

19.2 fb<sup>-1</sup> (8 TeV)

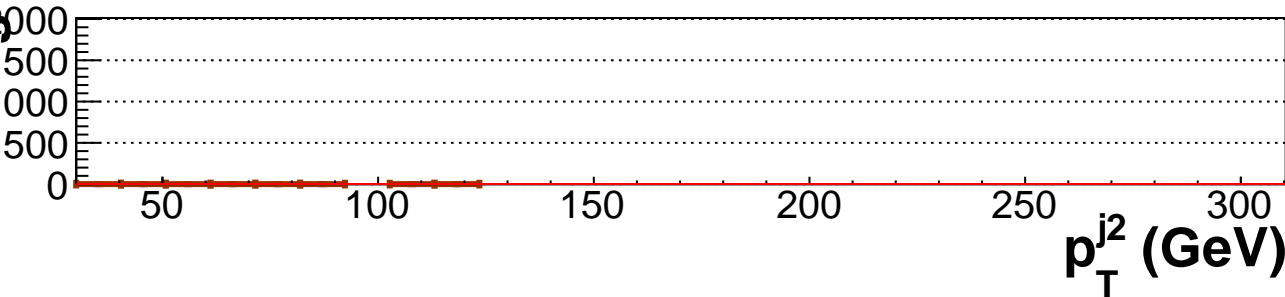
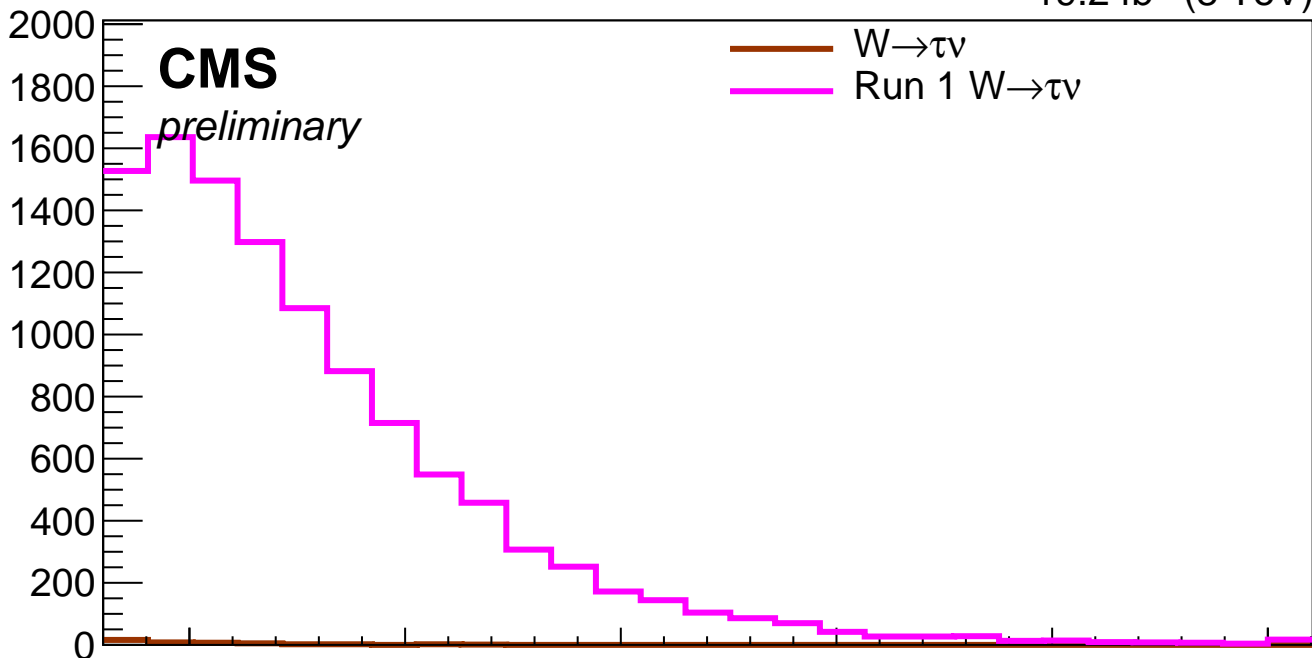
**CMS**

*preliminary*

—  $W \rightarrow \tau \nu$   
— Run 1  $W \rightarrow \tau \nu$

**Data/Bkg**

**$p_T^{j2}$  (GeV)**



19.2 fb<sup>-1</sup> (8 TeV)

**CMS**

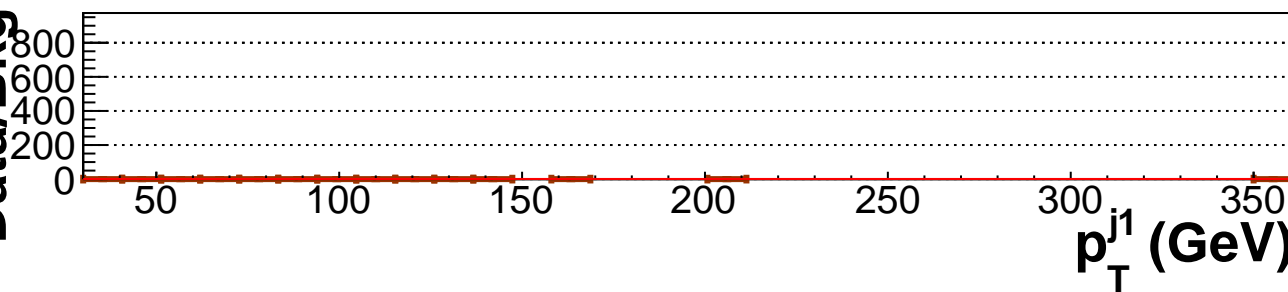
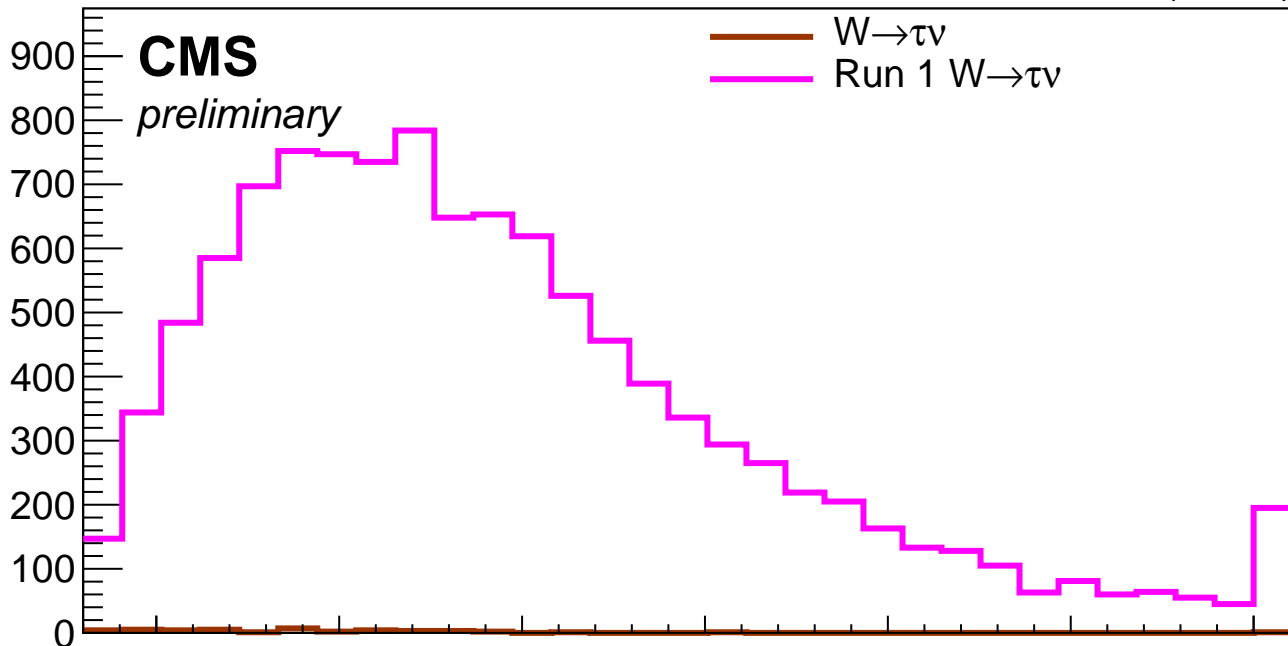
*preliminary*

W→τν

Run 1 W→τν

Data/Bkg

p<sub>T</sub><sup>j1</sup> (GeV)



19.2 fb<sup>-1</sup> (8 TeV)

**CMS**  
*preliminary*

—  $W \rightarrow \tau \nu$   
— Run 1  $W \rightarrow \tau \nu$

600  
500  
400  
300  
200  
100  
0

Data/Bkg

600  
400  
200  
0

-4

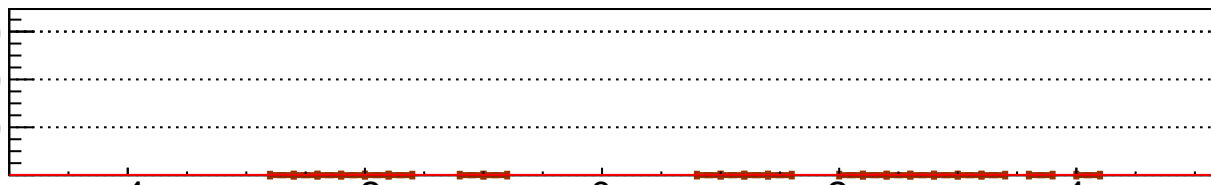
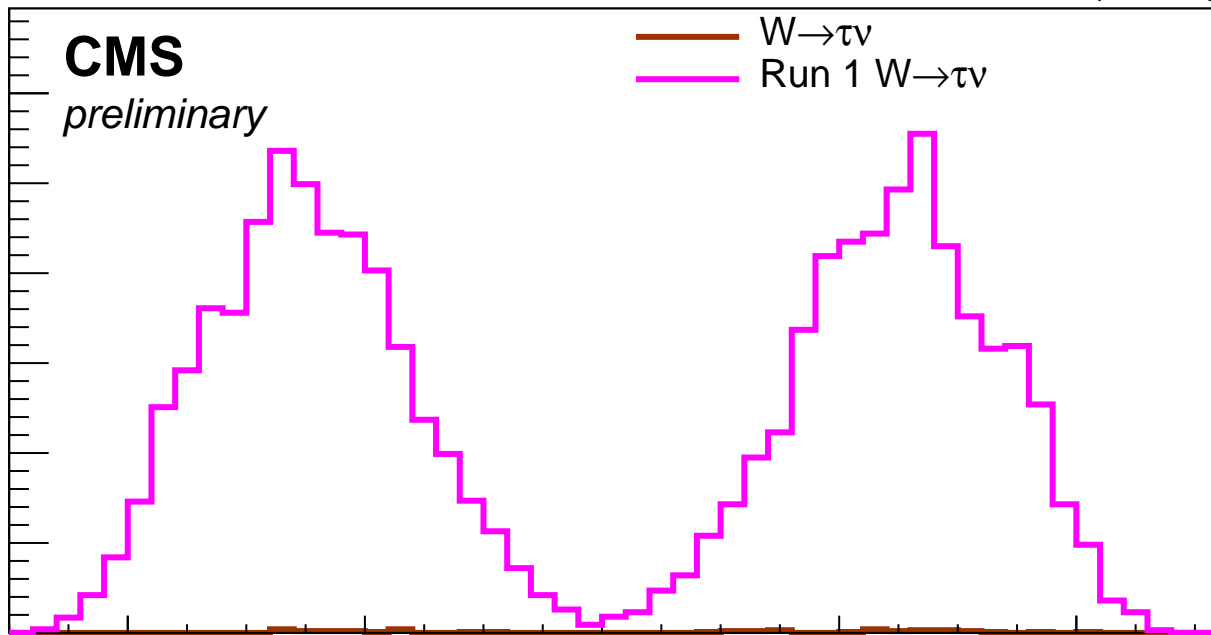
-2

0

2

4

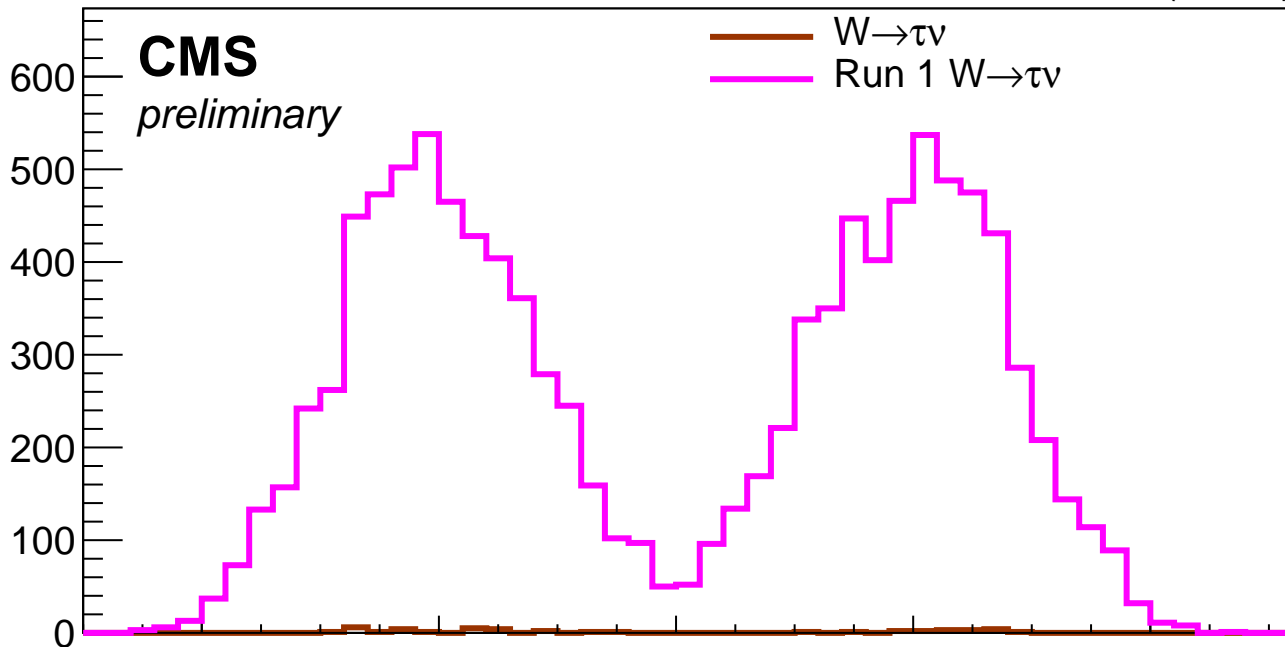
$\eta_{j2}$



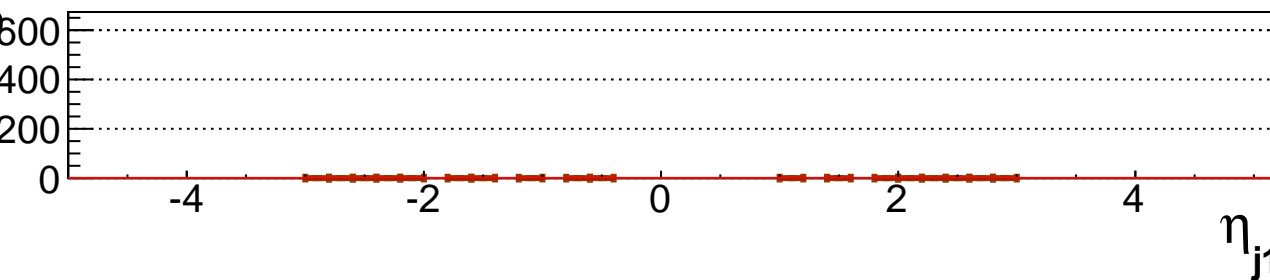
19.2 fb<sup>-1</sup> (8 TeV)

**CMS**  
*preliminary*

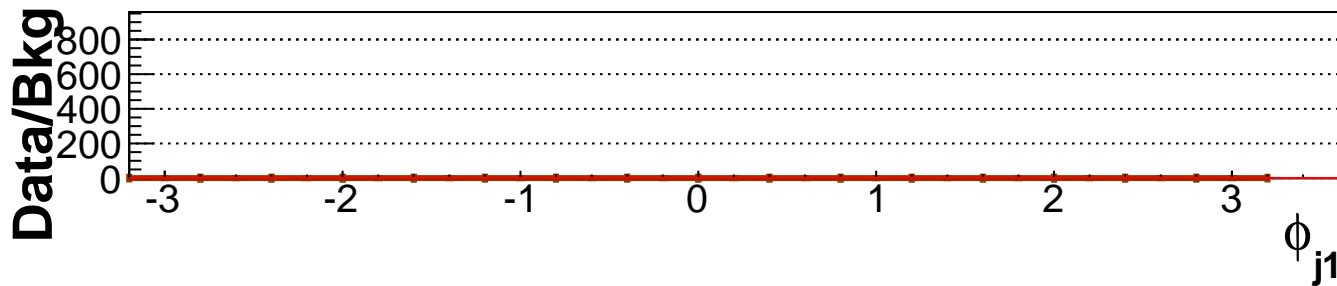
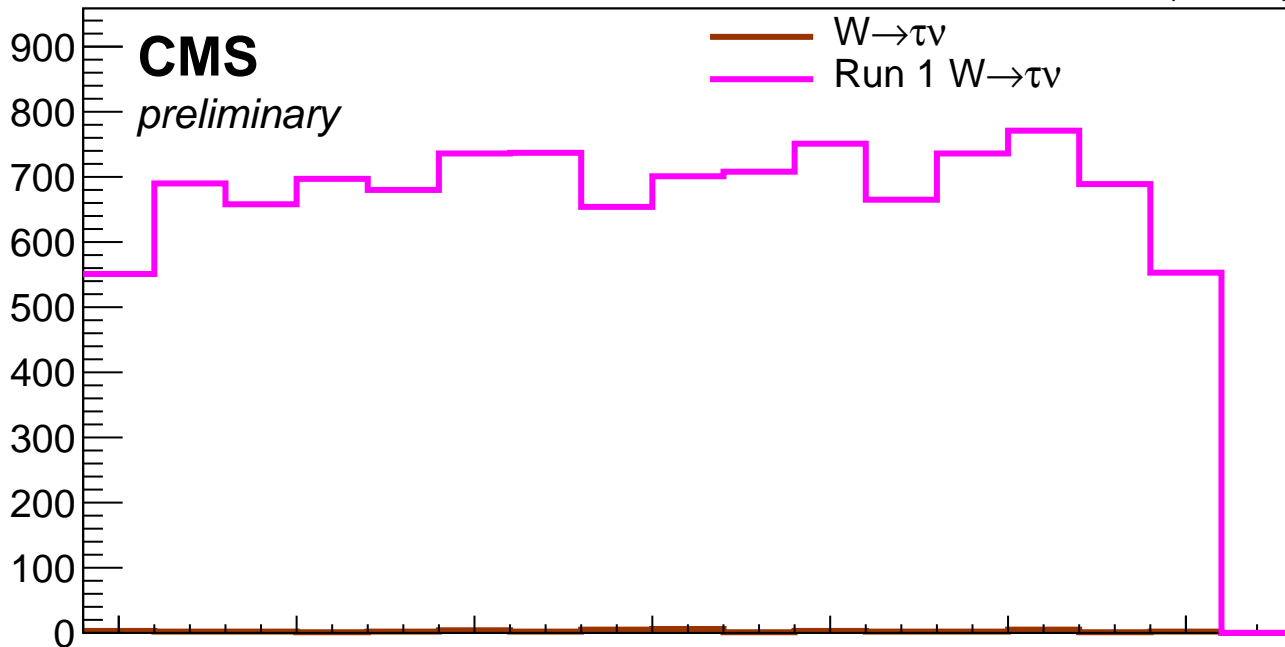
—  $W \rightarrow \tau \nu$   
— Run 1  $W \rightarrow \tau \nu$



**Data/Bkg**



19.2 fb<sup>-1</sup> (8 TeV)



19.2 fb<sup>-1</sup> (8 TeV)

**CMS**

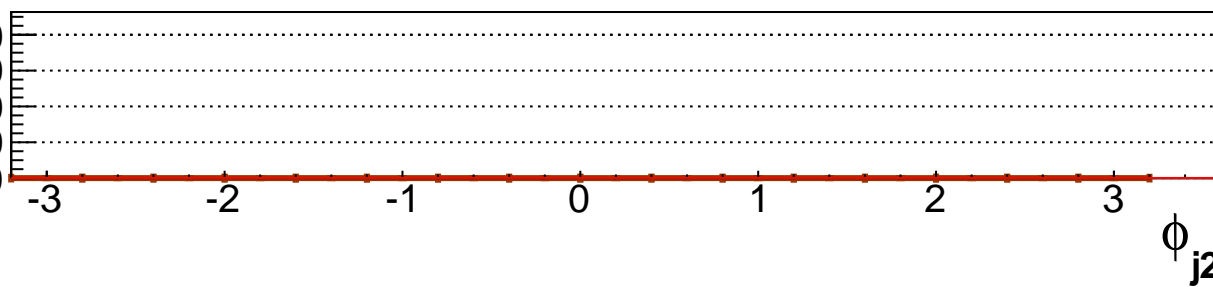
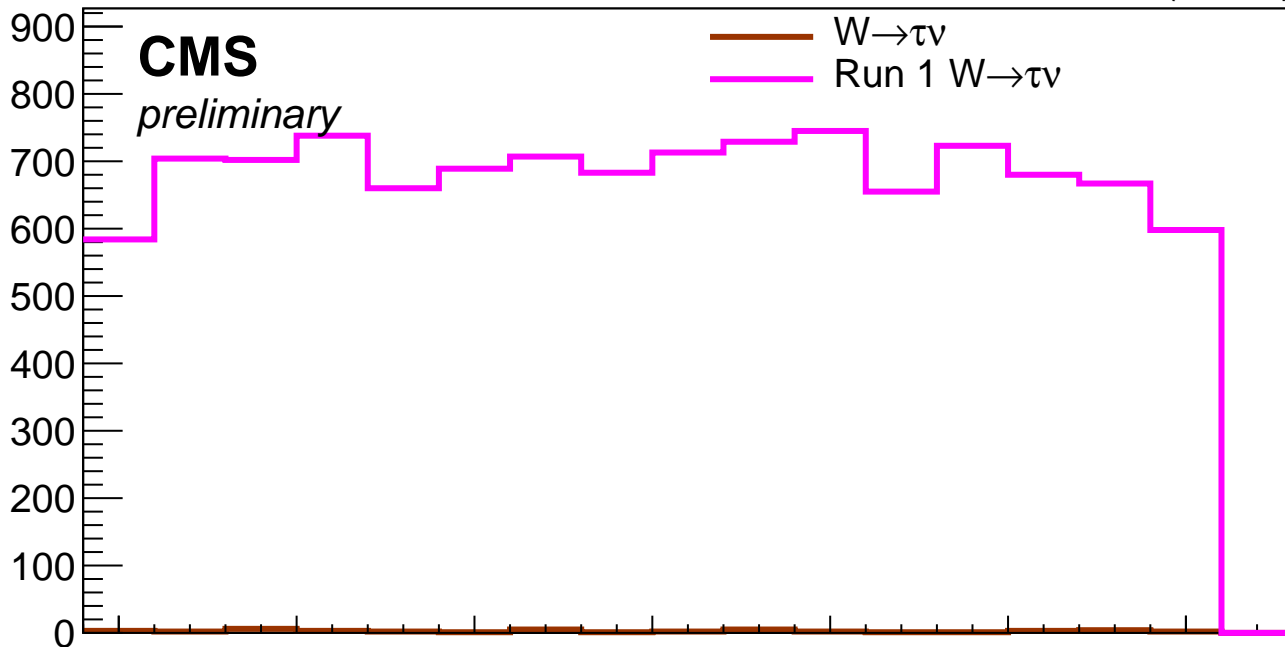
*preliminary*

—  $W \rightarrow \tau \nu$

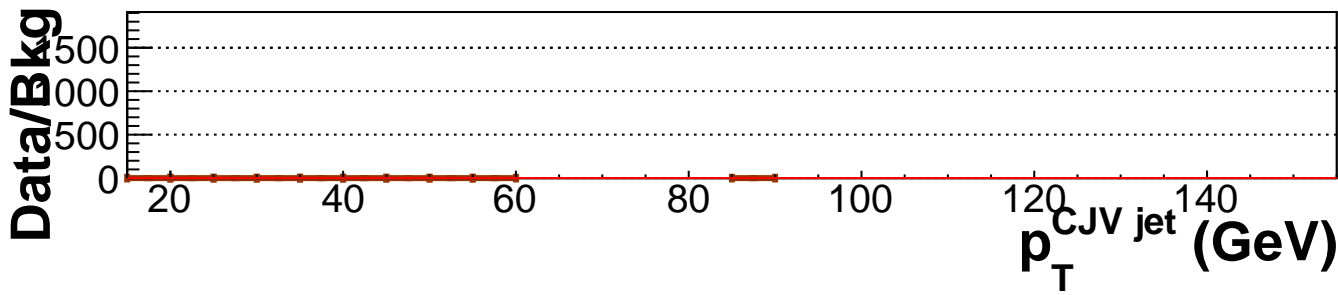
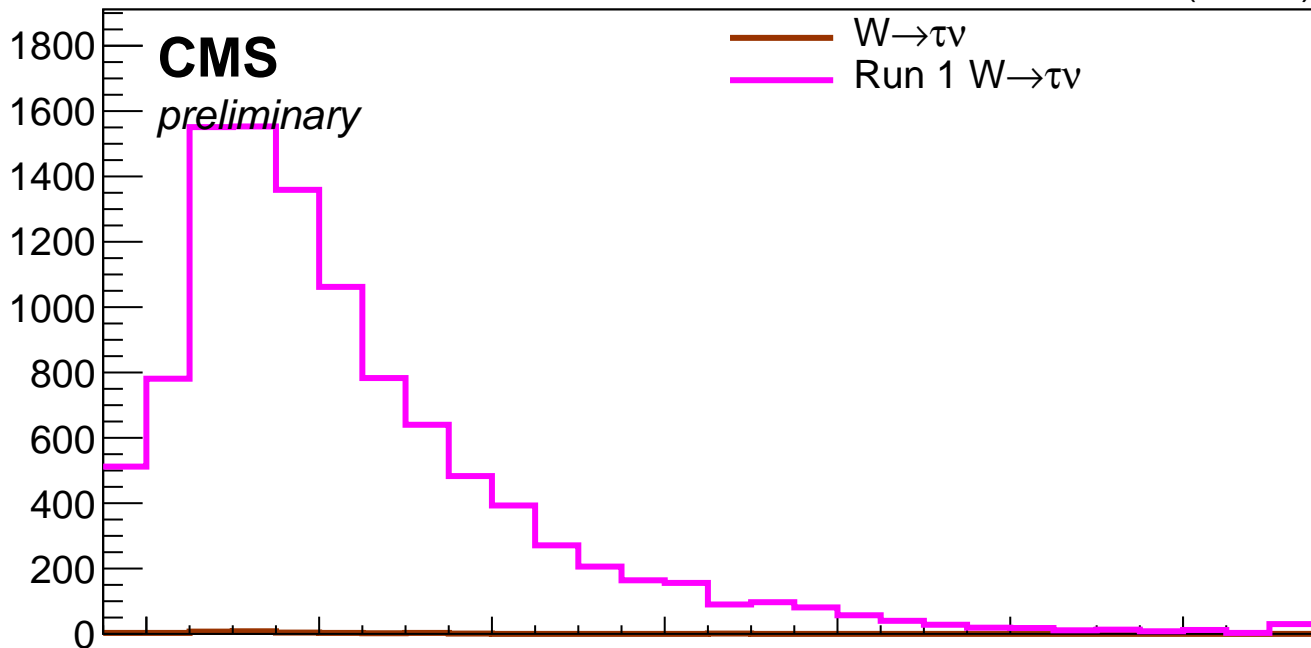
— Run 1  $W \rightarrow \tau \nu$

**Data/Bkg**

$\phi_{j2}$



19.2 fb<sup>-1</sup> (8 TeV)



19.2 fb<sup>-1</sup> (8 TeV)

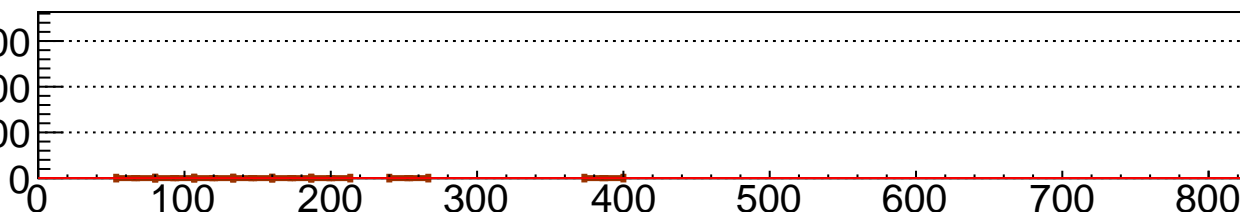
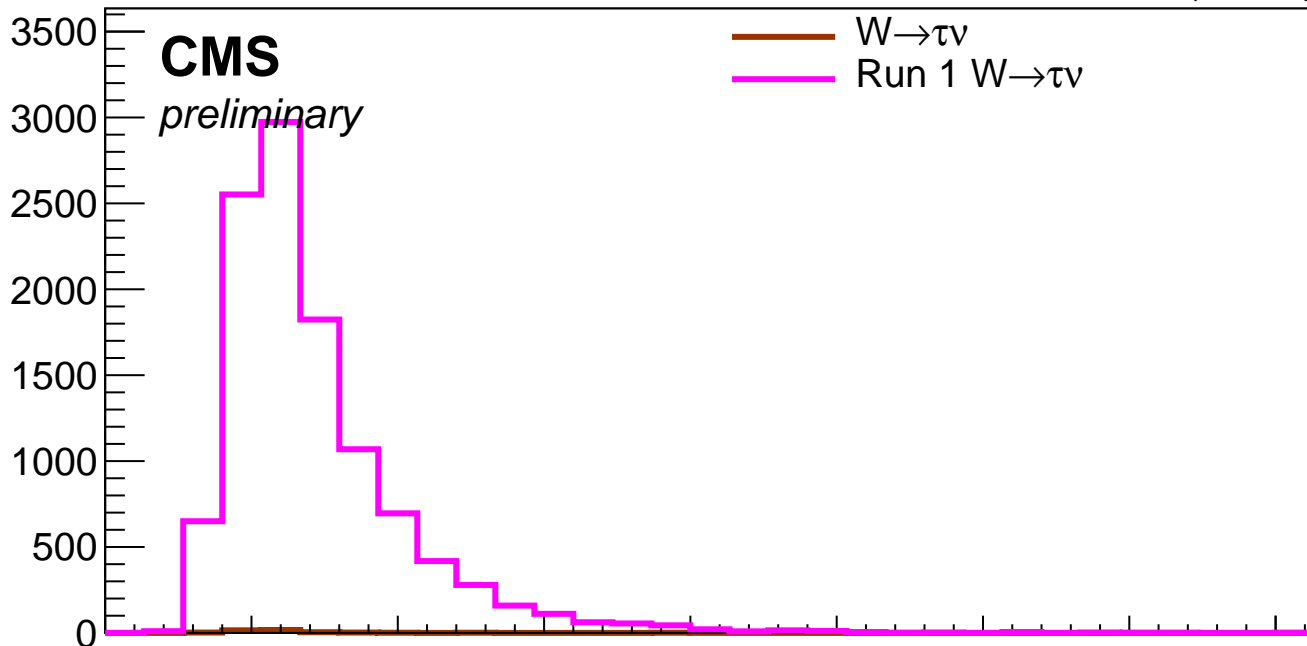
**CMS**

*preliminary*

—  $W \rightarrow \tau \nu$   
— Run 1  $W \rightarrow \tau \nu$

**Data/Bkg**

**Missing transverse energy (GeV)**





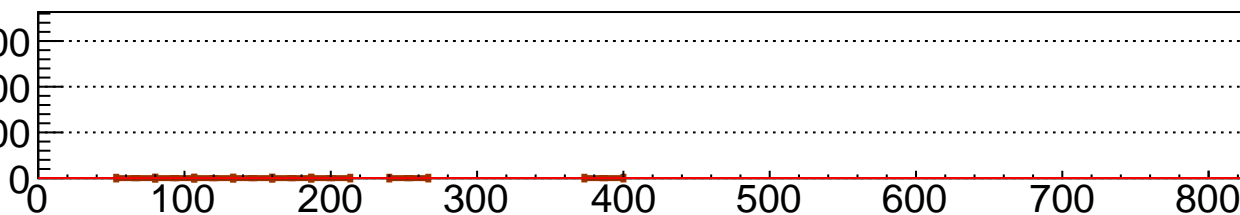
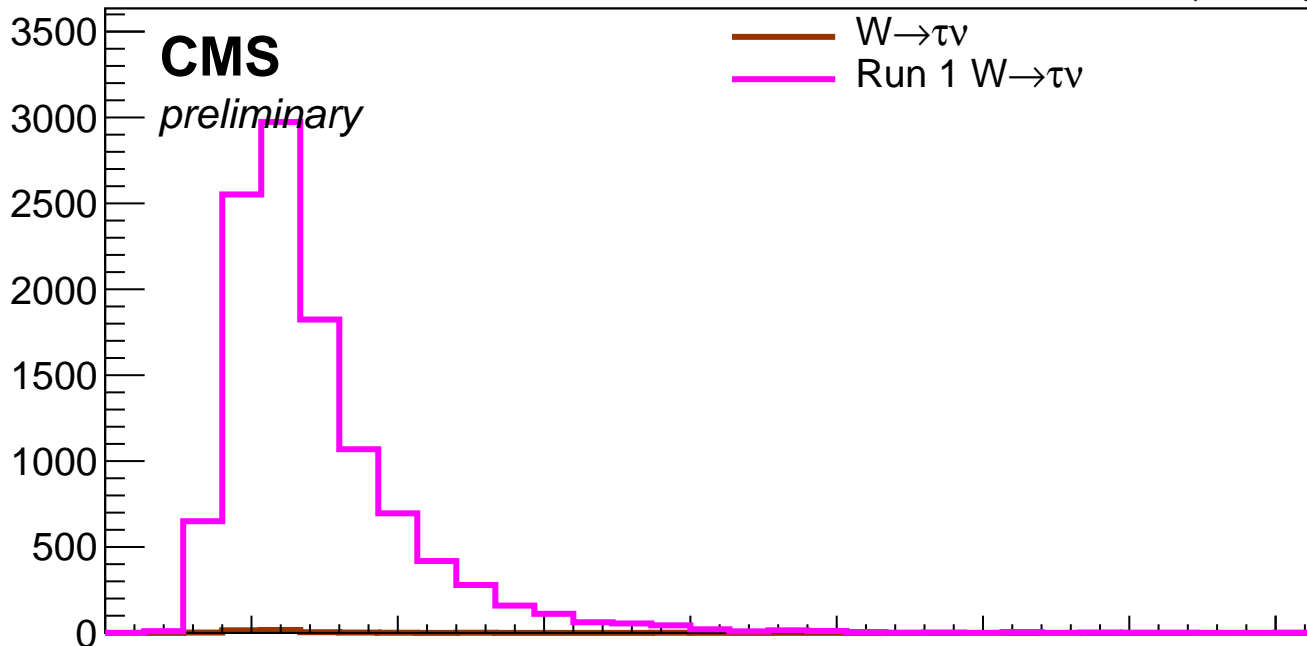
19.2 fb<sup>-1</sup> (8 TeV)

**CMS**  
*preliminary*

—  $W \rightarrow \tau \nu$   
— Run 1  $W \rightarrow \tau \nu$

**Data/Bkg**

**MET (GeV)**



19.2 fb<sup>-1</sup> (8 TeV)

**CMS**

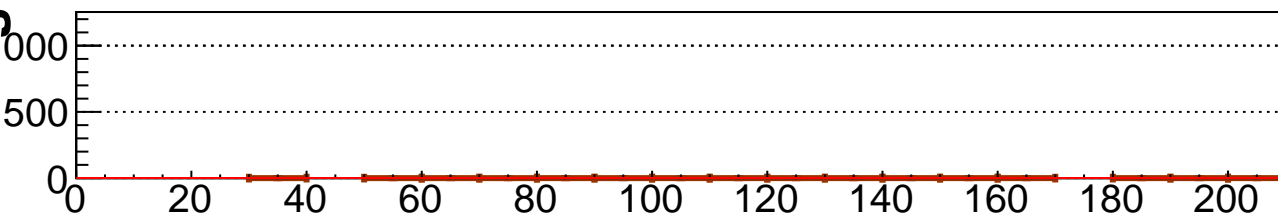
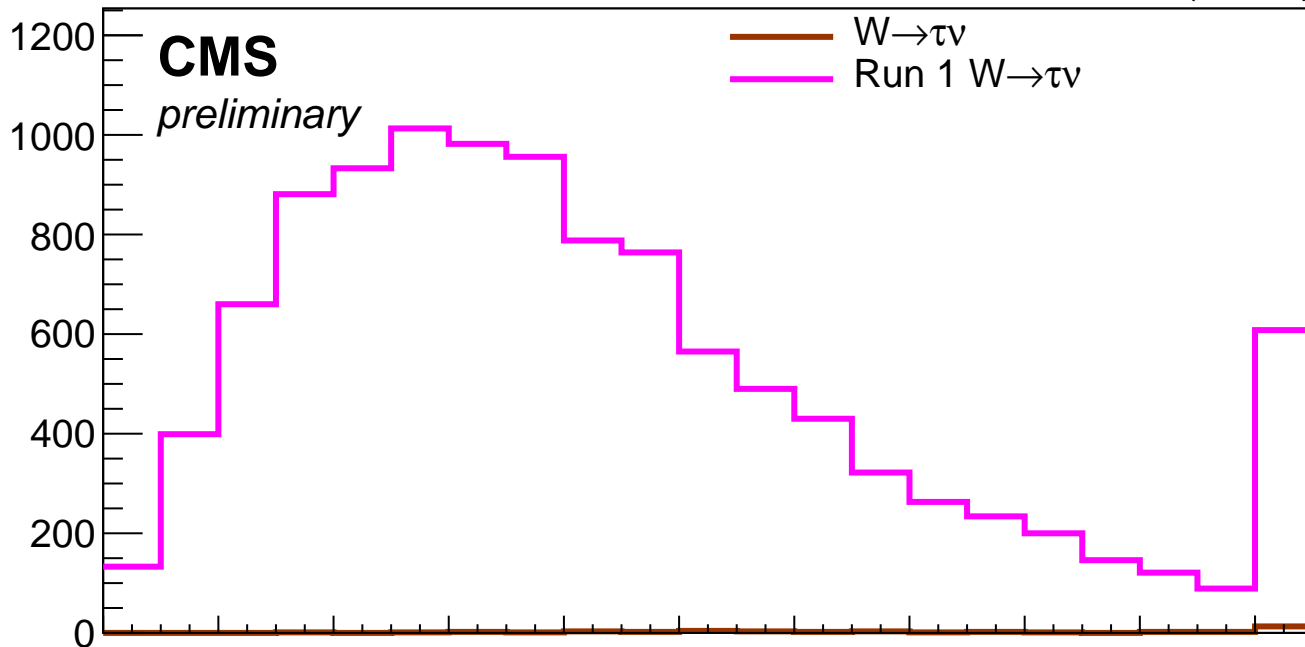
*preliminary*

—  $W \rightarrow \tau \nu$

— Run 1  $W \rightarrow \tau \nu$

**Data/Bkg**

**L1MET (GeV)**

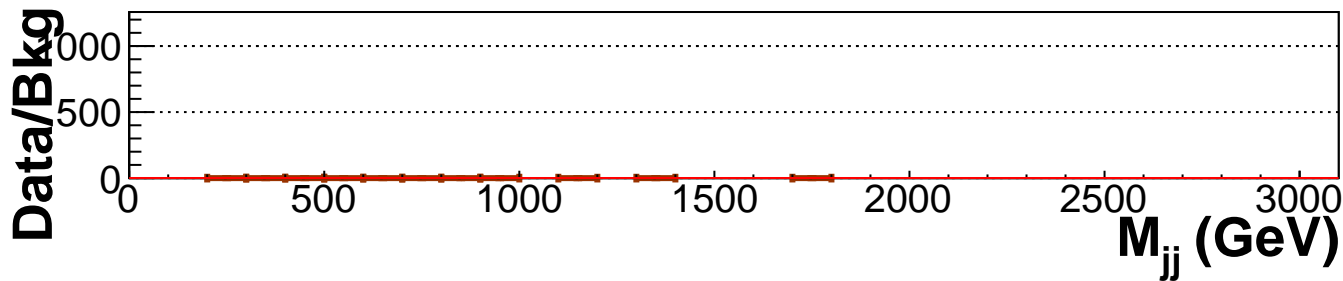


19.2 fb<sup>-1</sup> (8 TeV)

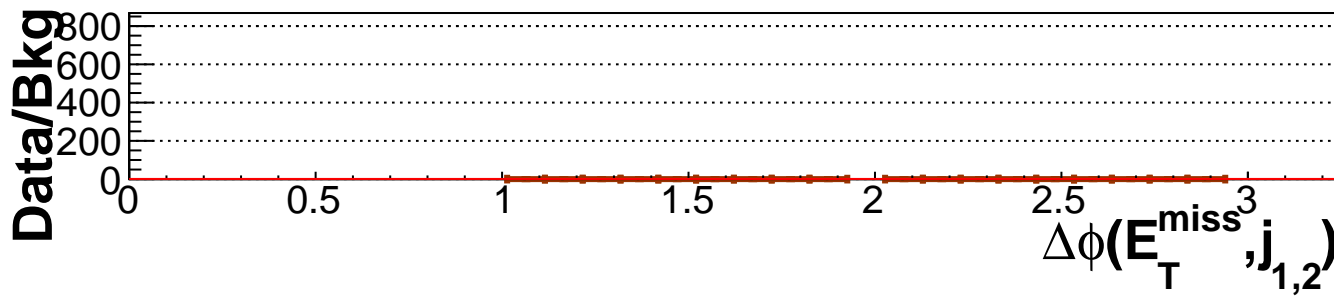
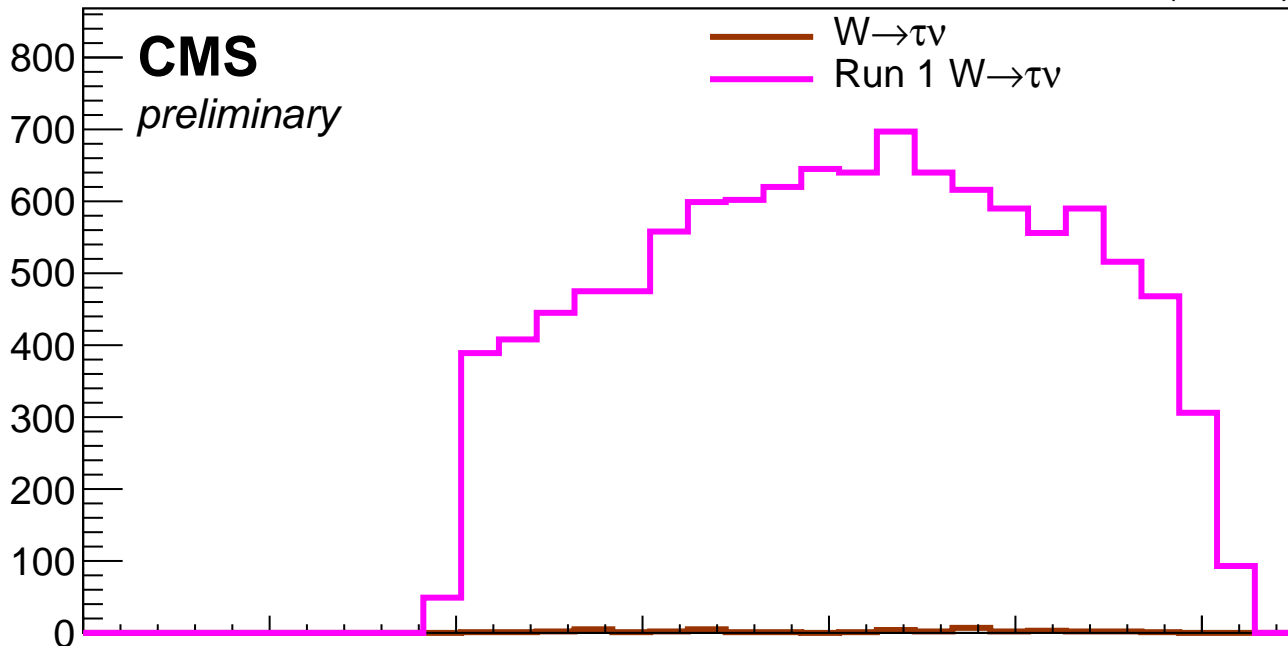
**CMS**

*preliminary*

—  $W \rightarrow \tau \nu$   
— Run 1  $W \rightarrow \tau \nu$



19.2 fb<sup>-1</sup> (8 TeV)

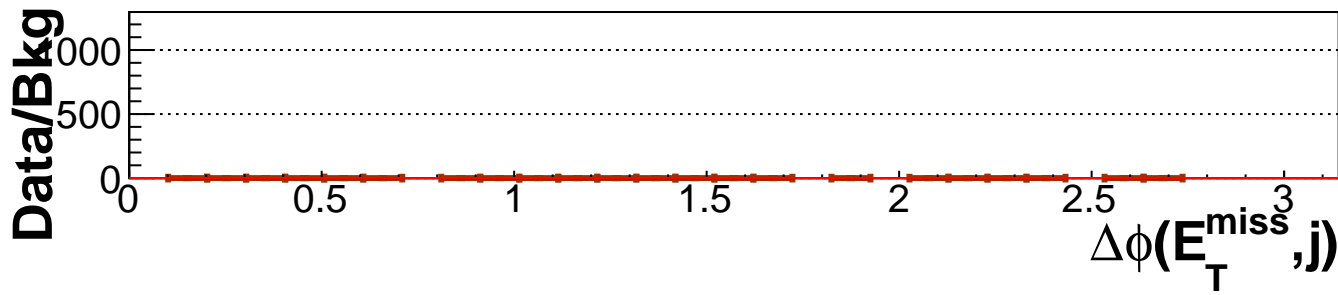


19.2 fb<sup>-1</sup> (8 TeV)

**CMS**

*preliminary*

—  $W \rightarrow \tau \nu$   
— Run 1  $W \rightarrow \tau \nu$



19.2 fb<sup>-1</sup> (8 TeV)

**CMS**

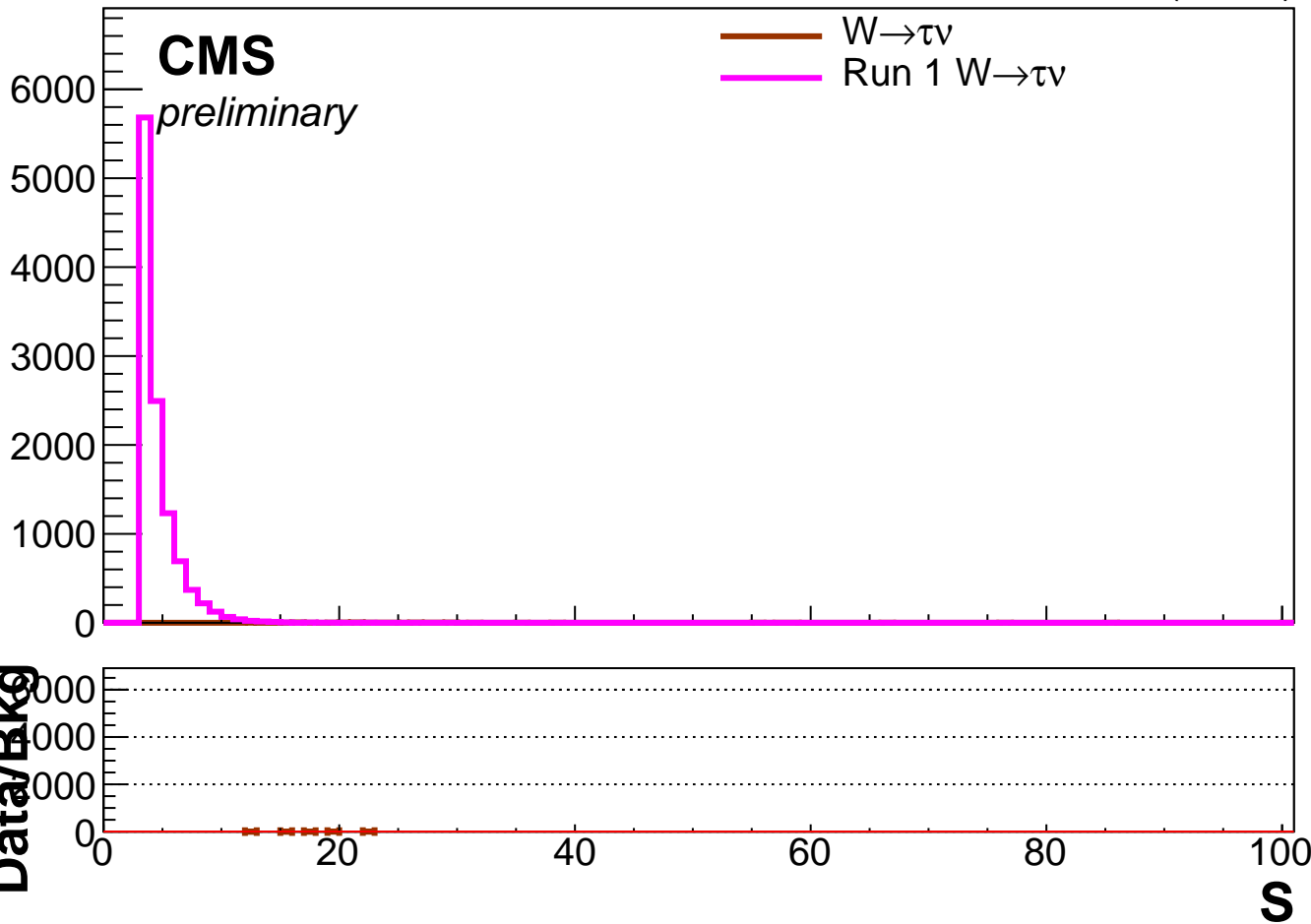
*preliminary*

—  $W \rightarrow \tau \nu$

— Run 1  $W \rightarrow \tau \nu$

**Data/Bkg**

**S**



19.2 fb<sup>-1</sup> (8 TeV)

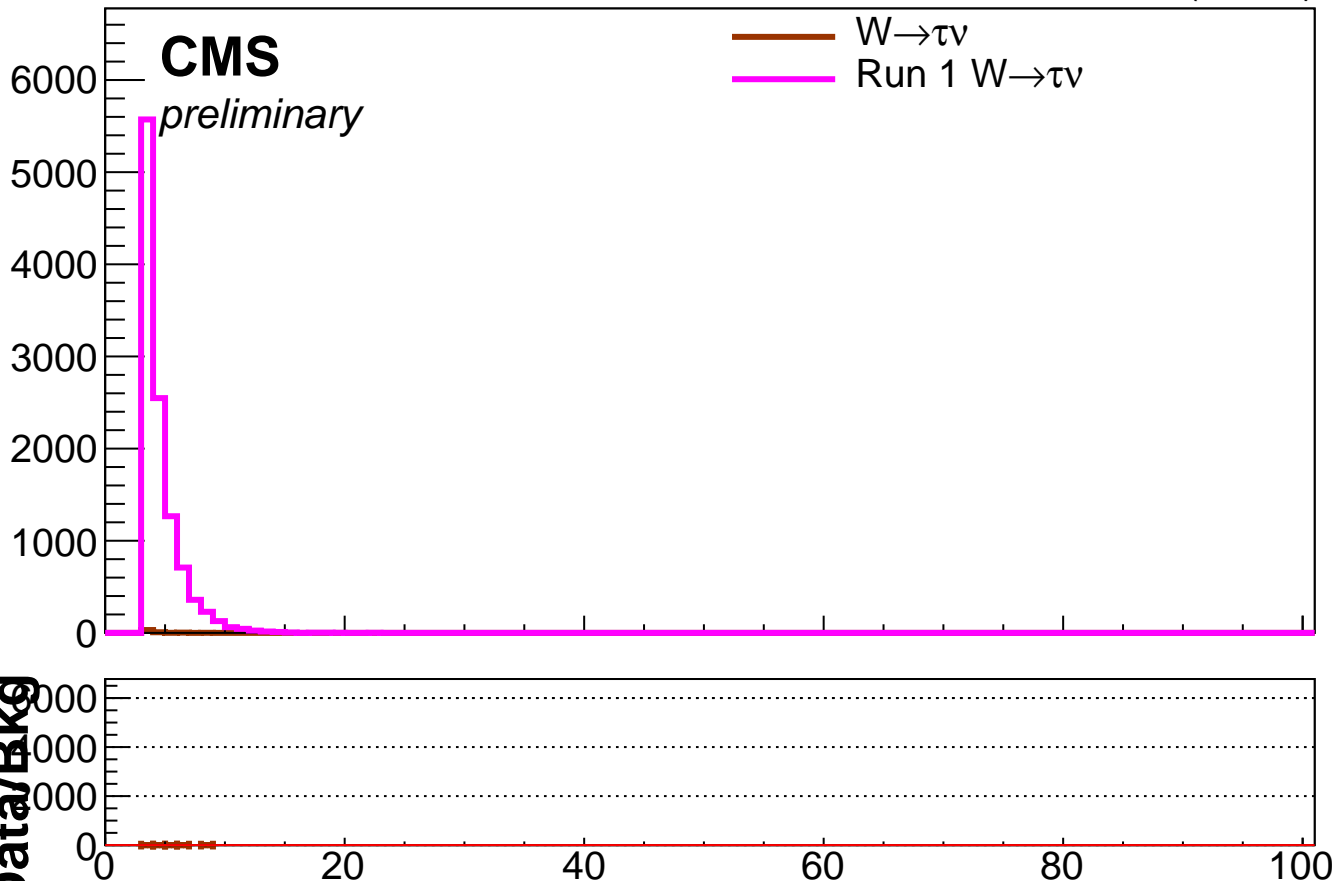
**CMS**

*preliminary*

—  $W \rightarrow \tau \nu$   
— Run 1  $W \rightarrow \tau \nu$

**Data/Bkg**

**Run 1 S**



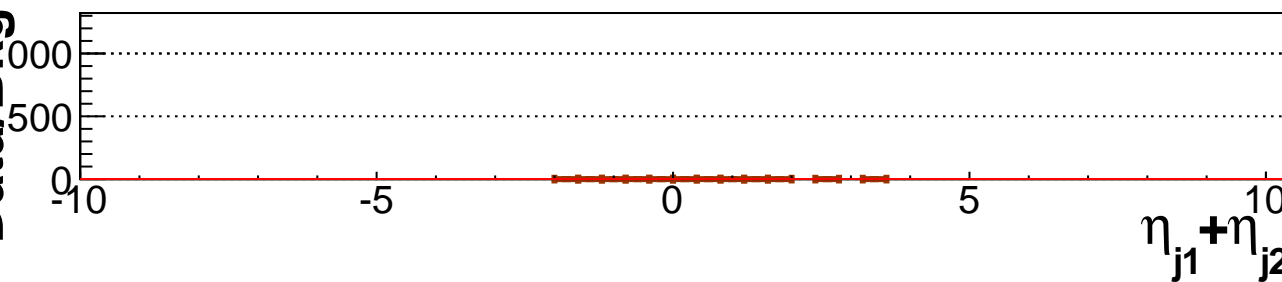
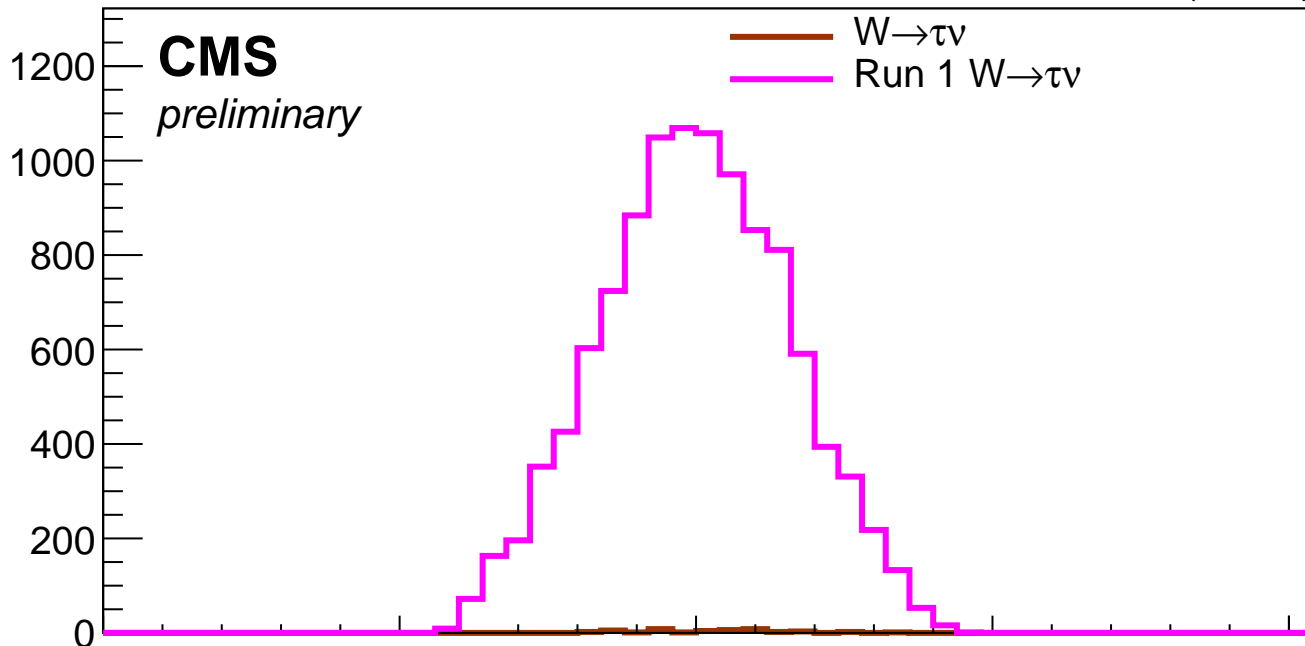
19.2 fb<sup>-1</sup> (8 TeV)

**CMS**  
*preliminary*

—  $W \rightarrow \tau \nu$   
— Run 1  $W \rightarrow \tau \nu$

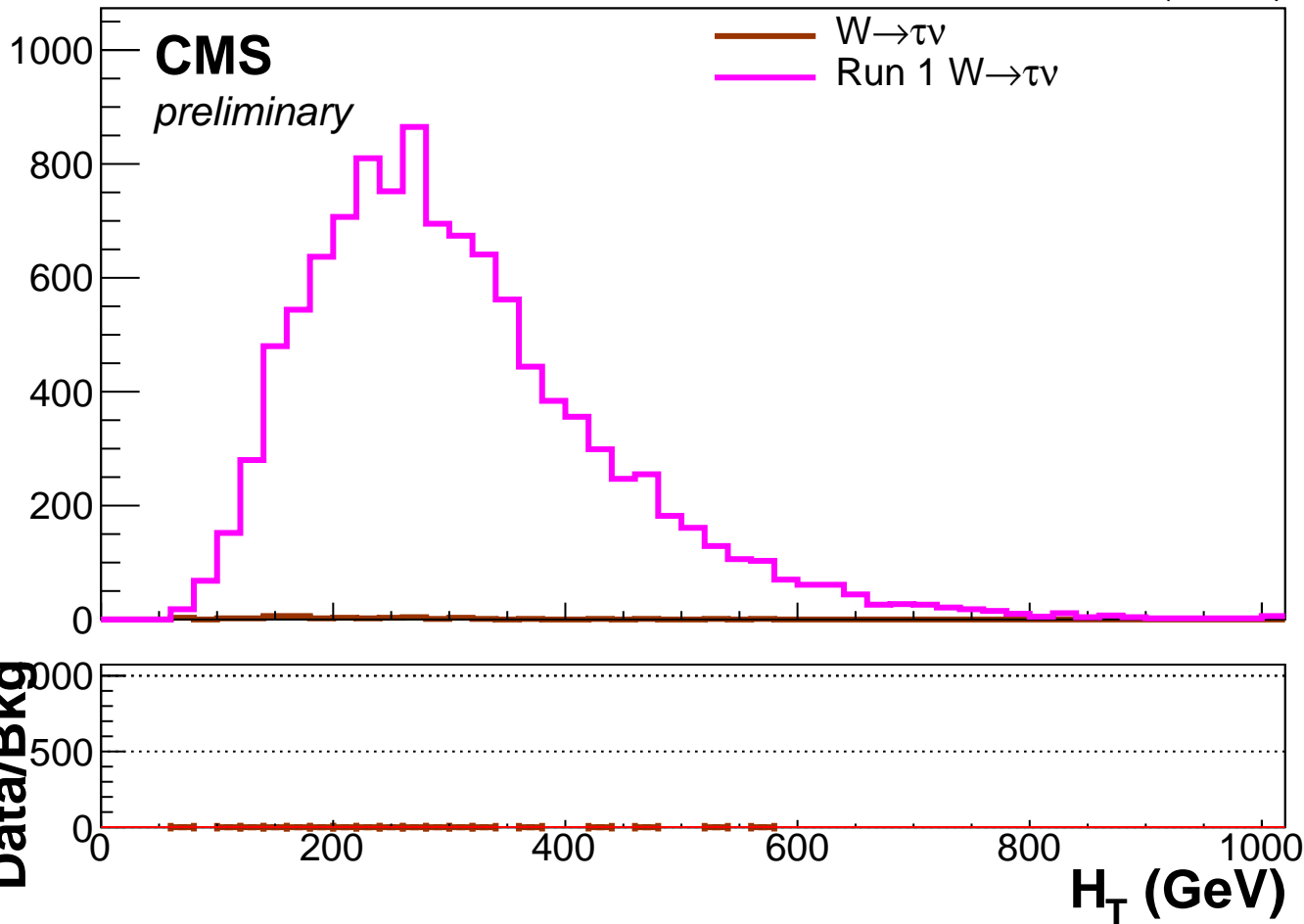
**Data/Bkg**

$\eta_{j1} + \eta_{j2}$





19.2 fb<sup>-1</sup> (8 TeV)

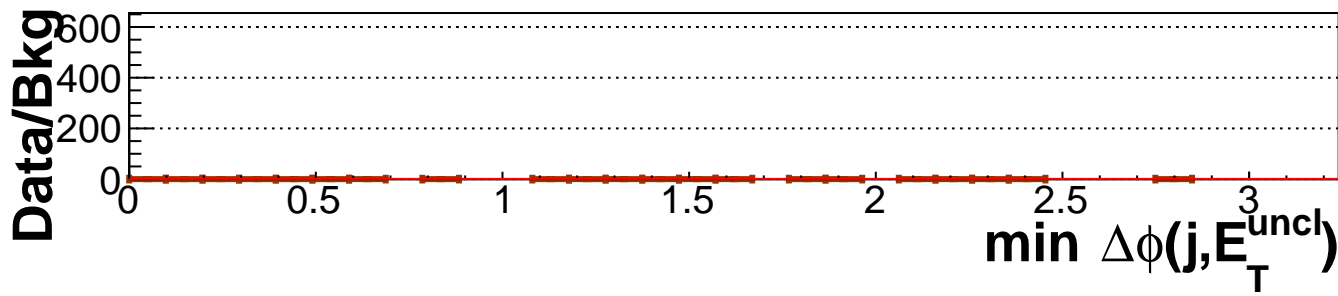


19.2 fb<sup>-1</sup> (8 TeV)

**CMS**

*preliminary*

—  $W \rightarrow \tau \nu$   
— Run 1  $W \rightarrow \tau \nu$

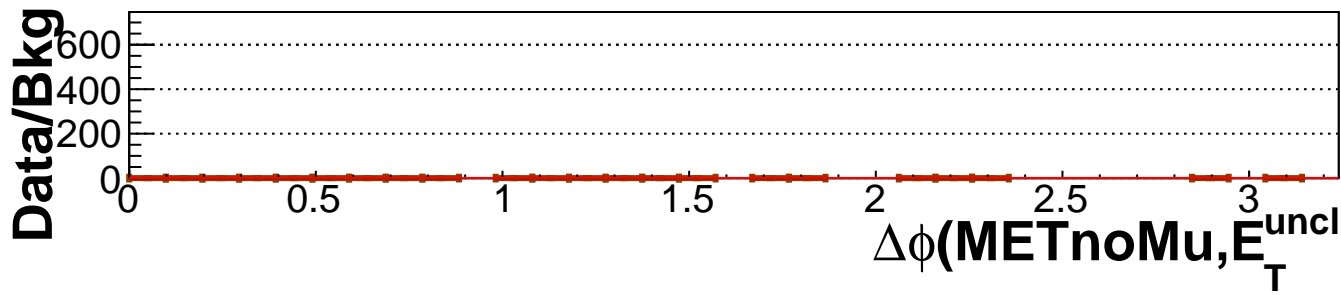


19.2 fb<sup>-1</sup> (8 TeV)

**CMS**

*preliminary*

—  $W \rightarrow \tau \nu$   
— Run 1  $W \rightarrow \tau \nu$

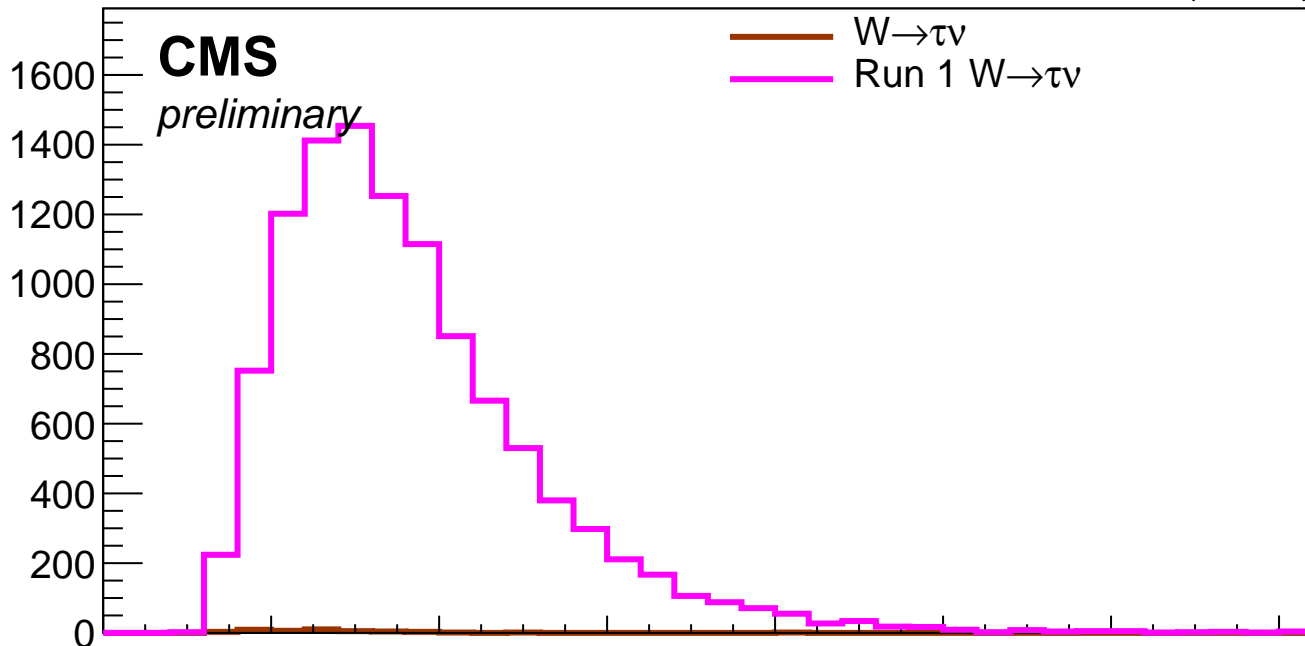


19.2 fb<sup>-1</sup> (8 TeV)

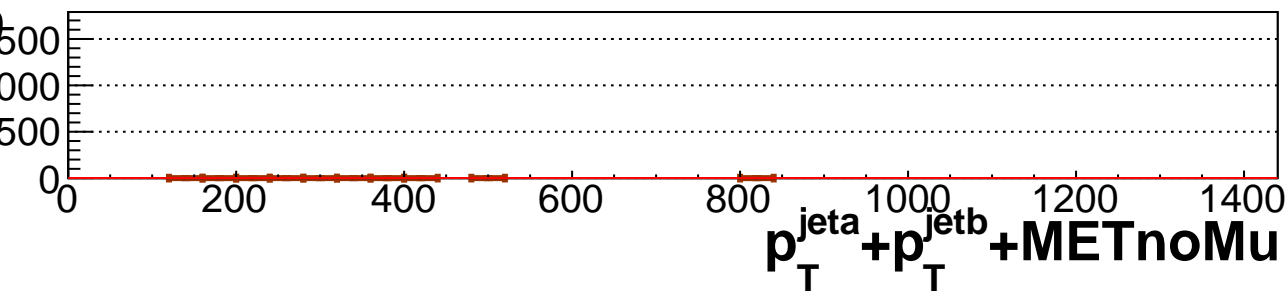
**CMS**

*preliminary*

—  $W \rightarrow \tau \nu$   
— Run 1  $W \rightarrow \tau \nu$



**Data/Bkg**



19.2 fb<sup>-1</sup> (8 TeV)

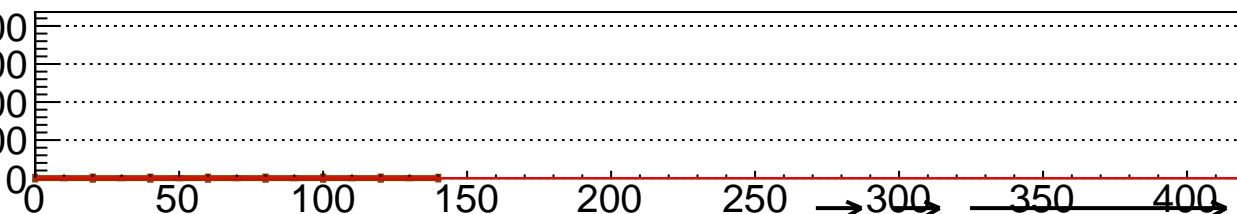
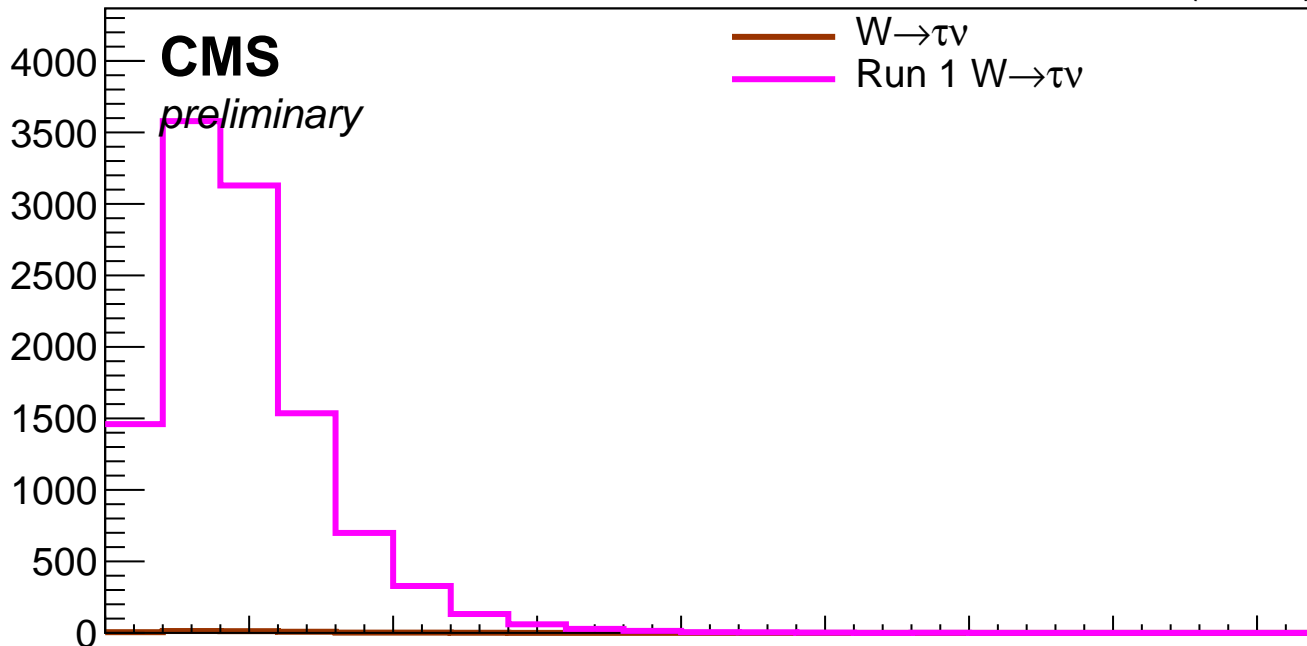
**CMS**

*preliminary*

—  $W \rightarrow \tau \nu$   
— Run 1  $W \rightarrow \tau \nu$

**Data/Bkg**

**$p_T(ja+jb+METnoMu)$**



19.2 fb<sup>-1</sup> (8 TeV)

**CMS**

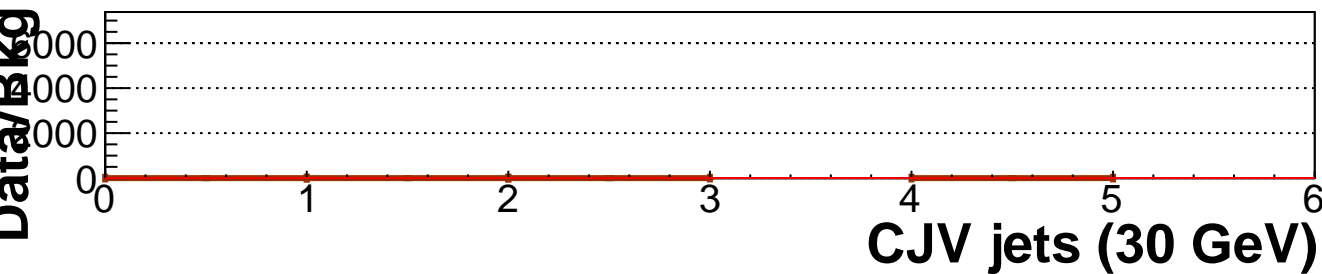
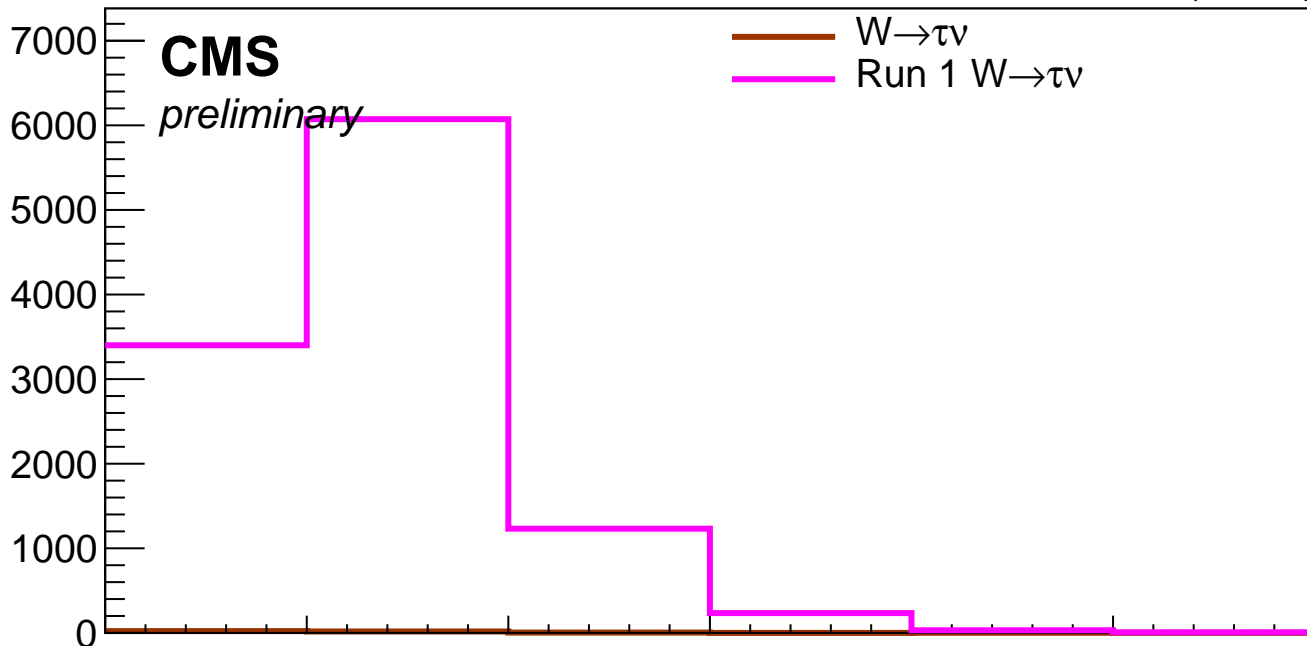
*preliminary*

W→τν

Run 1 W→τν

**Data/Bkg**

**CJV jets (30 GeV)**



19.2 fb<sup>-1</sup> (8 TeV)

**CMS**

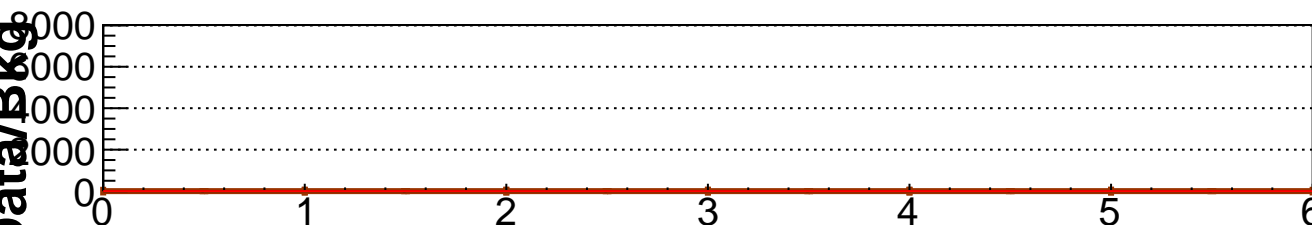
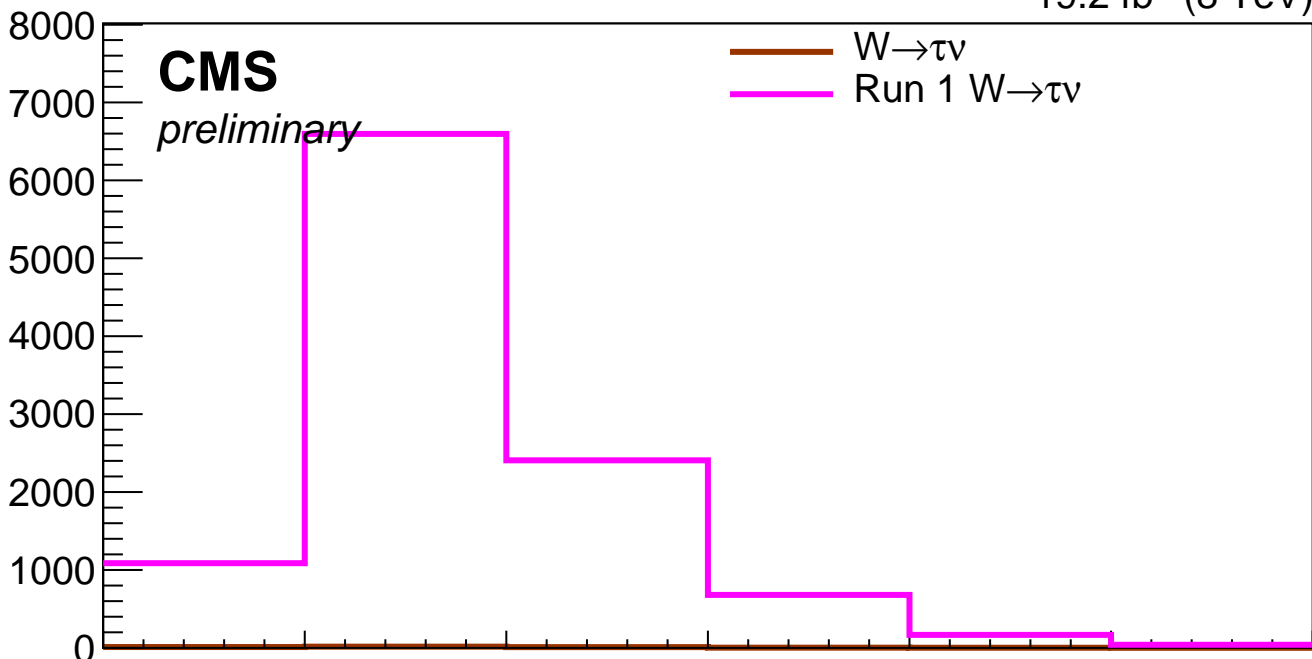
*preliminary*

W→τν

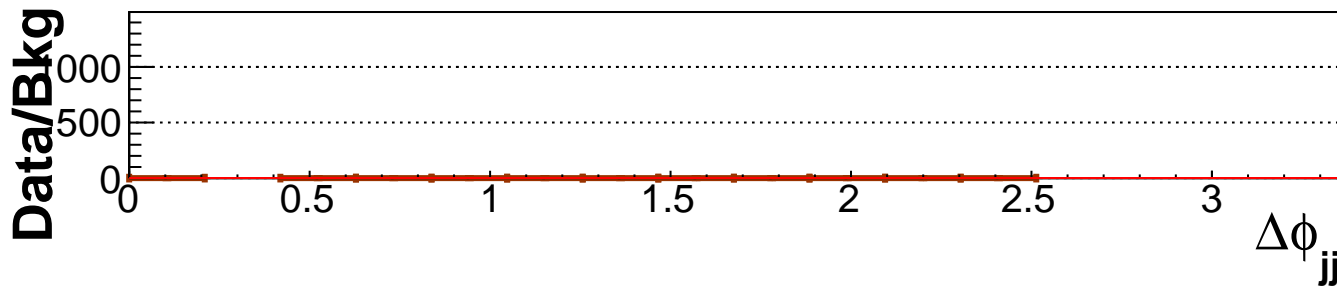
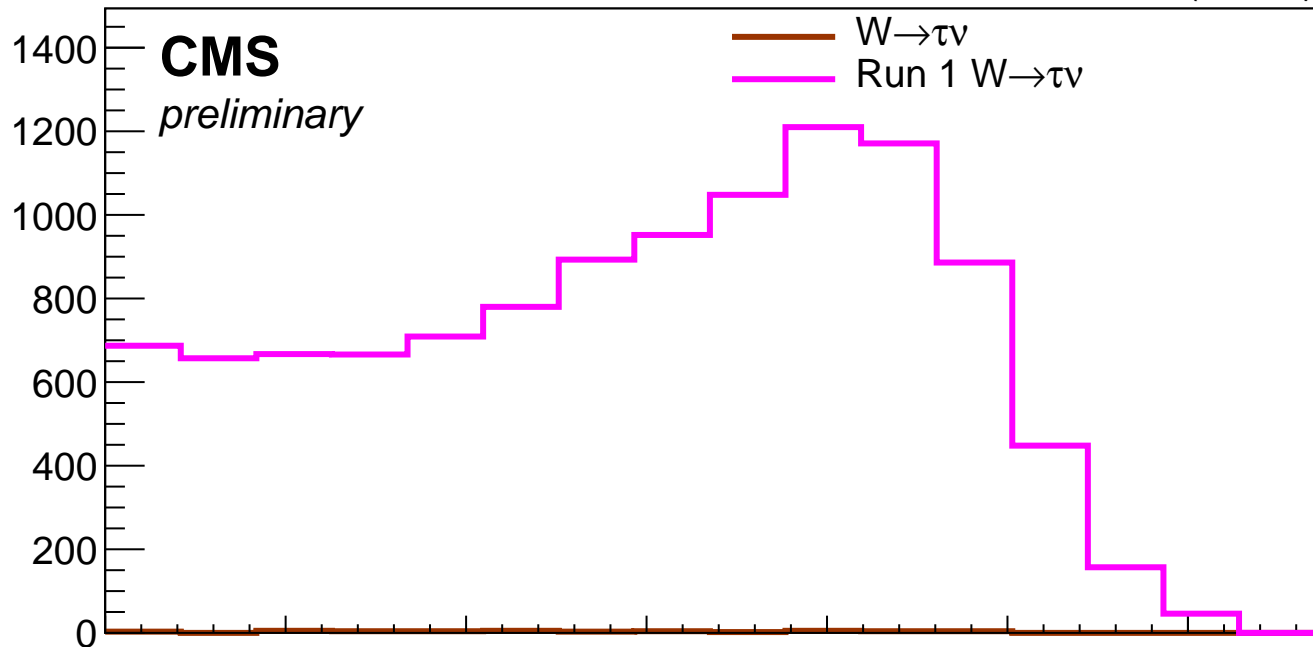
Run 1 W→τν

Data/Bkg

CJV jets (20 GeV EB, 30 GeV EE)



19.2 fb<sup>-1</sup> (8 TeV)





19.2 fb<sup>-1</sup> (8 TeV)

**CMS**

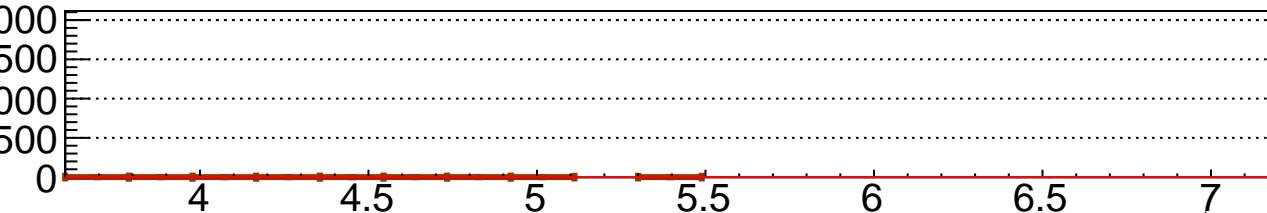
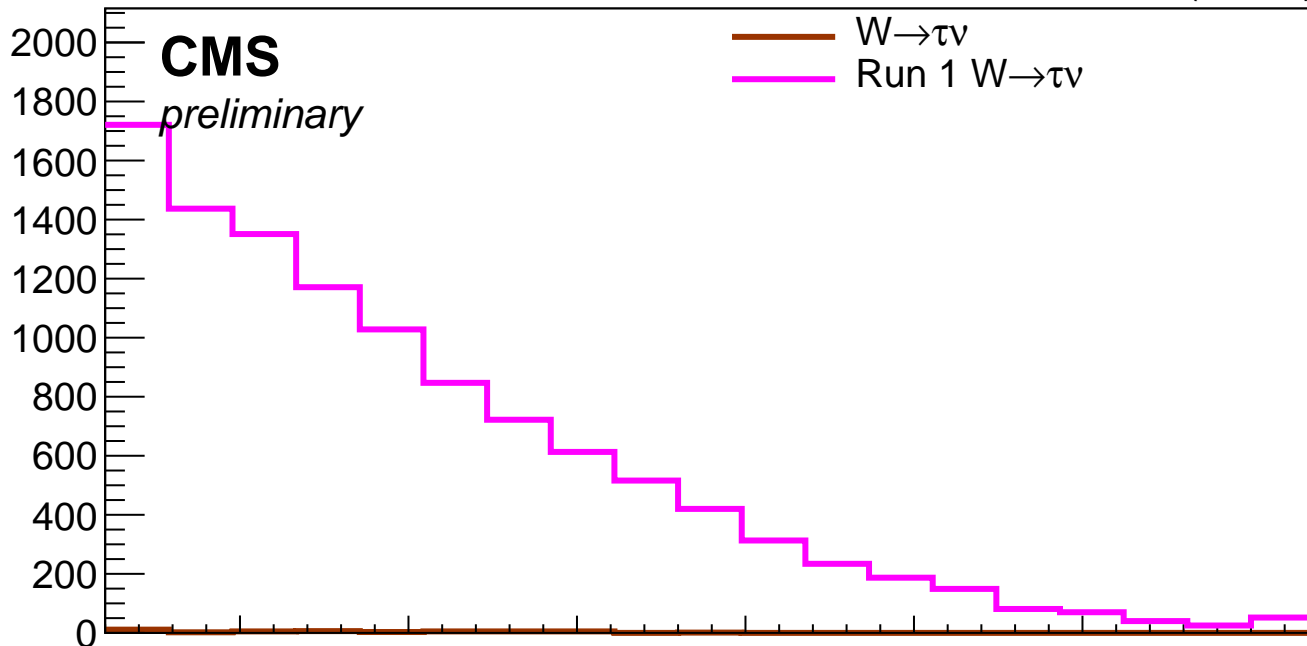
*preliminary*

—  $W \rightarrow \tau \nu$

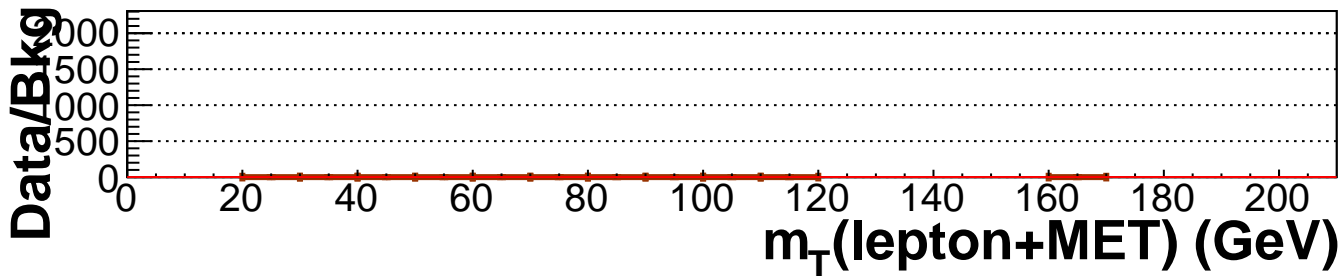
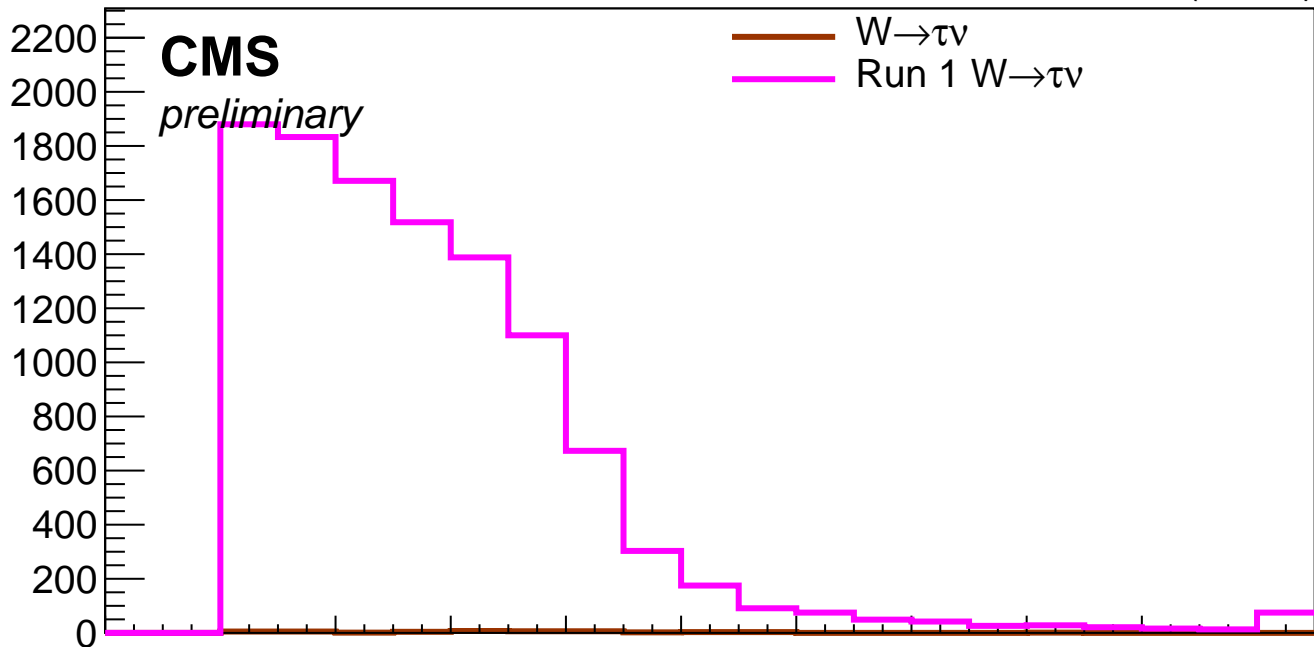
— Run 1  $W \rightarrow \tau \nu$

**Data/Bkg**

$\Delta\eta_{jj}$



19.2 fb<sup>-1</sup> (8 TeV)



19.2 fb<sup>-1</sup> (8 TeV)

**CMS**

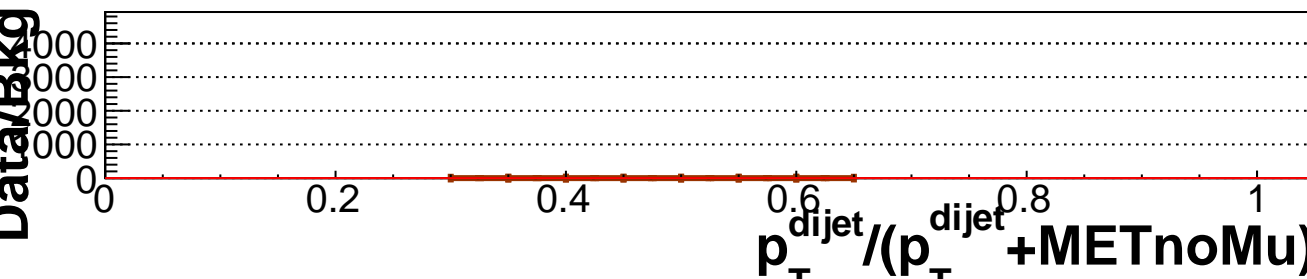
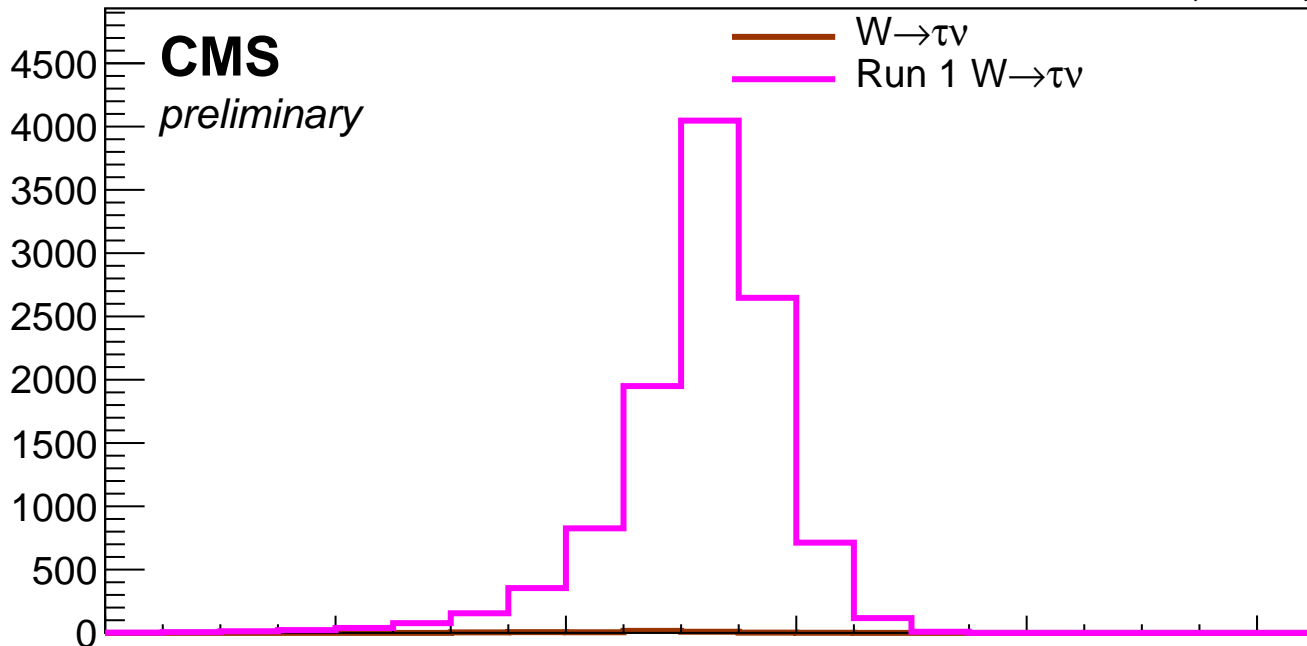
*preliminary*

W→τν

Run 1 W→τν

**Data/Bkg**

$p_T^{\text{dijet}} / (p_T^{\text{dijet}} + \text{MET}_{\text{noMu}})$



19.2 fb<sup>-1</sup> (8 TeV)

**CMS**

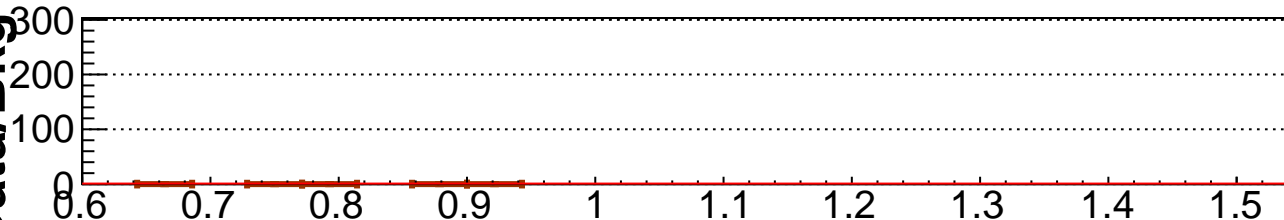
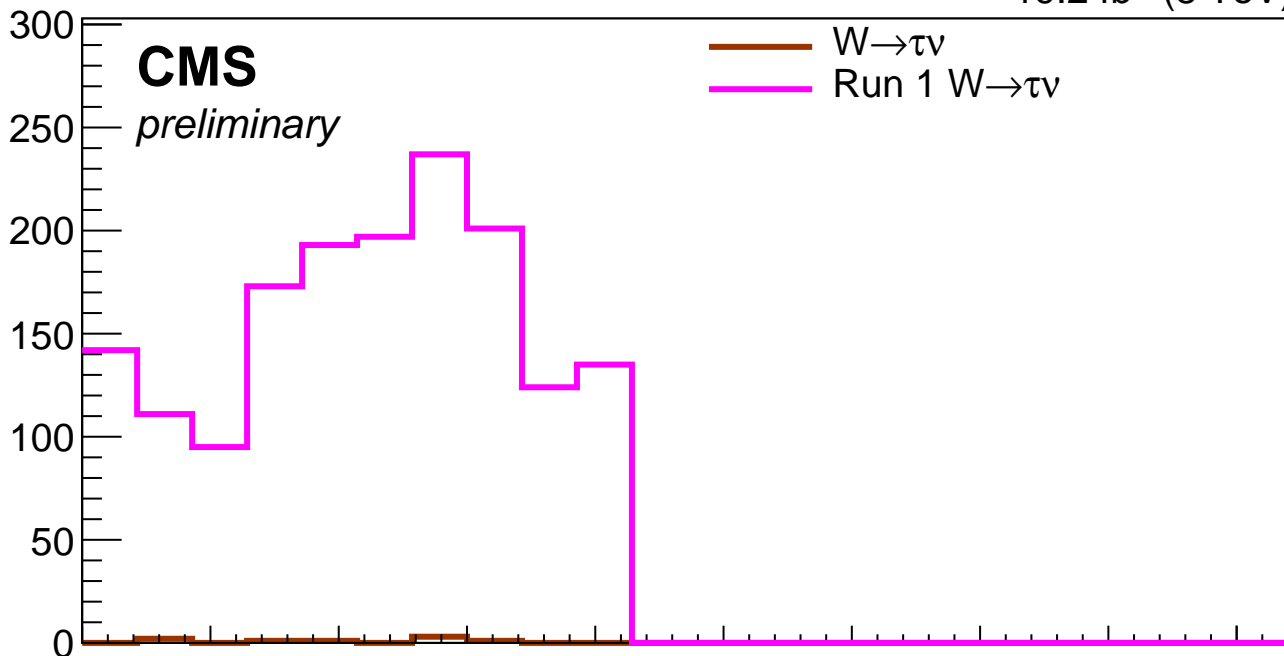
*preliminary*

—  $W \rightarrow \tau \nu$

— Run 1  $W \rightarrow \tau \nu$

**Data/Bkg**

**Jet 1 CSV**

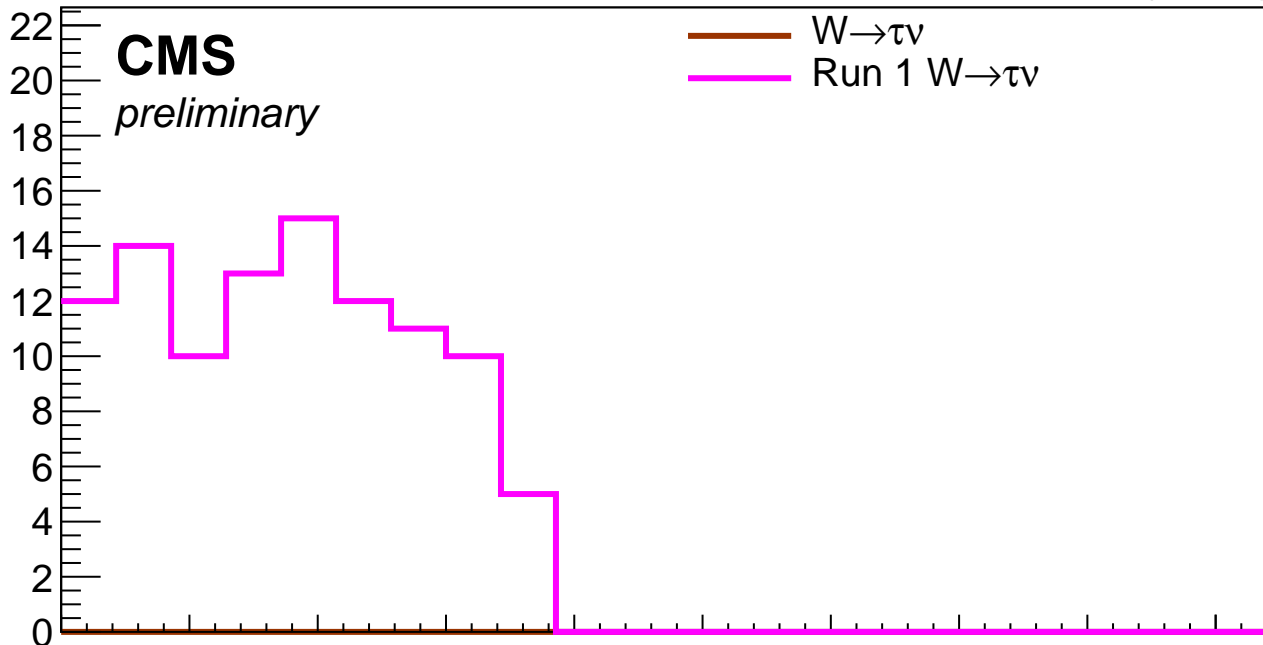


19.2 fb<sup>-1</sup> (8 TeV)

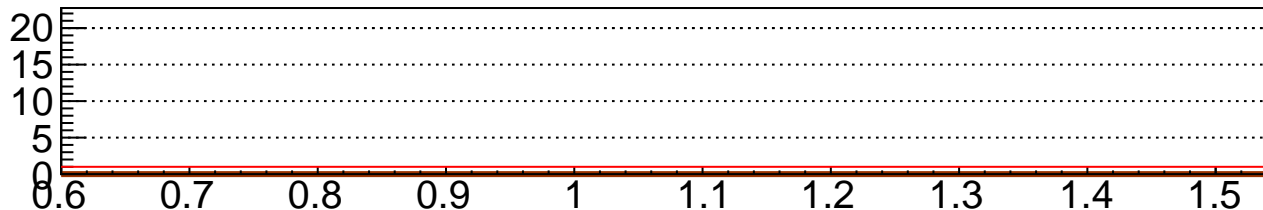
**CMS**  
*preliminary*

—  $W \rightarrow \tau \nu$   
— Run 1  $W \rightarrow \tau \nu$

**Data/Bkg**



**Jet 2 CSV**



19.2 fb<sup>-1</sup> (8 TeV)

**CMS**

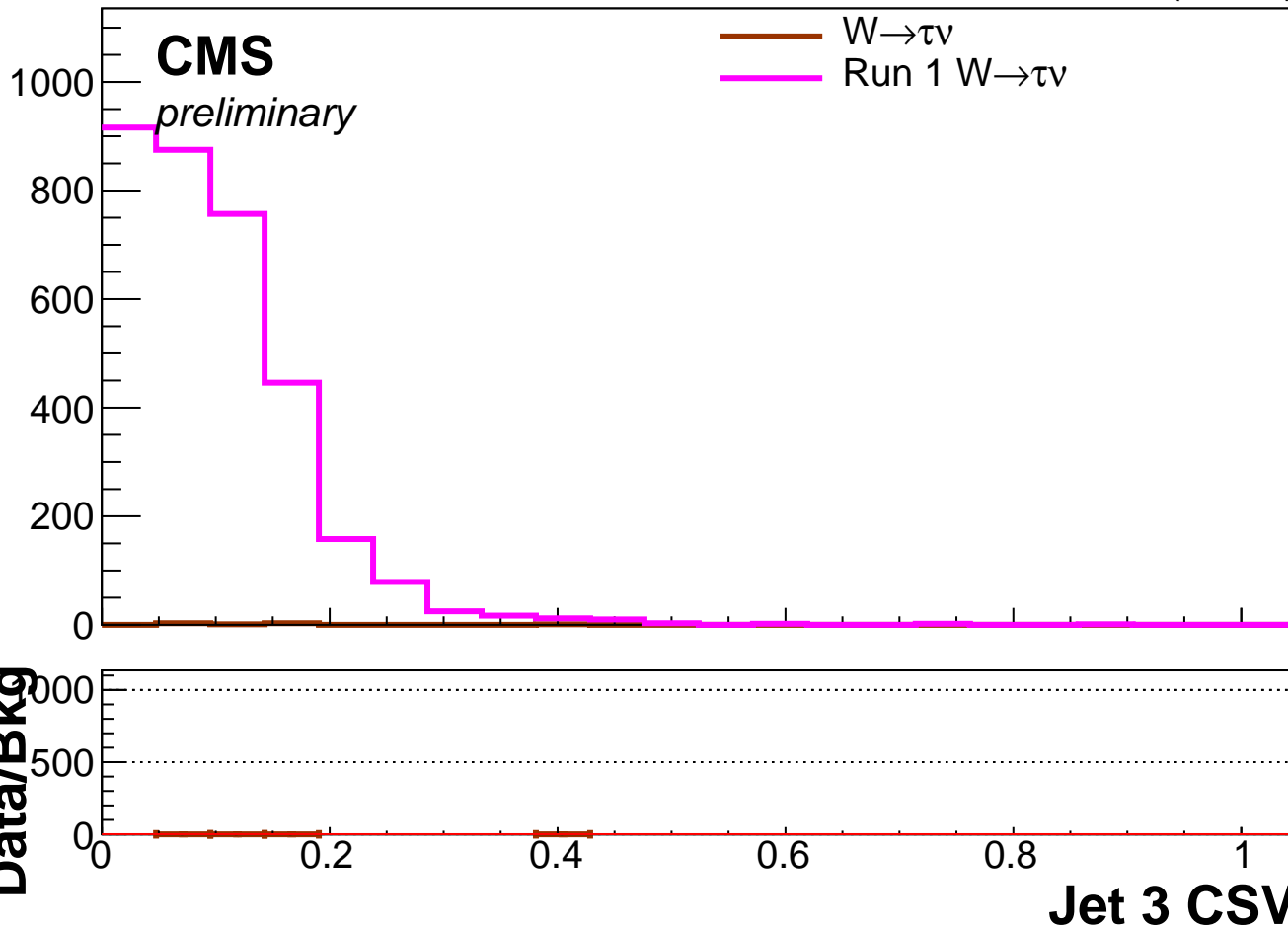
*preliminary*

W→τν

Run 1 W→τν

**Data/Bkg**

**Jet 3 CSV**



19.2 fb<sup>-1</sup> (8 TeV)

**CMS**

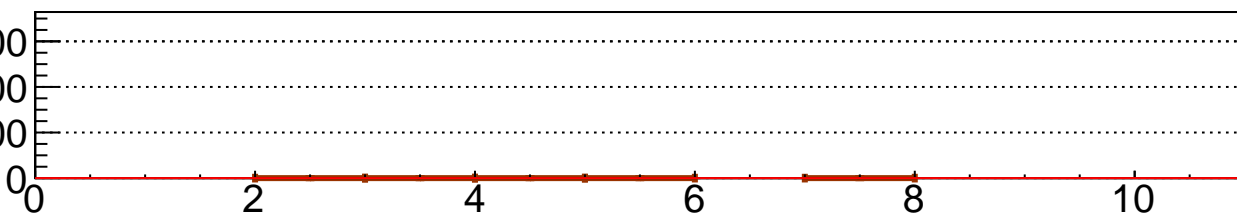
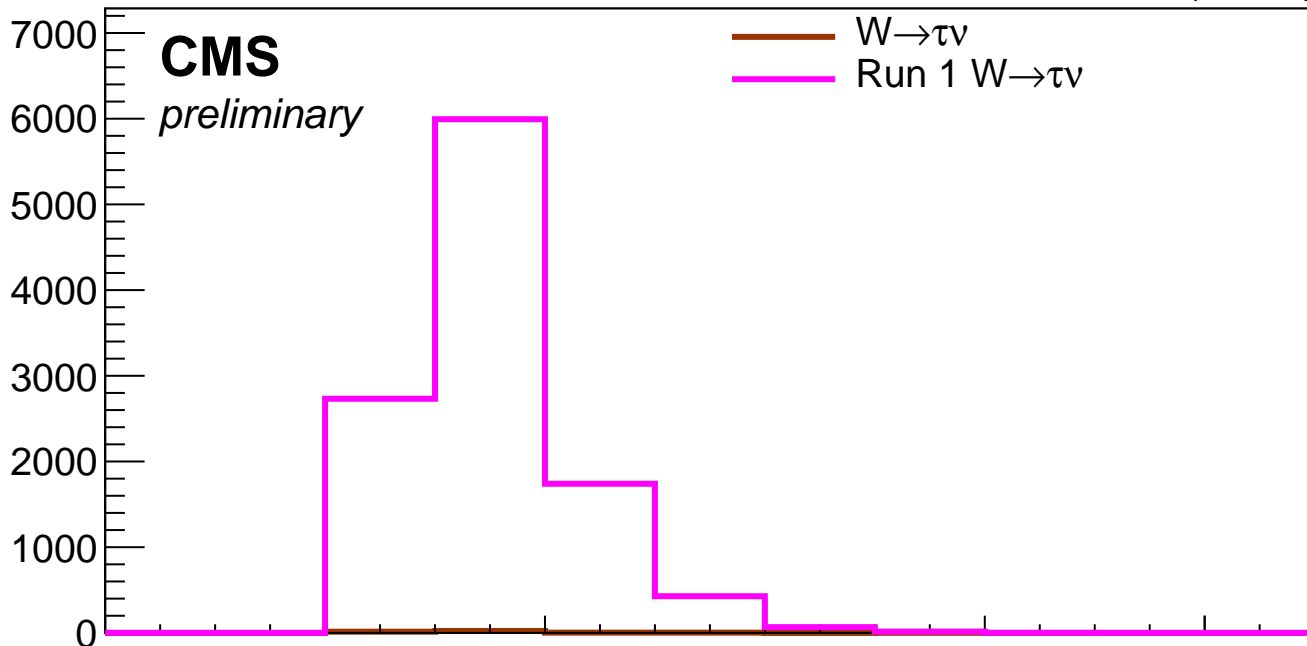
*preliminary*

—  $W \rightarrow \tau \nu$

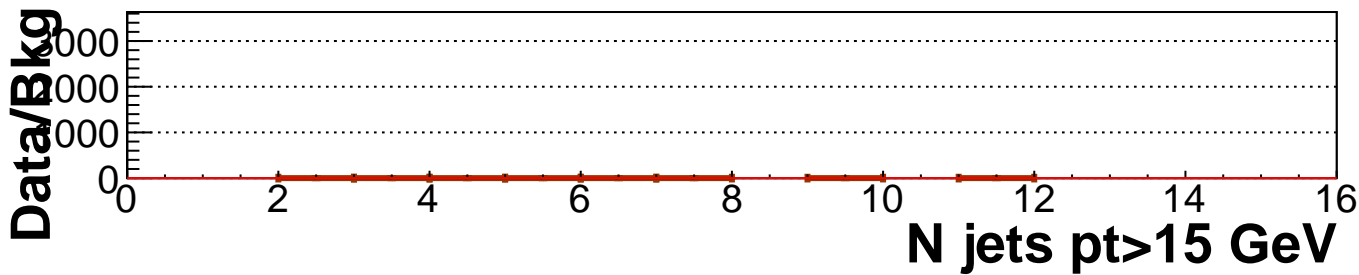
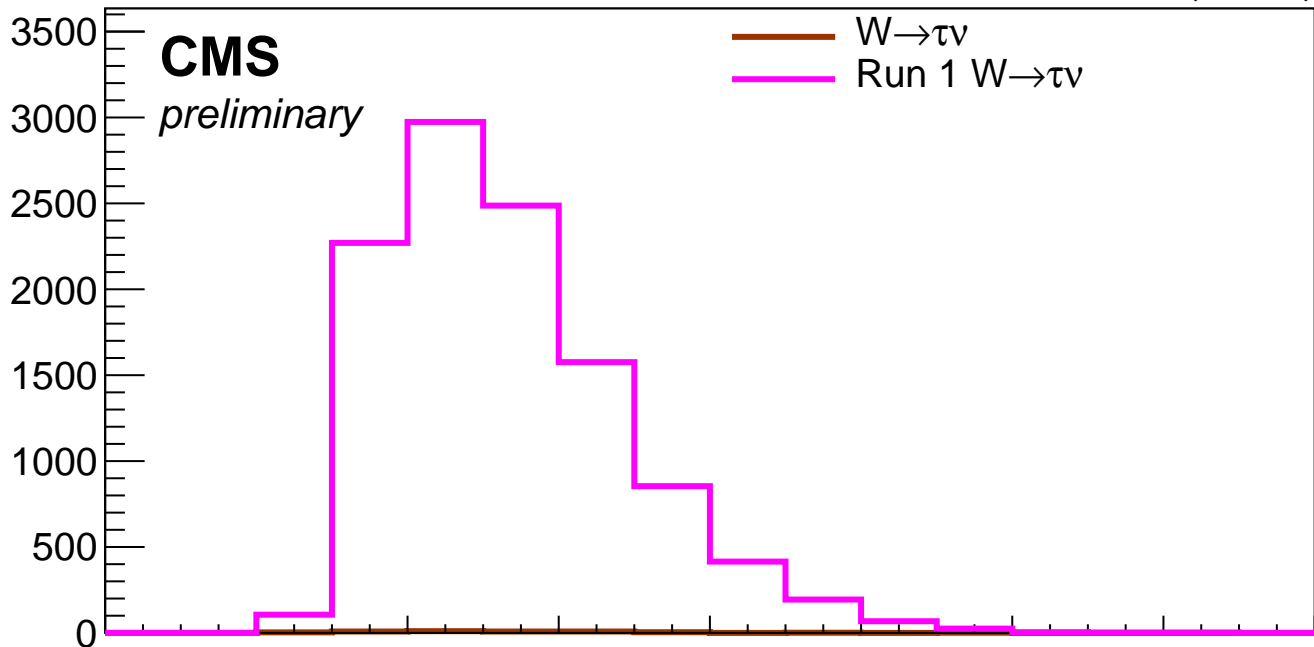
— Run 1  $W \rightarrow \tau \nu$

**Data/Bkg**

**N jets pt>30 GeV**



19.2 fb<sup>-1</sup> (8 TeV)





19.2 fb<sup>-1</sup> (8 TeV)

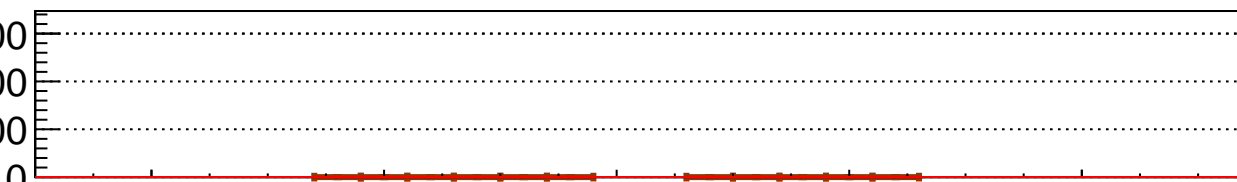
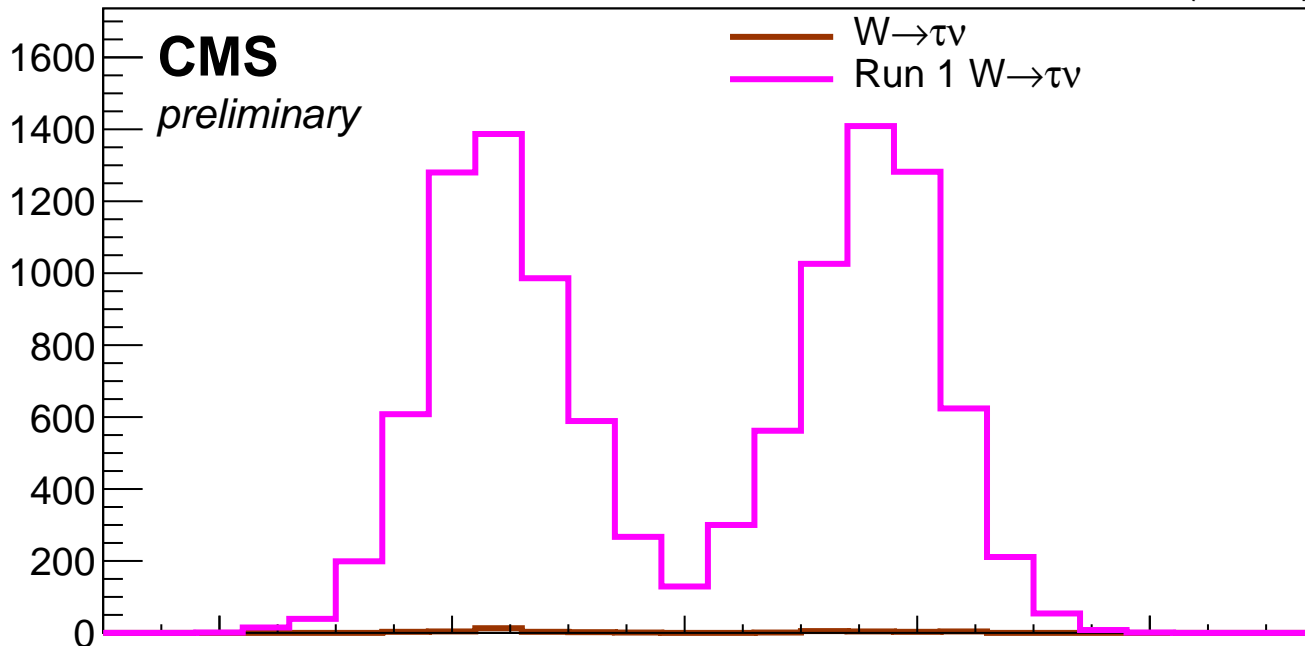
**CMS**

*preliminary*

—  $W \rightarrow \tau \nu$   
— Run 1  $W \rightarrow \tau \nu$

**Data/Bkg**

**Central tag jet  $\eta$**



19.2 fb<sup>-1</sup> (8 TeV)

**CMS**

*preliminary*

W→τν

Run 1 W→τν

**Data/Bkg**

**Forward tag jet  $\eta$**

