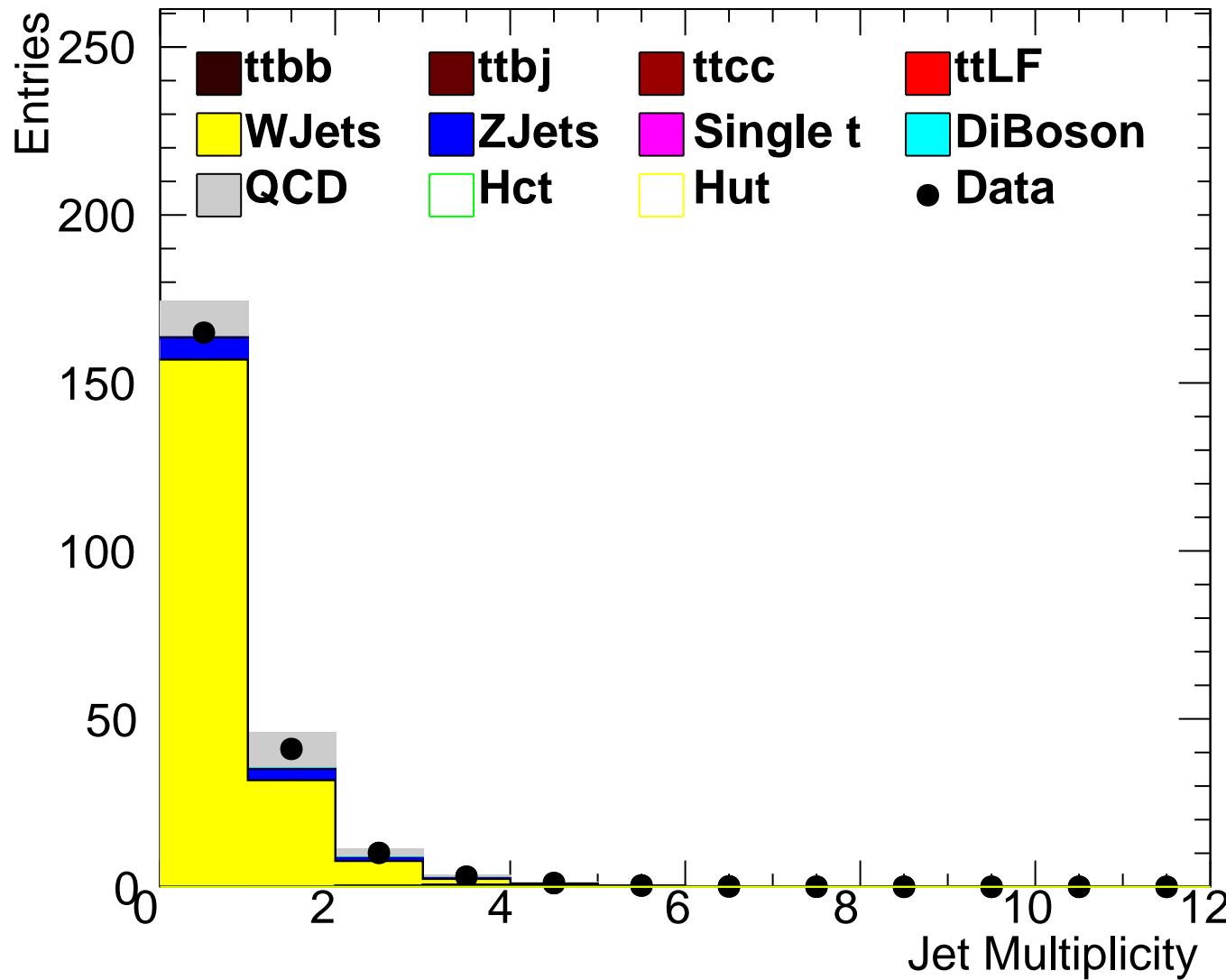


# Ch0\_so

6

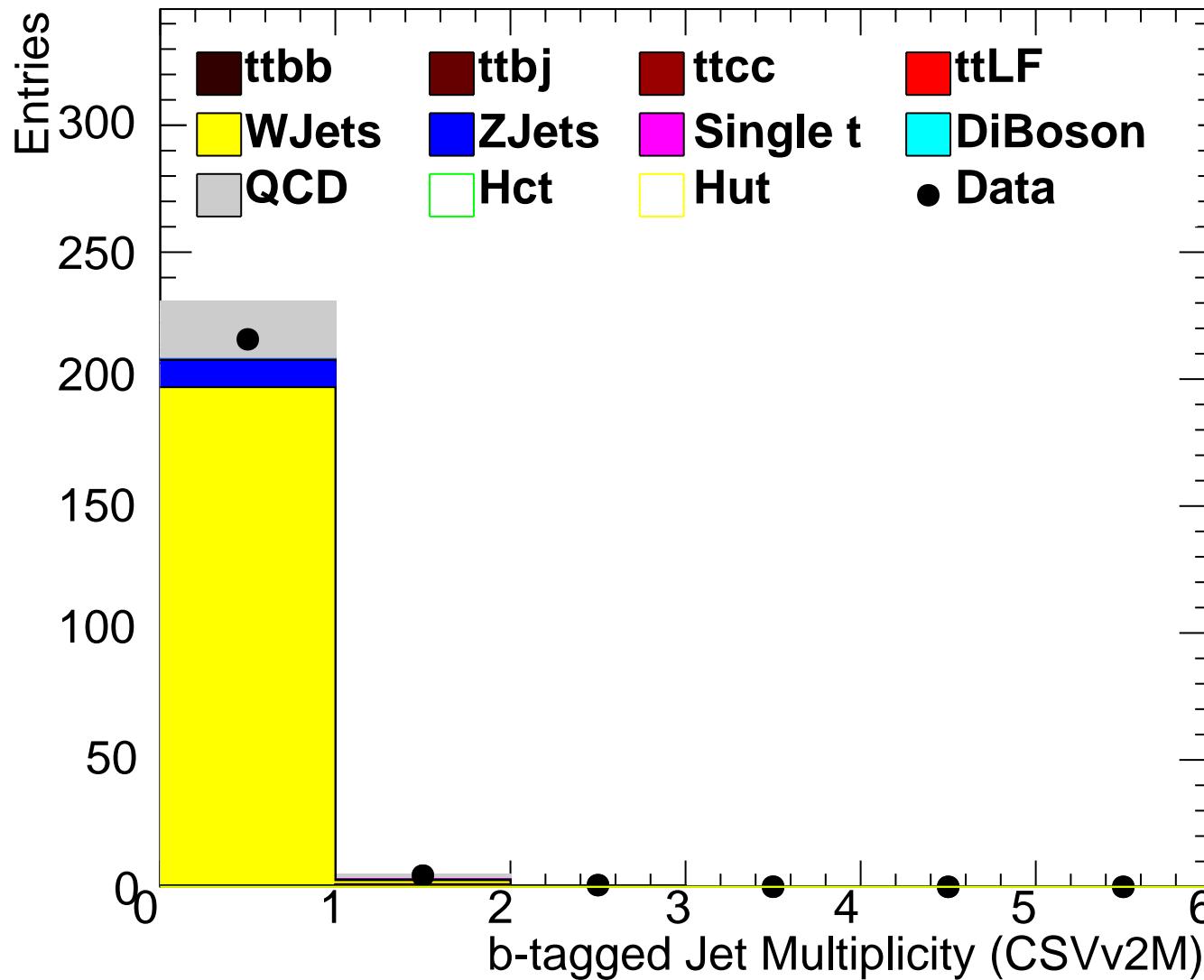
CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$



# Ch0\_so

6

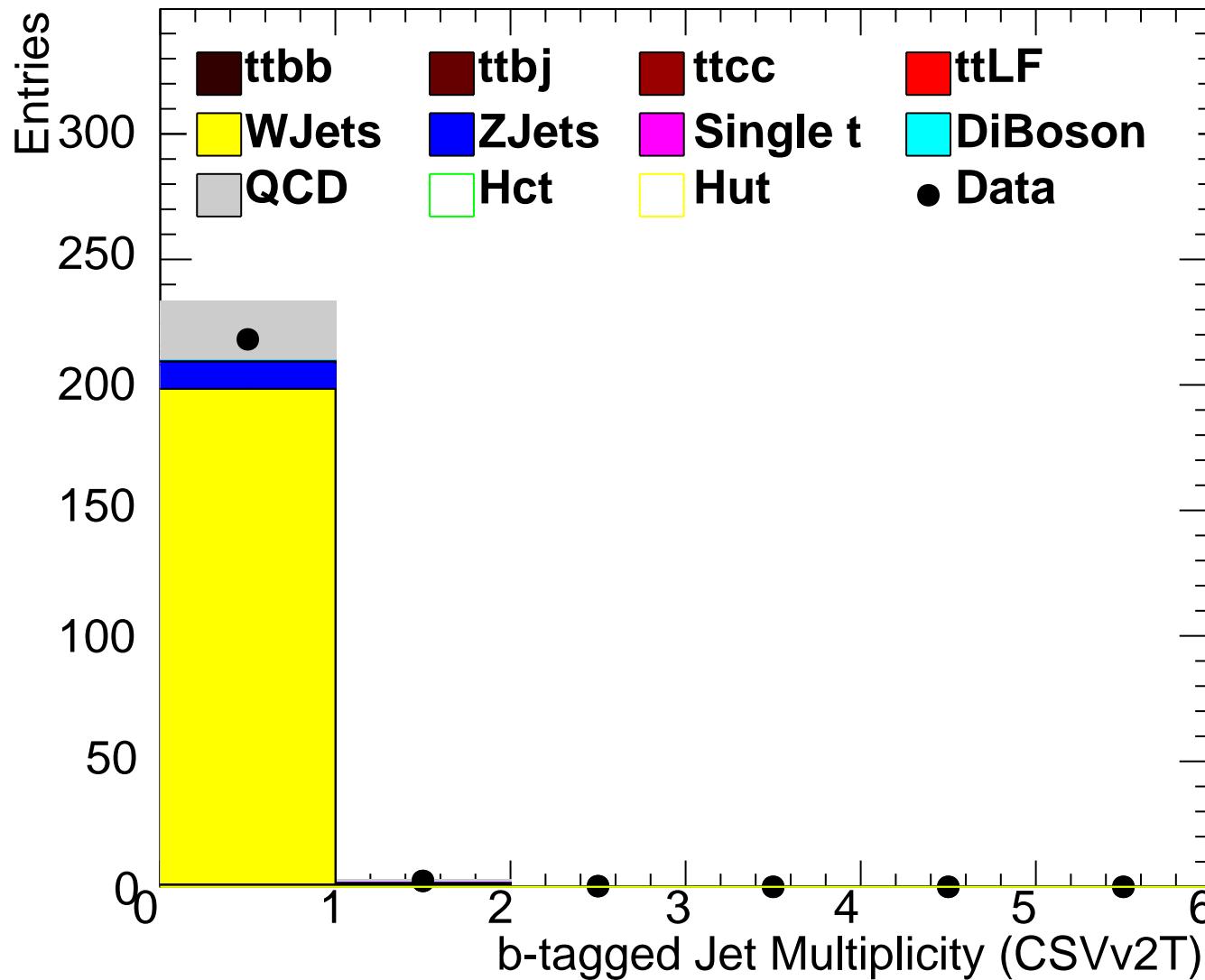
CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$



# Ch0\_so

6

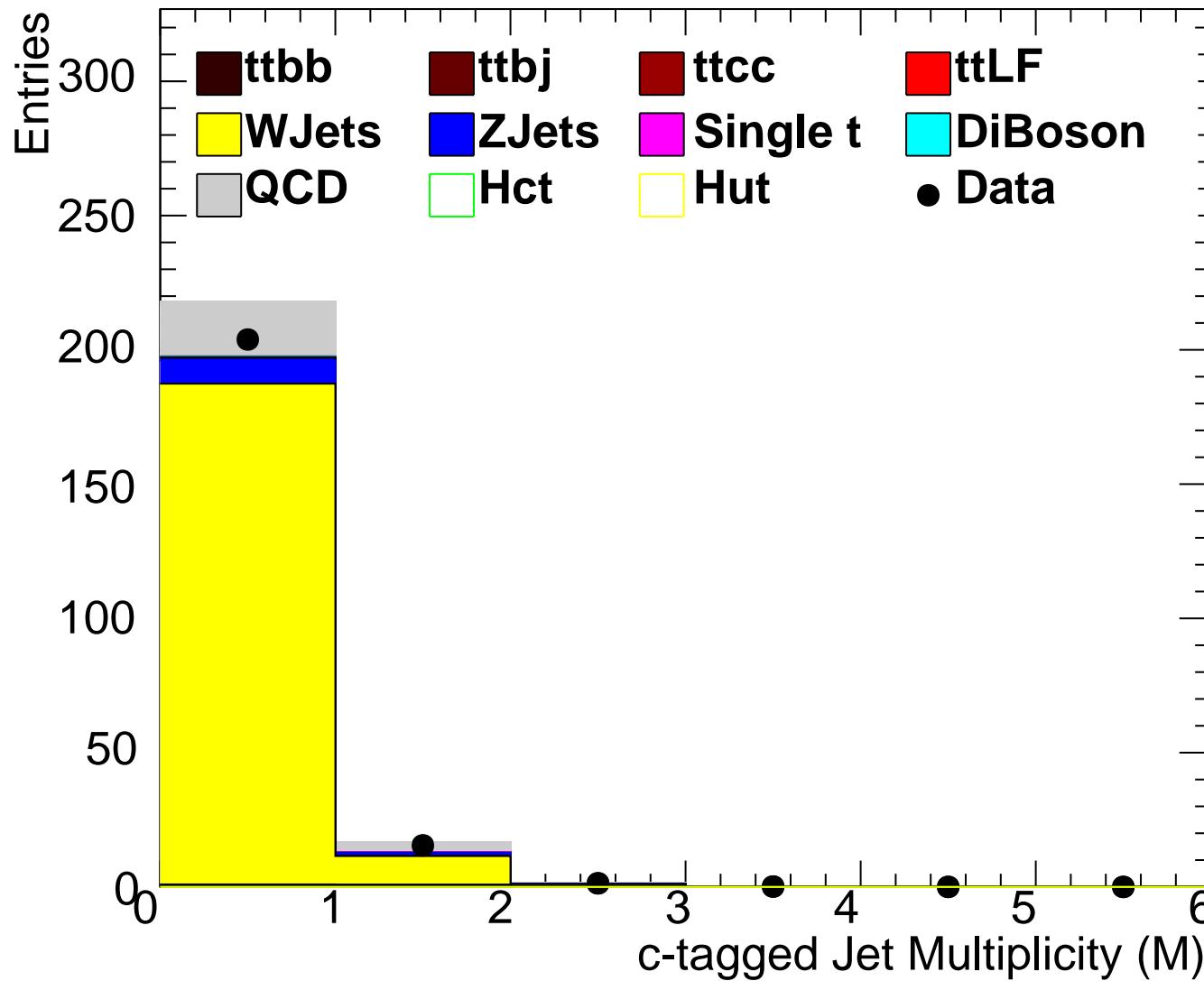
CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$



# Ch0\_so

6

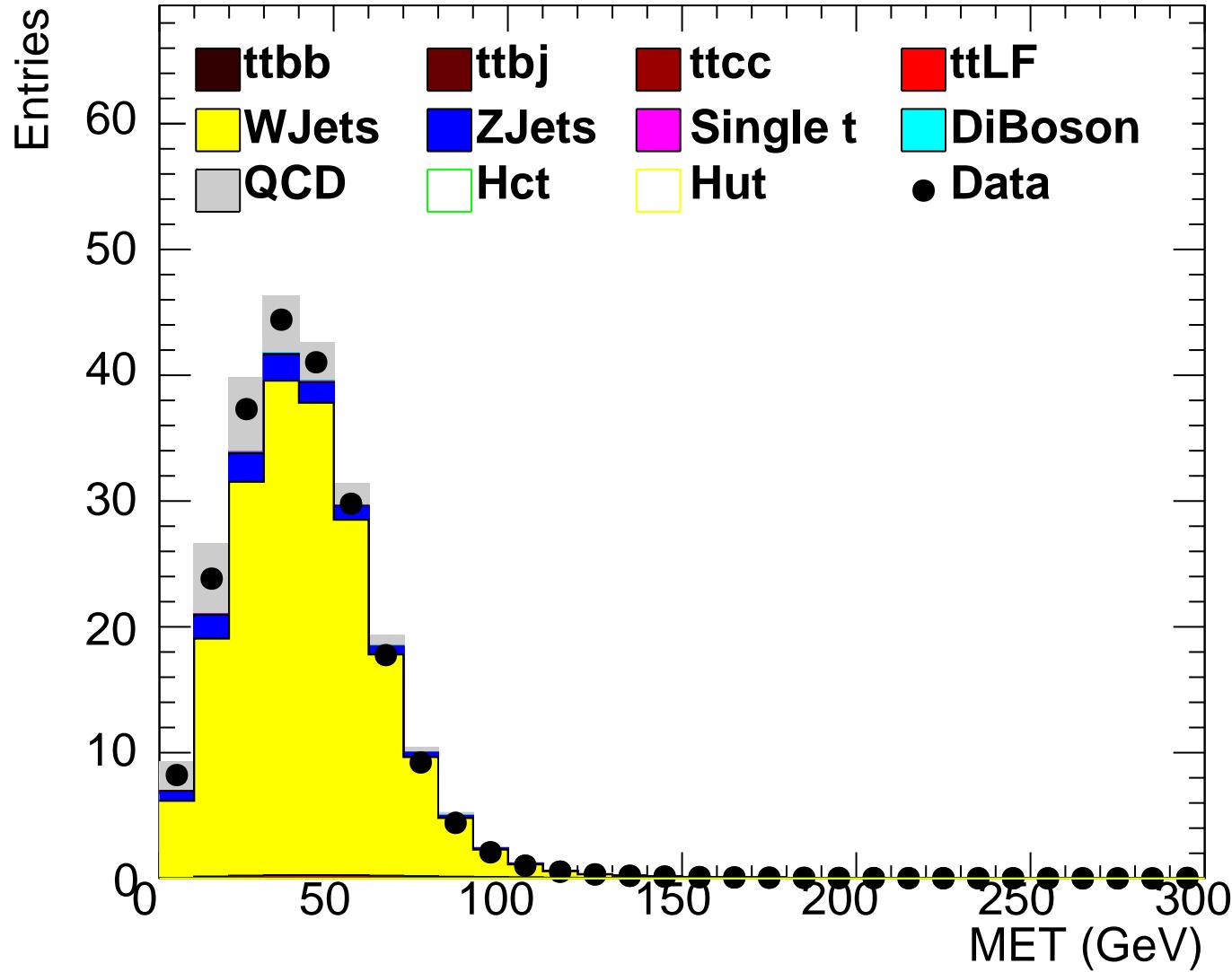
CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$



# Ch0\_so

6

CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$



**Ch0\_S0**x 10<sup>6</sup>CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV

Entries

22

20

18

16

14

12

10

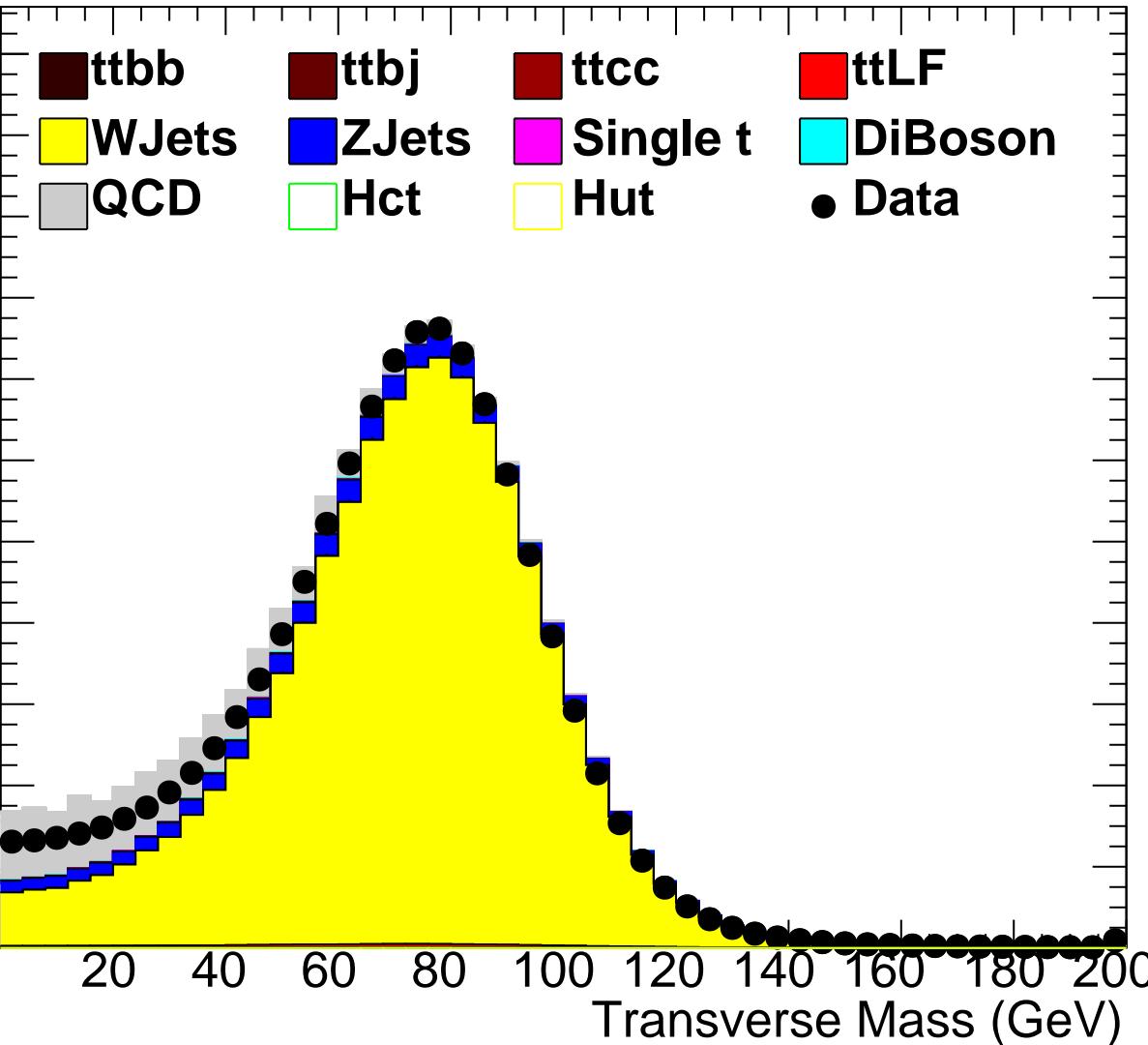
8

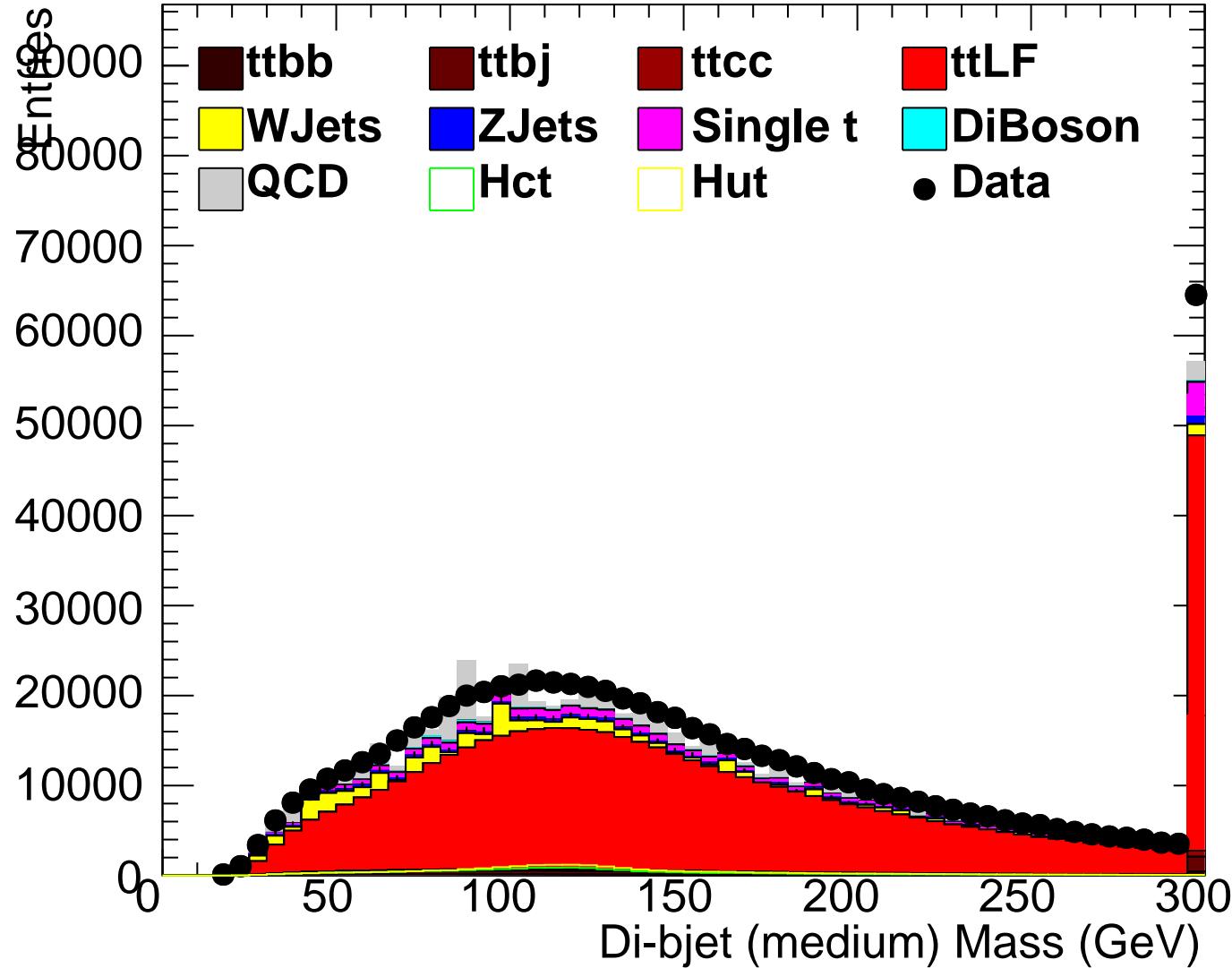
6

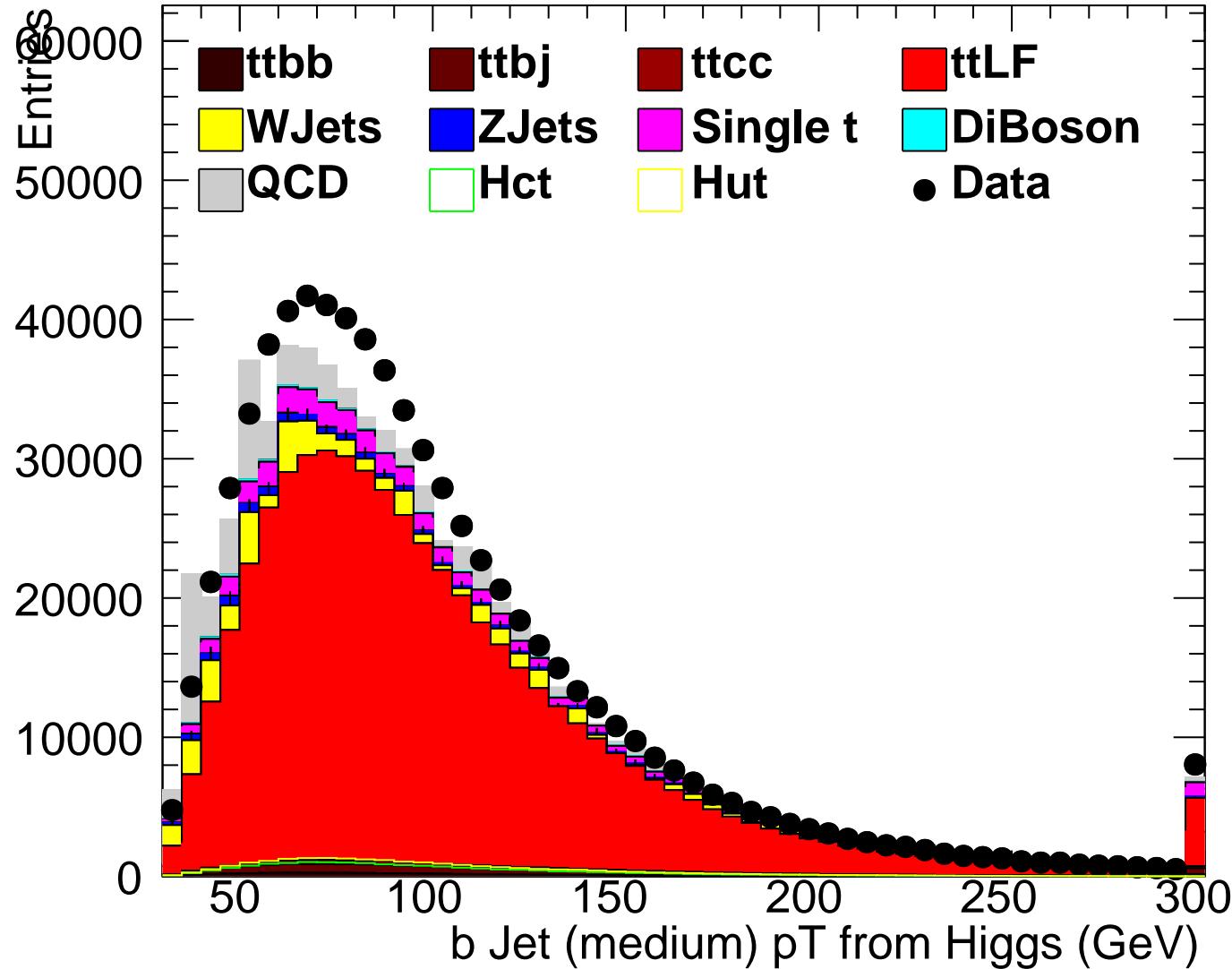
4

2

0

x 10<sup>6</sup>

**Ch0\_S0**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch0\_S0**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch0\_S0**

$\times 10^{-3}$

CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$

Entries

4000

3500

3000

2500

2000

1500

1000

500

0

50

100

150

200

250

300

leading c Jet (medium) pT (GeV)

ttbb

ttbj

ttcc

ttLF

WJets

ZJets

Single t

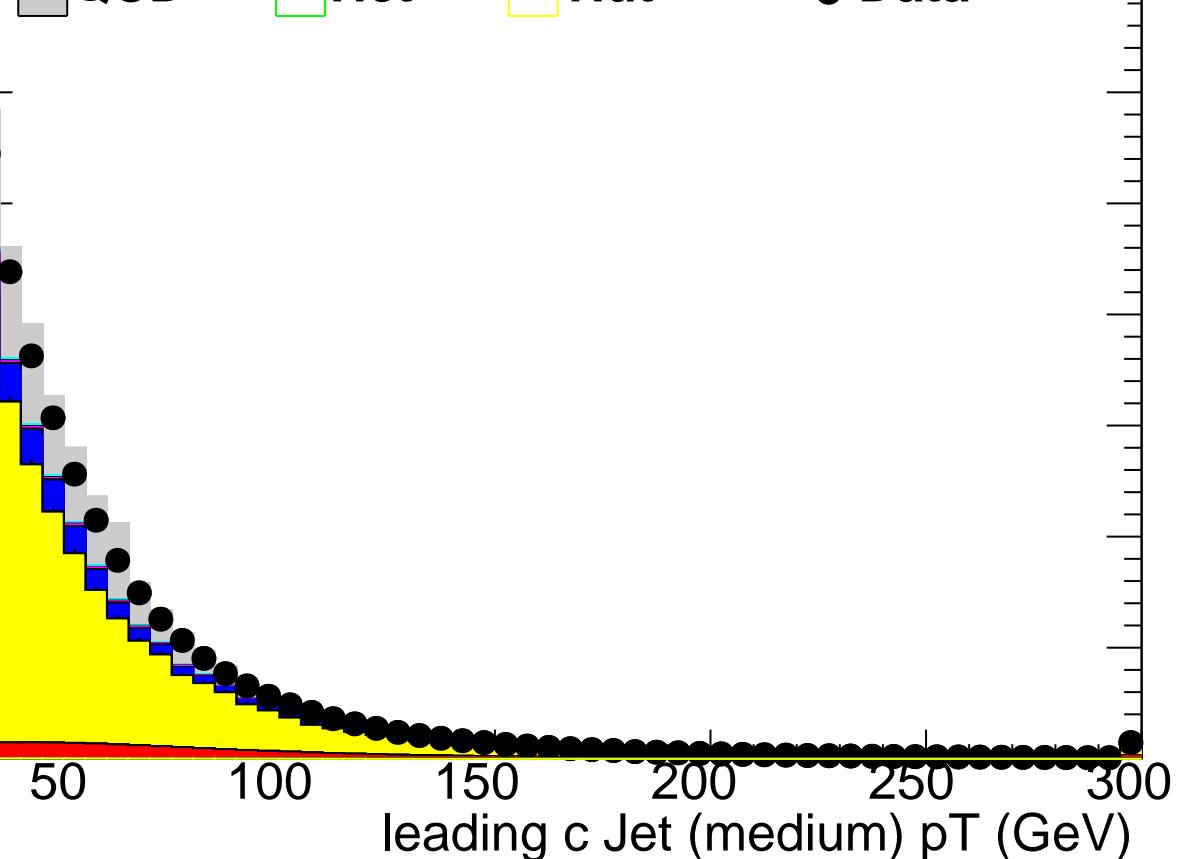
DiBoson

QCD

Hct

Hut

Data



**Ch0\_S0**x 10<sup>6</sup>CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV

Entries

16

14

12

10

8

6

4

2

0

x 10<sup>6</sup>x 10<sup>6</sup>

ttbj

ttcc

ttLF

WJets

ZJets

Single t

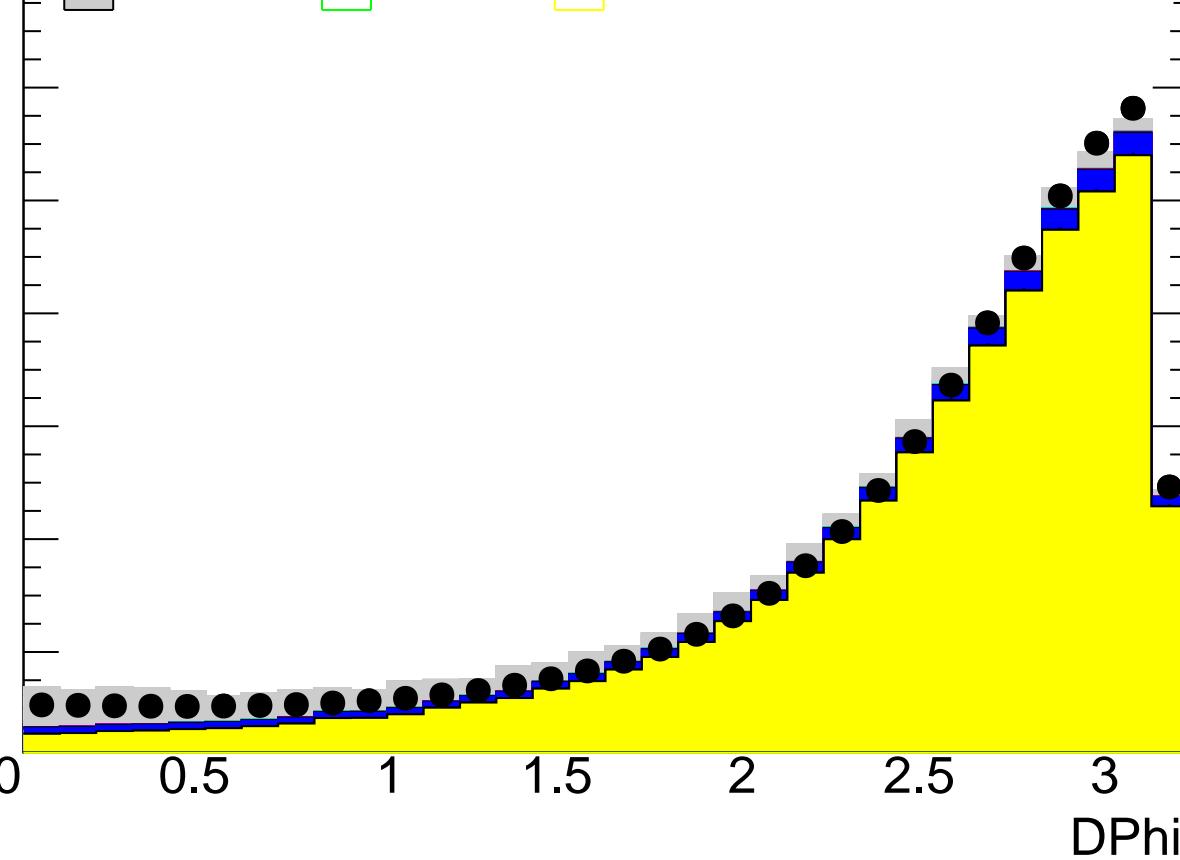
DiBoson

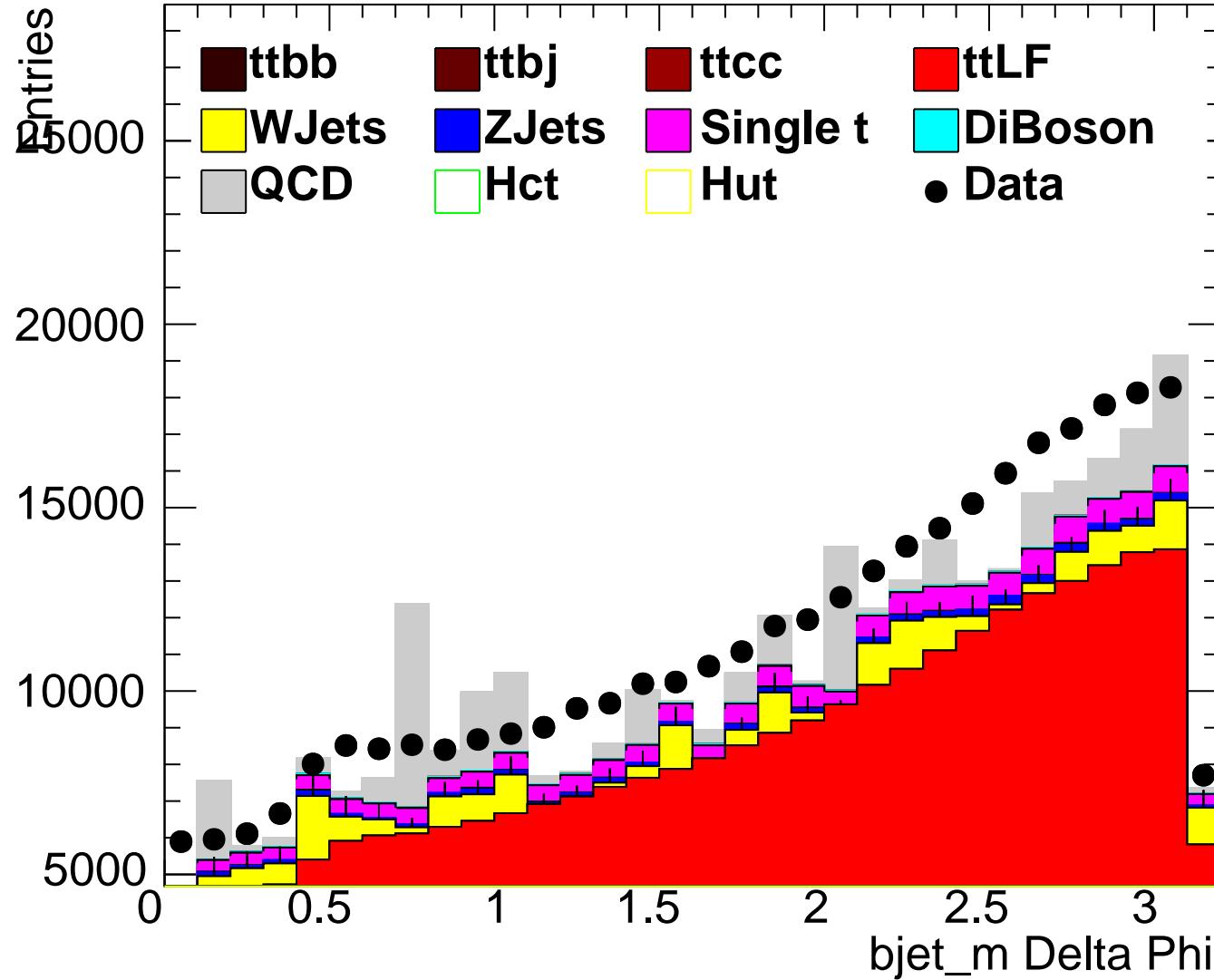
QCD

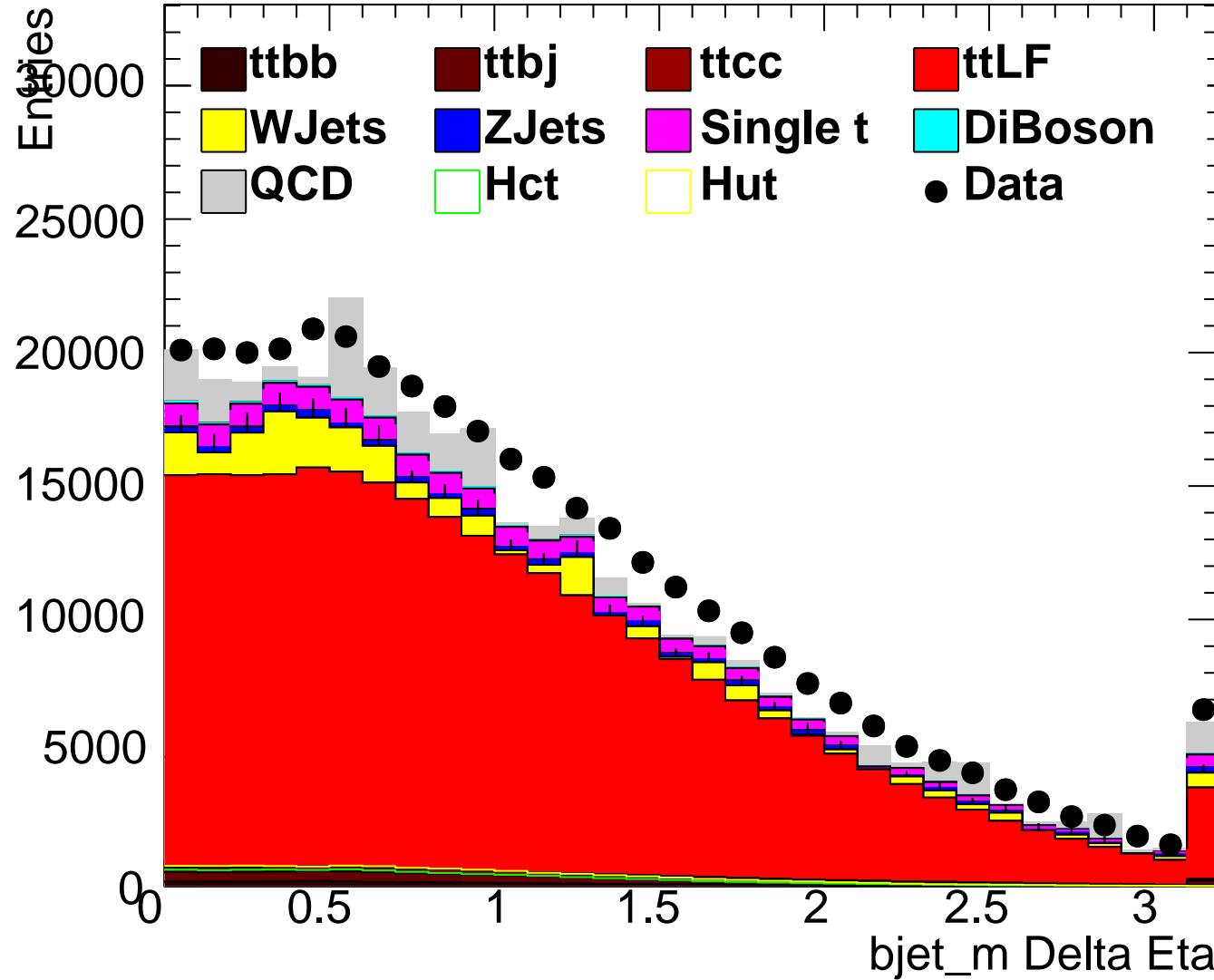
Hct

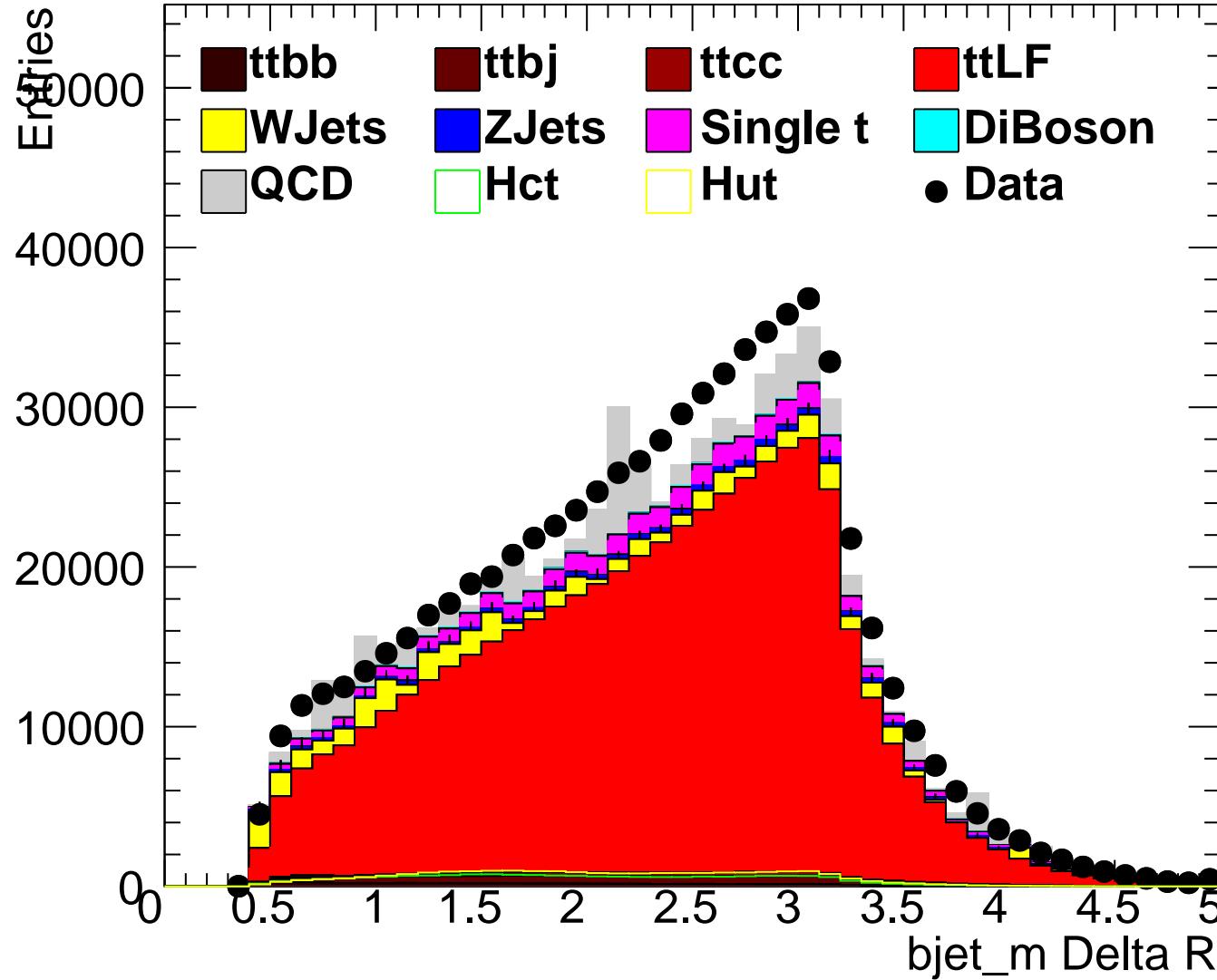
Hut

Data



**Ch0\_S0**CMS, 35.9  $\text{fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch0\_S0**CMS, 35.9  $\text{fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch0\_S0**CMS, 35.9  $\text{fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch0\_S0**

$\times 10^6$

CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$

Entries

140

120

100

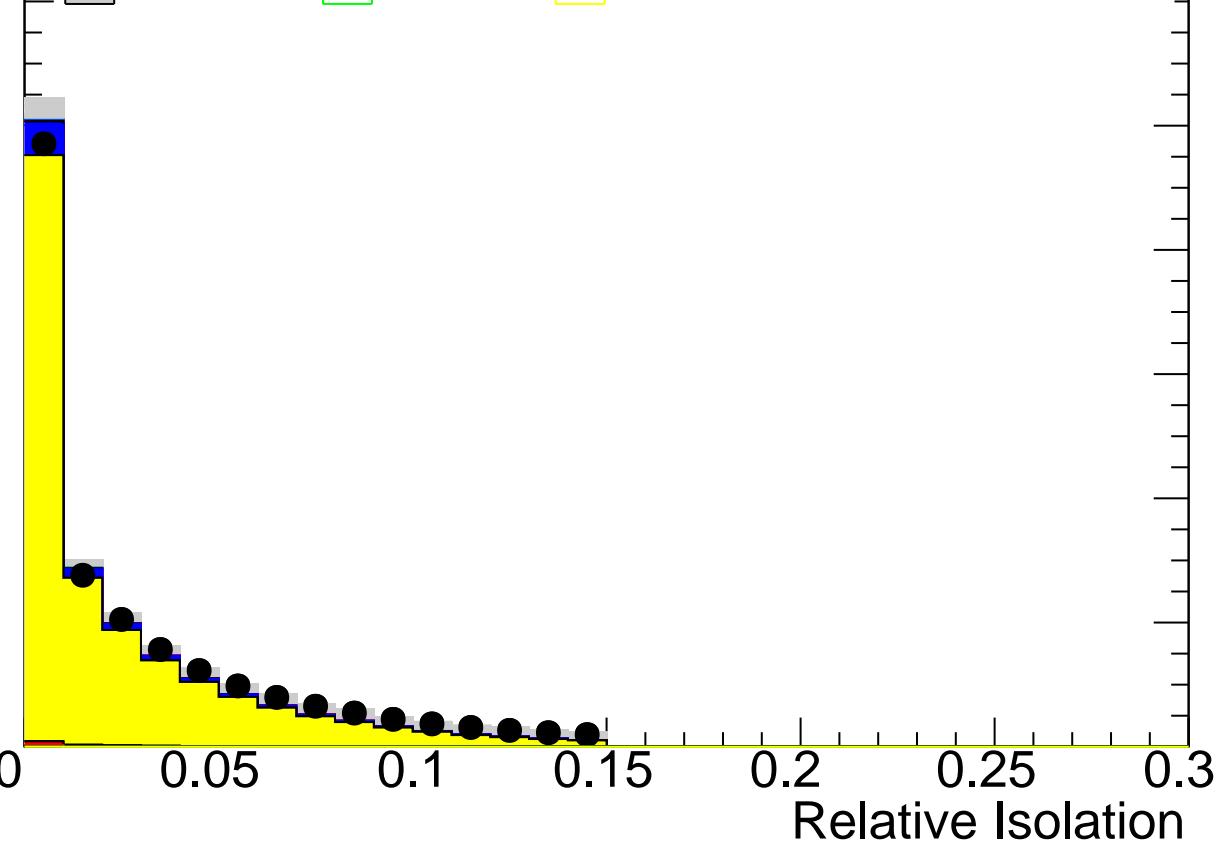
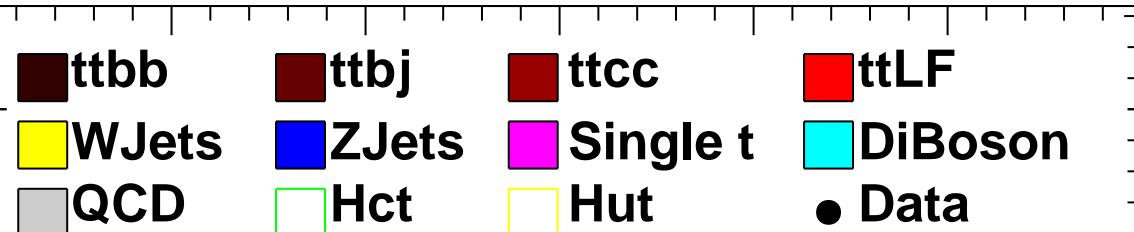
80

60

40

20

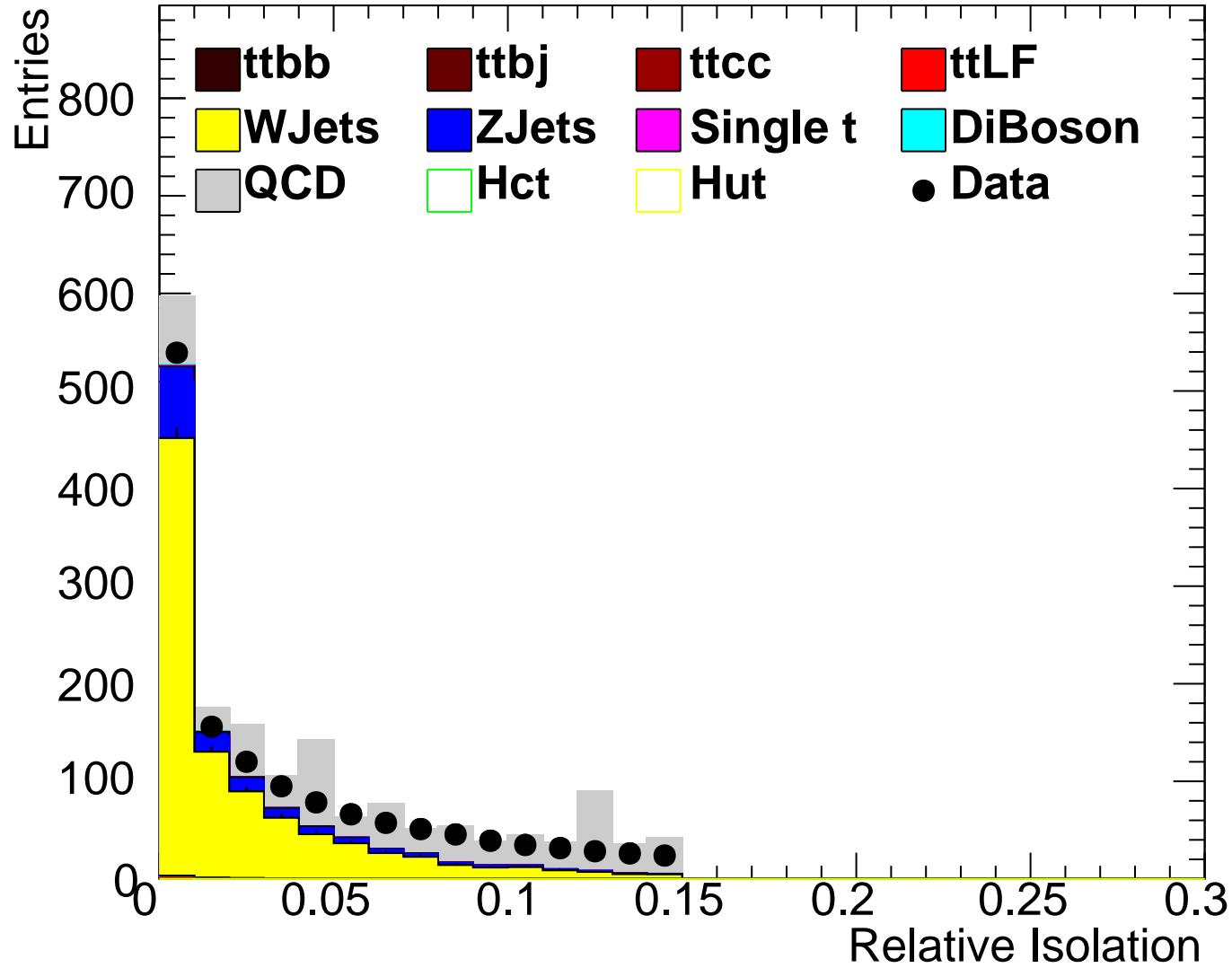
0



**Ch0\_S0**

$\times 10^{-3}$

CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$



**Ch0\_S0**x 10<sup>6</sup>CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV

Entries

45

40

35

30

25

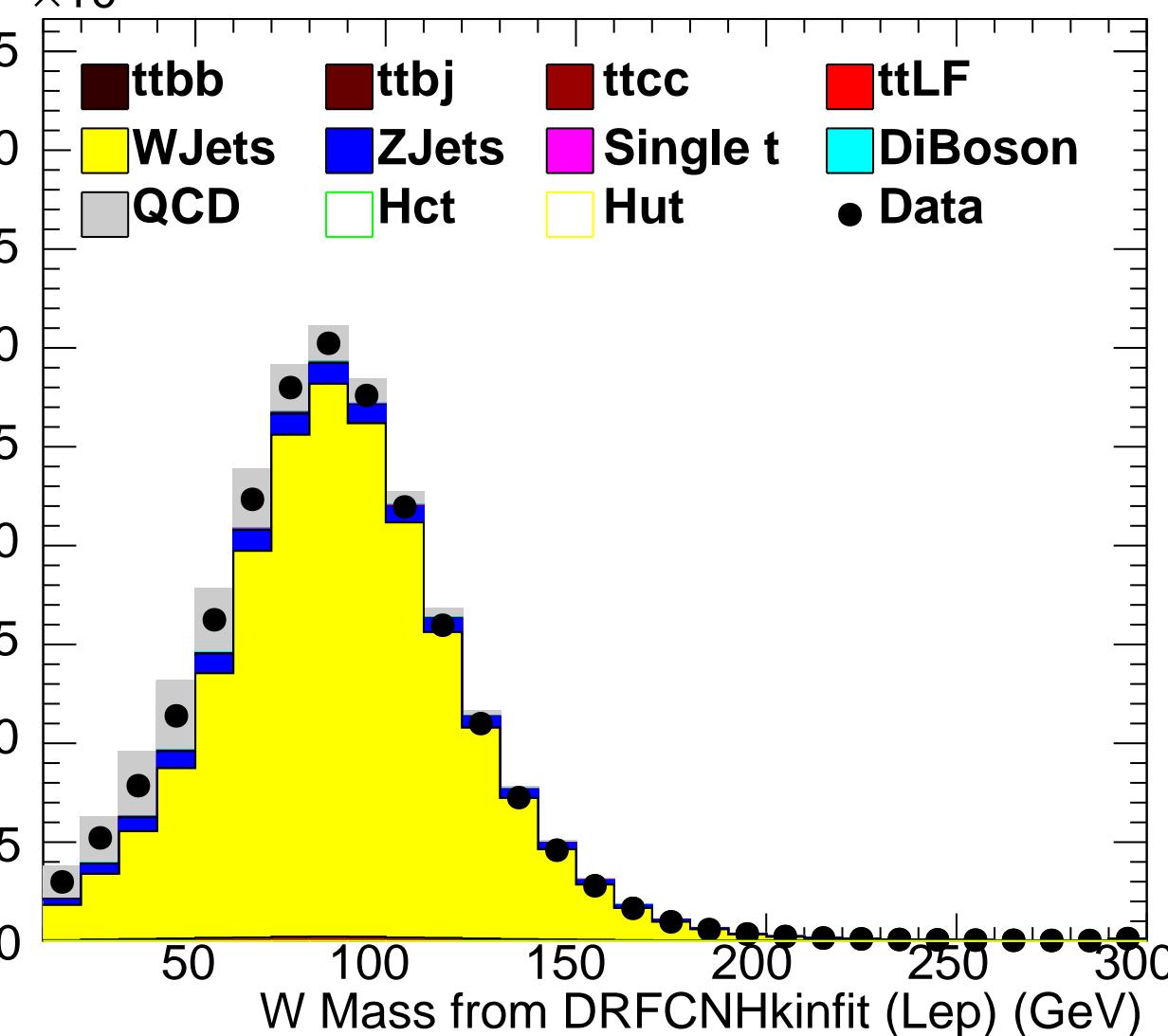
20

15

10

5

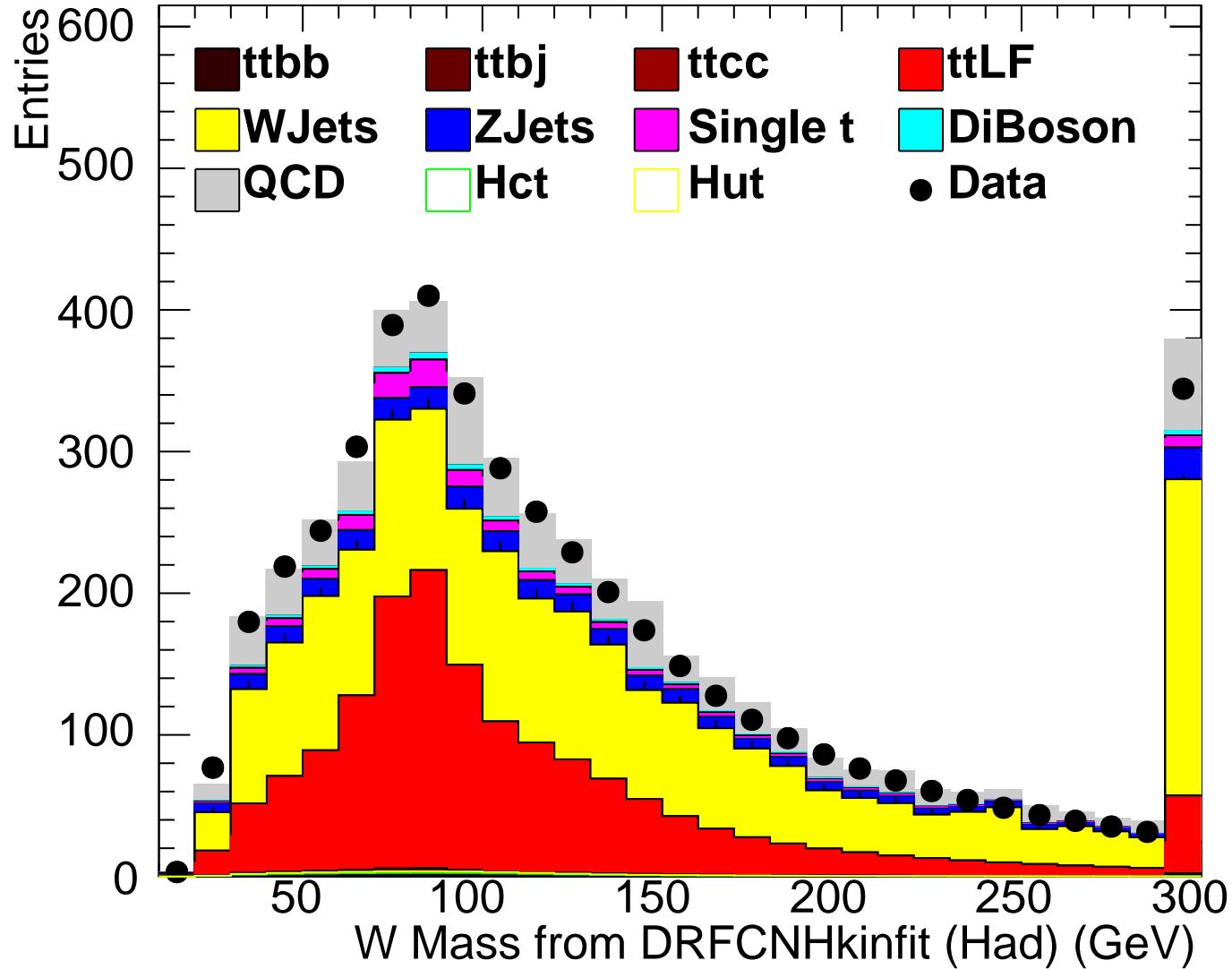
0

**ttbb****WJets****QCD****ttbj****ZJets****Hct****ttcc****Hut****ttLF****Single t****DiBoson****Data**W Mass from DRFCN<sub>H</sub>kinfit (Lep) (GeV)

**Ch0\_S0**

$\times 10^3$

CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$



**Ch0\_S0**

$\times 10^3$

CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$

Entries

600

500

400

300

200

100

0

**ttbb**    **ttbj**    **ttcc**    **ttLF**  
**WJets**    **ZJets**    **Single t**    **DiBoson**  
**QCD**    **Hct**    **Hut**

● Data

H Mass from DRFCN<sub>H</sub>kinfit (bb)(GeV)

50

100

150

200

250

300

**Ch0\_S0**

$\times 10^3$

CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$

Entries

250

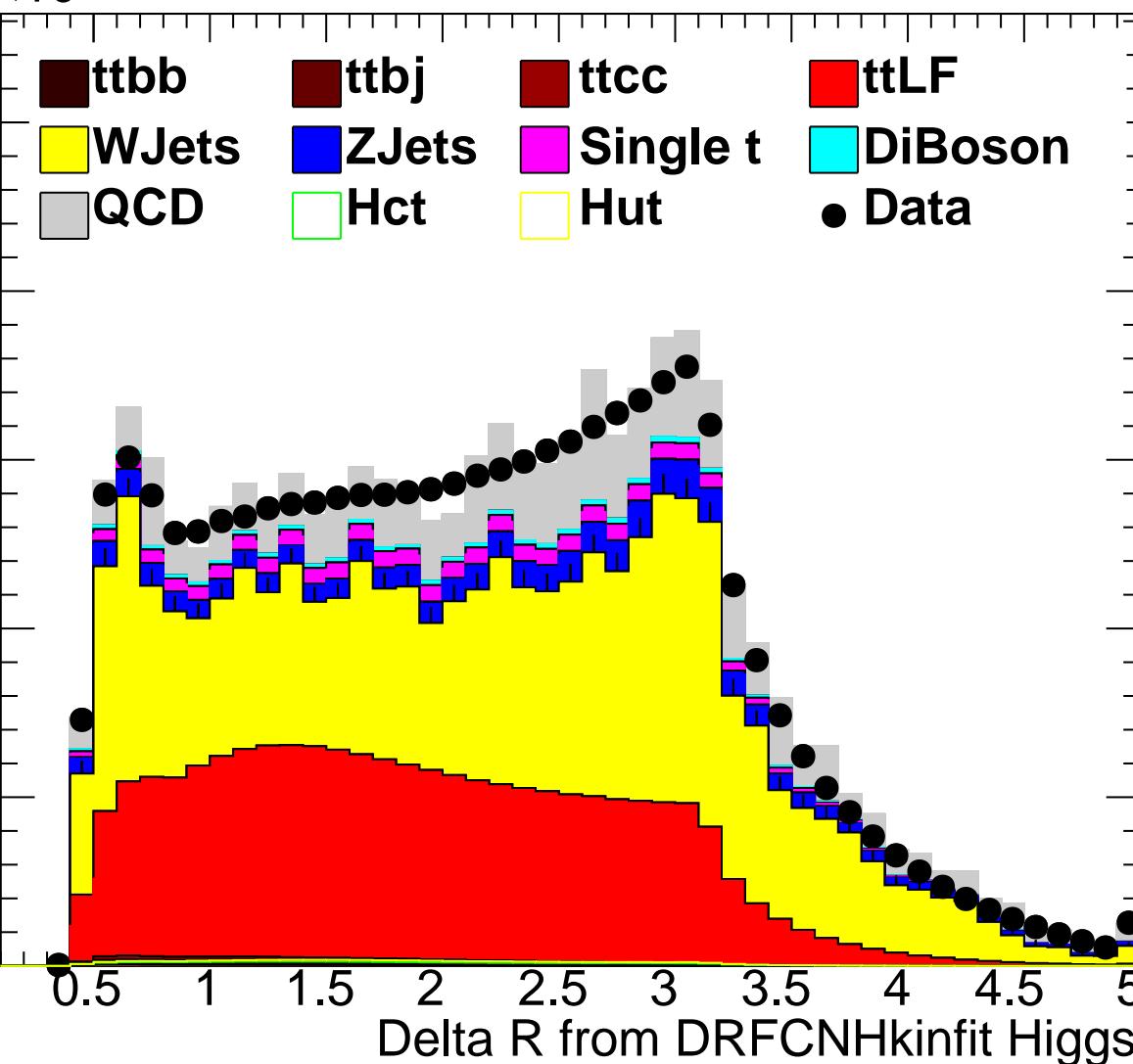
200

150

100

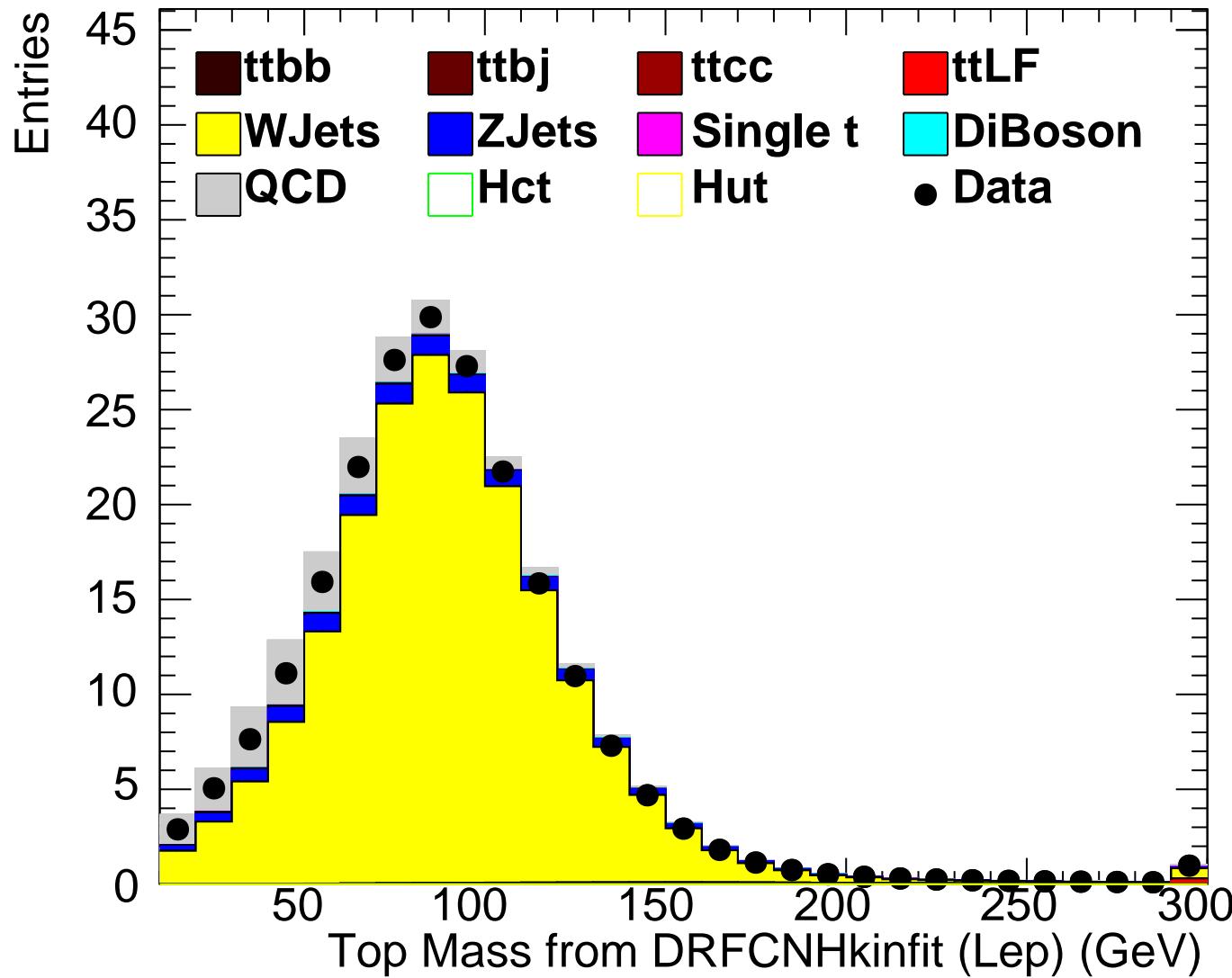
50

0



Ch0\_S0

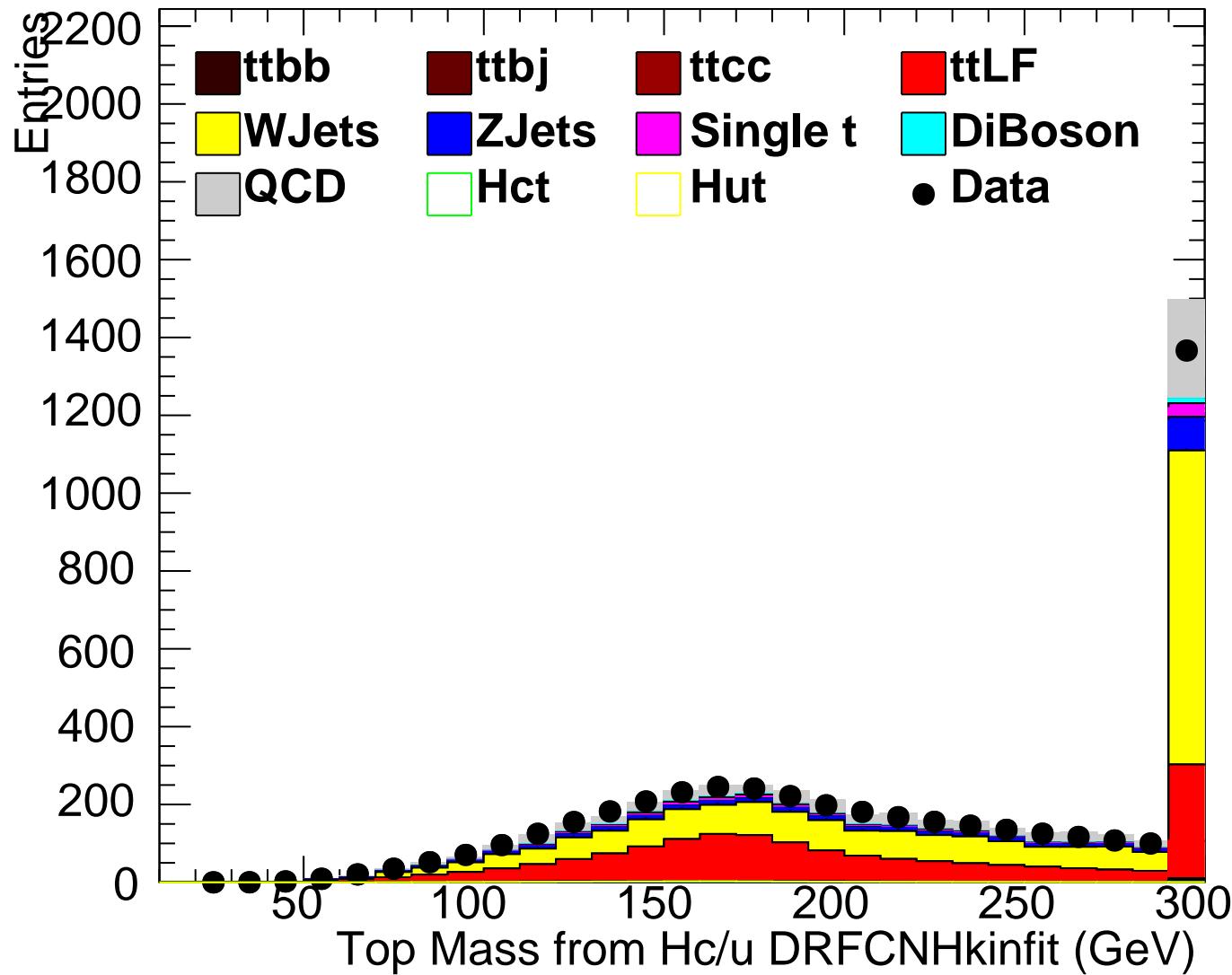
CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV



**Ch0\_S0**

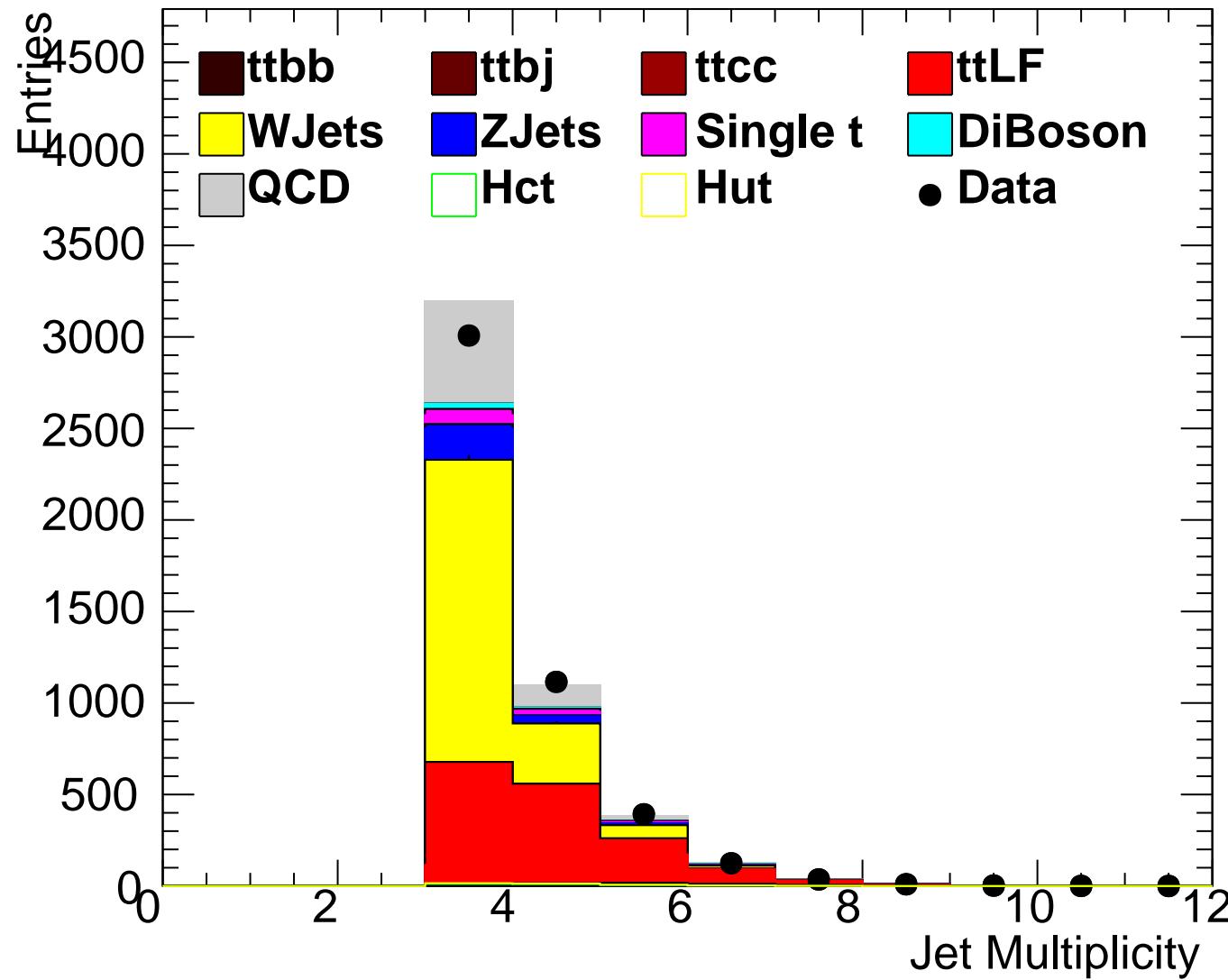
$\times 10^{-3}$

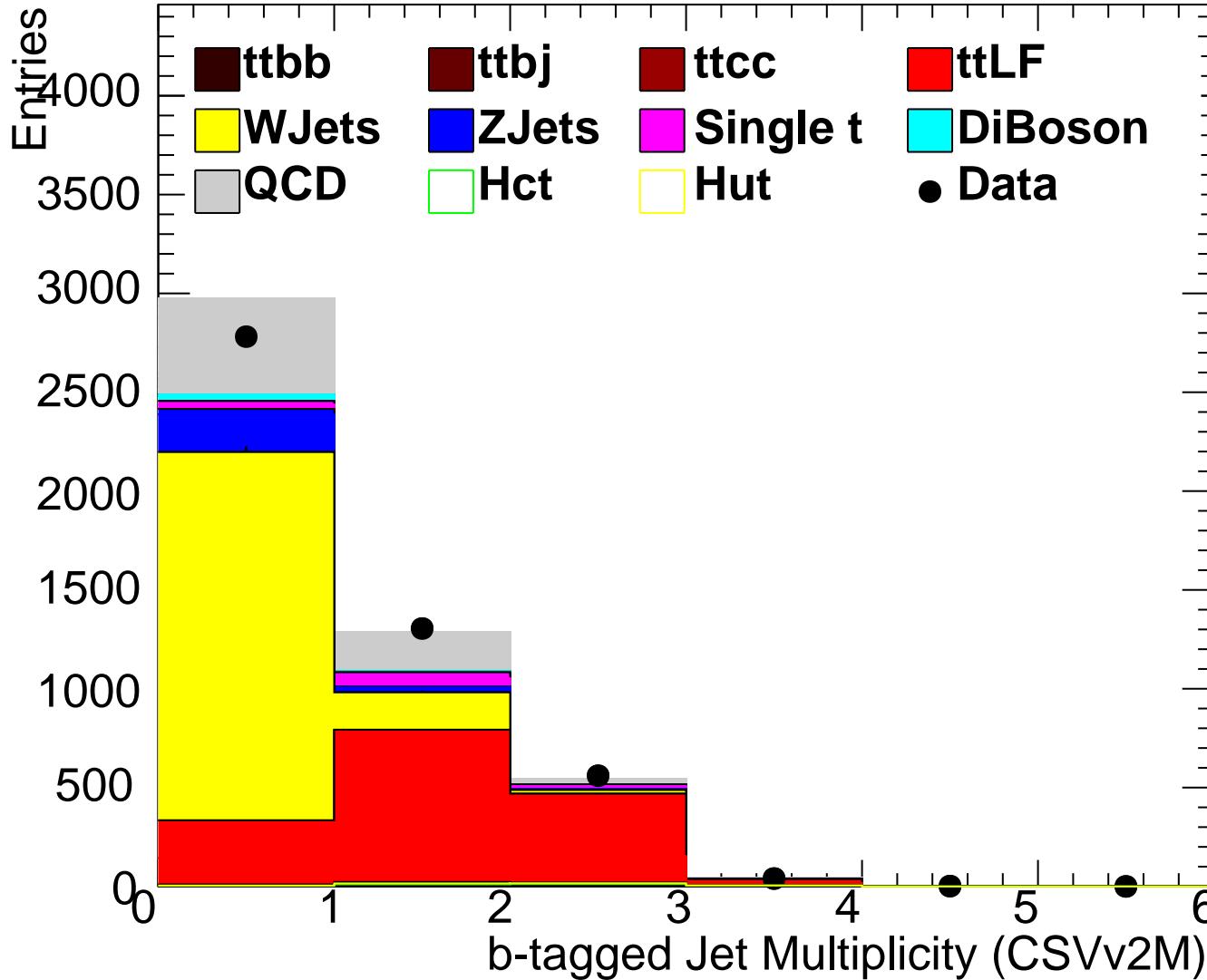
CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$



Ch0\_S1

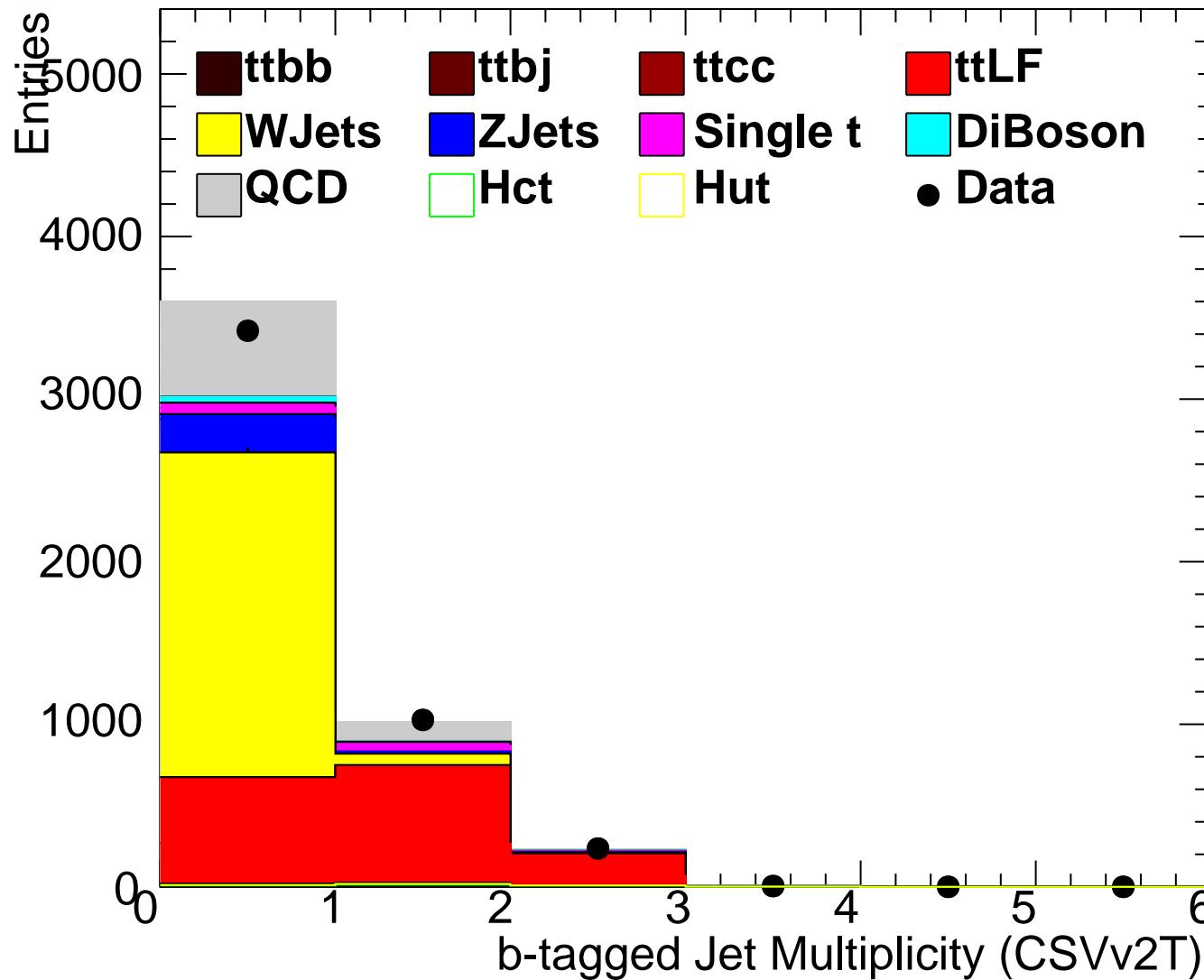
CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$

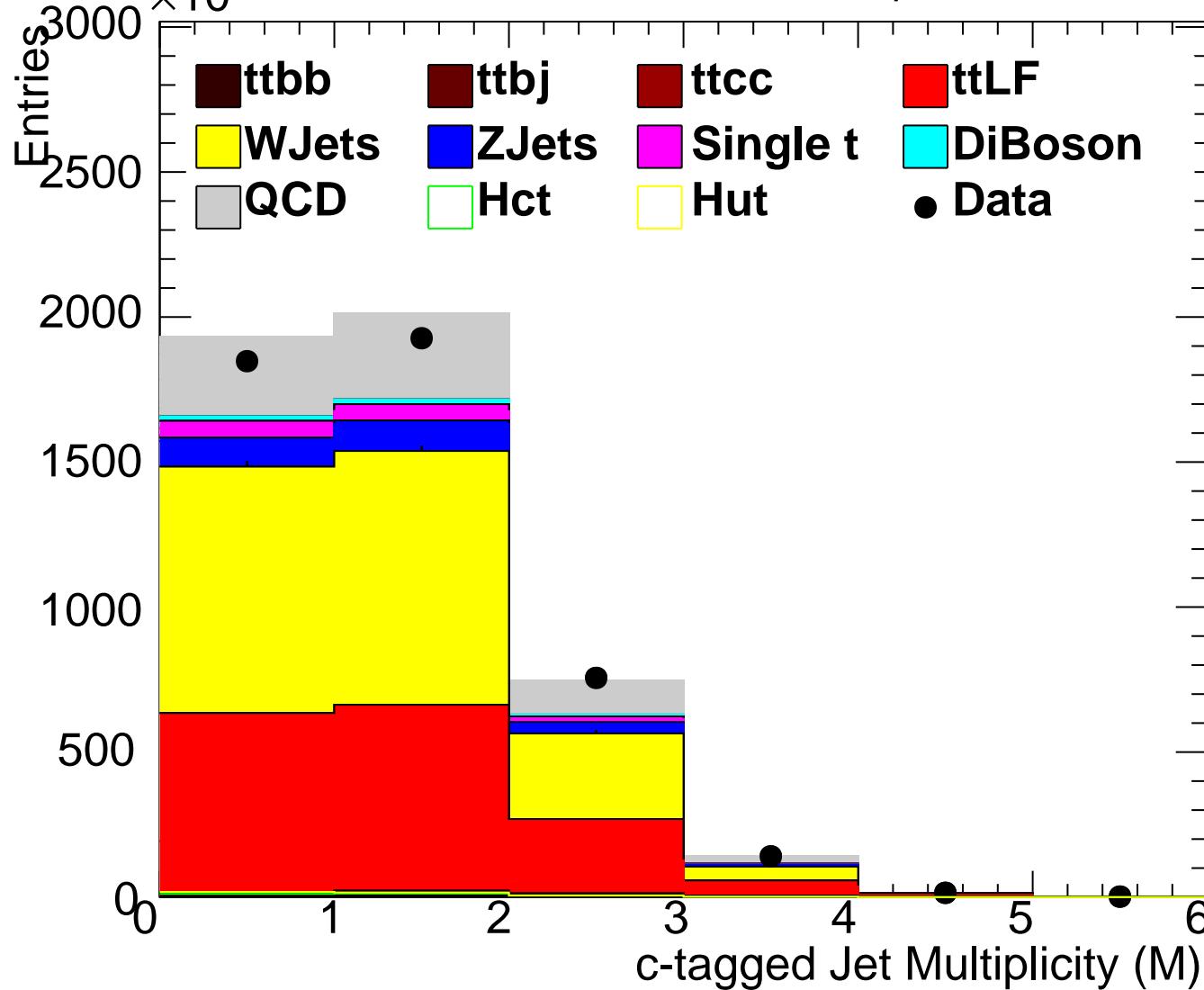


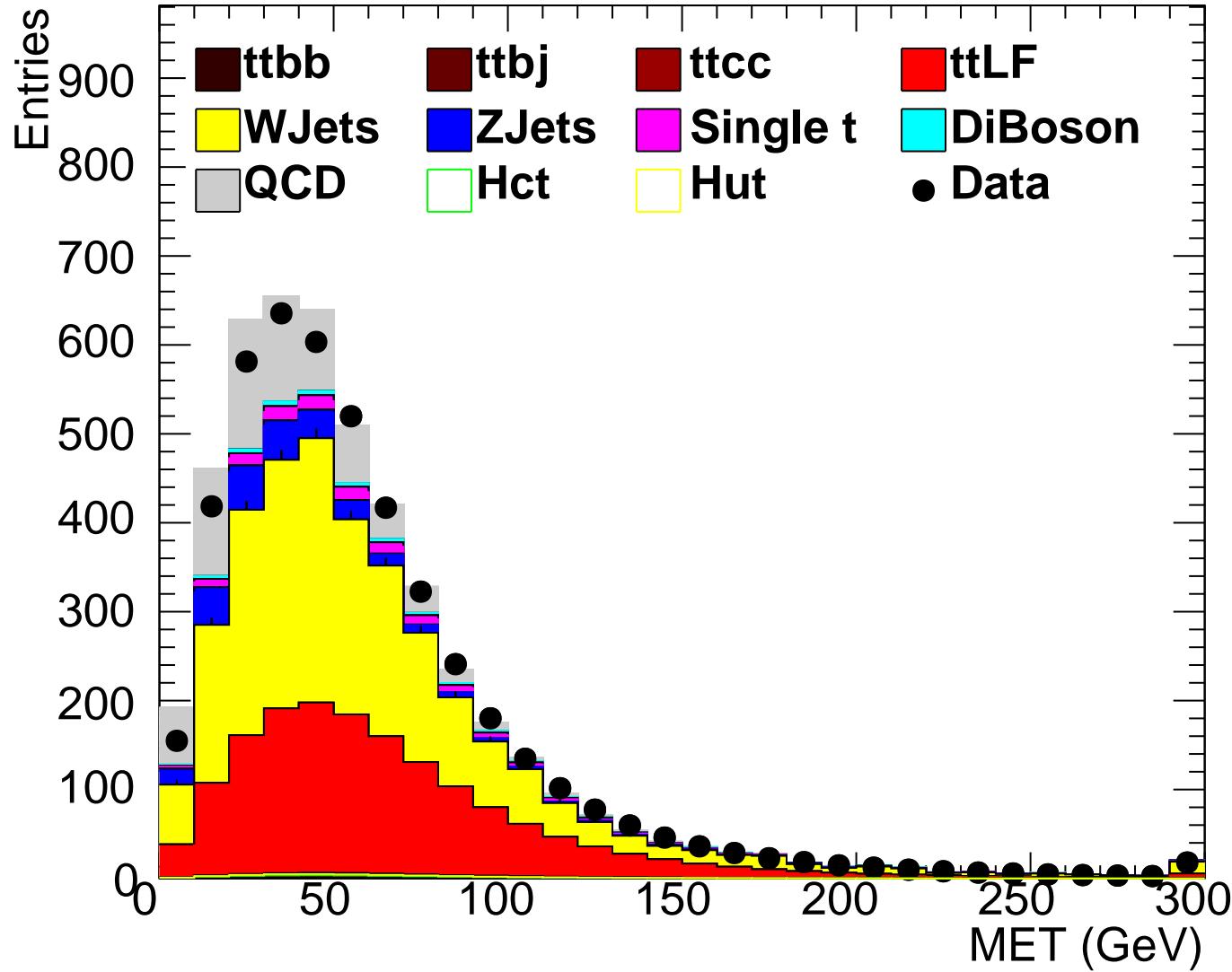
**Ch0\_S1** $\times 10^3$ CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

Ch0\_S1

CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$



**Ch0\_S1**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch0\_S1** $\times 10^3$ CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch0\_S1** $\times 10^3$ CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

Entries

300

250

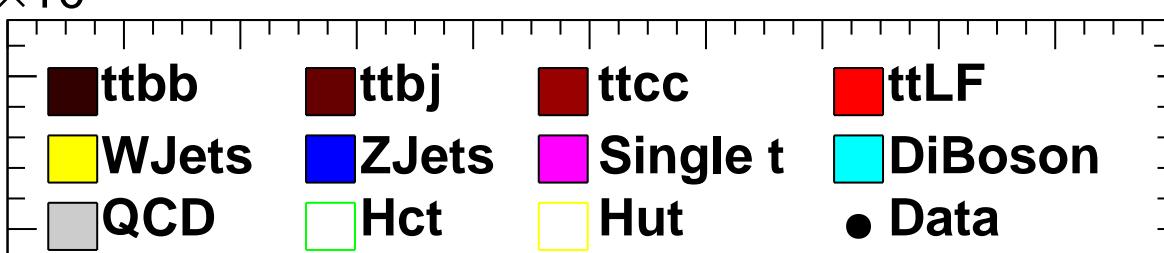
200

150

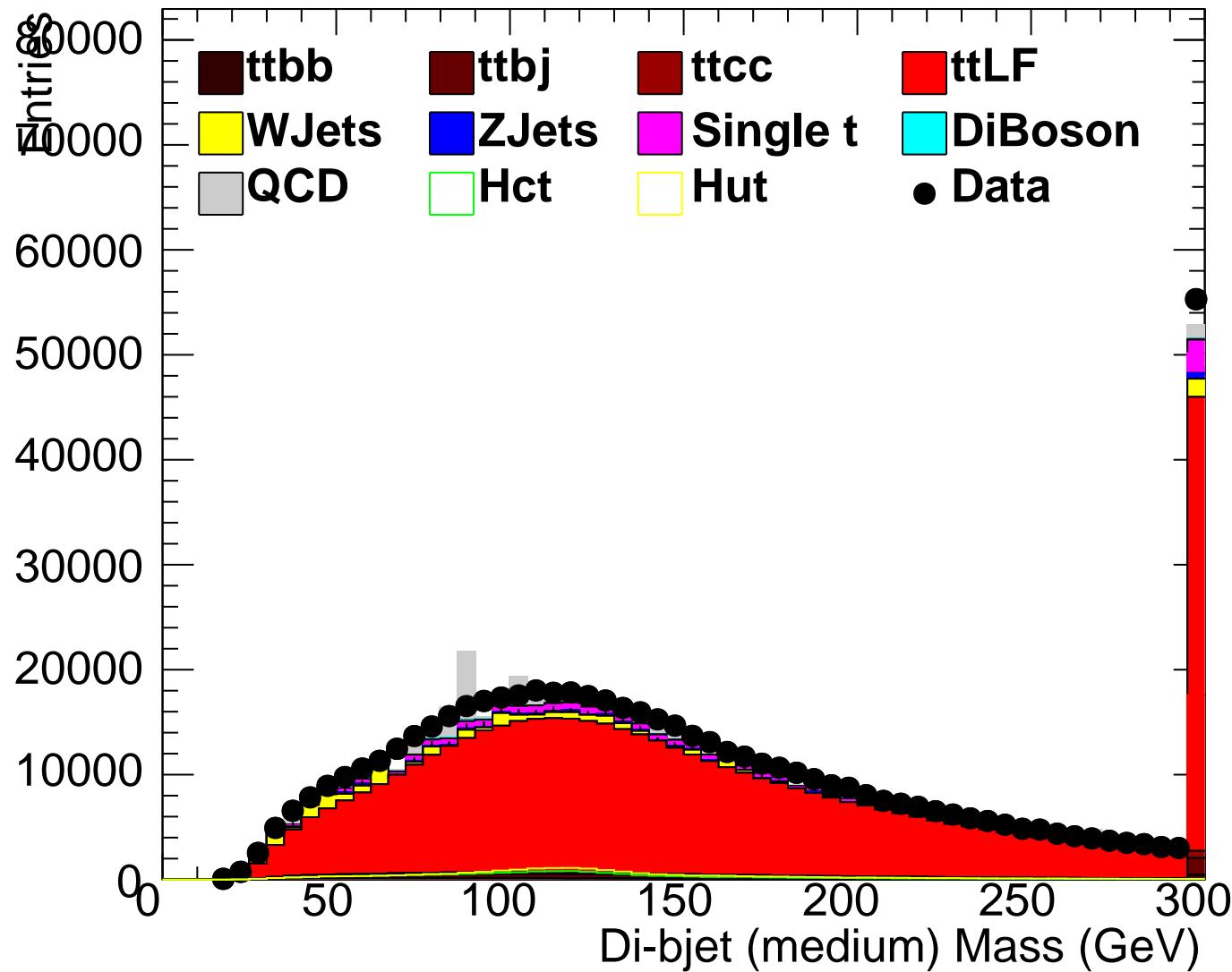
100

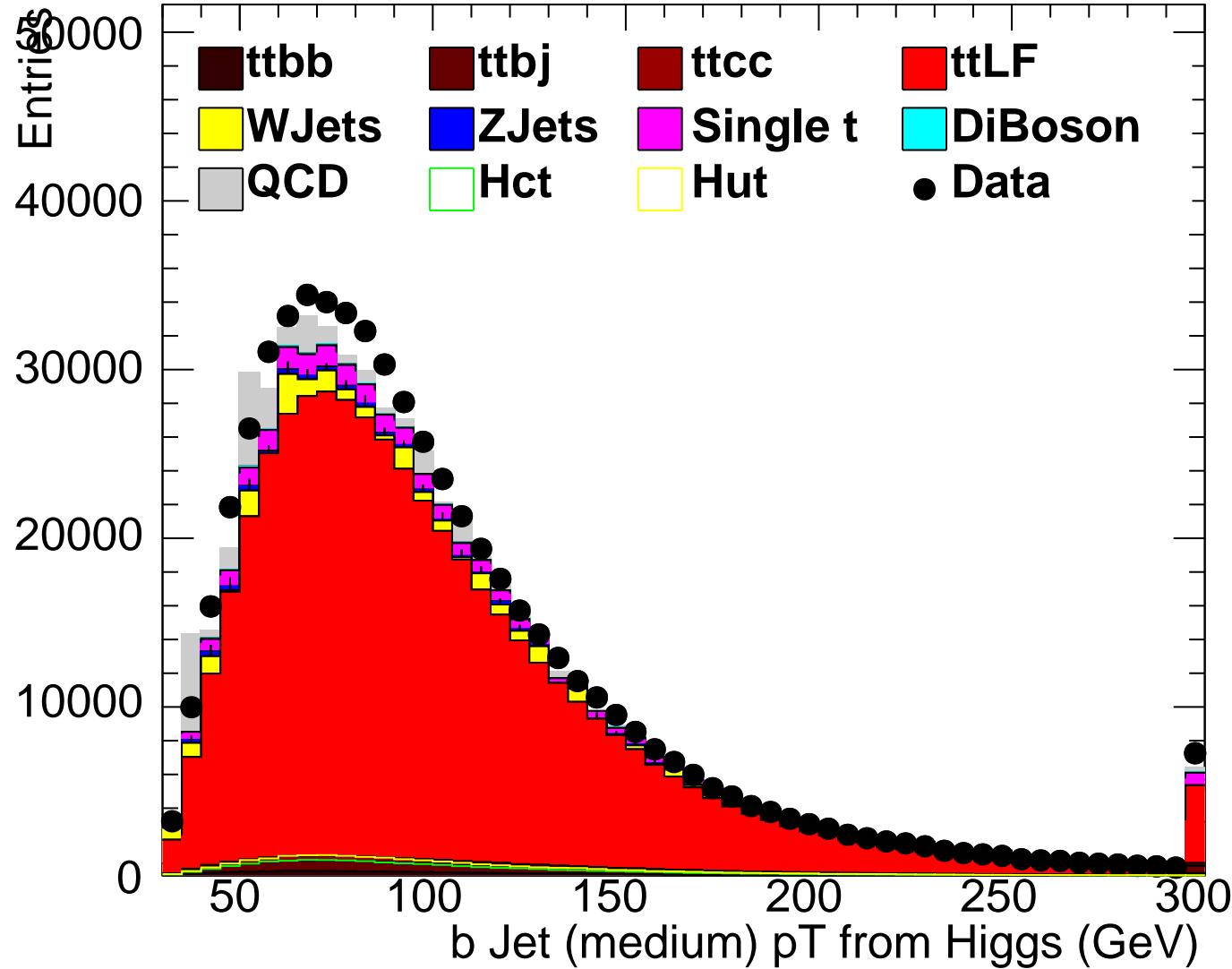
50

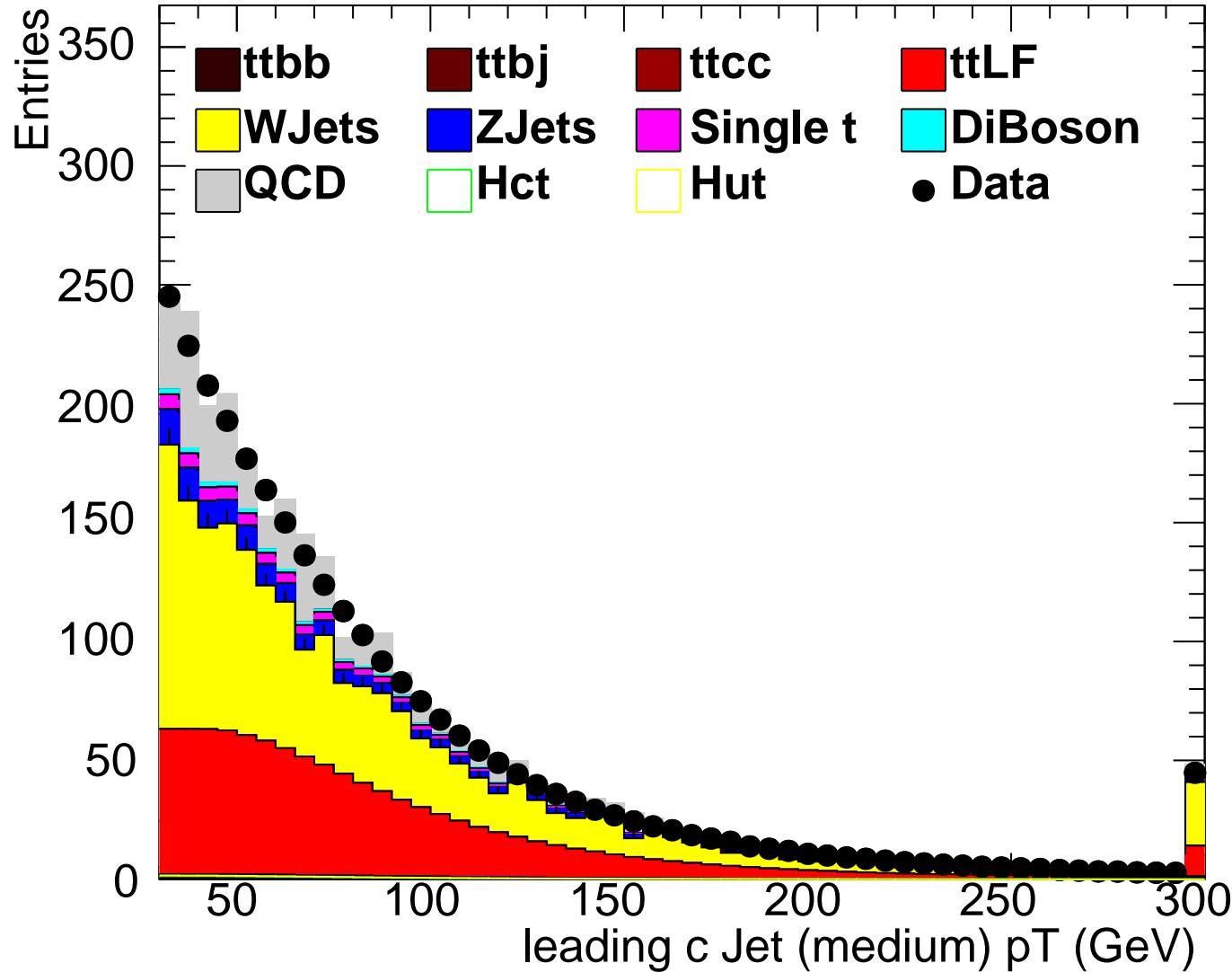
0



Transverse Mass (GeV)

**Ch0\_S1**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch0\_S1**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch0\_S1** $\times 10^3$ CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch0\_S1** $\times 10^3$ CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

Entries

140

120

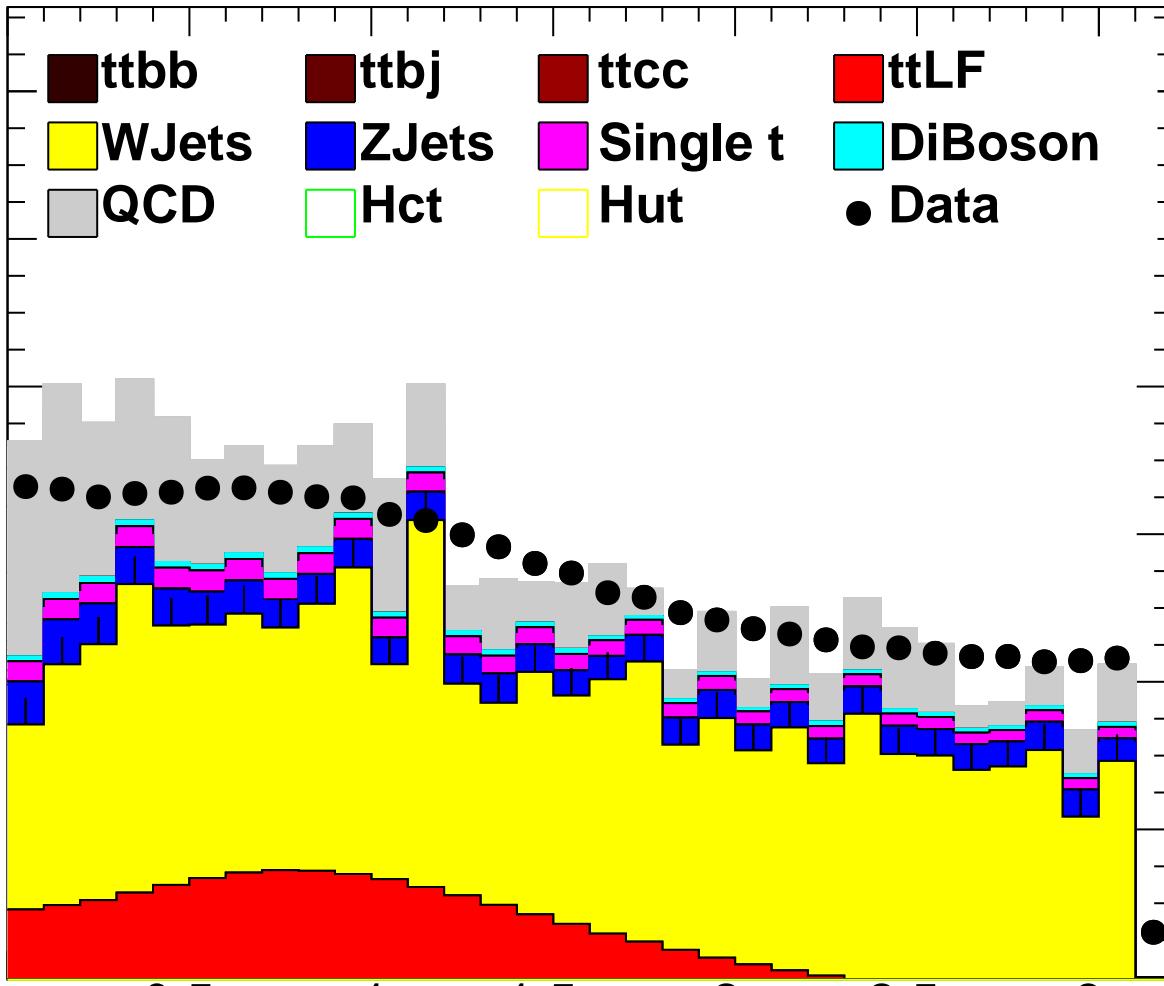
100

80

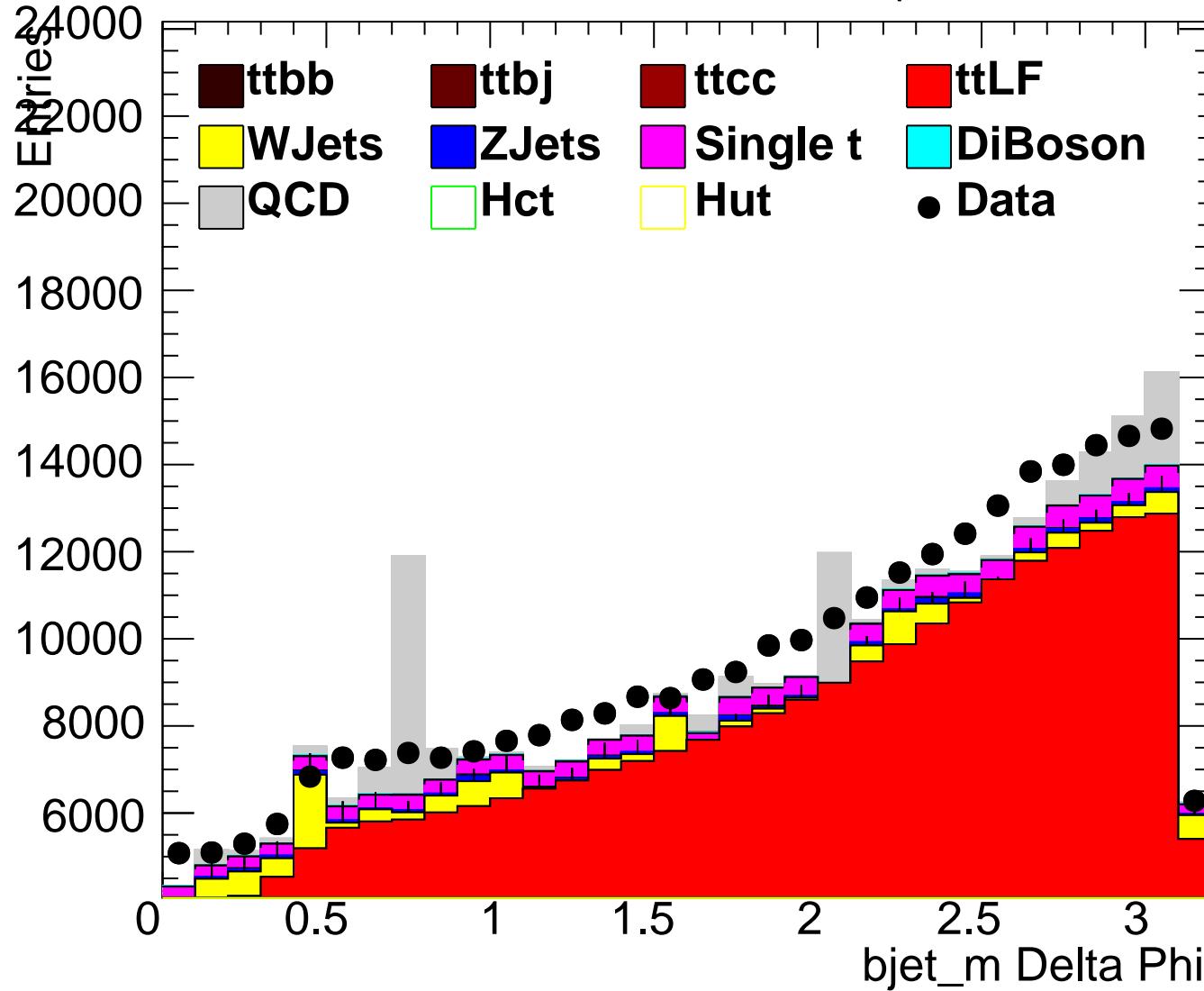
60

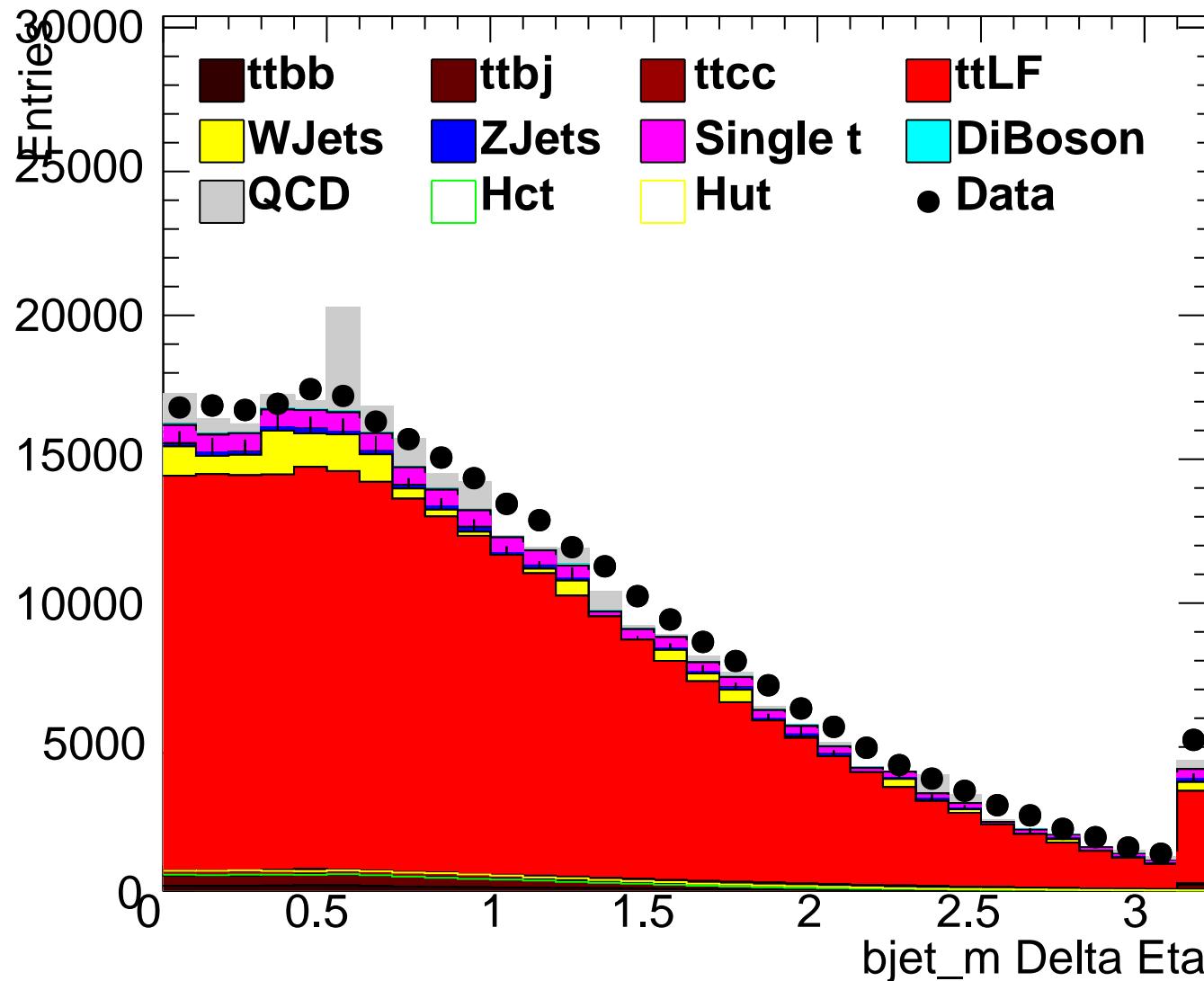
40

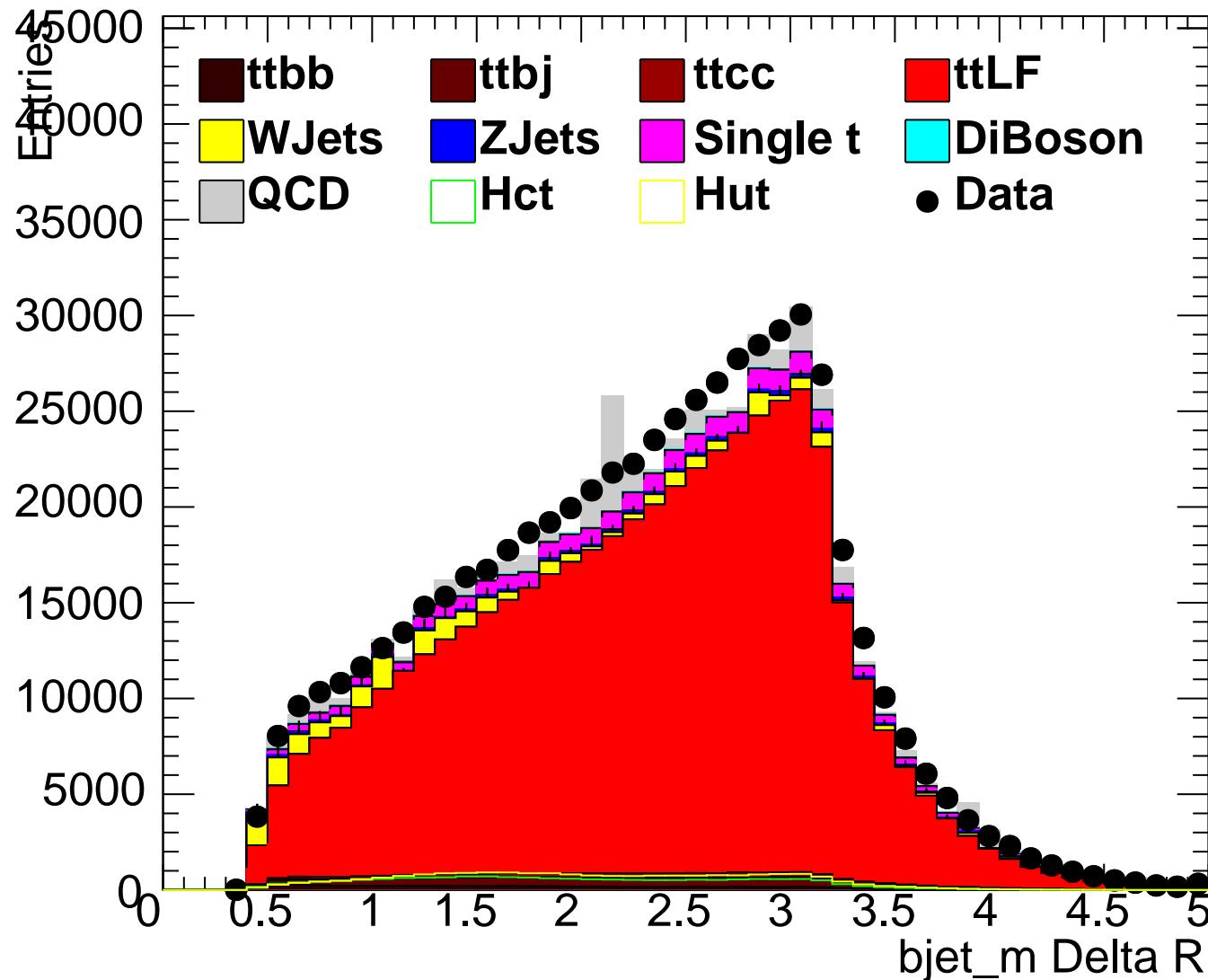
20

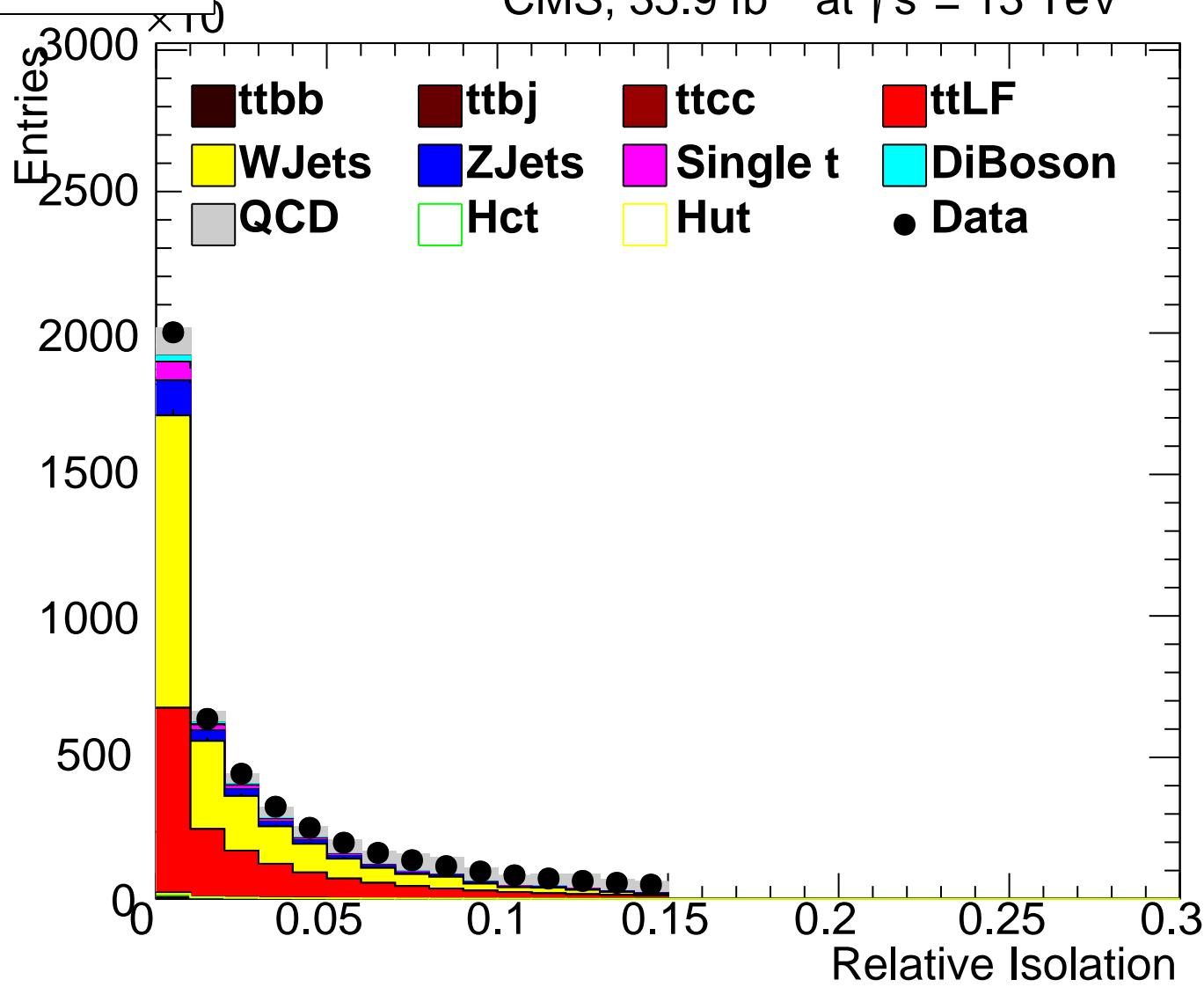


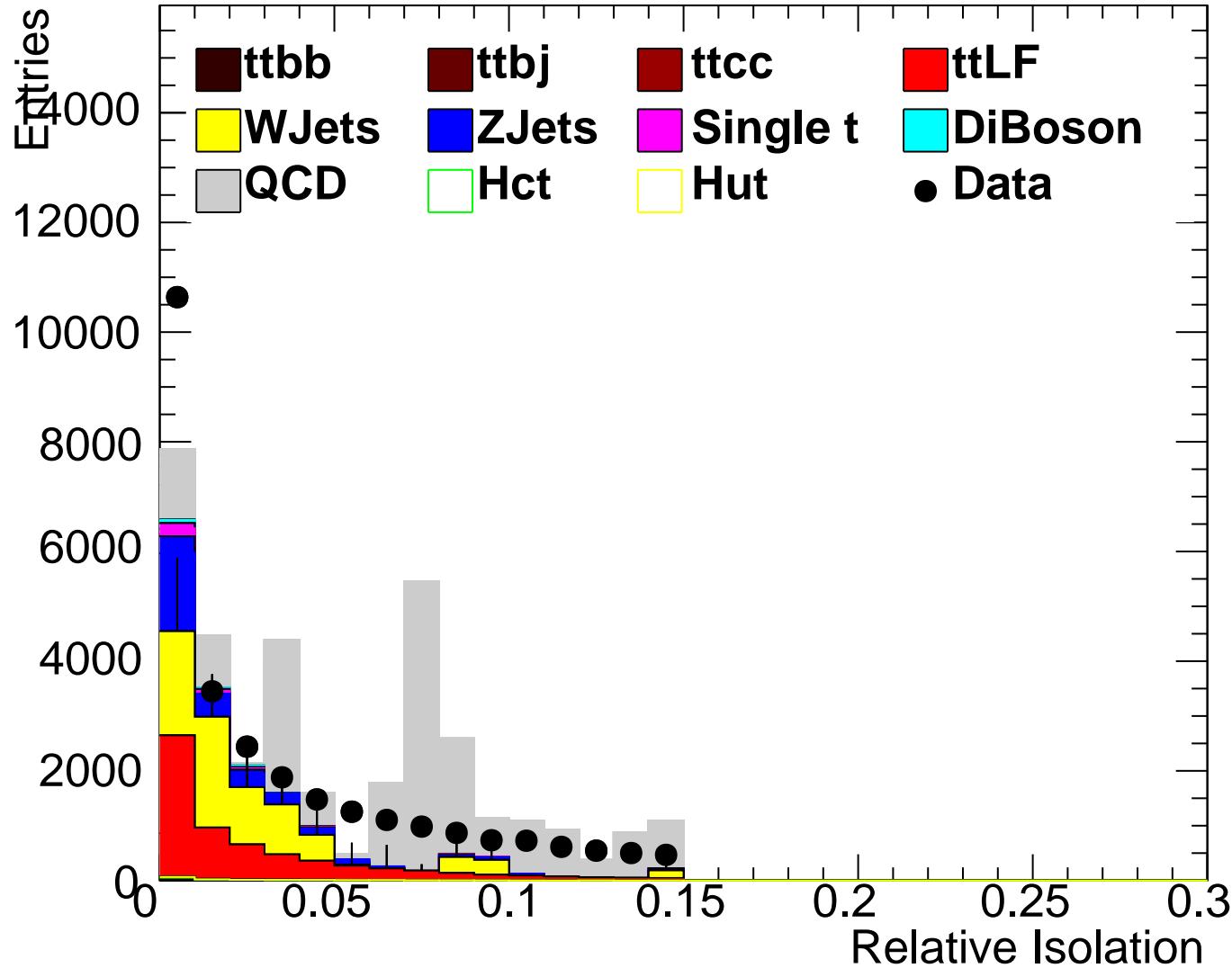
DPhi

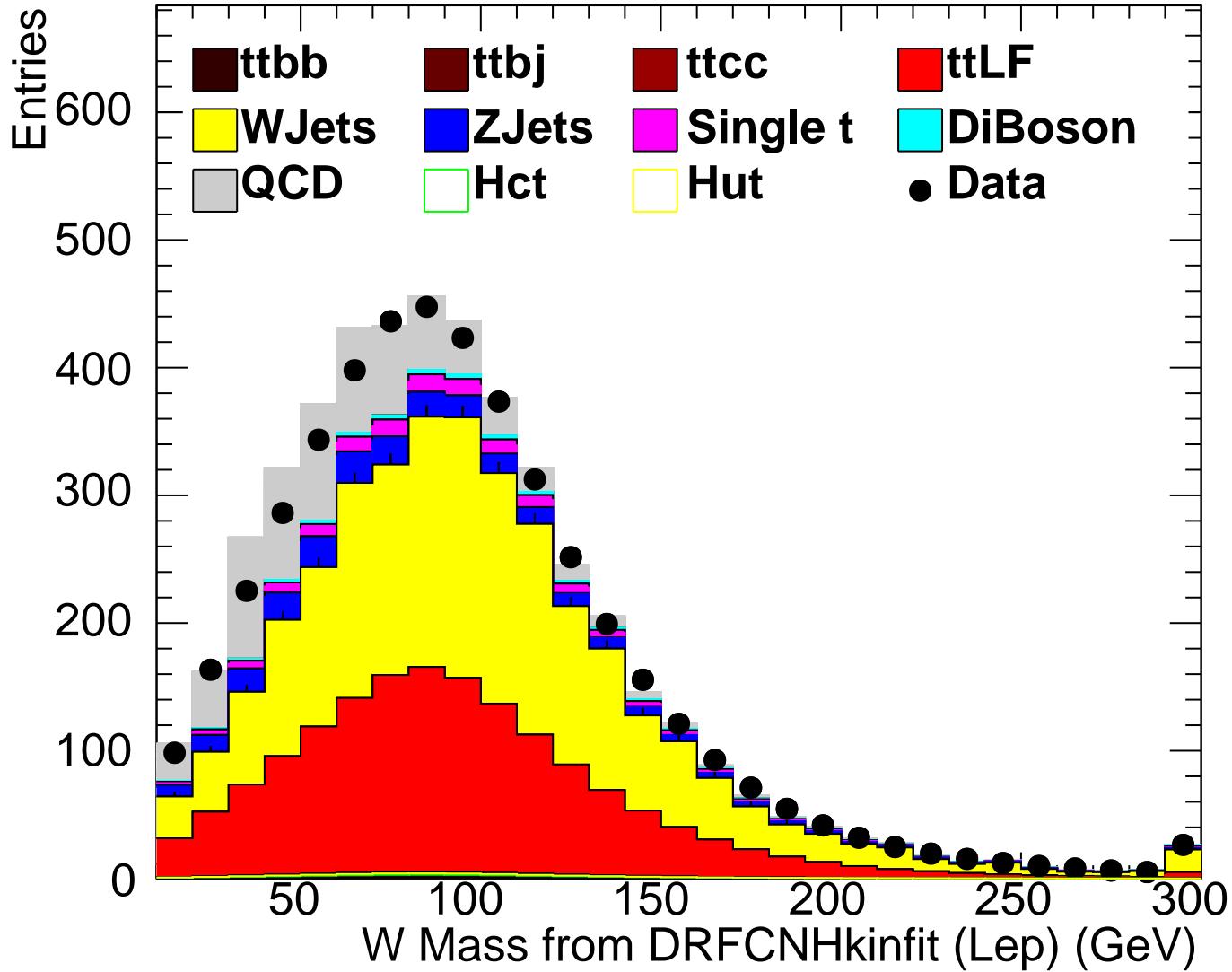
**Ch0\_S1**CMS, 35.9  $\text{fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

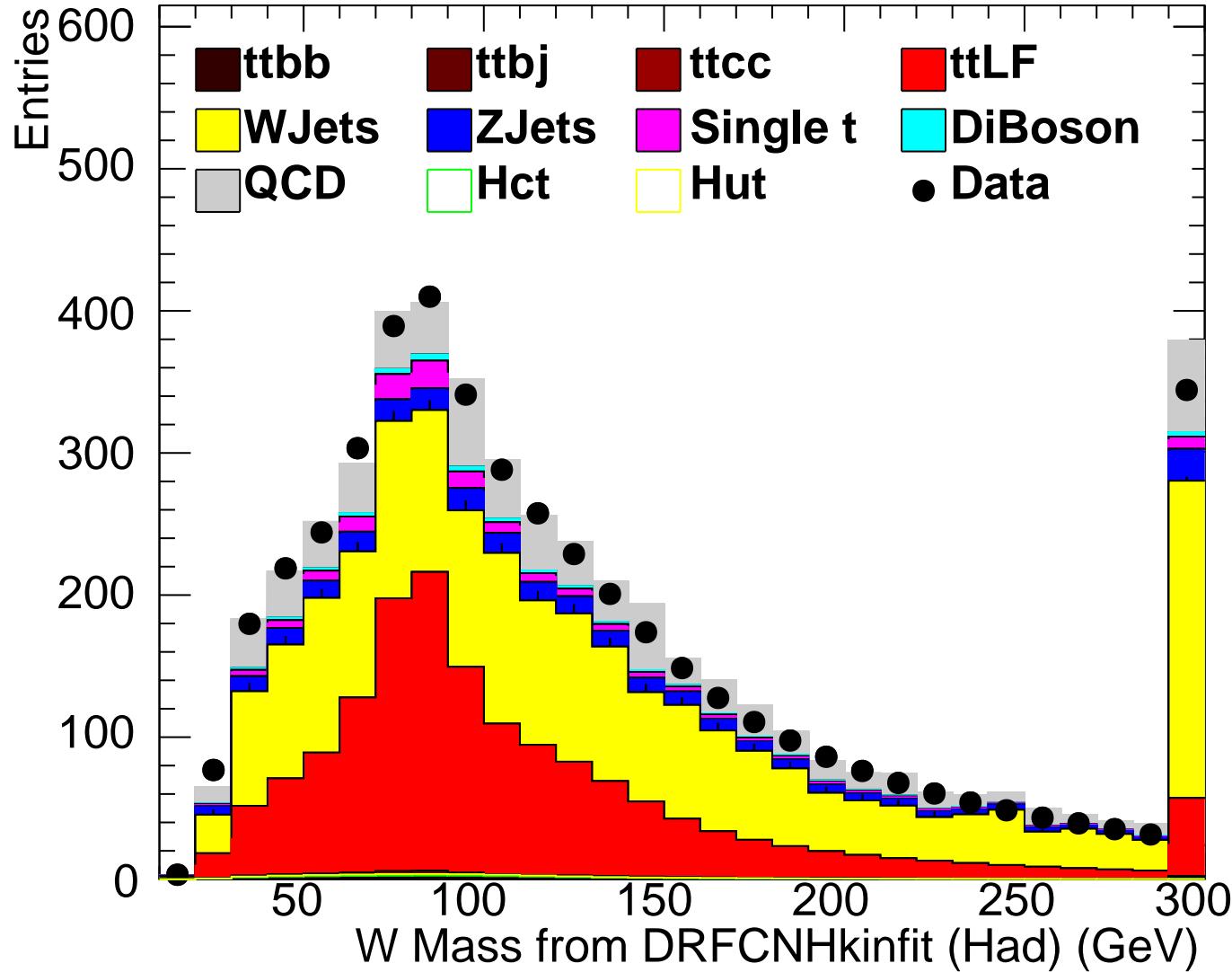
**Ch0\_S1**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

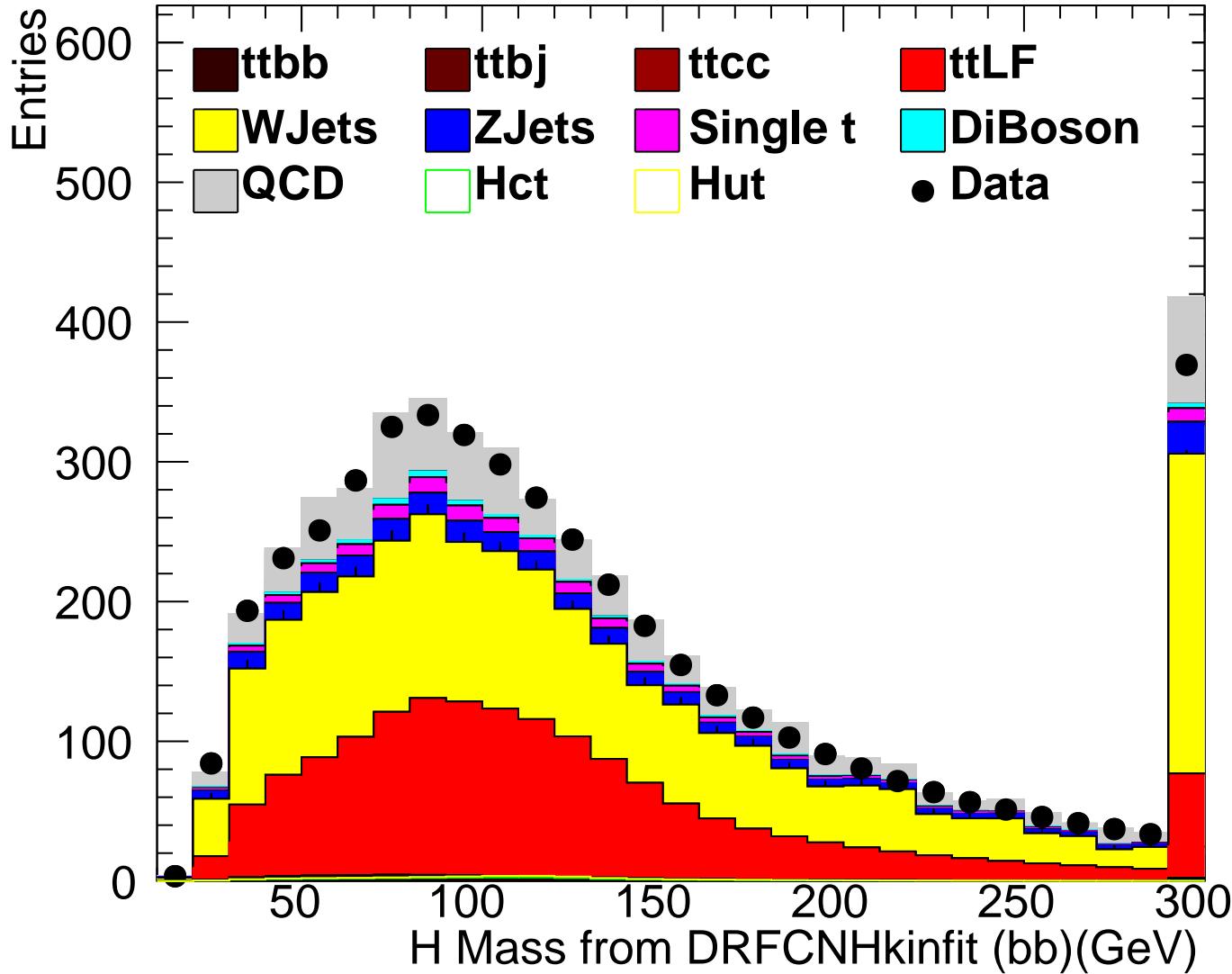
**Ch0\_S1**CMS, 35.9  $\text{fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch0\_S1**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch0\_S1**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch0\_S1** $\times 10^3$ CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch0\_S1** $\times 10^3$ CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch0\_S1** $\times 10^3$ CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch0\_S1** $\times 10^3$ CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

Entries

250

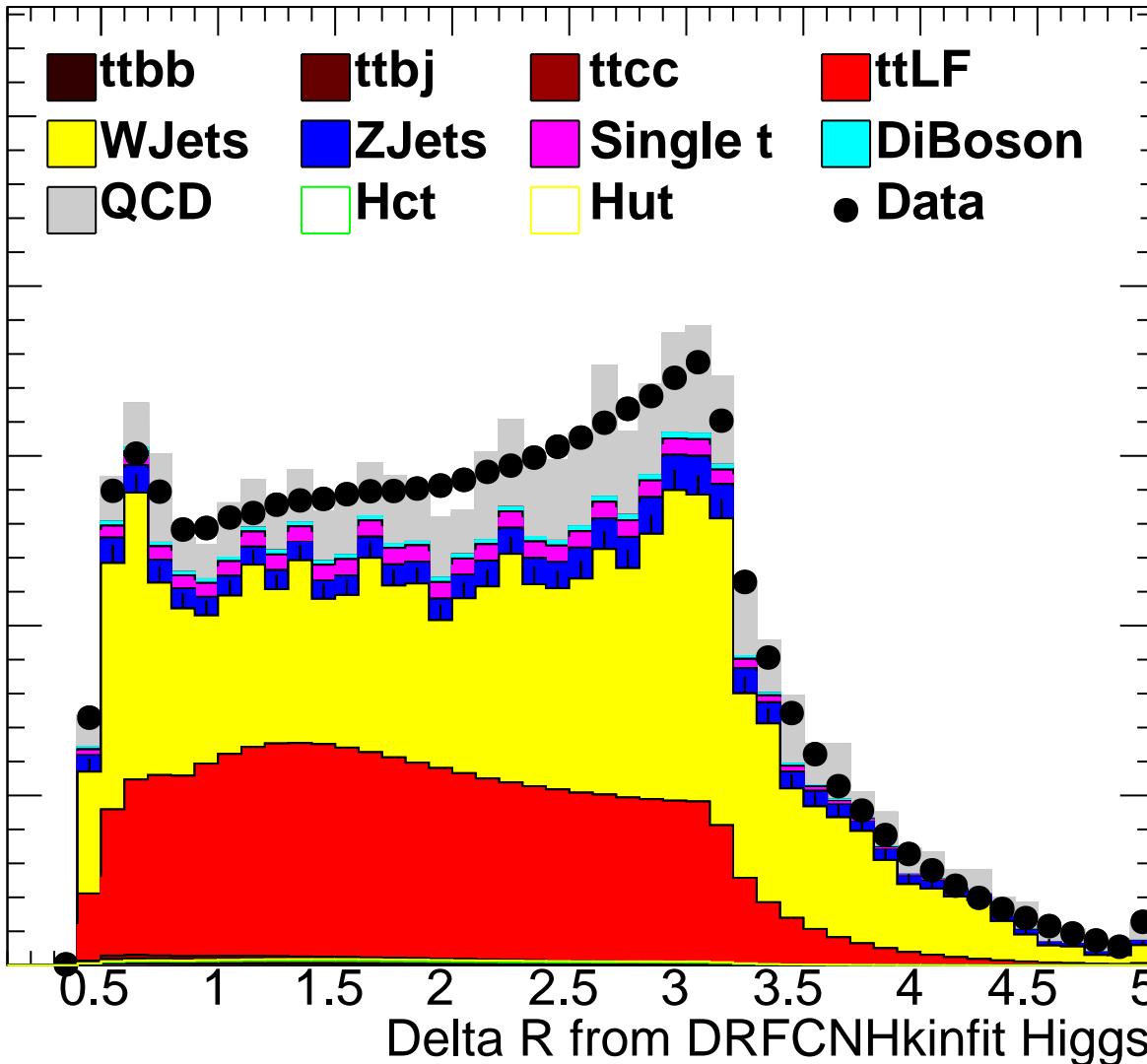
200

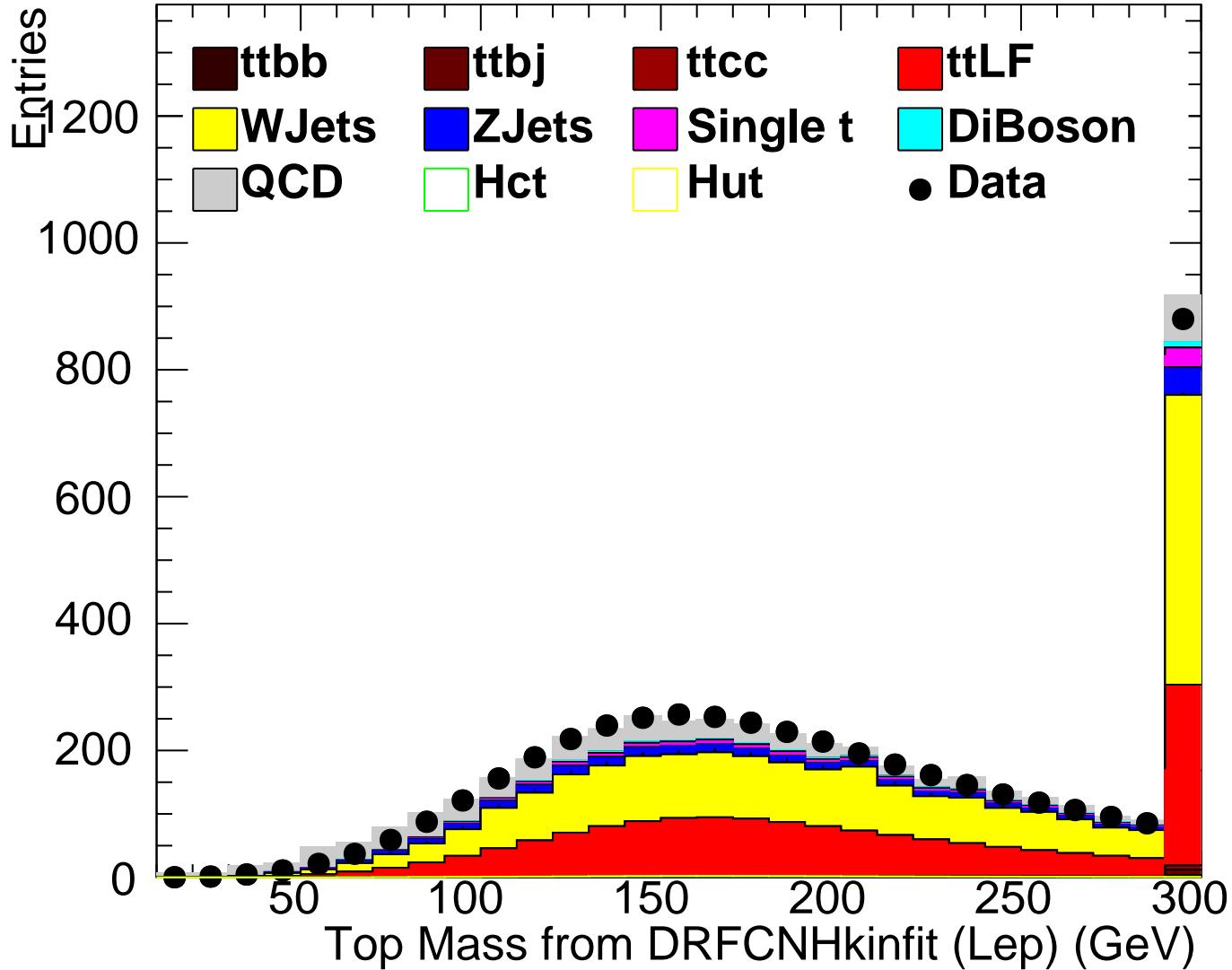
150

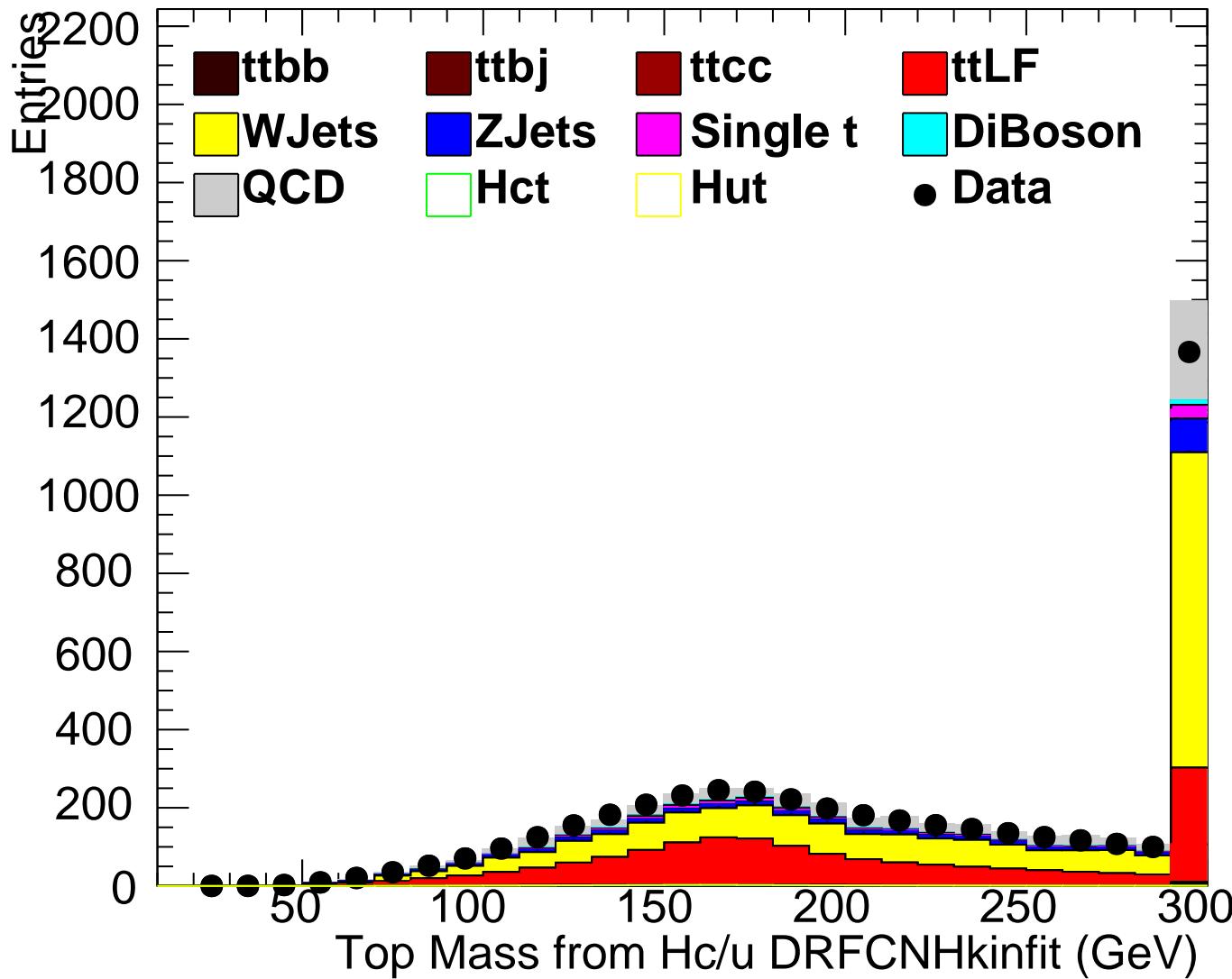
100

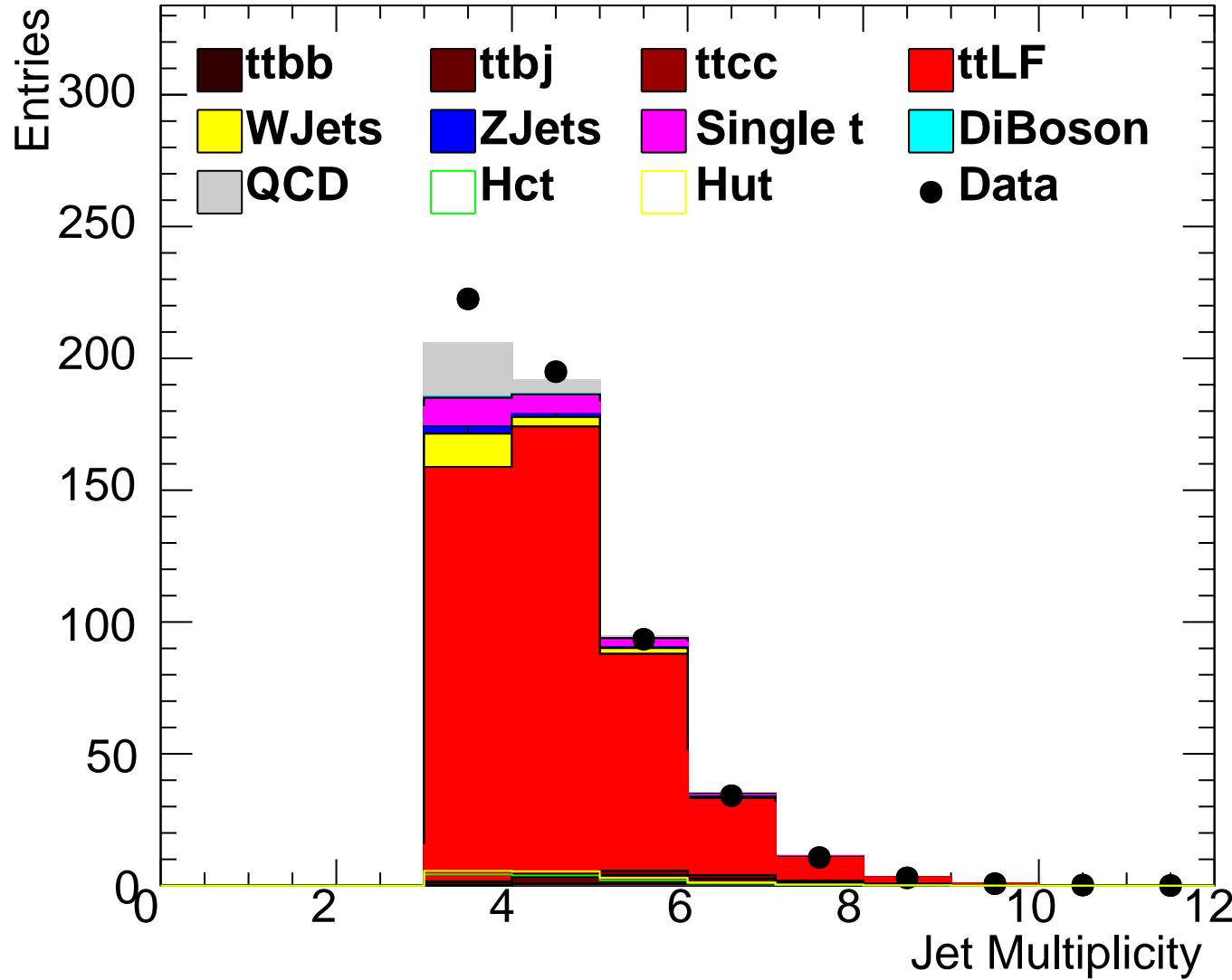
50

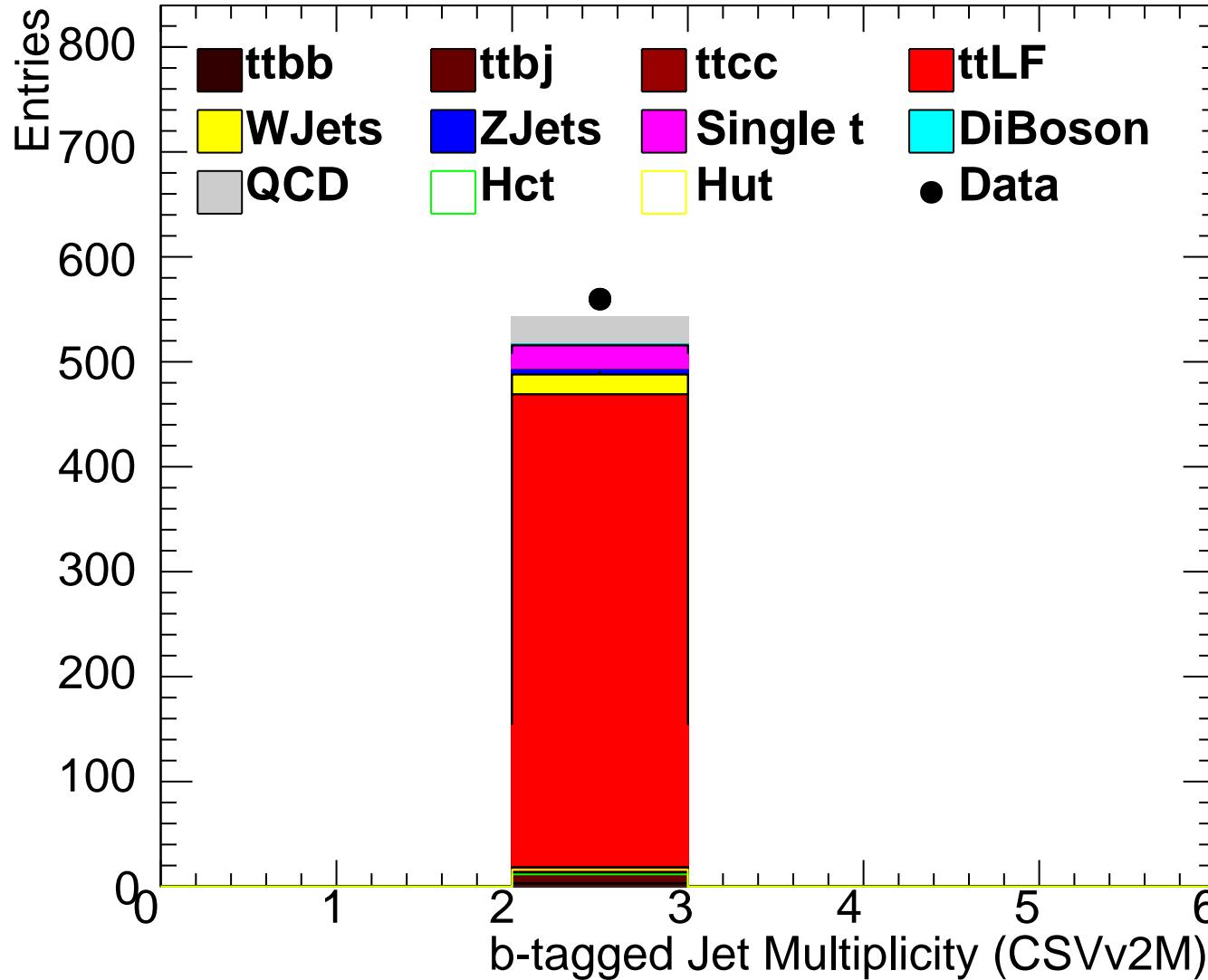
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**Ch0\_S1** $\times 10^3$ CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

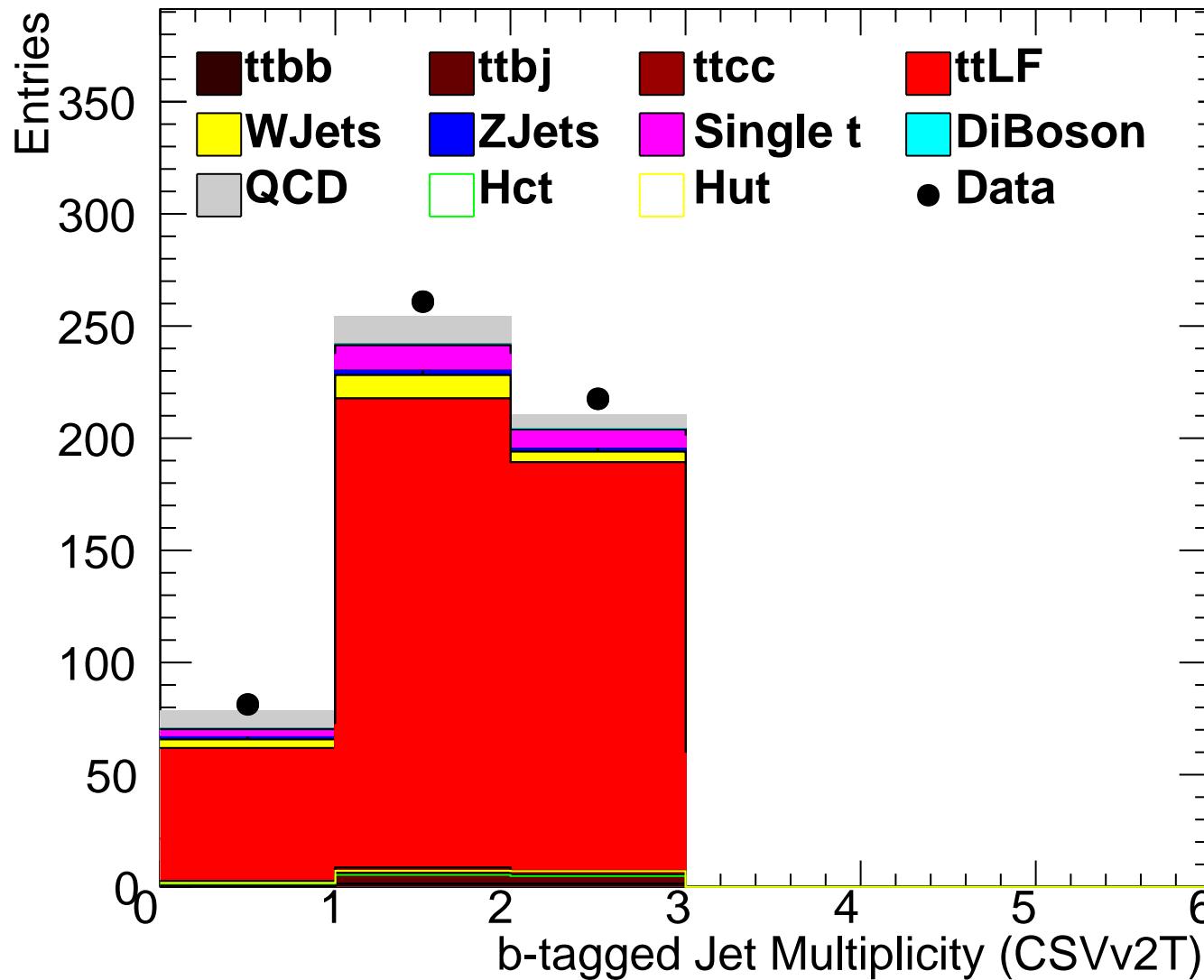
**Ch0\_S1** $\times 10^3$ CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

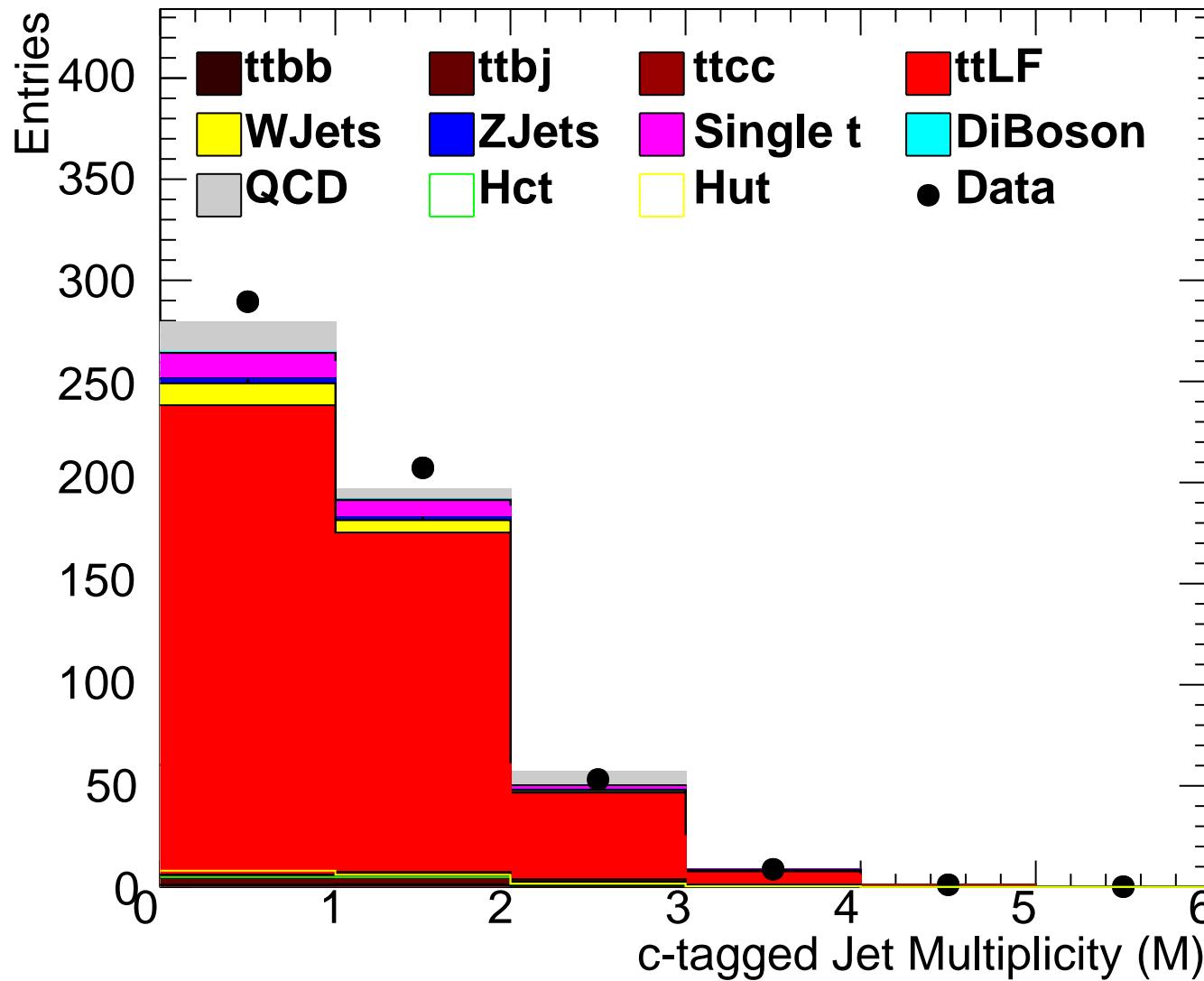
**Ch0\_S2**x 10<sup>3</sup>CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV

**Ch0\_S2**x 10<sup>3</sup>CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV

Ch0\_S2

CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$





**Ch0\_S2**x 10<sup>-3</sup>CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV

Entries

100

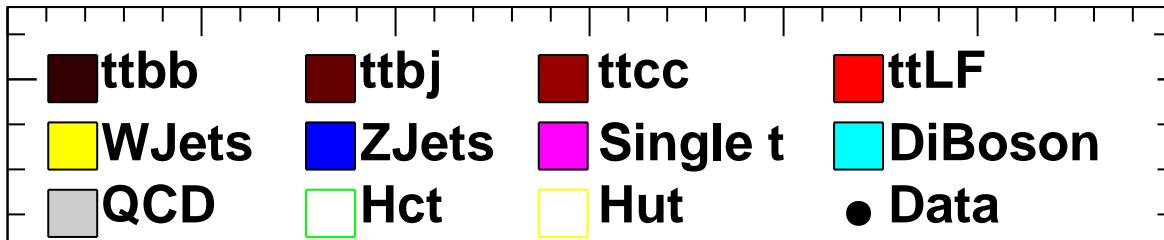
80

60

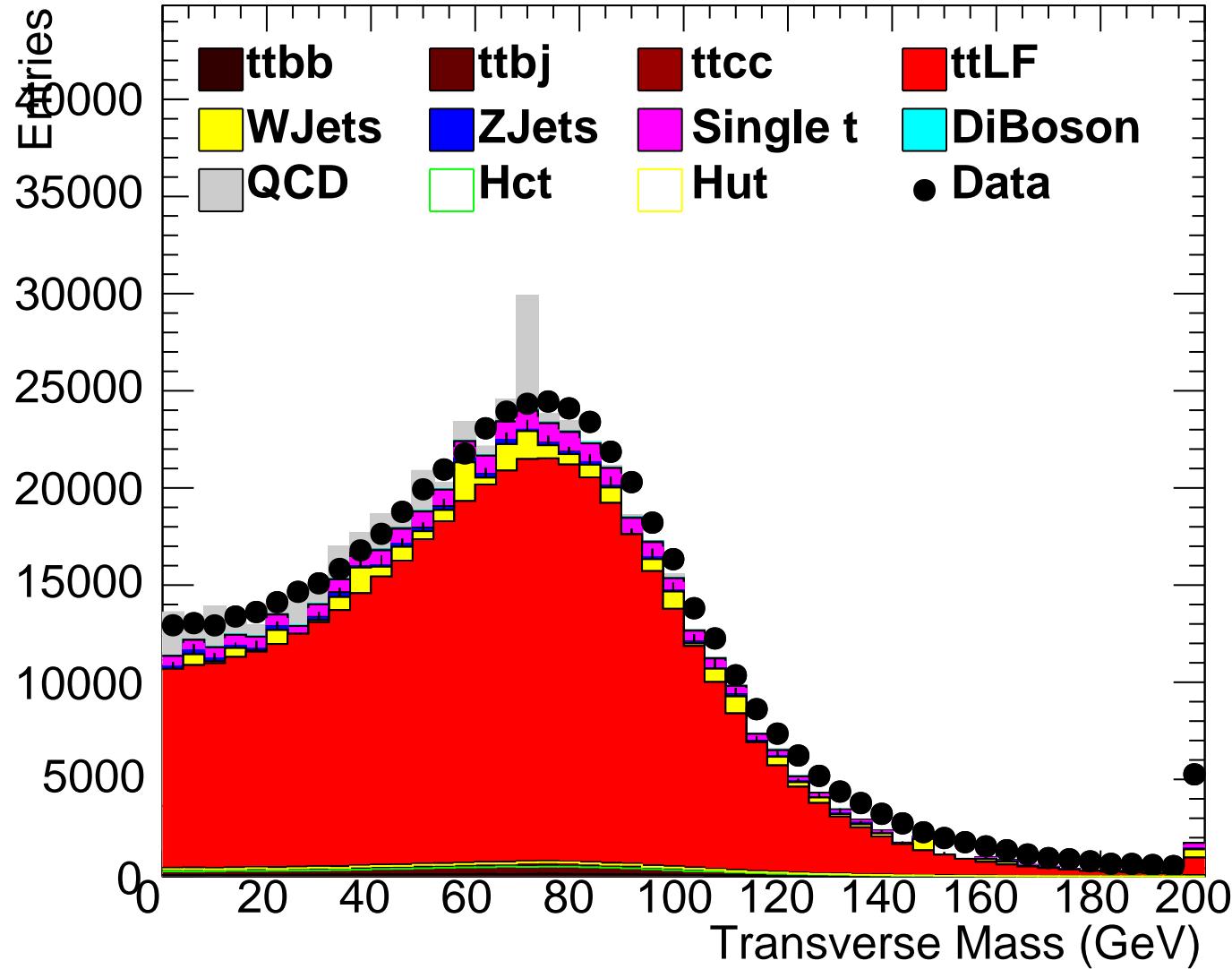
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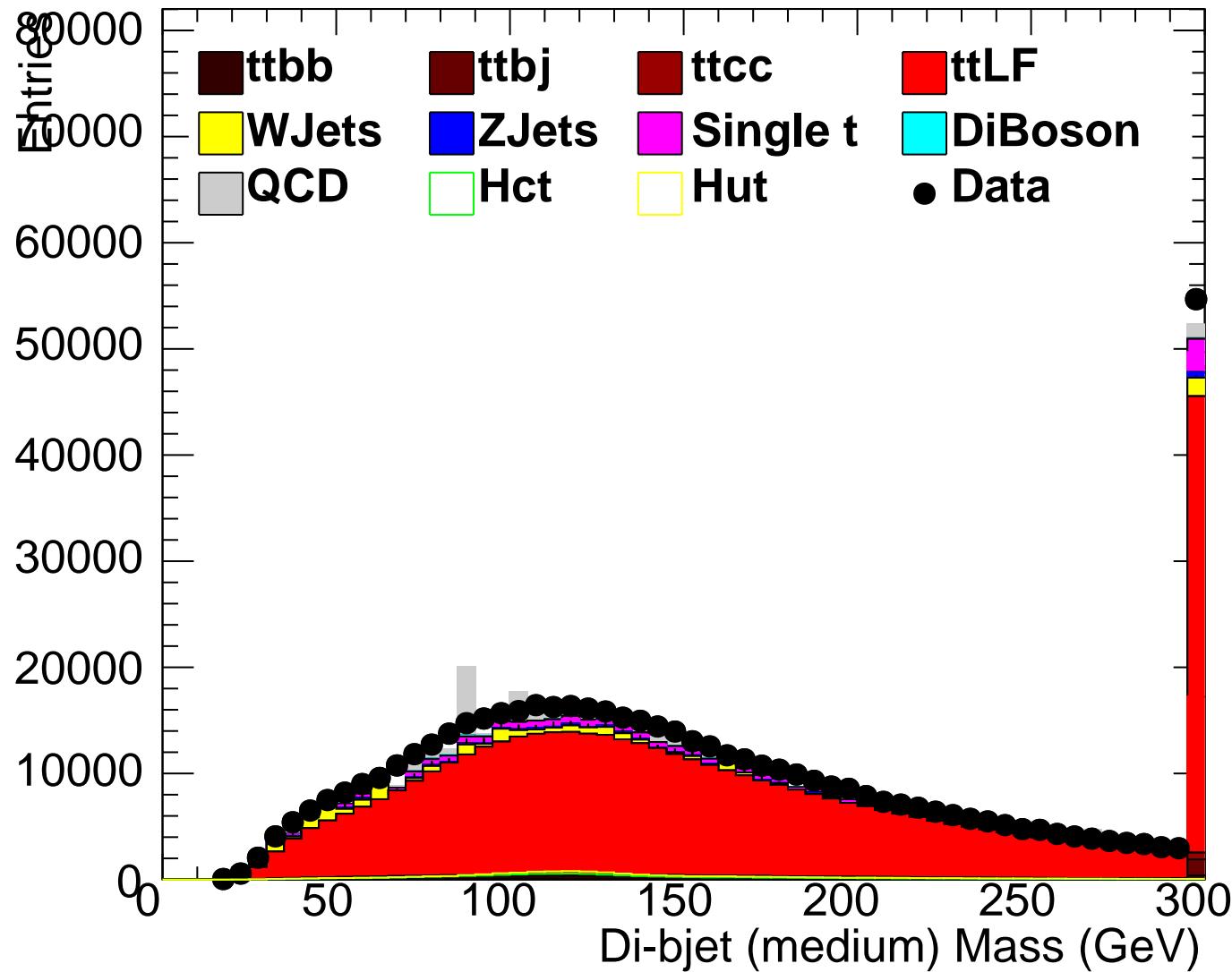
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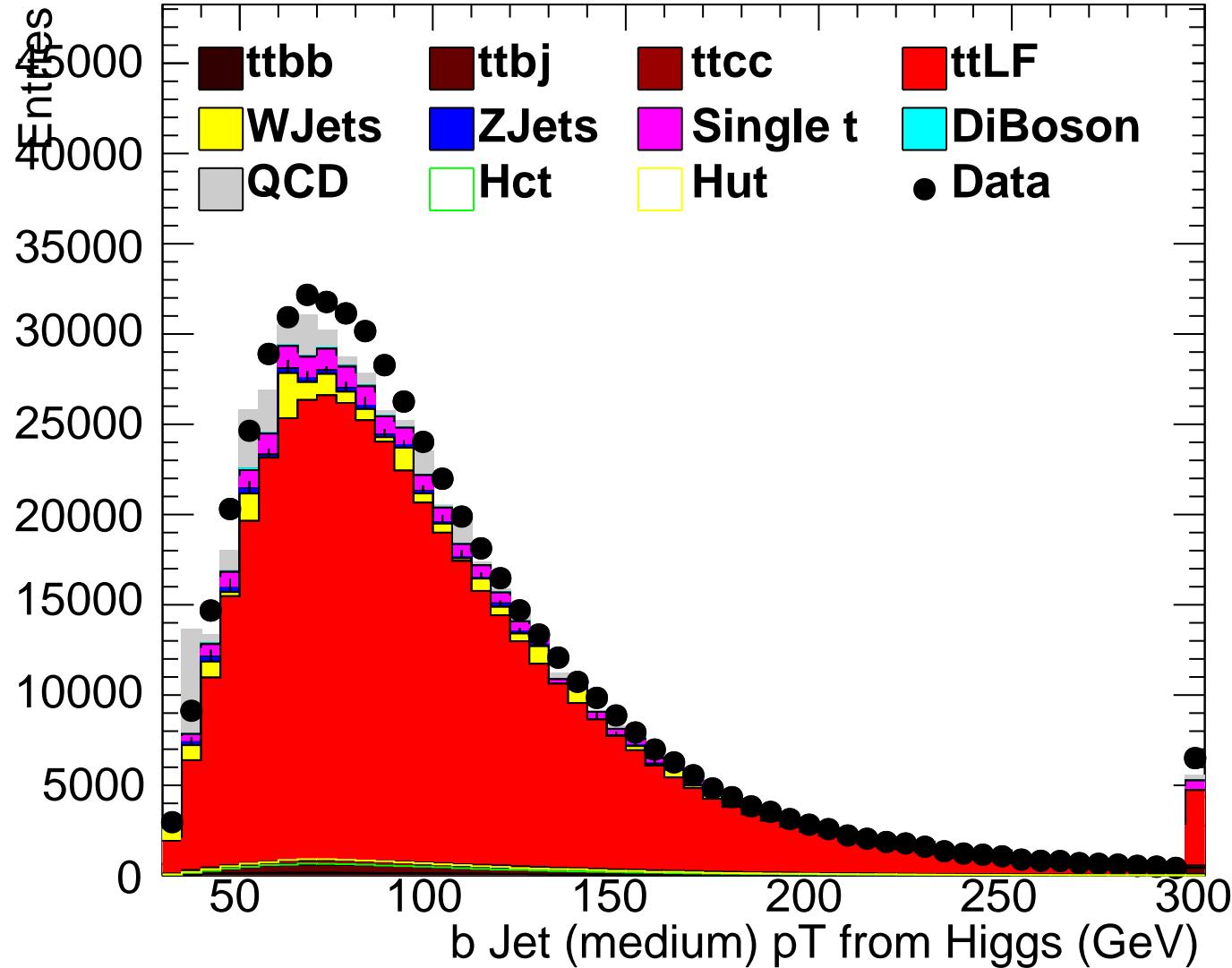
0

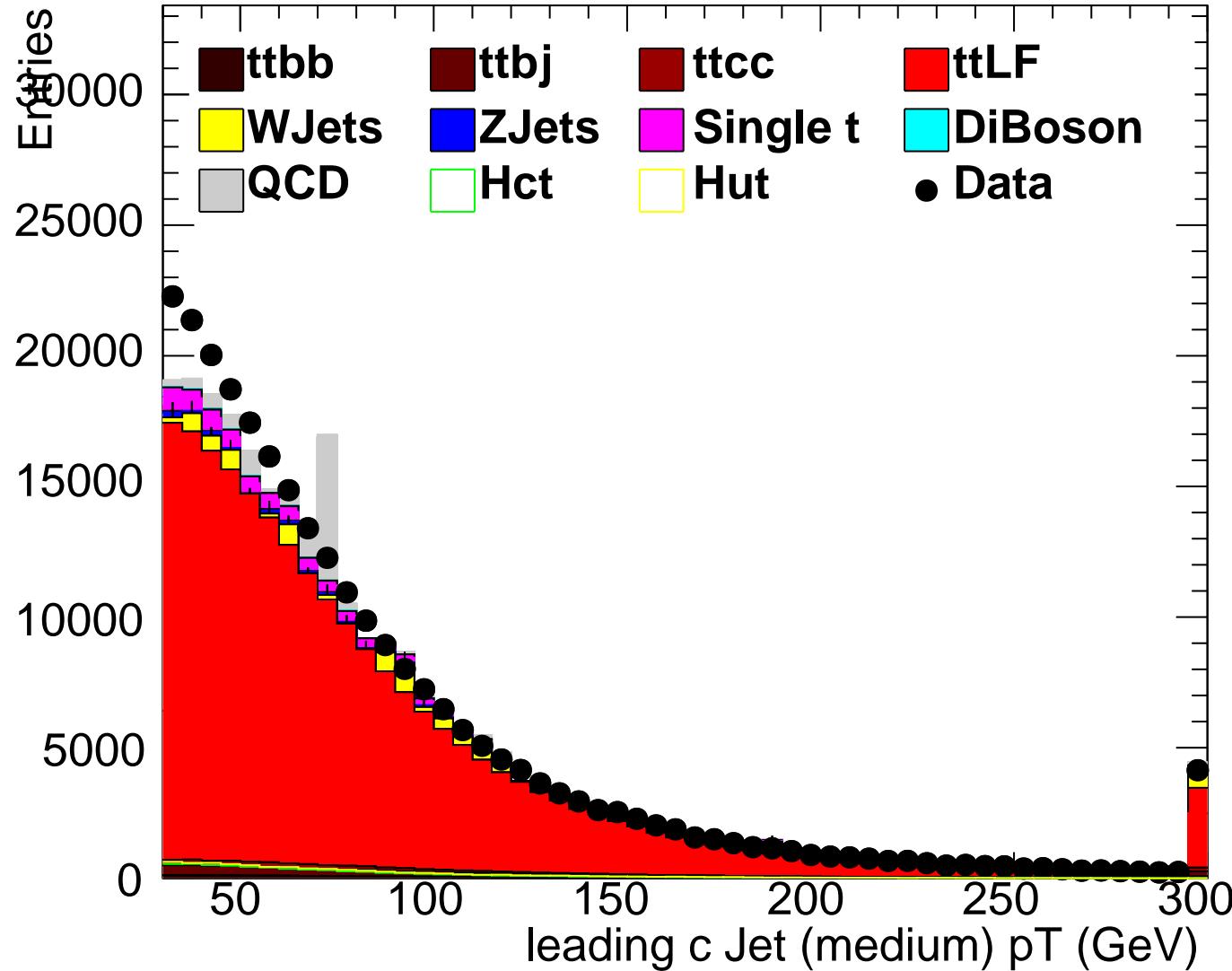


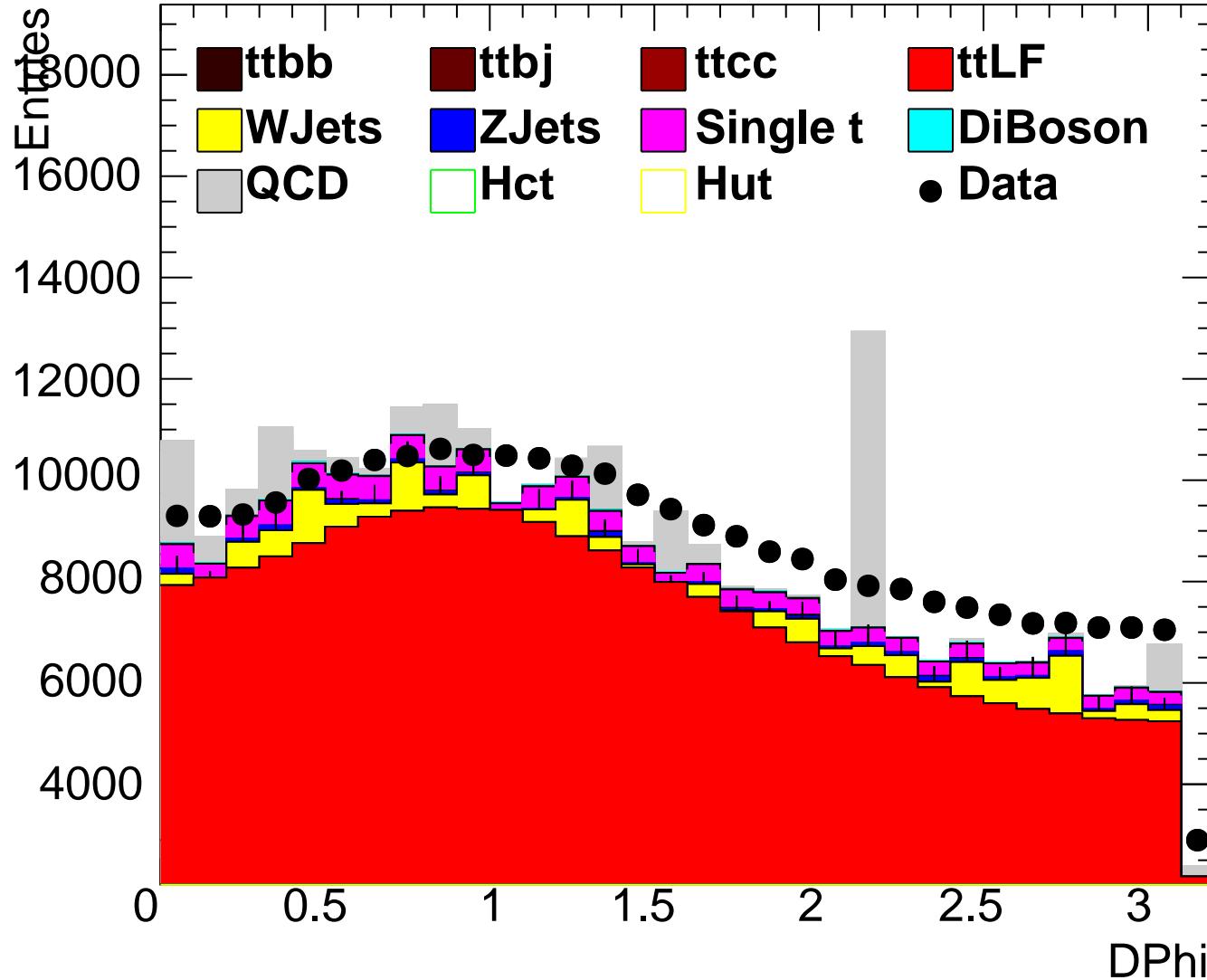
MET (GeV)

**Ch0\_S2**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch0\_S2**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

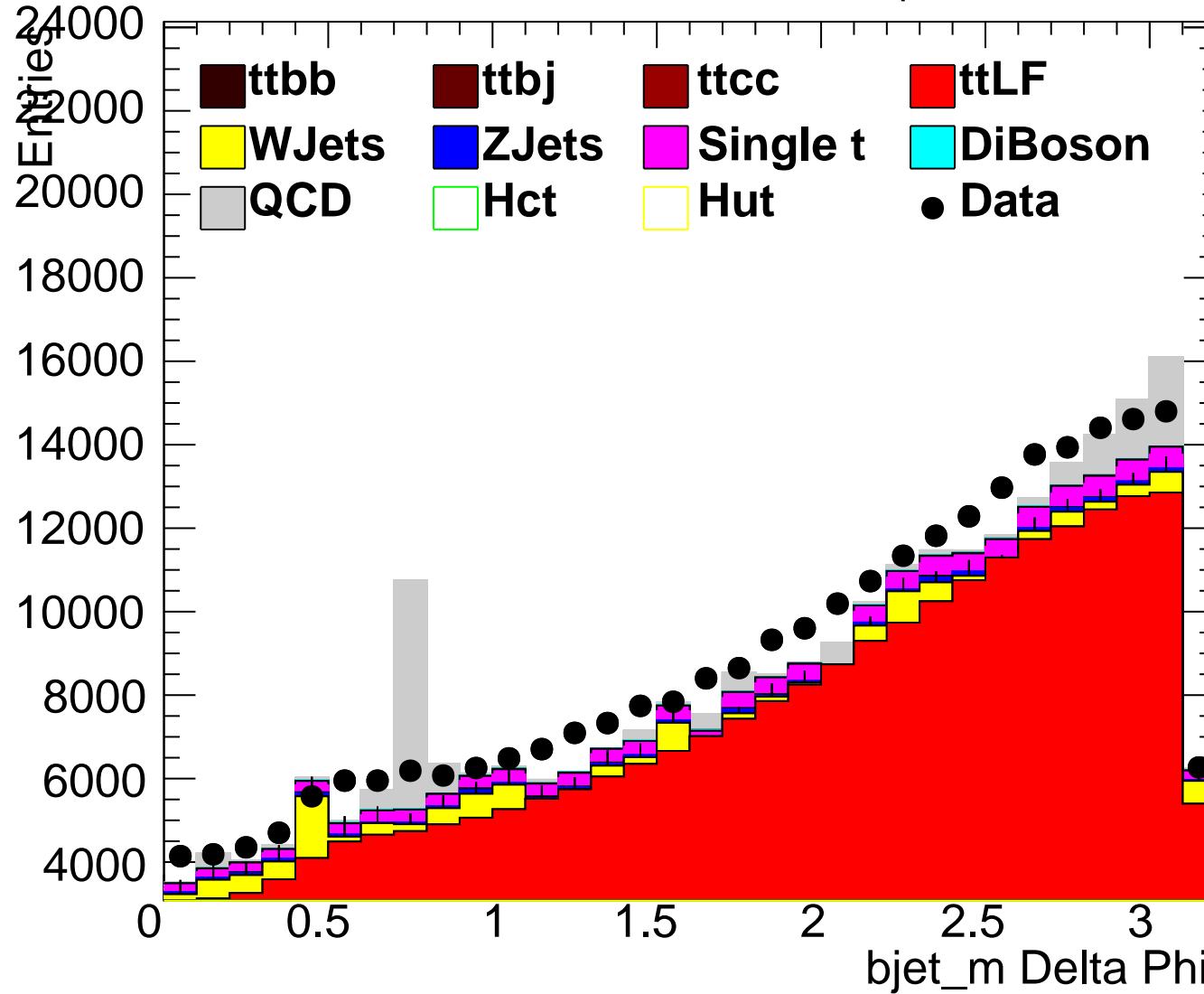
**Ch0\_S2**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

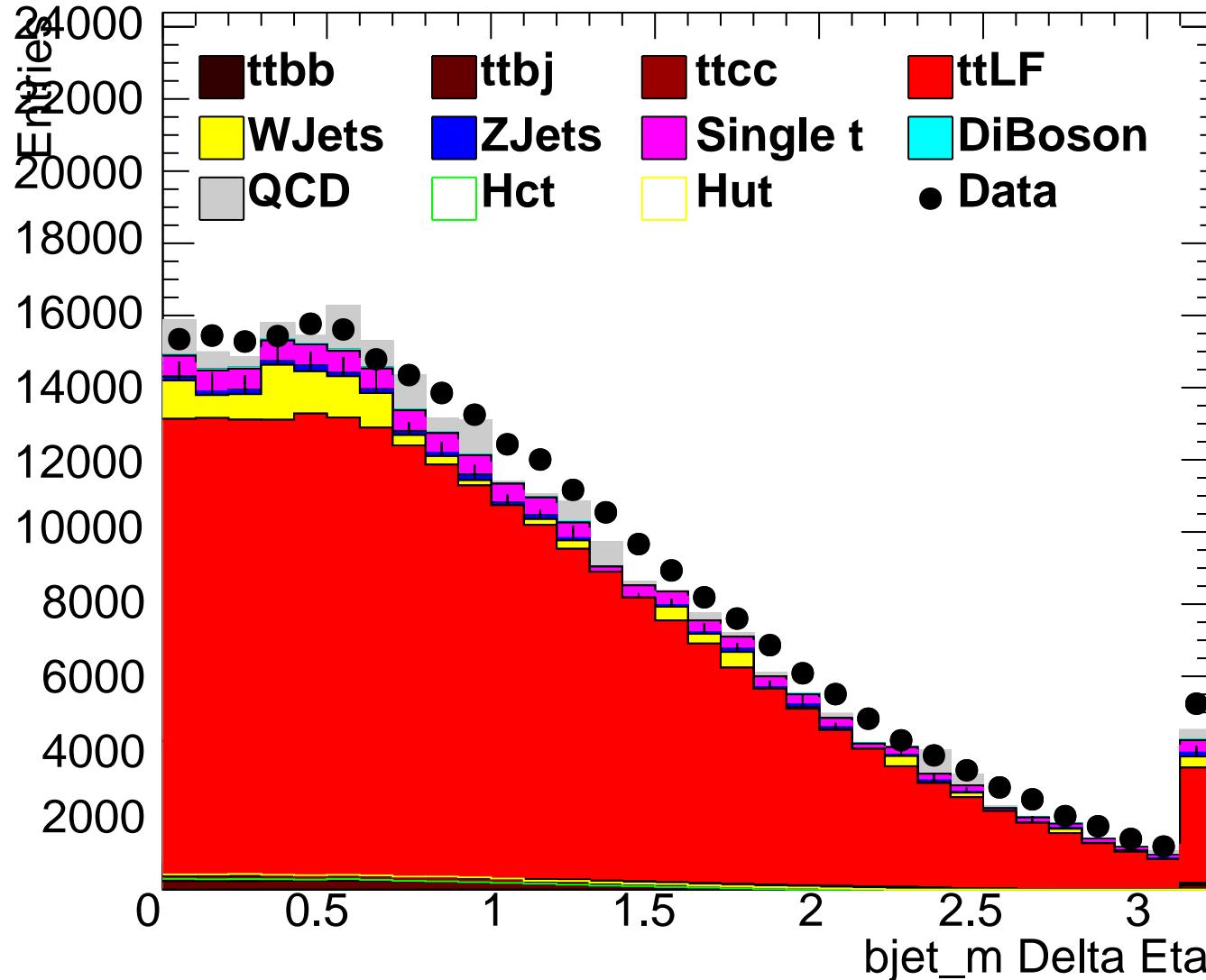
**Ch0\_S2**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

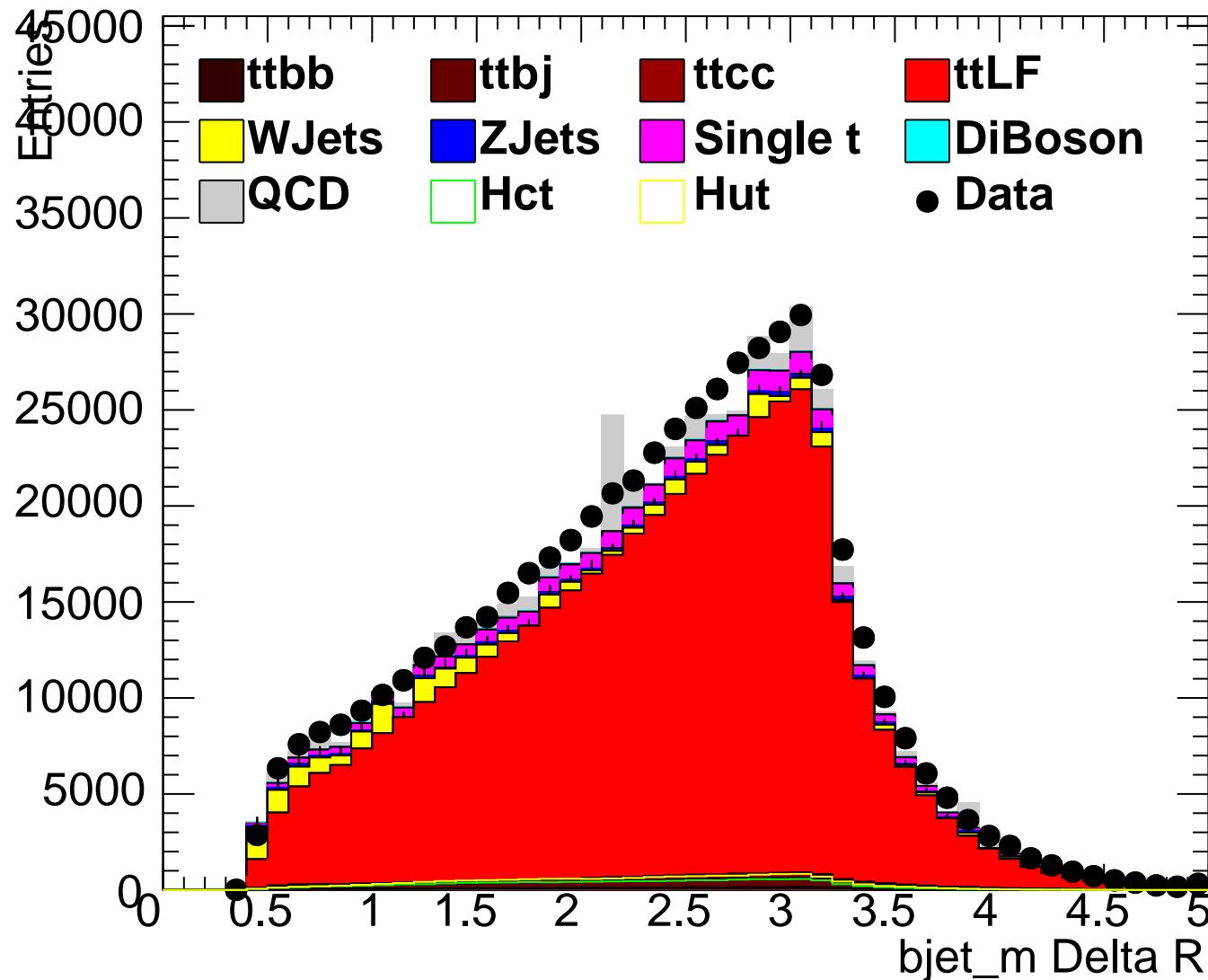
**Ch0\_S2**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

Ch0\_S2

CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV



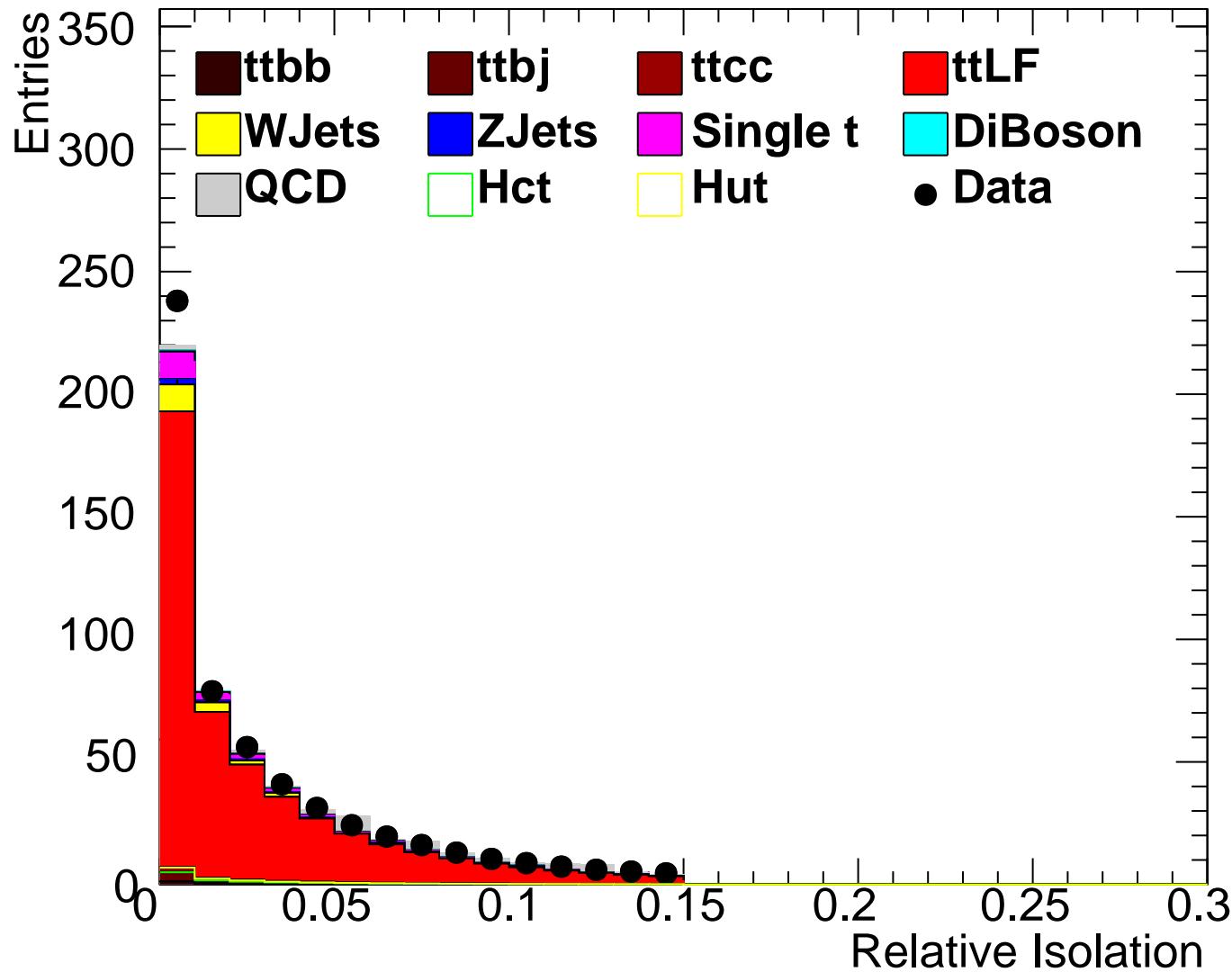
**Ch0\_S2**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

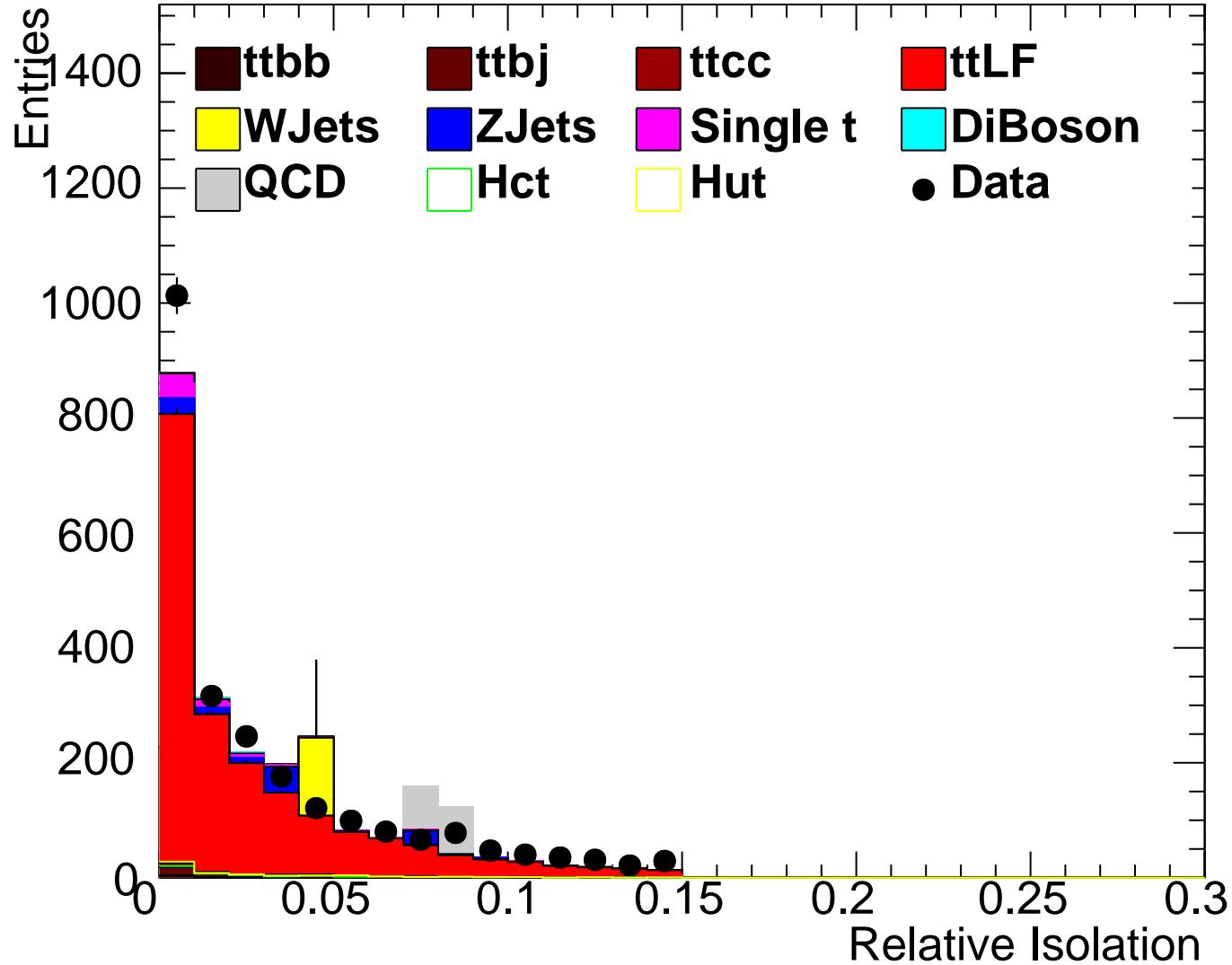


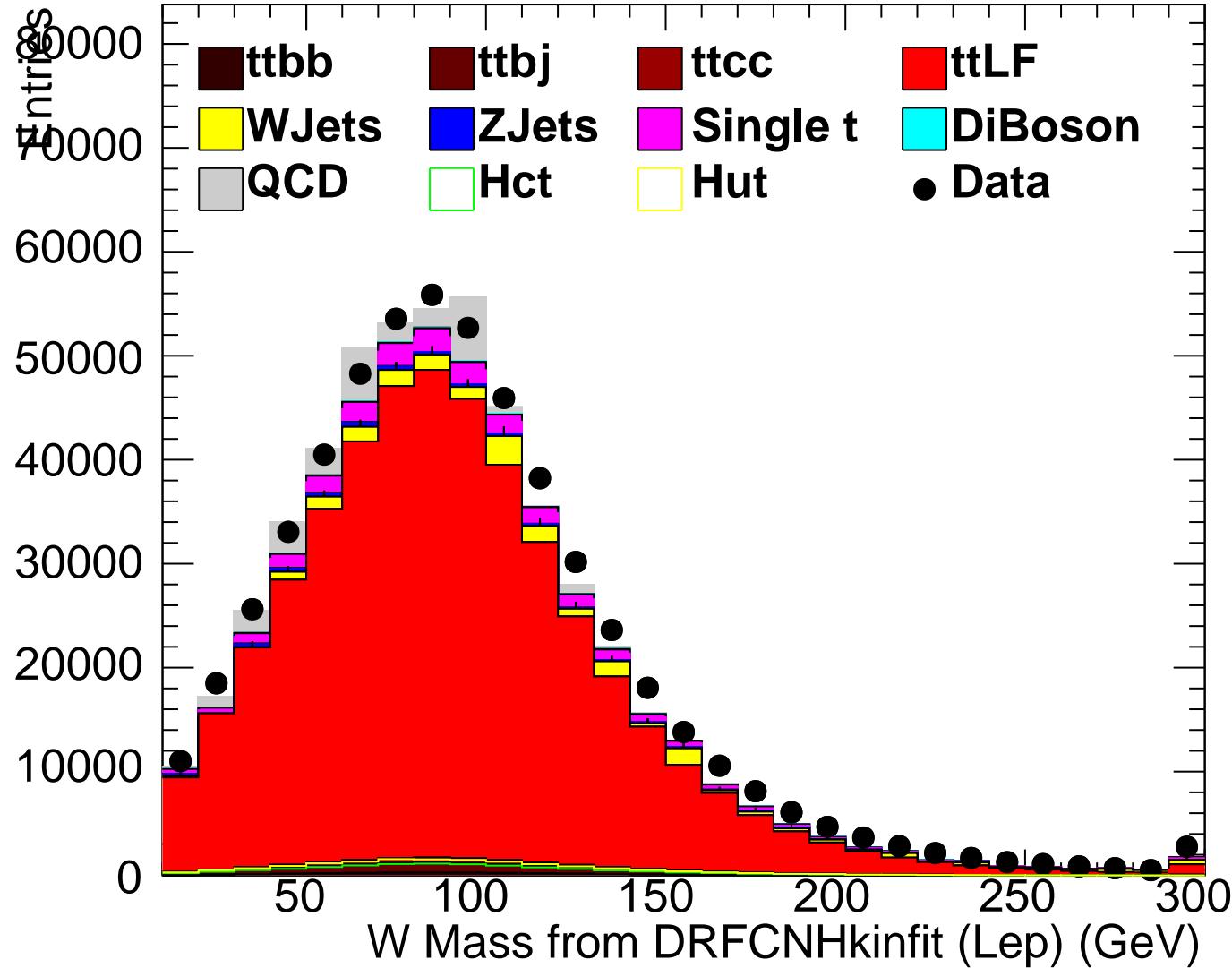
**Ch0\_S2**

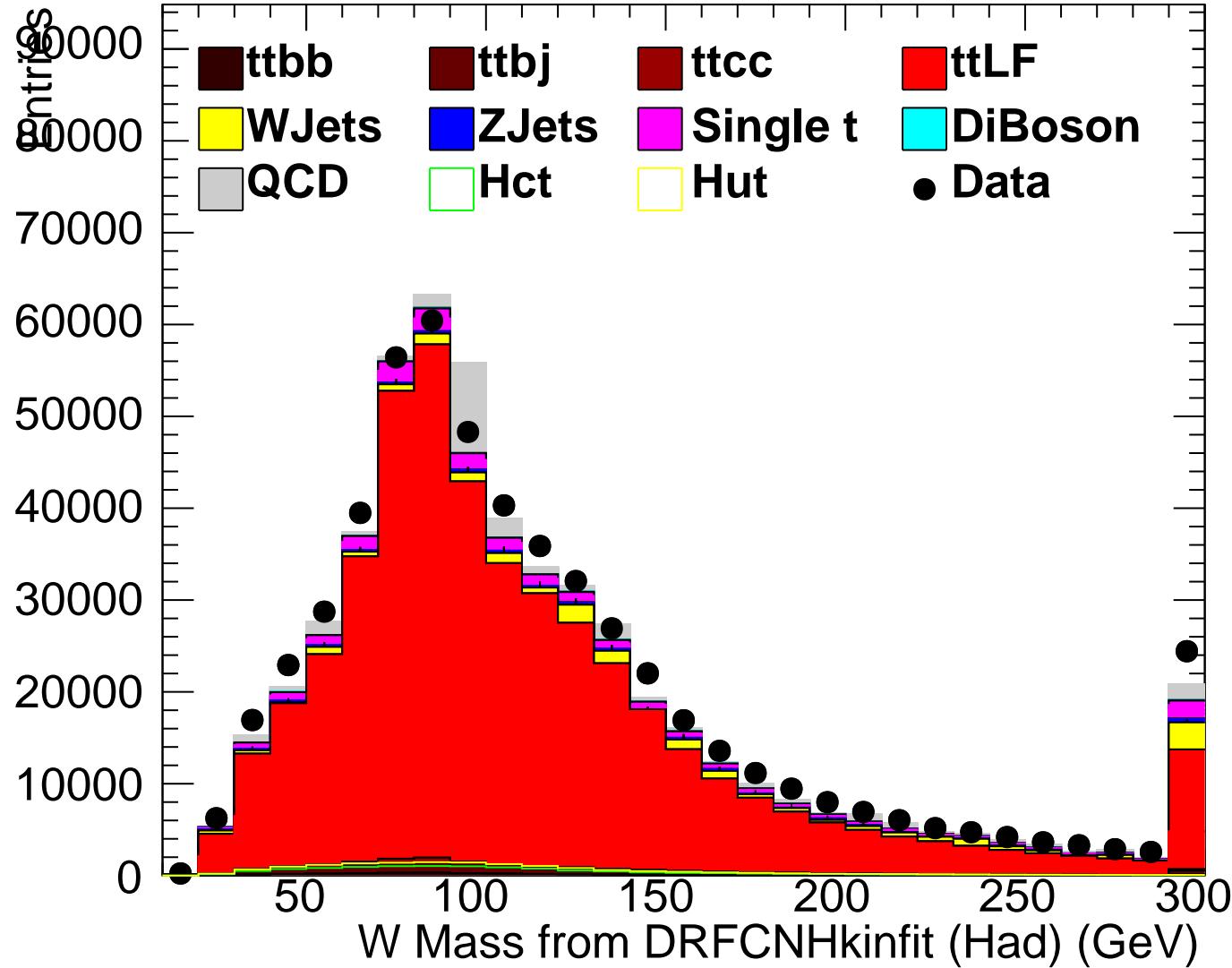
$\times 10^{-3}$

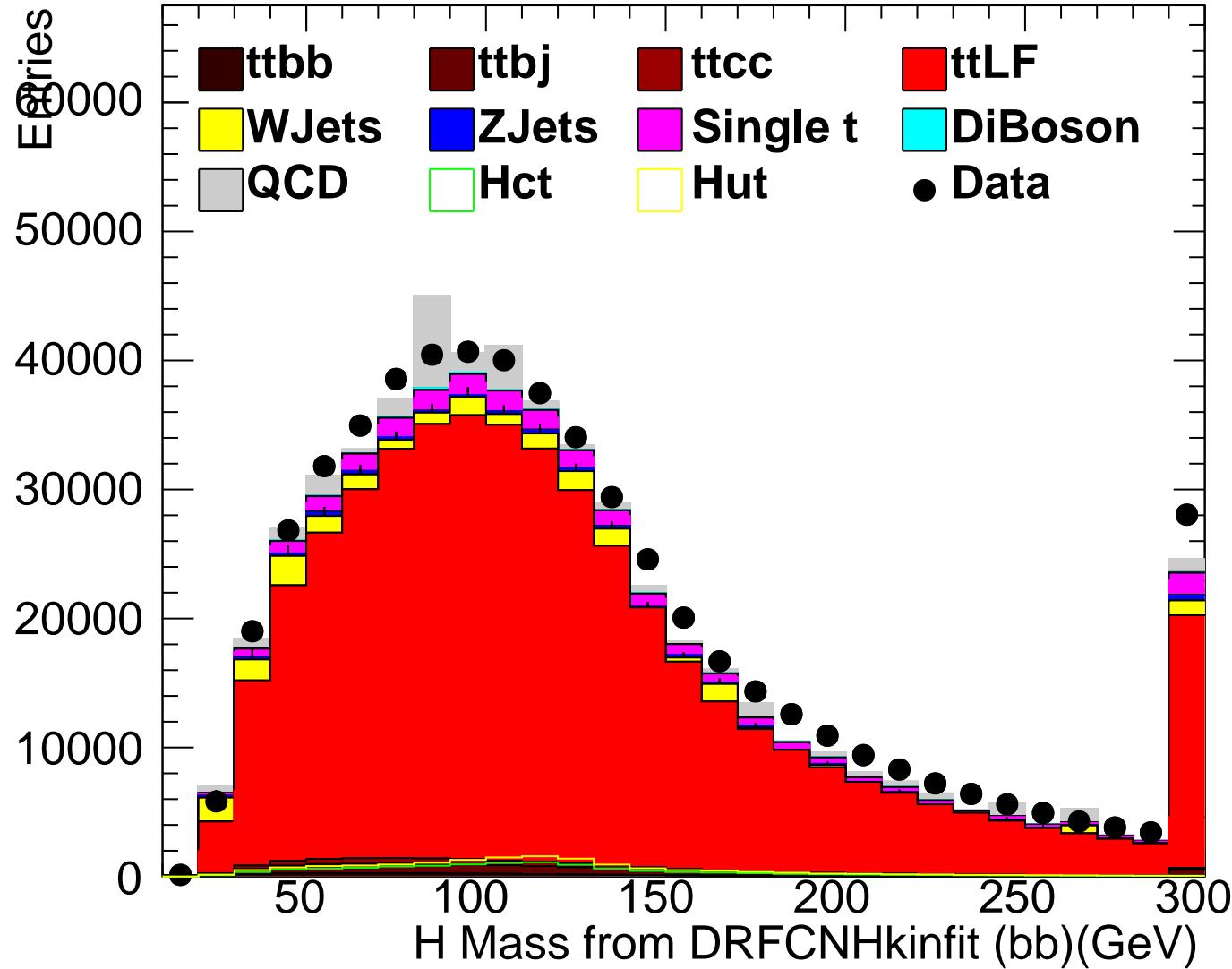
CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$

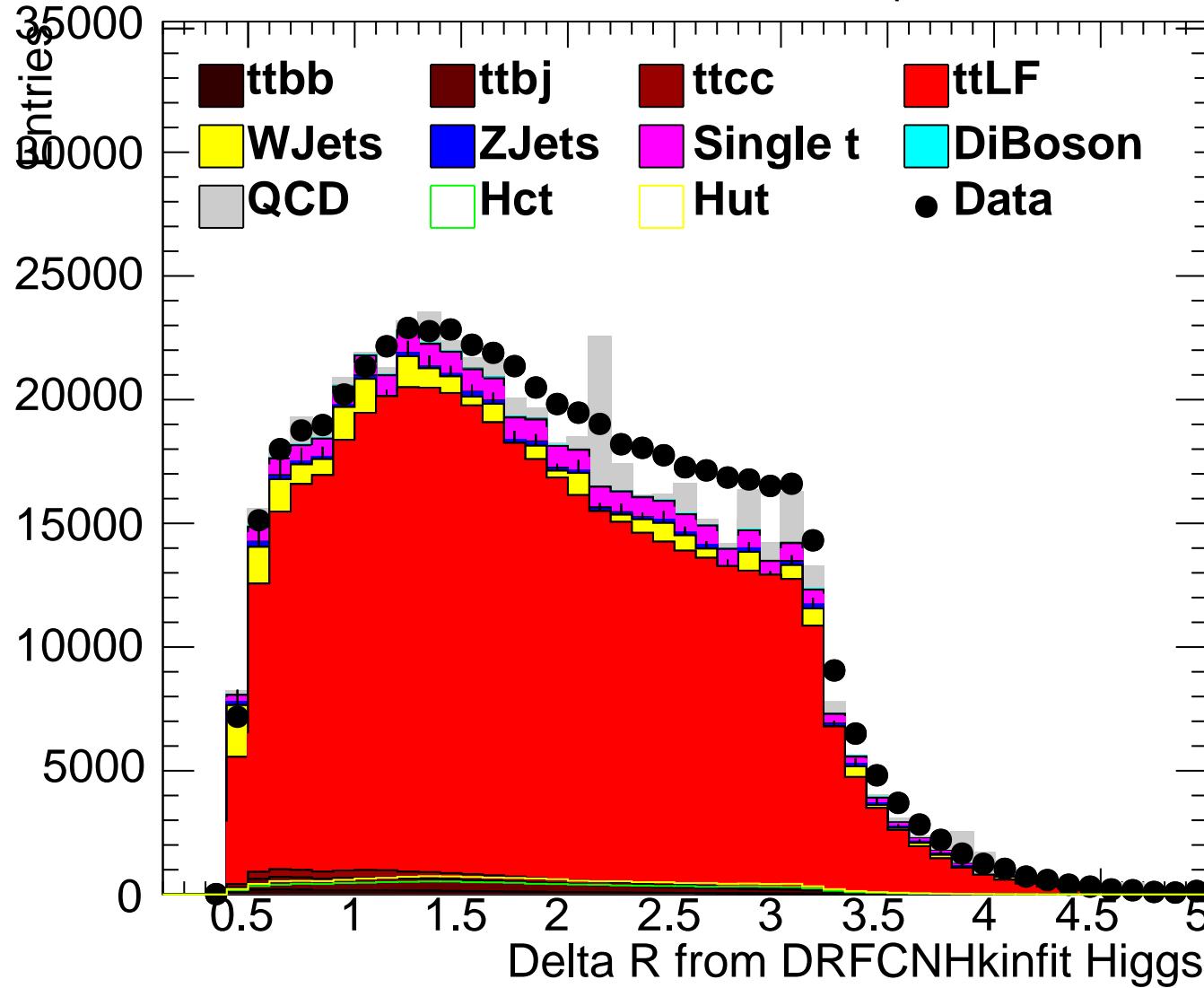




**Ch0\_S2**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch0\_S2**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch0\_S2**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch0\_S2**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch0\_S2**x 10<sup>3</sup>CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV

Entries

140

120

100

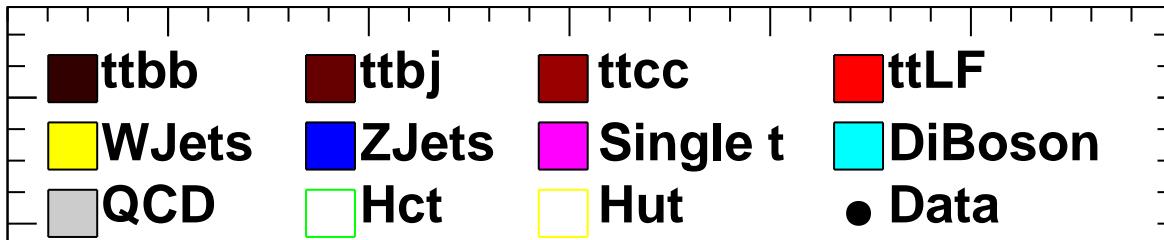
80

60

40

20

0

Top Mass from DRFCN<sub>H</sub>kinfit (Lep) (GeV)

50

250

300

**Ch0\_S2**x 10<sup>-3</sup>CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV

Entries

160

140

120

100

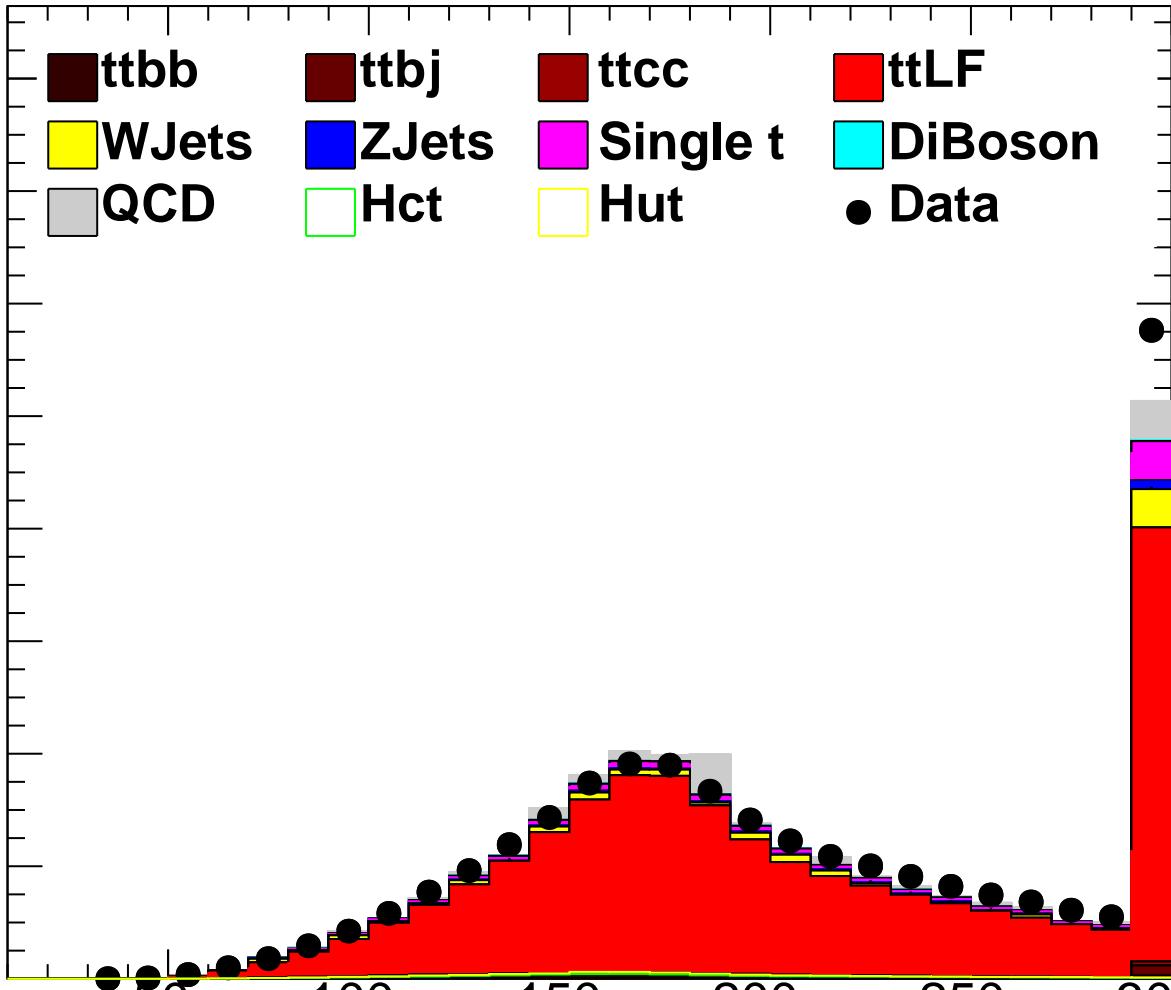
80

60

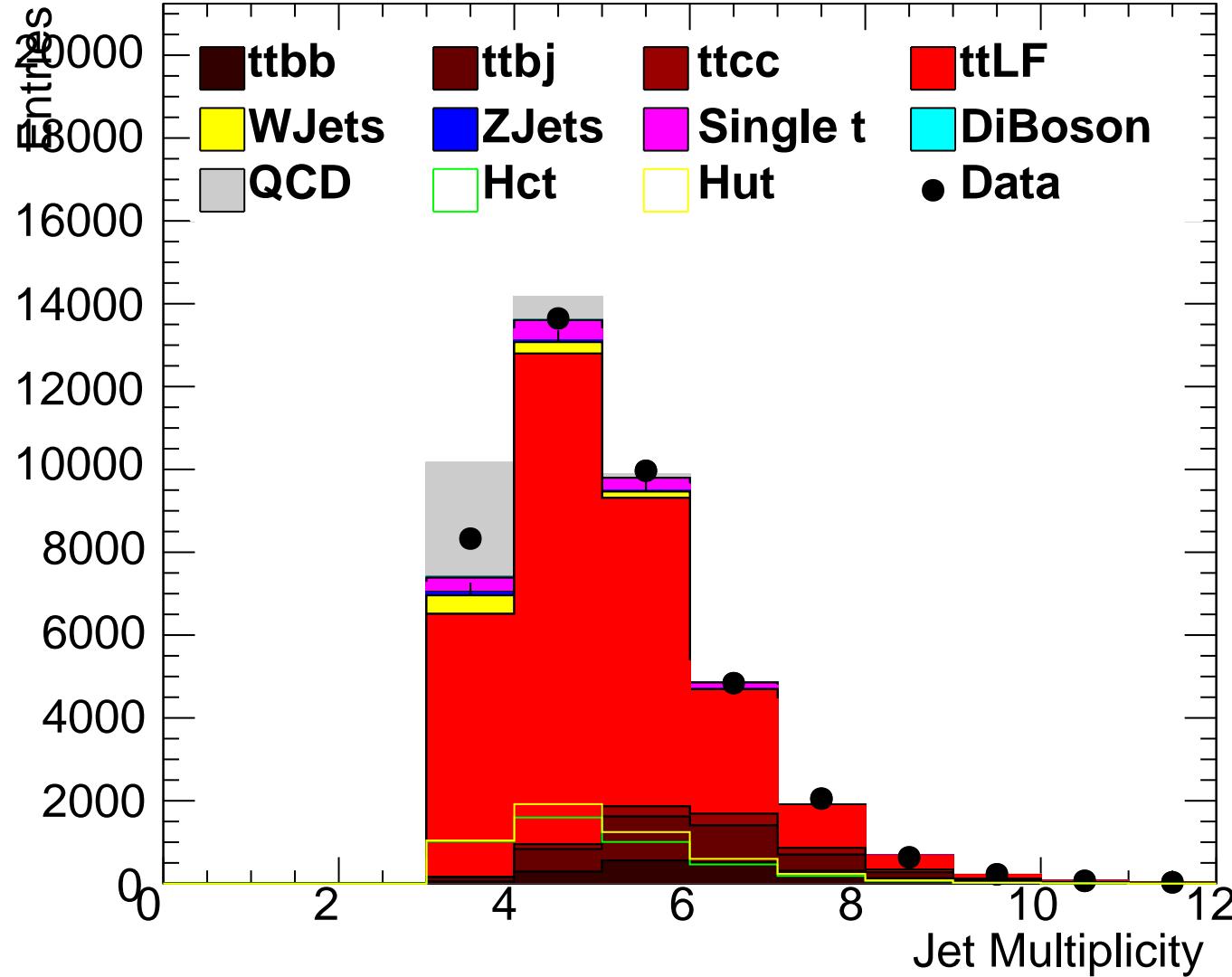
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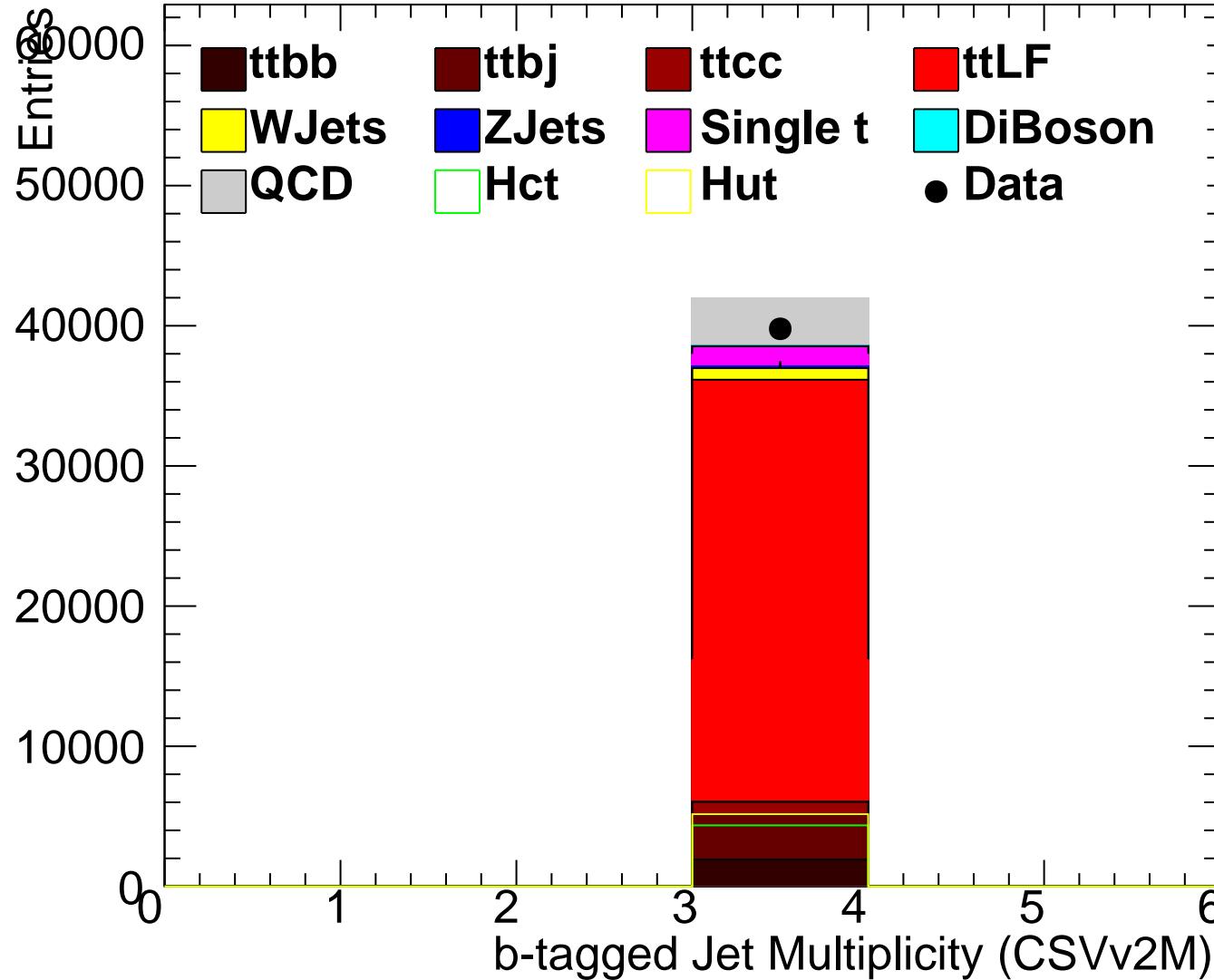
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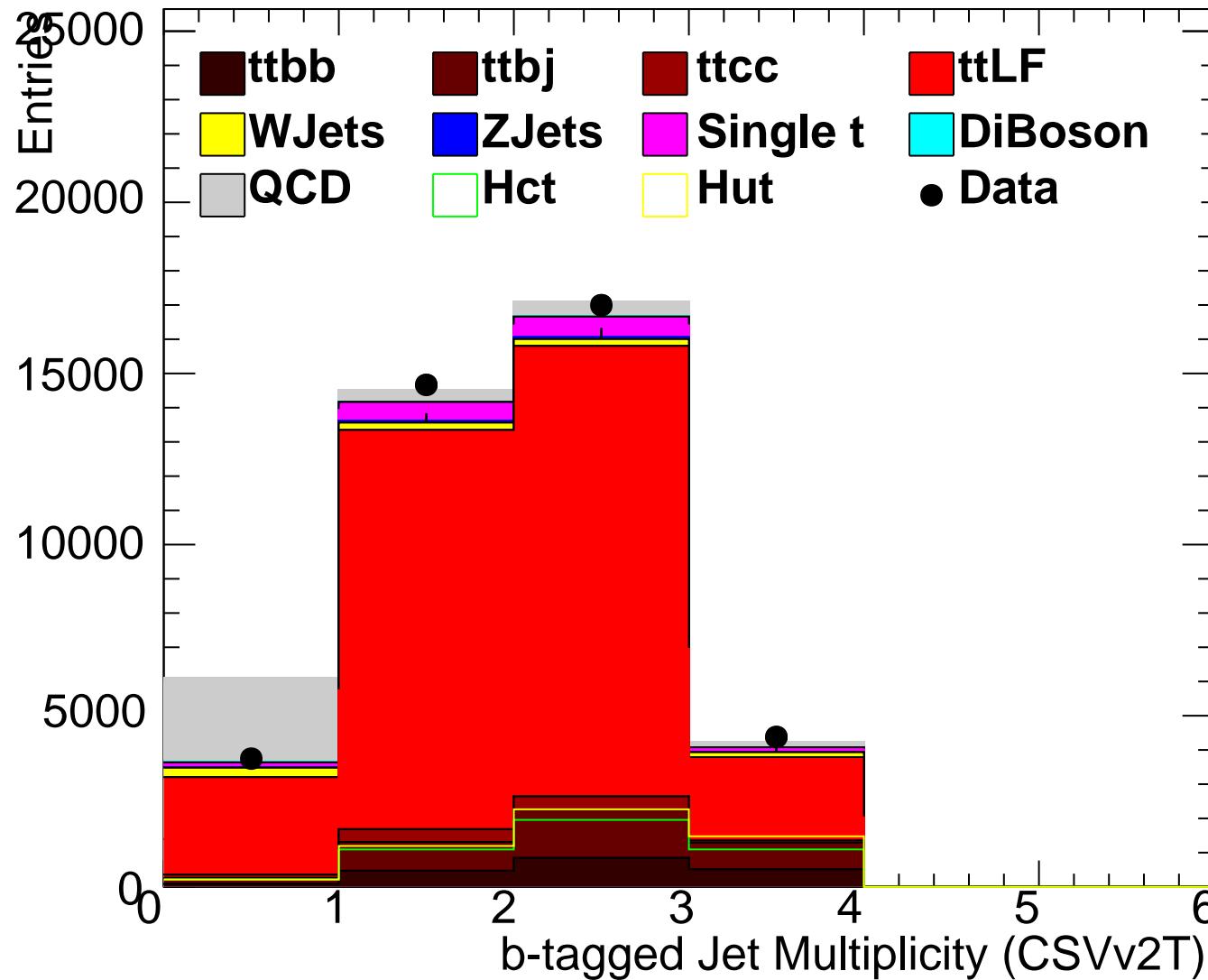
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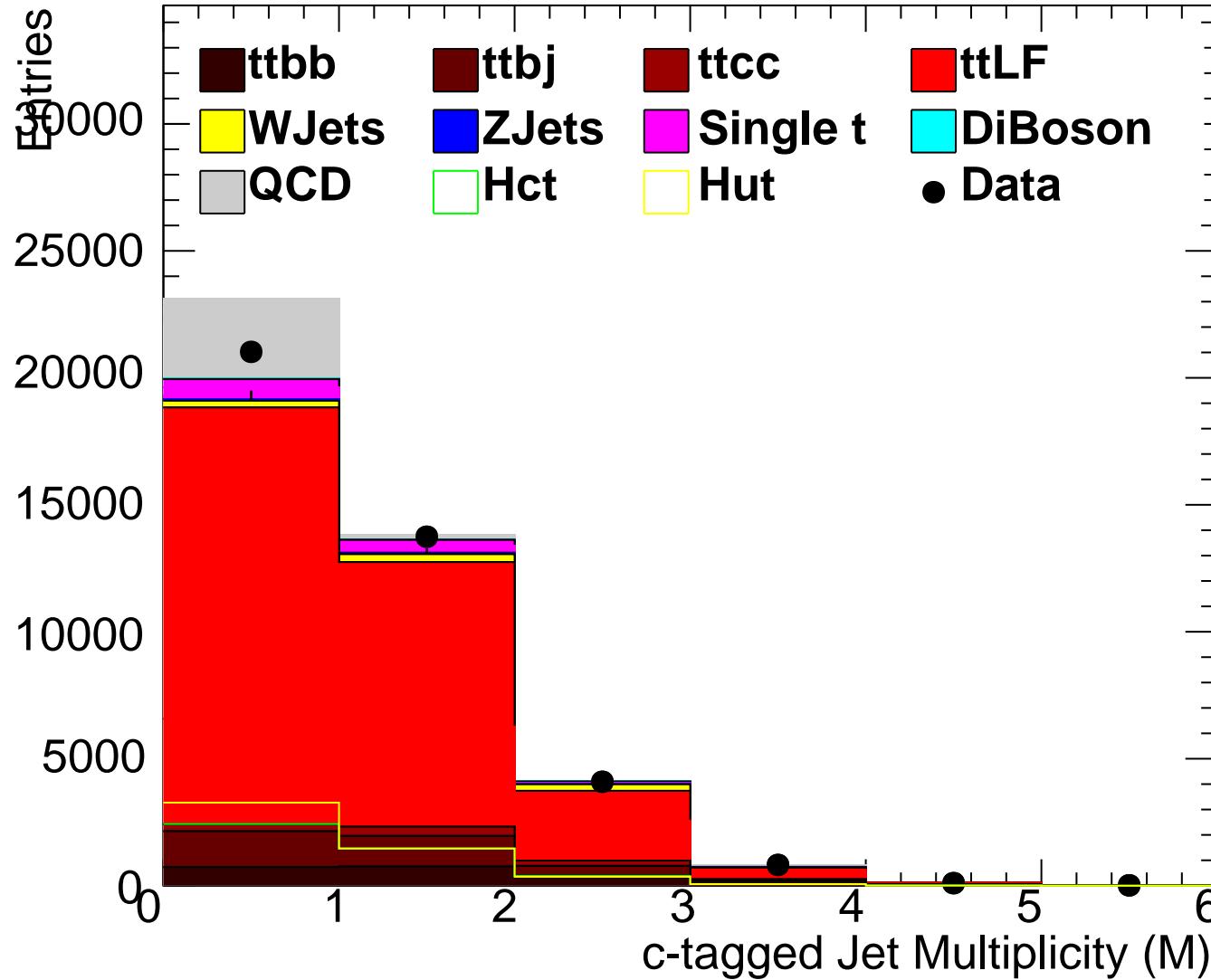


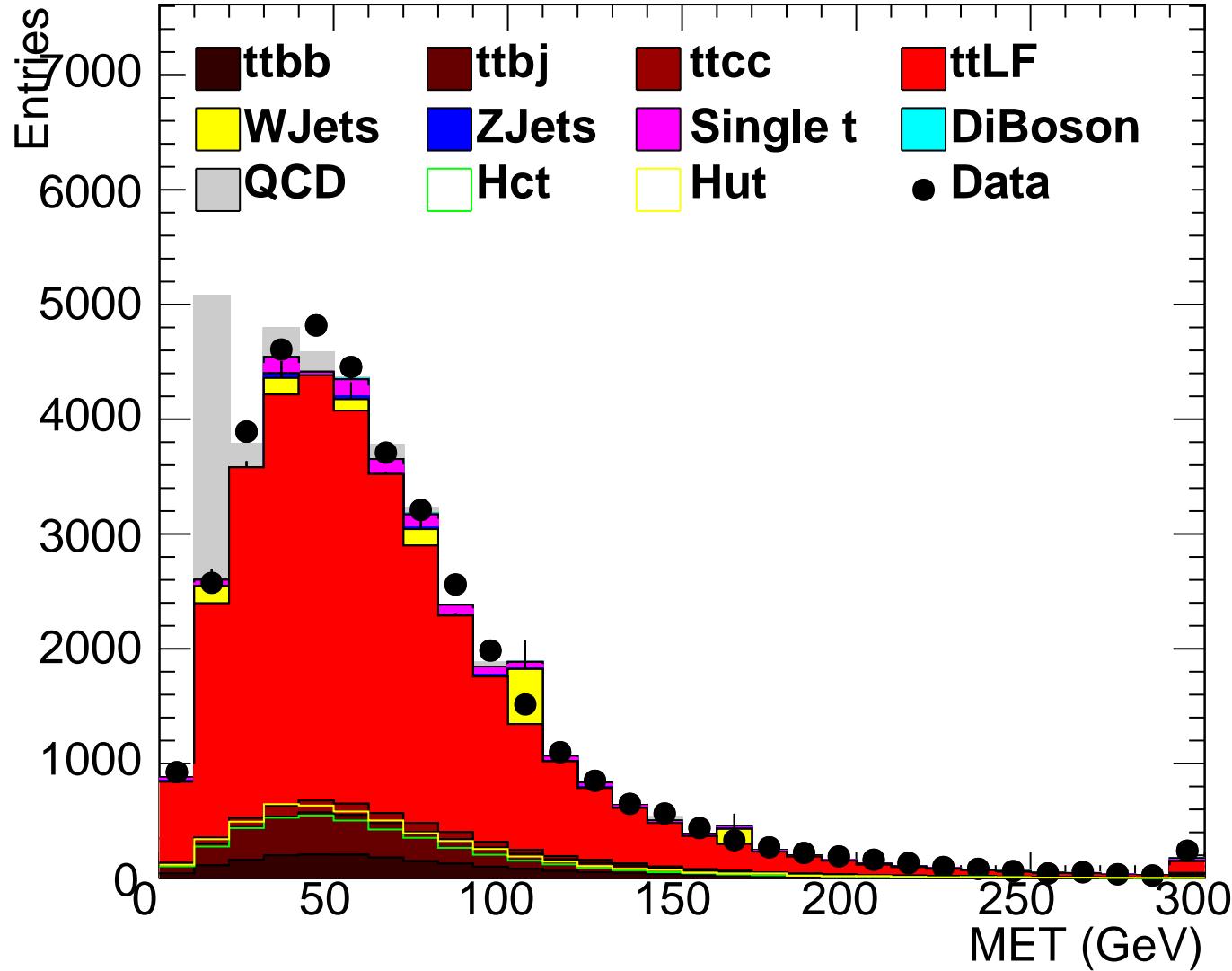
Top Mass from Hc/u DRFCN Hkinfit (GeV)

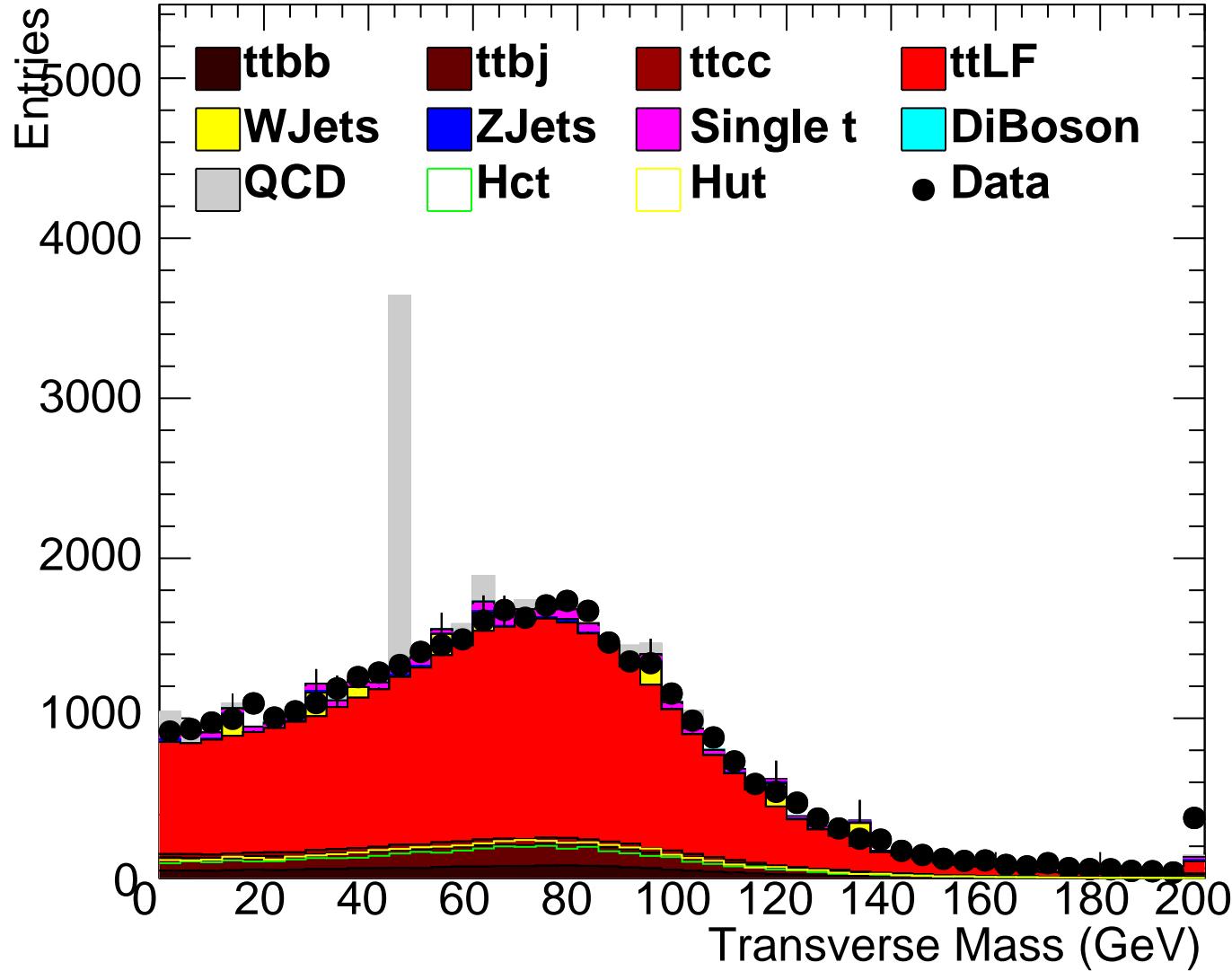


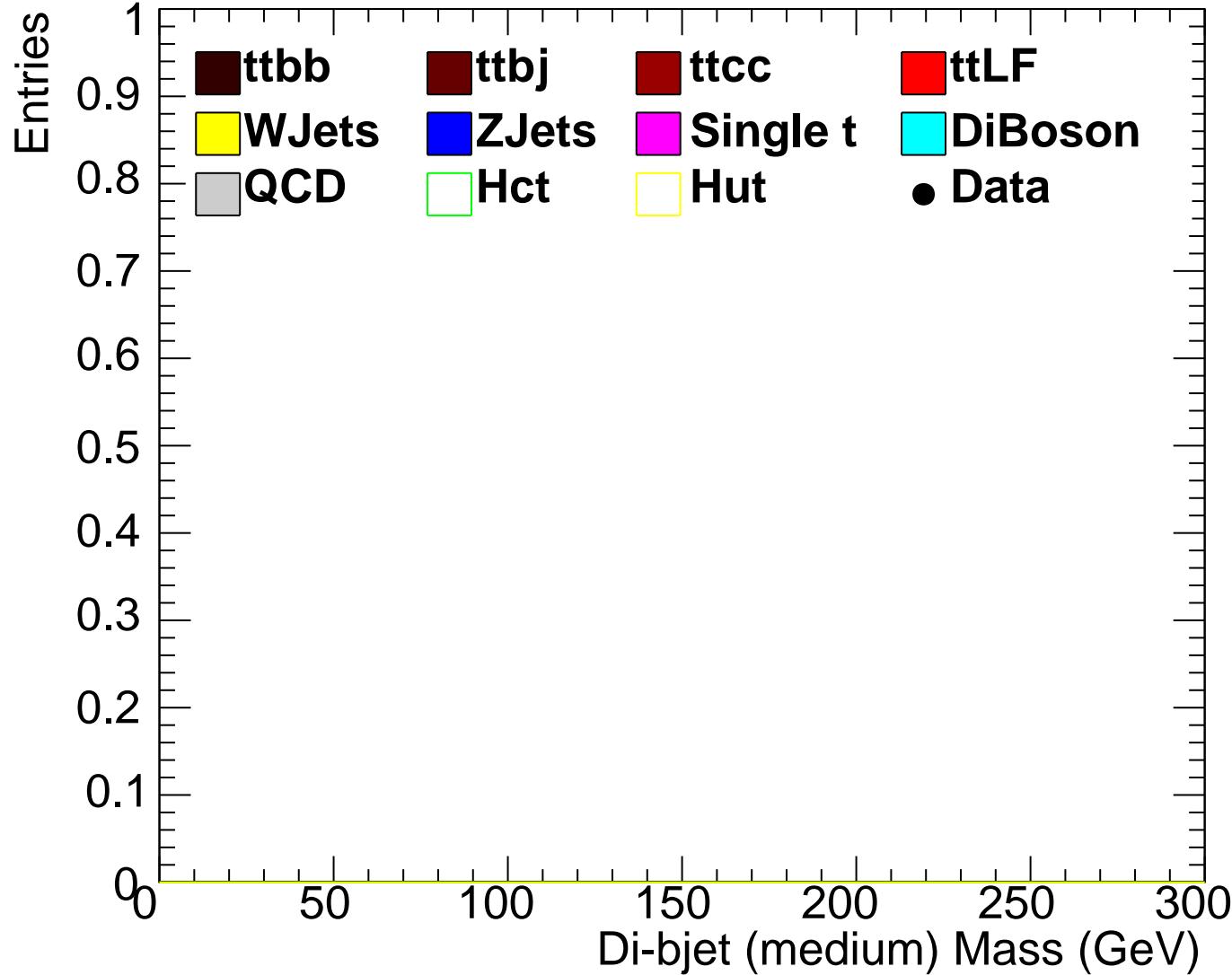


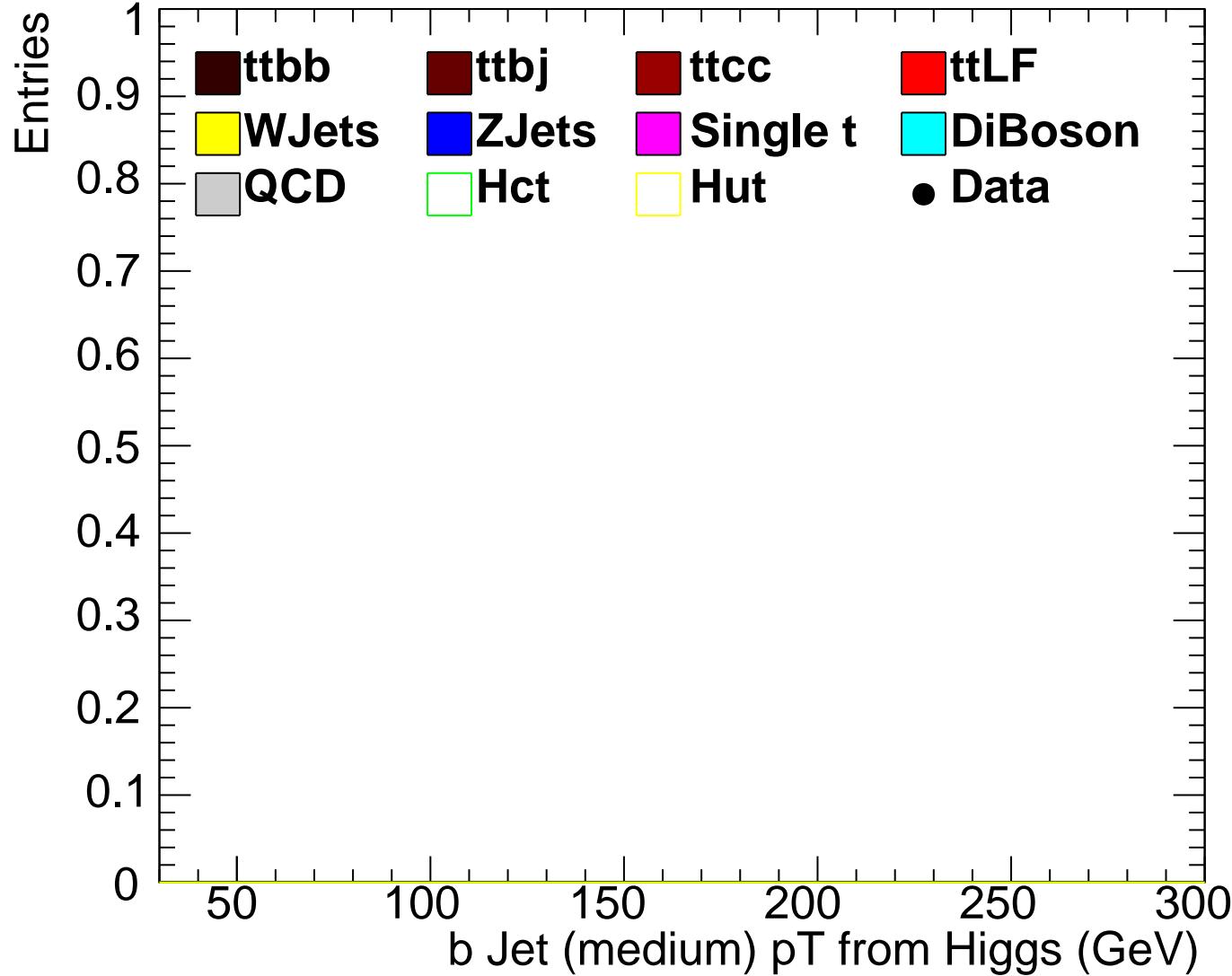


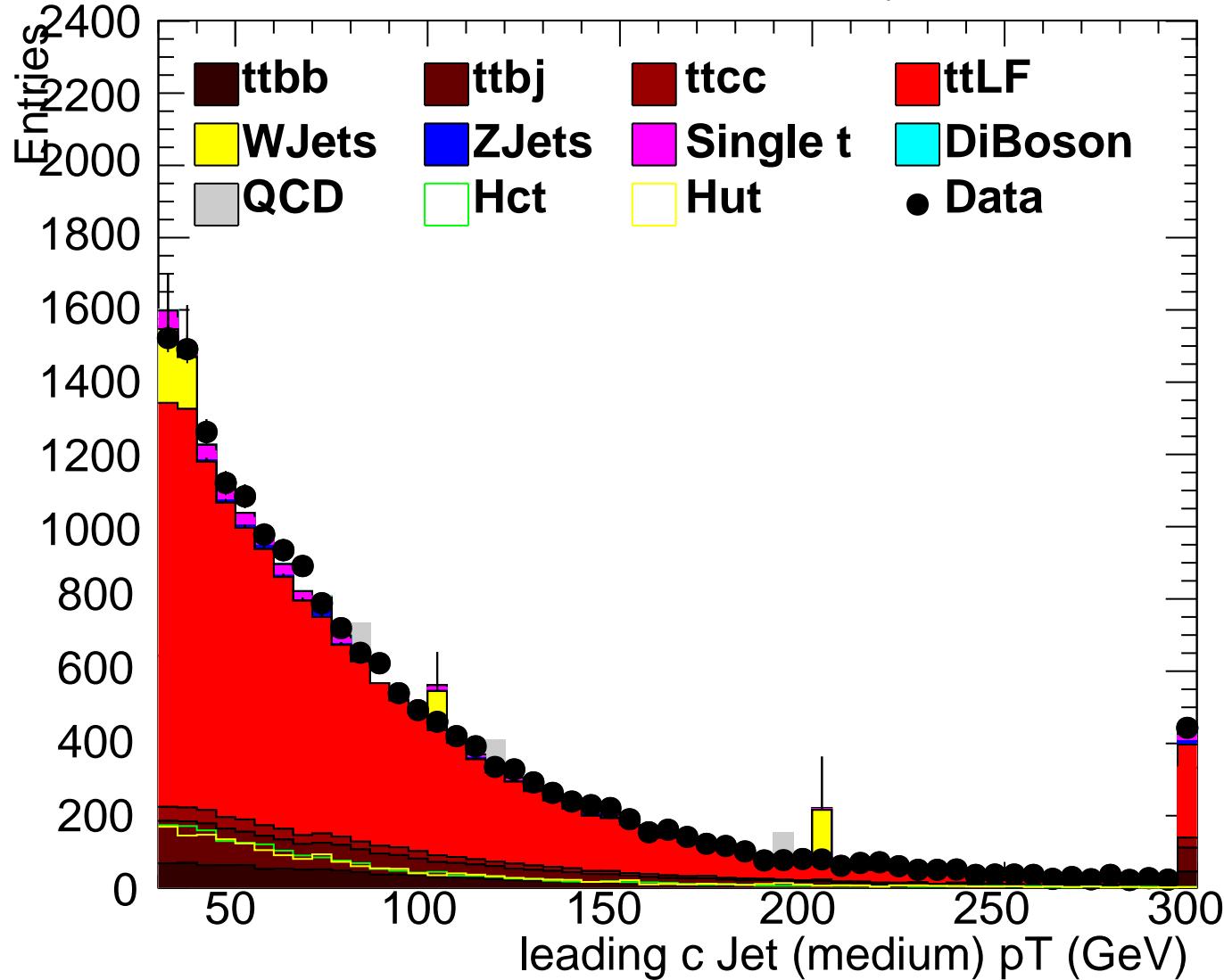


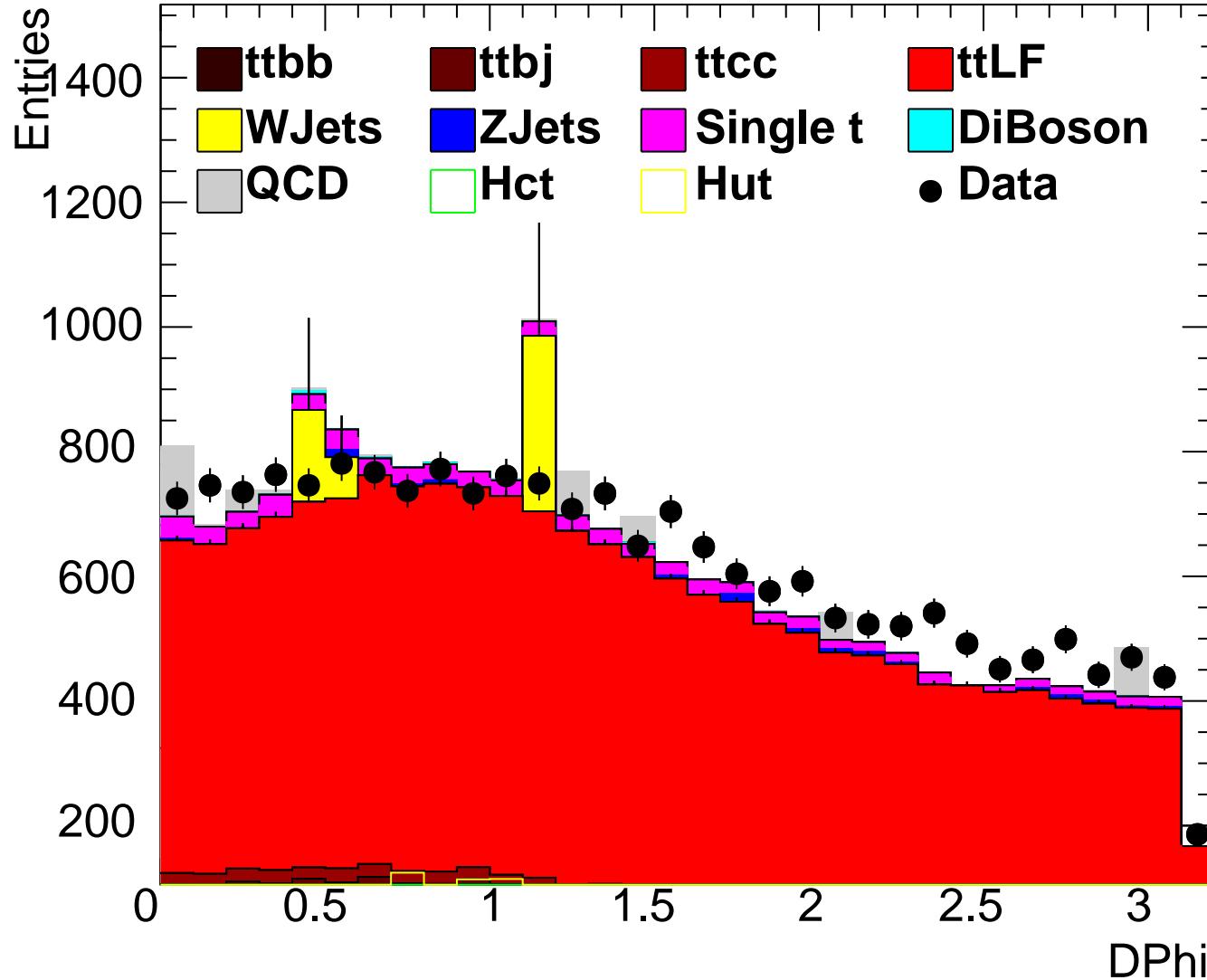
**Ch0\_S3**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

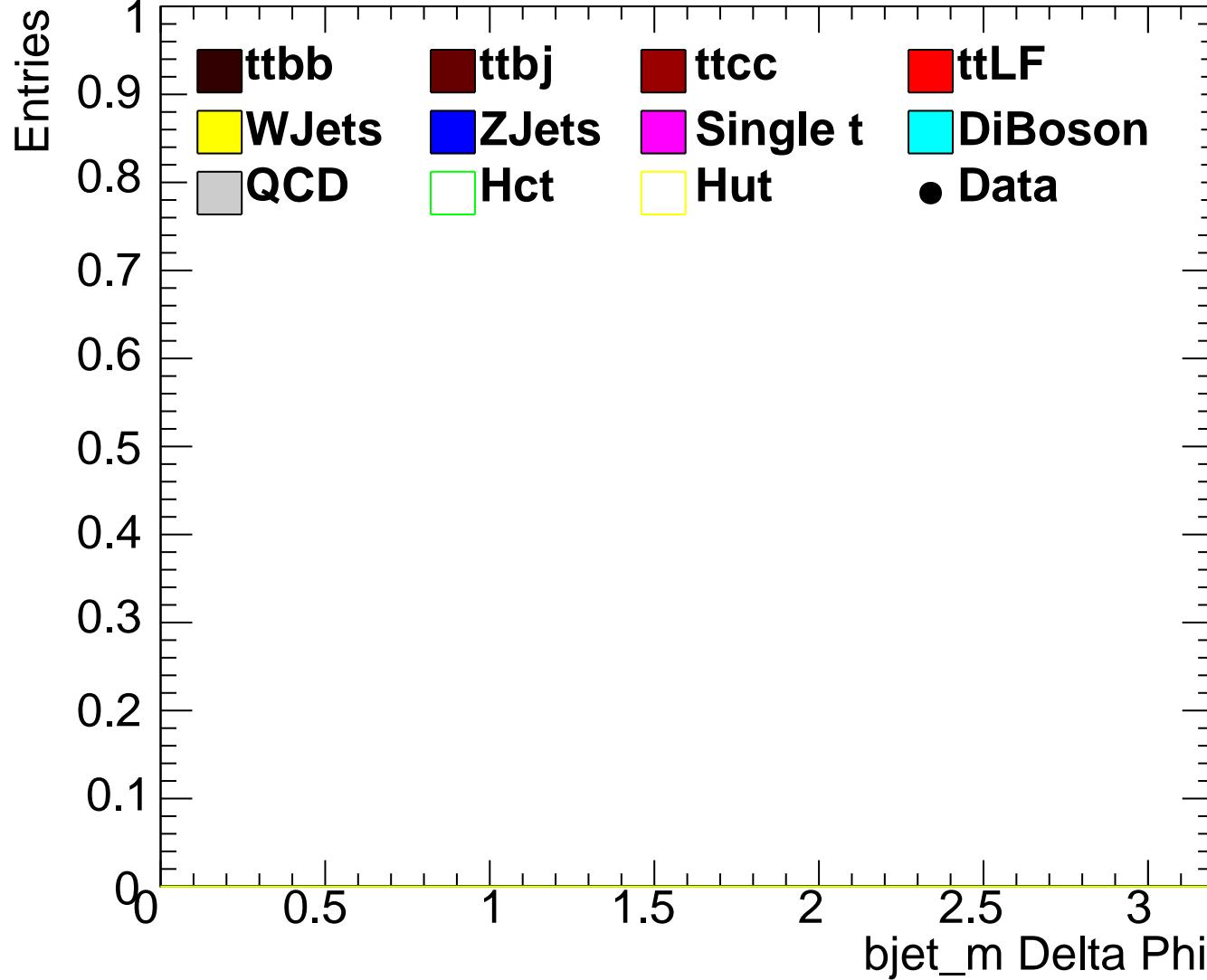
**Ch0\_S3**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

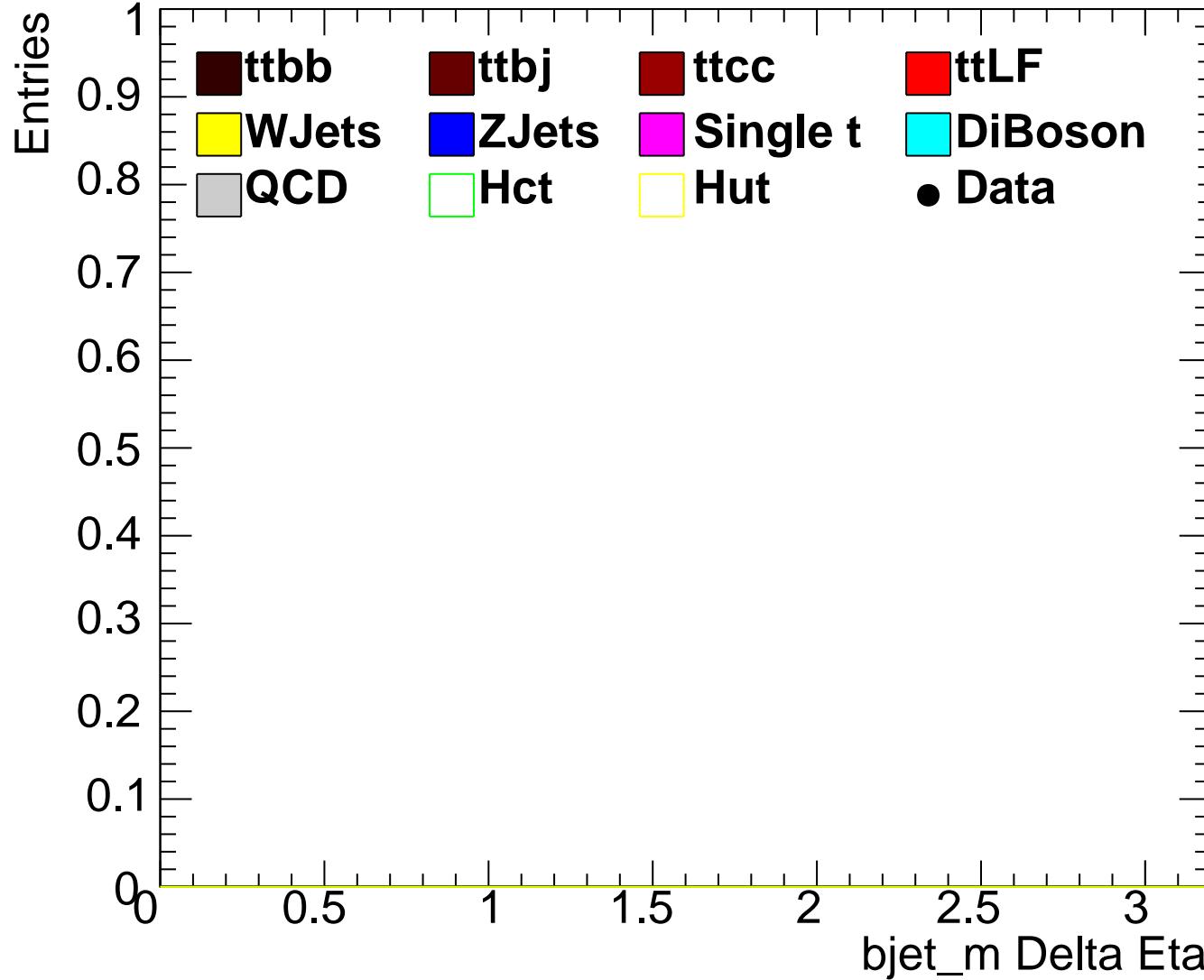


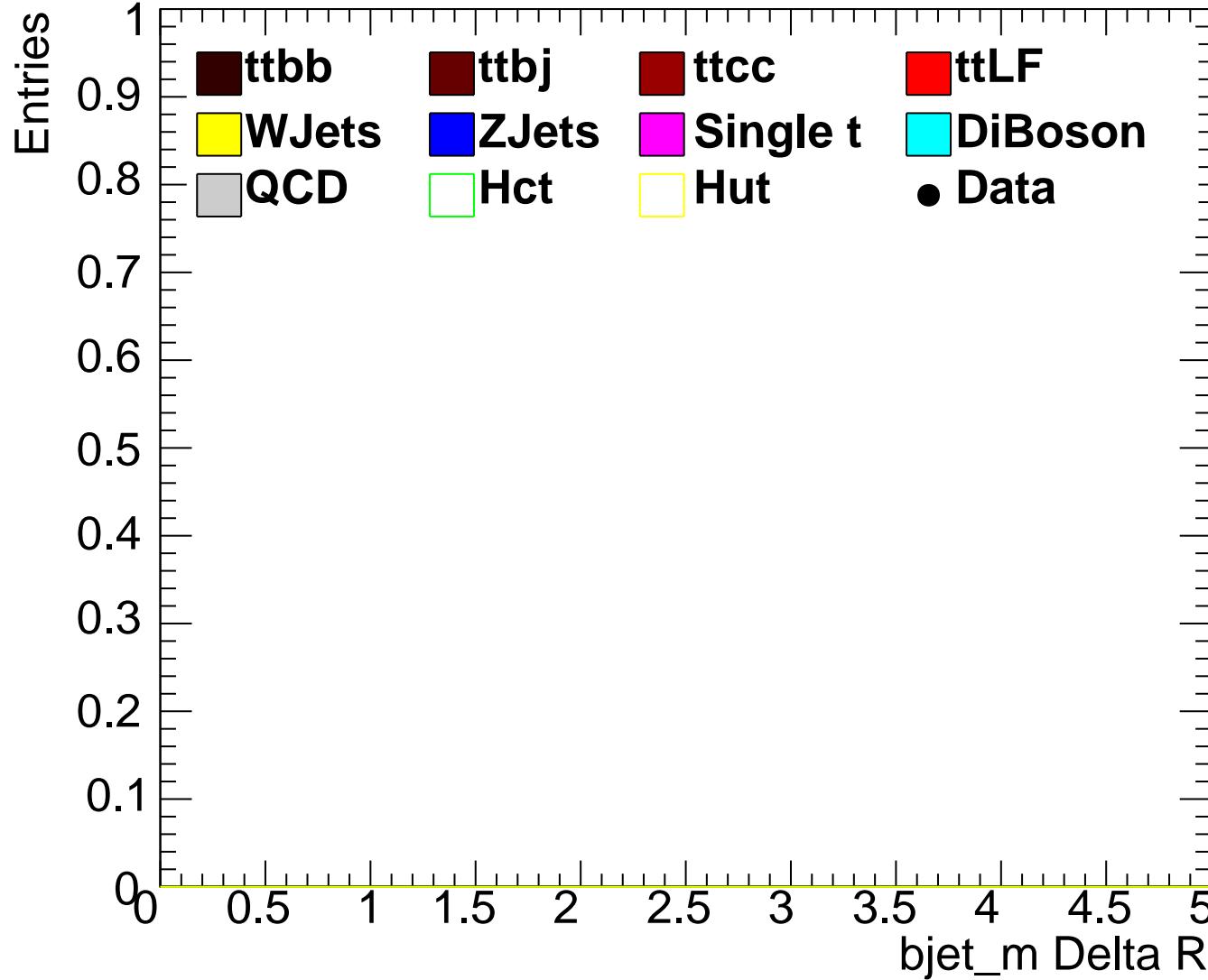


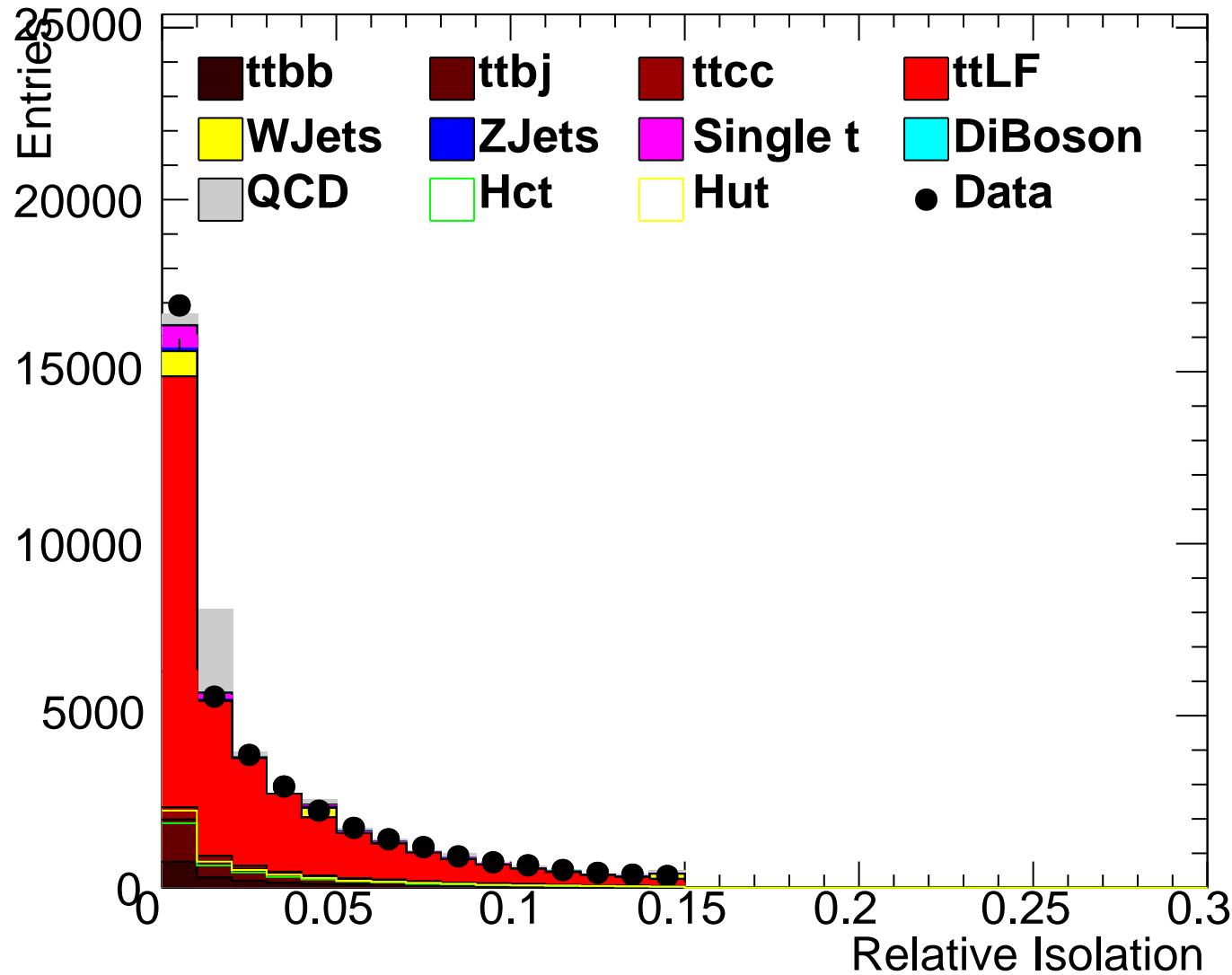
**Ch0\_S3**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

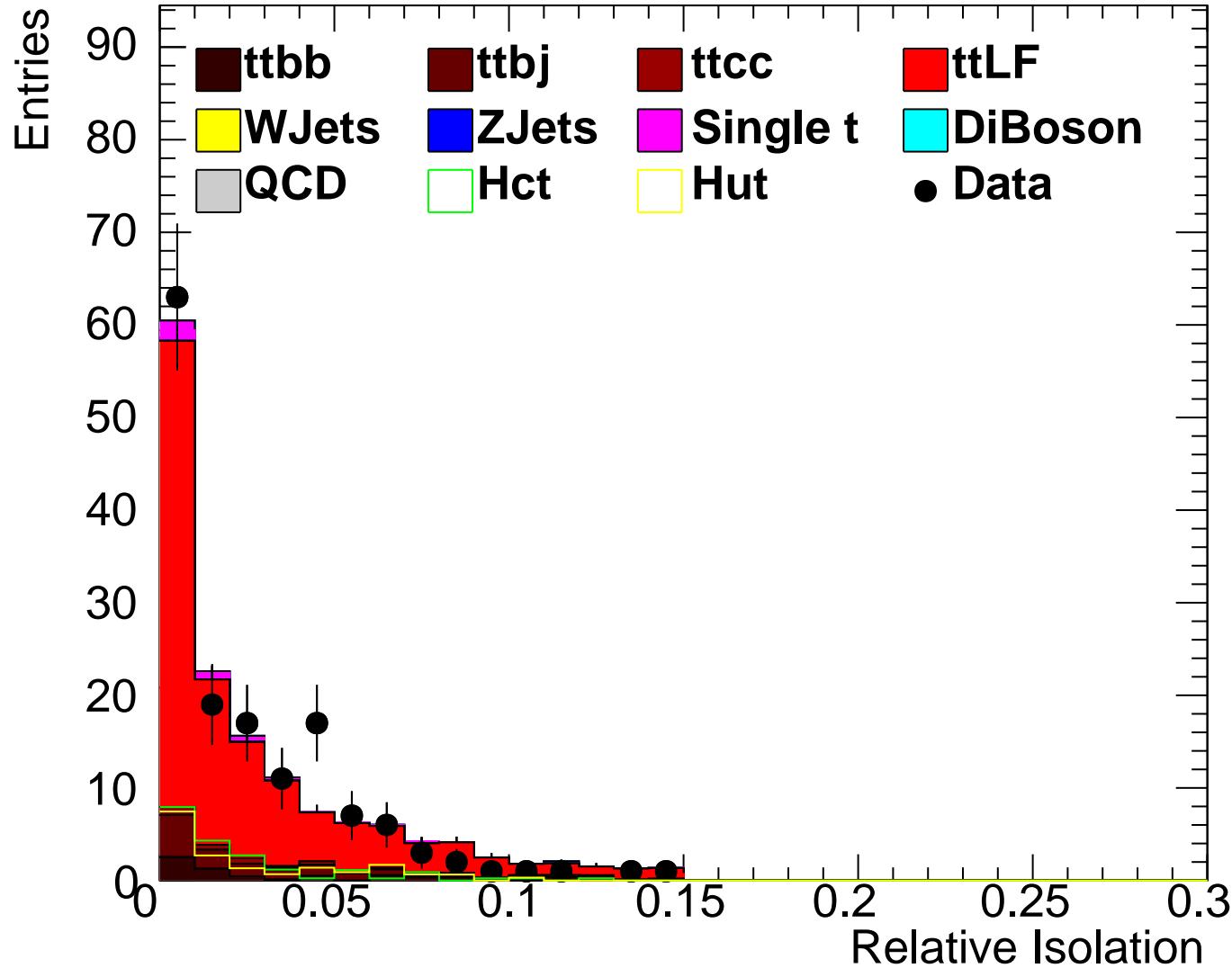
**Ch0\_S3**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

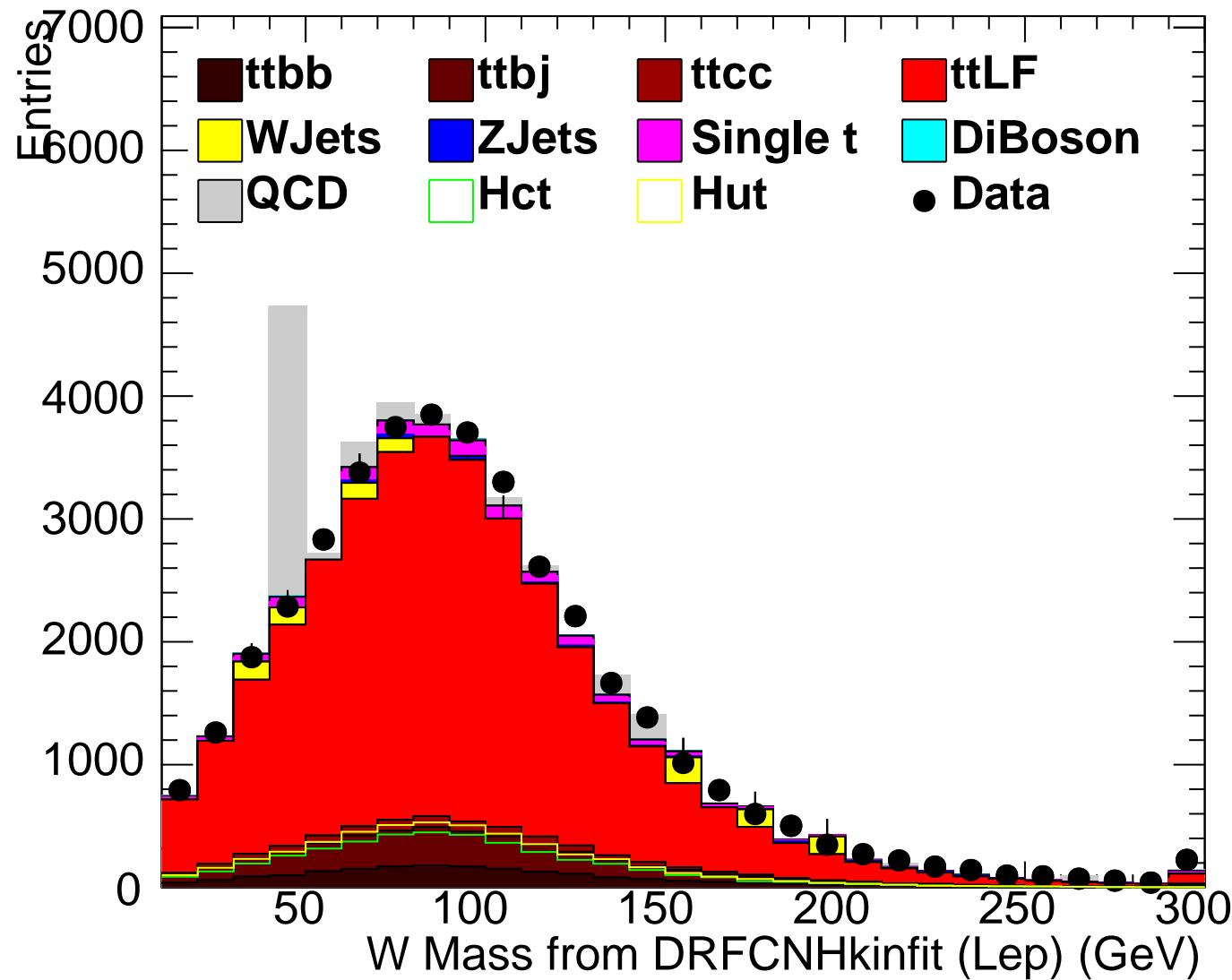


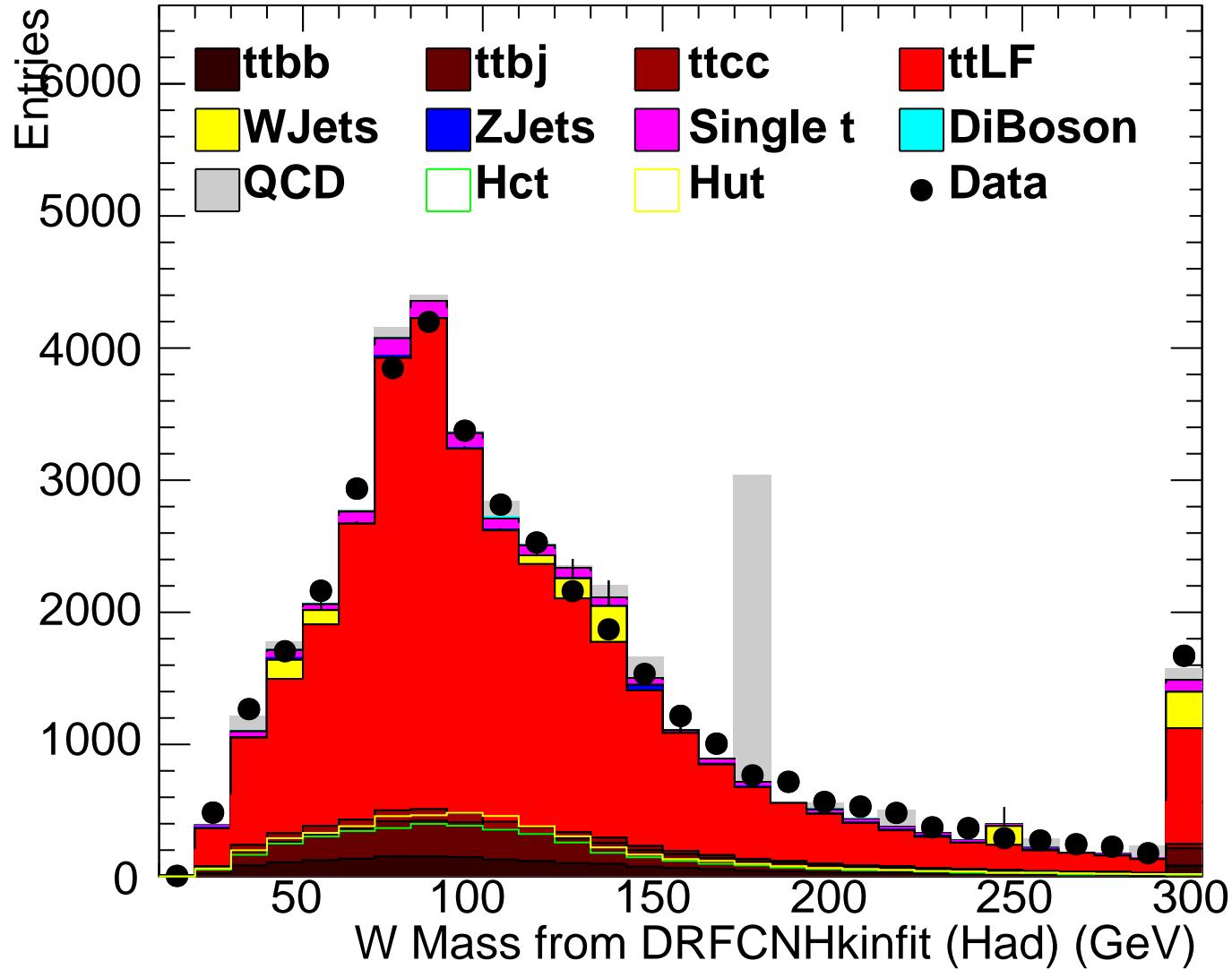


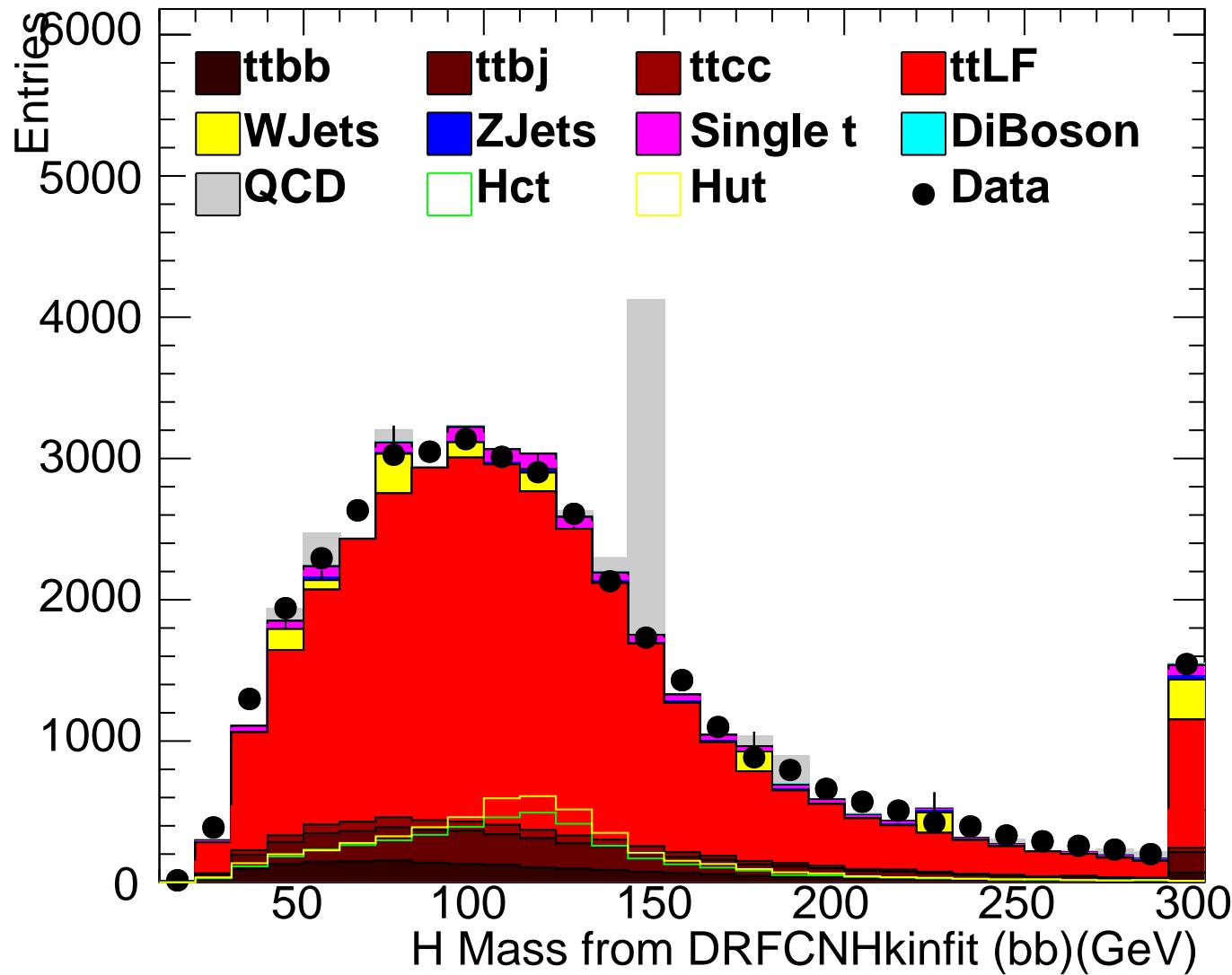


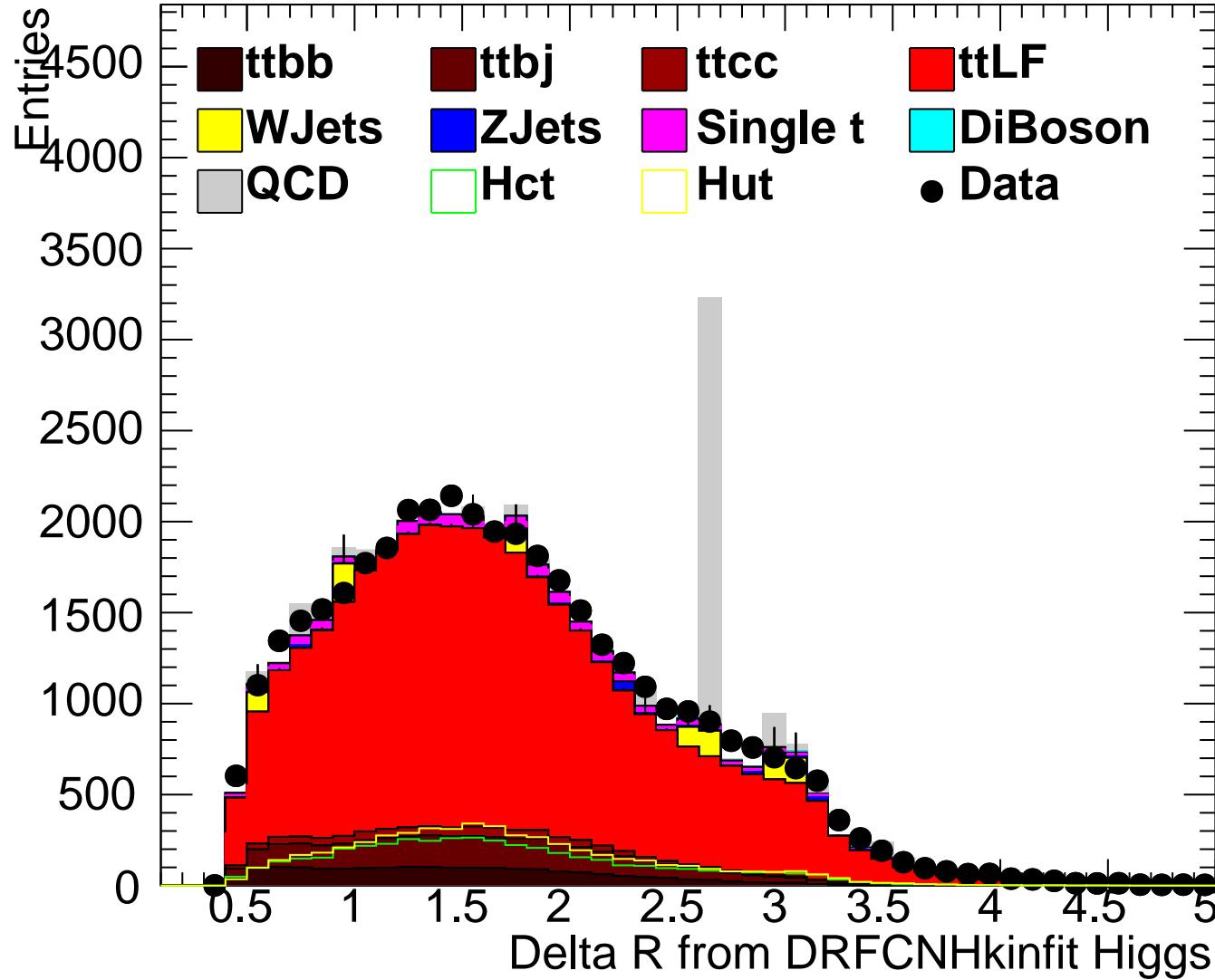
**Ch0\_S3**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

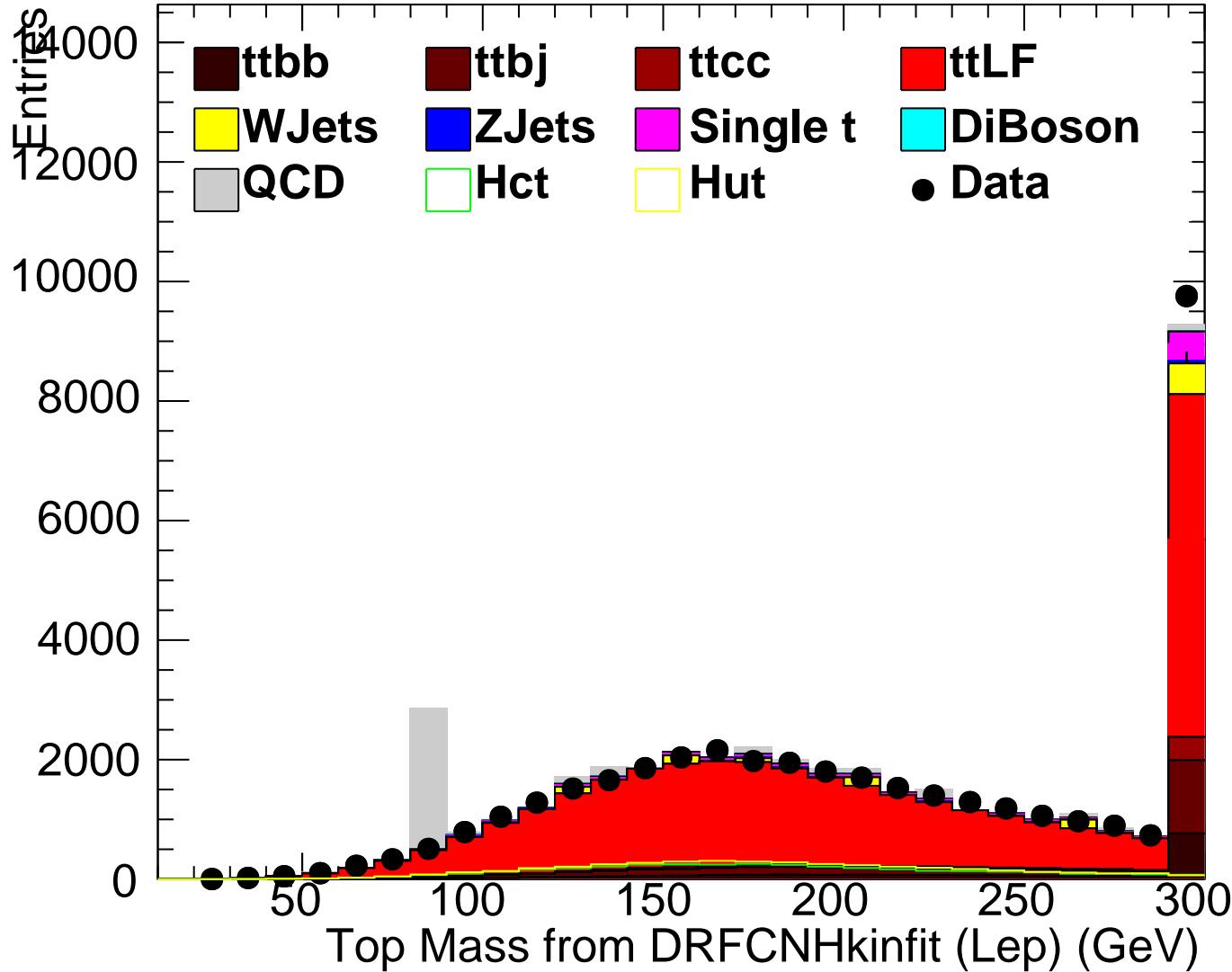


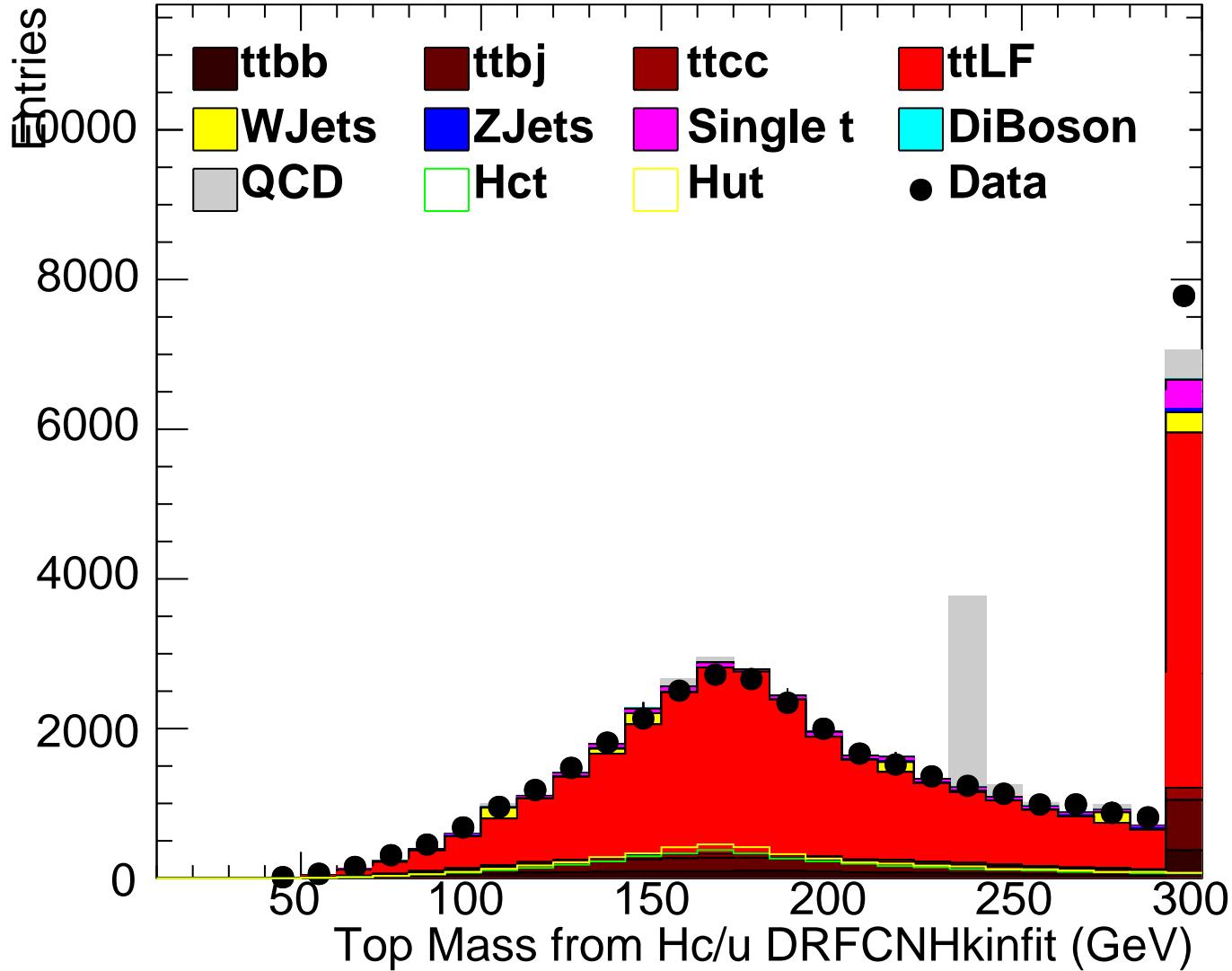


**Ch0\_S3**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch0\_S3**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 





**Ch0\_S3**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch0\_S4**x 10<sup>3</sup>CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV

Entries

300

250

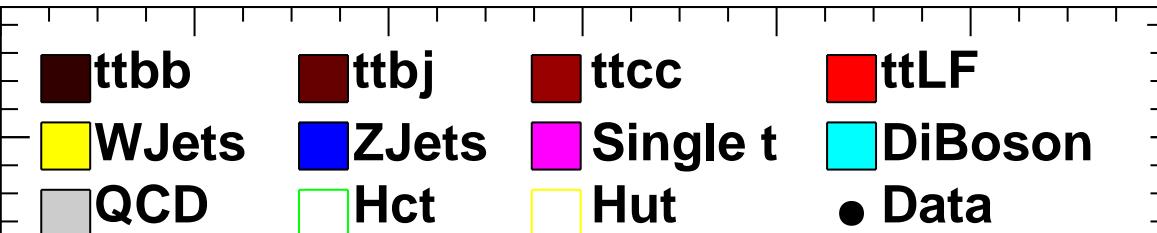
200

150

100

50

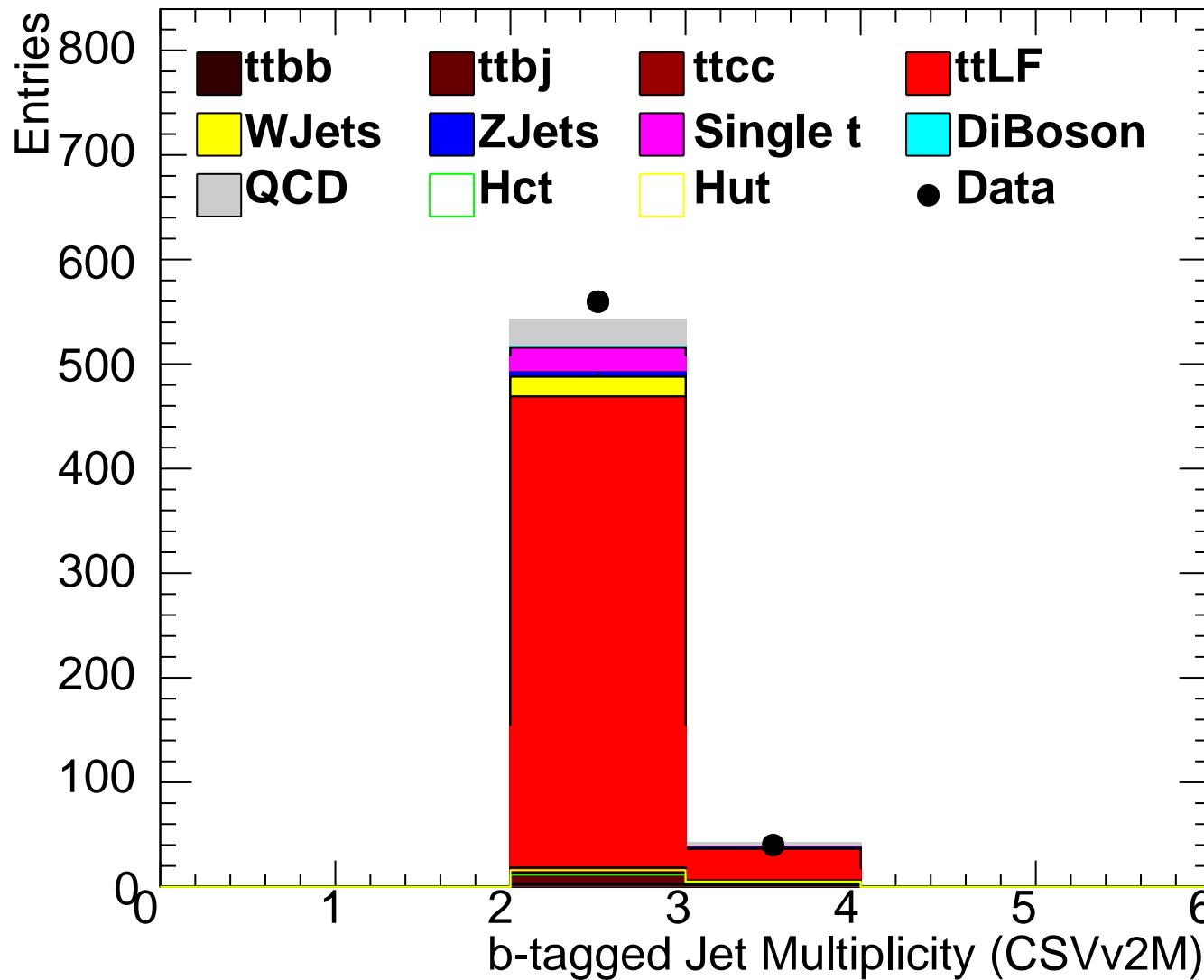
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Jet Multiplicity

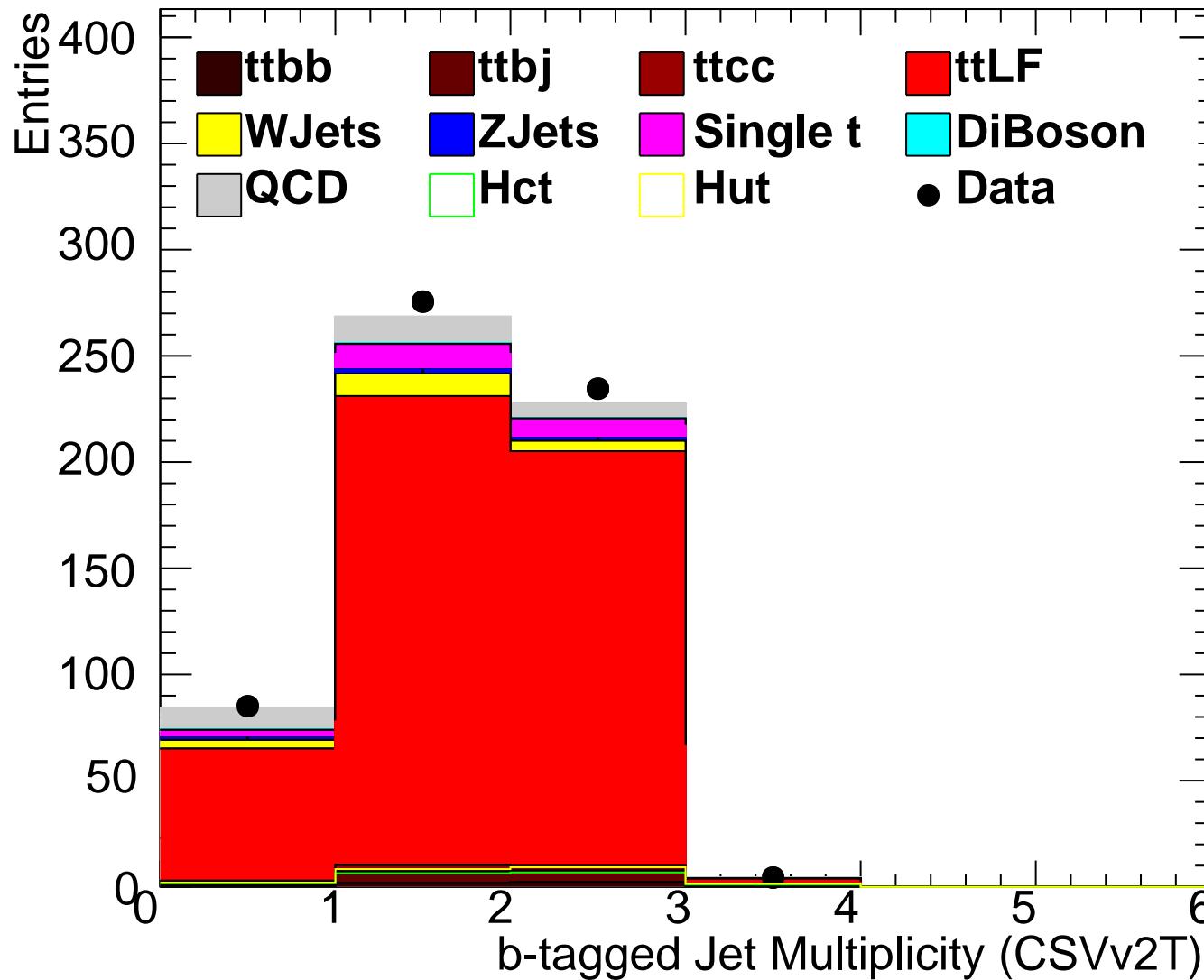
Ch0\_S4

CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV



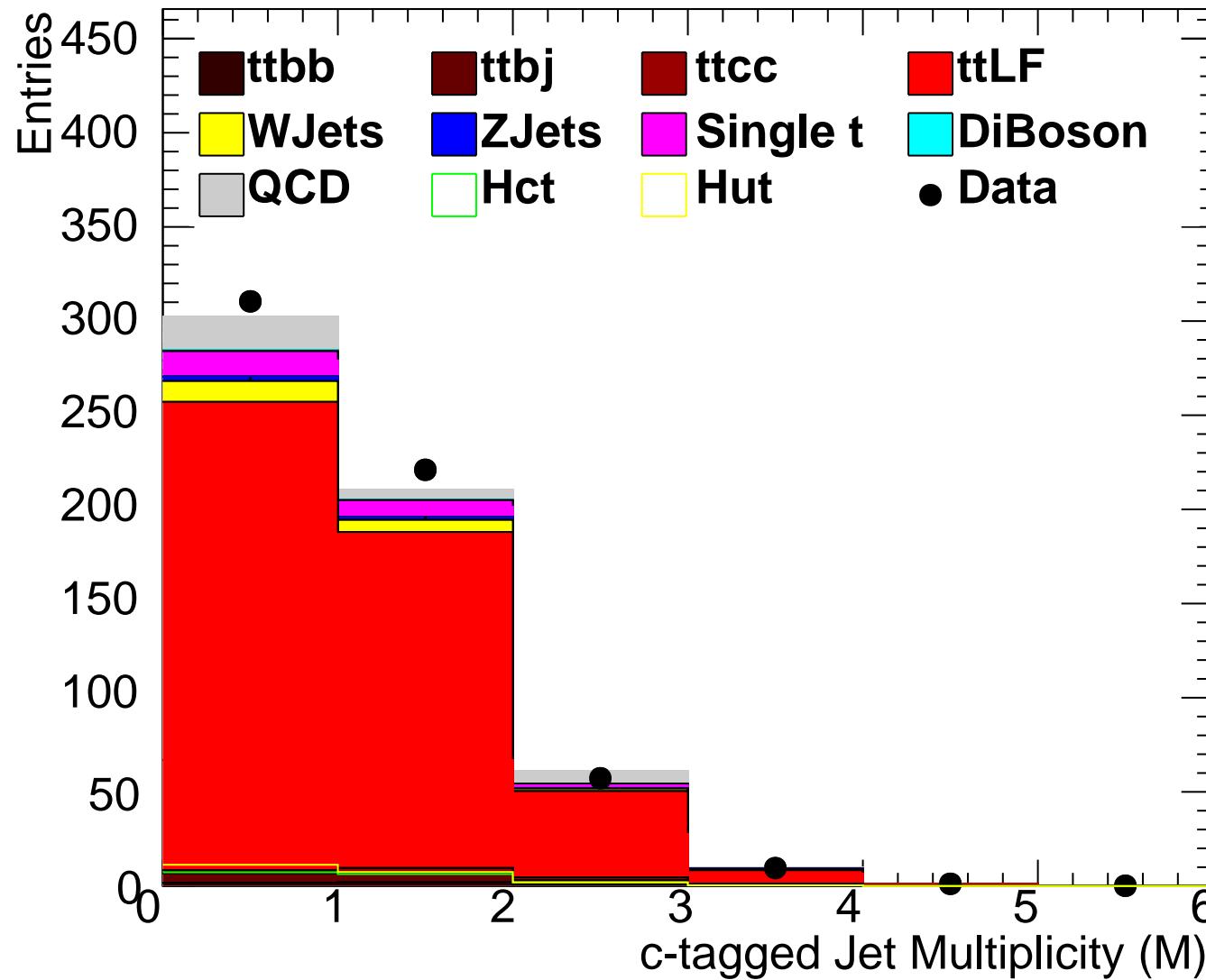
Ch0\_S4

CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV



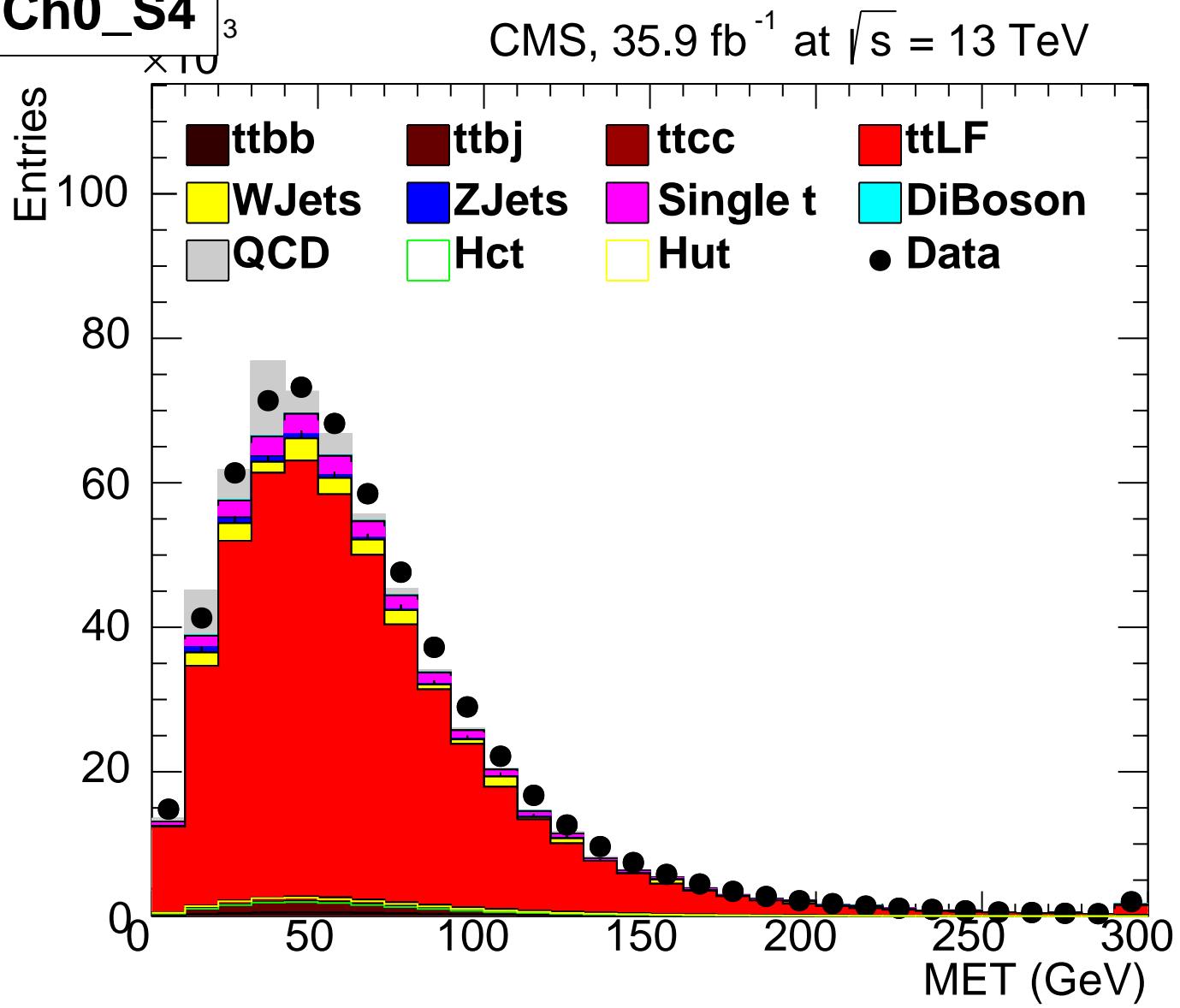
Ch0\_S4

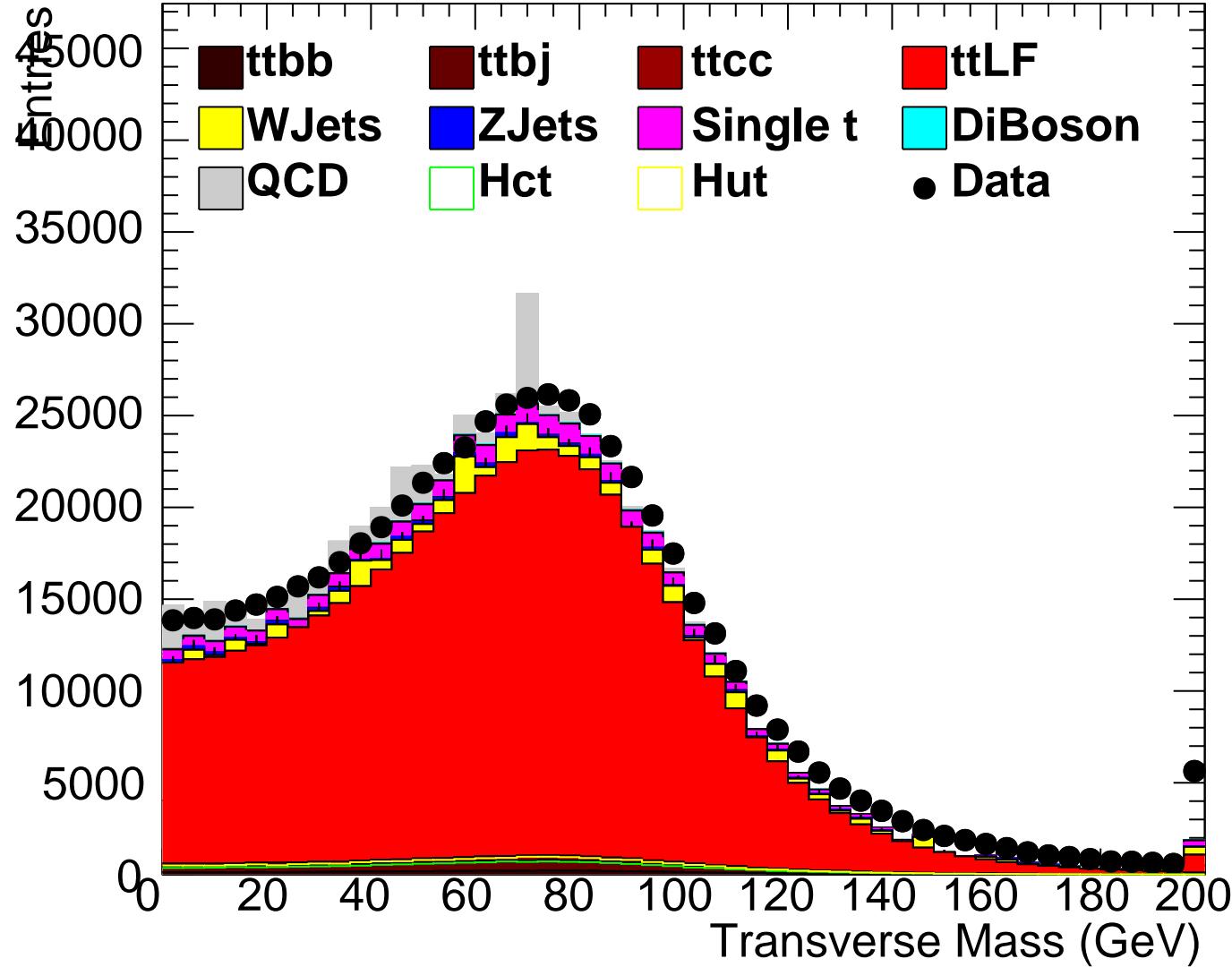
CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV

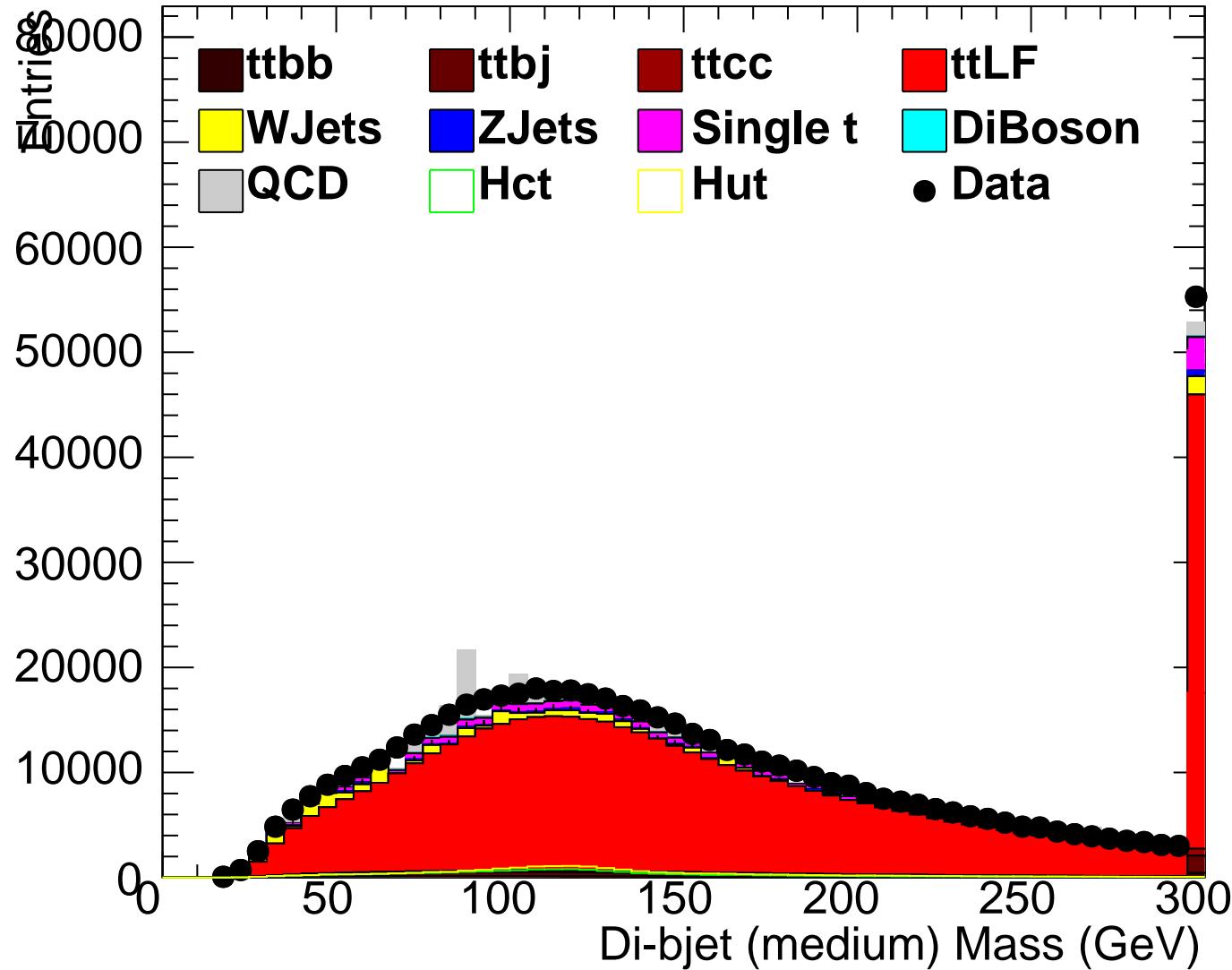


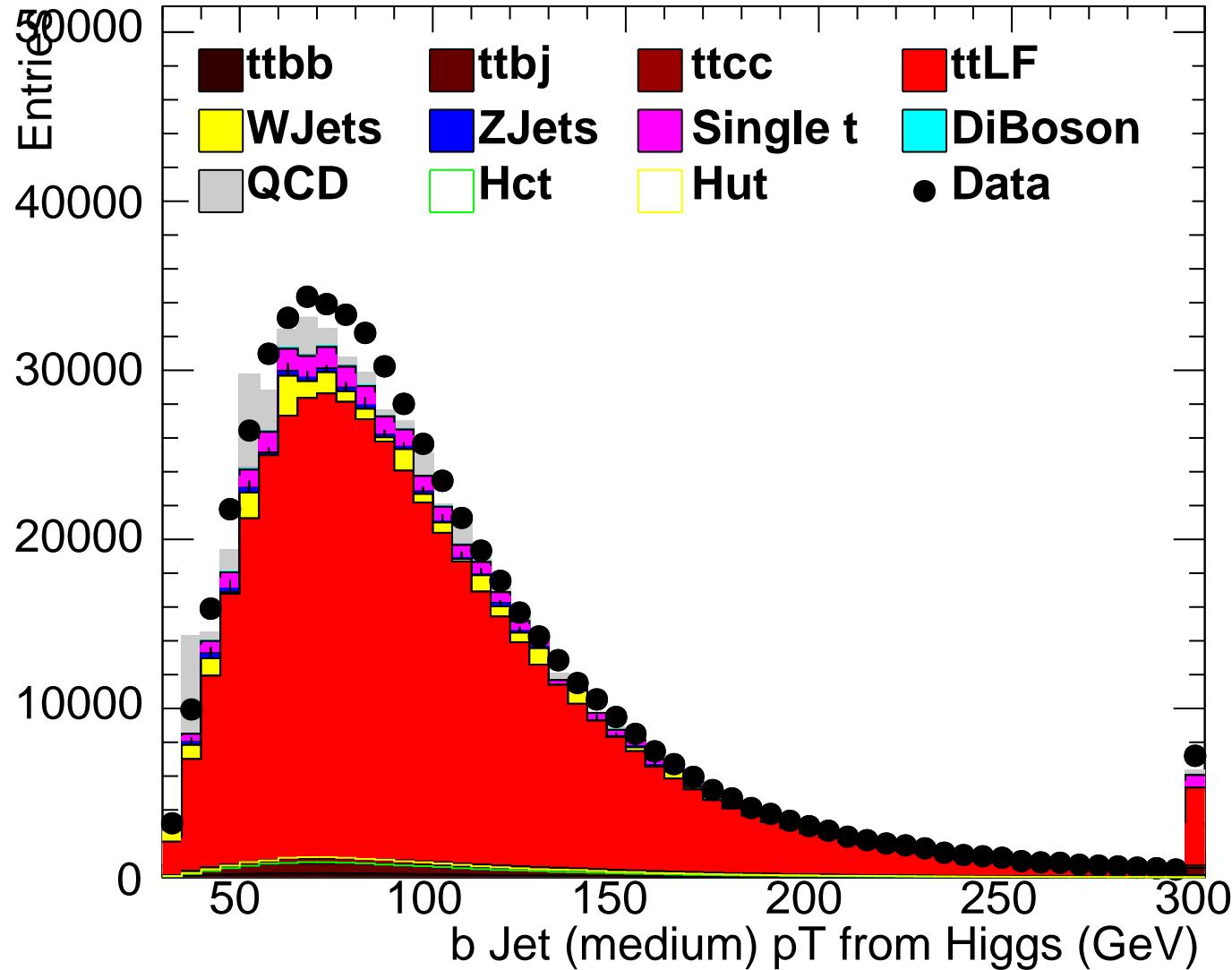
**Ch0\_S4**x 10<sup>-3</sup>CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV

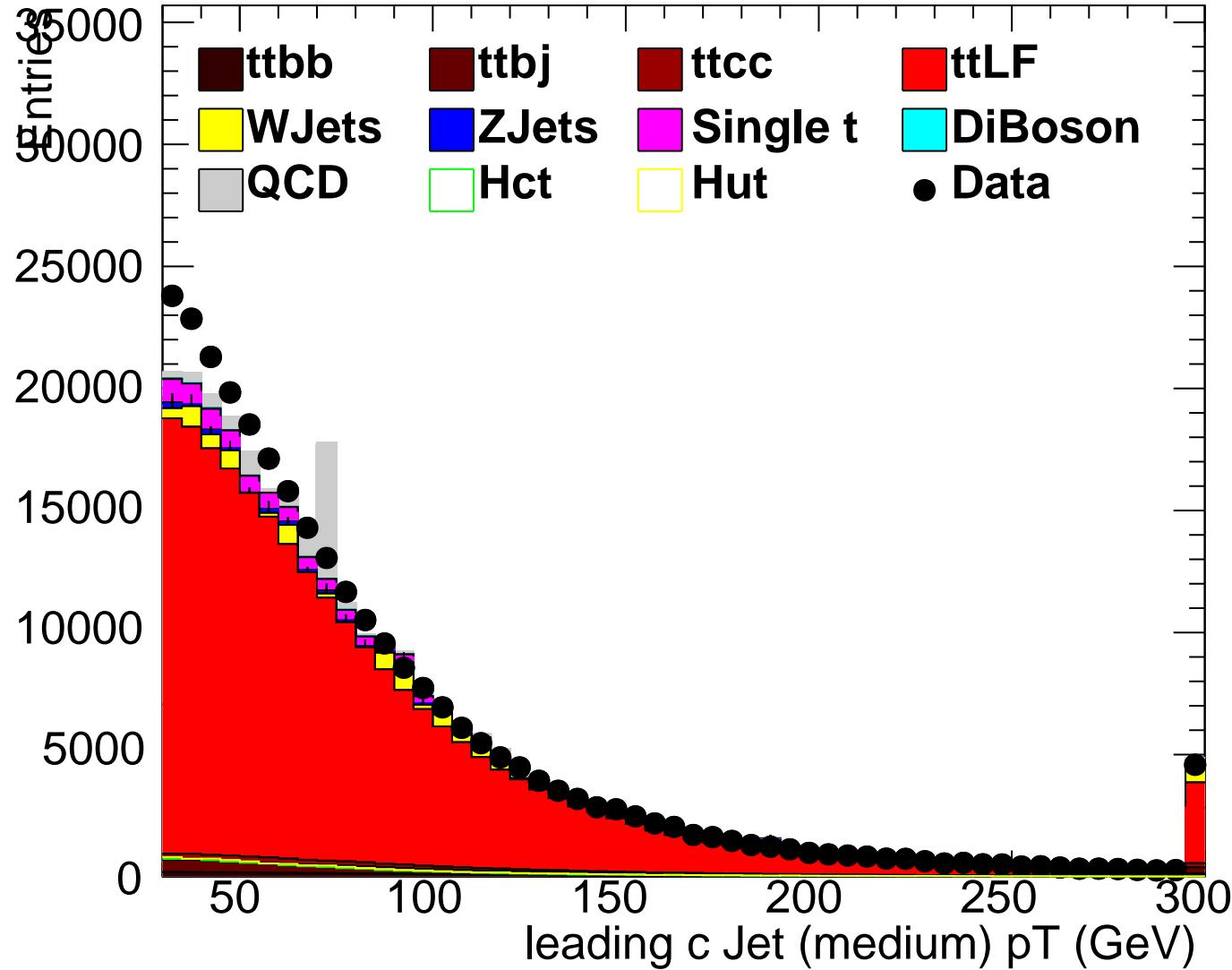
Entries

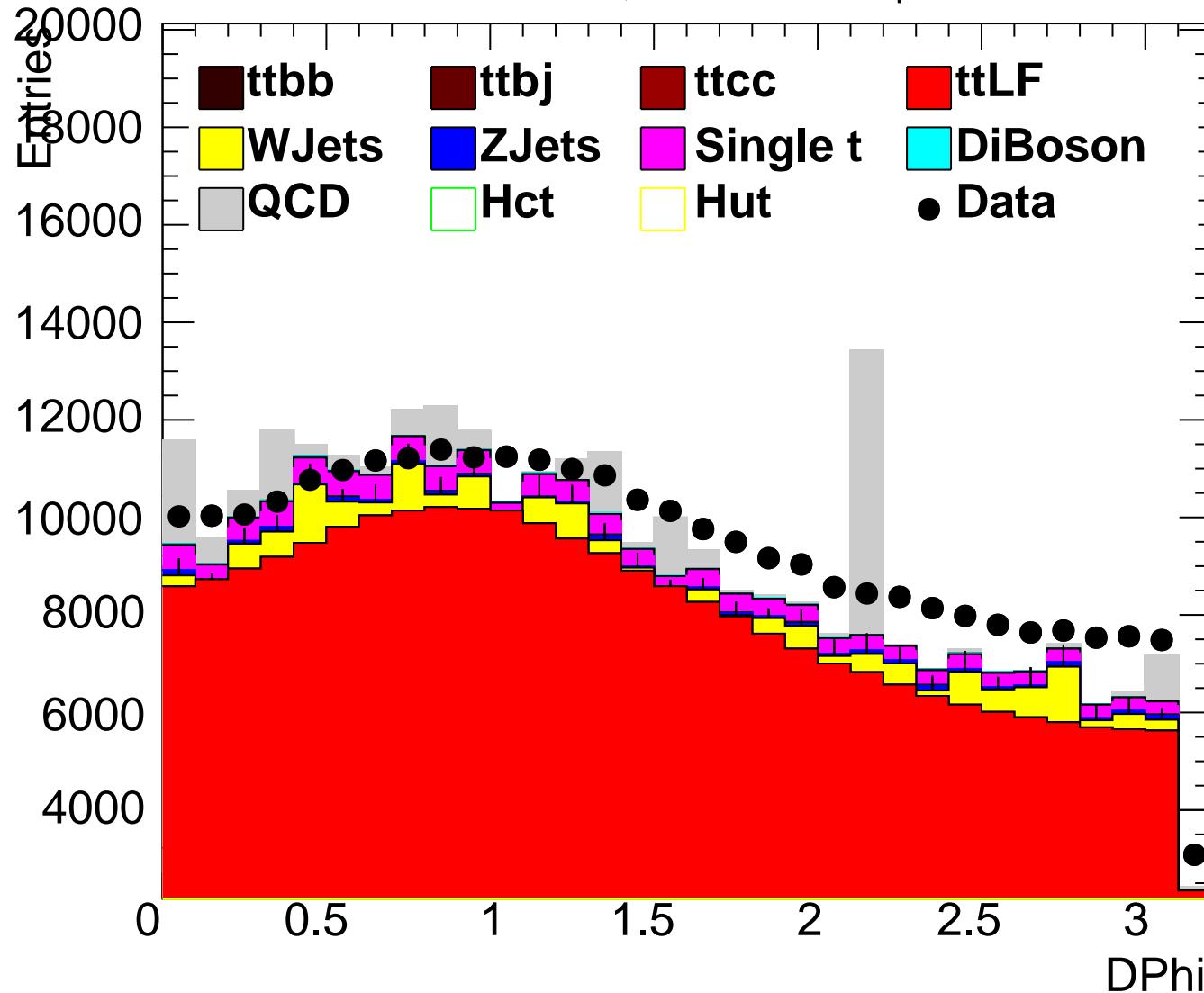


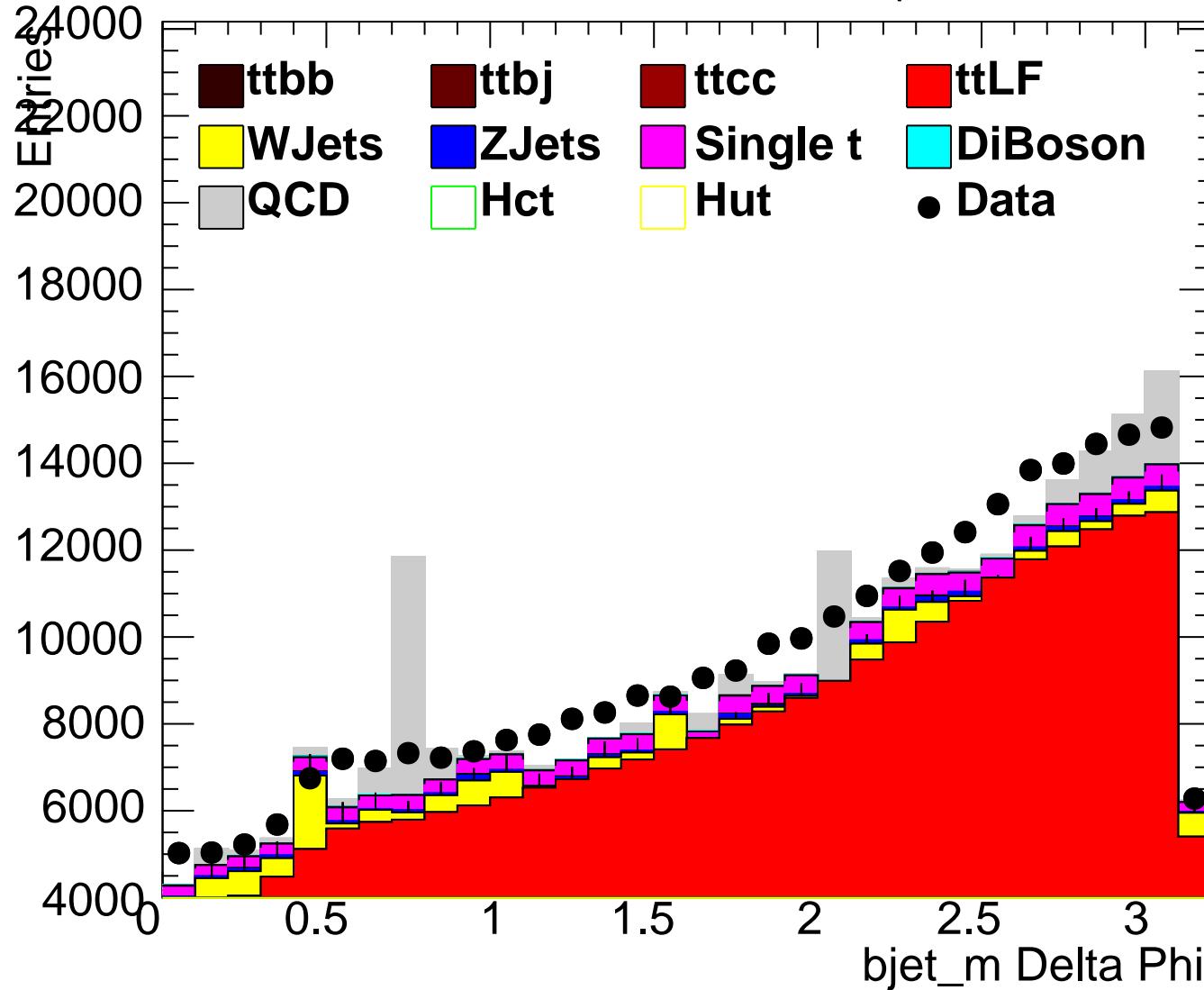
**Ch0\_S4**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

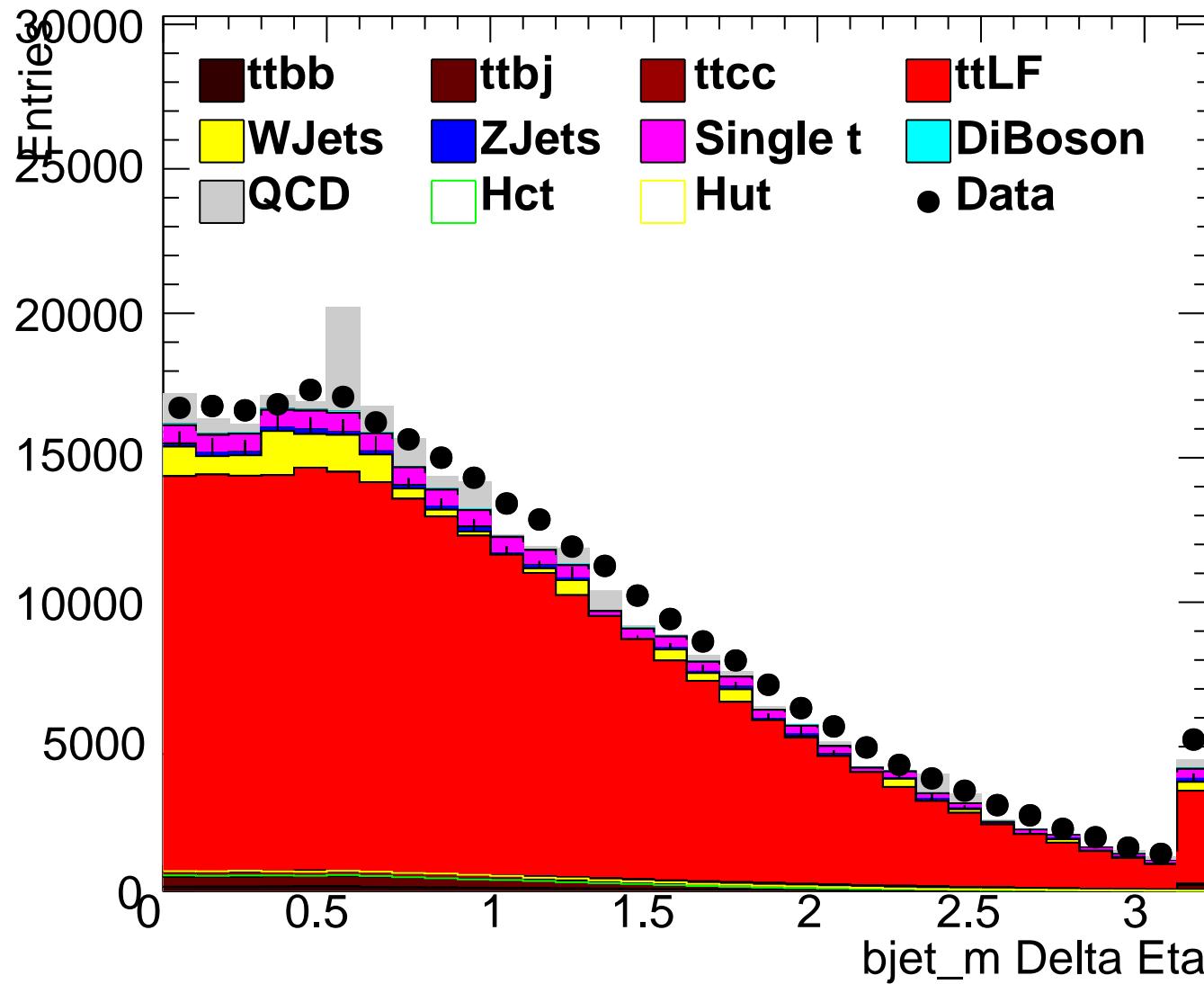
**Ch0\_S4**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

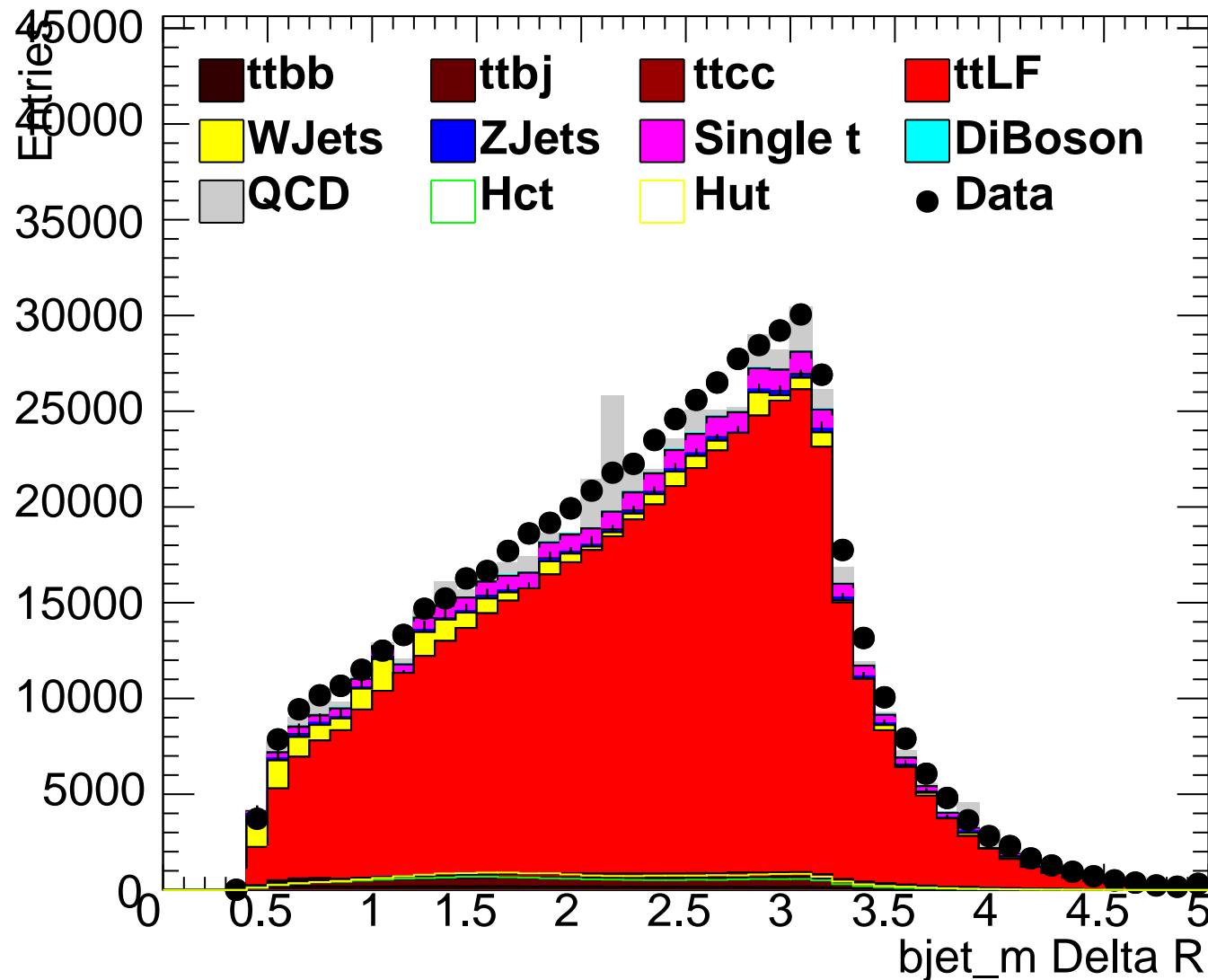
**Ch0\_S4**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch0\_S4**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch0\_S4**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch0\_S4**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch0\_S4**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch0\_S4**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch0\_S4**x 10<sup>3</sup>CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV

Entries

350

300

250

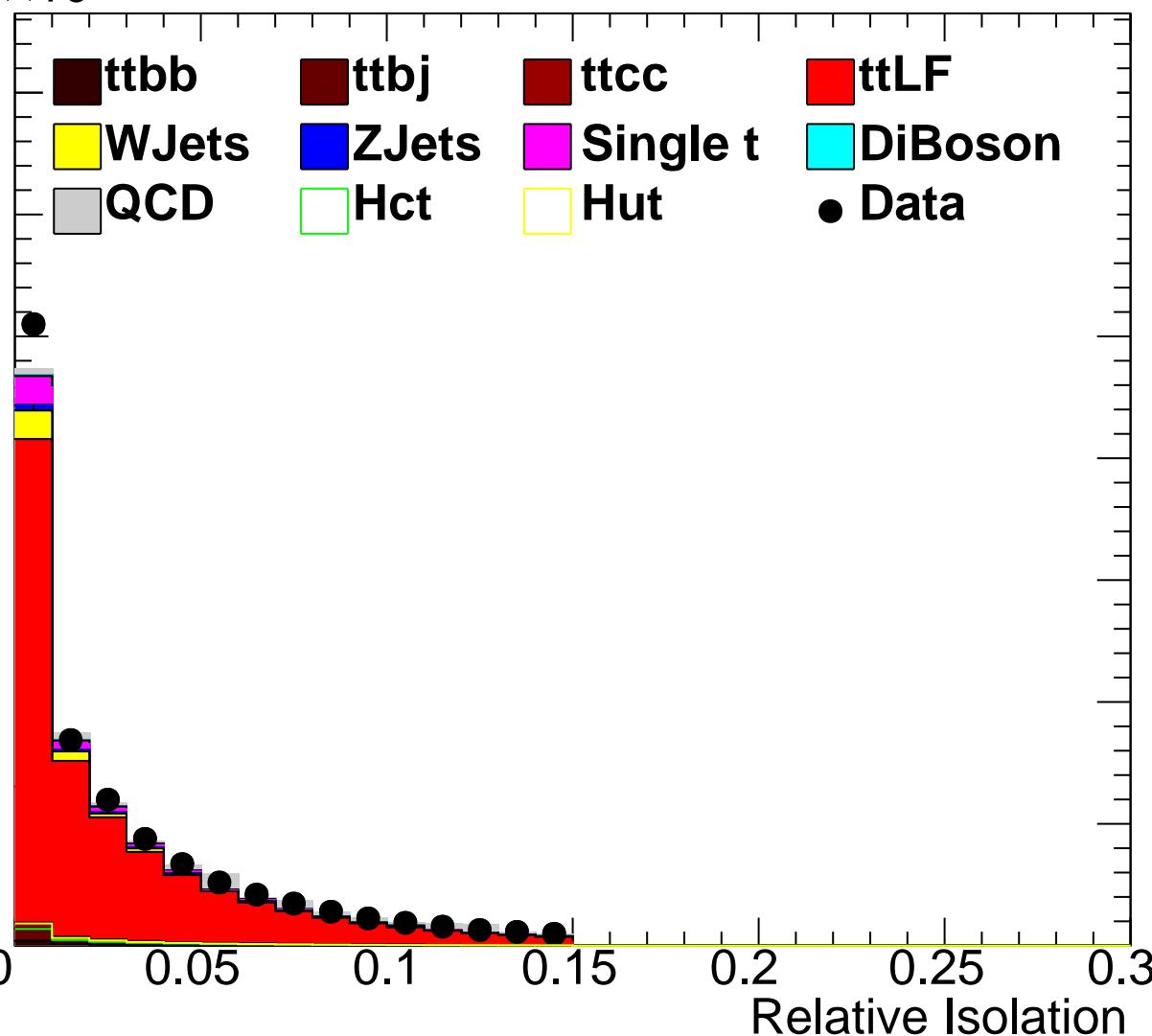
200

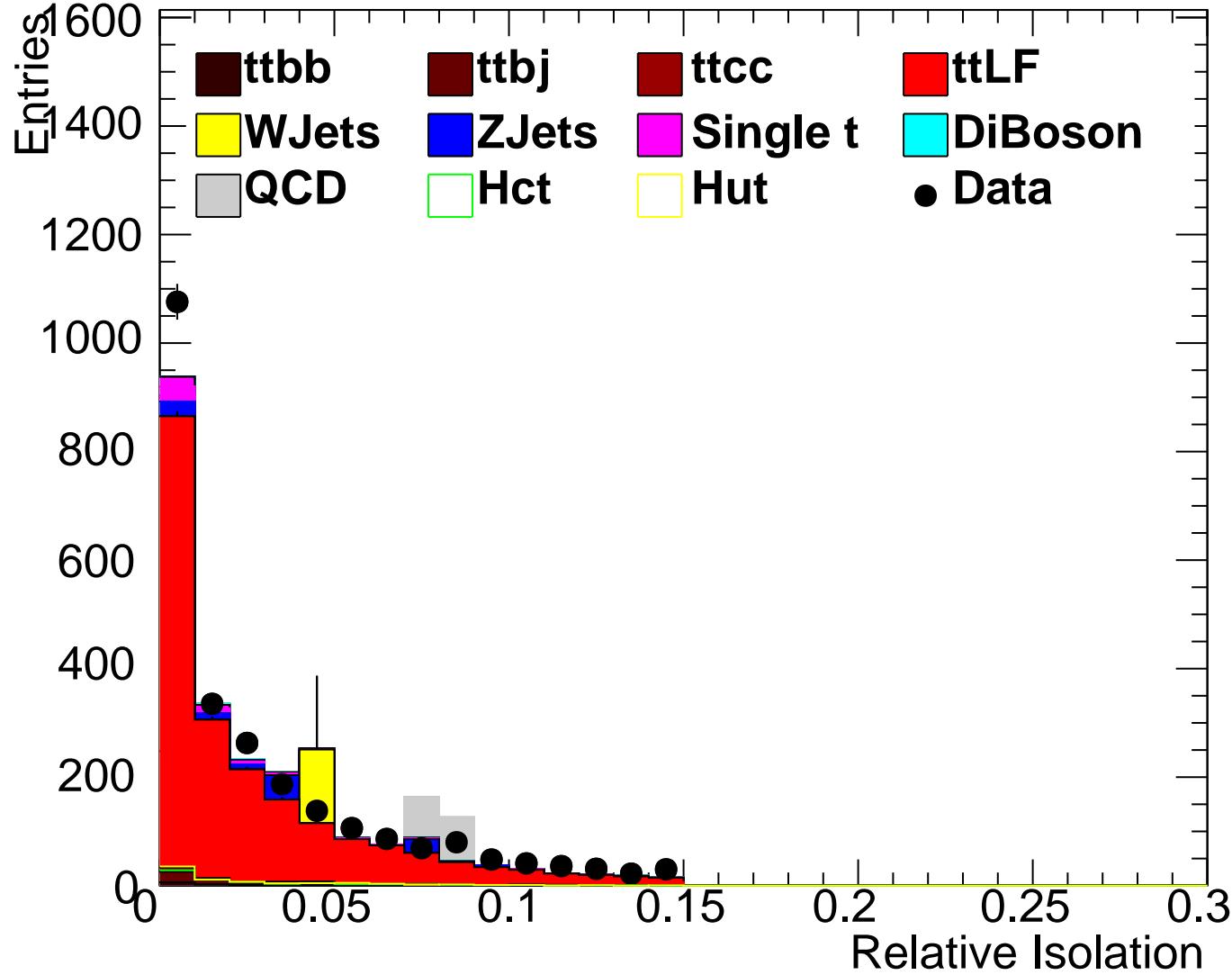
150

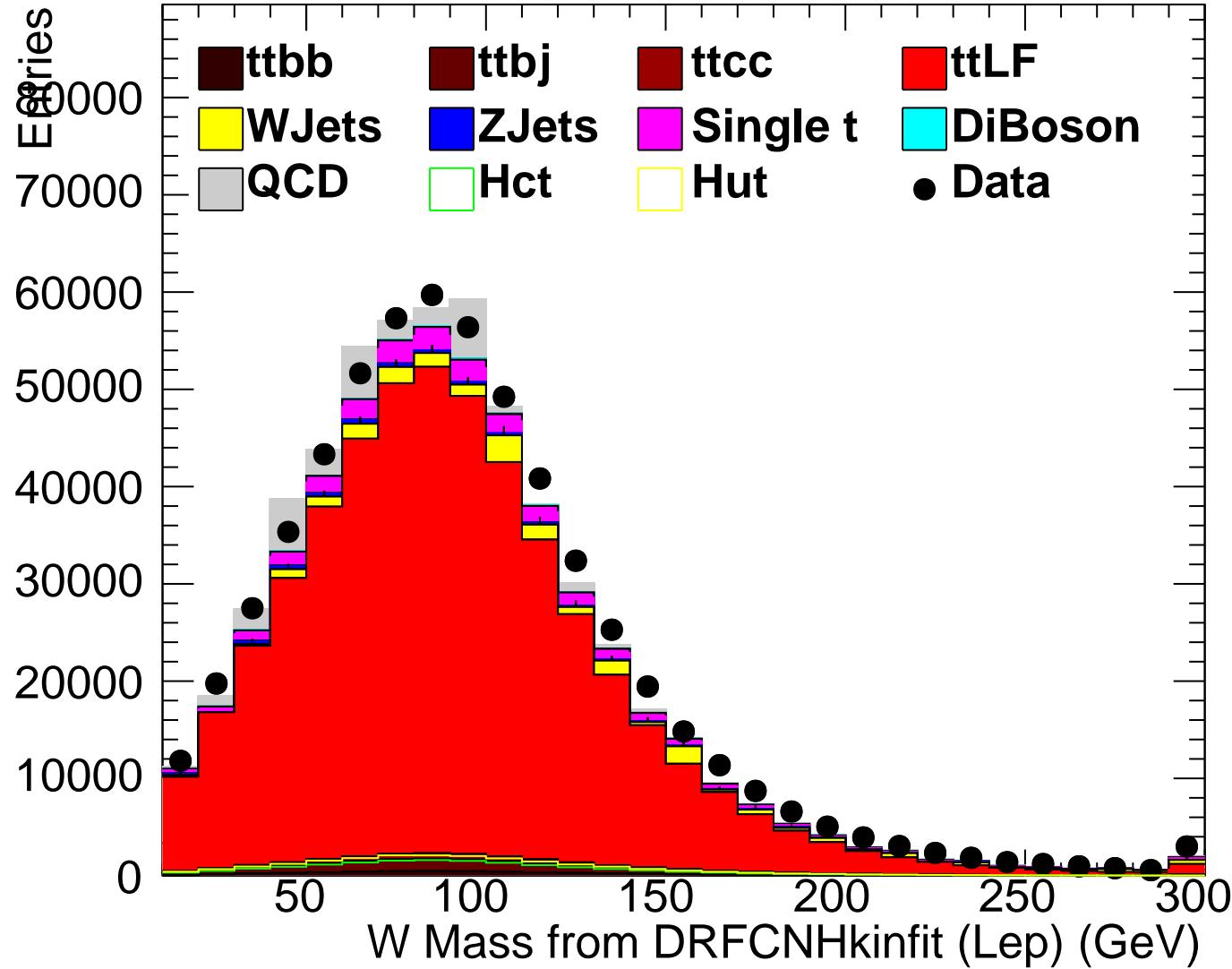
100

50

0

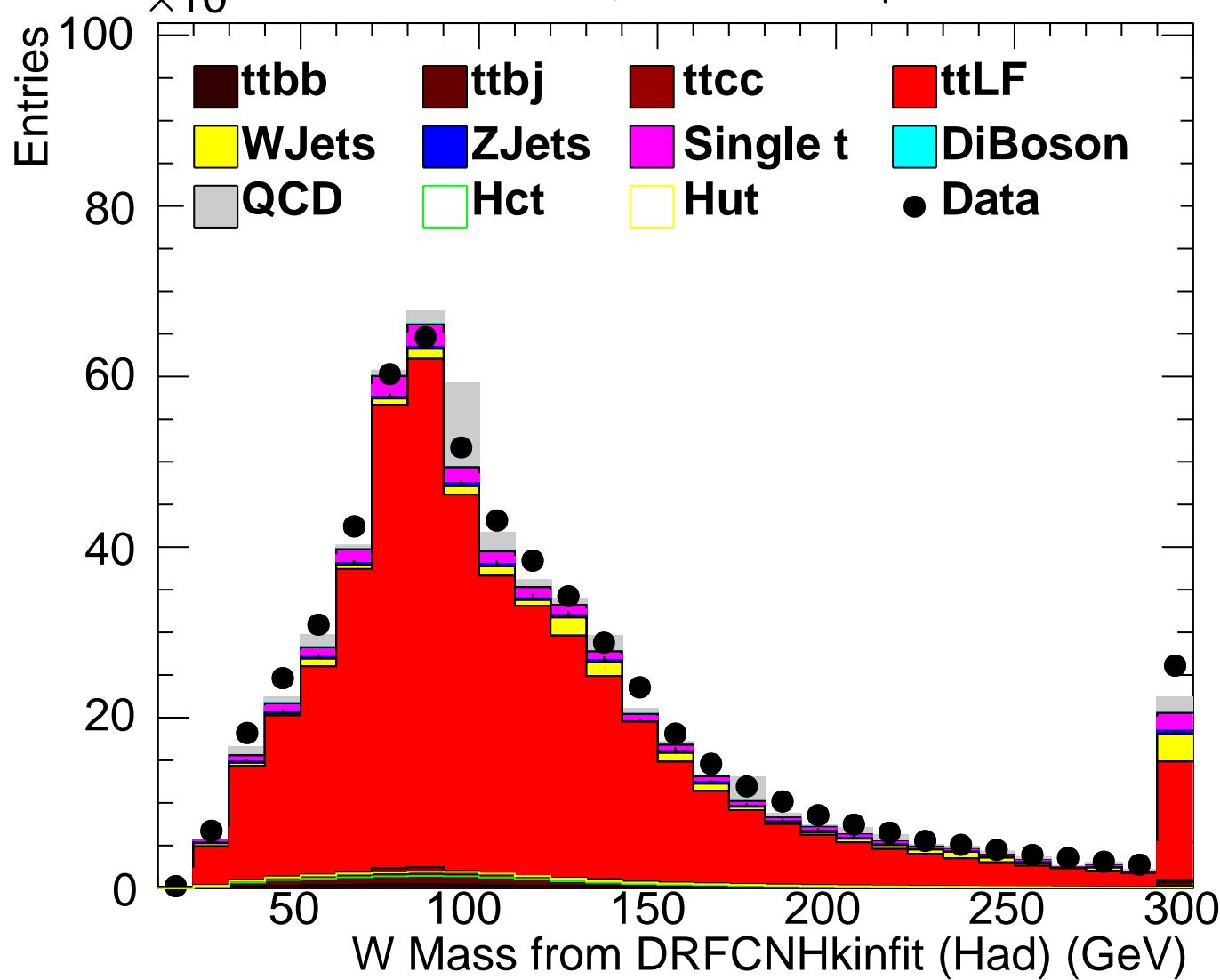
**ttbb****ttbj****ttcc****ttLF****WJets****ZJets****Single t****DiBoson****QCD****Hct****Hut****Data**

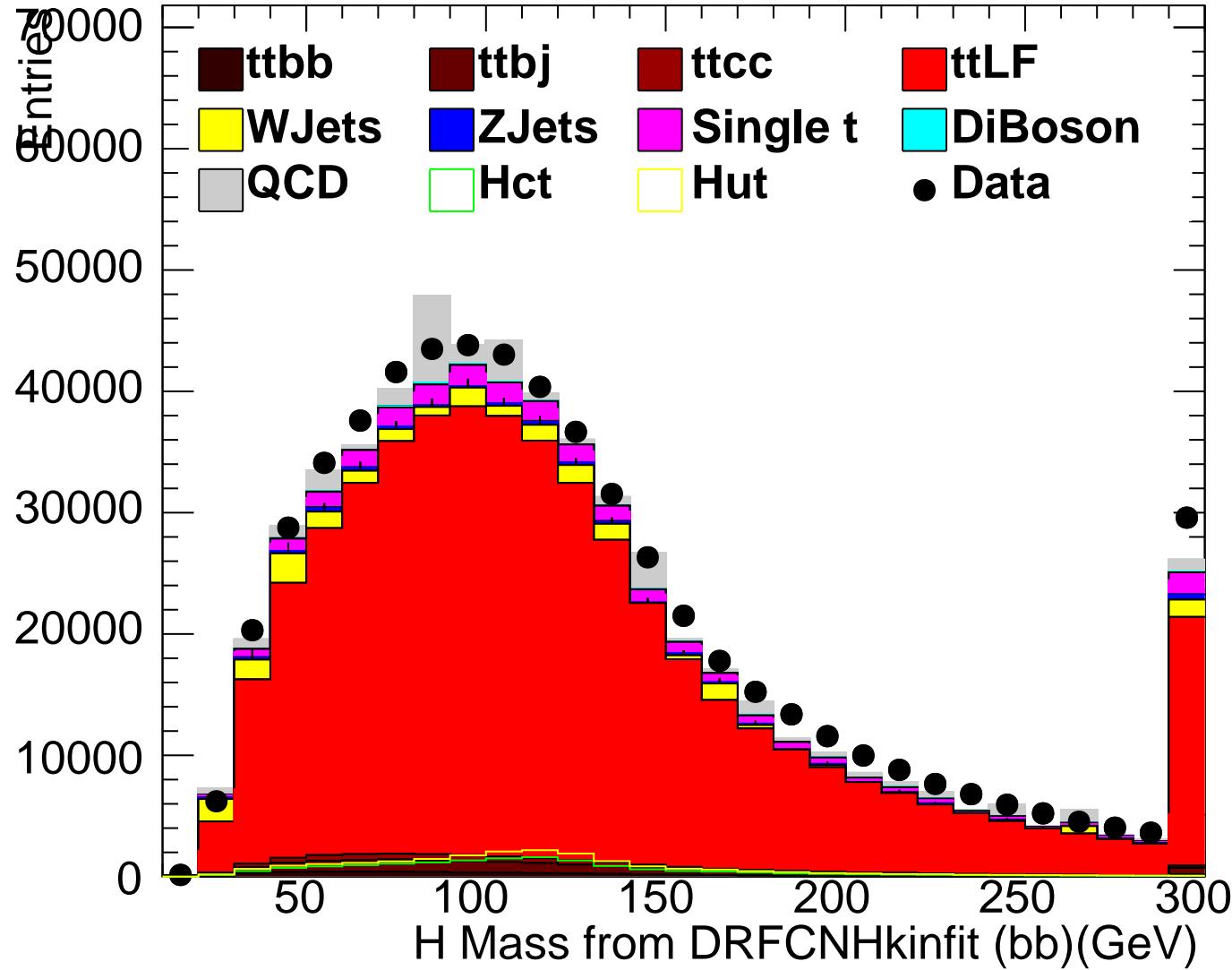


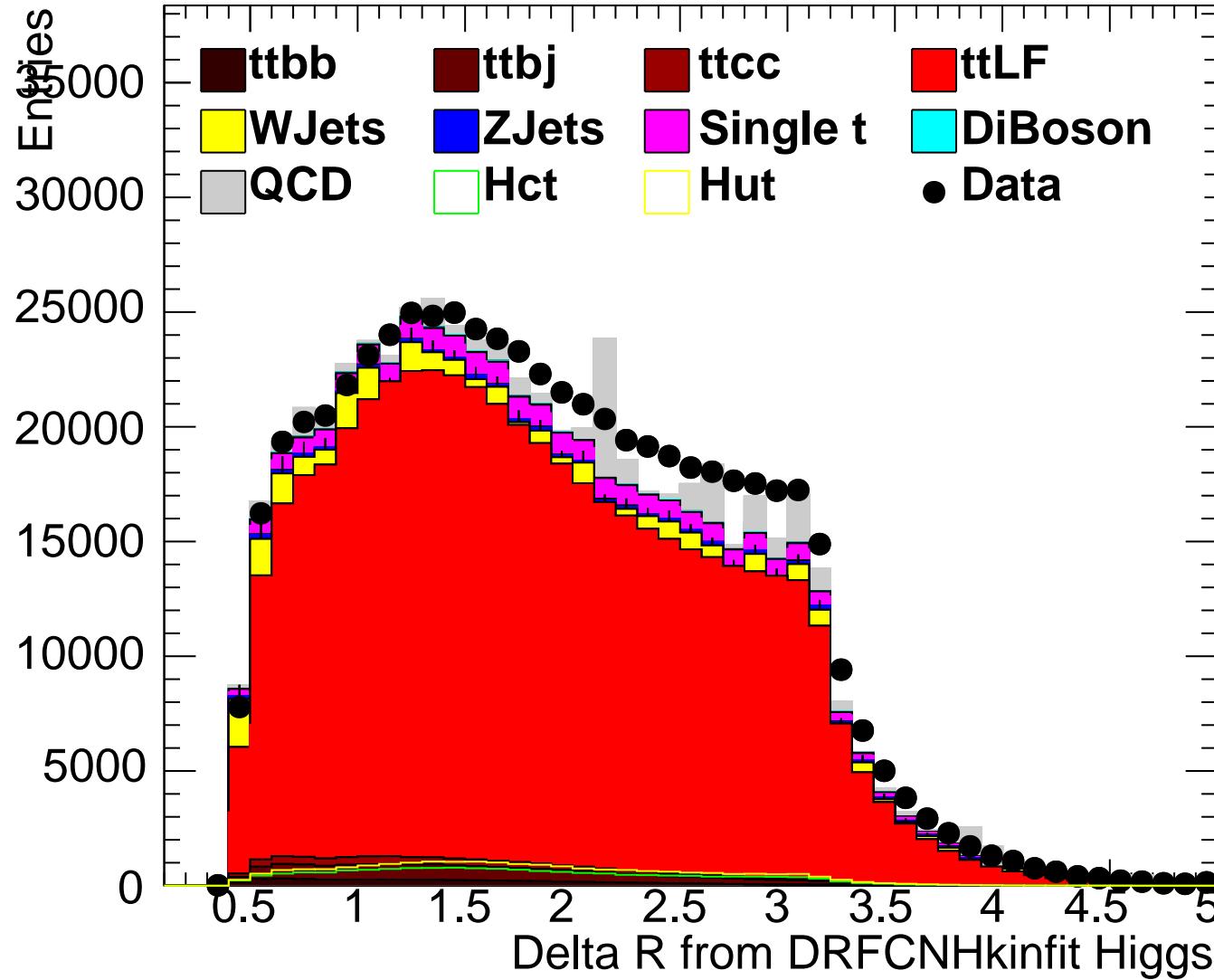
**Ch0\_S4**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

Ch0\_S4

CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV

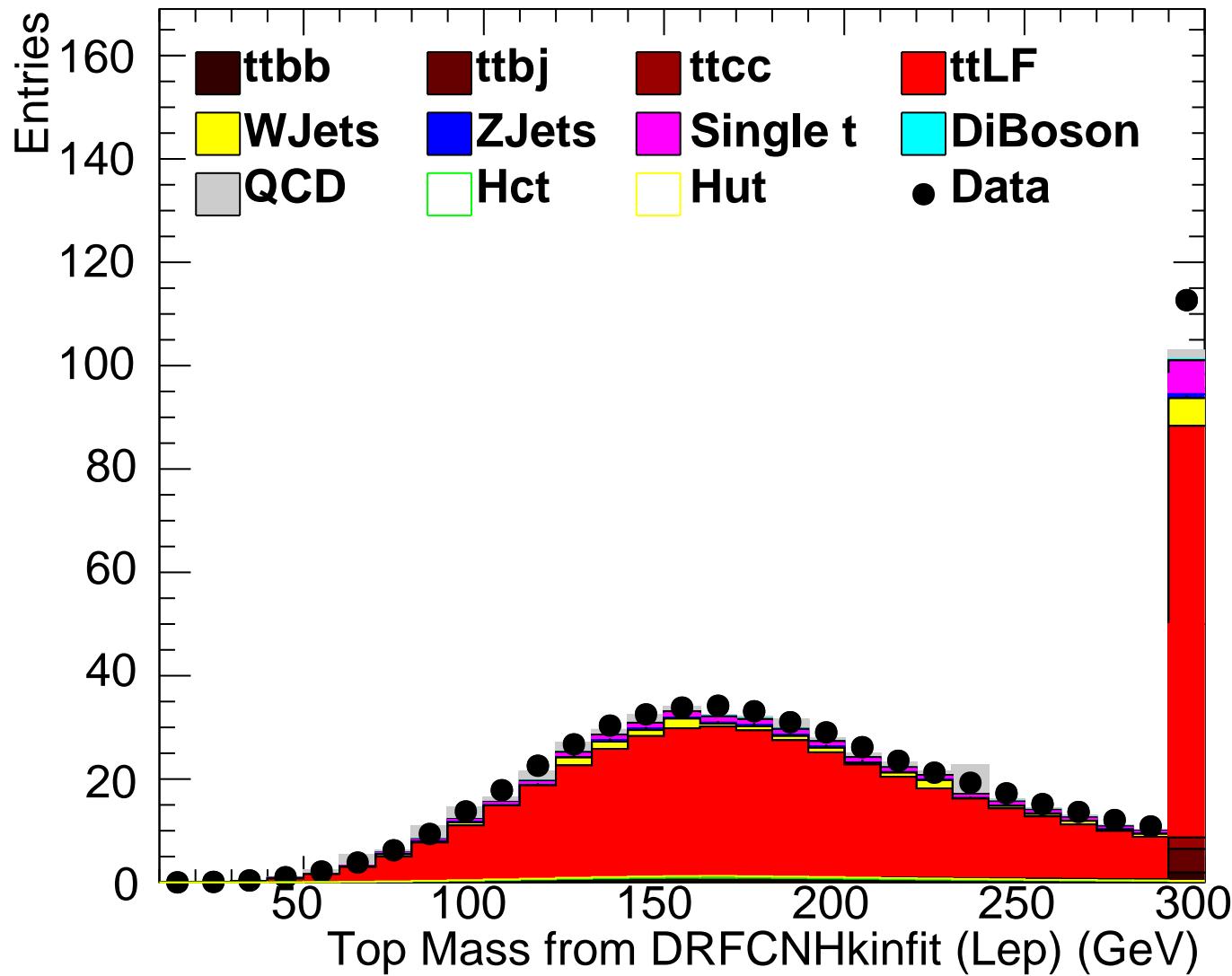


**Ch0\_S4**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 



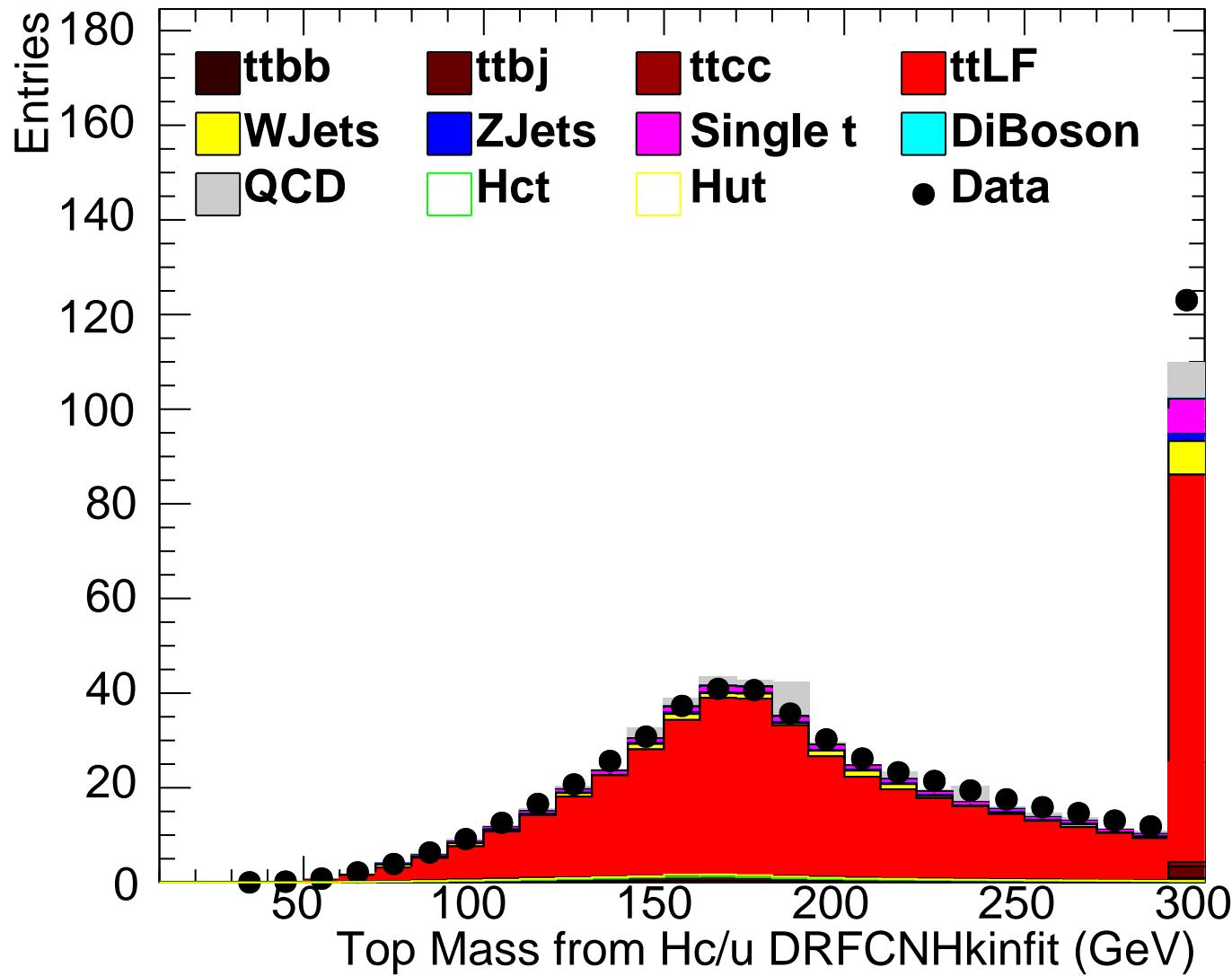
Ch0\_S4

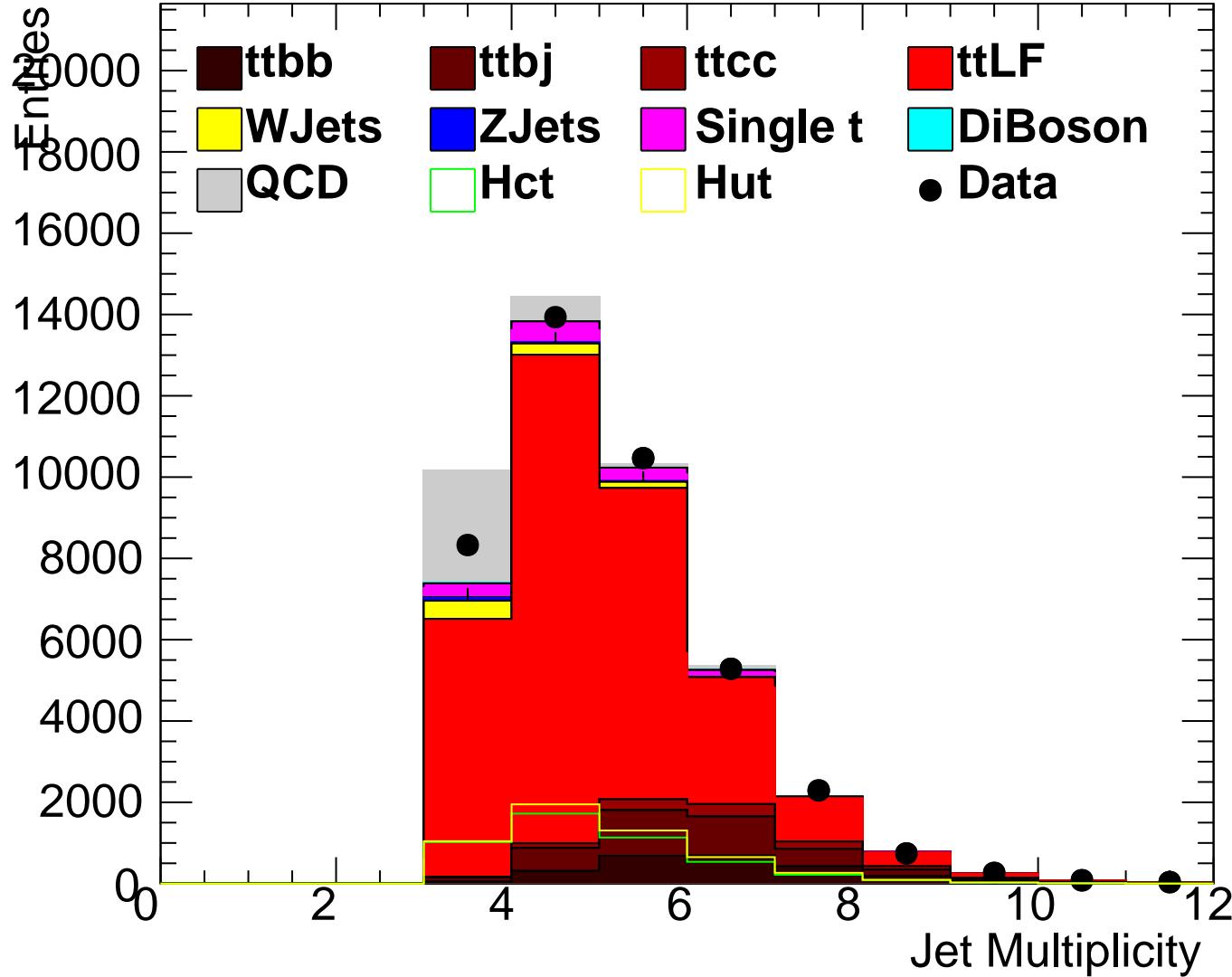
CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV



Ch0\_S4

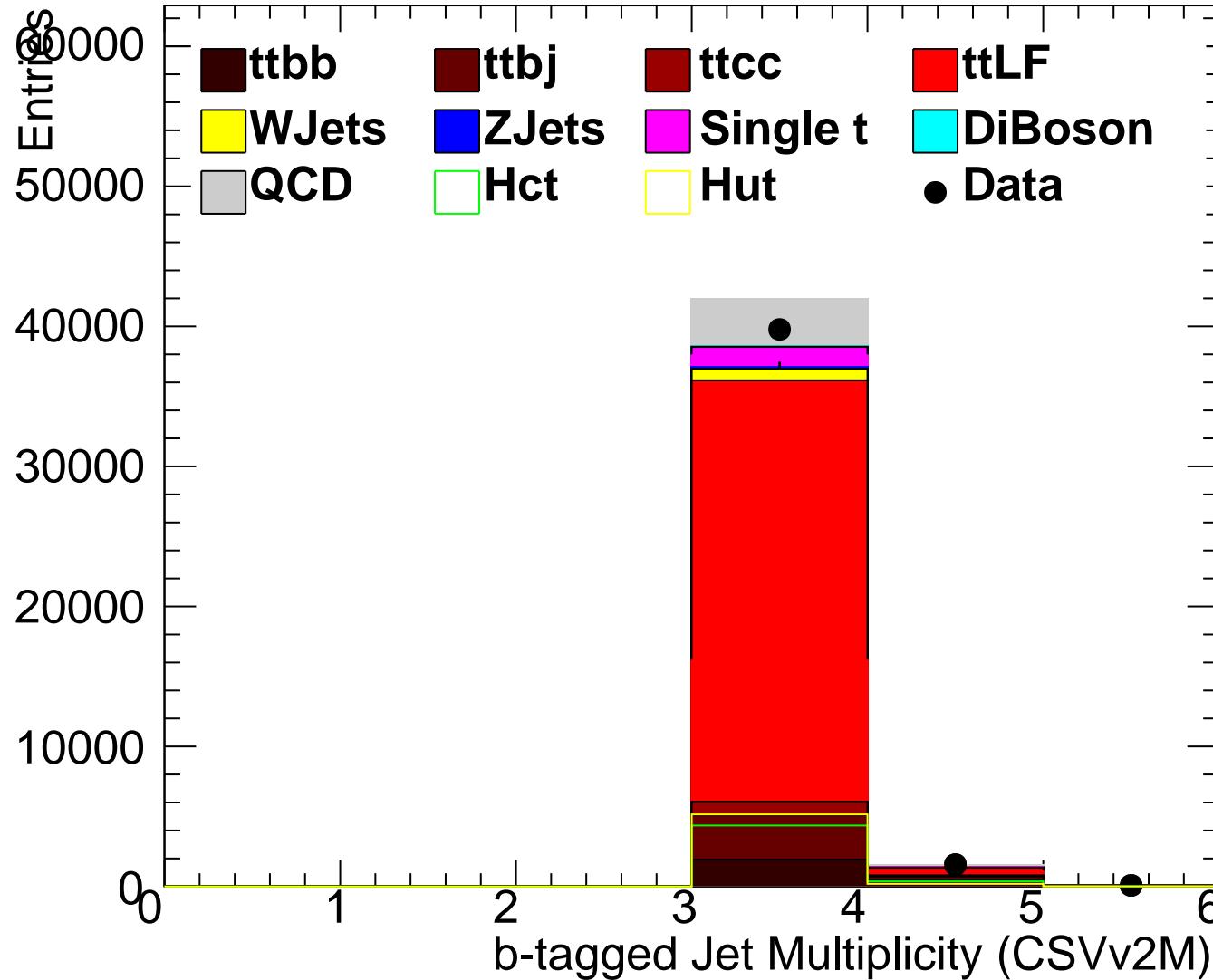
CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV

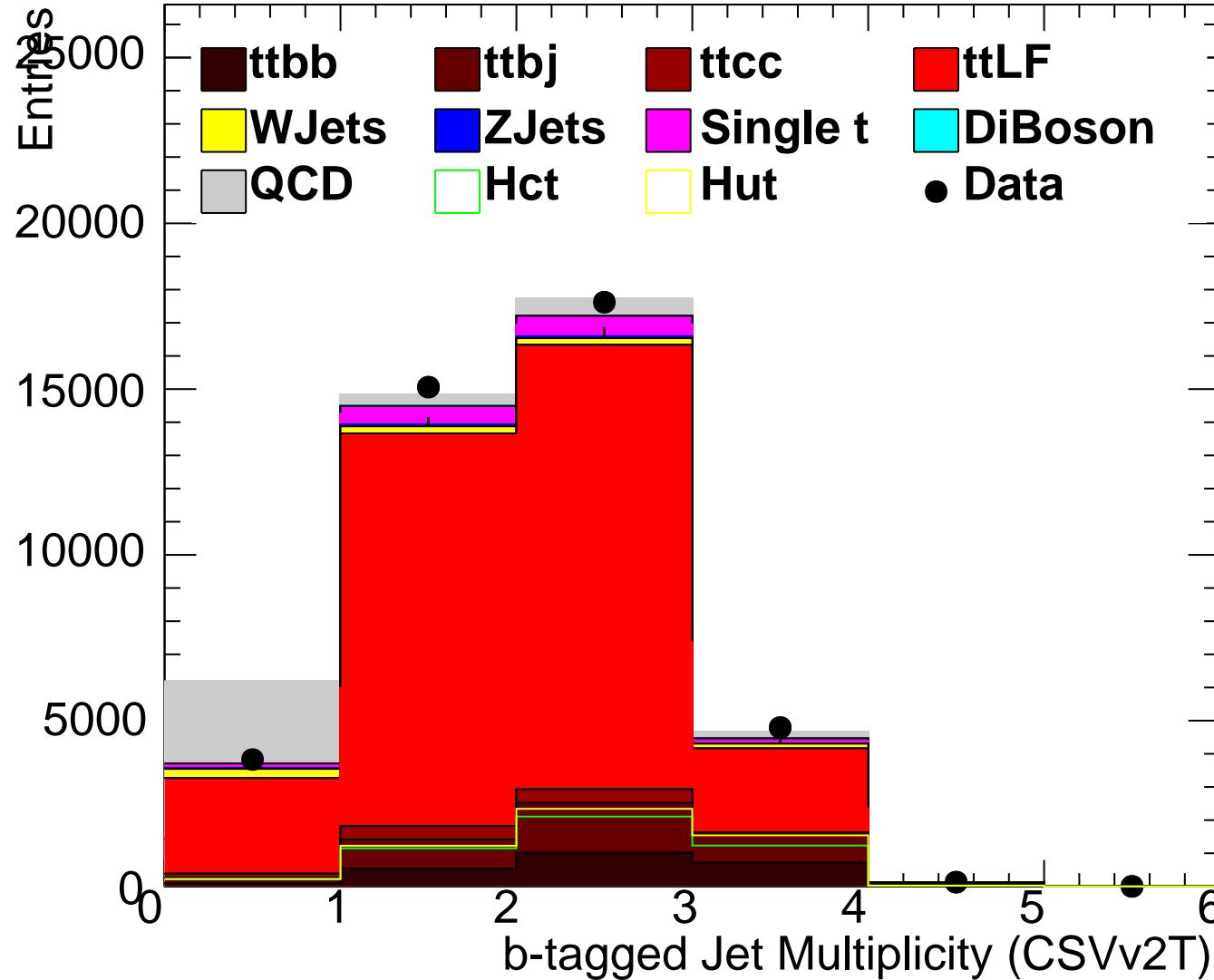


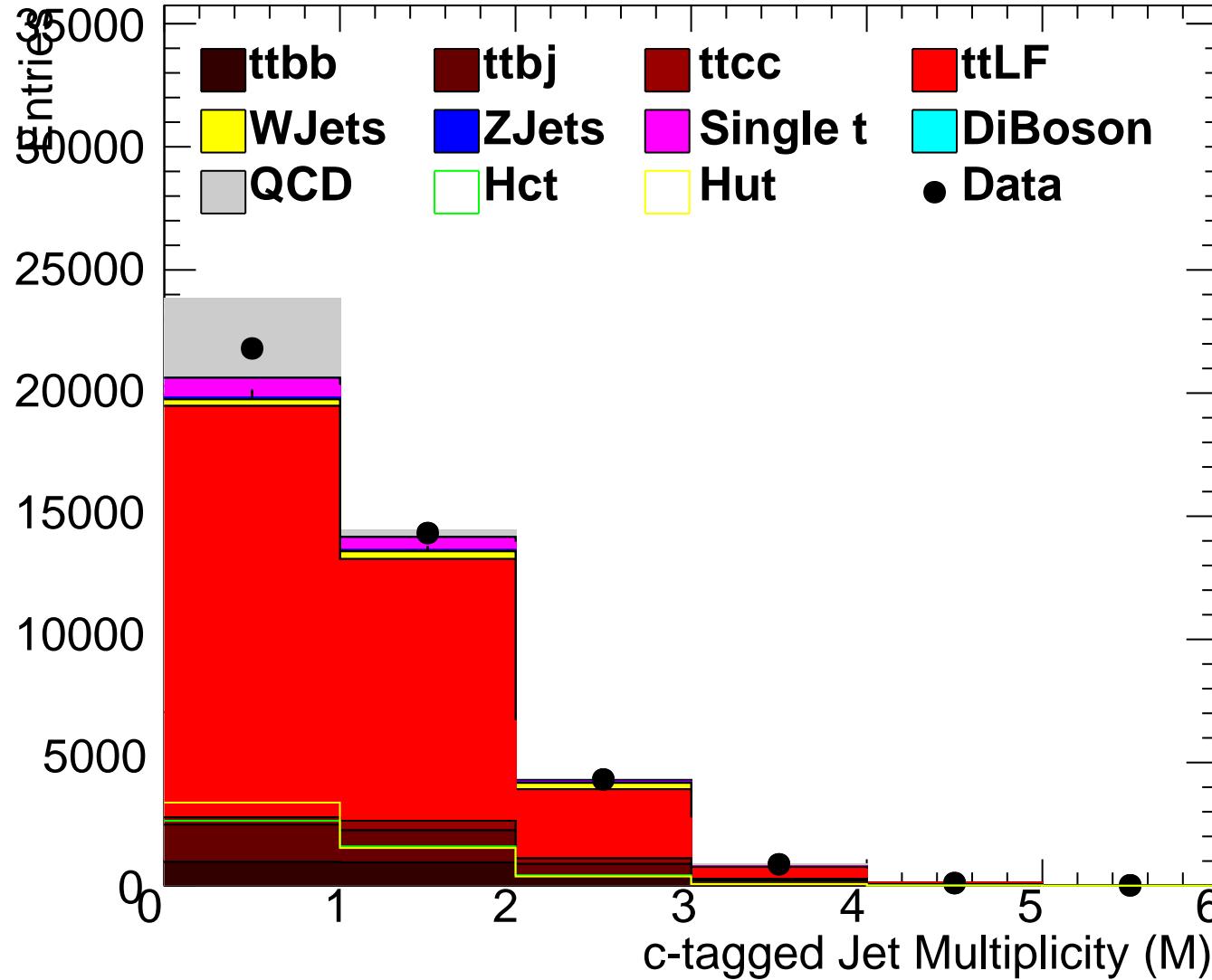


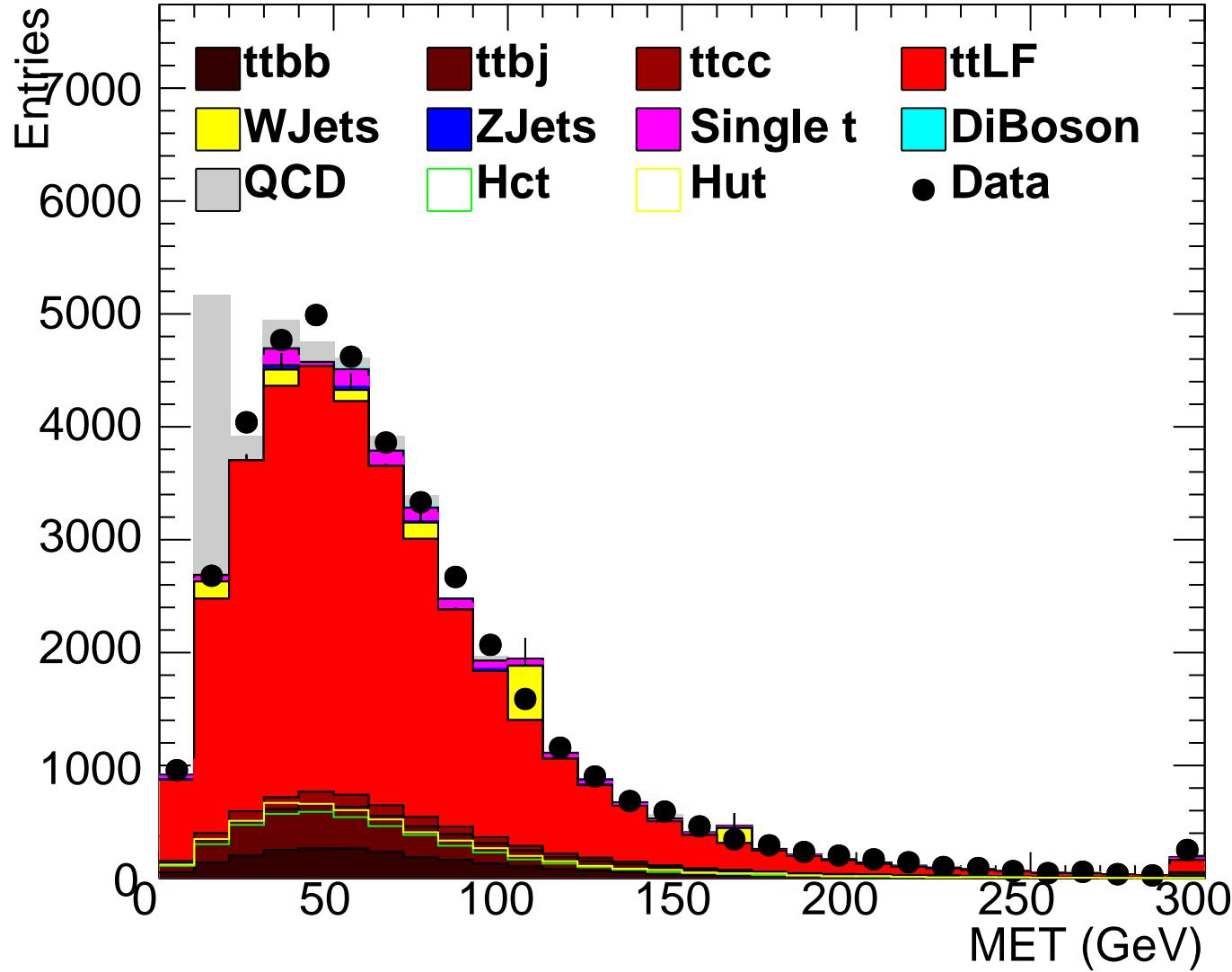
Ch0\_S5

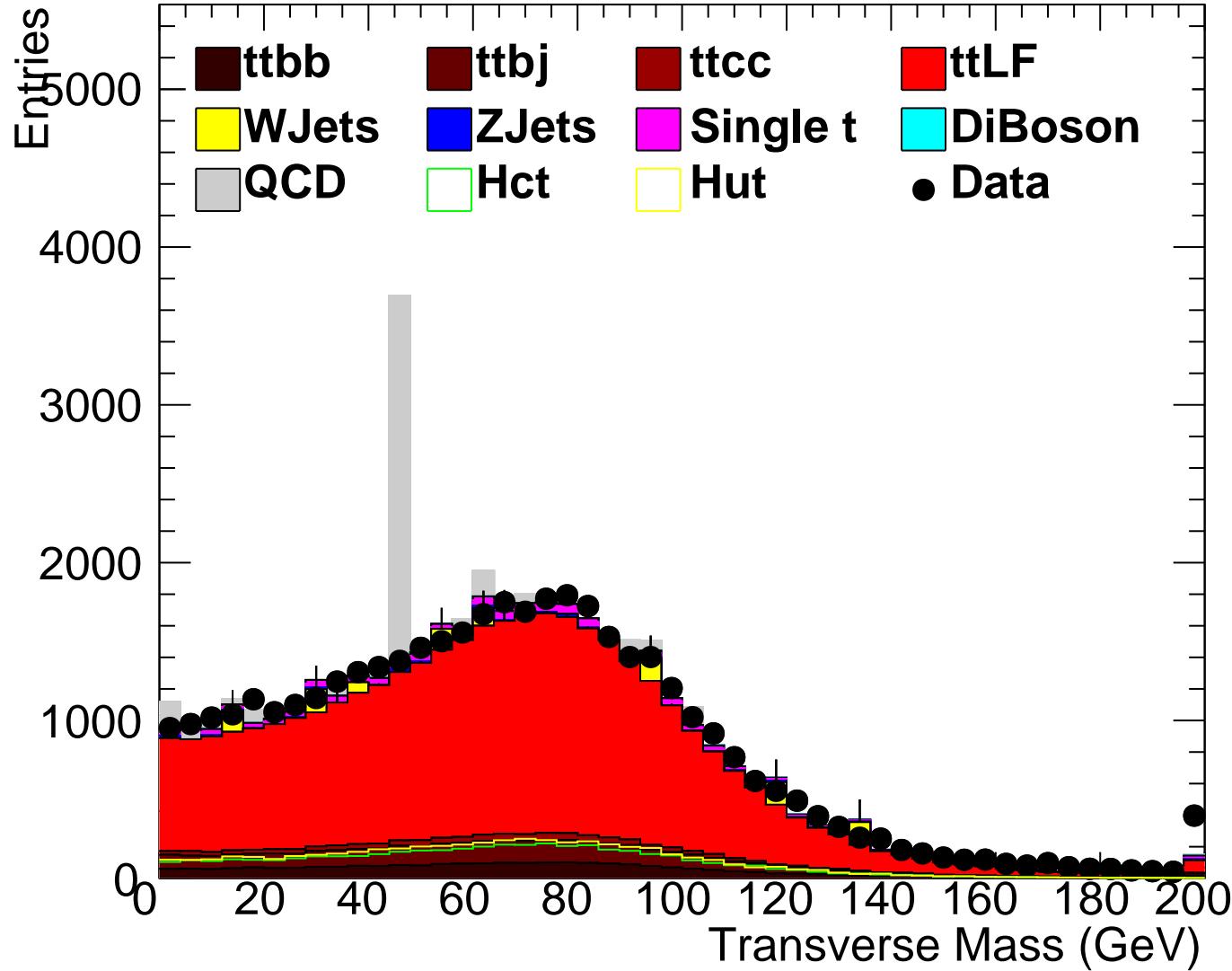
CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$

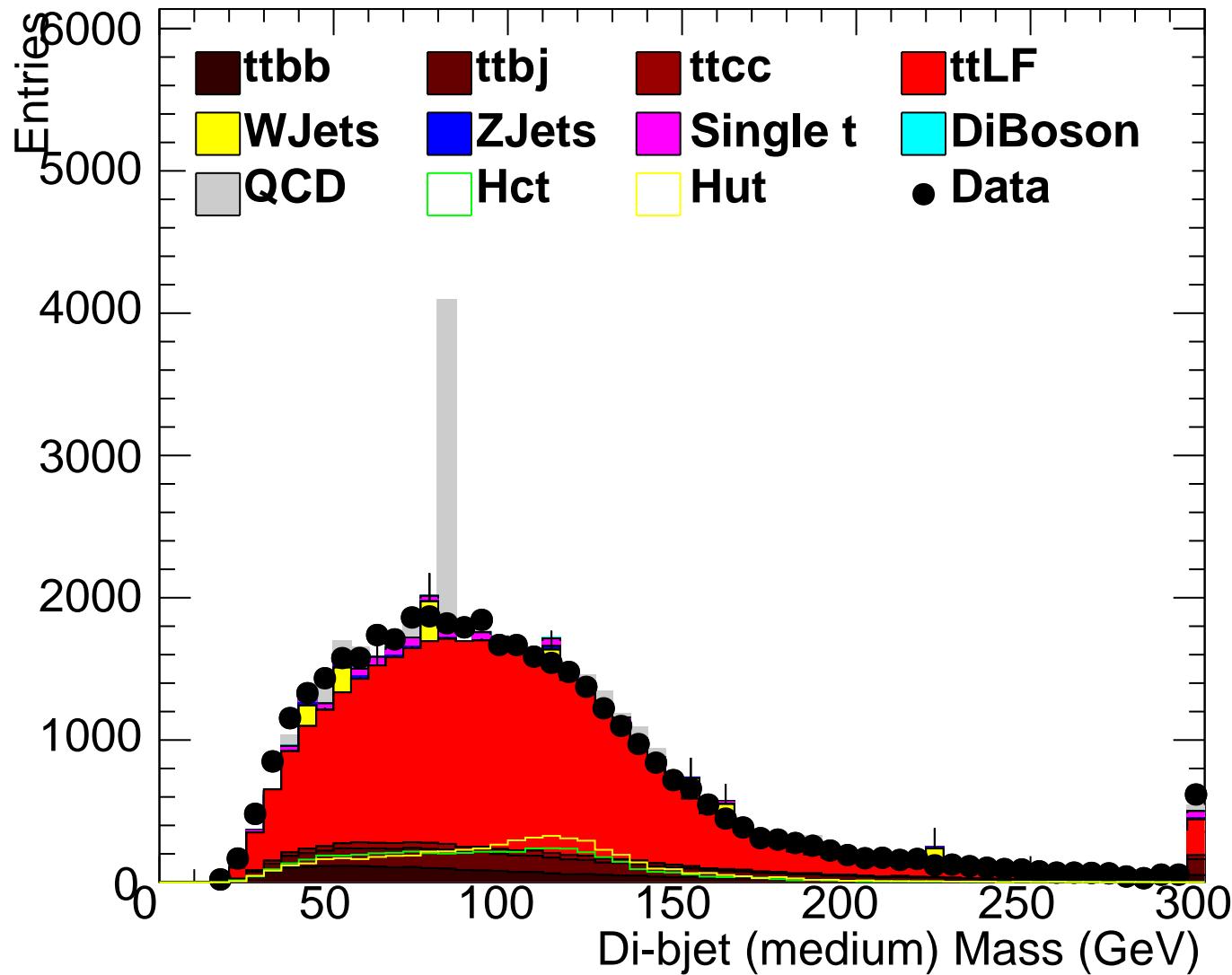


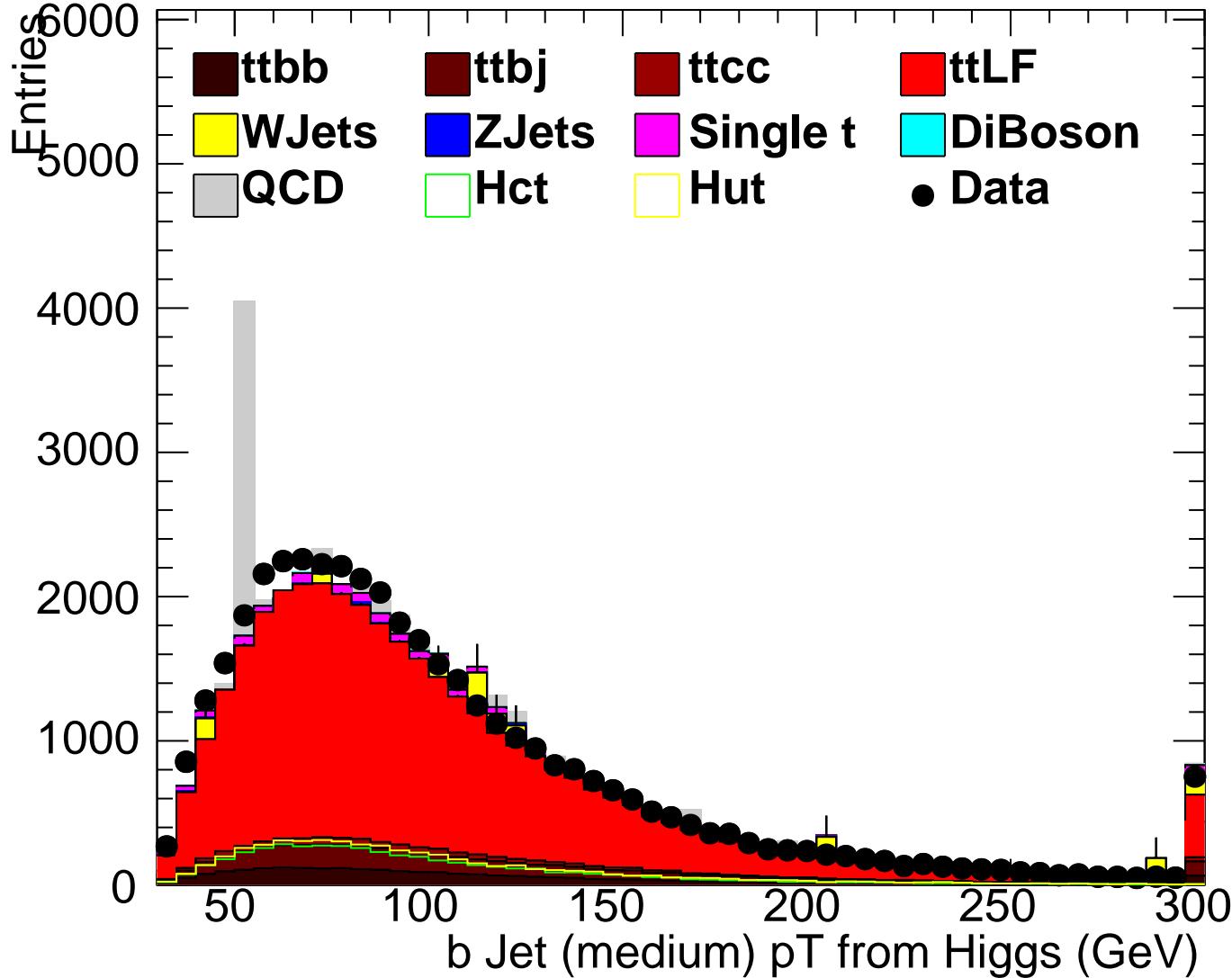


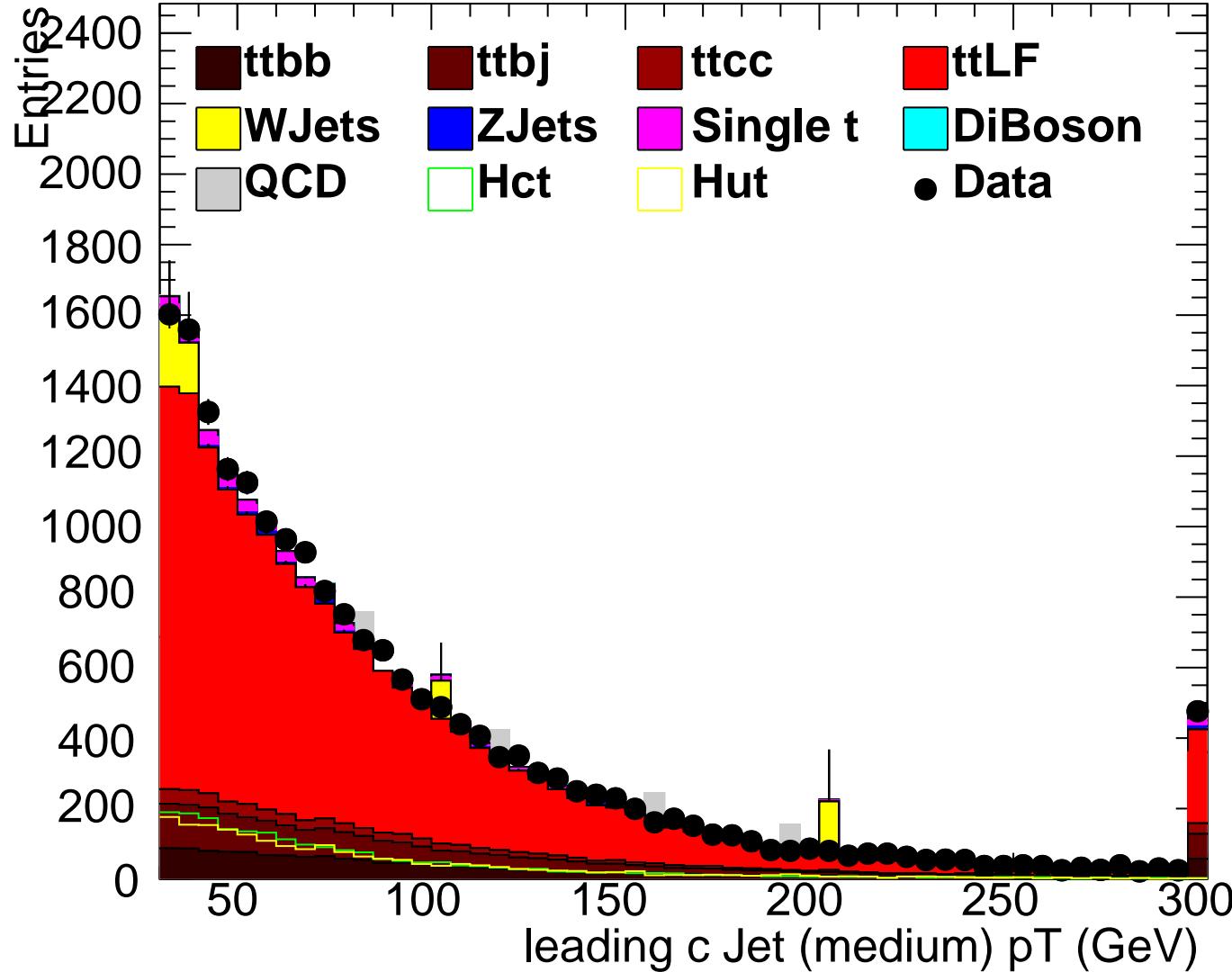
**Ch0\_S5**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

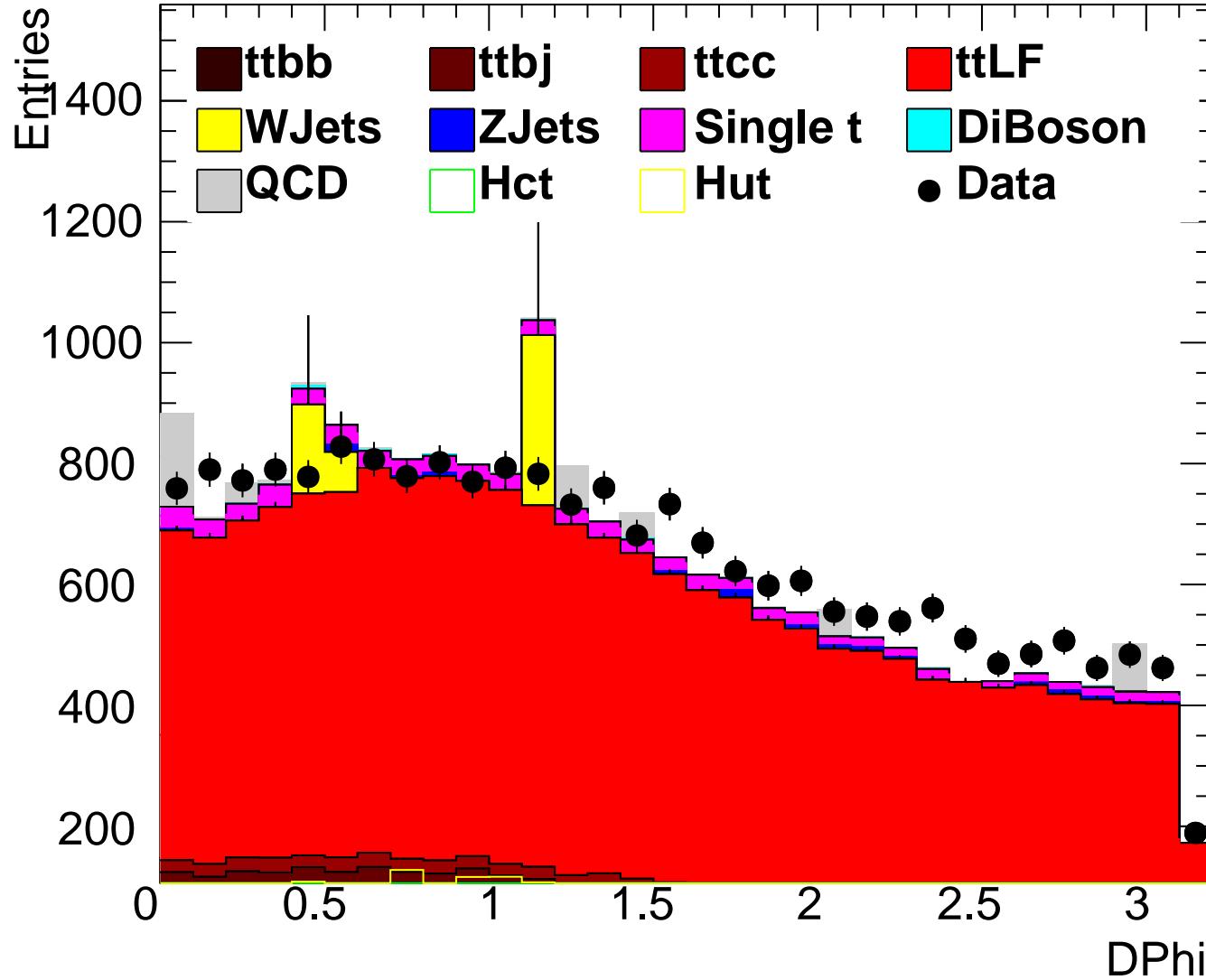
**Ch0\_S5**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

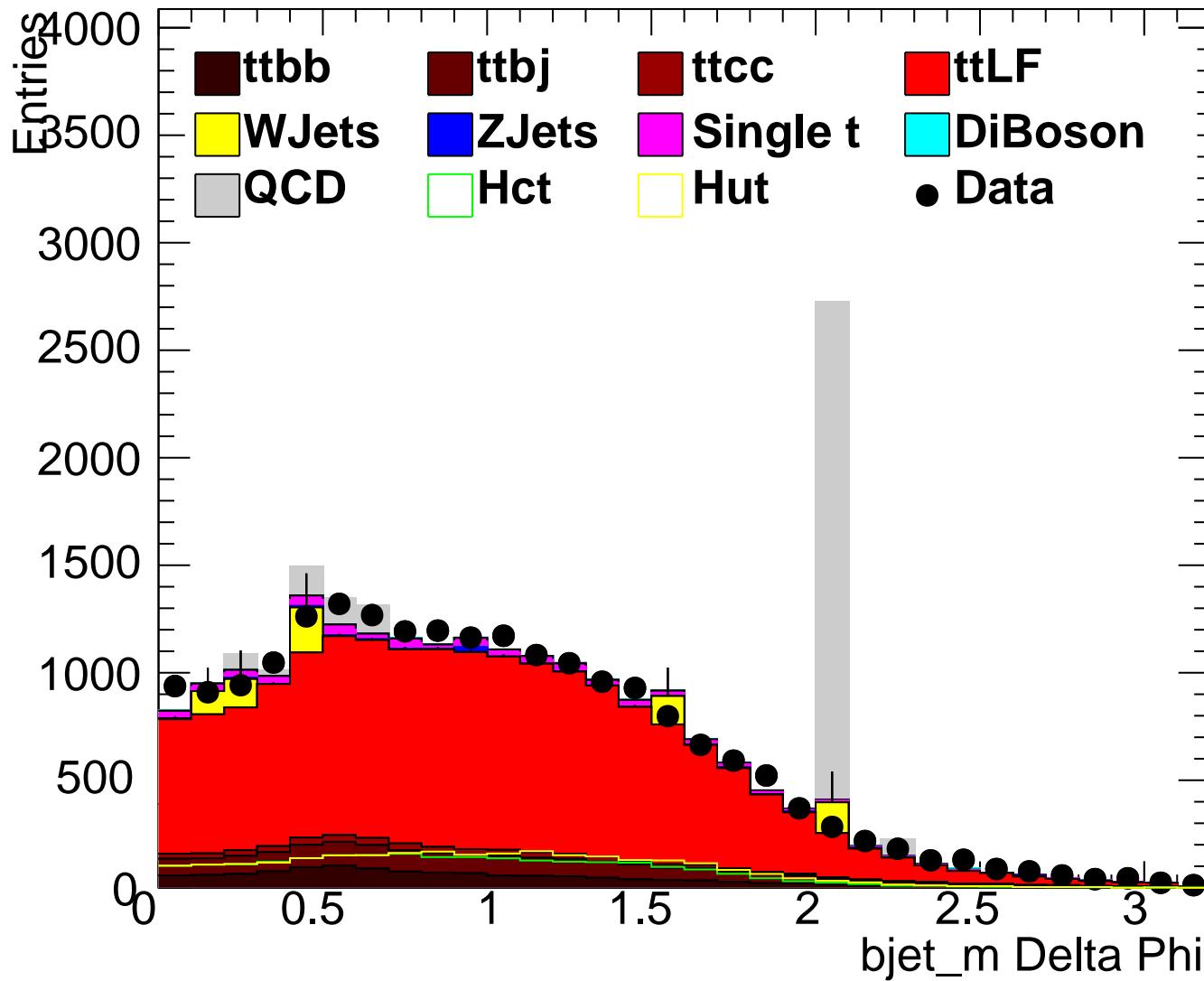
**Ch0\_S5**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

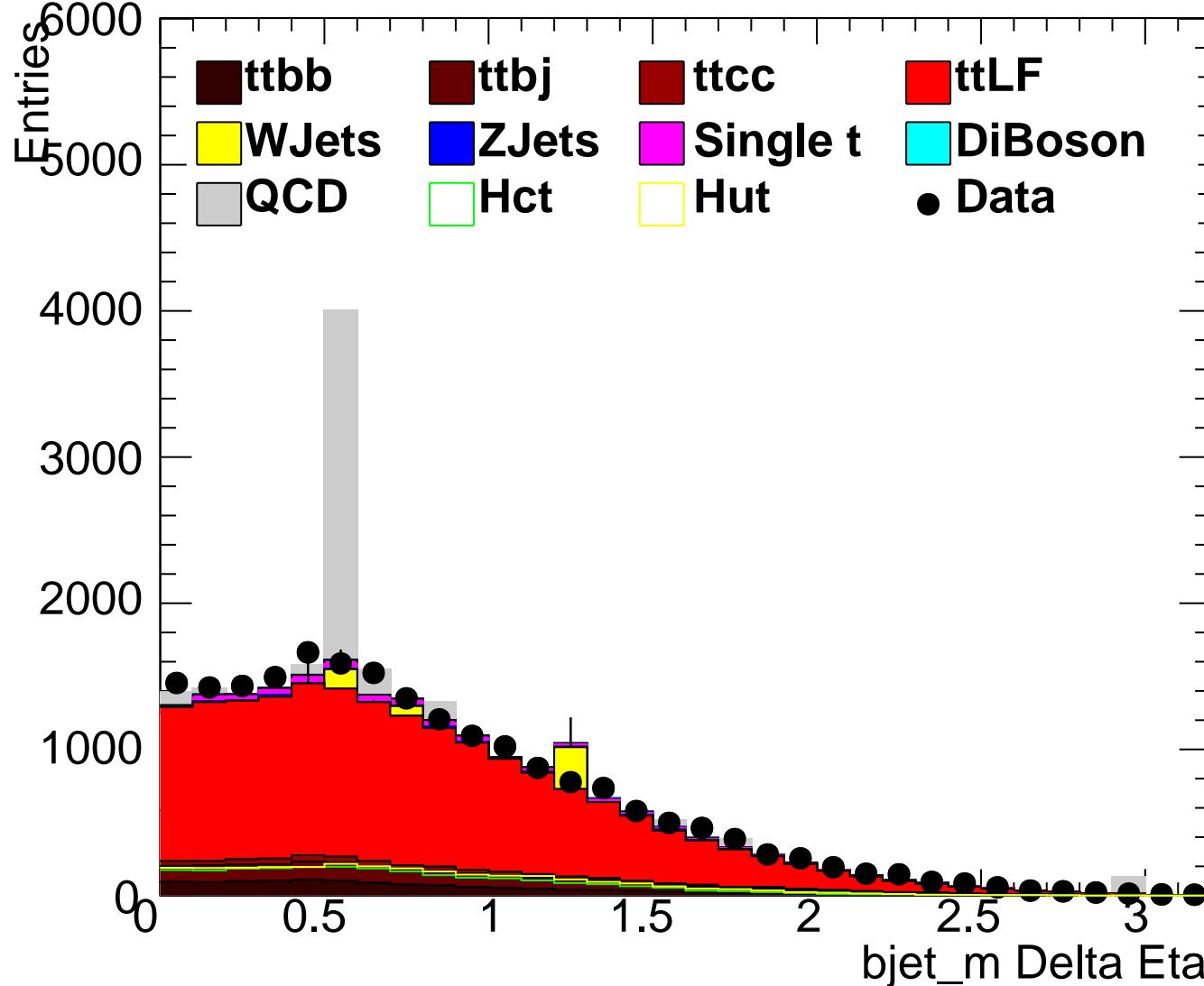
**Ch0\_S5**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

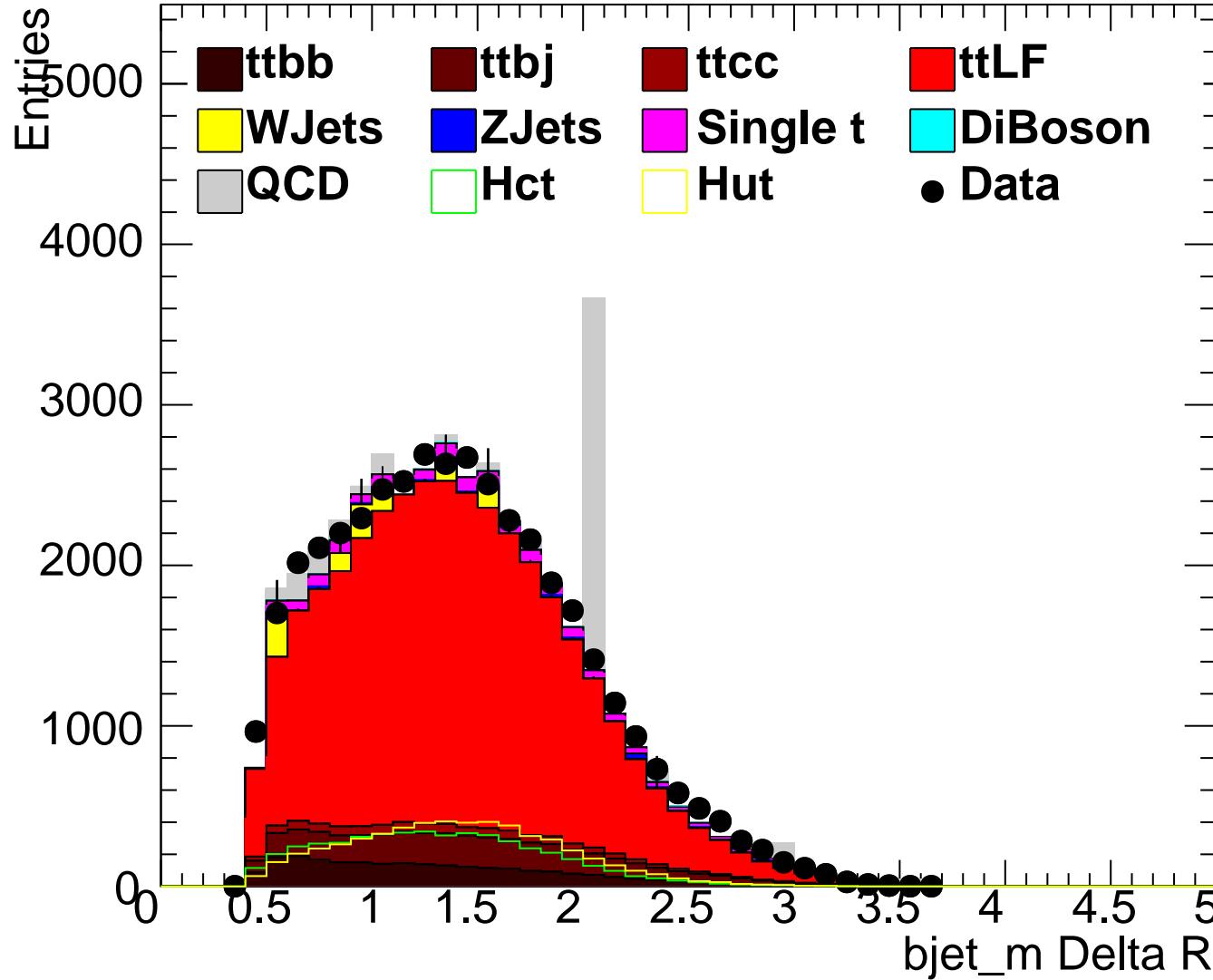
**Ch0\_S5**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch0\_S5**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 



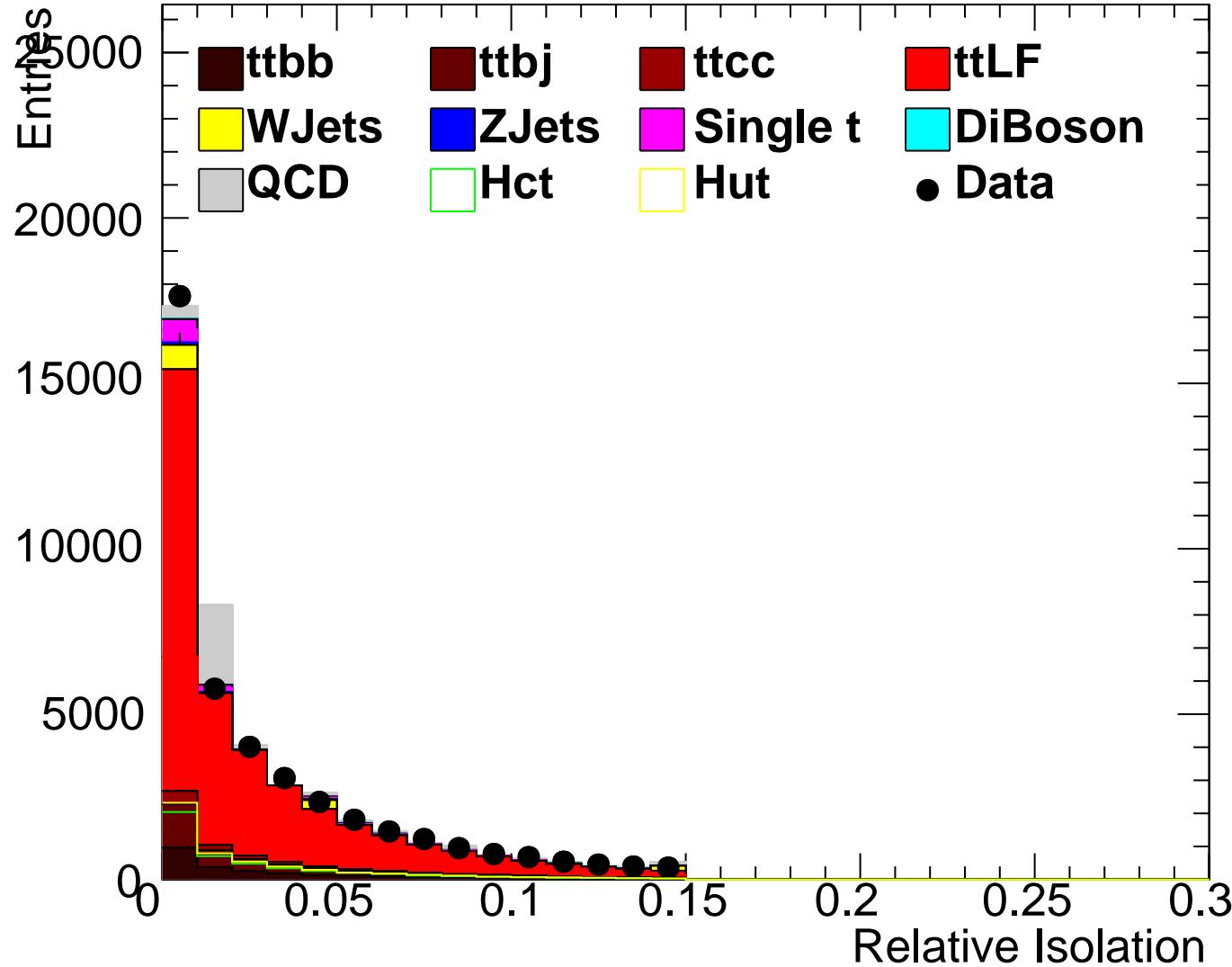
**Ch0\_S5**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch0\_S5**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 



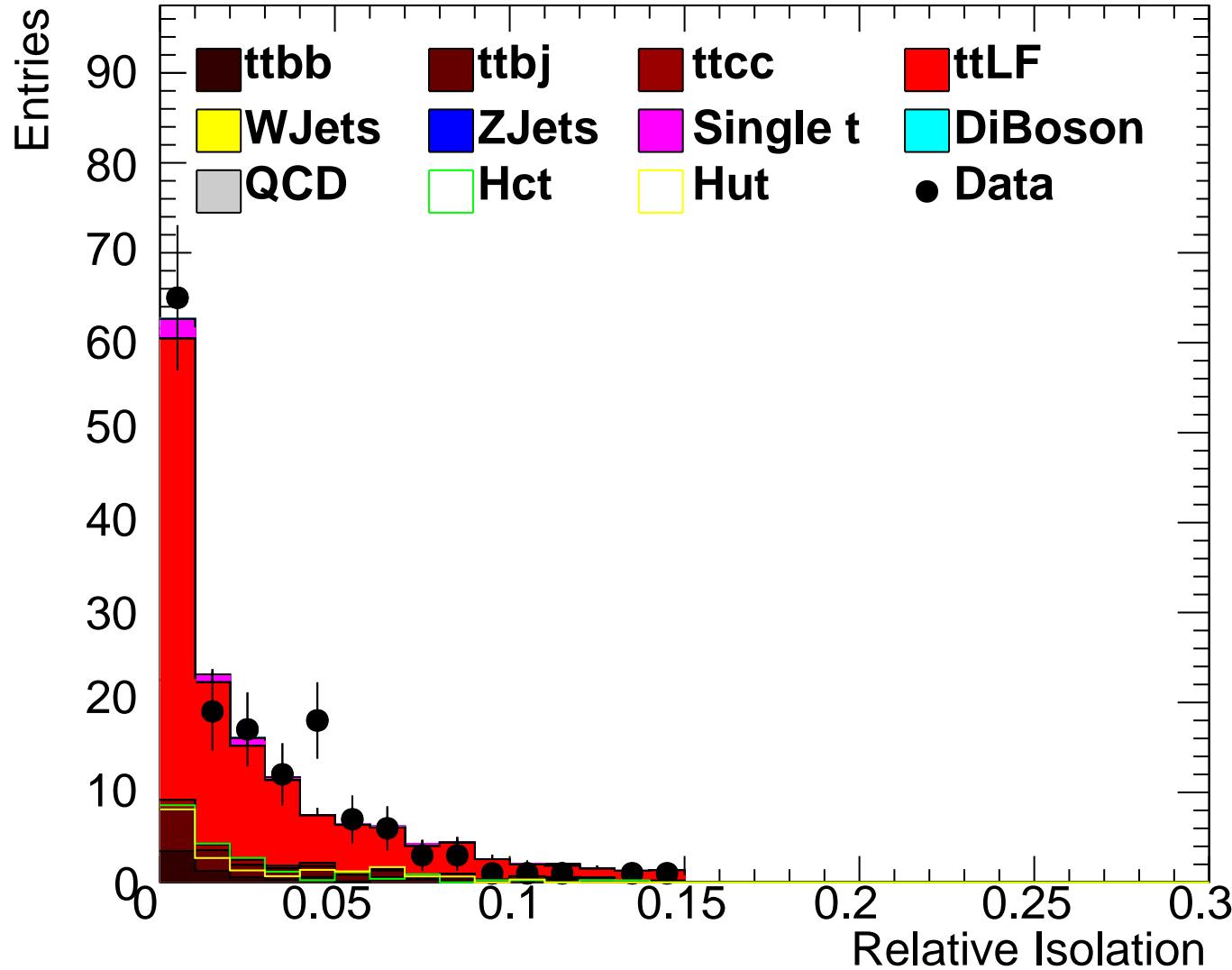
Ch0\_S5

CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$



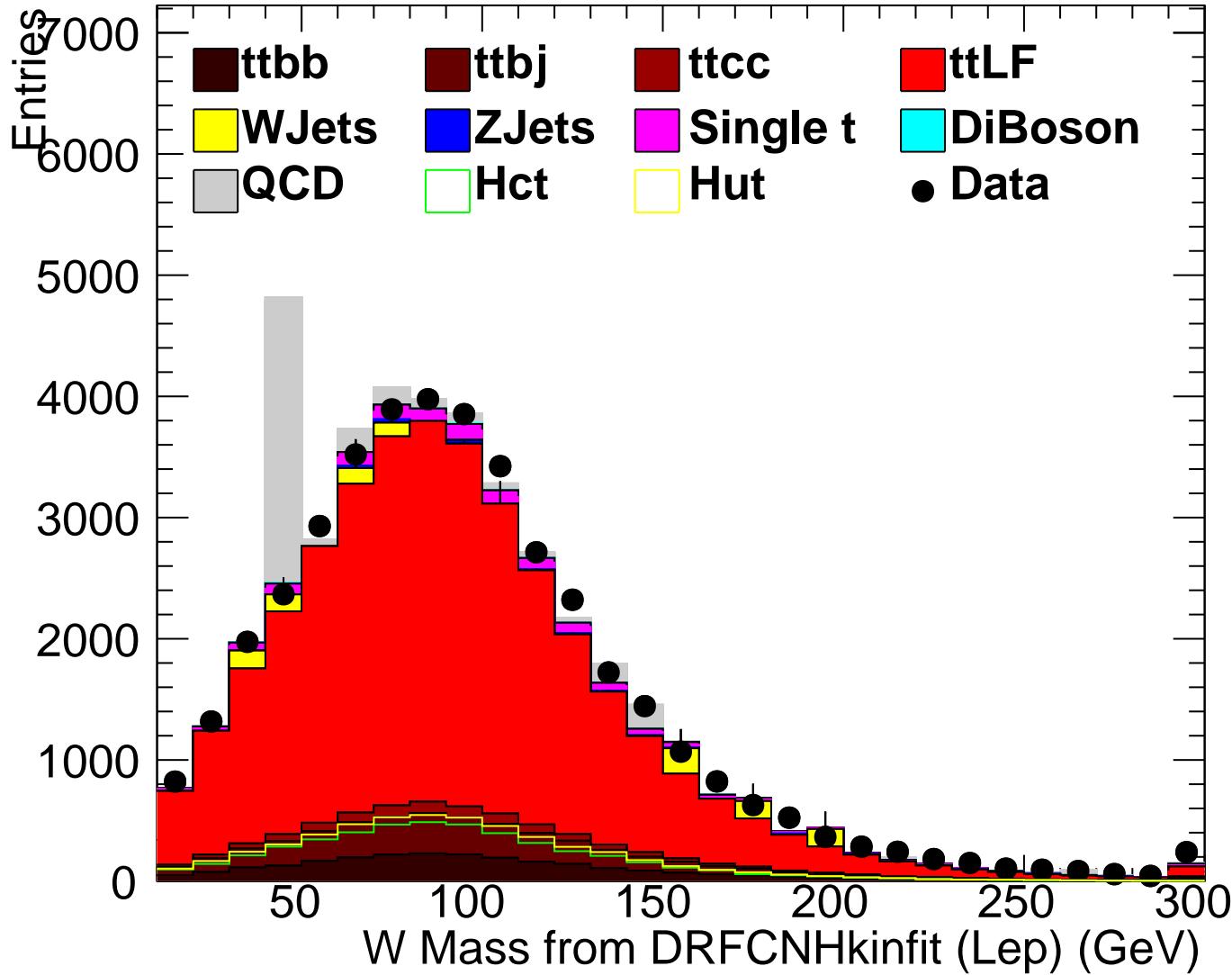
Ch0\_S5

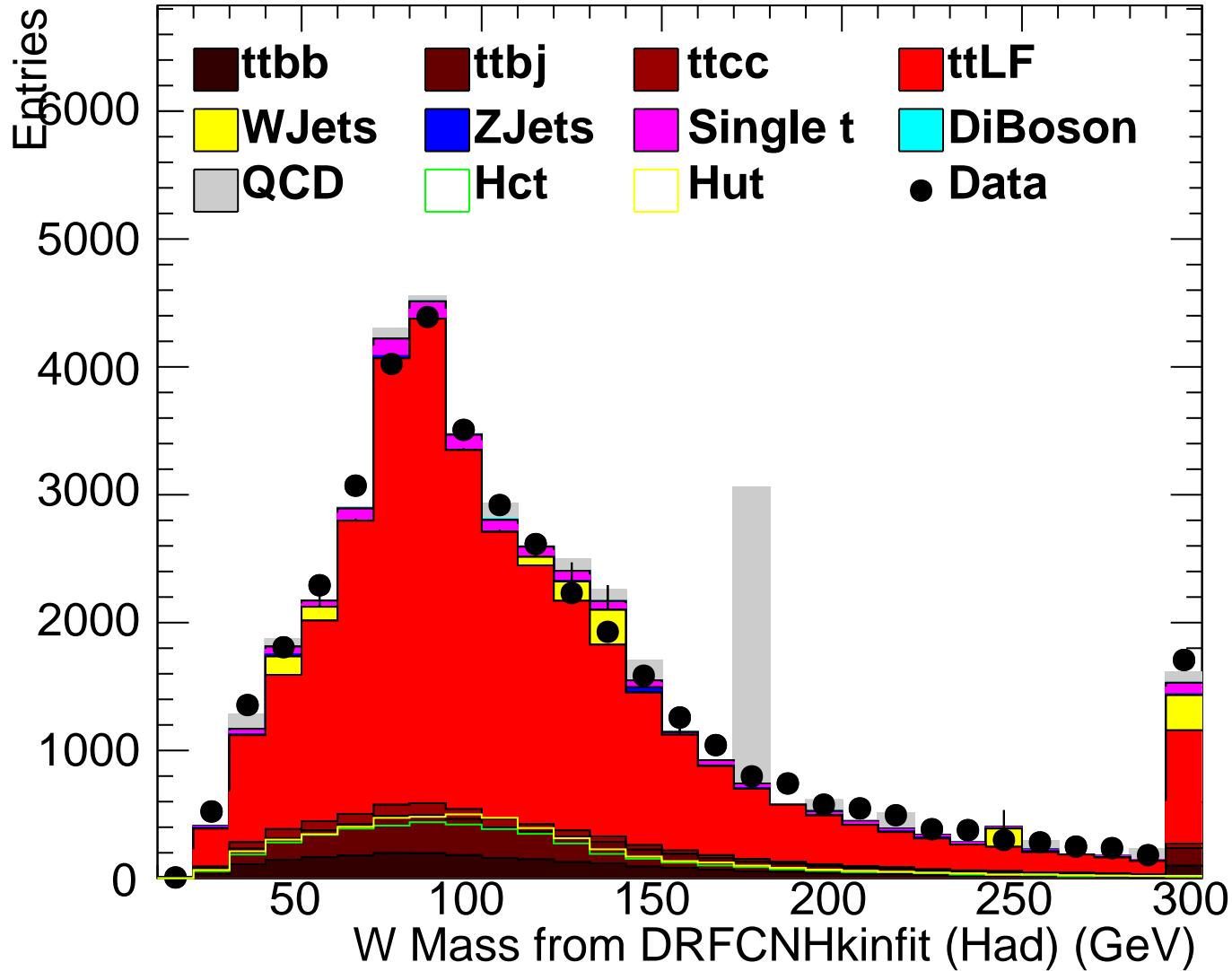
CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$

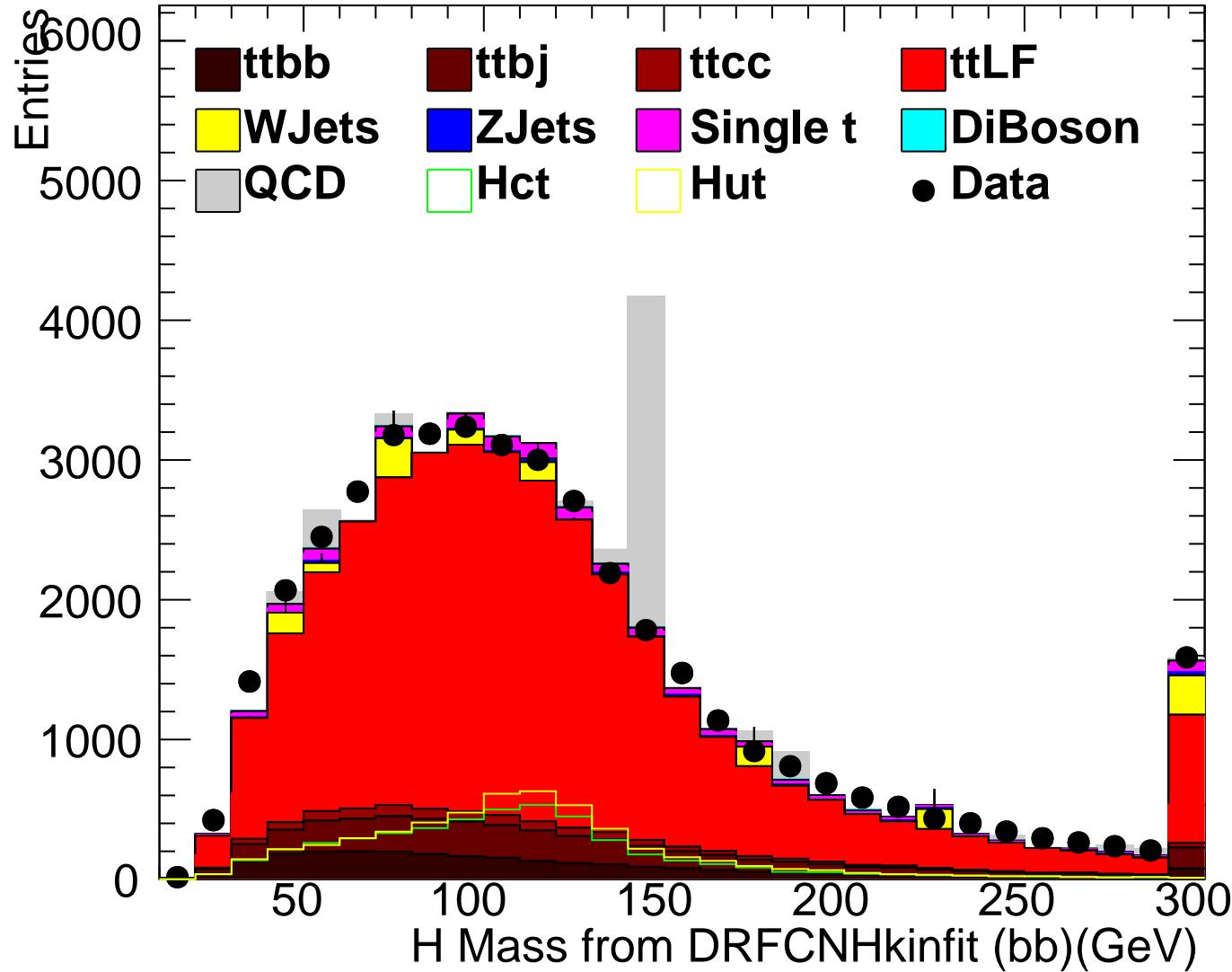


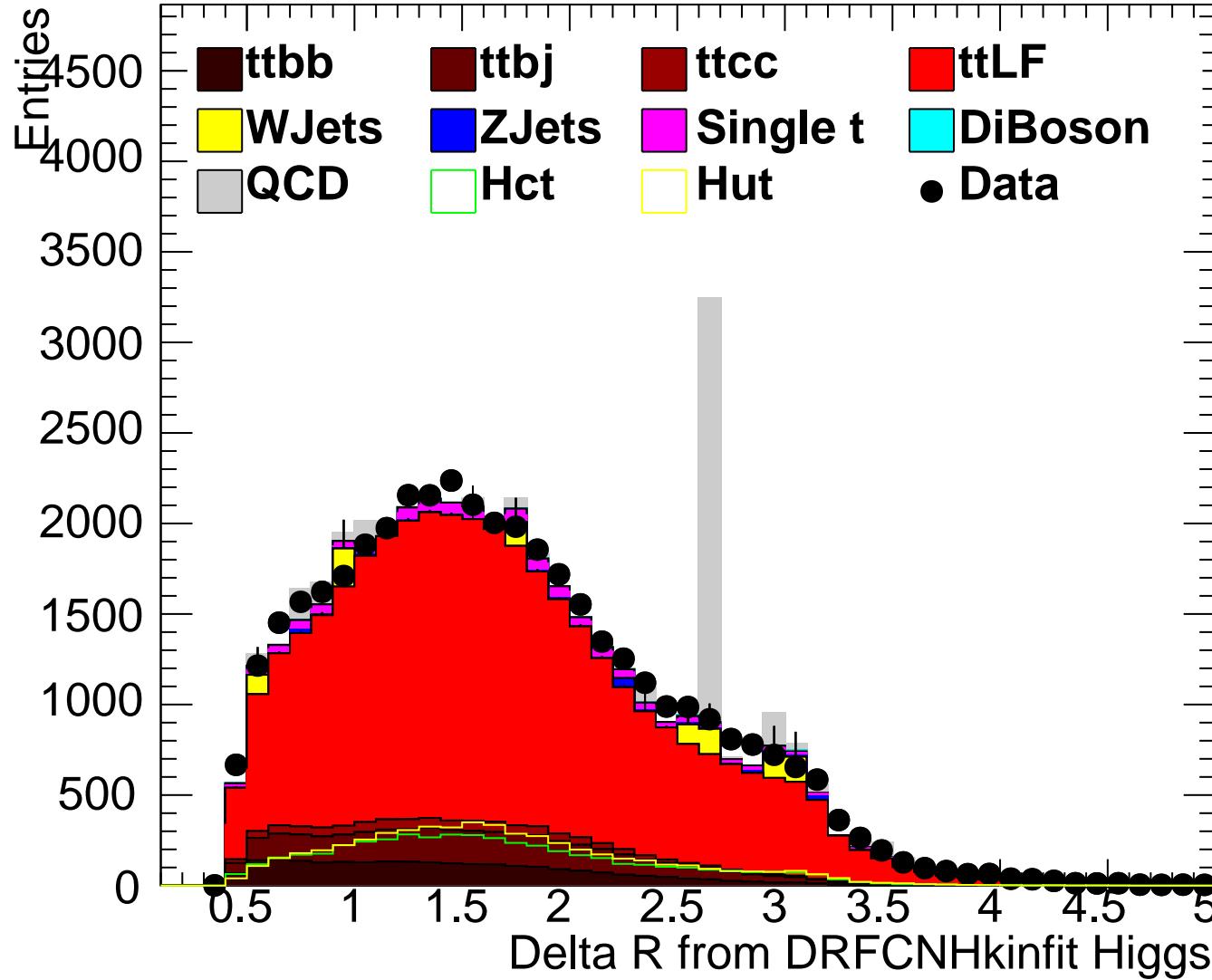
Ch0\_S5

CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV



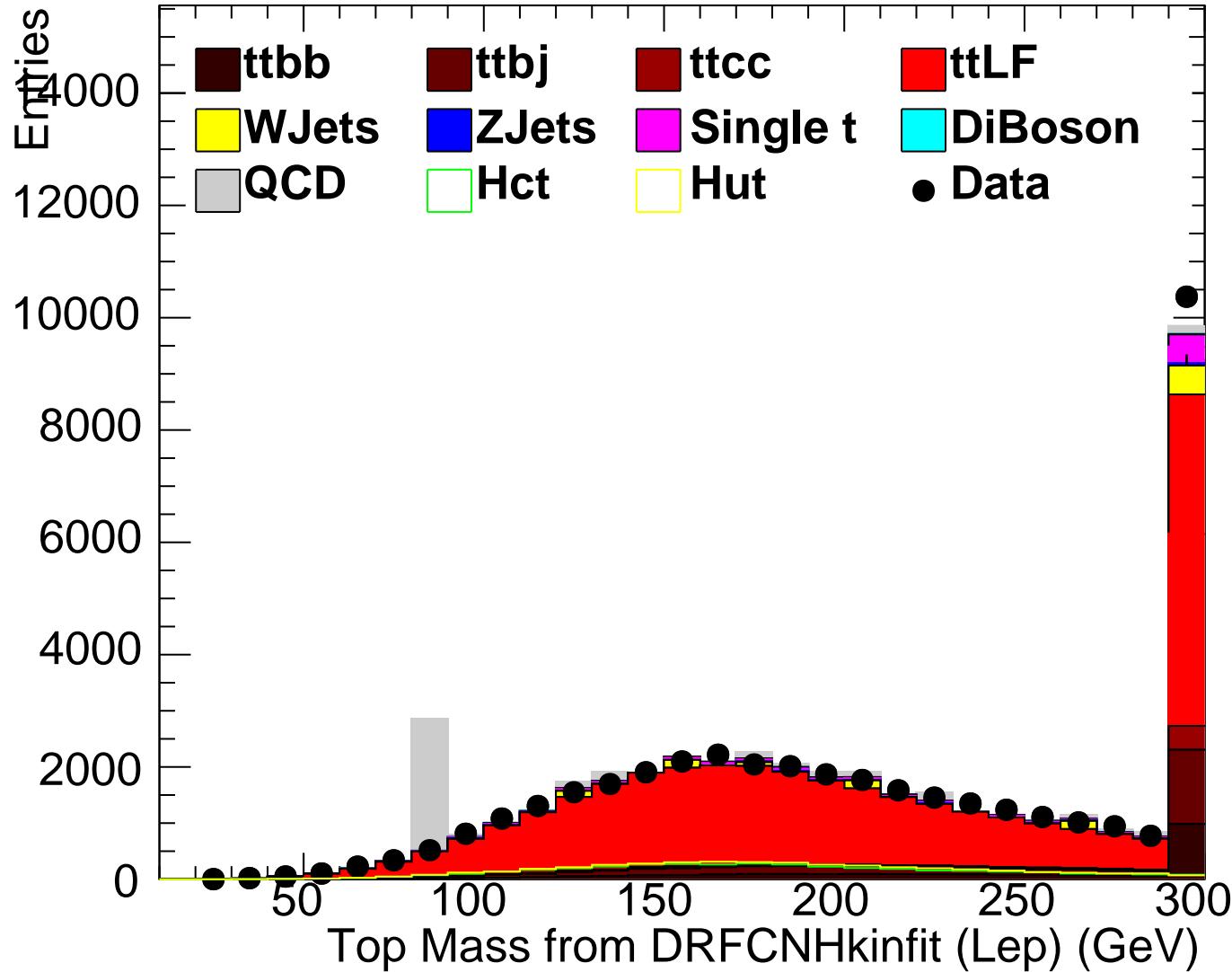


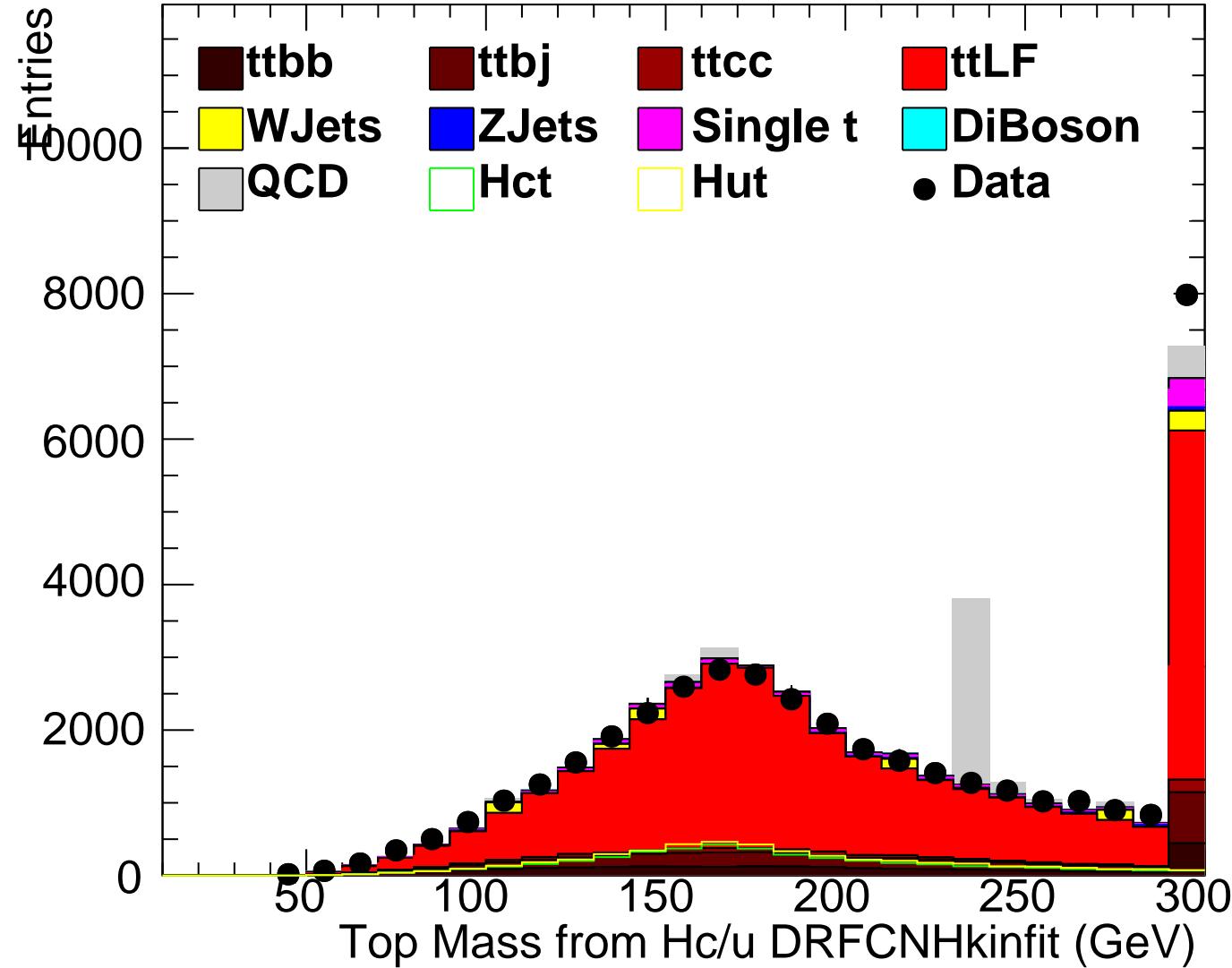
**Ch0\_S5**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch0\_S5**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

Ch0\_S5

CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$

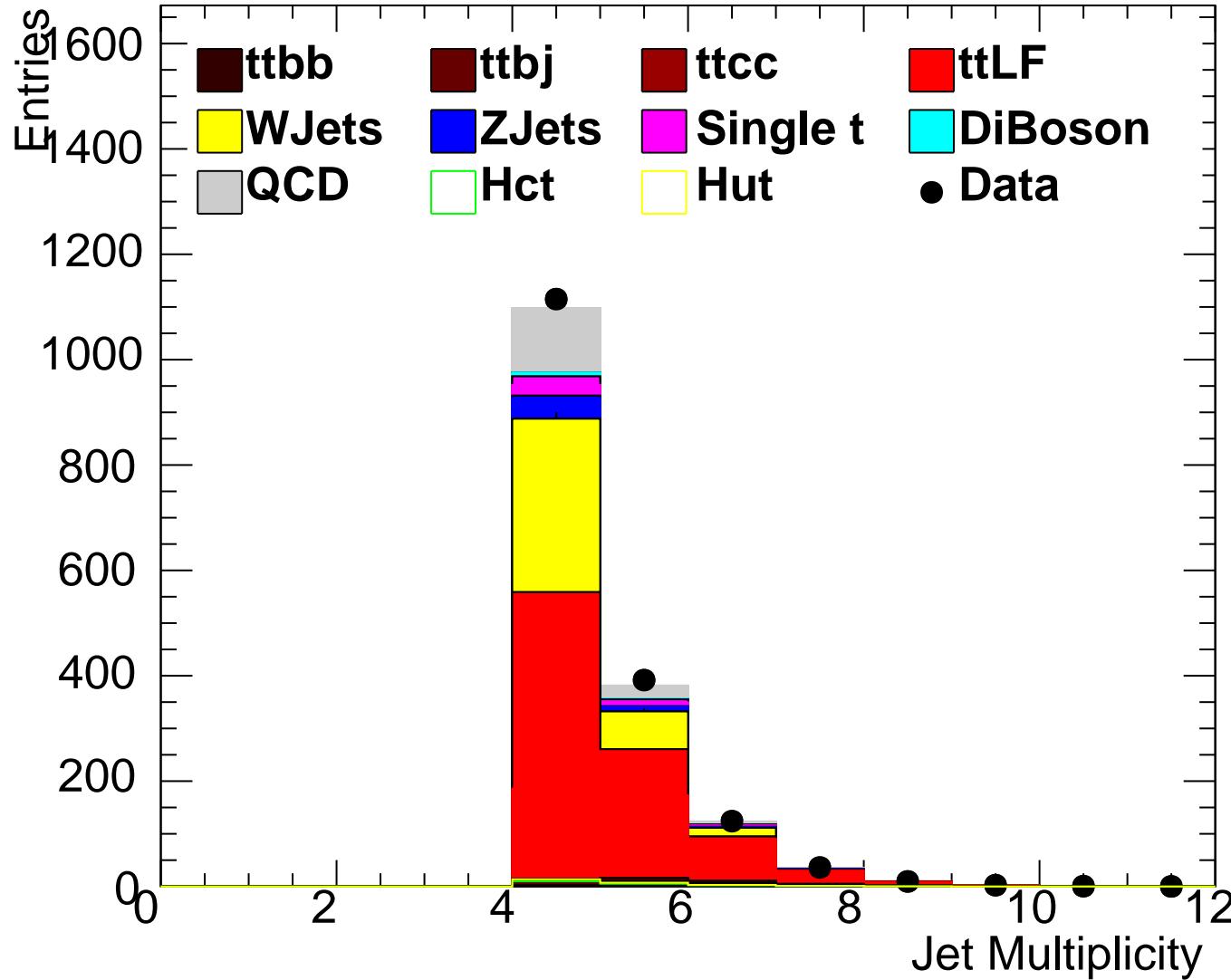


**Ch0\_S5**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

Ch0\_S6

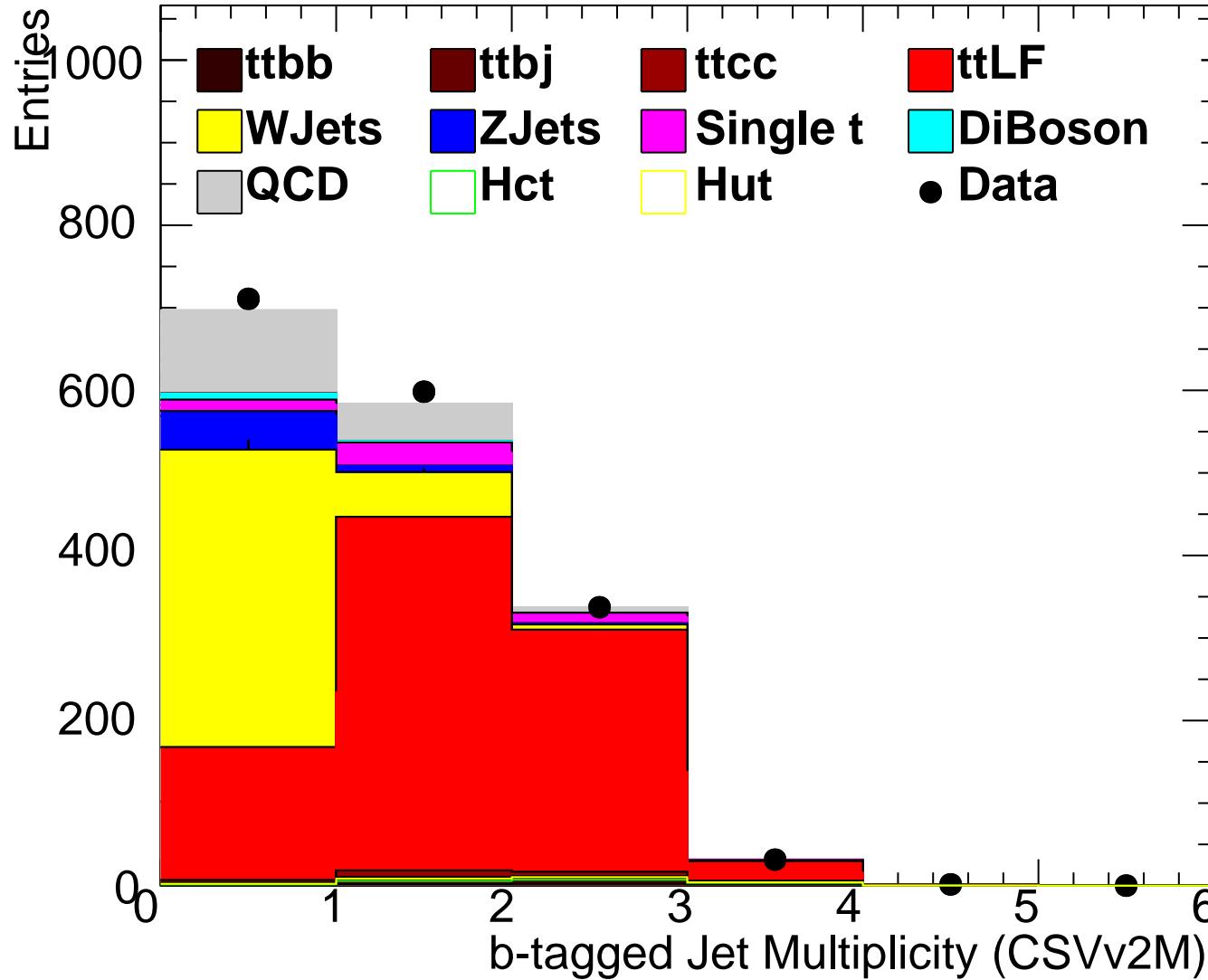
0 | 3

CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$



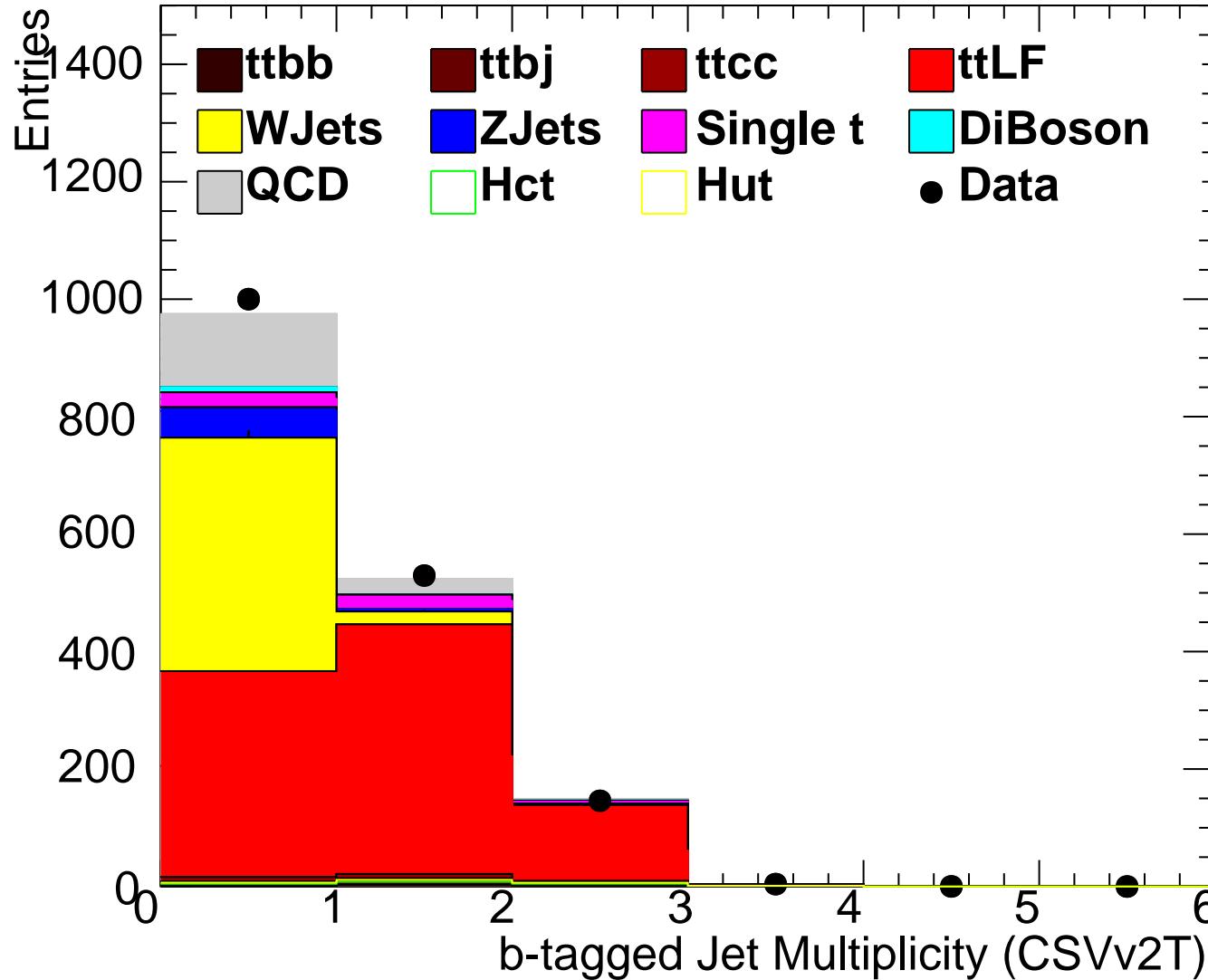
Ch0\_S6

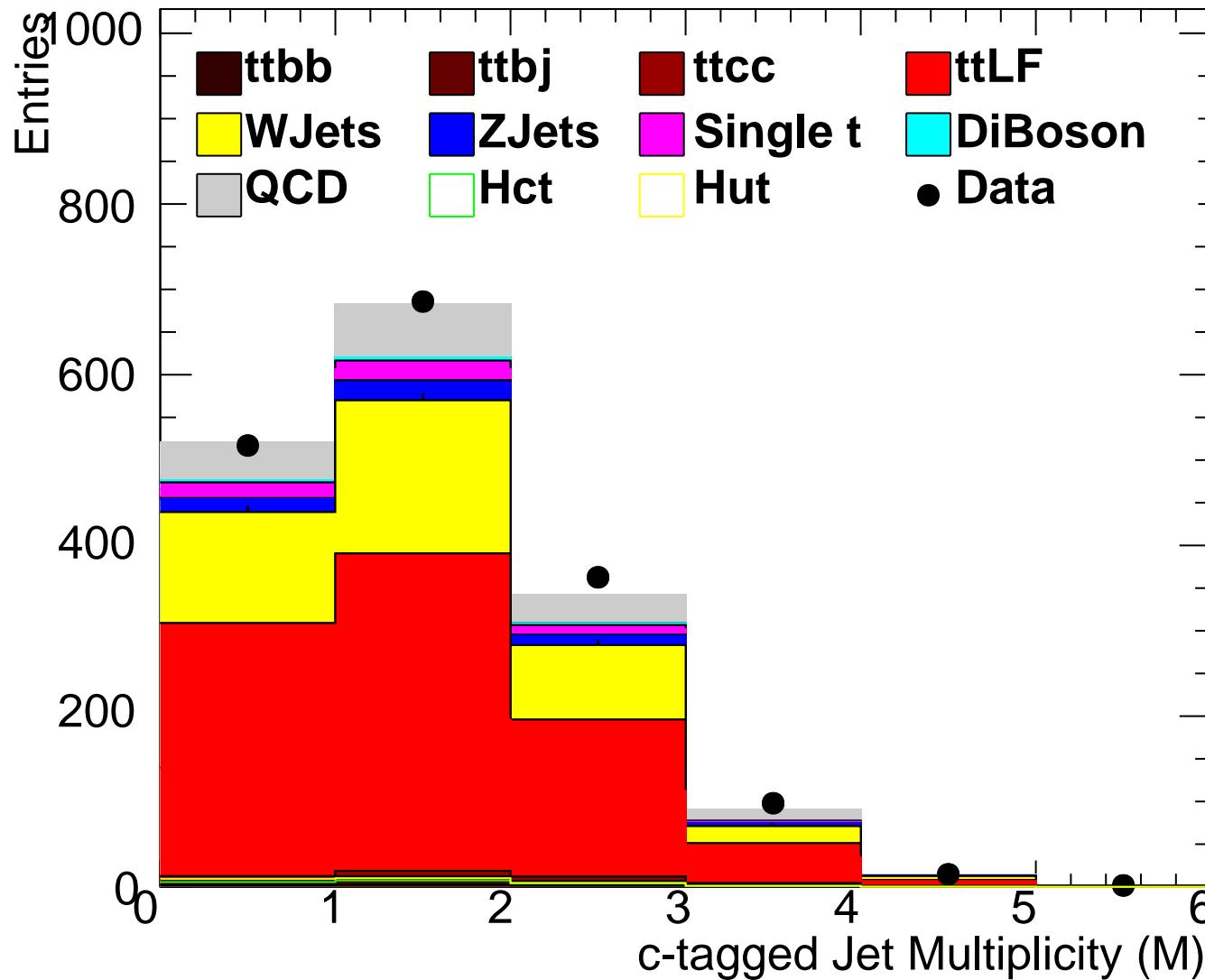
CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV

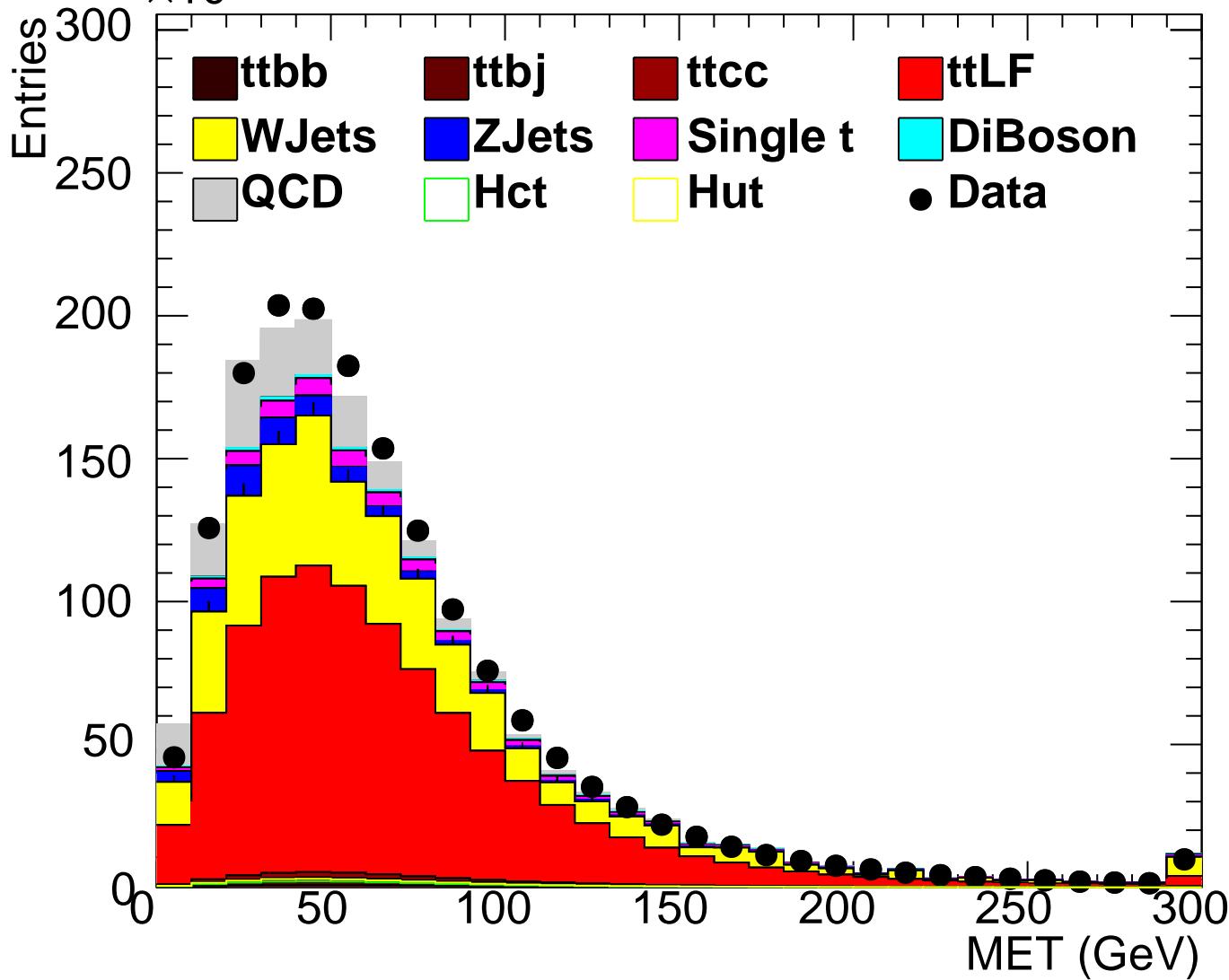


Ch0\_S6

CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$



**Ch0\_S6**x 10<sup>3</sup>CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV

**Ch0\_S6**3  
 $\times 10^3$ CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch0\_S6**x 10<sup>3</sup>CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV

Entries

100

80

60

40

20

0

20

40

60

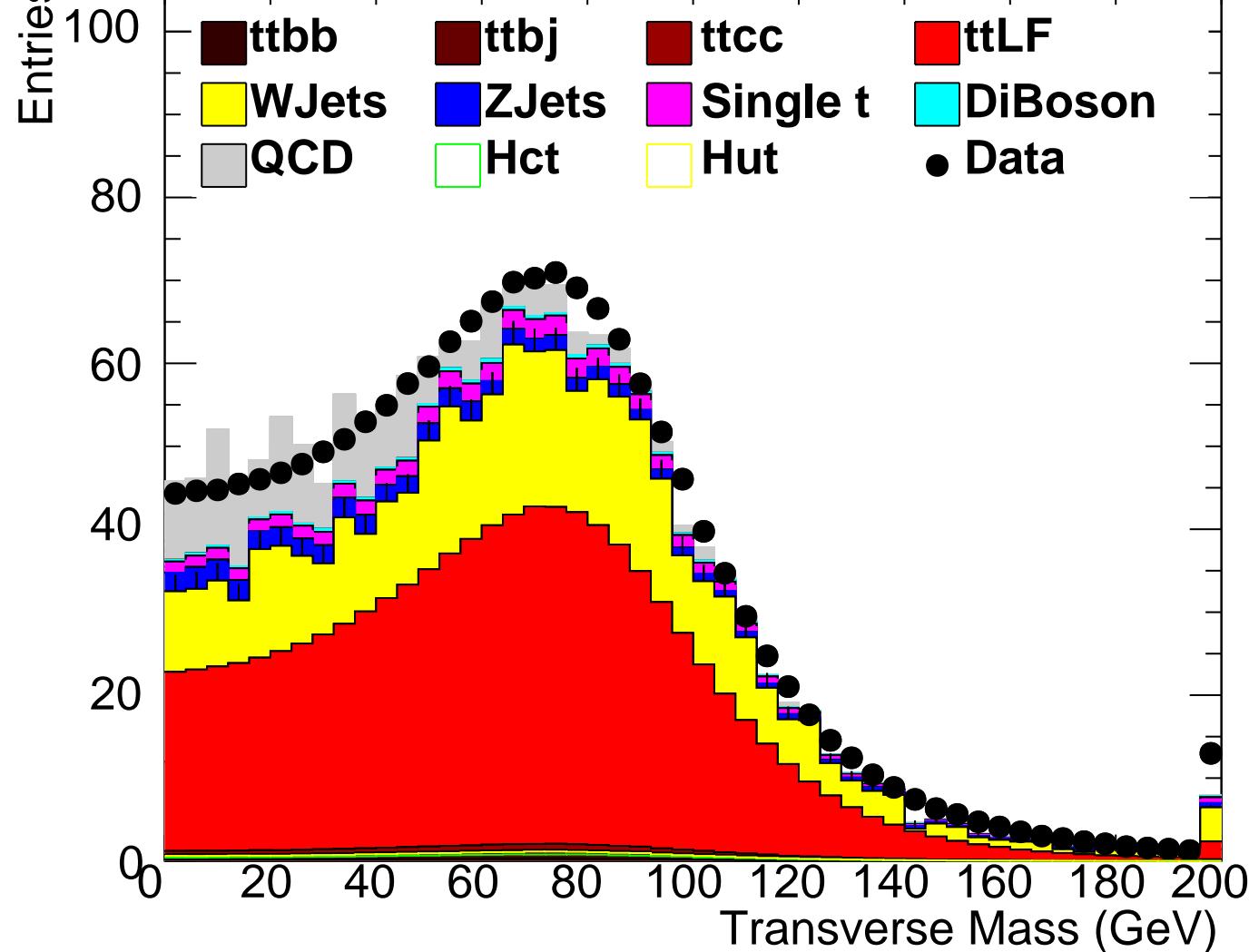
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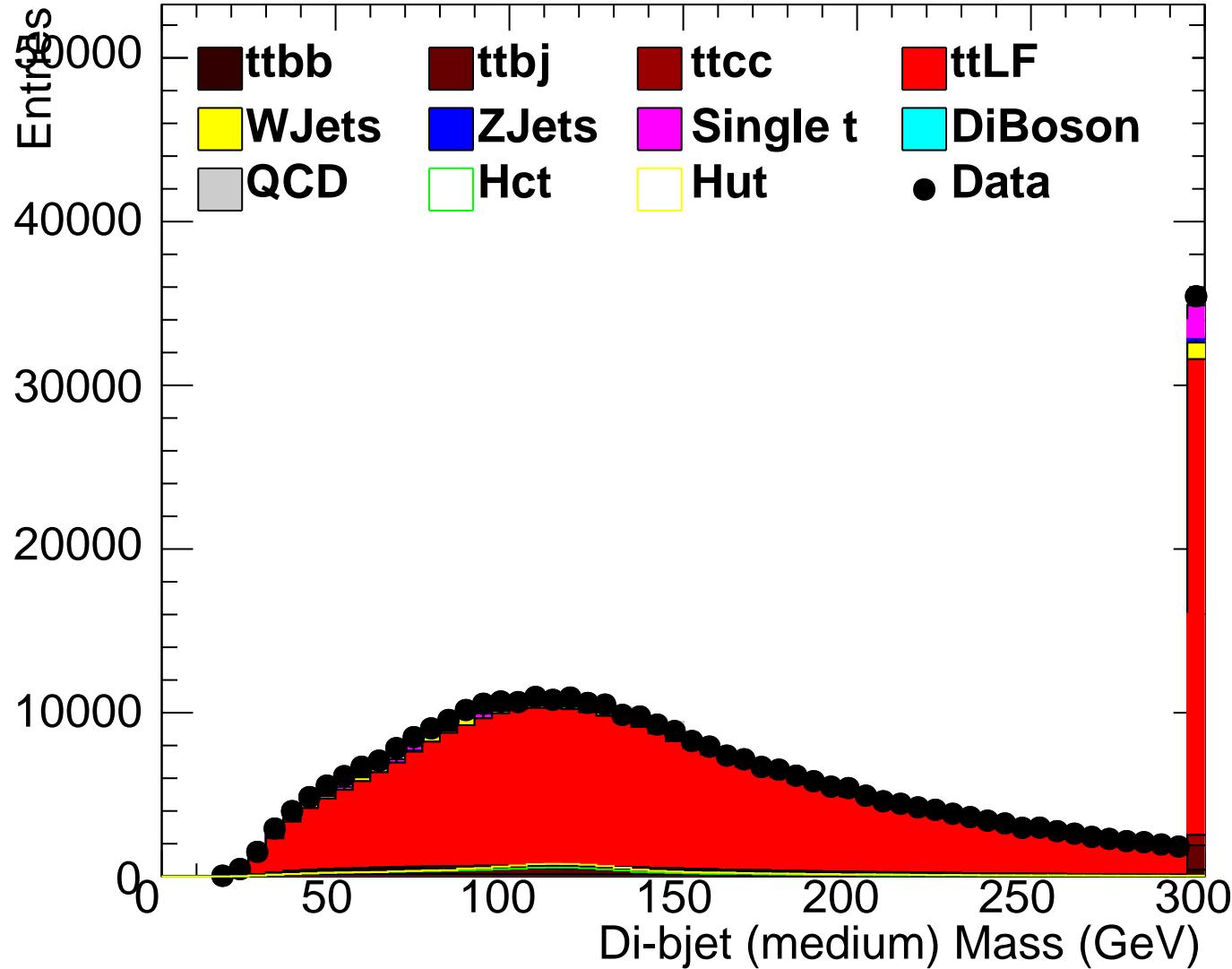
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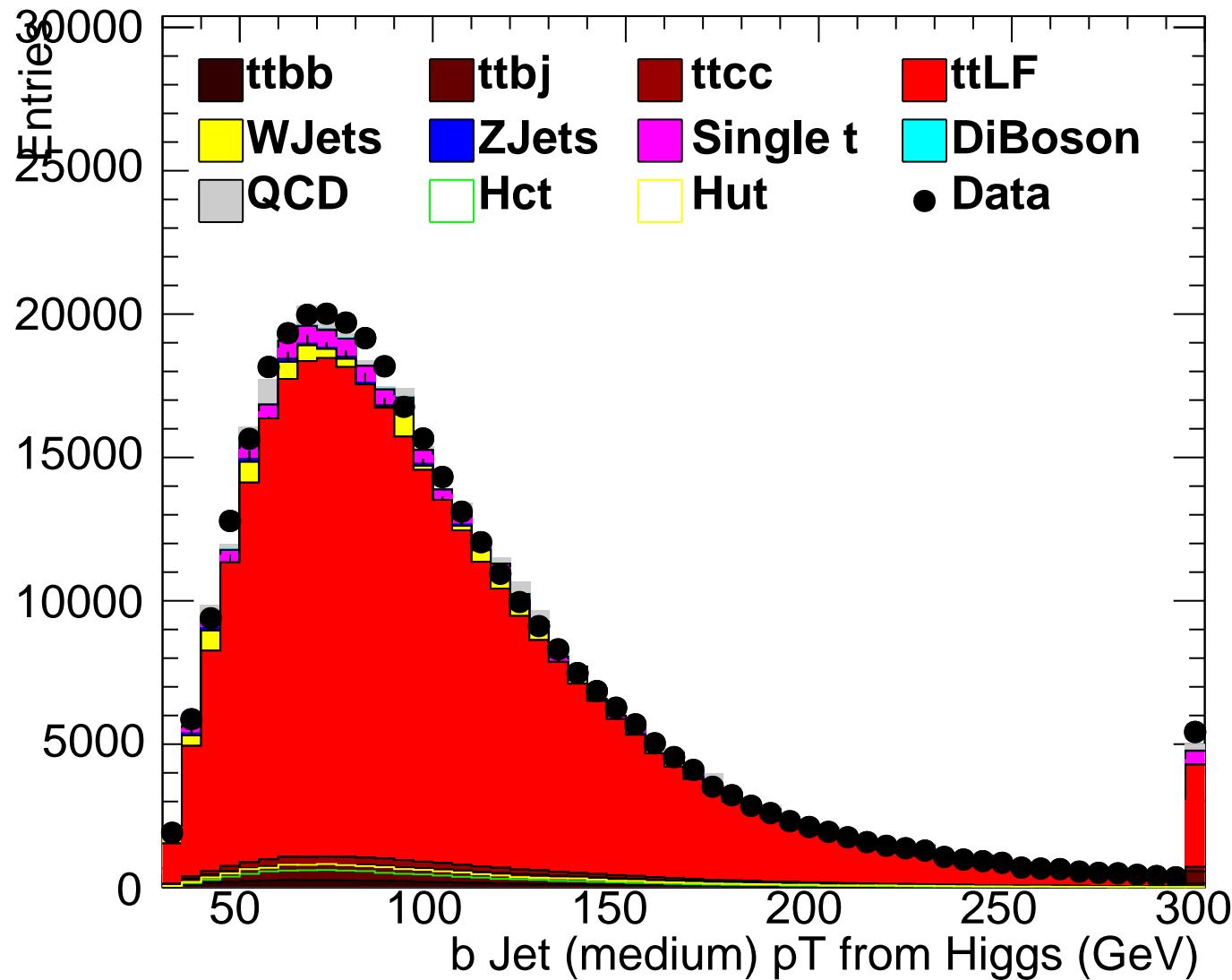
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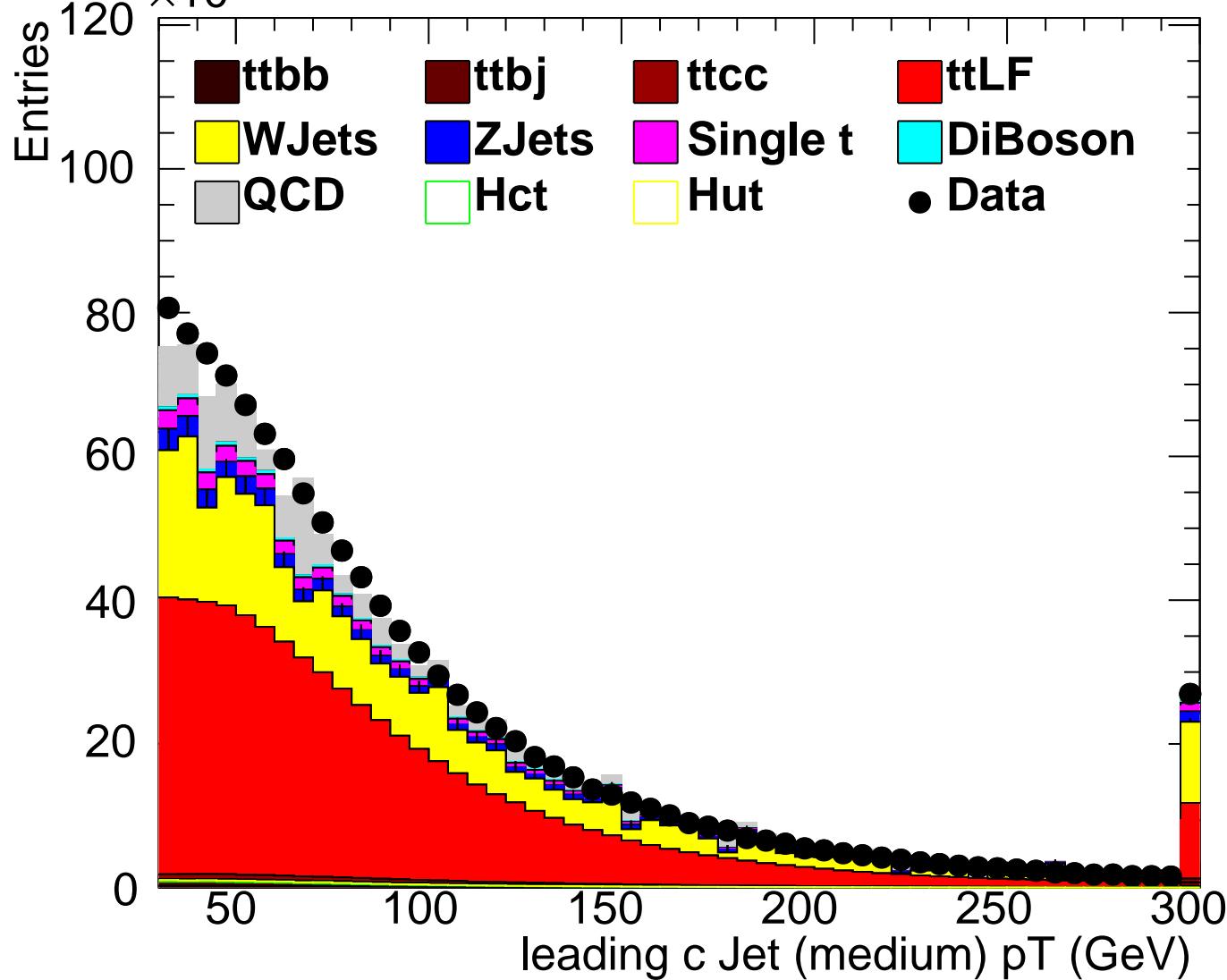
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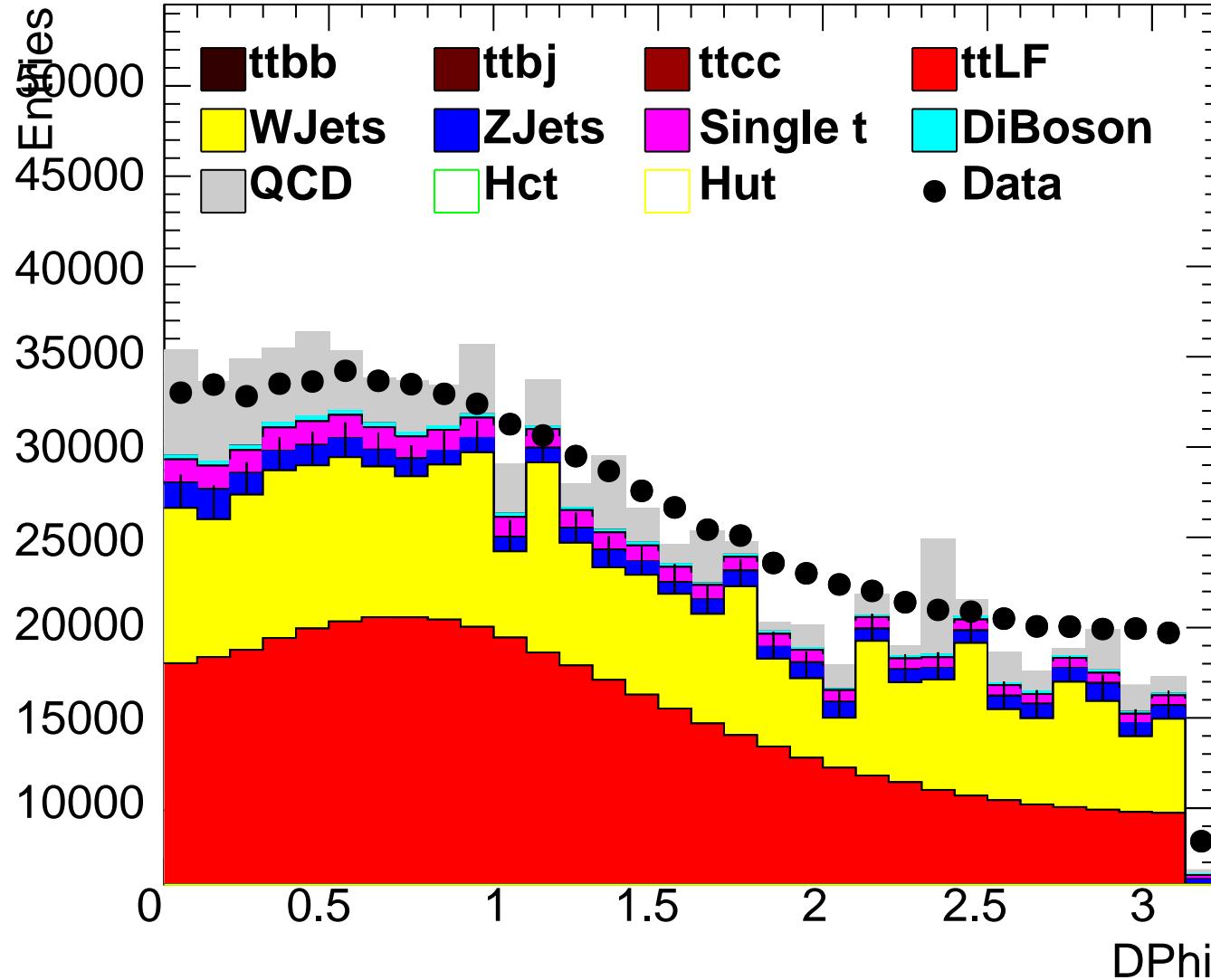
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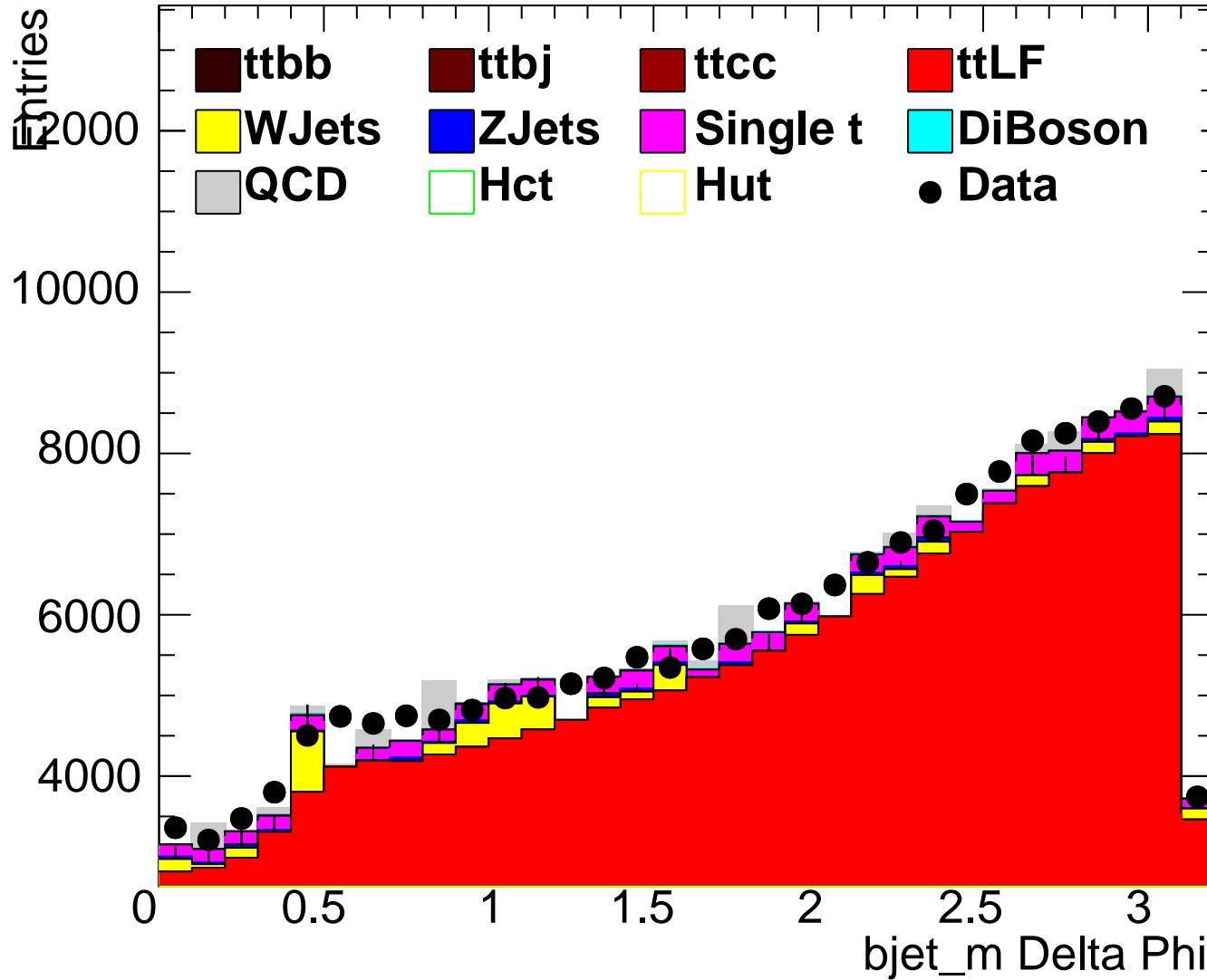


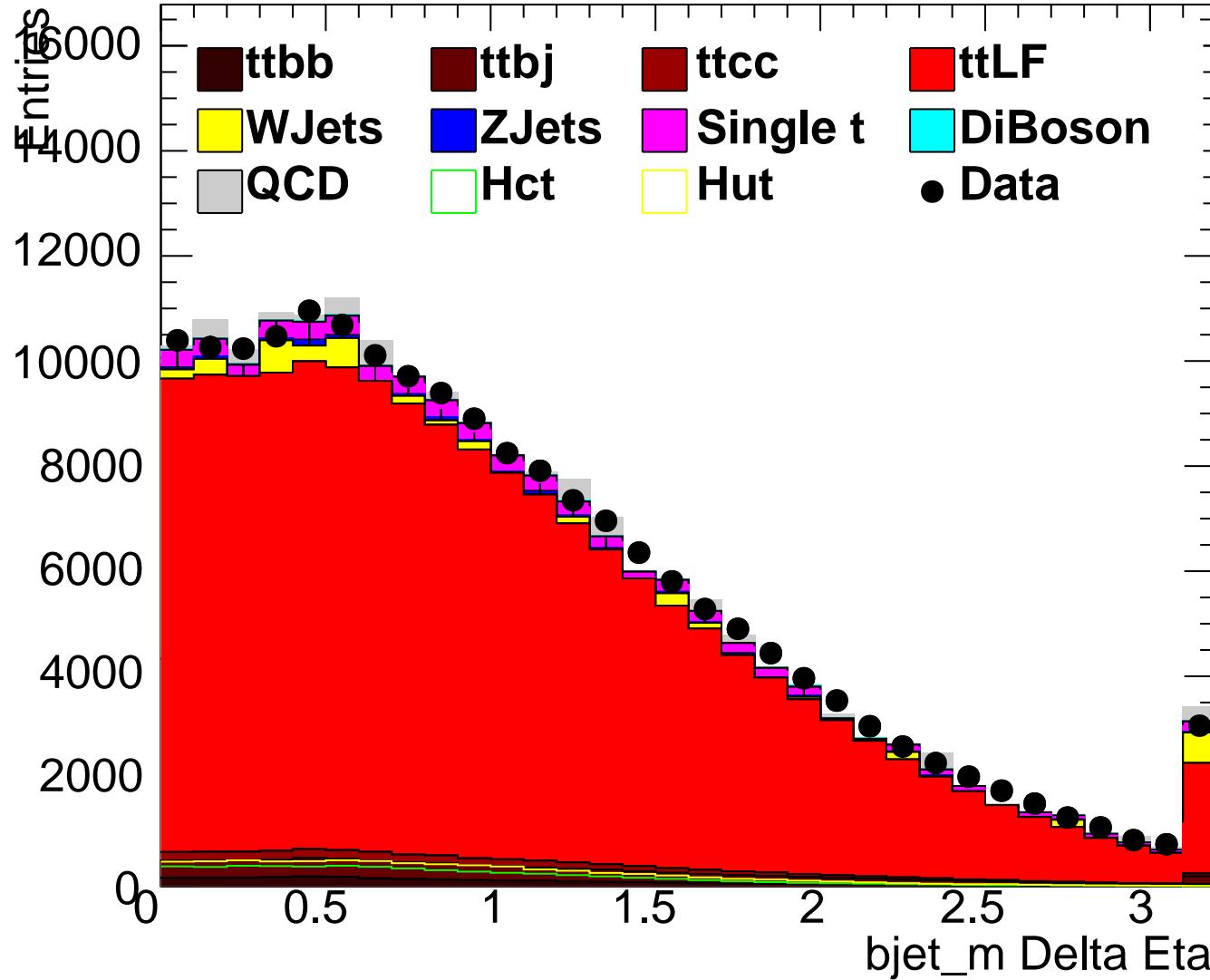
**Ch0\_S6**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

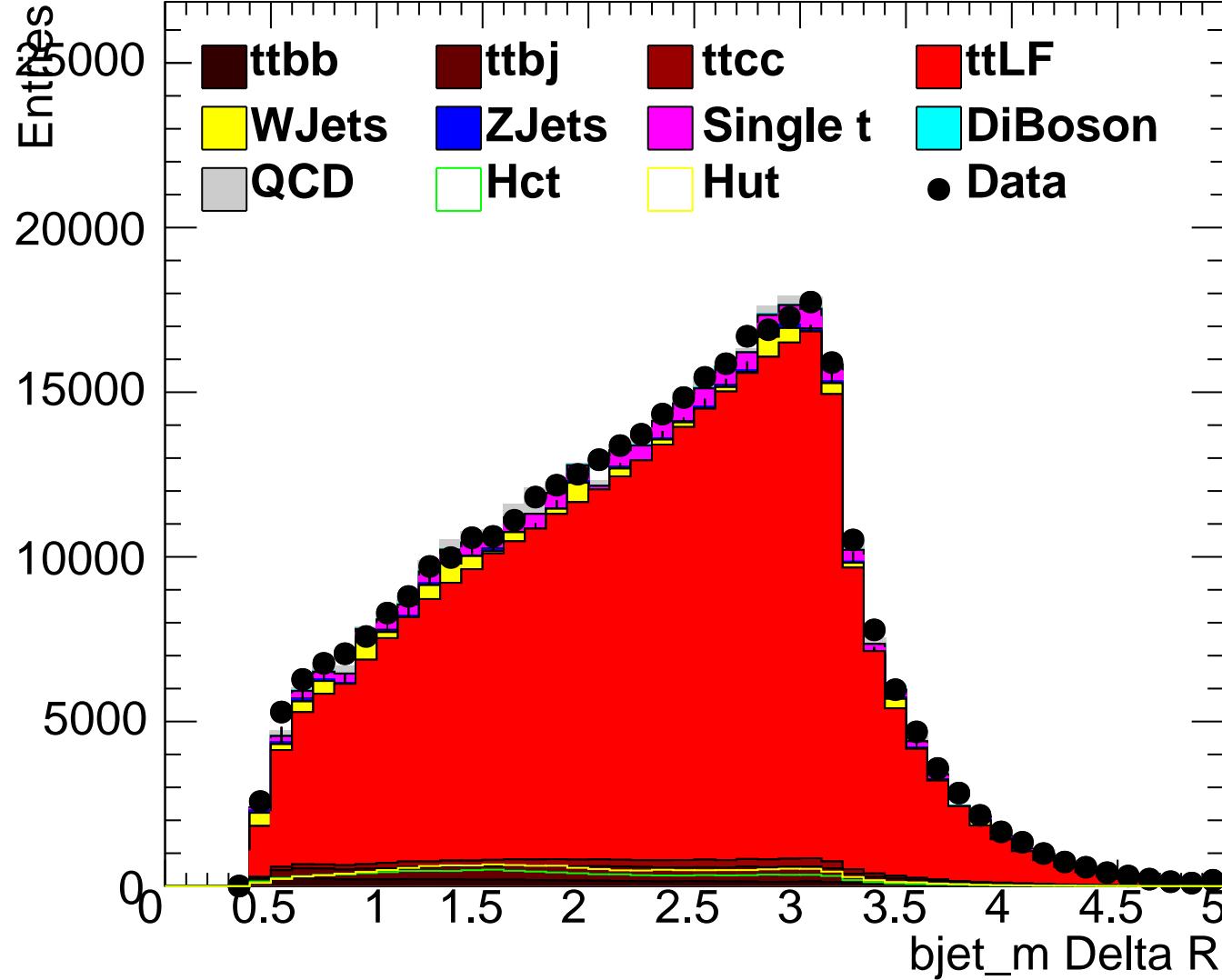
**Ch0\_S6**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch0\_S6**x 10<sup>3</sup>CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV

**Ch0\_S6**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 



**Ch0\_S6**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch0\_S6**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch0\_S6**x 10<sup>3</sup>CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV

Entries

1000

800

600

400

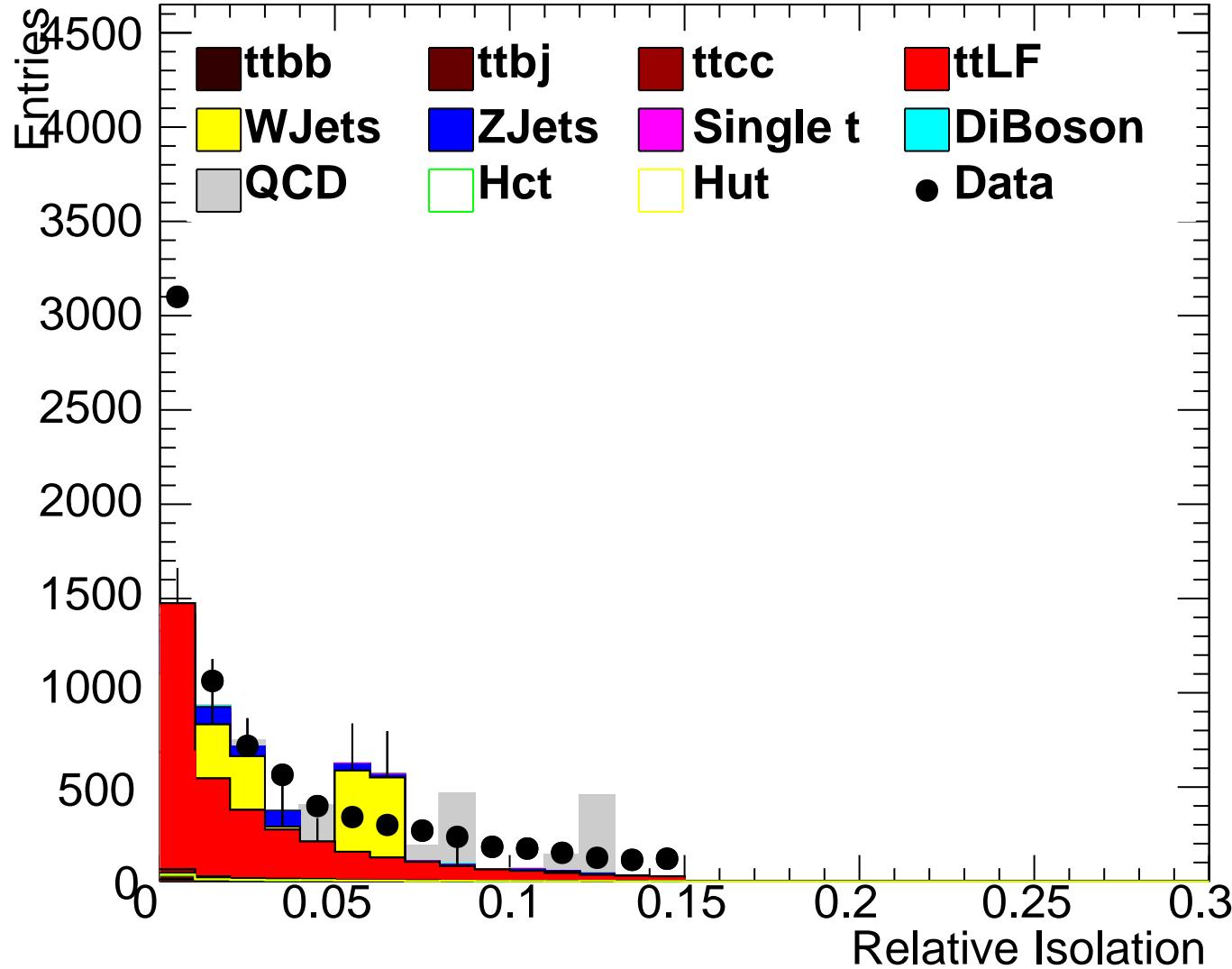
200

0

ttbb  
WJets  
QCDttbj  
ZJets  
Hctttcc  
Single t  
HutttLF  
DiBoson  
Data

Relative Isolation

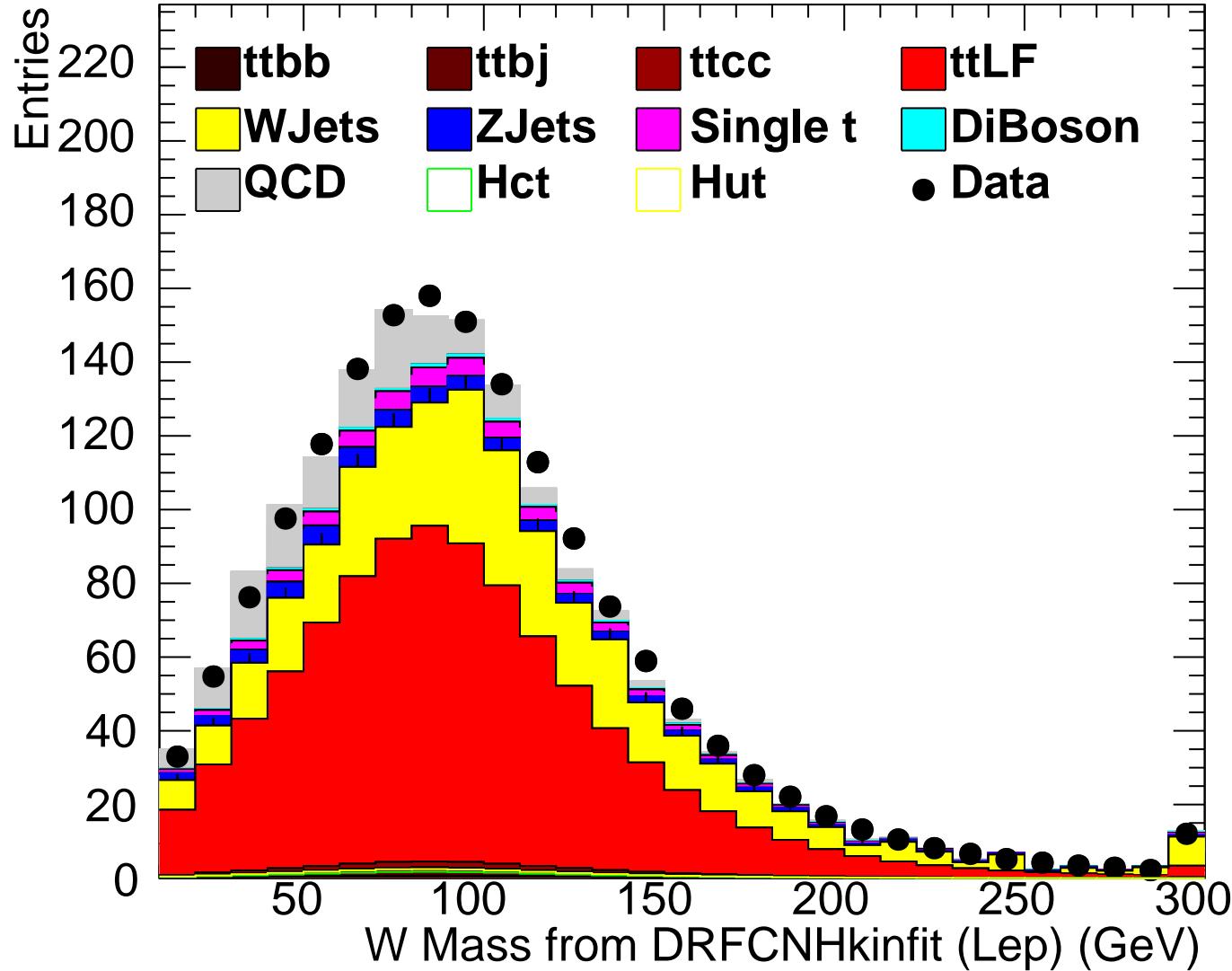
x 10<sup>3</sup>

**Ch0\_S6**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch0\_S6**

$\times 10^{-3}$

CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$



**Ch0\_S6**

$\times 10^{-3}$

CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$

Entries

250

200

150

100

50

0

**ttbb**    **ttbj**    **ttcc**    **ttLF**  
**WJets**    **ZJets**    **Single t**    **DiBoson**  
**QCD**    **Hct**    **Hut**

● Data

W Mass from DRFCN<sub>H</sub>kinfit (Had) (GeV)

50

100

150

200

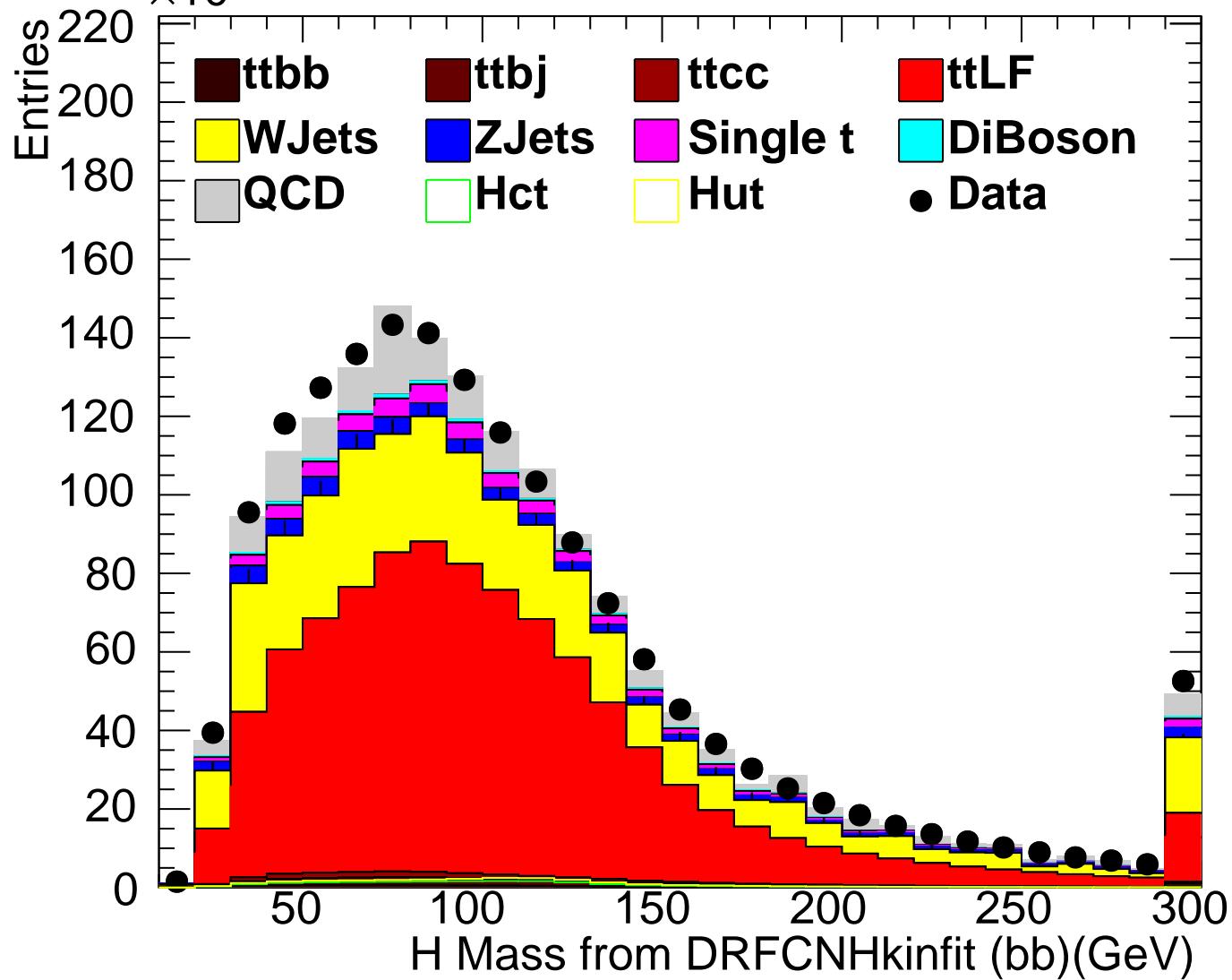
250

300

**Ch0\_S6**

$\times 10^3$

CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$



**Ch0\_S6**

$\times 10^3$

CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$

Entries

120

100

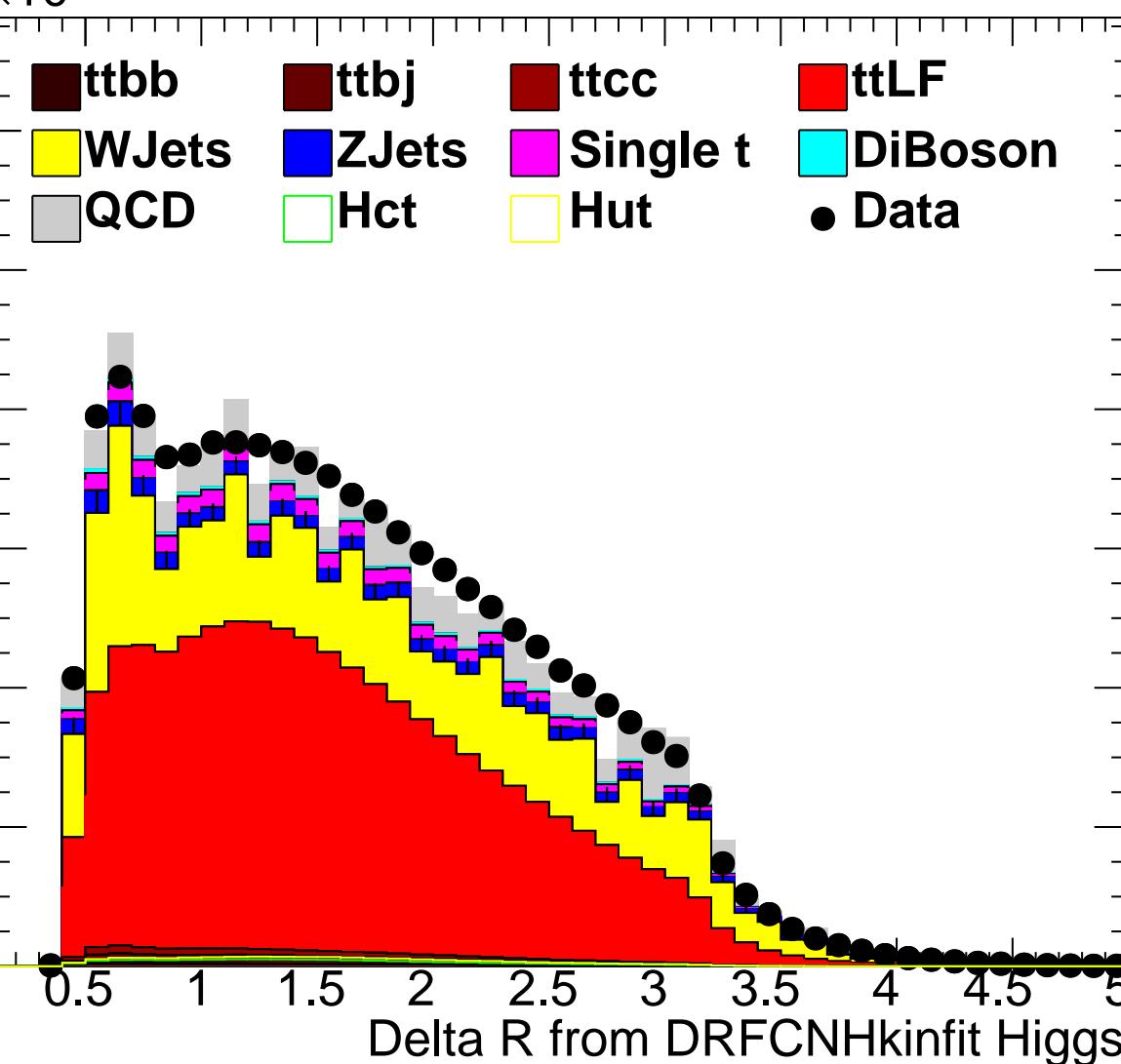
80

60

40

20

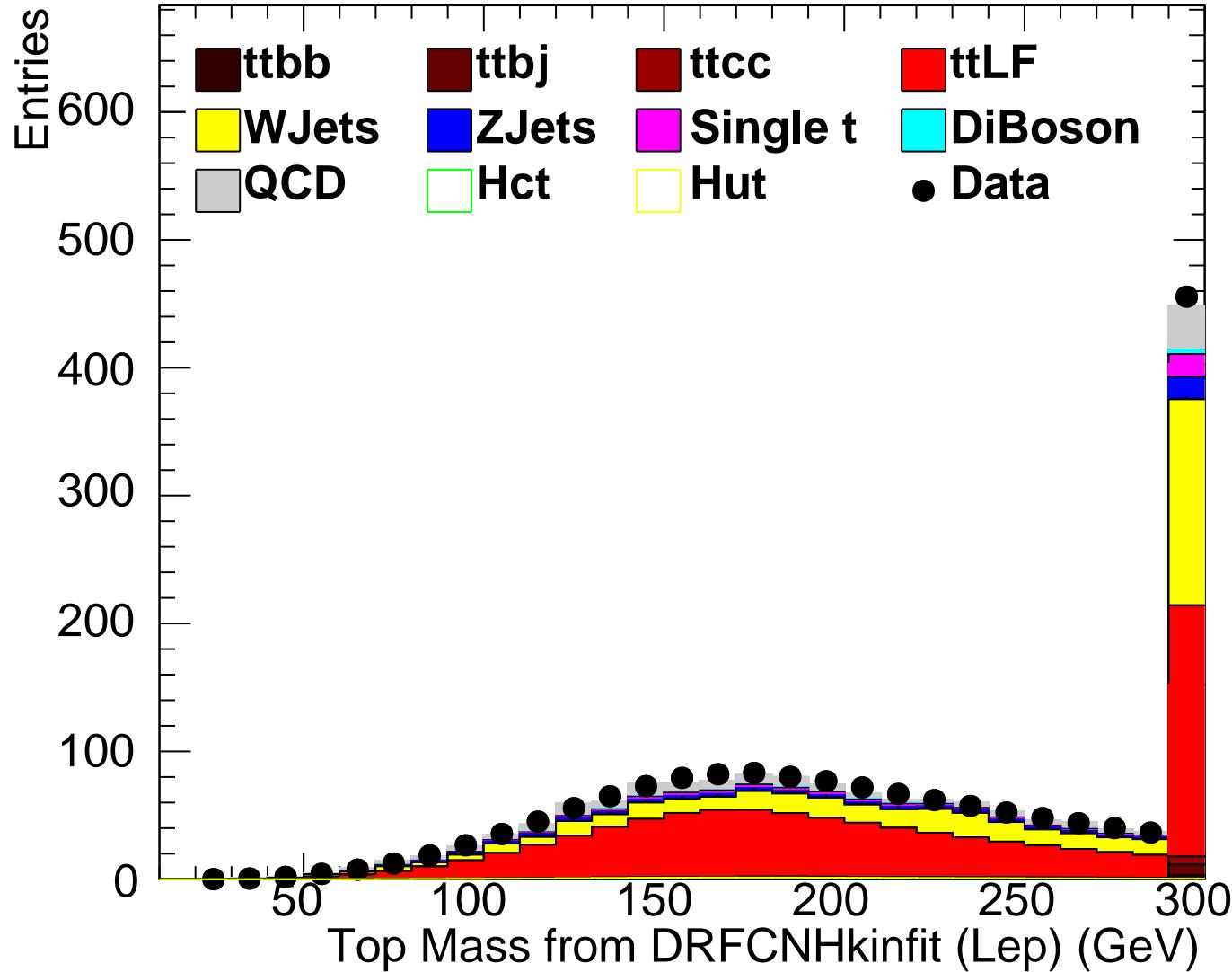
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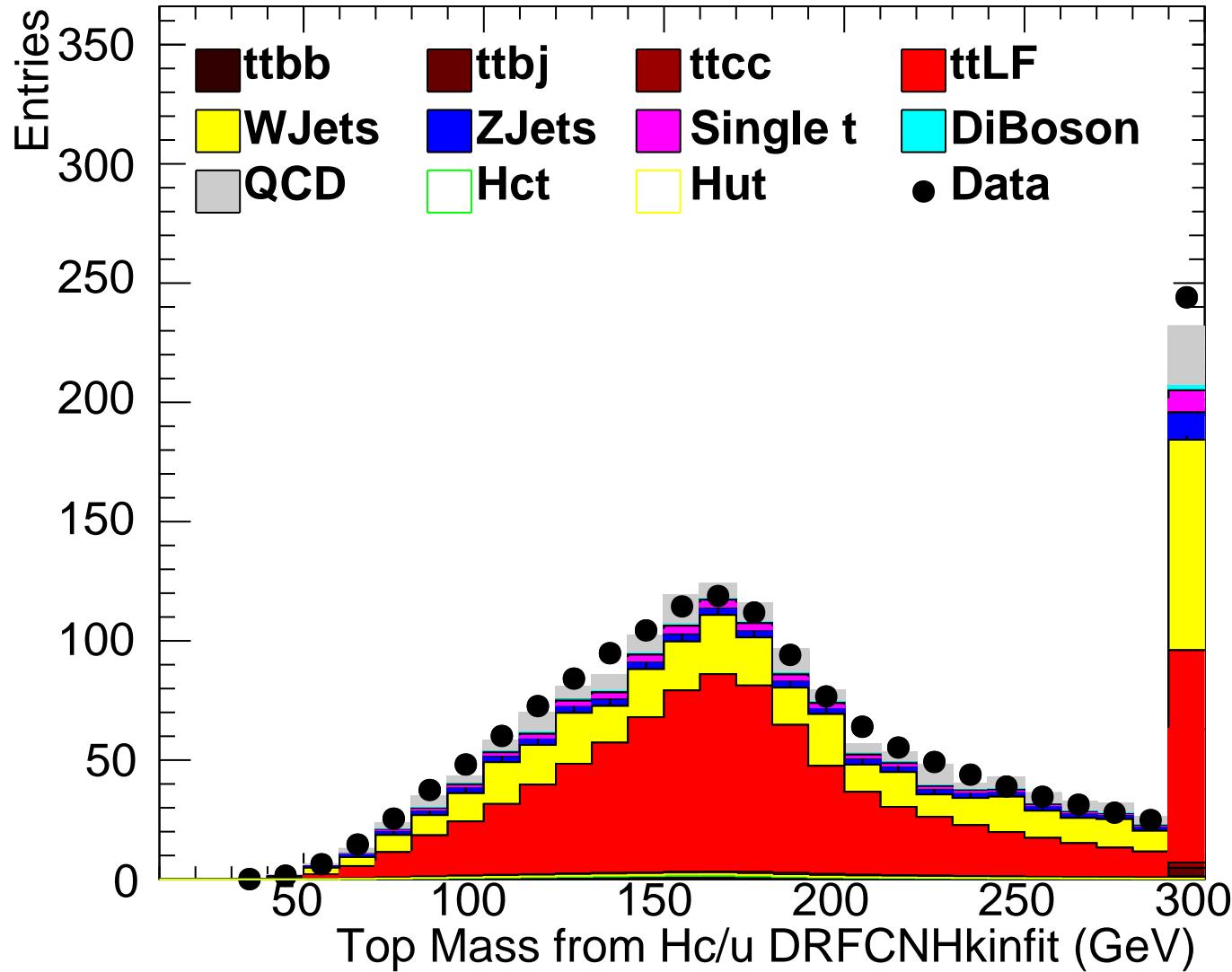


Ch0\_S6

3

CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$

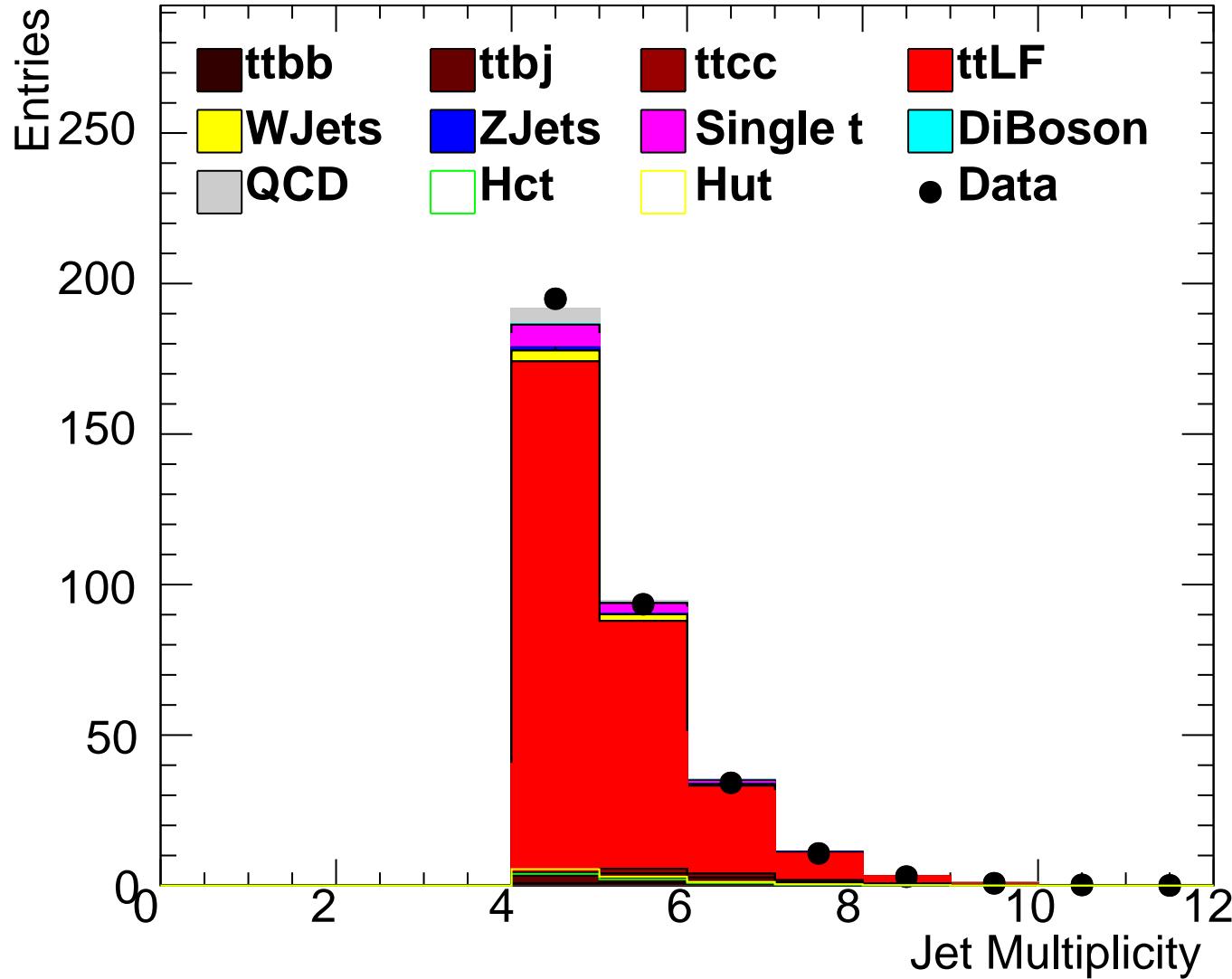


**Ch0\_S6**x 10<sup>3</sup>CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV

Ch0\_S7

3

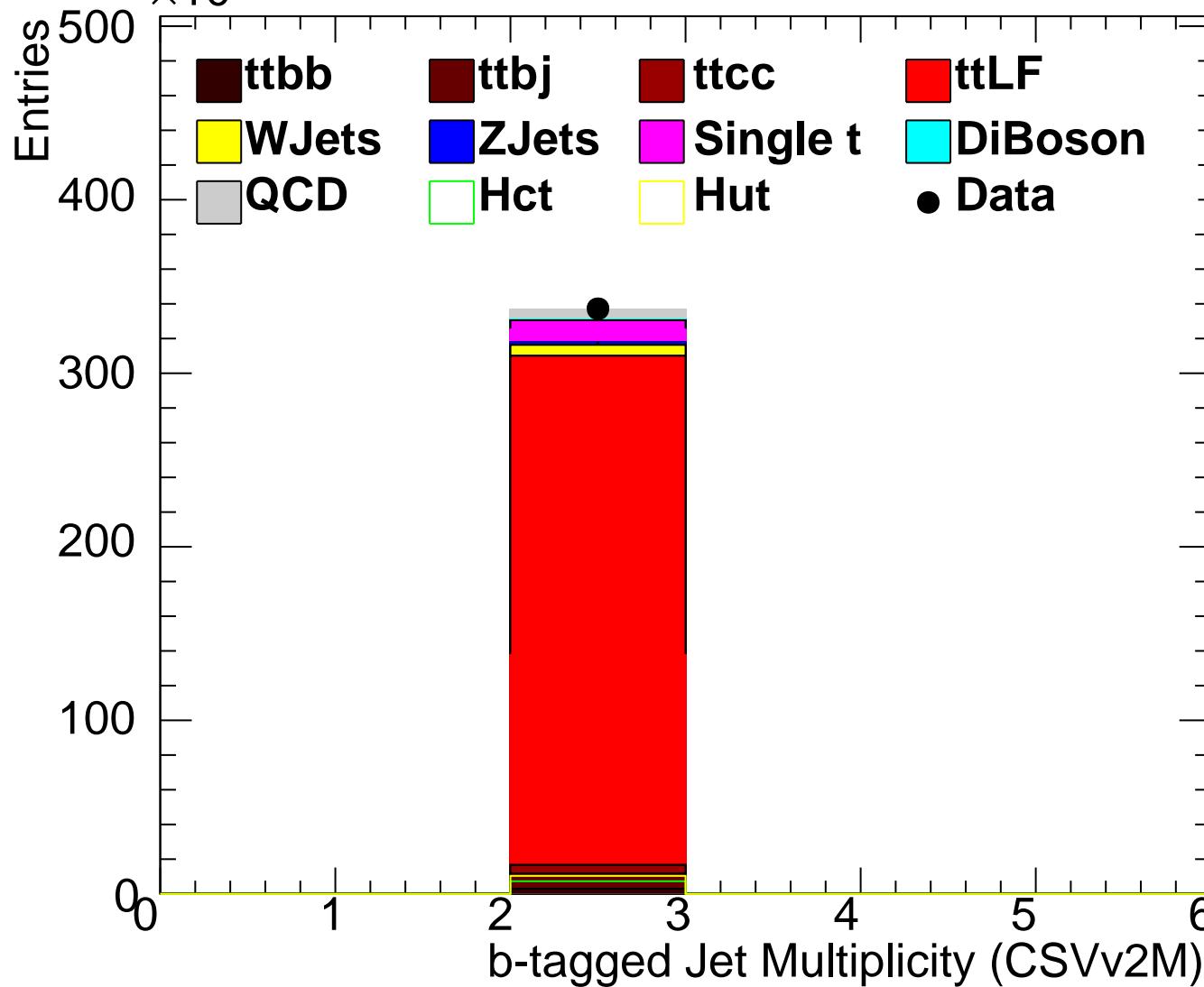
CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$

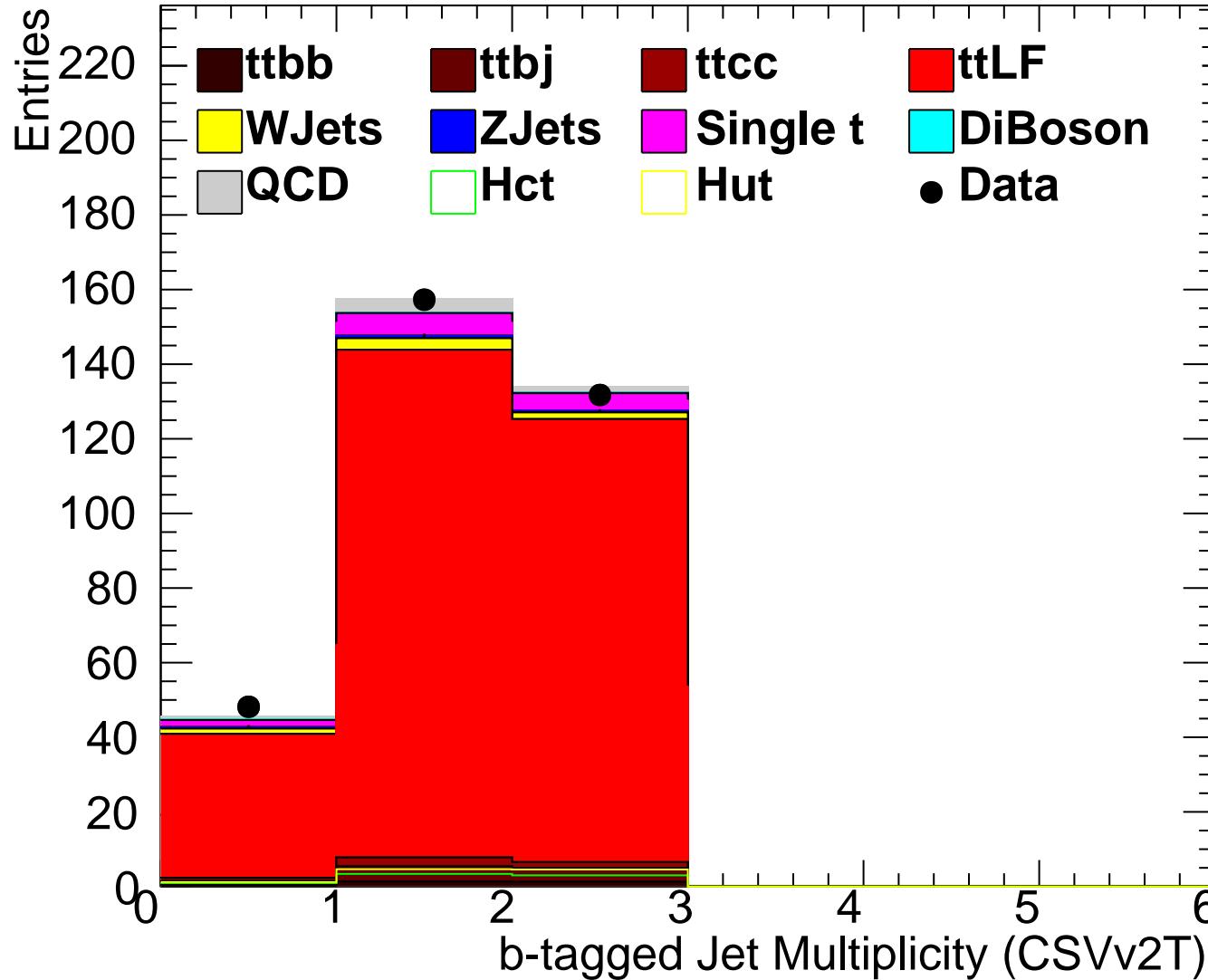


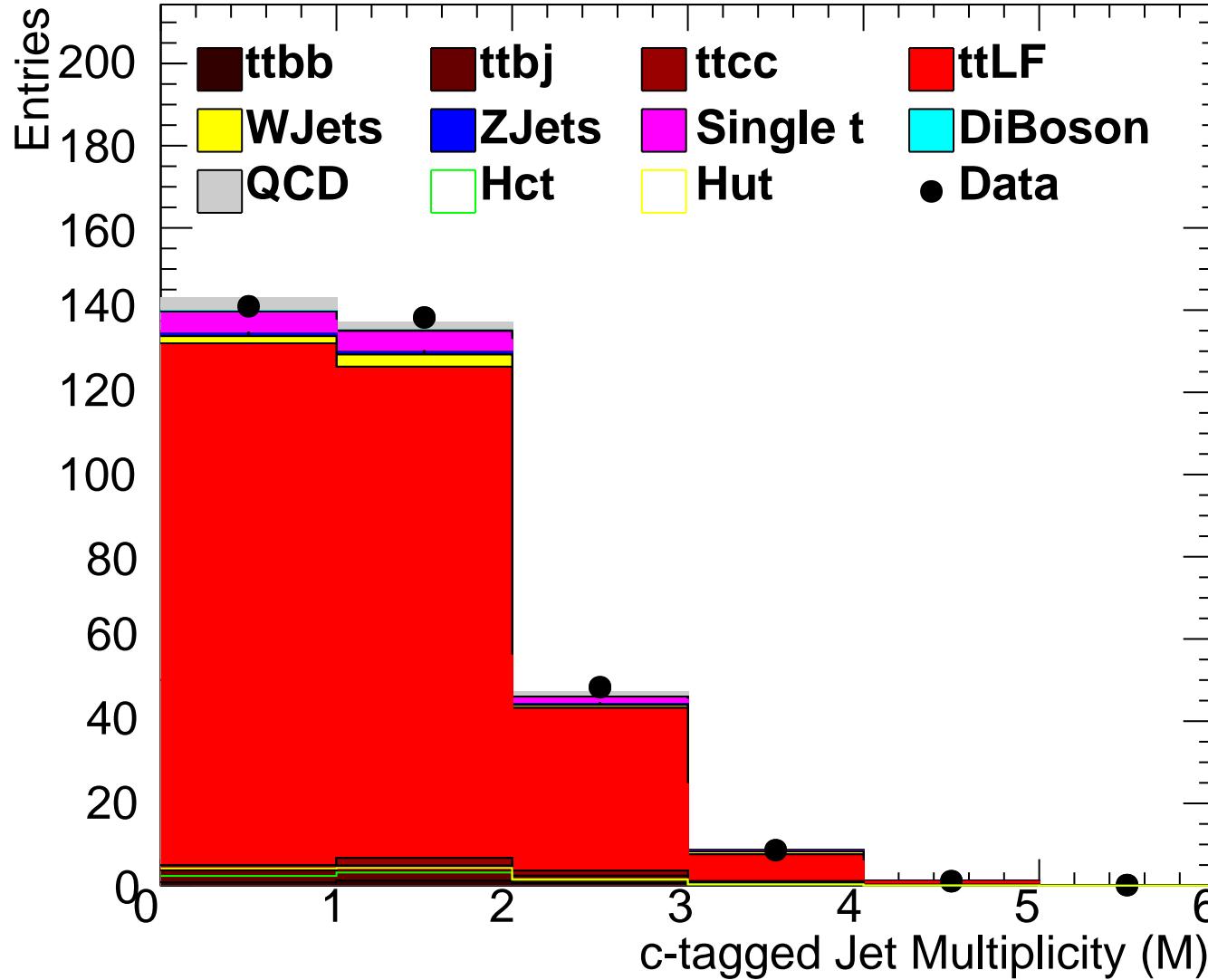
Ch0\_S7

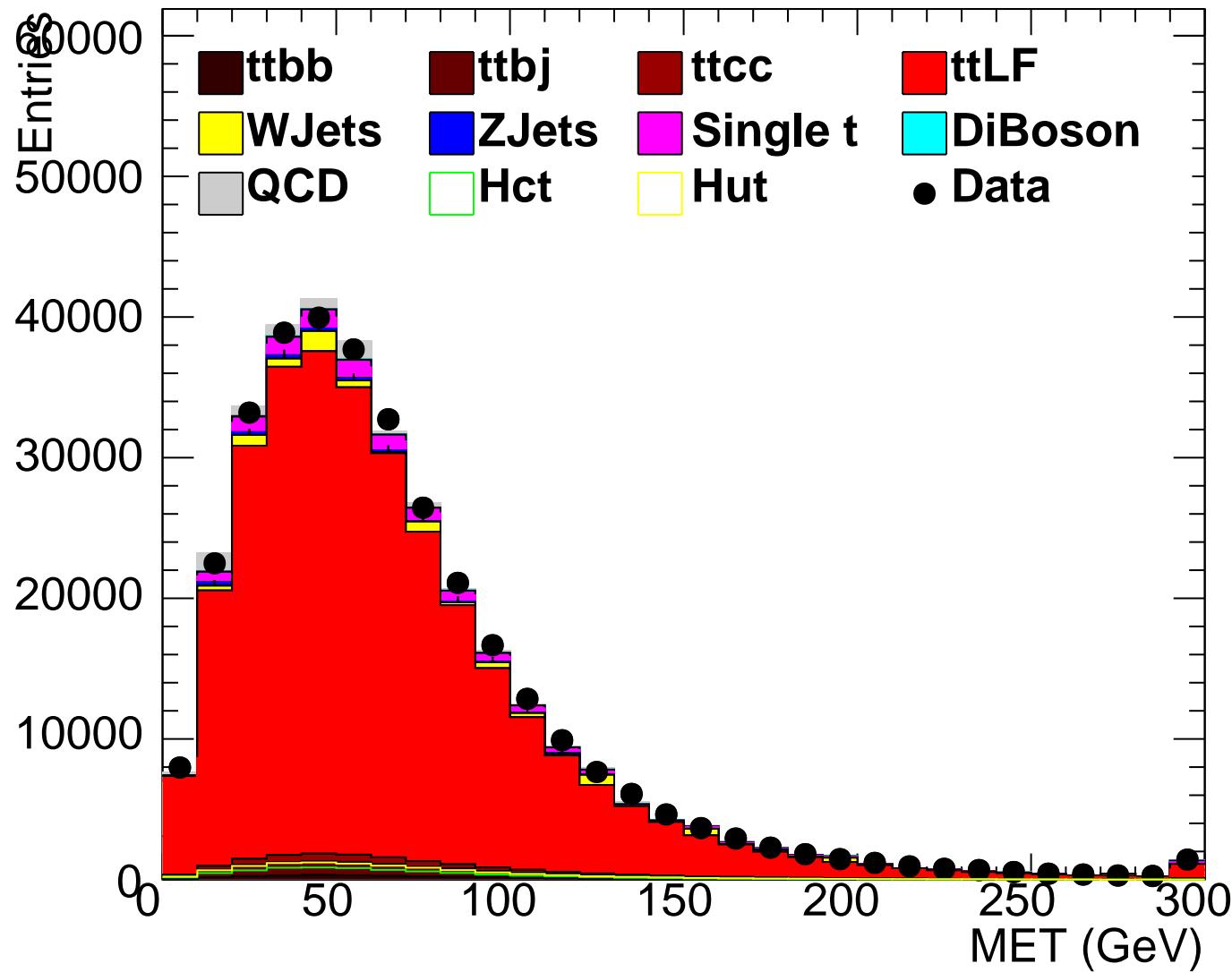
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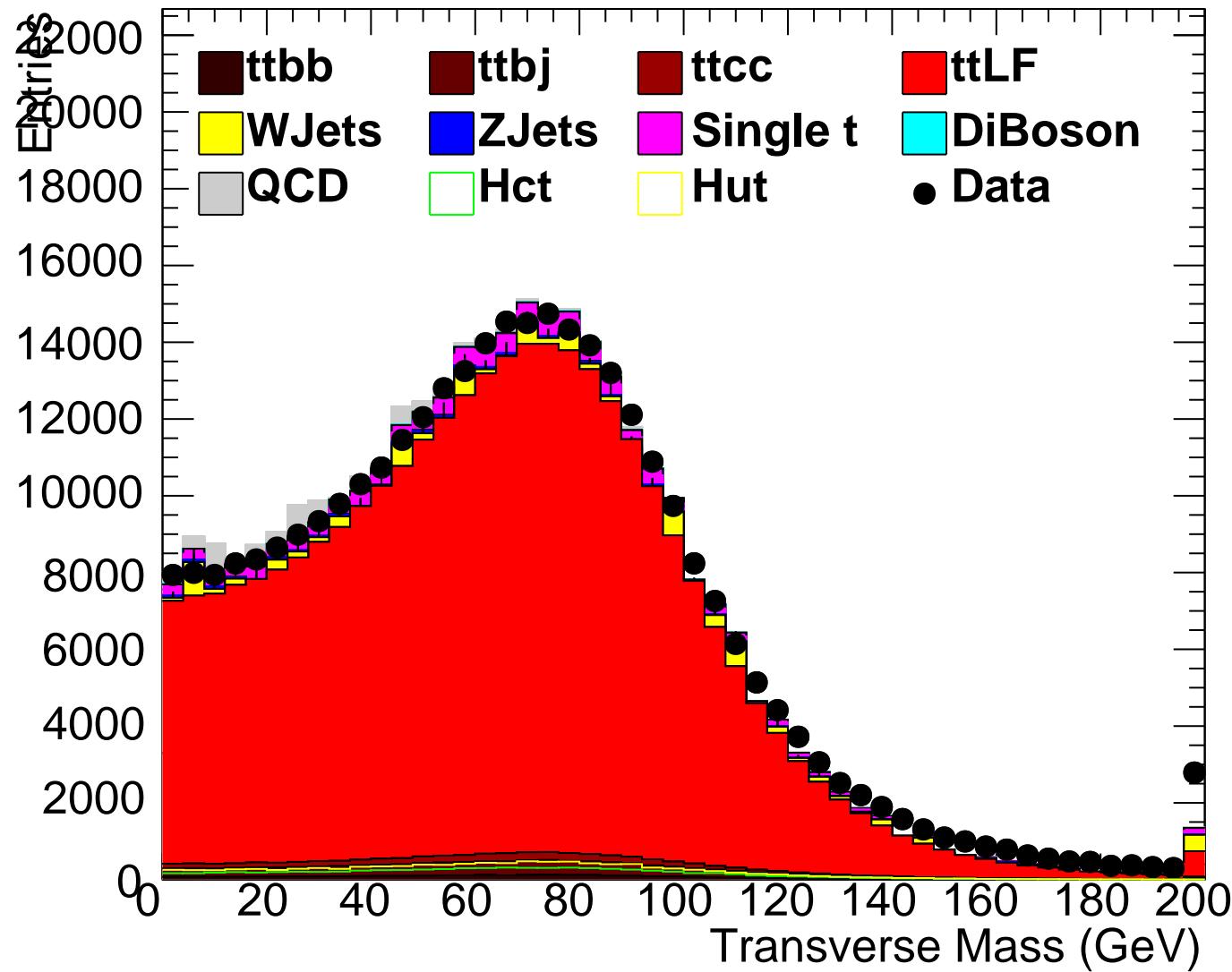
CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$

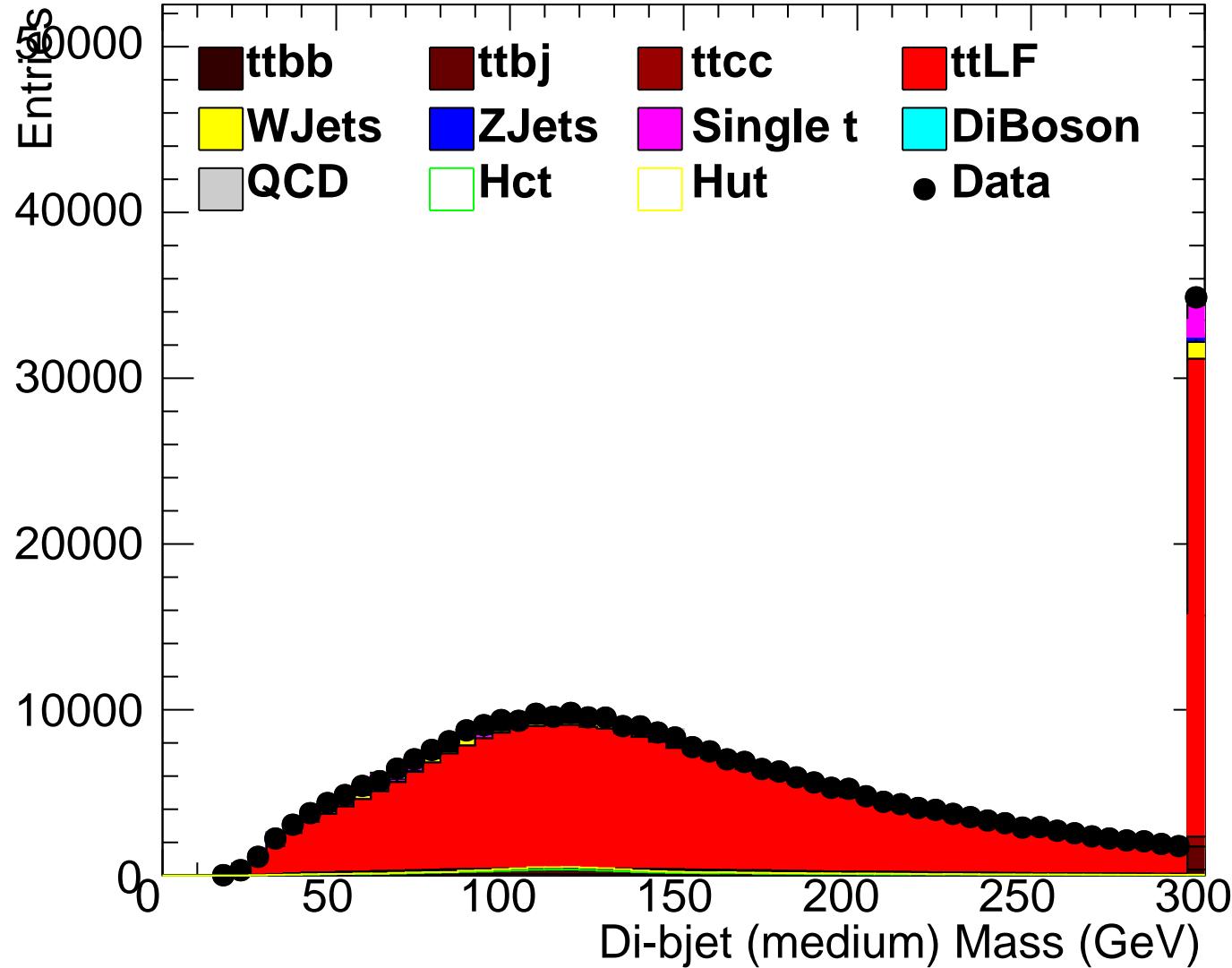


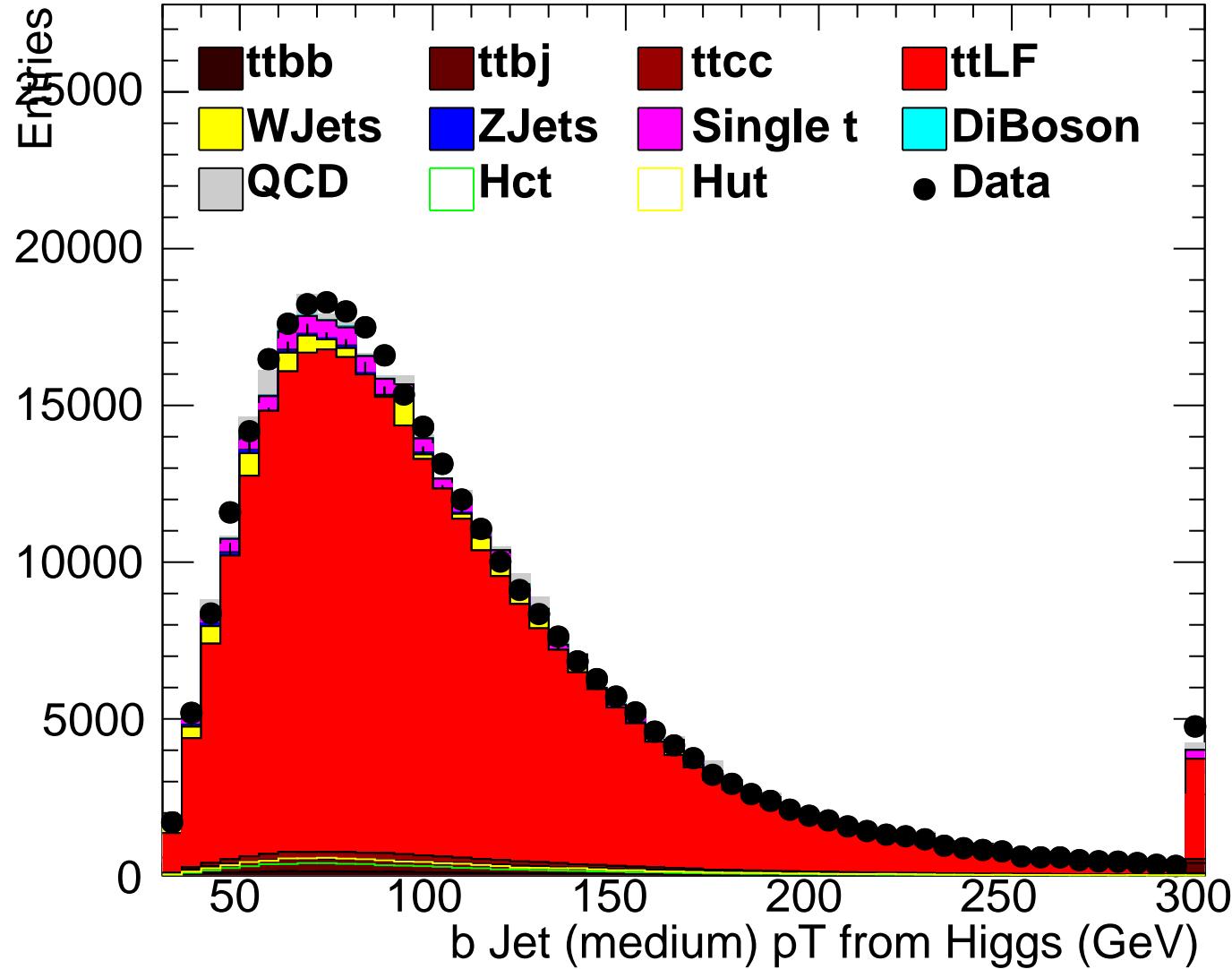


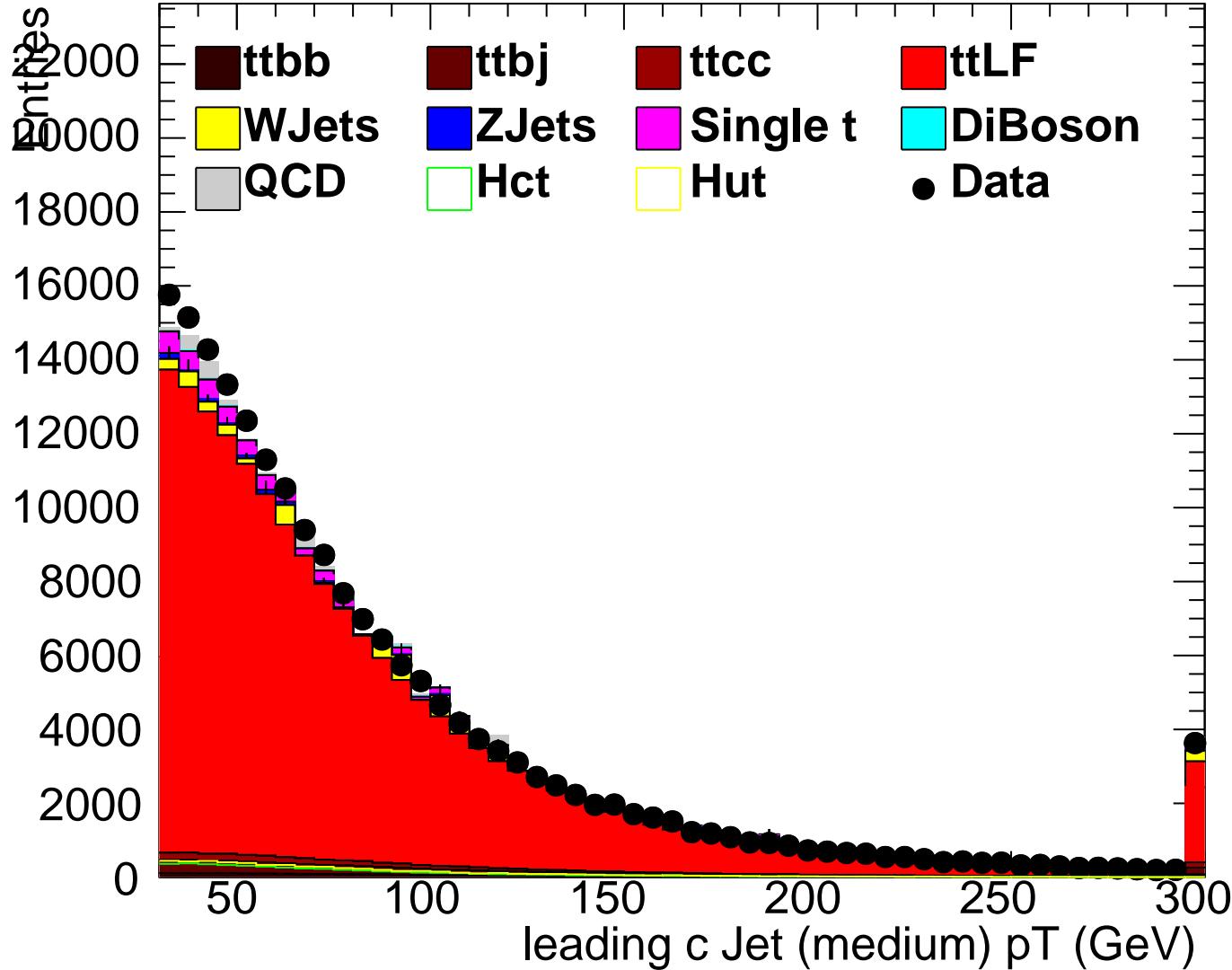
**Ch0\_S7**x 10<sup>3</sup>CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV

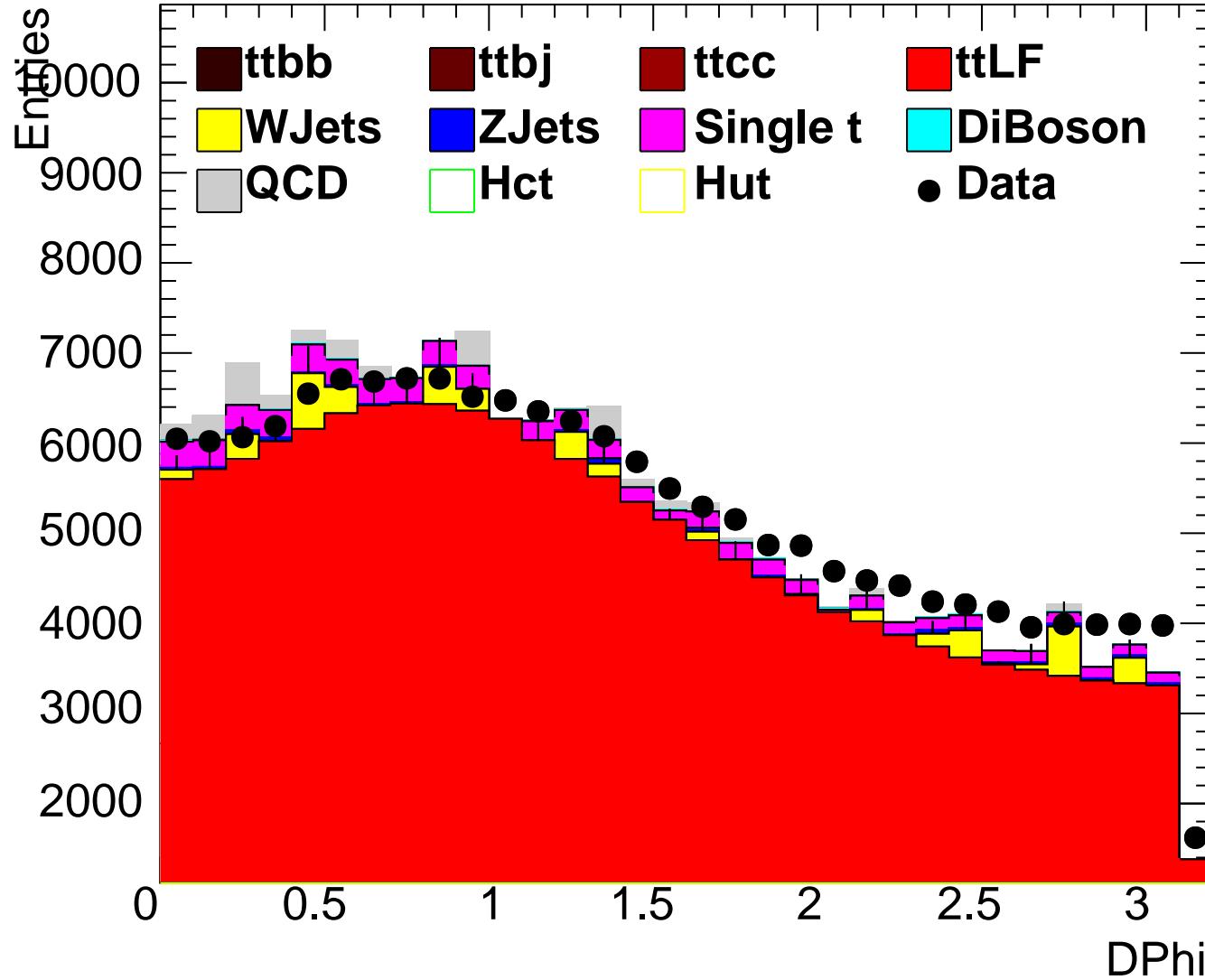


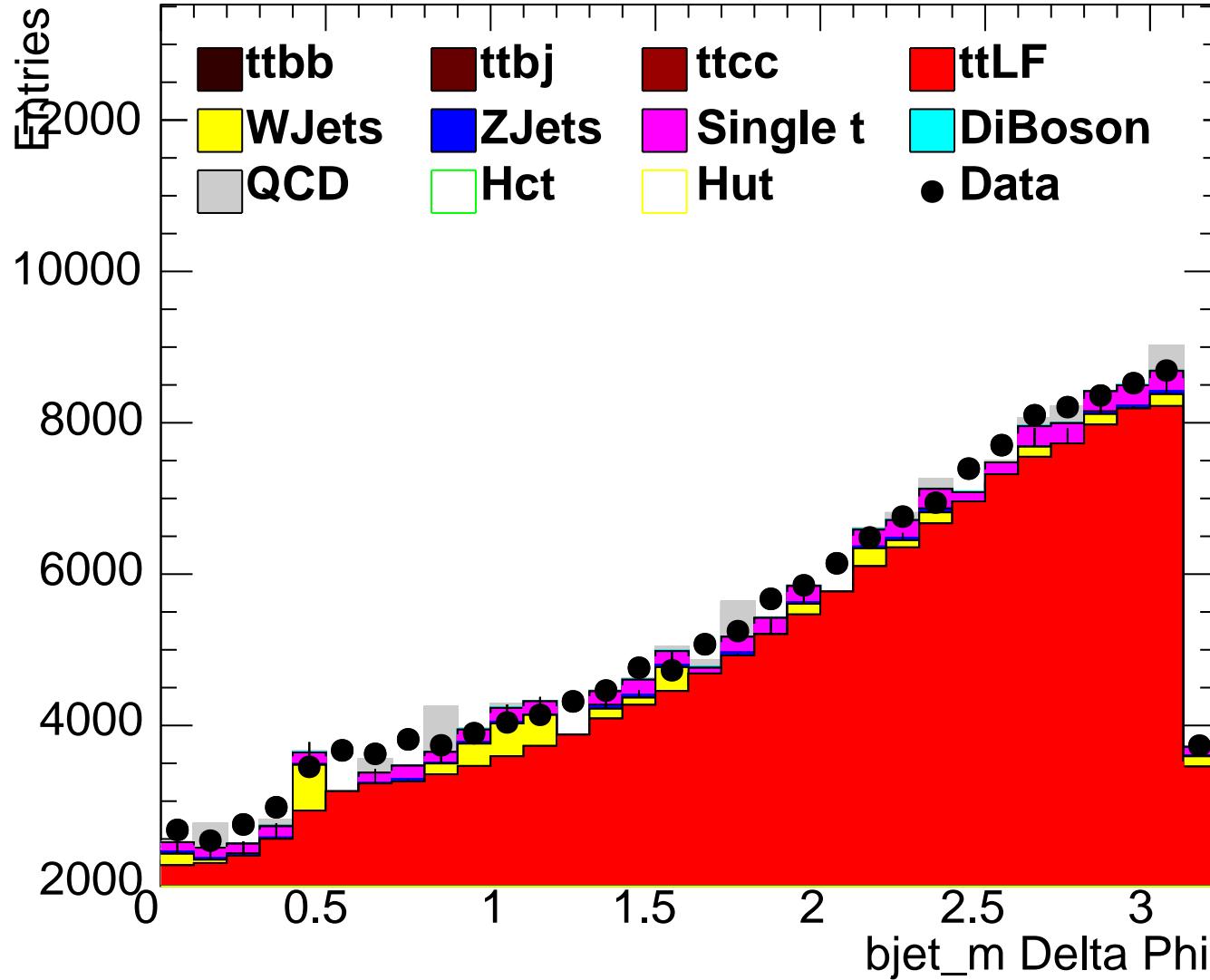
**Ch0\_S7**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

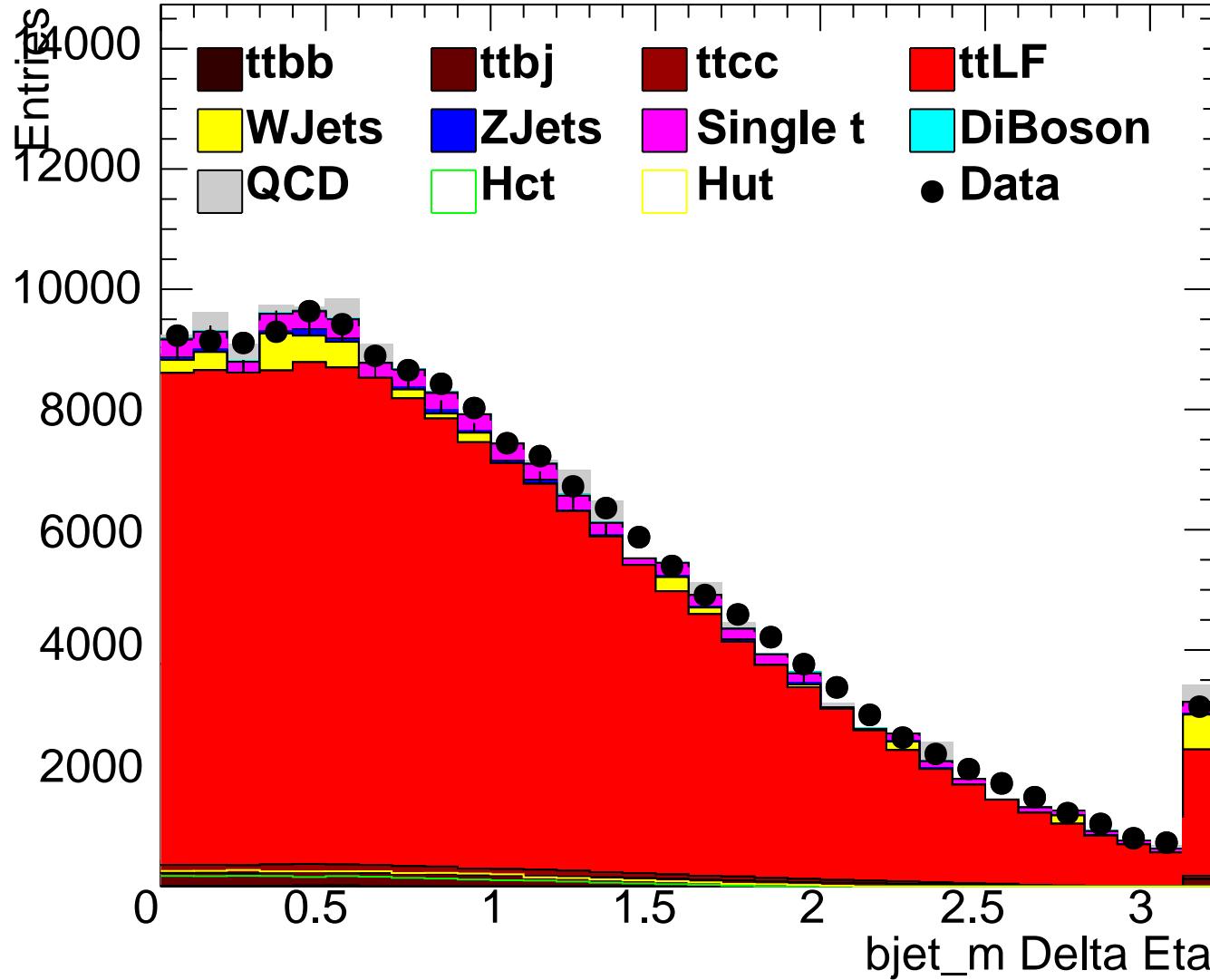
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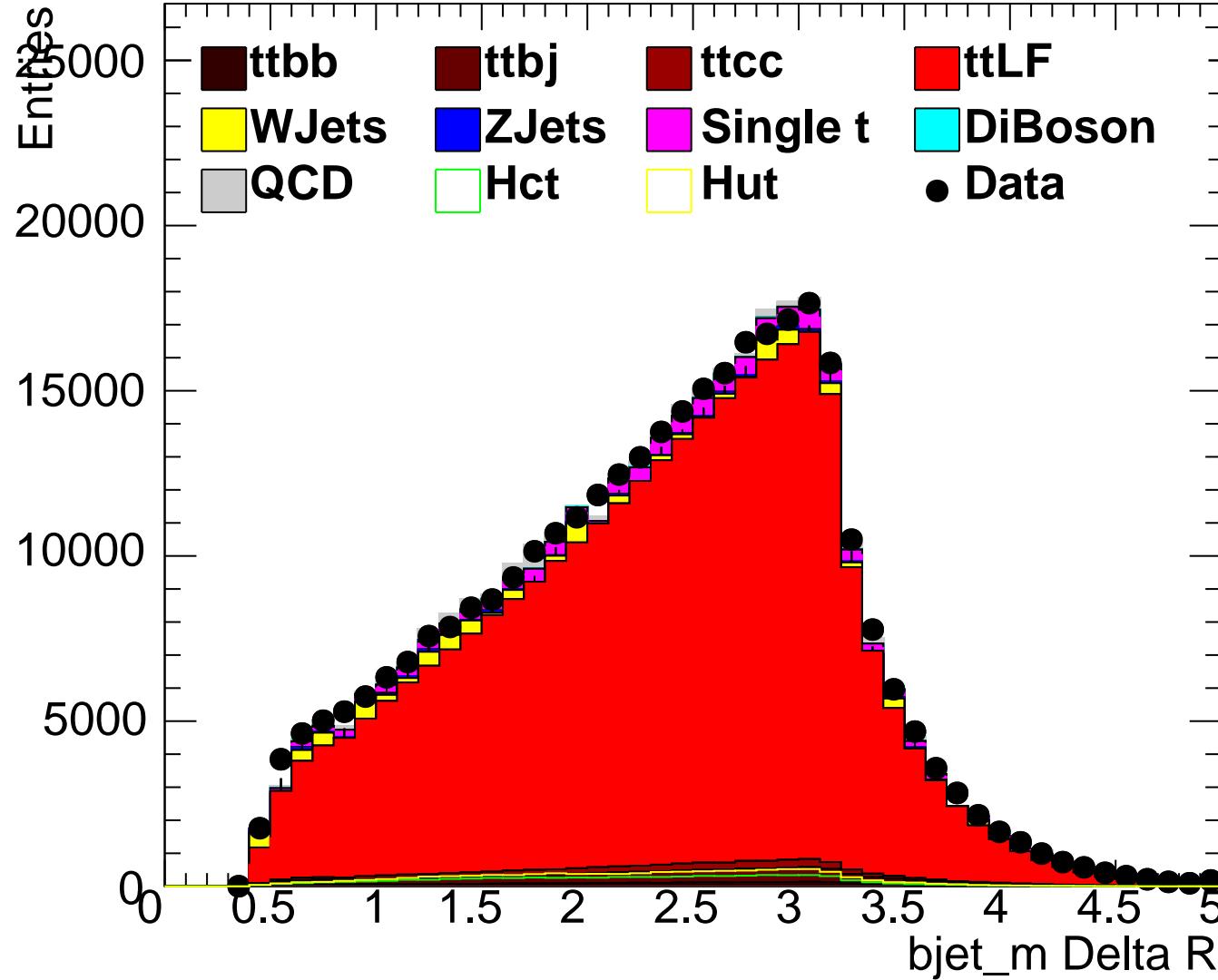
**Ch0\_S7**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch0\_S7**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch0\_S7**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

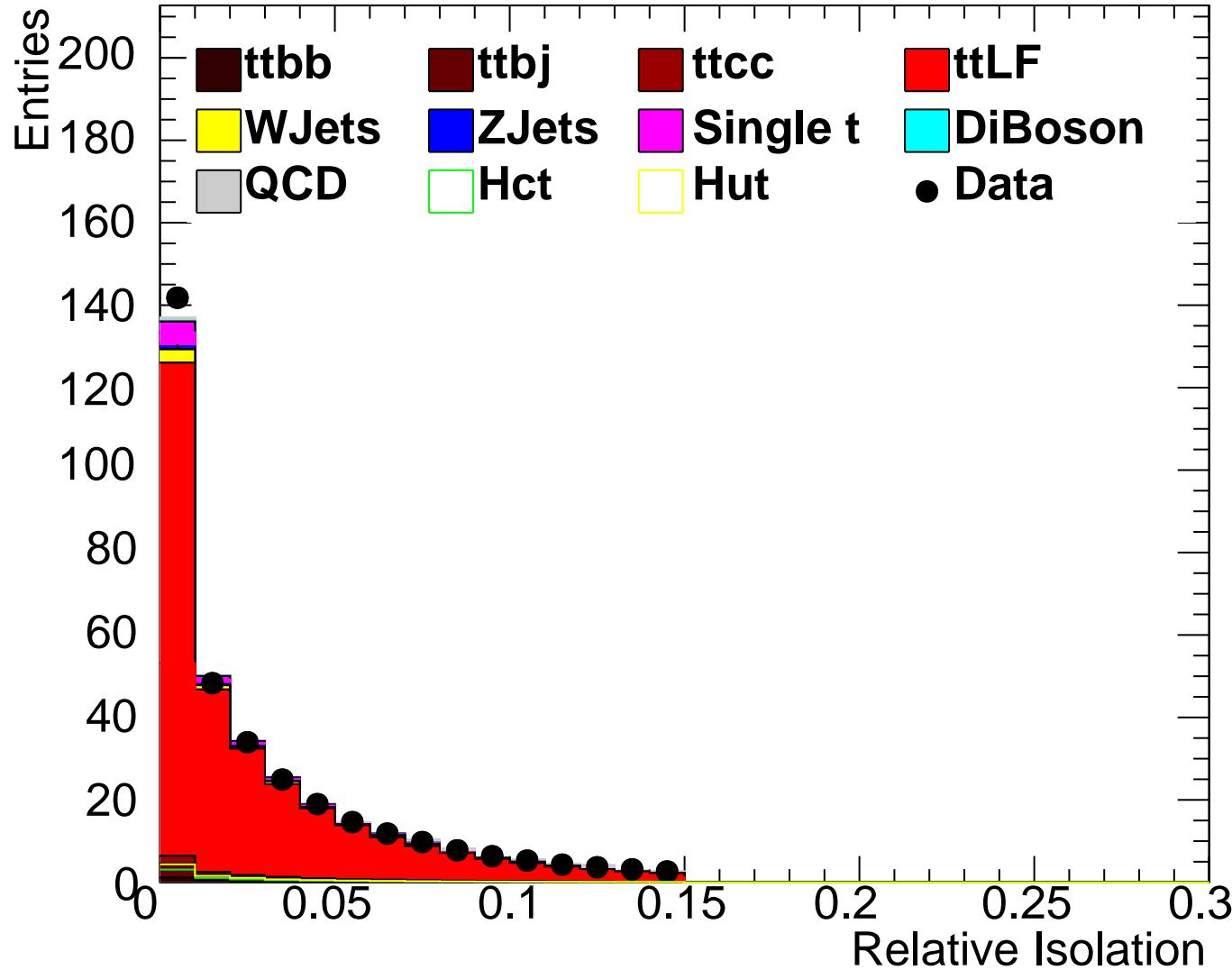
**Ch0\_S7**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

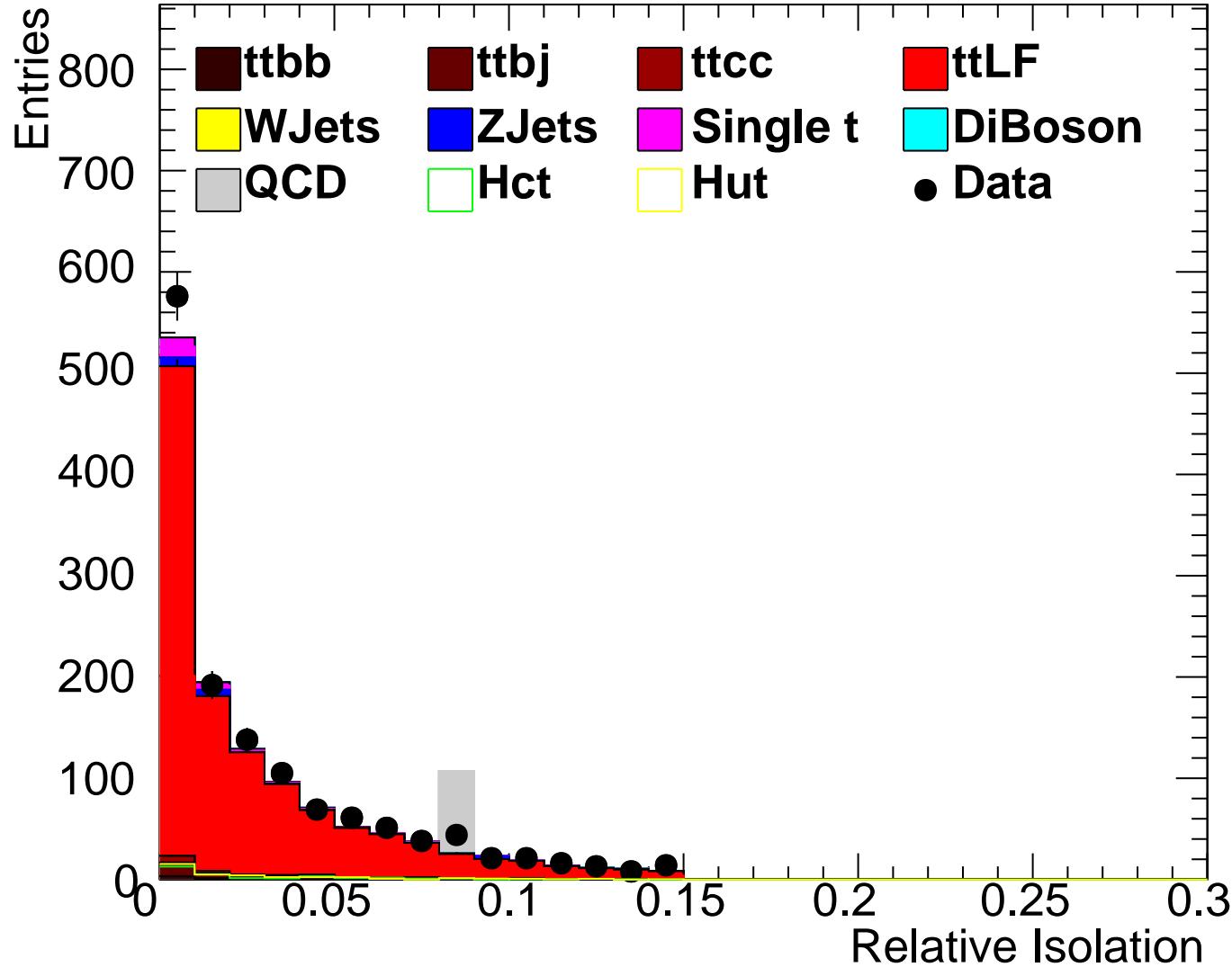


**Ch0\_S7**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

Ch0\_S7

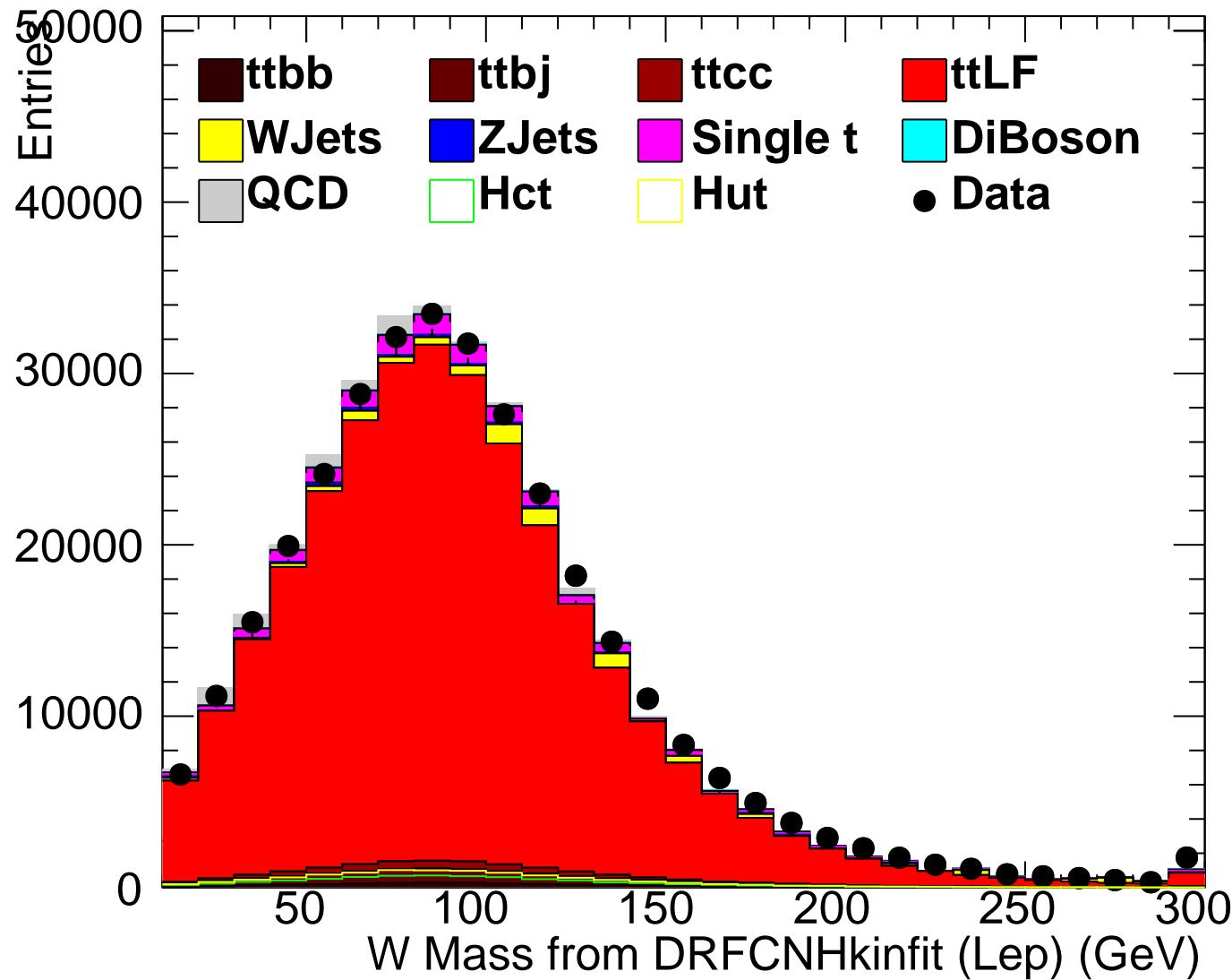
CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV

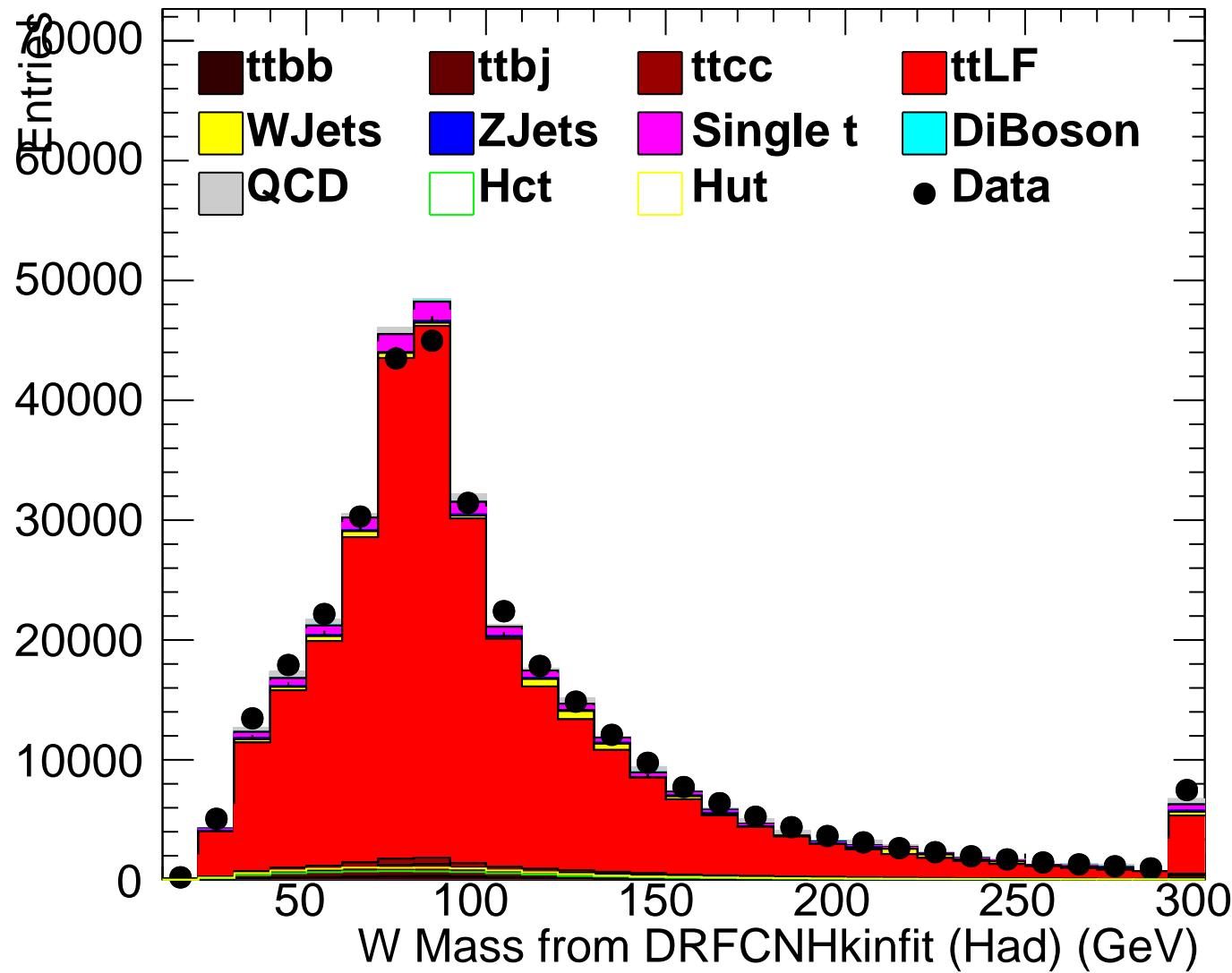


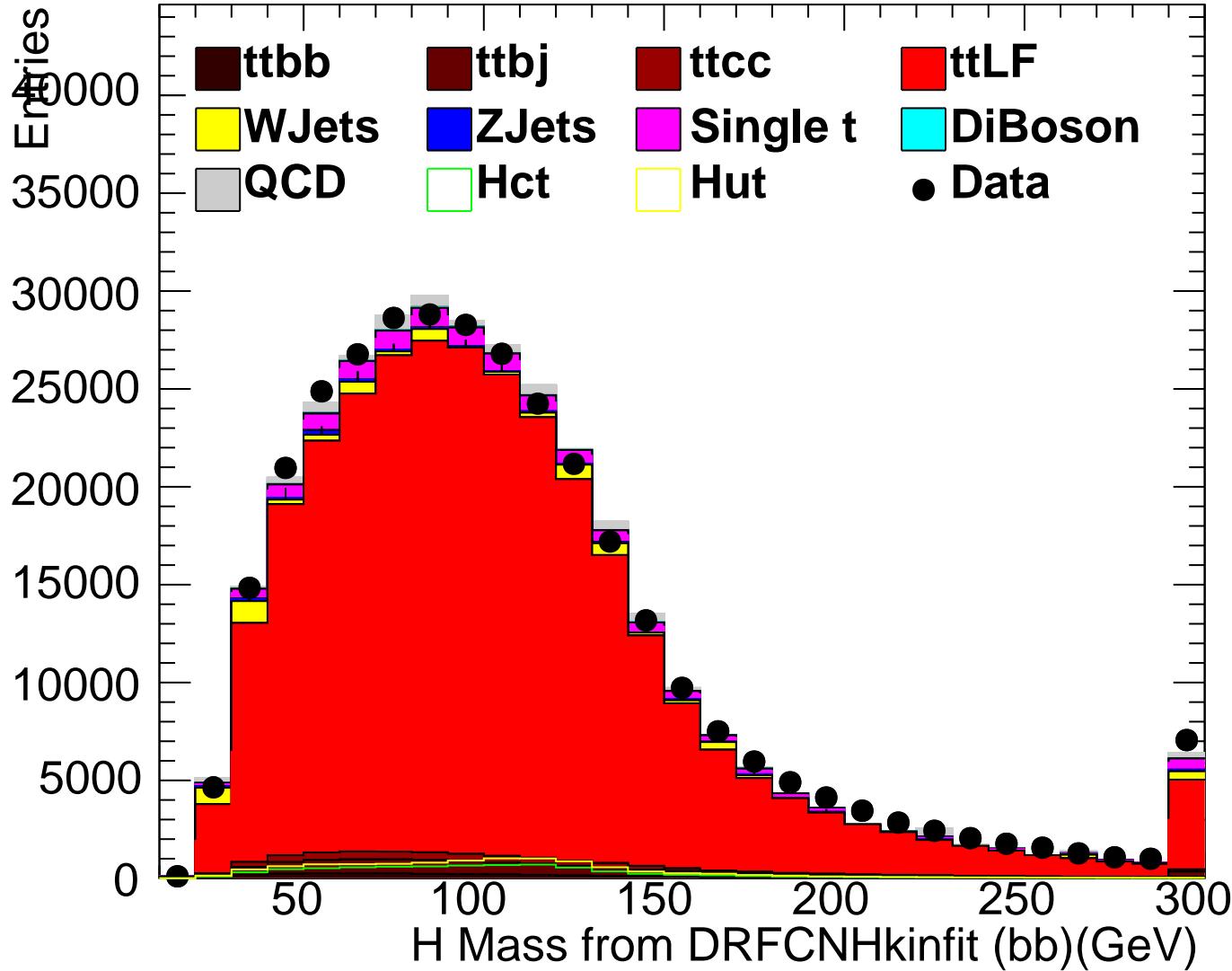
**Ch0\_S7**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

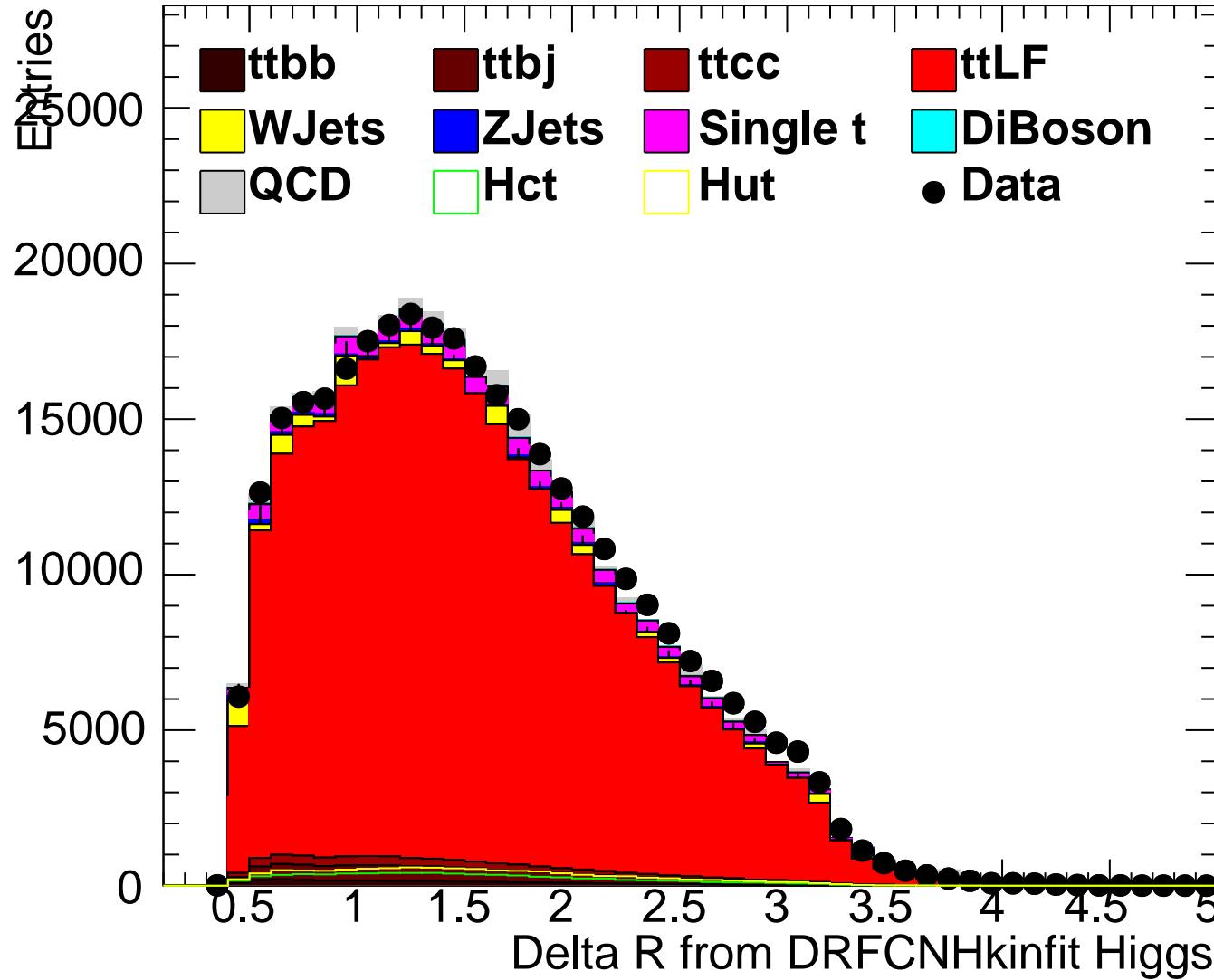
Ch0\_S7

CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$



**Ch0\_S7**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

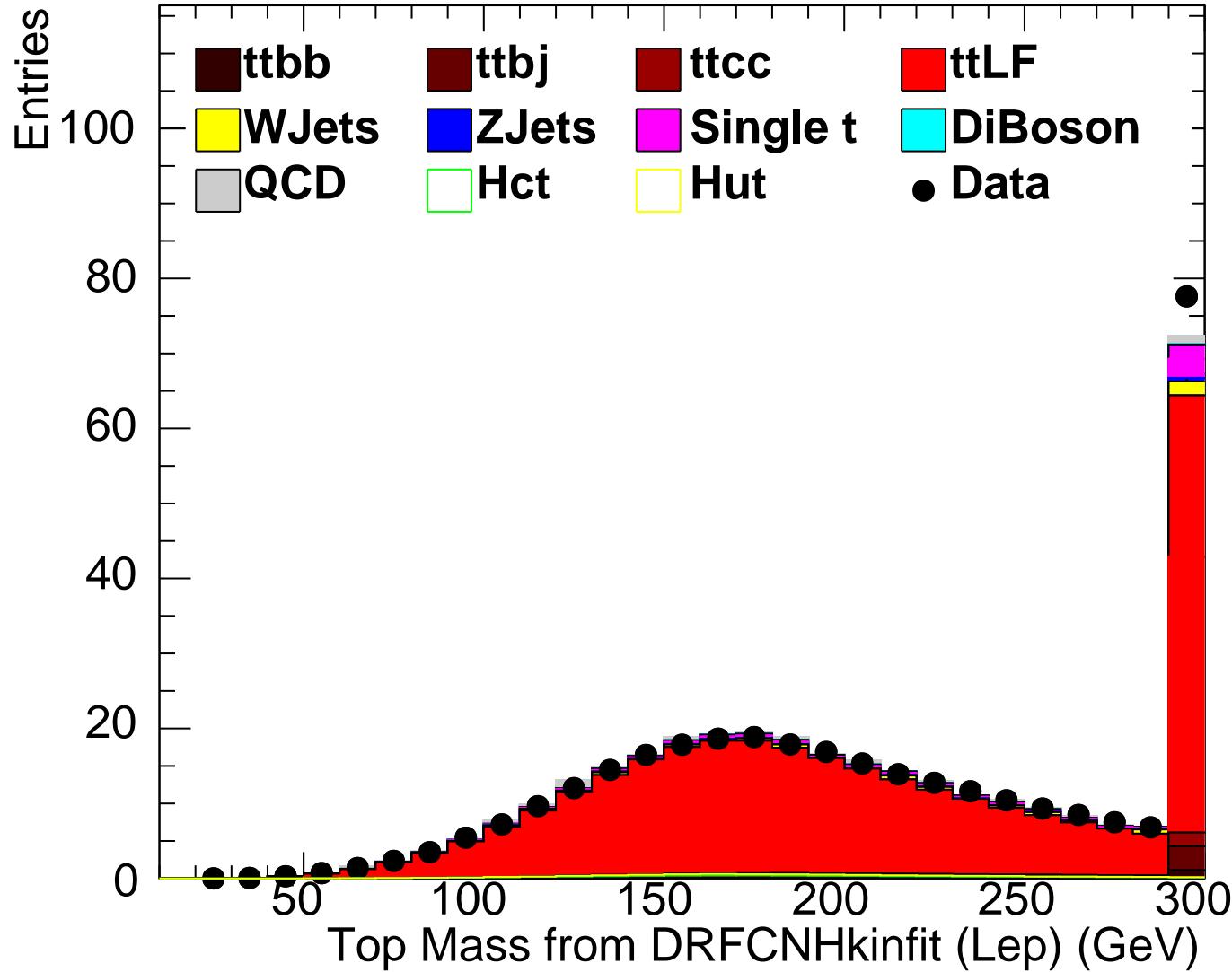
**Ch0\_S7**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

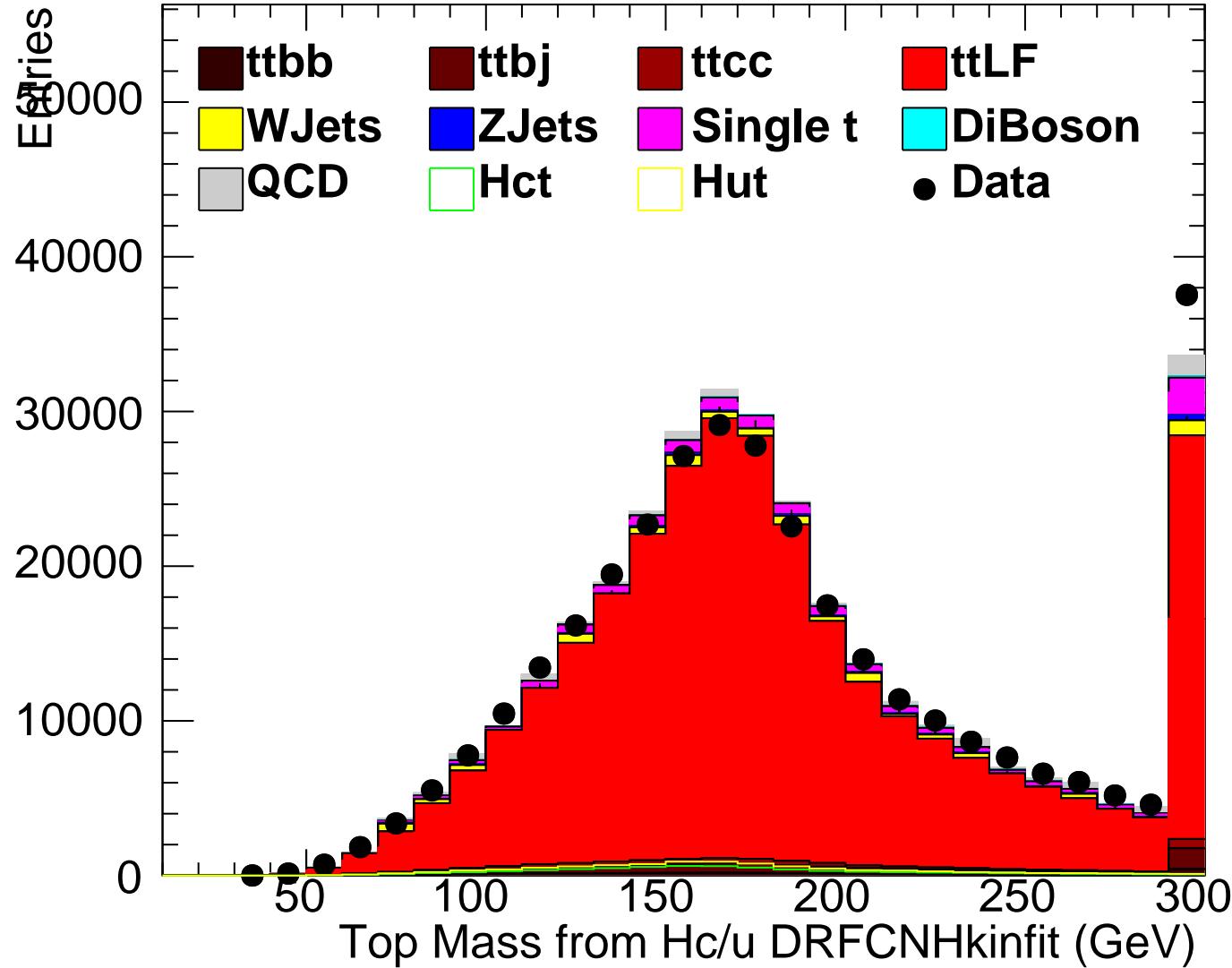
**Ch0\_S7**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

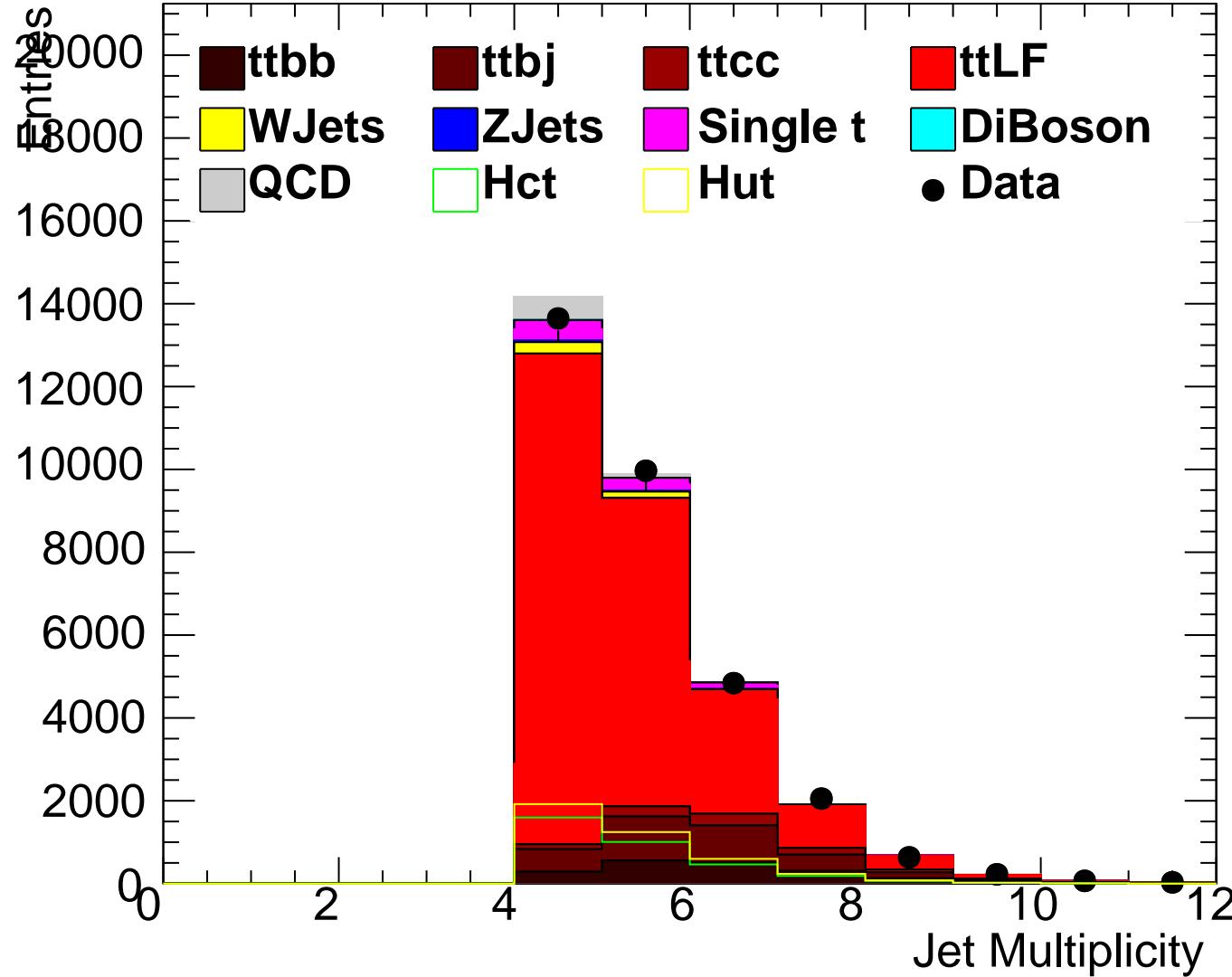
Ch0\_S7

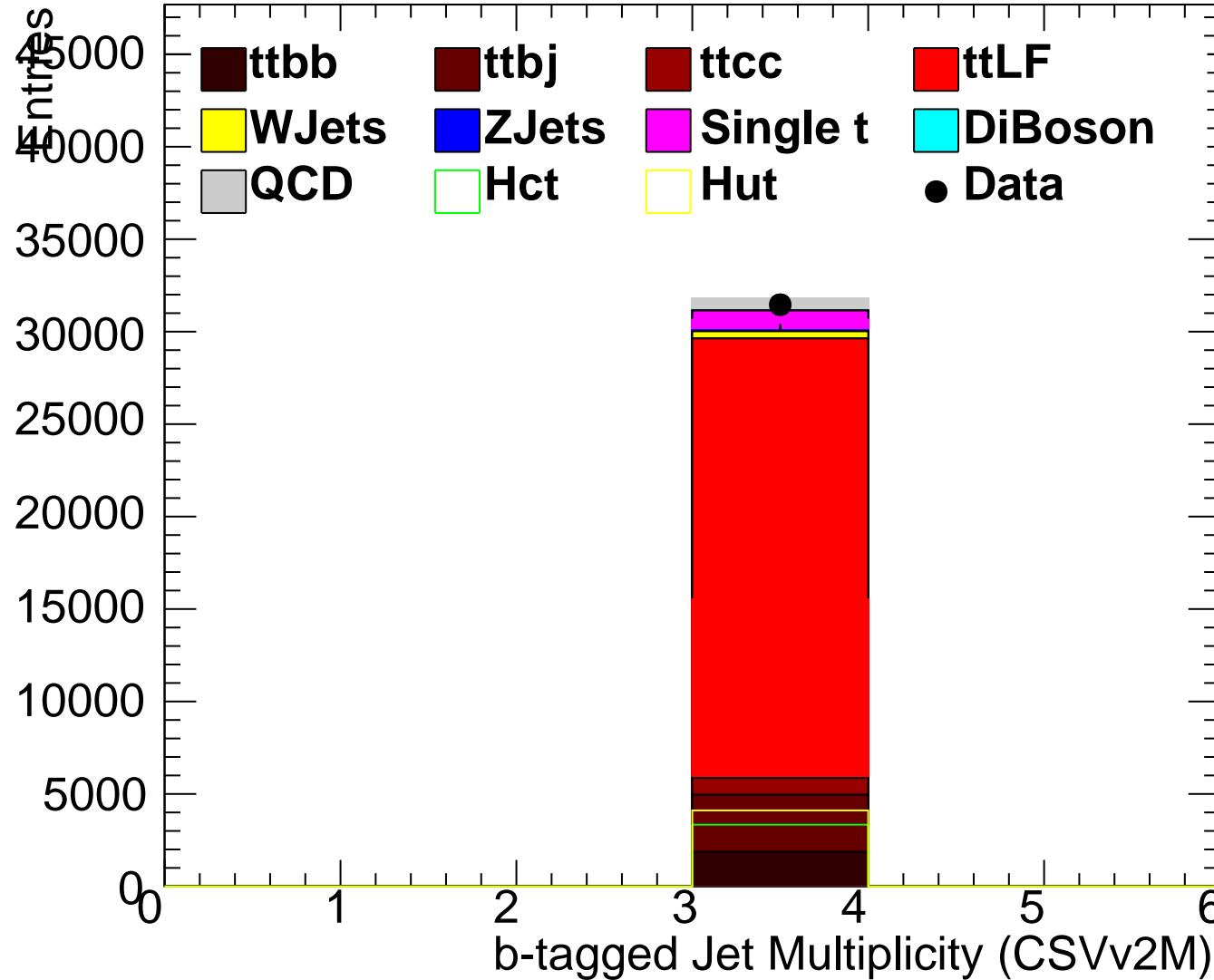
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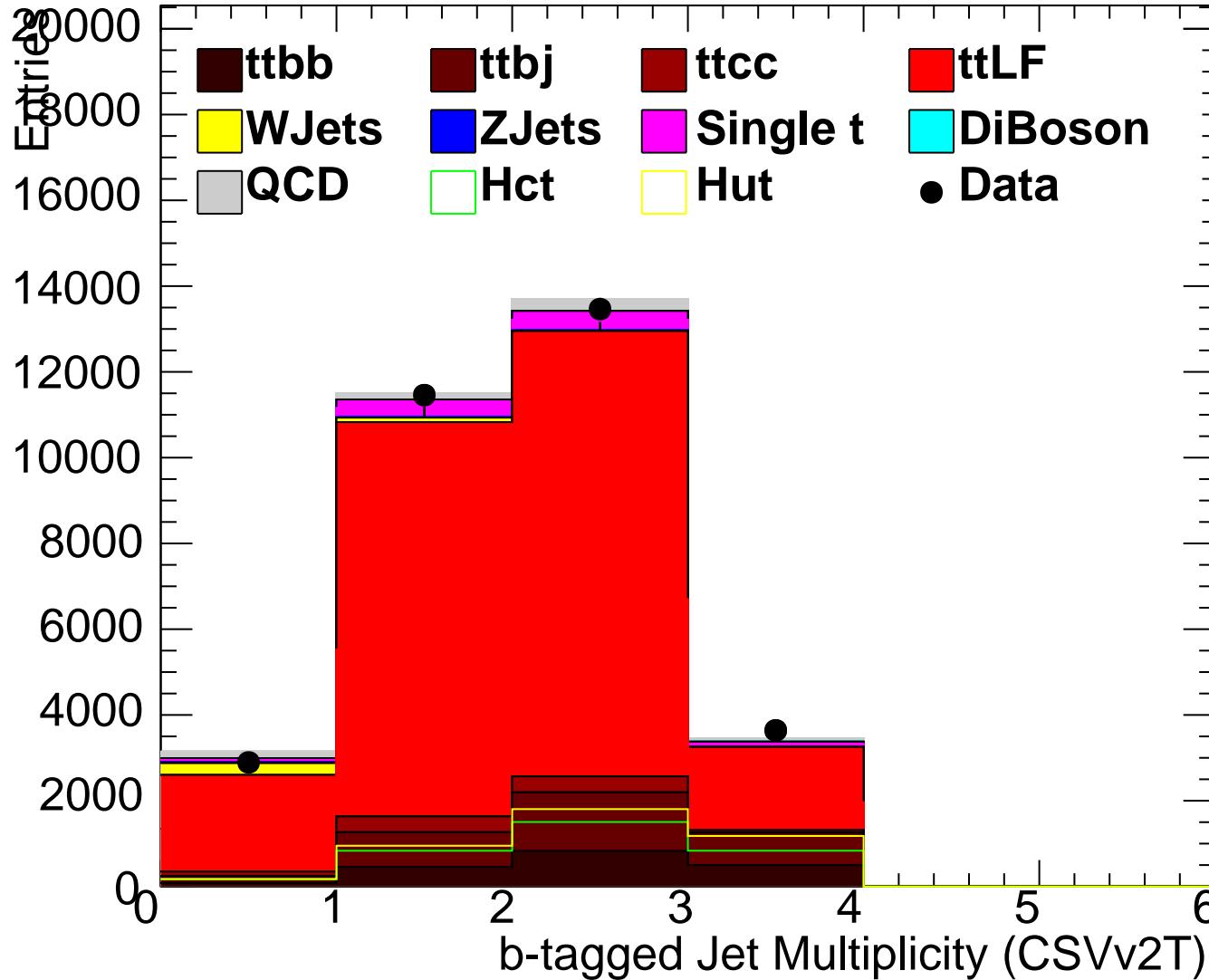
CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV

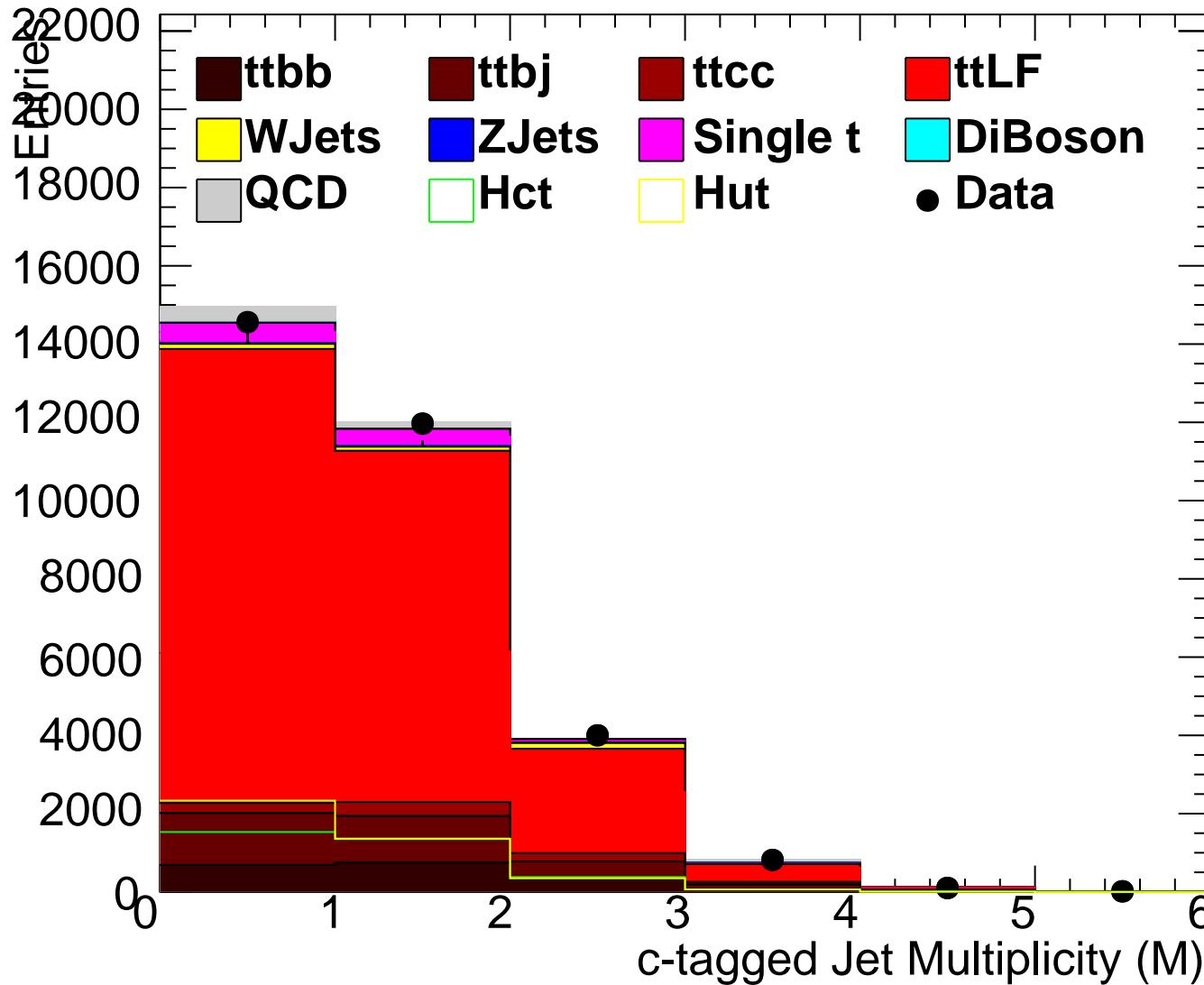


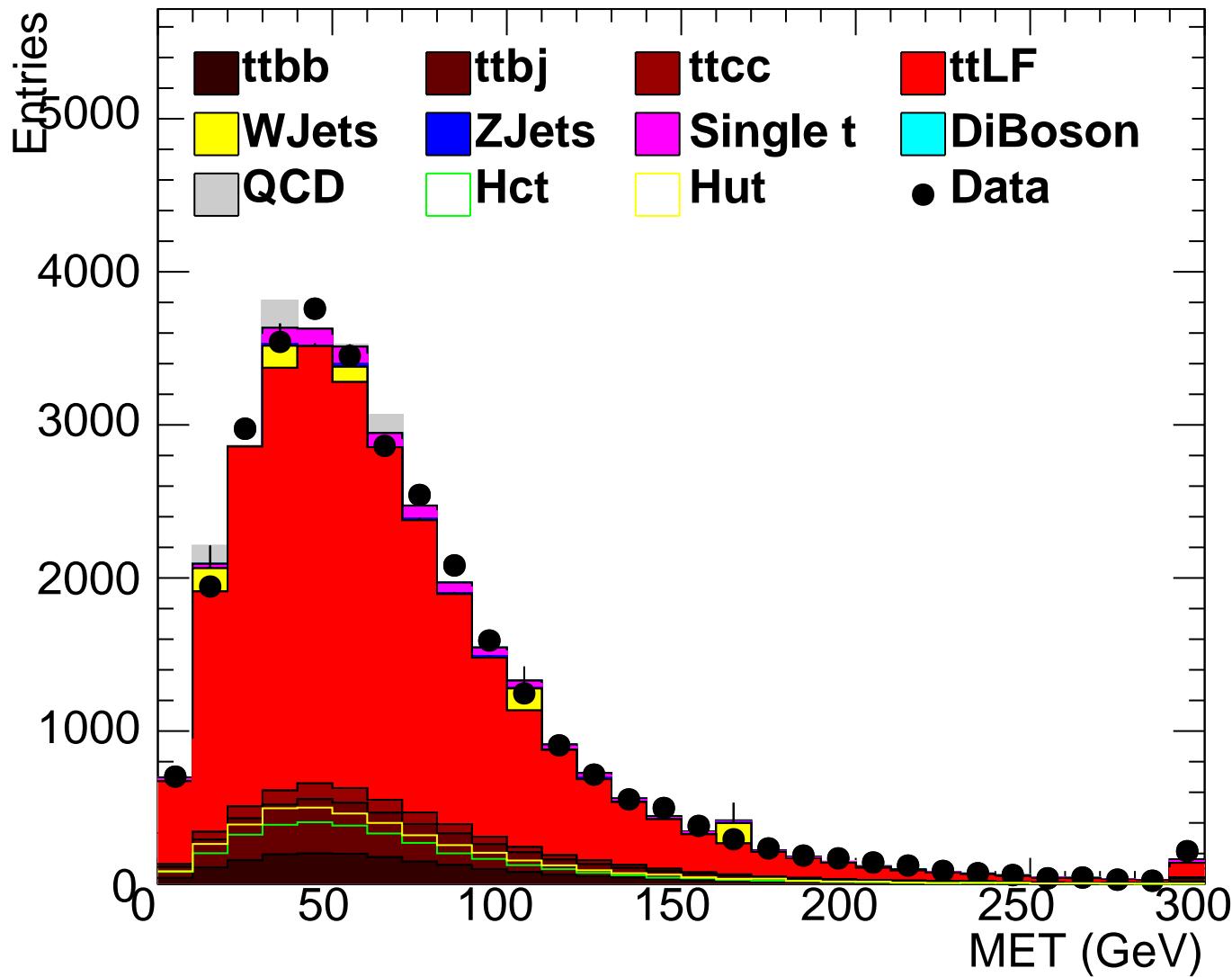
**Ch0\_S7**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

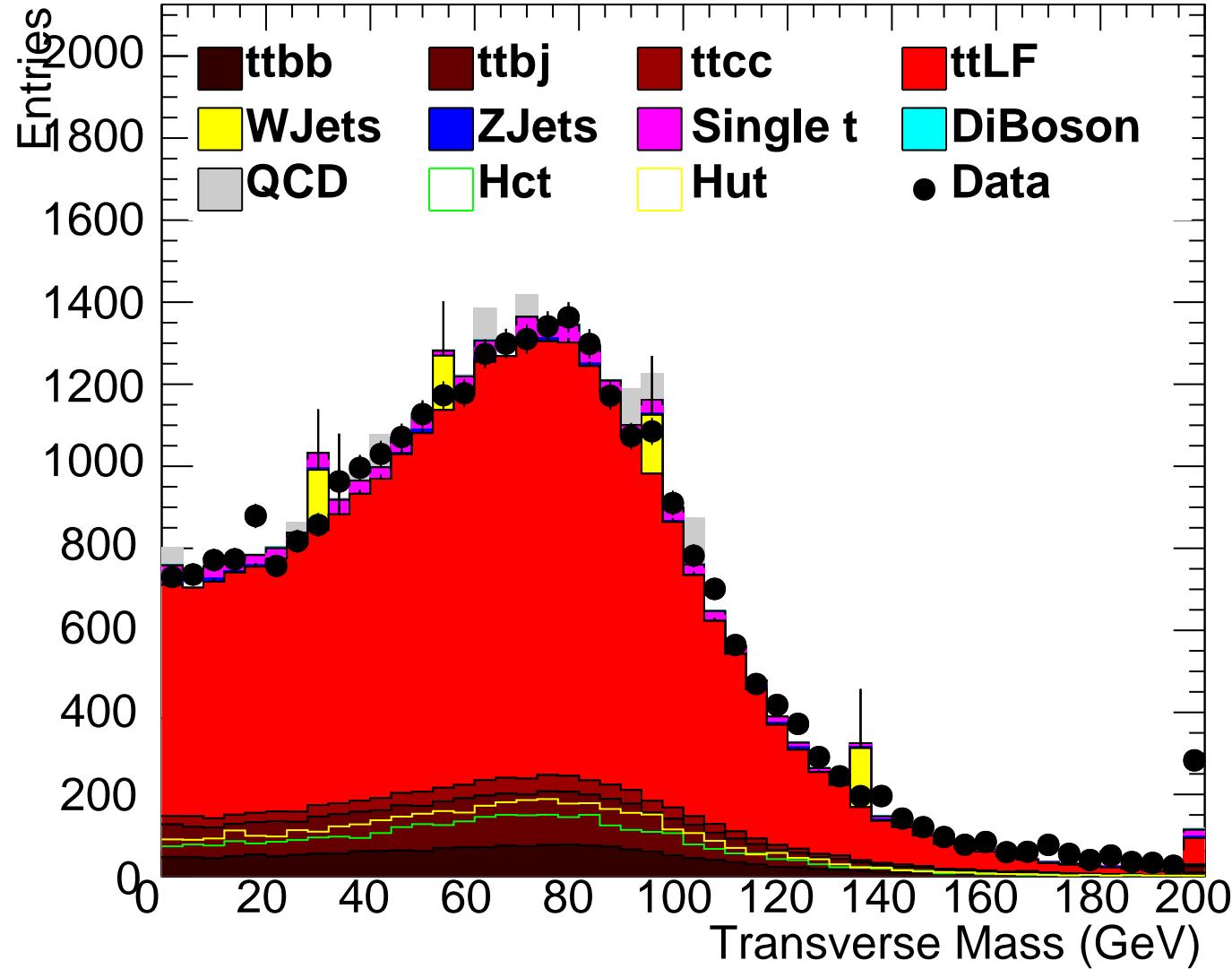


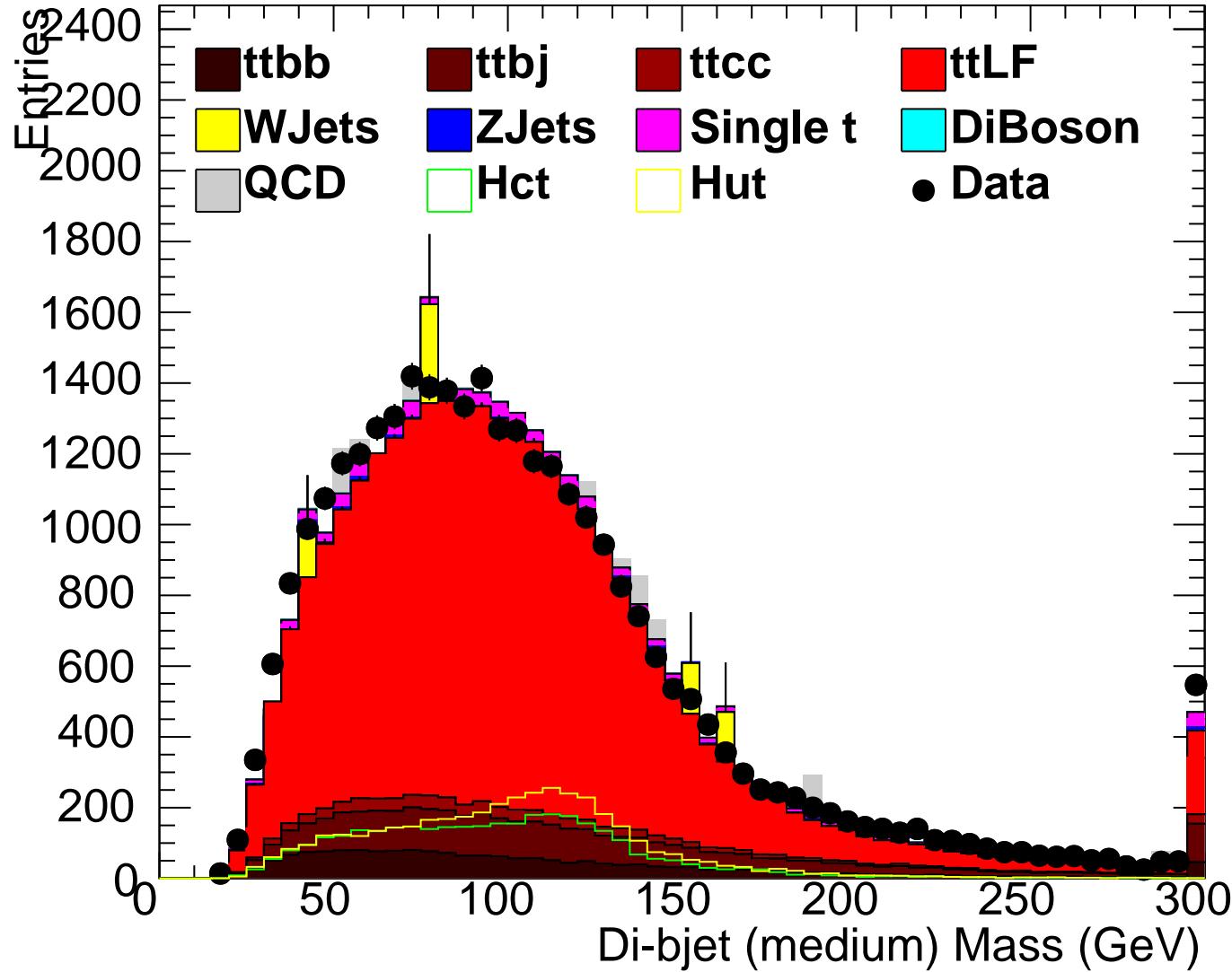


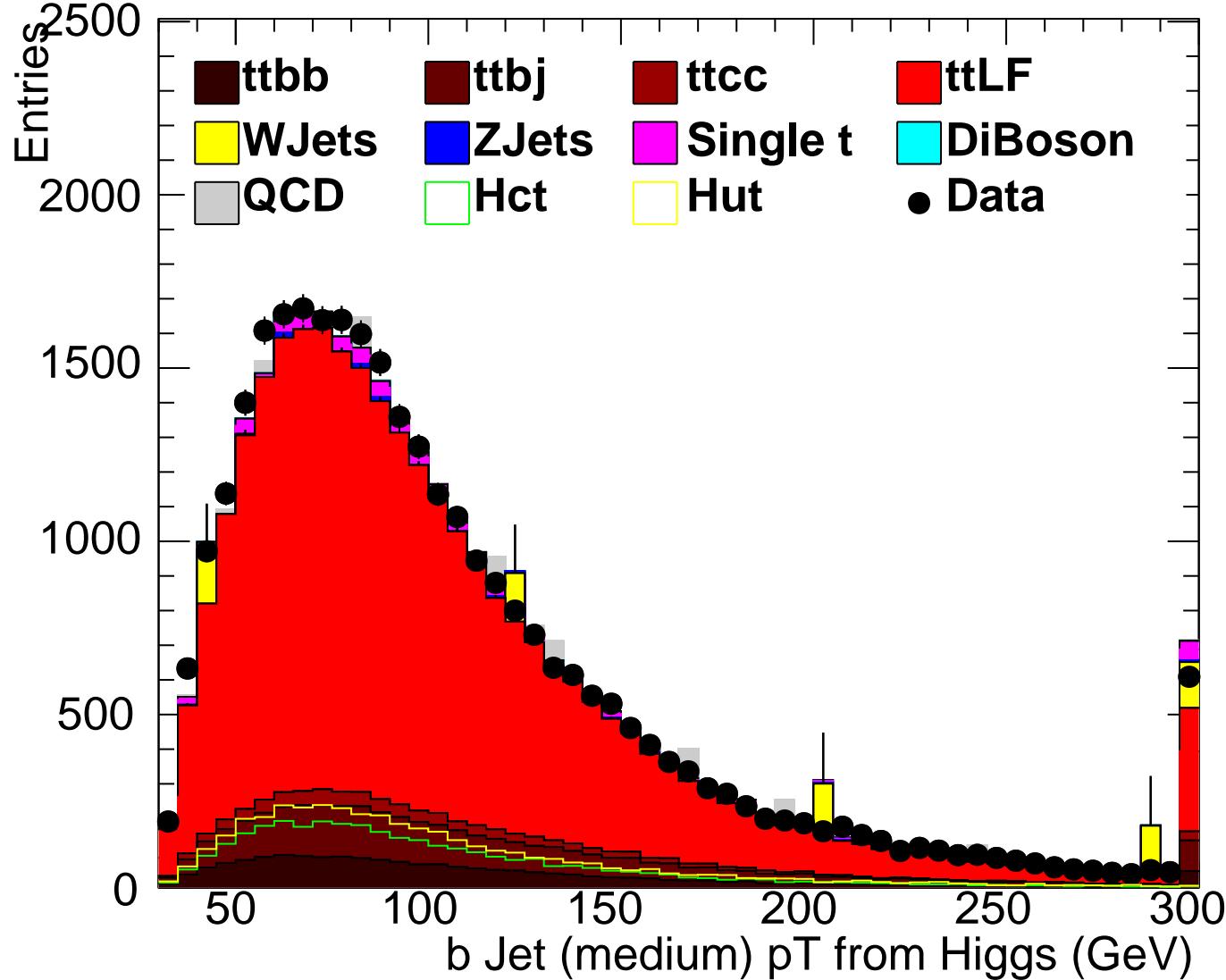


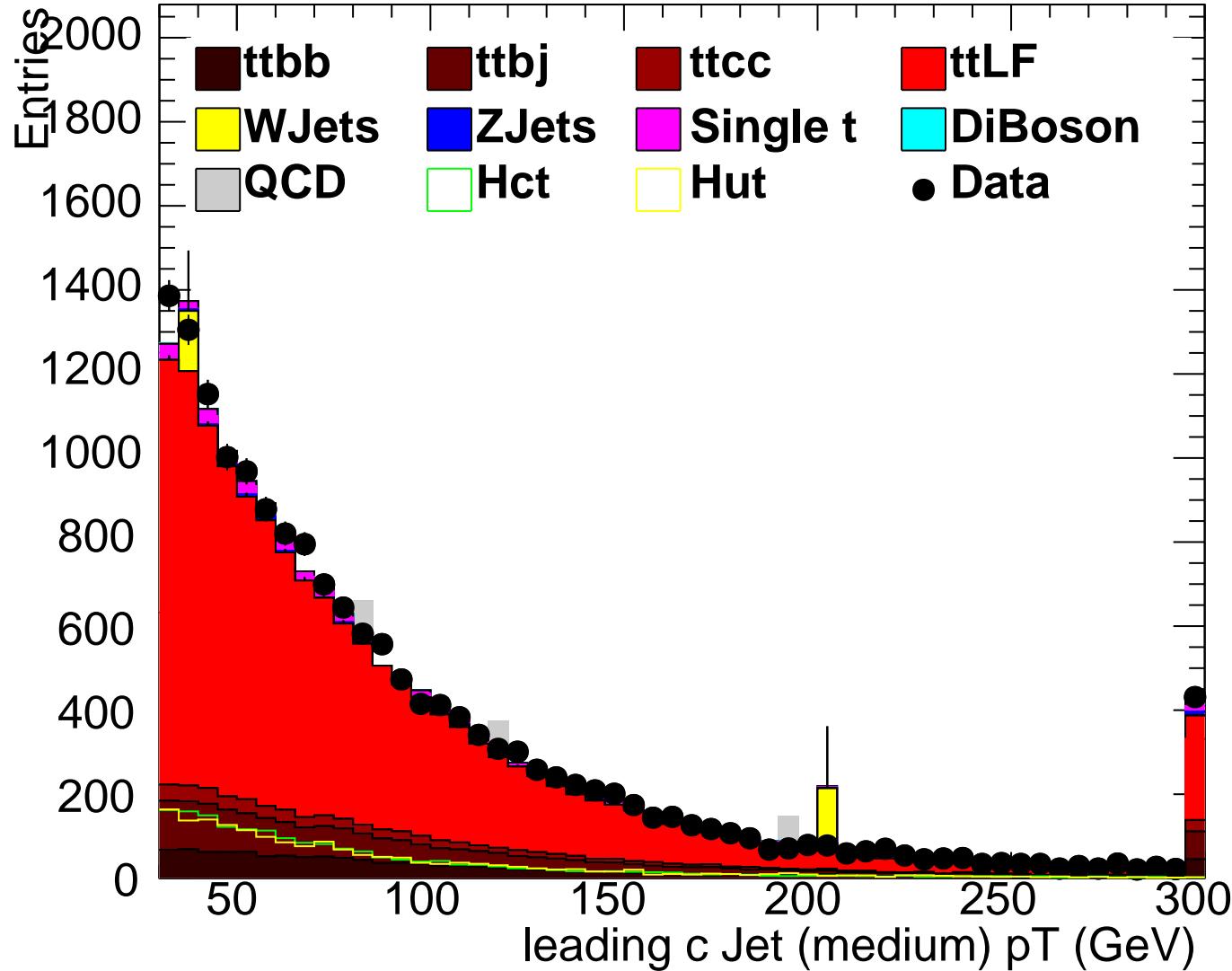


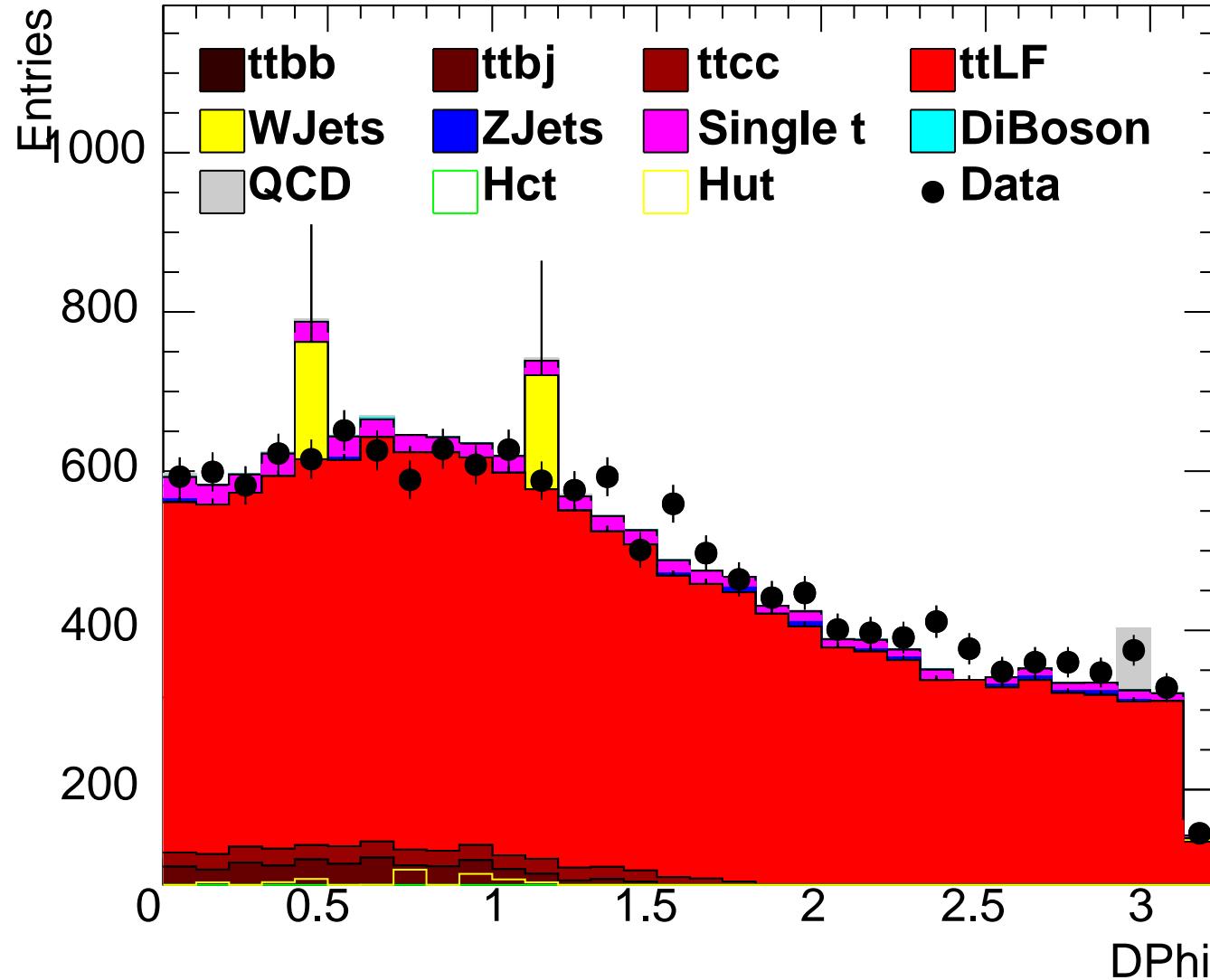


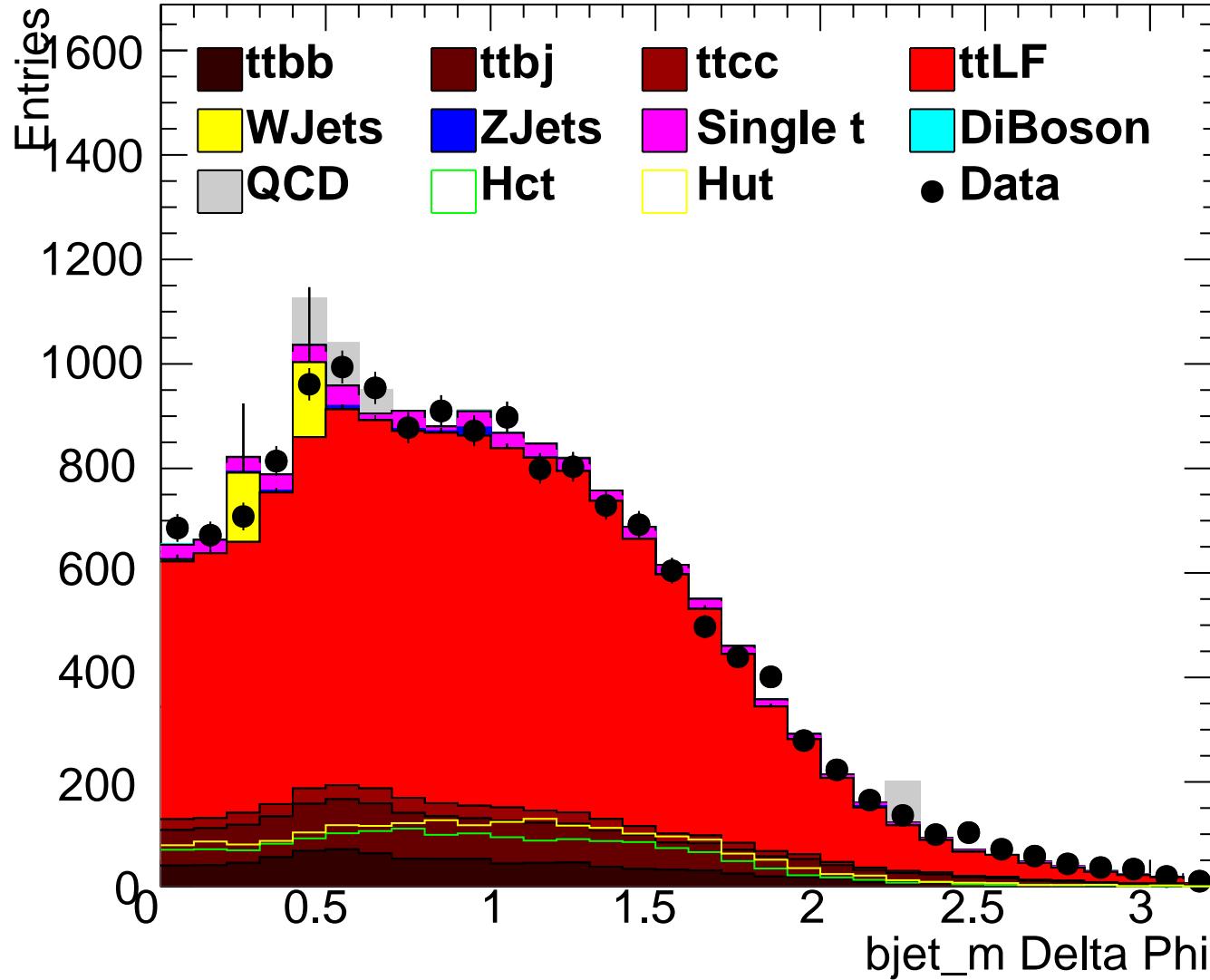


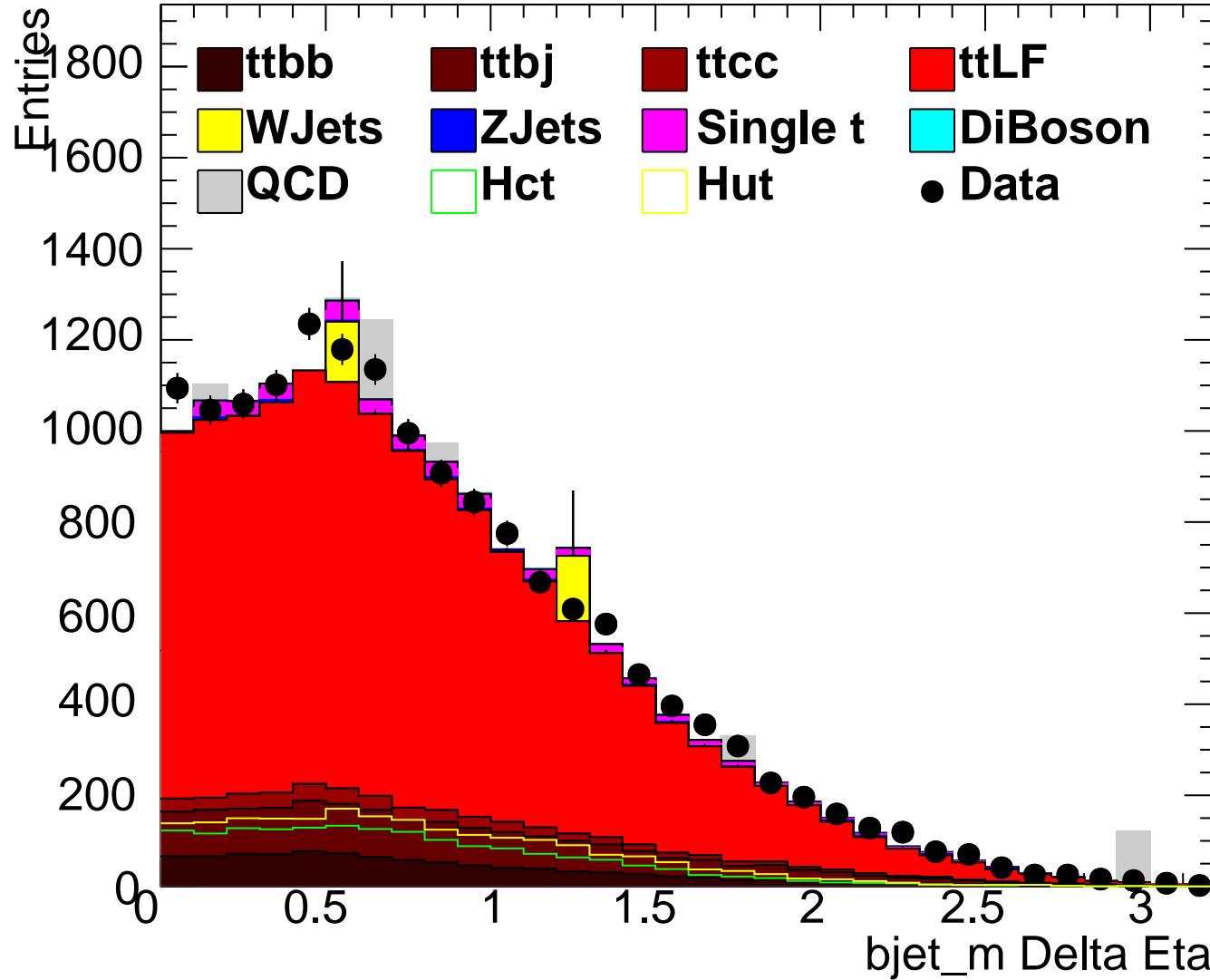


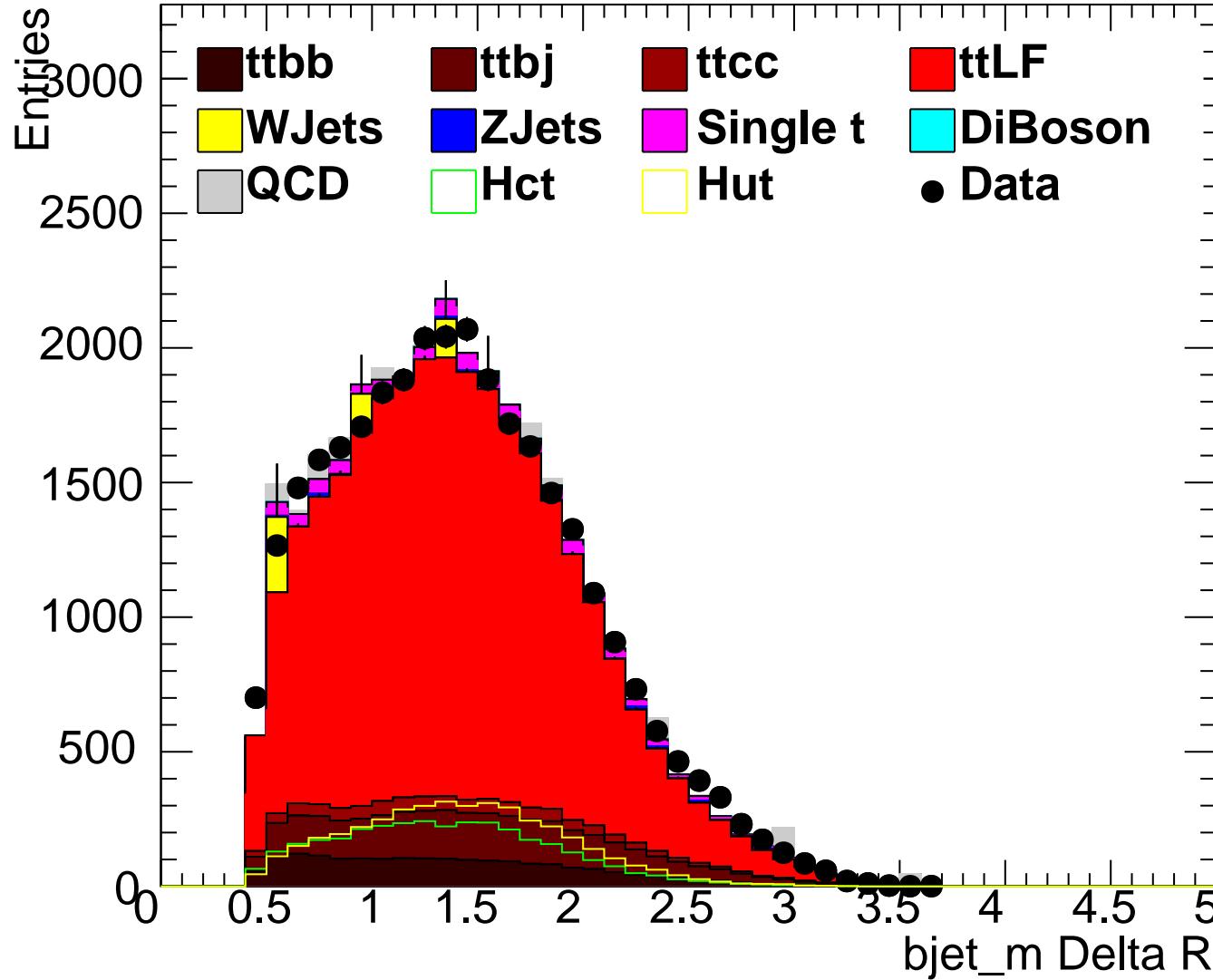
**Ch0\_S8**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

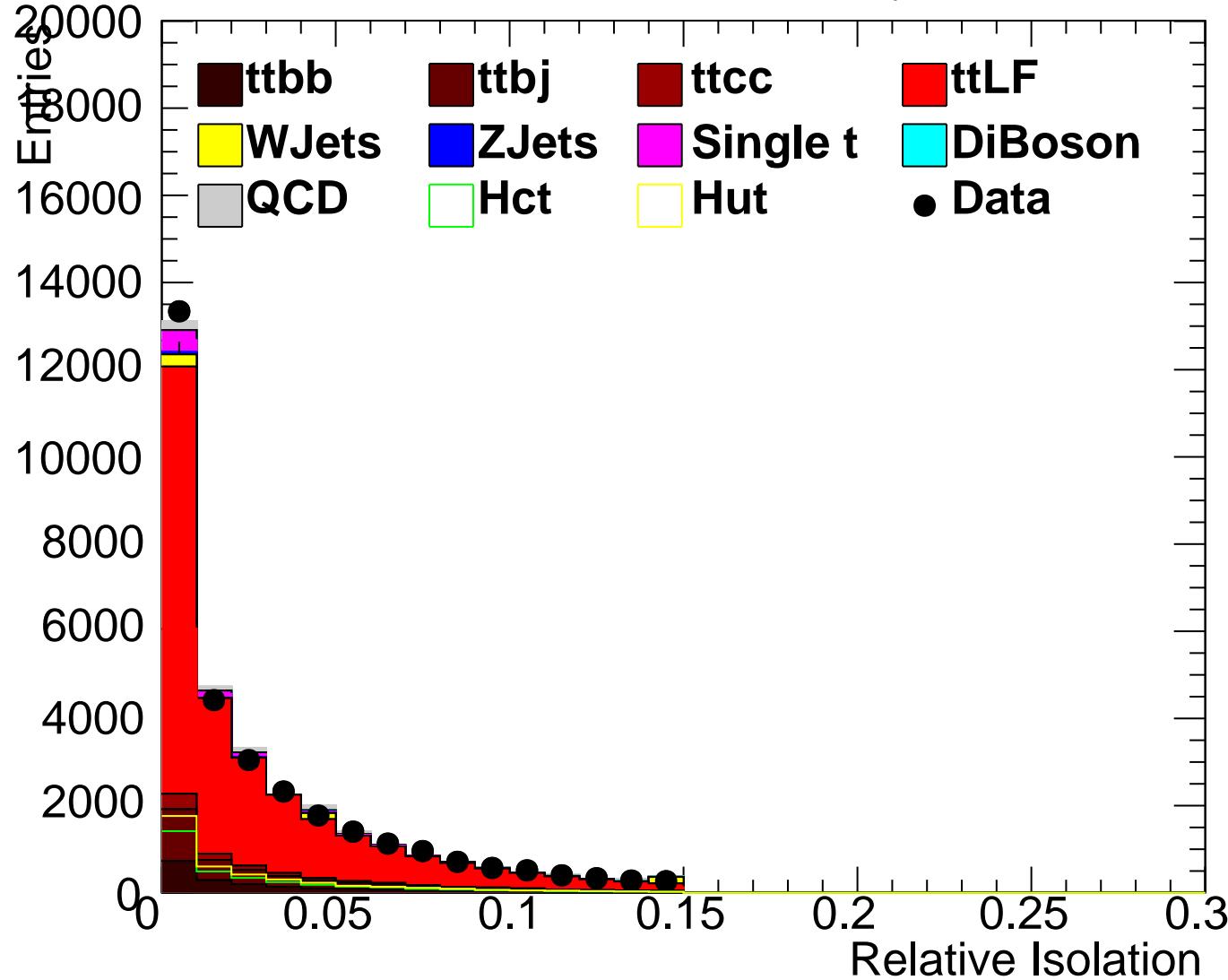
**Ch0\_S8**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

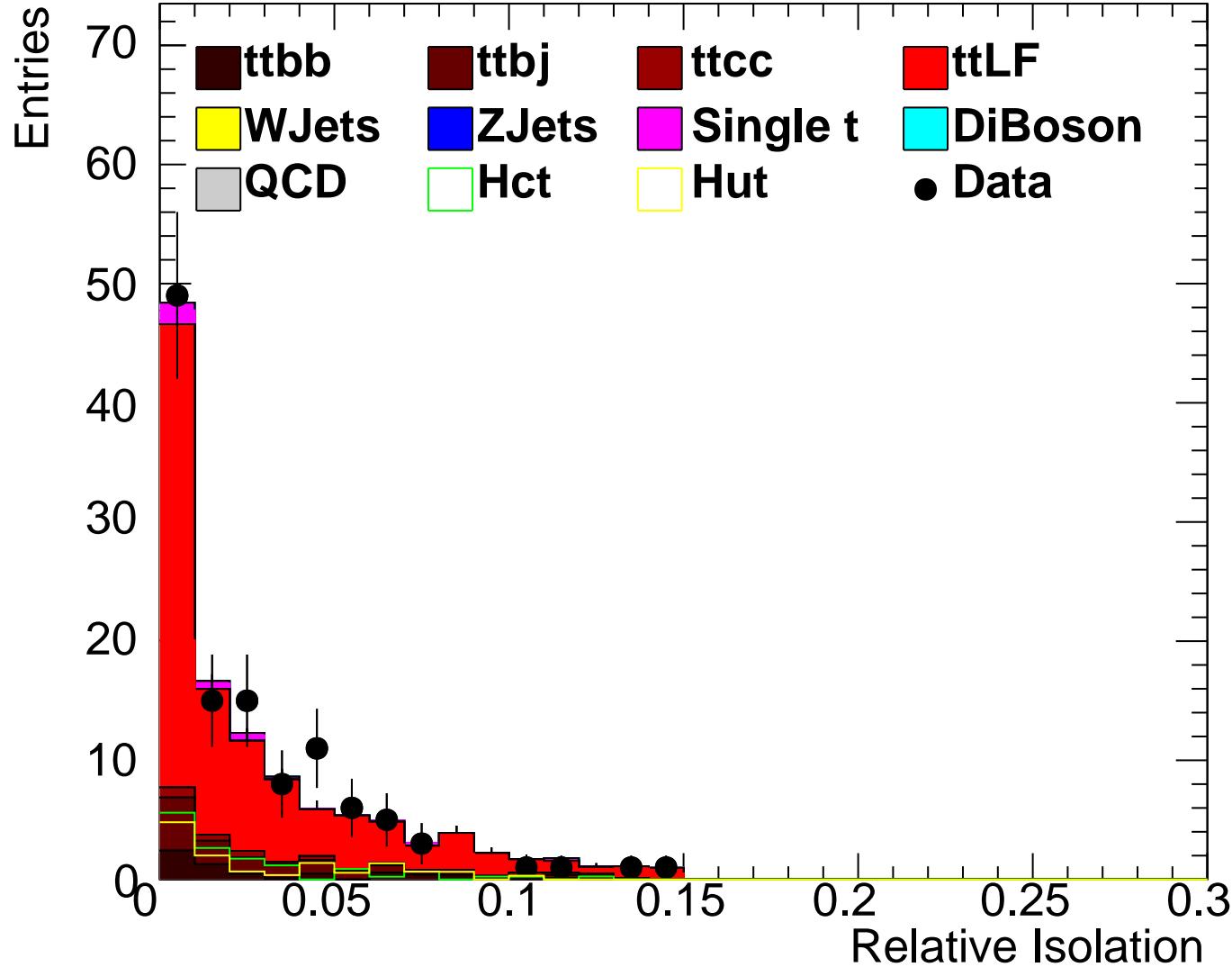


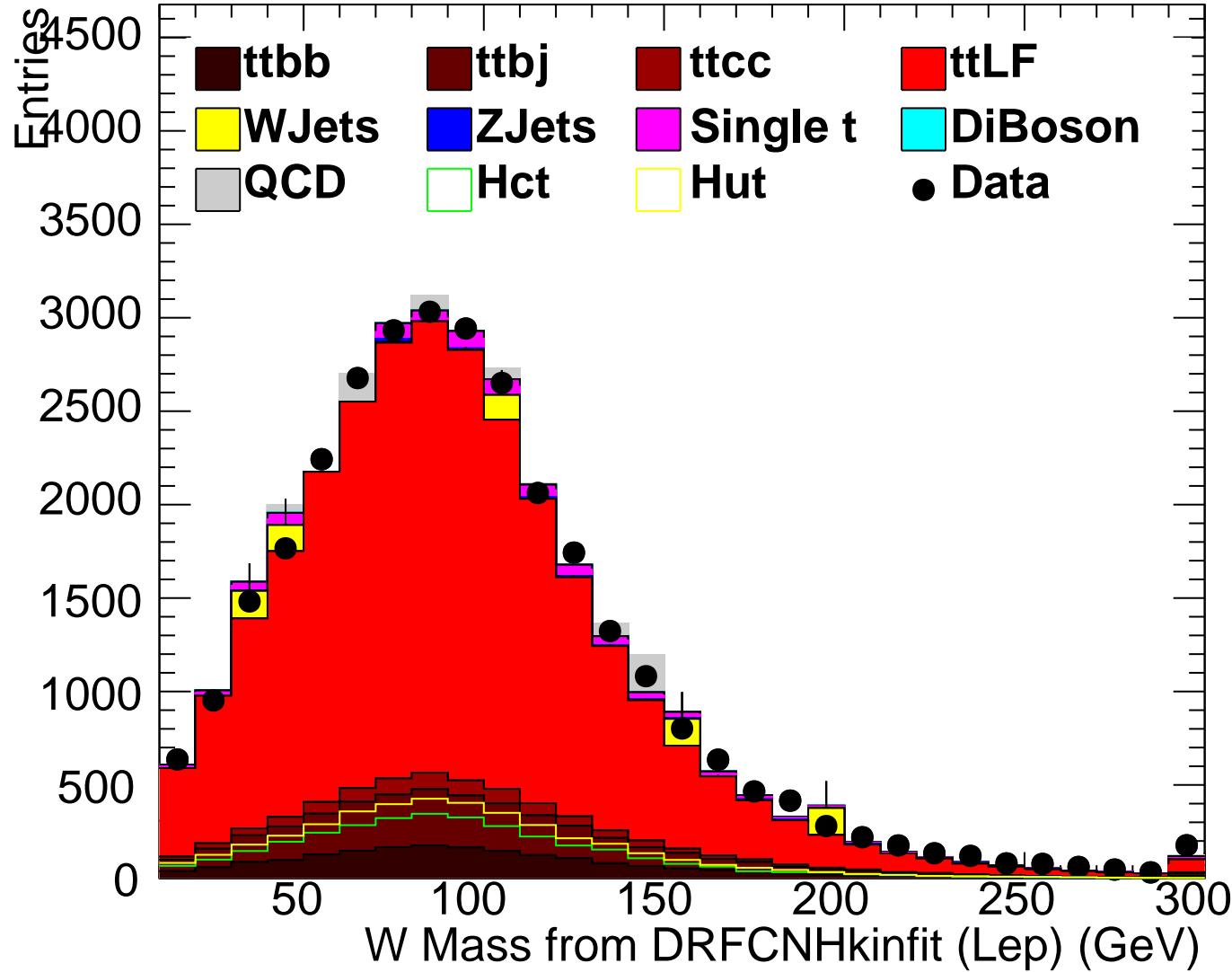
**Ch0\_S8**CMS, 35.9  $\text{fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

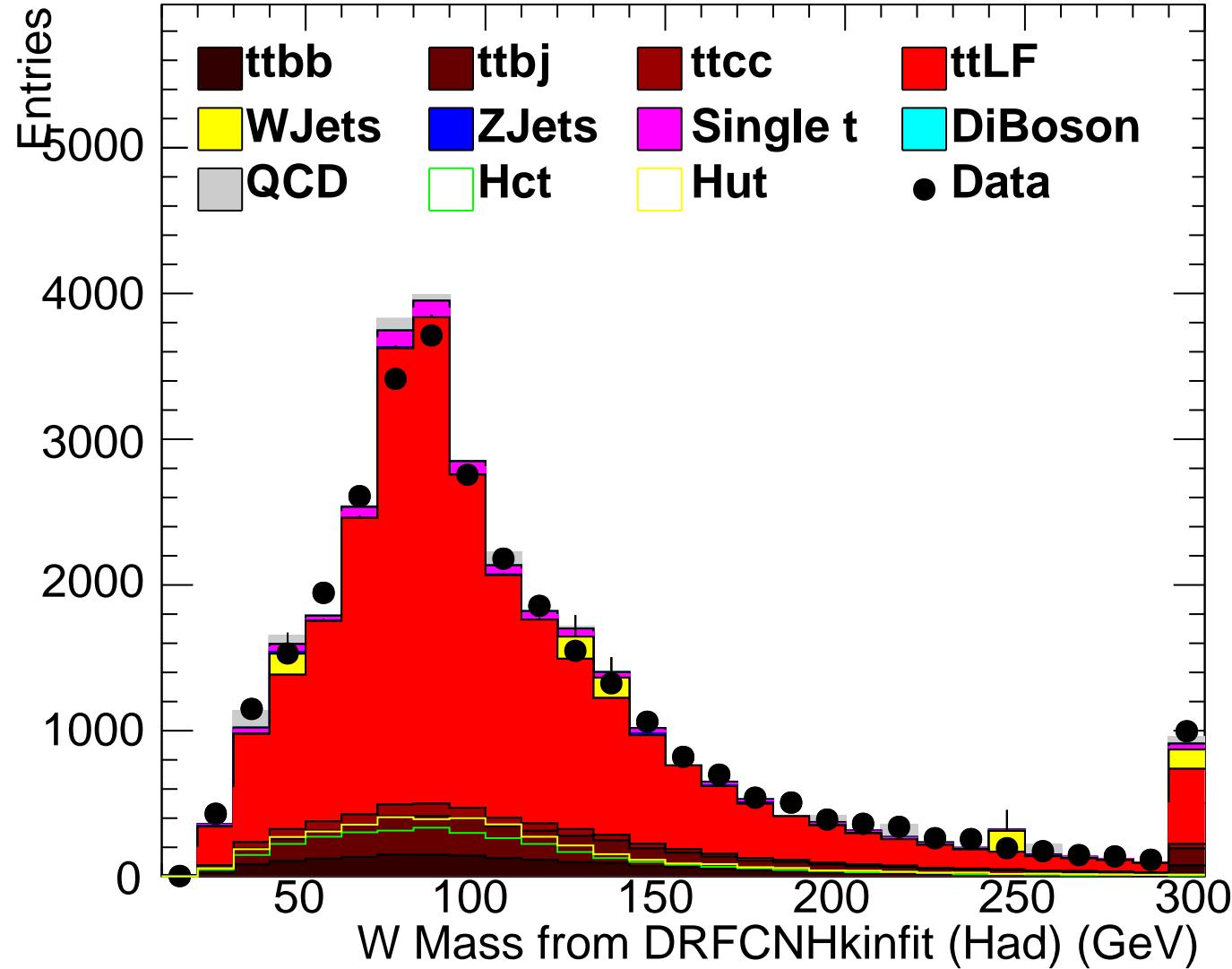




**Ch0\_S8**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

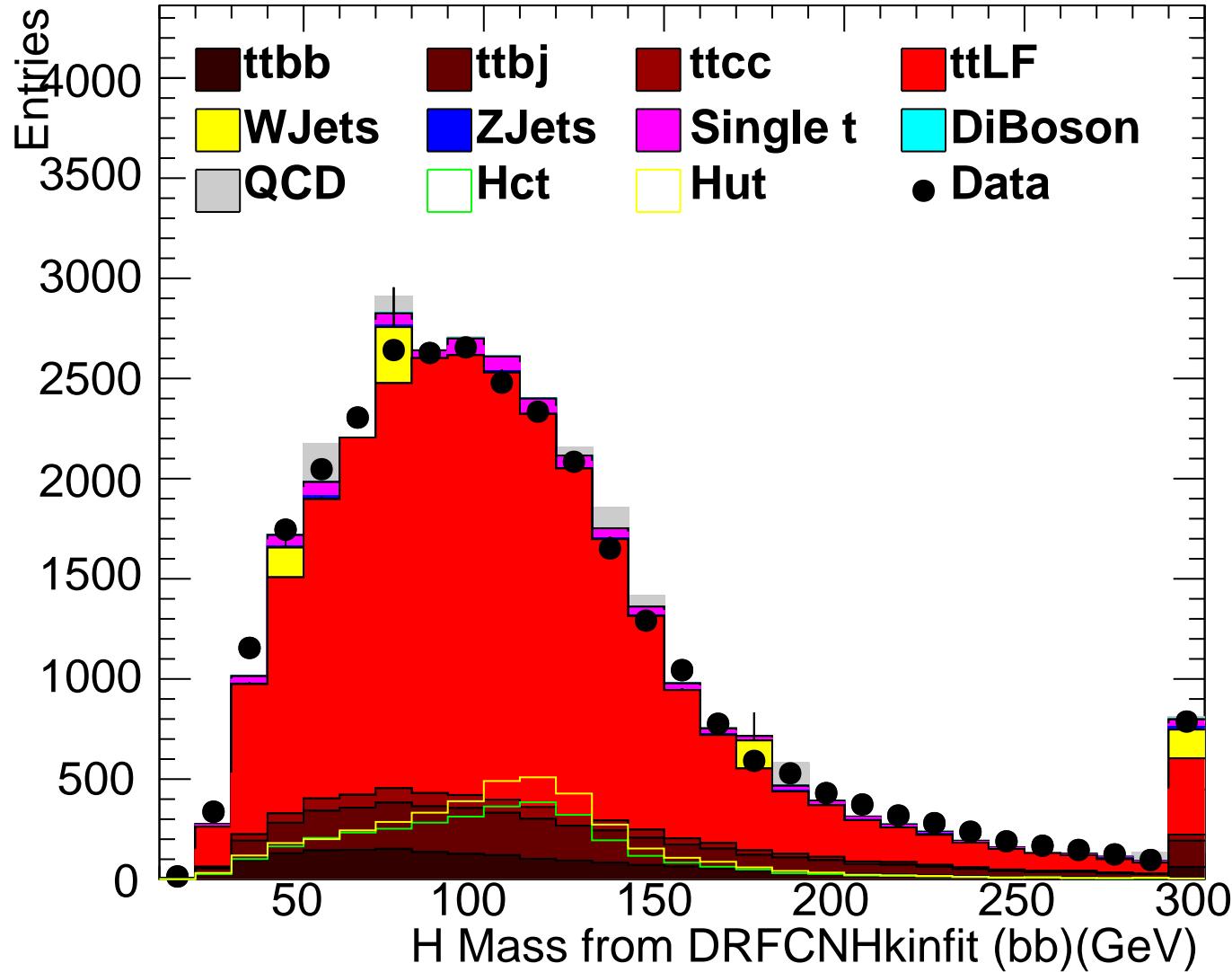


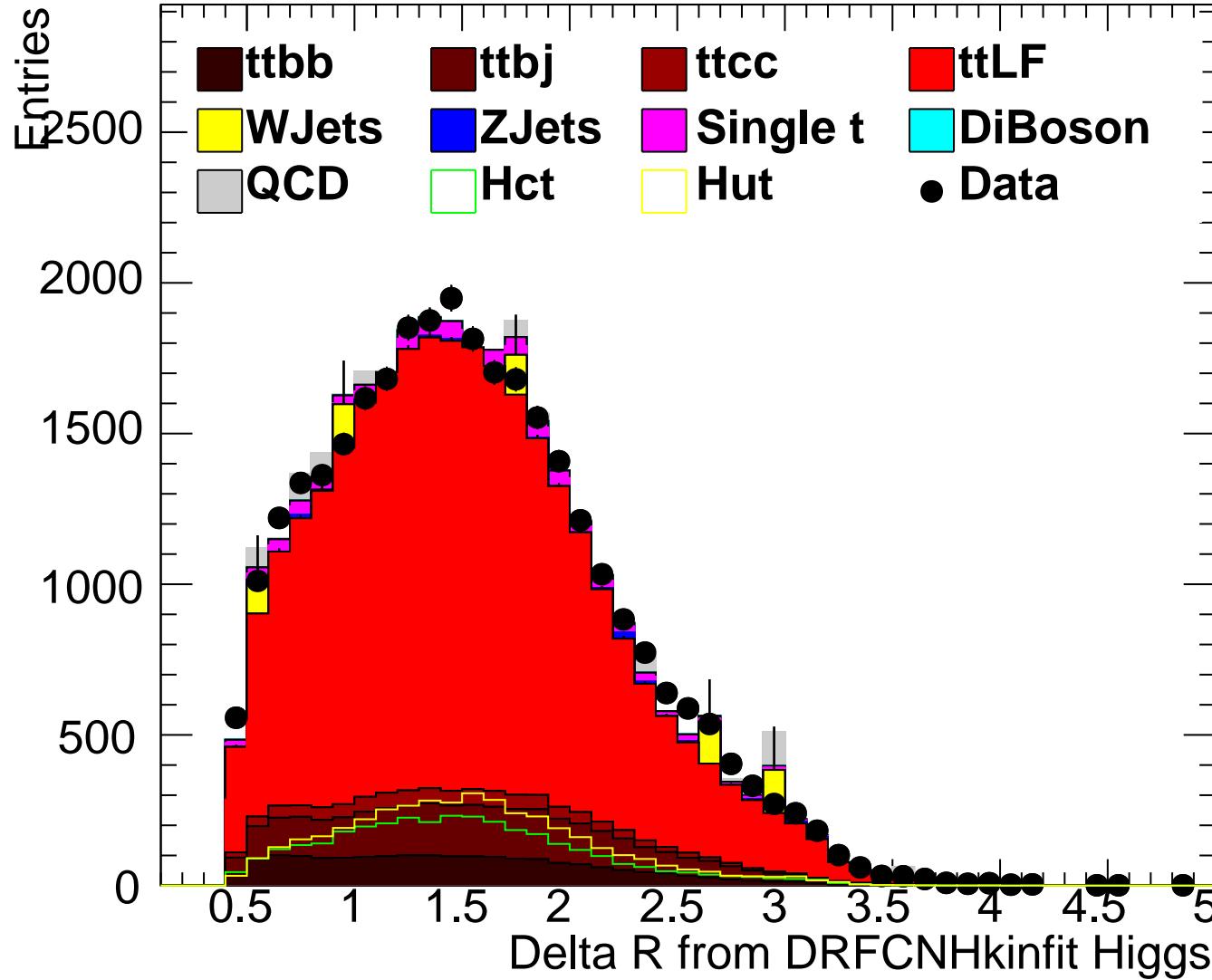


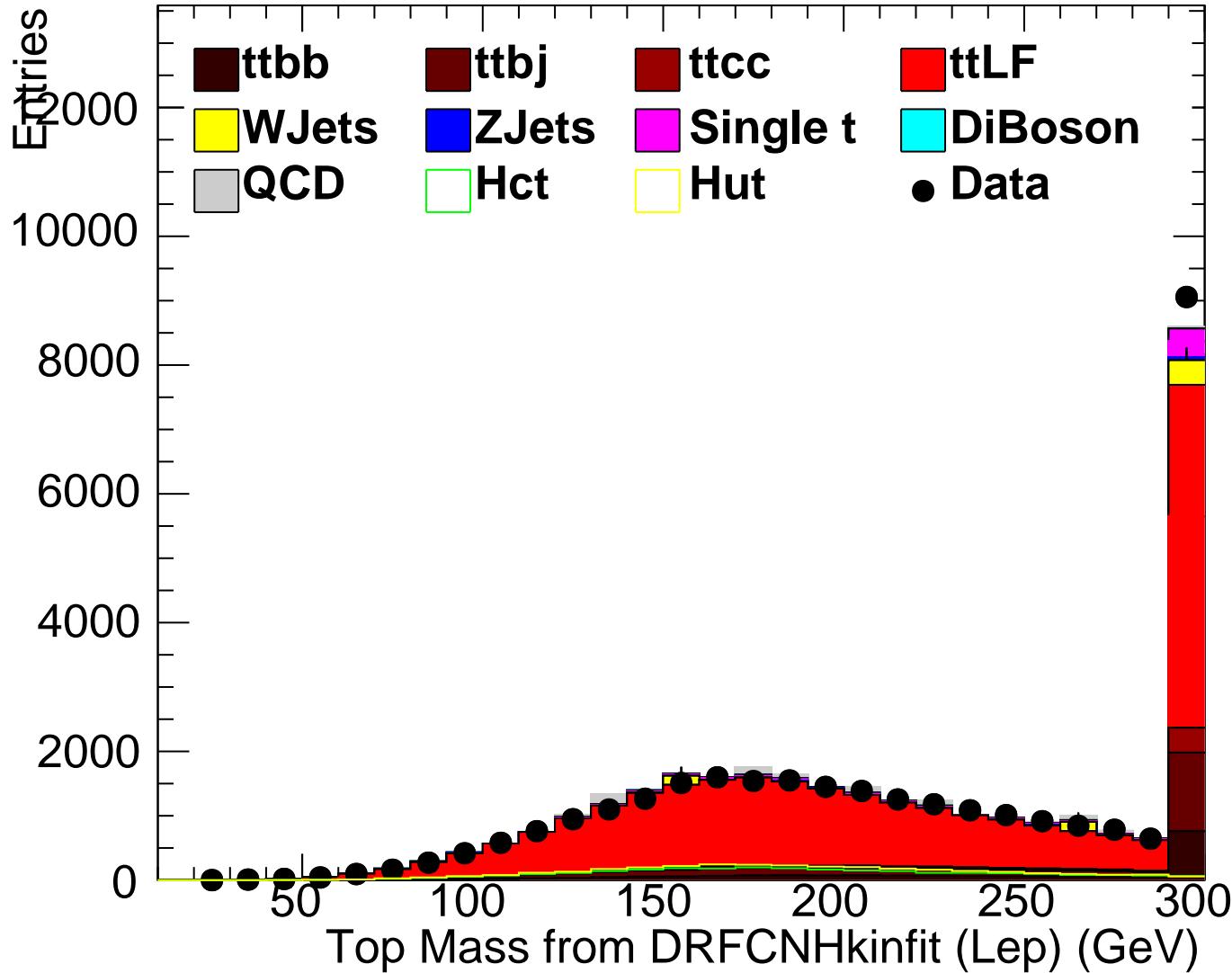
**Ch0\_S8**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

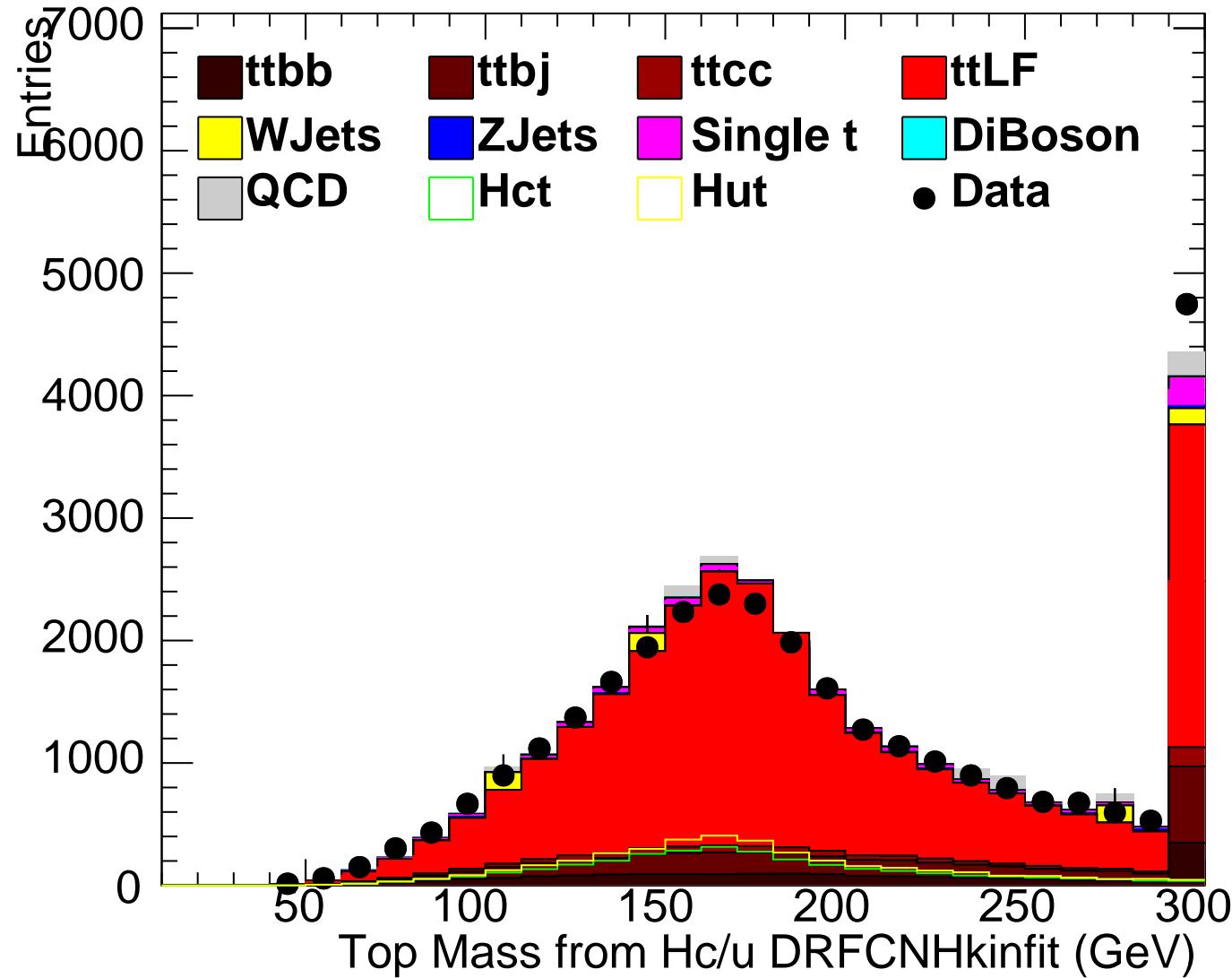
Ch0\_S8

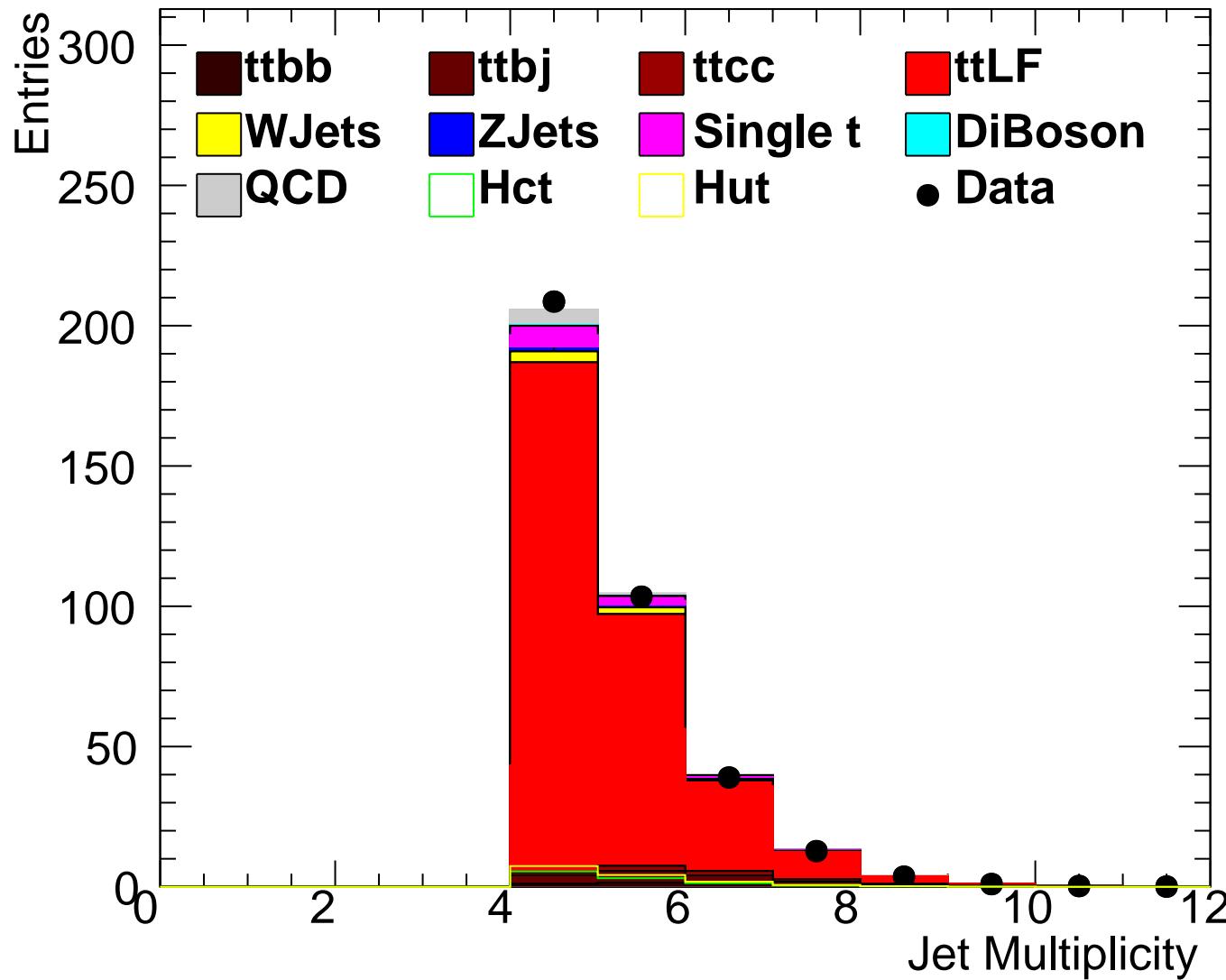
CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$





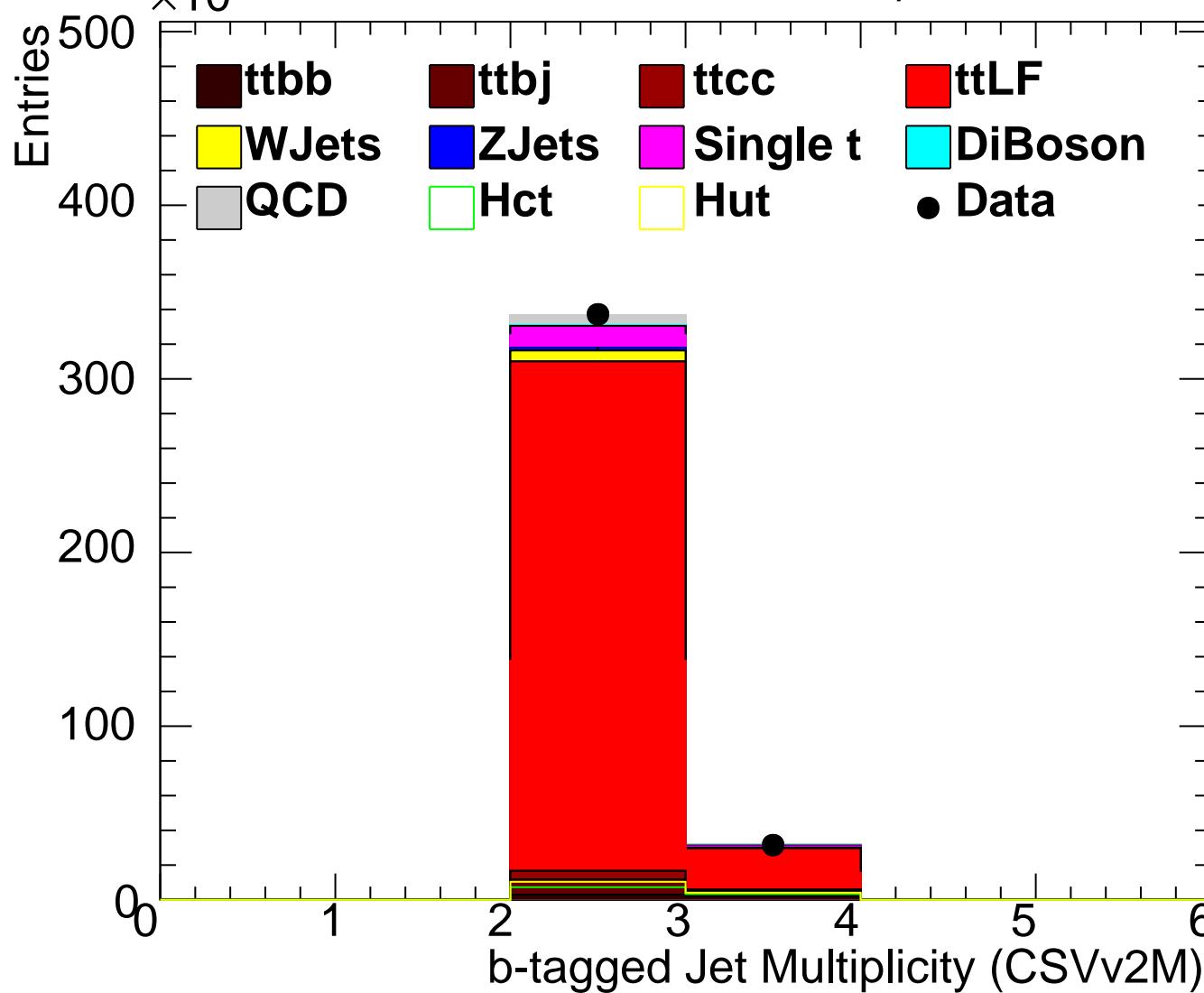


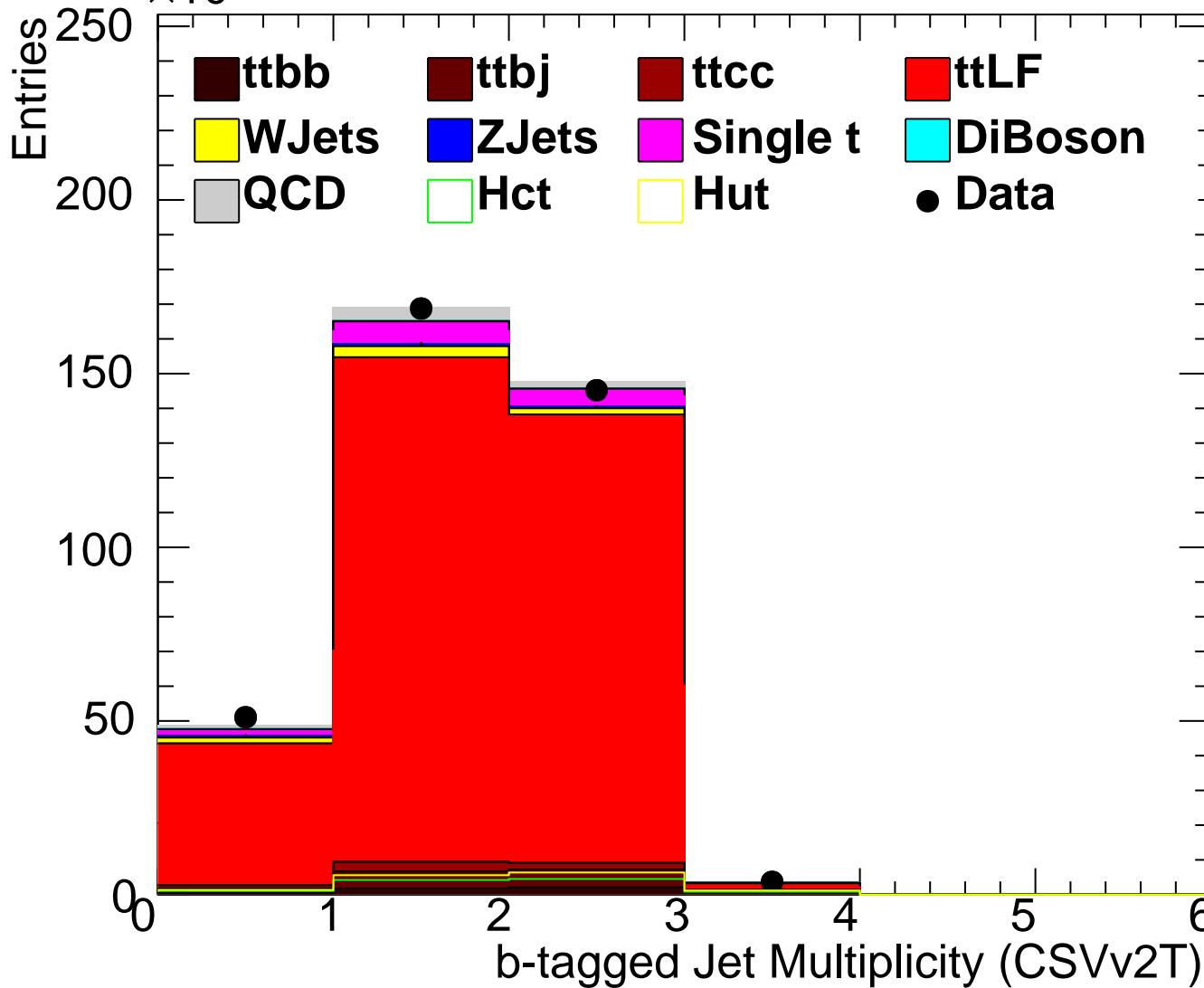
**Ch0\_S8**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

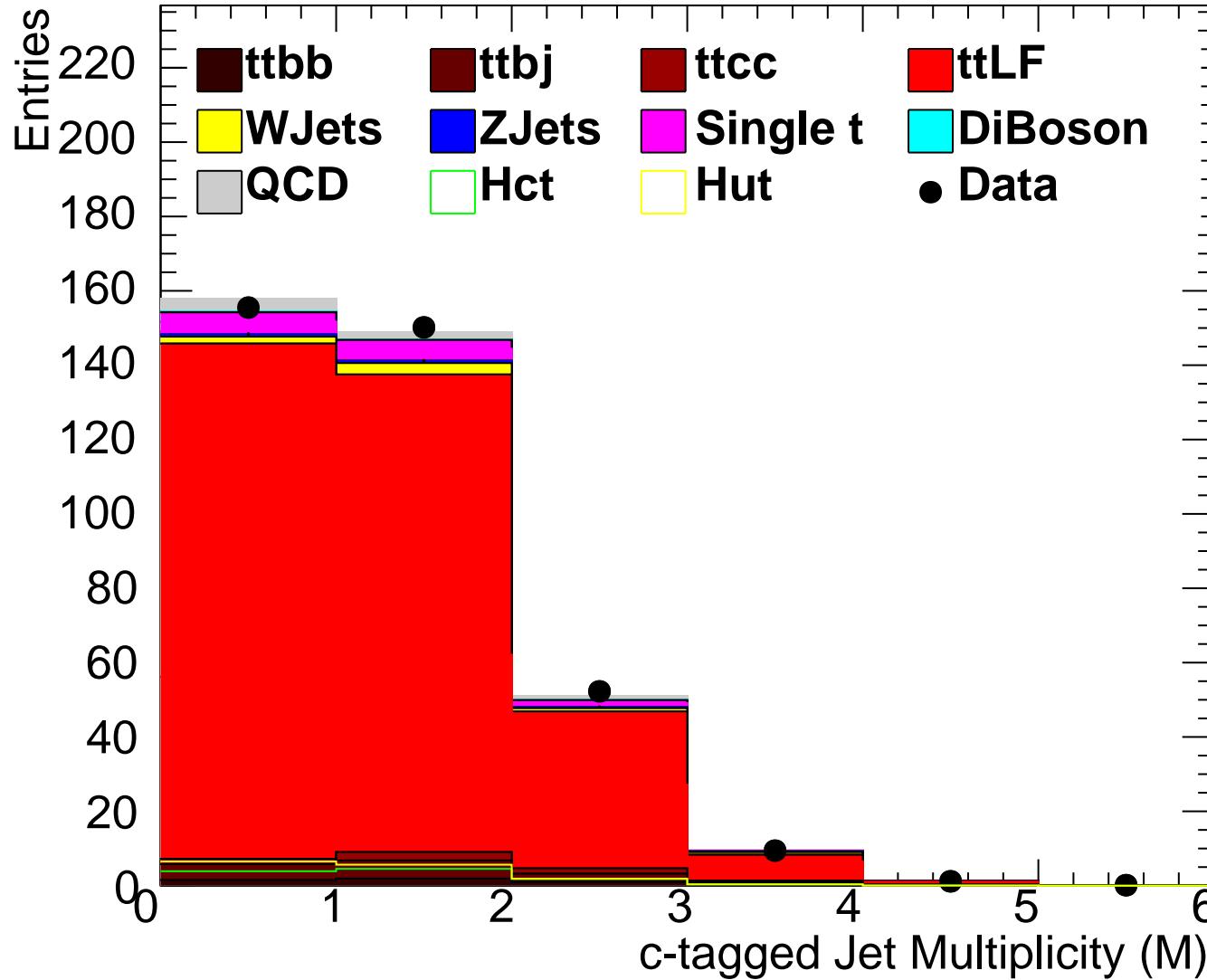


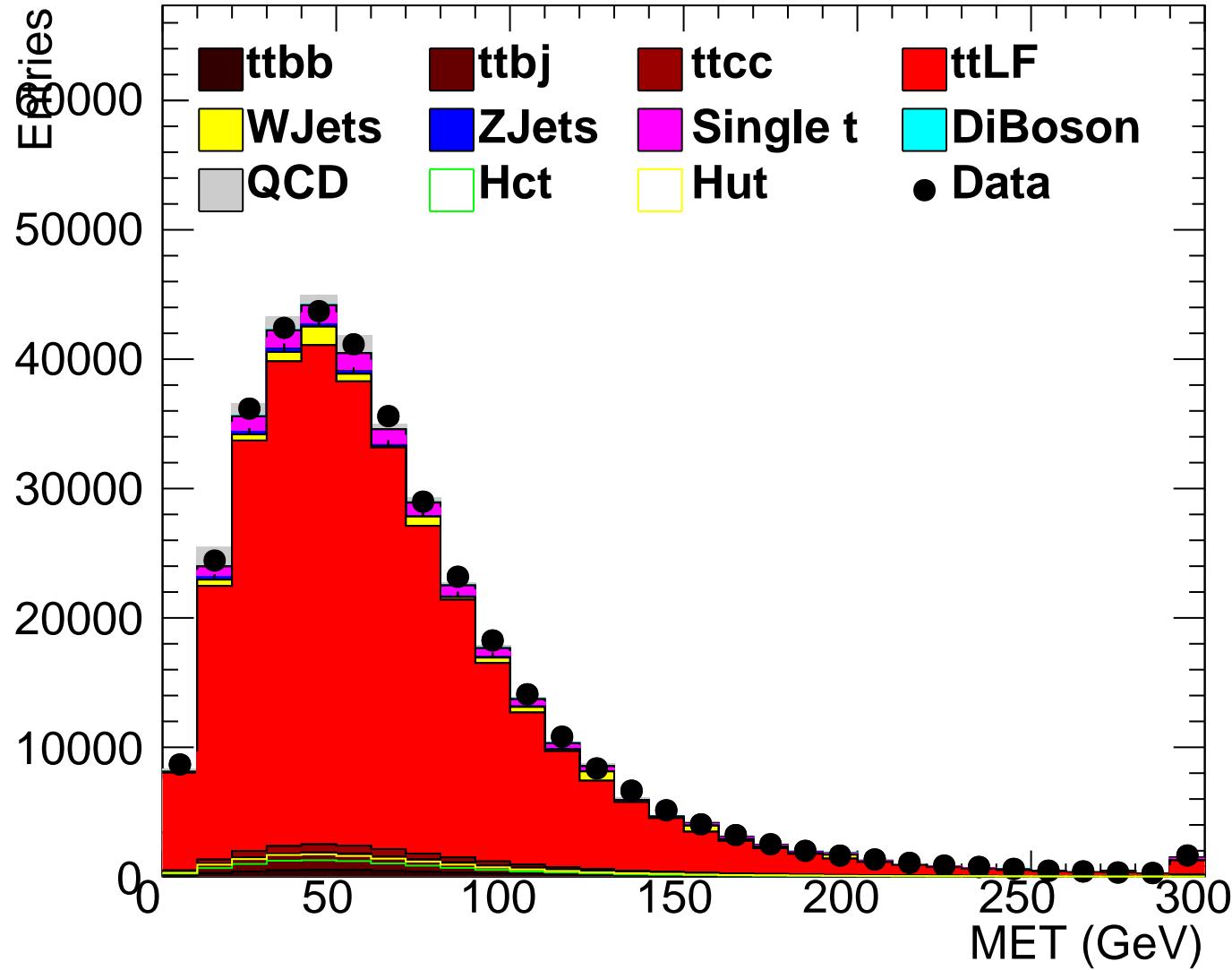
Ch0\_S9

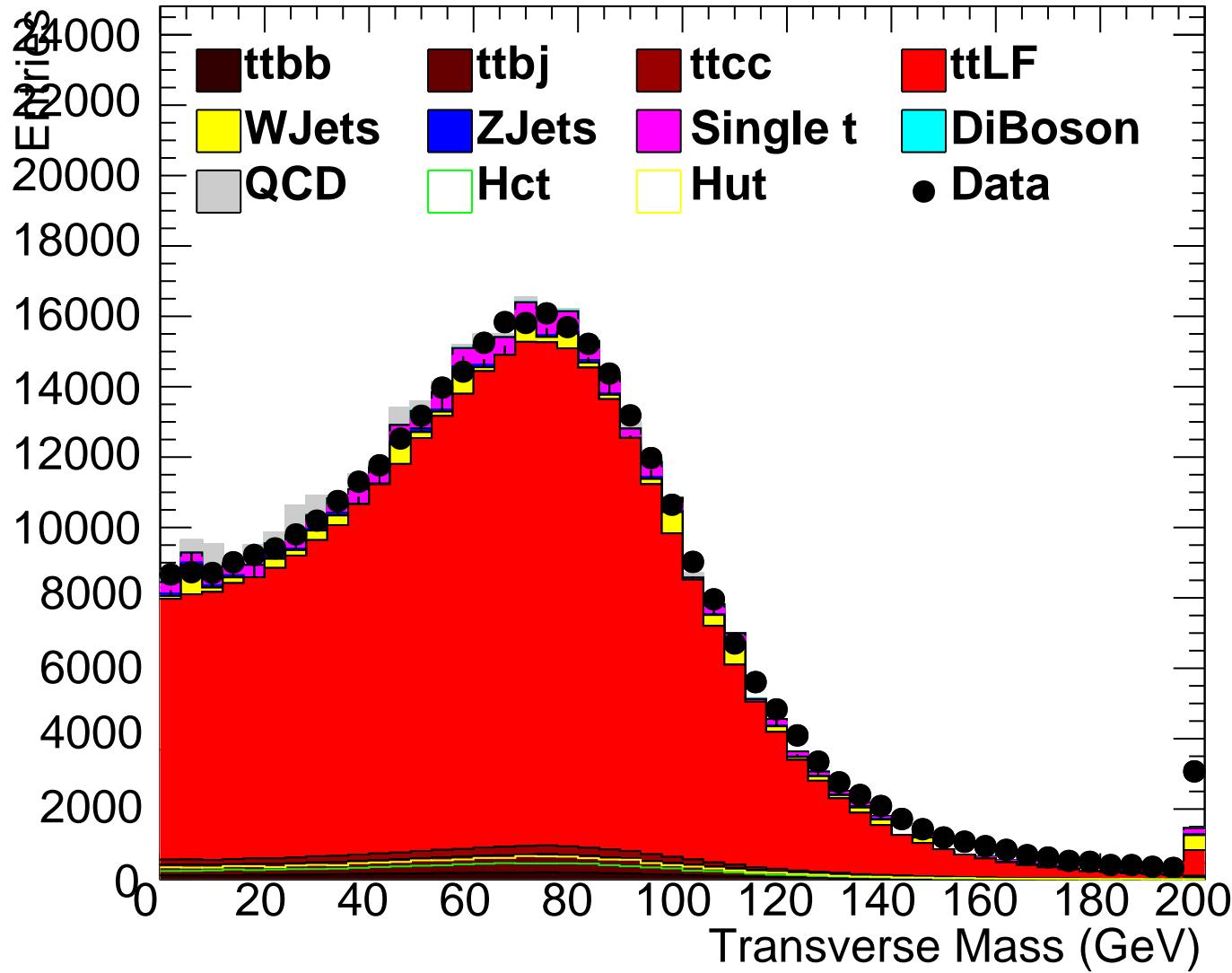
CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV

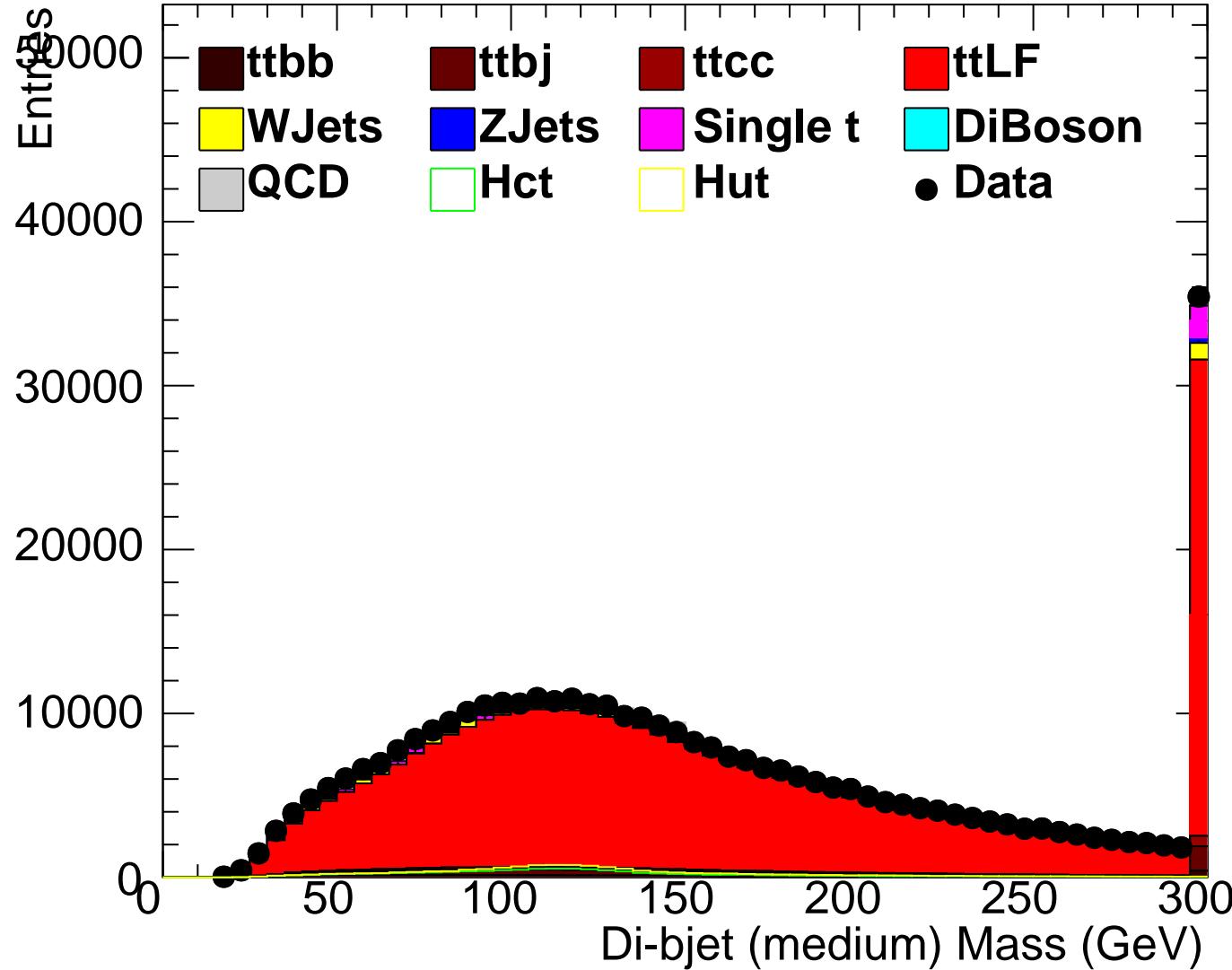


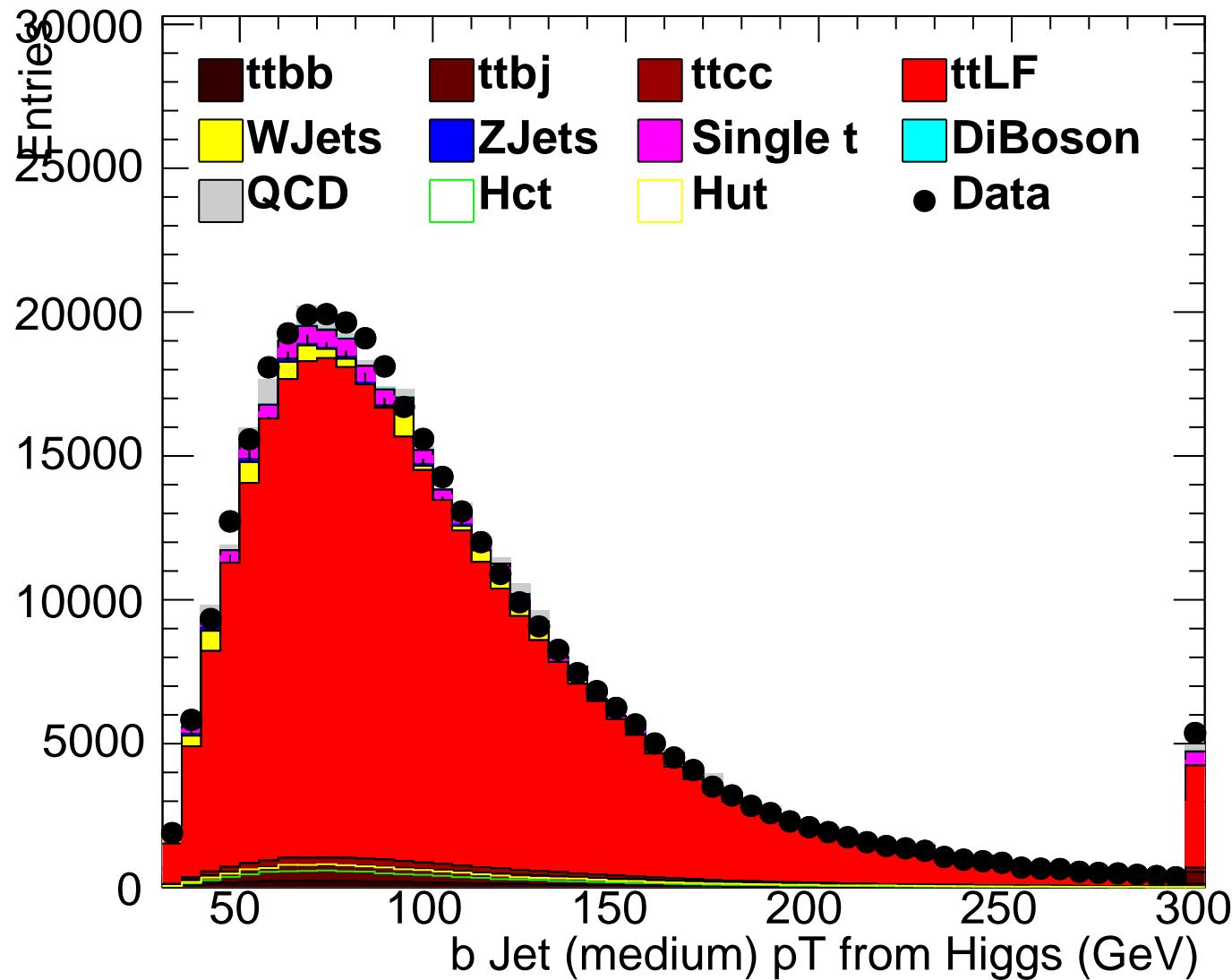
**Ch0\_S9**3  
 $\times 10^3$ CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

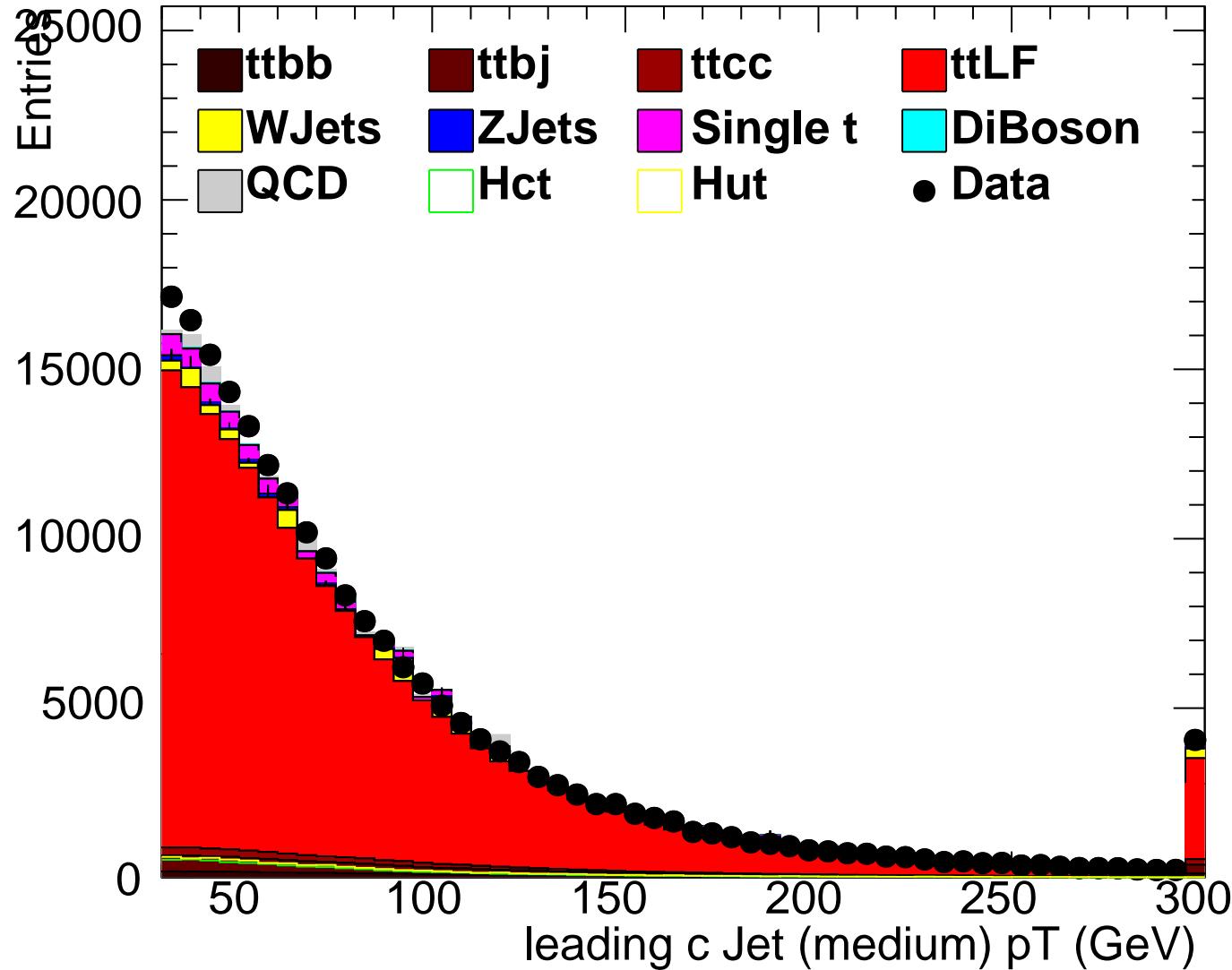


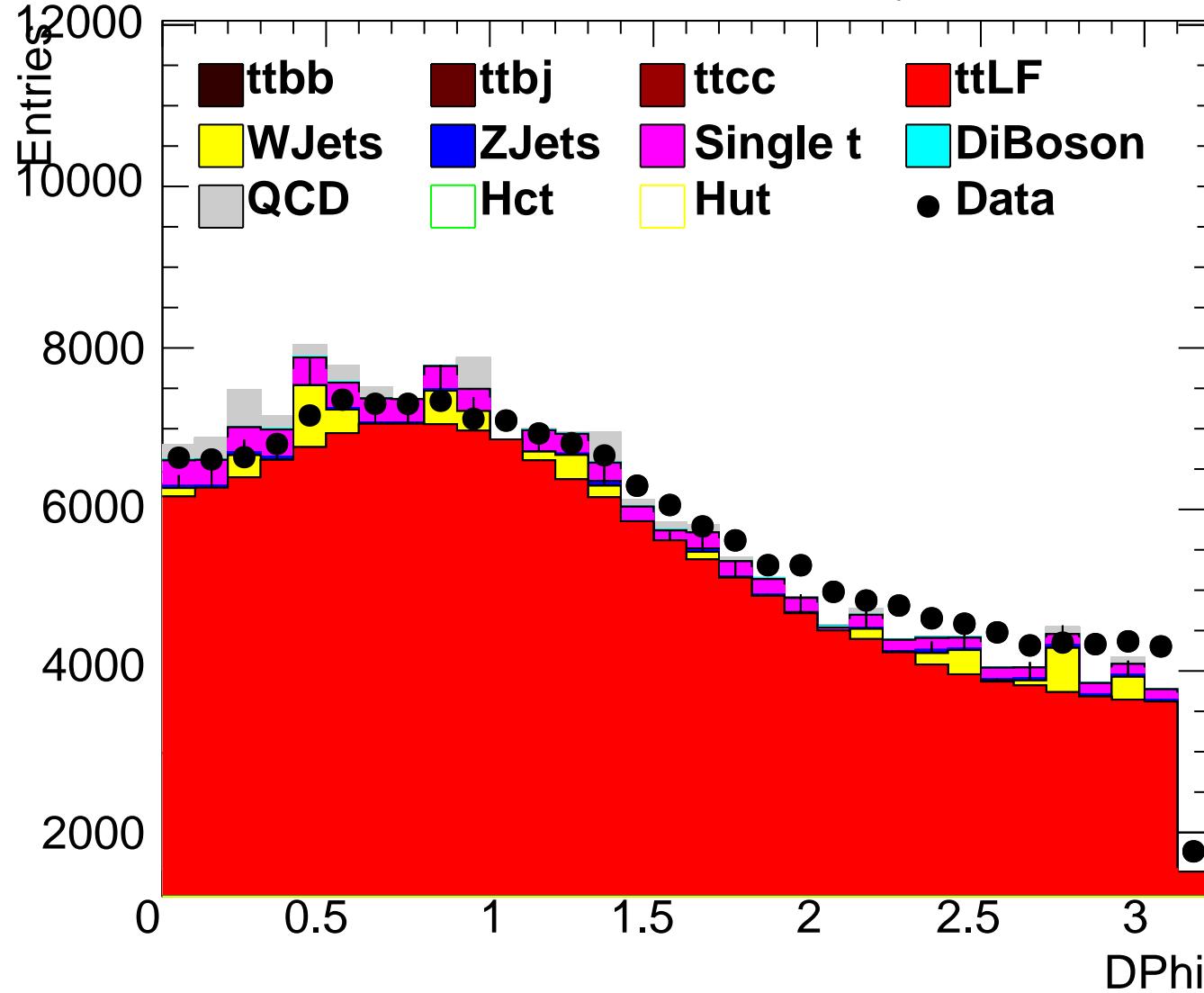
**Ch0\_S9**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

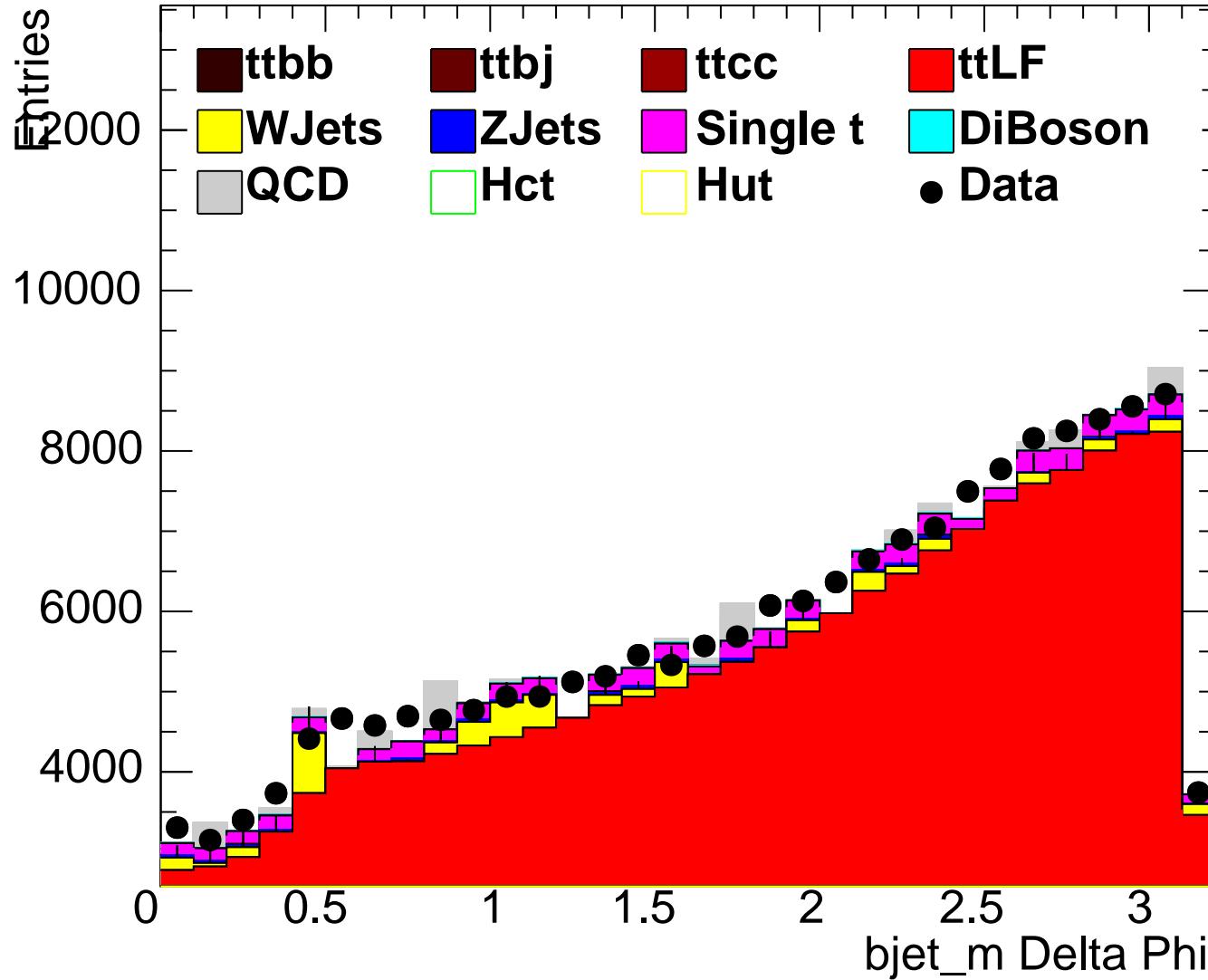
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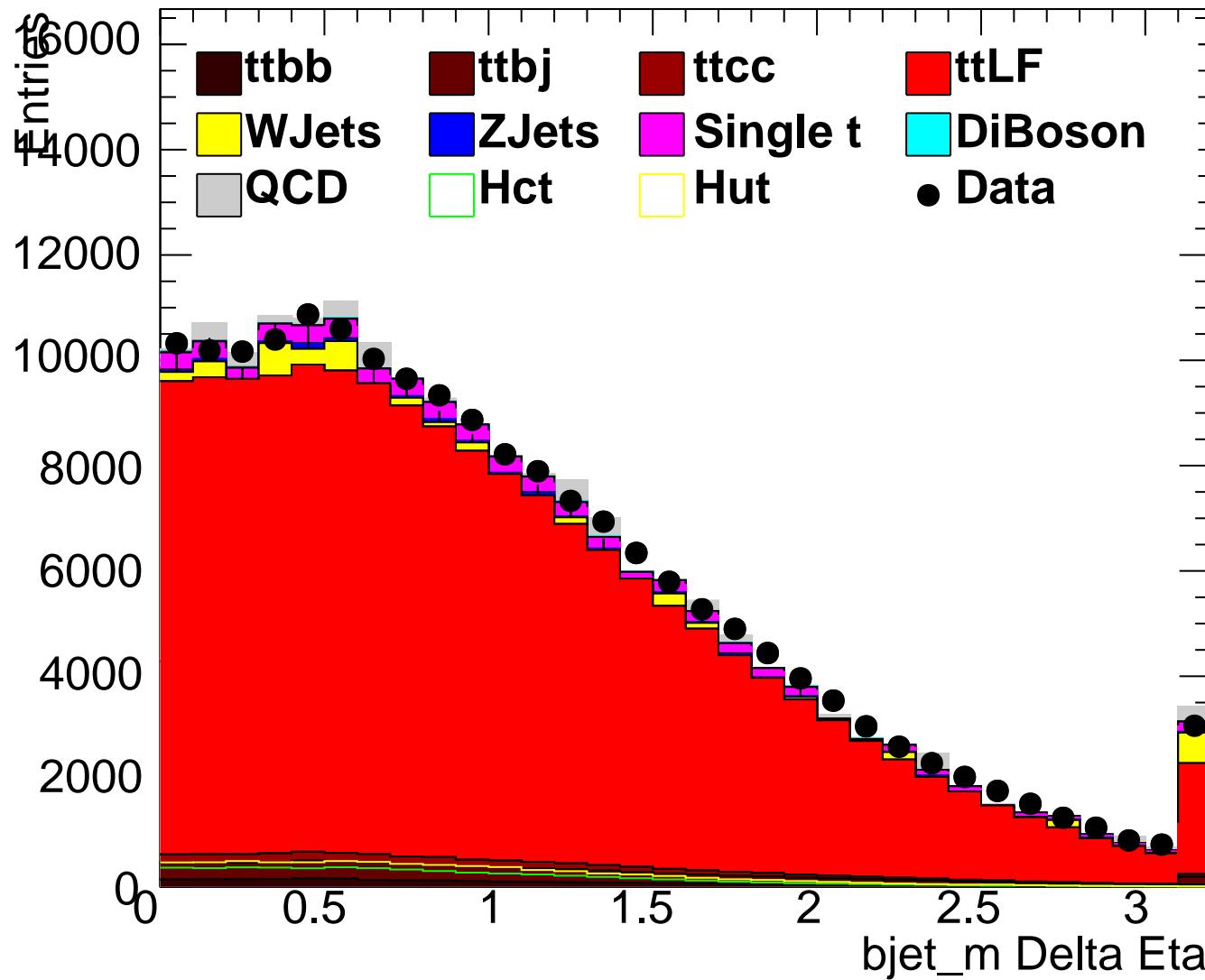
**Ch0\_S9**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

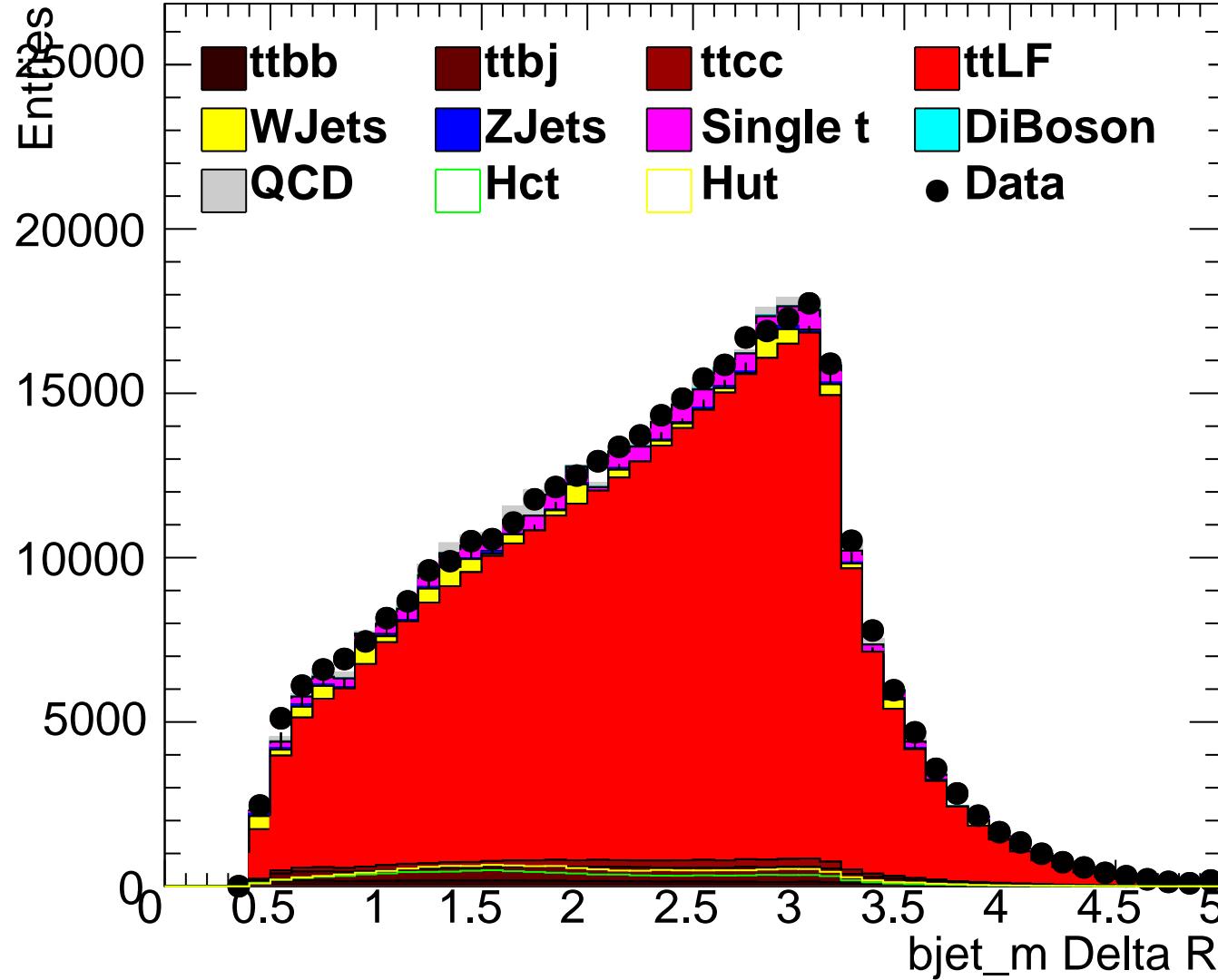
**Ch0\_S9**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch0\_S9**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch0\_S9**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

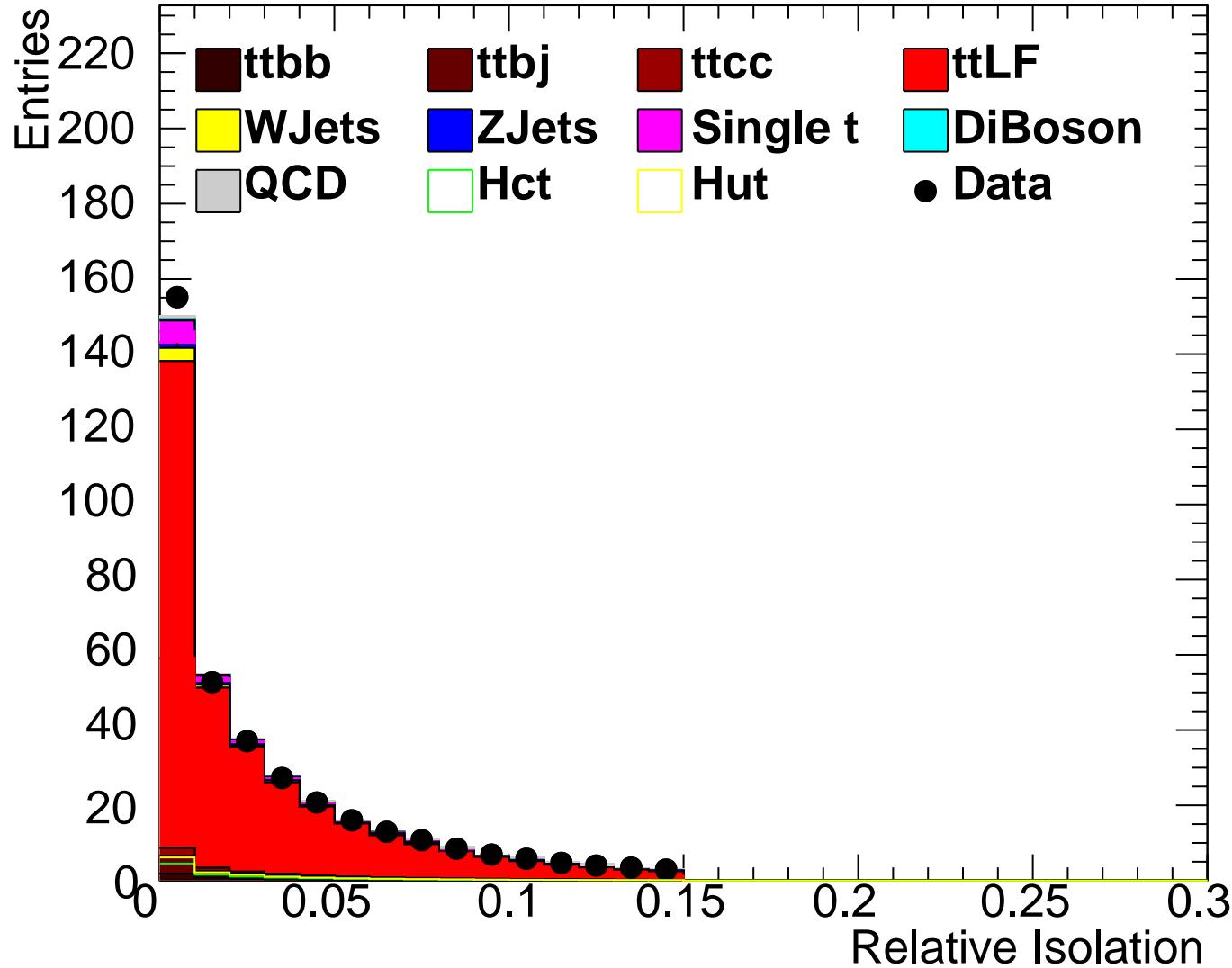


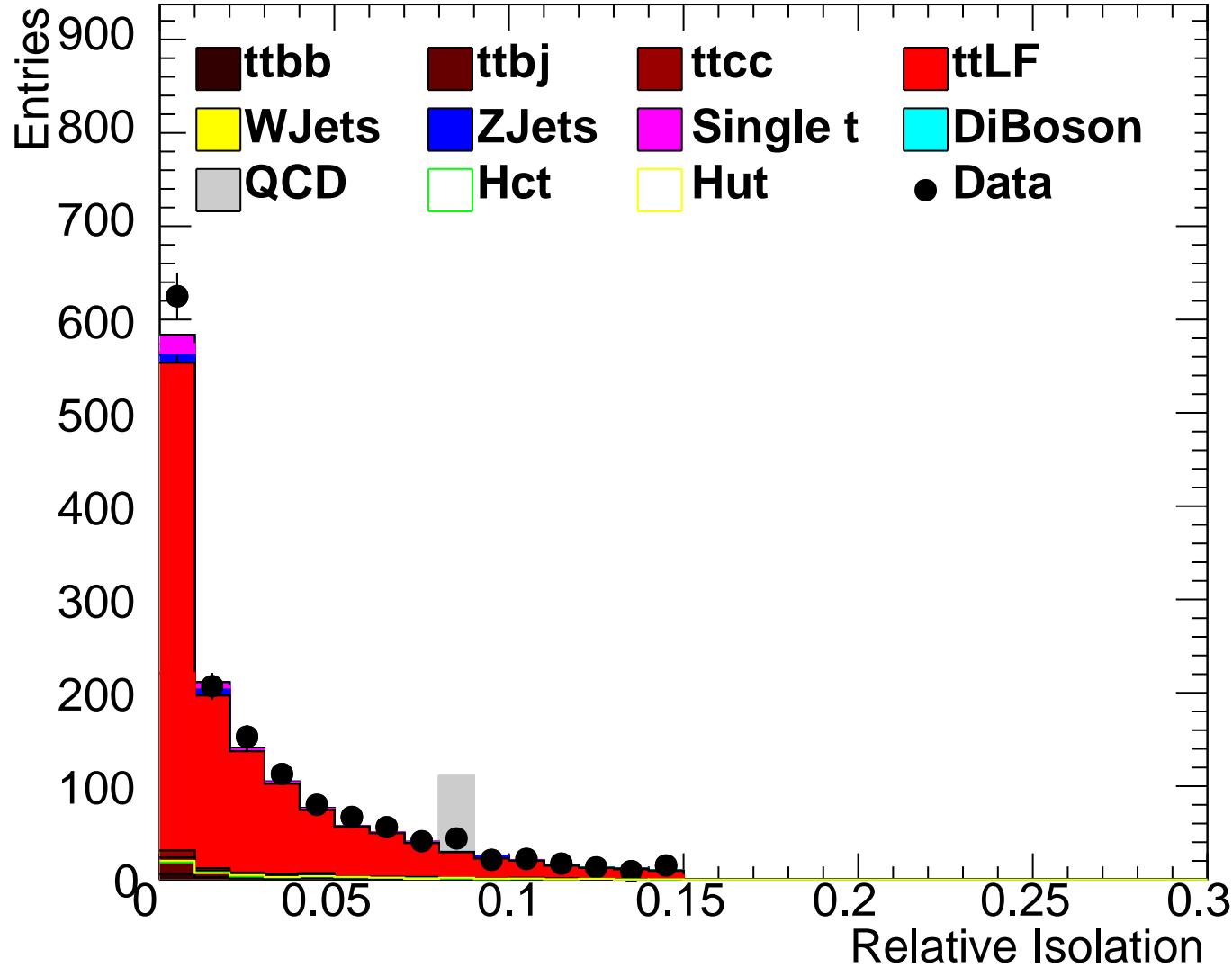


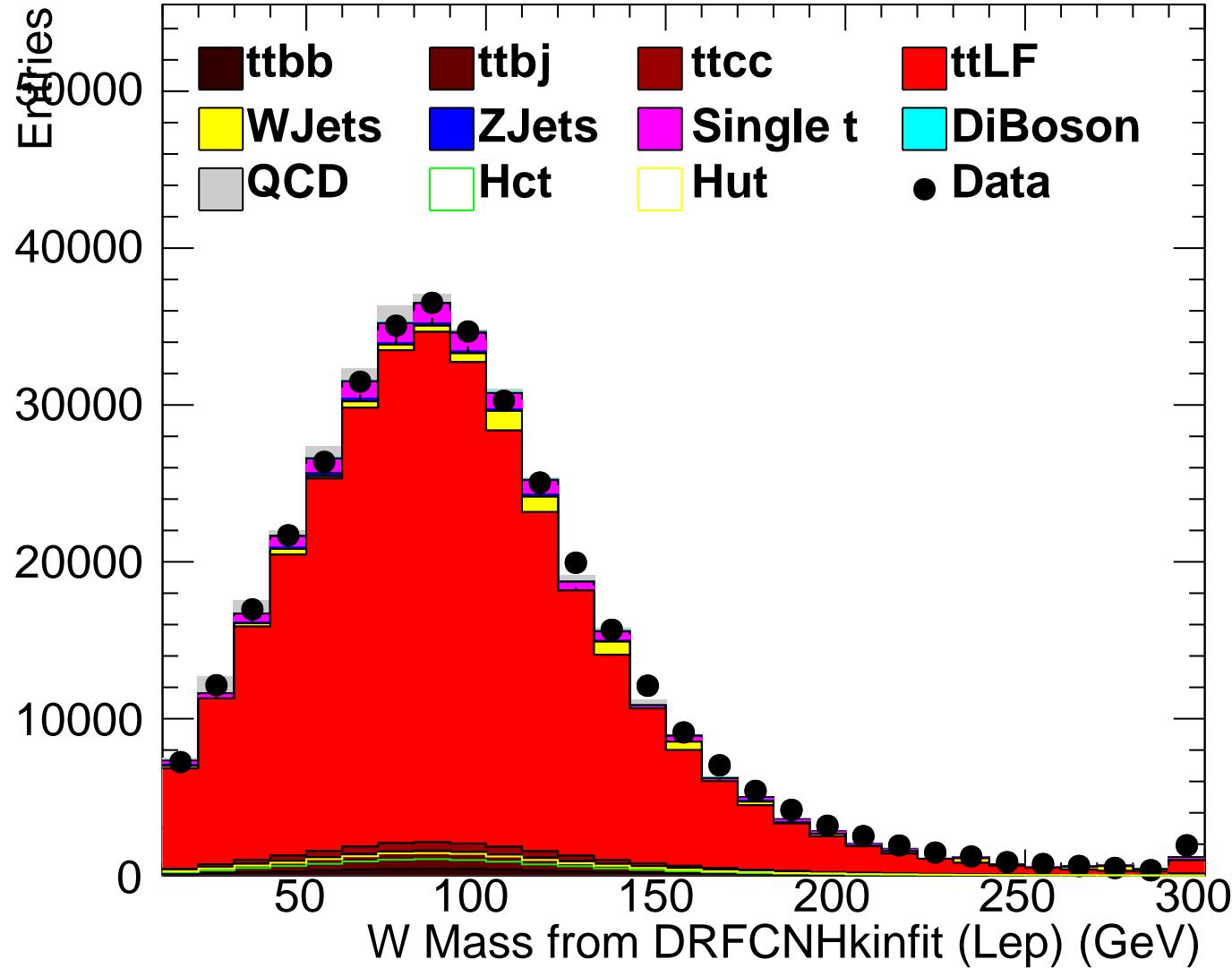
**Ch0\_S9**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

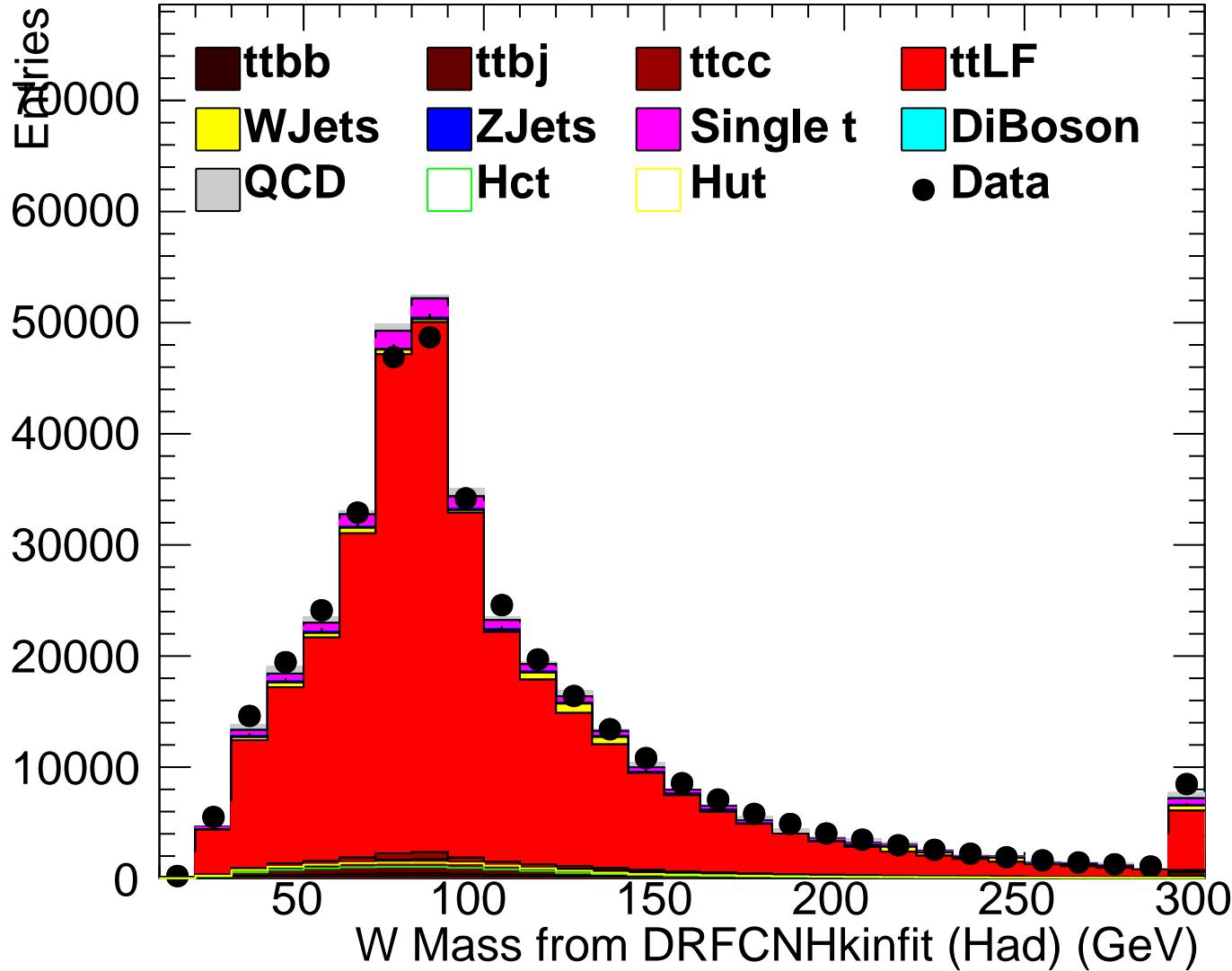
Ch0\_S9

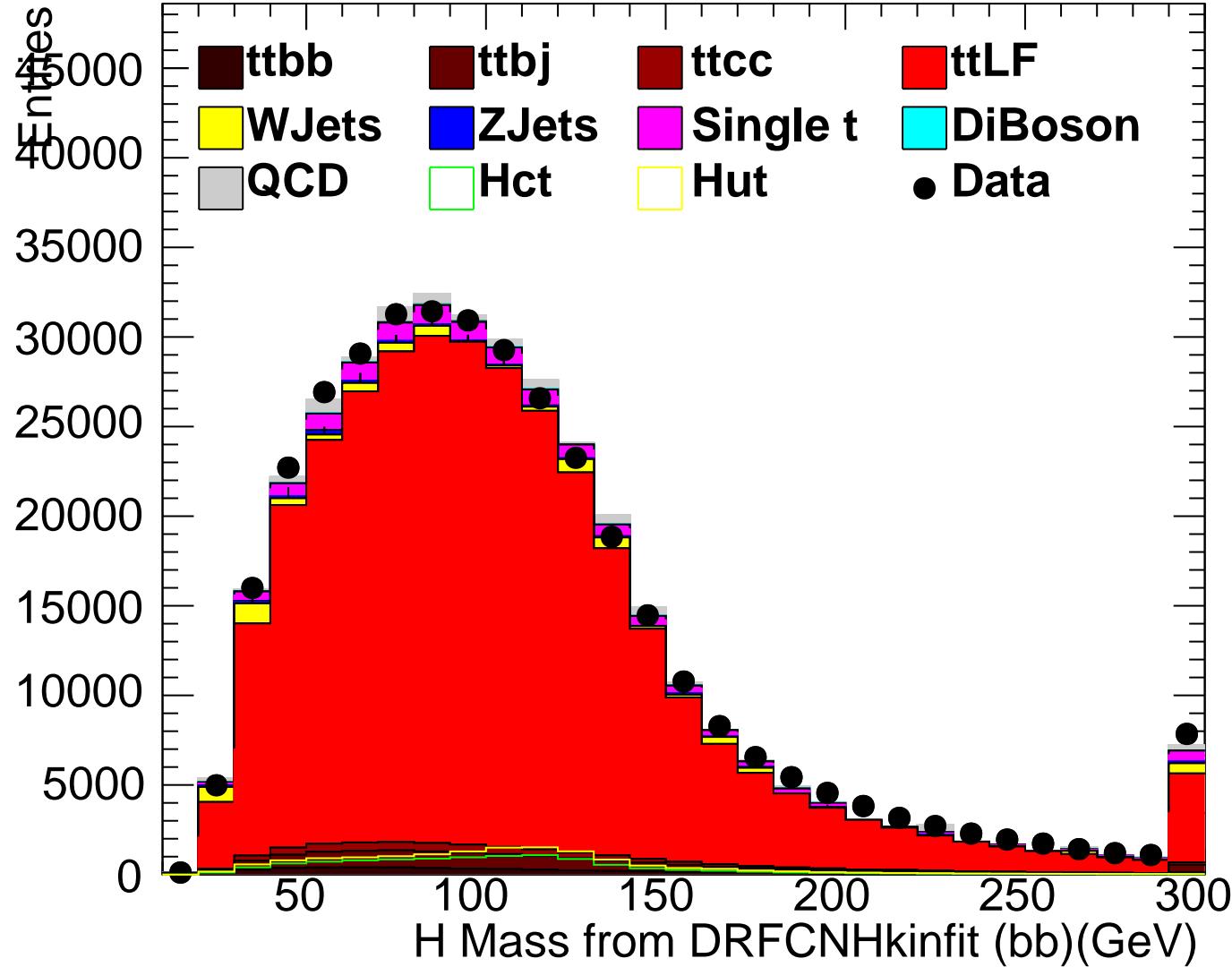
CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$

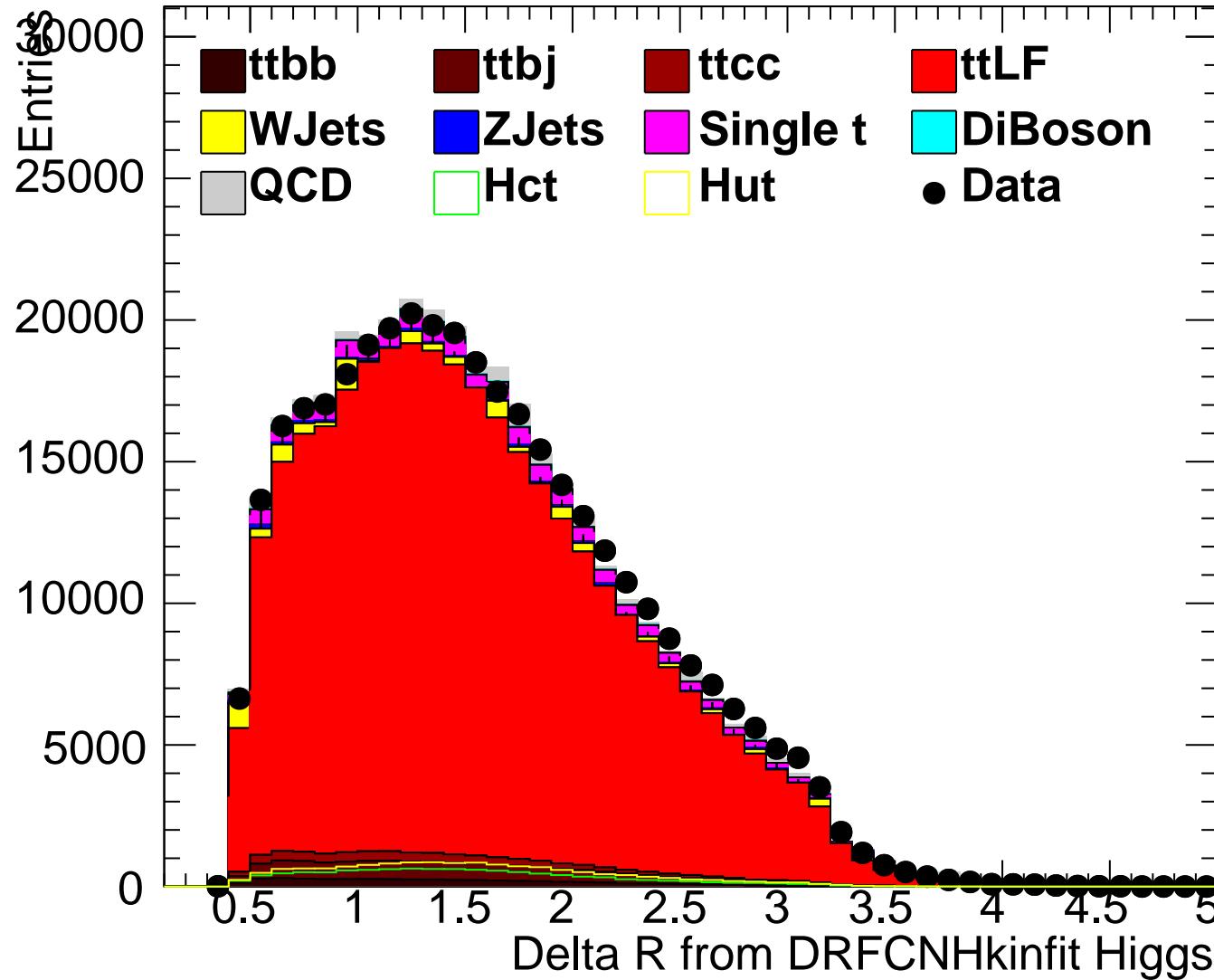


**Ch0\_S9**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch0\_S9**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch0\_S9**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch0\_S9**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch0\_S9**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch0\_S9**x 10<sup>-3</sup>CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV

Entries

120

100

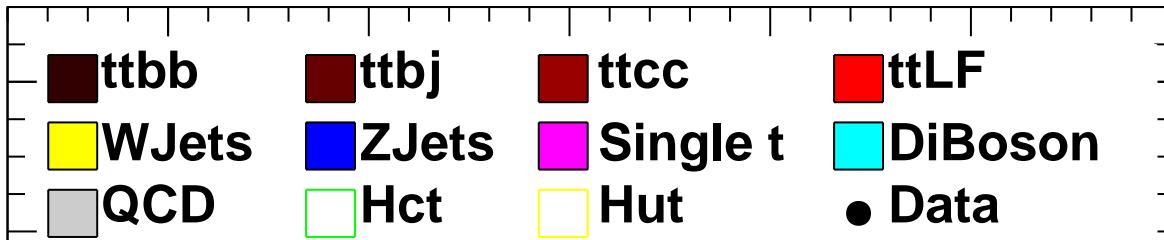
80

60

40

20

0



Top Mass from DRFCNHNkinf (Lep) (GeV)

50

100

150

200

250

300

50

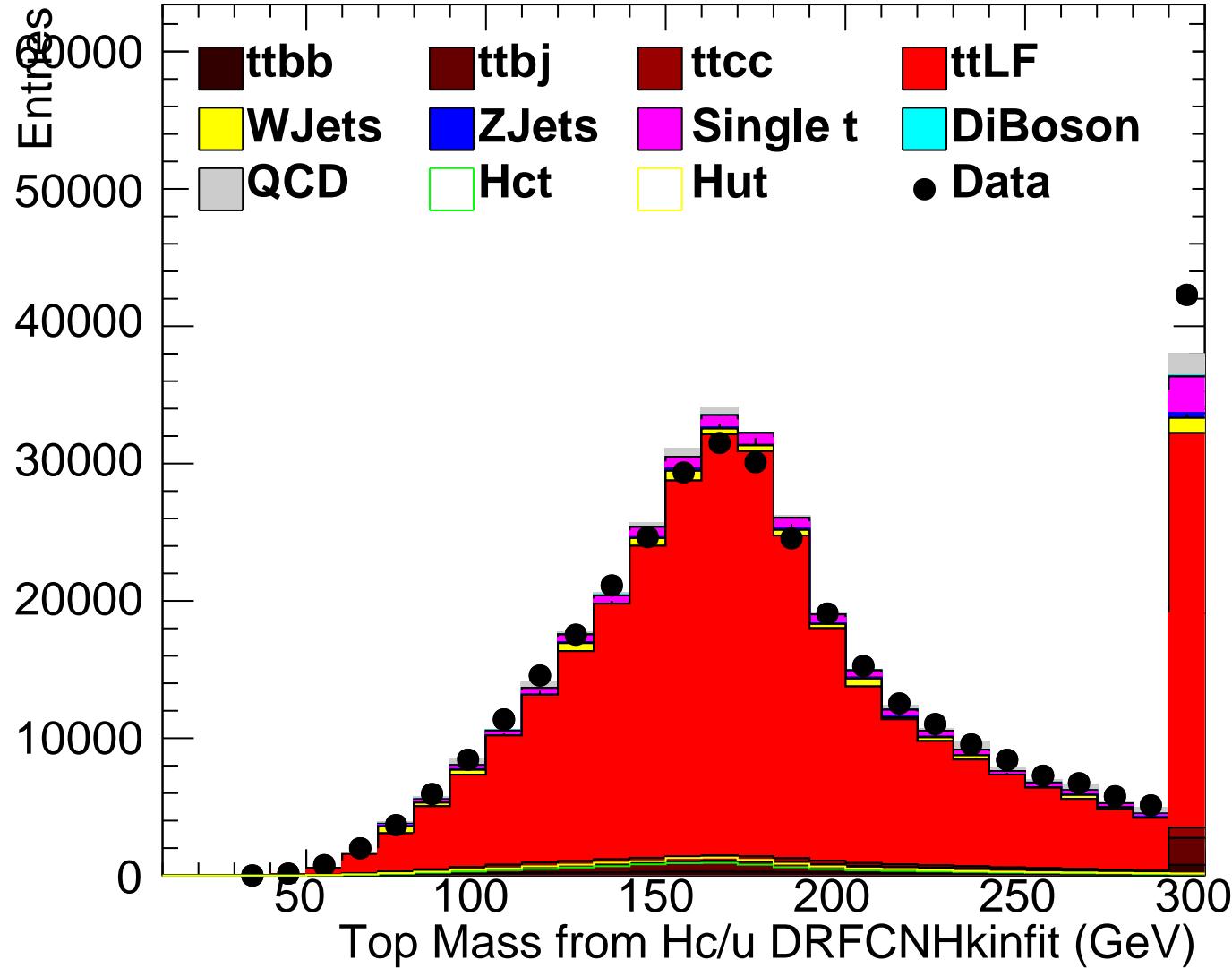
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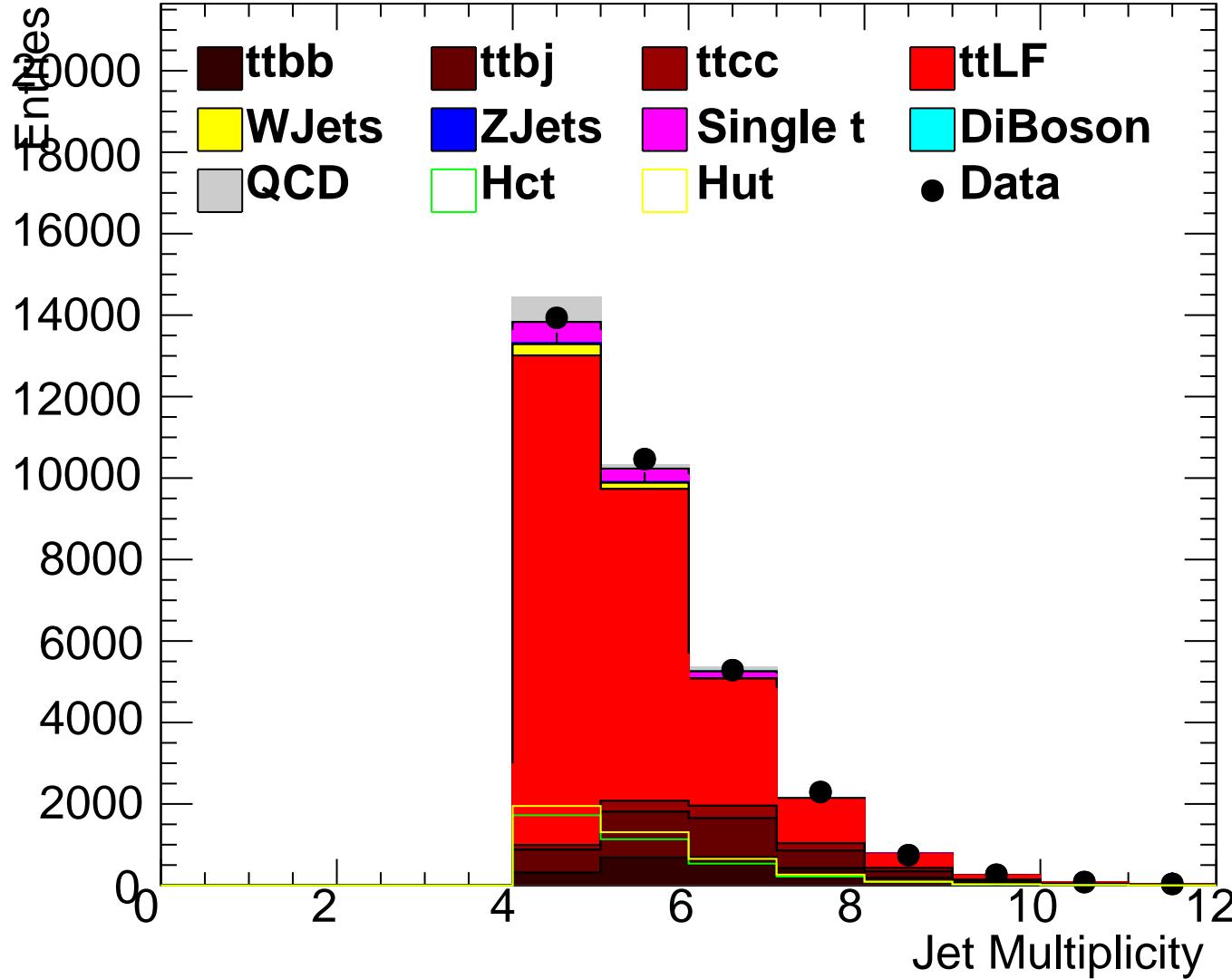
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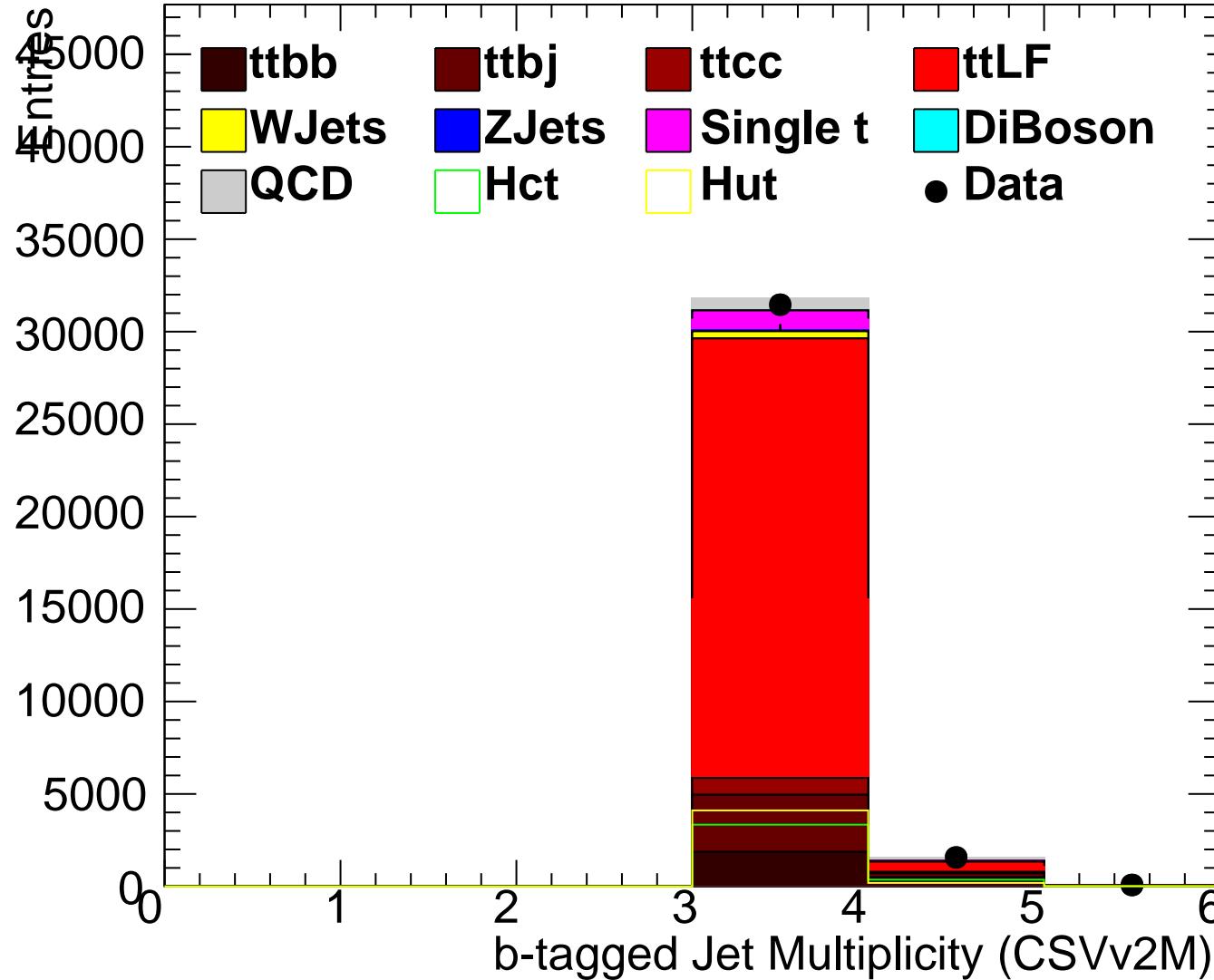
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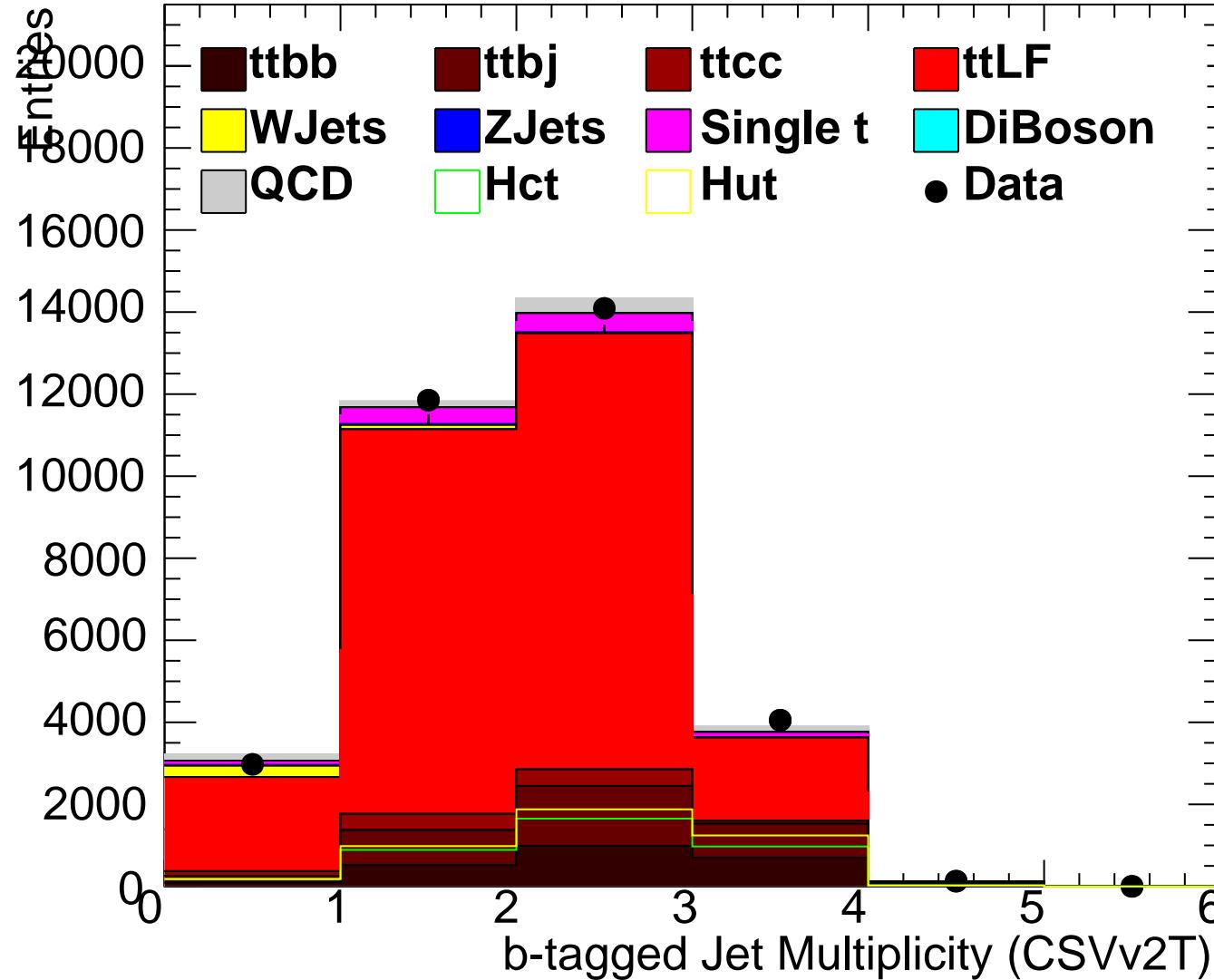
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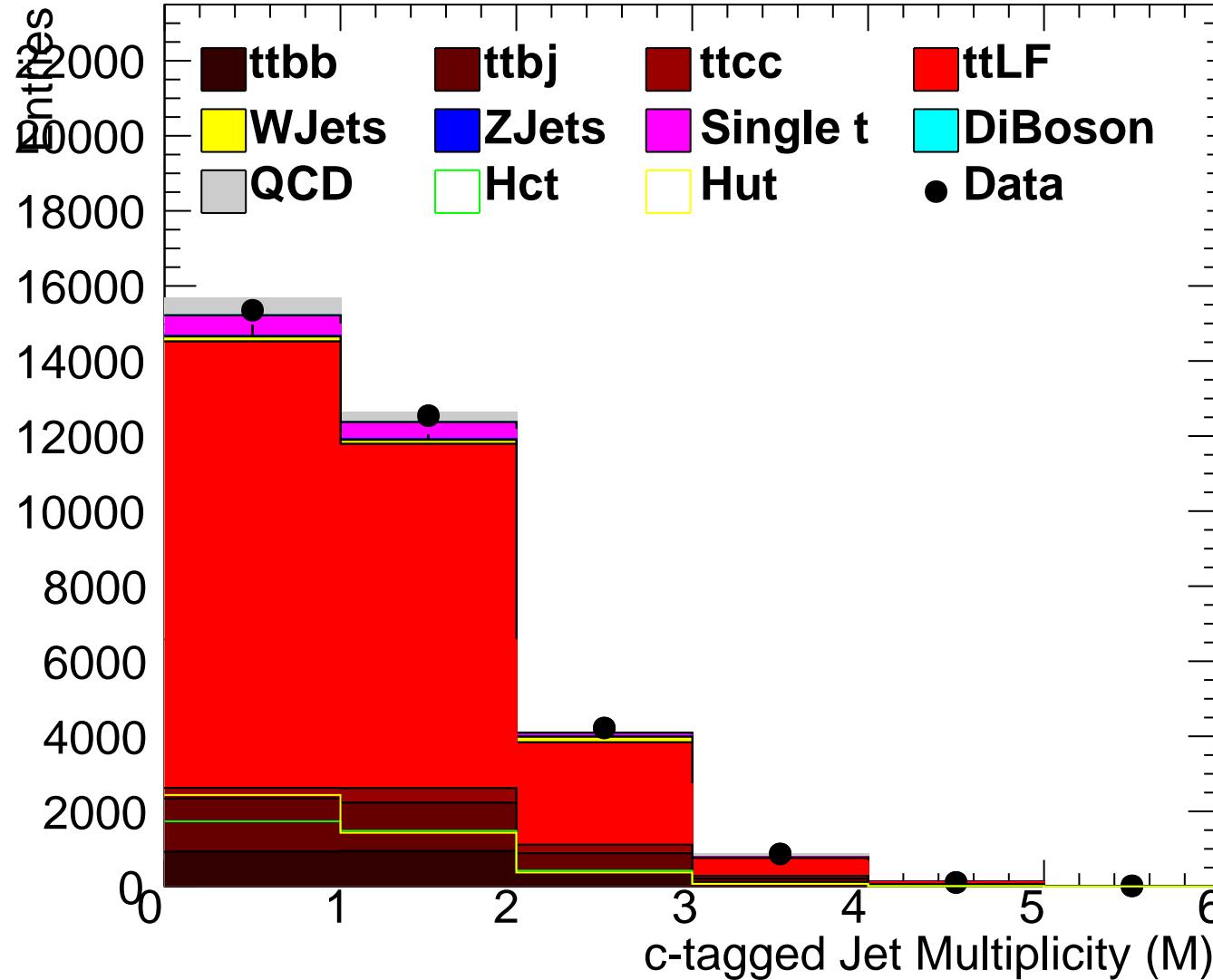
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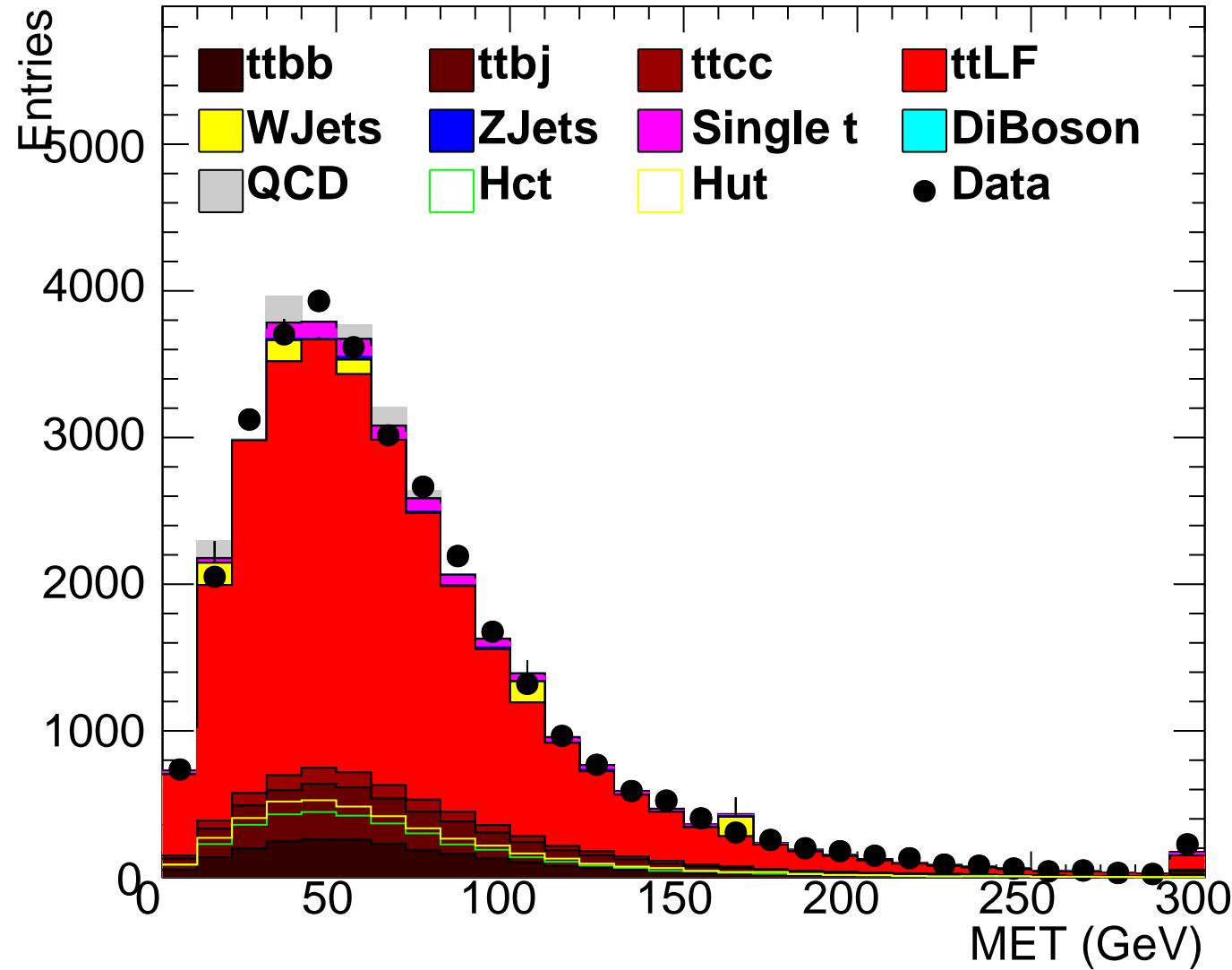
**Ch0\_S9**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 





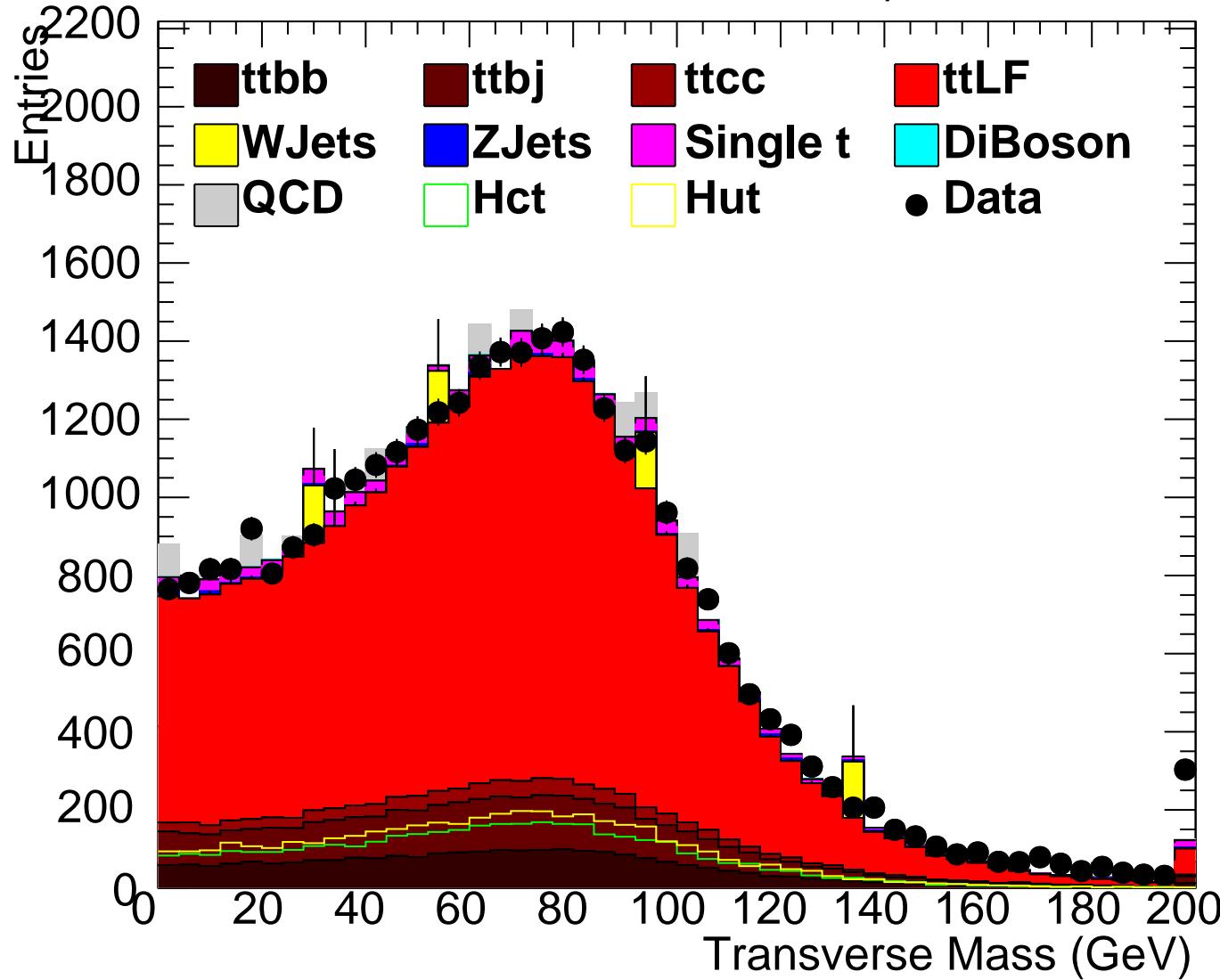


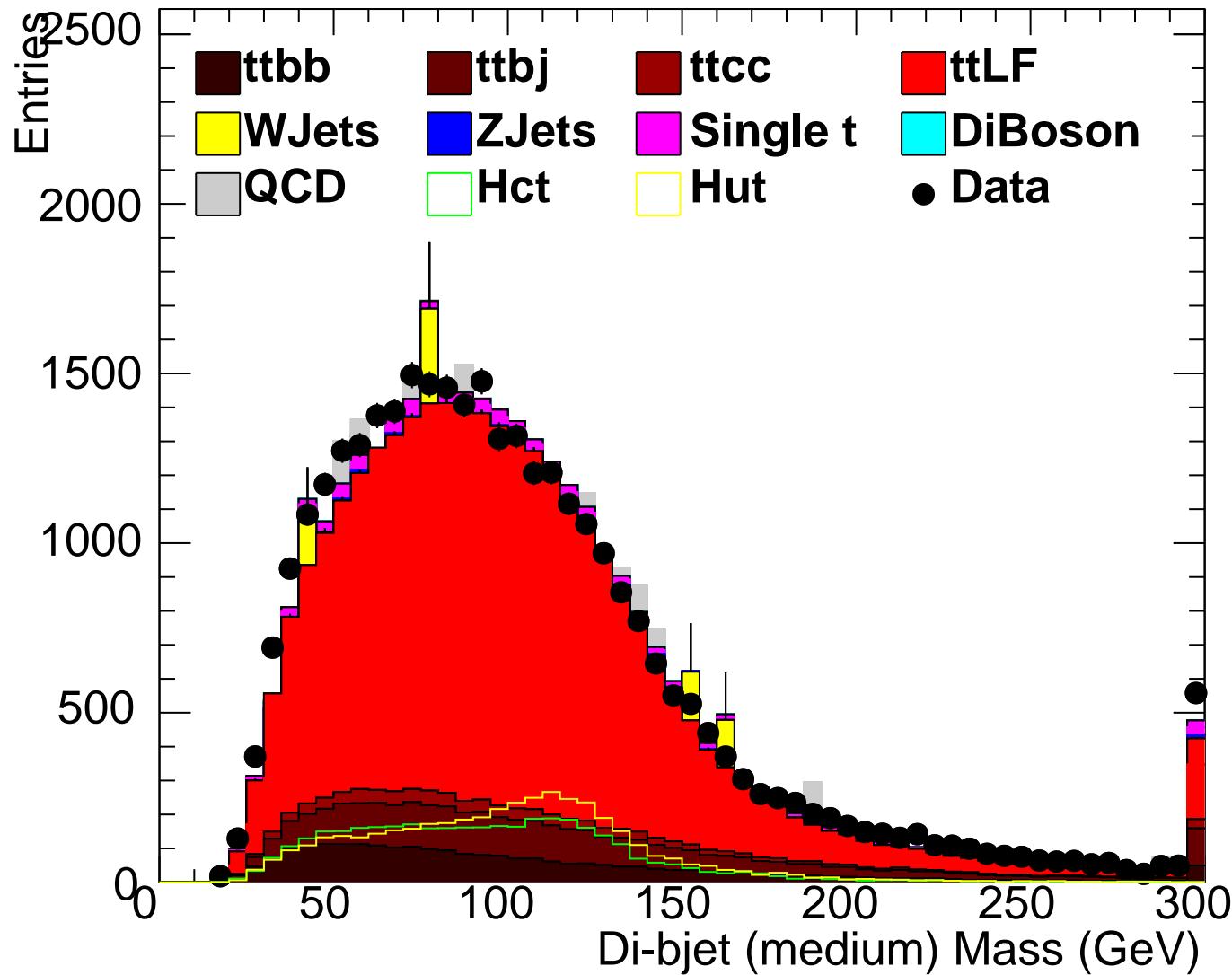


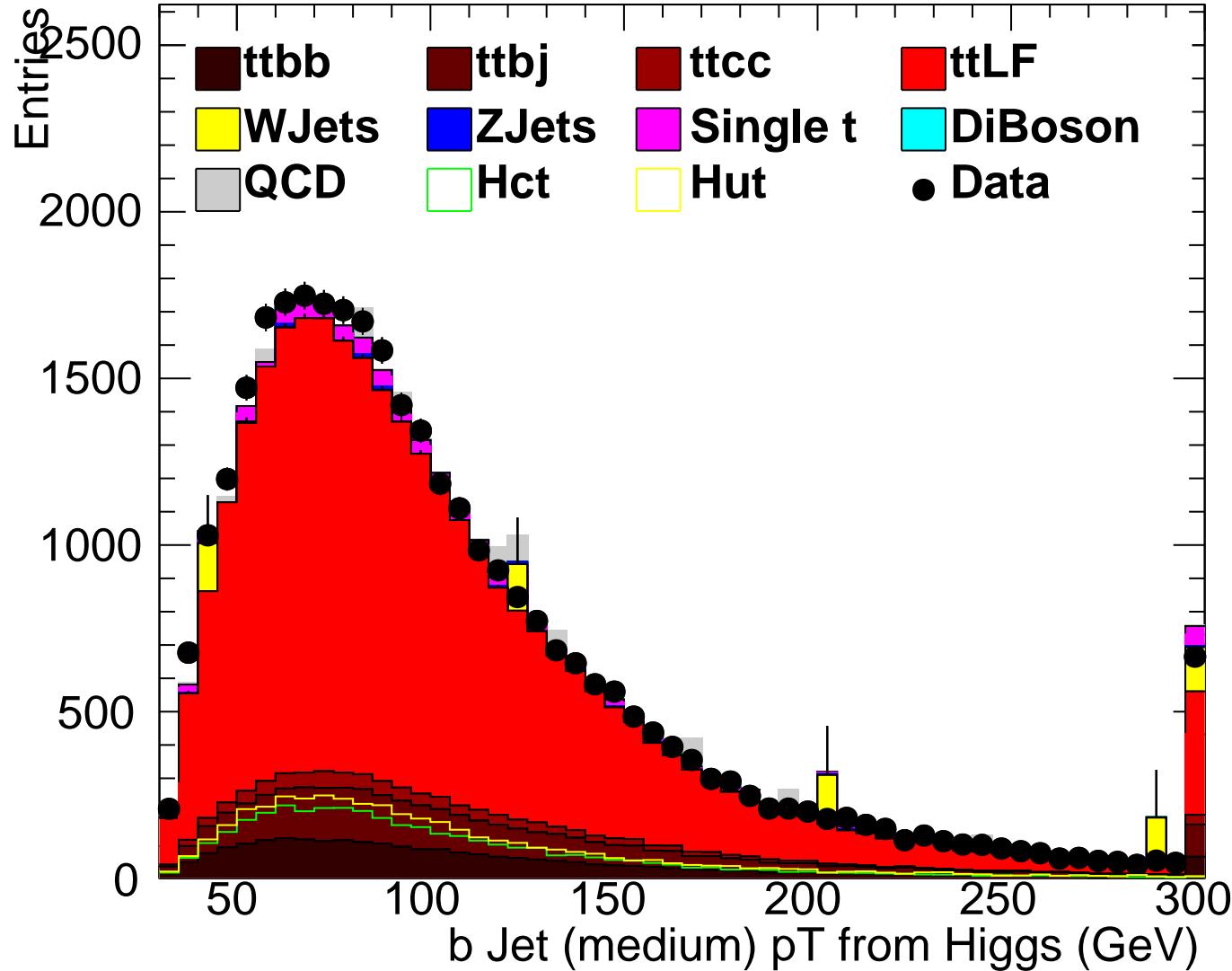


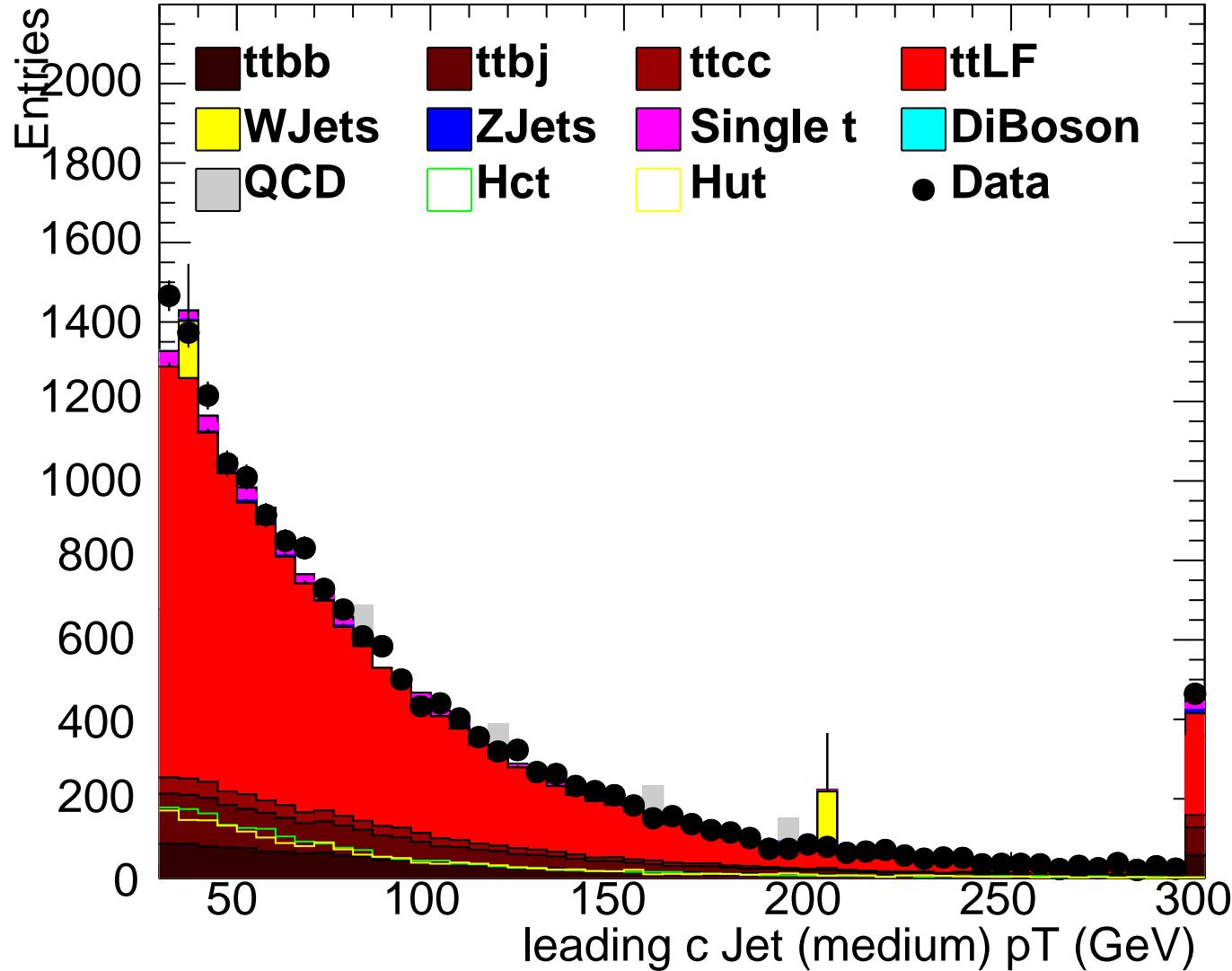
**Ch0\_S10**

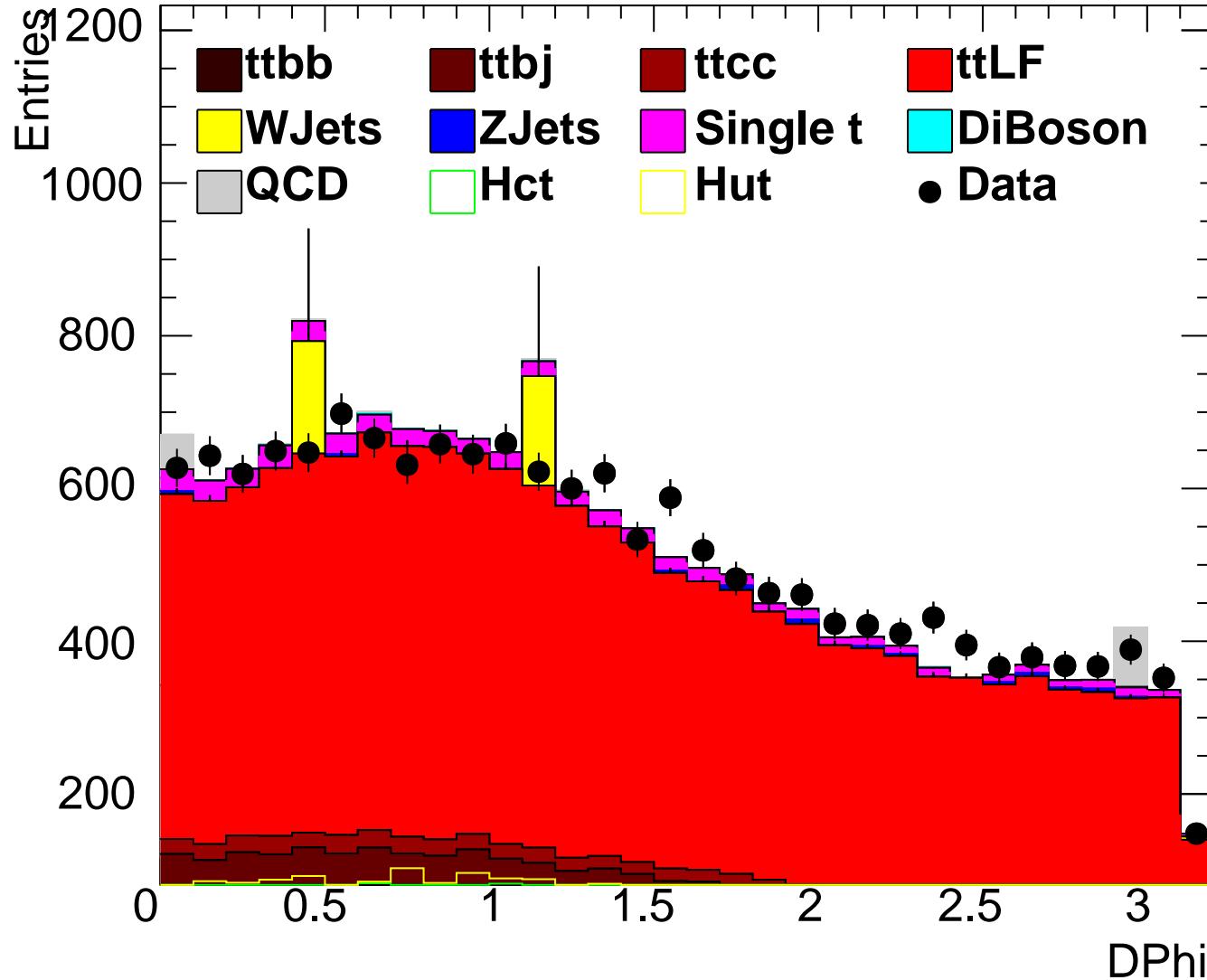
CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$

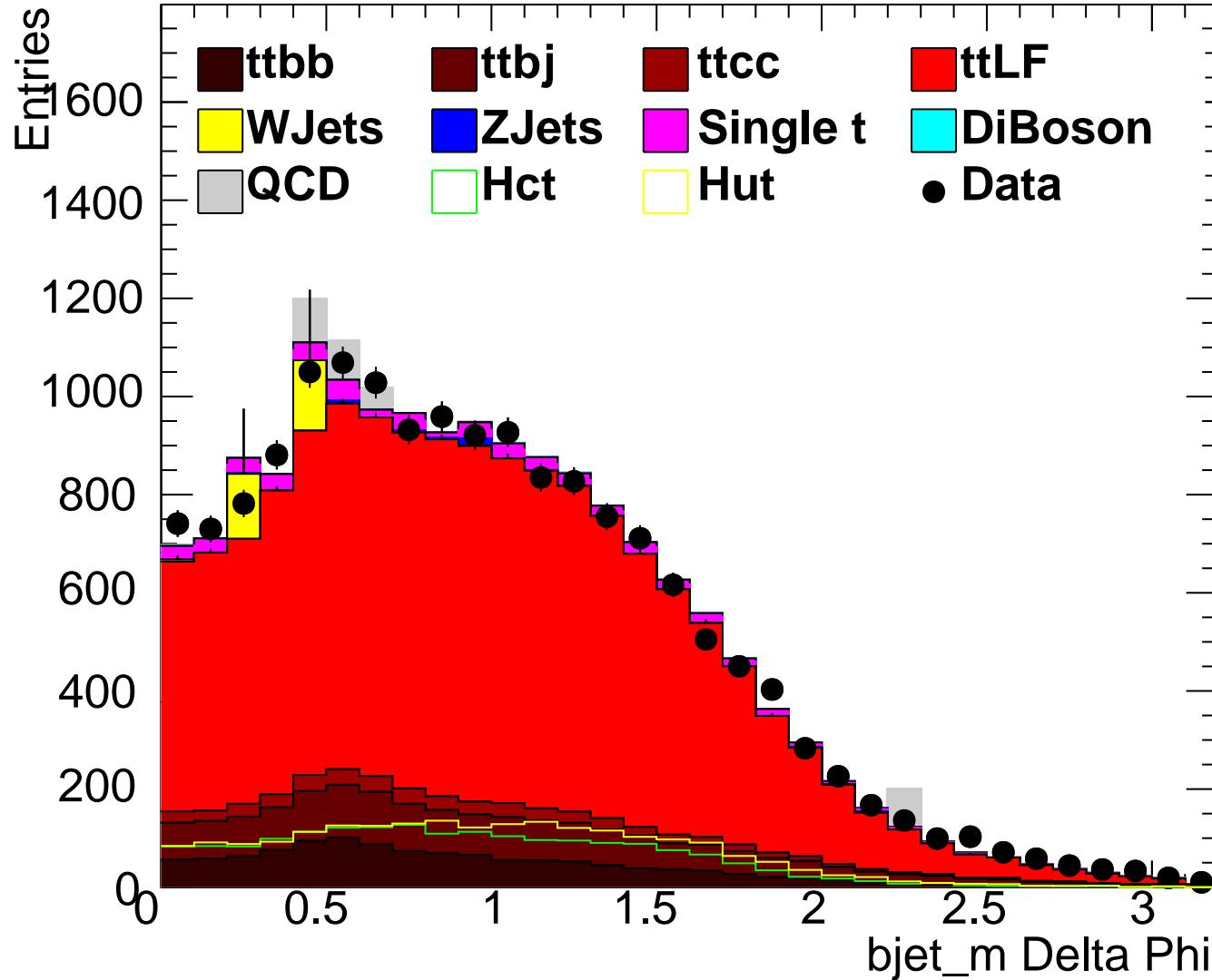


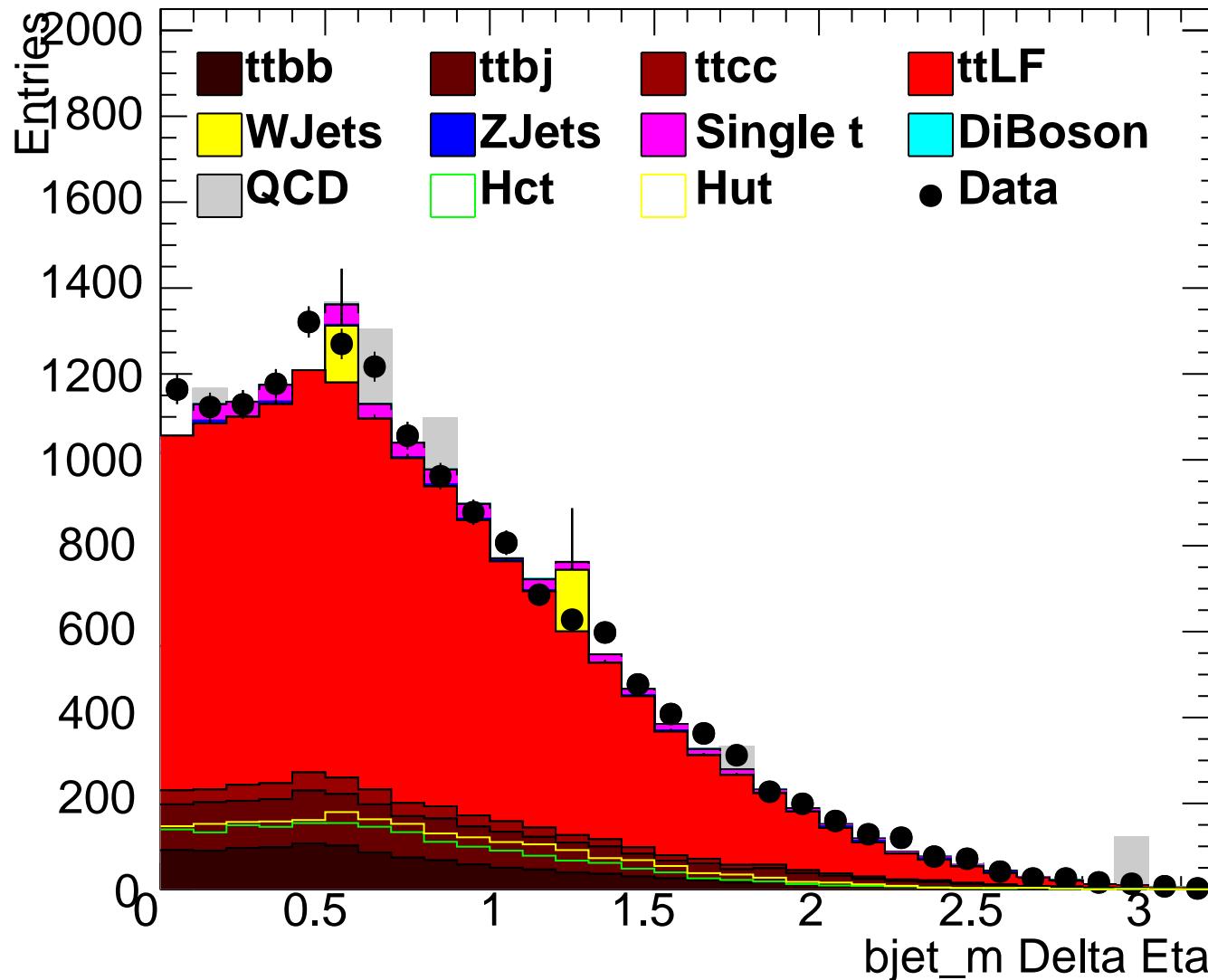
**Ch0\_S10**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

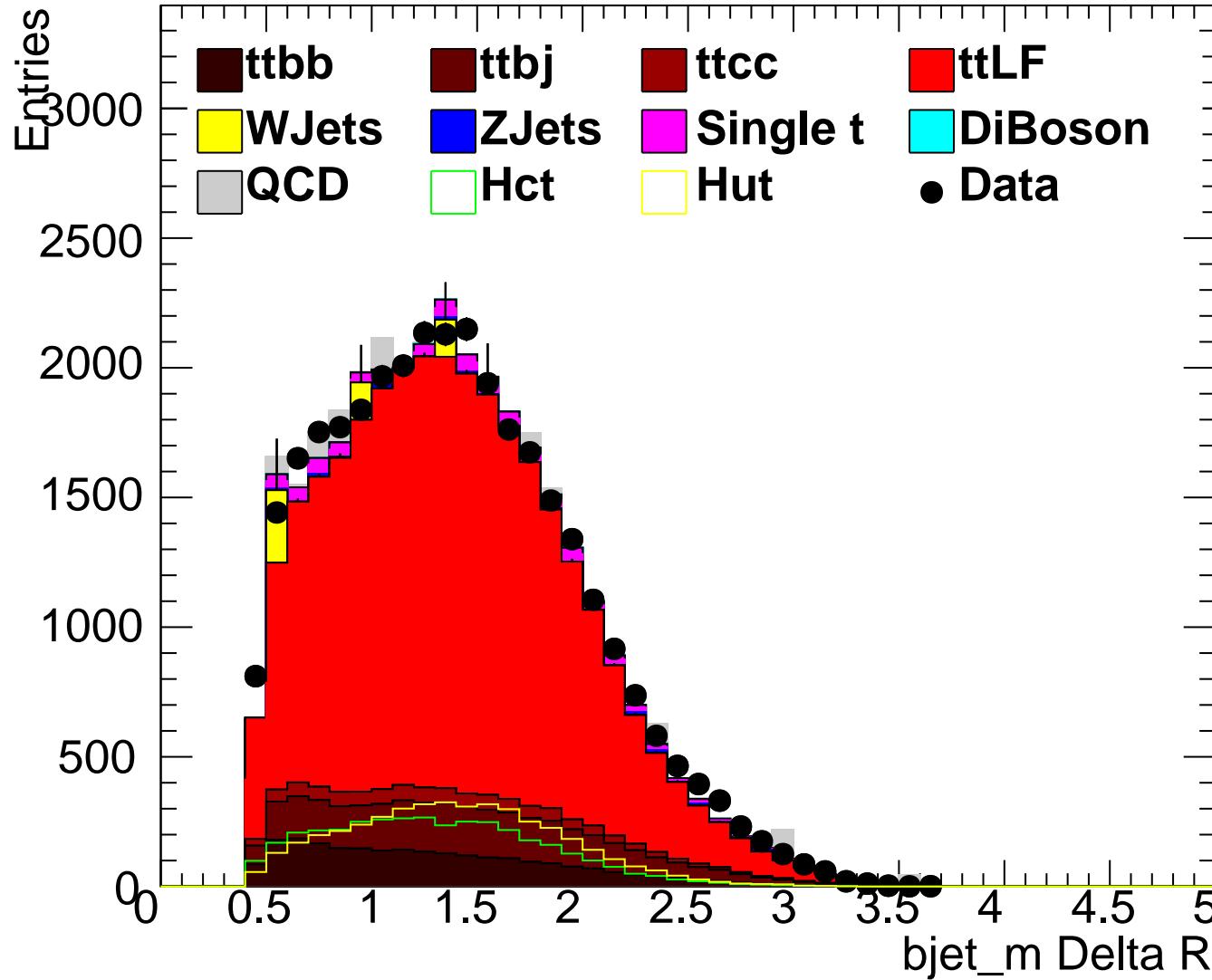
**Ch0\_S10**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

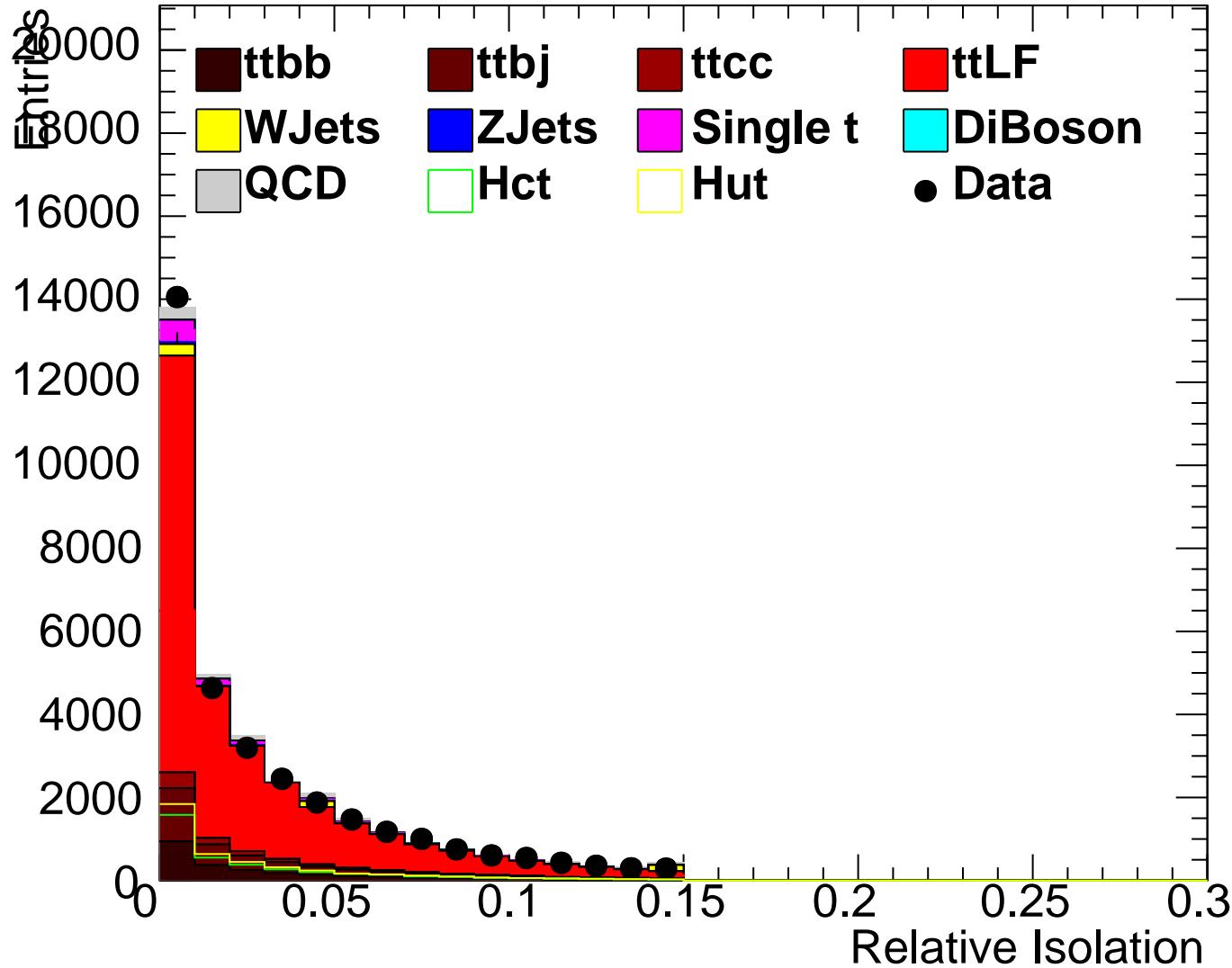
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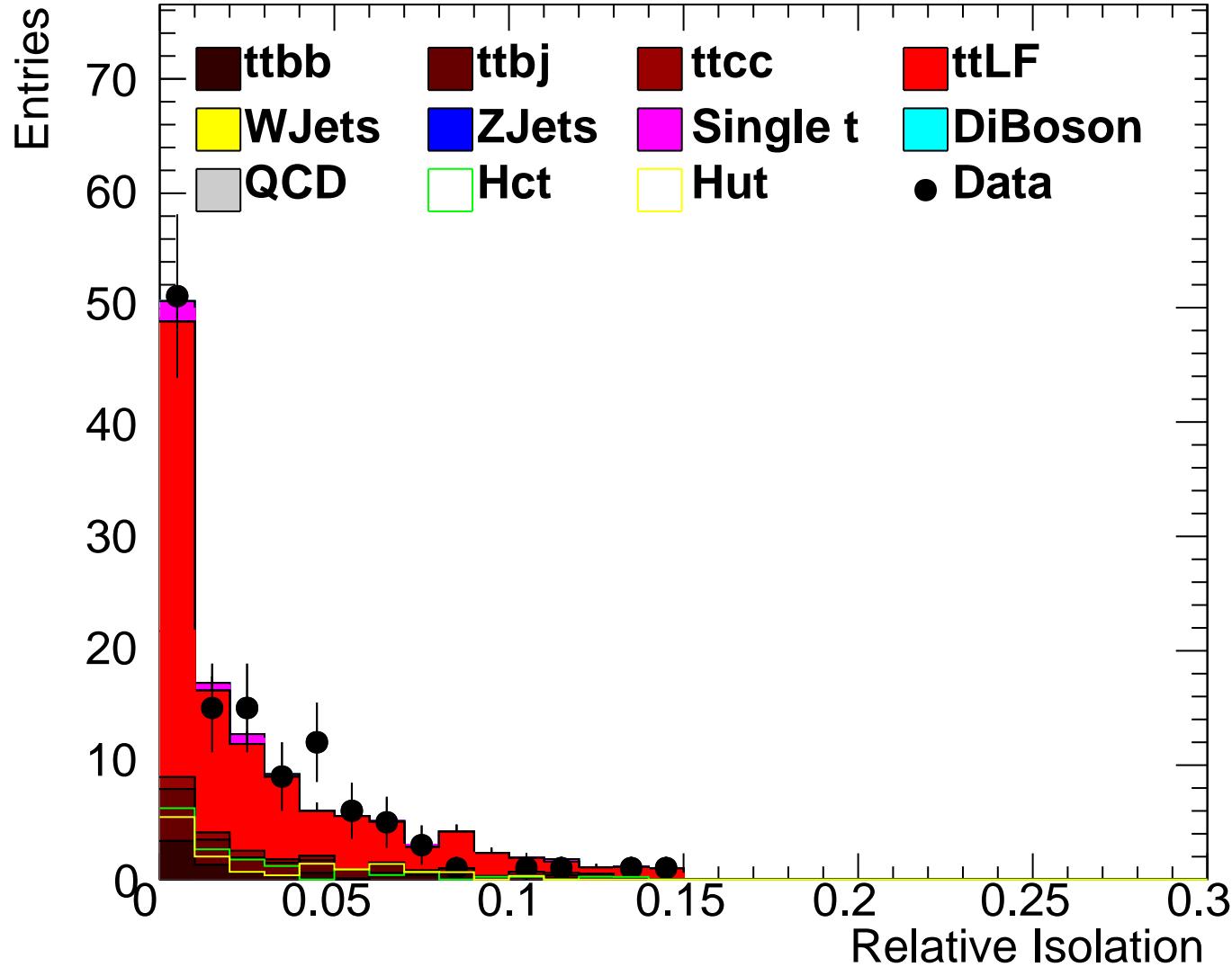


**Ch0\_S10**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch0\_S10**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

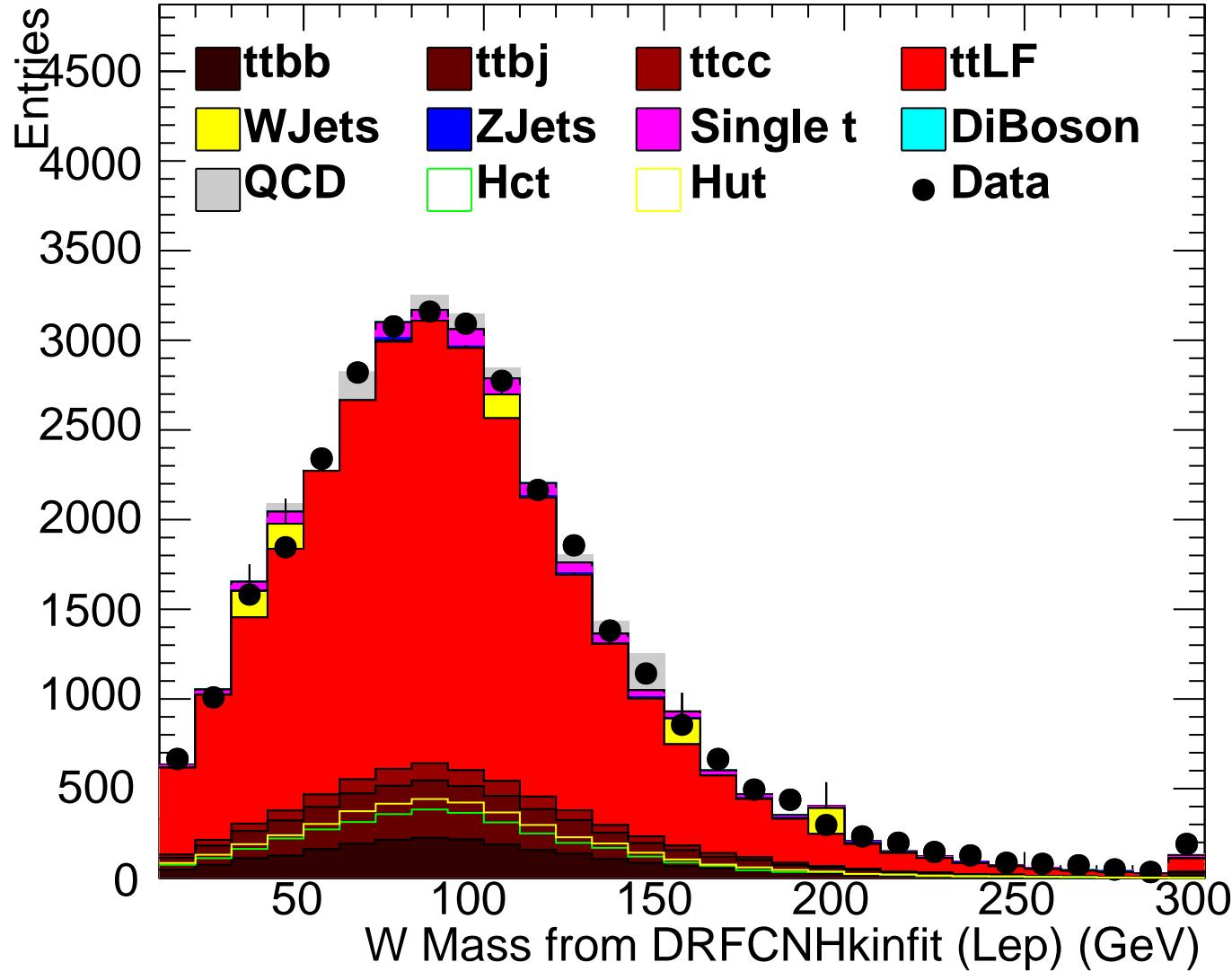


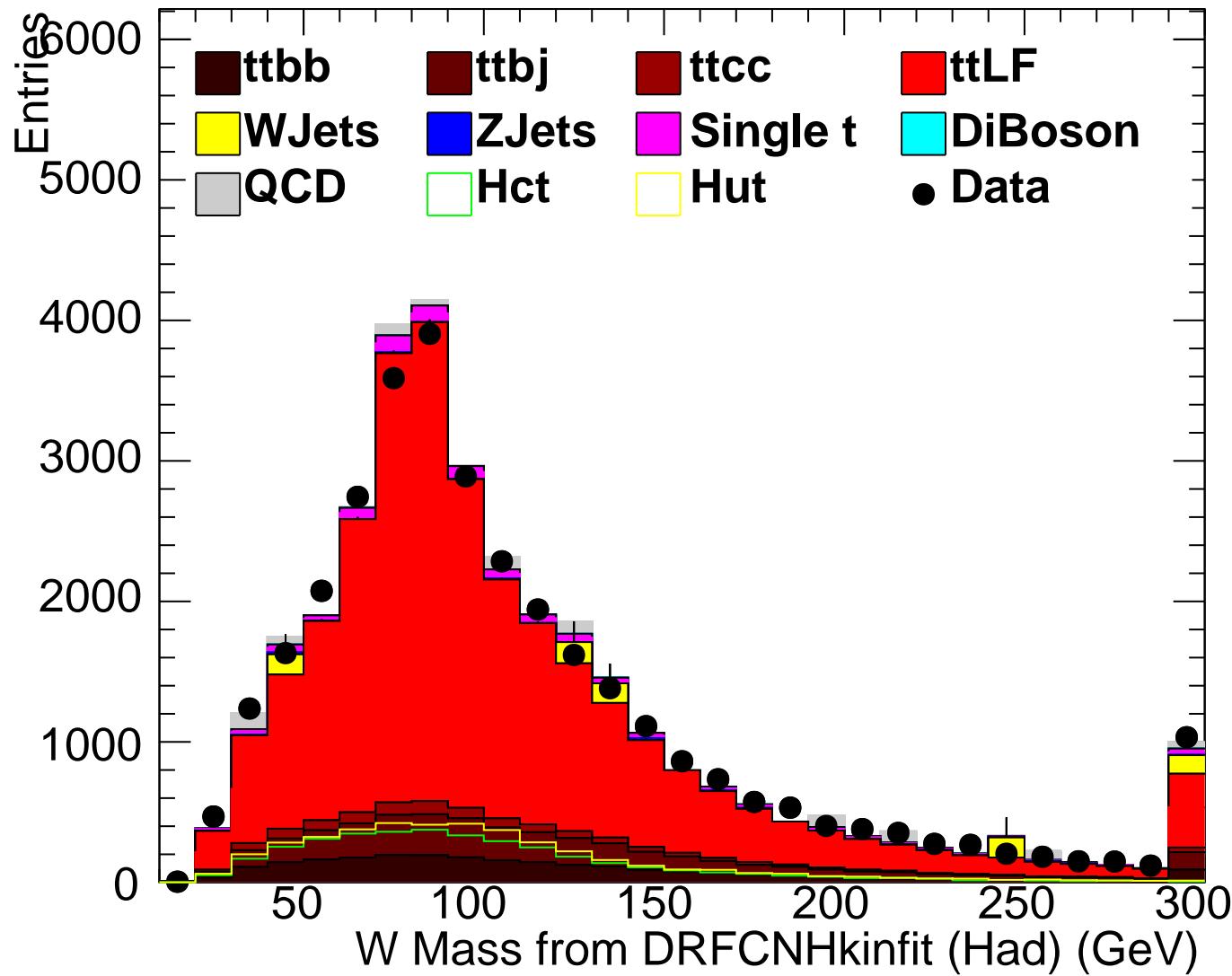


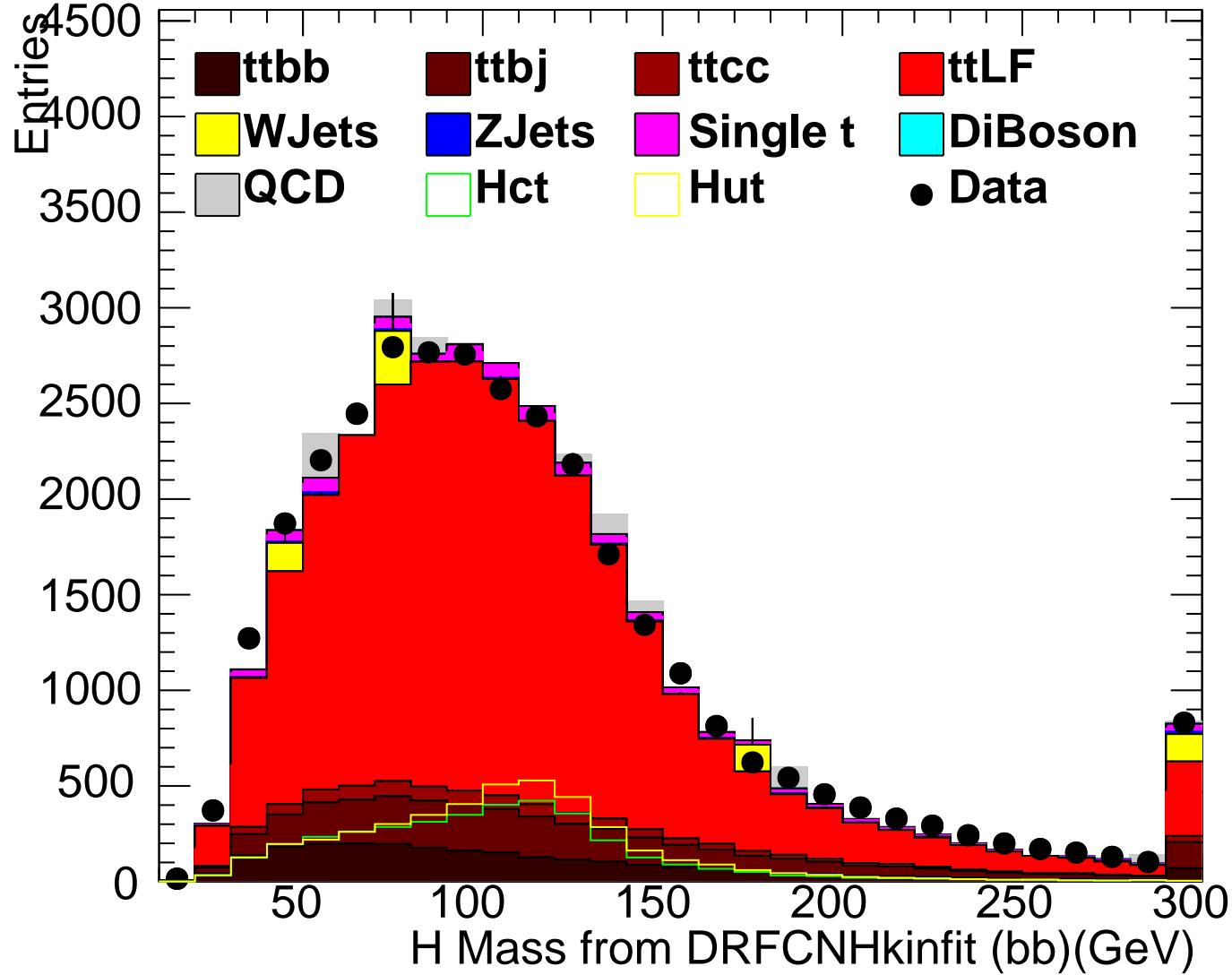


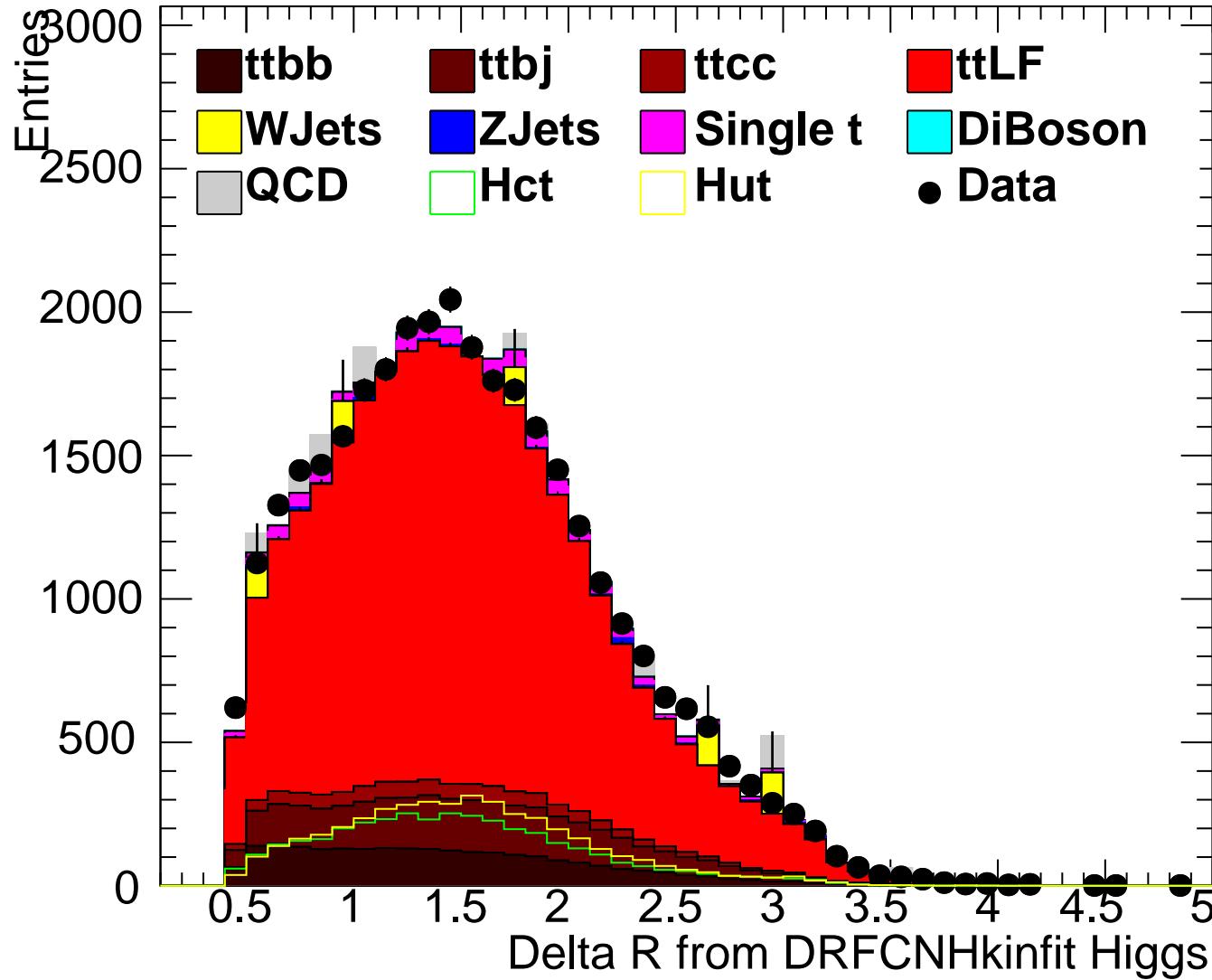
# Ch0\_S10

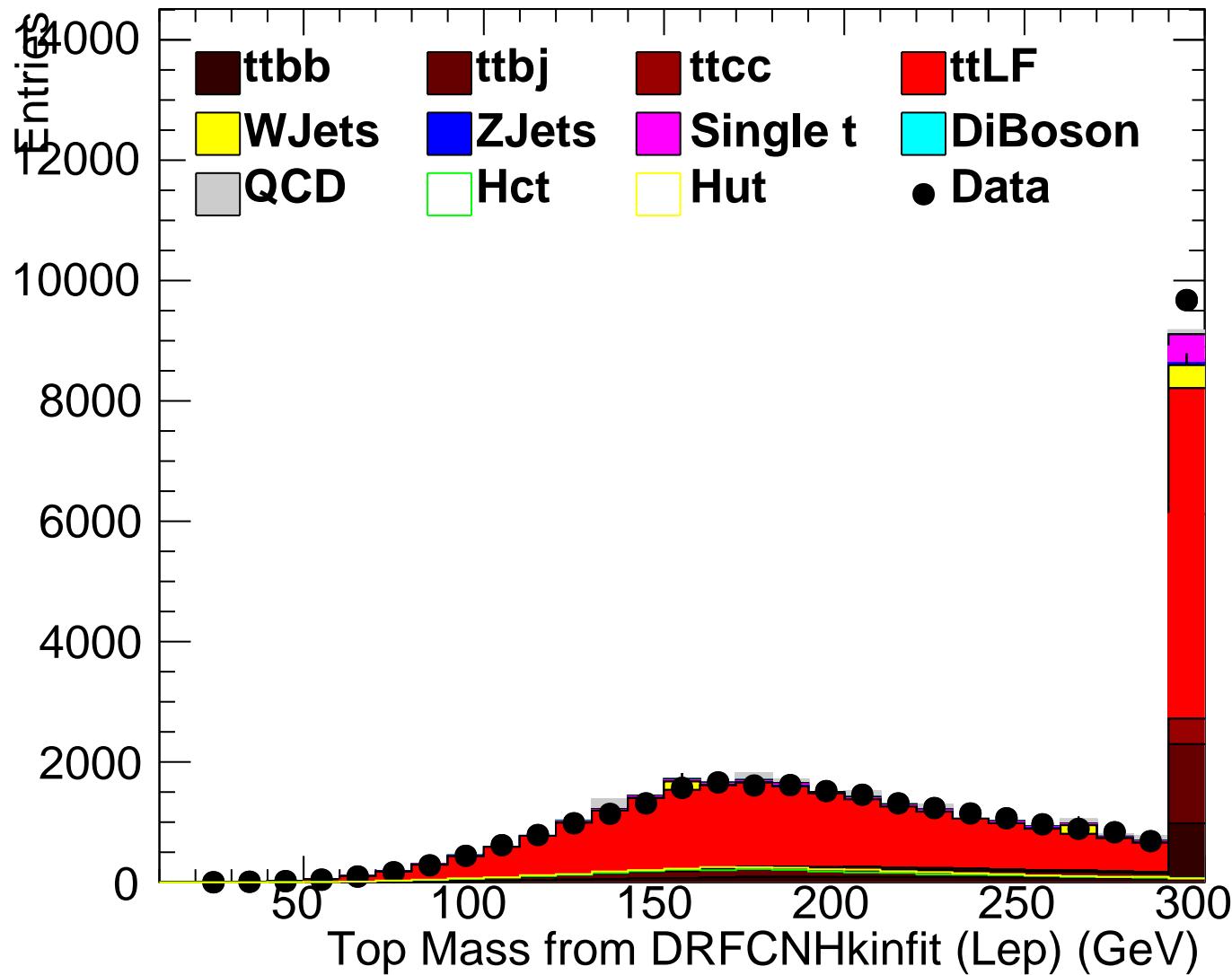
CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$

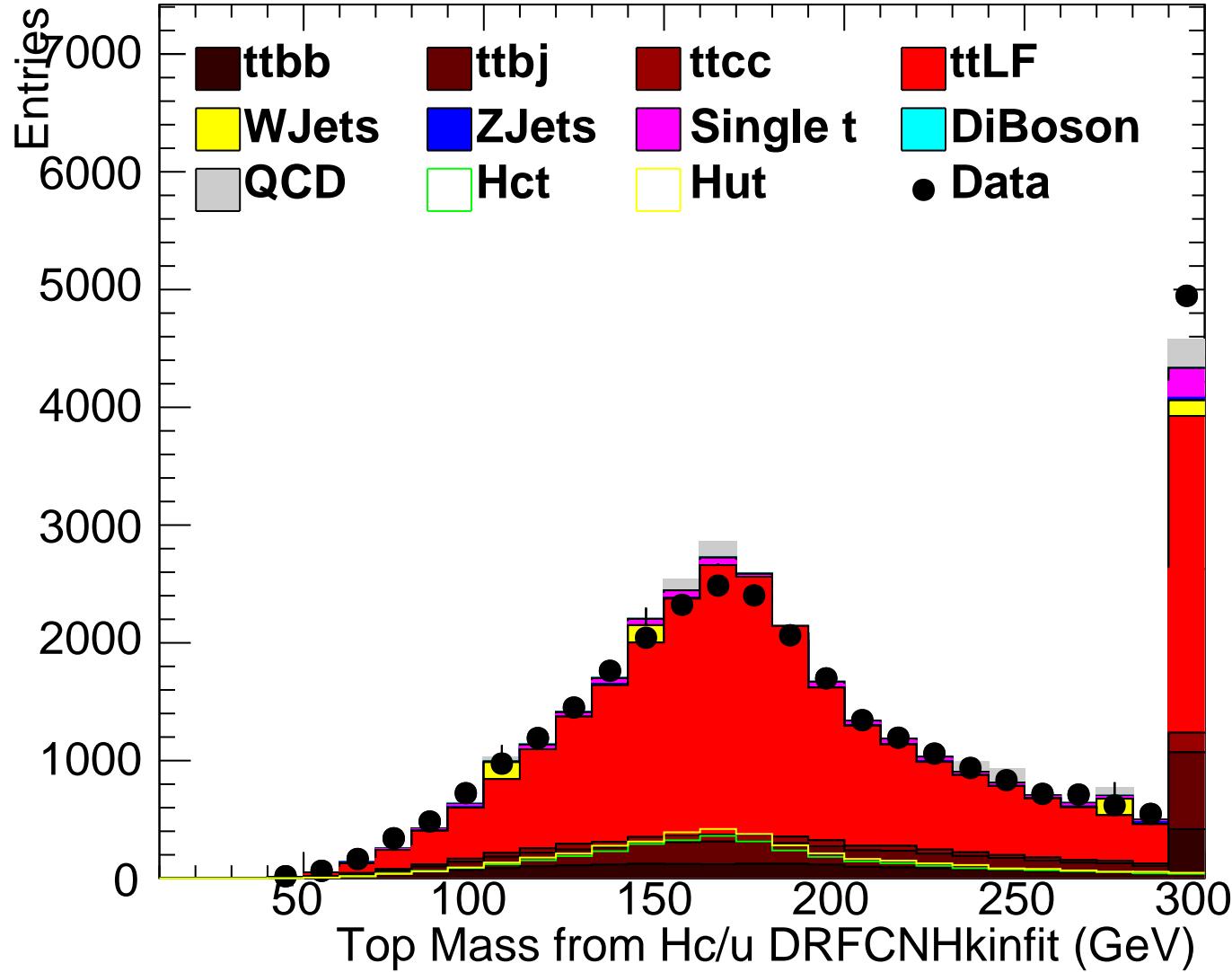






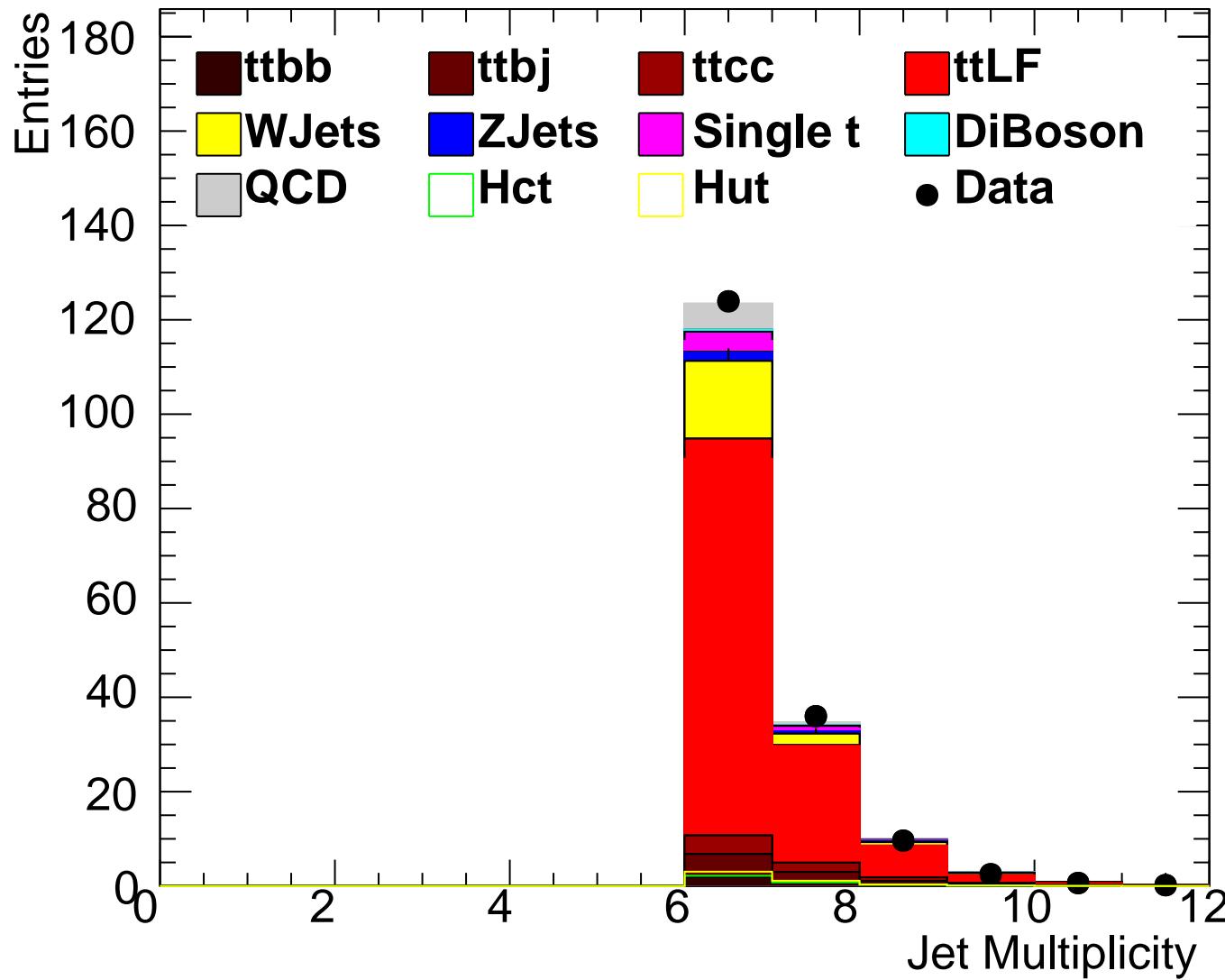


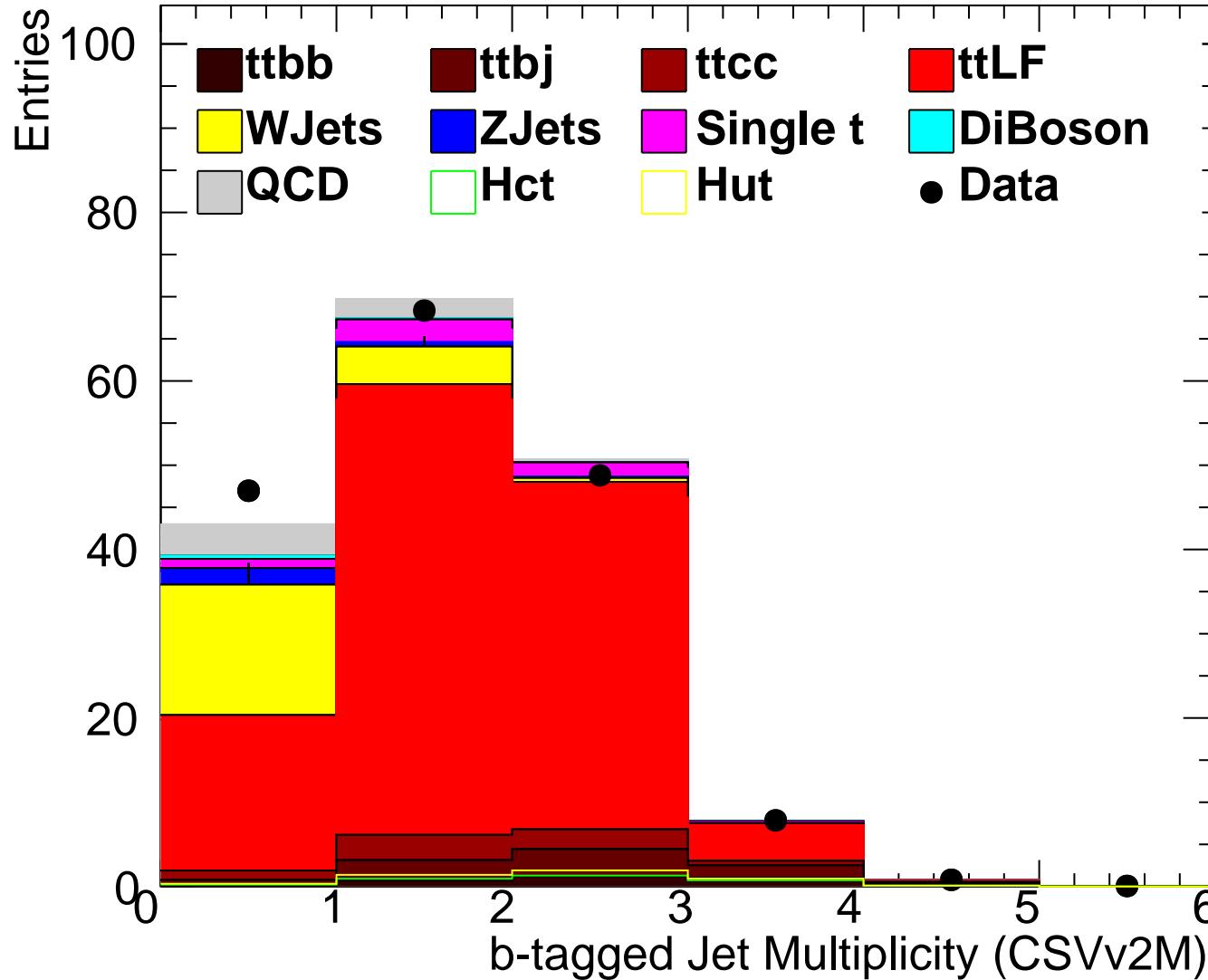
**Ch0\_S10**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch0\_S10**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

Ch0\_S11

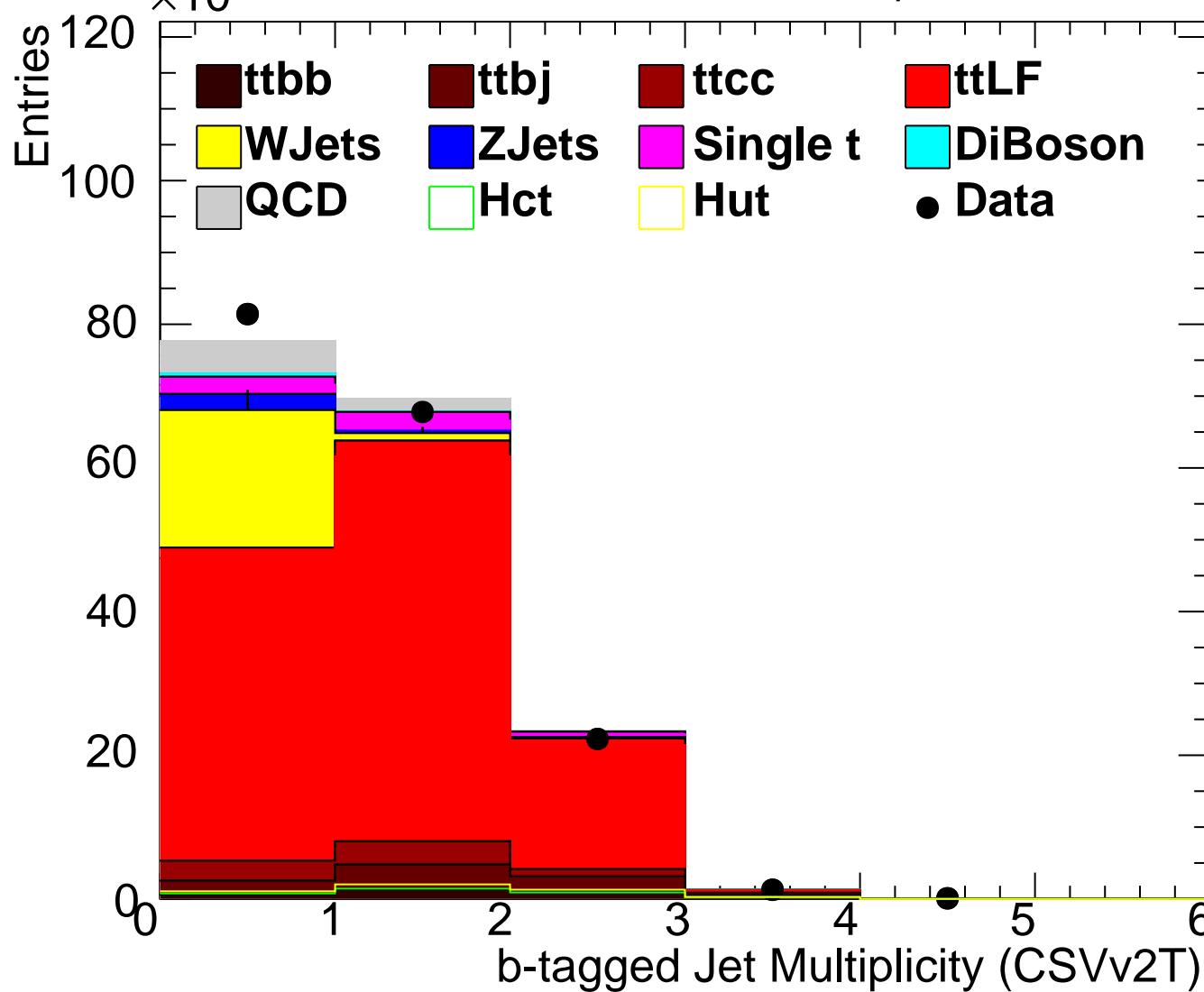
CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV

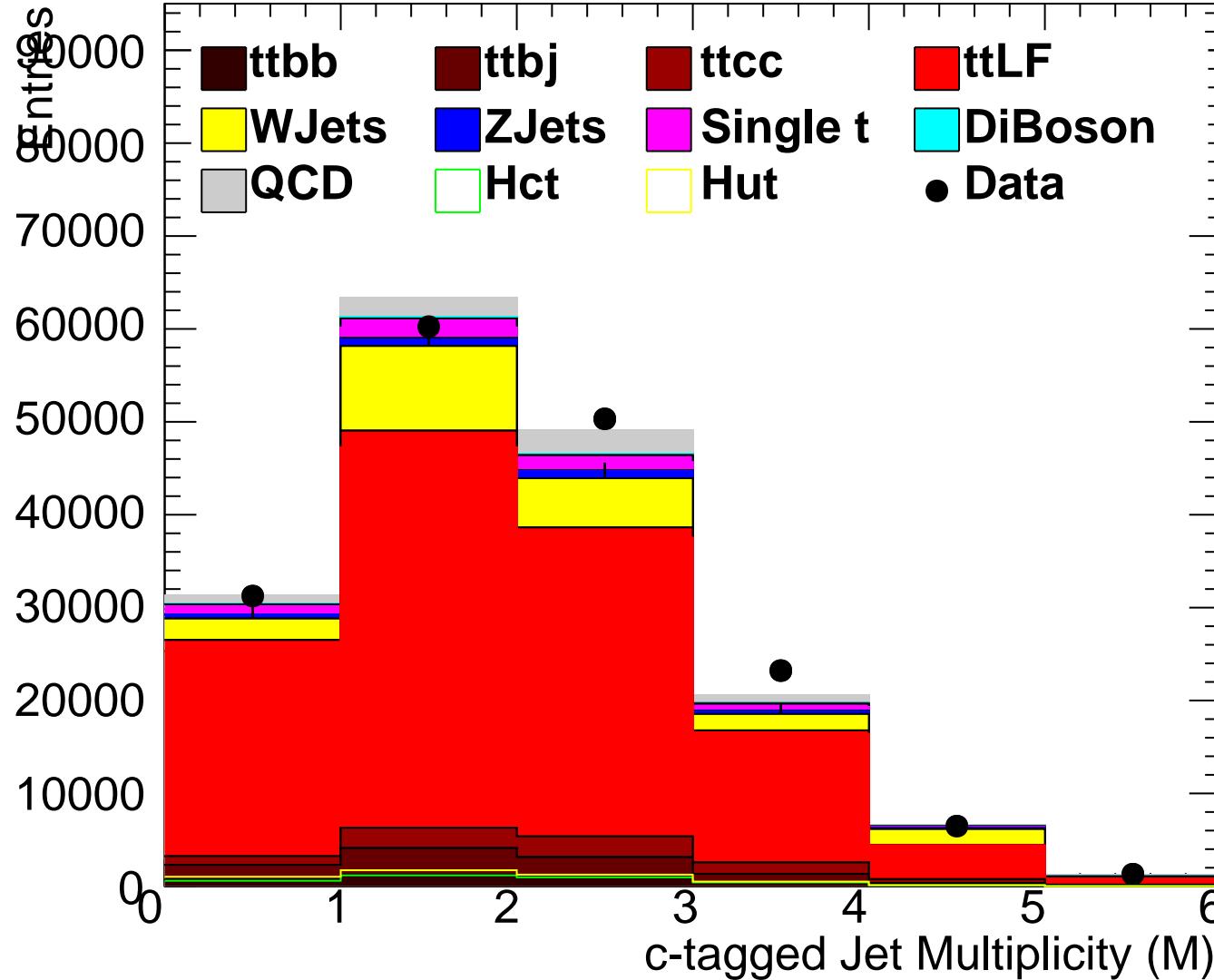


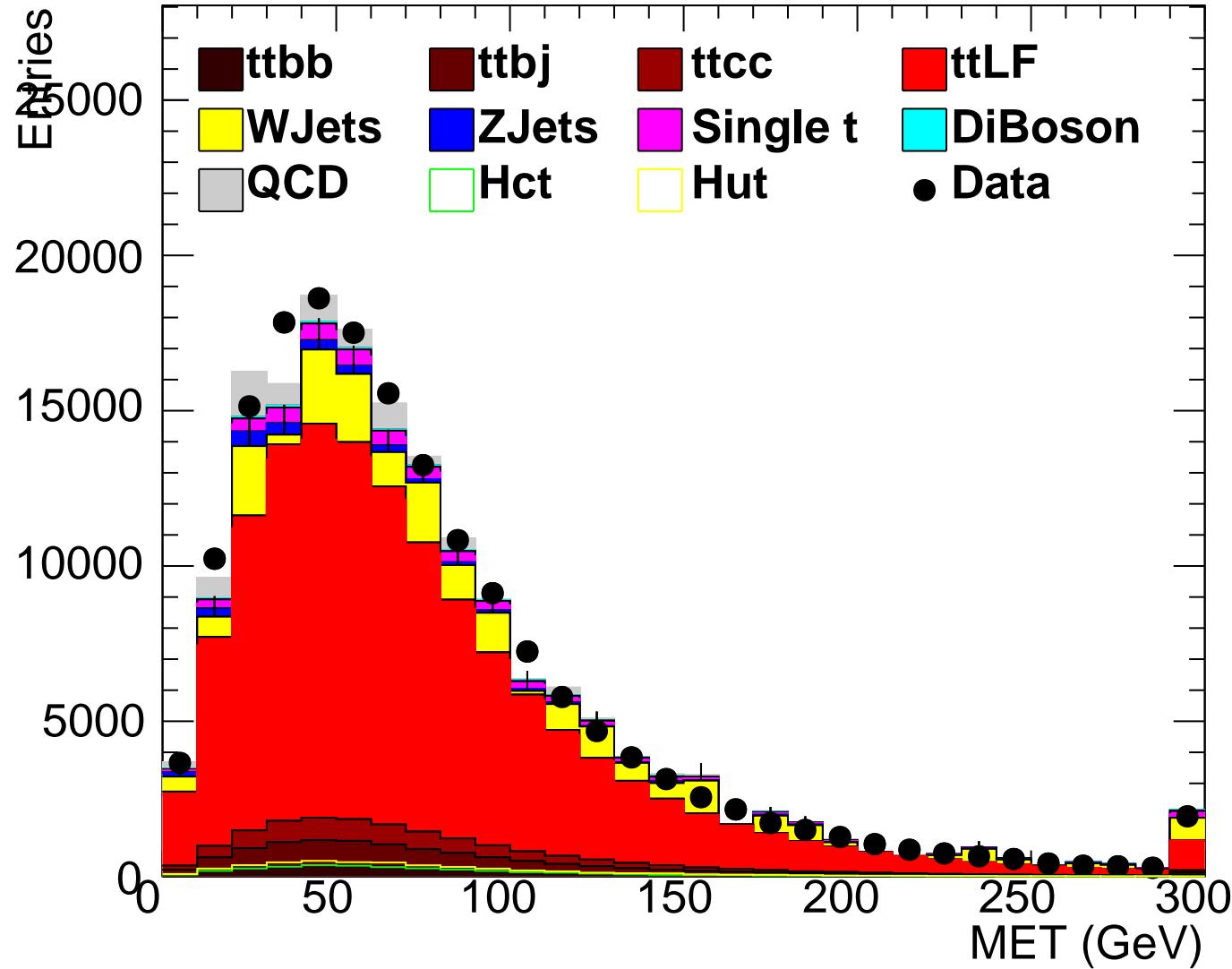
**Ch0\_S11**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

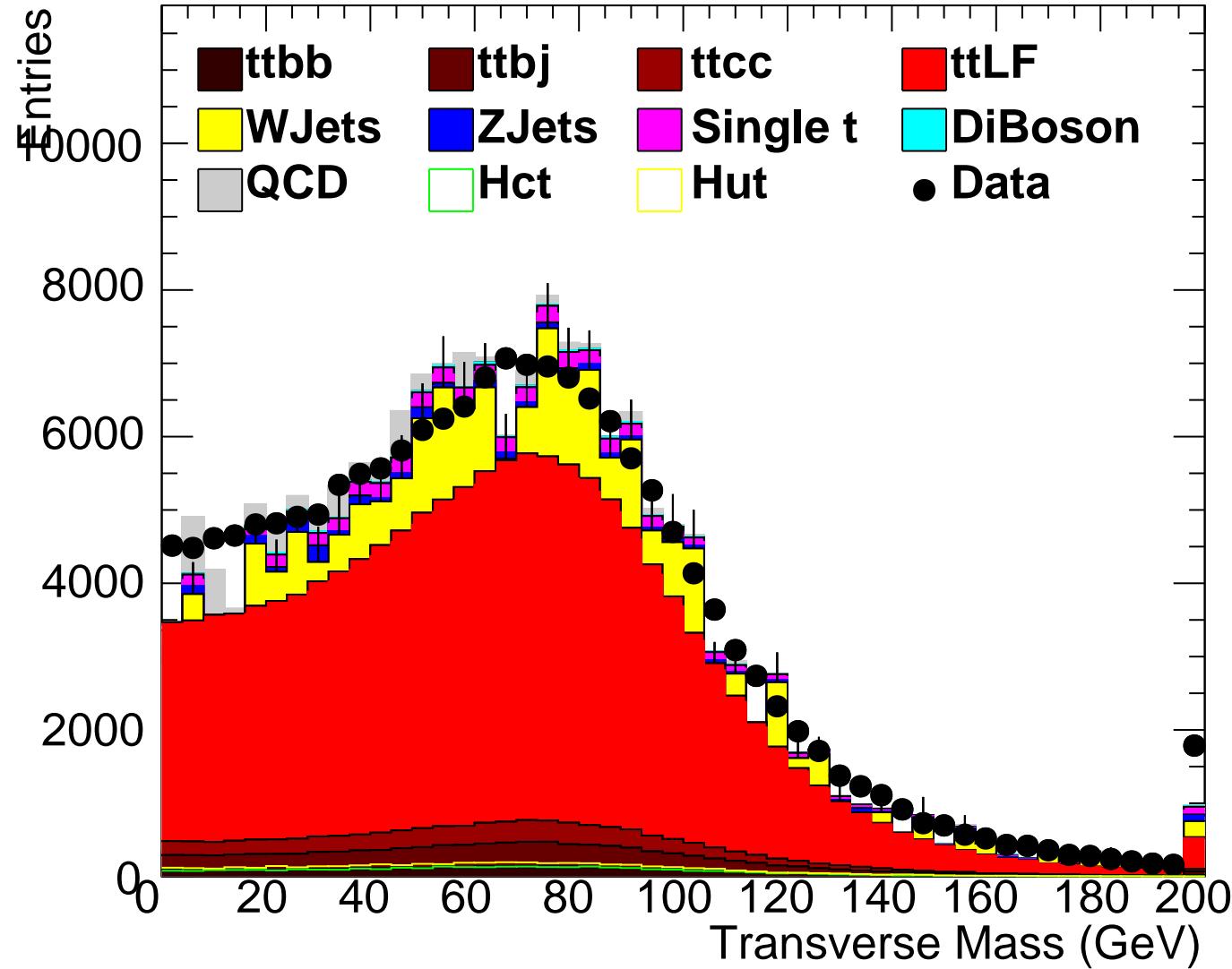
# Ch0\_S11

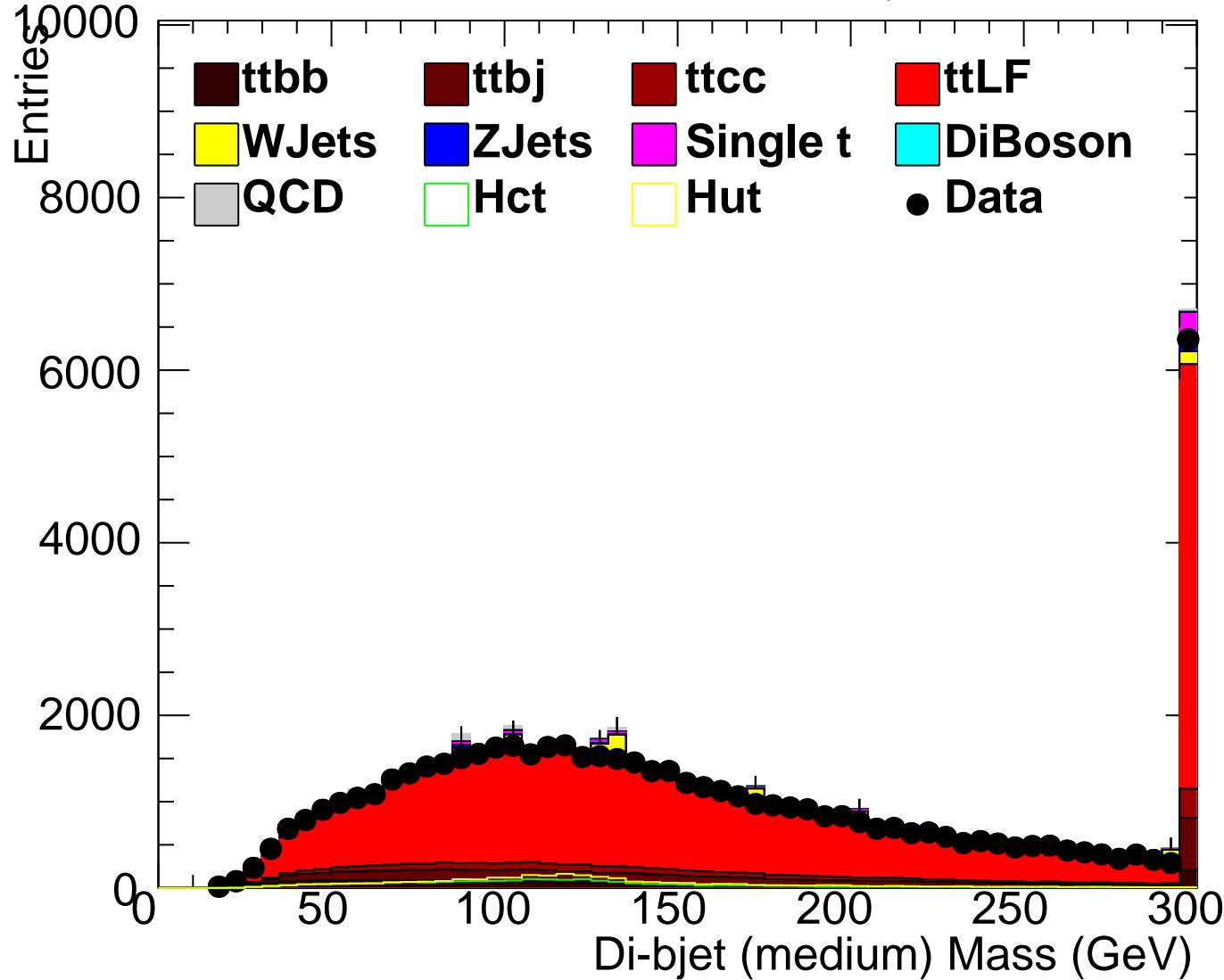
CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$

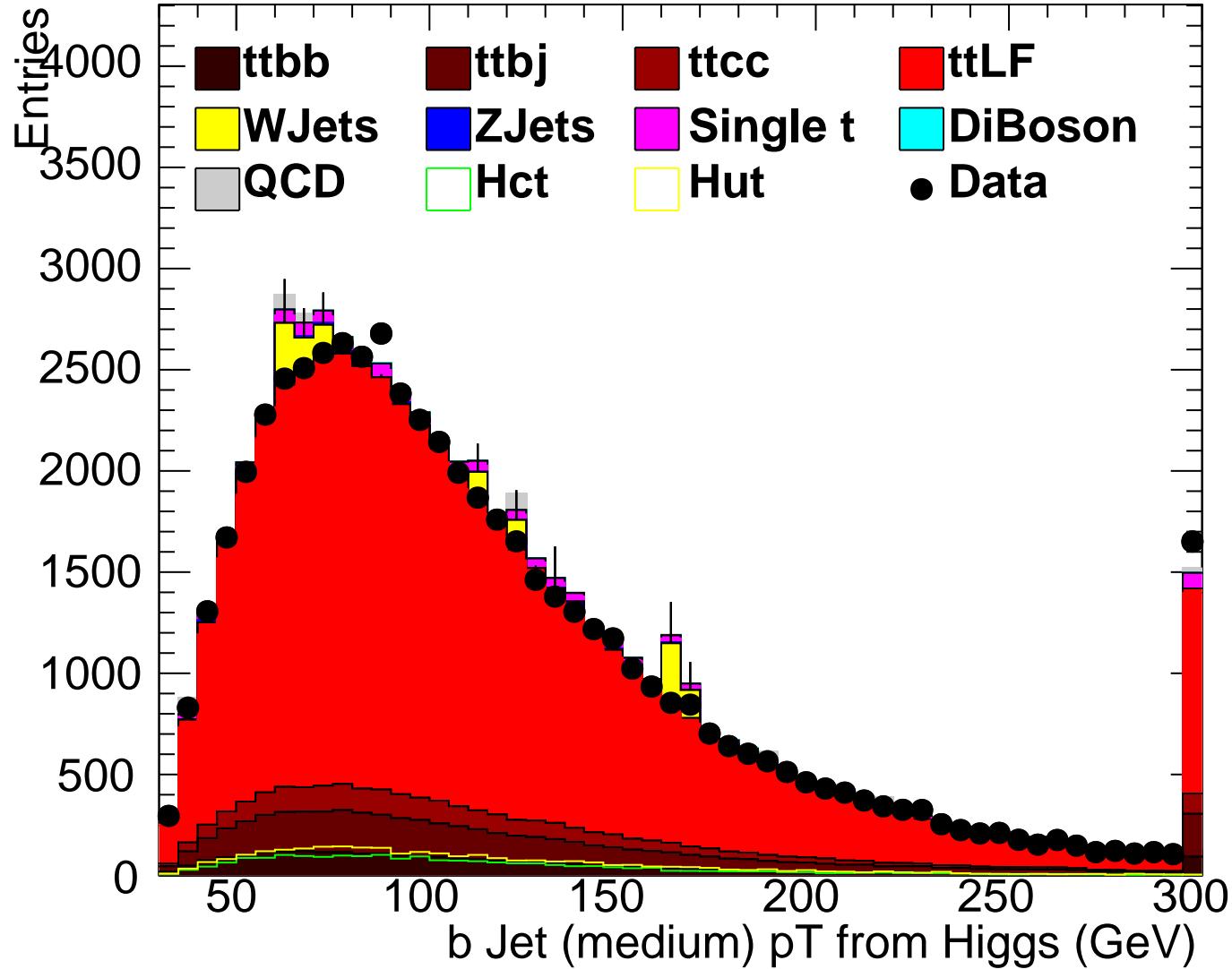


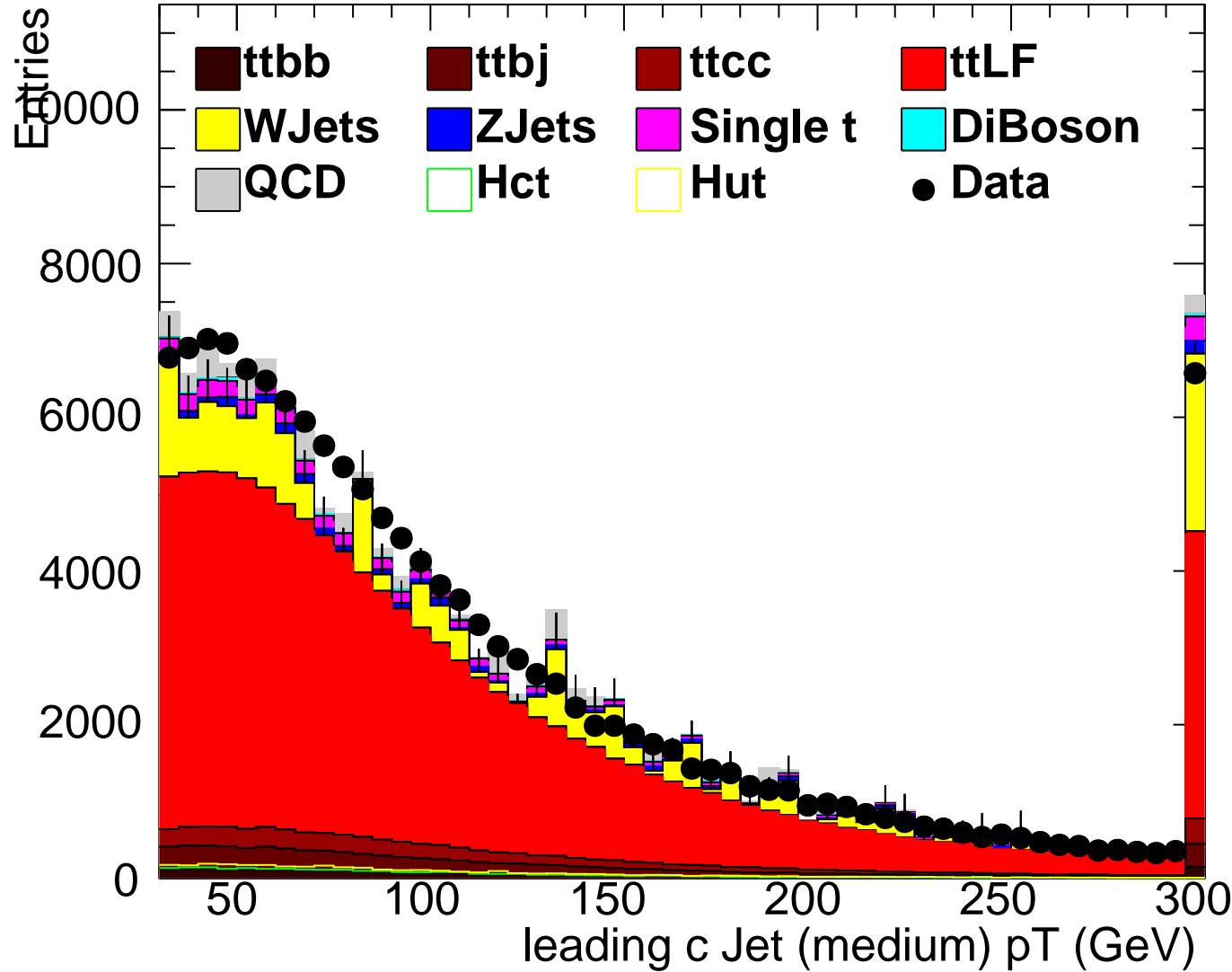


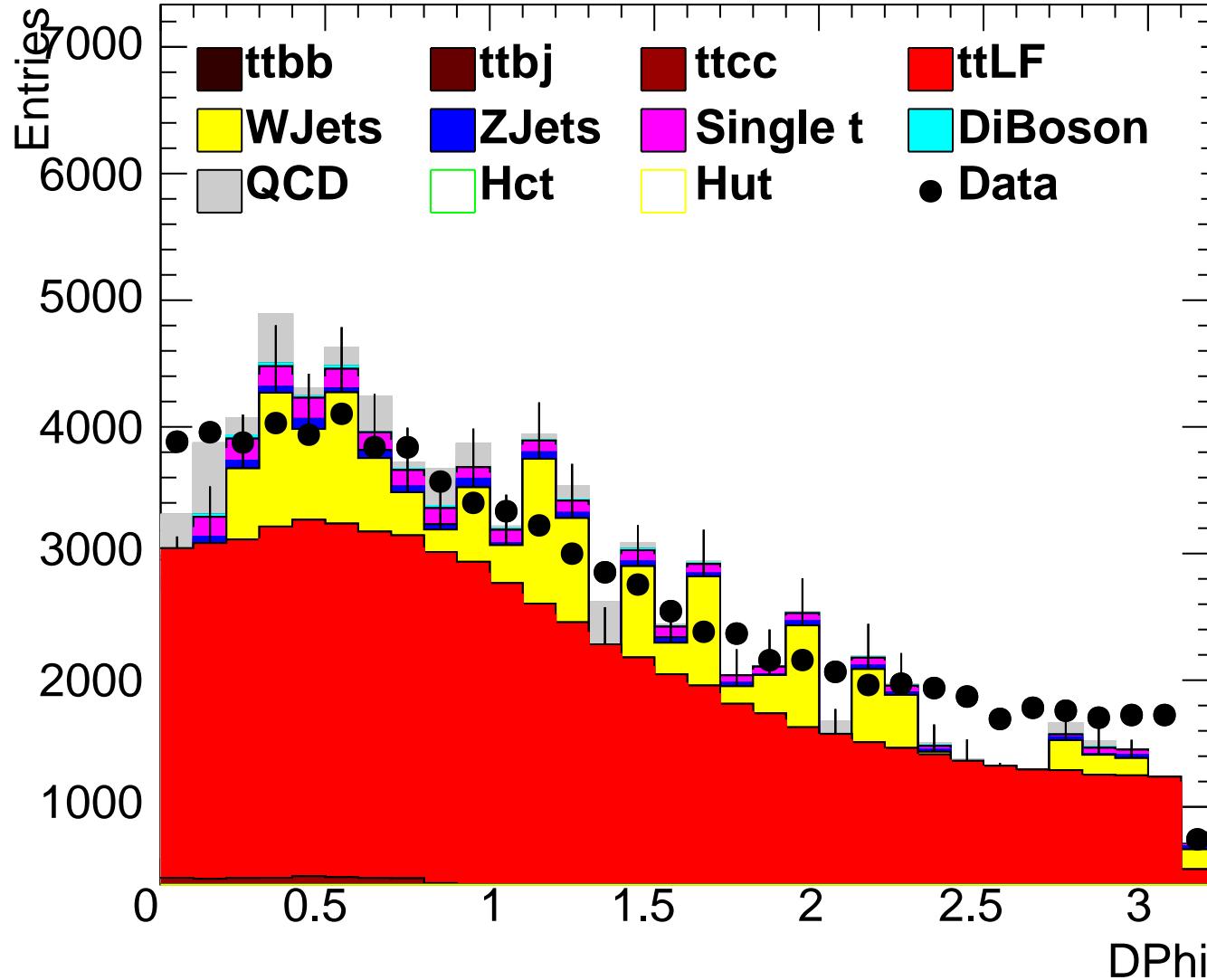
**Ch0\_S11**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

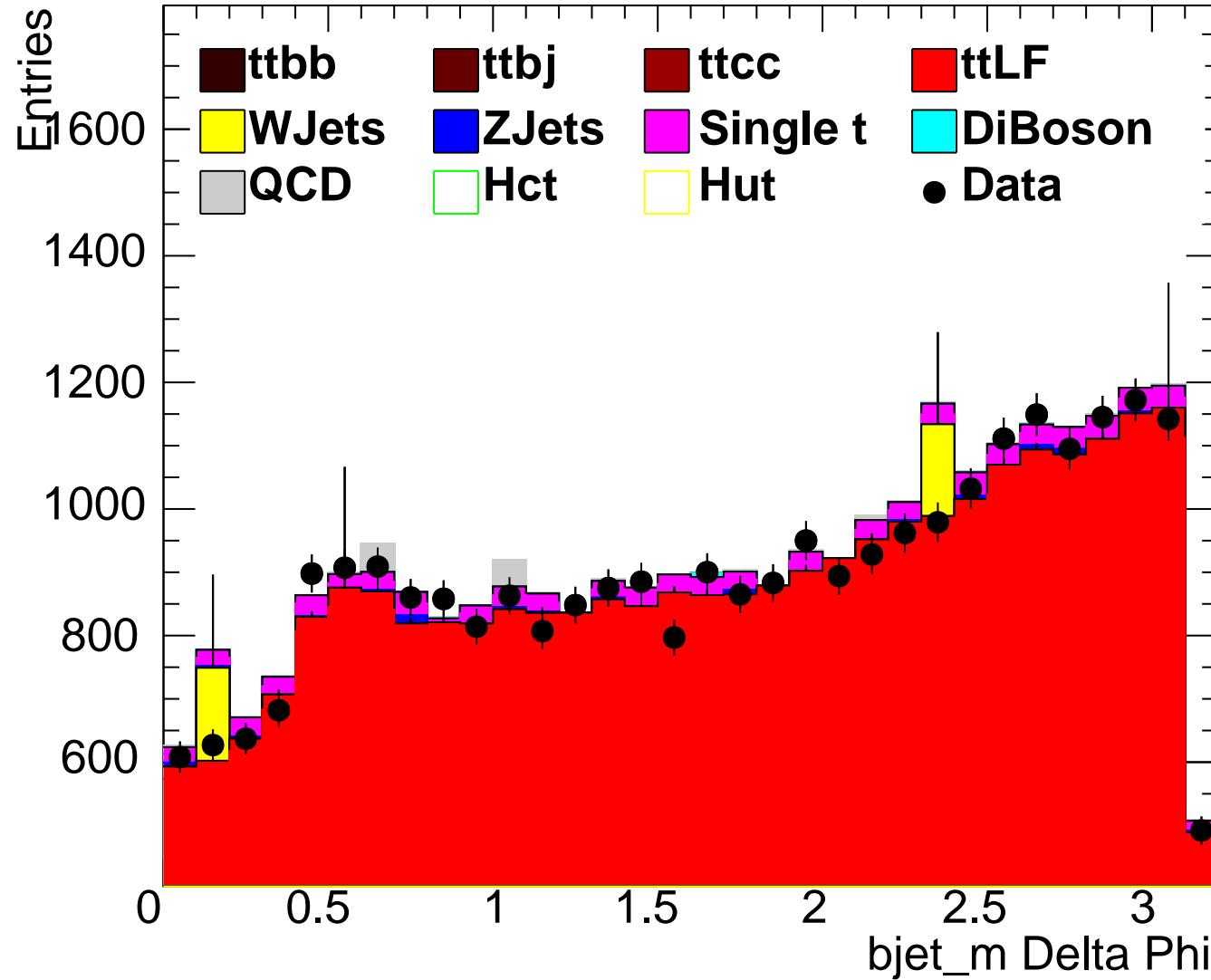
**Ch0\_S11**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

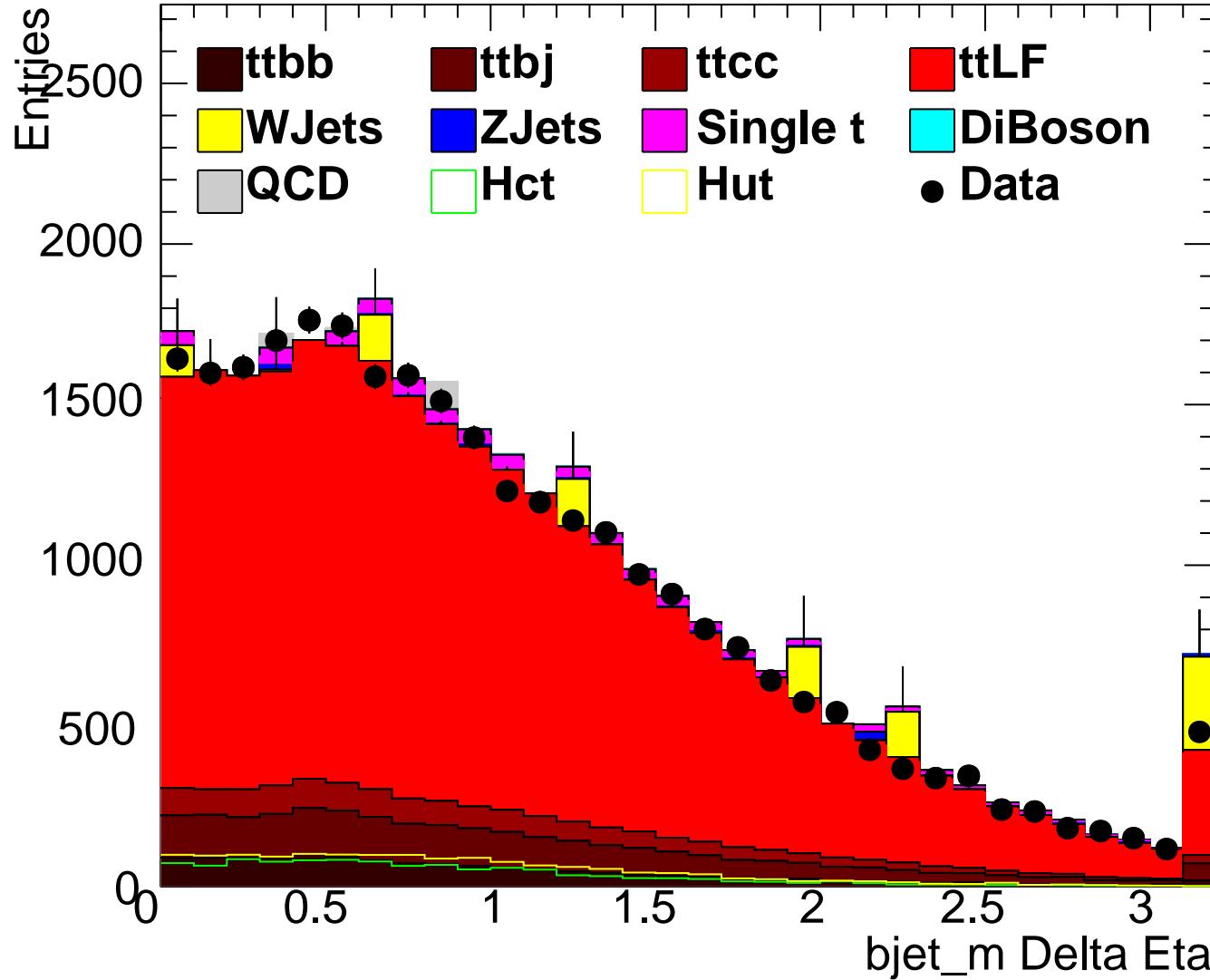
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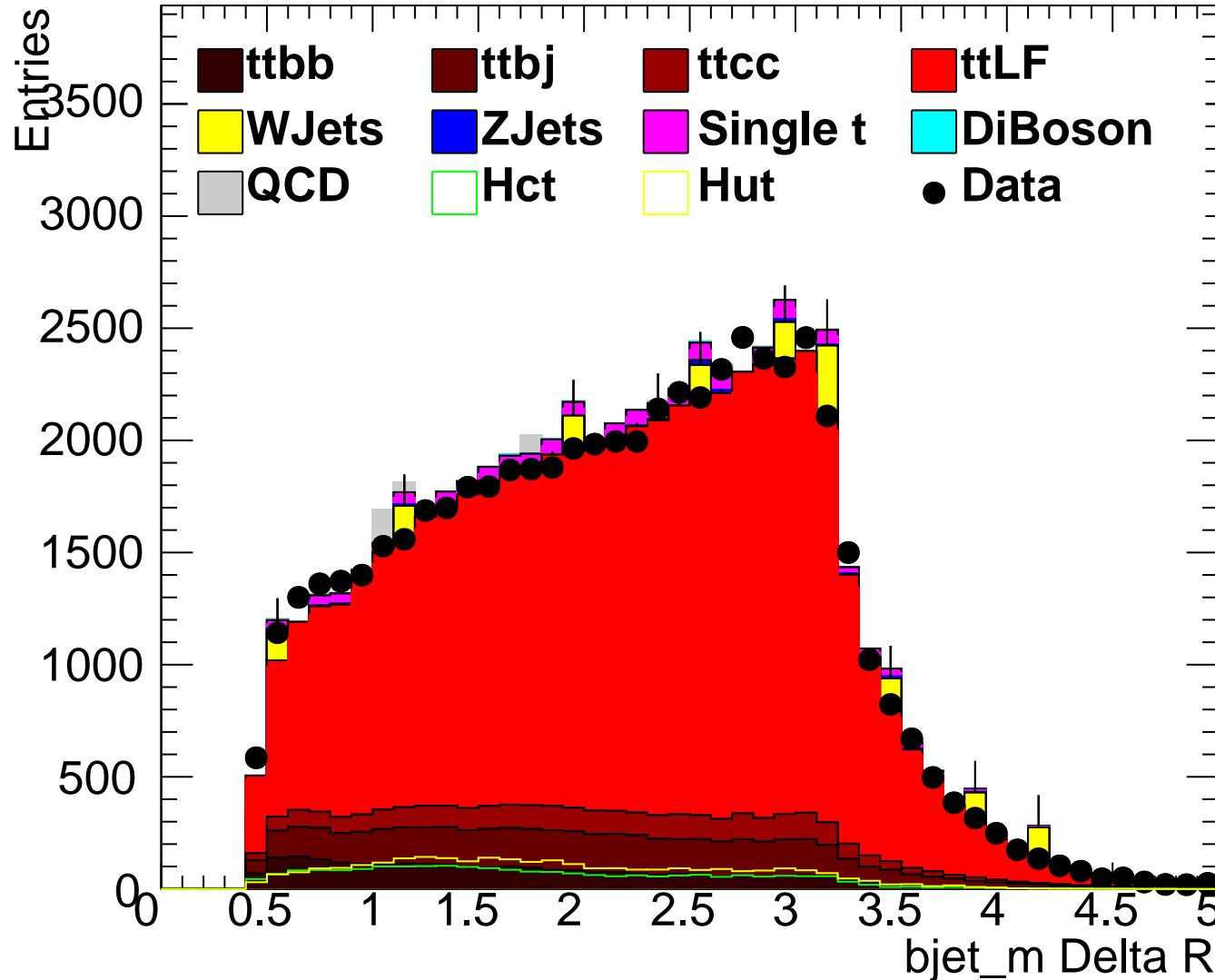
**Ch0\_S11**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch0\_S11**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 



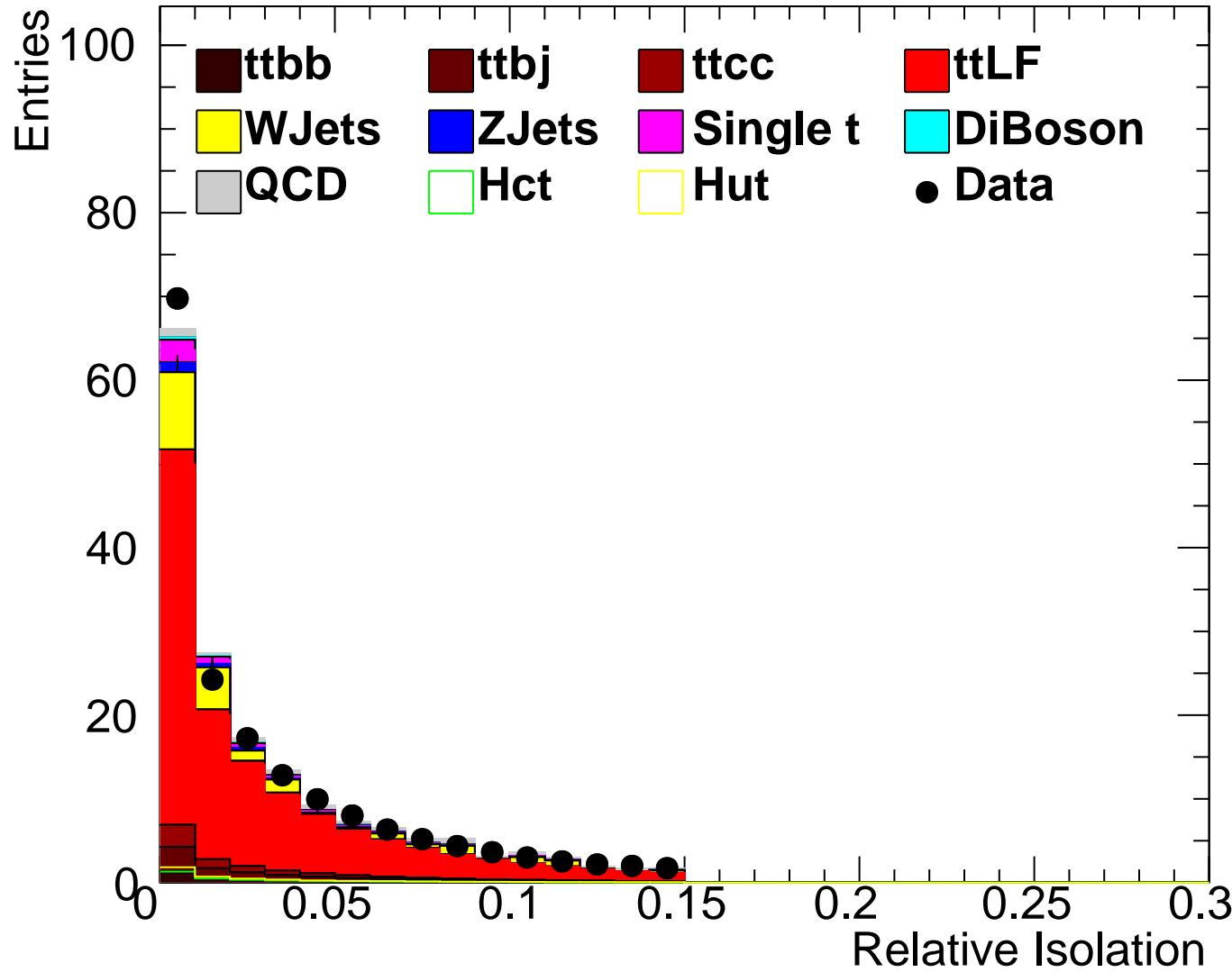


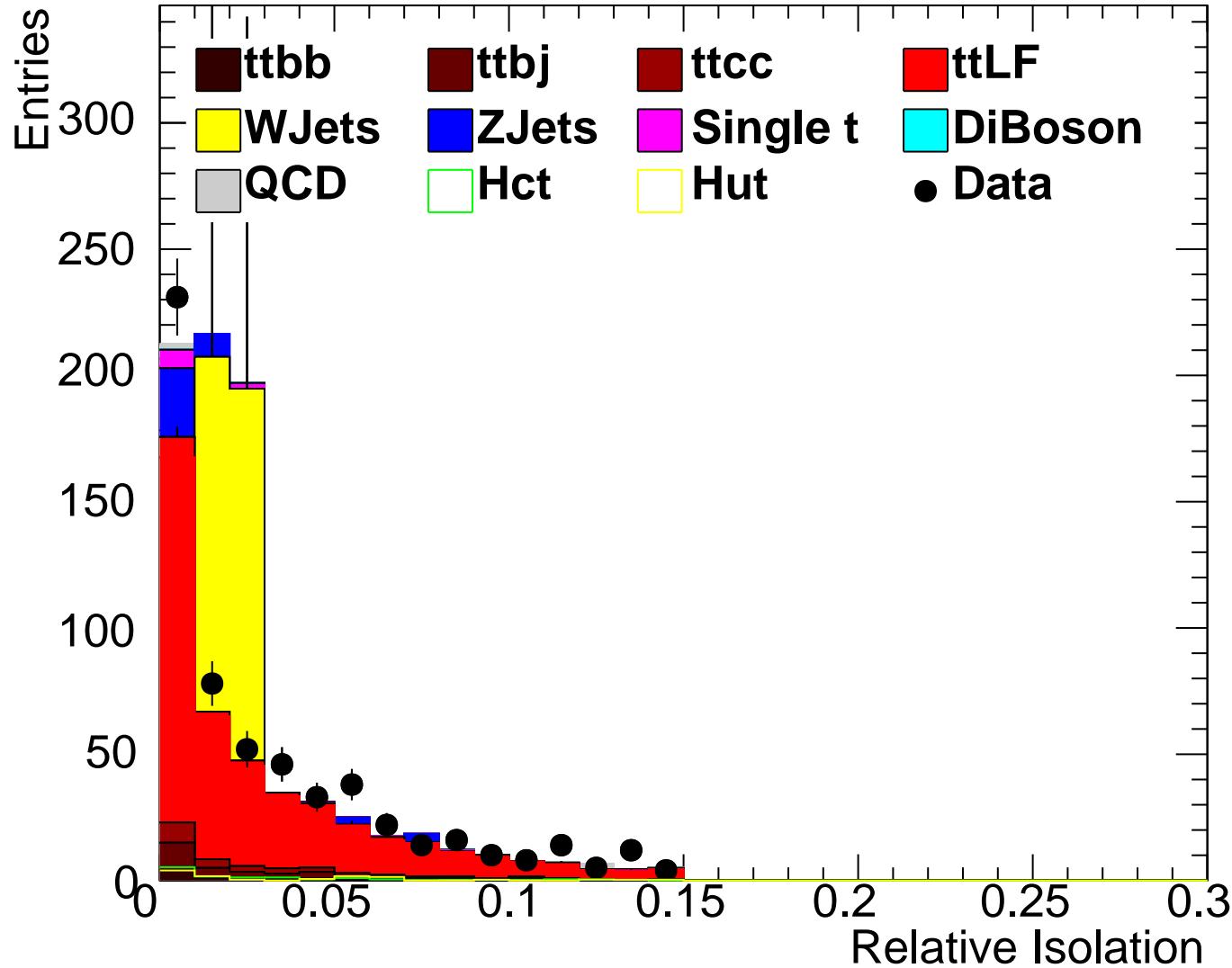


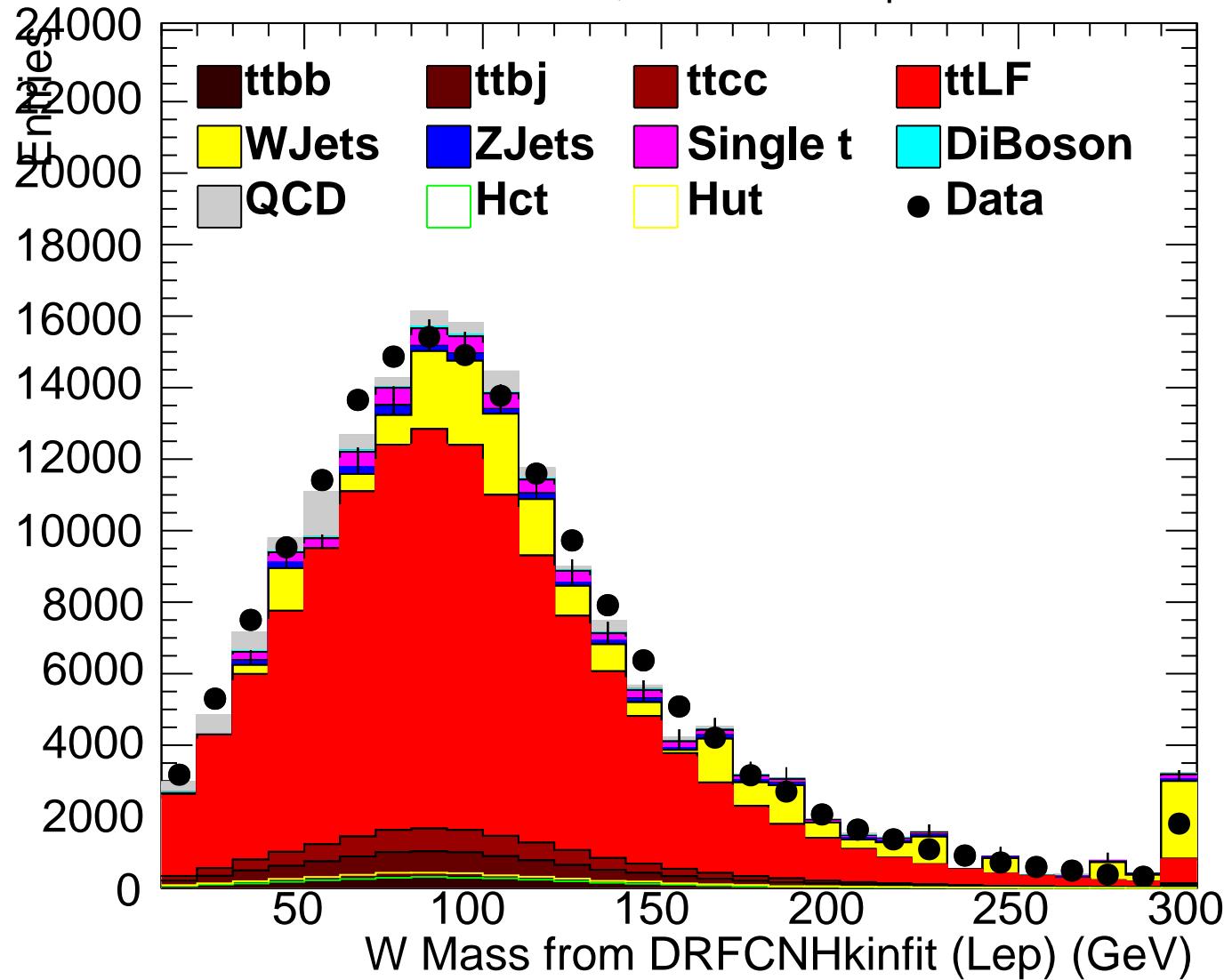


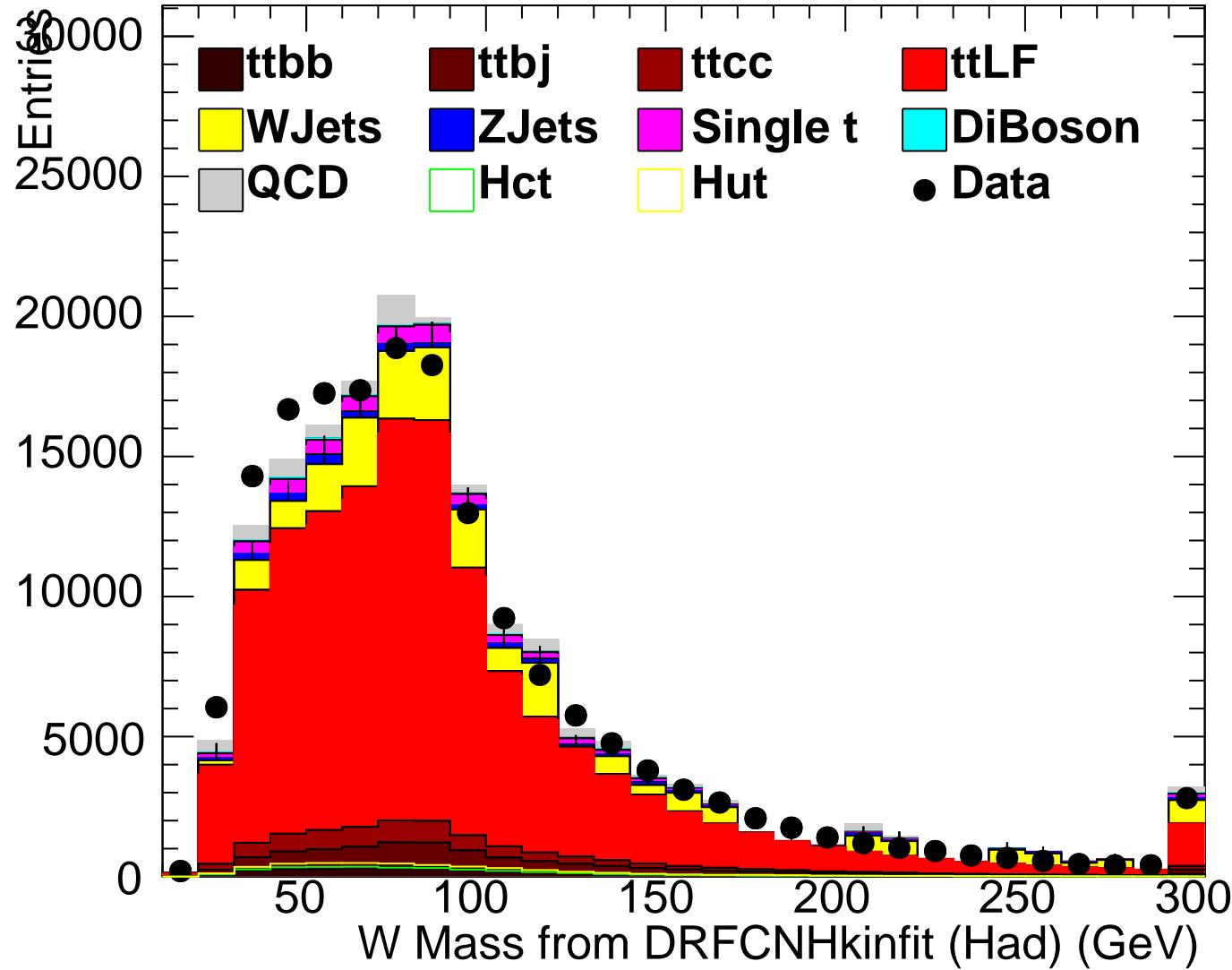
Ch0\_S11

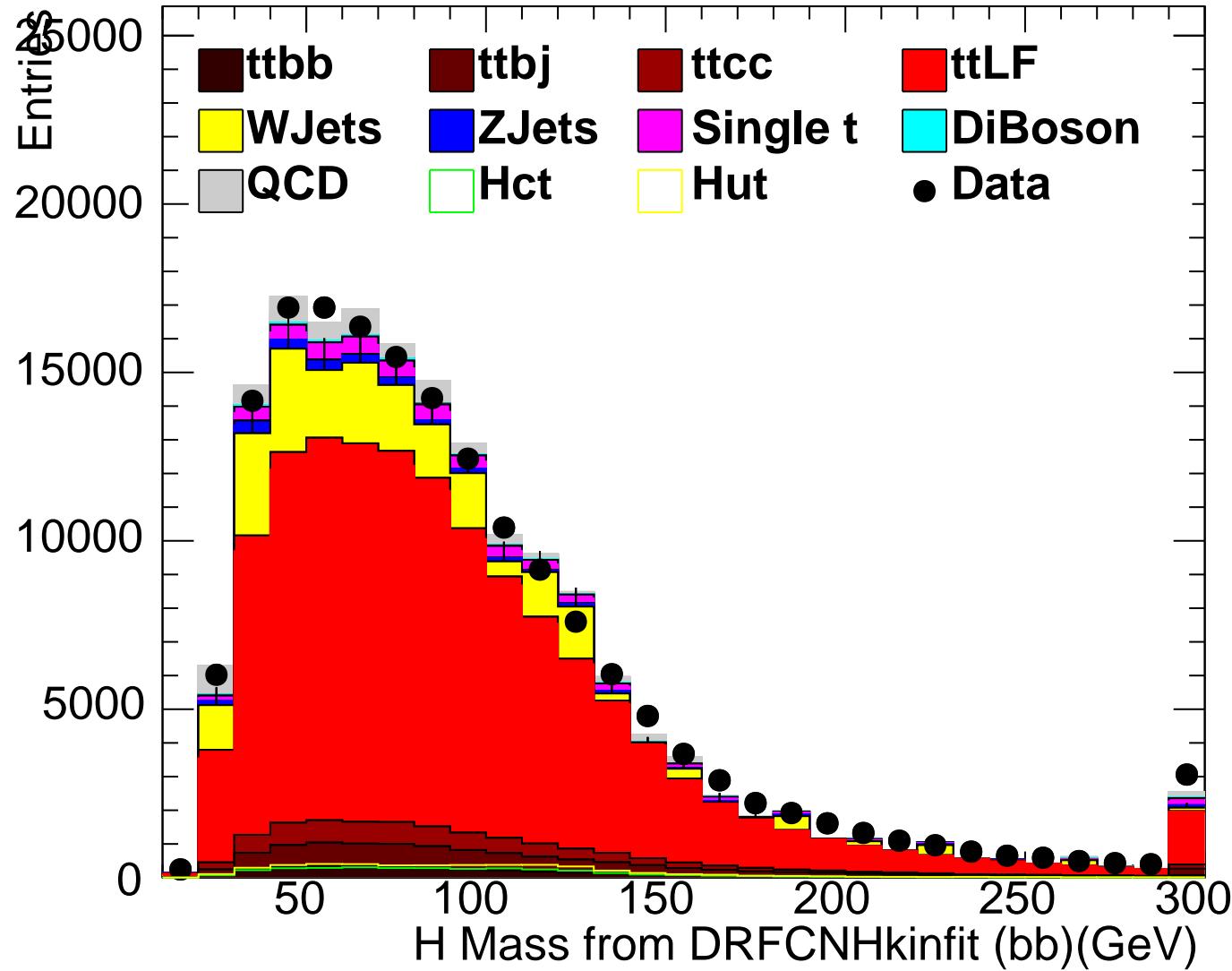
CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$

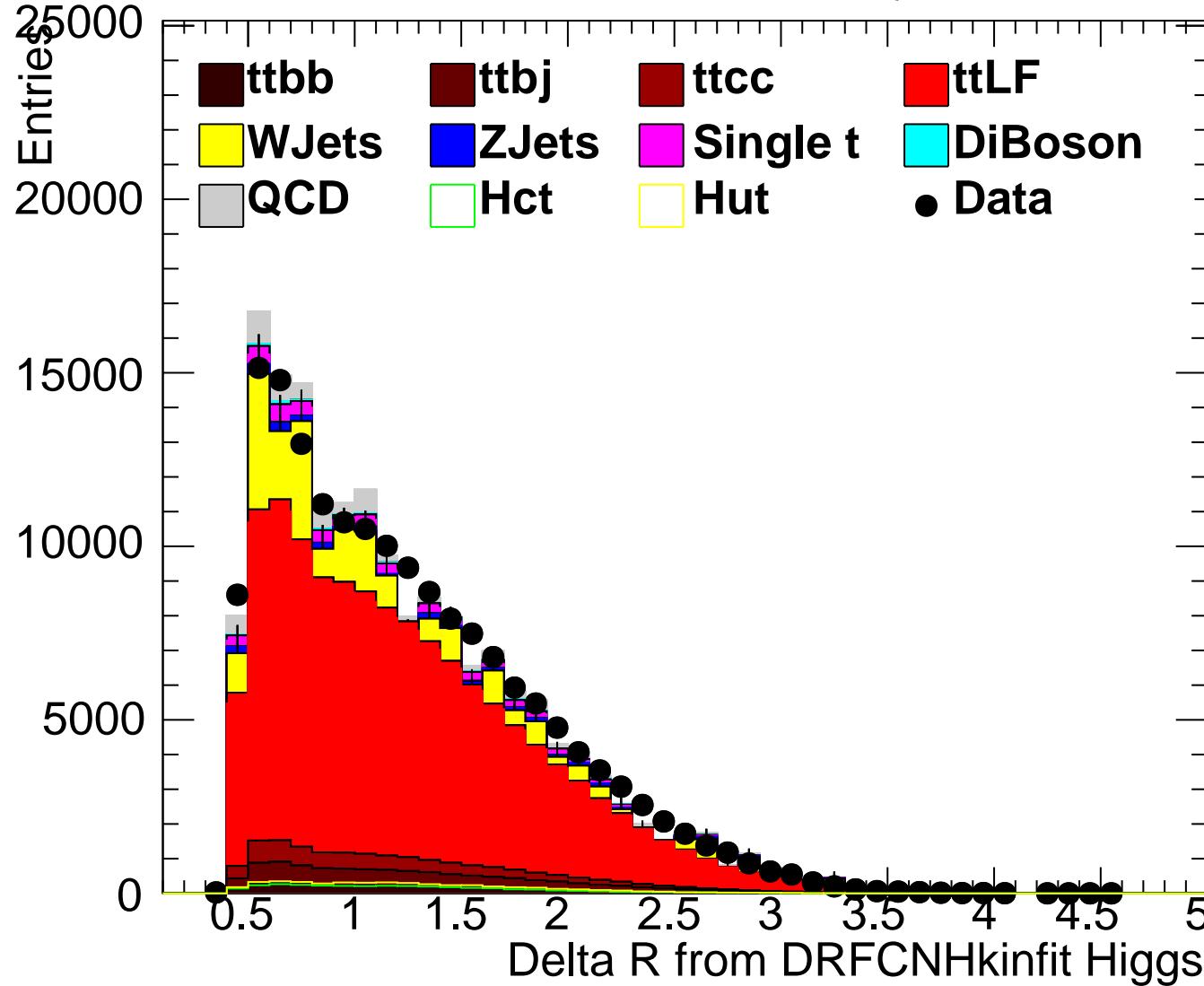




**Ch0\_S11**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

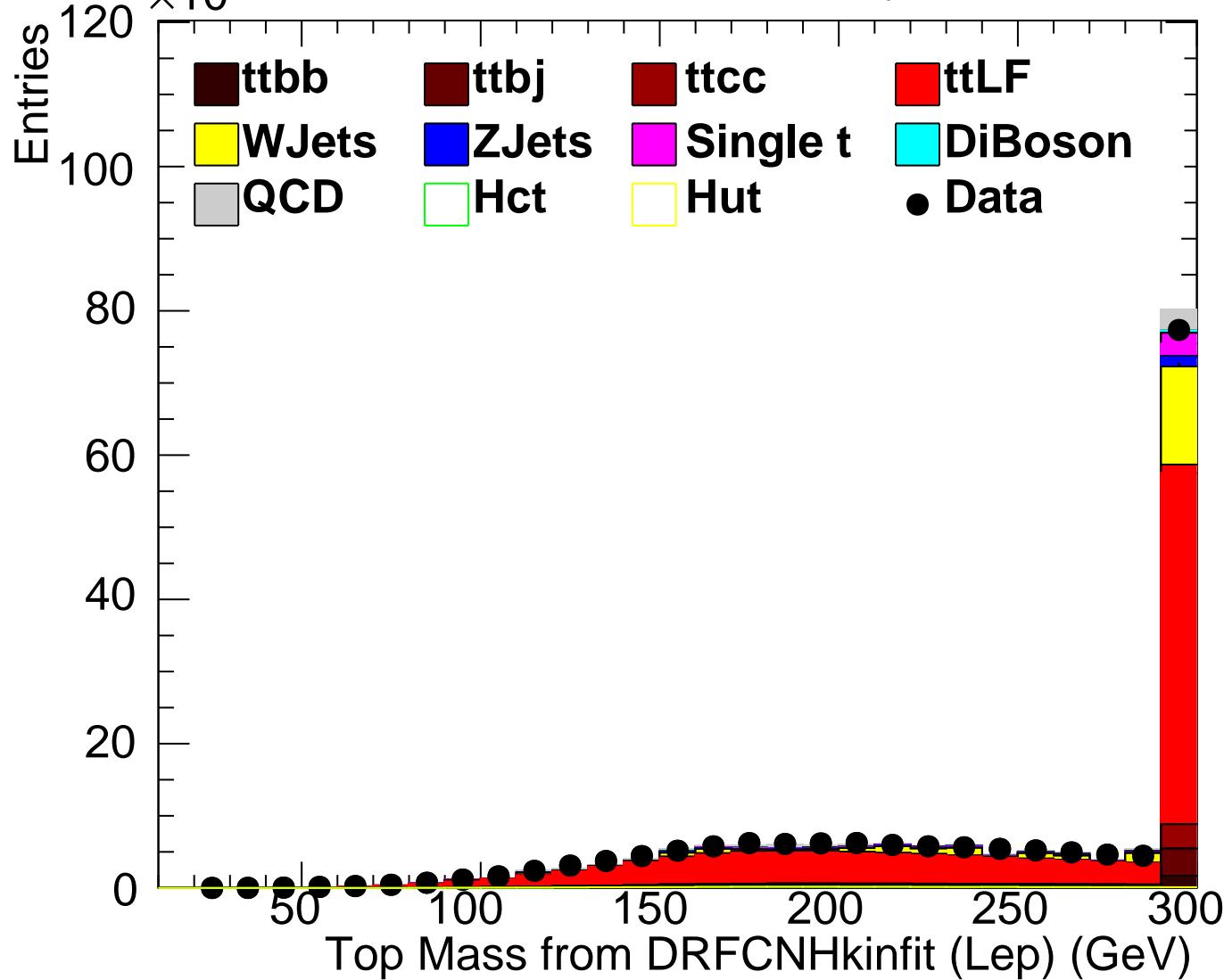
**Ch0\_S11**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

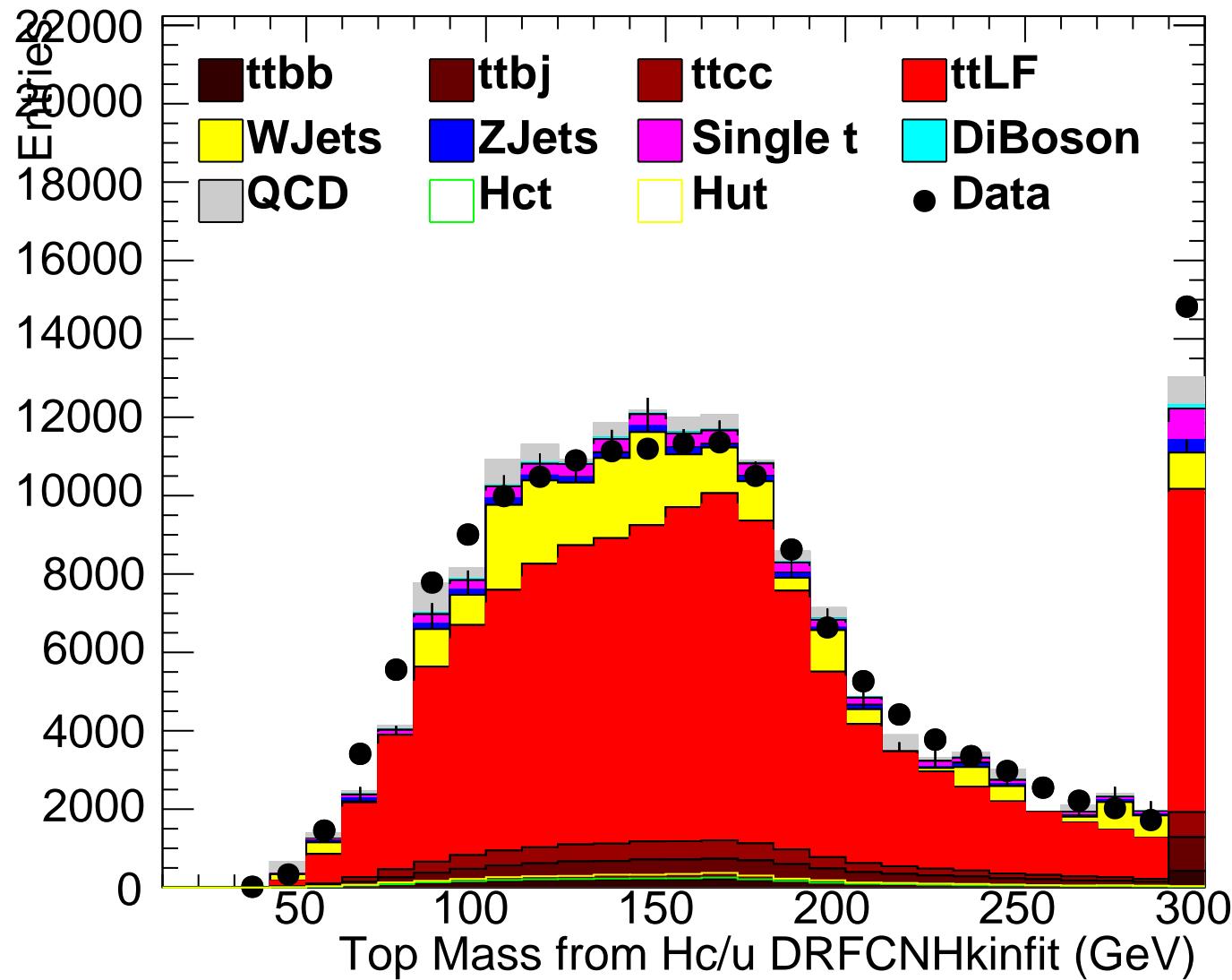
**Ch0\_S11**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch0\_S11**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

Ch0\_S11

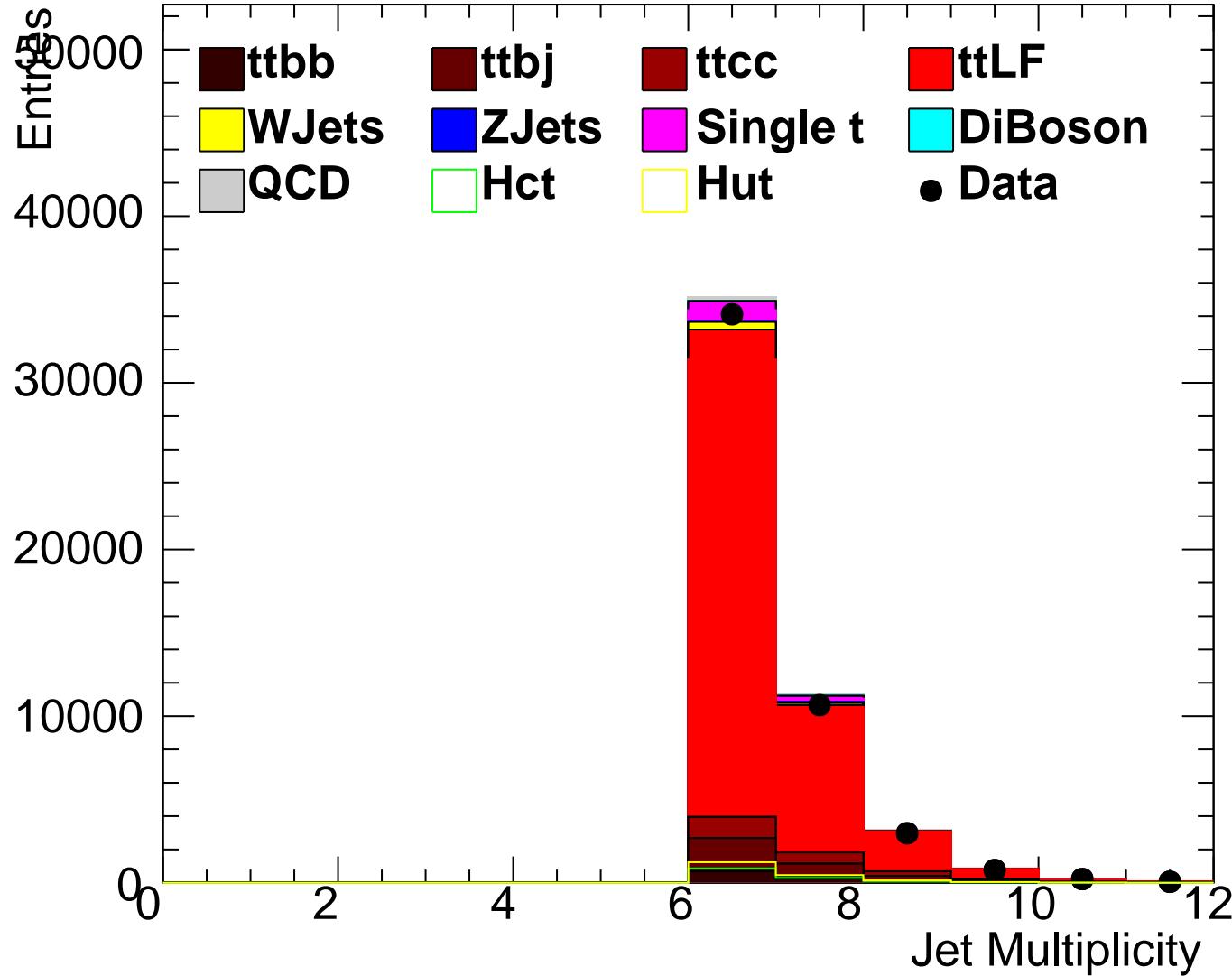
CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV



**Ch0\_S11**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

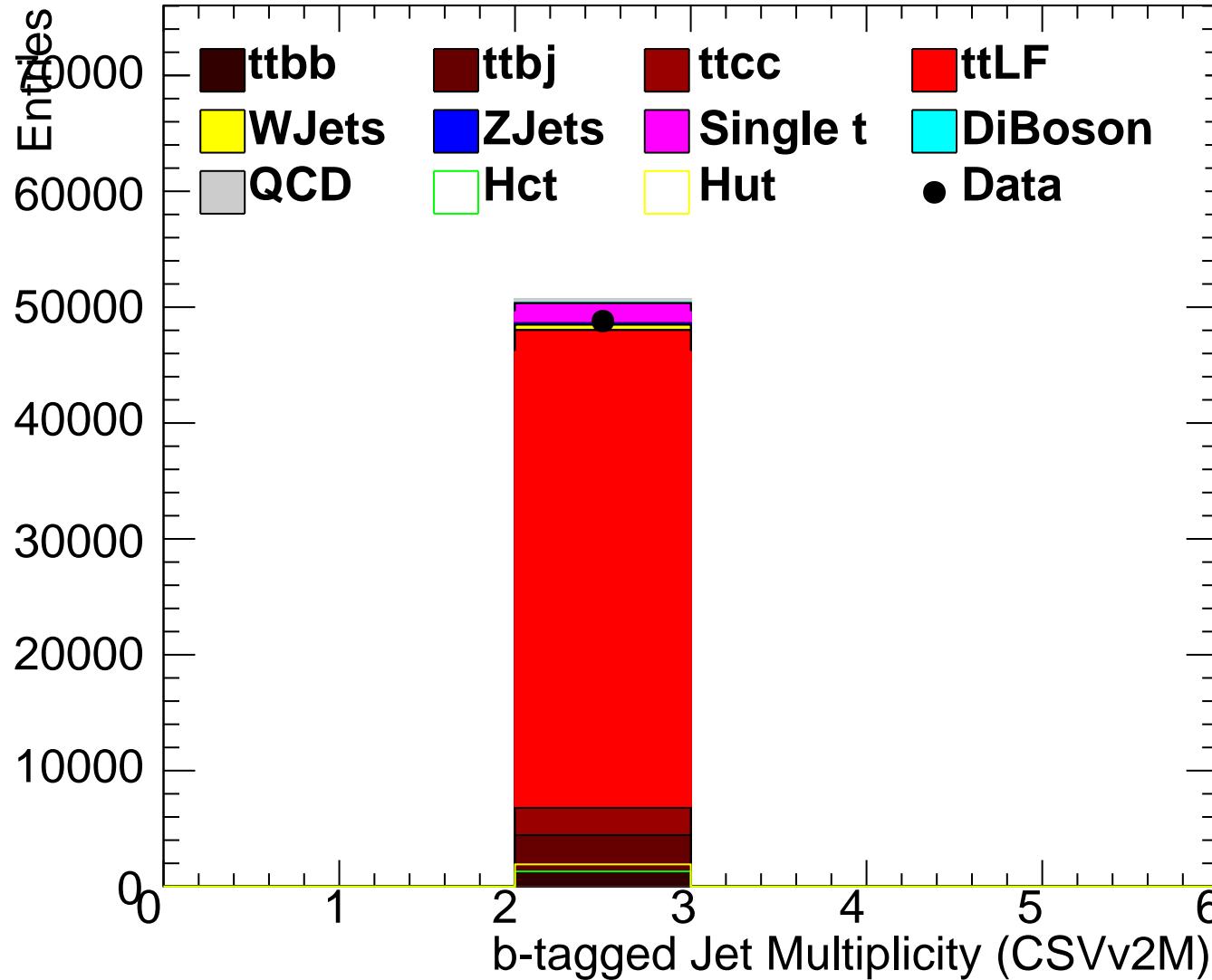
Ch0 S12

CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV



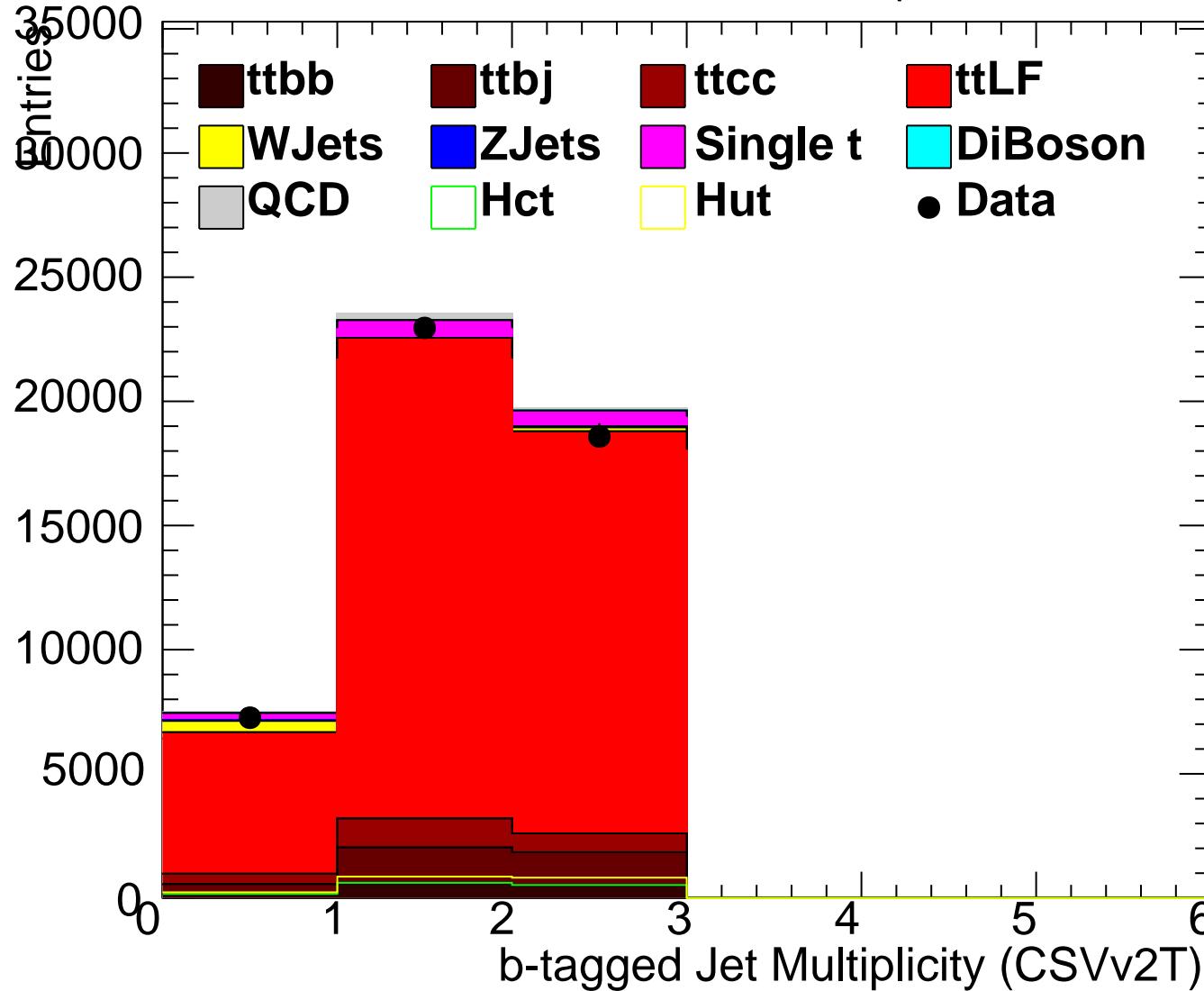
Ch0 S12

CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV



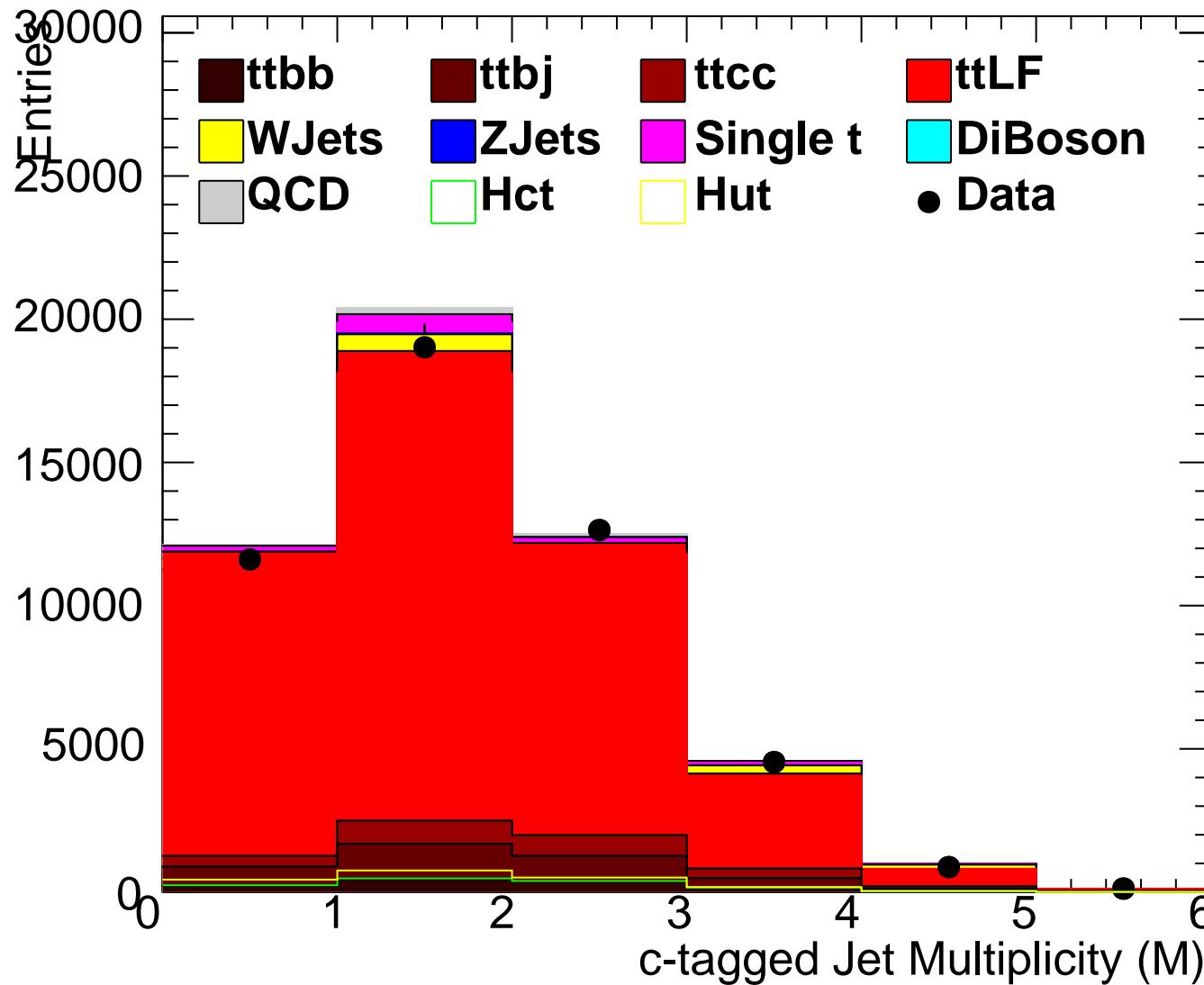
**Ch0\_S12**

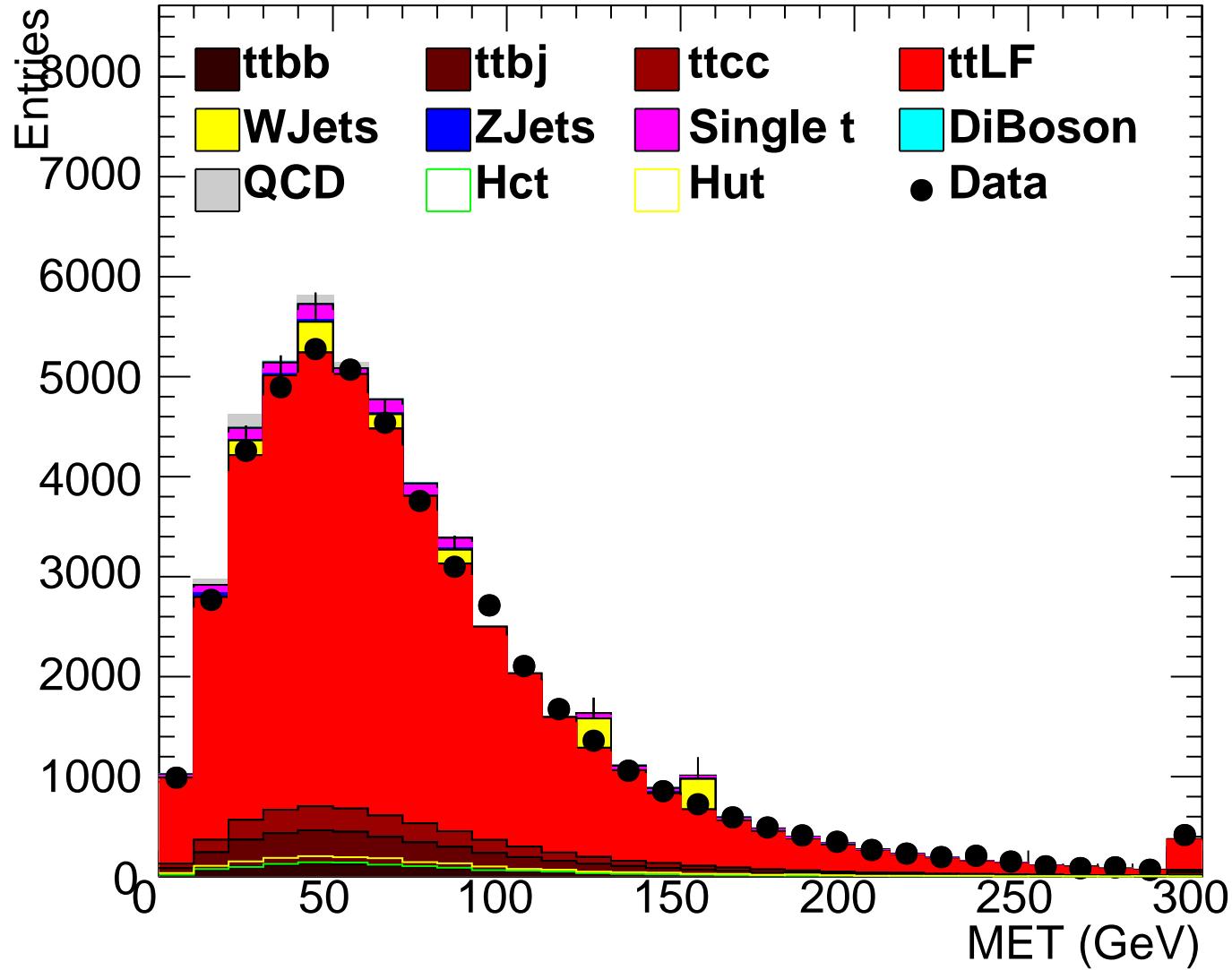
CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$

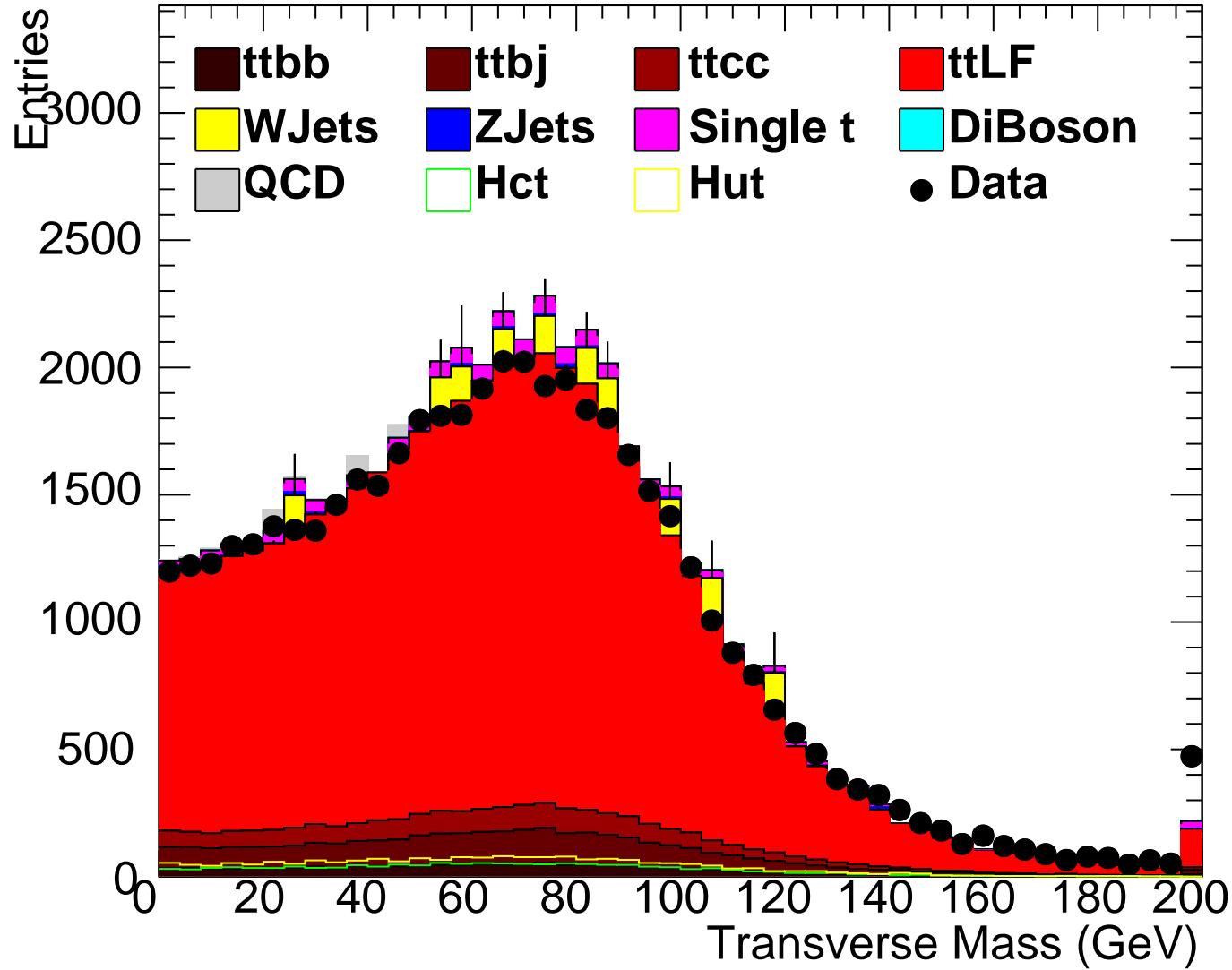


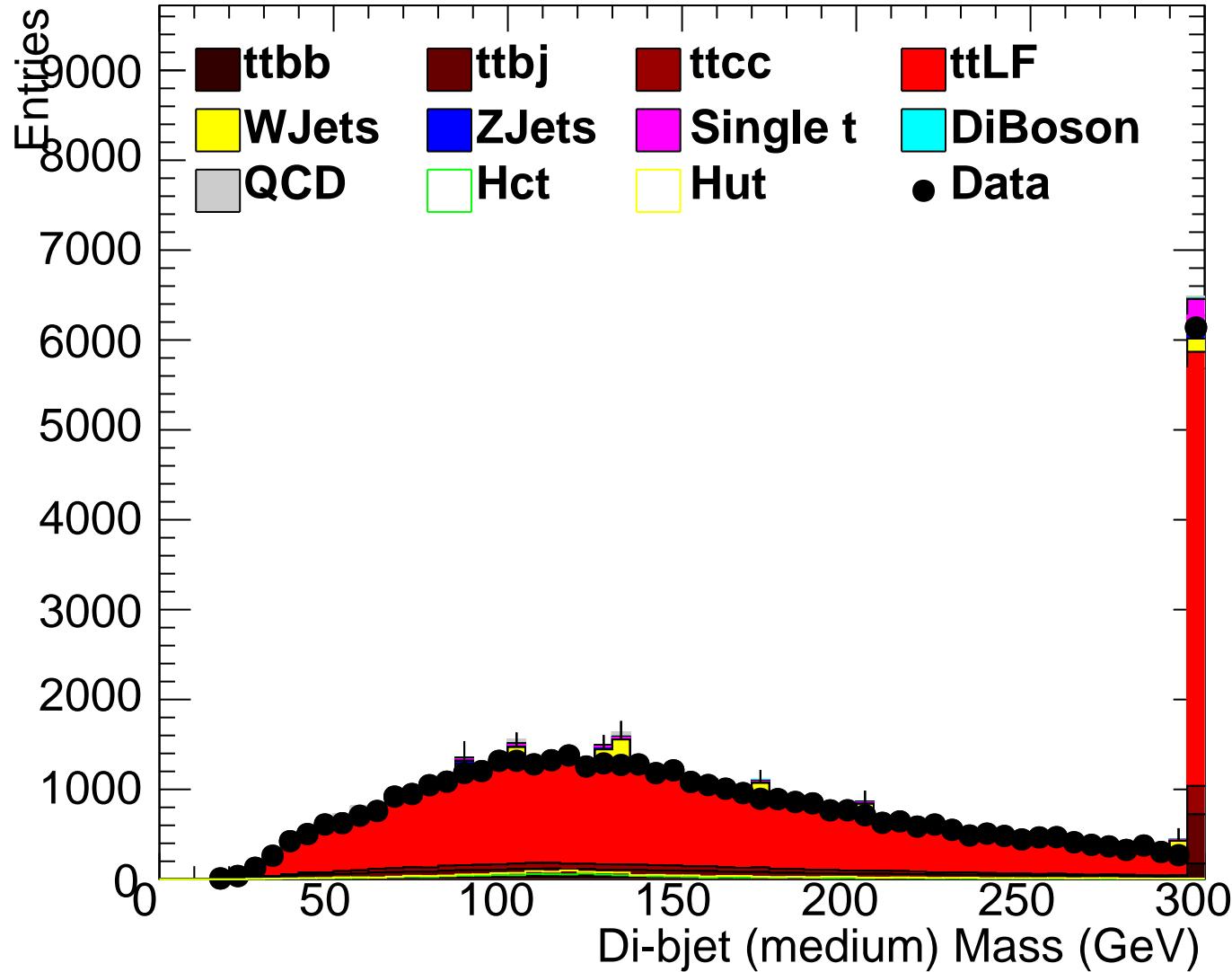
Ch0 S12

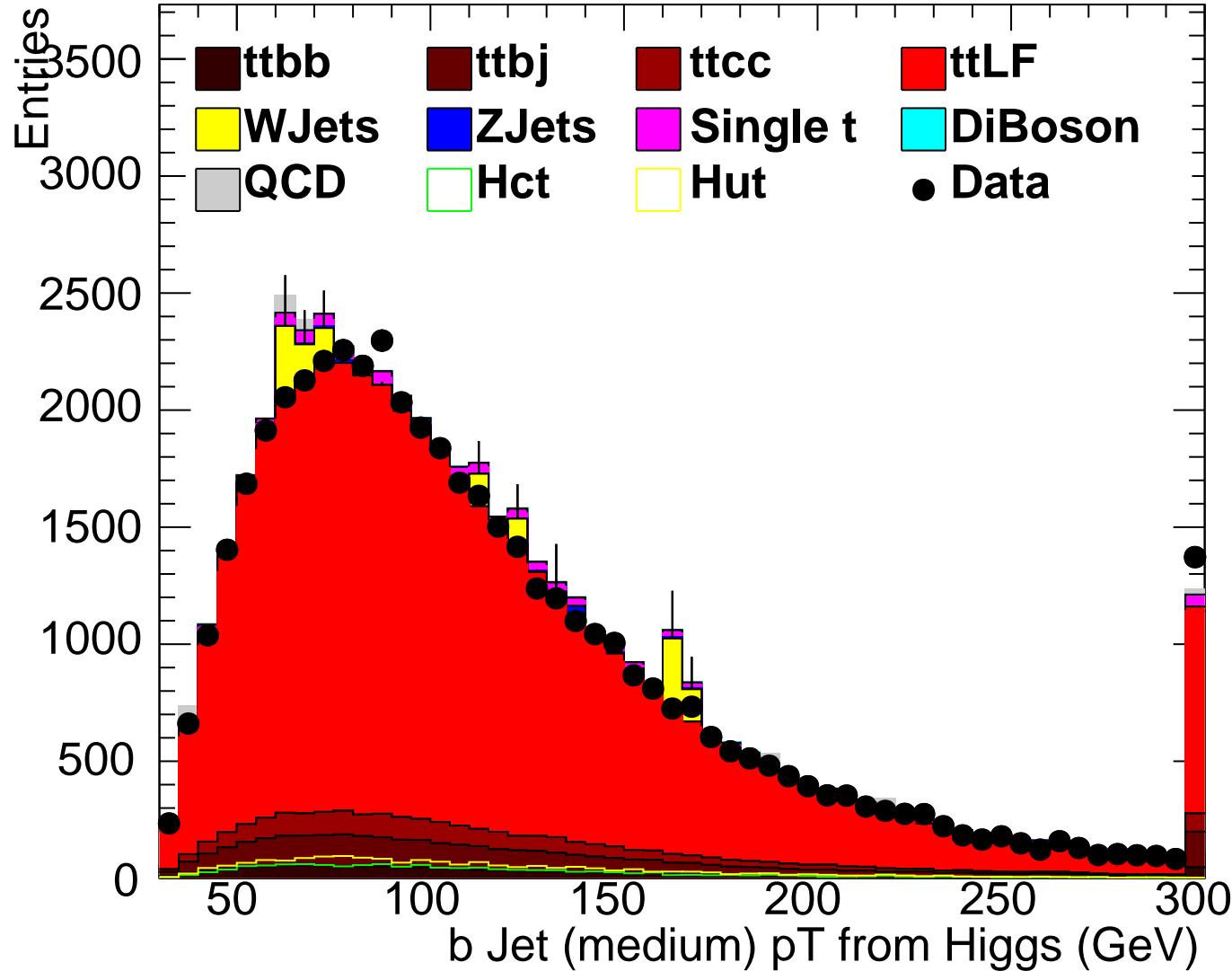
CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$

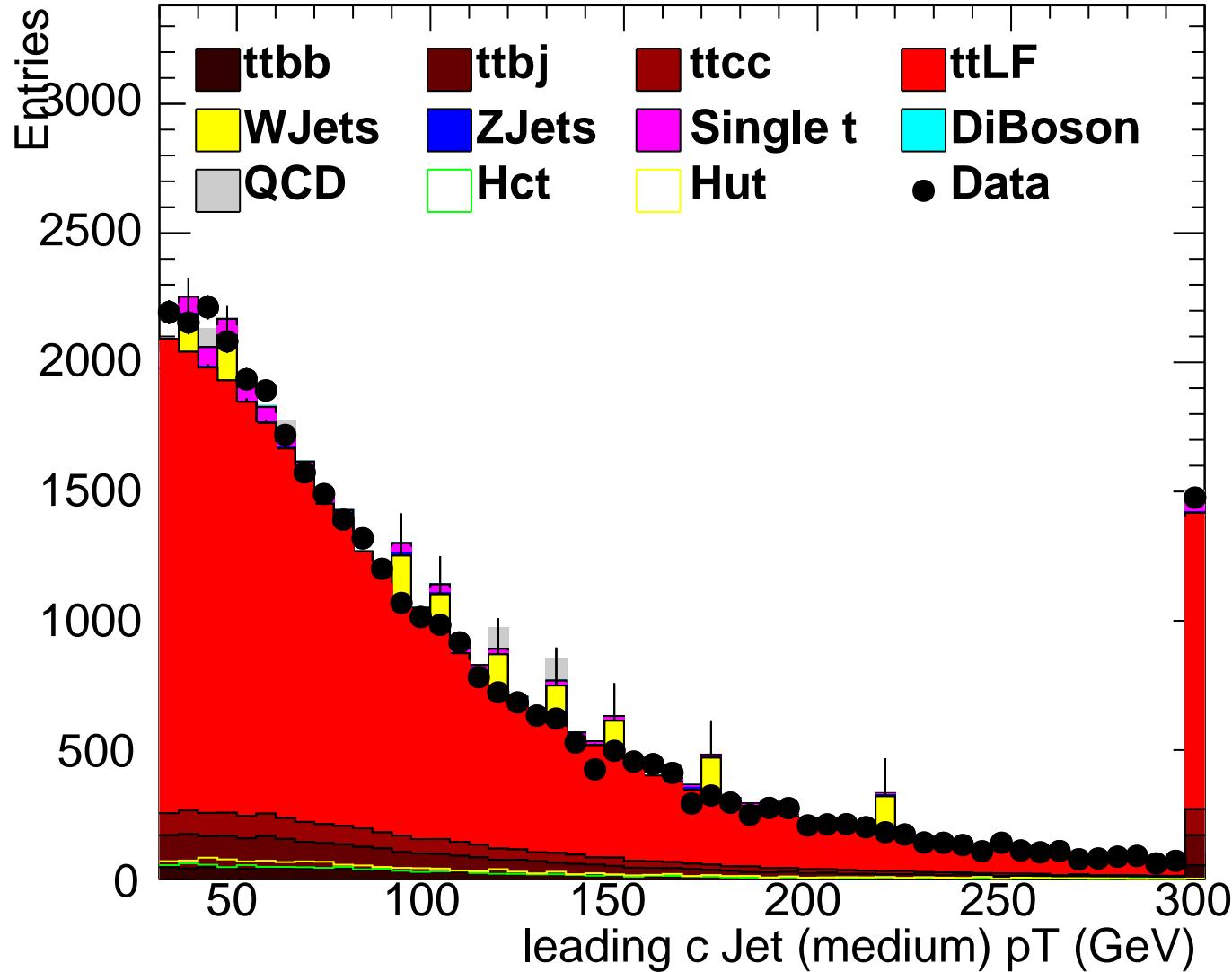


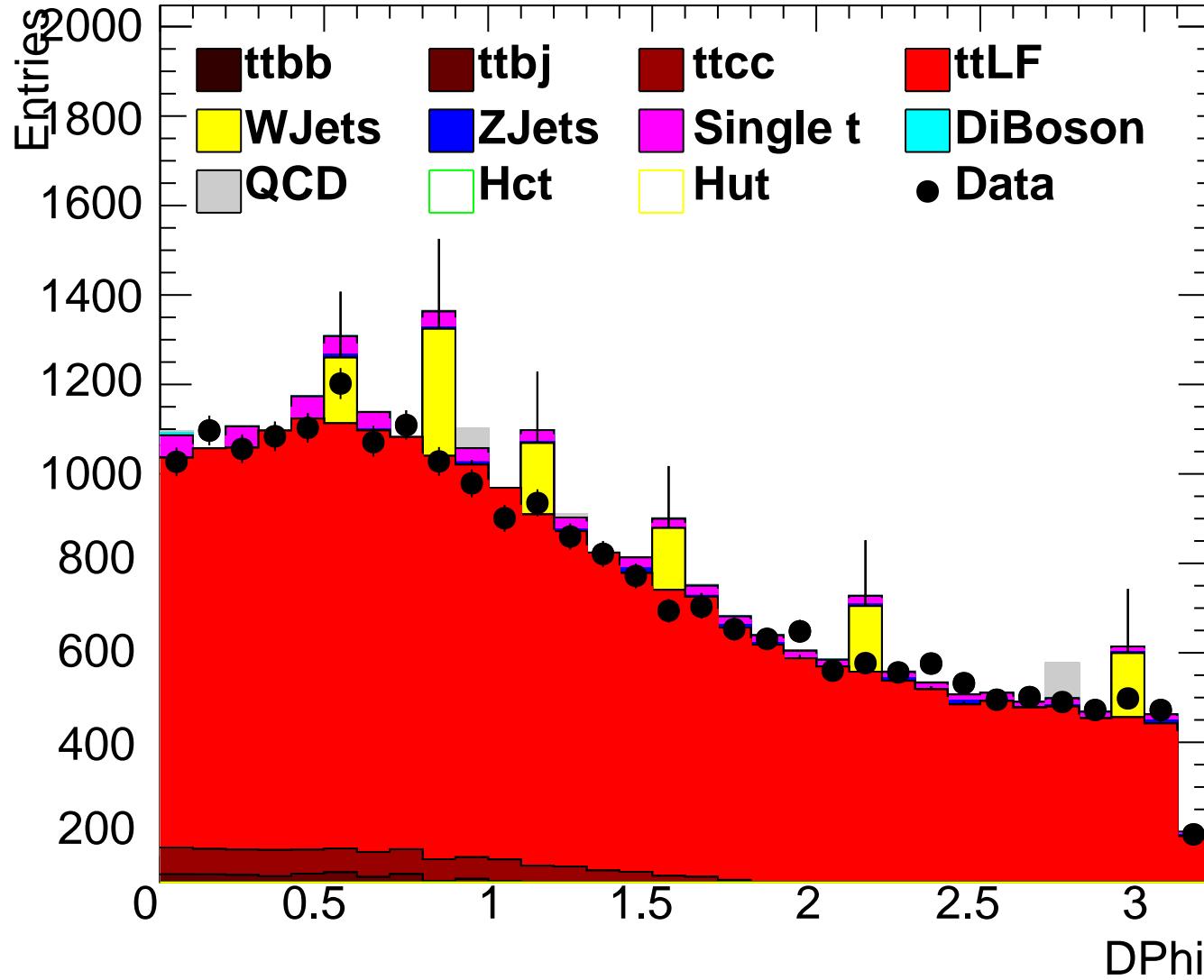


**Ch0\_S12**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch0\_S12**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

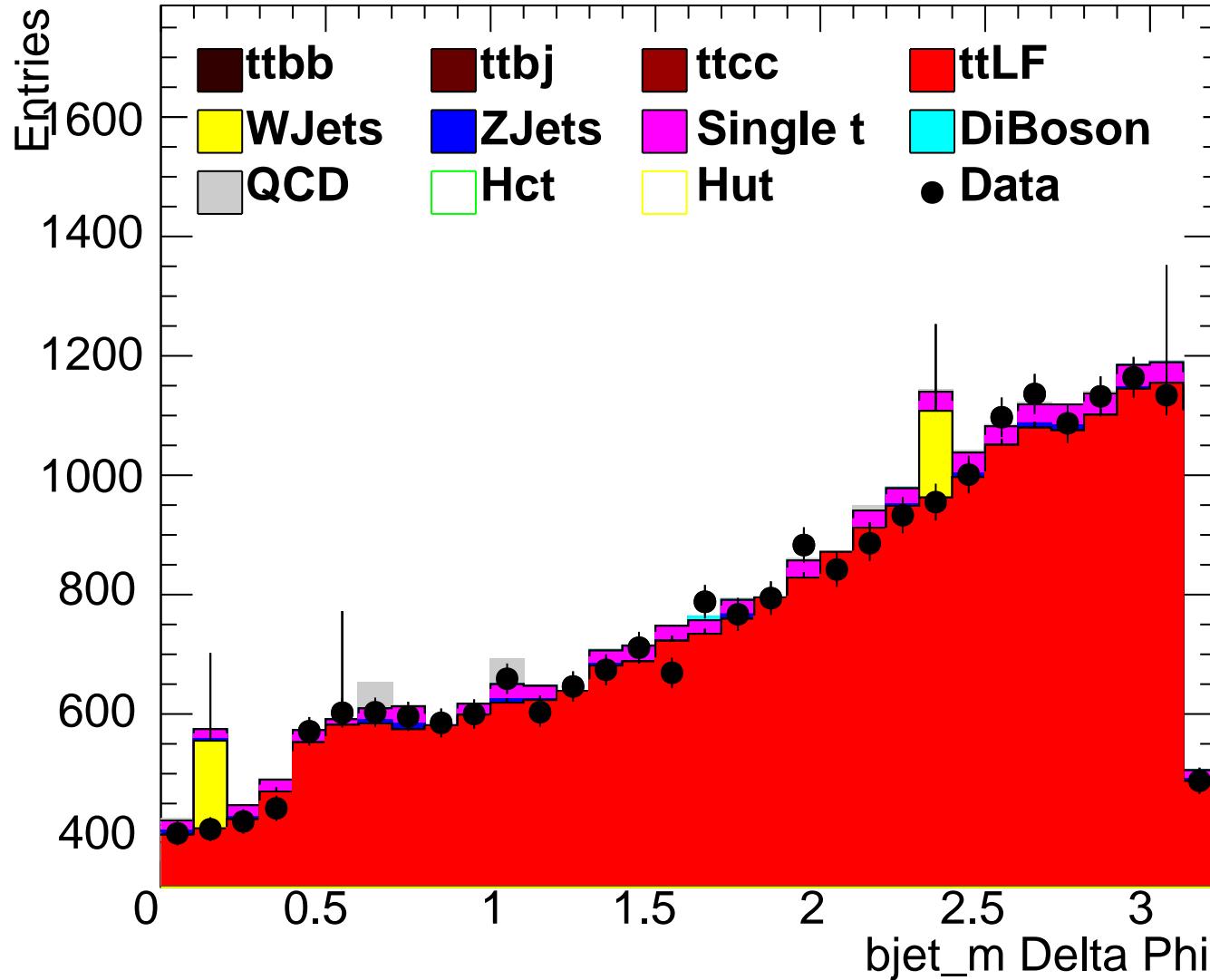
**Ch0\_S12**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

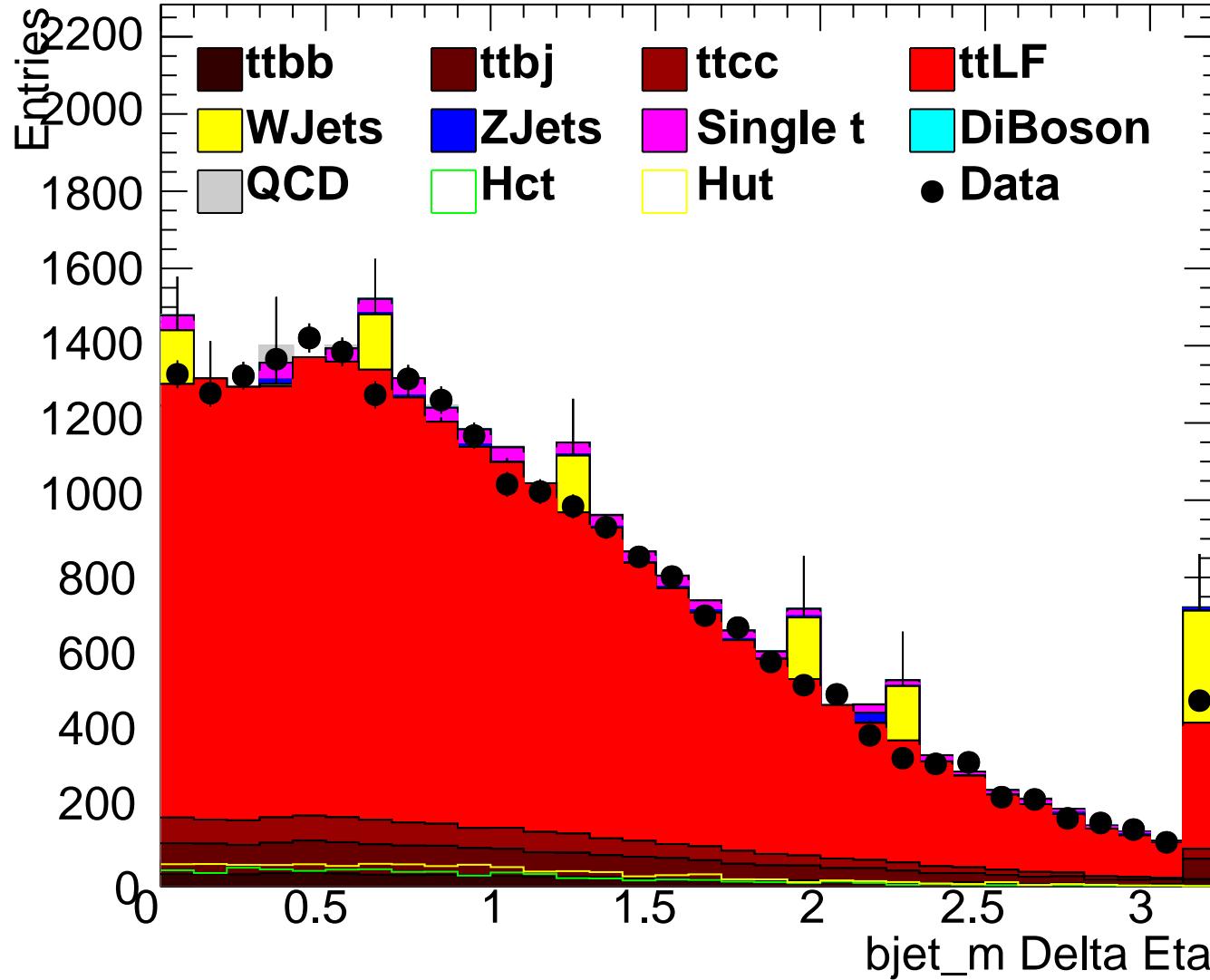
**Ch0\_S12**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

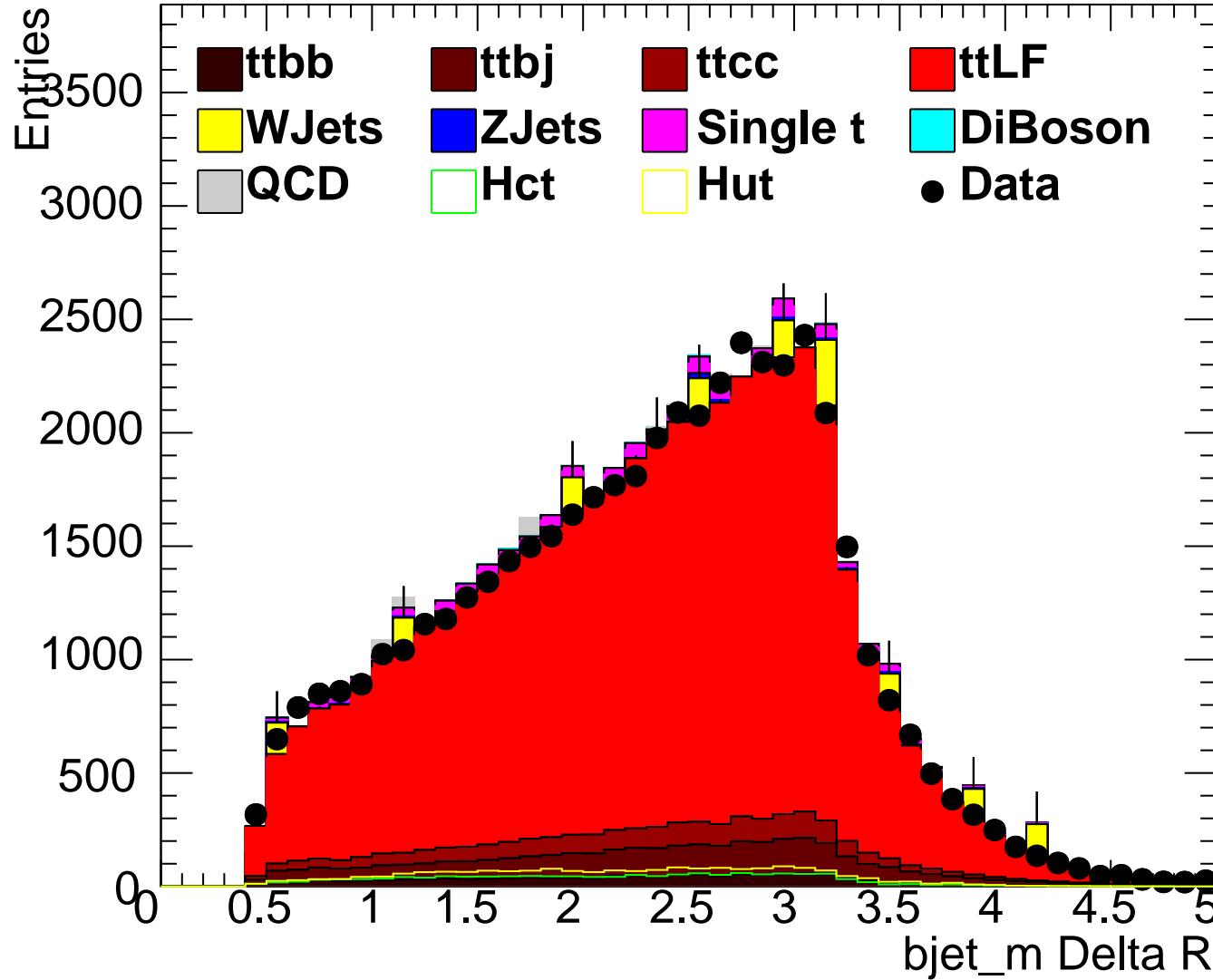


Ch0 S12

CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$

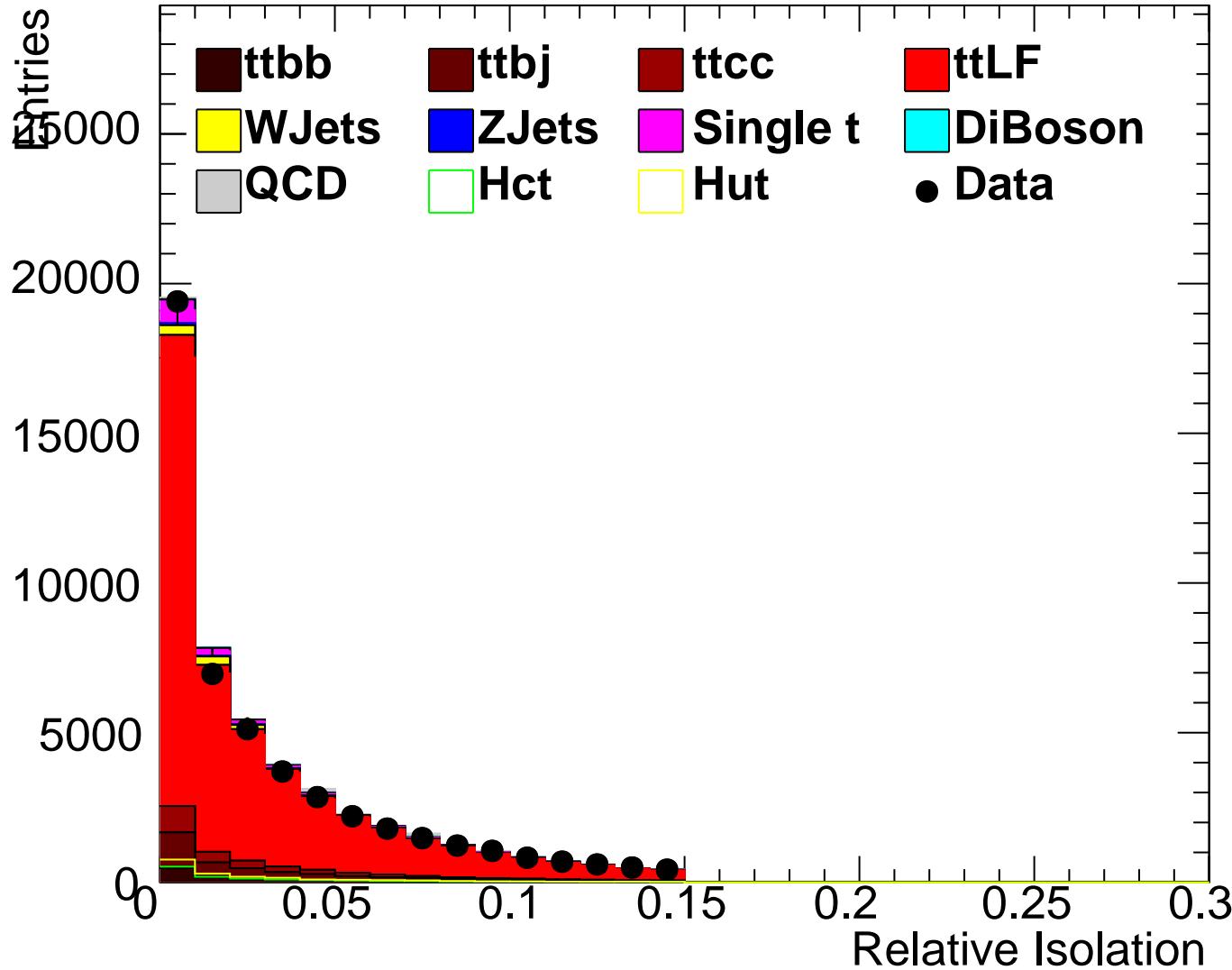


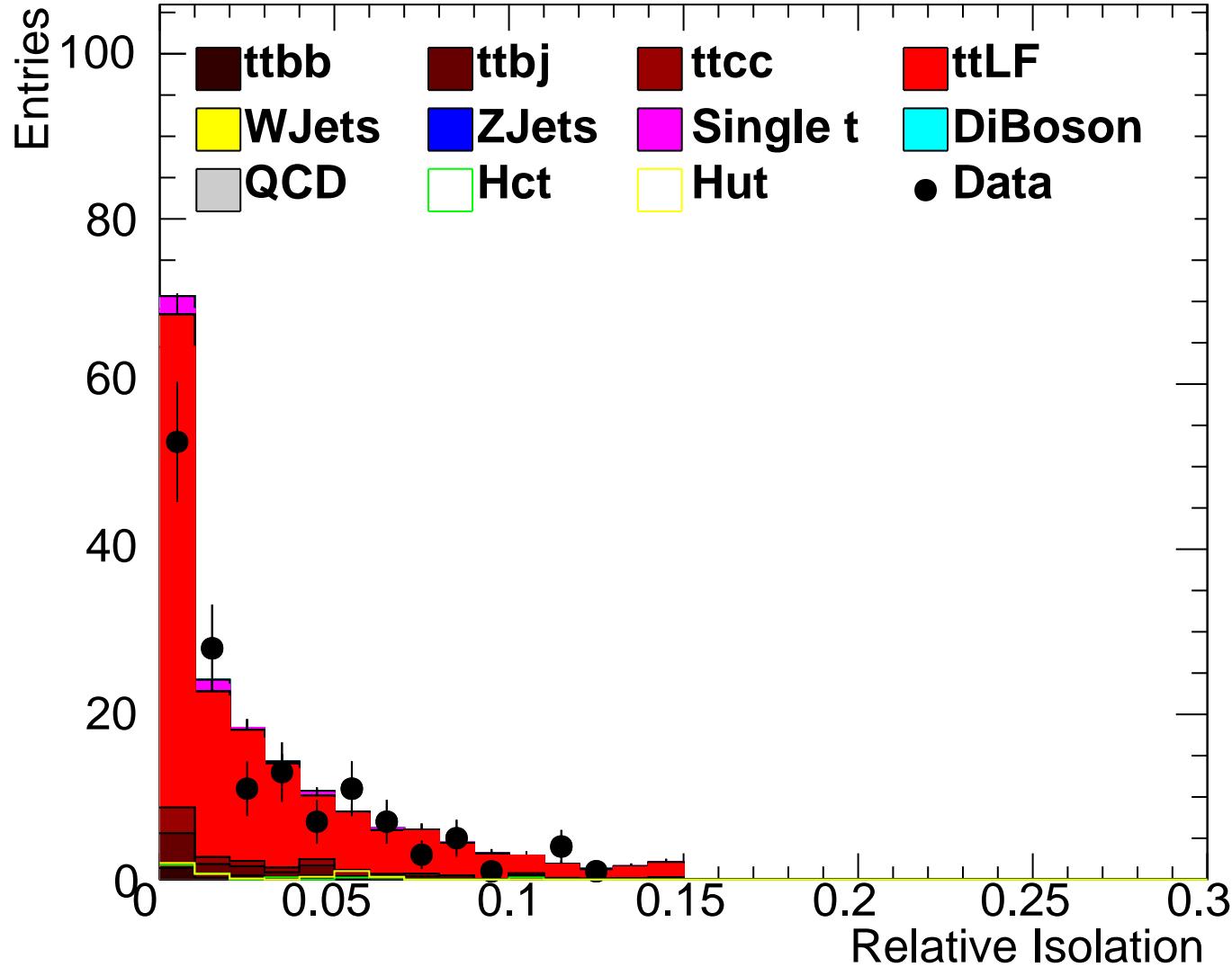


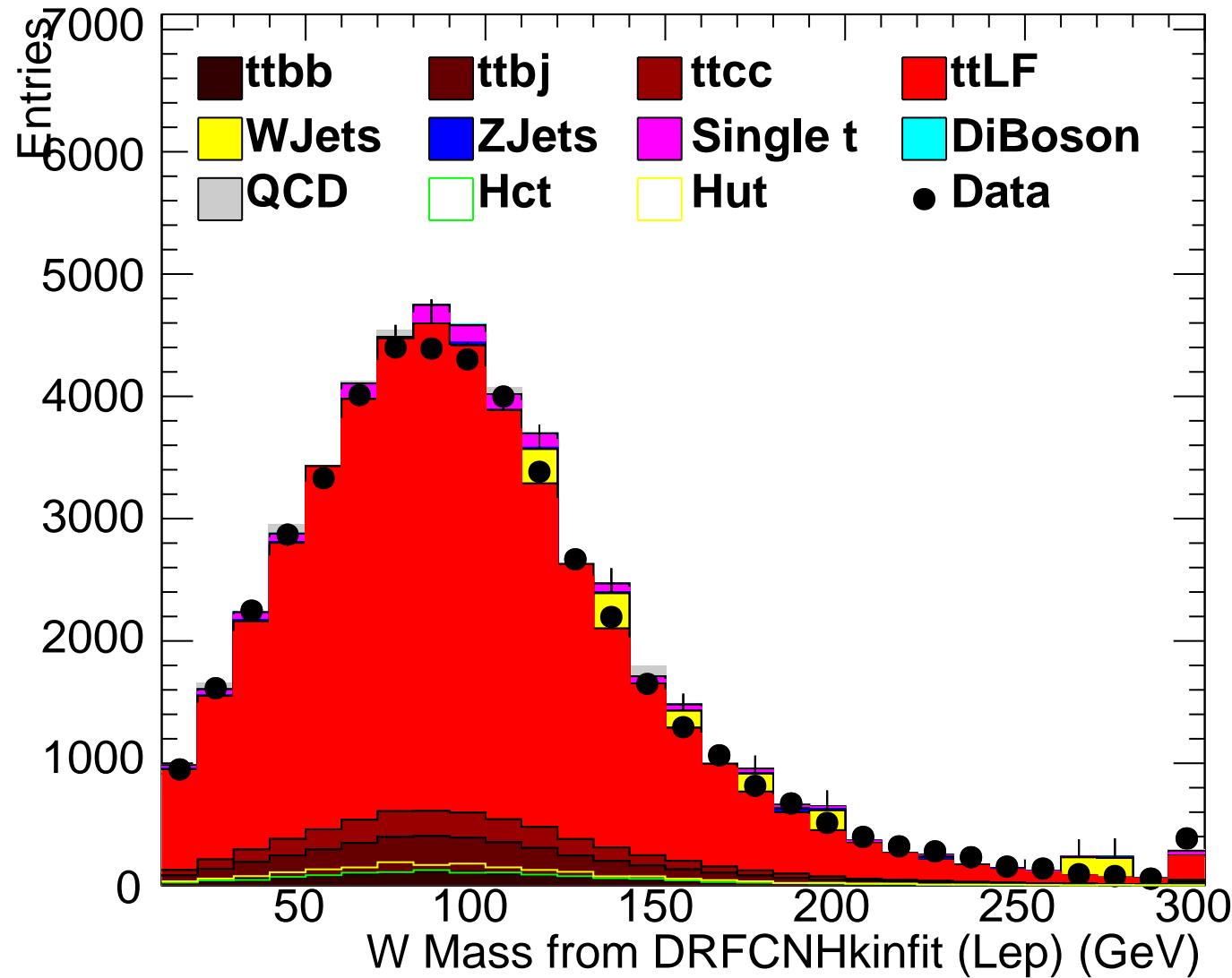
**Ch0\_S12**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

Ch0 S12

CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$

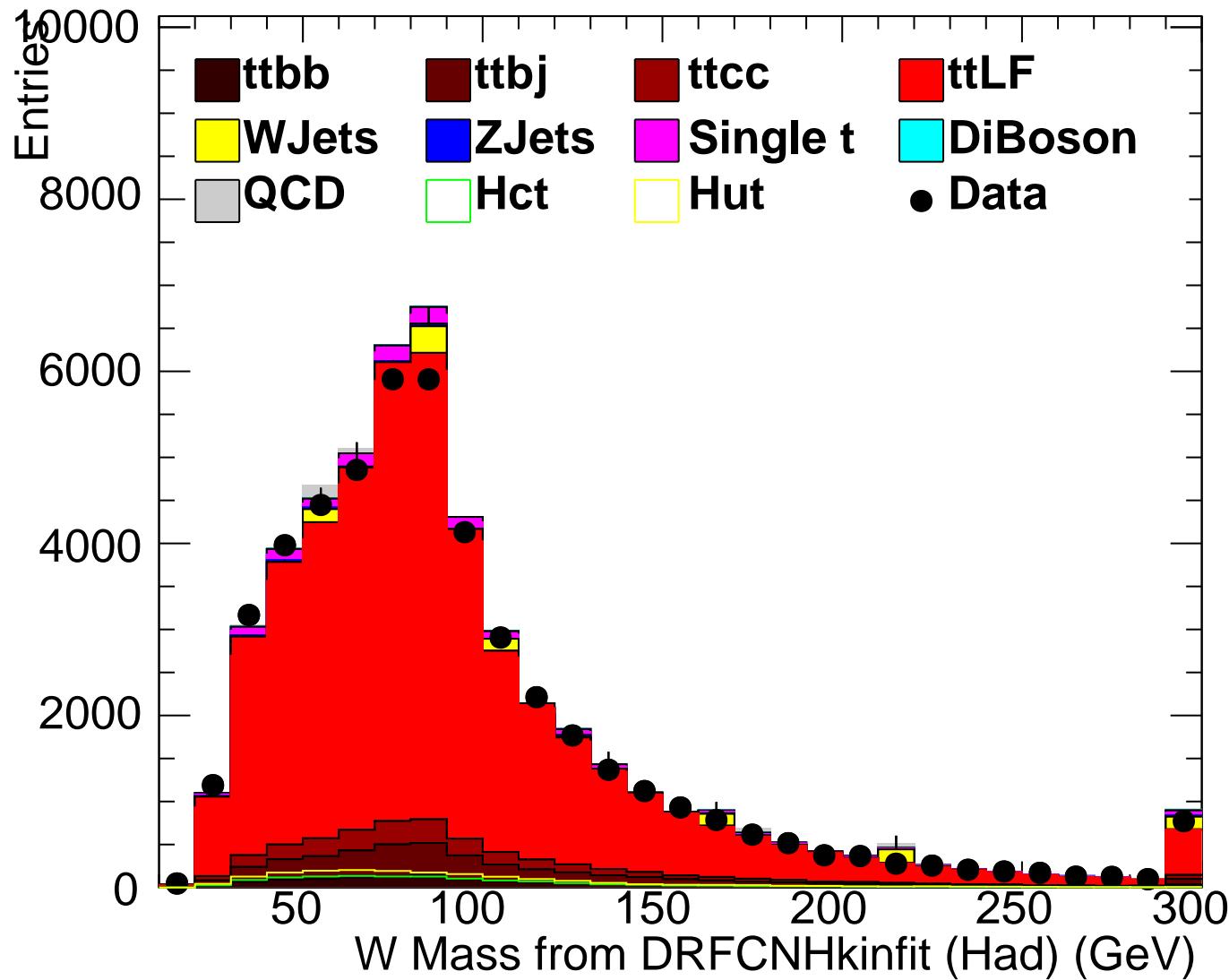


**Ch0\_S12**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch0\_S12**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

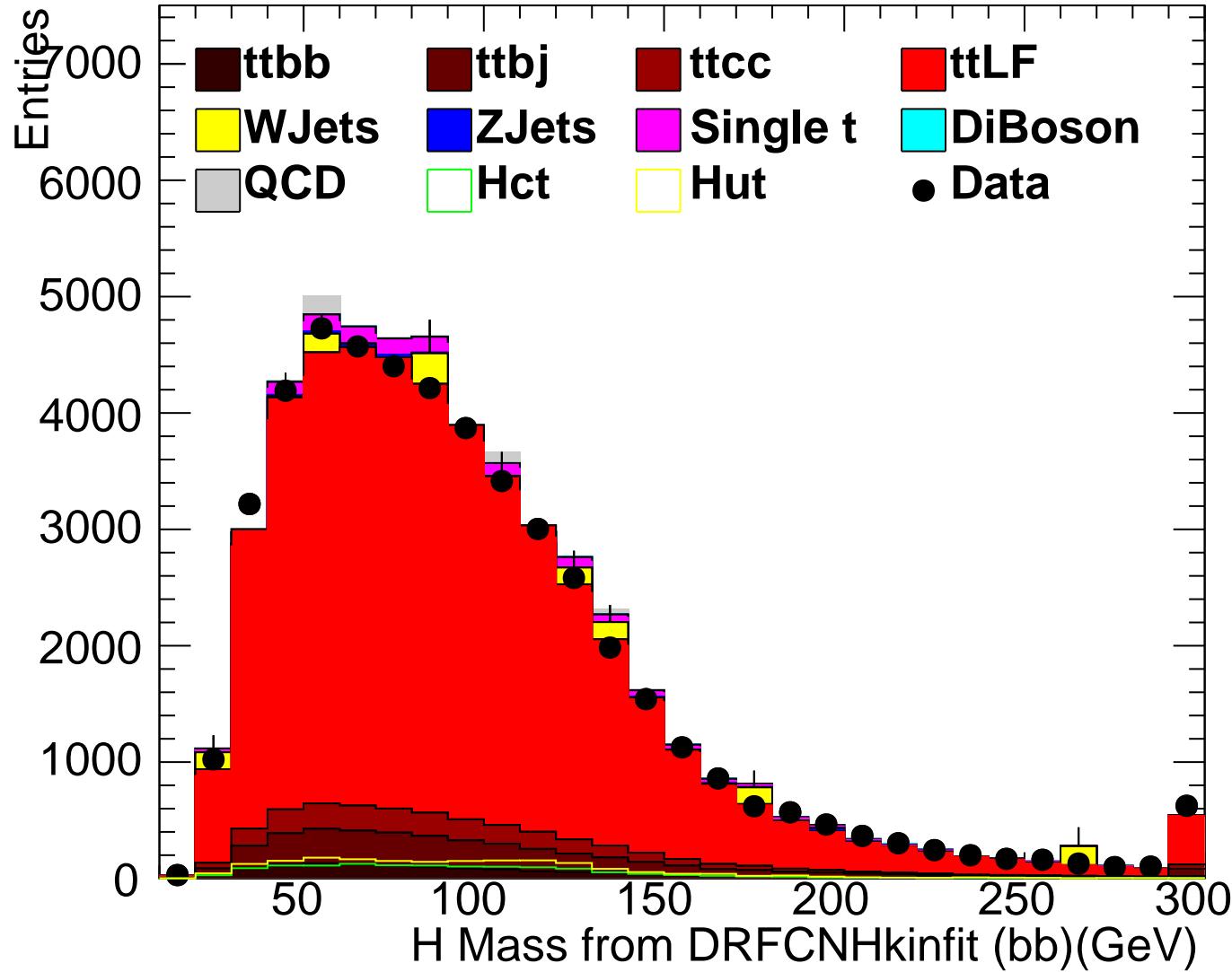
Ch0\_S12

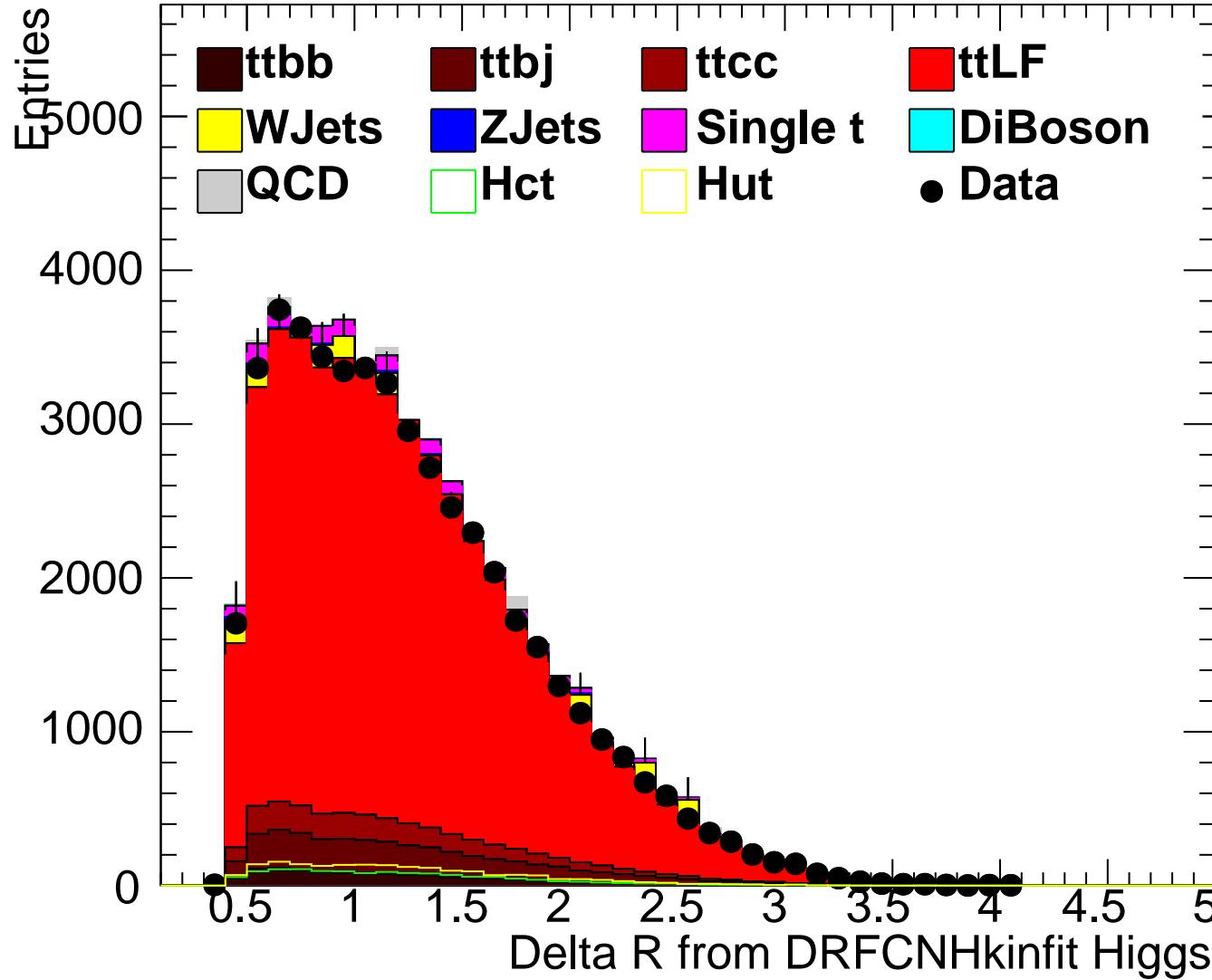
CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$



Ch0 S12

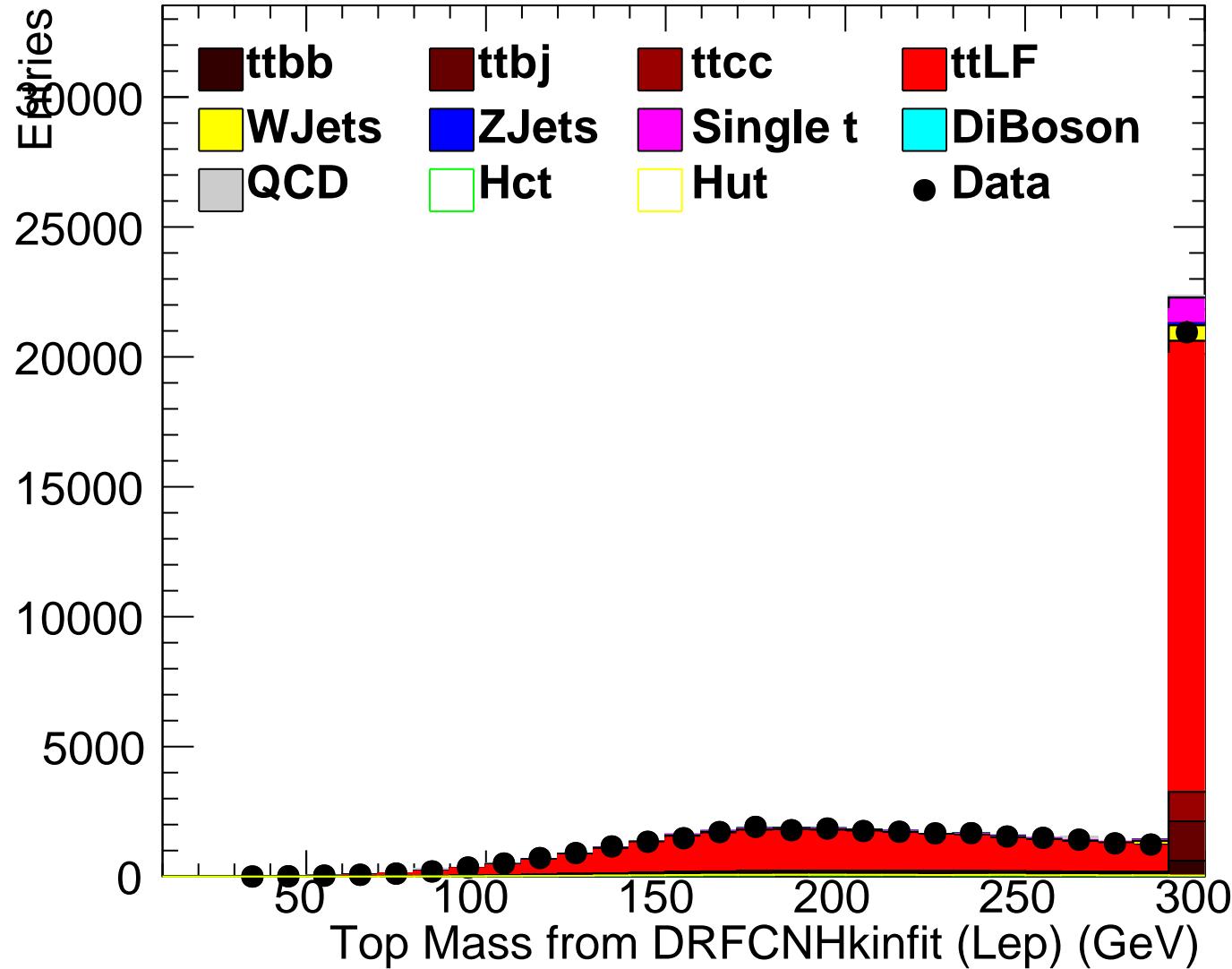
CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$





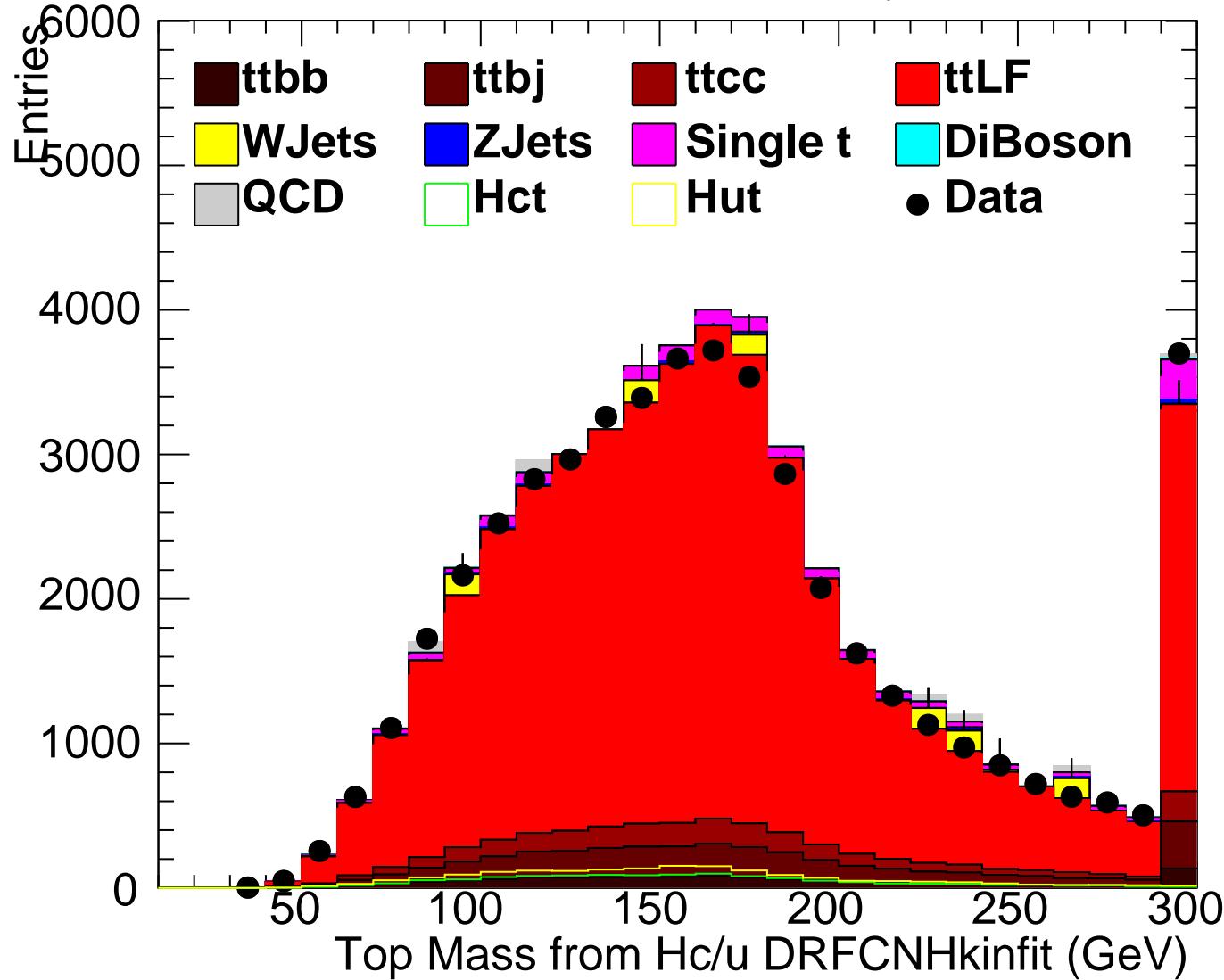
Ch0 S12

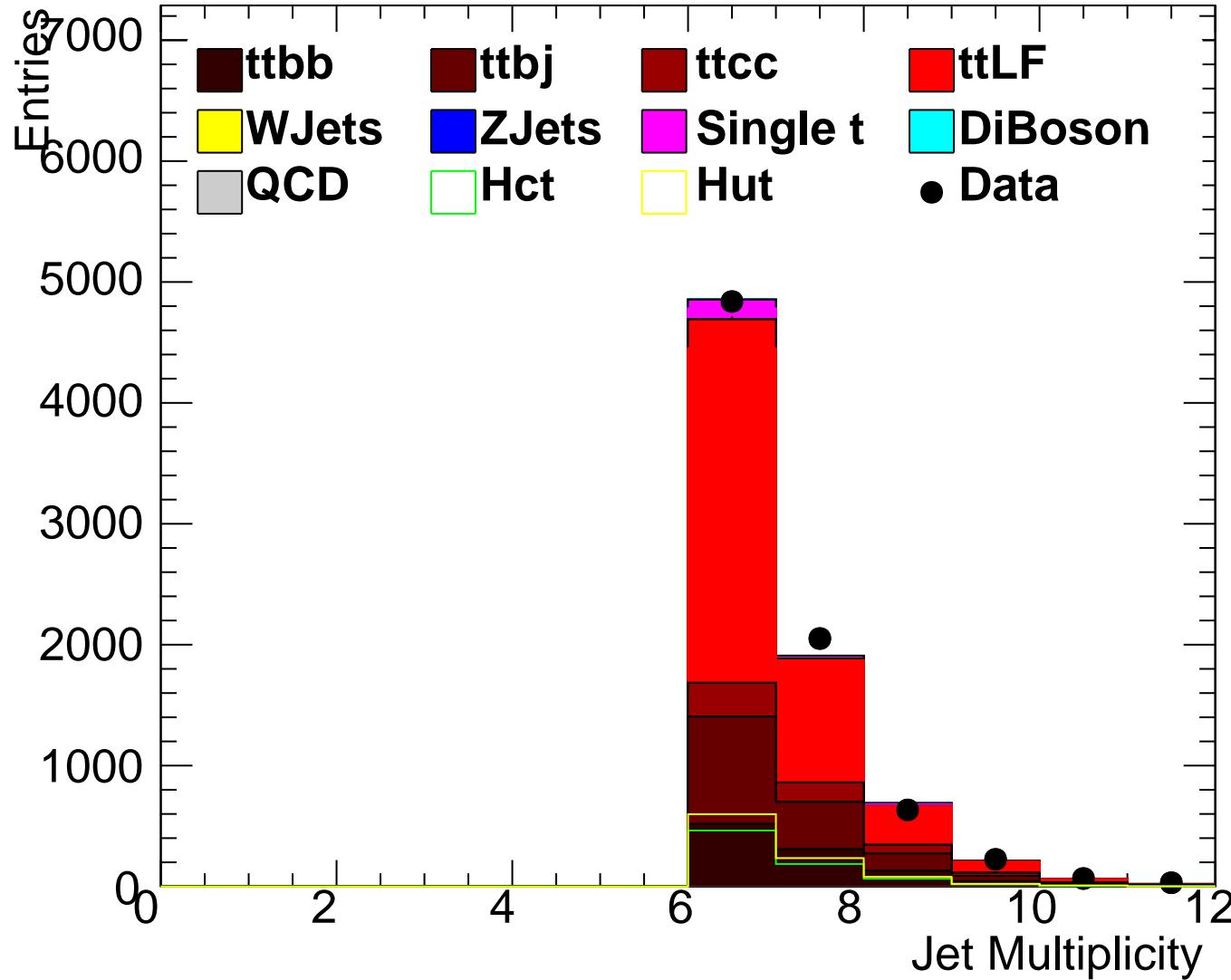
CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$



# Ch0\_S12

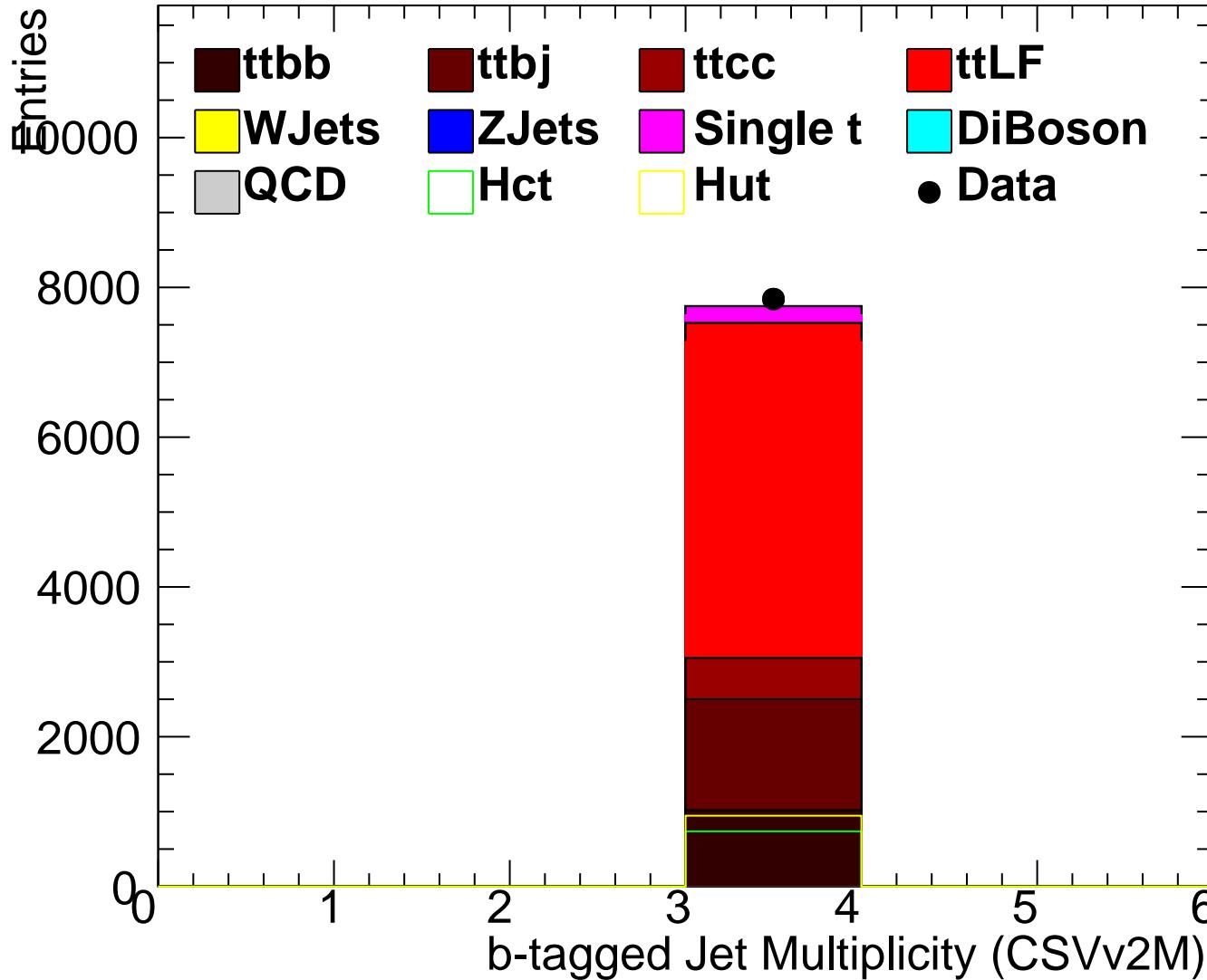
CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV

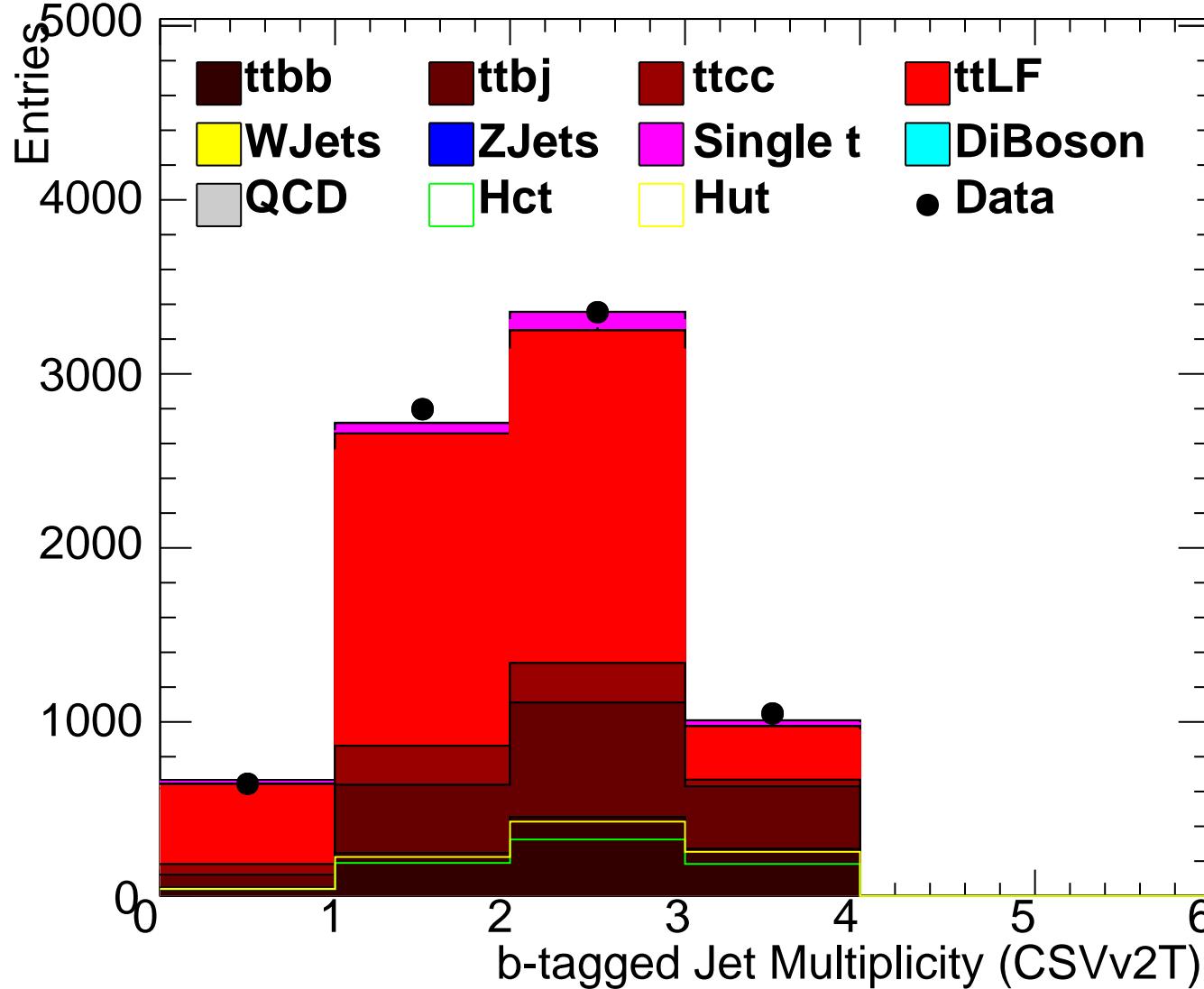


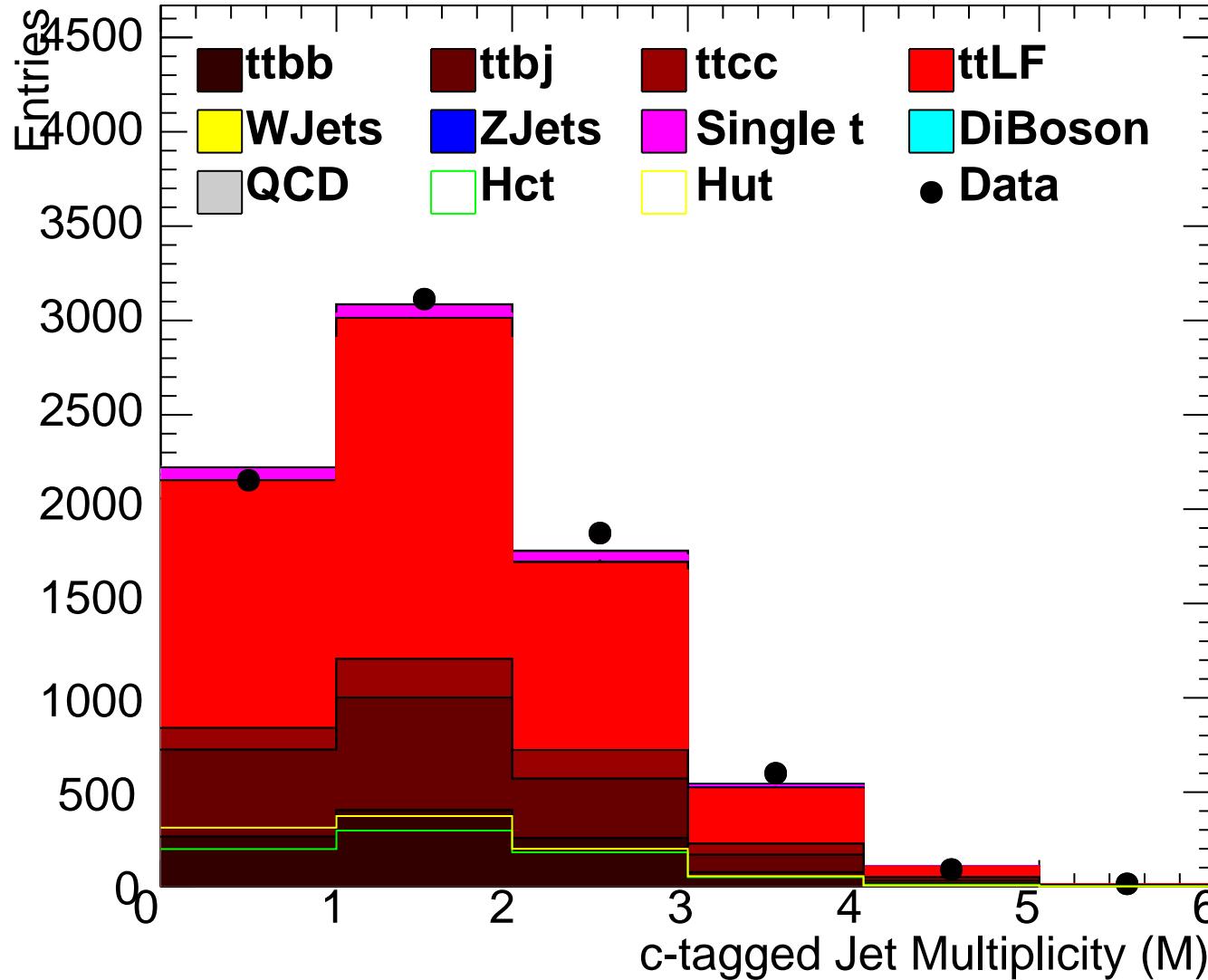


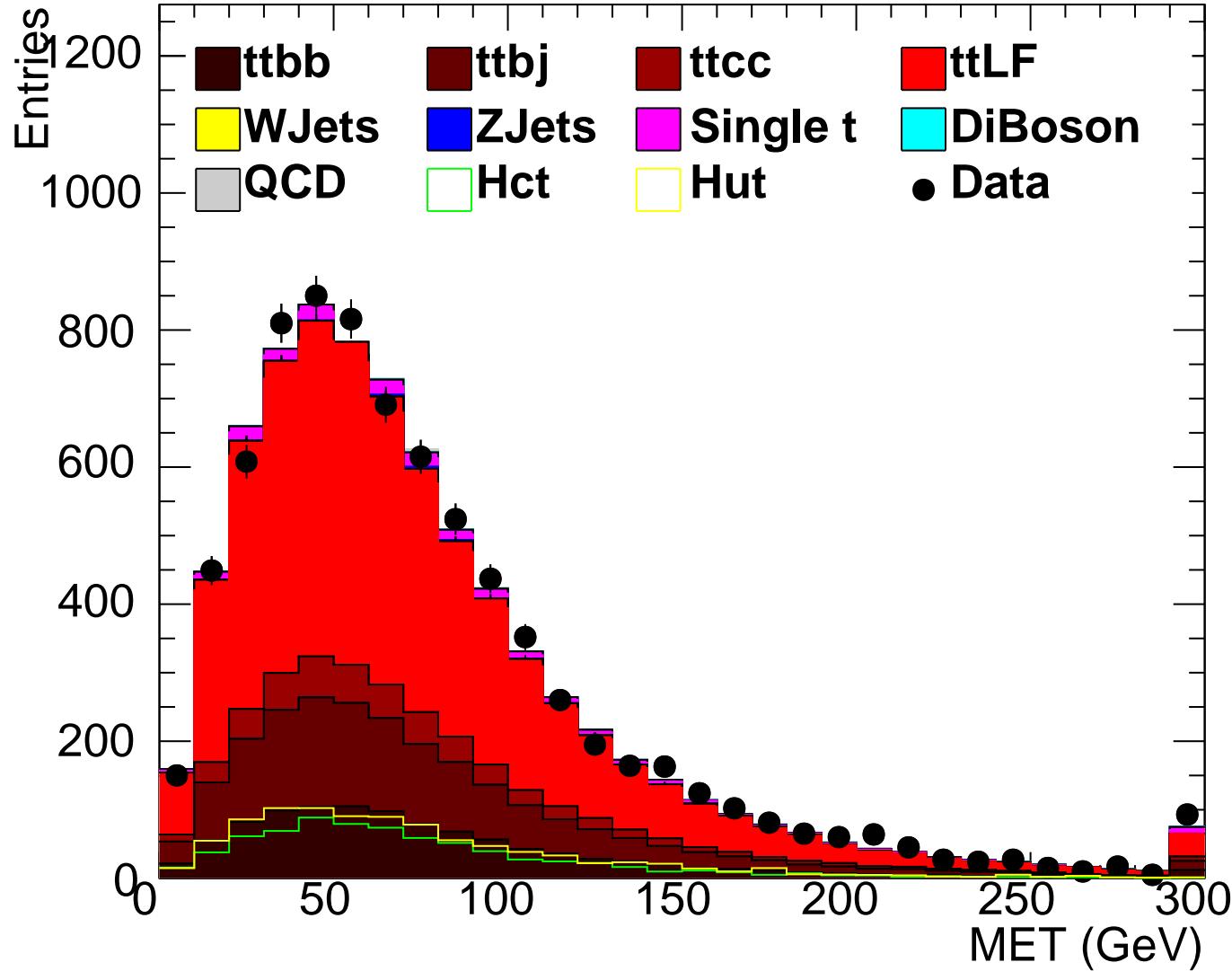
Ch0\_S13

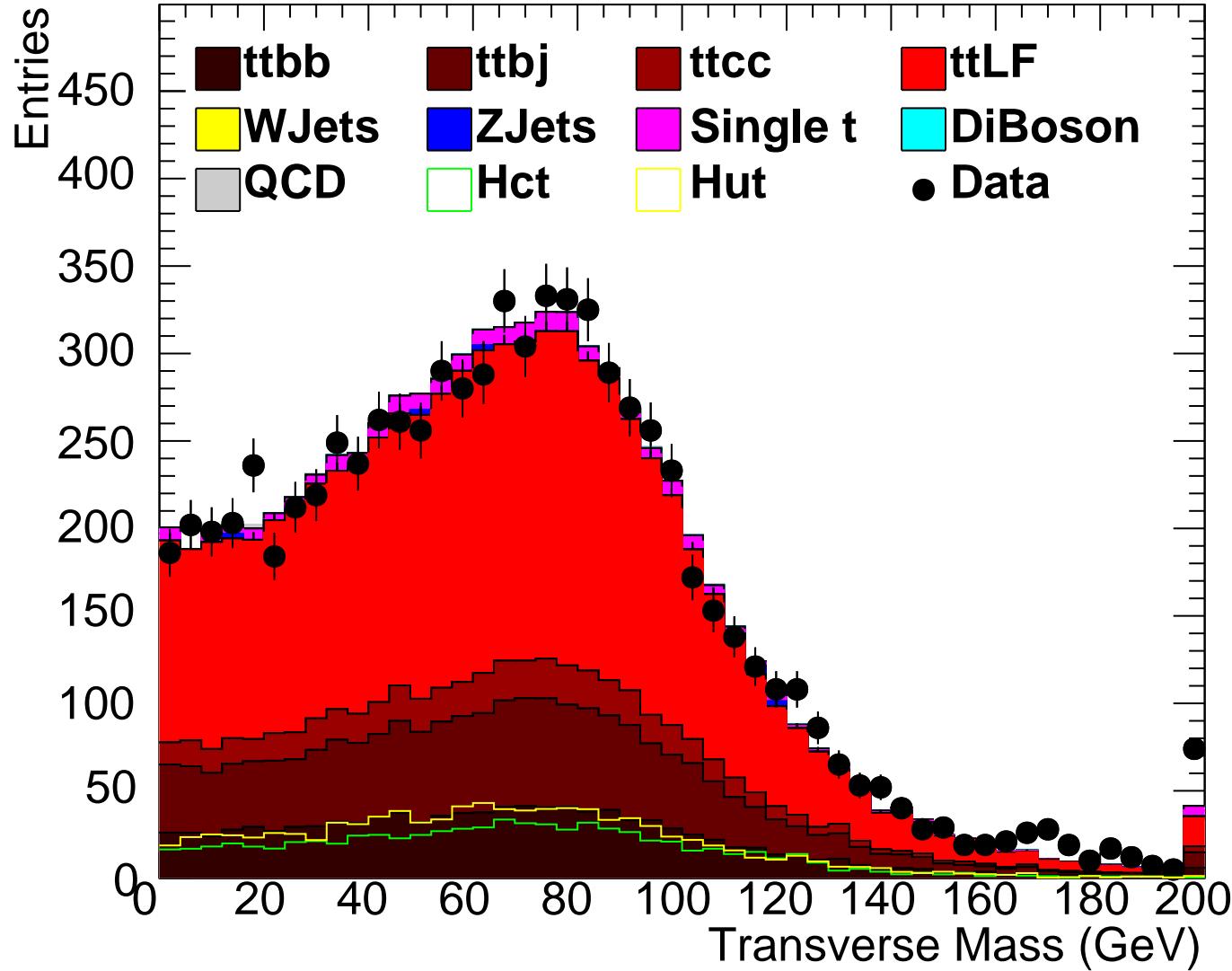
CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$

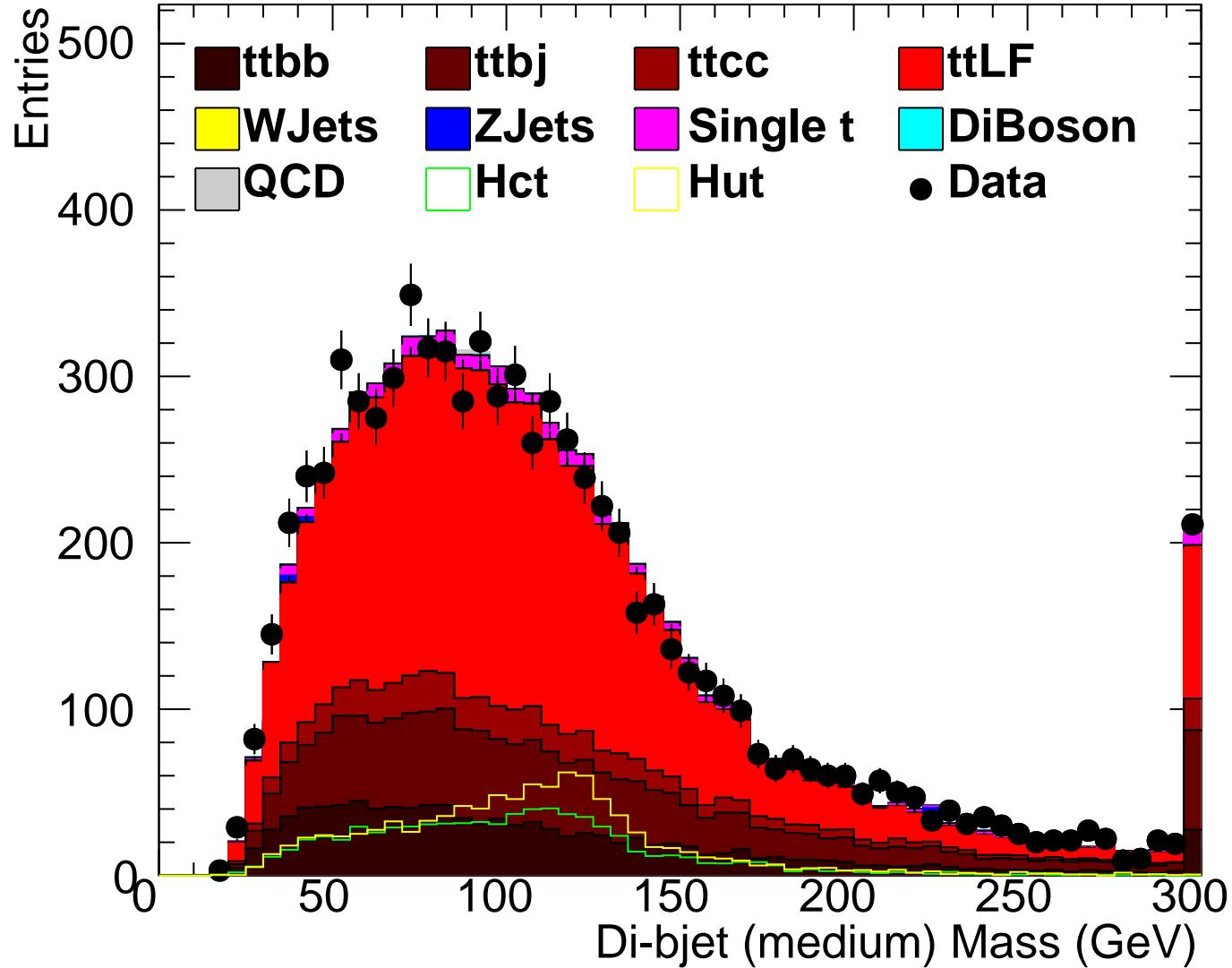


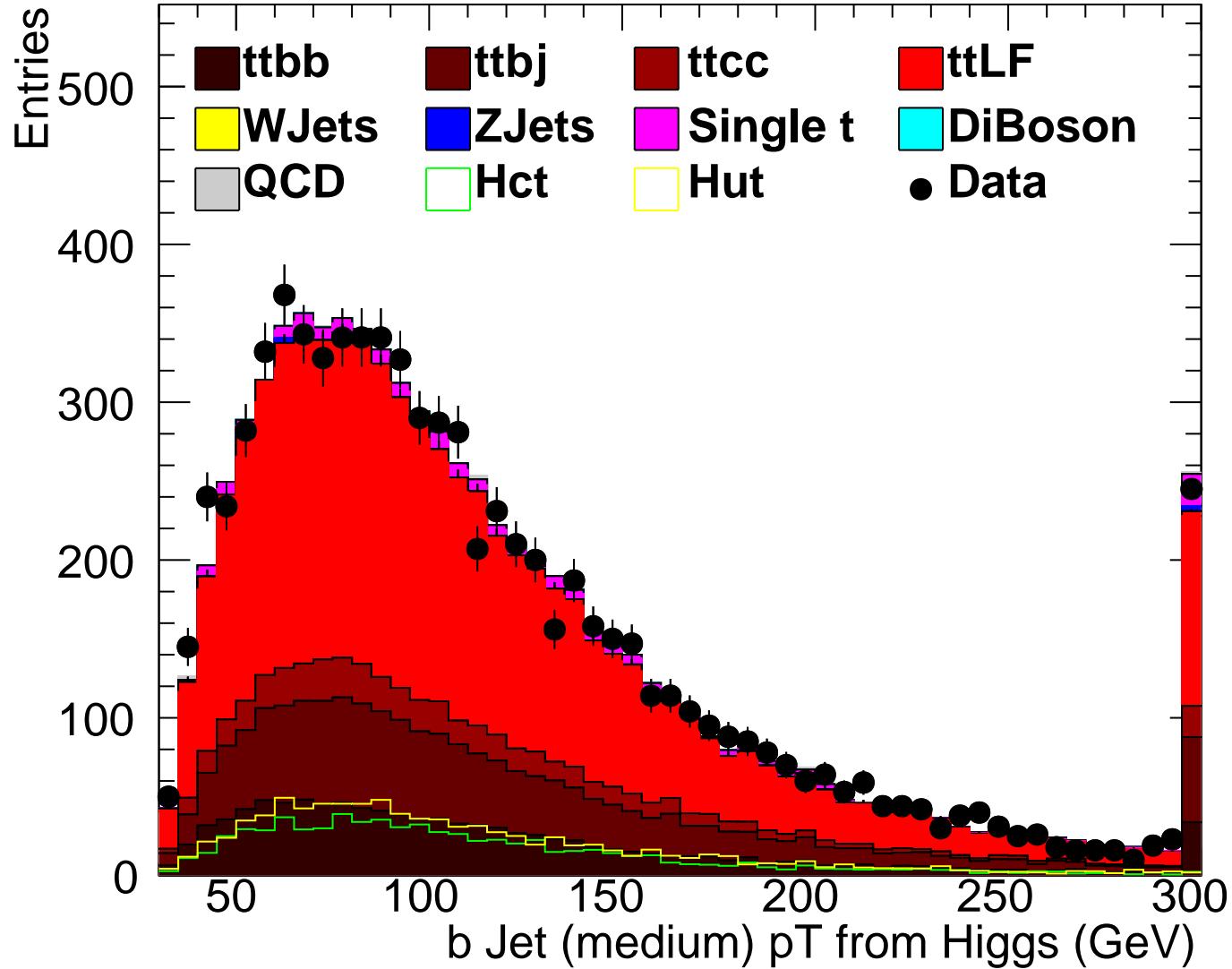
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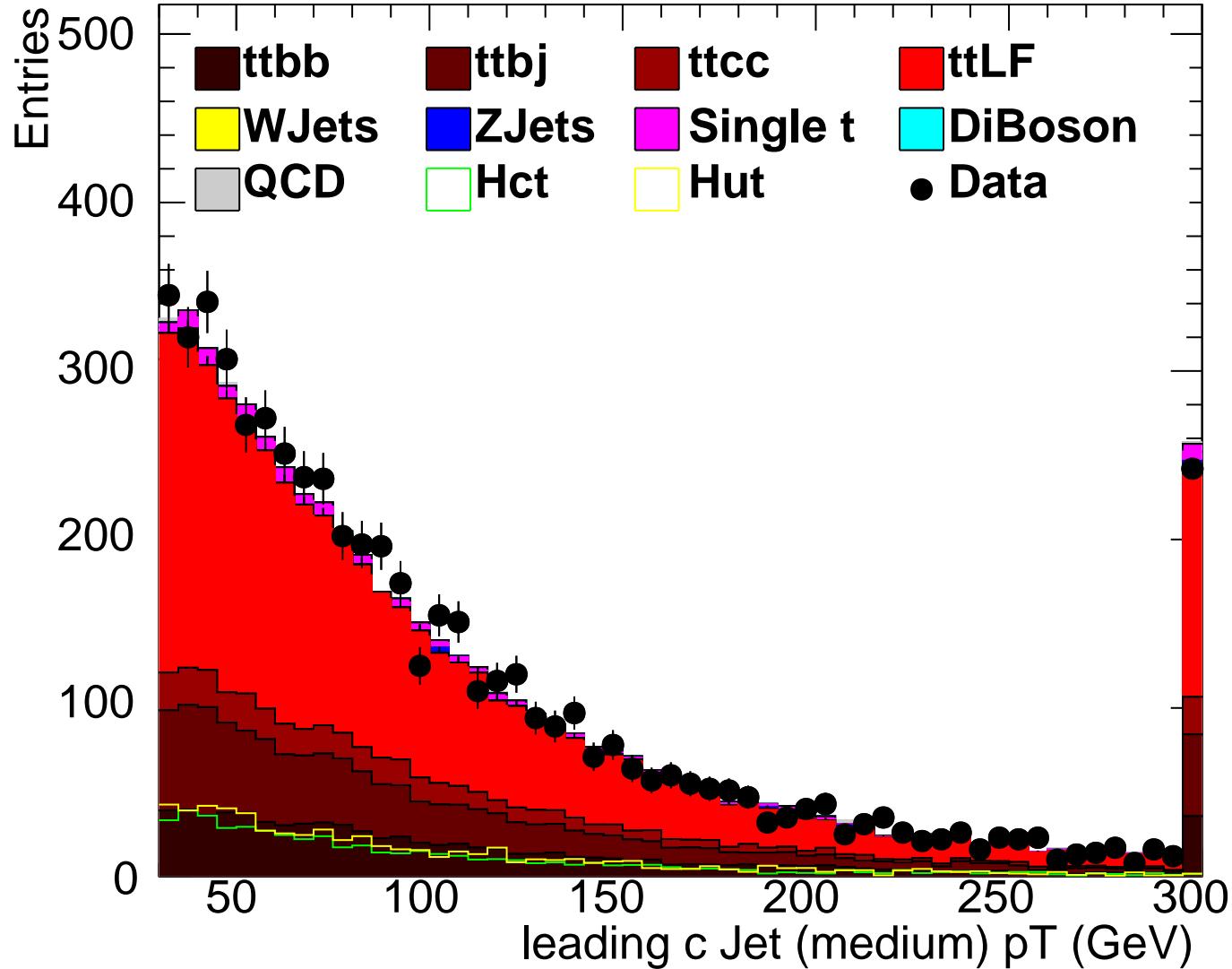


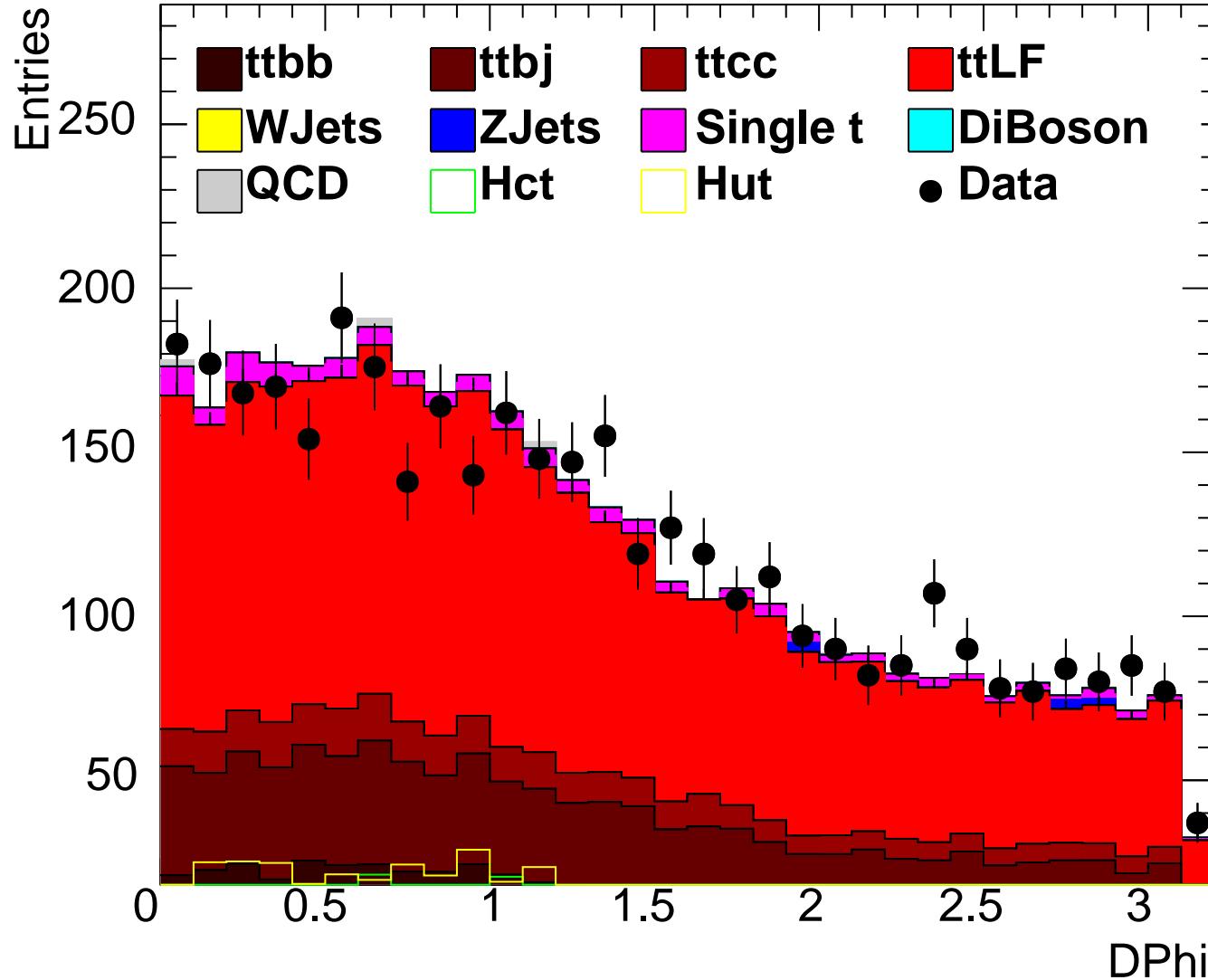
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**Ch0\_S13**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

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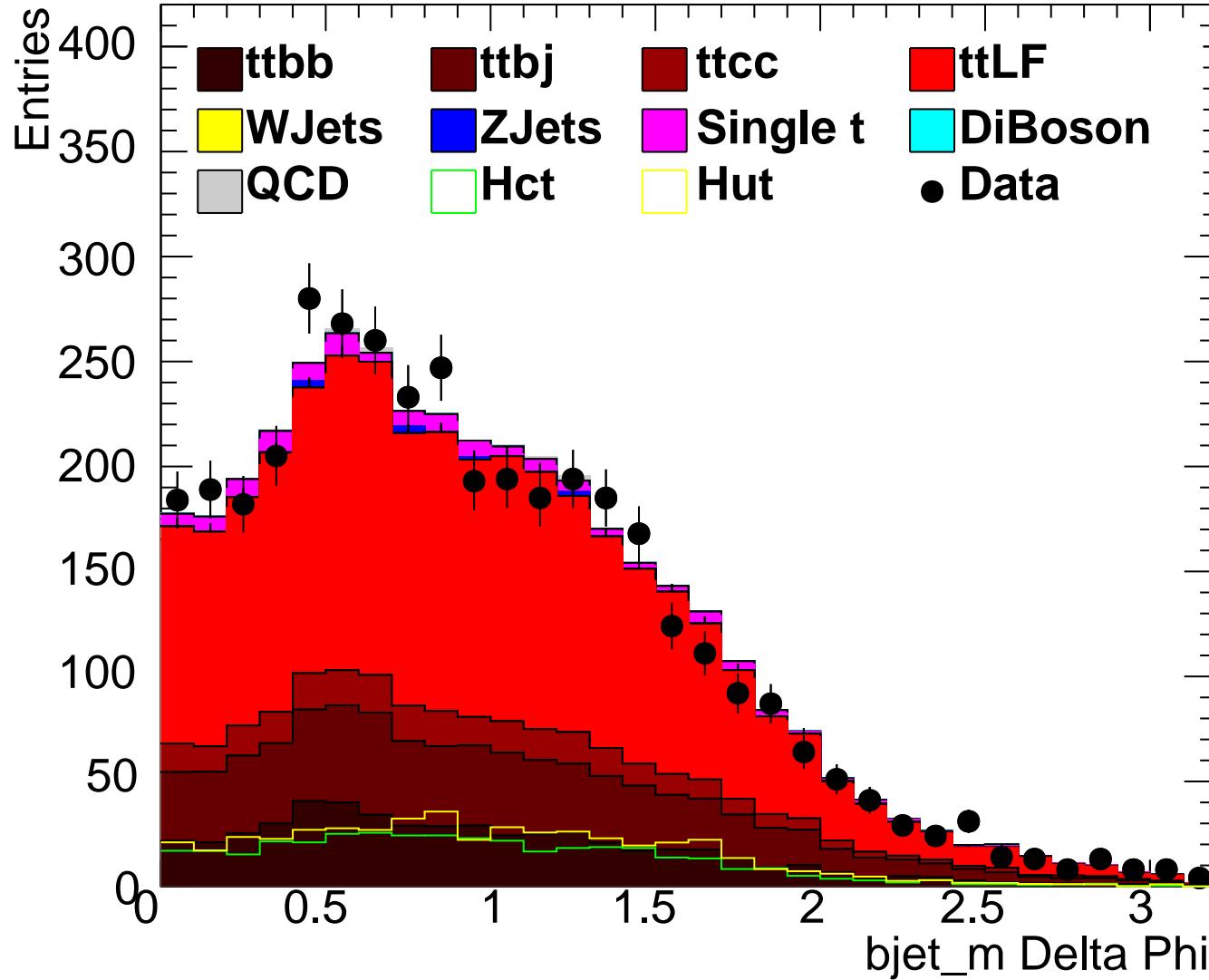
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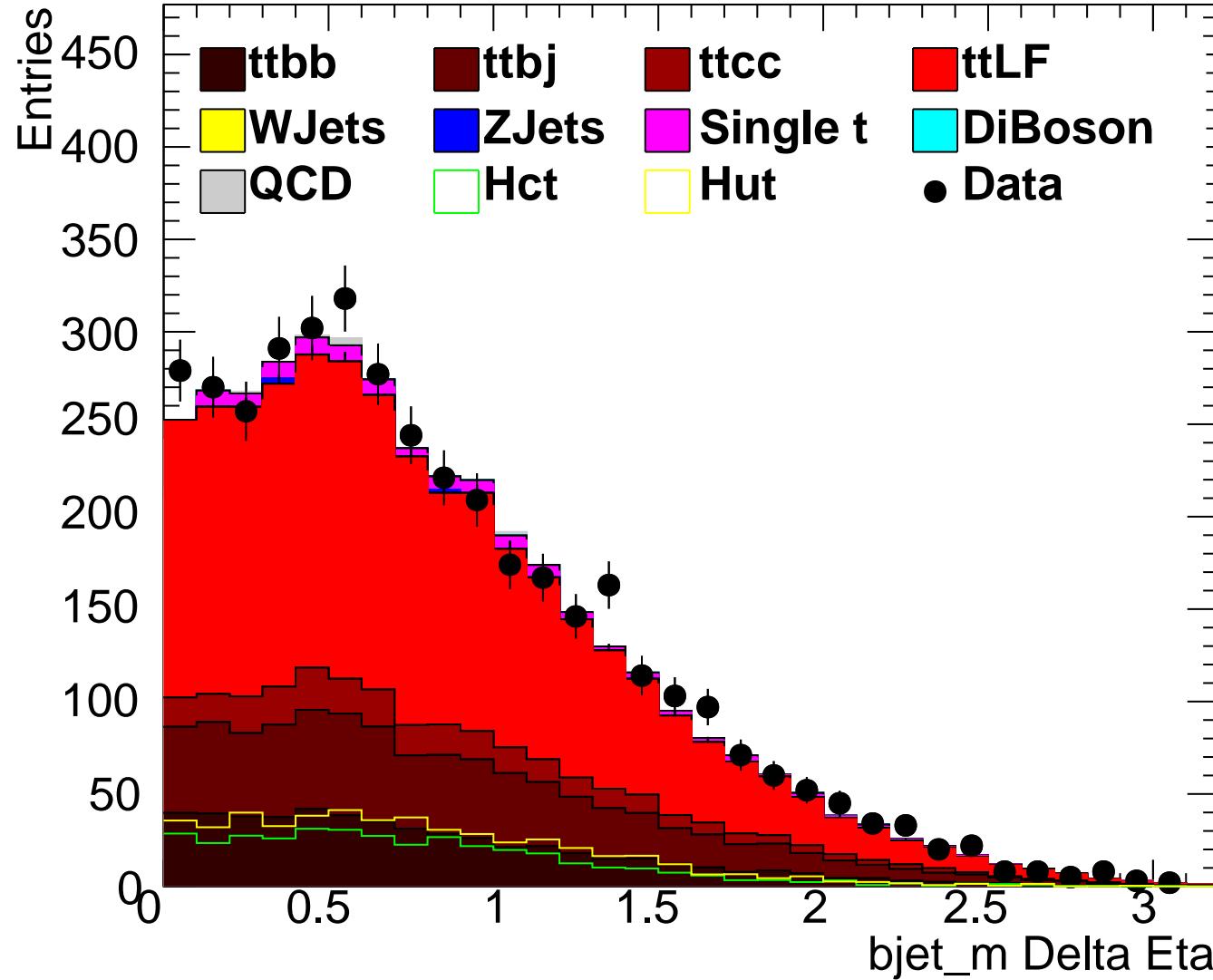
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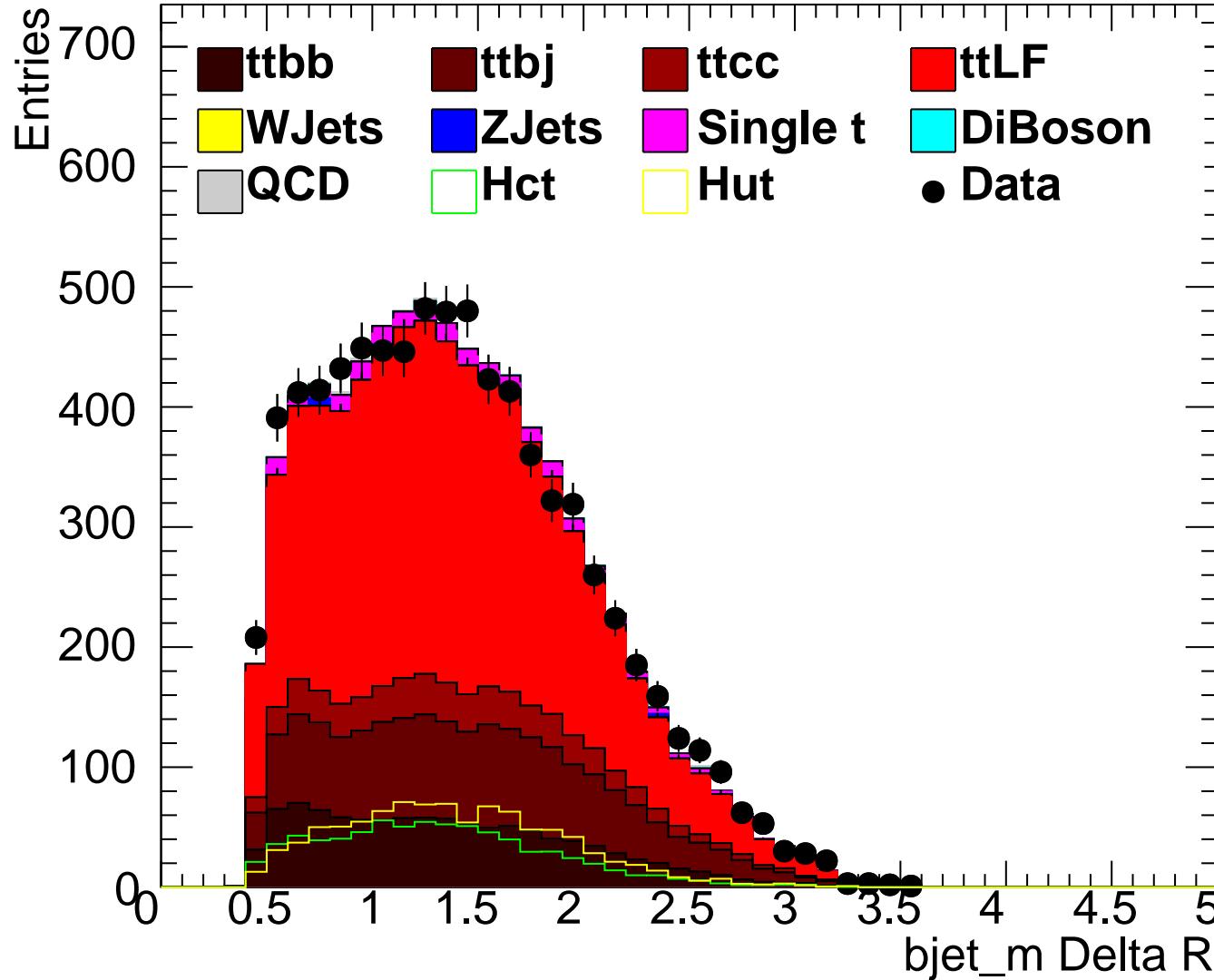
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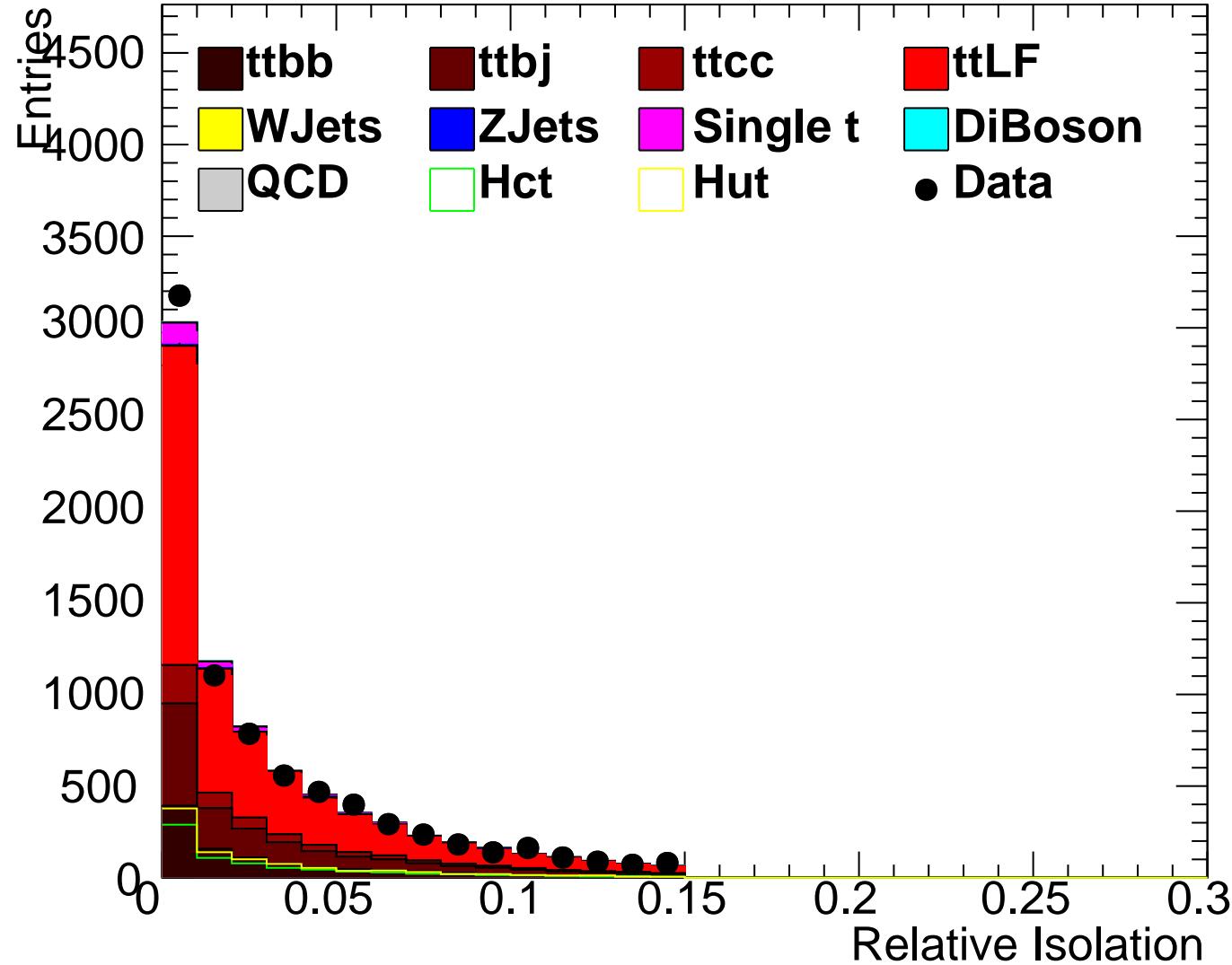
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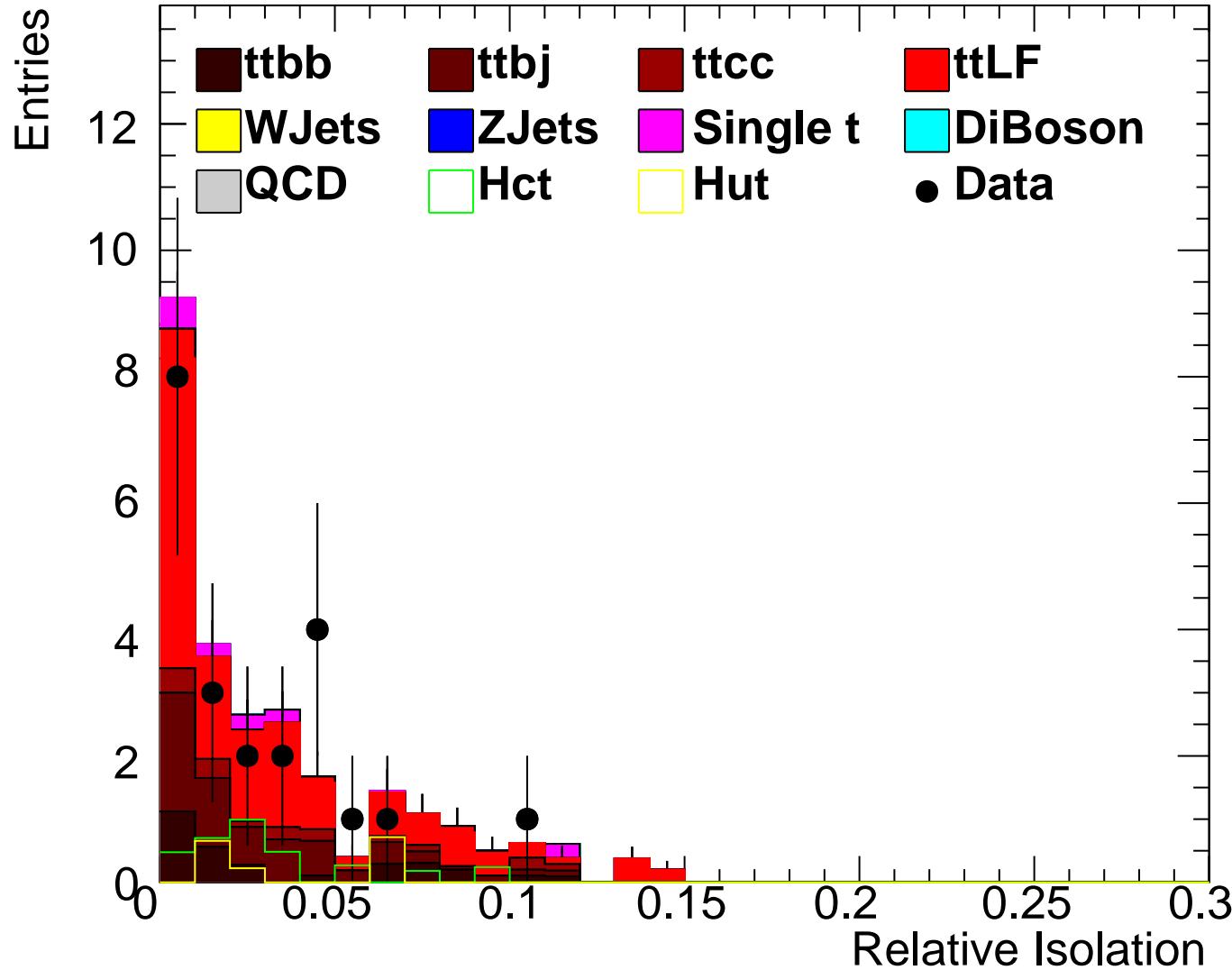
CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV

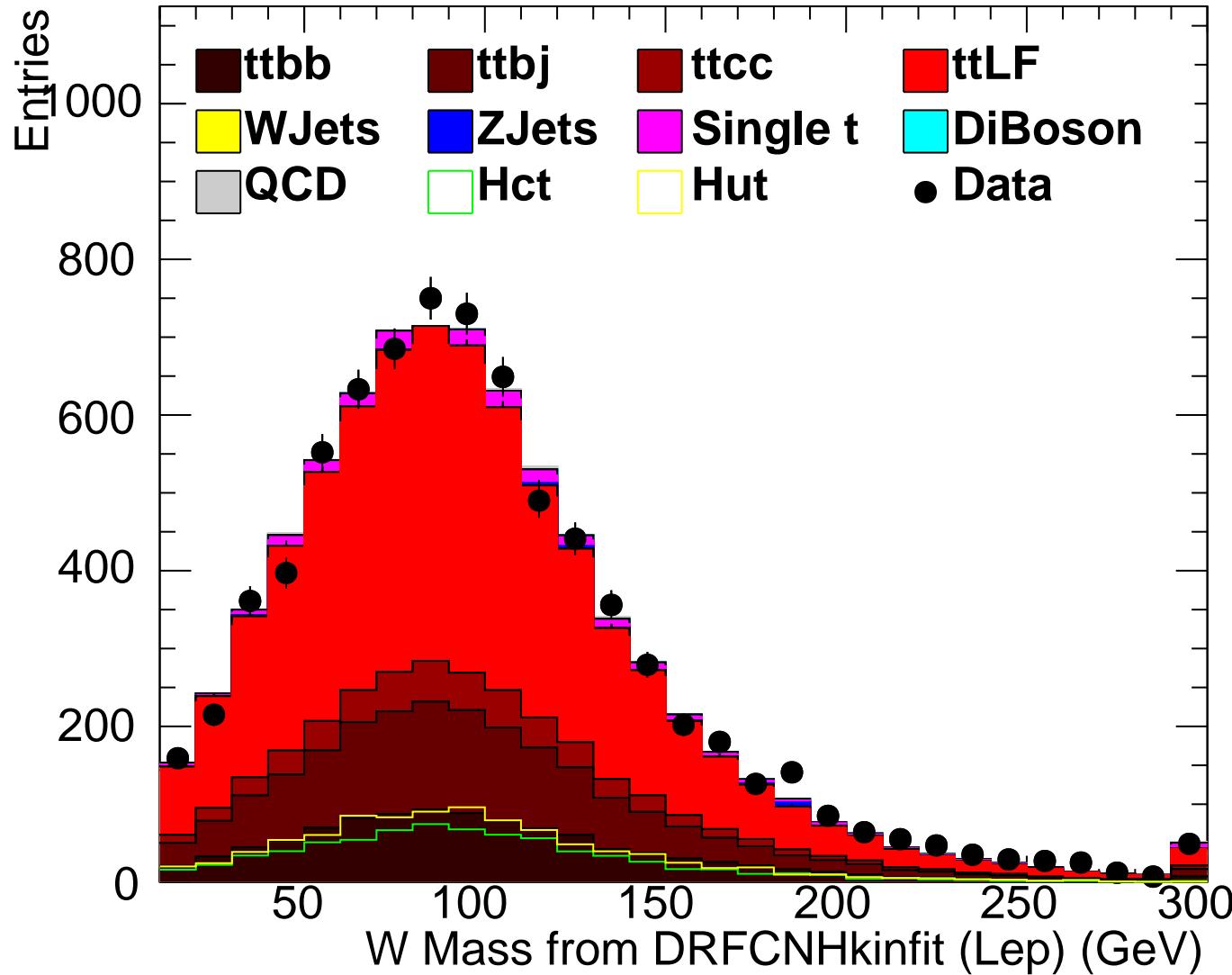






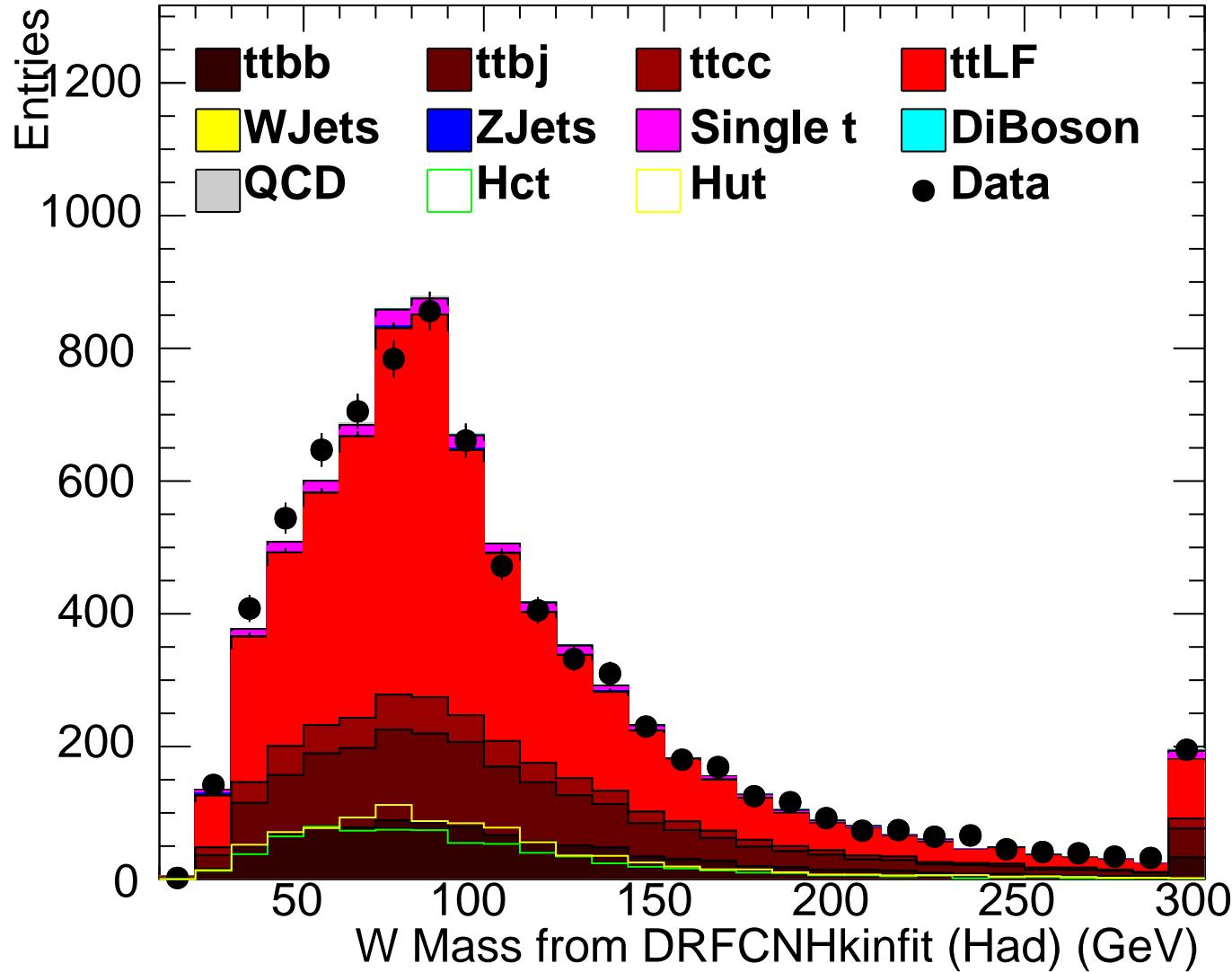


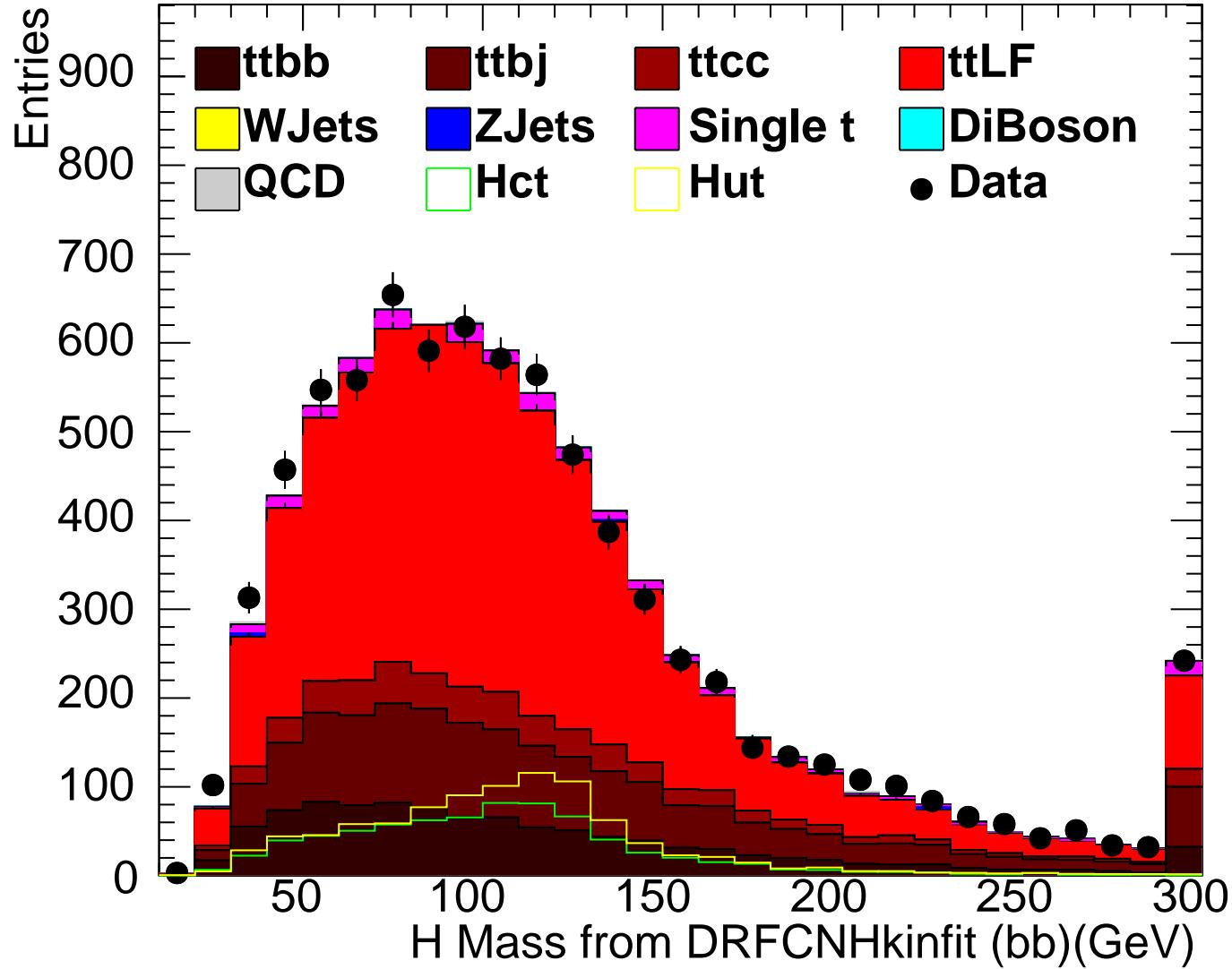




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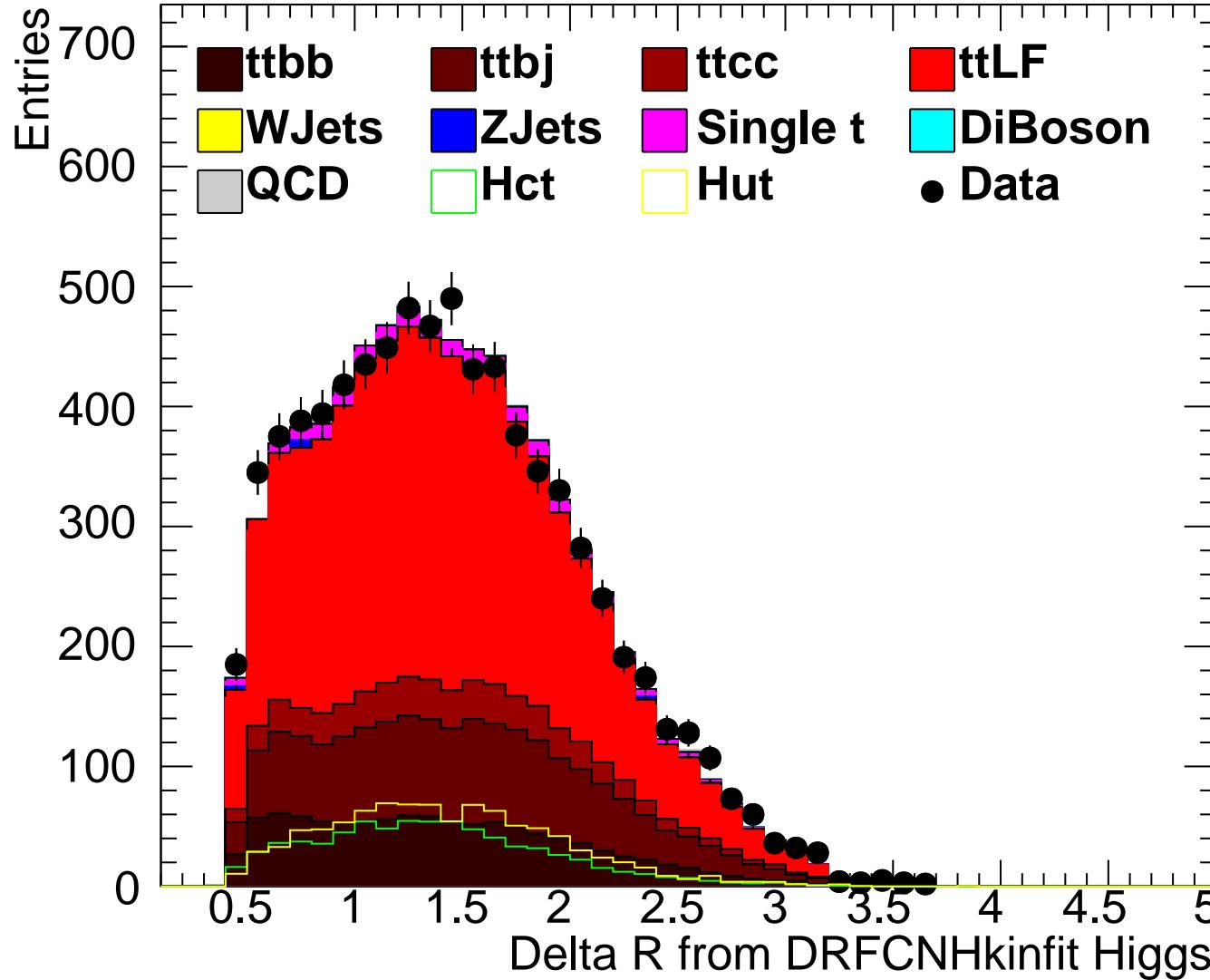
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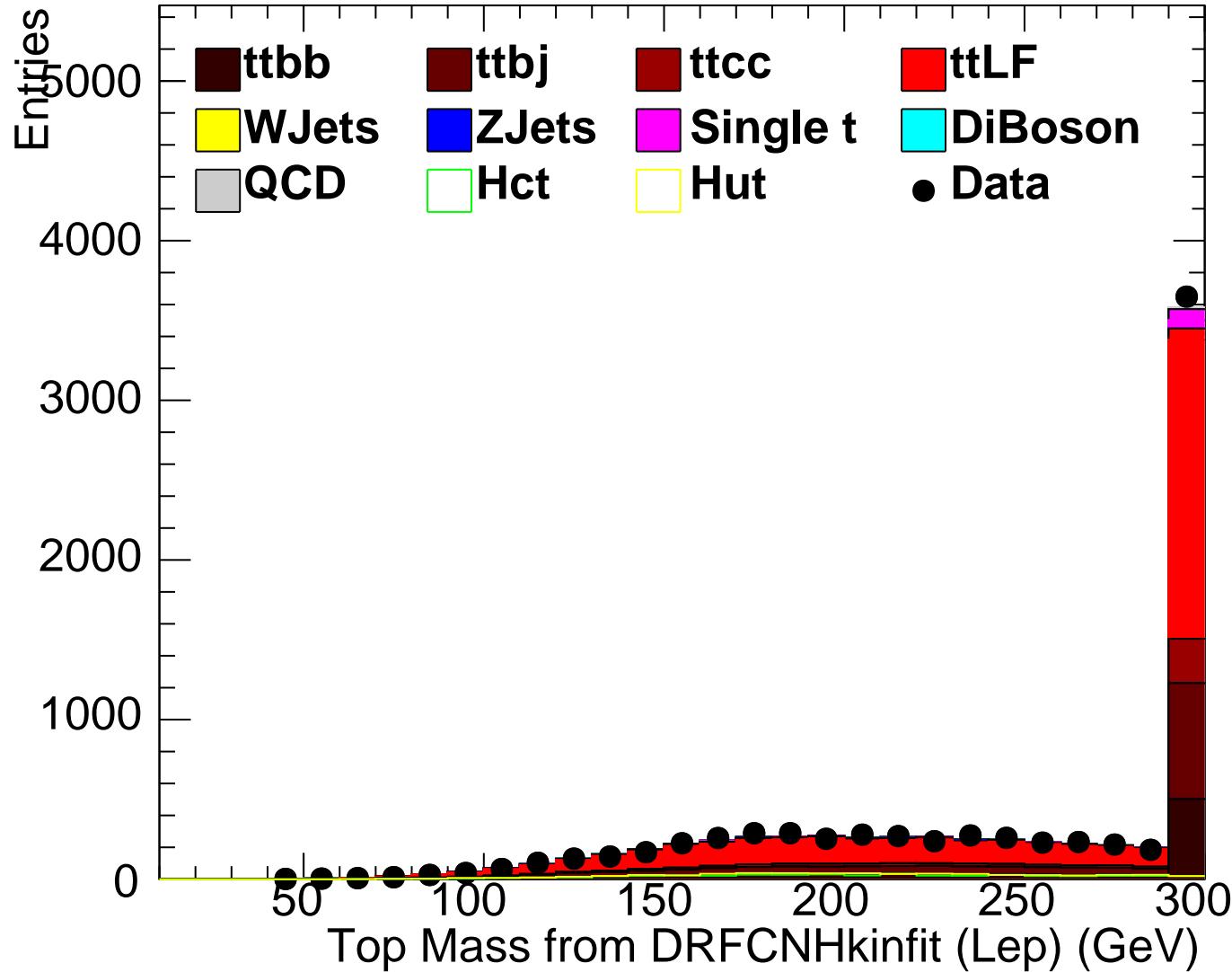


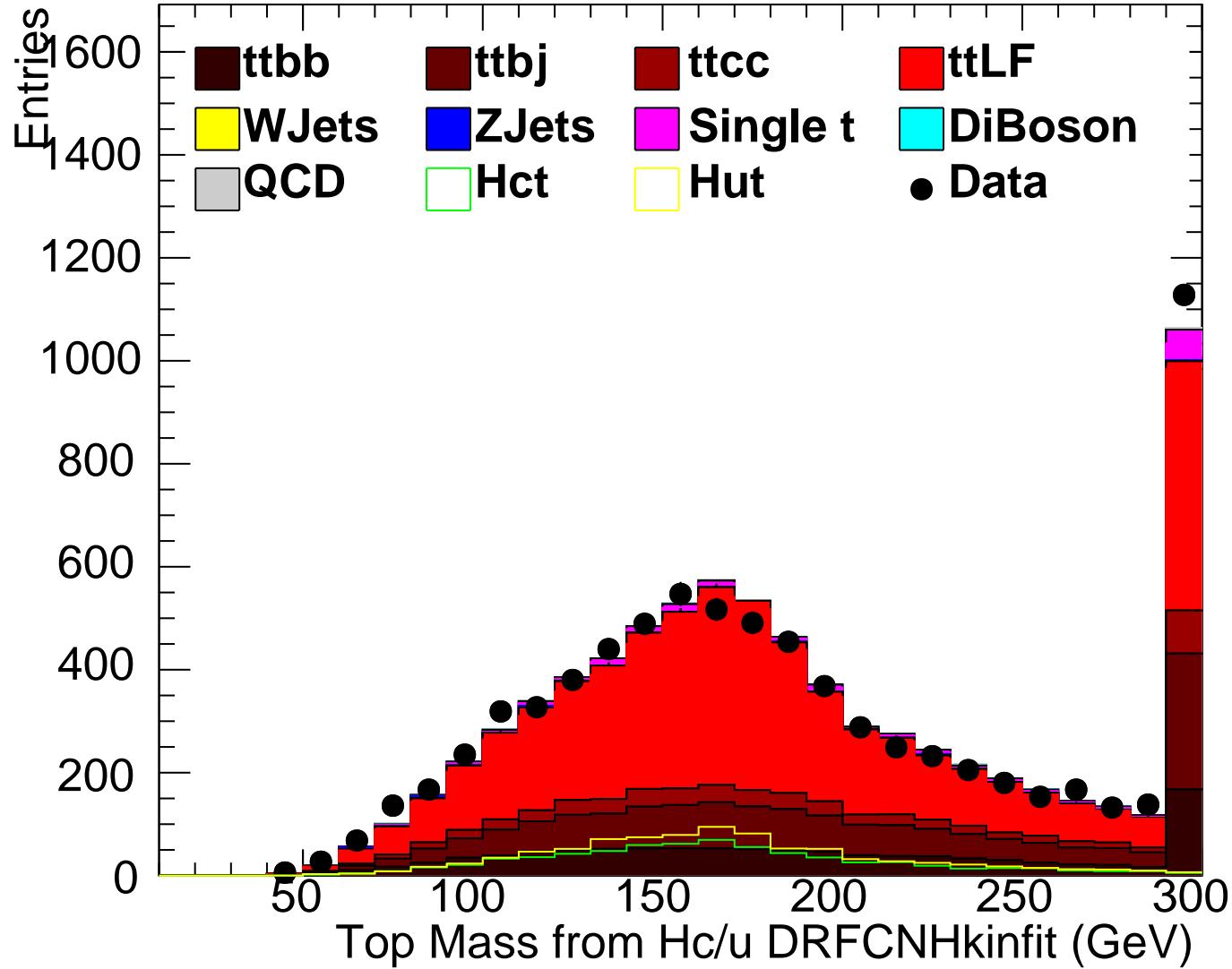
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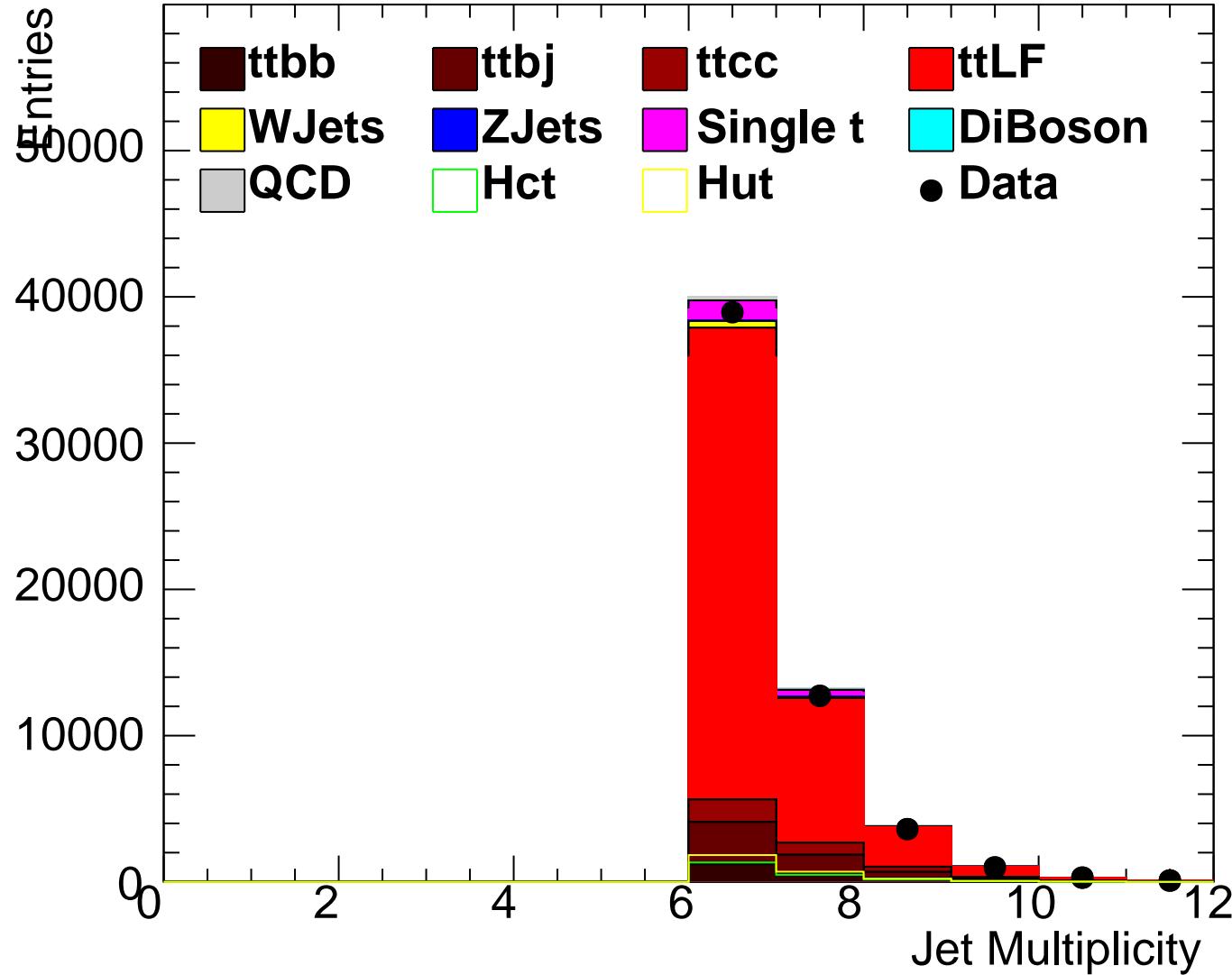
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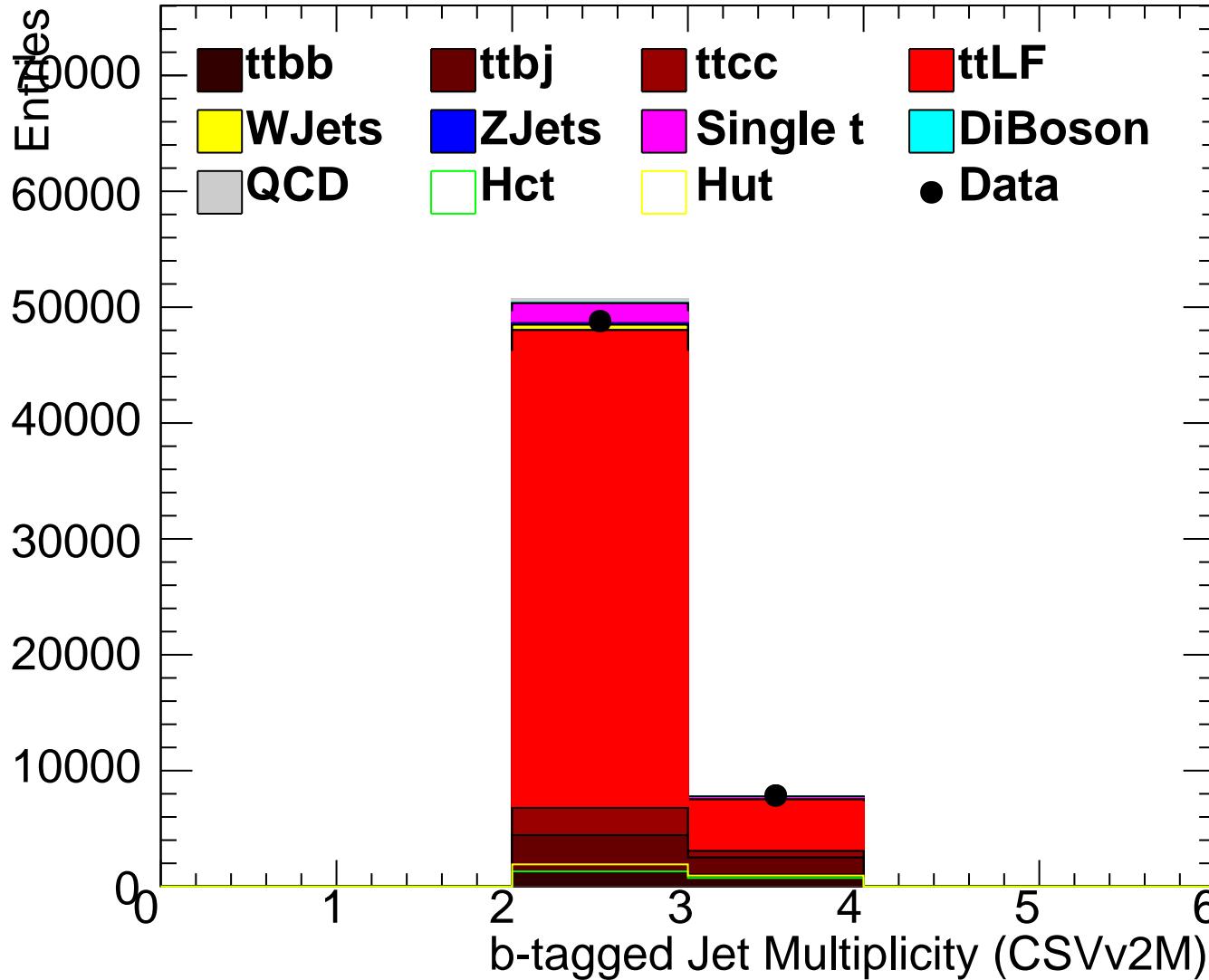
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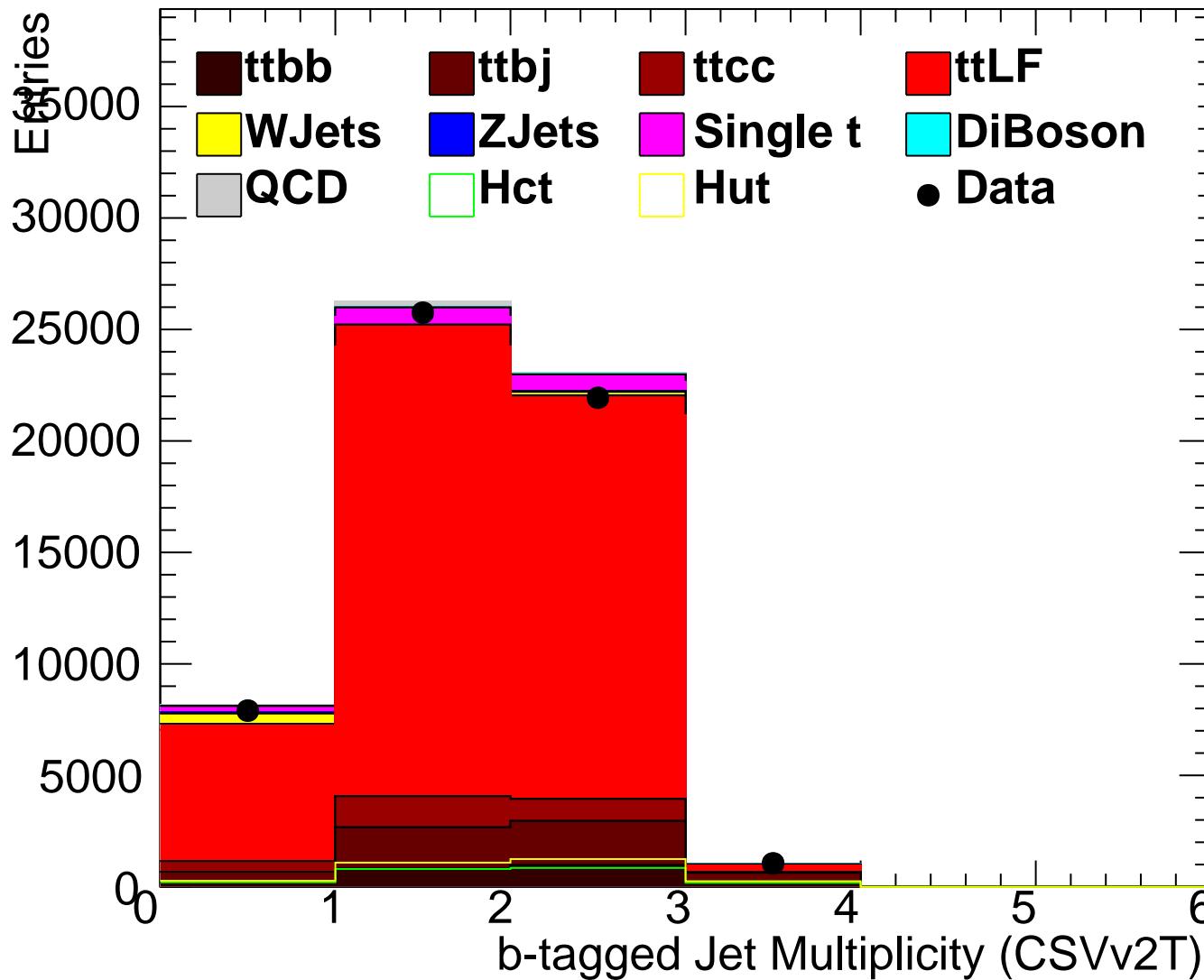


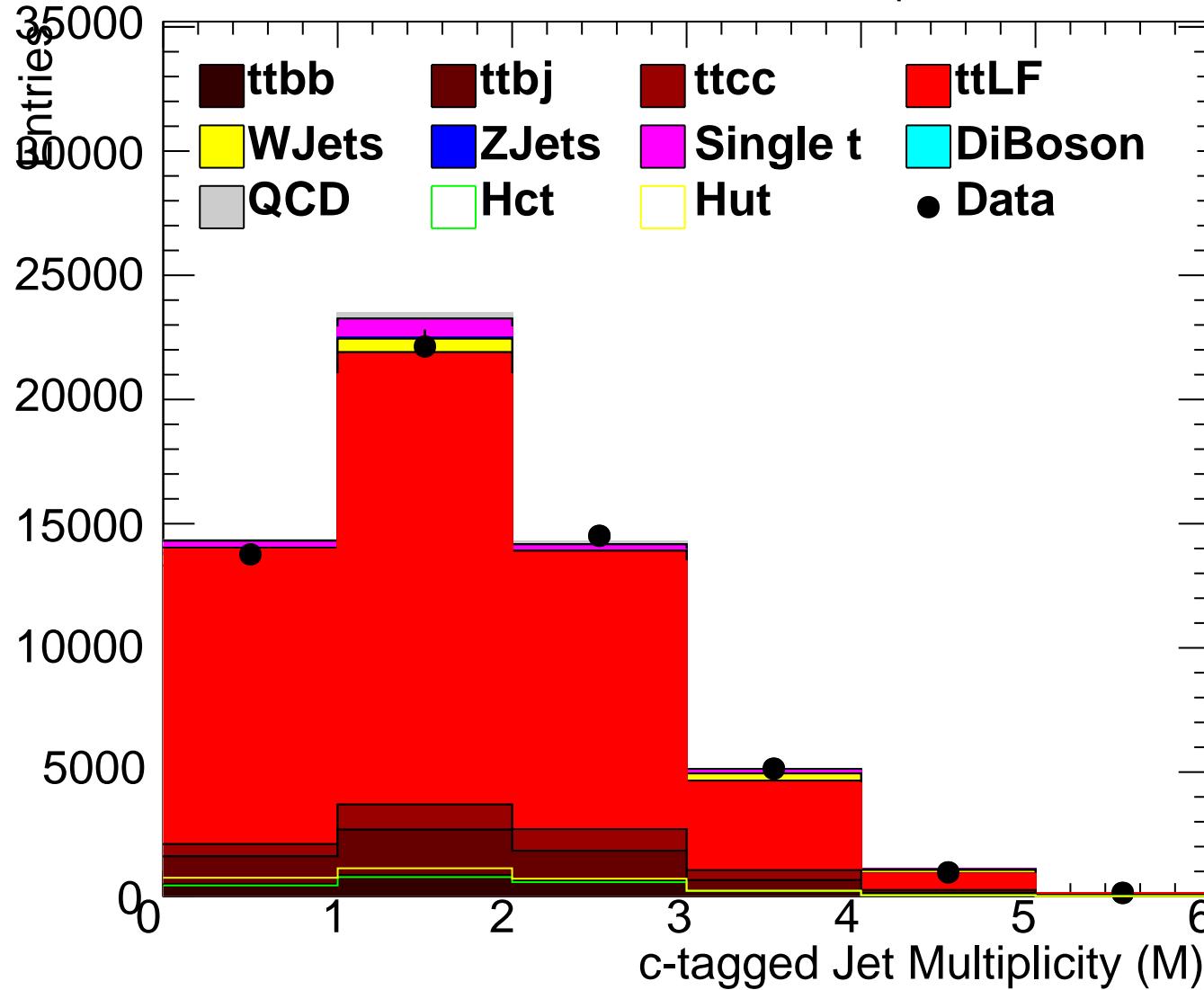
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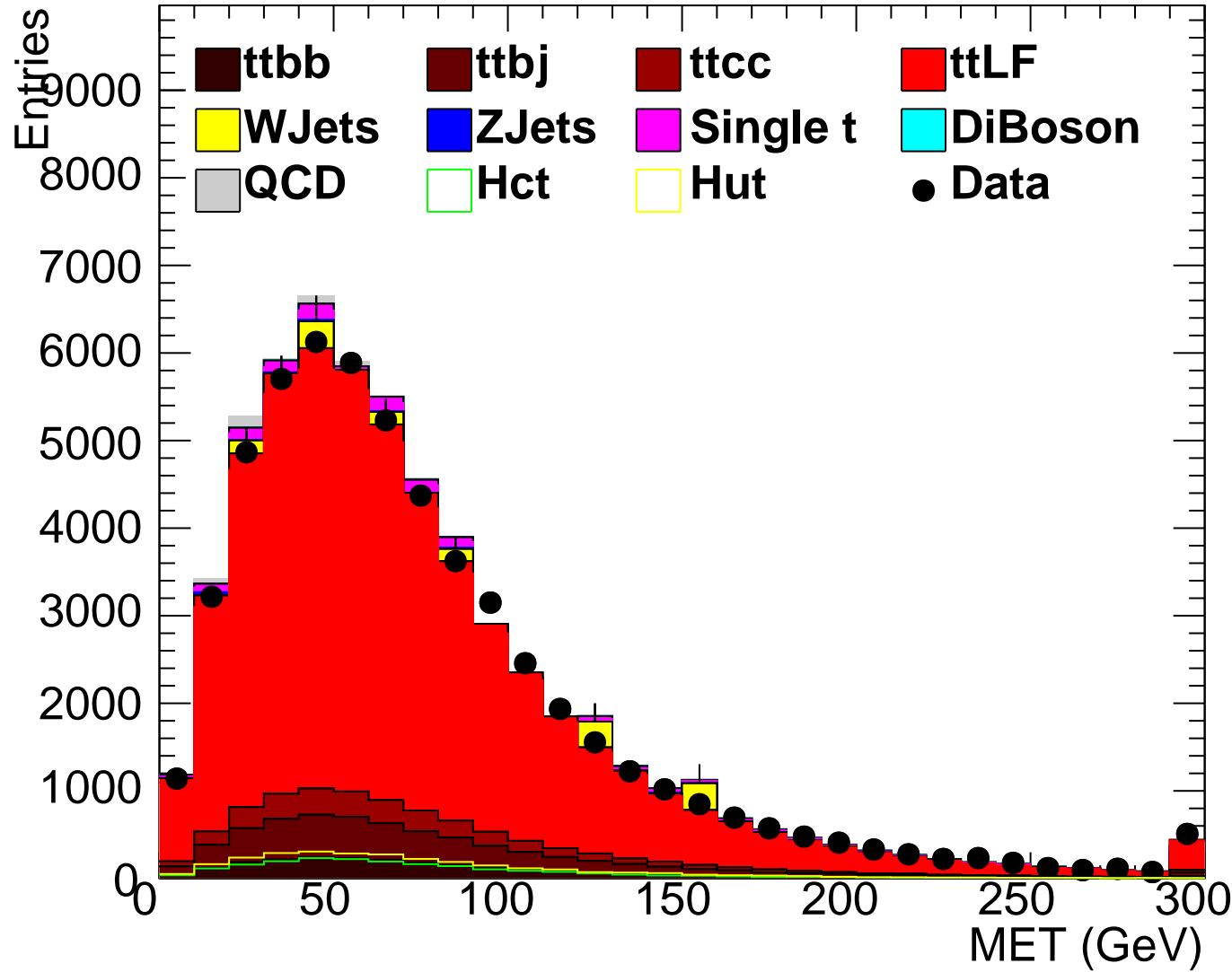
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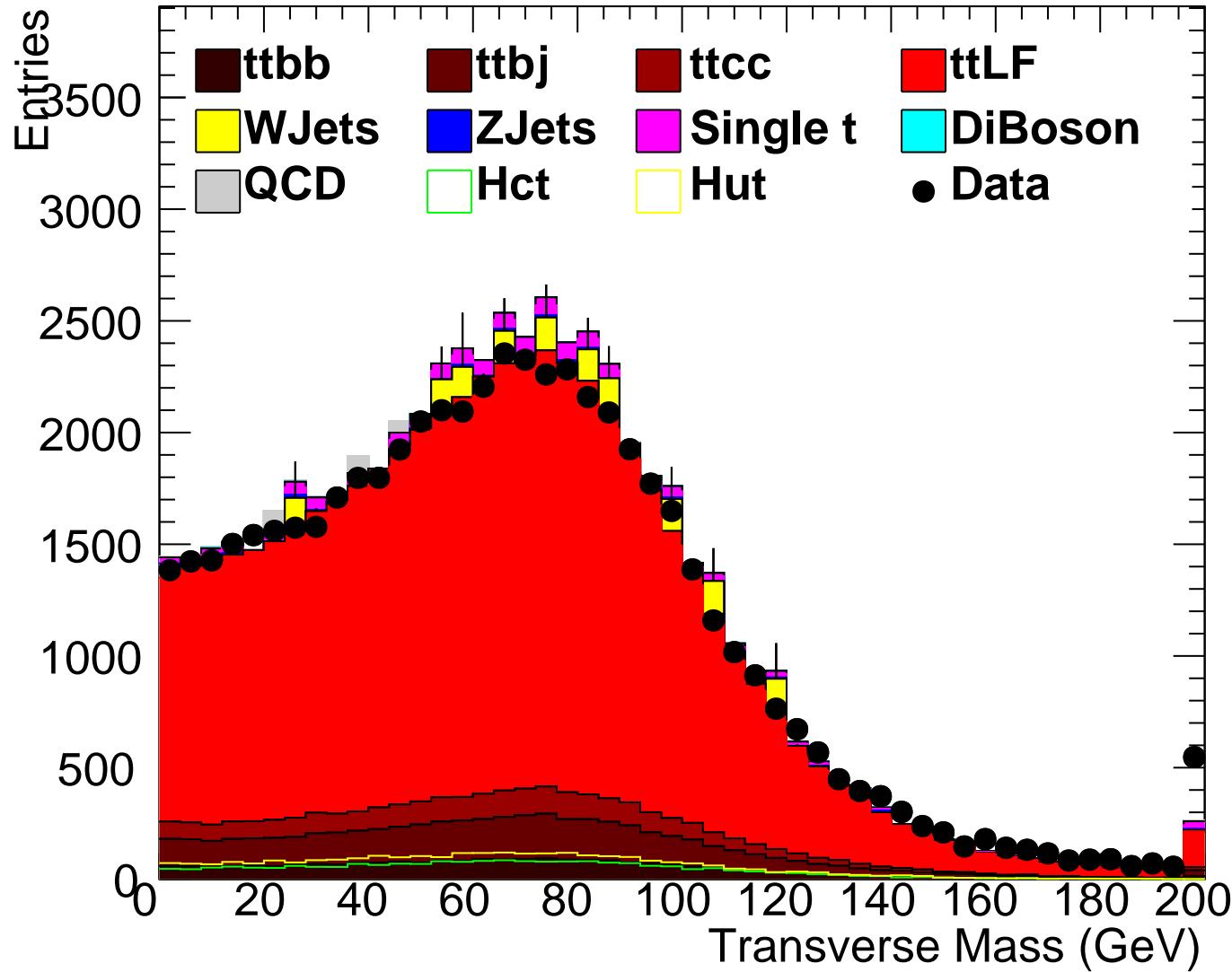
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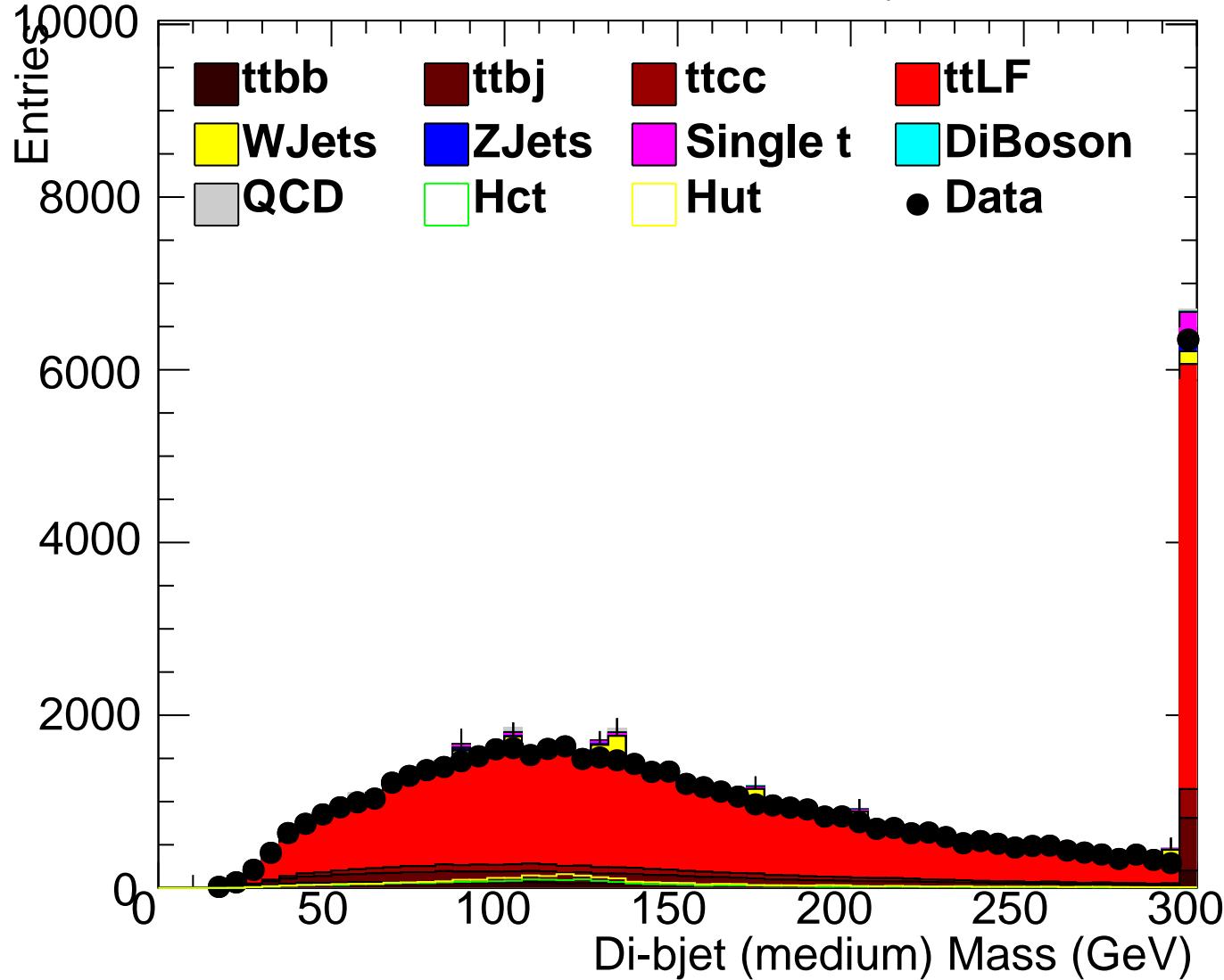
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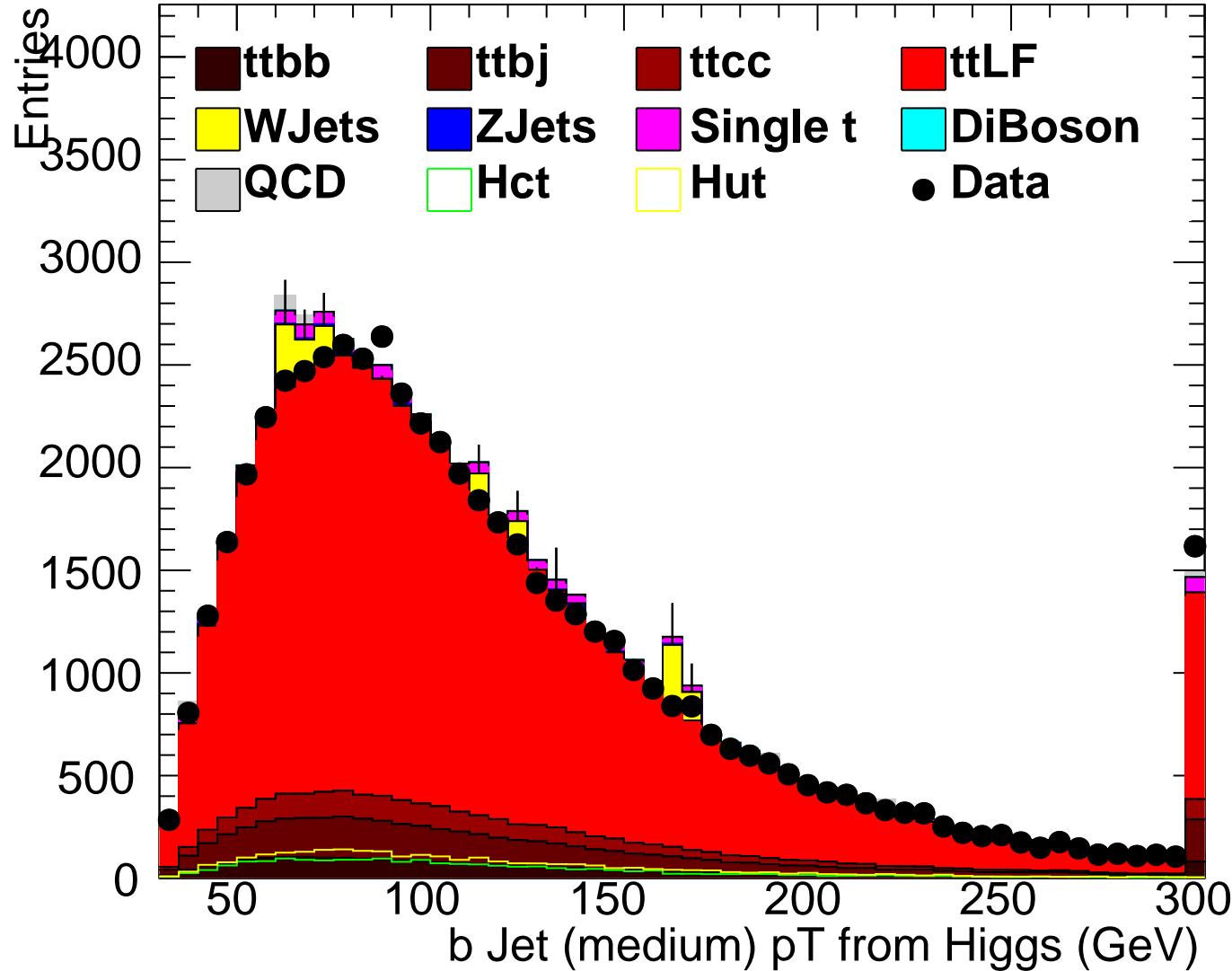


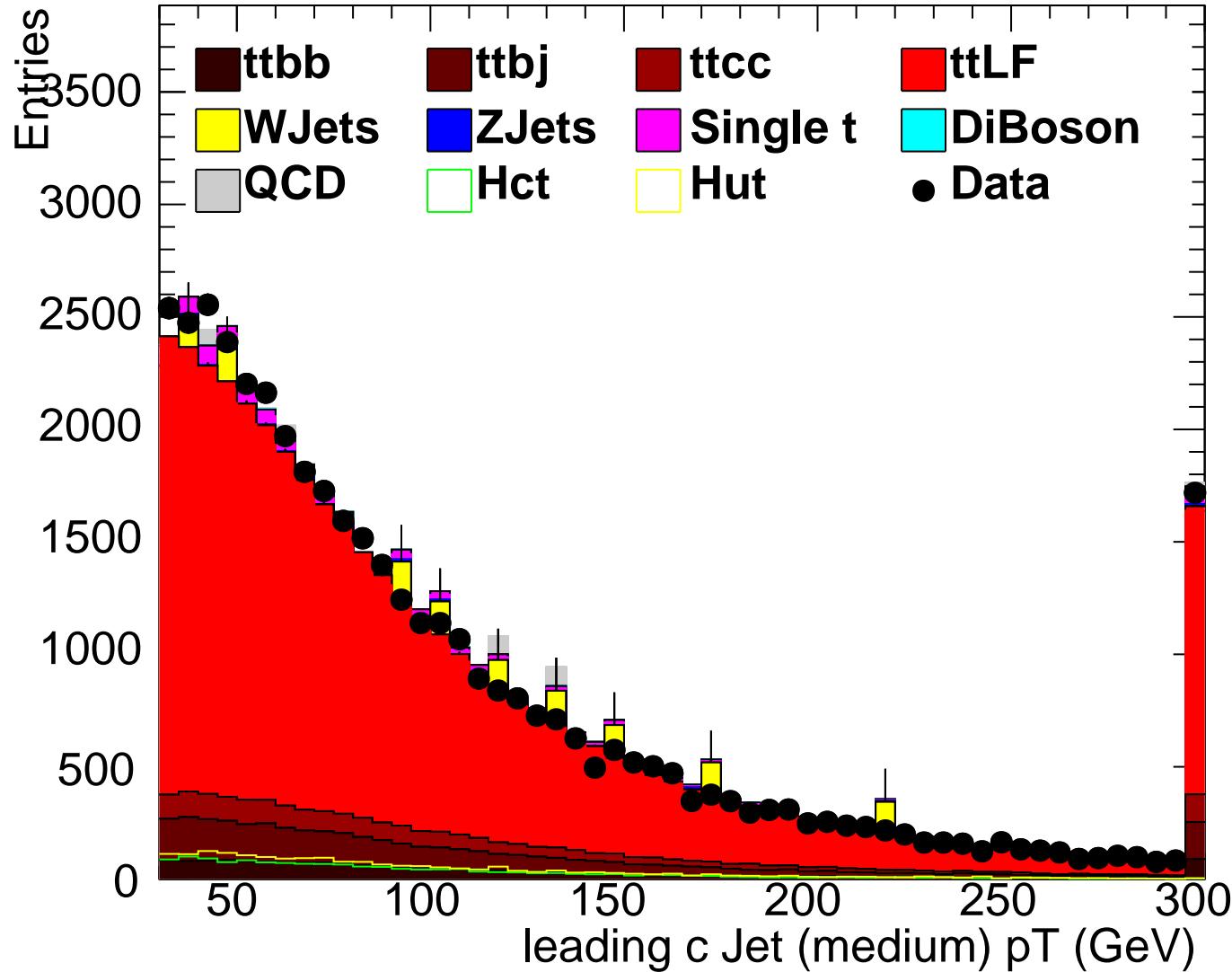
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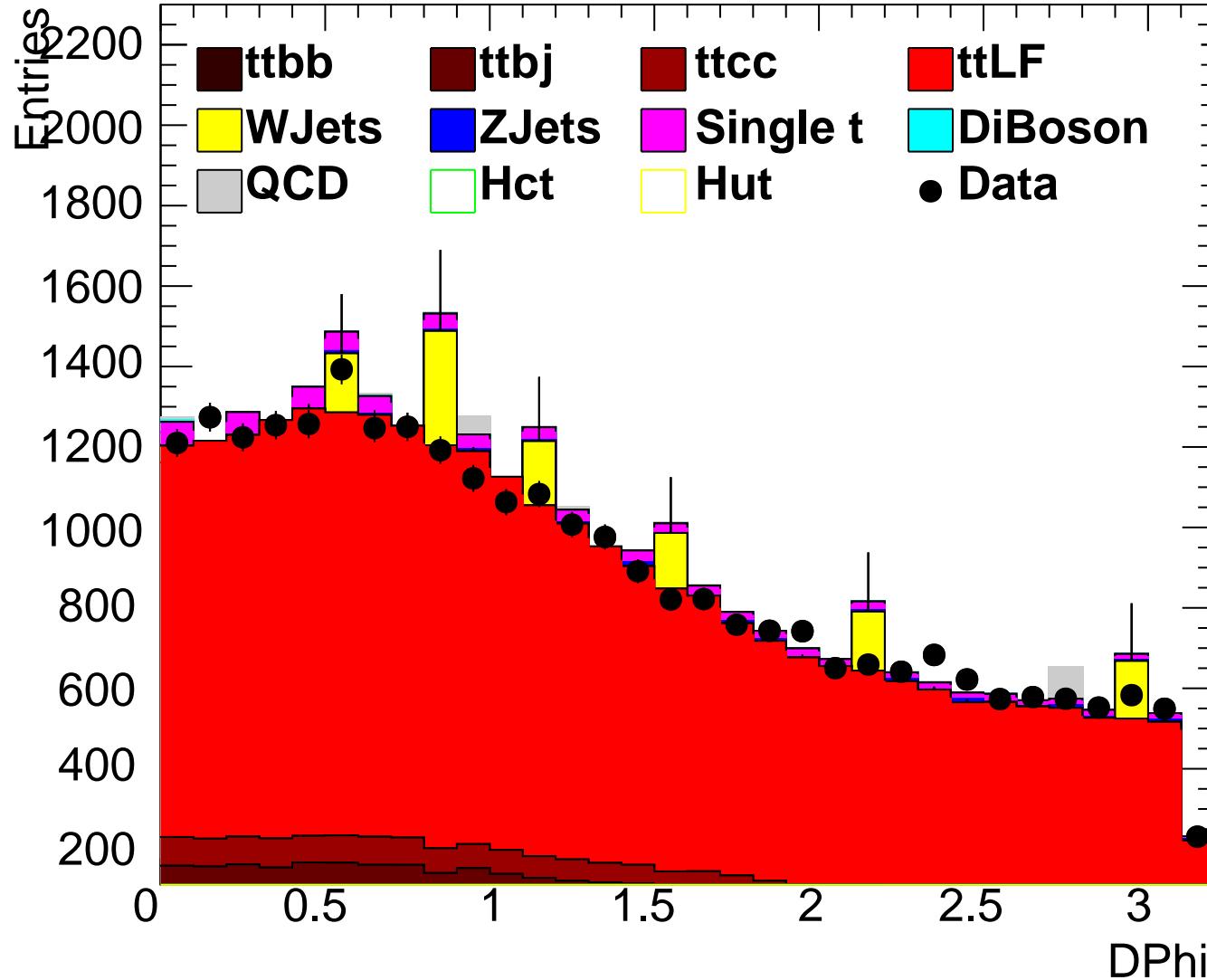
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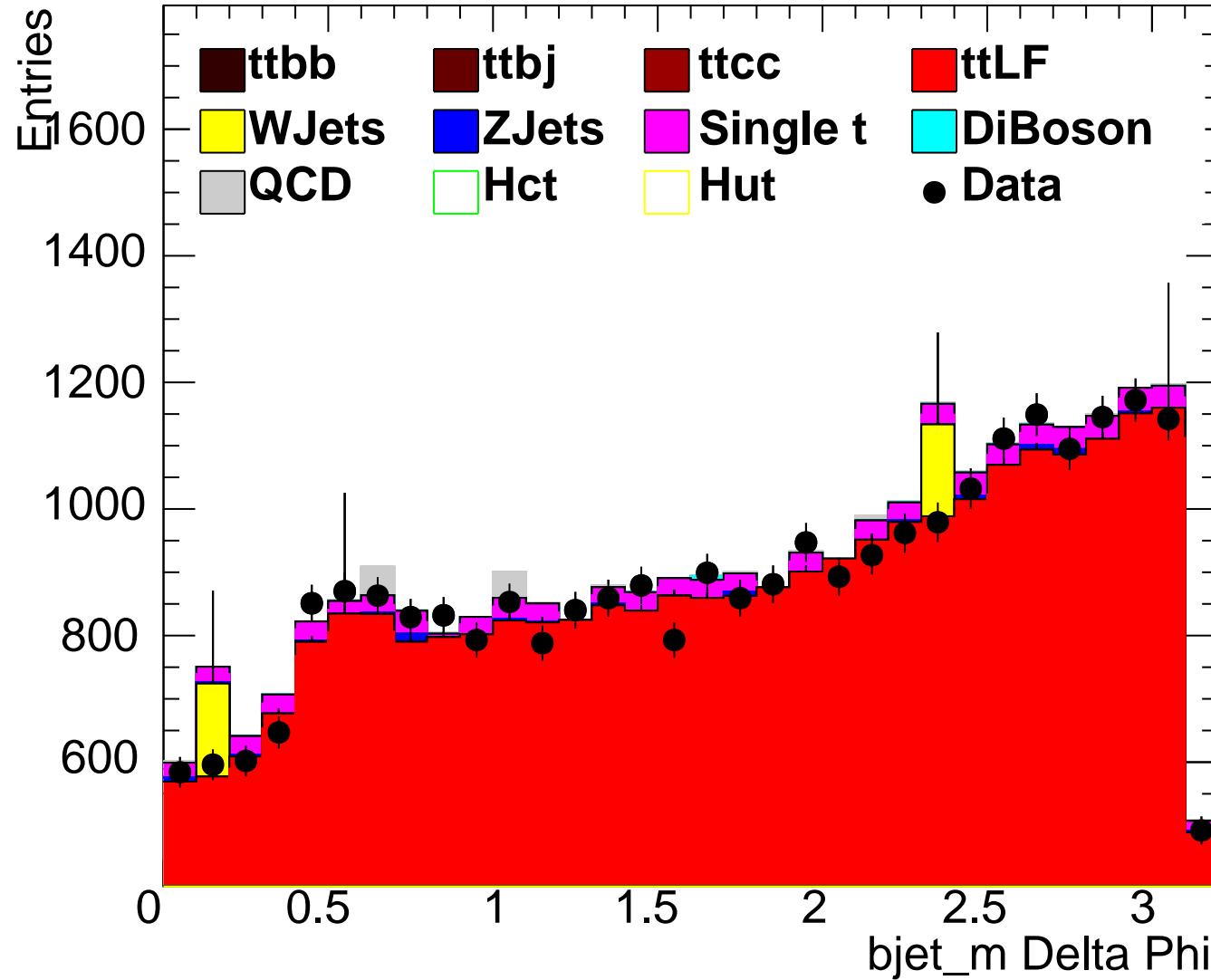
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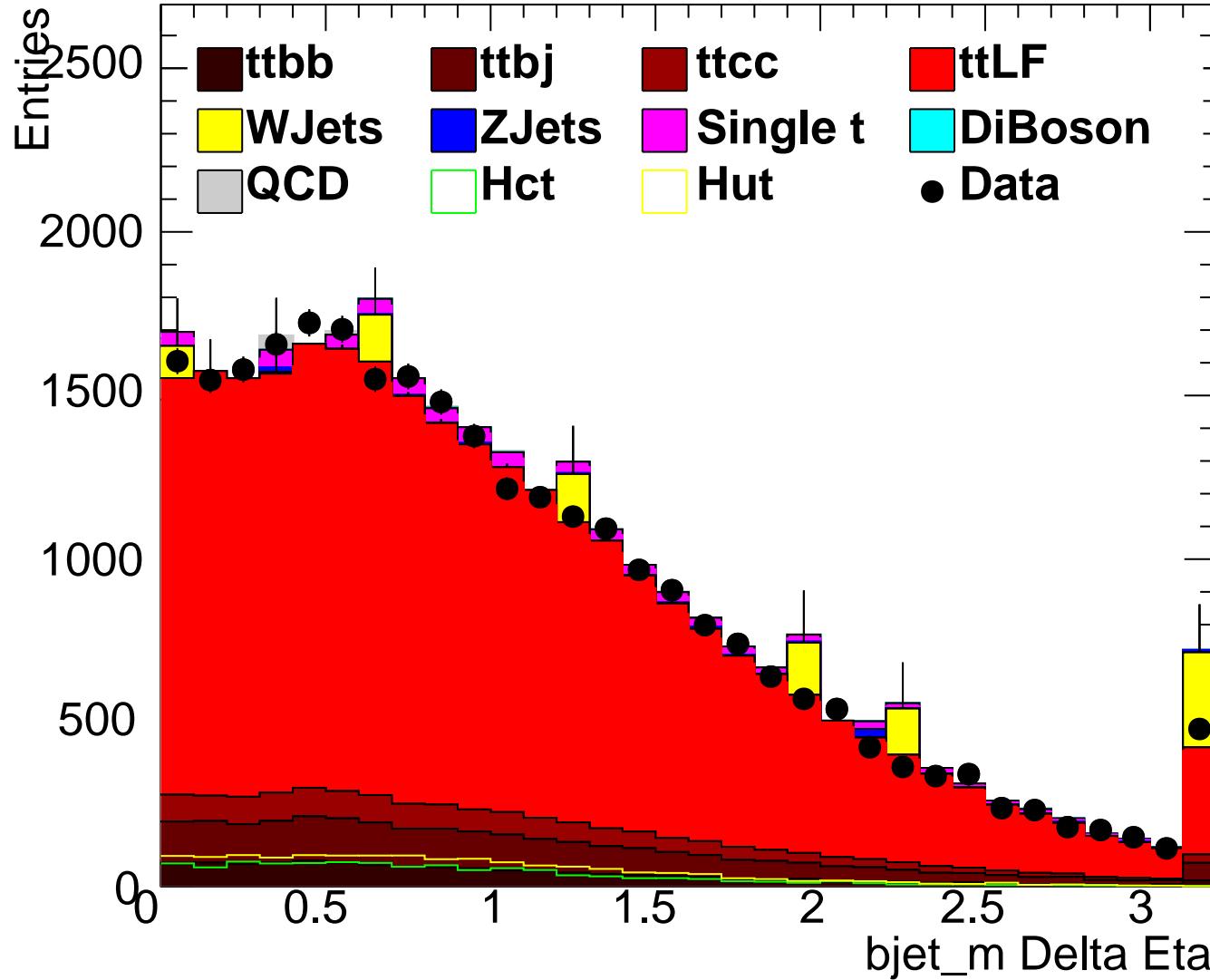


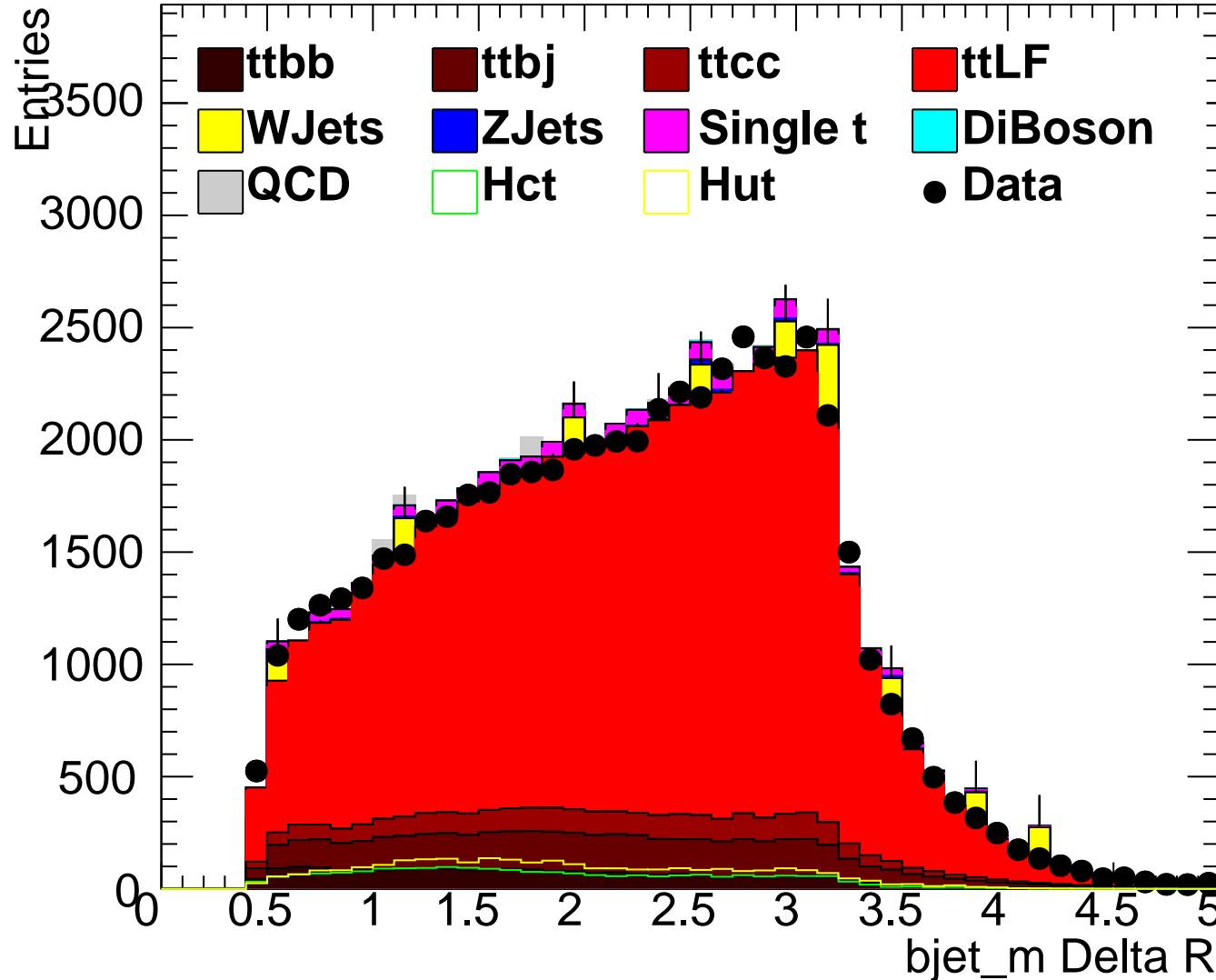


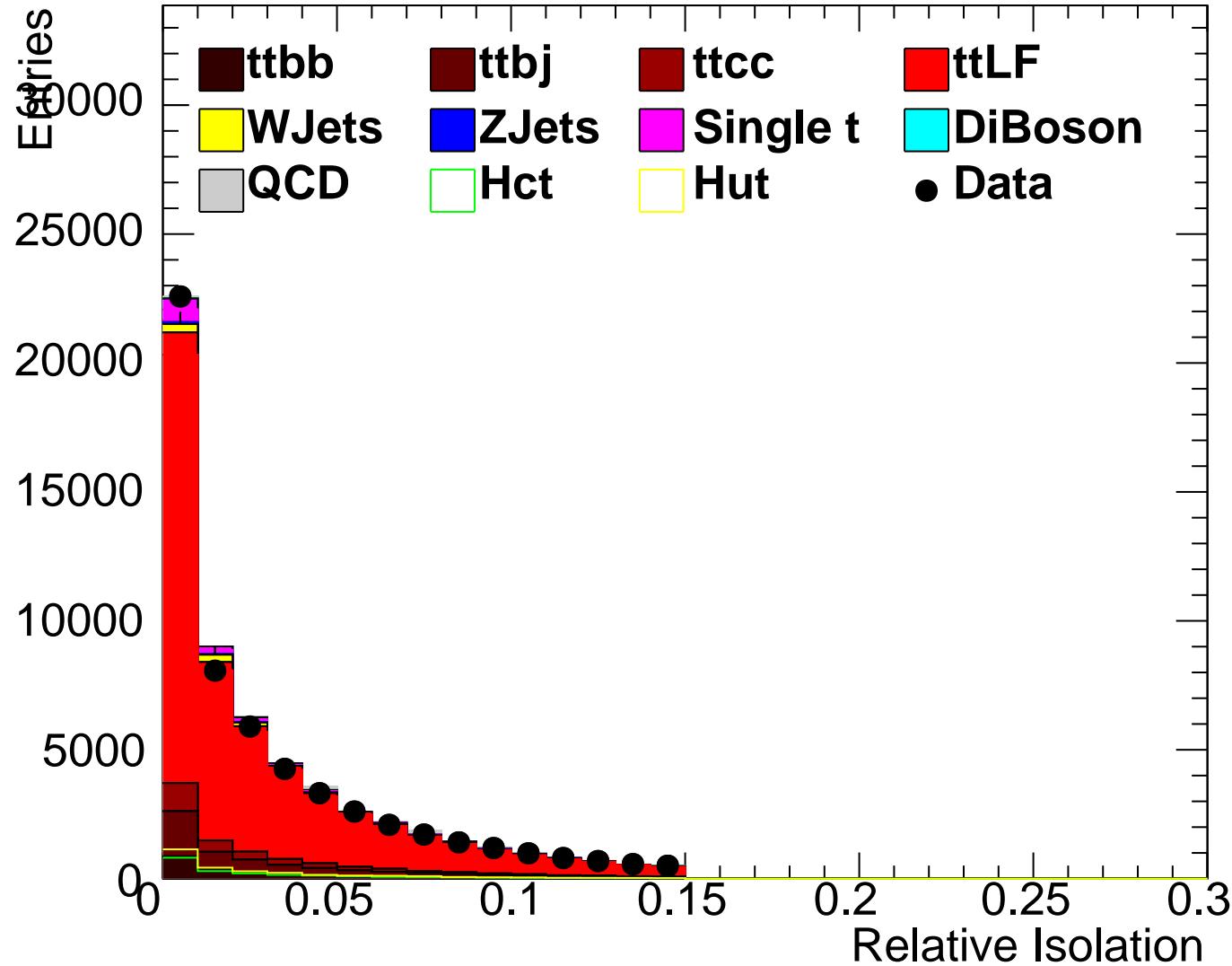
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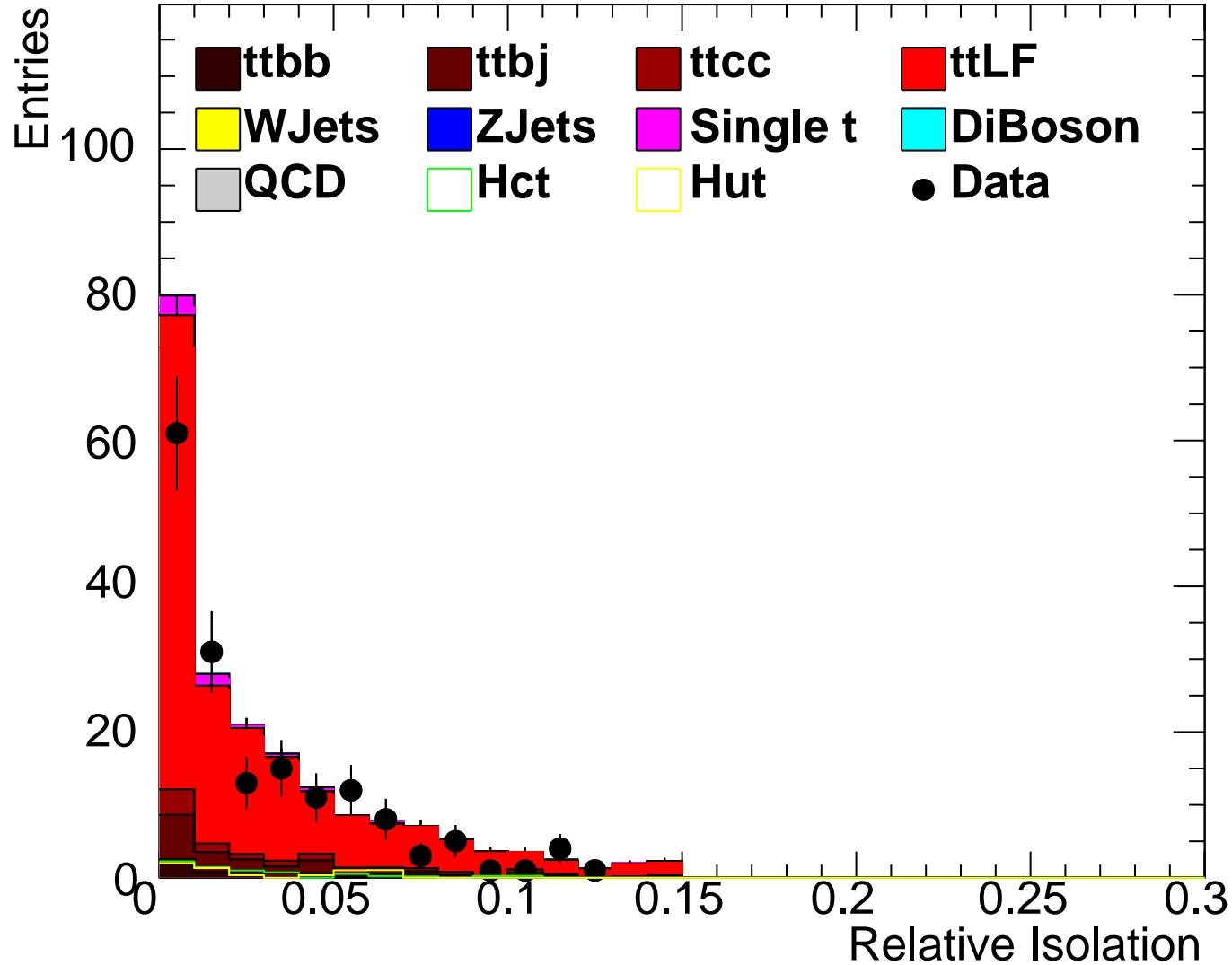


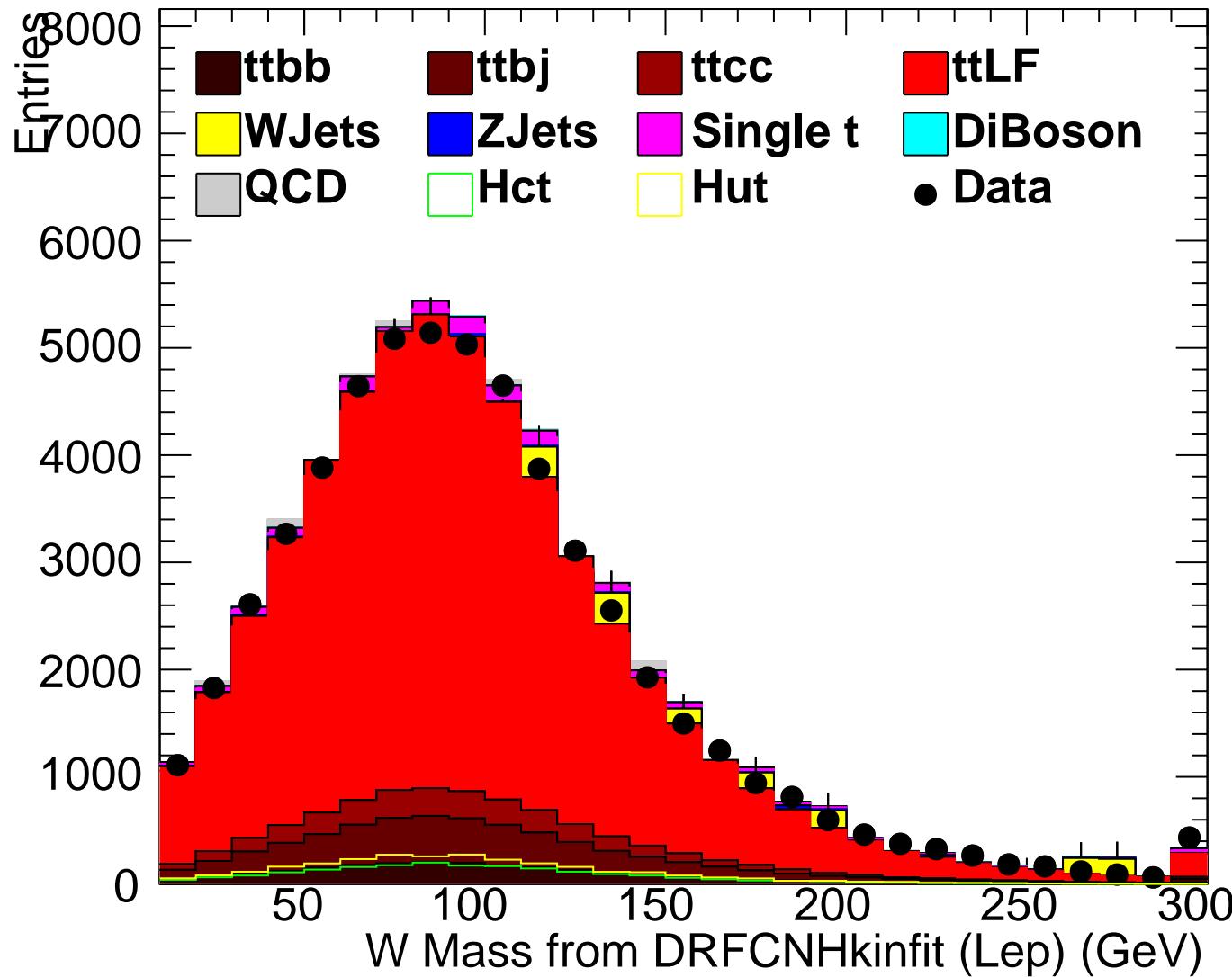






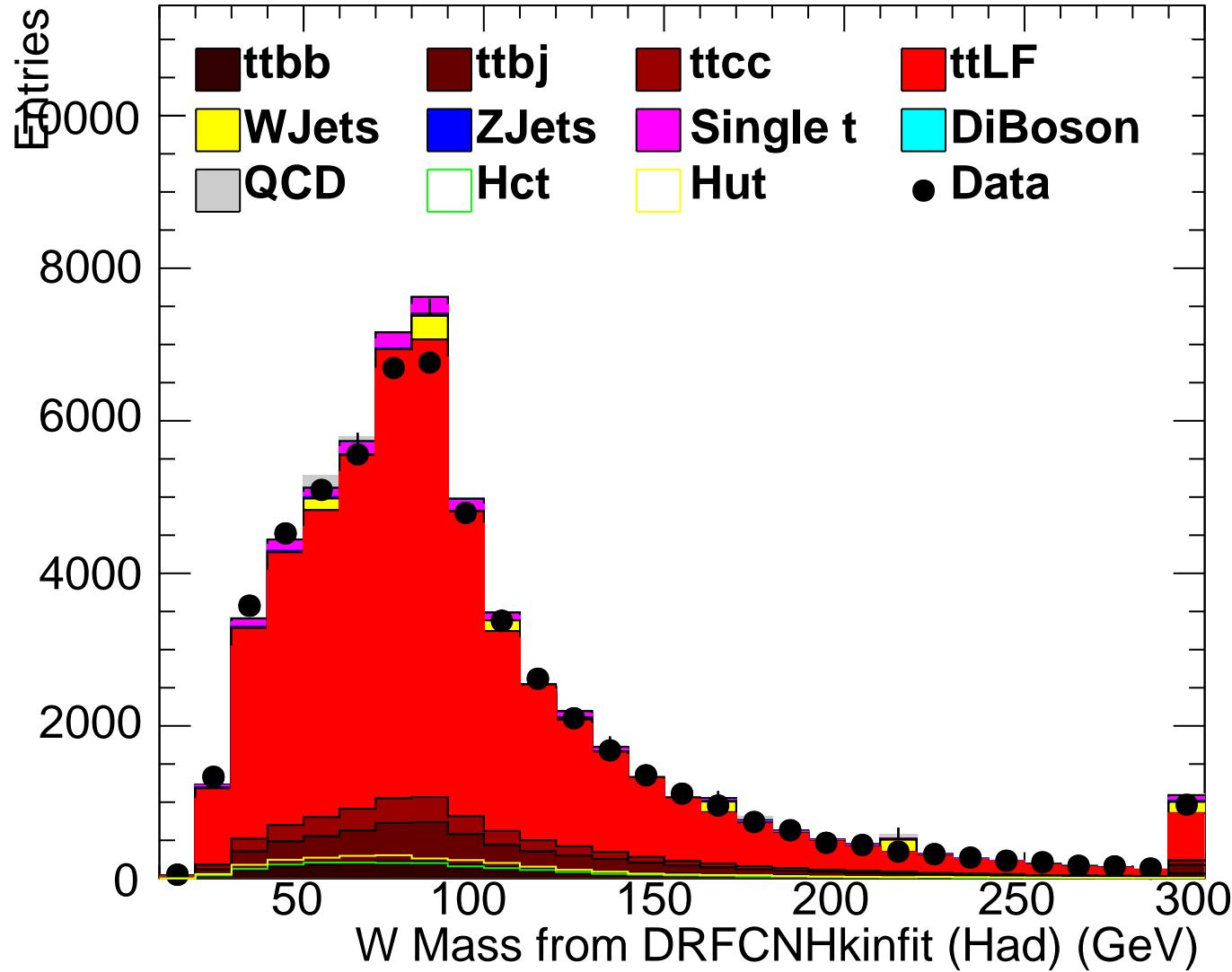


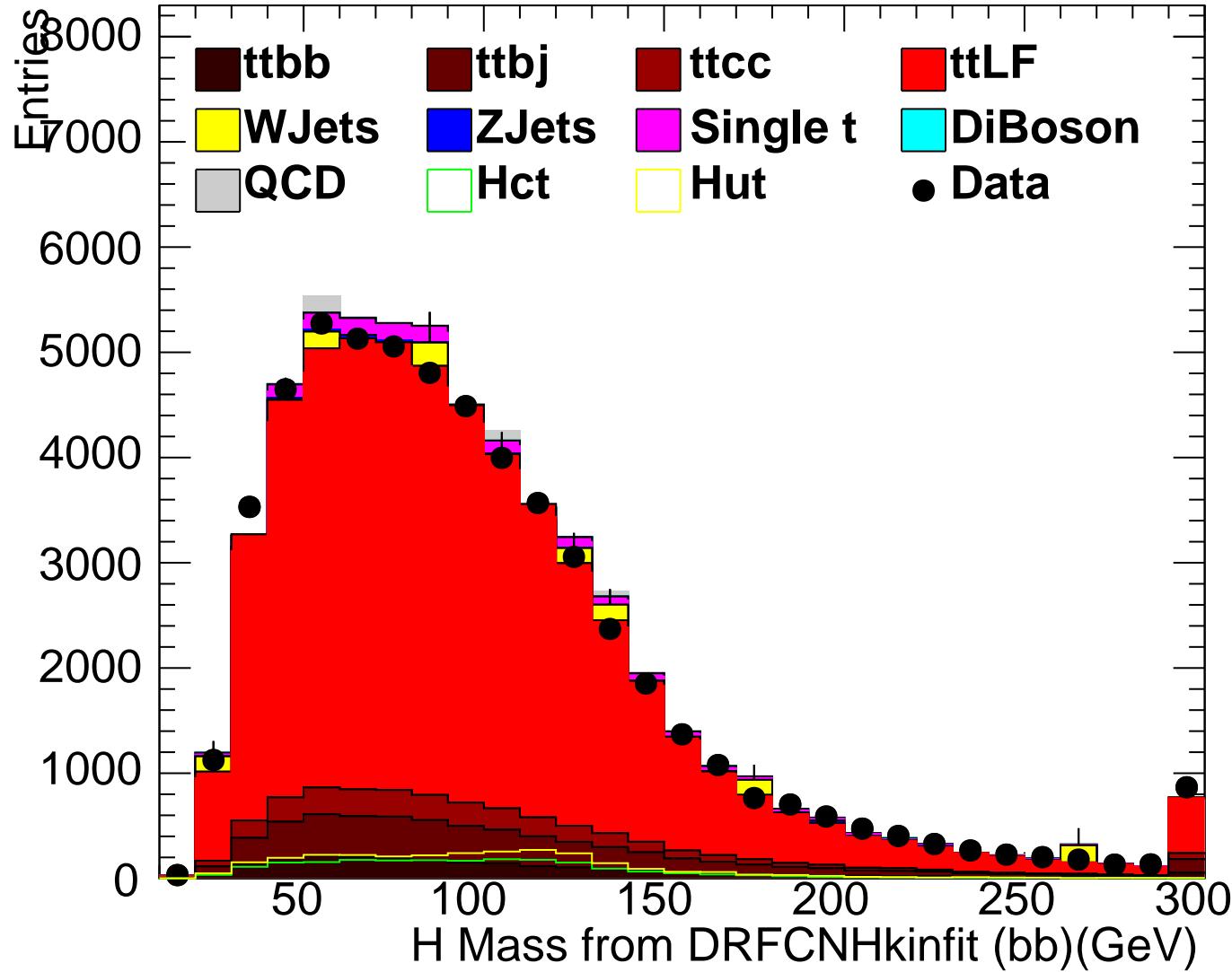
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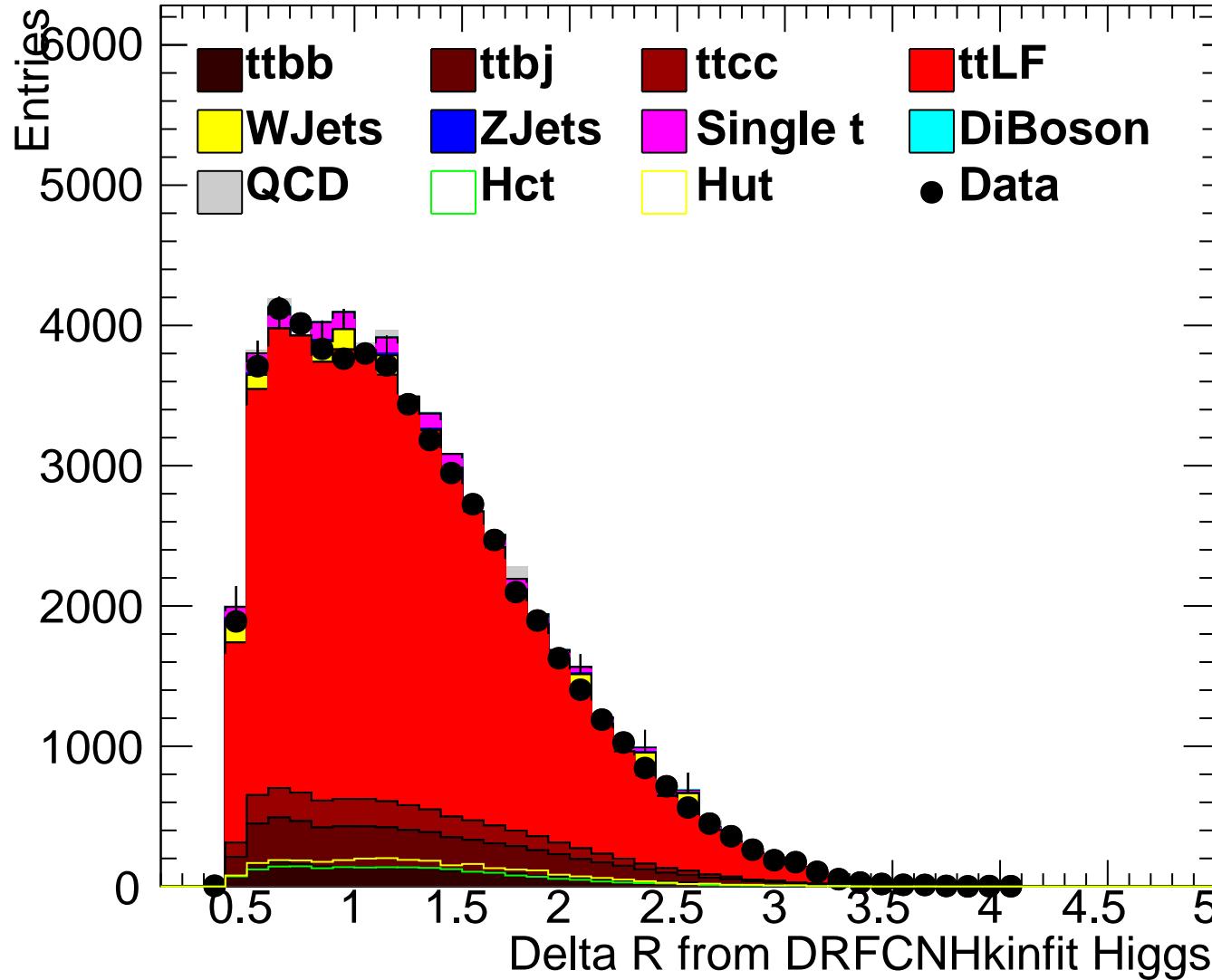


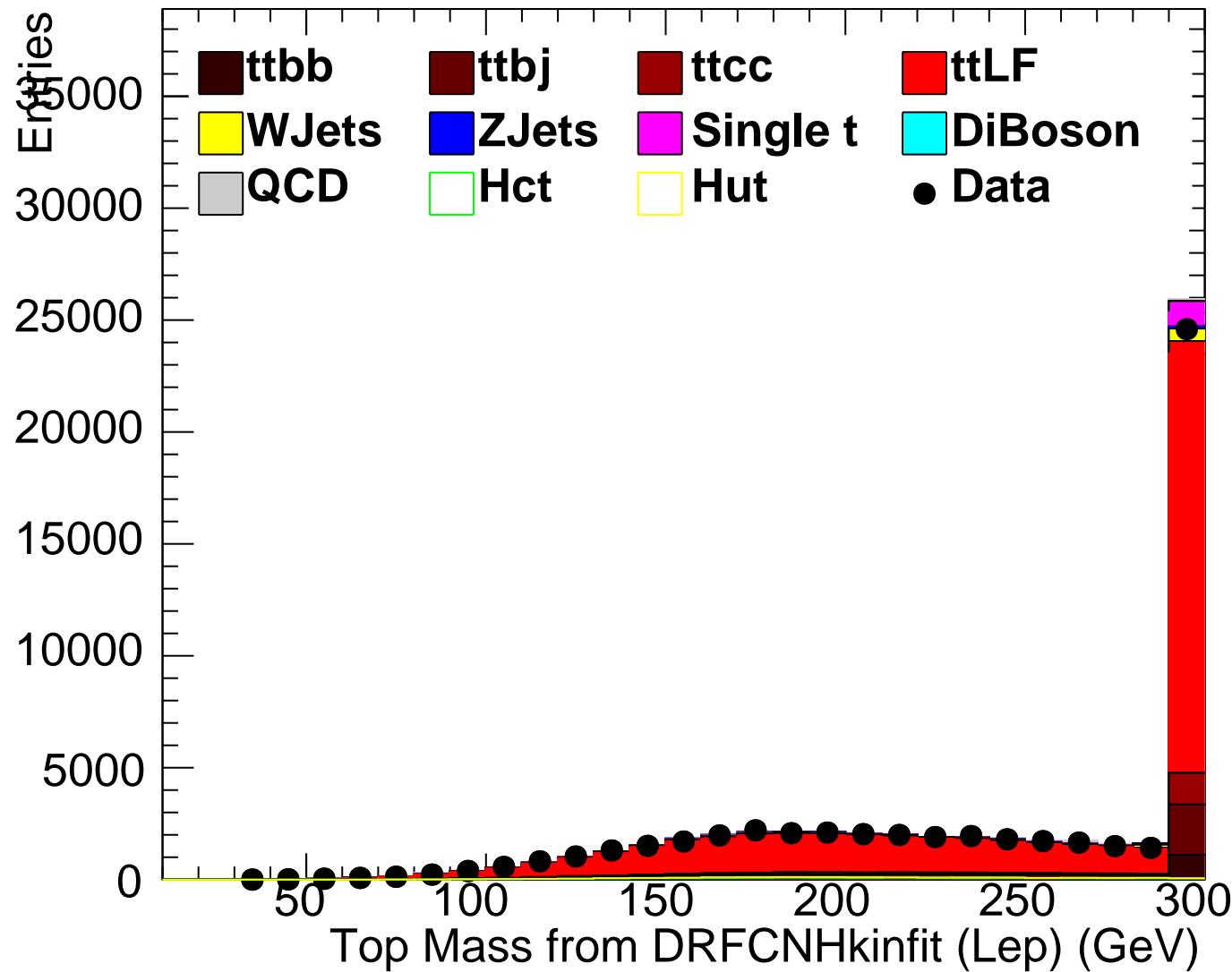
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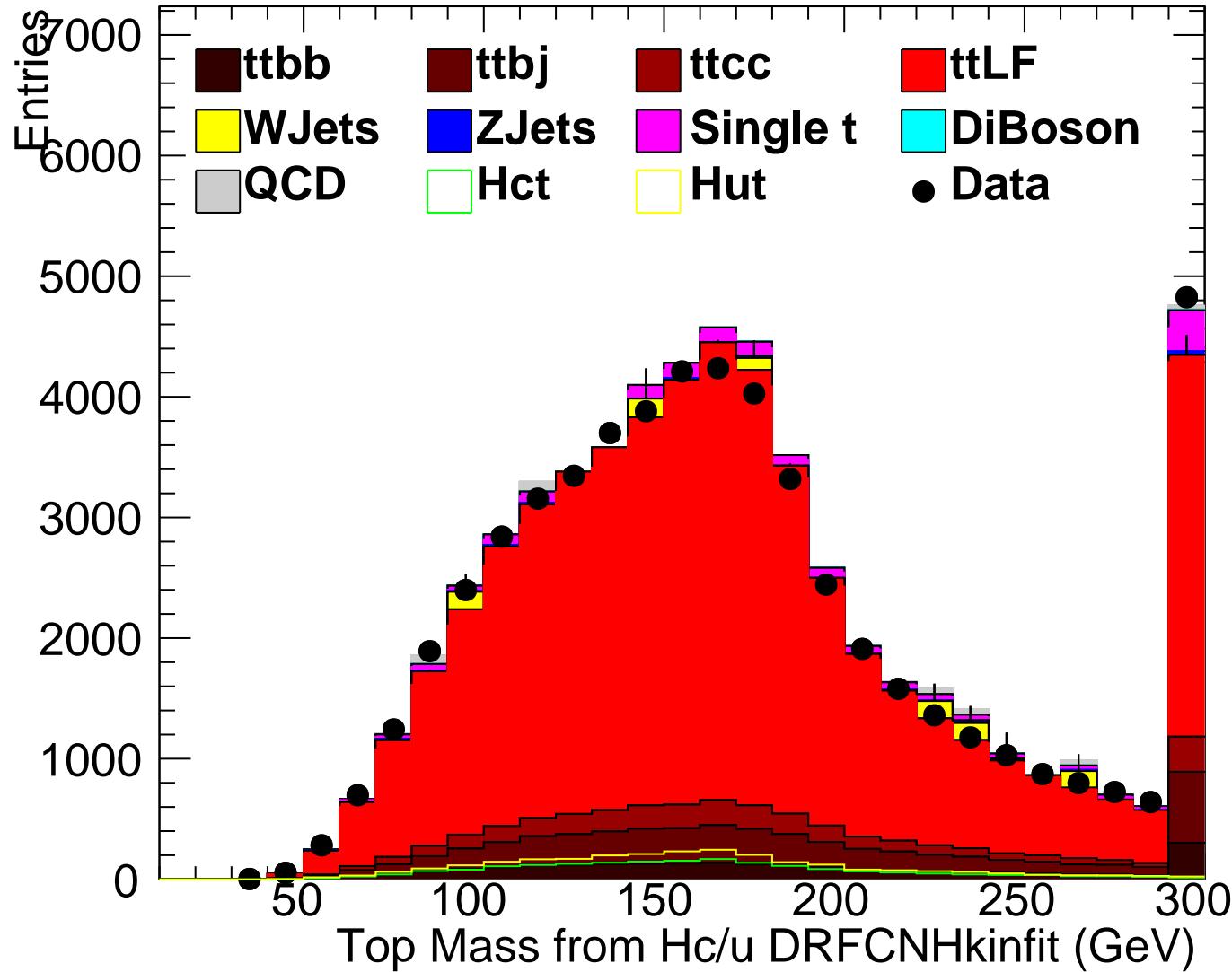
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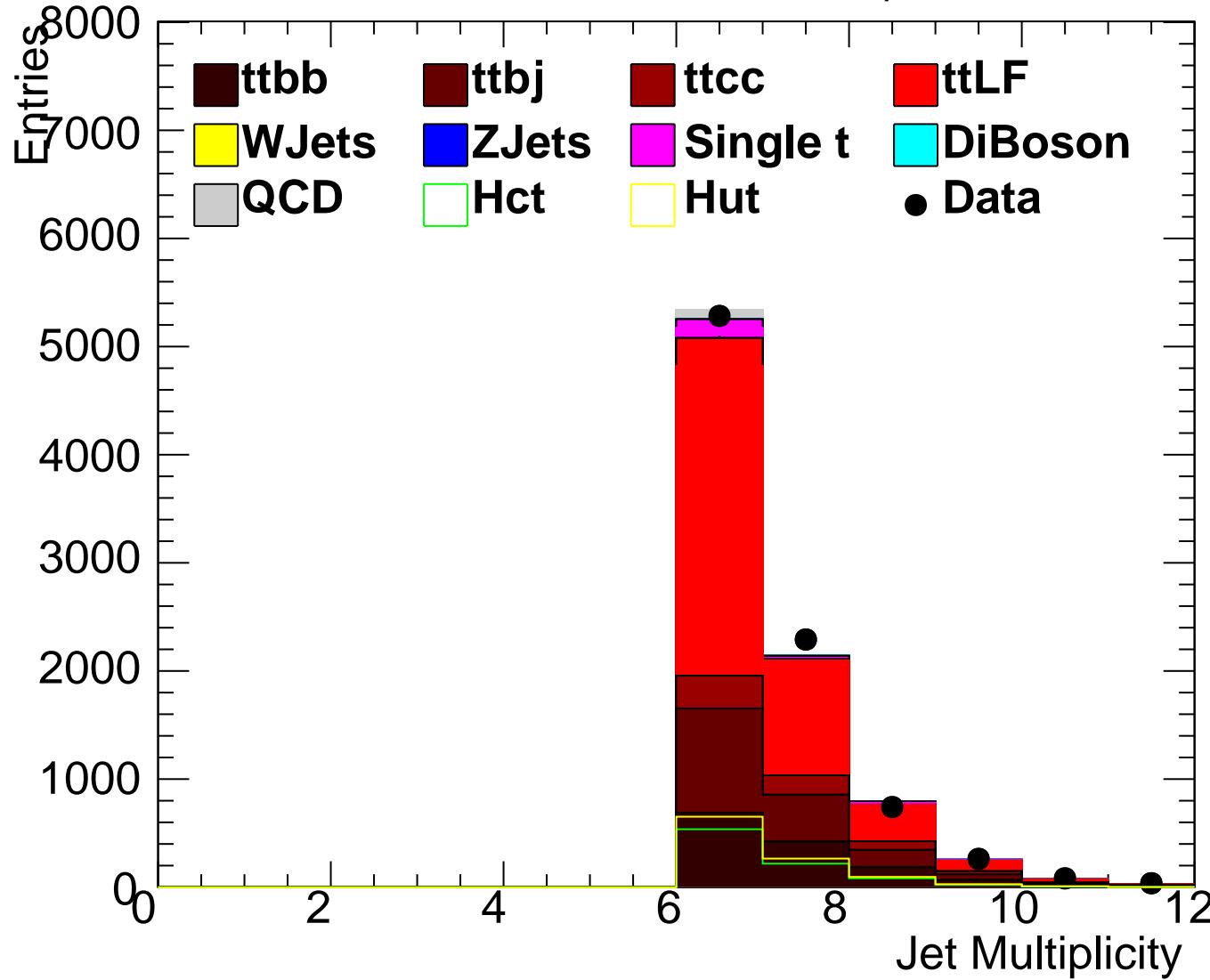


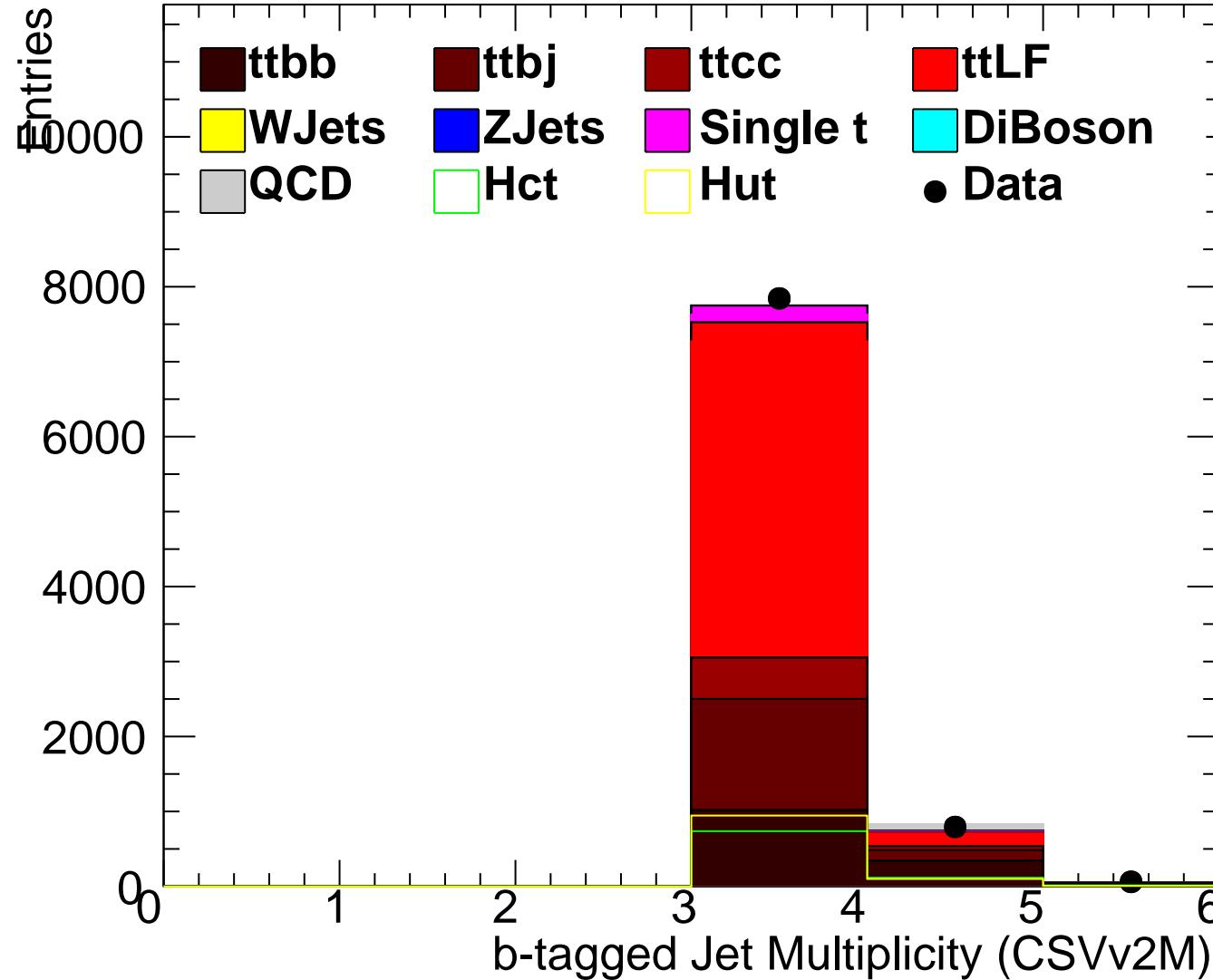
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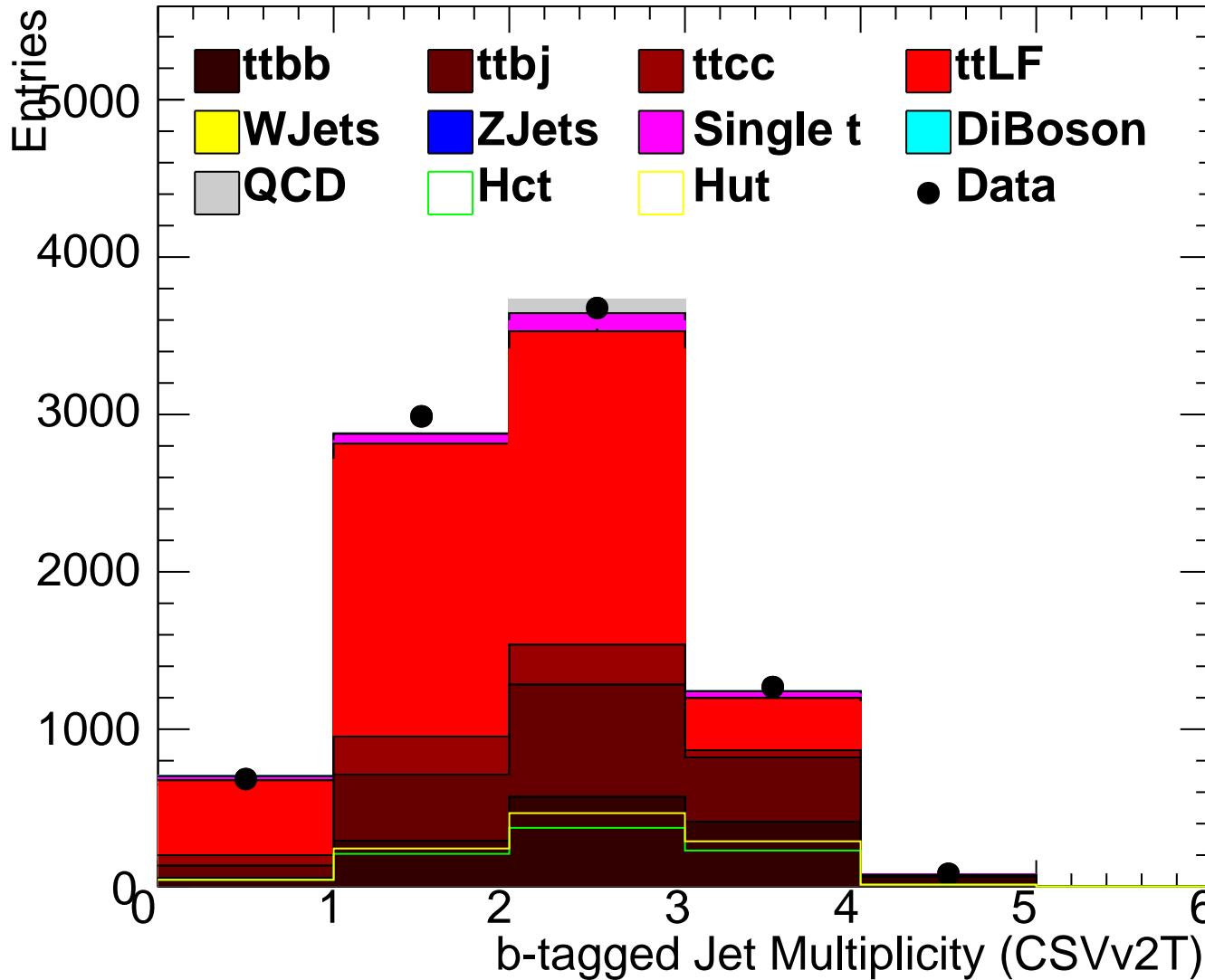


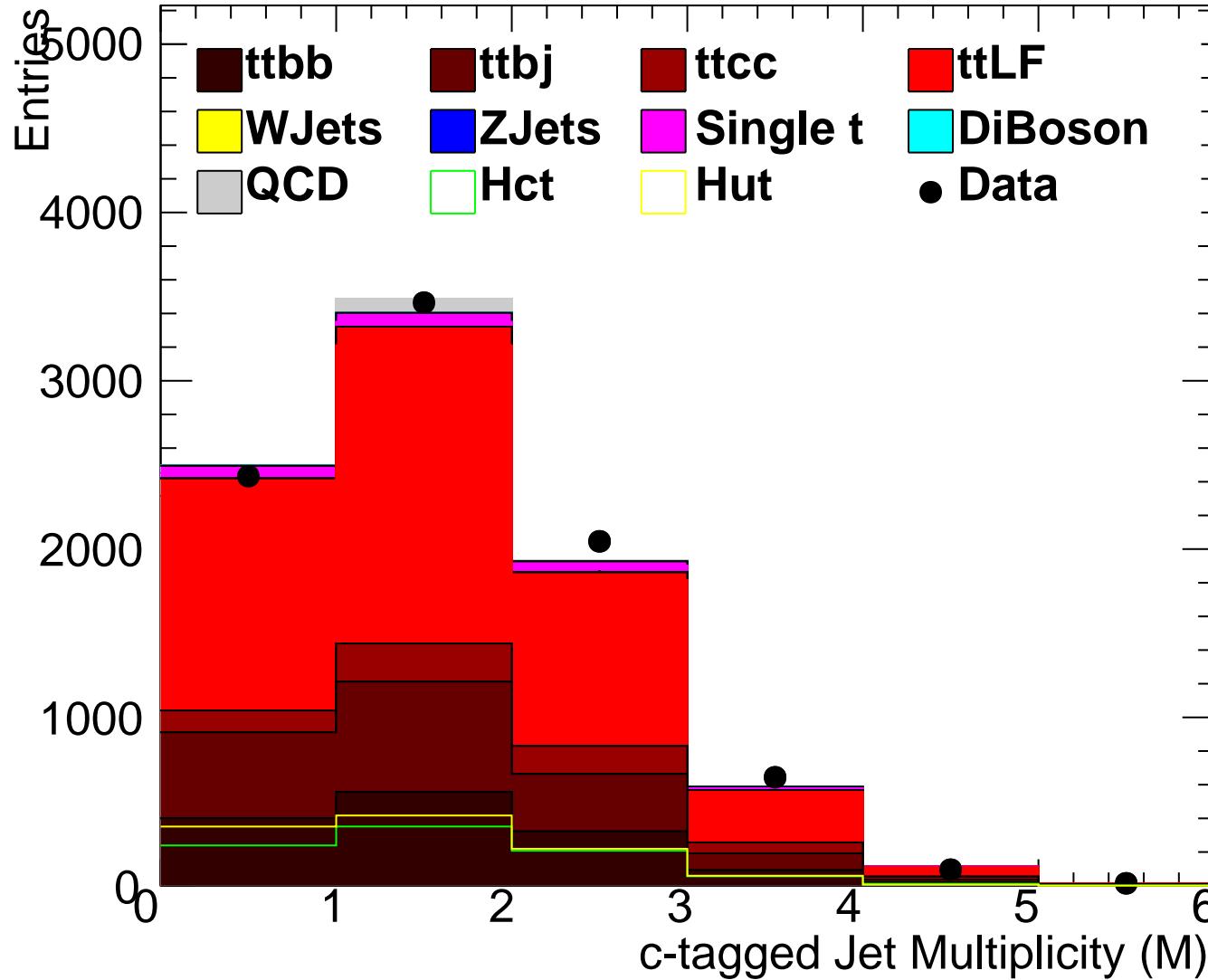


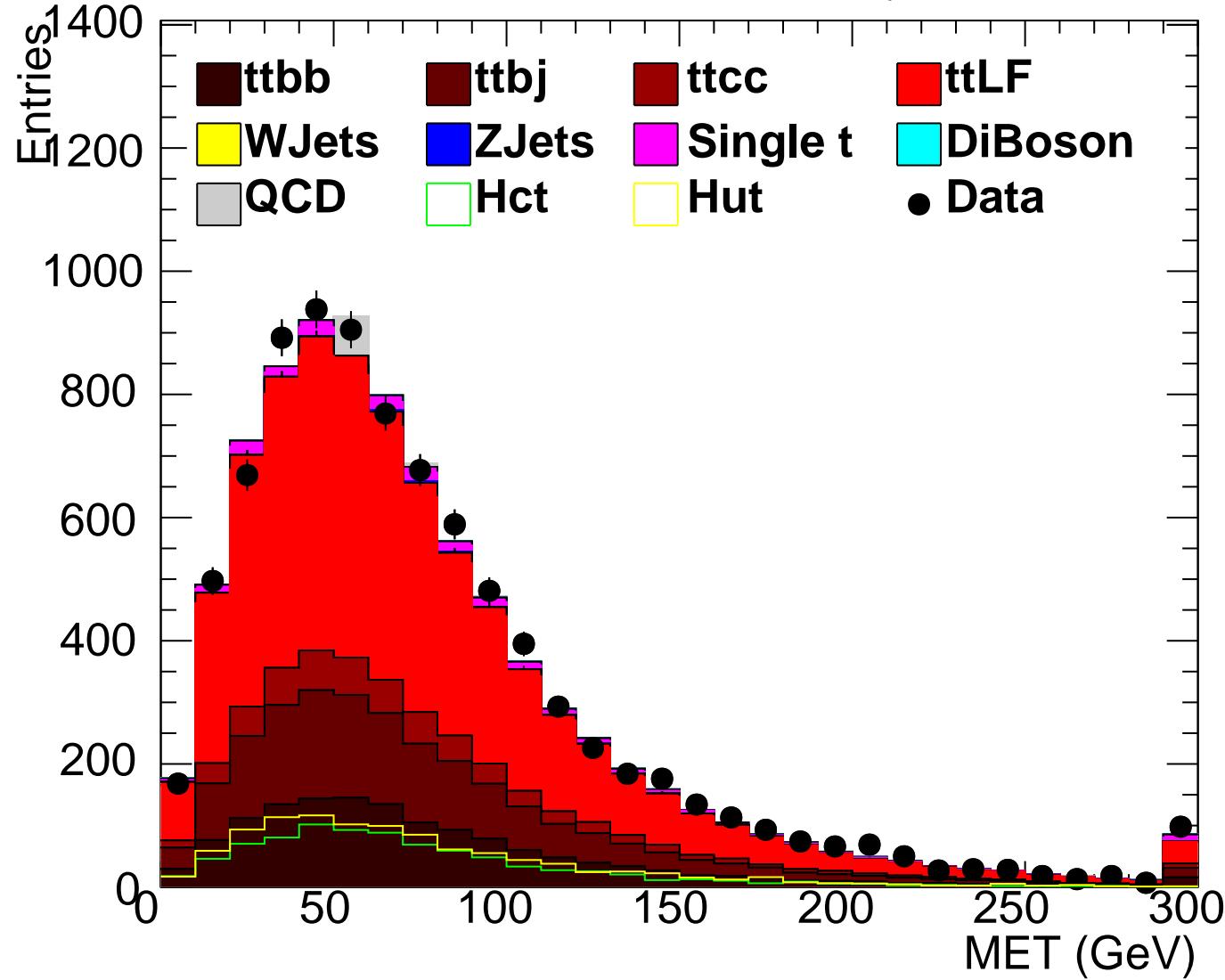
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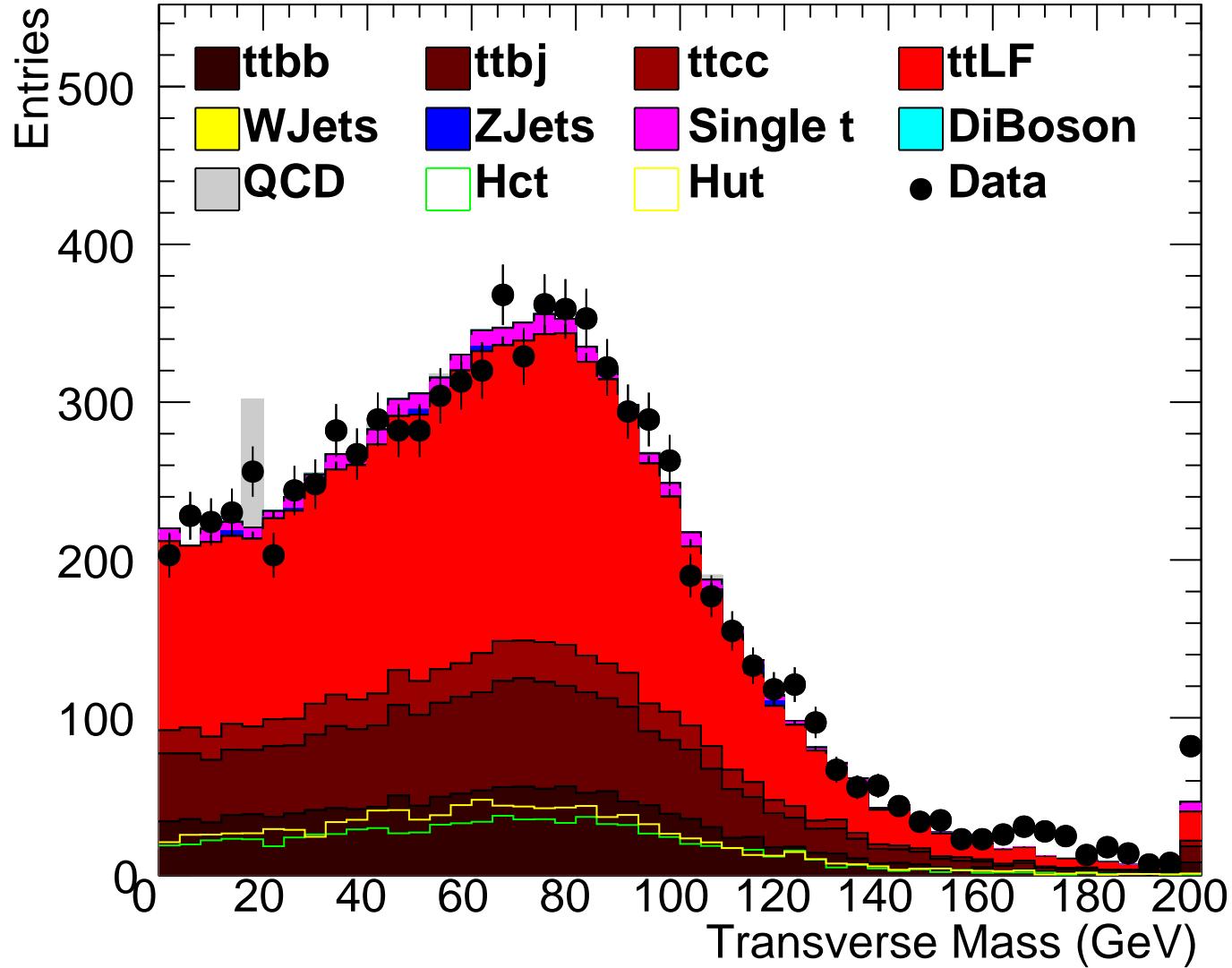
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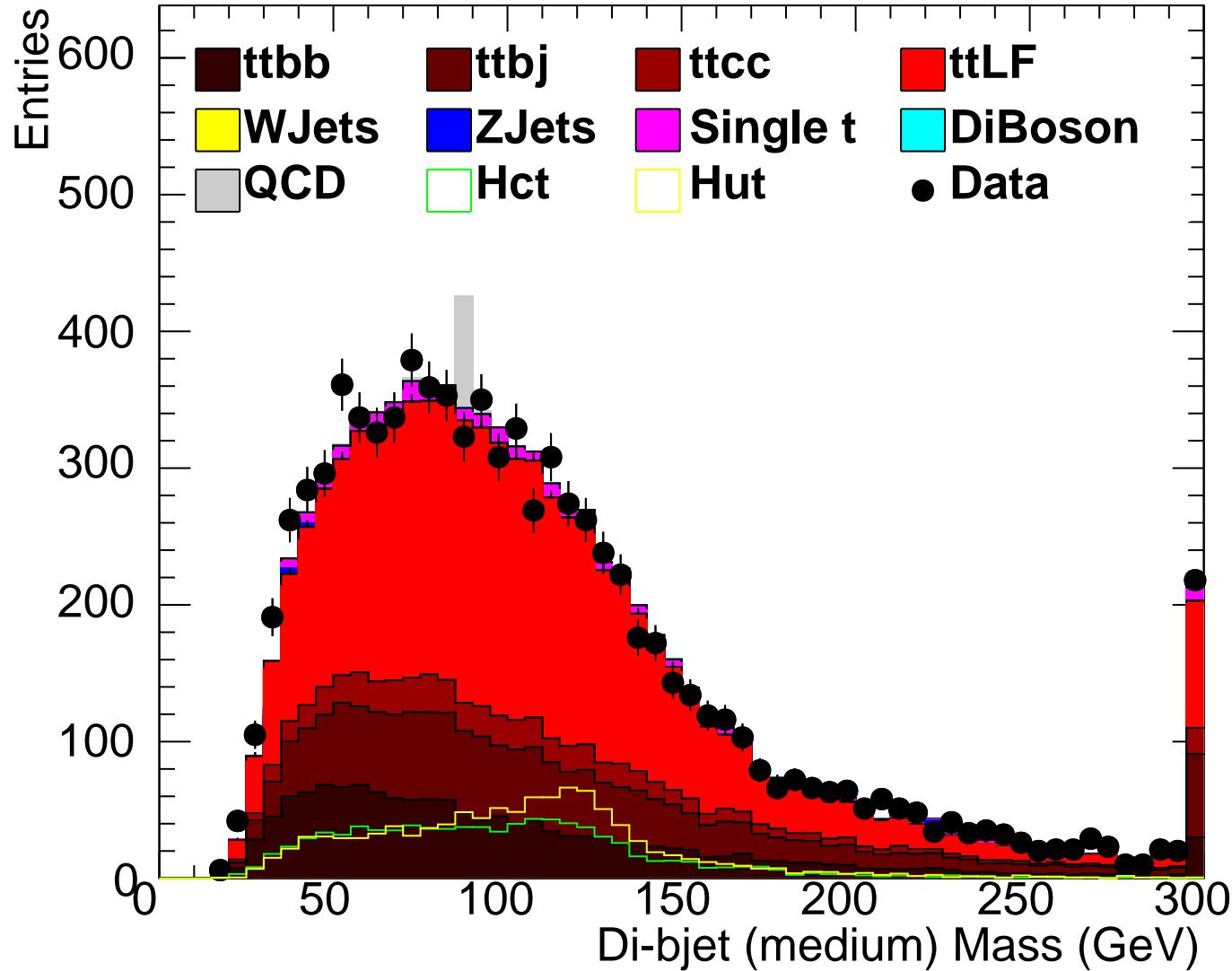
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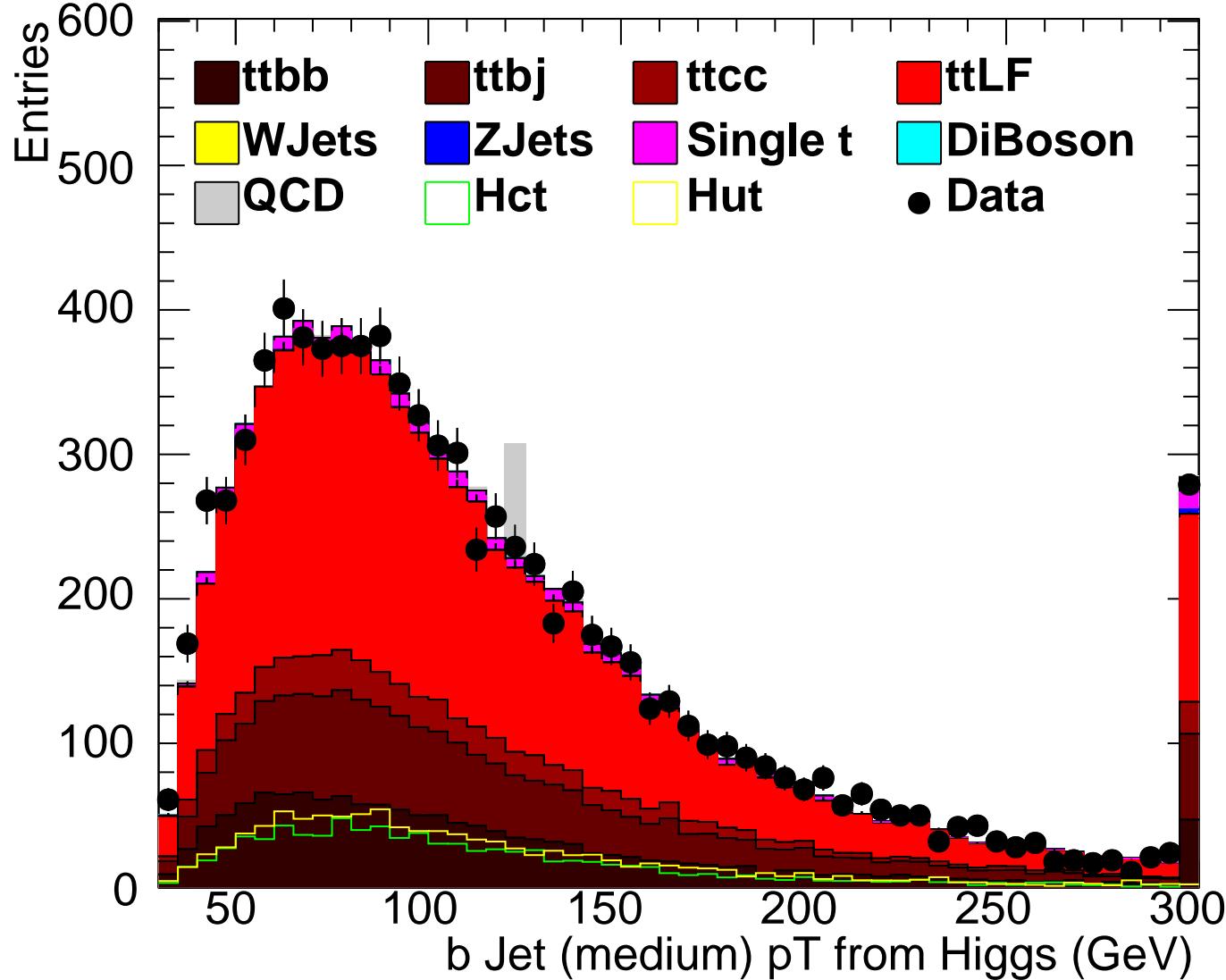


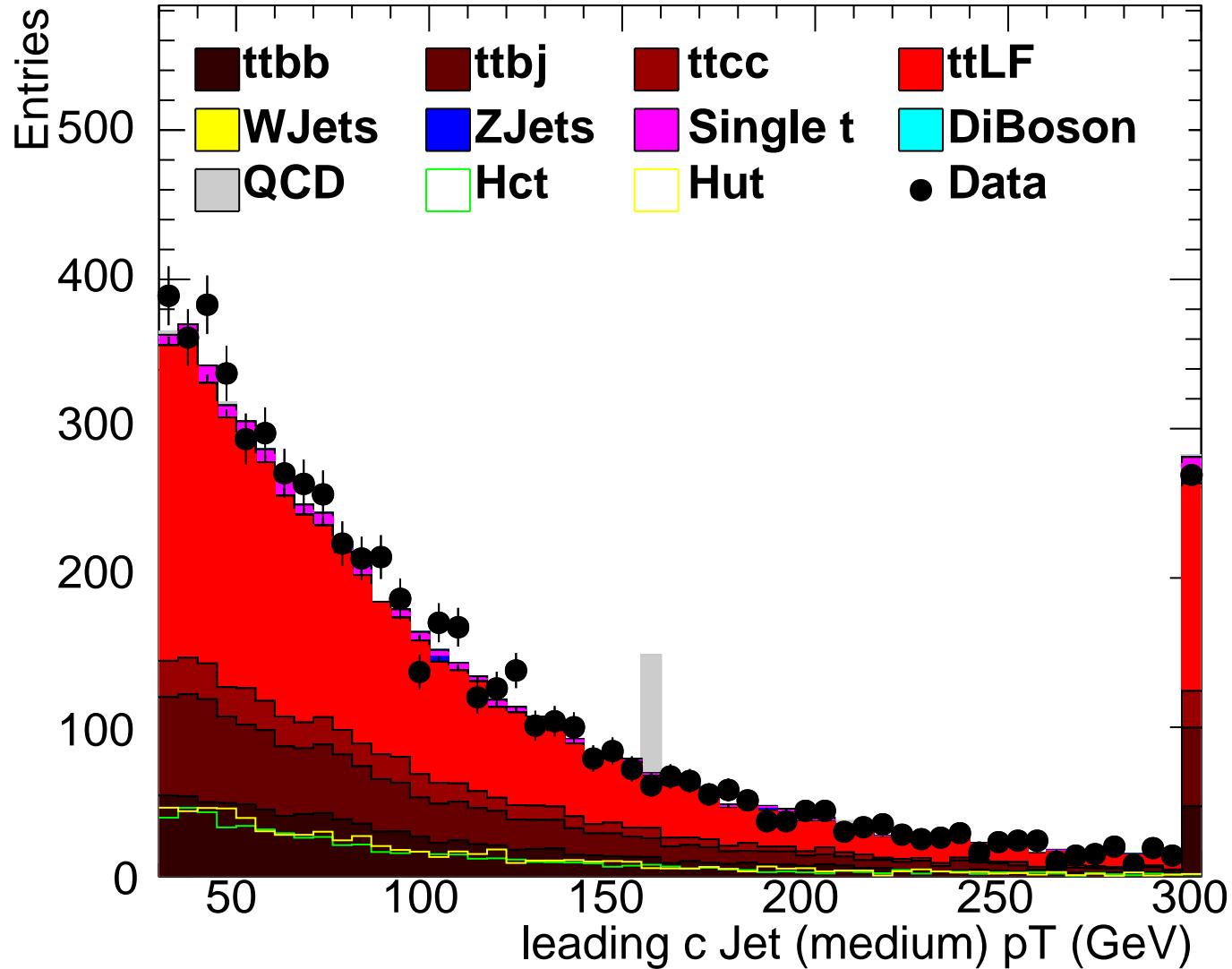
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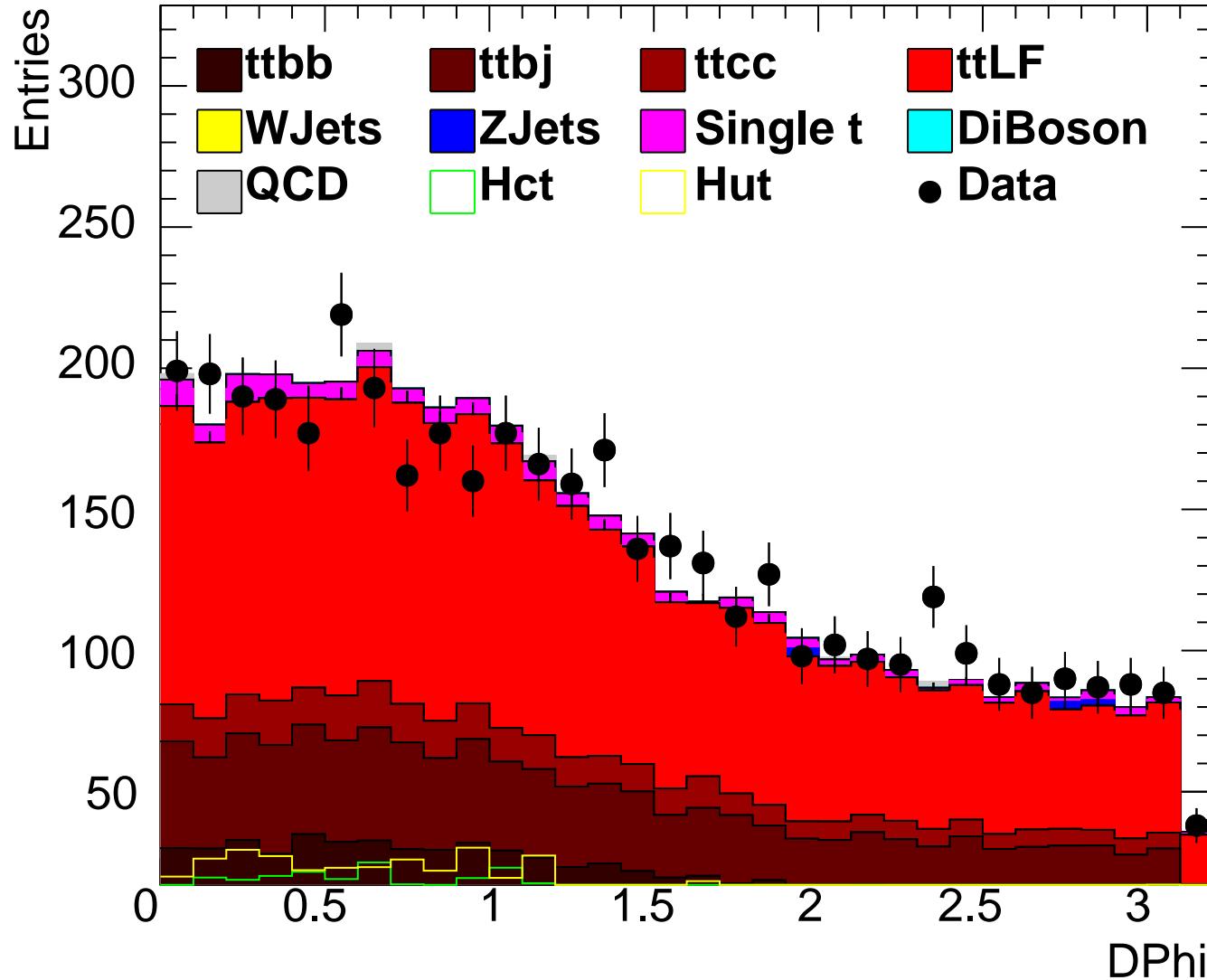
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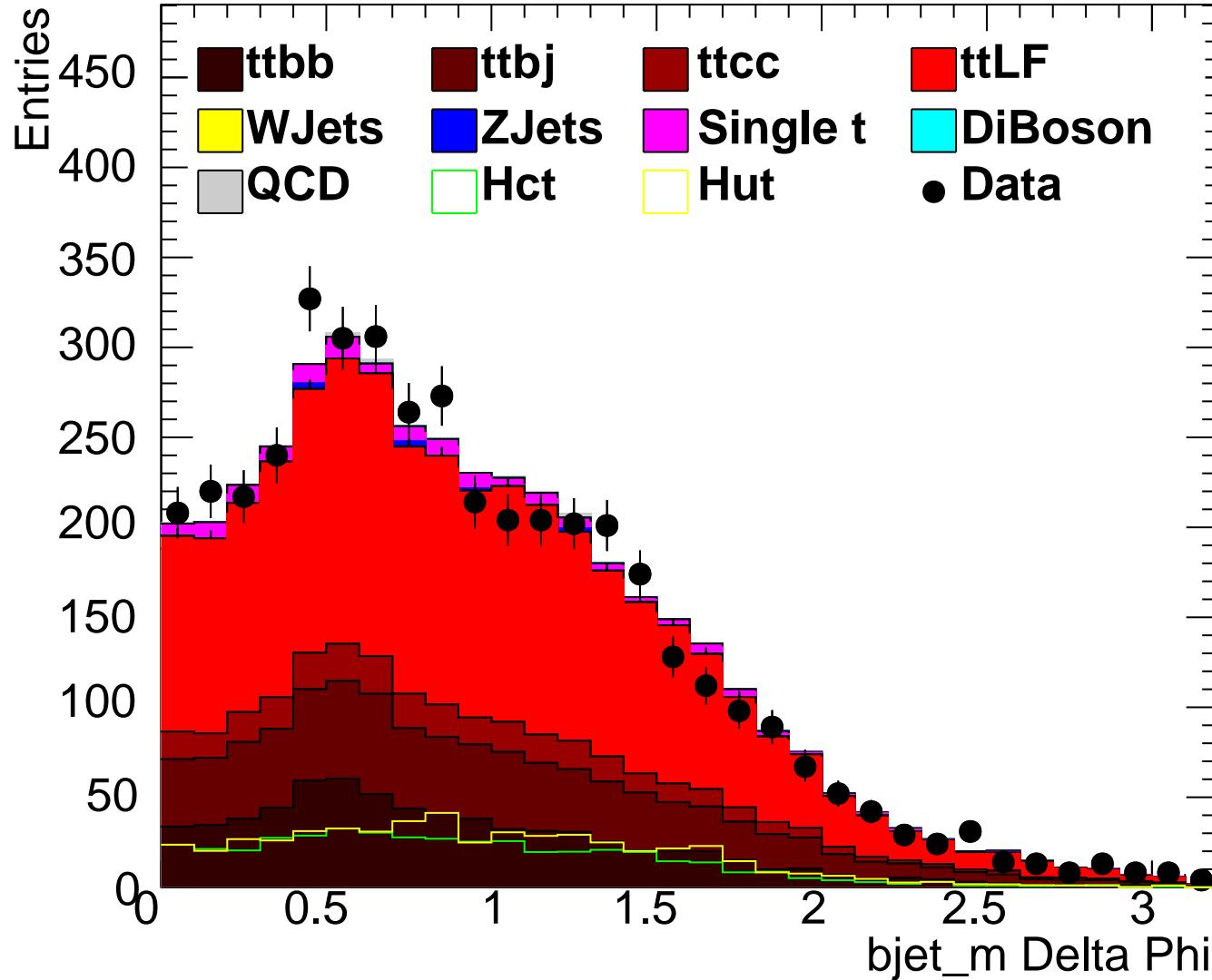
**Ch0\_S15**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

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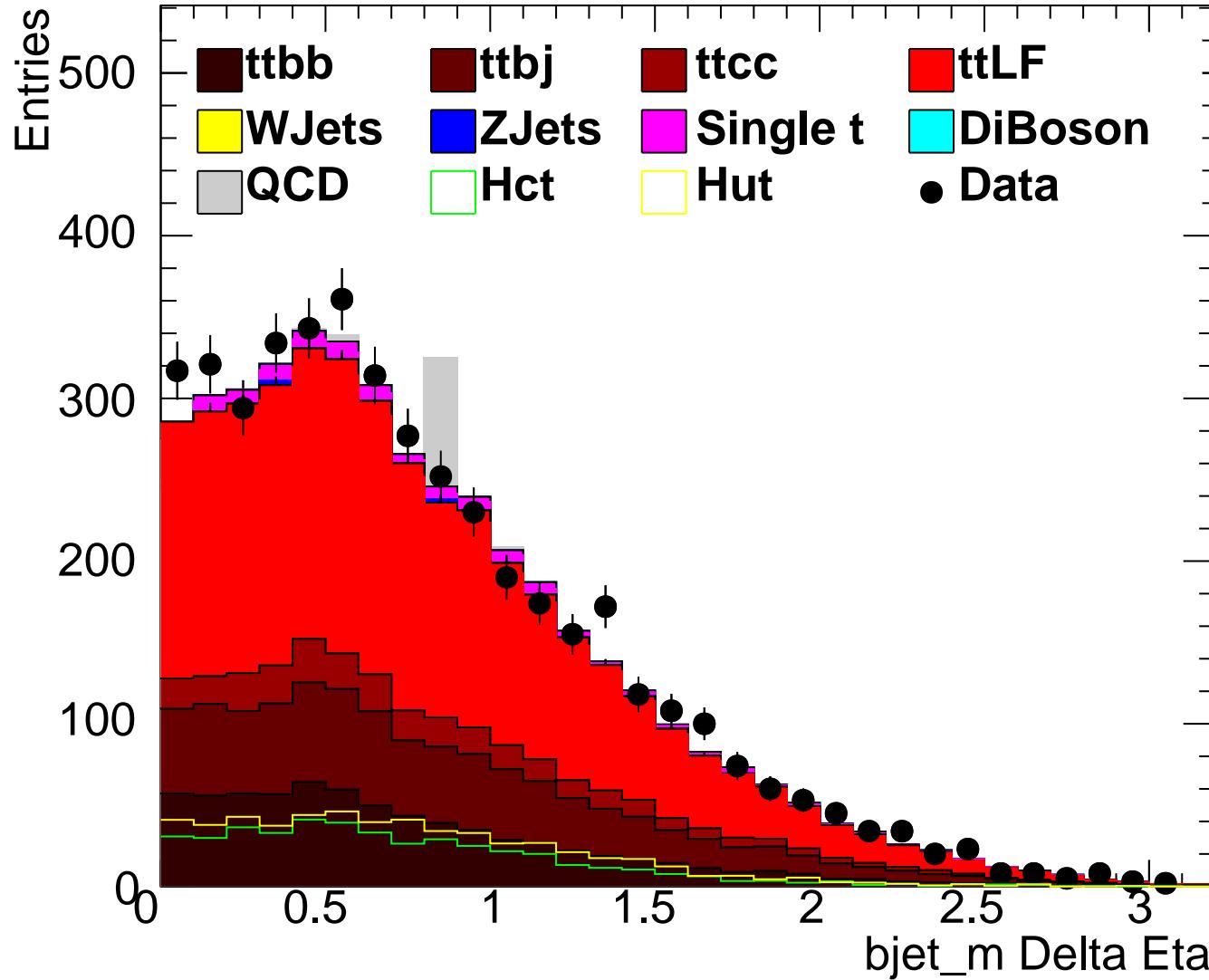
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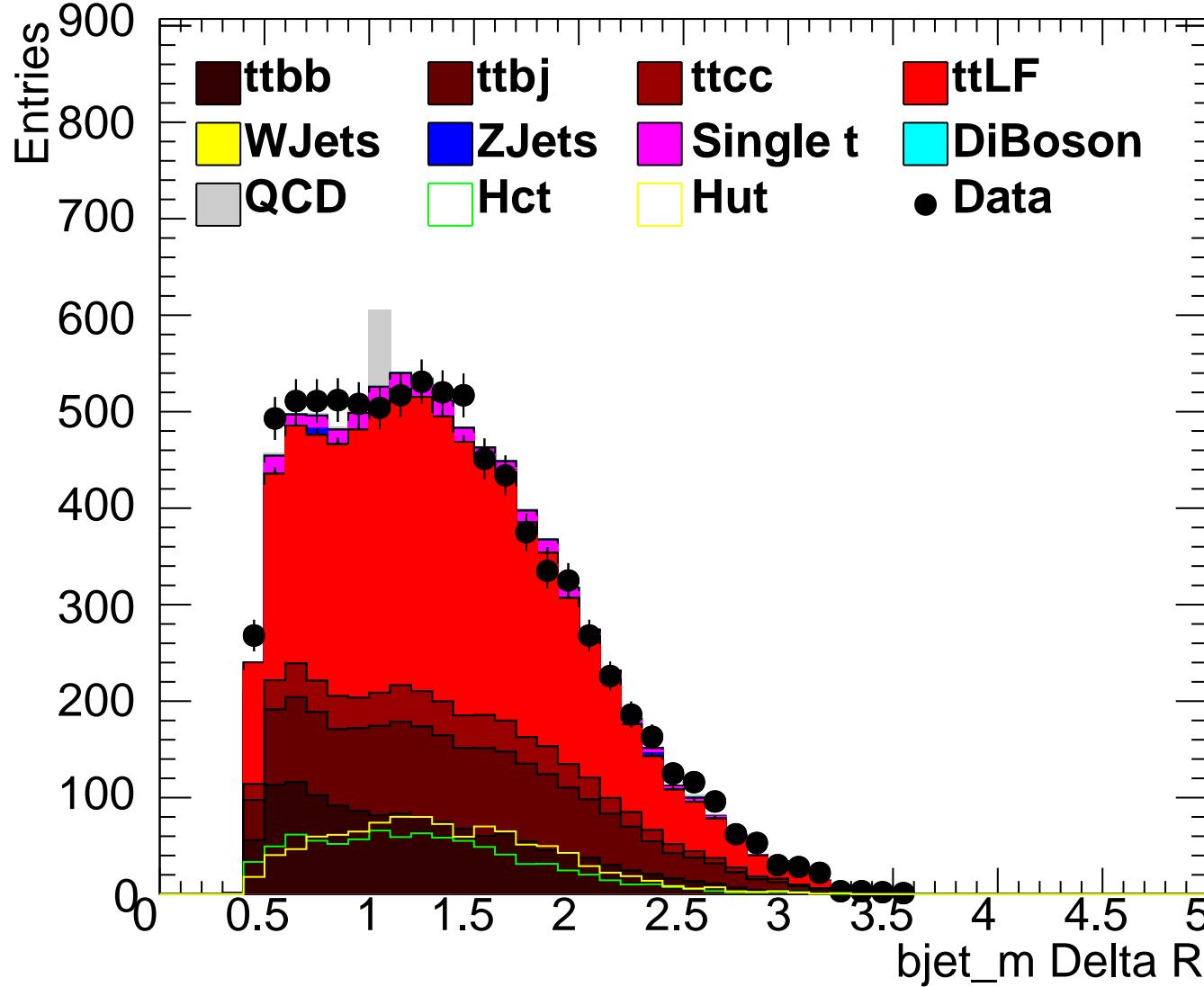
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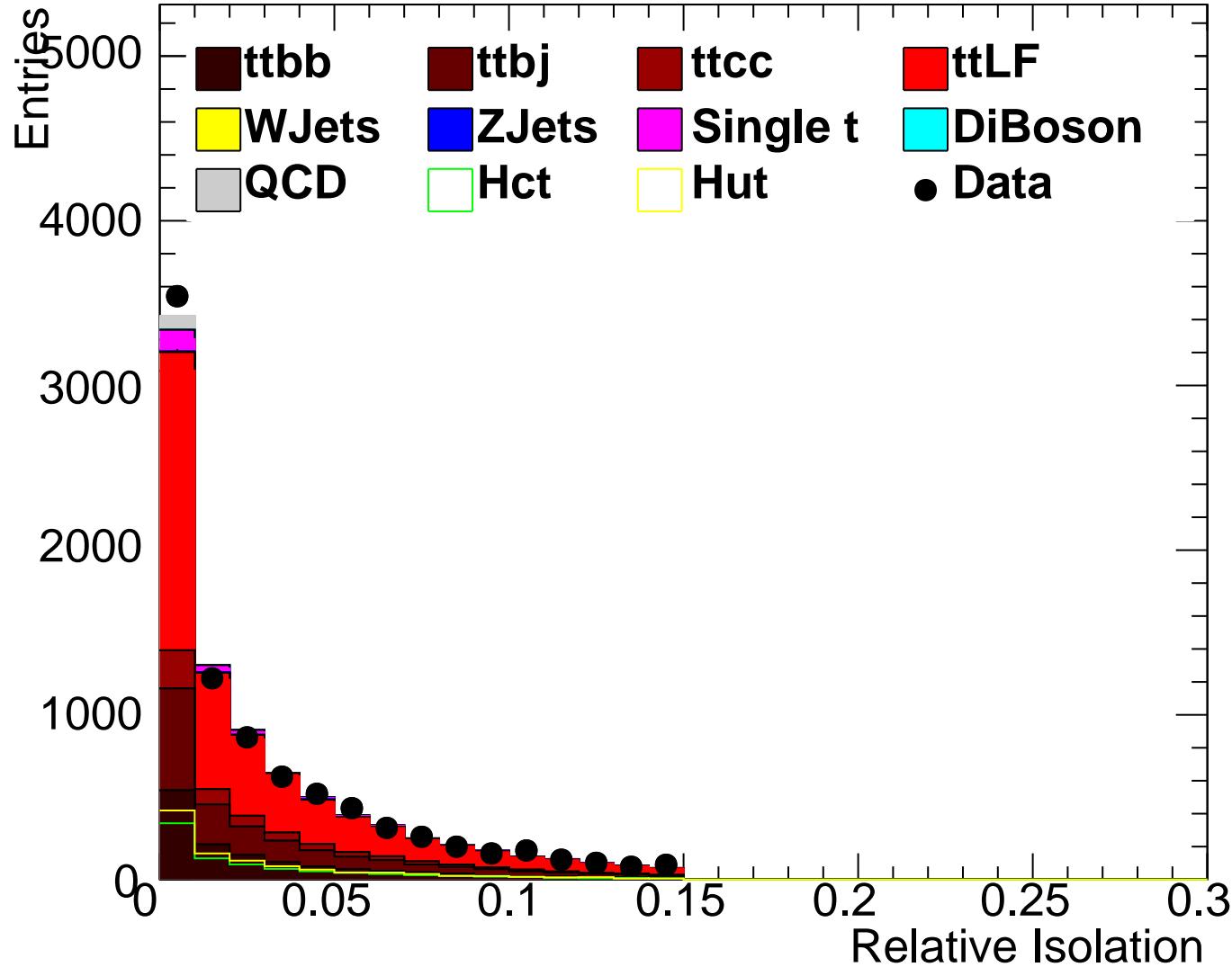
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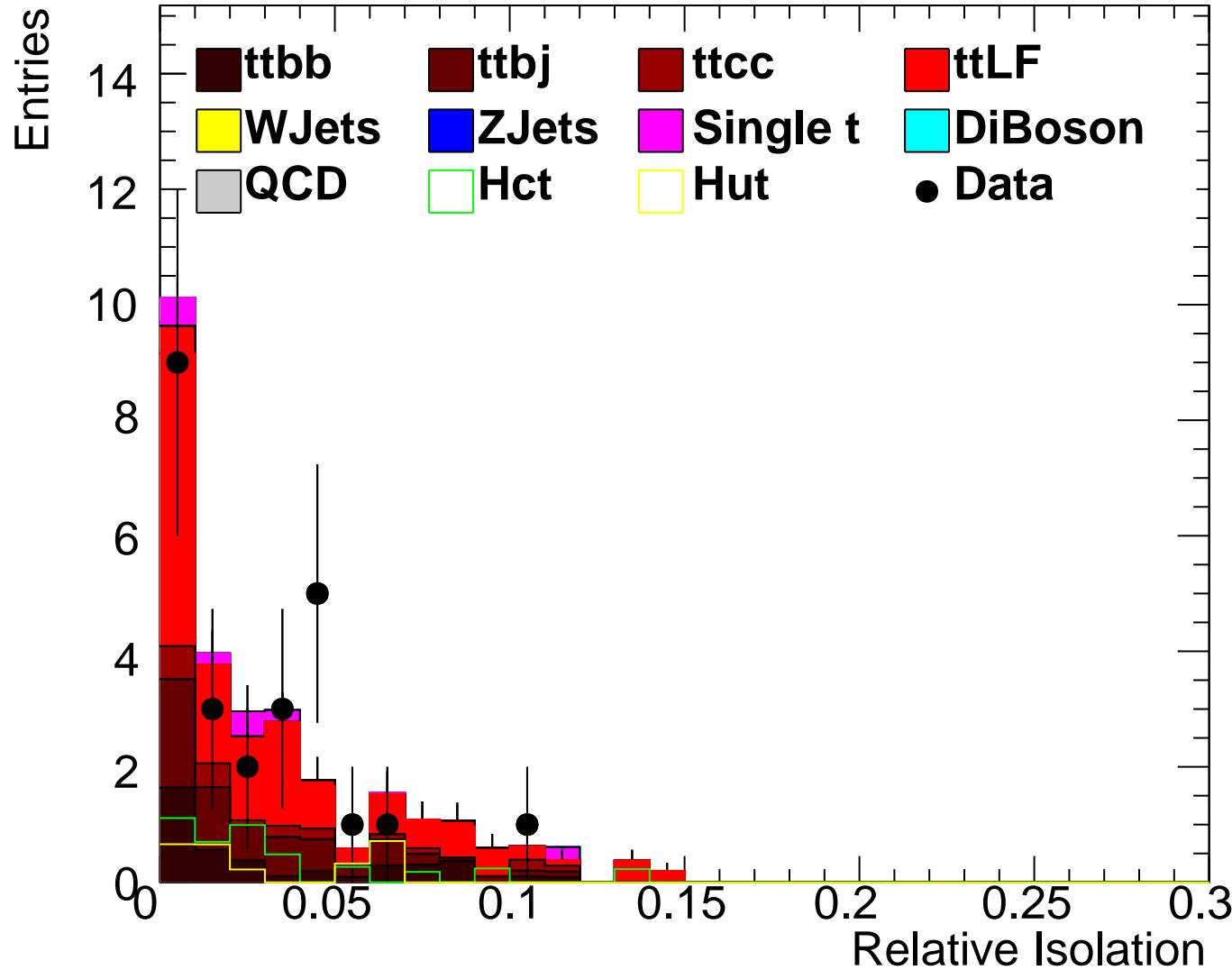
Ch0 S15

CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$



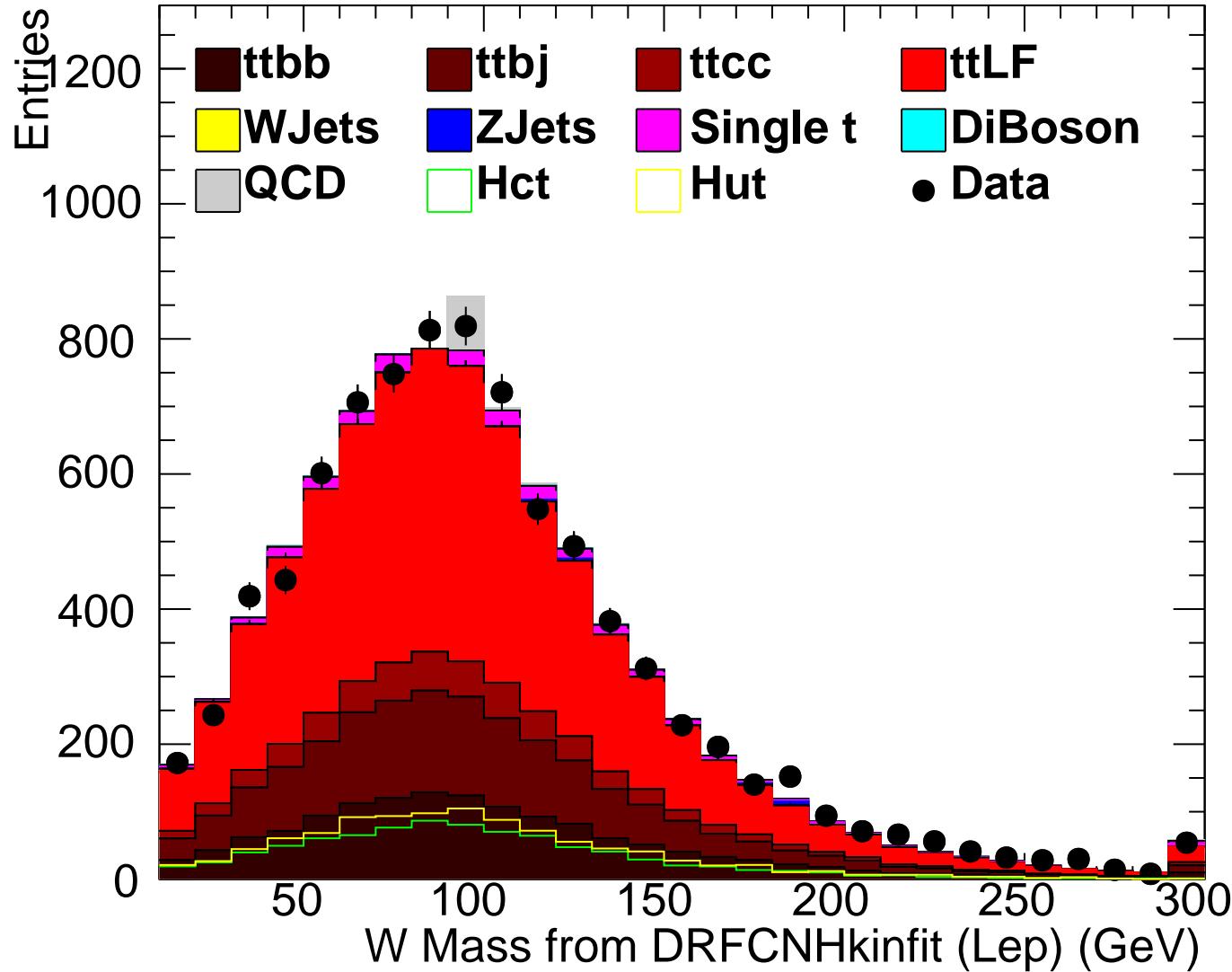
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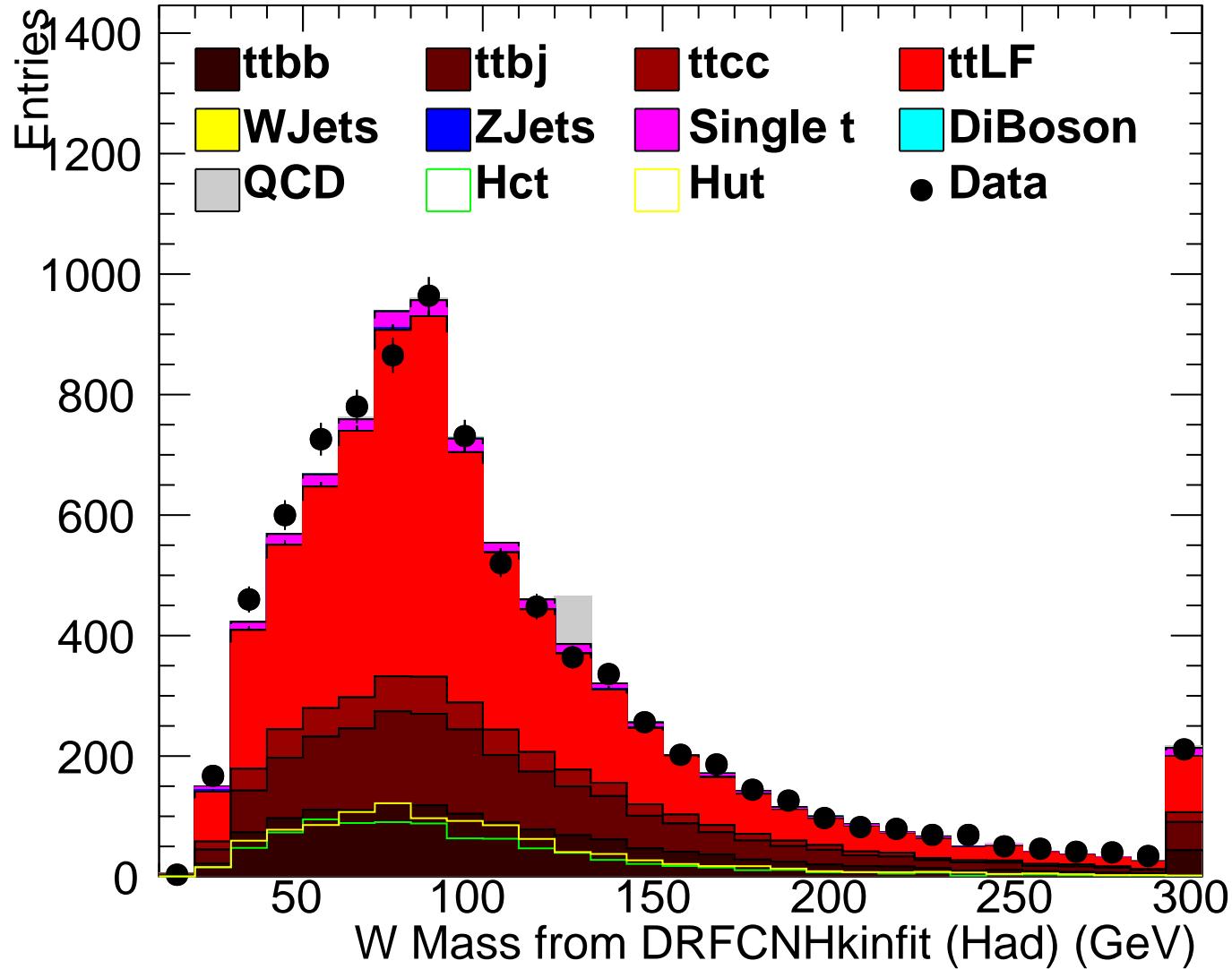
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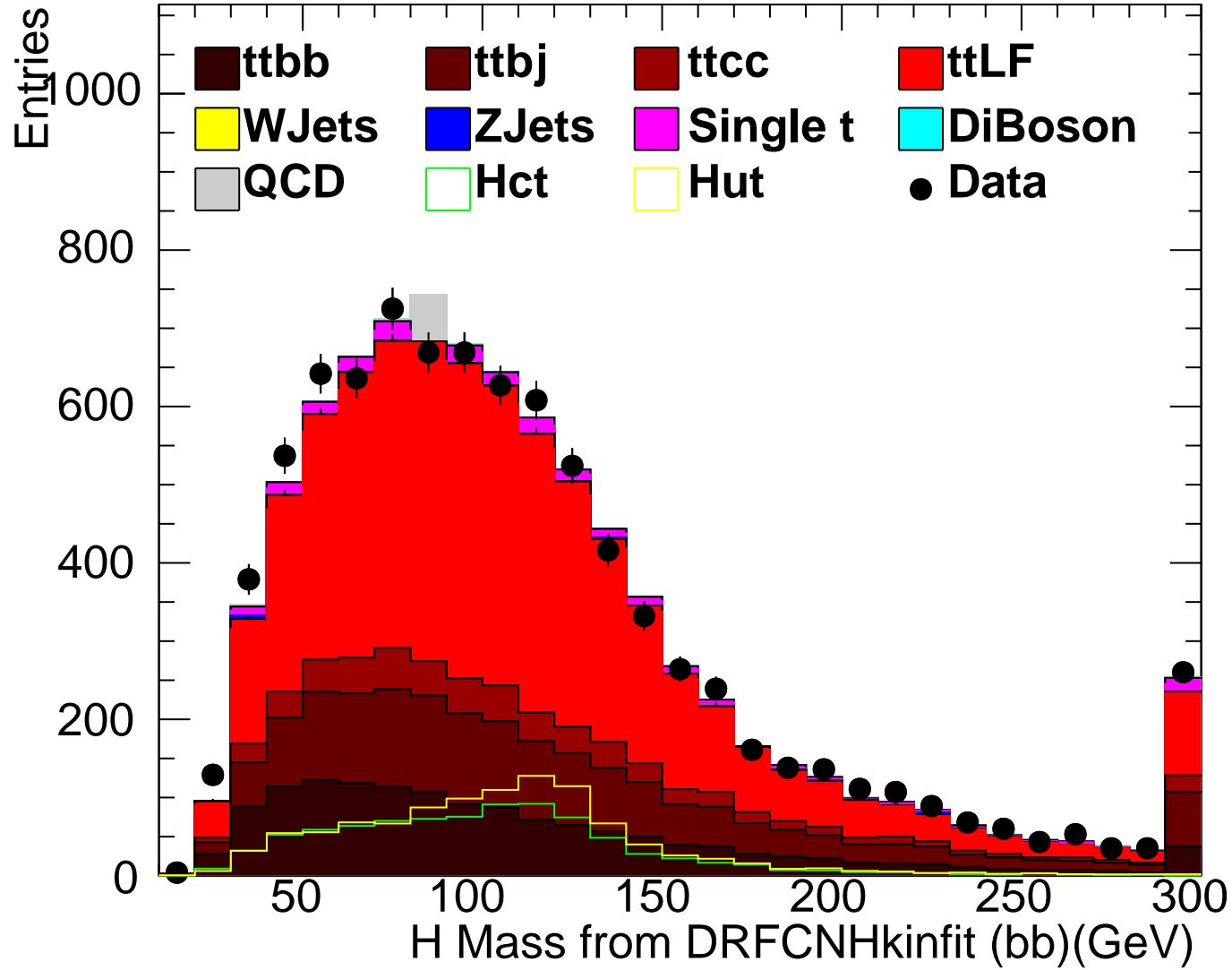


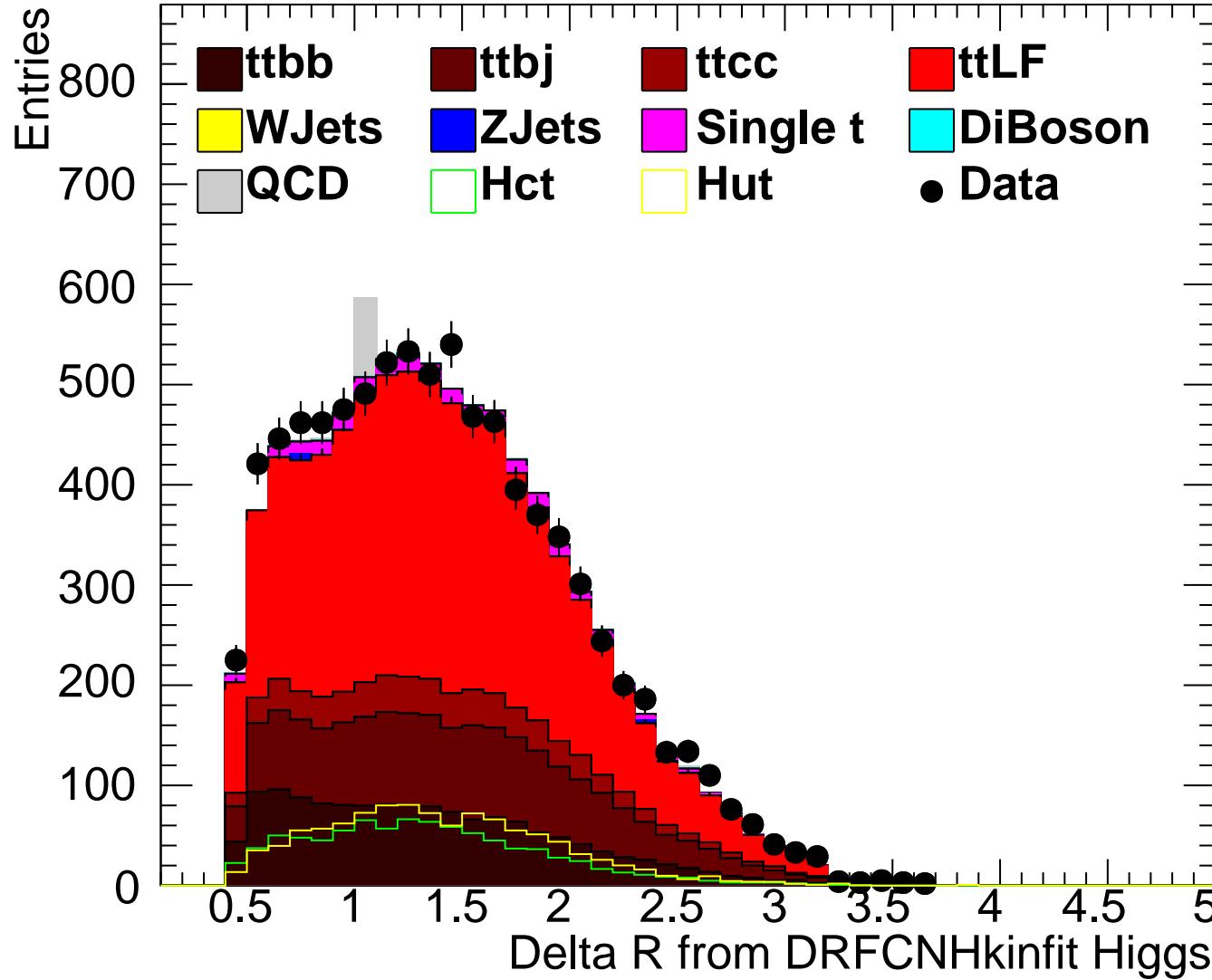
Ch0 S15

CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$



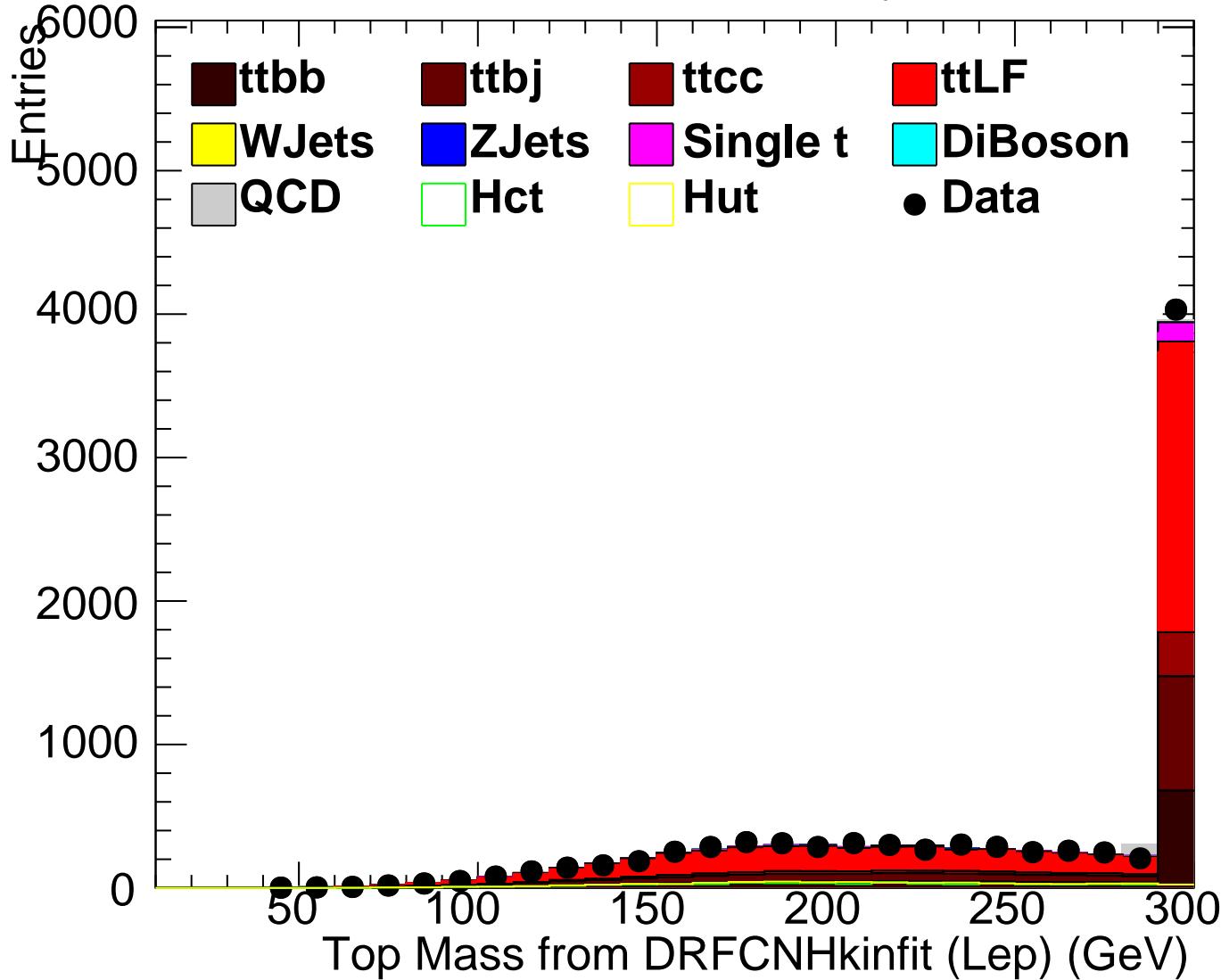
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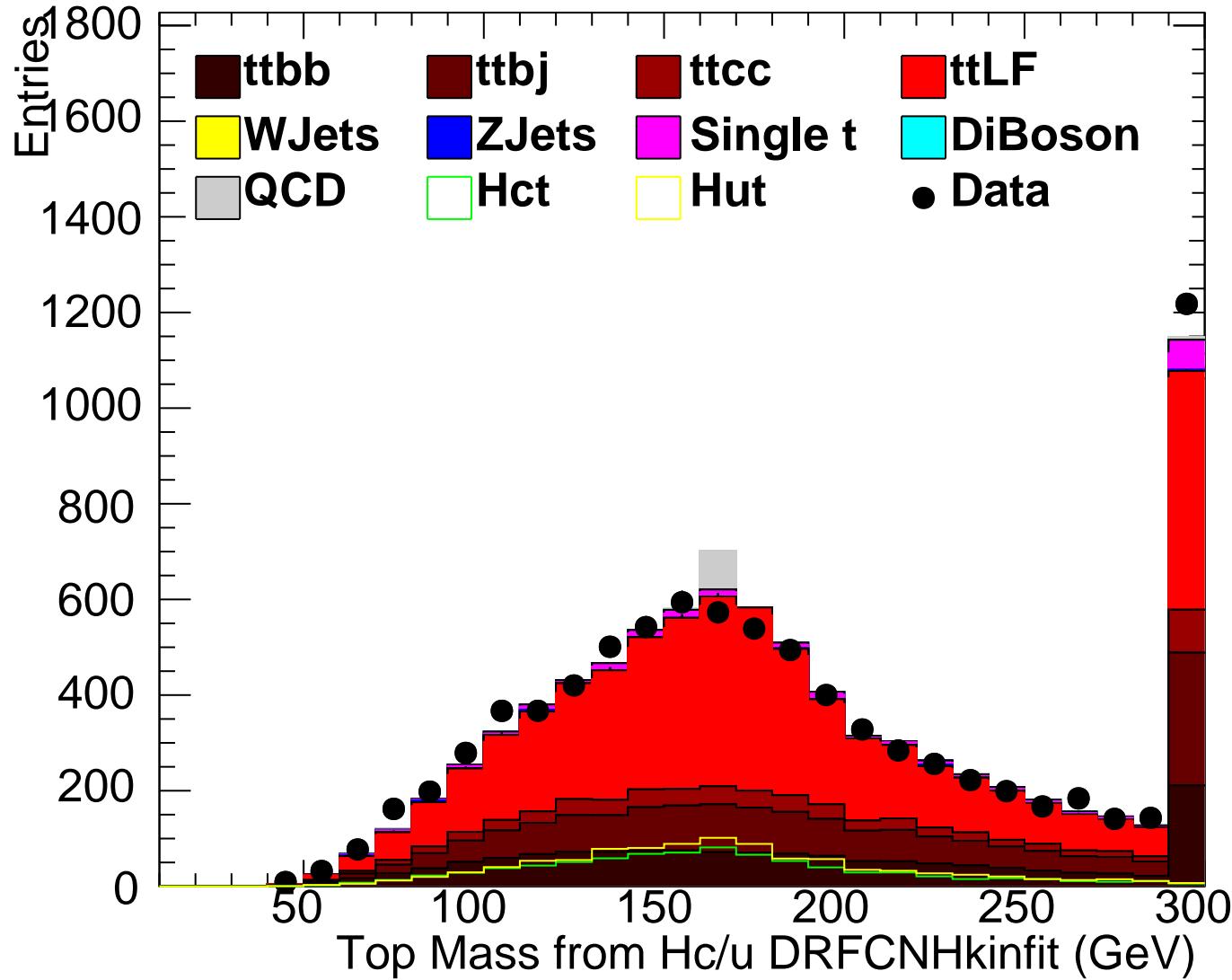
**Ch0\_S15**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch0\_S15**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

Ch0\_S15

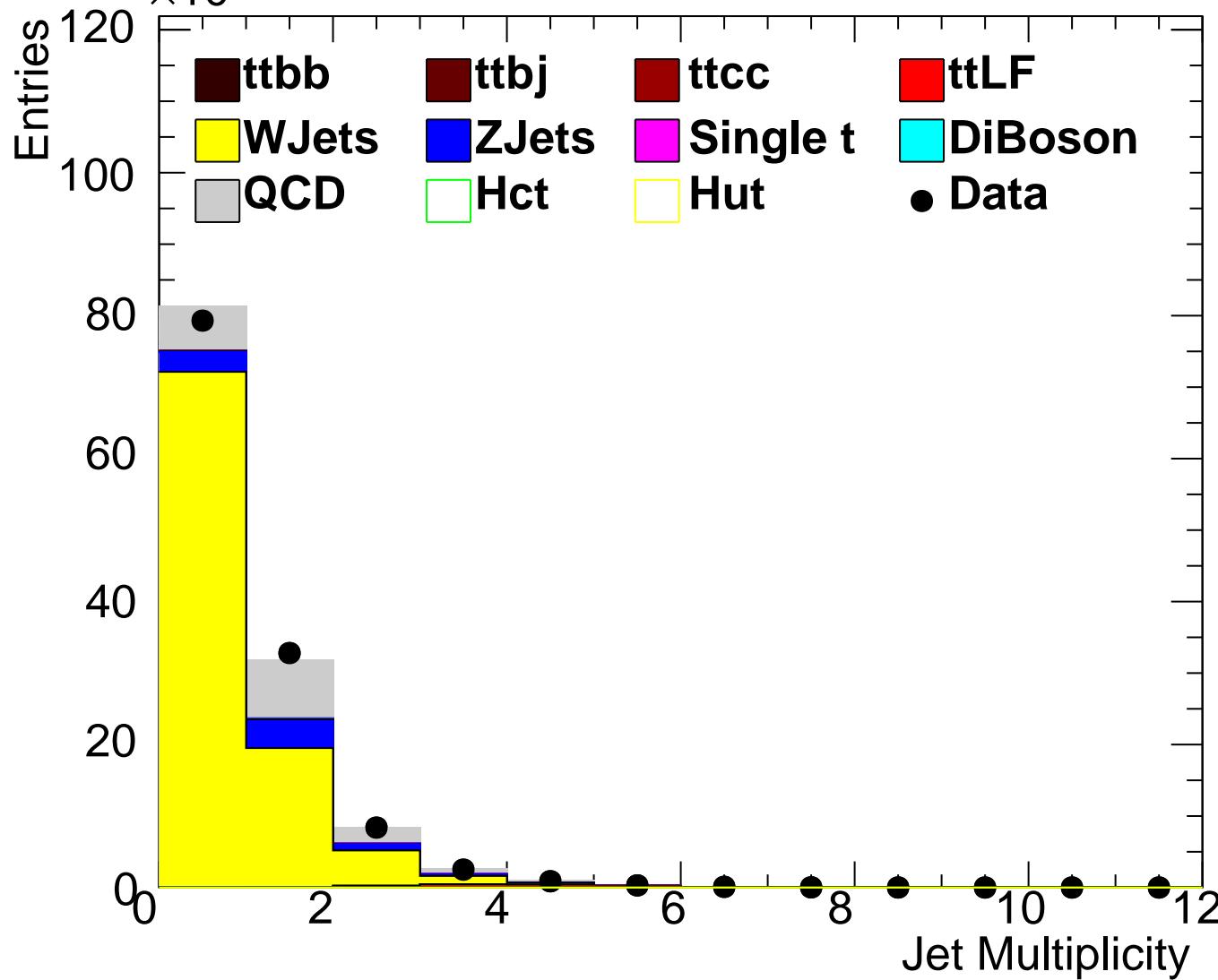
CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV



**Ch0\_S15**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

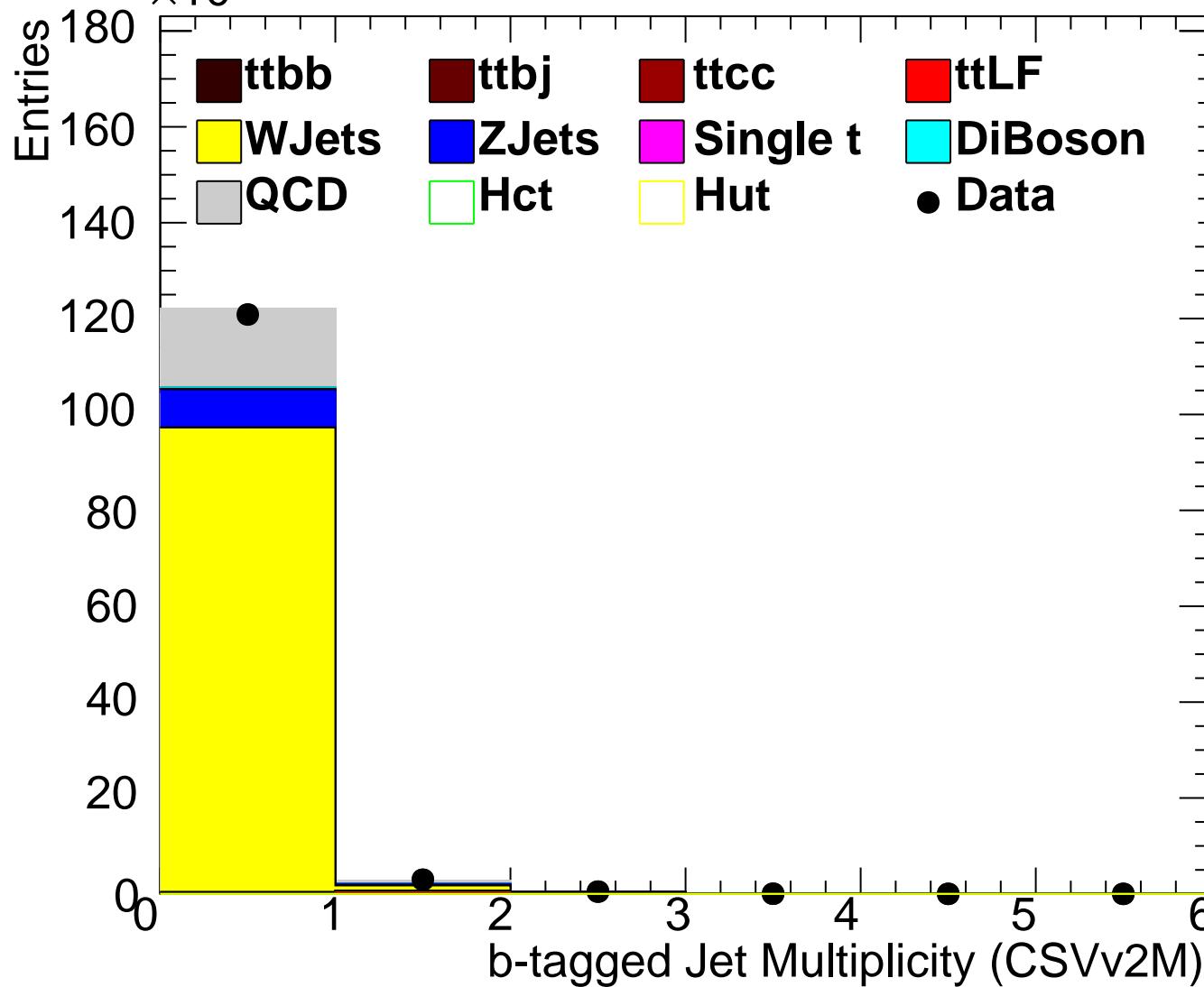
Ch1\_S0

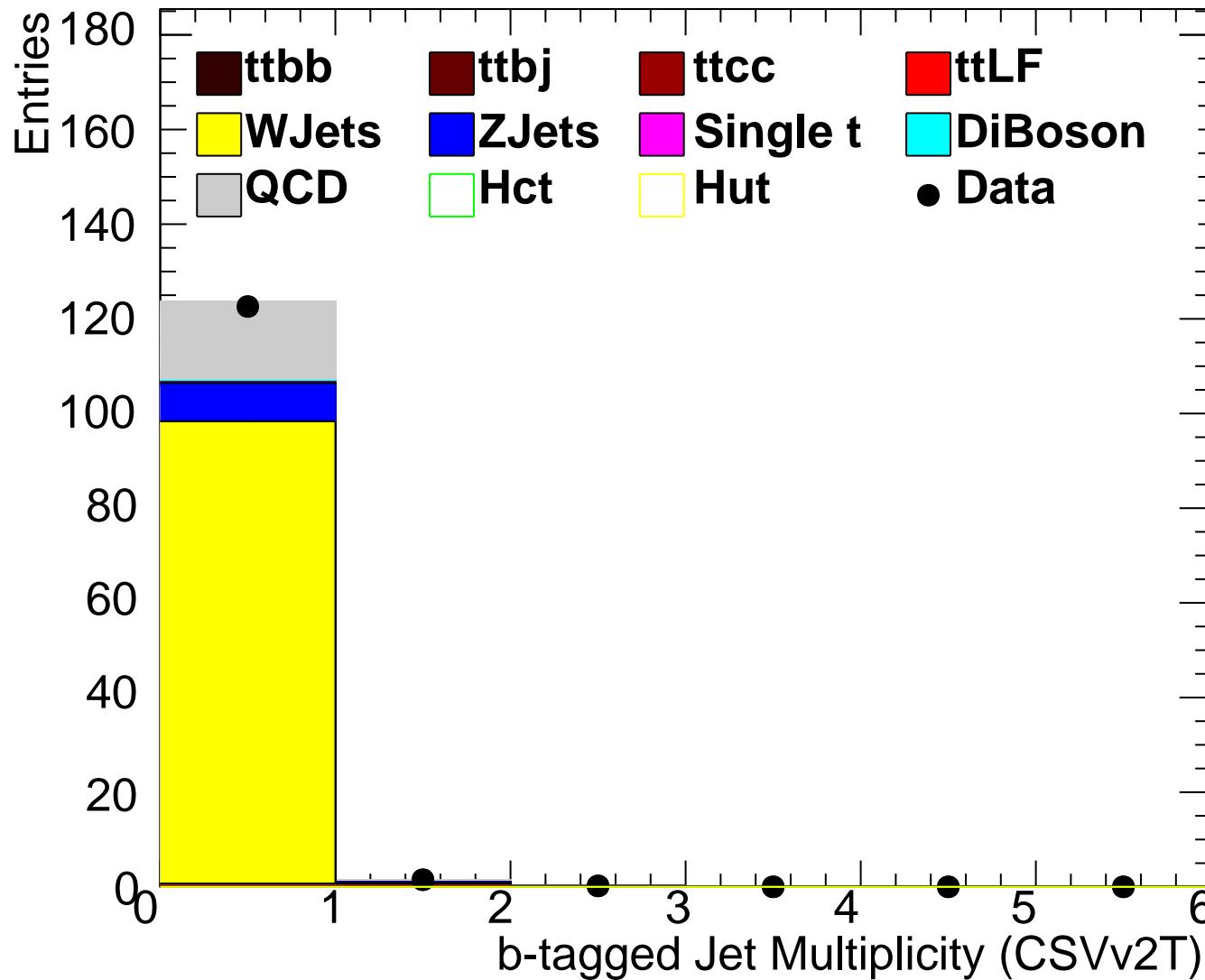
CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV



Ch1\_S0

CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$

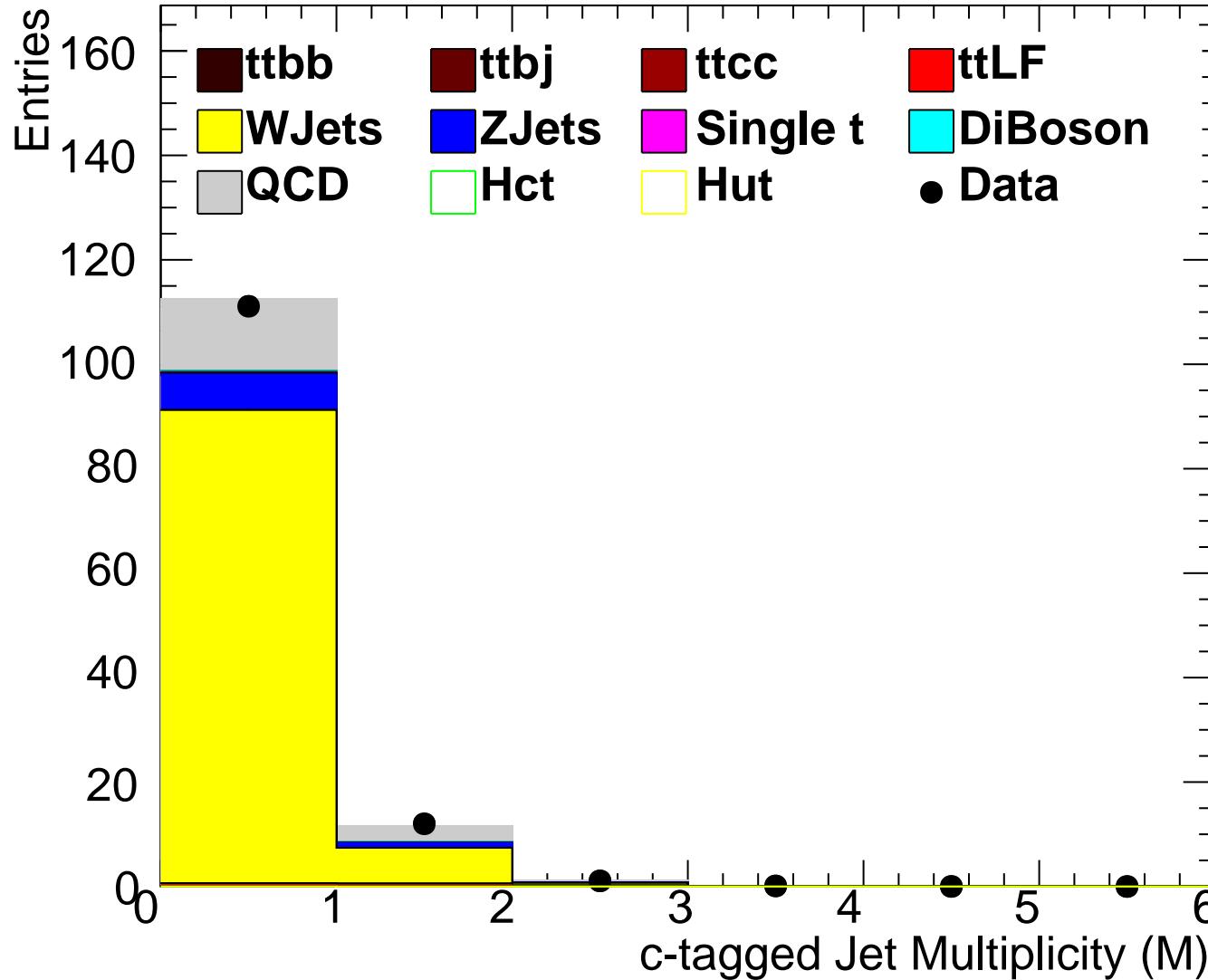


**Ch1\_S0**x 10<sup>6</sup>CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV

**Ch1\_S0**

$\times 10^6$

CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$



**Ch1\_S0**x 10<sup>6</sup>CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV

Entries

35

30

25

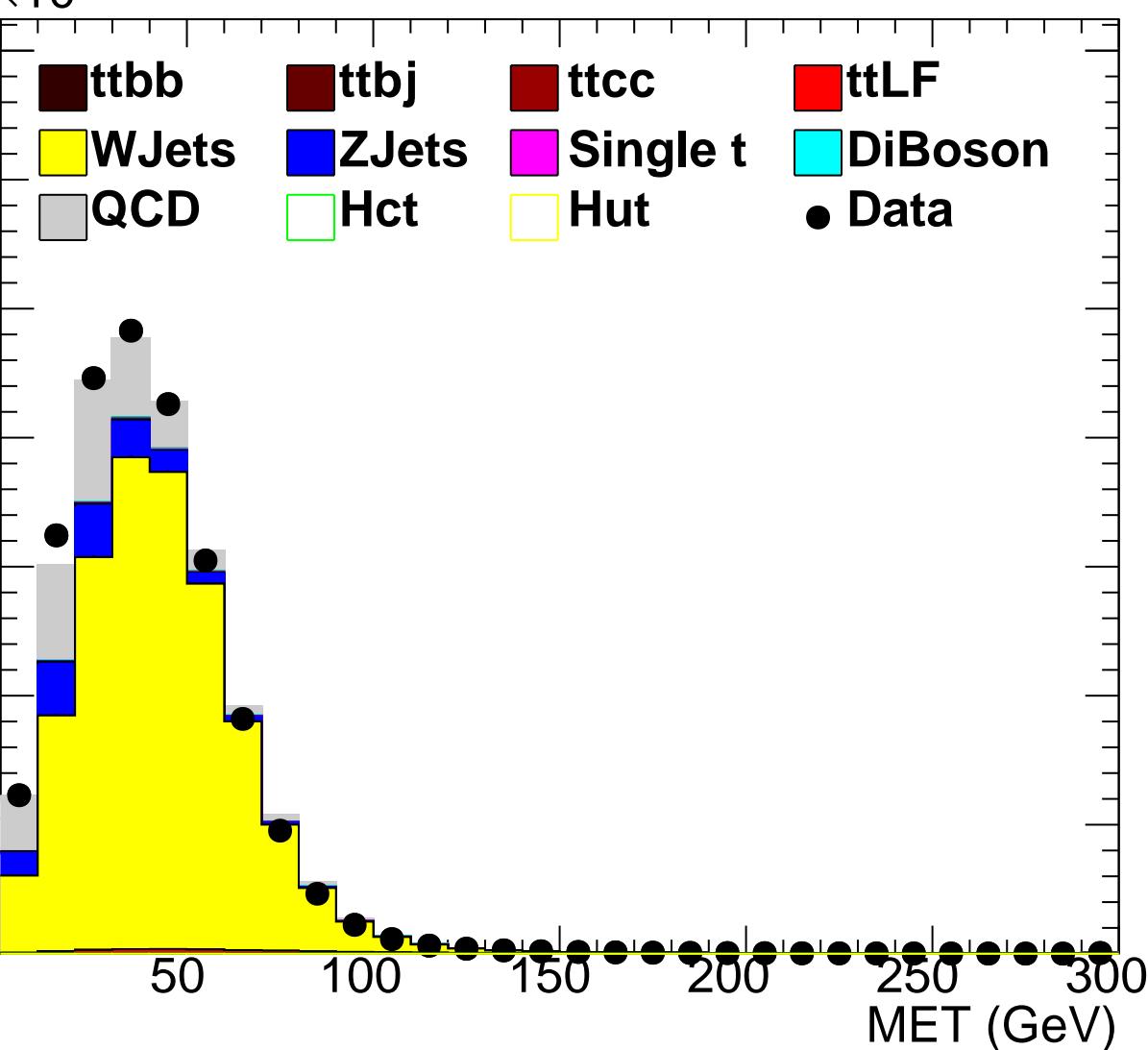
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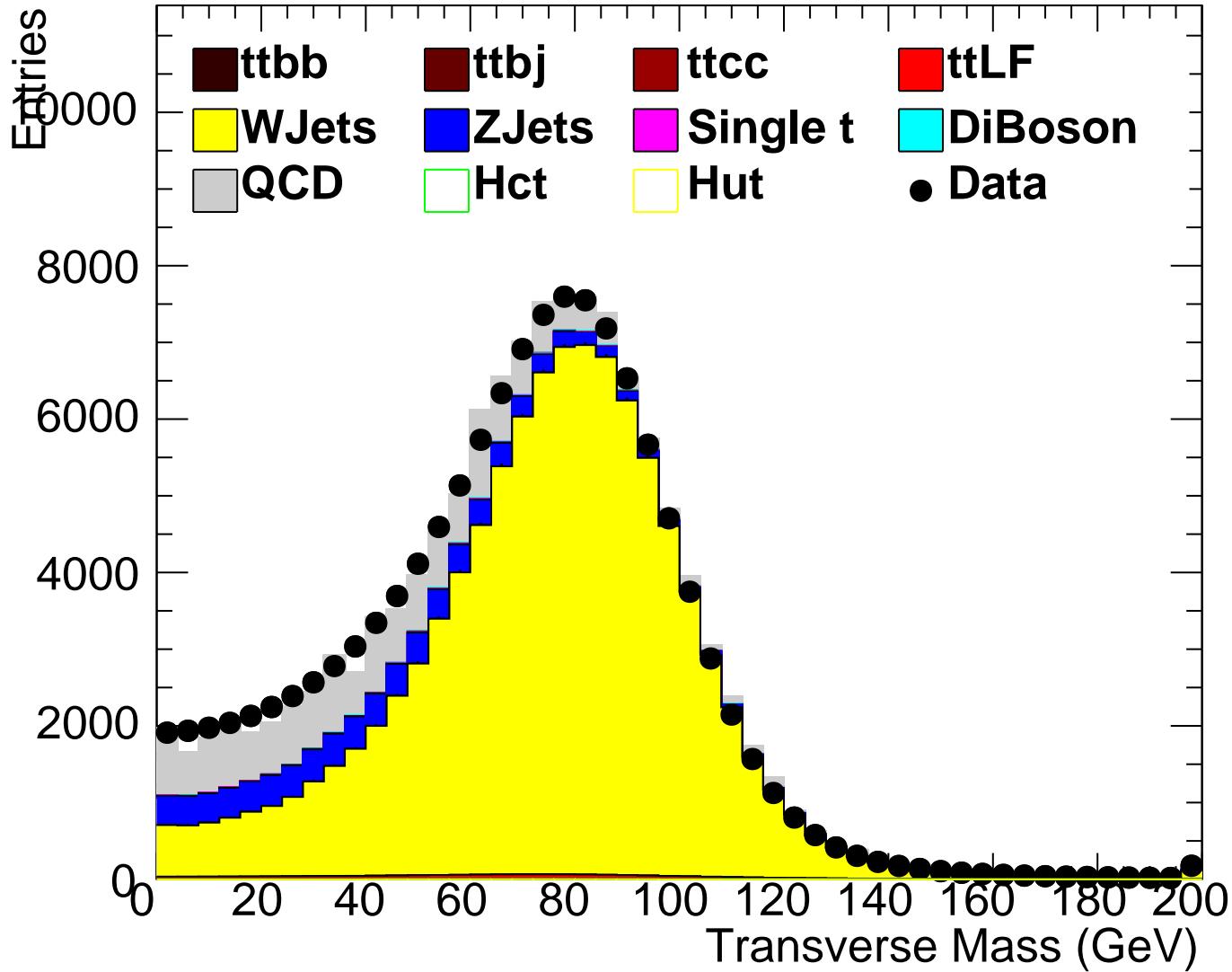
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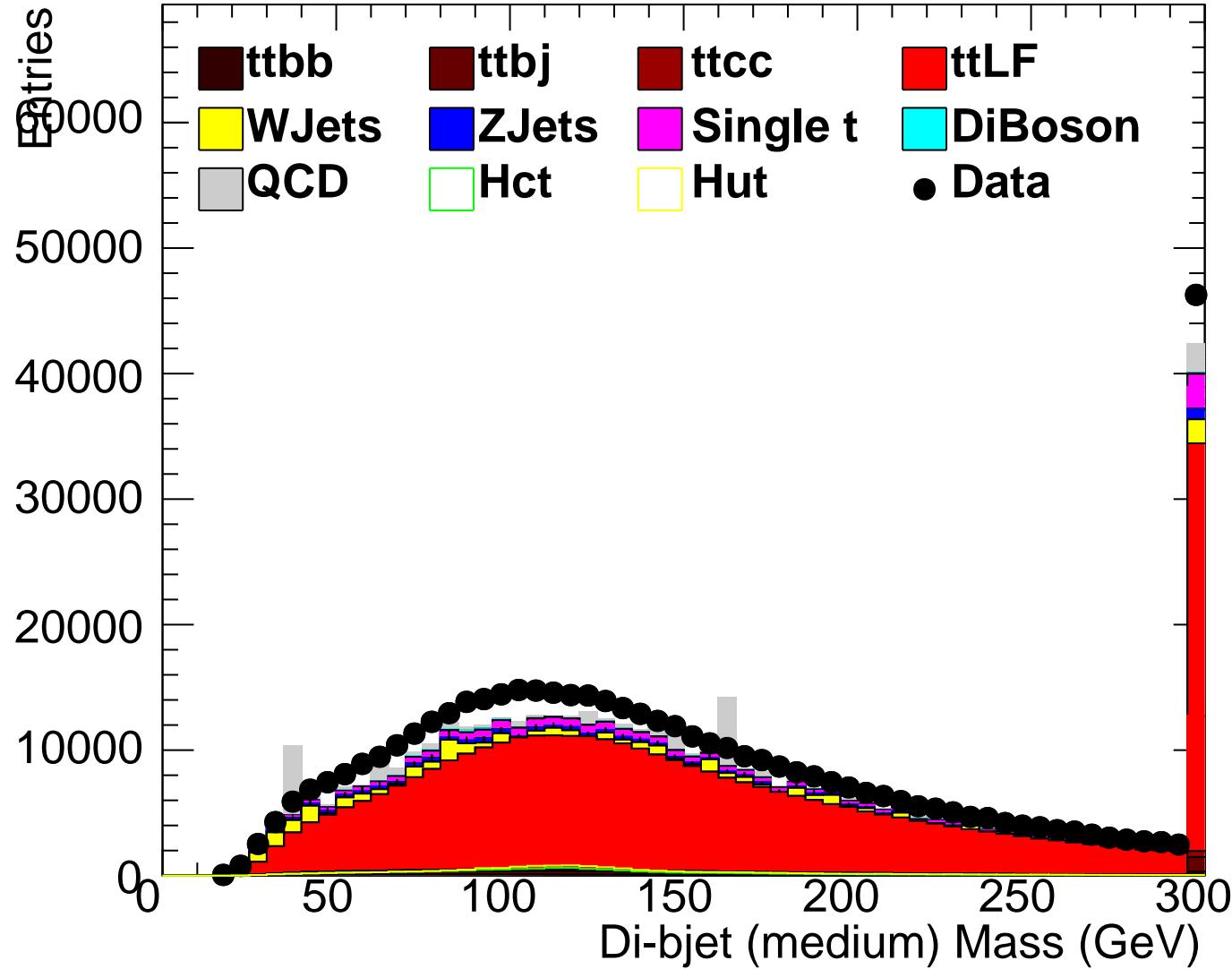
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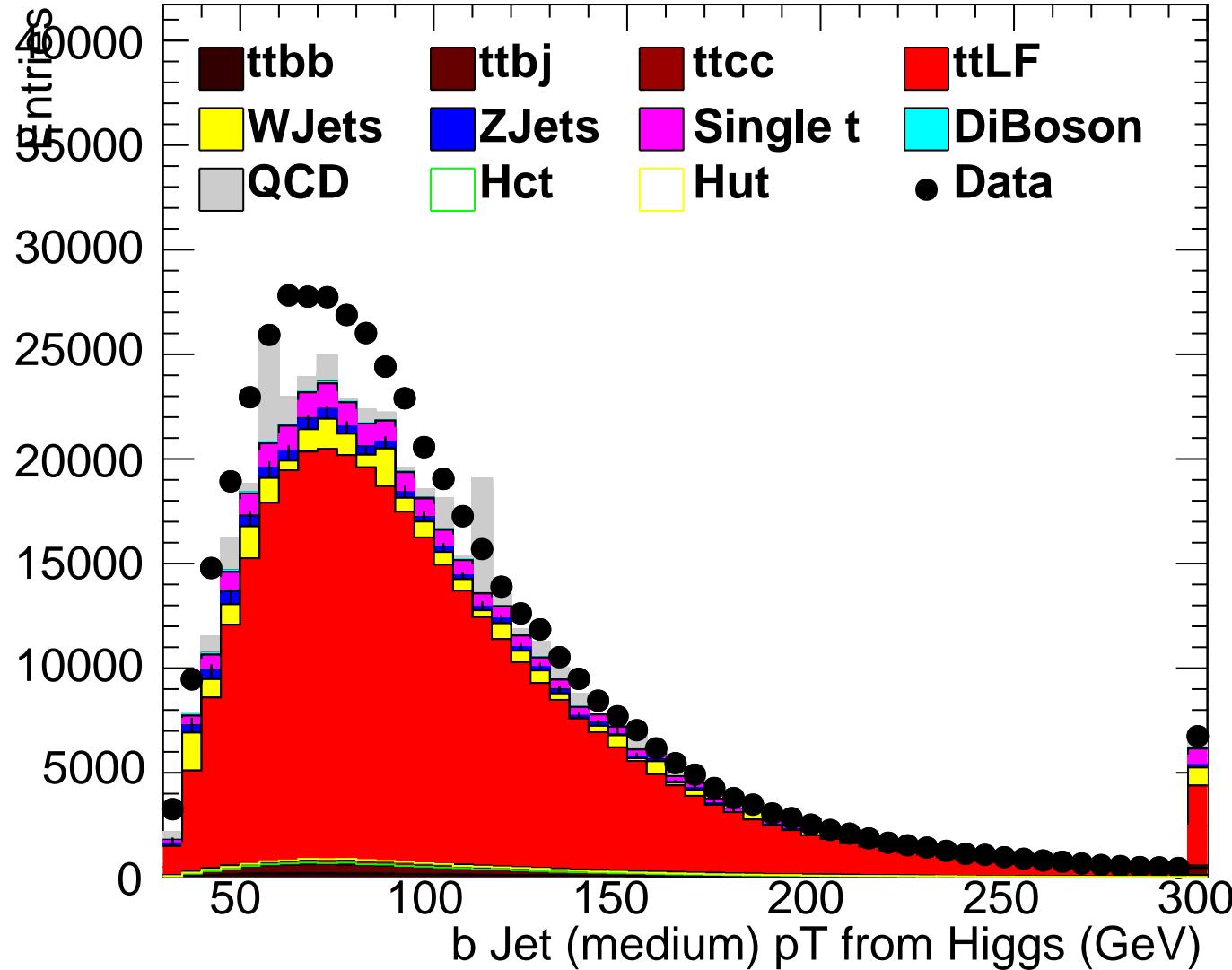
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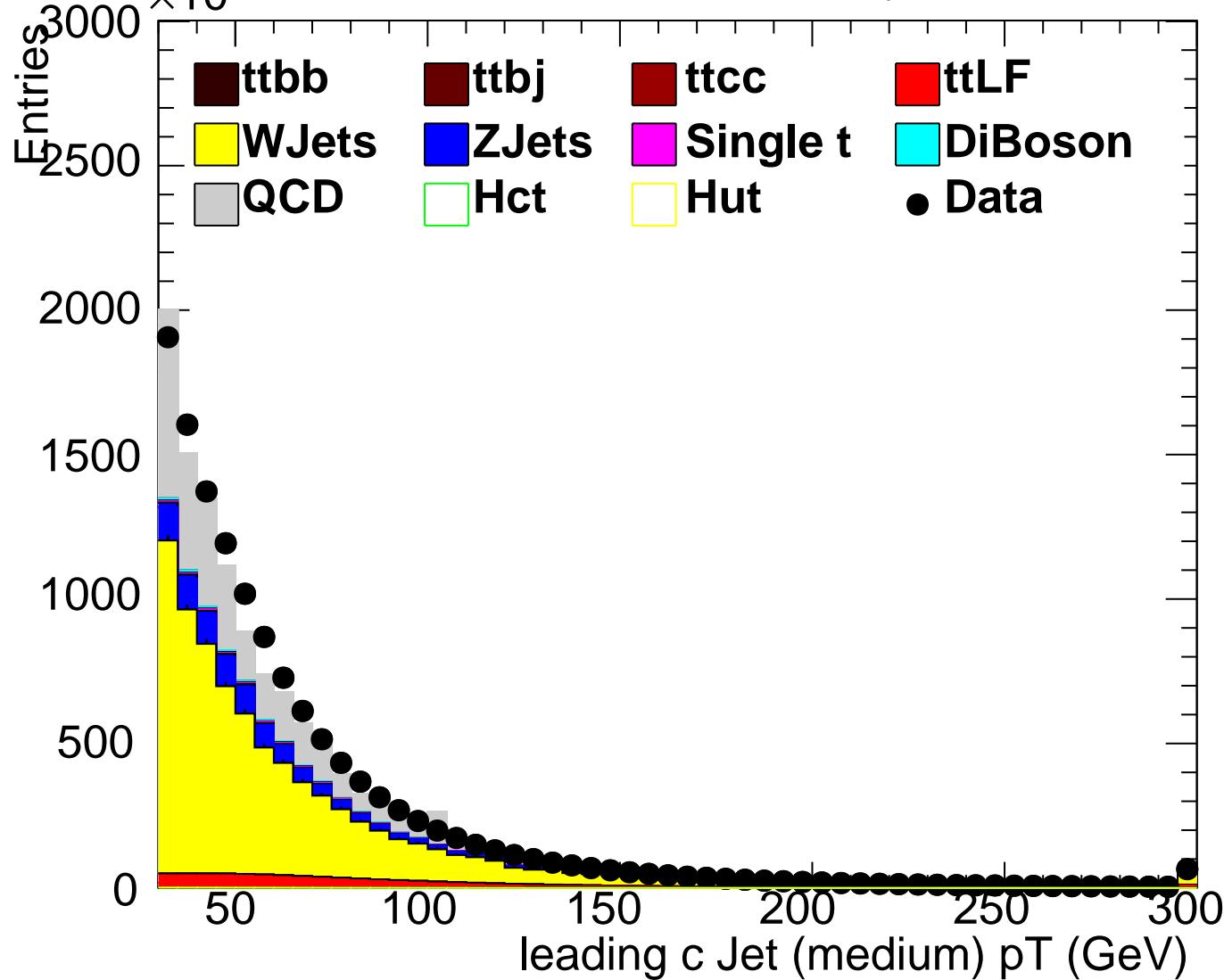
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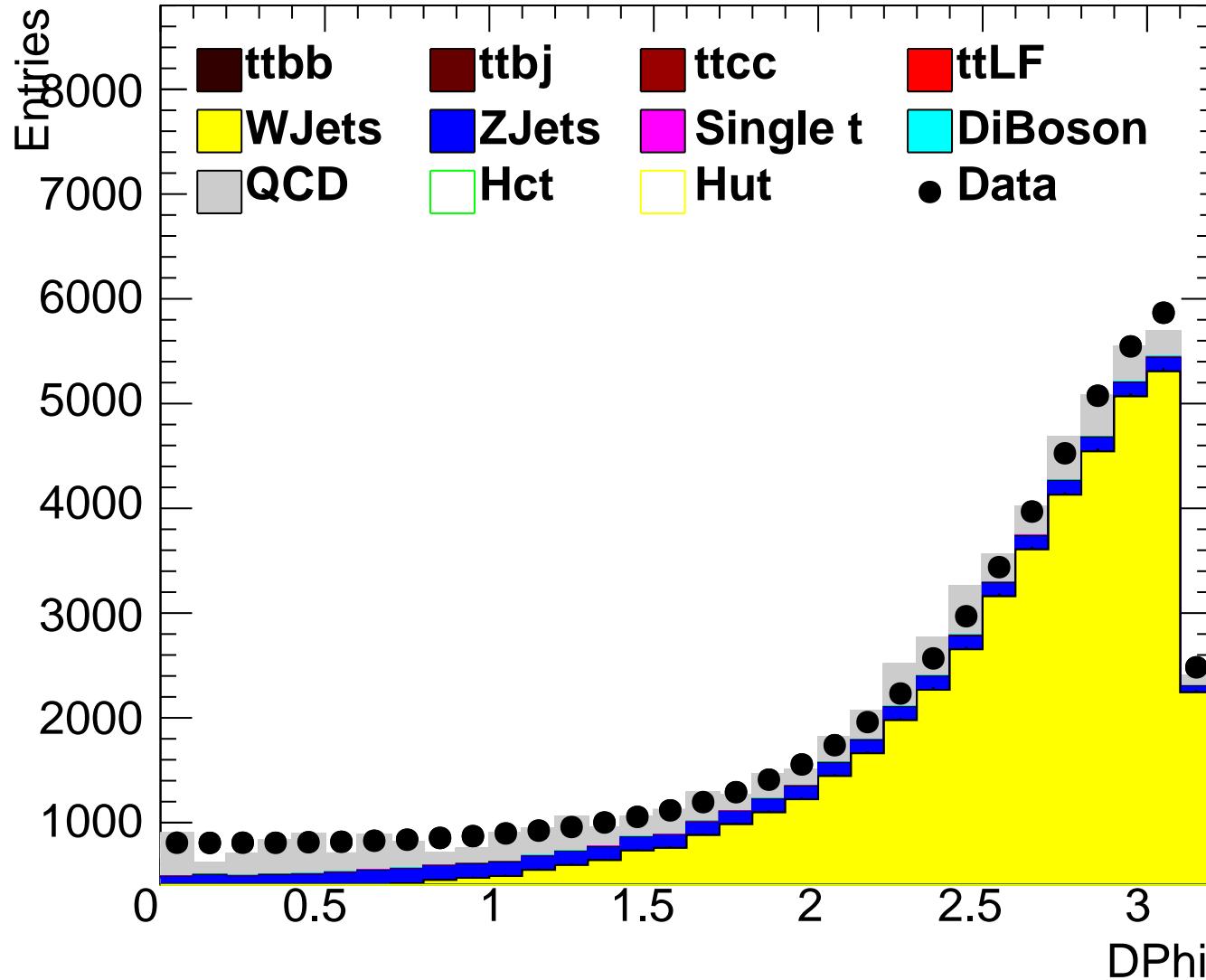
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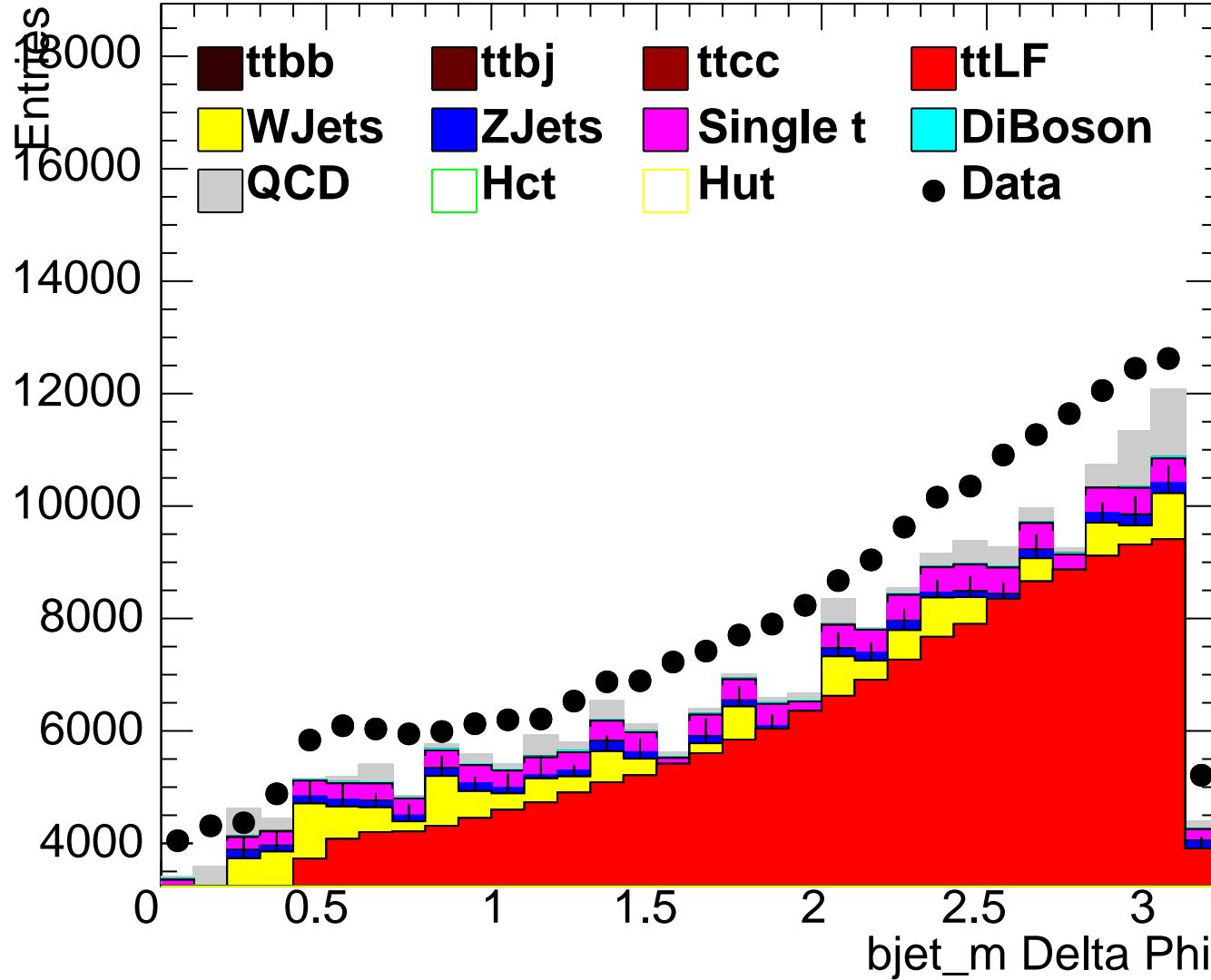
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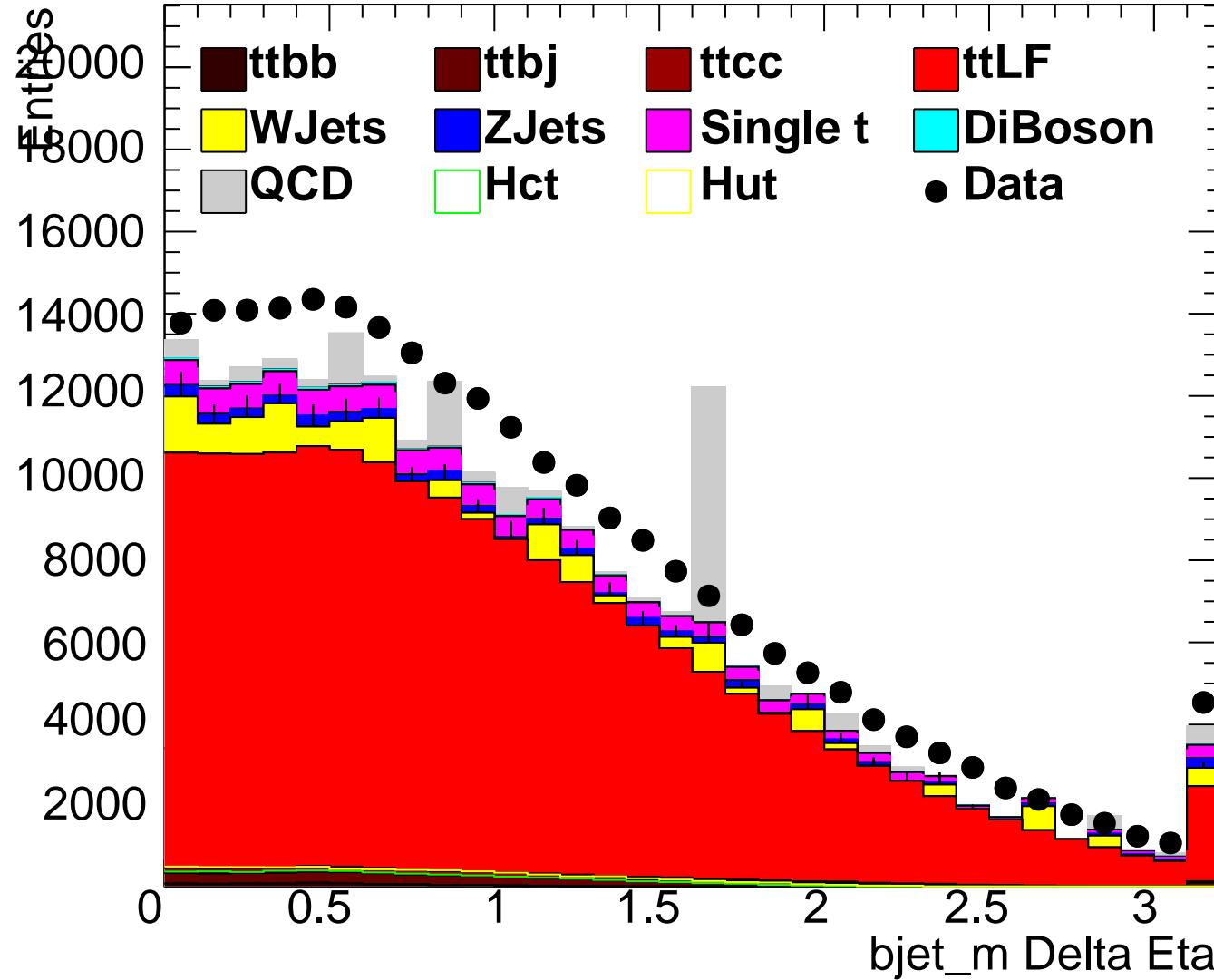
CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$

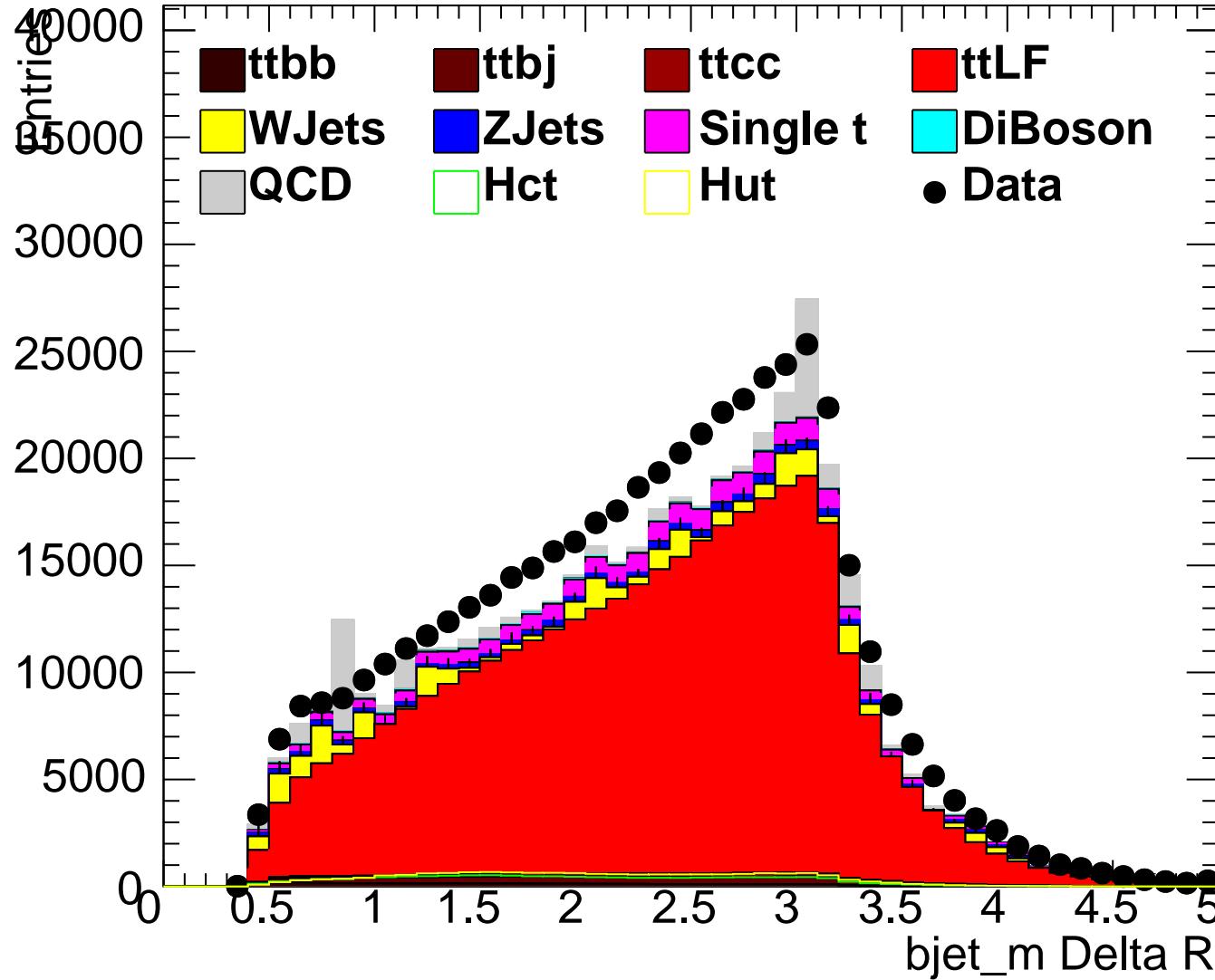


**Ch1\_S0**3  
 $\times 10^3$ CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch1\_S0**x 10<sup>3</sup>CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV

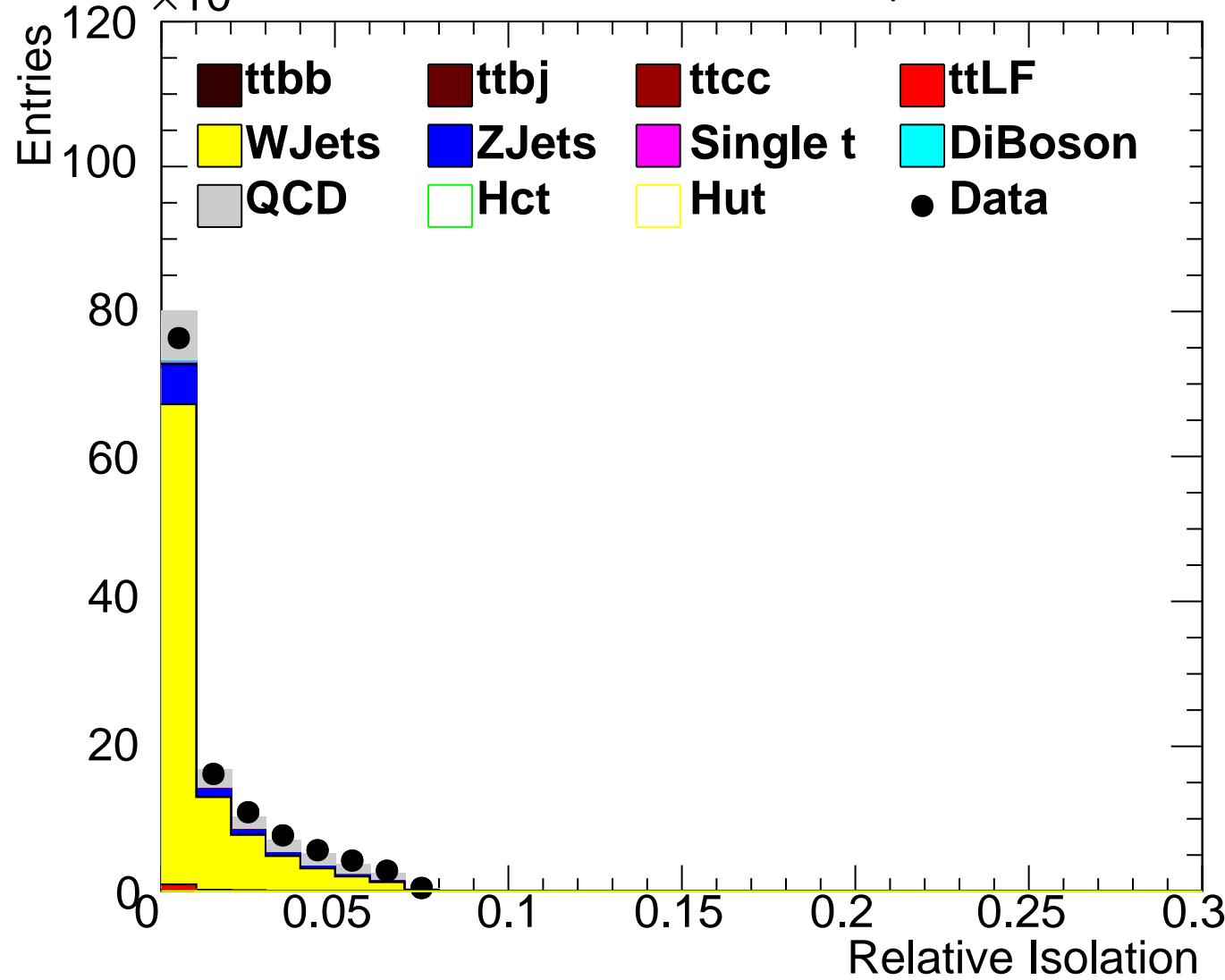
**Ch1\_S0**CMS, 35.9  $\text{fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch1\_S0**CMS, 35.9  $\text{fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch1\_S0**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

Ch1\_S0 6

CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV

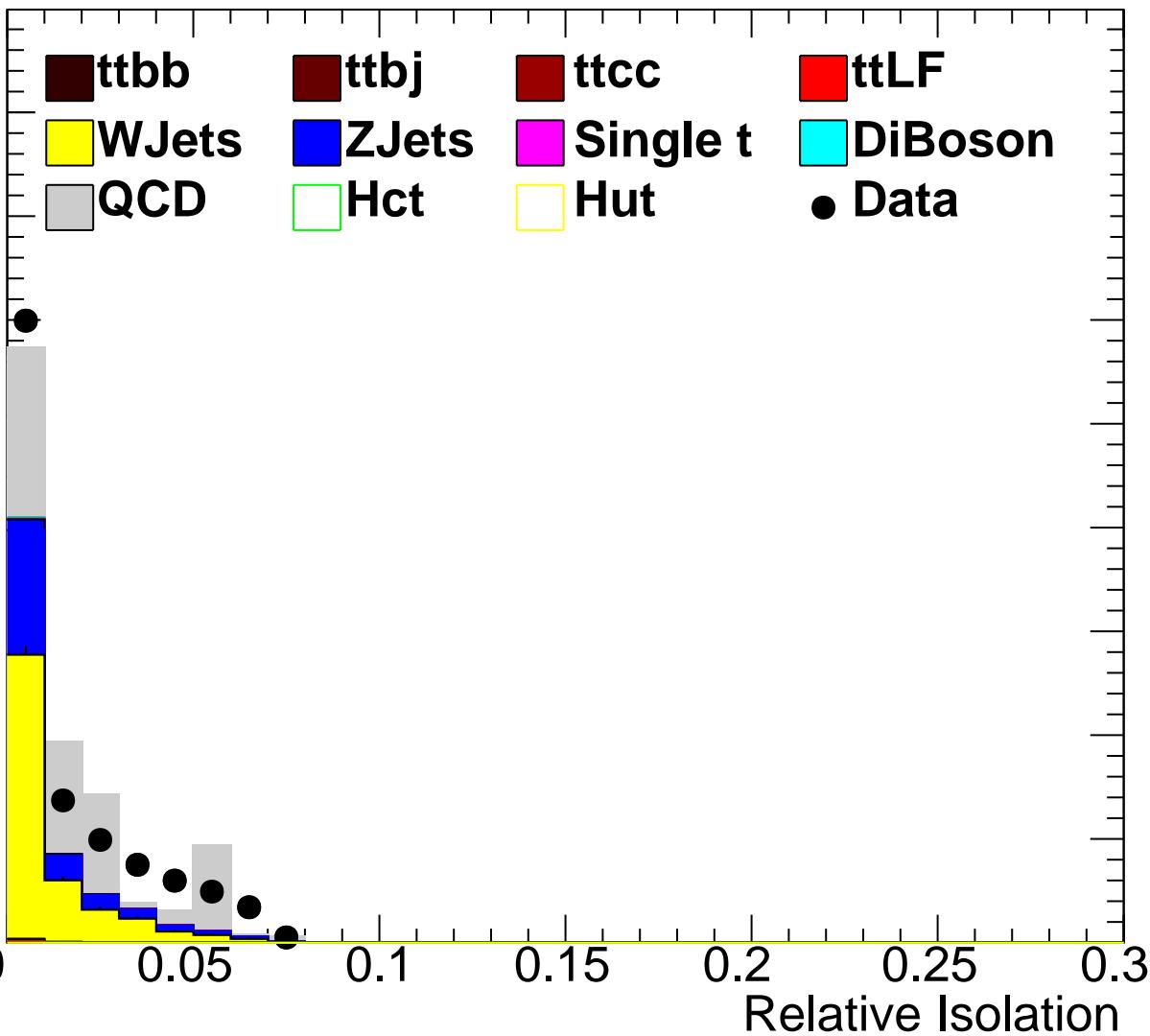


**Ch1\_S0**

$\times 10^{-3}$

CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$

Entries



**Ch1\_S0**x 10<sup>6</sup>CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV

Entries

24  
22  
20  
18  
16  
14  
12  
10  
8  
6  
4  
2  
0

|              |              |                 |                |
|--------------|--------------|-----------------|----------------|
| <b>ttbb</b>  | <b>ttbj</b>  | <b>ttcc</b>     | <b>ttLF</b>    |
| <b>WJets</b> | <b>ZJets</b> | <b>Single t</b> | <b>DiBoson</b> |
| <b>QCD</b>   | <b>Hct</b>   | <b>Hut</b>      | ● Data         |

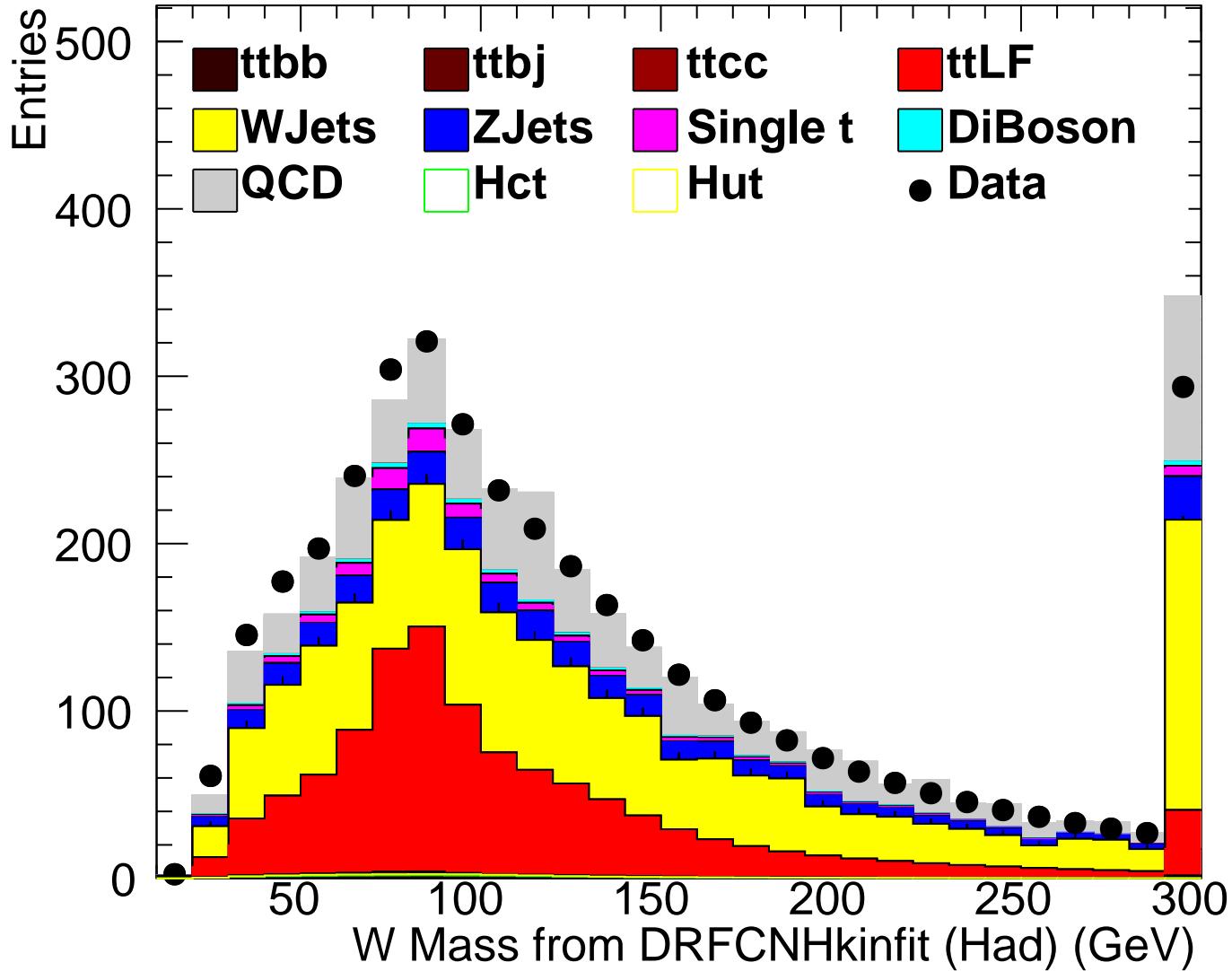
W Mass from DRFCN<sub>H</sub>kinfit (Lep) (GeV)

50 100 150 200 250 300

**Ch1\_S0**

$\times 10^3$

CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$



**Ch1\_S0**

$\times 10^{-3}$

CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$

Entries

500

400

300

200

100

0

**ttbb**    **ttbj**    **ttcc**    **ttLF**  
**WJets**    **ZJets**    **Single t**    **DiBoson**  
**QCD**    **Hct**    **Hut**

● Data

H Mass from DRFCN<sub>H</sub>kinfit (bb)(GeV)

50

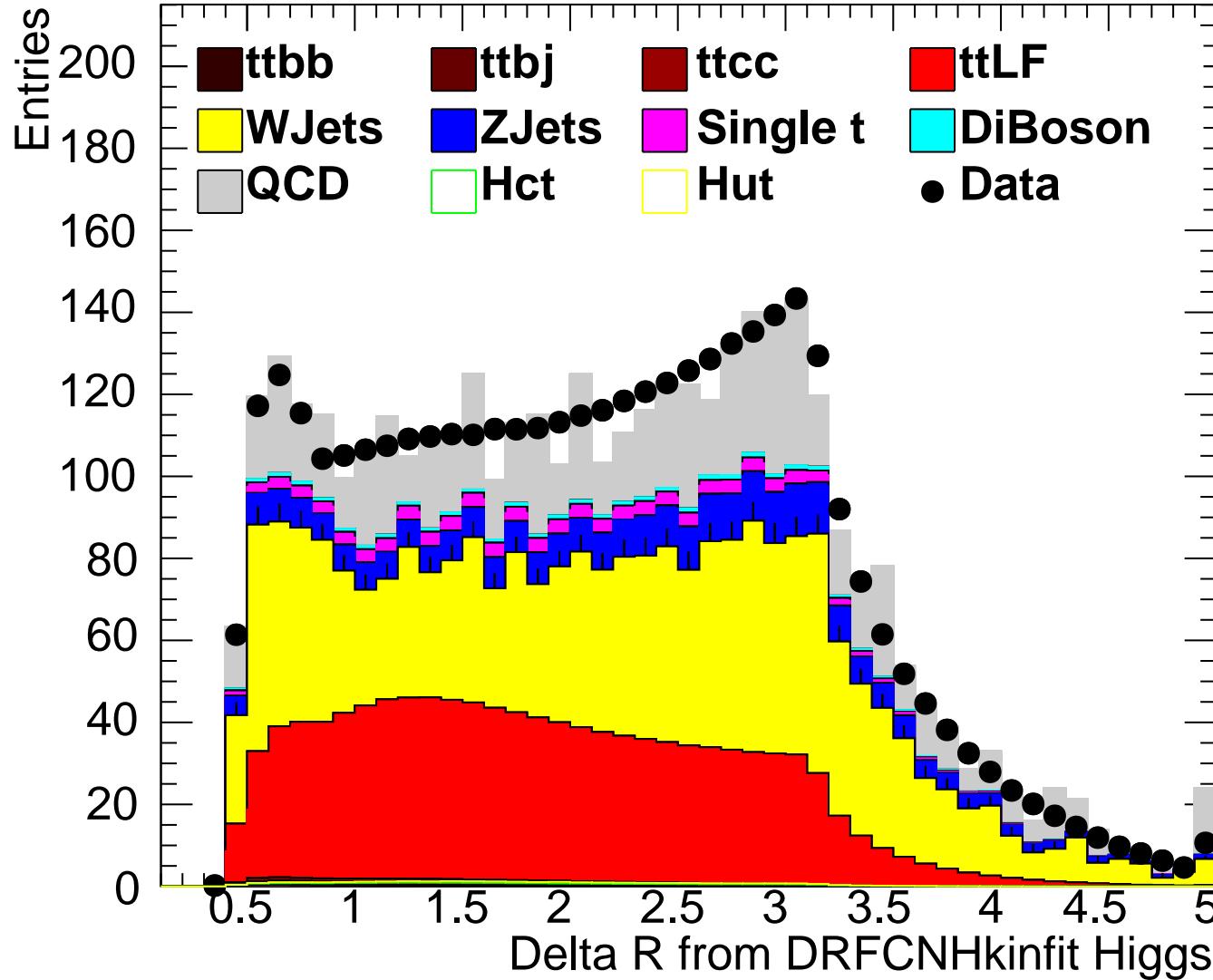
100

150

200

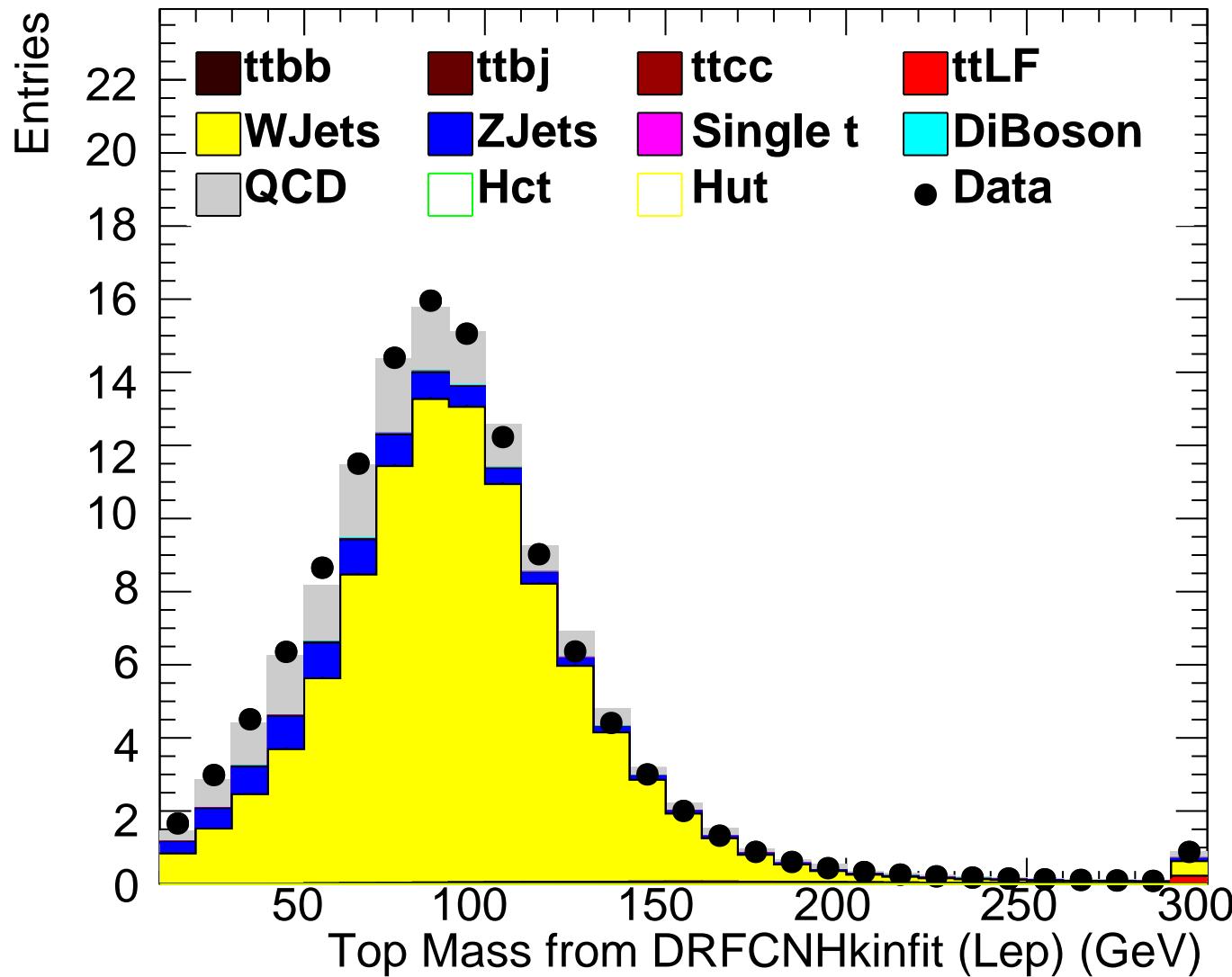
250

300

**Ch1\_S0**x 10<sup>3</sup>CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV

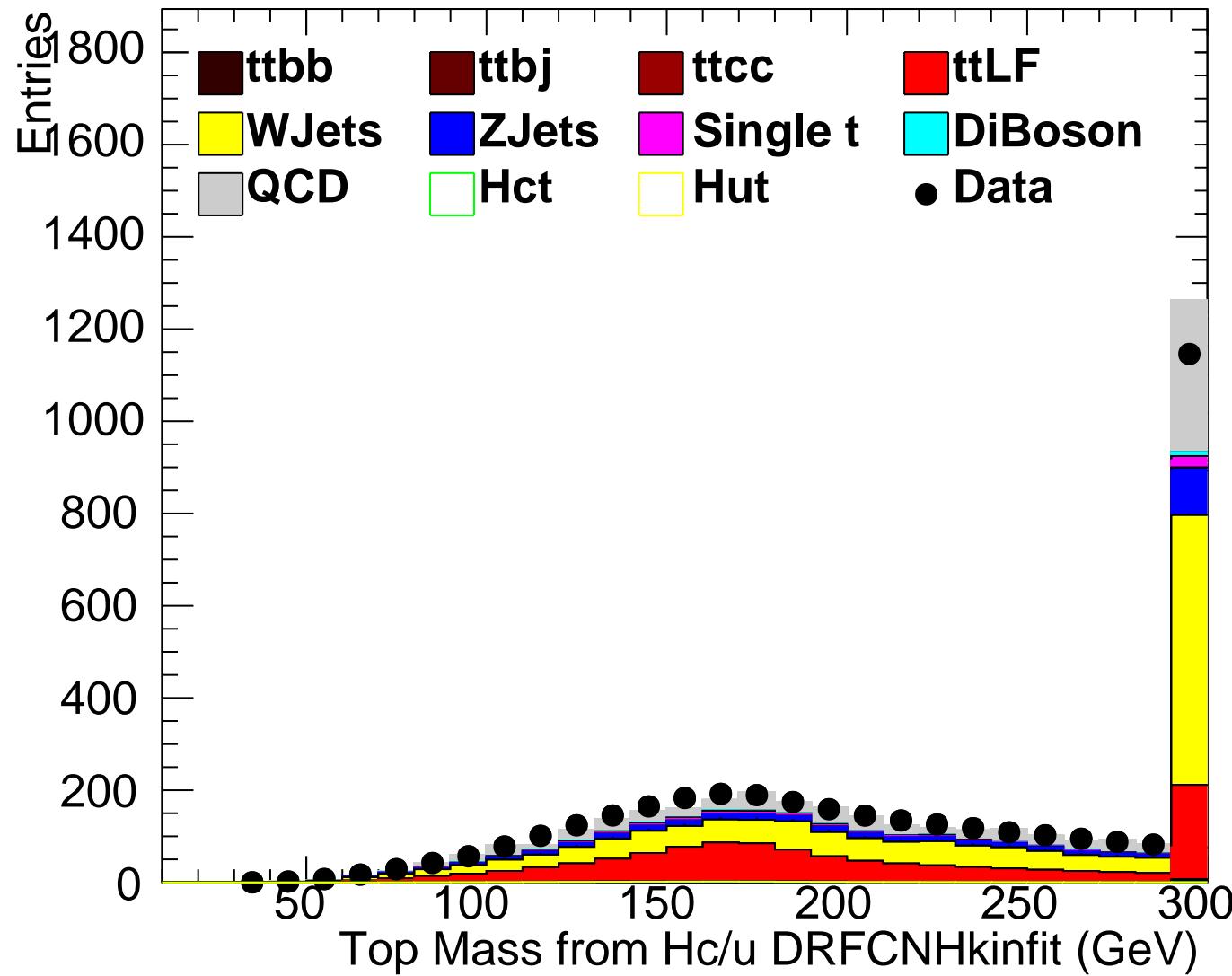
Ch1\_S0

CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV



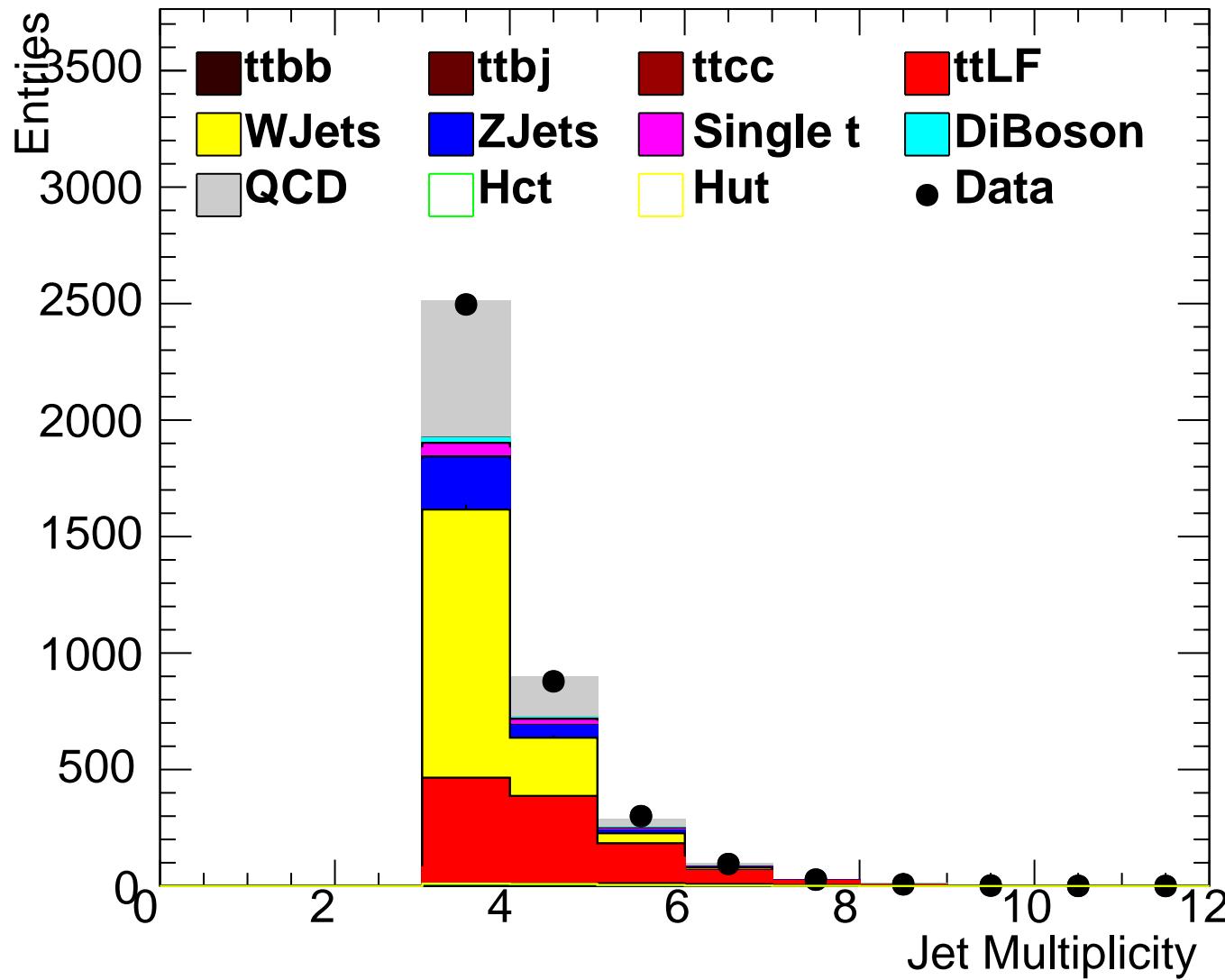
# Ch1\_S0

CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV



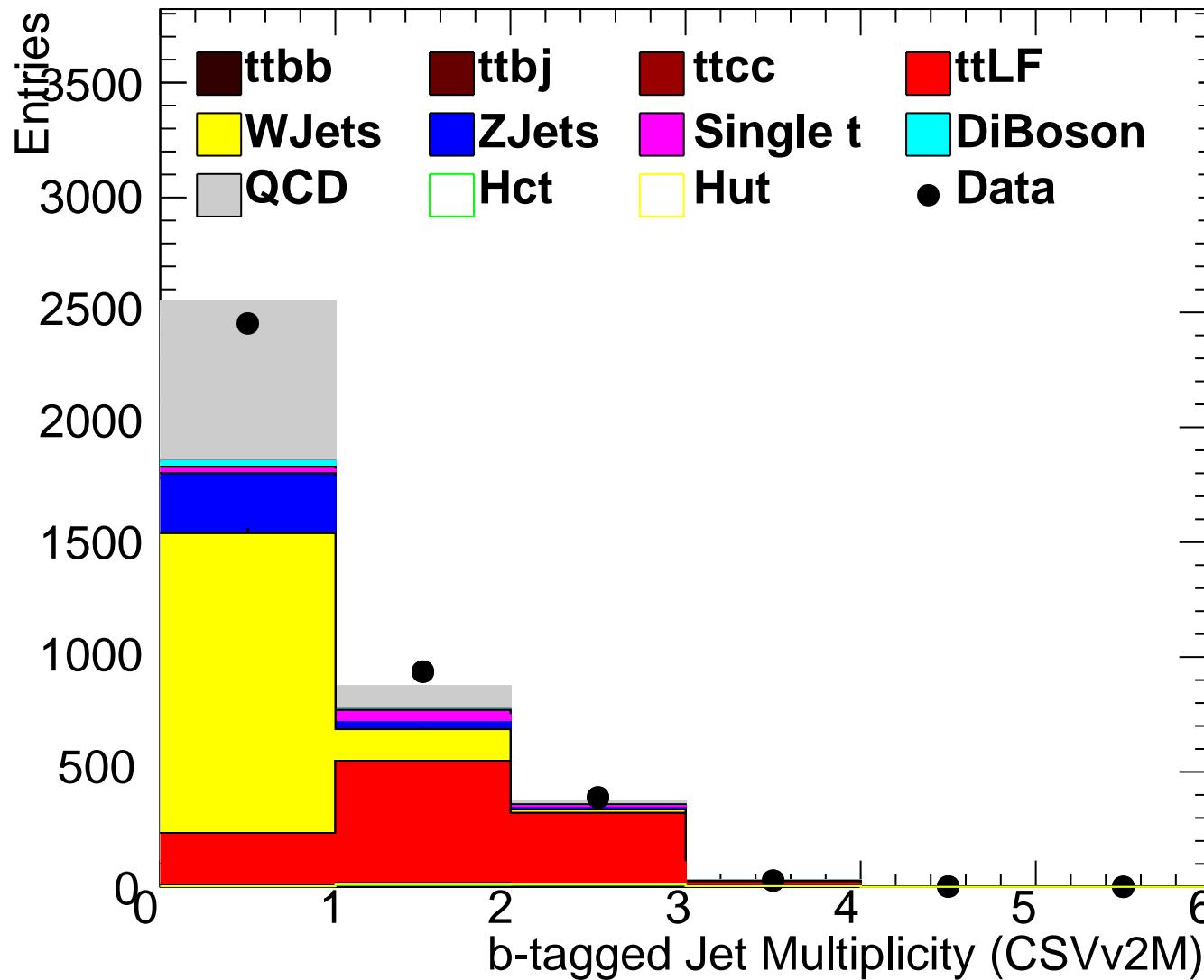
Ch1\_S1

CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$



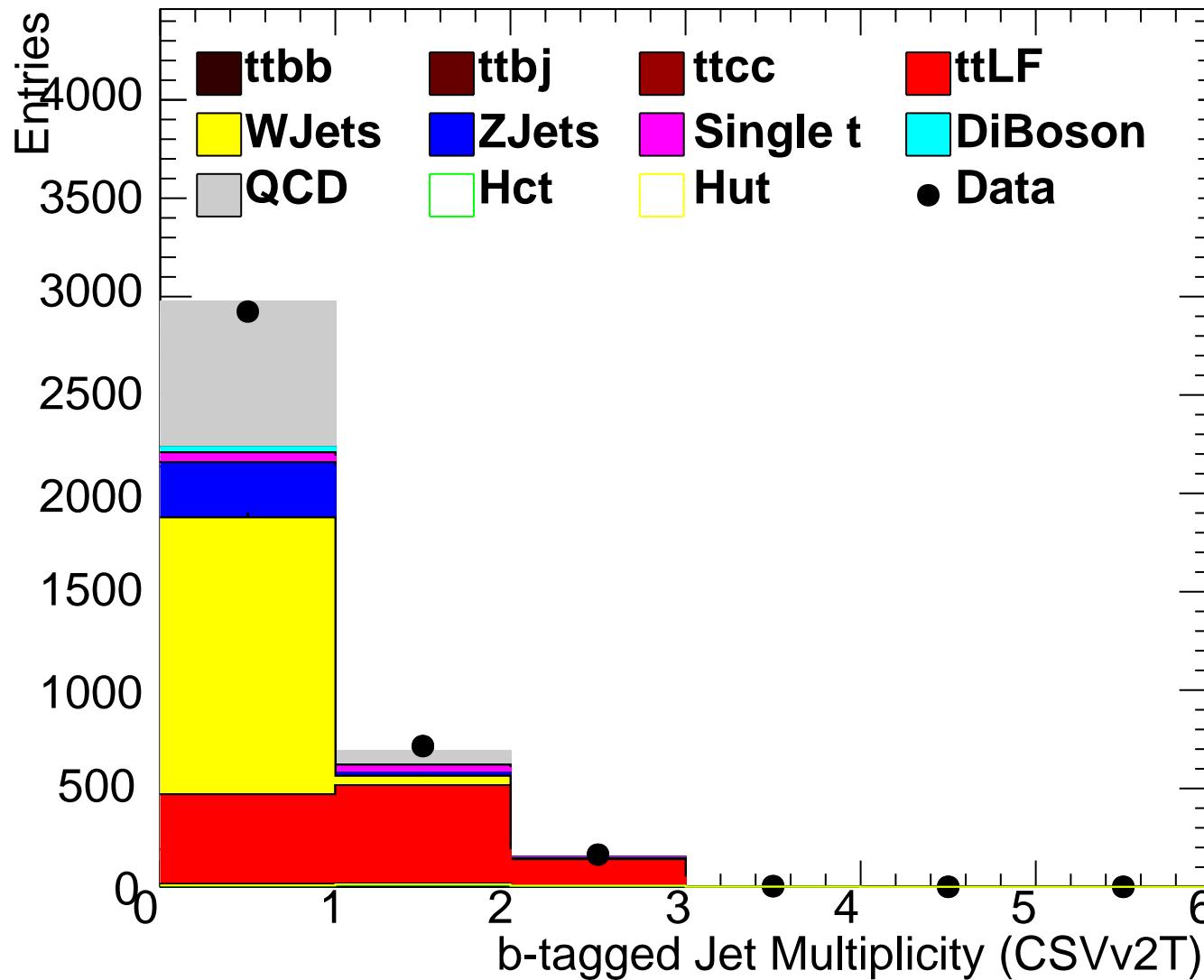
Ch1\_S1 3

CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$



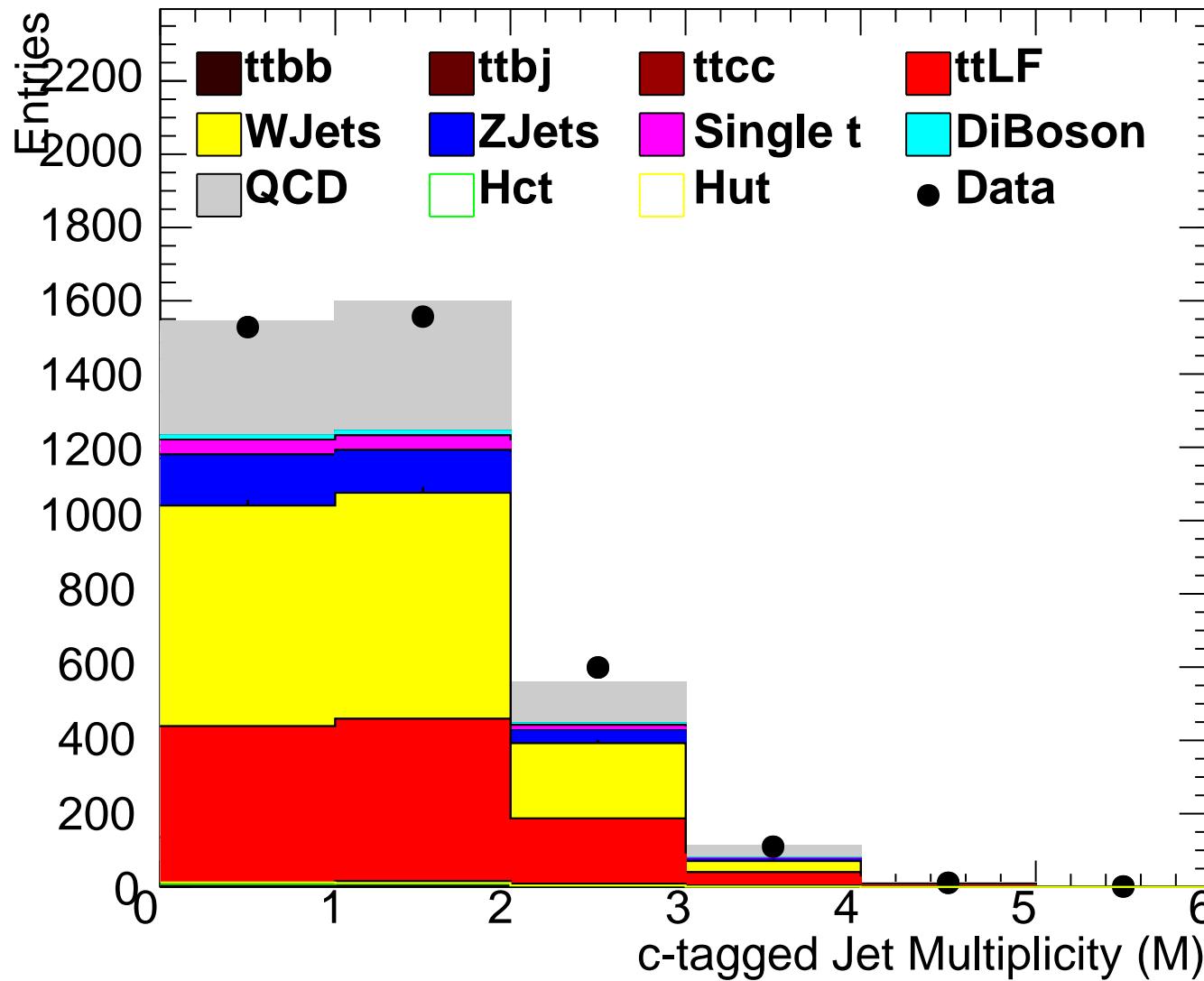
Ch1\_S1

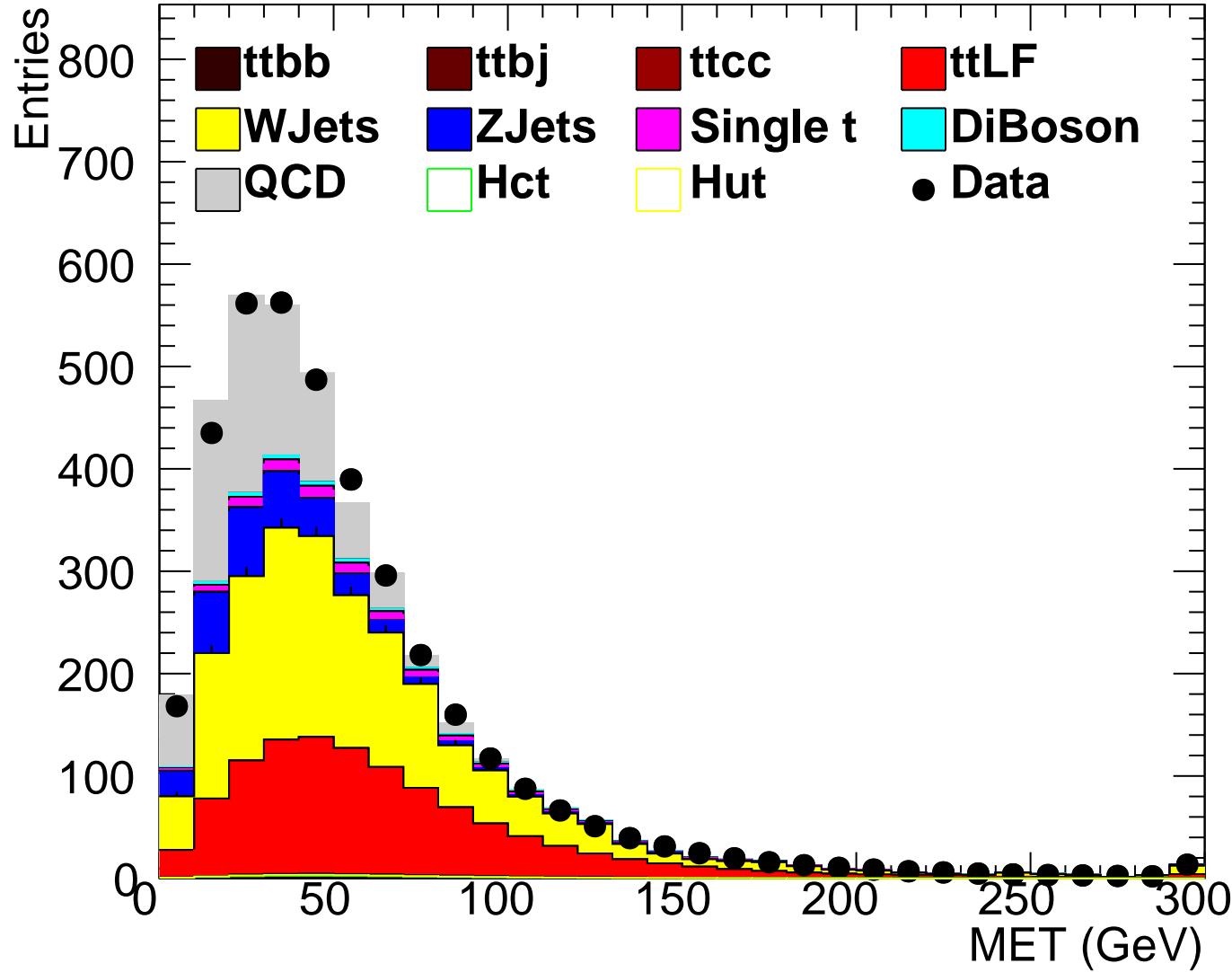
CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$

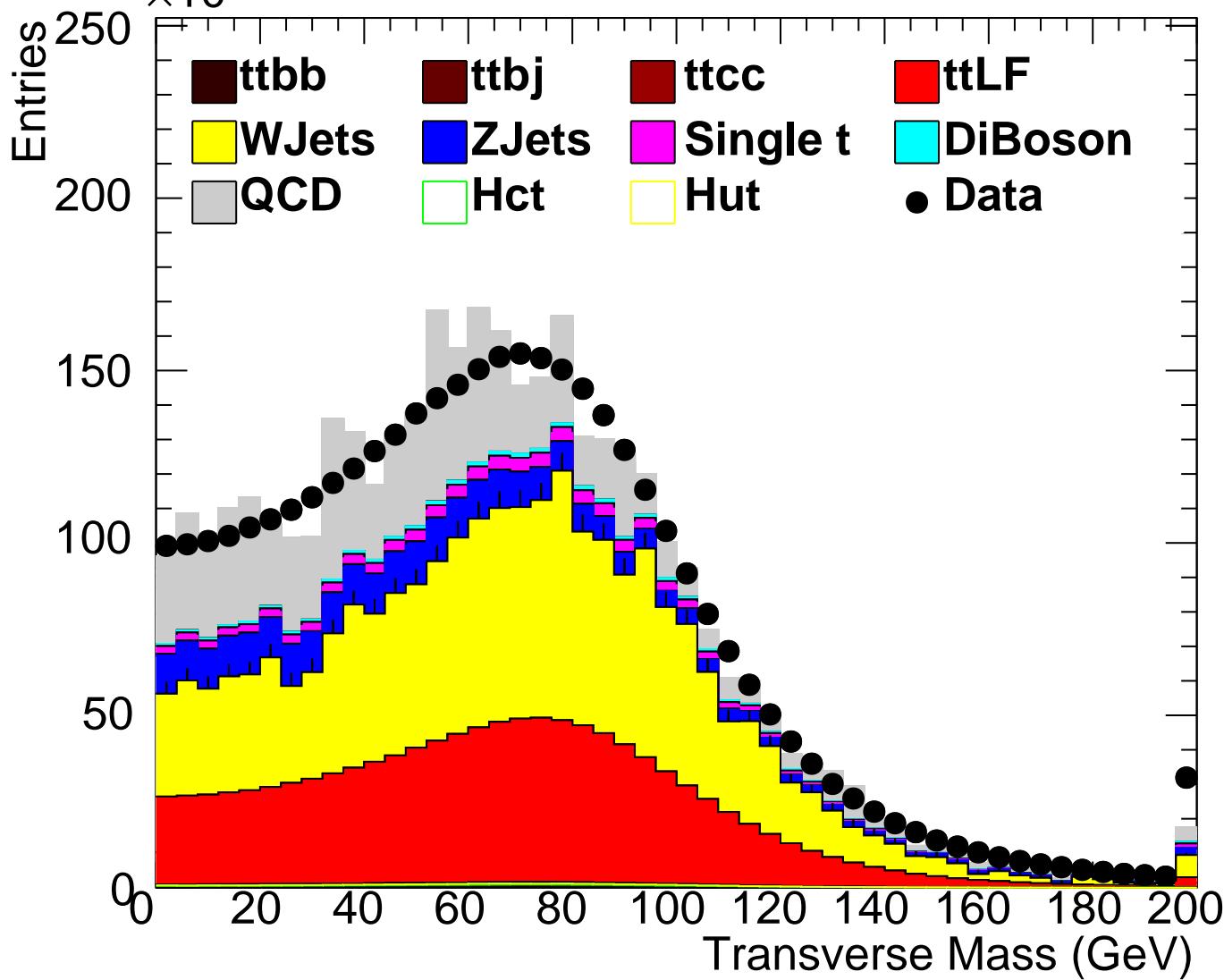


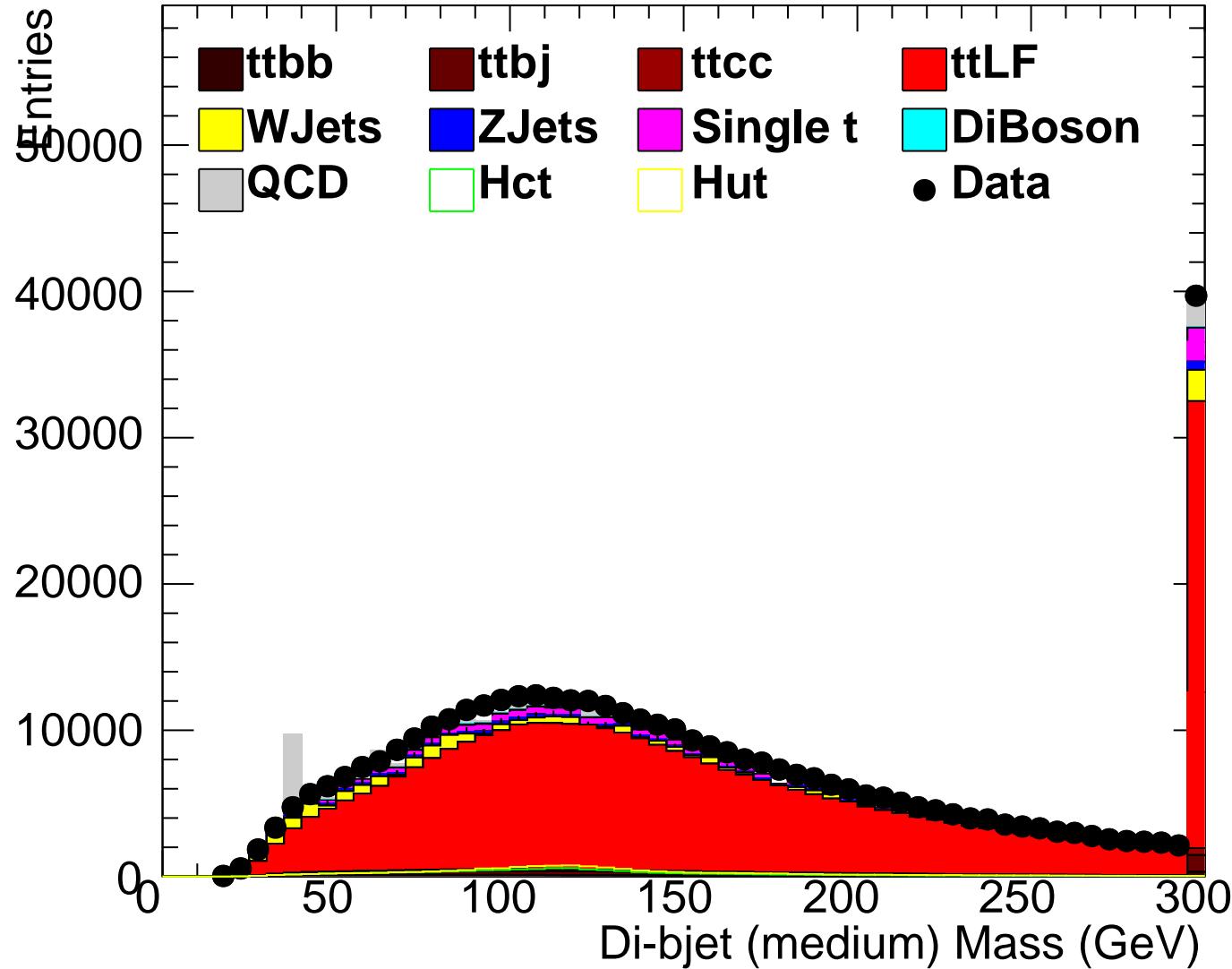
Ch1\_S1

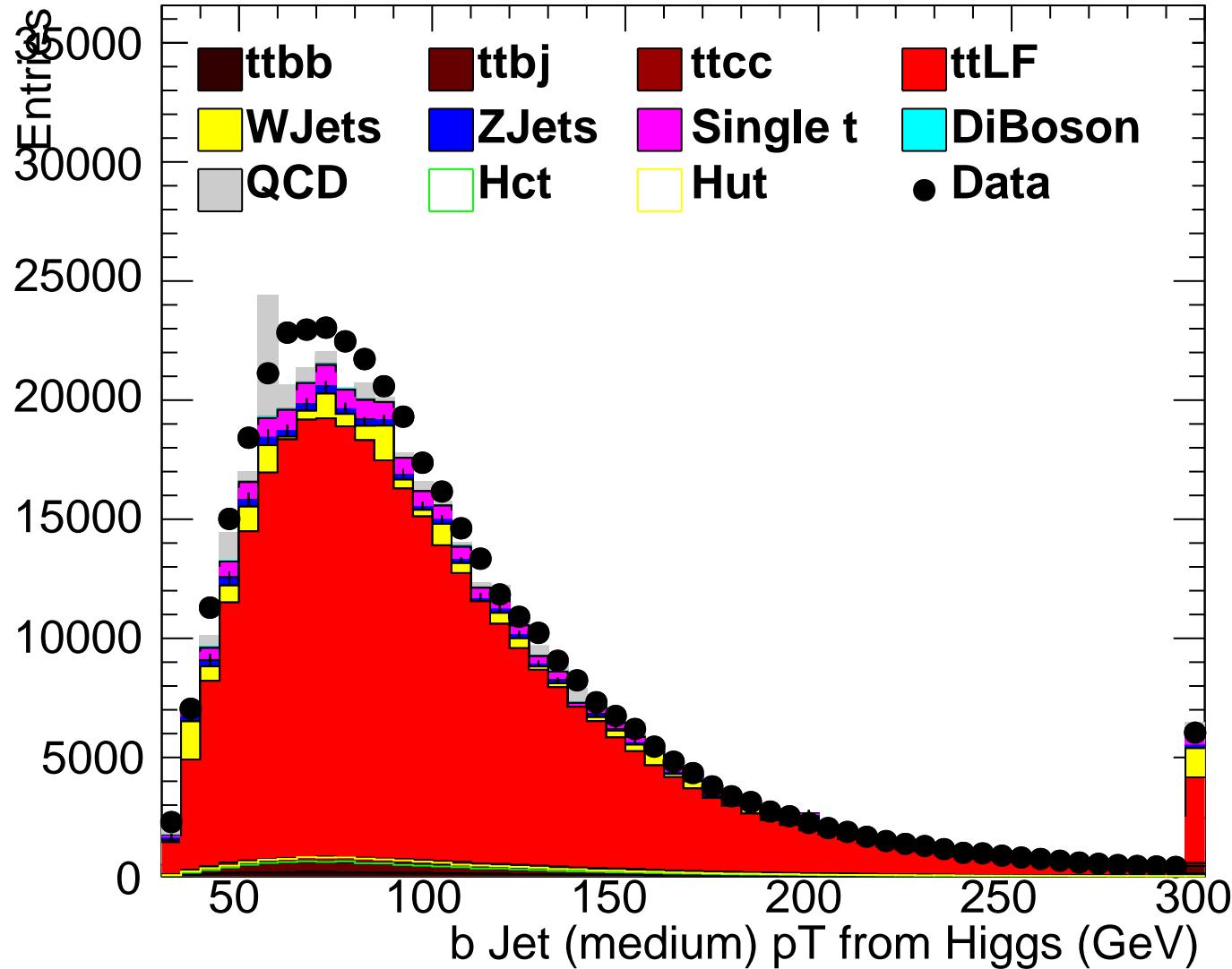
CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$



**Ch1\_S1** $\times 10^3$ CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch1\_S1**x 10<sup>3</sup>CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV

**Ch1\_S1**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch1\_S1**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch1\_S1** $\times 10^3$ CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

Entries

250

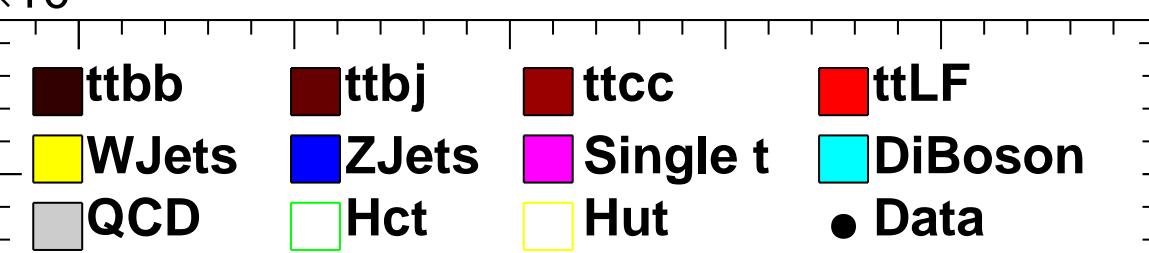
200

150

100

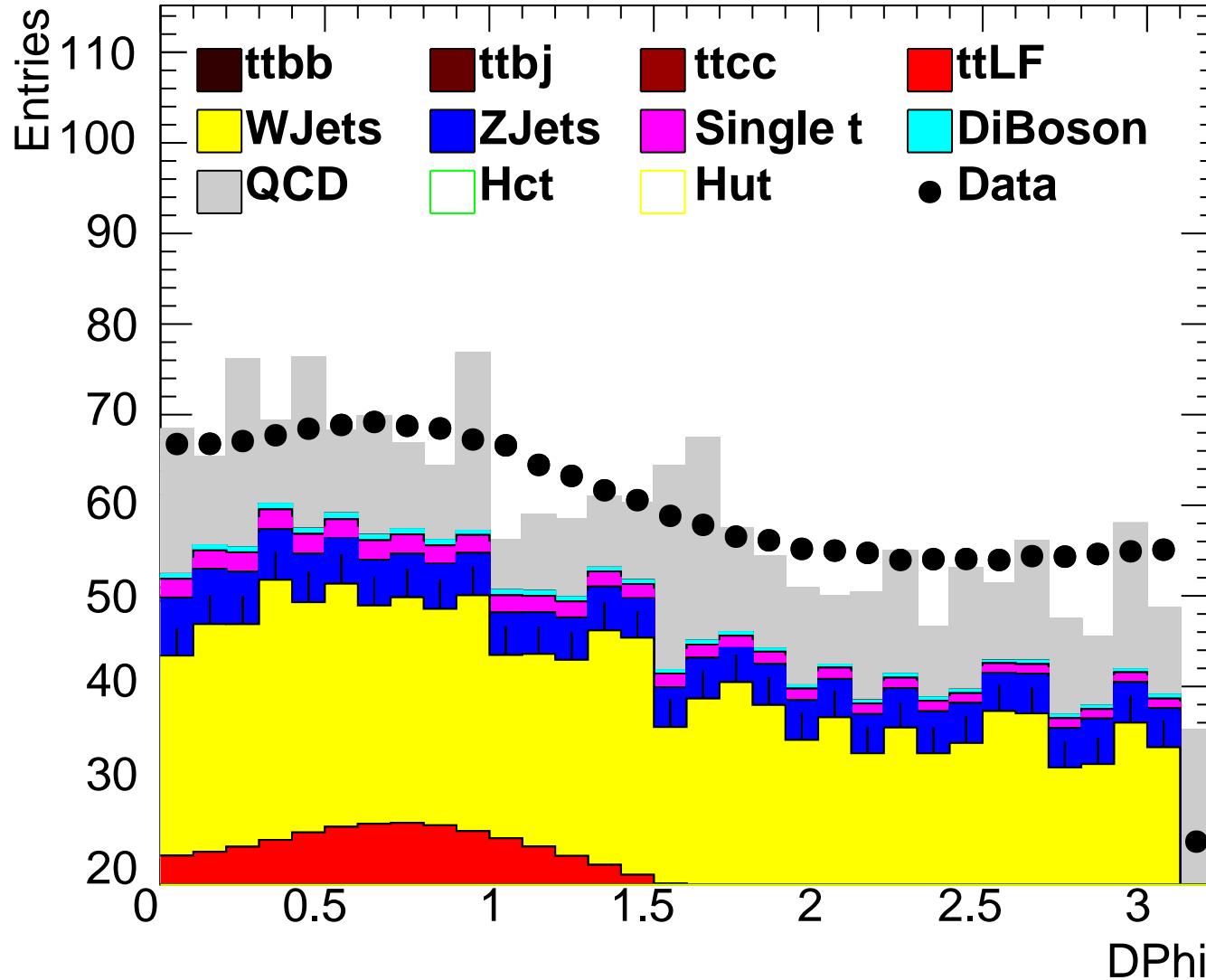
50

0



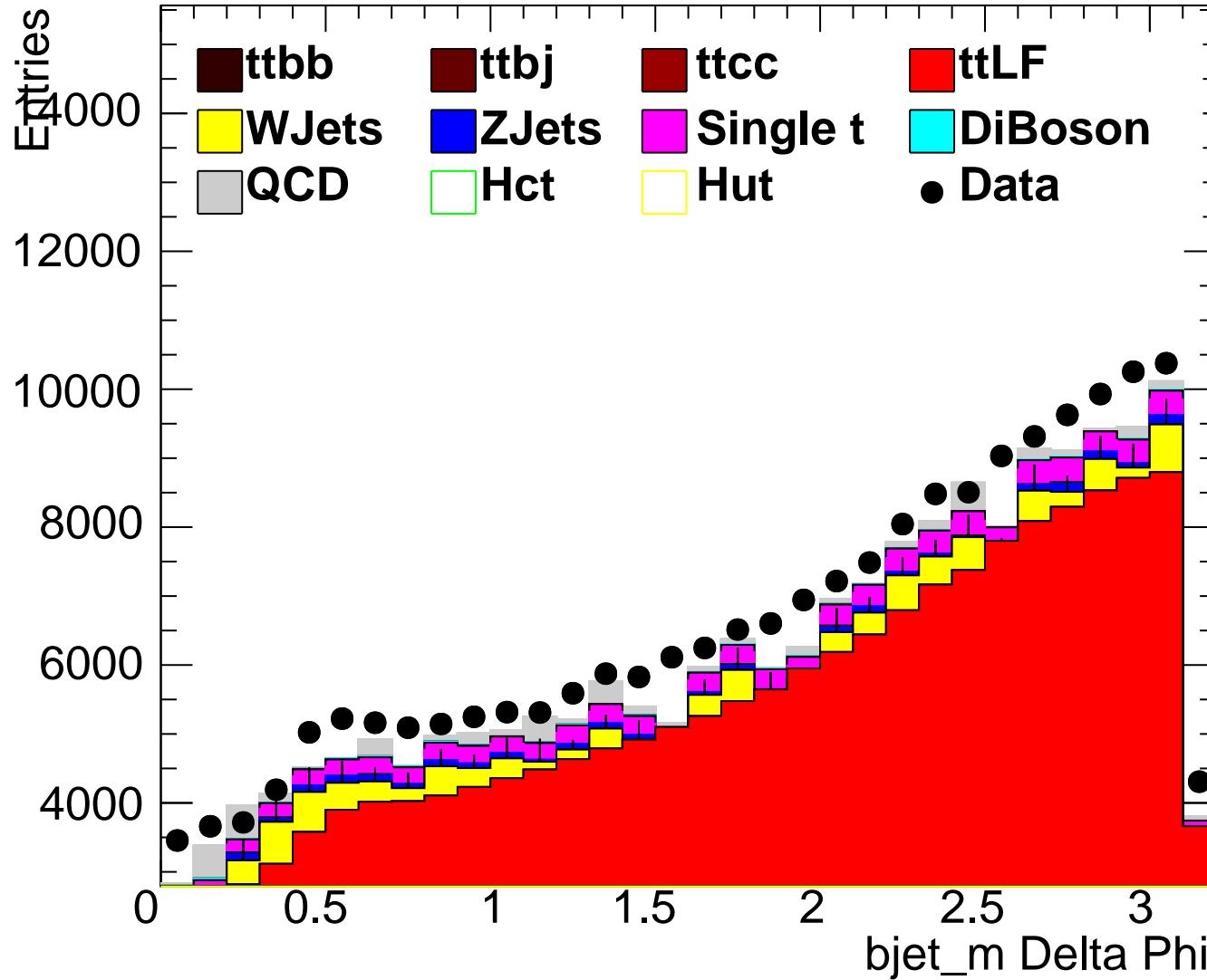
leading c Jet (medium) pT (GeV)

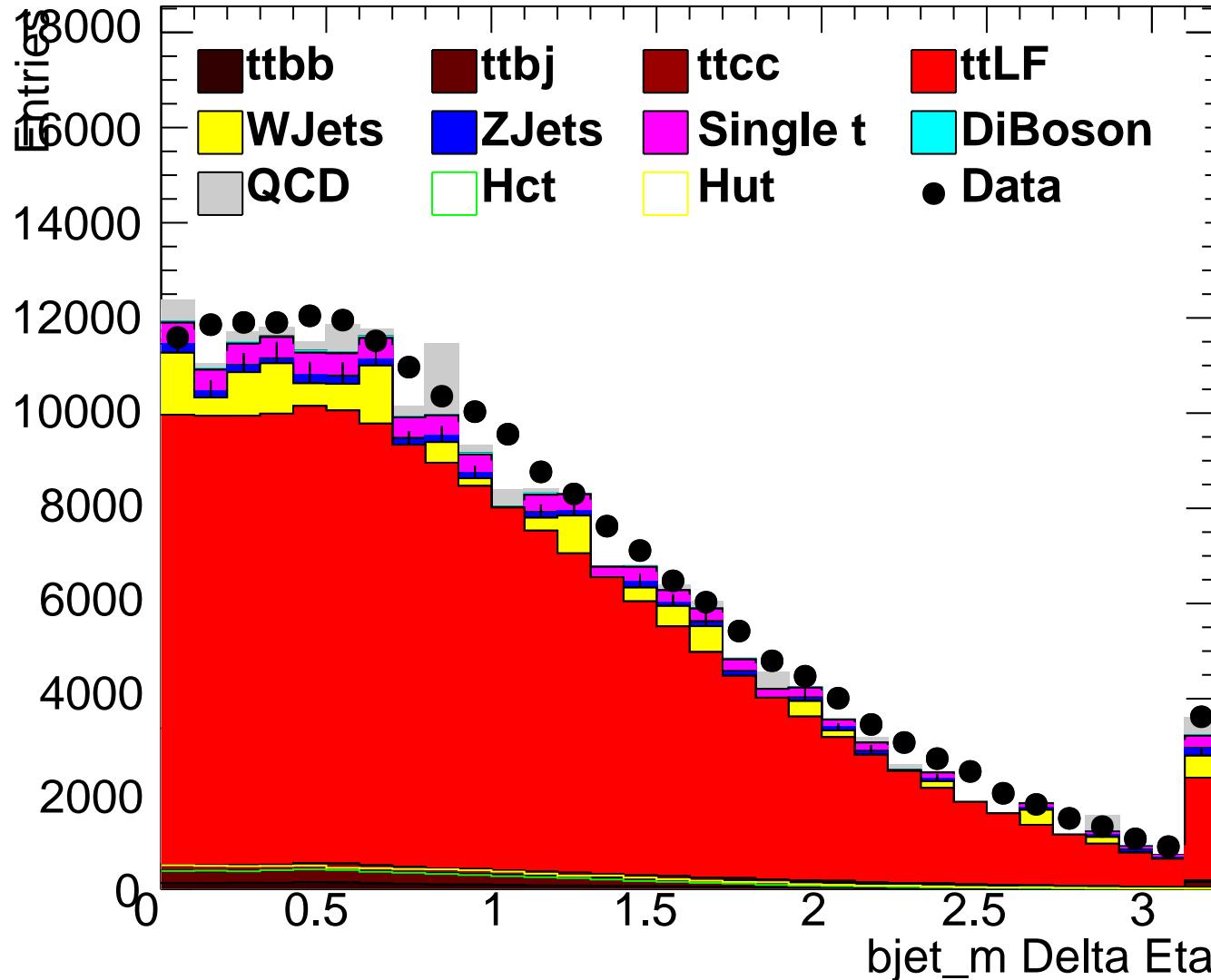
50 100 150 200 250 300

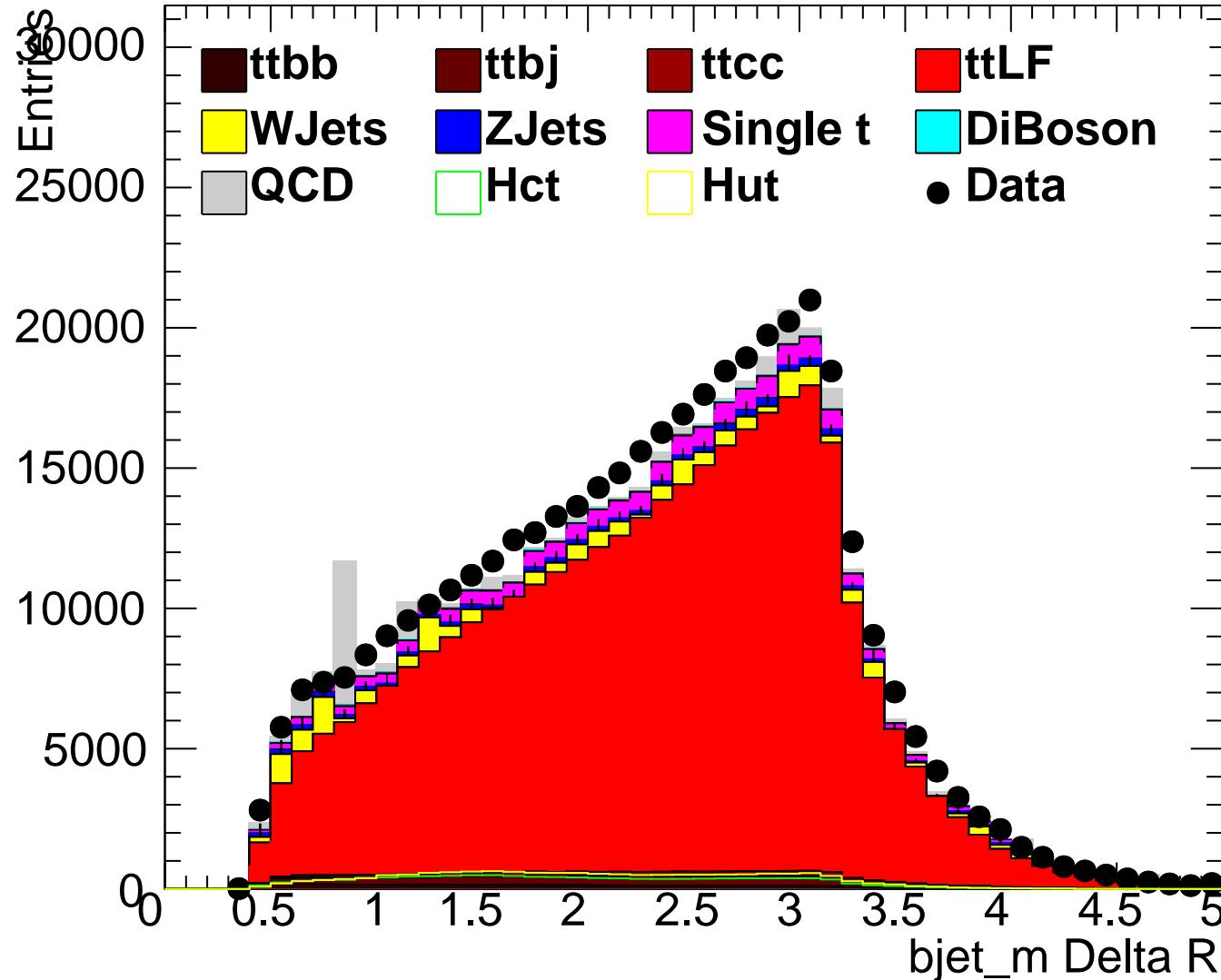
**Ch1\_S1** $\times 10^3$ CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

Ch1\_S1

CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$

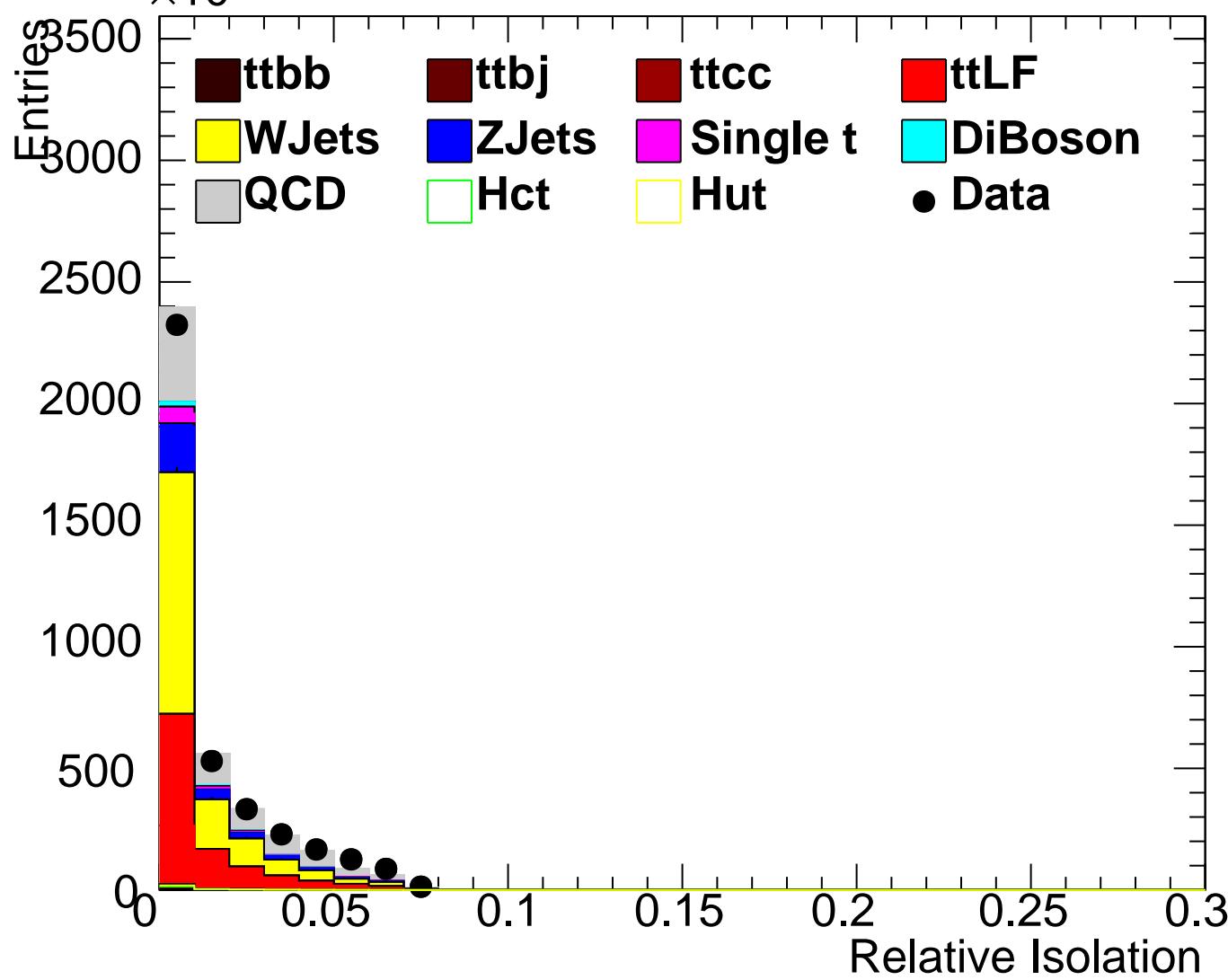


**Ch1\_S1**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch1\_S1**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

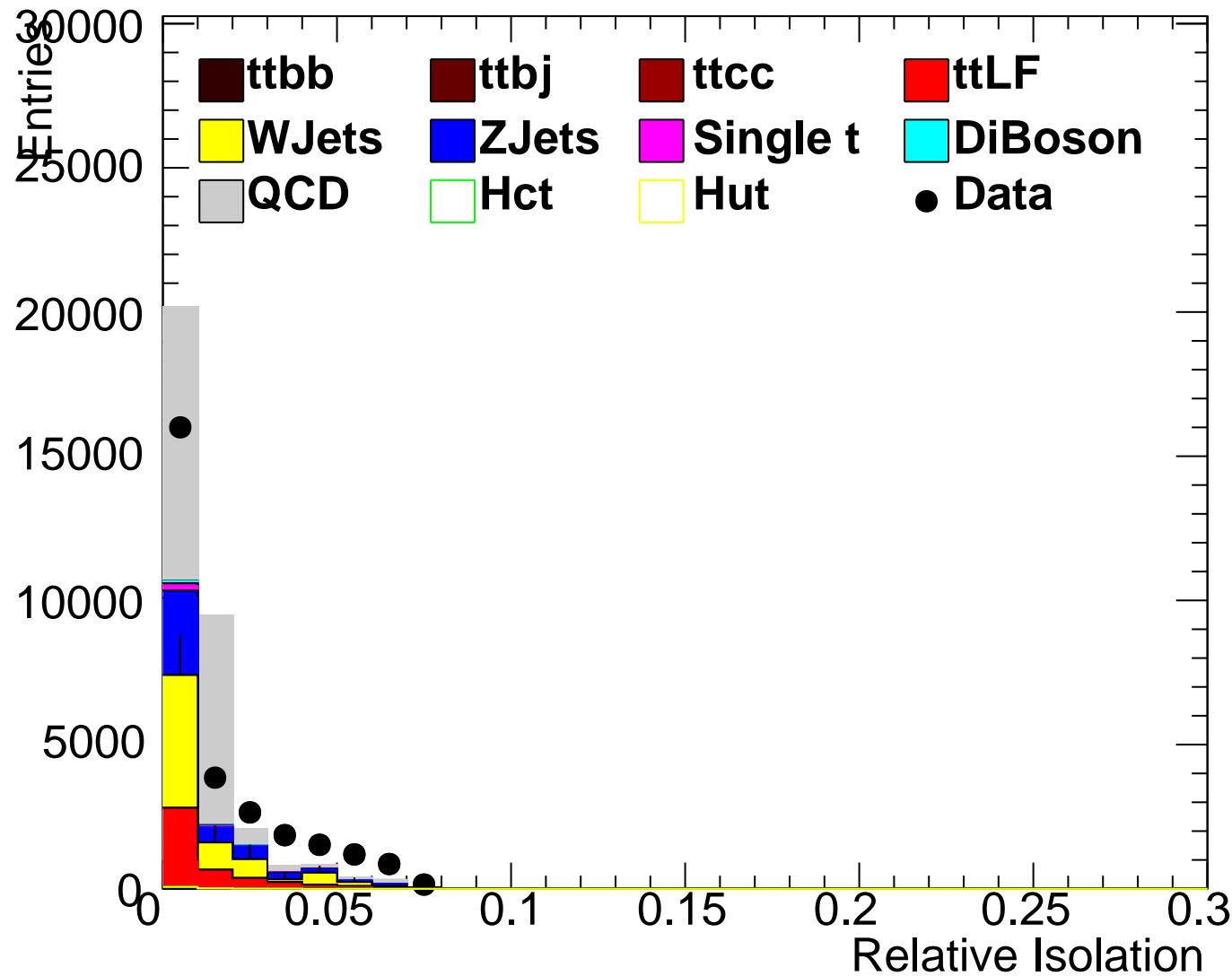
Ch1\_S1

CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$



Ch1\_S1

CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$



**Ch1\_S1** $\times 10^3$ CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

Entries

500

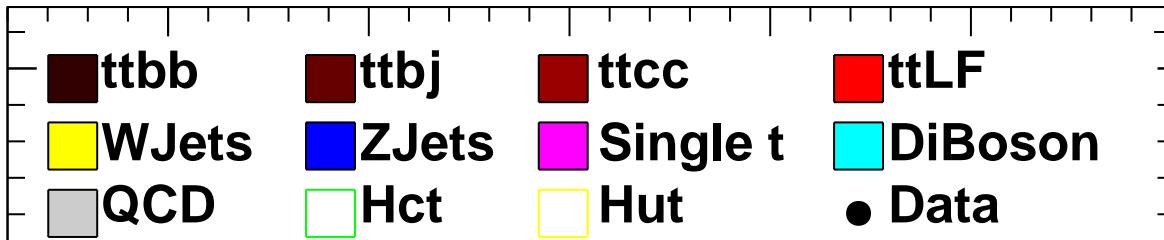
400

300

200

100

0

W Mass from DRFCN<sub>H</sub>kinfit (Lep) (GeV)

**Ch1\_S1** $\times 10^3$ CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

Entries

500

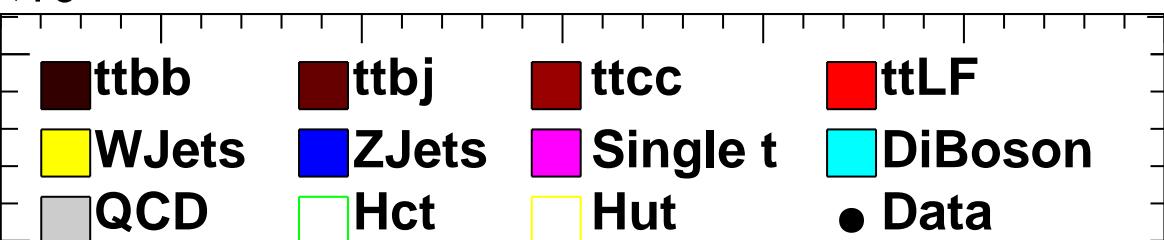
400

300

200

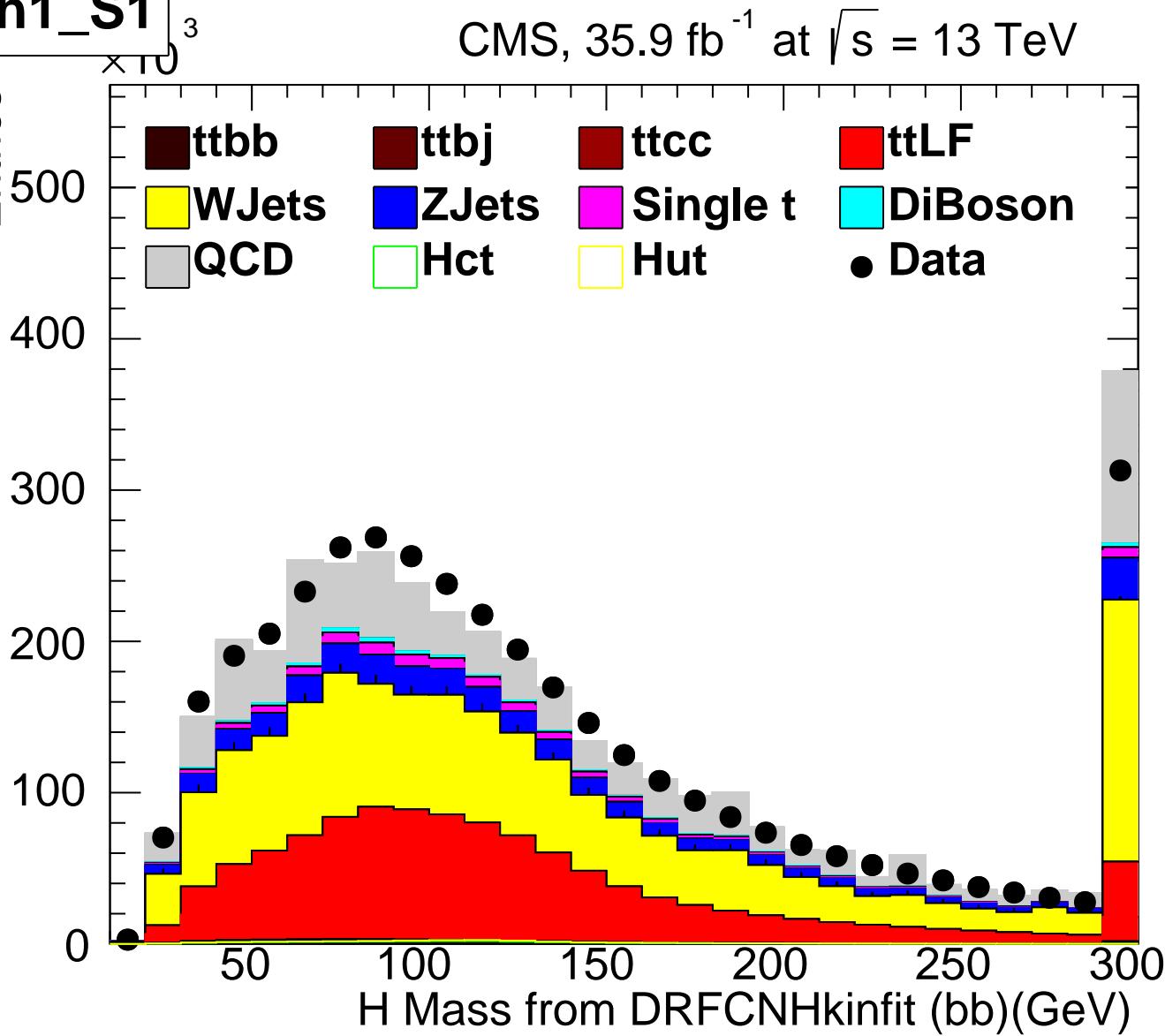
100

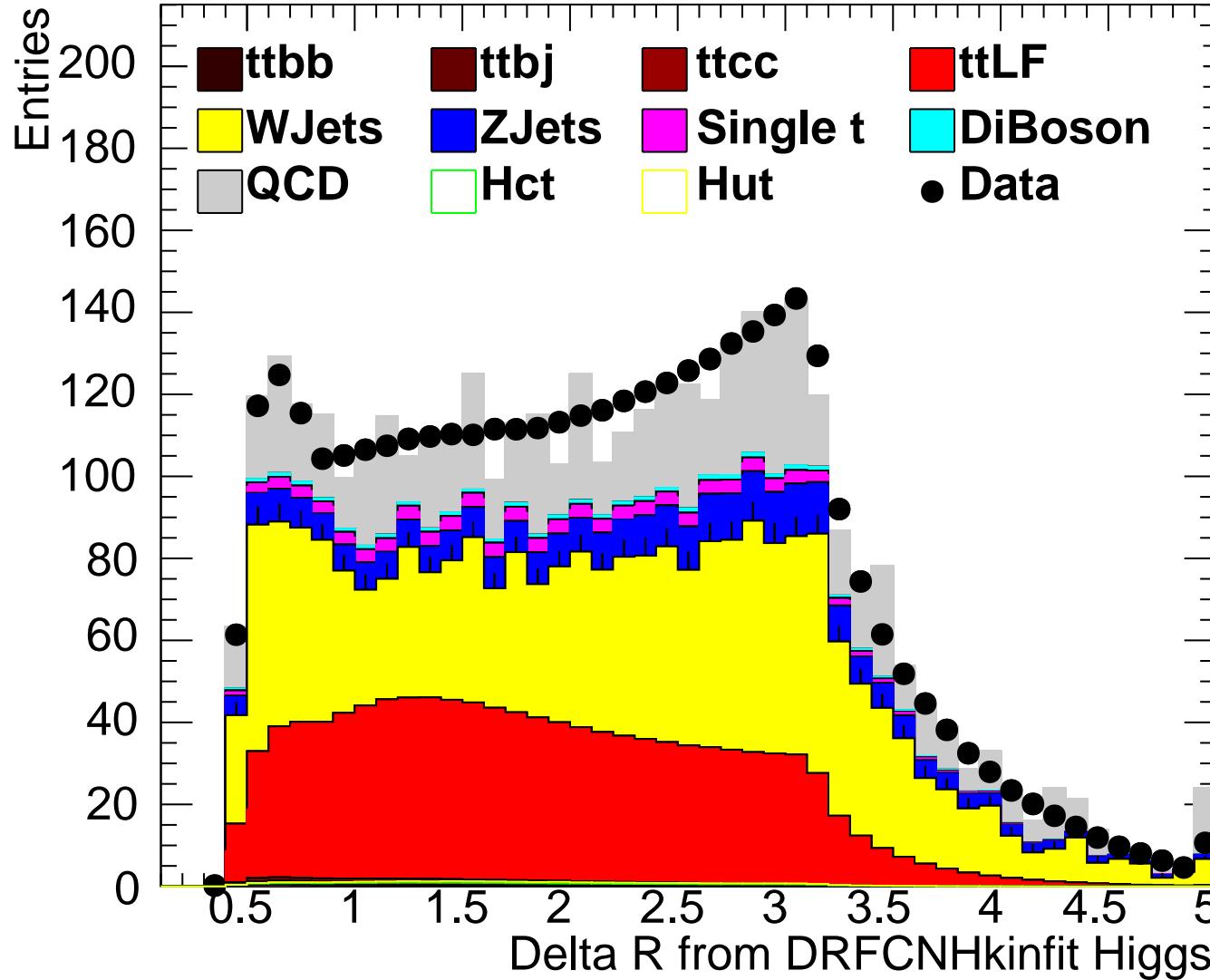
0

W Mass from DRFCN $H_{\text{kinfit}}$  (Had) (GeV)

**Ch1\_S1** $\times 10^{-3}$ CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

Entries



**Ch1\_S1** $\times 10^3$ CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch1\_S1** $\times 10^3$ CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

Entries

 $1000 \times 10^3$ 

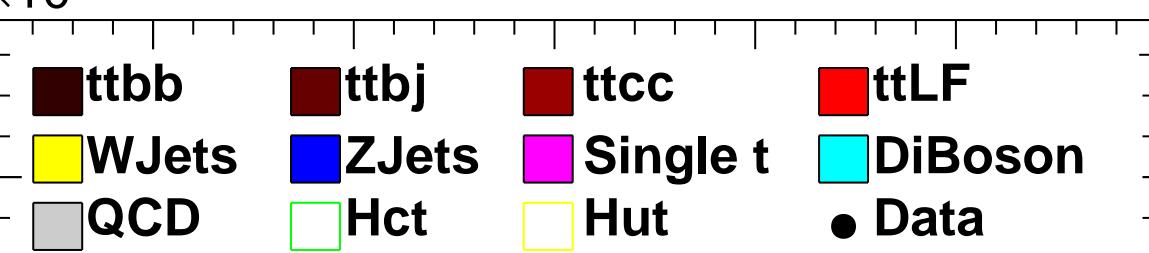
800

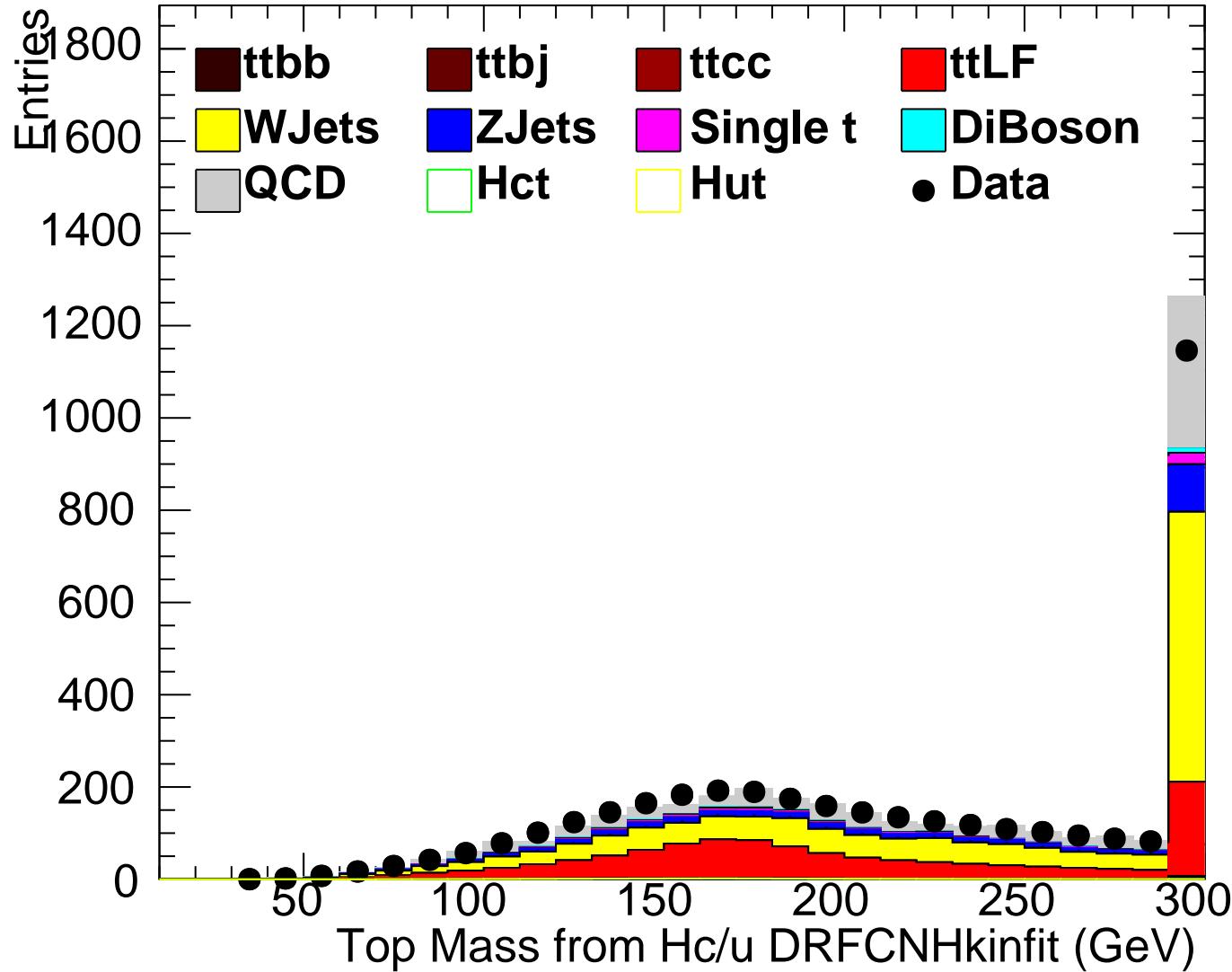
600

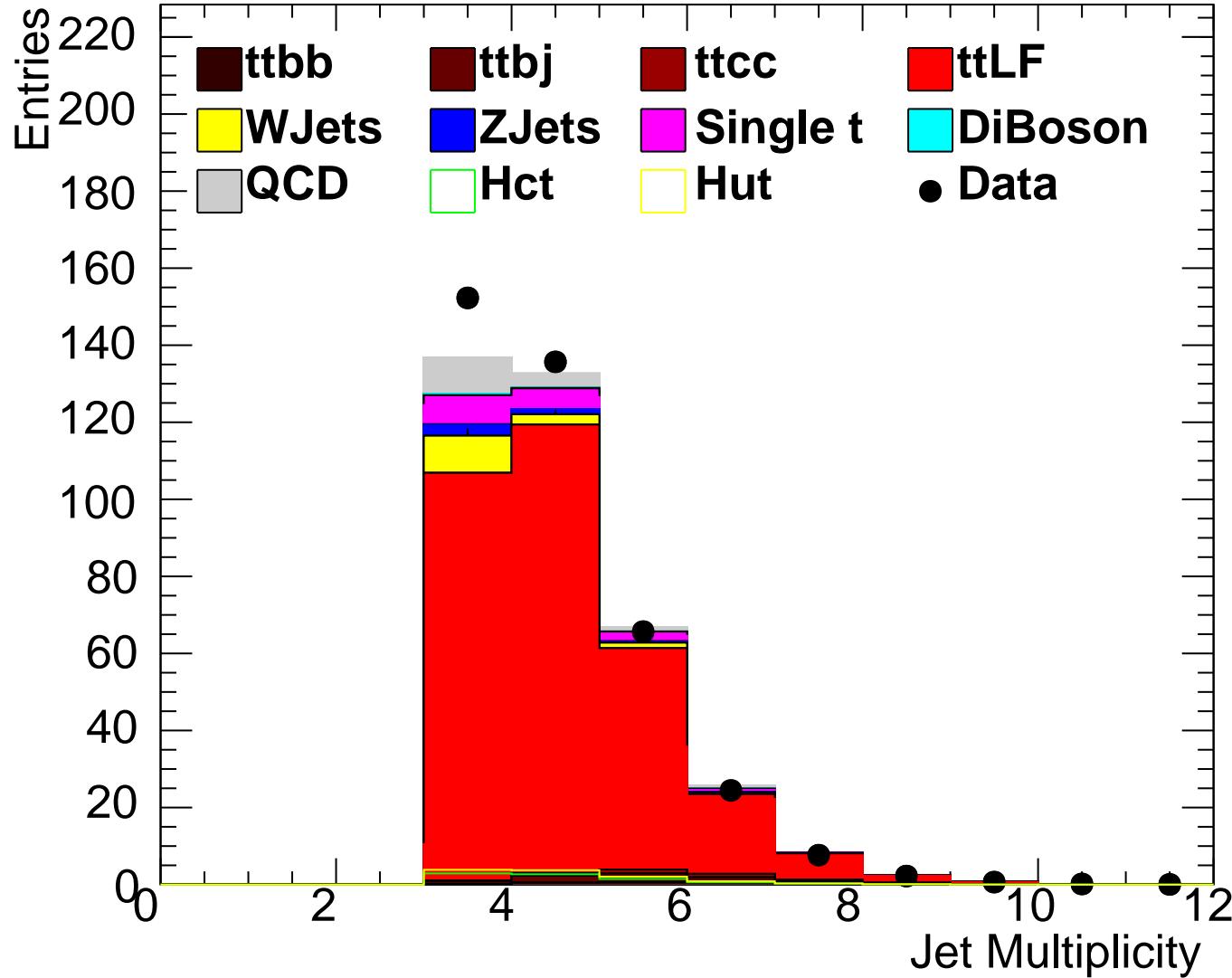
400

200

0

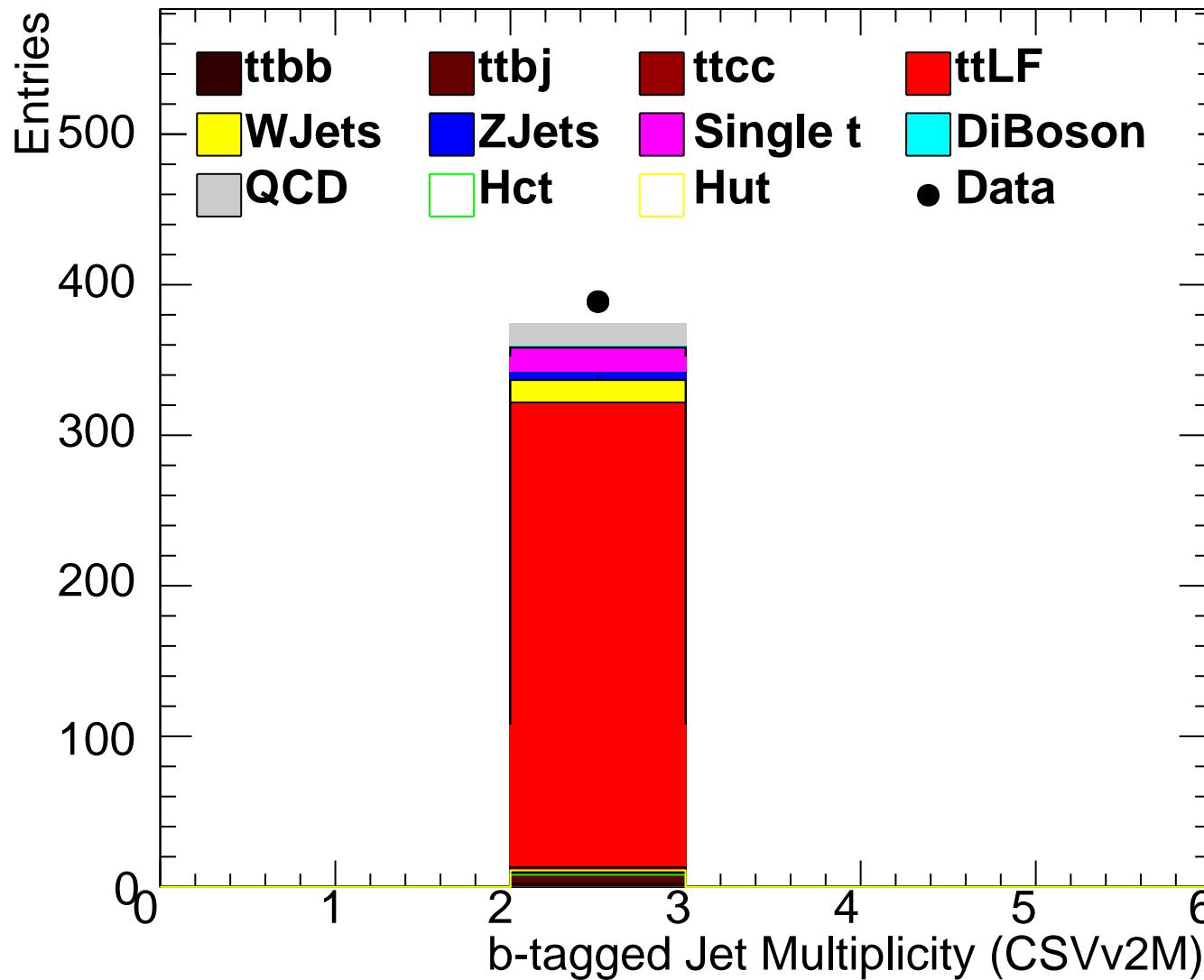
Top Mass from DRFCN $H_k$ infit (Lep) (GeV)

**Ch1\_S1** $\times 10^3$ CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch1\_S2**x 10<sup>3</sup>CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV

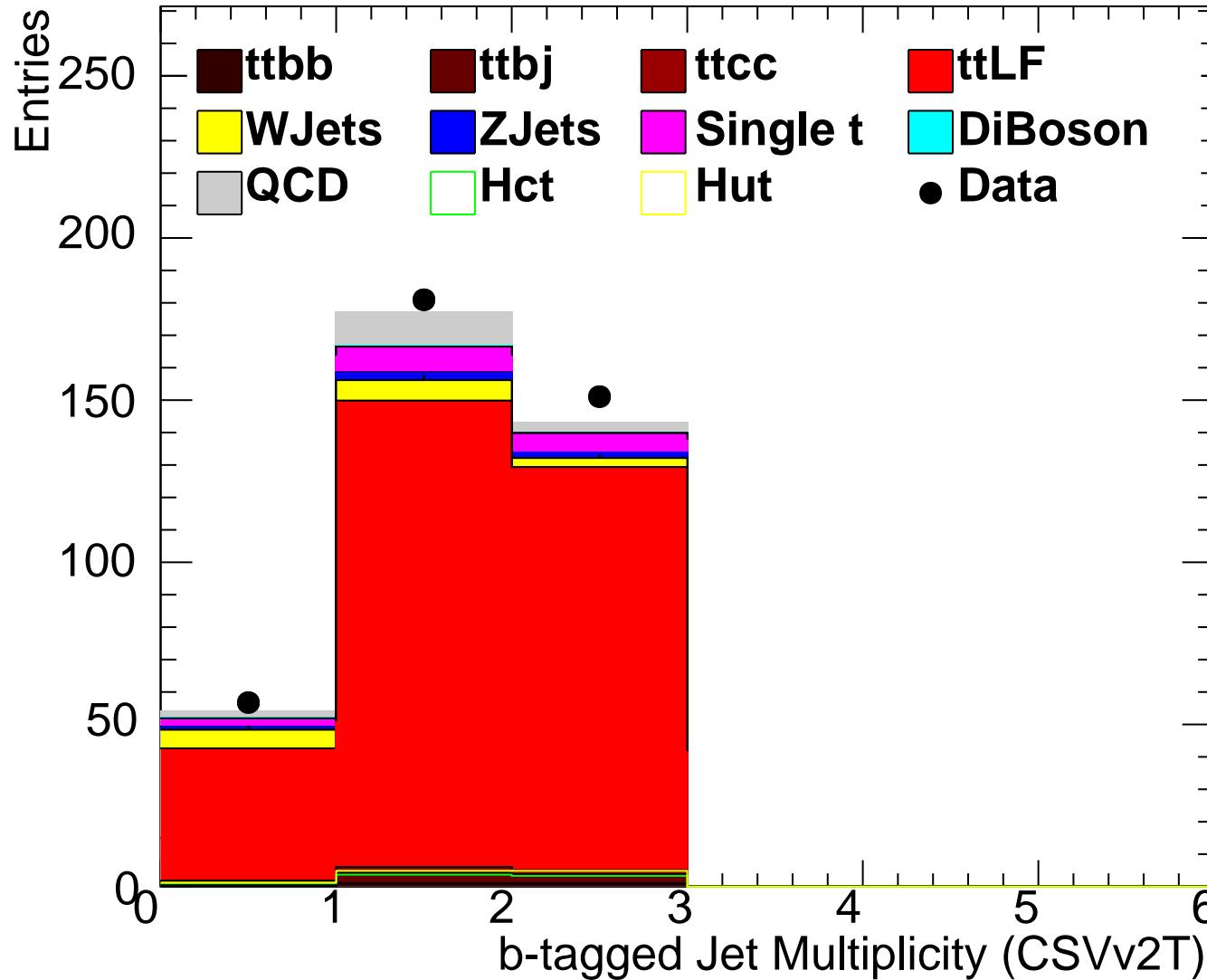
Ch1\_S2

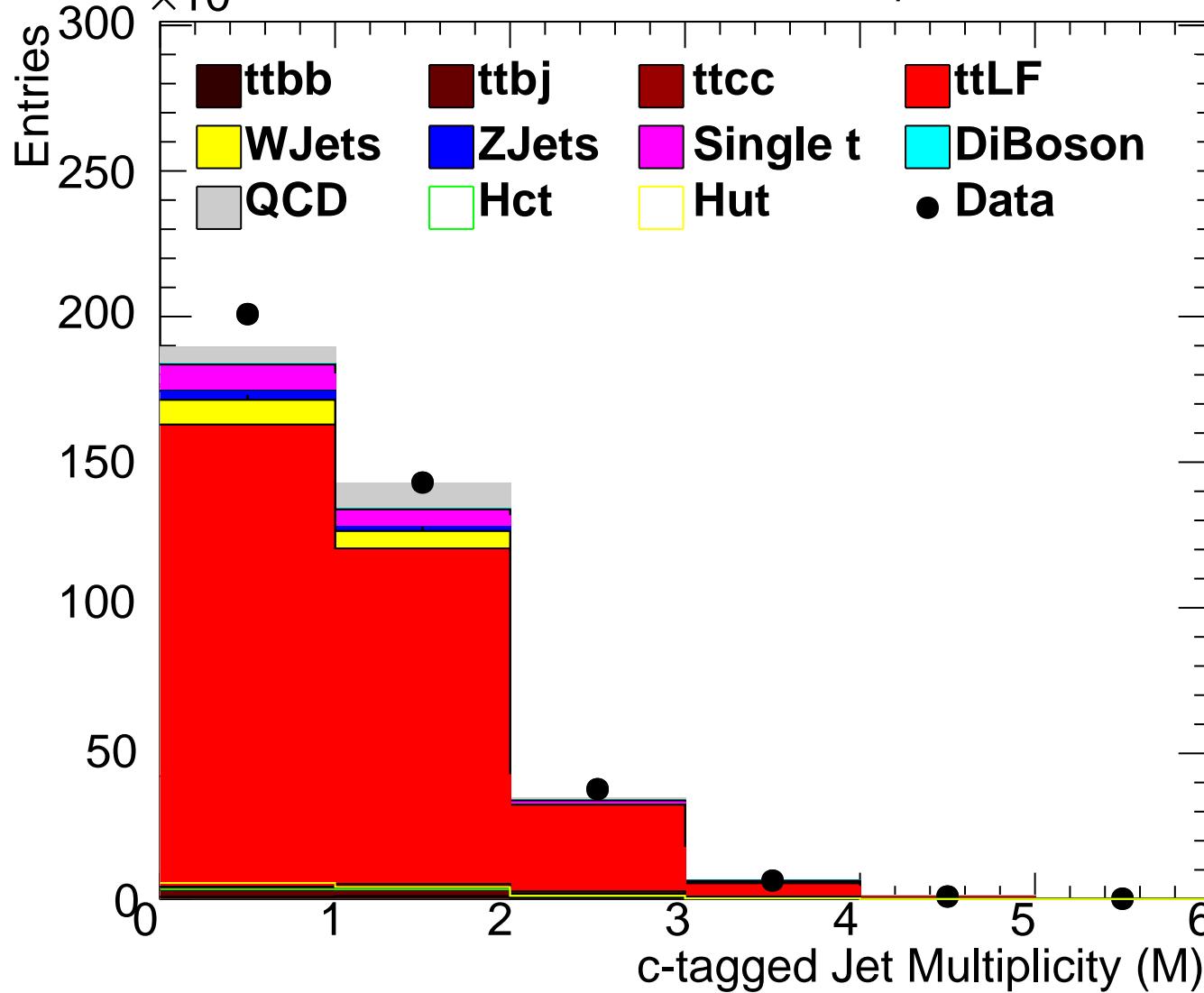
CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$



Ch1\_S2

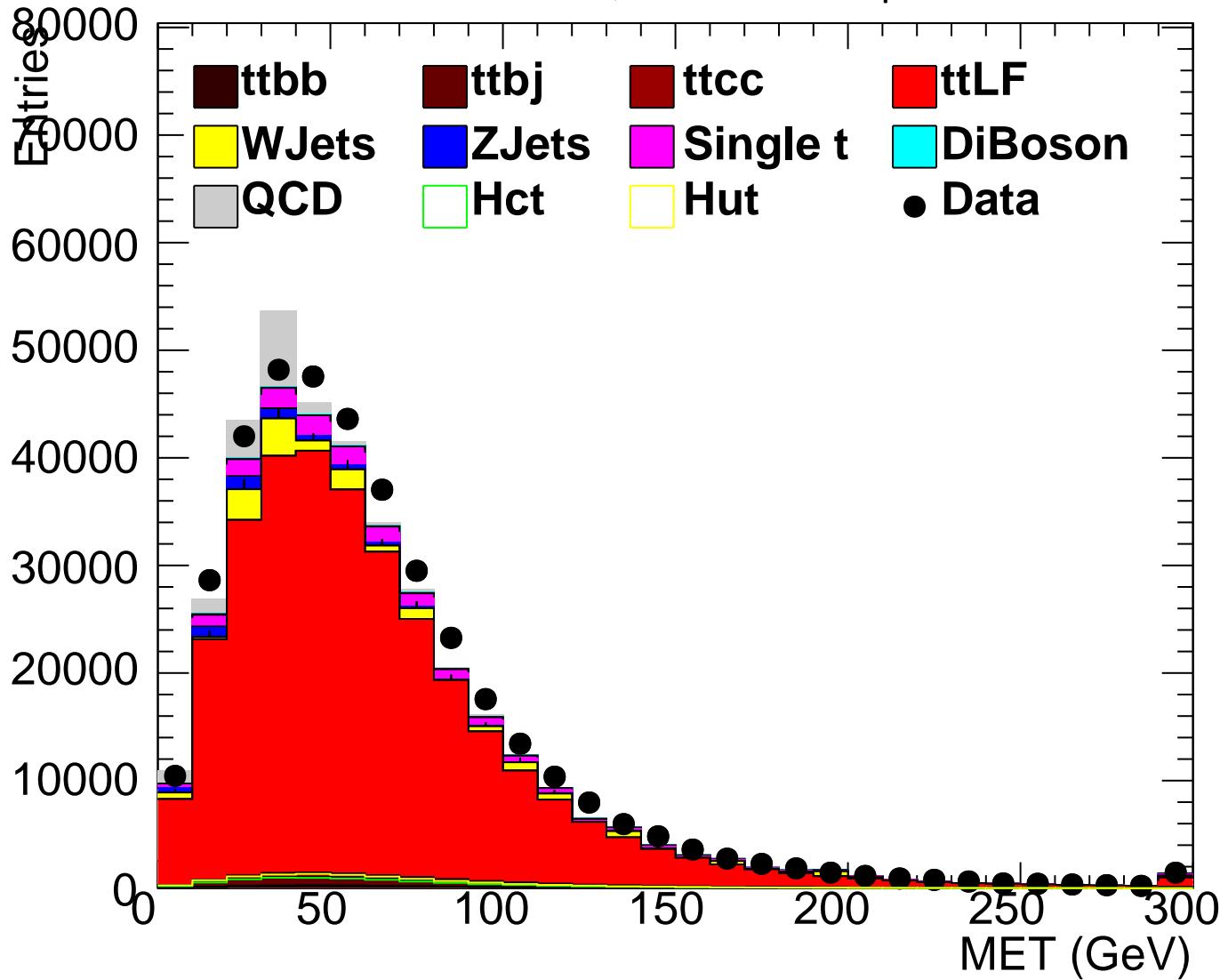
CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$

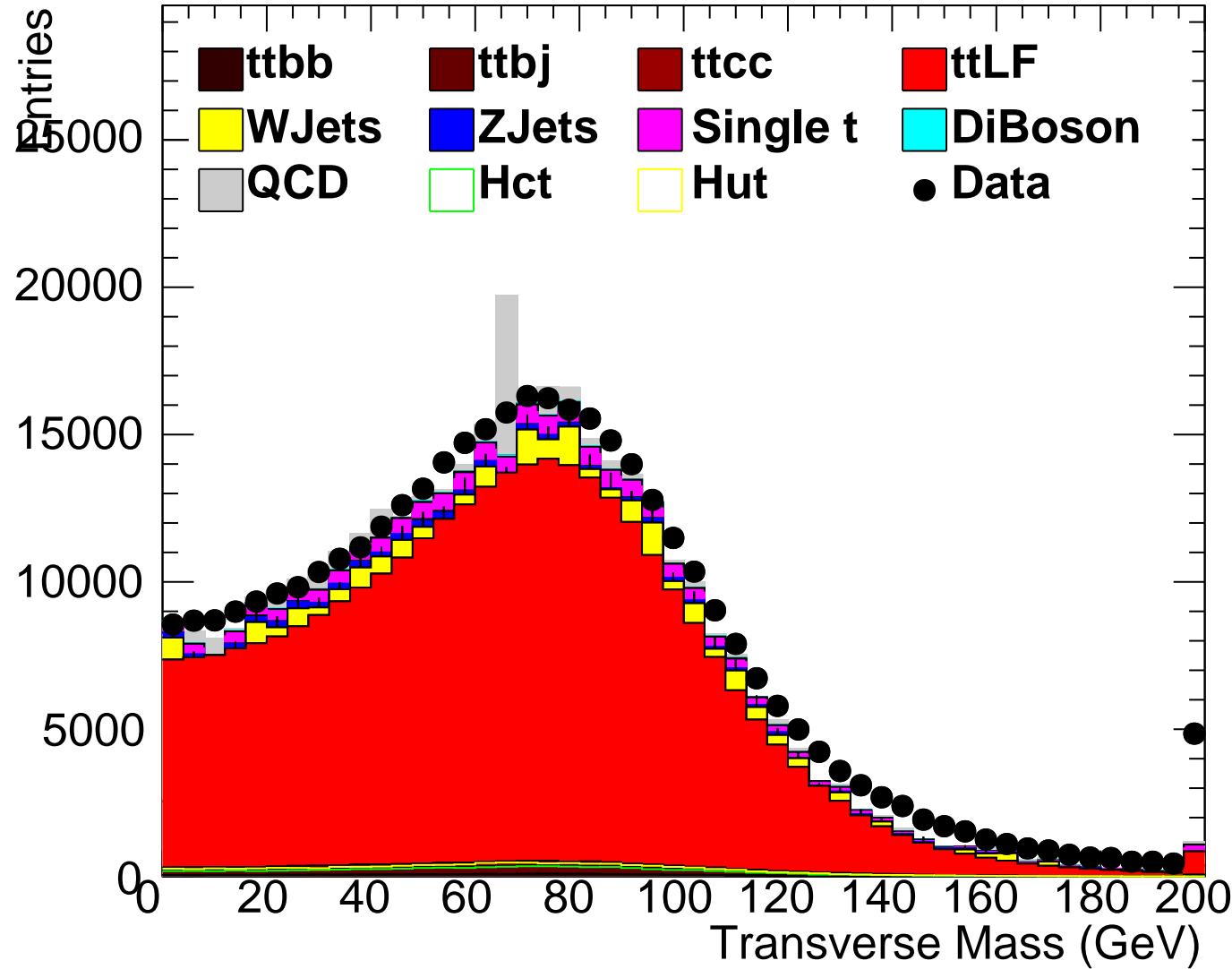


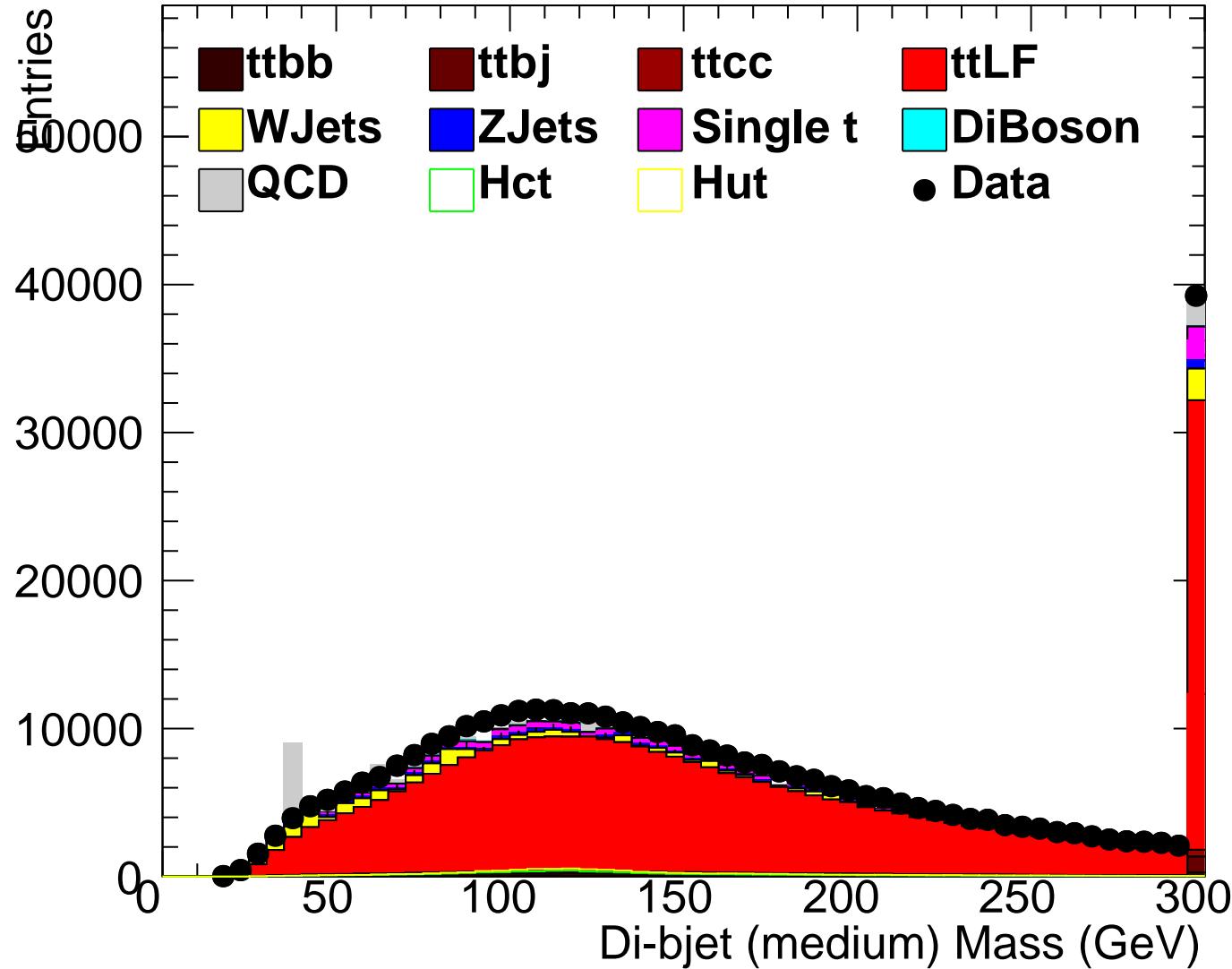


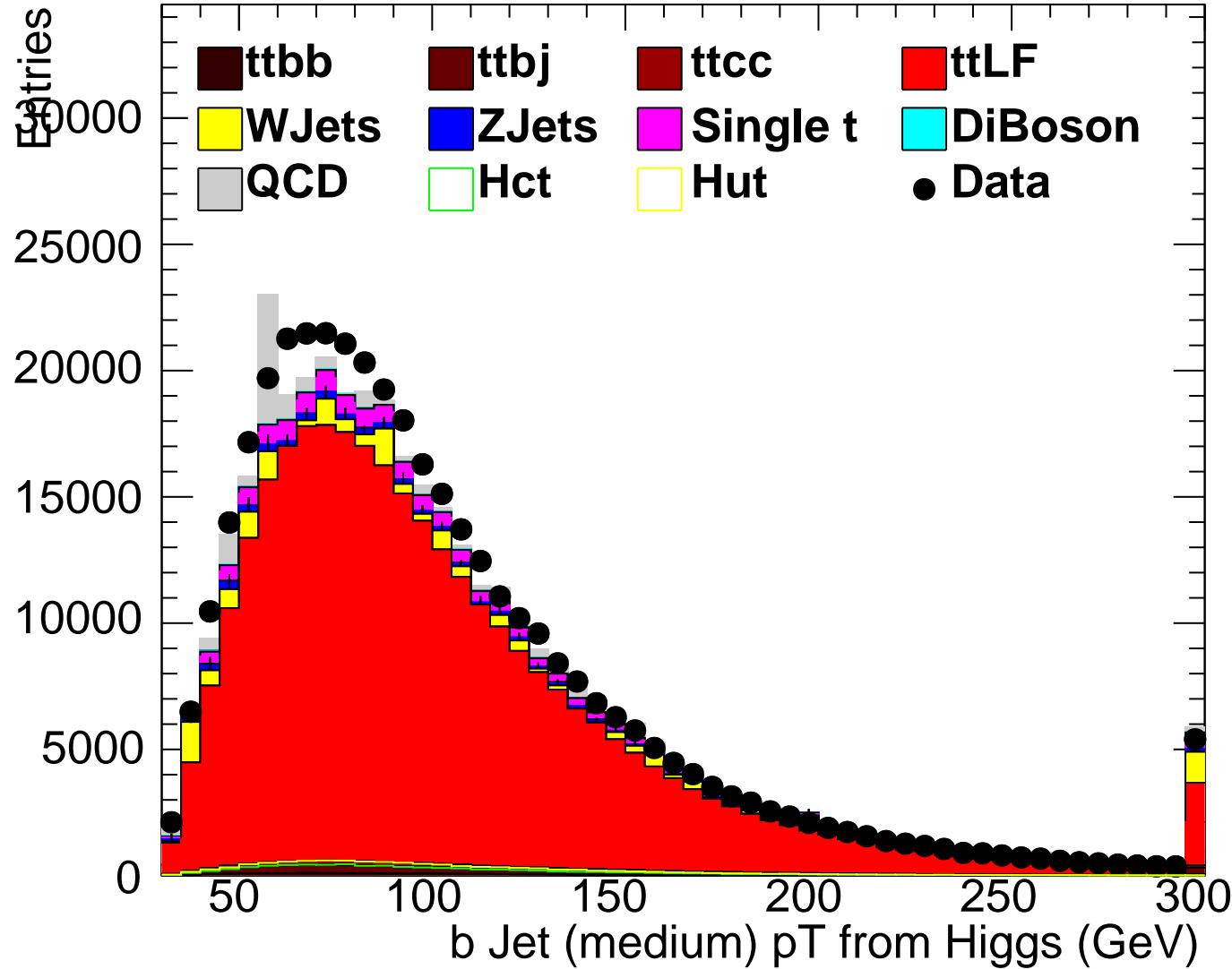
Ch1\_S2

CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$



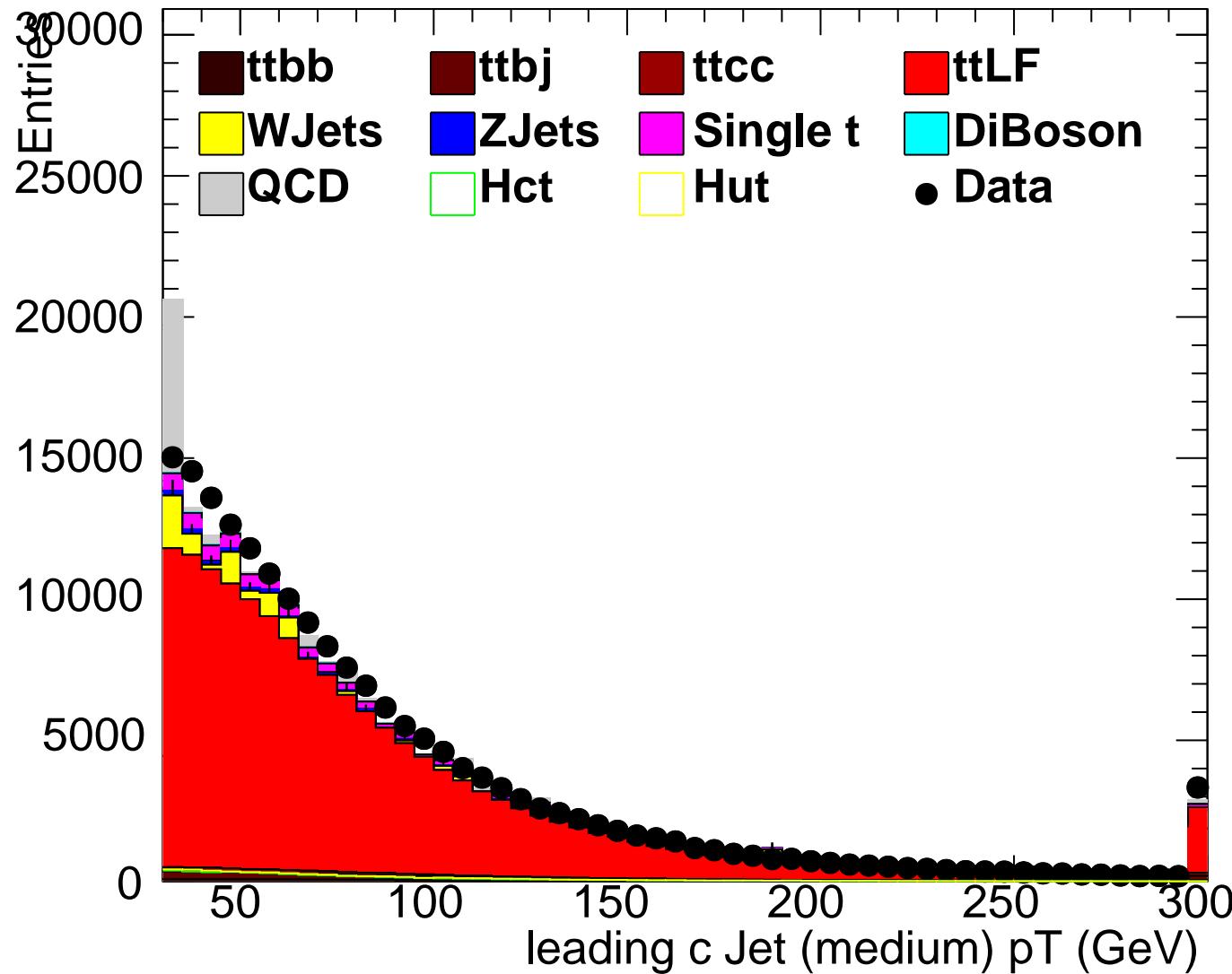
**Ch1\_S2**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

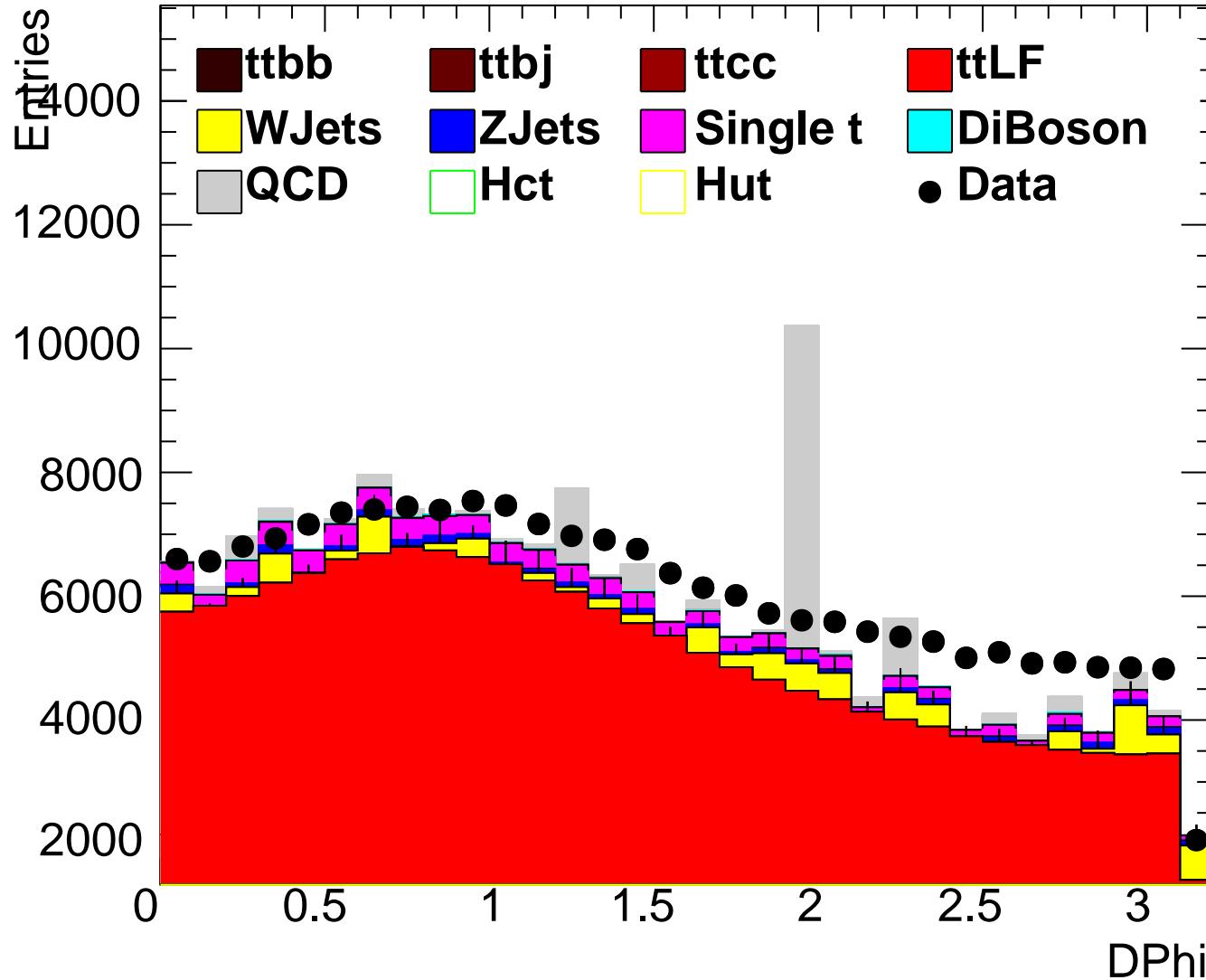
**Ch1\_S2**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

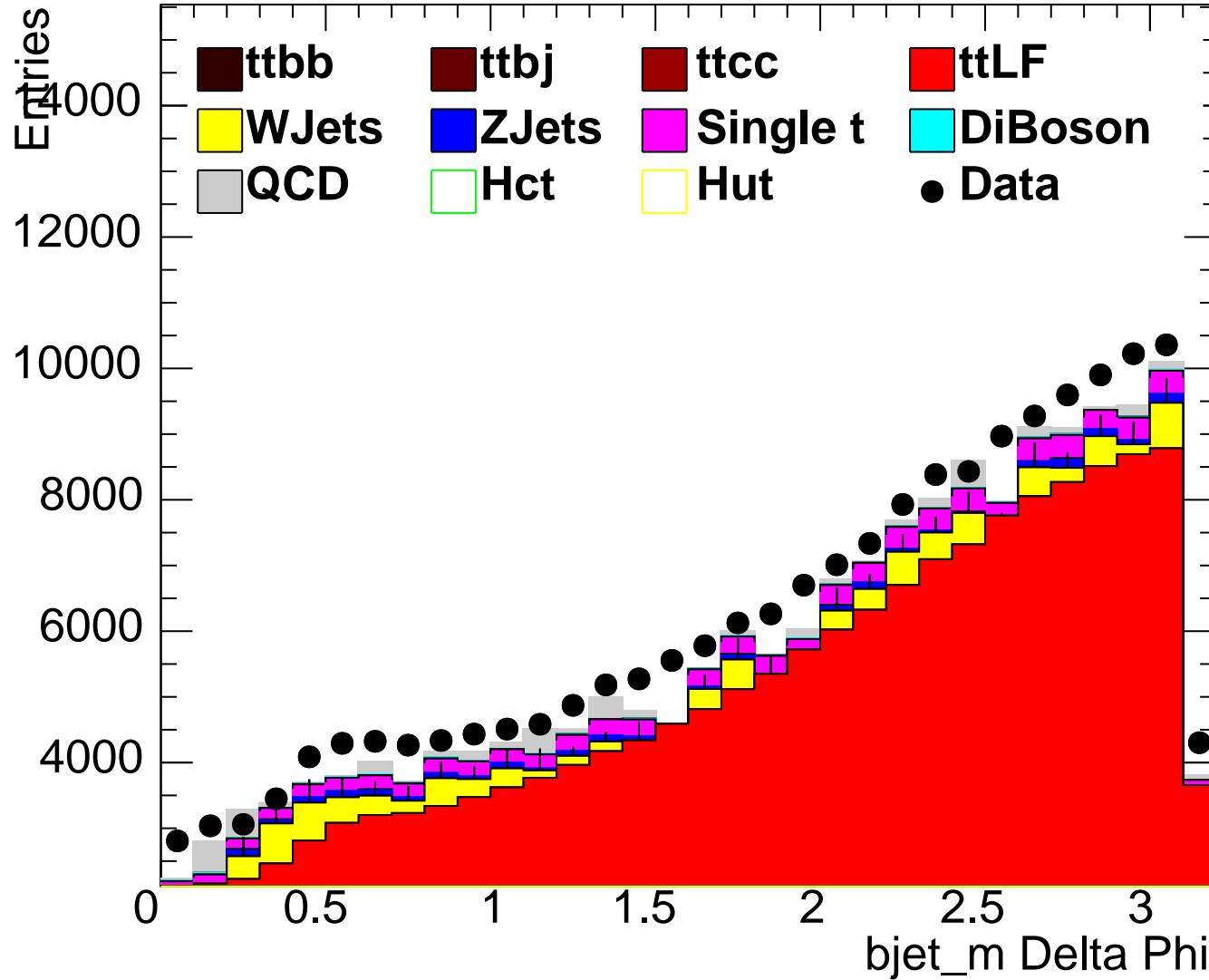
**Ch1\_S2**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

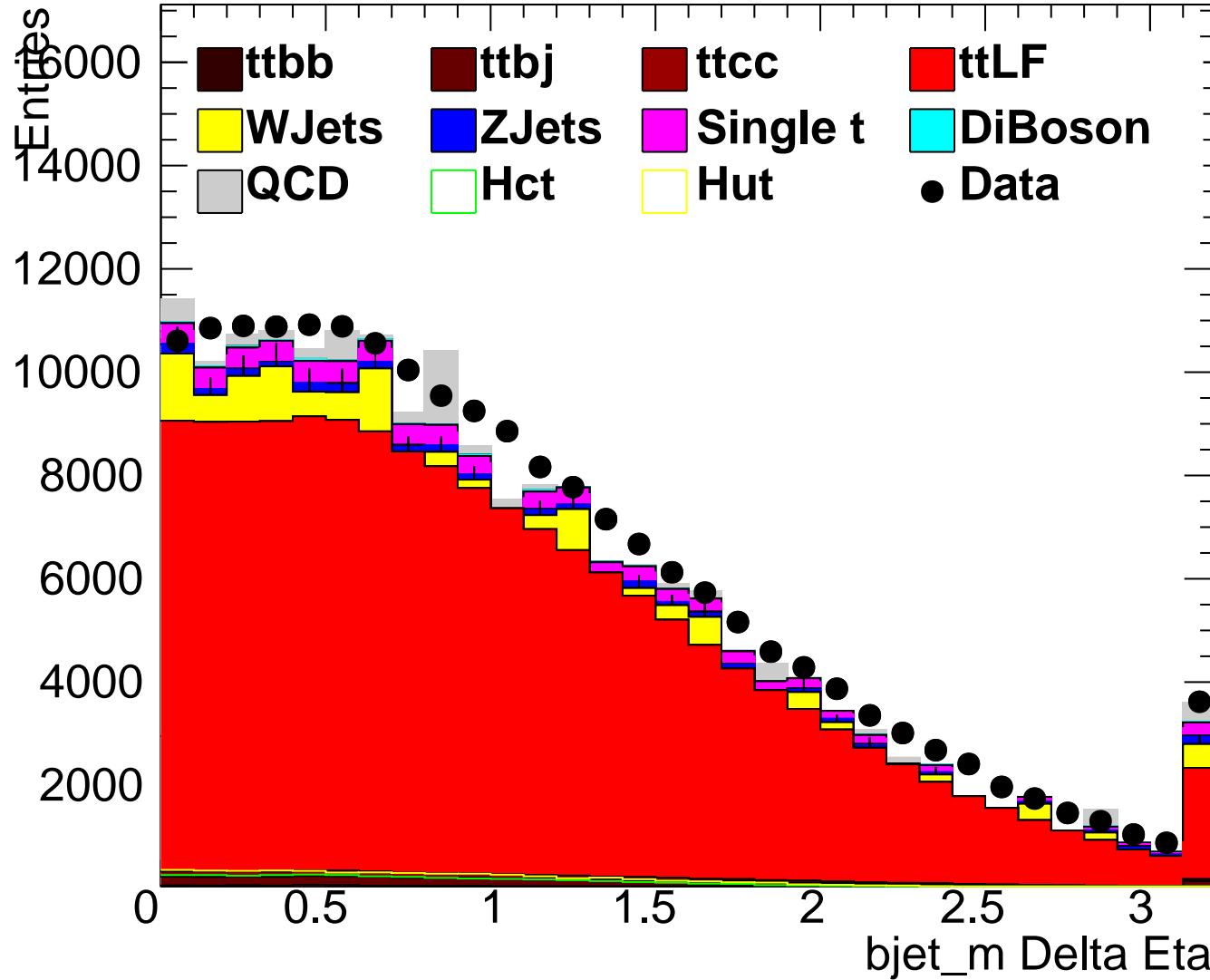
Ch1 S2

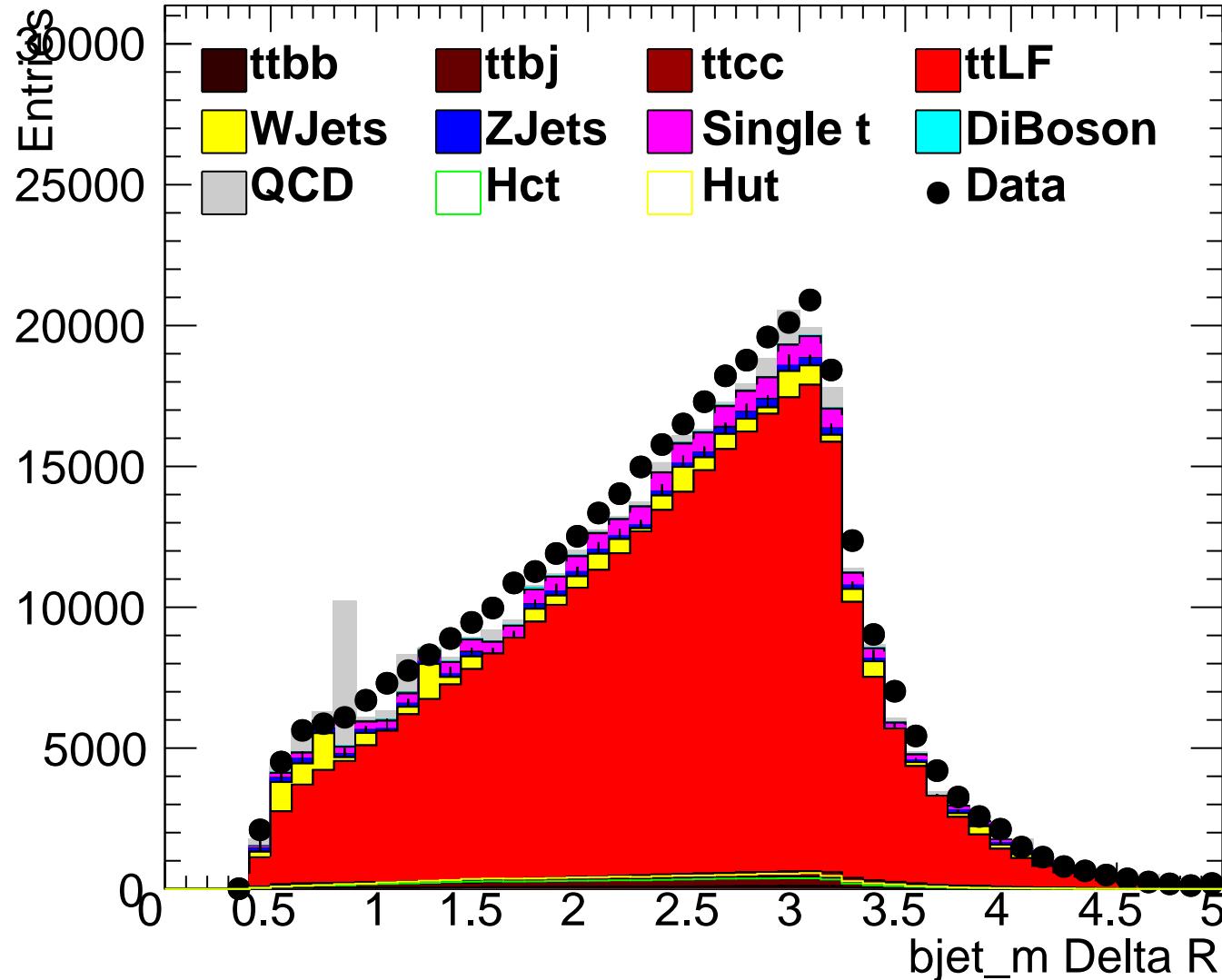
CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$

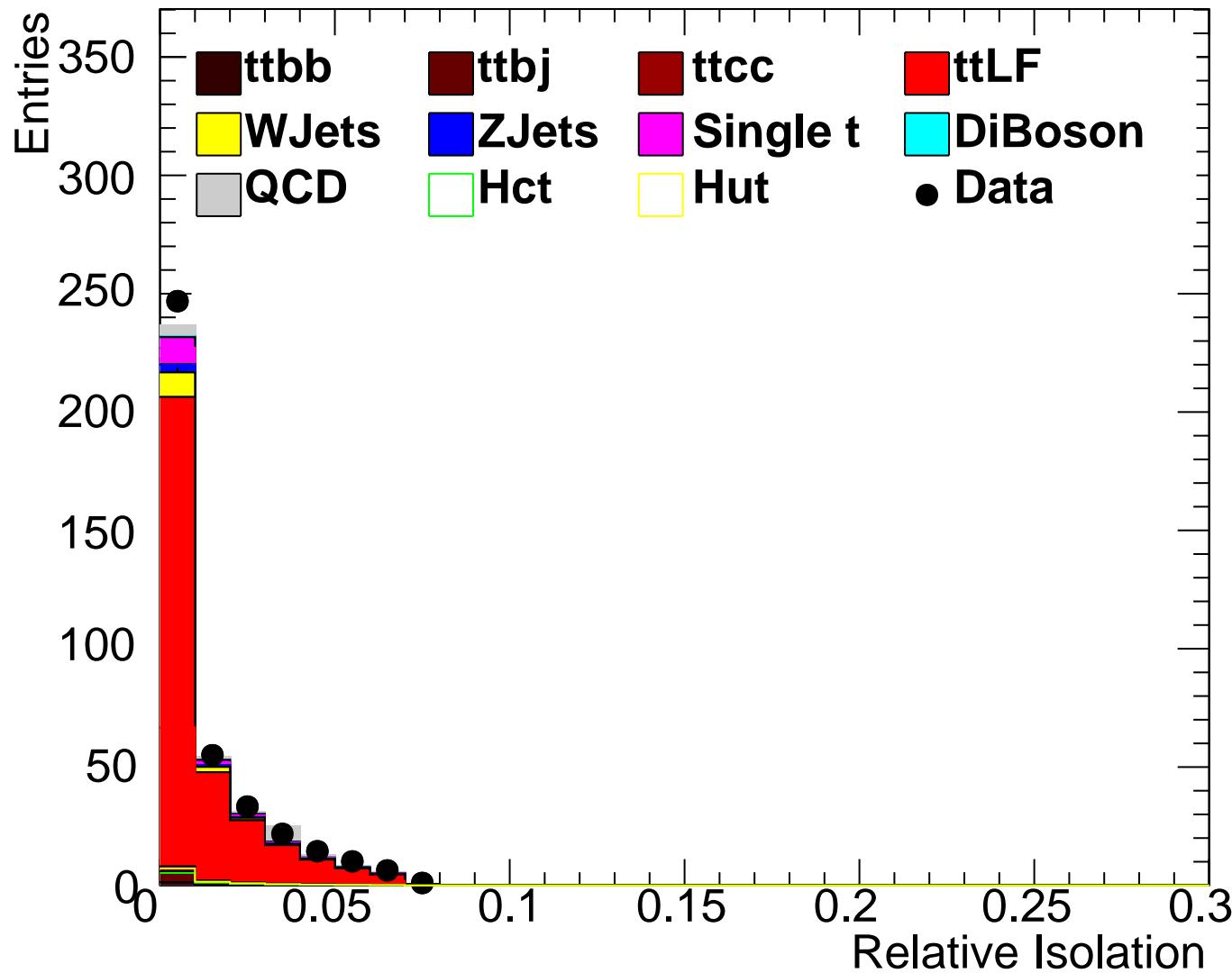


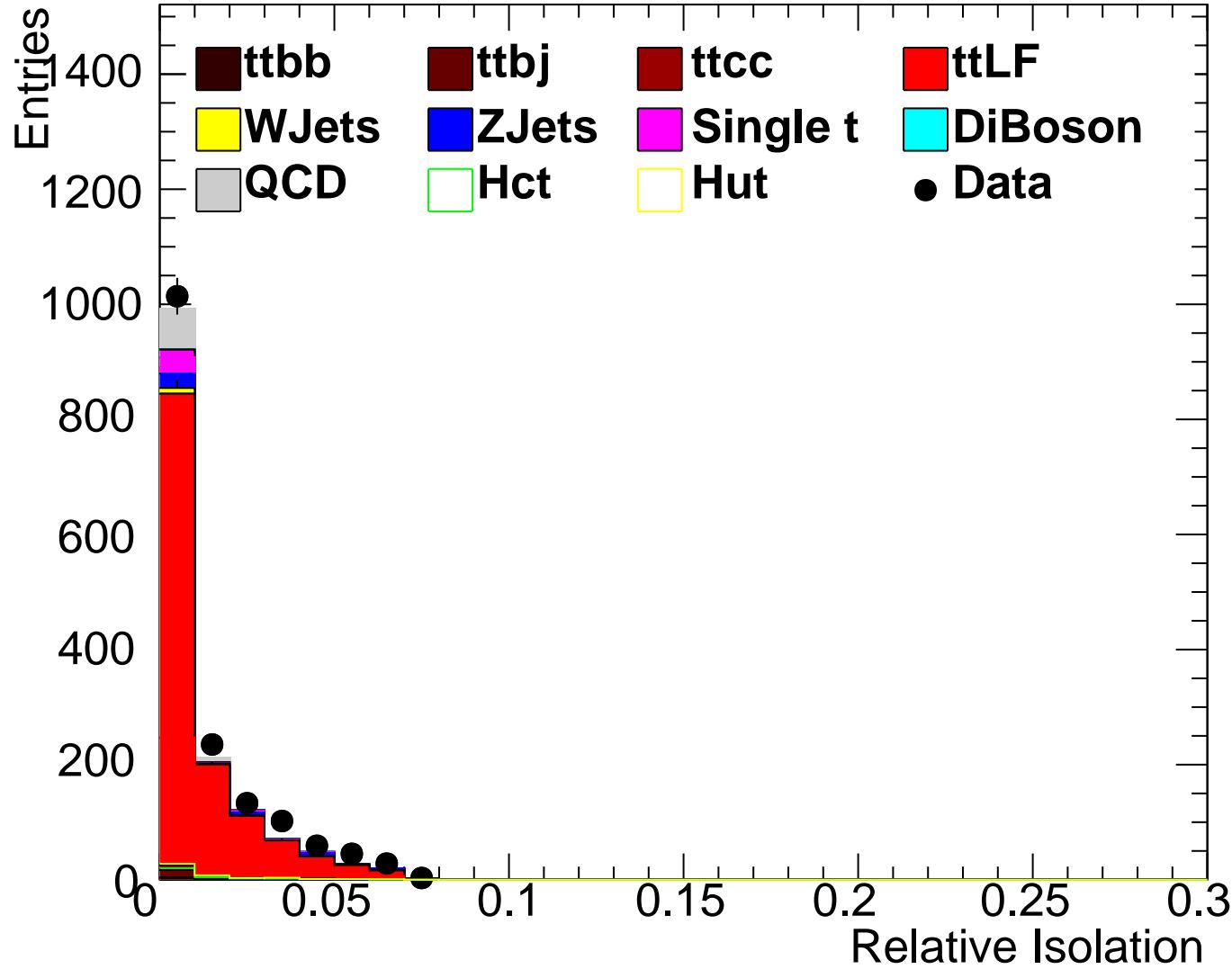
**Ch1\_S2**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch1\_S2**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch1\_S2**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

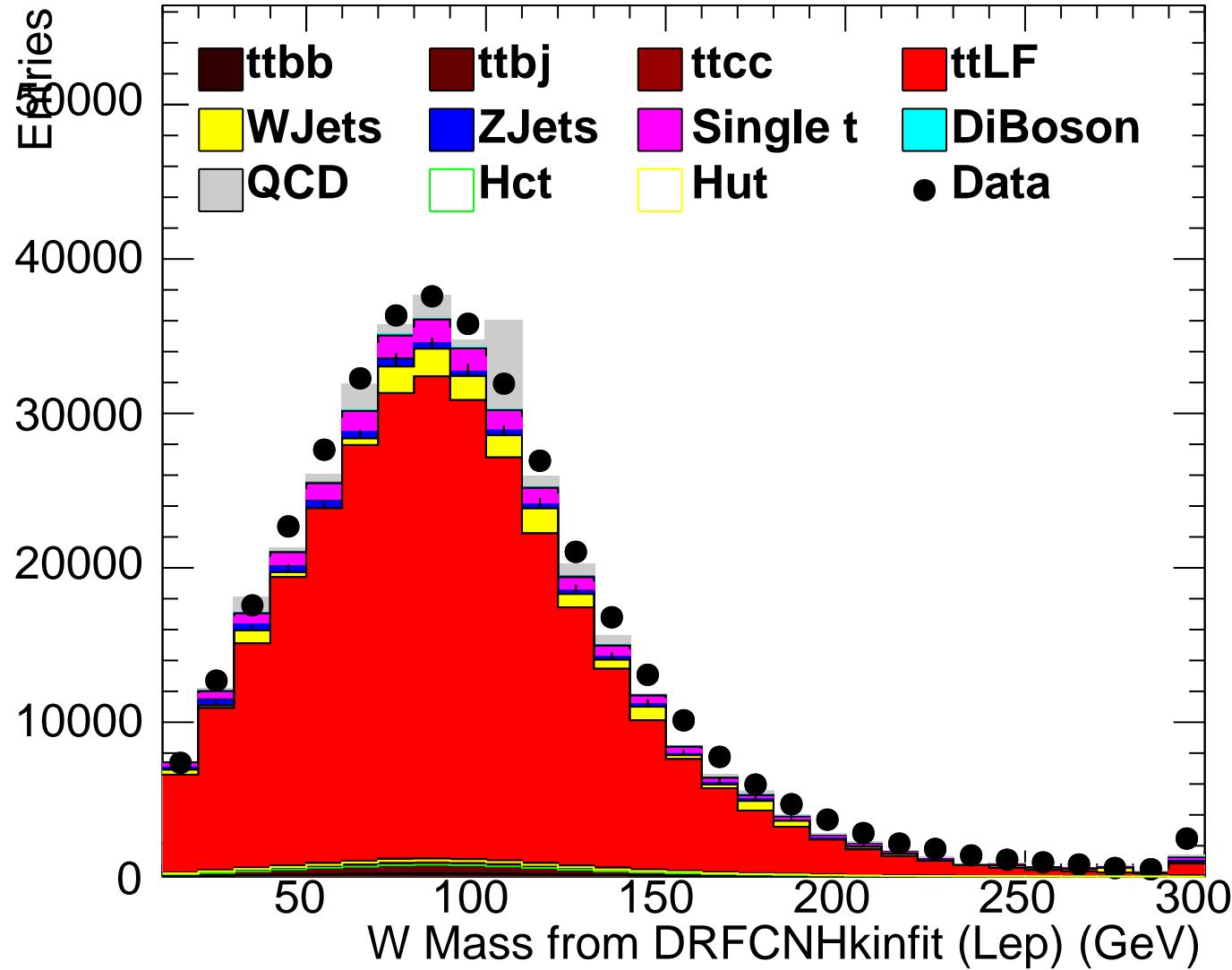


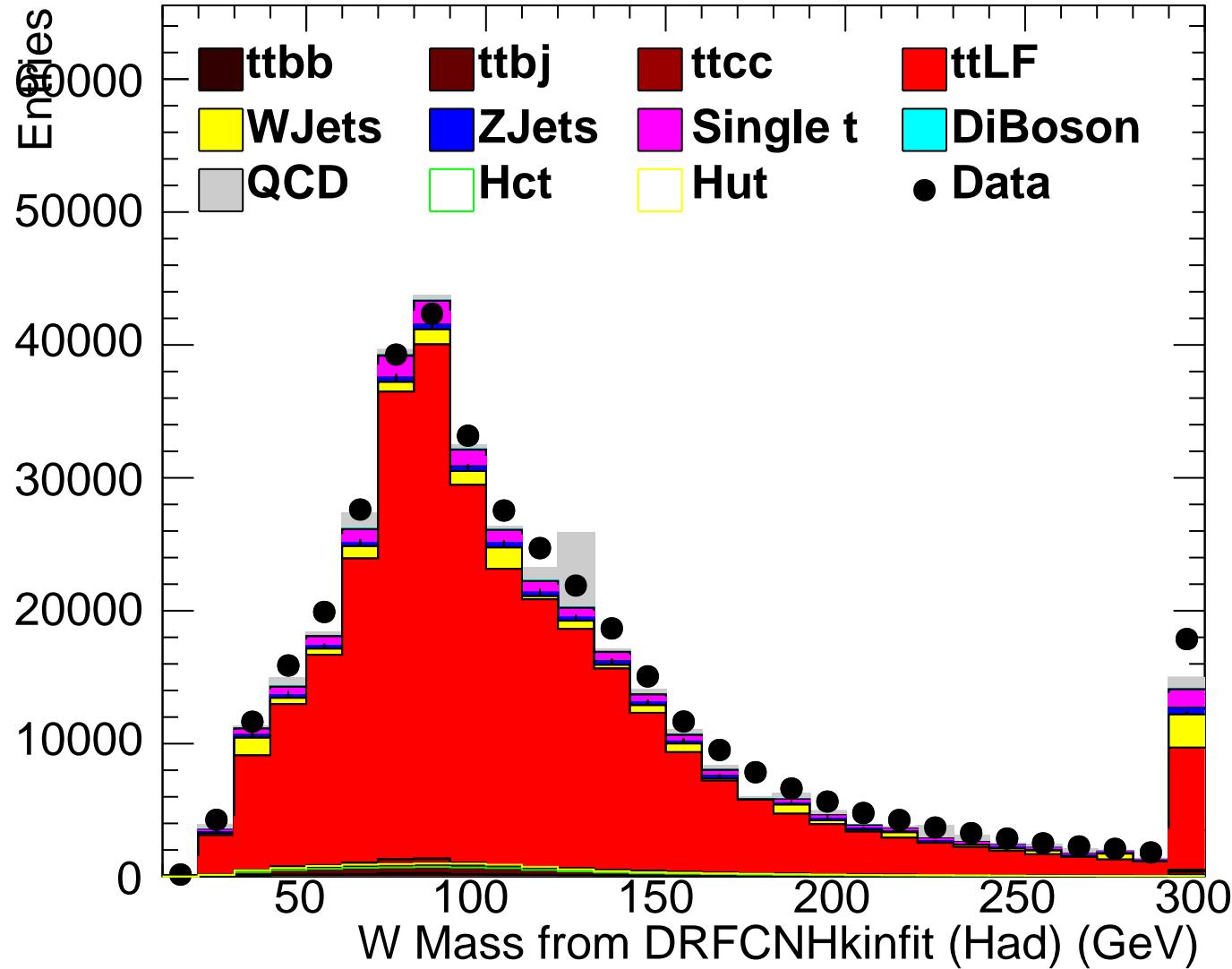


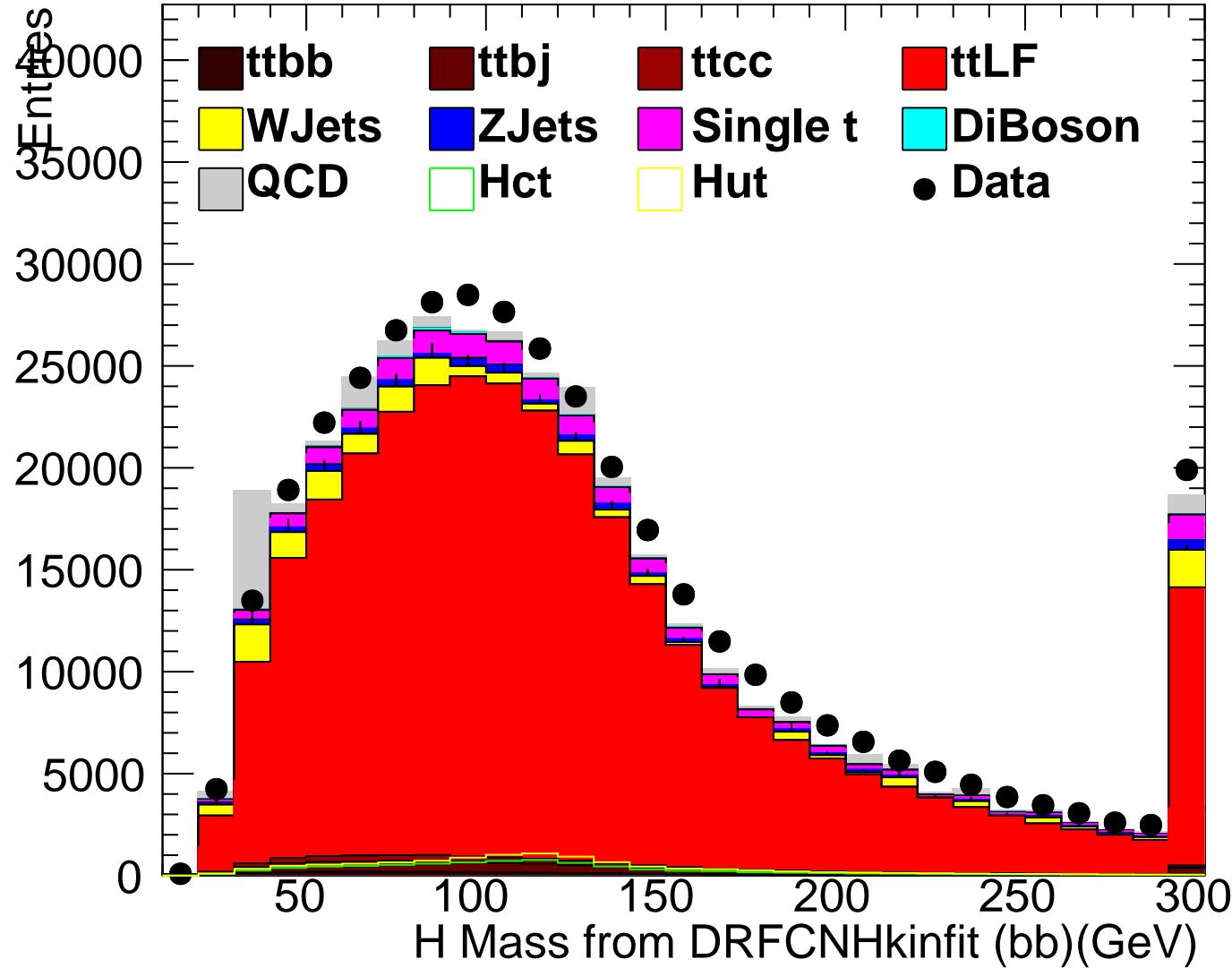


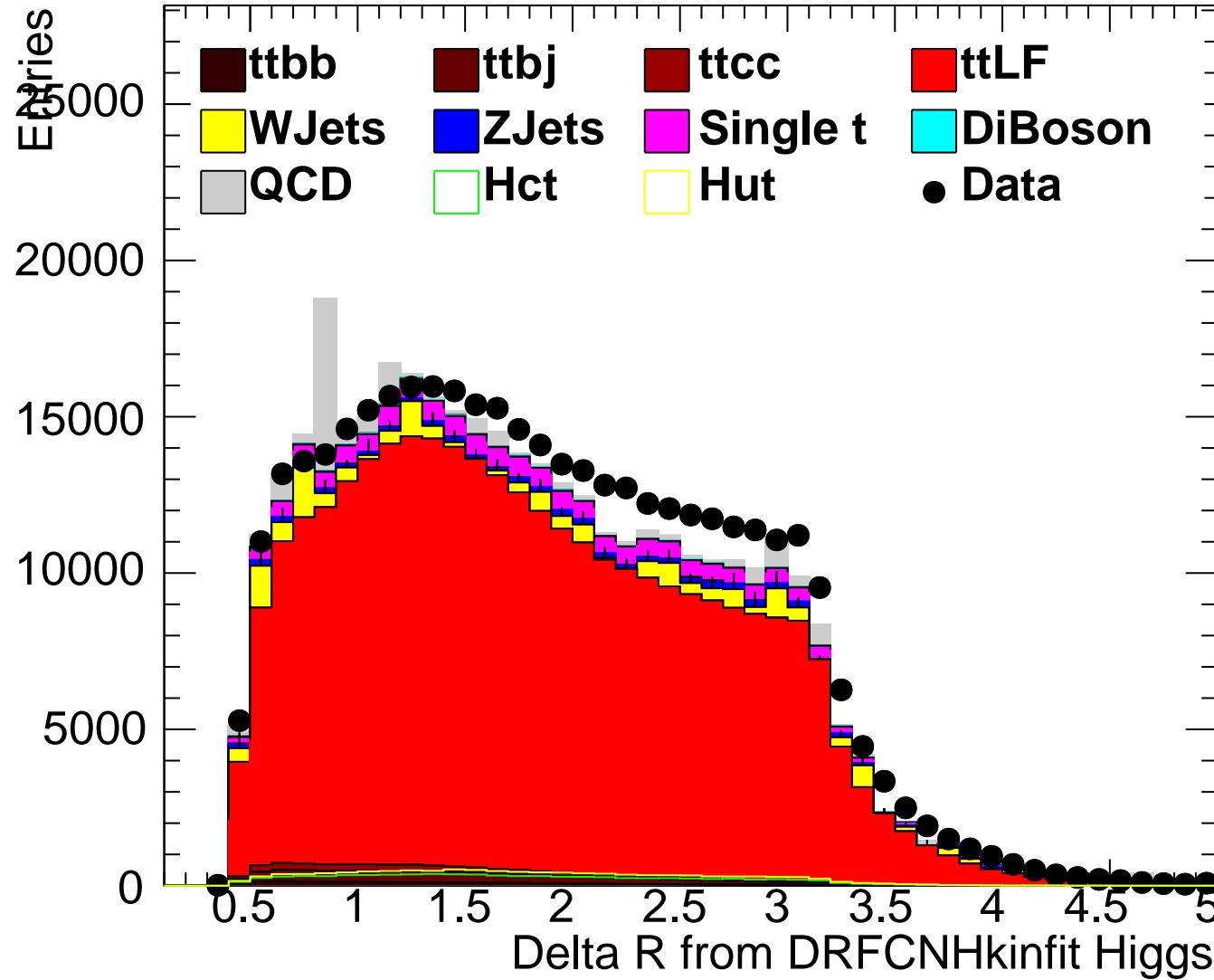
Ch1\_S2

CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$



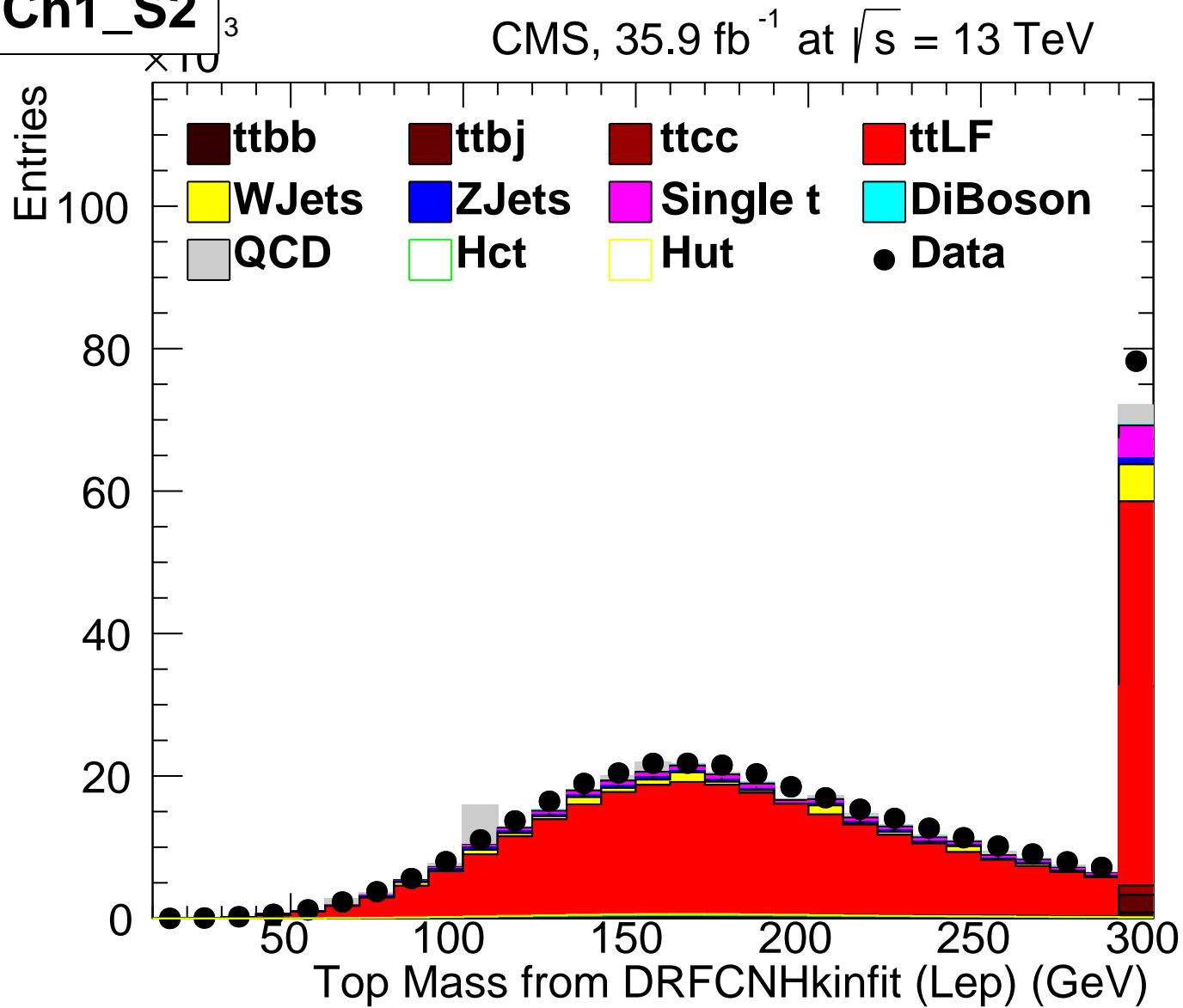
**Ch1\_S2**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

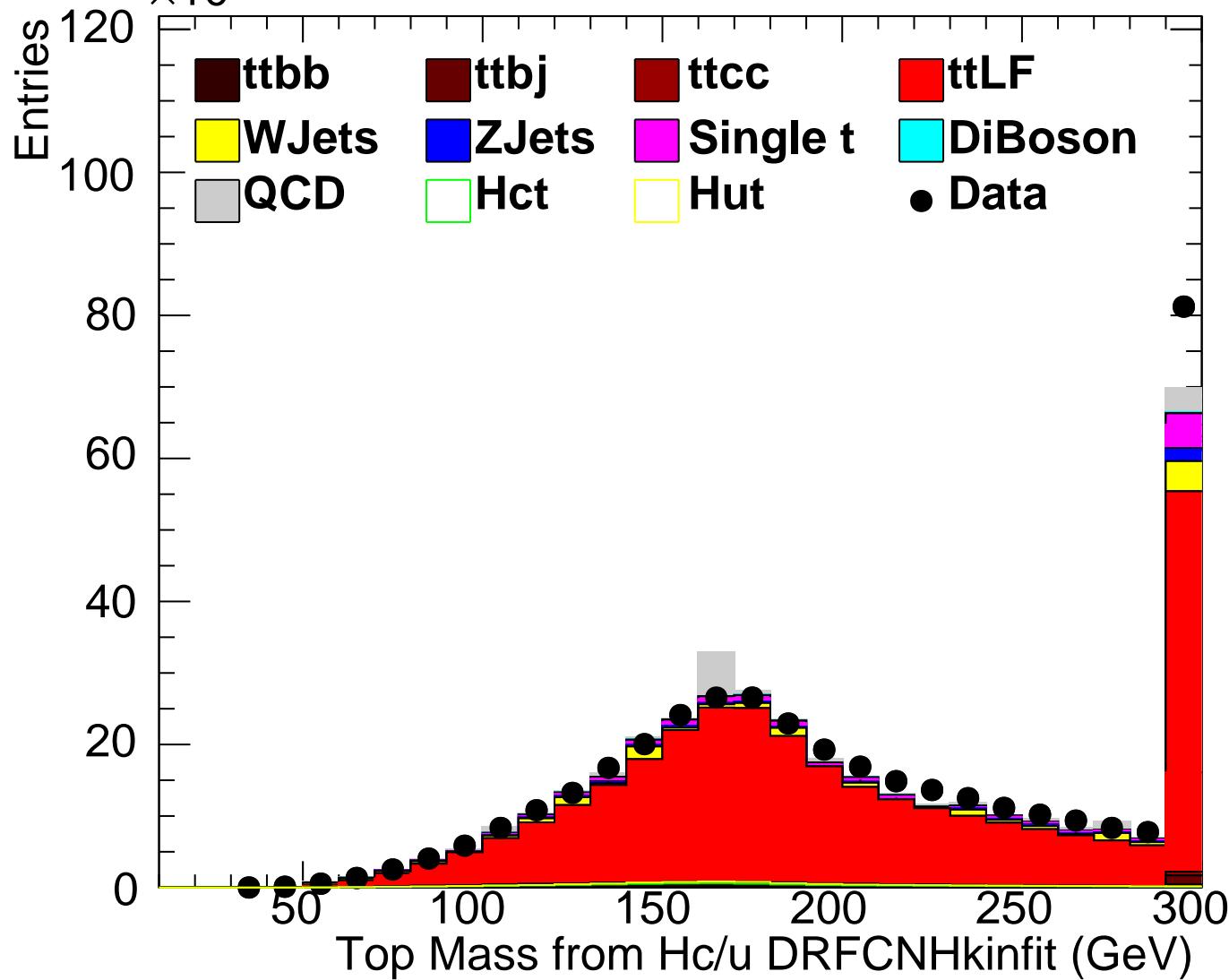
**Ch1\_S2**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

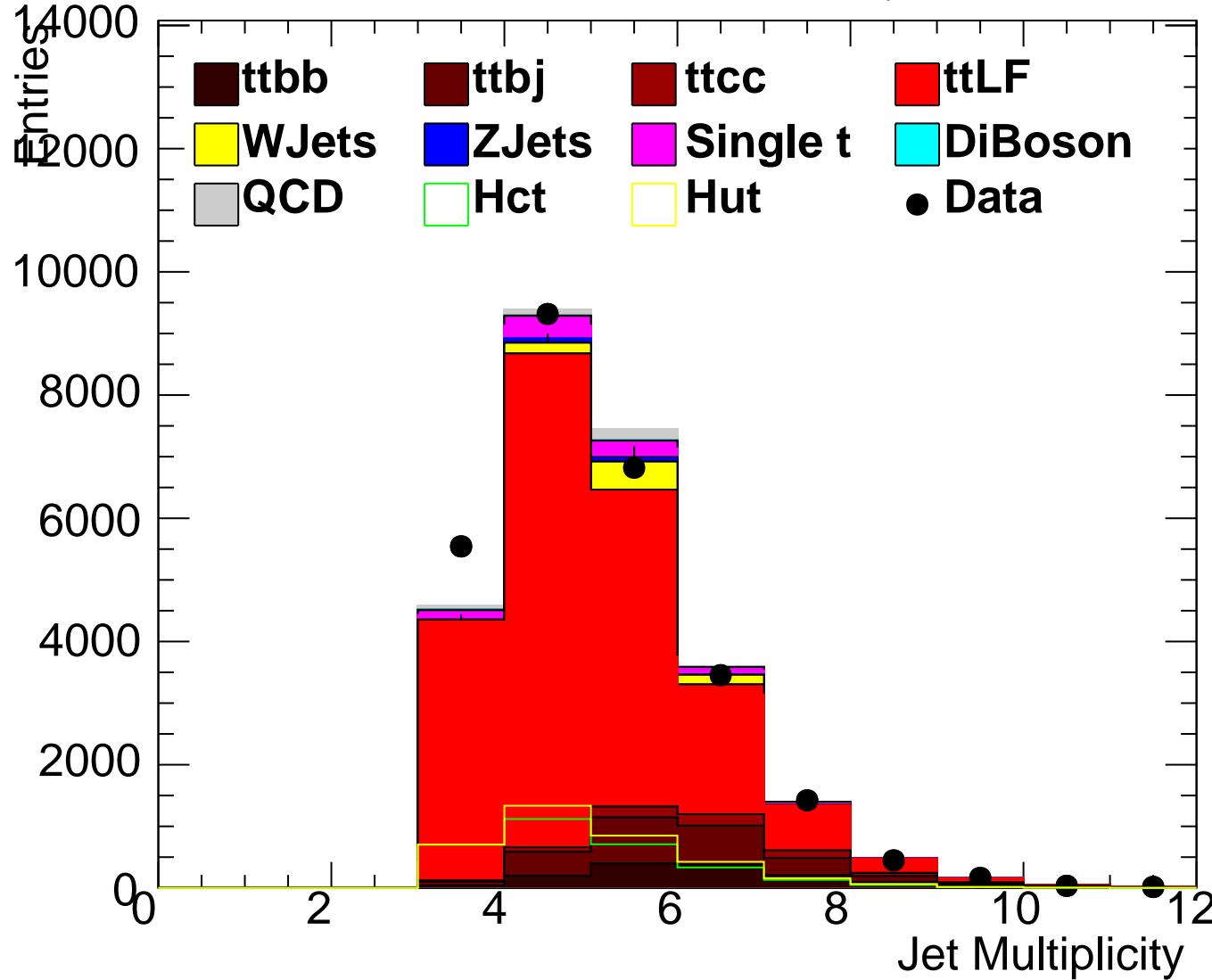
**Ch1\_S2**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

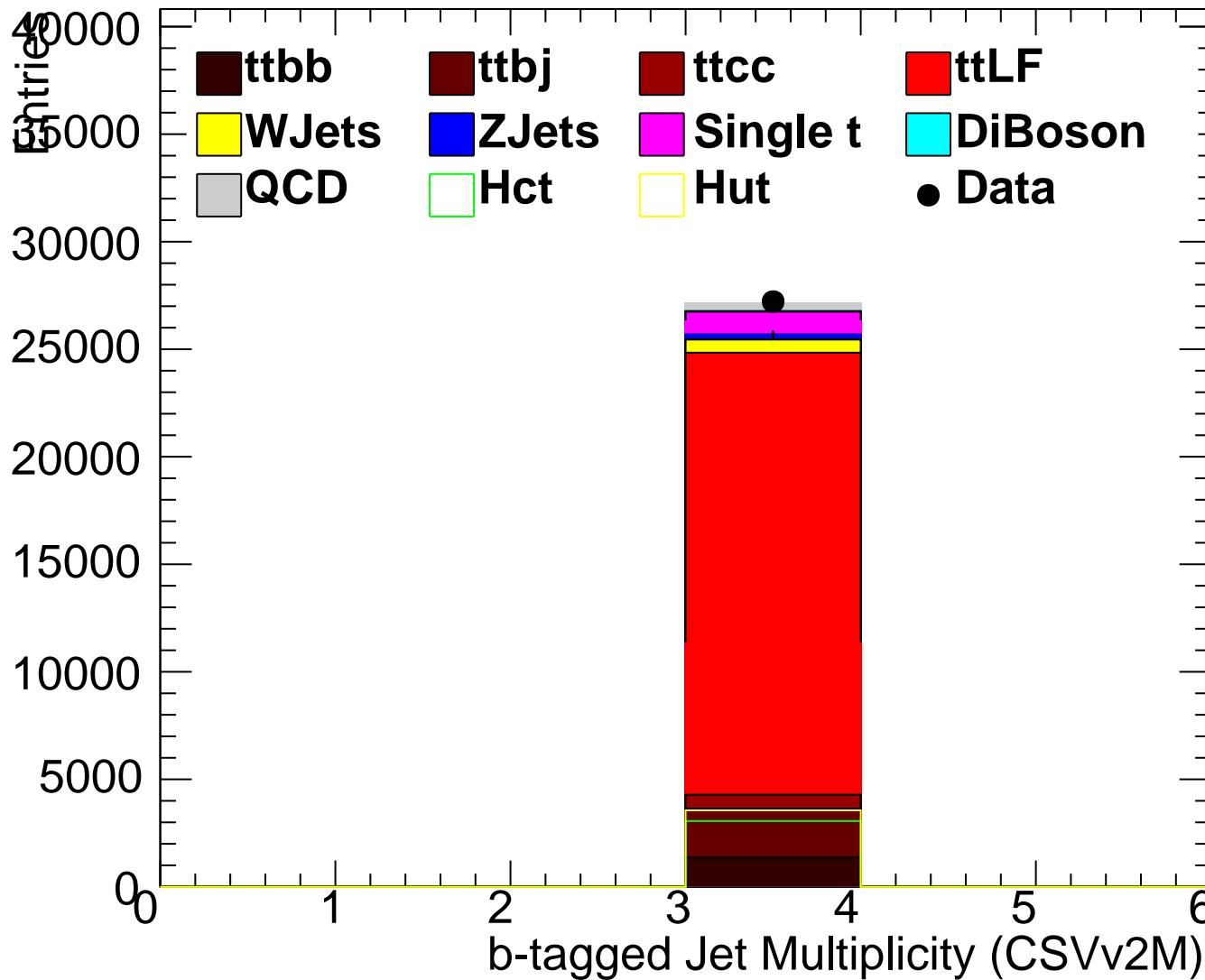
**Ch1\_S2**x 10<sup>3</sup>CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV

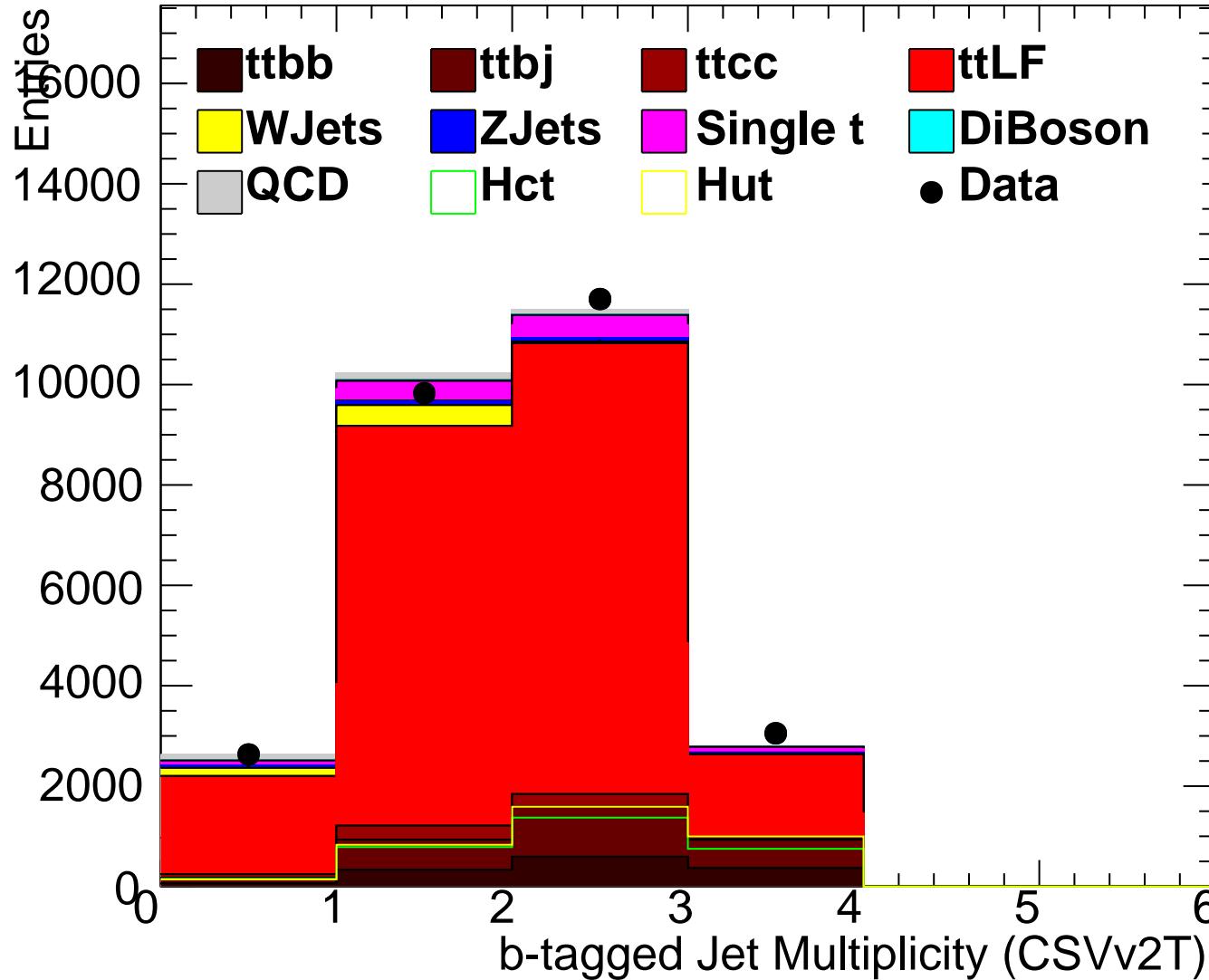
Entries

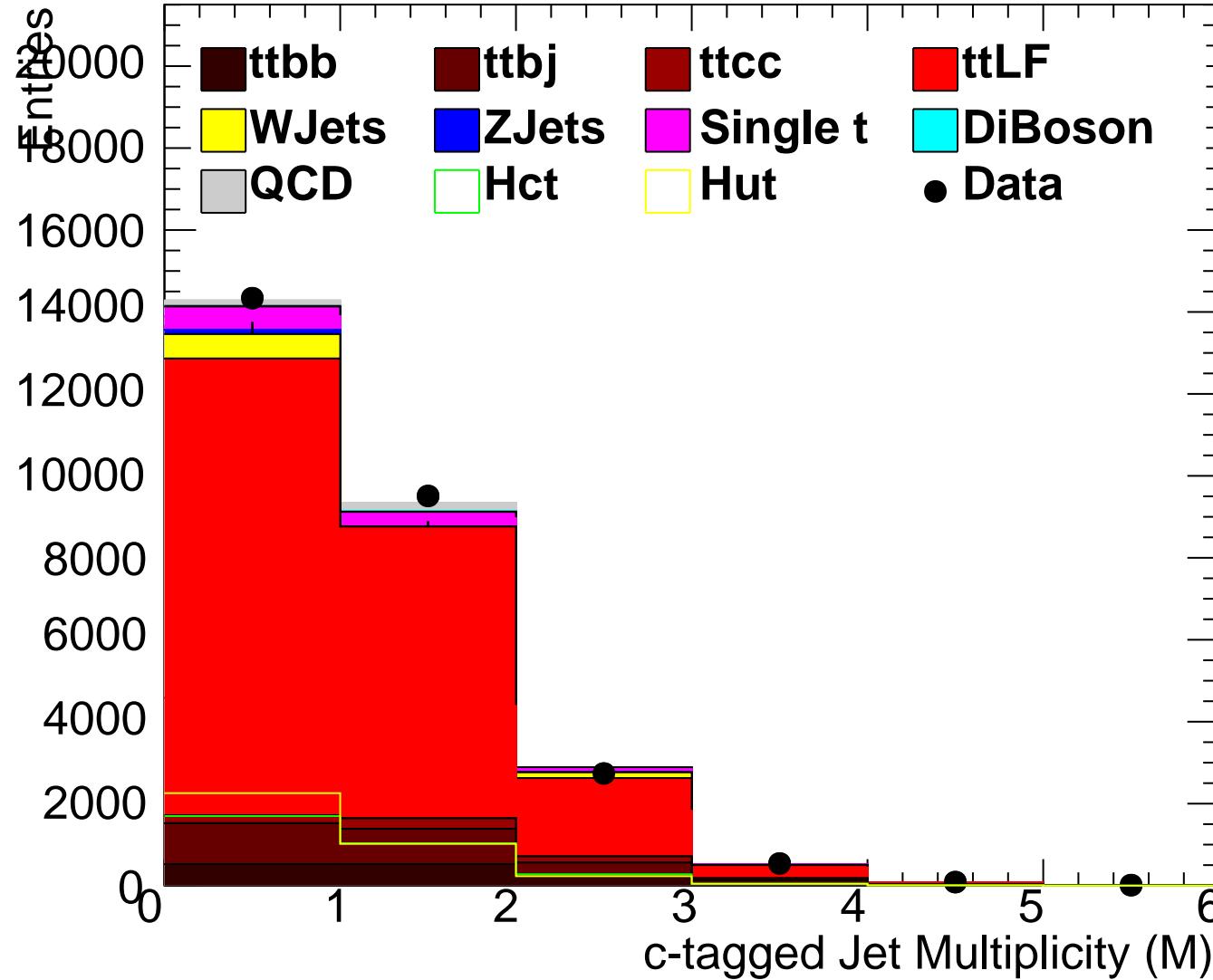


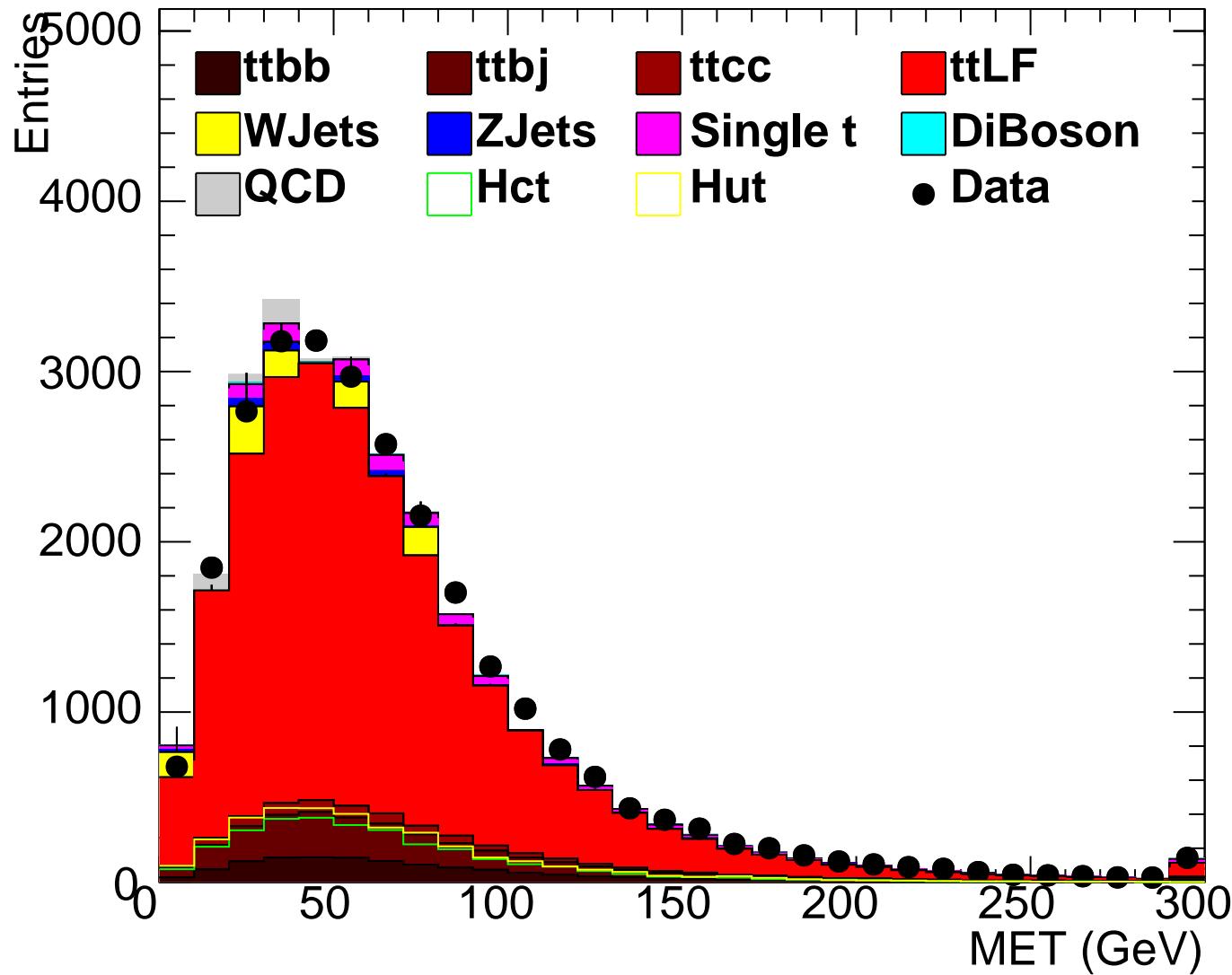


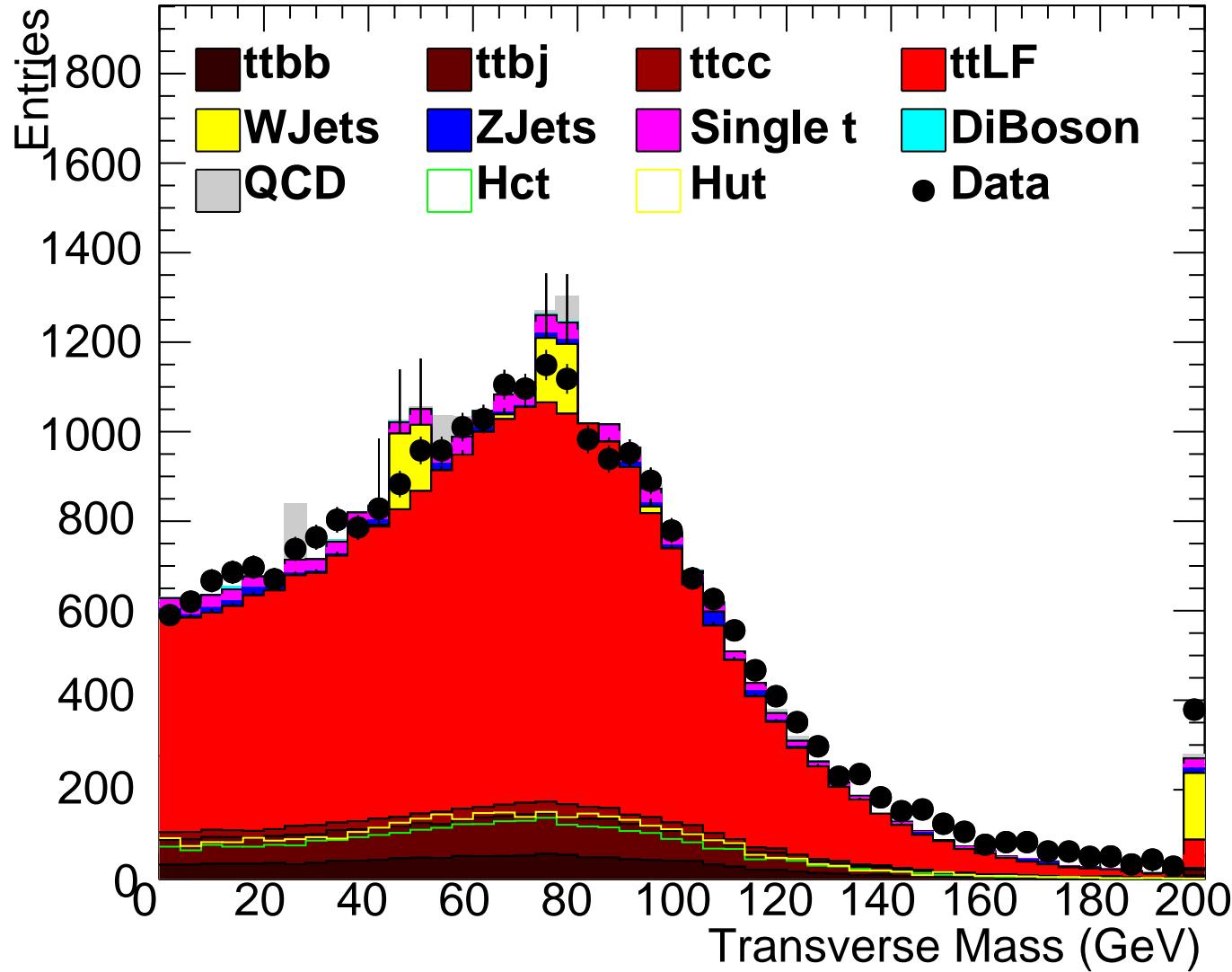


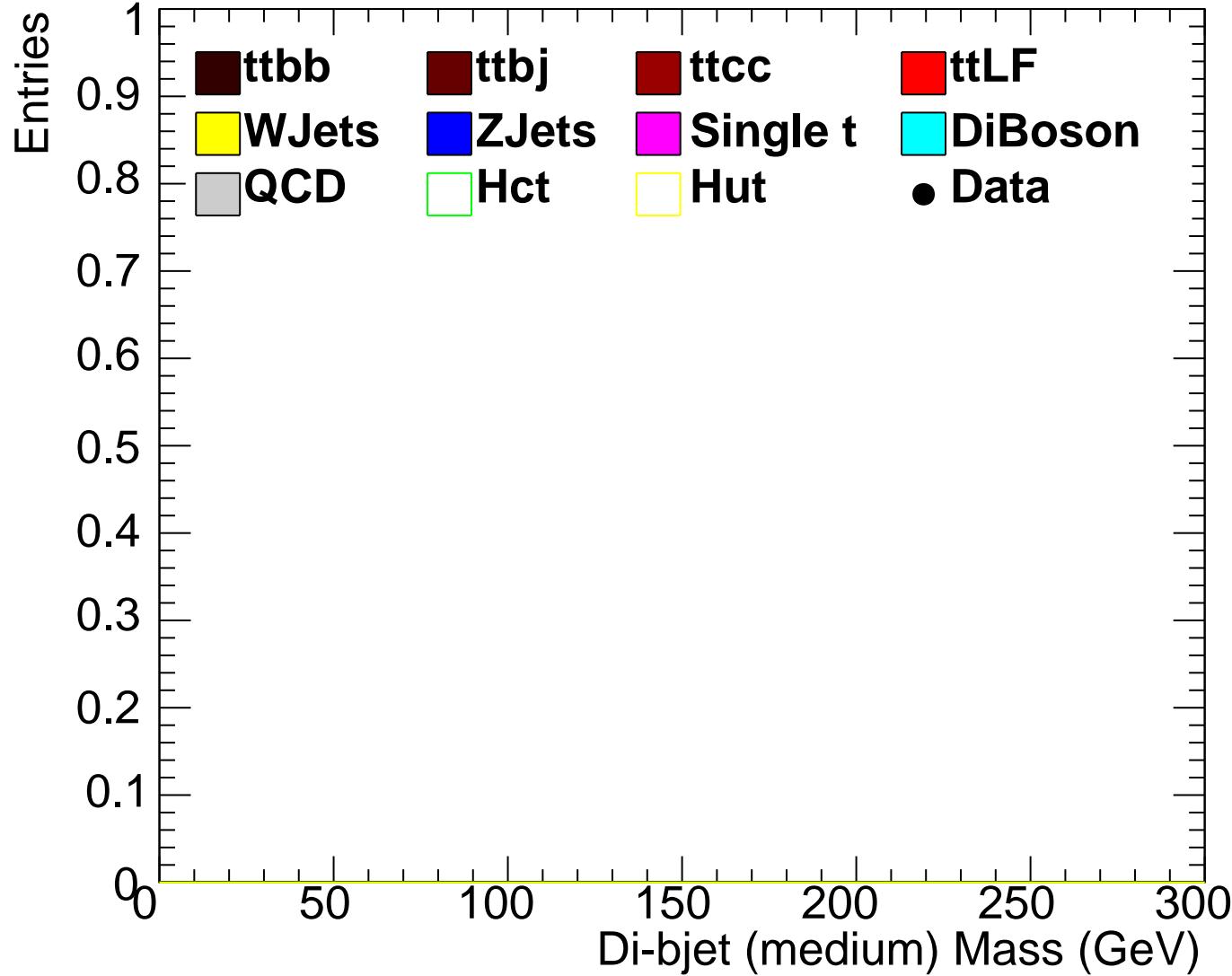


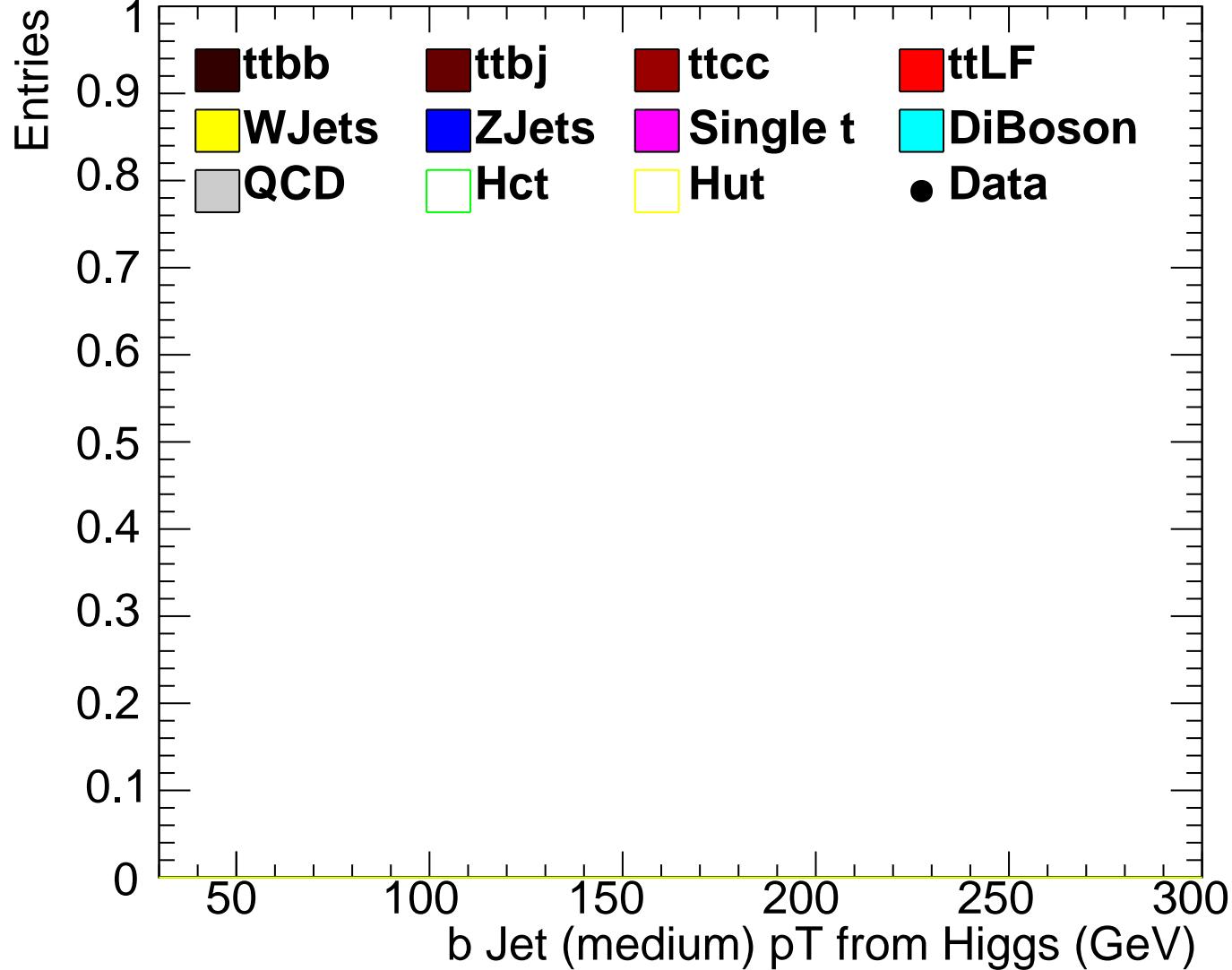


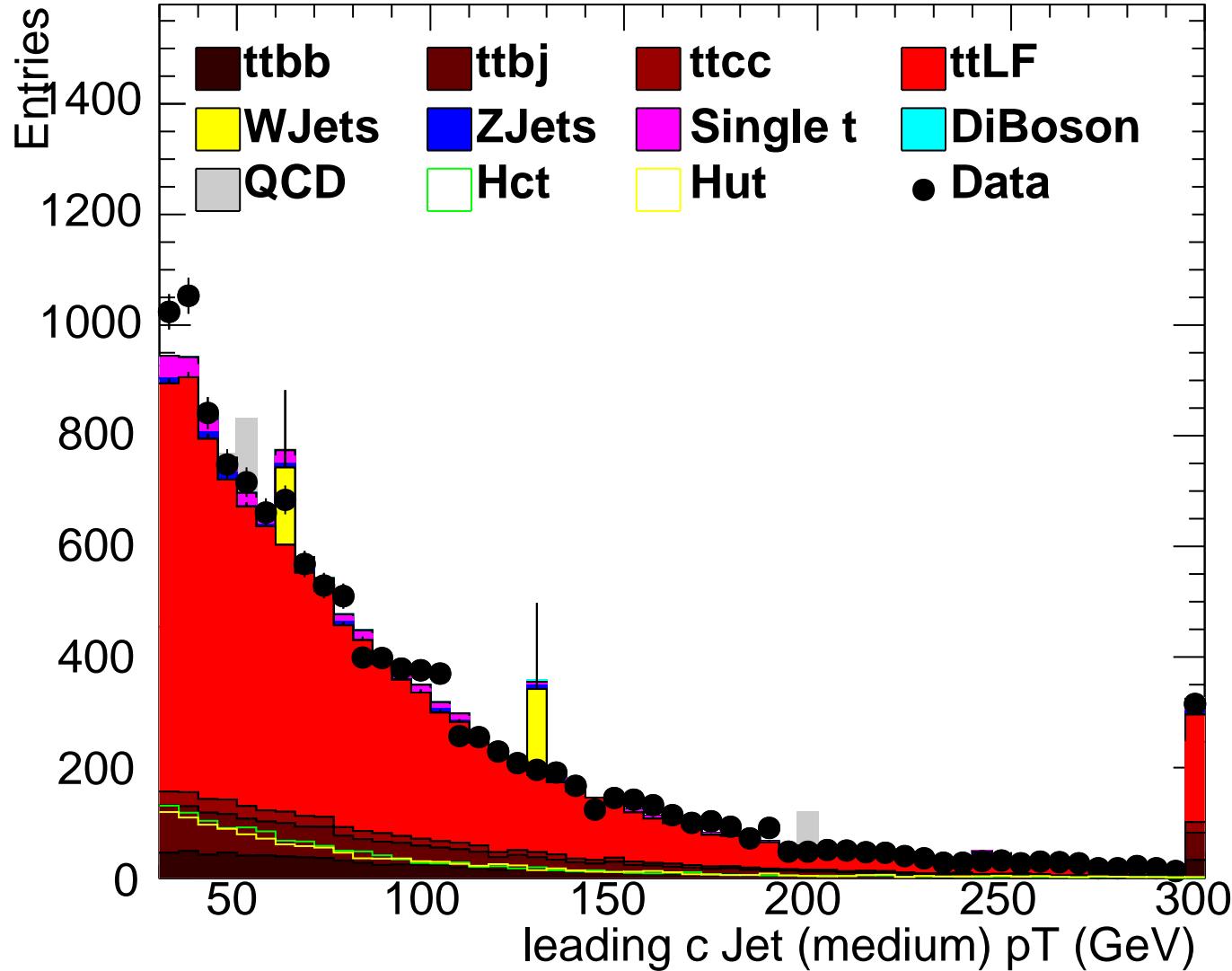


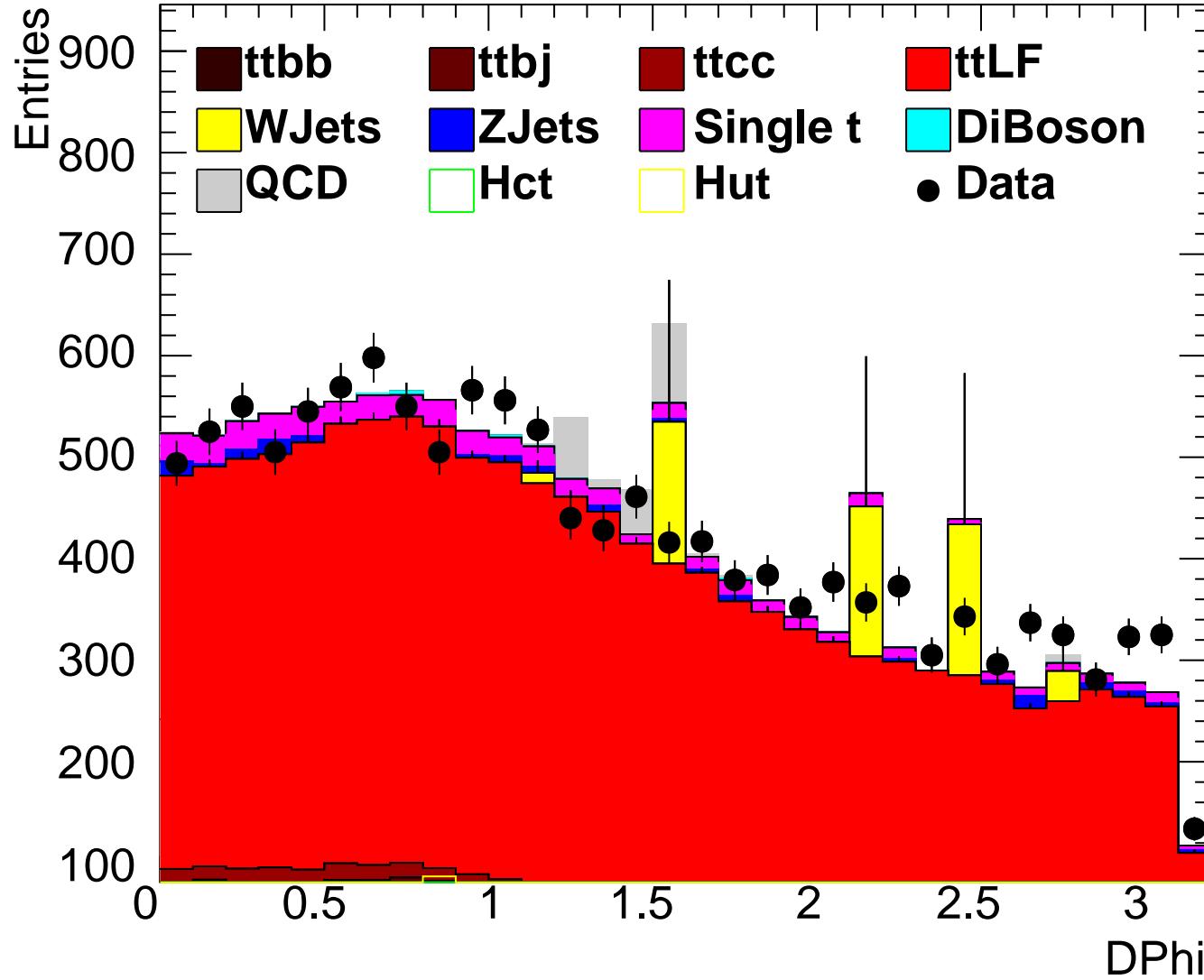


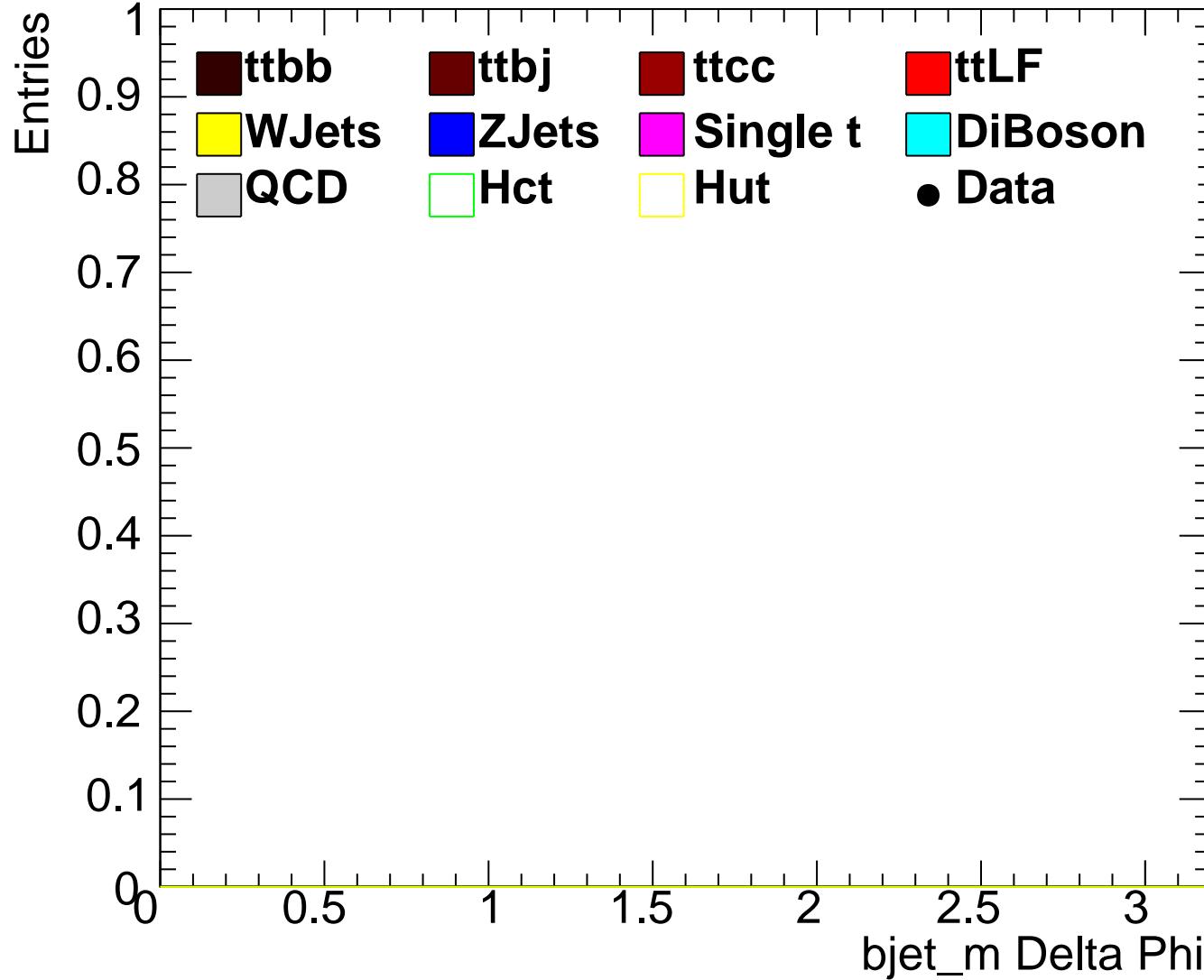


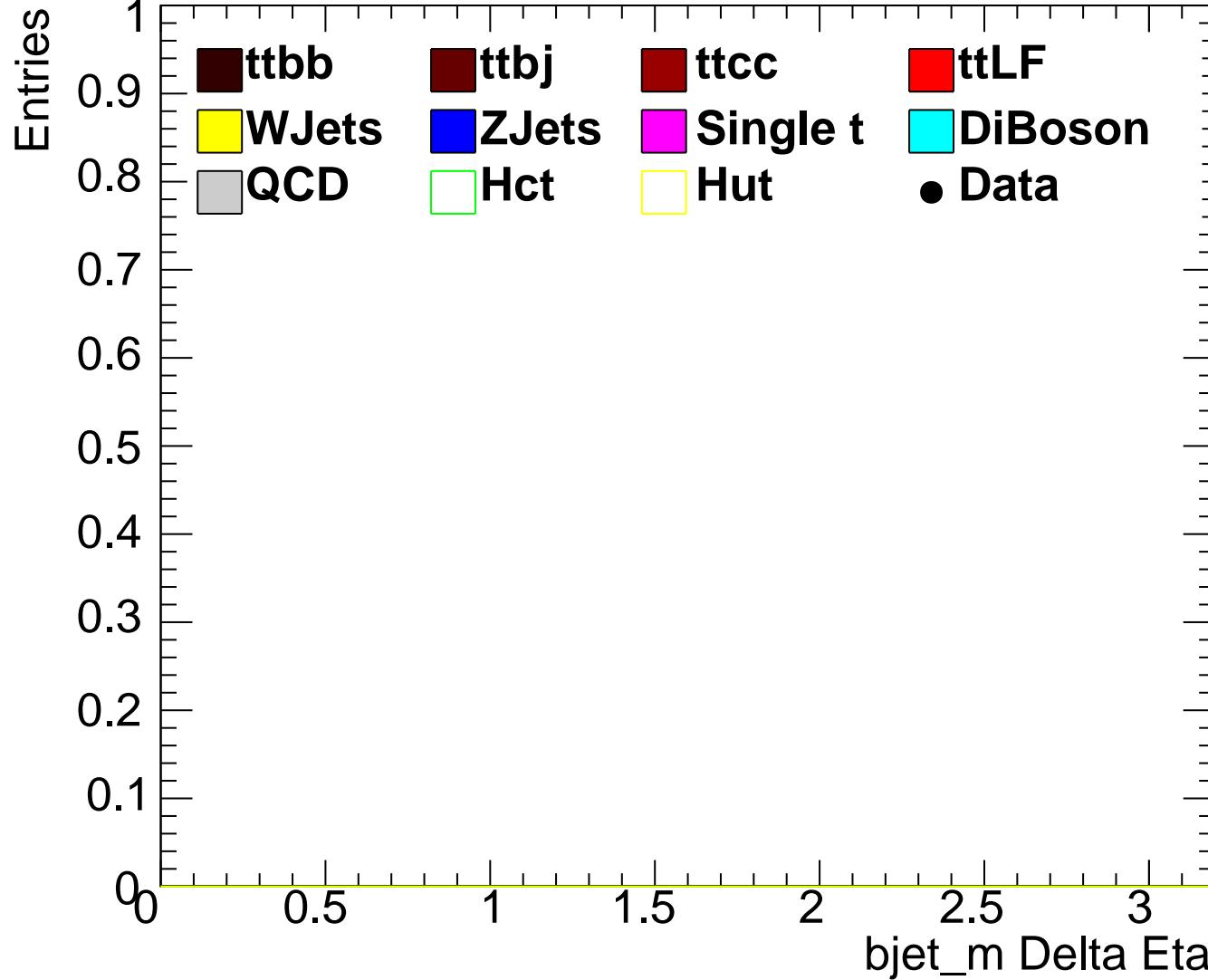


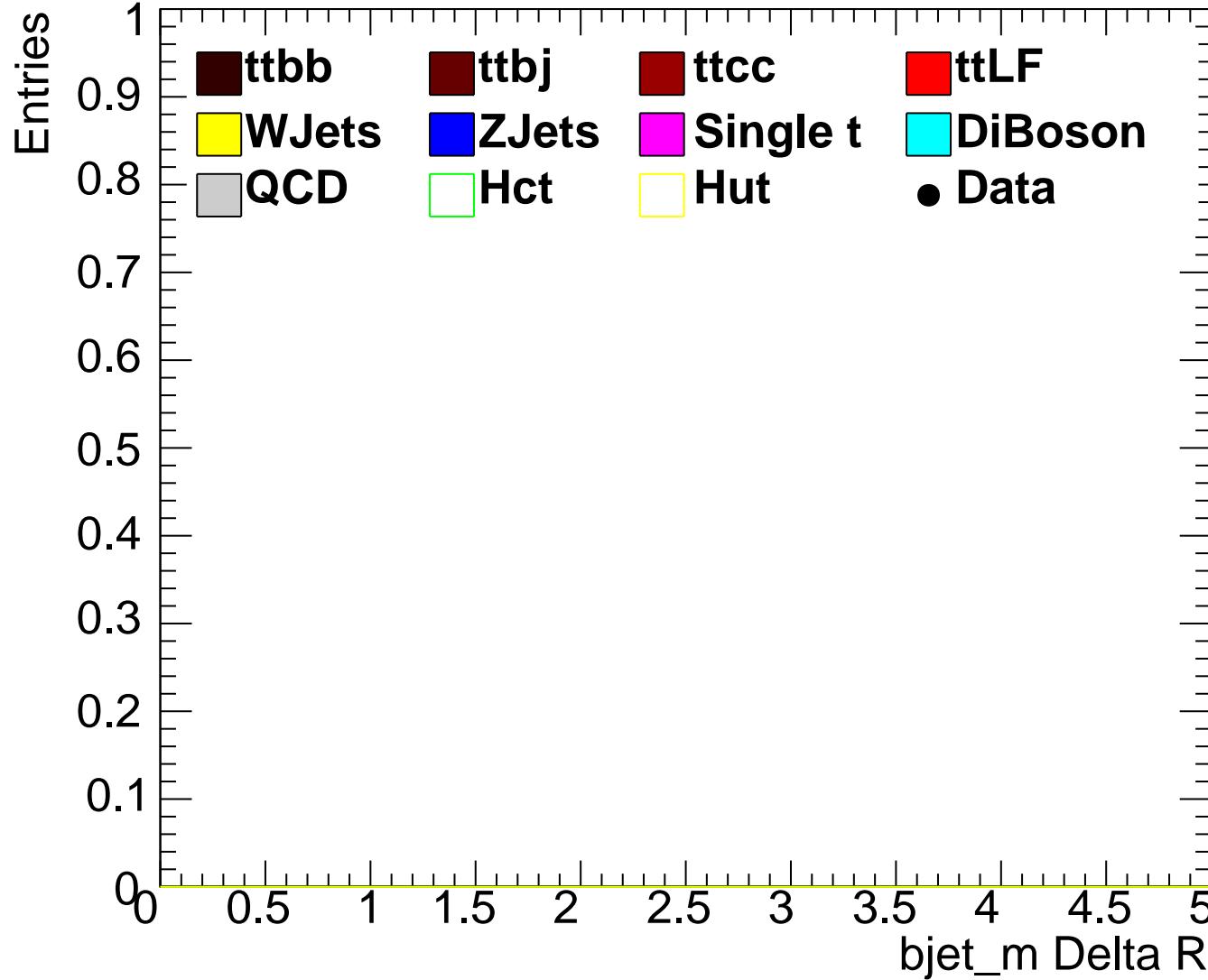


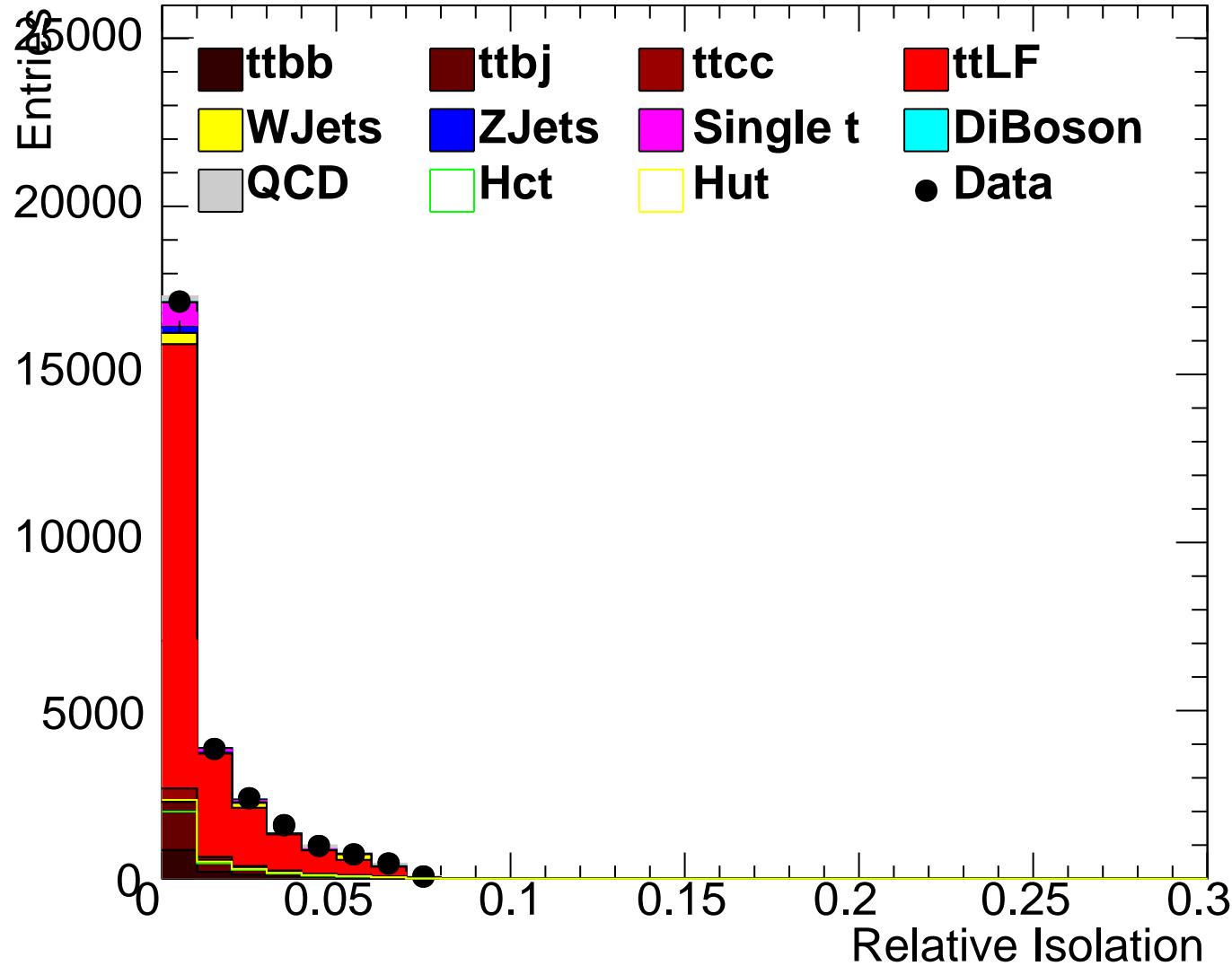
**Ch1\_S3**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

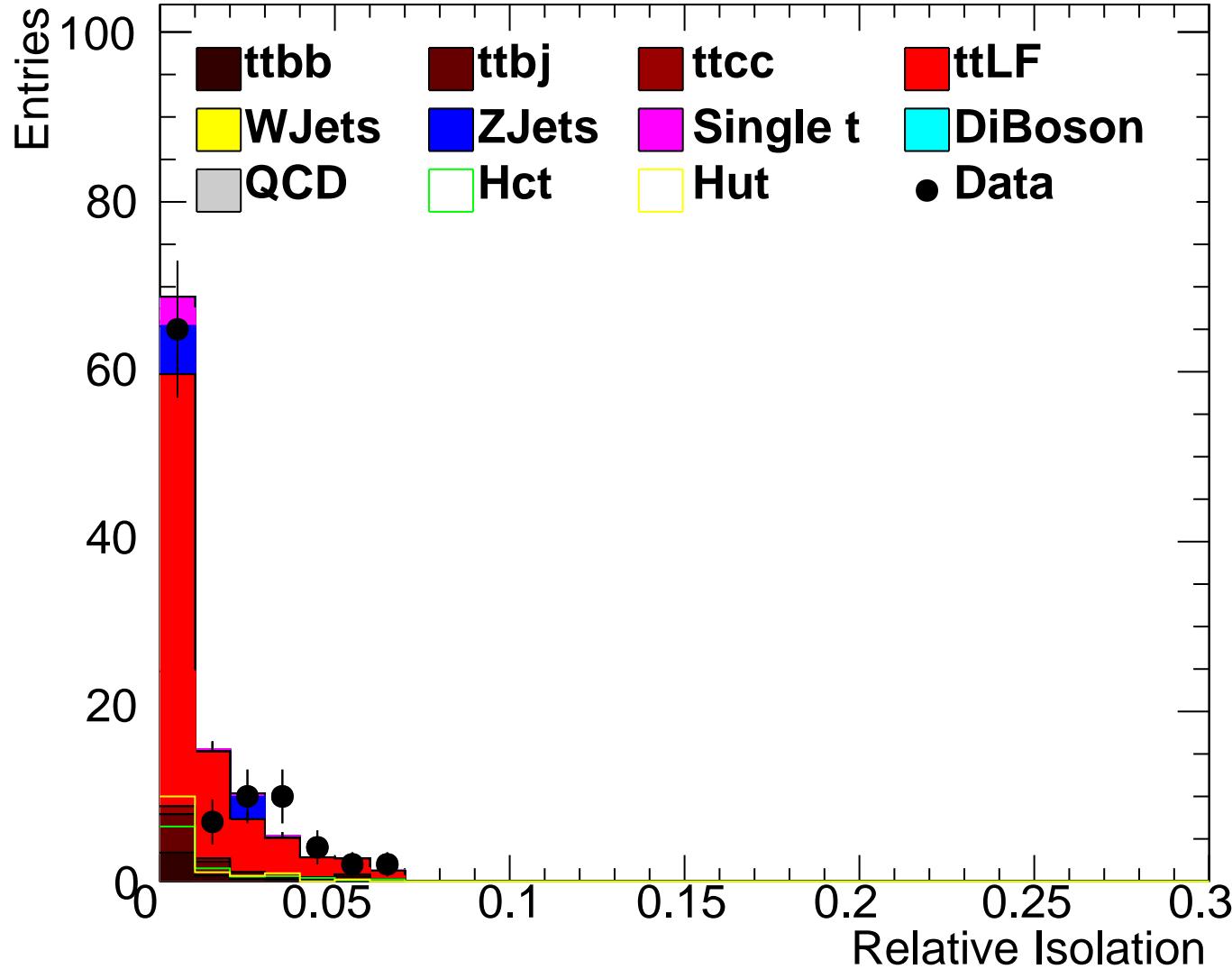


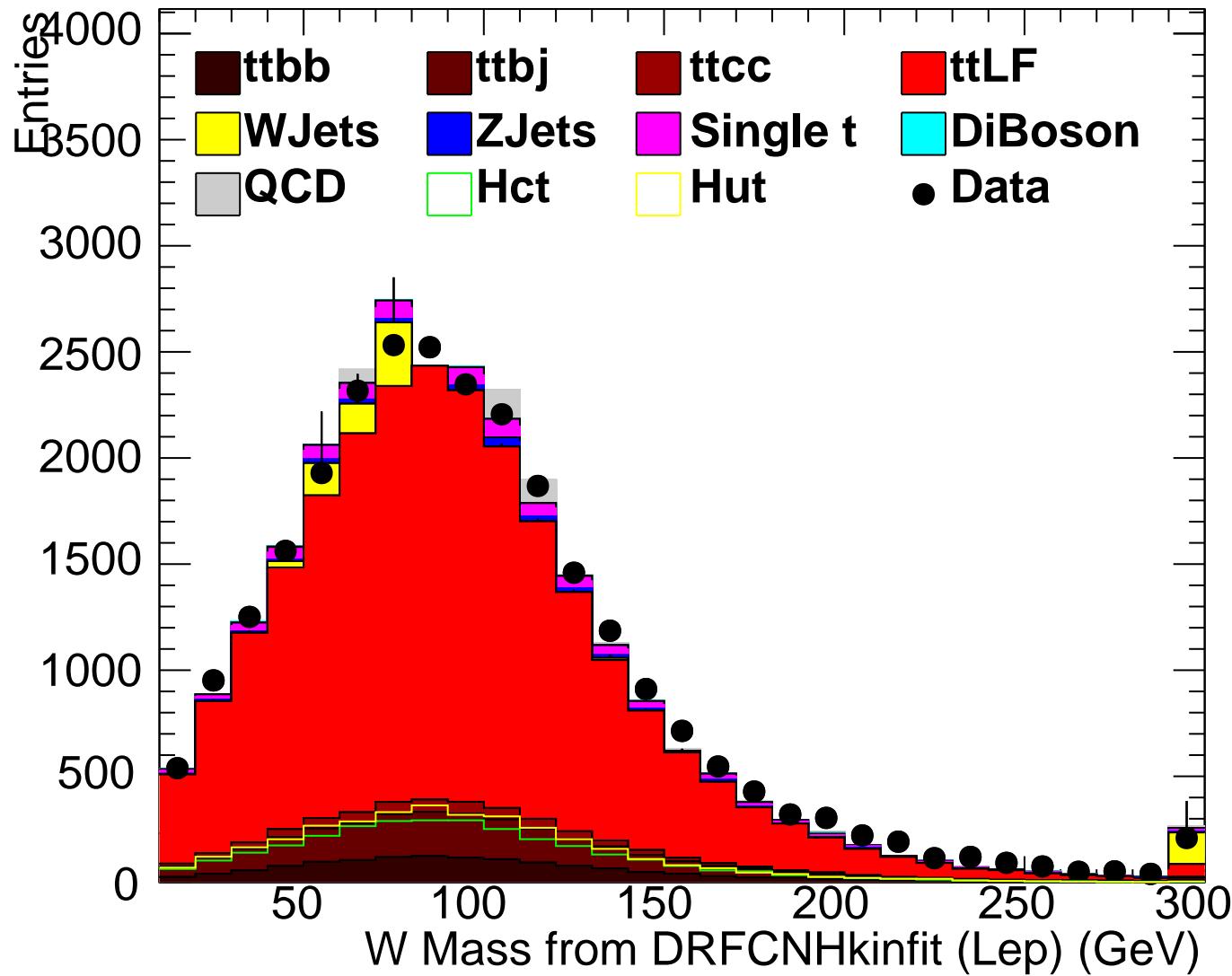


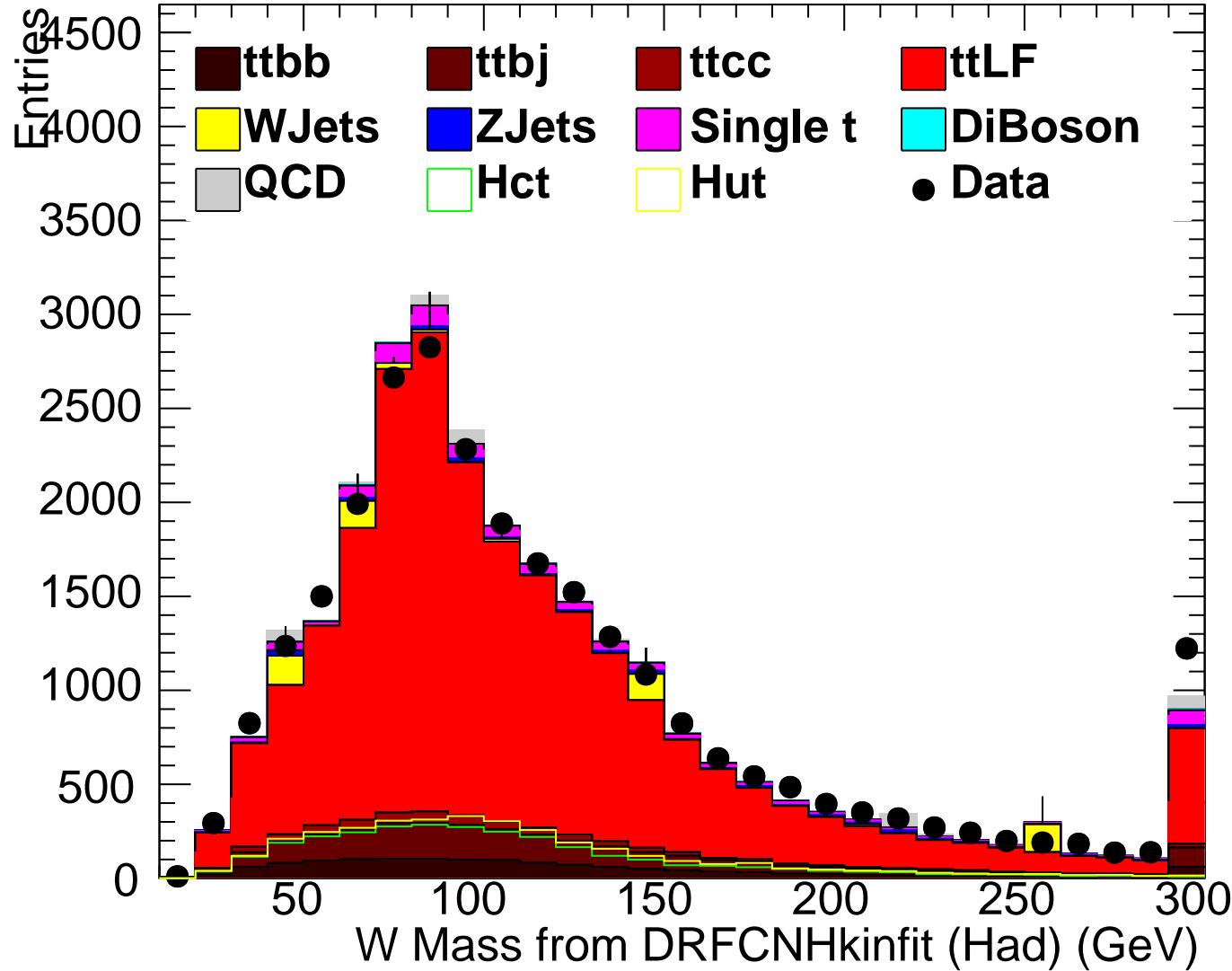


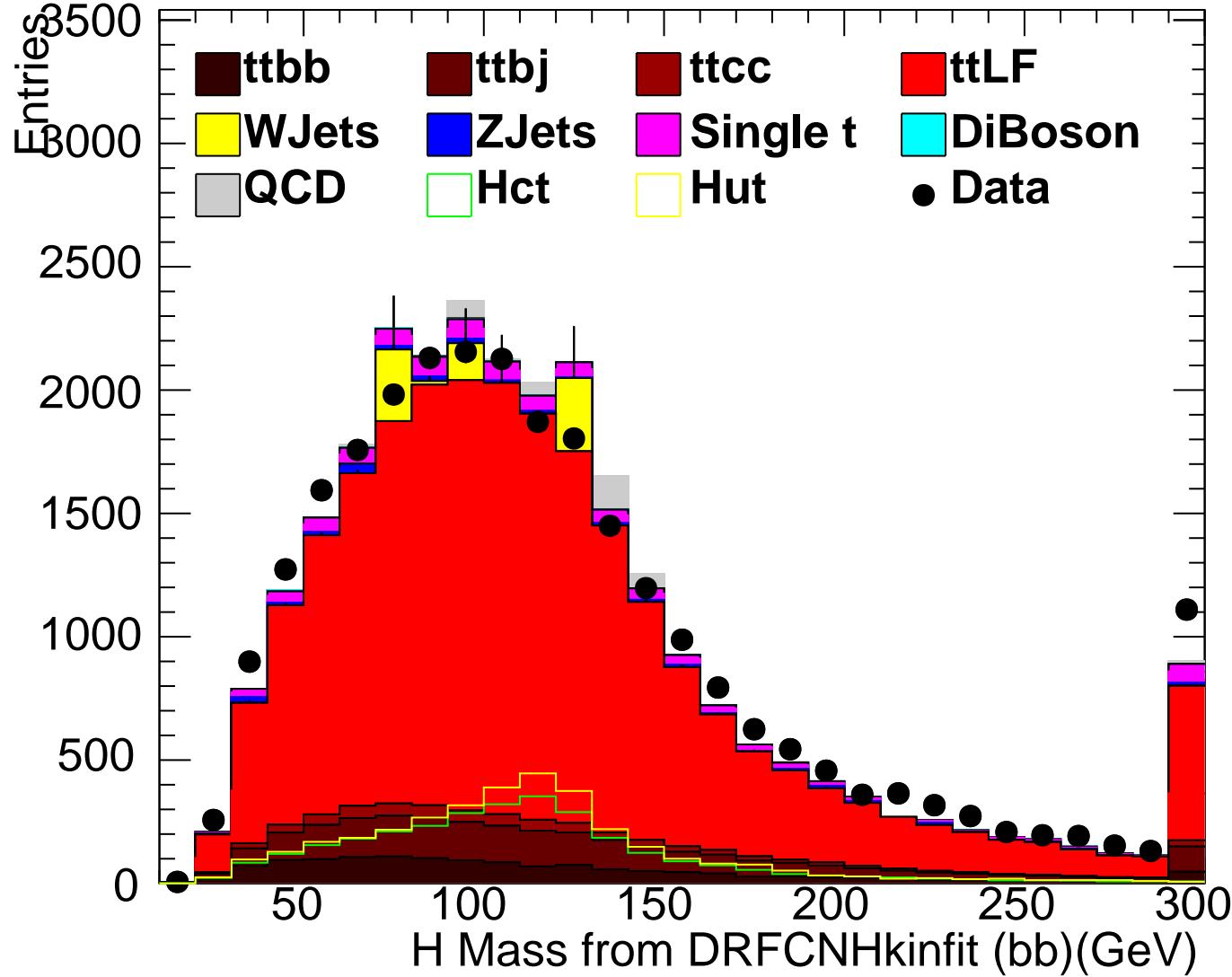


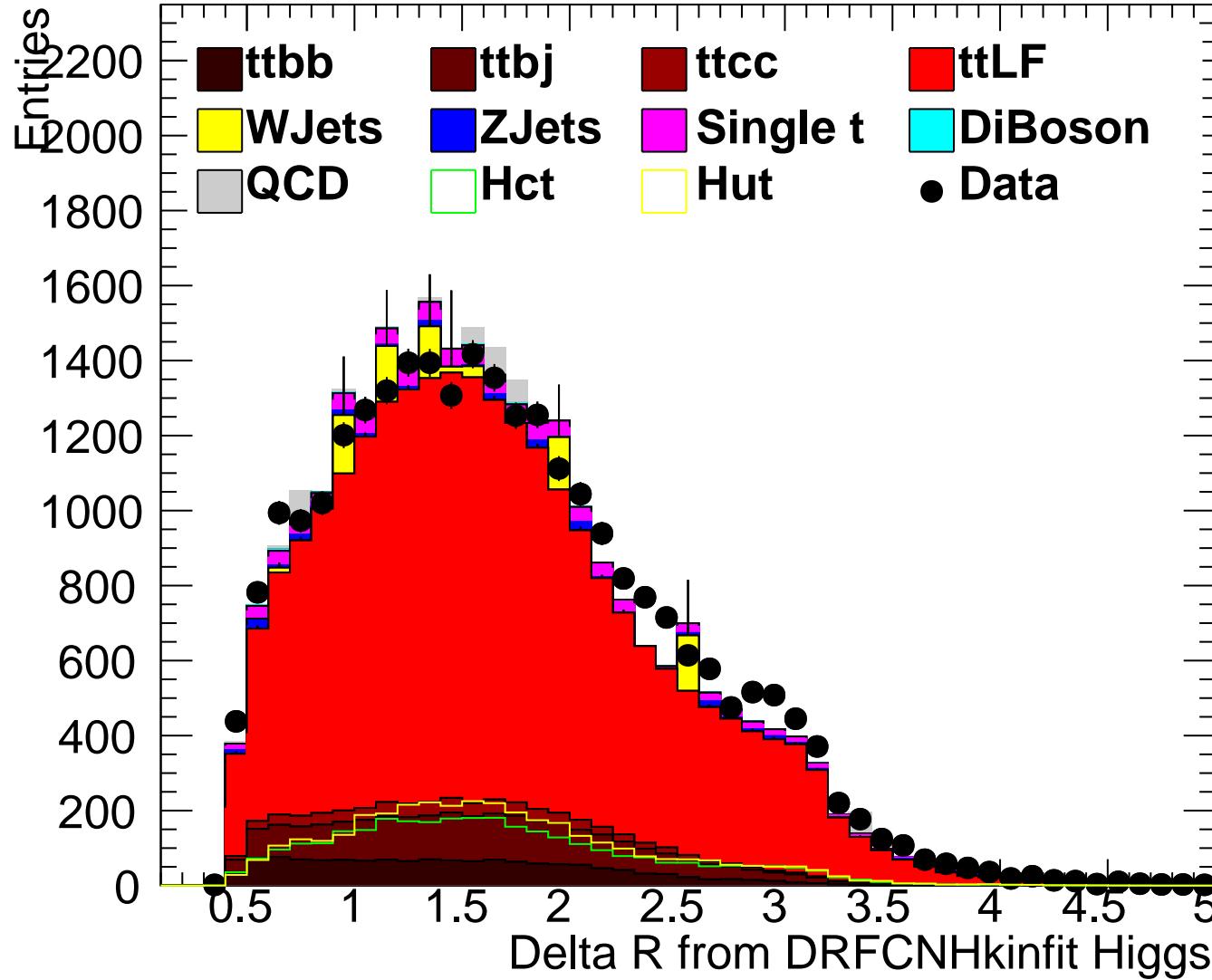


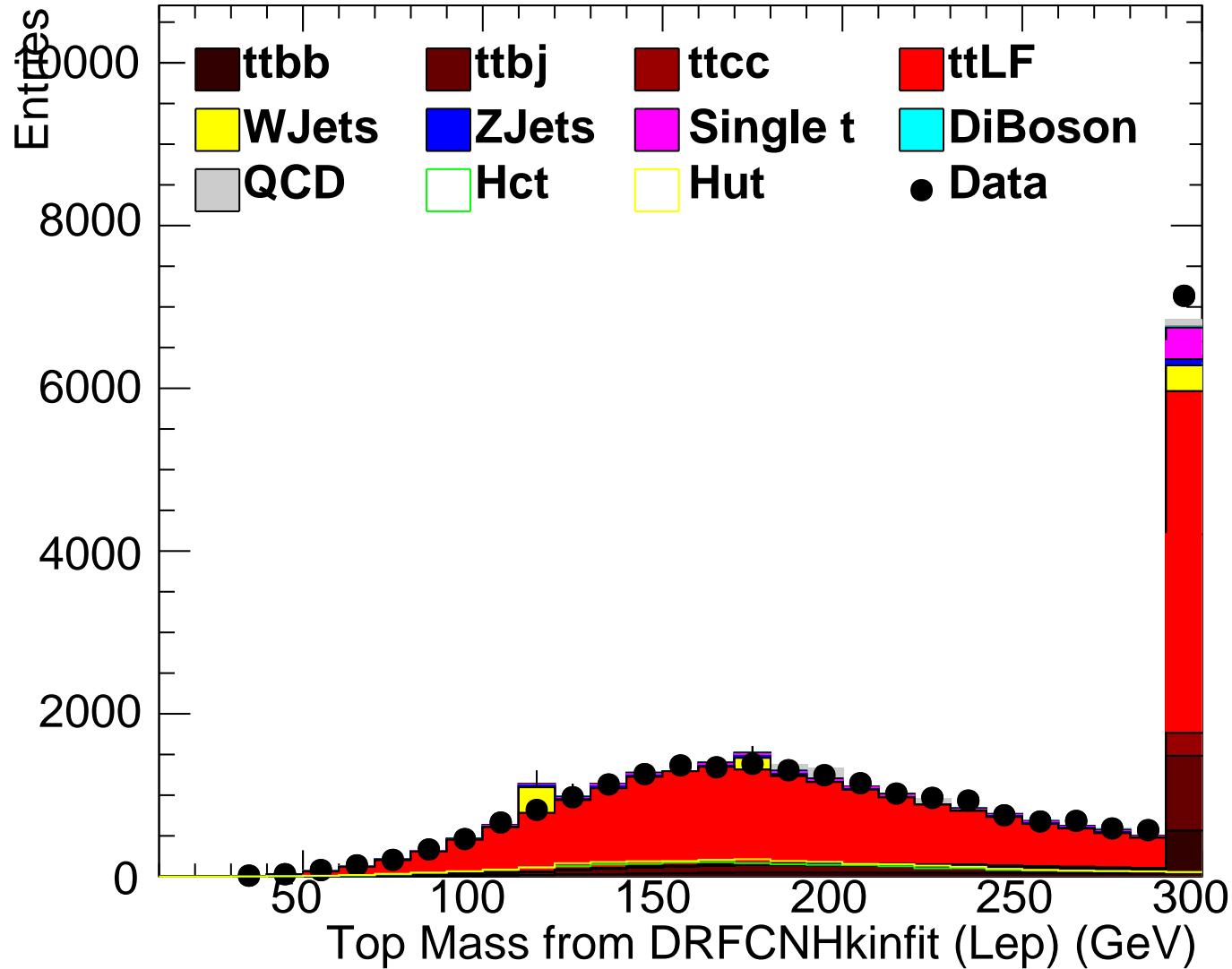


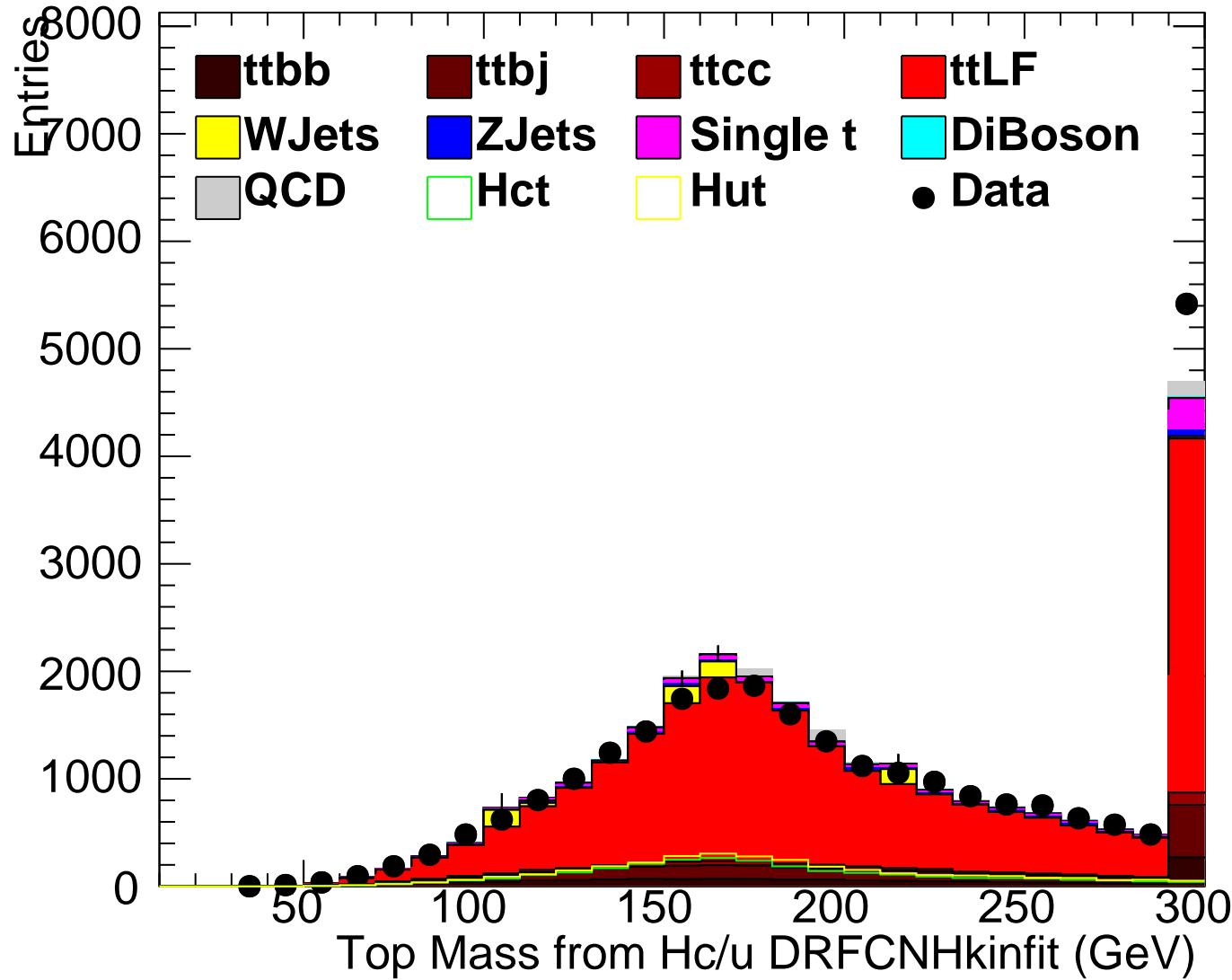
**Ch1\_S3**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 





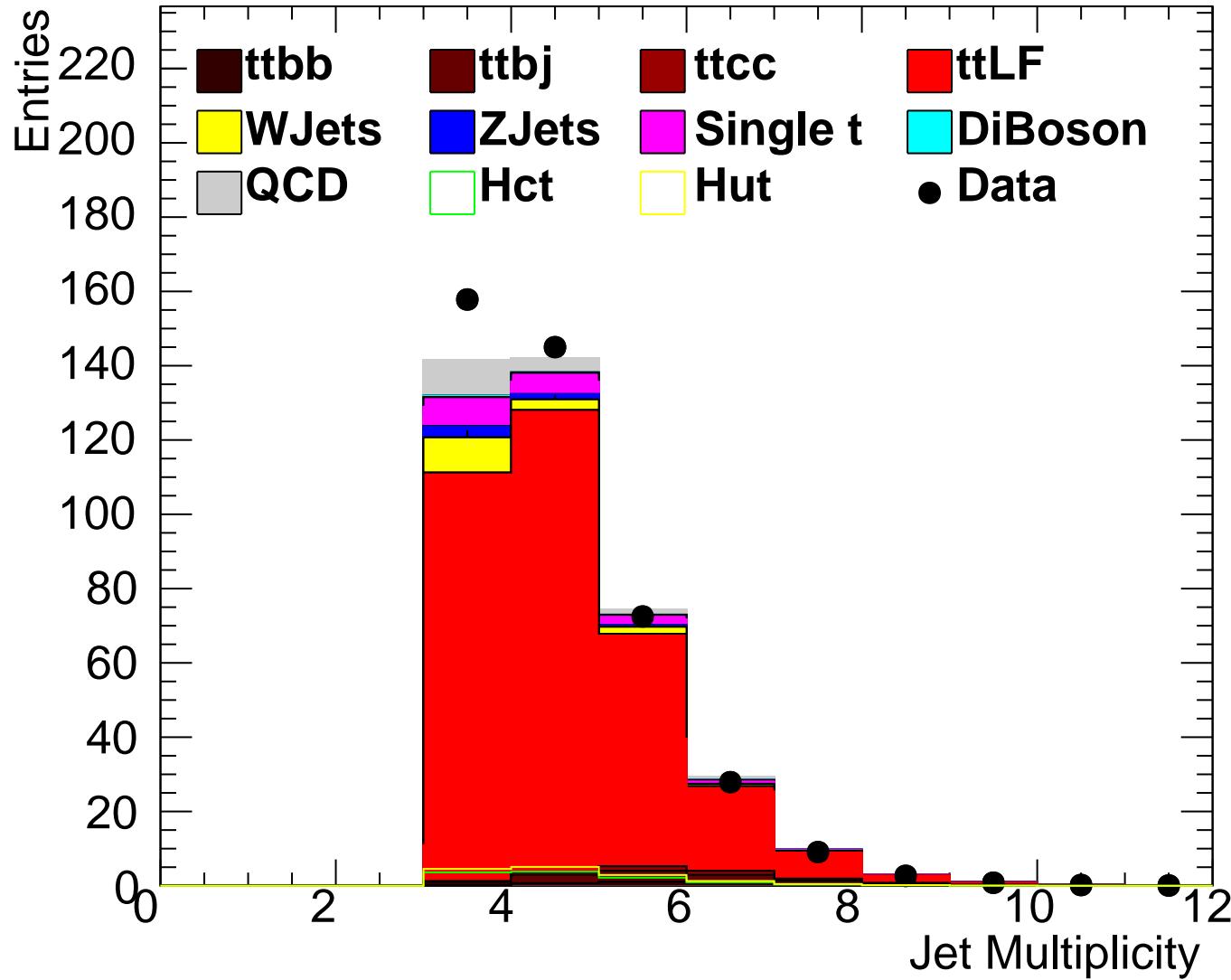
**Ch1\_S3**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 



**Ch1\_S3**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

Ch1\_S4

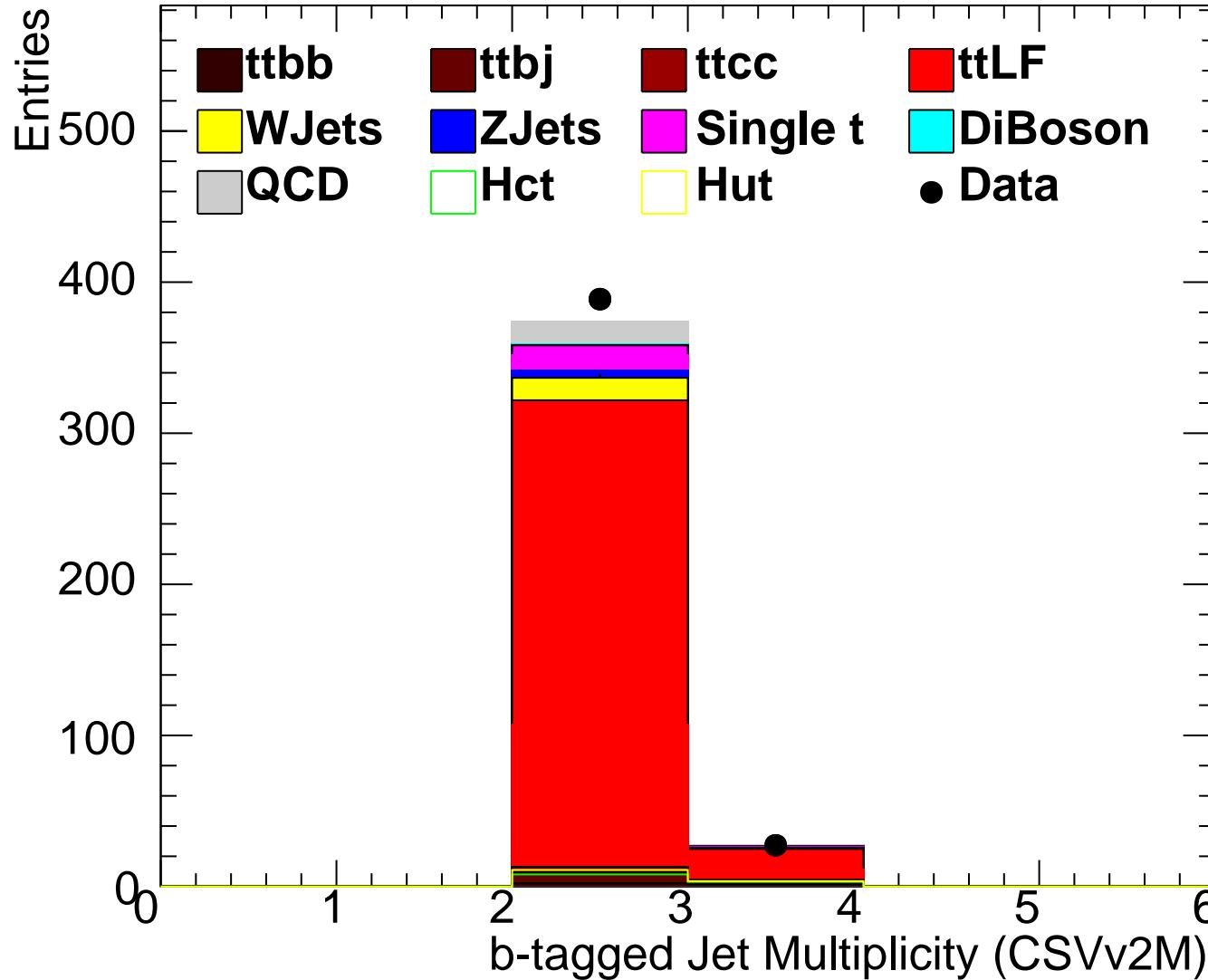
CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$



Ch1\_S4

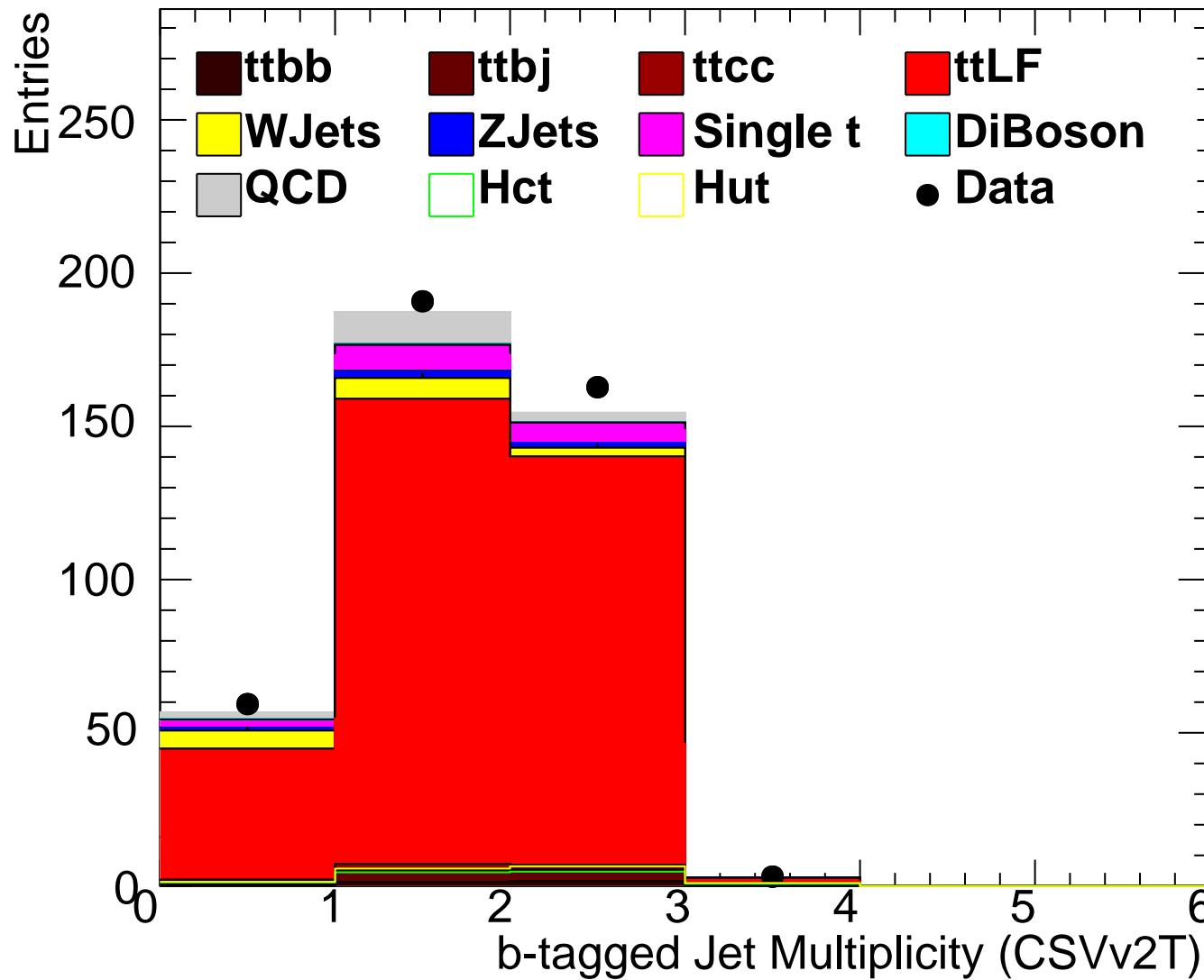
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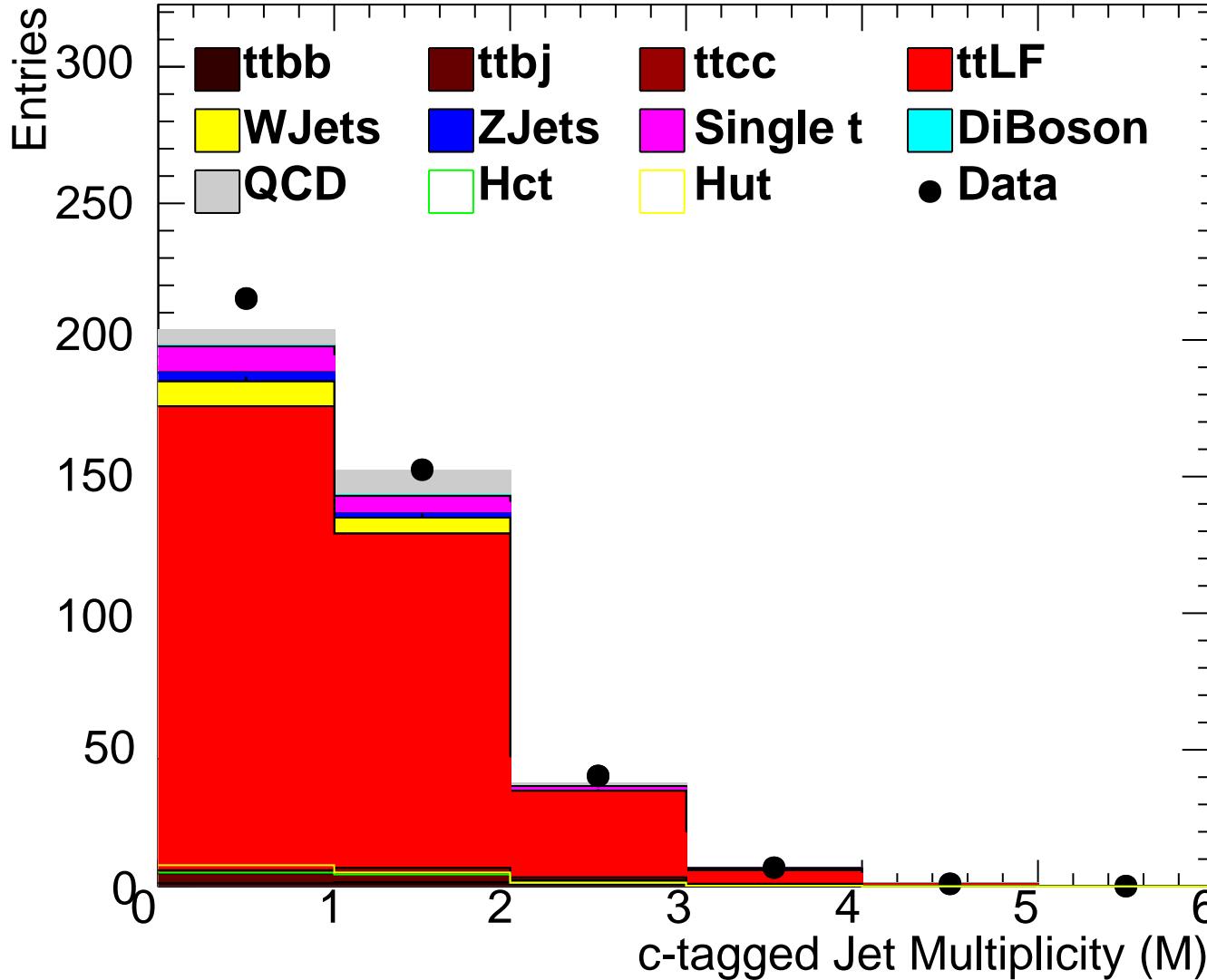
CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV

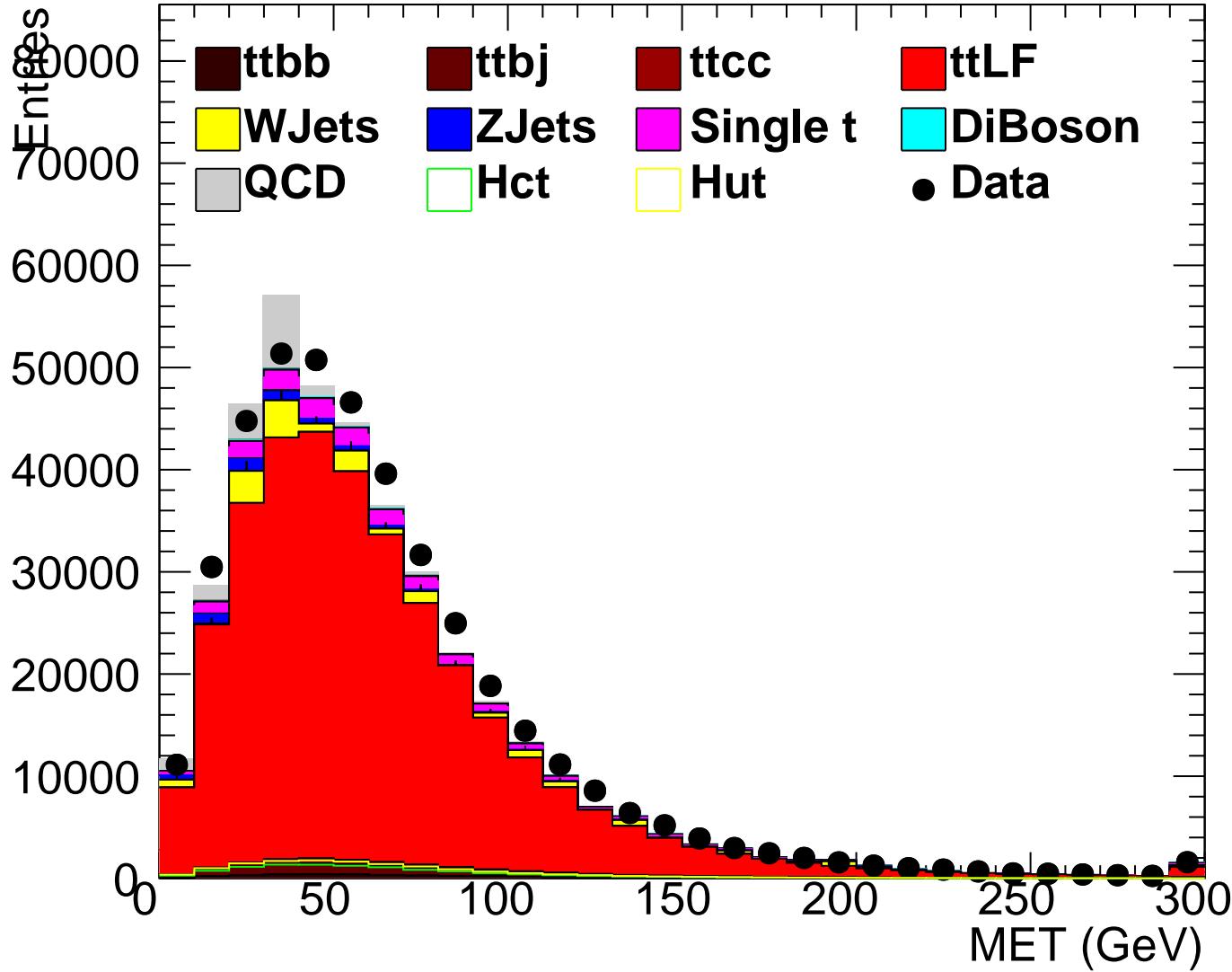


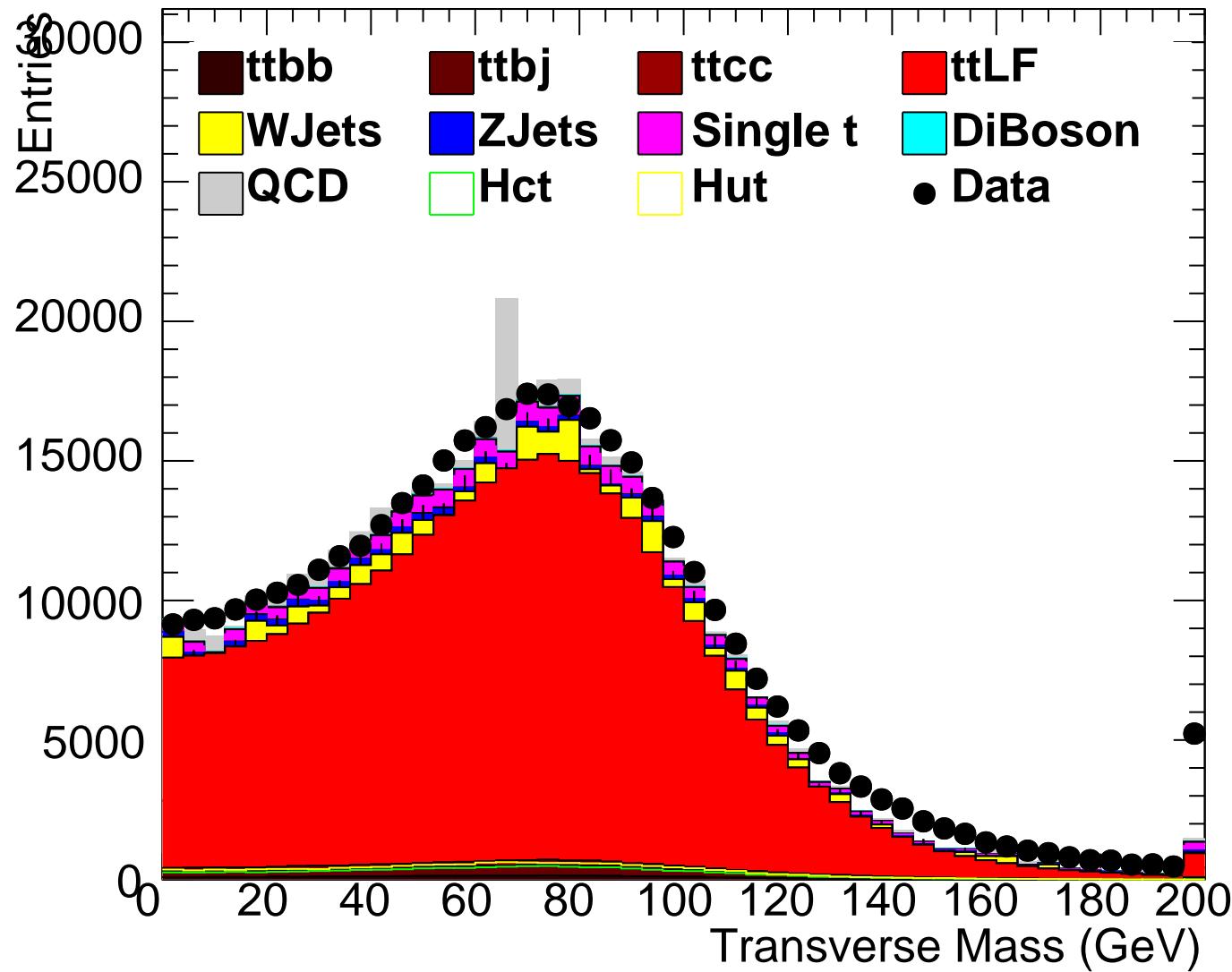
Ch1\_S4

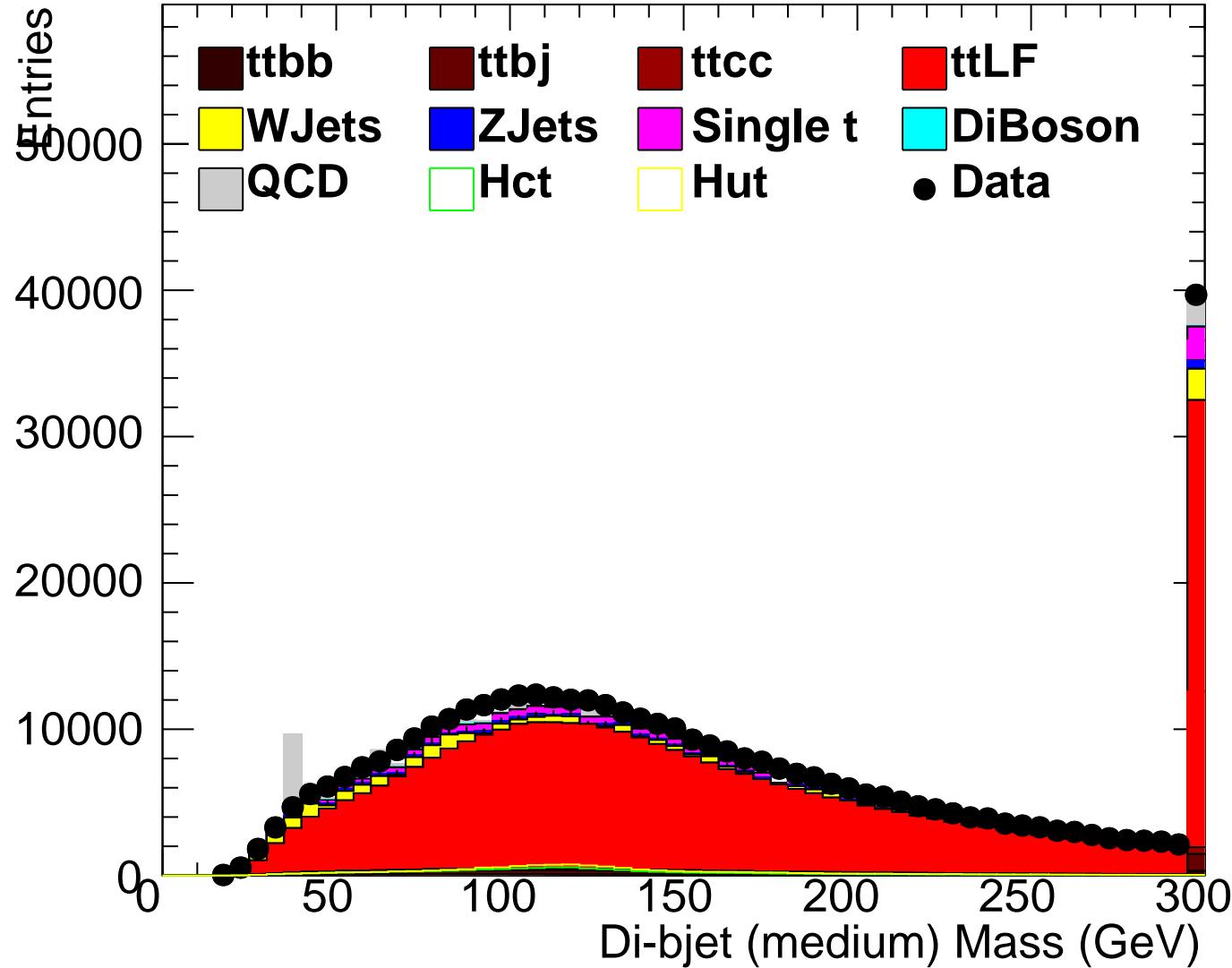
CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$

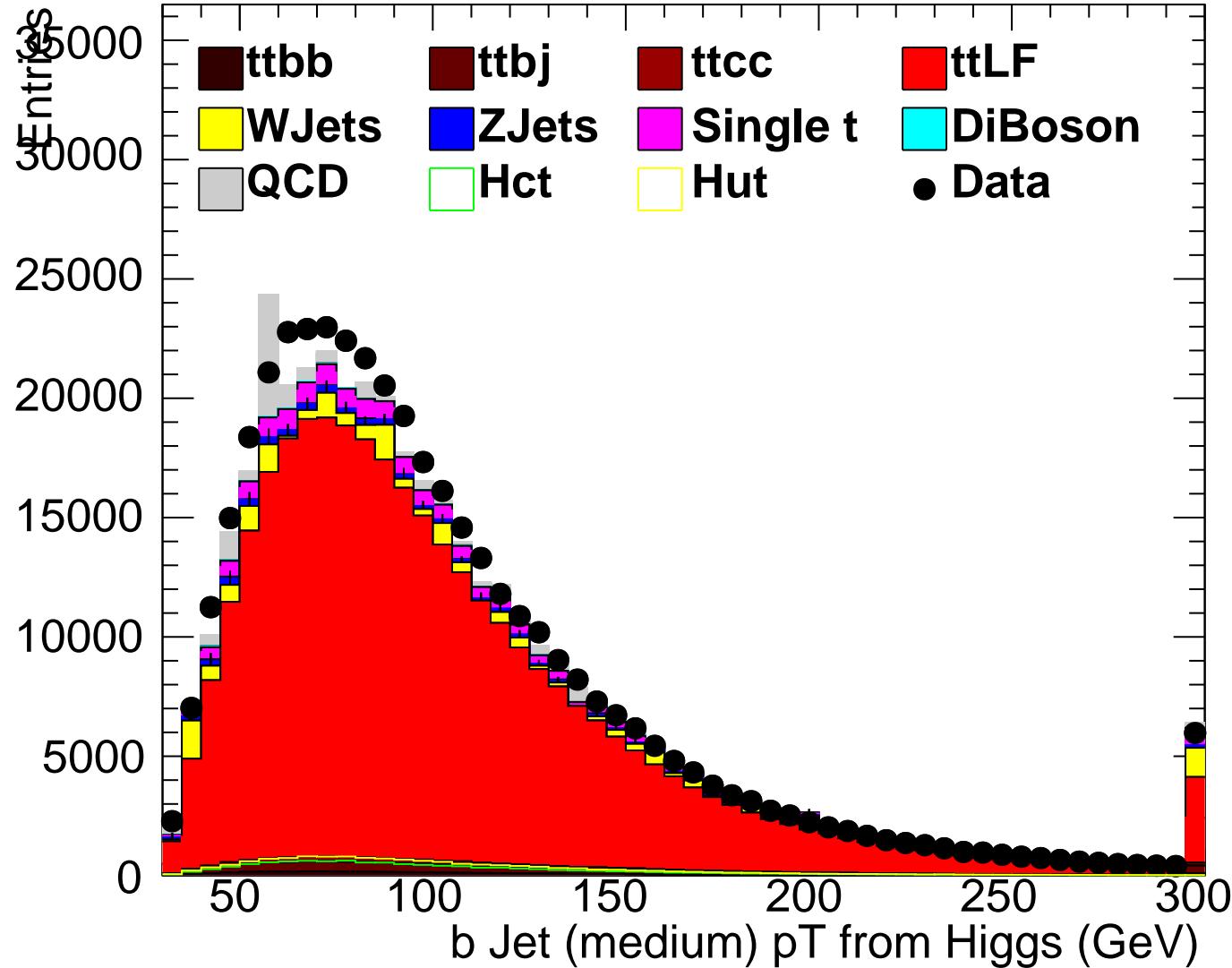


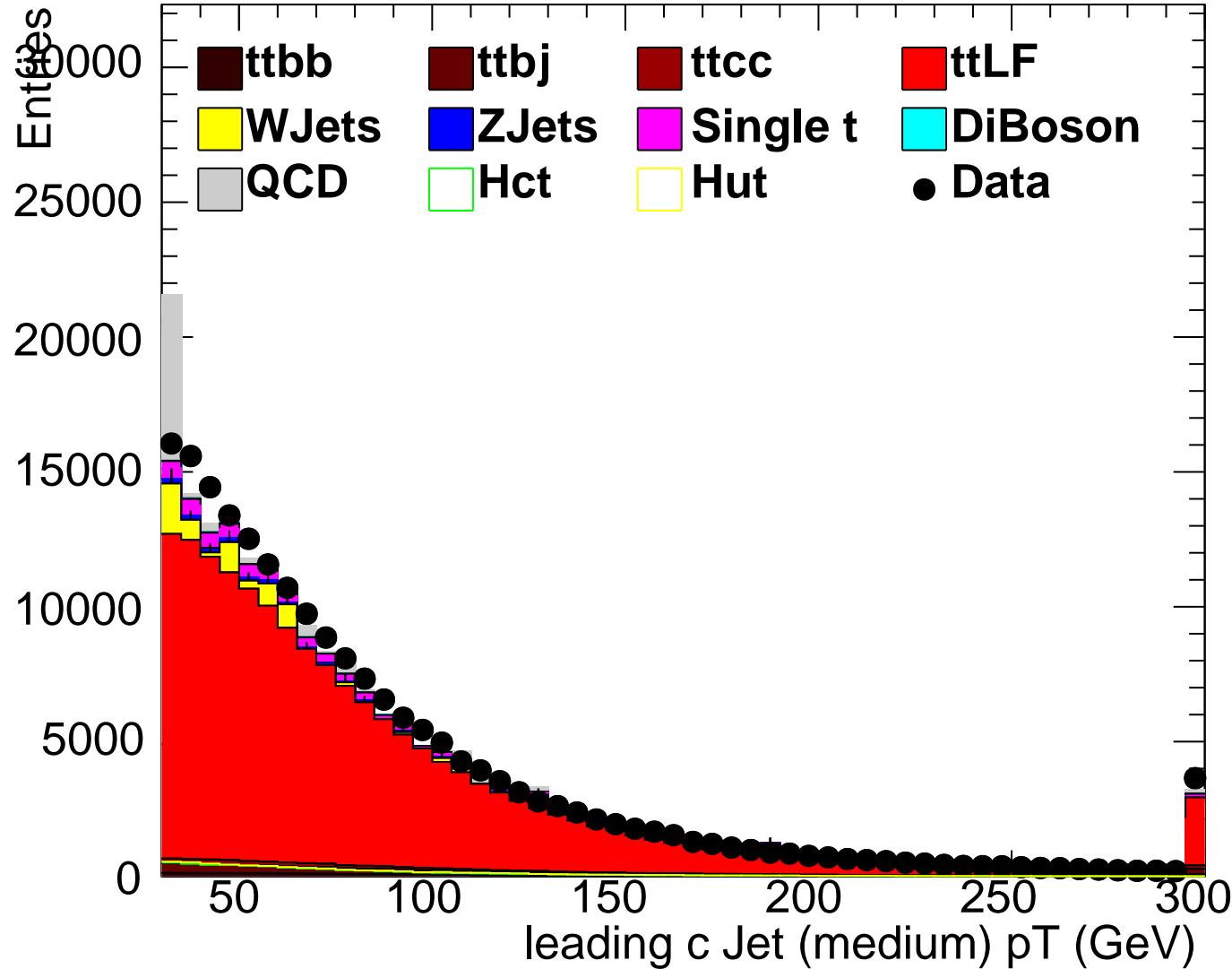
**Ch1\_S4**x 10<sup>3</sup>CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV

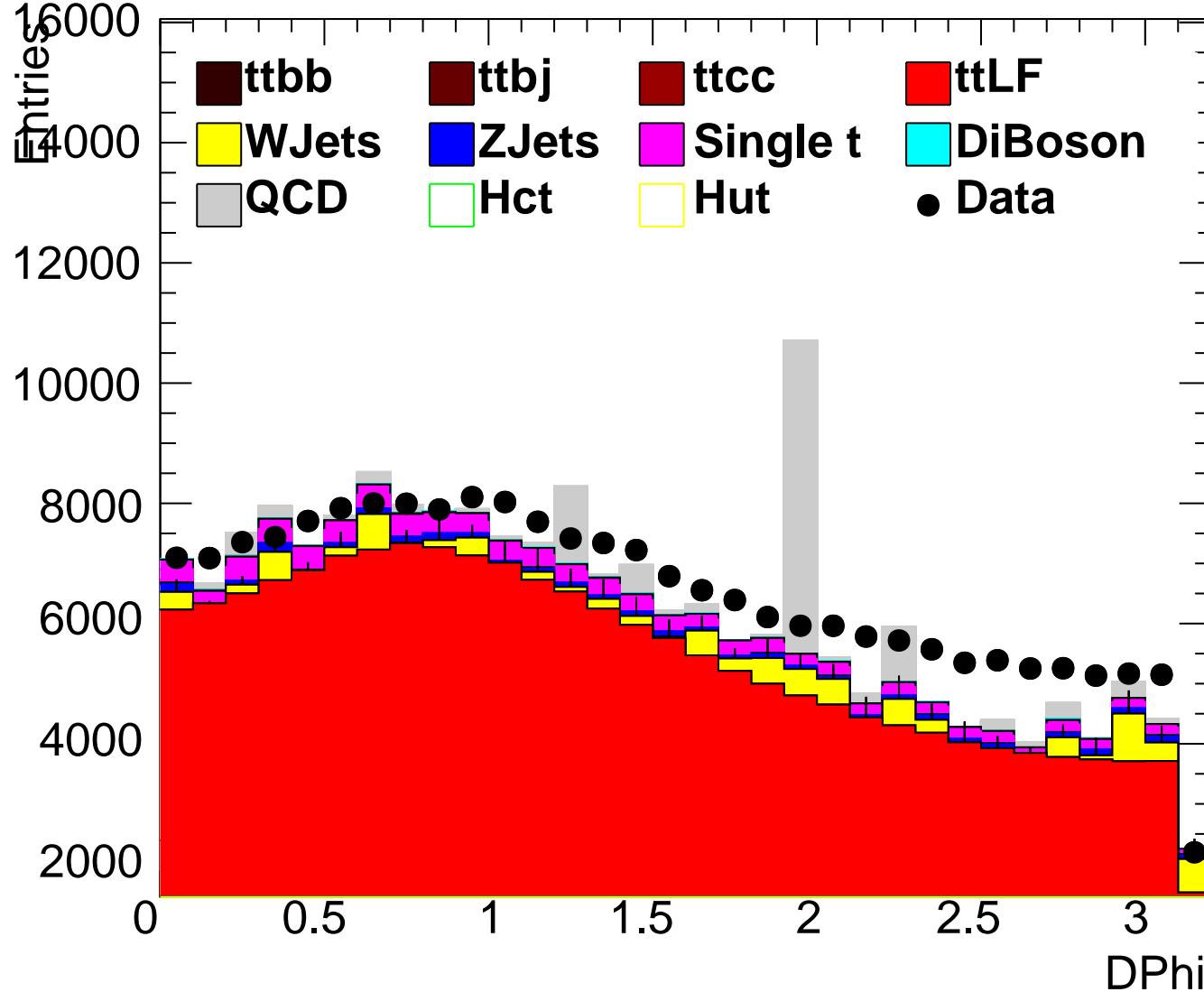


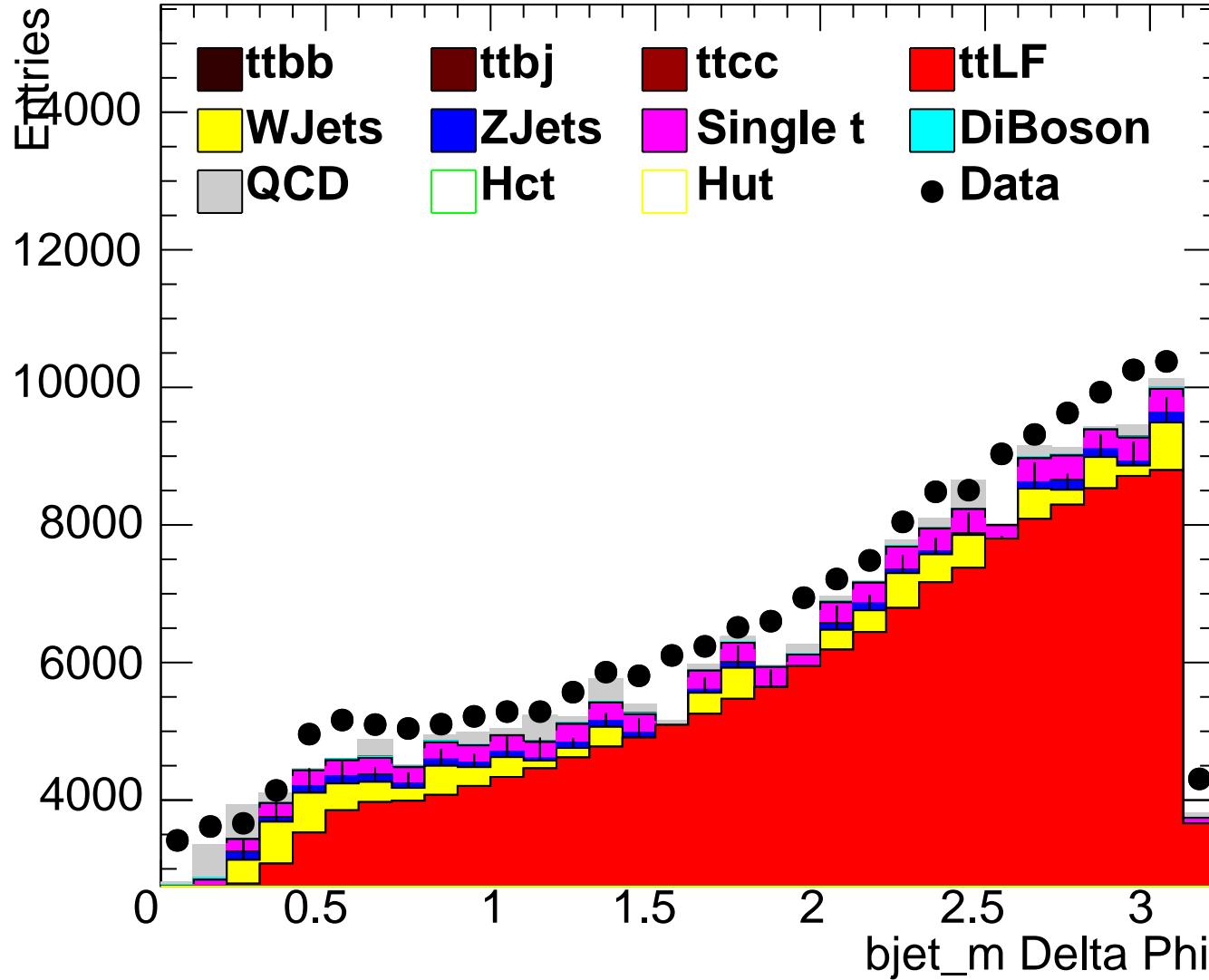
**Ch1\_S4**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

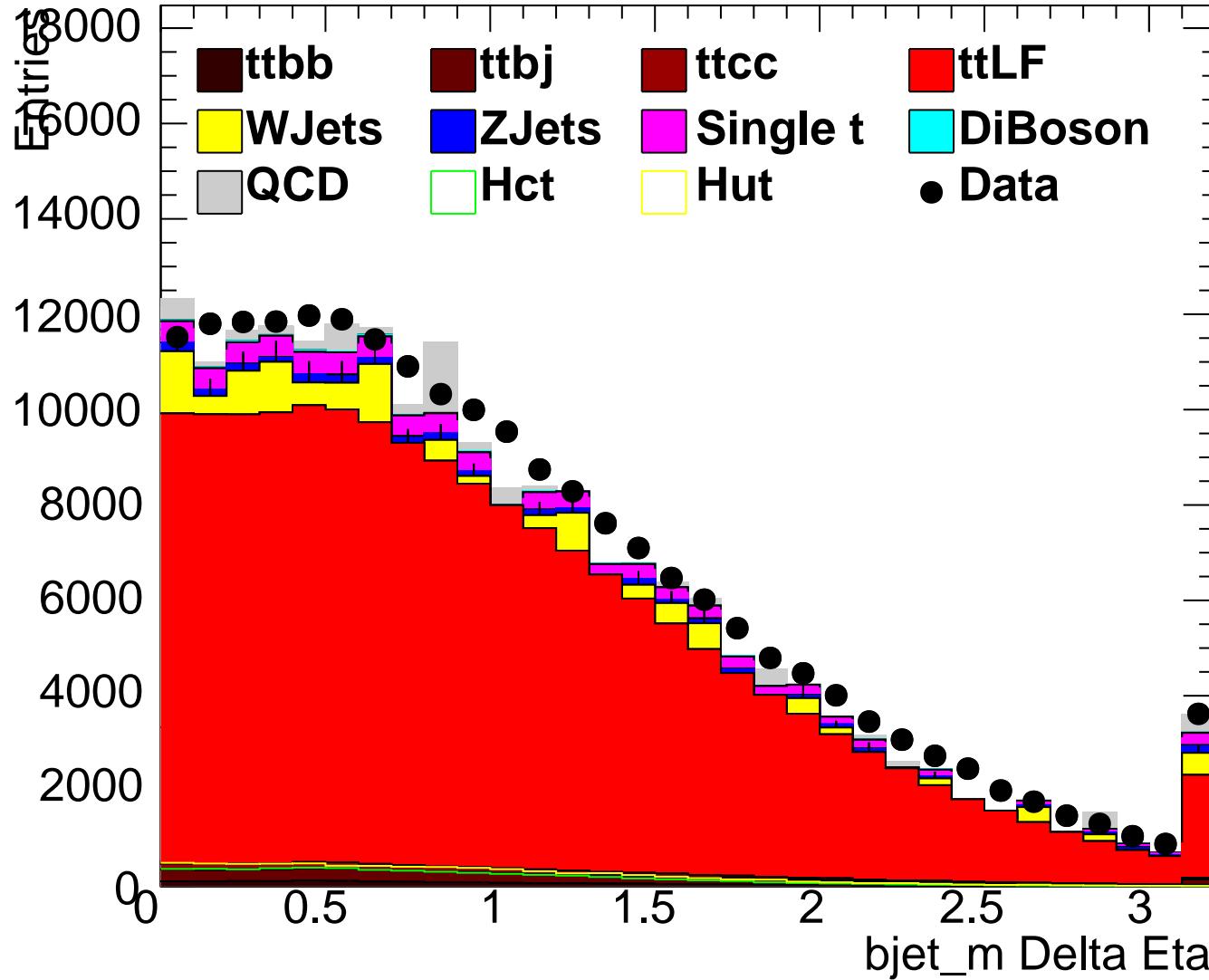
**Ch1\_S4**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

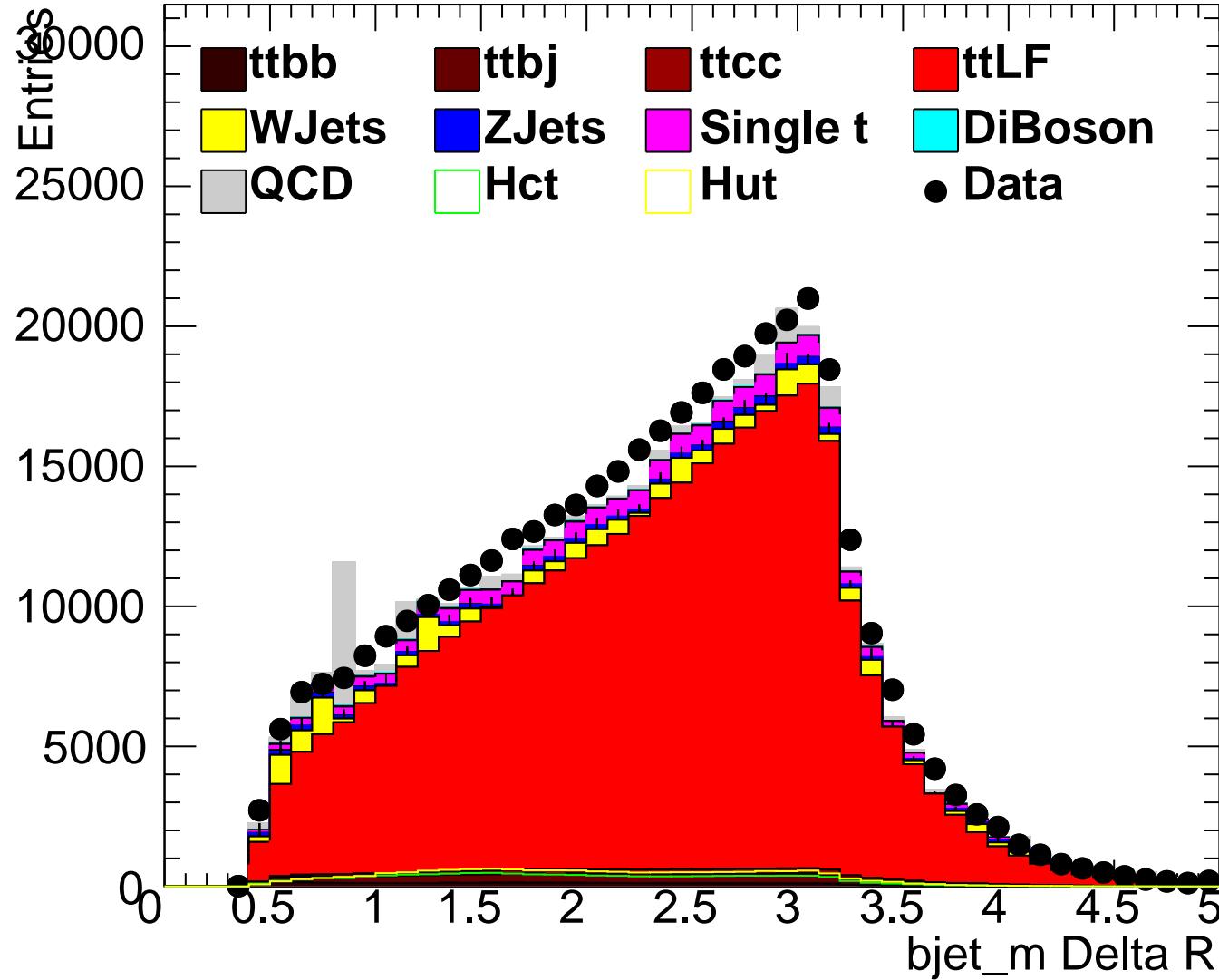
**Ch1\_S4**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch1\_S4**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch1\_S4**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

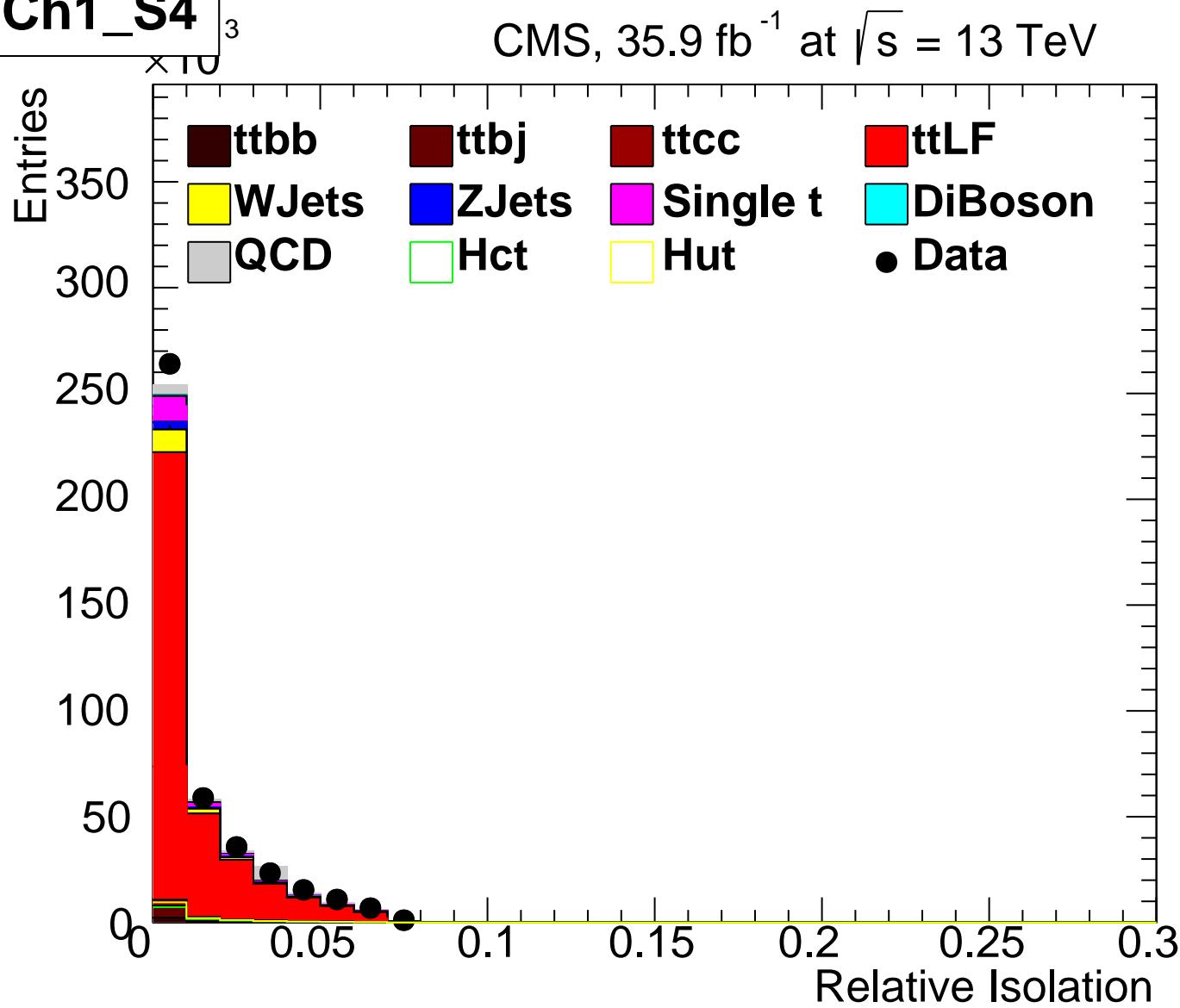


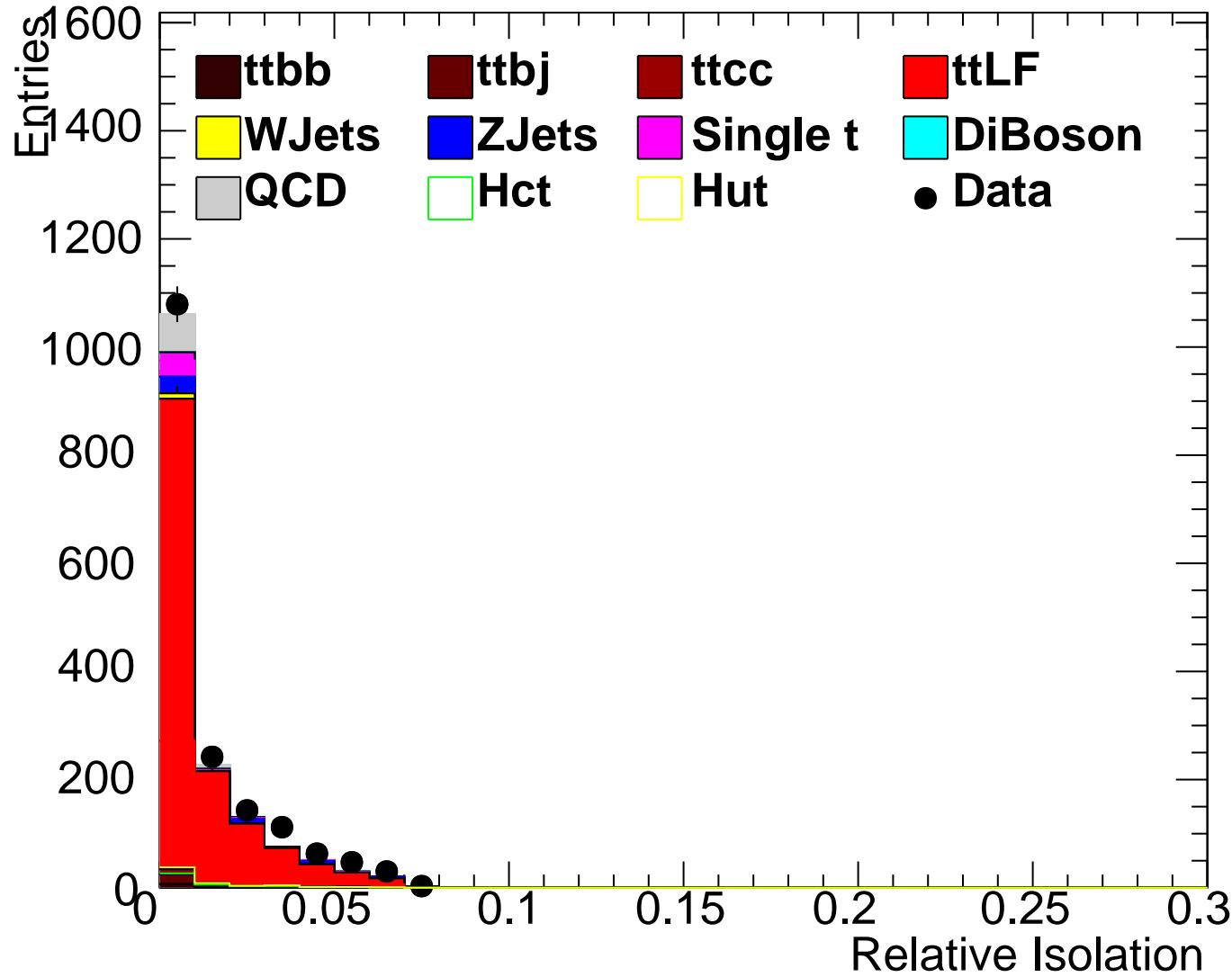


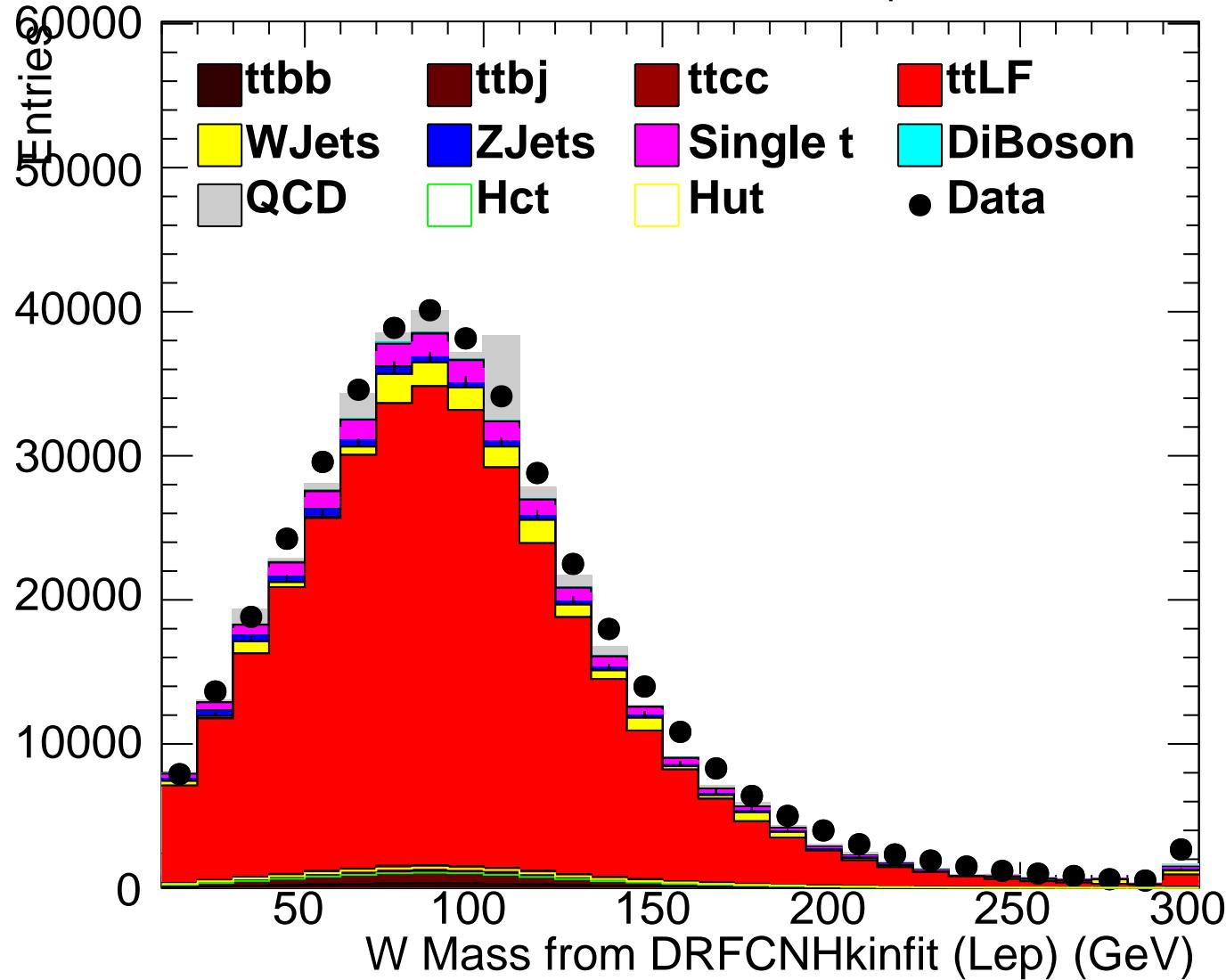


**Ch1\_S4**x 10<sup>3</sup>CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV

Entries

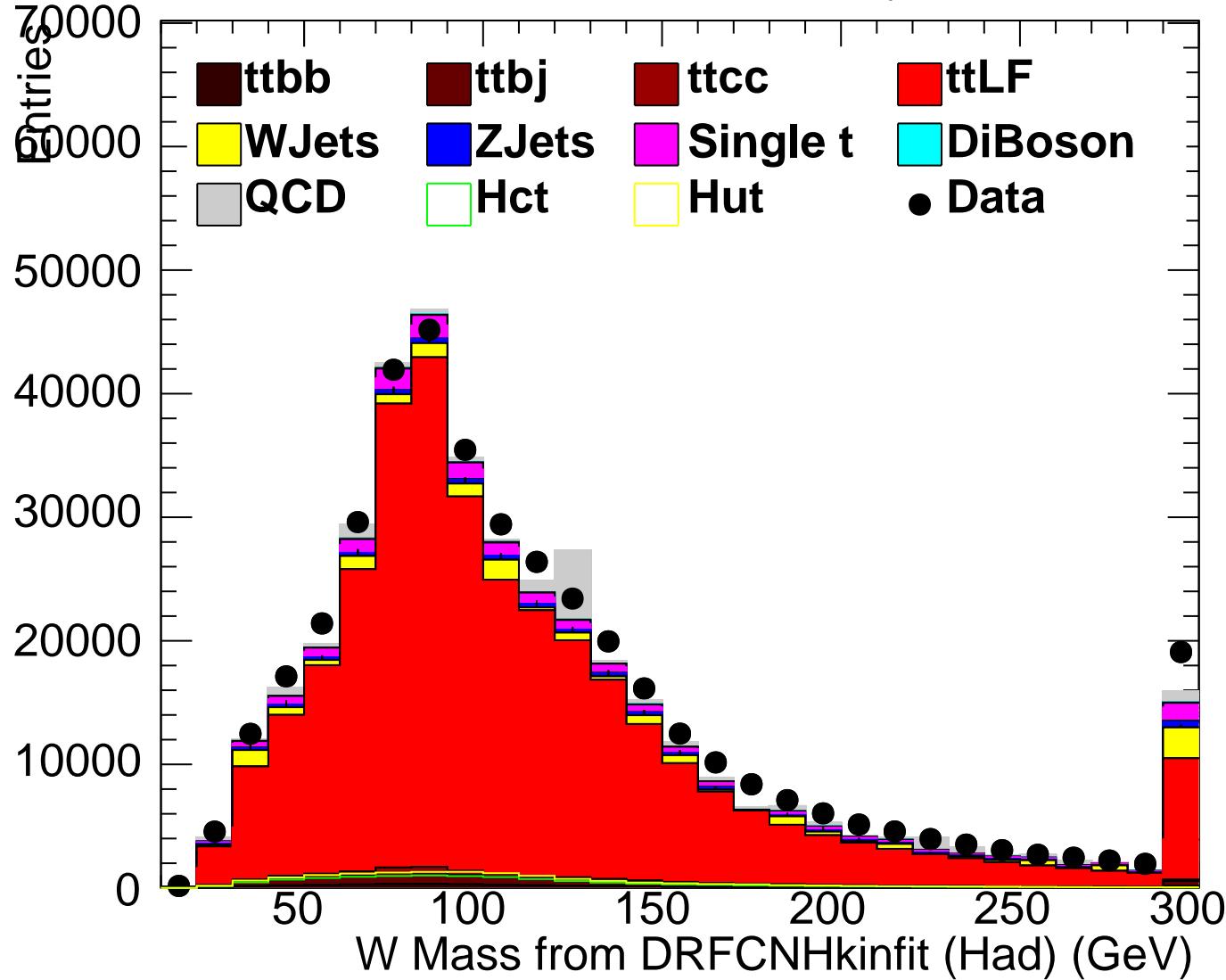


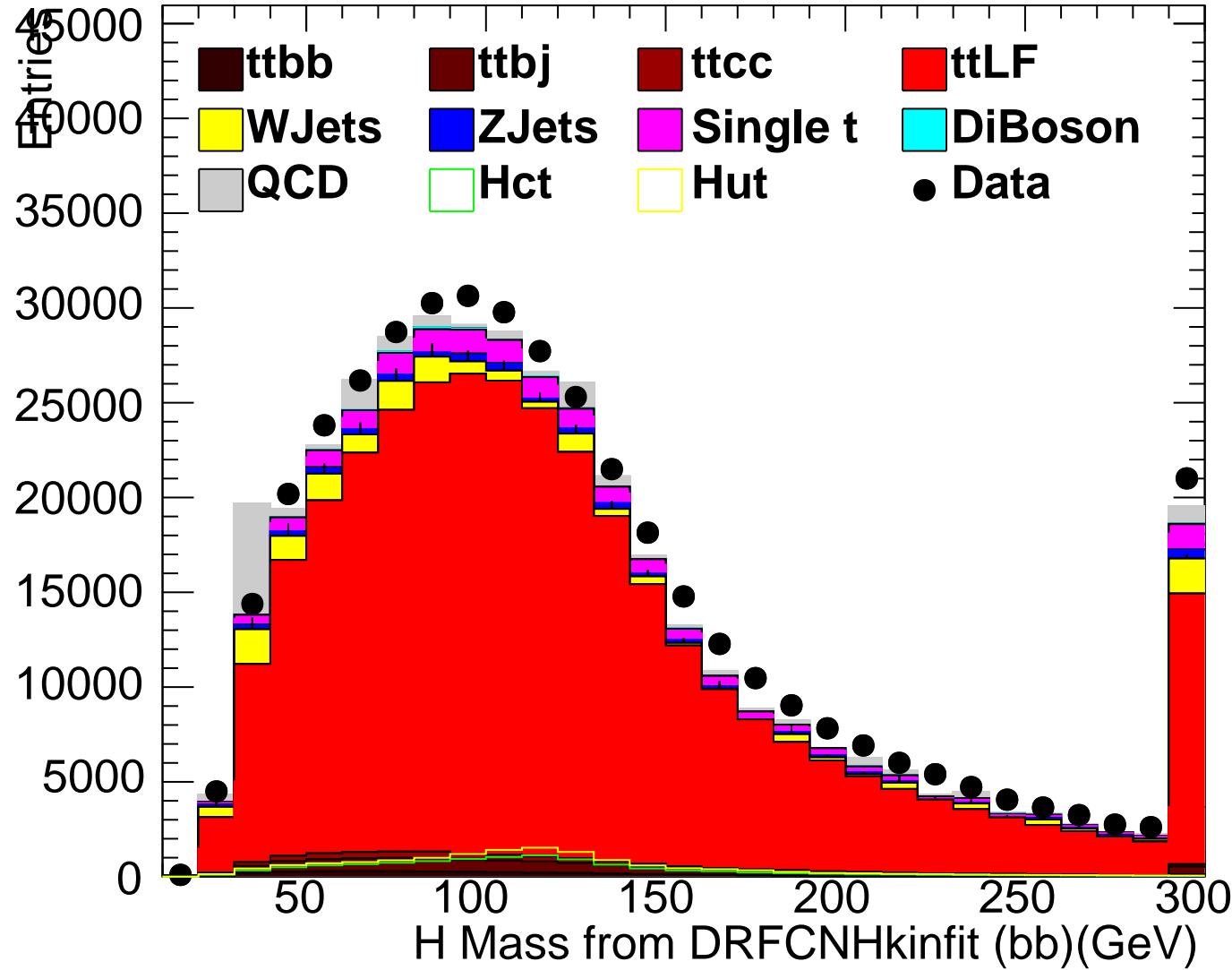


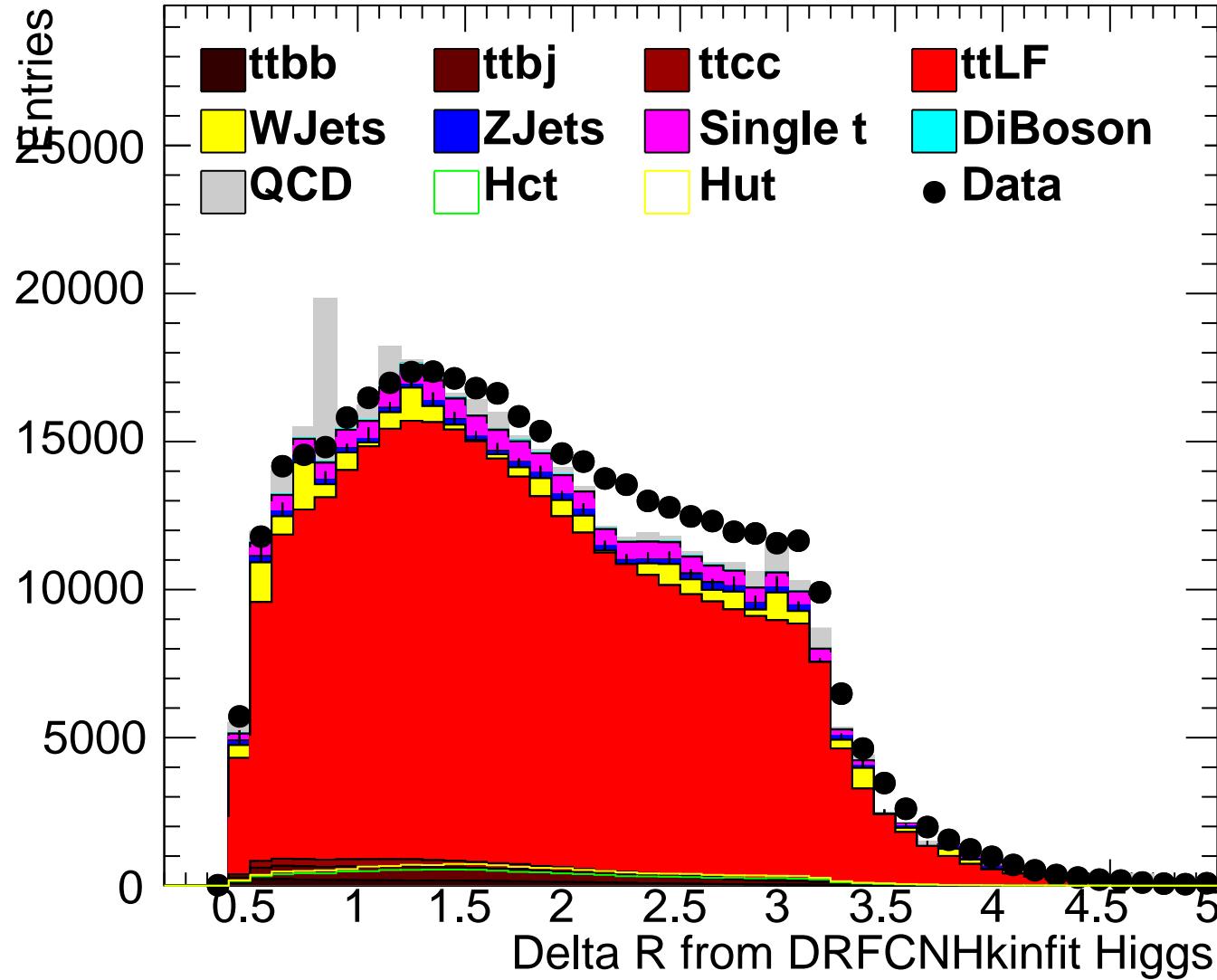
**Ch1\_S4**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

Ch1\_S4

CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV



**Ch1\_S4**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 



**Ch1\_S4**x 10<sup>3</sup>CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV

Entries

120

100

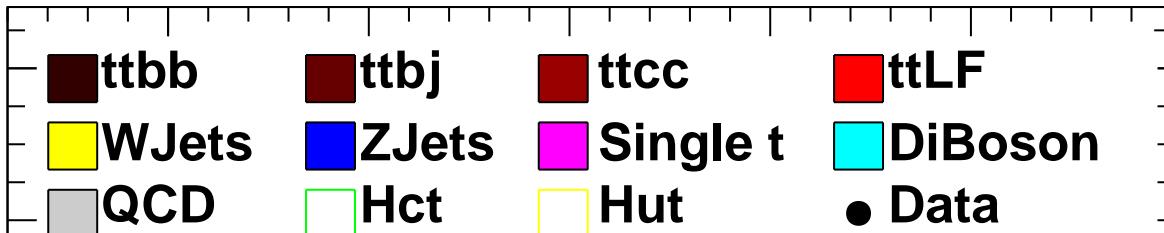
80

60

40

20

0

Top Mass from DRFCN<sub>H</sub>kinfit (Lep) (GeV)

50

100

150

200

250

300

**Ch1\_S4**x 10<sup>3</sup>CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV

Entries

120

100

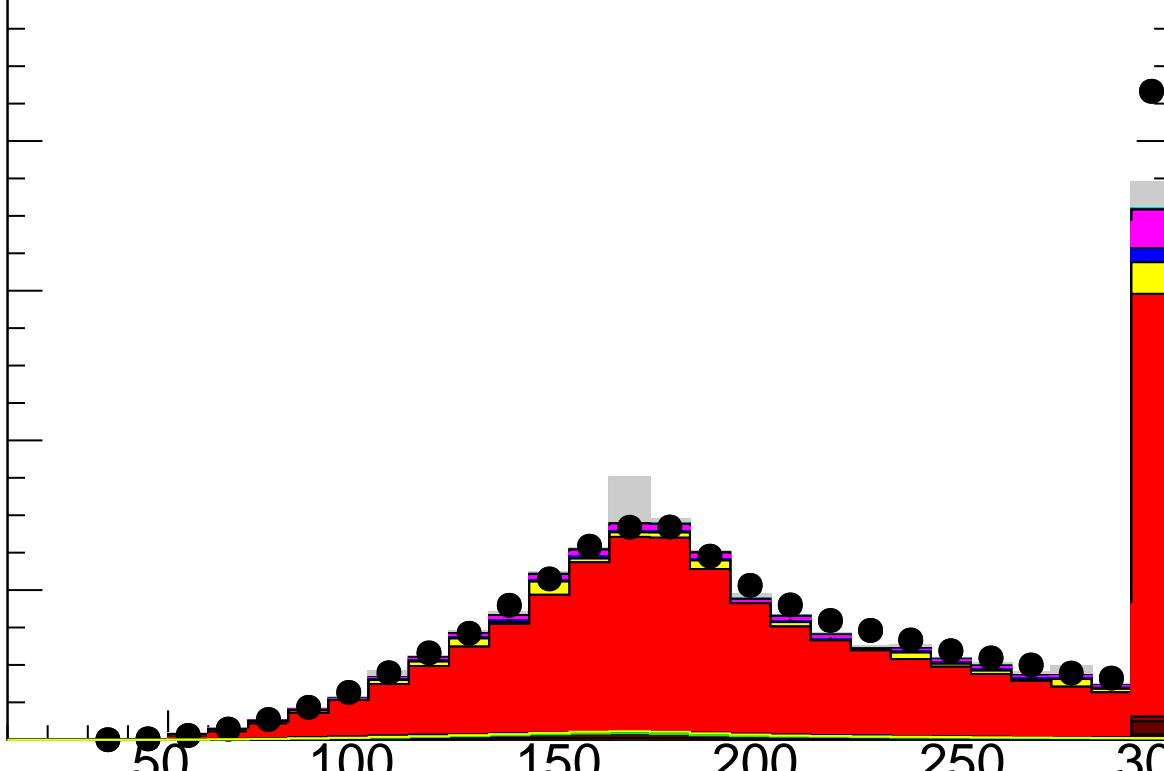
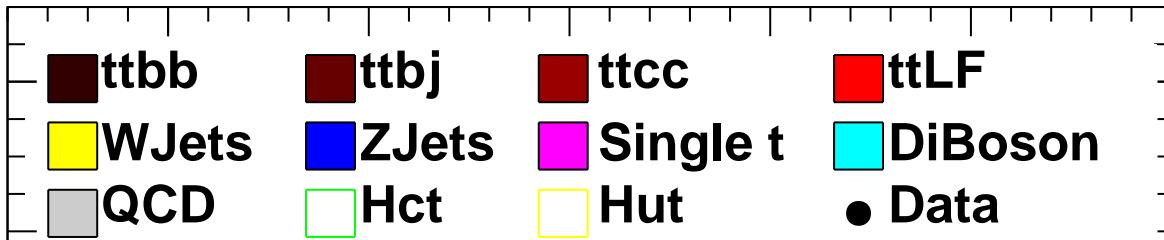
80

60

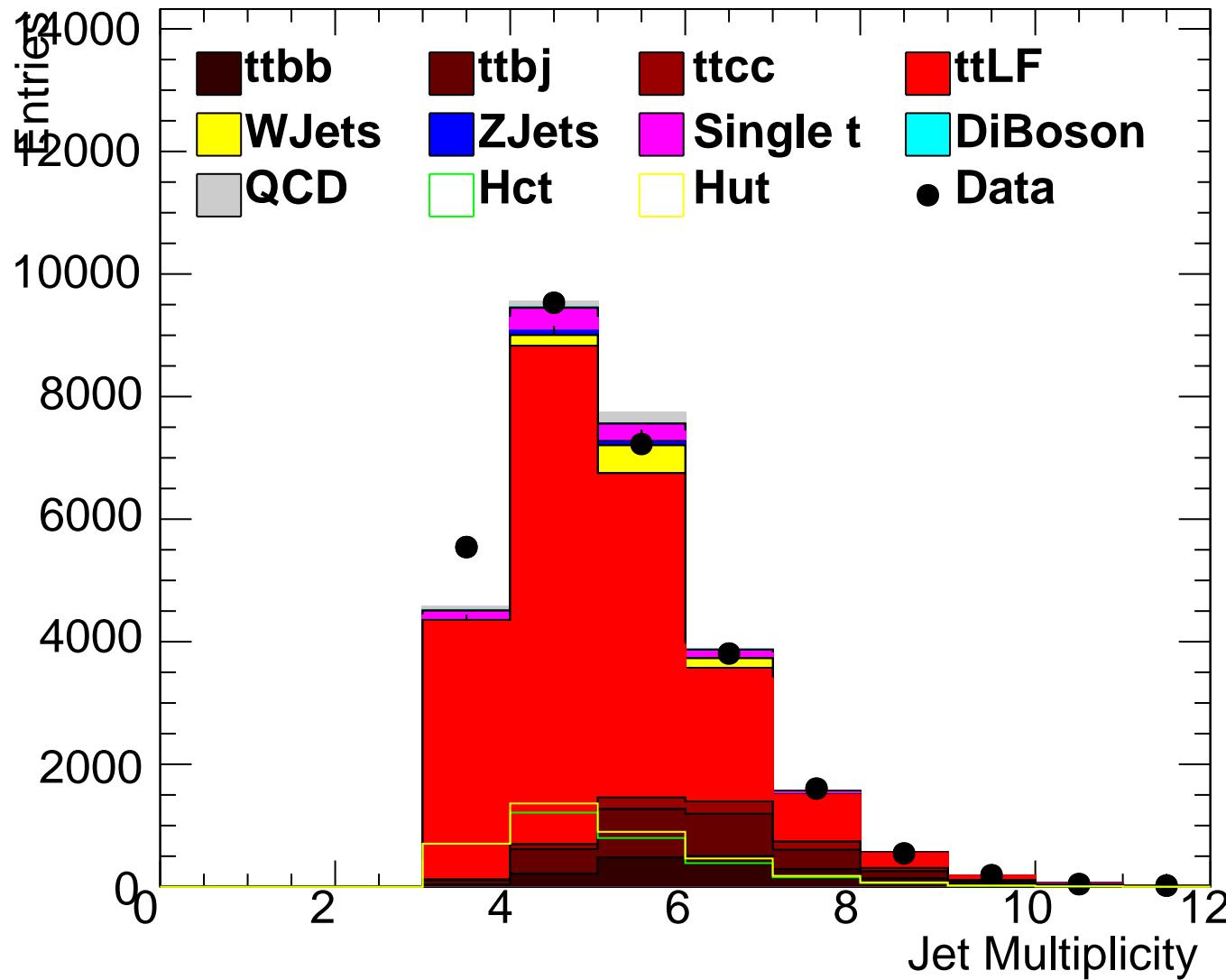
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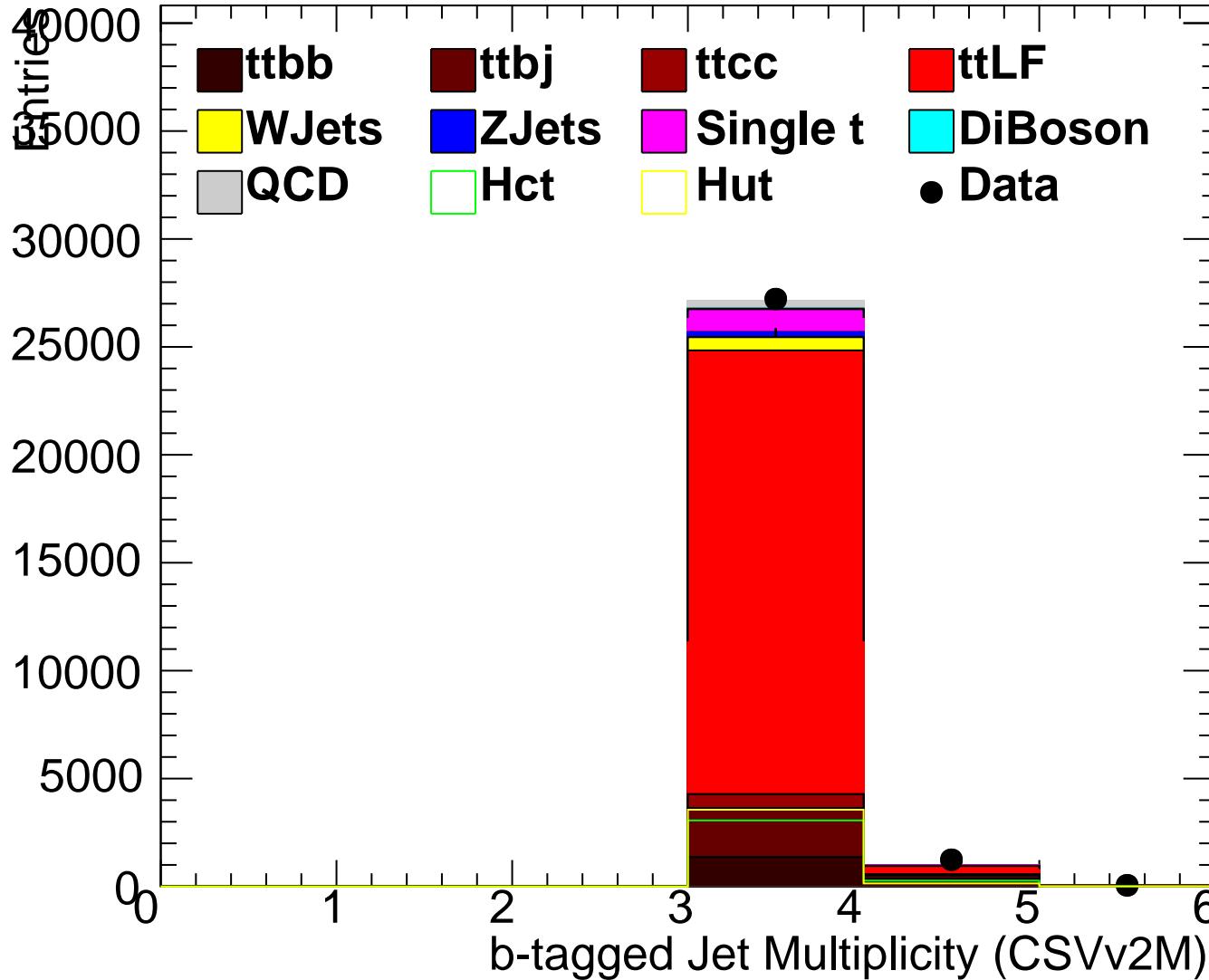
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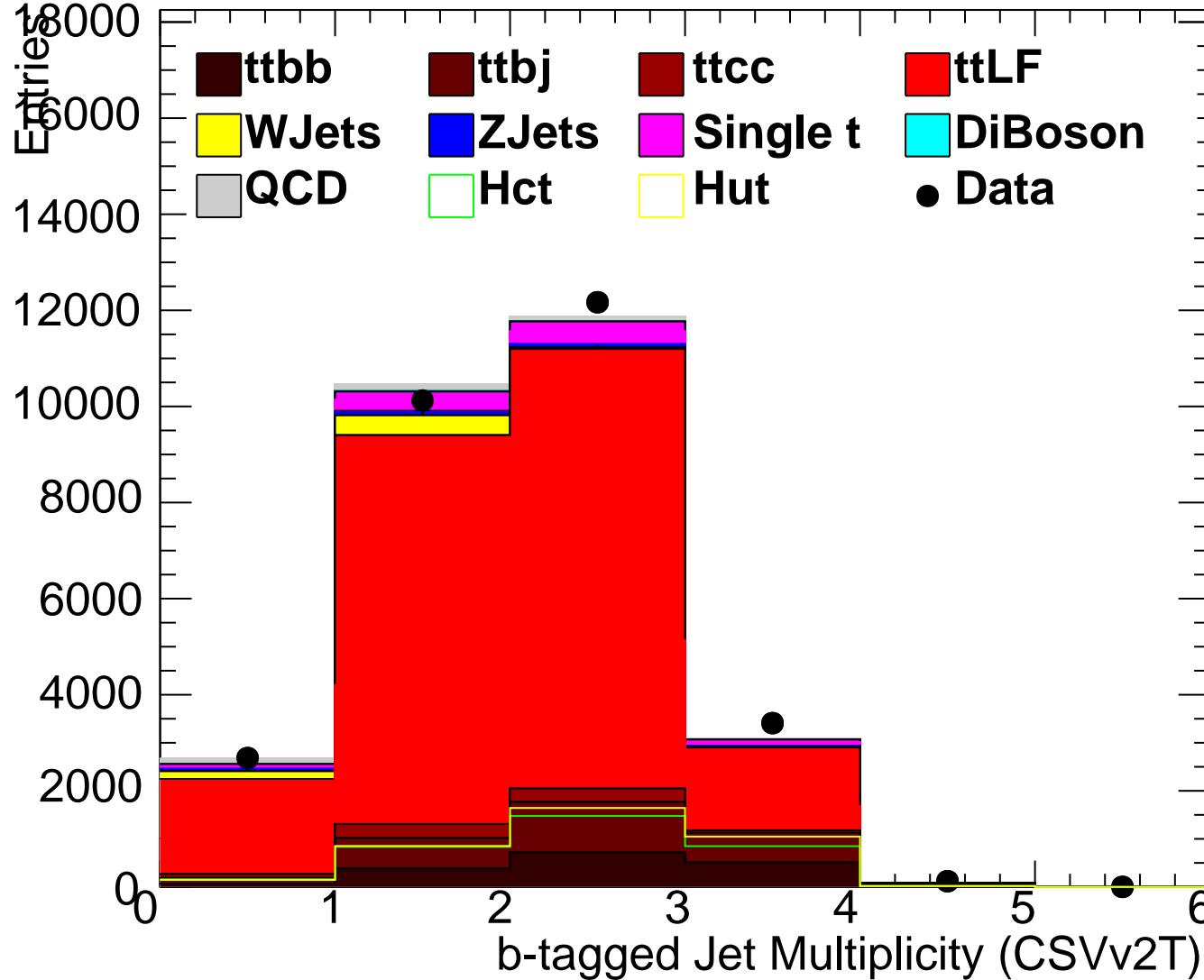
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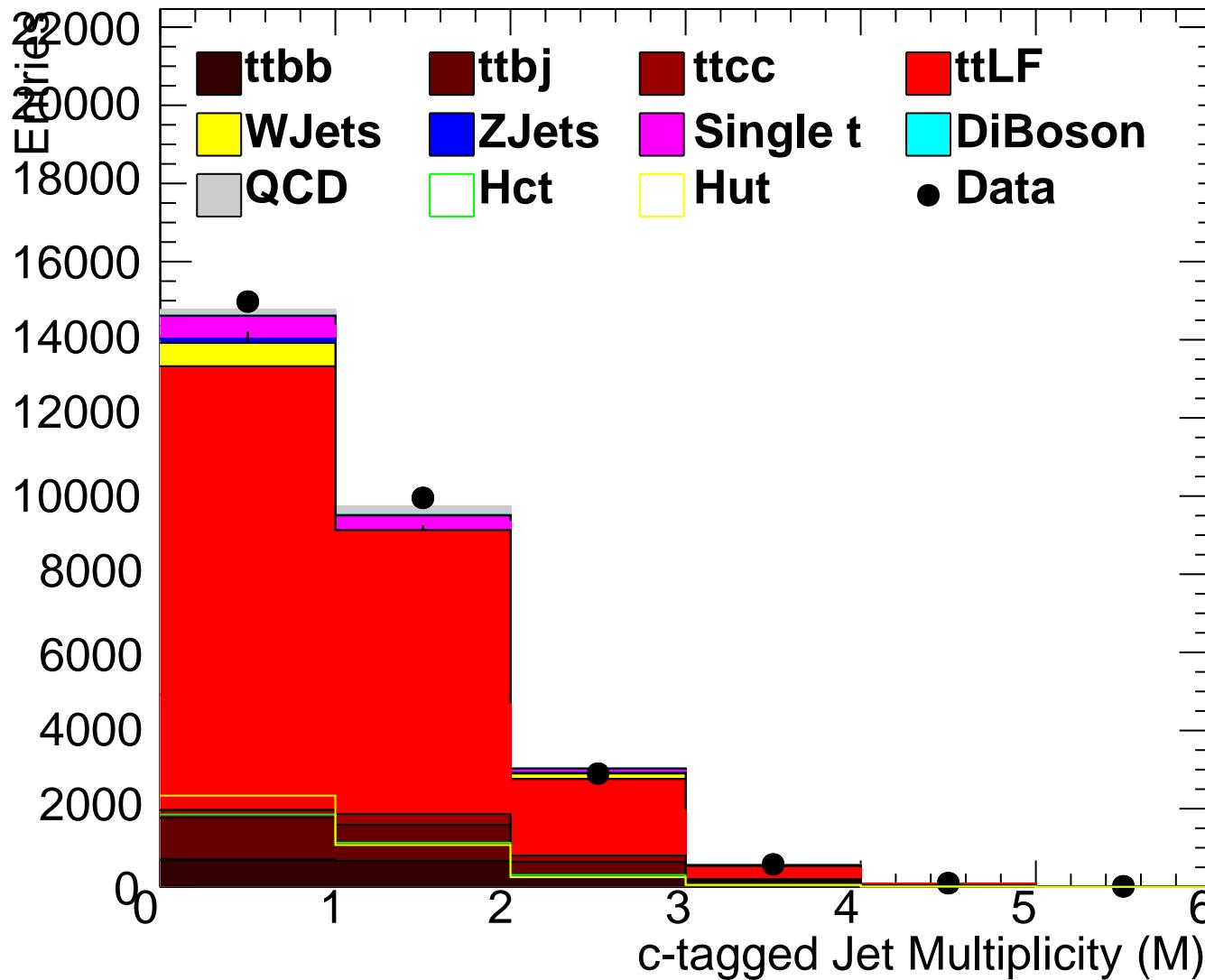


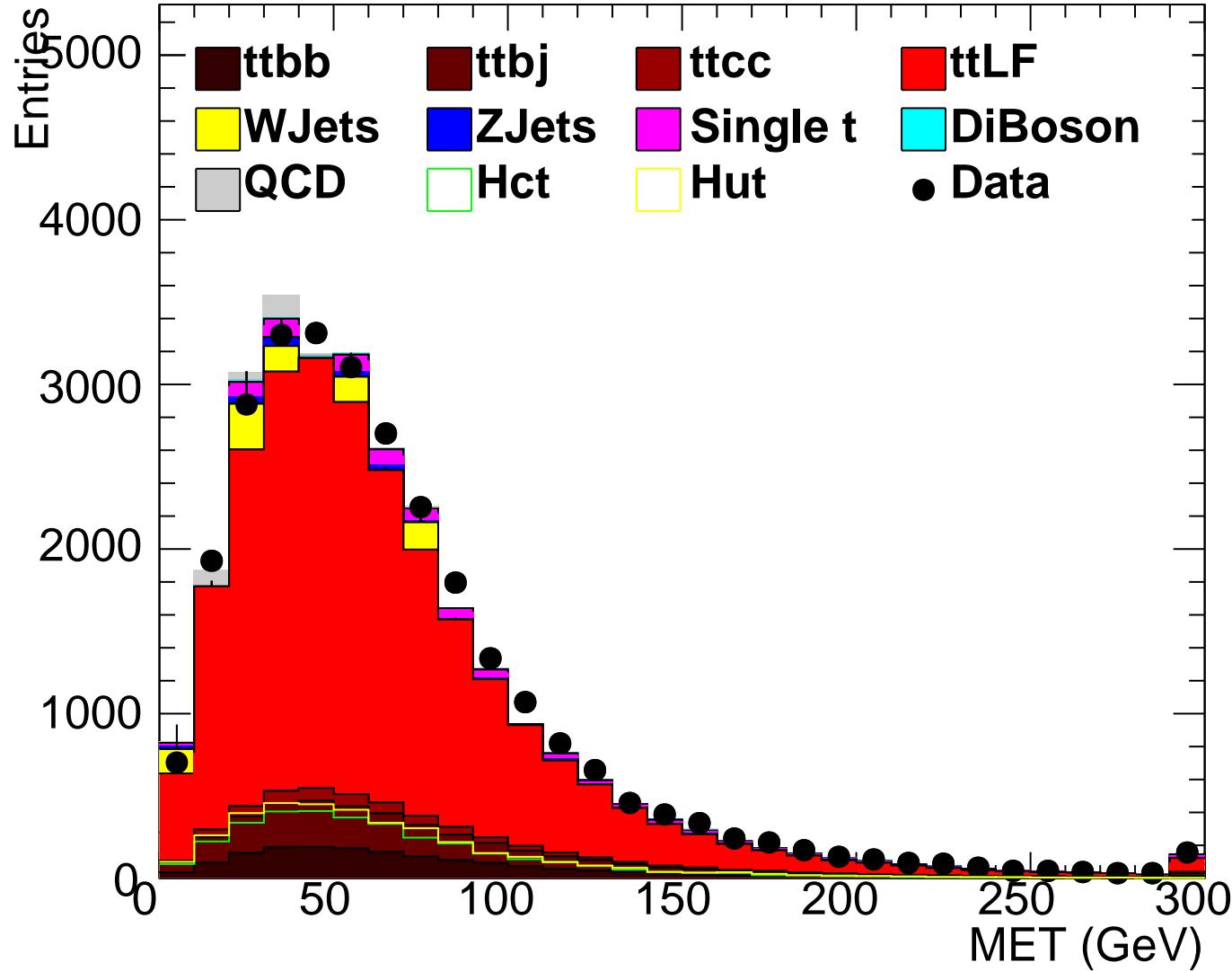
Top Mass from Hc/u DRFCN Hkinfit (GeV)

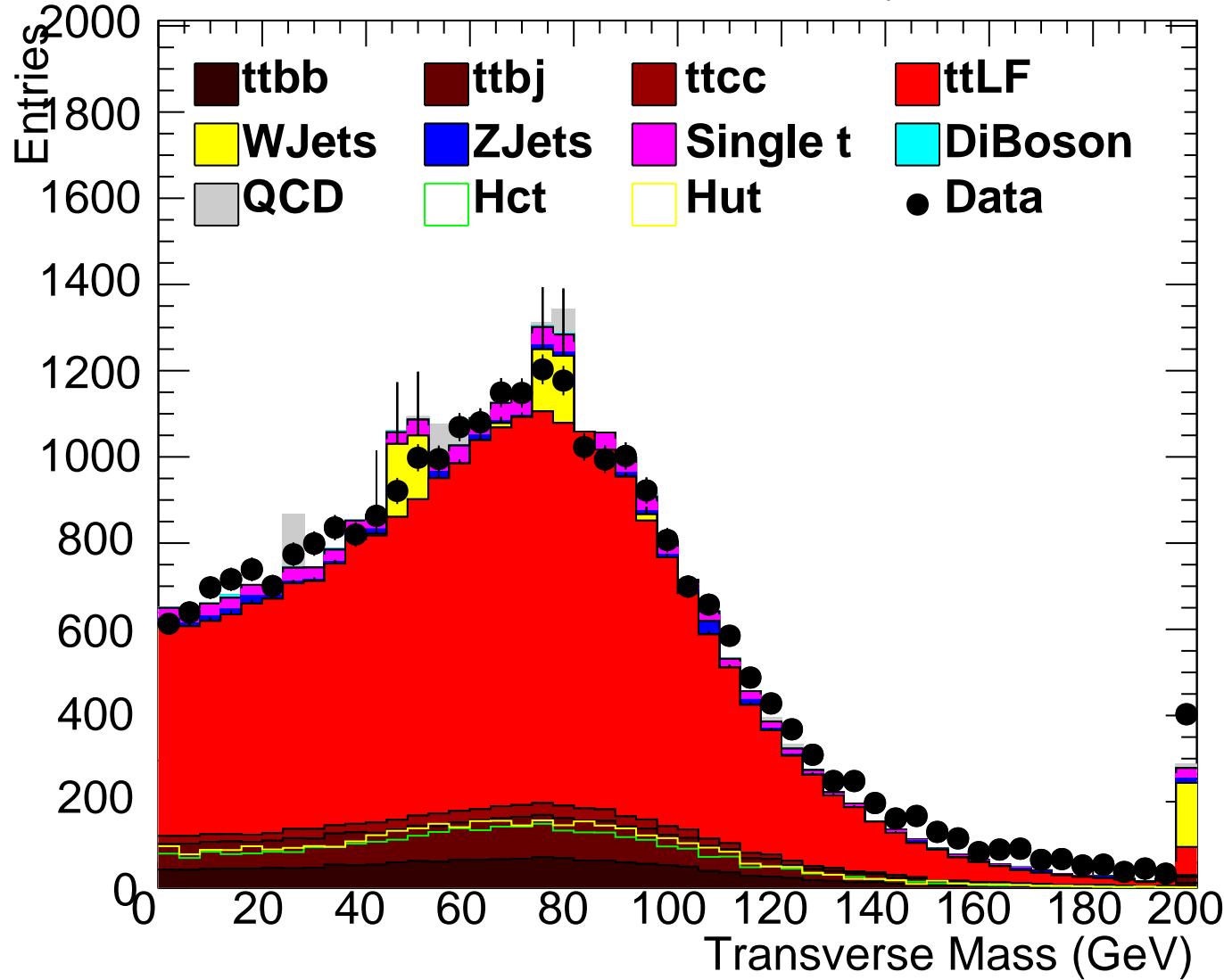


**Ch1\_S5**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 



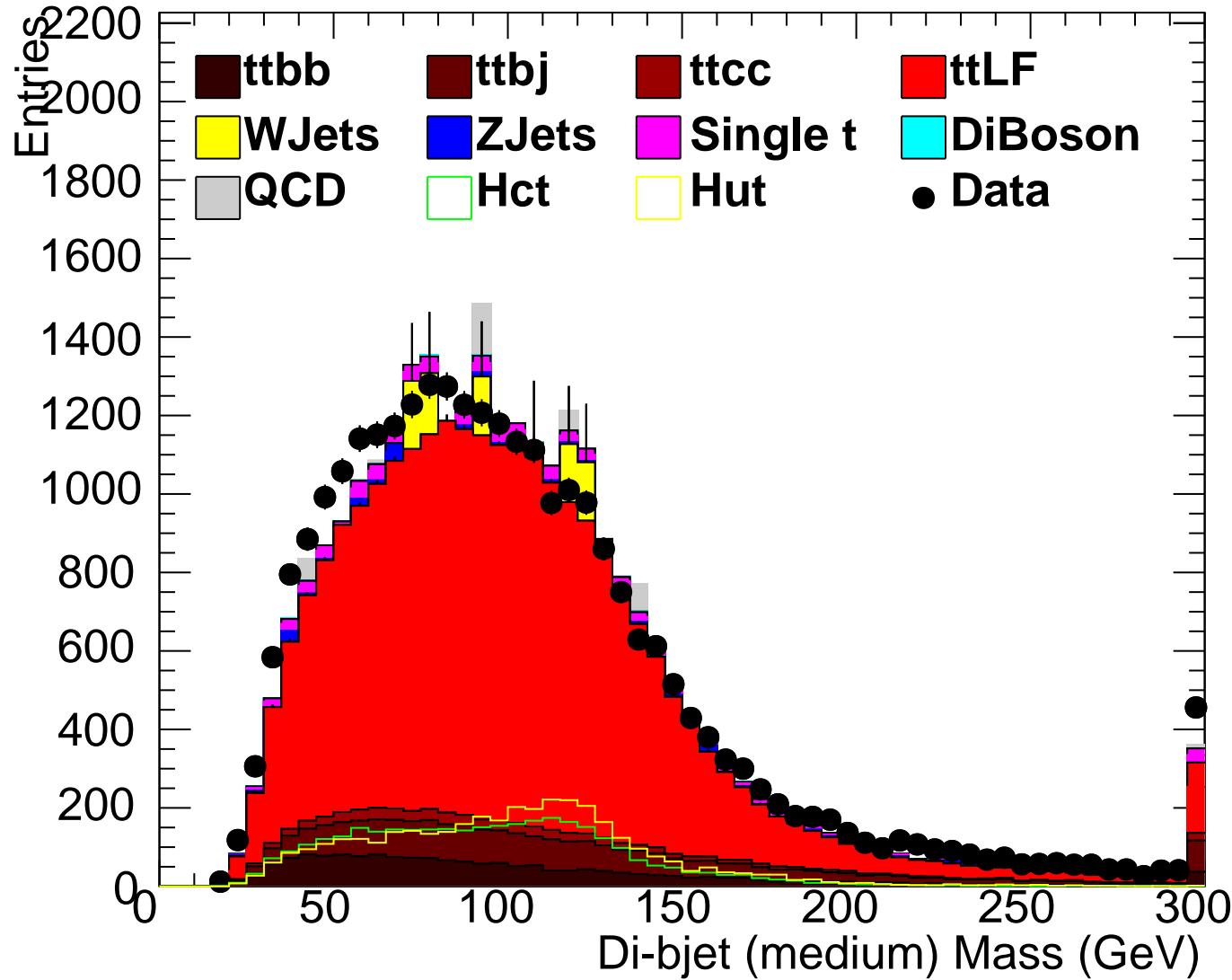


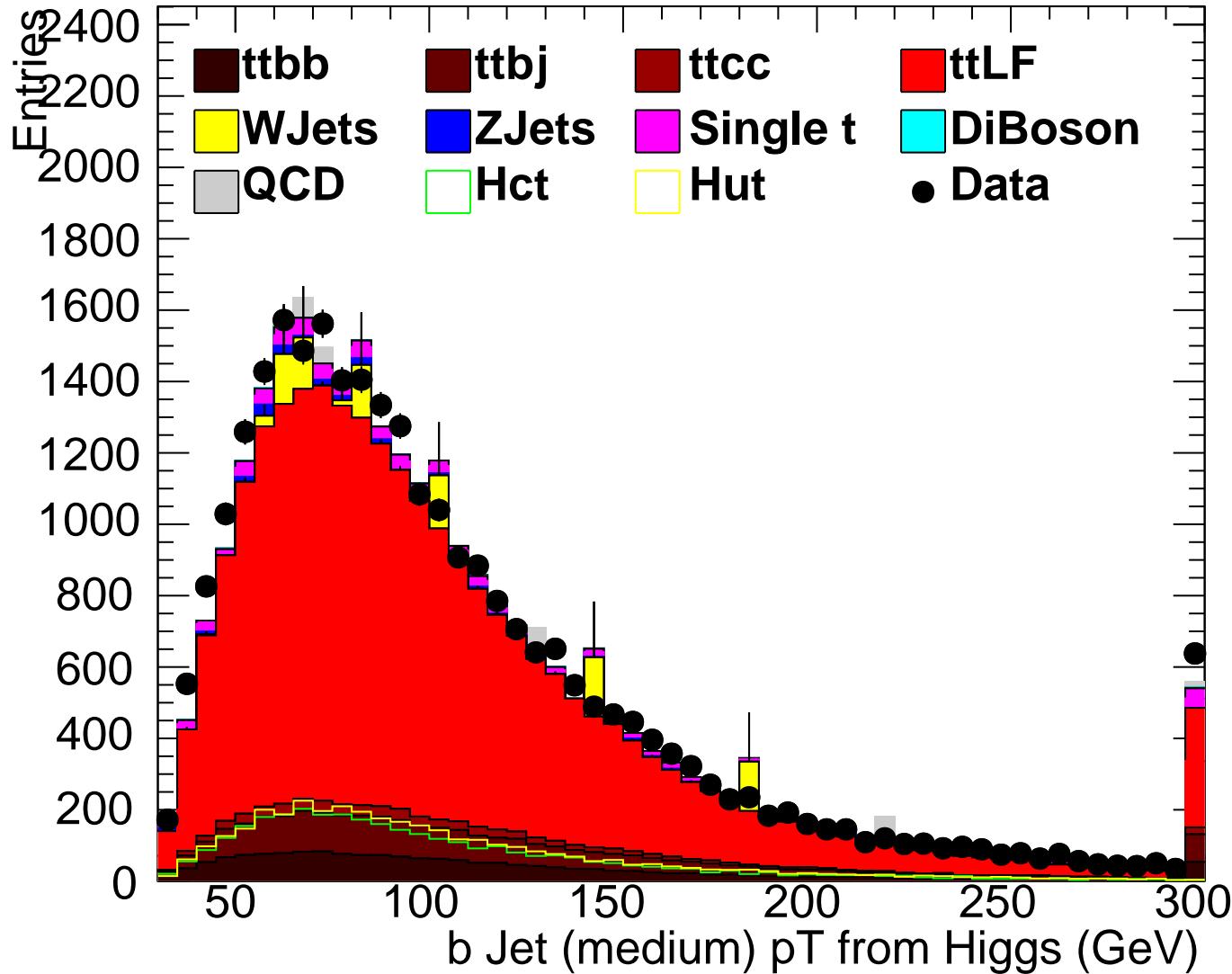
**Ch1\_S5**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

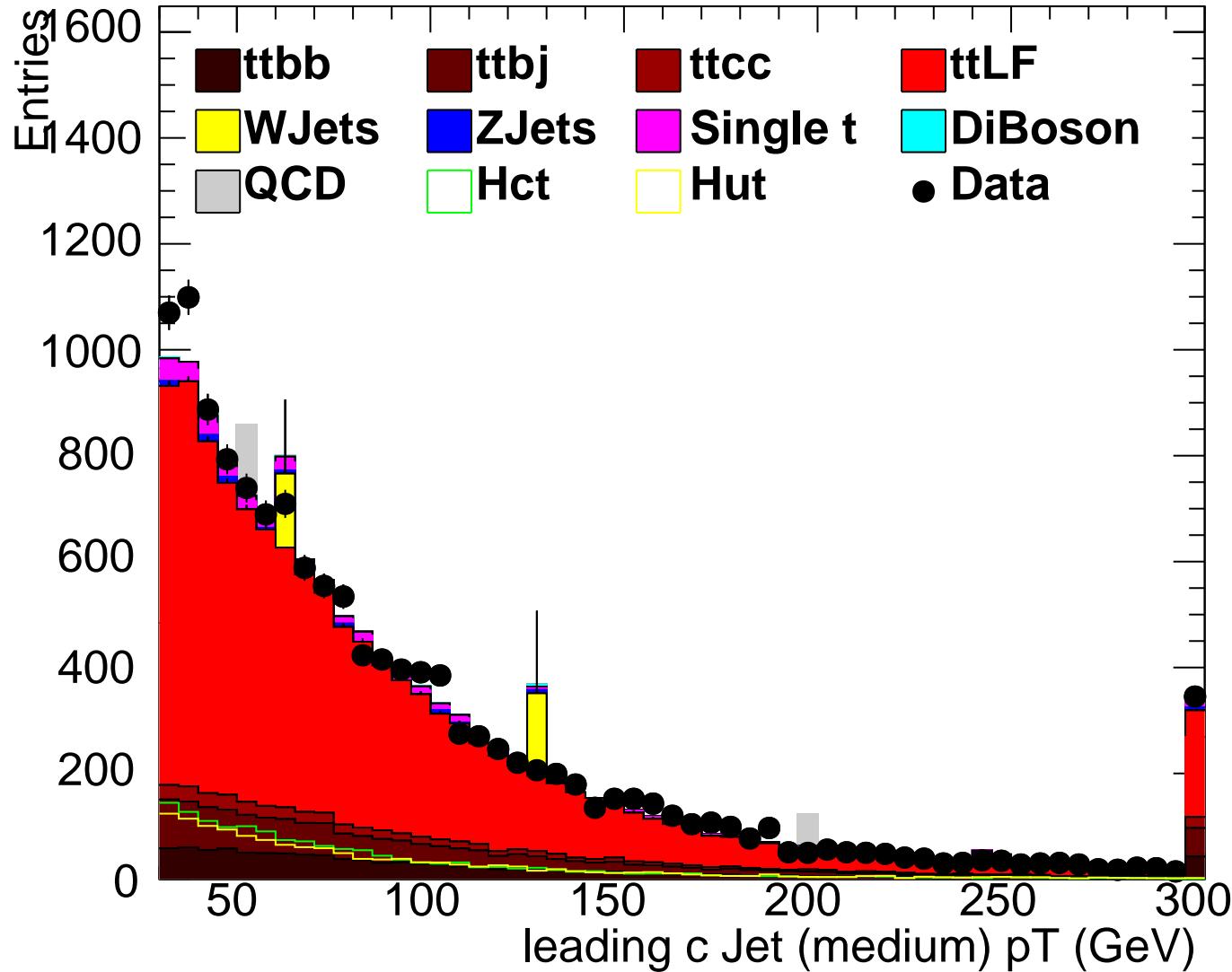
**Ch1\_S5**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

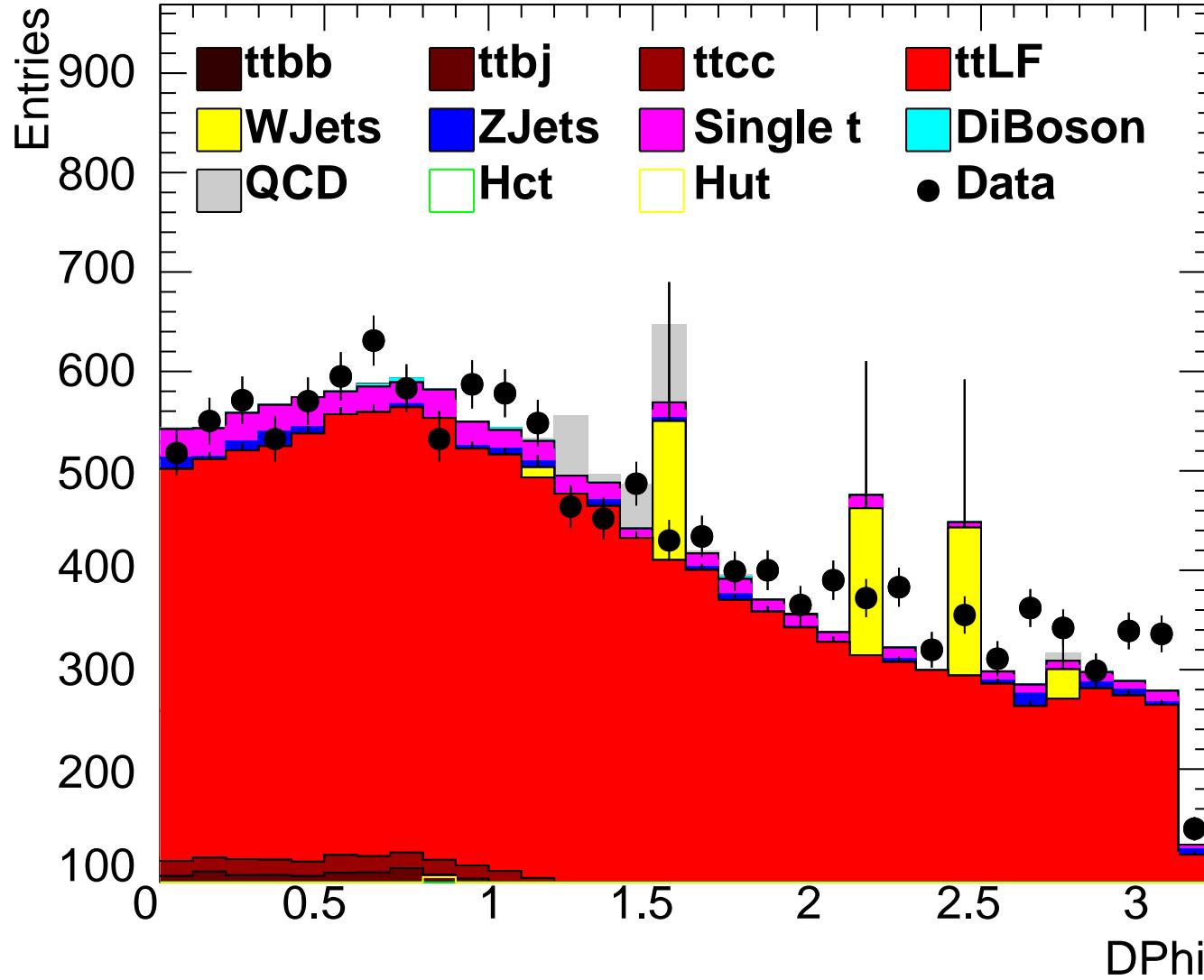
# Ch1\_S5

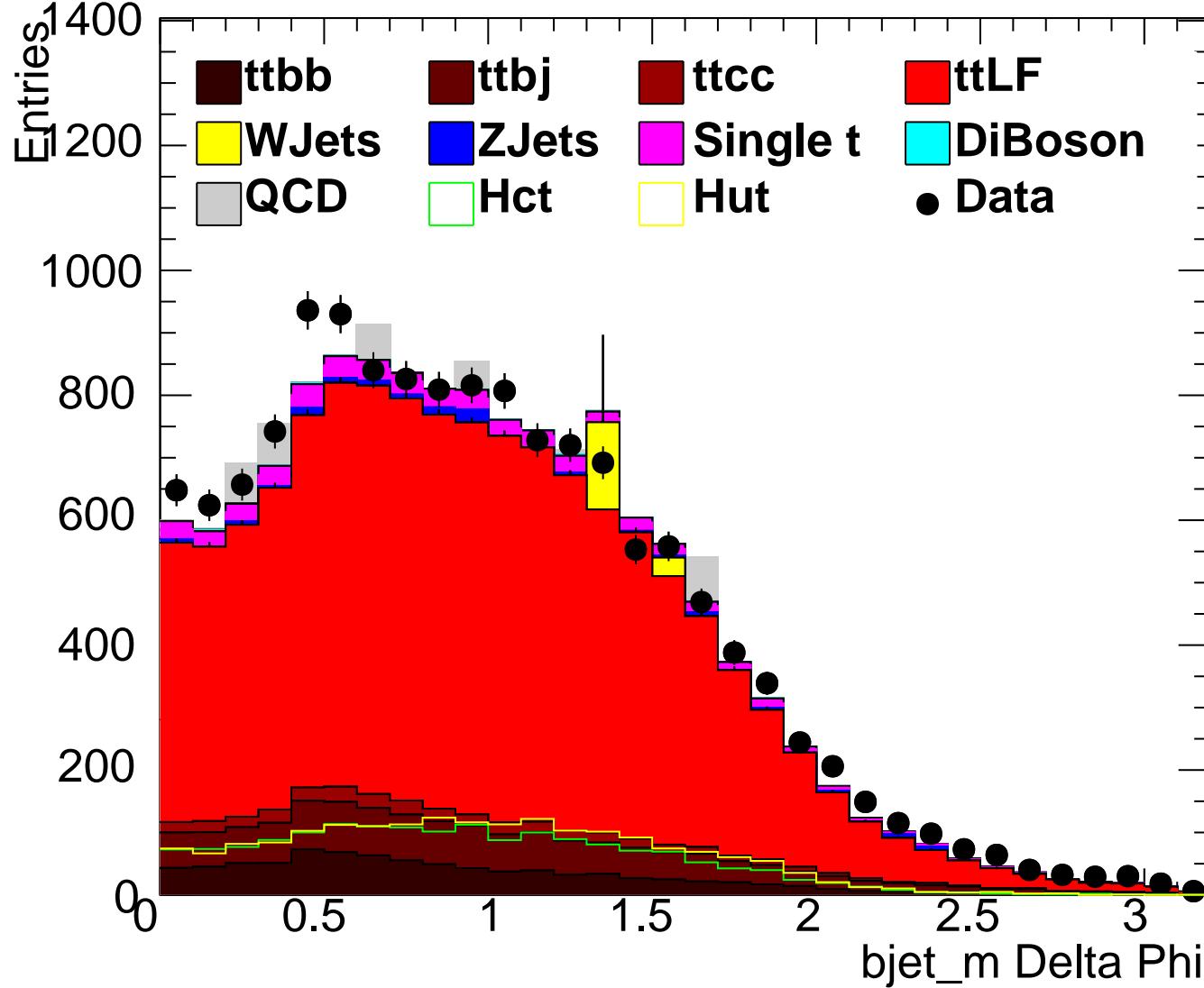
CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$





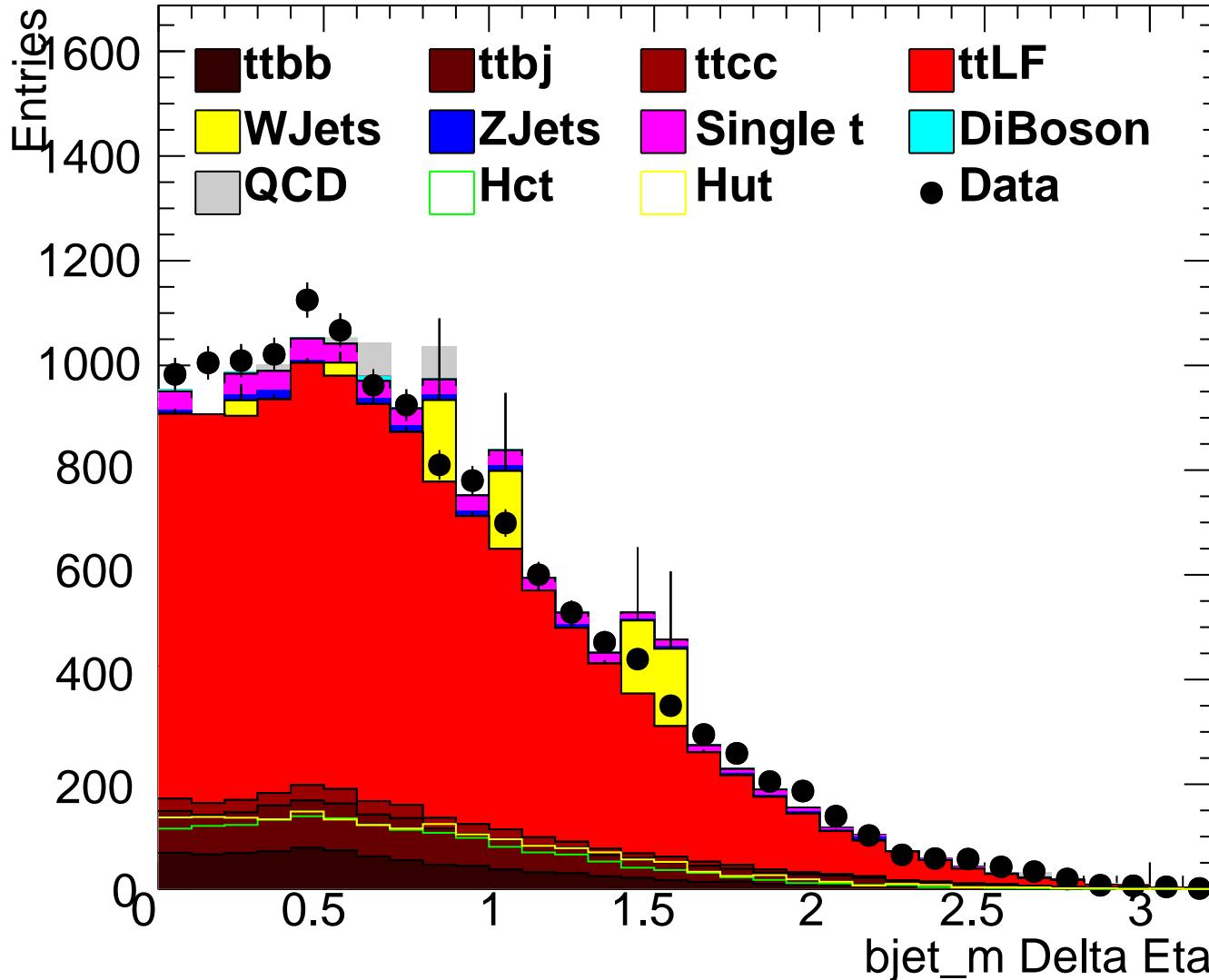
**Ch1\_S5**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

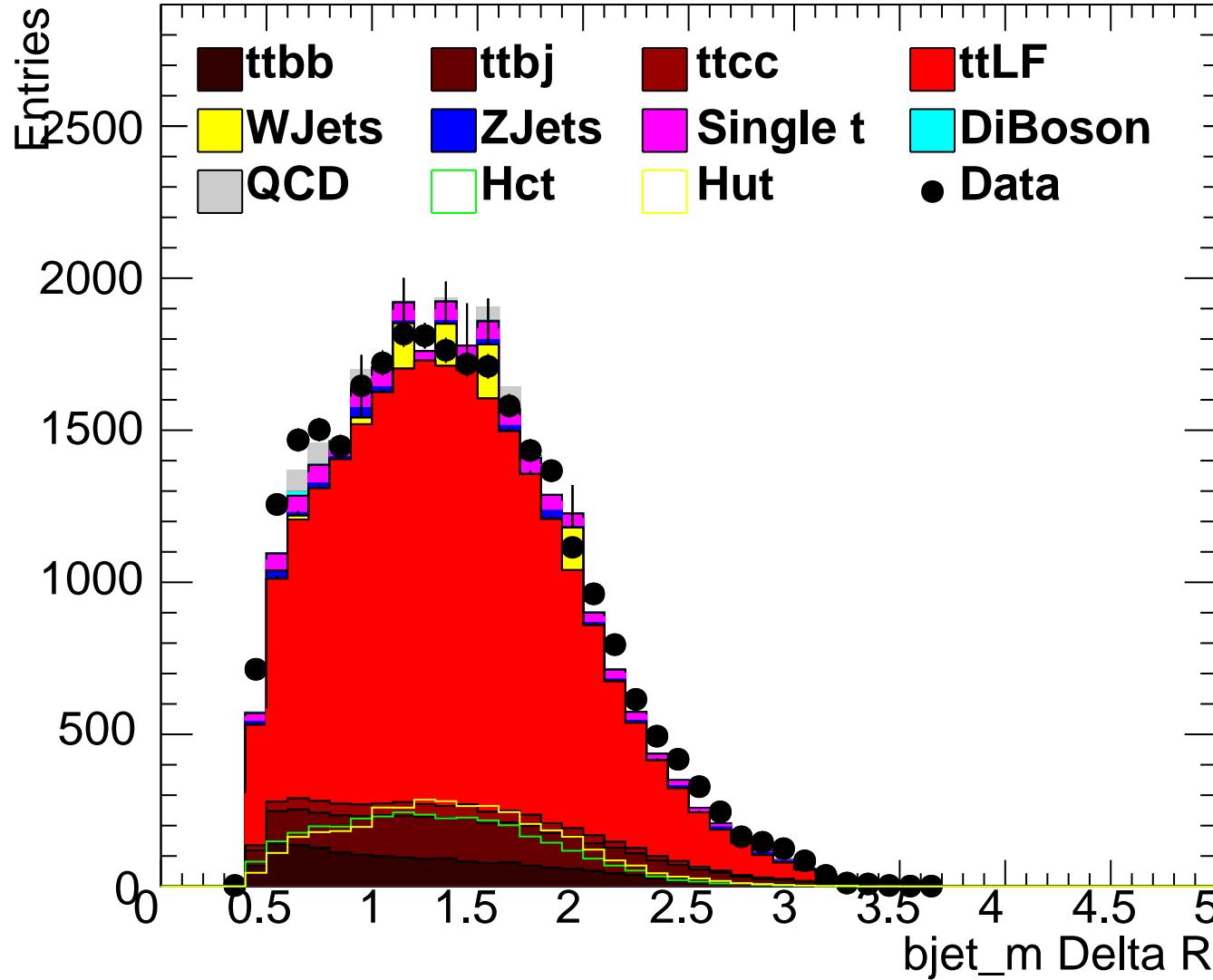


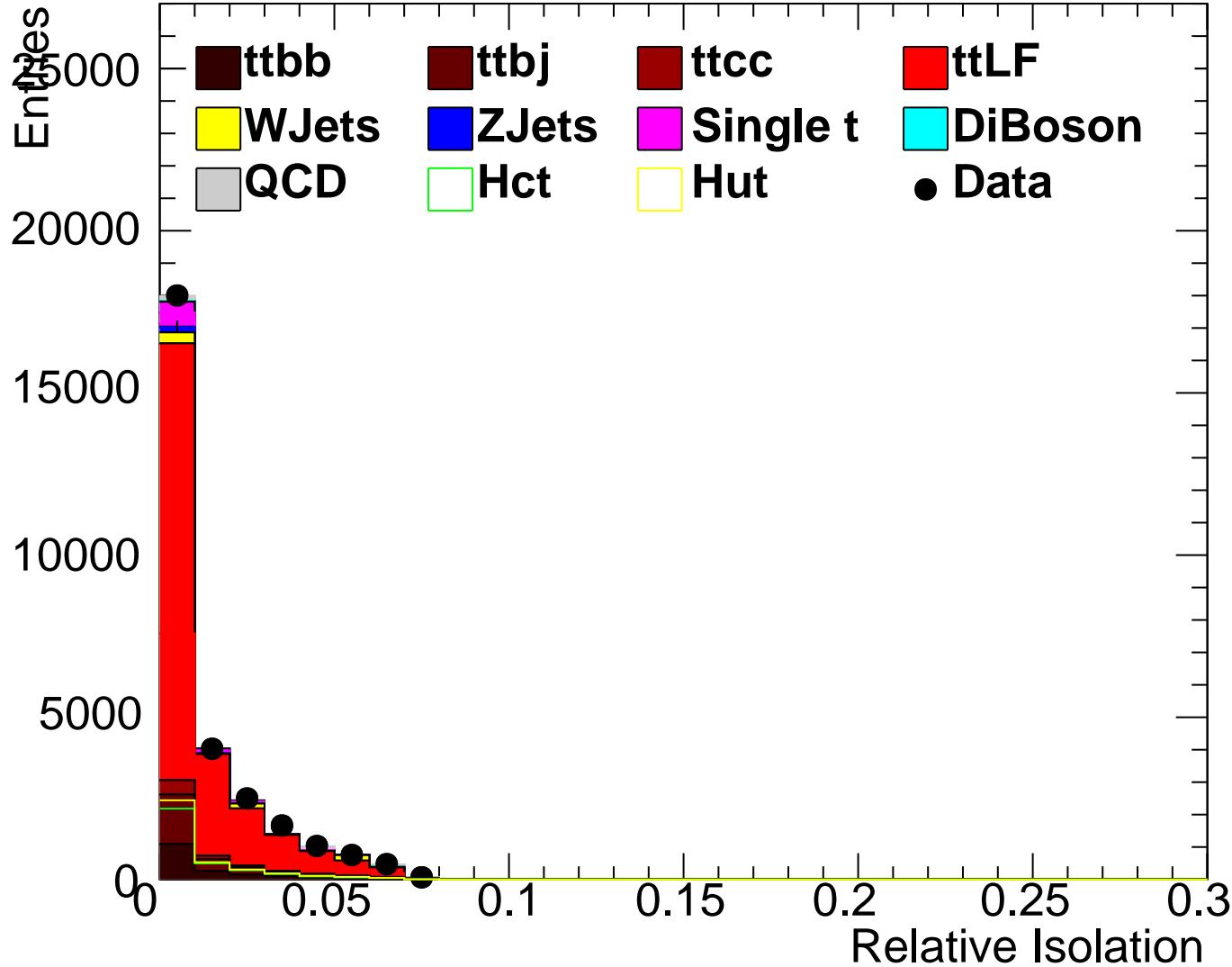
**Ch1\_S5**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

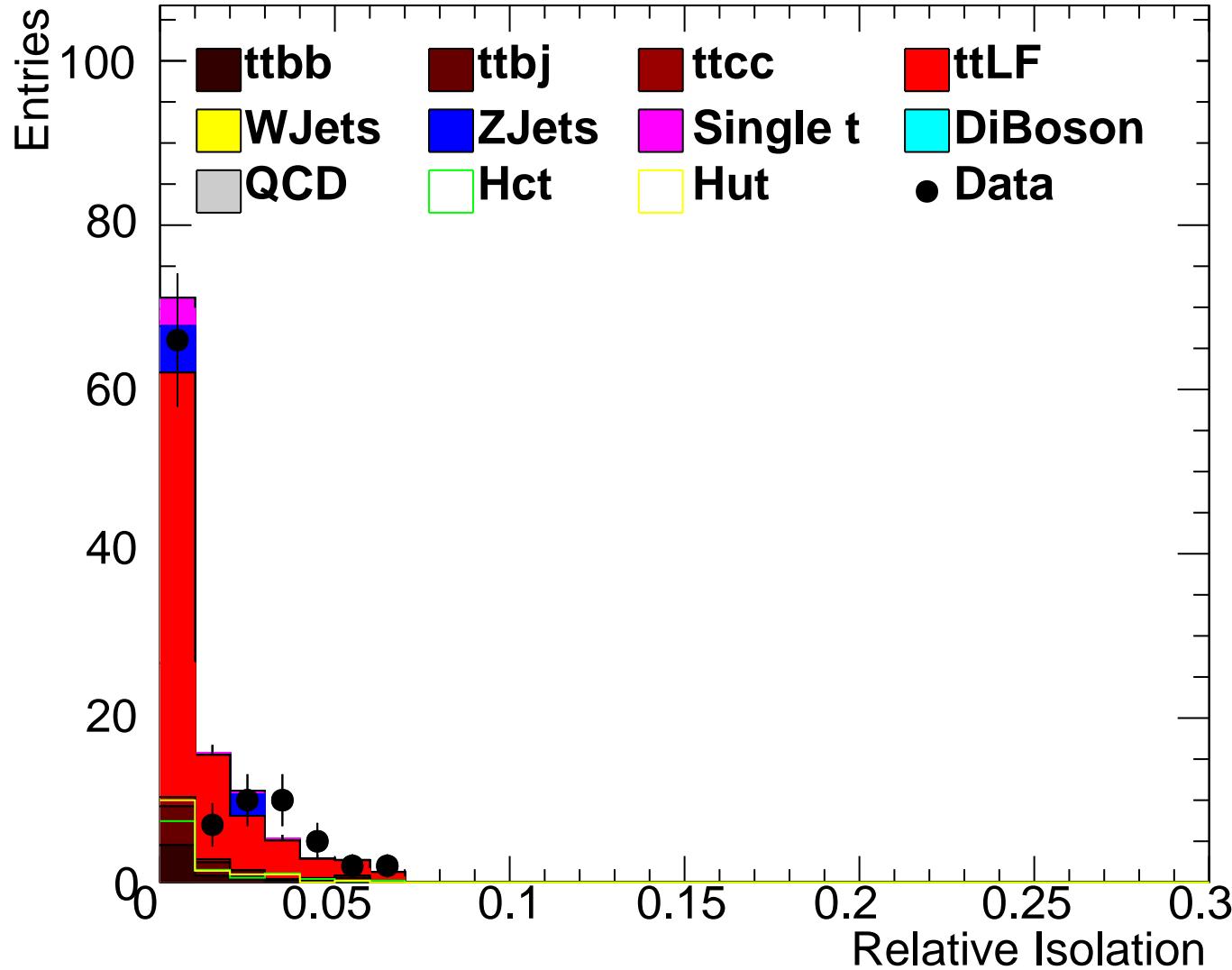
Ch1\_S5

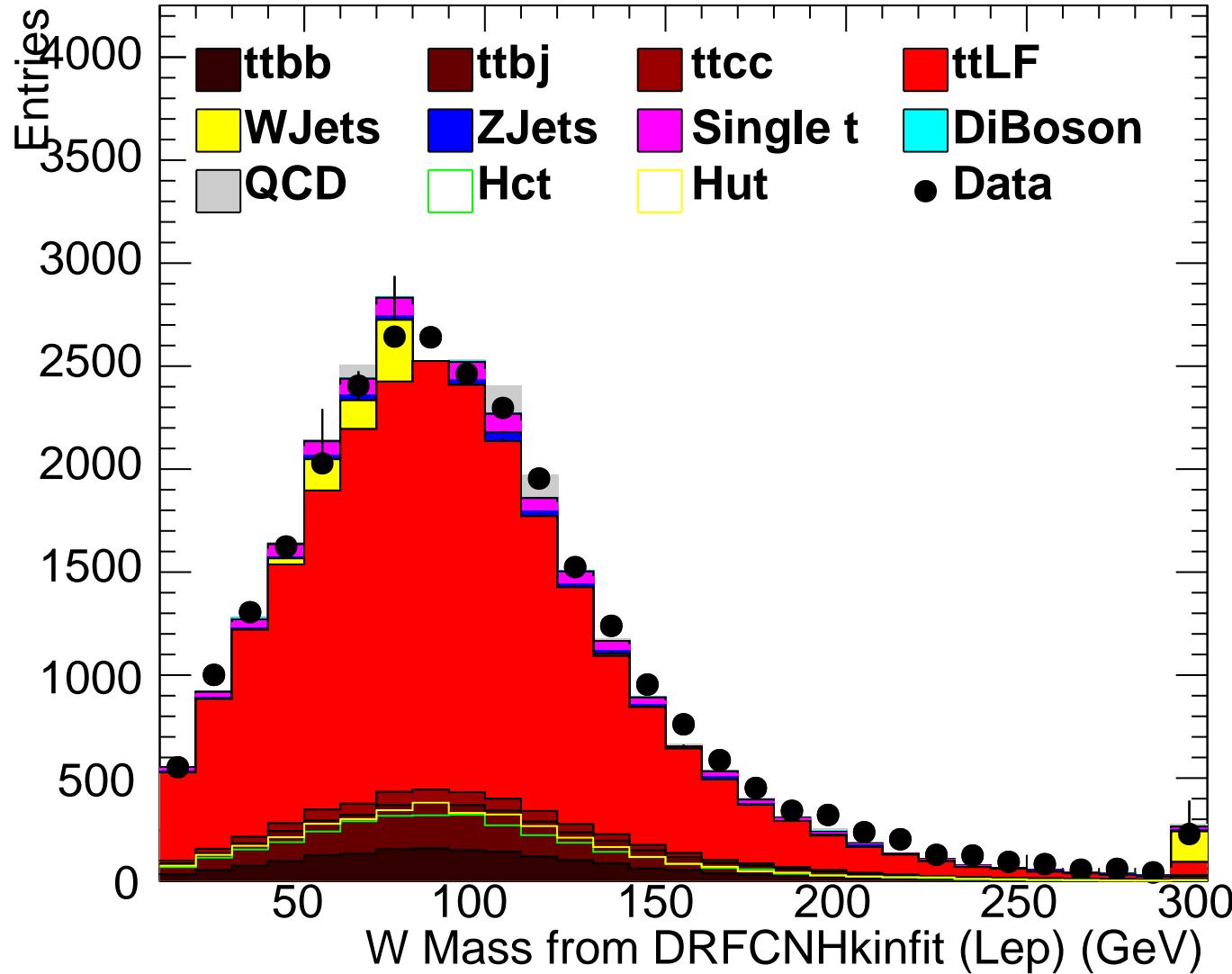
CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$

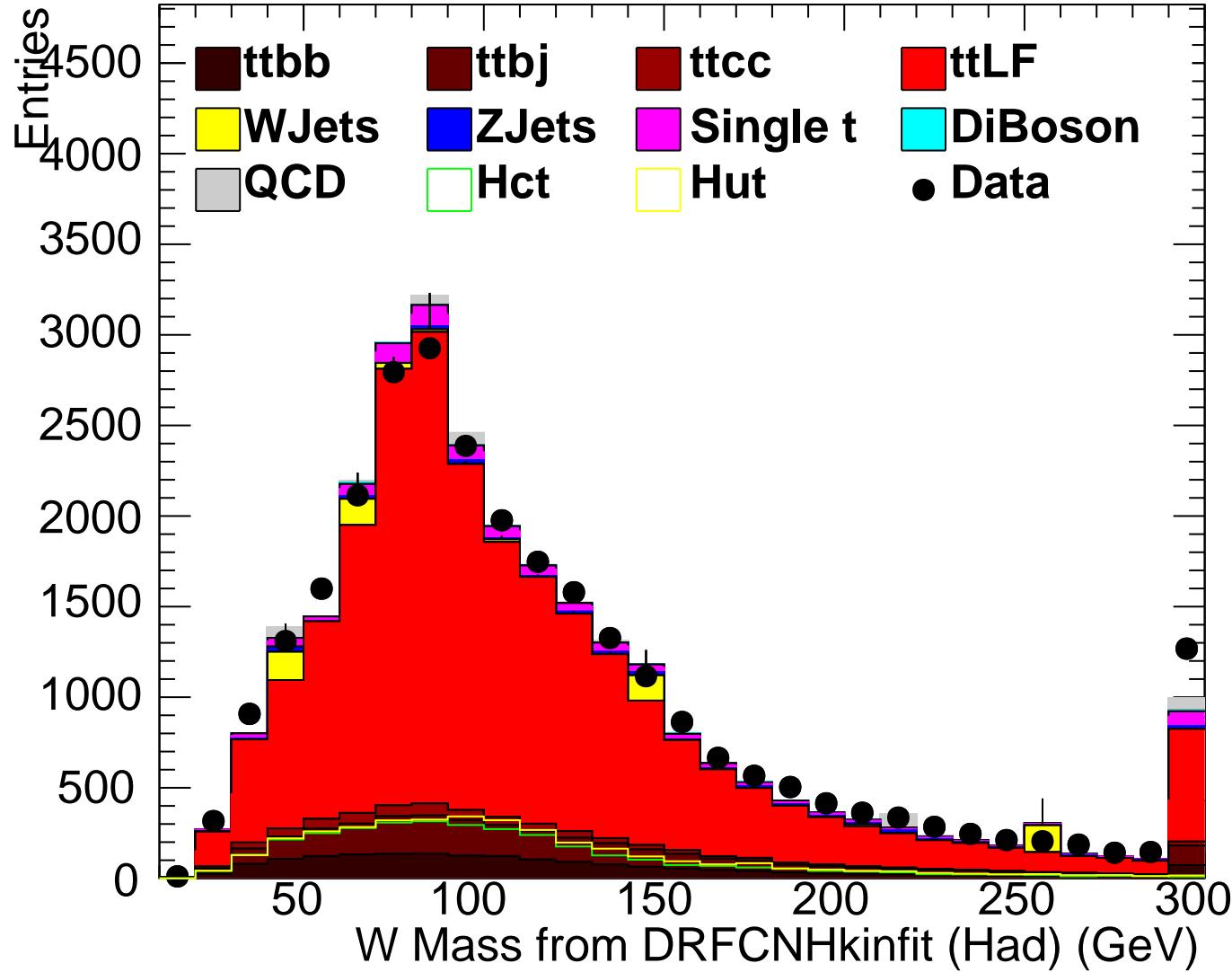


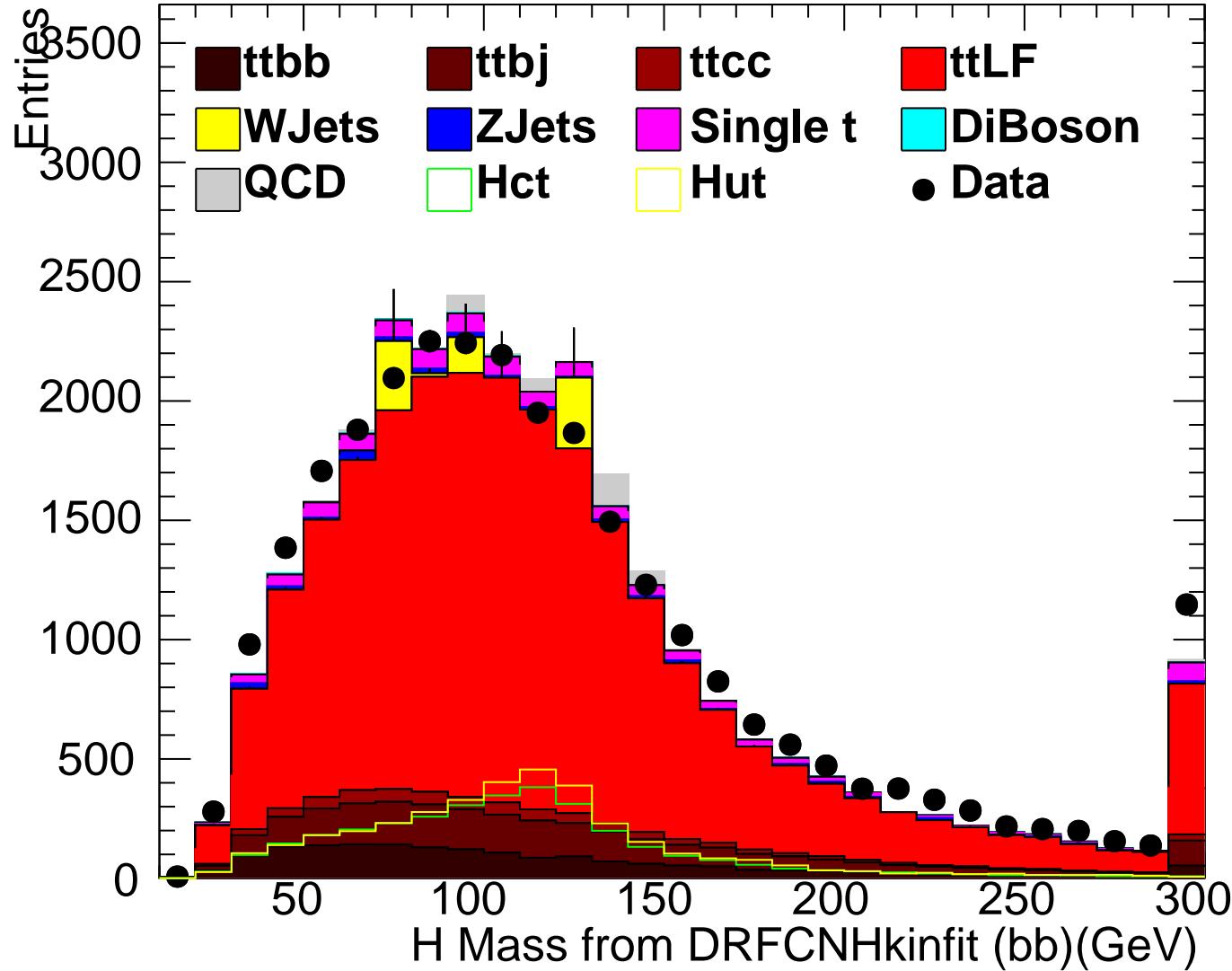


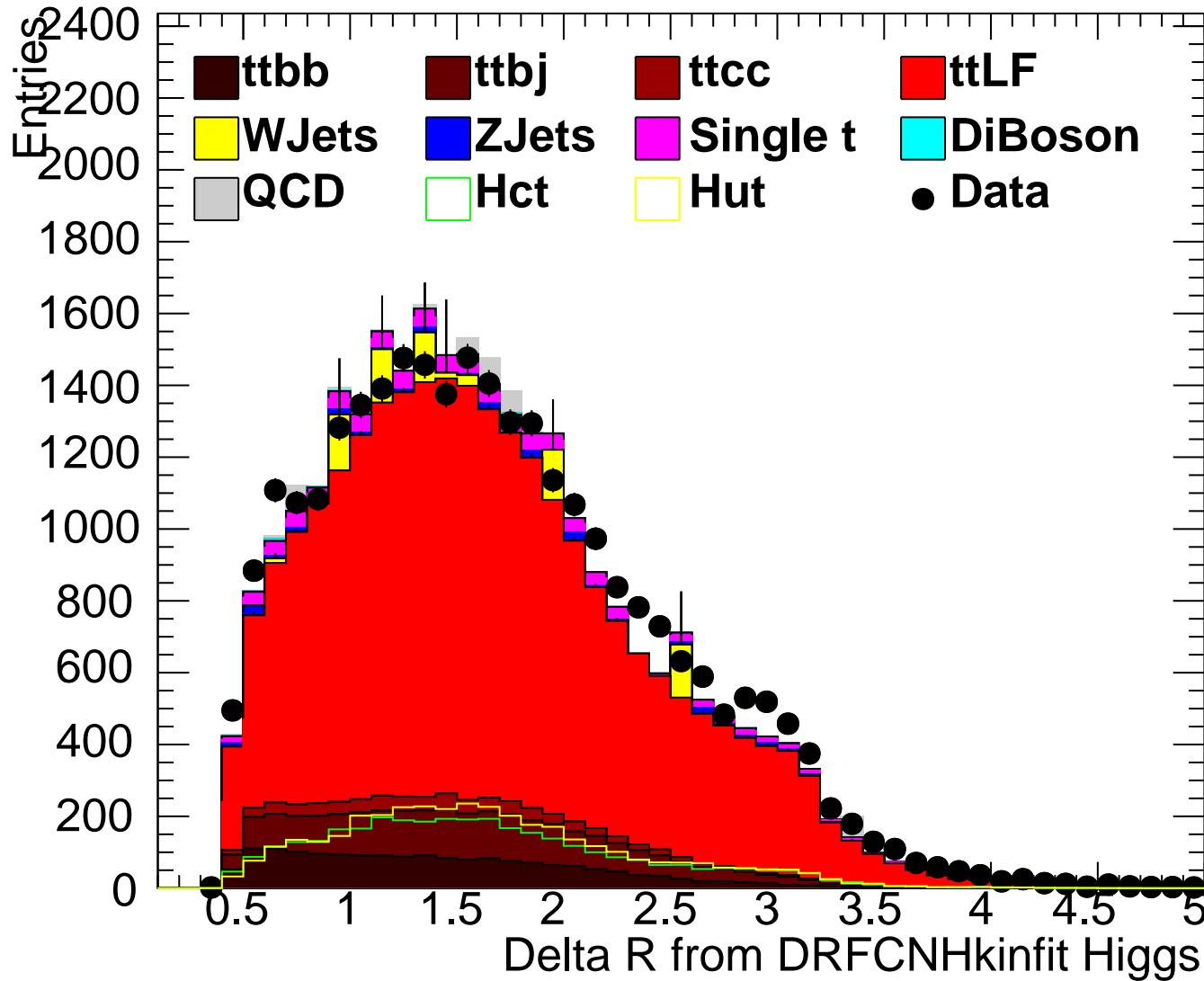
**Ch1\_S5**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

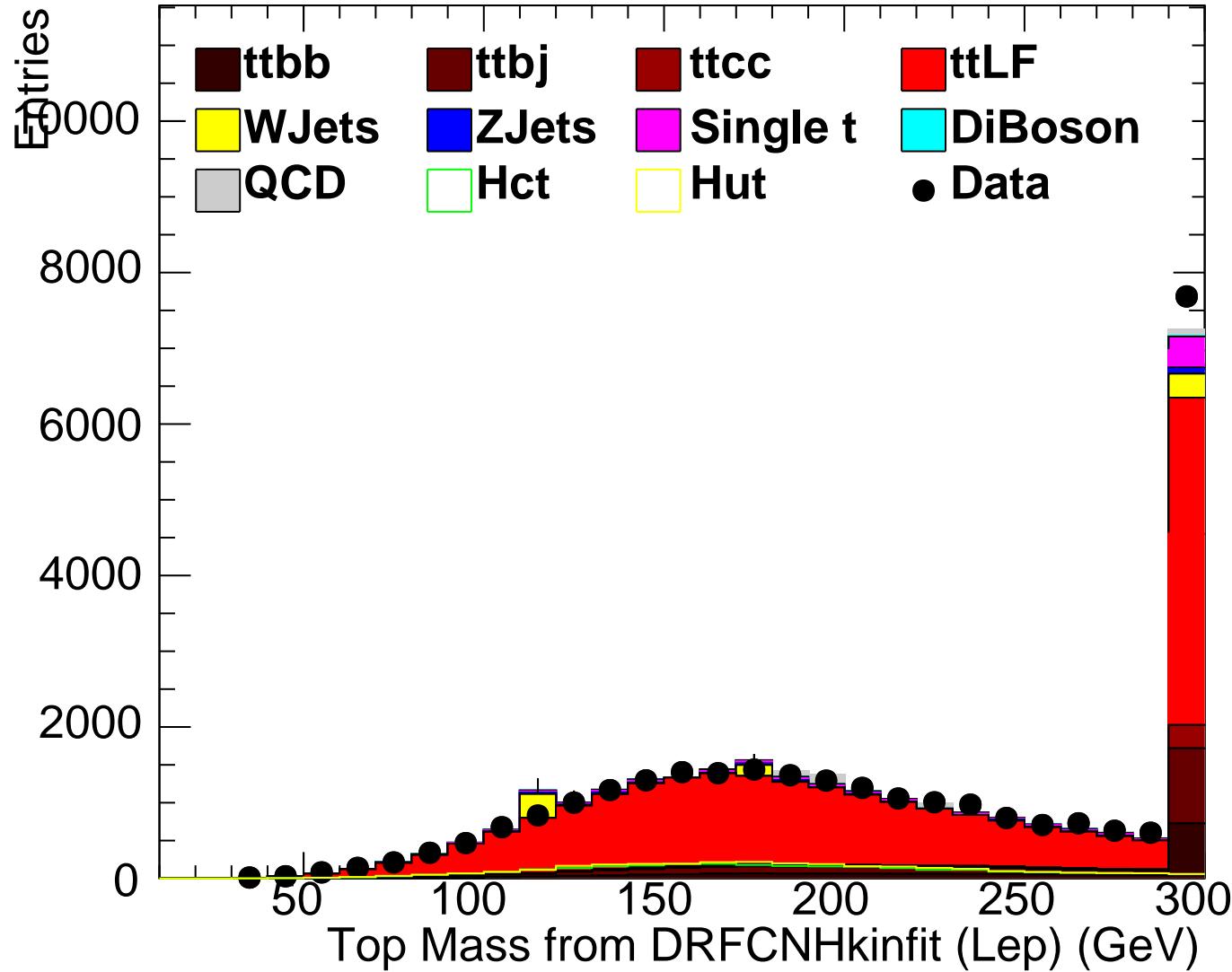


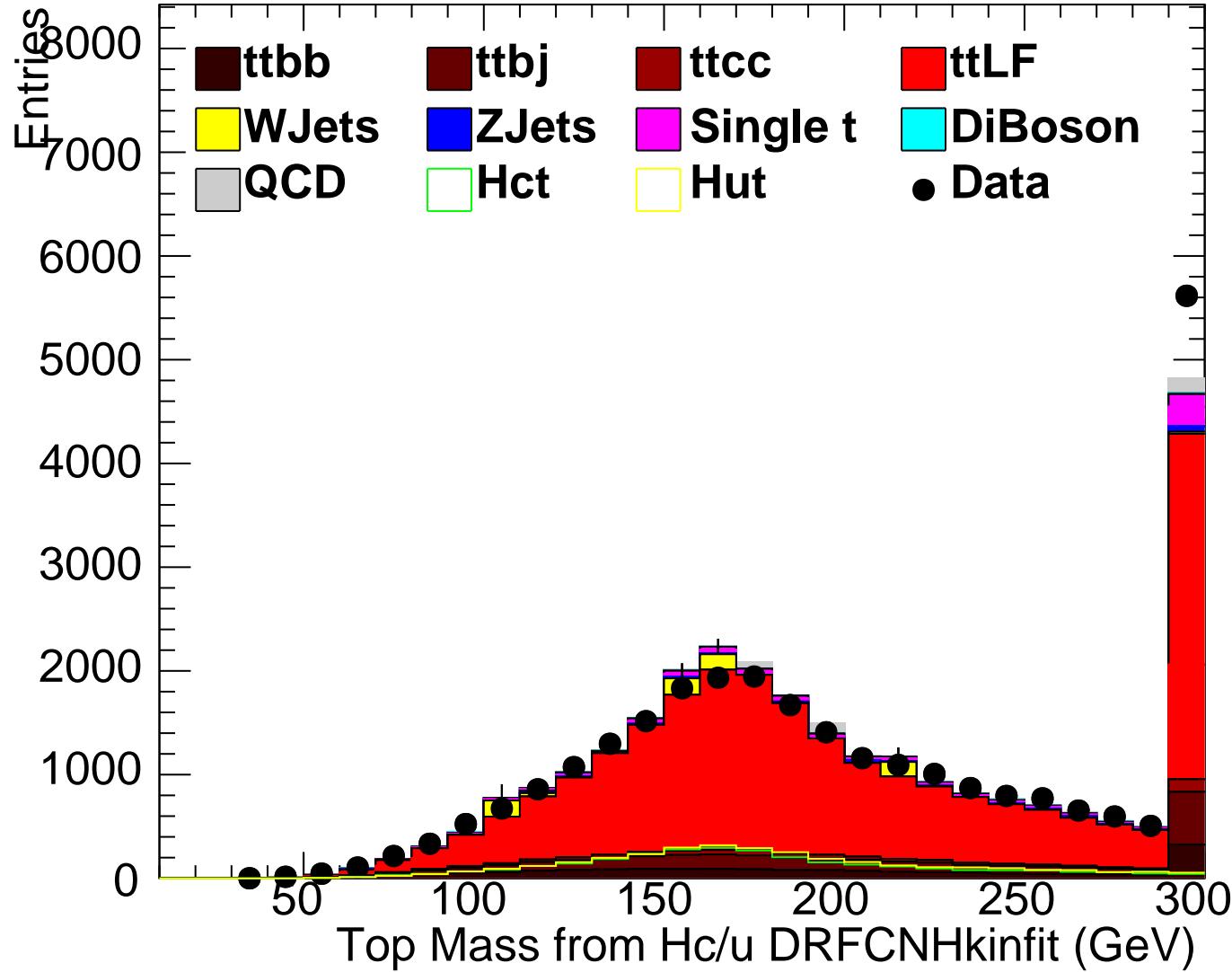


**Ch1\_S5**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch1\_S5**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 



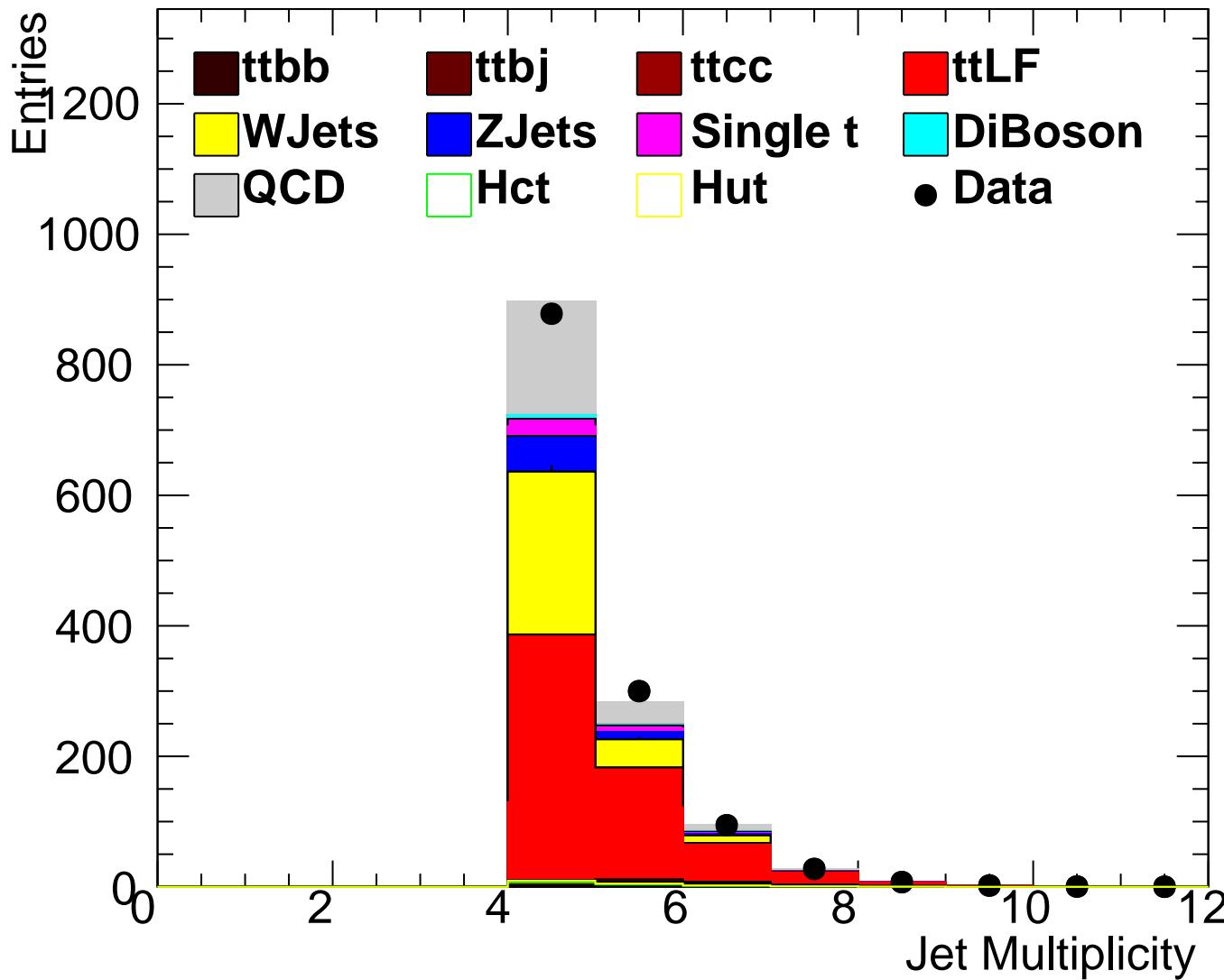


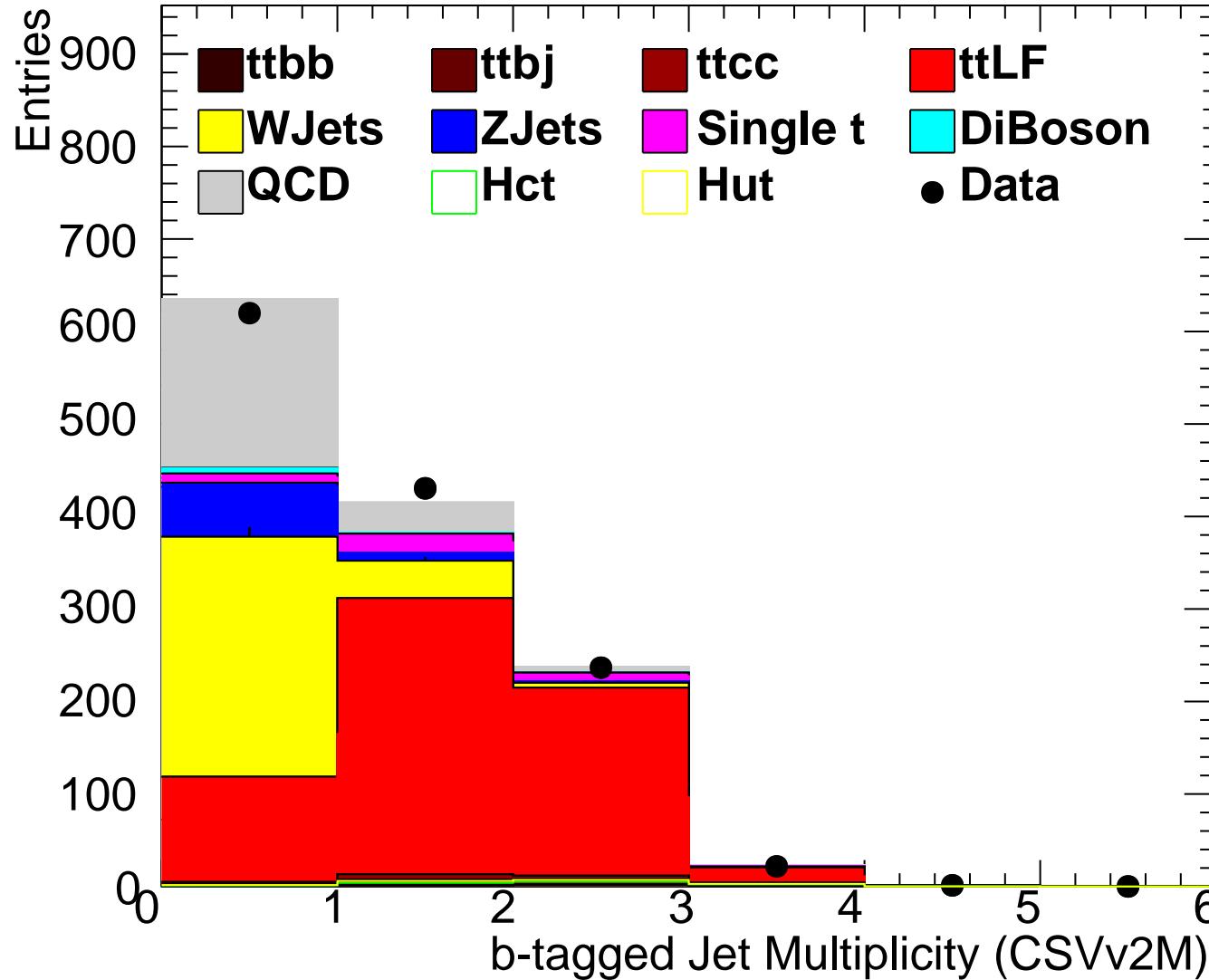
**Ch1\_S5**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

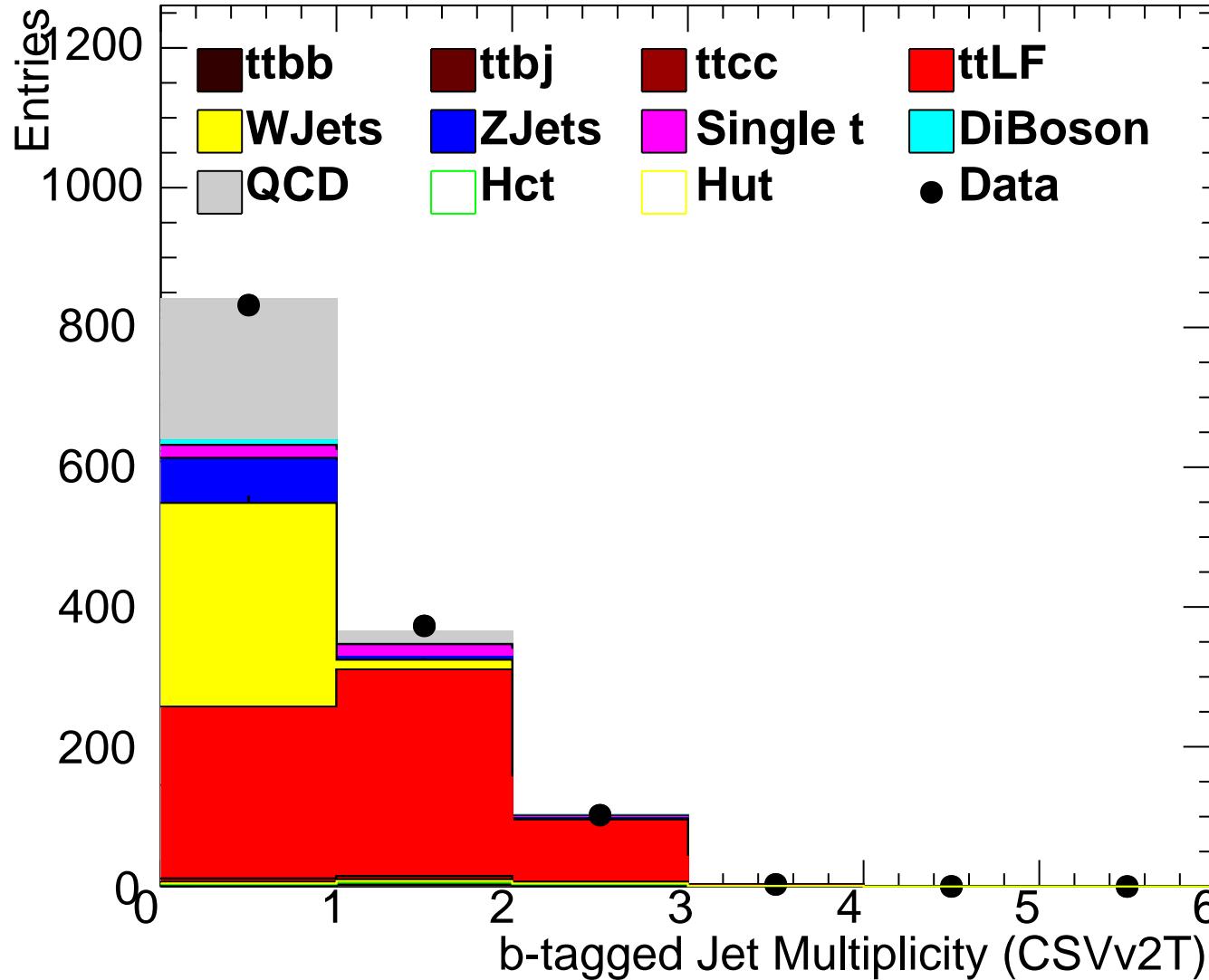
Ch1\_S6

3

CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$

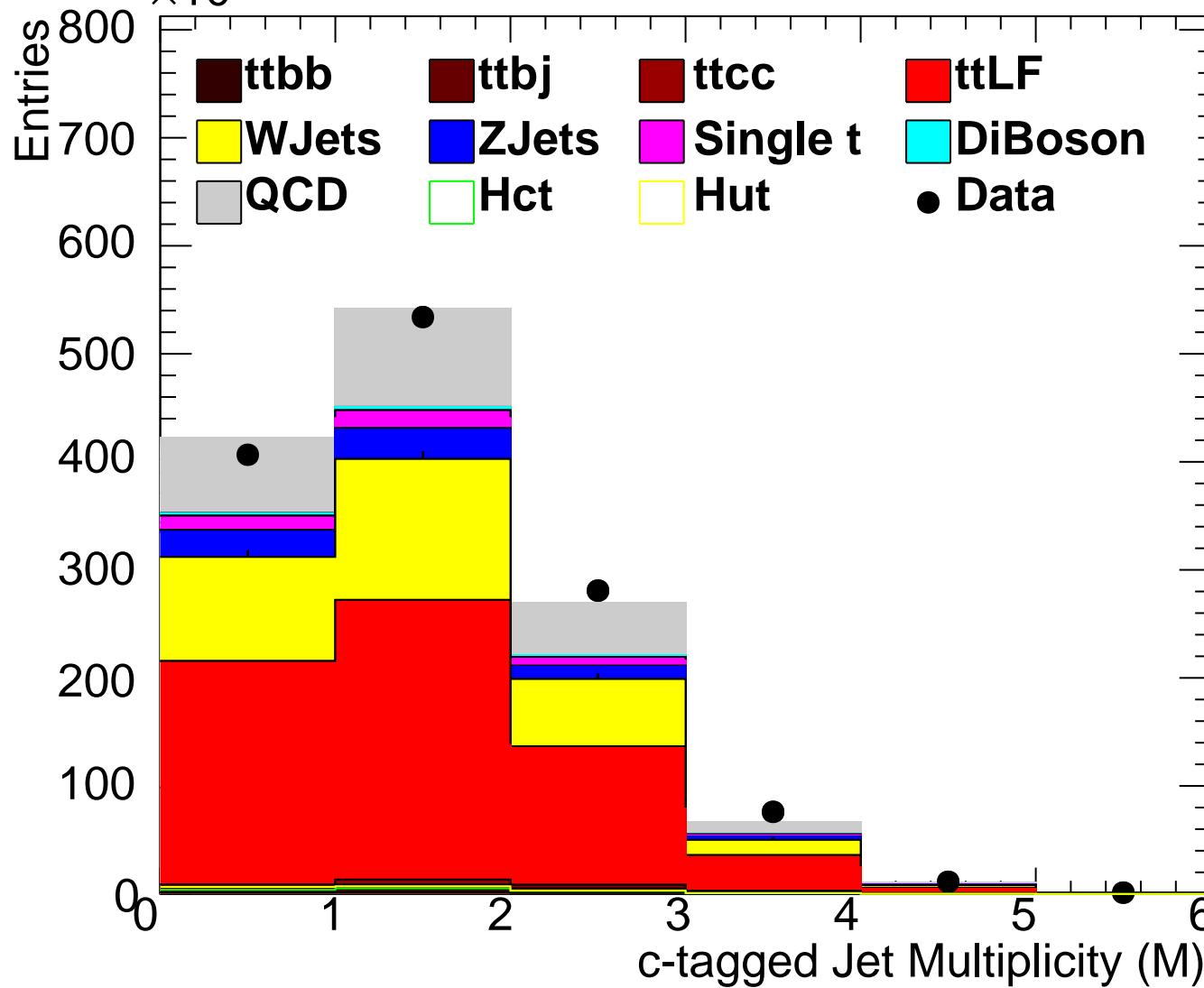


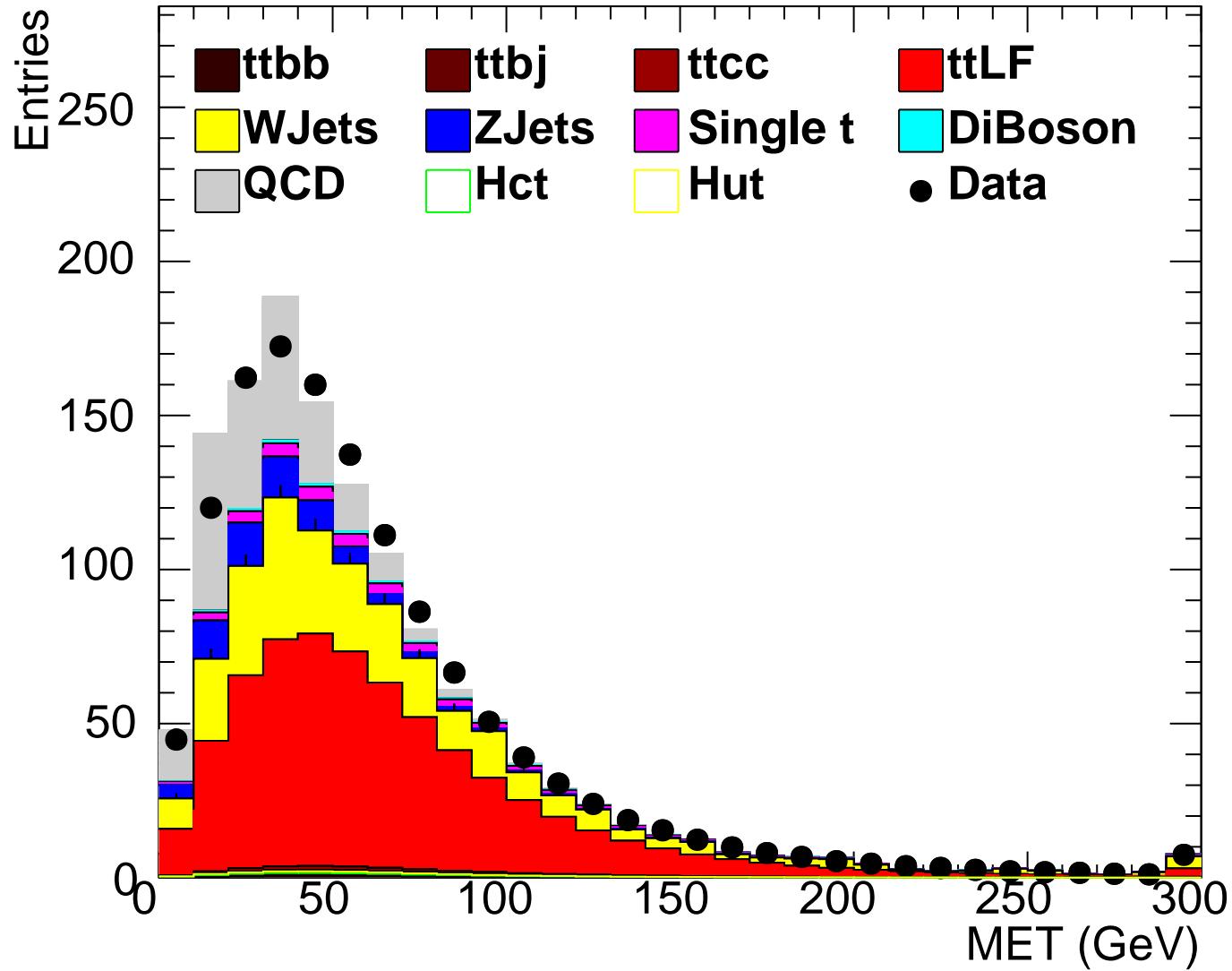
**Ch1\_S6**3  
 $\times 10^3$ CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

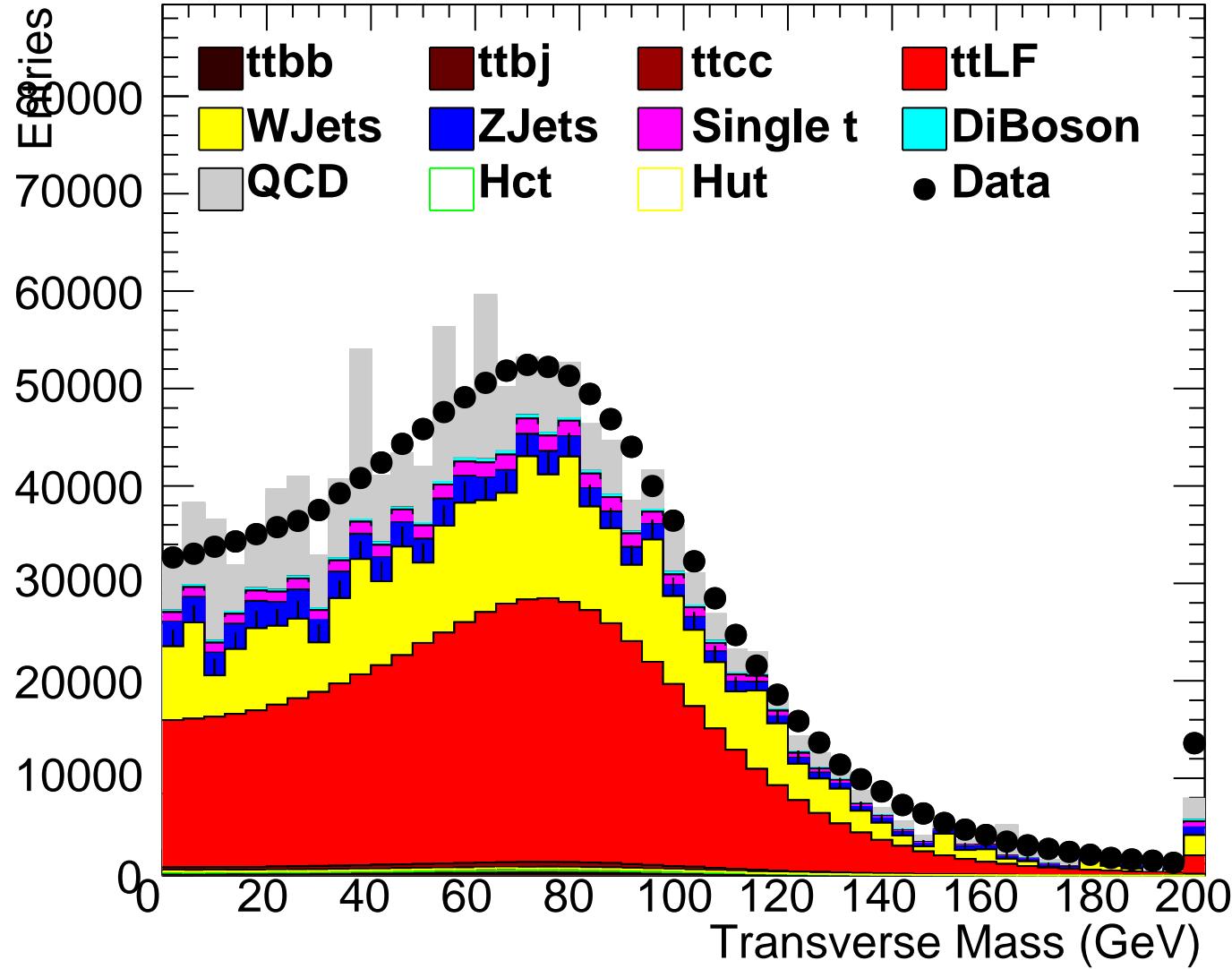
**Ch1\_S6**x 10<sup>3</sup>CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV

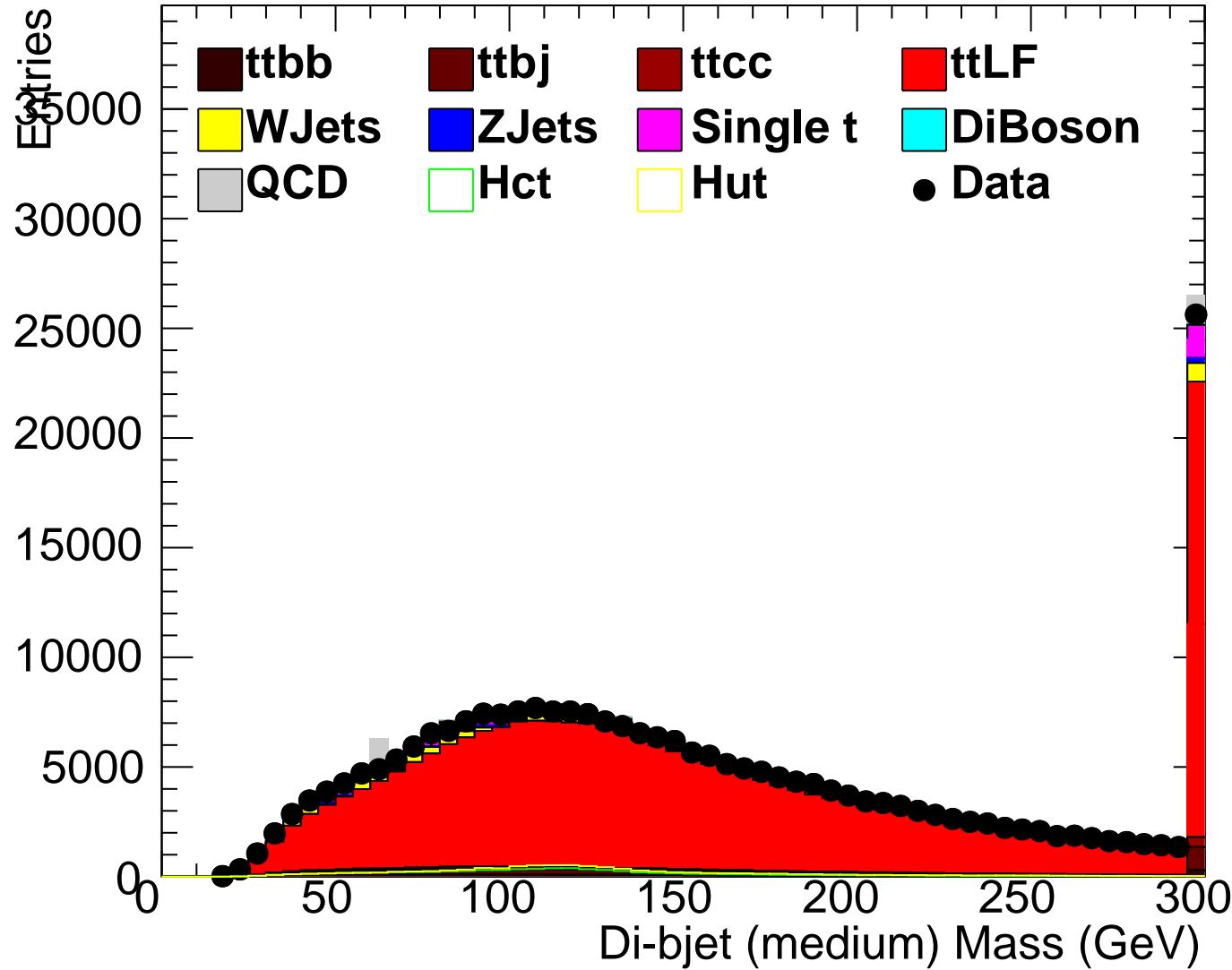
Ch1\_S6

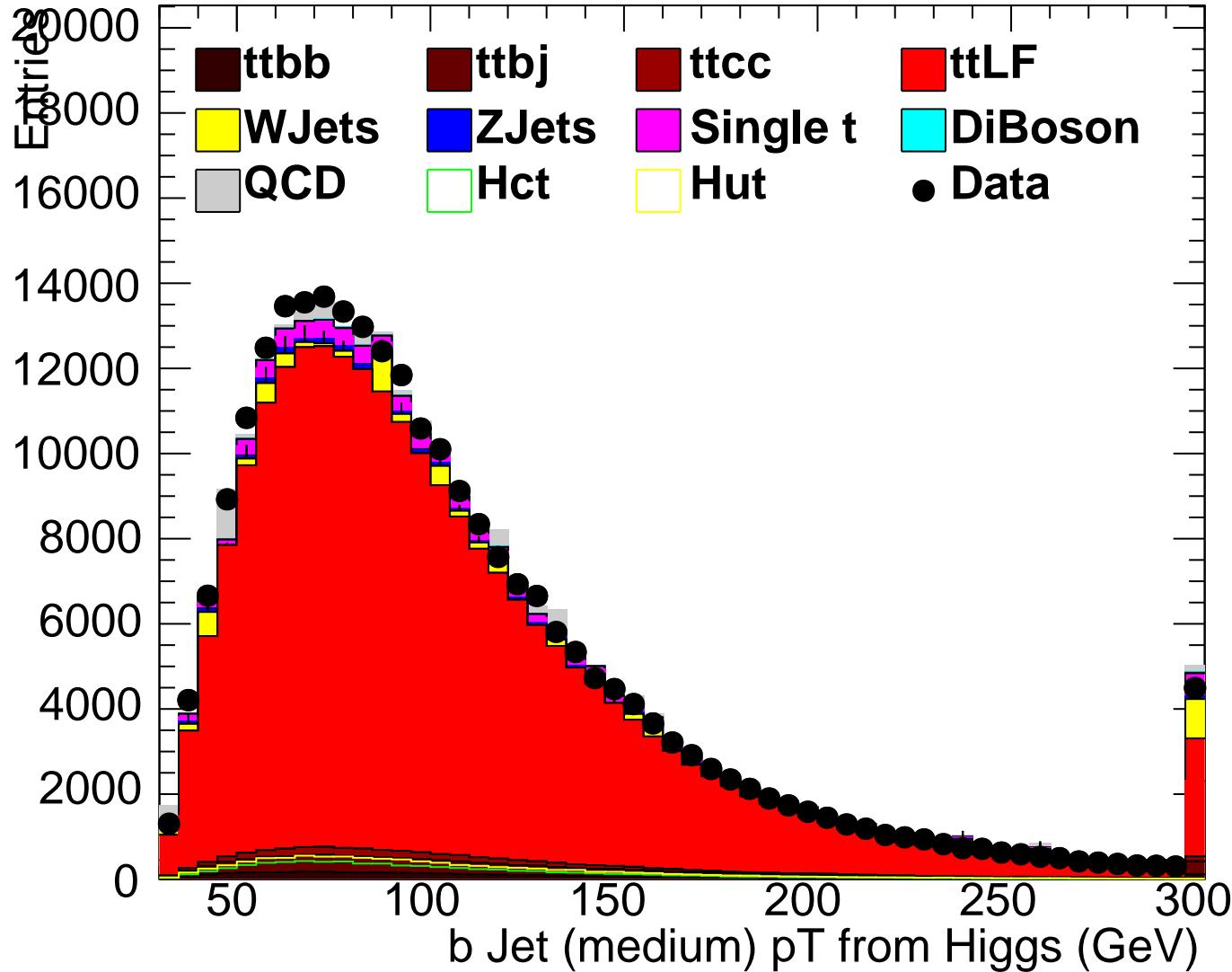
CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV

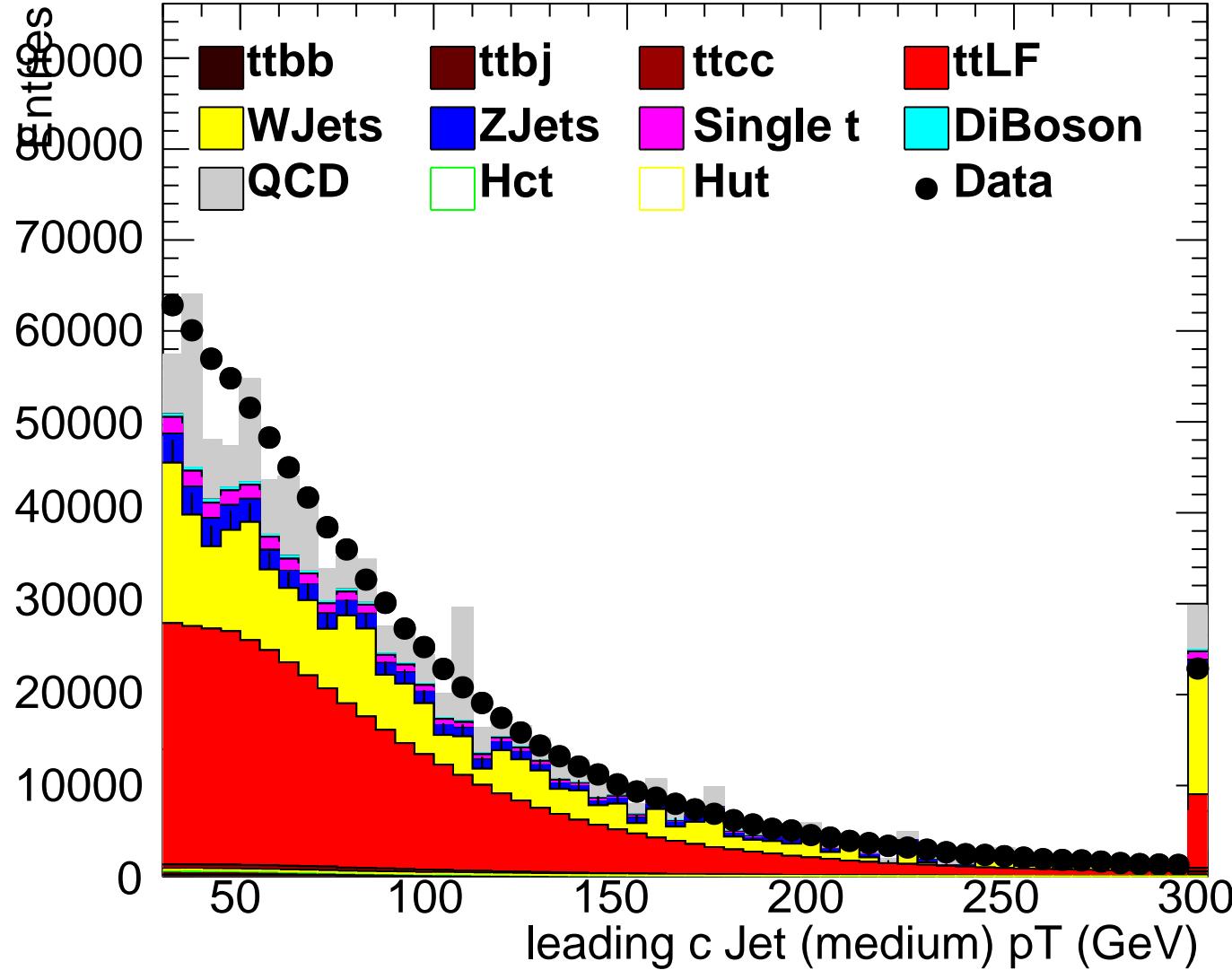


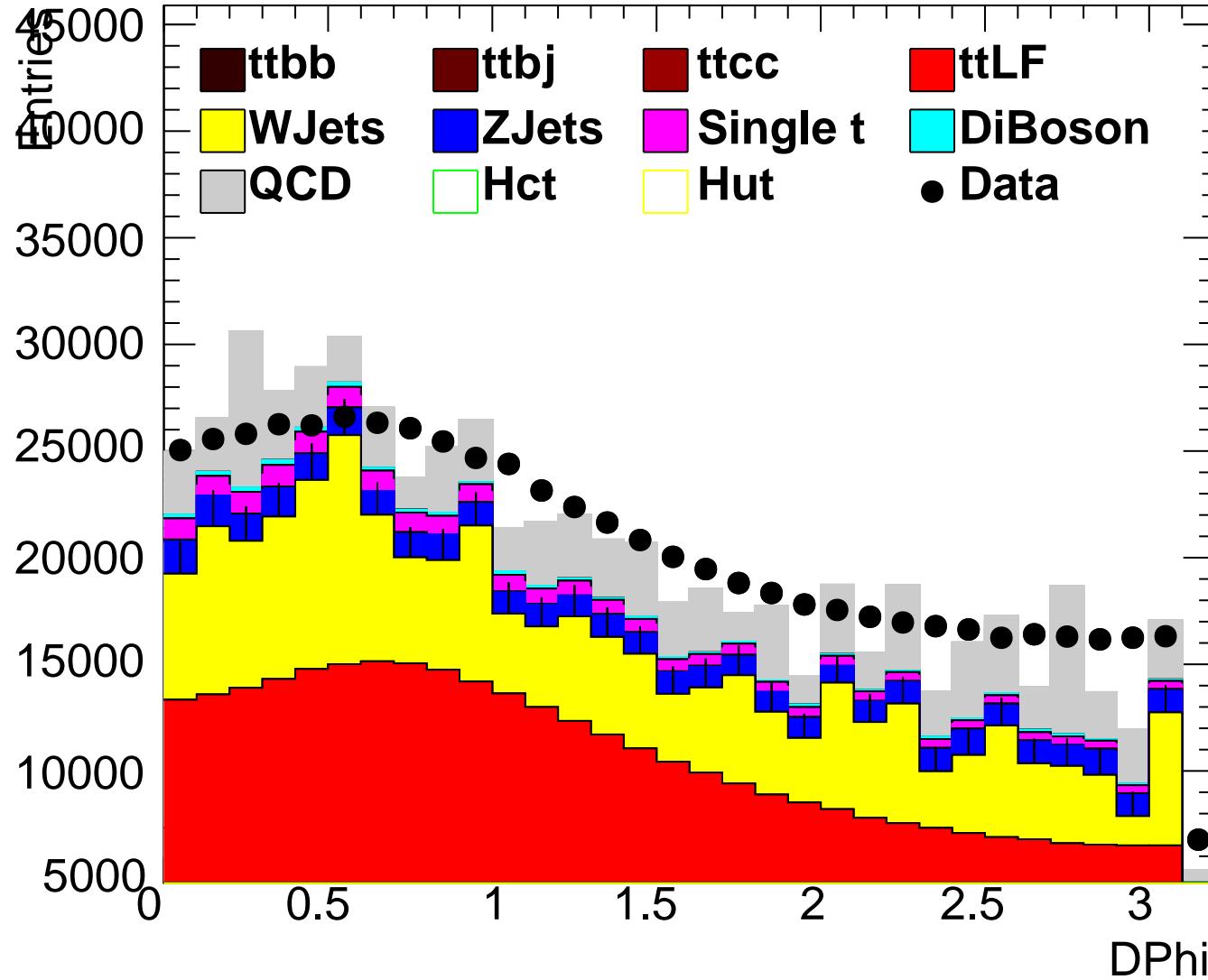
**Ch1\_S6**x 10<sup>-3</sup>CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV

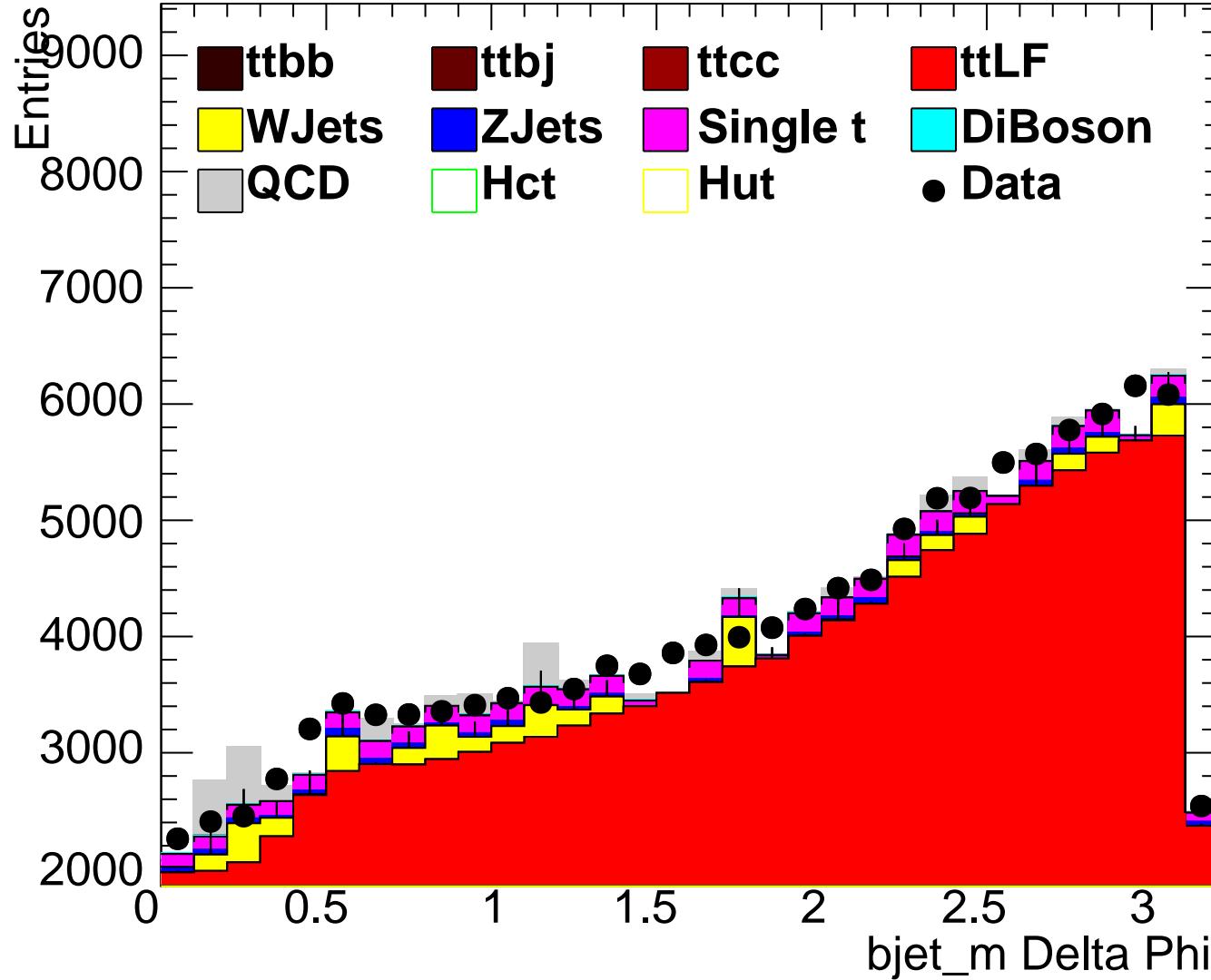
**Ch1\_S6**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch1\_S6**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch1\_S6**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

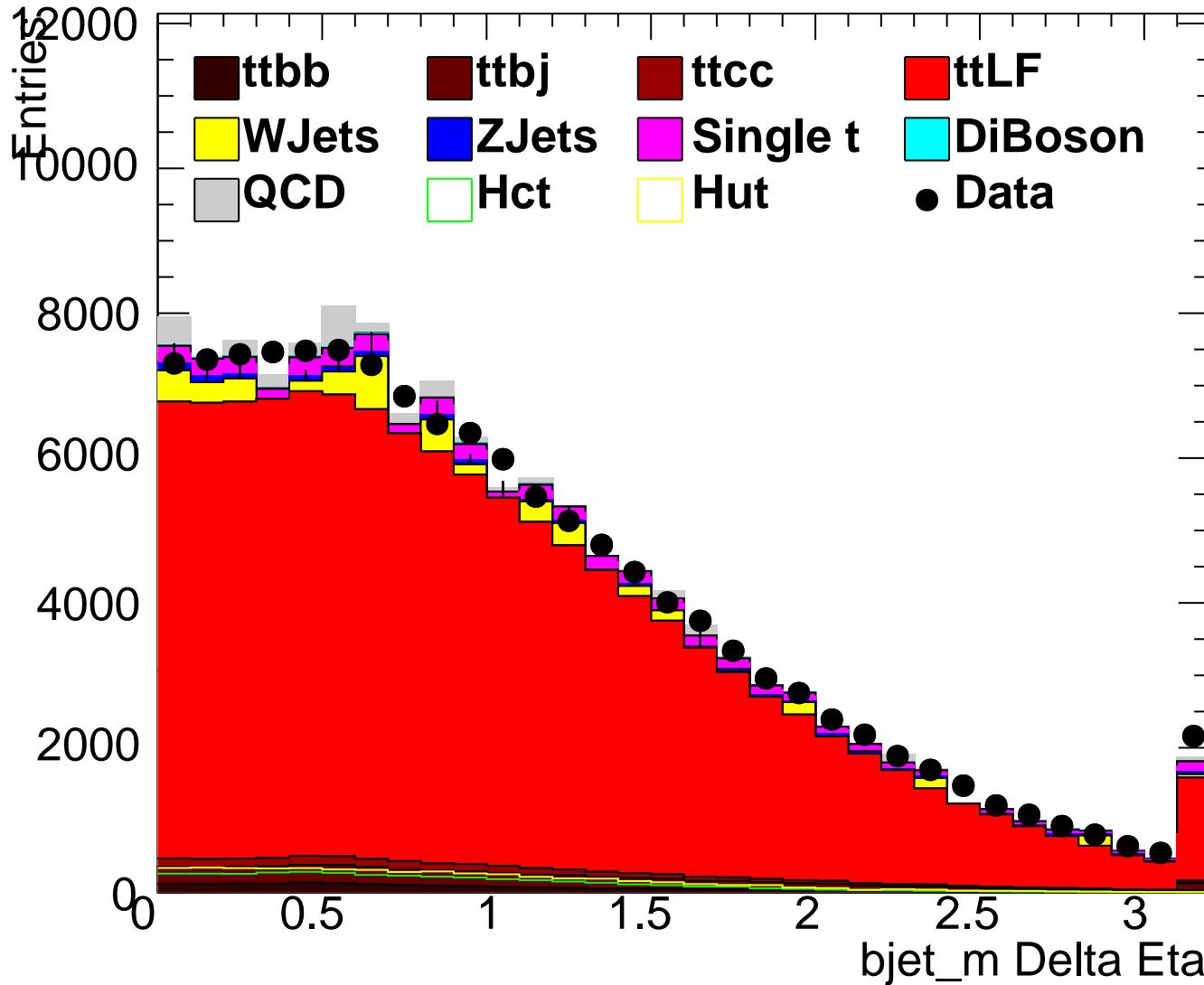
**Ch1\_S6**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

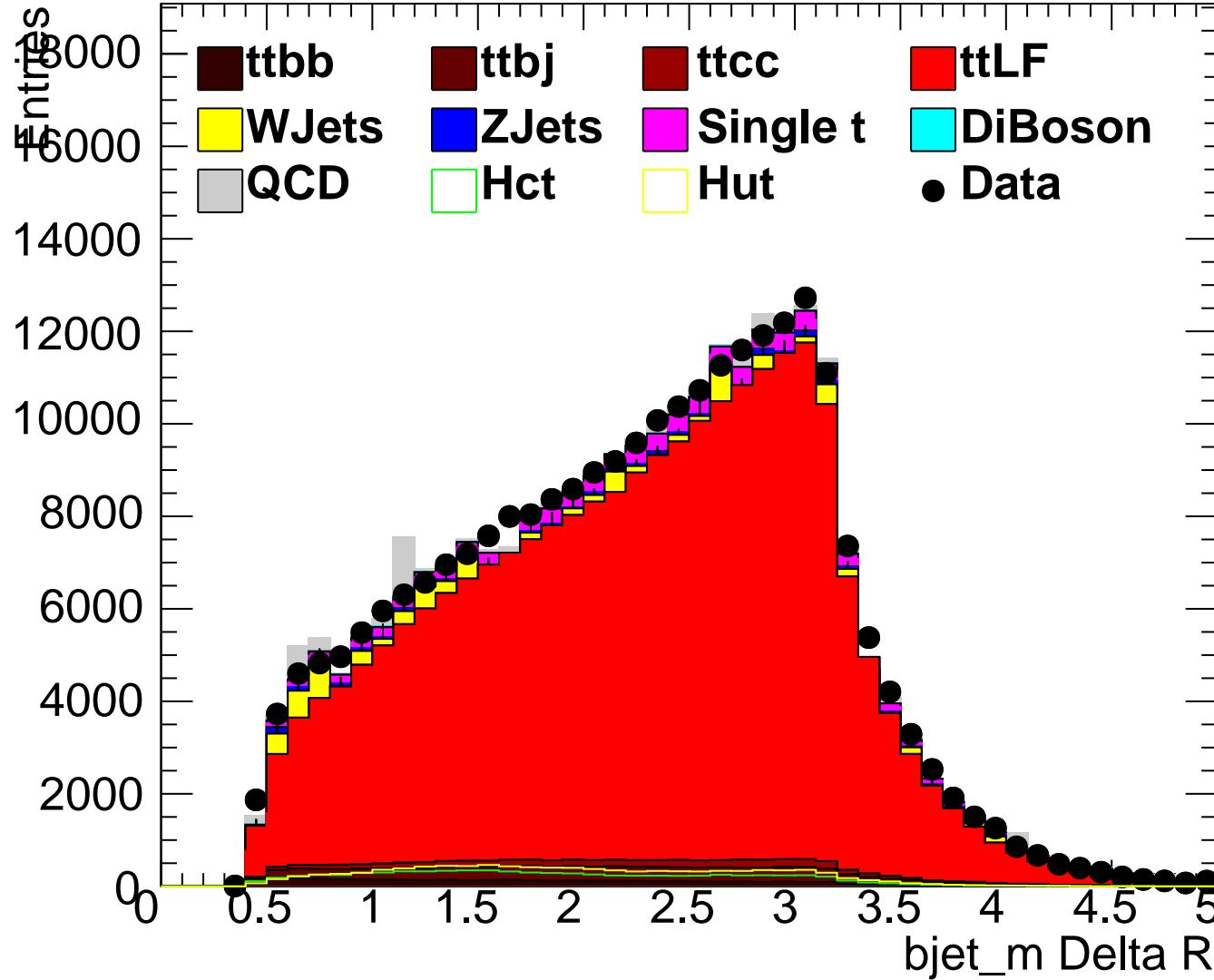
**Ch1\_S6**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 



Ch1\_S6

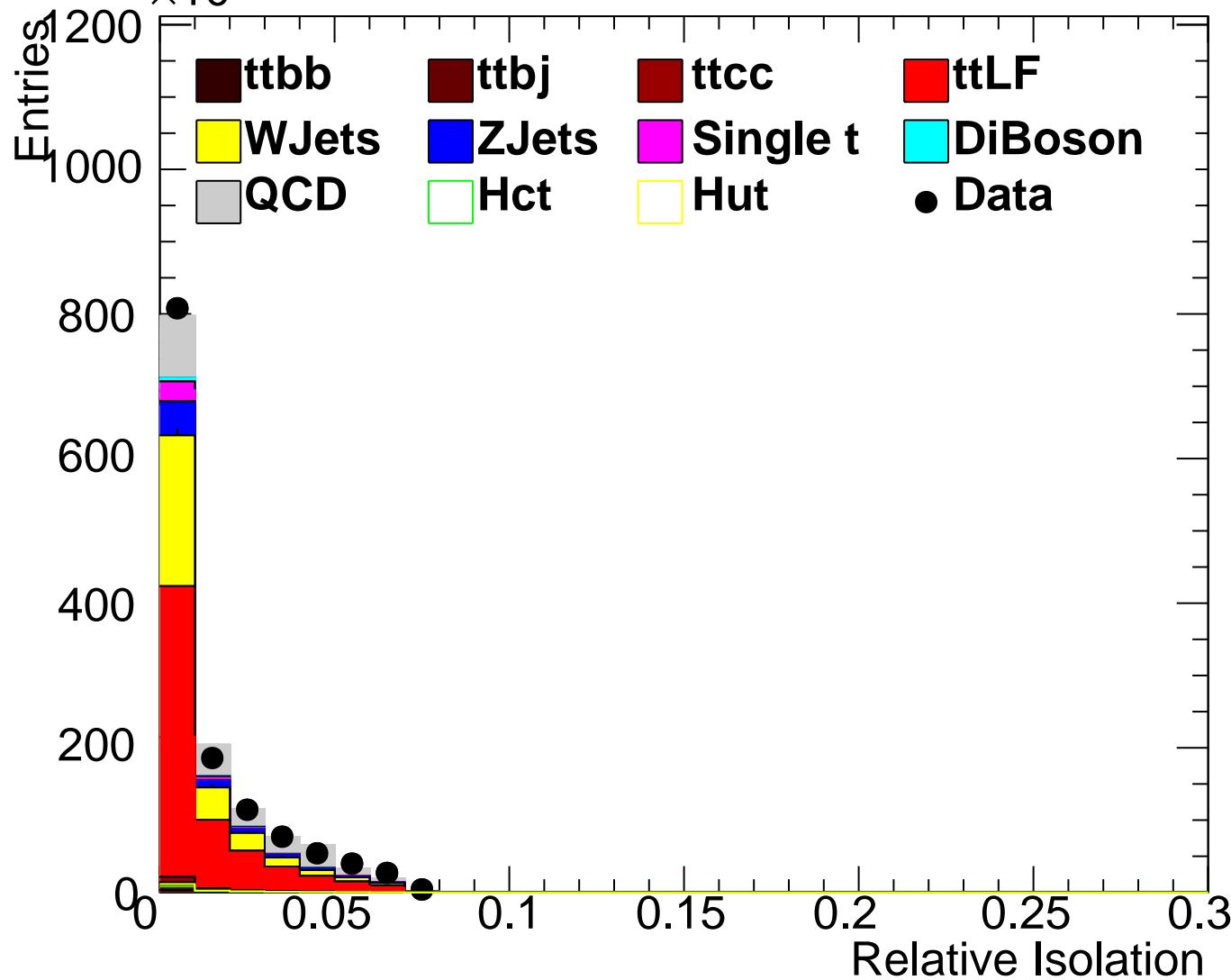
CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV





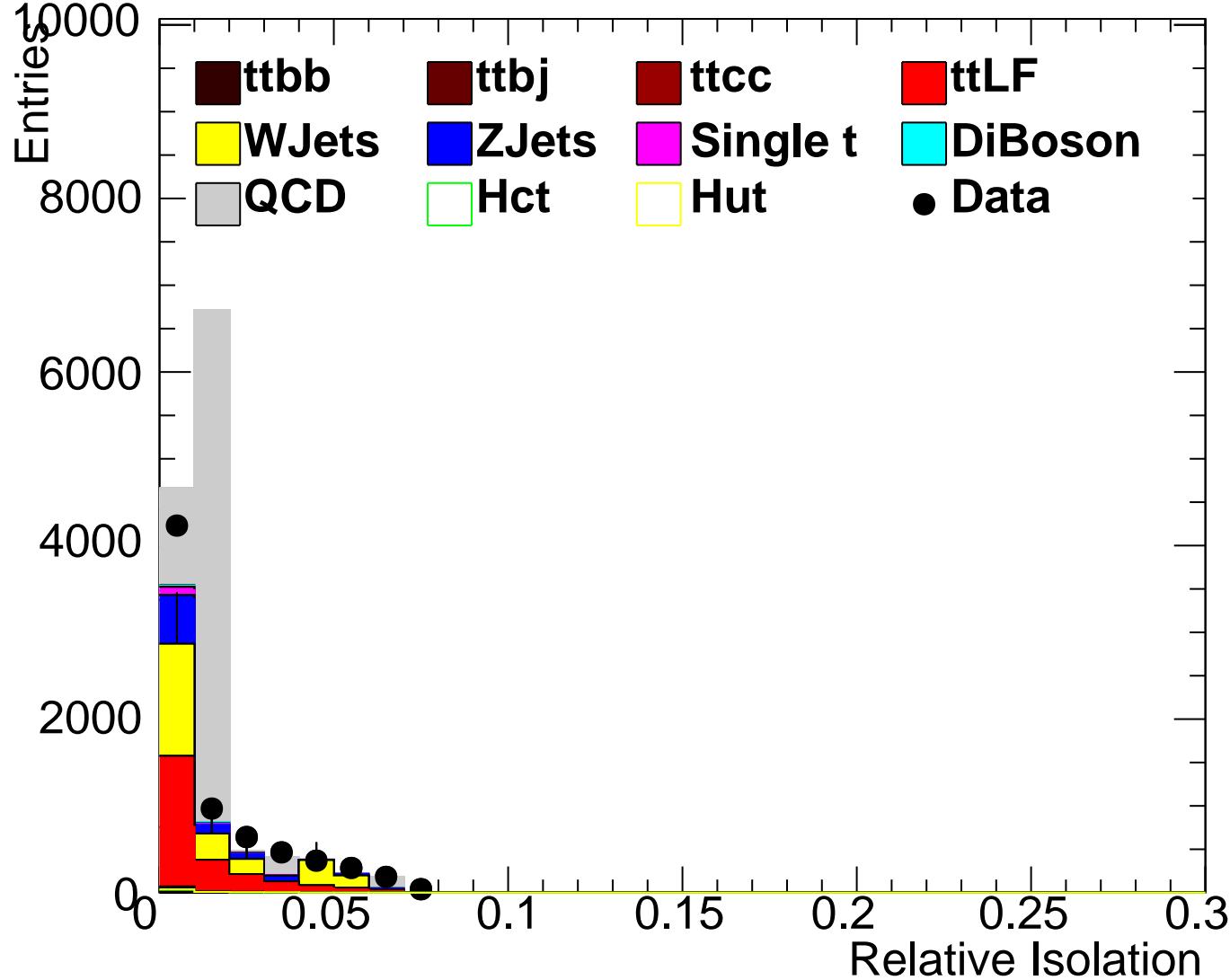
# Ch1\_S6

CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$



Ch1\_S6

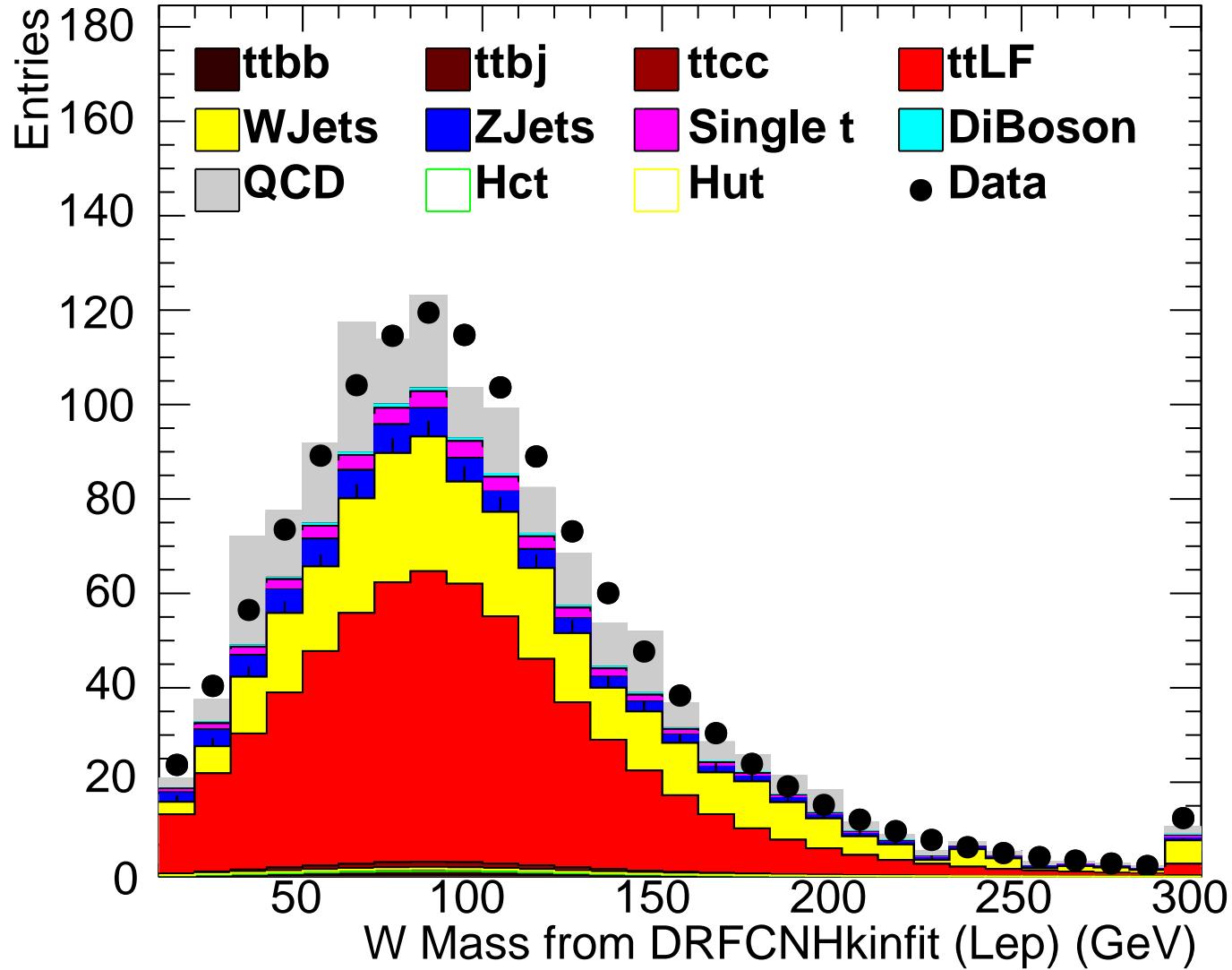
CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$



**Ch1\_S6**

$\times 10^{-3}$

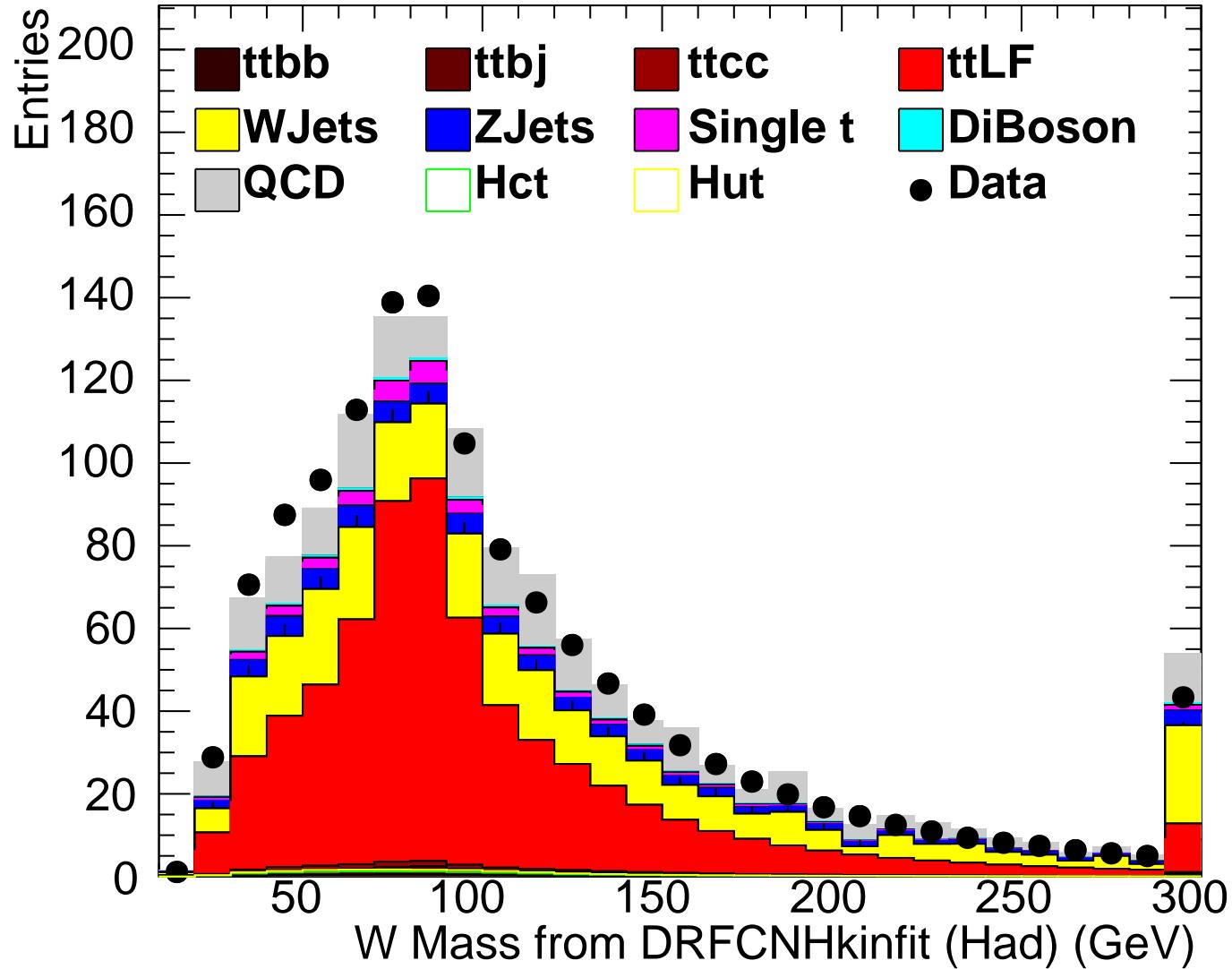
CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$



**Ch1\_S6**

$\times 10^{-3}$

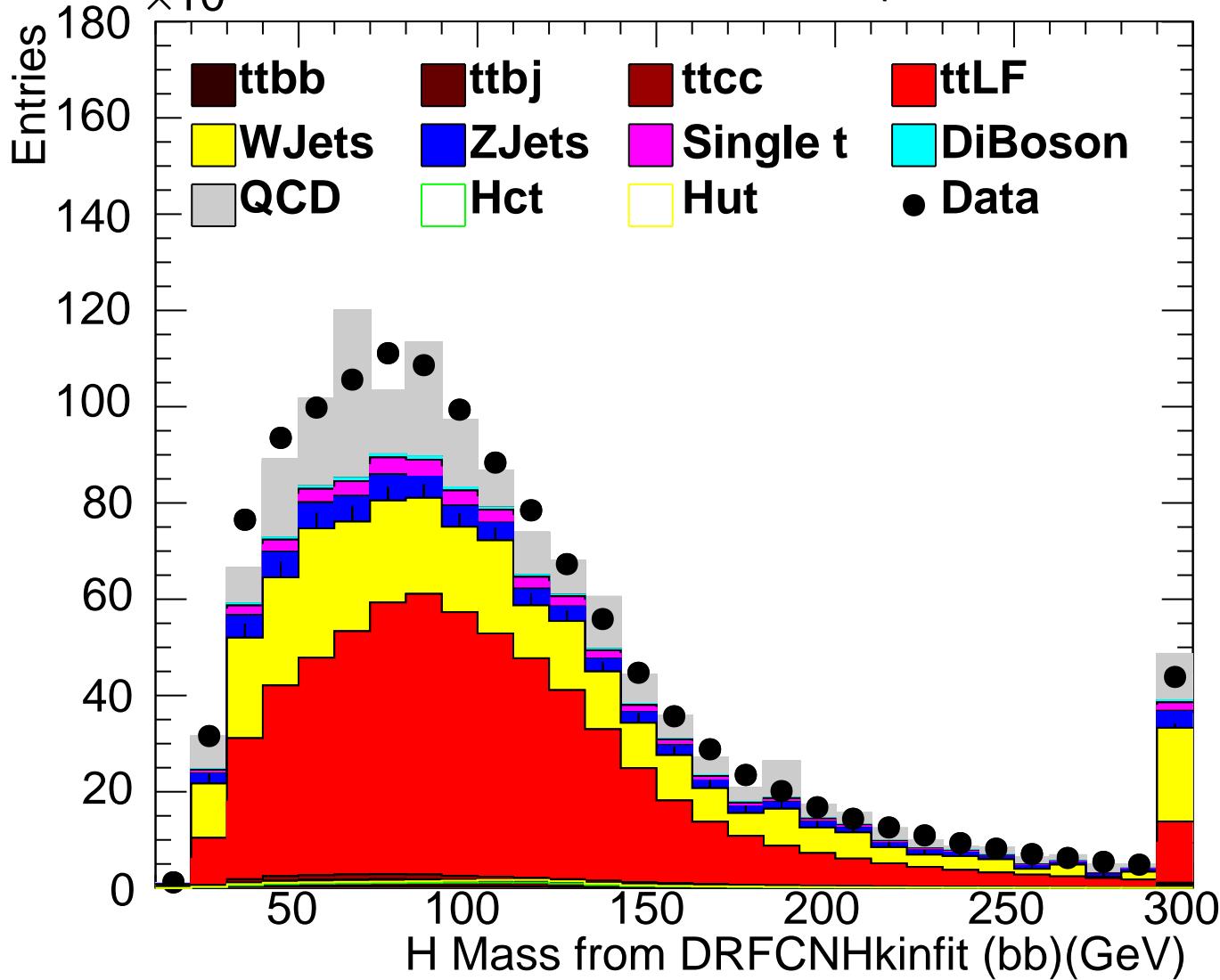
CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$

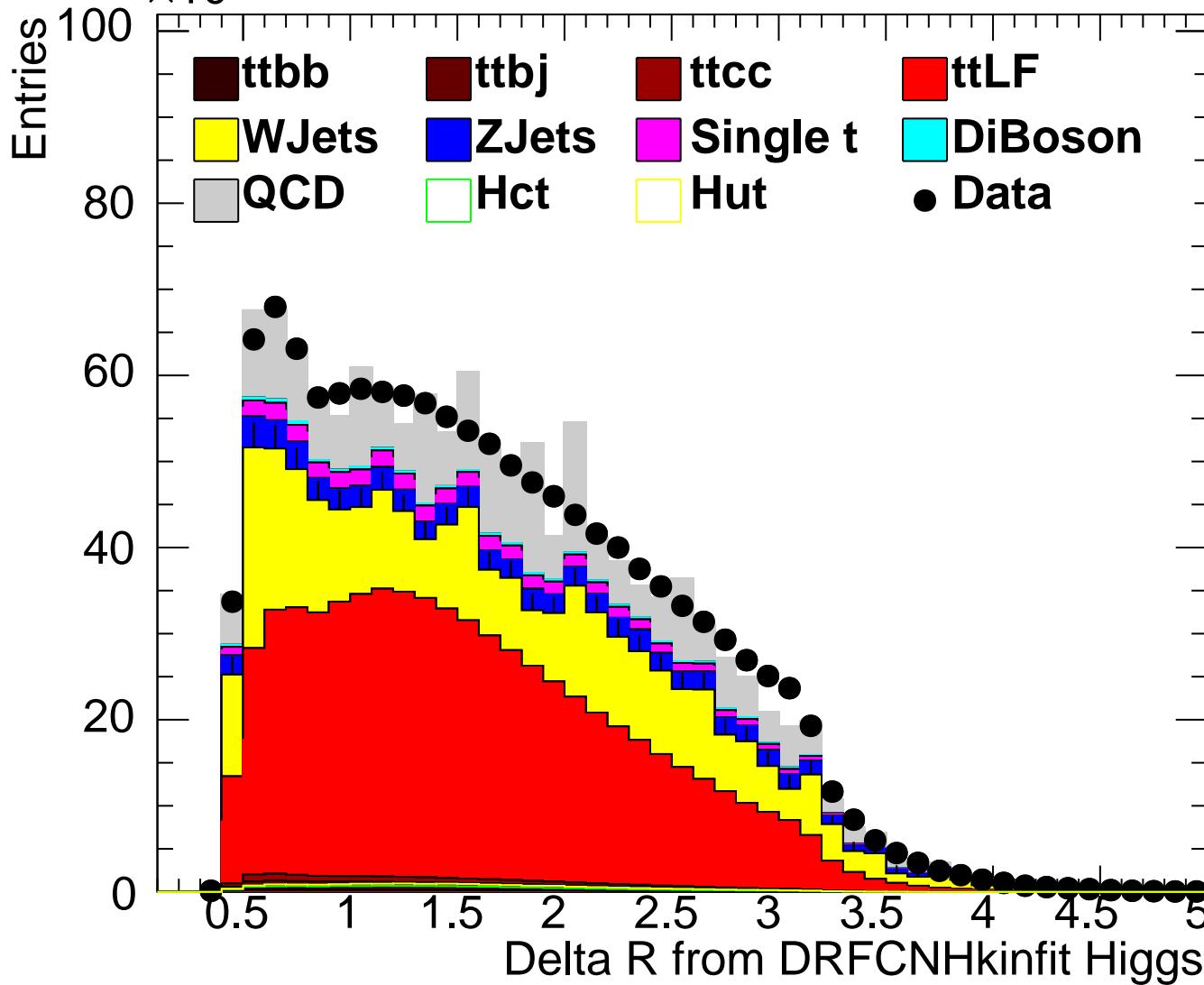


**Ch1\_S6**

$\times 10^3$

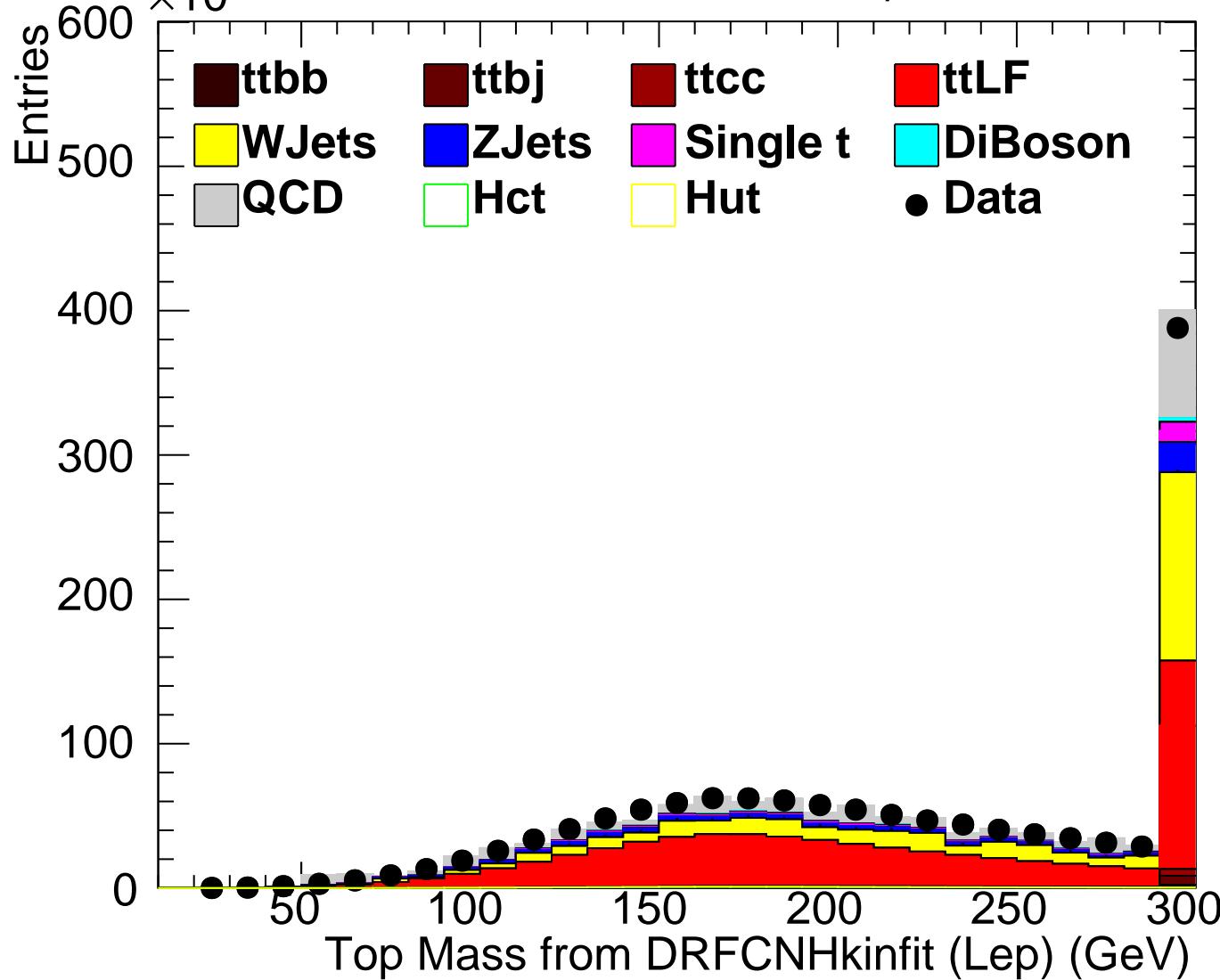
CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$

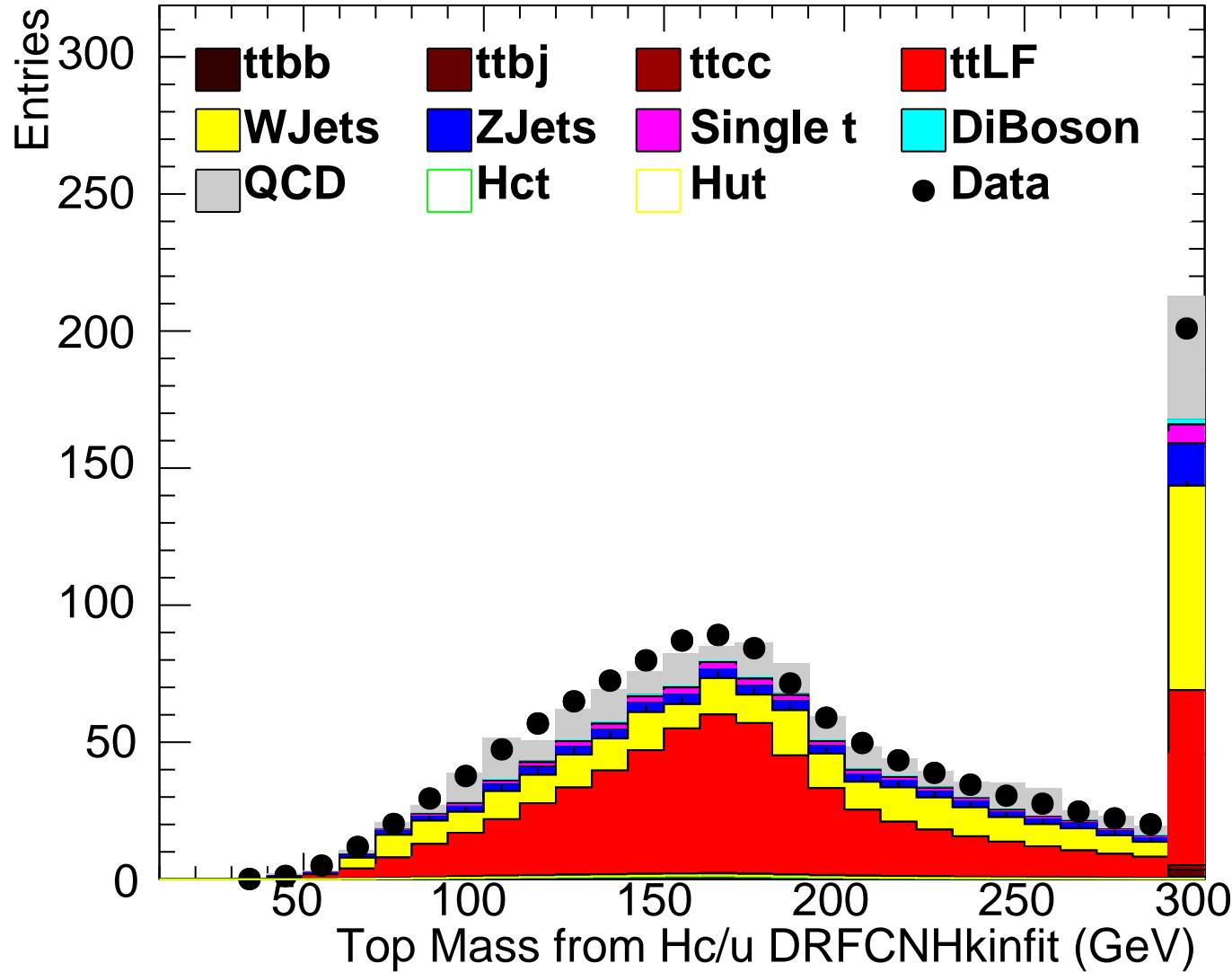


**Ch1\_S6**x 10<sup>3</sup>CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV

Ch1\_S6

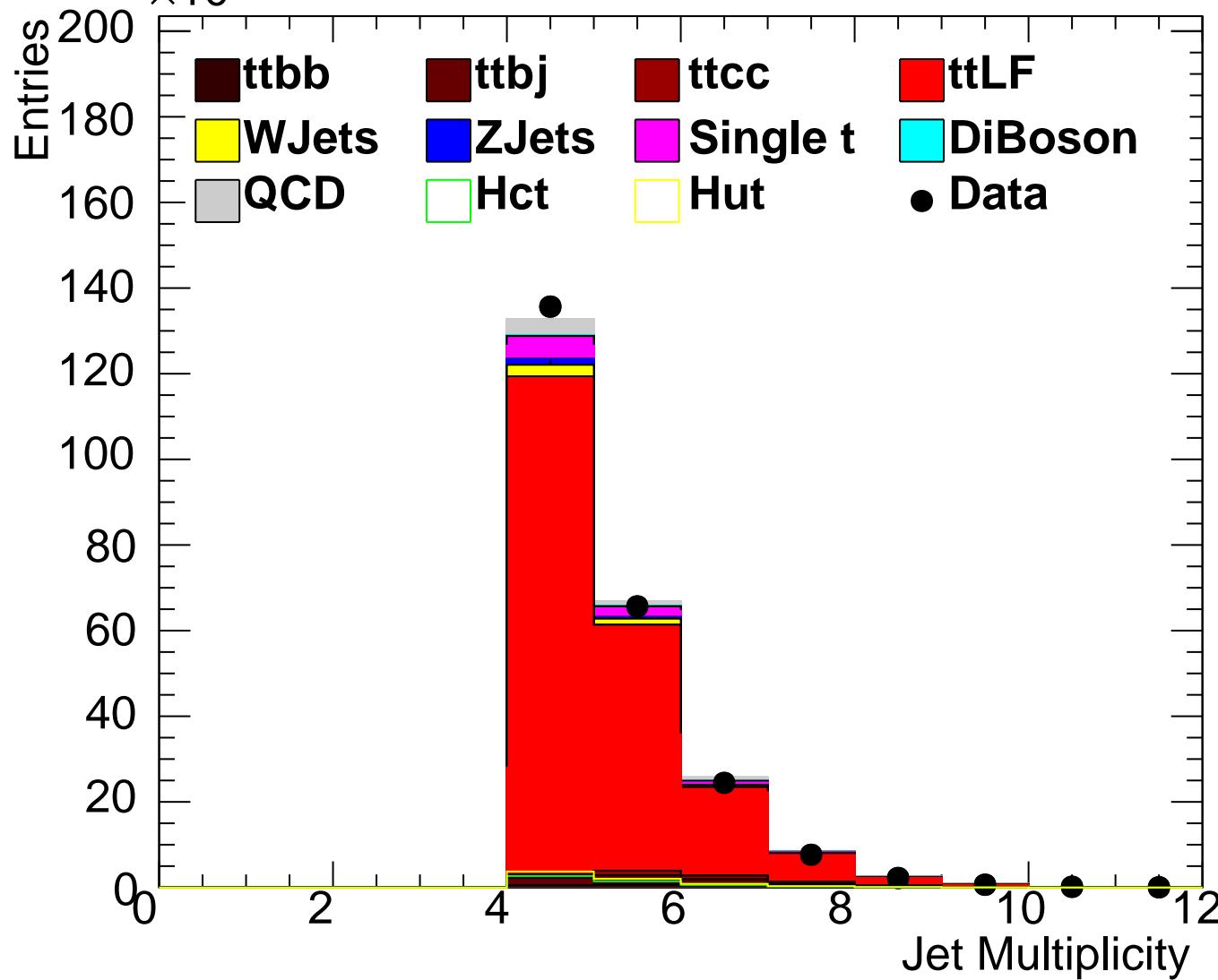
CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV



**Ch1\_S6**x 10<sup>3</sup>CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV

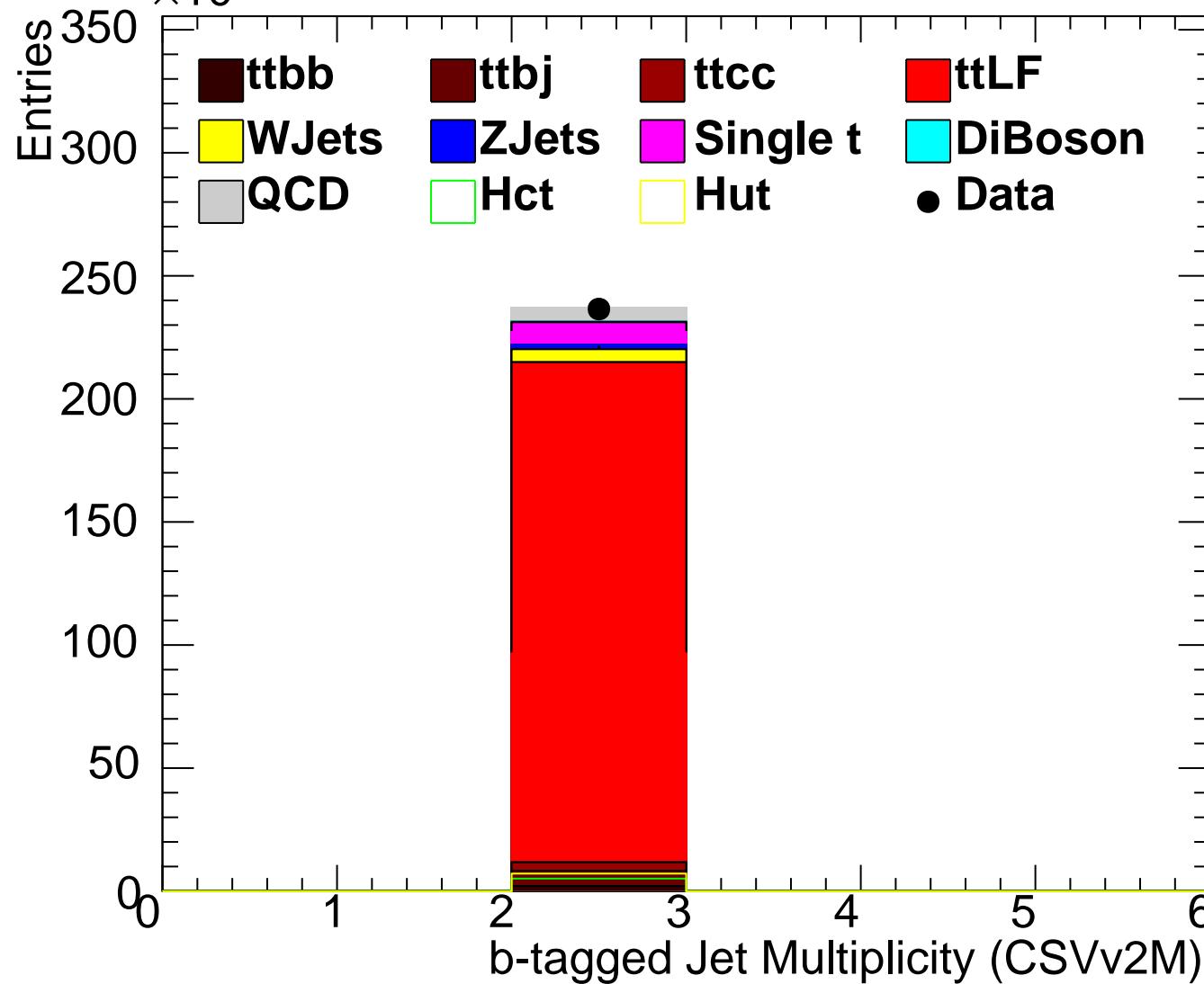
Ch1\_S7

CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV



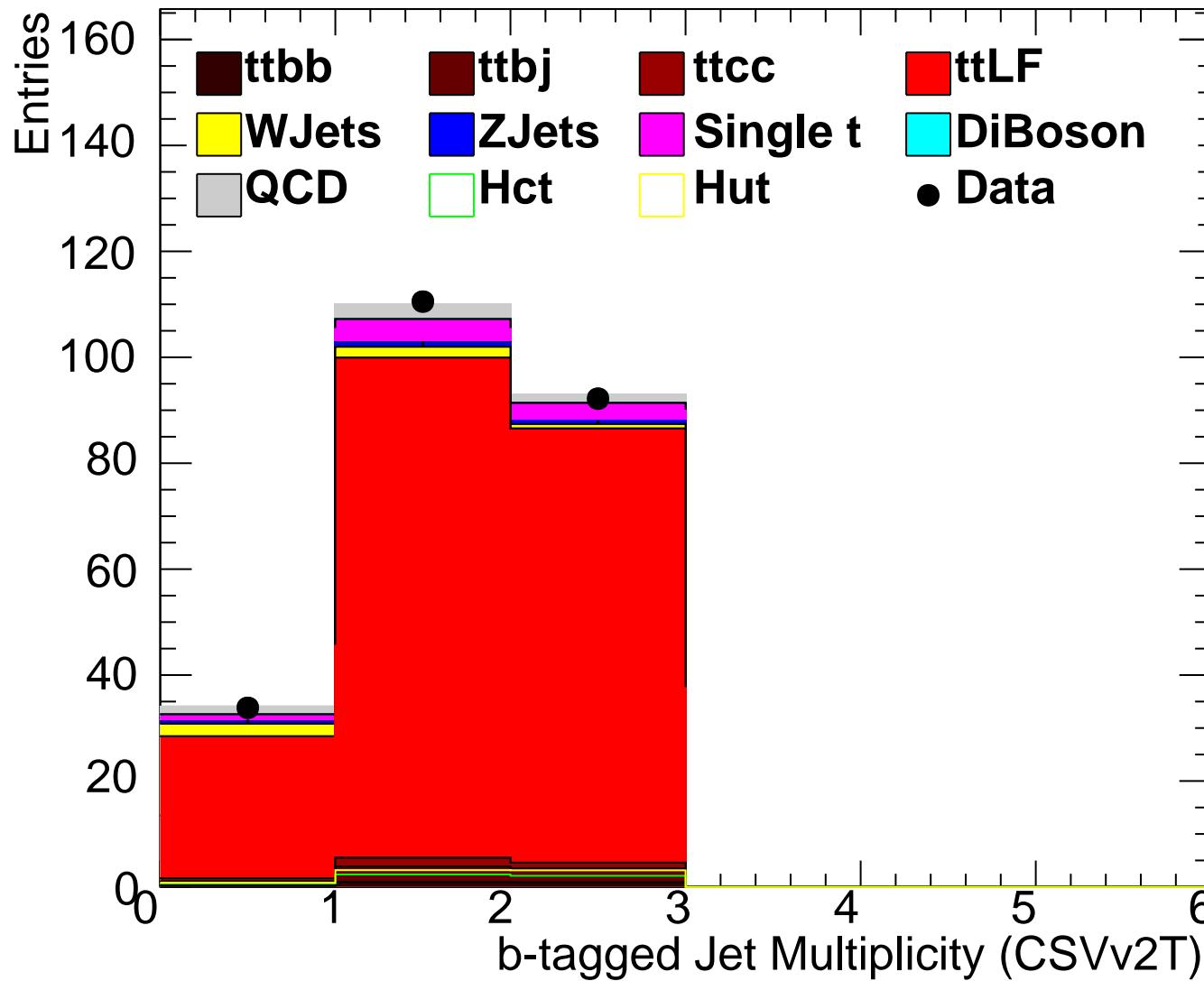
Ch1\_S7

CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$



Ch1\_S7 3

CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$



**Ch1\_S7**x 10<sup>3</sup>CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV

Entries

140

120

100

80

60

40

20

0

0

1

2

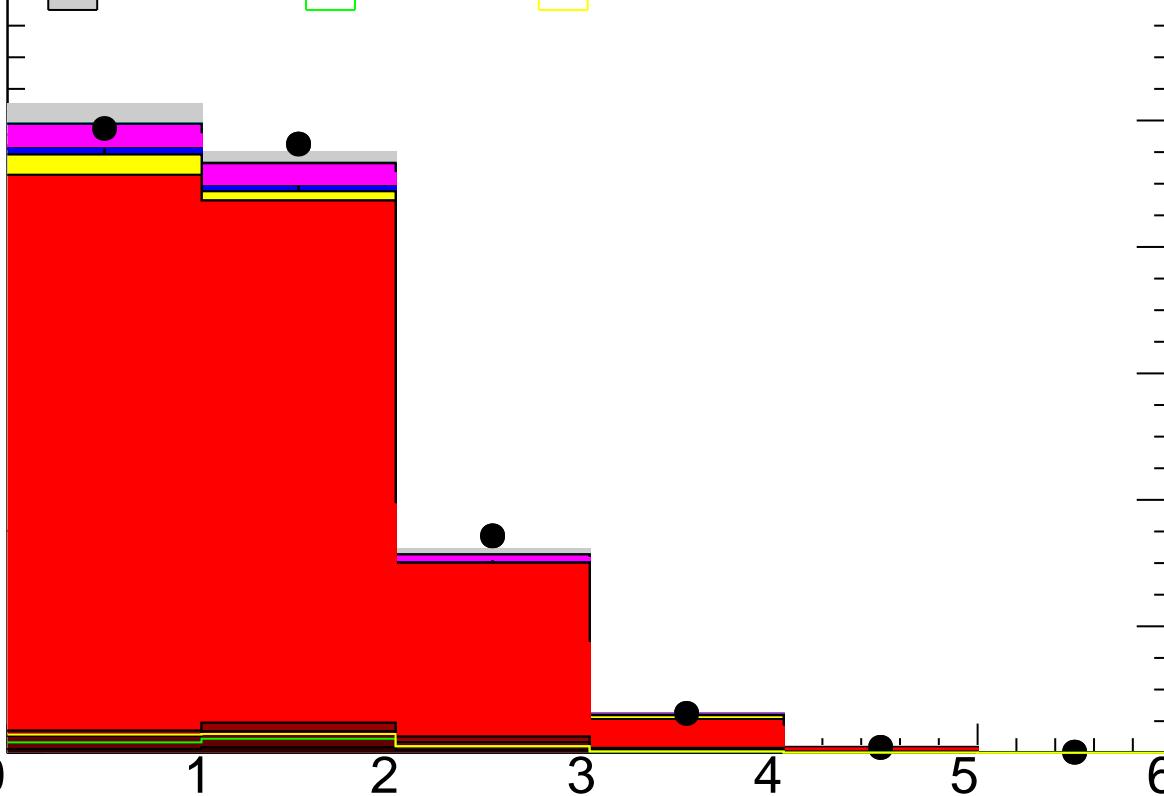
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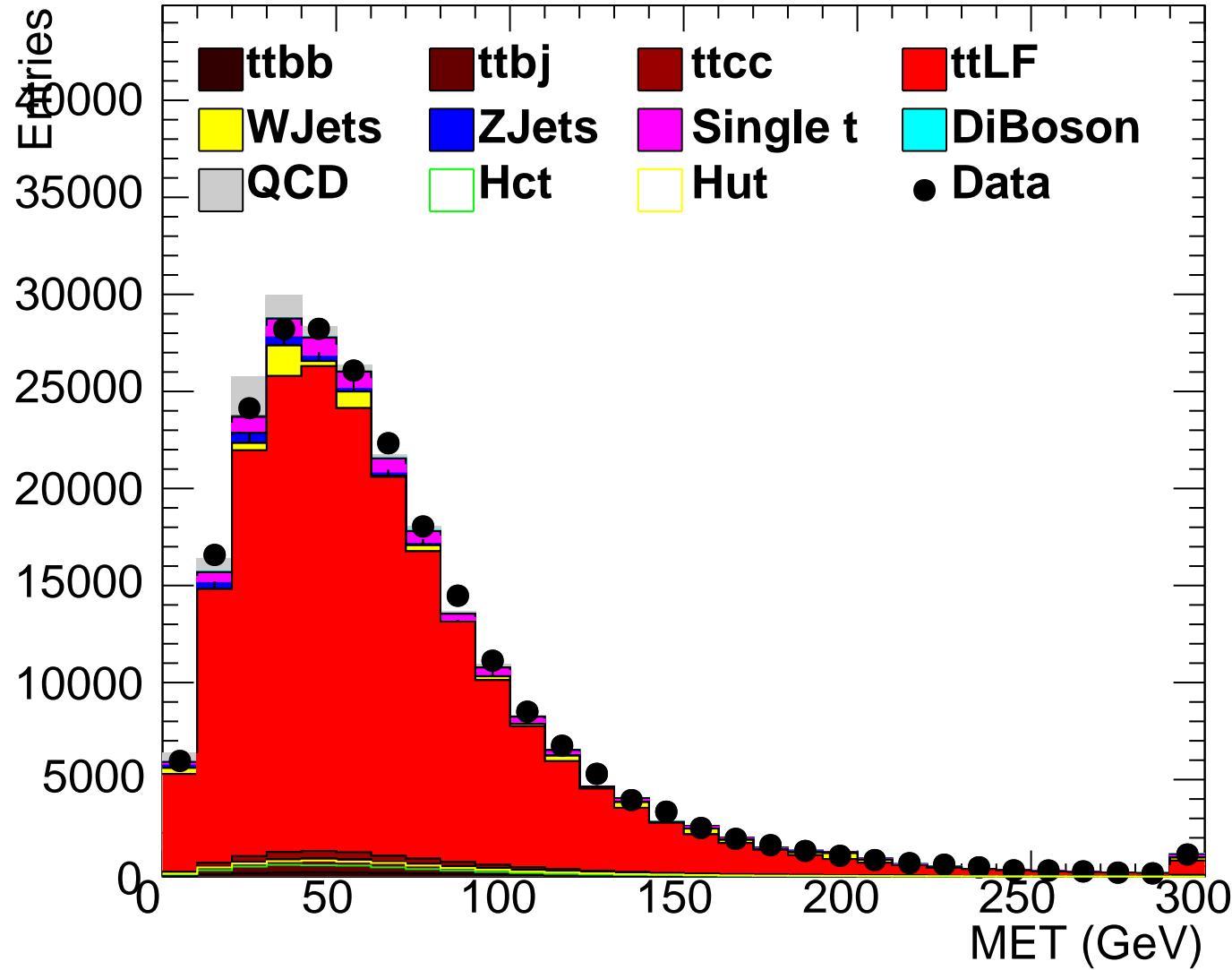
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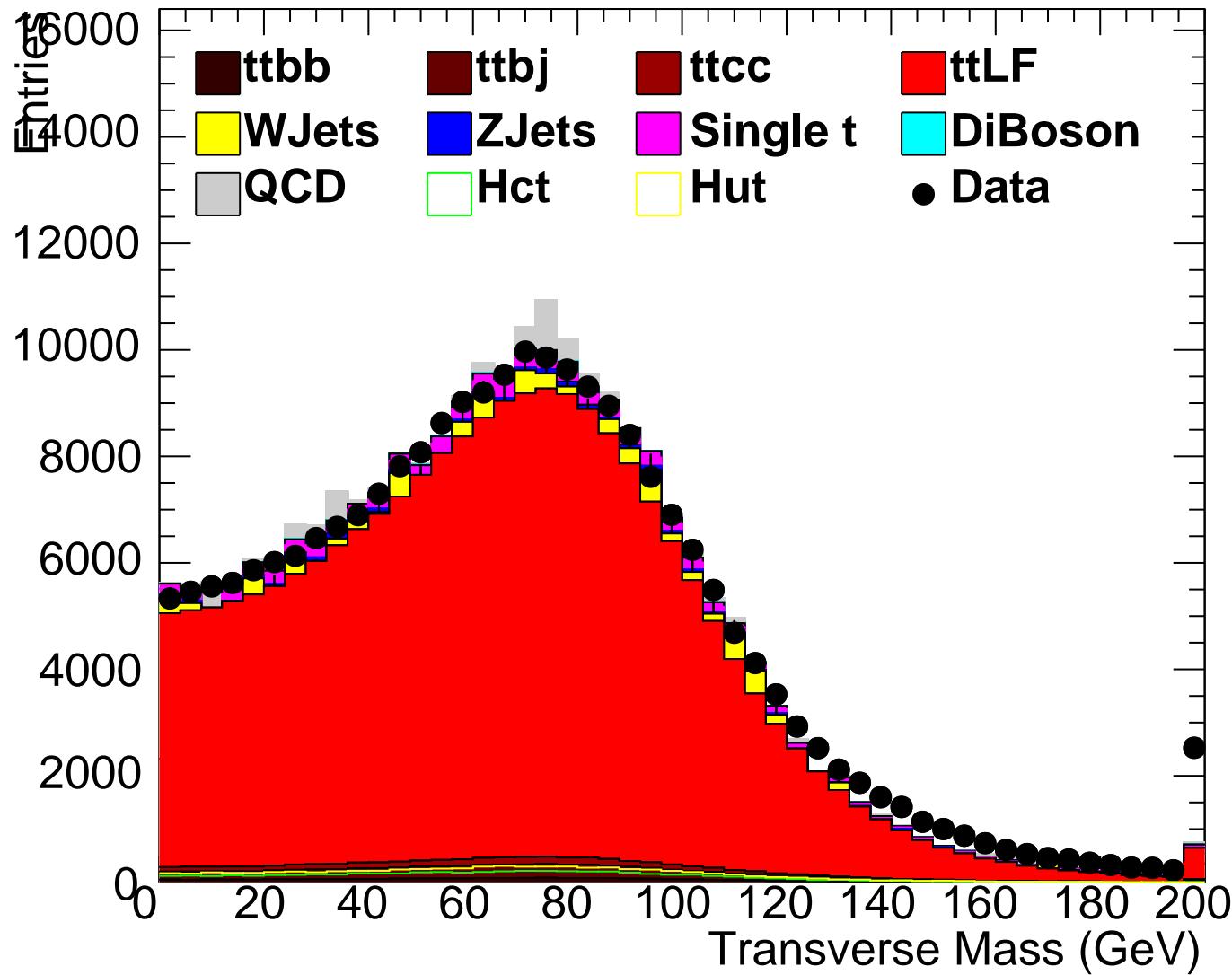
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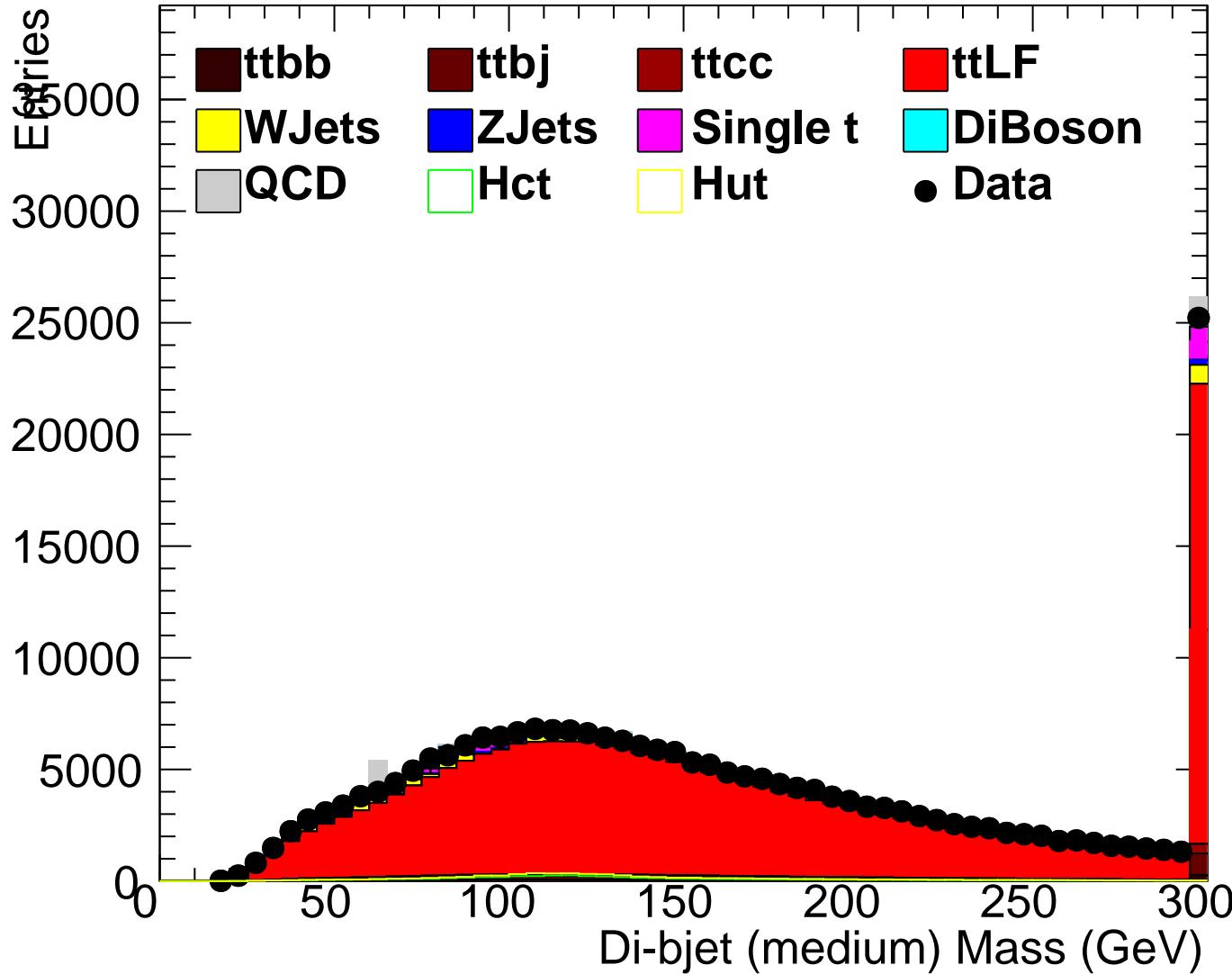
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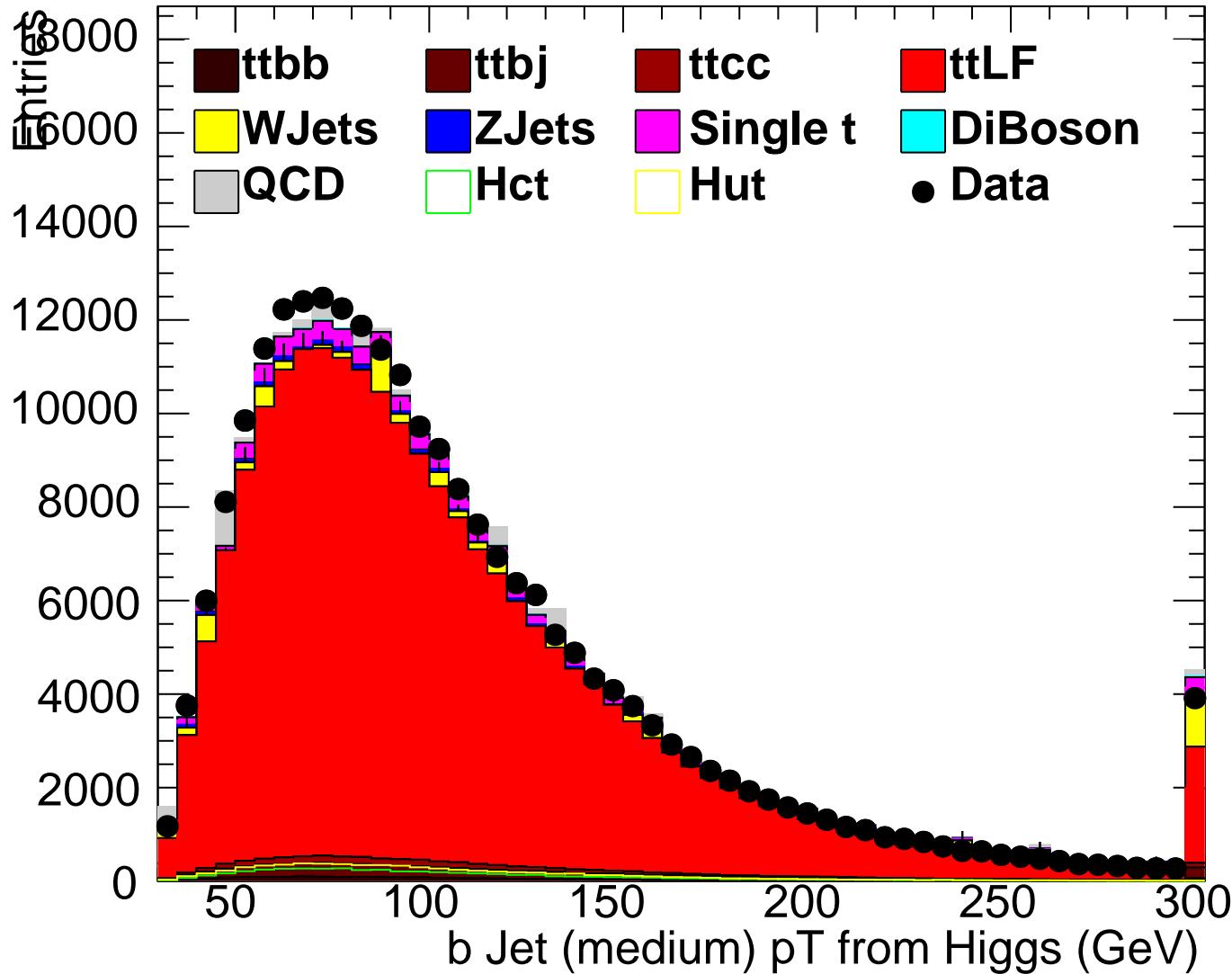
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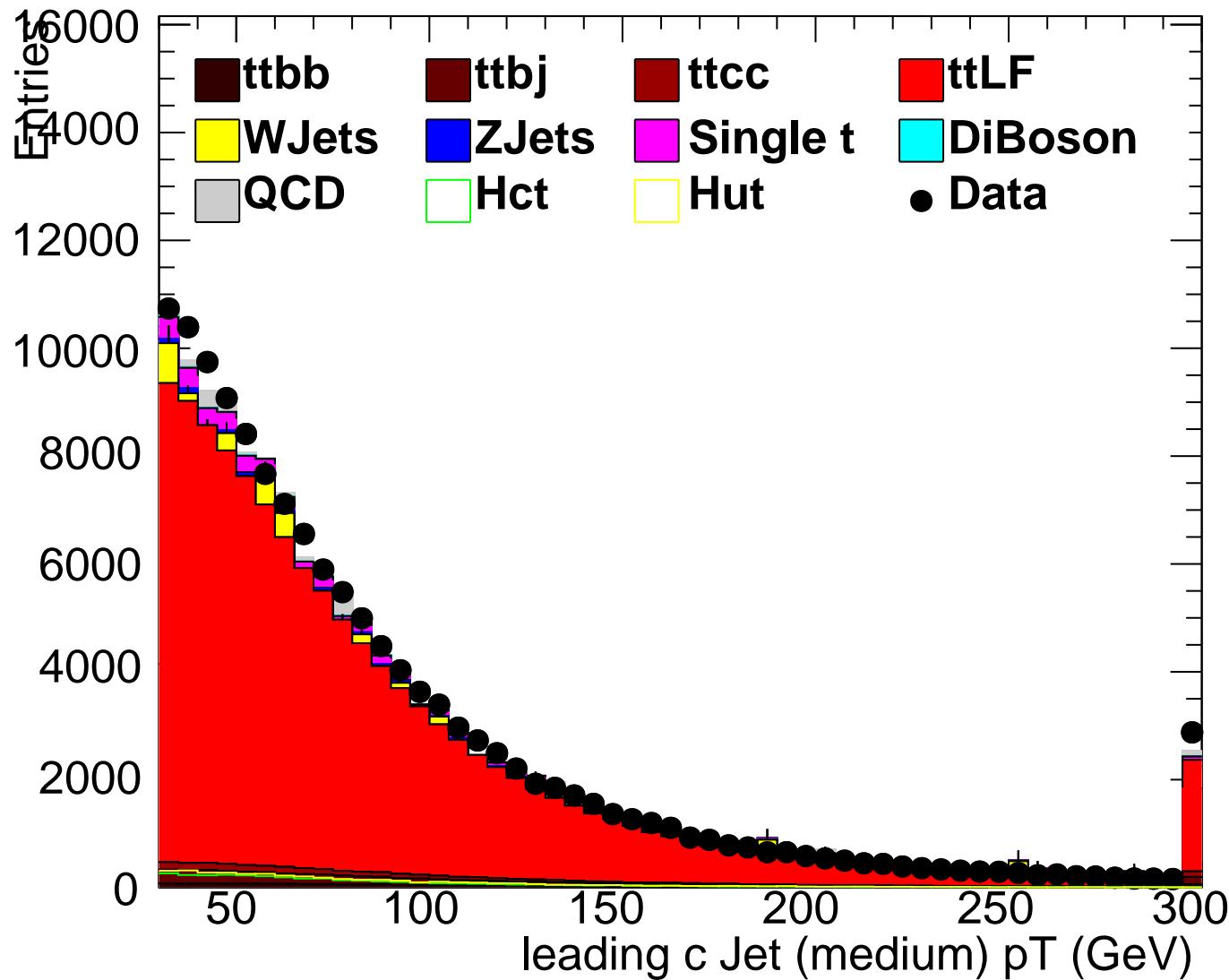


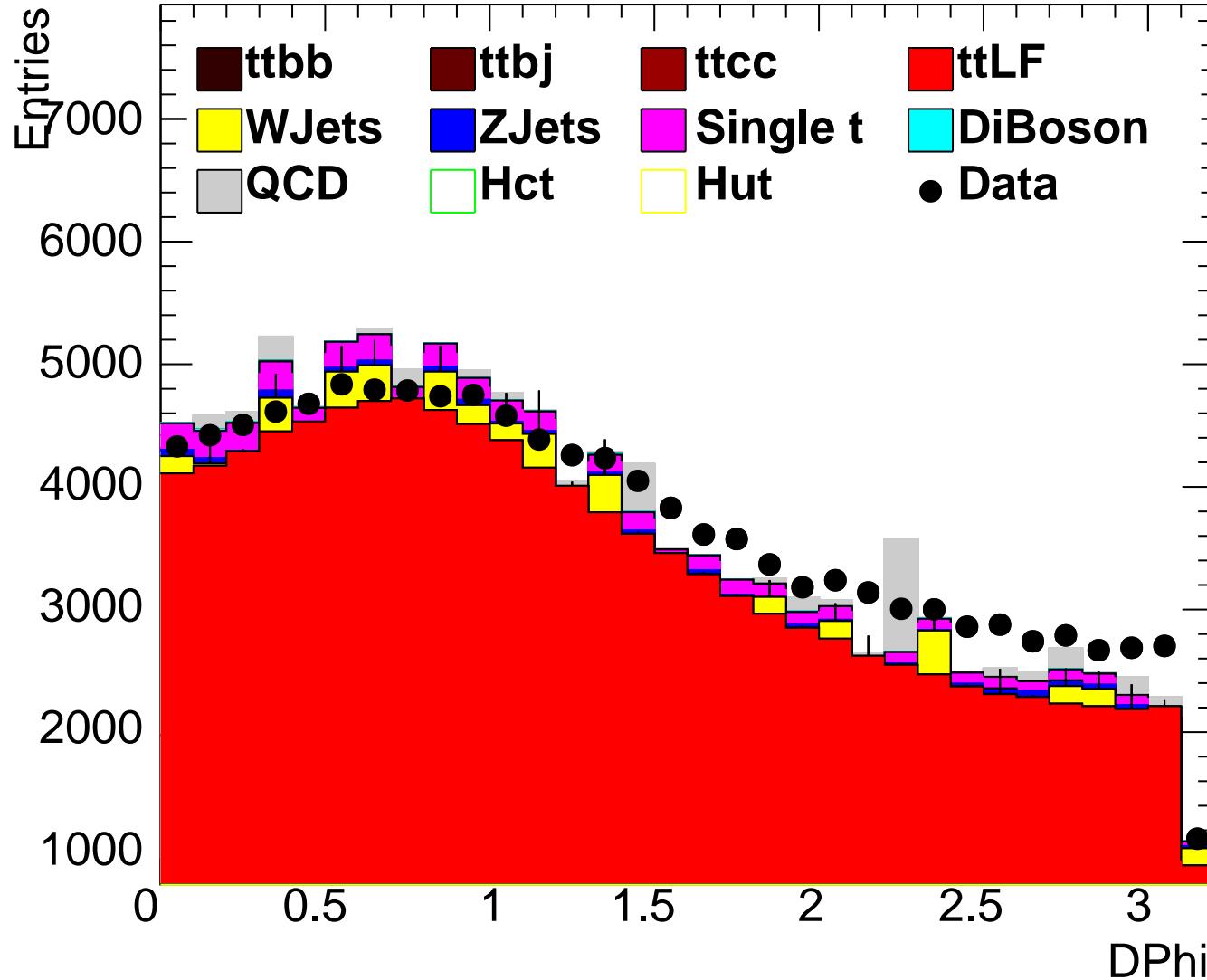
**Ch1\_S7**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

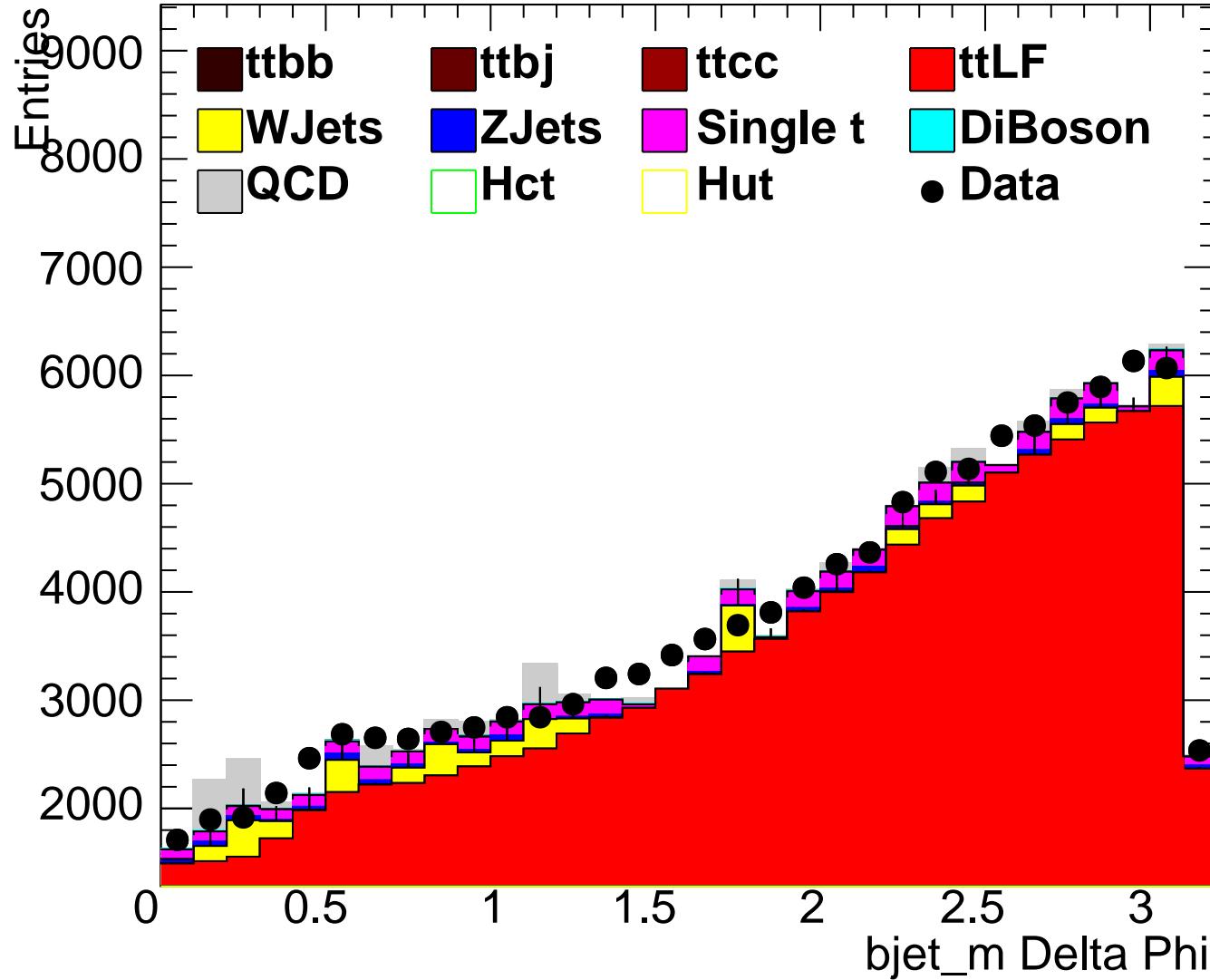
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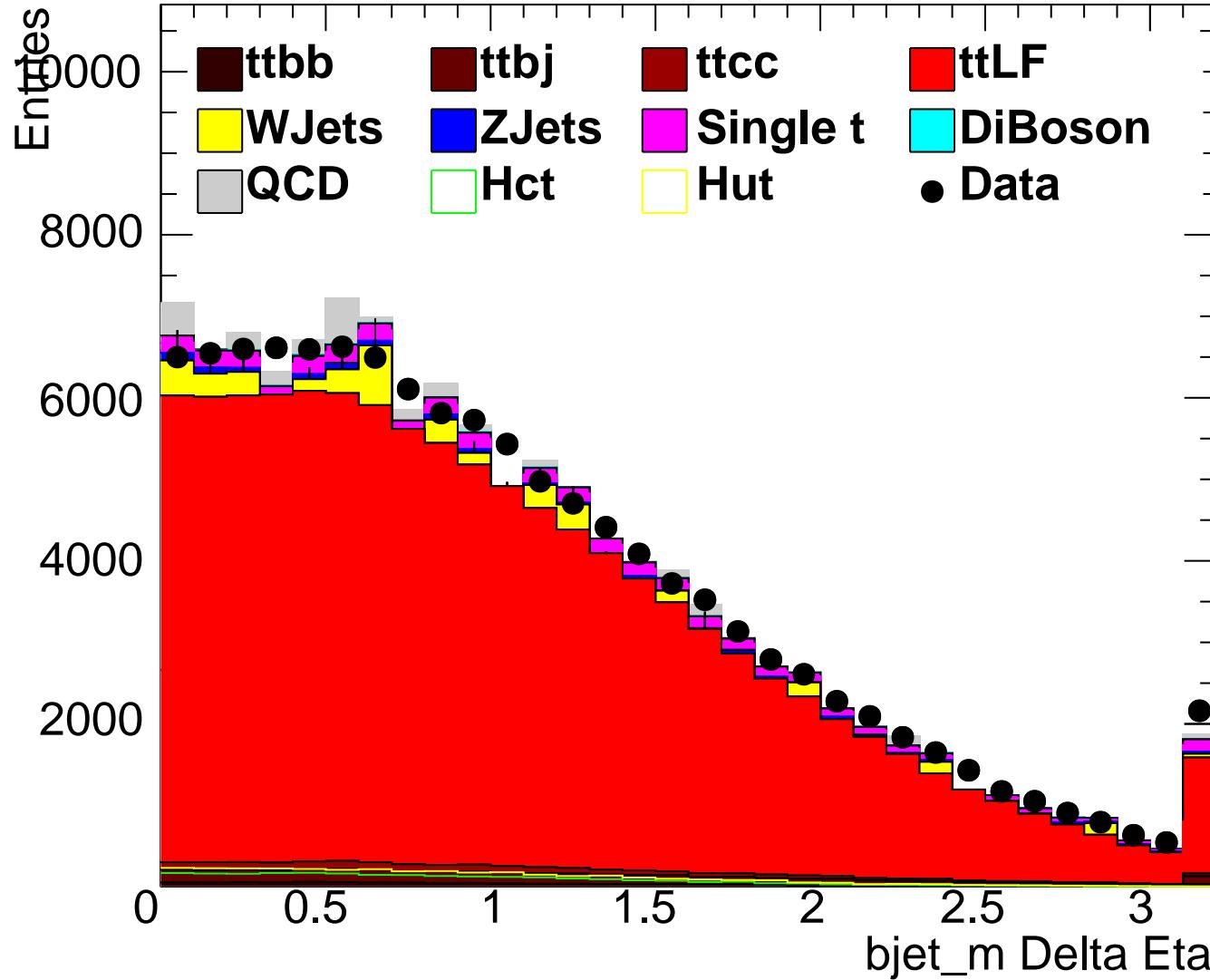
**Ch1\_S7**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

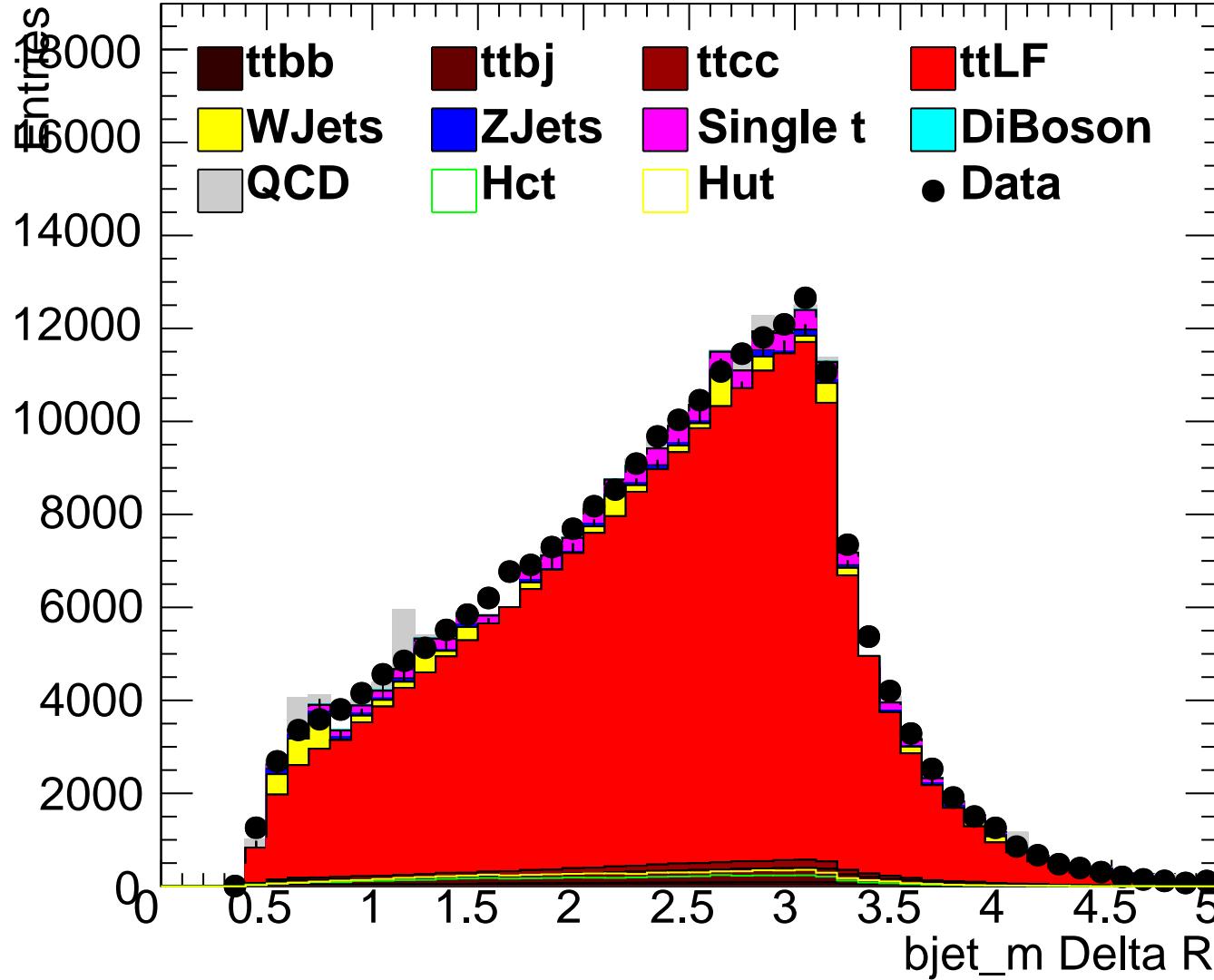
**Ch1\_S7**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch1\_S7**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 



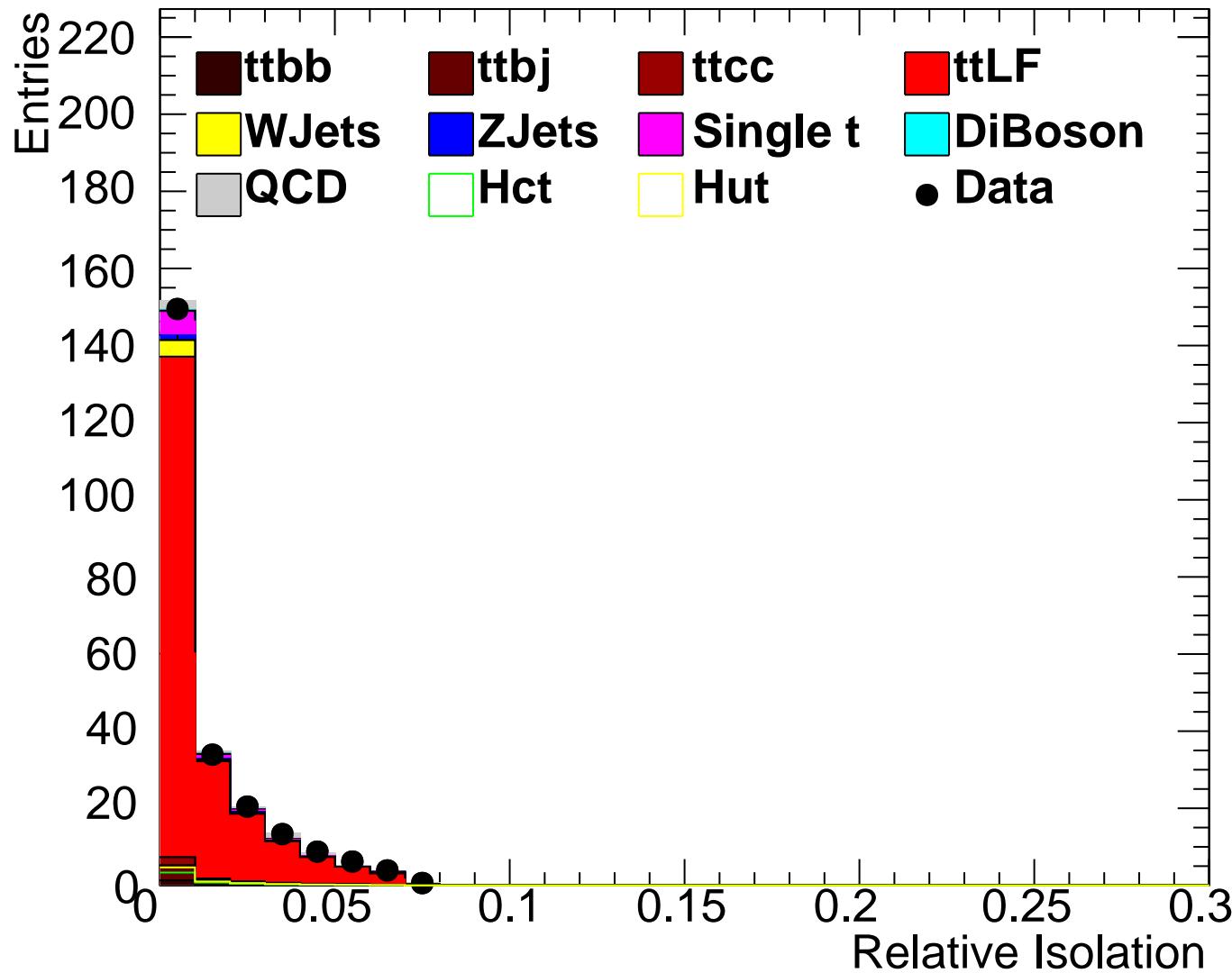


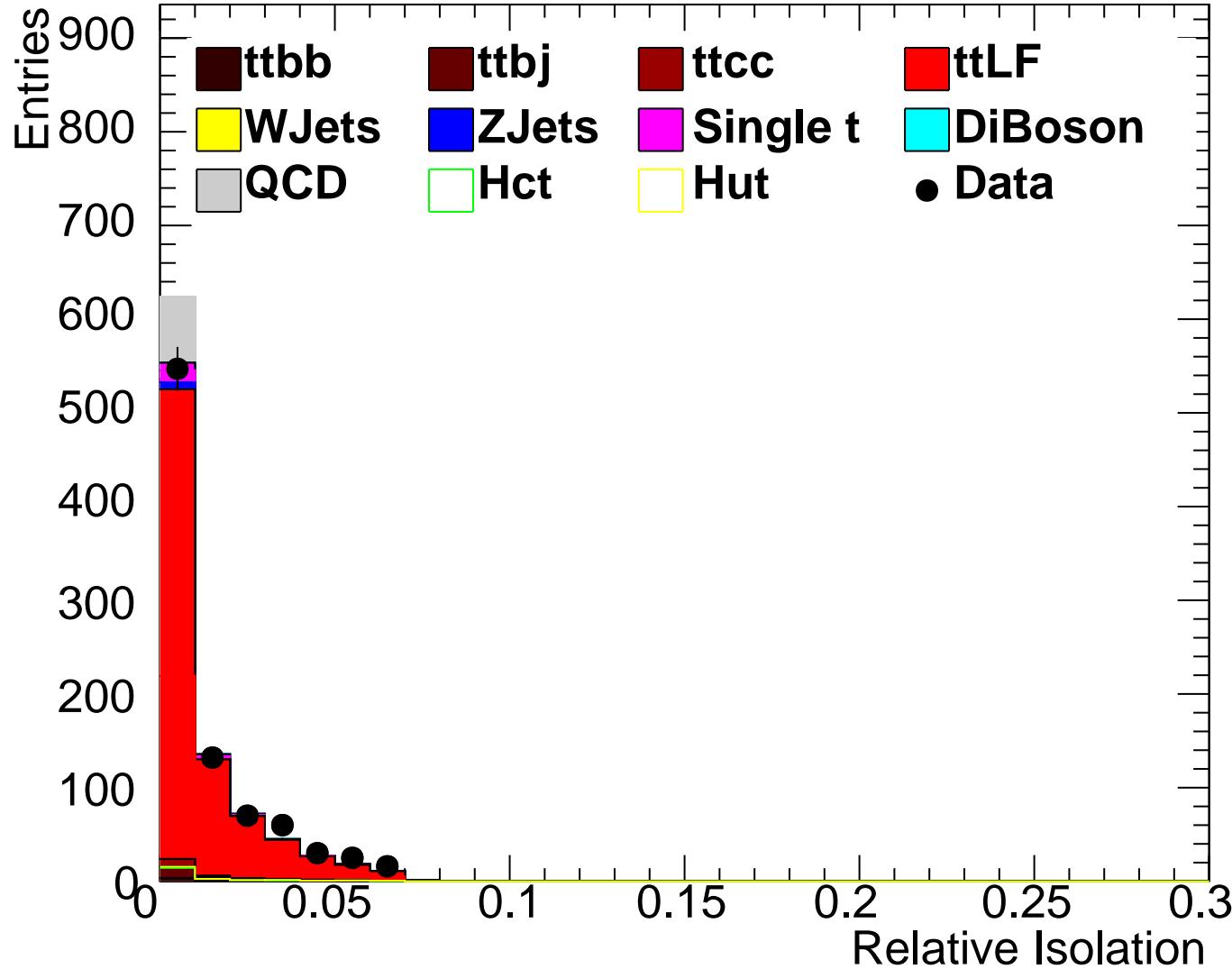
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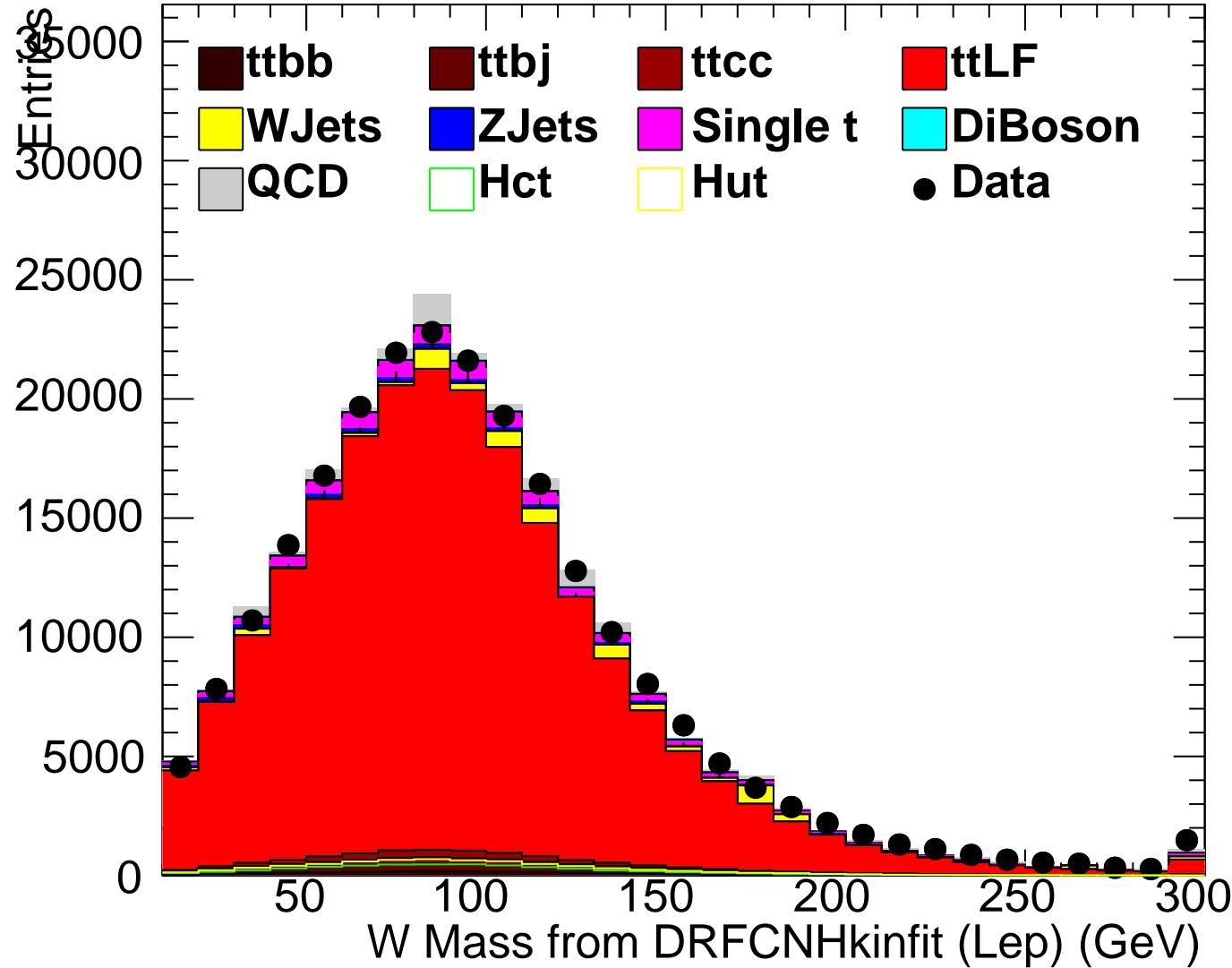
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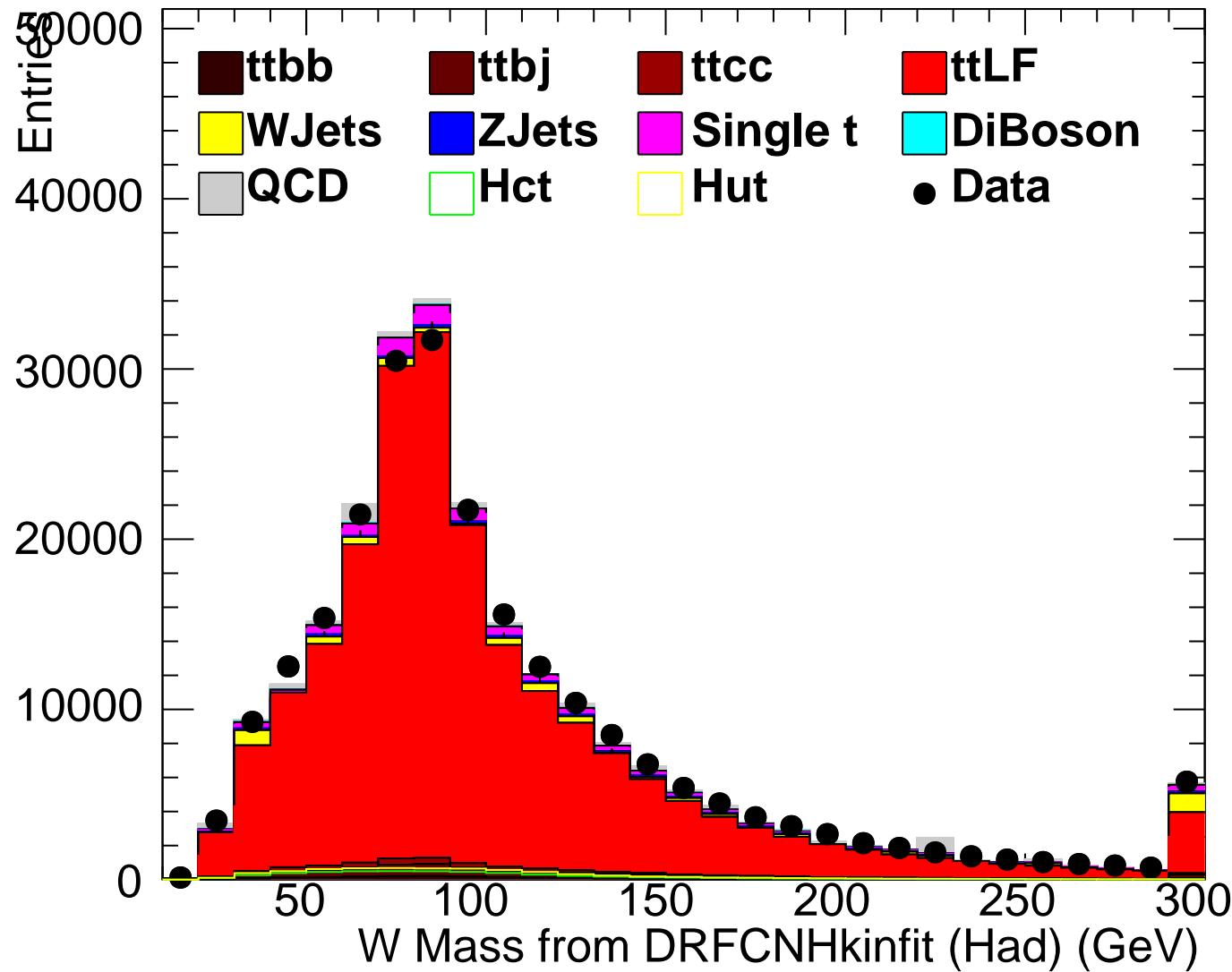
Ch1\_S7

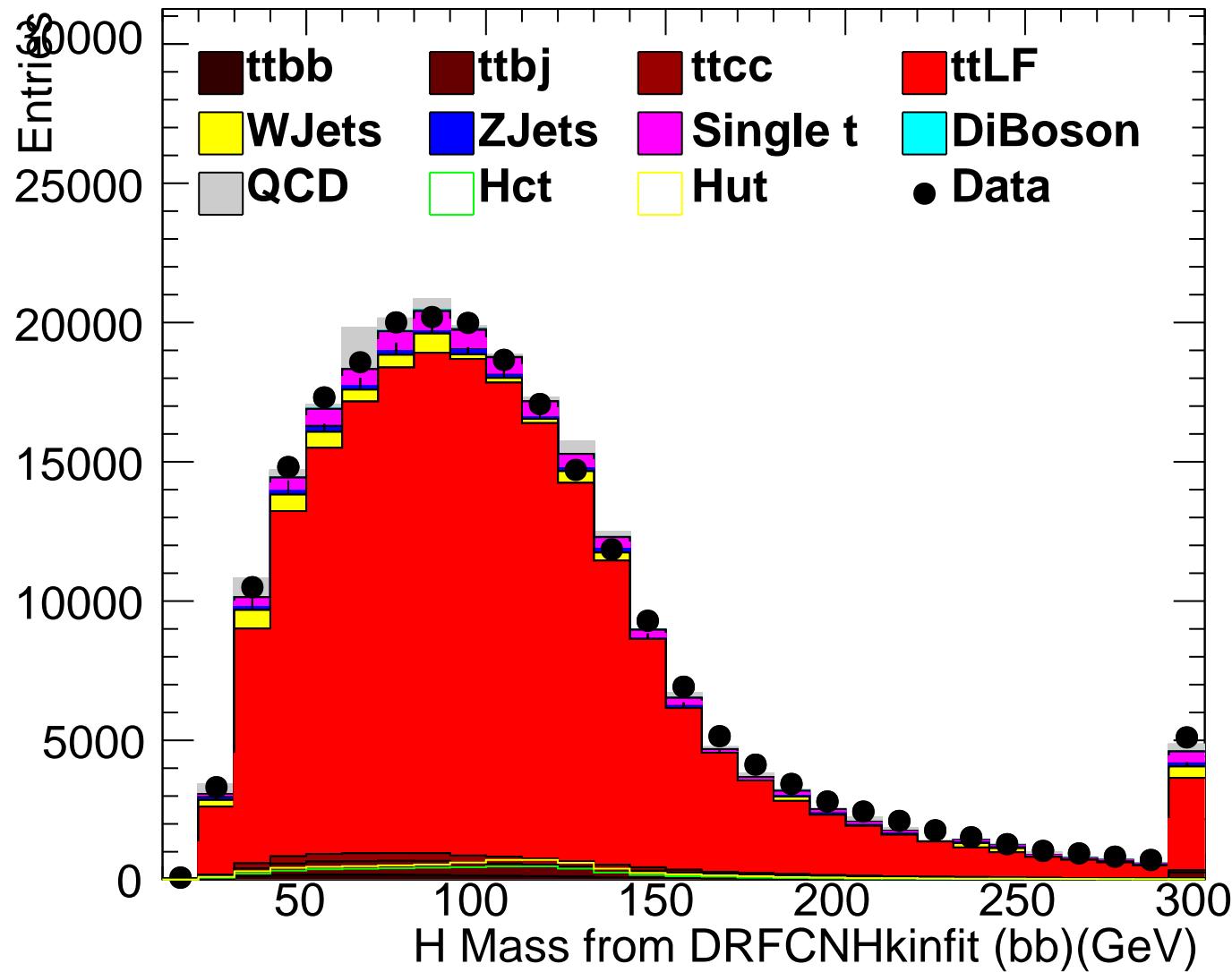
CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$

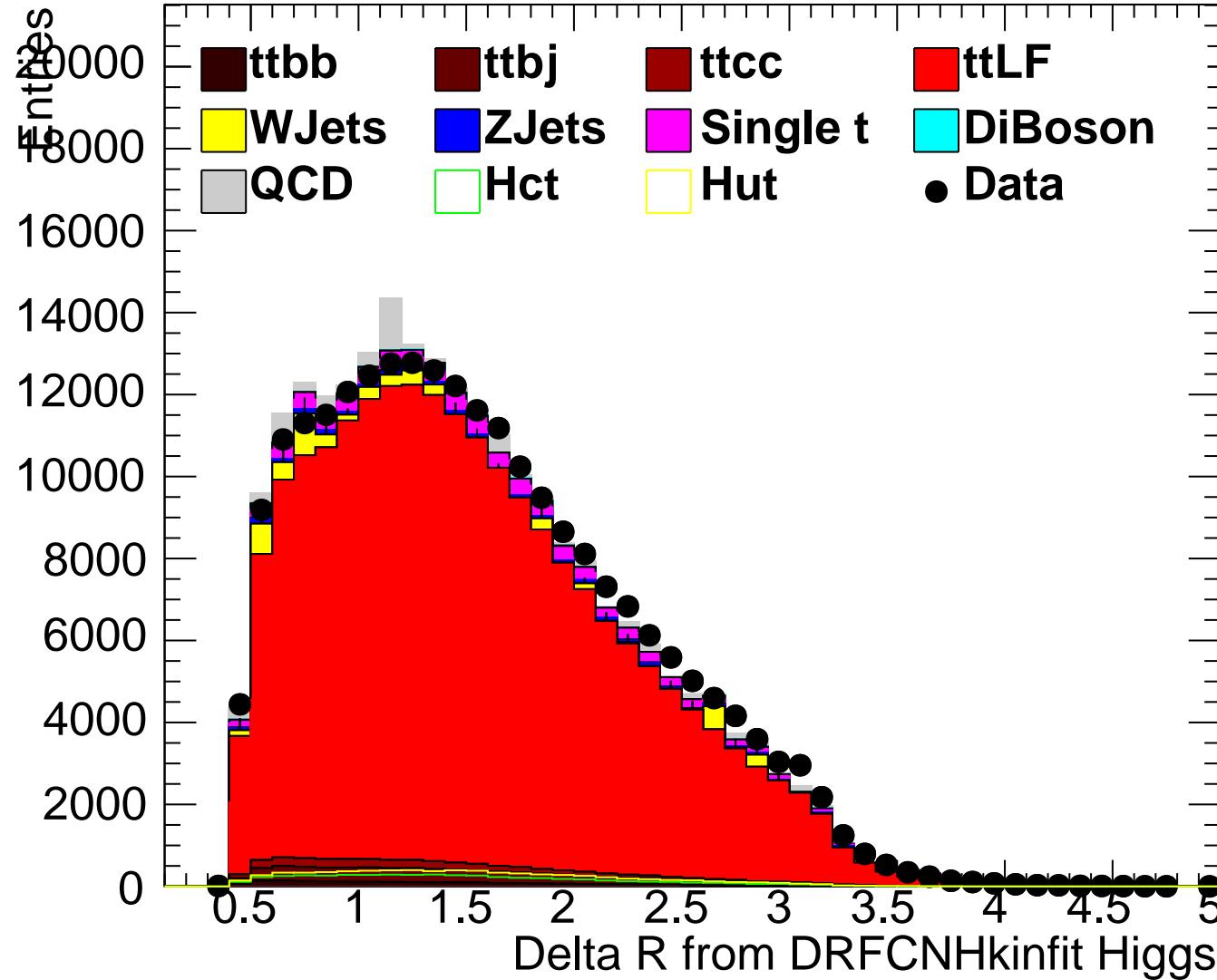


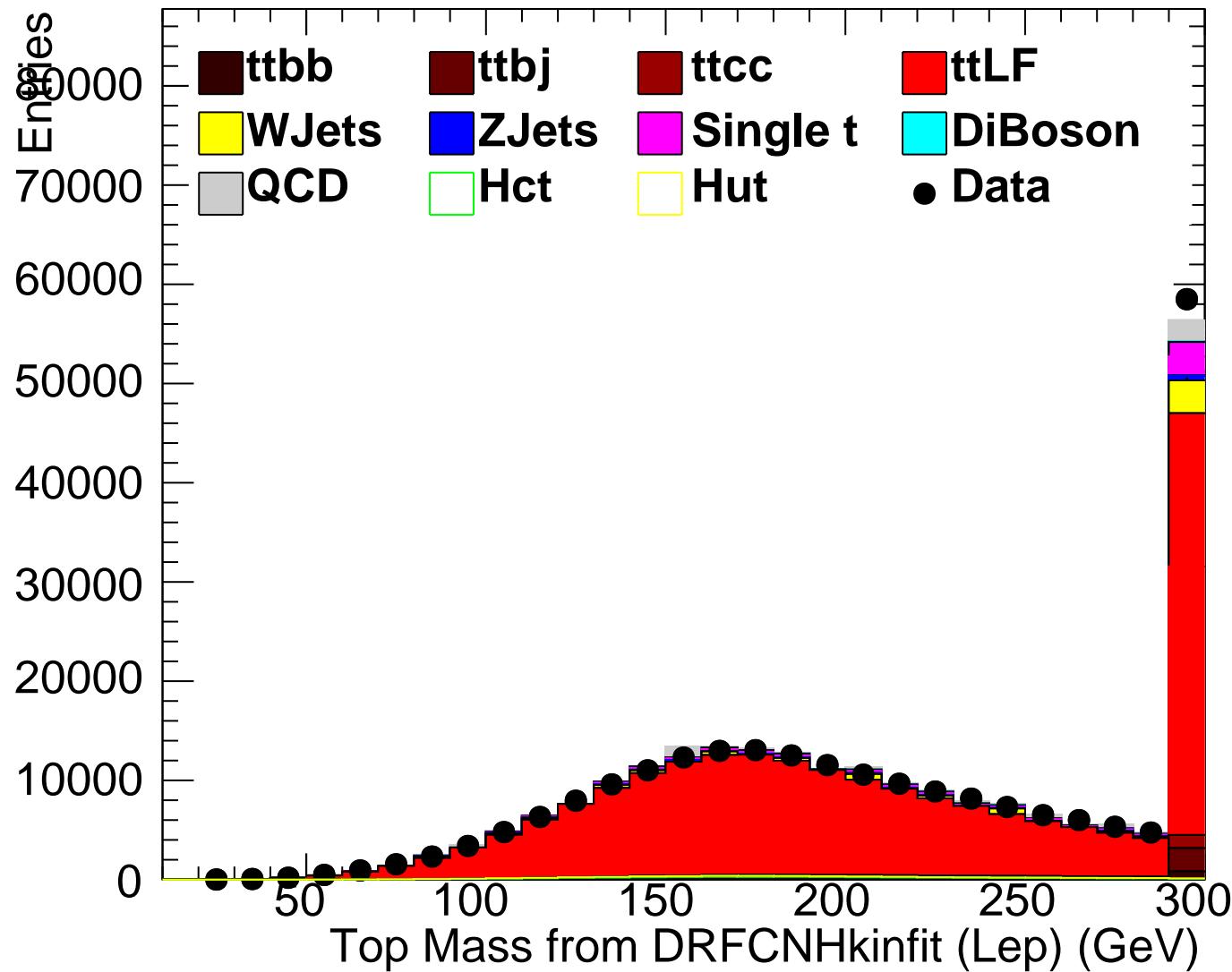
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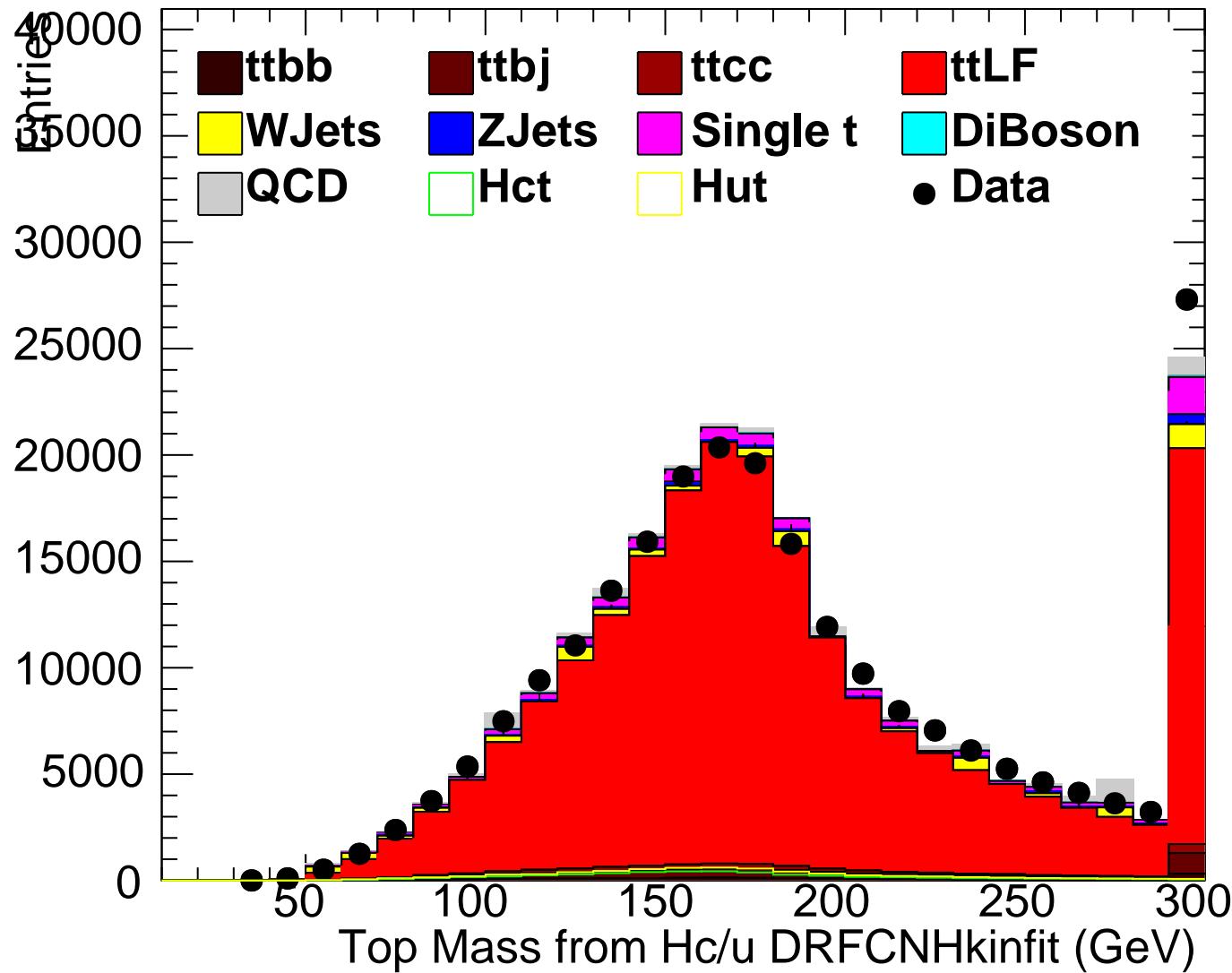
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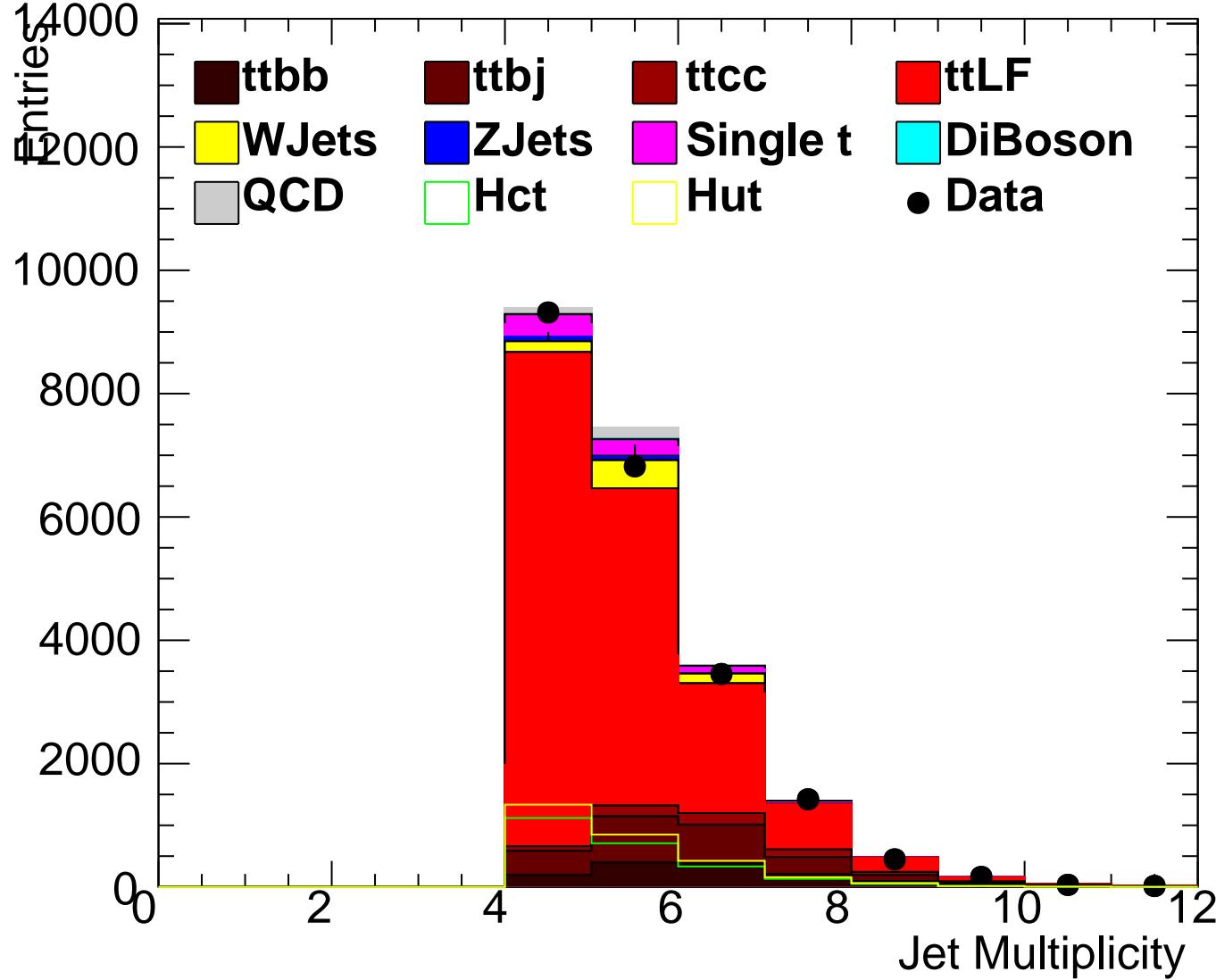
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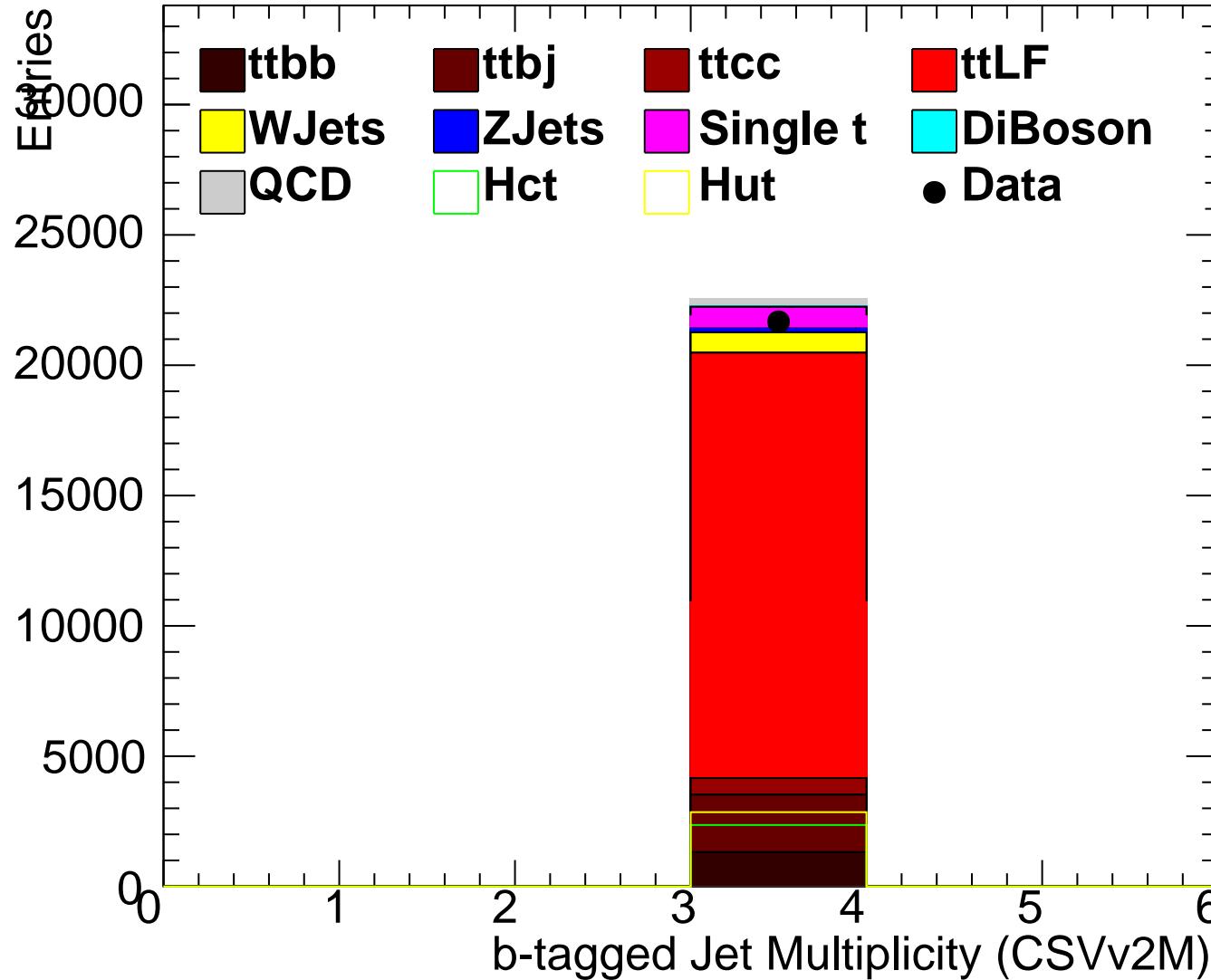
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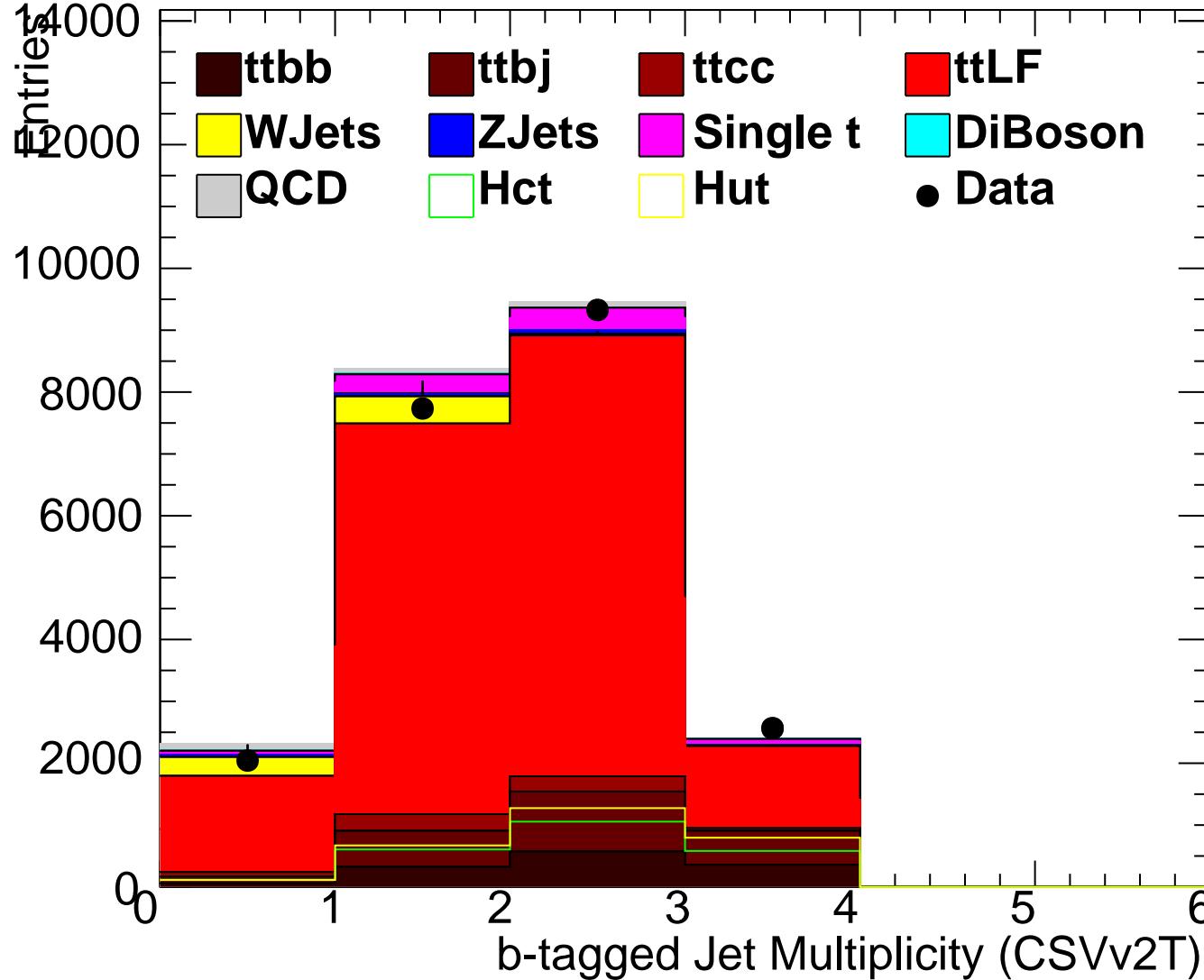
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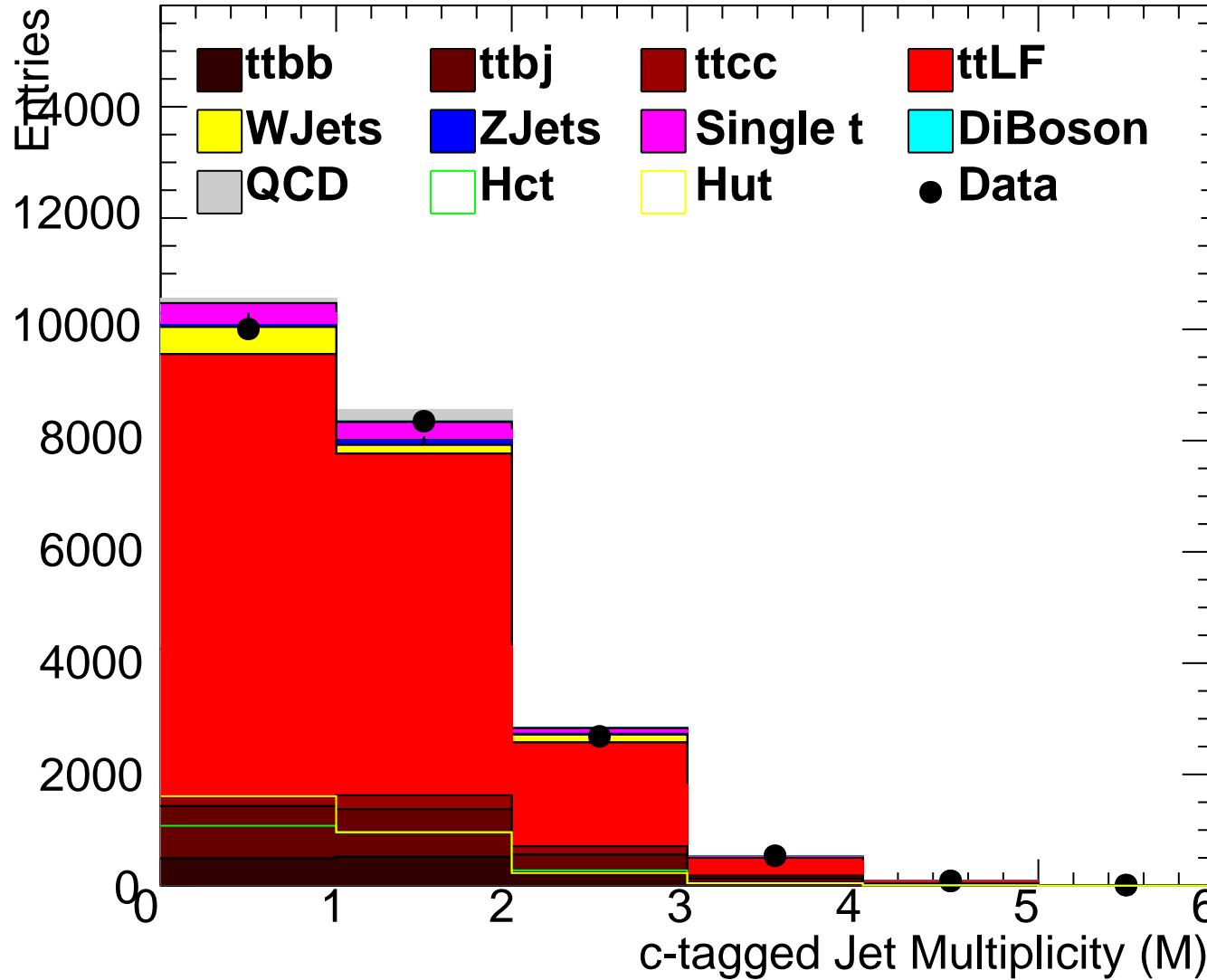


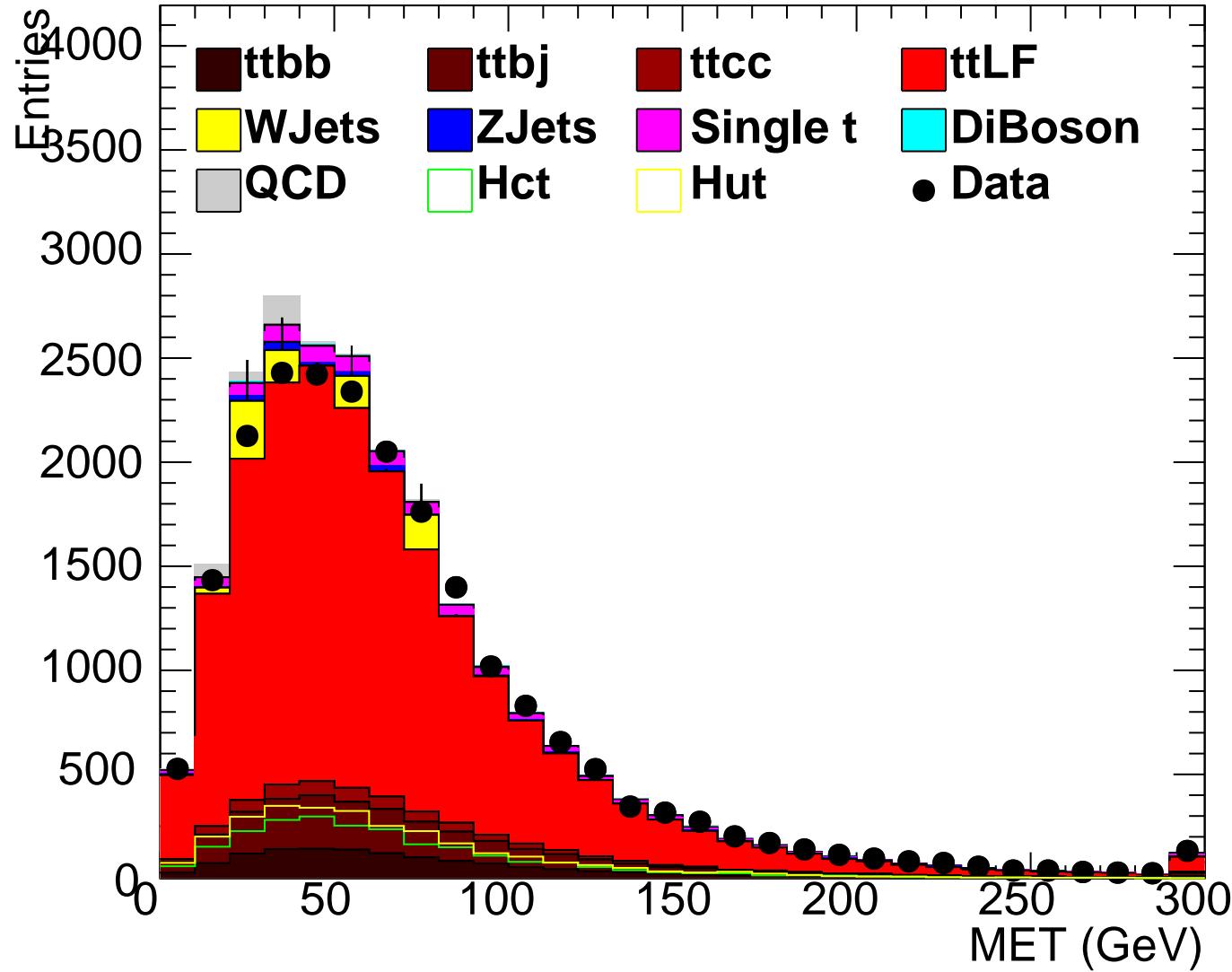
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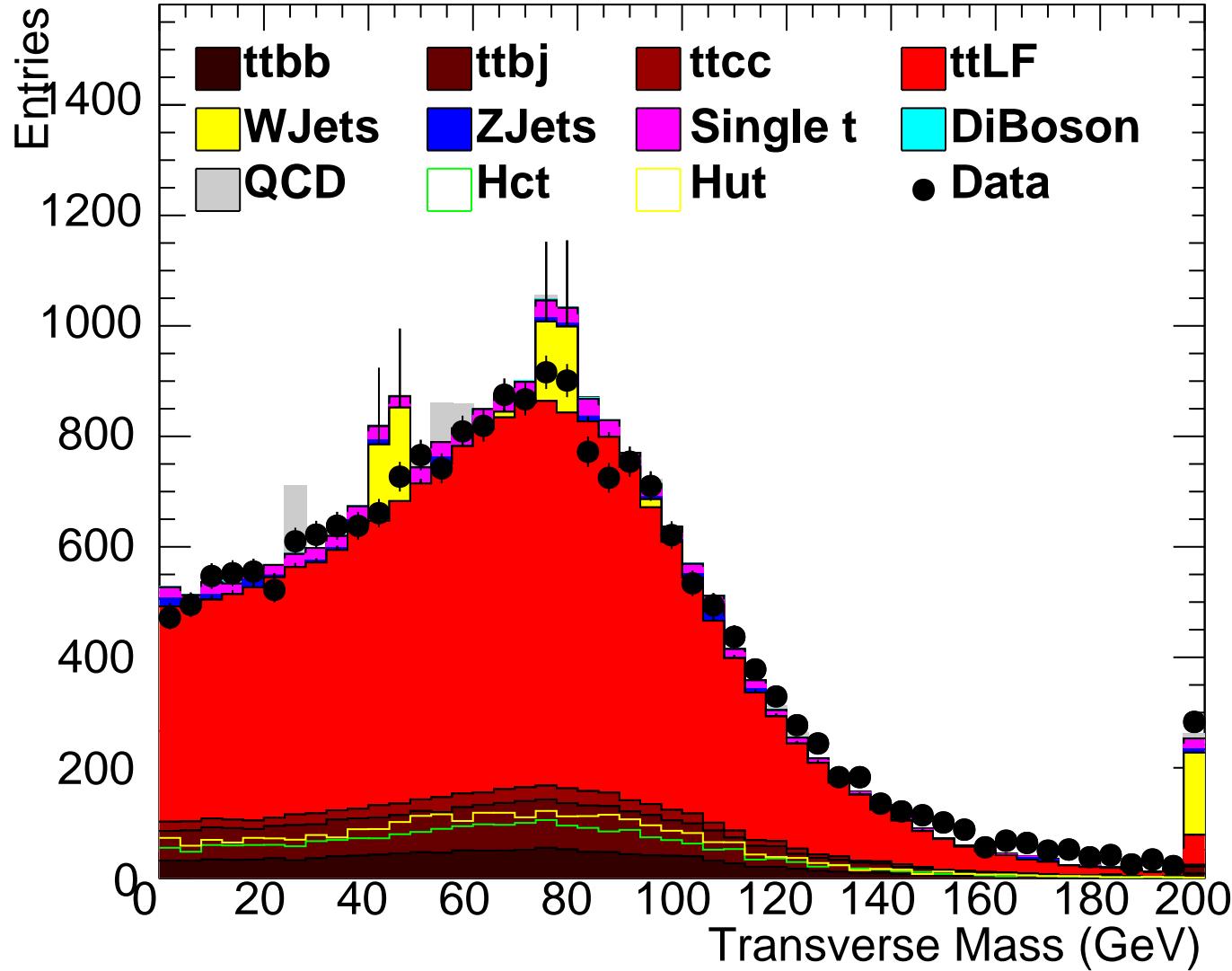


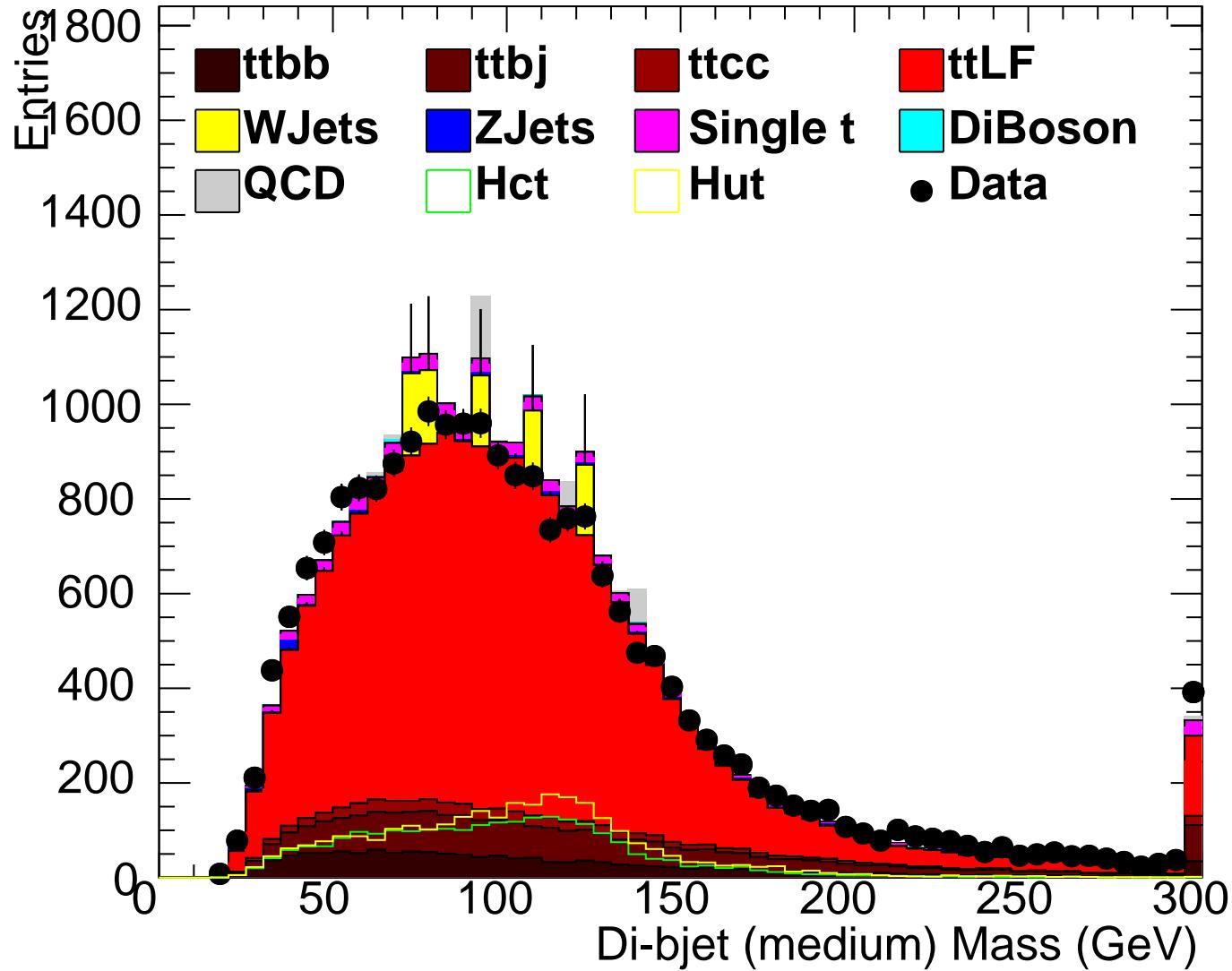


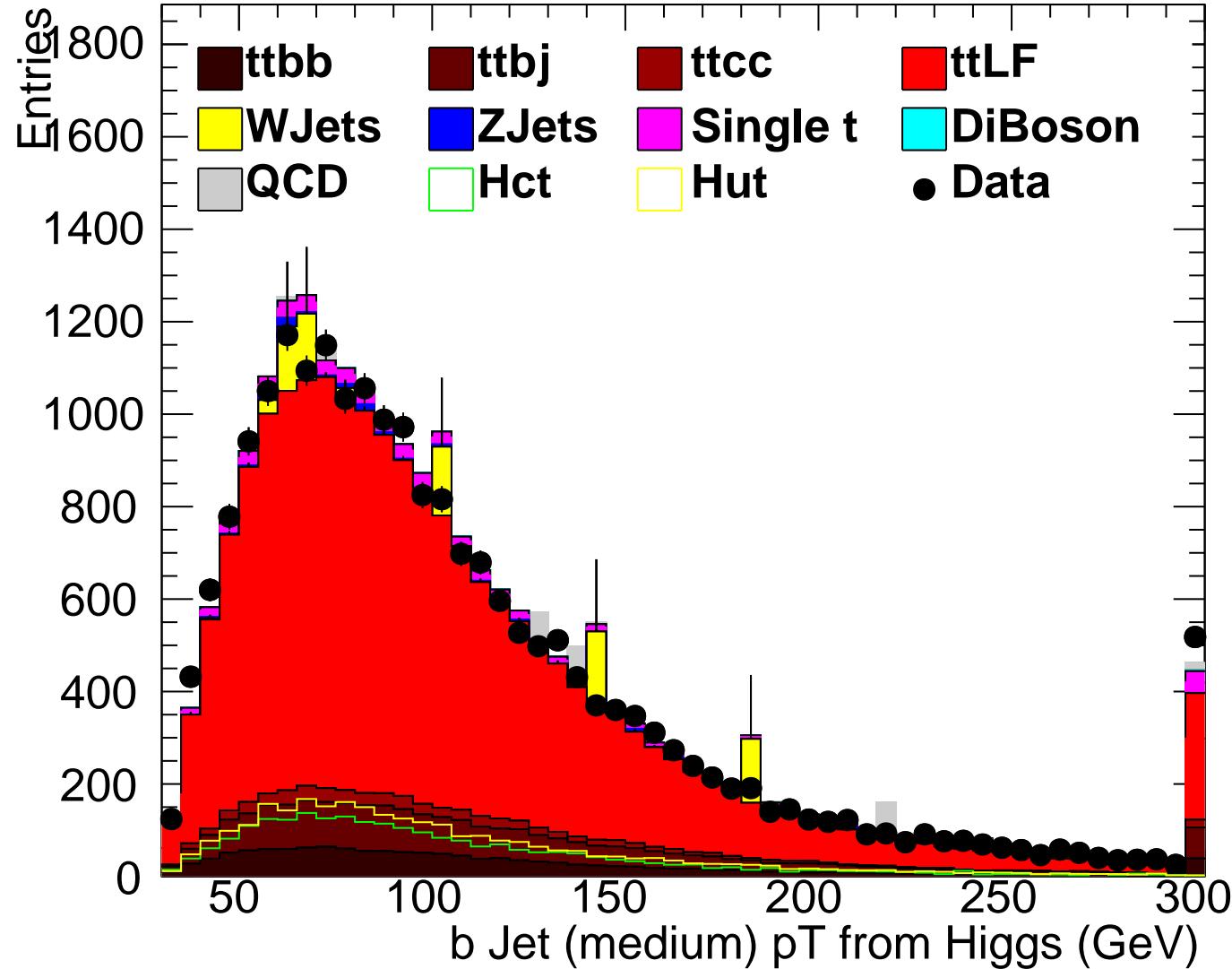


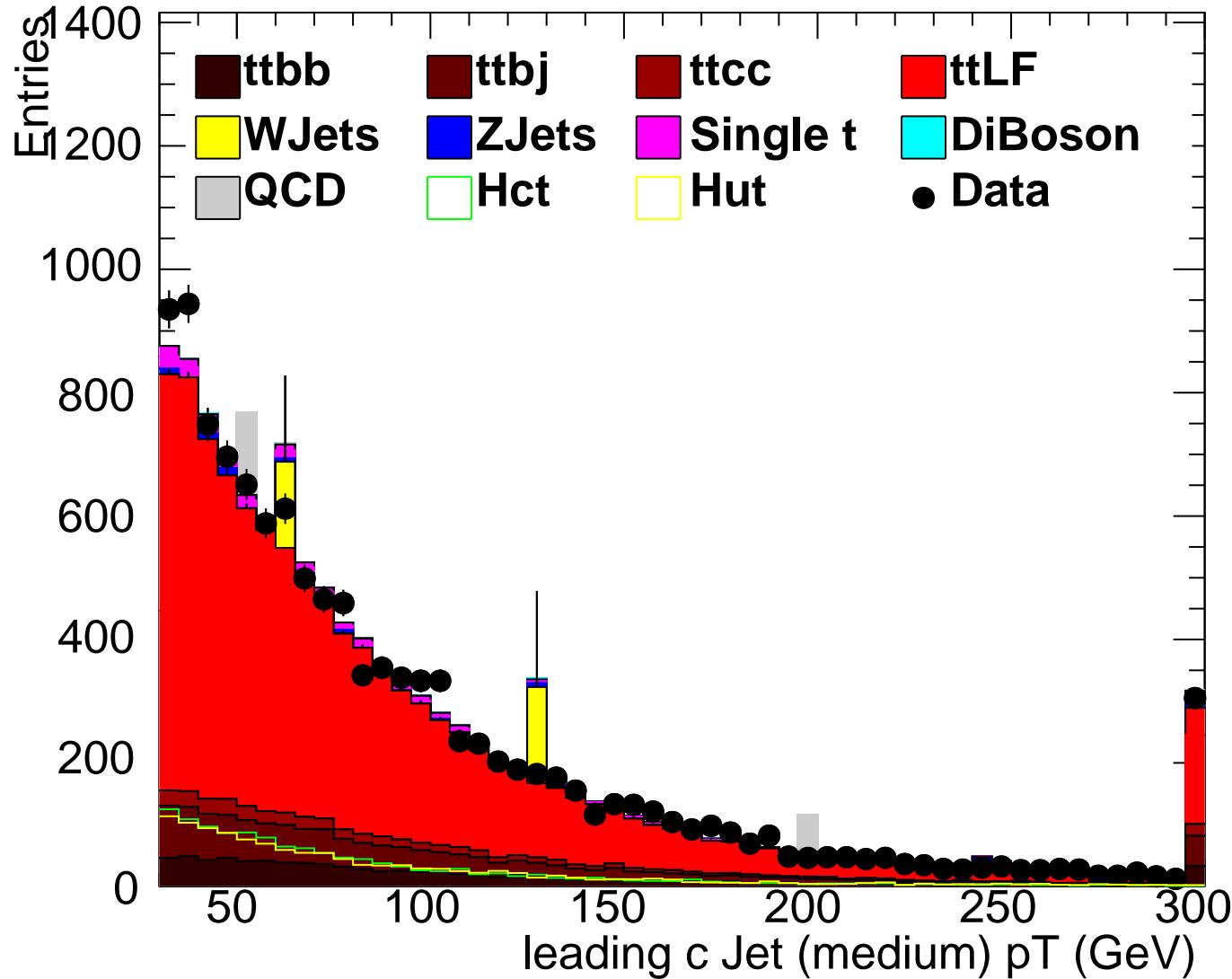


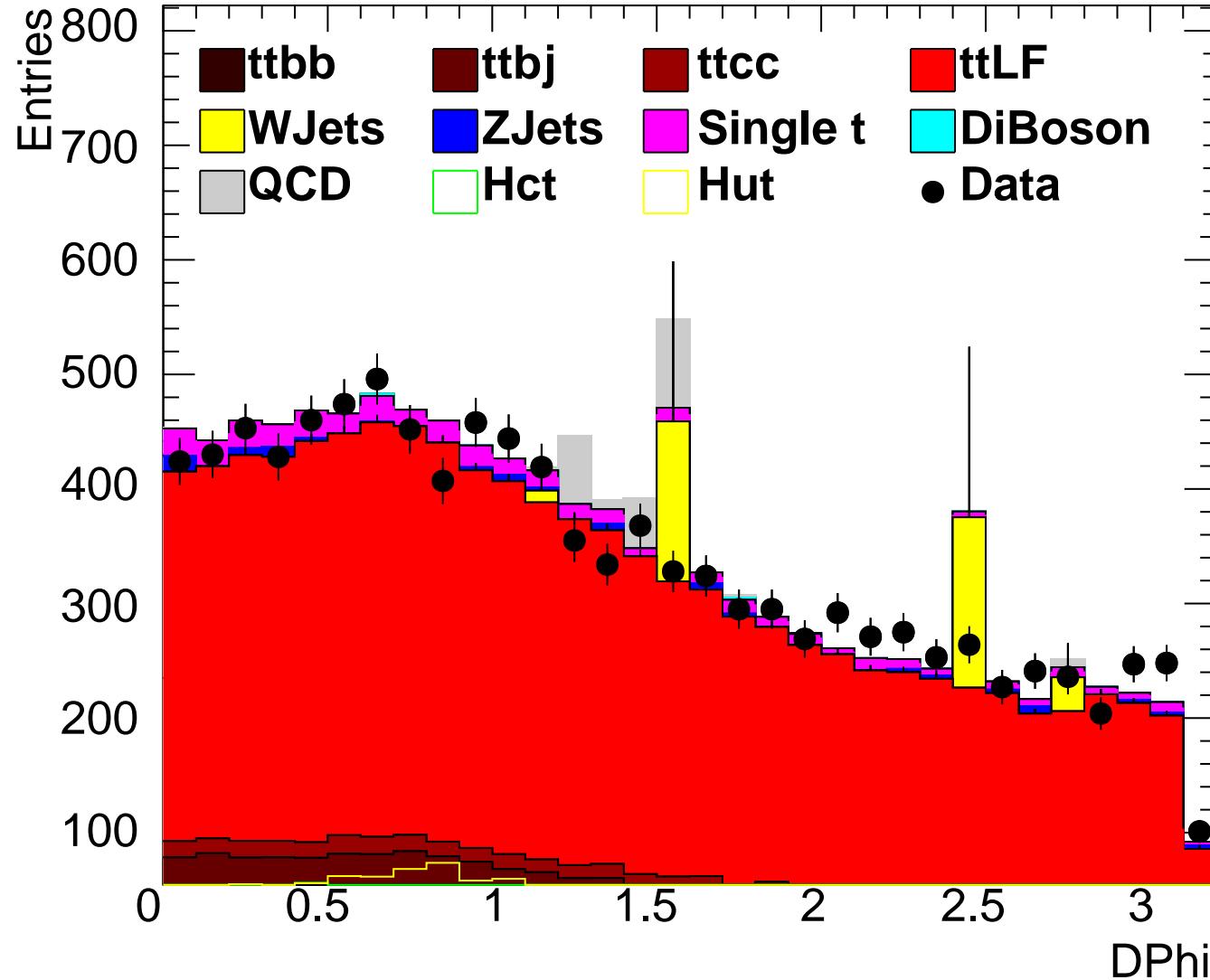


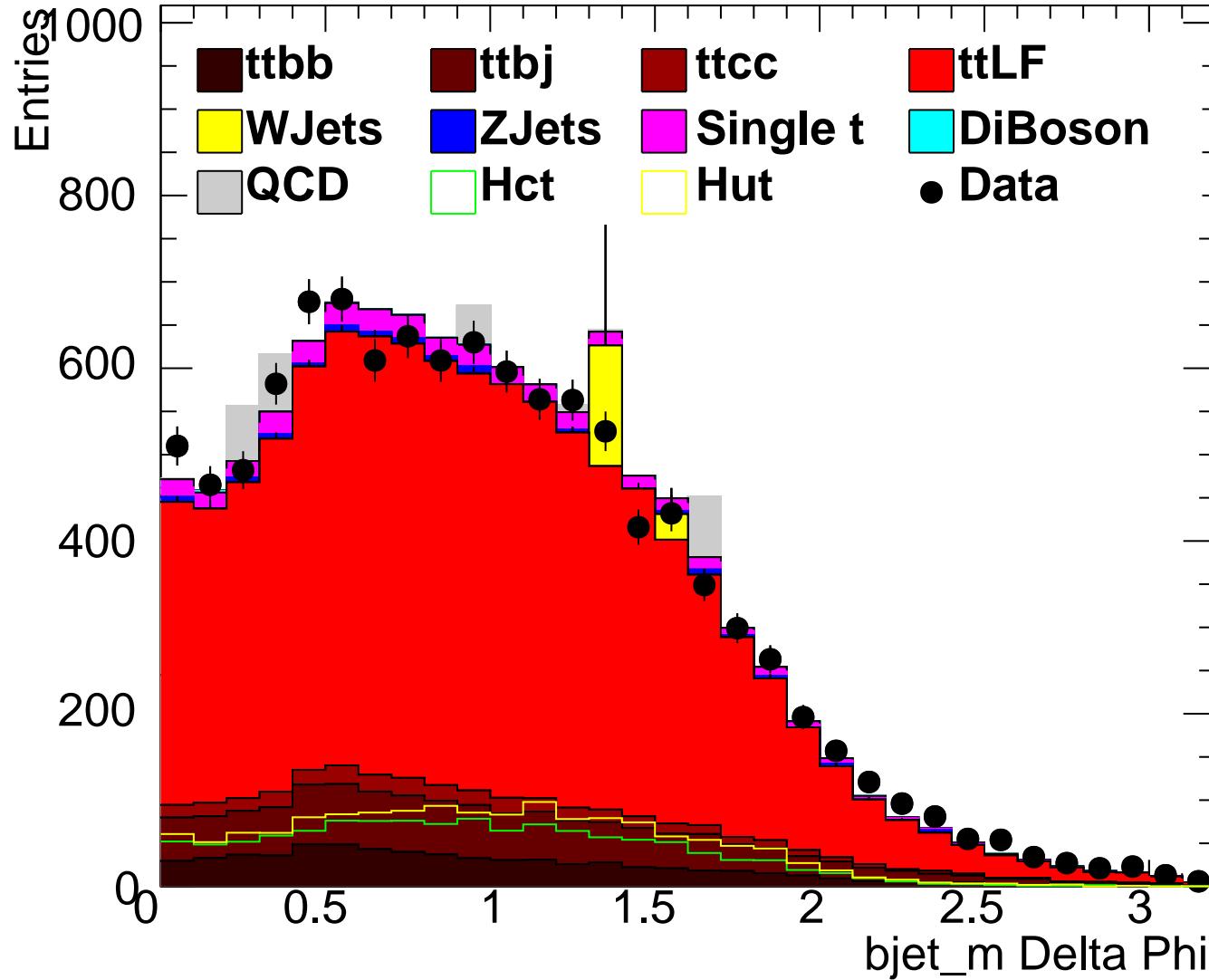
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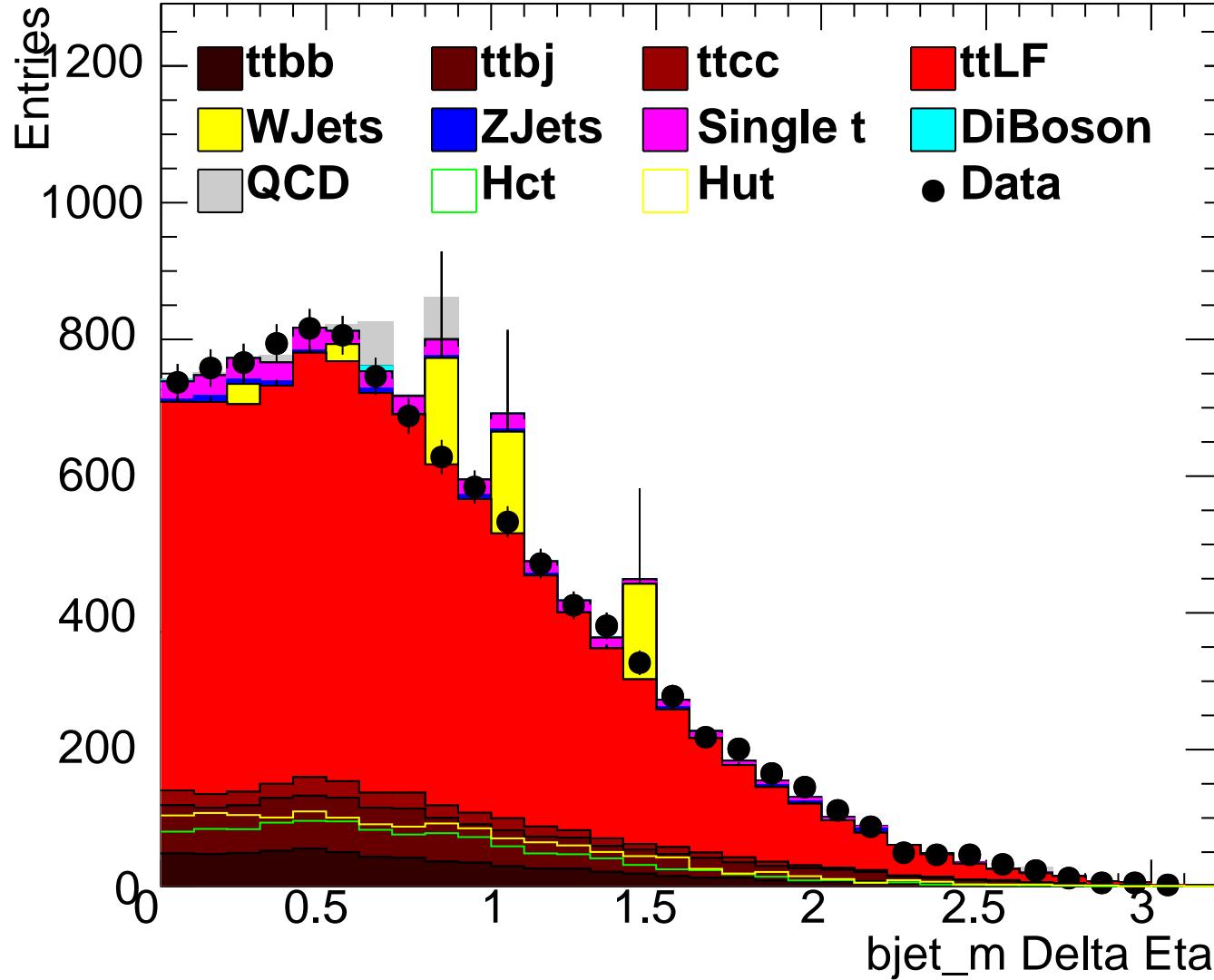
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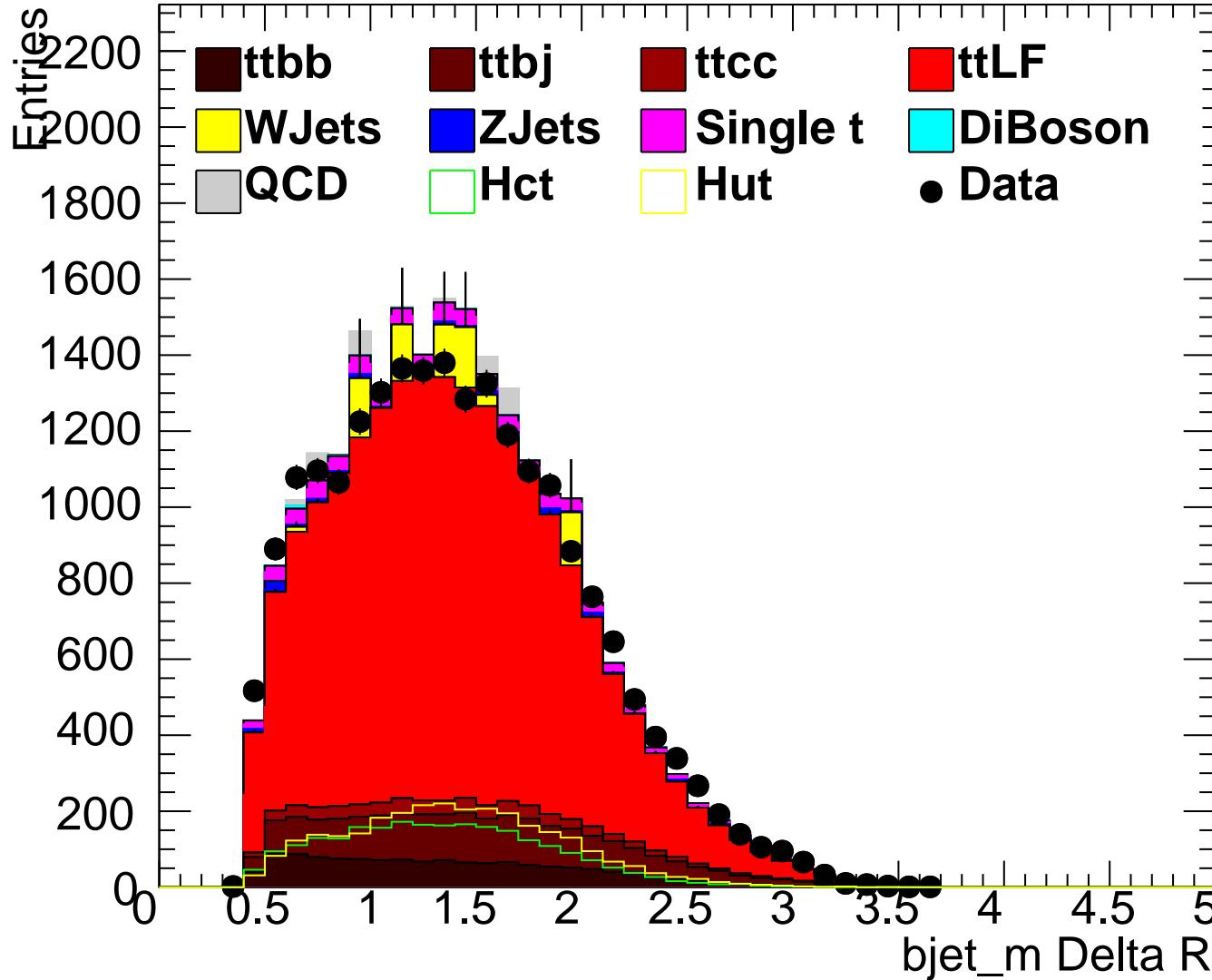
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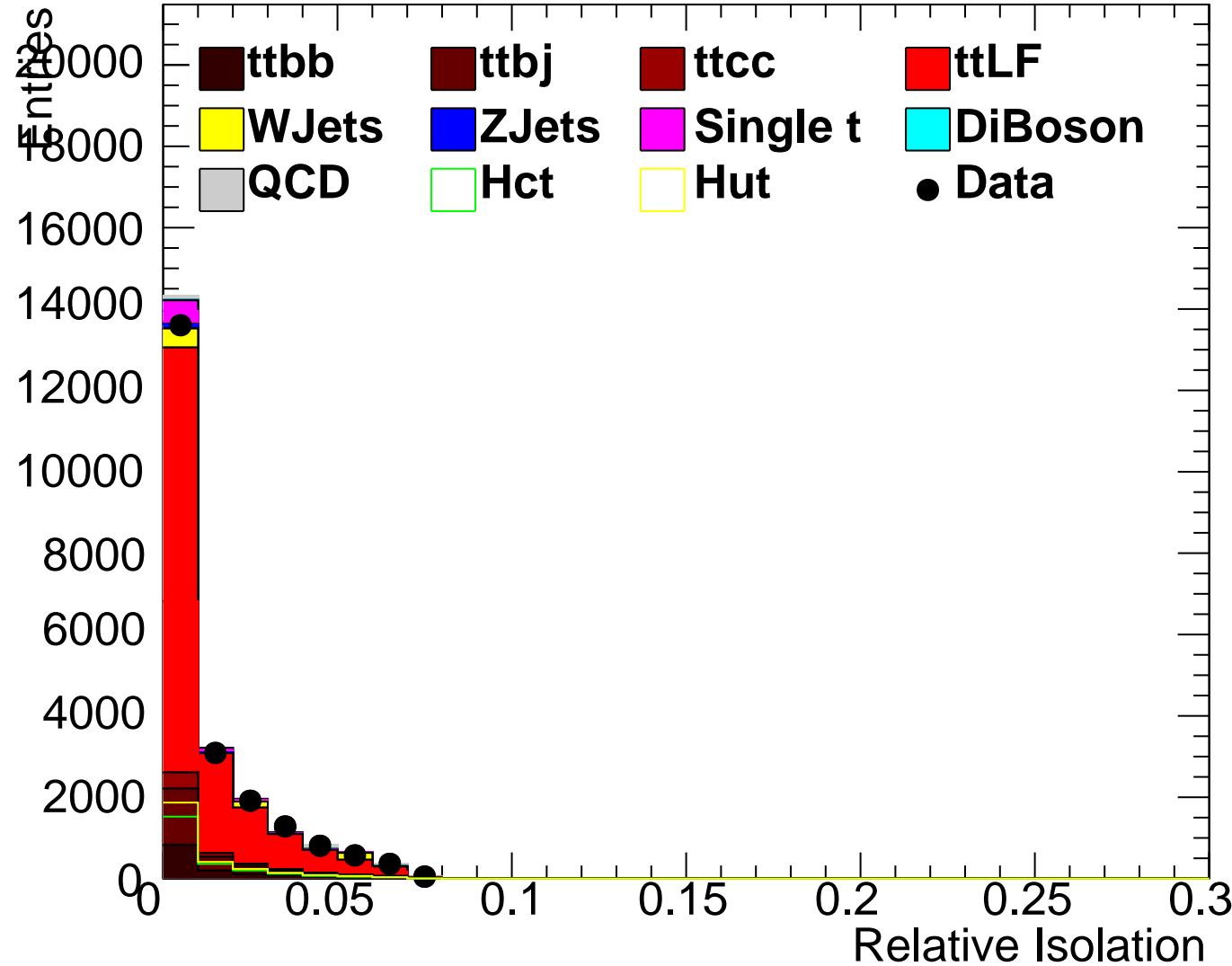
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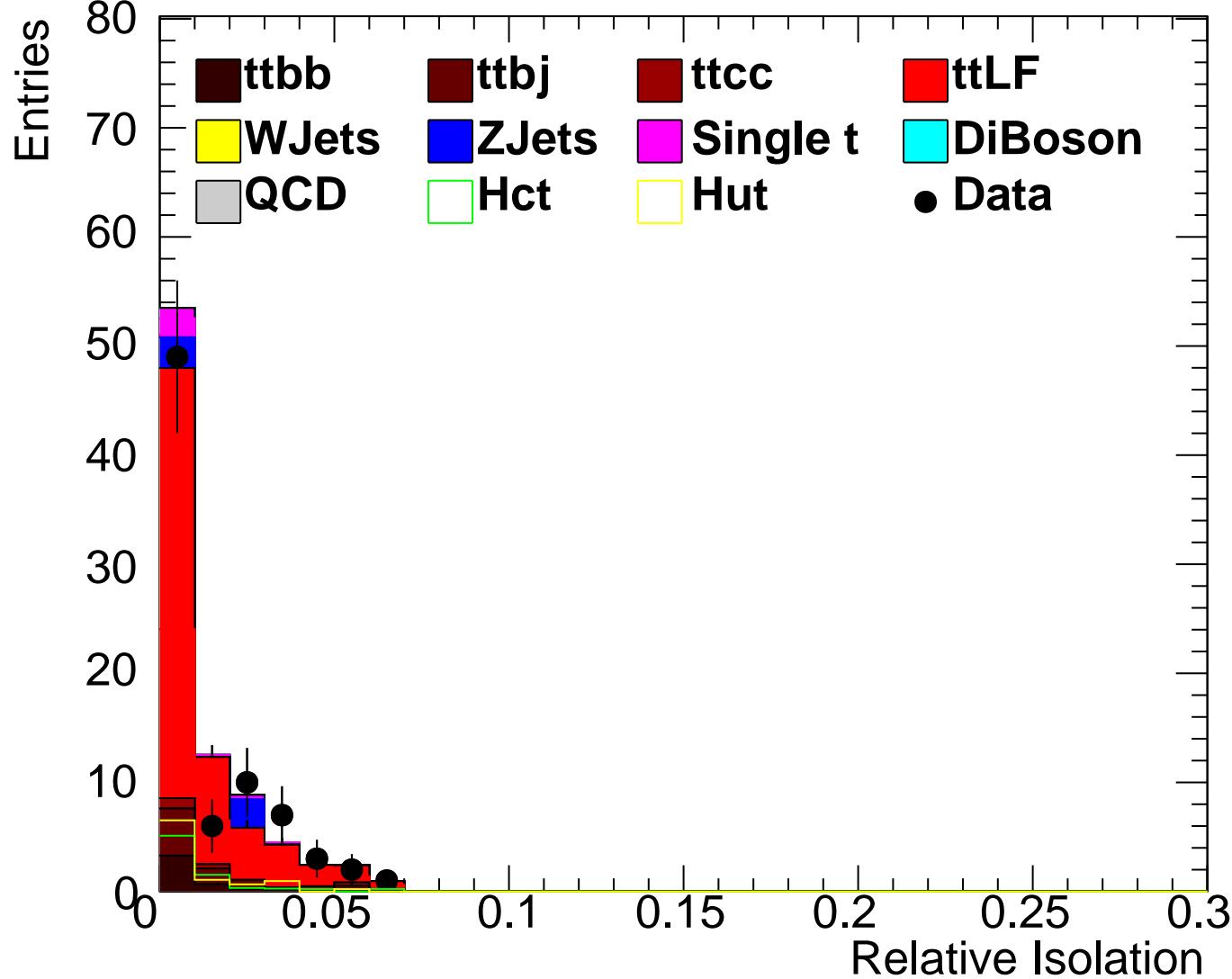
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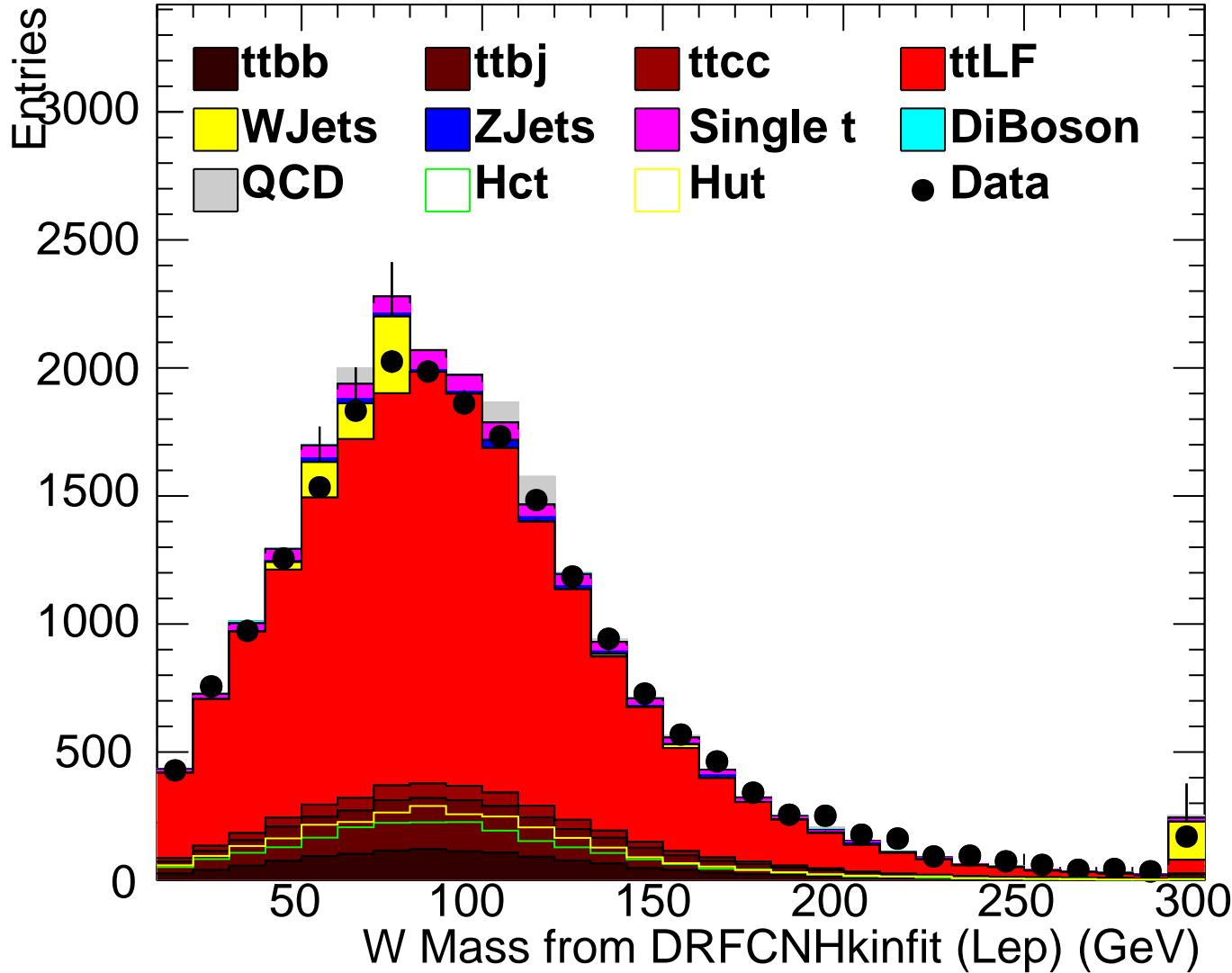
**Ch1\_S8**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

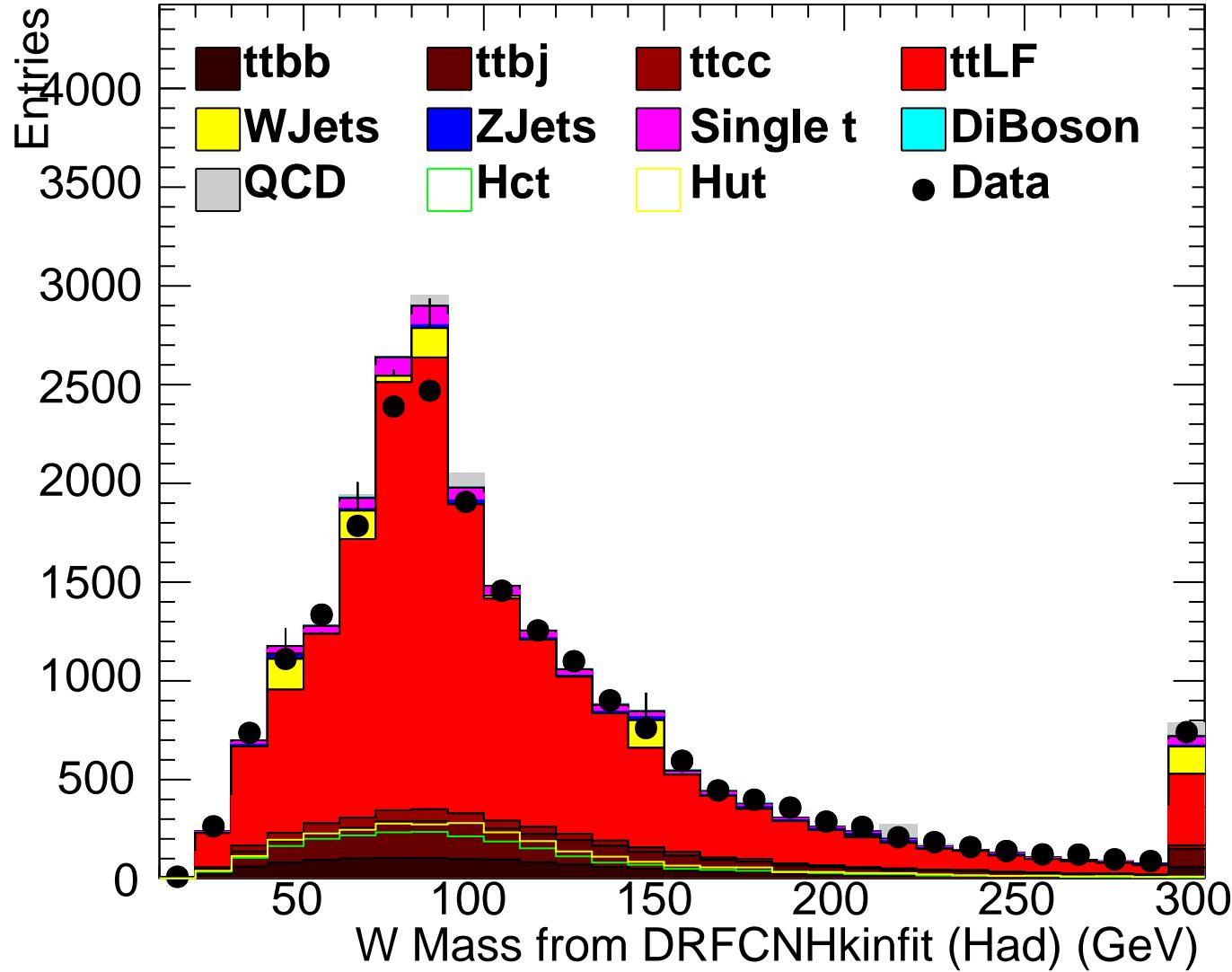


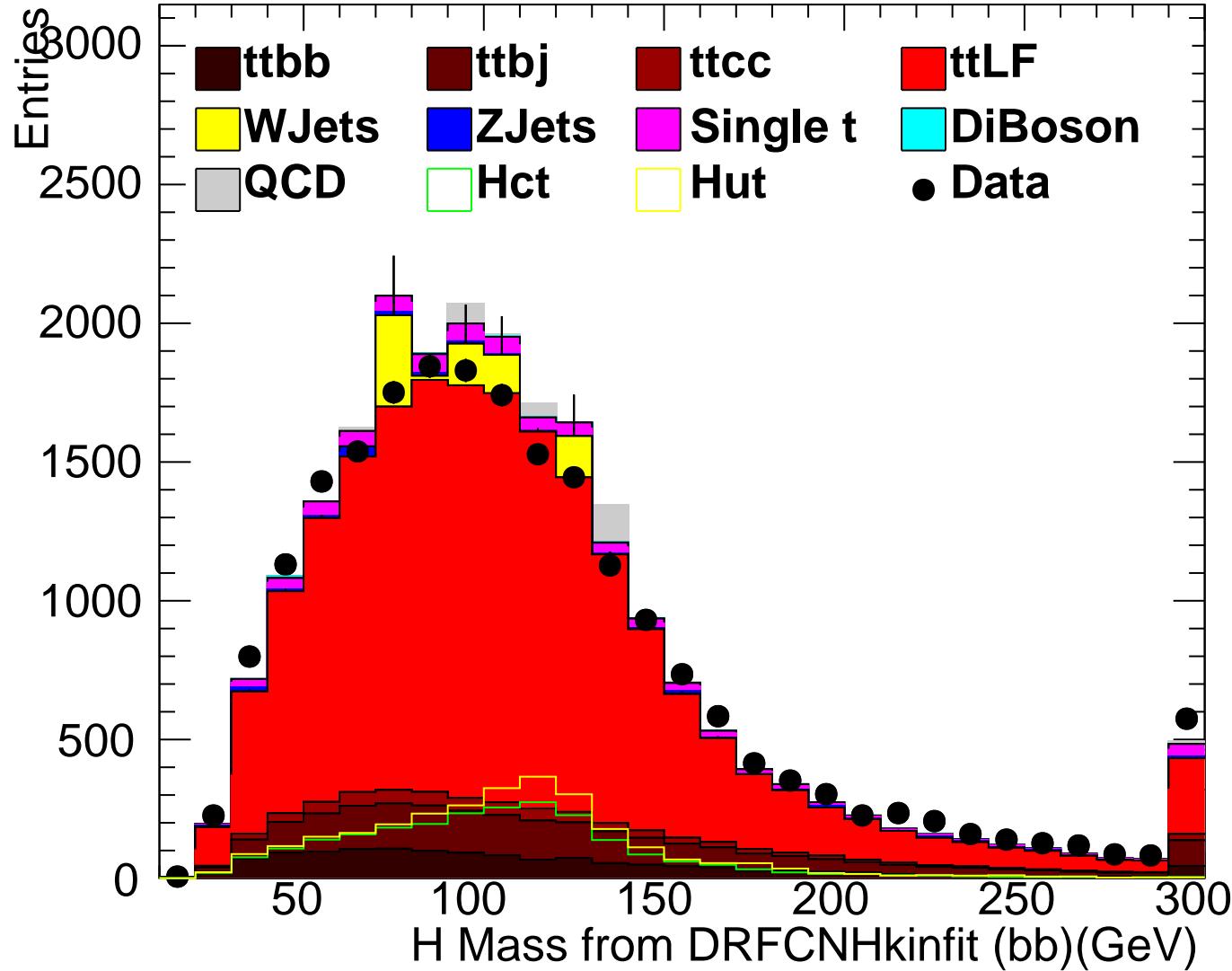


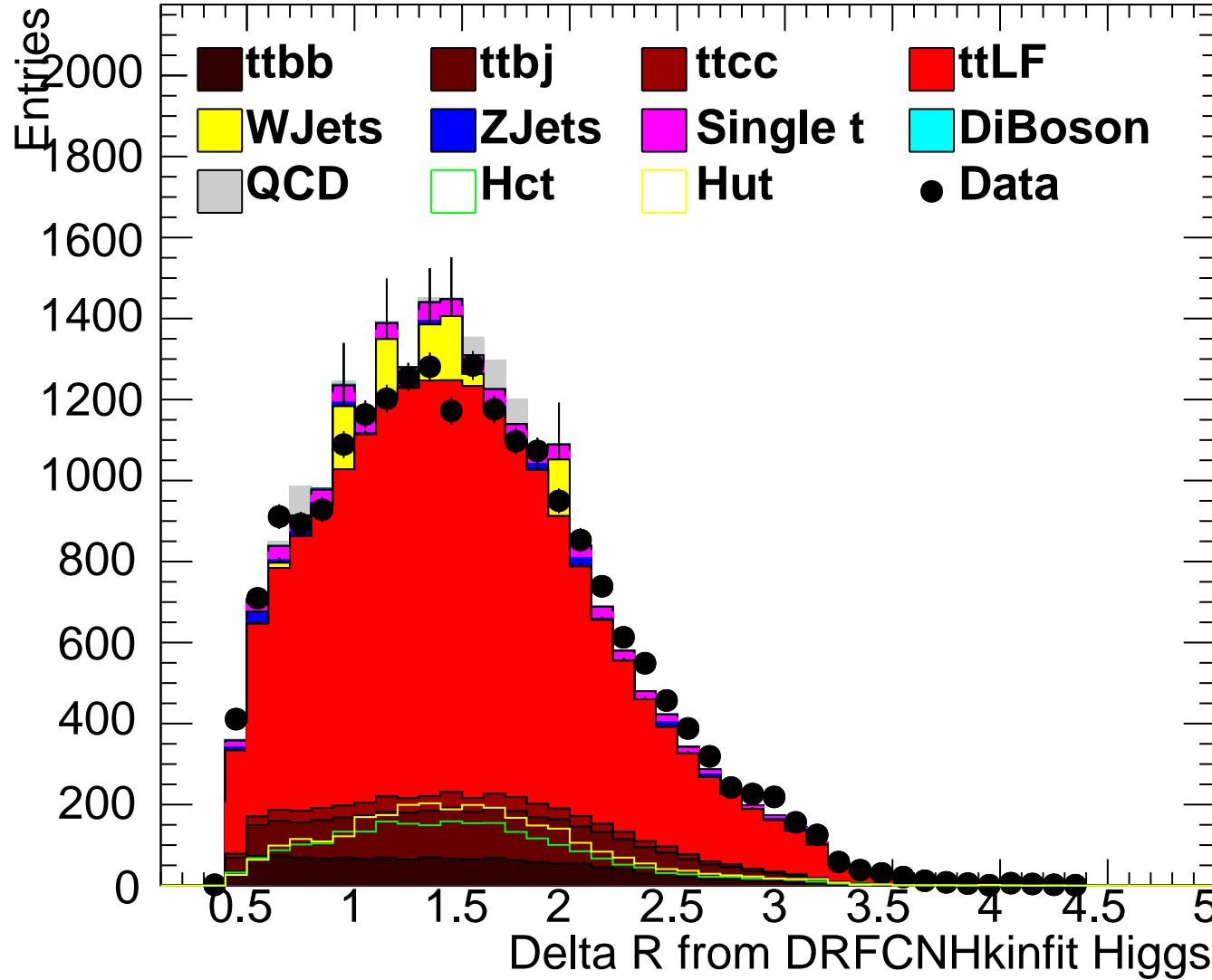




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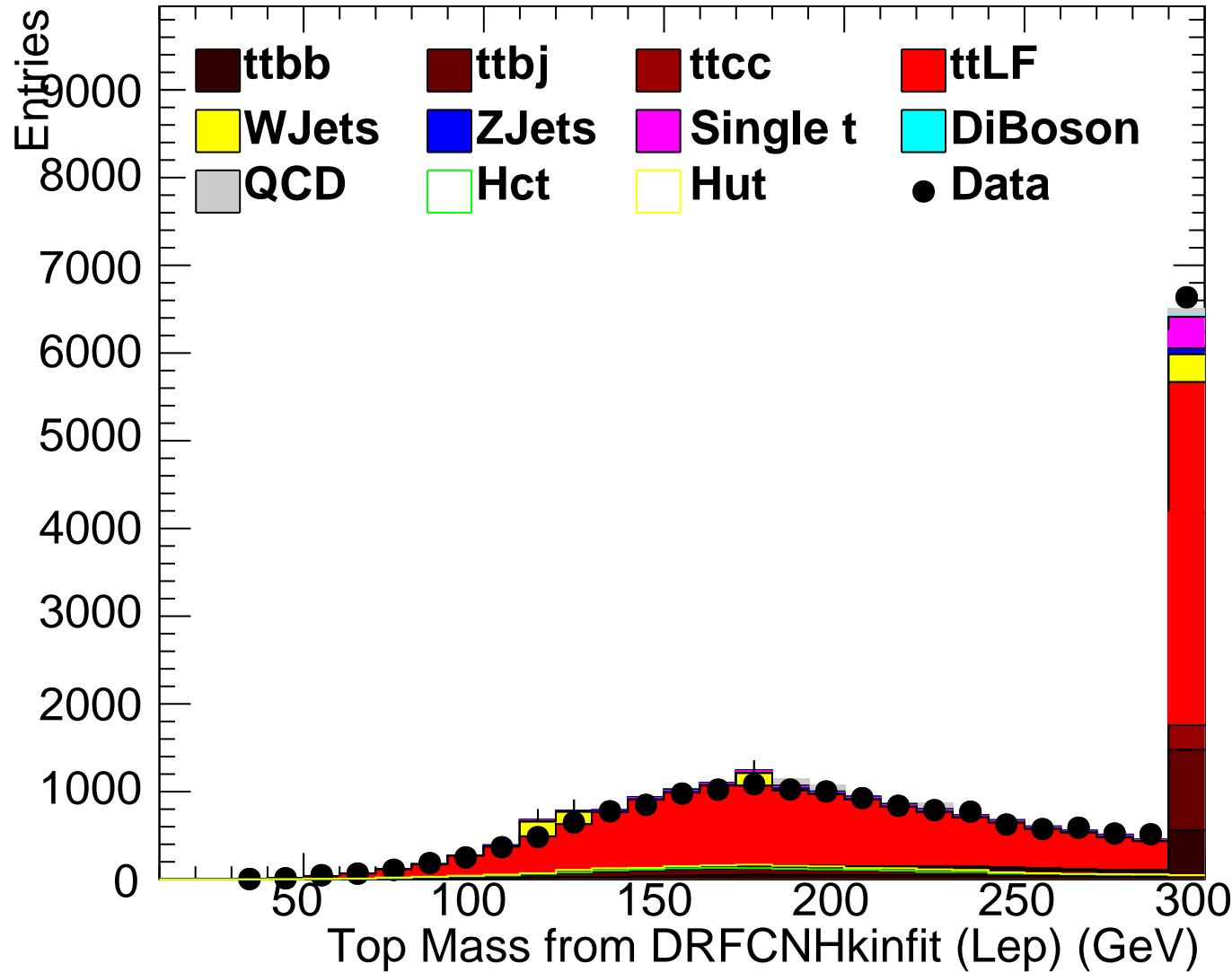
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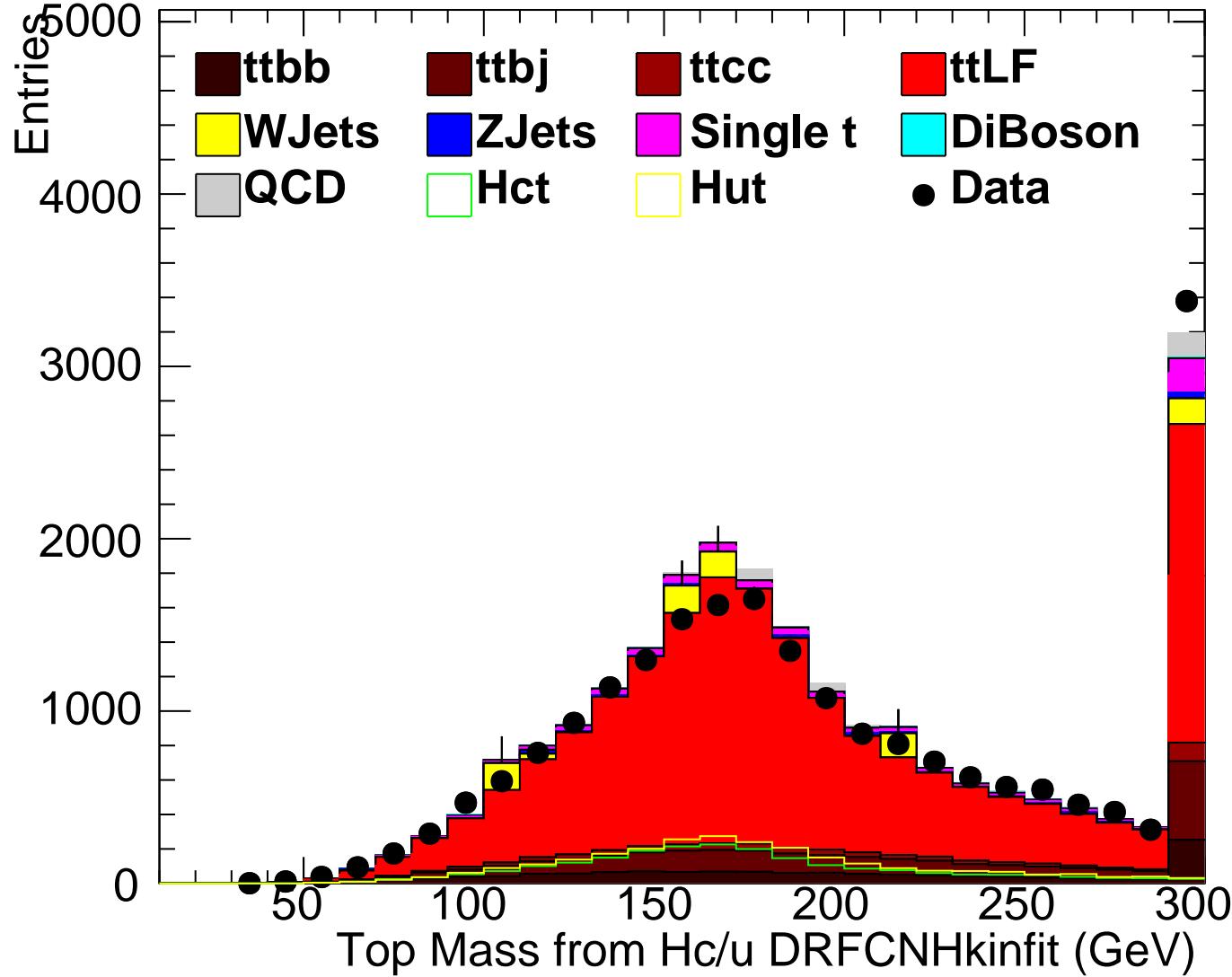
**Ch1\_S8**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch1\_S8**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

Ch1\_S8

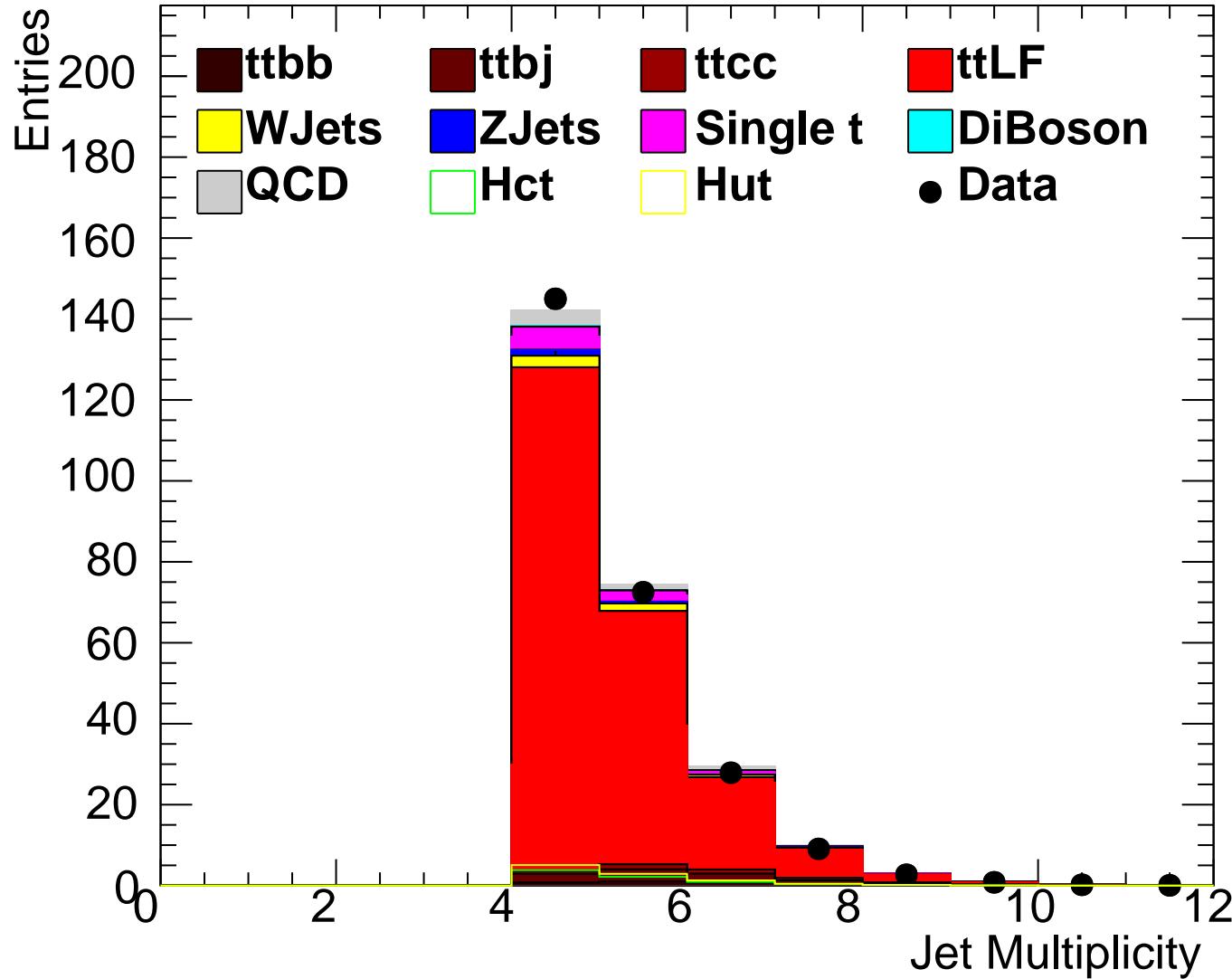
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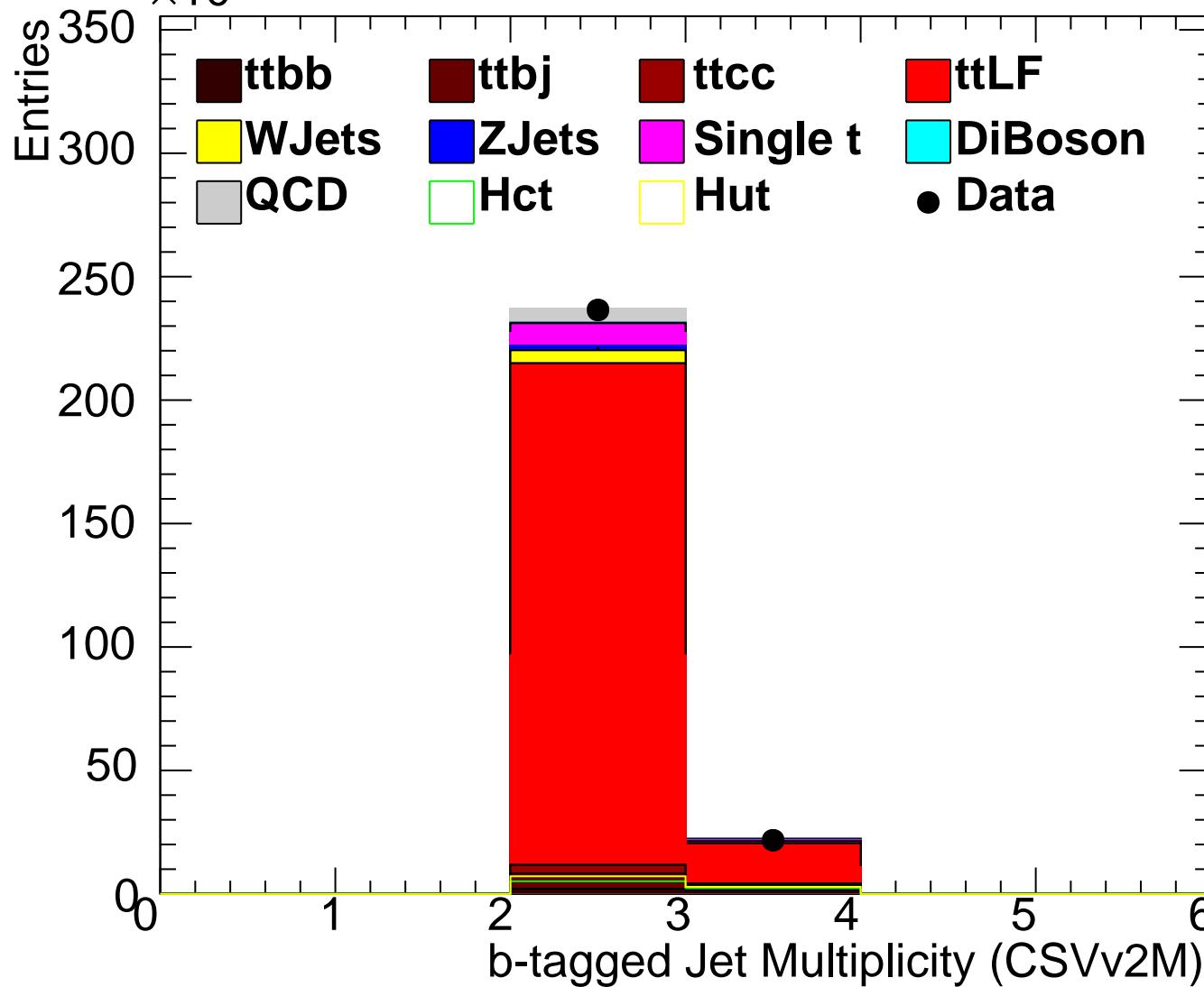


**Ch1\_S8**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

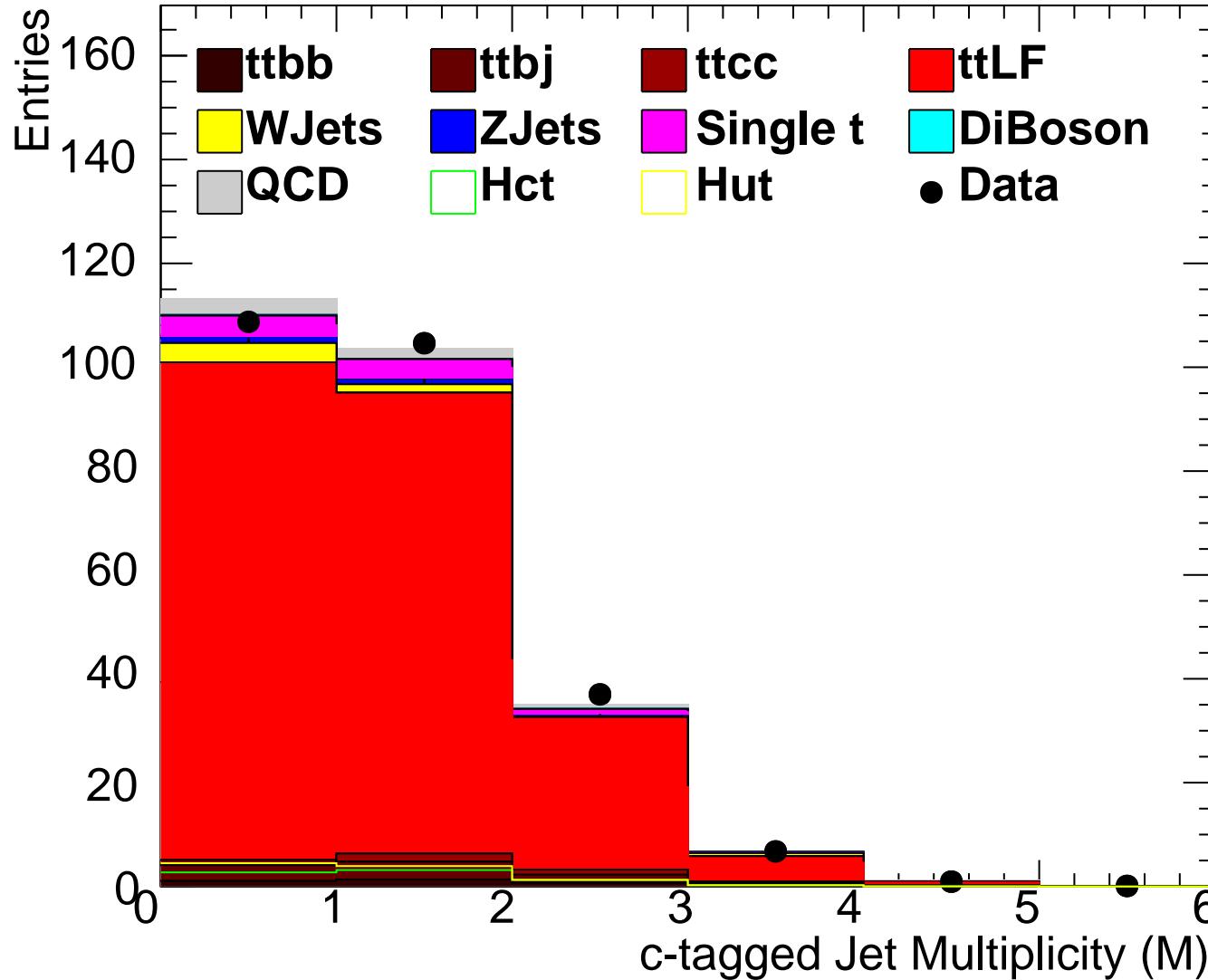
Ch1\_S9

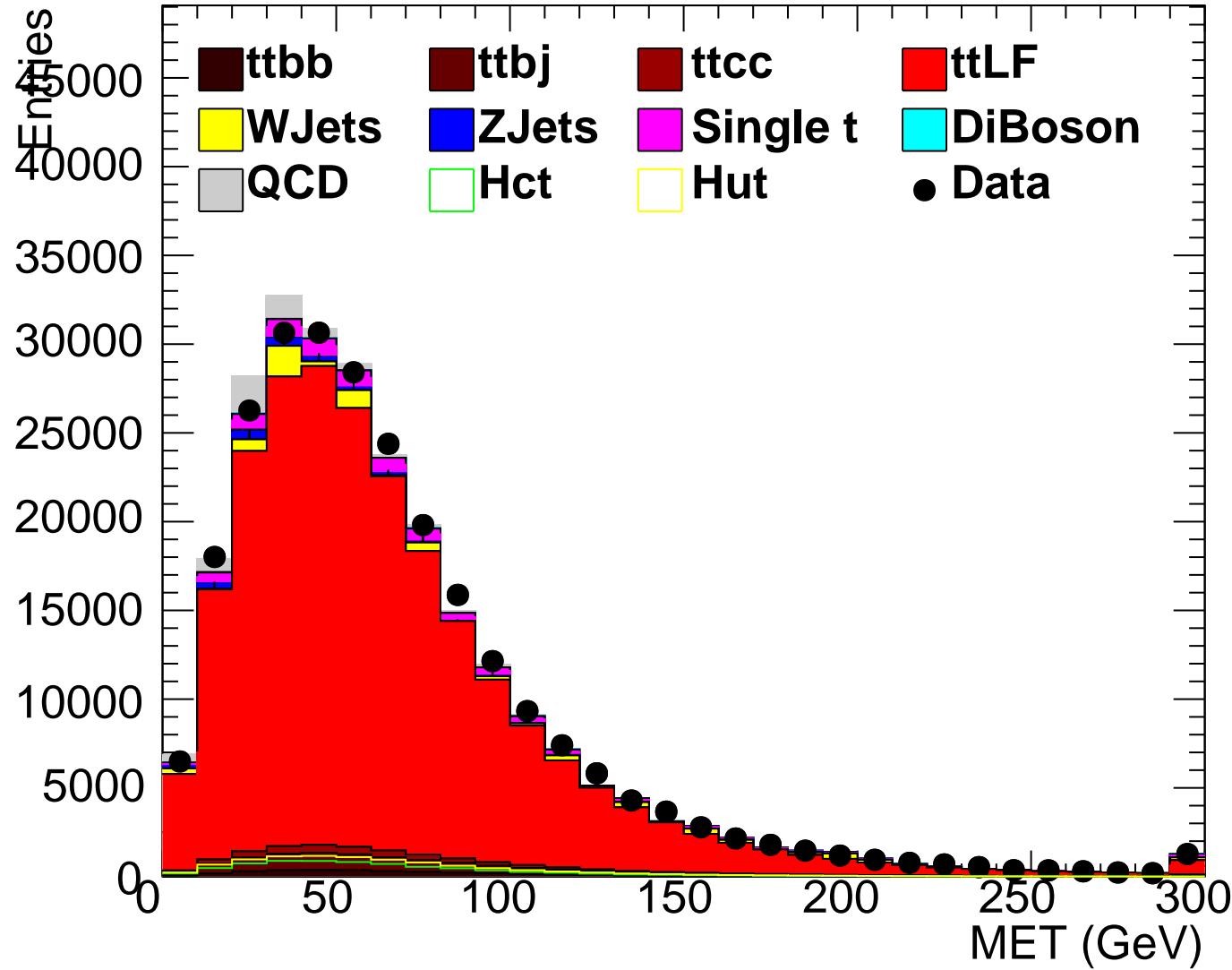
CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$

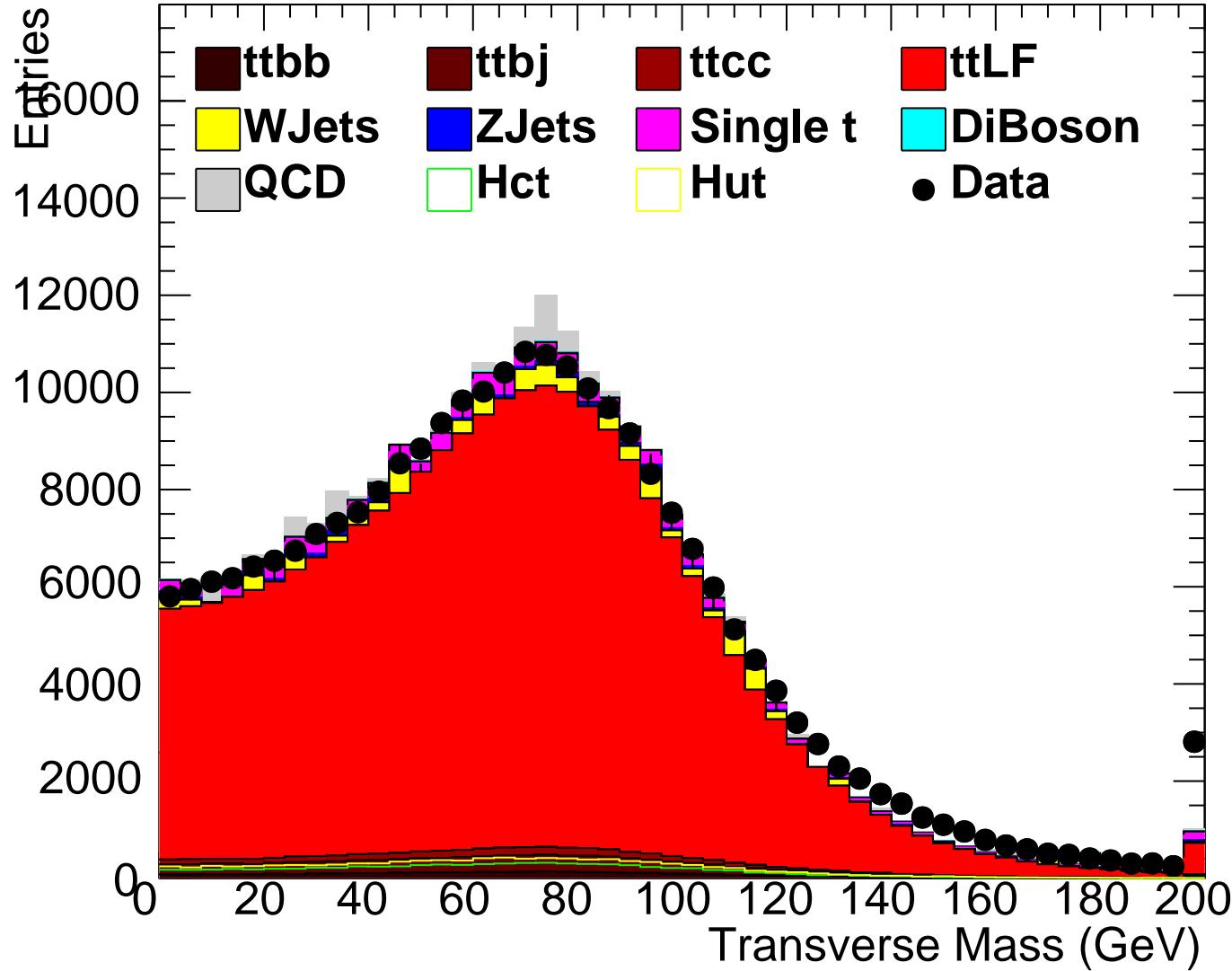


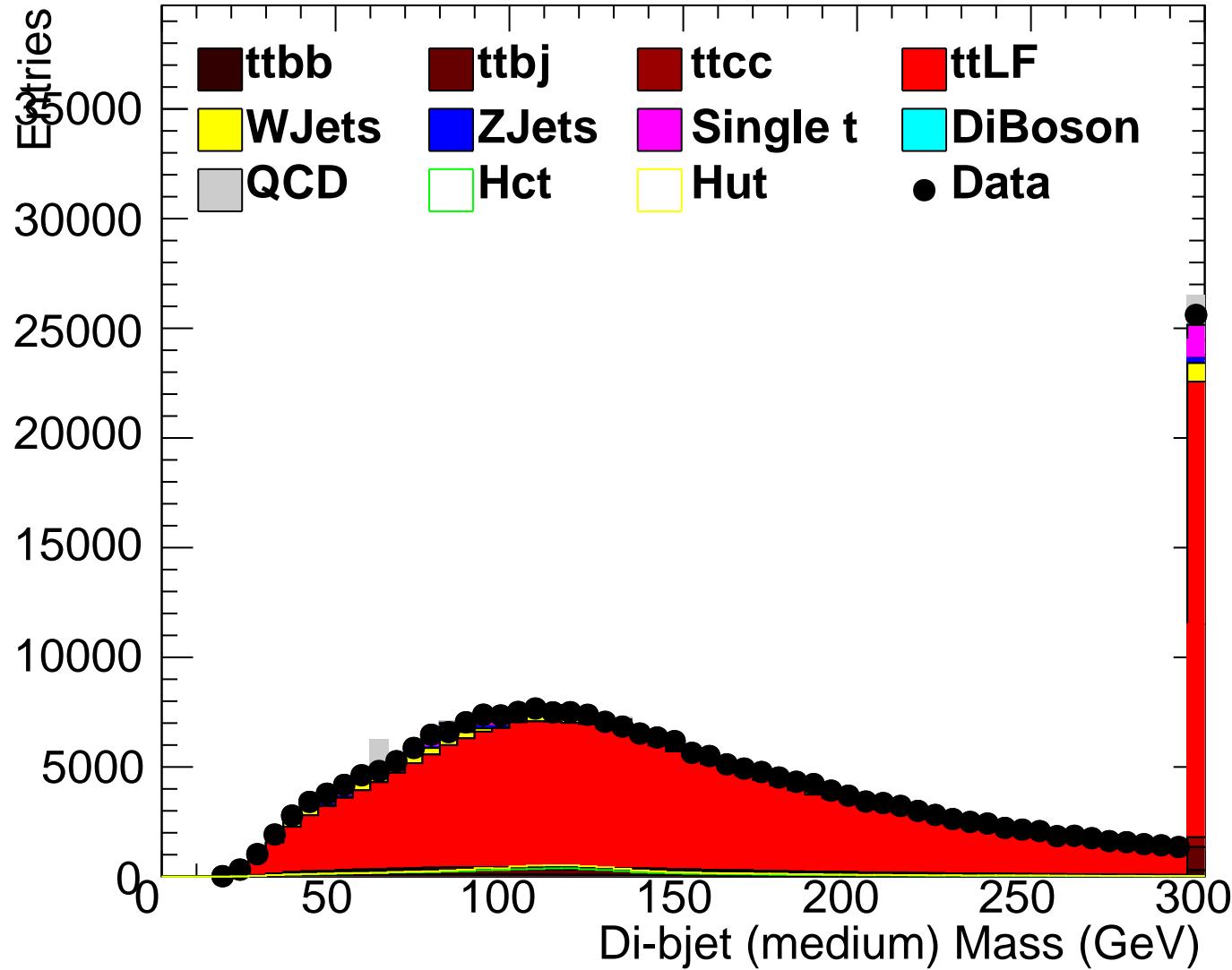
**Ch1\_S9**3  
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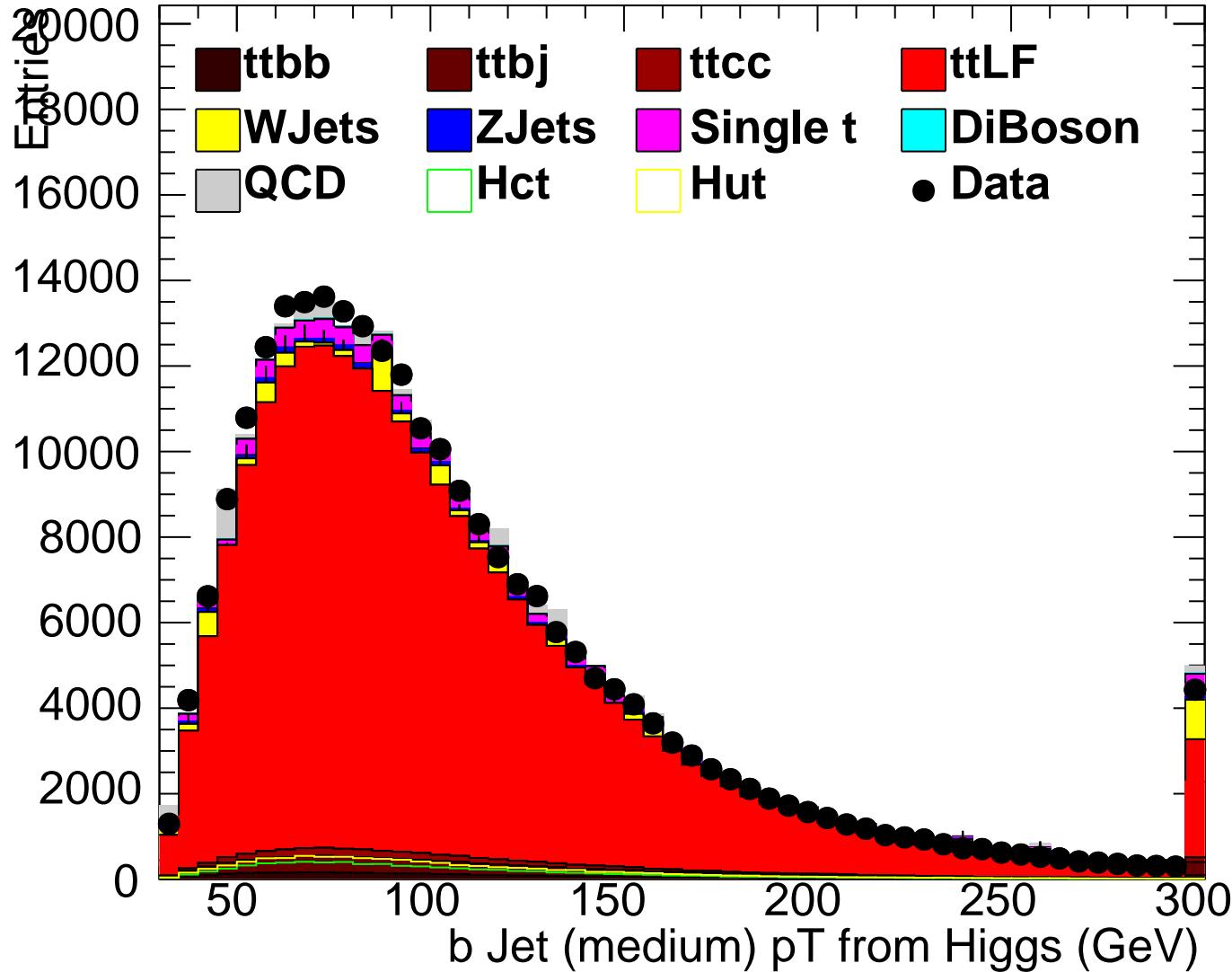


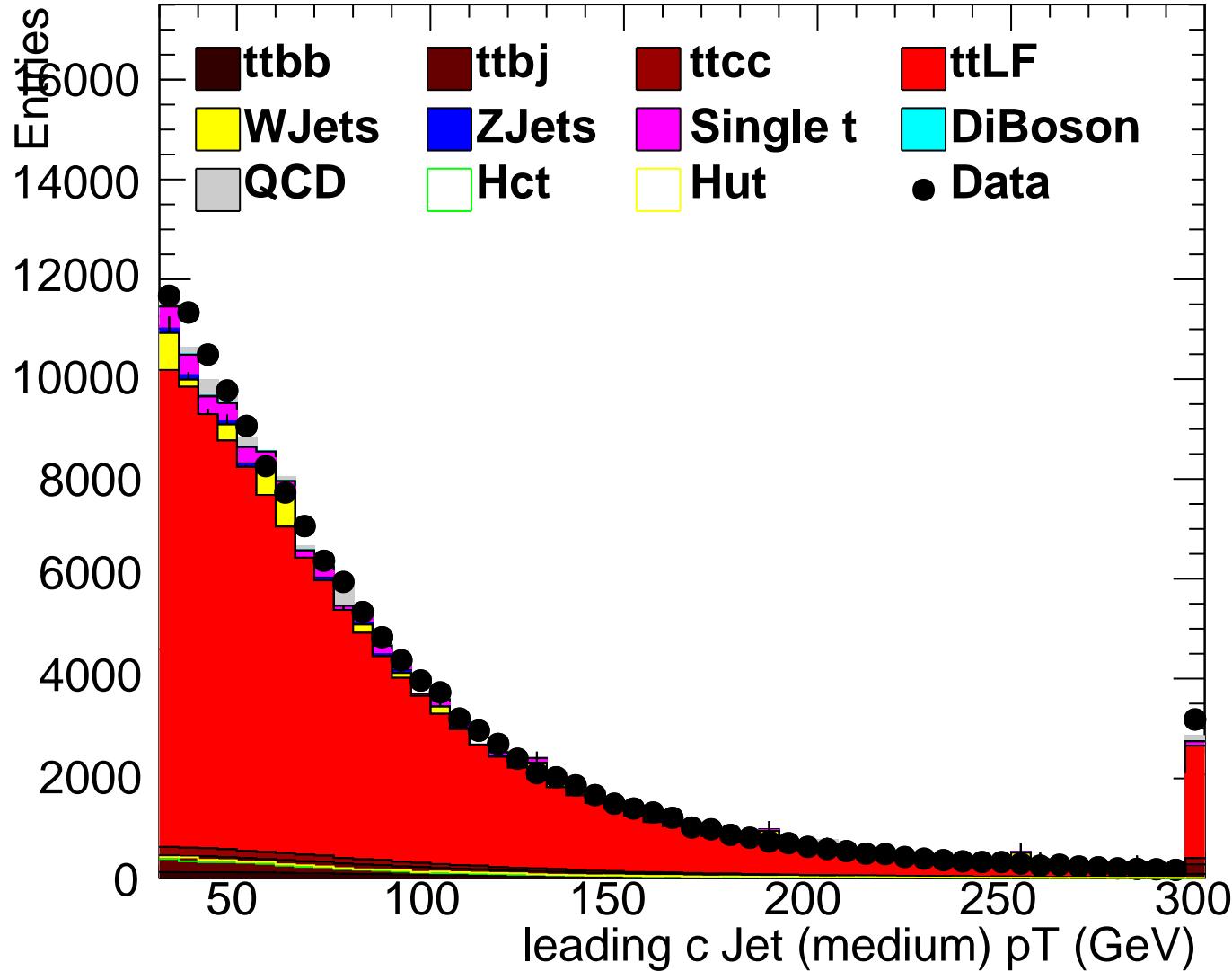


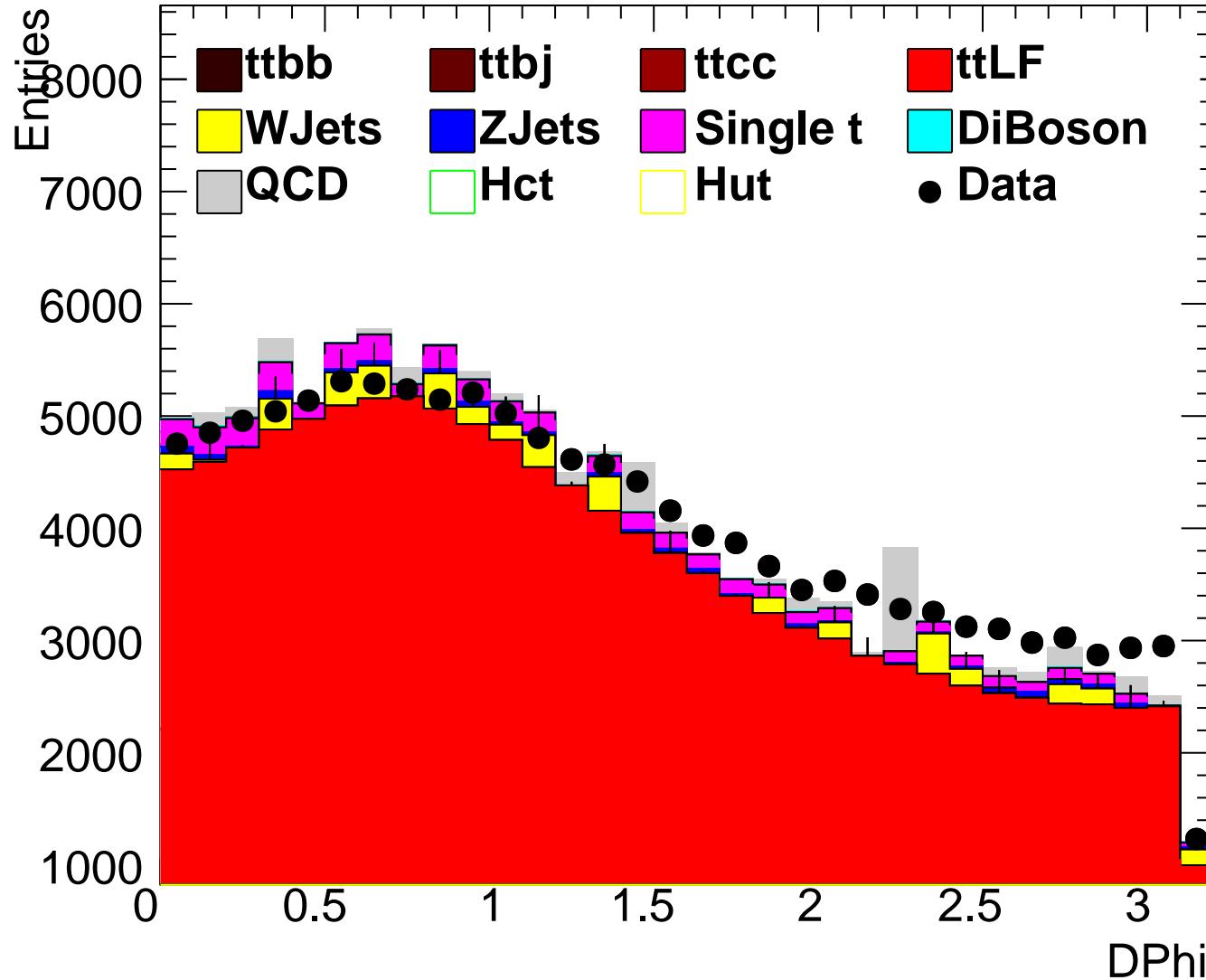
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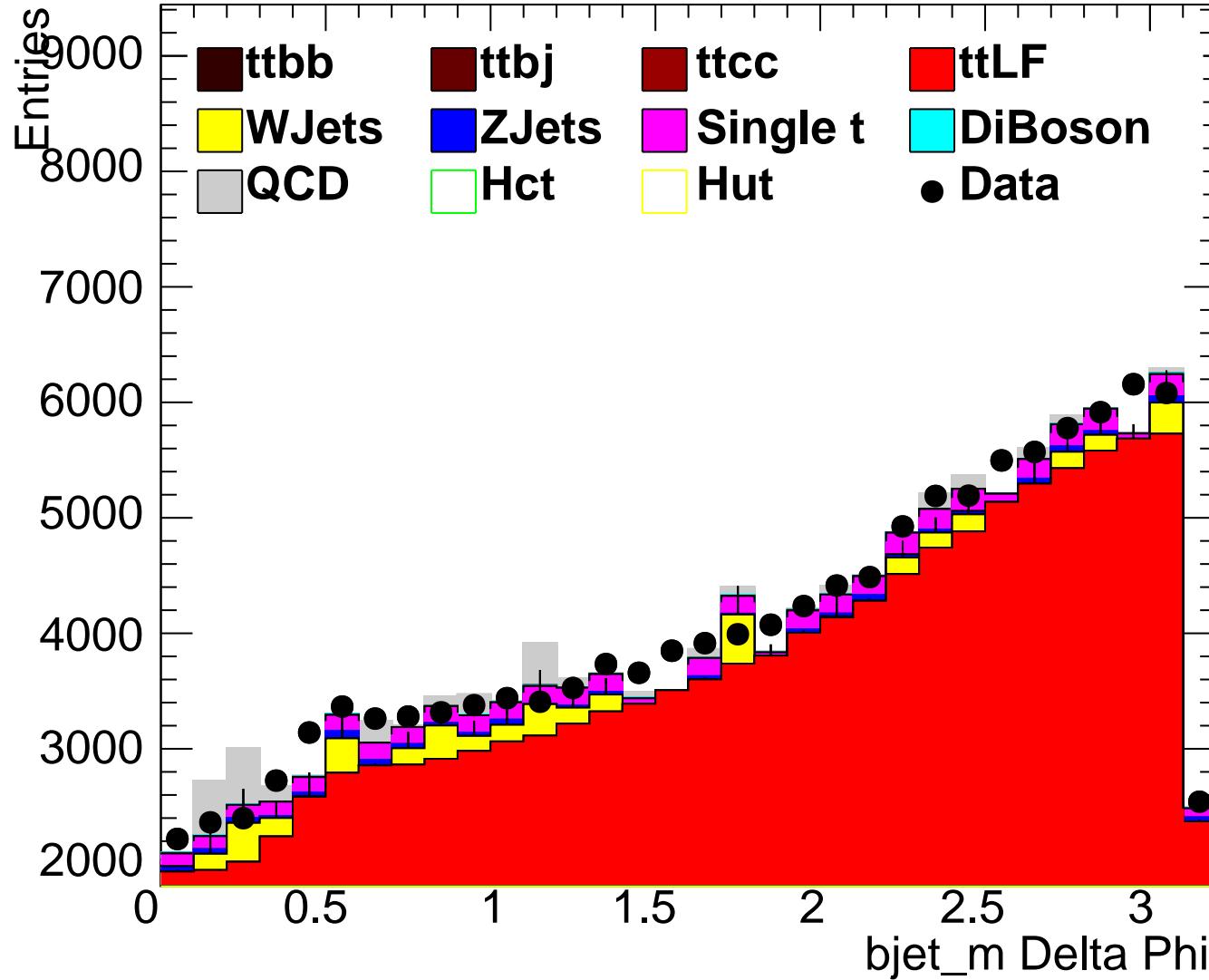
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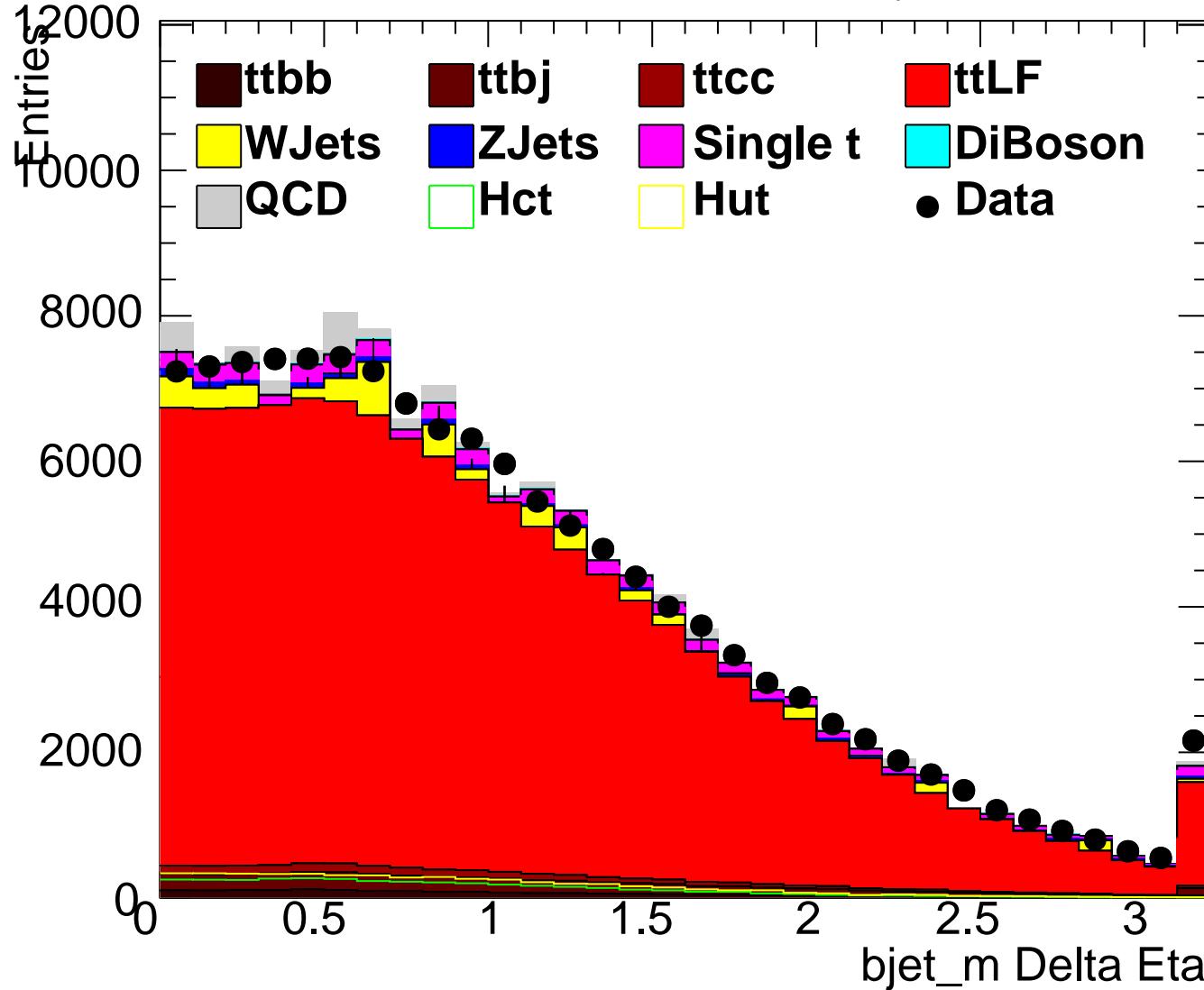


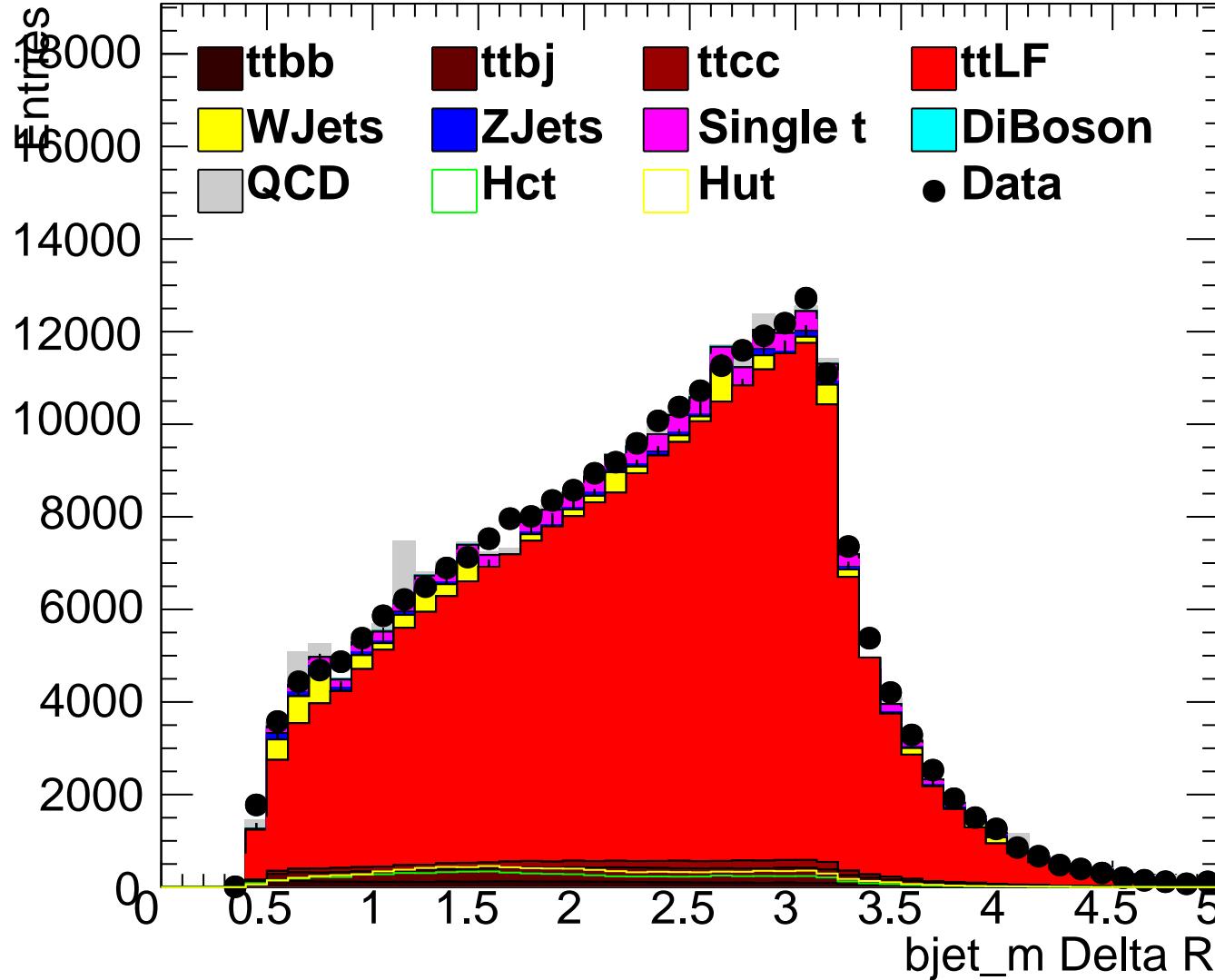
**Ch1\_S9**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch1\_S9**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 



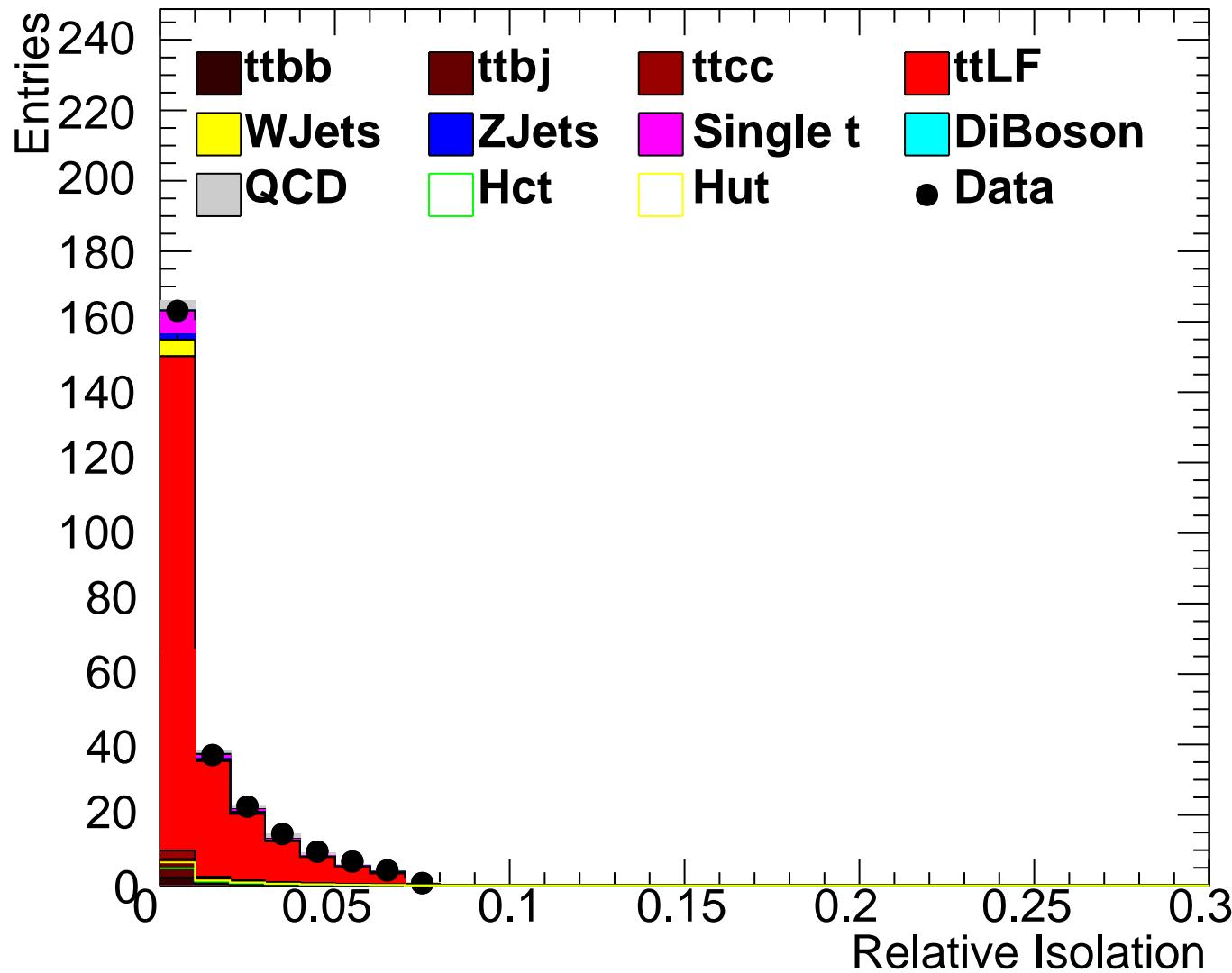


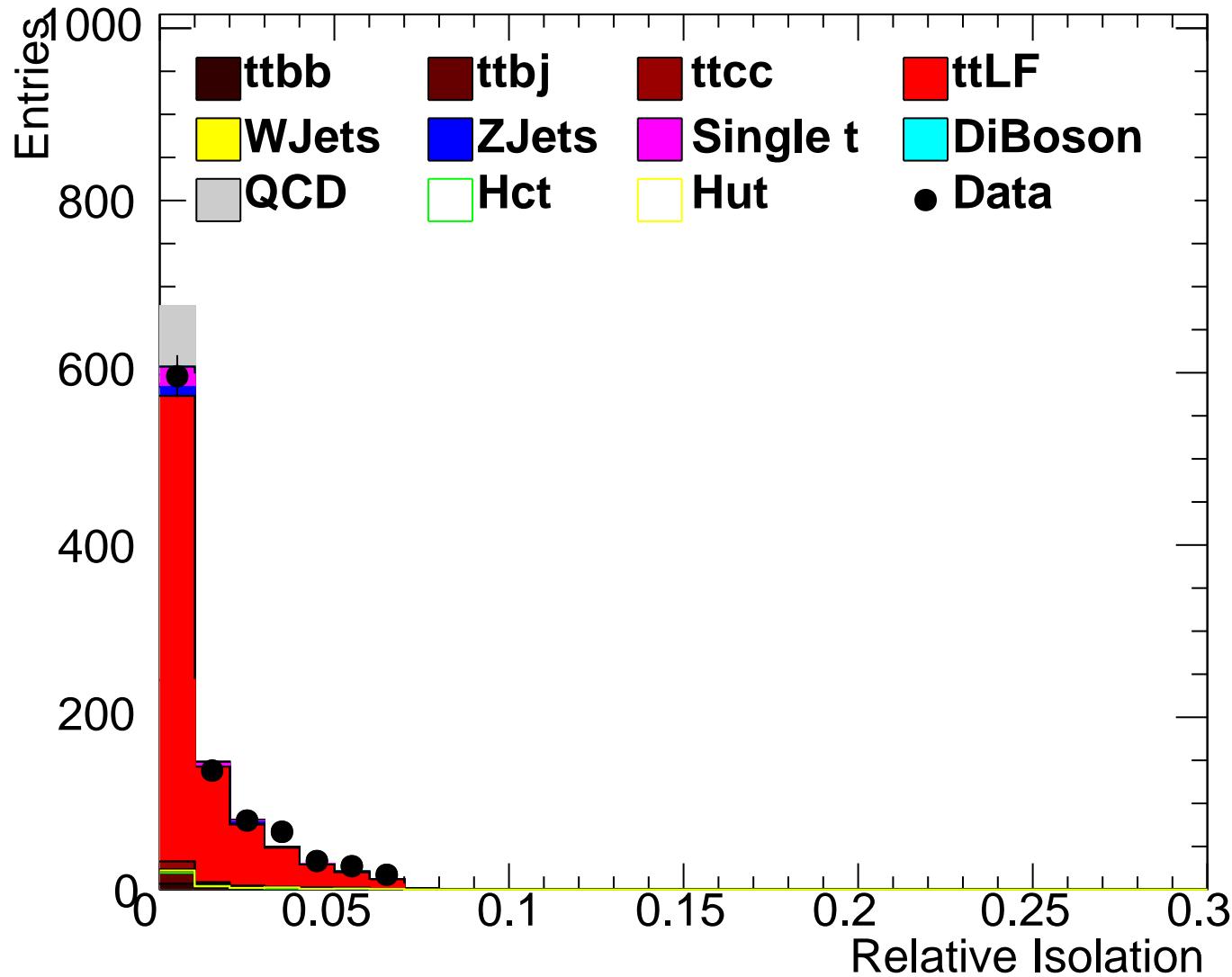
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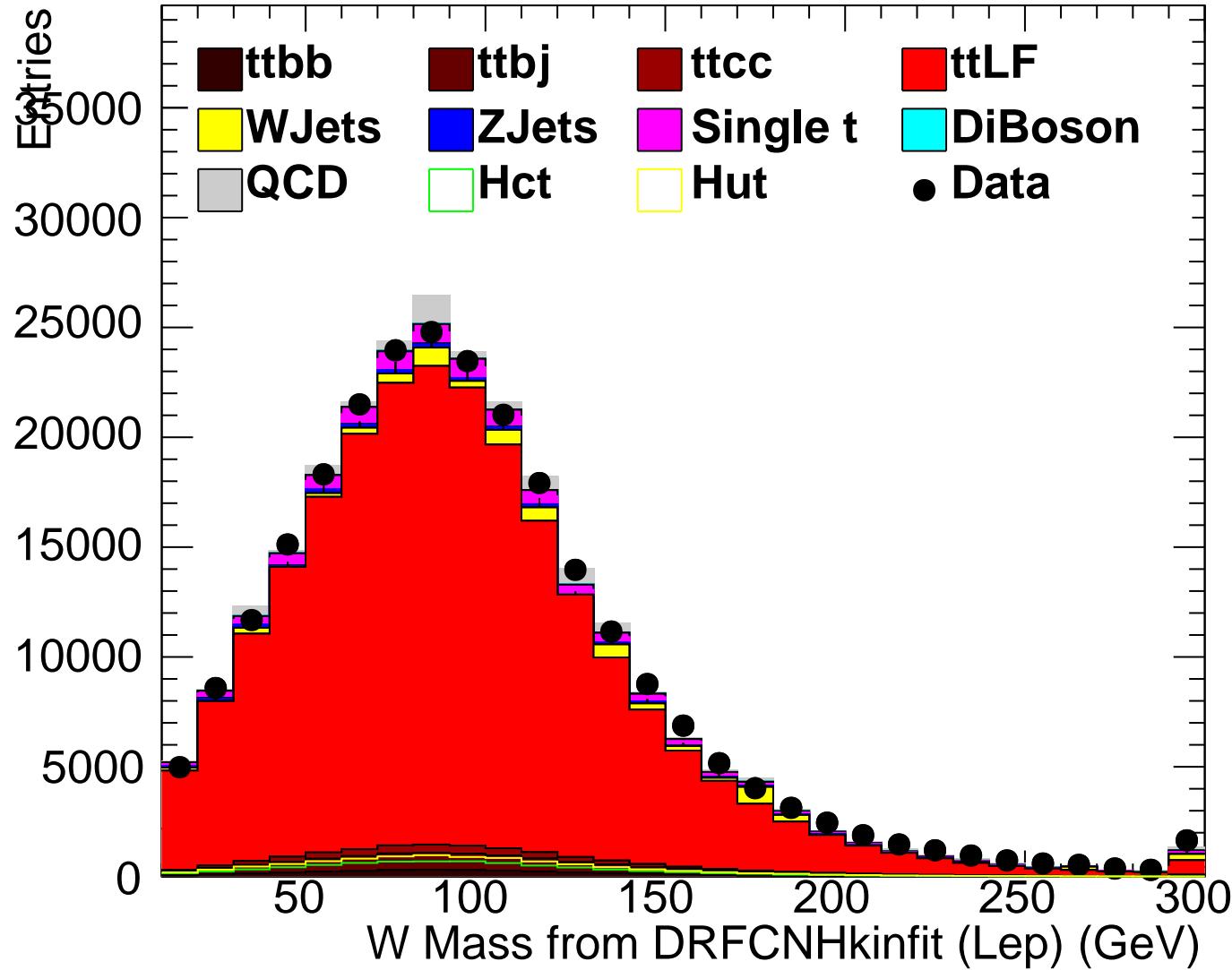


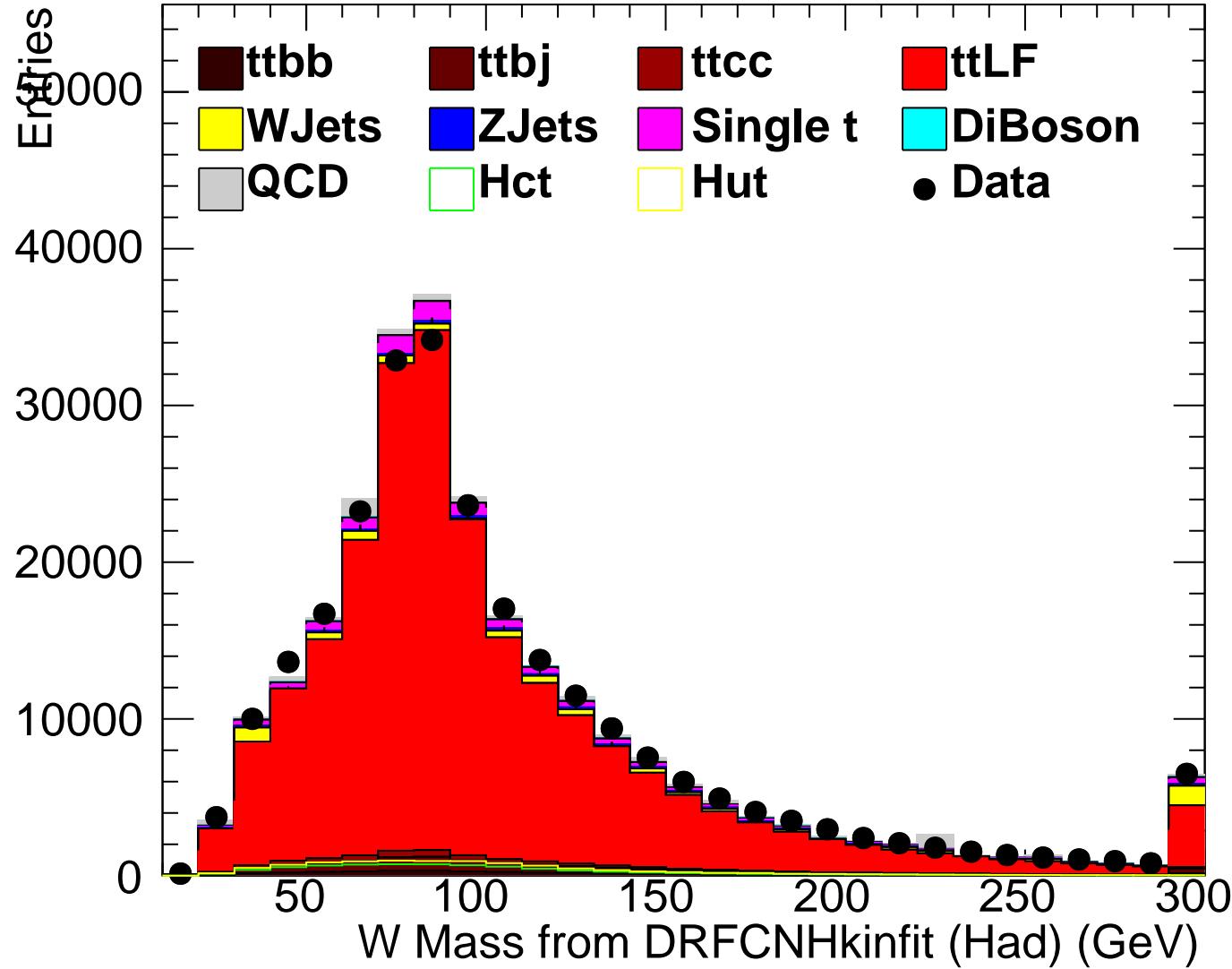
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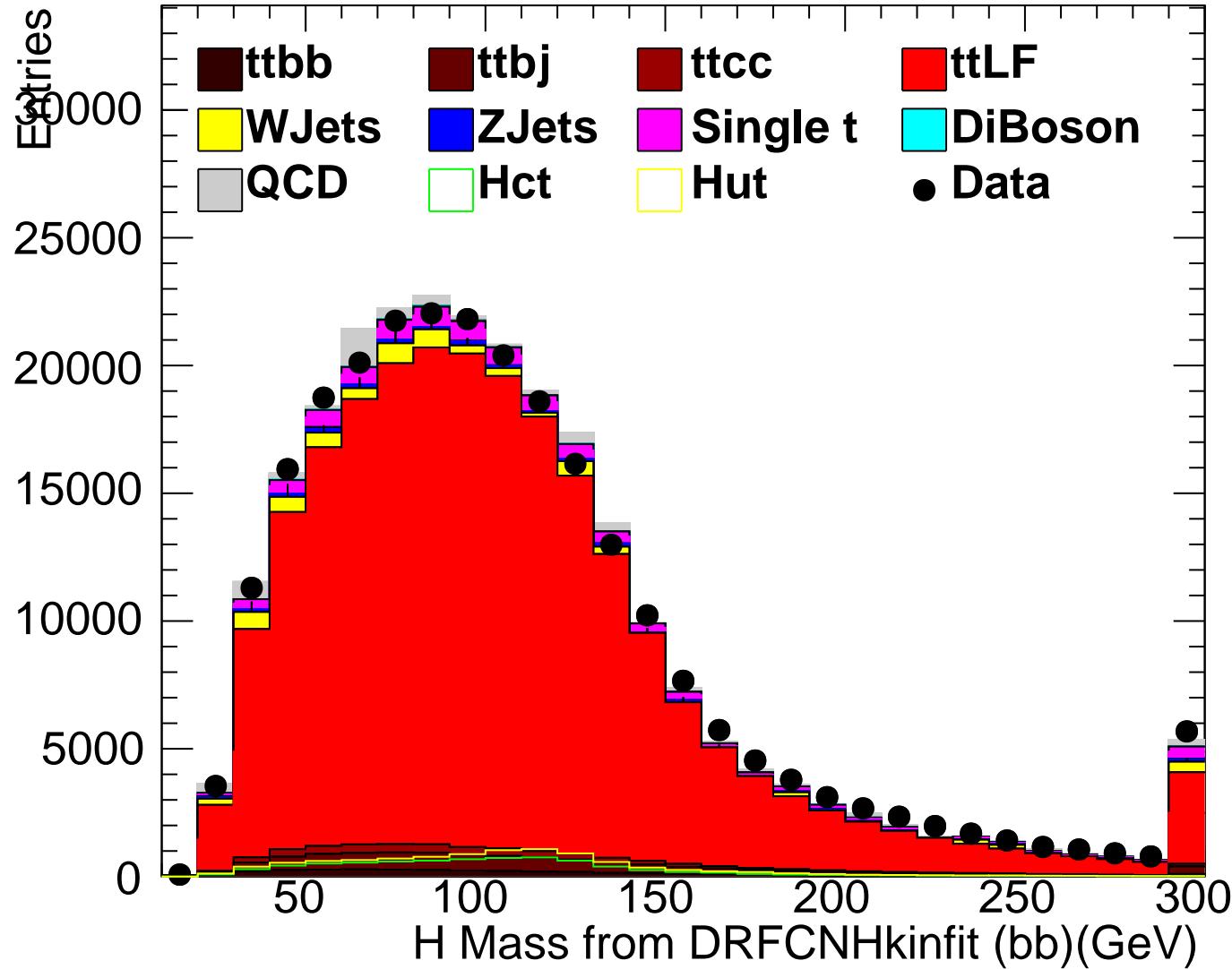
CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$

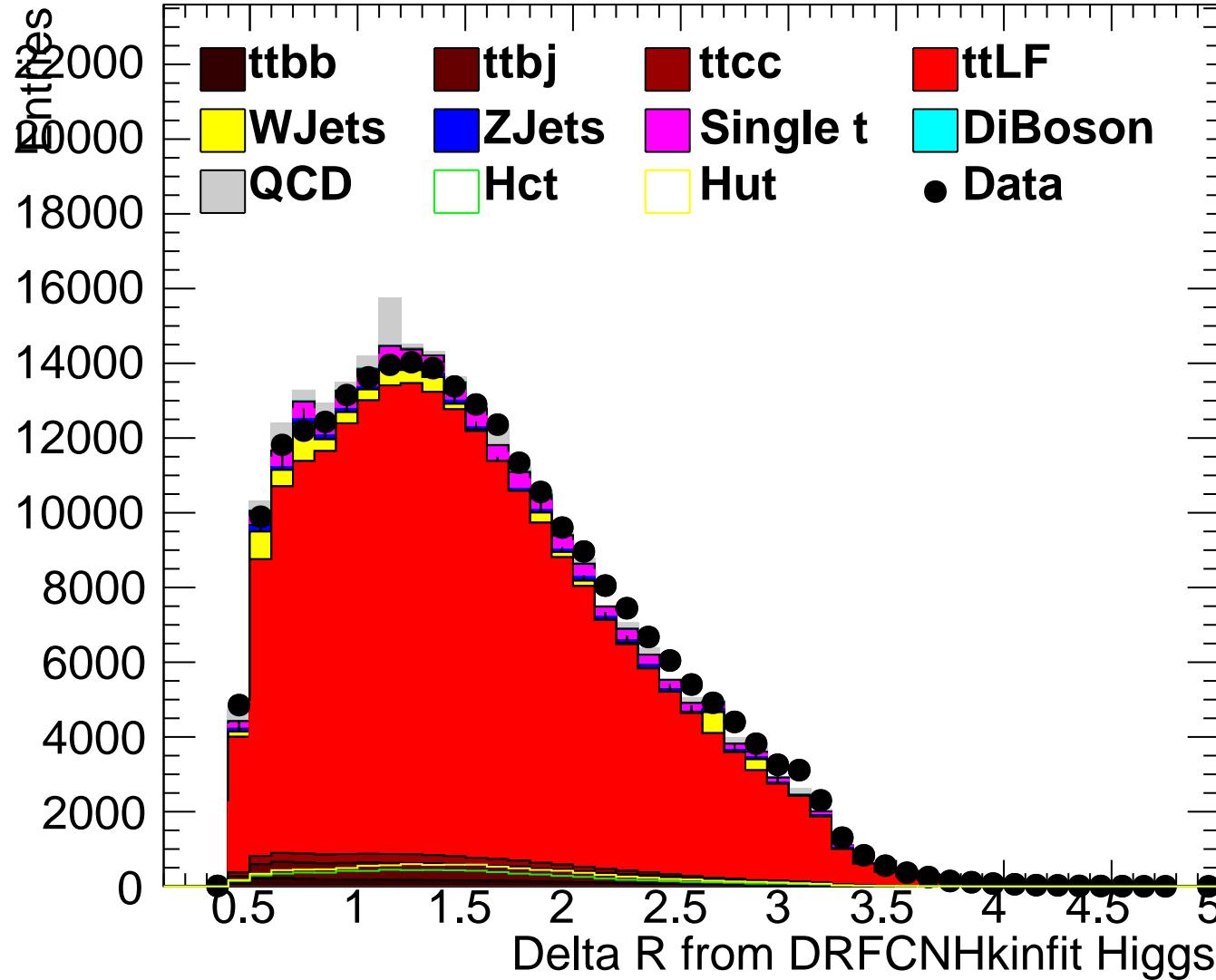


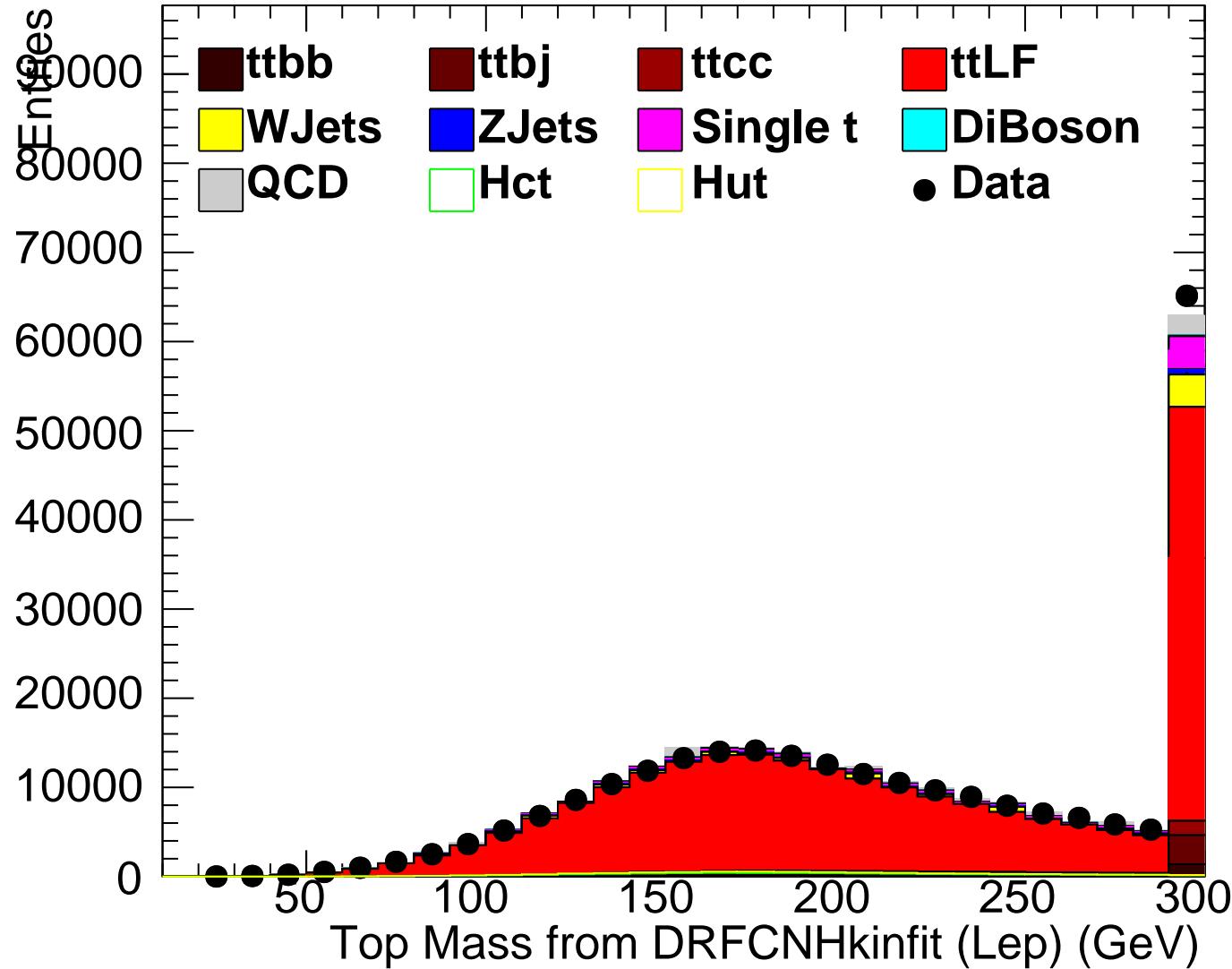
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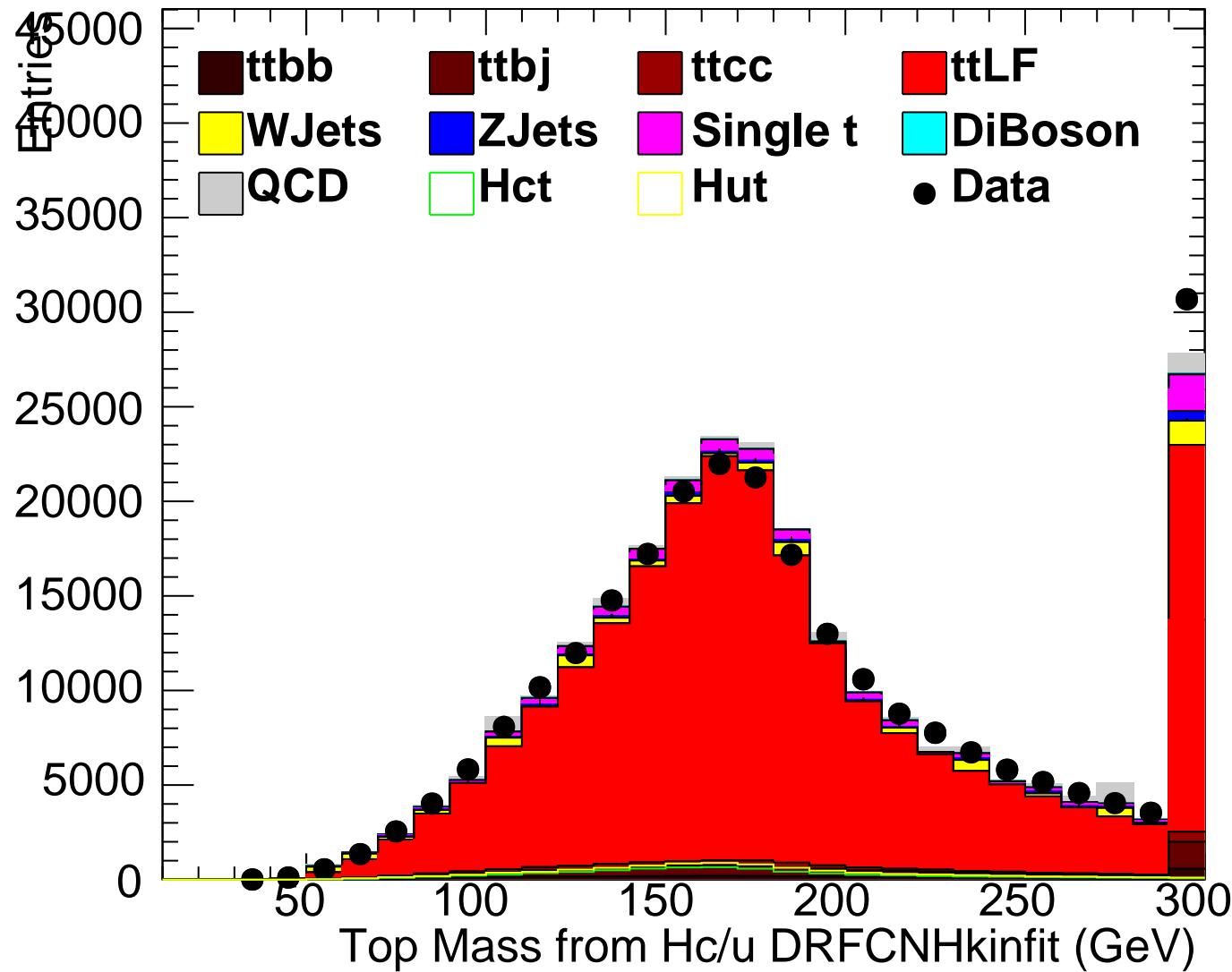


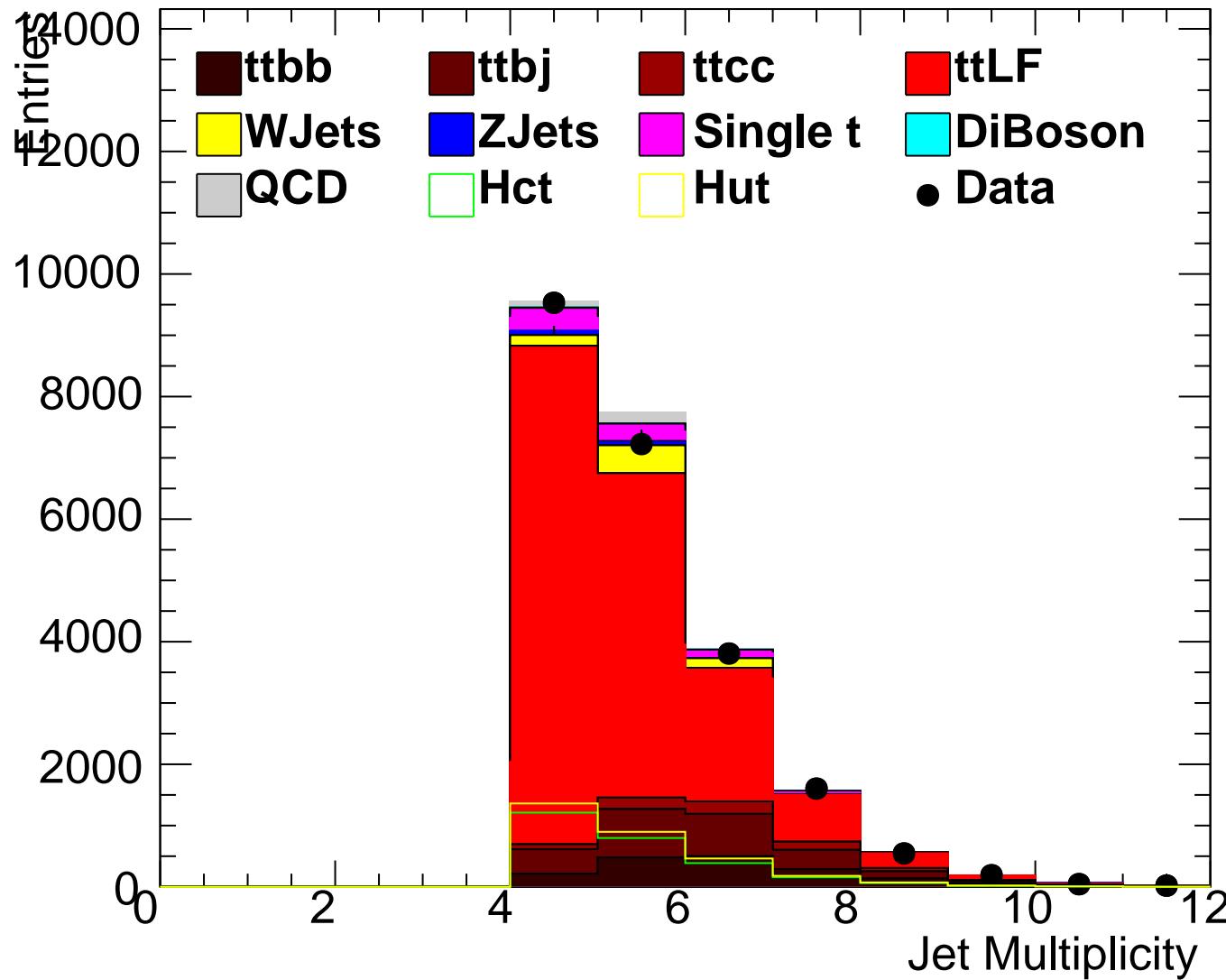
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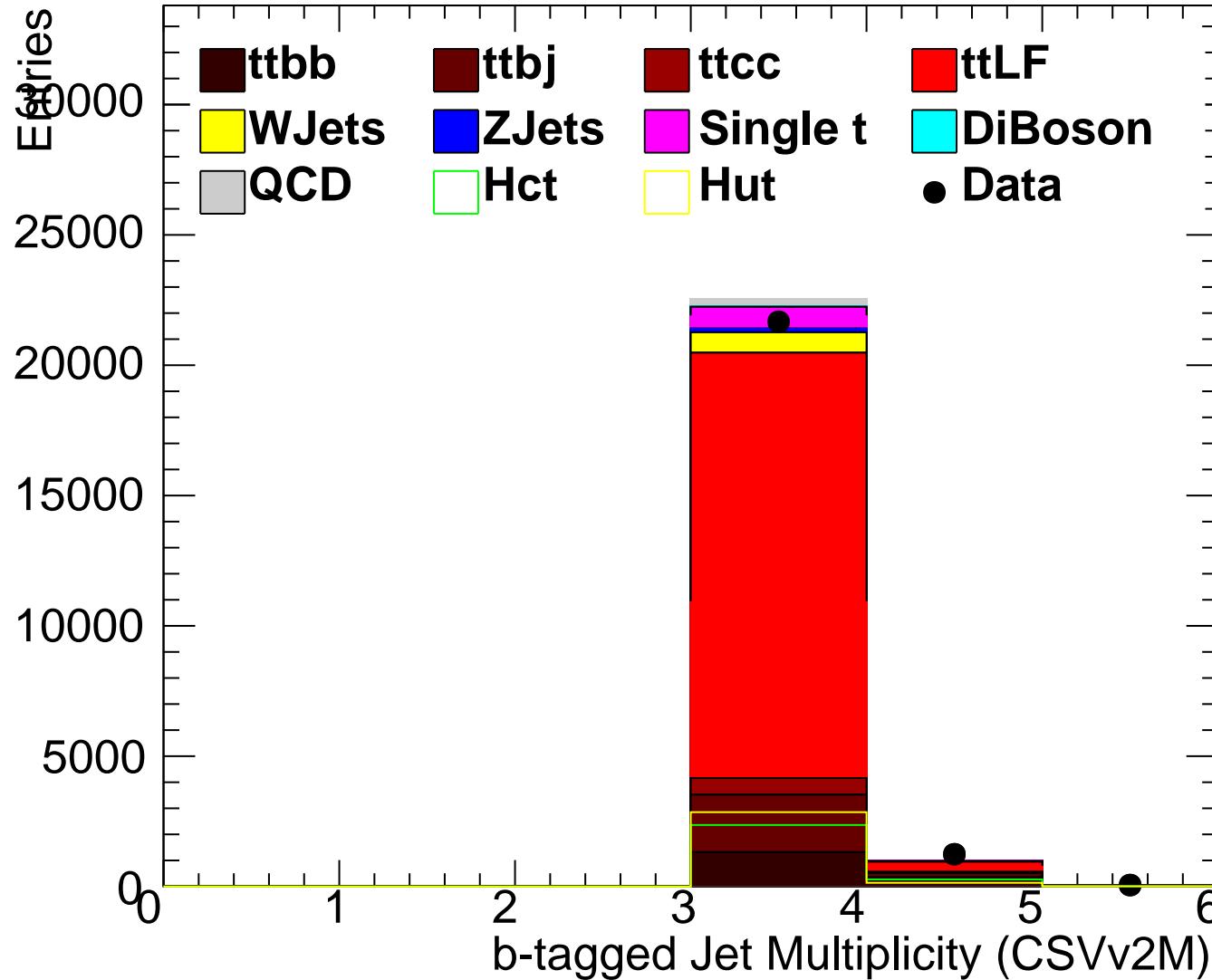


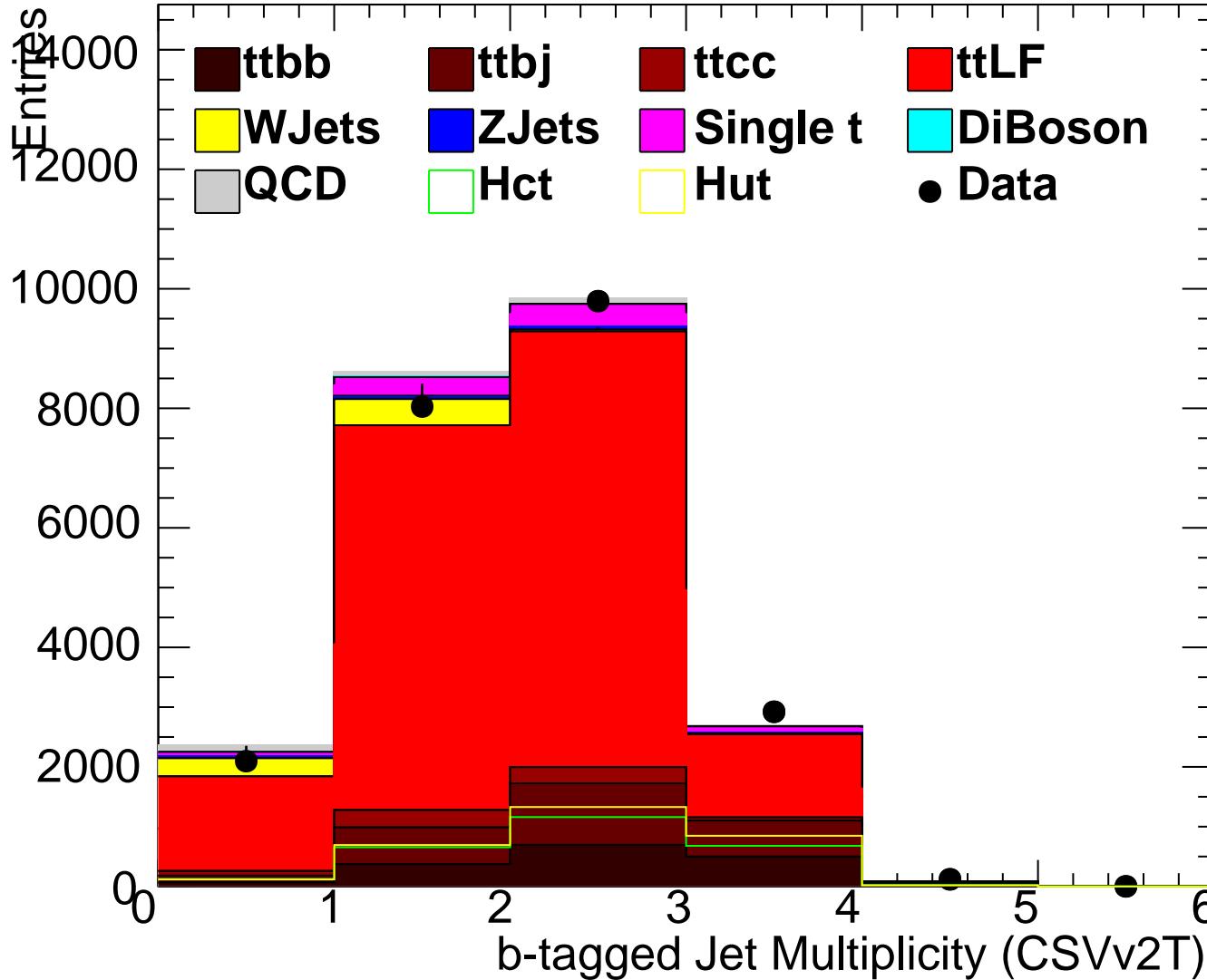
**Ch1\_S9**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

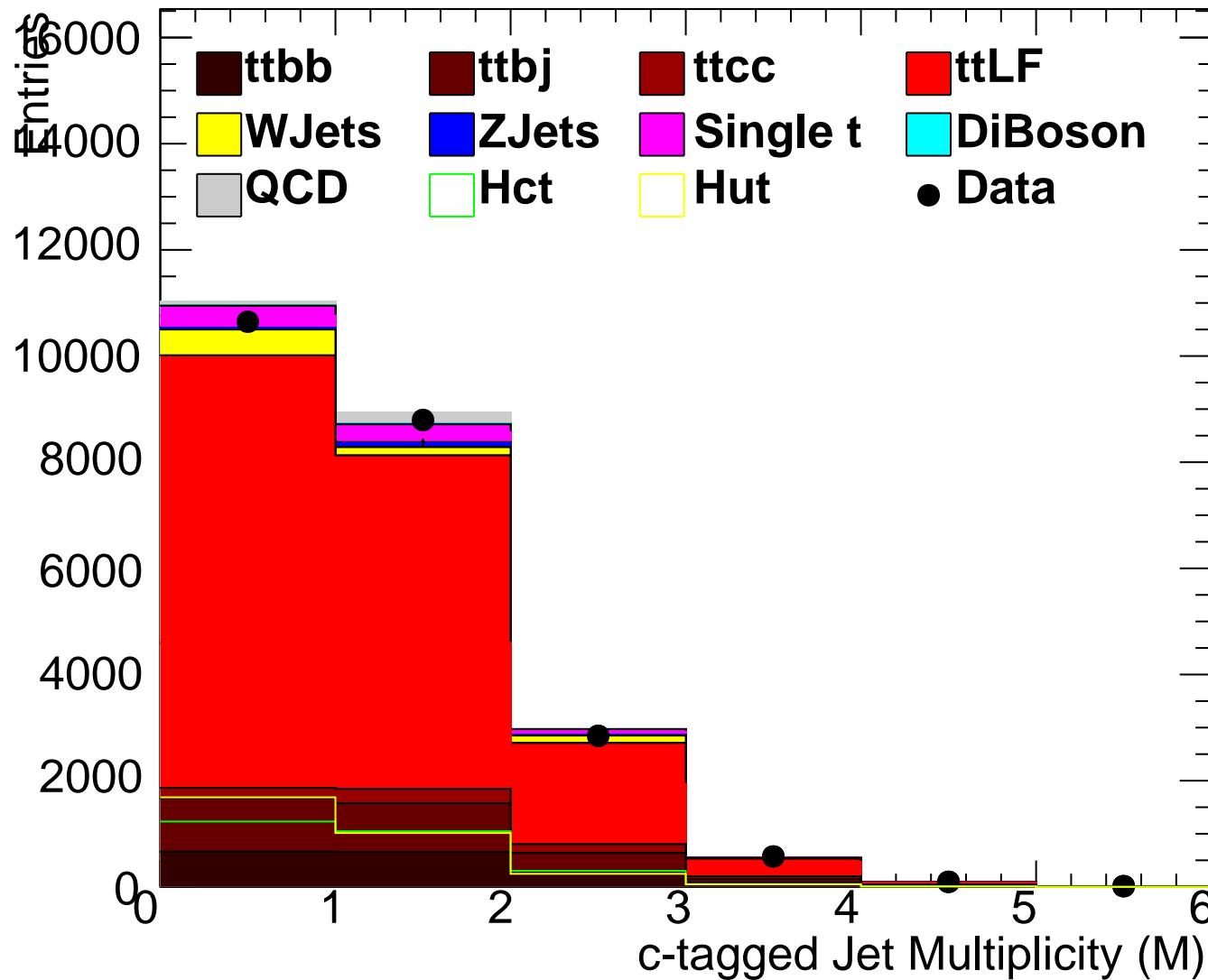
**Ch1\_S9**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

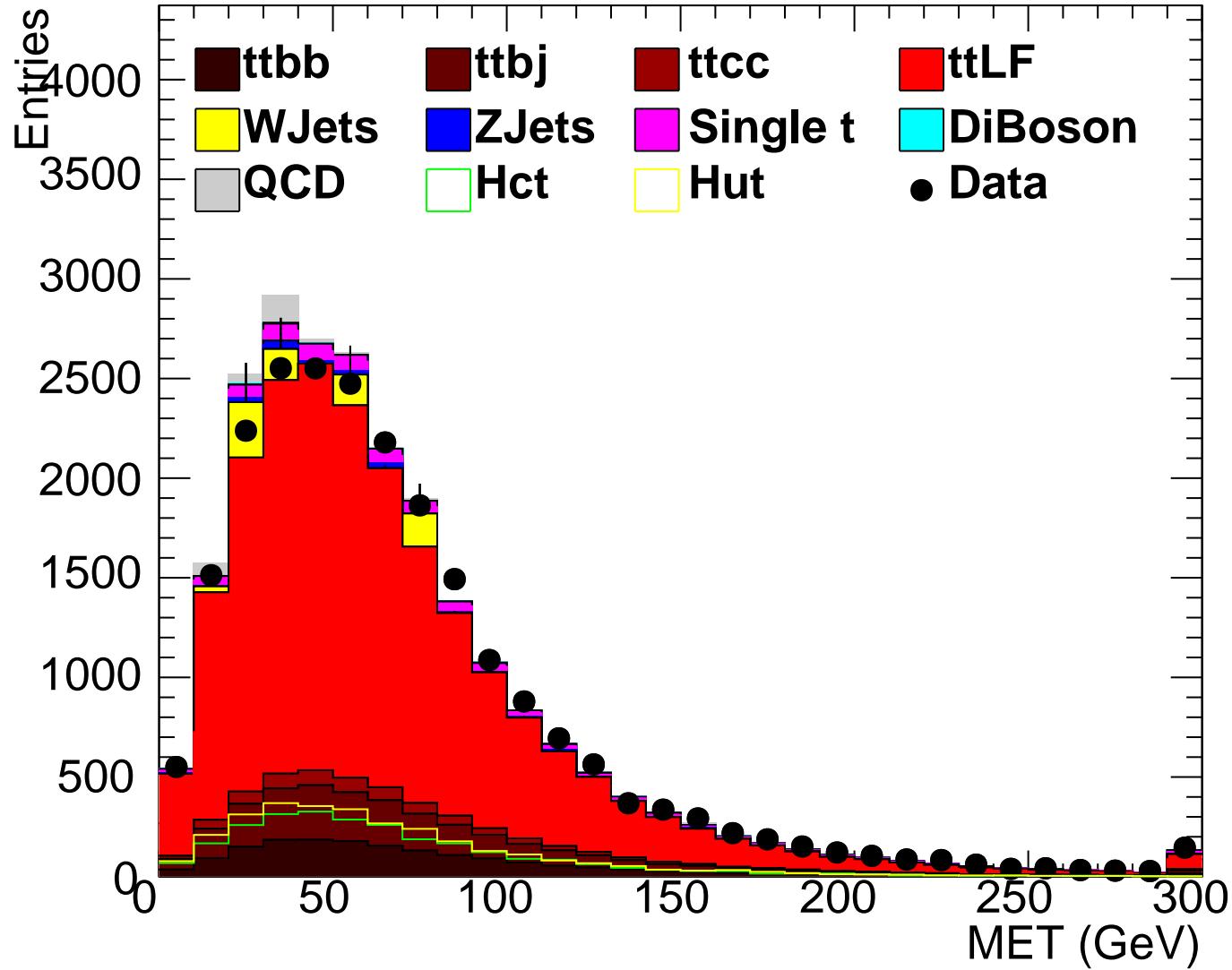
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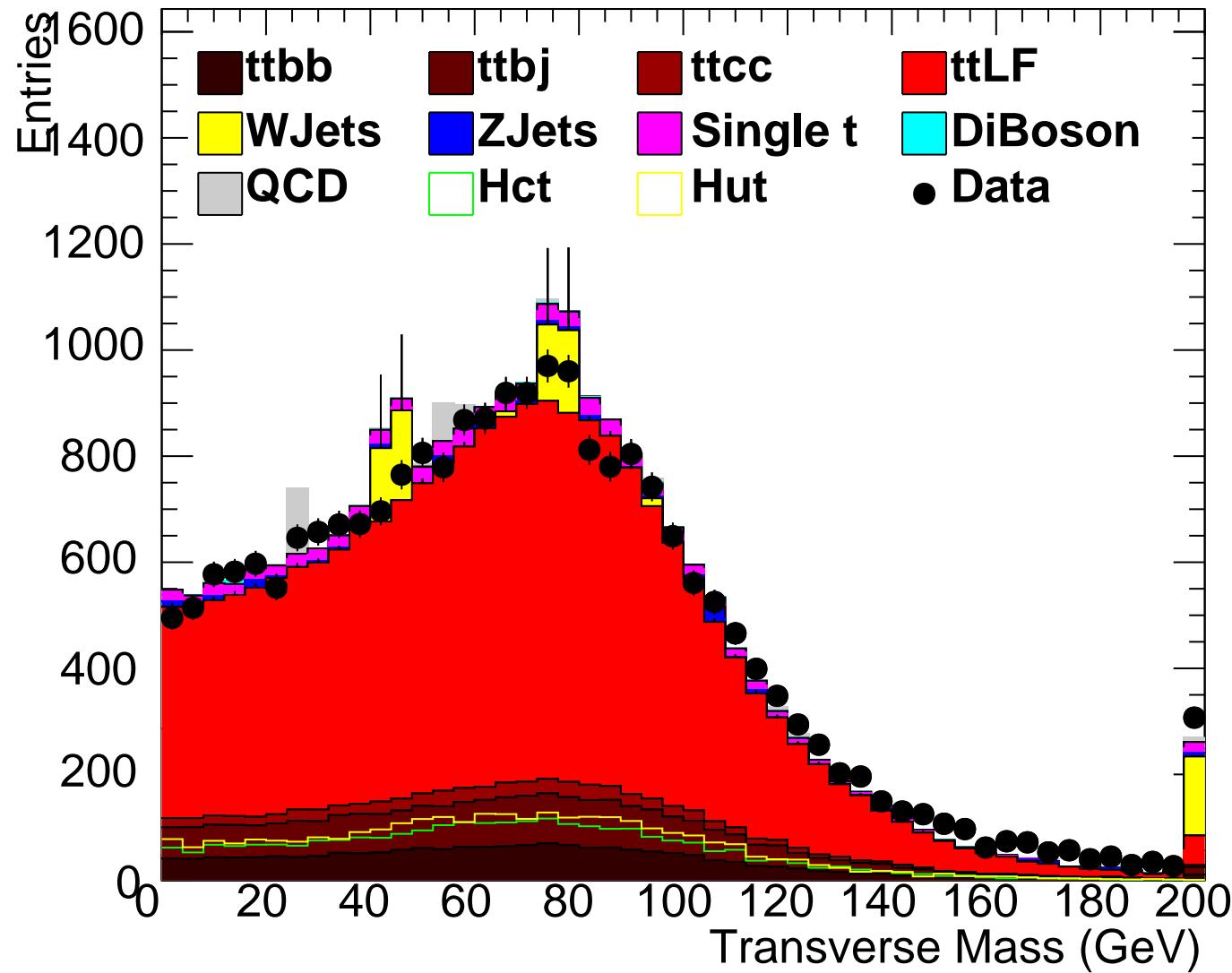


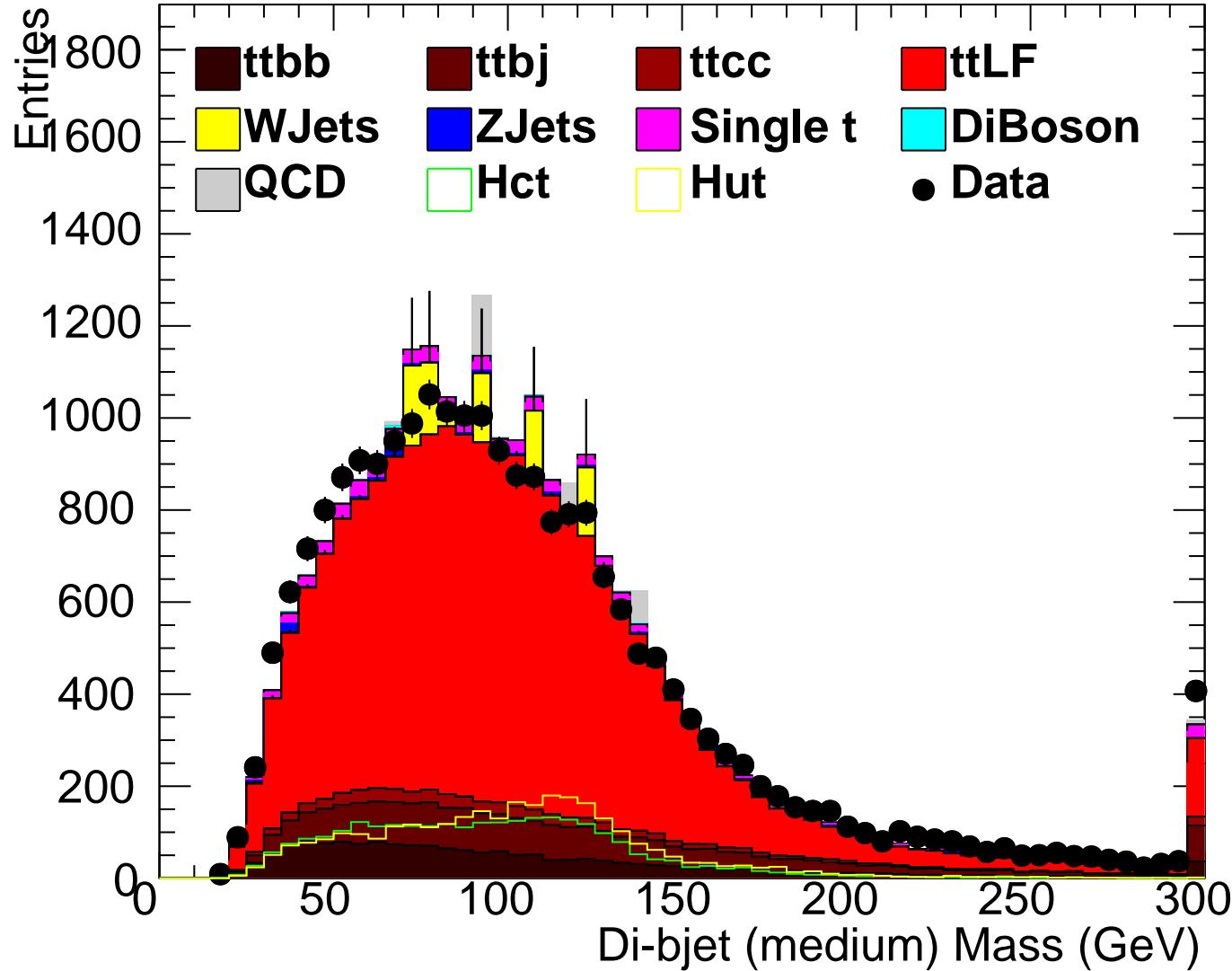
**Ch1\_S10**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

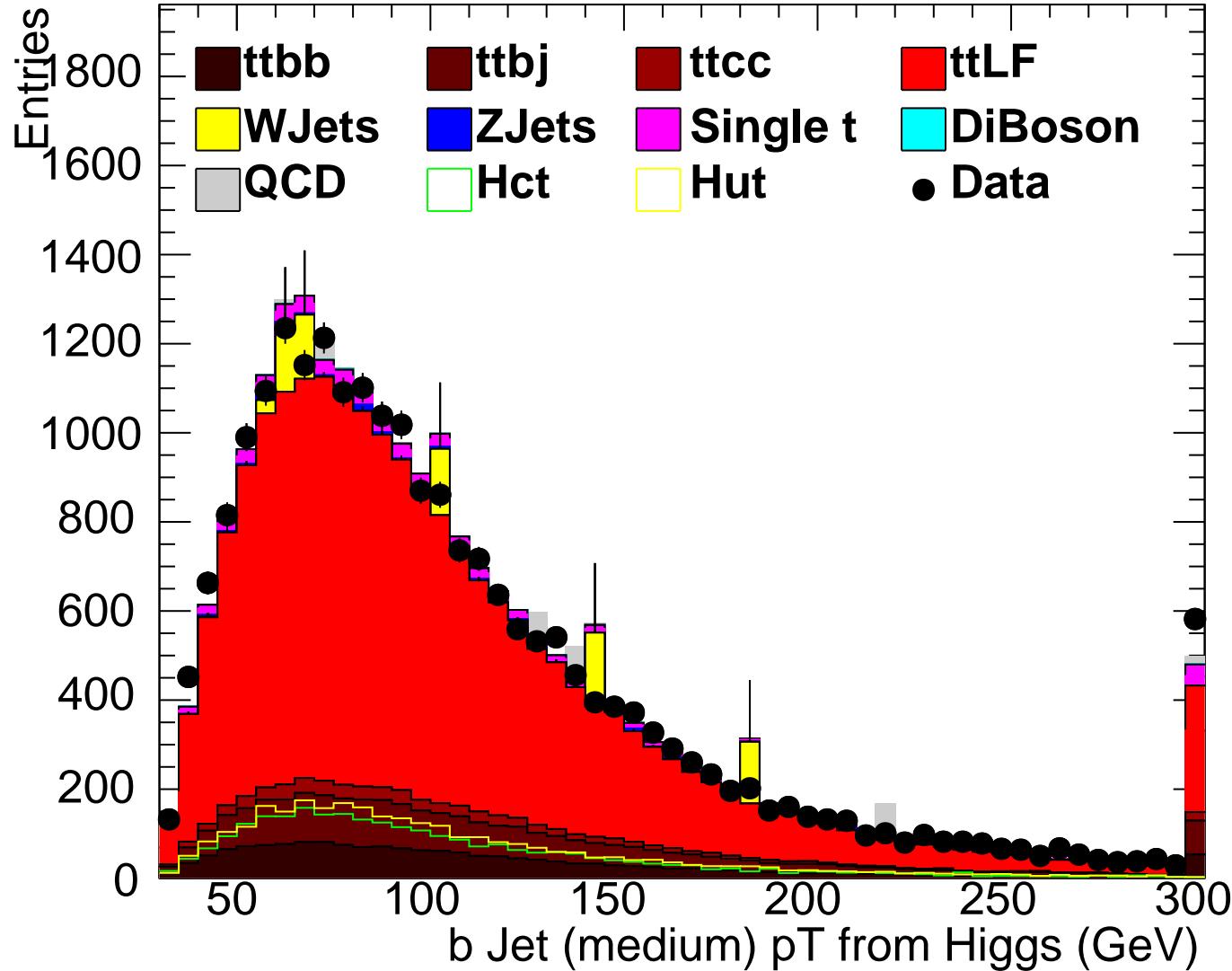


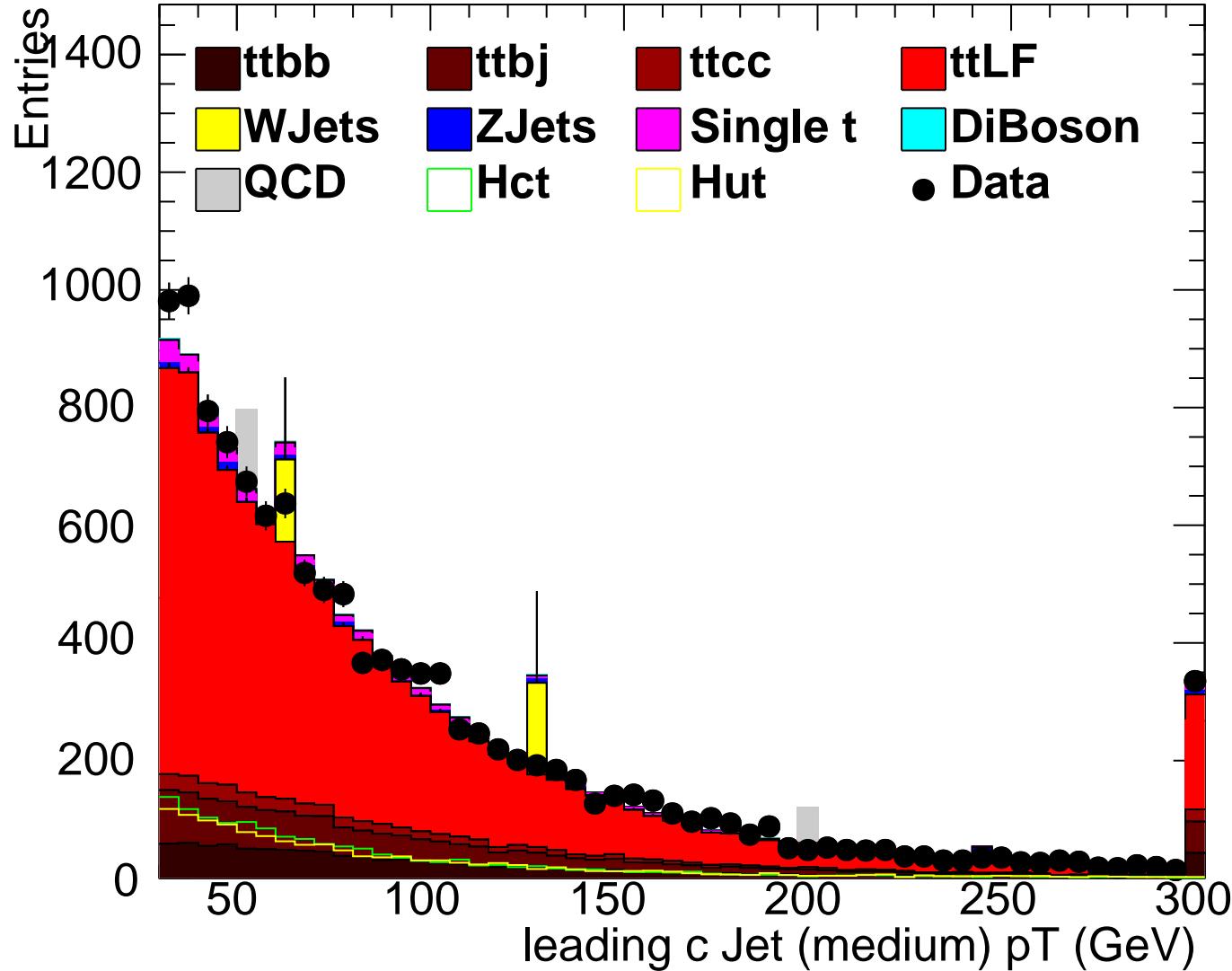


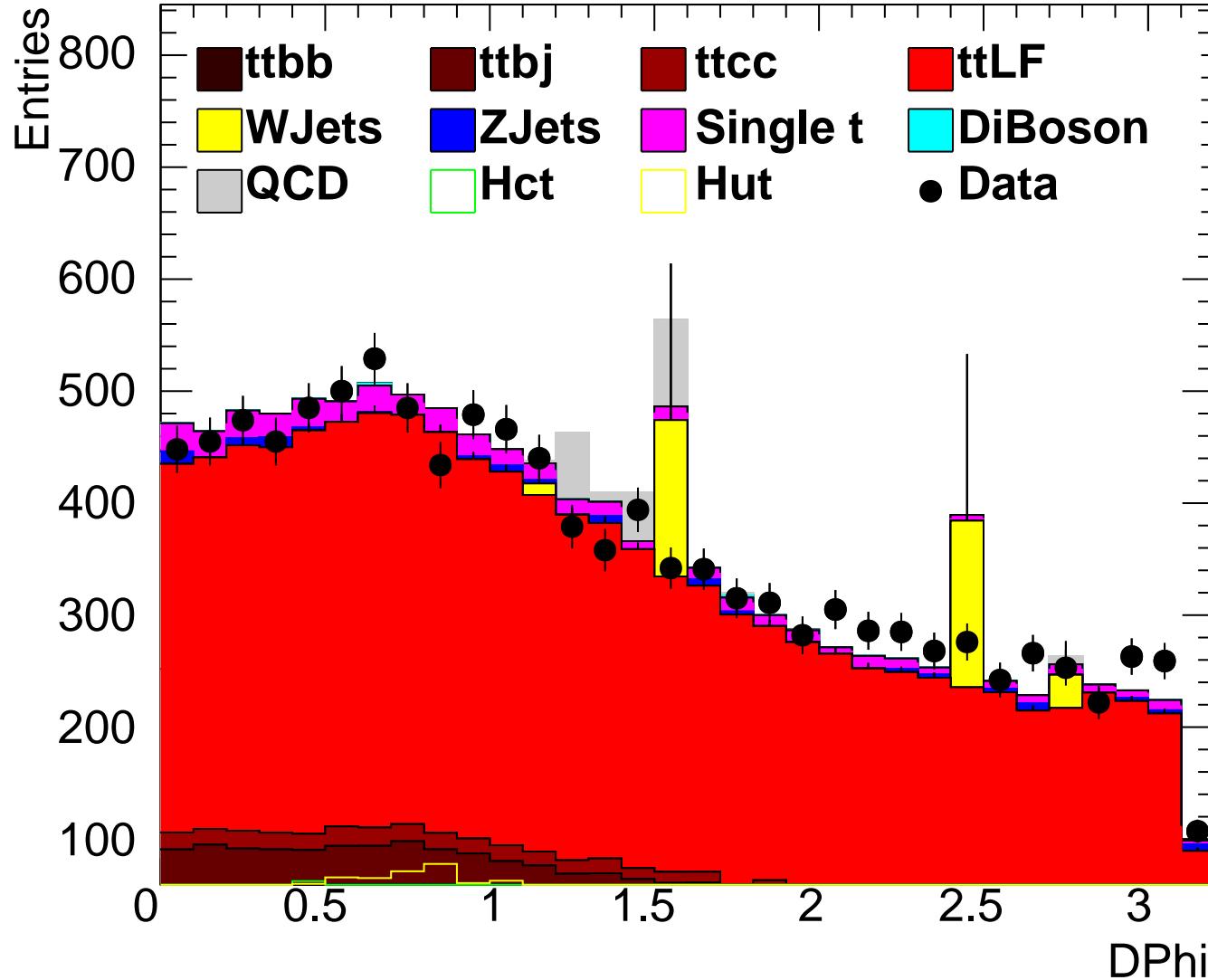
**Ch1\_S10**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

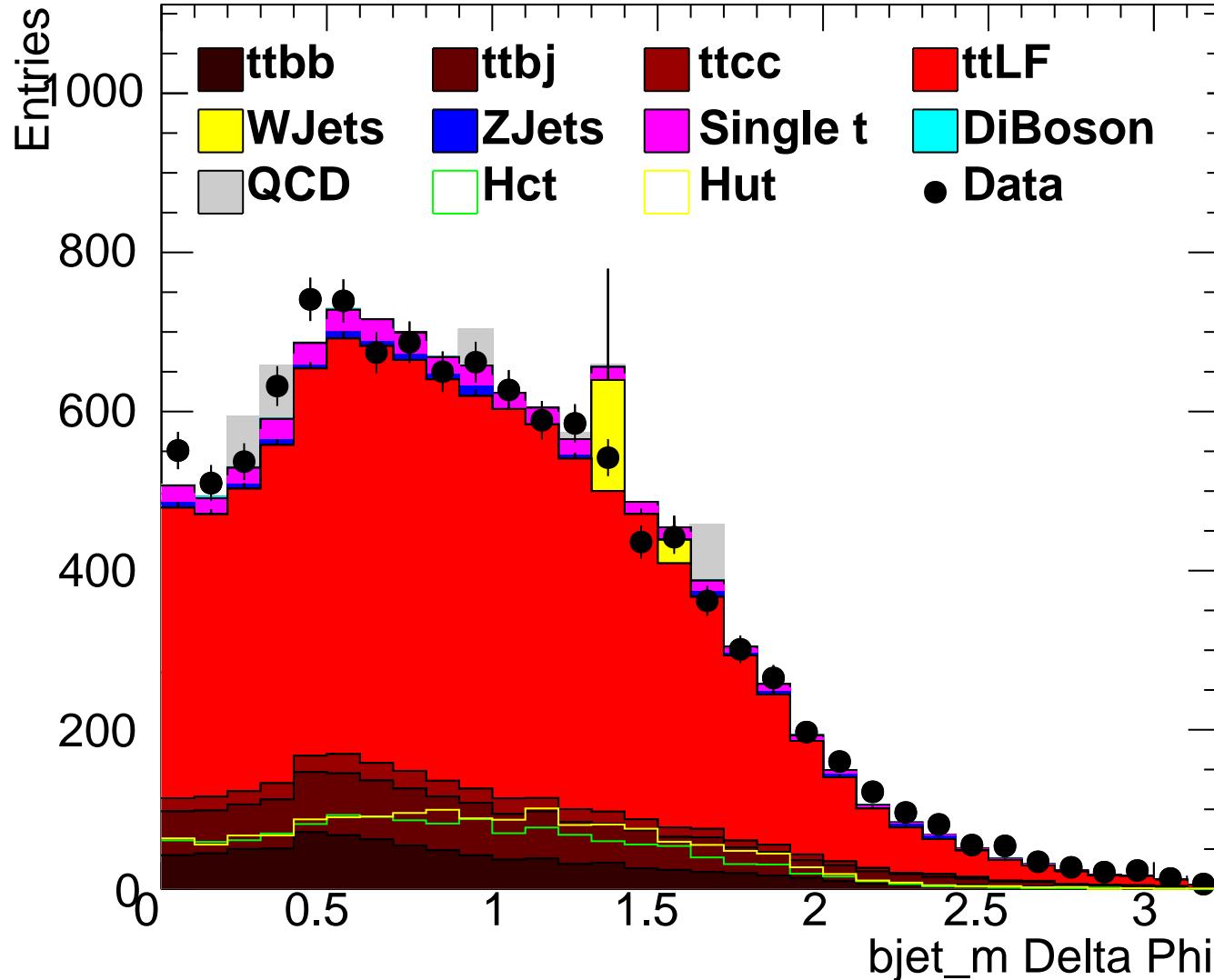


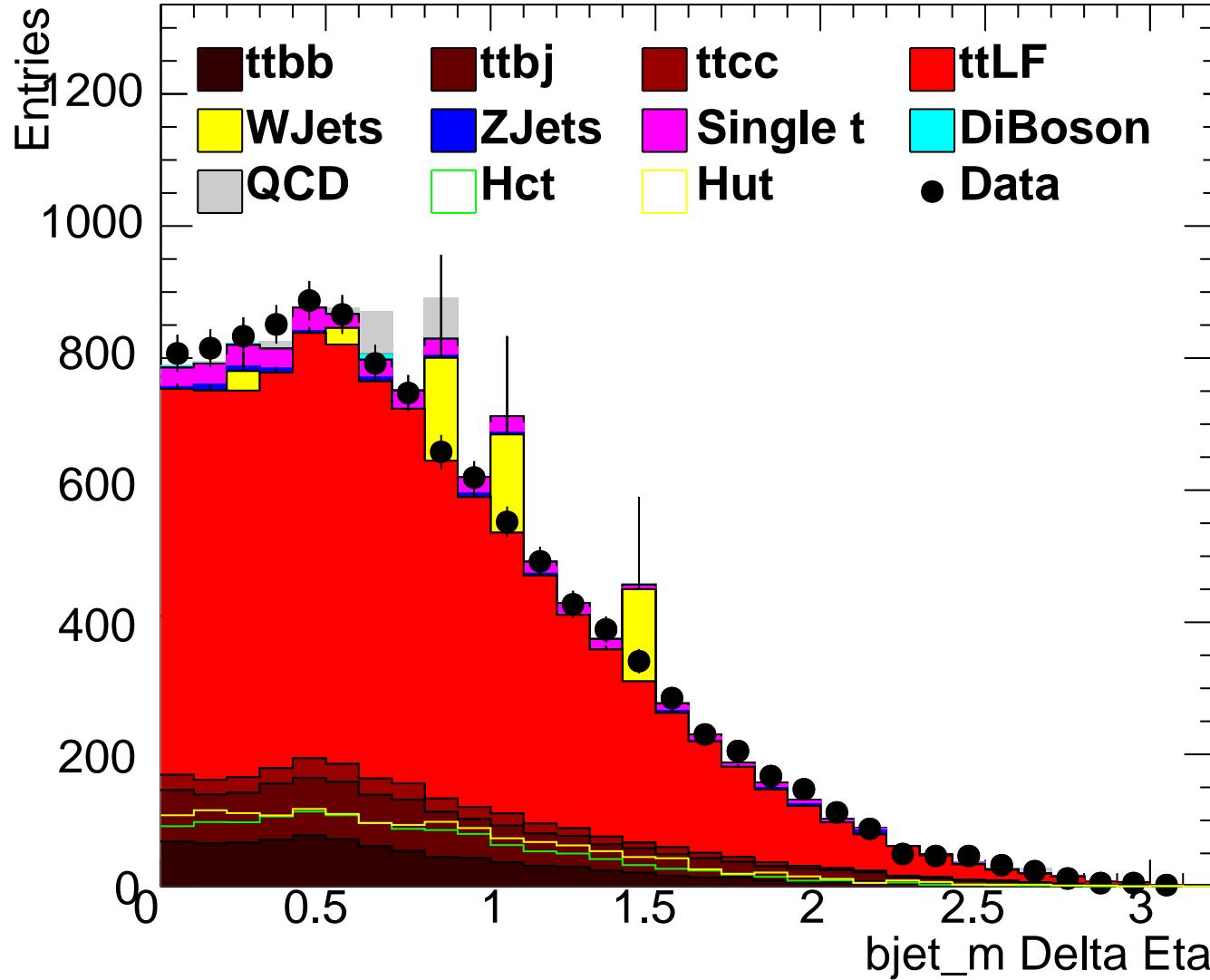
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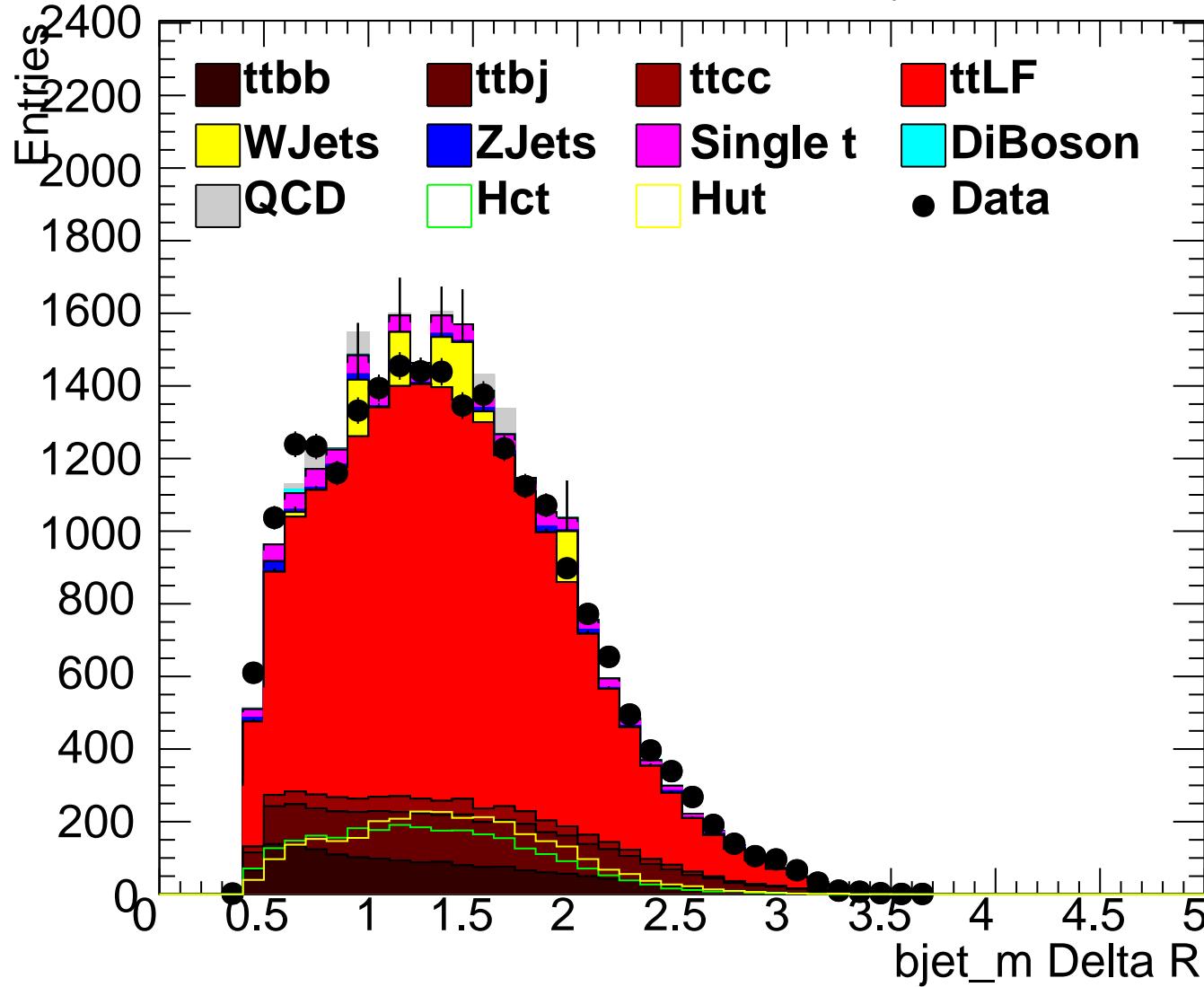


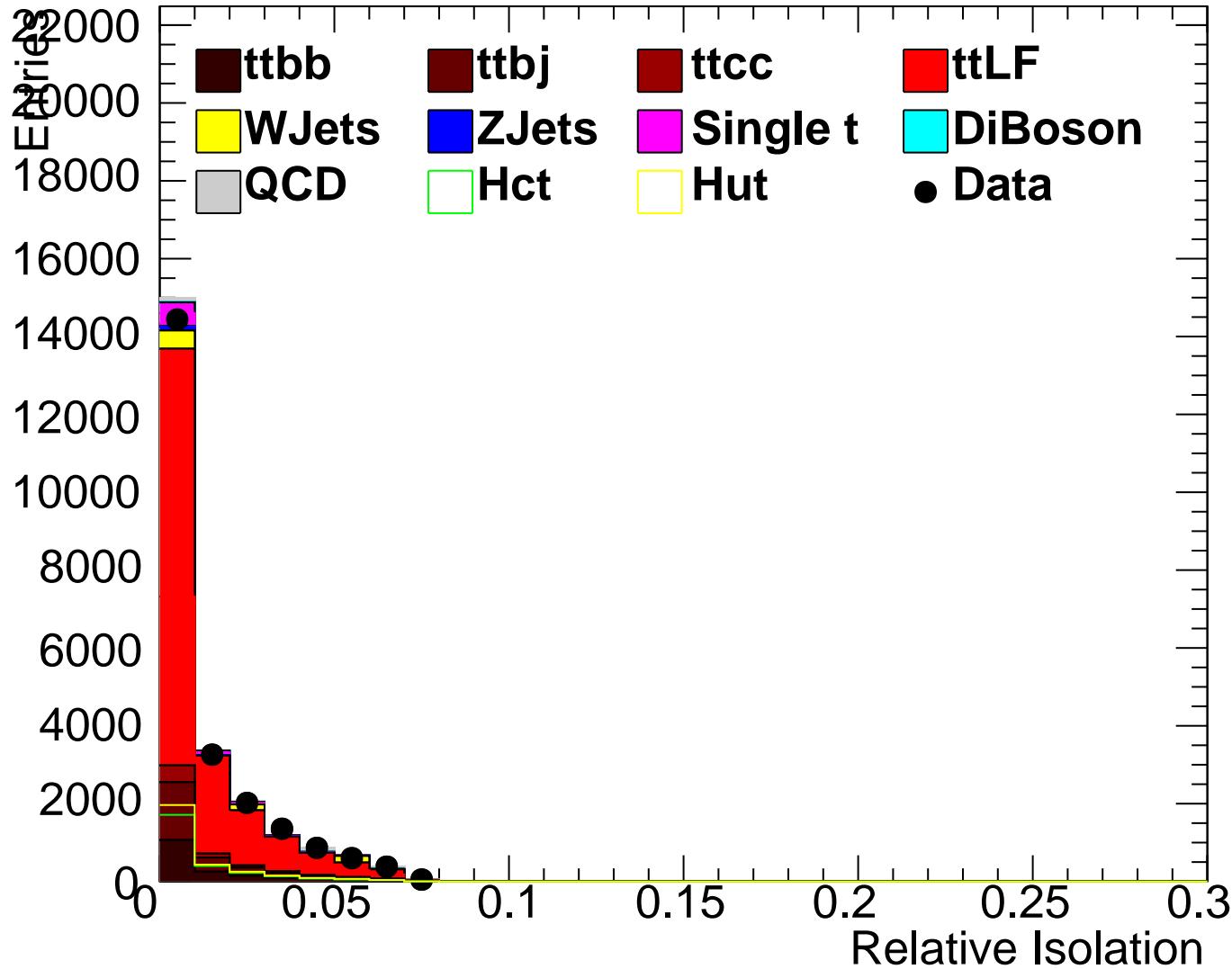
**Ch1\_S10**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

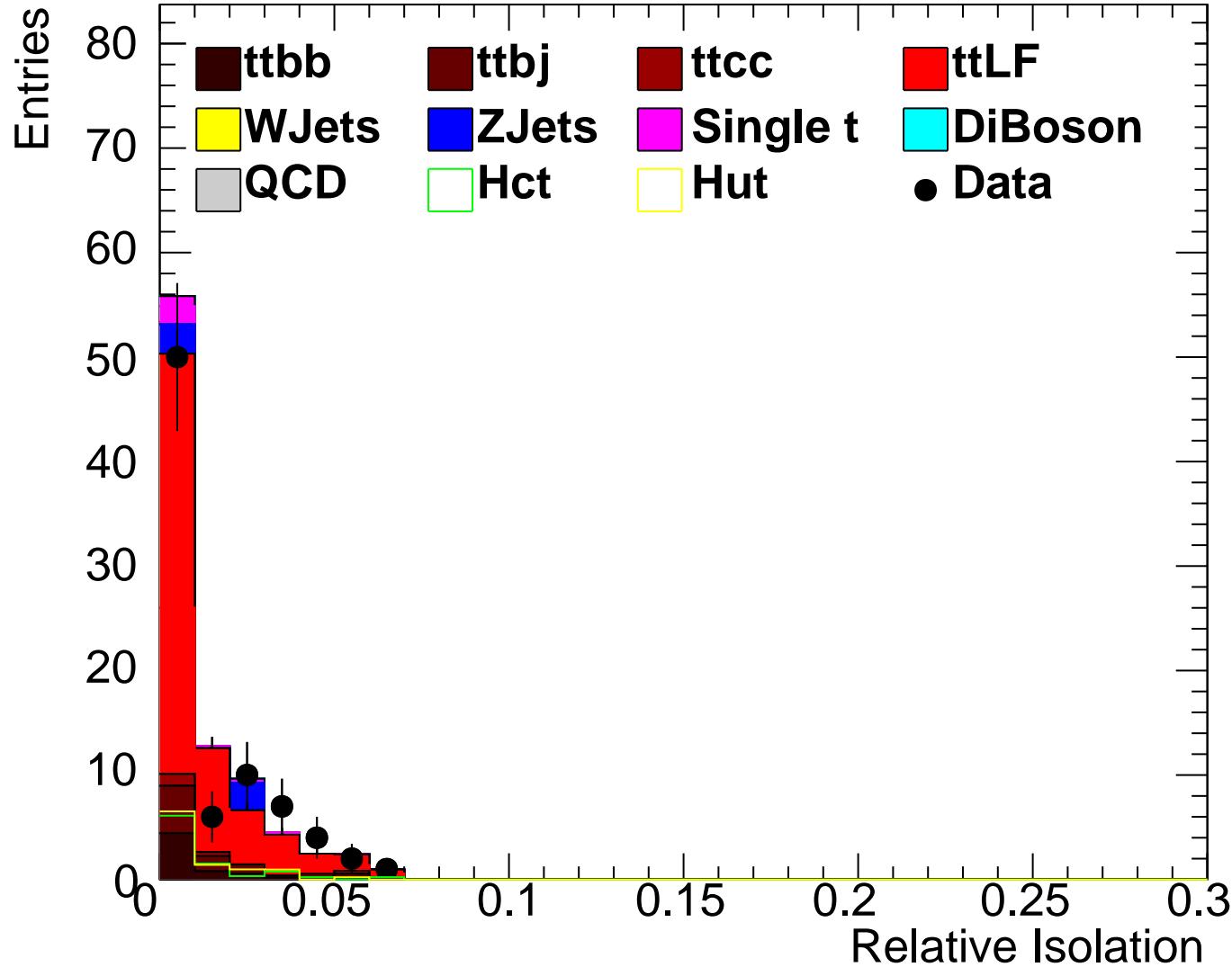
**Ch1\_S10**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

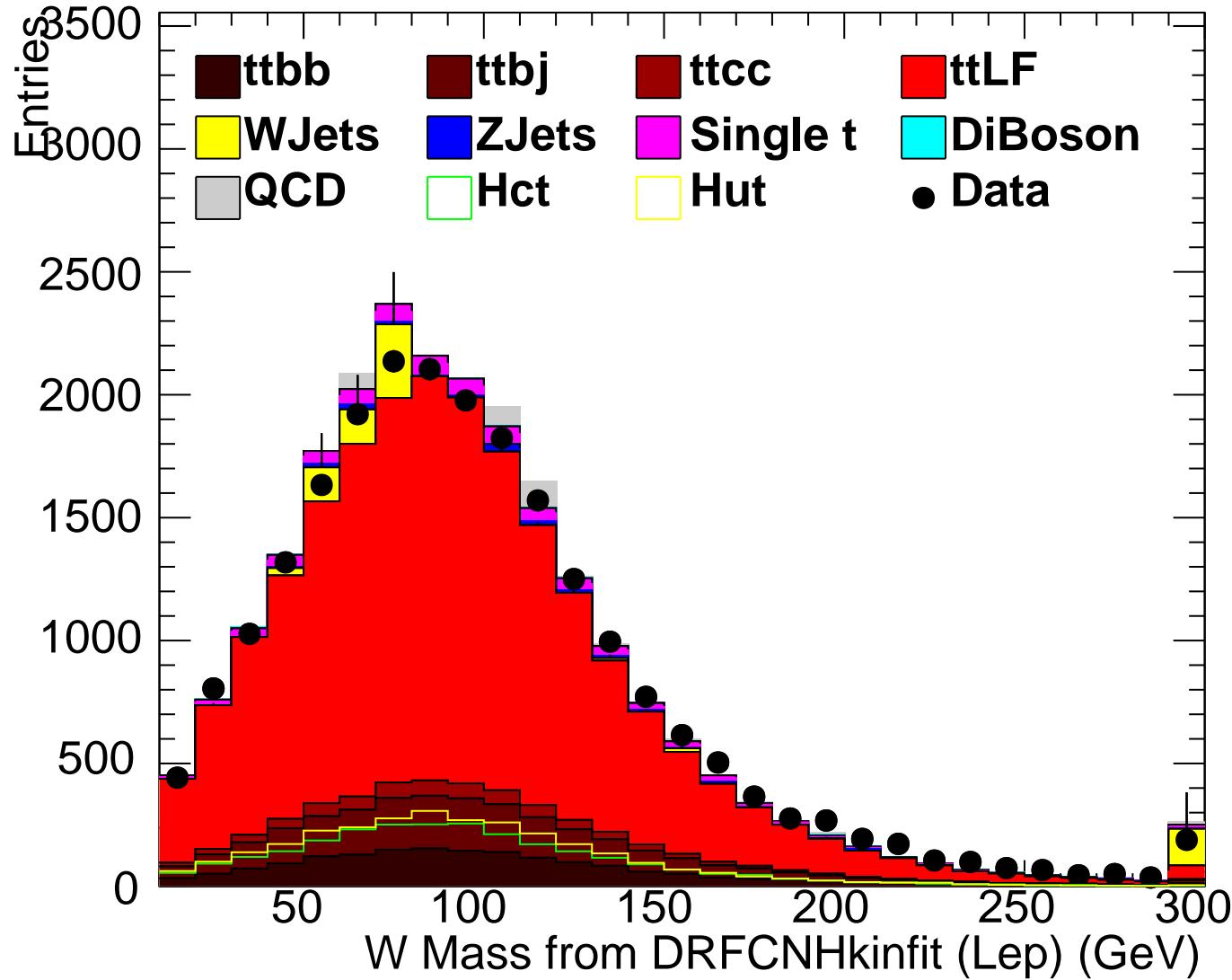
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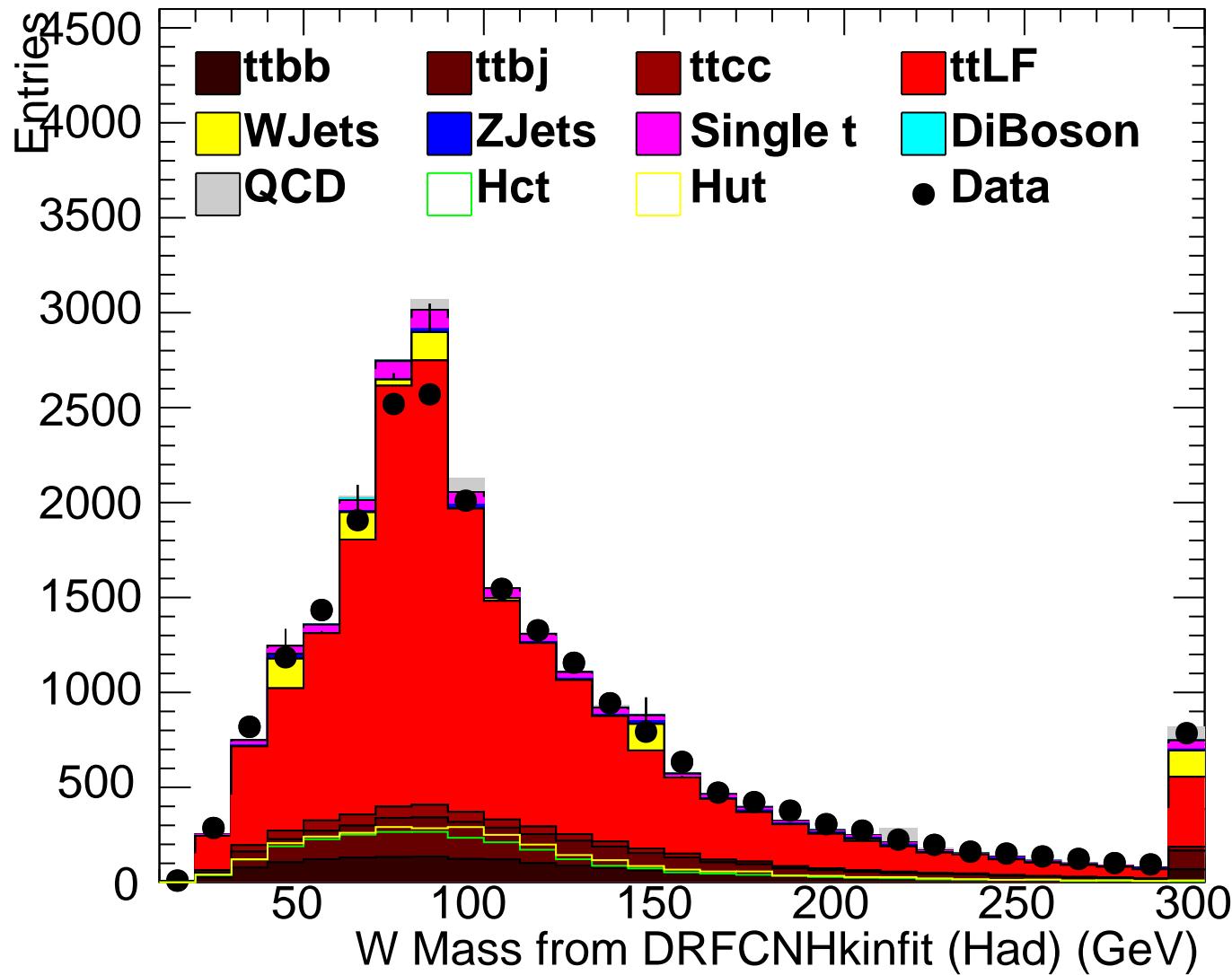
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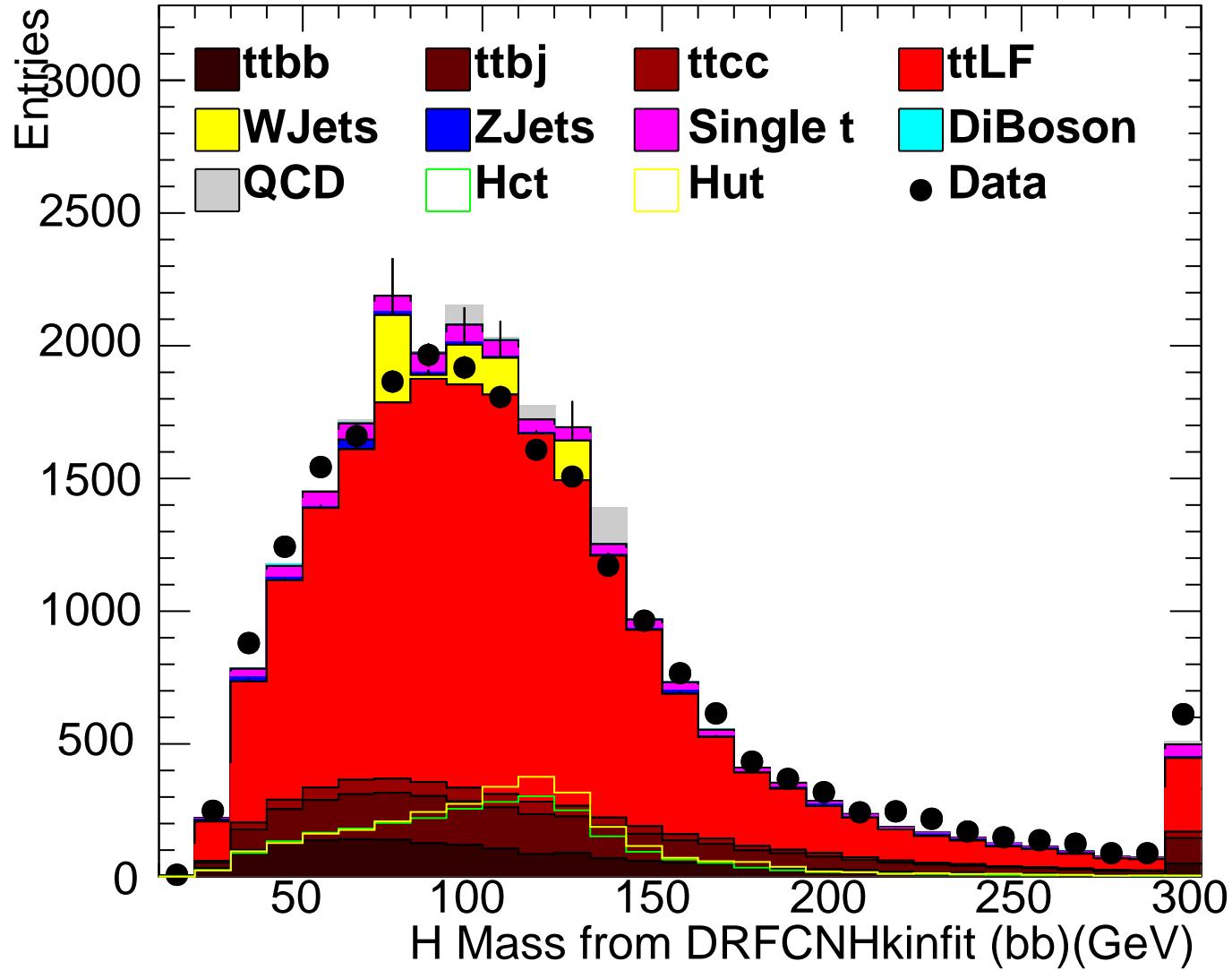
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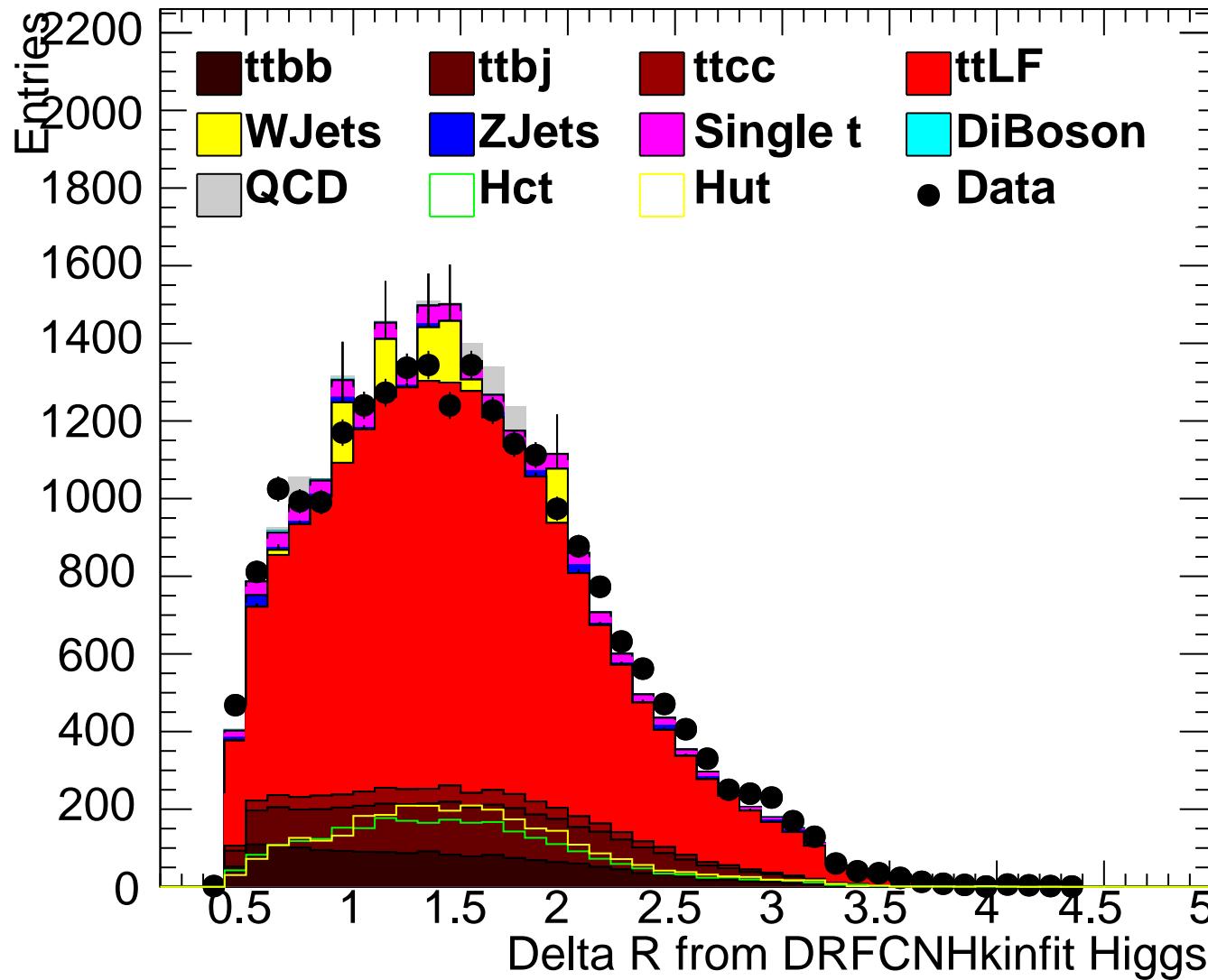


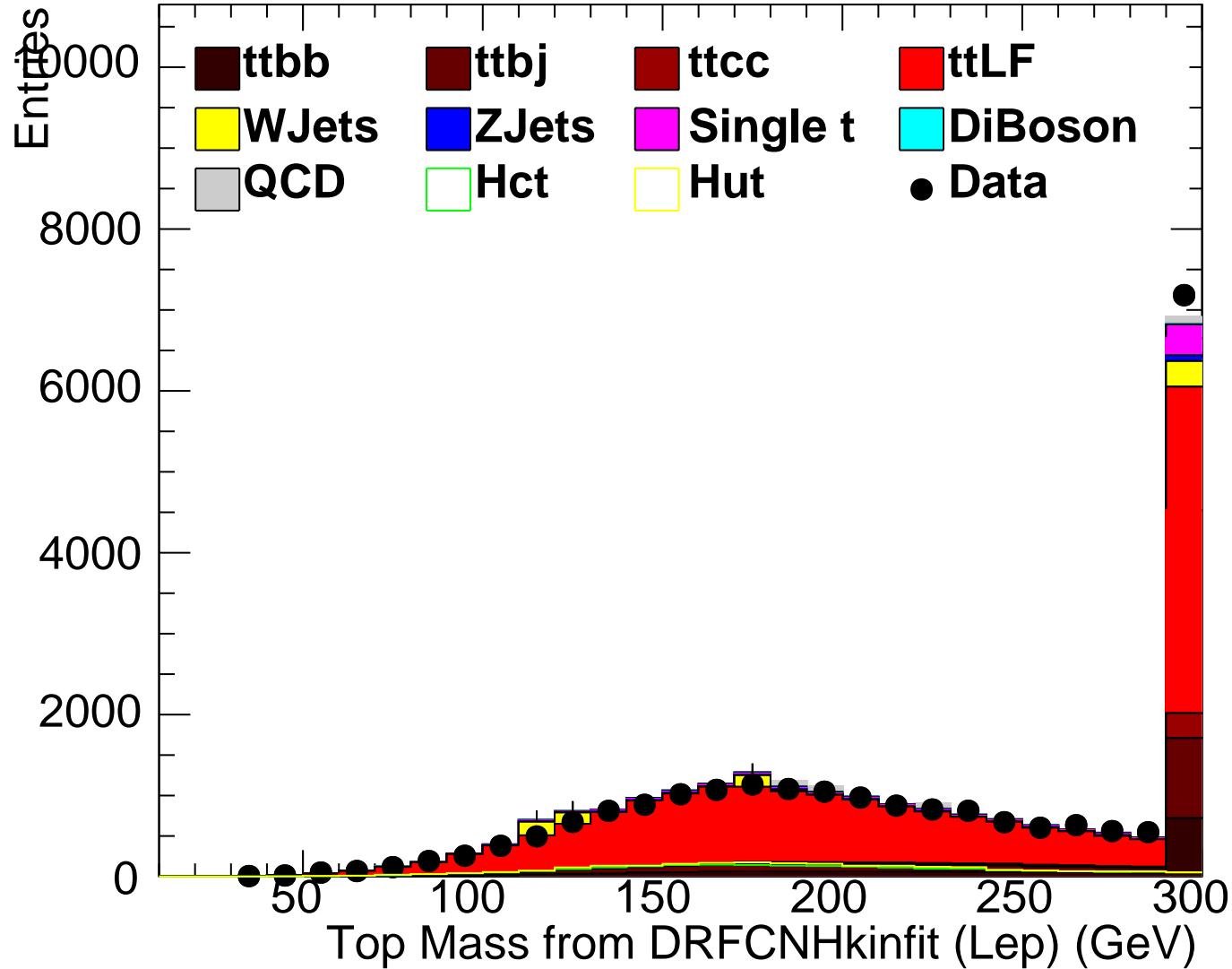


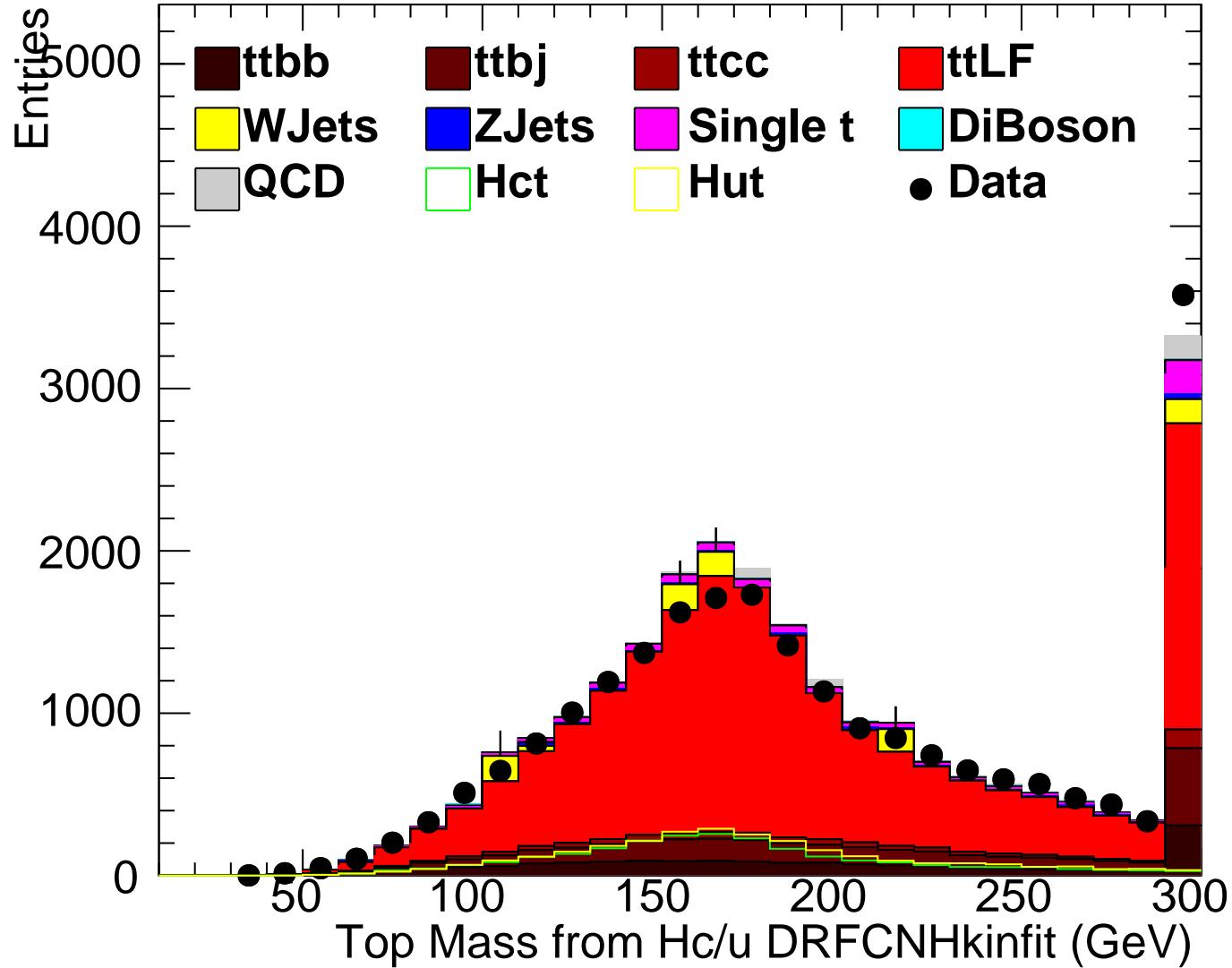
**Ch1\_S10**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch1\_S10**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch1\_S10**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

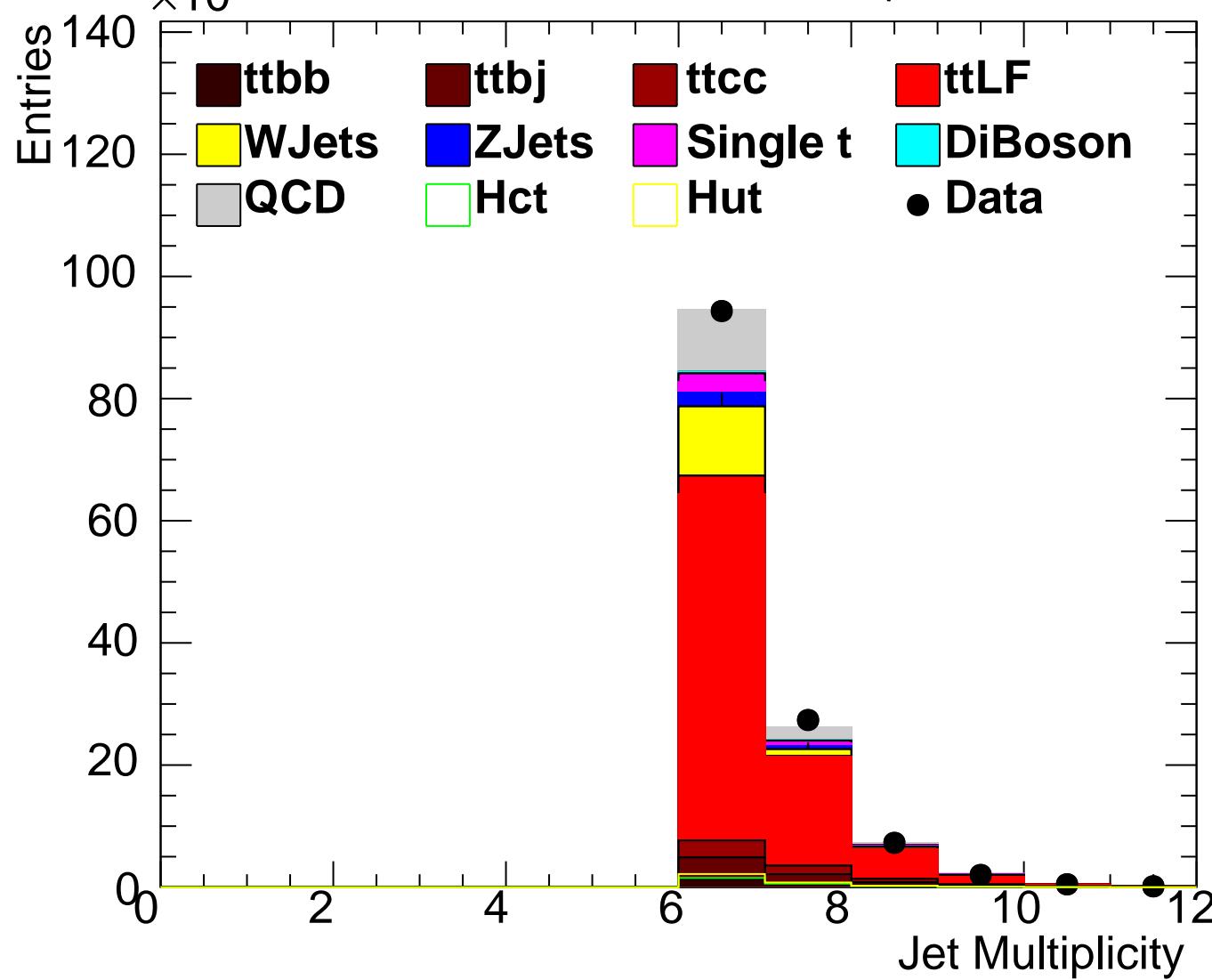


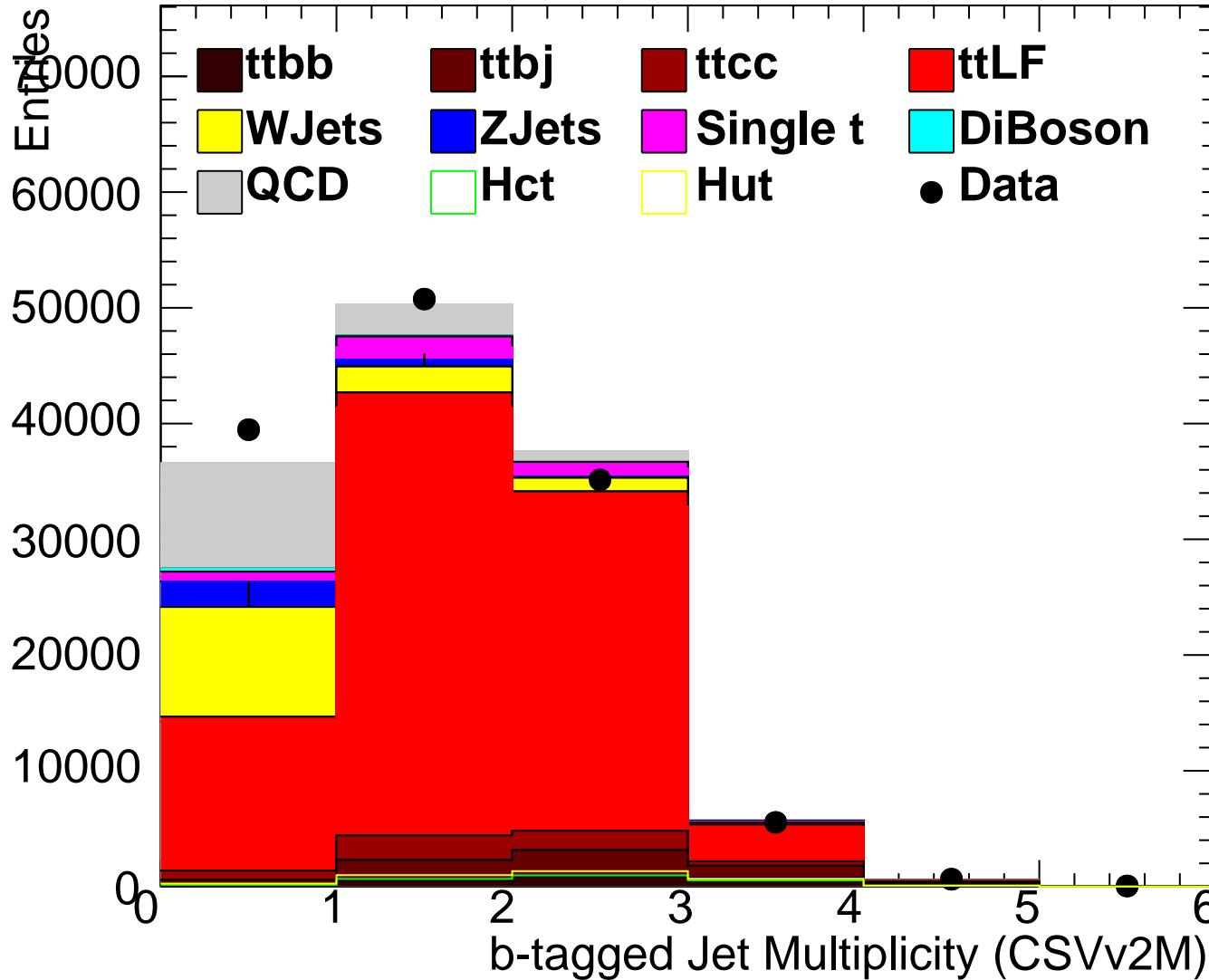
**Ch1\_S10**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

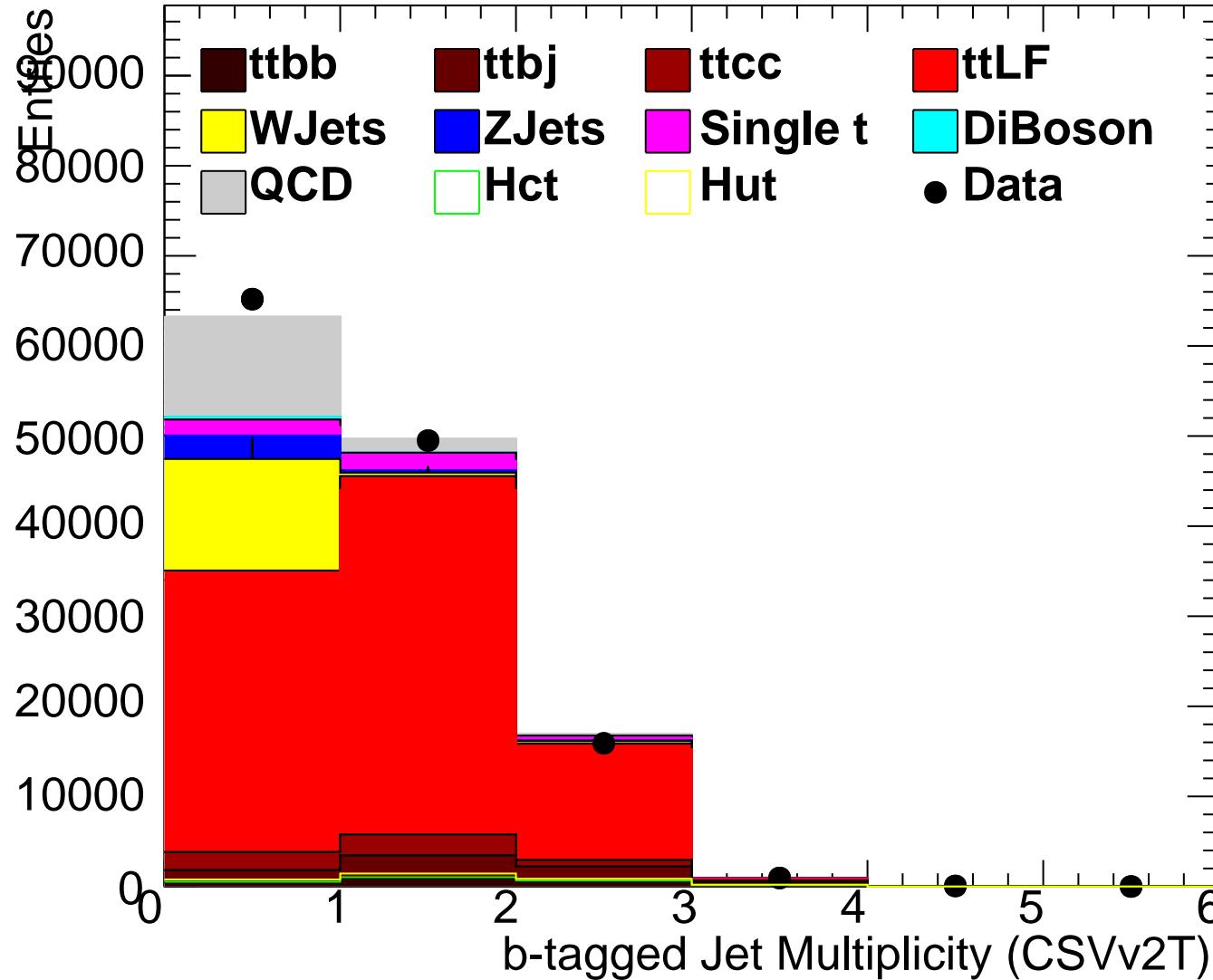
**Ch1\_S10**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

Ch1\_S11

CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$

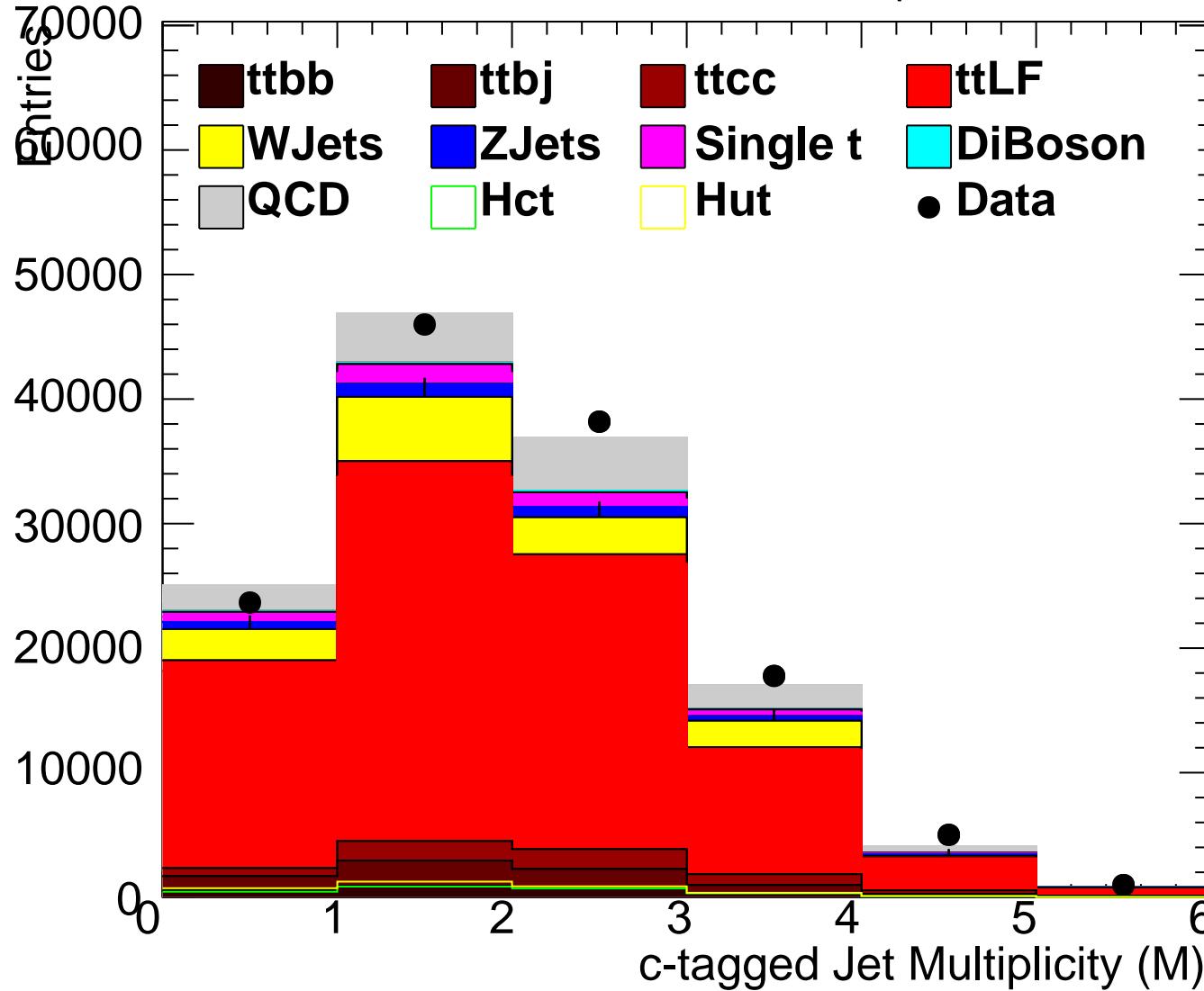


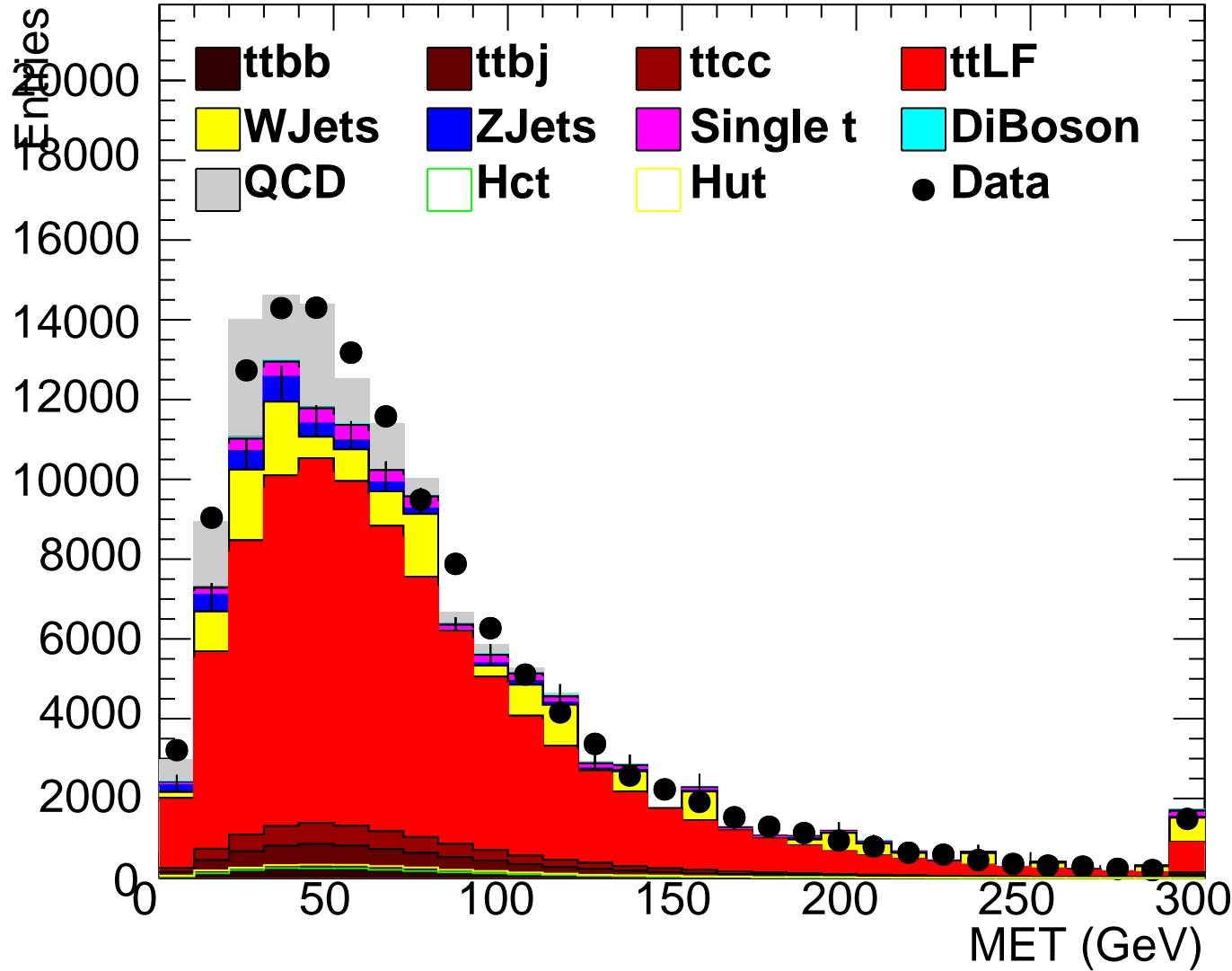


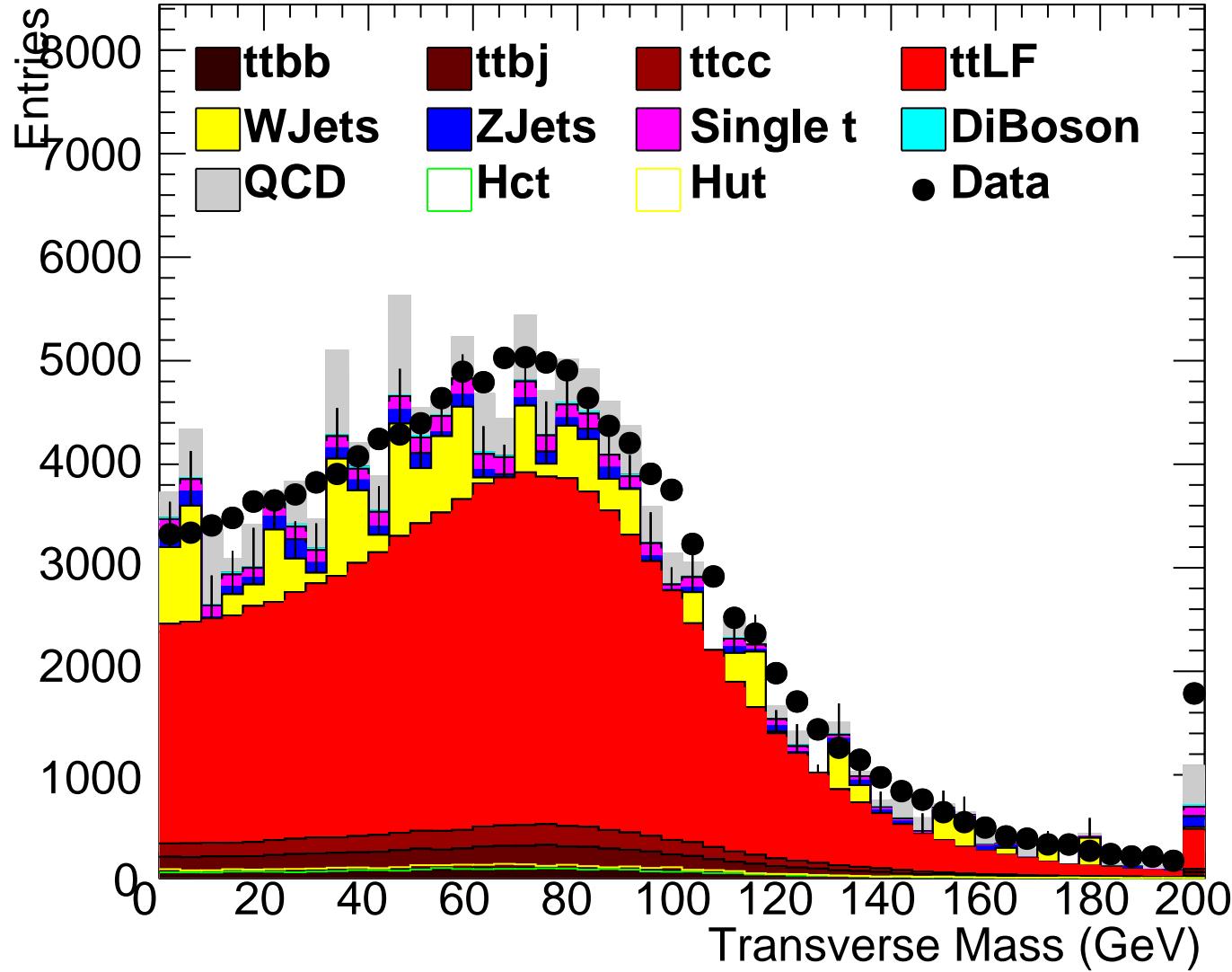


Ch1\_S11

CMS, 35.9 fb<sup>-1</sup> at  $\sqrt{s} = 13$  TeV

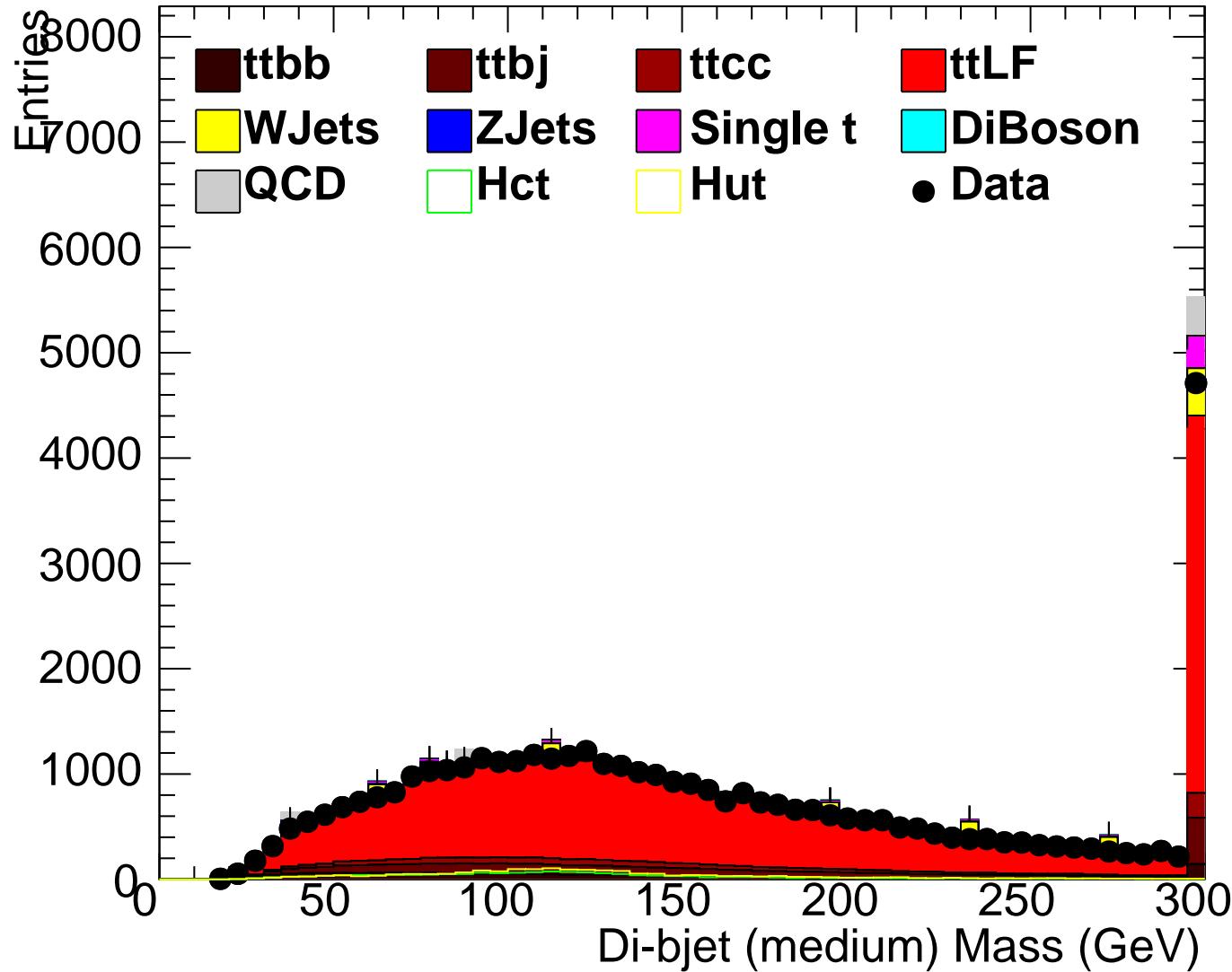


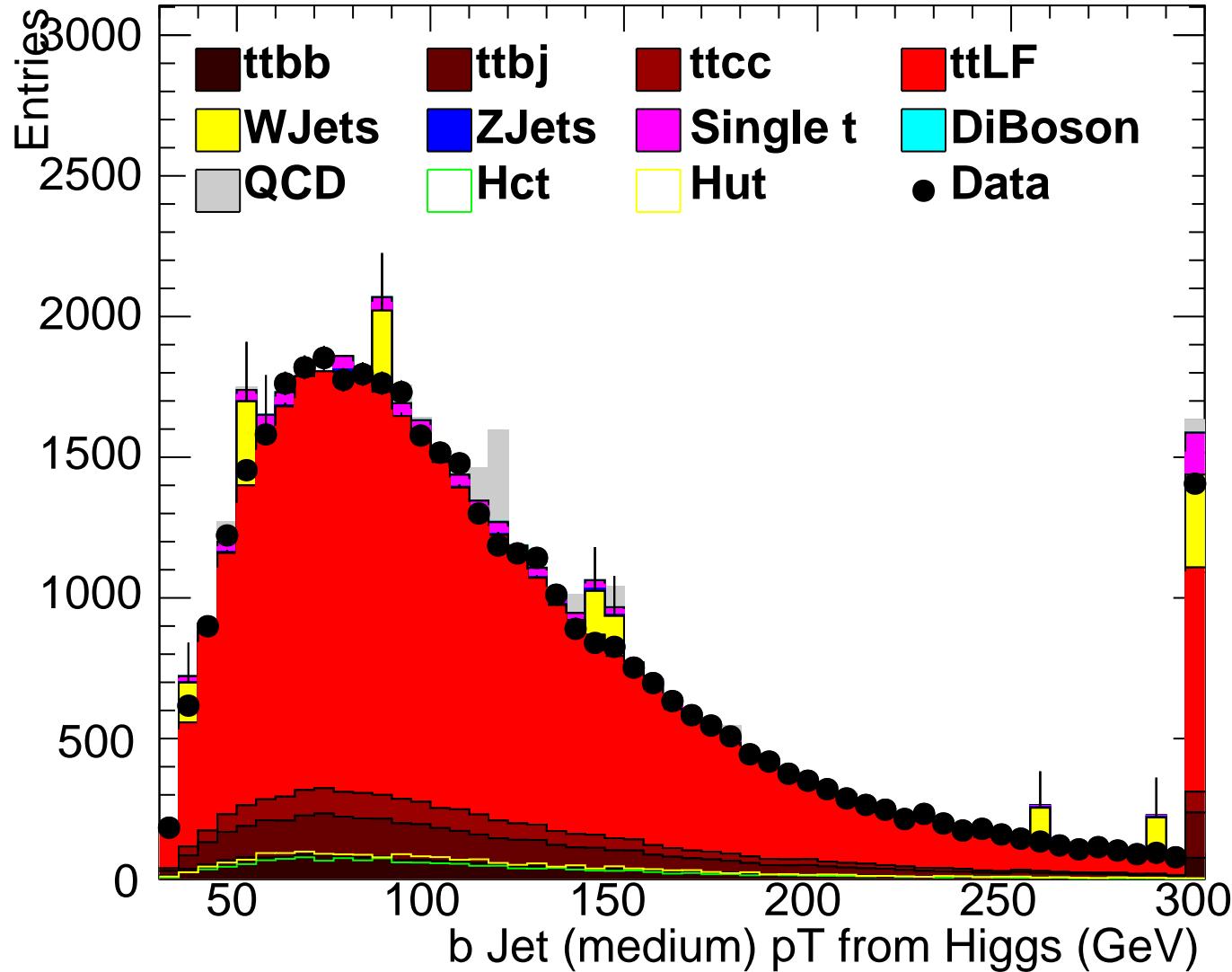
**Ch1\_S11**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

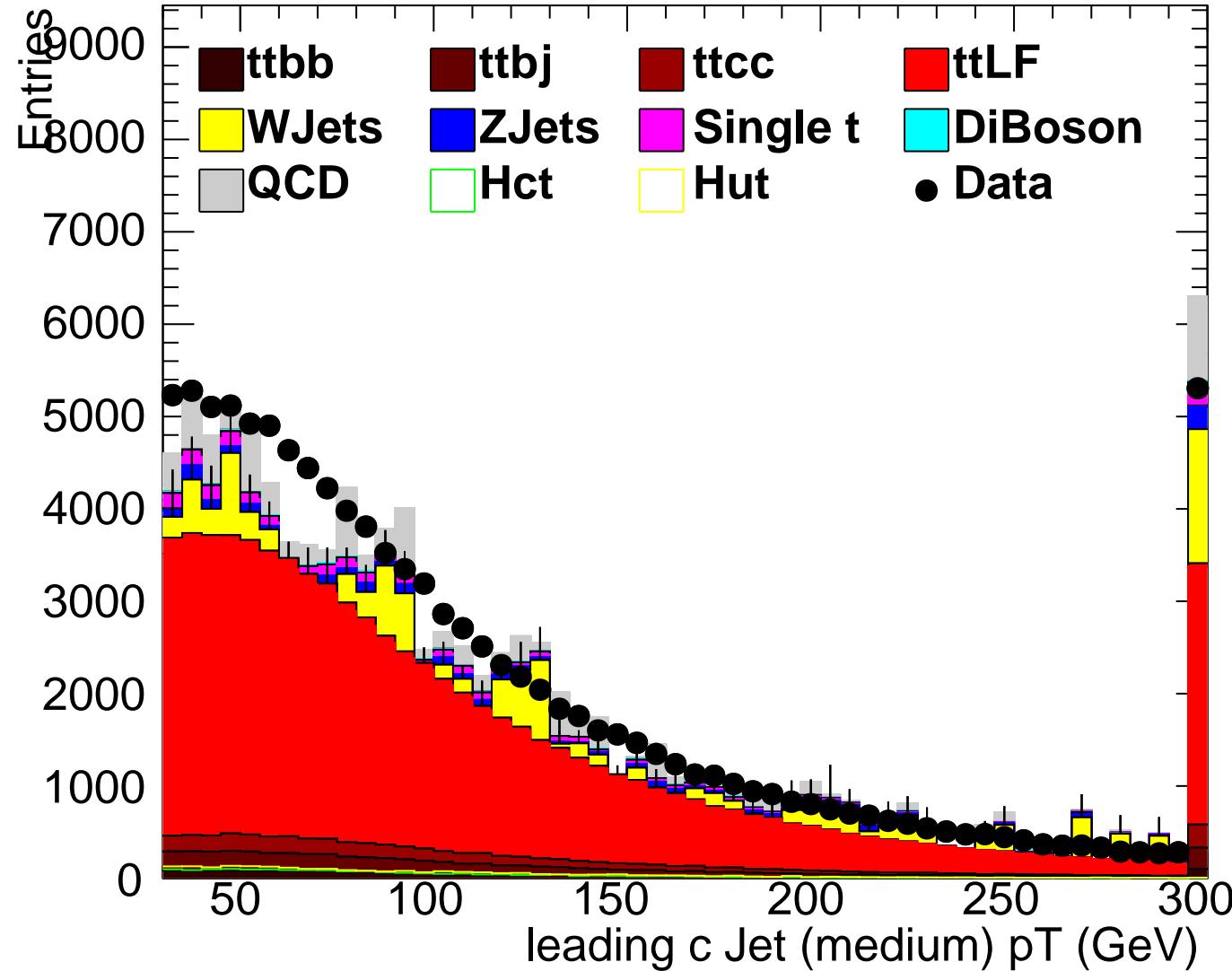
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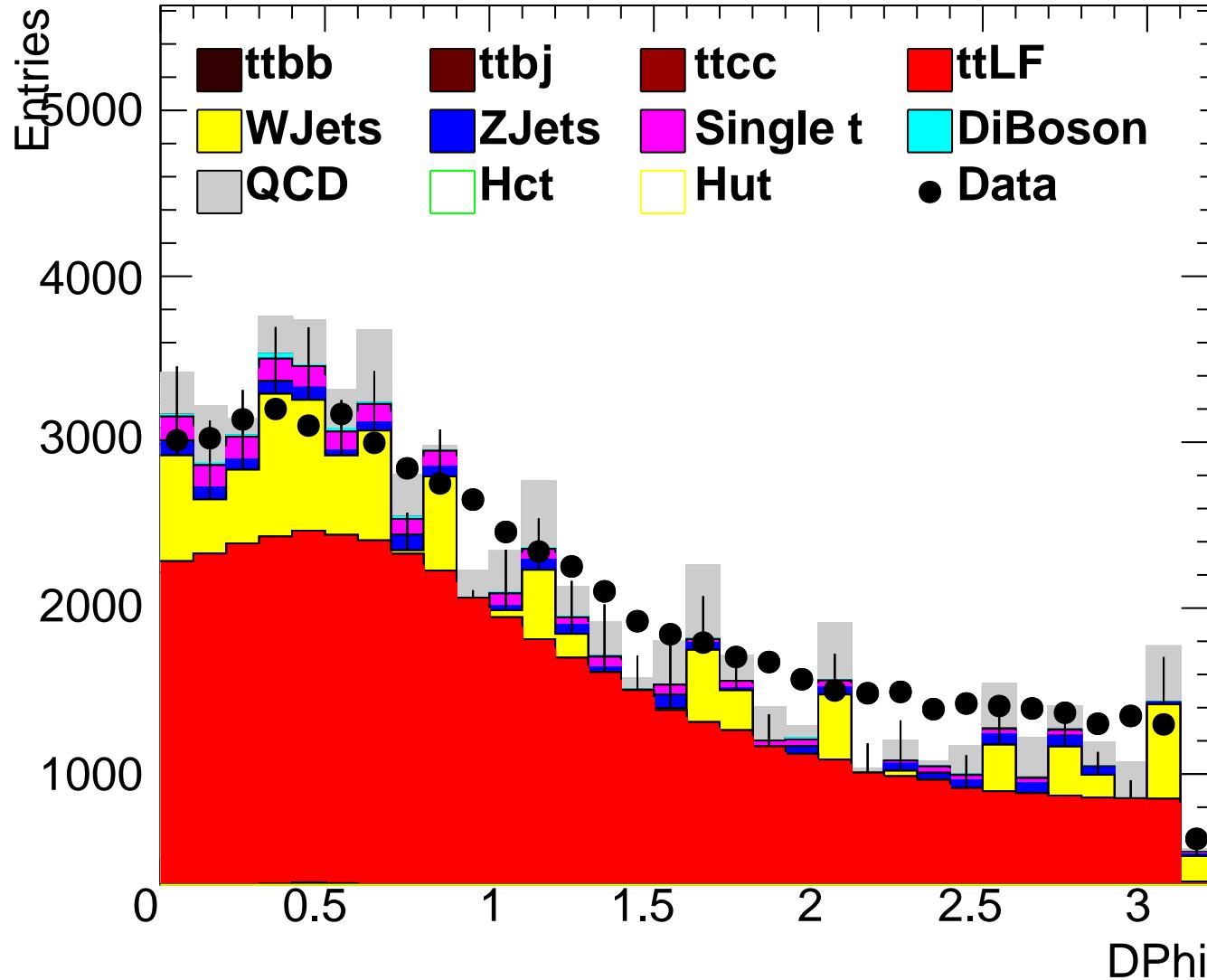
Ch1\_S11

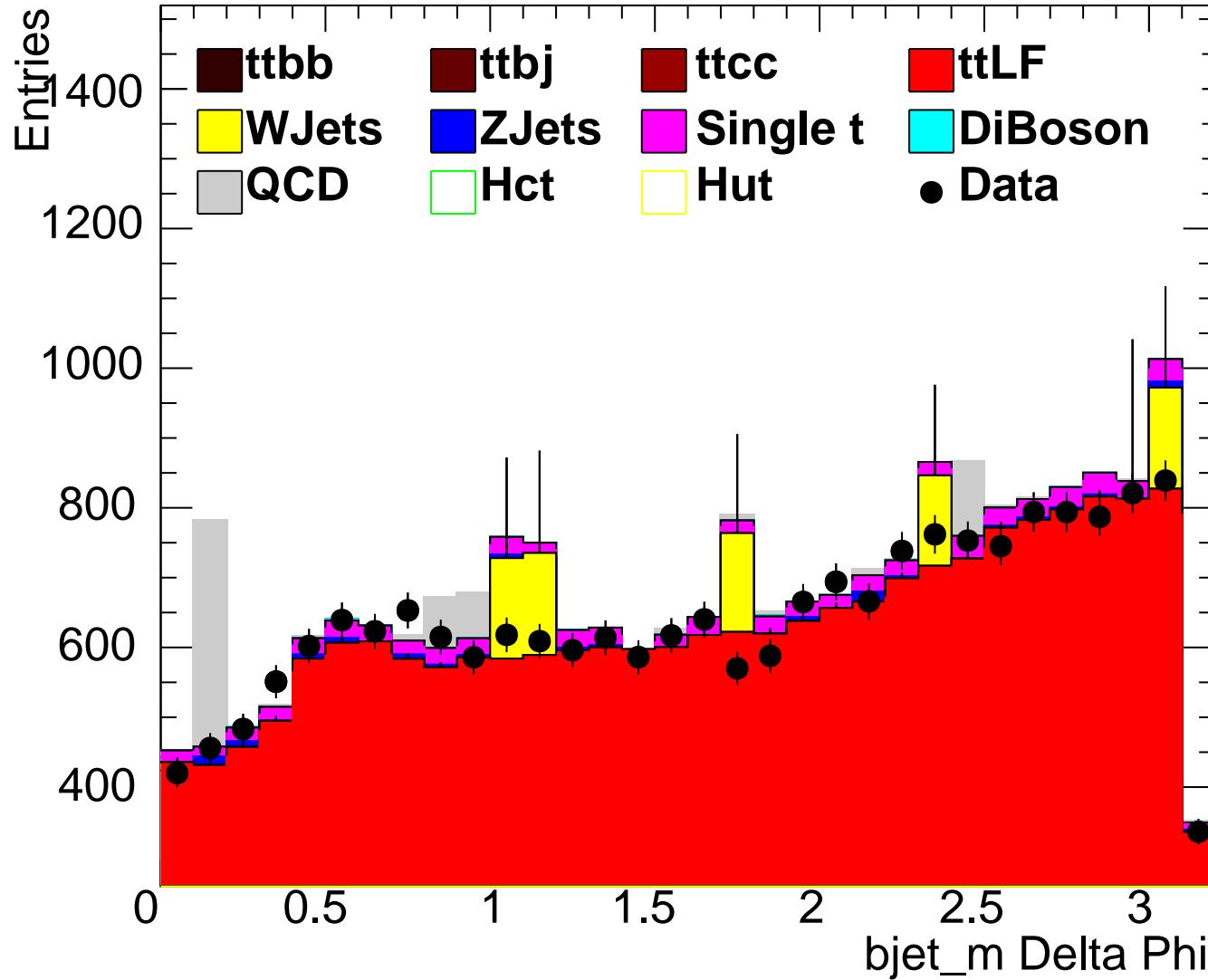
CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$

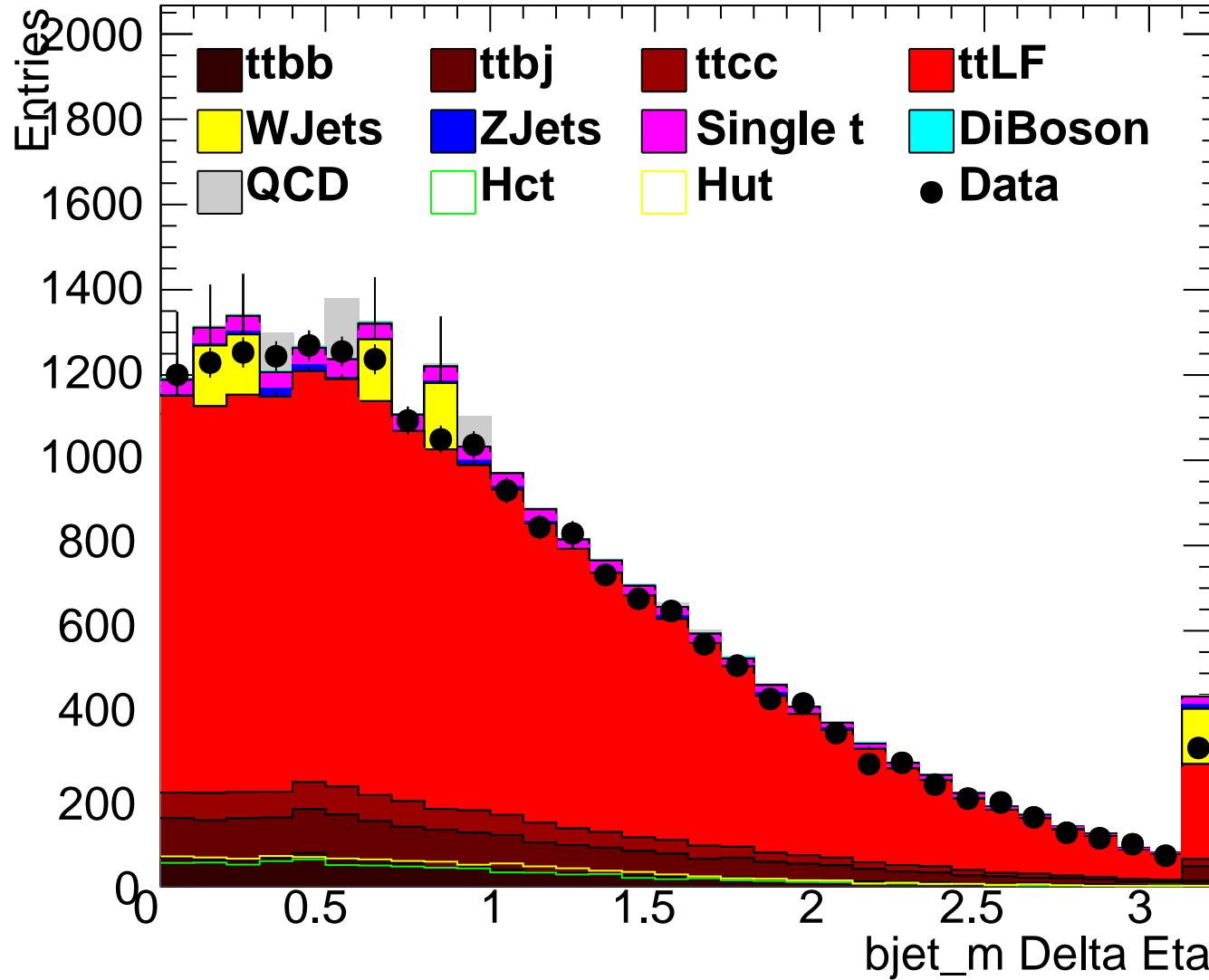


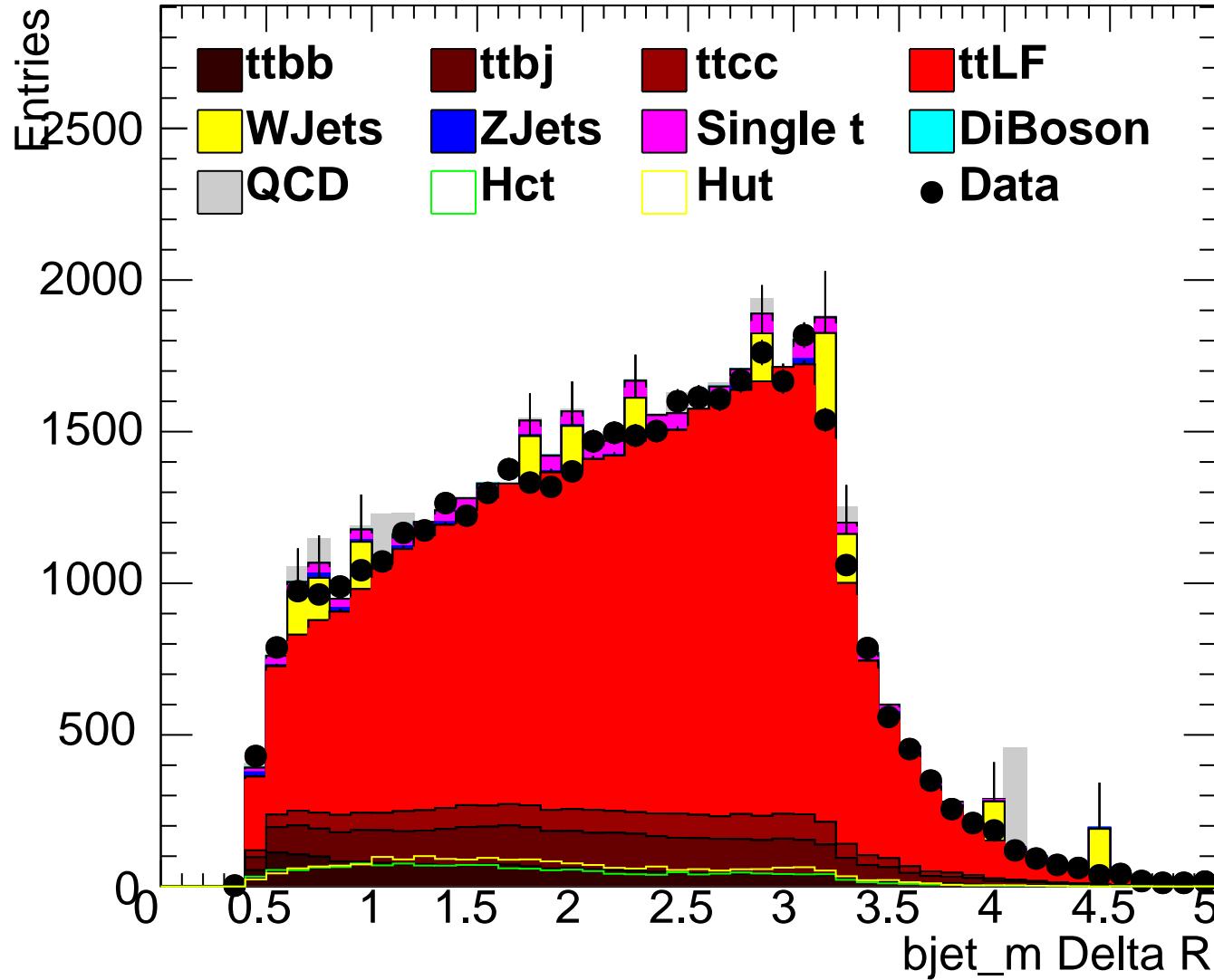
**Ch1\_S11**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch1\_S11**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 



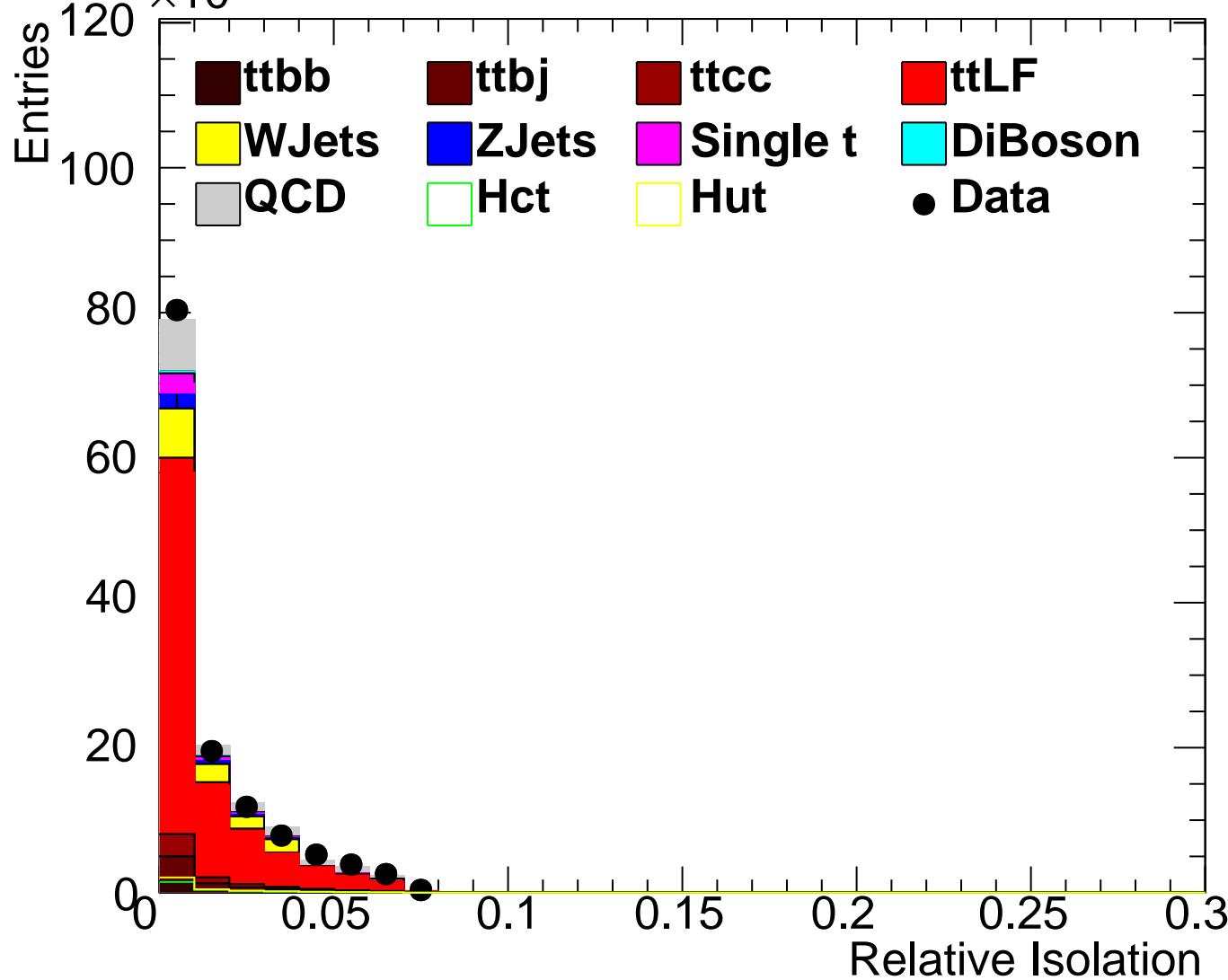


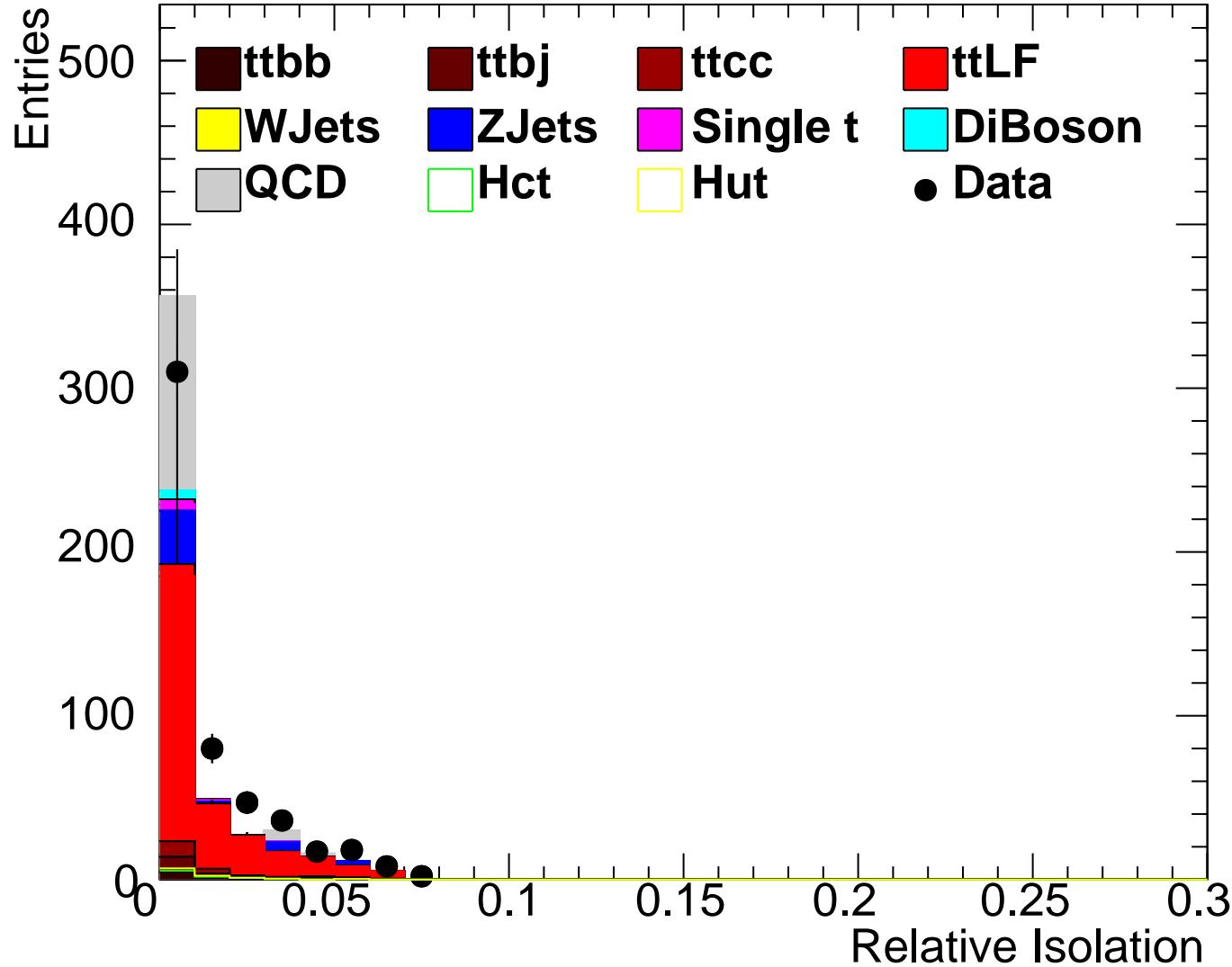


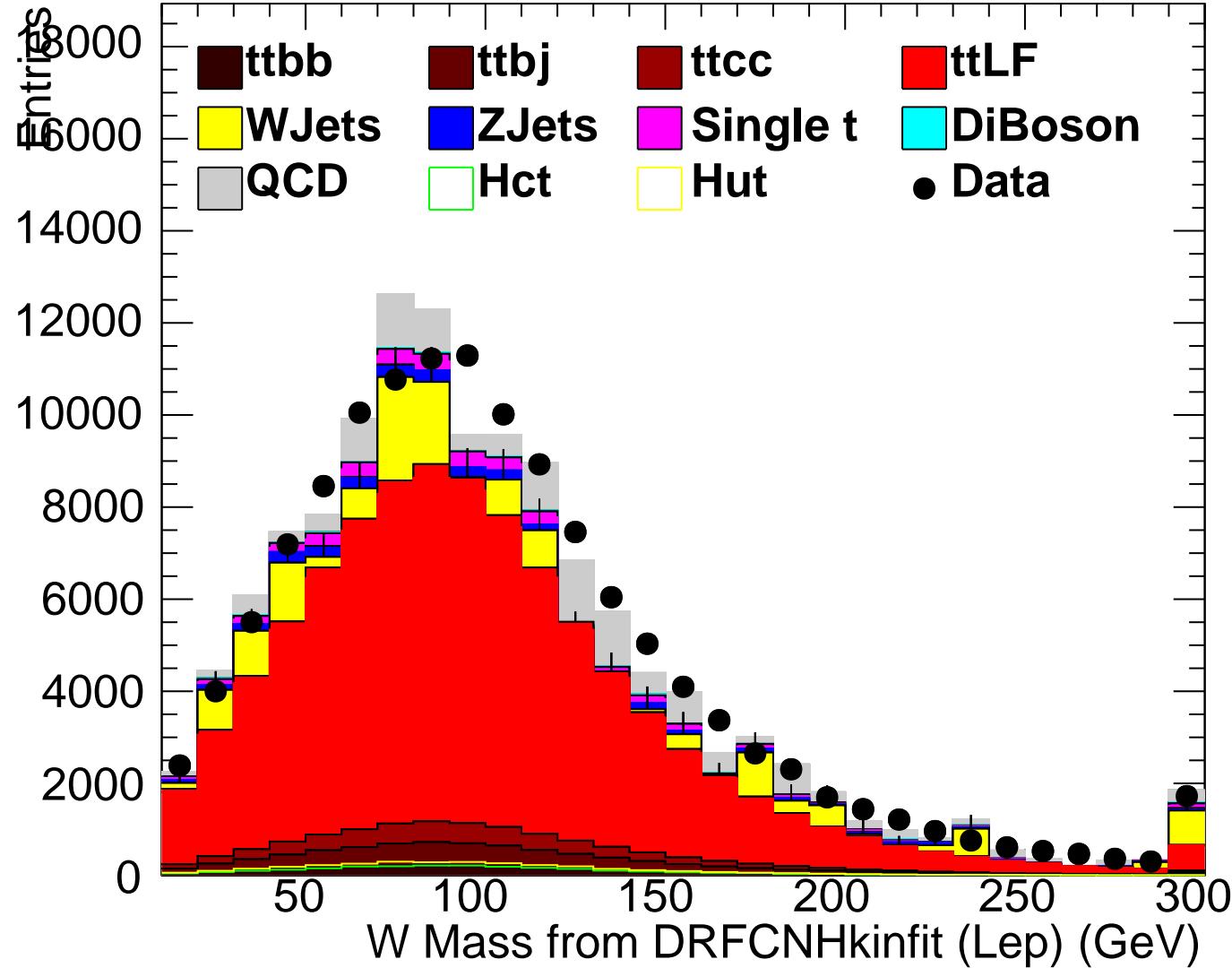


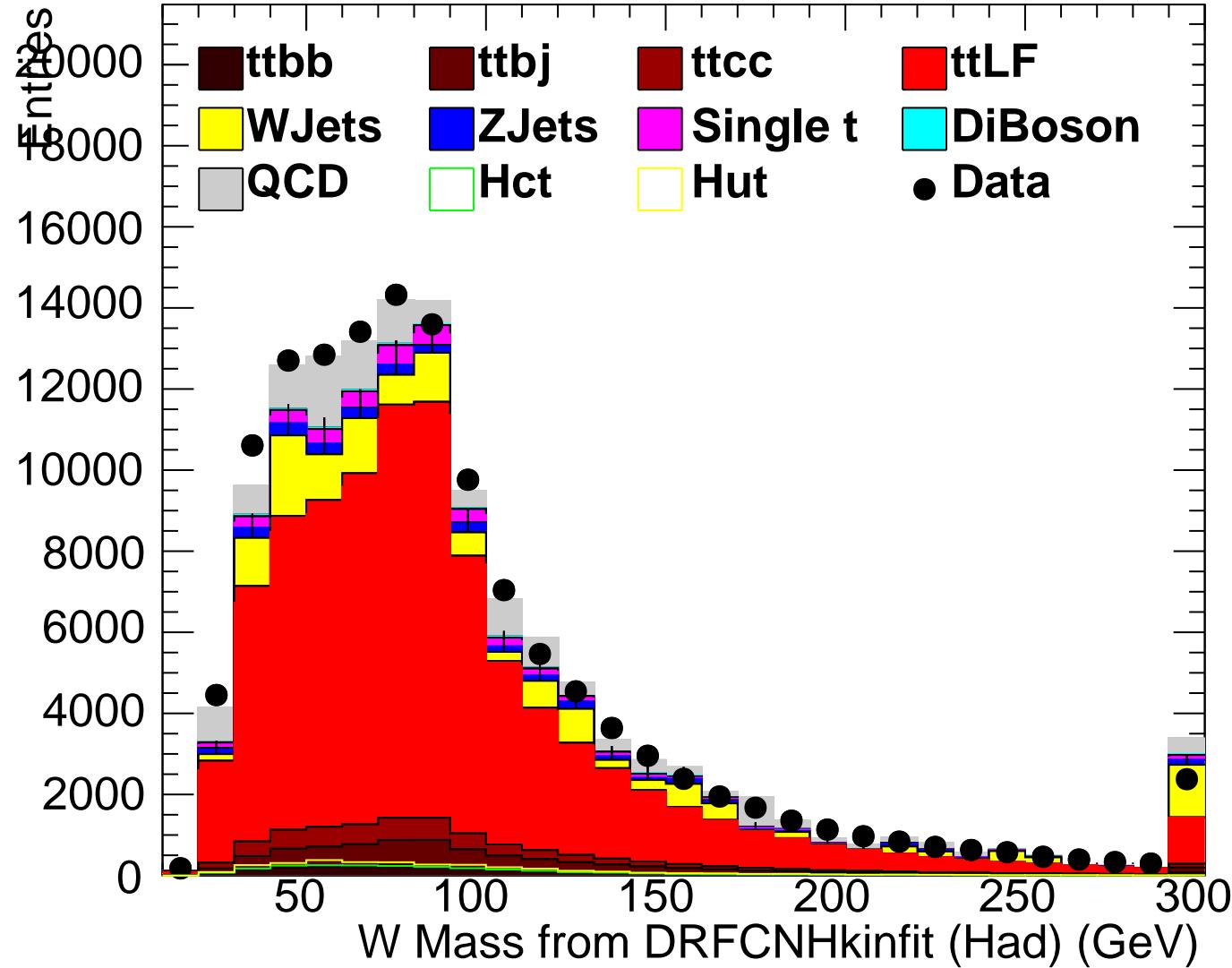
Ch1\_S11

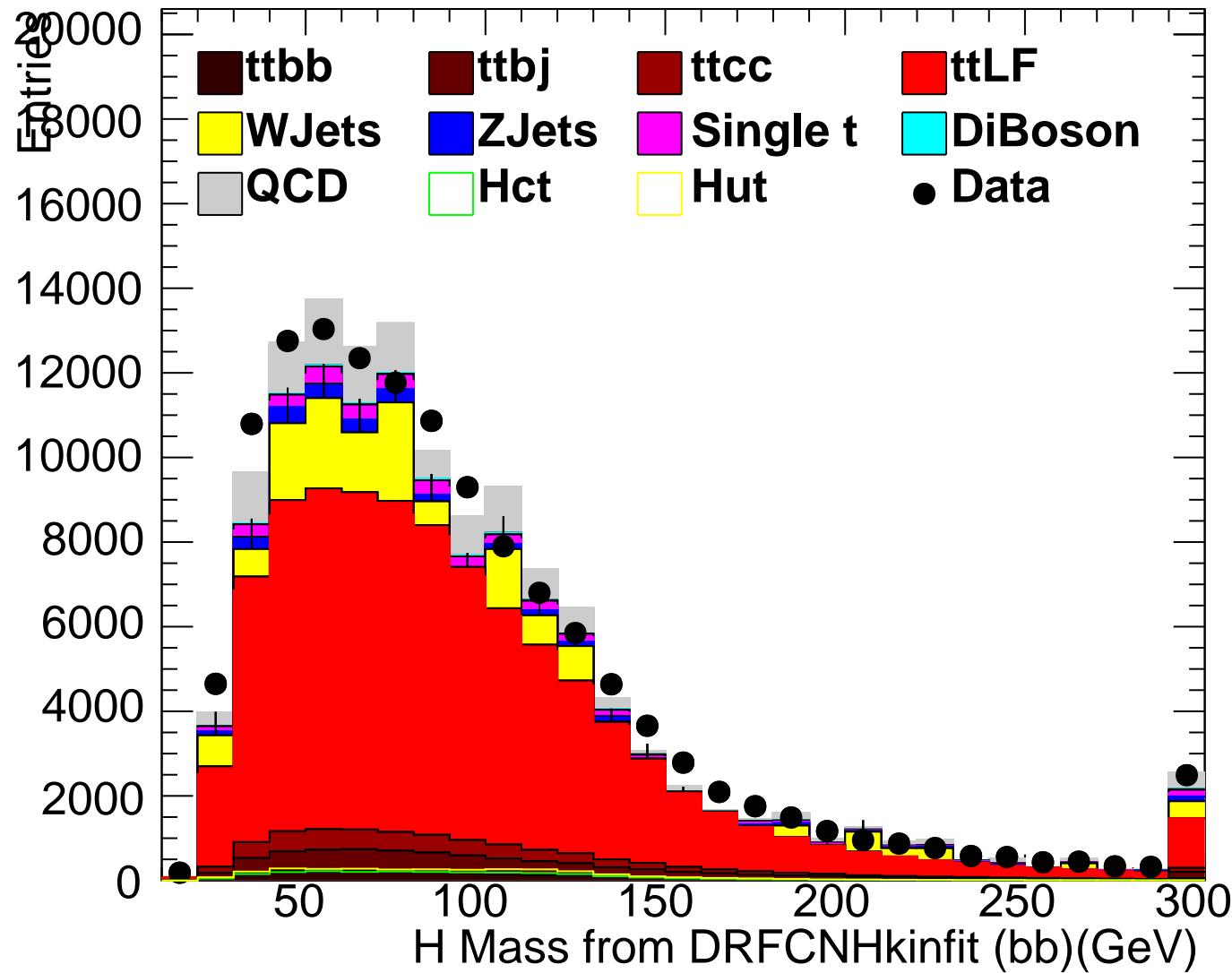
CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$

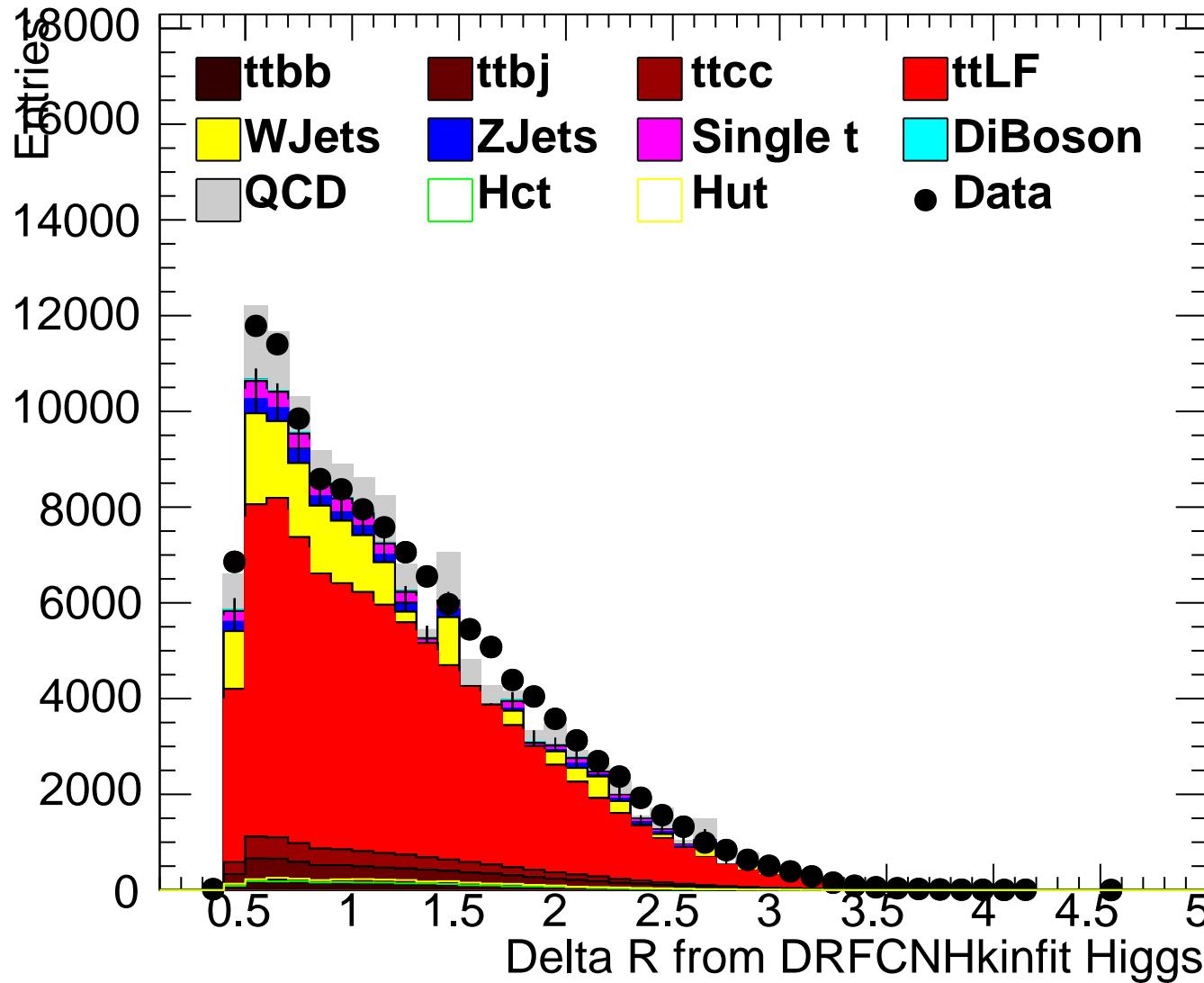


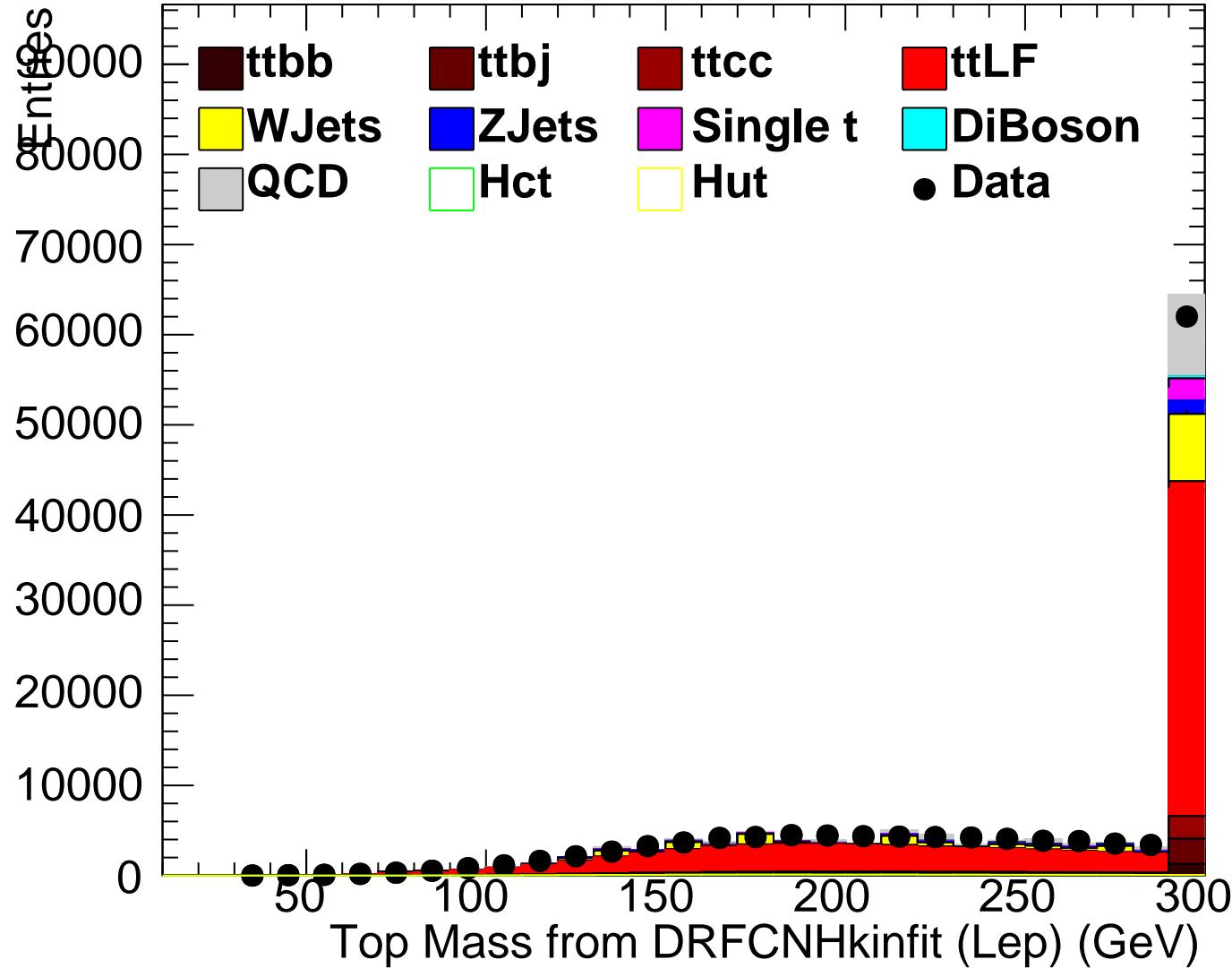


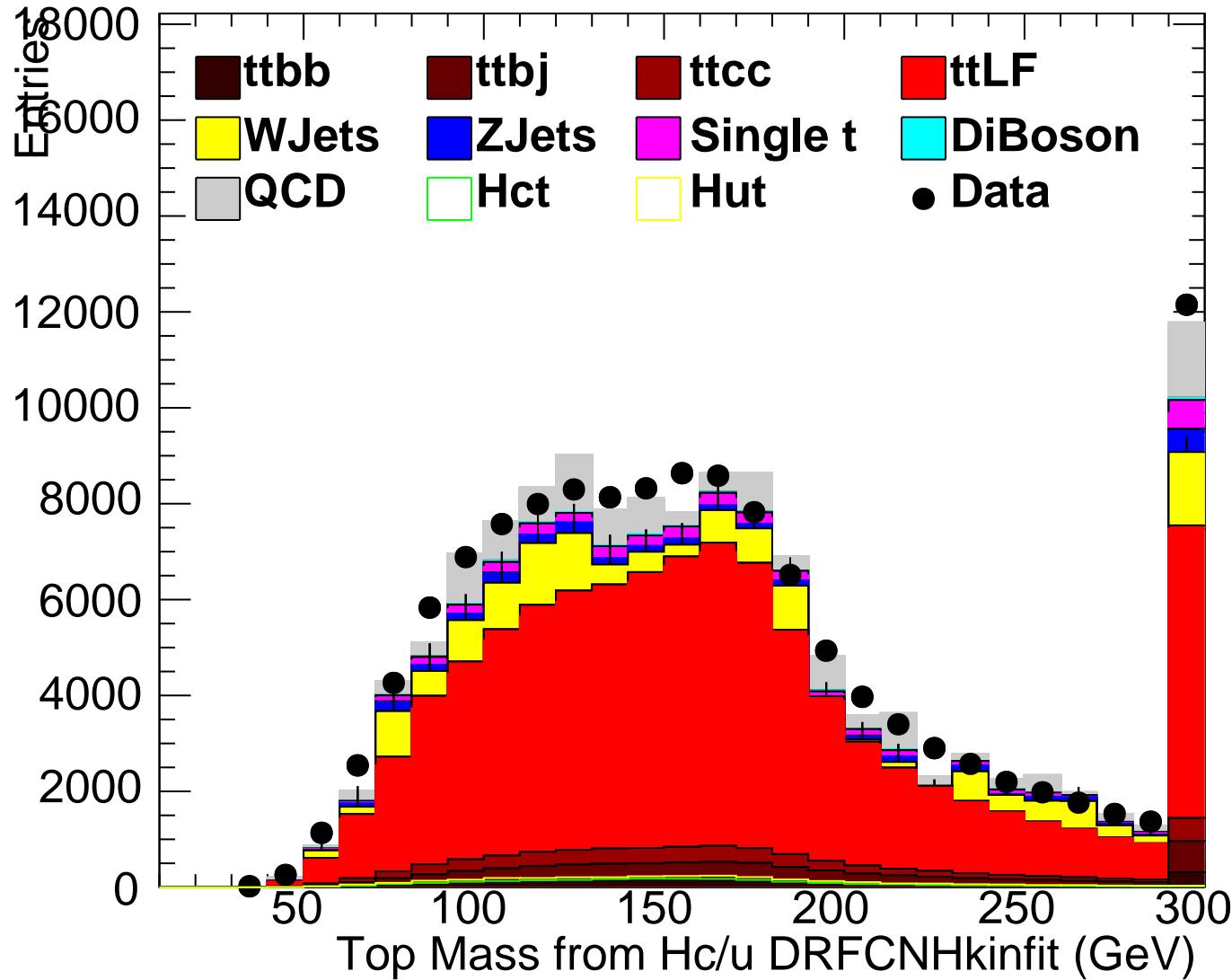


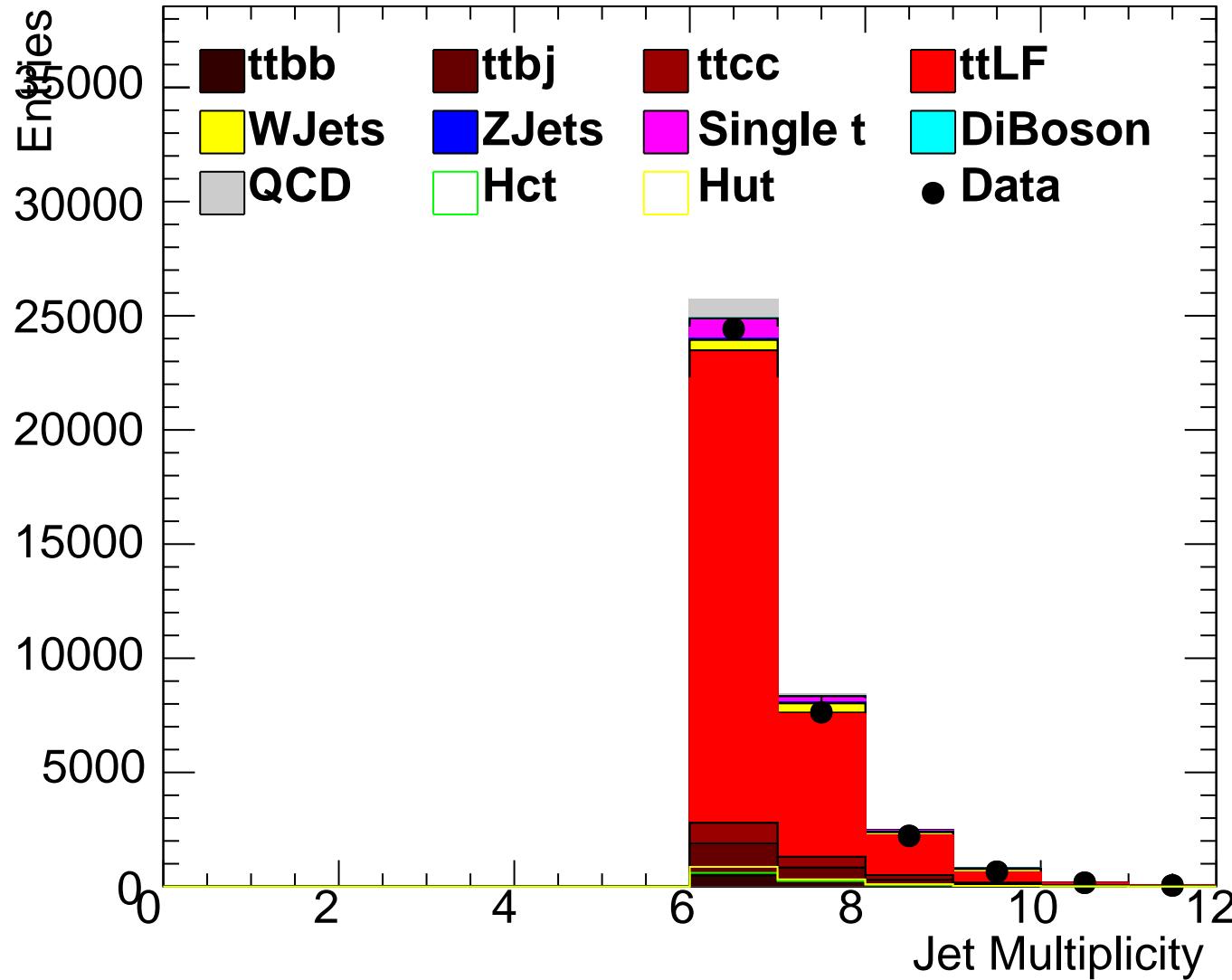
**Ch1\_S11**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch1\_S11**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 



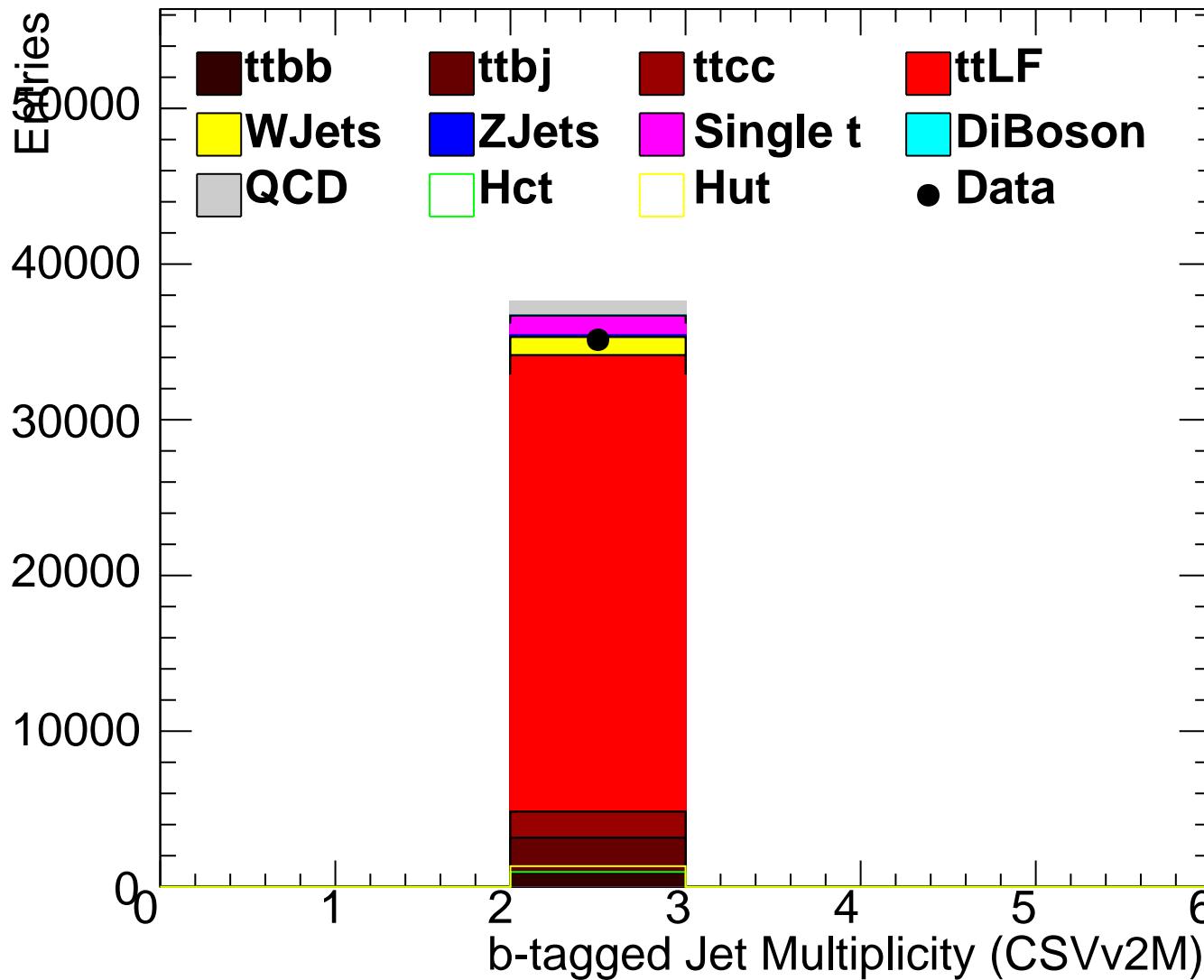


**Ch1\_S11**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 



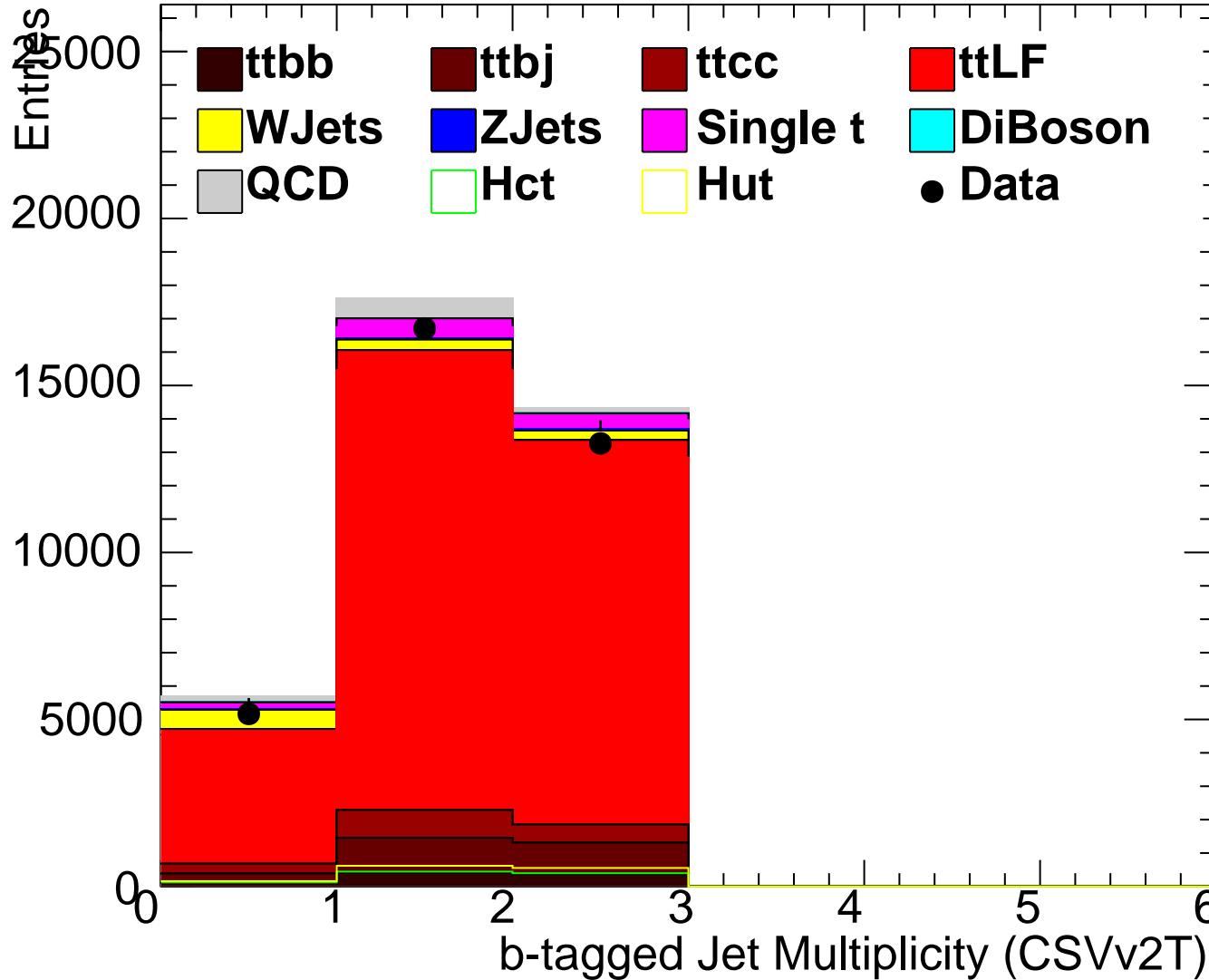
Ch1 S12

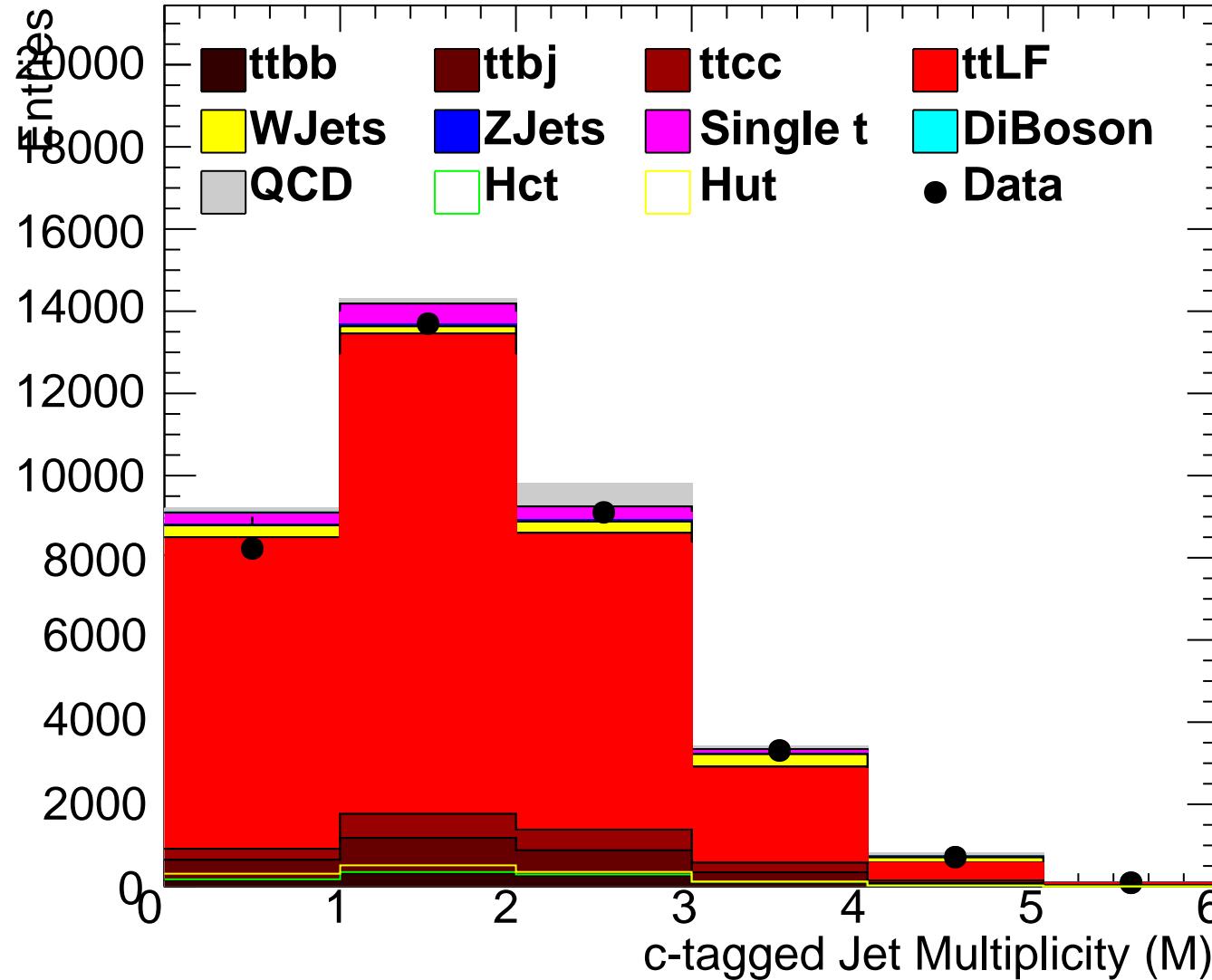
CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$

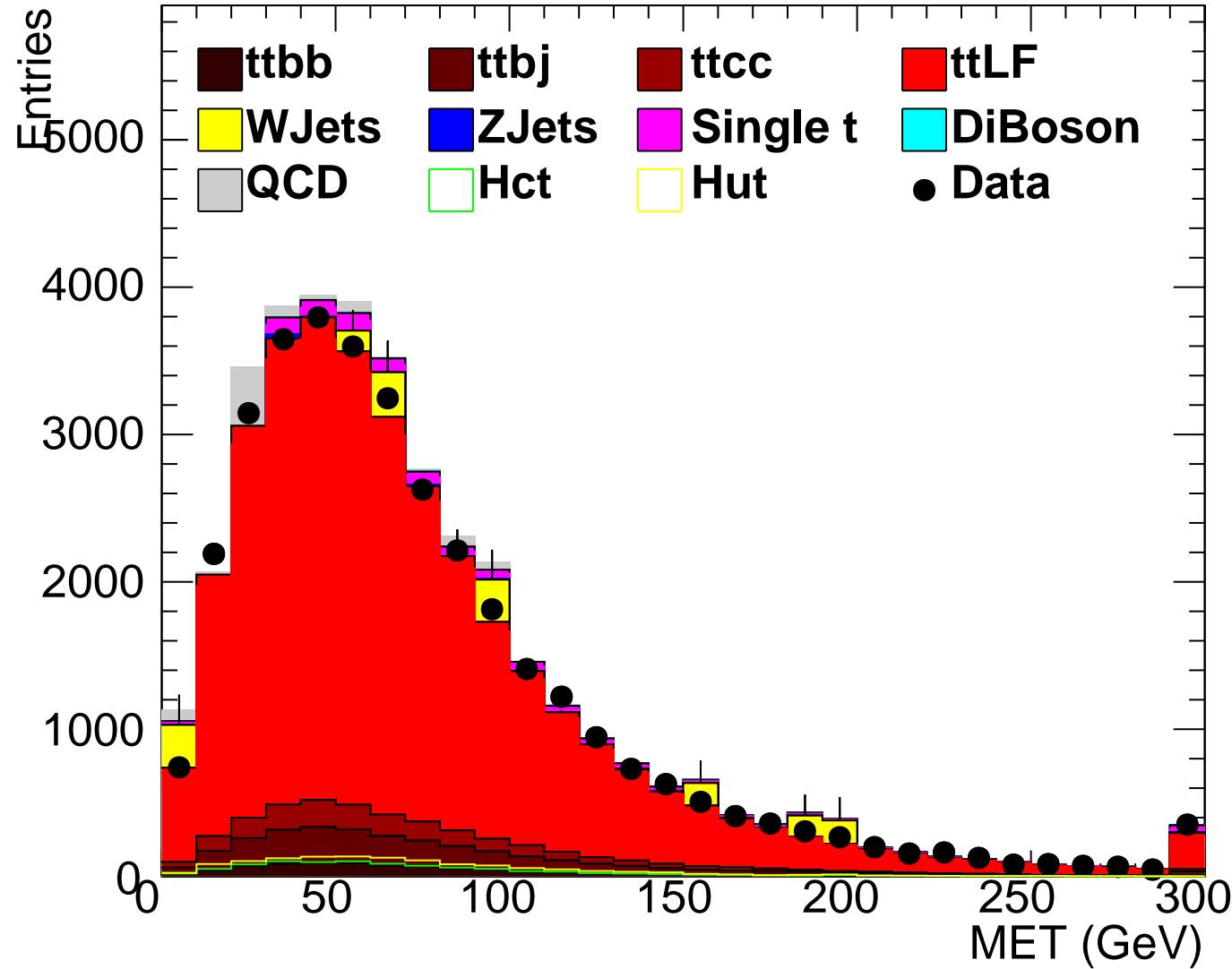


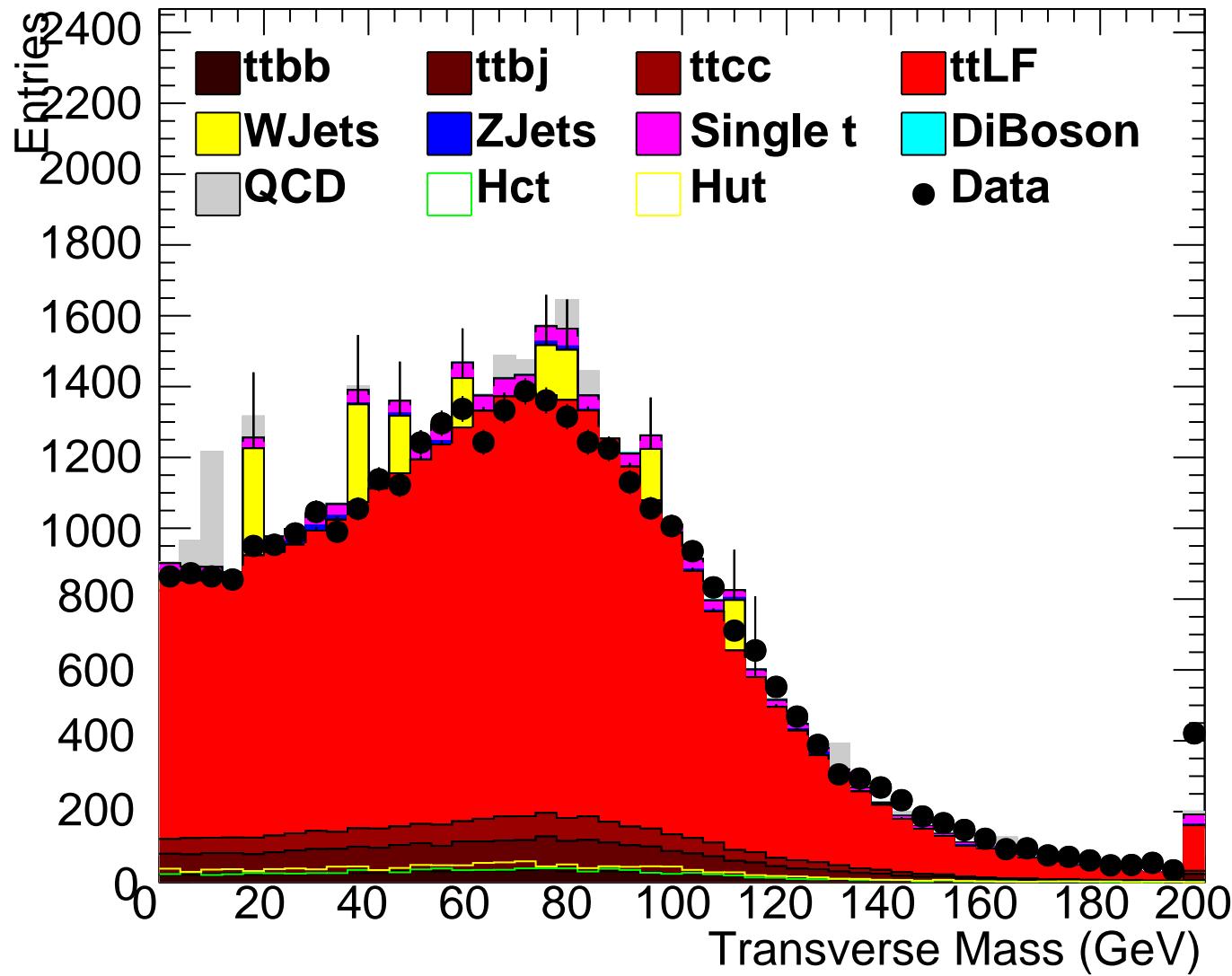
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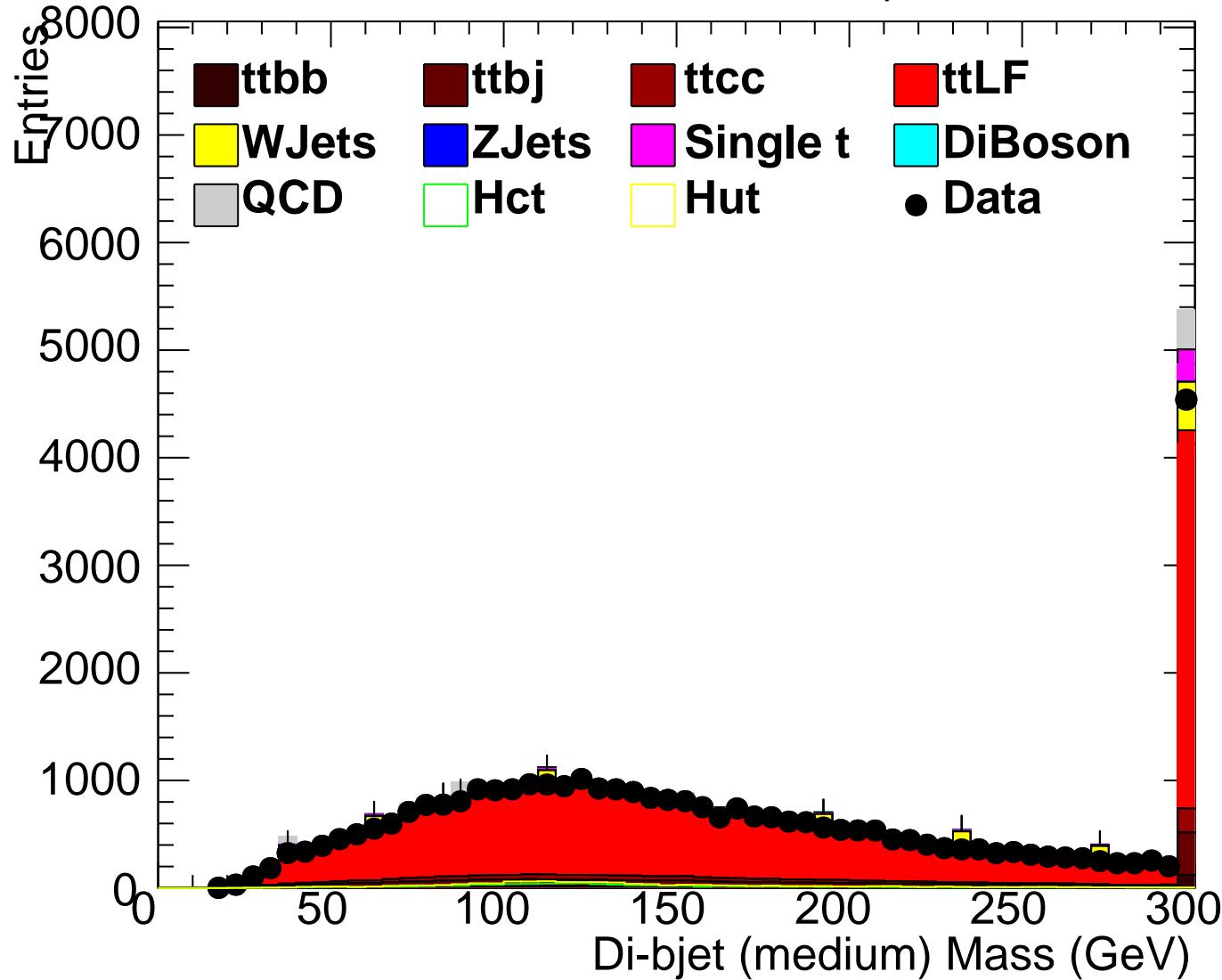
CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$

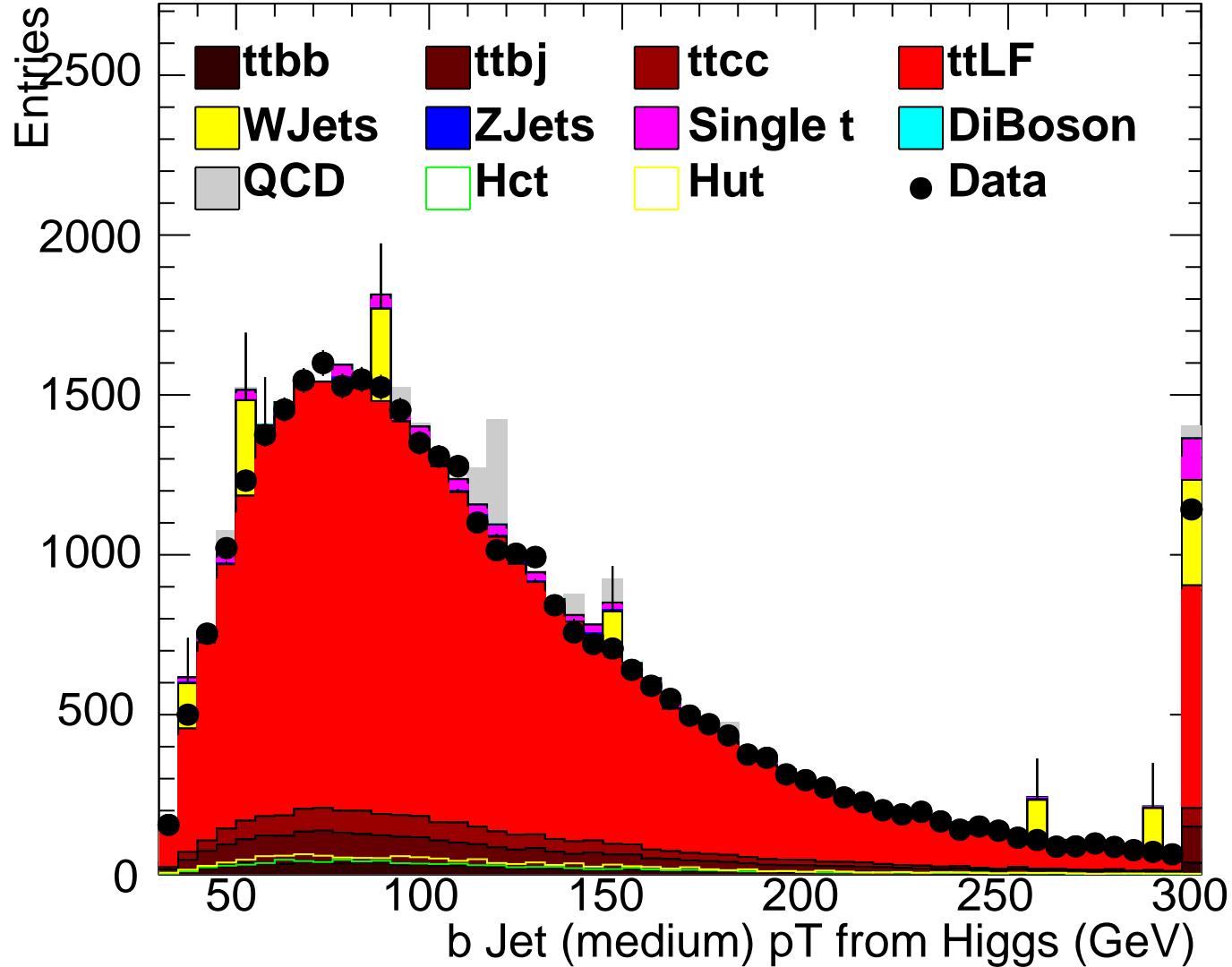


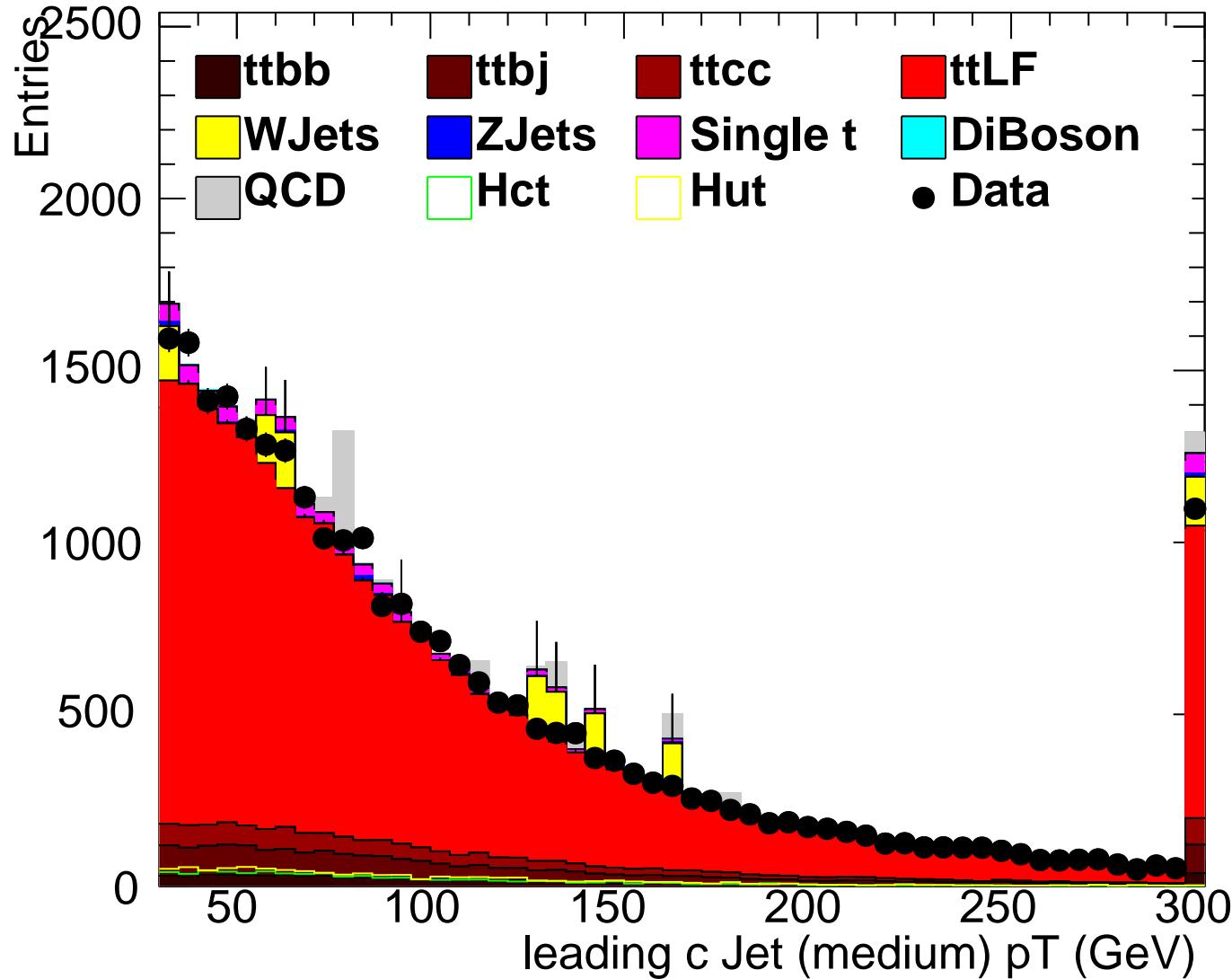


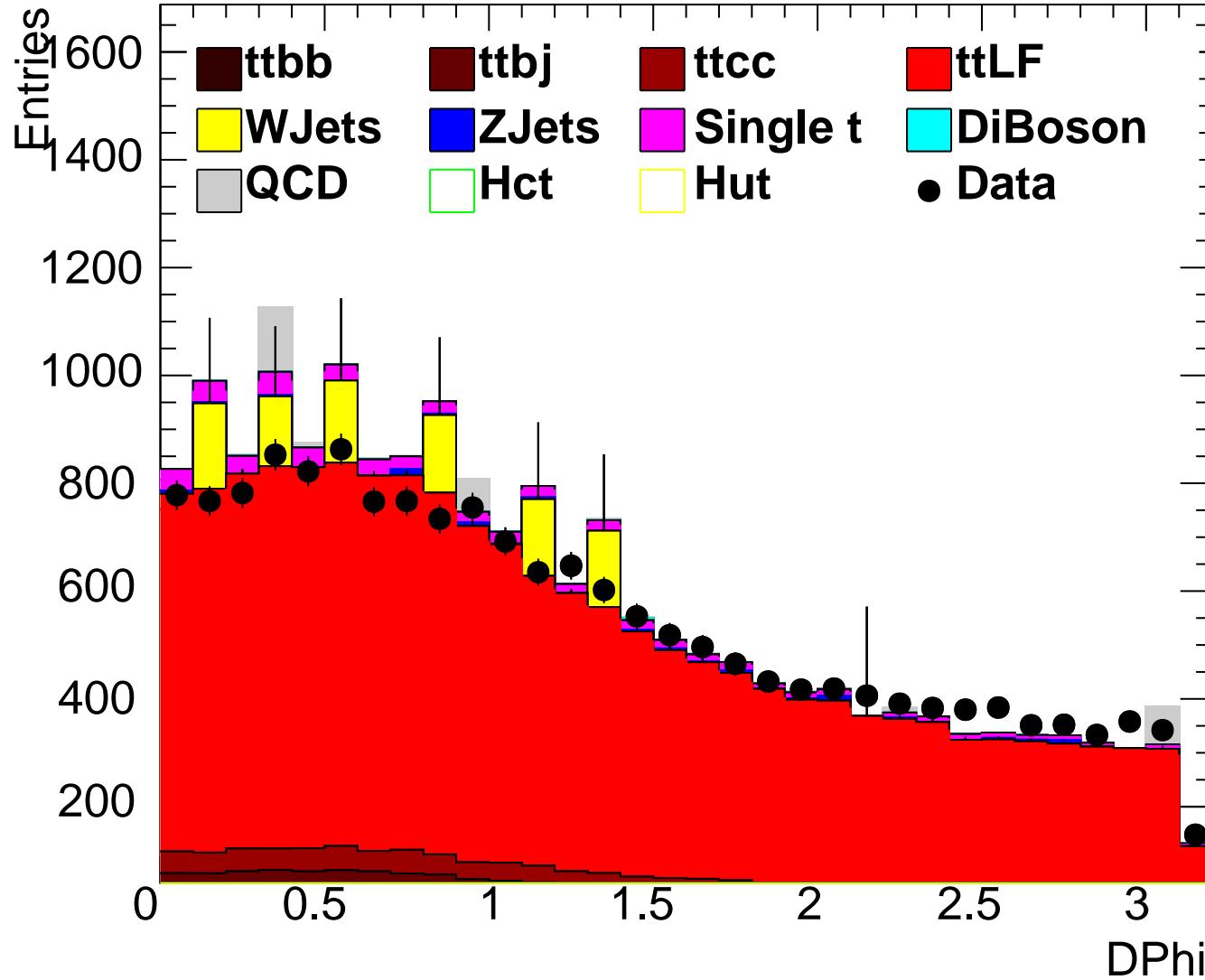
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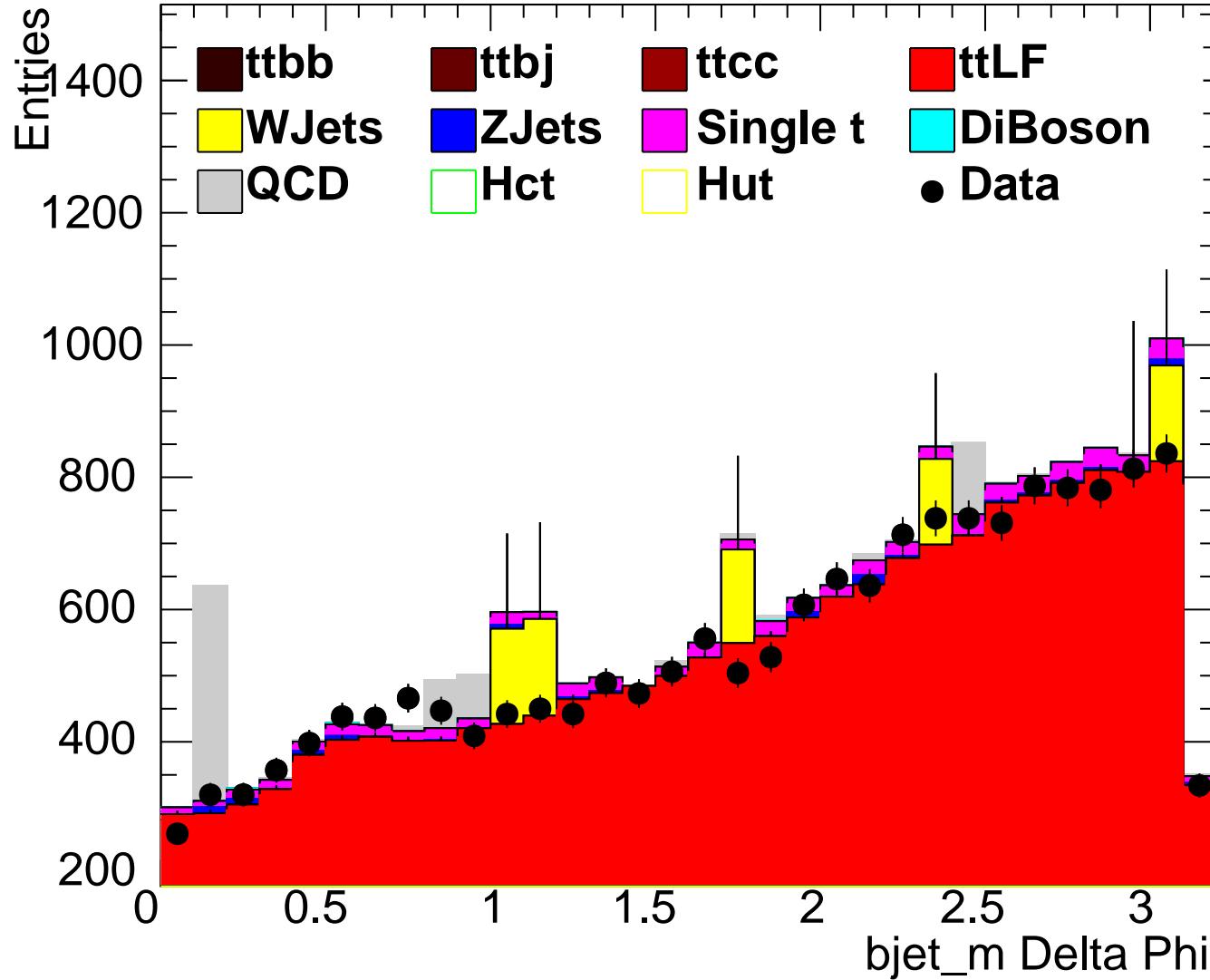
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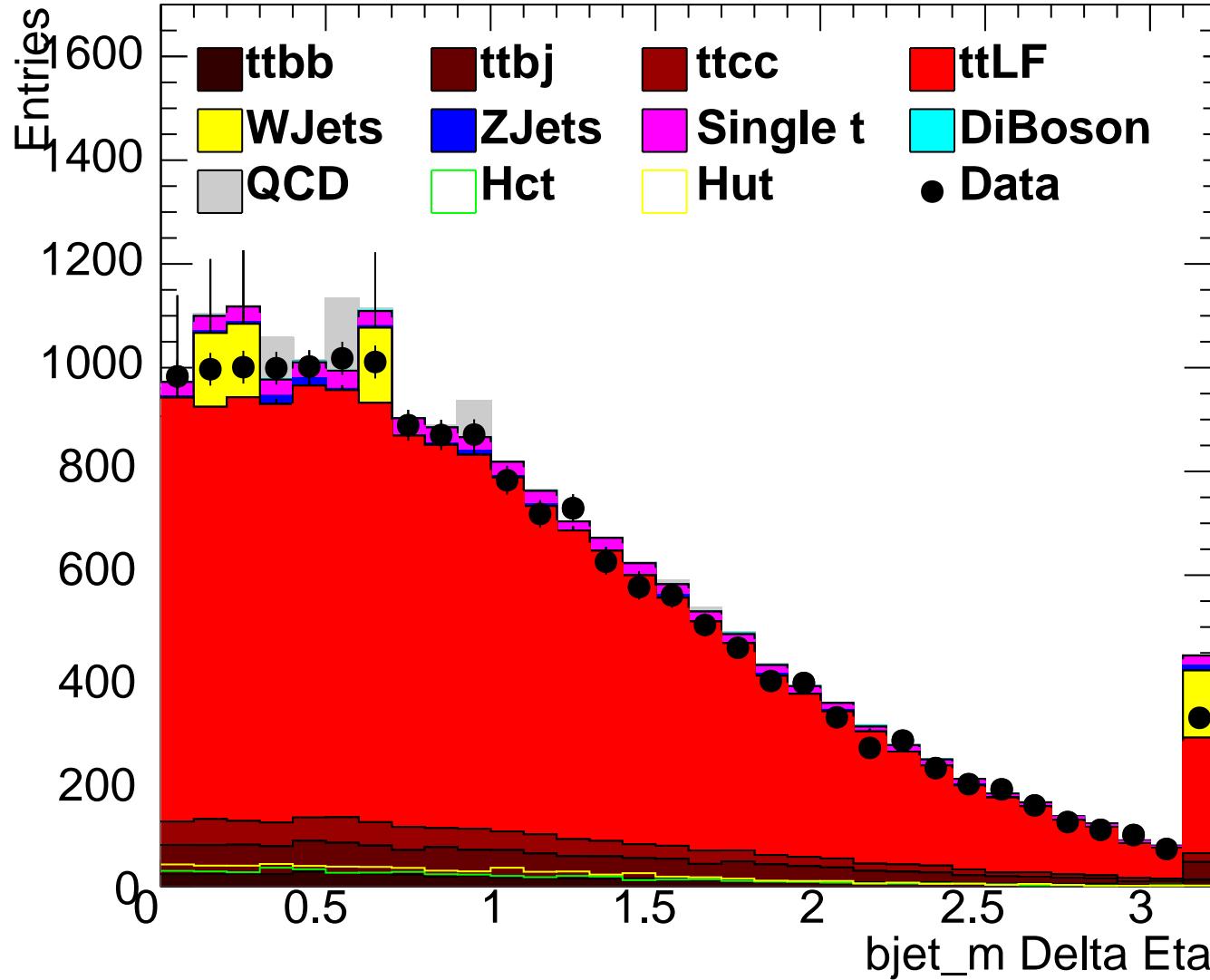
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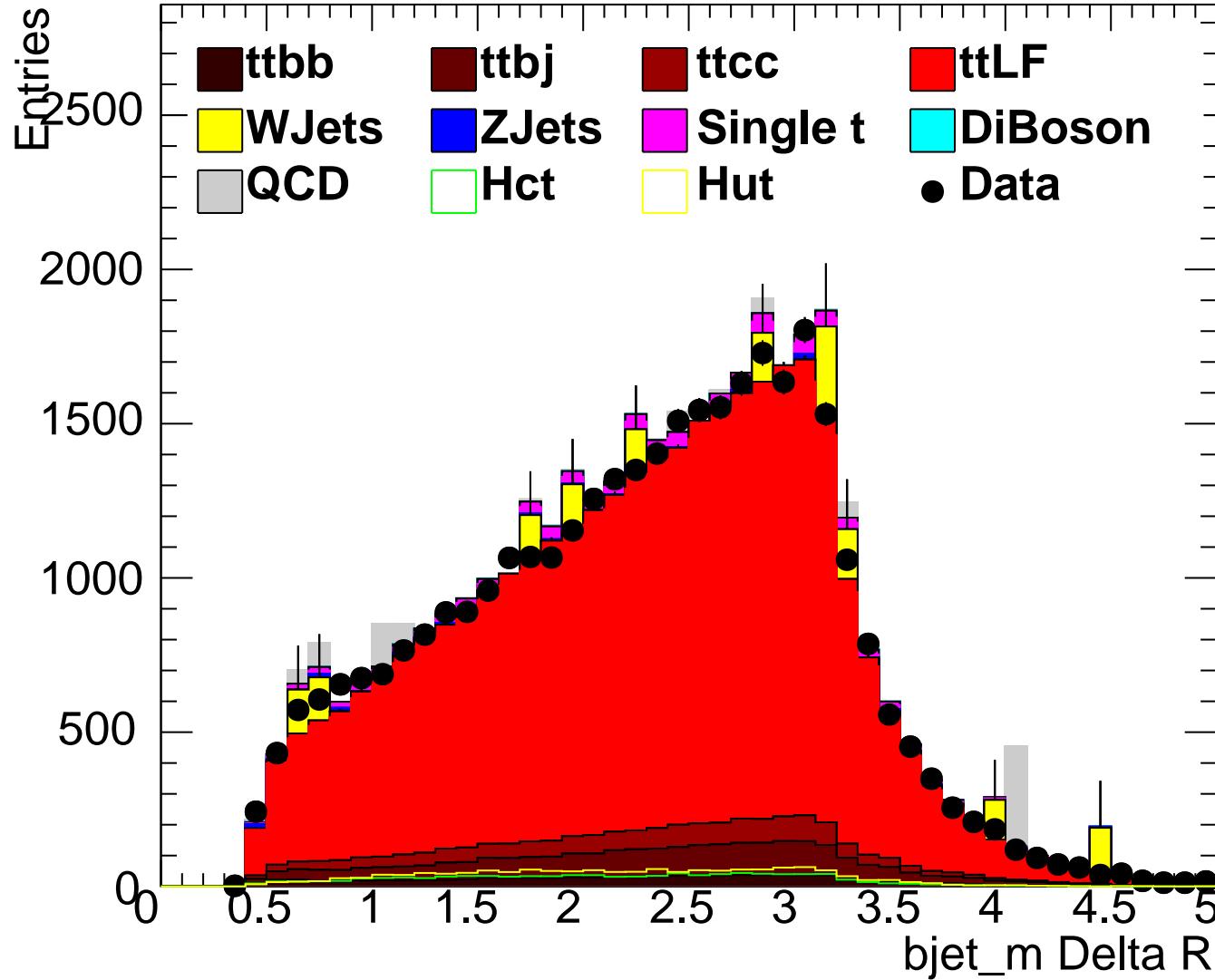
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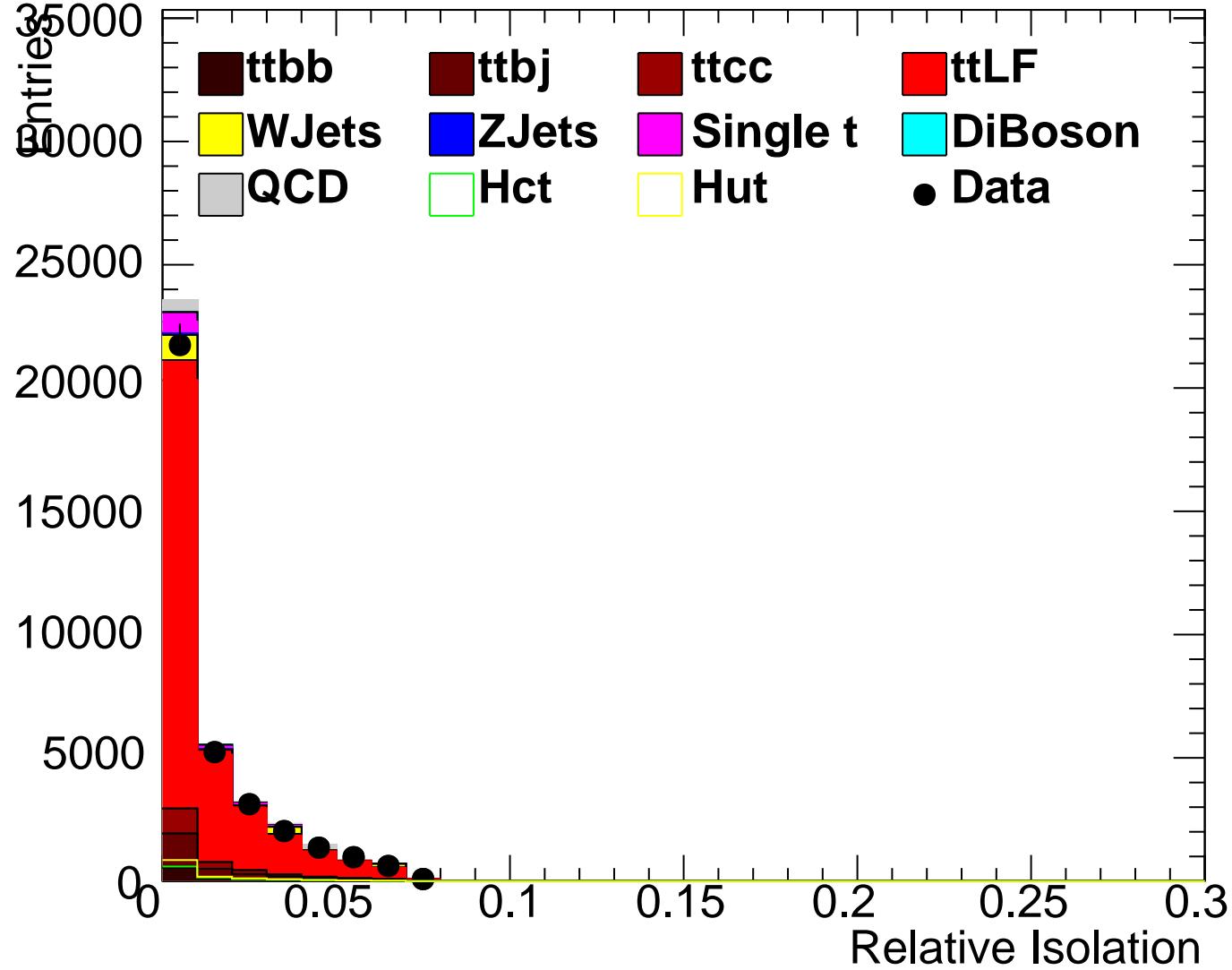
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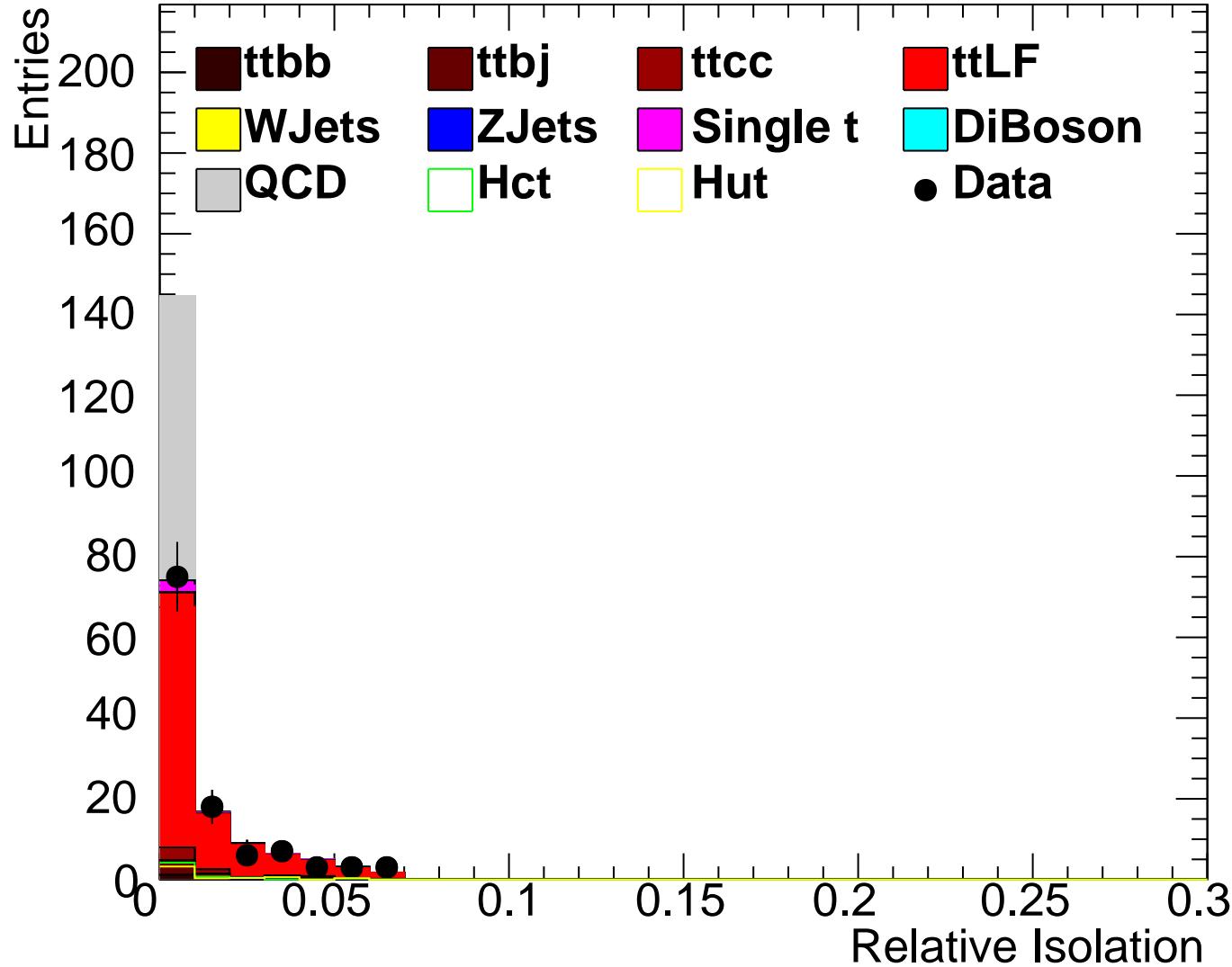
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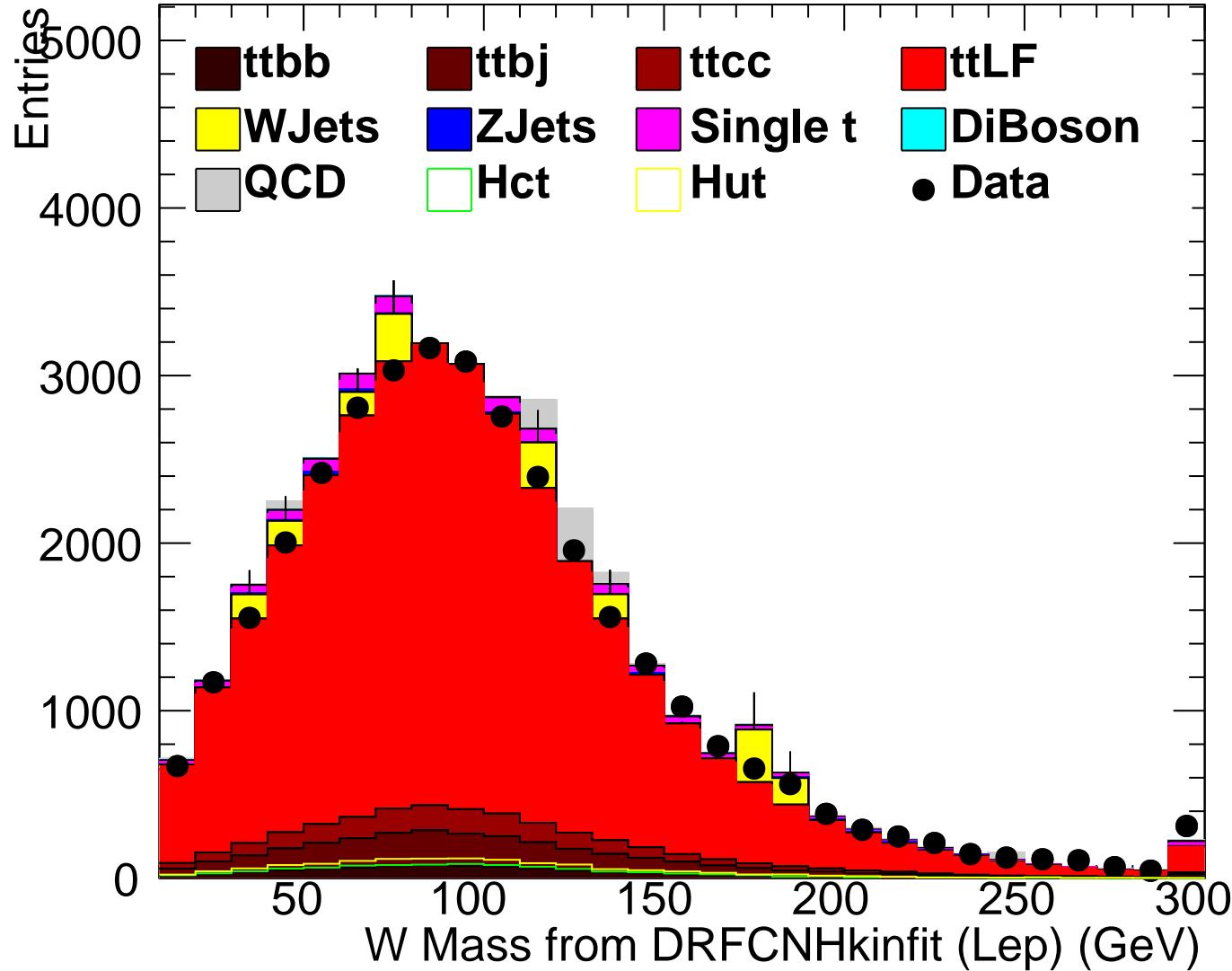
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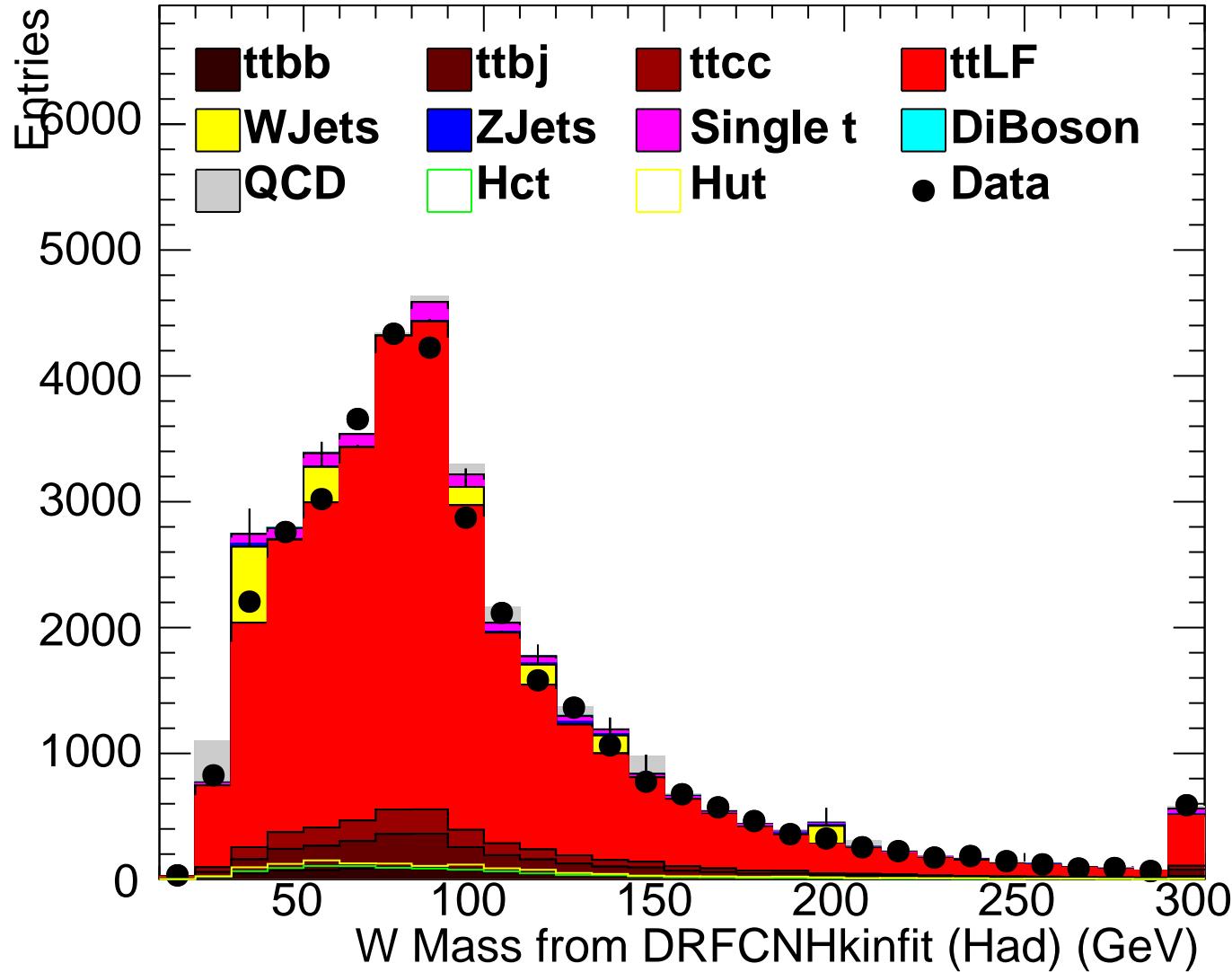
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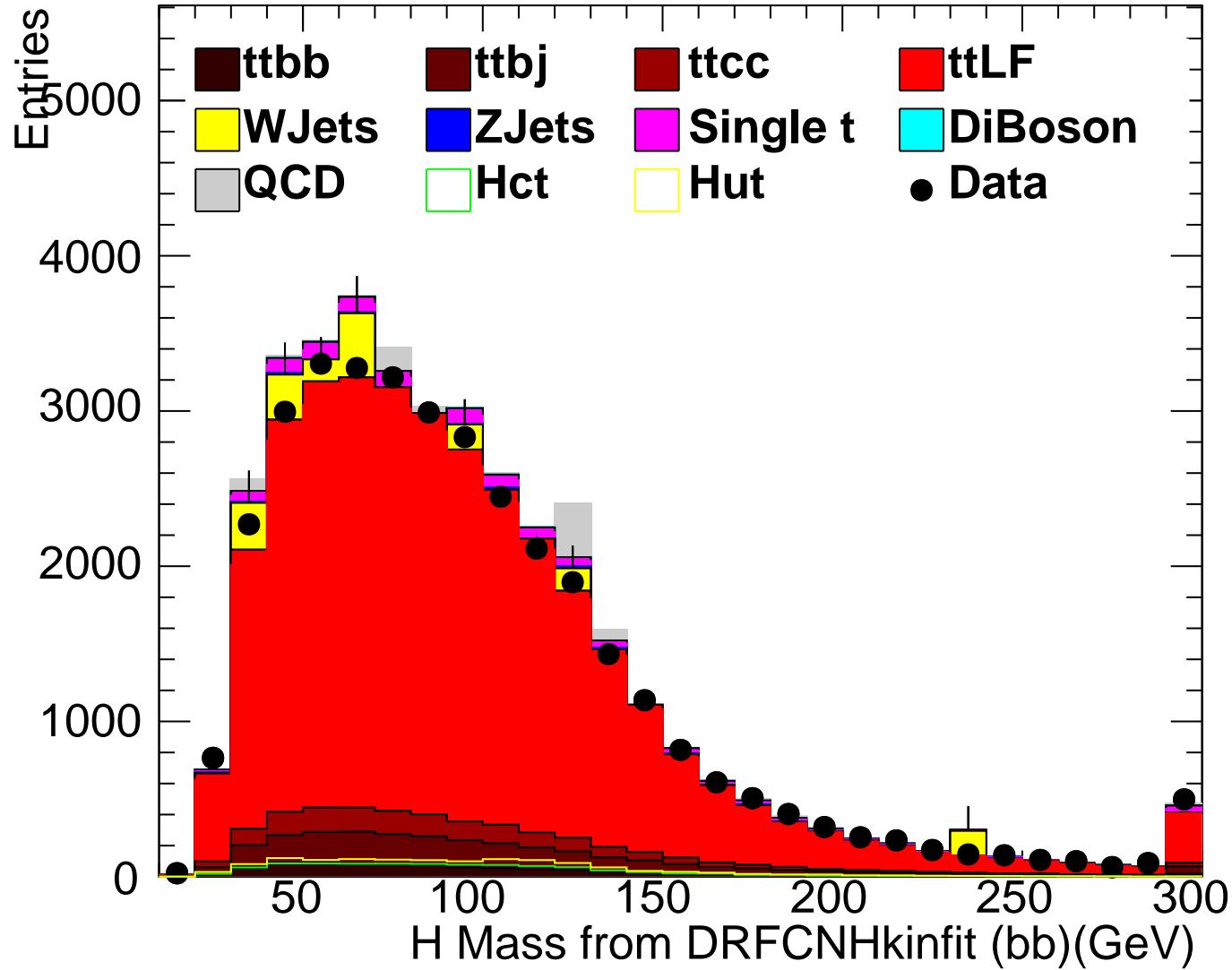
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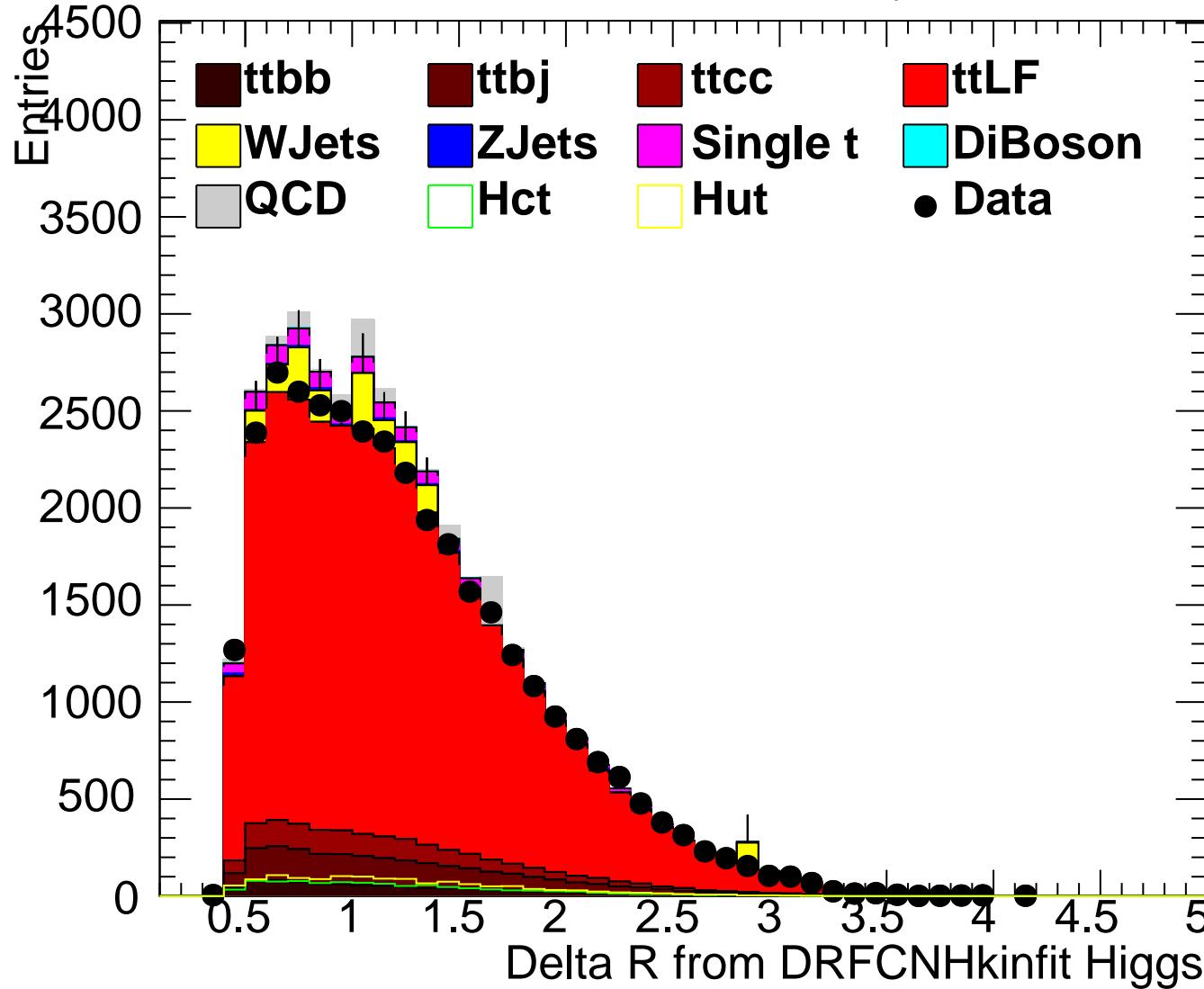
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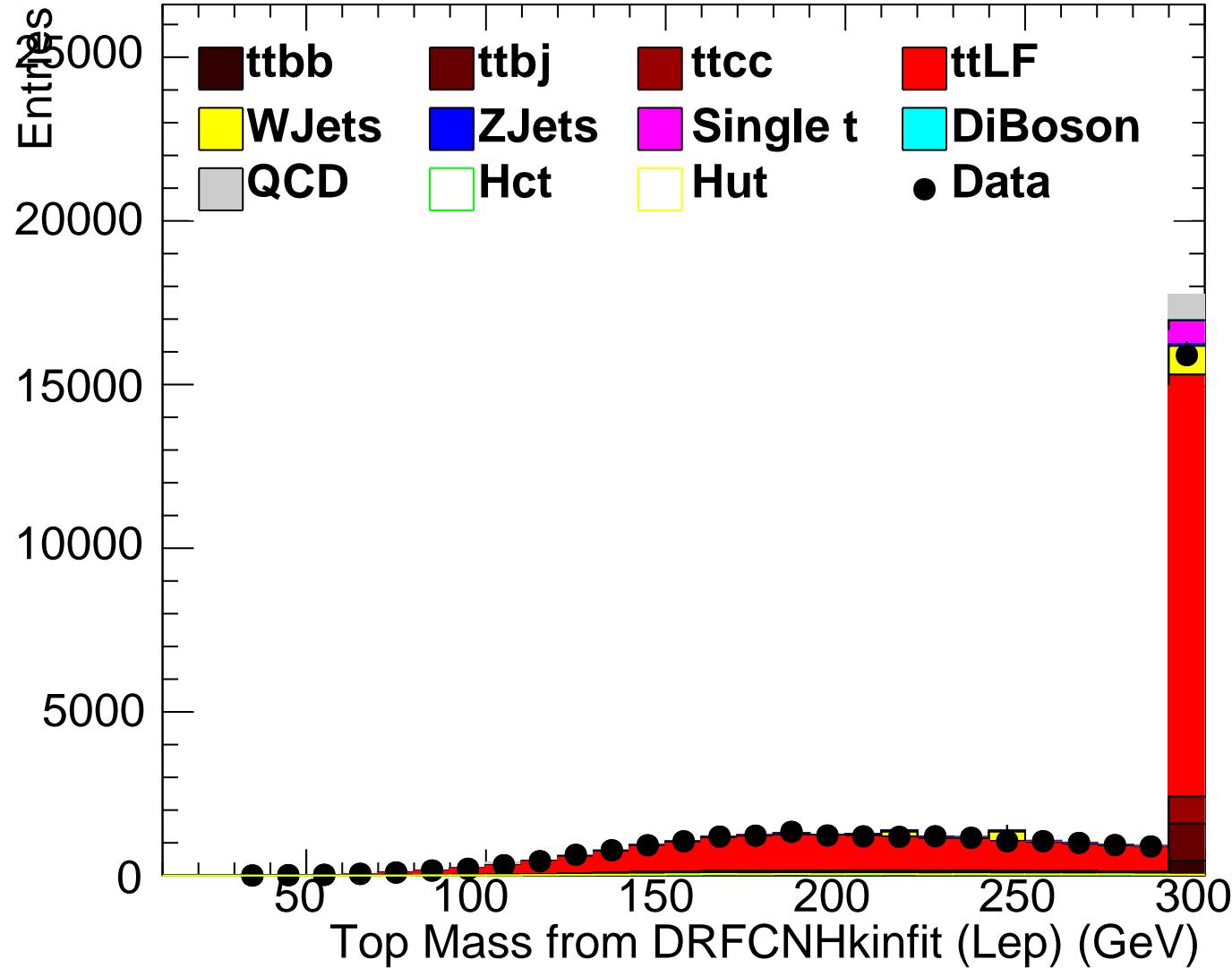


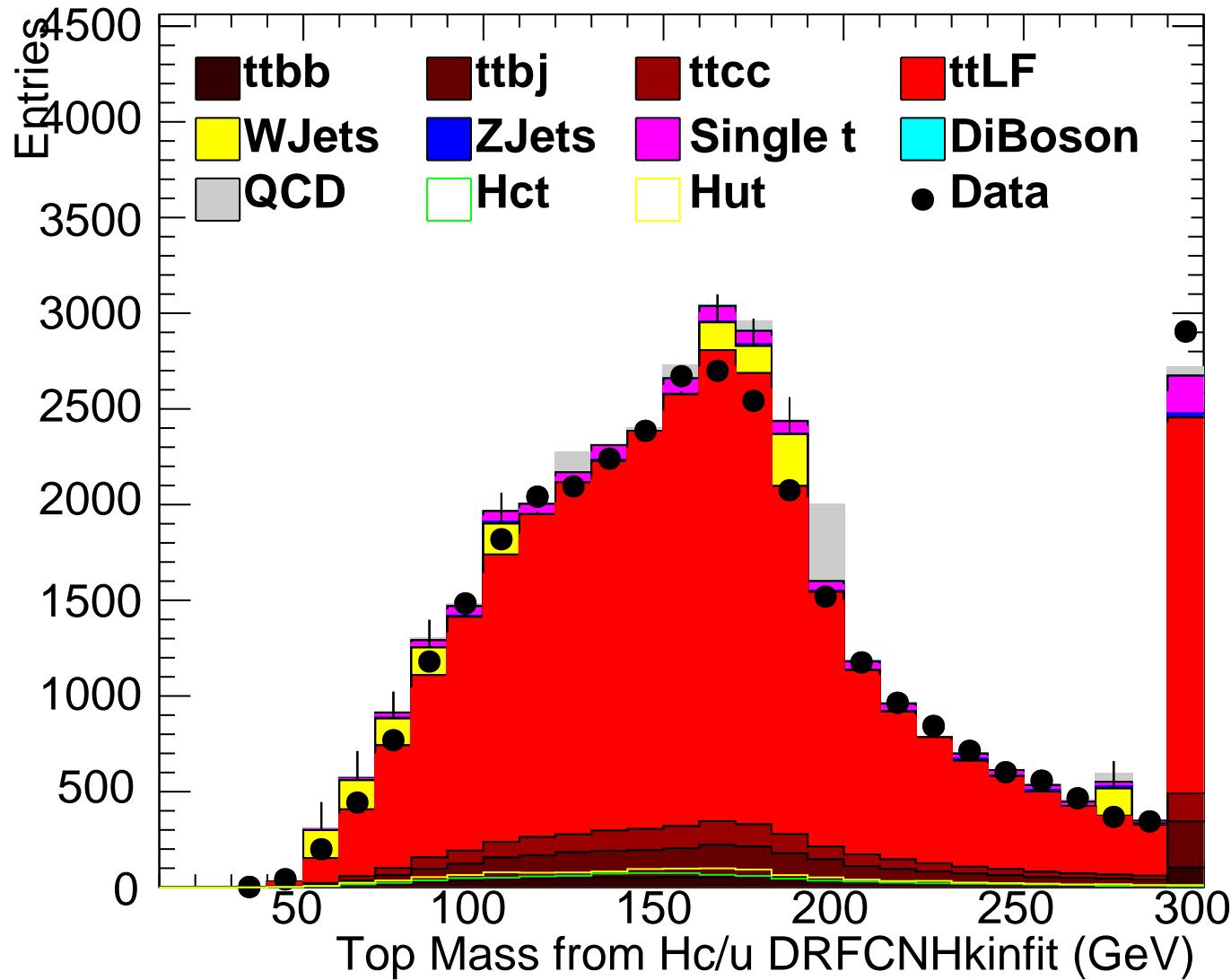
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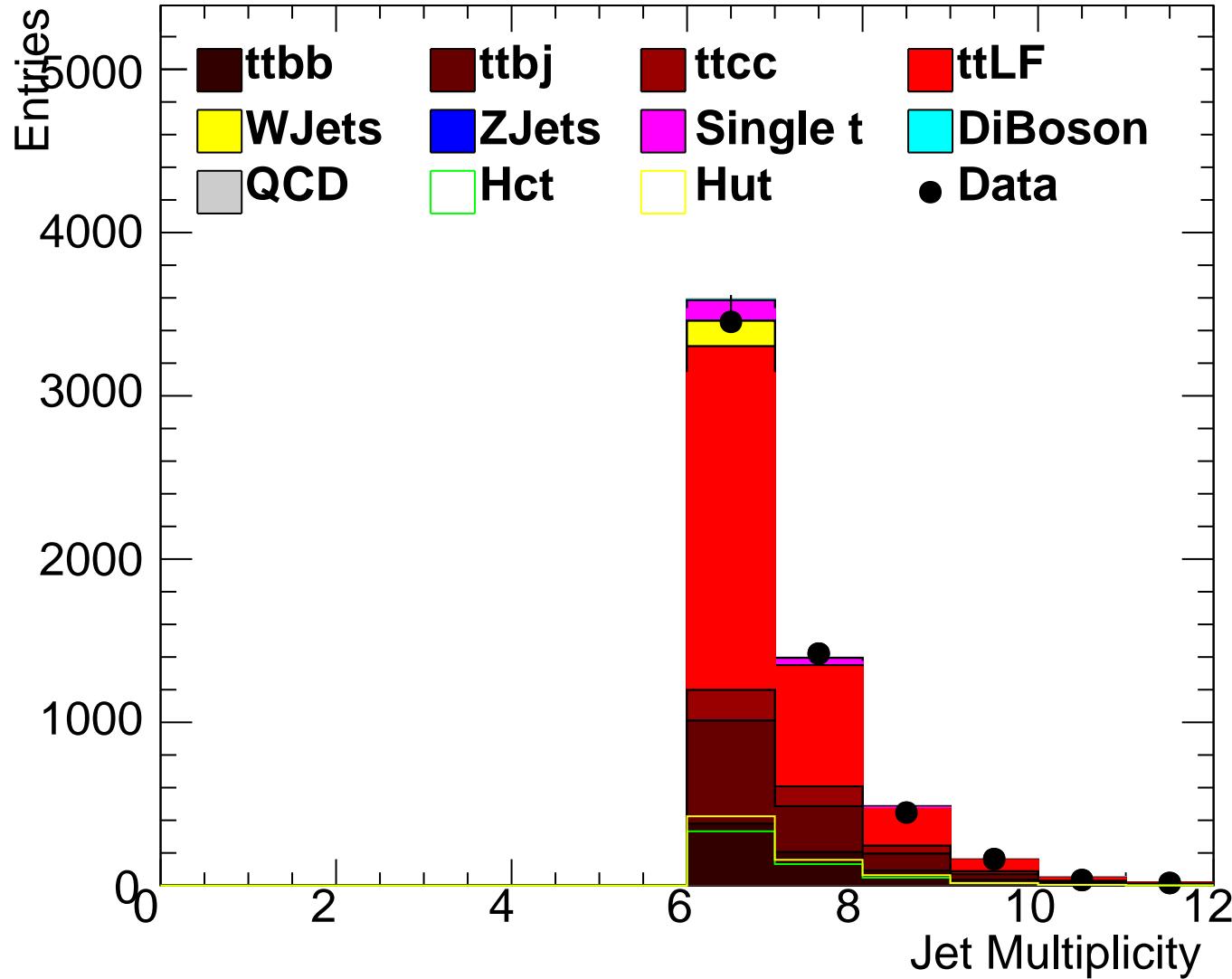
**Ch1\_S12**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

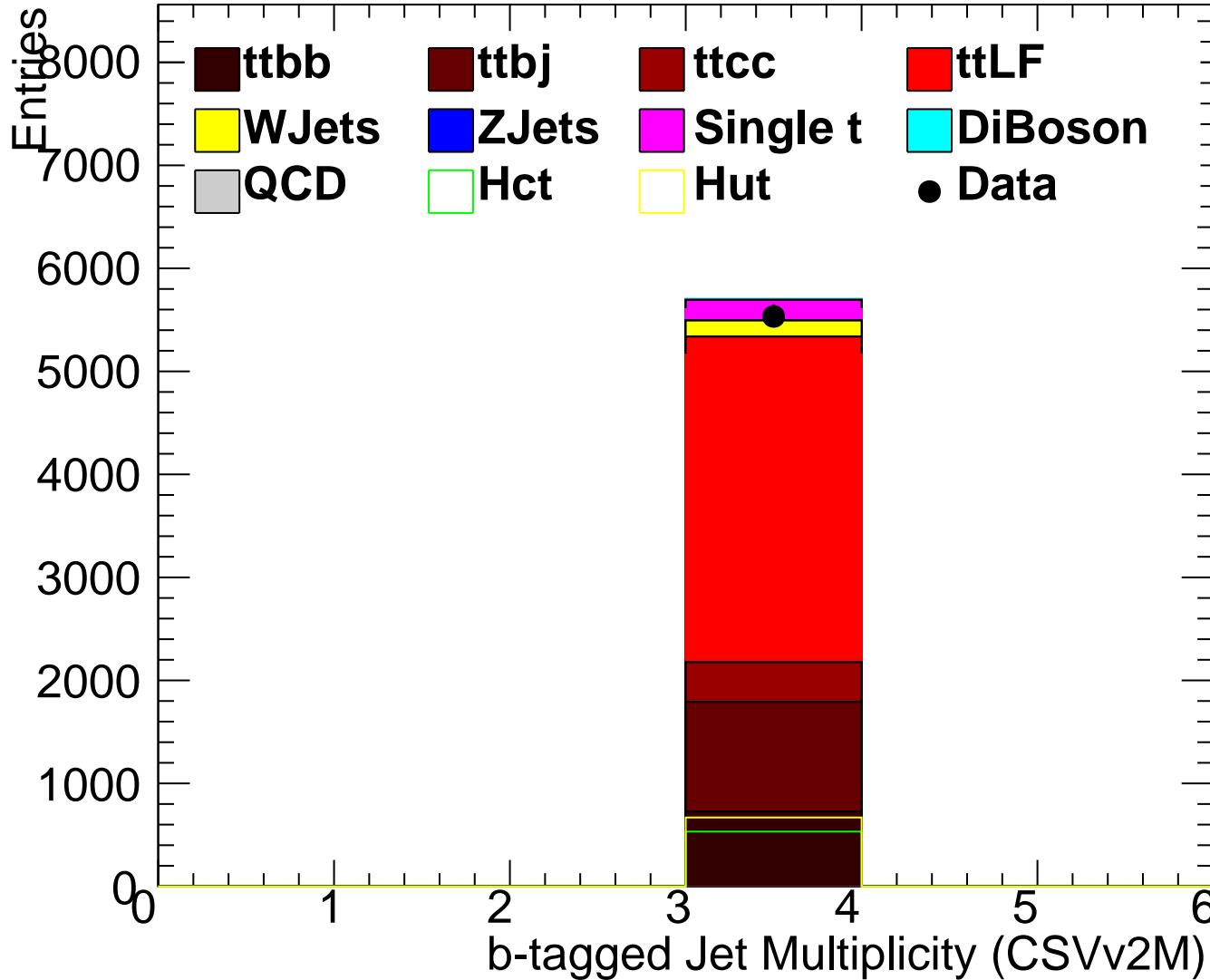
**Ch1\_S12**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

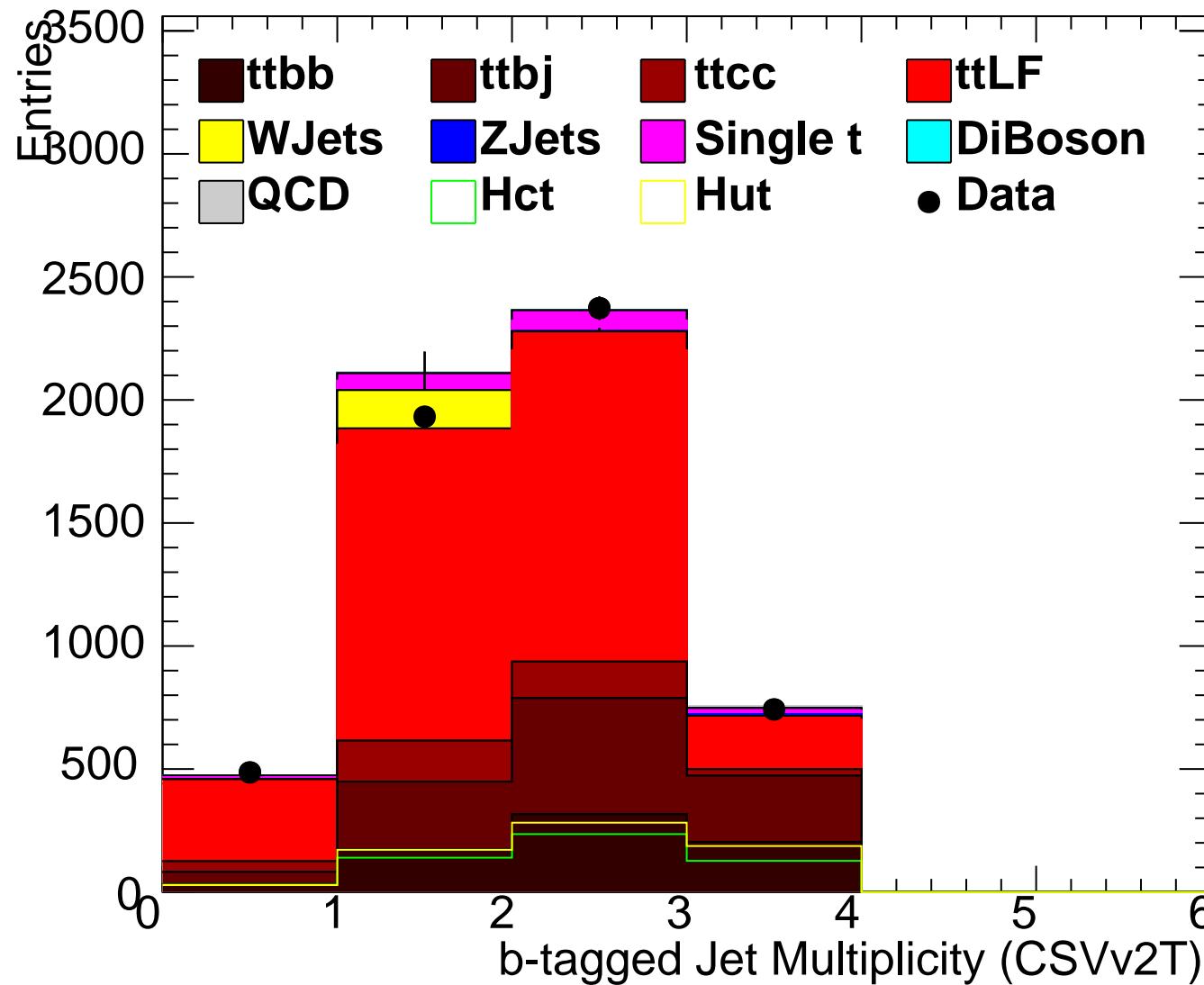
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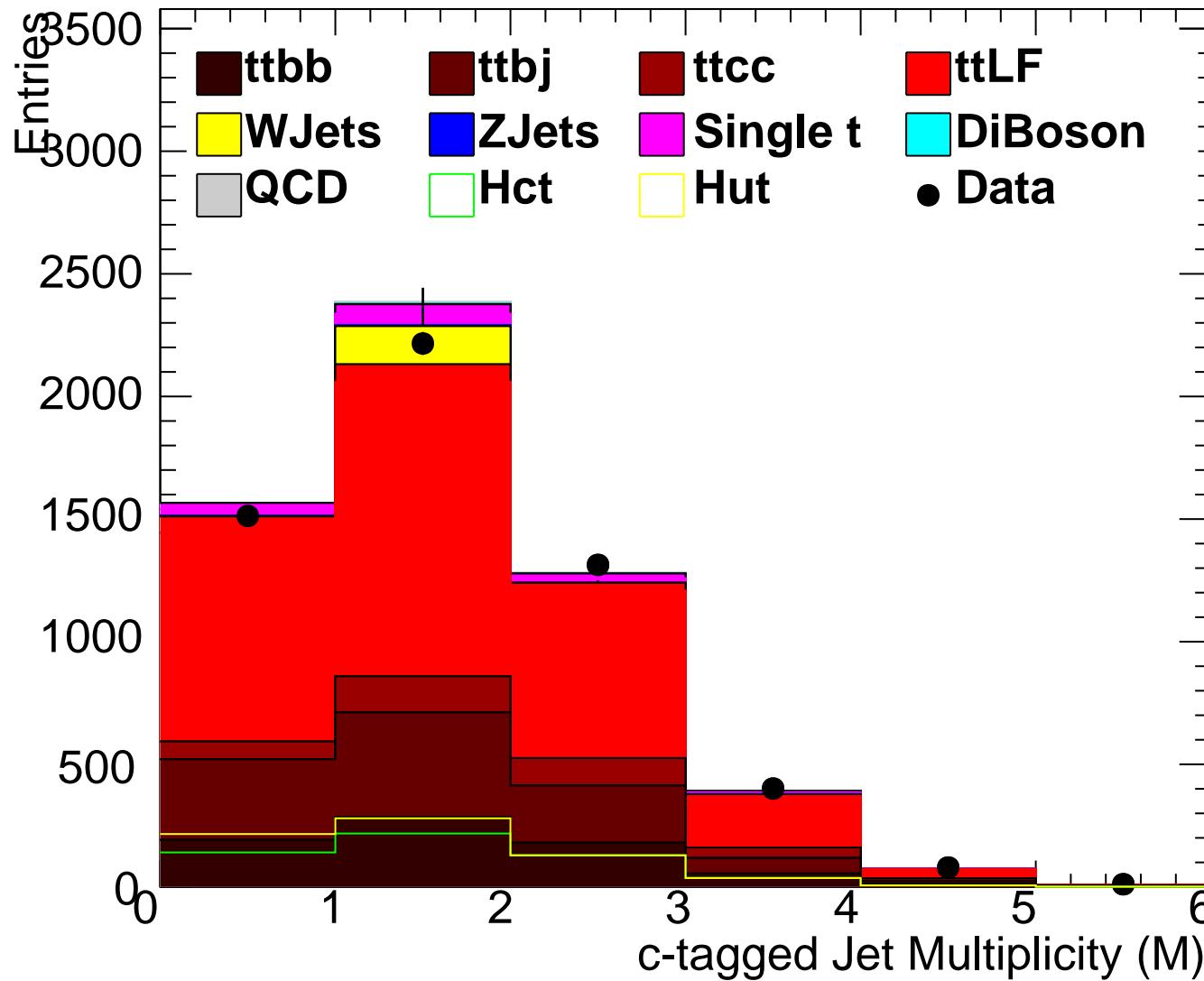
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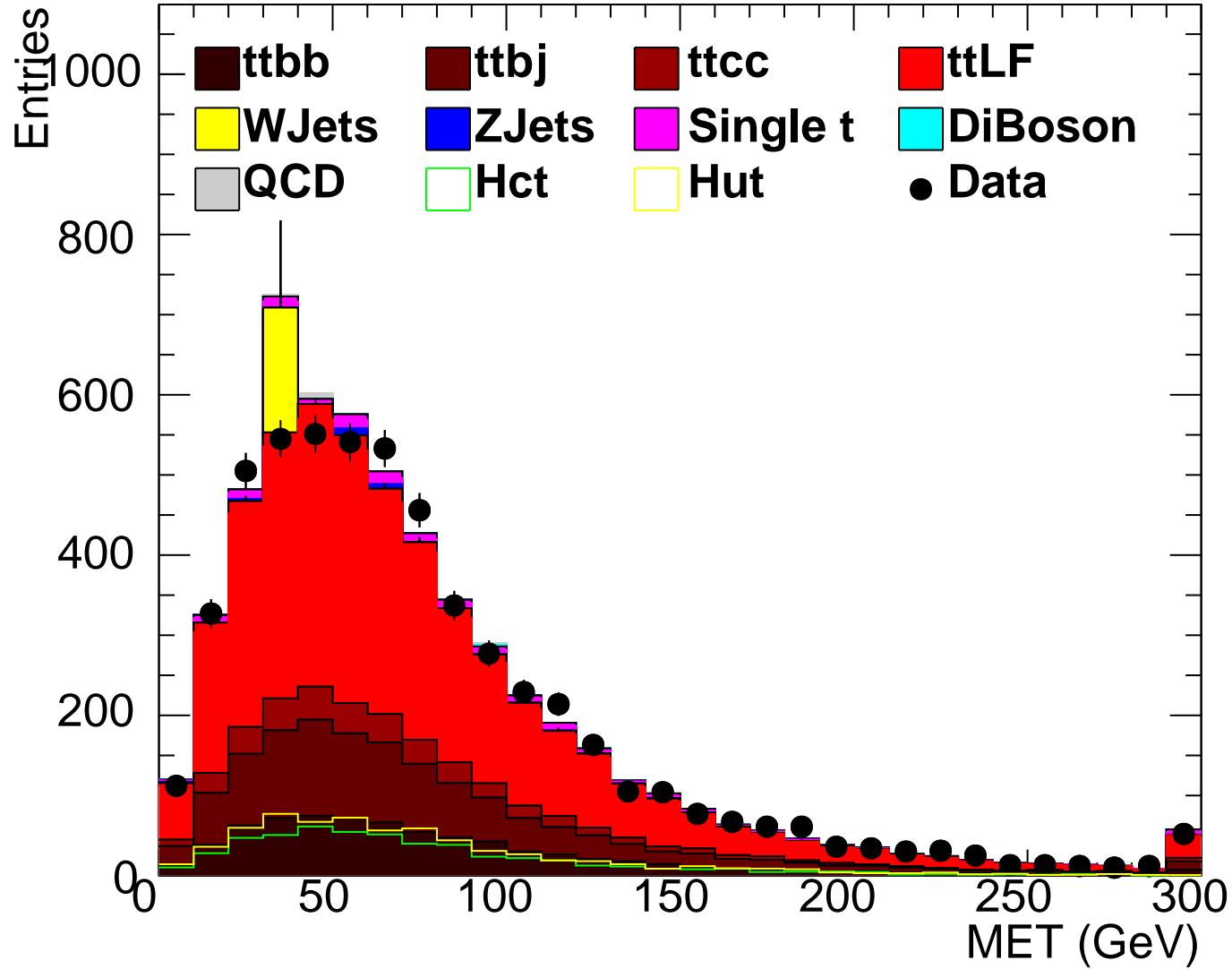
**Ch1\_S12**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

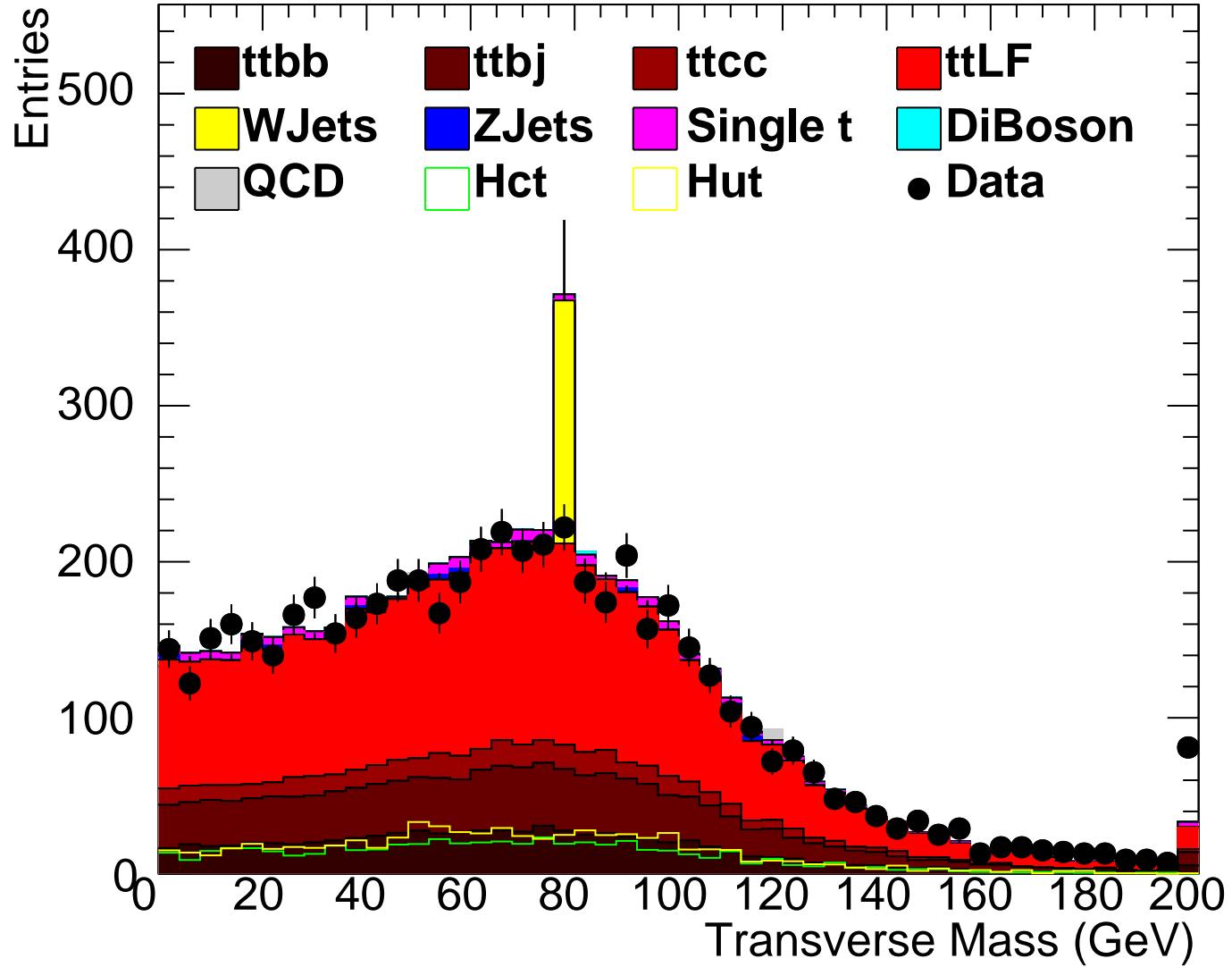


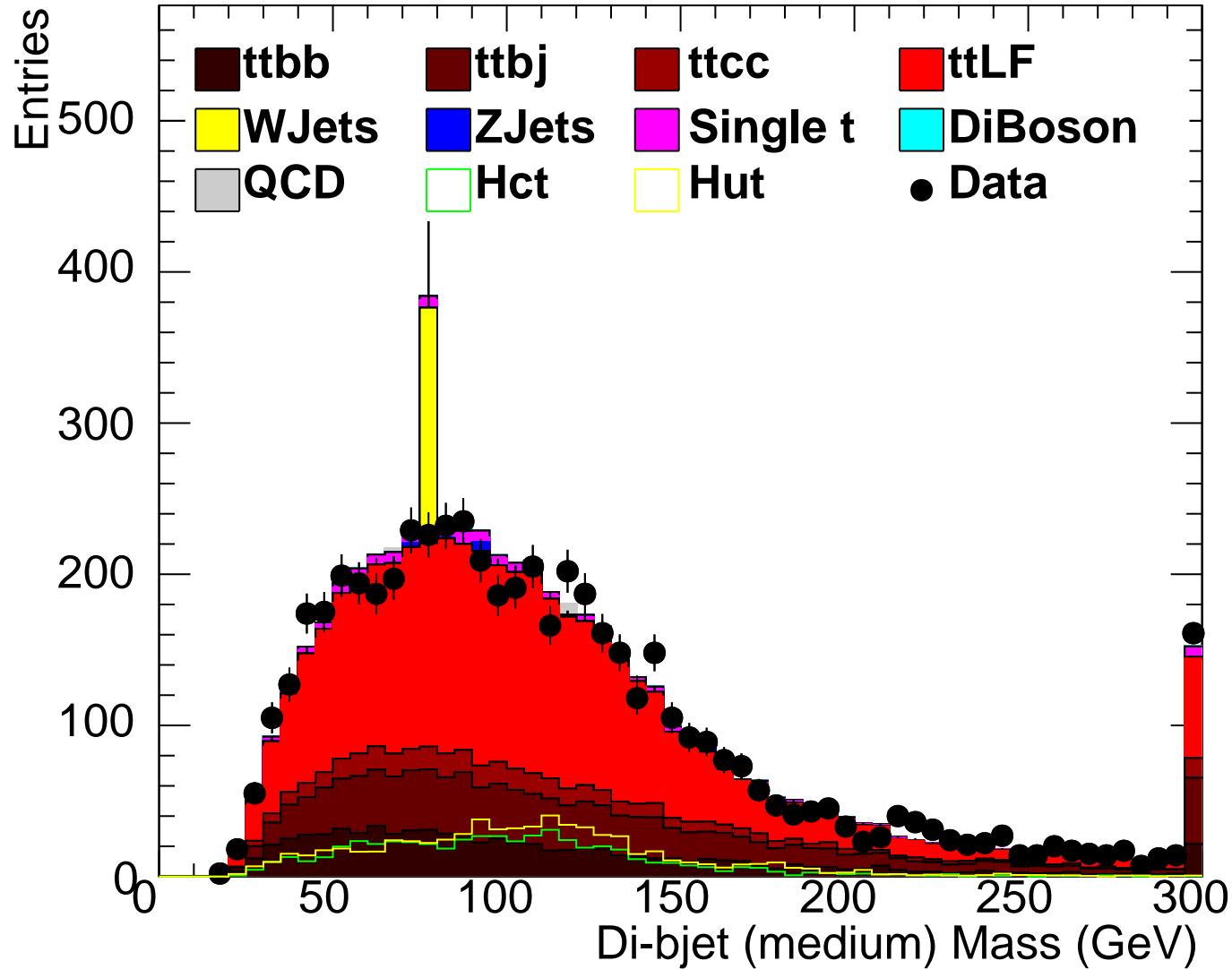


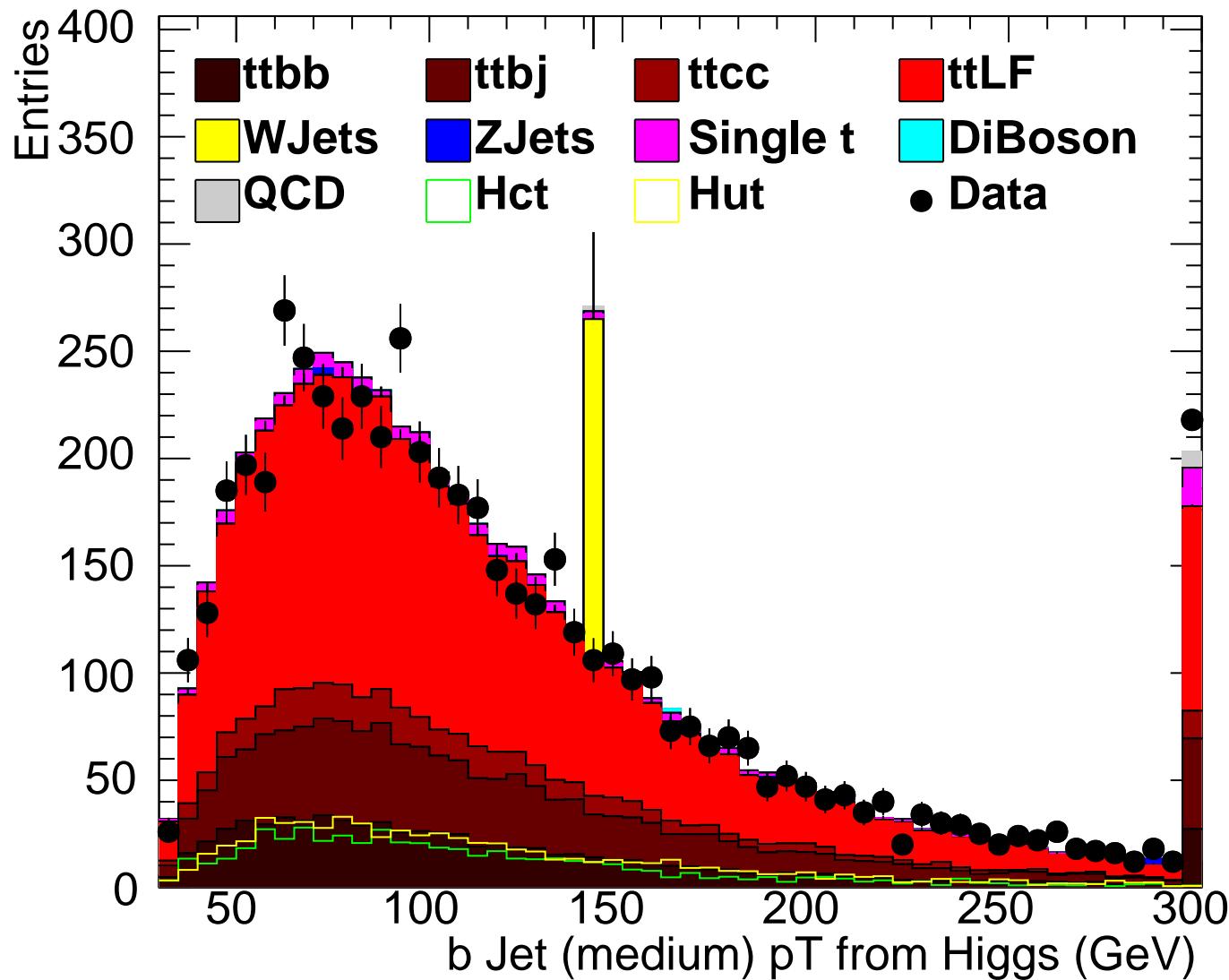


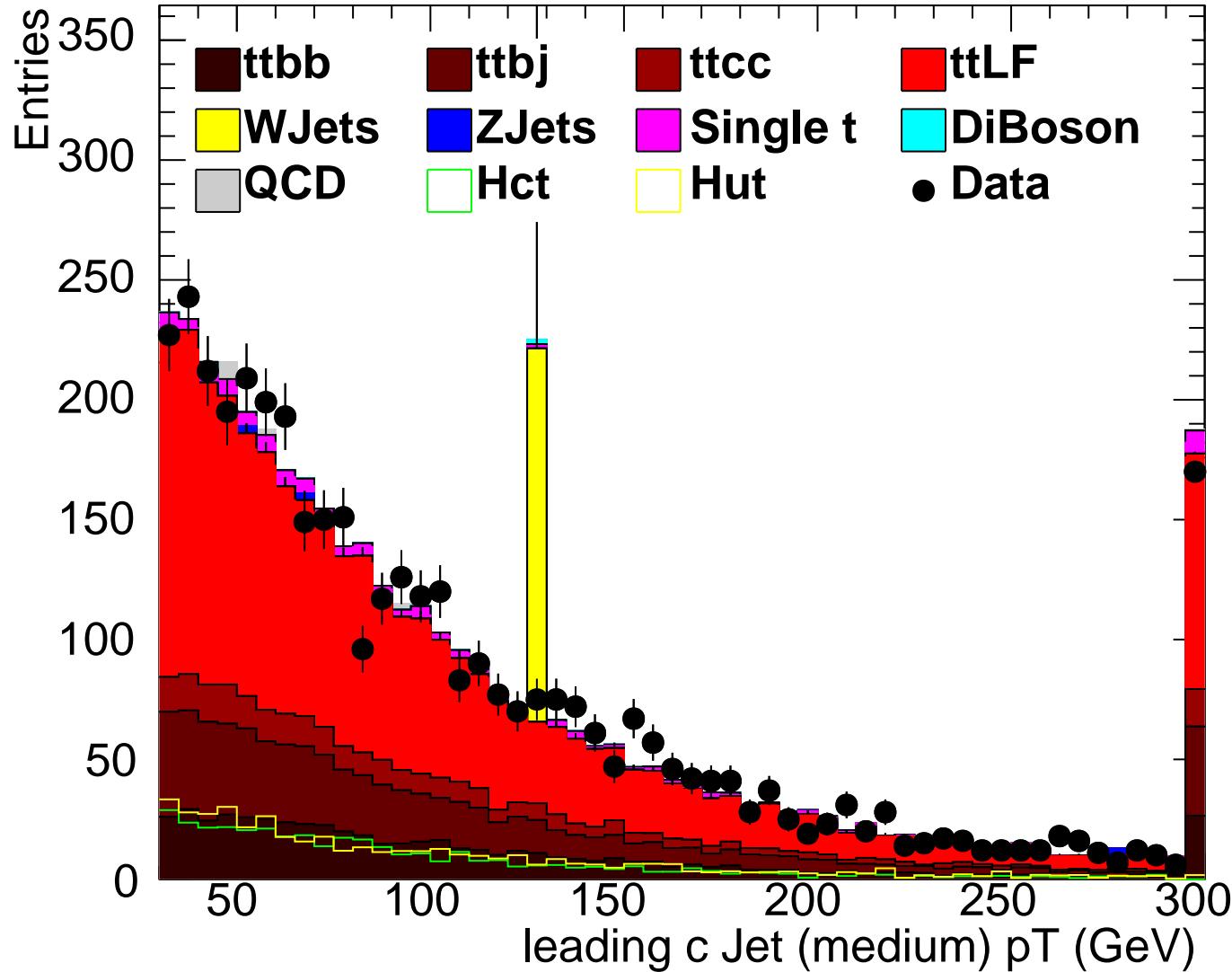


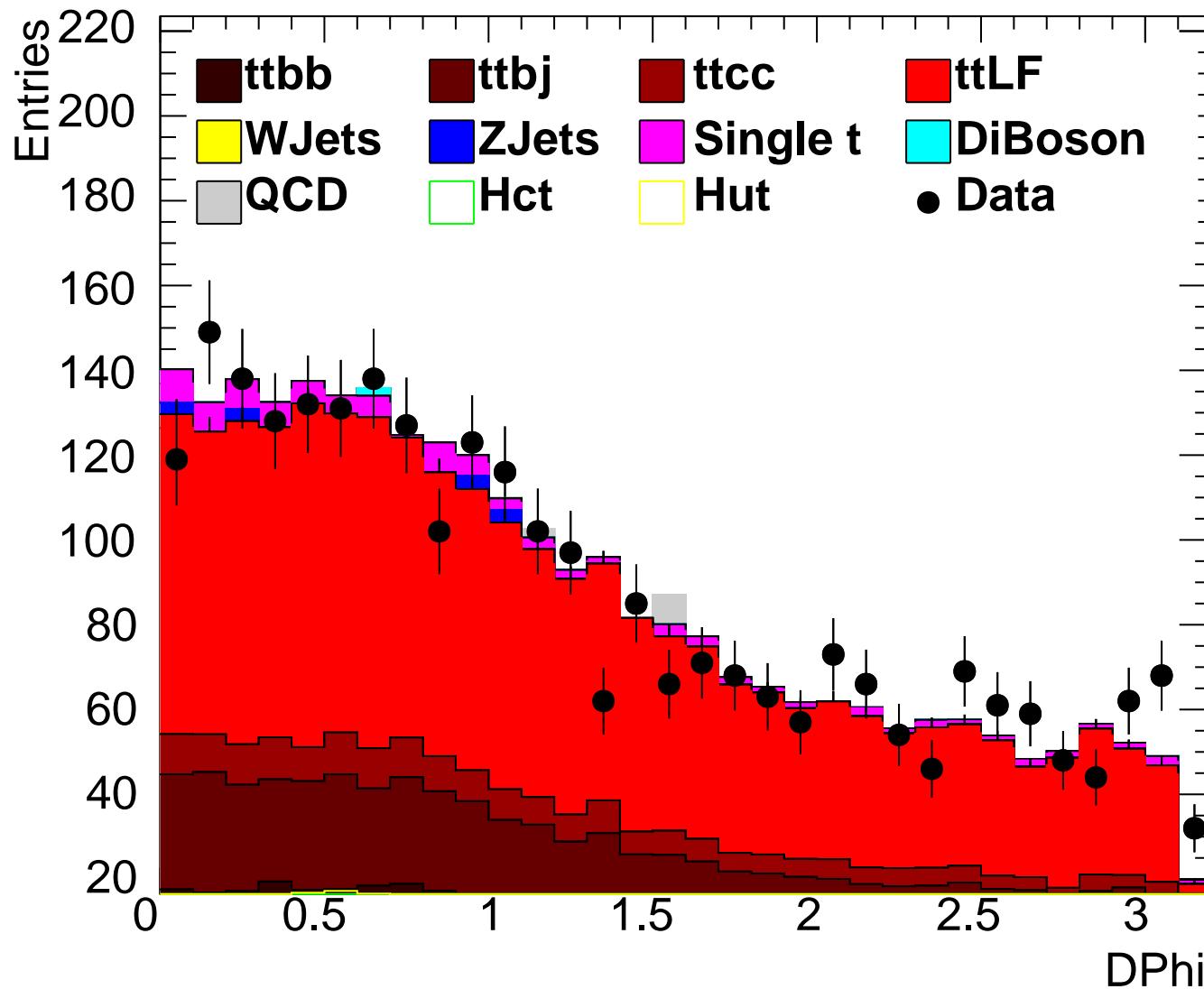
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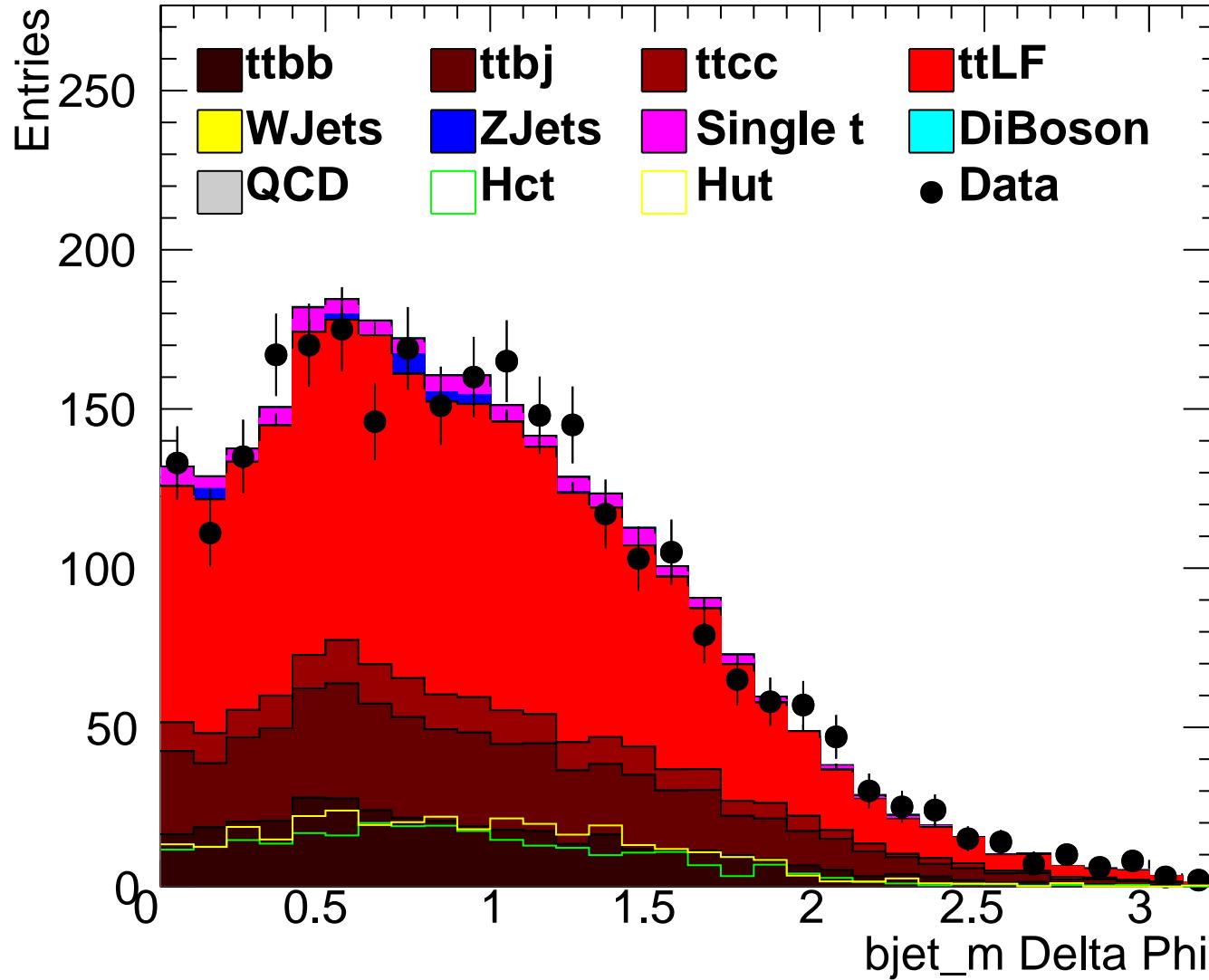
**Ch1\_S13**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

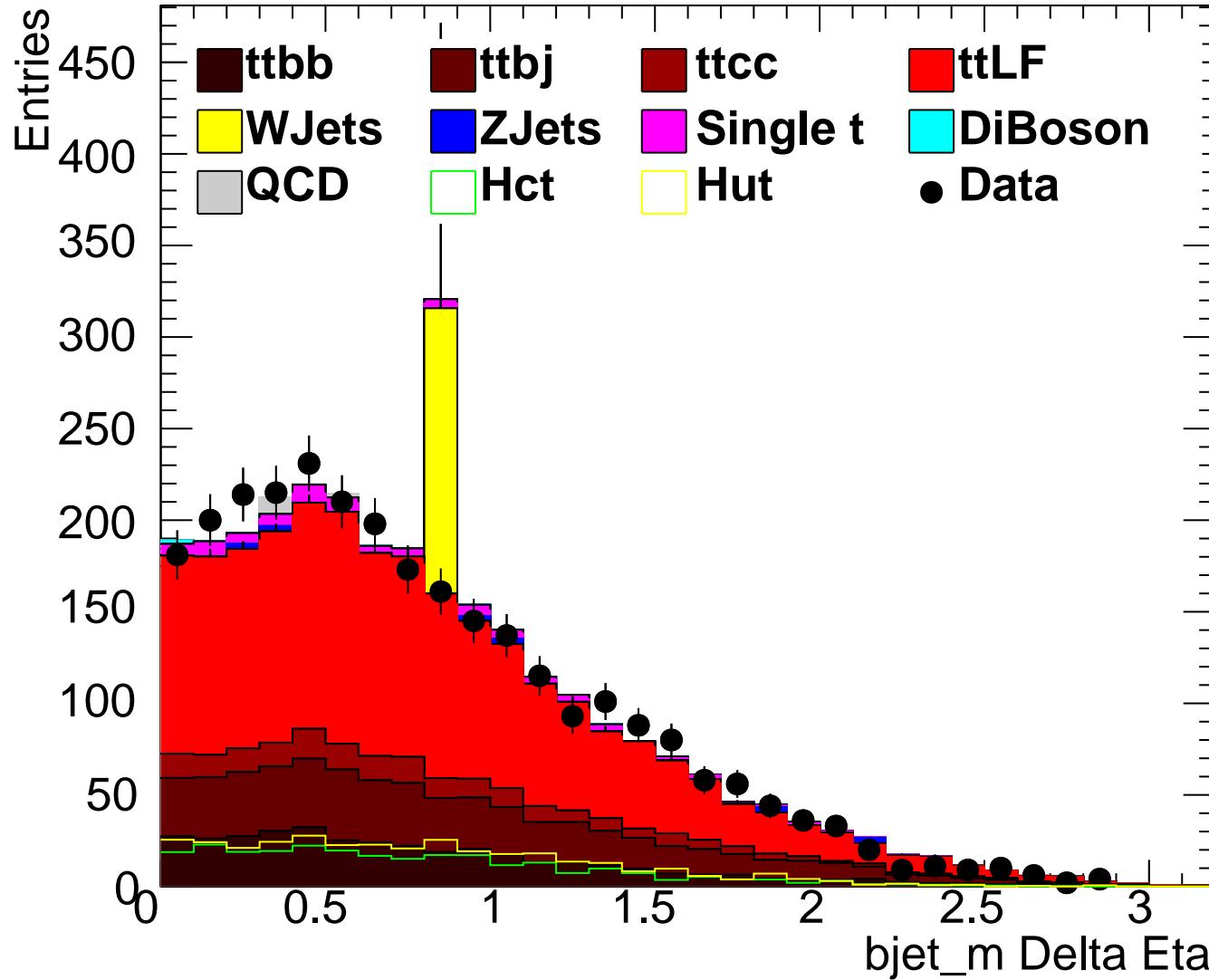
**Ch1\_S13**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

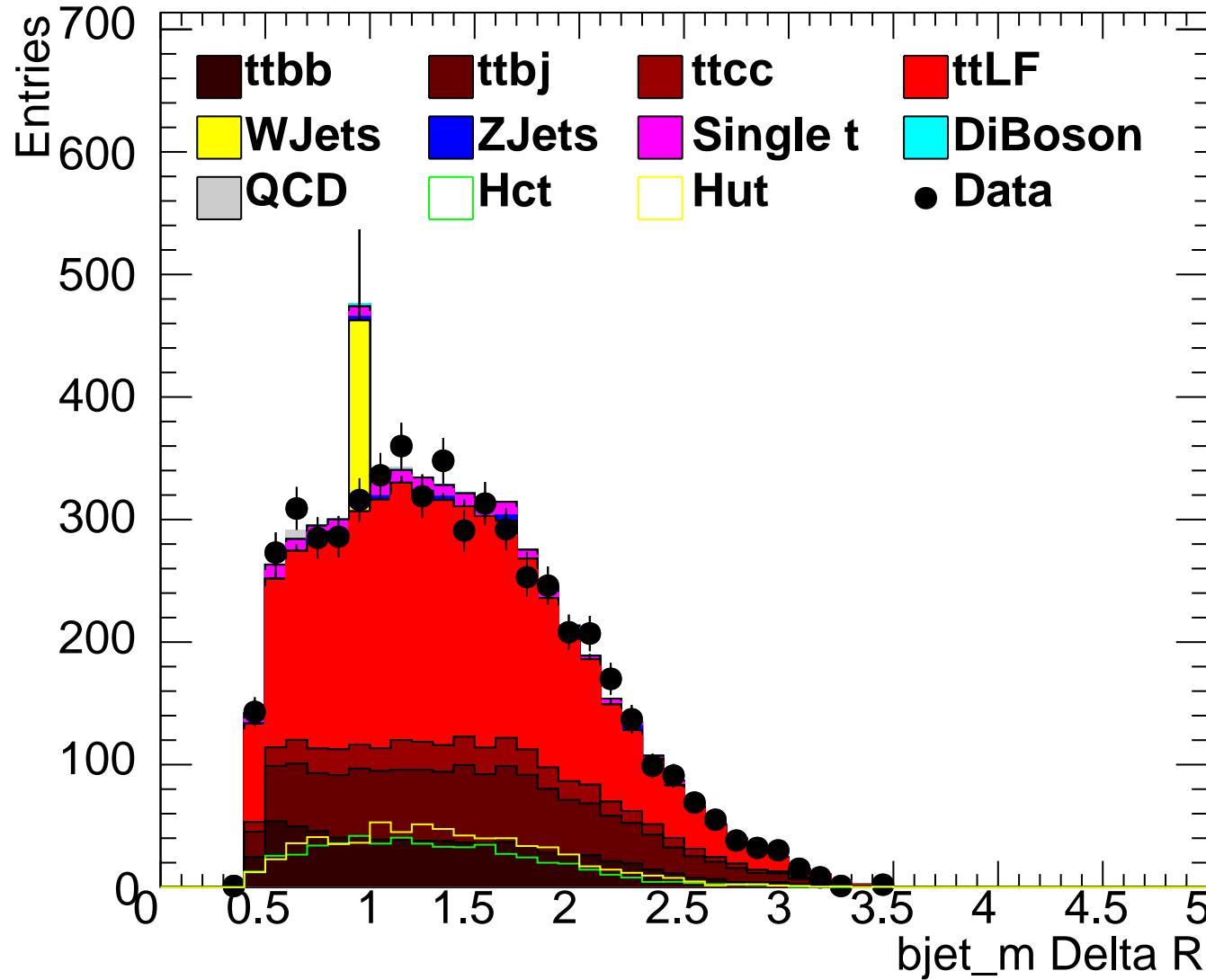
**Ch1\_S13**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

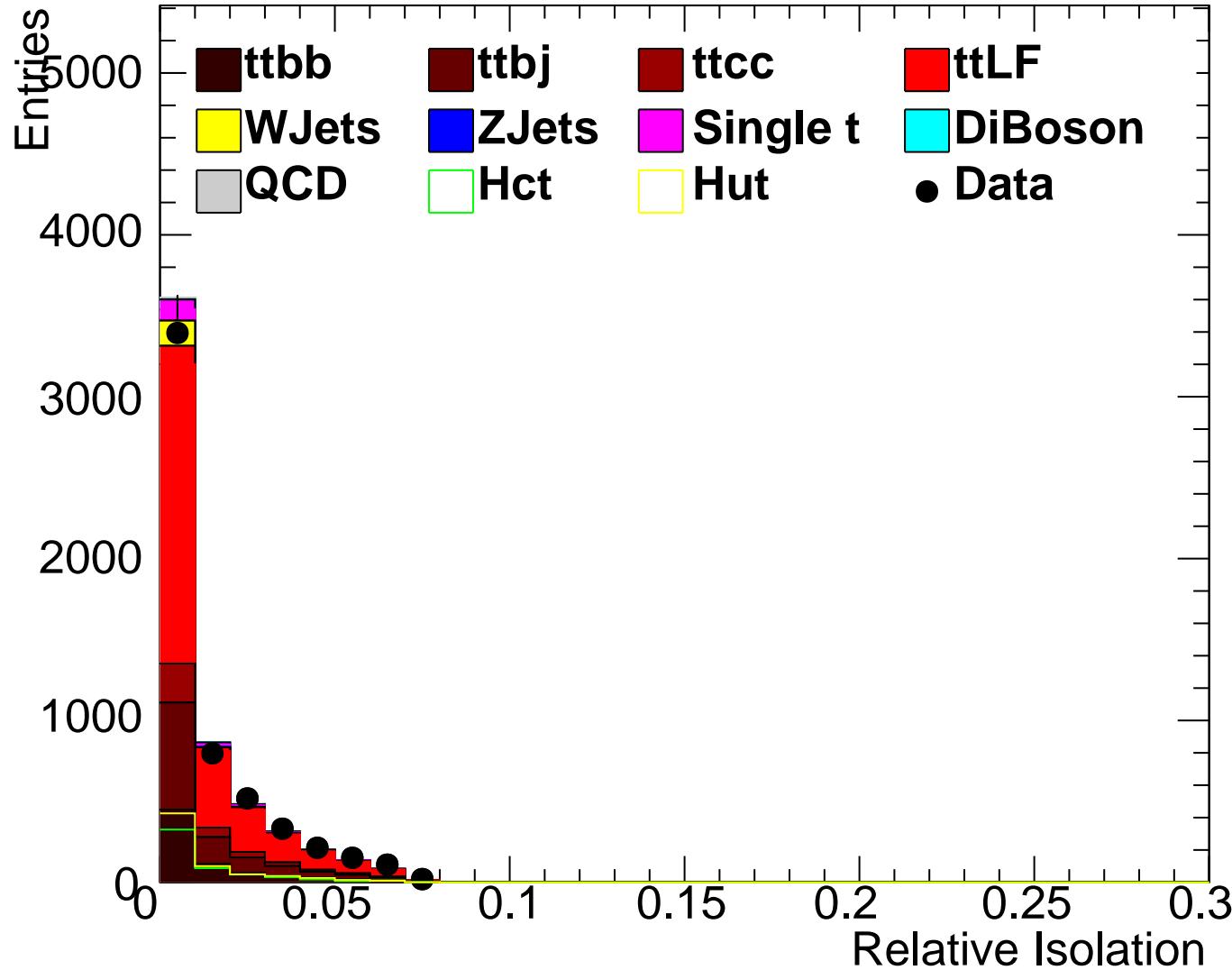
**Ch1\_S13**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

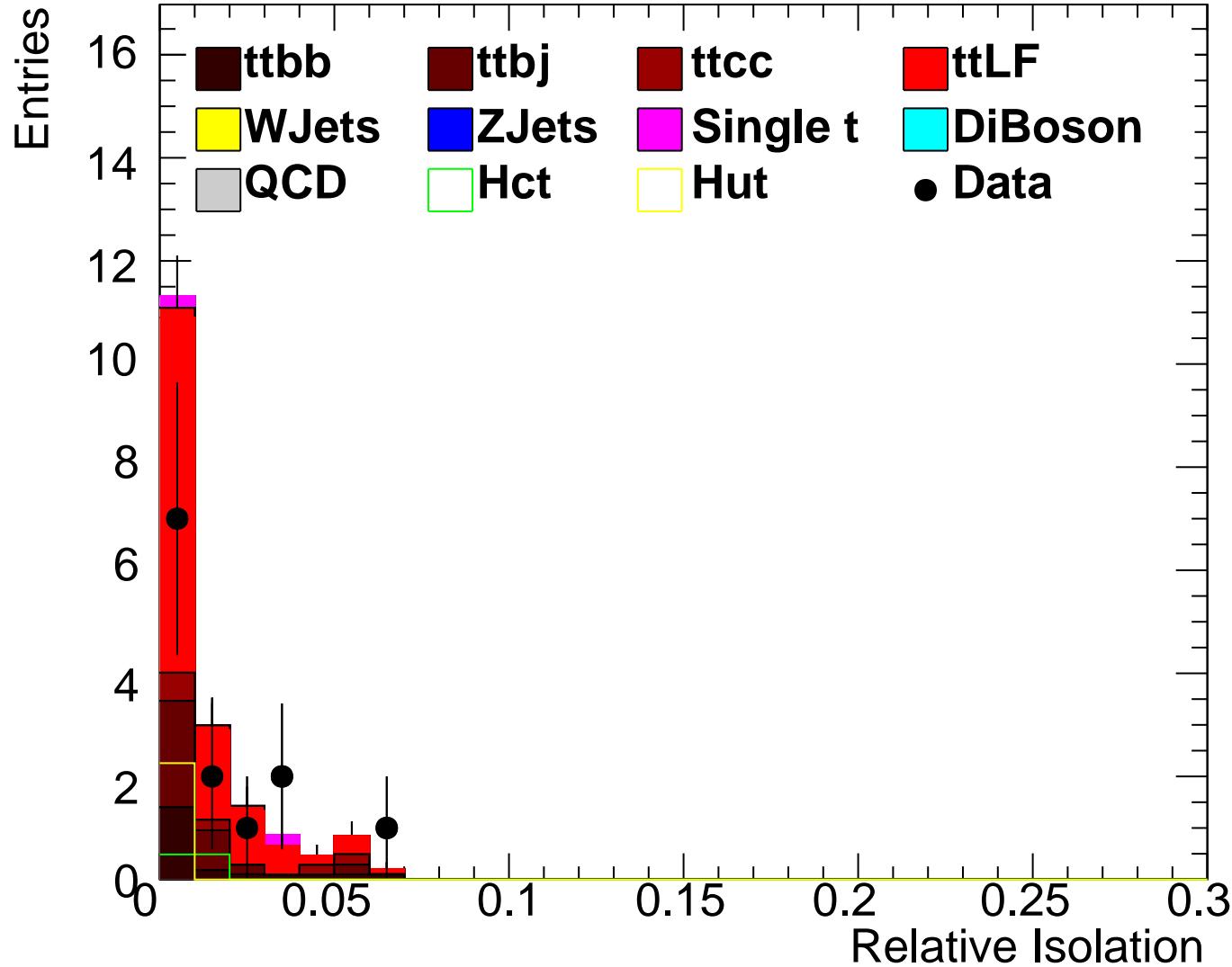


**Ch1\_S13**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch1\_S13**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

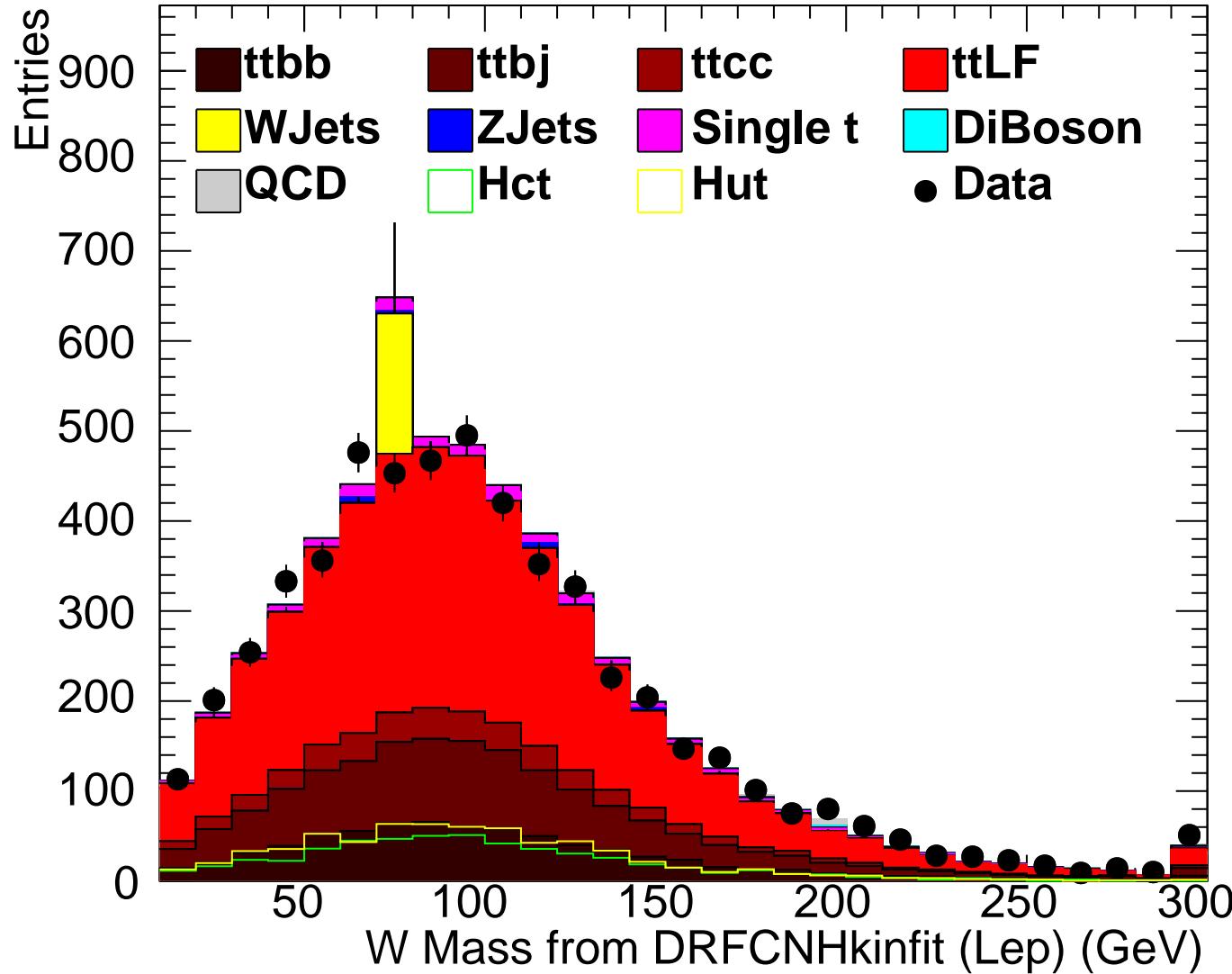


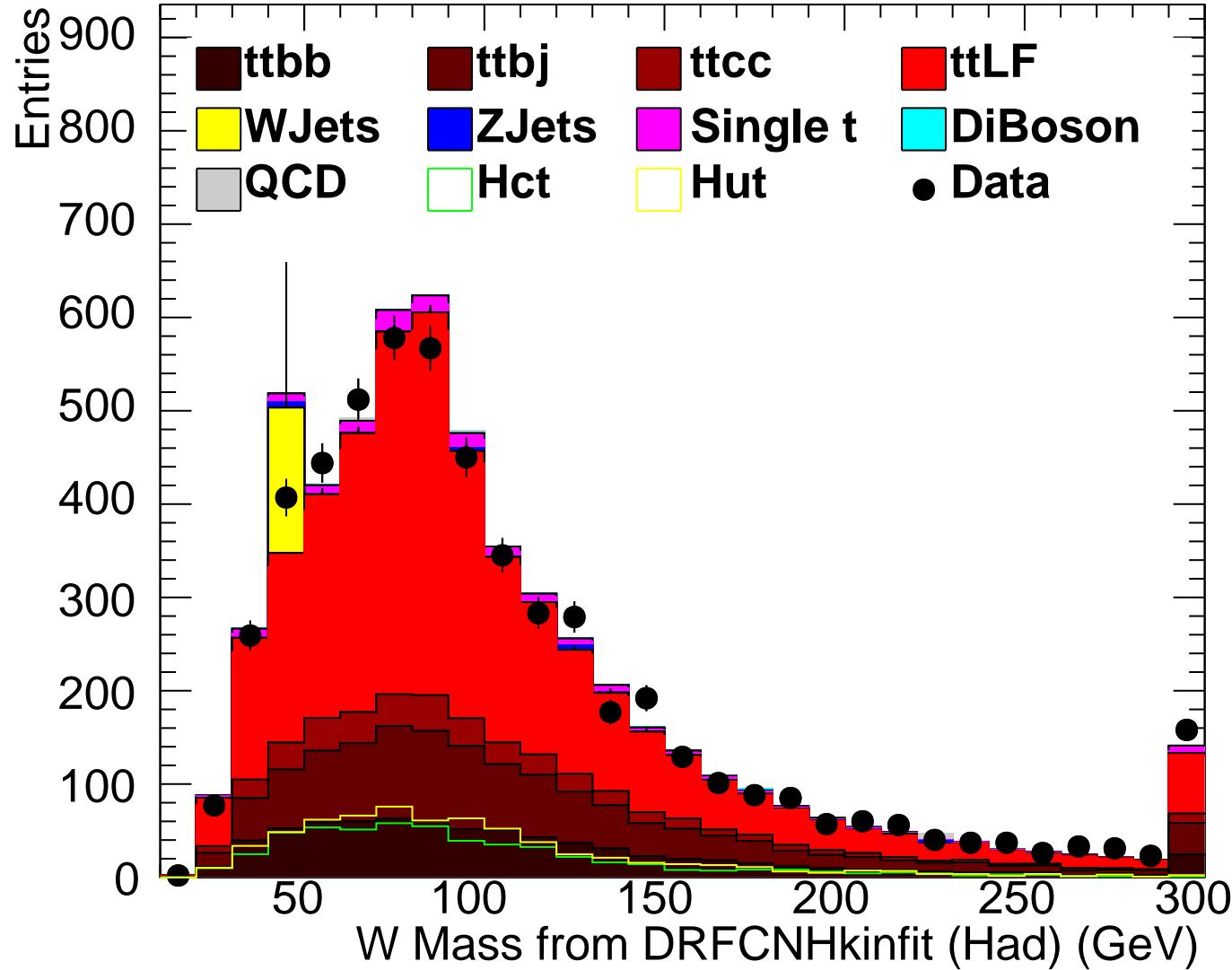


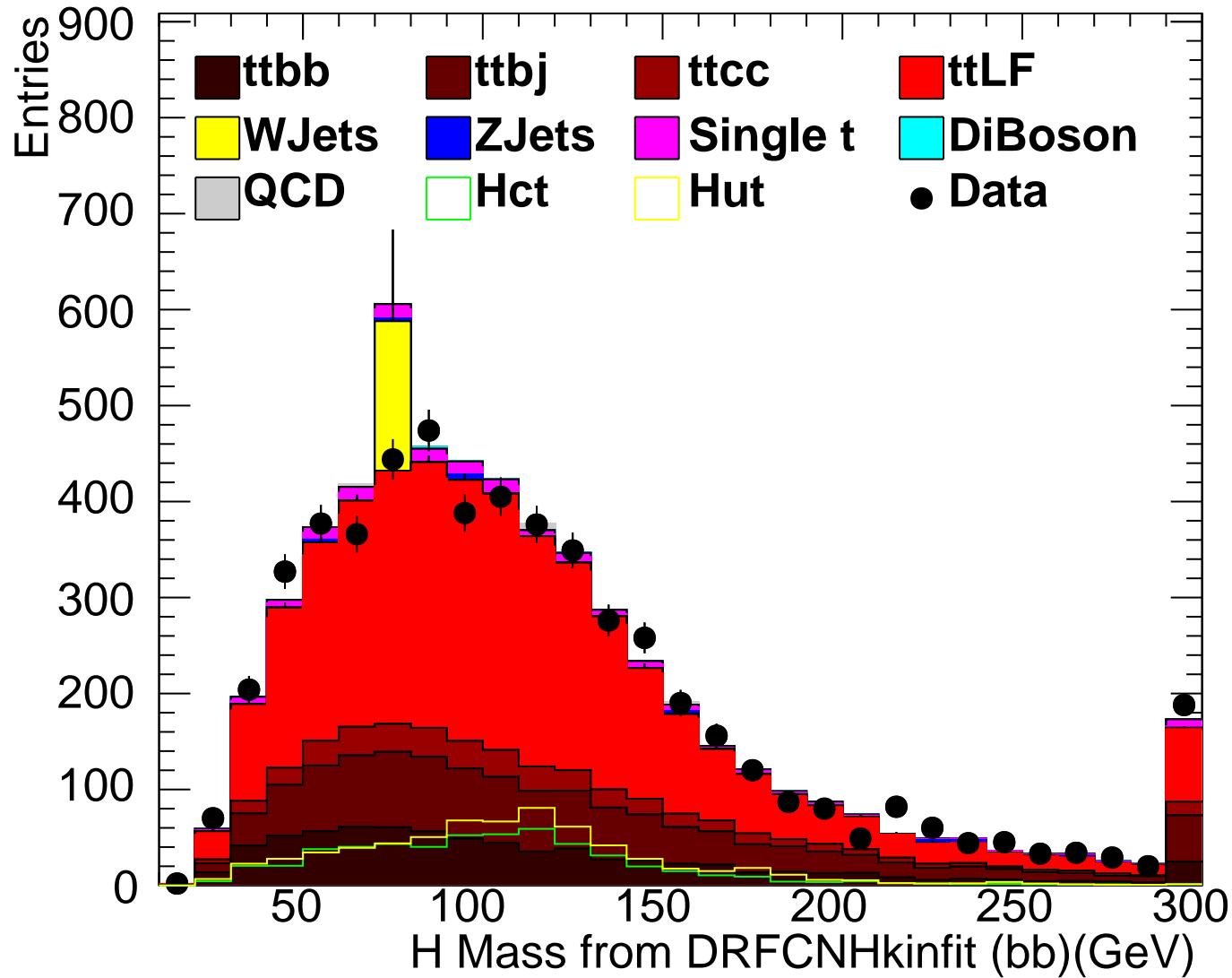


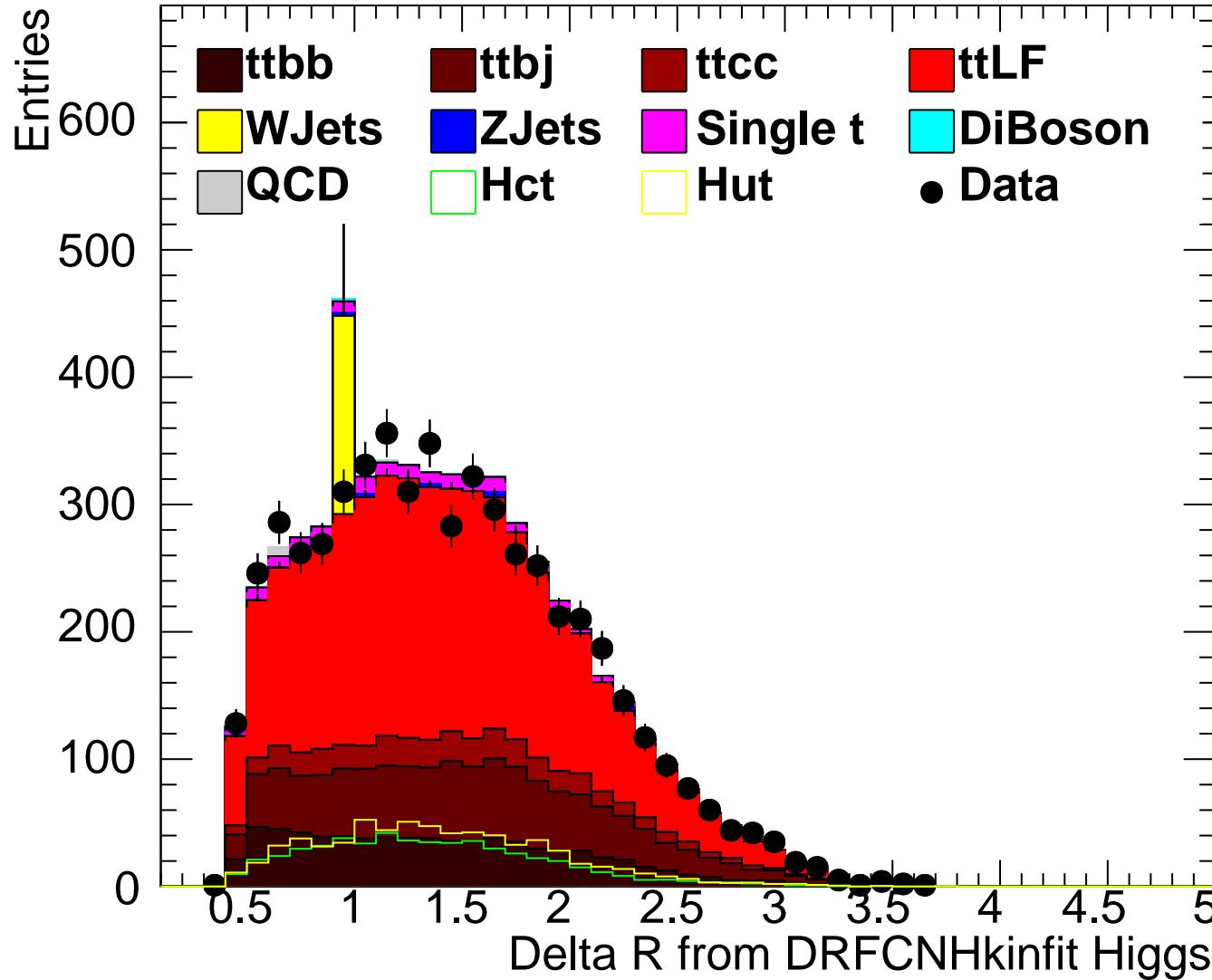
Ch1 S13

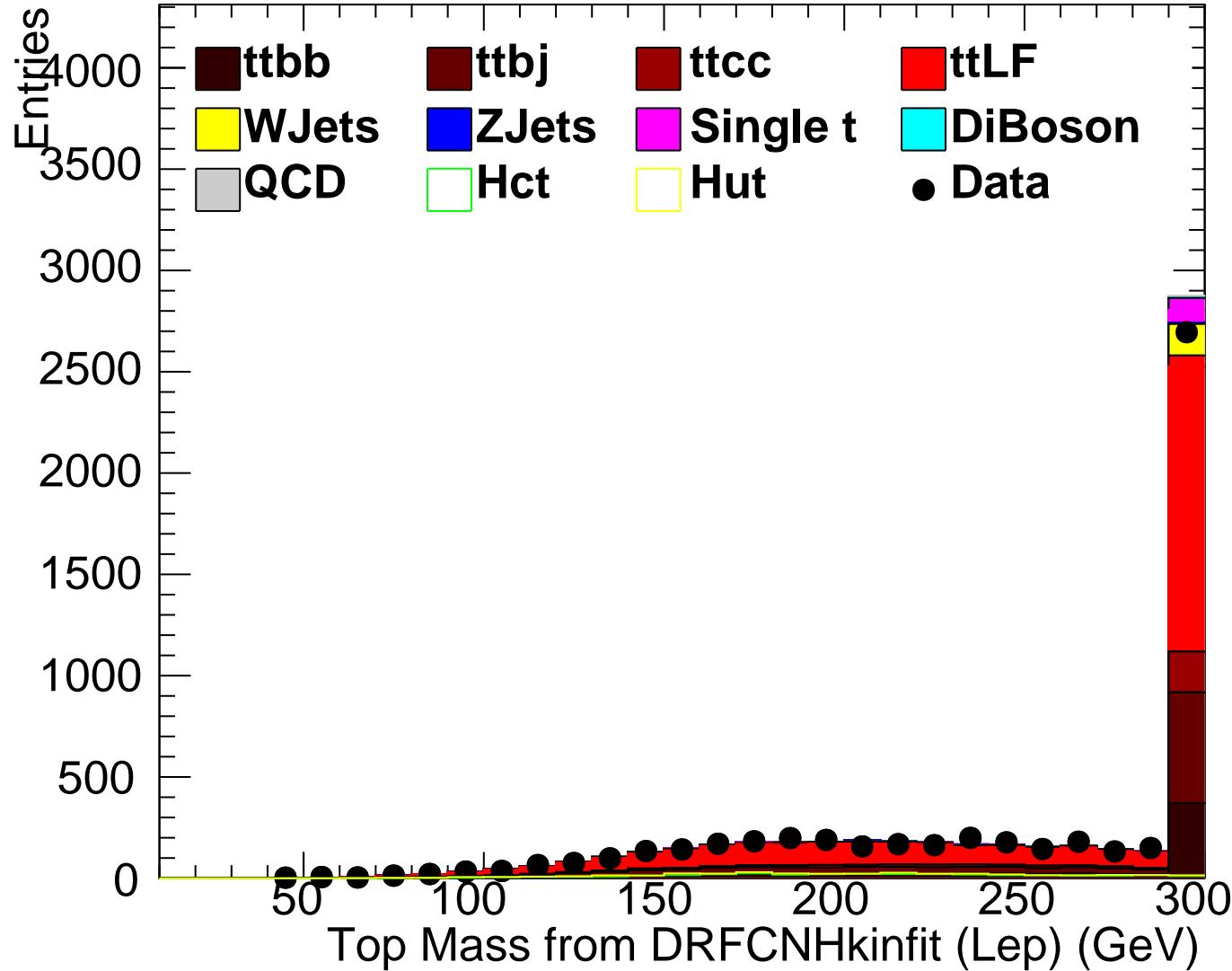
CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$

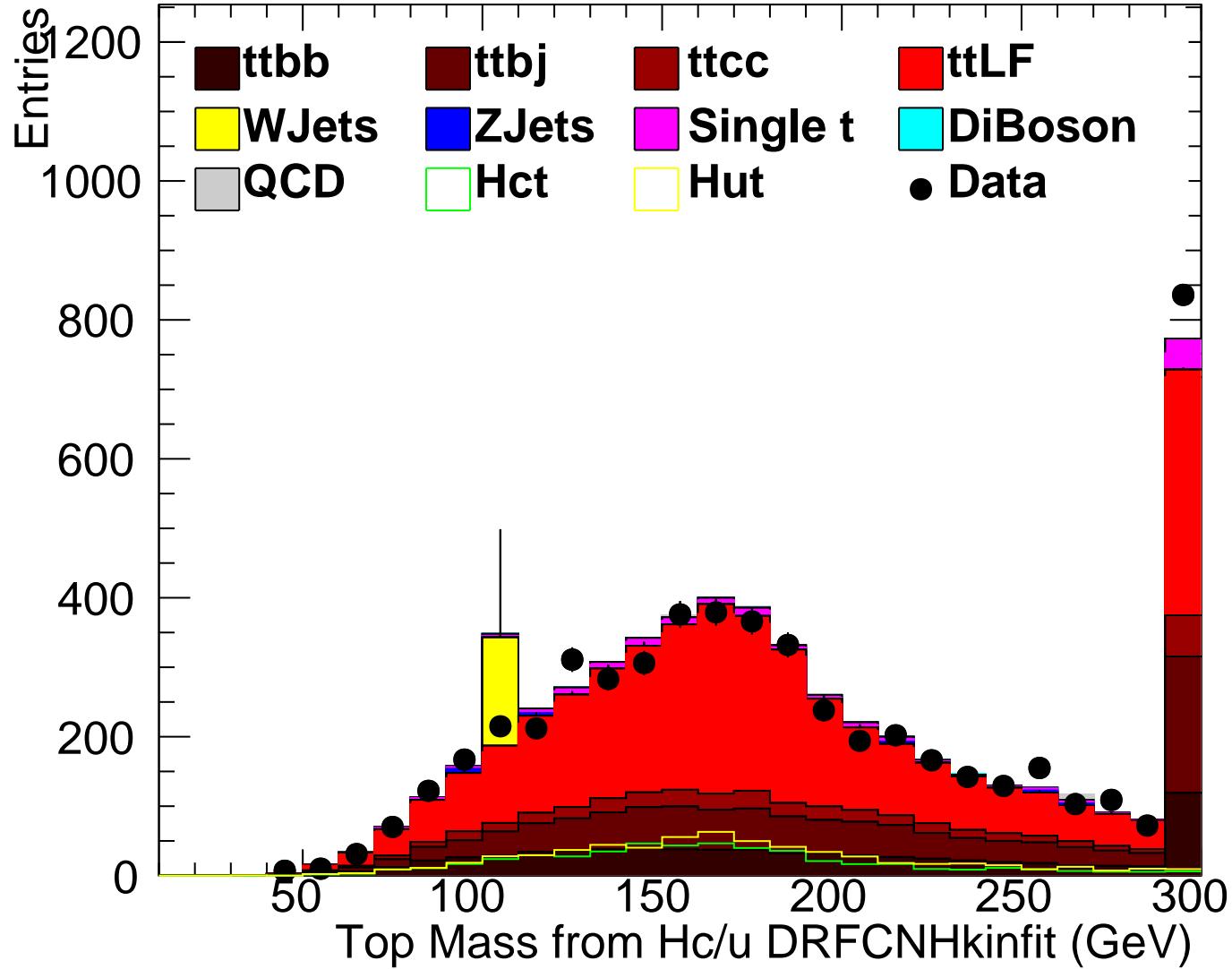


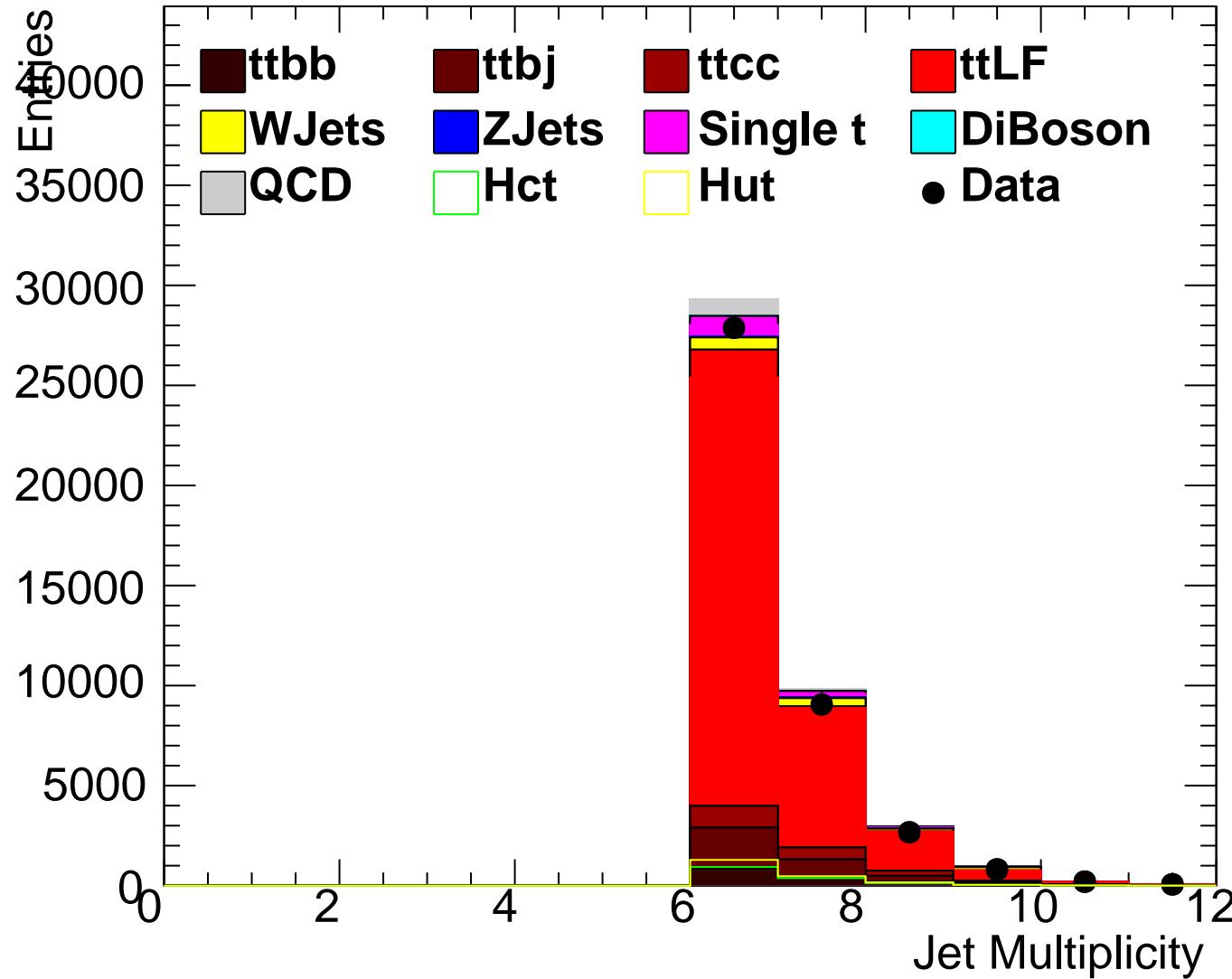


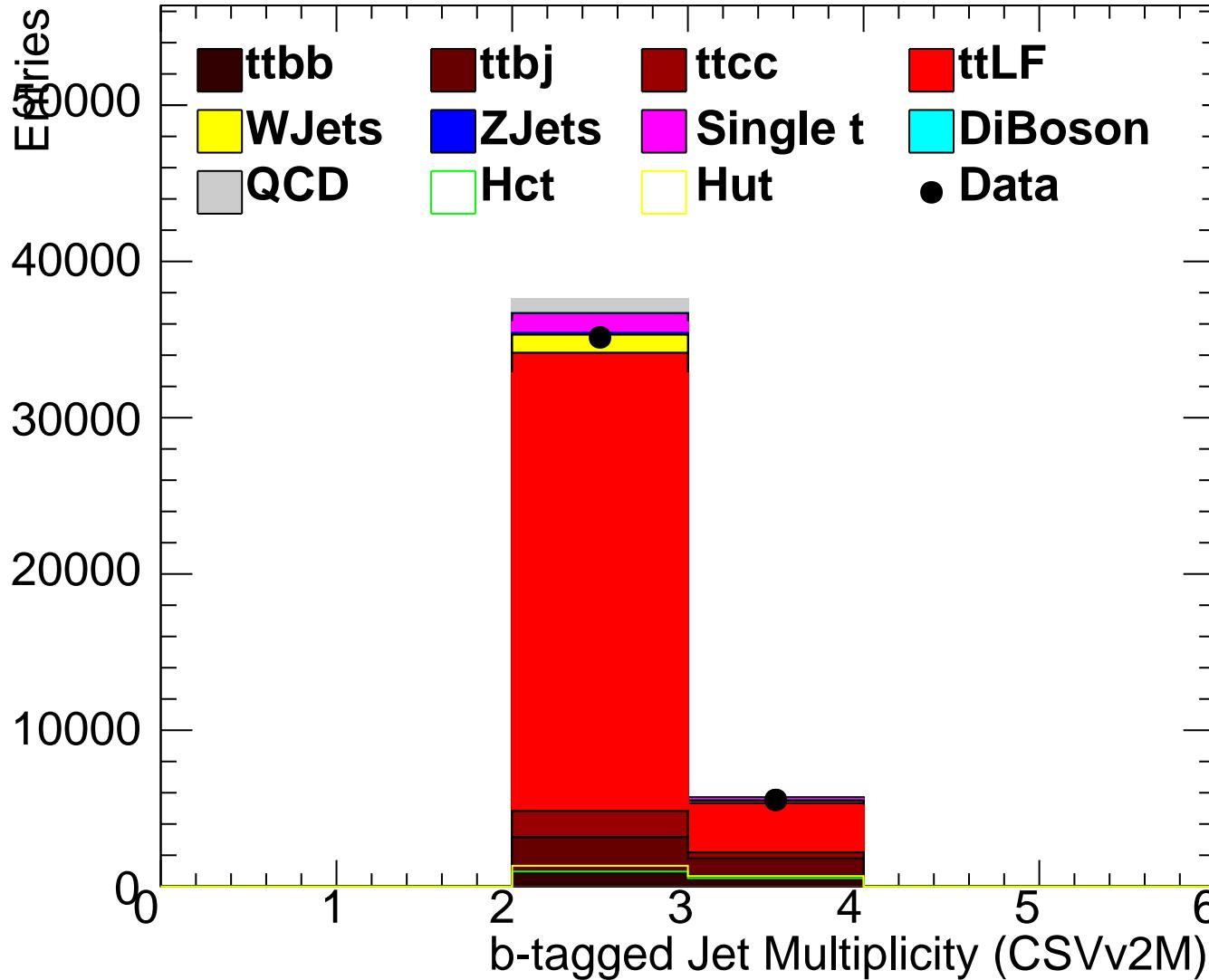
**Ch1\_S13**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

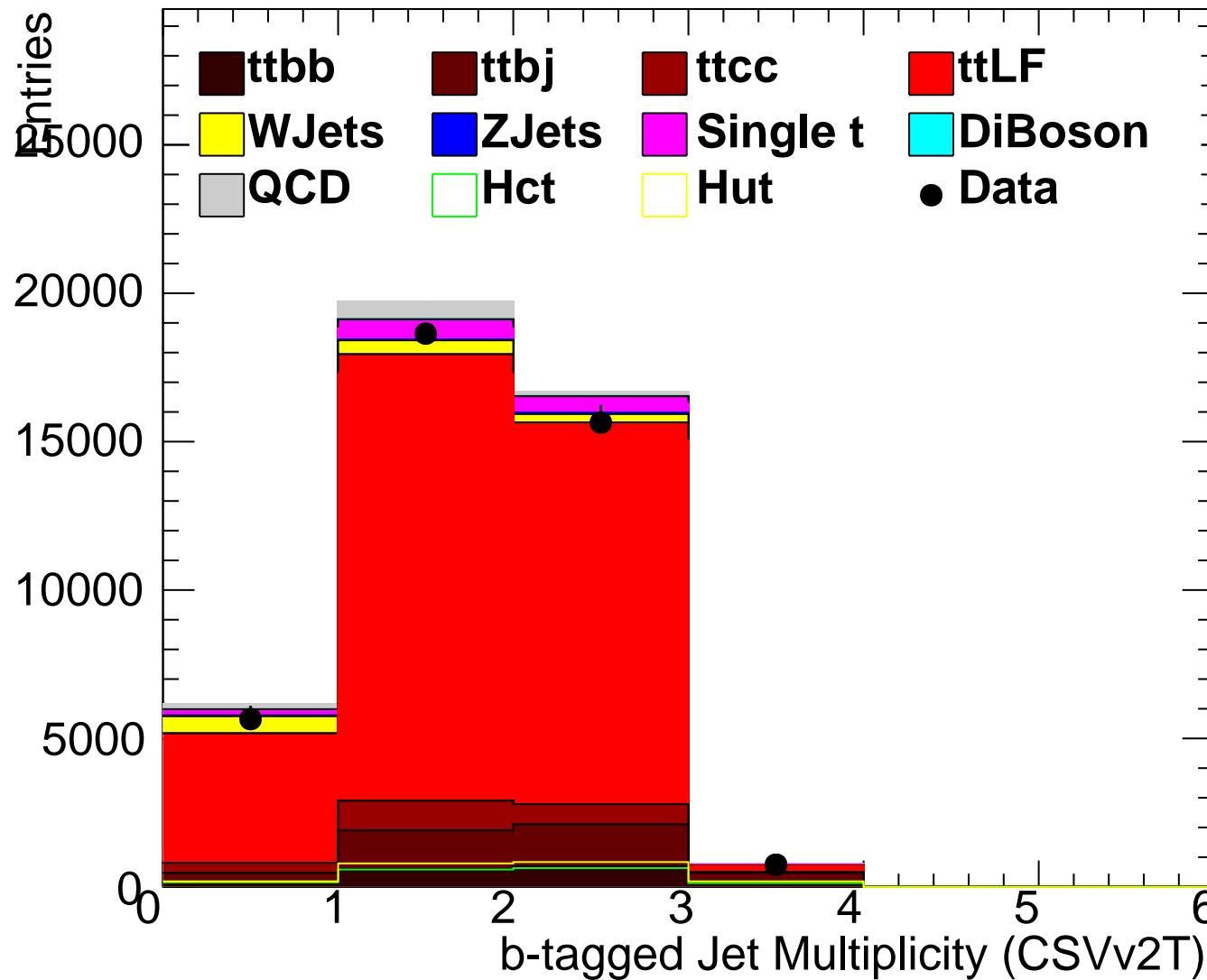




**Ch1\_S13**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

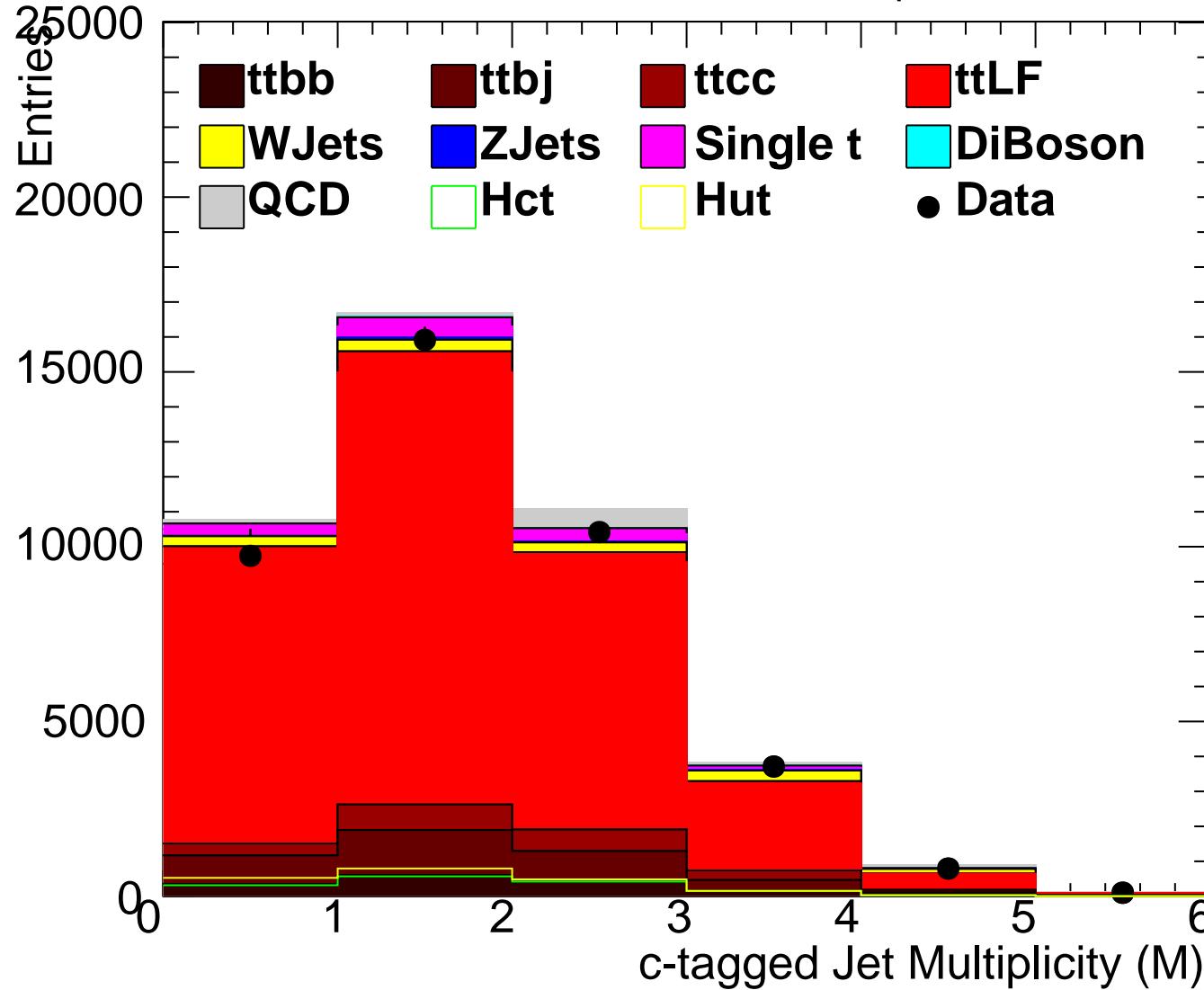


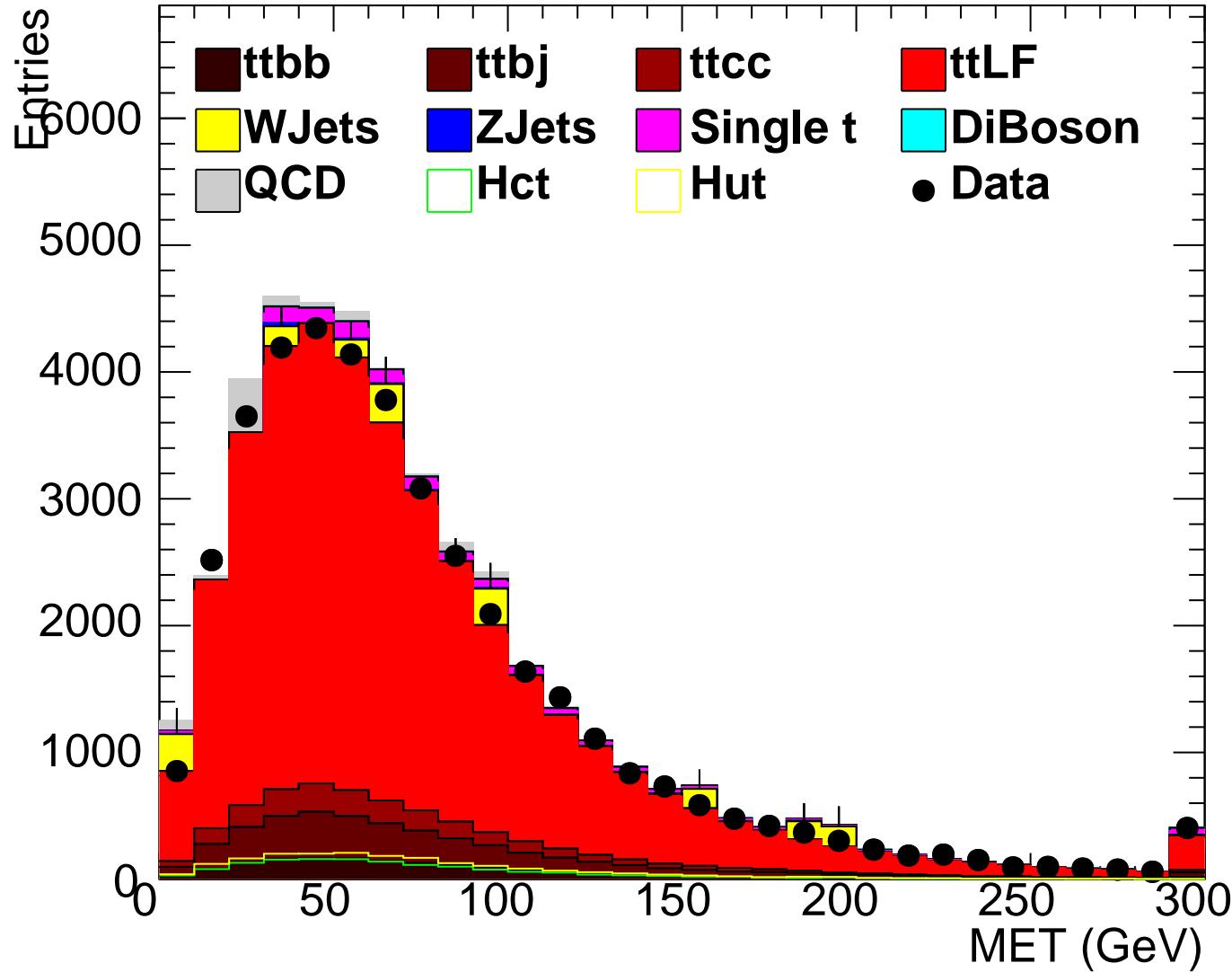


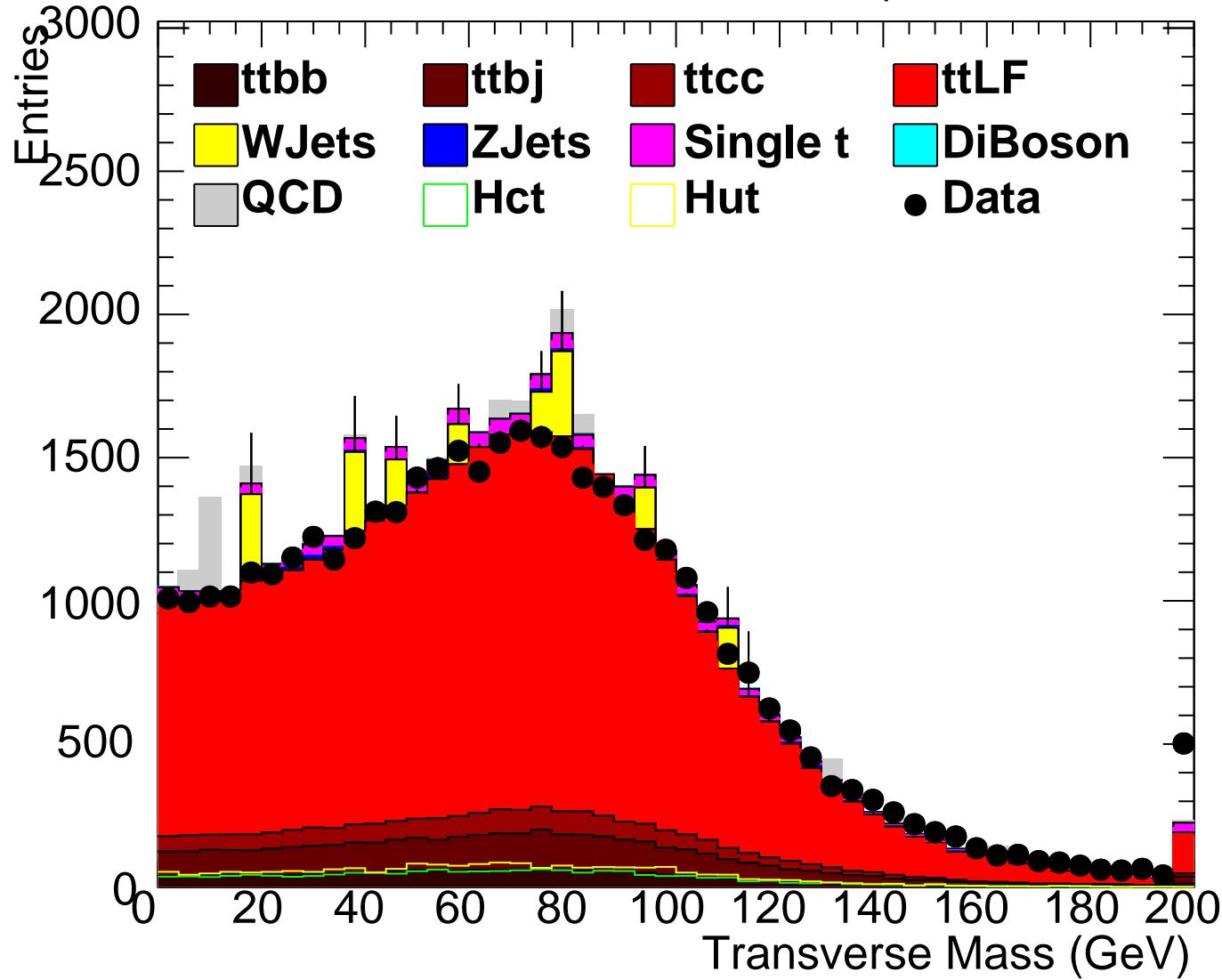


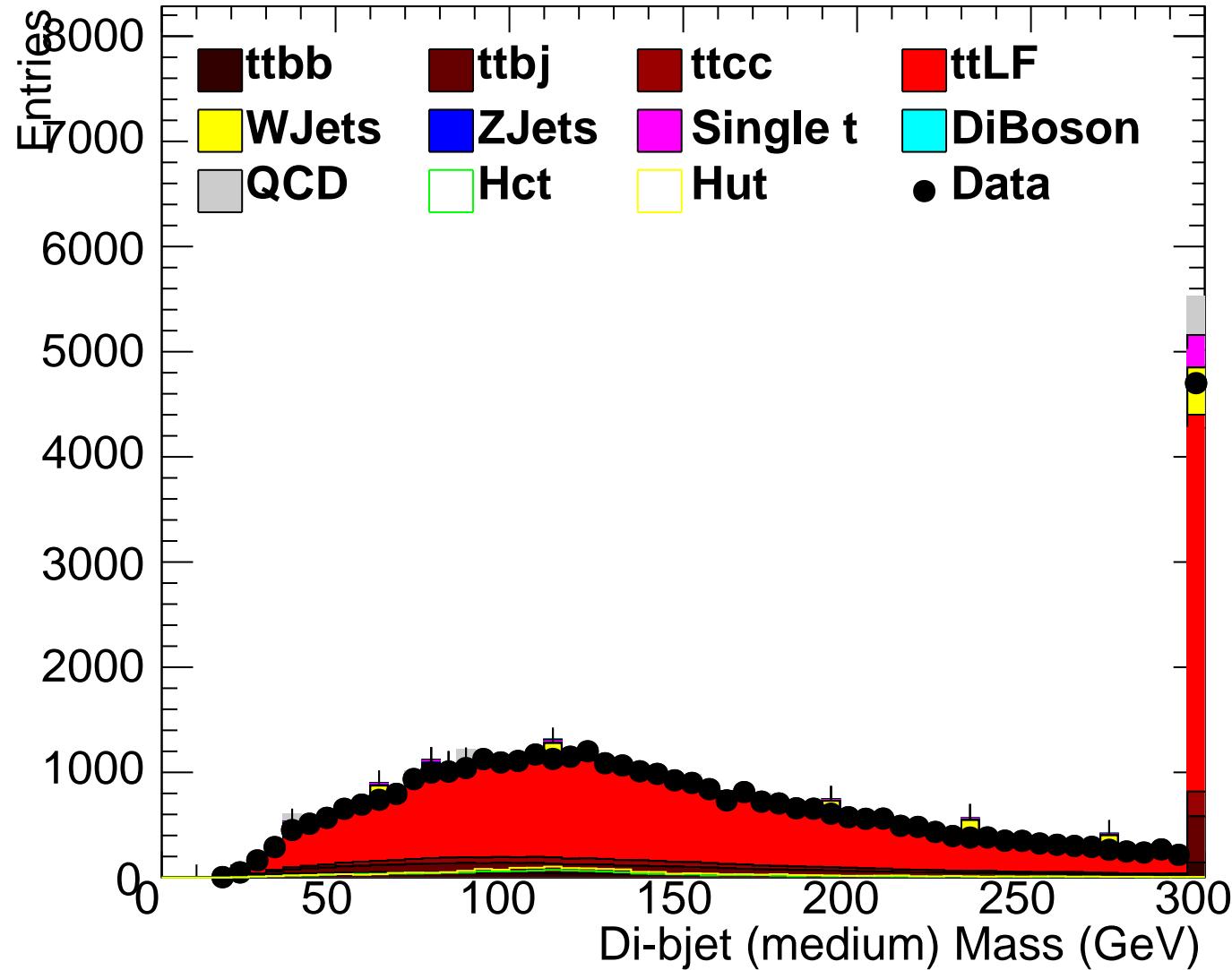
Ch1\_S14

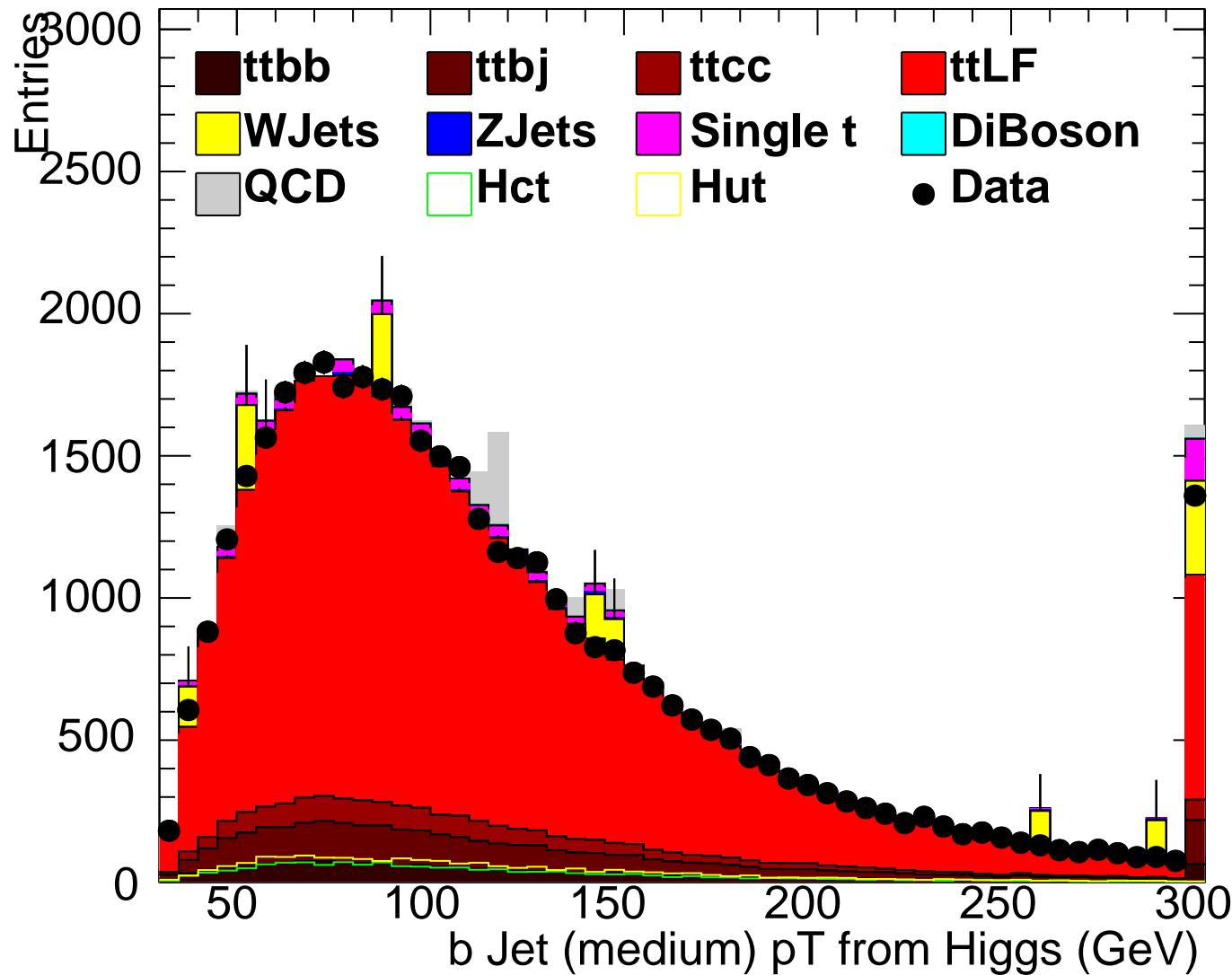
CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$

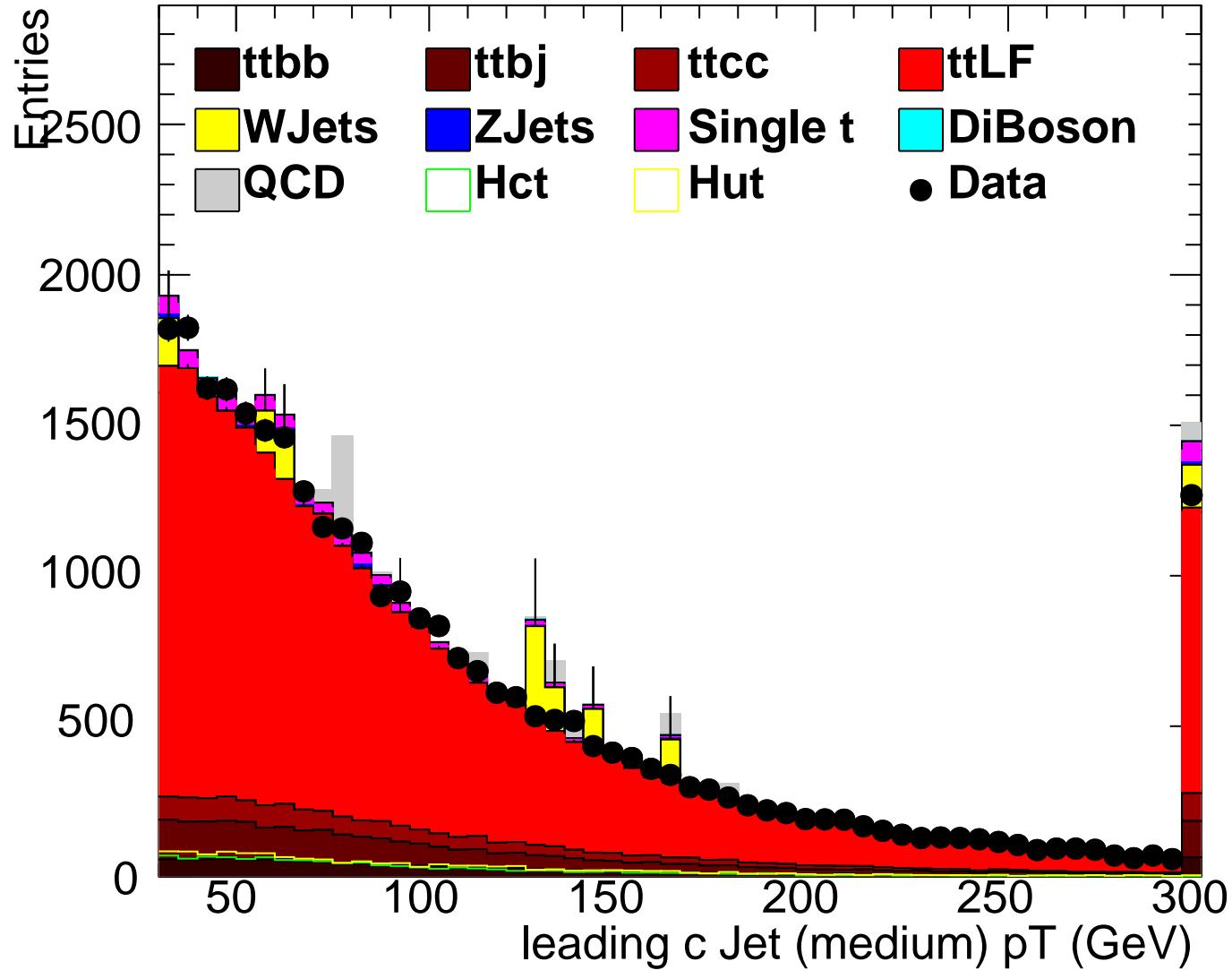


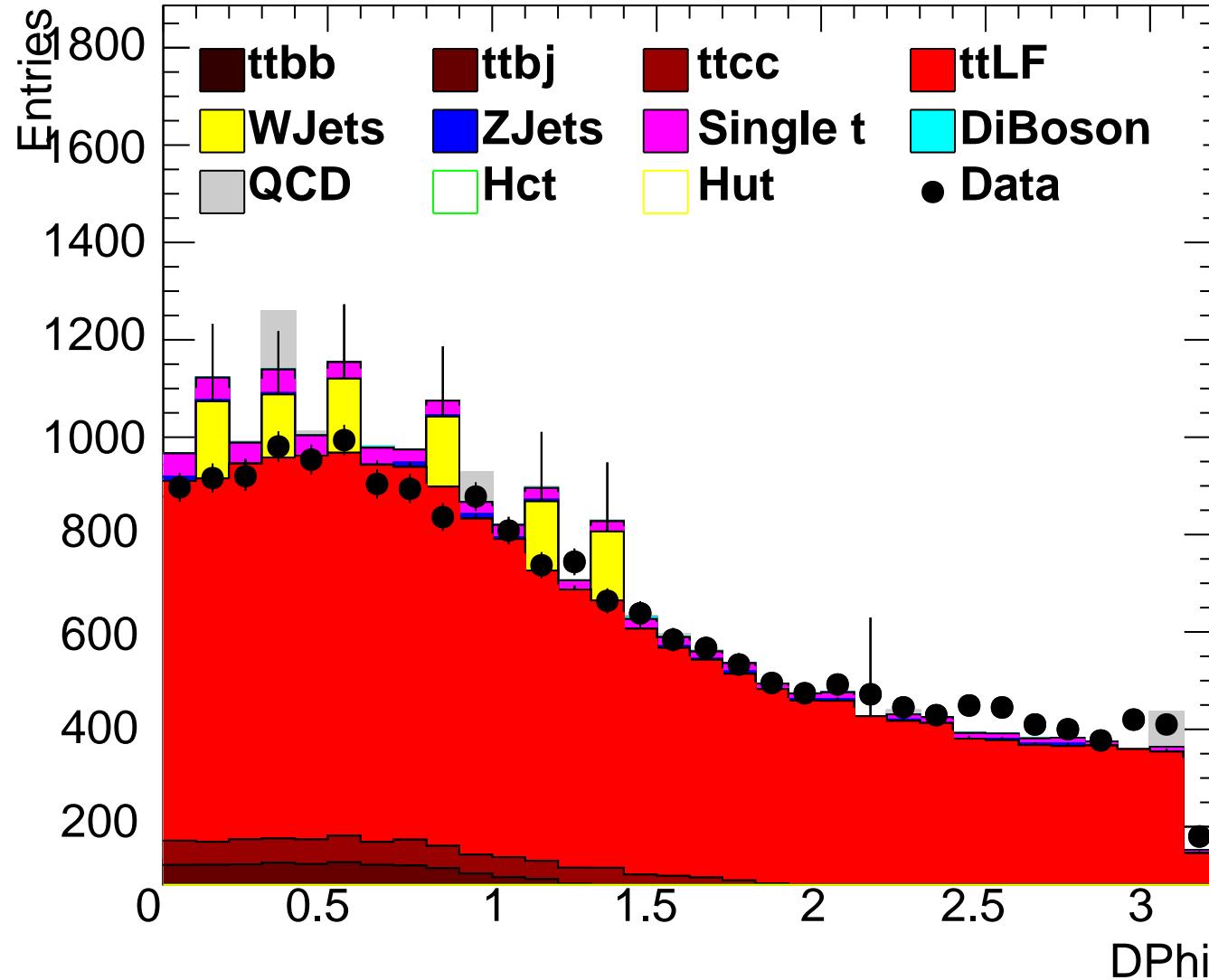
**Ch1\_S14**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

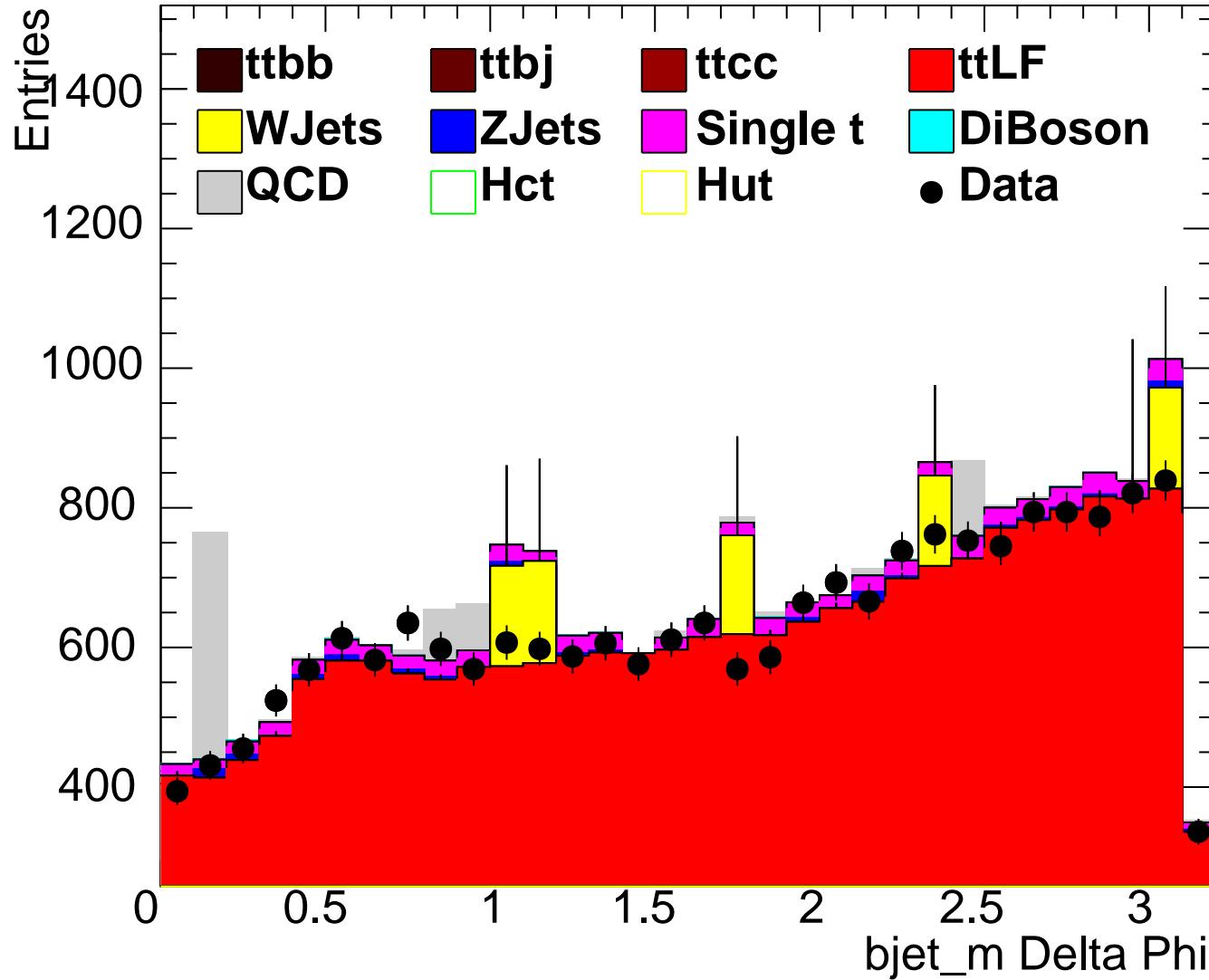
**Ch1\_S14**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

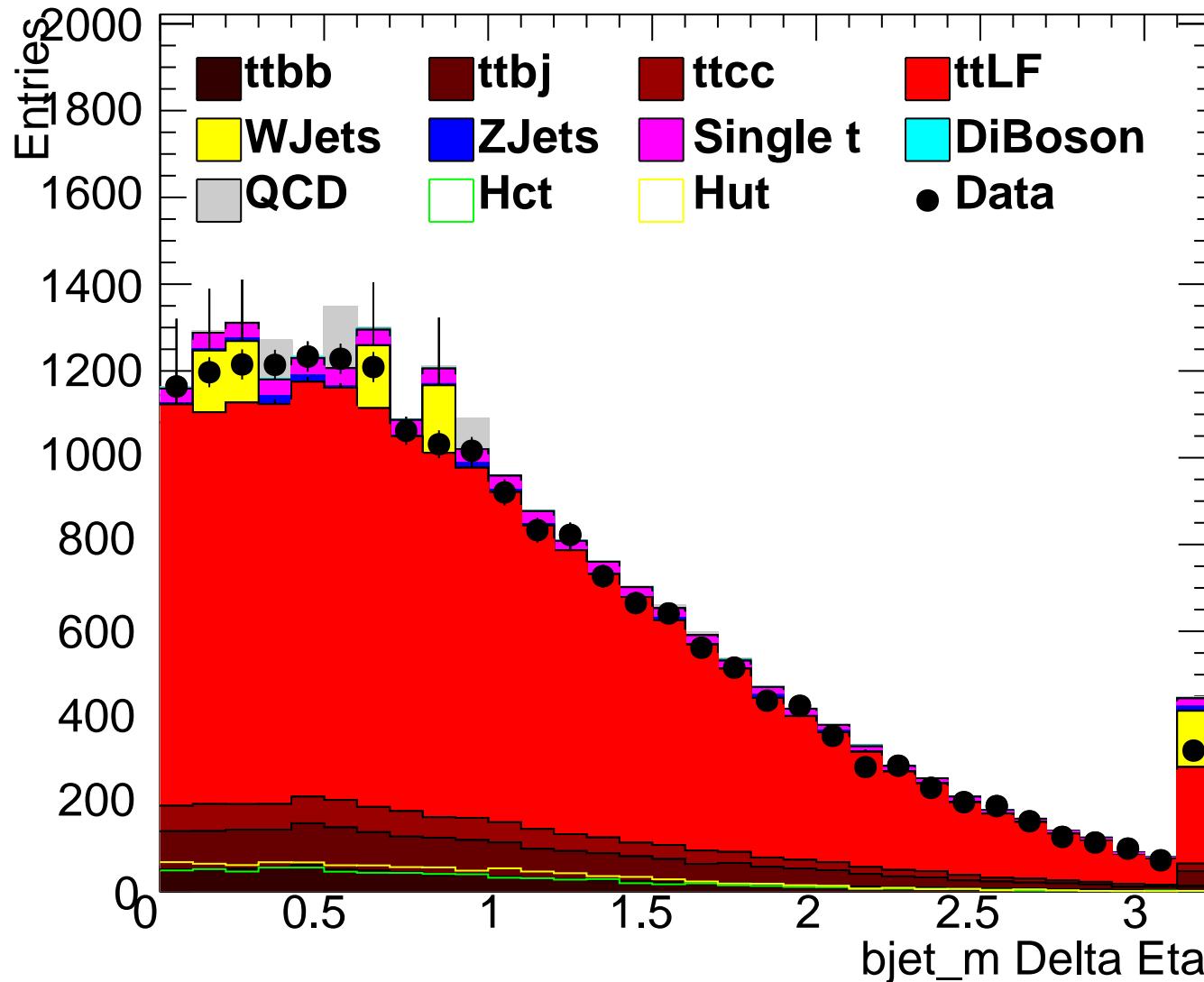


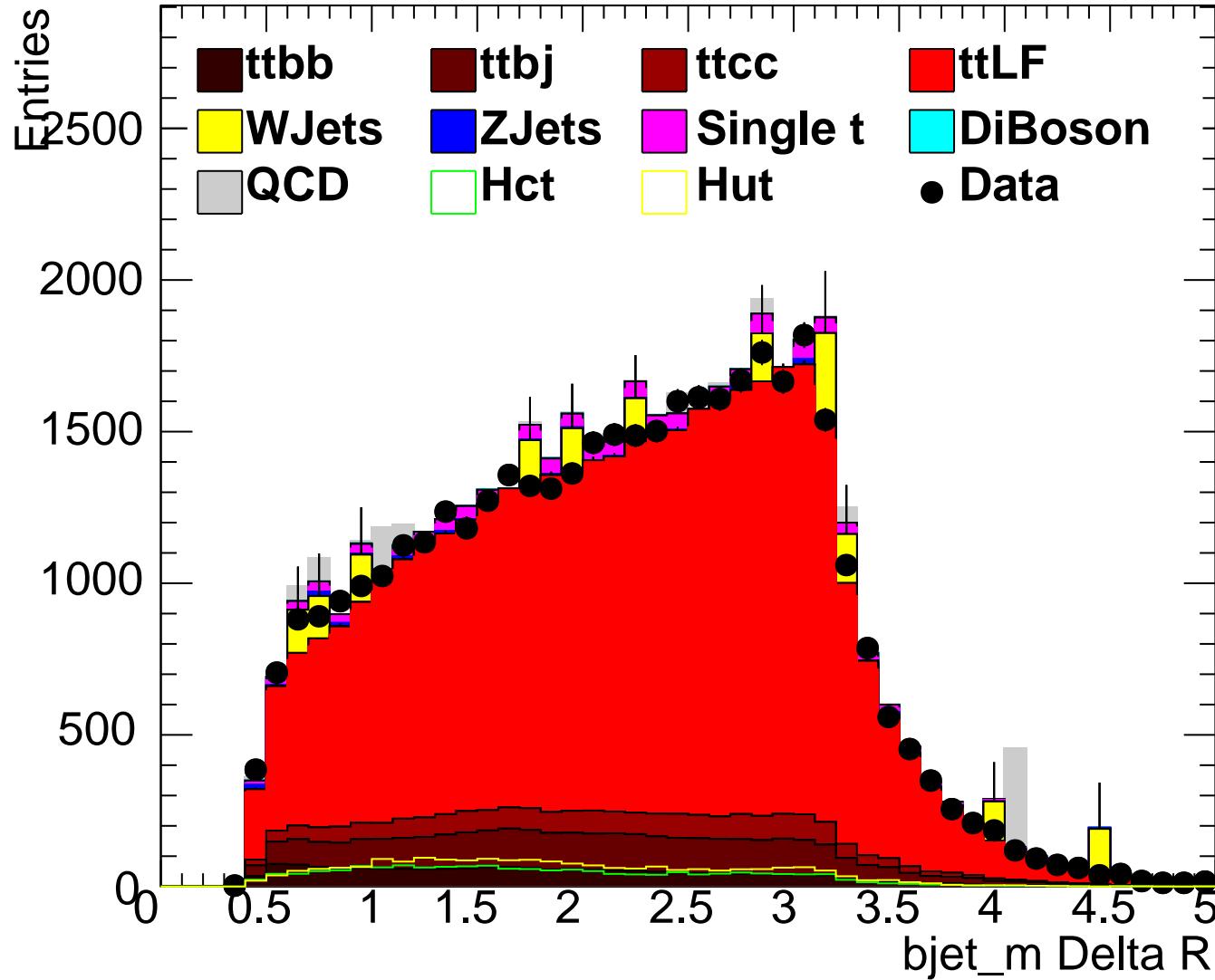


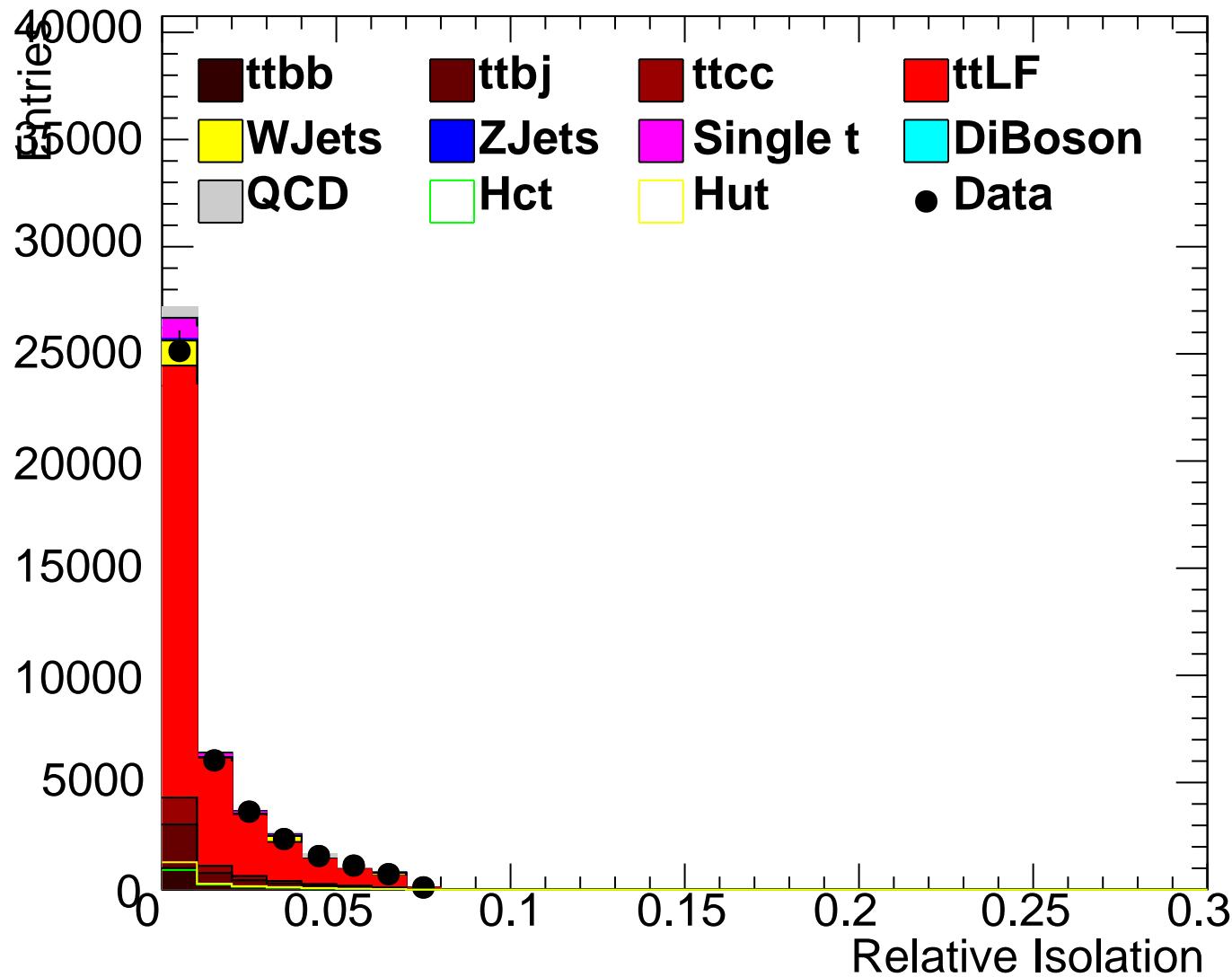
**Ch1\_S14**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

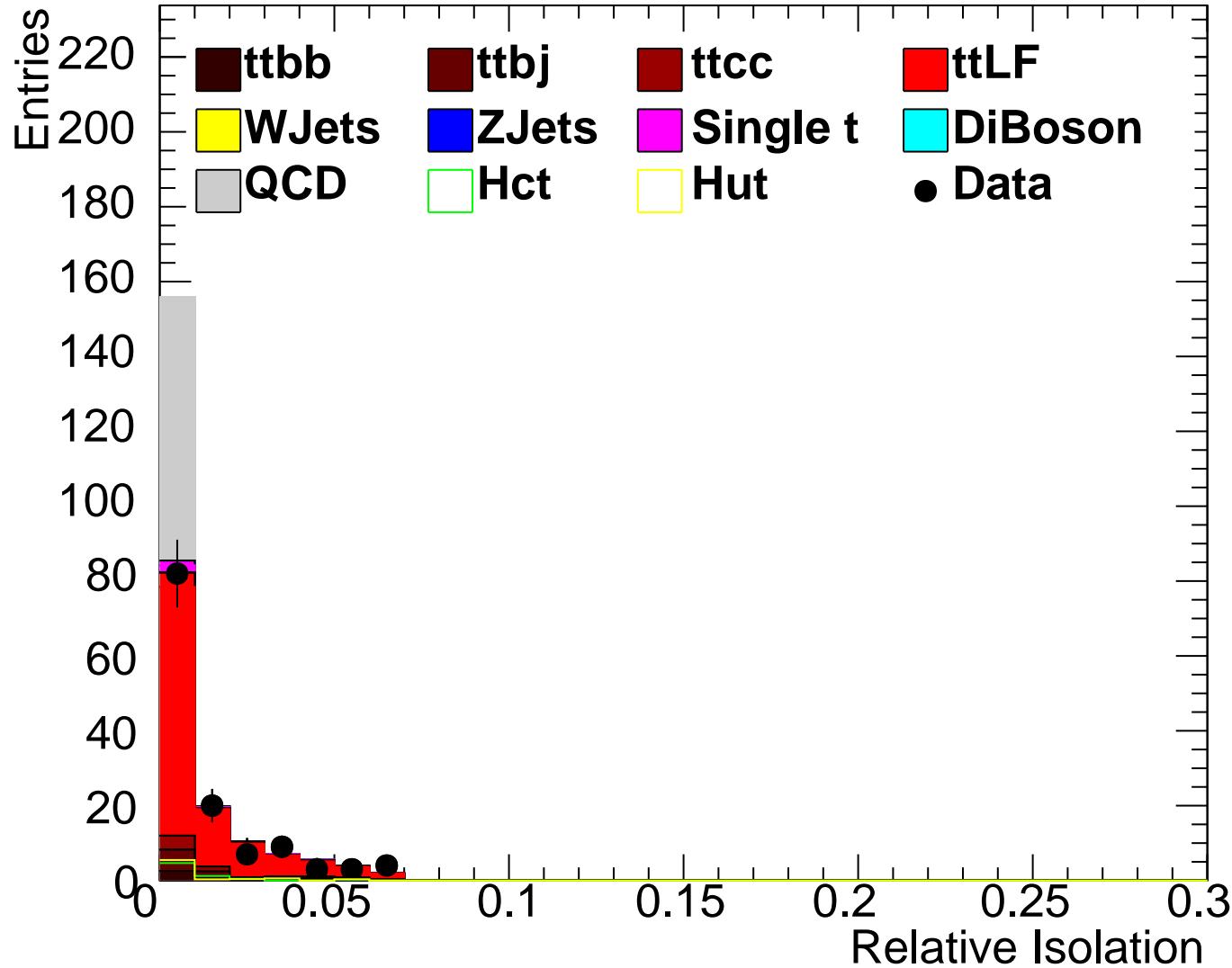




**Ch1\_S14**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

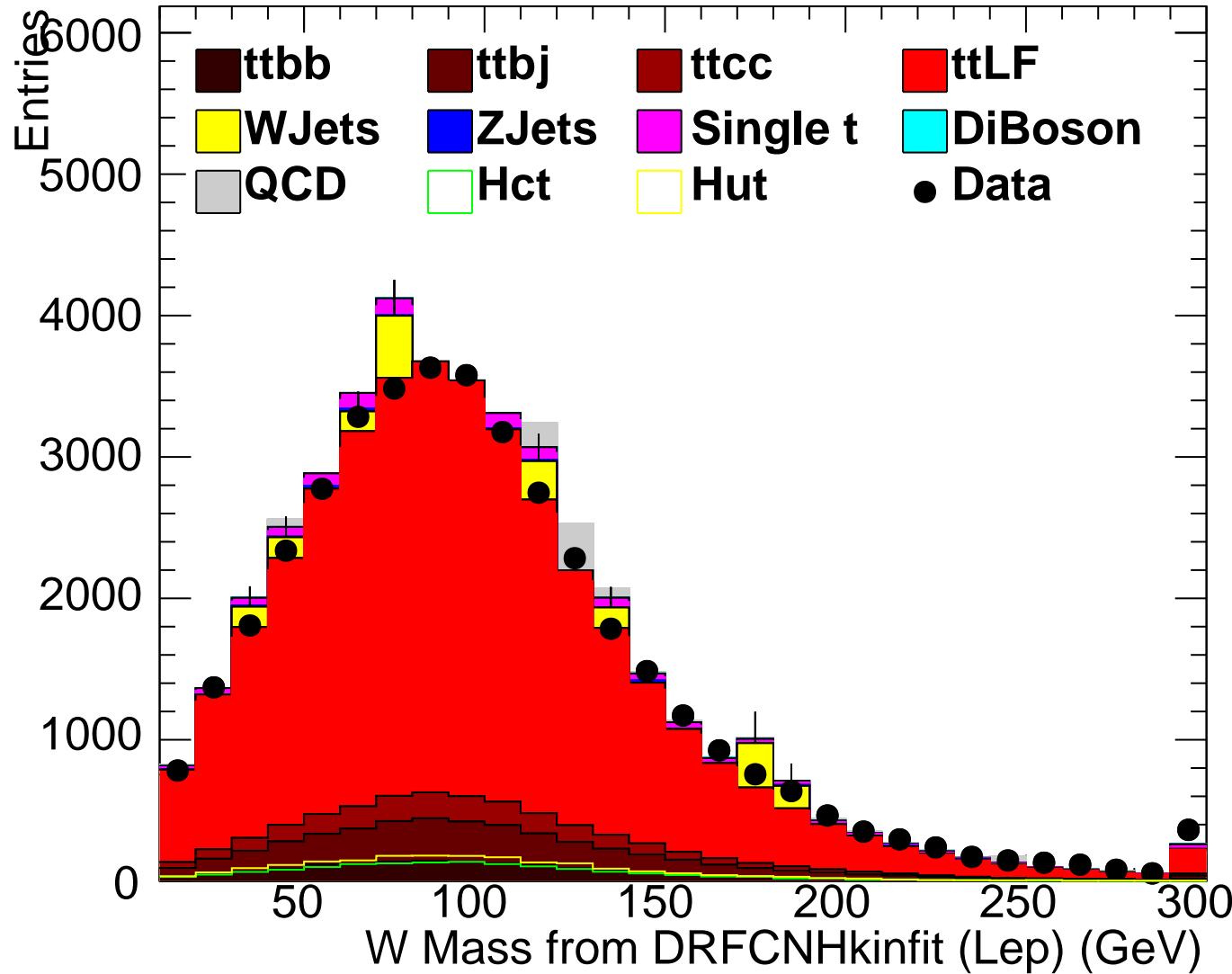


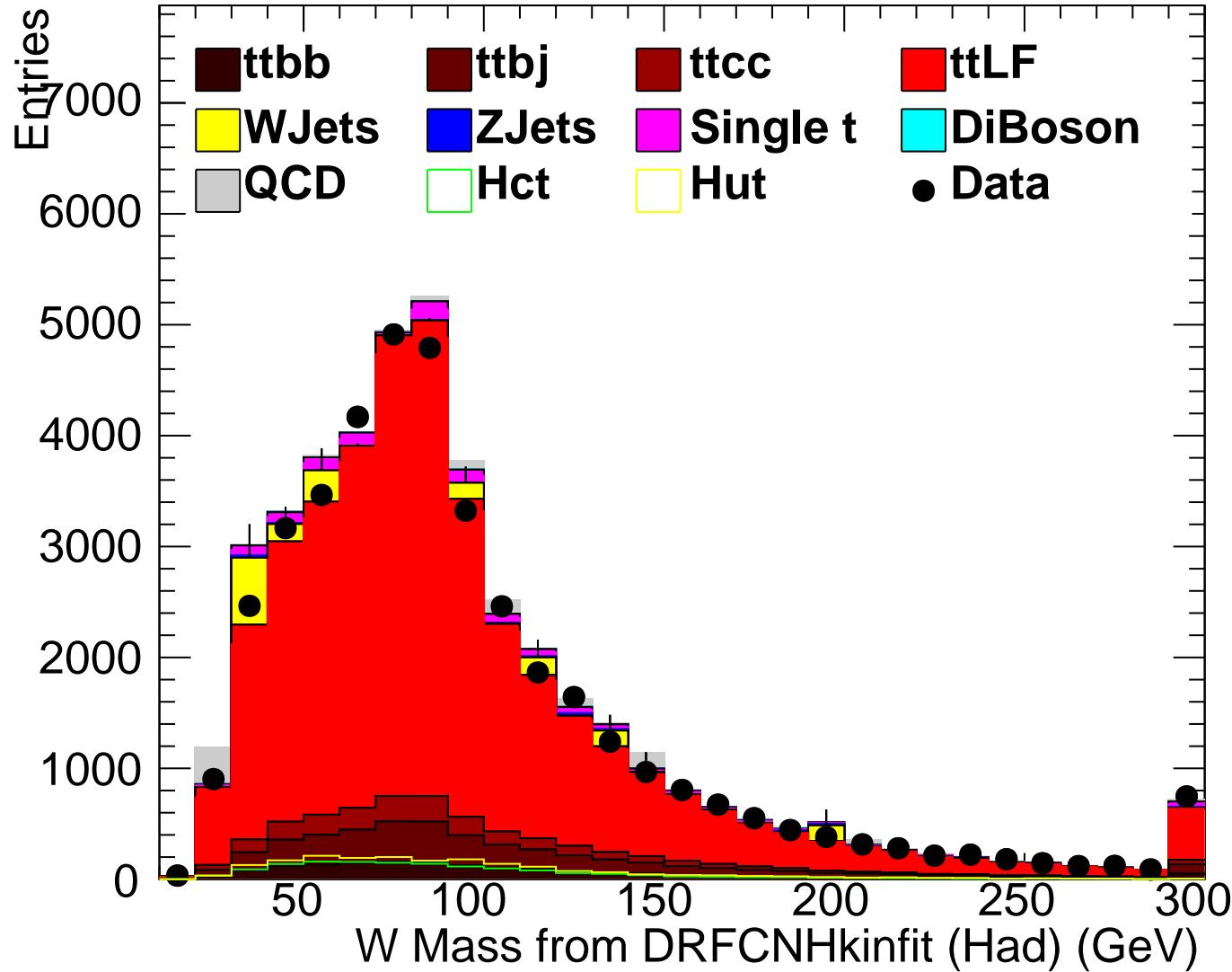


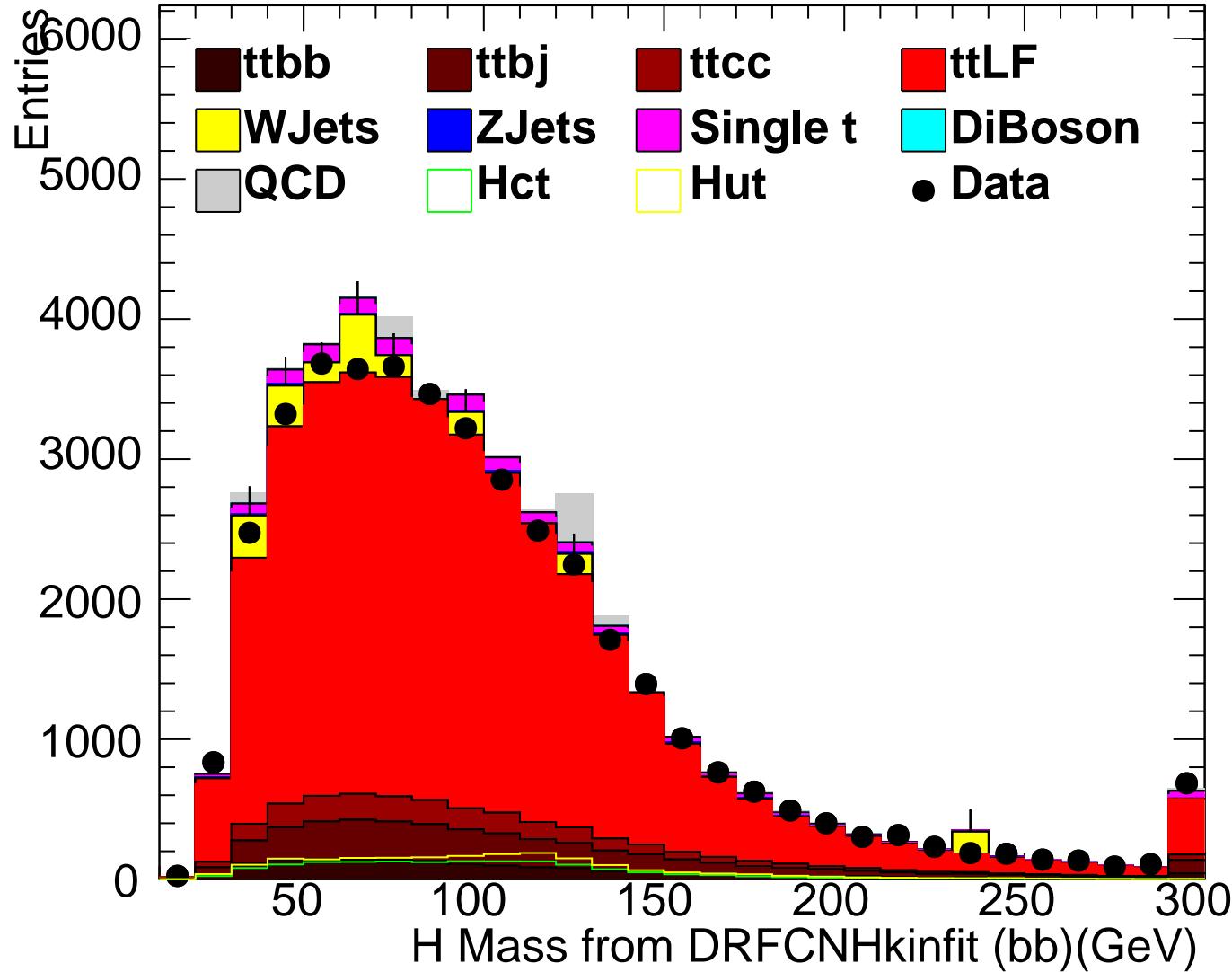


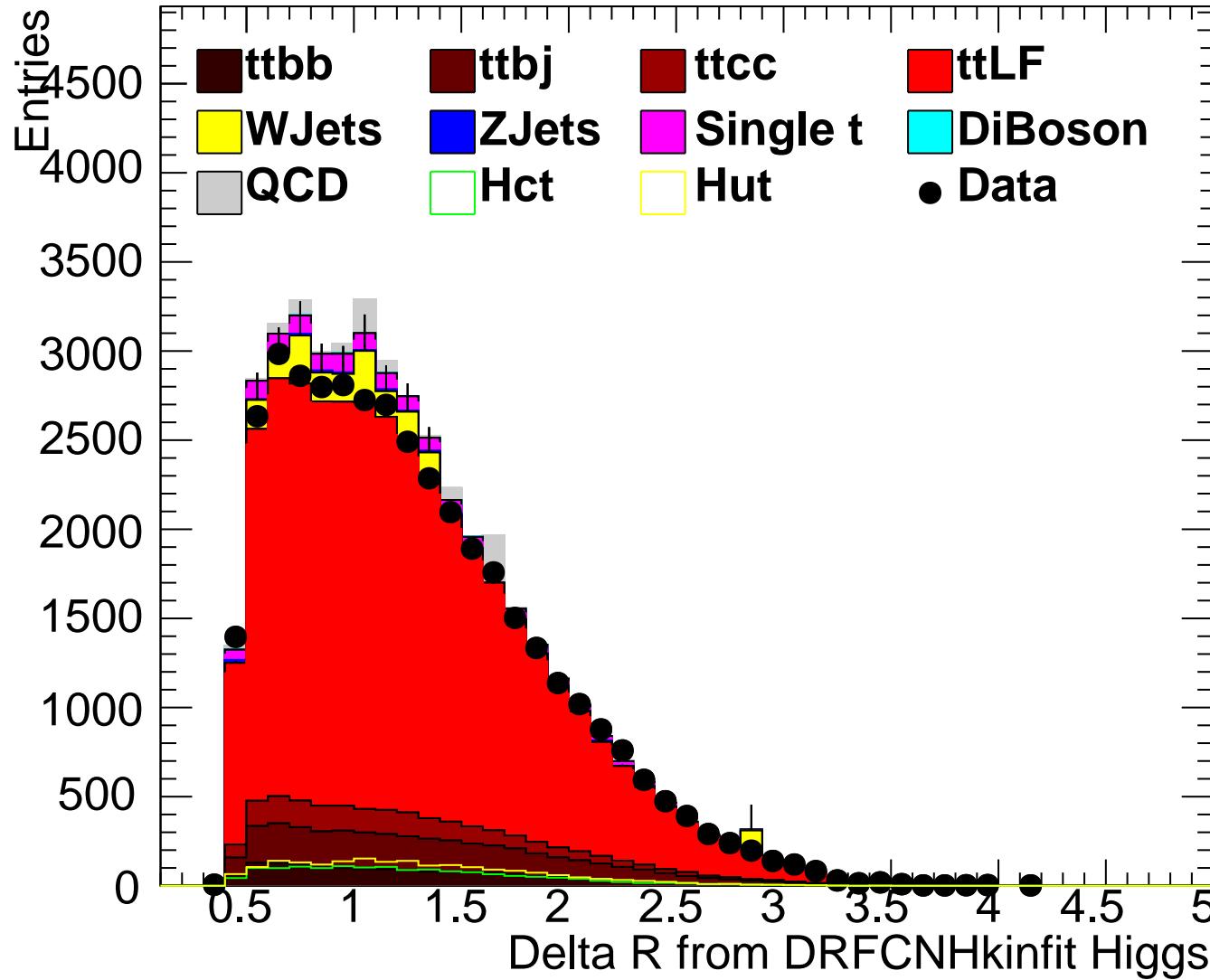
Ch1 S14

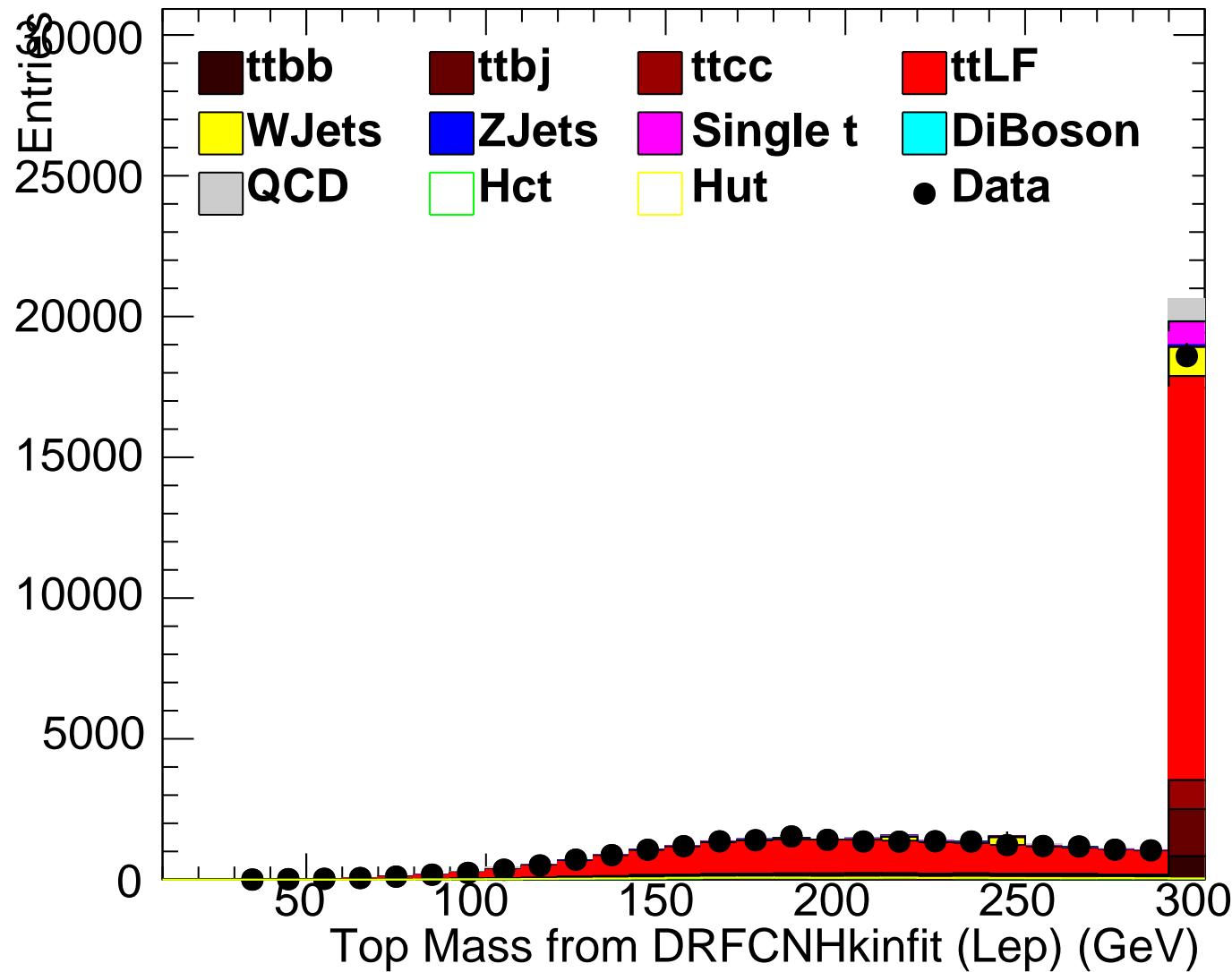
CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$

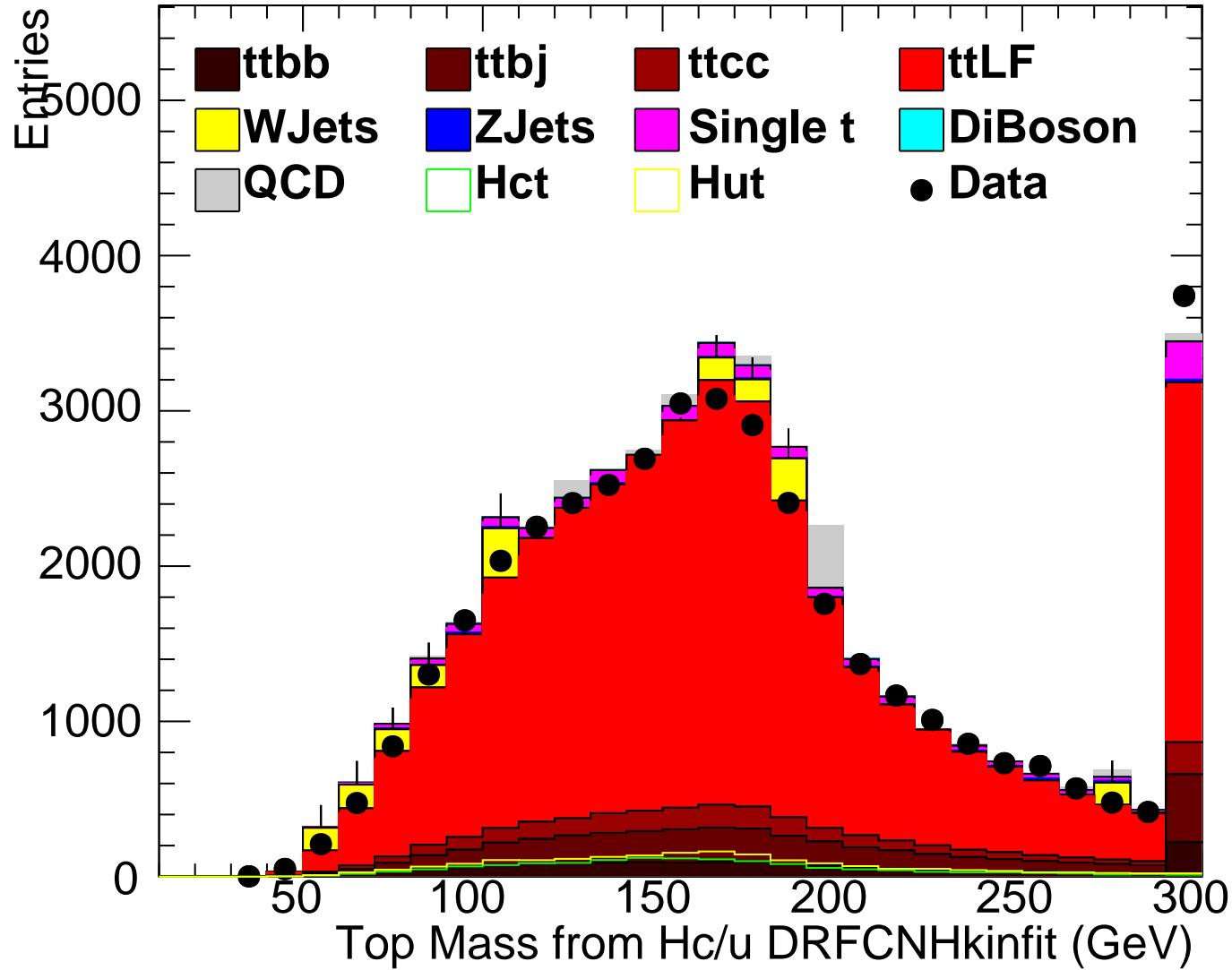


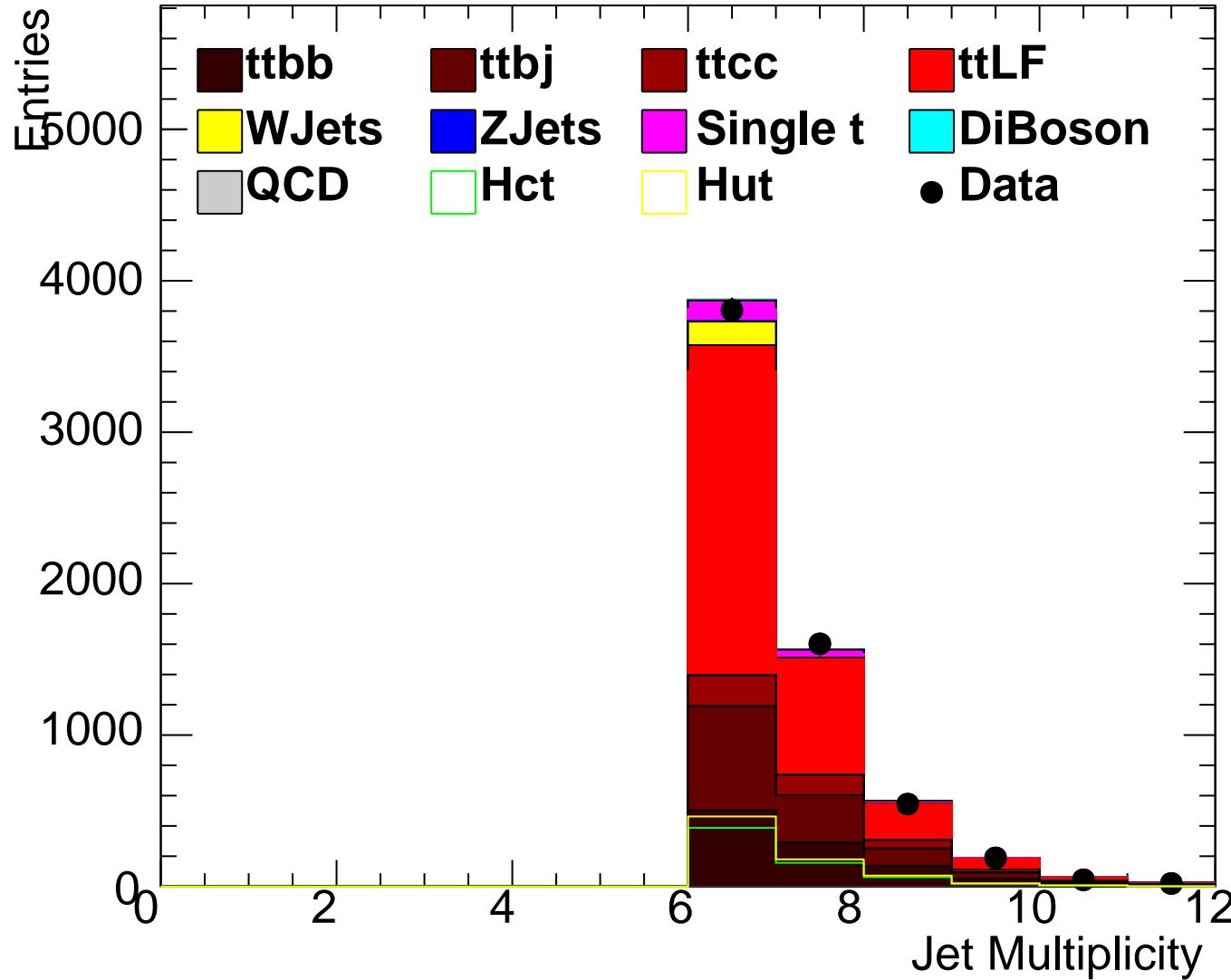


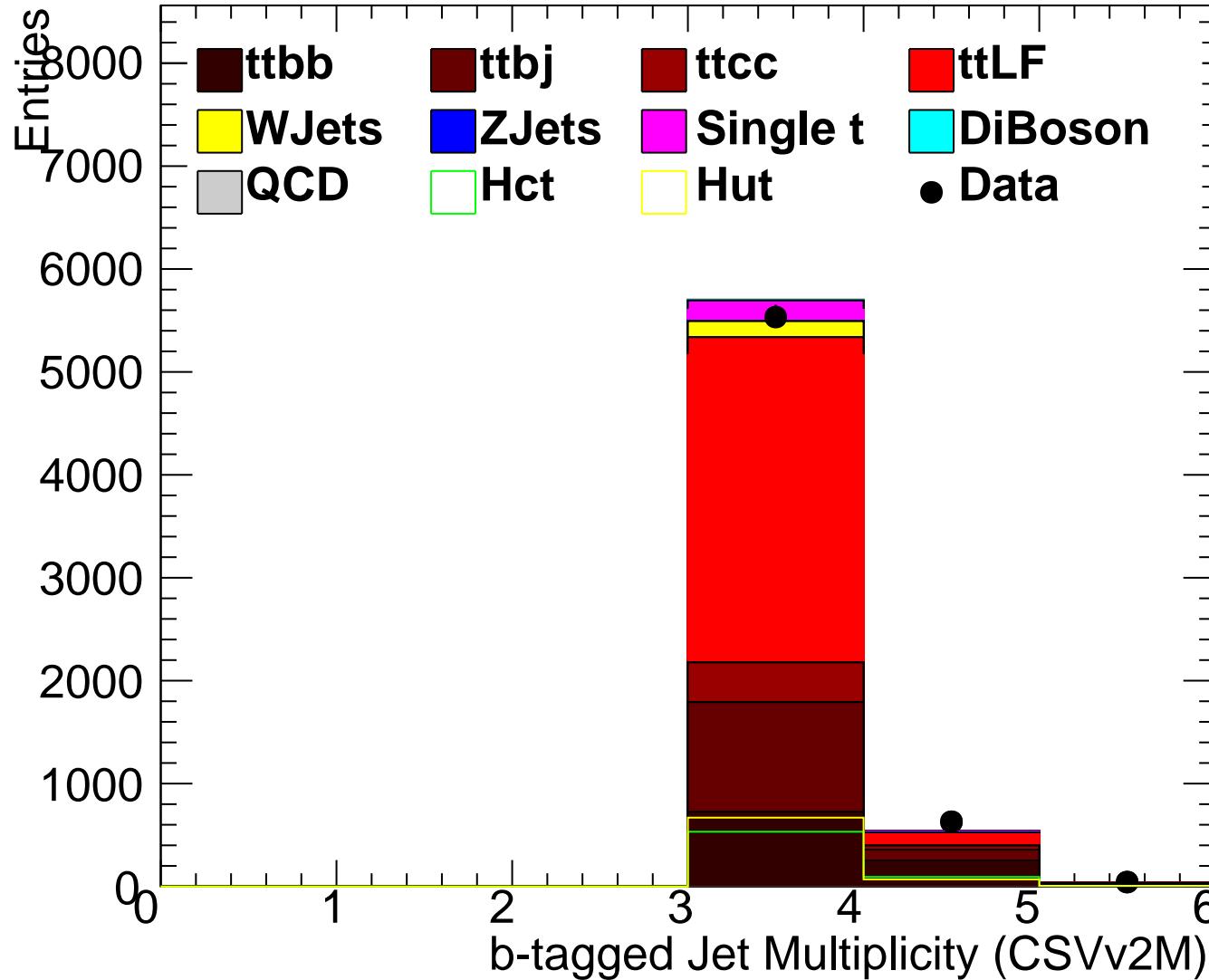


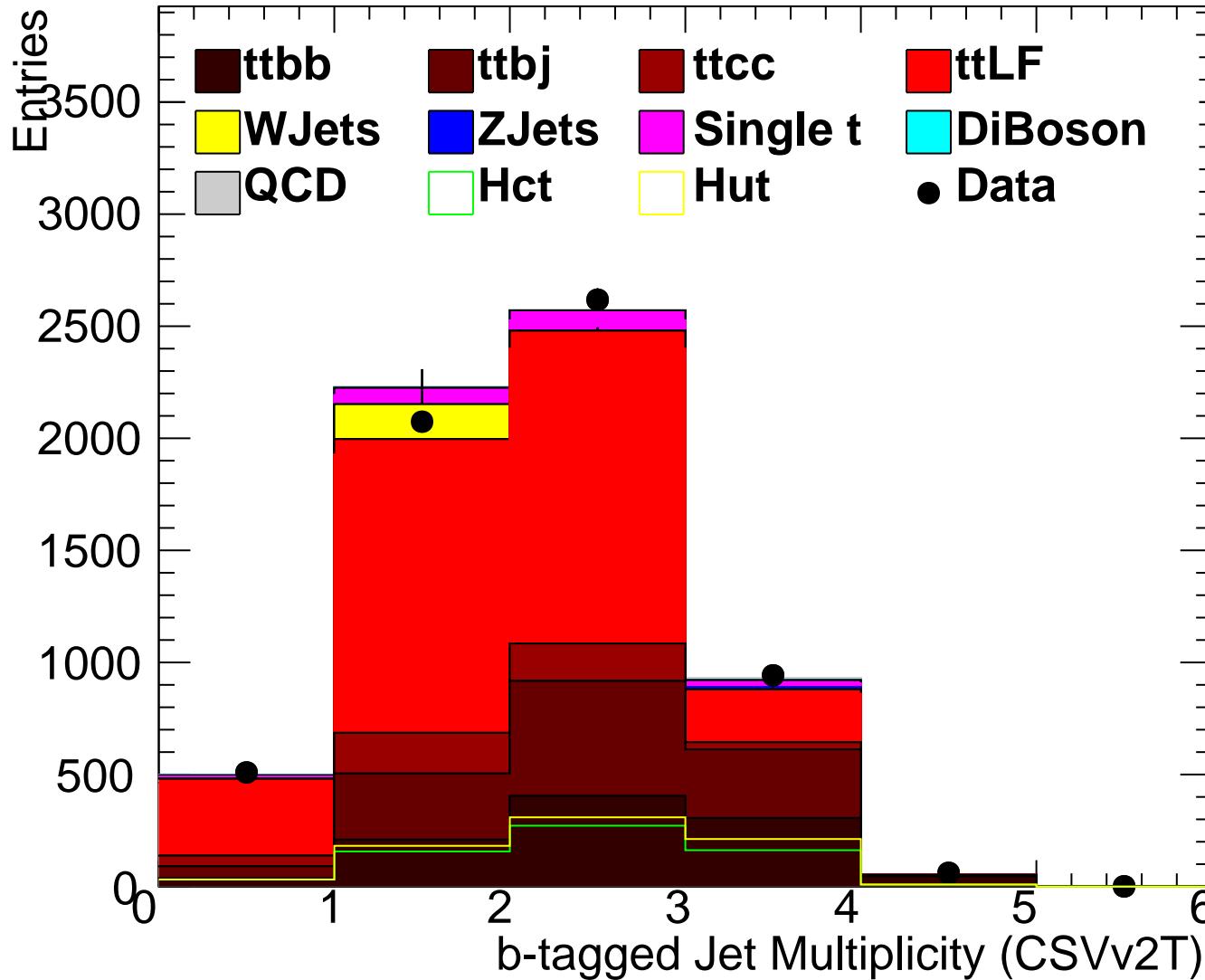


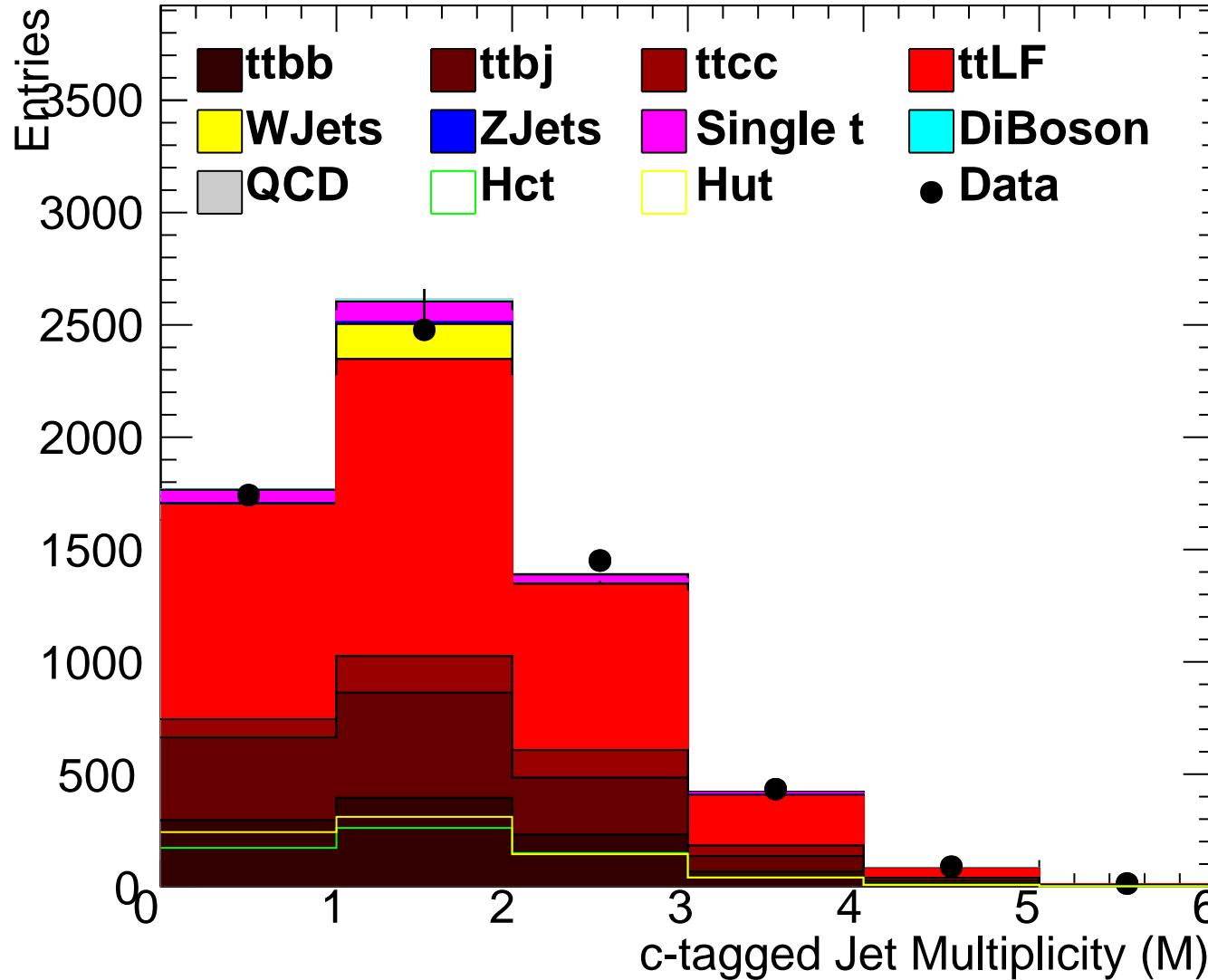


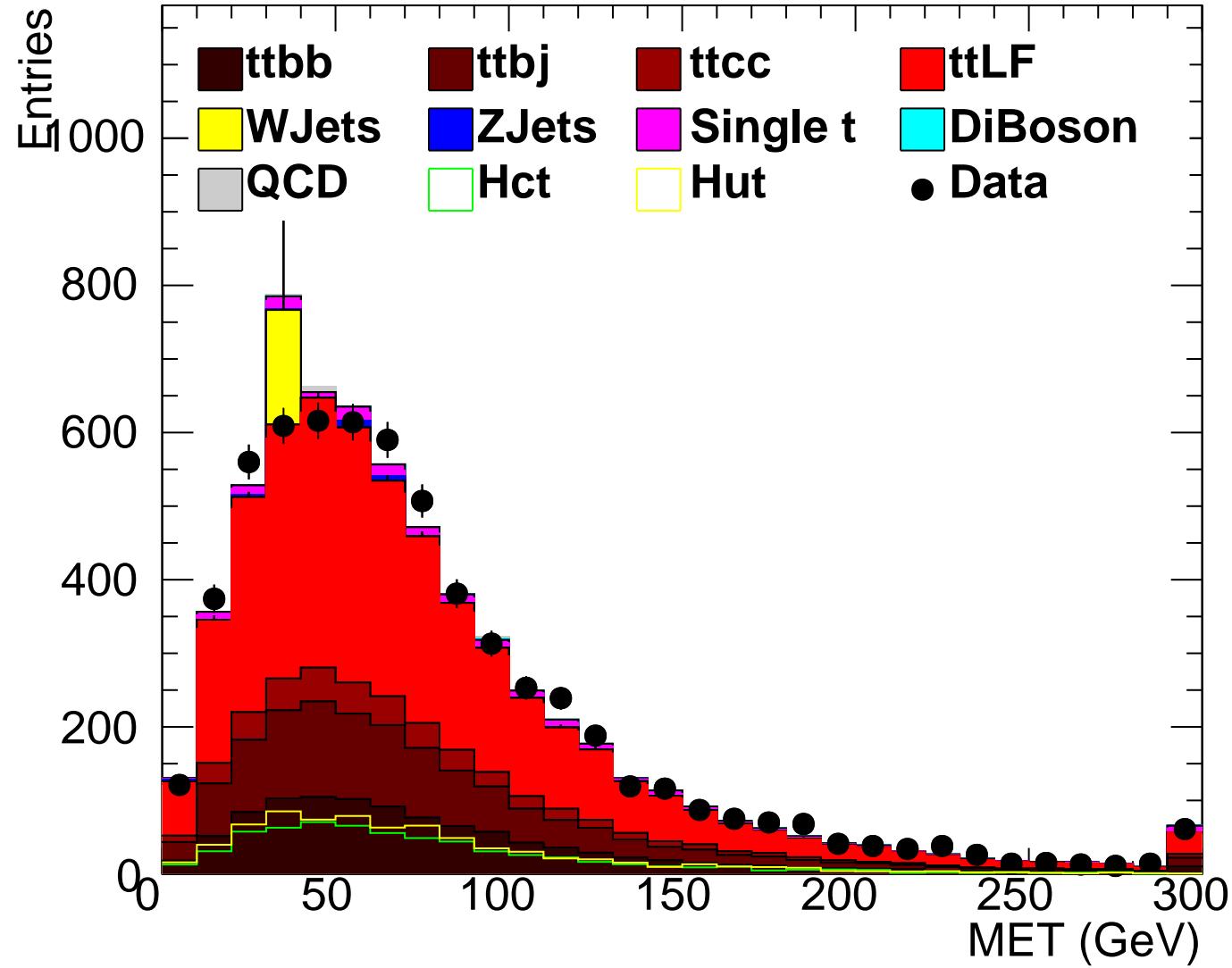
**Ch1\_S14**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

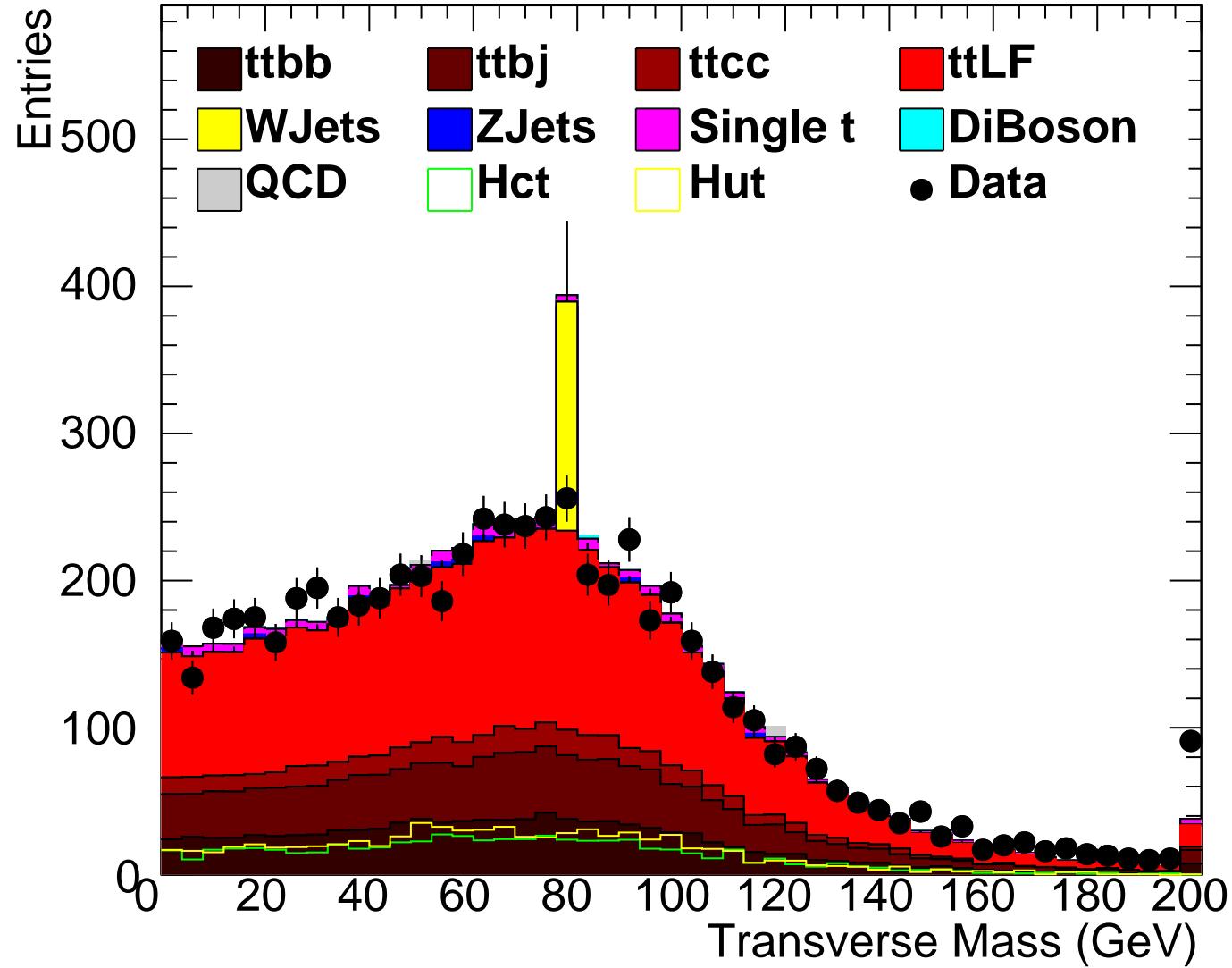


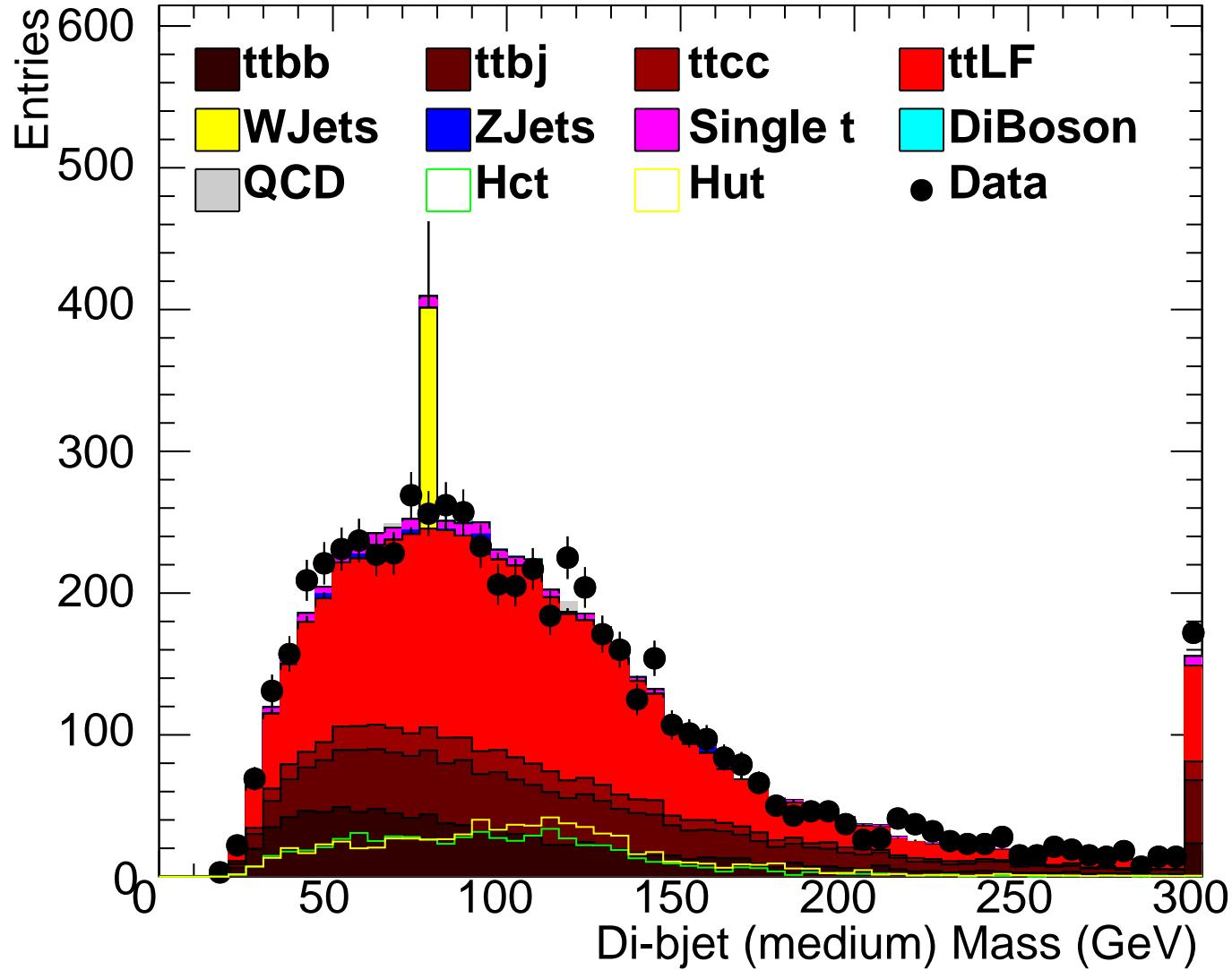
**Ch1\_S15**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

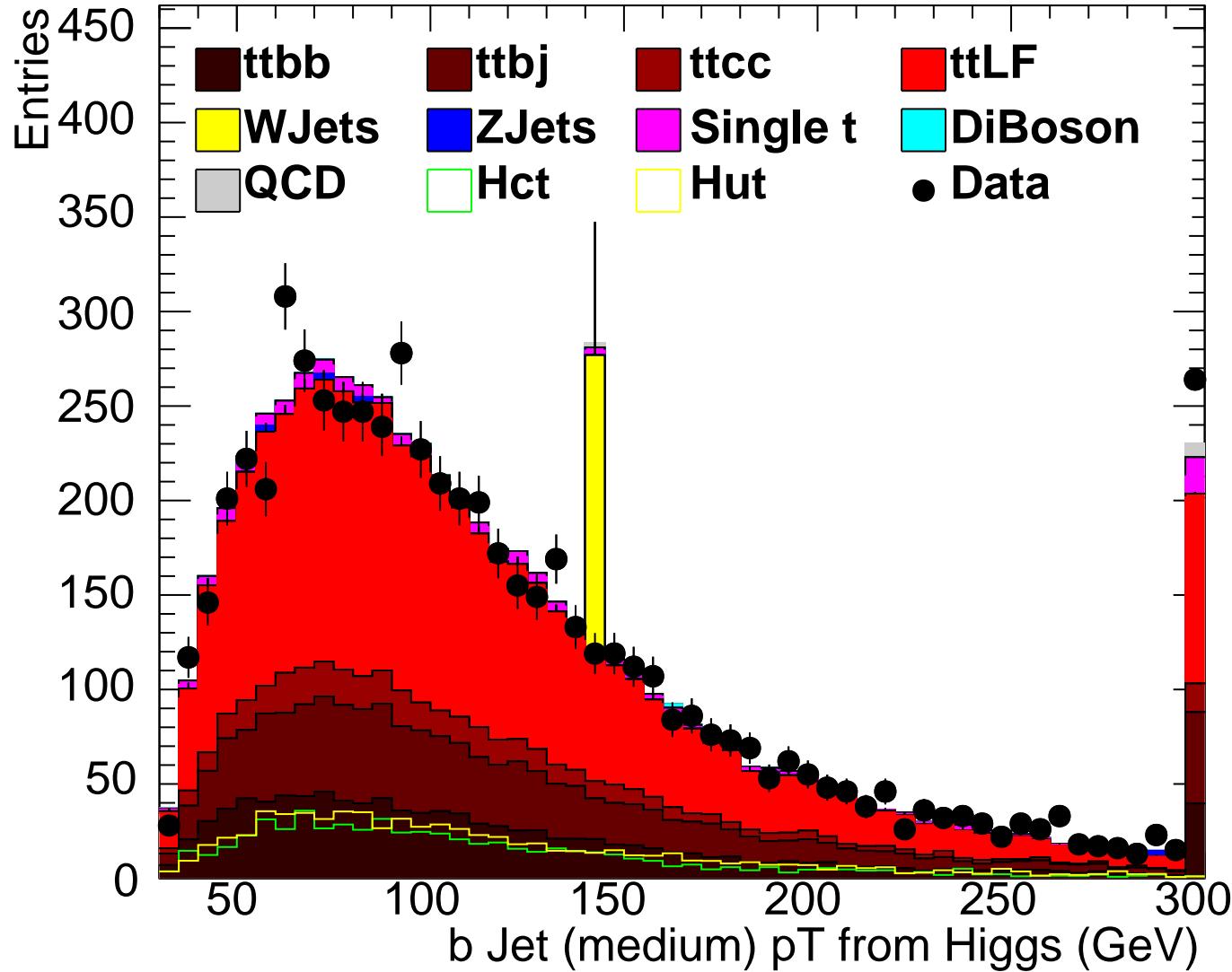


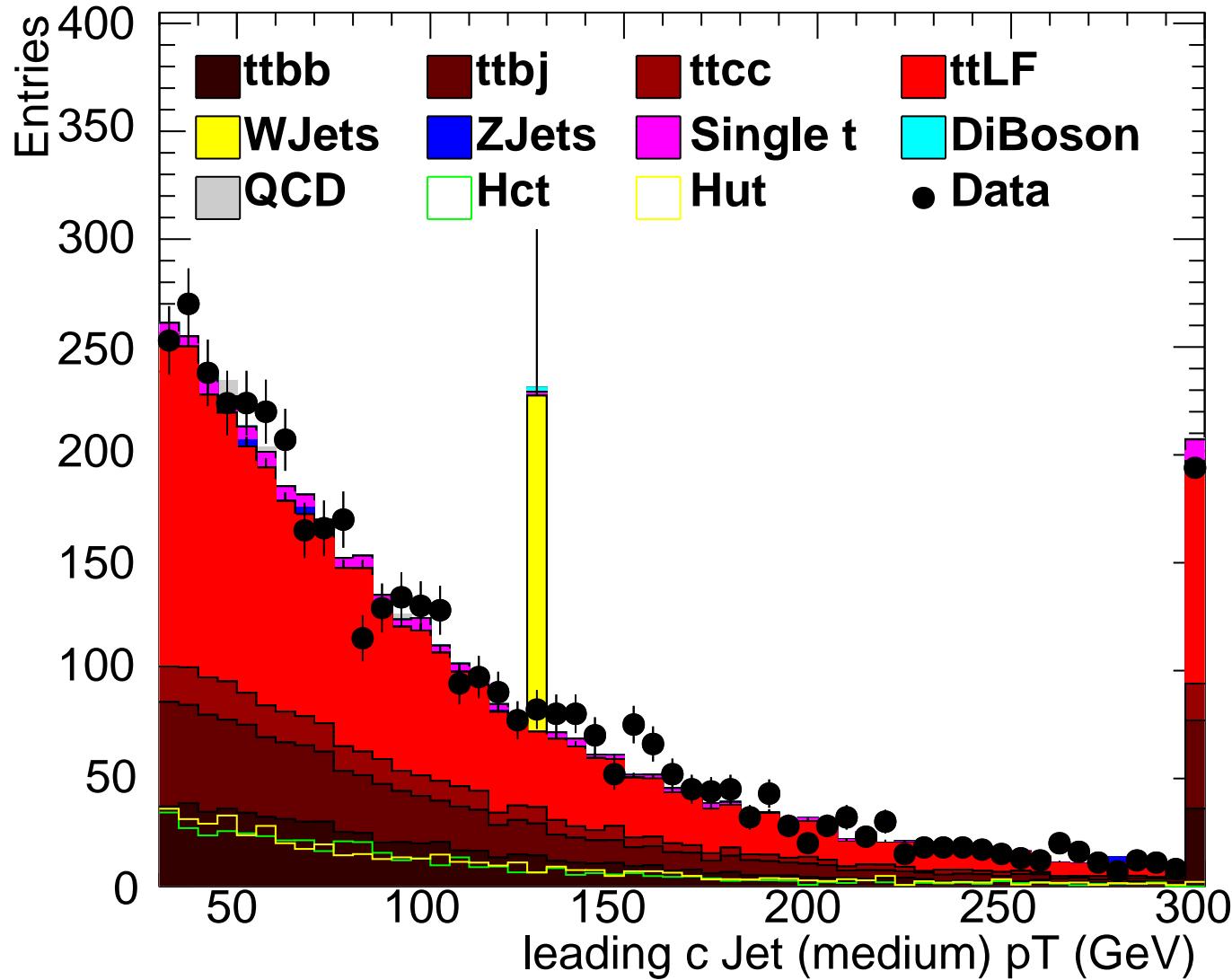


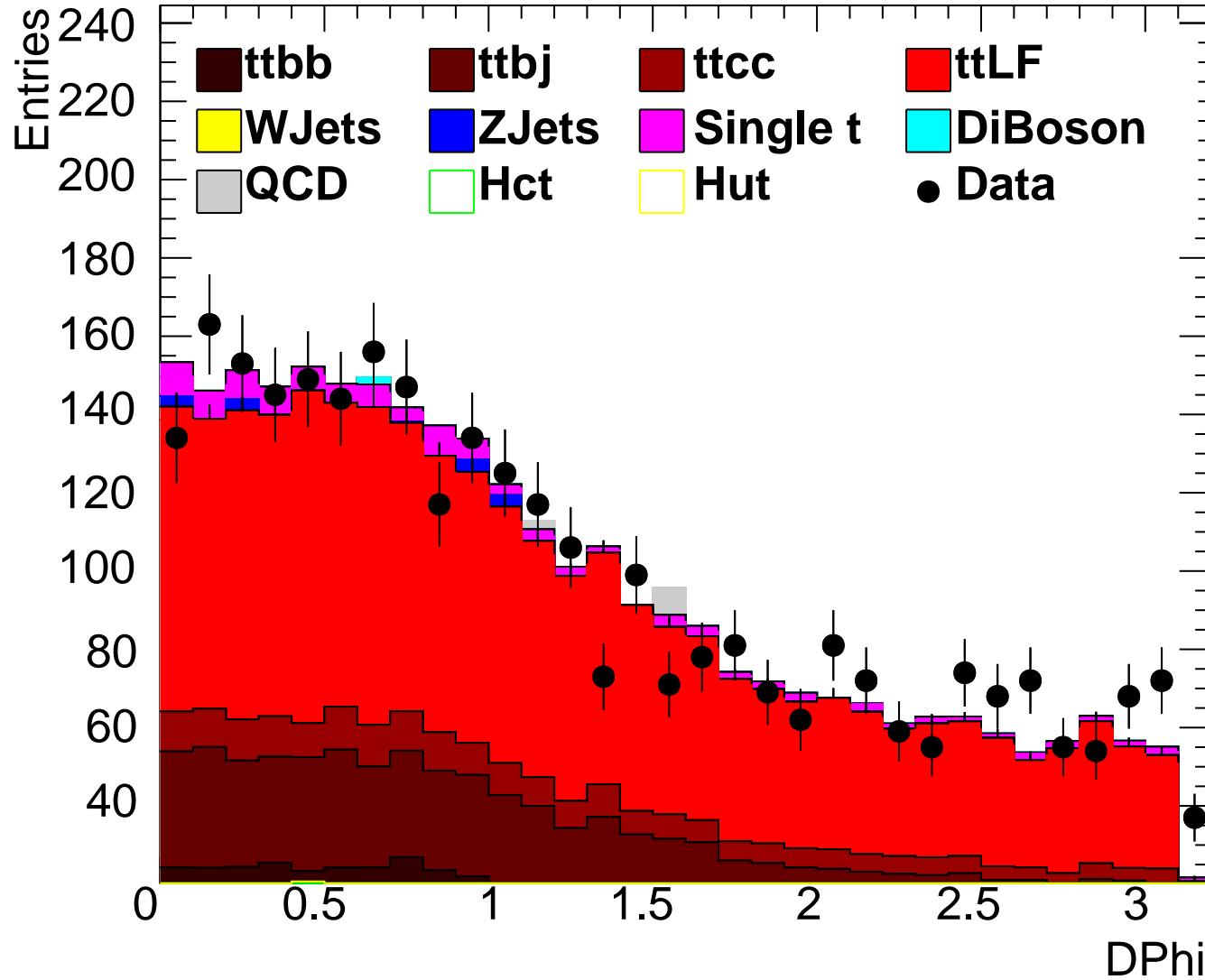


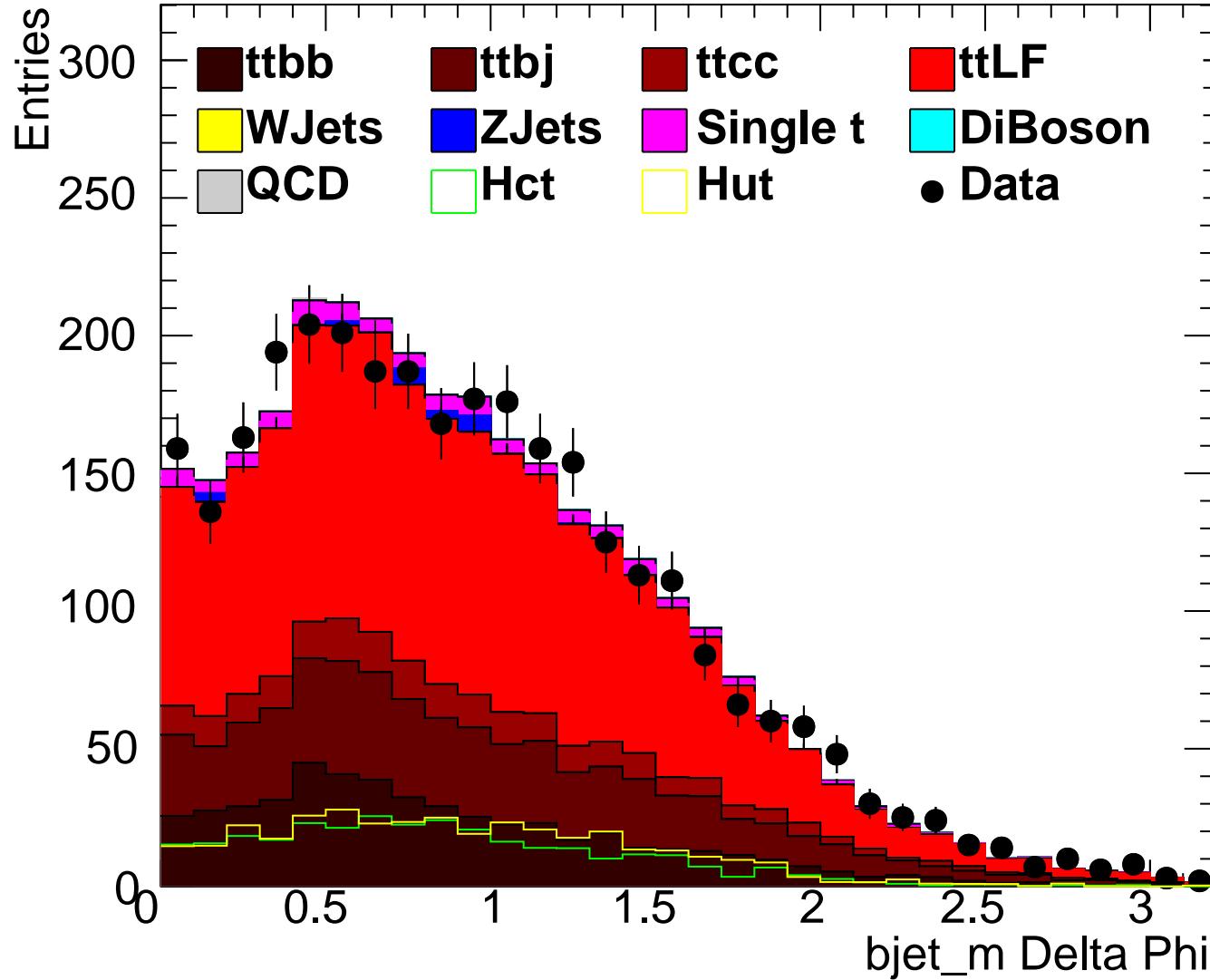
**Ch1\_S15**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

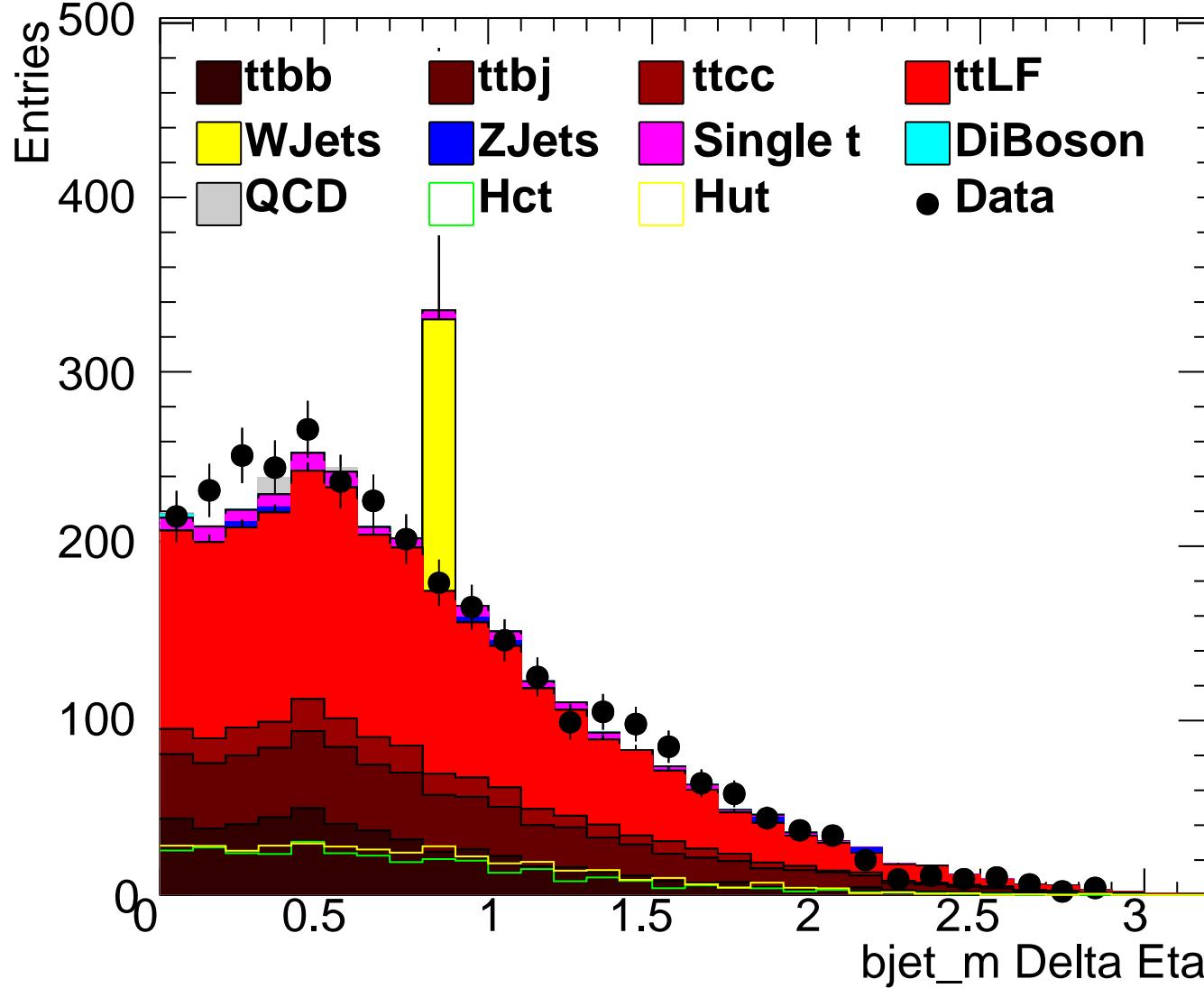
**Ch1\_S15**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

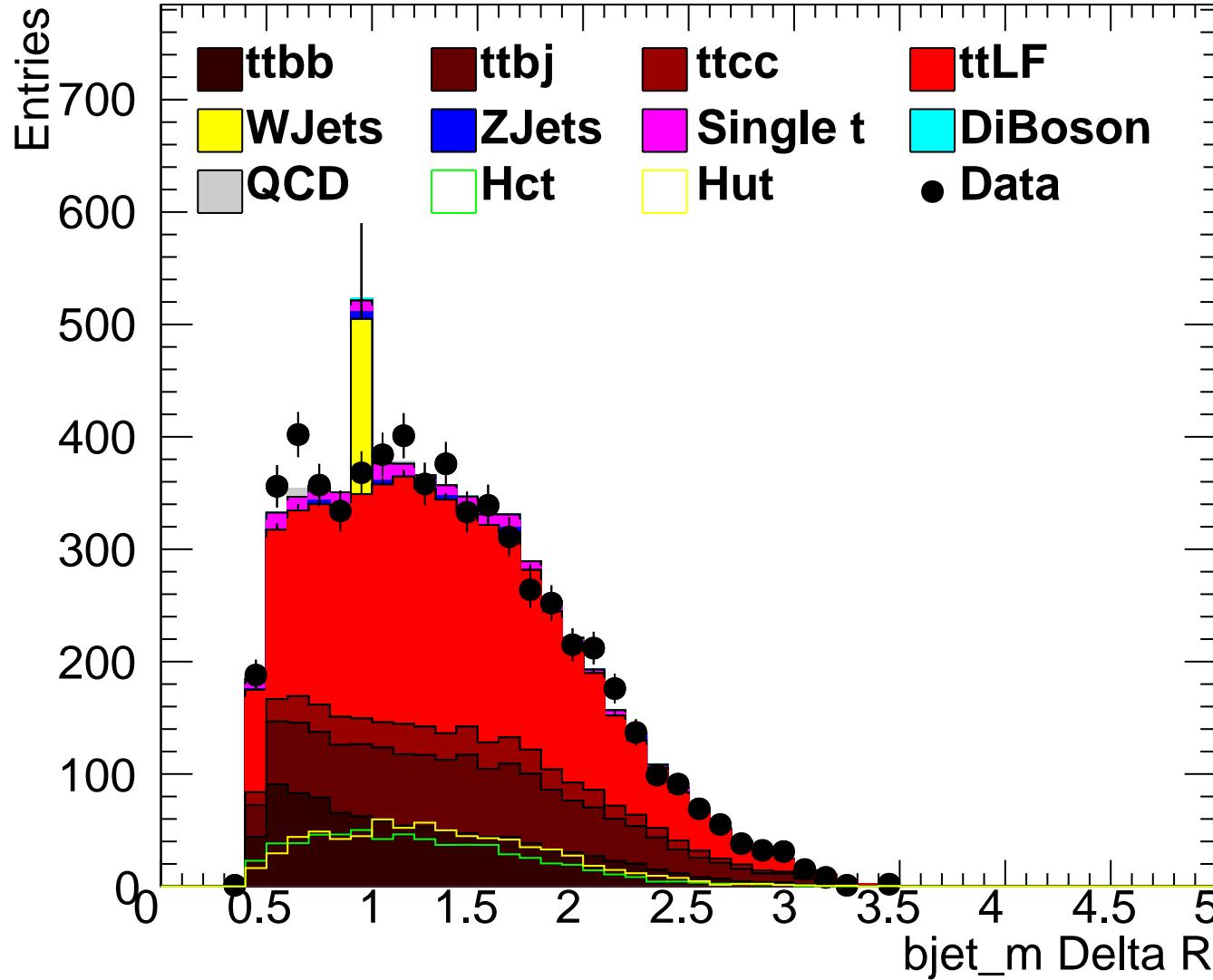
**Ch1\_S15**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

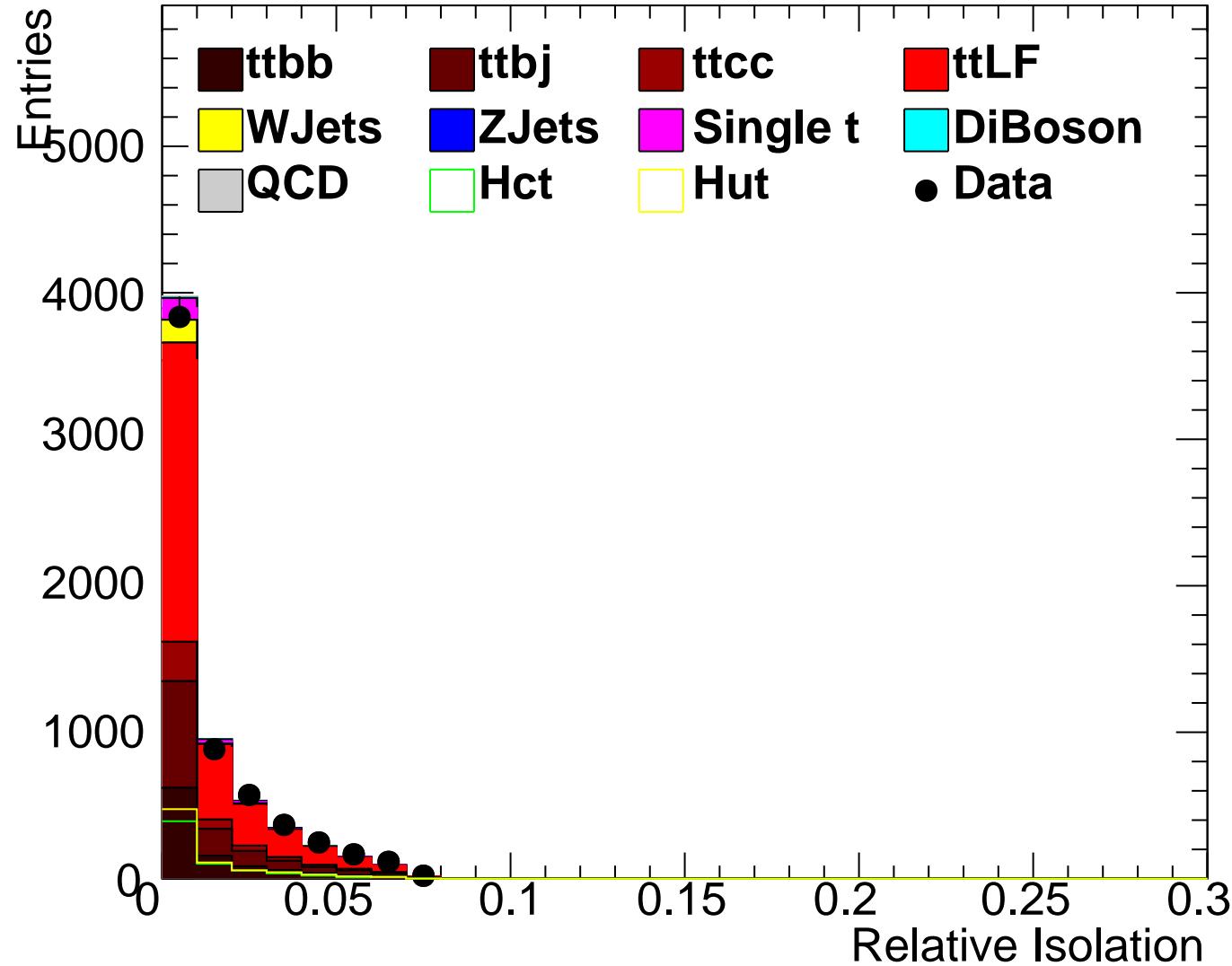
**Ch1\_S15**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

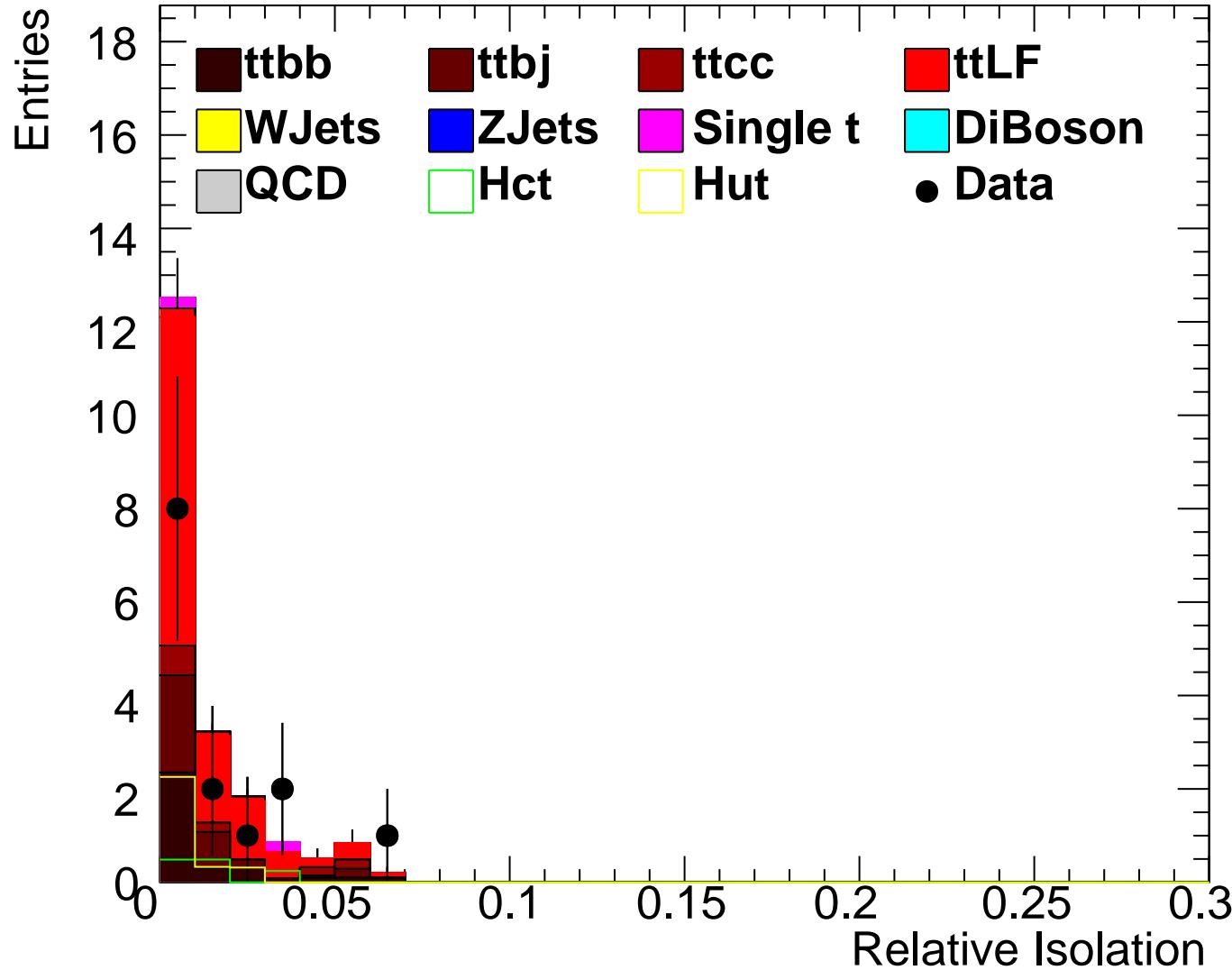


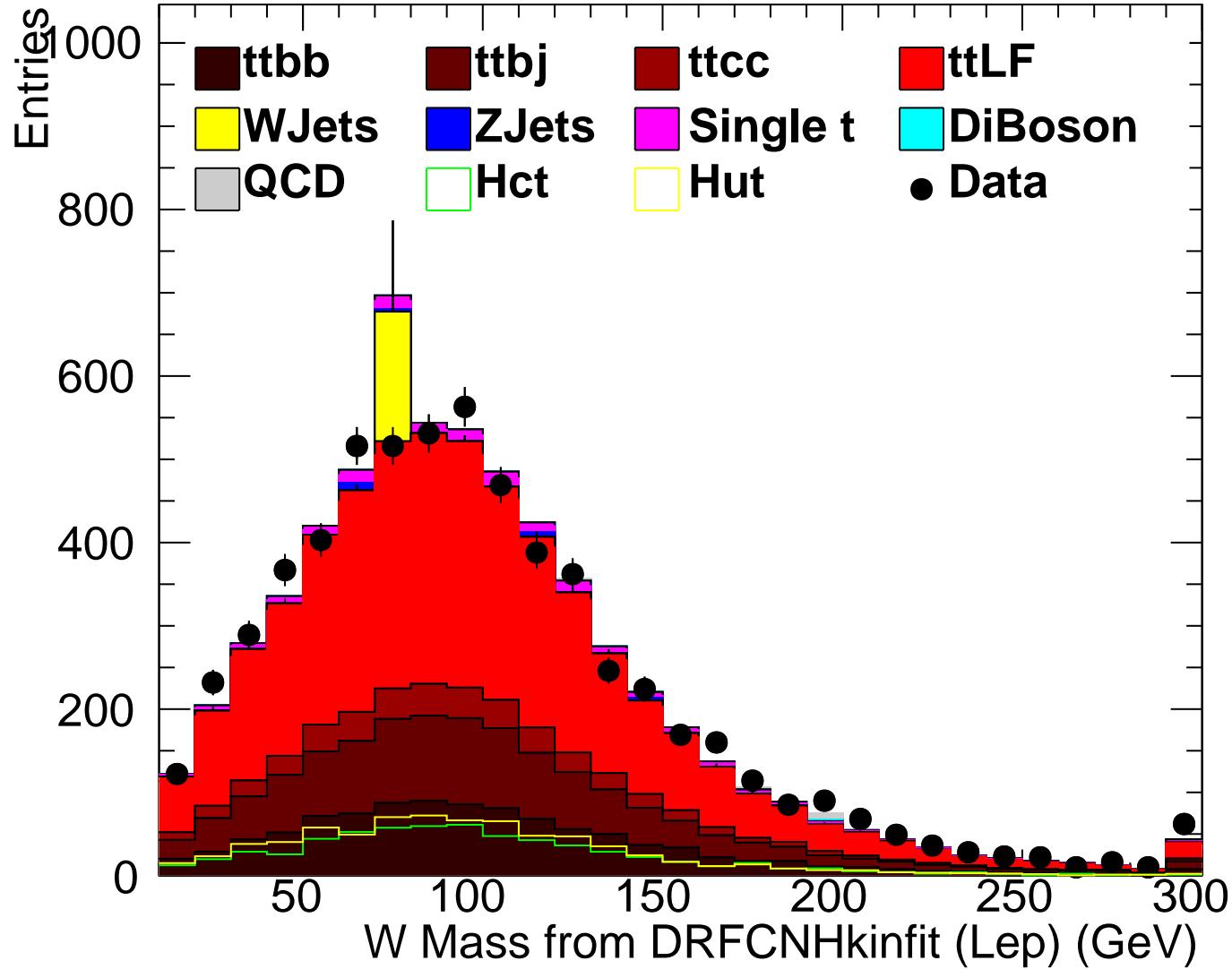
**Ch1\_S15**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

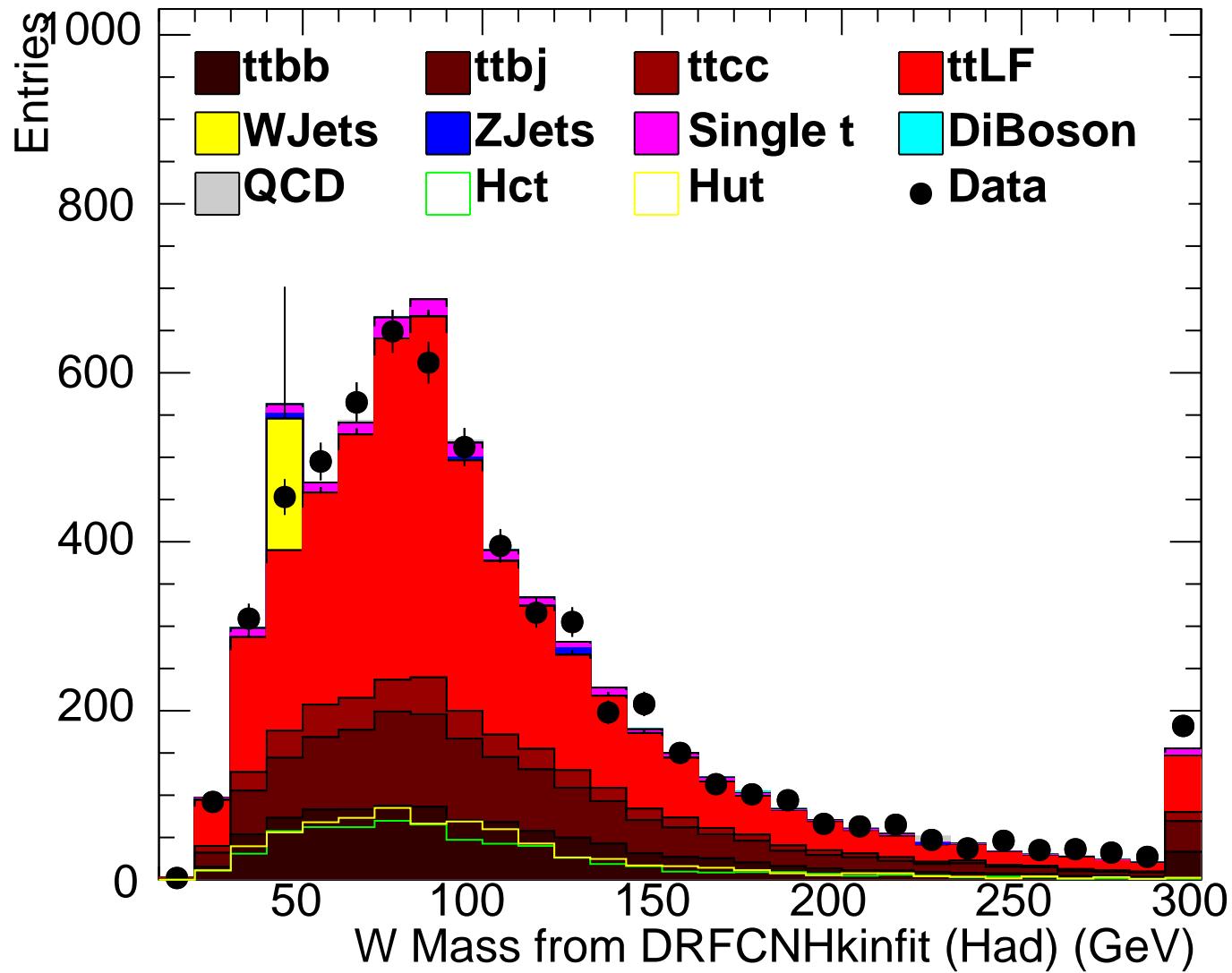
**Ch1\_S15**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

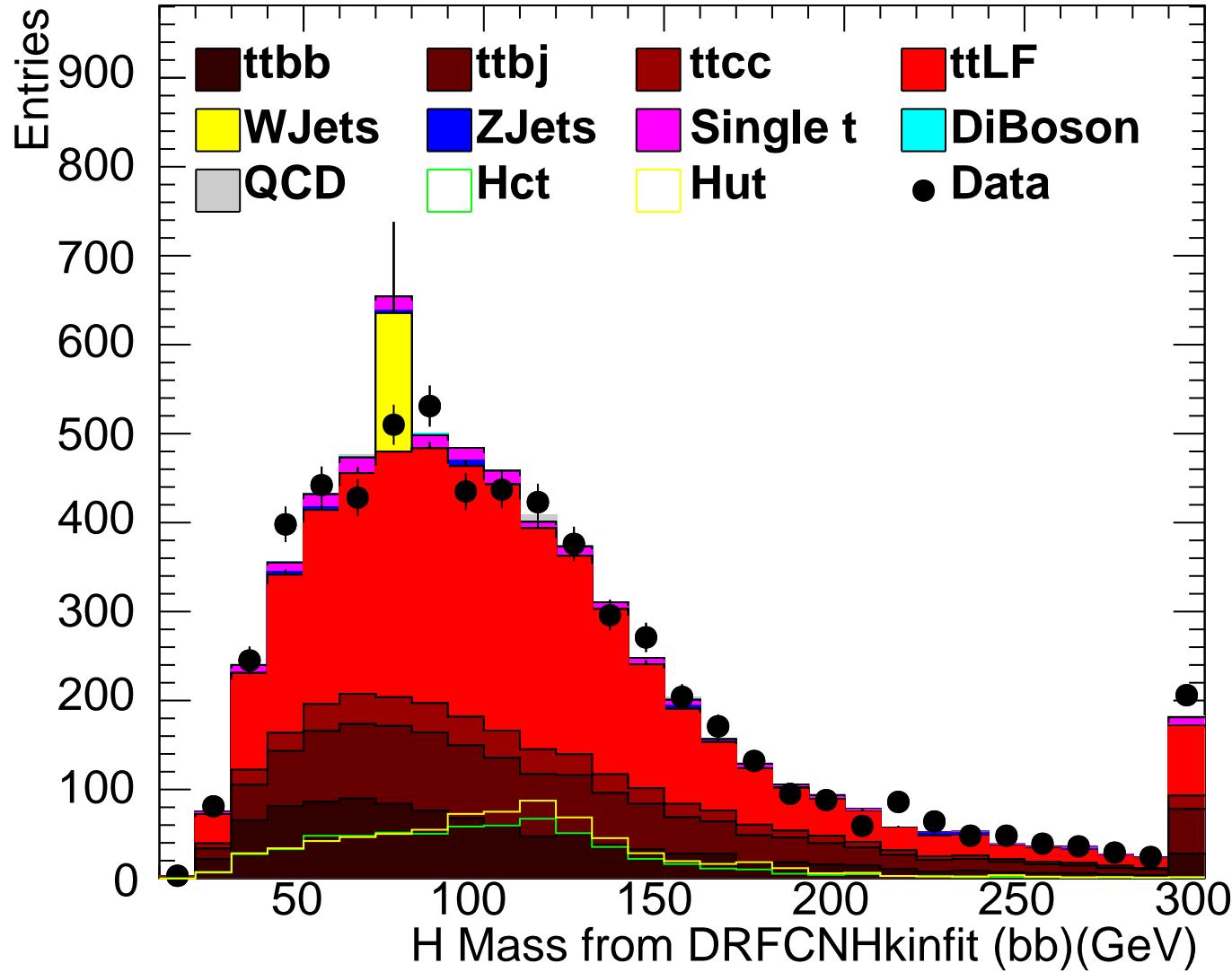


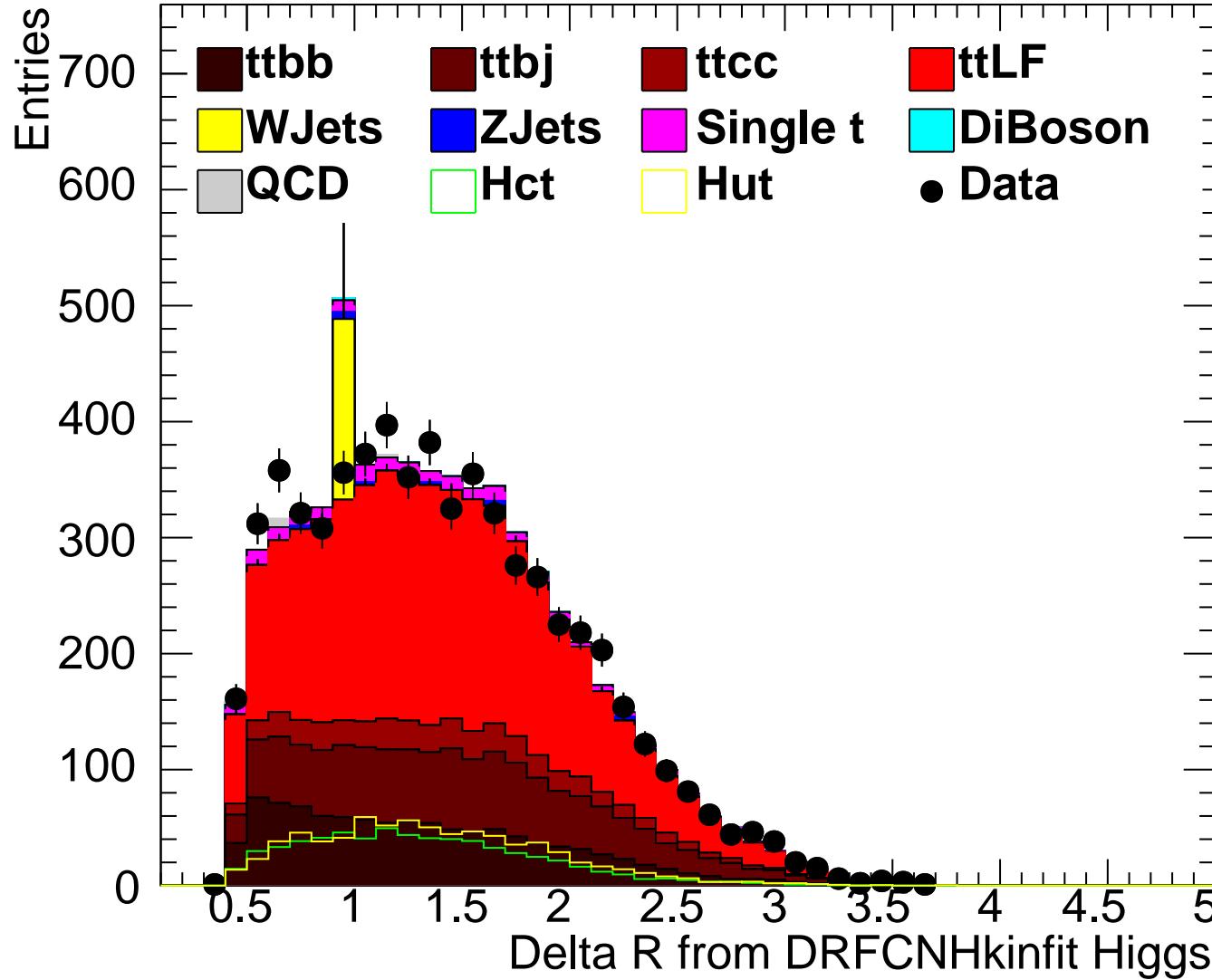
**Ch1\_S15**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

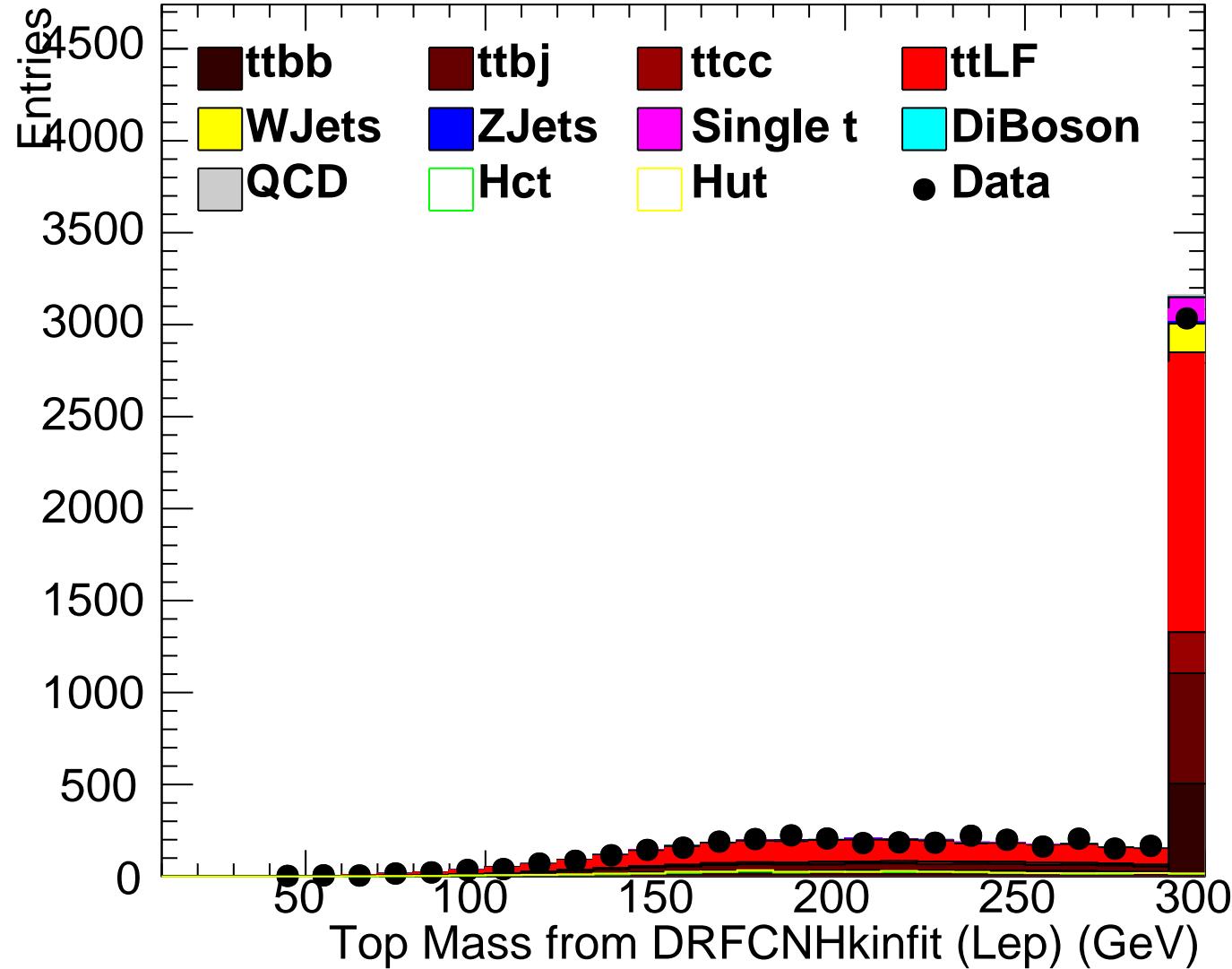


**Ch1\_S15**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch1\_S15**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch1\_S15**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 

**Ch1\_S15**CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$ 



Ch1\_S15

CMS,  $35.9 \text{ fb}^{-1}$  at  $\sqrt{s} = 13 \text{ TeV}$

