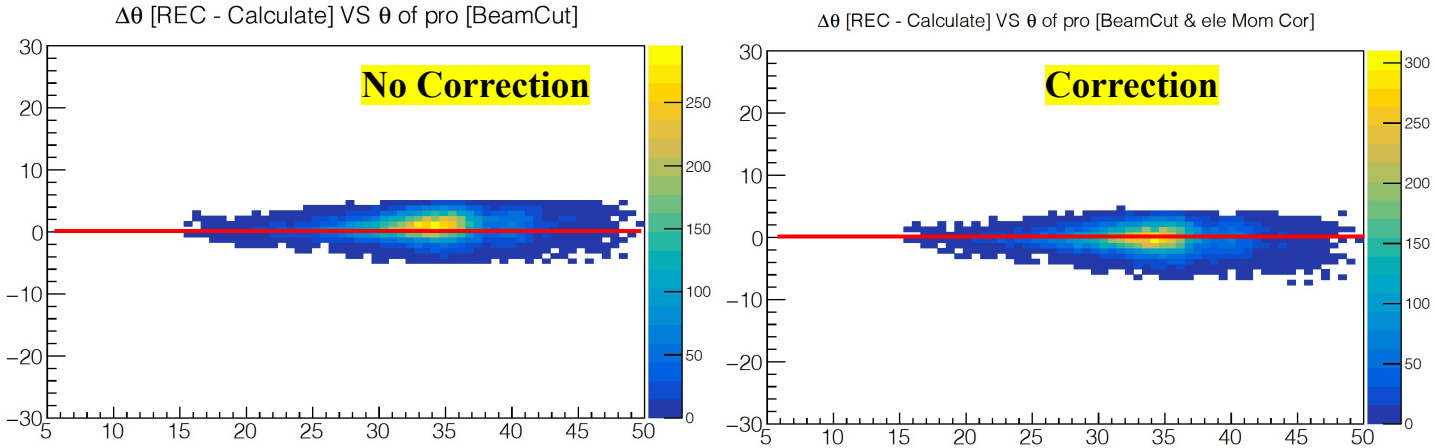
$\Delta p_p \; vs \; \theta_p$



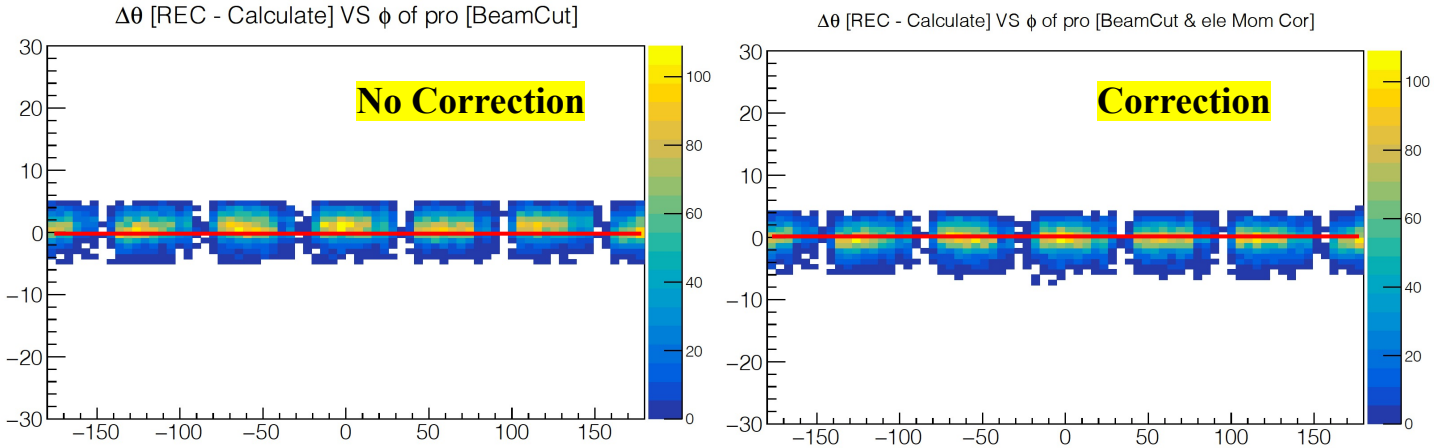
$\Delta p_p \; vs \; \varphi_p$



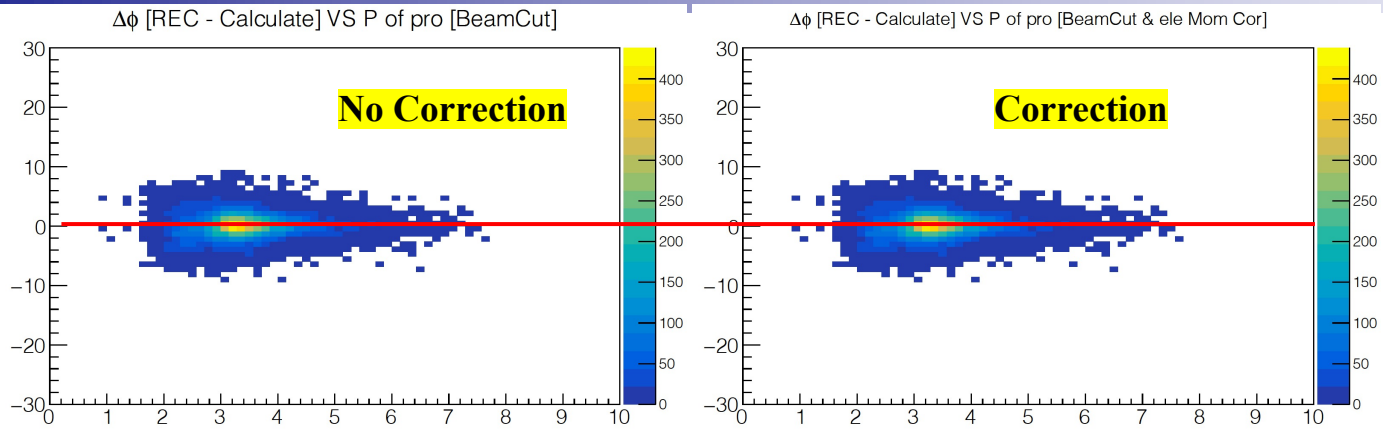
$\Delta\theta_p vs\ p_p$



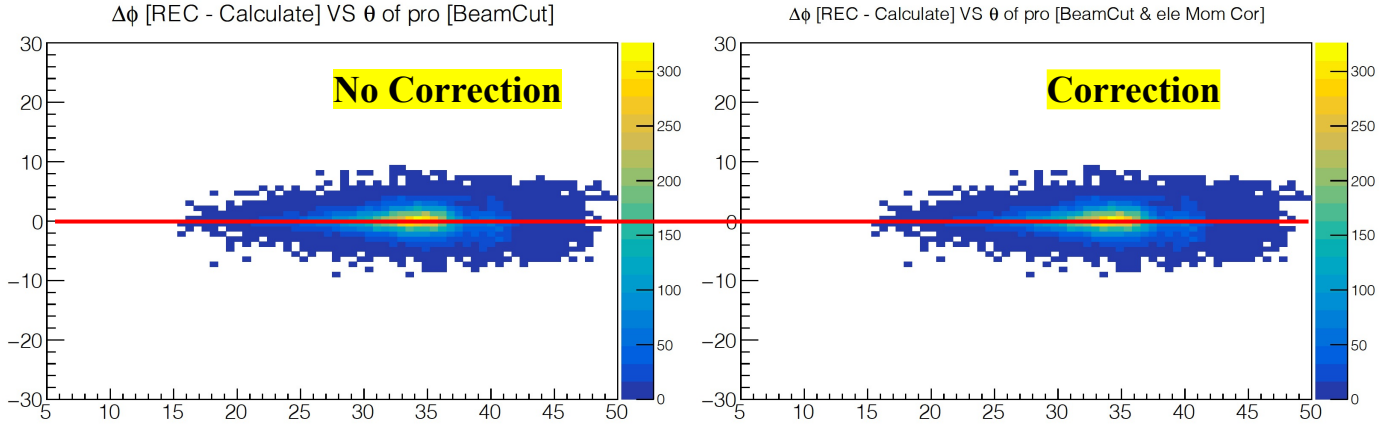
$\Delta\theta_p vs\ \theta_p$



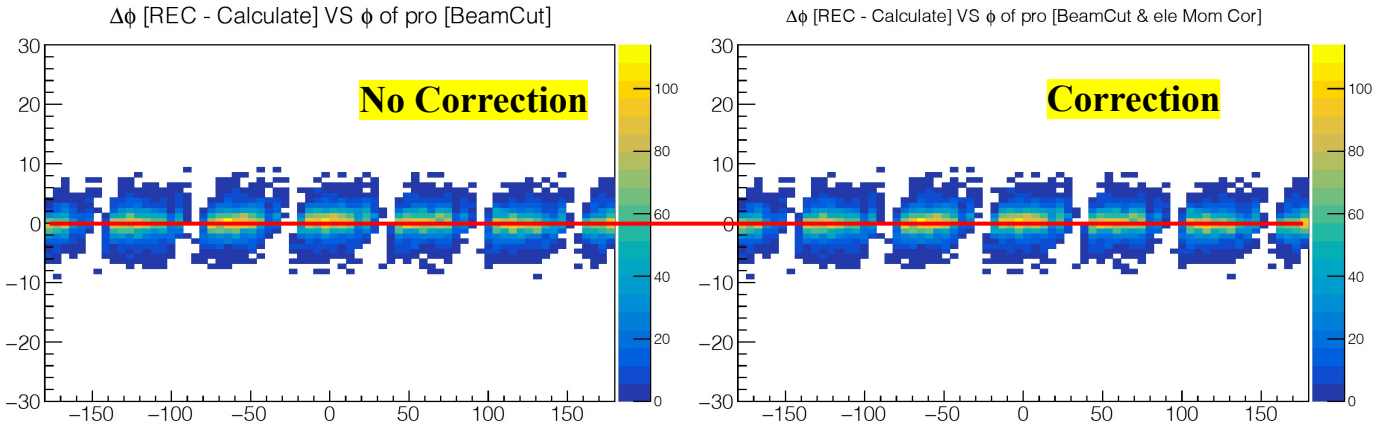
$\Delta\theta_p vs\varphi_p$



$\Delta\varphi_p vs\ p_p$

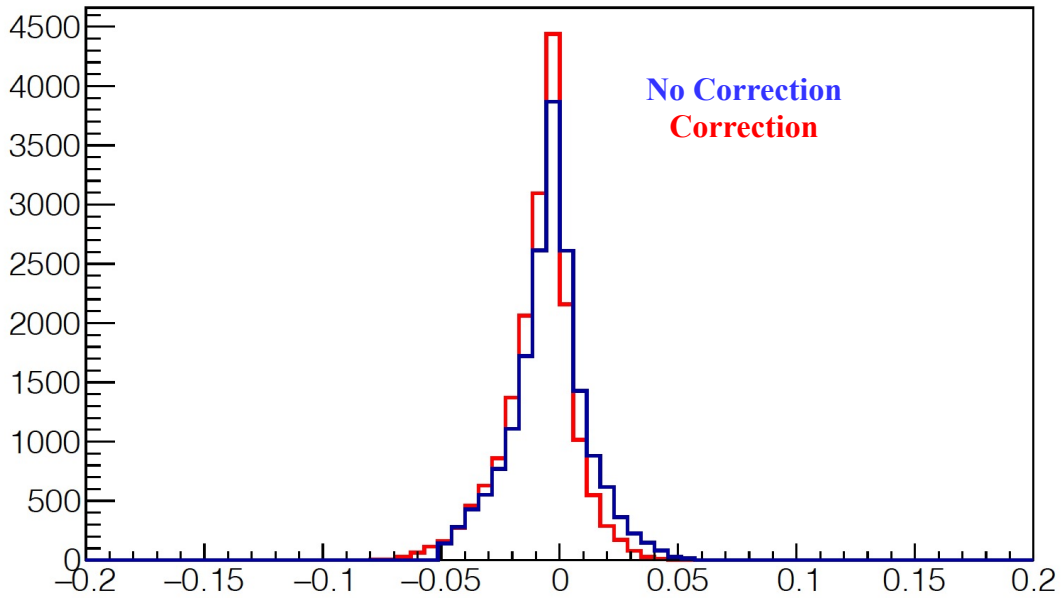


$\Delta\varphi_p vs\ \theta_p$

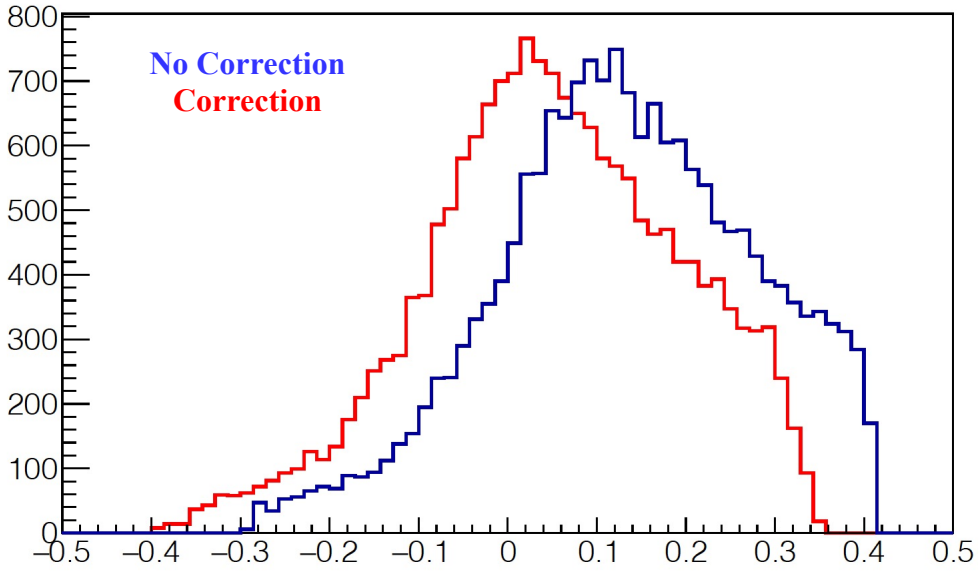


$\Delta\varphi_p vs\varphi_p$

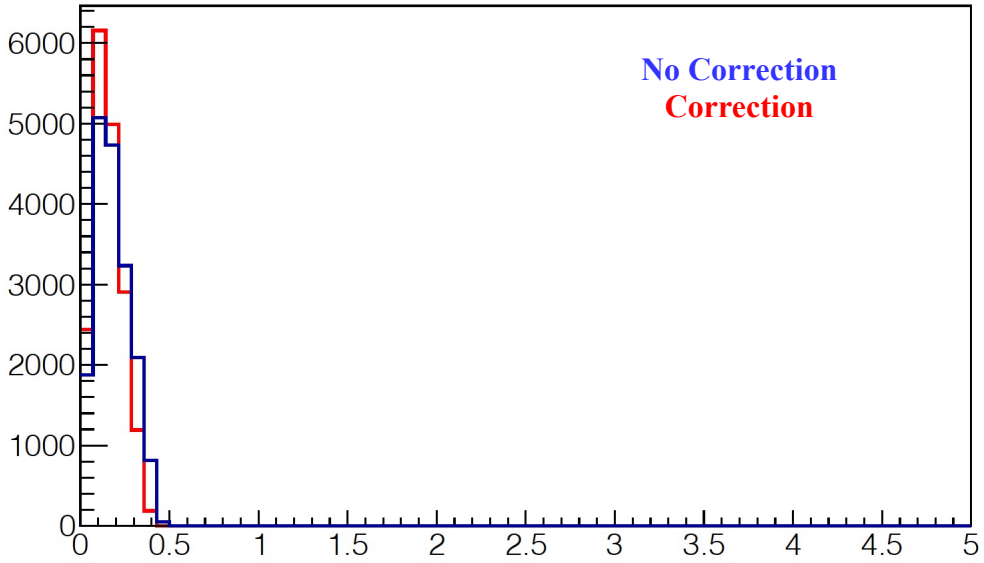
Missing Mass [BeamCut & ele Mom Cor]



Missing Energy [BeamCut & ele Mom Cor]



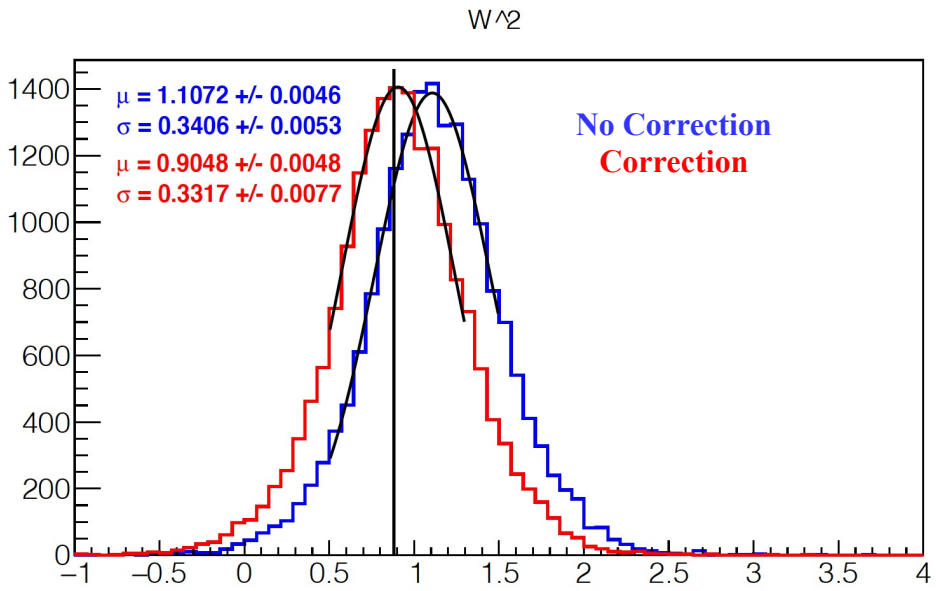
Missing Momentum [BeamCut & ele Mom Cor]

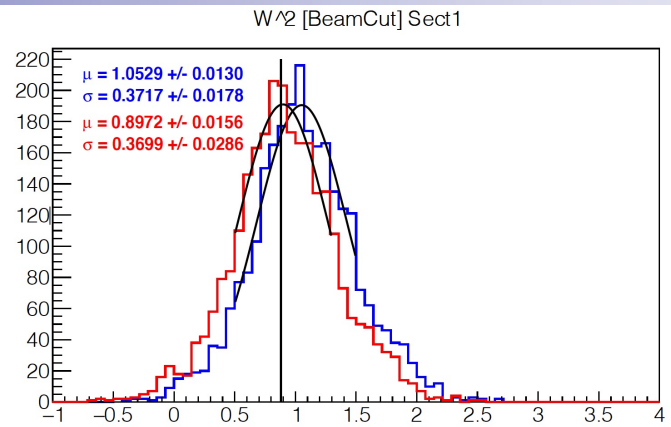


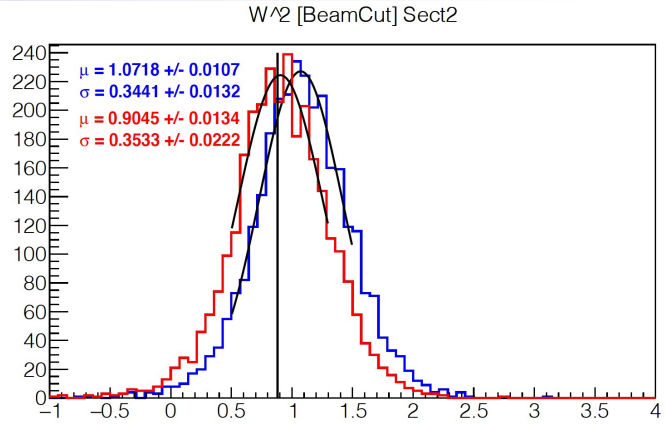
Future plan

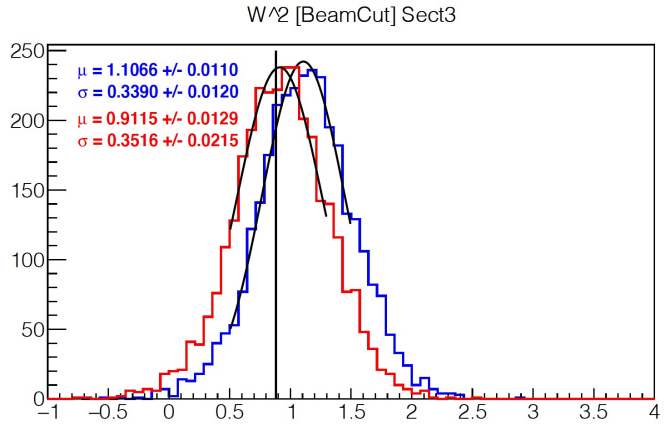
- Extract electron corrections for other data set
- Apply corrections to e-n channel and test if there is an improvement

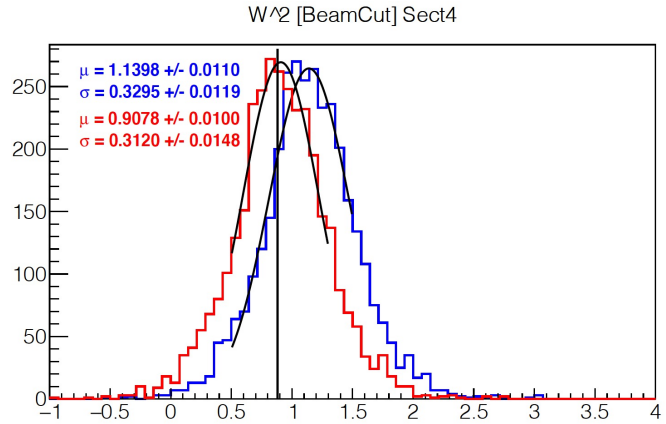
Thank you …

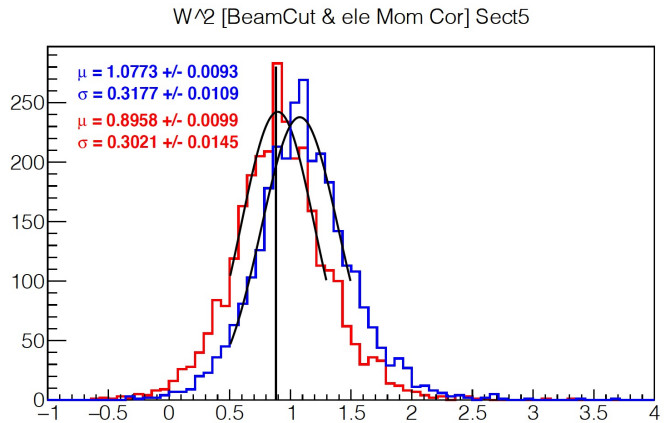

W^2
μ = 1.1072 +/- 0.0046
σ = 0.3406 +/- 0.0053
μ = 0.9048 +/- 0.0048
σ = 0.3317 +/- 0.0077
No Correction
Correction

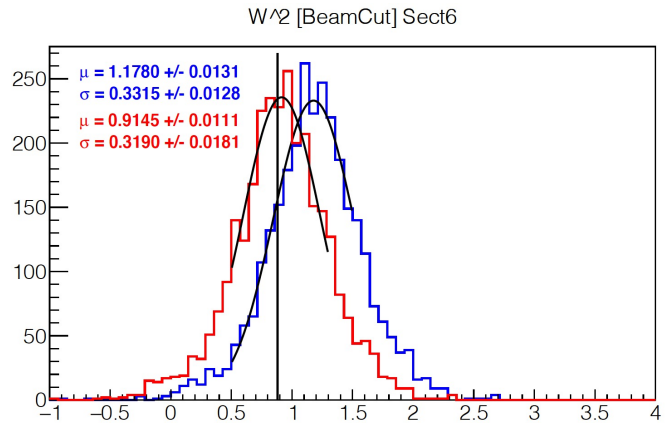

W^2 [BeamCut] Sect1
μ = 1.0529 +/- 0.0130
σ = 0.3717 +/- 0.0178
μ = 0.8972 +/- 0.0156
σ = 0.3699 +/- 0.0286

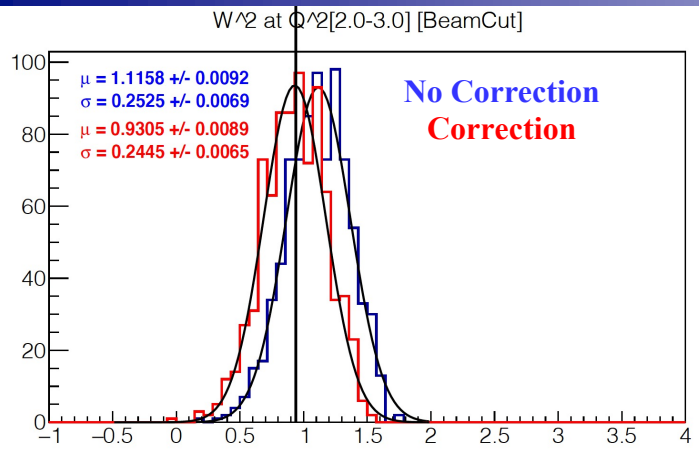

W^2 [BeamCut] Sect2
μ = 1.0718 +/- 0.0107
σ = 0.3441 +/- 0.0132
μ = 0.9045 +/- 0.0134
σ = 0.3533 +/- 0.0222

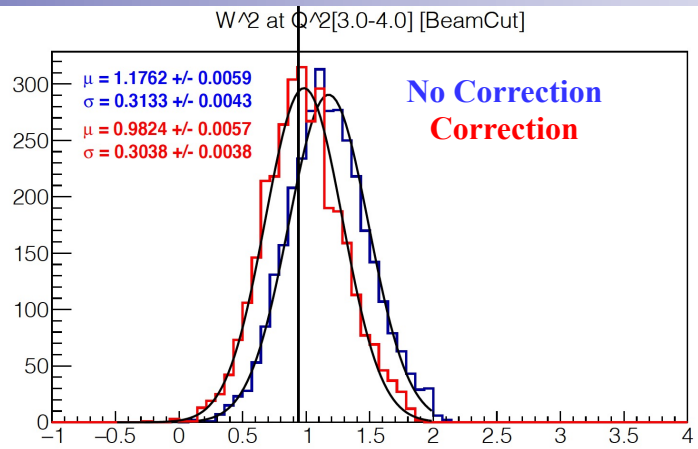

W^2 [BeamCut] Sect3
μ = 1.1066 +/- 0.0110
σ = 0.3390 +/- 0.0120
μ = 0.9115 +/- 0.0129
σ = 0.3516 +/- 0.0215

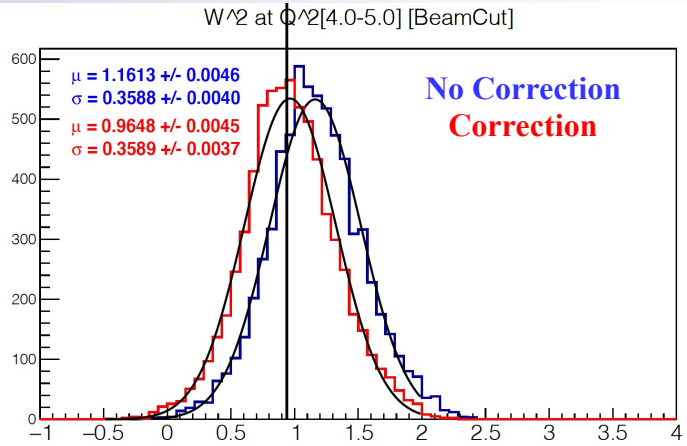

W^2 [BeamCut] Sect4
μ = 1.1398 +/- 0.0110
σ = 0.3295 +/- 0.0119
μ = 0.9078 +/- 0.0100
σ = 0.3120 +/- 0.0148

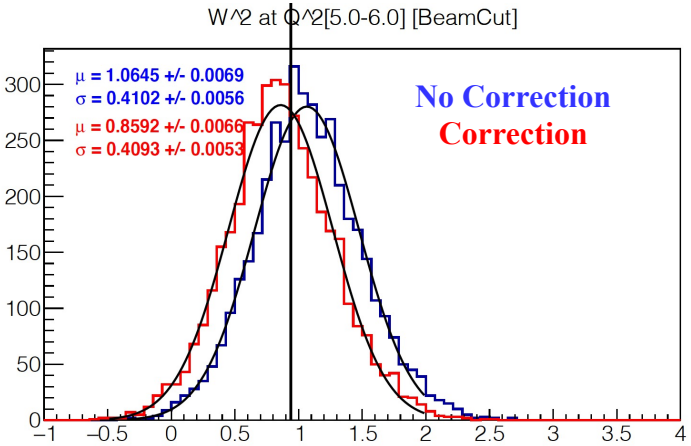

W^2 [BeamCut & ele Mom Cor] Sect5
μ = 1.0773 +/- 0.0093
σ = 0.3177 +/- 0.0109
μ = 0.8958 +/- 0.0099
σ = 0.3021 +/- 0.0145

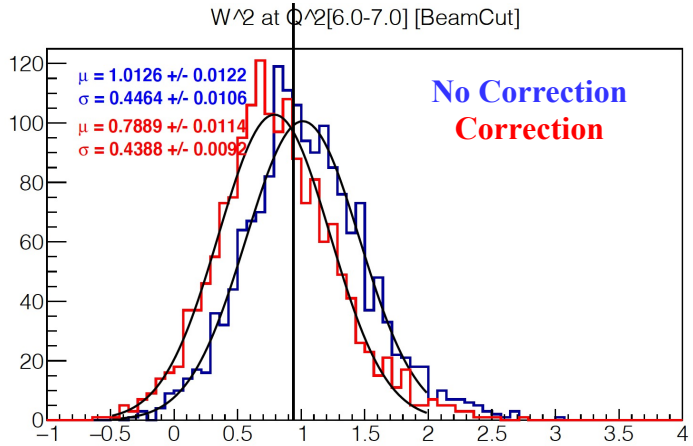

W^2 [BeamCut] Sect6
μ = 1.1780 +/- 0.0131
σ = 0.3315 +/- 0.0128
μ = 0.9145 +/- 0.0111
σ = 0.3190 +/- 0.0181

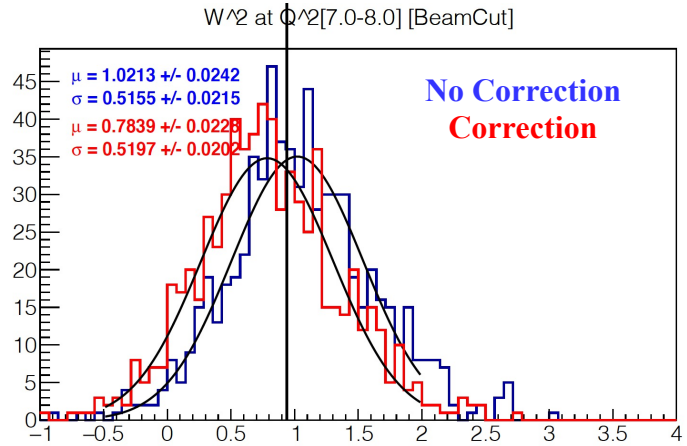

W^2 at Q^2[2.0-3.0] [BeamCut]
μ = 1.1158 +/- 0.0092
σ = 0.2525 +/- 0.0069
μ = 0.9305 +/- 0.0089
σ = 0.2445 +/- 0.0065
No Correction
Correction

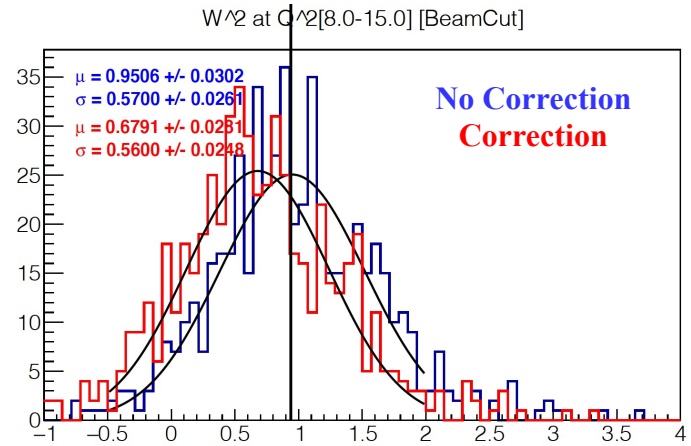

W^2 at Q^2[3.0-4.0] [BeamCut]
μ = 1.1762 +/- 0.0059
σ = 0.3133 +/- 0.0043
μ = 0.9824 +/- 0.0057
σ = 0.3038 +/- 0.0038
No Correction
Correction


W^2 at Q^2[4.0-5.0] [BeamCut]
μ = 1.1613 +/- 0.0046
σ = 0.3588 +/- 0.0040
μ = 0.9648 +/- 0.0045
σ = 0.3589 +/- 0.0037
No Correction
Correction


W^2 at Q^2[5.0-6.0] [BeamCut]
μ = 1.0645 +/- 0.0069
σ = 0.4102 +/- 0.0056
μ = 0.8592 +/- 0.0066
σ = 0.4093 +/- 0.0053
No Correction
Correction

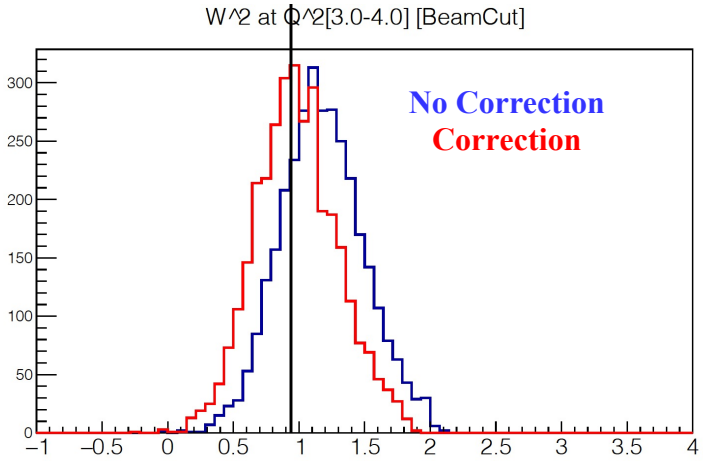

W^2 at Q^2[6.0-7.0] [BeamCut]
μ = 1.0126 +/- 0.0122
σ = 0.4464 +/- 0.0106
μ = 0.7889 +/- 0.0114
σ = 0.4388 +/- 0.0092
No Correction
Correction

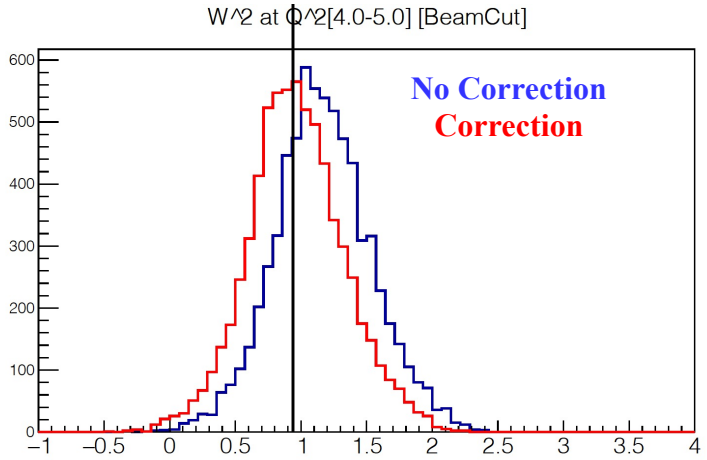

W^2 at Q^2[7.0-8.0] [BeamCut]
μ = 1.0213 +/- 0.0242
σ = 0.5155 +/- 0.0215
μ = 0.7839 +/- 0.0228
σ = 0.5197 +/- 0.0202
No Correction
Correction

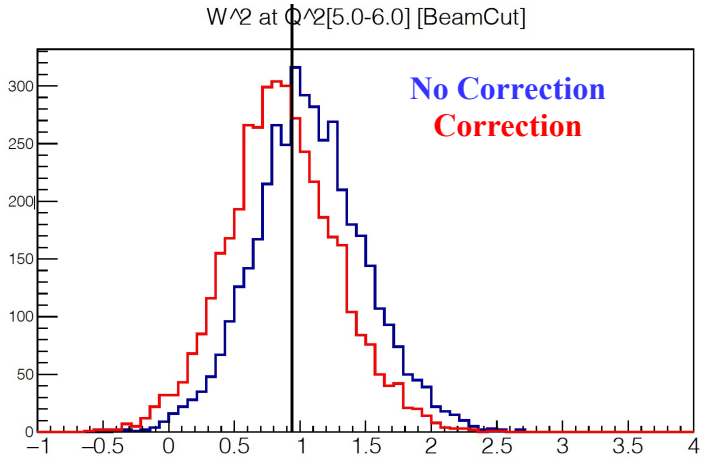

W^2 at Q^2[8.0-15.0] [BeamCut]
μ = 0.9506 +/- 0.0302
σ = 0.5700 +/- 0.0261
μ = 0.6791 +/- 0.0231
σ = 0.5600 +/- 0.0248
No Correction
Correction

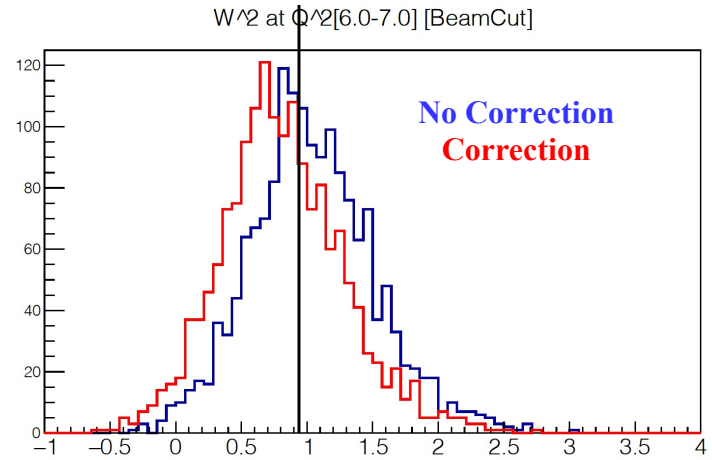
W^2 at Q^2 *bins*

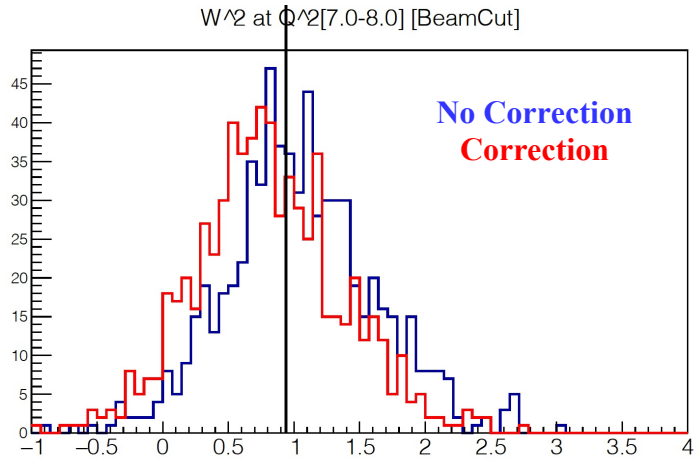
W^2 at Q^2 *bins*

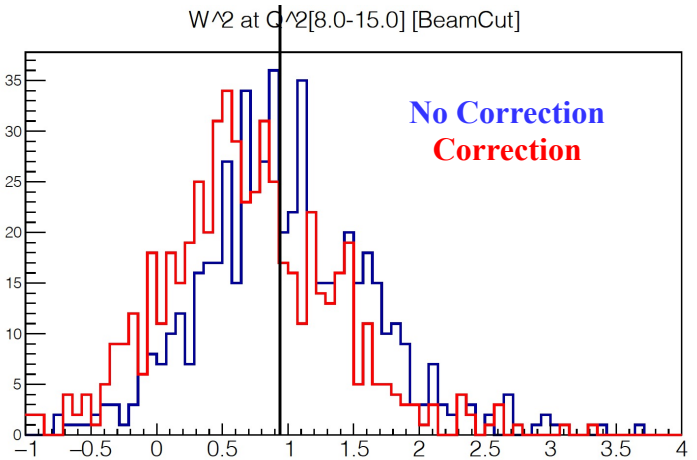

W^2 at Q^2[3.0-4.0] [BeamCut]
No Correction
Correction


W^2 at Q^2[4.0-5.0] [BeamCut]
No Correction
Correction

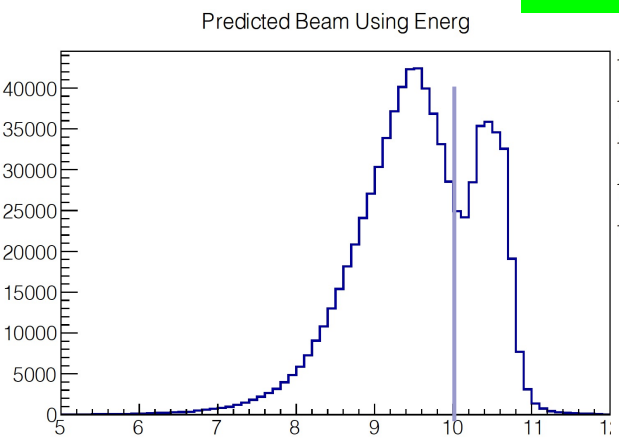

W^2 at Q^2[5.0-6.0] [BeamCut]
No Correction
Correction

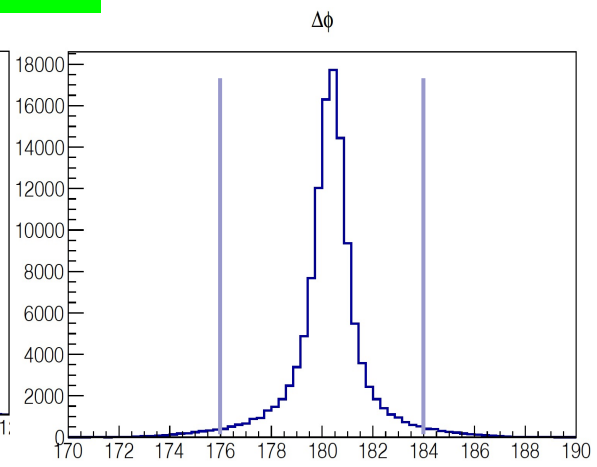

W^2 at Q^2[6.0-7.0] [BeamCut]
No Correction
Correction

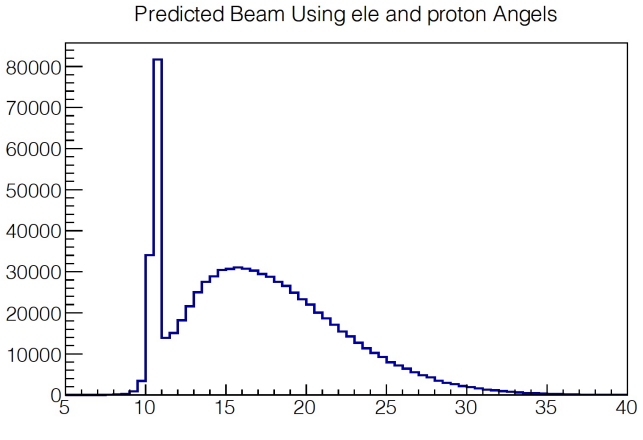

W^2 at Q^2[7.0-8.0] [BeamCut]
No Correction
Correction

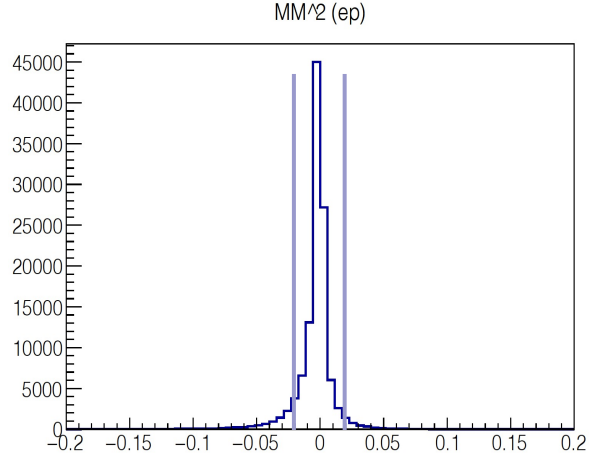

W^2 at Q^2[8.0-15.0] [BeamCut]
No Correction
Correction

RGA

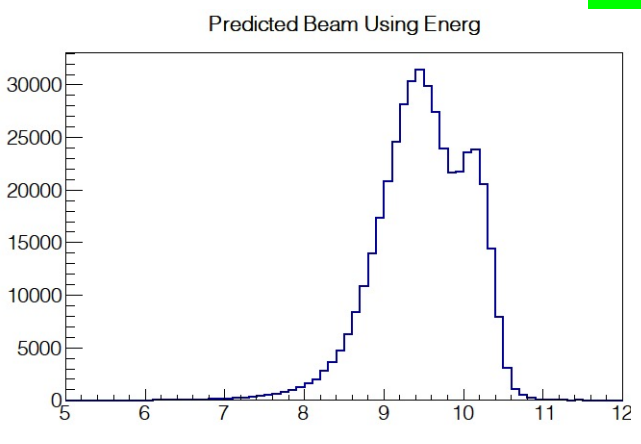


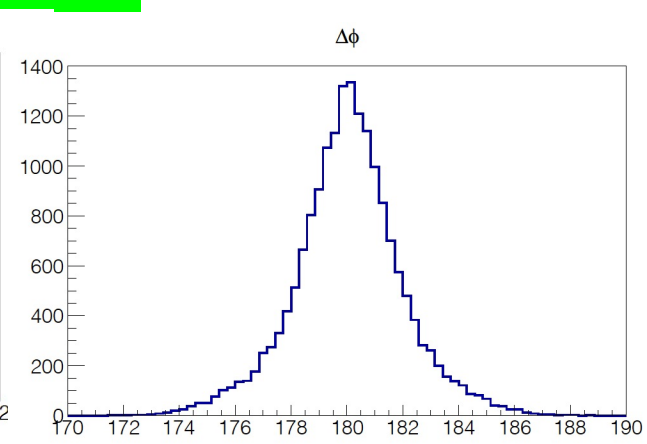


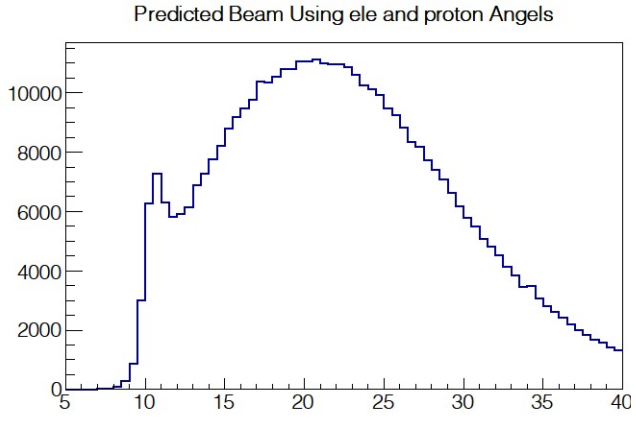


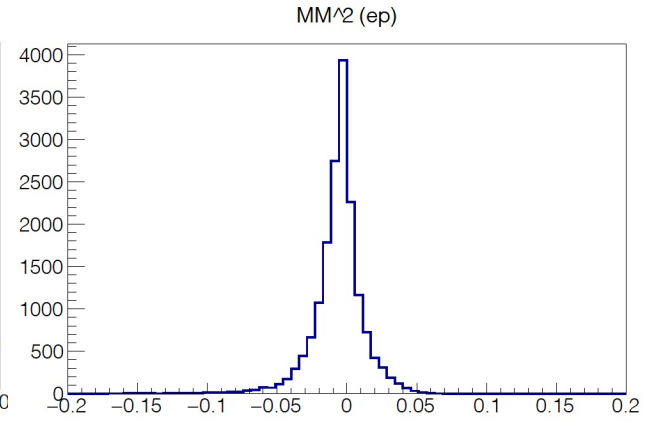


RGB









$$E_{beam} = \frac{2M_N * a_0}{a_1^2 - a_0^2}$$

$$a_0 = 1 - \frac{1}{\cos\theta_e - \frac{\sin\theta_e}{\tan(-\theta_N)}}$$

$$a_1 = \frac{\sin\theta_e}{\sin(\theta_e + \theta_N)}$$