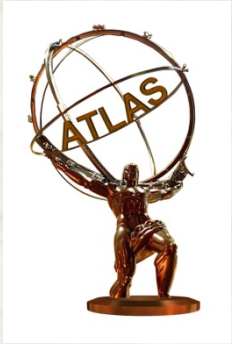
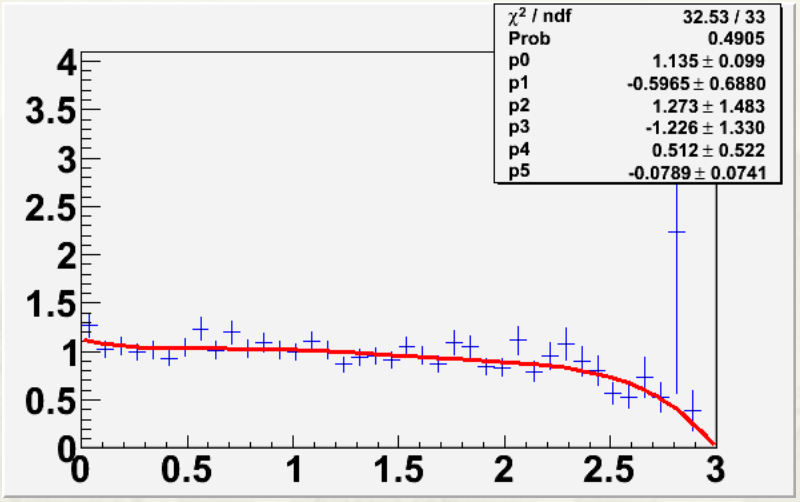
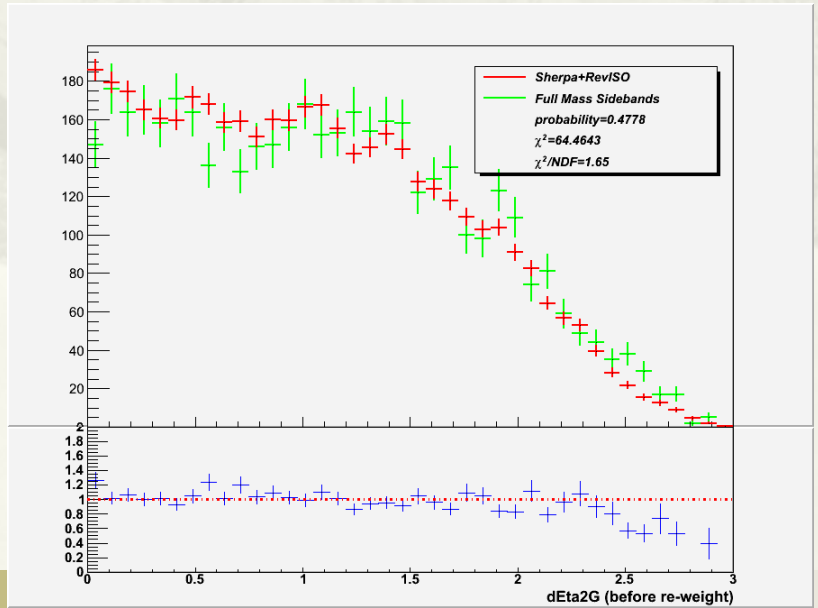
Background Reweighting in VBF MVA Aanalysis

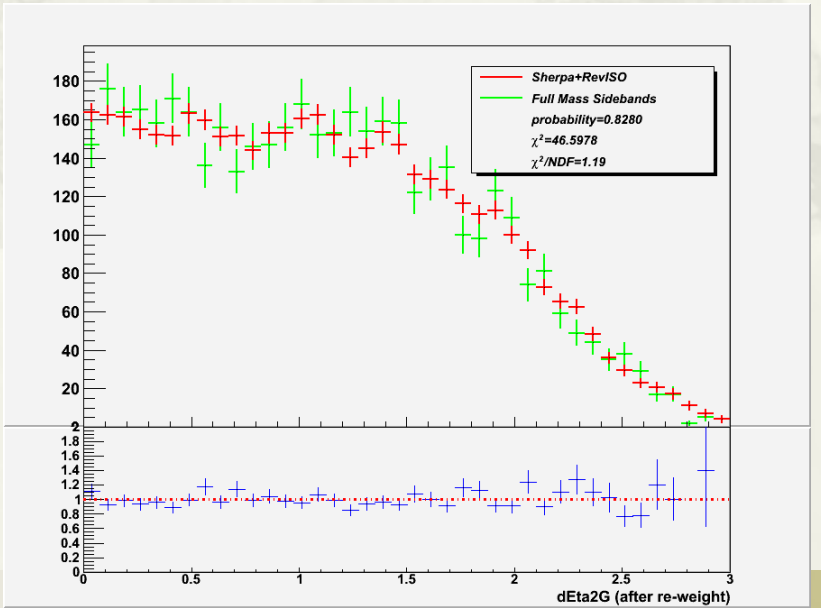


Reweight with dEta2G

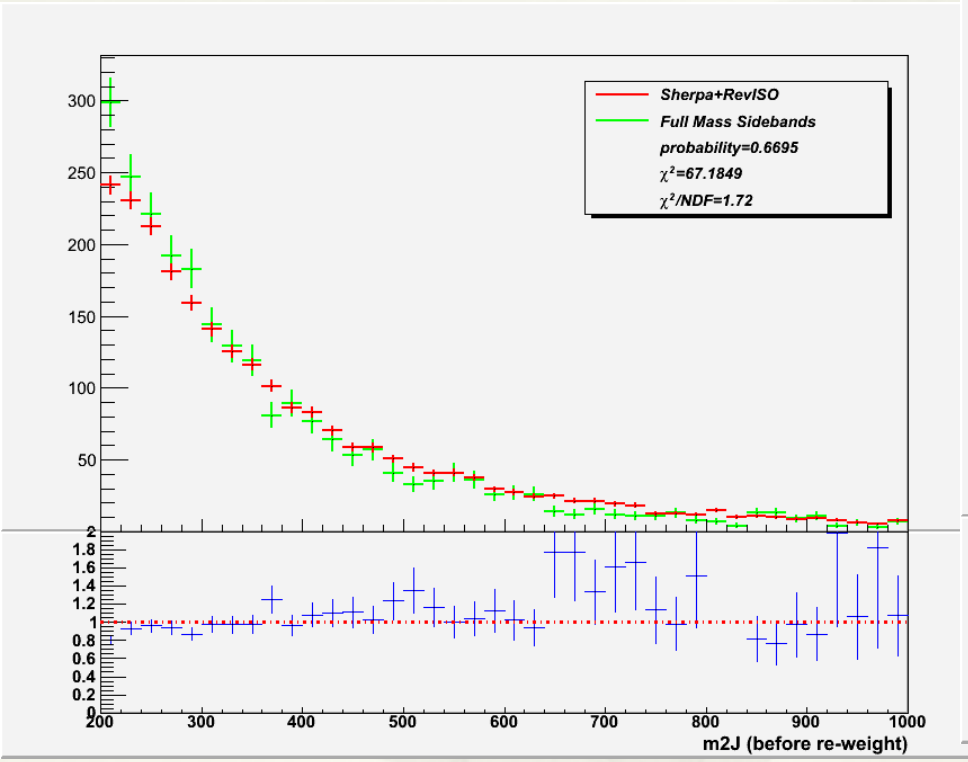
Reweight with dEta2G

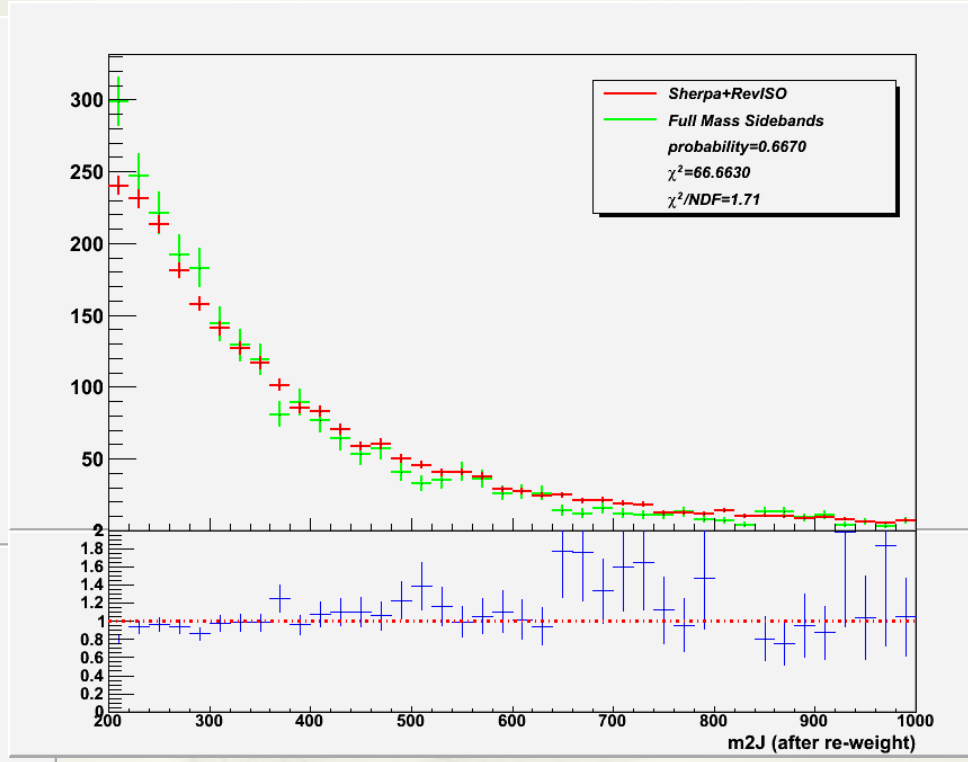




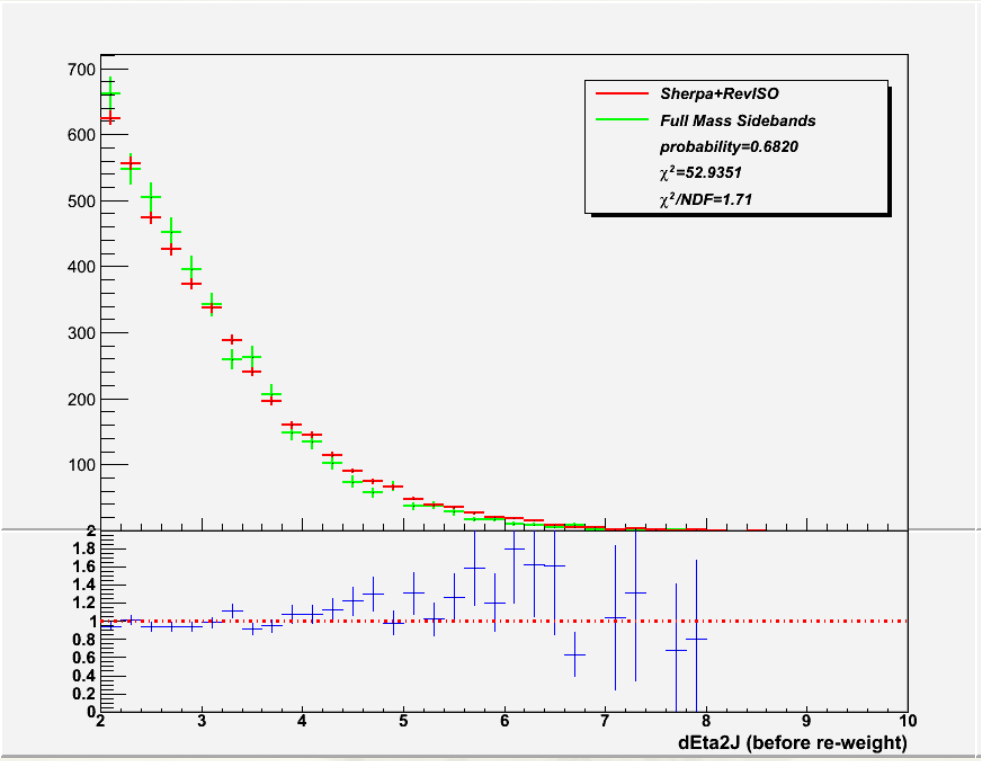


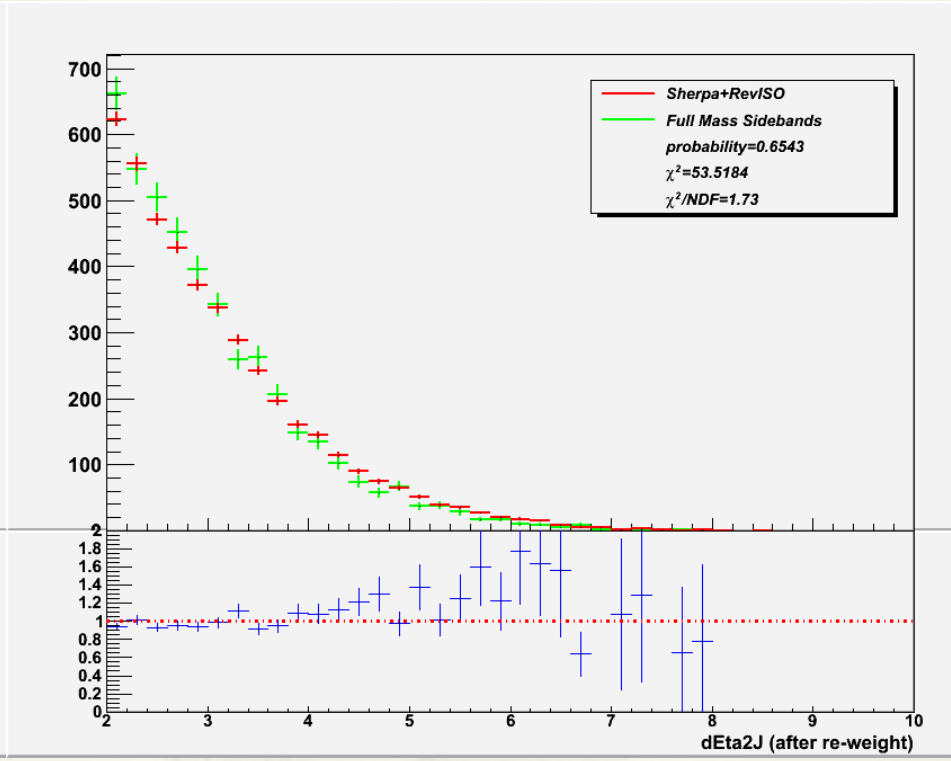
m2J


Sherpa+RevISO
Full Mass Sidebands
probability=0.6695
χ²=67.1849
χ²/NDF=1.72
m2J (before re-weight)

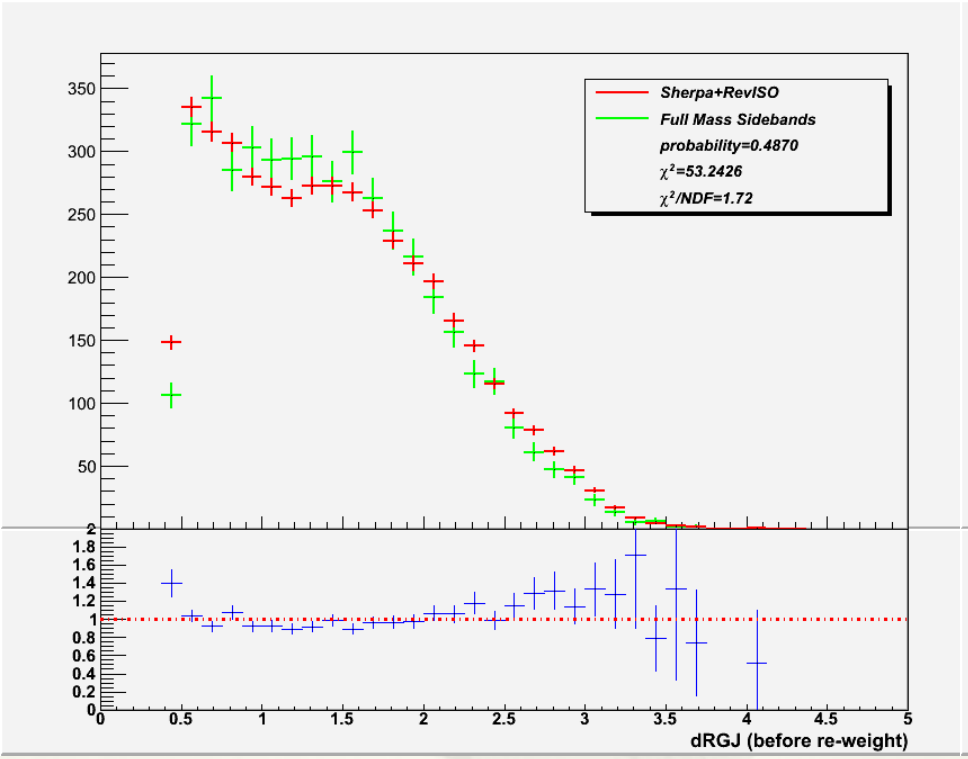

Sherpa+RevISO
Full Mass Sidebands
probability=0.6670
χ²=66.6630
χ²/NDF=1.71
m2J (after re-weight)

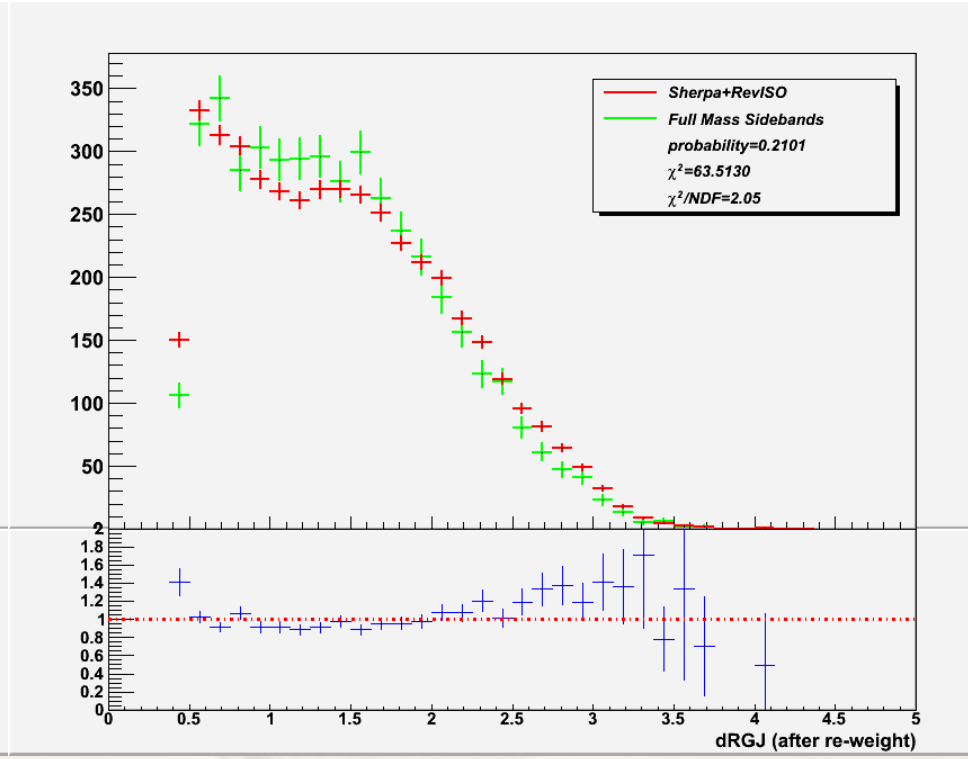
dEta2J


Sherpa+RevISO
Full Mass Sidebands
probability=0.6820
χ²=52.9351
χ²/NDF=1.71
dEta2J (before re-weight)

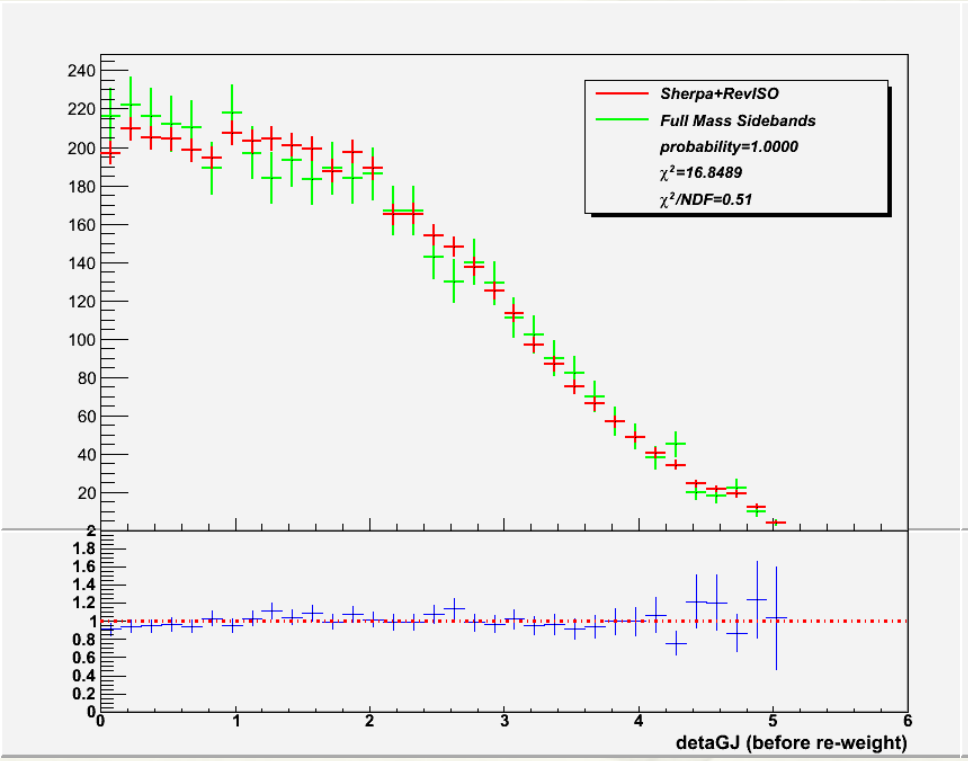

Sherpa+RevISO
Full Mass Sidebands
probability=0.6543
χ²=53.5184
χ²/NDF=1.73
dEta2J (after re-weight)

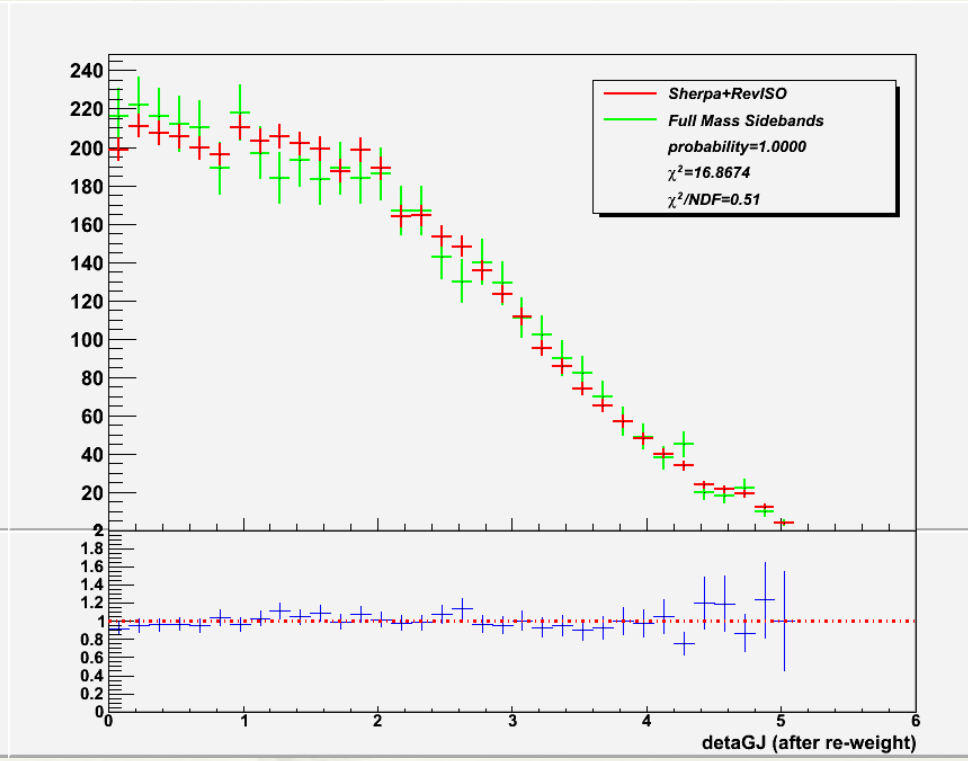
dRGJ


Sherpa+RevISO
Full Mass Sidebands
probability=0.4870
χ²=53.2426
χ²/NDF=1.72
dRGJ (before re-weight)

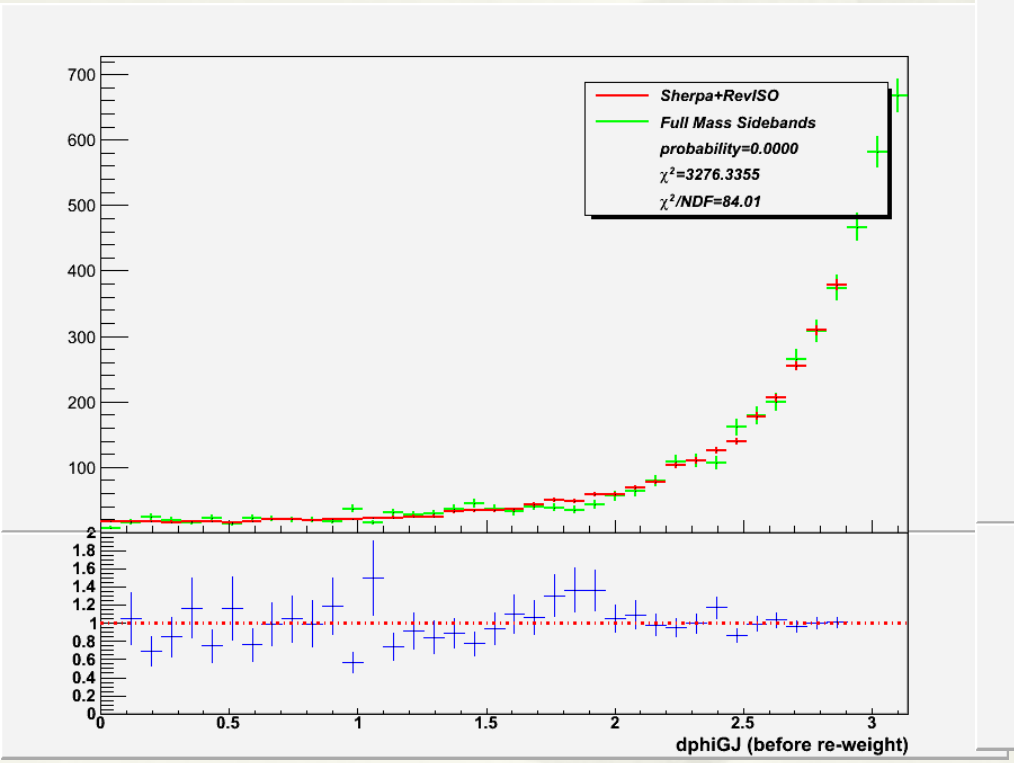

Sherpa+RevISO
Full Mass Sidebands
probability=0.2101
χ²=63.5130
χ²/NDF=2.05
dRGJ (after re-weight)

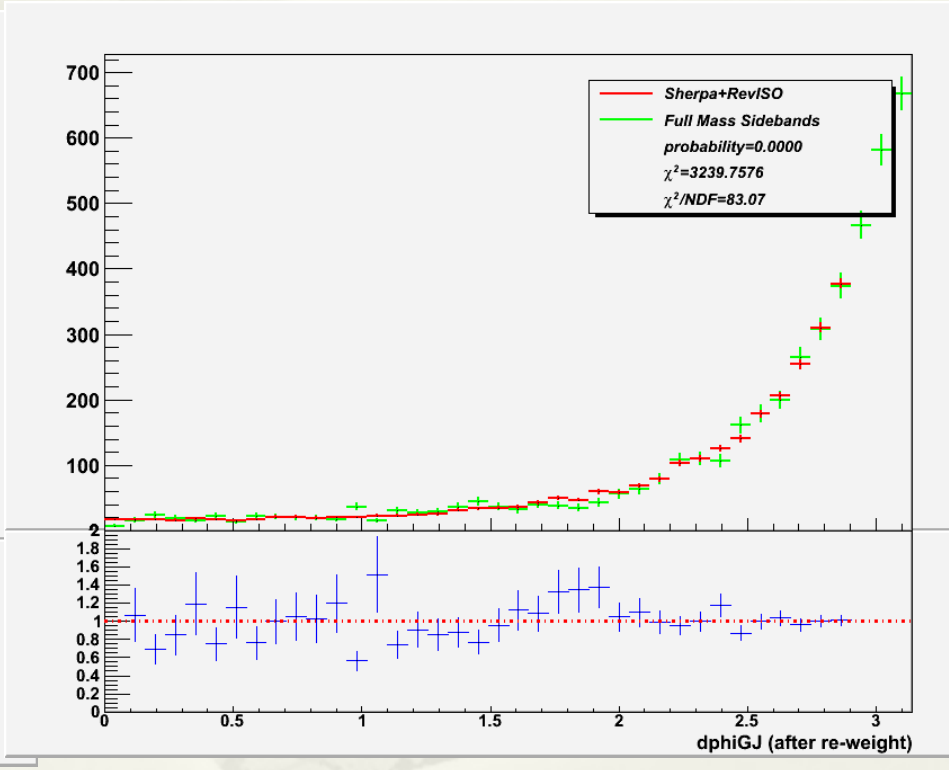
detaGJ


Sherpa+RevISO
Full Mass Sidebands
probability=1.0000
χ²=16.8489
χ²/NDF=0.51
detaGJ (before re-weight)

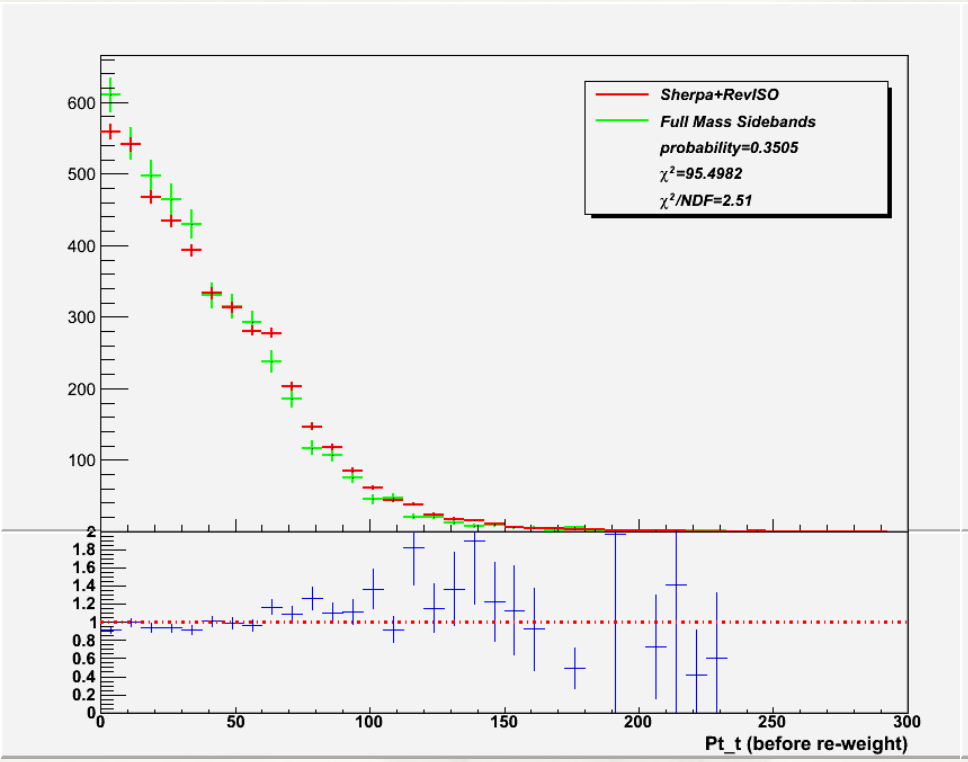

Sherpa+RevISO
Full Mass Sidebands
probability=1.0000
χ²=16.8674
χ²/NDF=0.51
detaGJ (after re-weight)

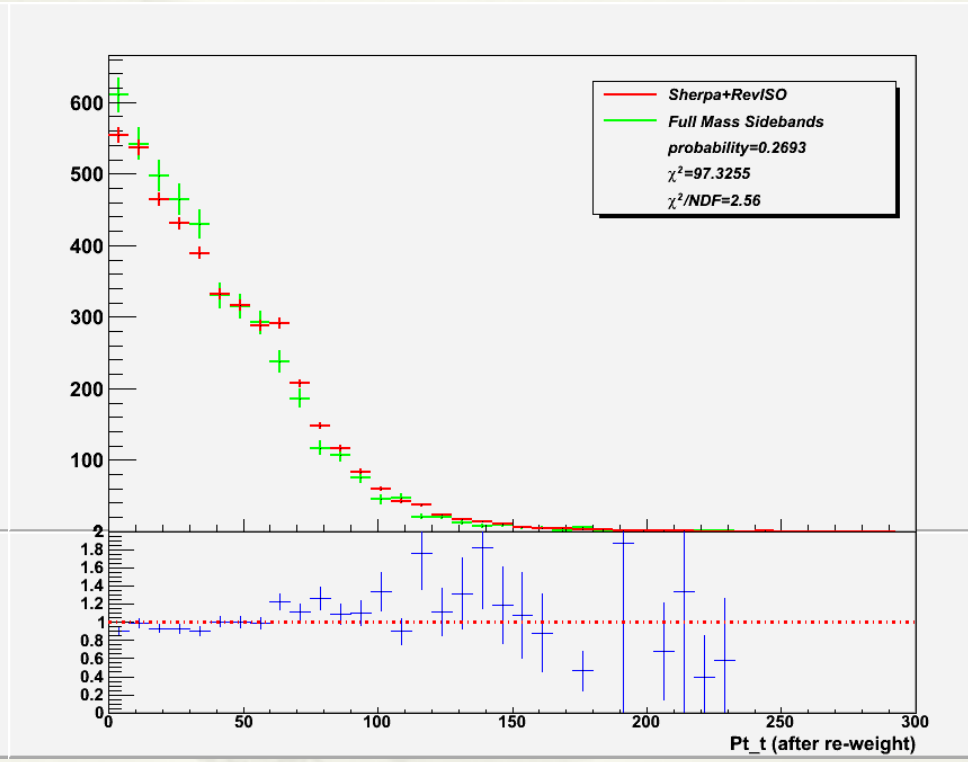
dphiGJ


Sherpa+RevISO
Full Mass Sidebands
probability=0.0000
χ²=3276.3355
χ²/NDF=84.01
dphiGJ (before re-weight)

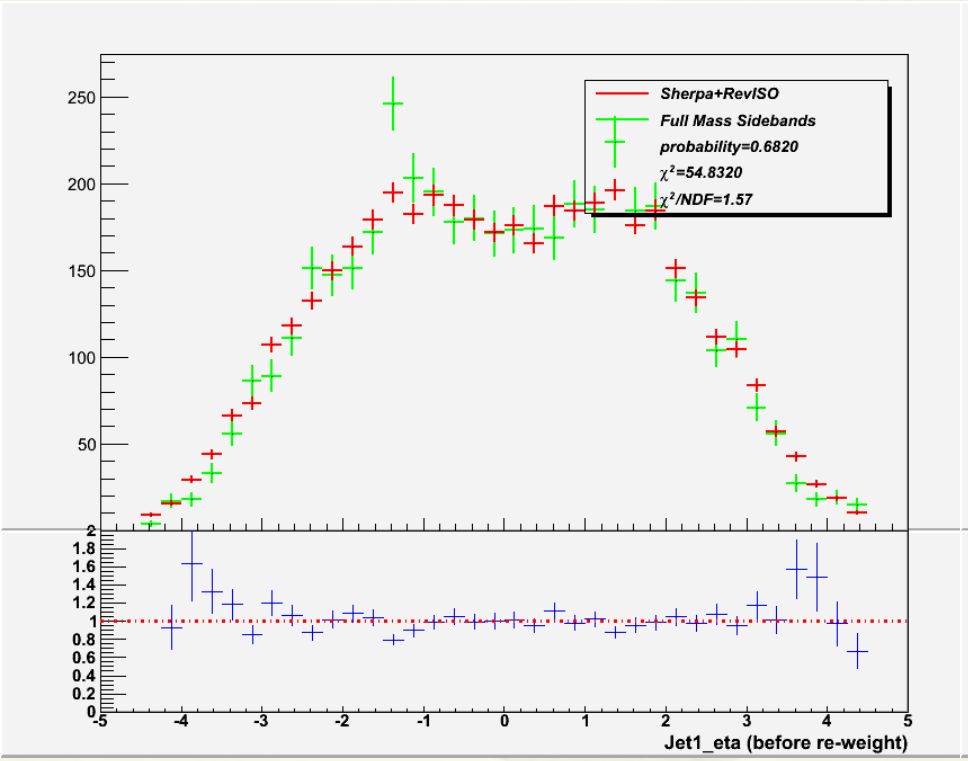

Sherpa+RevISO
Full Mass Sidebands
probability=0.0000
χ²=3239.7576
χ²/NDF=83.07
dphiGJ (after re-weight)

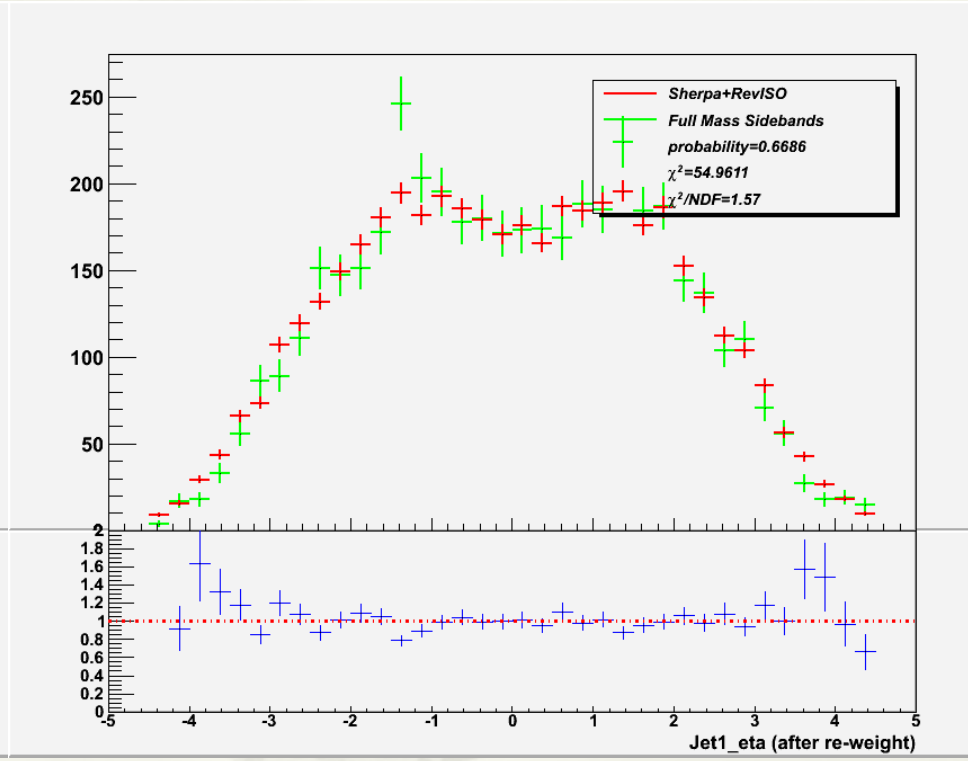
ptt


Sherpa+RevISO
Full Mass Sidebands
probability=0.3505
χ²=95.4982
χ²/NDF=2.51
Pt_t (before re-weight)

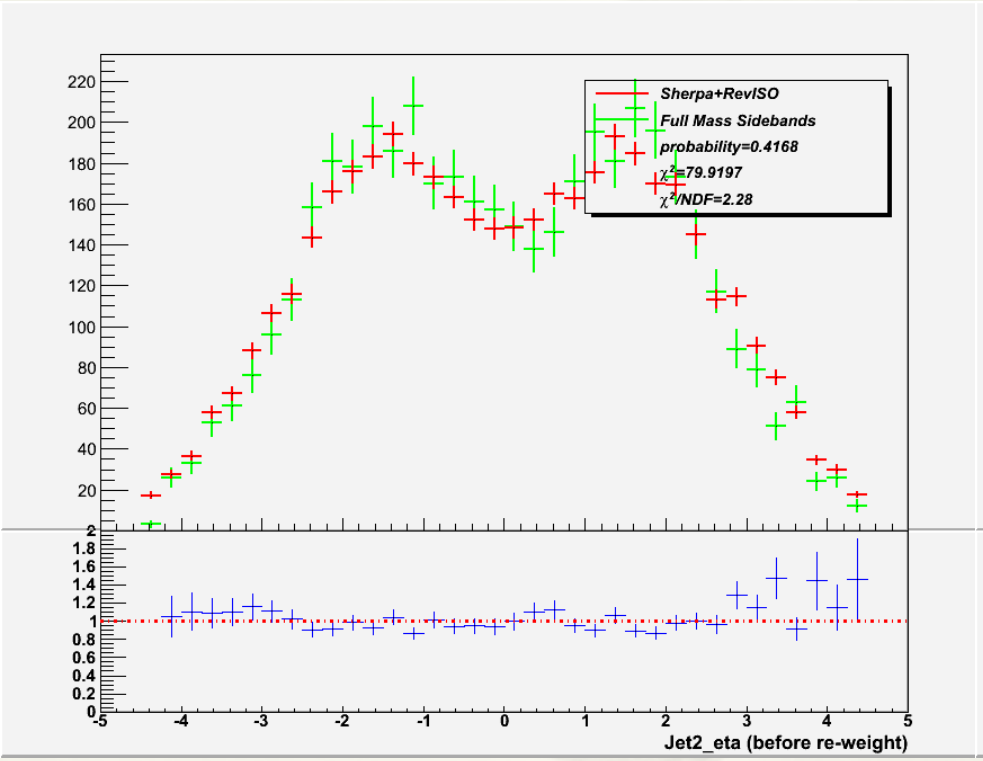

Sherpa+RevISO
Full Mass Sidebands
probability=0.2693
χ²=97.3255
χ²/NDF=2.56
Pt_t (after re-weight)

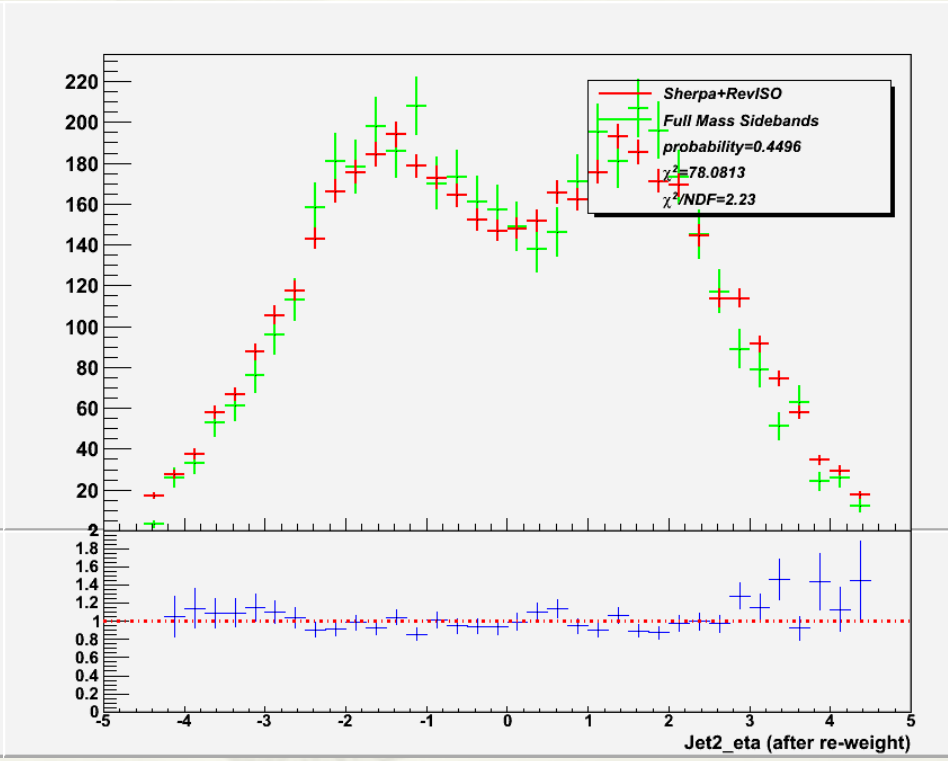
Jet1_eta


Sherpa+RevISO
Full Mass Sidebands
probability=0.6820
χ²=54.8320
χ²/NDF=1.57
Jet1_eta (before re-weight)


Sherpa+RevISO
Full Mass Sidebands
probability=0.6686
χ²=54.9611
χ²/NDF=1.57
Jet1_eta (after re-weight)

Jet2_eta

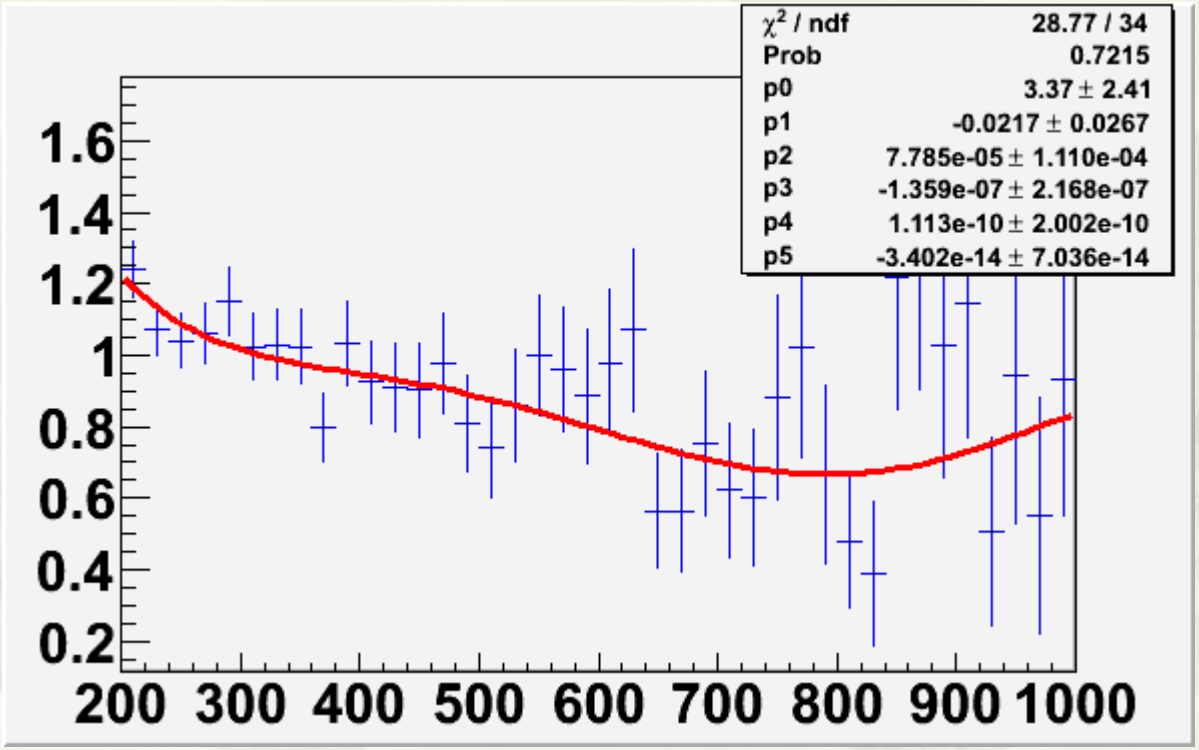

Sherpa+RevISO
Full Mass Sidebands
probability=0.4168
χ²=79.9197
χ²/NDF=2.28
Jet2_eta (before re-weight)


Sherpa+RevISO
Full Mass Sidebands
probability=0.4496
χ²=78.0813
χ²/NDF=2.23
Jet2_eta (after re-weight)

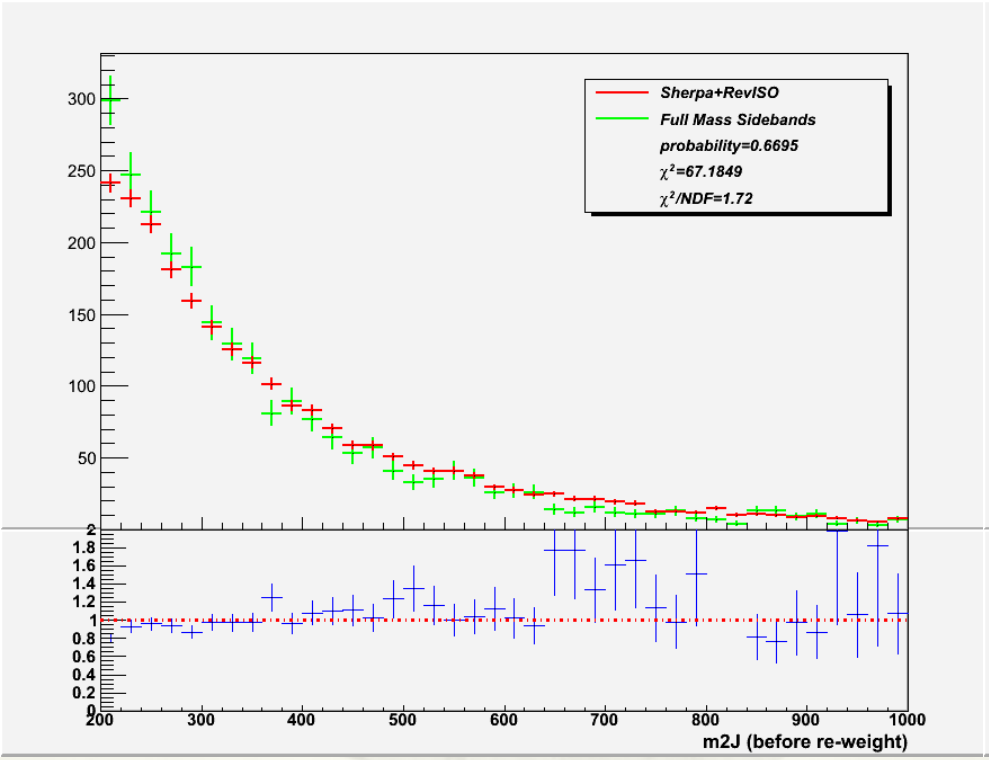
- Redo mva optimization
- Redo working point optimization
- Relative improvement on mu uncertainties:<1%

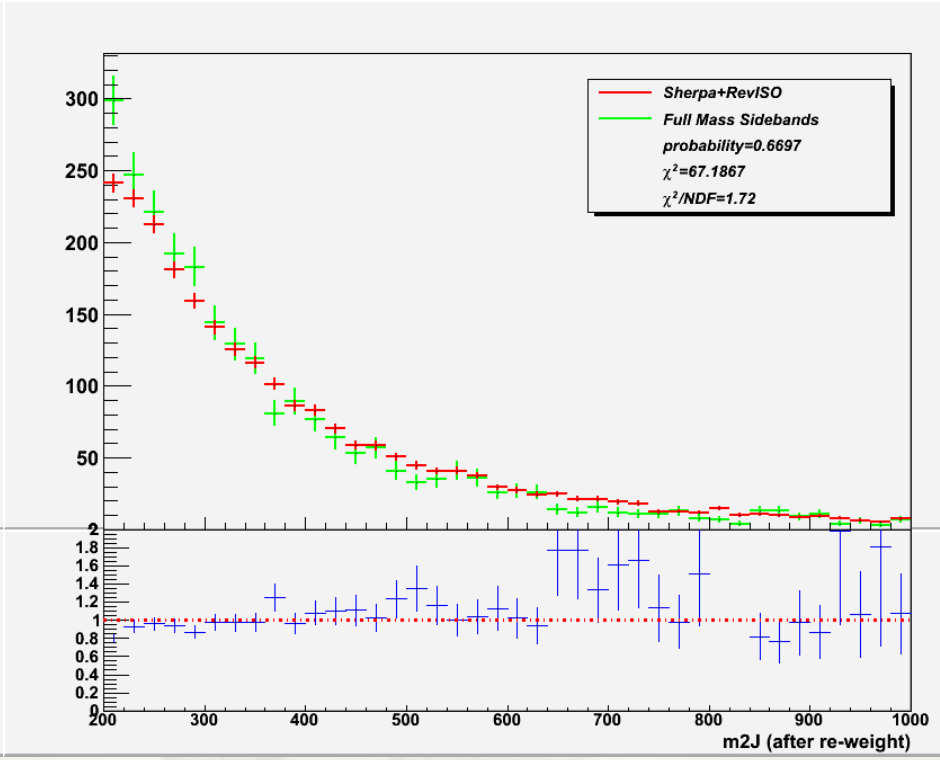
Reweight with m2J

fit

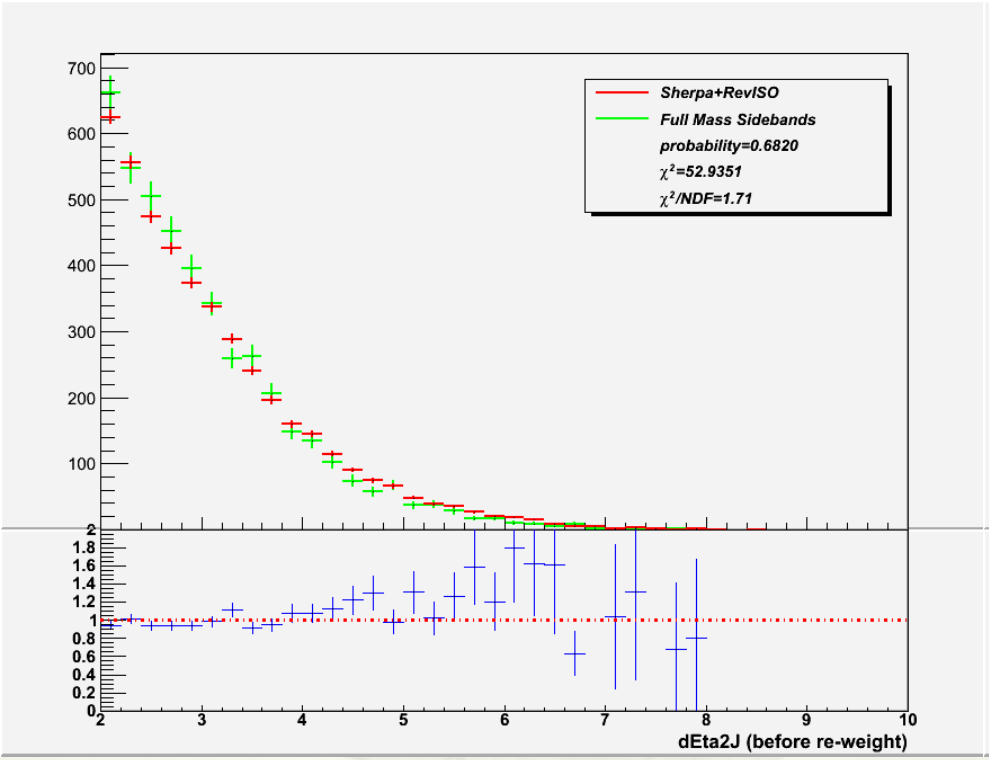

χ² / ndf 28.77 / 34
Prob 0.7215
p0 3.37 ± 2.41
p1 -0.0217 ± 0.0267
p2 7.785e-05 ± 1.110e-04
p3 -1.359e-07 ± 2.168e-07
p4 1.113e-10 ± 2.002e-10
p5 -3.402e-14 ± 7.036e-14
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
200 300 400 500 600 700 800 900 1000

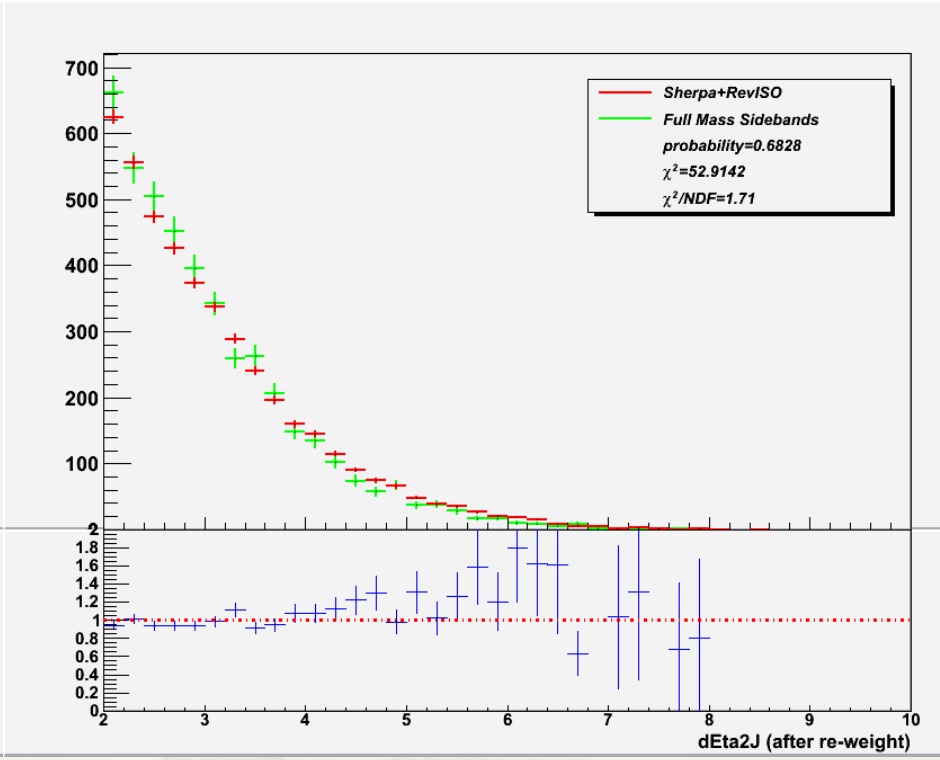
m2J


Sherpa+RevISO
Full Mass Sidebands
probability=0.6695
χ²=67.1849
χ²/NDF=1.72
m2J (before re-weight)

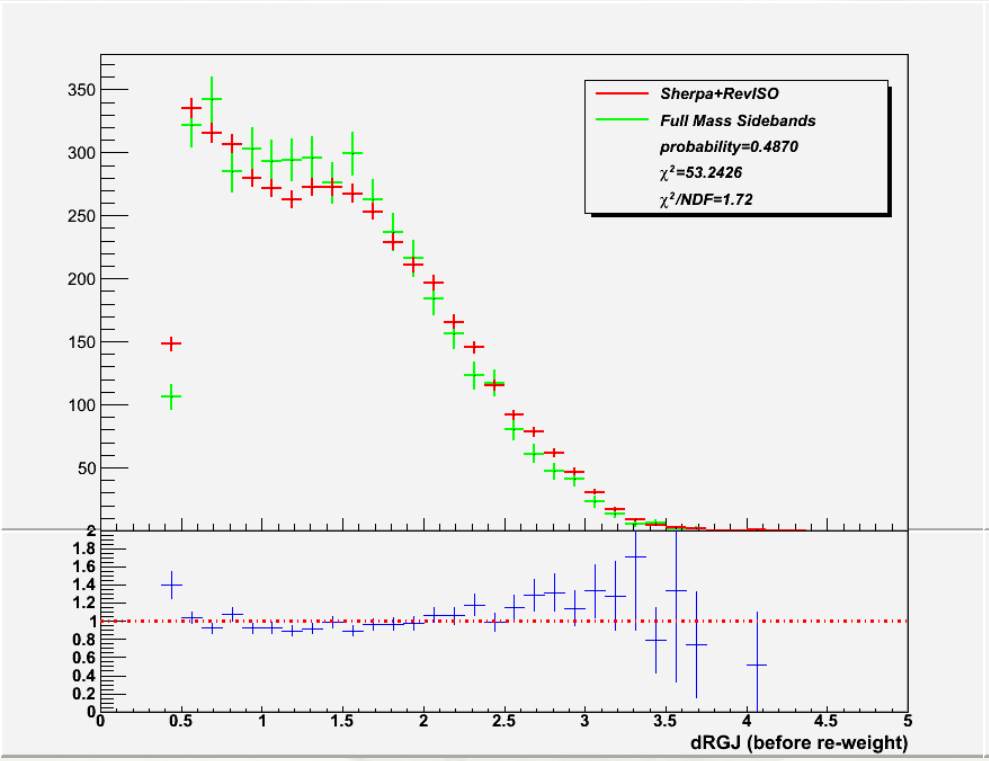

Sherpa+RevISO
Full Mass Sidebands
probability=0.6697
χ²=67.1867
χ²/NDF=1.72
m2J (after re-weight)

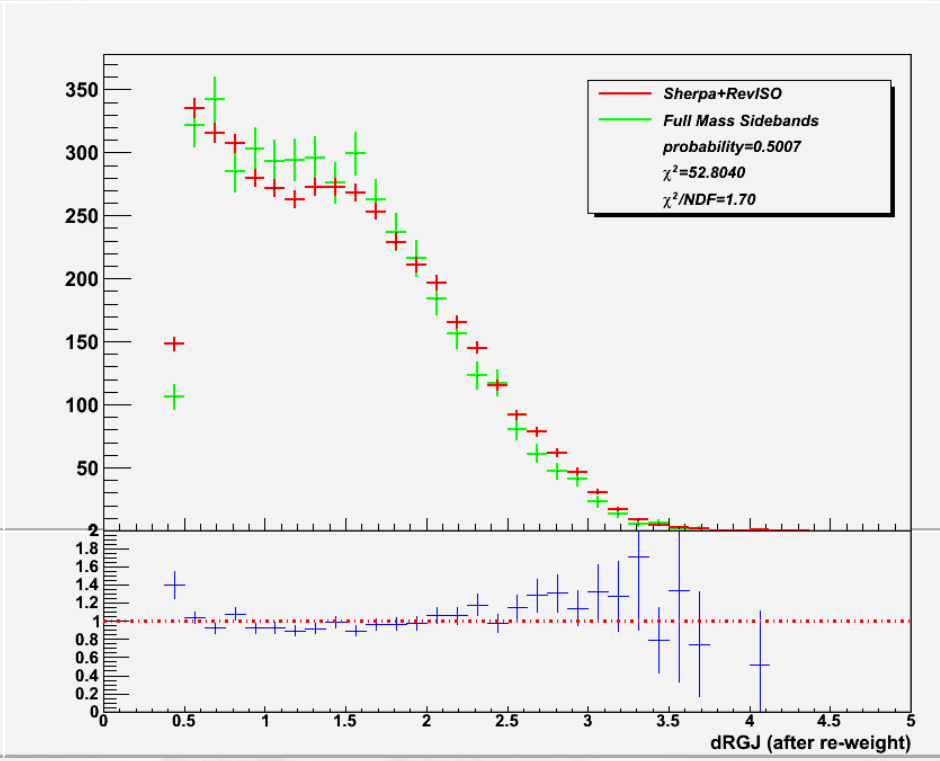
dEta2J


Sherpa+RevISO
Full Mass Sidebands
probability=0.6820
χ²=52.9351
χ²/NDF=1.71
dEta2J (before re-weight)

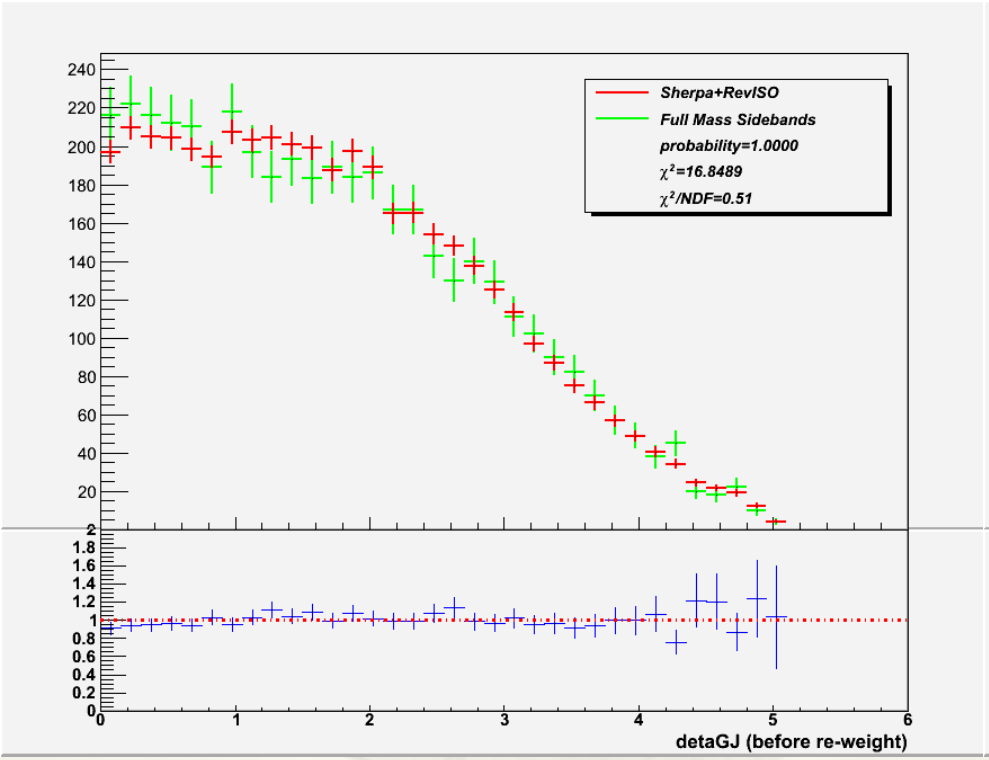

Sherpa+RevISO
Full Mass Sidebands
probability=0.6828
χ²=52.9142
χ²/NDF=1.71
dEta2J (after re-weight)

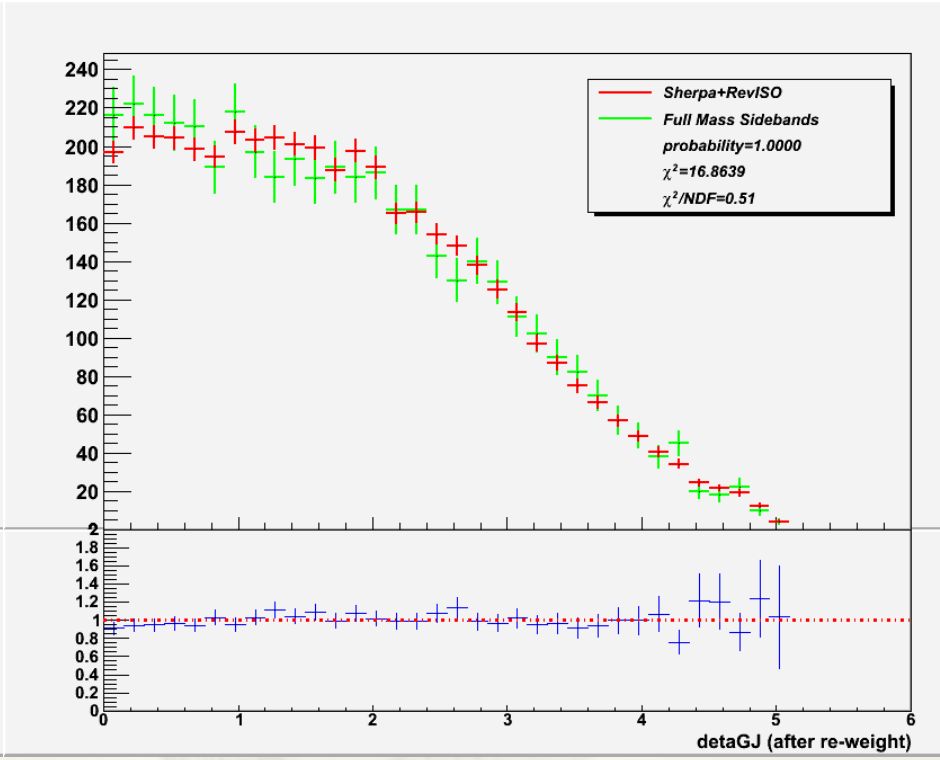
dRGJ


Sherpa+RevISO
Full Mass Sidebands
probability=0.4870
χ²=53.2426
χ²/NDF=1.72
dRGJ (before re-weight)

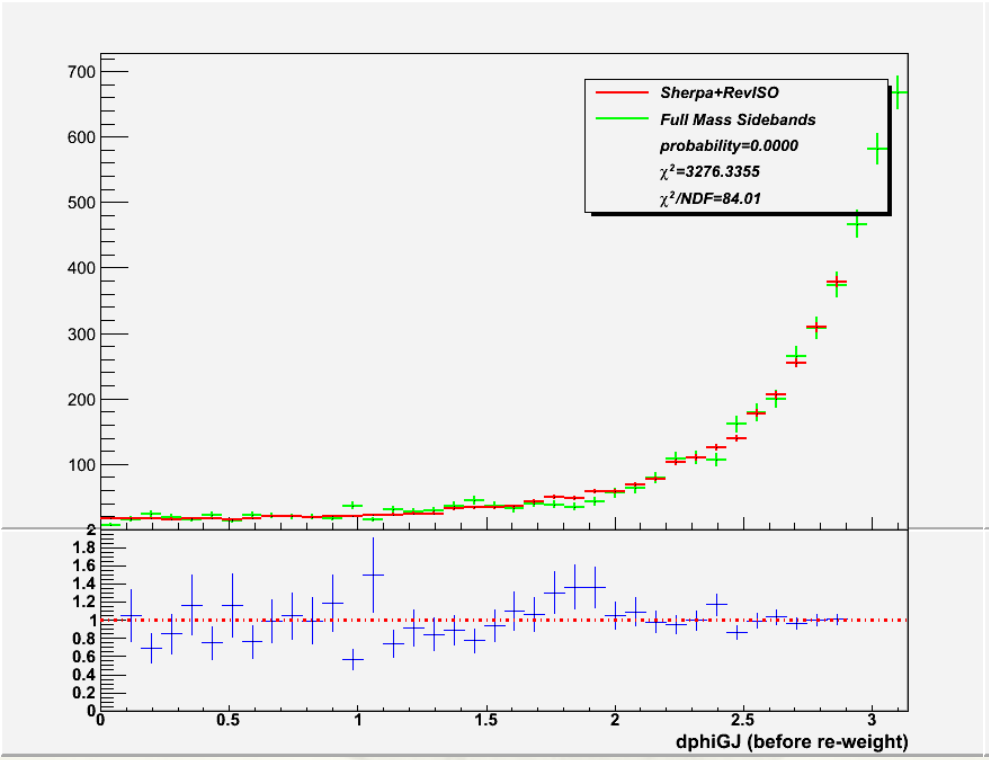

Sherpa+RevISO
Full Mass Sidebands
probability=0.5007
χ²=52.8040
χ²/NDF=1.70
dRGJ (after re-weight)

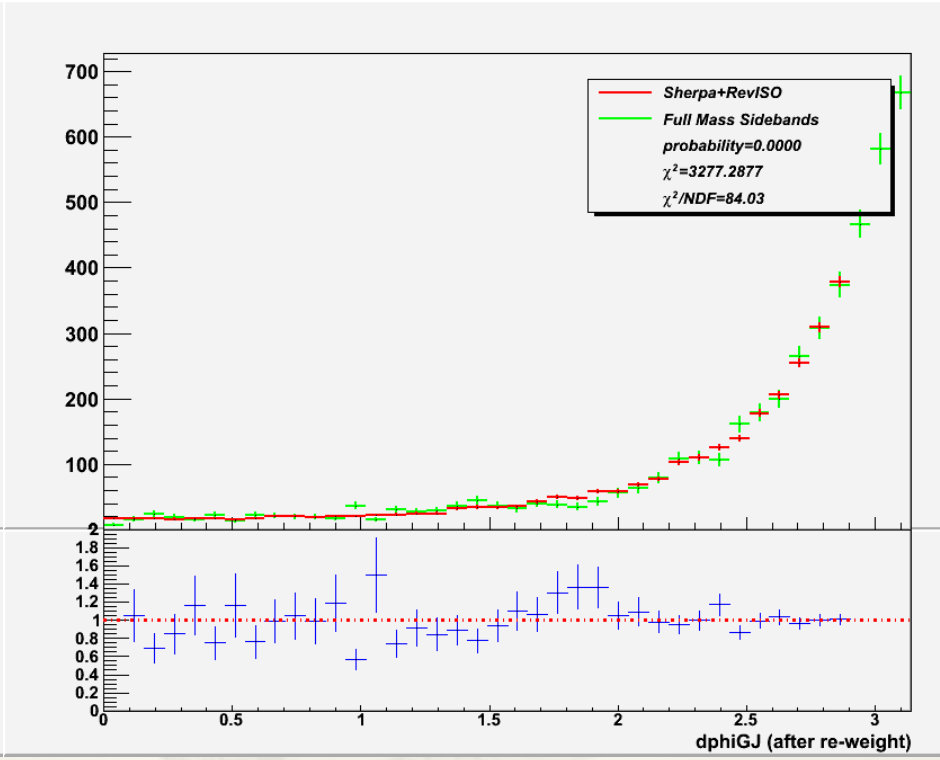
detaGJ


Sherpa+RevISO
Full Mass Sidebands
probability=1.0000
χ²=16.8489
χ²/NDF=0.51
detaGJ (before re-weight)


Sherpa+RevISO
Full Mass Sidebands
probability=1.0000
χ²=16.8639
χ²/NDF=0.51
detaGJ (after re-weight)

dphiGJ

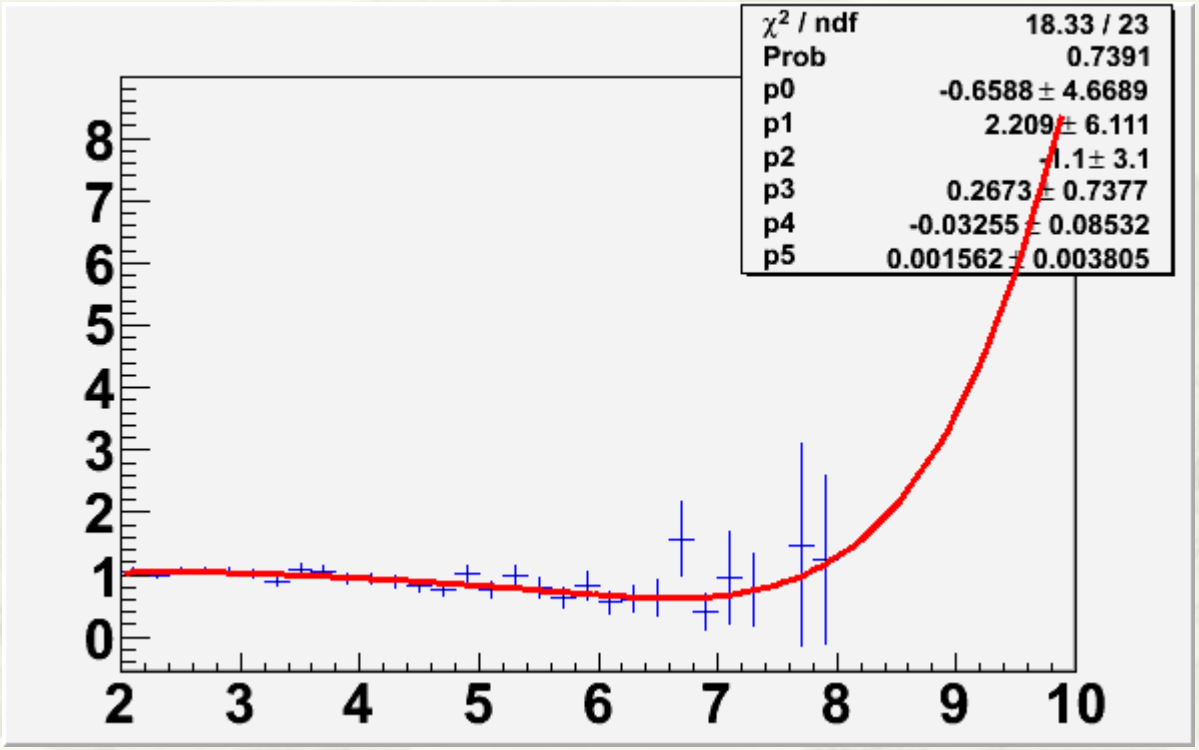

Sherpa+RevISO
Full Mass Sidebands
probability=0.0000
χ²=3276.3355
χ²/NDF=84.01
dphiGJ (before re-weight)


Sherpa+RevISO
Full Mass Sidebands
probability=0.0000
χ²=3277.2877
χ²/NDF=84.03
dphiGJ (after re-weight)

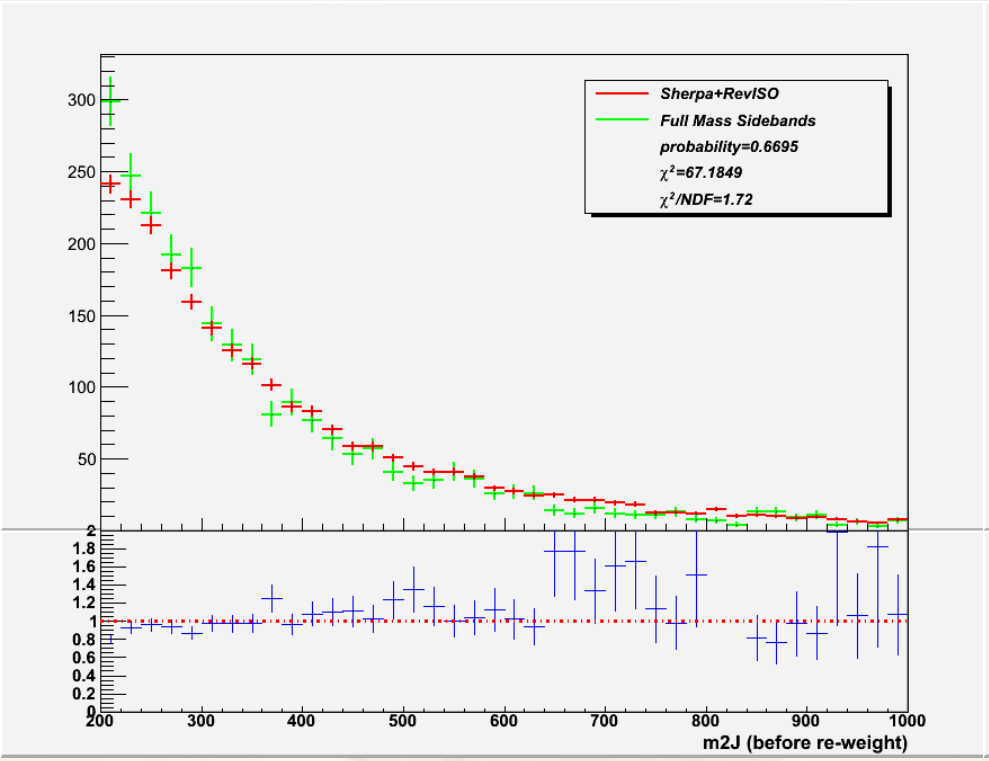
- Redo mva optimization
- Redo working point optimization
- Relative improvement on mu uncertainties:1.2%

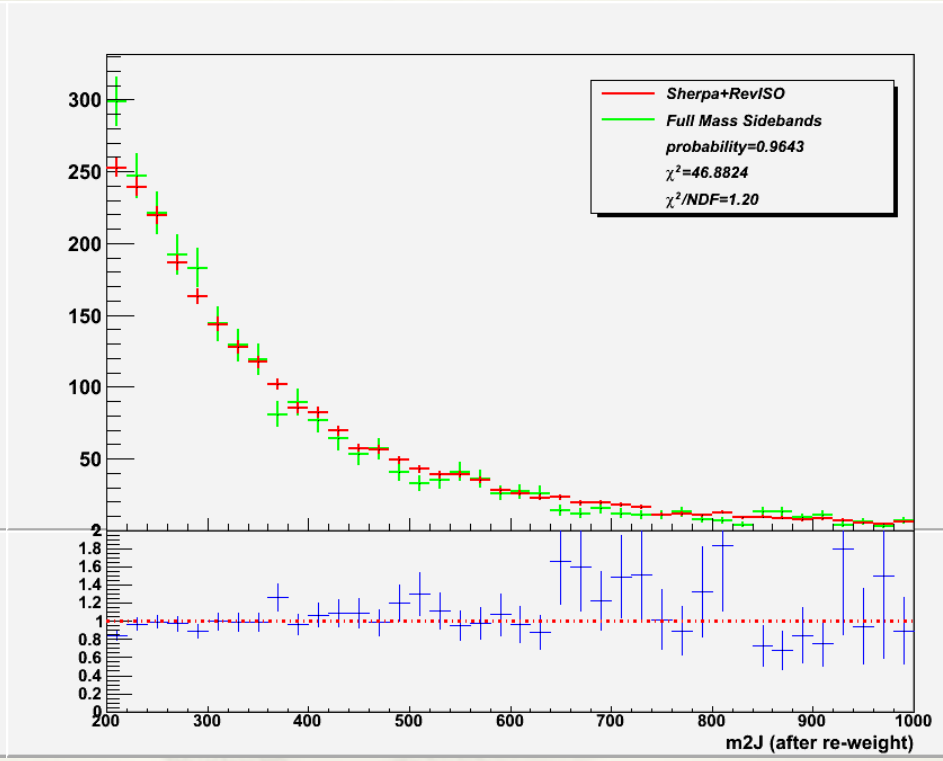
Reweight with dEta2J

fit

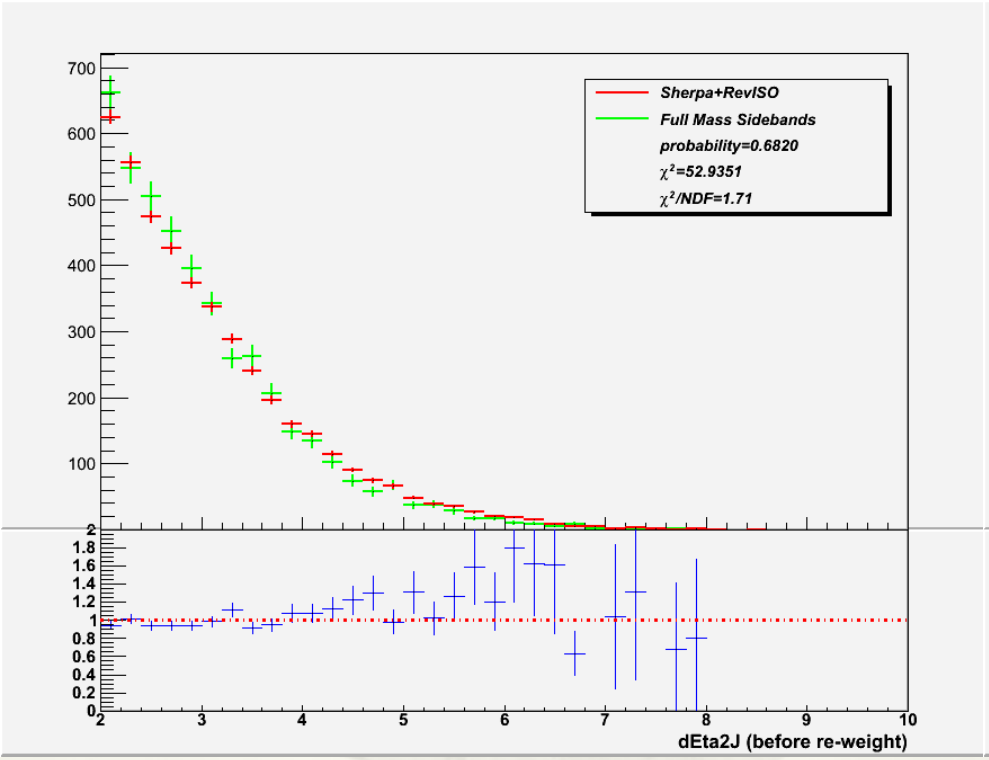

χ² / ndf 18.33 / 23
Prob 0.7391
p0 -0.6588 ± 4.6689
p1 2.209 ± 6.111
p2 -1.1 ± 3.1
p3 0.2673 ± 0.7377
p4 -0.03255 ± 0.08532
p5 0.001562 ± 0.003805
0
1
2
3
4
5
6
7
8
2
3
4
5
6
7
8
9
10

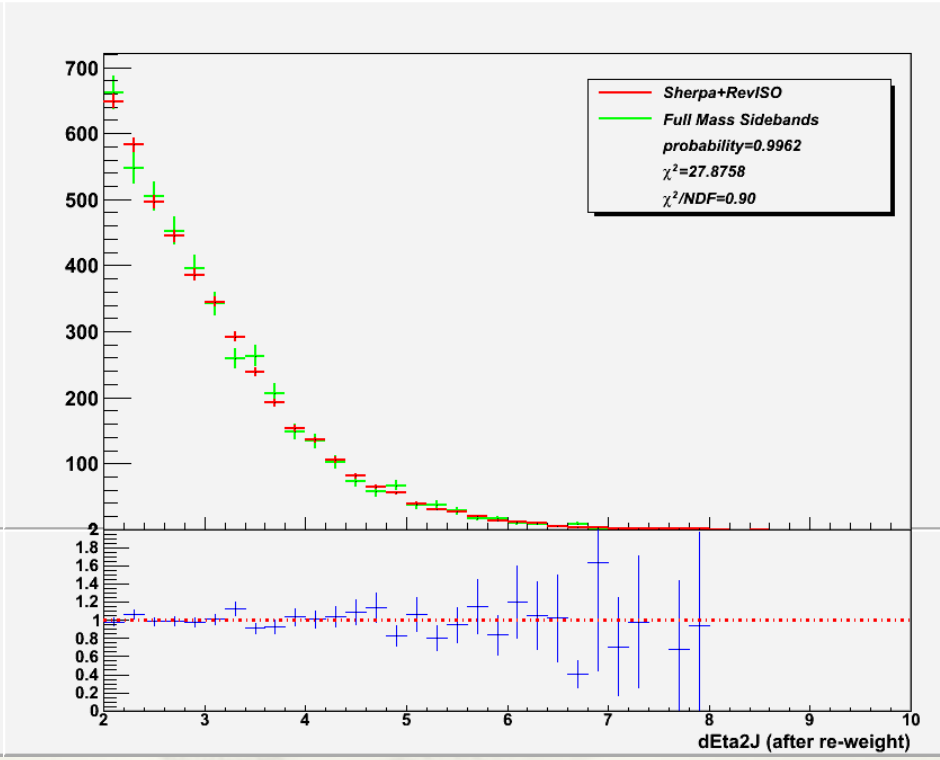
m2J


Sherpa+RevISO
Full Mass Sidebands
probability=0.6695
χ²=67.1849
χ²/NDF=1.72
m2J (before re-weight)

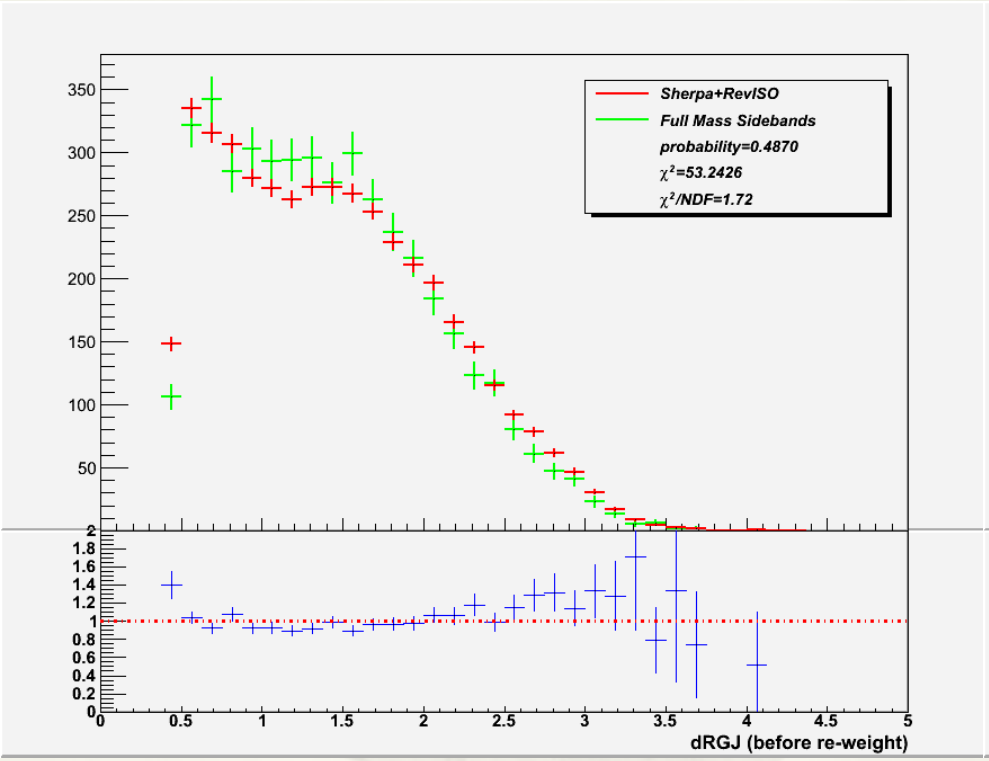

Sherpa+RevISO
Full Mass Sidebands
probability=0.9643
χ²=46.8824
χ²/NDF=1.20
m2J (after re-weight)

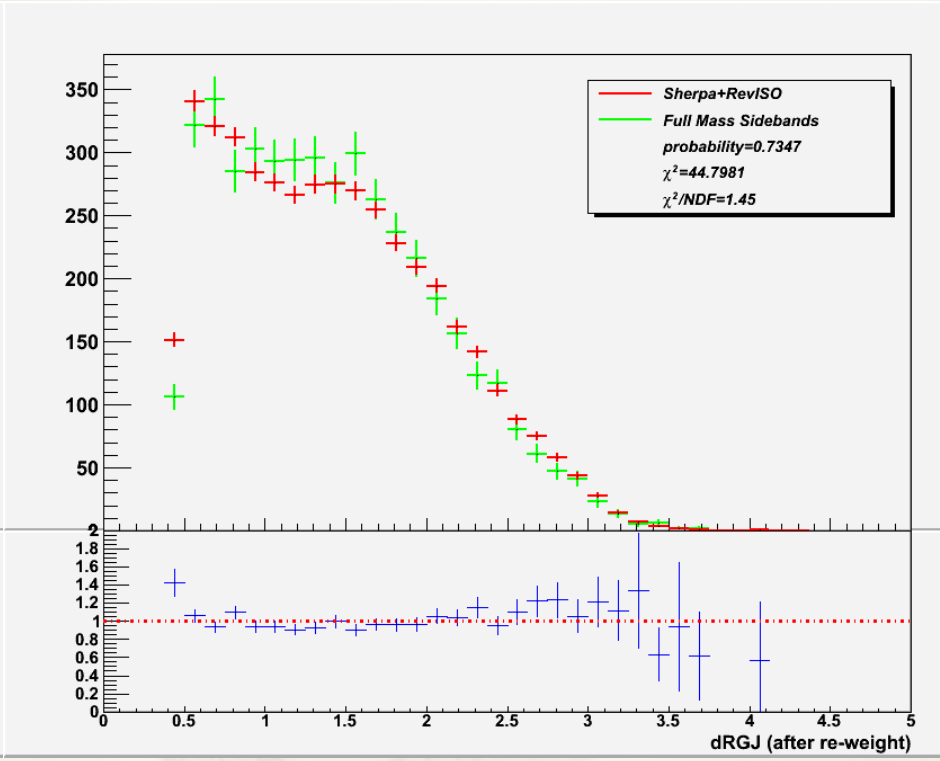
dEta2J


Sherpa+RevISO
Full Mass Sidebands
probability=0.6820
χ²=52.9351
χ²/NDF=1.71
dEta2J (before re-weight)

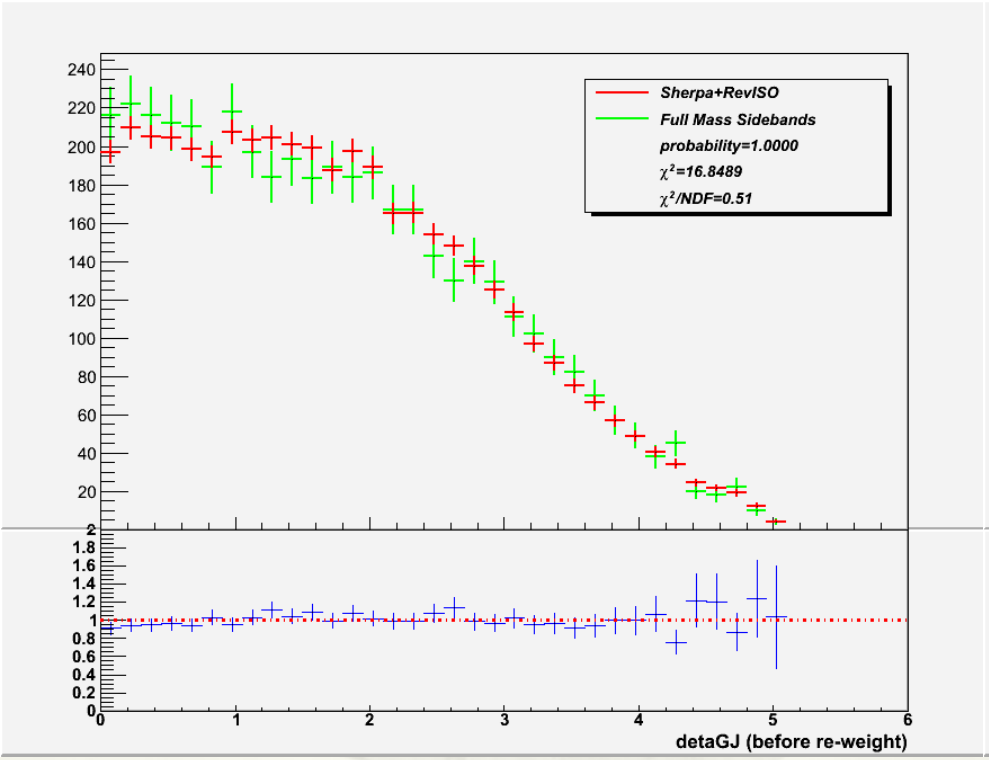

Sherpa+RevISO
Full Mass Sidebands
probability=0.9962
χ²=27.8758
χ²/NDF=0.90
dEta2J (after re-weight)

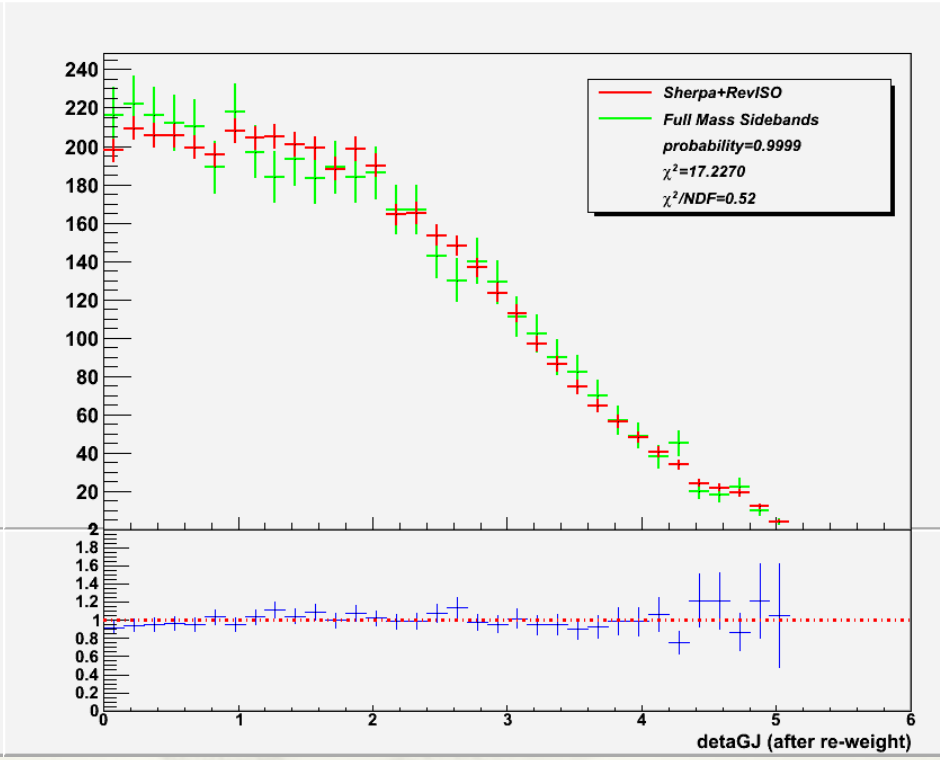
dRGJ

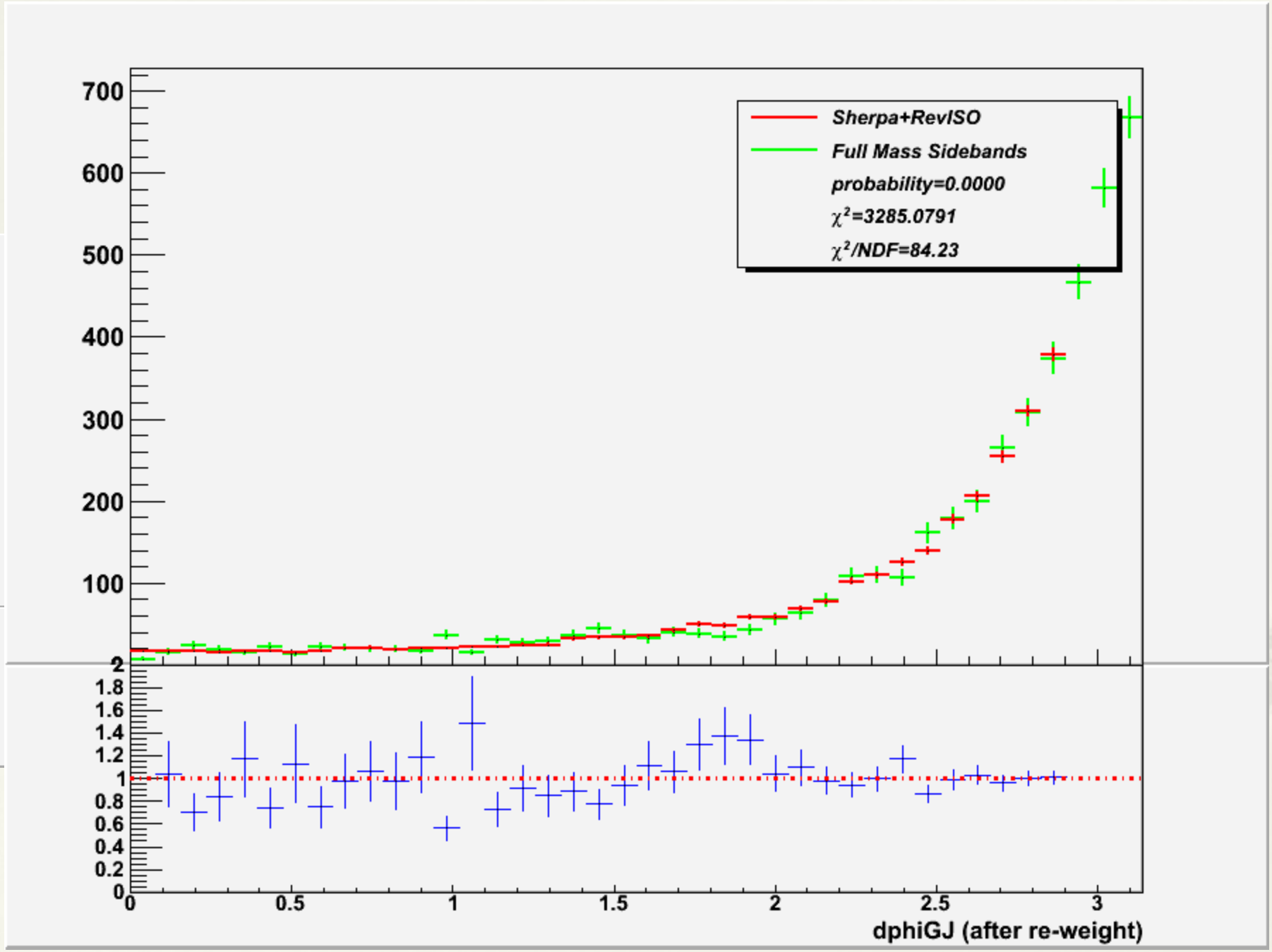

Sherpa+RevISO
Full Mass Sidebands
probability=0.4870
χ²=53.2426
χ²/NDF=1.72
dRGJ (before re-weight)


Sherpa+RevISO
Full Mass Sidebands
probability=0.7347
χ²=44.7981
χ²/NDF=1.45
dRGJ (after re-weight)

detaGJ


Sherpa+RevISO
Full Mass Sidebands
probability=1.0000
χ²=16.8489
χ²/NDF=0.51
detaGJ (before re-weight)


Sherpa+RevISO
Full Mass Sidebands
probability=0.9999
χ²=17.2270
χ²/NDF=0.52
detaGJ (after re-weight)


Sherpa+RevISO
Full Mass Sidebands
probability=0.0000
χ²=3285.0791
χ²/NDF=84.23
700
600
500
400
300
200
100
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0
0.5
1
1.5
2
2.5
3
dphiGJ (after re-weight)

- Redo mva optimization
- Redo working point optimization
- Relative improvement on mu uncertainties:2.3%,
  - compare to Moriond, ~4% improvement