E02-013 Analysis Update

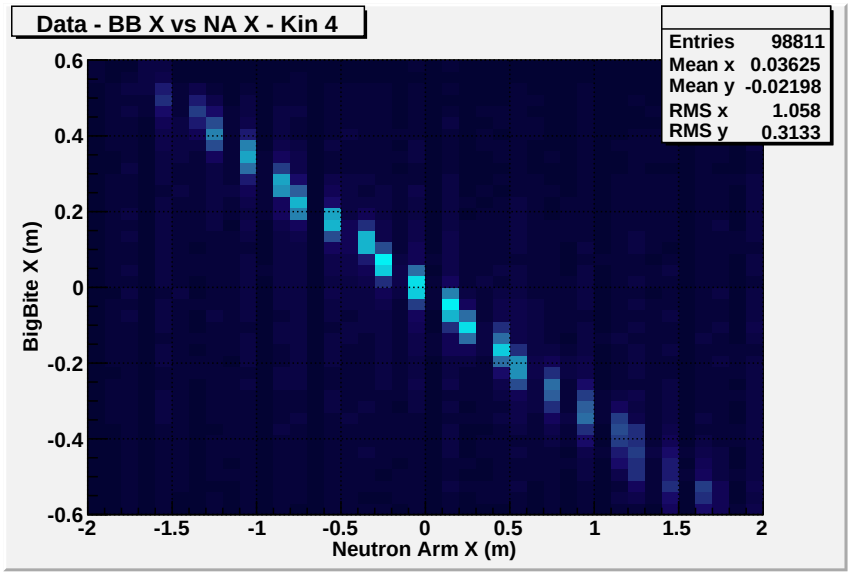
Seamus Riordan

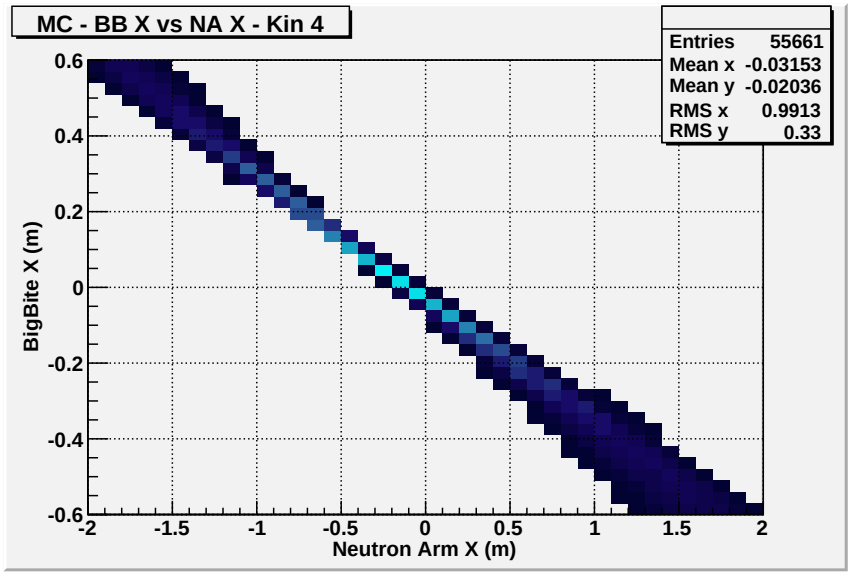
July 8, 2008

Continuing MC

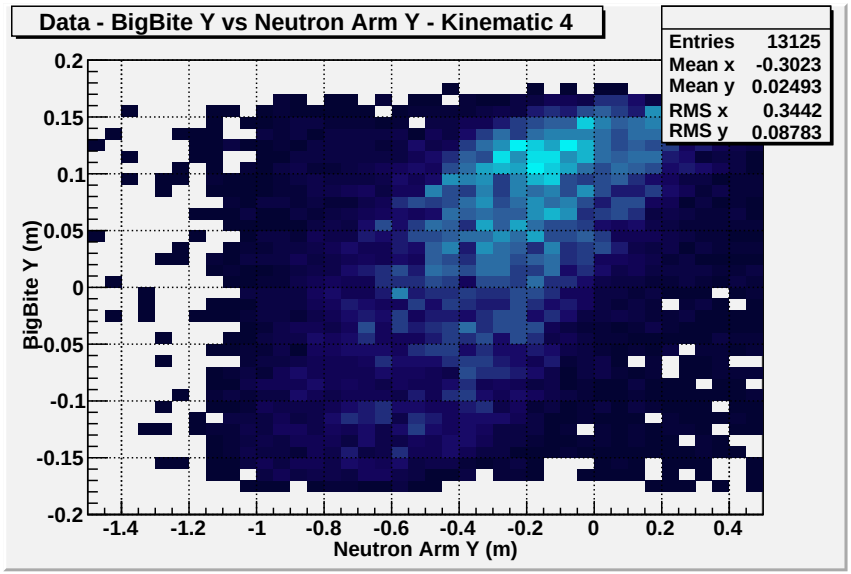
- Improved spectrometer acceptances by matching BigBite and neutron arm
- Put in ^3He target
- Trying to match W to data through various methods
- Background seems to play a significant role especially for Kin3 at higher currents

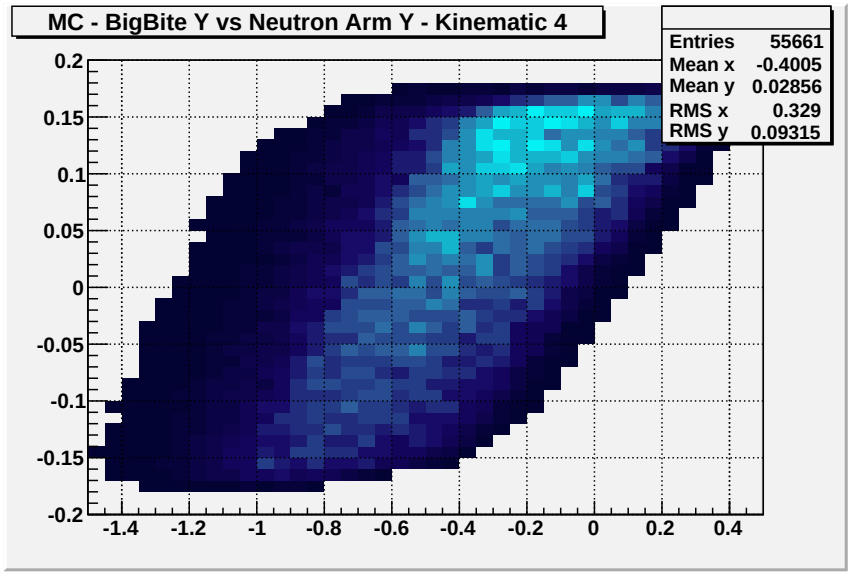
Kin 4: Coplanarity matches:



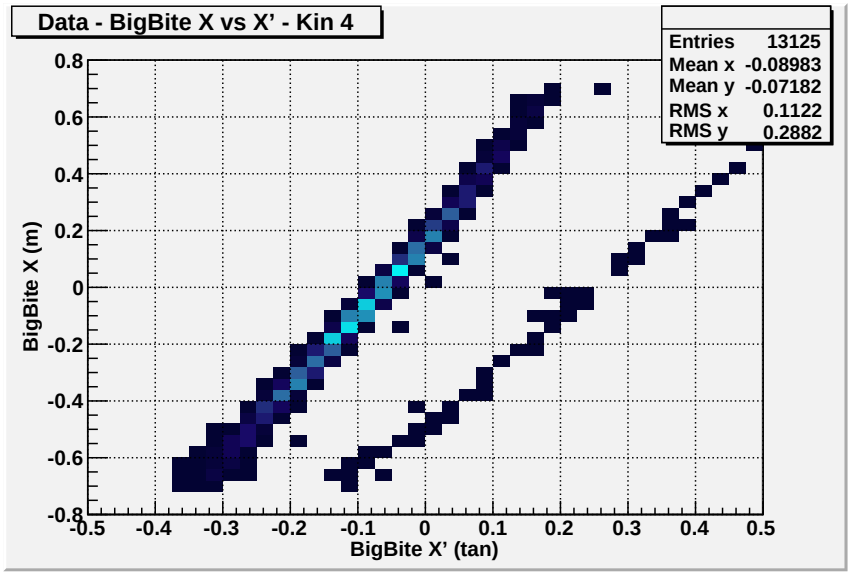


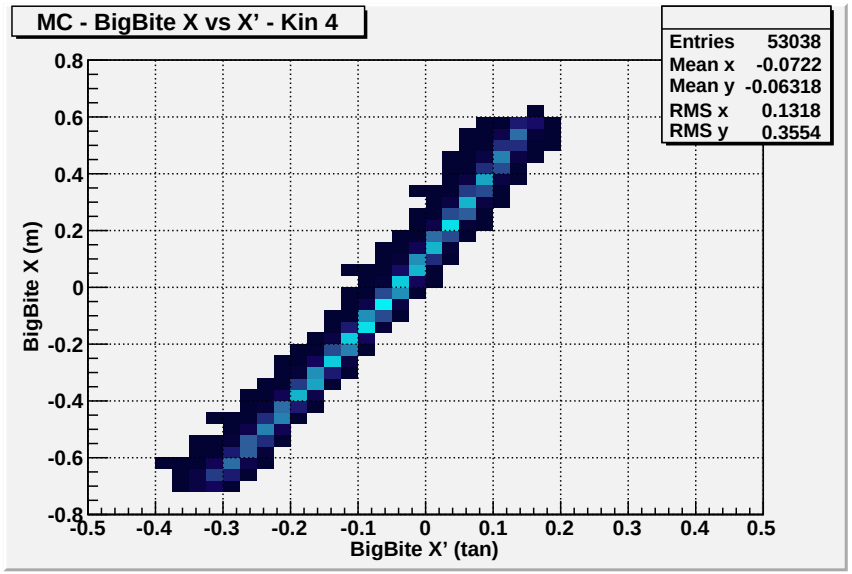
Inplane matches:



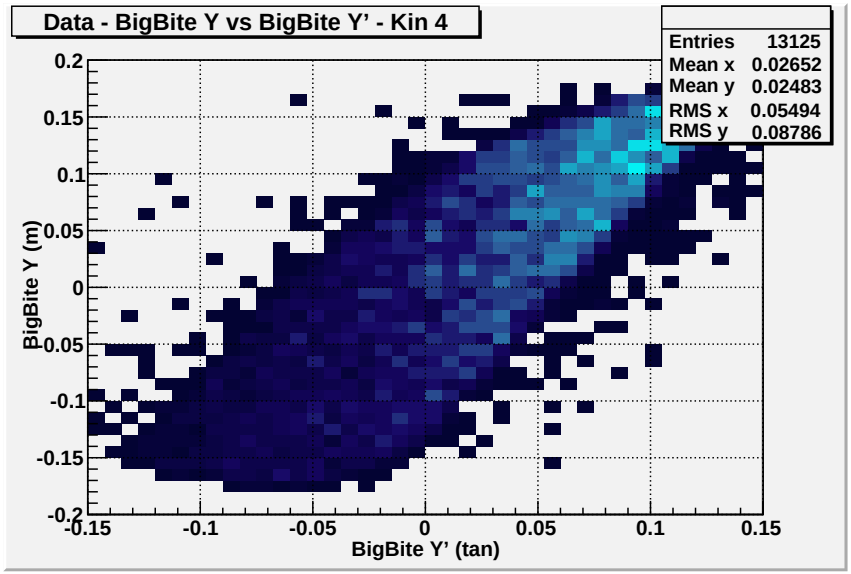


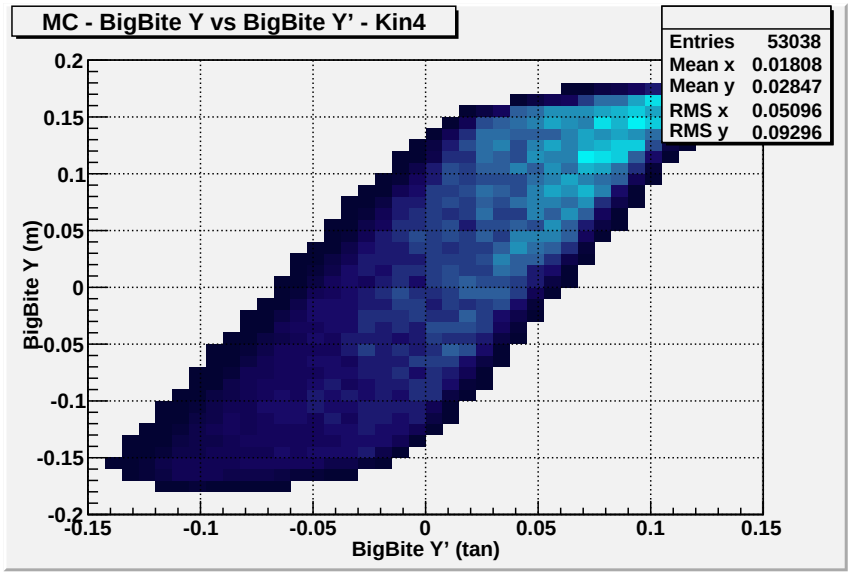
X vs X'


Data - BigBite X vs X' - Kin 4
Entries 13125
Mean x -0.08983
Mean y -0.07182
RMS x 0.1122
RMS y 0.2882
BigBite X (m)
BigBite X' (tan)

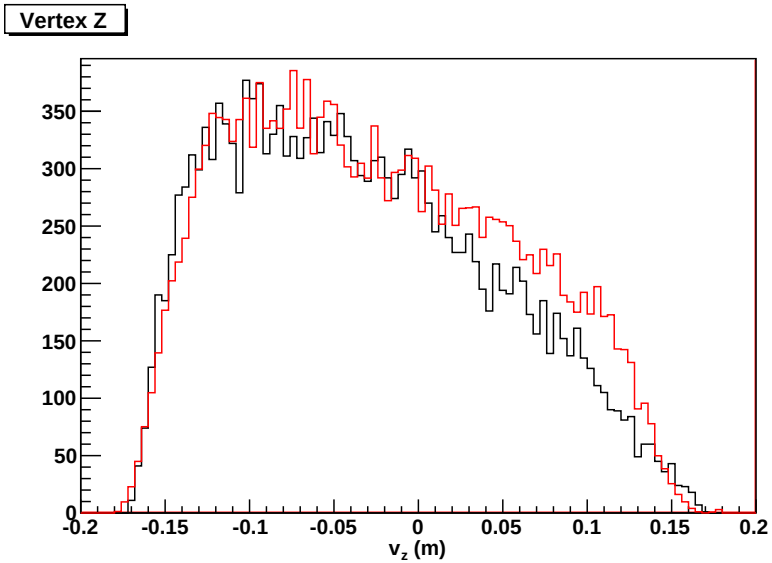

MC - BigBite X vs X' - Kin 4
Entries 53038
Mean x -0.0722
Mean y -0.06318
RMS x 0.1318
RMS y 0.3554
BigBite X (m)
BigBite X' (tan)

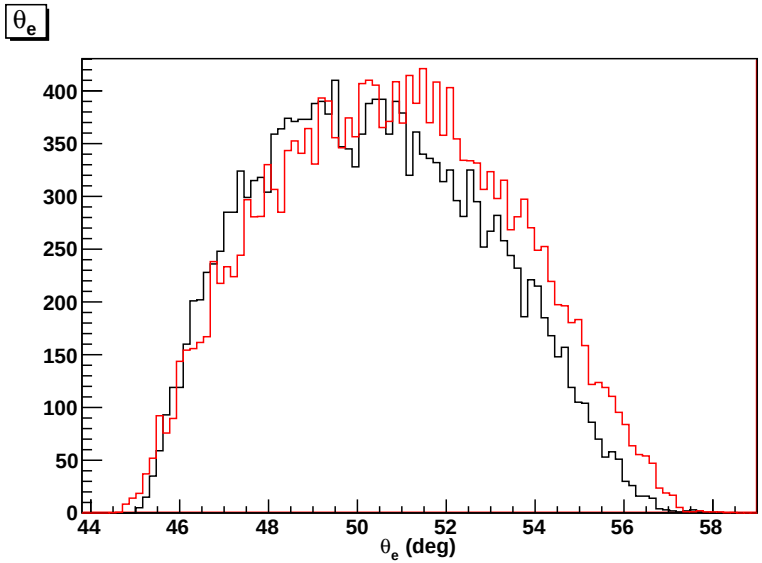
Y vs Y'


Data - BigBite Y vs BigBite Y' - Kin 4
Entries 13125
Mean x 0.02652
Mean y 0.02483
RMS x 0.05494
RMS y 0.08786
BigBite Y (m)
BigBite Y' (tan)


MC - BigBite Y vs BigBite Y' - Kin4
Entries 53038
Mean x 0.01808
Mean y 0.02847
RMS x 0.05096
RMS y 0.09296
BigBite Y (m)
BigBite Y' (tan)

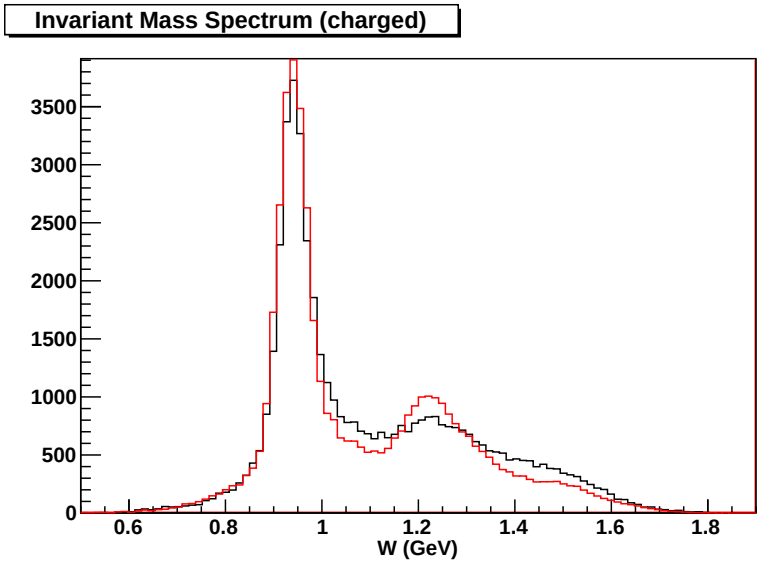
v_z and $\cos\theta_e$

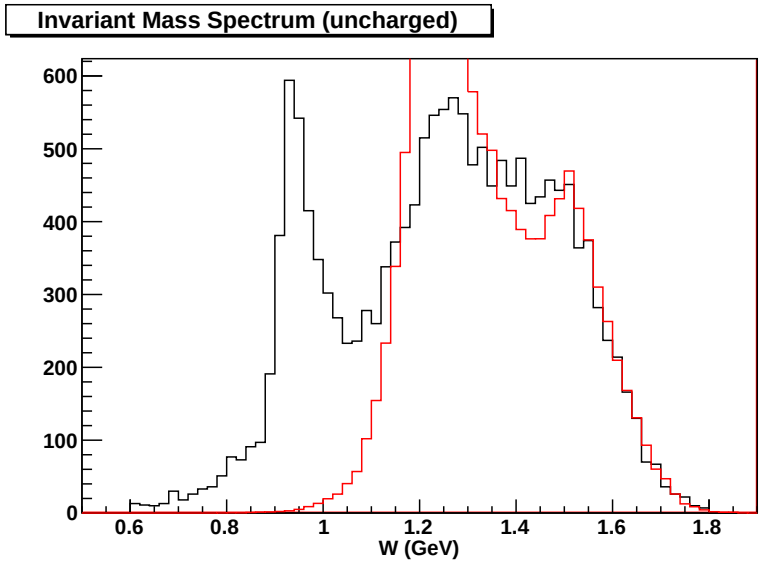




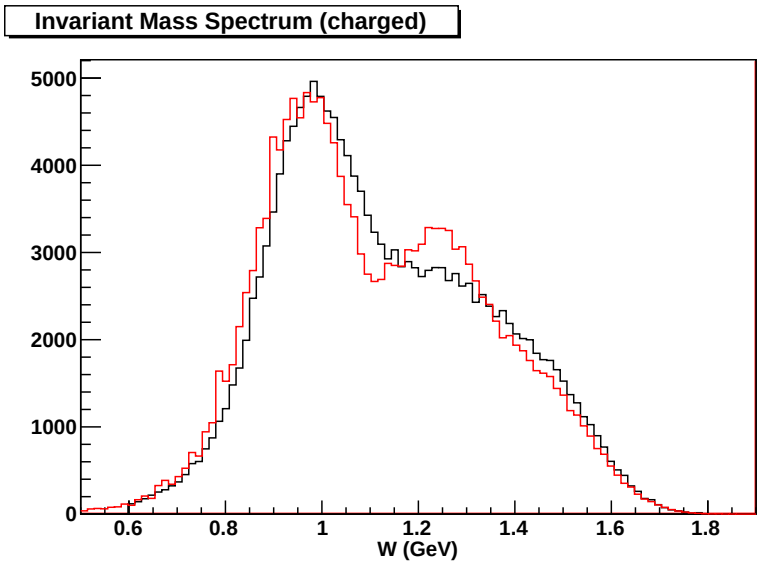
Data in black, sim in red

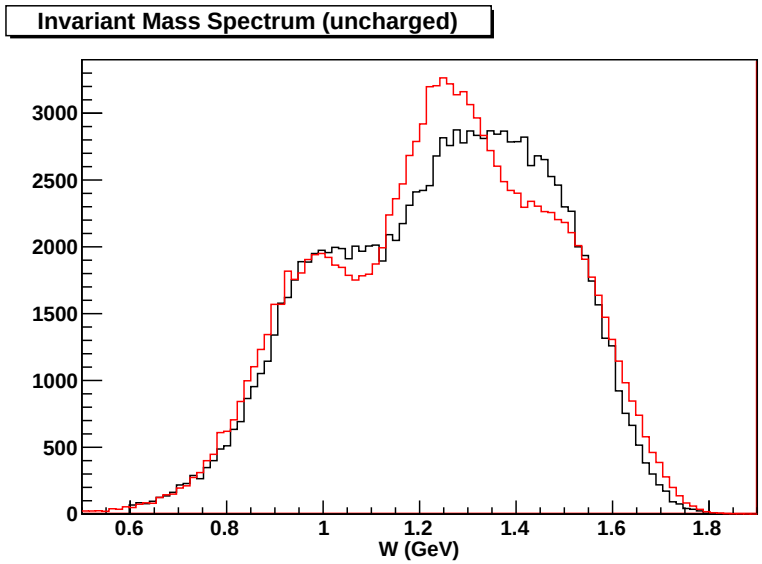
W, H2


Invariant Mass Spectrum (charged)
3500
3000
2500
2000
1500
1000
500
0
0.6
0.8
1
1.2
1.4
1.6
1.8
W (GeV)


Invariant Mass Spectrum (uncharged)
600
500
400
300
200
100
0
0.6
0.8
1
1.2
1.4
1.6
1.8
W (GeV)

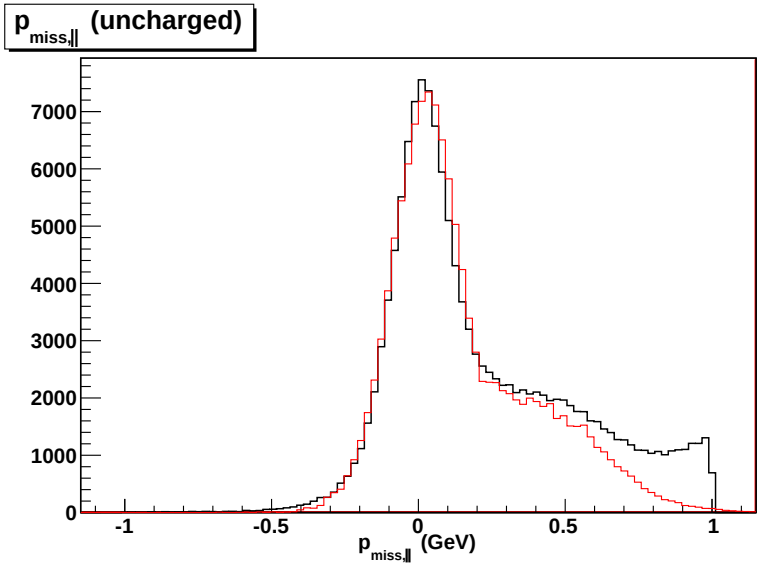
W, 3He

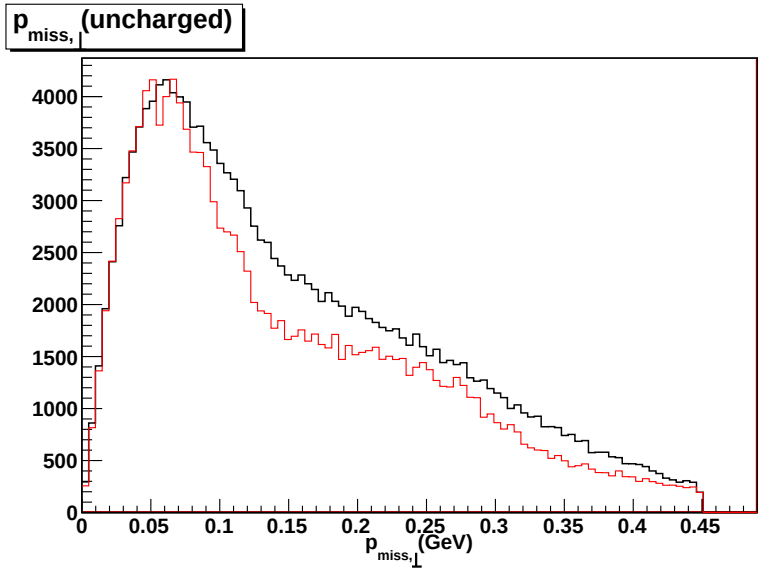




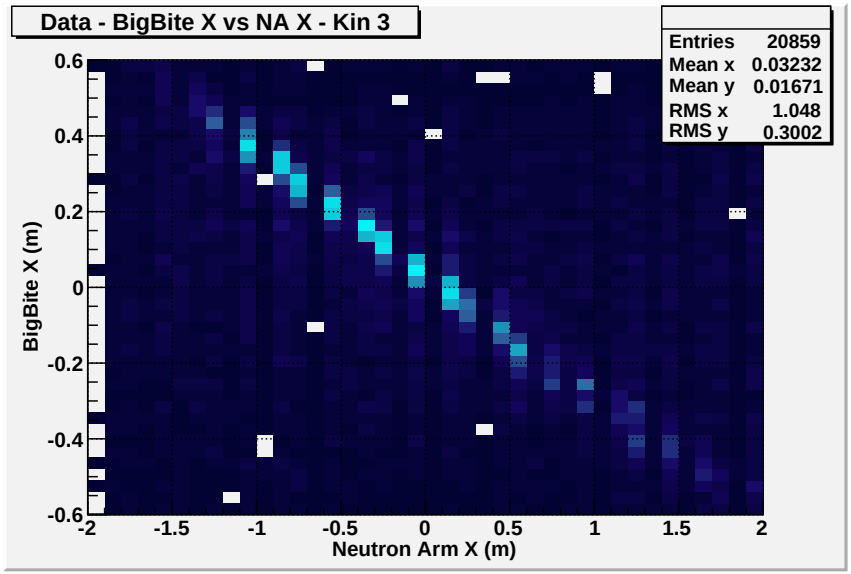
Uncharged includes 40% charge mixing

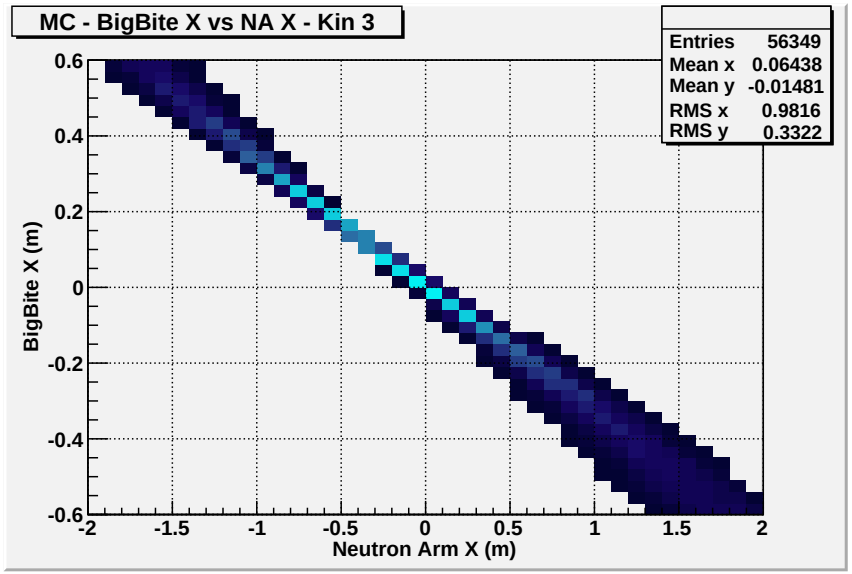
Background plays a role in matching spectra



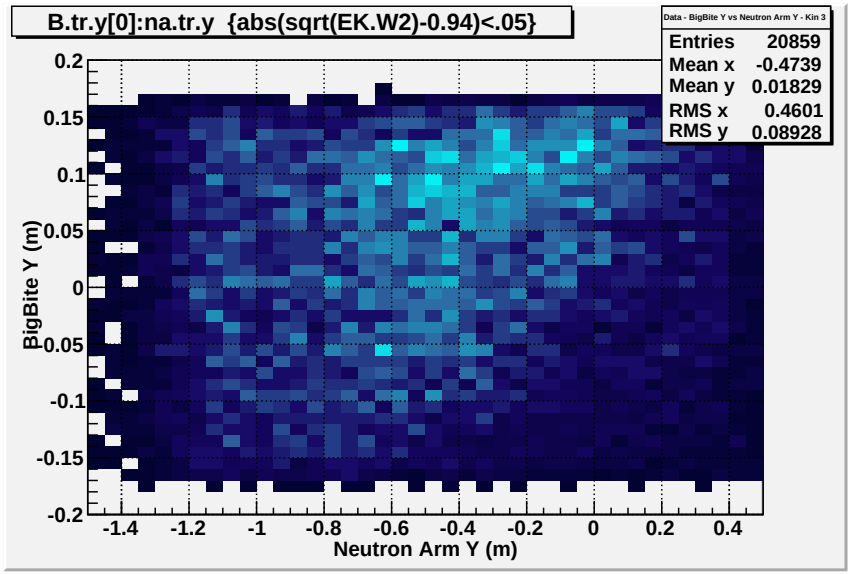


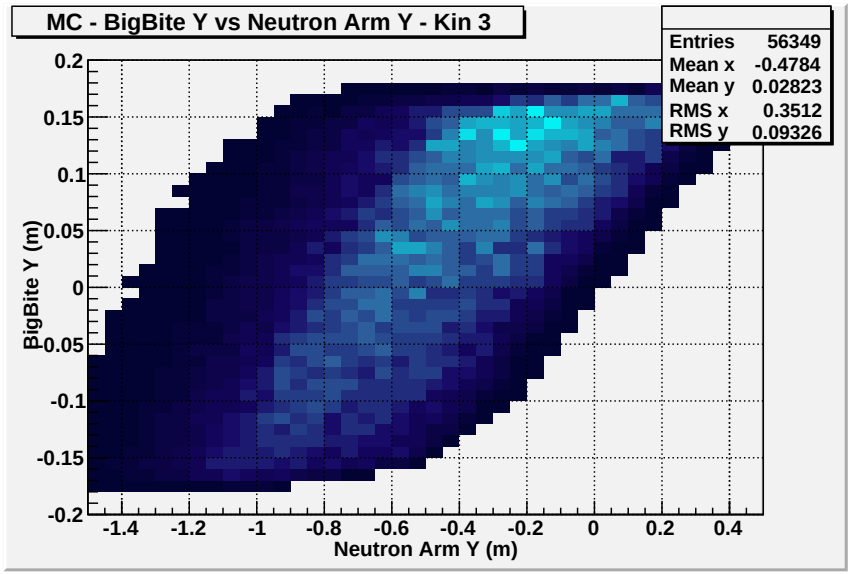
Kin 3: Coplanarity matches:



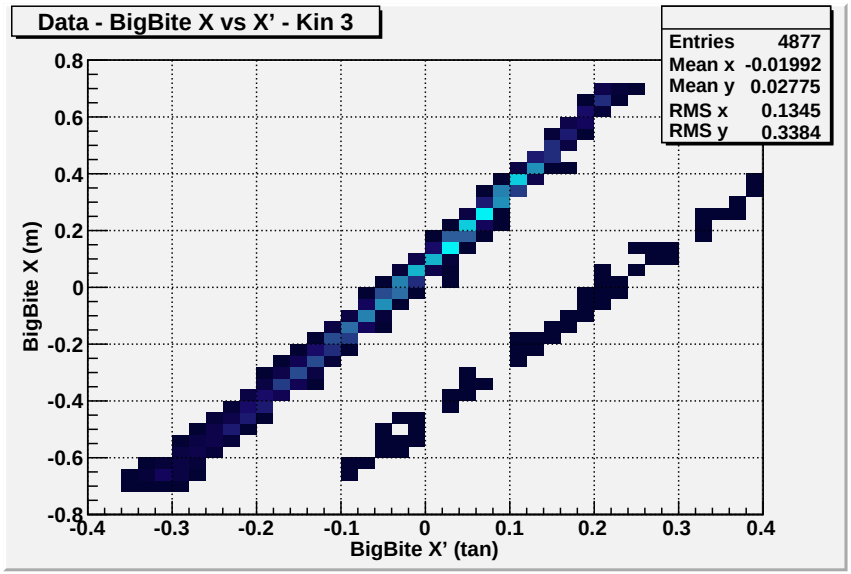


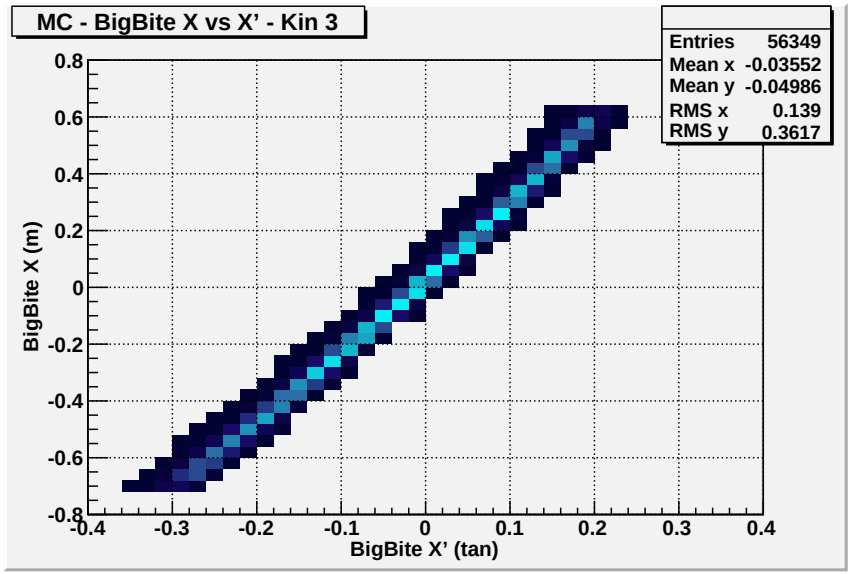
Inplane matches:



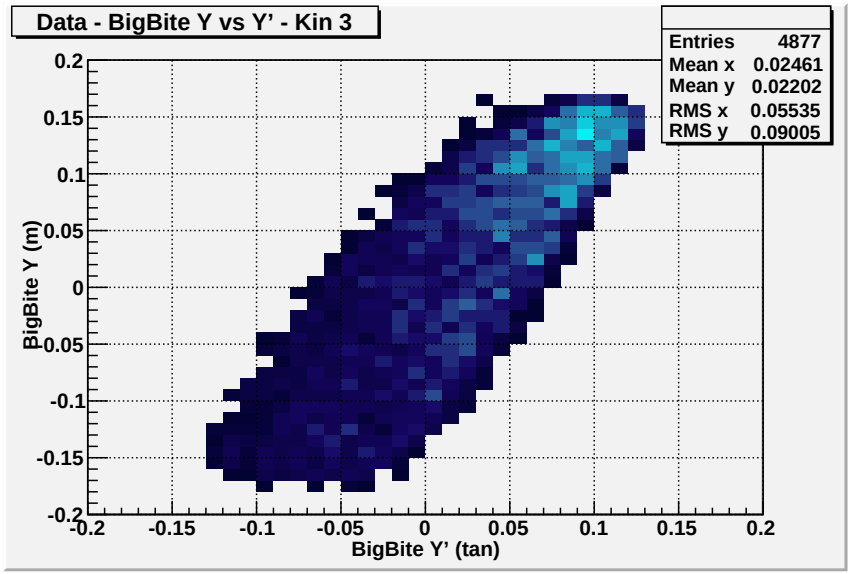


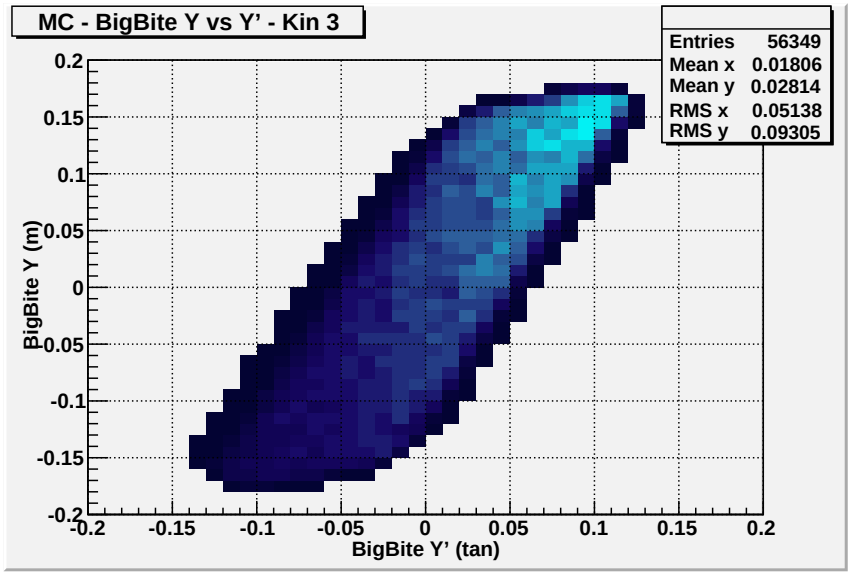
X vs X'


Data - BigBite X vs X' - Kin 3
Entries 4877
Mean x -0.01992
Mean y 0.02775
RMS x 0.1345
RMS y 0.3384
BigBite X (m)
BigBite X' (tan)

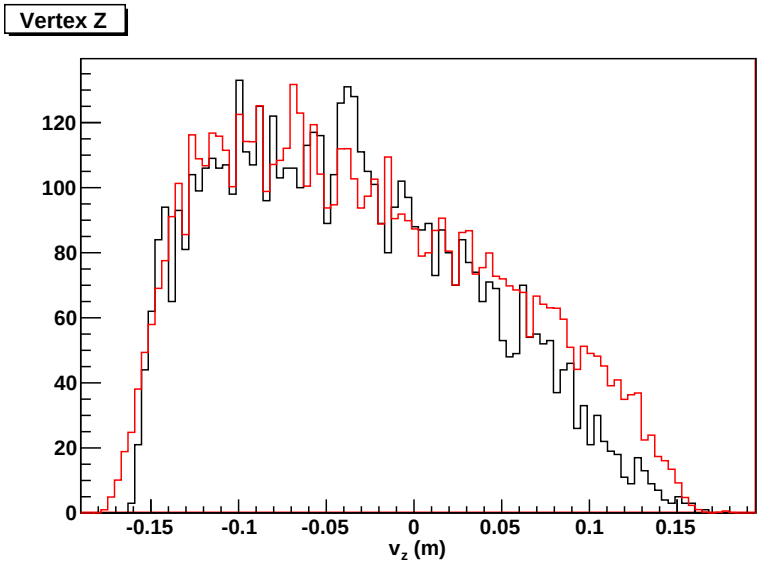

MC - BigBite X vs X' - Kin 3
Entries 56349
Mean x -0.03552
Mean y -0.04986
RMS x 0.139
RMS y 0.3617
BigBite X (m)
BigBite X' (tan)

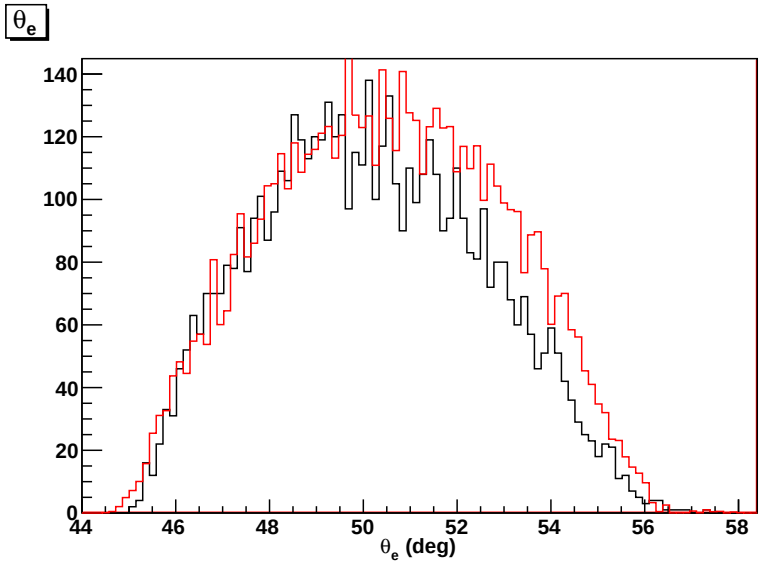
Y vs Y'


Data - BigBite Y vs Y' - Kin 3
Entries 4877
Mean x 0.02461
Mean y 0.02202
RMS x 0.05535
RMS y 0.09005
BigBite Y (m)
BigBite Y' (tan)


MC - BigBite Y vs Y' - Kin 3
Entries 56349
Mean x 0.01806
Mean y 0.02814
RMS x 0.05138
RMS y 0.09305
BigBite Y (m)
BigBite Y' (tan)

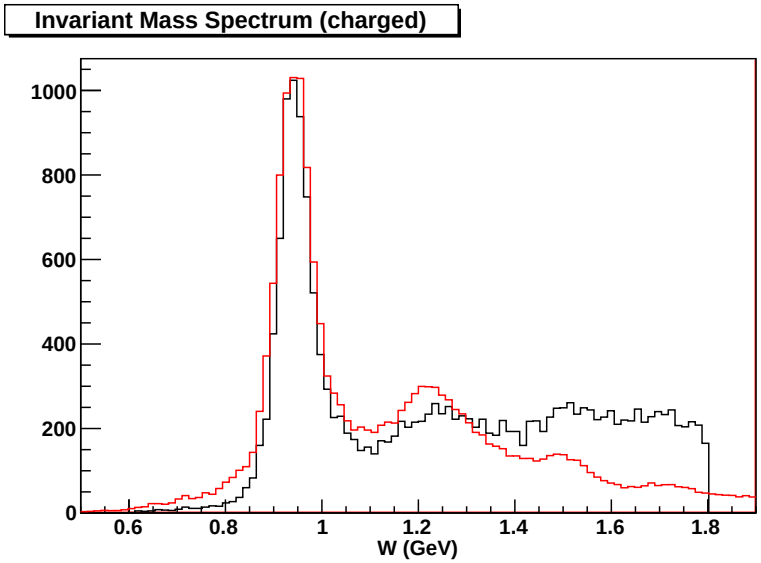
v_z and $\cos\theta_e$

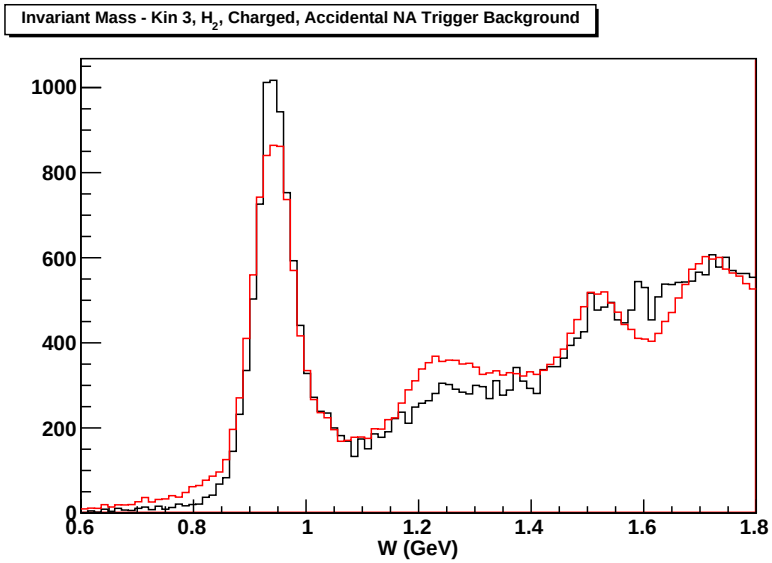




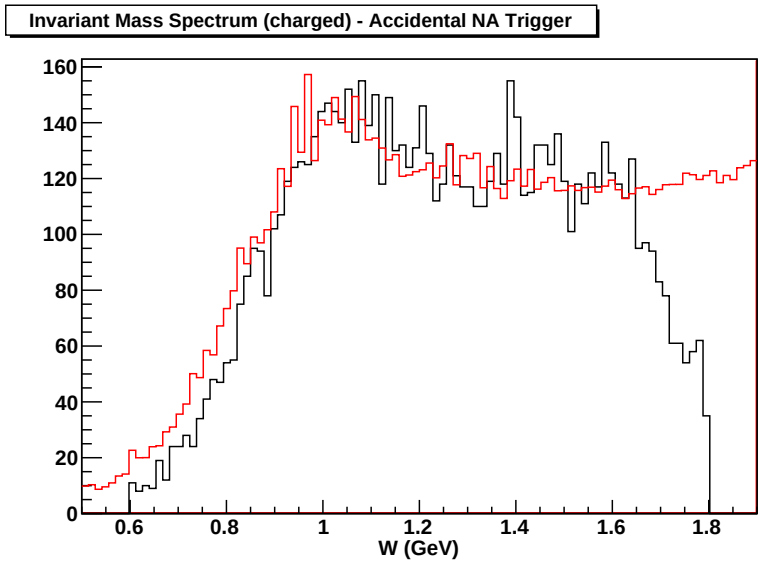
Data in black, sim in red

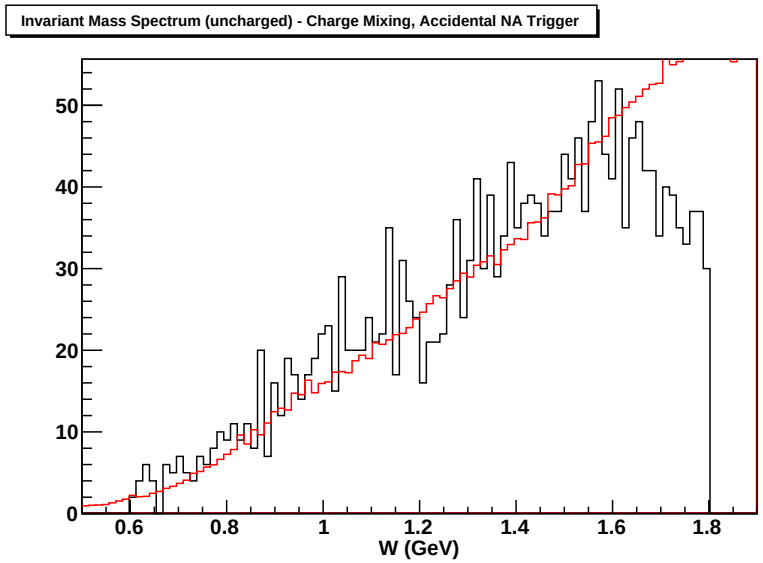
W, H2


Invariant Mass Spectrum (charged)
1000
800
600
400
200
0
0.6
0.8
1
1.2
1.4
1.6
1.8
W (GeV)


Invariant Mass - Kin 3, H2, Charged, Accidental NA Trigger Background
1000
800
600
400
200
0
0.6
0.8
1
1.2
1.4
1.6
1.8
W (GeV)

W, 3He



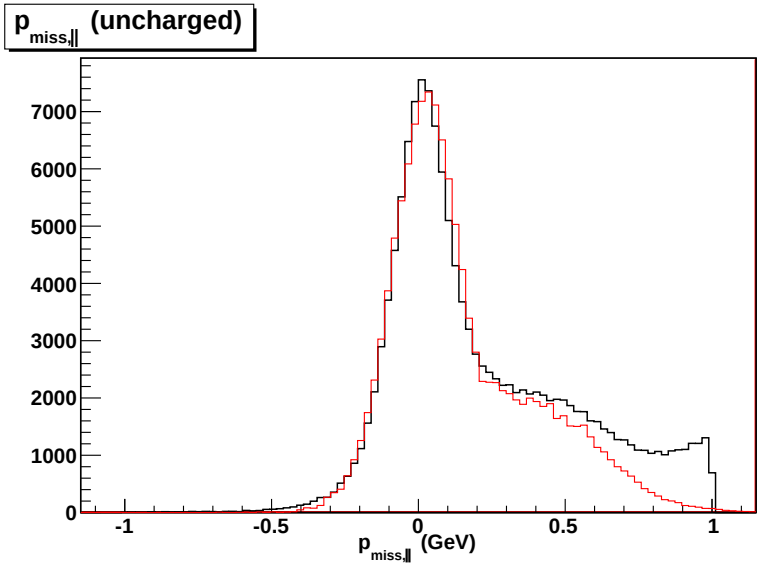


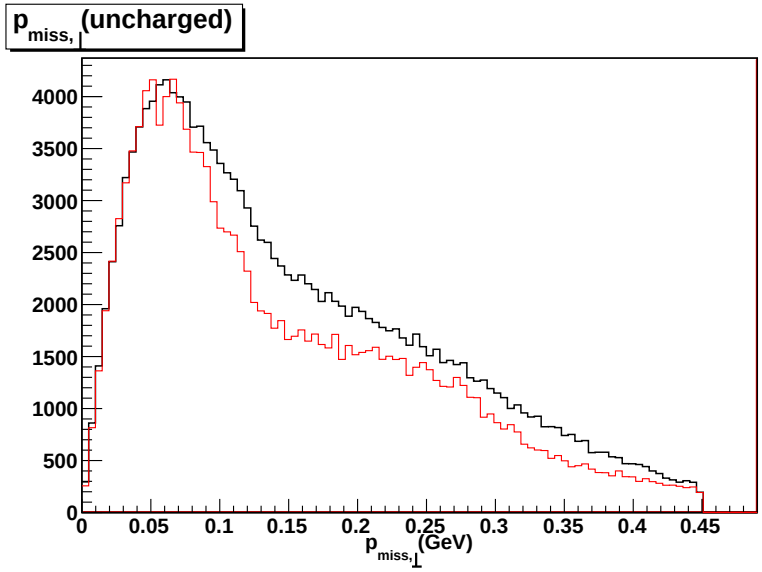
Charged

Uncharged

Uncharged includes charge mixing and background trigger

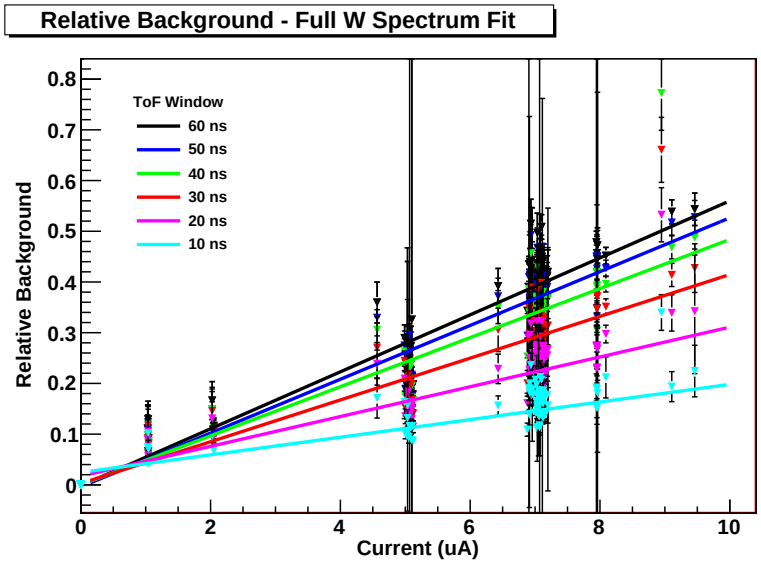
Background plays a role in matching spectra





$$W_{\mathrm{data}}(i) = \alpha W_{\mathrm{MC,ch}}(i) + \beta W_{\mathrm{MC,un}}(i) + \gamma W_{\mathrm{MC,back}}(i)$$

Relative background $= \gamma/(\alpha + \beta)$



Free fit shows bias to background at higher currents

Summary

MC left to do:

- Asymmetry
- Additional radiative effects
- GEANT