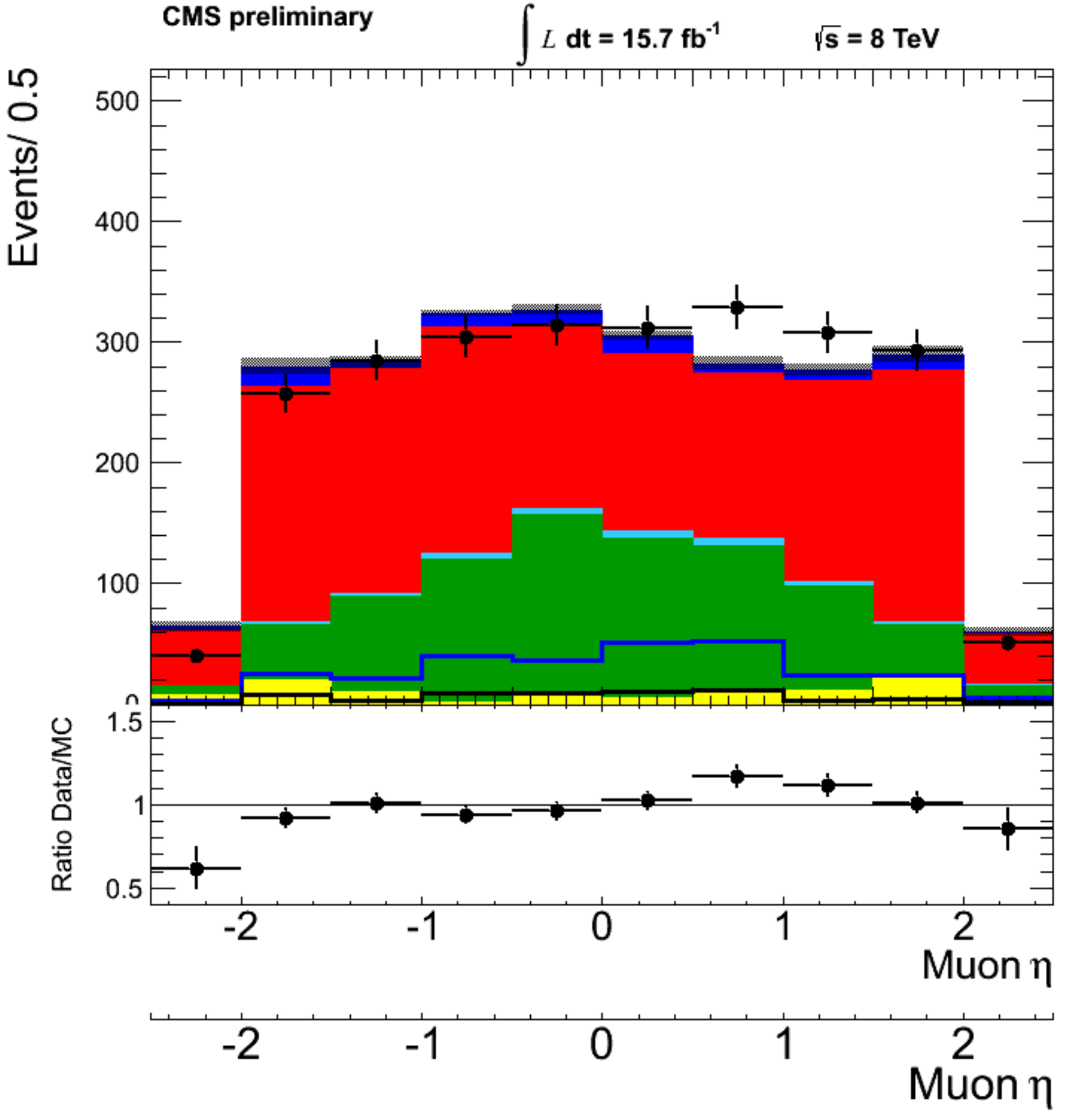
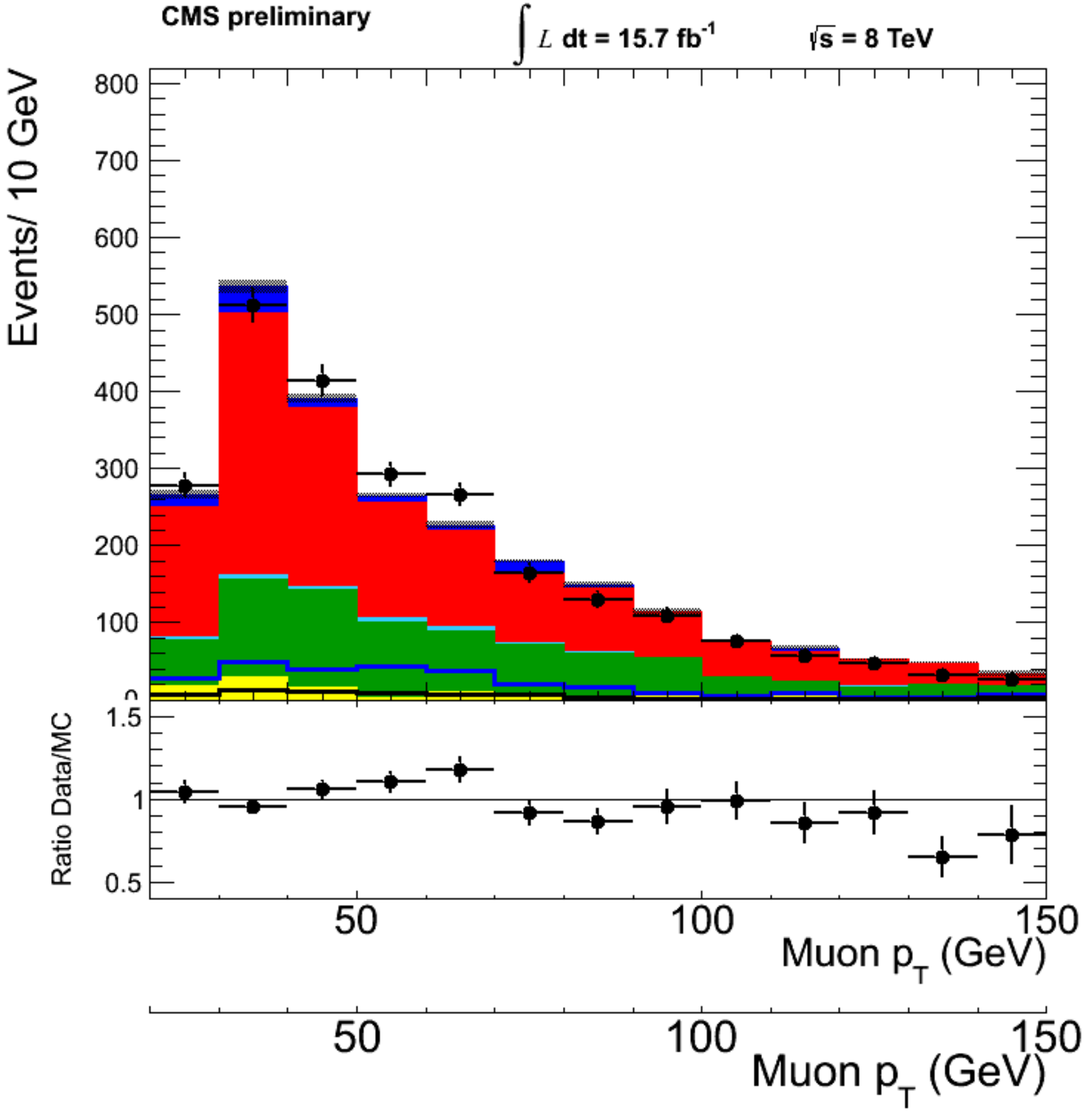
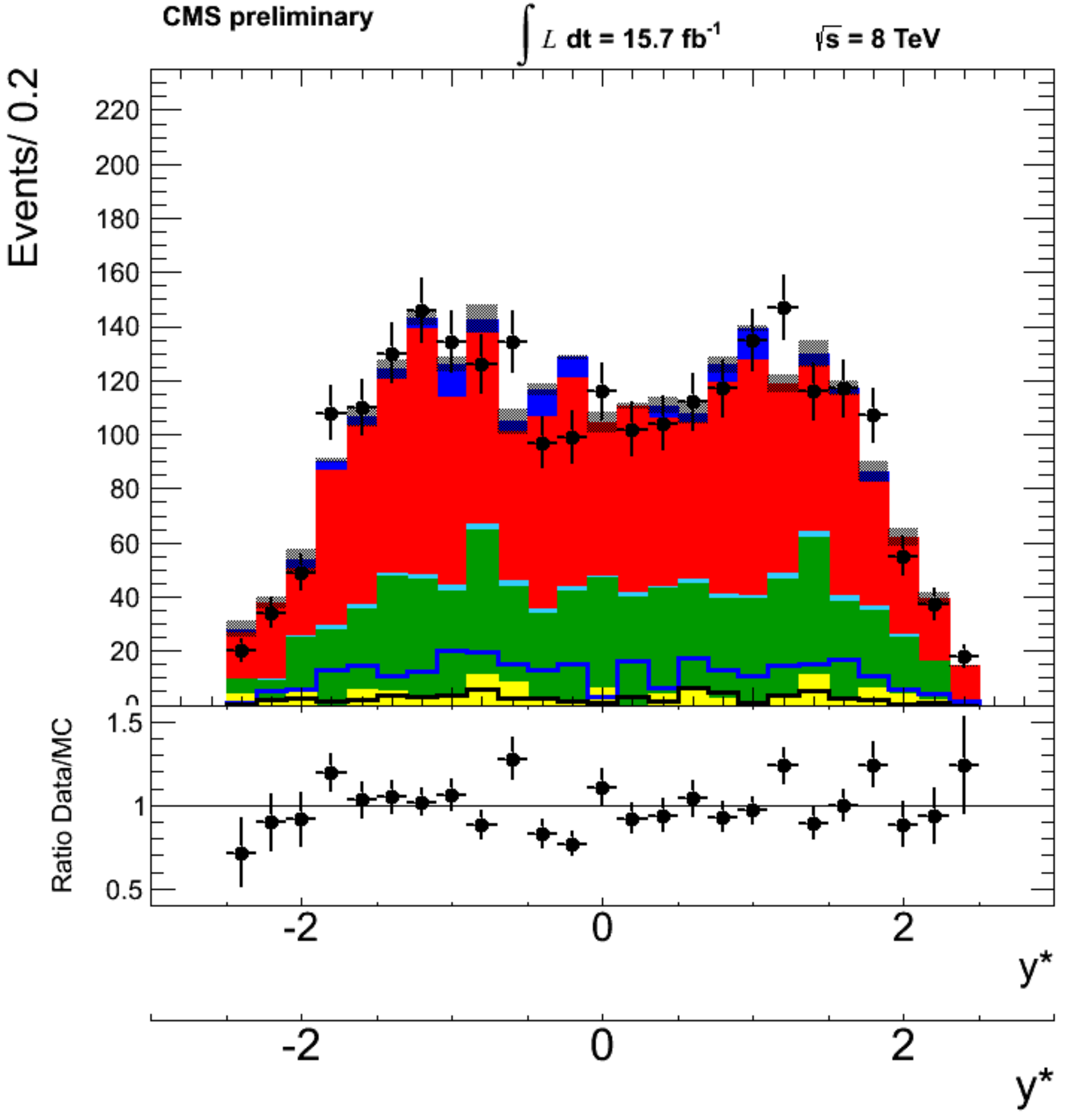
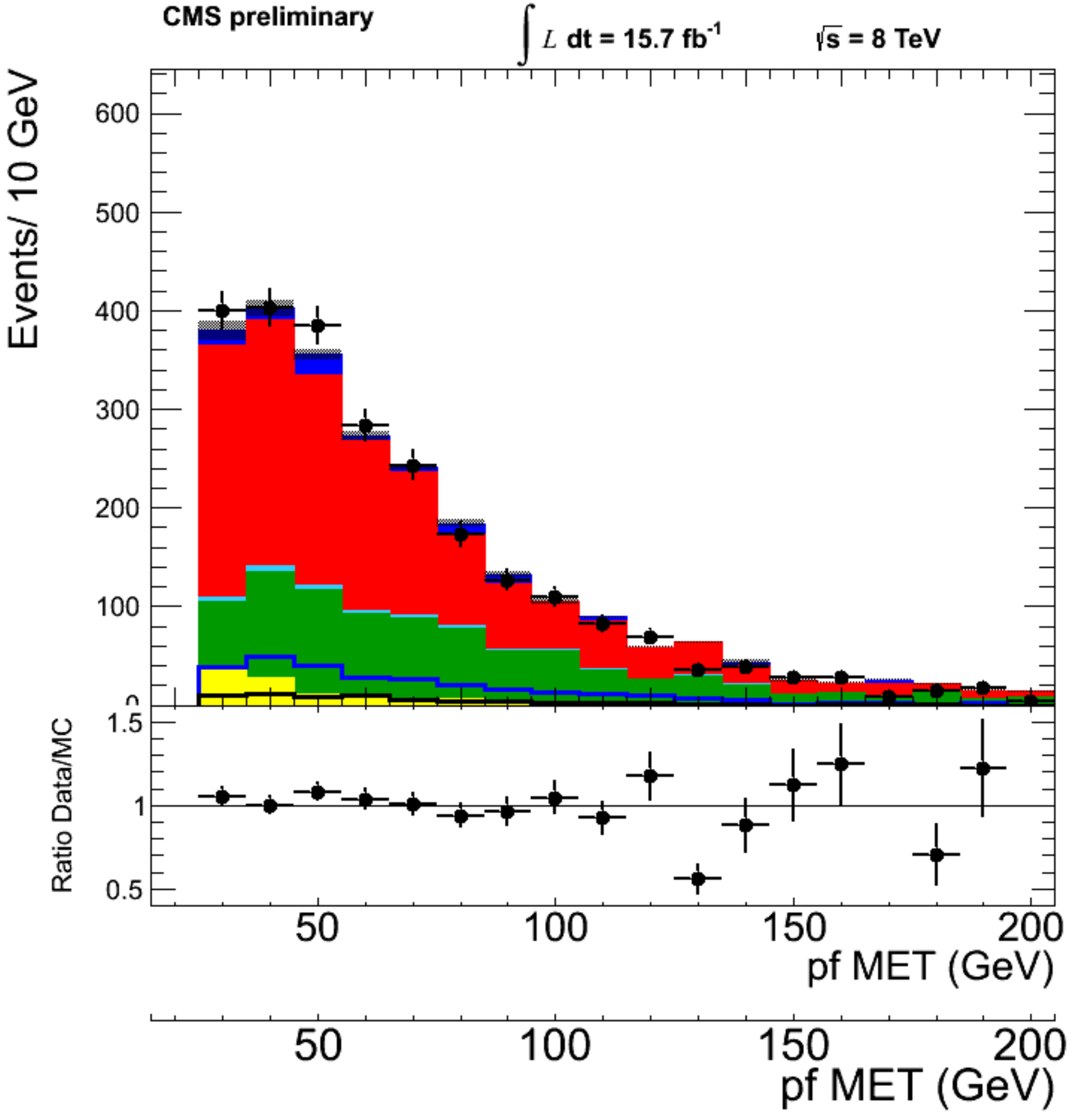
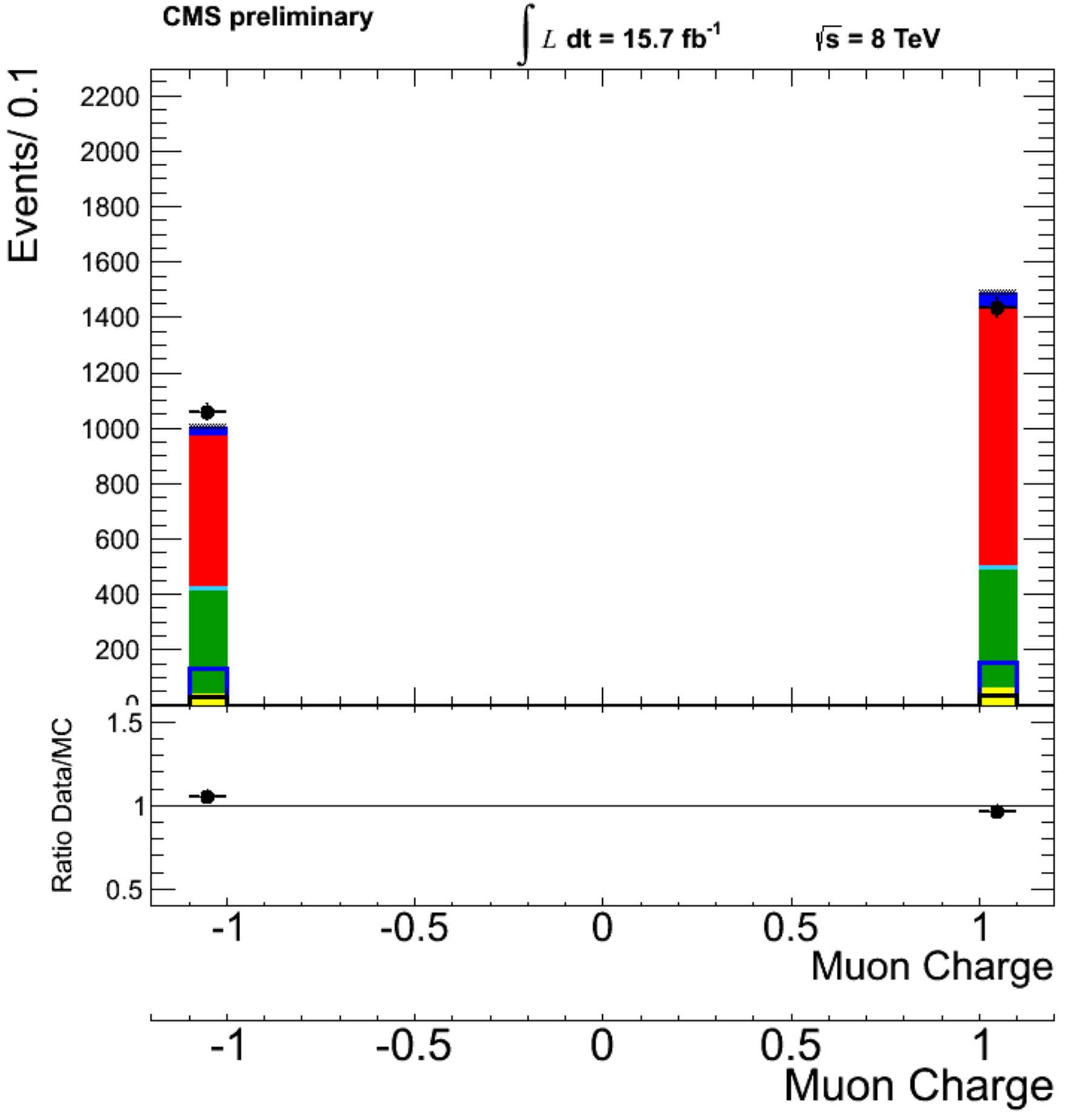
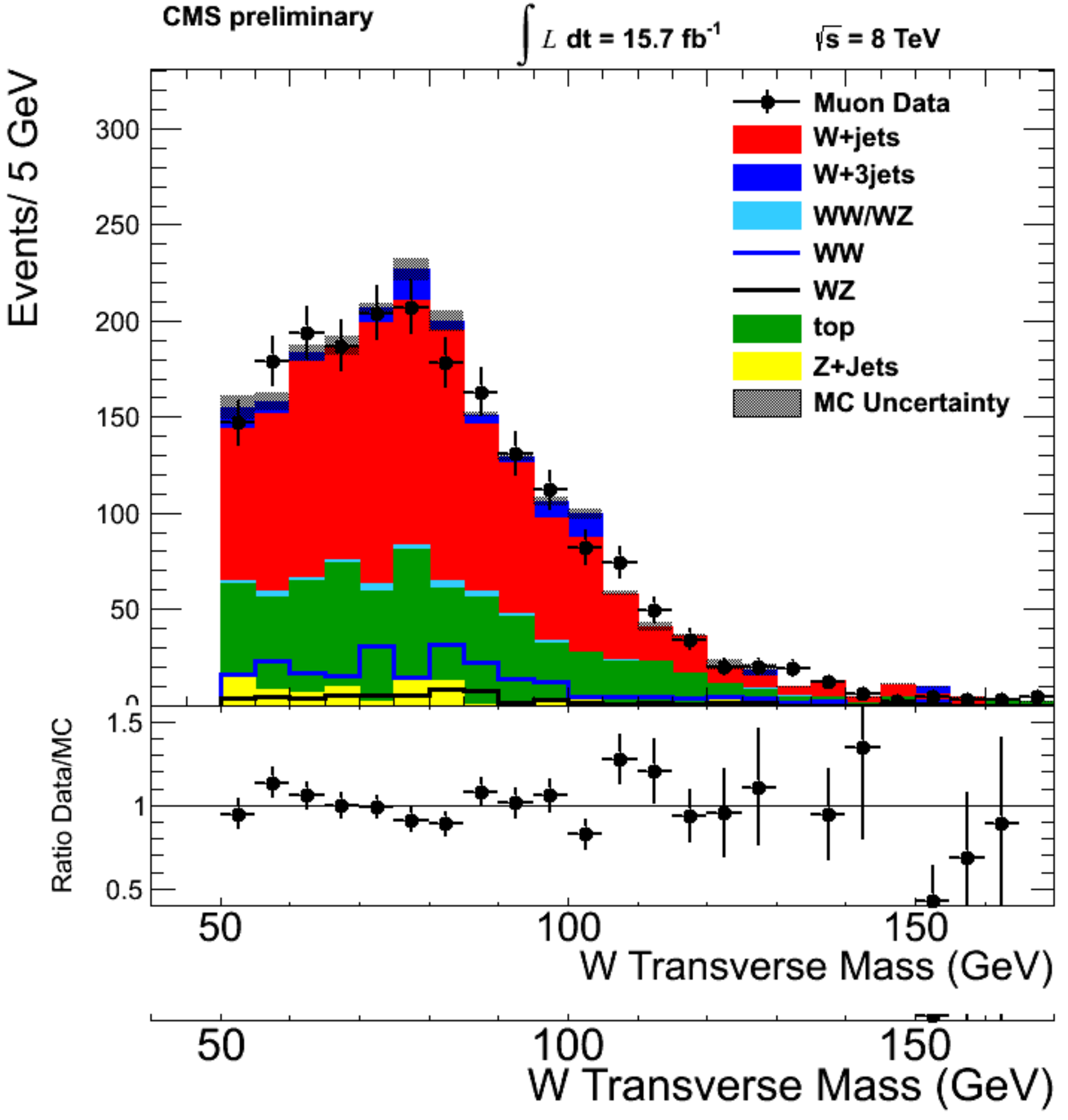

CMS preliminary
$\int L\,dt = 15.7\ fb^{-1}$
$\sqrt{s} = 8$ TeV
Events/ 0.5
500
400
300
200
100
0
Ratio Data/MC
1.5
1
0.5
-2
-1
0
1
2
Muon η
-2
-1
0
1
2
Muon η

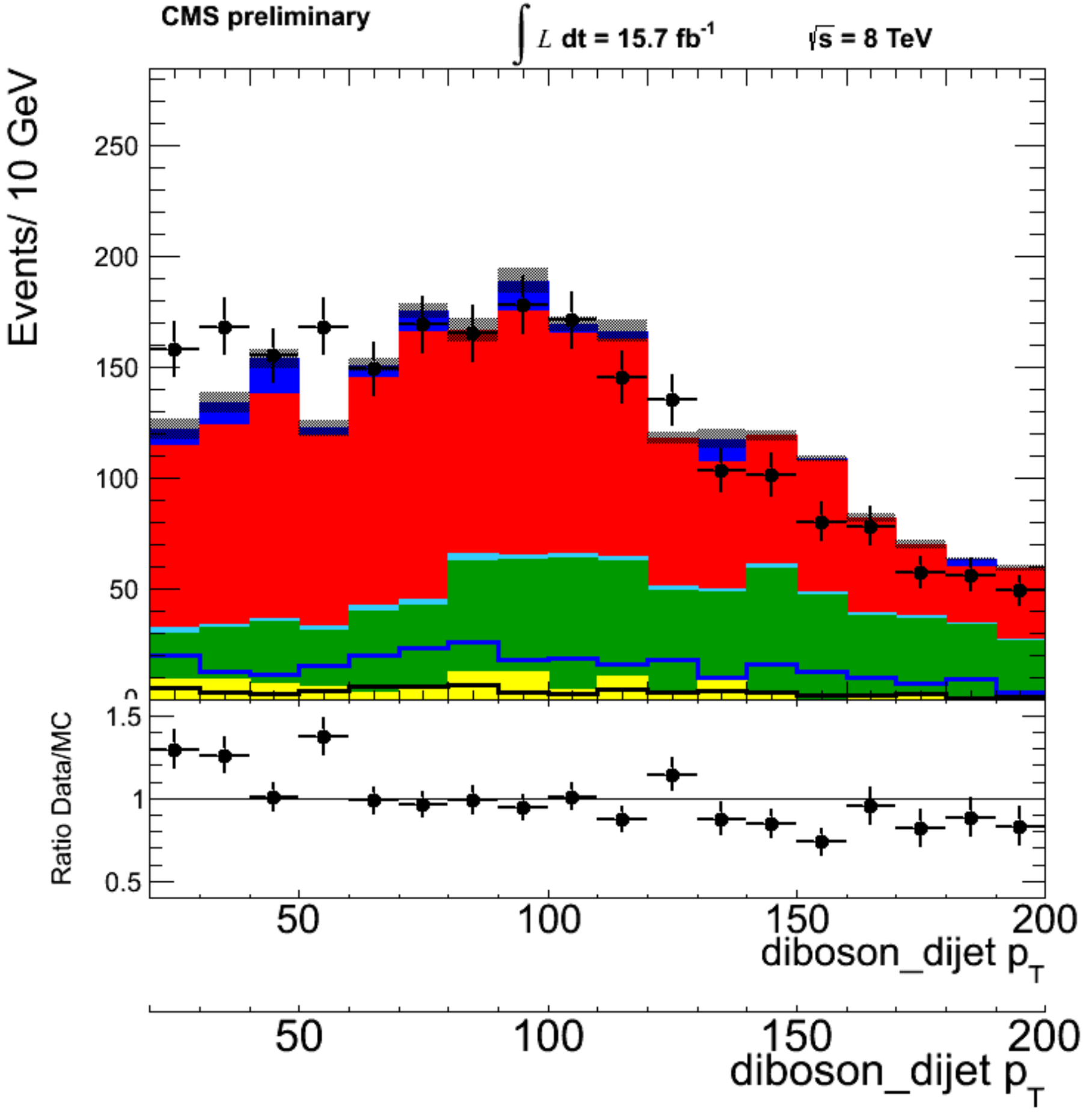

CMS preliminary
$\int L\,dt = 15.7\ fb^{-1}$
$\sqrt{s} = 8$ TeV
Events/ 10 GeV
800
700
600
500
400
300
200
100
0
Ratio Data/MC
1.5
1
0.5
50
100
150
Muon p_T (GeV)
50
100
150
Muon p_T (GeV)

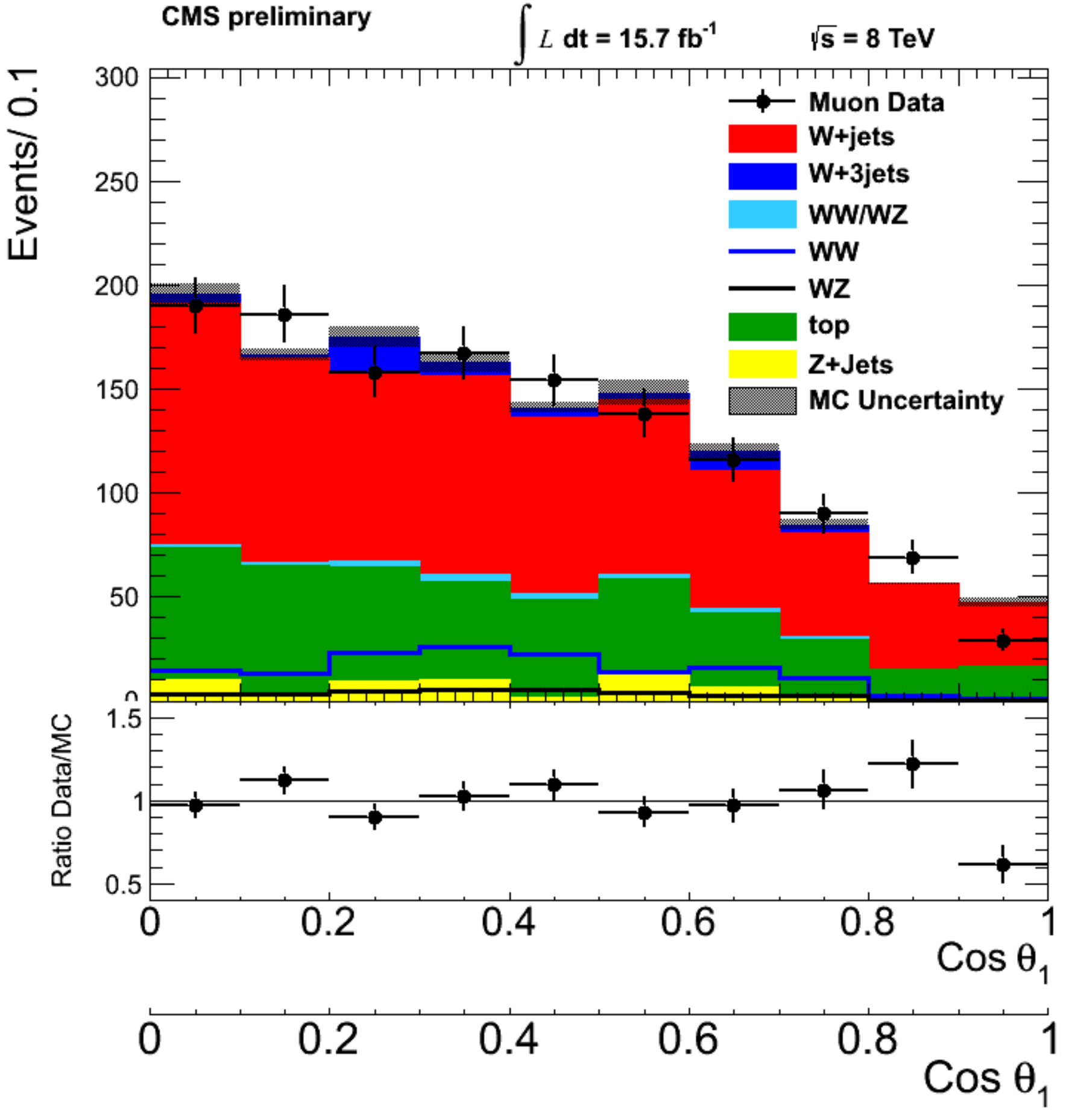

CMS preliminary
$\int L\,dt = 15.7\ fb^{-1}$
$\sqrt{s} = 8$ TeV
Events/ 0.2
Ratio Data/MC
y*
y*

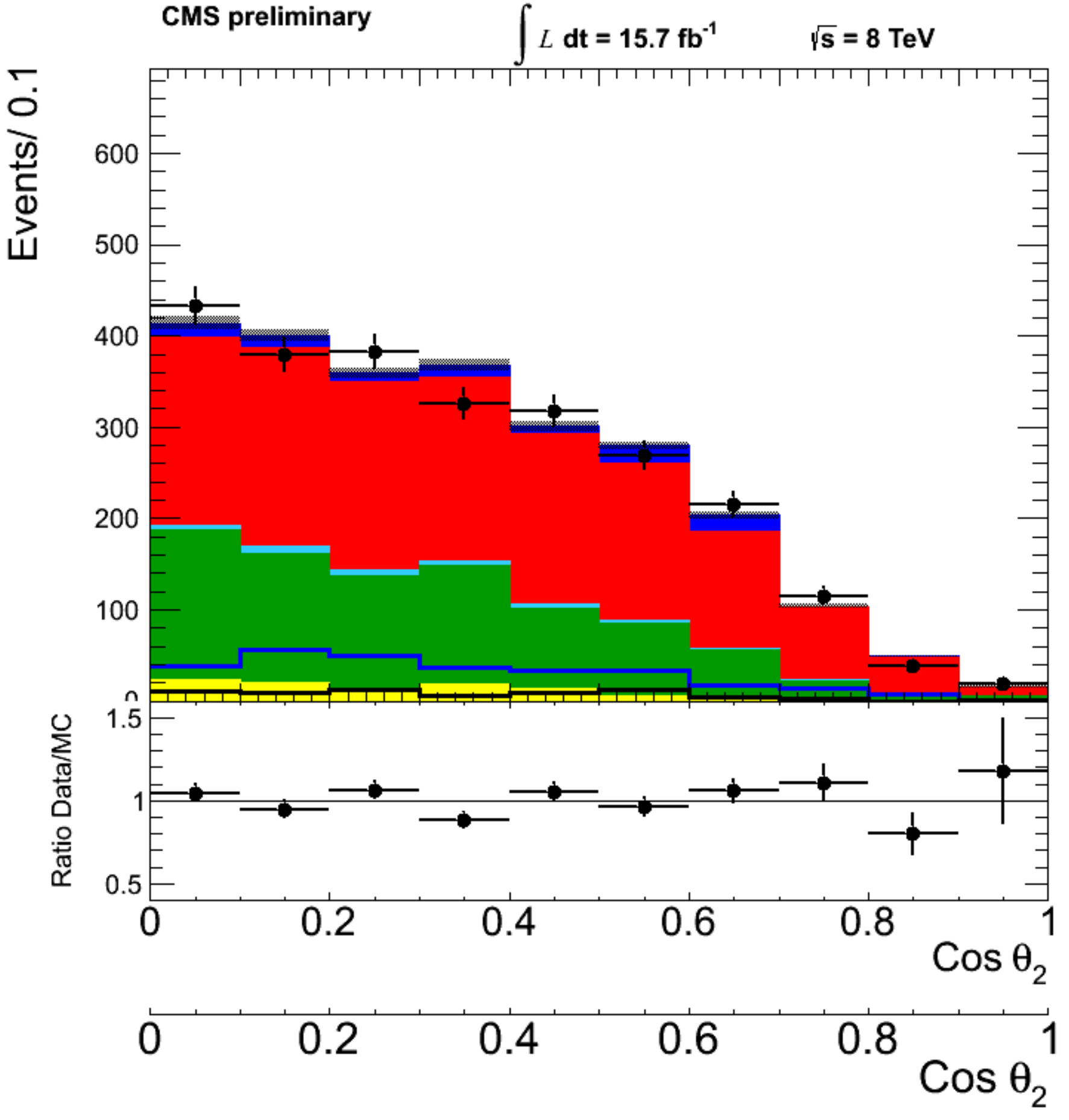

CMS preliminary
$\int L\,dt = 15.7\ fb^{-1}$
$\sqrt{s} = 8$ TeV
Events/ 10 GeV
600
500
400
300
200
100
0
Ratio Data/MC
1.5
1
0.5
50
100
150
200
pf MET (GeV)
50
100
150
200
pf MET (GeV)

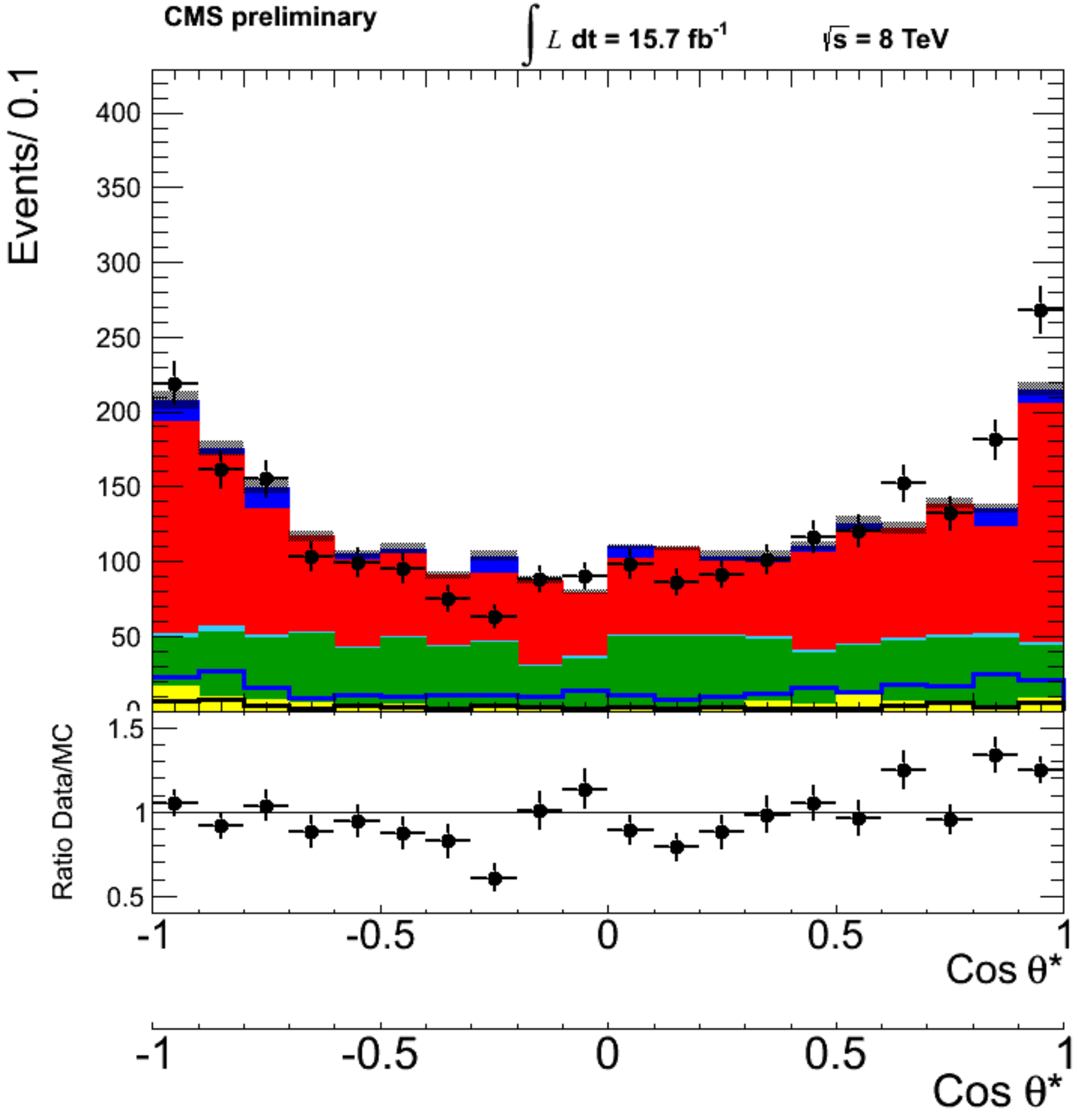

CMS preliminary
∫ L dt = 15.7 fb-1
√s = 8 TeV
Events/ 0.1
2200
2000
1800
1600
1400
1200
1000
800
600
400
200
0
Ratio Data/MC
1.5
1
0.5
-1
-0.5
0
0.5
1
Muon Charge
-1
-0.5
0
0.5
1
Muon Charge

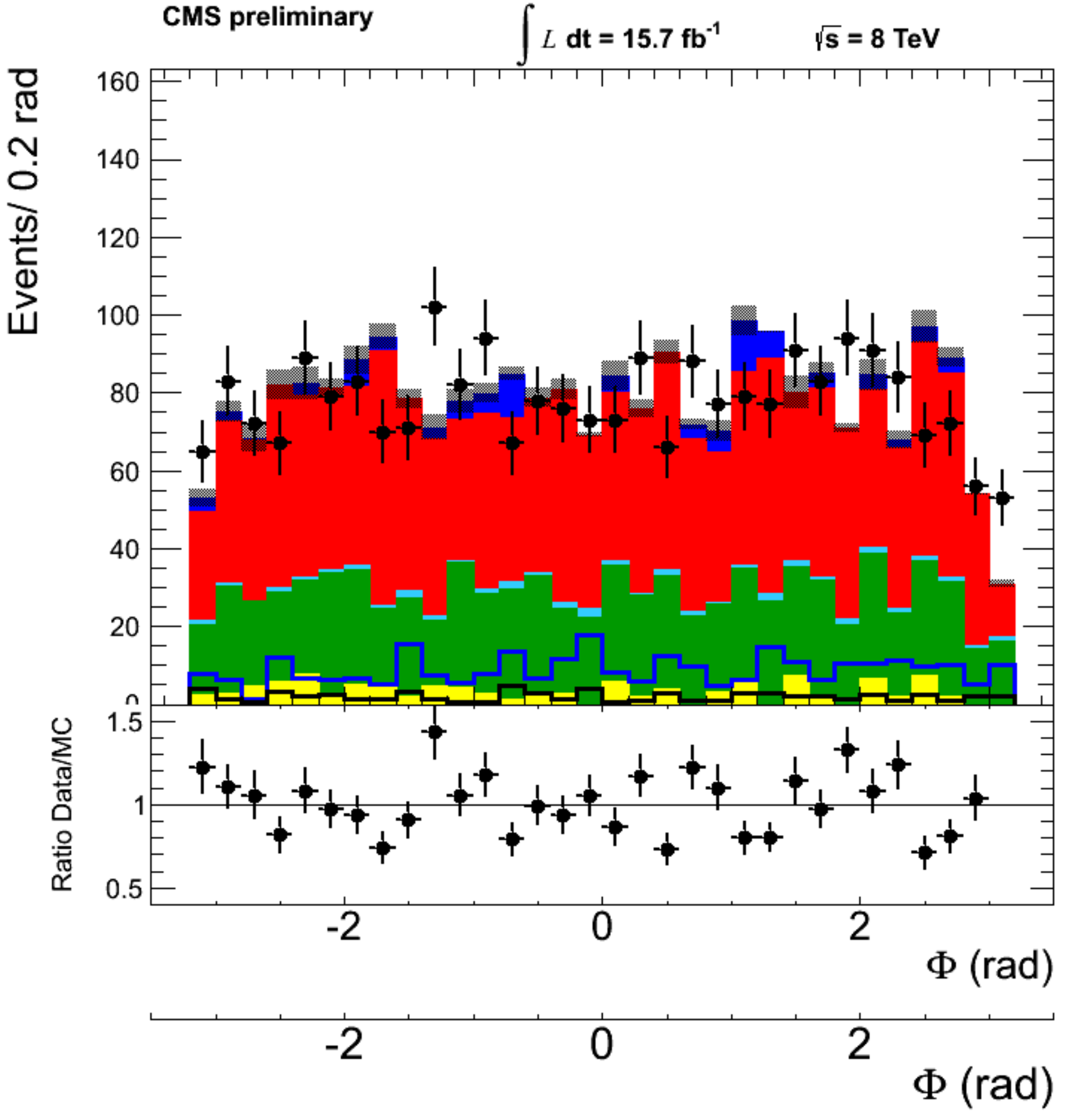

CMS preliminary
$\int L\,dt = 15.7\ fb^{-1}$
$\sqrt{s}$ = 8 TeV
Events/ 5 GeV
Muon Data
W+jets
W+3jets
WW/WZ
WW
WZ
top
Z+Jets
MC Uncertainty
Ratio Data/MC
W Transverse Mass (GeV)
W Transverse Mass (GeV)

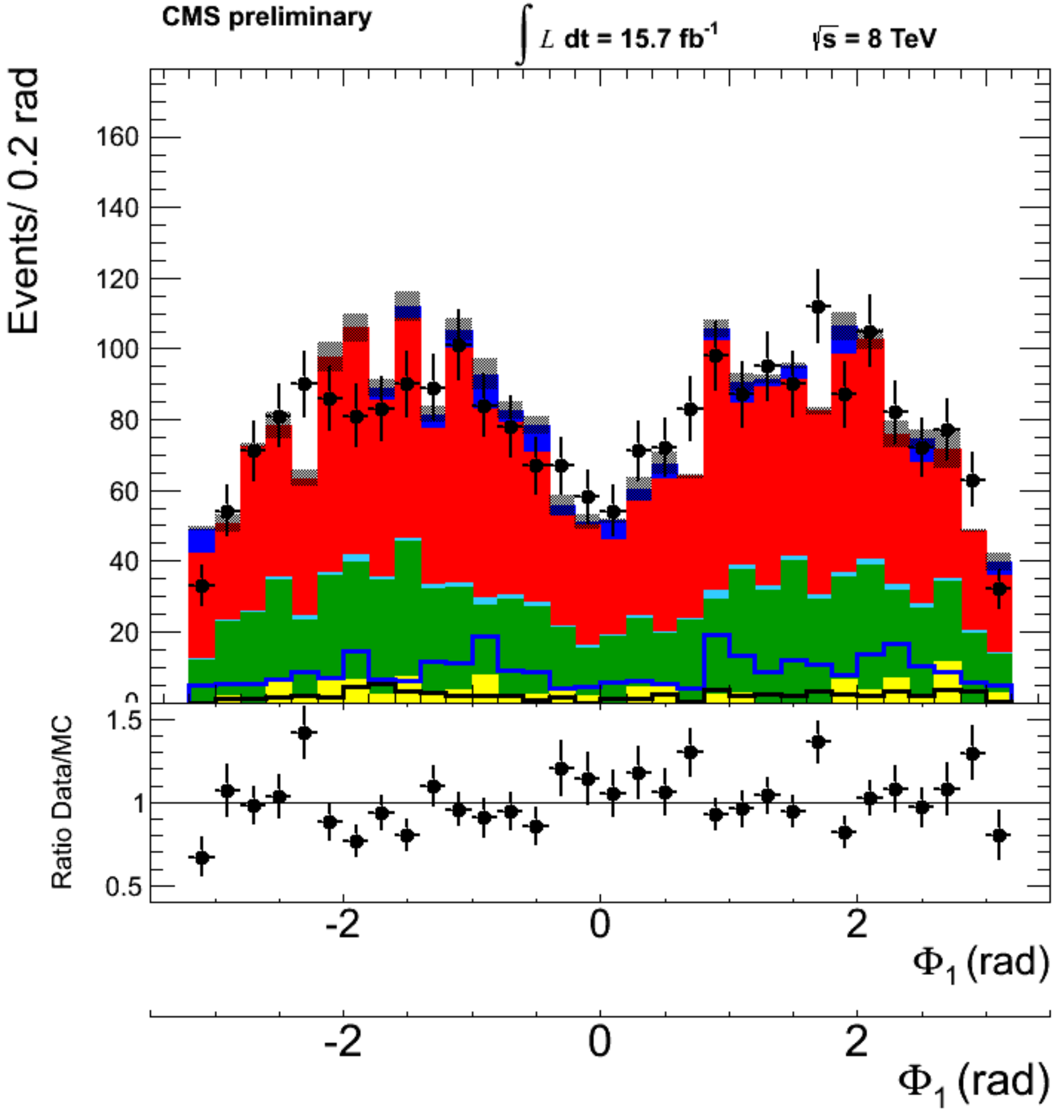

CMS preliminary
∫ L dt = 15.7 fb-1
√s = 8 TeV
Events/ 10 GeV
250
200
150
100
50
0
Ratio Data/MC
1.5
1
0.5
50
100
150
200
diboson_dijet pT
50
100
150
200
diboson_dijet pT

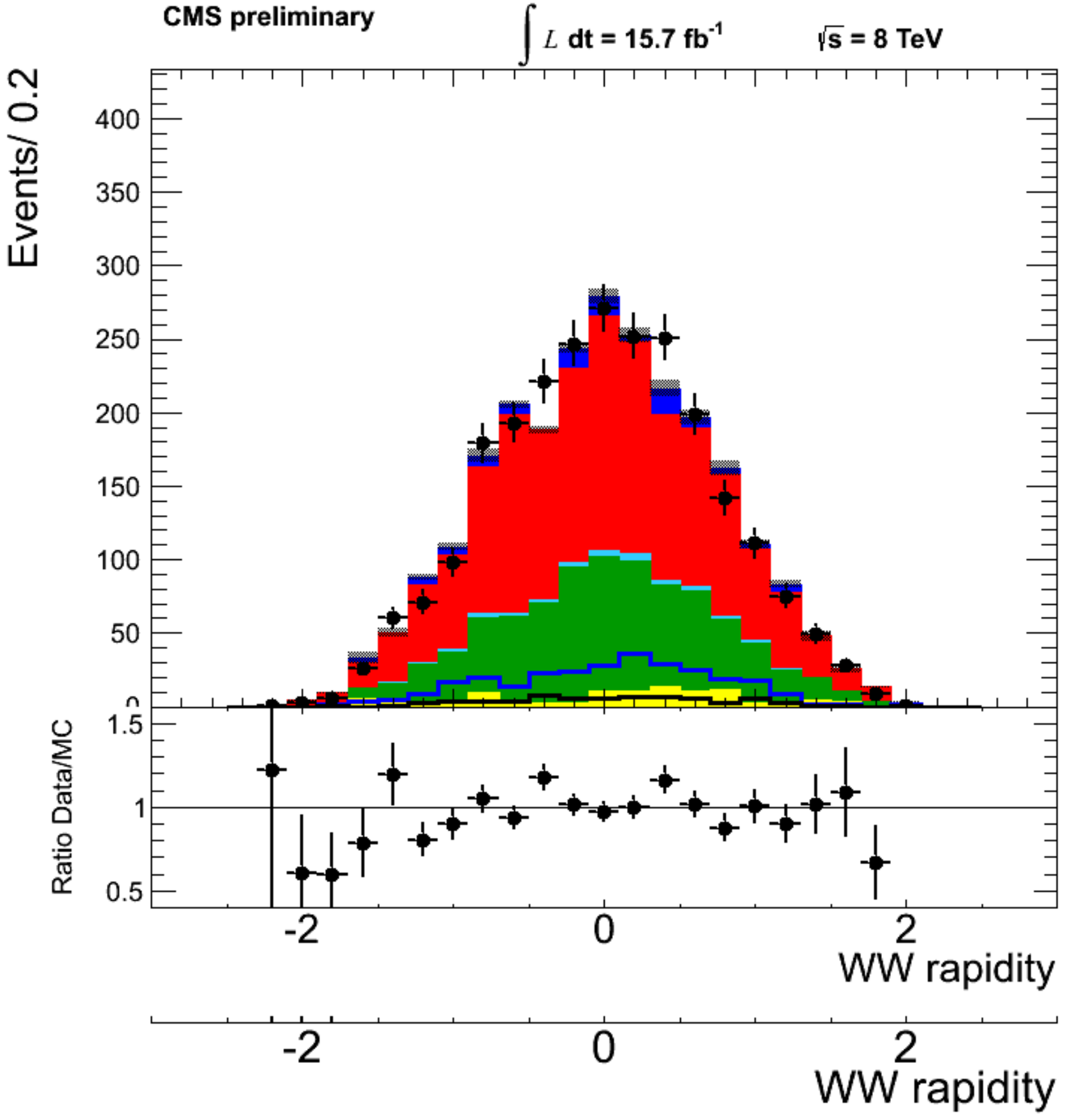

CMS preliminary
$\int L\,dt = 15.7\ fb^{-1}$
$\sqrt{s}$ = 8 TeV
Events/ 0.1
Muon Data
W+jets
W+3jets
WW/WZ
WW
WZ
top
Z+Jets
MC Uncertainty
Ratio Data/MC
Cos θ_1
Cos θ_1

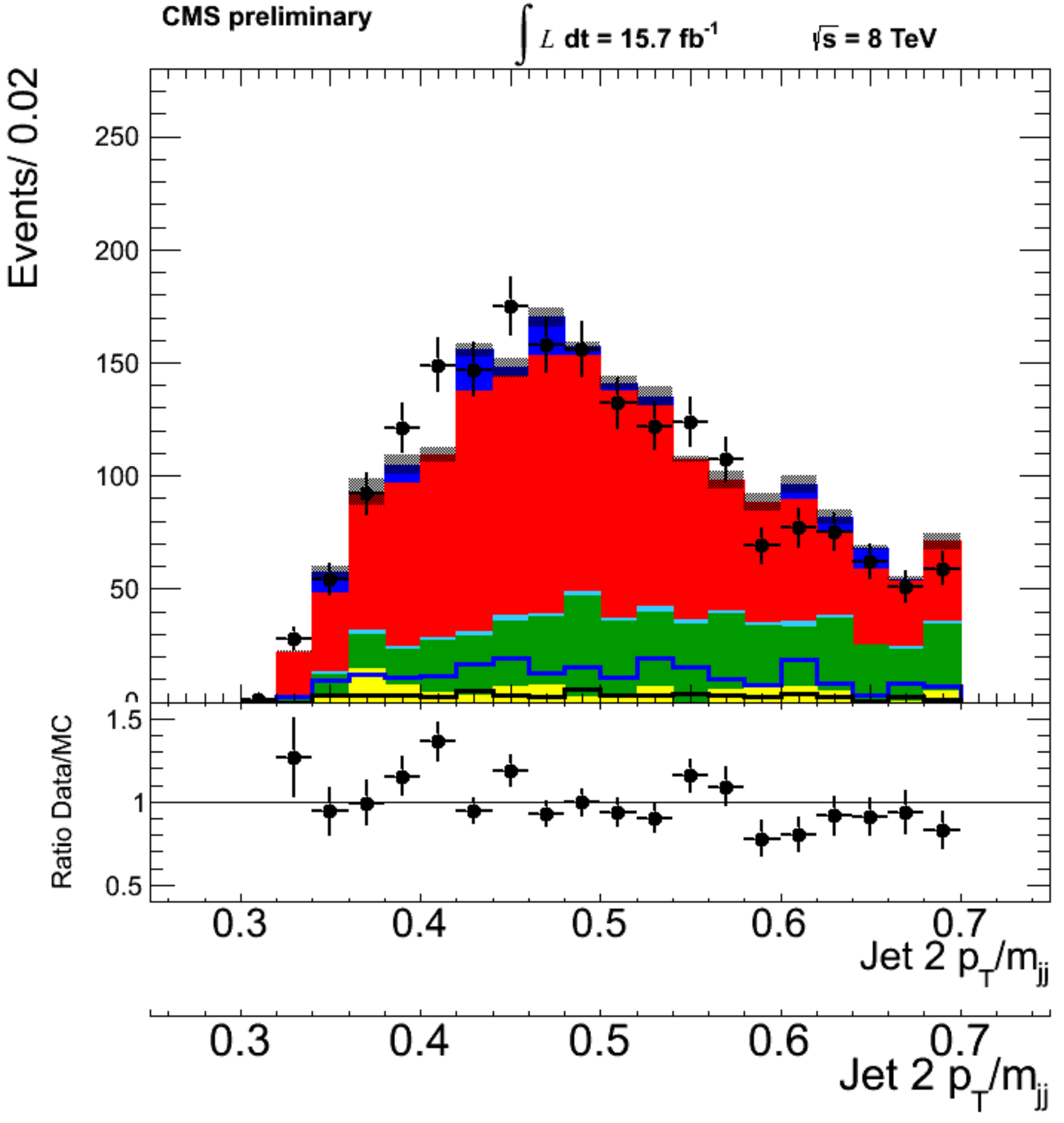

CMS preliminary
∫ L dt = 15.7 fb-1
√s = 8 TeV
Events/ 0.1
600
500
400
300
200
100
0
Ratio Data/MC
1.5
1
0.5
0
0.2
0.4
0.6
0.8
1
Cos θ2
0
0.2
0.4
0.6
0.8
1
Cos θ2

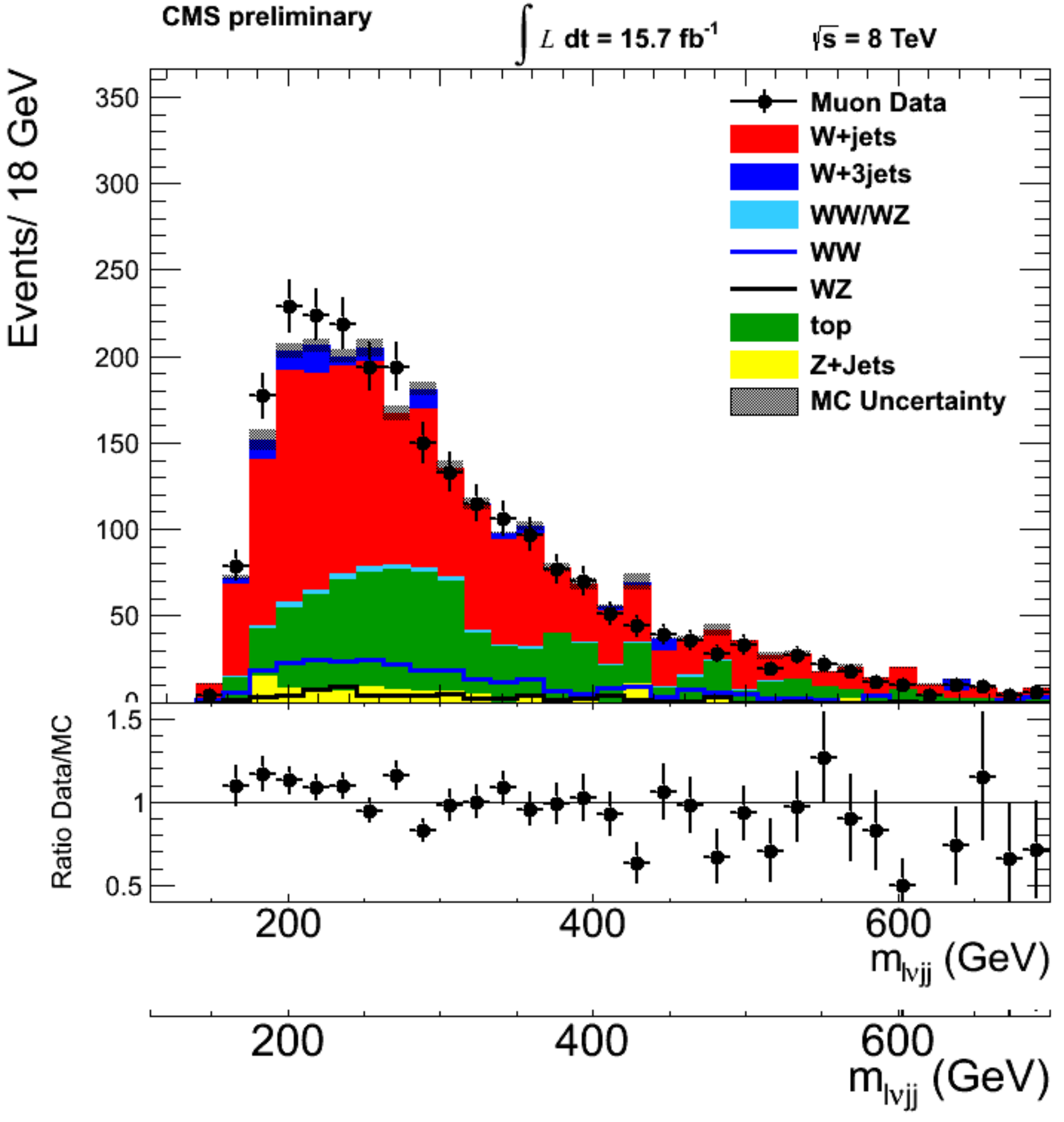

CMS preliminary
∫ L dt = 15.7 fb-1
√s = 8 TeV
Events/ 0.1
400
350
300
250
200
150
100
50
0
Ratio Data/MC
1.5
1
0.5
-1
-0.5
0
0.5
1
Cos θ*
-1
-0.5
0
0.5
1
Cos θ*

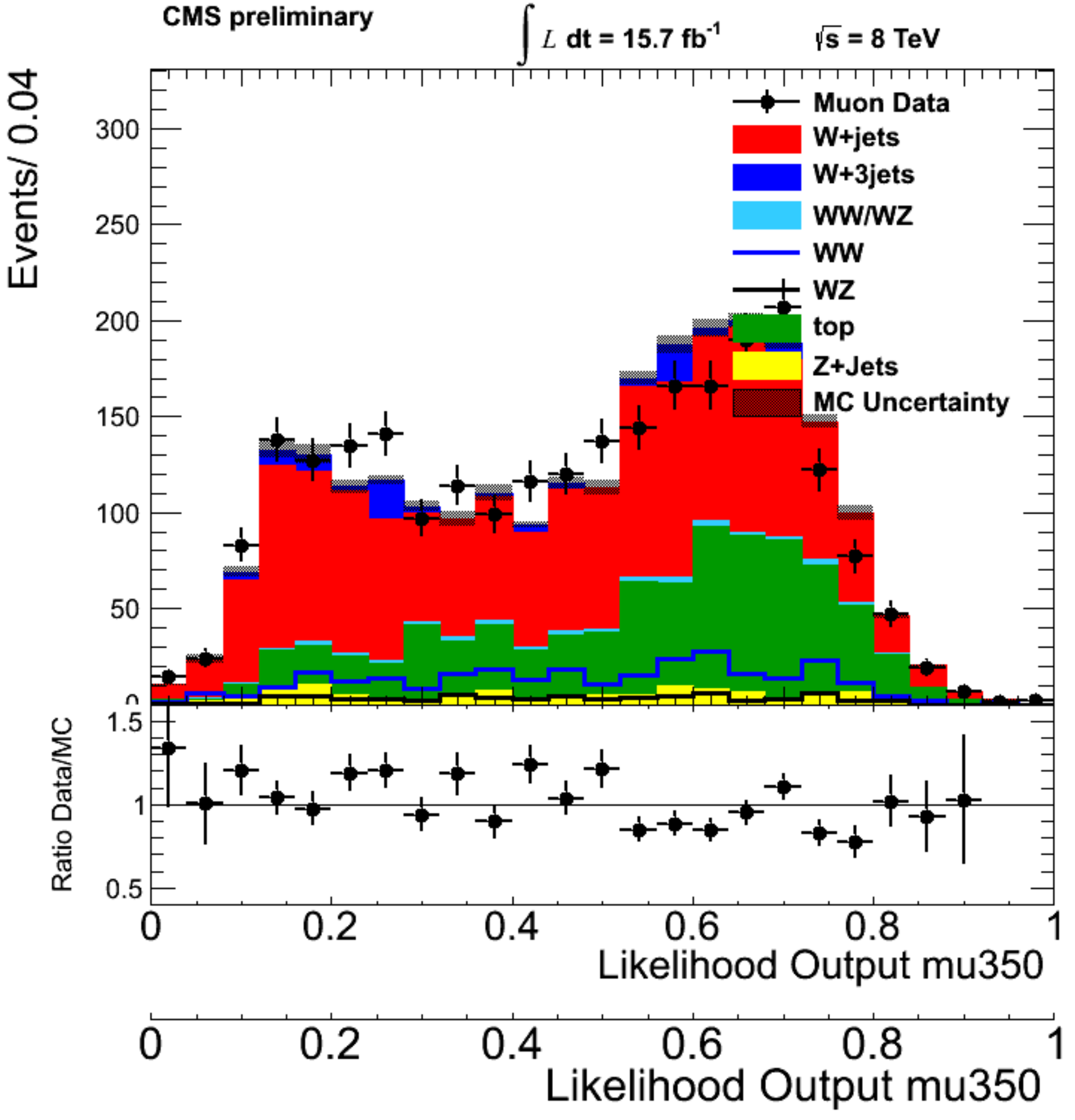

CMS preliminary
$\int L\,dt = 15.7\ fb^{-1}$
$\sqrt{s} = 8$ TeV
Events/ 0.2 rad
160
140
120
100
80
60
40
20
0
Ratio Data/MC
1.5
1
0.5
-2
0
2
Φ (rad)
-2
0
2
Φ (rad)

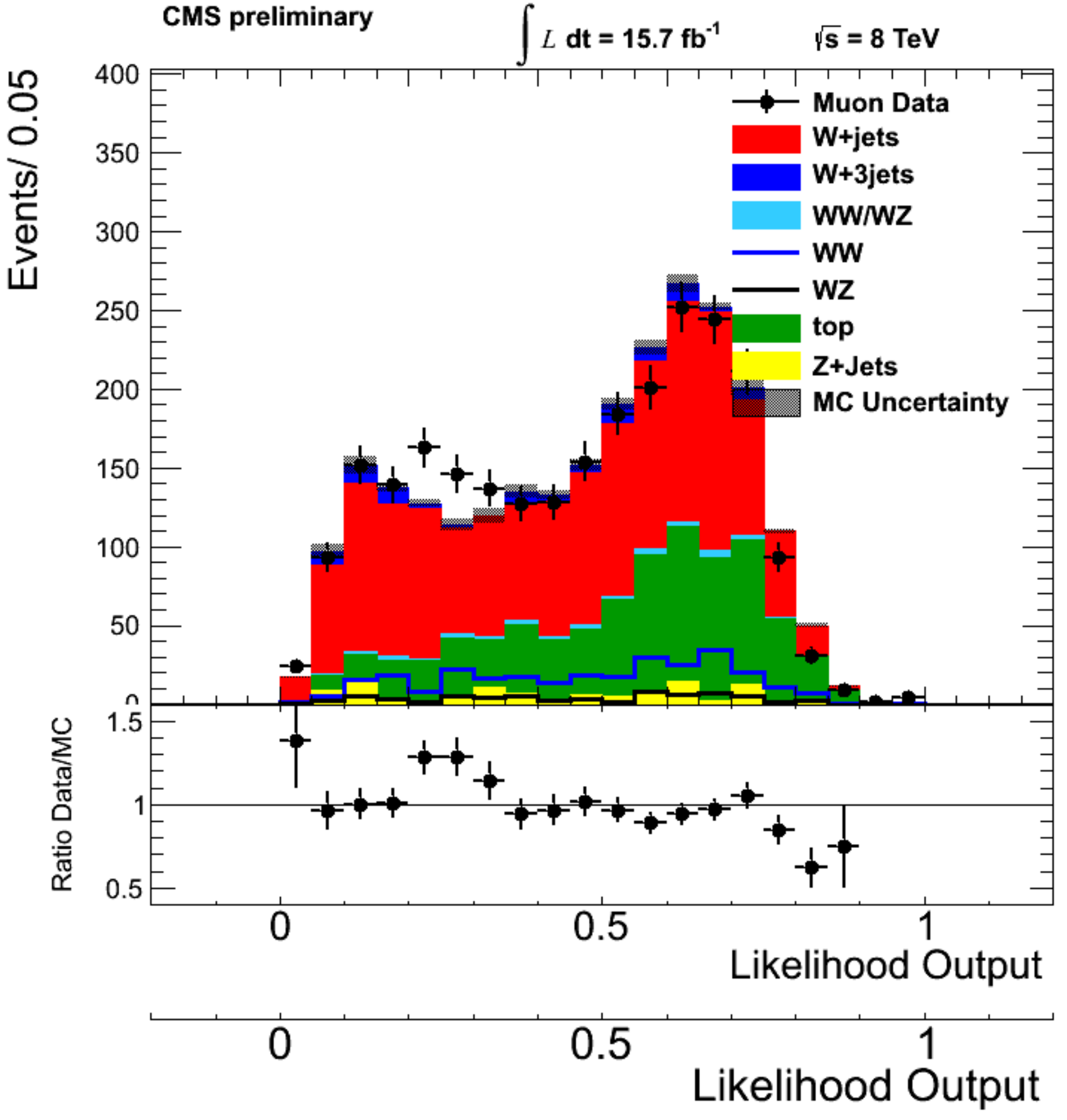

CMS preliminary
∫ L dt = 15.7 fb-1
√s = 8 TeV
Events/ 0.2 rad
160
140
120
100
80
60
40
20
0
Ratio Data/MC
1.5
1
0.5
-2
0
2
Φ1 (rad)
-2
0
2
Φ1 (rad)

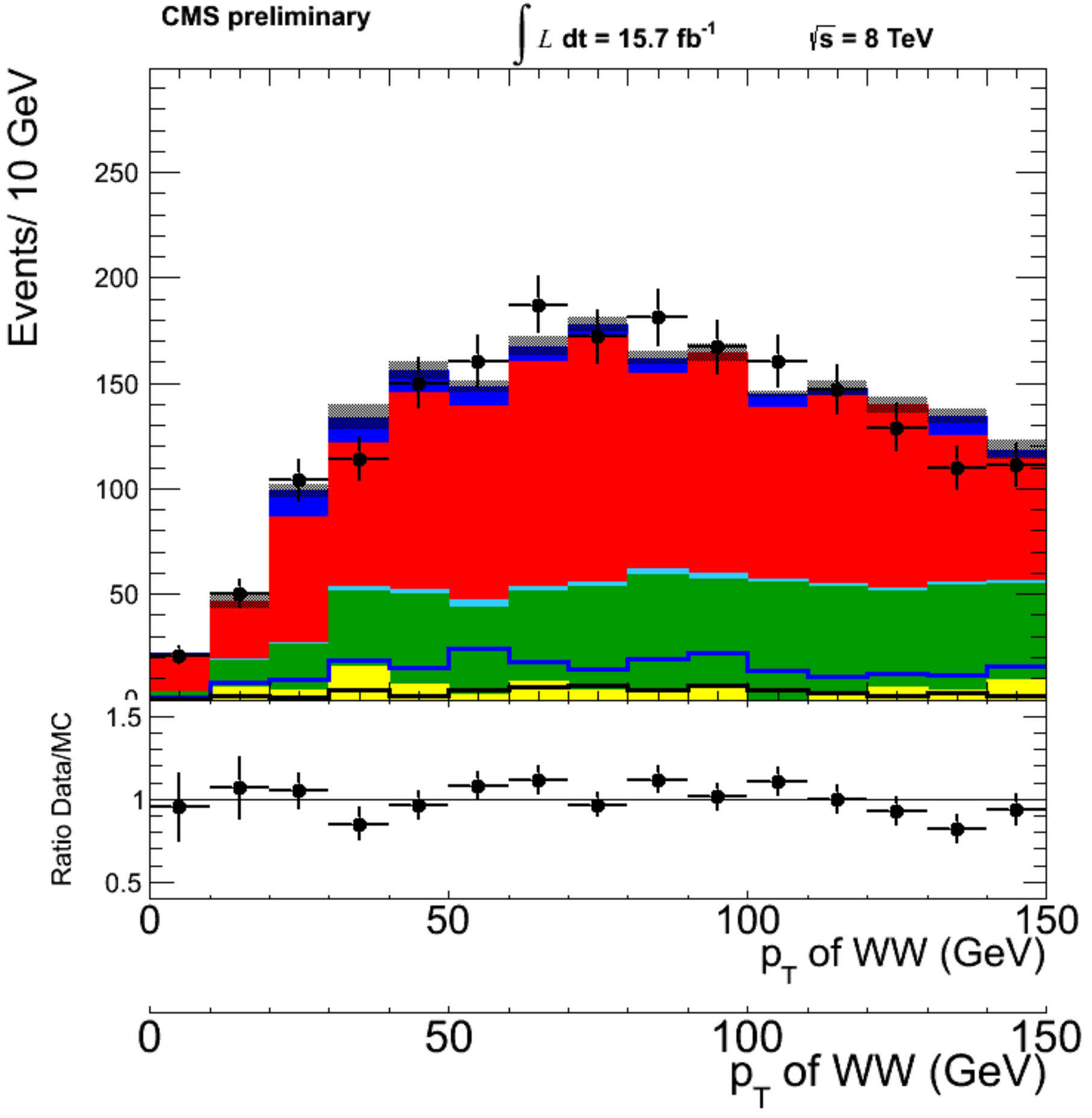

CMS preliminary
$\int L\,dt = 15.7\ fb^{-1}$
$\sqrt{s} = 8$ TeV
Events/ 0.2
400
350
300
250
200
150
100
50
0
Ratio Data/MC
1.5
1
0.5
-2
0
2
WW rapidity
-2
0
2
WW rapidity

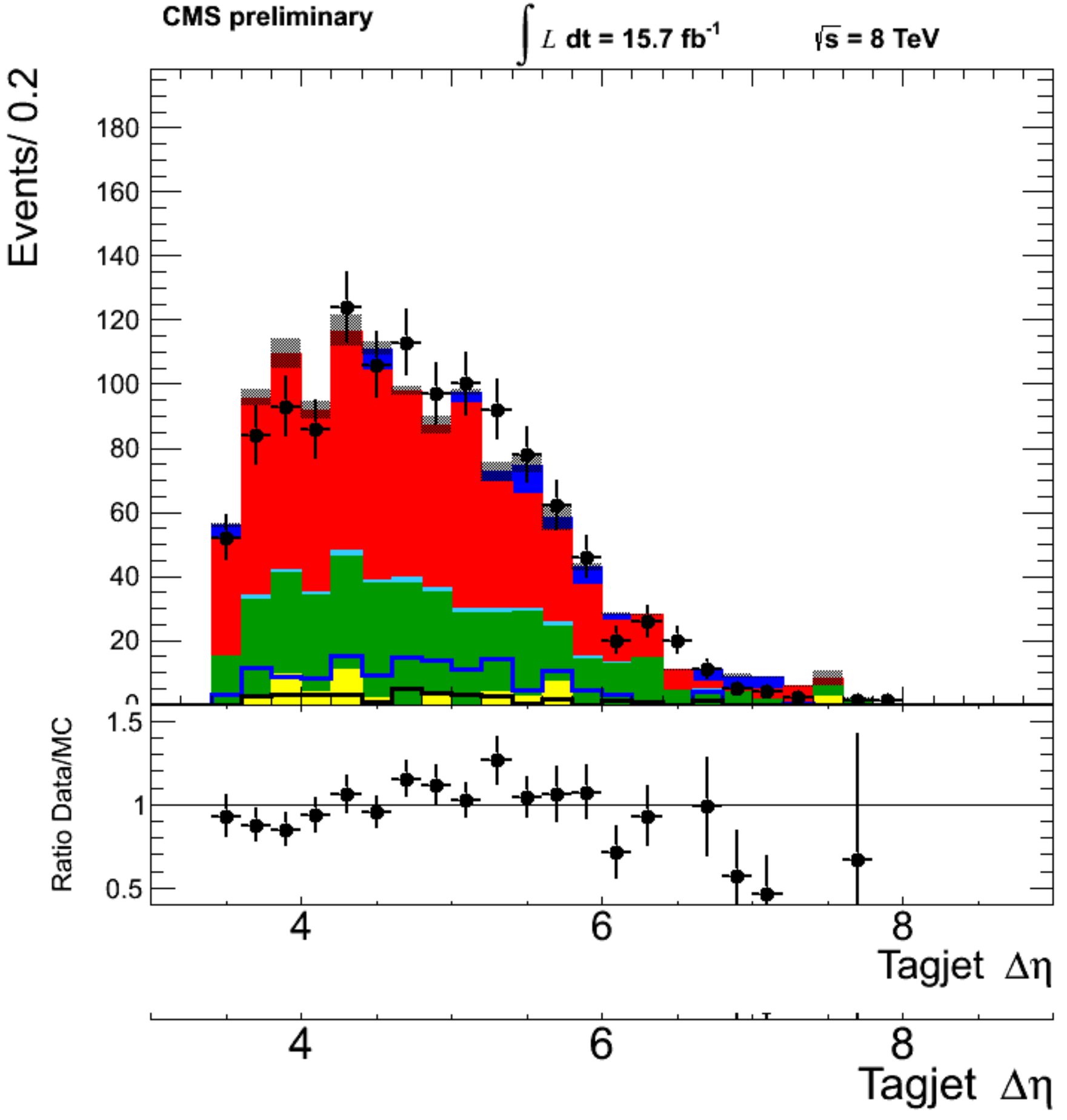

CMS preliminary
∫ L dt = 15.7 fb-1
√s = 8 TeV
Events/ 0.02
250
200
150
100
50
0
Ratio Data/MC
1.5
1
0.5
0.3
0.4
0.5
0.6
0.7
Jet 2 pT/mjj
0.3
0.4
0.5
0.6
0.7
Jet 2 pT/mjj

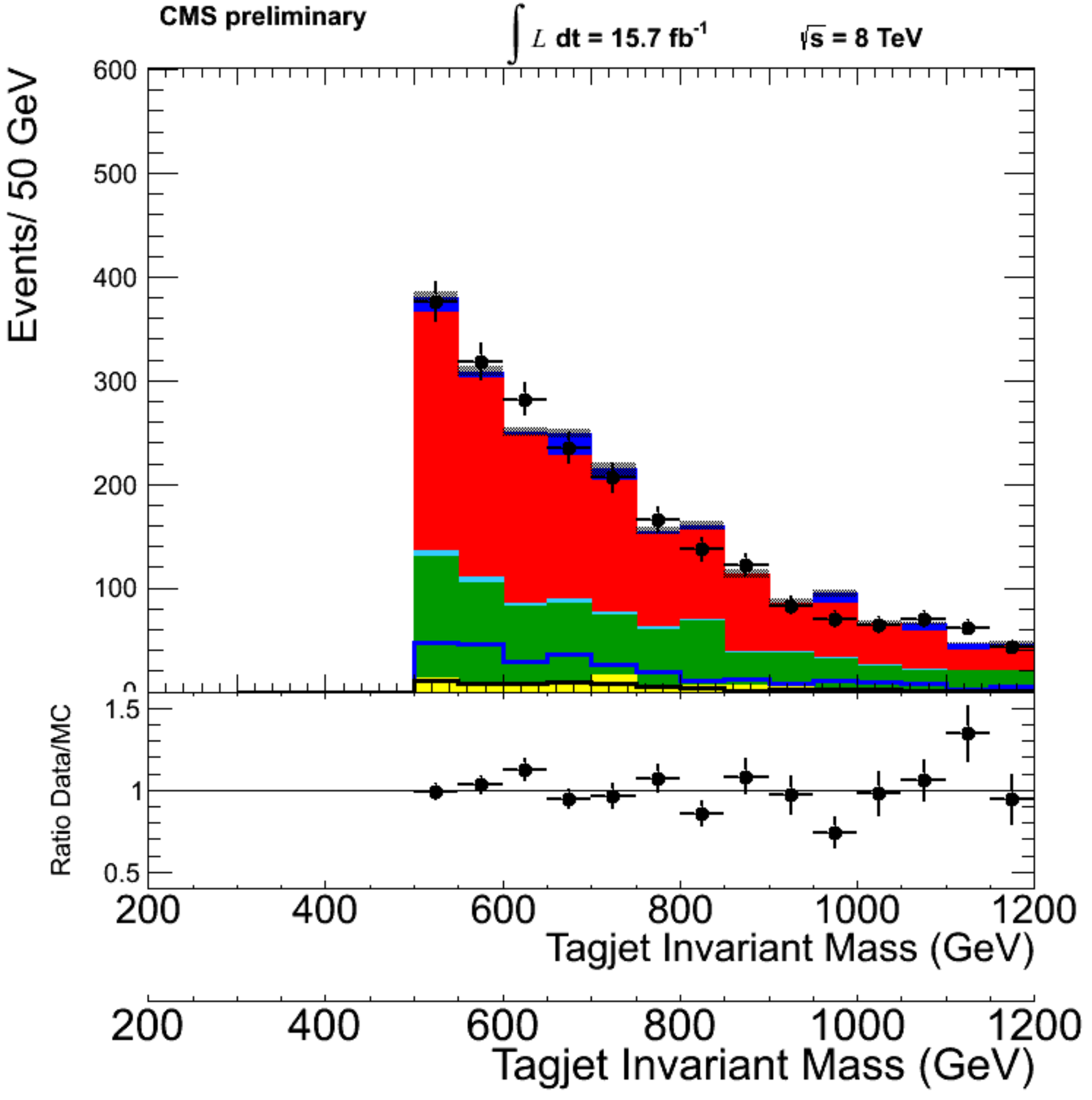

CMS preliminary
$\int L\,dt = 15.7\ fb^{-1}$
$\sqrt{s}$ = 8 TeV
Events/ 18 GeV
Muon Data
W+jets
W+3jets
WW/WZ
WW
WZ
top
Z+Jets
MC Uncertainty
Ratio Data/MC
$m_{l\nu jj}$ (GeV)
$m_{l\nu jj}$ (GeV)

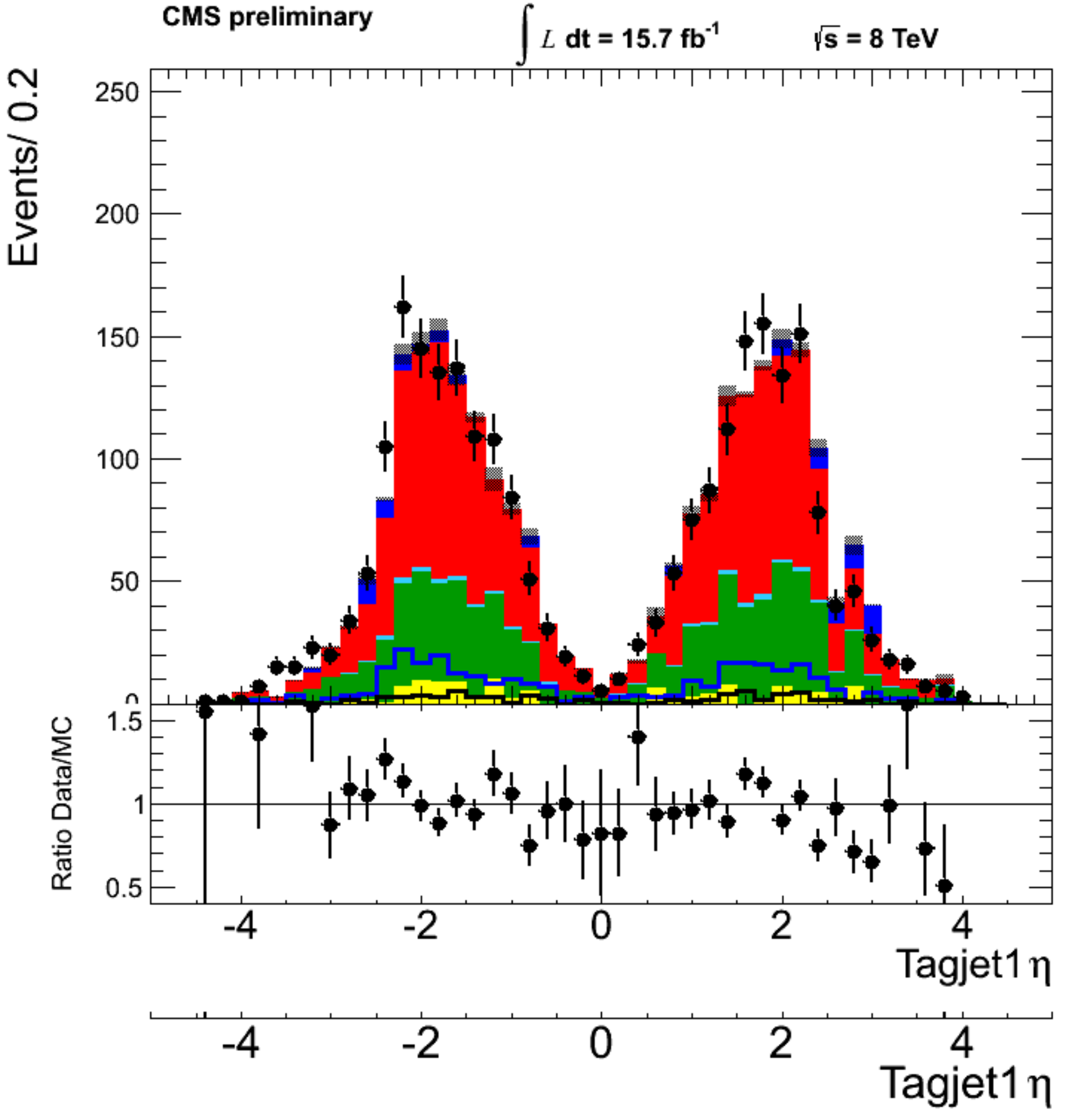

CMS preliminary
∫ L dt = 15.7 fb-1
√s = 8 TeV
Events/ 0.04
Muon Data
W+jets
W+3jets
WW/WZ
WW
WZ
top
Z+Jets
MC Uncertainty
Ratio Data/MC
Likelihood Output mu350
Likelihood Output mu350

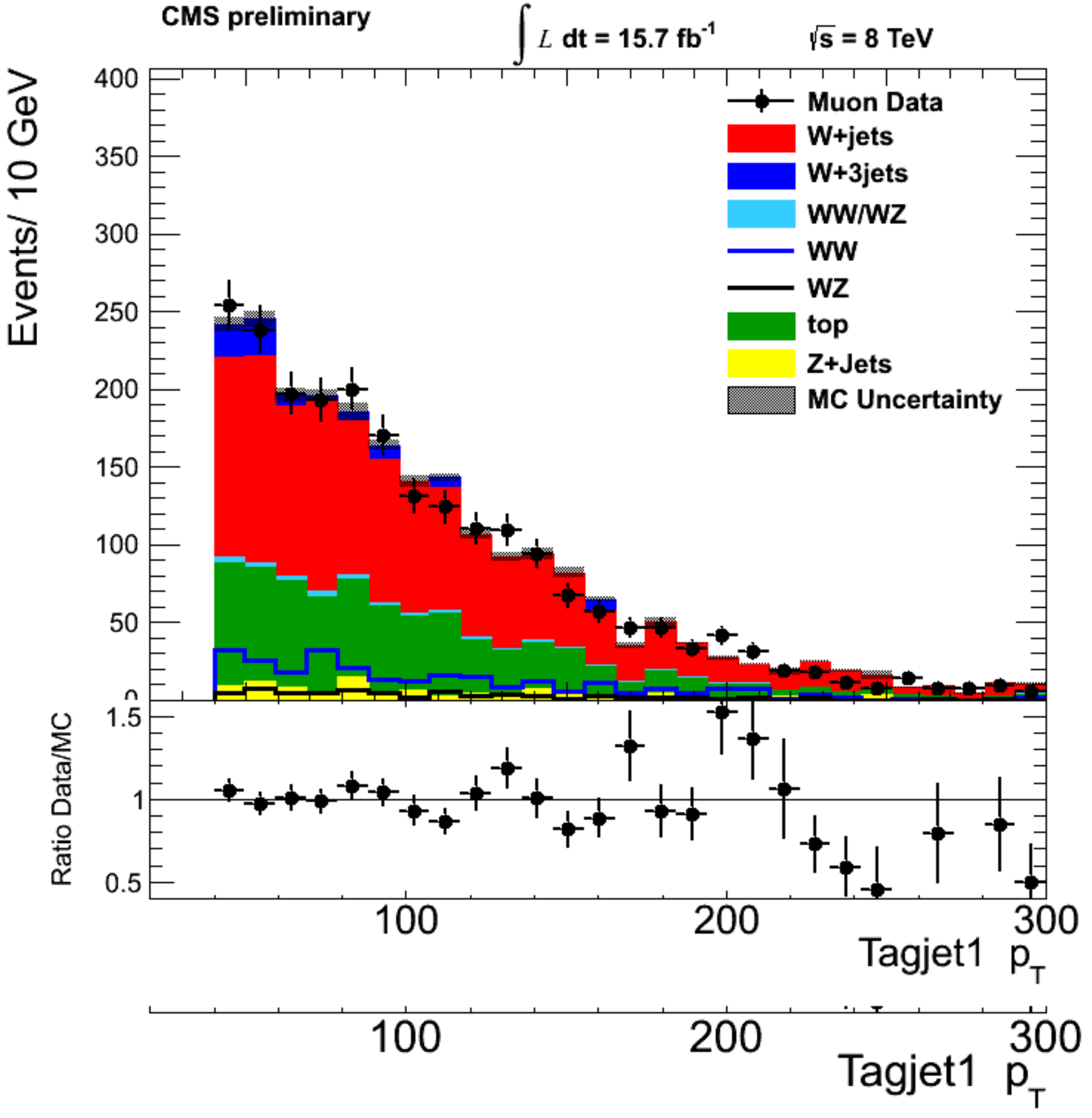

CMS preliminary
$\int L\,dt = 15.7\ fb^{-1}$
$\sqrt{s}$ = 8 TeV
Events/ 0.05
Muon Data
W+jets
W+3jets
WW/WZ
WW
WZ
top
Z+Jets
MC Uncertainty
Ratio Data/MC
Likelihood Output
Likelihood Output

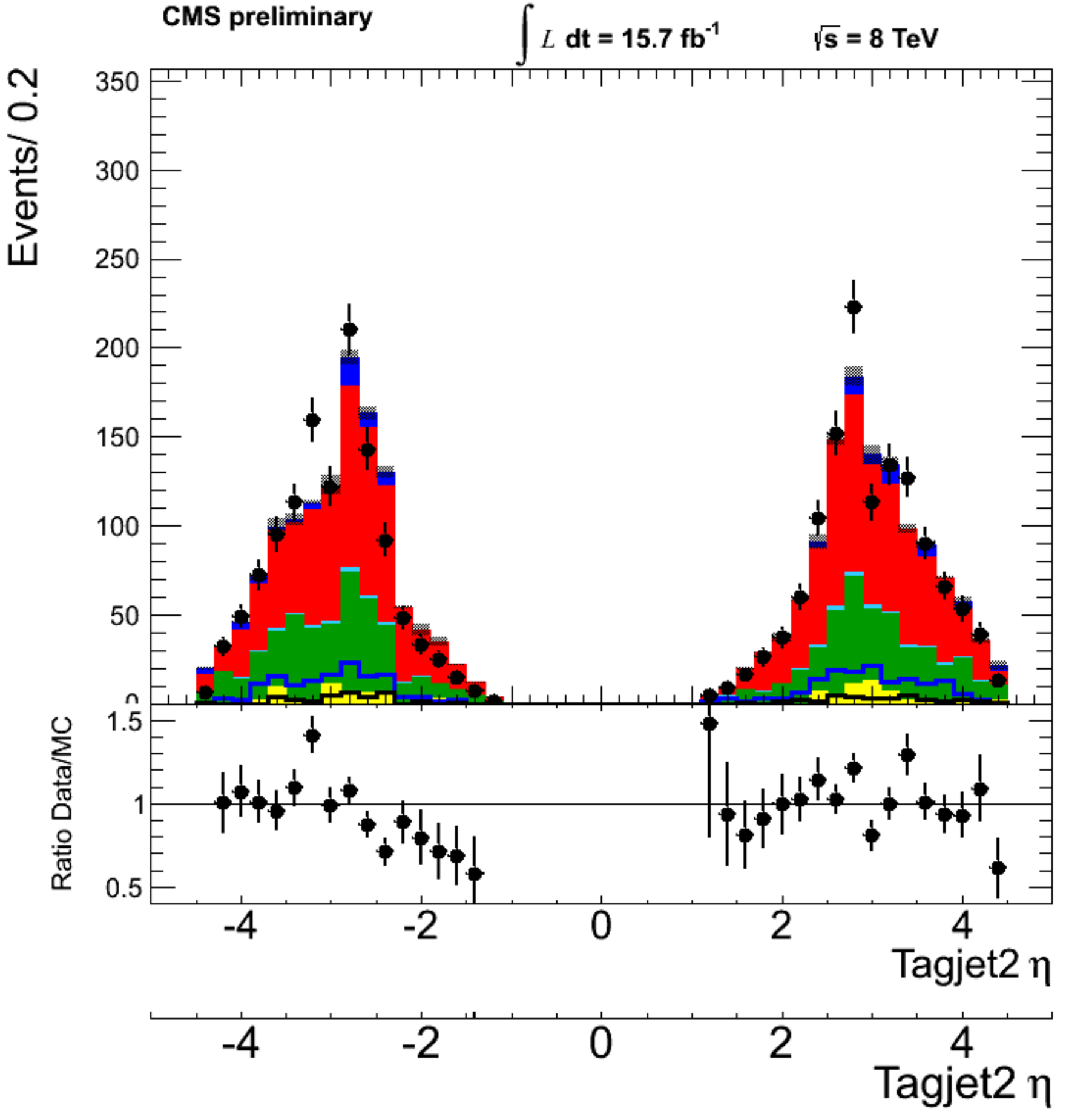

CMS preliminary
$\int L\,dt = 15.7\ fb^{-1}$
$\sqrt{s} = 8$ TeV
Events/ 10 GeV
250
200
150
100
50
0
Ratio Data/MC
1.5
1
0.5
0
50
100
150
p_T of WW (GeV)
0
50
100
150
p_T of WW (GeV)

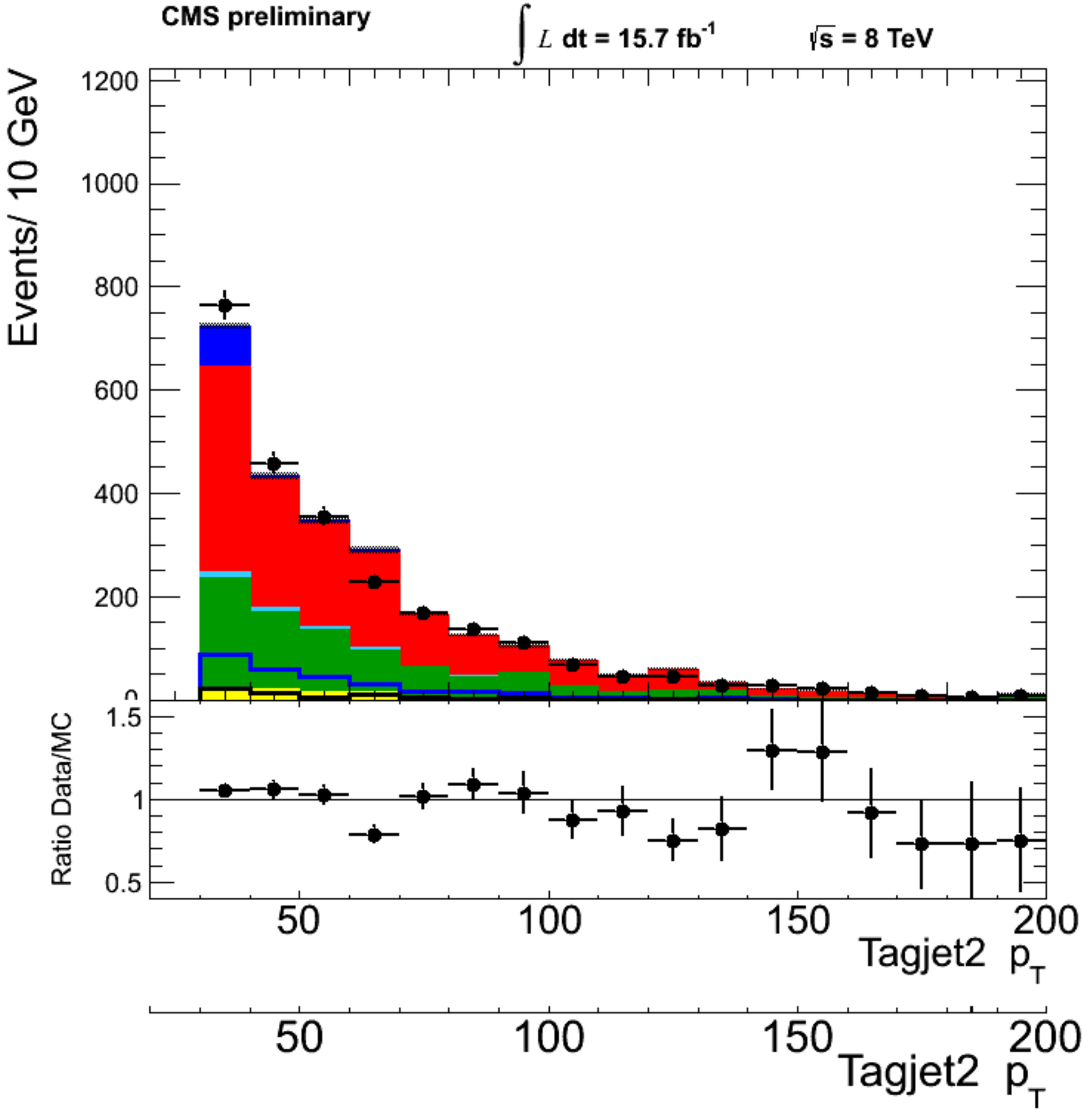

CMS preliminary
$\int L\,dt = 15.7\ fb^{-1}$
$\sqrt{s} = 8$ TeV
Events/ 0.2
180
160
140
120
100
80
60
40
20
0
Ratio Data/MC
1.5
1
0.5
4
6
8
Tagjet Δη
4
6
8
Tagjet Δη

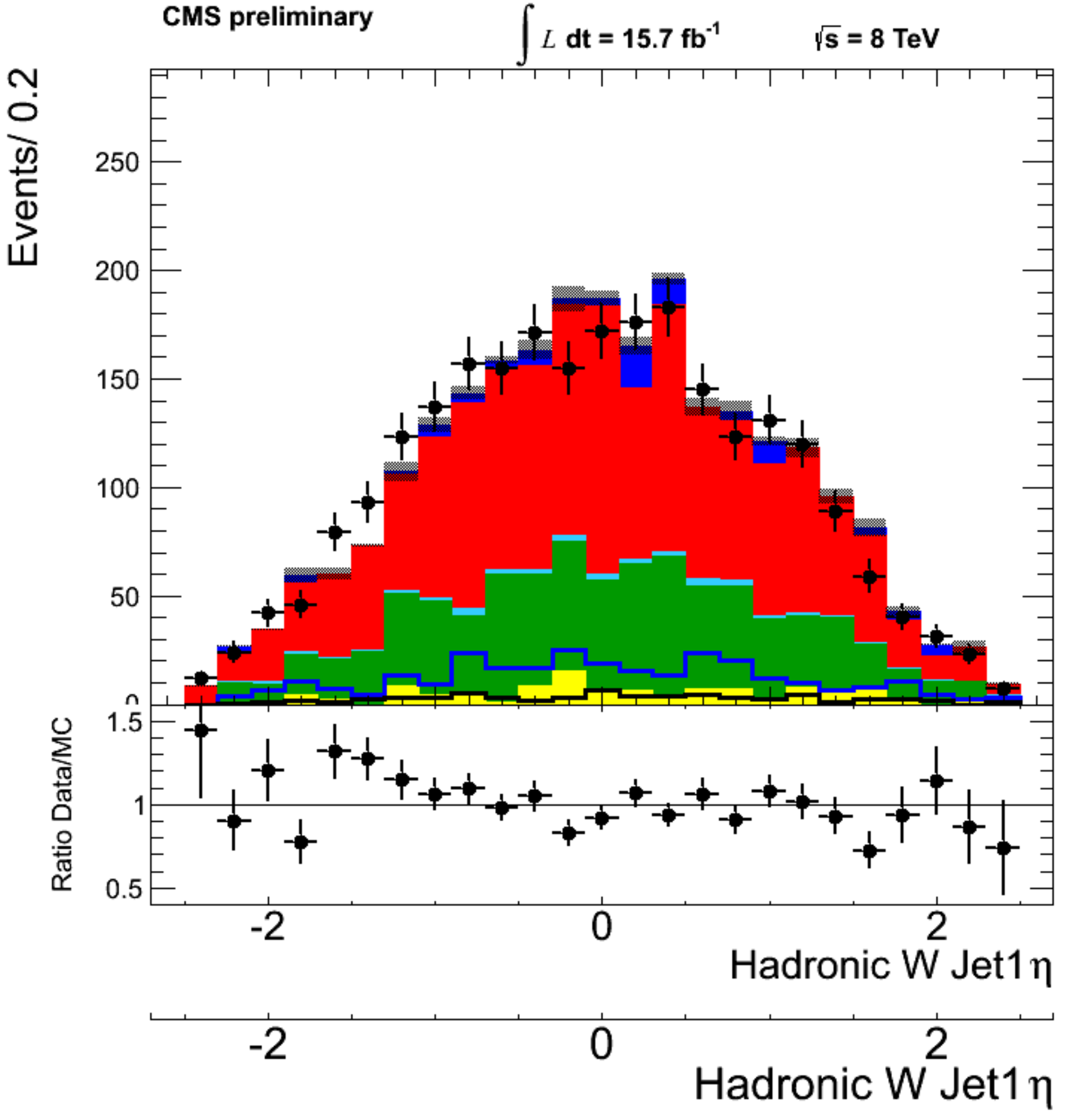

CMS preliminary
$\int L\,dt = 15.7\ fb^{-1}$
$\sqrt{s} = 8$ TeV
Events/ 50 GeV
600
500
400
300
200
100
0
Ratio Data/MC
1.5
1
0.5
200
400
600
800
1000
1200
Tagjet Invariant Mass (GeV)
200
400
600
800
1000
1200
Tagjet Invariant Mass (GeV)

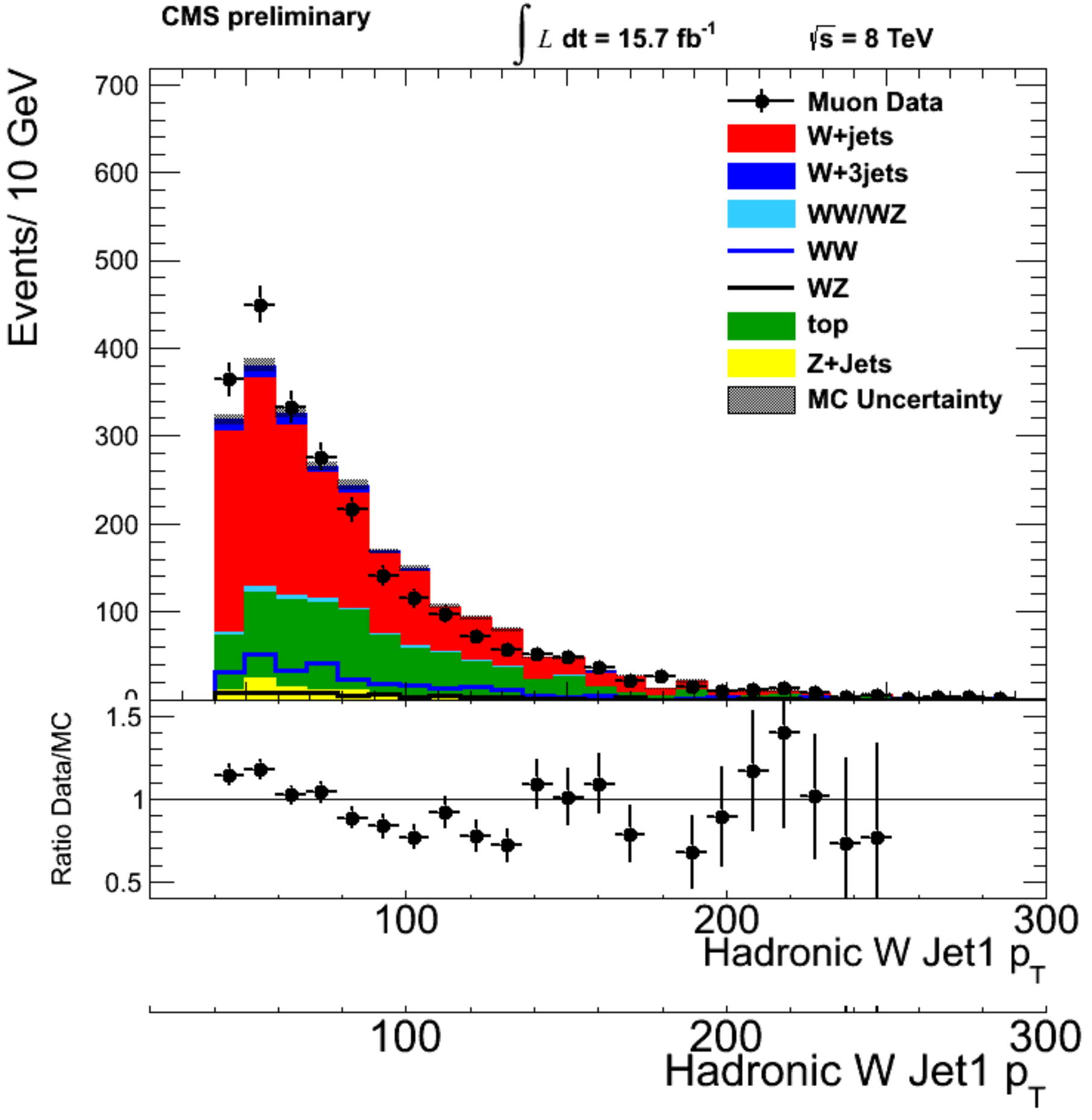

CMS preliminary
∫ L dt = 15.7 fb-1
√s = 8 TeV
Events/ 0.2
250
200
150
100
50
0
Ratio Data/MC
1.5
1
0.5
-4
-2
0
2
4
Tagjet1 η
-4
-2
0
2
4
Tagjet1 η

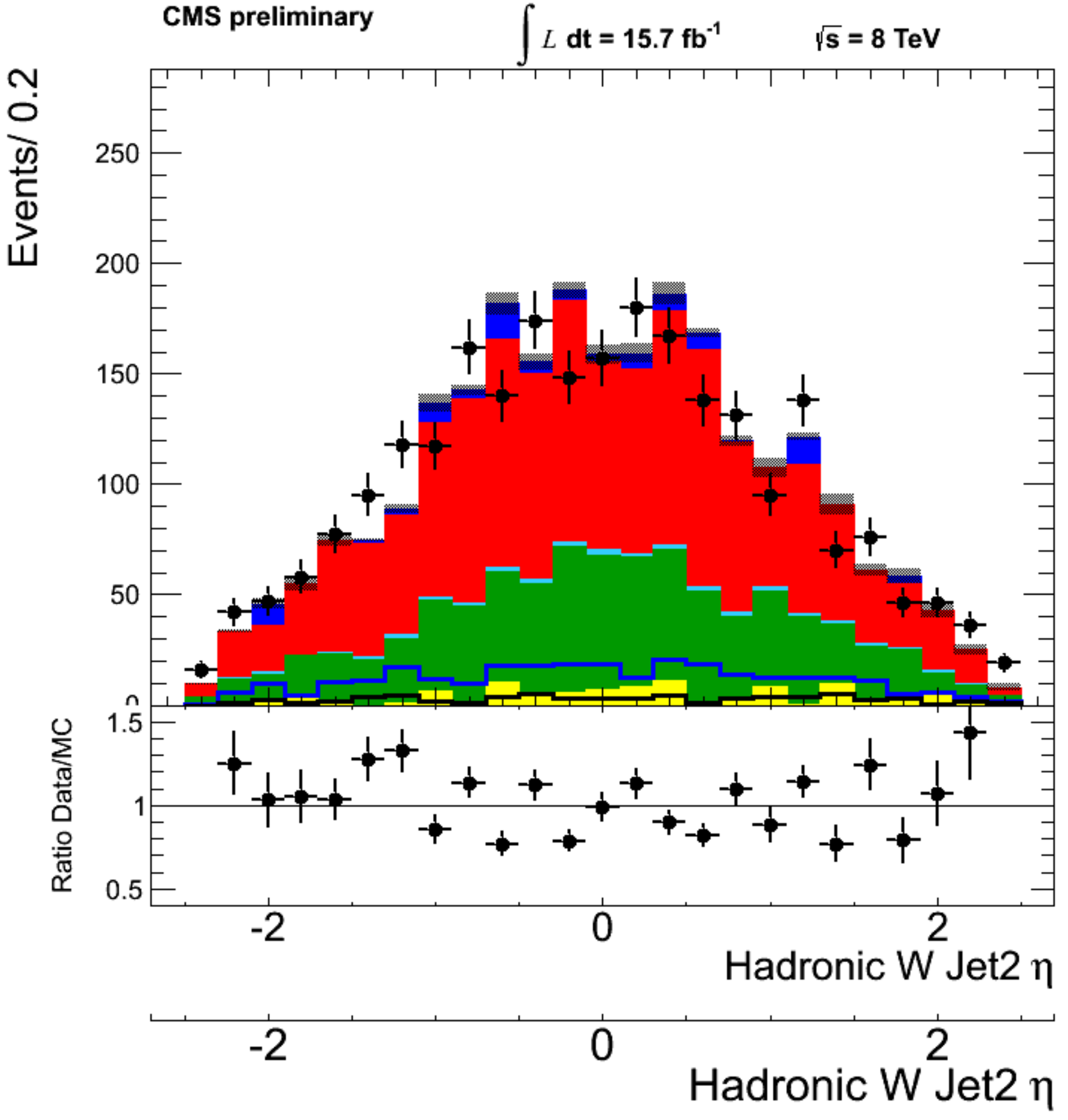

CMS preliminary
$\int L\,dt = 15.7\ fb^{-1}$
$\sqrt{s}$ = 8 TeV
Events/ 10 GeV
Muon Data
W+jets
W+3jets
WW/WZ
WW
WZ
top
Z+Jets
MC Uncertainty
Ratio Data/MC
Tagjet1 p_T
Tagjet1 p_T

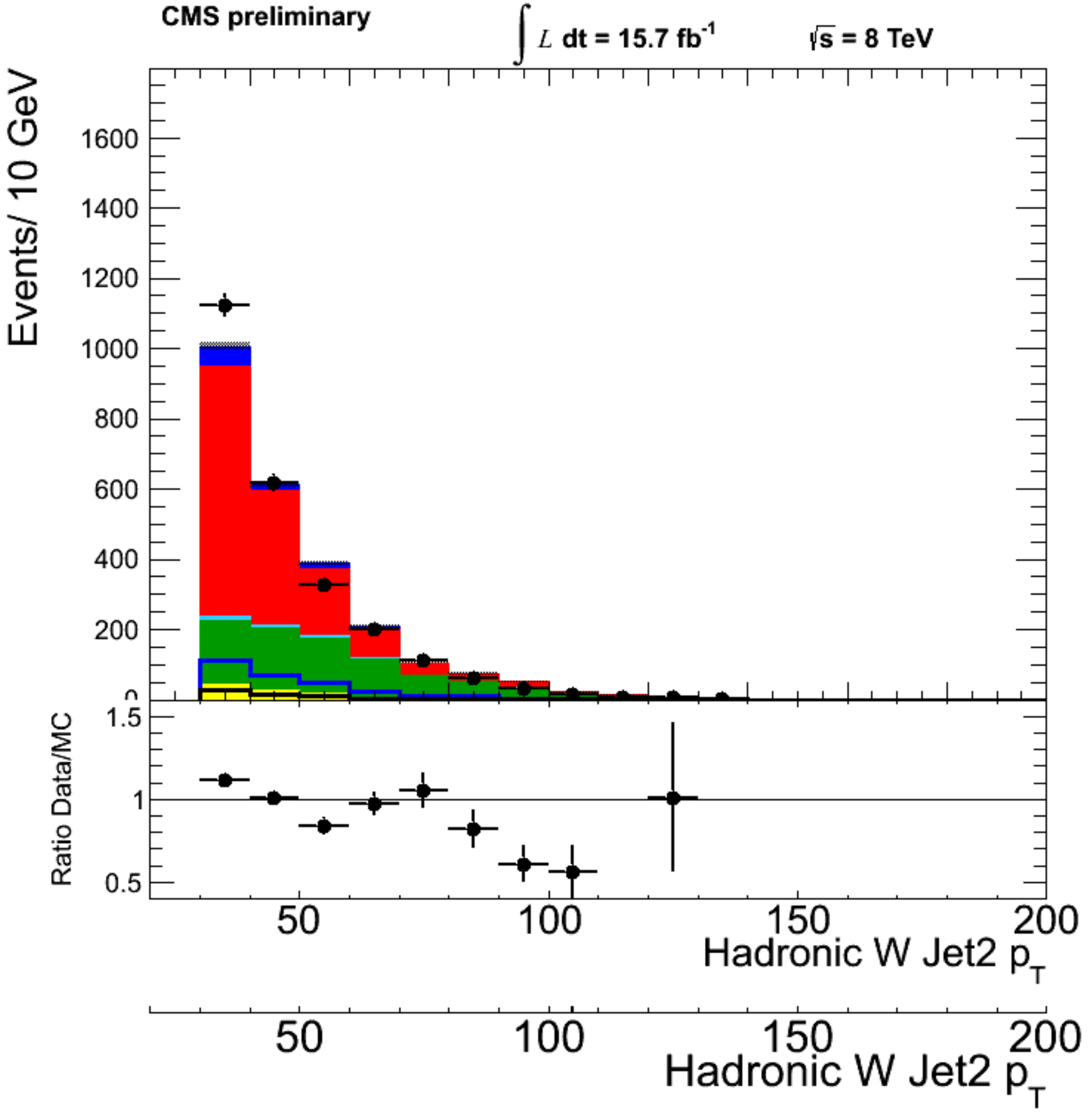

CMS preliminary
∫ L dt = 15.7 fb-1
√s = 8 TeV
Events/ 0.2
350
300
250
200
150
100
50
0
Ratio Data/MC
1.5
1
0.5
-4
-2
0
2
4
Tagjet2 η
-4
-2
0
2
4
Tagjet2 η

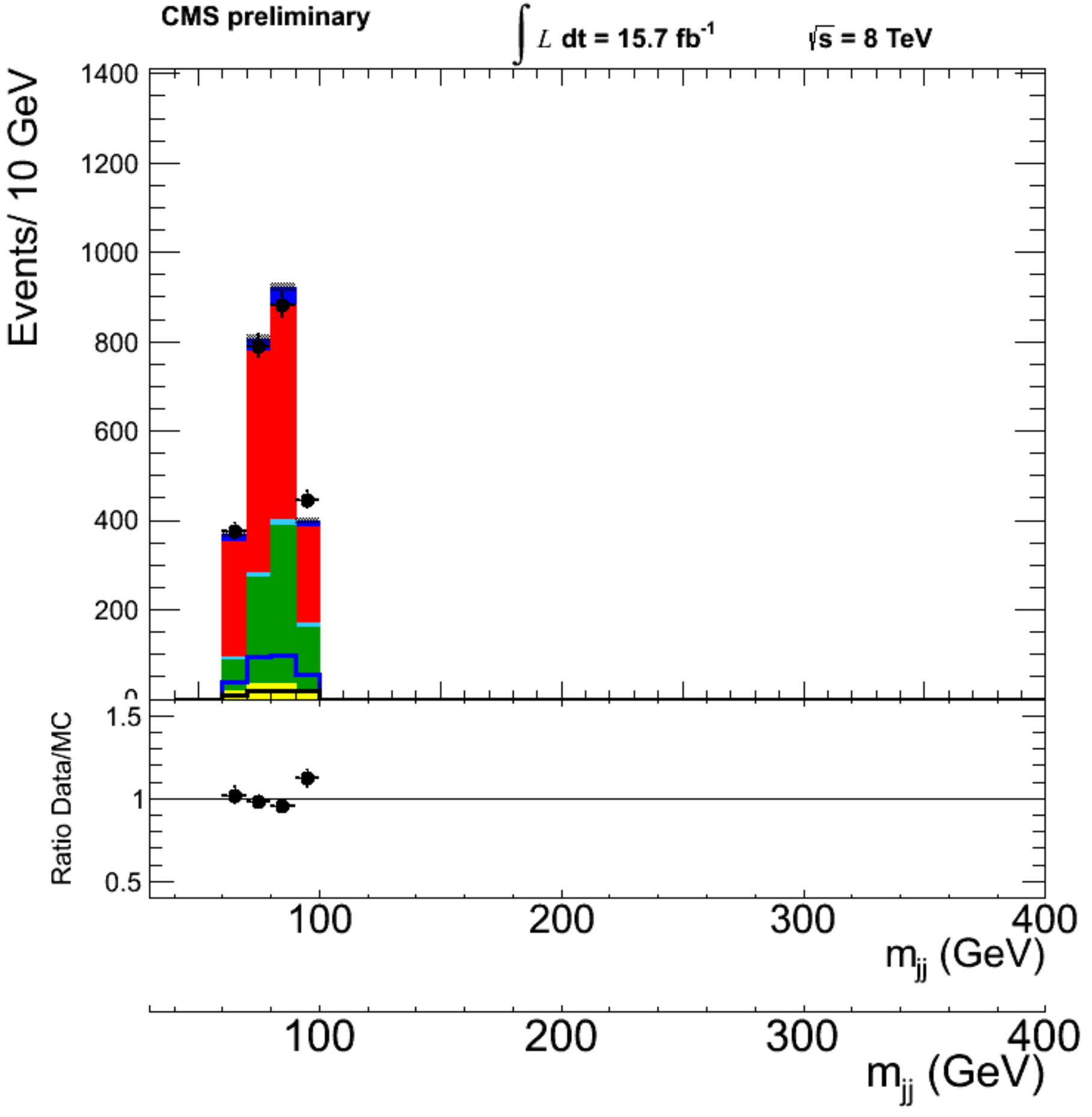

CMS preliminary
$\int L\,dt = 15.7\ fb^{-1}$
$\sqrt{s} = 8$ TeV
Events/ 10 GeV
1200
1000
800
600
400
200
0
Ratio Data/MC
1.5
1
0.5
50
100
150
200
Tagjet2 p_T
50
100
150
200
Tagjet2 p_T


CMS preliminary
$\int L\,dt = 15.7\ fb^{-1}$
$\sqrt{s} = 8$ TeV
Events/ 0.2
250
200
150
100
50
Ratio Data/MC
1.5
1
0.5
-2
0
2
Hadronic W Jet1 η
-2
0
2
Hadronic W Jet1 η


CMS preliminary
$\int L\,dt = 15.7\ fb^{-1}$
$\sqrt{s}$ = 8 TeV
Events/ 10 GeV
Muon Data
W+jets
W+3jets
WW/WZ
WW
WZ
top
Z+Jets
MC Uncertainty
Ratio Data/MC
Hadronic W Jet1 p_T
Hadronic W Jet1 p_T


CMS preliminary
$\int L\,dt = 15.7\ fb^{-1}$
$\sqrt{s} = 8$ TeV
Events/ 0.2
250
200
150
100
50
Ratio Data/MC
1.5
1
0.5
-2
0
2
Hadronic W Jet2 η
-2
0
2
Hadronic W Jet2 η


CMS preliminary
∫ L dt = 15.7 fb-1
√s = 8 TeV
Events/ 10 GeV
1600
1400
1200
1000
800
600
400
200
0
Ratio Data/MC
1.5
1
0.5
50
100
150
200
Hadronic W Jet2 pT
50
100
150
200
Hadronic W Jet2 pT


CMS preliminary
$\int L\,dt = 15.7\ fb^{-1}$
$\sqrt{s} = 8$ TeV
Events/ 10 GeV
1400
1200
1000
800
600
400
200
0
Ratio Data/MC
1.5
1
0.5
100
200
300
400
m_{jj} (GeV)
100
200
300
400
m_{jj} (GeV)