Jet Reconstruction Efficiencies

Utilizing p14 Monte Carlo and Athena v01-04-03

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UIC Presentation
28APR04

Samples Used

Monte Carlo

Z-> e e	(CTEQ4)	247000 events	- opposite side of Z pt > 10 GeV
Zj-> e e j		149500 events	- straight efficiencies
Zjj-> e e j j		179000 events	- straight efficiencies

Data

2EM skim – 12,345,000 events - opposite side of Z pt > 10GeV

20APR2002 – Present

Good EM Object Definitions for Z

pt > 20.0

\eta\ < 1.1

iso < 0.15

Hmx7 < 12.0

emf > 0.90

one track match between the two EM candidates

EM-JETS removal

pt > 20.0

\eta\ < 2.5

iso < 0.15

Hmx7 < 12.0

emf > 0.90

Delta R < 0.45

Jet Quality Cuts

$0.05 < emf < 0.95$

$chf < 0.40$

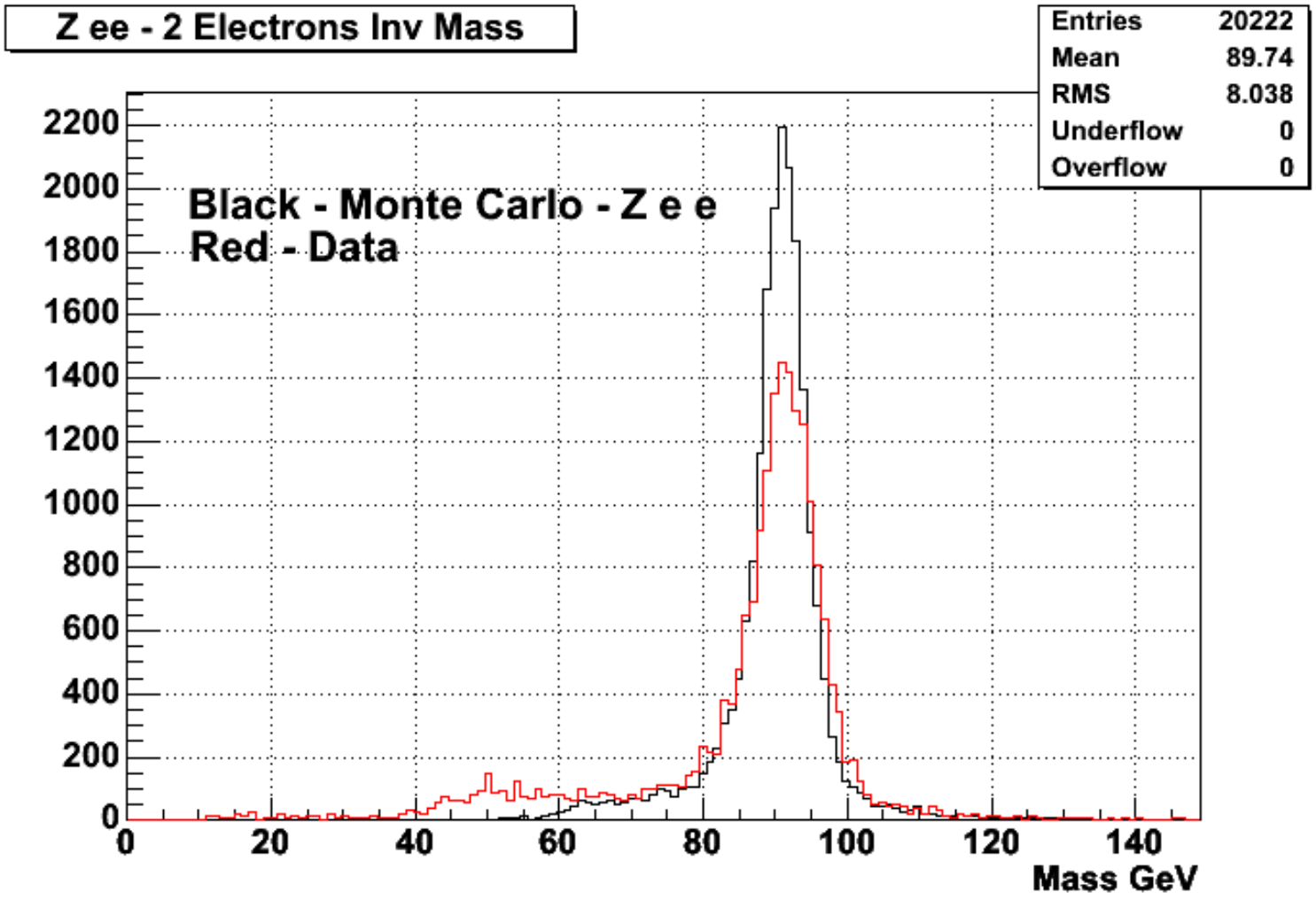
$HotFraction < 10.0$

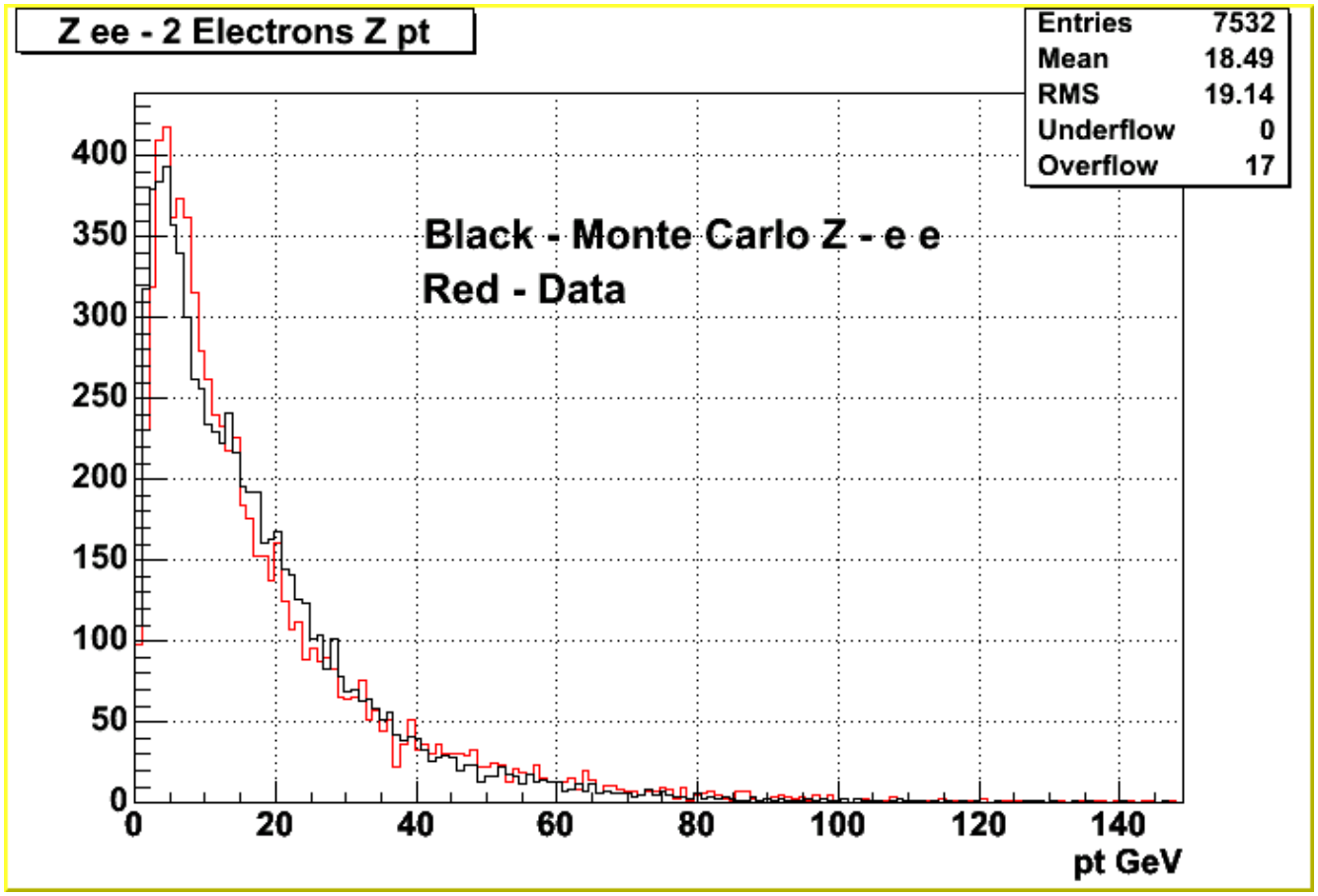
$N90 > 1$

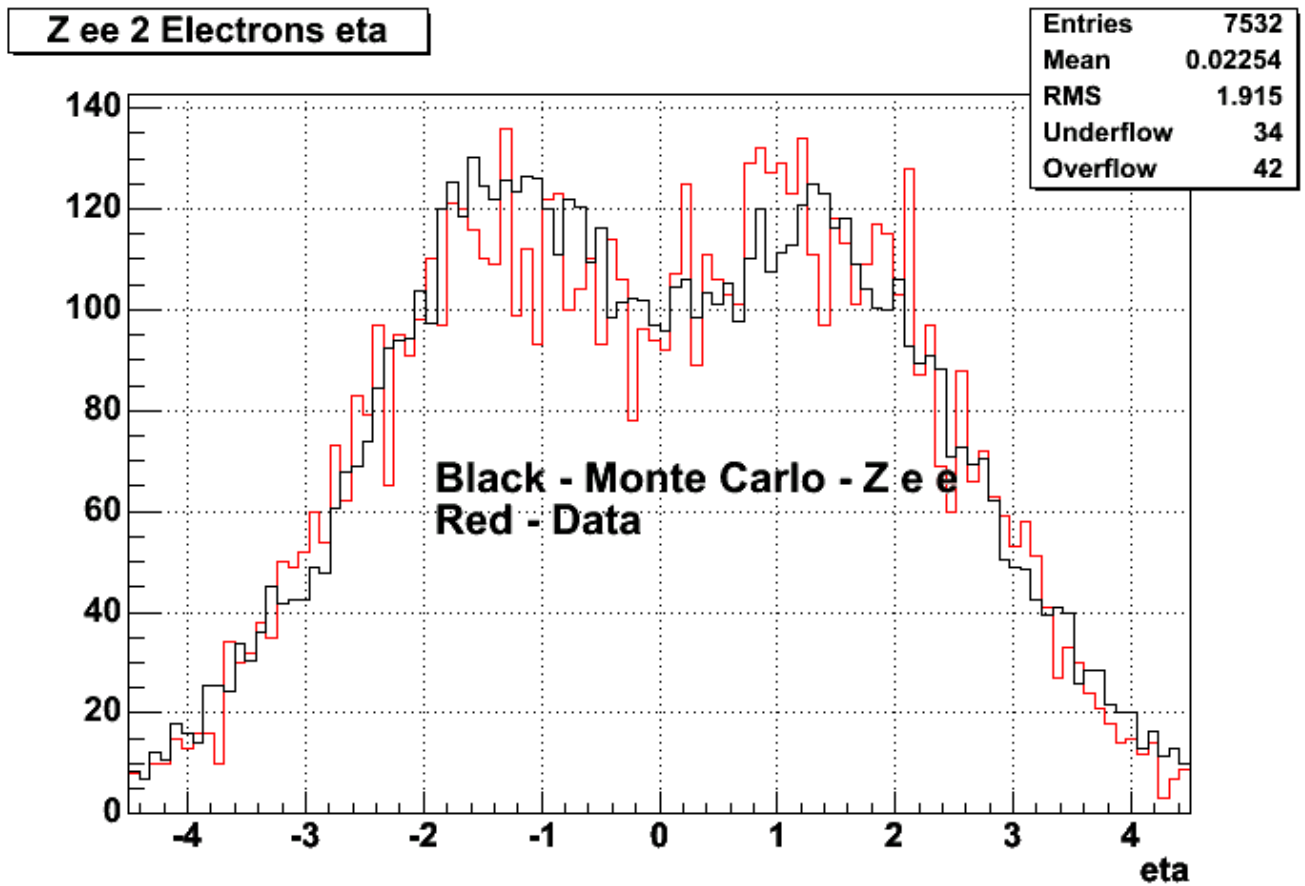
$CC\ L1 > 0.40$

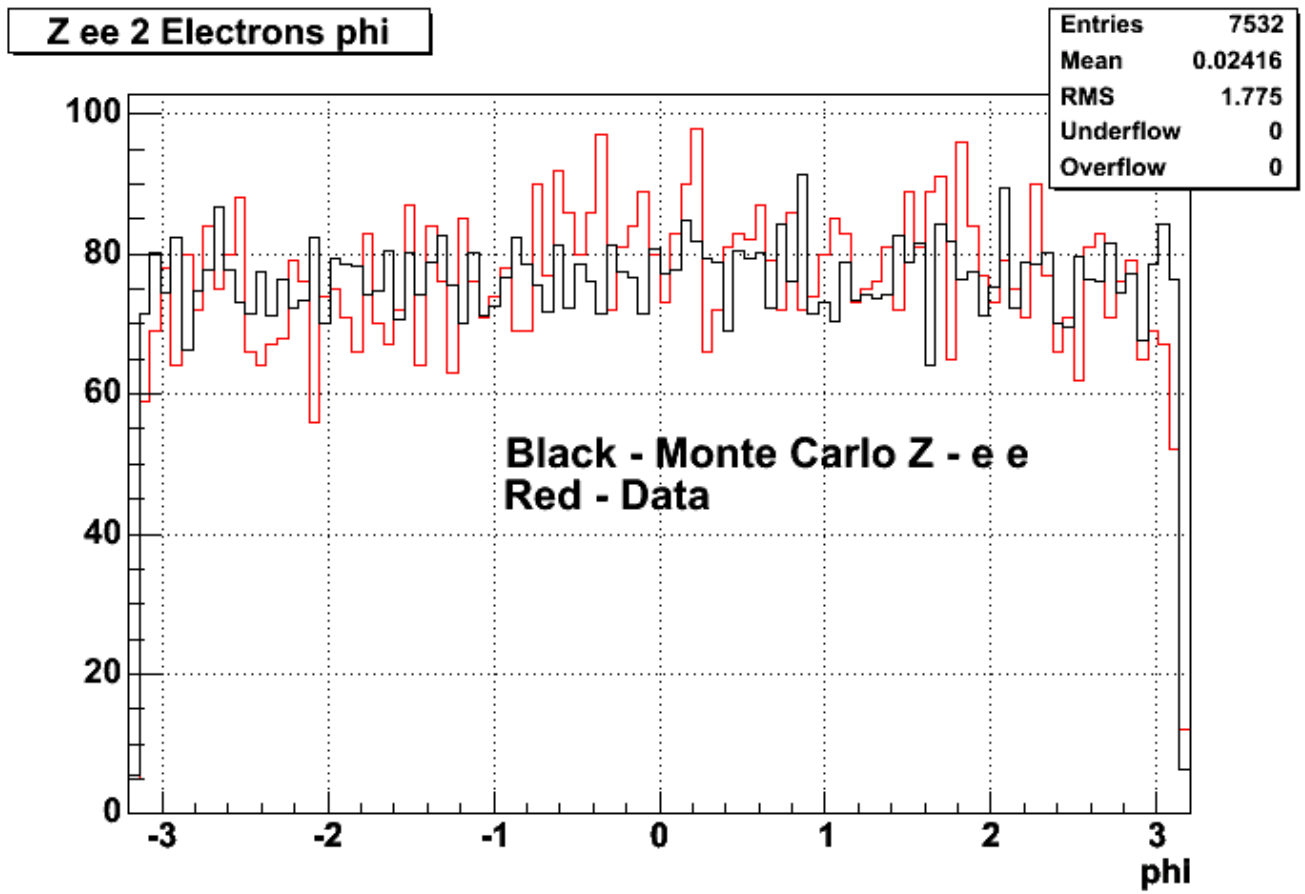
$ICR\ L1 > 0.20$

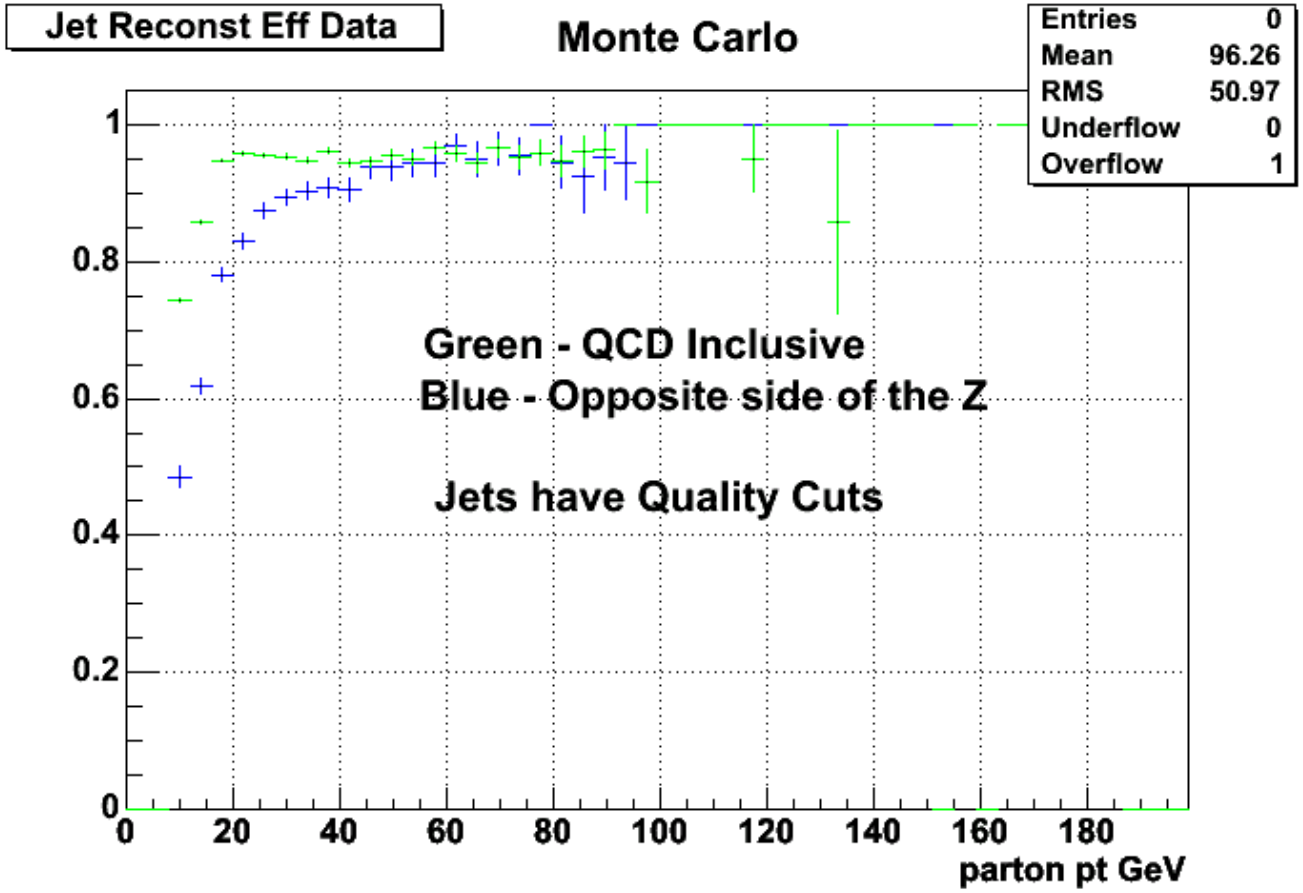
$EC\ L1 > 0.40$

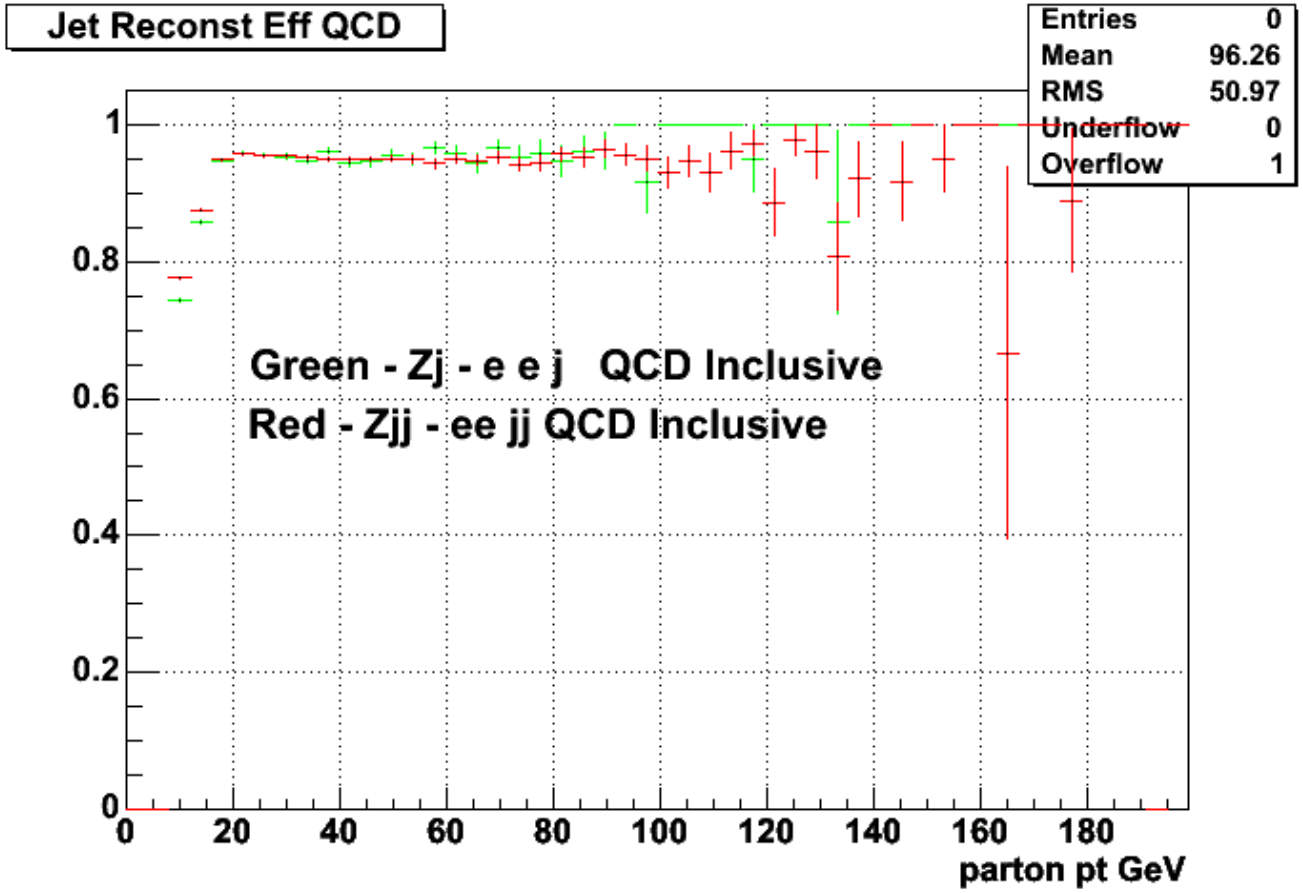

Z ee - 2 Electrons Inv Mass
Entries 20222
Mean 89.74
RMS 8.038
Underflow 0
Overflow 0
Black - Monte Carlo - Z e e
Red - Data
2200
2000
1800
1600
1400
1200
1000
800
600
400
200
0
0
20
40
60
80
100
120
140
Mass GeV

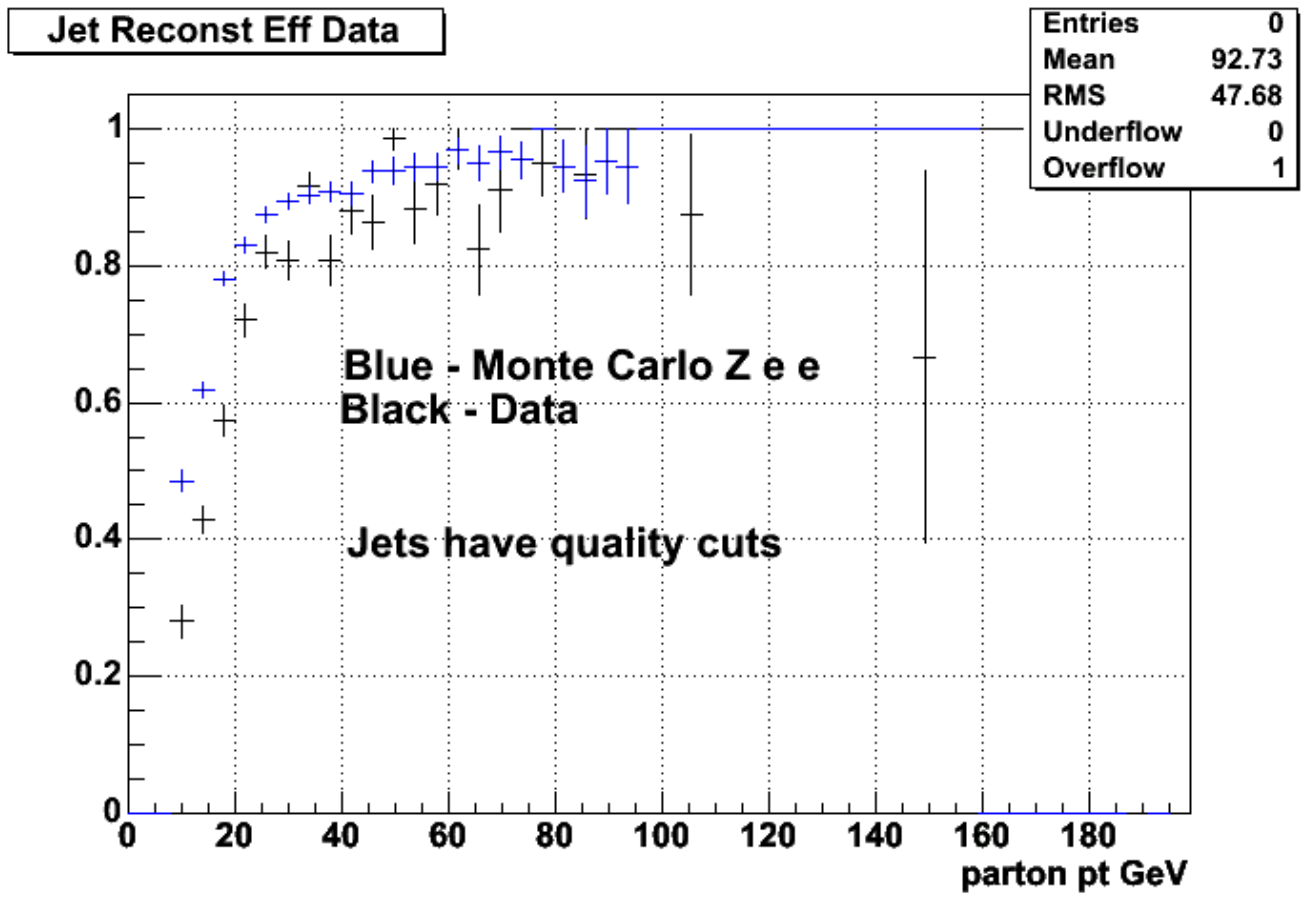

Z ee - 2 Electrons Z pt
Entries 7532
Mean 18.49
RMS 19.14
Underflow 0
Overflow 17
Black - Monte Carlo Z - e e
Red - Data
400
350
300
250
200
150
100
50
0
0
20
40
60
80
100
120
140
pt GeV

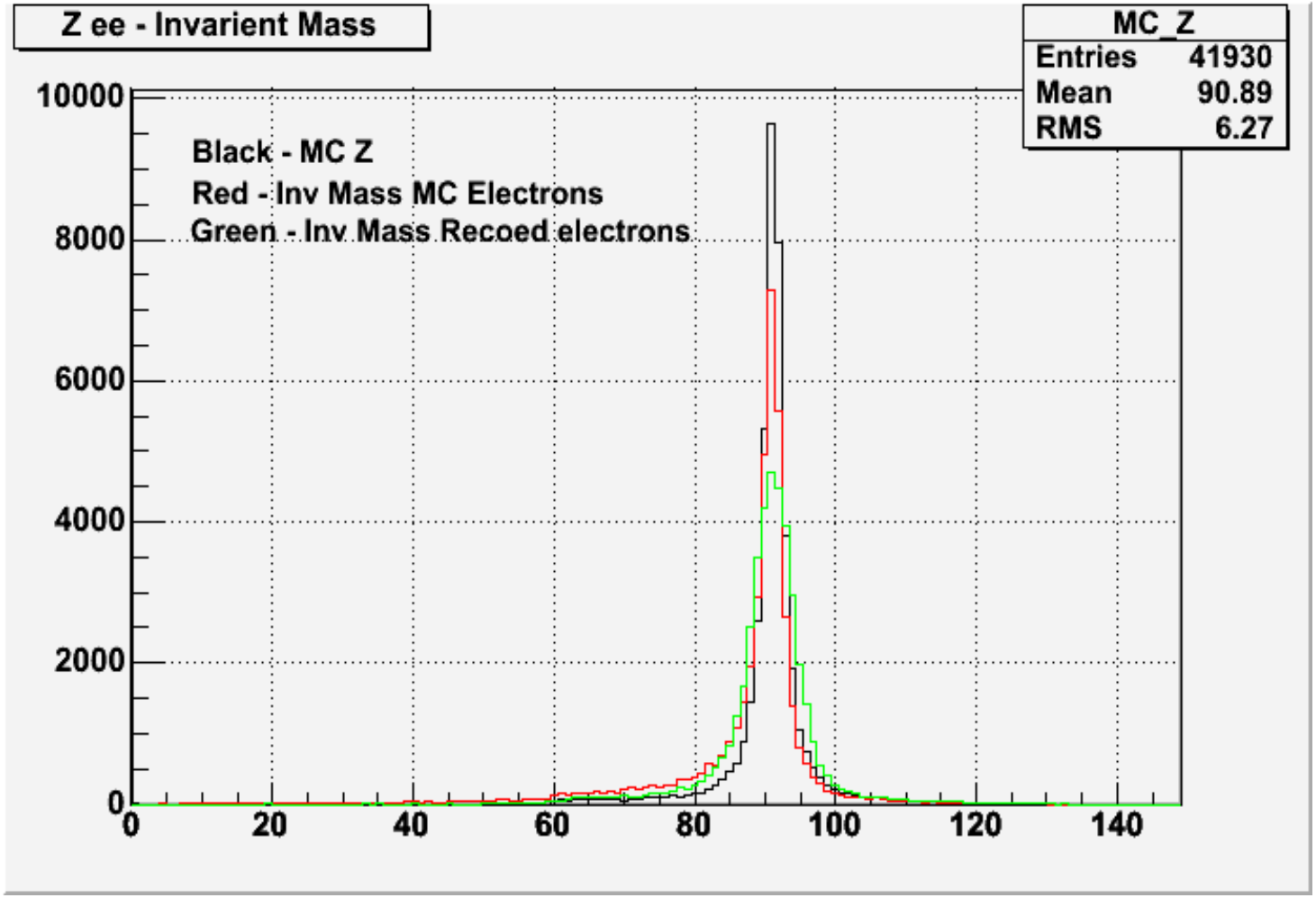

Z ee 2 Electrons eta
Entries 7532
Mean 0.02254
RMS 1.915
Underflow 34
Overflow 42
Black - Monte Carlo - Z e e
Red - Data
140
120
100
80
60
40
20
0
-4
-3
-2
-1
0
1
2
3
4
eta

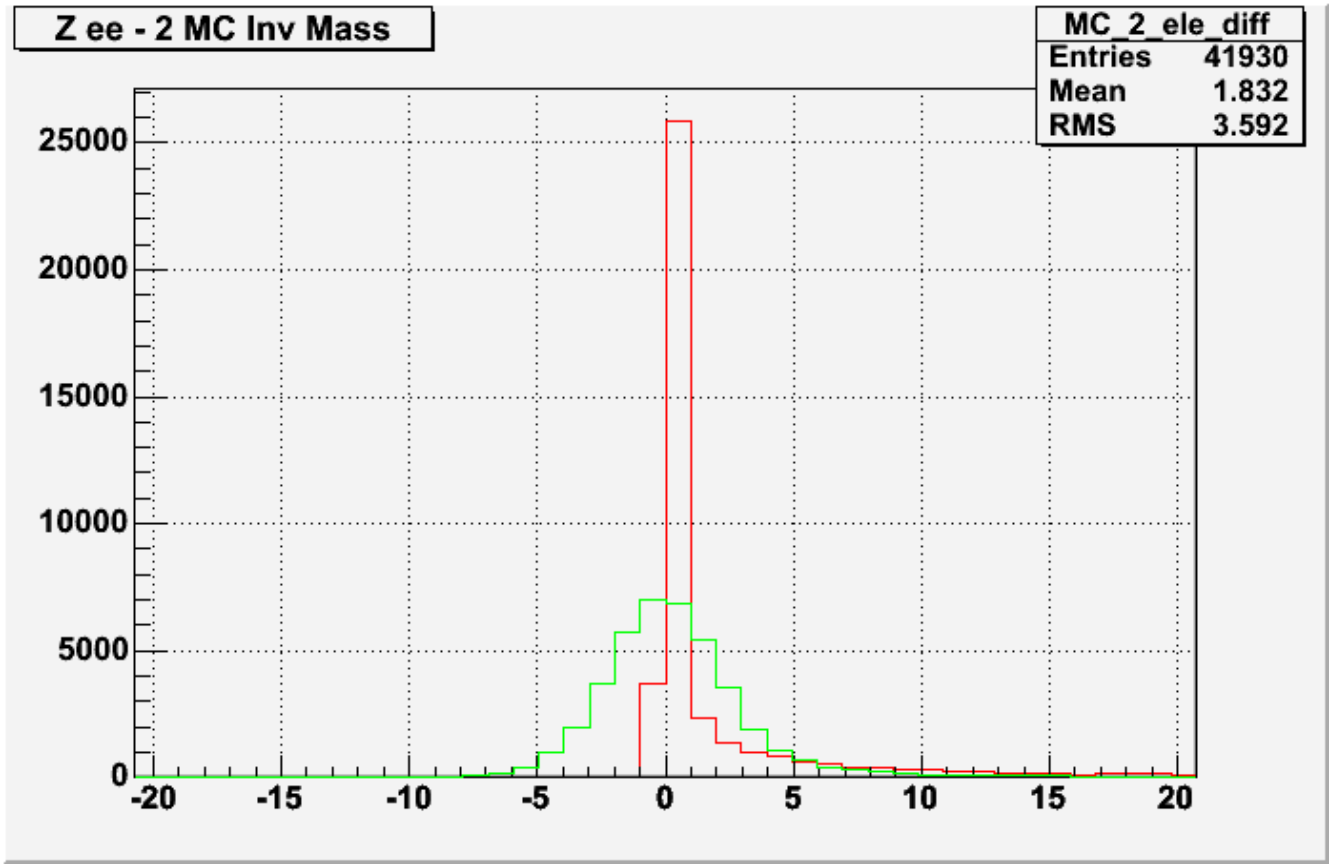

Z ee 2 Electrons phi
Entries 7532
Mean 0.02416
RMS 1.775
Underflow 0
Overflow 0
Black - Monte Carlo Z - e e
Red - Data
100
80
60
40
20
0
-3
-2
-1
0
1
2
3
phl

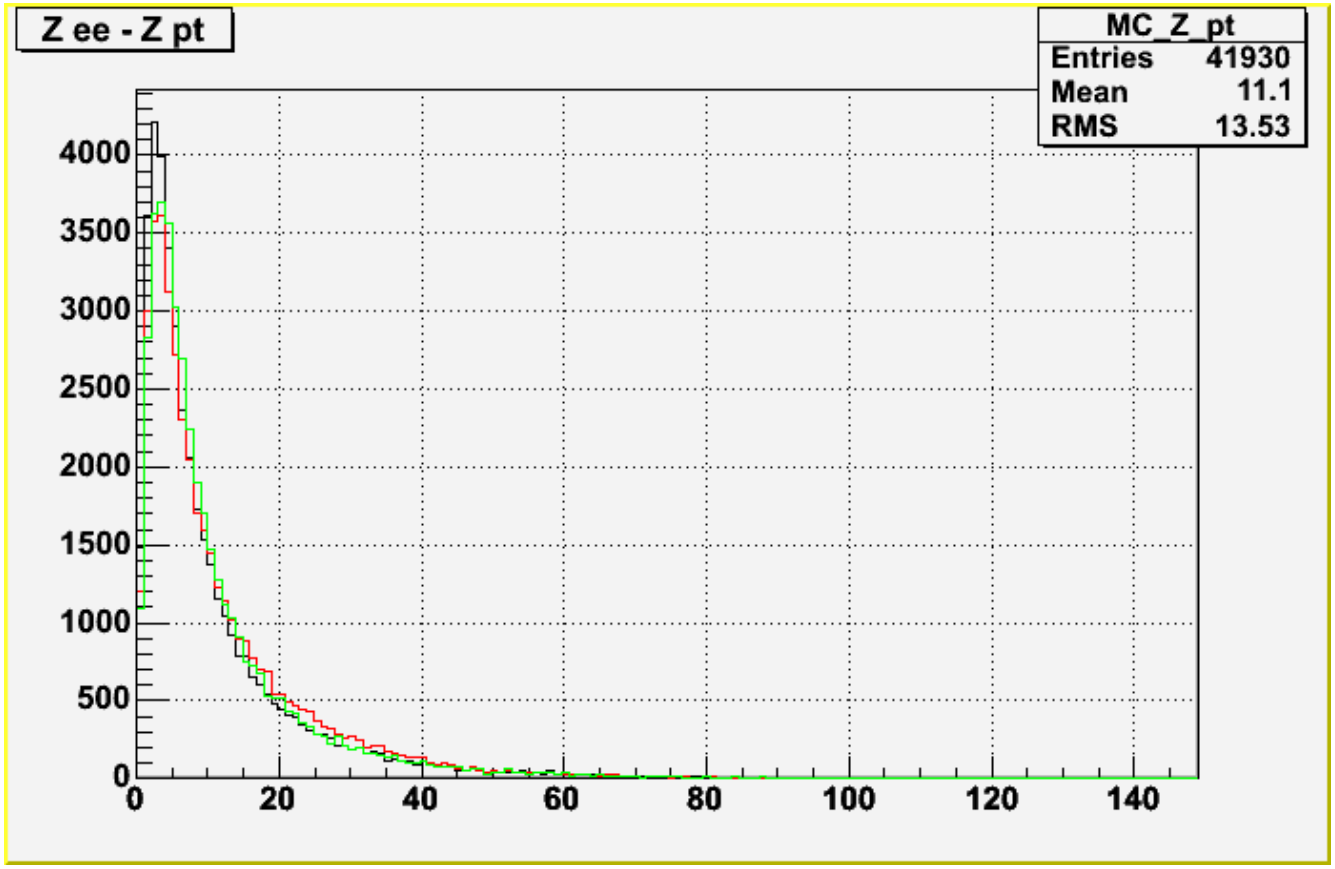

Jet Reconst Eff Data
Monte Carlo
Entries 0
Mean 96.26
RMS 50.97
Underflow 0
Overflow 1
Green - QCD Inclusive
Blue - Opposite side of the Z
Jets have Quality Cuts
1
0.8
0.6
0.4
0.2
0
0
20
40
60
80
100
120
140
160
180
parton pt GeV

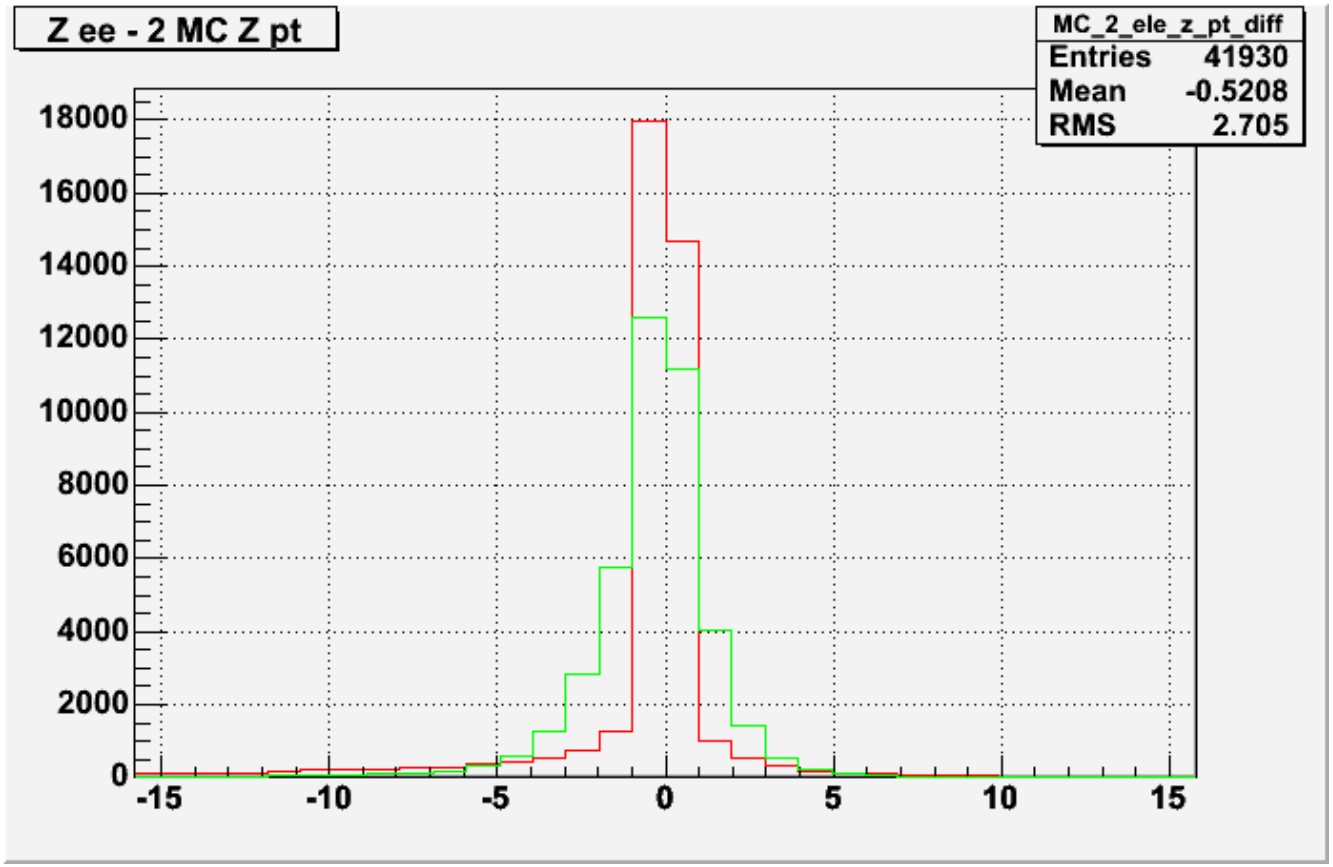

Jet Reconst Eff QCD
Entries 0
Mean 96.26
RMS 50.97
Underflow 0
Overflow 1
Green - Zj - e e j QCD Inclusive
Red - Zjj - ee jj QCD Inclusive
1
0.8
0.6
0.4
0.2
0
0
20
40
60
80
100
120
140
160
180
parton pt GeV

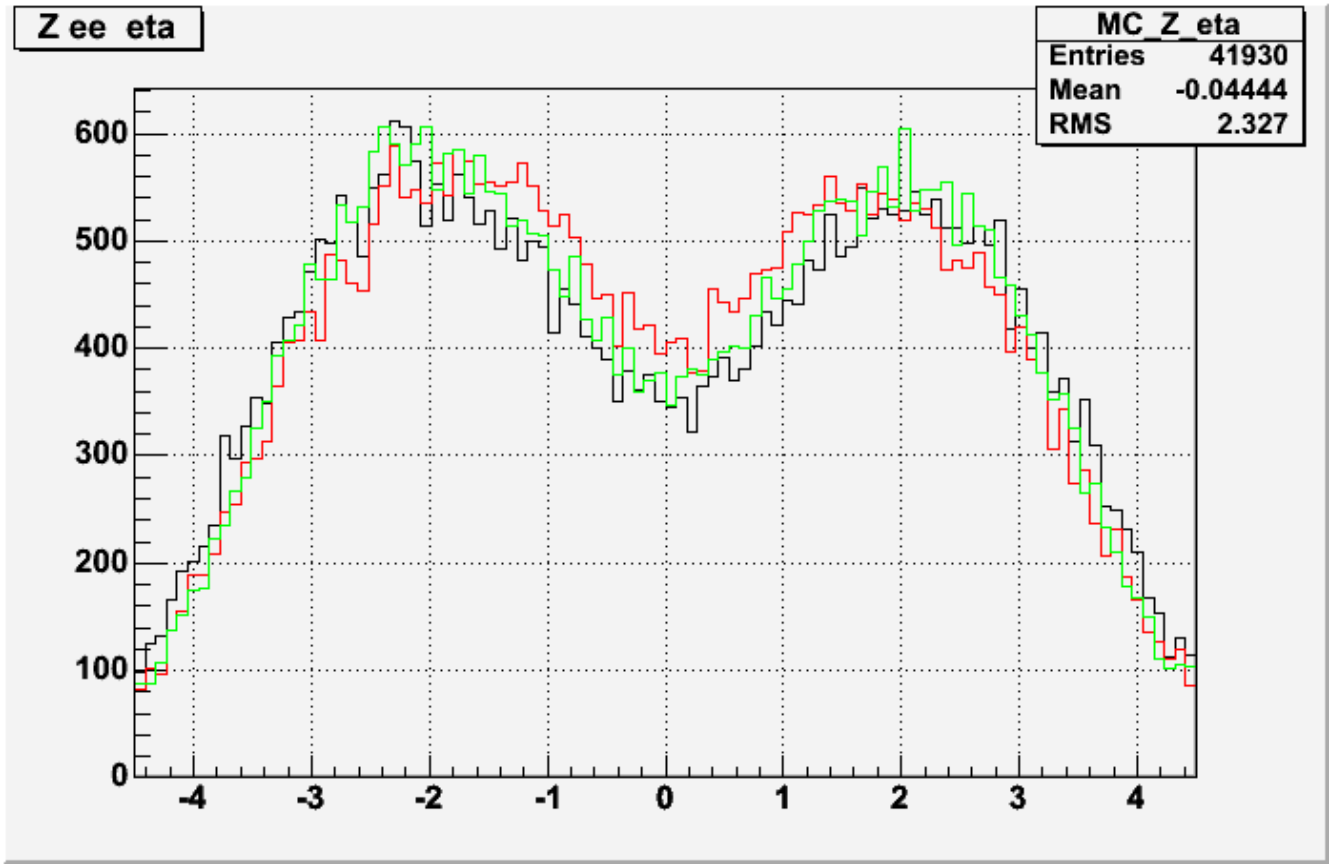

Jet Reconst Eff Data
Entries 0
Mean 92.73
RMS 47.68
Underflow 0
Overflow 1
Blue - Monte Carlo Z e e
Black - Data
Jets have quality cuts
1
0.8
0.6
0.4
0.2
0
0
20
40
60
80
100
120
140
160
180
parton pt GeV

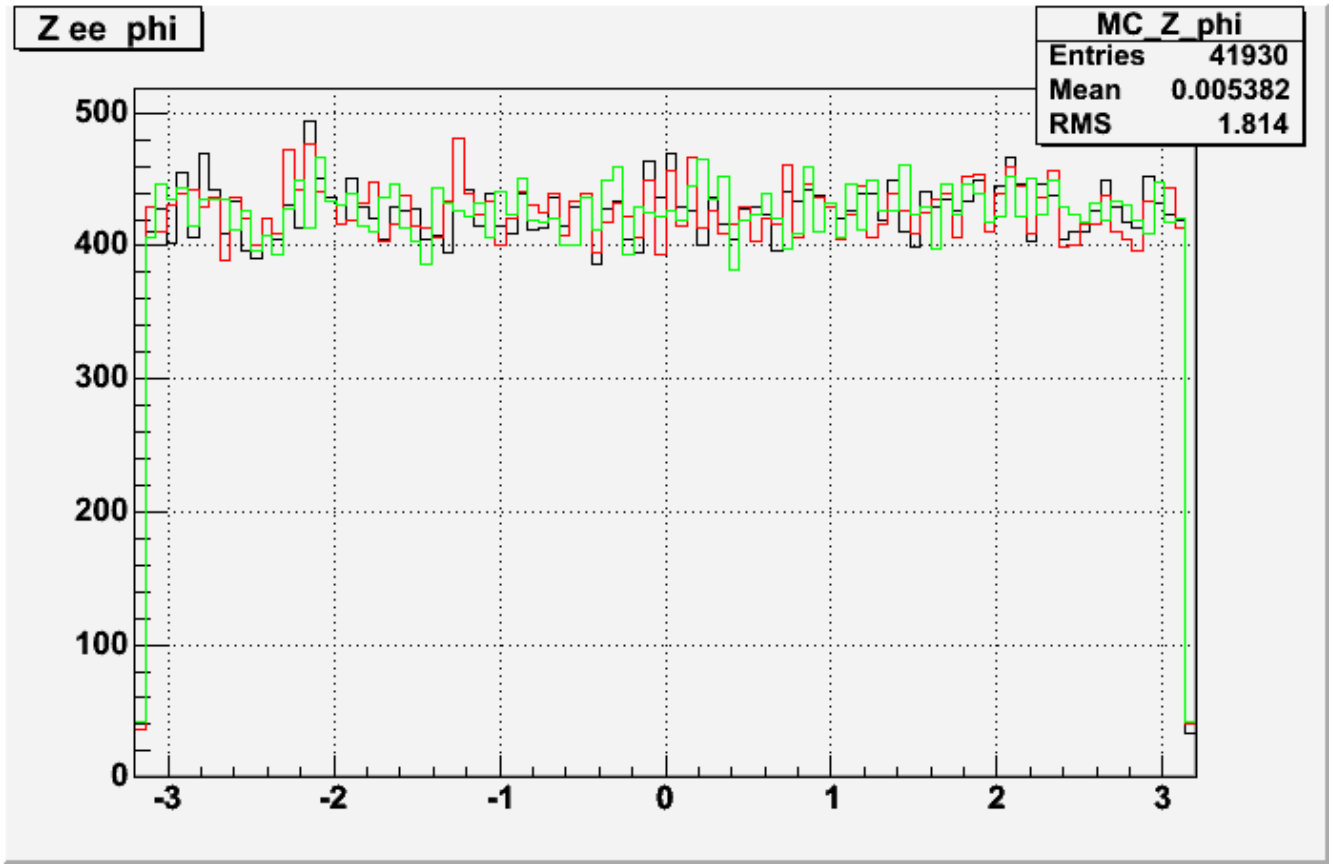

Z ee - Invarient Mass
MC_Z
Entries 41930
Mean 90.89
RMS 6.27
Black - MC Z
Red - Inv Mass MC Electrons
Green - Inv Mass Recoed electrons
10000
8000
6000
4000
2000
0
0
20
40
60
80
100
120
140


Z ee - 2 MC Inv Mass
MC_2_ele_diff
Entries 41930
Mean 1.832
RMS 3.592
25000
20000
15000
10000
5000
0
-20
-15
-10
-5
0
5
10
15
20


Z ee - Z pt
MC_Z_pt
Entries 41930
Mean 11.1
RMS 13.53
4000
3500
3000
2500
2000
1500
1000
500
0
0
20
40
60
80
100
120
140


Z ee - 2 MC Z pt
MC_2_ele_z_pt_diff
Entries 41930
Mean -0.5208
RMS 2.705
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
-15
-10
-5
0
5
10
15


Z ee eta
MC_Z_eta
Entries 41930
Mean -0.04444
RMS 2.327
600
500
400
300
200
100
0
-4
-3
-2
-1
0
1
2
3
4


Z ee phi
MC_Z_phi
Entries 41930
Mean 0.005382
RMS 1.814
500
400
300
200
100
0
-3
-2
-1
0
1
2
3