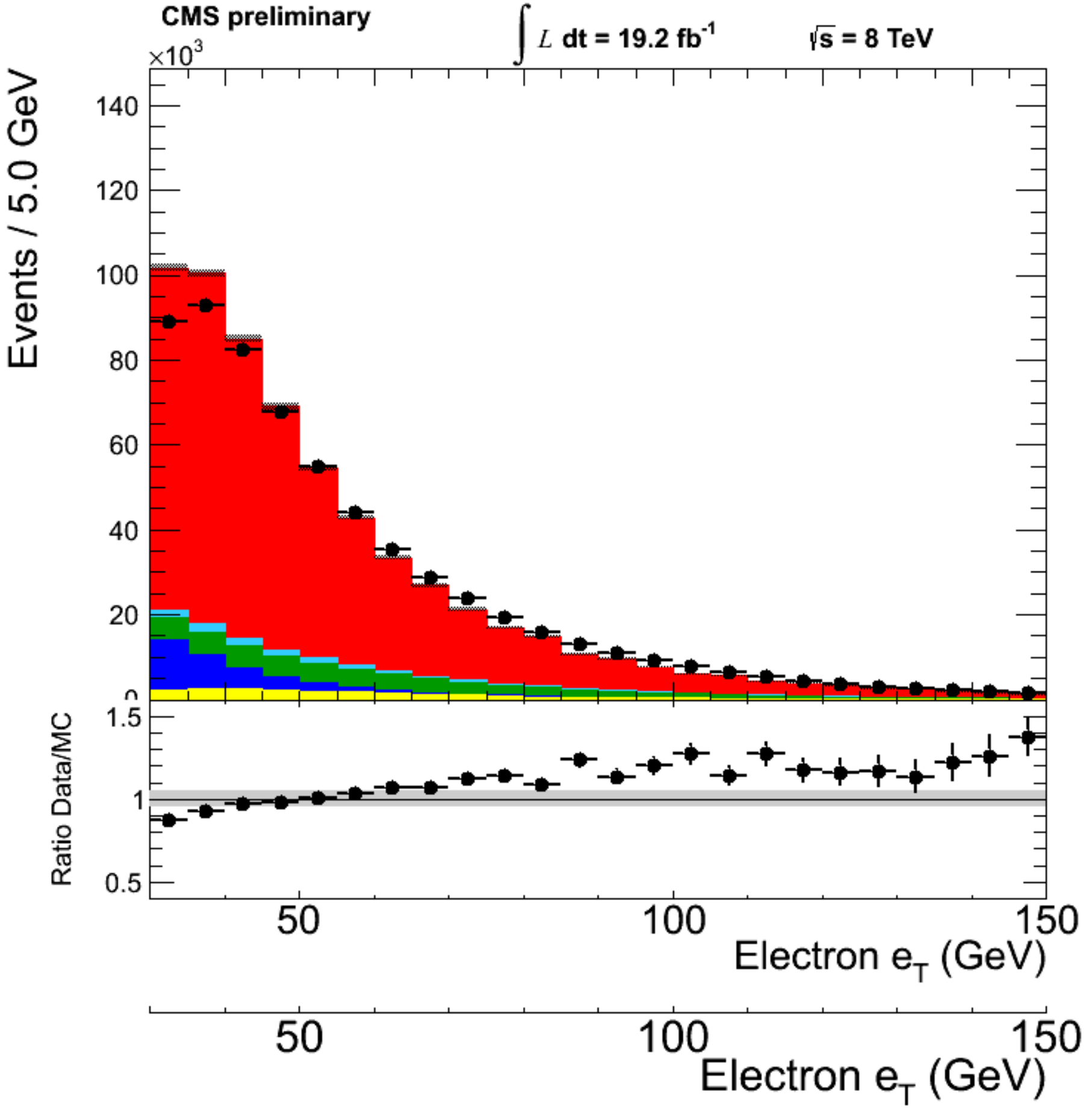
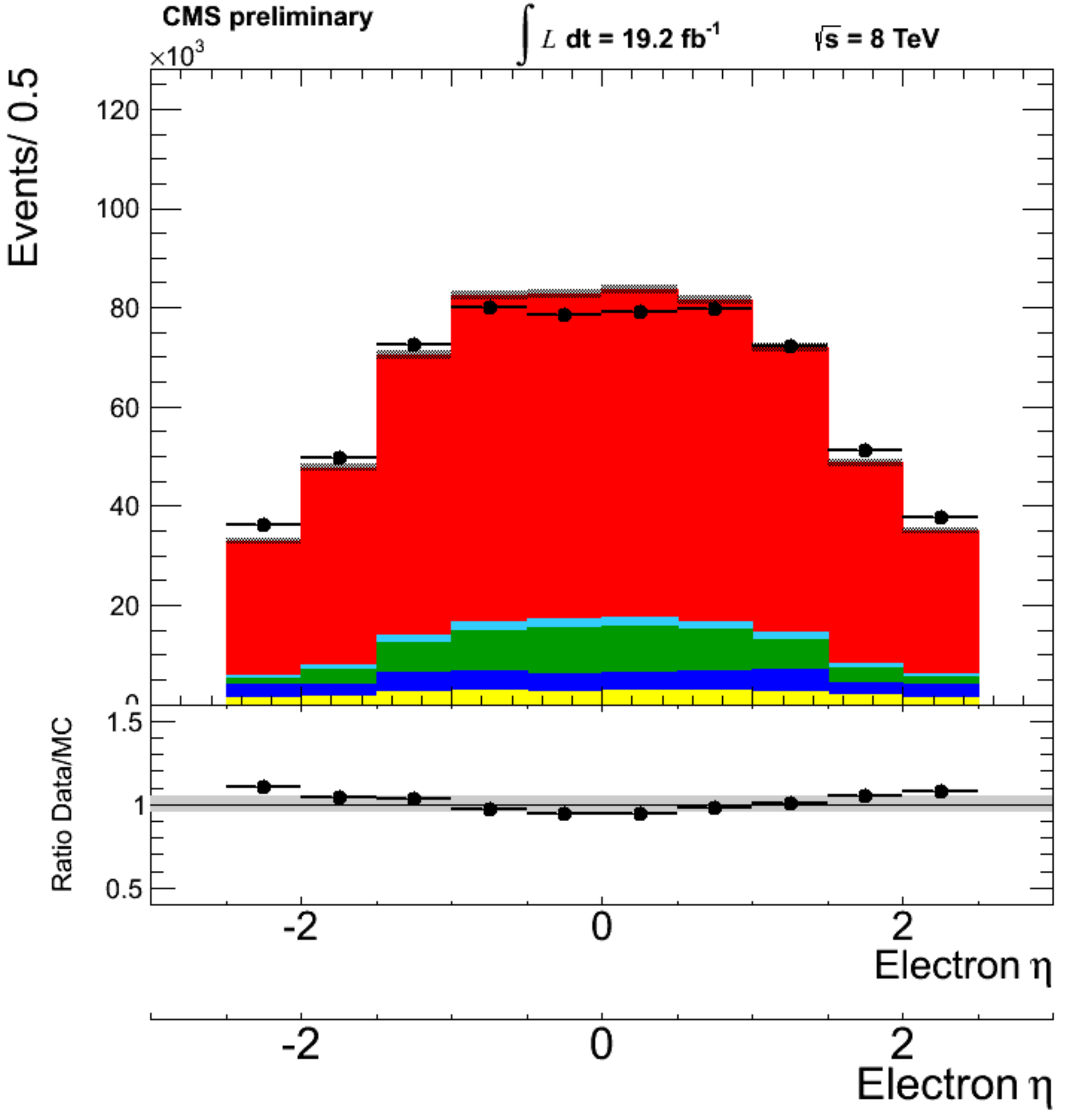
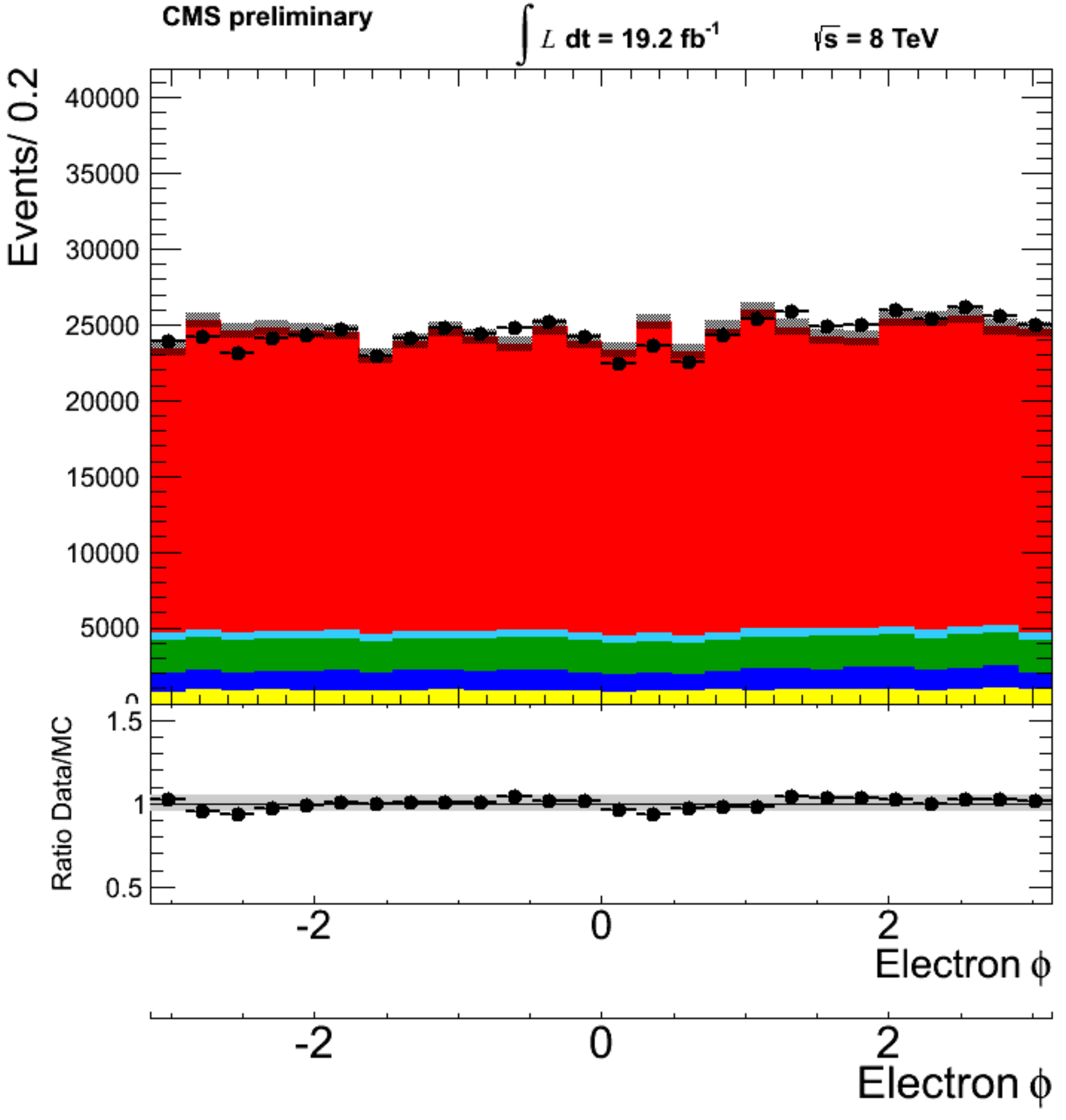
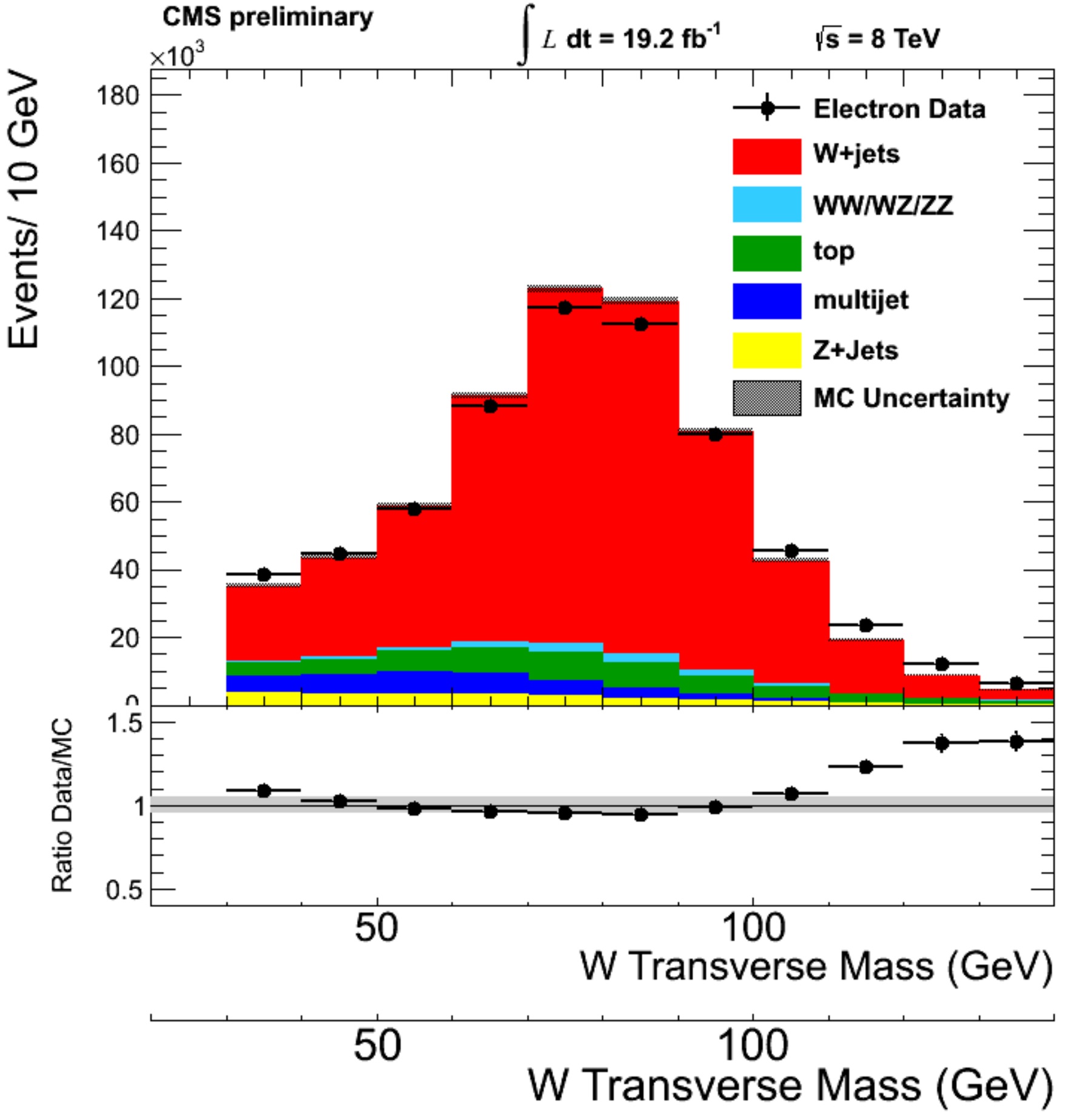
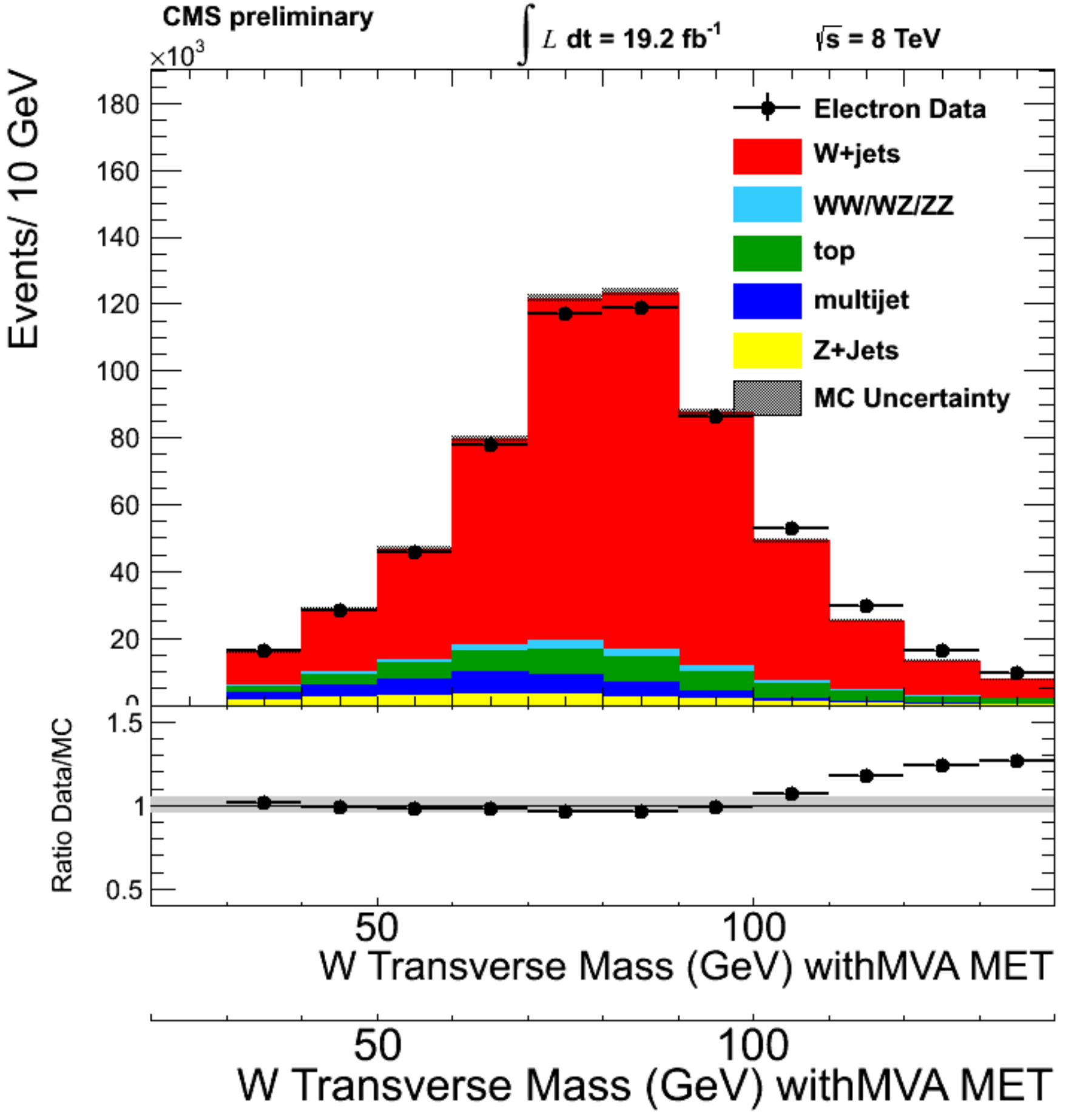
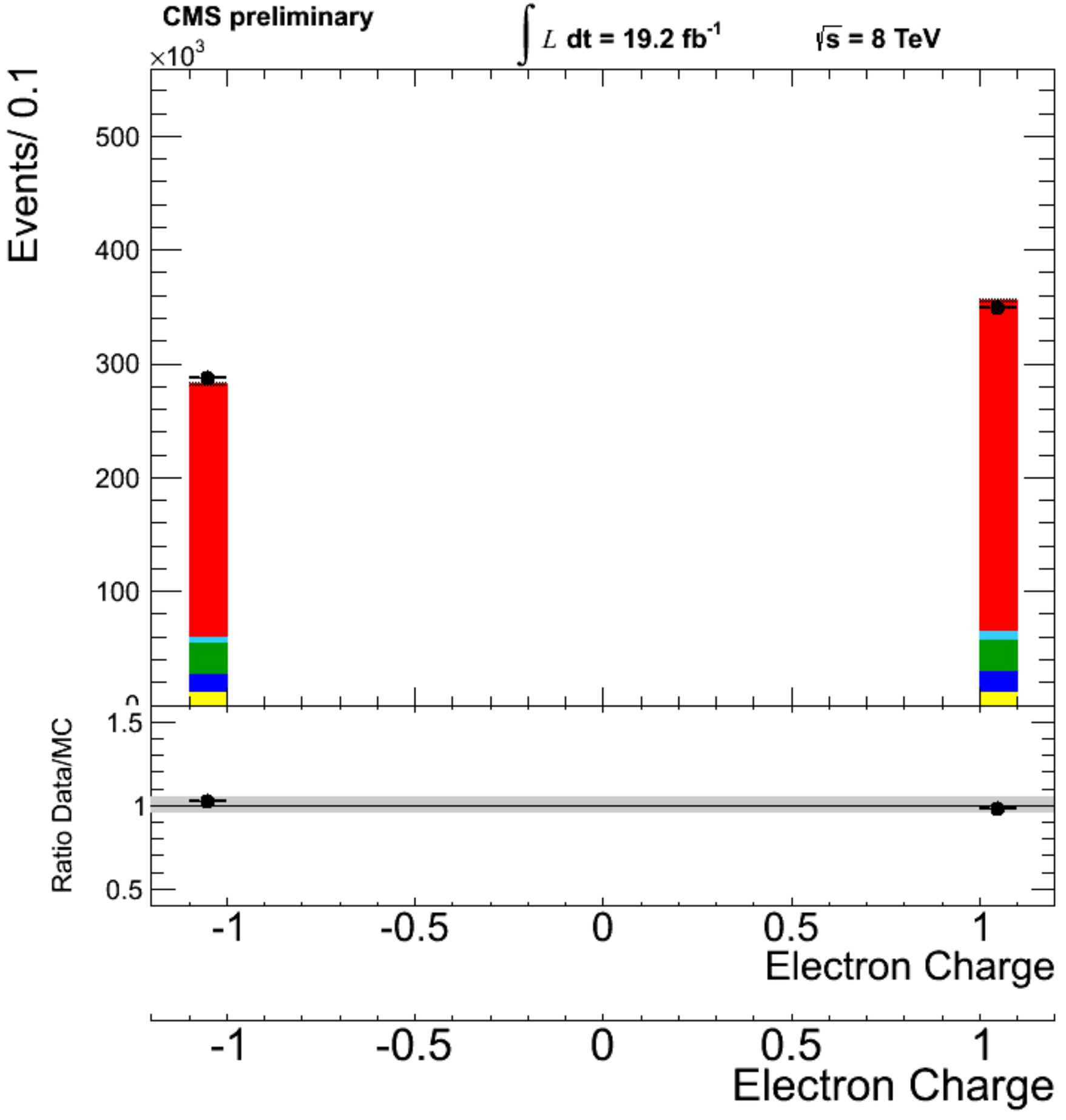

CMS preliminary
$\int L\,dt = 19.2\ fb^{-1}$
$\sqrt{s} = 8$ TeV
$\times 10^3$
Events / 5.0 GeV
140
120
100
80
60
40
20
0
Ratio Data/MC
1.5
1
0.5
50
100
150
Electron e_T (GeV)
50
100
150
Electron e_T (GeV)

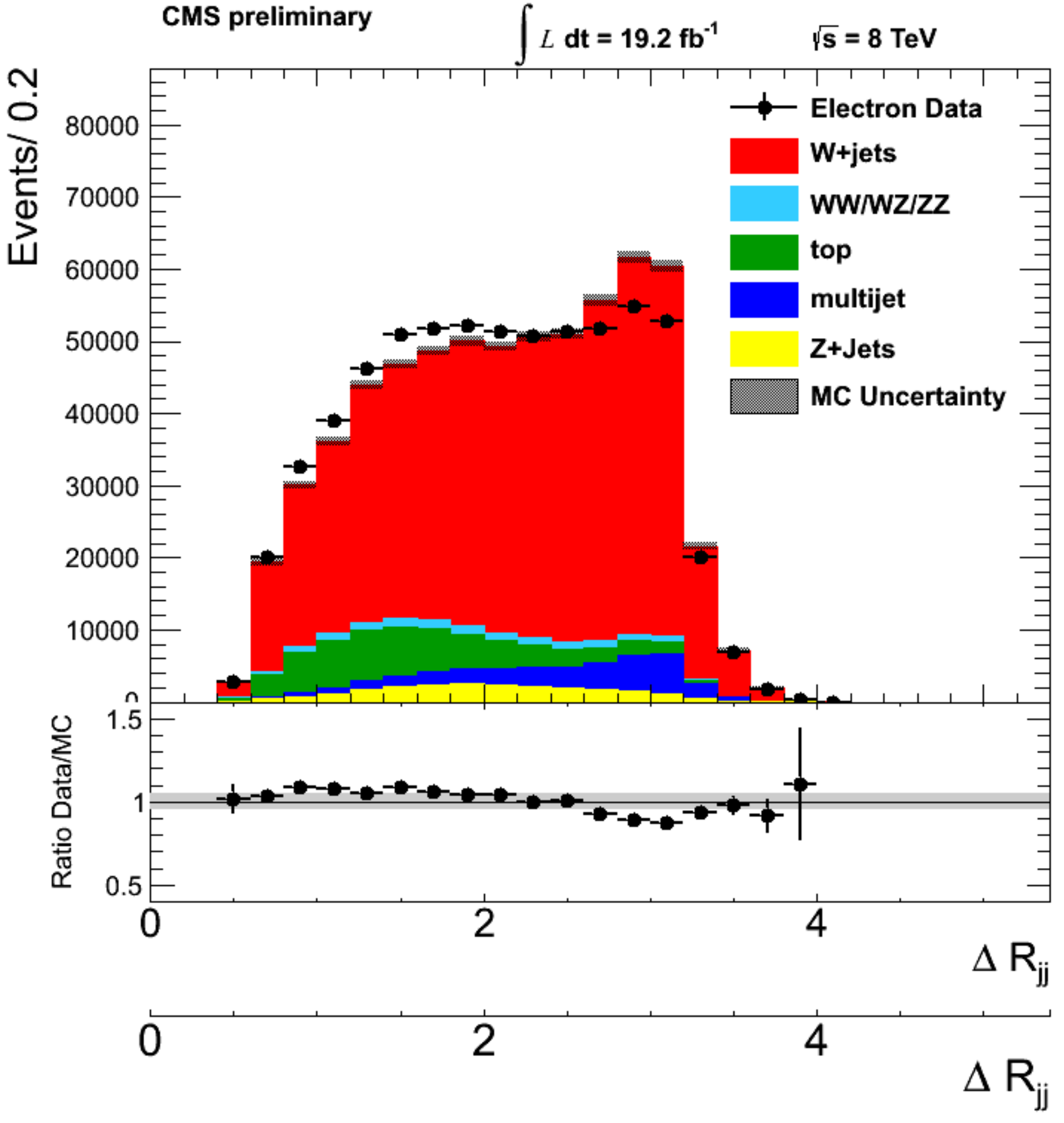

CMS preliminary
$\int L\,dt = 19.2\ fb^{-1}$
$\sqrt{s} = 8$ TeV
$\times 10^3$
Events/ 0.5
120
100
80
60
40
20
0
Ratio Data/MC
1.5
1
0.5
-2
0
2
Electron η
-2
0
2
Electron η

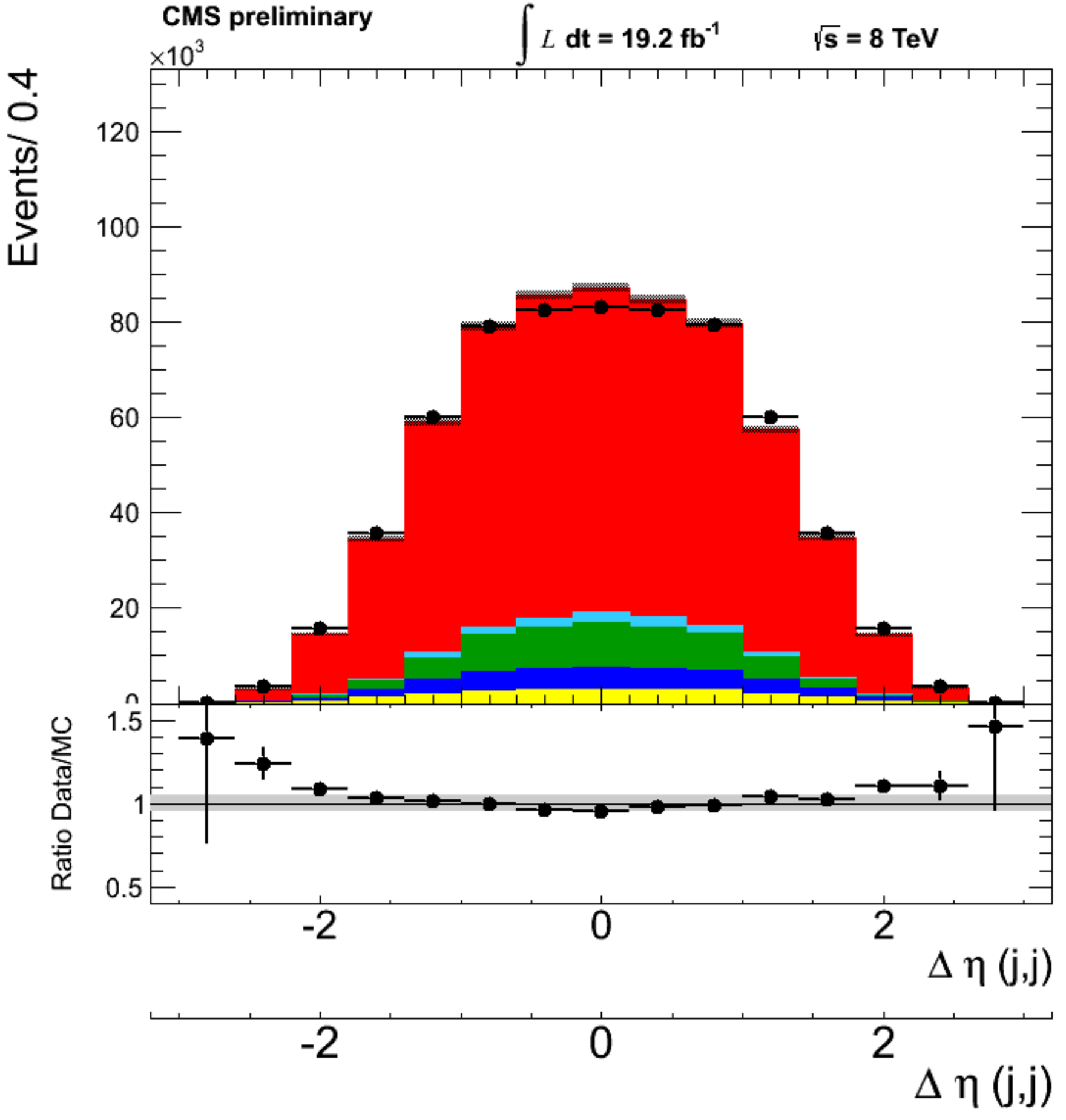

CMS preliminary
$\int L\,dt = 19.2\ fb^{-1}$
$\sqrt{s} = 8$ TeV
Events/ 0.2
40000
35000
30000
25000
20000
15000
10000
5000
0
Ratio Data/MC
1.5
1
0.5
-2
0
2
Electron ϕ
-2
0
2
Electron ϕ

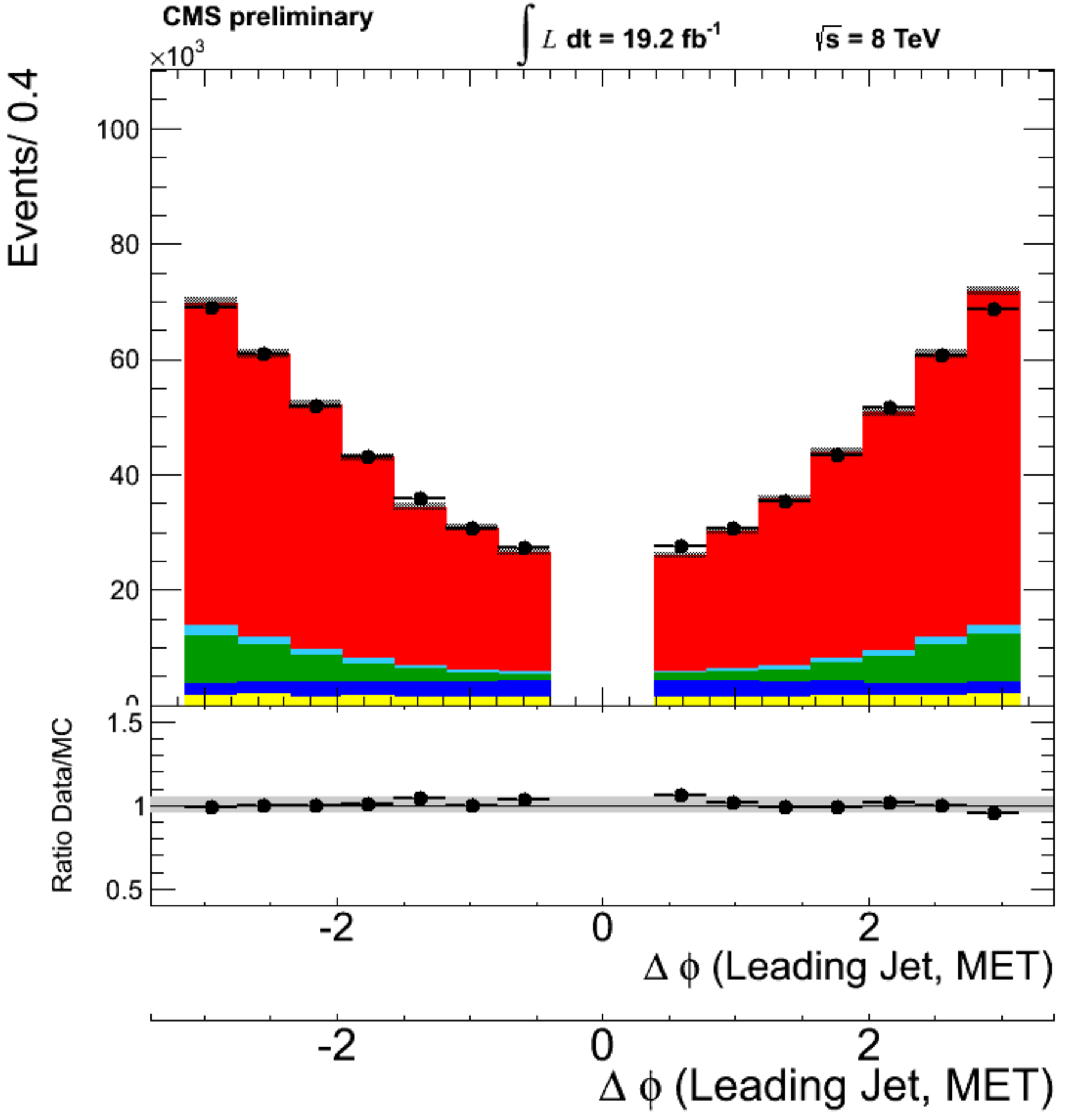

CMS preliminary
$\int L\,dt = 19.2\ fb^{-1}$
$\sqrt{s} = 8$ TeV
Events/ 10 GeV
$\times 10^3$
Electron Data
W+jets
WW/WZ/ZZ
top
multijet
Z+Jets
MC Uncertainty
Ratio Data/MC
W Transverse Mass (GeV)
W Transverse Mass (GeV)

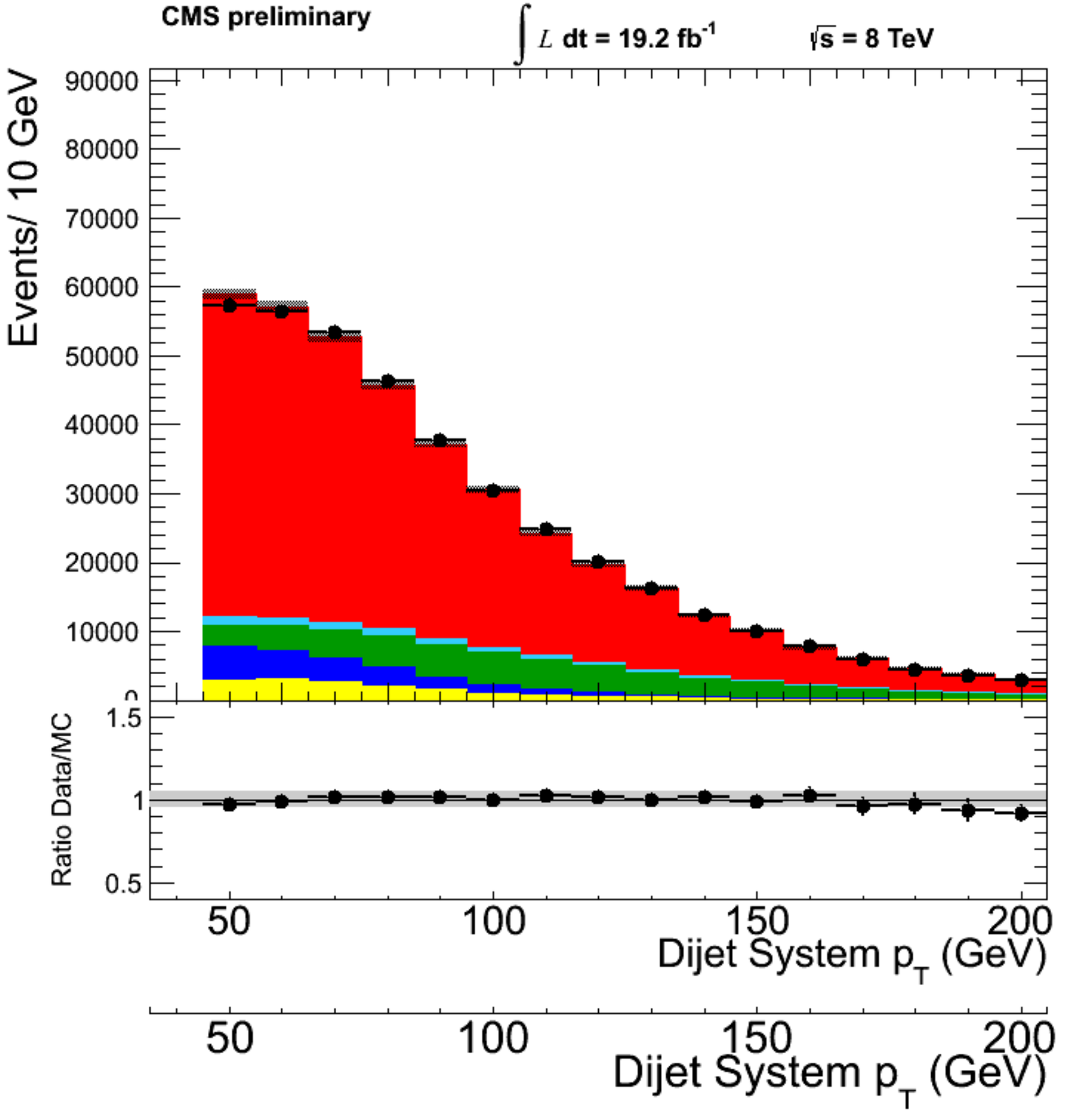

CMS preliminary
$\int L\,dt = 19.2\ fb^{-1}$
$\sqrt{s} = 8$ TeV
Events/ 10 GeV
$\times 10^3$
Electron Data
W+jets
WW/WZ/ZZ
top
multijet
Z+Jets
MC Uncertainty
Ratio Data/MC
W Transverse Mass (GeV) withMVA MET
W Transverse Mass (GeV) withMVA MET

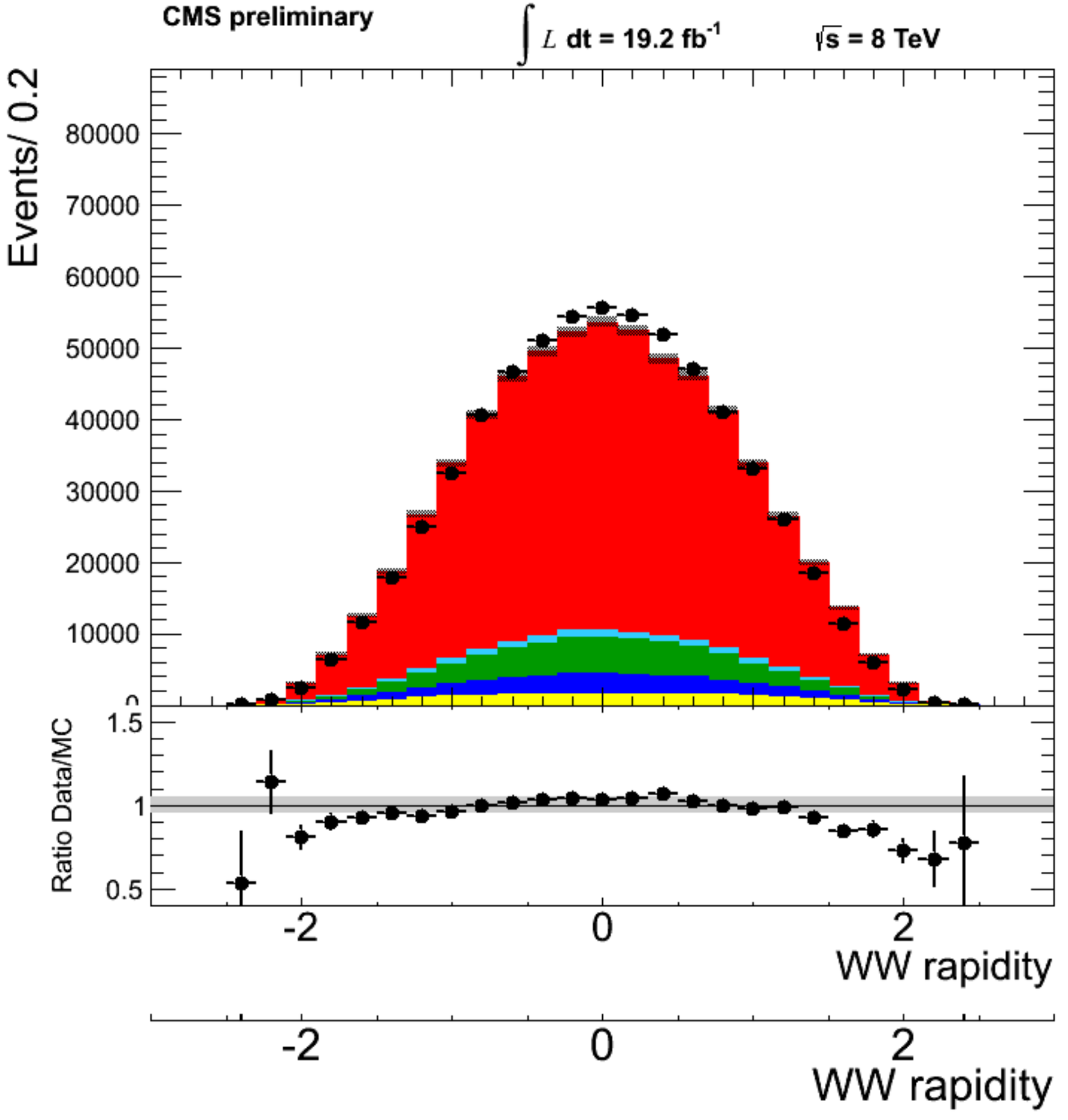

CMS preliminary
$\int L\,dt = 19.2\ fb^{-1}$
$\sqrt{s} = 8$ TeV
$\times 10^3$
Events/ 0.1
500
400
300
200
100
0
Ratio Data/MC
1.5
1
0.5
-1
-0.5
0
0.5
1
Electron Charge
-1
-0.5
0
0.5
1
Electron Charge

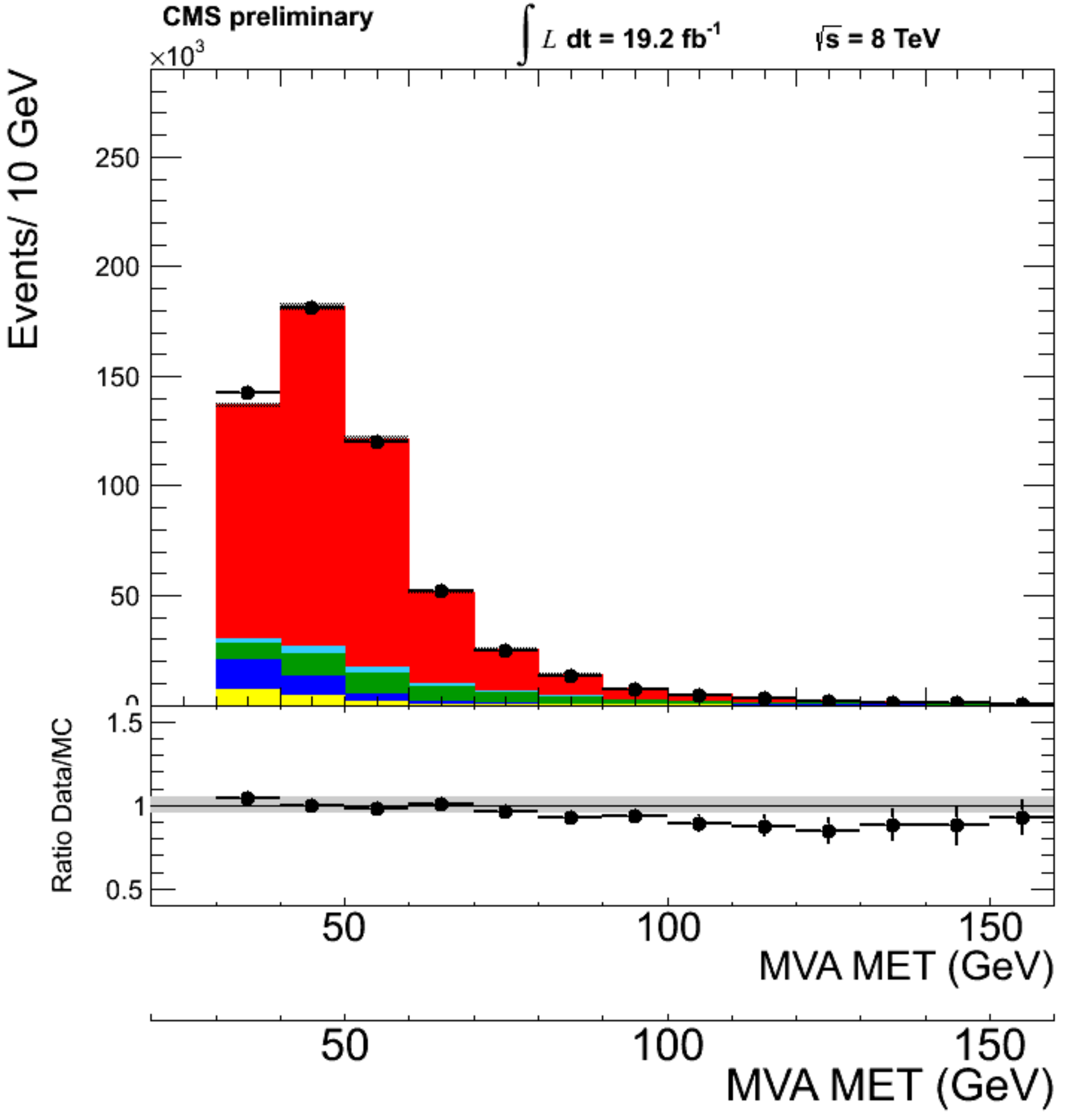

CMS preliminary
$\int L\,dt = 19.2\ fb^{-1}$
$\sqrt{s} = 8$ TeV
Events/ 0.2
Electron Data
W+jets
WW/WZ/ZZ
top
multijet
Z+Jets
MC Uncertainty
Ratio Data/MC
ΔR_{jj}

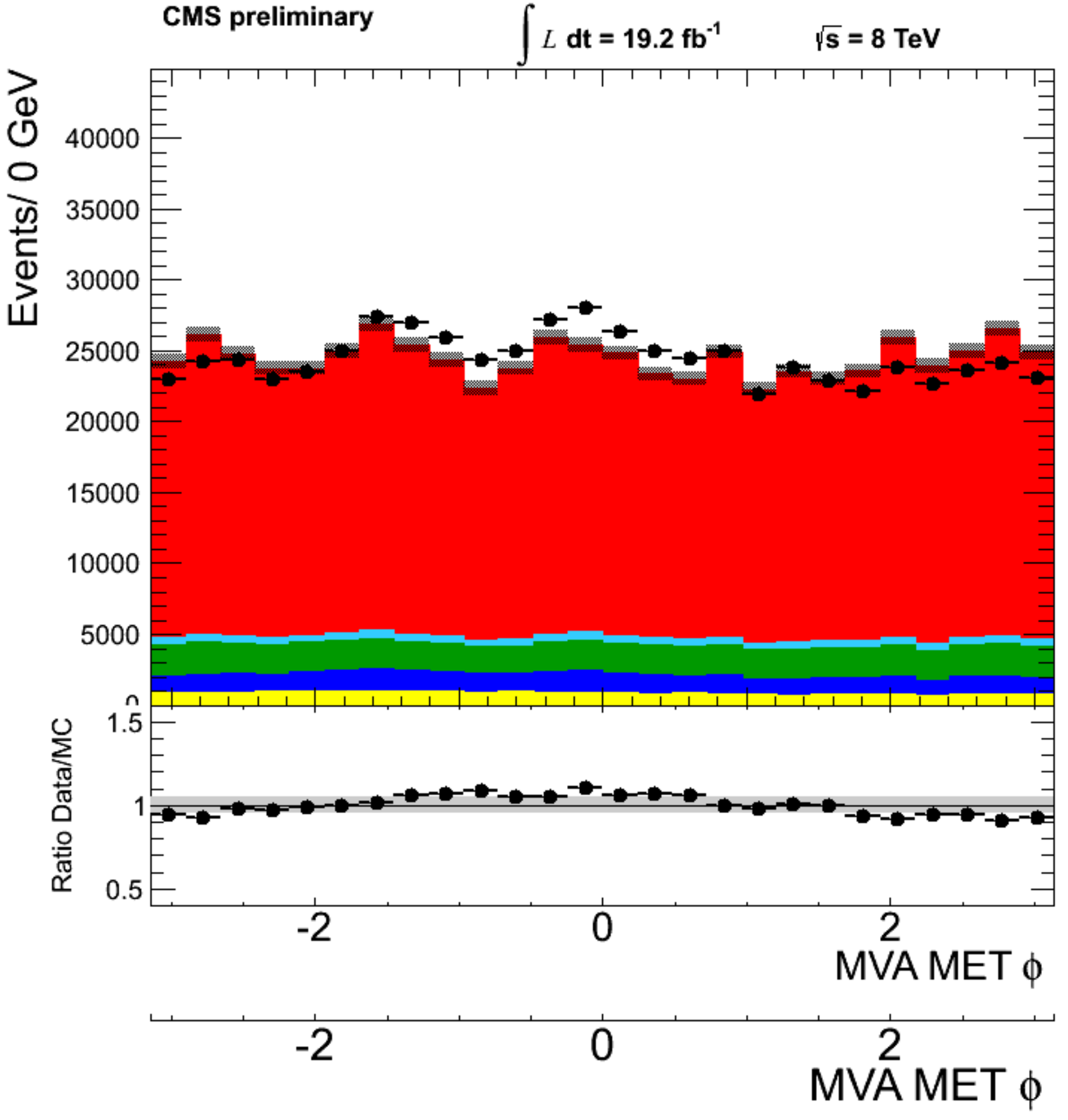

CMS preliminary
$\int L\,dt = 19.2\ fb^{-1}$
$\sqrt{s} = 8$ TeV
$\times 10^3$
Events/ 0.4
120
100
80
60
40
20
0
Ratio Data/MC
1.5
1
0.5
-2
0
2
$\Delta\eta$ (j,j)
-2
0
2
$\Delta\eta$ (j,j)

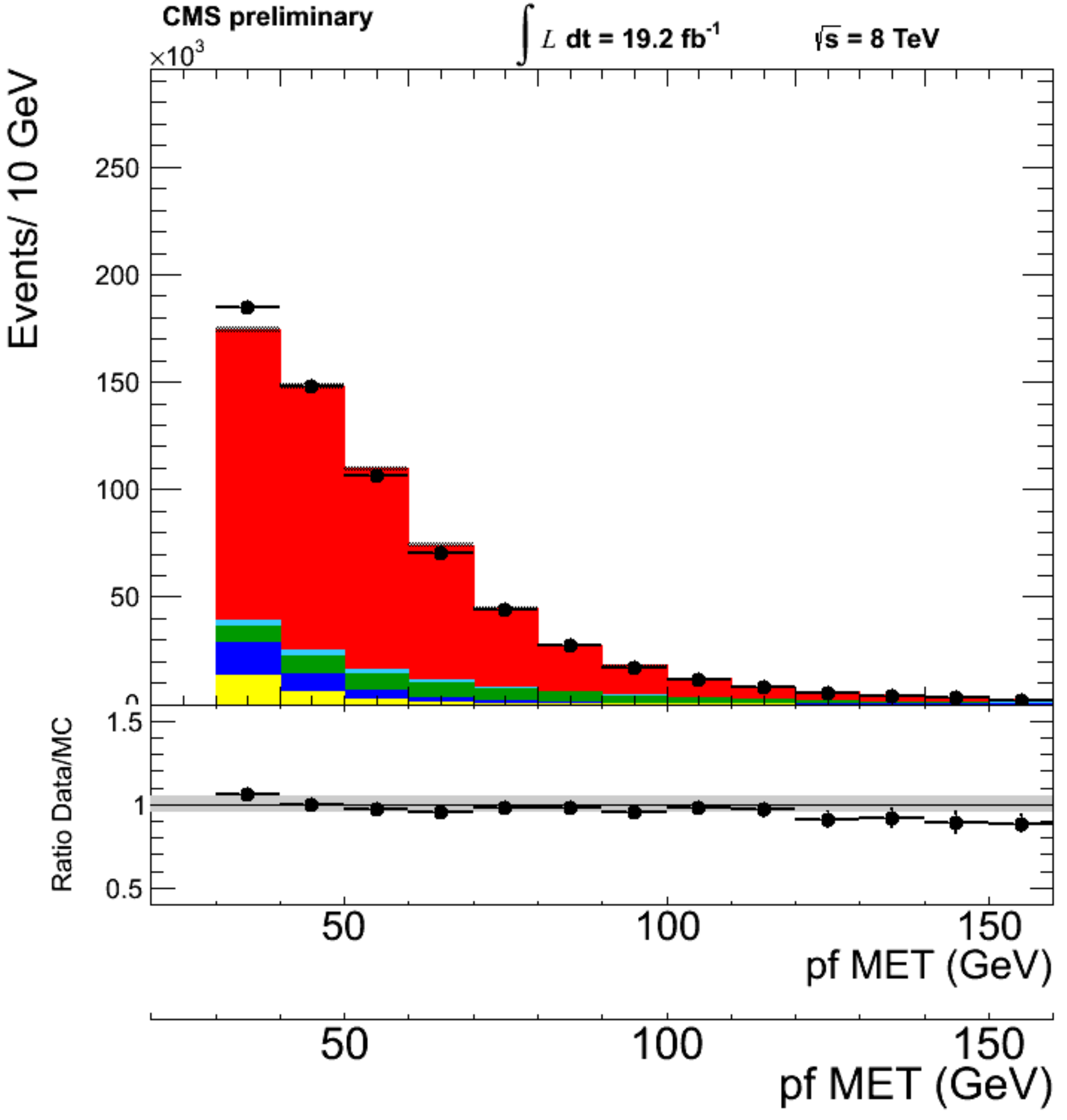

CMS preliminary
$\int L\,dt = 19.2\ fb^{-1}$
$\sqrt{s} = 8$ TeV
$\times 10^3$
Events/ 0.4
100
80
60
40
20
0
Ratio Data/MC
1.5
1
0.5
-2
0
2
$\Delta\phi$ (Leading Jet, MET)
-2
0
2
$\Delta\phi$ (Leading Jet, MET)

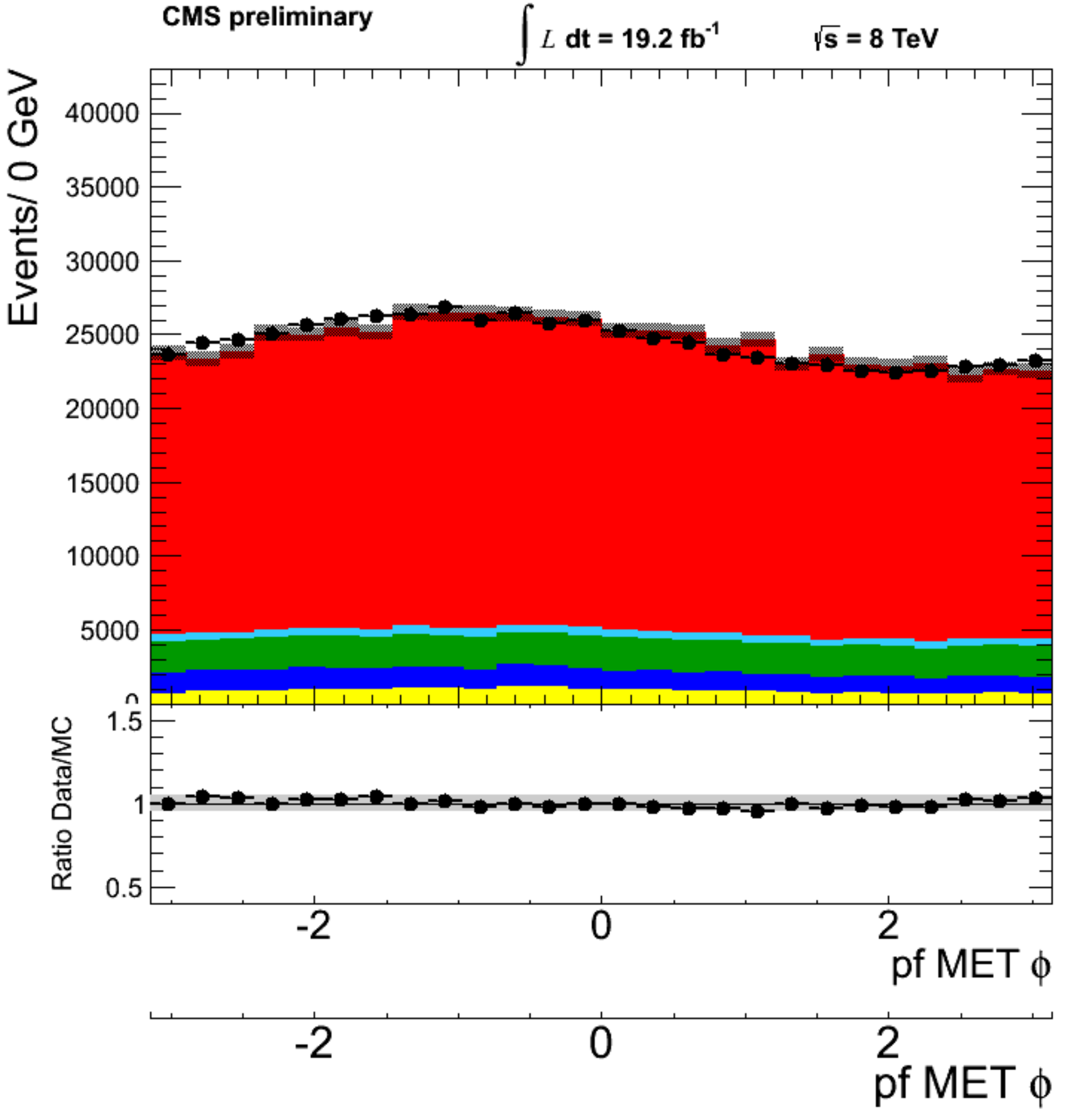

CMS preliminary
$\int L\,dt = 19.2\ fb^{-1}$
$\sqrt{s} = 8$ TeV
Events/ 10 GeV
90000
80000
70000
60000
50000
40000
30000
20000
10000
0
Ratio Data/MC
1.5
1
0.5
50
100
150
200
Dijet System p_T (GeV)
50
100
150
200
Dijet System p_T (GeV)

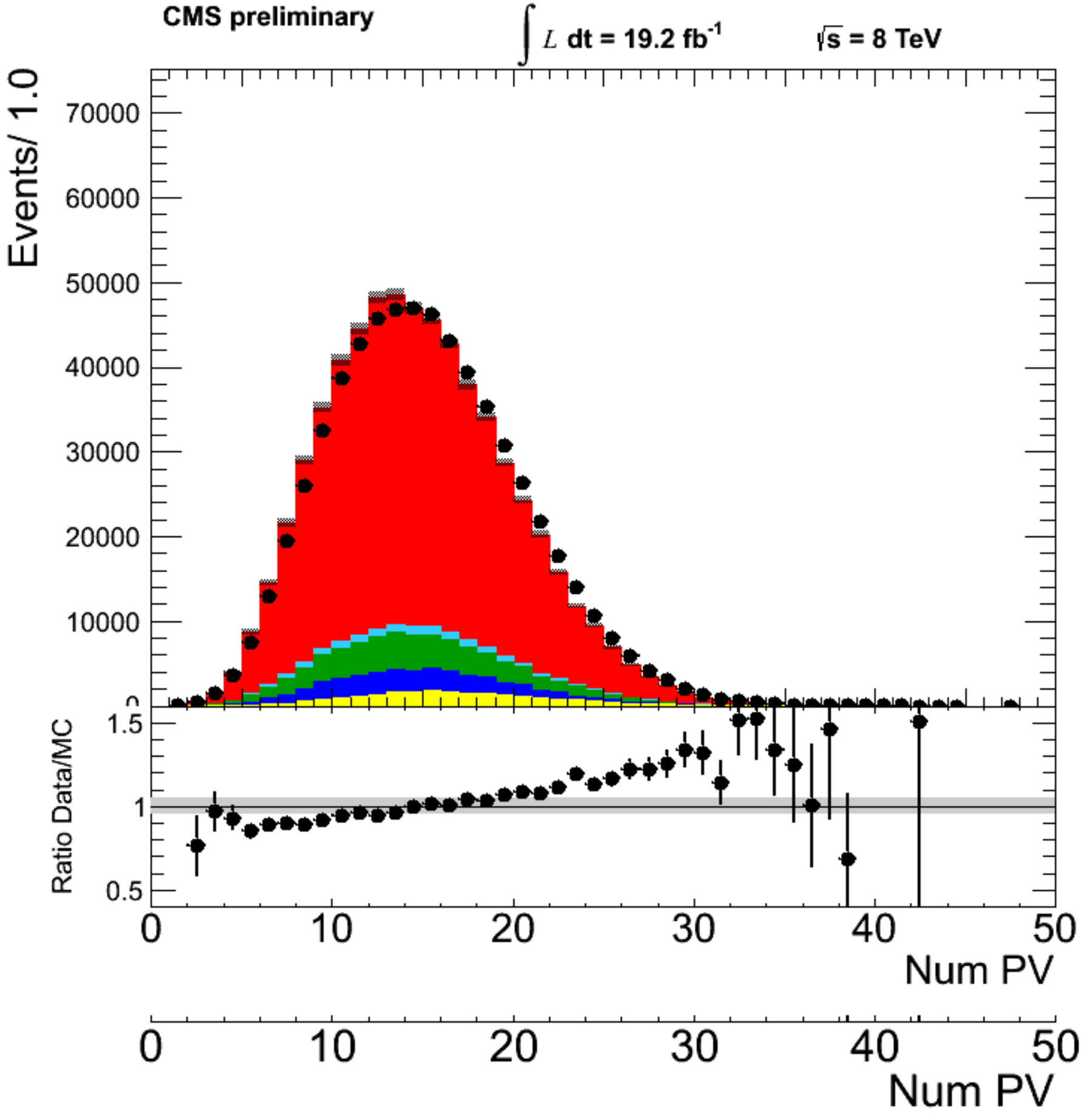

CMS preliminary
$\int L\,dt = 19.2\ fb^{-1}$
$\sqrt{s} = 8$ TeV
Events/ 0.2
80000
70000
60000
50000
40000
30000
20000
10000
0
Ratio Data/MC
1.5
1
0.5
-2
0
2
WW rapidity
-2
0
2
WW rapidity

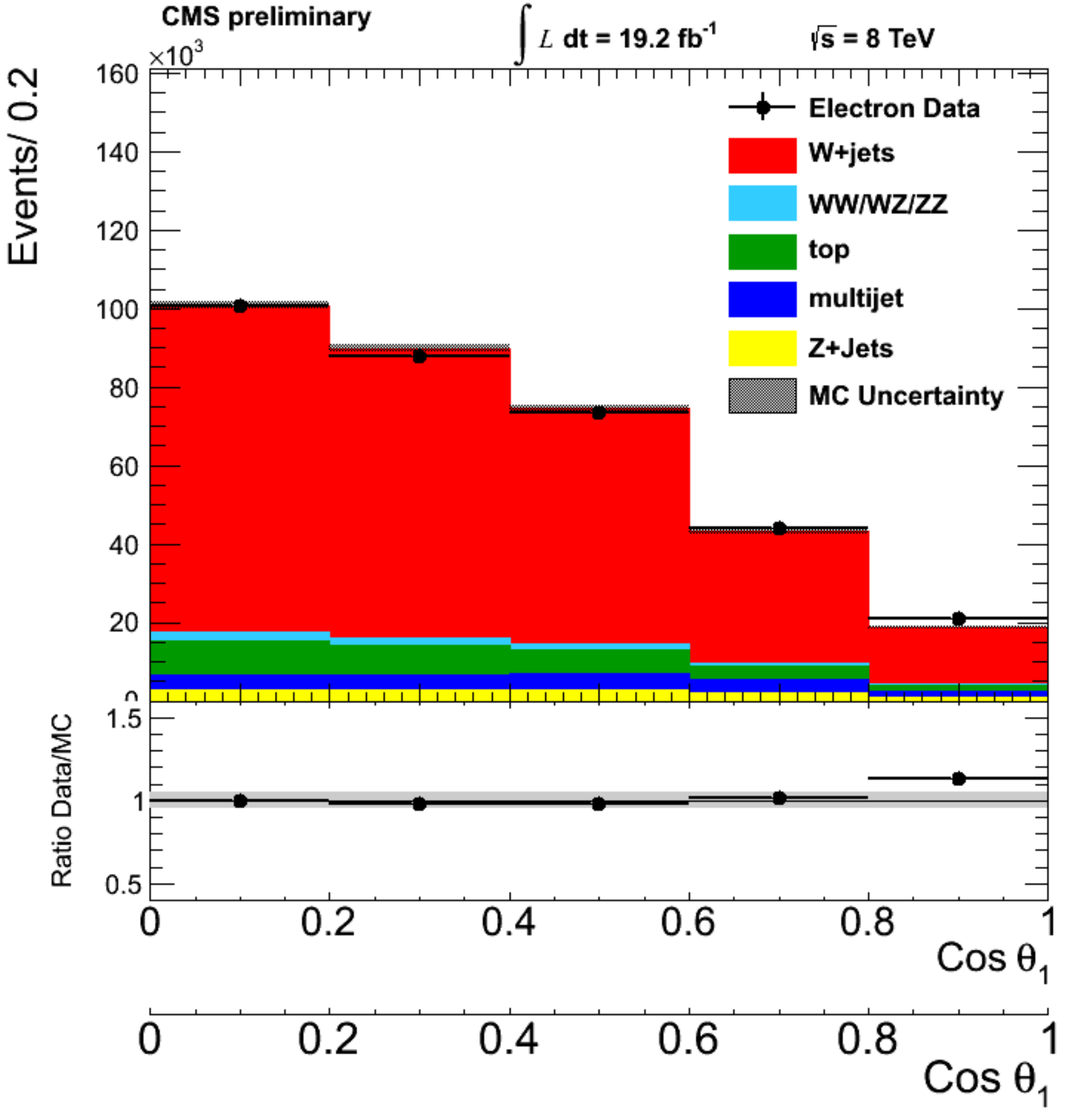

CMS preliminary
$\int L\,dt = 19.2\ fb^{-1}$
$\sqrt{s} = 8$ TeV
$\times 10^3$
Events/ 10 GeV
250
200
150
100
50
Ratio Data/MC
1.5
1
0.5
50
100
150
MVA MET (GeV)
50
100
150
MVA MET (GeV)

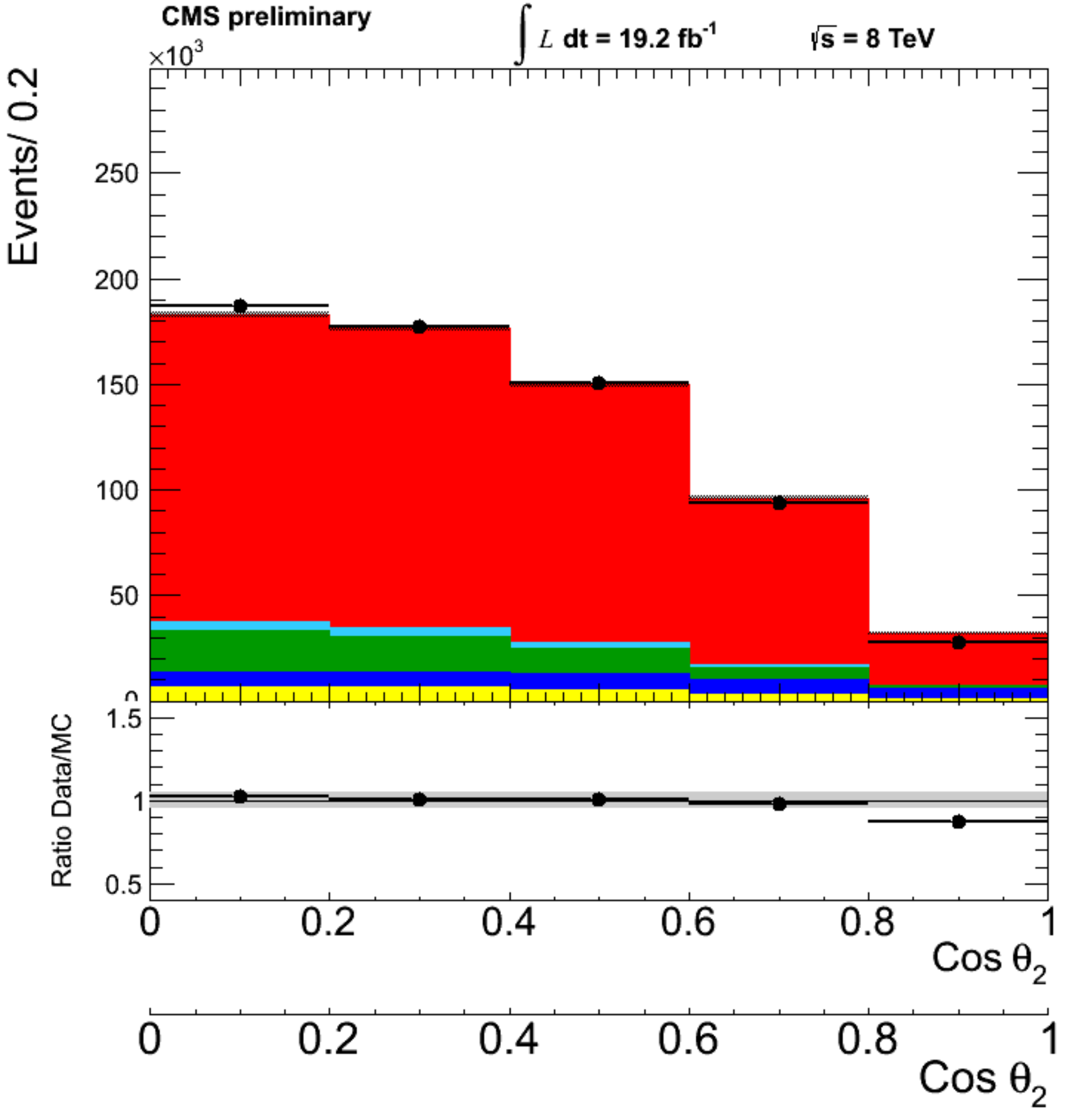

CMS preliminary
$\int L\,dt = 19.2\ fb^{-1}$
$\sqrt{s} = 8$ TeV
Events/ 0 GeV
40000
35000
30000
25000
20000
15000
10000
5000
0
Ratio Data/MC
1.5
1
0.5
-2
0
2
MVA MET ϕ
-2
0
2
MVA MET ϕ

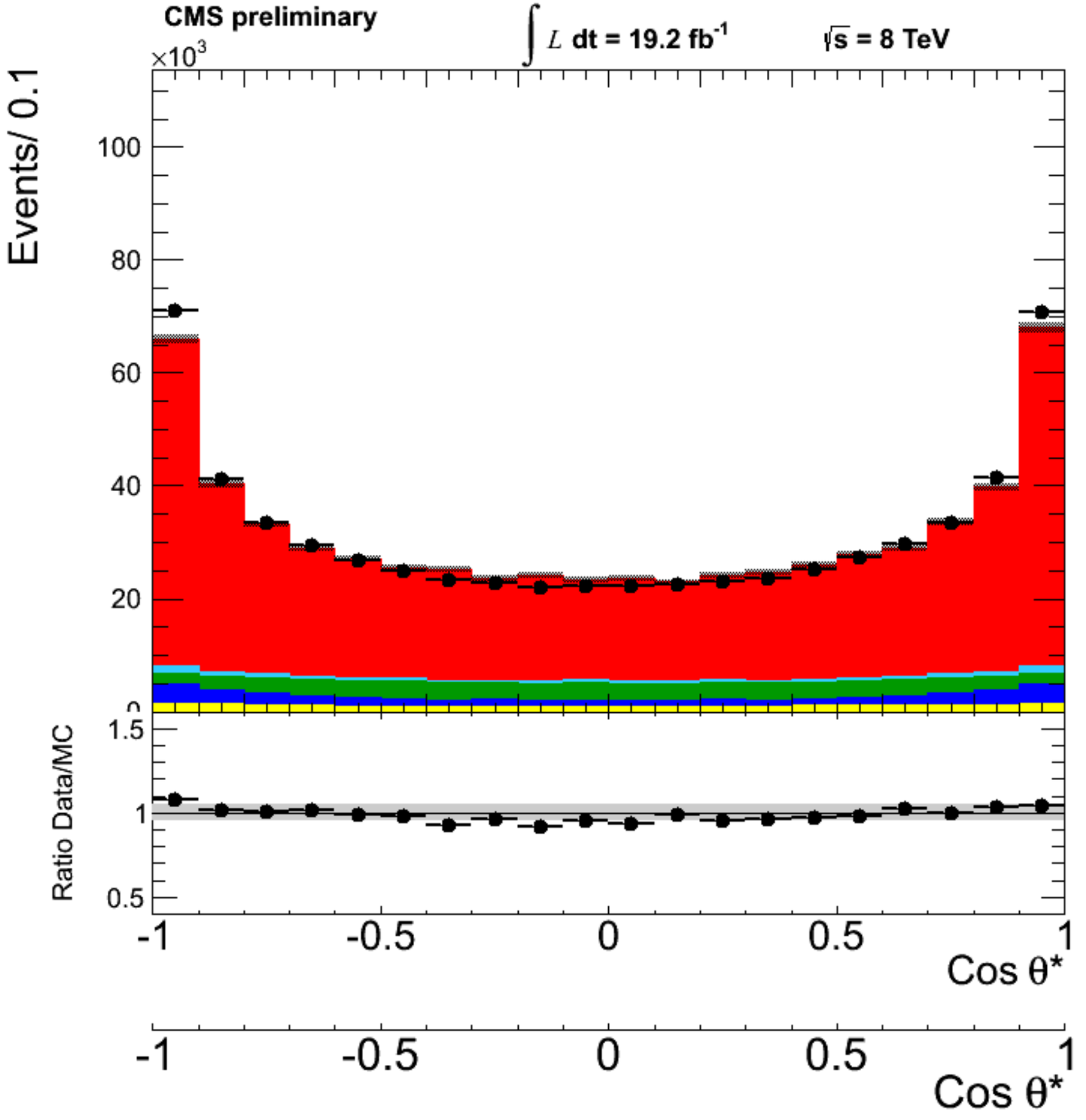

CMS preliminary
$\int L\,dt = 19.2\ fb^{-1}$
$\sqrt{s} = 8$ TeV
$\times 10^3$
Events/ 10 GeV
250
200
150
100
50
0
Ratio Data/MC
1.5
1
0.5
50
100
150
pf MET (GeV)
50
100
150
pf MET (GeV)

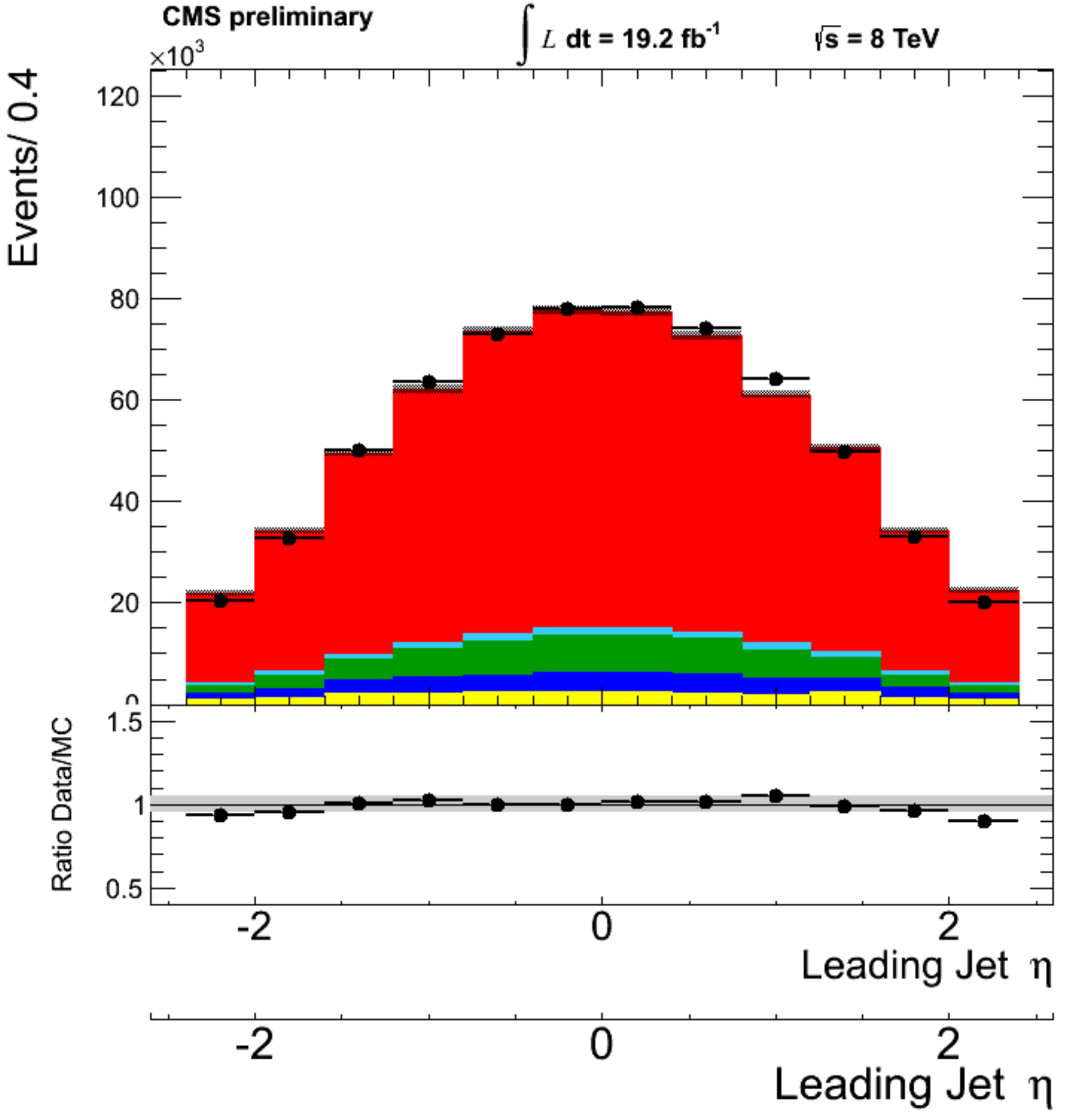

CMS preliminary
$\int L\,dt = 19.2\ fb^{-1}$
$\sqrt{s} = 8$ TeV
Events/ 0 GeV
40000
35000
30000
25000
20000
15000
10000
5000
0
Ratio Data/MC
1.5
1
0.5
-2
0
2
pf MET ϕ
-2
0
2
pf MET ϕ

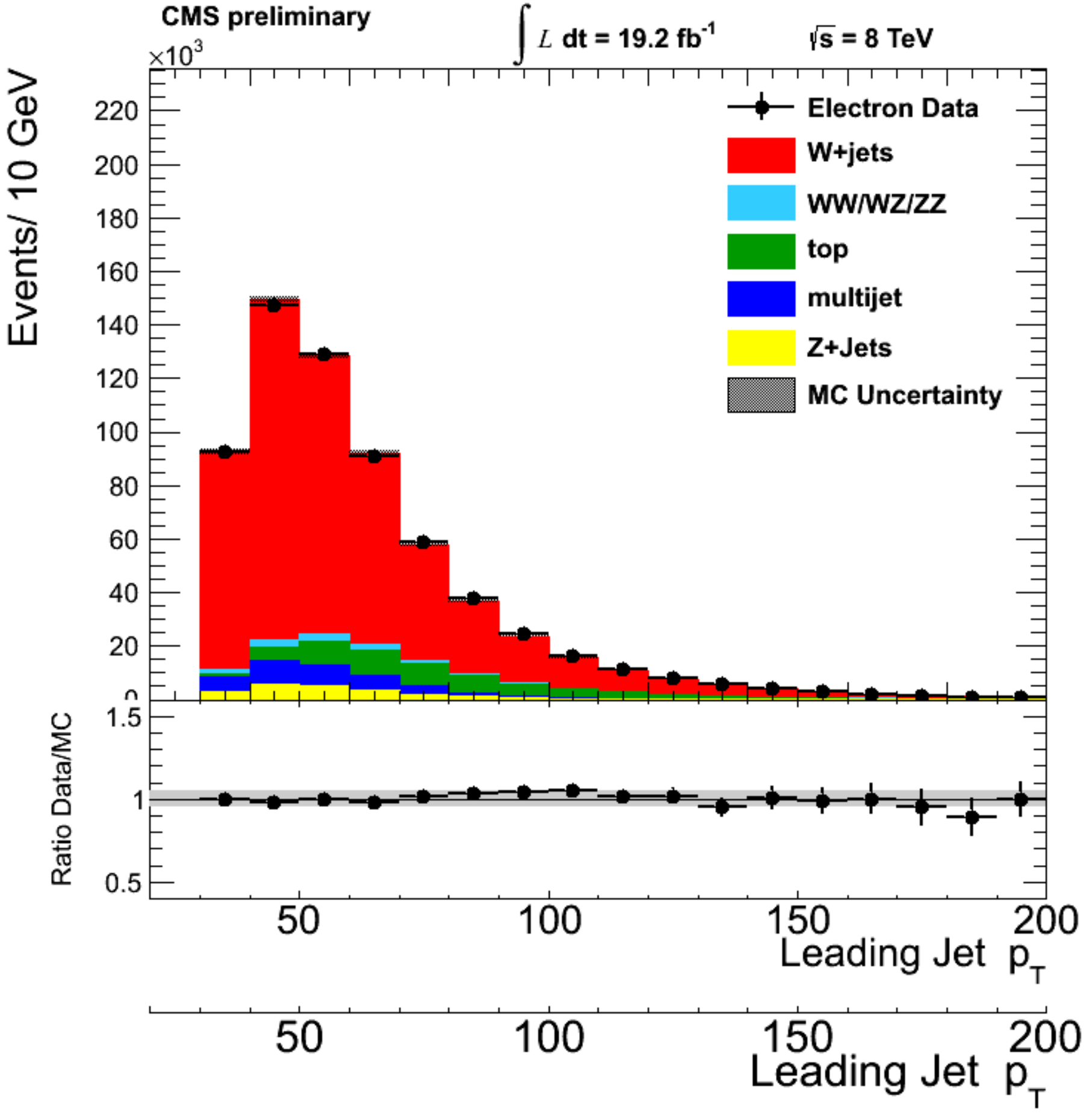

CMS preliminary
∫ L dt = 19.2 fb-1
√s = 8 TeV
Events/ 1.0
70000
60000
50000
40000
30000
20000
10000
0
Ratio Data/MC
1.5
1
0.5
0
10
20
30
40
50
Num PV
0
10
20
30
40
50
Num PV

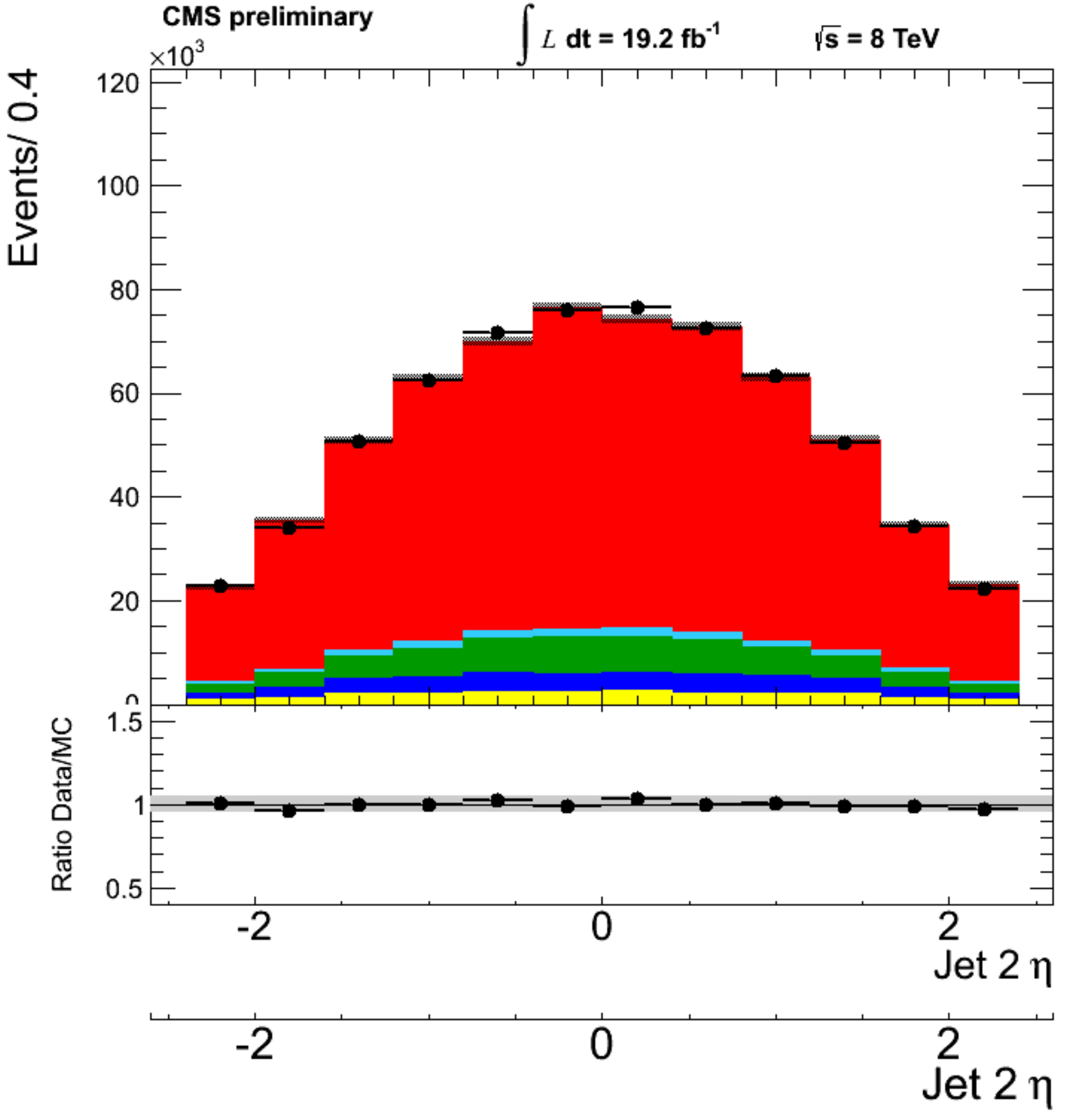

CMS preliminary
$\int L\,dt = 19.2\ fb^{-1}$
$\sqrt{s} = 8$ TeV
Events/ 0.2
$\times 10^3$
Electron Data
W+jets
WW/WZ/ZZ
top
multijet
Z+Jets
MC Uncertainty
Ratio Data/MC
Cos θ_1
Cos θ_1

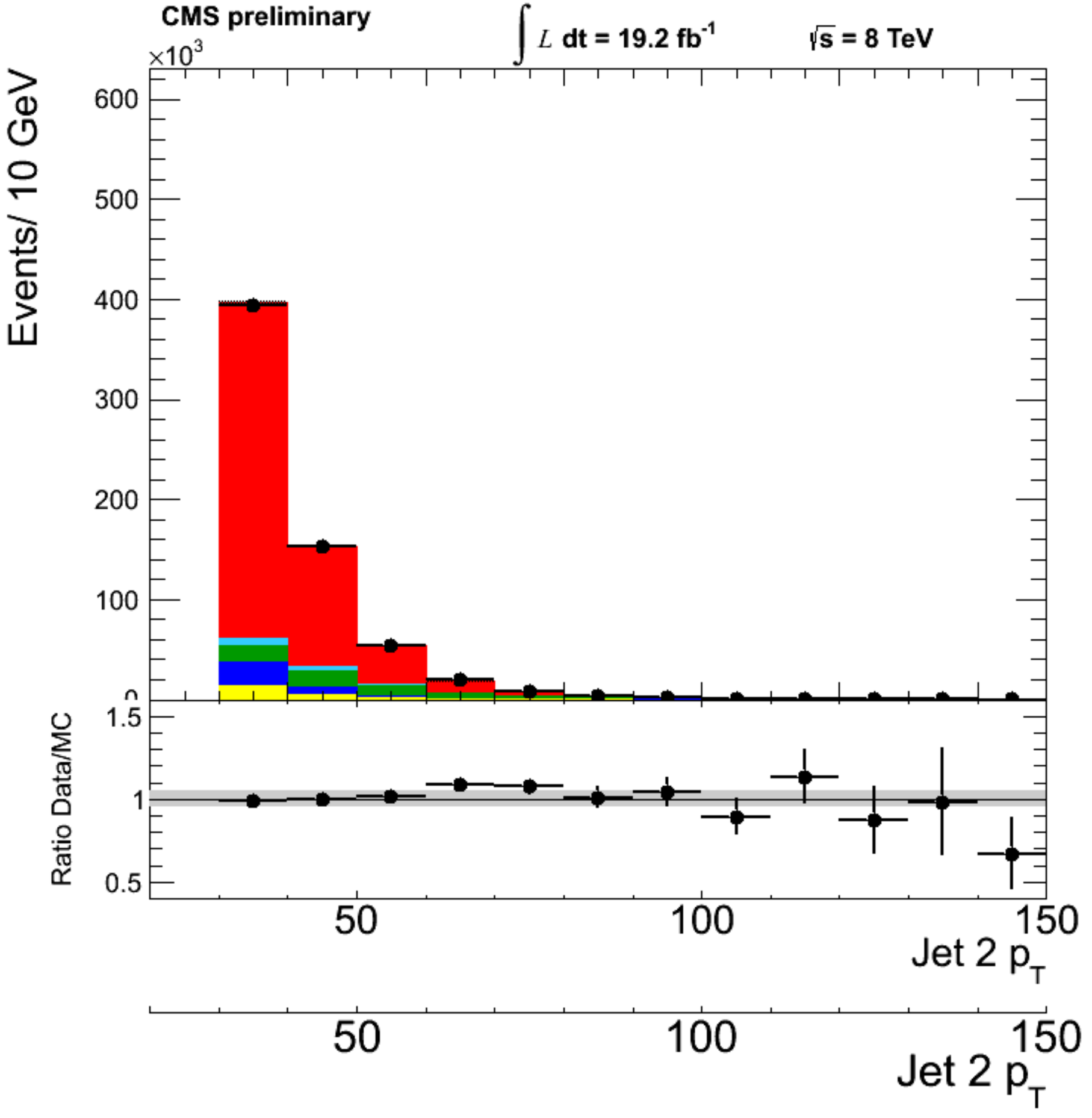

CMS preliminary
$\int L\,dt = 19.2\ fb^{-1}$
$\sqrt{s} = 8$ TeV
$\times 10^3$
Events/ 0.2
250
200
150
100
50
0
Ratio Data/MC
1.5
1
0.5
0
0.2
0.4
0.6
0.8
1
Cos θ_2
0
0.2
0.4
0.6
0.8
1
Cos θ_2

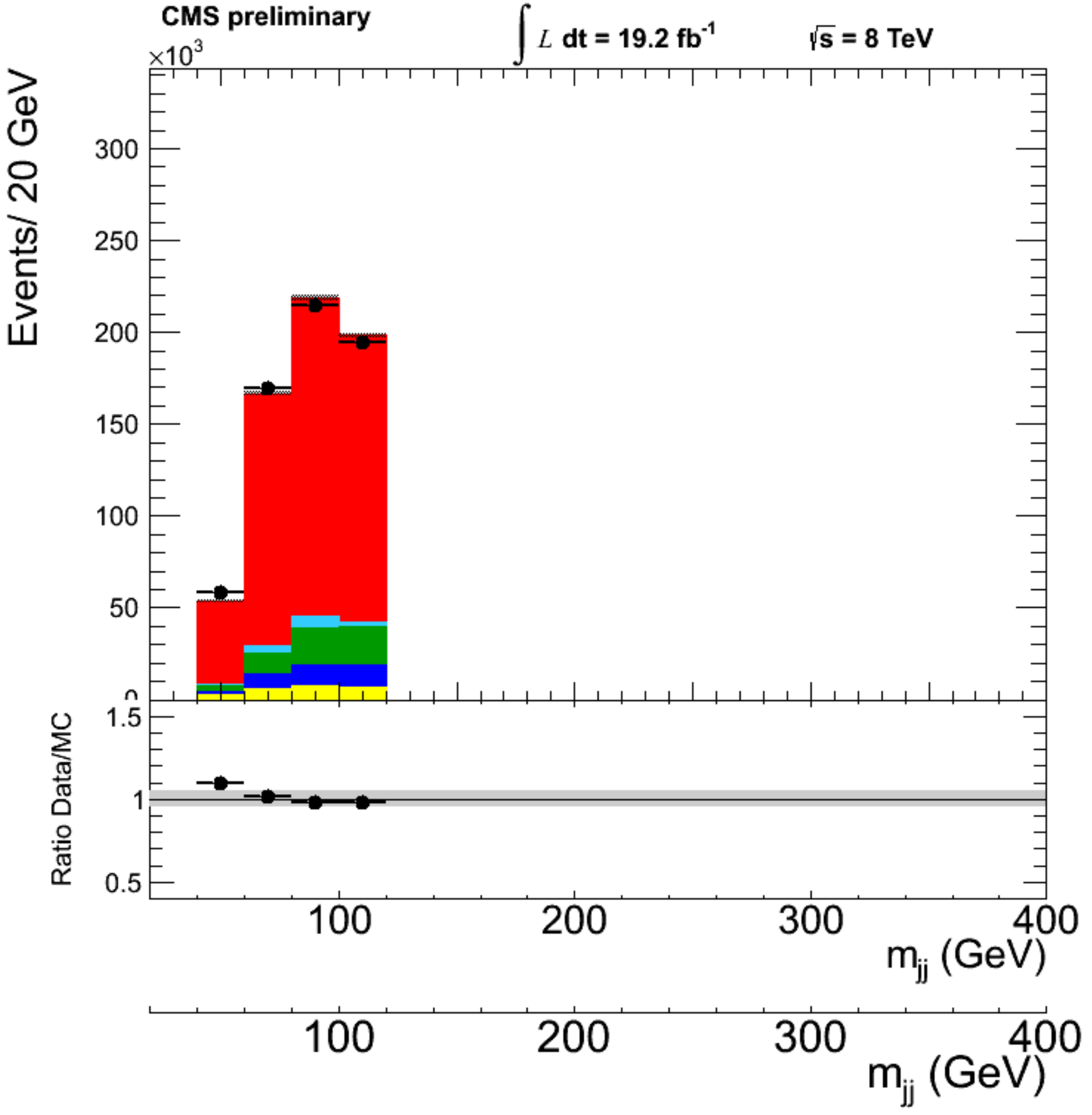

CMS preliminary
$\int L\,dt = 19.2\ fb^{-1}$
$\sqrt{s} = 8$ TeV
$\times 10^3$
Events/ 0.1
100
80
60
40
20
0
Ratio Data/MC
1.5
1
0.5
-1
-0.5
0
0.5
1
Cos θ*
-1
-0.5
0
0.5
1
Cos θ*

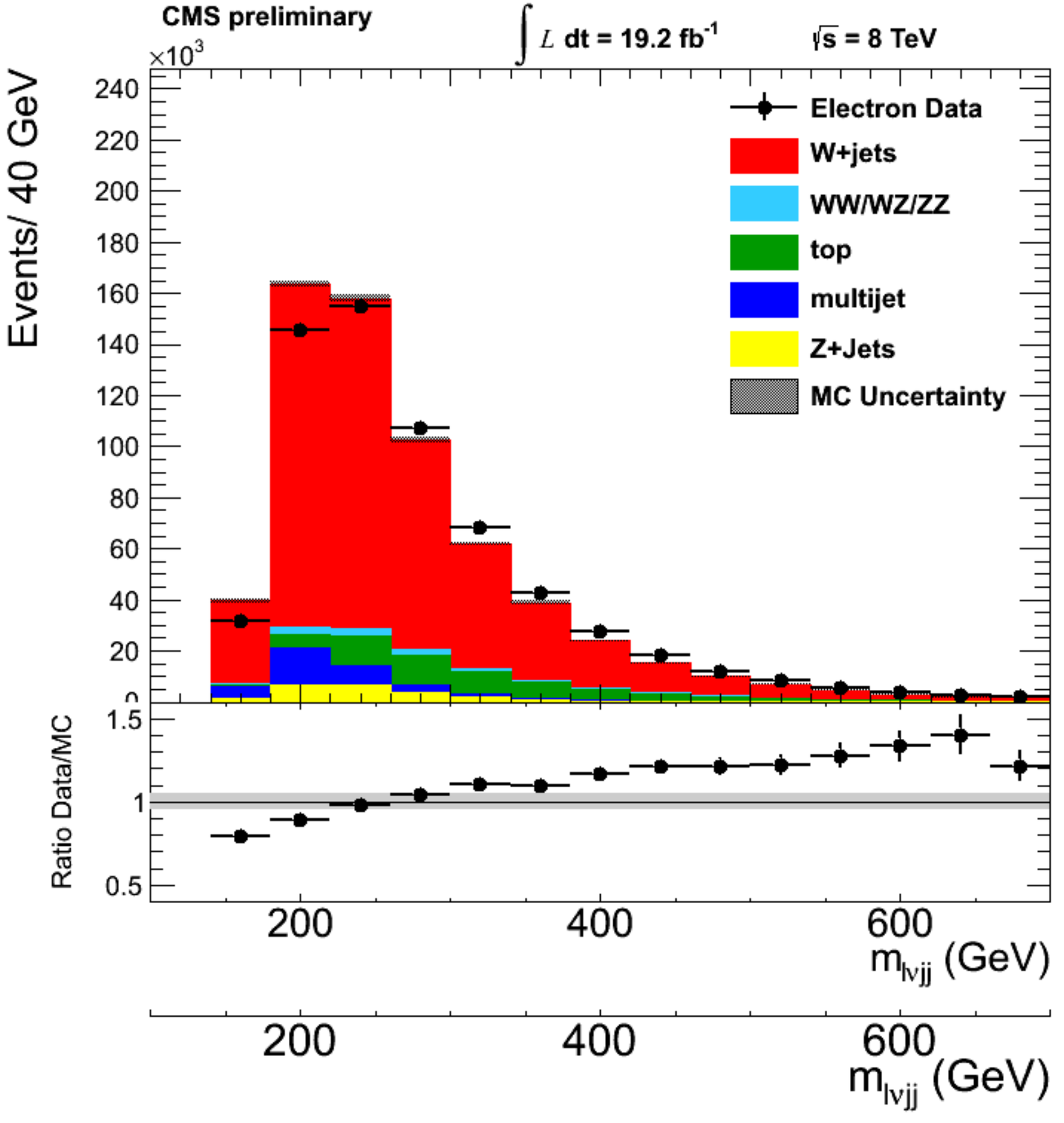

CMS preliminary
$\int L\,dt = 19.2\ fb^{-1}$
$\sqrt{s} = 8$ TeV
$\times 10^3$
Events/ 0.4
120
100
80
60
40
20
0
Ratio Data/MC
1.5
1
0.5
-2
0
2
Leading Jet η
-2
0
2
Leading Jet η

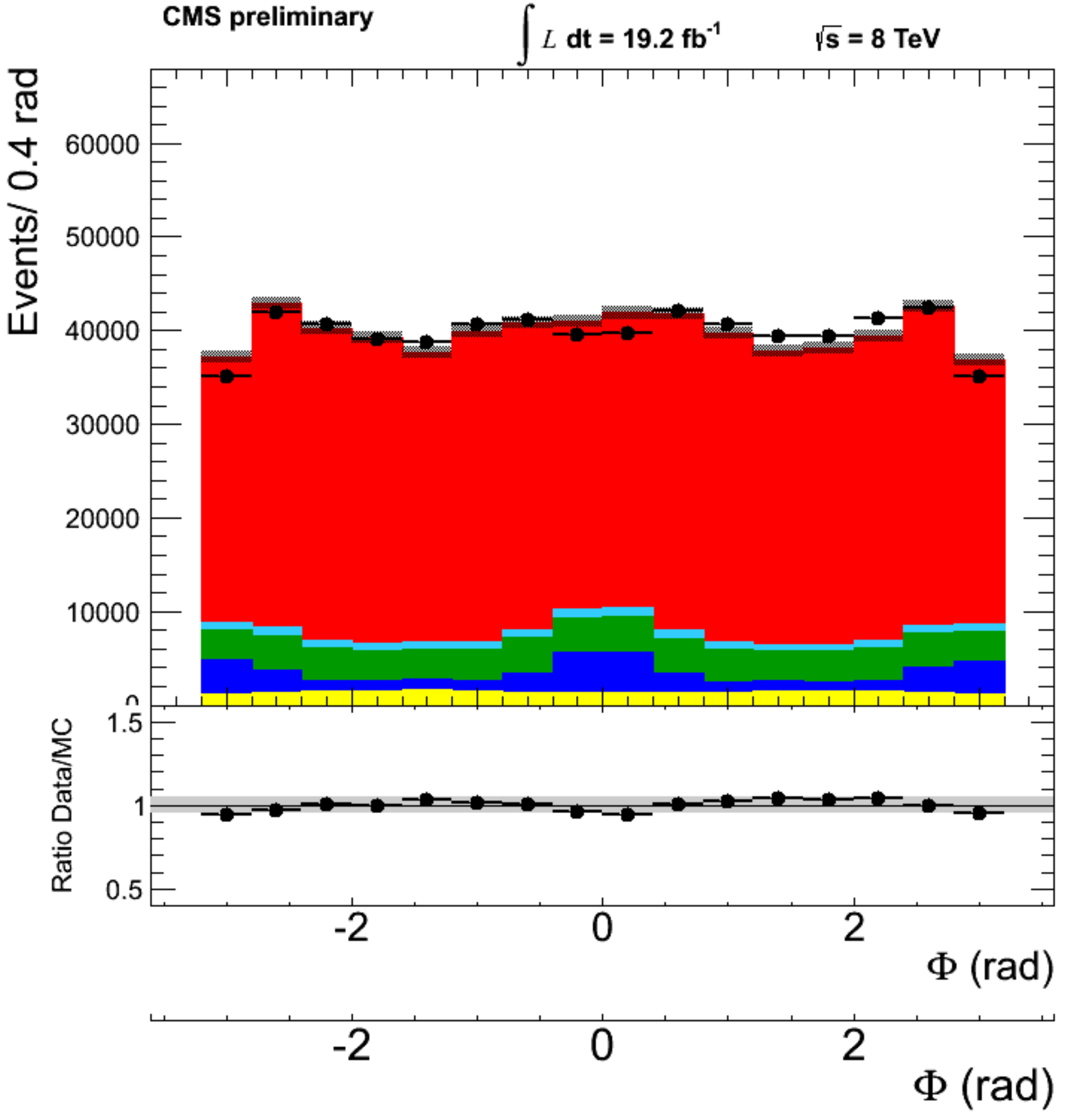

CMS preliminary
$\int L\,dt = 19.2\ fb^{-1}$
$\sqrt{s} = 8$ TeV
Events/ 10 GeV
$\times 10^3$
Electron Data
W+jets
WW/WZ/ZZ
top
multijet
Z+Jets
MC Uncertainty
Ratio Data/MC
Leading Jet p_T
Leading Jet p_T

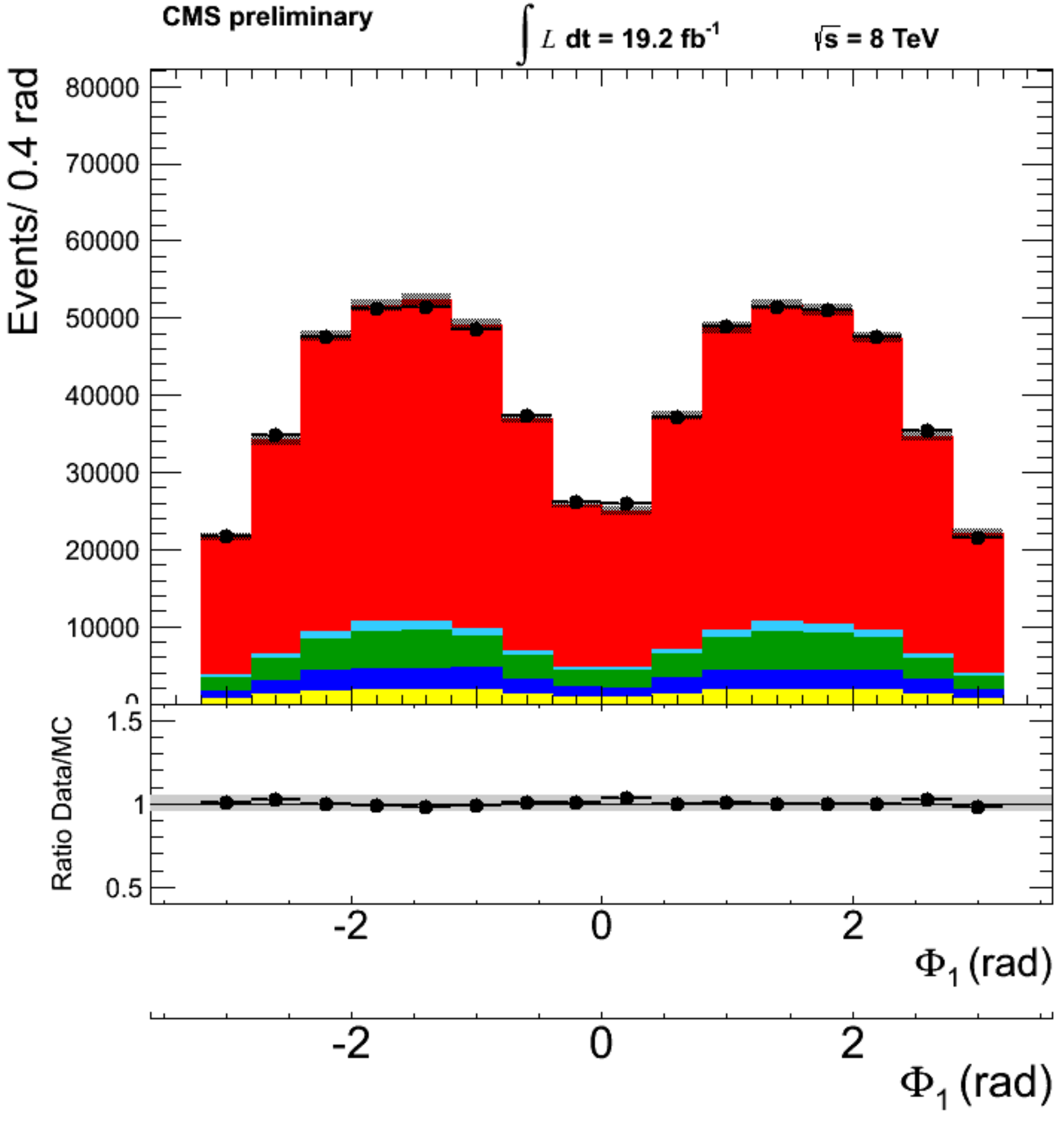

CMS preliminary
$\int L\,dt = 19.2\ fb^{-1}$
$\sqrt{s} = 8$ TeV
$\times 10^3$
Events/ 0.4
120
100
80
60
40
20
0
Ratio Data/MC
1.5
1
0.5
-2
0
2
Jet 2 η
-2
0
2
Jet 2 η

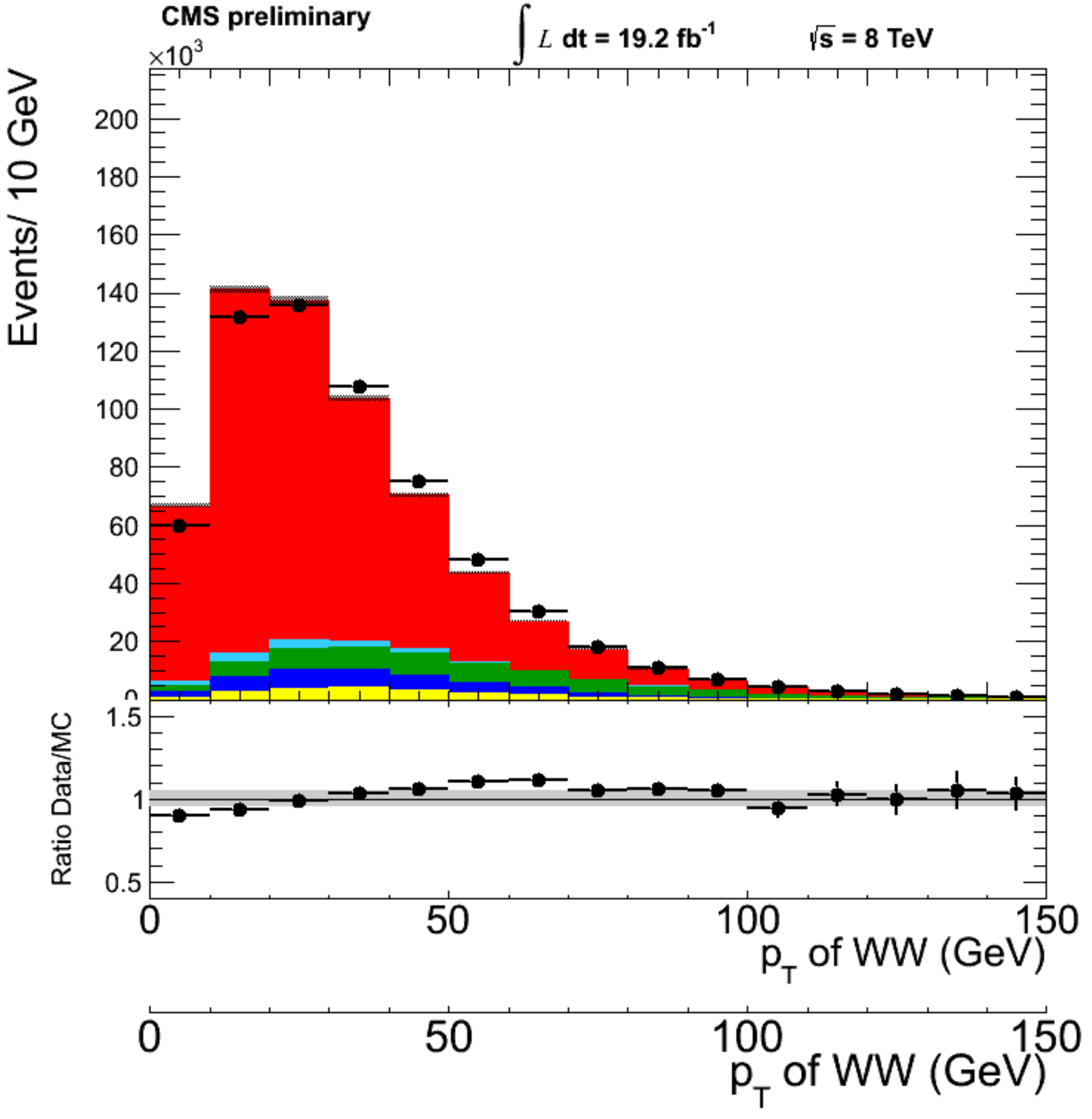

CMS preliminary
$\int L\,dt = 19.2\ fb^{-1}$
$\sqrt{s} = 8$ TeV
$\times 10^3$
Events/ 10 GeV
600
500
400
300
200
100
0
Ratio Data/MC
1.5
1
0.5
50
100
150
Jet 2 p_T
50
100
150
Jet 2 p_T


CMS preliminary
$\int L\,dt = 19.2\ fb^{-1}$
$\sqrt{s} = 8$ TeV
$\times 10^3$
Events/ 20 GeV
300
250
200
150
100
50
0
Ratio Data/MC
1.5
1
0.5
100
200
300
400
m_{jj} (GeV)
100
200
300
400
m_{jj} (GeV)


CMS preliminary
$\int L\,dt = 19.2\ fb^{-1}$
$\sqrt{s} = 8$ TeV
Events/ 40 GeV
$\times 10^3$
Electron Data
W+jets
WW/WZ/ZZ
top
multijet
Z+Jets
MC Uncertainty
Ratio Data/MC
$m_{l\nu jj}$ (GeV)


CMS preliminary
$\int L\,dt = 19.2\ fb^{-1}$
$\sqrt{s} = 8$ TeV
Events/ 0.4 rad
60000
50000
40000
30000
20000
10000
0
Ratio Data/MC
1.5
1
0.5
-2
0
2
Φ (rad)
-2
0
2
Φ (rad)


CMS preliminary
$\int L\,dt = 19.2\ fb^{-1}$
$\sqrt{s} = 8$ TeV
Events/ 0.4 rad
80000
70000
60000
50000
40000
30000
20000
10000
0
Ratio Data/MC
1.5
1
0.5
-2
0
2
Φ_1 (rad)
-2
0
2
Φ_1 (rad)


CMS preliminary
$\int L\,dt = 19.2\ fb^{-1}$
$\sqrt{s} = 8$ TeV
$\times 10^3$
Events/ 10 GeV
200
180
160
140
120
100
80
60
40
20
0
Ratio Data/MC
1.5
1
0.5
0
50
100
150
p_T of WW (GeV)
0
50
100
150
p_T of WW (GeV)