

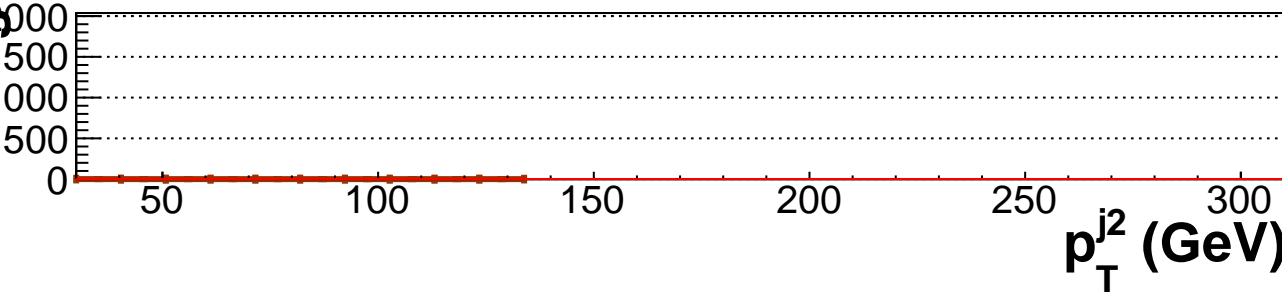
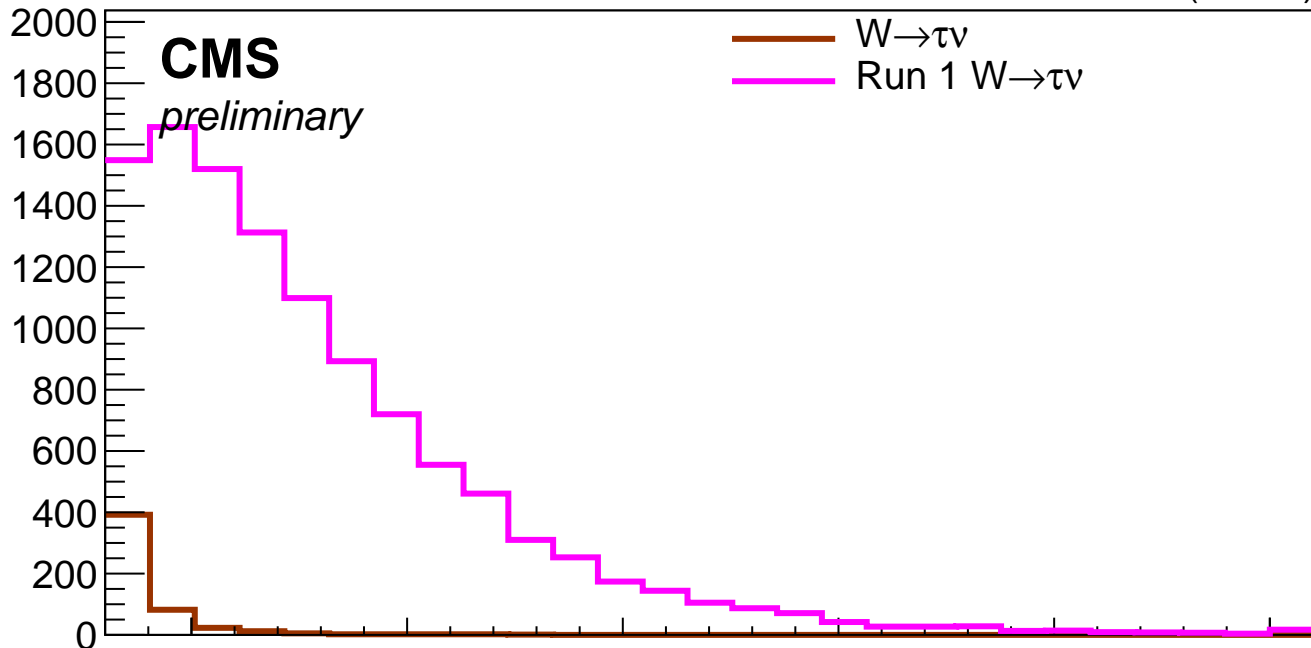
19.2 fb<sup>-1</sup> (8 TeV)

**CMS**  
*preliminary*

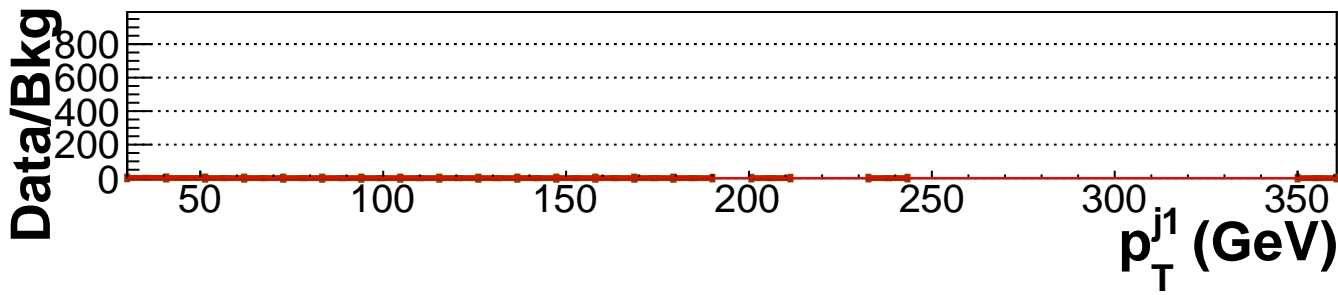
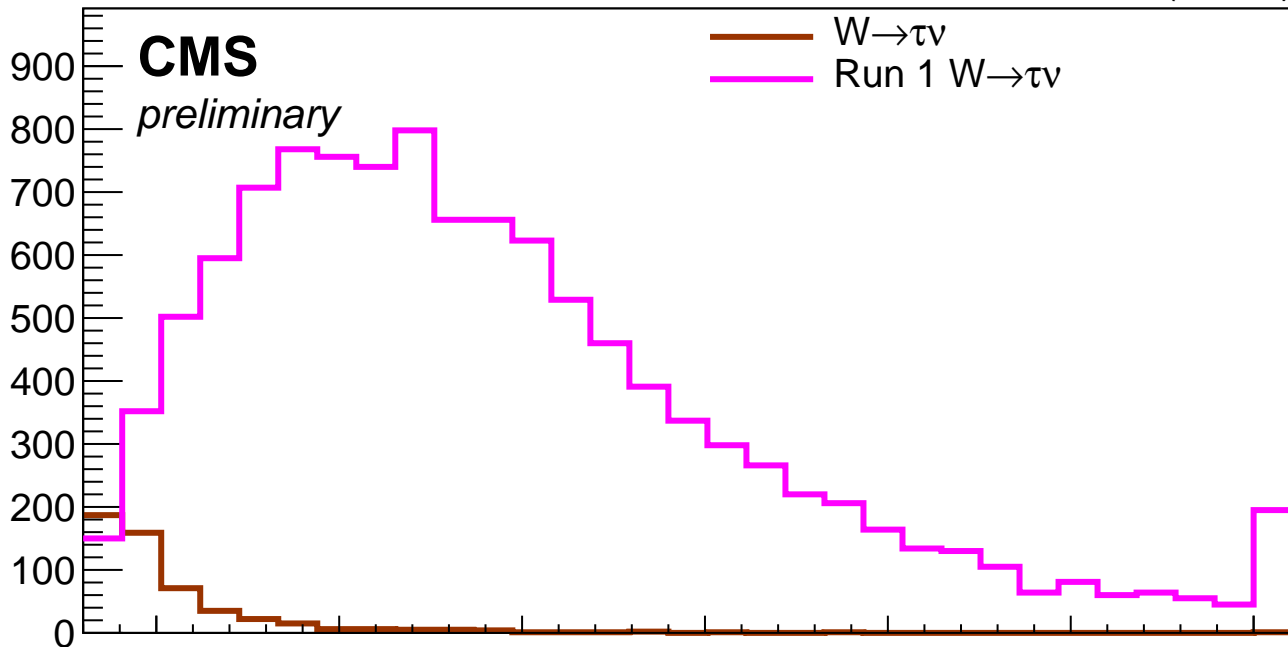
—  $W \rightarrow \tau \nu$   
— Run 1  $W \rightarrow \tau \nu$

**Data/Bkg**

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



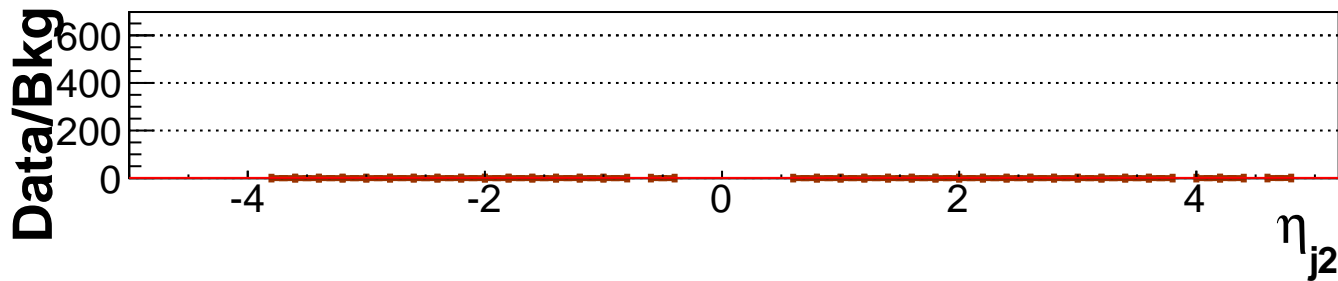
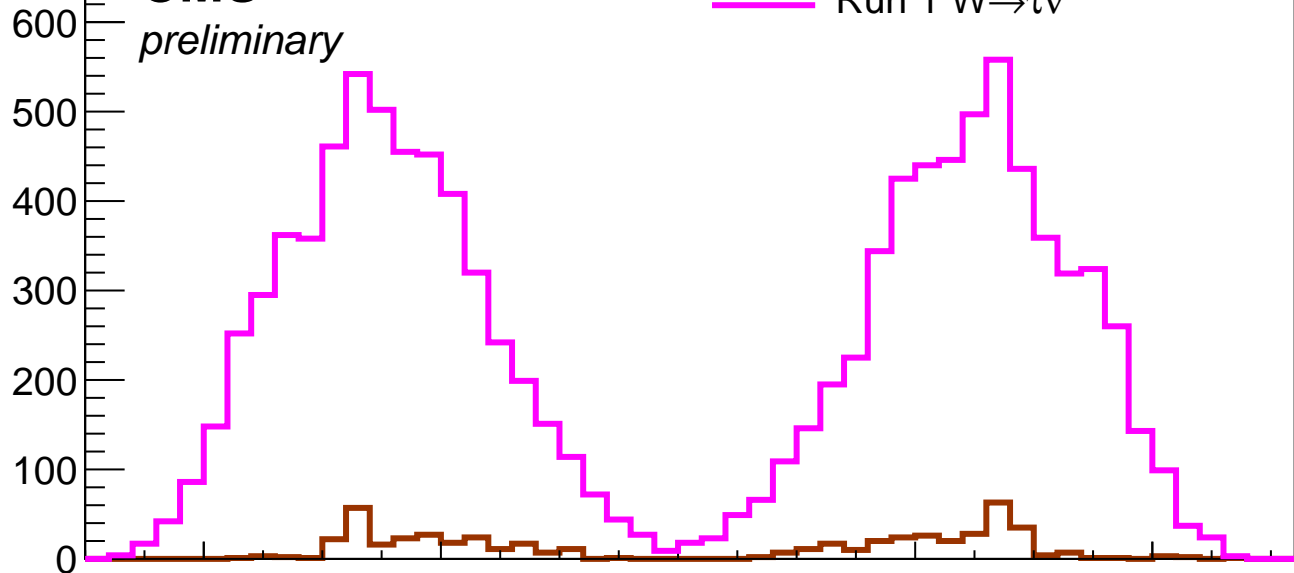
19.2 fb<sup>-1</sup> (8 TeV)



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

**CMS**  
*preliminary*

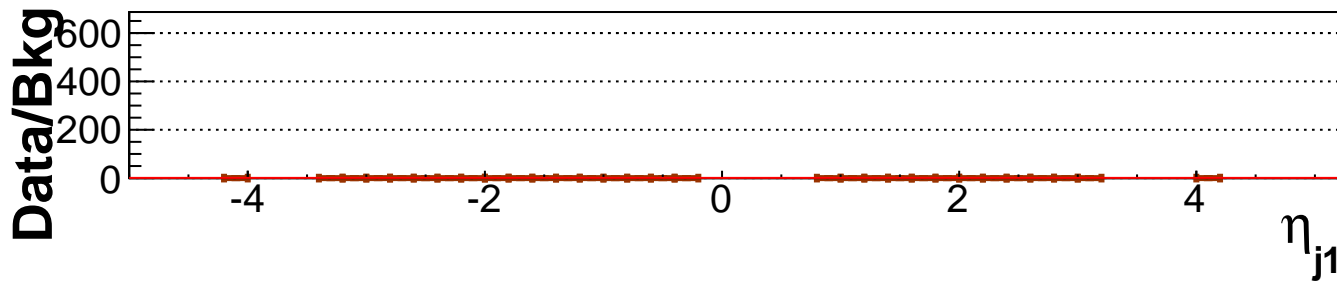
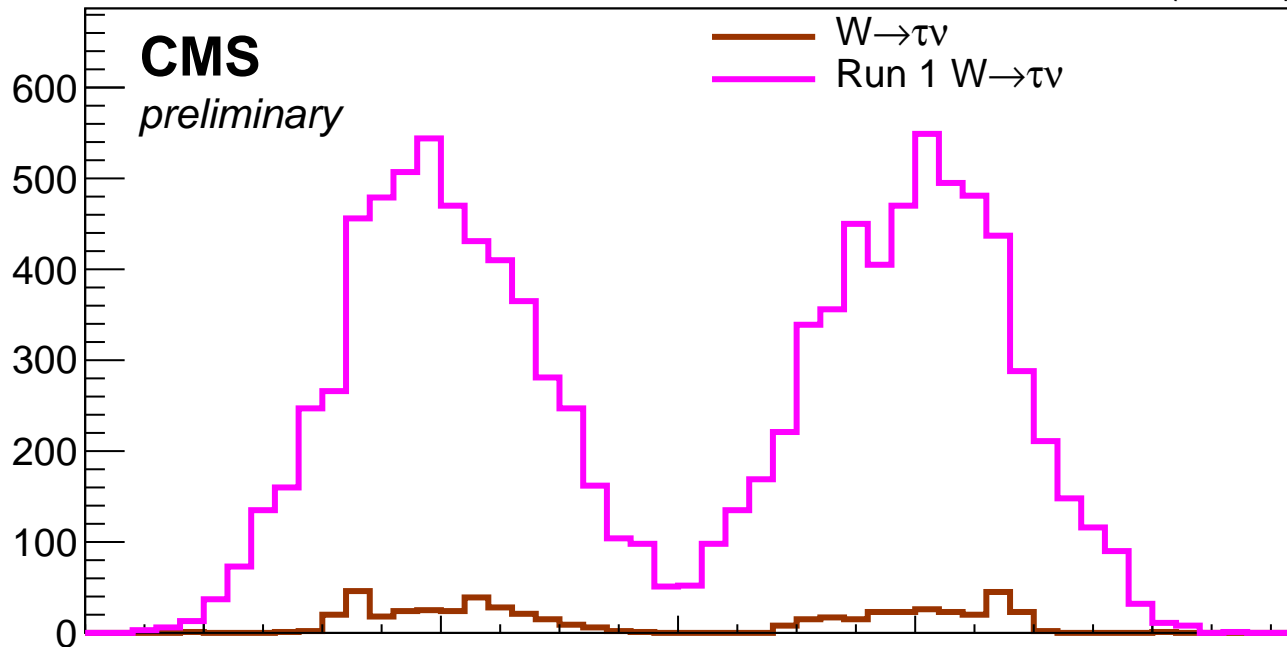
—  $W \rightarrow \tau \nu$   
— Run 1  $W \rightarrow \tau \nu$



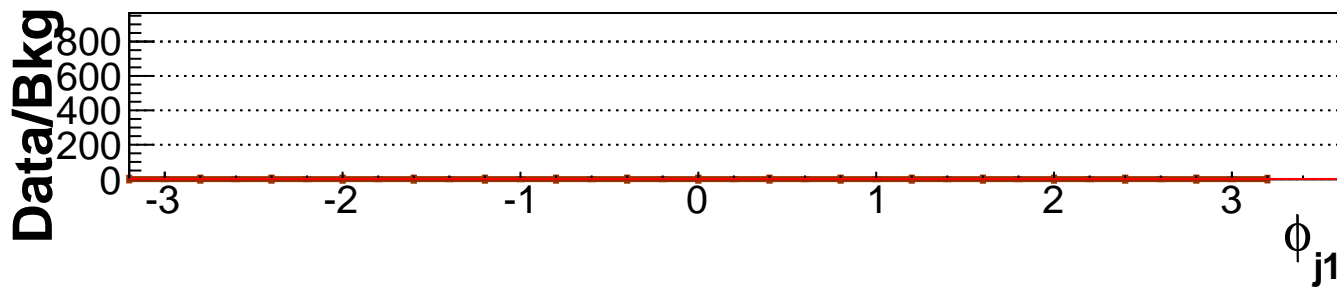
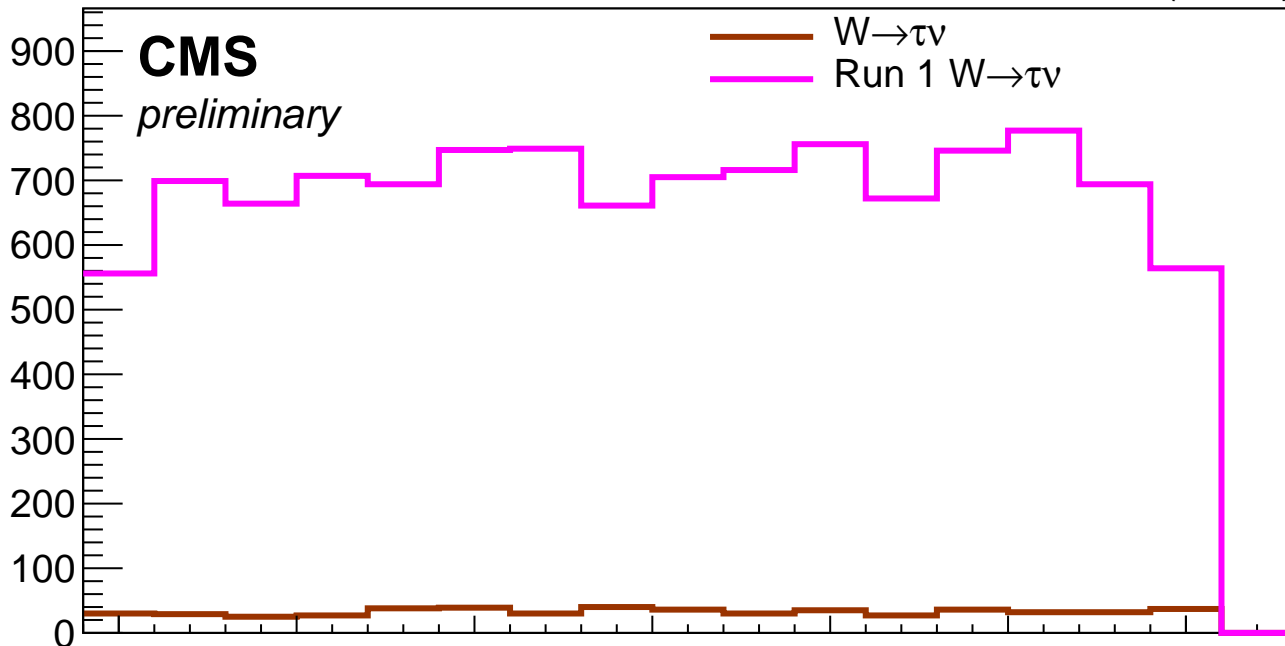
19.2 fb<sup>-1</sup> (8 TeV)

**CMS**  
*preliminary*

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



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



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

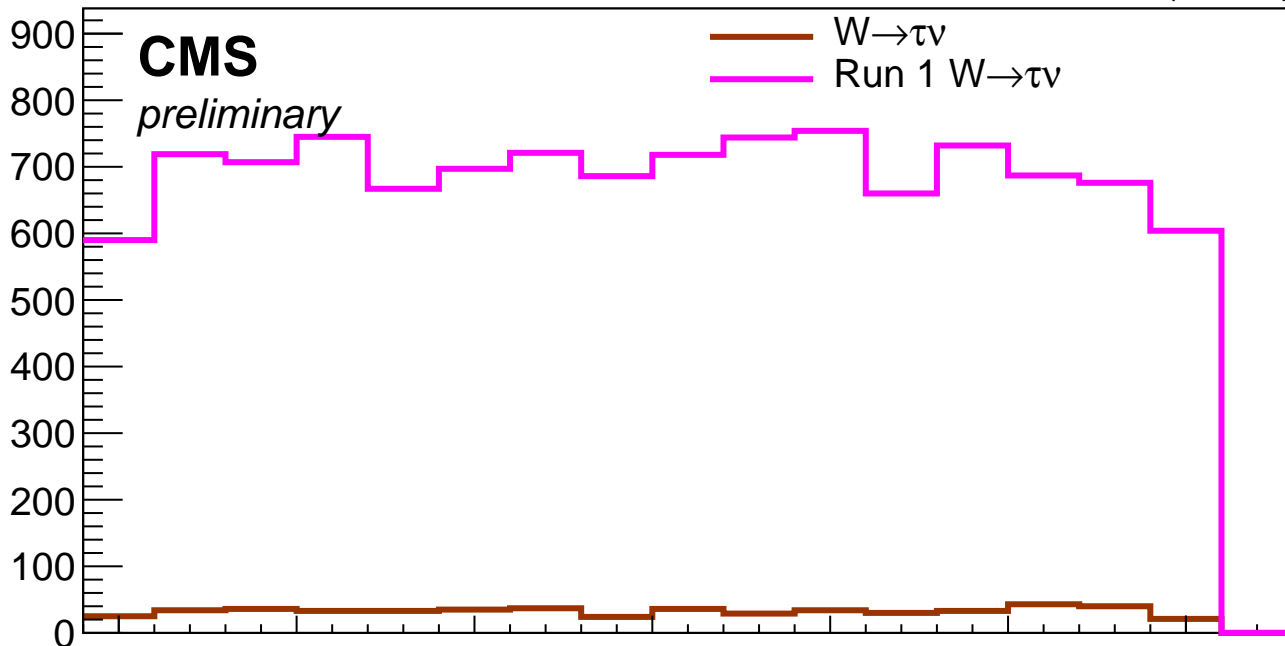
**CMS**

*preliminary*

—  $W \rightarrow \tau \nu$

— Run 1  $W \rightarrow \tau \nu$

**Data/Bkg**



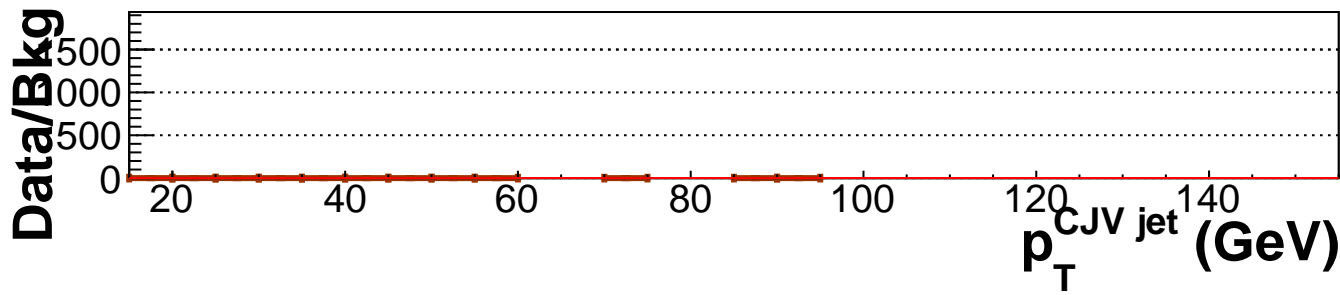
$\phi_{j2}$

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

**CMS**

*preliminary*

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



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

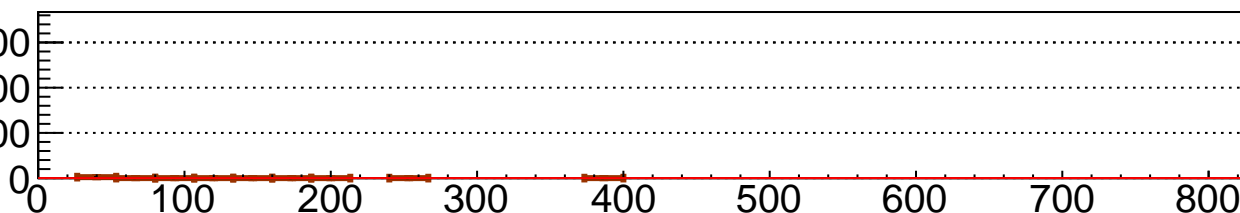
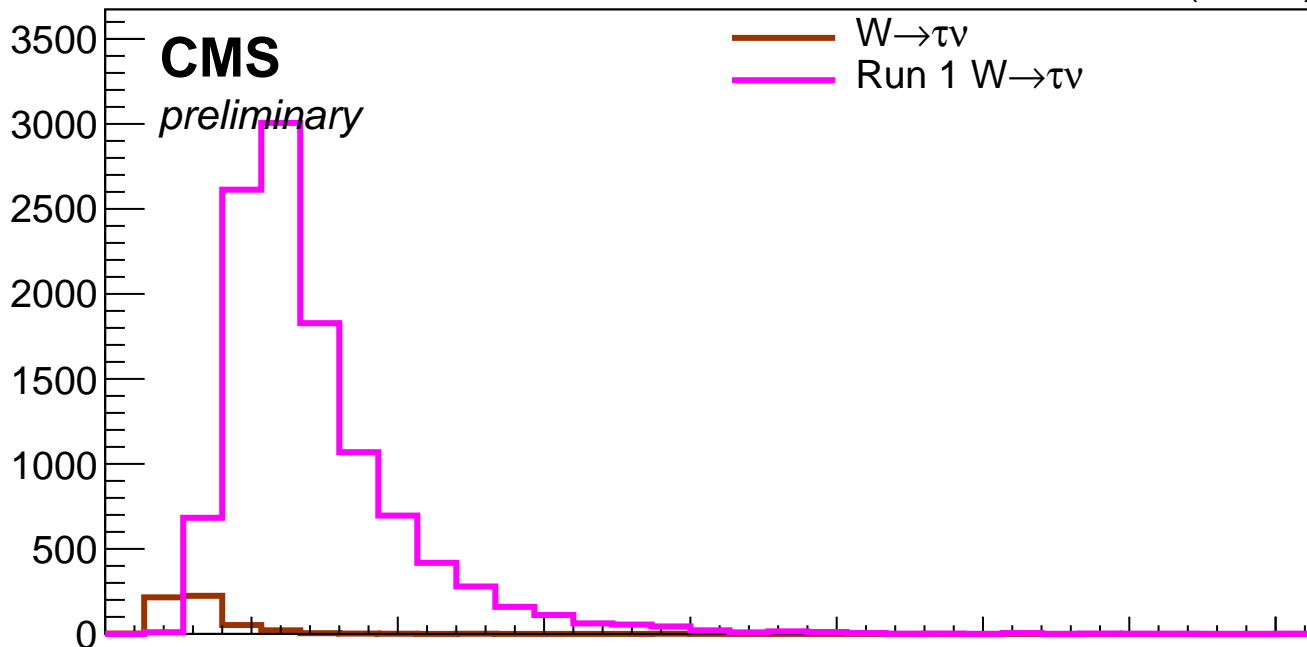
**CMS**

*preliminary*

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

**Data/Bkg**

**Missing transverse energy (GeV)**





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

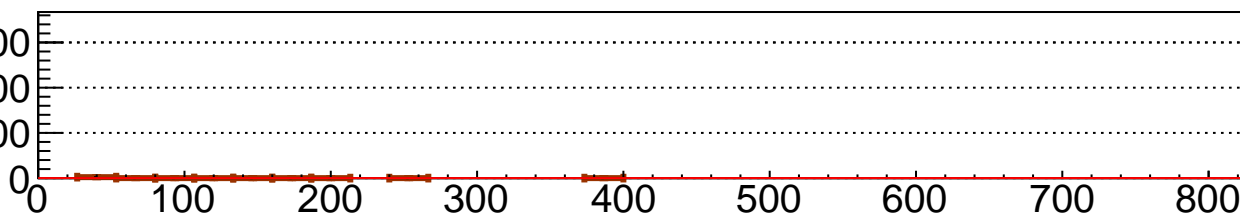
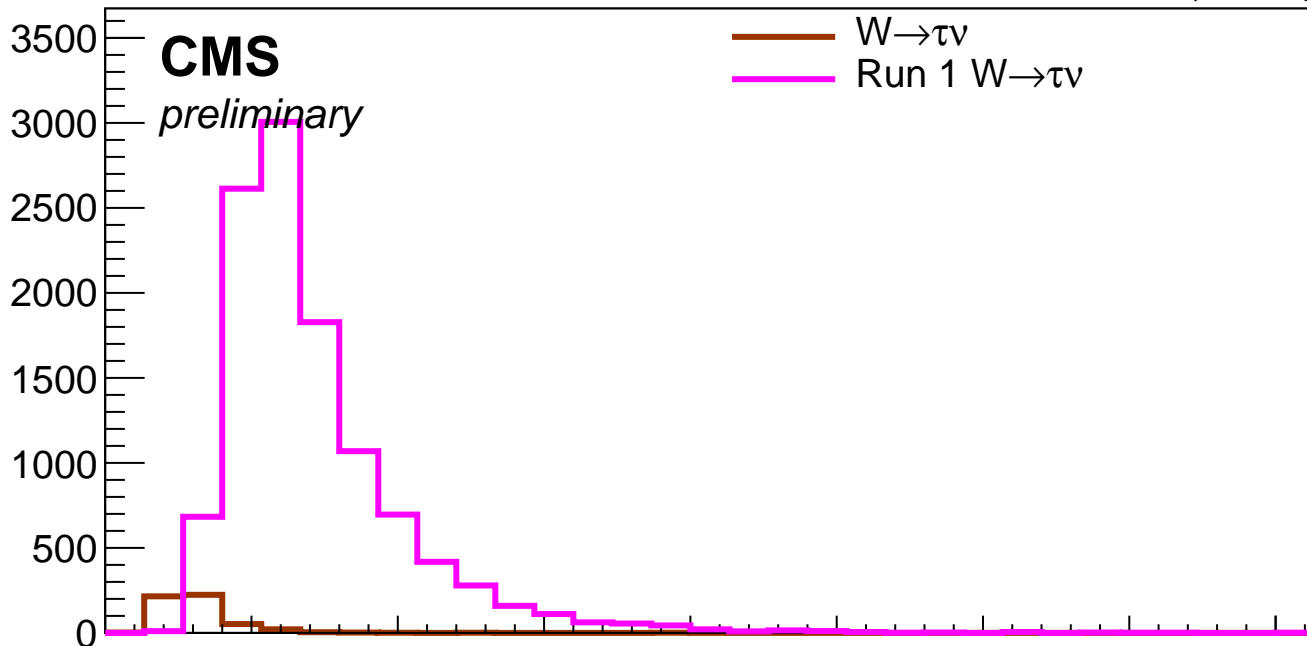
**CMS**

*preliminary*

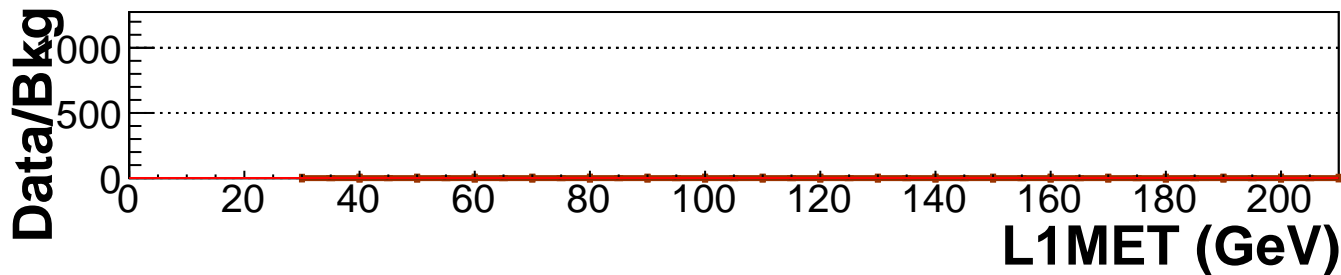
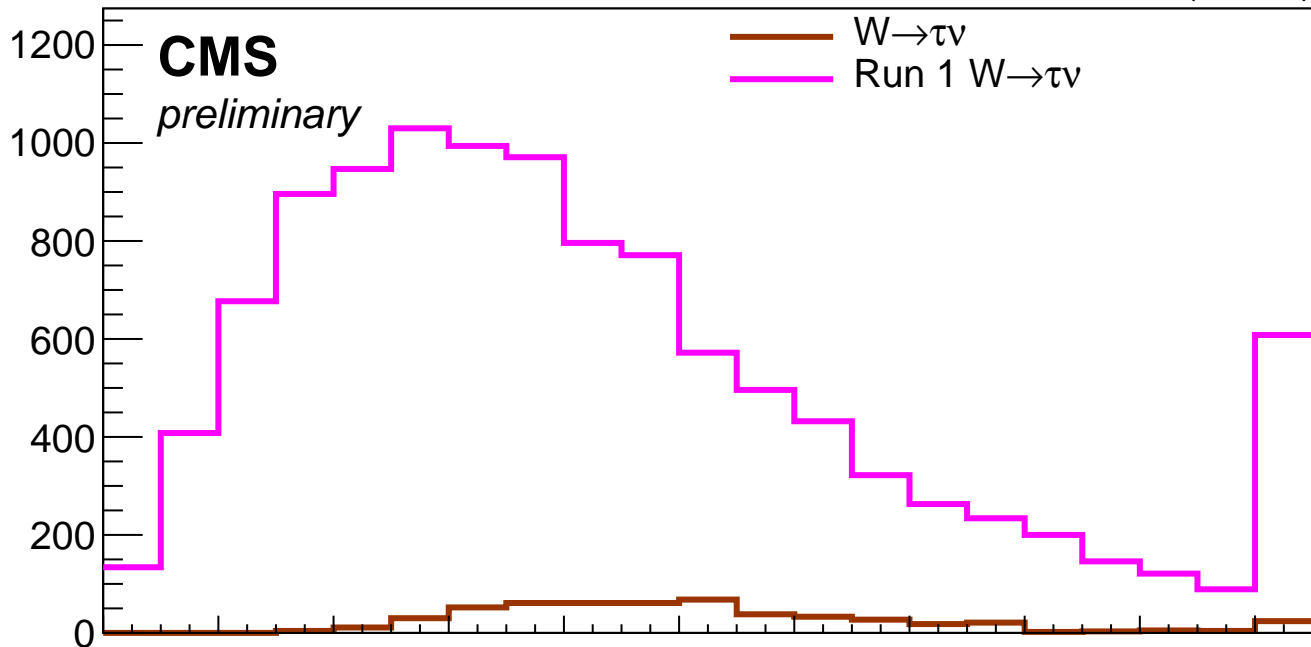
—  $W \rightarrow \tau \nu$   
— Run 1  $W \rightarrow \tau \nu$

**Data/Bkg**

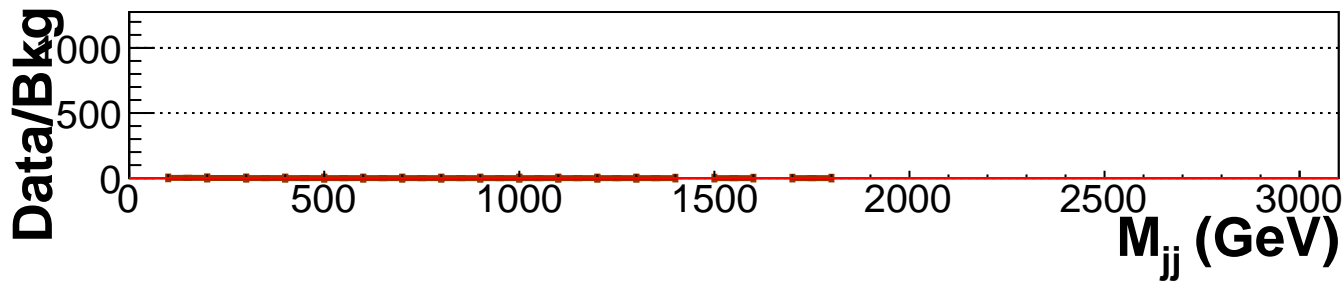
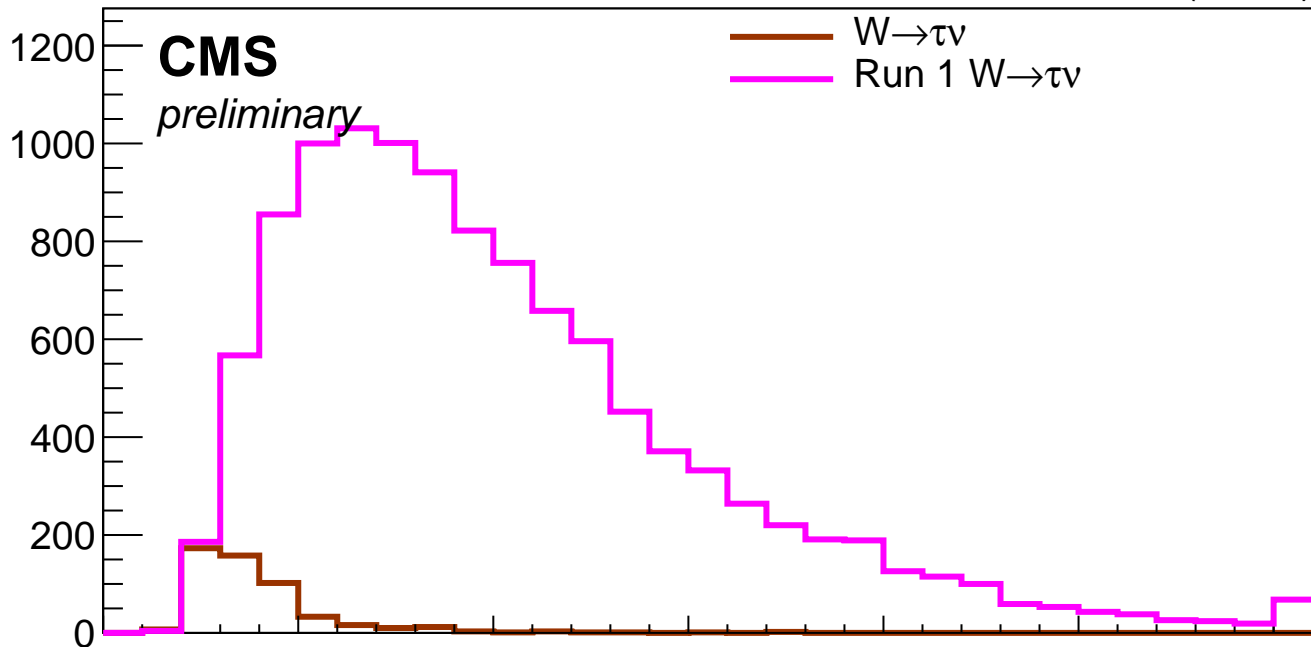
**MET (GeV)**



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



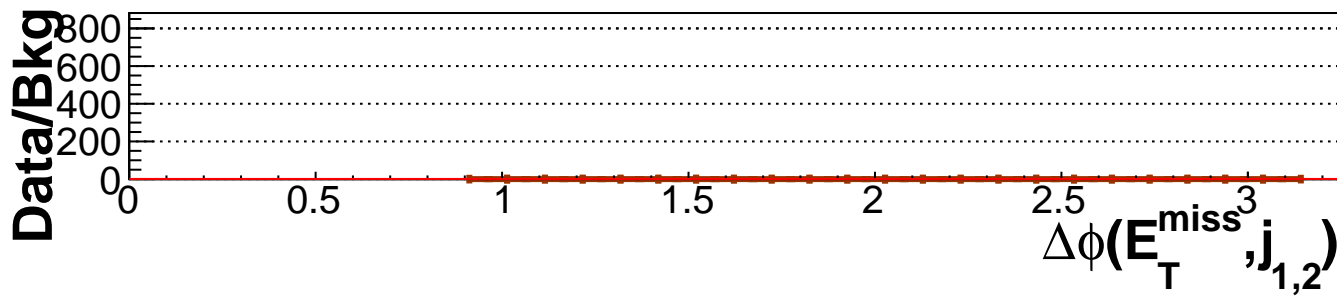
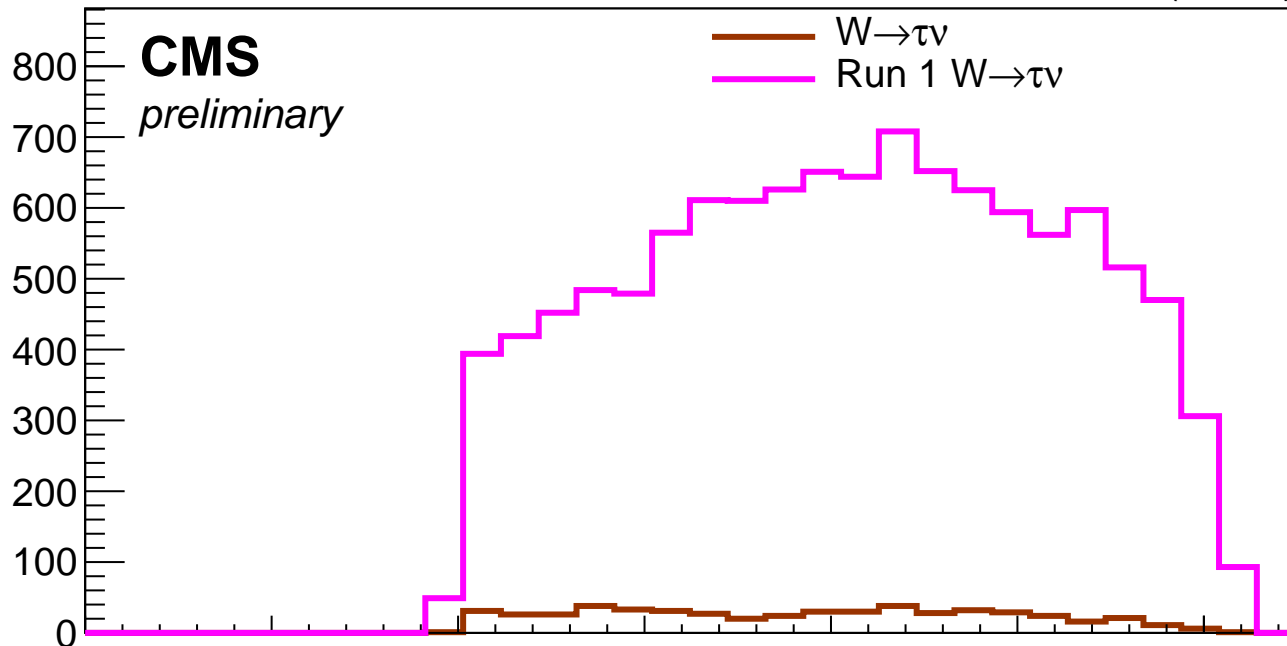
19.2 fb<sup>-1</sup> (8 TeV)



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

**CMS**  
*preliminary*

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



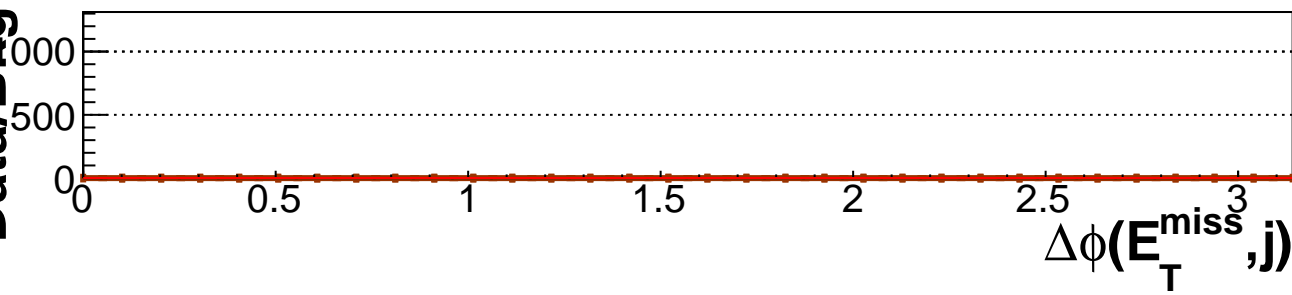
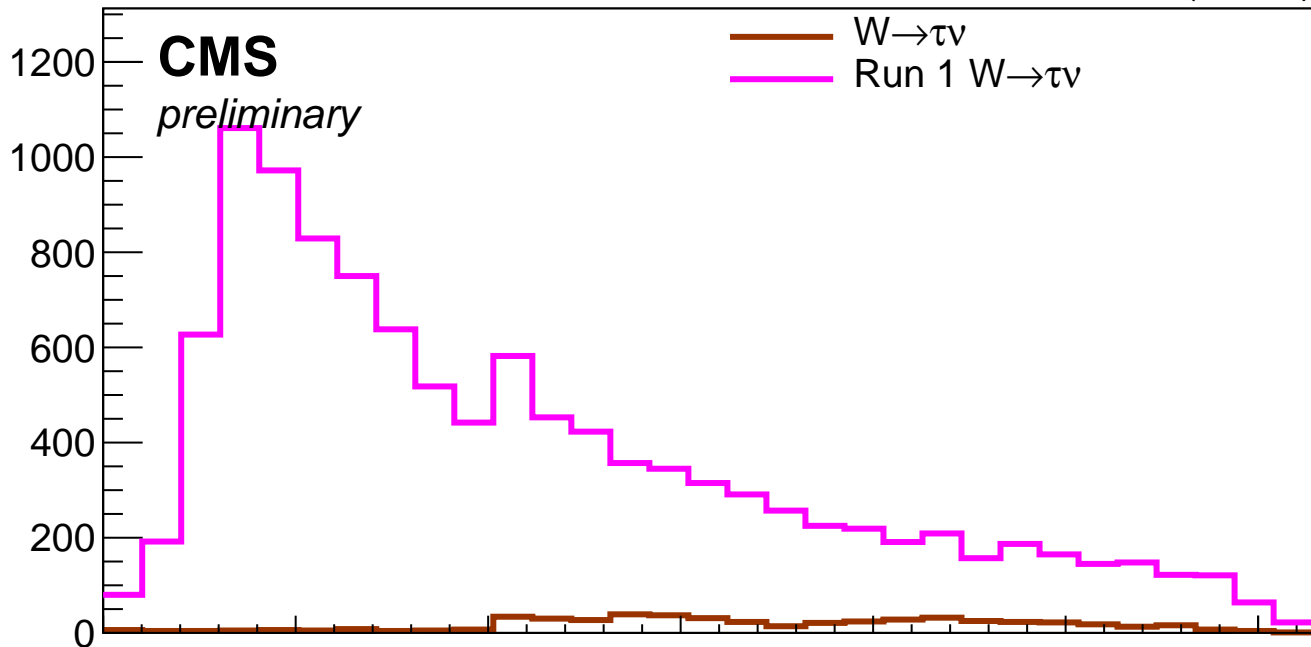
19.2 fb<sup>-1</sup> (8 TeV)

**CMS**

*preliminary*

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

**Data/Bkg**



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

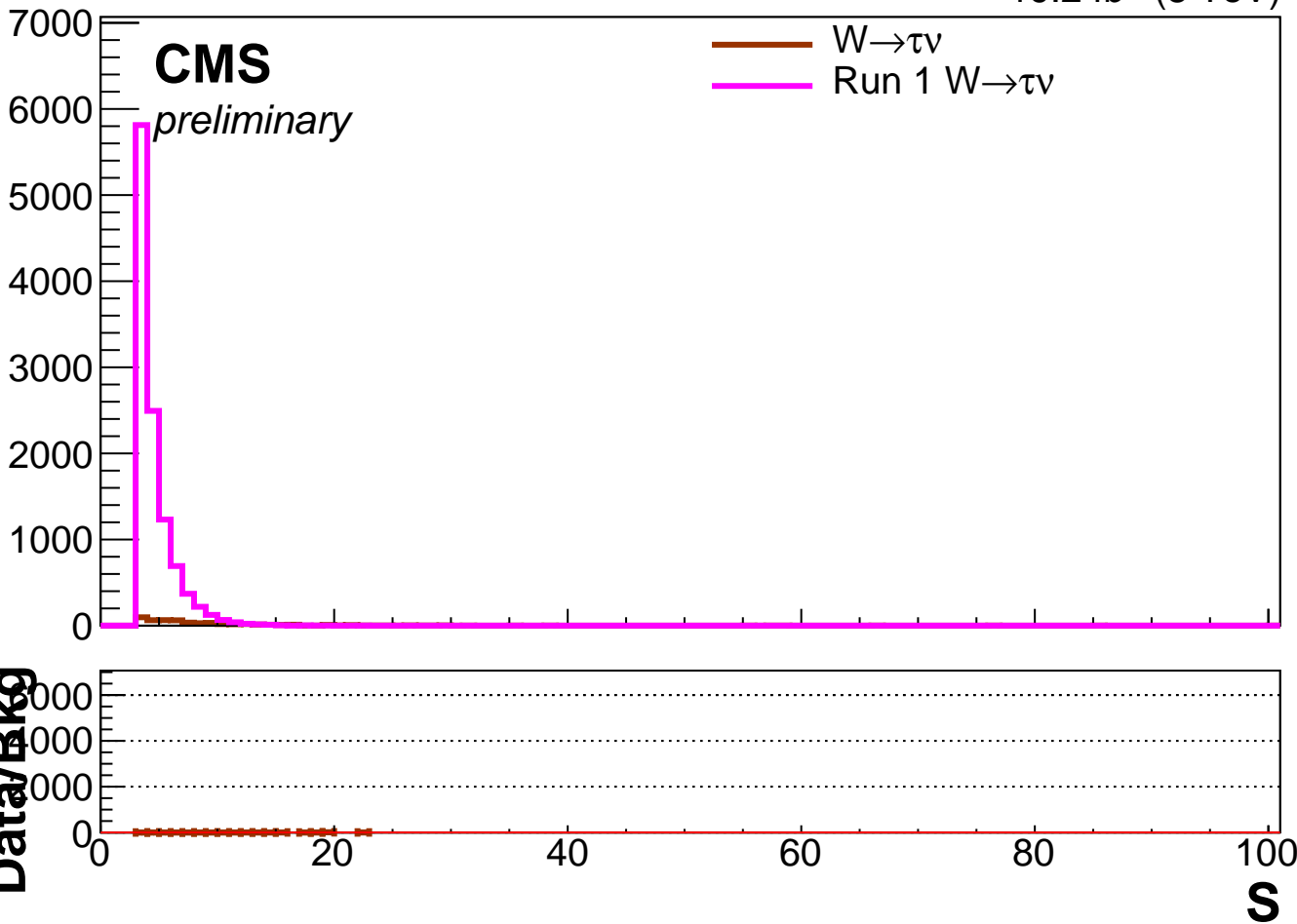
**CMS**

*preliminary*

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

**Data/Bkg**

**S**

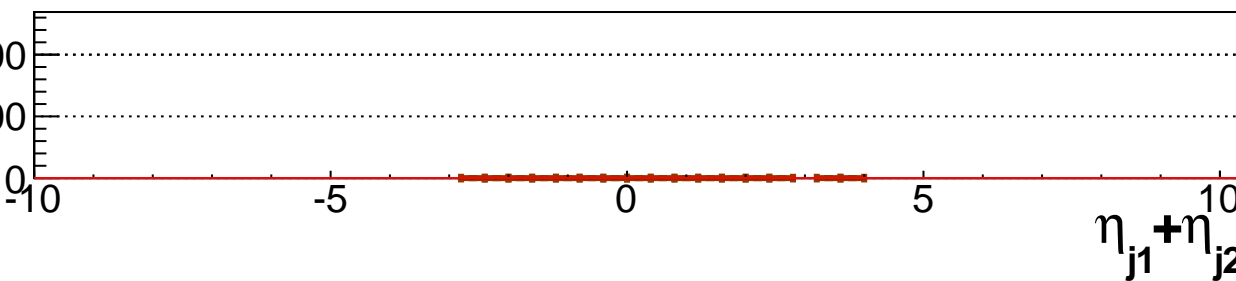
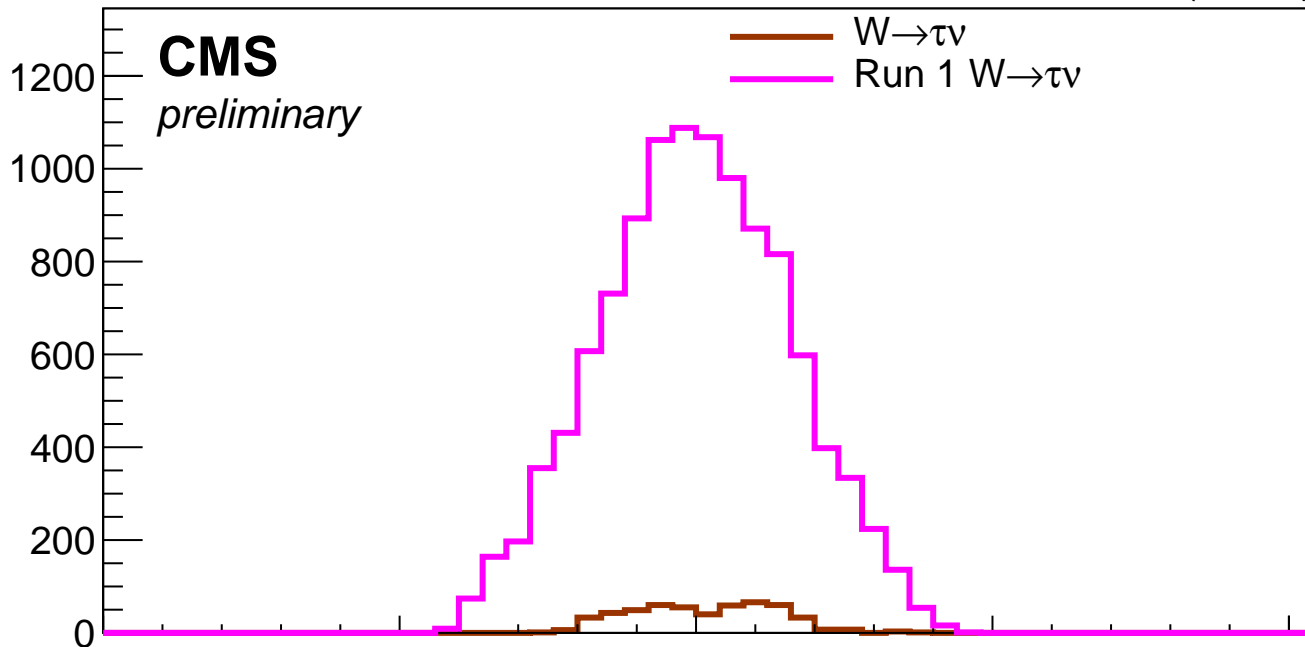


19.2 fb<sup>-1</sup> (8 TeV)

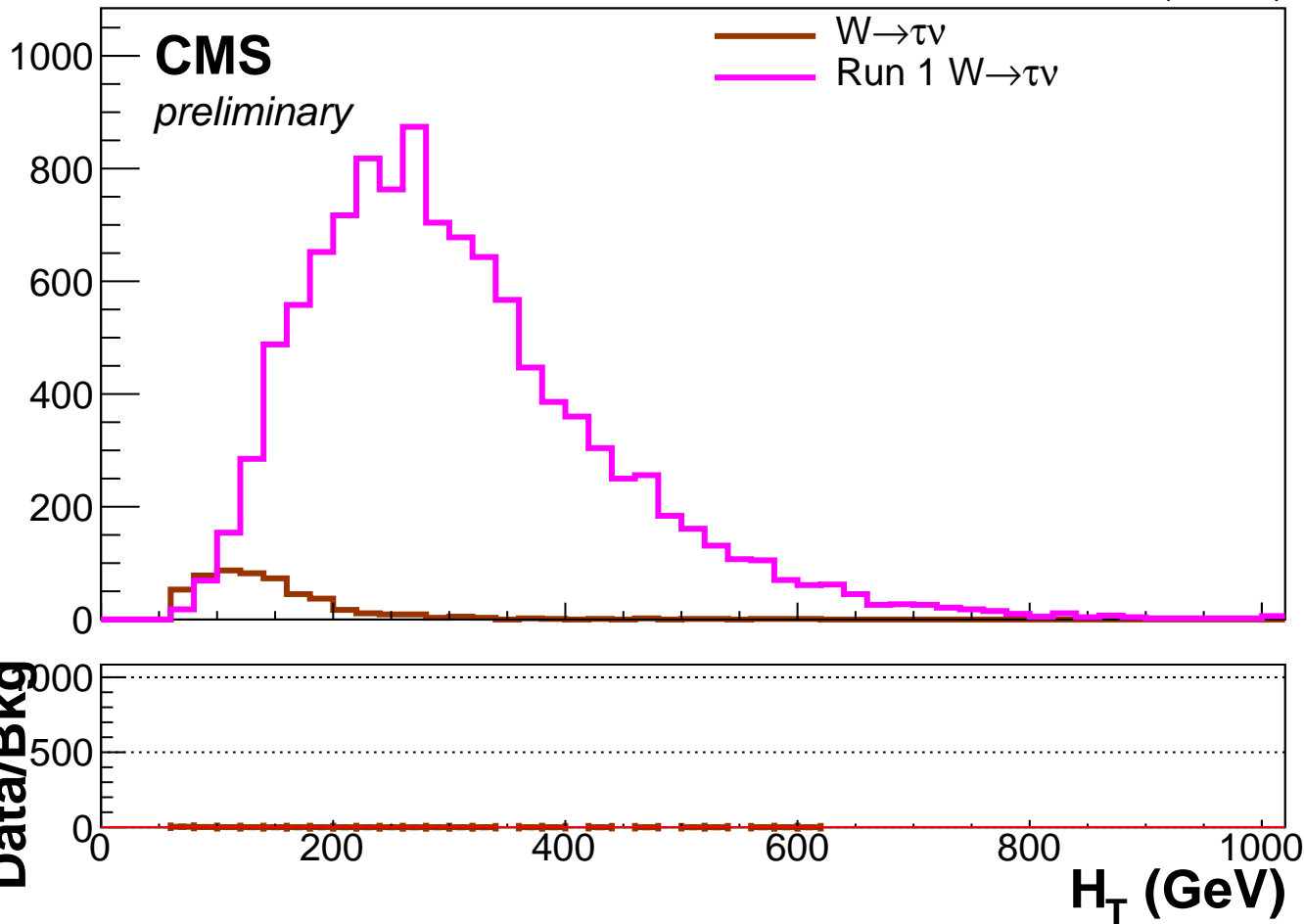
**CMS**  
*preliminary*

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

**Data/Bkg**



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



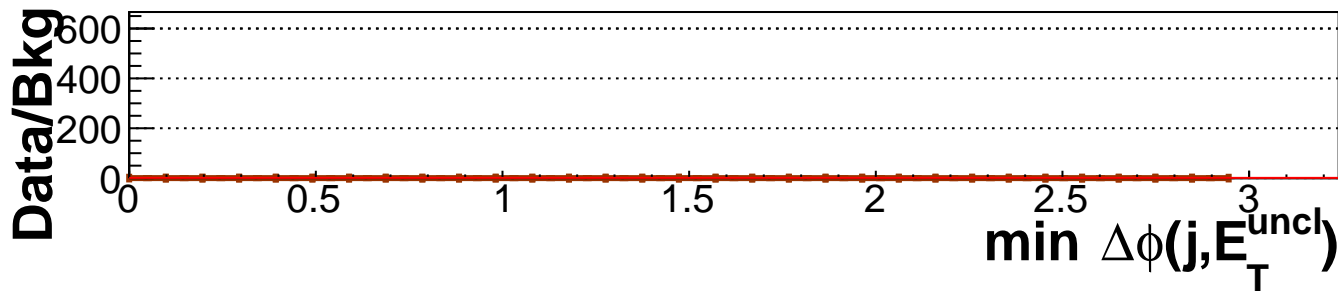
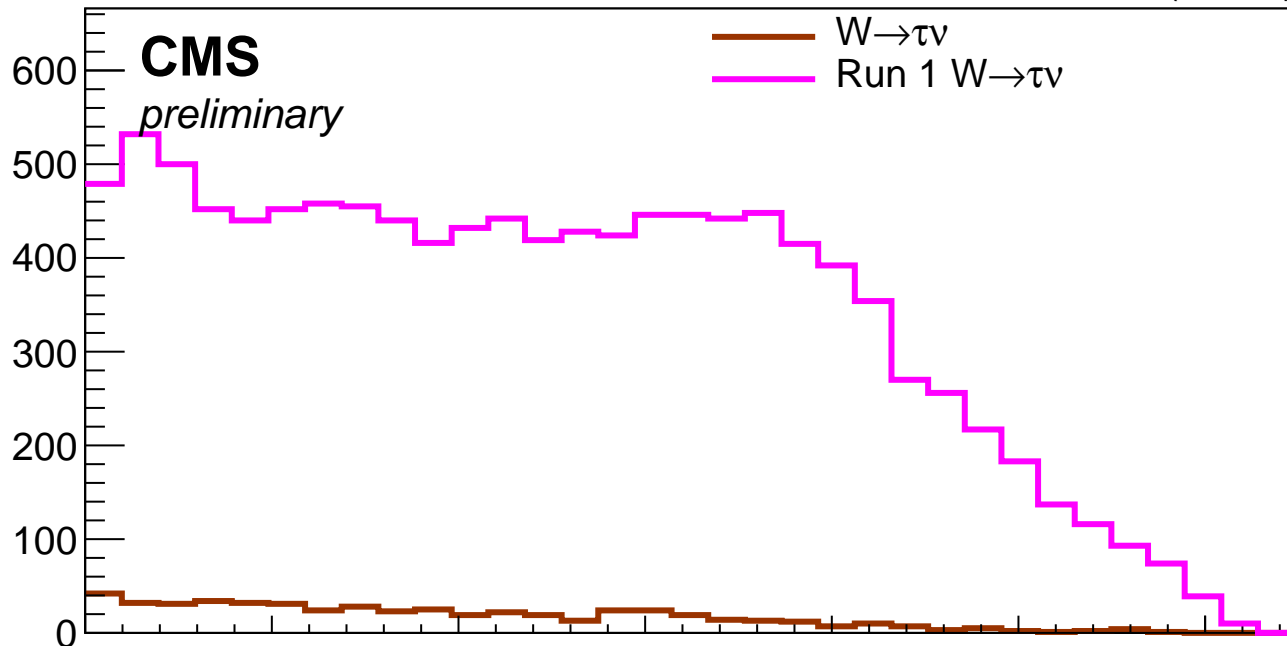


19.2 fb<sup>-1</sup> (8 TeV)

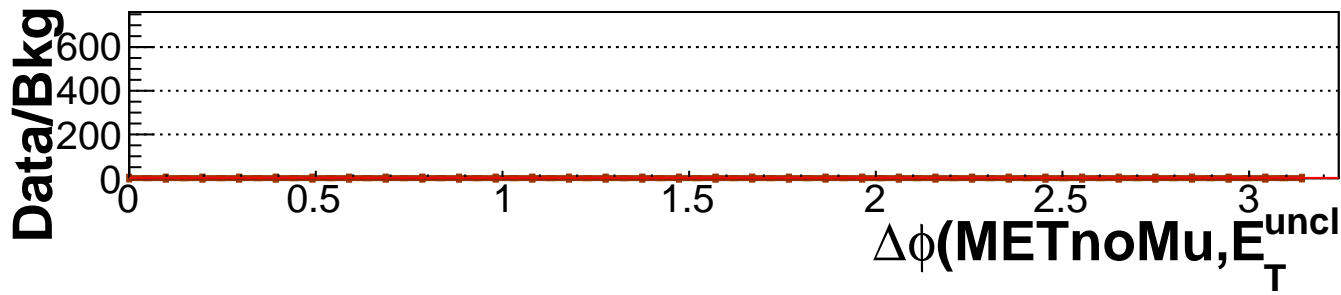
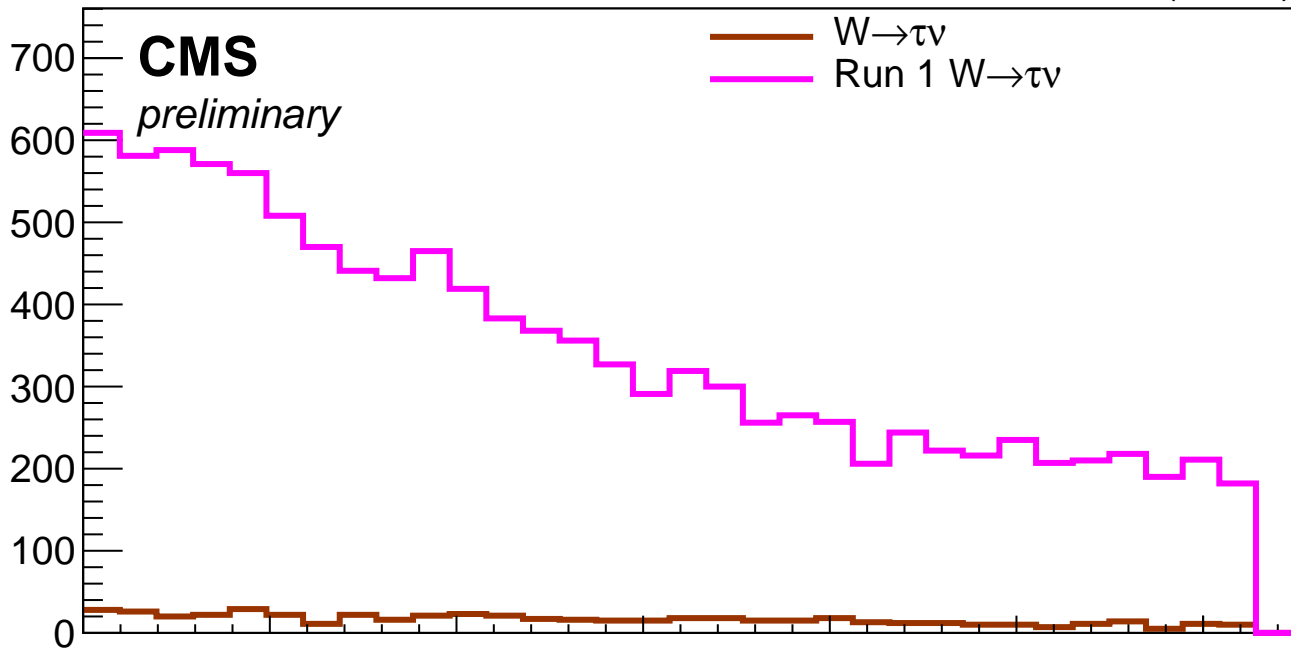
**CMS**

*preliminary*

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



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



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

**CMS**

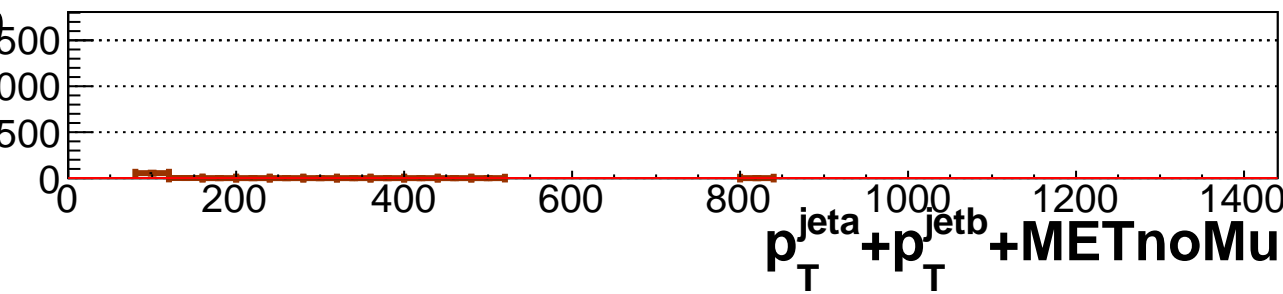
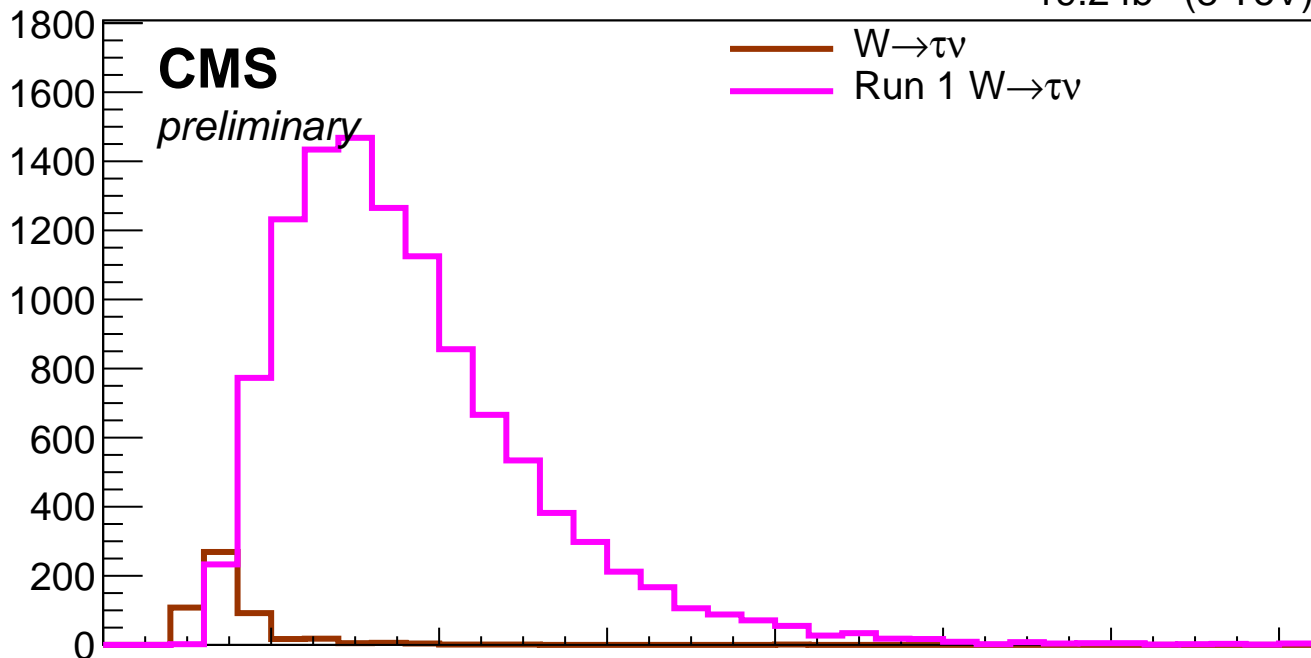
*preliminary*

—  $W \rightarrow \tau \nu$

— Run 1  $W \rightarrow \tau \nu$

**Data/Bkg**

**$p_T^{\text{jeta}} + p_T^{\text{jetb}} + \text{MET}_{\text{noMu}}$**



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

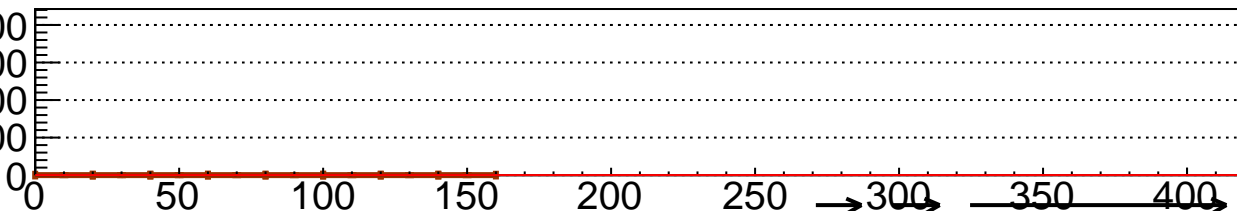
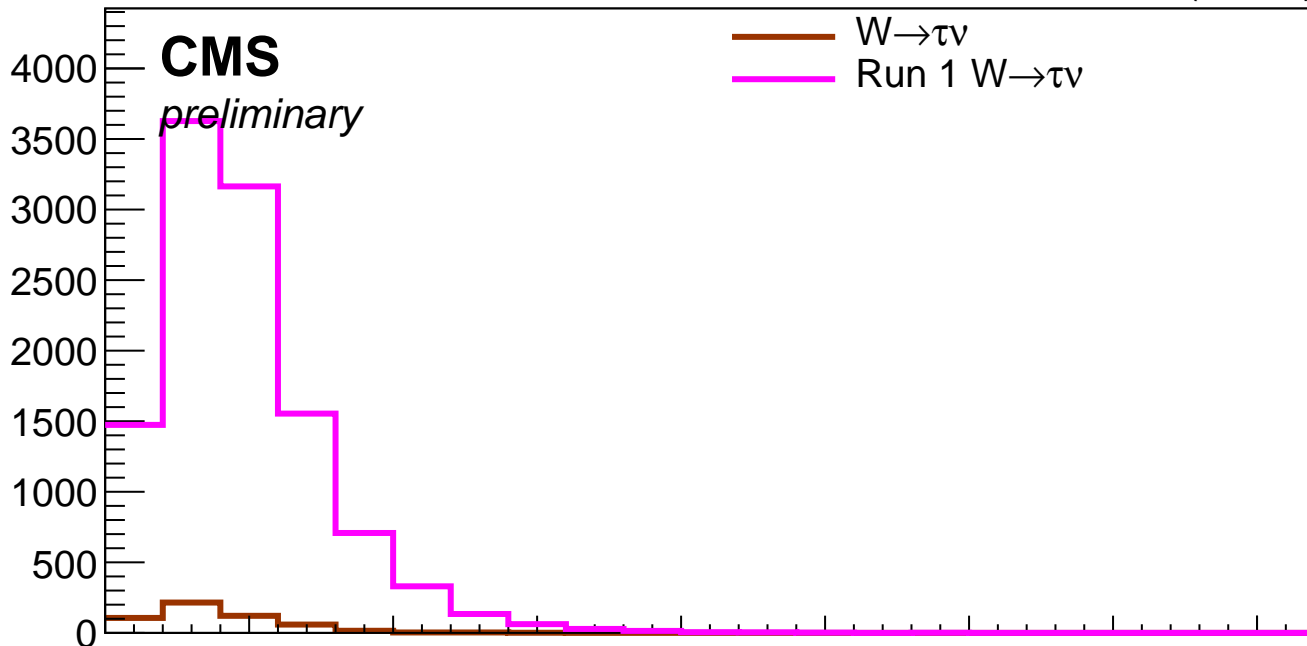
**CMS**

*preliminary*

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

**Data/Bkg**

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



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

**CMS**

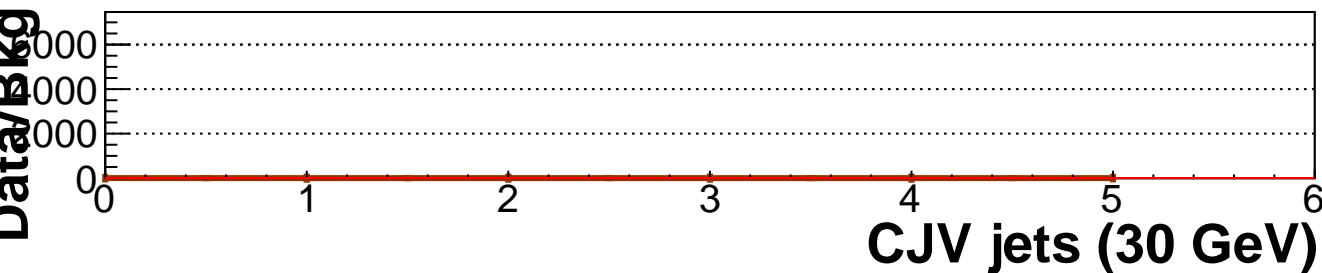
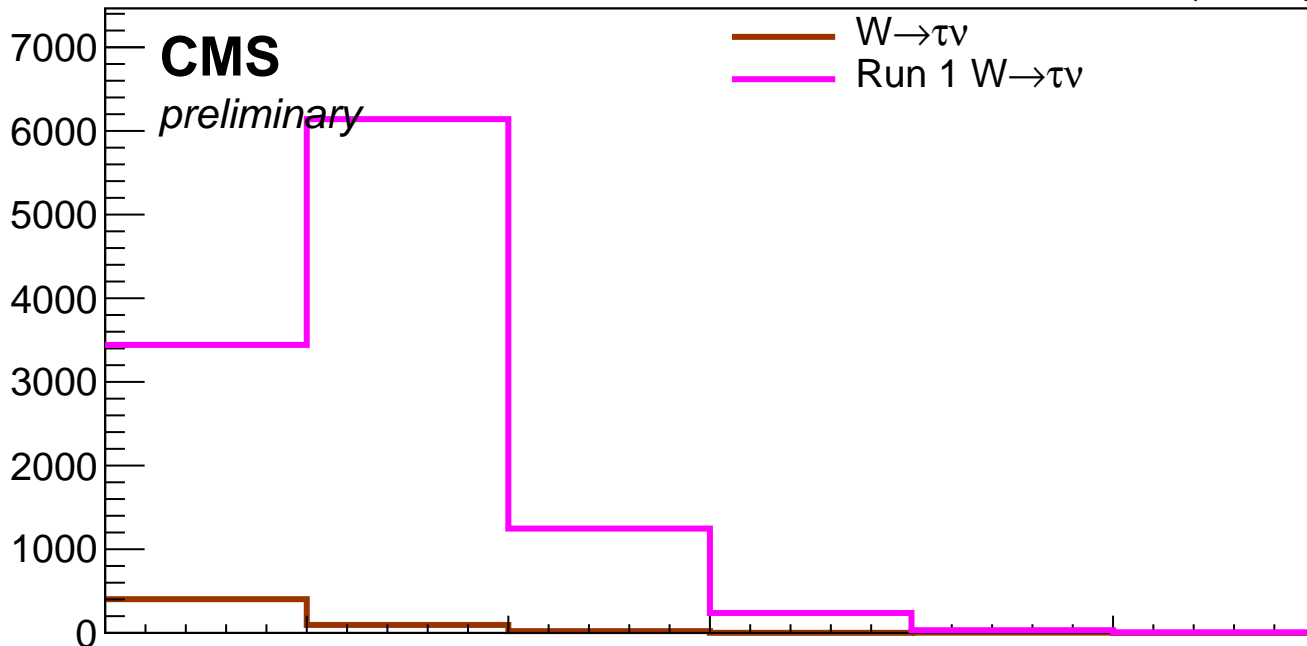
*preliminary*

W→τν

Run 1 W→τν

**Data/Bkg**

**CJV jets (30 GeV)**



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

**CMS**

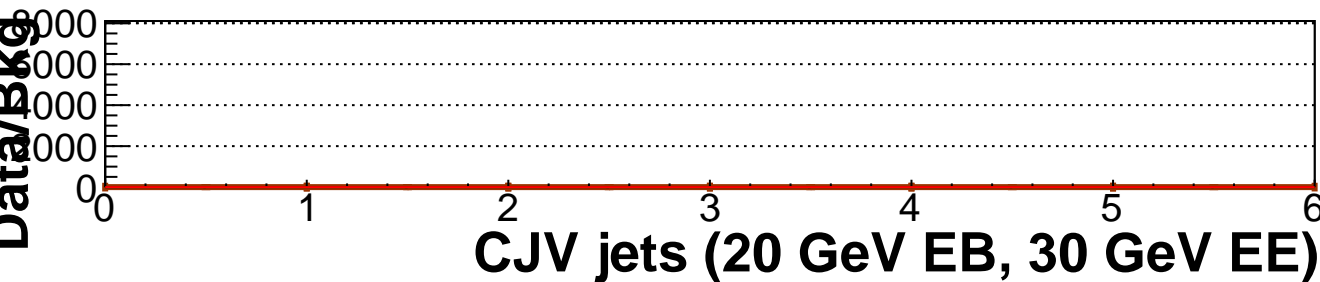
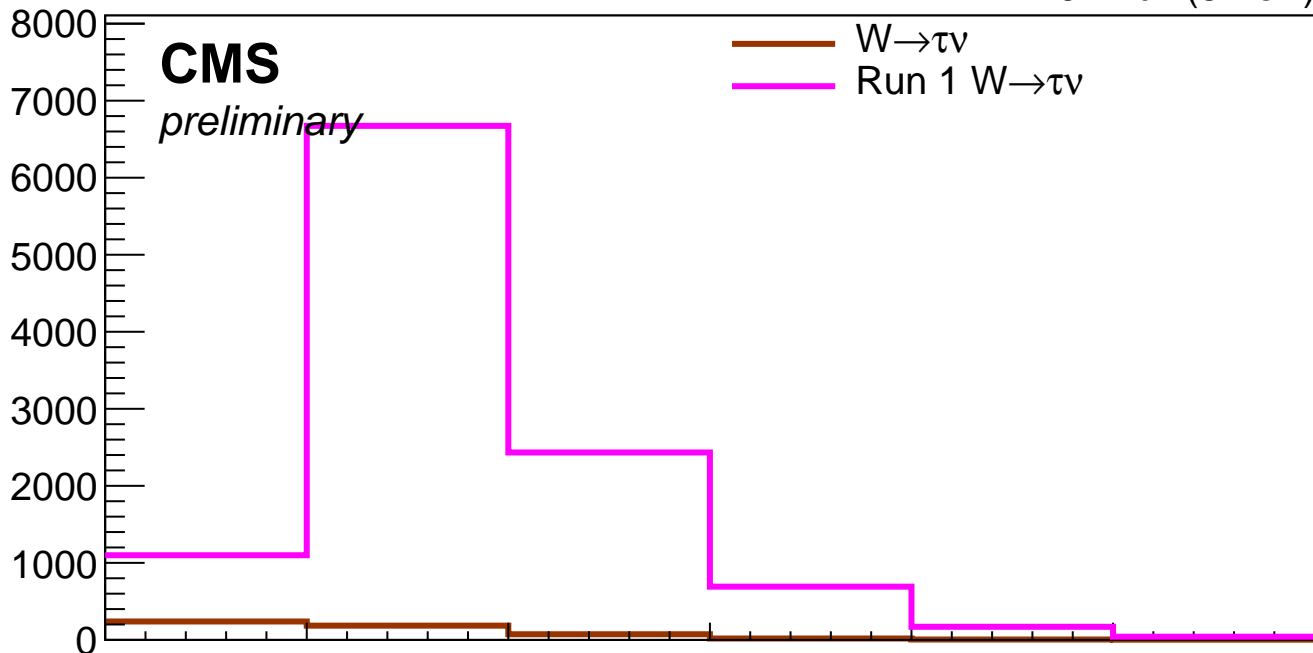
*preliminary*

W→τν

Run 1 W→τν

Data/Bkg

CJV jets (20 GeV EB, 30 GeV EE)



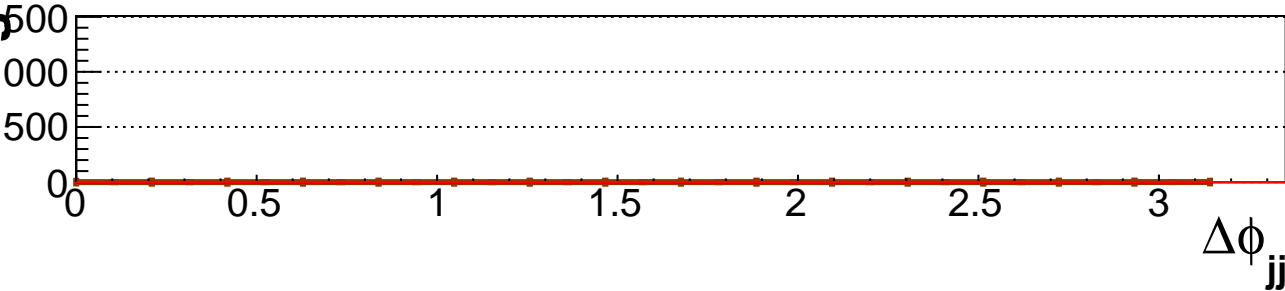
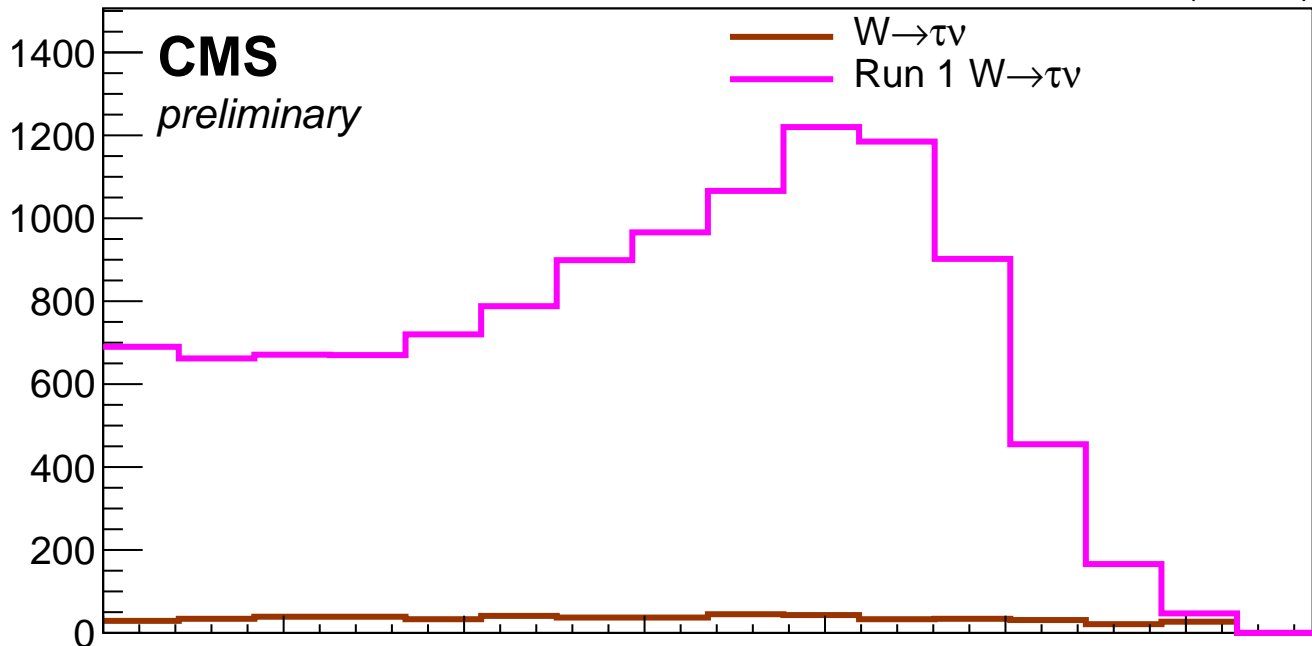
19.2 fb<sup>-1</sup> (8 TeV)

**CMS**  
*preliminary*

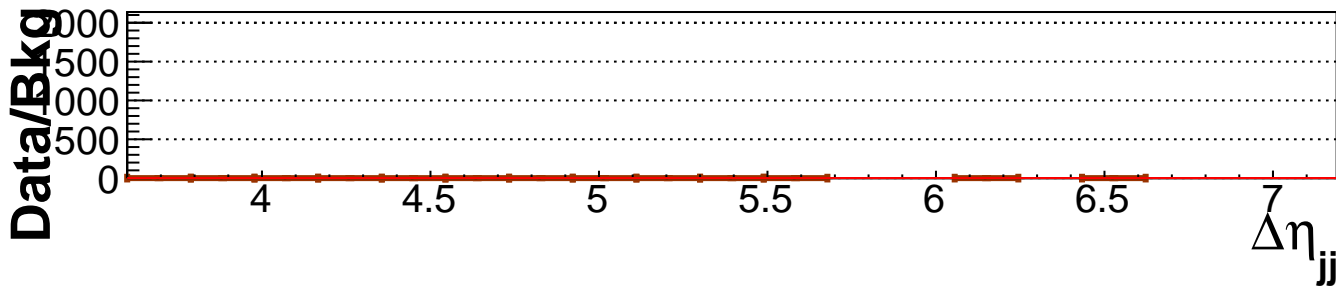
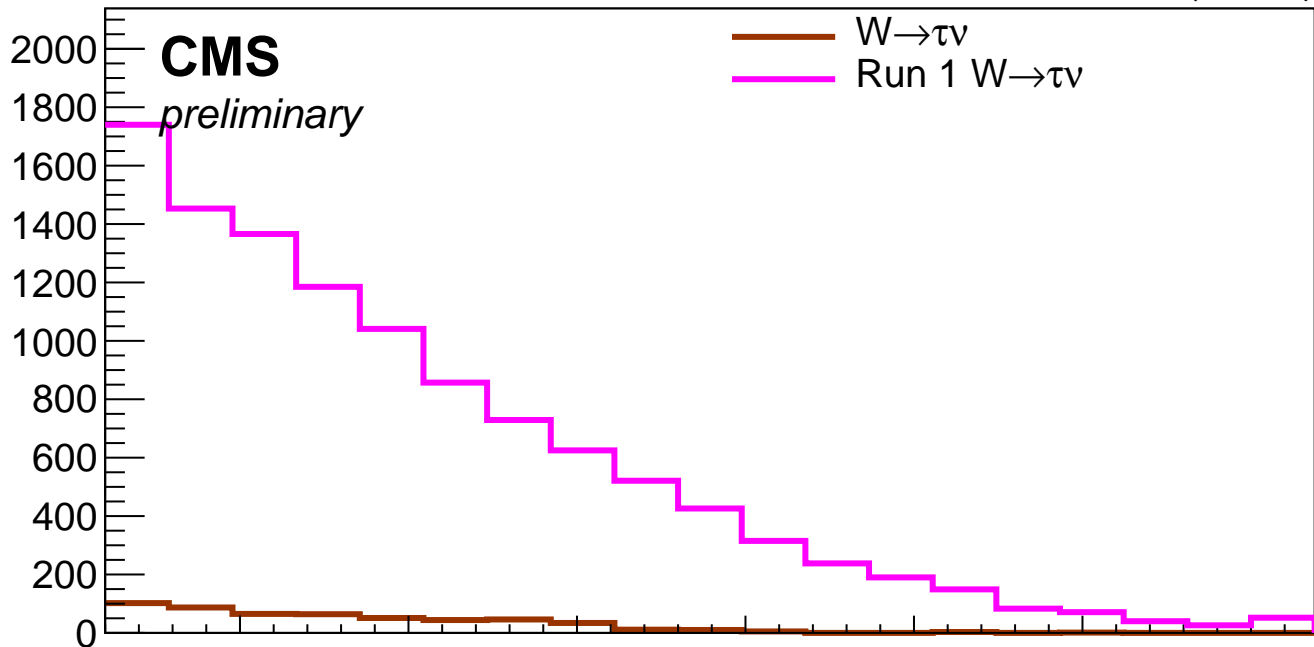
—  $W \rightarrow \tau \nu$   
— Run 1  $W \rightarrow \tau \nu$

**Data/Bkg**

$\Delta\phi_{jj}$

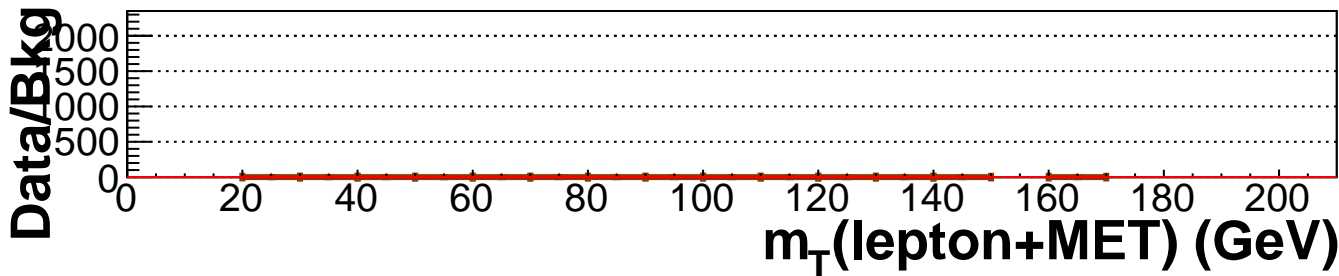
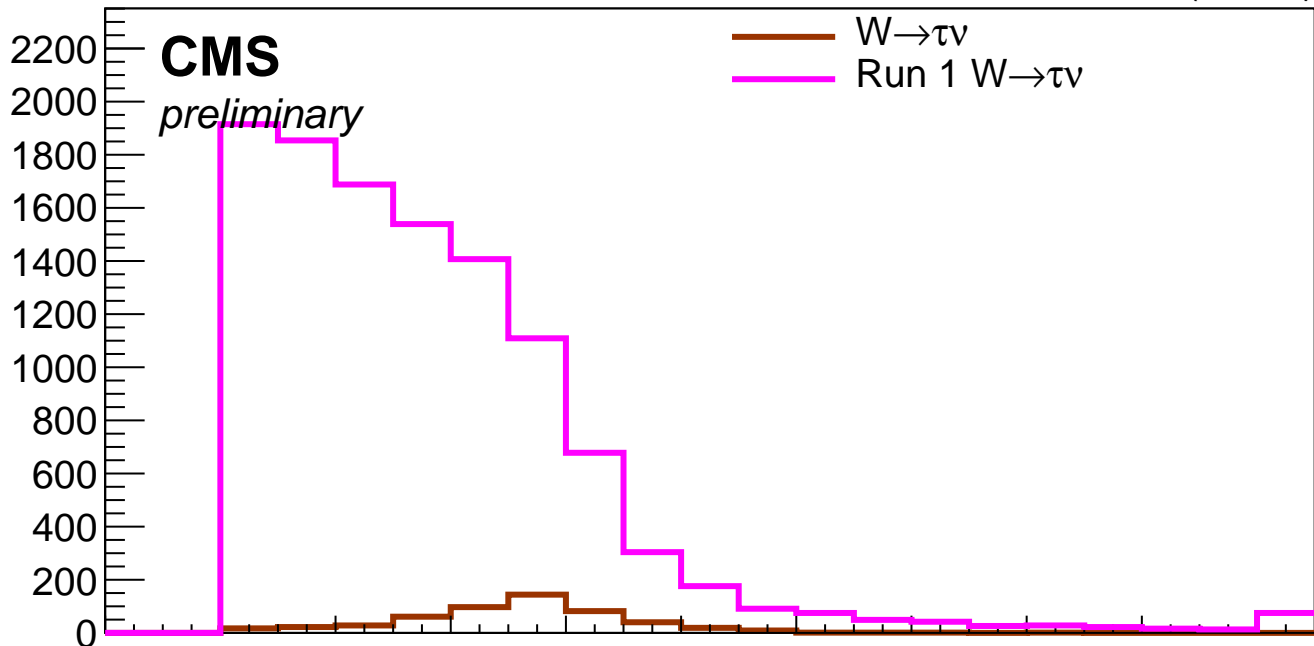


19.2 fb<sup>-1</sup> (8 TeV)





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



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

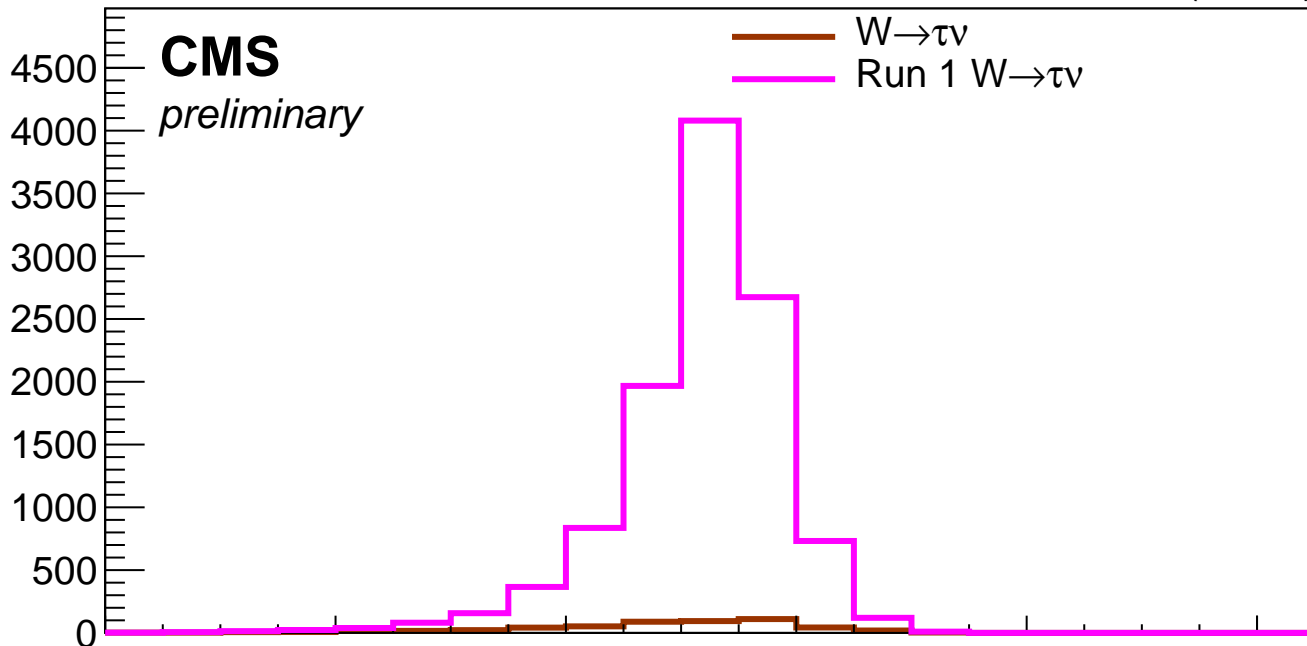
**CMS**

*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**

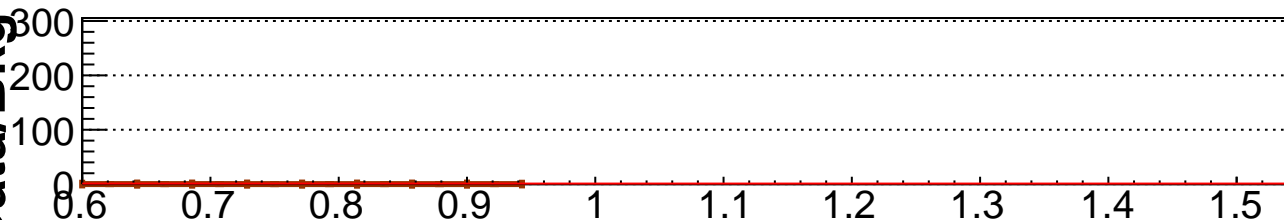
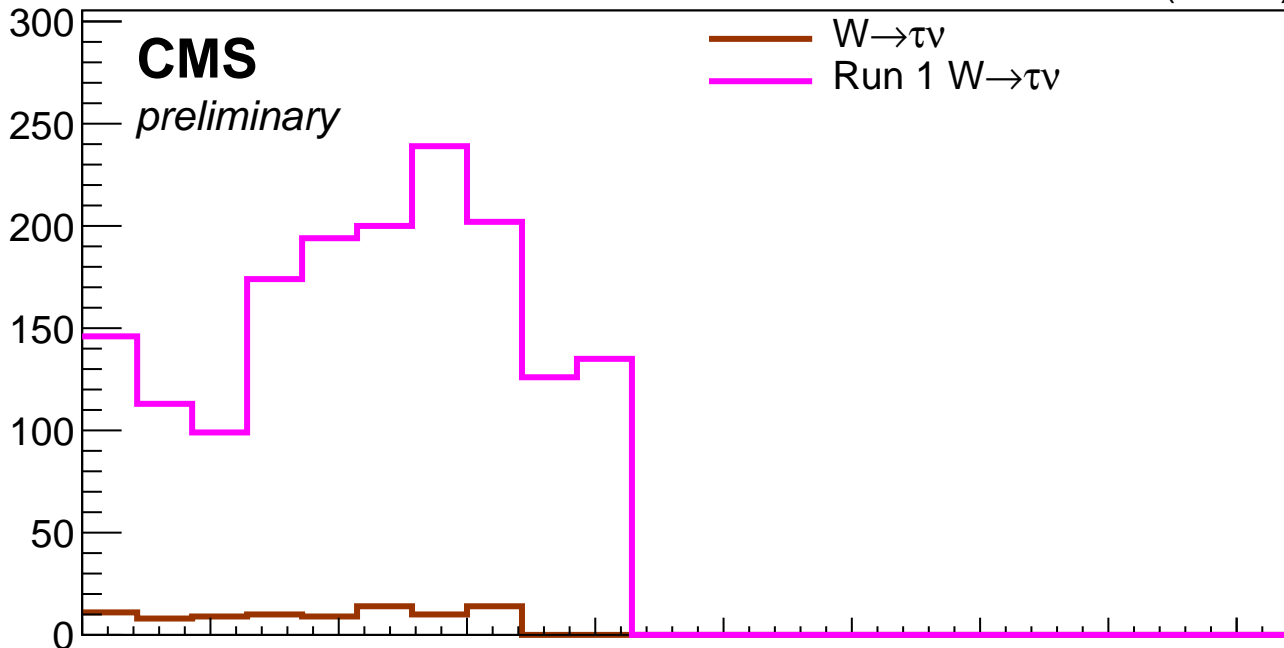
*preliminary*

—  $W \rightarrow \tau \nu$

— Run 1  $W \rightarrow \tau \nu$

**Data/Bkg**

**Jet 1 CSV**

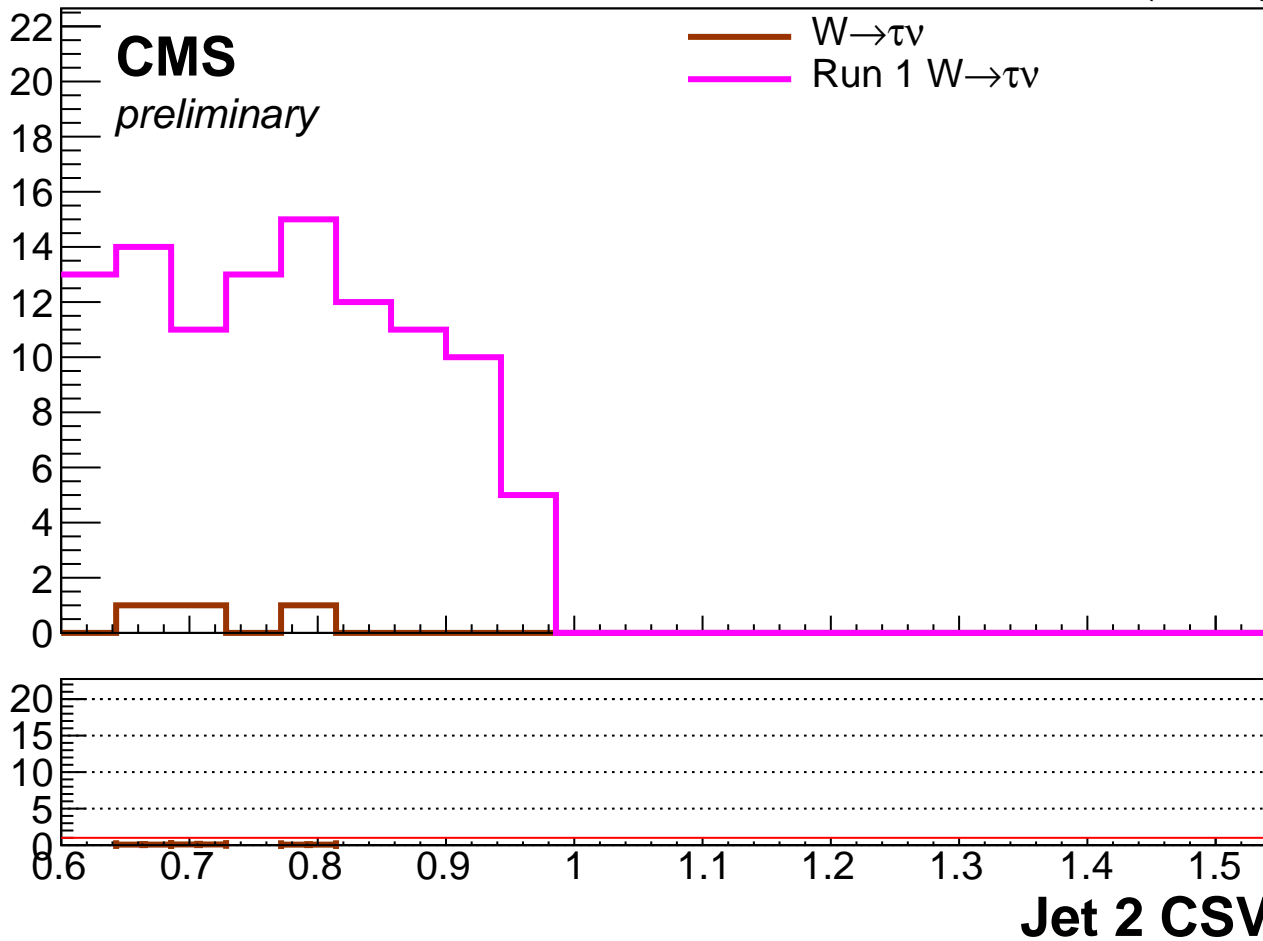


19.2 fb<sup>-1</sup> (8 TeV)

**CMS**  
*preliminary*

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

**Data/Bkg**



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

**CMS**

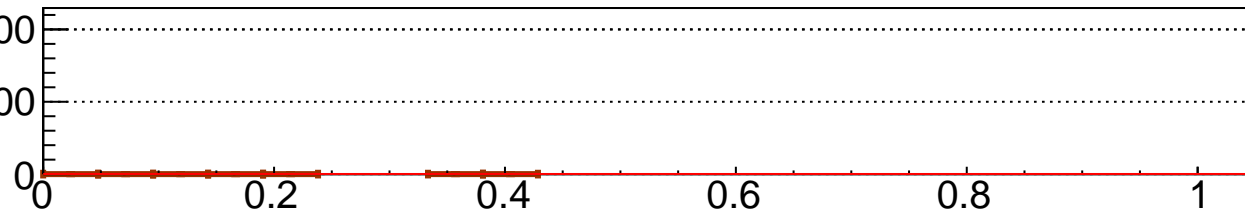
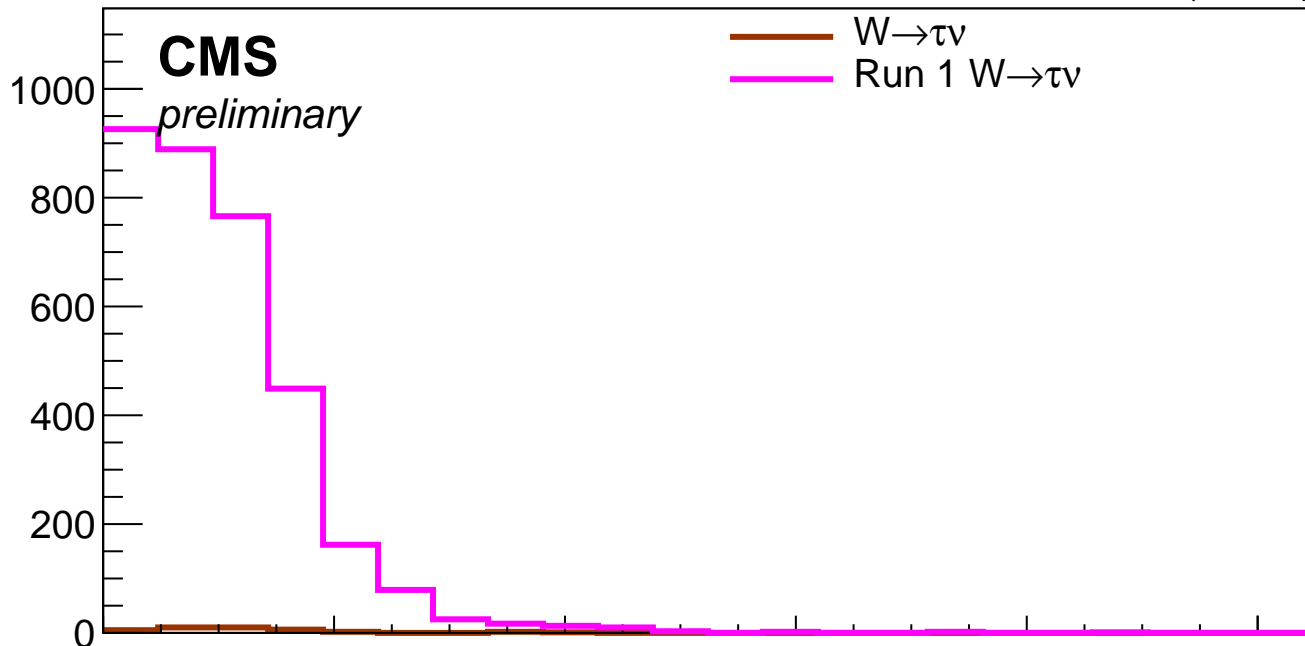
*preliminary*

—  $W \rightarrow \tau \nu$

— Run 1  $W \rightarrow \tau \nu$

**Data/Bkg**

**Jet 3 CSV**



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

**CMS**

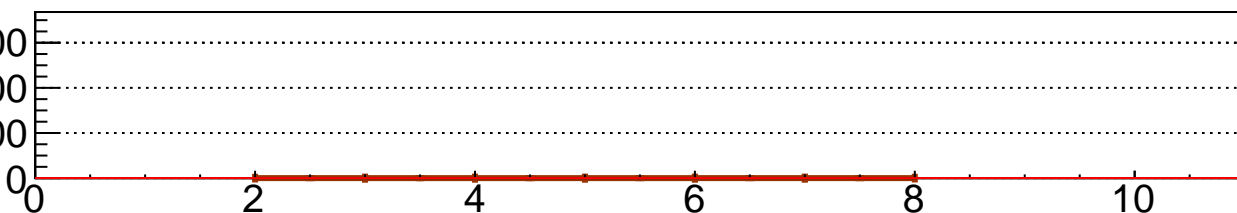
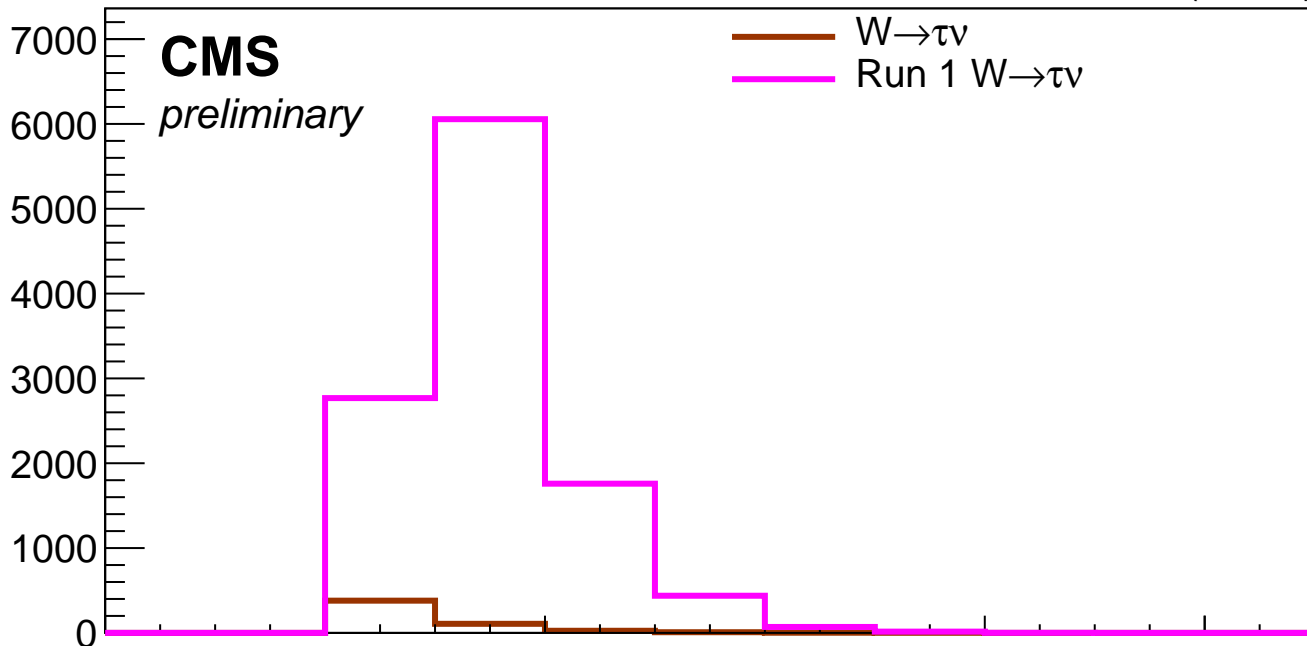
*preliminary*

W→τν

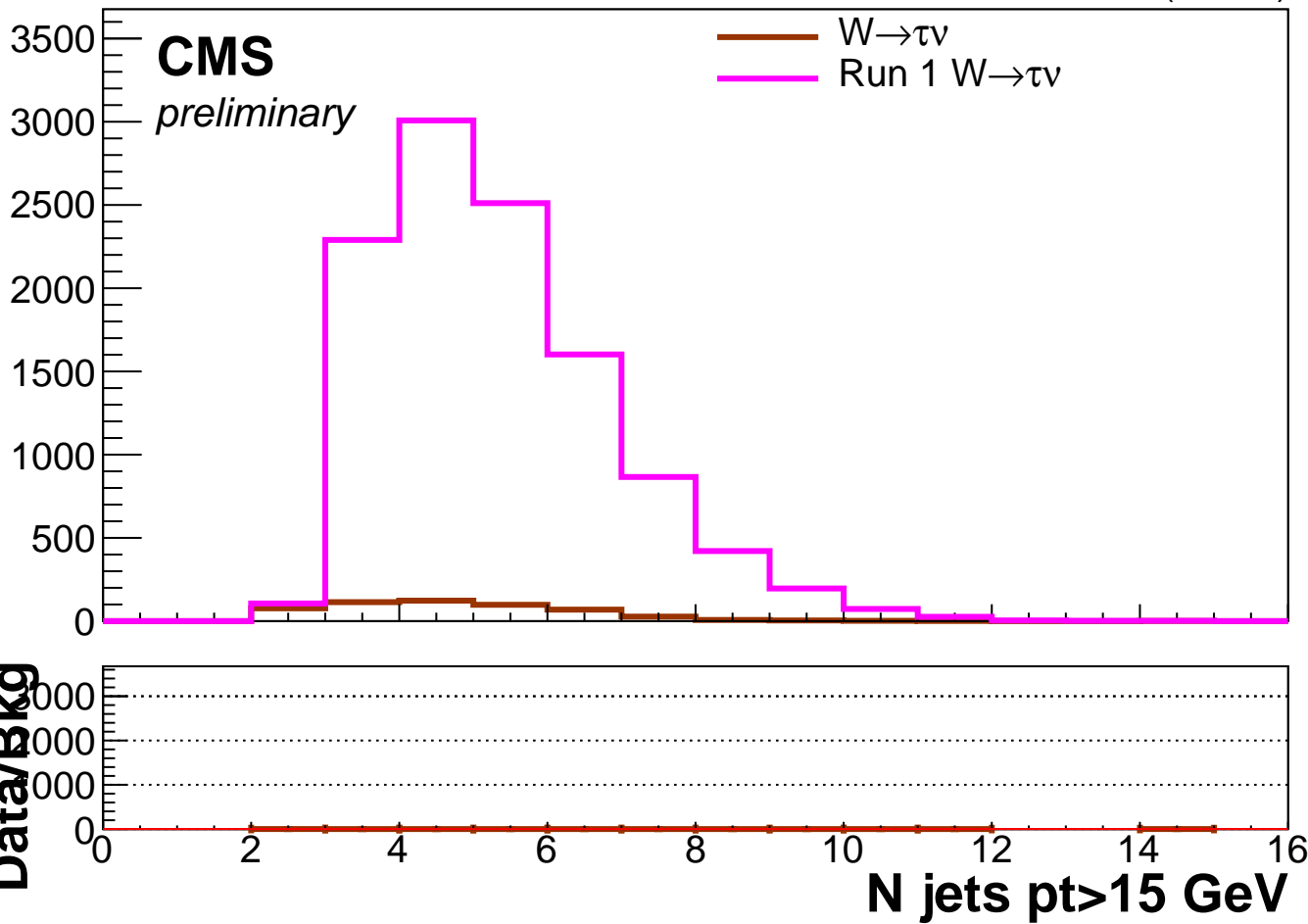
Run 1 W→τν

**Data/Bkg**

**N jets pt>30 GeV**



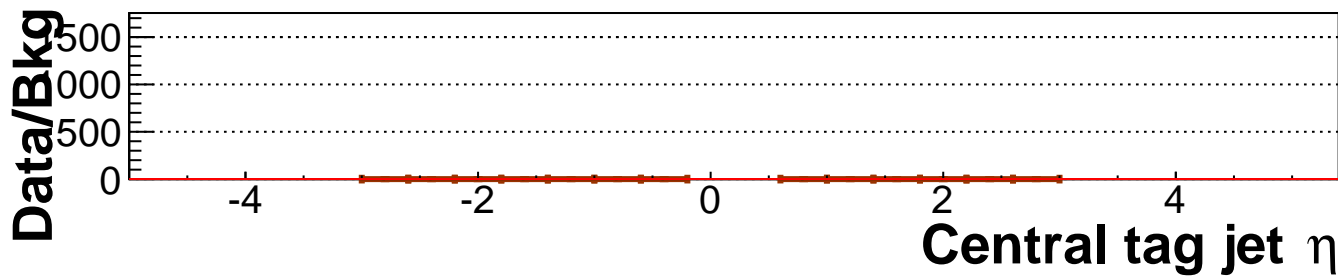
19.2 fb<sup>-1</sup> (8 TeV)



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

**CMS**  
*preliminary*

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





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

**CMS**

*preliminary*

—  $W \rightarrow \tau \nu$

— Run 1  $W \rightarrow \tau \nu$

**Data/Bkg**

**Forward tag jet  $\eta$**

