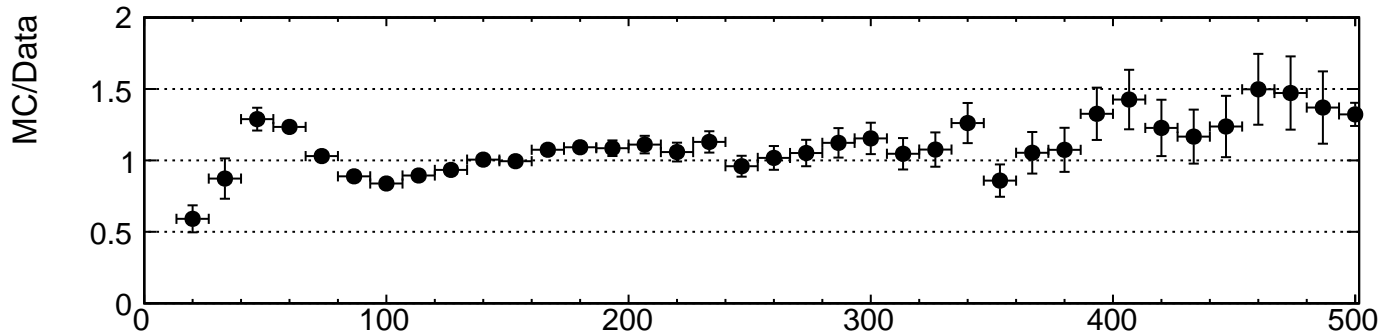
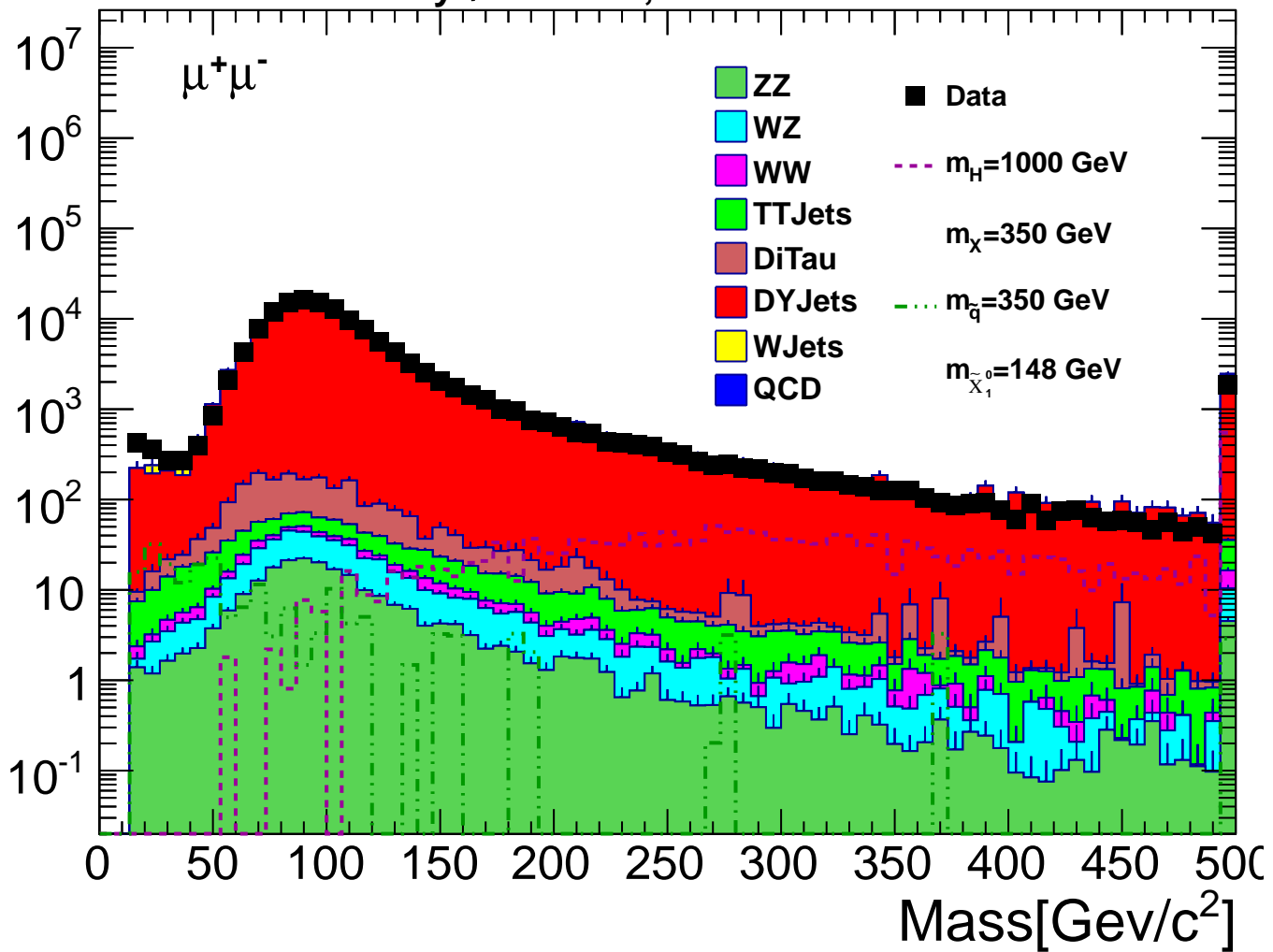


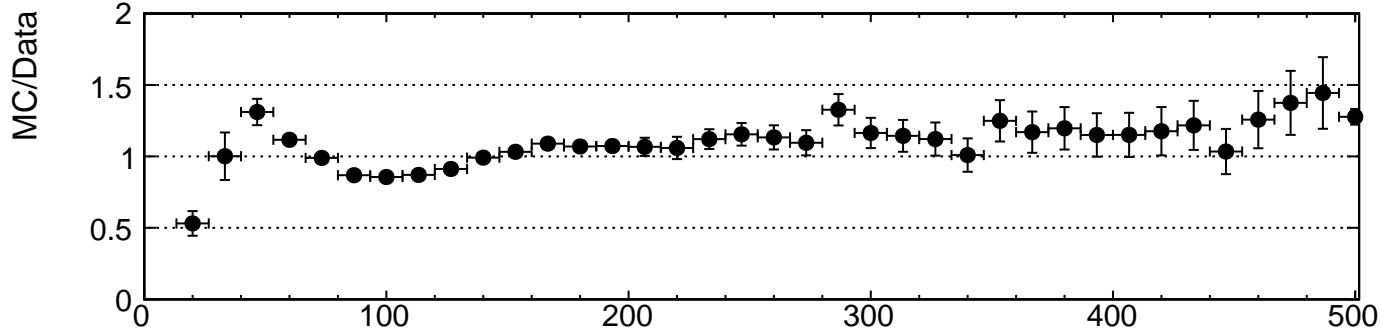
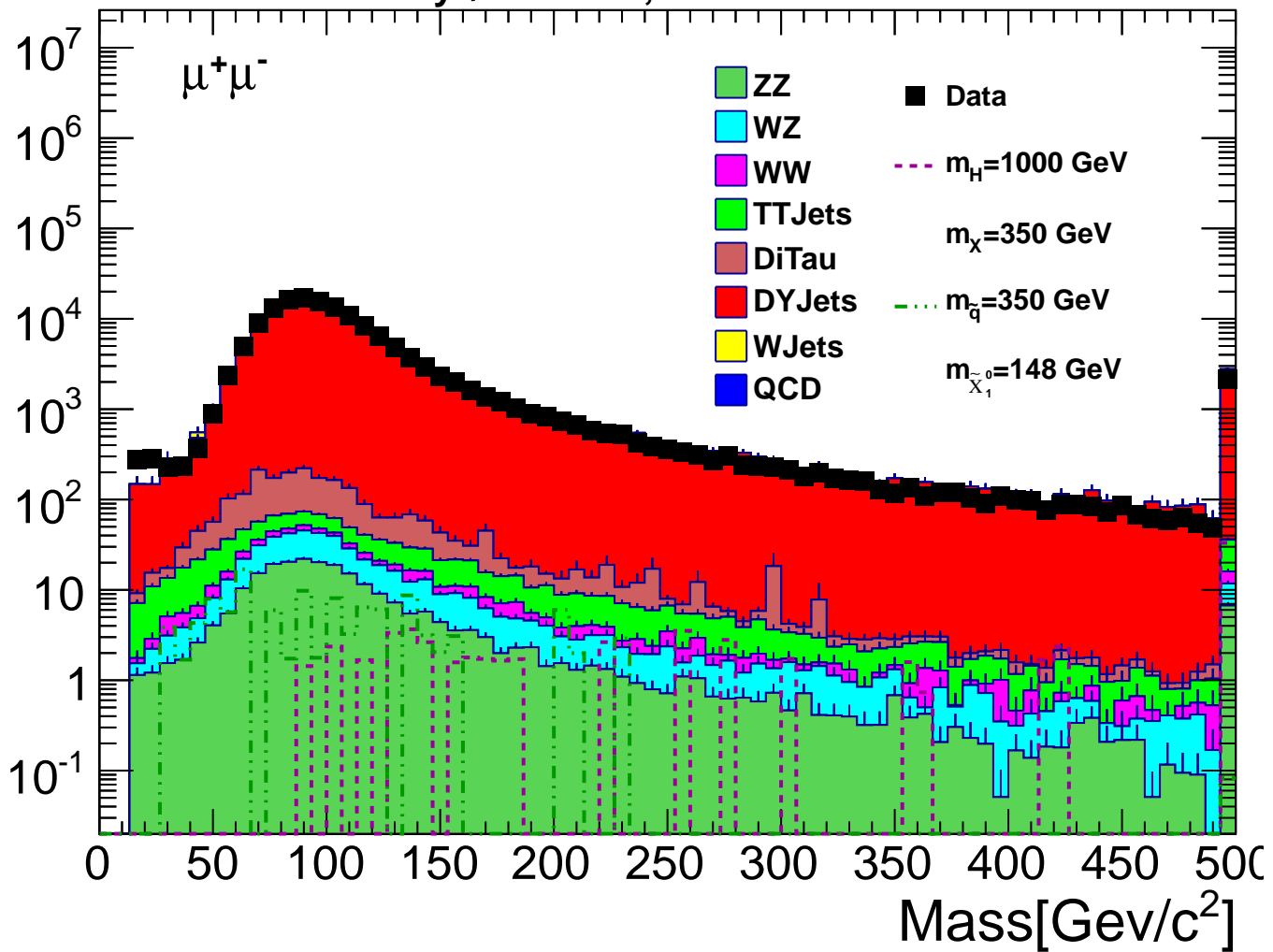
CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}$ ,  $L = 20.5 \text{ fb}^{-1}$

Entries



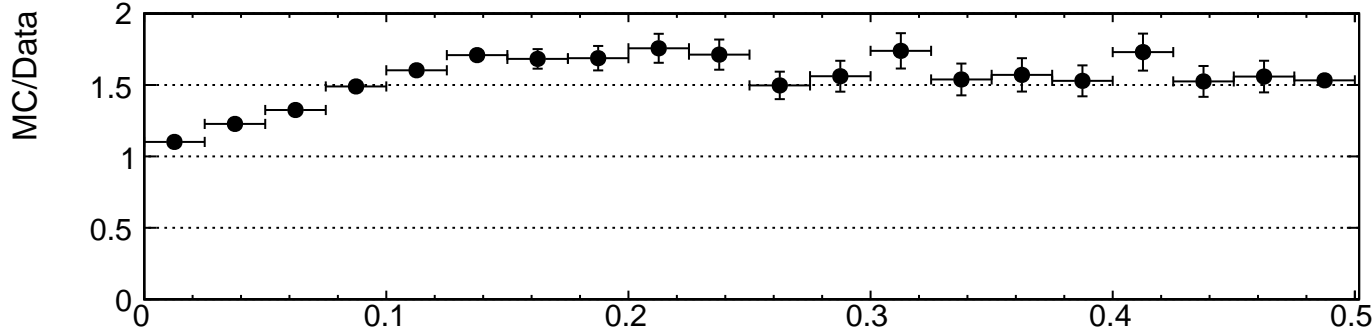
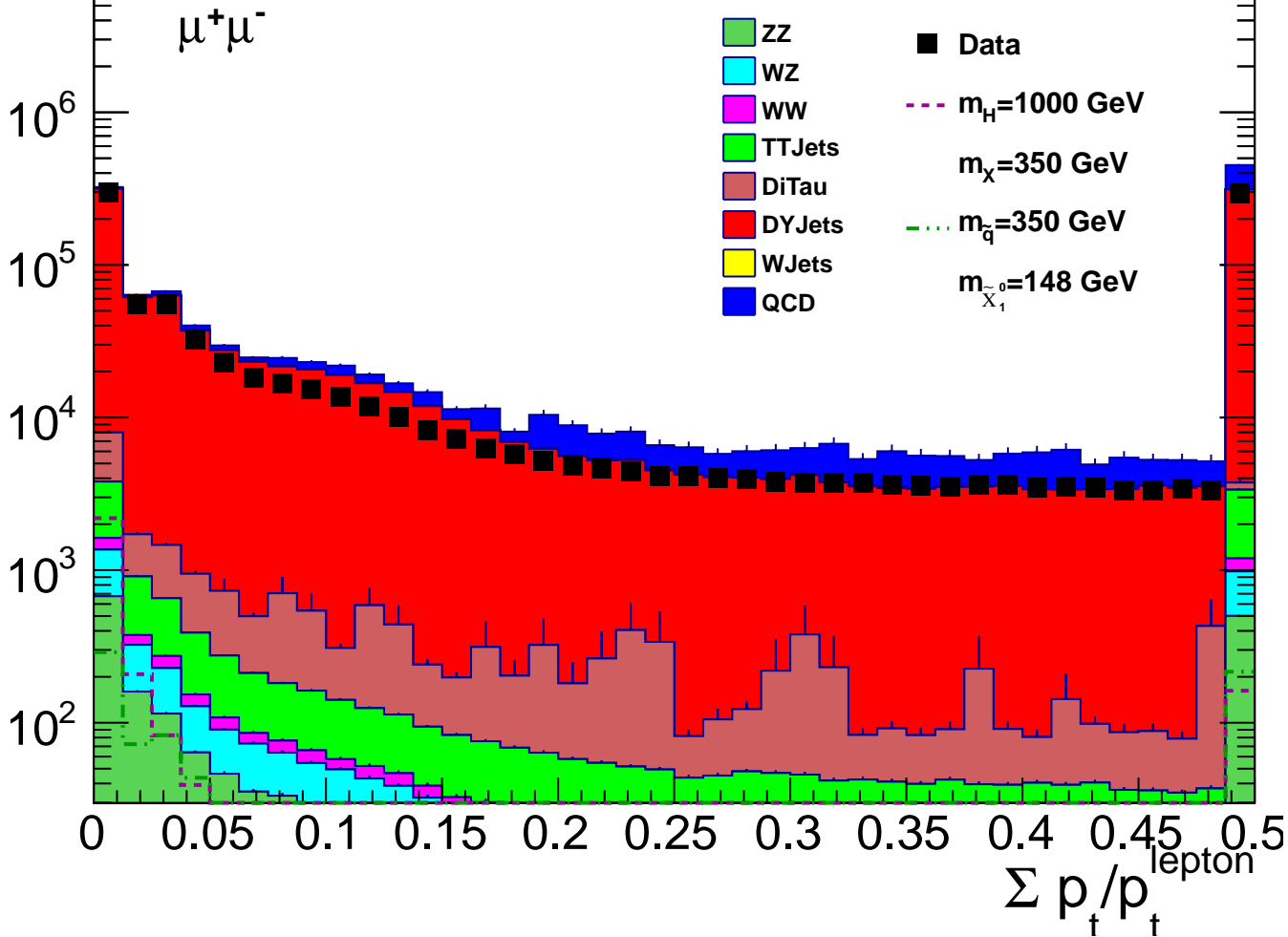
CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}$ ,  $L = 20.5 \text{ fb}^{-1}$

Entries



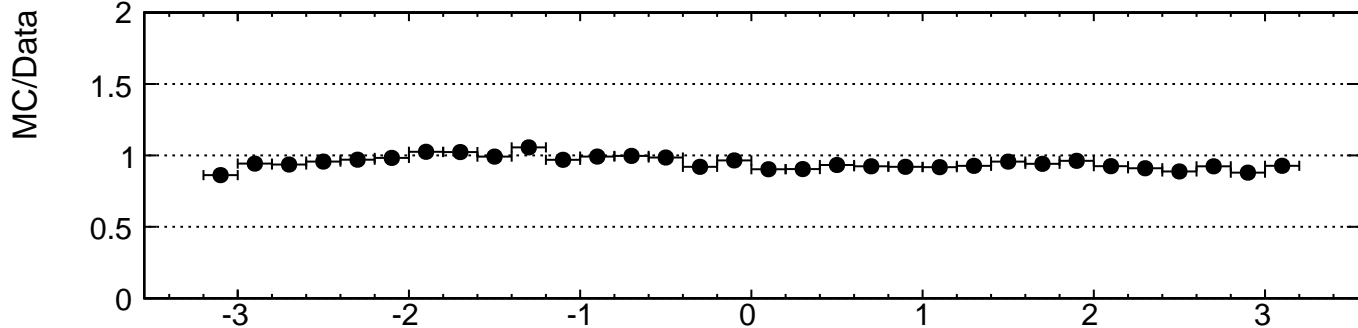
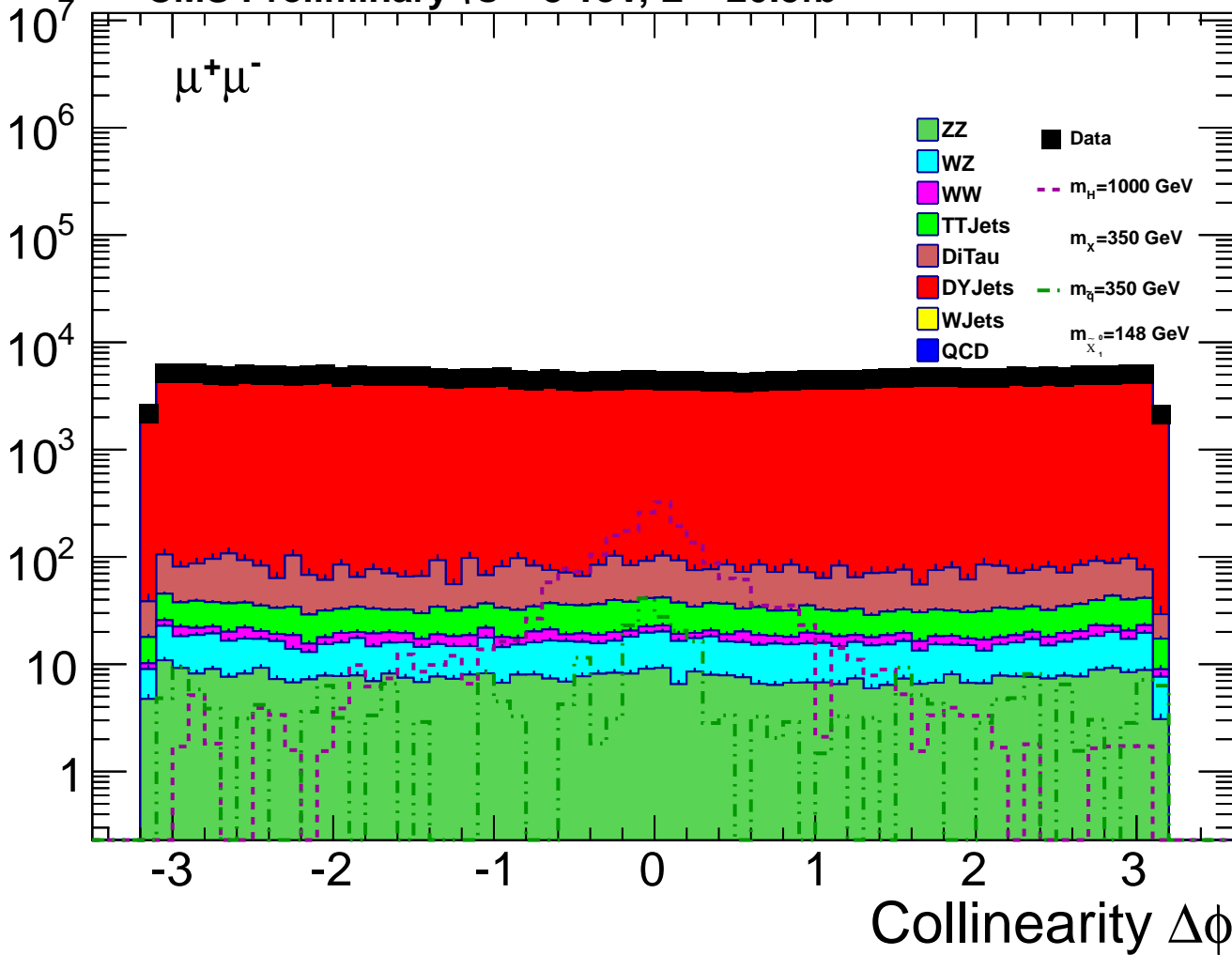
CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}$ ,  $L = 20.5 \text{ fb}^{-1}$

Entries



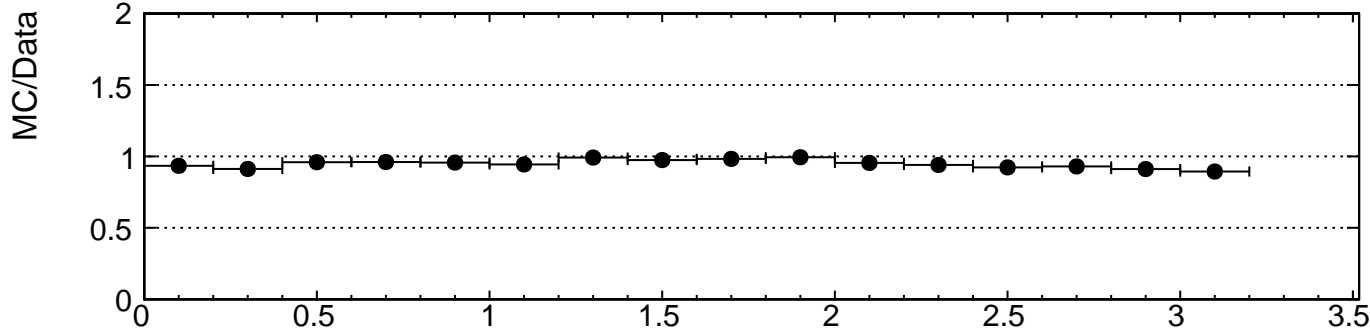
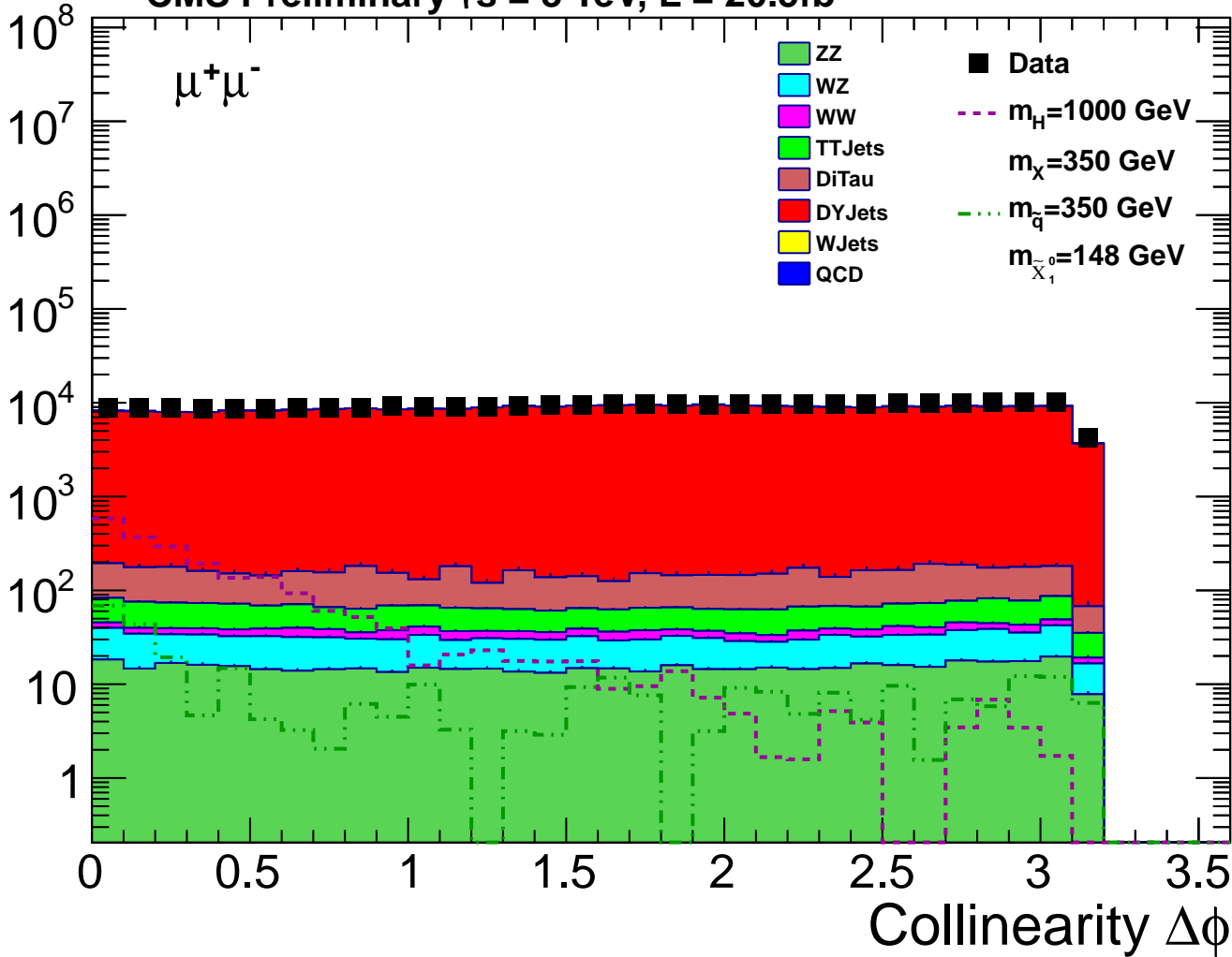
CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}, L = 20.5 \text{ fb}^{-1}$

Entries



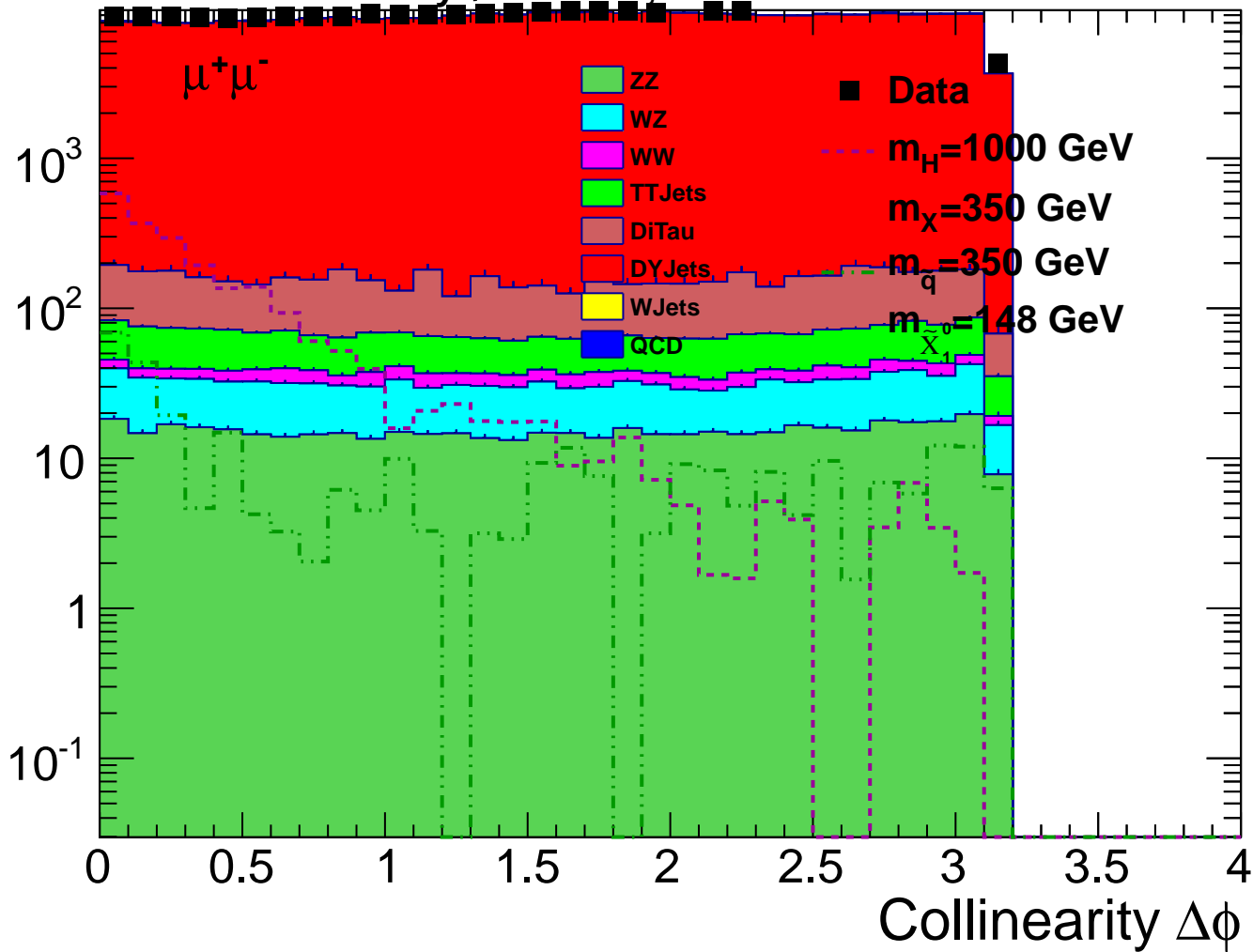
CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}$ ,  $L = 20.5 \text{ fb}^{-1}$

Entries

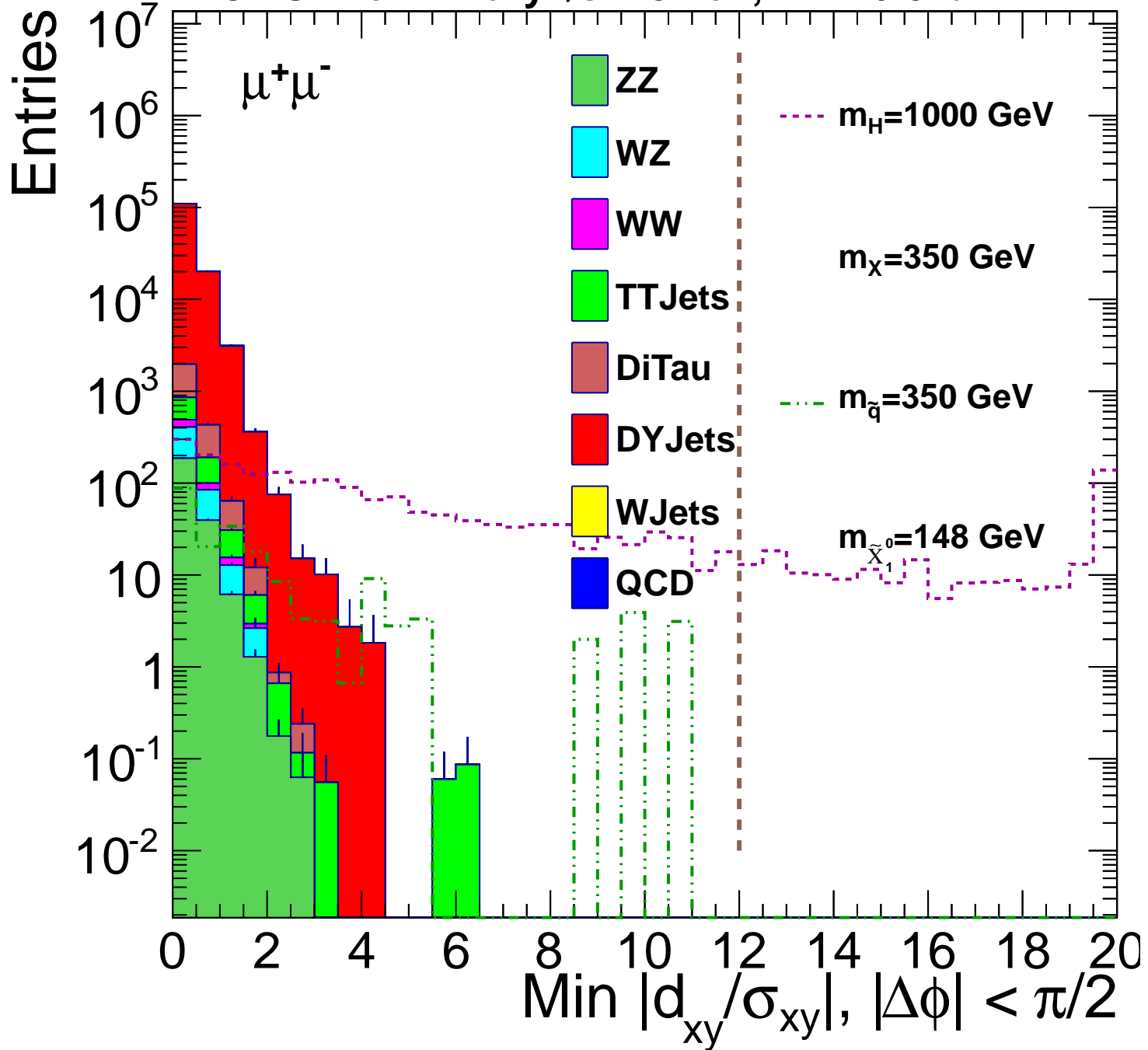


CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}$ ,  $L = 20.5 \text{ fb}^{-1}$

Entries

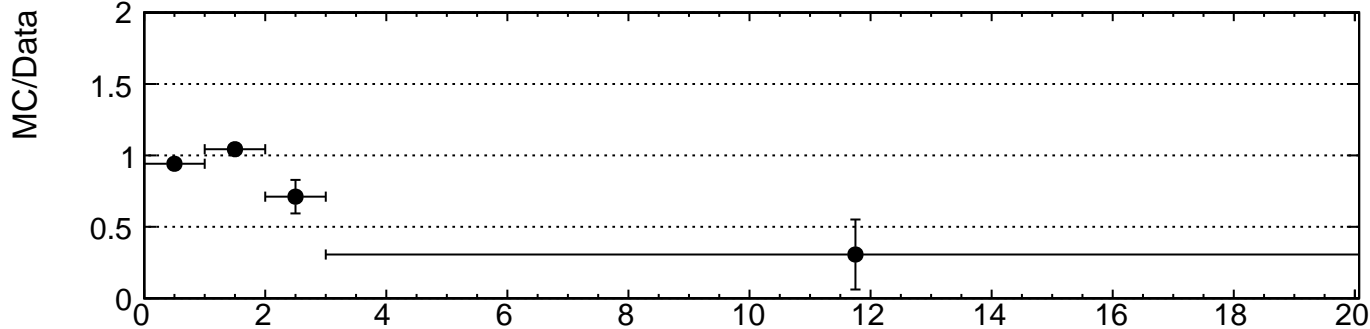
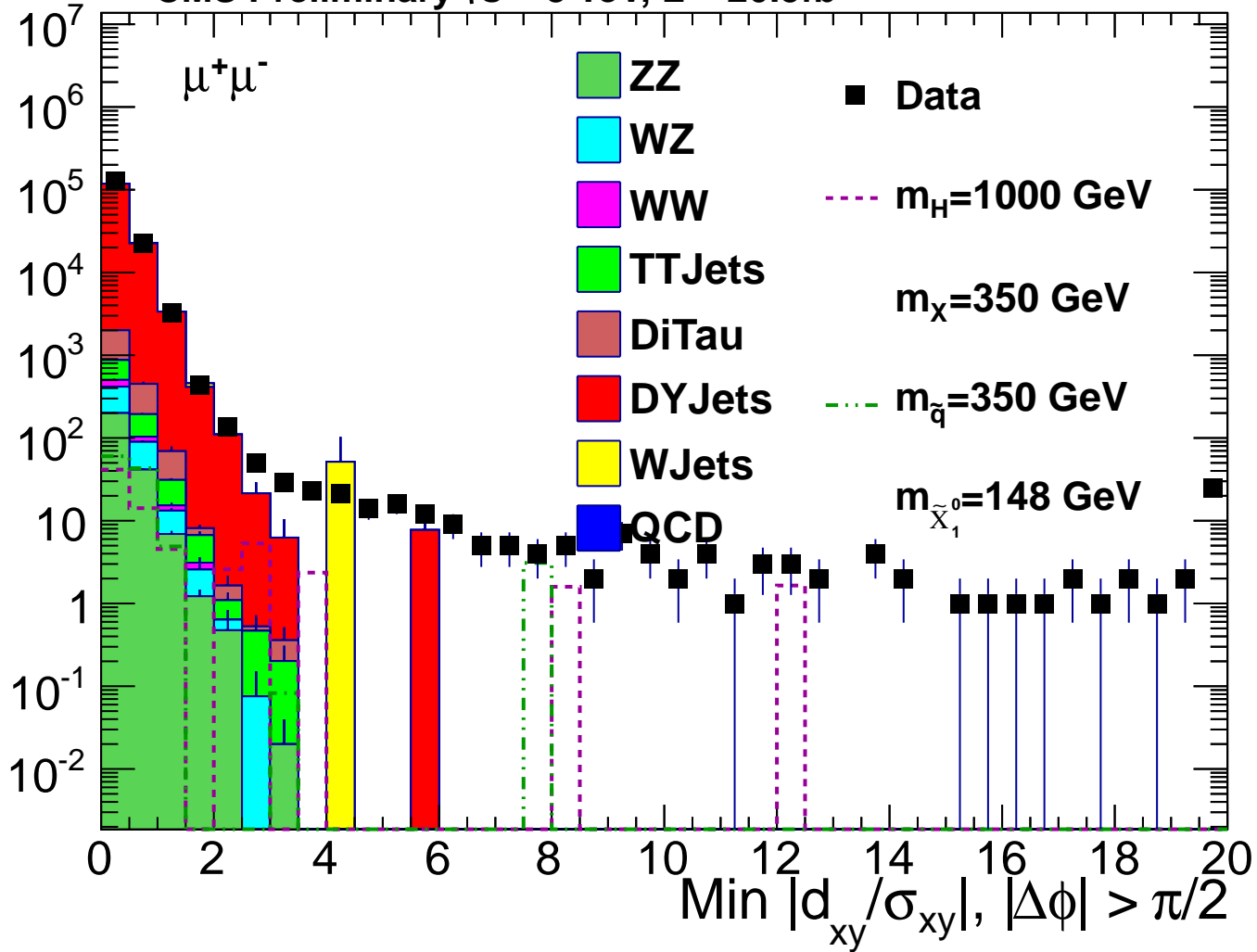


CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}$ ,  $L = 20.5 \text{ fb}^{-1}$



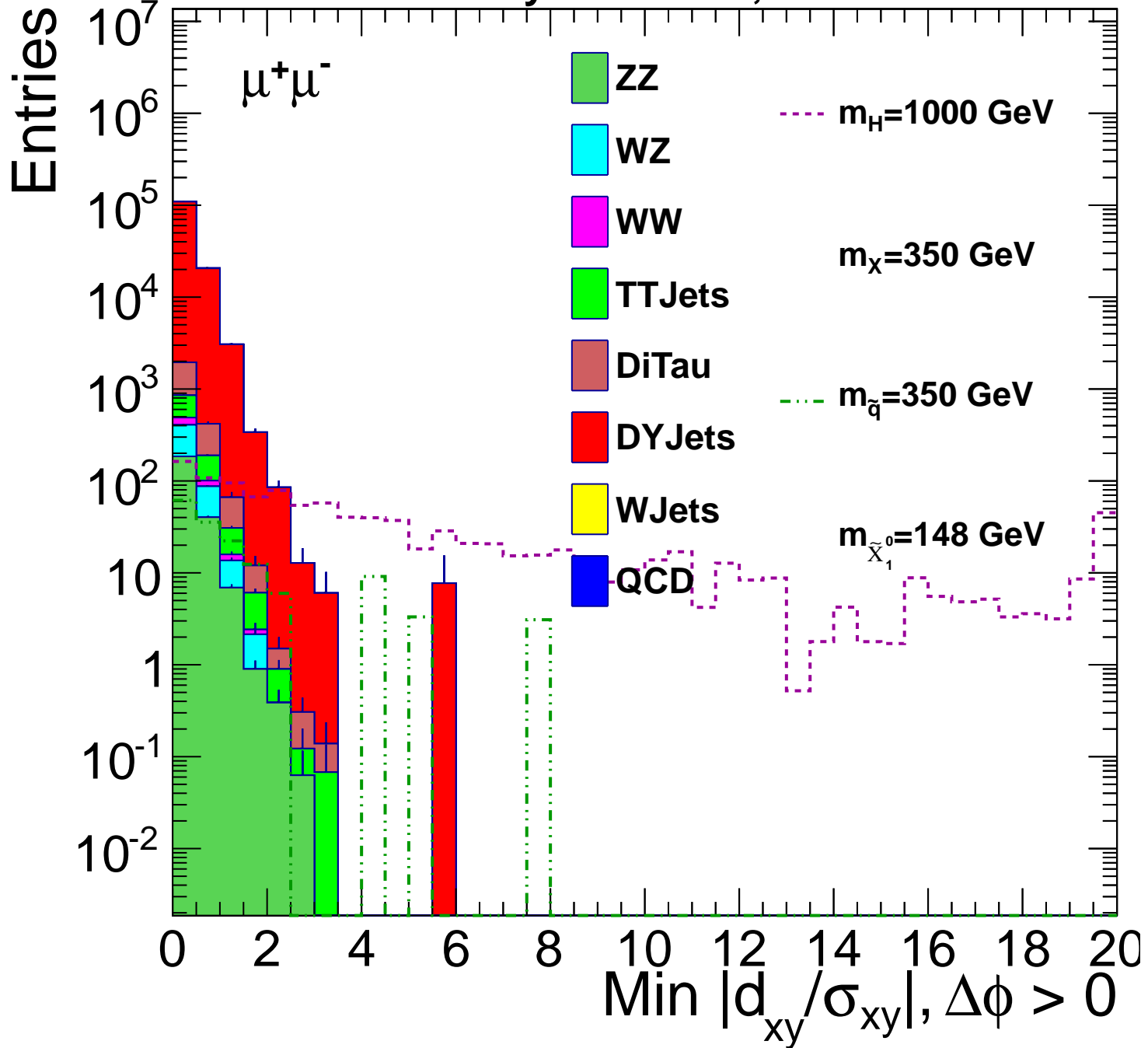
CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}$ ,  $L = 20.5 \text{ fb}^{-1}$

Entries

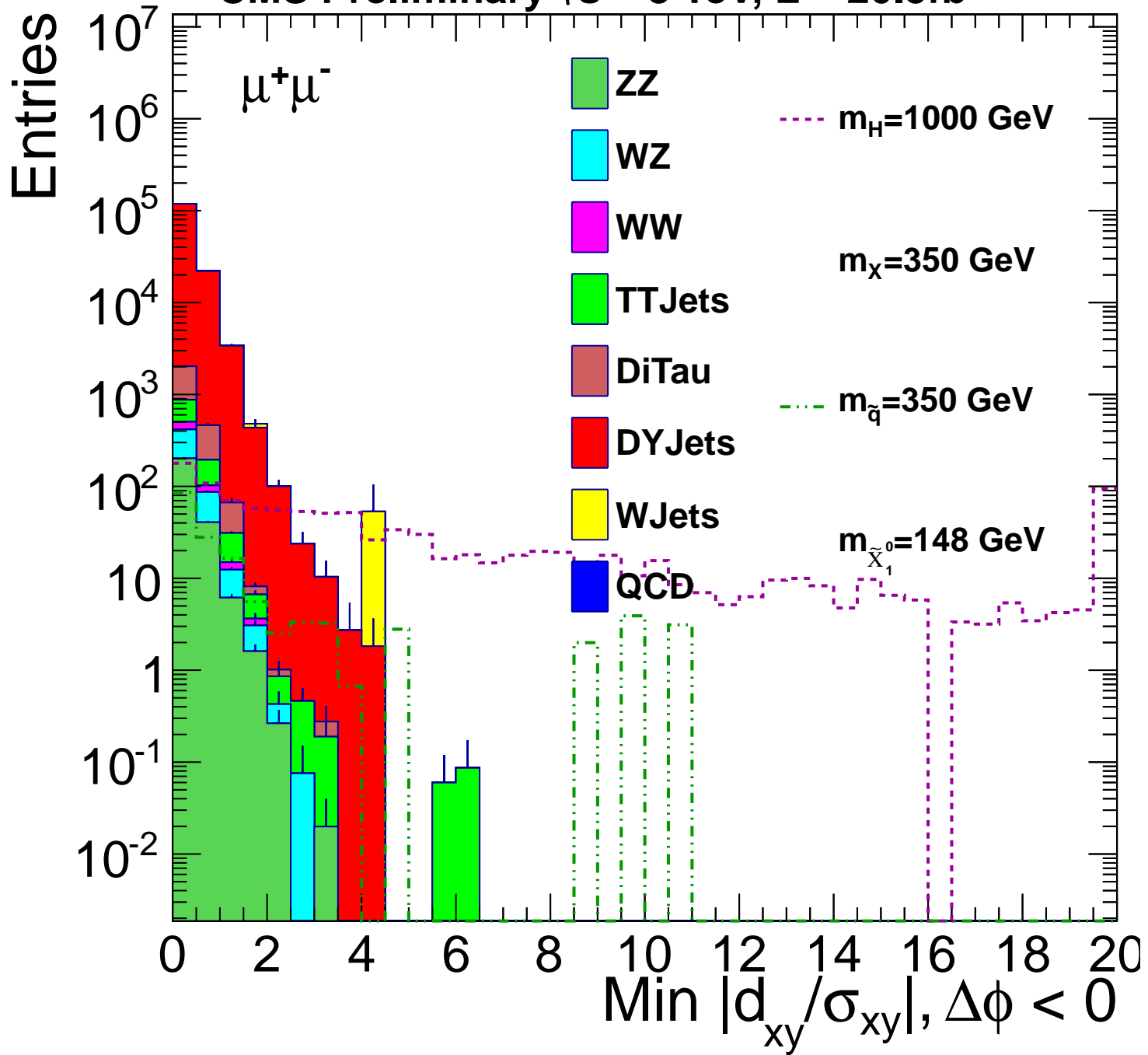




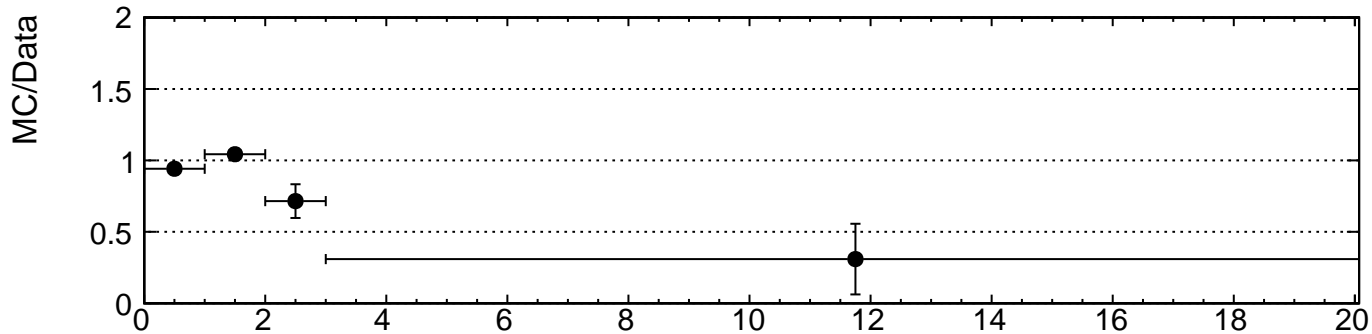
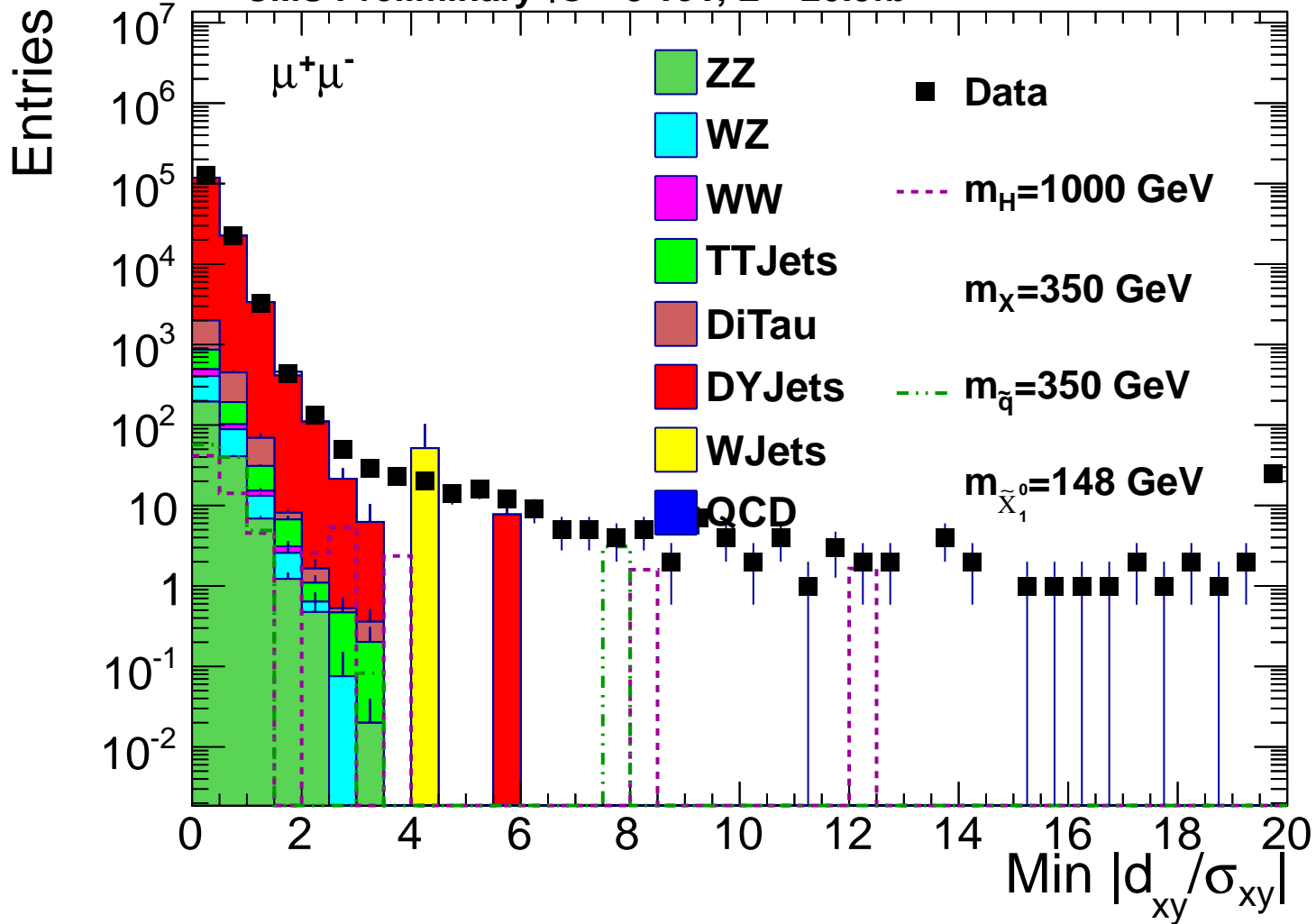
CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}$ ,  $L = 20.5 \text{ fb}^{-1}$



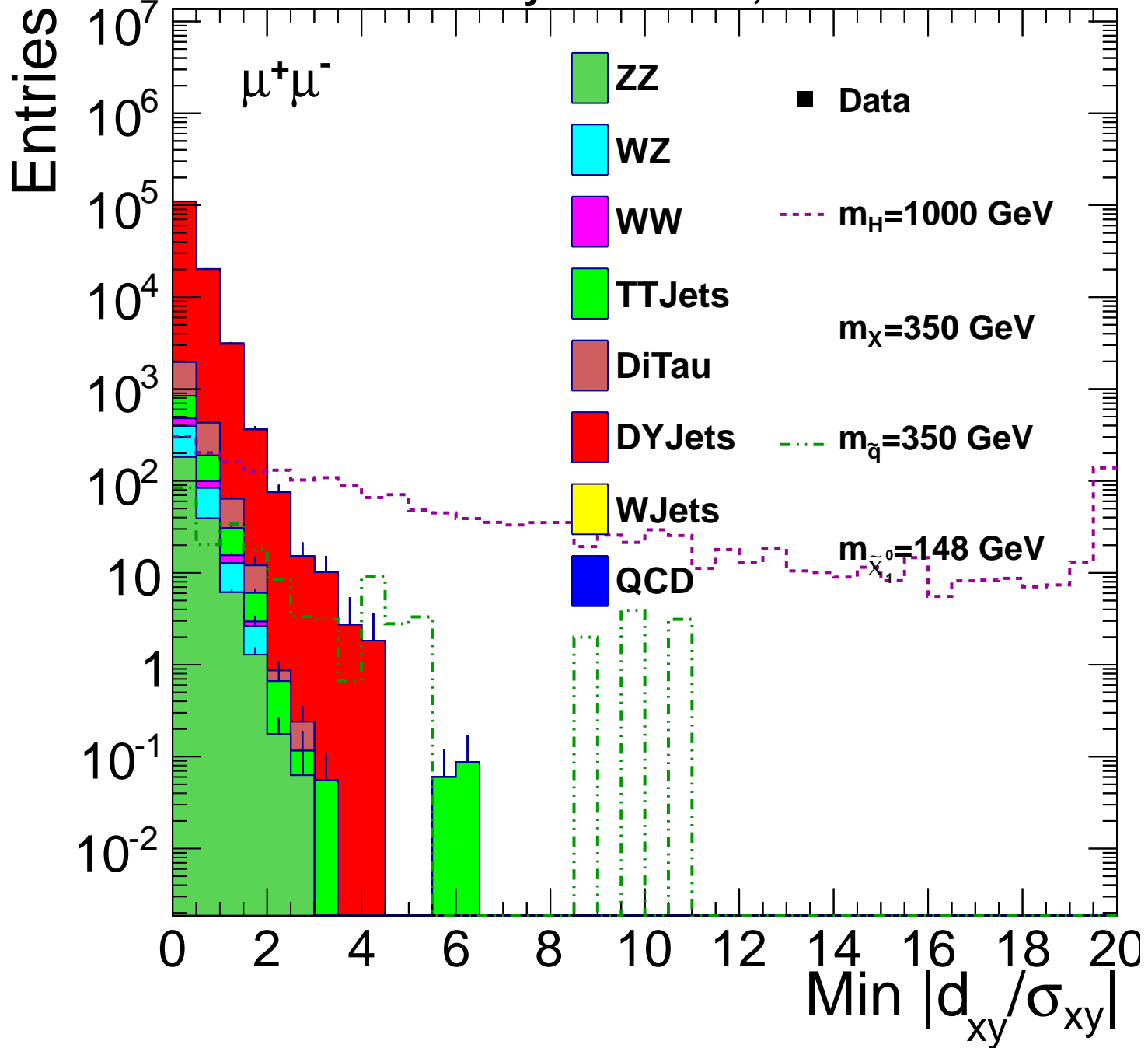
**CMS Preliminary  $\sqrt{s} = 8$  TeV,  $L = 20.5\text{fb}^{-1}$**



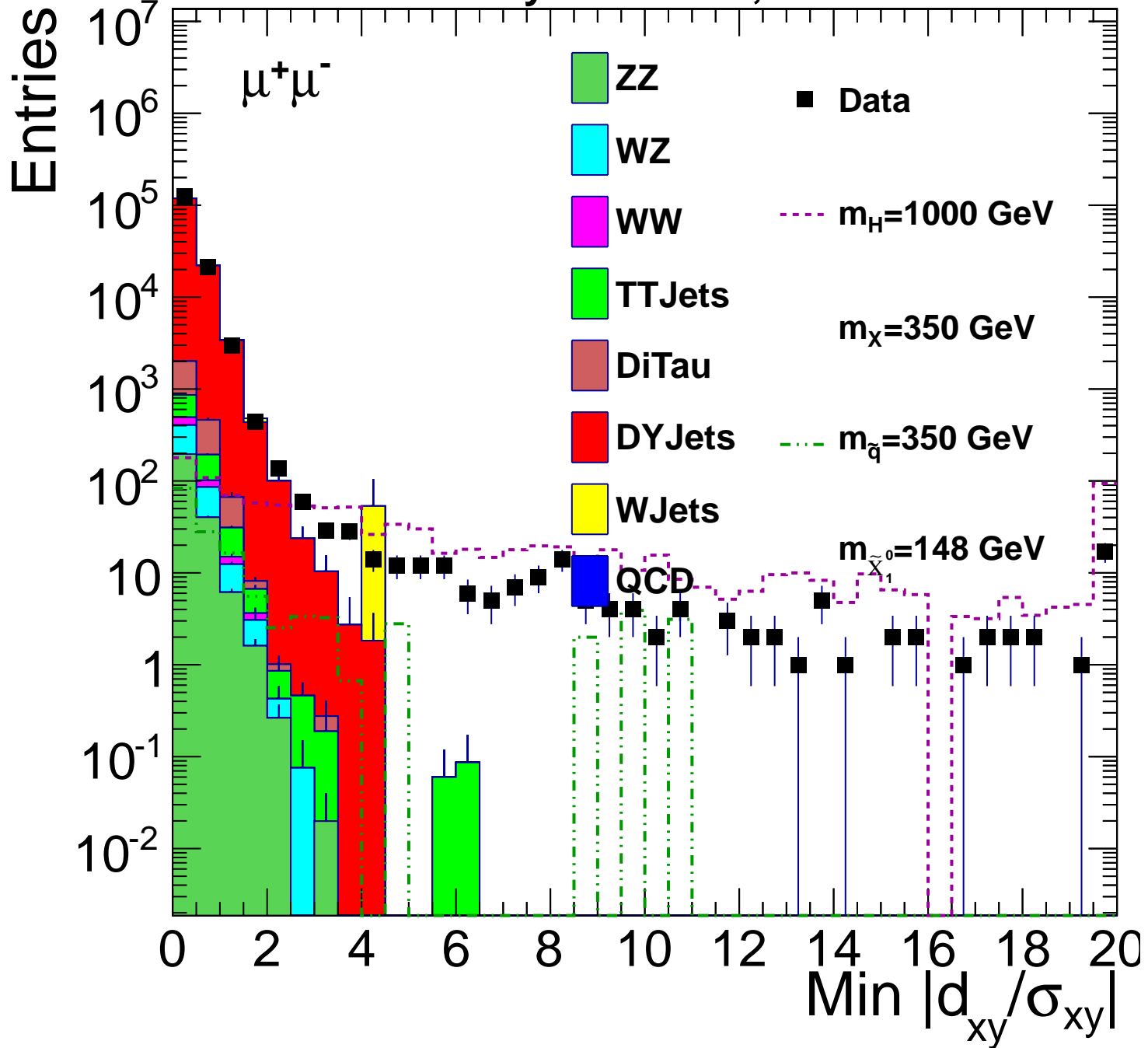
CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}$ ,  $L = 20.5 \text{ fb}^{-1}$



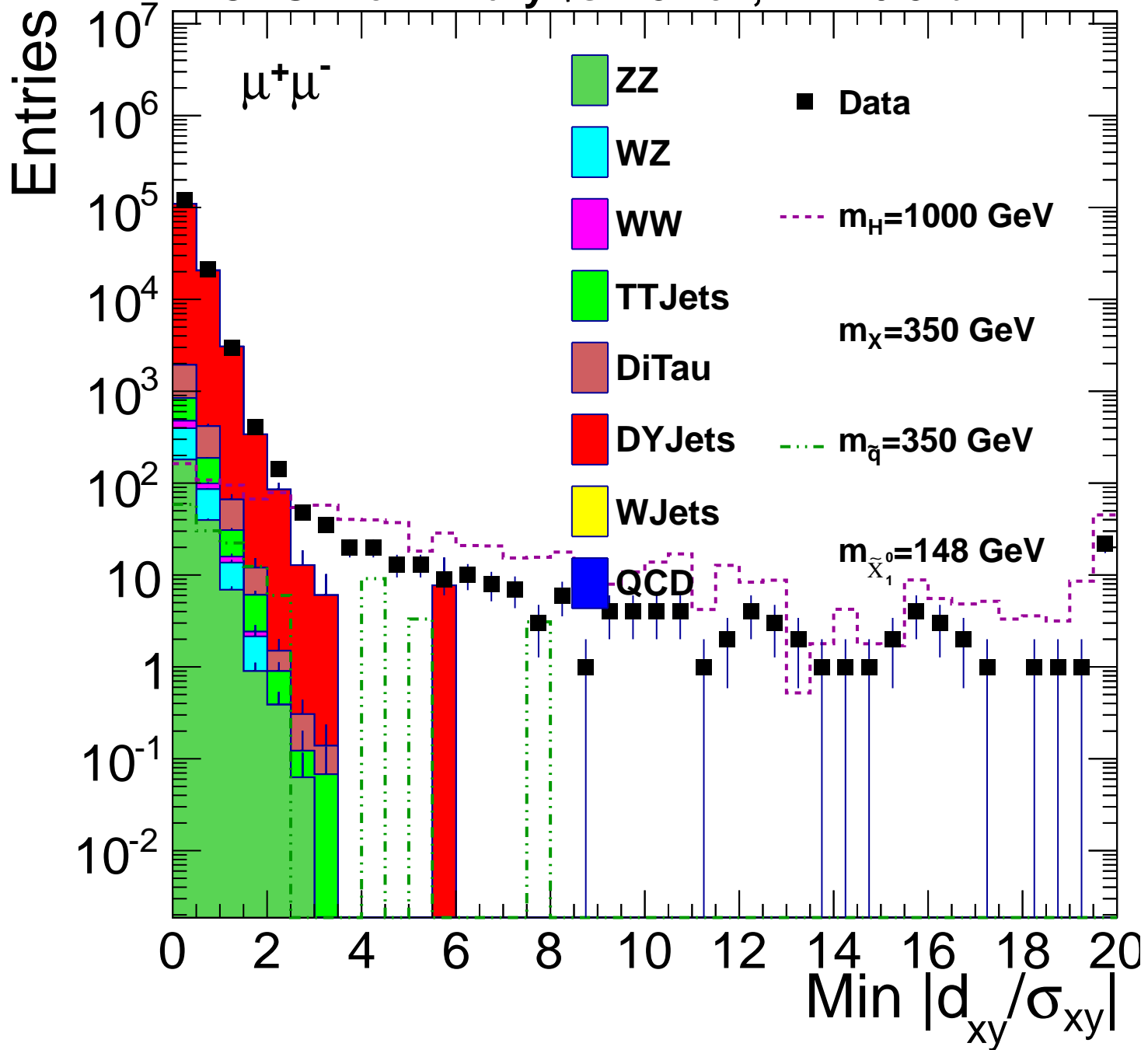
CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}$ ,  $L = 20.5 \text{ fb}^{-1}$



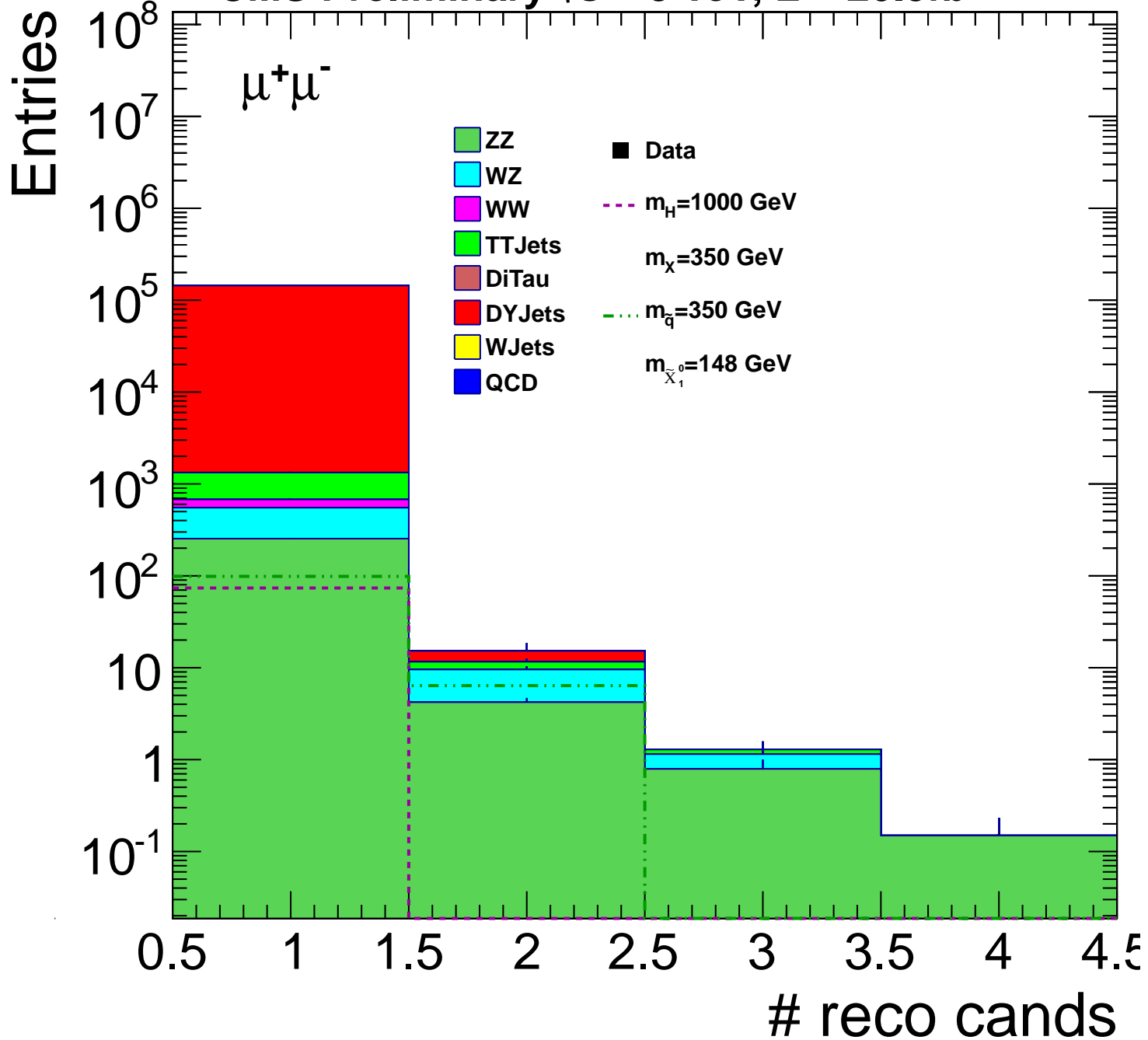
CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}$ ,  $L = 20.5 \text{ fb}^{-1}$



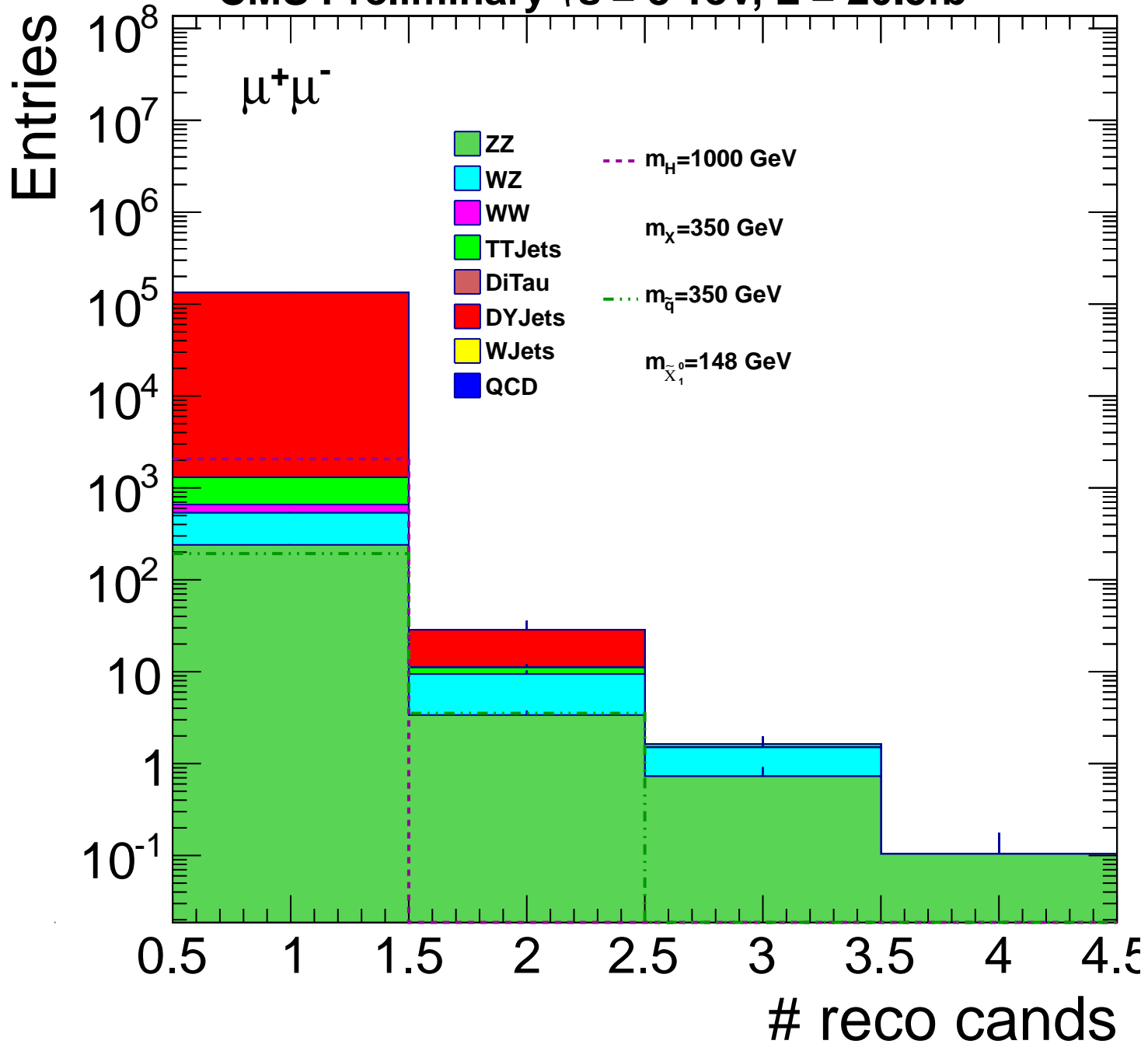
CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}$ ,  $L = 20.5 \text{ fb}^{-1}$



**CMS Preliminary  $\sqrt{s} = 8$  TeV,  $L = 20.5\text{fb}^{-1}$**



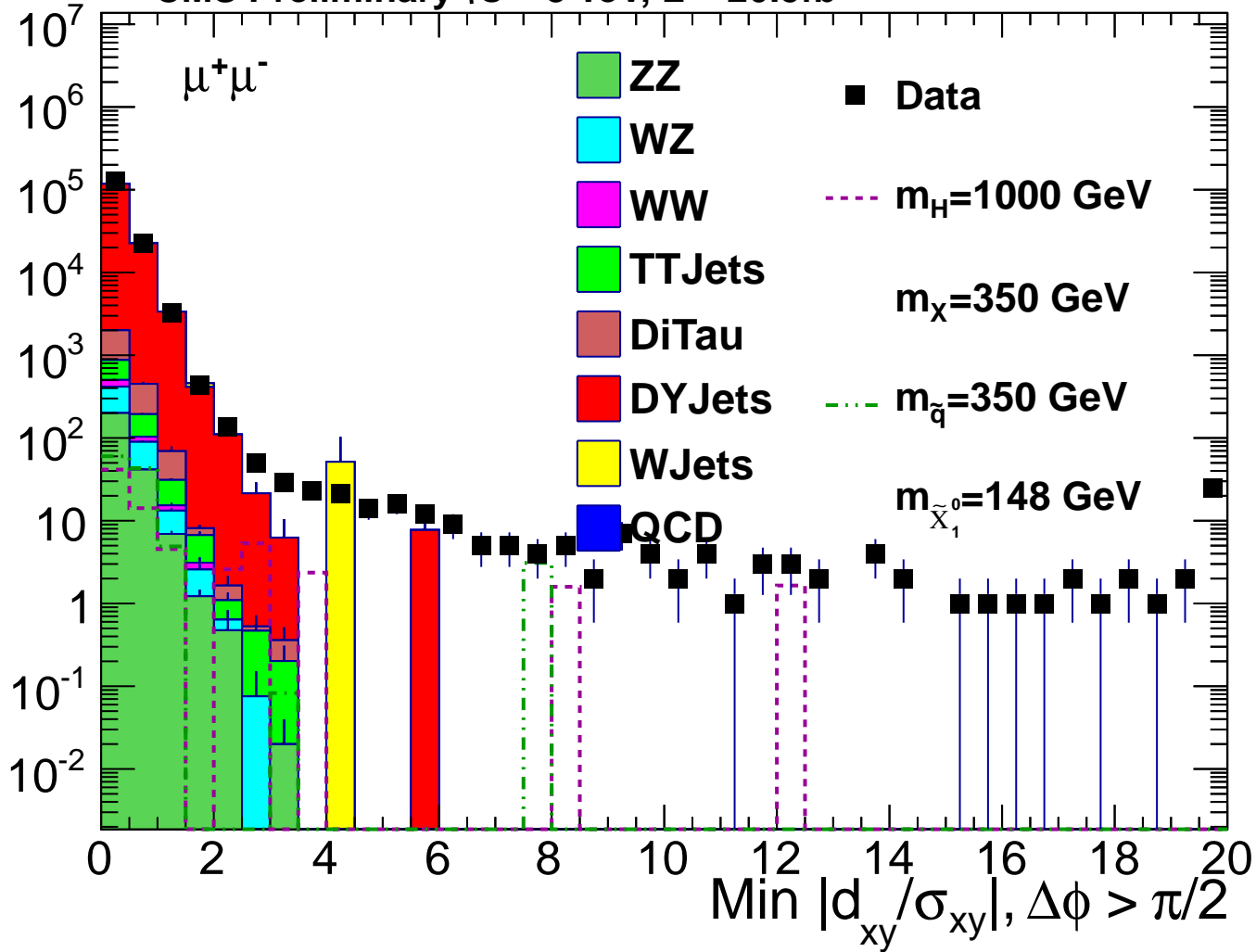
**CMS Preliminary  $\sqrt{s} = 8$  TeV,  $L = 20.5\text{fb}^{-1}$**



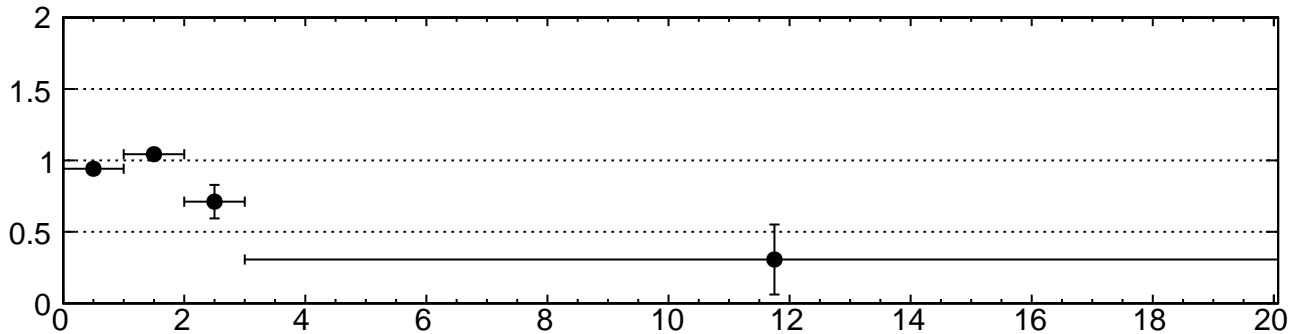


CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}$ ,  $L = 20.5 \text{ fb}^{-1}$

Entries



MC/Data



CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}, L = 20.5 \text{ fb}^{-1}$

Entries

$\mu^+\mu^-$

ZZ

WZ

WW

TTJets

DiTau

DYJets

WJets

QCD

■ Data

---  $m_H = 1000 \text{ GeV}$

$m_{\tilde{\chi}} = 350 \text{ GeV}$

-.-  $m_{\tilde{q}} = 350 \text{ GeV}$

$m_{\tilde{\chi}_1^0} = 148 \text{ GeV}$

$10^7$   
 $10^6$   
 $10^5$   
 $10^4$   
 $10^3$   
 $10^2$   
 $10$   
 $1$   
 $10^{-1}$   
 $10^{-2}$

0 2 4 6 8 10 12 14 16 18 20  
Min  $|d_{xy}/\sigma_{xy}|, \Delta\phi > \pi/2$

CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}$ ,  $L = 20.5 \text{ fb}^{-1}$

Entries

$\mu^+\mu^-$

ZZ

WZ

WW

TTJets

DiTau

DYJets

WJets

QCD

$m_H = 1000 \text{ GeV}$

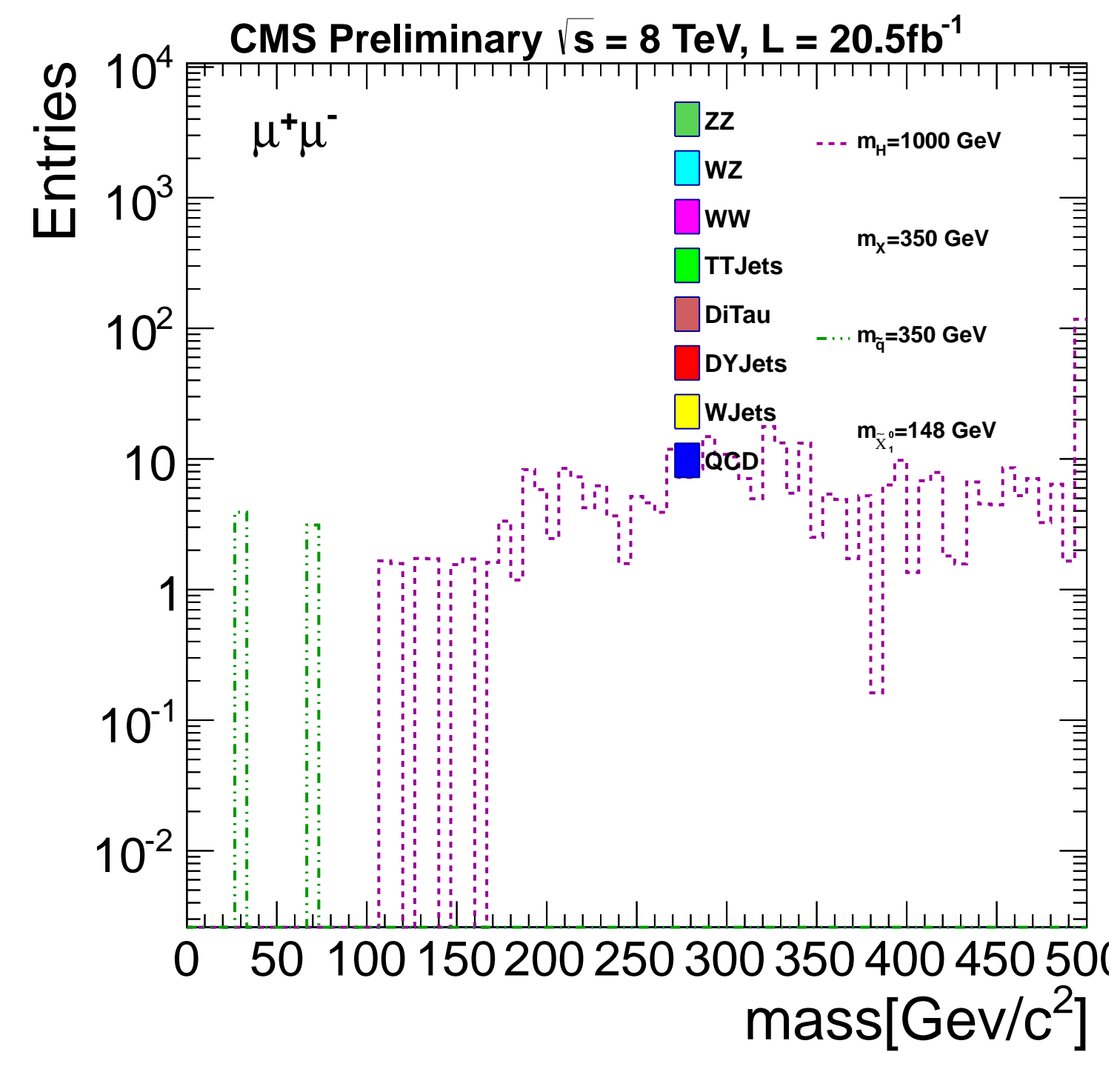
$m_{\tilde{\chi}} = 350 \text{ GeV}$

$m_{\tilde{q}} = 350 \text{ GeV}$

$m_{\tilde{\chi}_1^0} = 148 \text{ GeV}$

$10^4$   
 $10^3$   
 $10^2$   
 $10$   
 $1$   
 $10^{-1}$   
 $10^{-2}$

0 50 100 150 200 250 300 350 400 450 500  
mass[GeV/c<sup>2</sup>]



CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}$ ,  $L = 20.5 \text{ fb}^{-1}$

Entries

$\mu^+\mu^-$

ZZ

WZ

WW

TTJets

DiTau

DYJets

WJets

QCD

$m_H = 1000 \text{ GeV}$

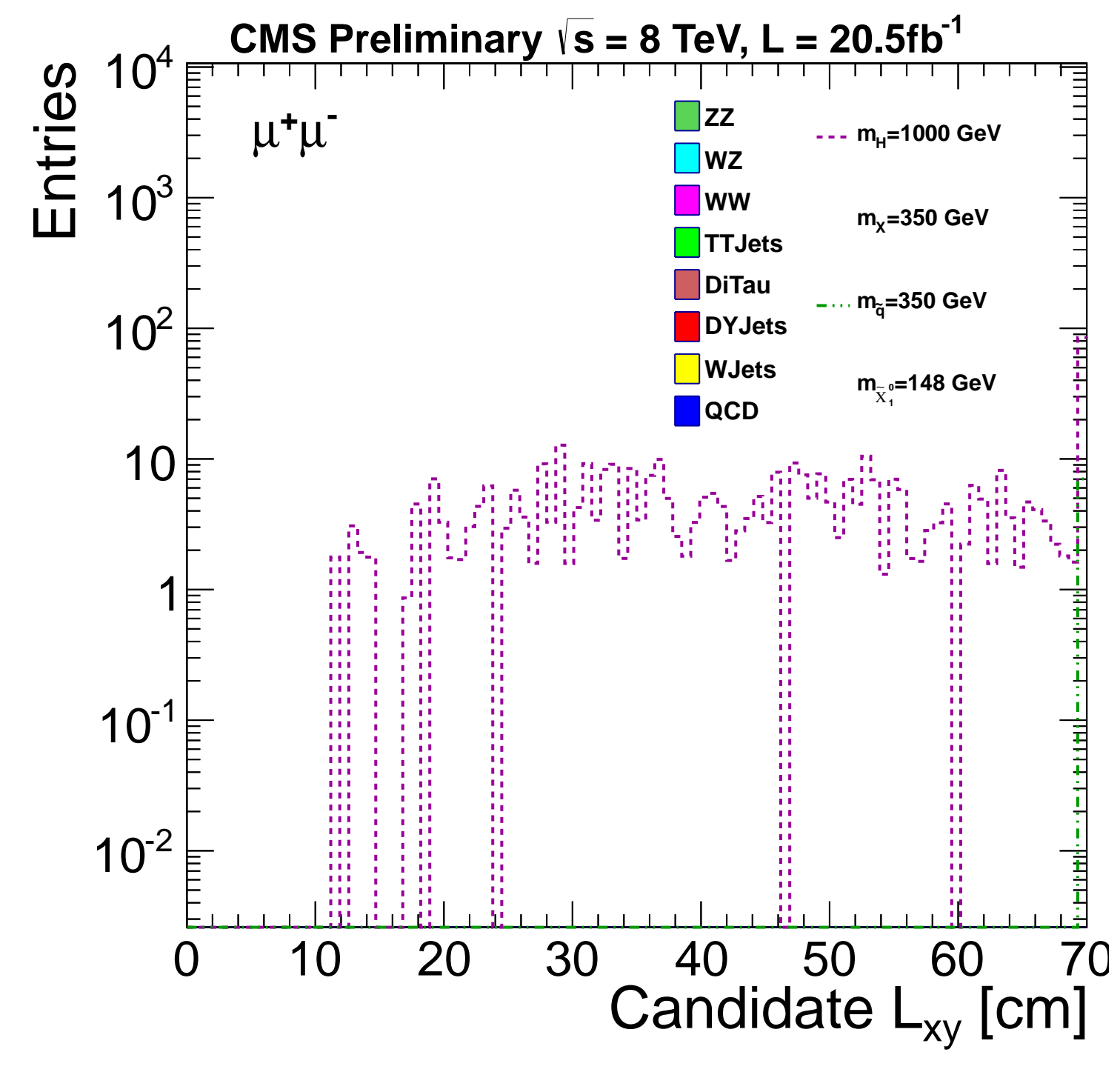
$m_{\tilde{\chi}} = 350 \text{ GeV}$

$m_{\tilde{q}} = 350 \text{ GeV}$

$m_{\tilde{X}_1^0} = 148 \text{ GeV}$

$10^4$   
 $10^3$   
 $10^2$   
 $10$   
 $1$   
 $10^{-1}$   
 $10^{-2}$

0 10 20 30 40 50 60 70  
Candidate  $L_{xy} [\text{cm}]$



CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}$ ,  $L = 20.5 \text{ fb}^{-1}$

Entries

$\mu^+\mu^-$

ZZ

WZ

WW

TTJets

DiTau

DYJets

WJets

QCD

$m_H = 1000 \text{ GeV}$

$m_{\tilde{\chi}} = 350 \text{ GeV}$

$m_{\tilde{q}} = 350 \text{ GeV}$

$m_{\tilde{X}_1^0} = 148 \text{ GeV}$

$10^3$

$10^2$

10

1

$10^{-1}$

-0.5

0

0.5

1

1.5

2

2.5

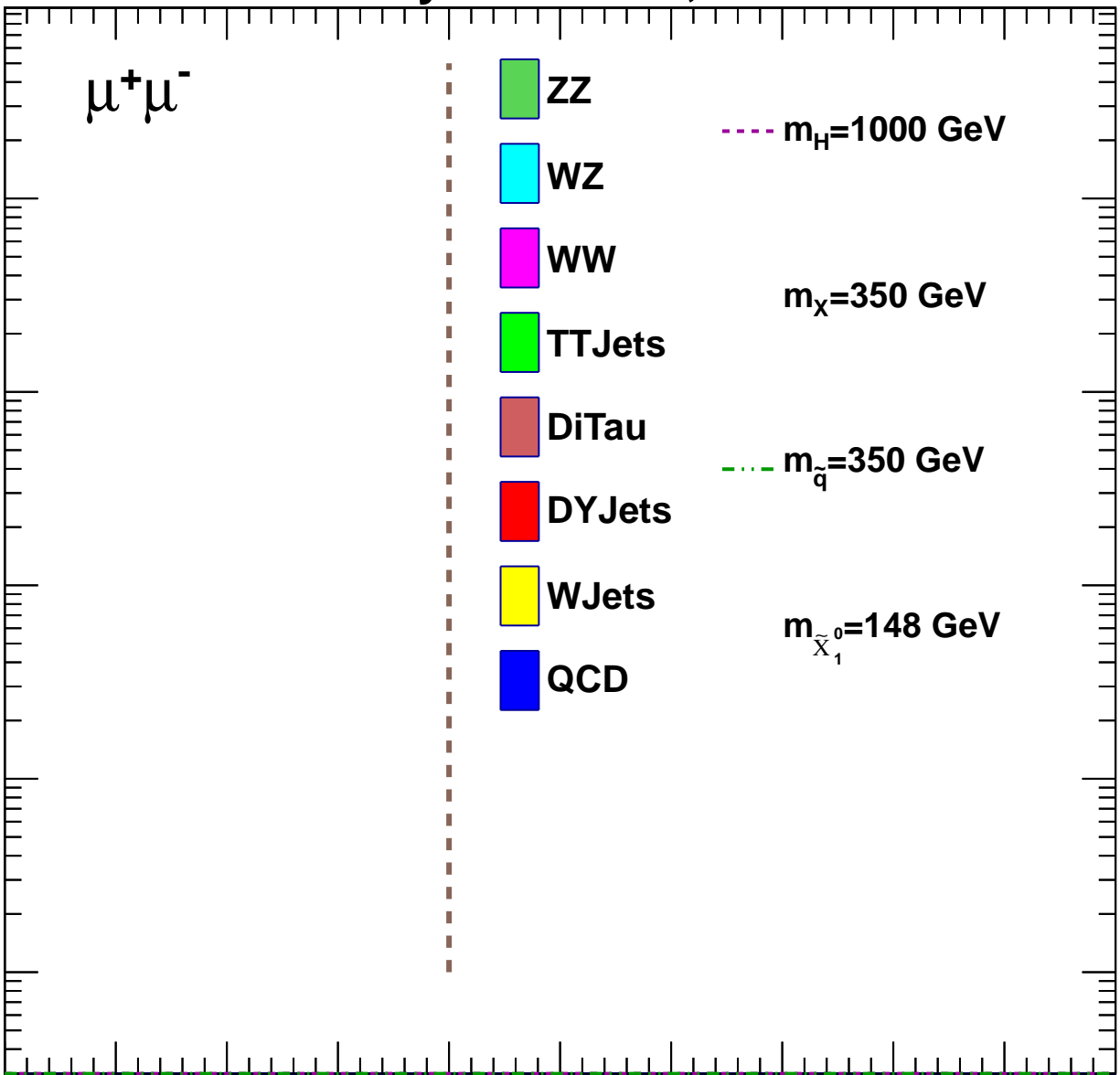
3

3.5

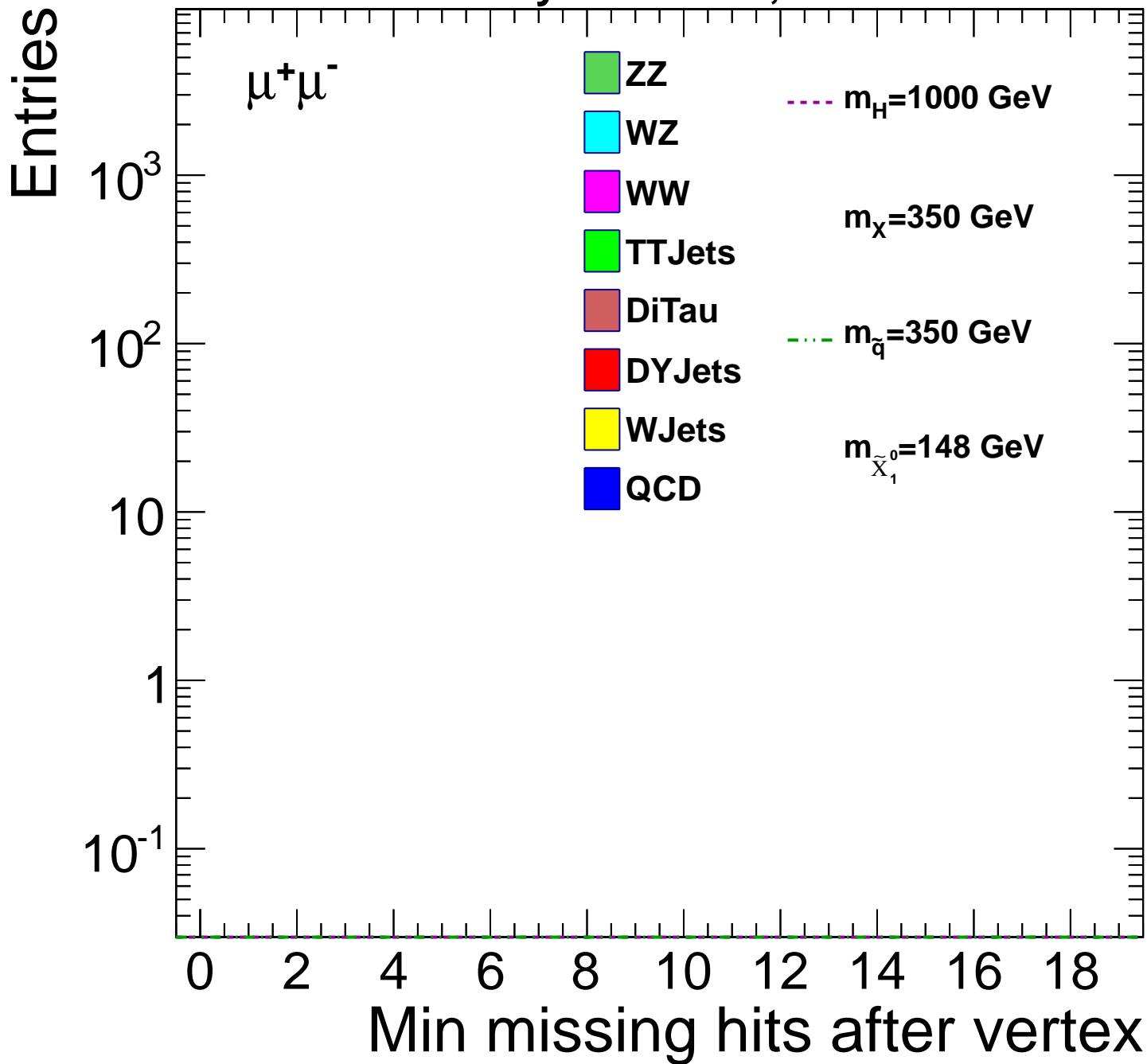
4

4.5

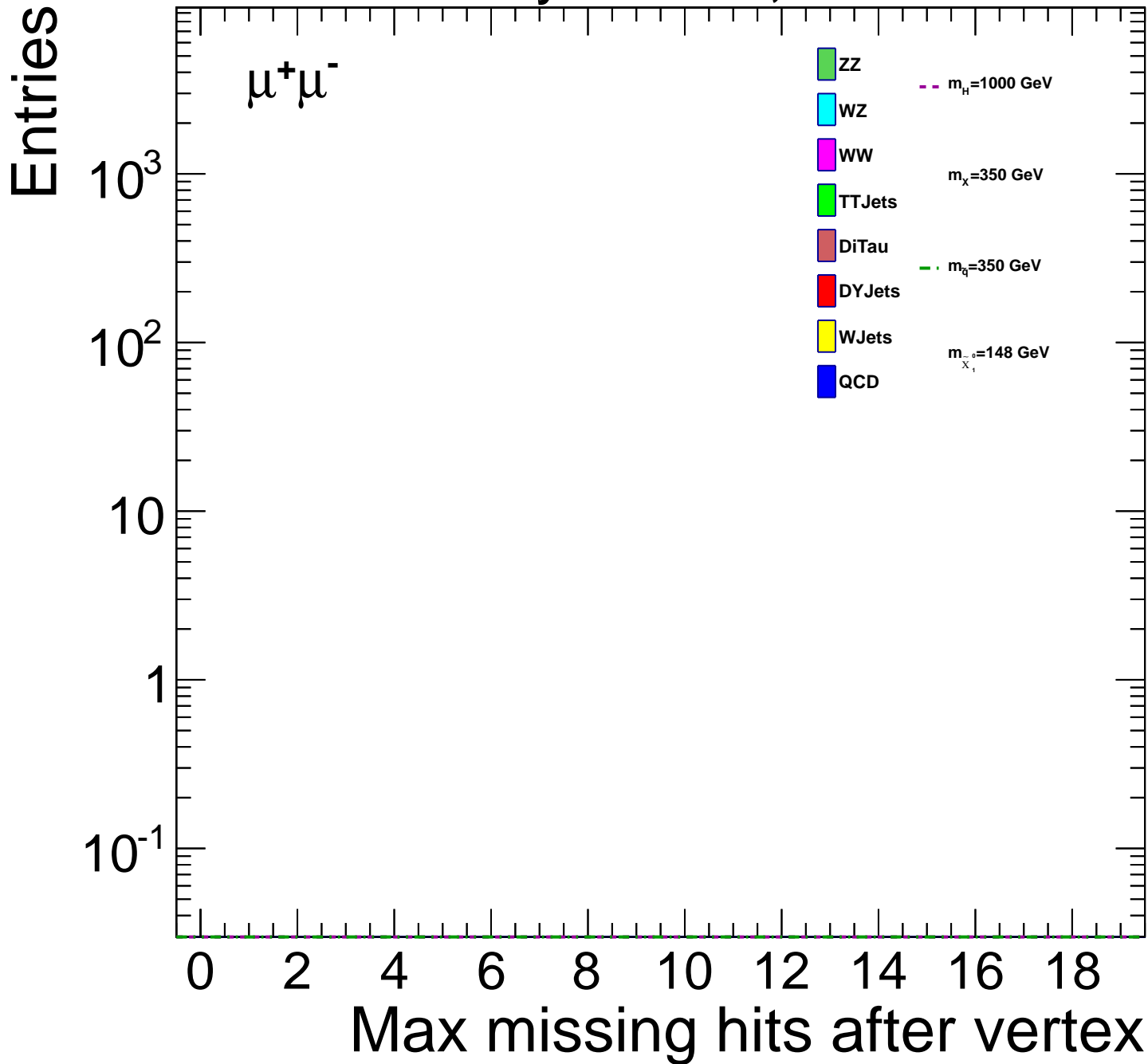
Number of hits before vertex



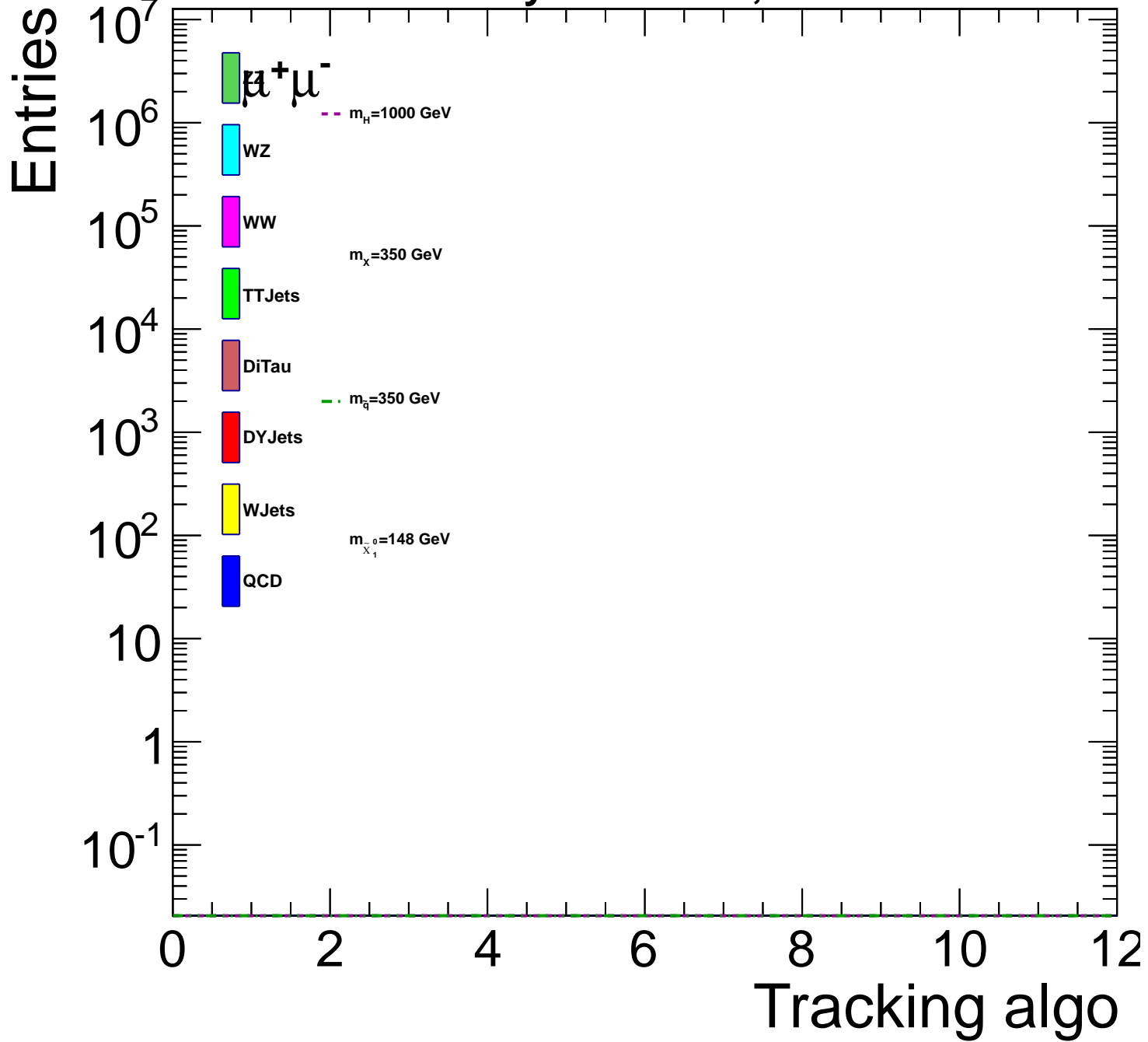
CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}$ ,  $L = 20.5 \text{ fb}^{-1}$



CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}$ ,  $L = 20.5 \text{ fb}^{-1}$

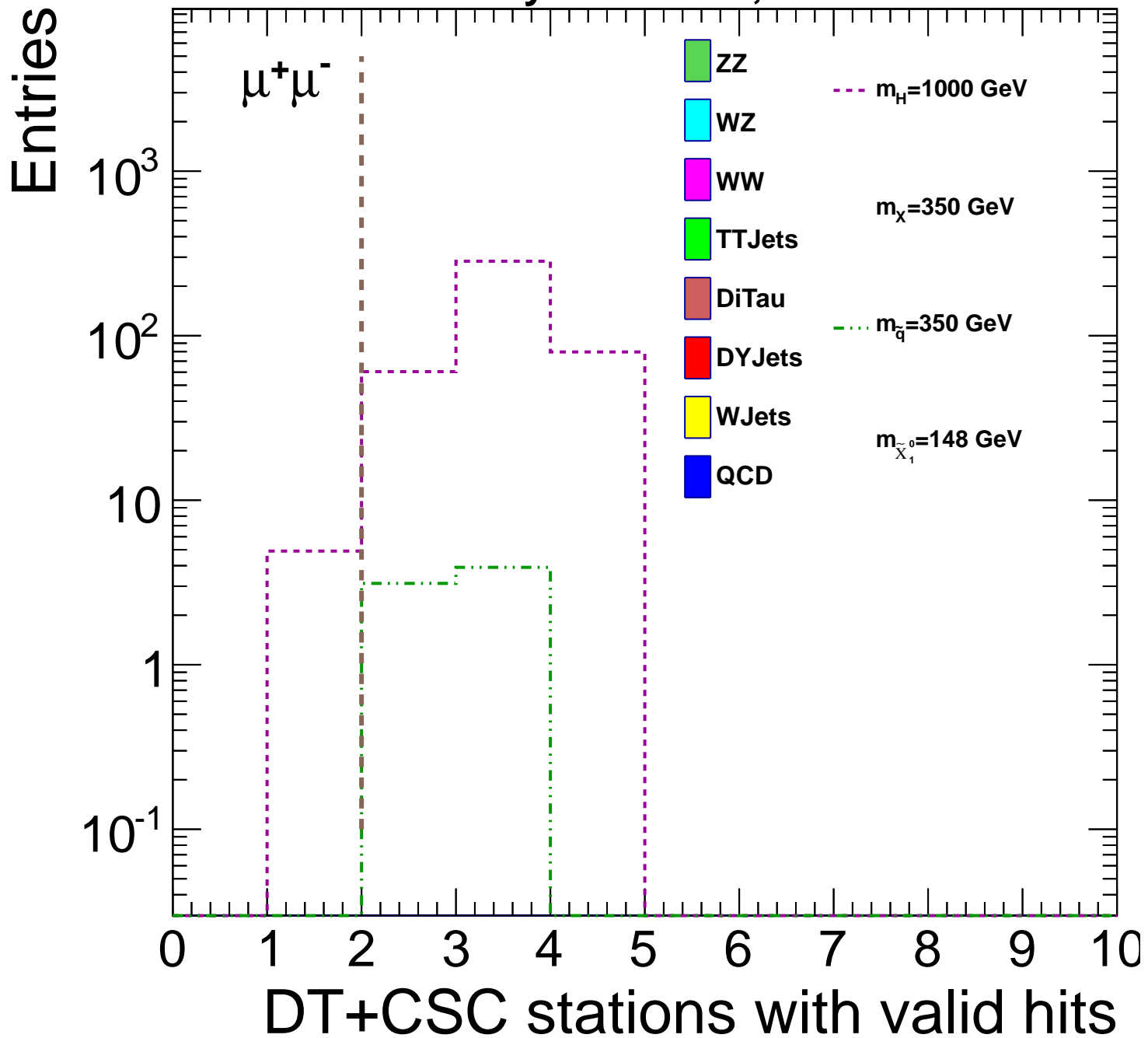


CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}$ ,  $L = 20.5 \text{ fb}^{-1}$

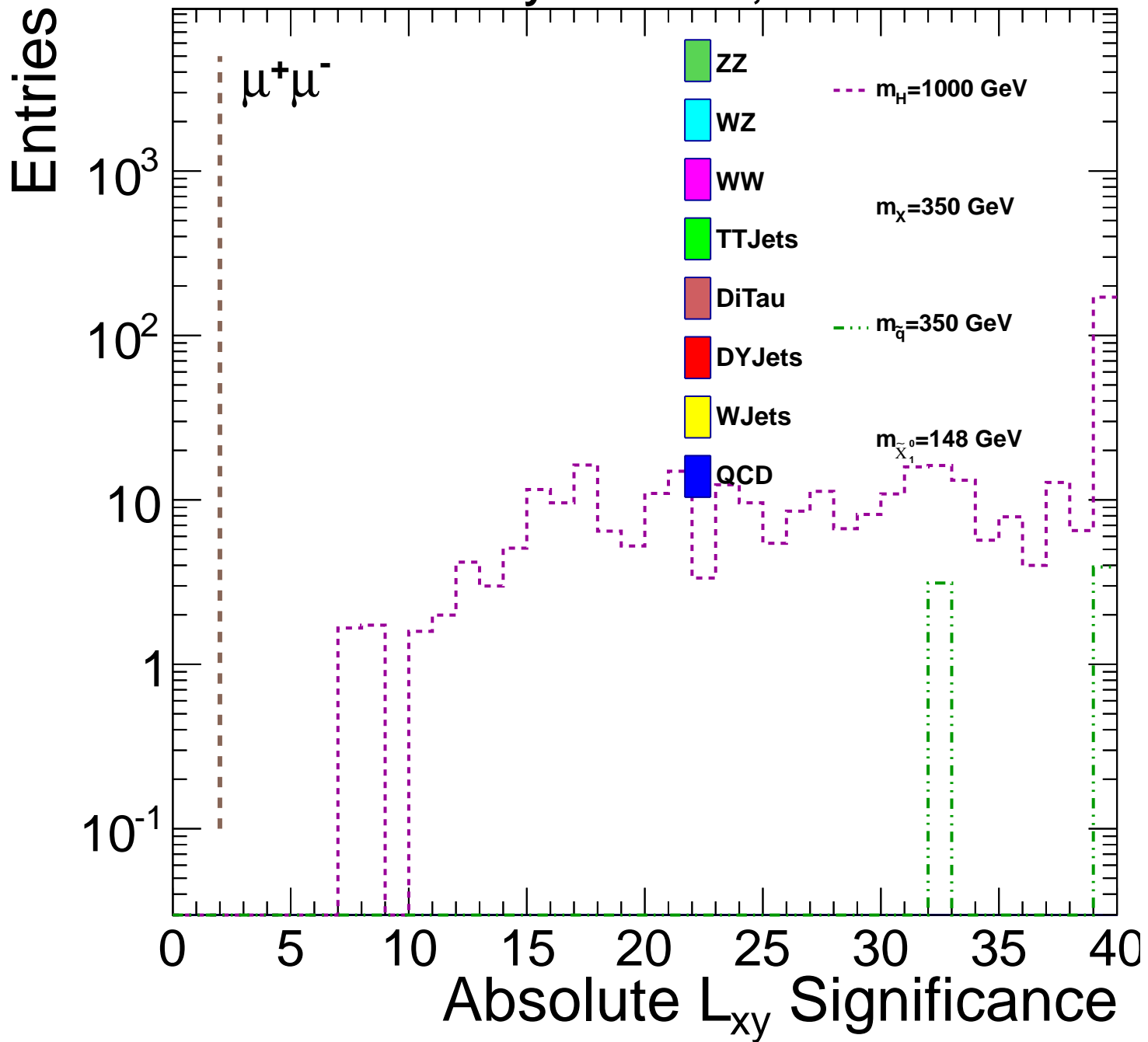




CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}$ ,  $L = 20.5 \text{ fb}^{-1}$



CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}$ ,  $L = 20.5 \text{ fb}^{-1}$



CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}$ ,  $L = 20.5 \text{ fb}^{-1}$

Entries

$\mu^+\mu^-$

ZZ

WZ

WW

TTJets

DiTau

DYJets

WJets

QCD

$m_H = 1000 \text{ GeV}$

$m_{\tilde{X}} = 350 \text{ GeV}$

$m_{\tilde{q}} = 350 \text{ GeV}$

$m_{\tilde{X}_1^0} = 148 \text{ GeV}$

$10^3$

$10^2$

10

1

$10^{-1}$

0

10

20

30

40

50

60

70

80

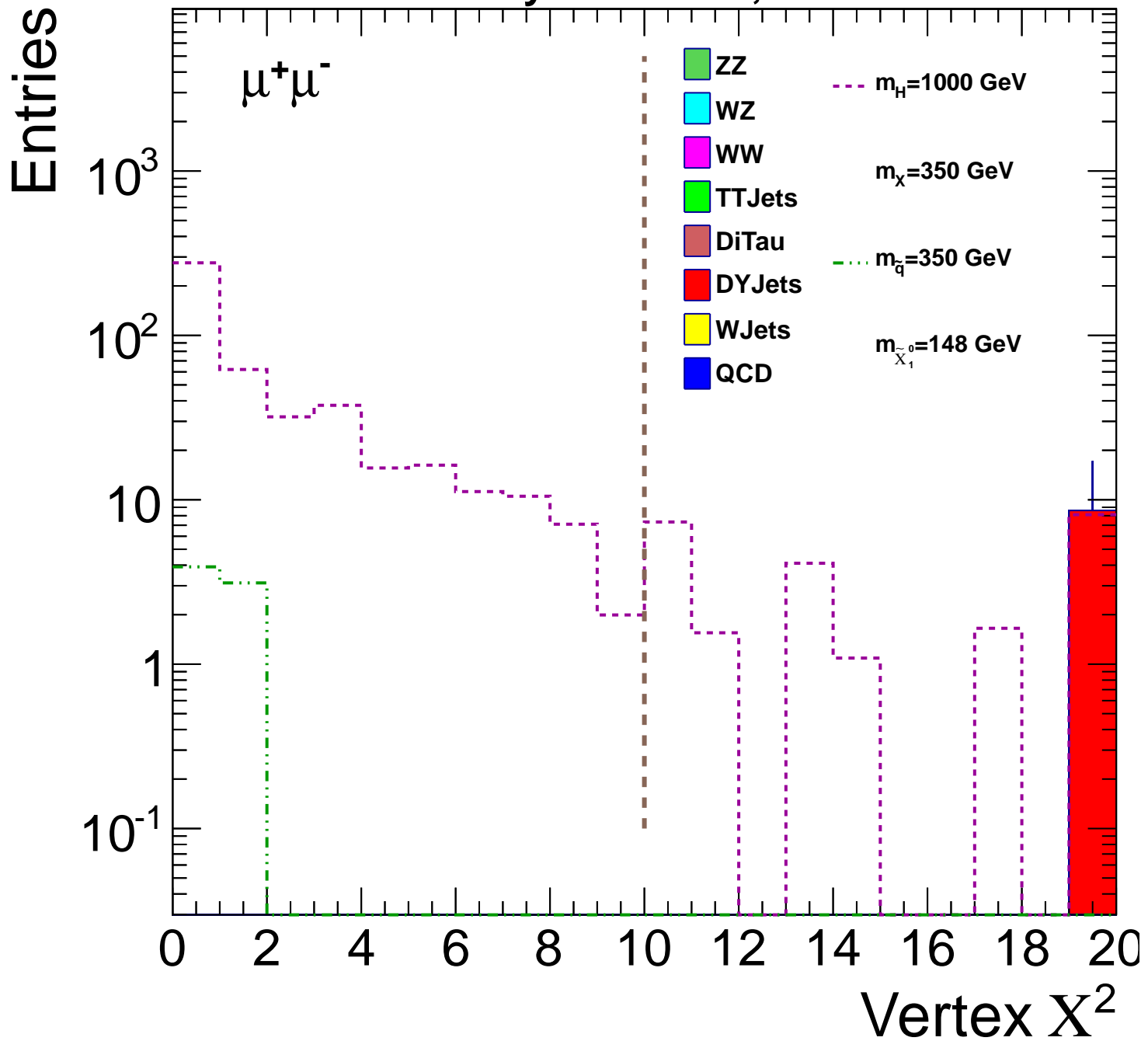
90

100

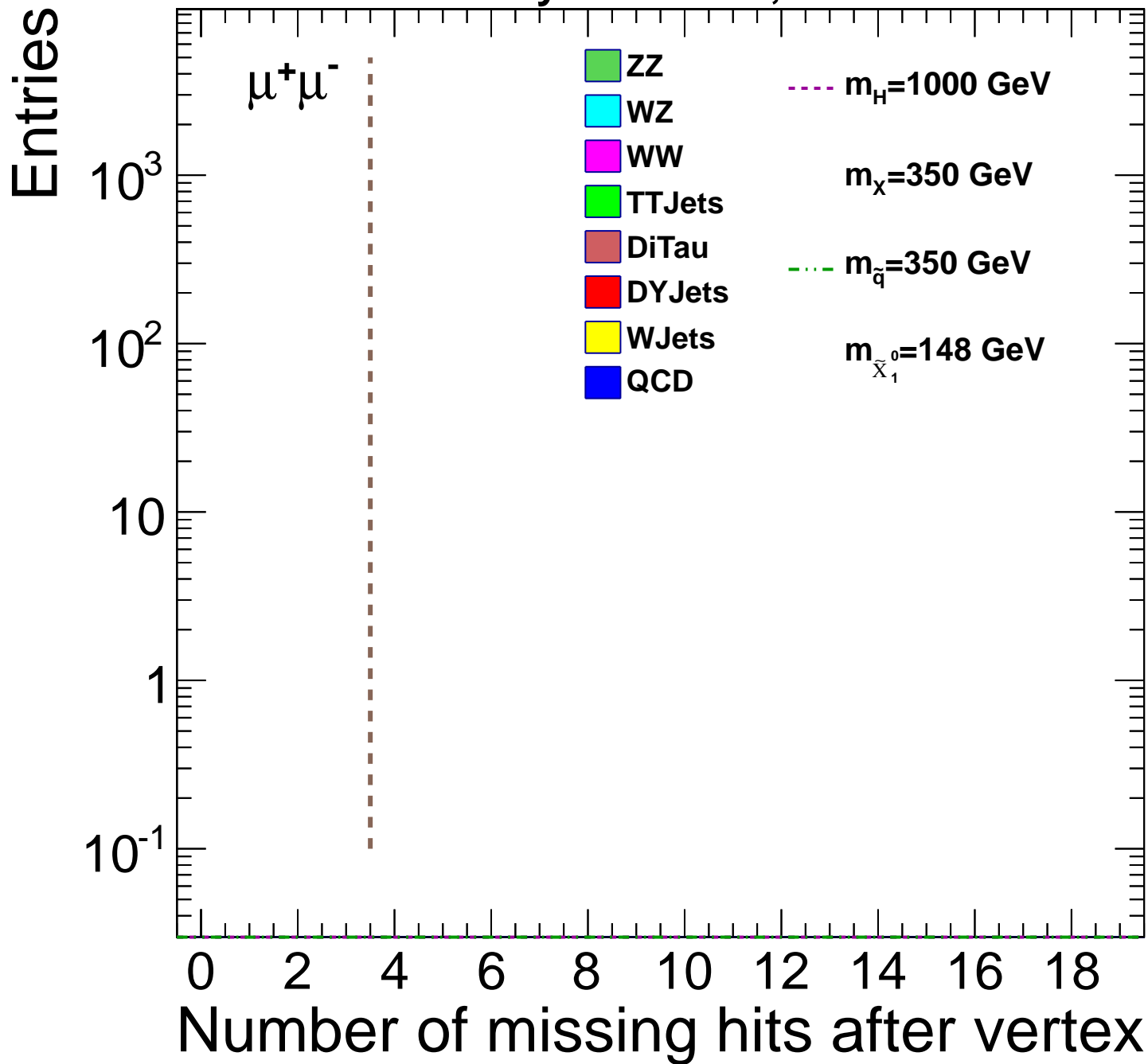
Minimum Absolute  $d_0$

$d_0$

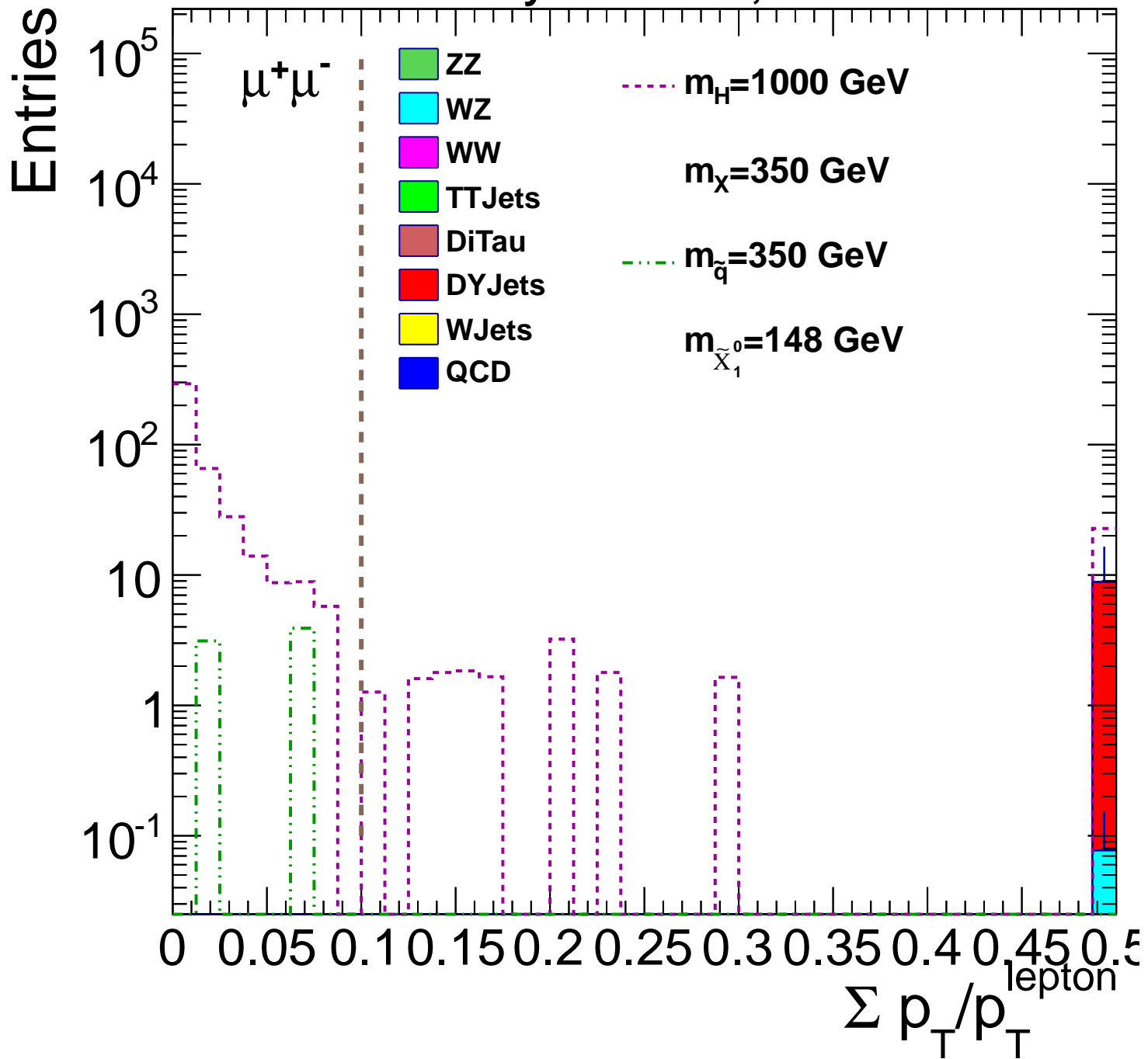
CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}$ ,  $L = 20.5 \text{ fb}^{-1}$

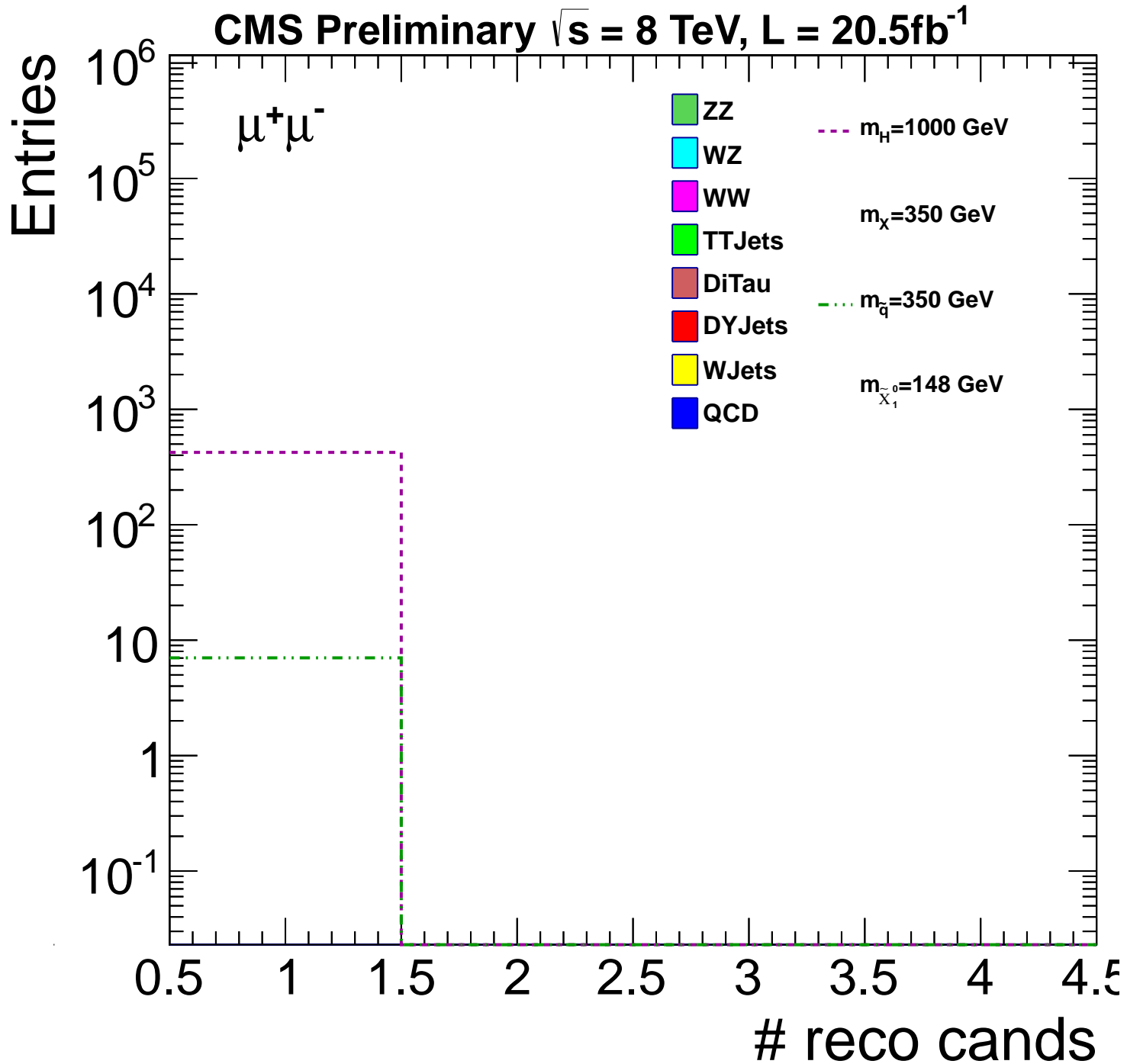


CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}$ ,  $L = 20.5 \text{ fb}^{-1}$



**CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}$ ,  $L = 20.5 \text{ fb}^{-1}$**





CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}$ ,  $L = 20.5 \text{ fb}^{-1}$

Entries

$\mu^+\mu^-$

ZZ

WZ

WW

TTJets

DiTau

DYJets

WJets

QCD

---  $m_H = 1000 \text{ GeV}$

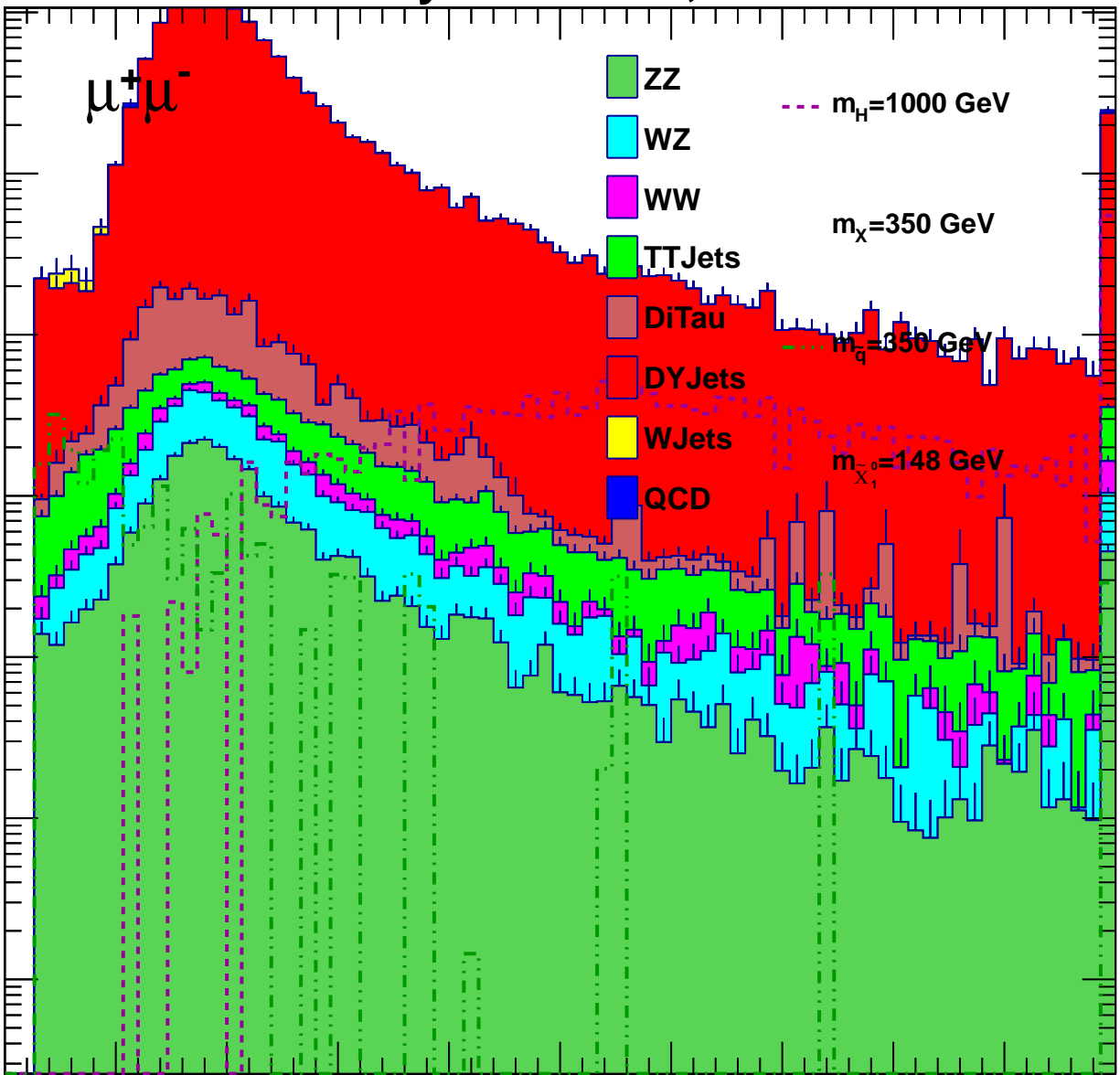
$m_{\tilde{\chi}} = 350 \text{ GeV}$

---  $m_{\tilde{g}} = 350 \text{ GeV}$

$m_{\tilde{\chi}_1^0} = 148 \text{ GeV}$

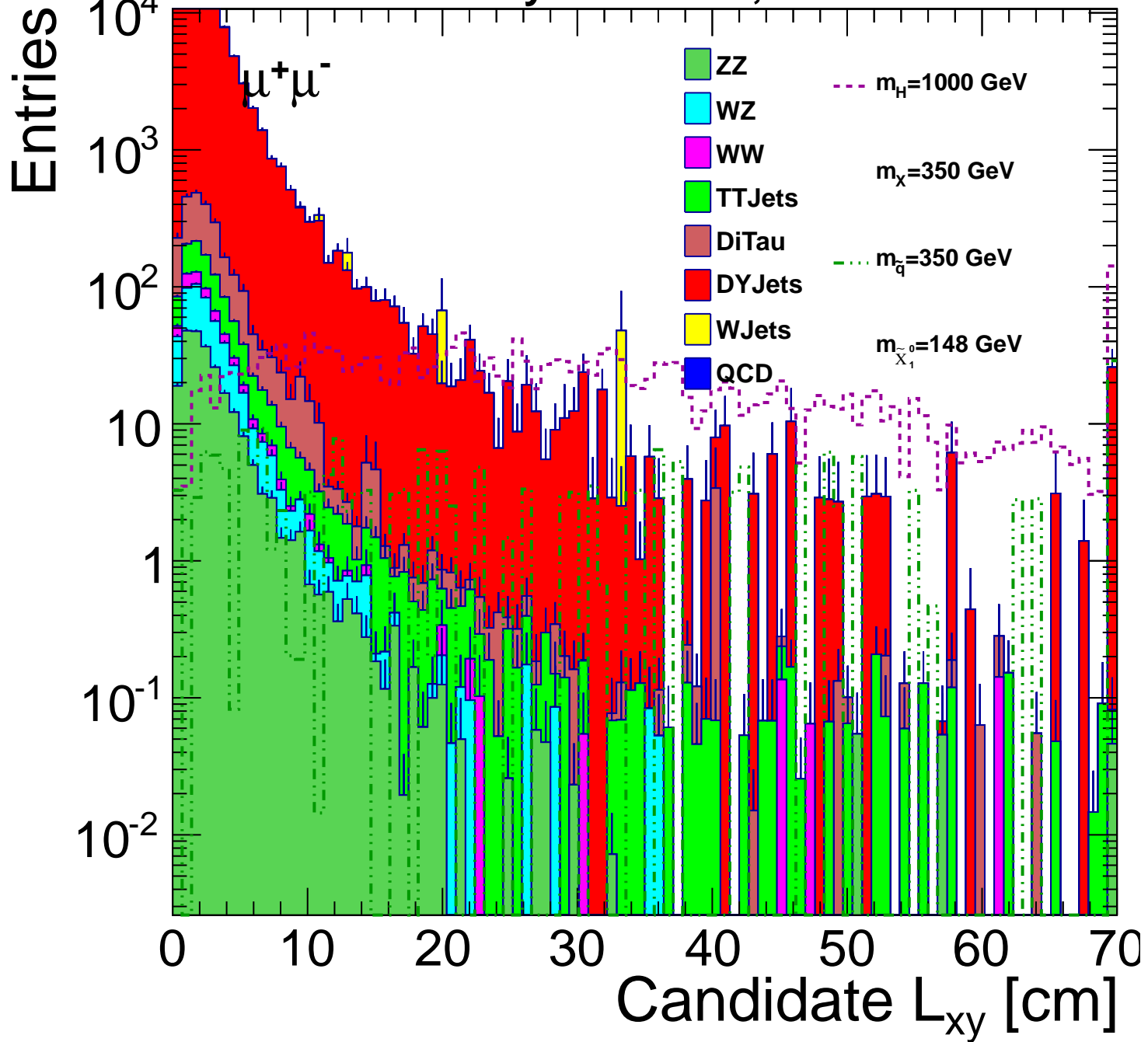
$10^4$   
 $10^3$   
 $10^2$   
 $10$   
 $1$   
 $10^{-1}$   
 $10^{-2}$

0 50 100 150 200 250 300 350 400 450 500  
mass[GeV/c<sup>2</sup>]

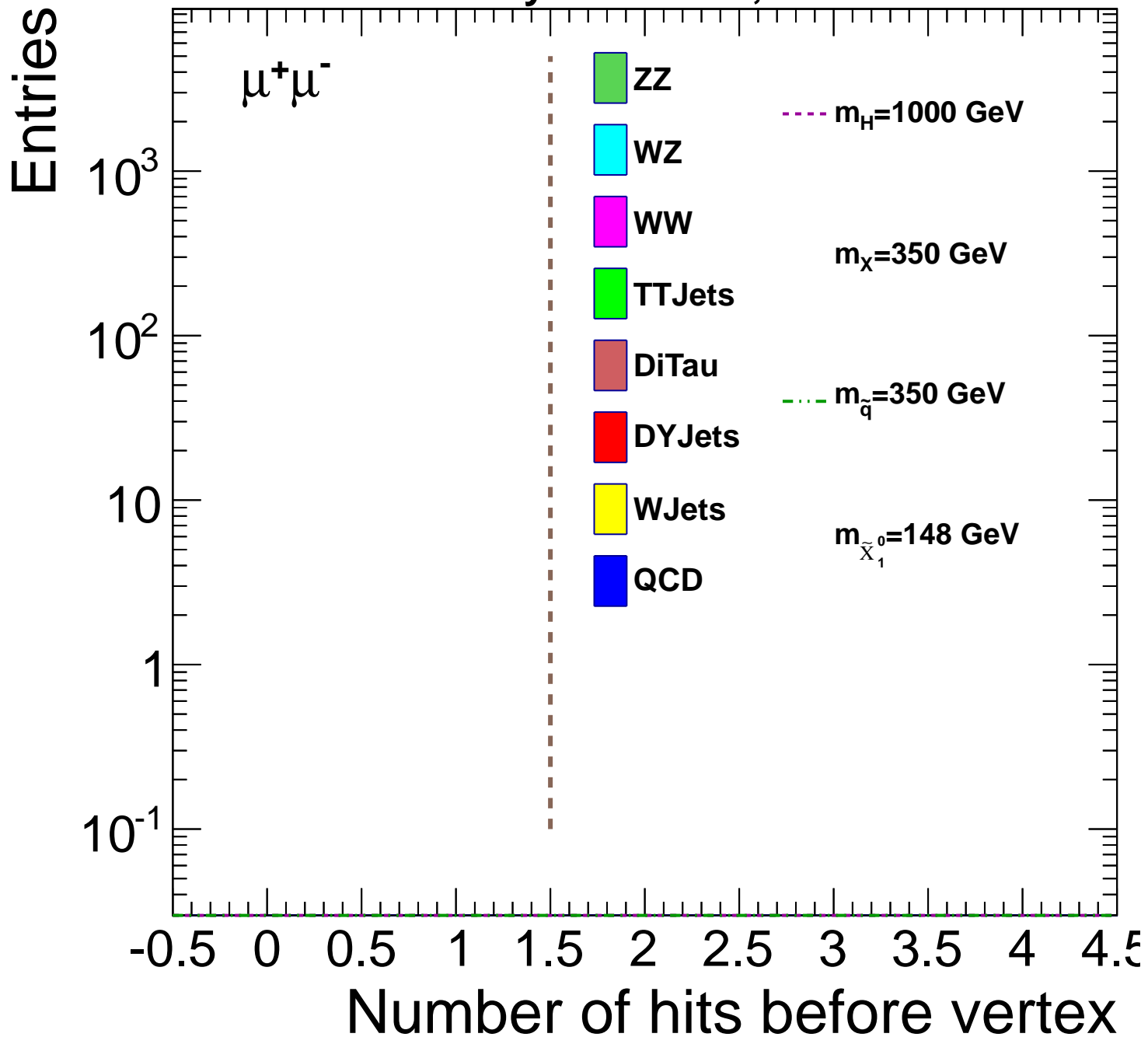




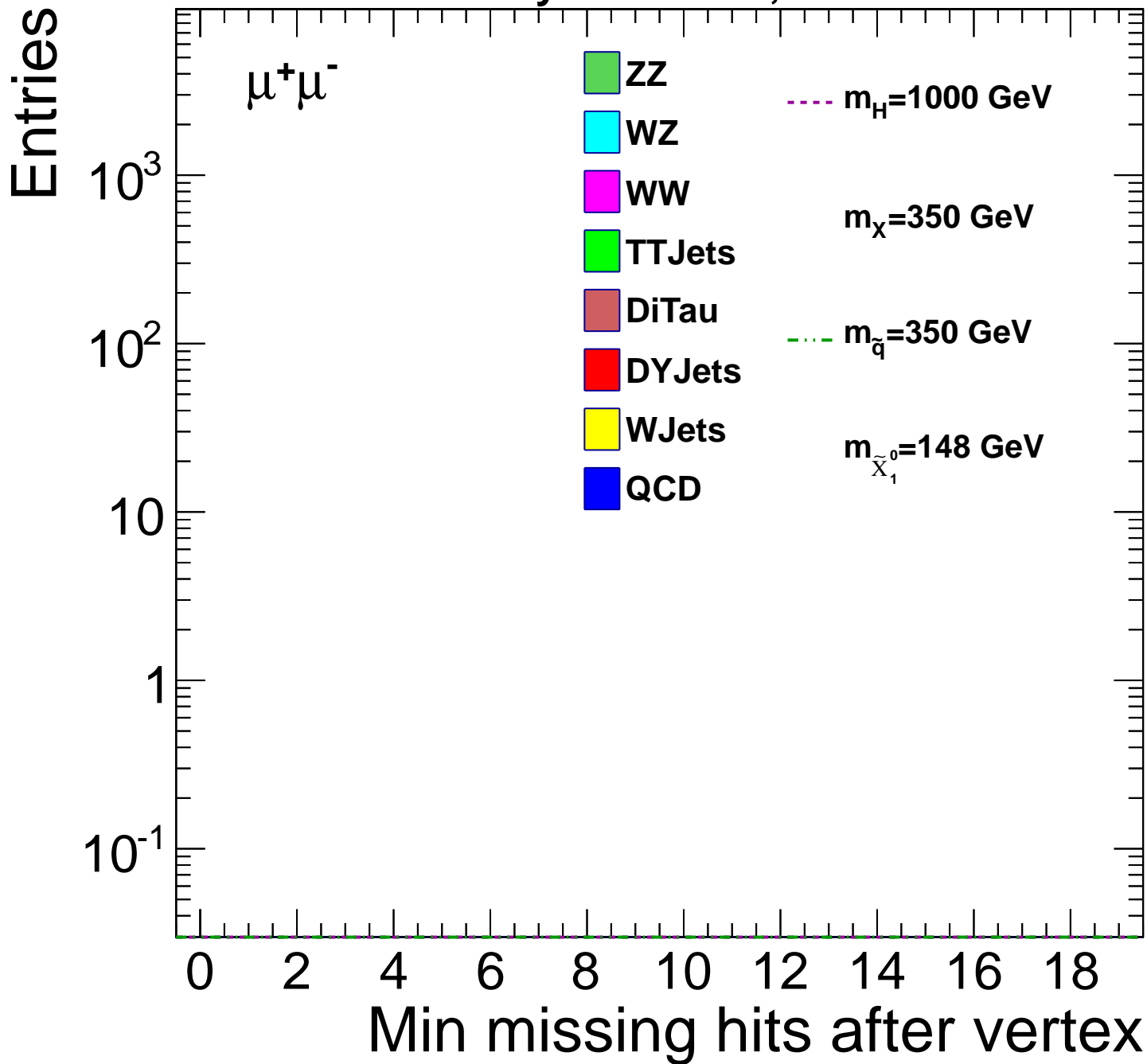
CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}$ ,  $L = 20.5 \text{ fb}^{-1}$



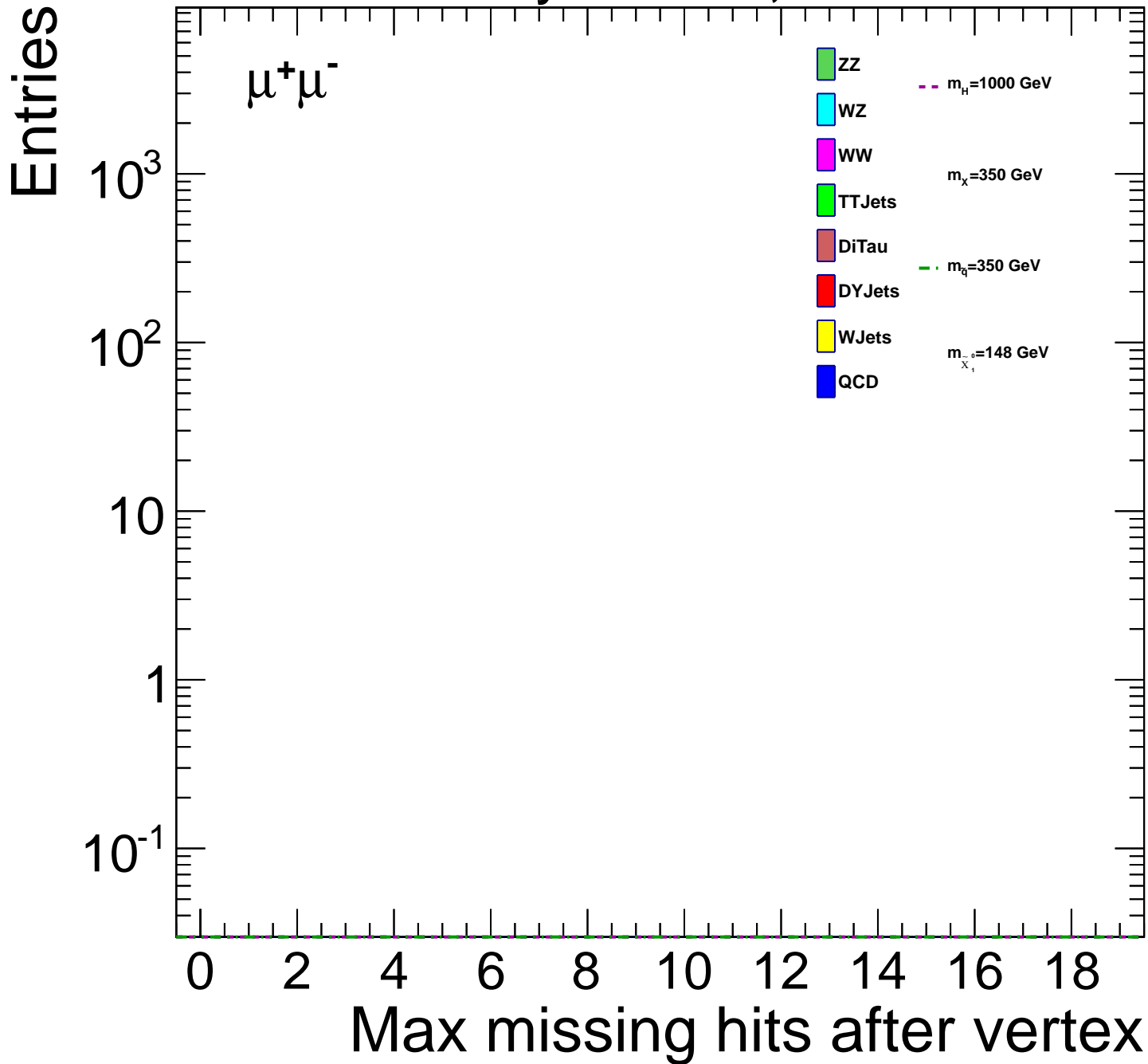
**CMS Preliminary  $\sqrt{s} = 8$  TeV,  $L = 20.5\text{fb}^{-1}$**



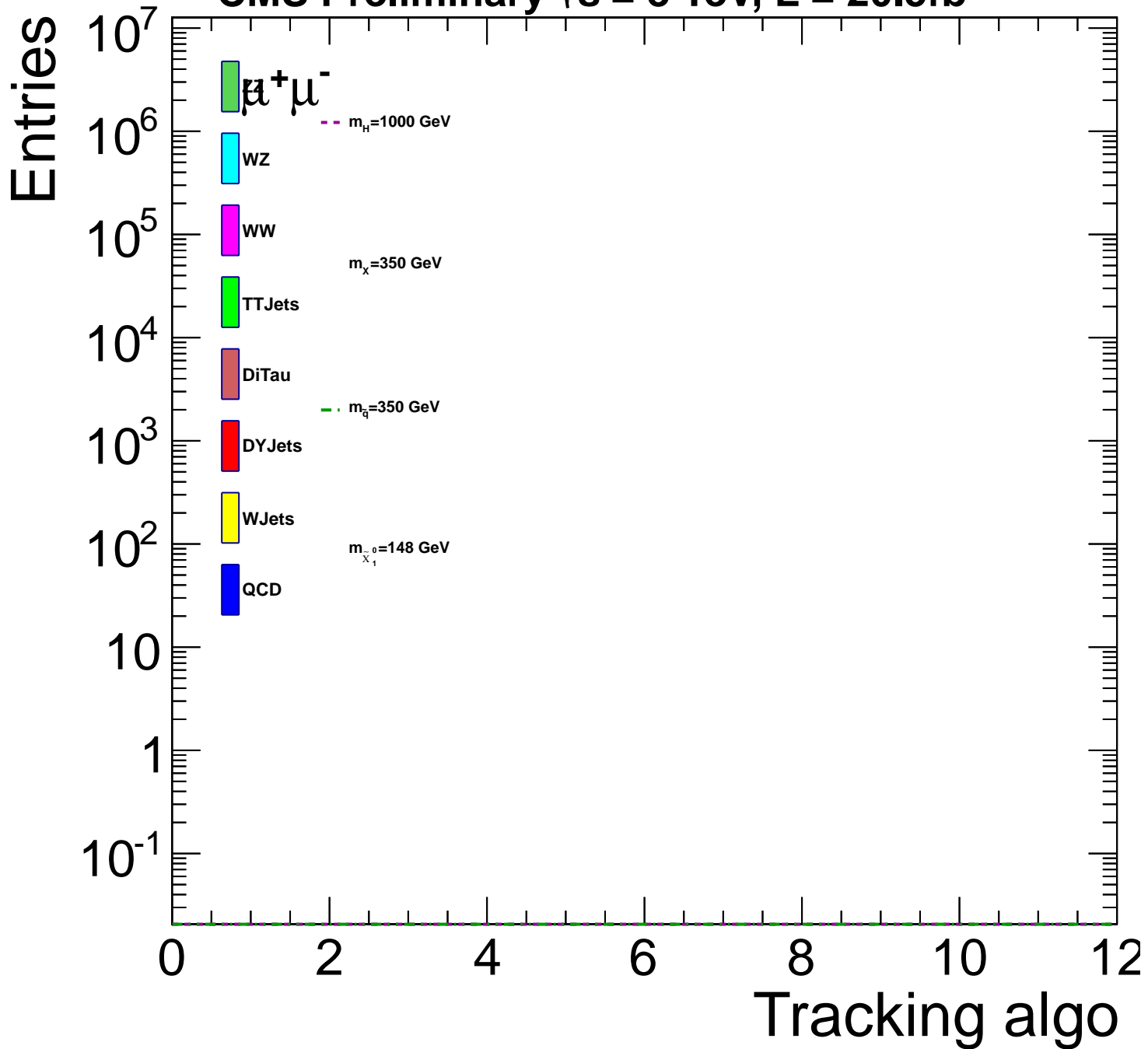
CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}$ ,  $L = 20.5 \text{ fb}^{-1}$



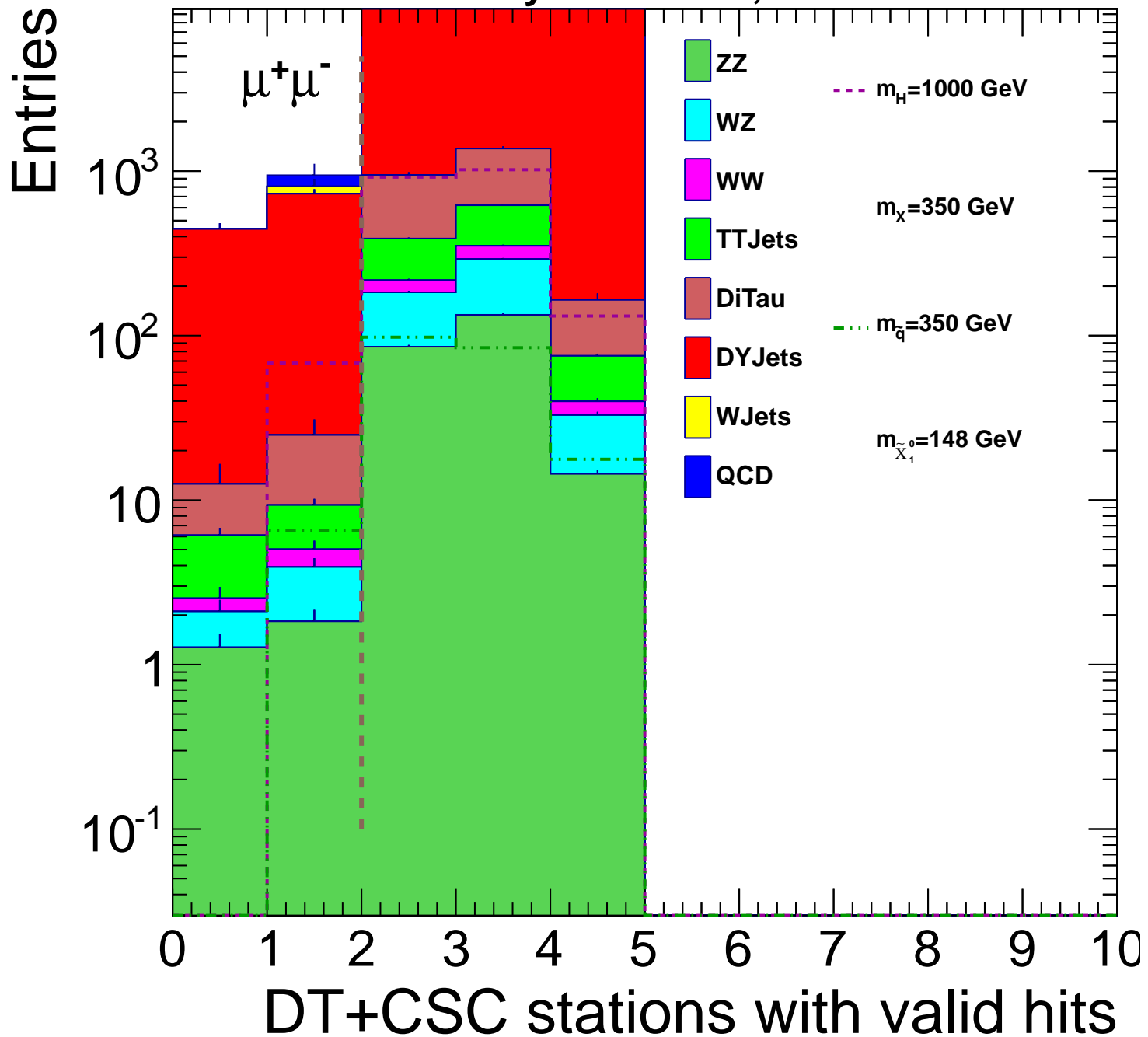
CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}$ ,  $L = 20.5 \text{ fb}^{-1}$



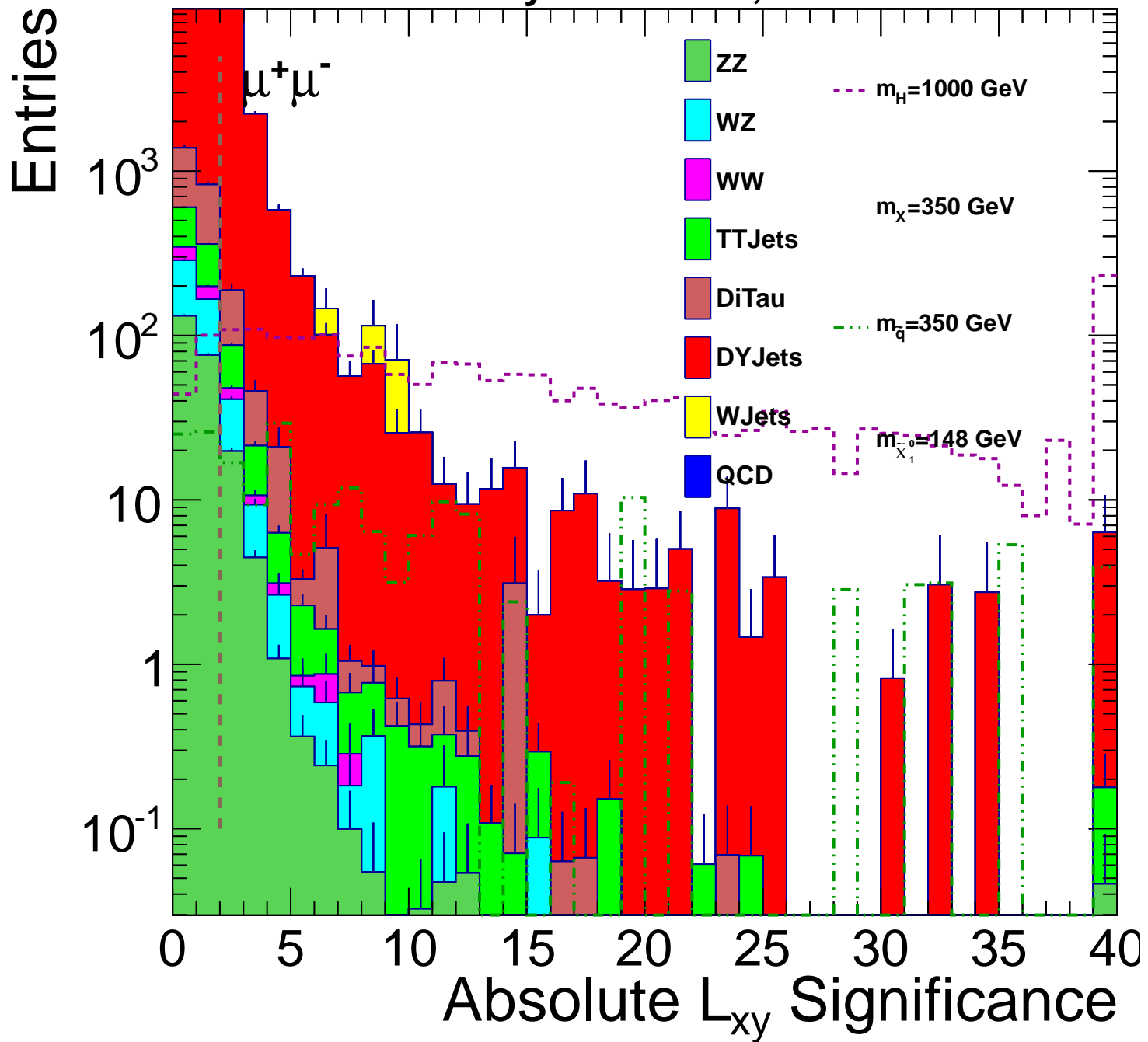
**CMS Preliminary  $\sqrt{s} = 8$  TeV,  $L = 20.5\text{fb}^{-1}$**



CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}$ ,  $L = 20.5 \text{ fb}^{-1}$



CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}$ ,  $L = 20.5 \text{ fb}^{-1}$



CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}$ ,  $L = 20.5 \text{ fb}^{-1}$

Entries

$\mu^+\mu^-$

ZZ

WZ

WW

TTJets

DiTau

DYJets

WJets

QCD

$m_H = 1000 \text{ GeV}$

$m_{\tilde{X}} = 350 \text{ GeV}$

$m_{\tilde{q}} = 350 \text{ GeV}$

$m_{\tilde{X}_1^0} = 148 \text{ GeV}$

$10^3$

$10^2$

10

1

$10^{-1}$

0

10

20

30

40

50

60

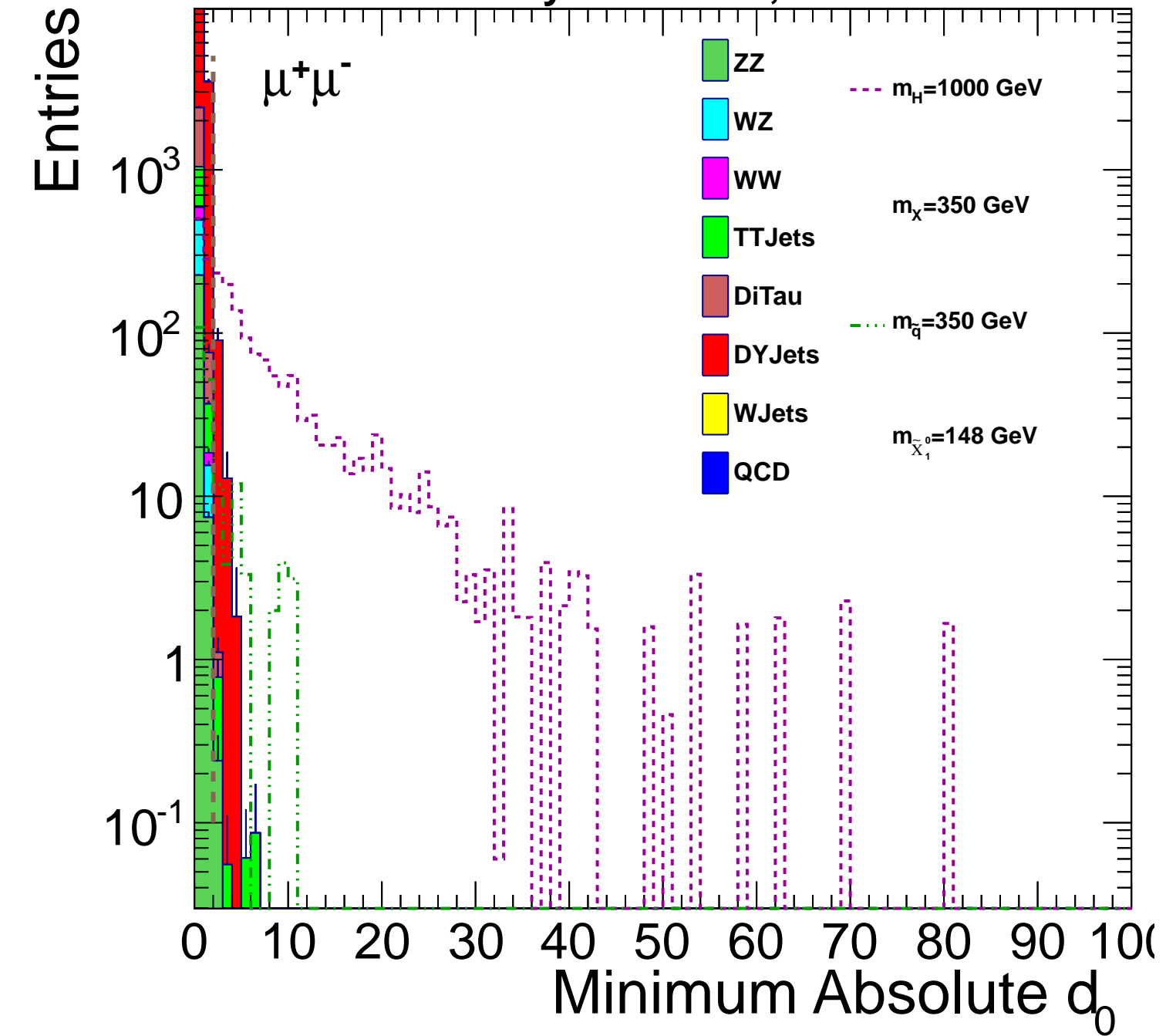
70

80

90

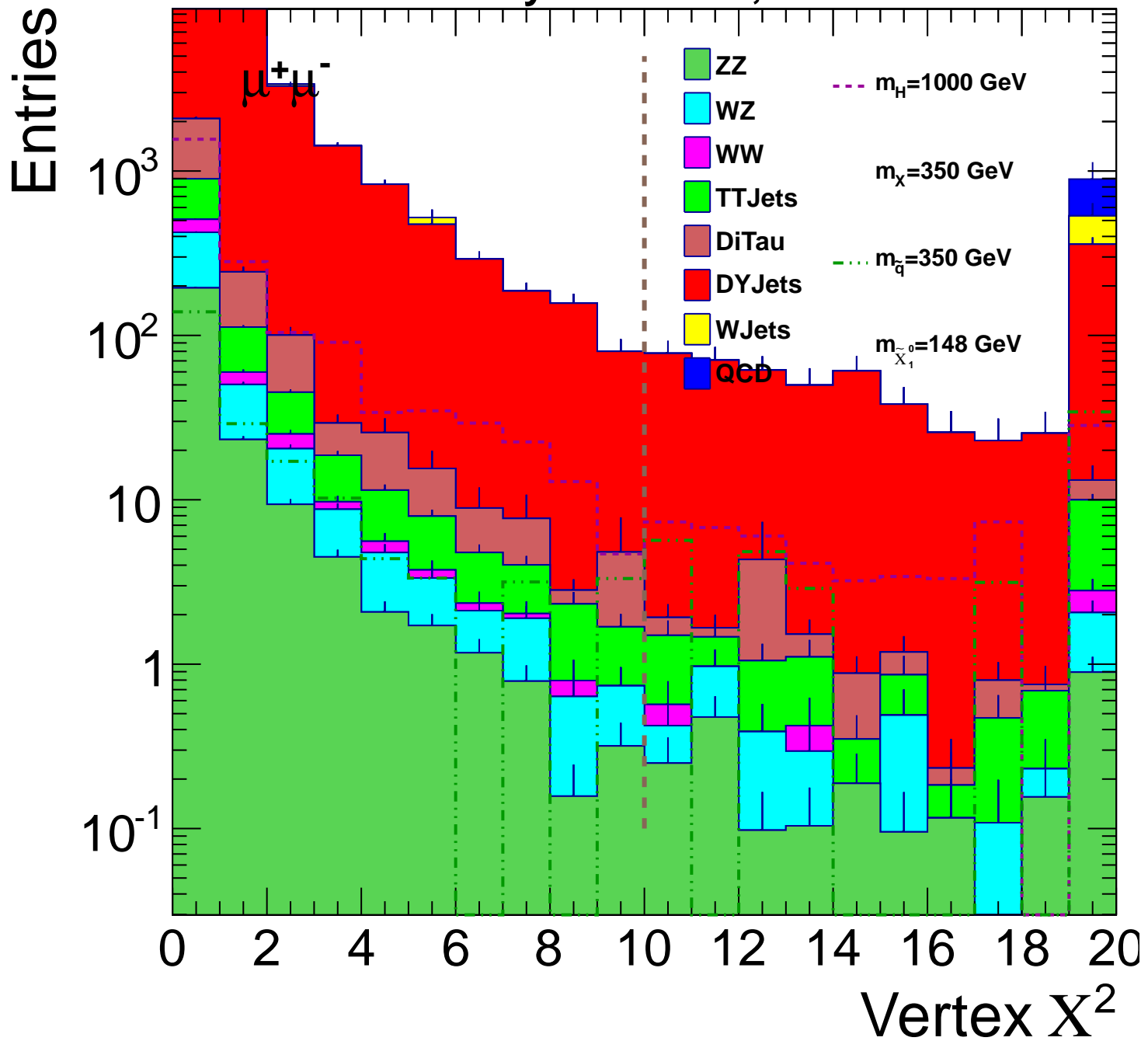
100

Minimum Absolute  $d_0$

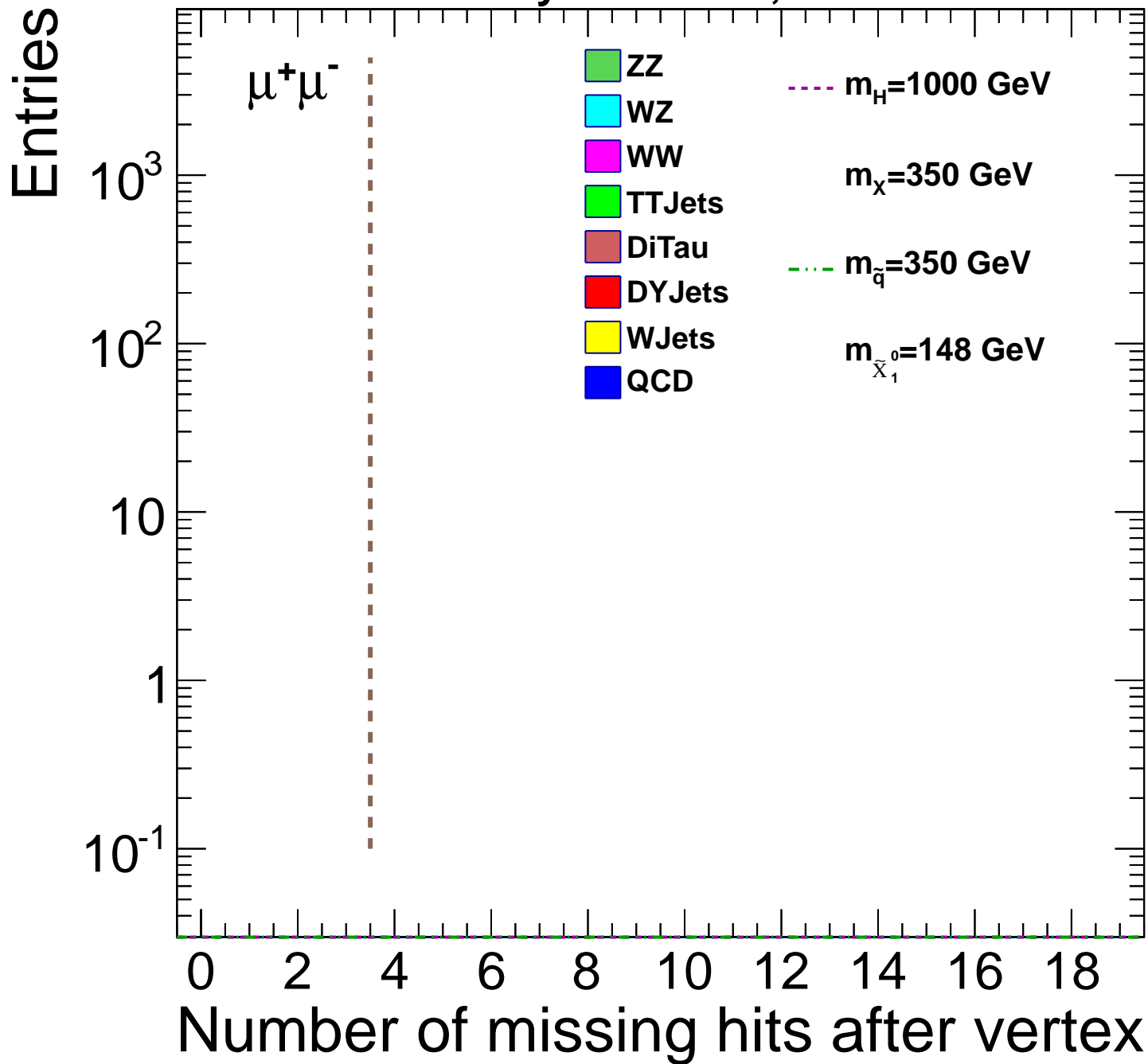




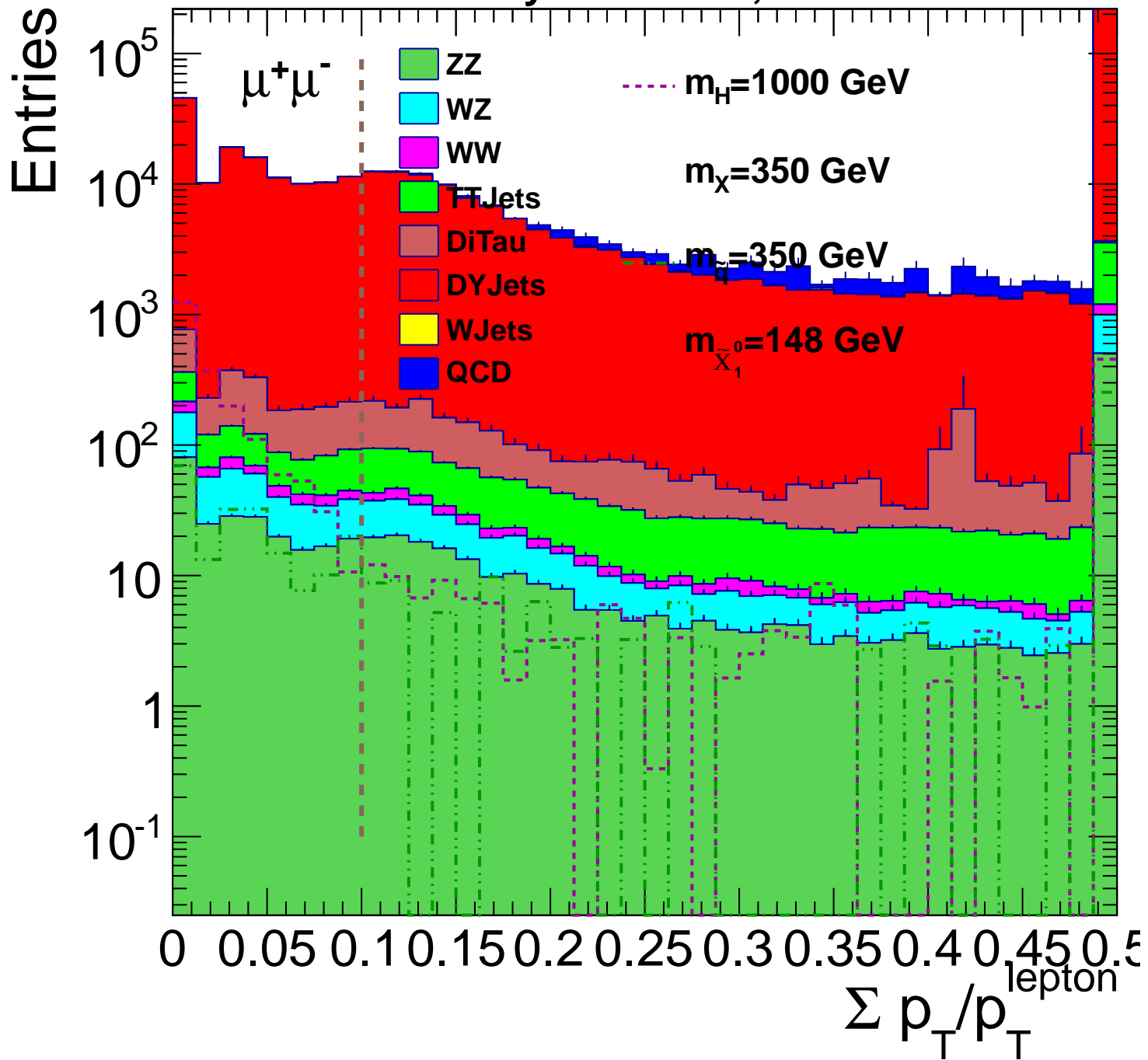
CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}$ ,  $L = 20.5 \text{ fb}^{-1}$



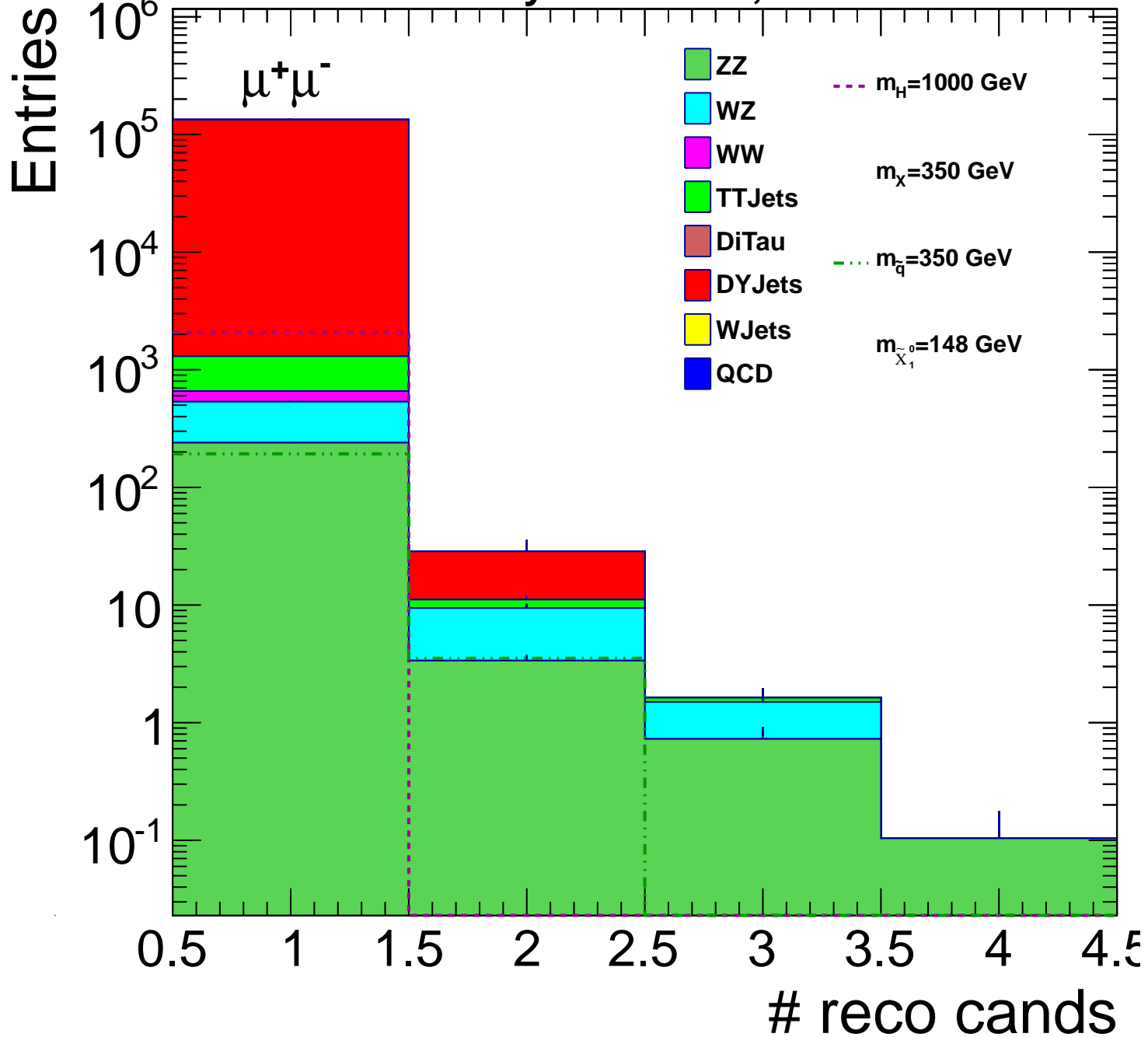
**CMS Preliminary  $\sqrt{s} = 8$  TeV,  $L = 20.5\text{fb}^{-1}$**



**CMS Preliminary  $\sqrt{s} = 8$  TeV,  $L = 20.5\text{fb}^{-1}$**

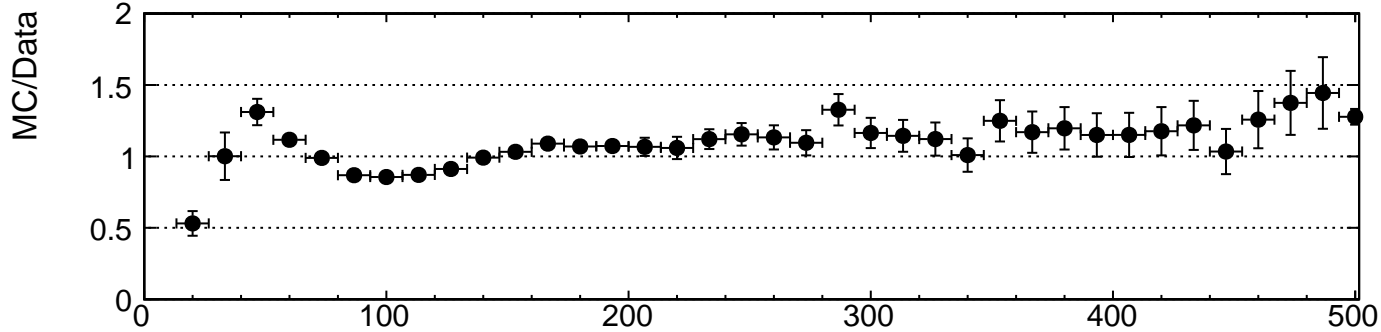
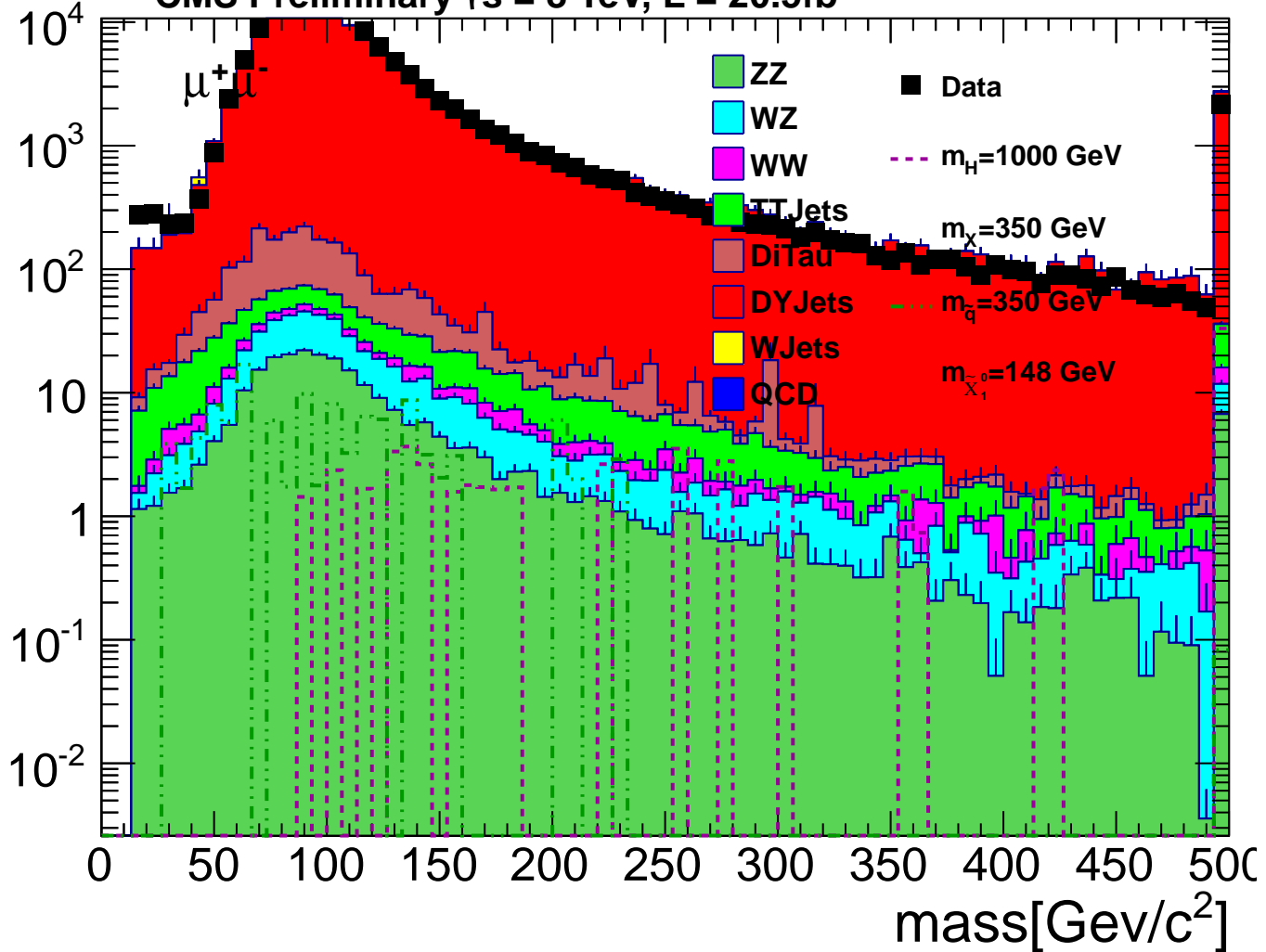


**CMS Preliminary  $\sqrt{s} = 8$  TeV,  $L = 20.5\text{fb}^{-1}$**

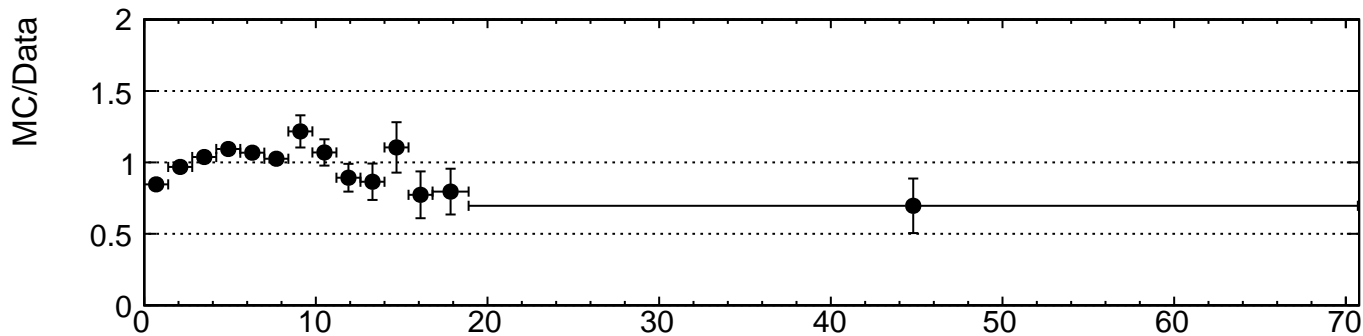
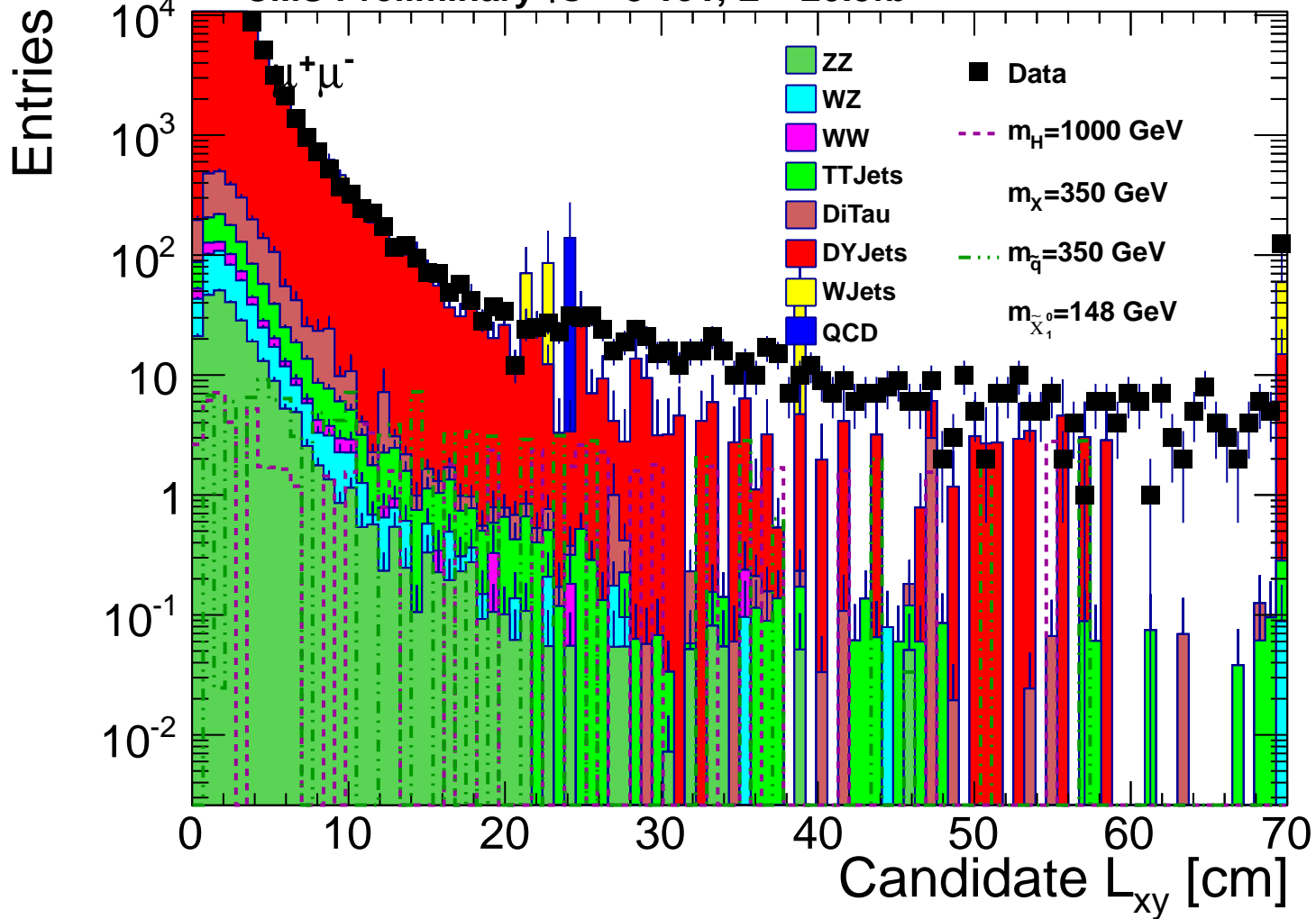


CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}$ ,  $L = 20.5 \text{ fb}^{-1}$

Entries



CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}$ ,  $L = 20.5 \text{ fb}^{-1}$



CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}$ ,  $L = 20.5 \text{ fb}^{-1}$

Entries

$\mu^+\mu^-$

$10^3$

$10^2$

10

1

$10^{-1}$

ZZ

WZ

WW

TTJets

DiTau

DYJets

WJets

QCD

■ Data

---  $m_H = 1000 \text{ GeV}$

$m_{\tilde{\chi}} = 350 \text{ GeV}$

-.-  $m_{\tilde{q}} = 350 \text{ GeV}$

$m_{\tilde{X}_1^0} = 148 \text{ GeV}$

-0.5

0

0.5

1

1.5

2

2.5

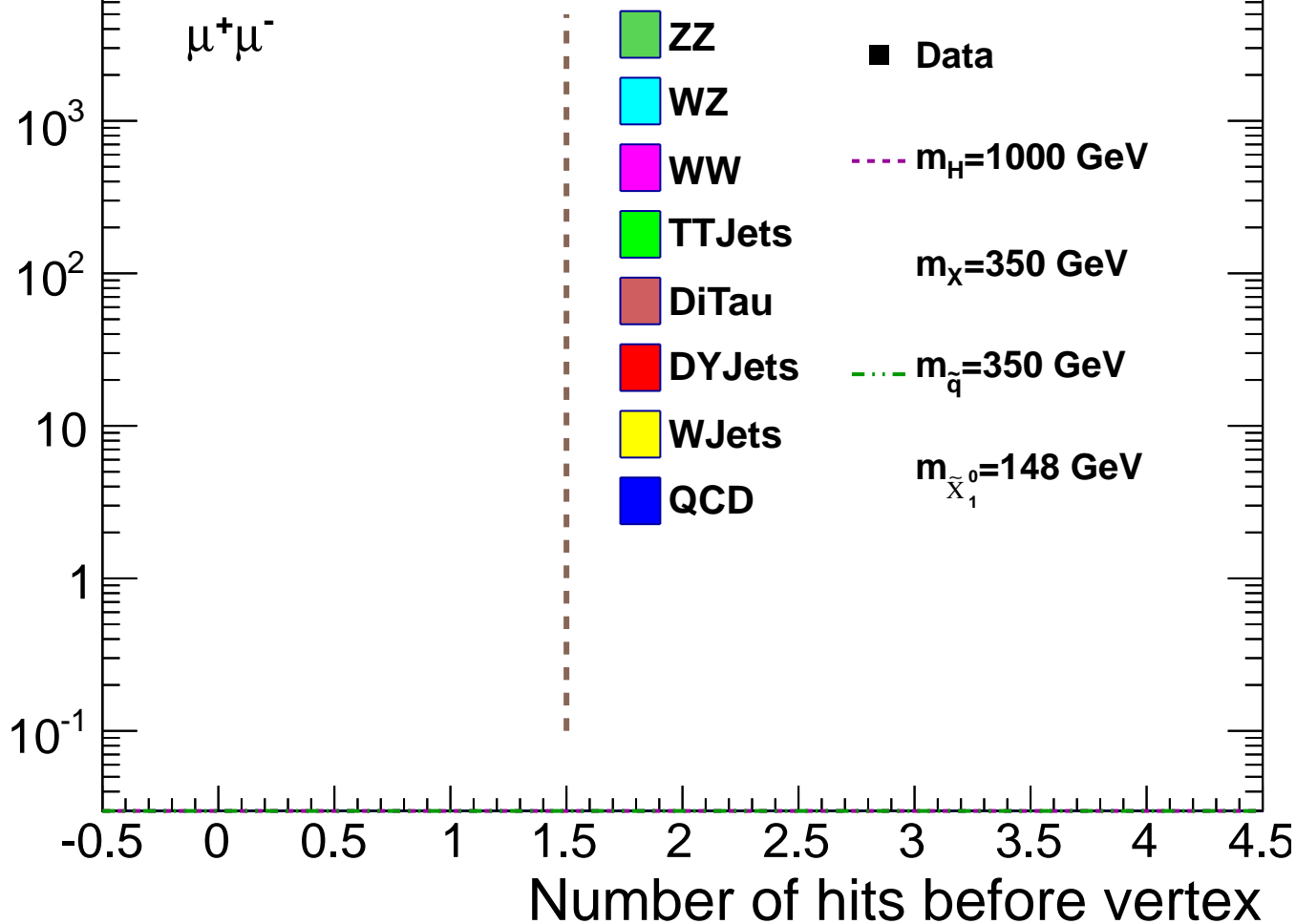
3

3.5

4

4.5

Number of hits before vertex



CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}$ ,  $L = 20.5 \text{ fb}^{-1}$

Entries

$\mu^+\mu^-$

ZZ

WZ

WW

TTJets

DiTau

DYJets

WJets

QCD

■ Data

---  $m_H = 1000 \text{ GeV}$

$m_\chi = 350 \text{ GeV}$

-.-  $m_{\tilde{q}} = 350 \text{ GeV}$

$m_{\tilde{X}_1^0} = 148 \text{ GeV}$

$10^3$

$10^2$

10

1

$10^{-1}$

0

2

4

6

8

10

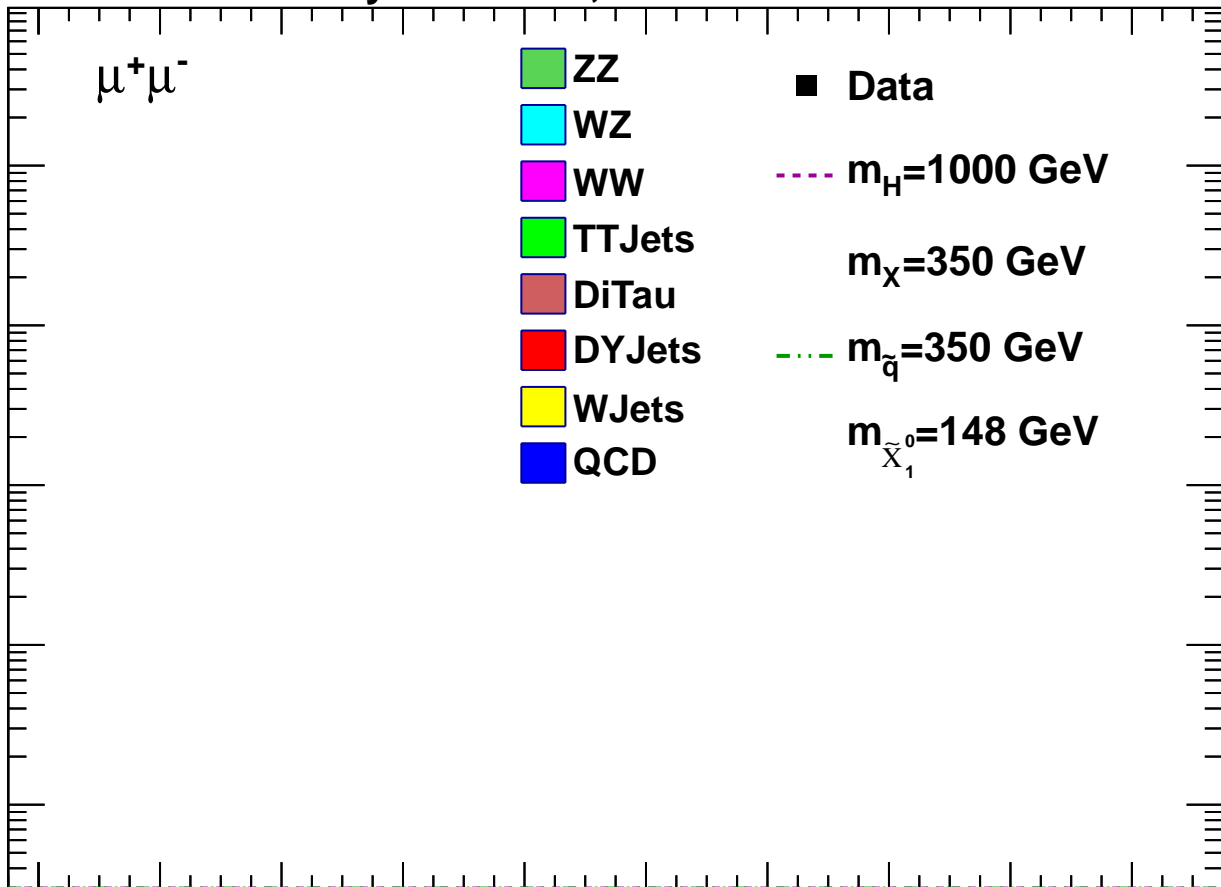
12

14

16

18

Min missing hits after vertex





CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}$ ,  $L = 20.5 \text{ fb}^{-1}$

Entries

$\mu^+\mu^-$

$10^3$

$10^2$

10

1

$10^{-1}$



■ Data

---  $m_H = 1000 \text{ GeV}$

---  $m_{\tilde{\chi}} = 350 \text{ GeV}$

---  $m_{\tilde{g}} = 350 \text{ GeV}$

---  $m_{\tilde{\chi}_1^0} = 148 \text{ GeV}$

0

2

4

6

8

10

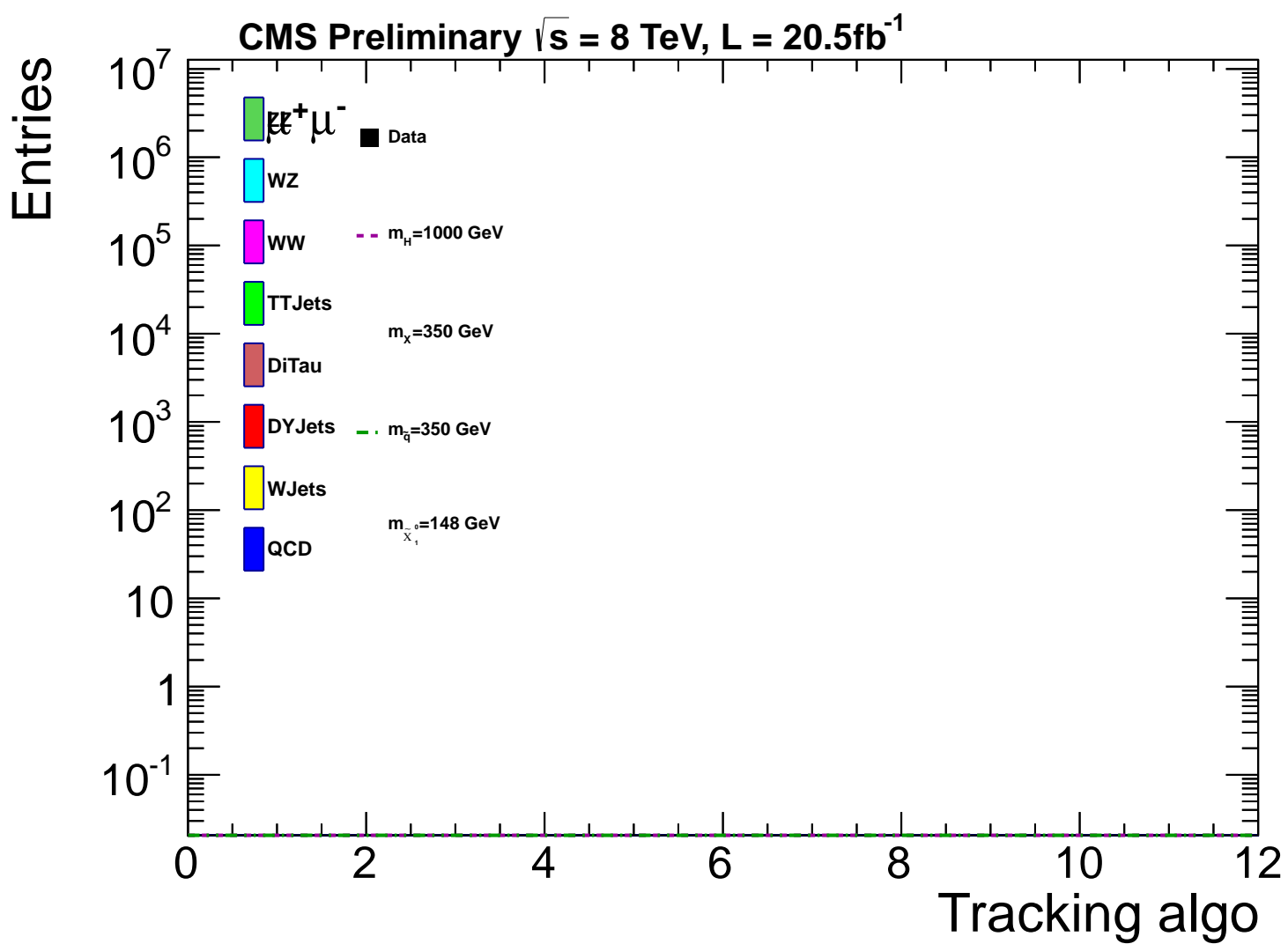
12

14

16

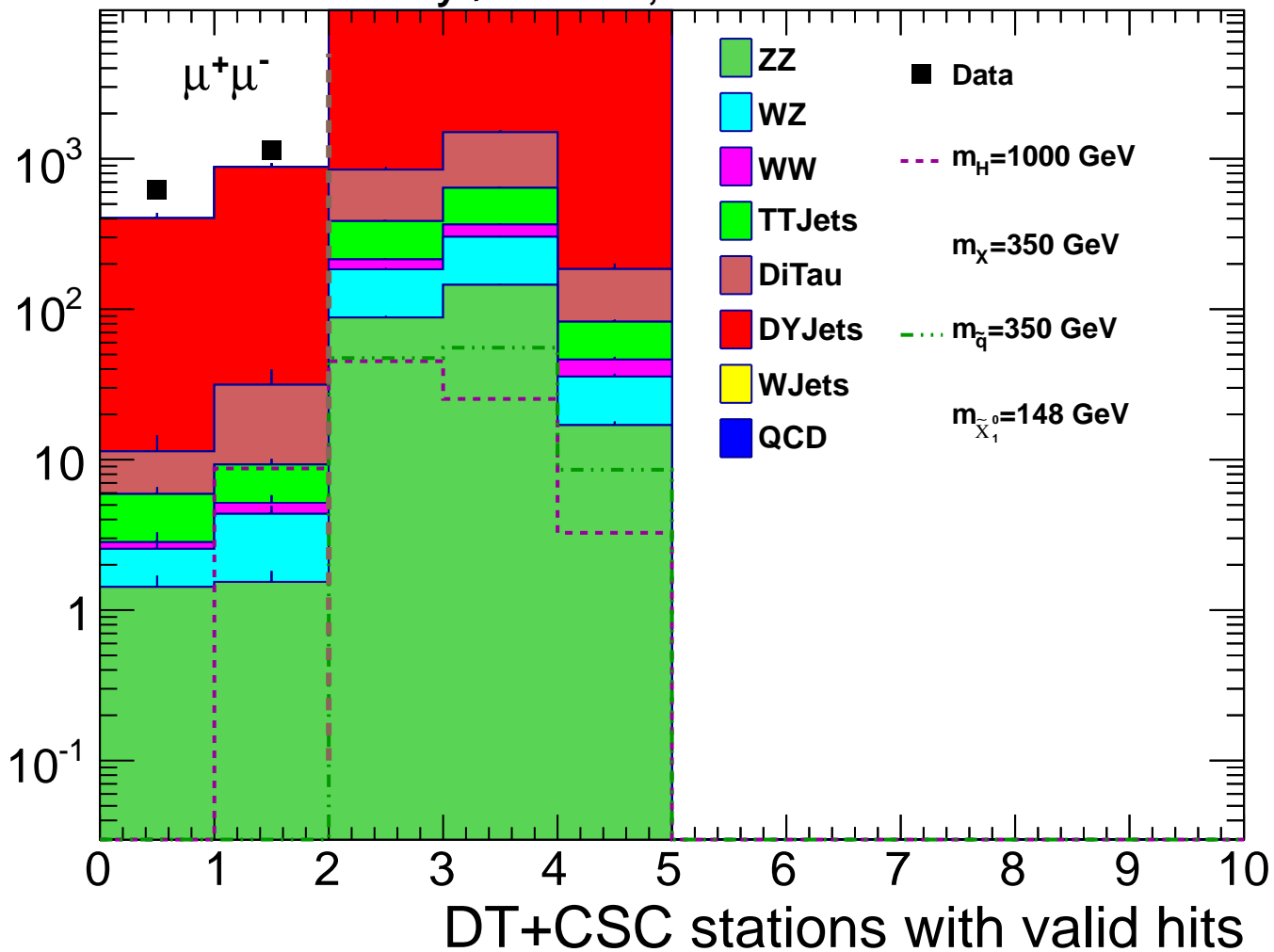
18

Max missing hits after vertex

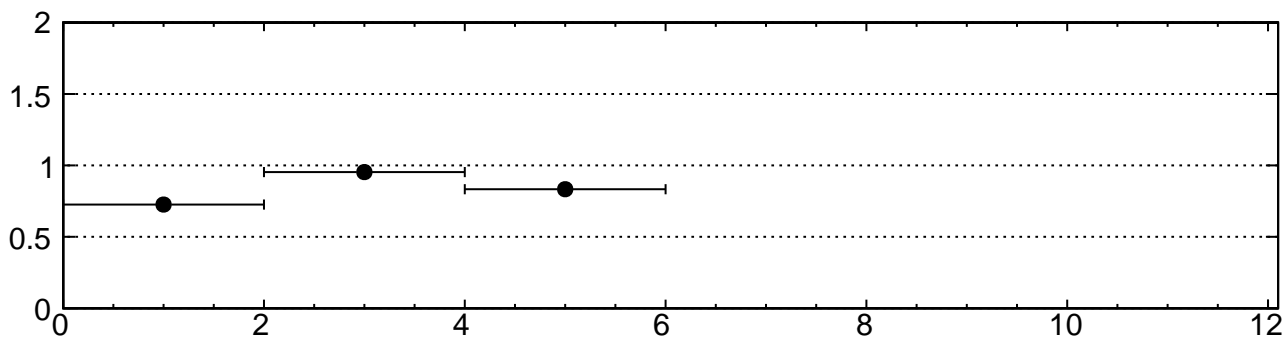


CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}$ ,  $L = 20.5 \text{ fb}^{-1}$

Entries

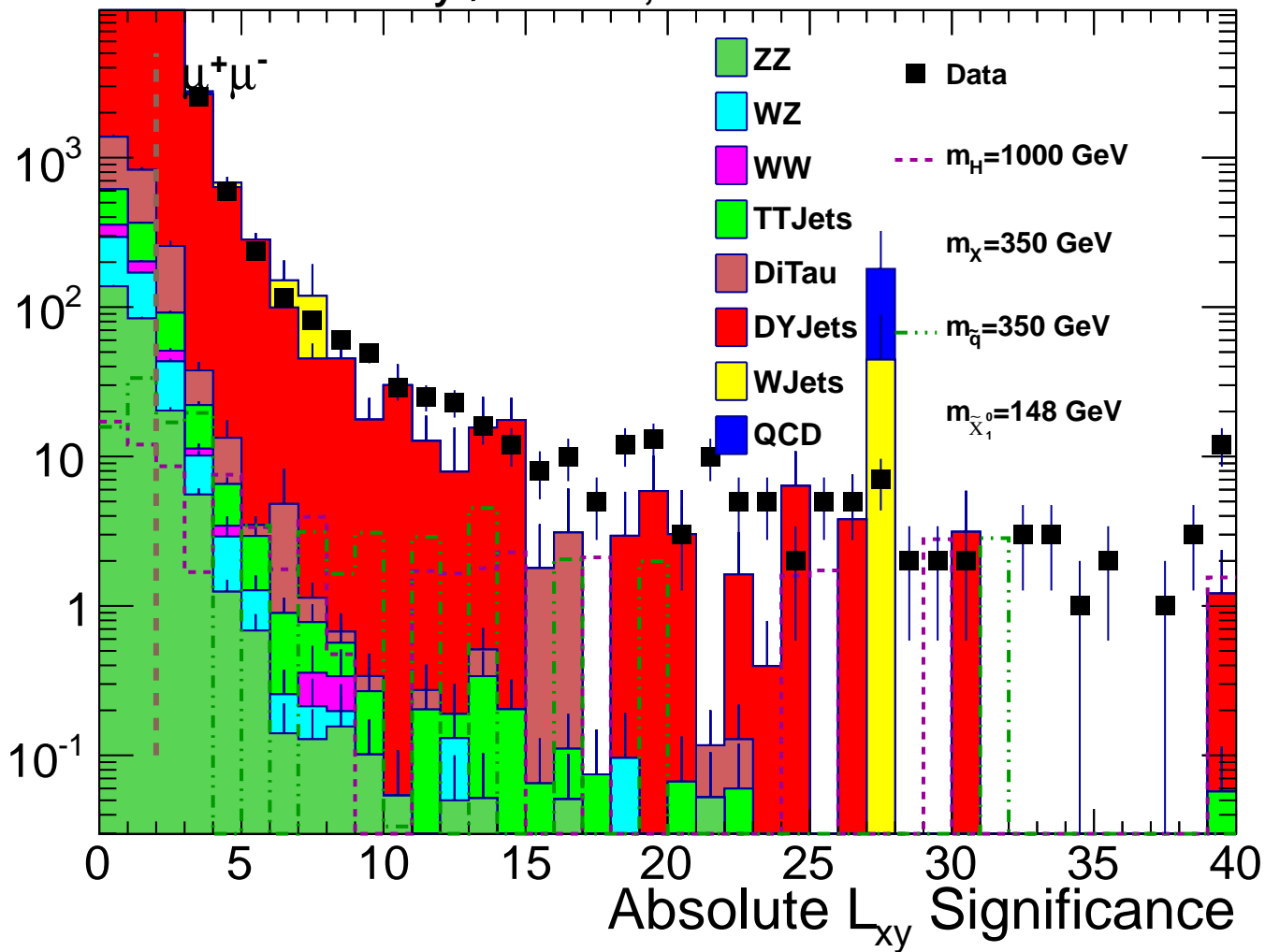


MC/Data

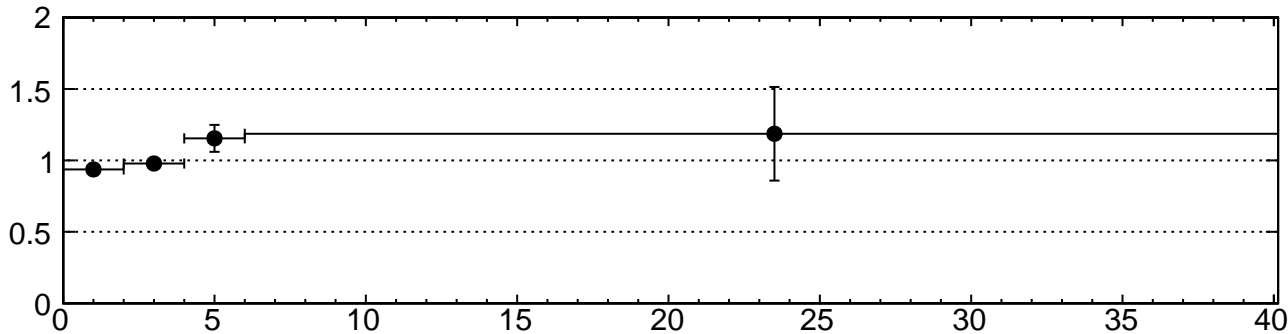


CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}$ ,  $L = 20.5 \text{ fb}^{-1}$

Entries

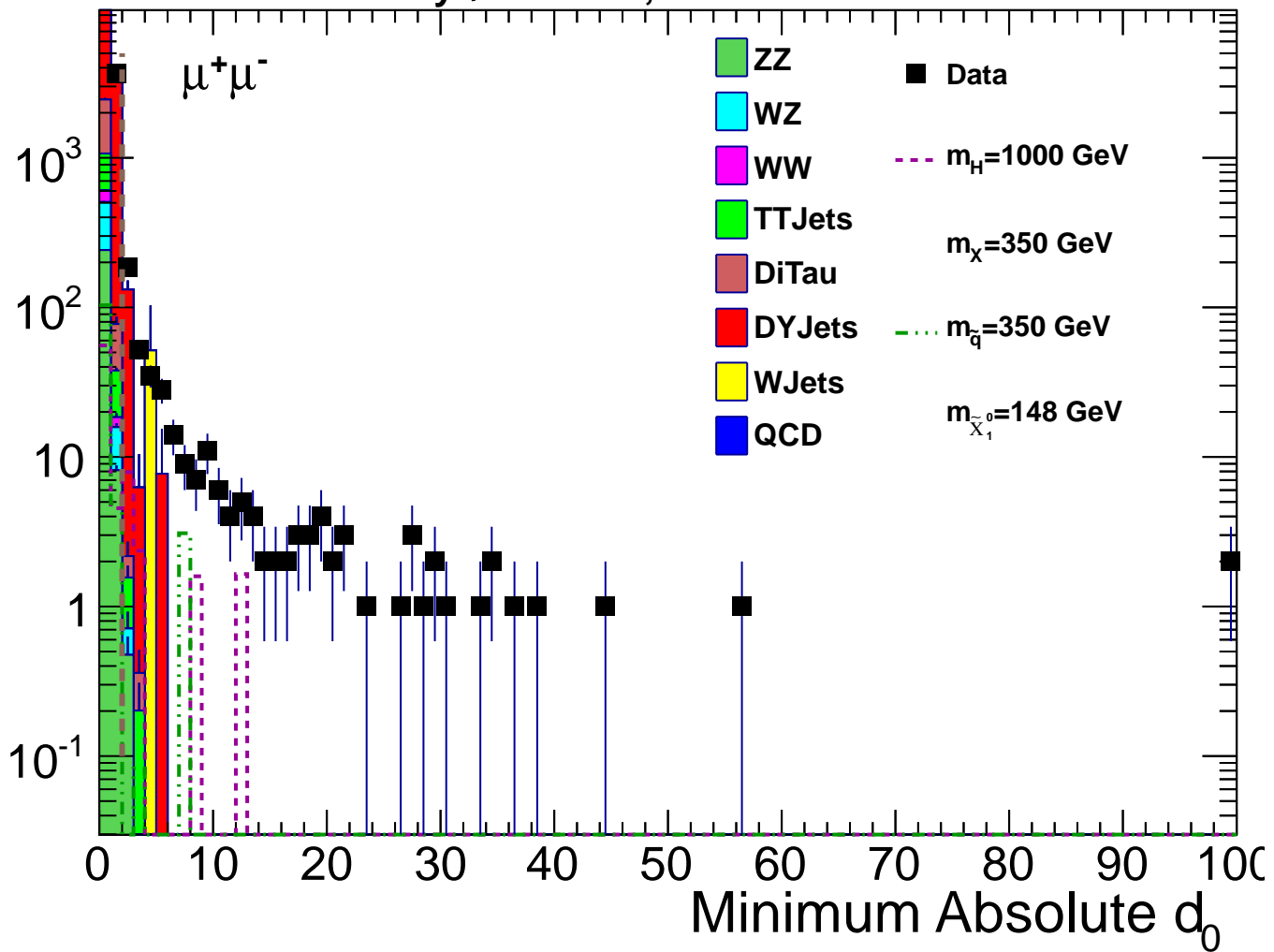


MC/Data

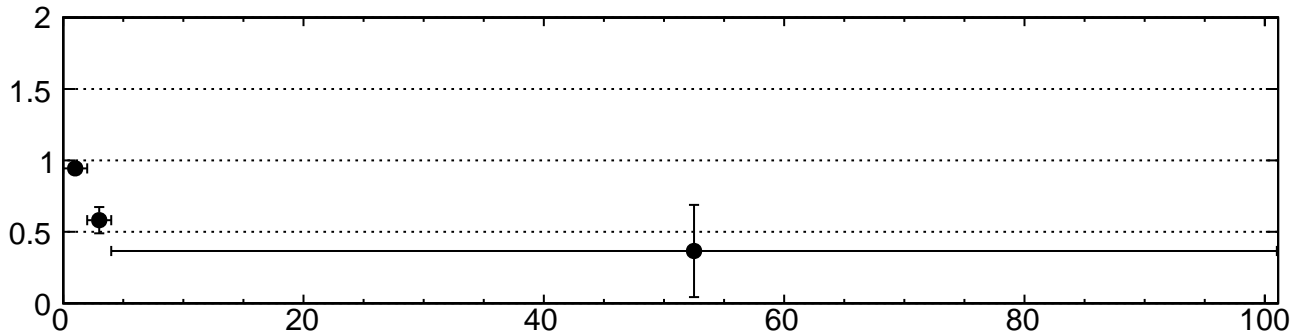


CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}$ ,  $L = 20.5 \text{ fb}^{-1}$

Entries

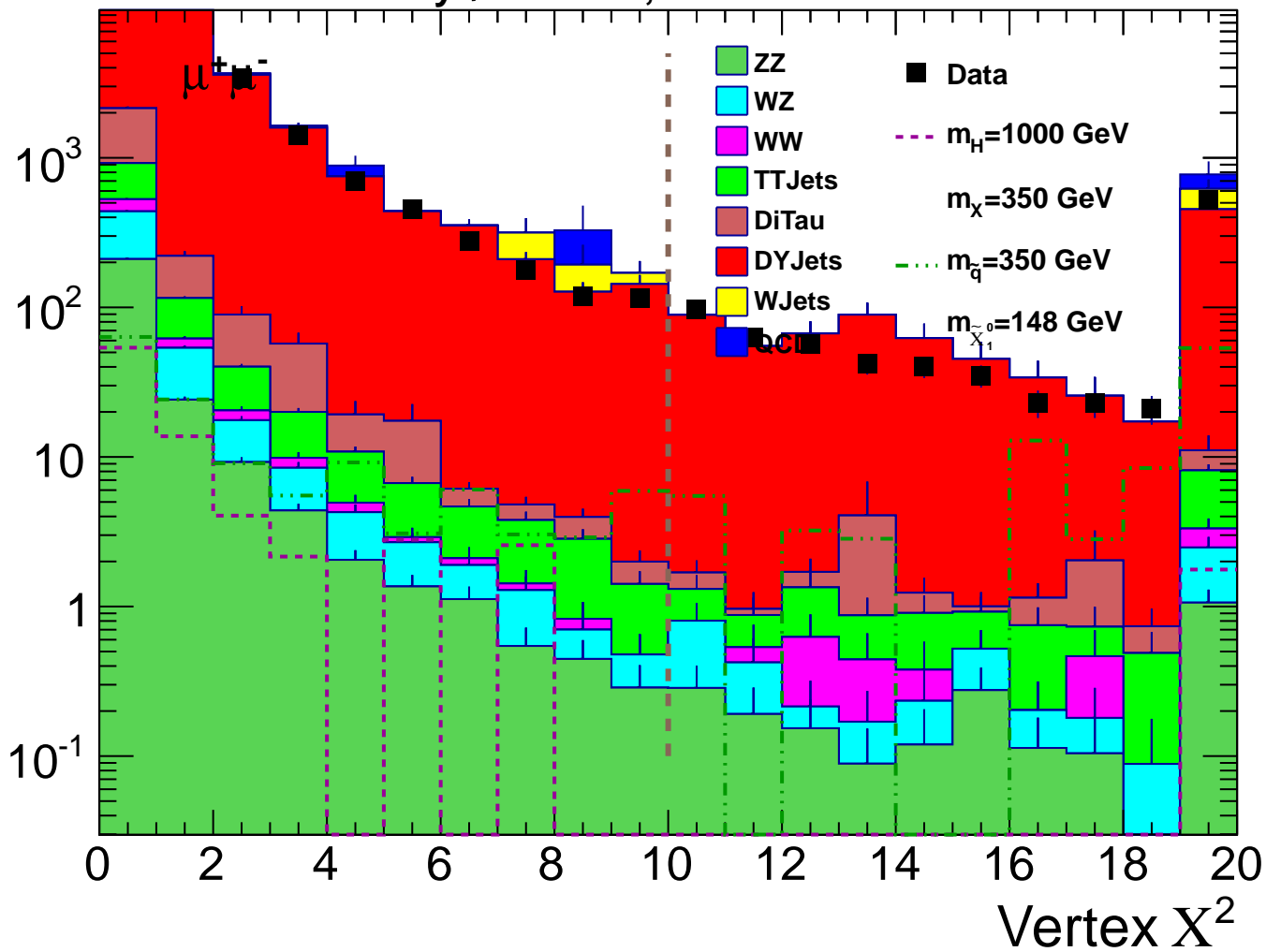


MC/Data

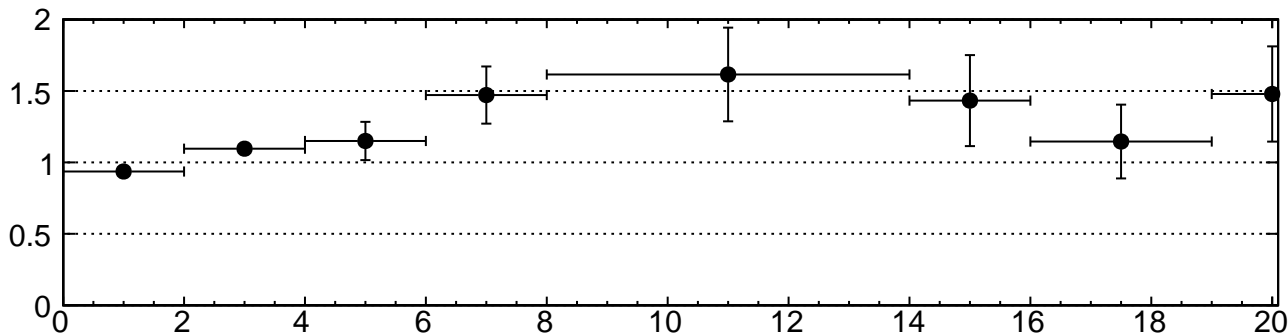


CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}$ ,  $L = 20.5 \text{ fb}^{-1}$

Entries

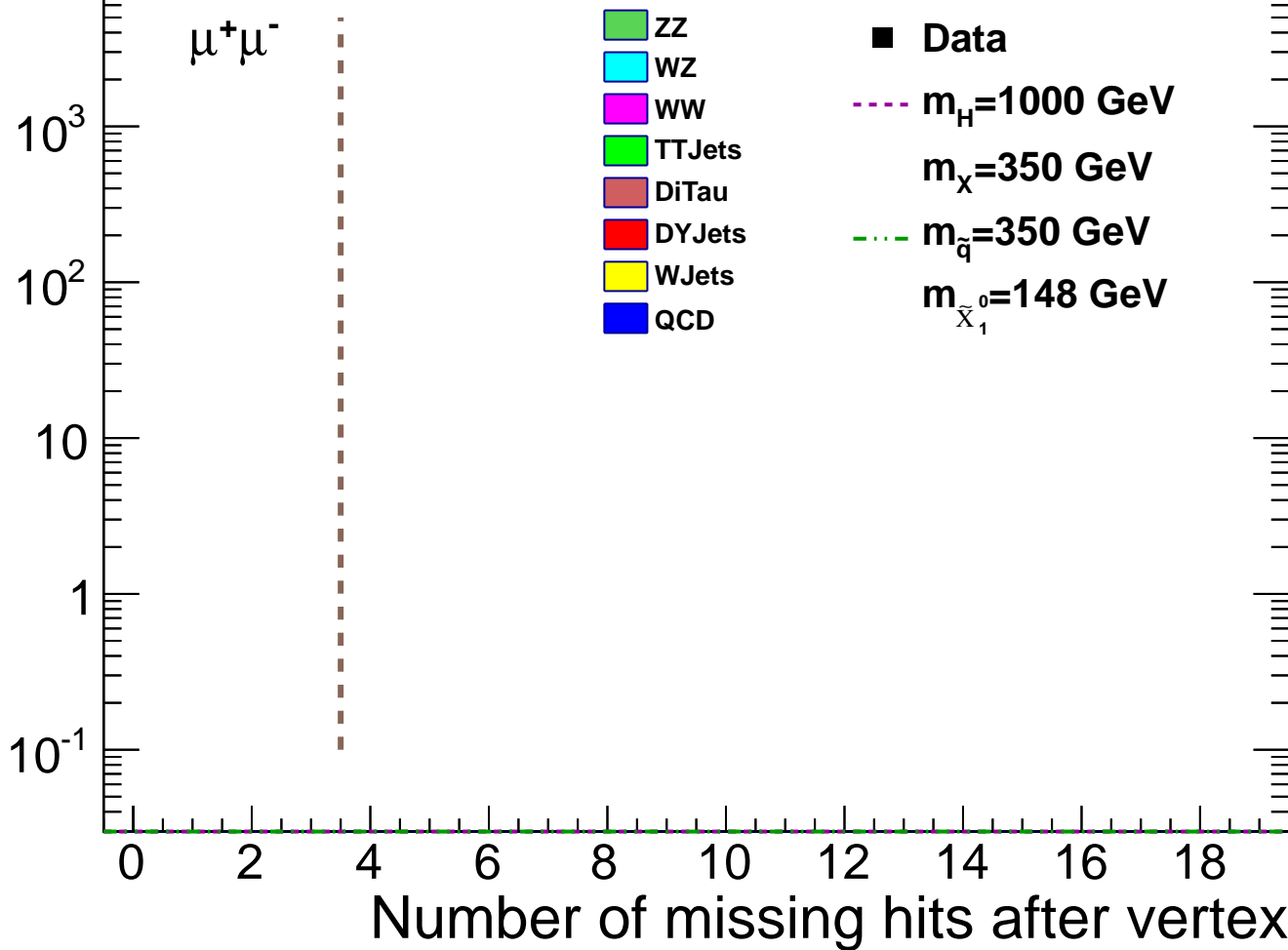


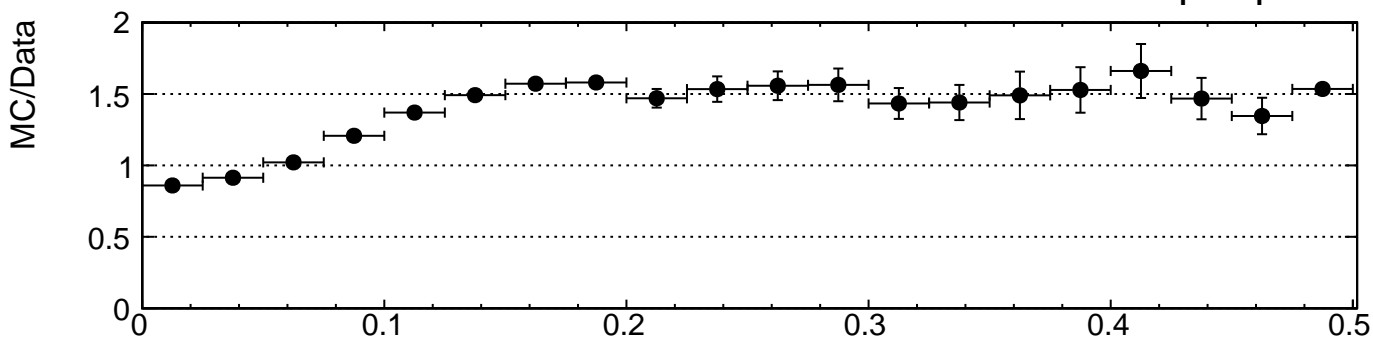
MC/Data



CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}$ ,  $L = 20.5 \text{ fb}^{-1}$

Entries

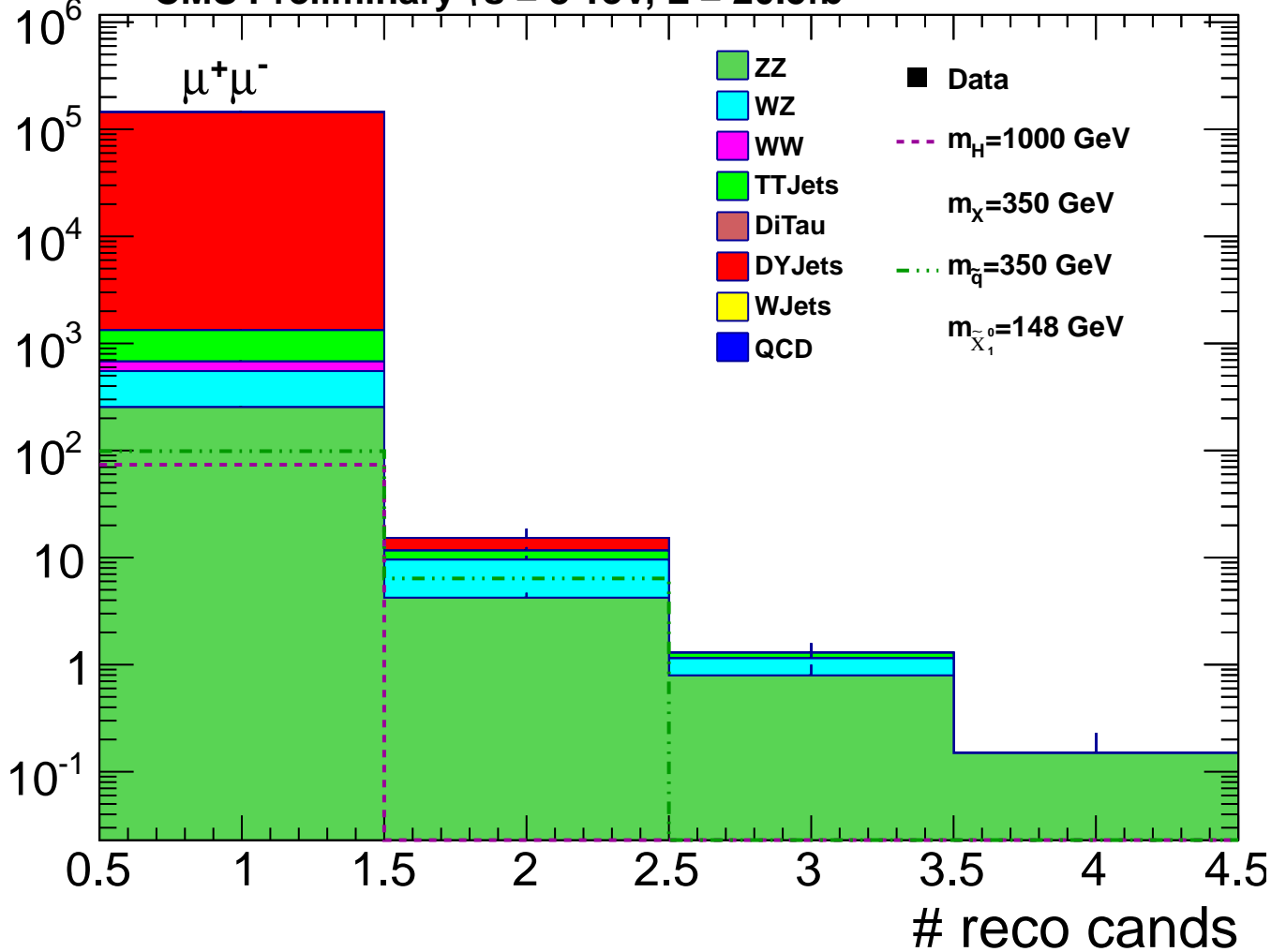




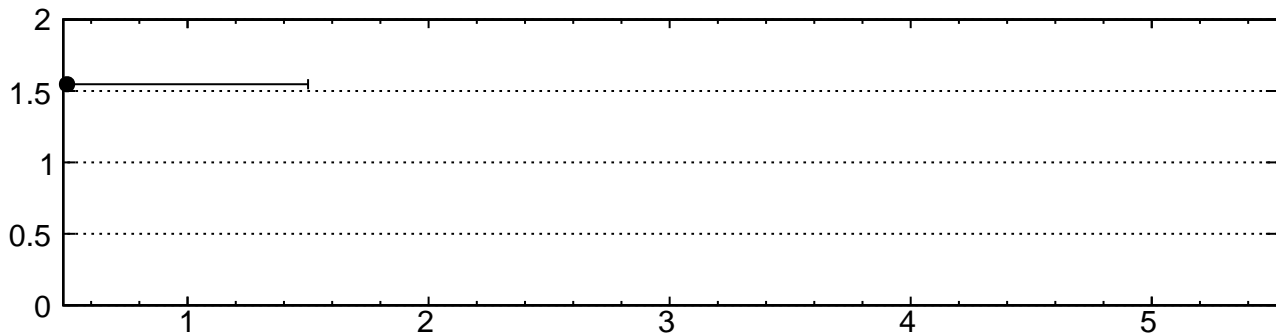


CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}$ ,  $L = 20.5 \text{ fb}^{-1}$

Entries

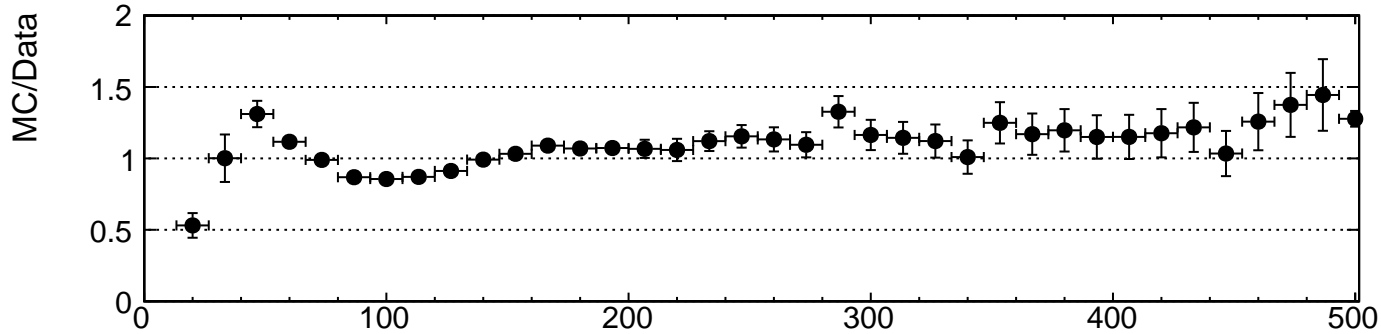
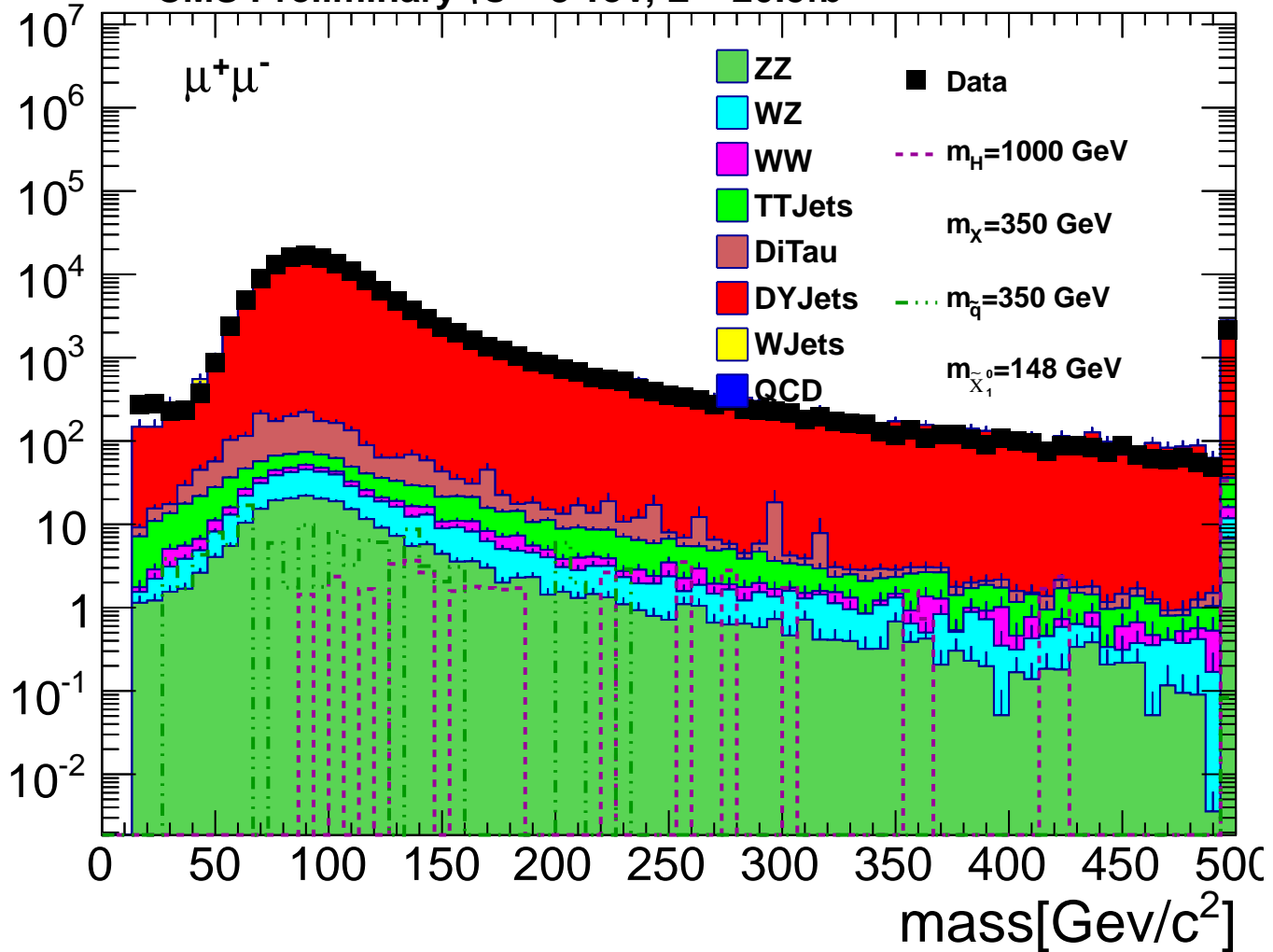


MC/Data



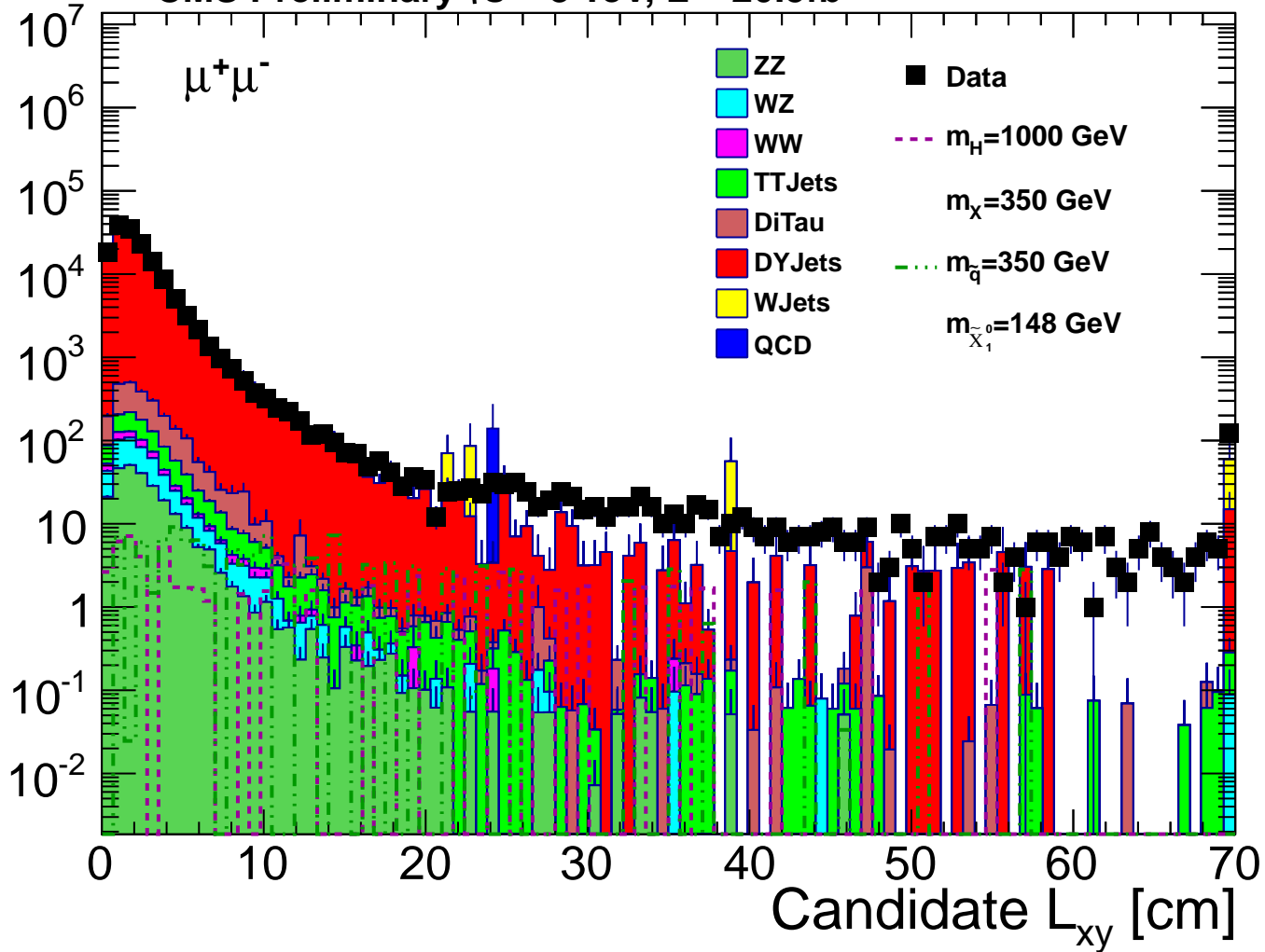
CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}$ ,  $L = 20.5 \text{ fb}^{-1}$

Entries

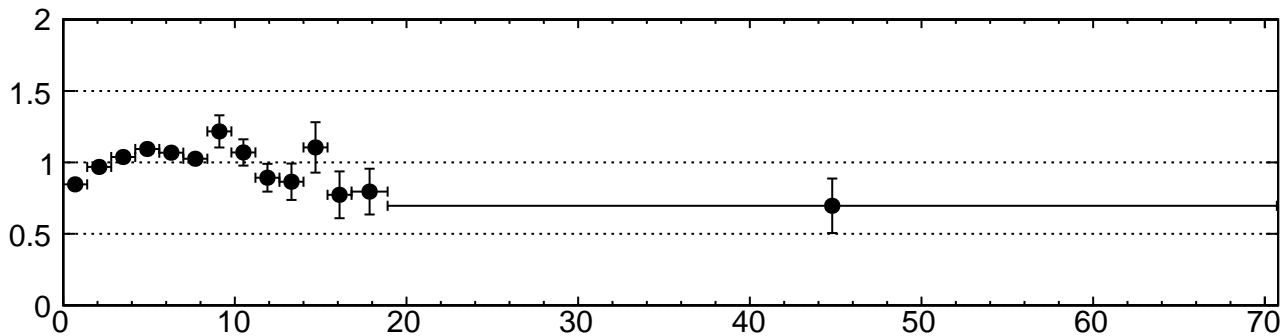


CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}$ ,  $L = 20.5 \text{ fb}^{-1}$

Entries



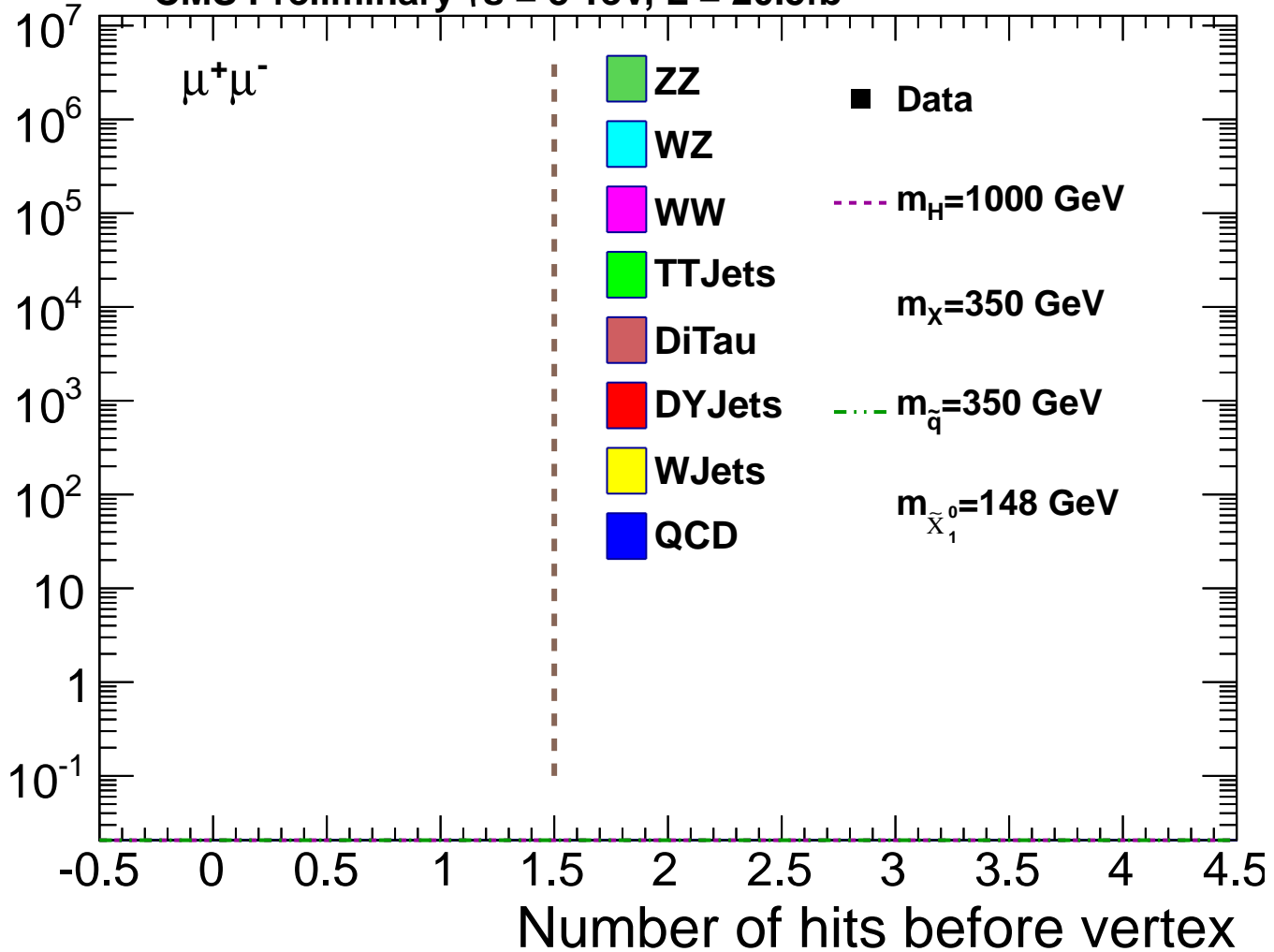
MC/Data



CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}$ ,  $L = 20.5 \text{ fb}^{-1}$

Entries

$\mu^+\mu^-$



Number of hits before vertex

CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}$ ,  $L = 20.5 \text{ fb}^{-1}$

Entries

$\mu^+\mu^-$

ZZ

WZ

WW

TTJets

DiTau

DYJets

WJets

QCD

■ Data

---  $m_H = 1000 \text{ GeV}$

$m_\chi = 350 \text{ GeV}$

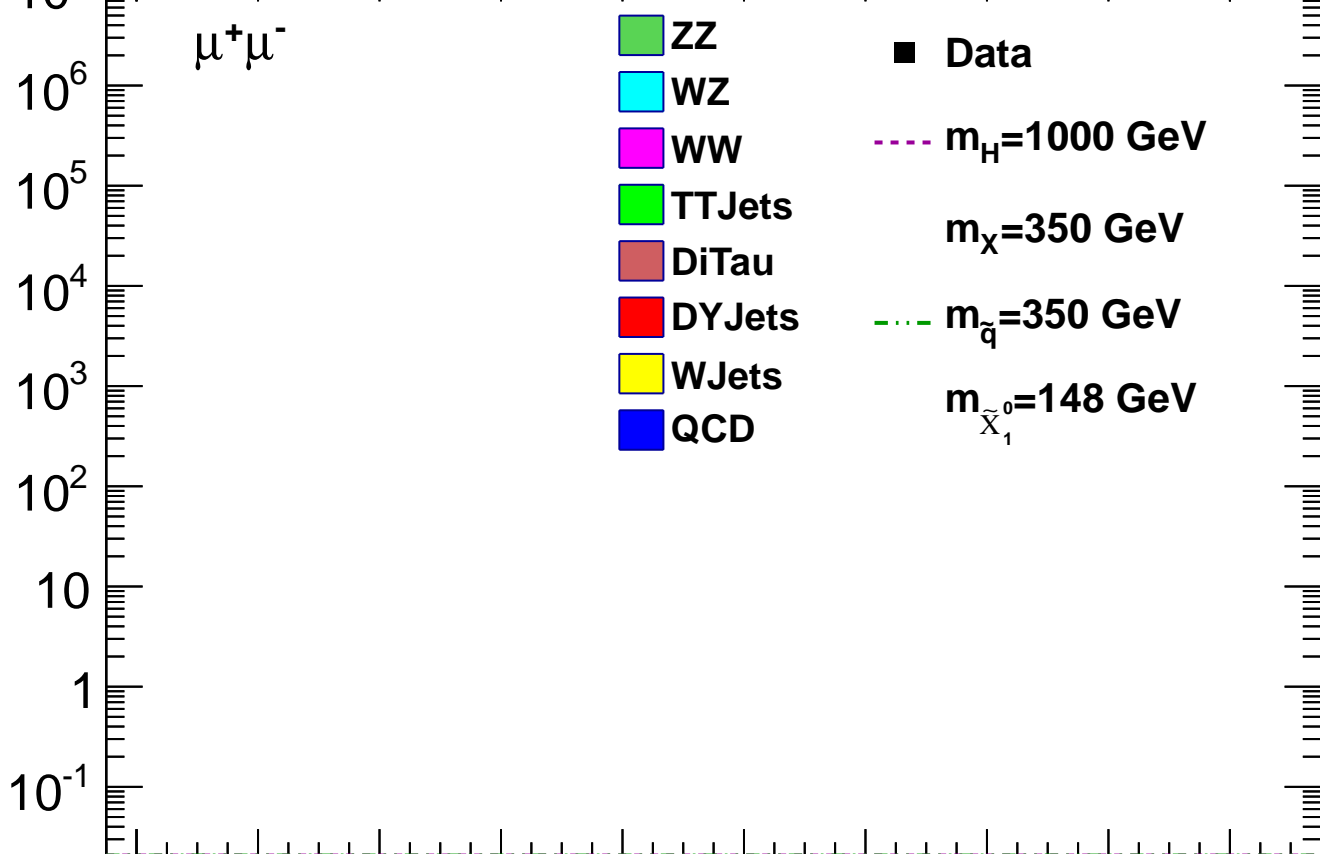
-.-  $m_{\tilde{q}} = 350 \text{ GeV}$

$m_{\tilde{X}_1^0} = 148 \text{ GeV}$

$10^7$   
 $10^6$   
 $10^5$   
 $10^4$   
 $10^3$   
 $10^2$   
 $10$   
 $1$   
 $10^{-1}$

0 2 4 6 8 10 12 14 16 18

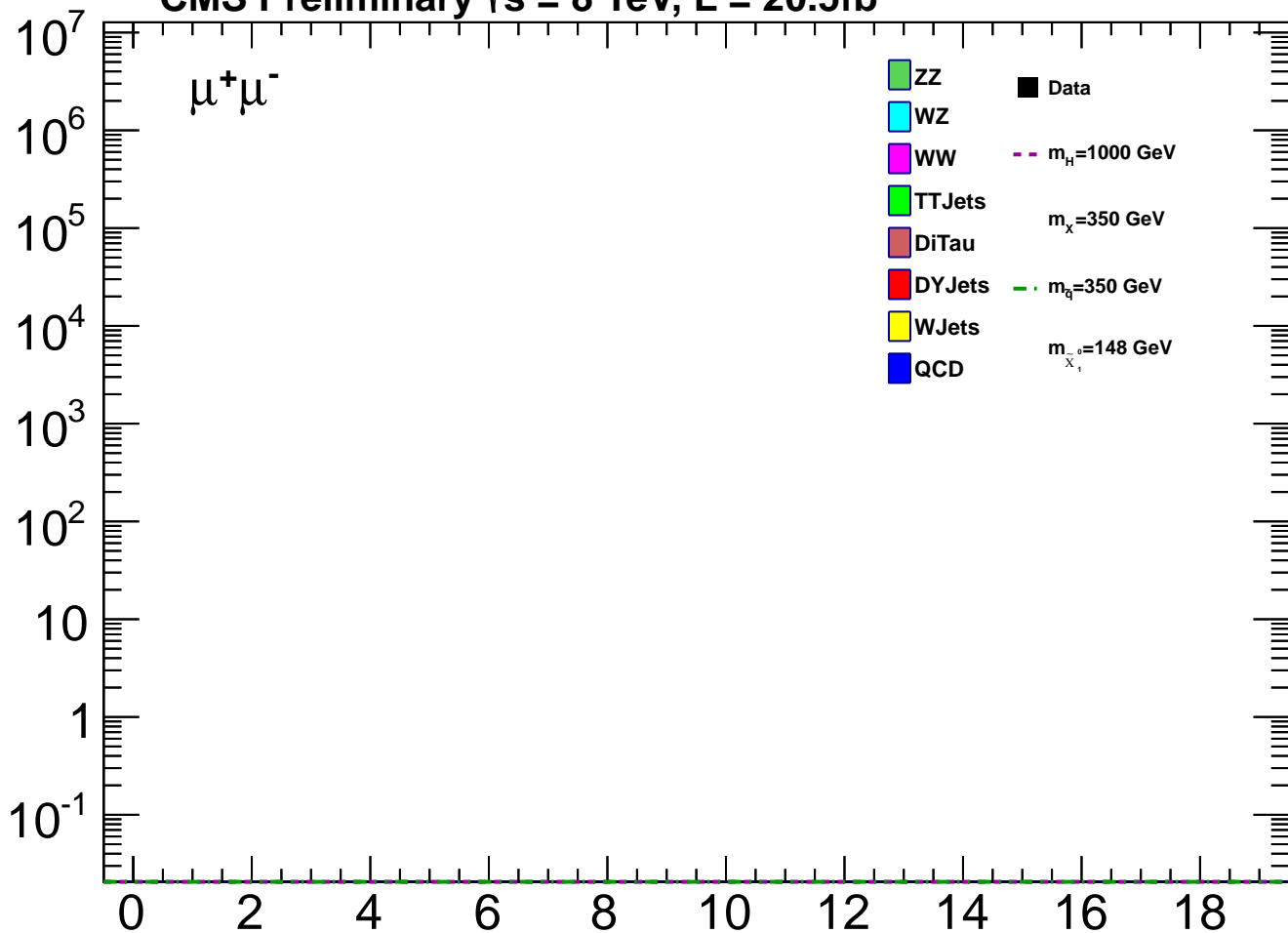
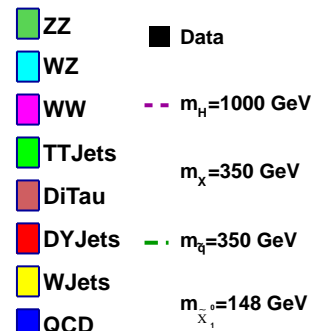
Min missing hits after vertex



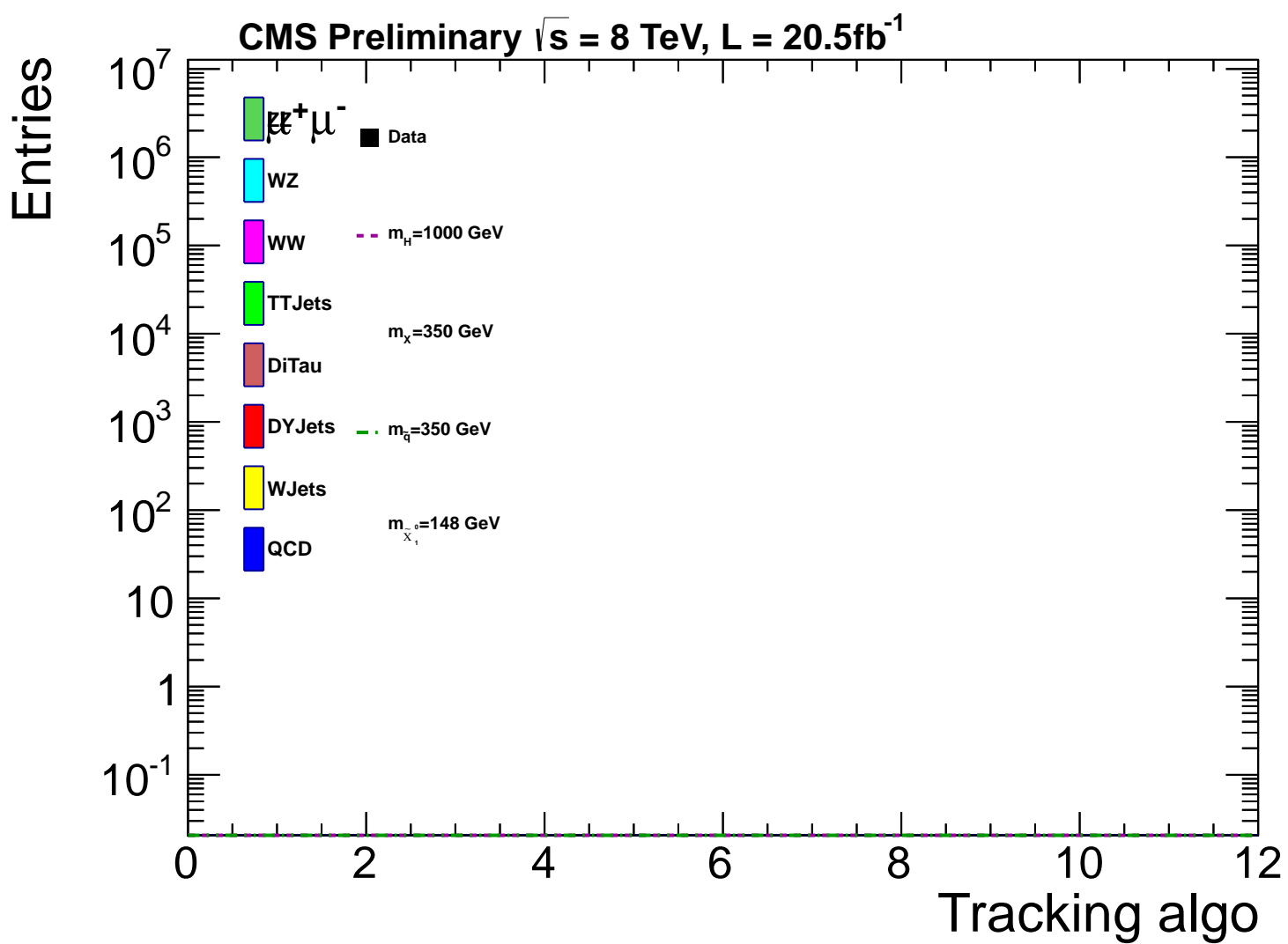
CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}$ ,  $L = 20.5 \text{ fb}^{-1}$

Entries

$\mu^+\mu^-$

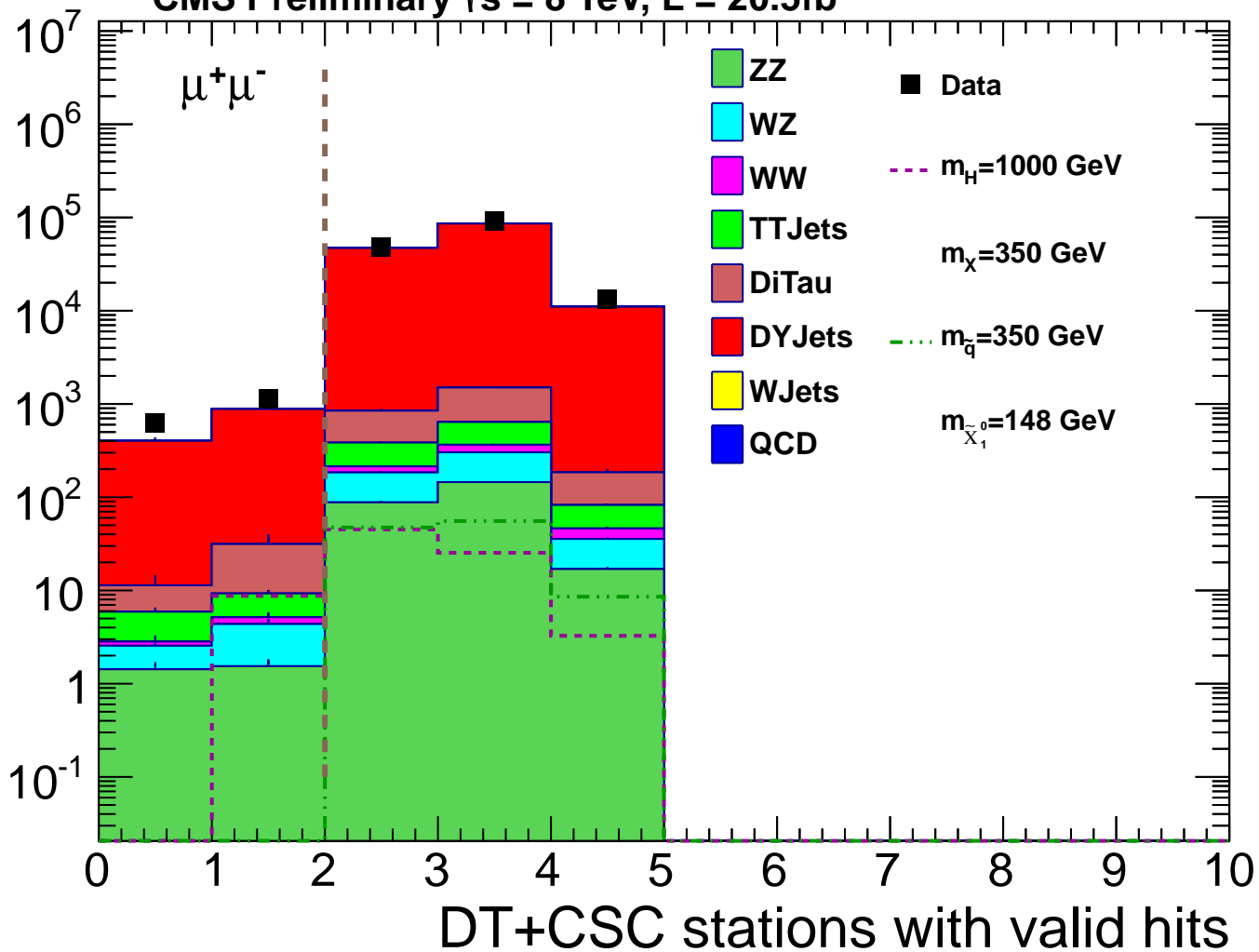


Max missing hits after vertex

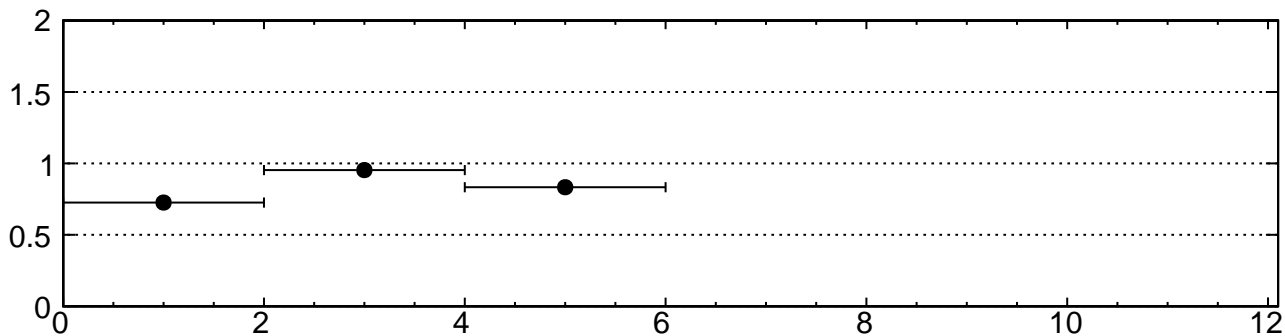


CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}$ ,  $L = 20.5 \text{ fb}^{-1}$

Entries



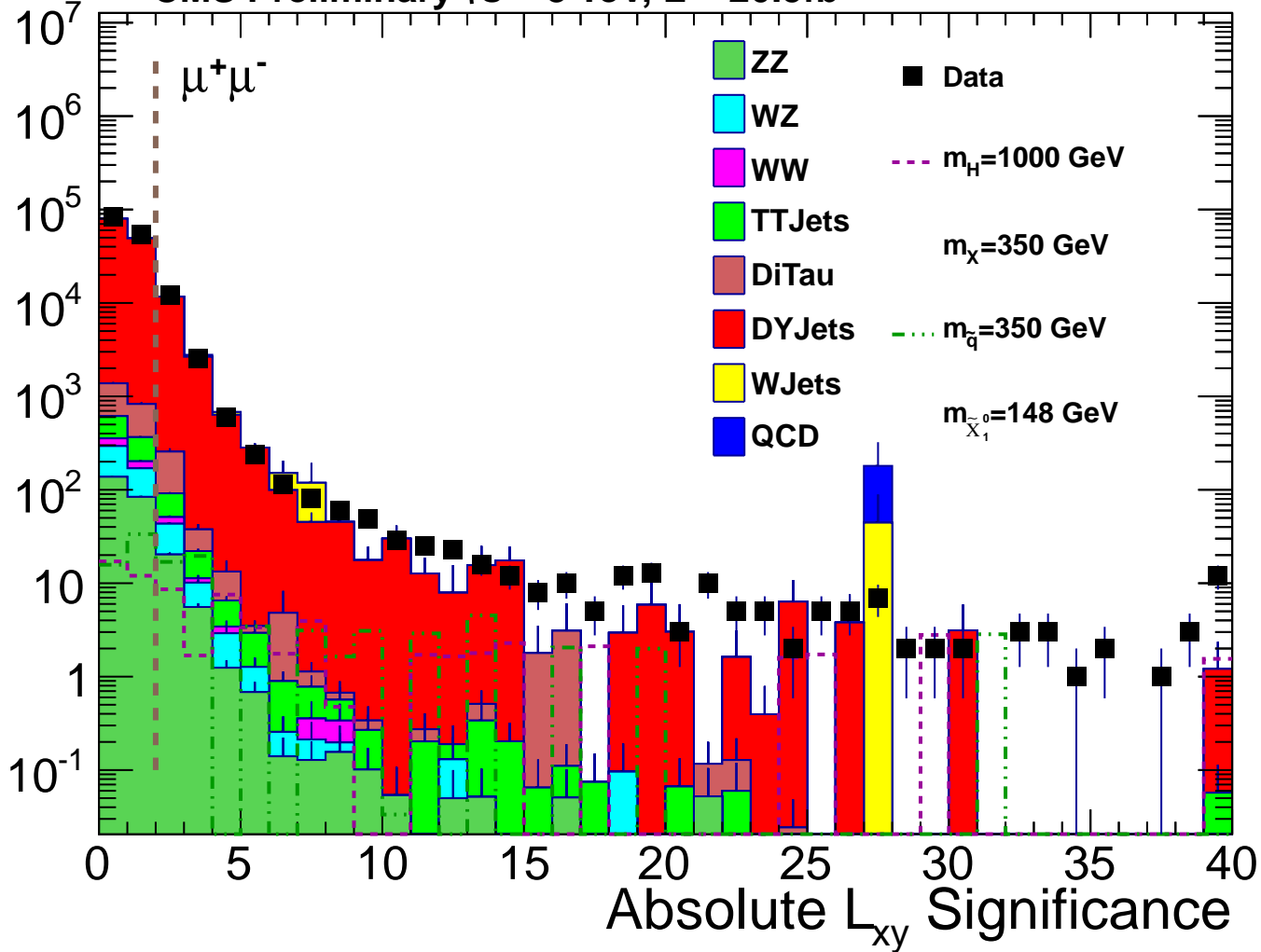
MC/Data



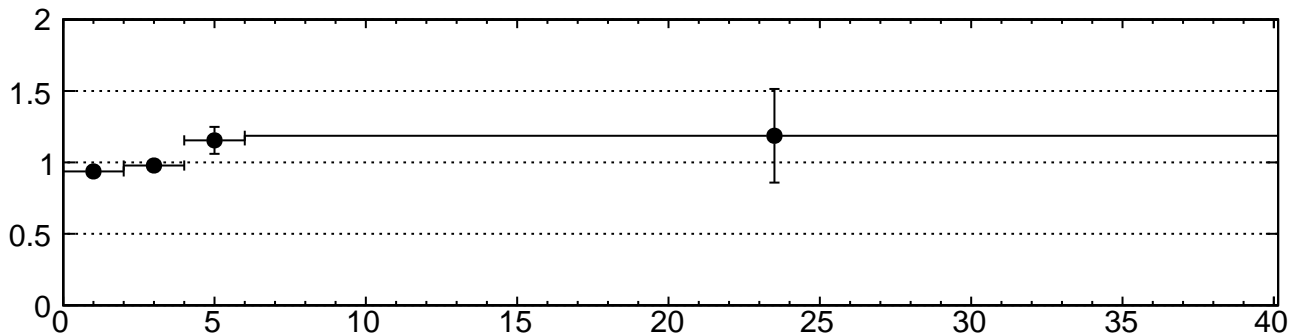


CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}$ ,  $L = 20.5 \text{ fb}^{-1}$

Entries

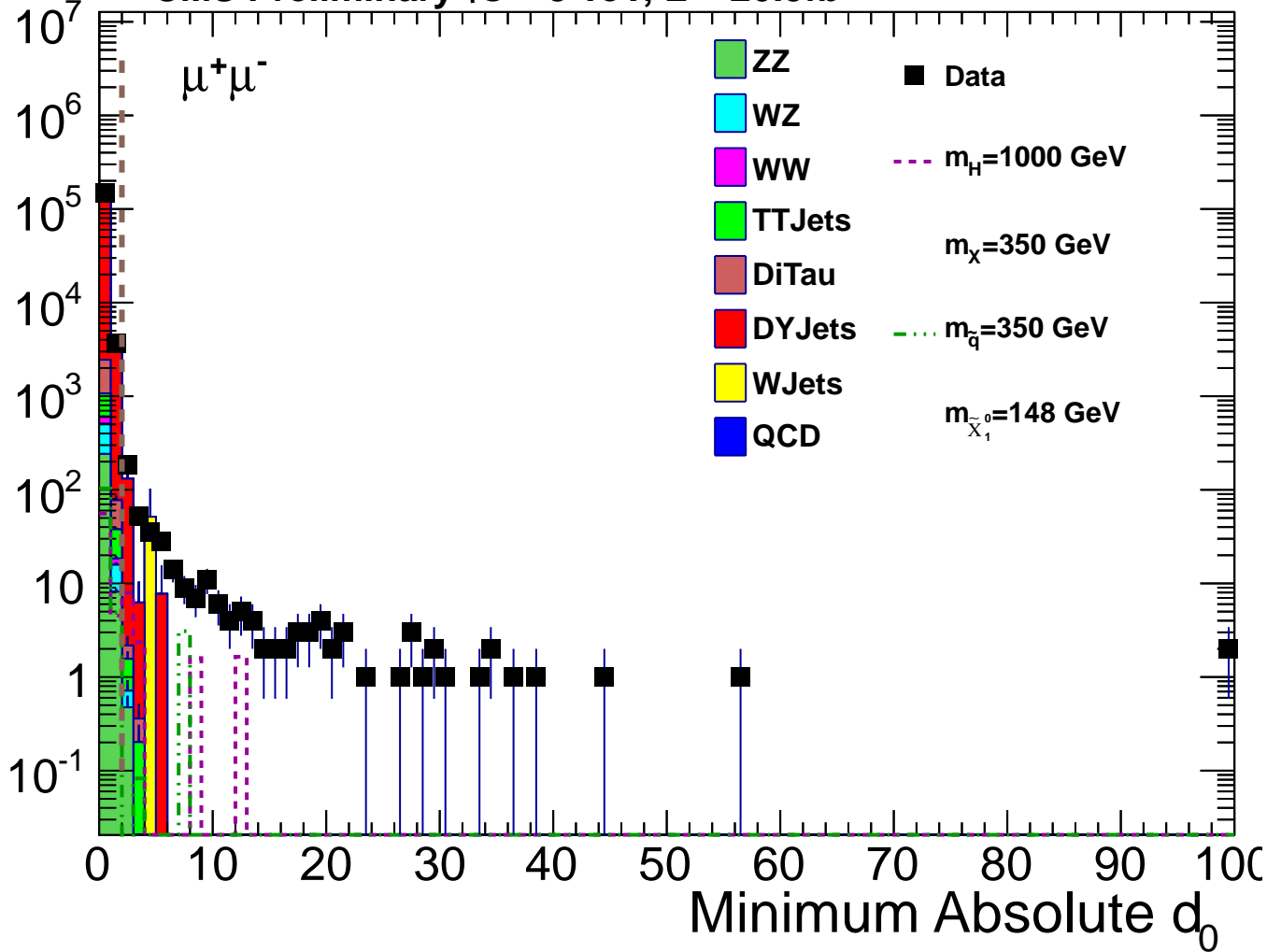


MC/Data

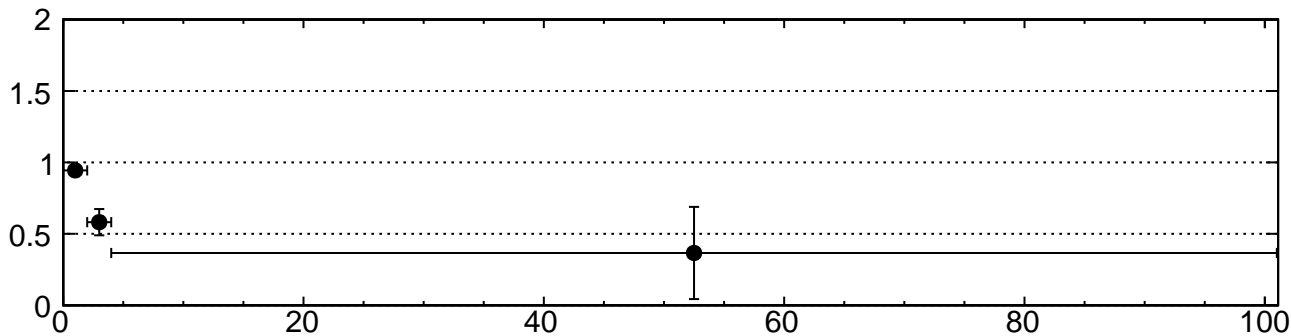


CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}$ ,  $L = 20.5 \text{ fb}^{-1}$

Entries

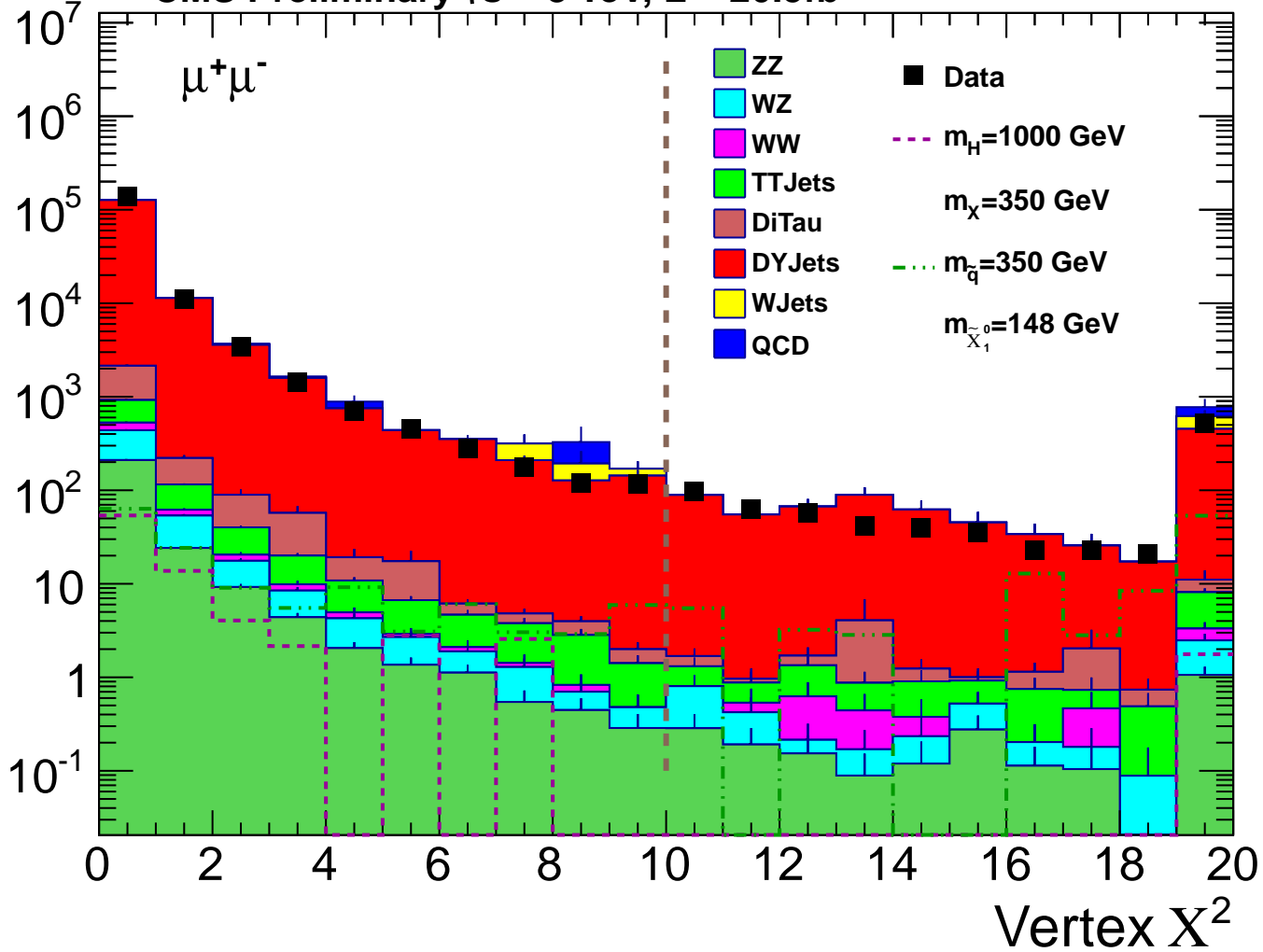


MC/Data

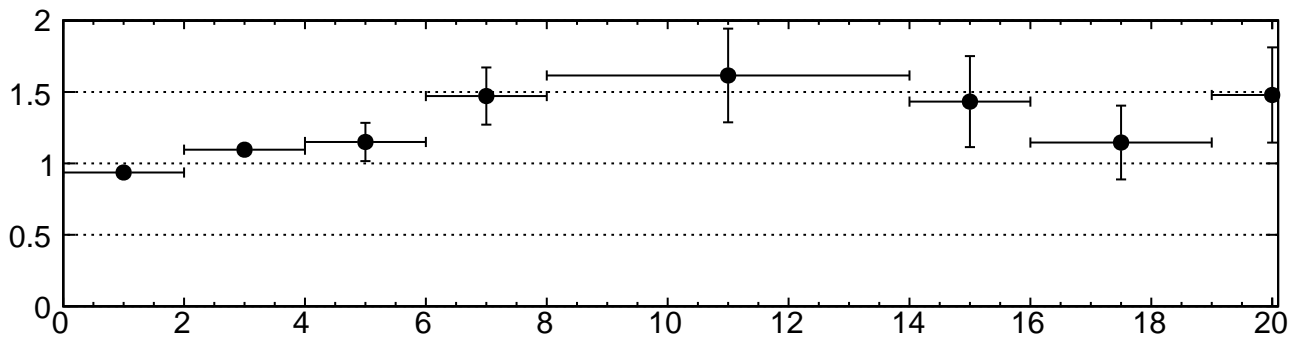


CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}$ ,  $L = 20.5 \text{ fb}^{-1}$

Entries

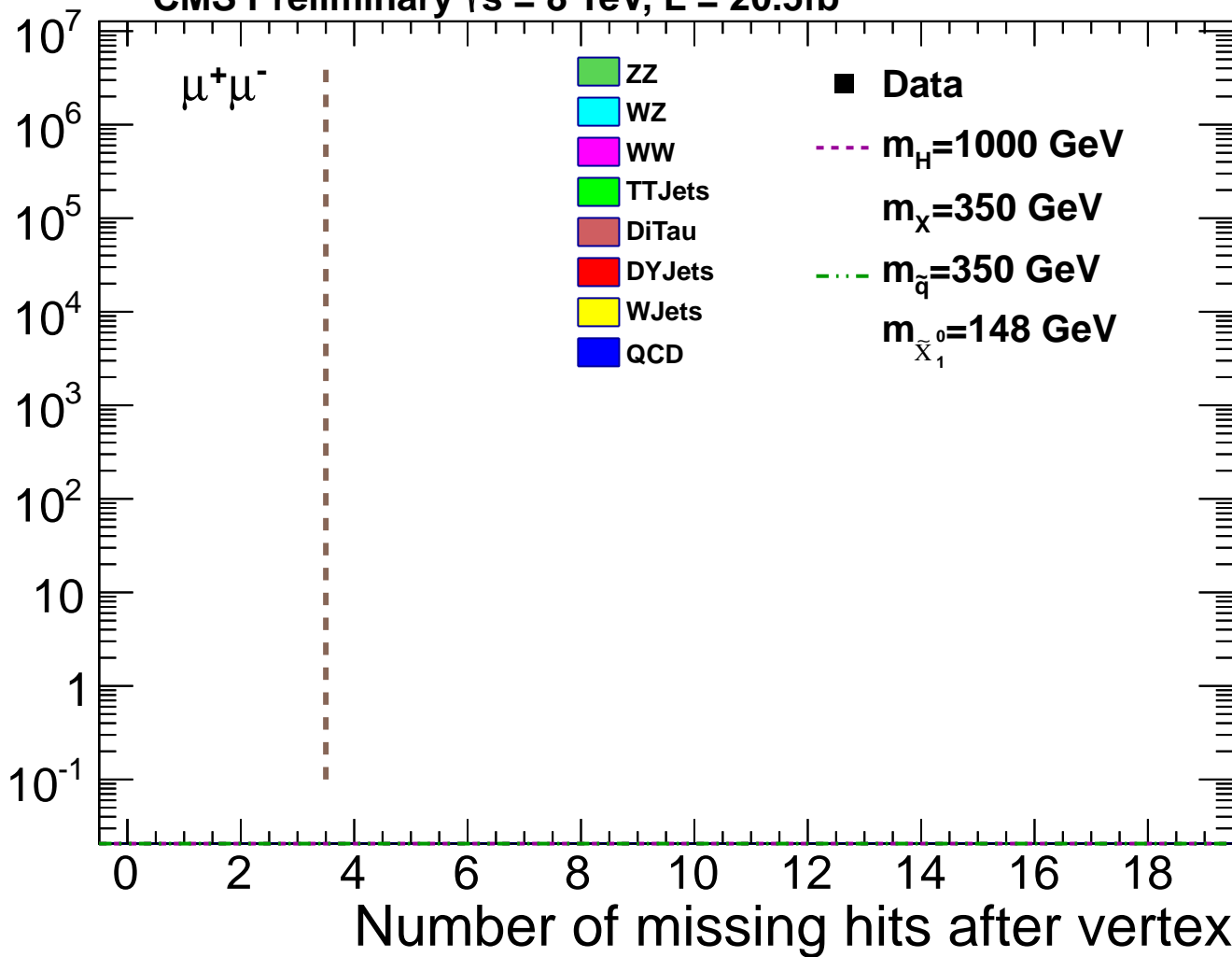


MC/Data



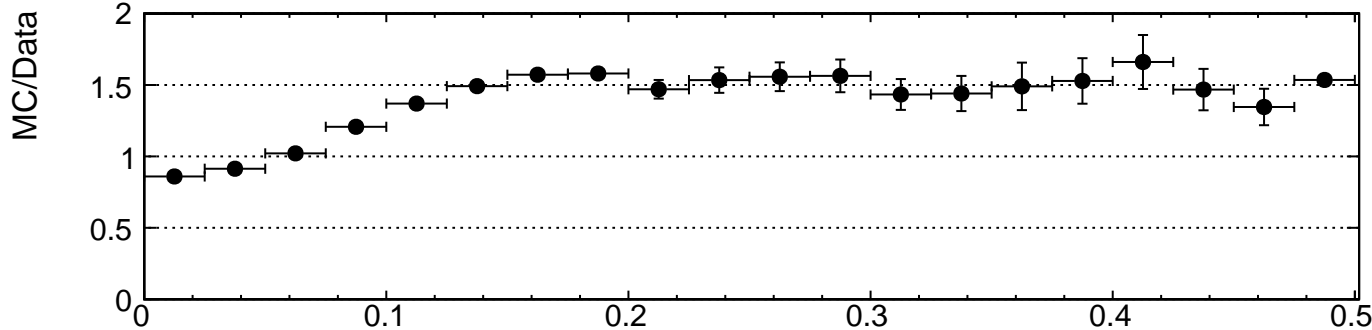
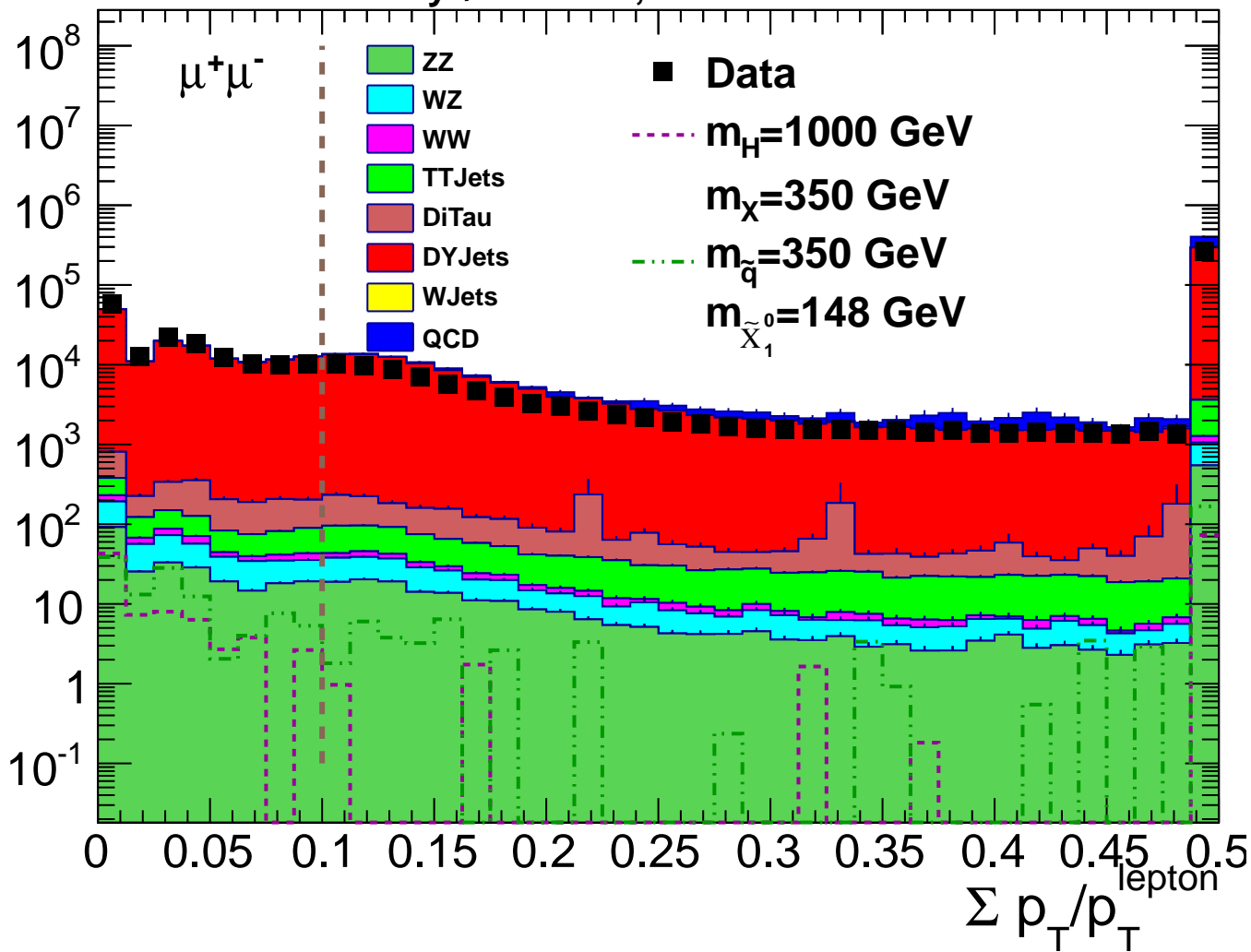
CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}$ ,  $L = 20.5 \text{ fb}^{-1}$

Entries



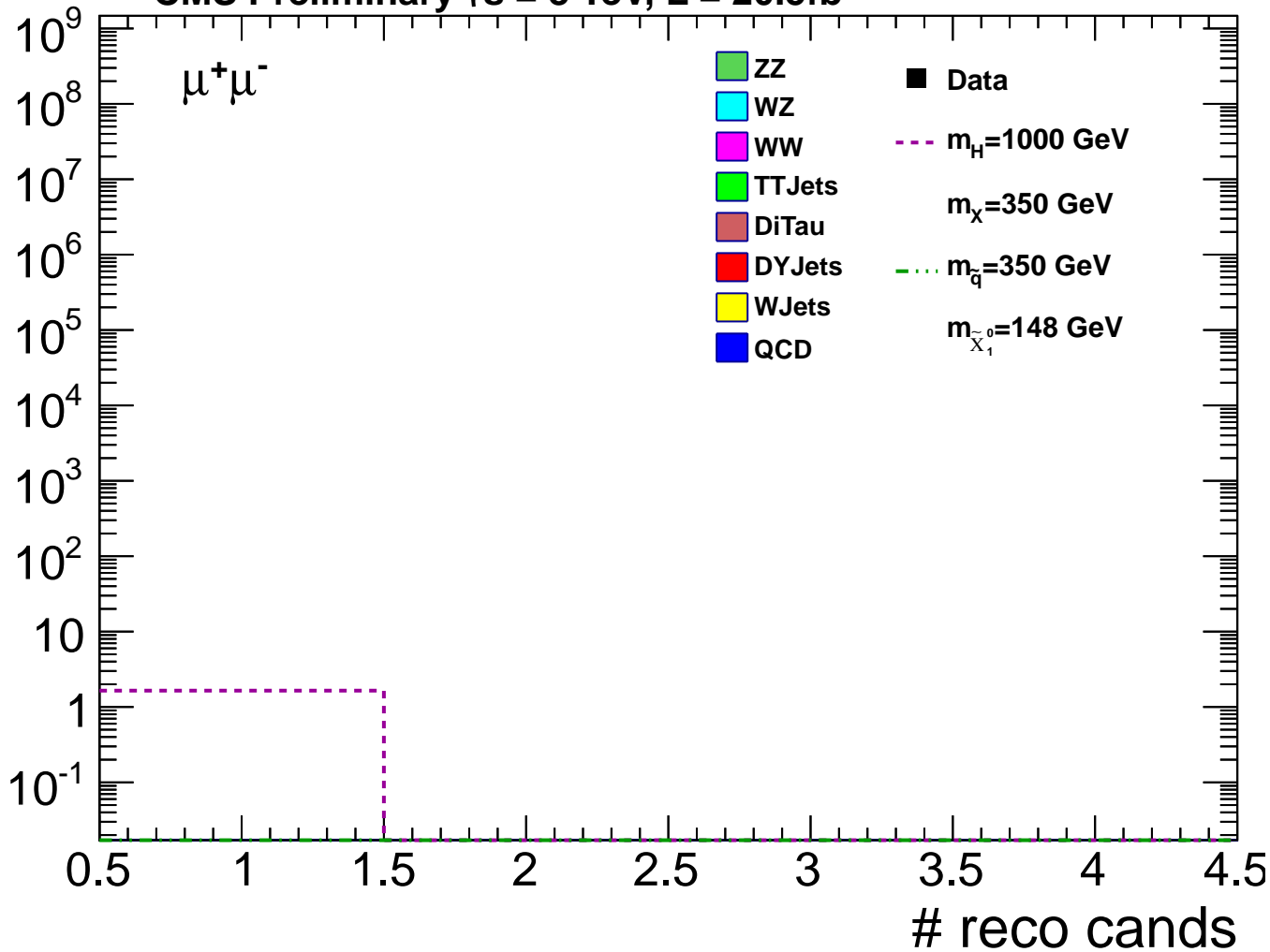
CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}$ ,  $L = 20.5 \text{ fb}^{-1}$

Entries

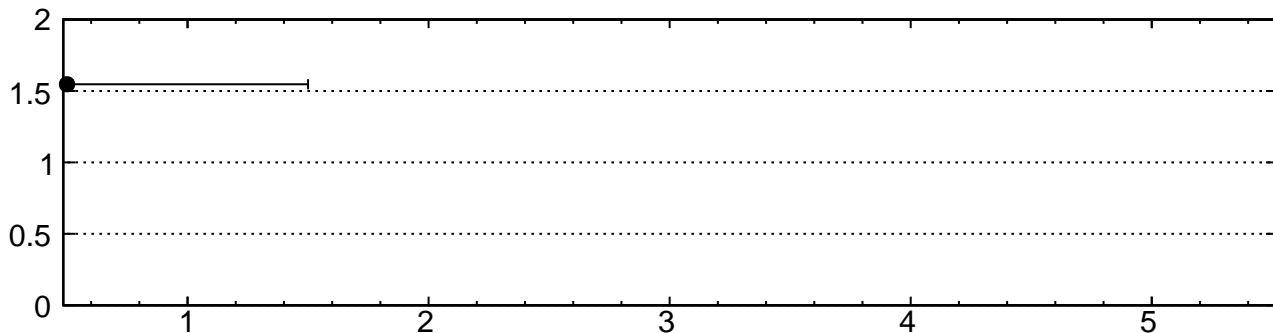


CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}, L = 20.5 \text{ fb}^{-1}$

Entries



MC/Data



CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}$ ,  $L = 20.5 \text{ fb}^{-1}$

Entries

$\mu^+\mu^-$

ZZ

WZ

WW

TTJets

DiTau

DYJets

WJets

QCD

$m_H = 1000 \text{ GeV}$

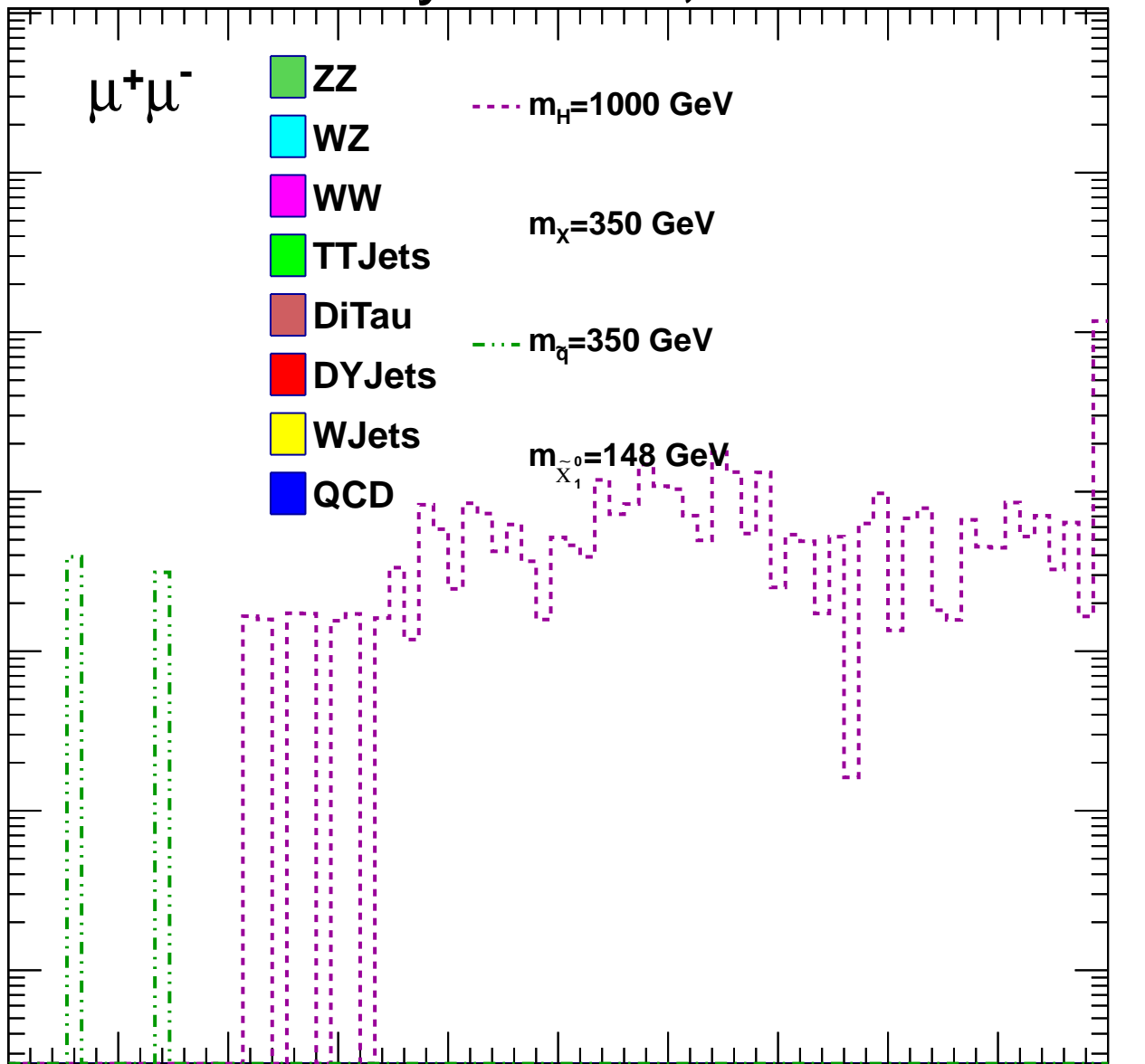
$m_{\chi} = 350 \text{ GeV}$

$m_{\tilde{q}} = 350 \text{ GeV}$

$m_{\tilde{X}_0} = 148 \text{ GeV}$

$10^4$   
 $10^3$   
 $10^2$   
 $10$   
 $1$   
 $10^{-1}$   
 $10^{-2}$

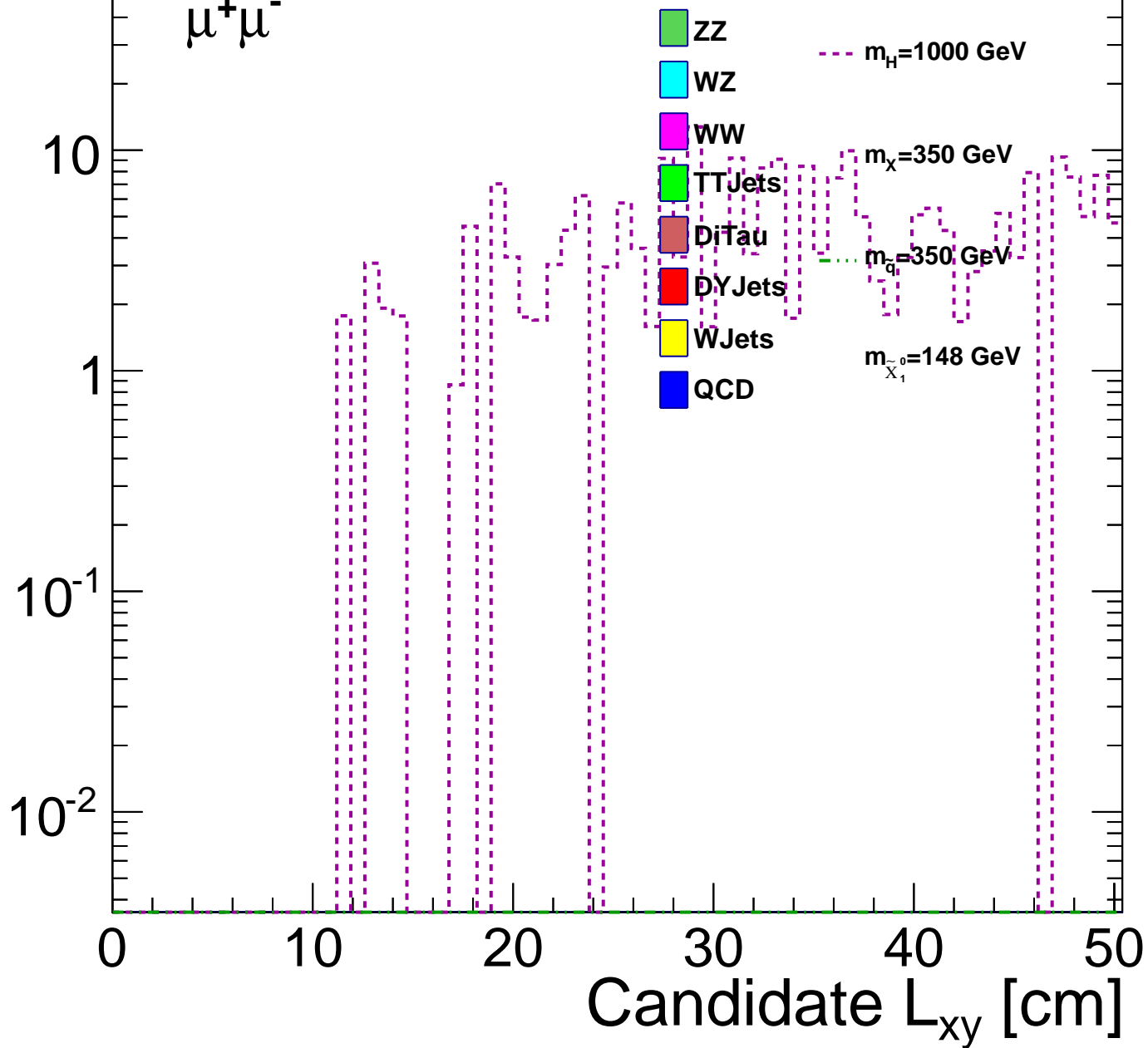
0 50 100 150 200 250 300 350 400 450 500  
Mass[GeV/c<sup>2</sup>]



CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}$ ,  $L = 20.5 \text{ fb}^{-1}$

Entries

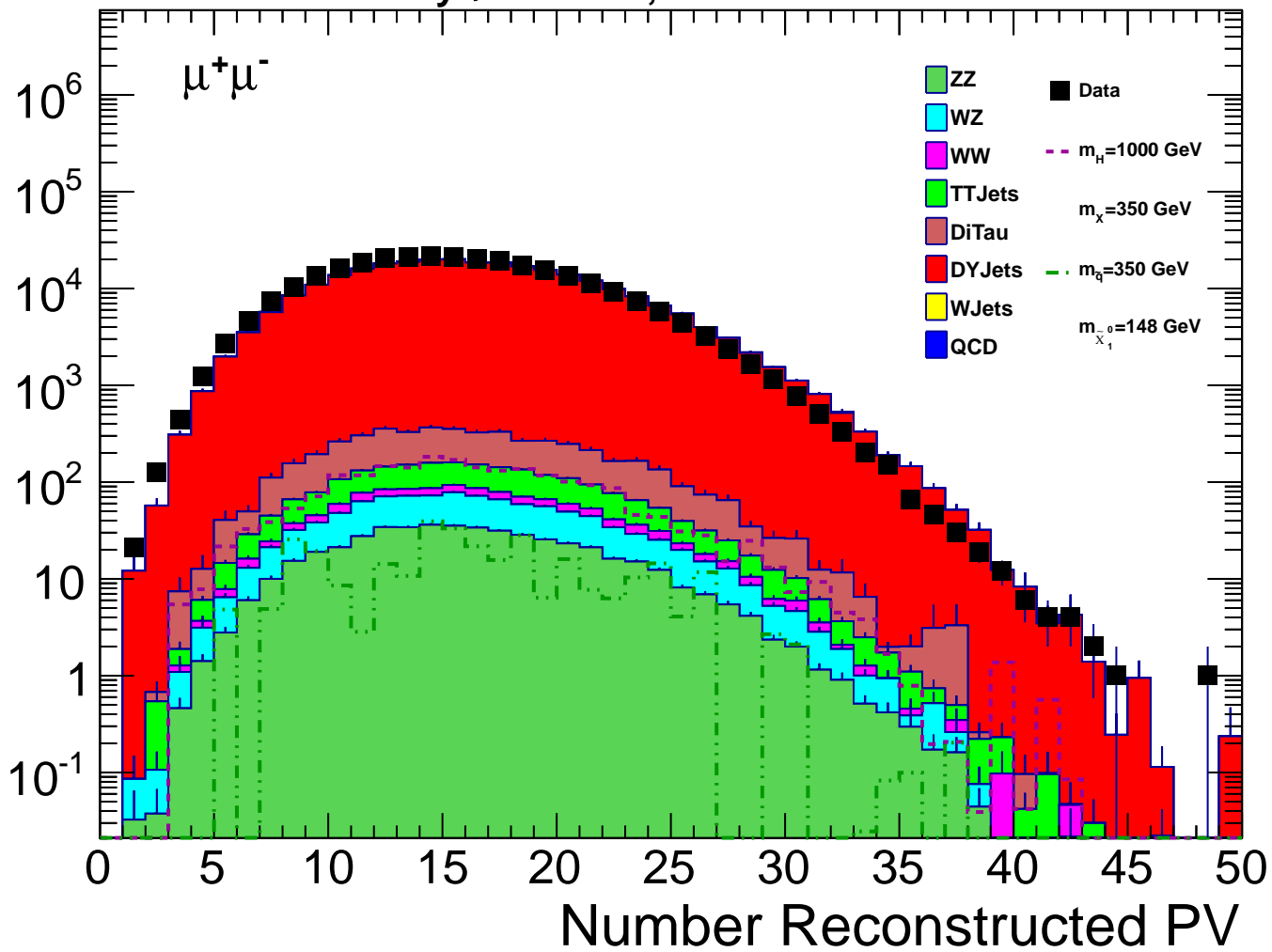
$\mu^+\mu^-$





CMS Preliminary  $\sqrt{s} = 8 \text{ TeV}$ ,  $L = 20.5 \text{ fb}^{-1}$

Entries



MC/Data

