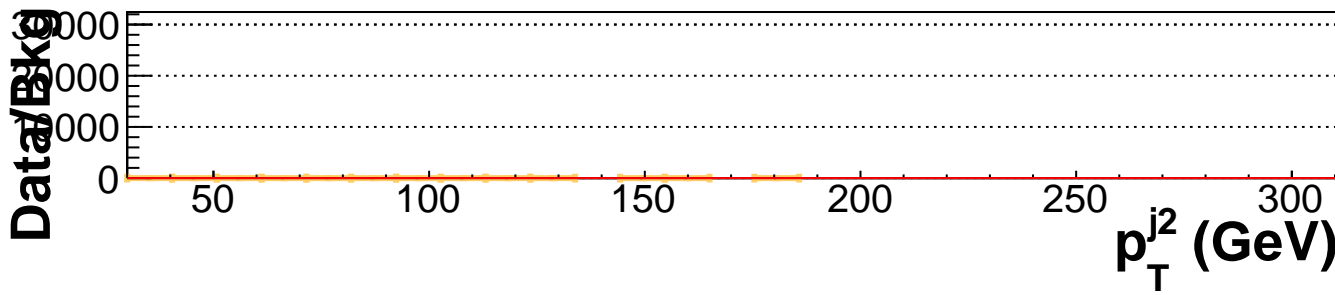
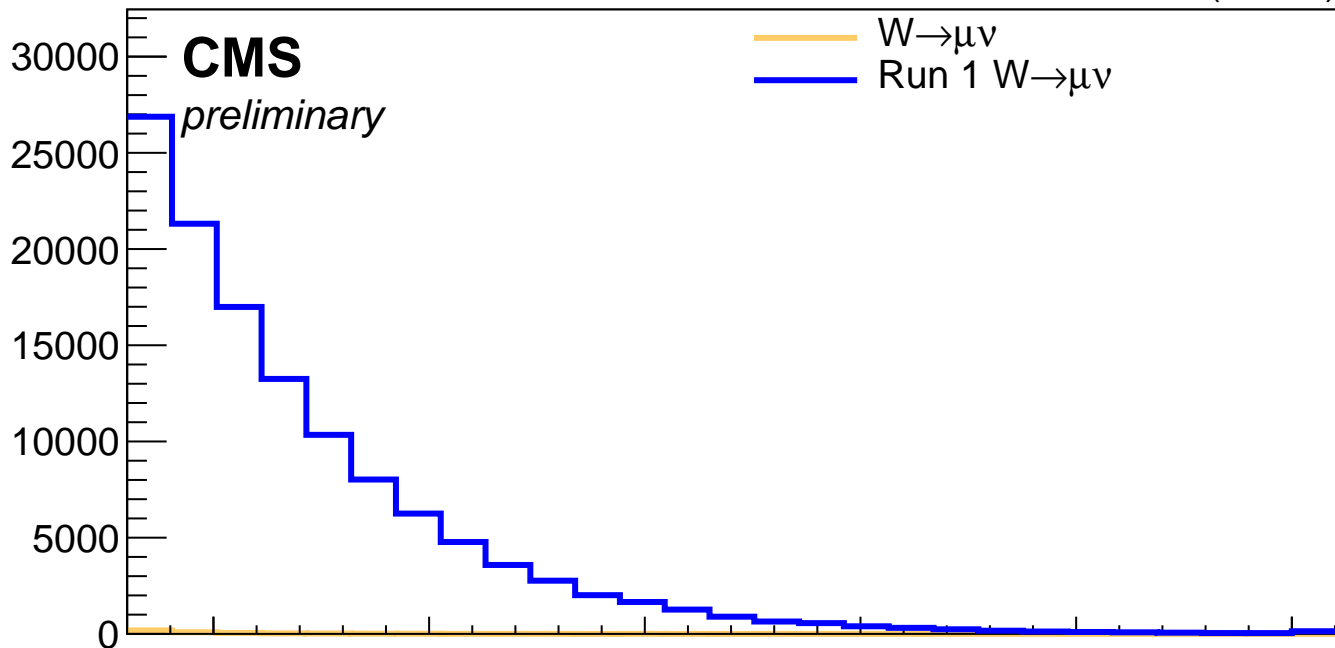


19.2 fb<sup>-1</sup> (8 TeV)

**CMS**

*preliminary*

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

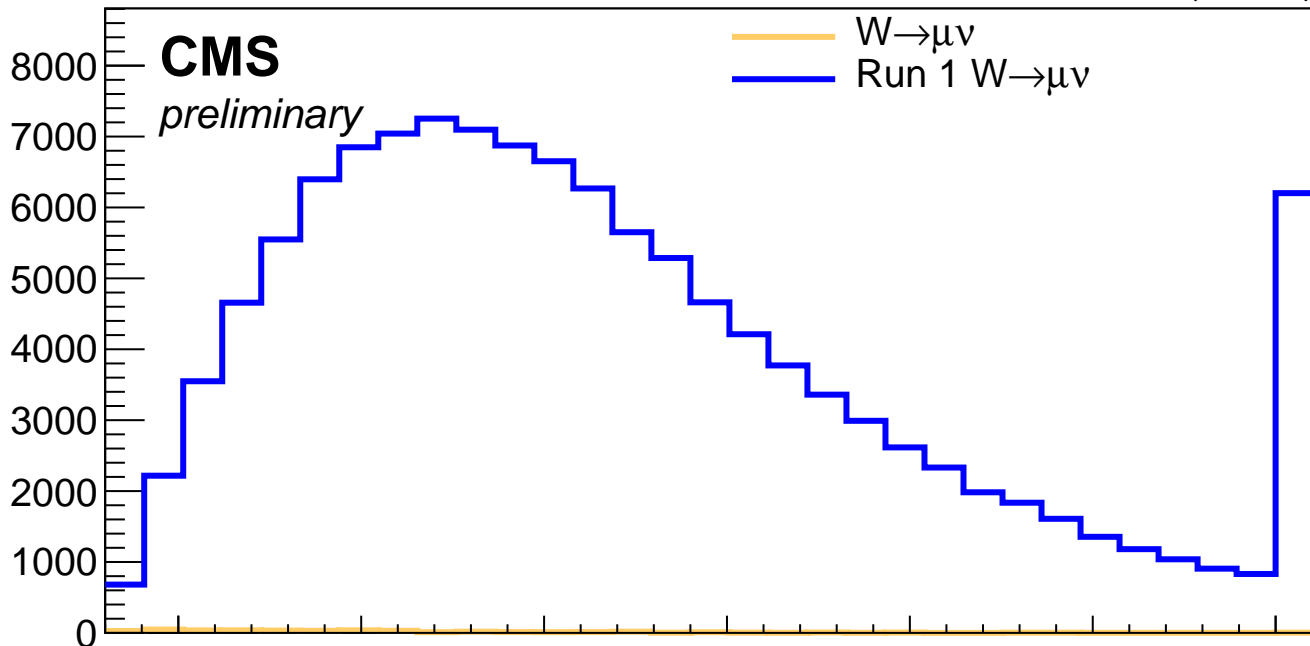


19.2 fb<sup>-1</sup> (8 TeV)

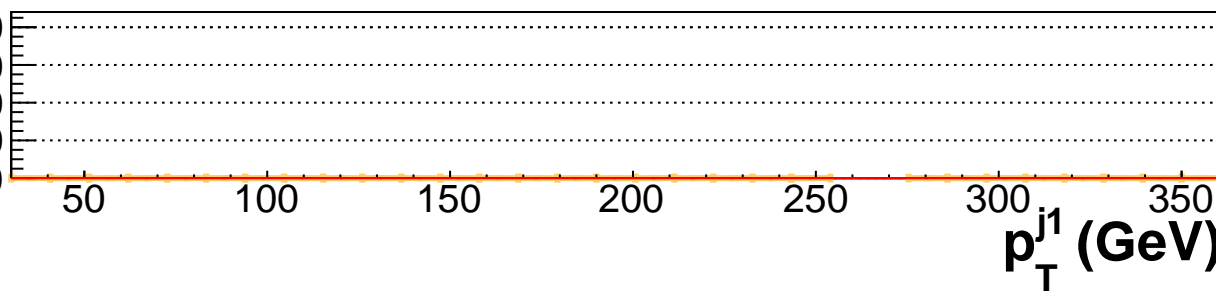
**CMS**

*preliminary*

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



**Data/Bkg**



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

**CMS**

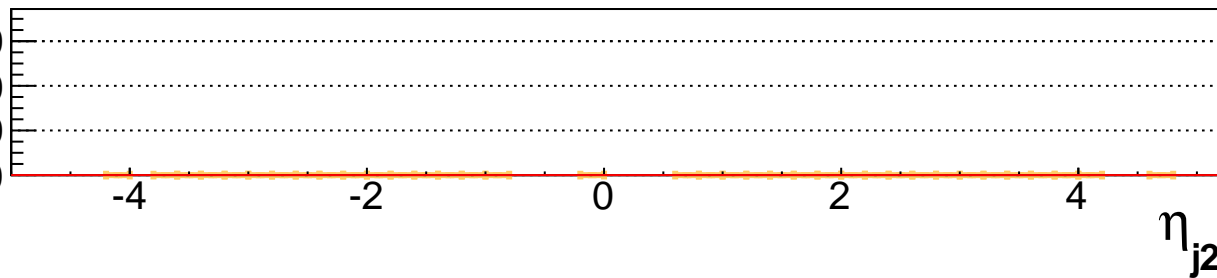
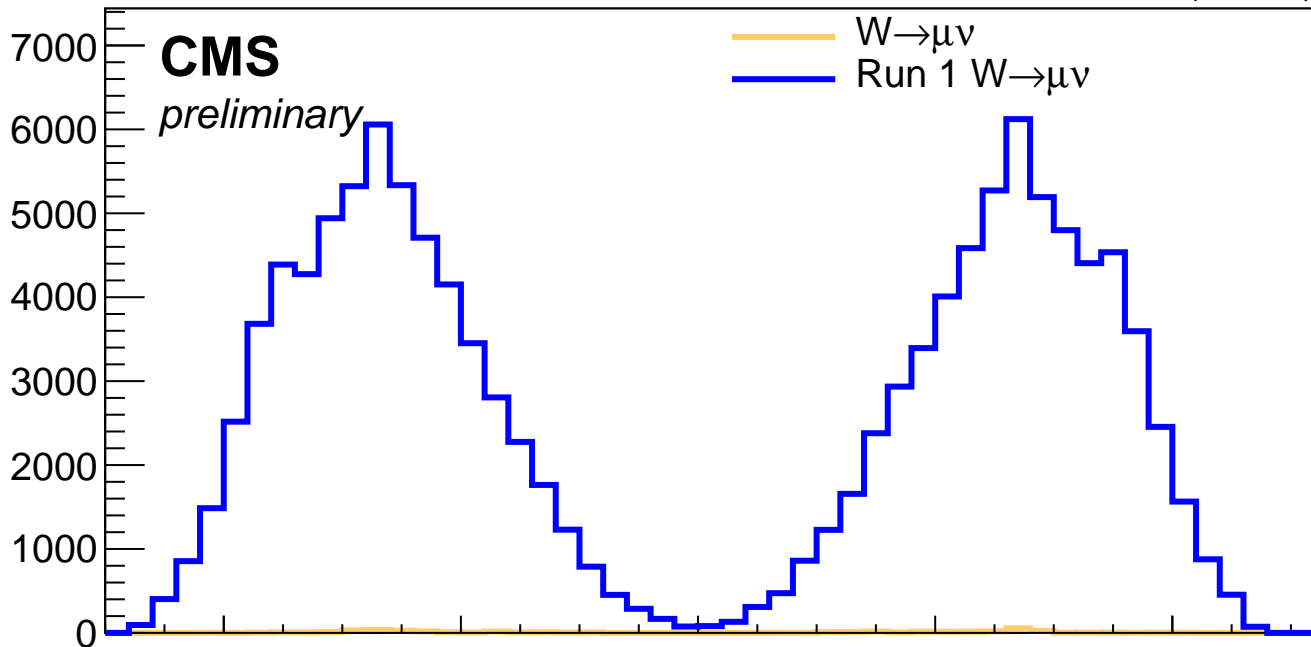
*preliminary*

—  $W \rightarrow \mu\nu$

— Run 1  $W \rightarrow \mu\nu$

**Data/Bkg**

$\eta_{j2}$



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

**CMS**

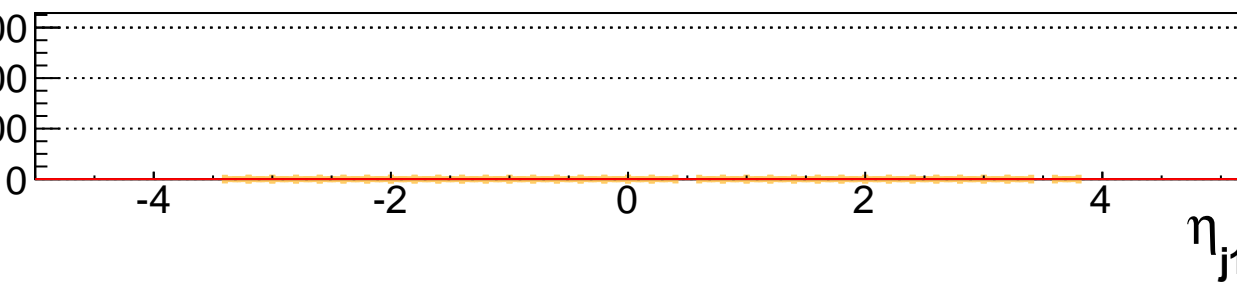
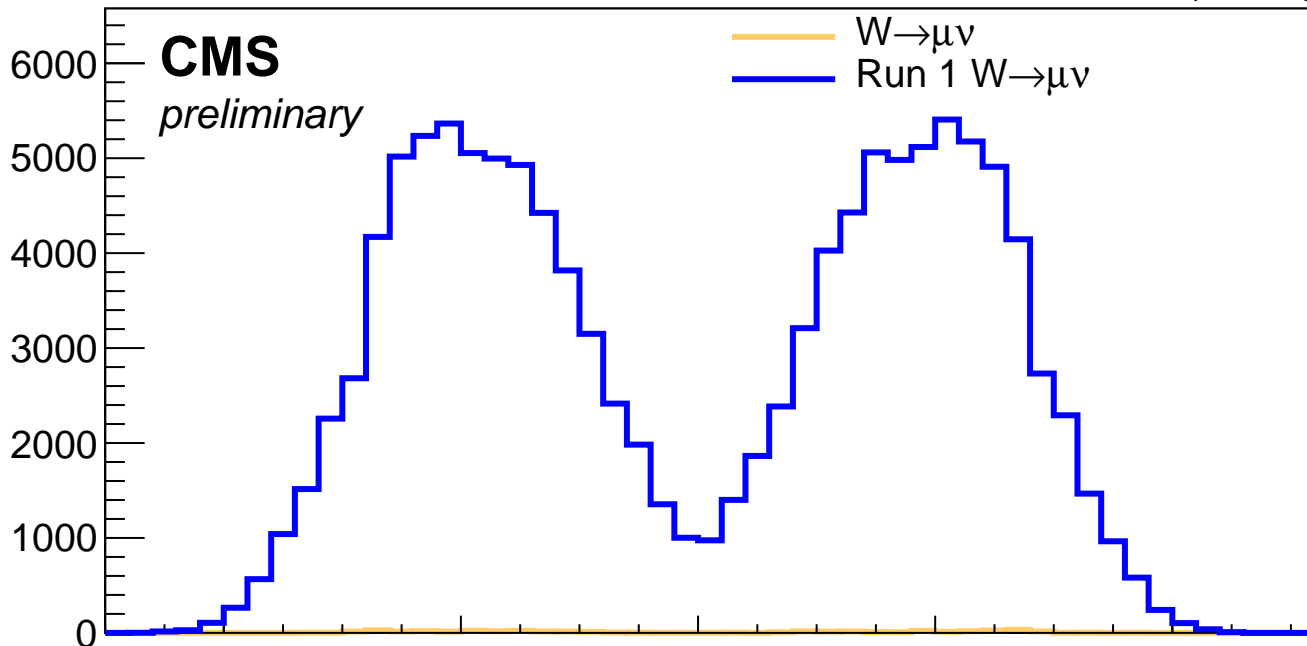
*preliminary*

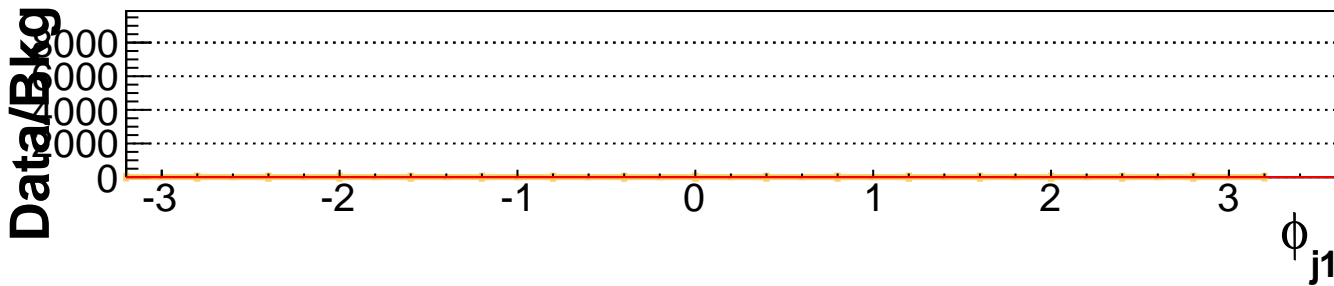
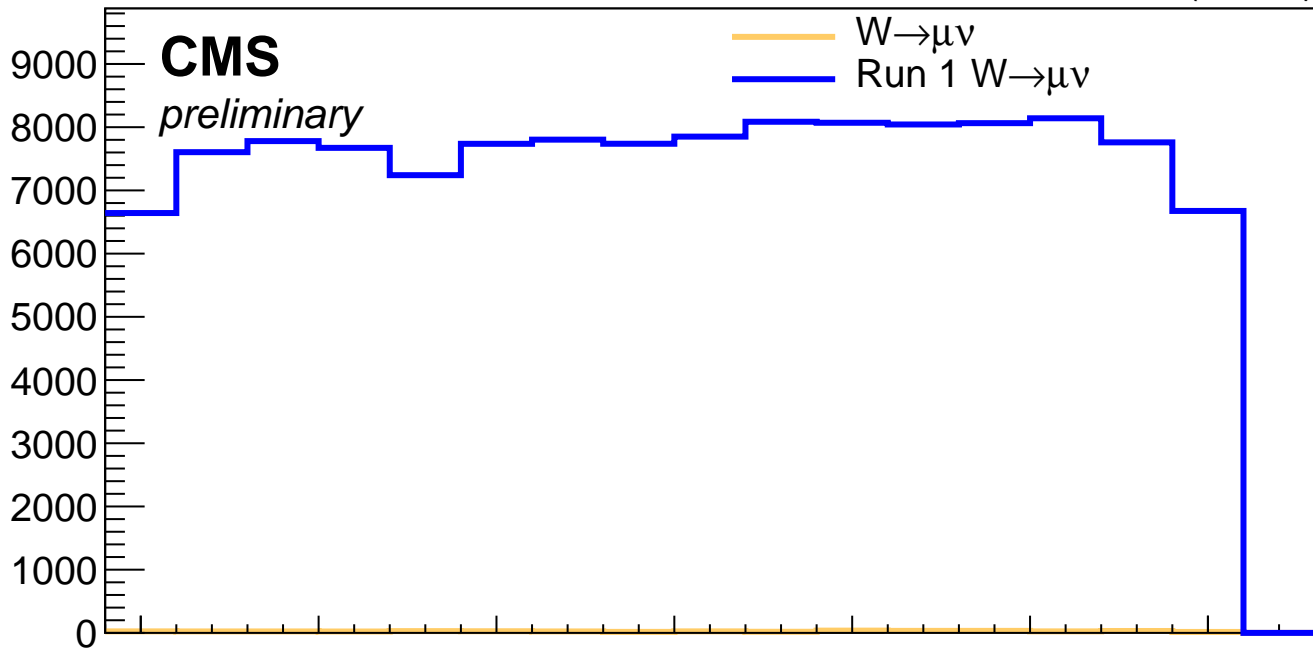
—  $W \rightarrow \mu \nu$

— Run 1  $W \rightarrow \mu \nu$

**Data/Bkg**

$\eta_{j1}$



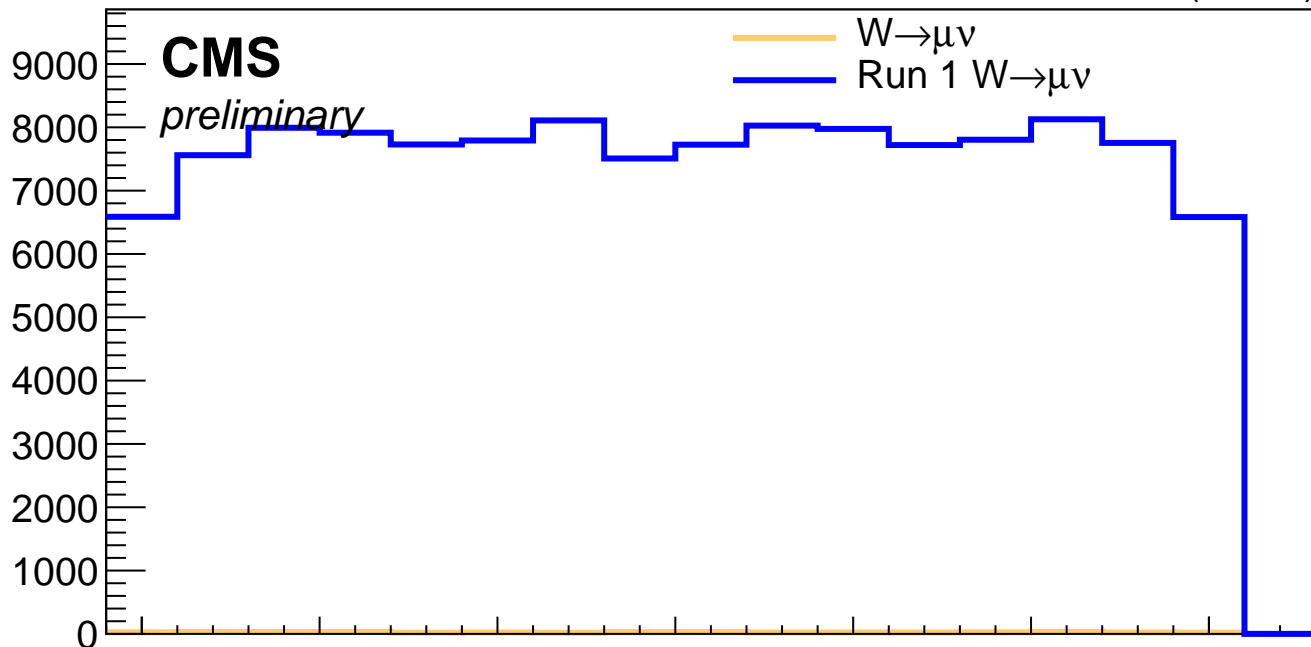
19.2 fb<sup>-1</sup> (8 TeV)

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

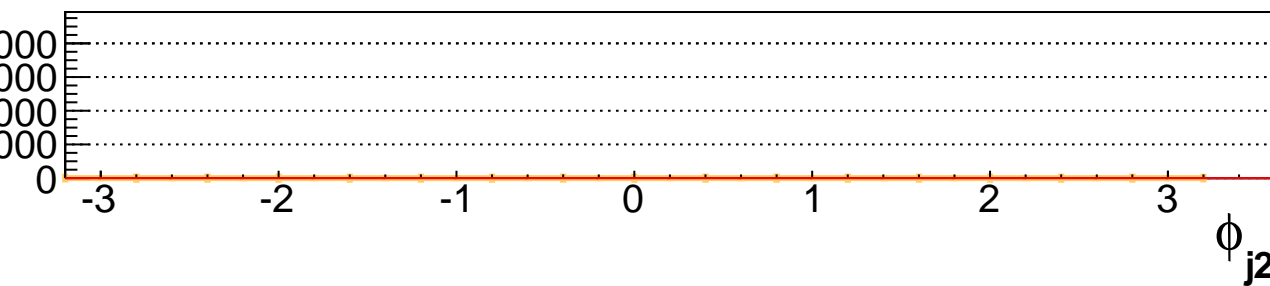
**CMS**

*preliminary*

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



**Data/Bkg**

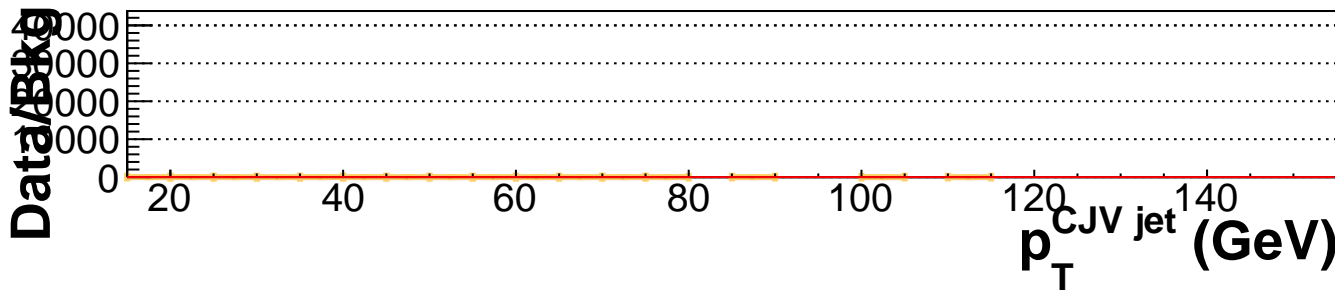
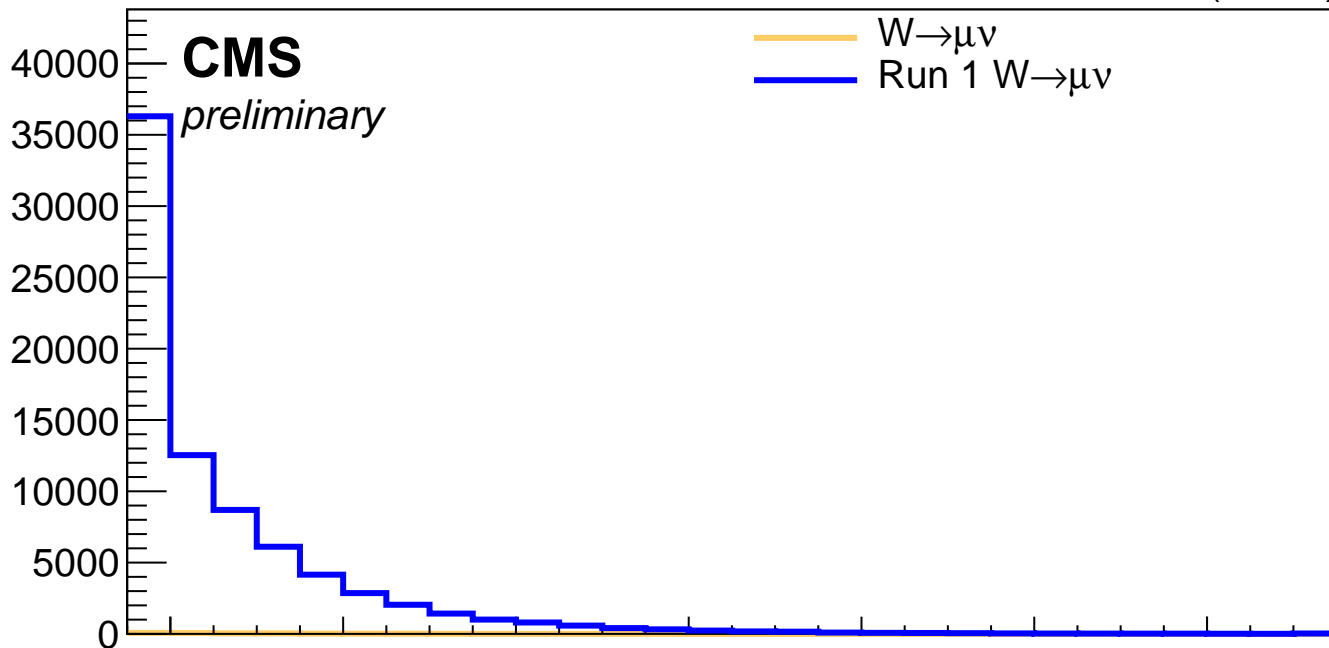


19.2 fb<sup>-1</sup> (8 TeV)

**CMS**

*preliminary*

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

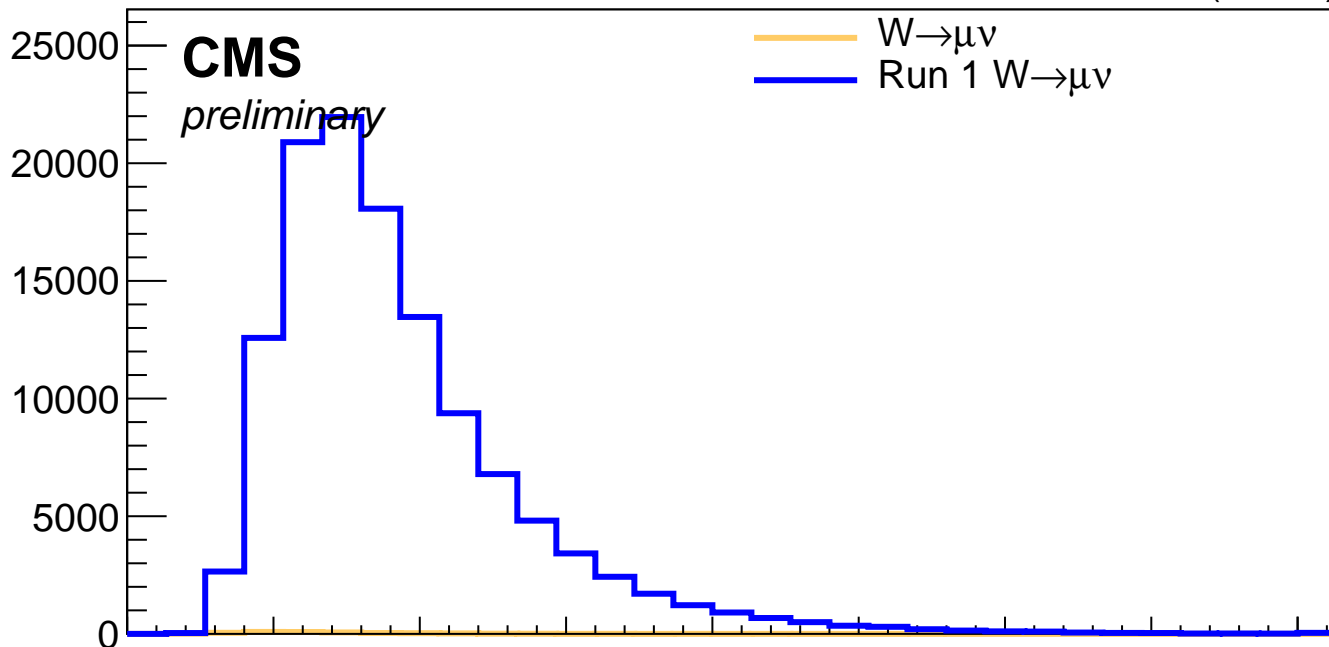


19.2 fb<sup>-1</sup> (8 TeV)

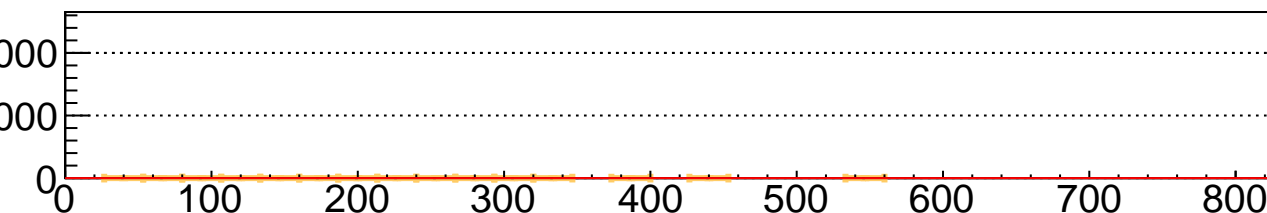
**CMS**

*preliminary*

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



**Data/Bkg**



**Missing transverse energy (GeV)**

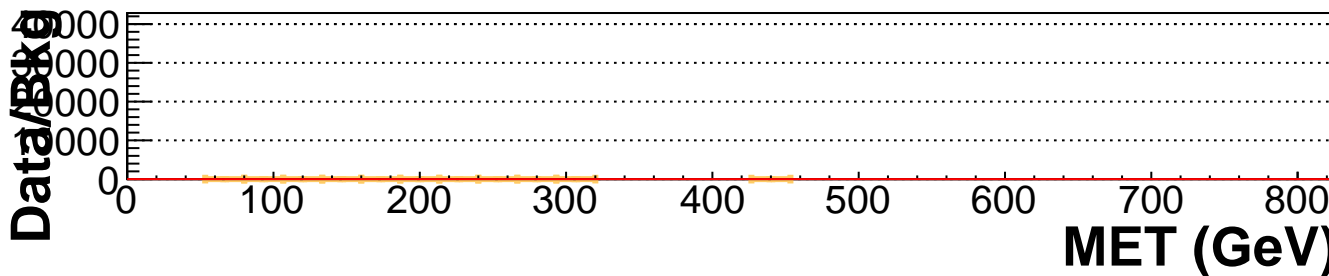
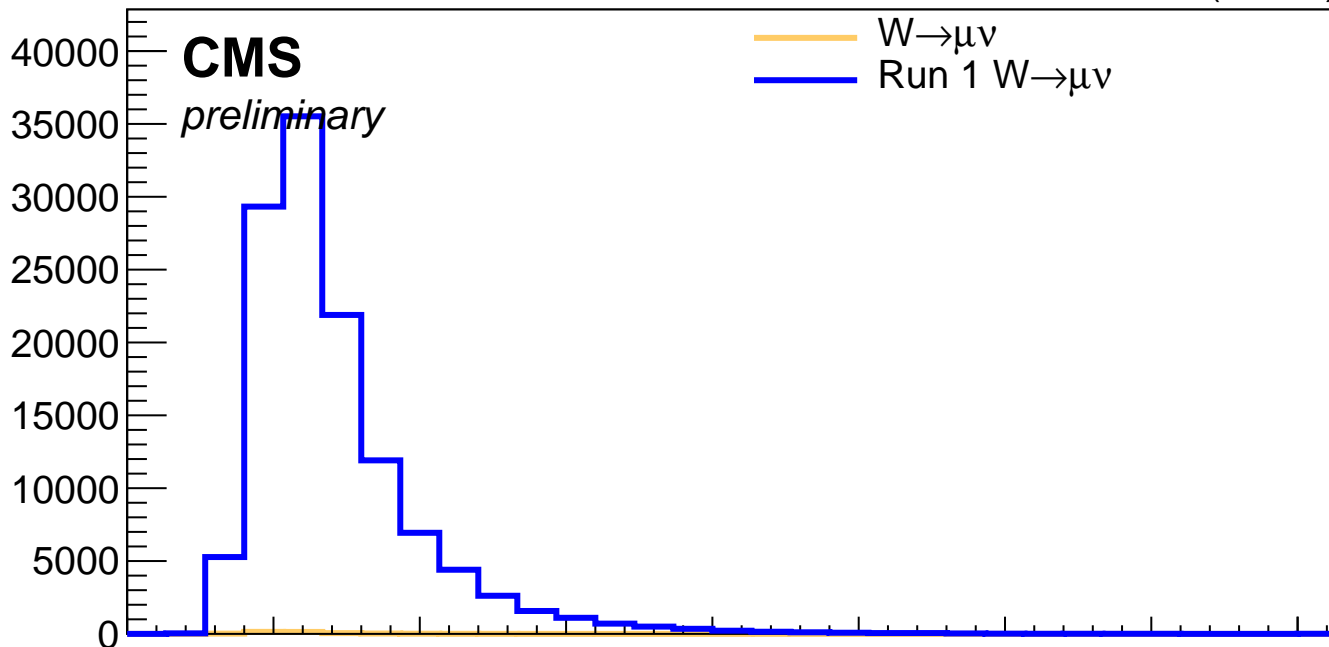


19.2 fb<sup>-1</sup> (8 TeV)

**CMS**

*preliminary*

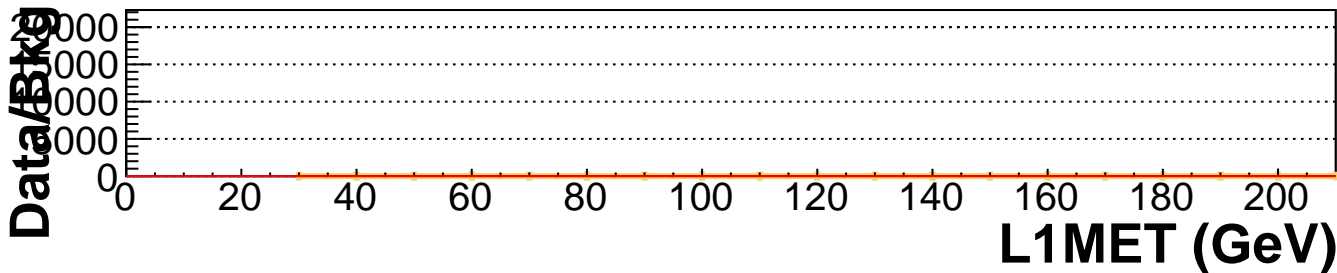
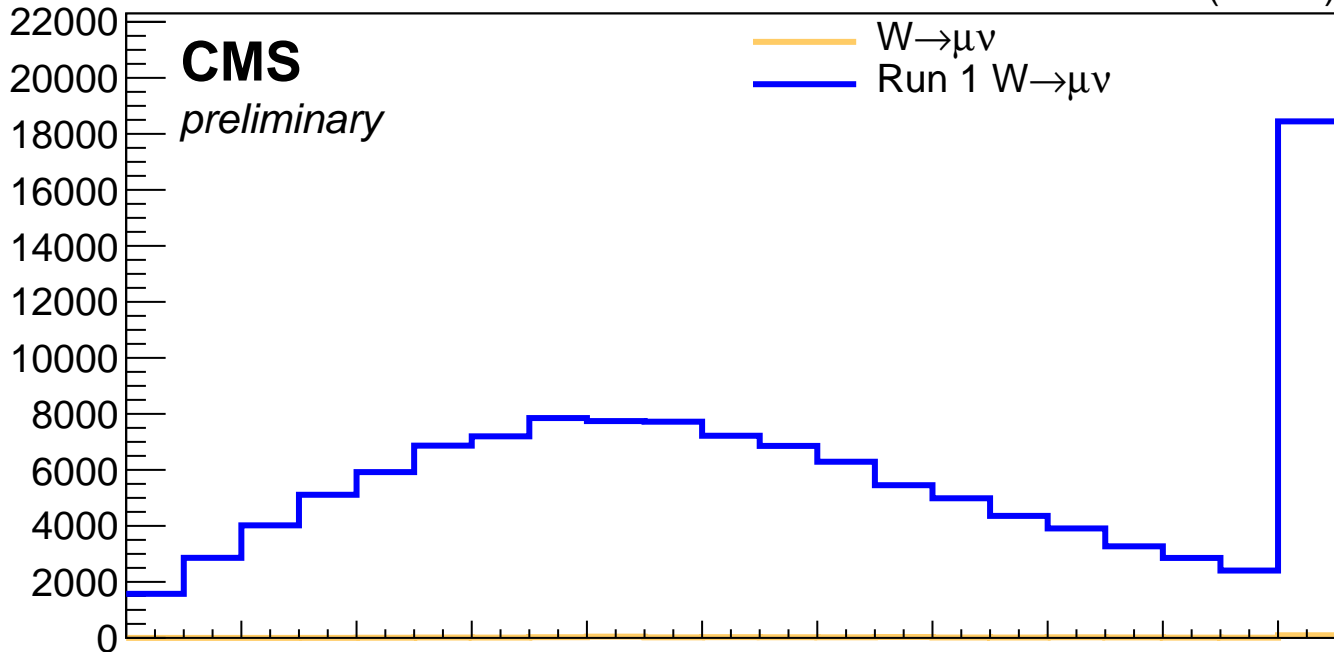
—  $W \rightarrow \mu \nu$   
— Run 1  $W \rightarrow \mu \nu$



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

**CMS**  
*preliminary*

— W→μν  
— Run 1 W→μν

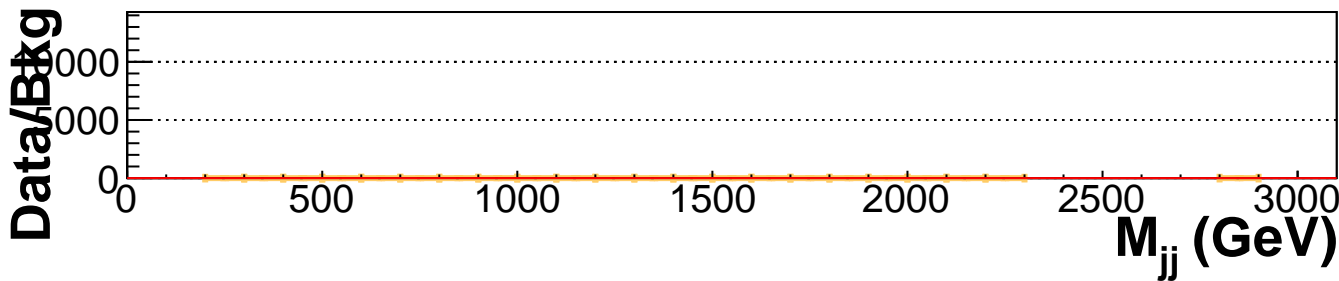
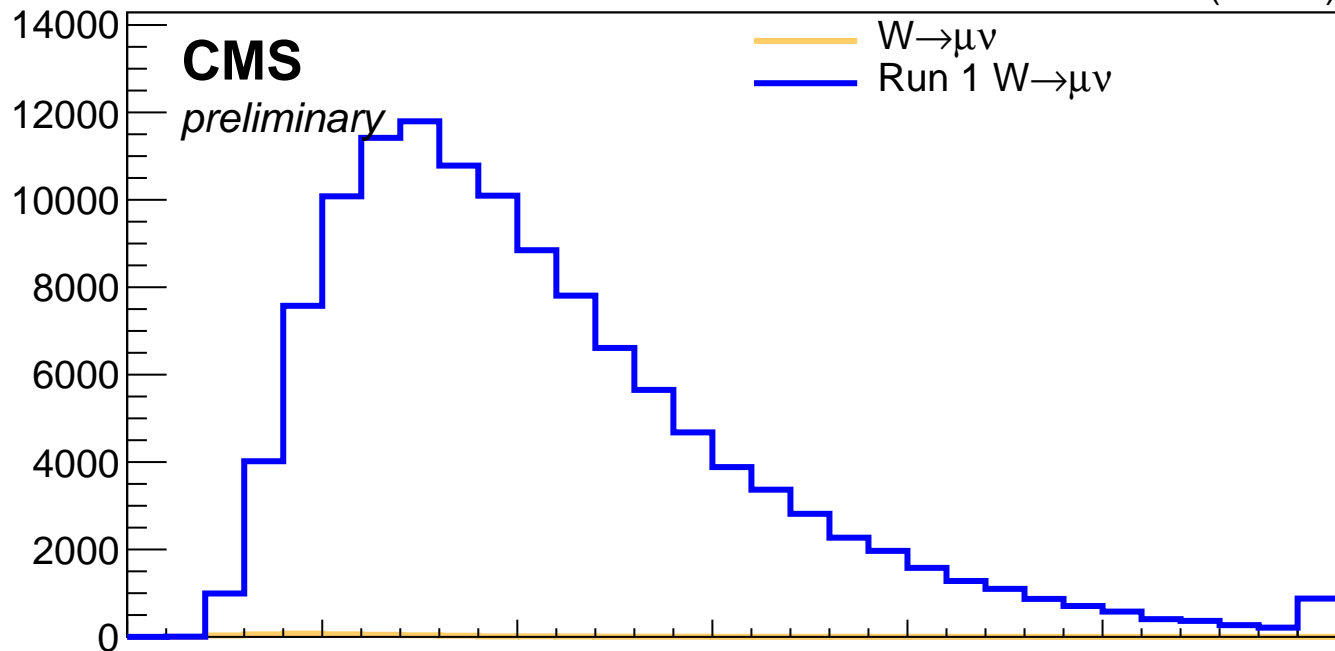


19.2 fb<sup>-1</sup> (8 TeV)

**CMS**

*preliminary*

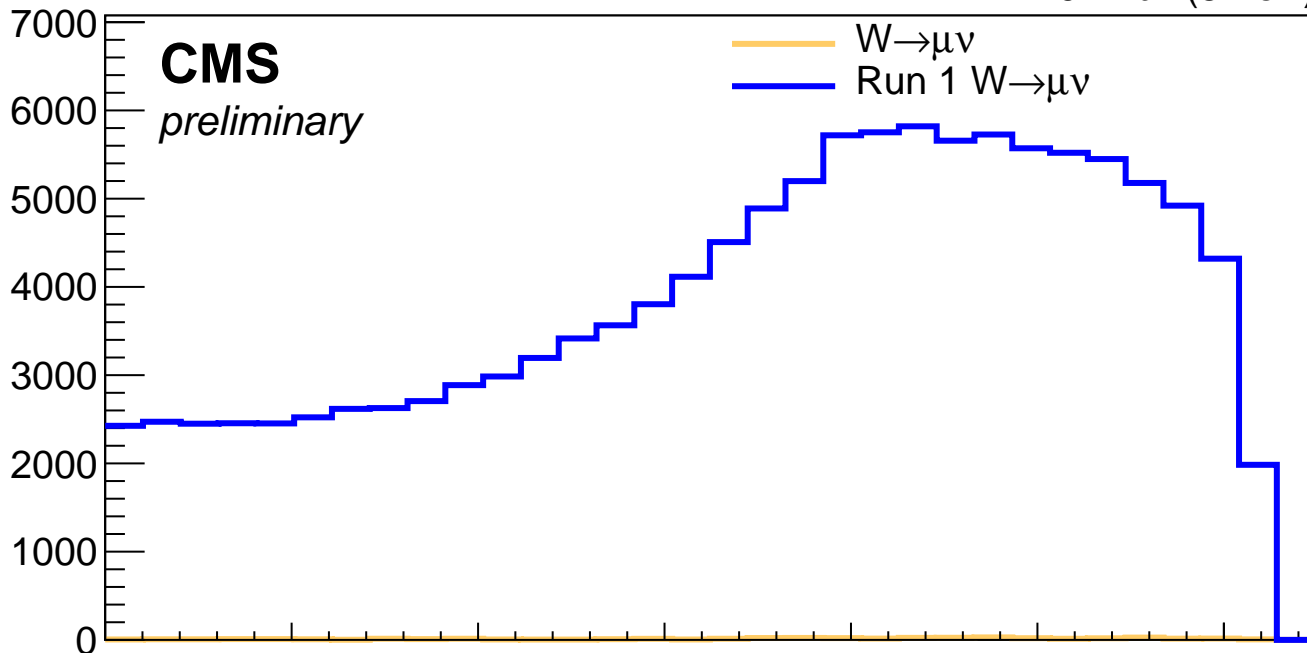
—  $W \rightarrow \mu\nu$   
— Run 1  $W \rightarrow \mu\nu$



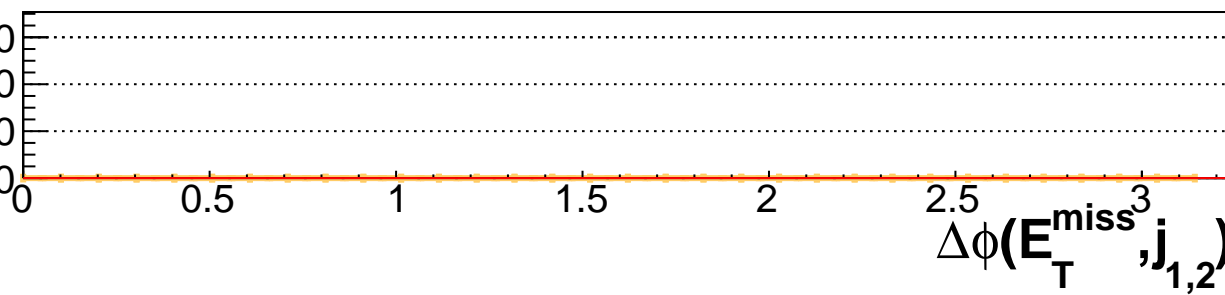
19.2 fb<sup>-1</sup> (8 TeV)

**CMS**  
*preliminary*

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



**Data/Bkg**

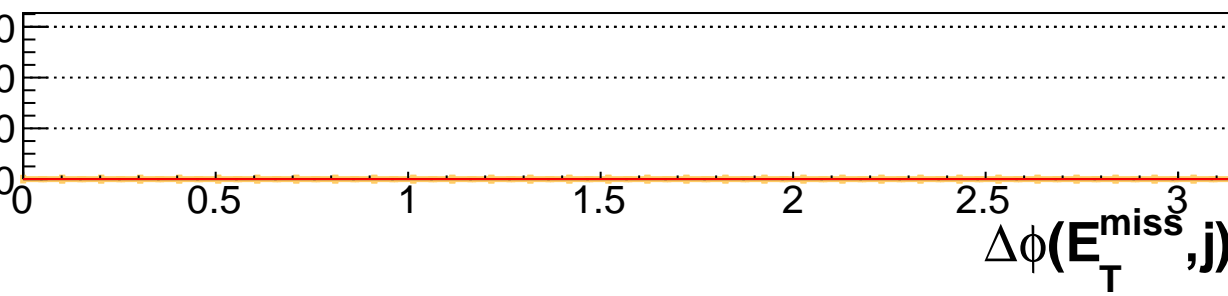
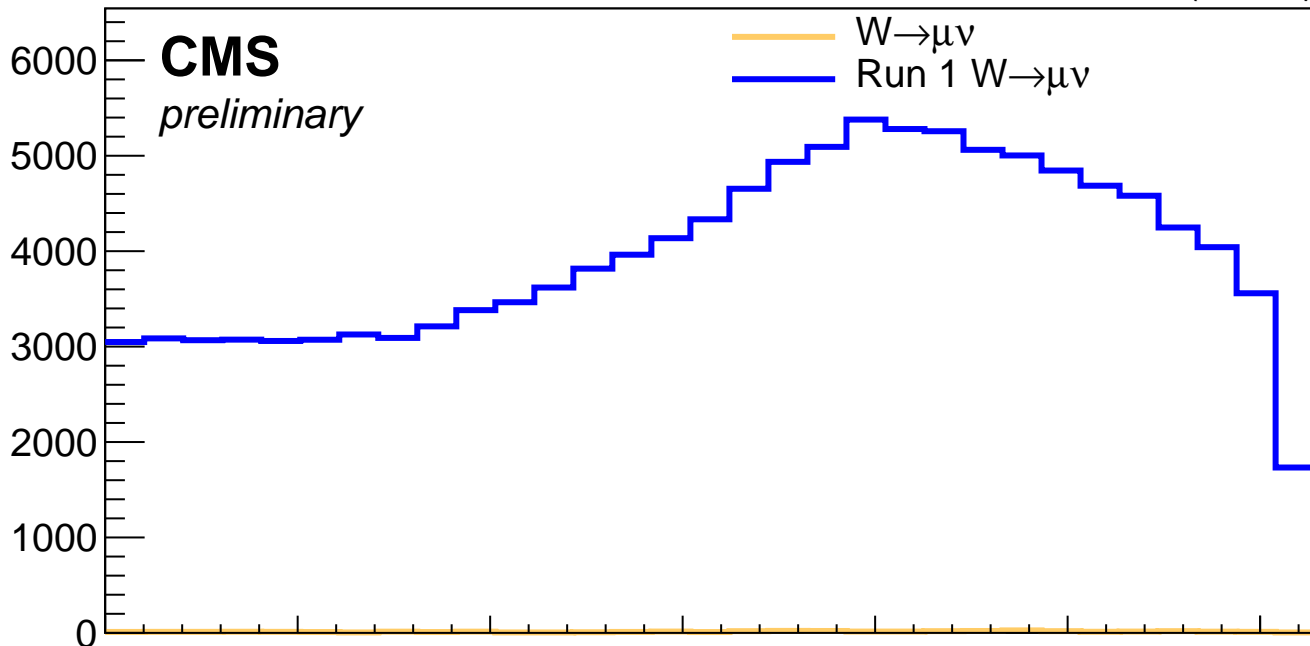


19.2 fb<sup>-1</sup> (8 TeV)

**CMS**  
*preliminary*

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

**Data/Bkg**

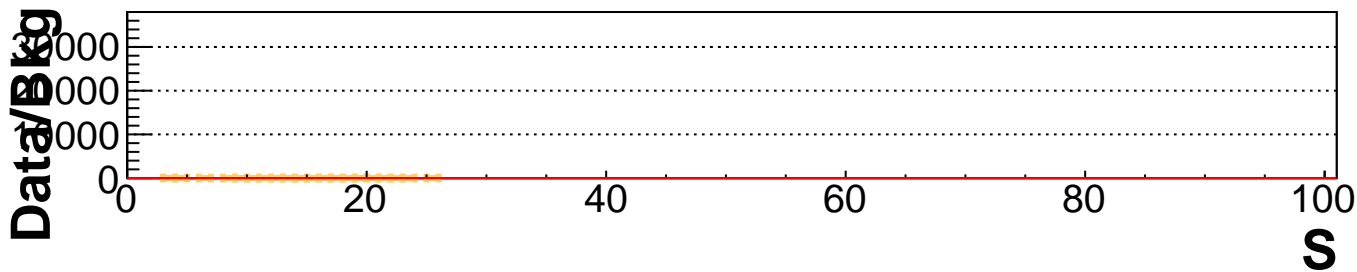
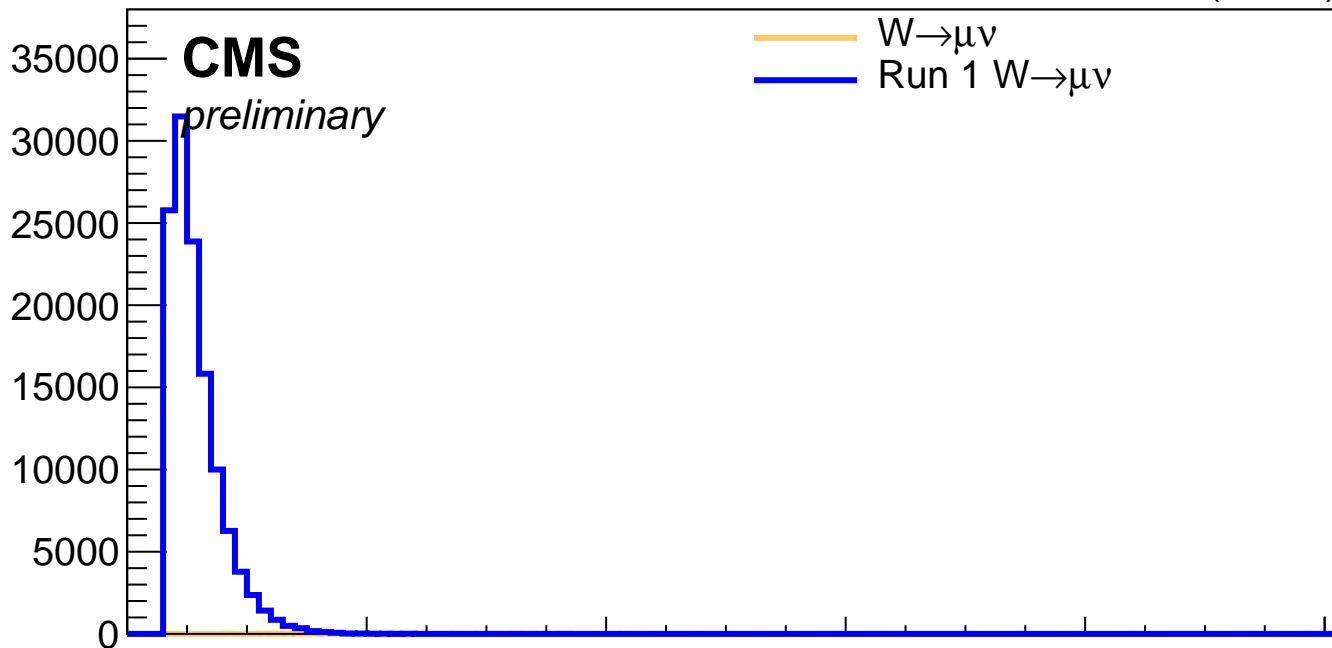


19.2 fb<sup>-1</sup> (8 TeV)

**CMS**

*preliminary*

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

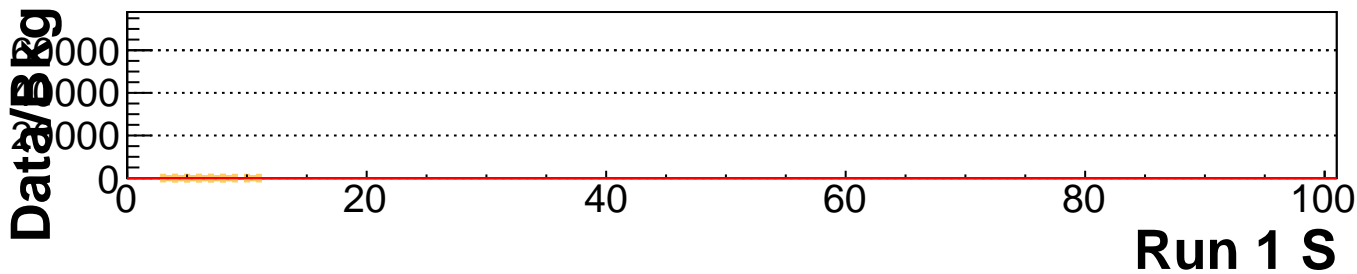
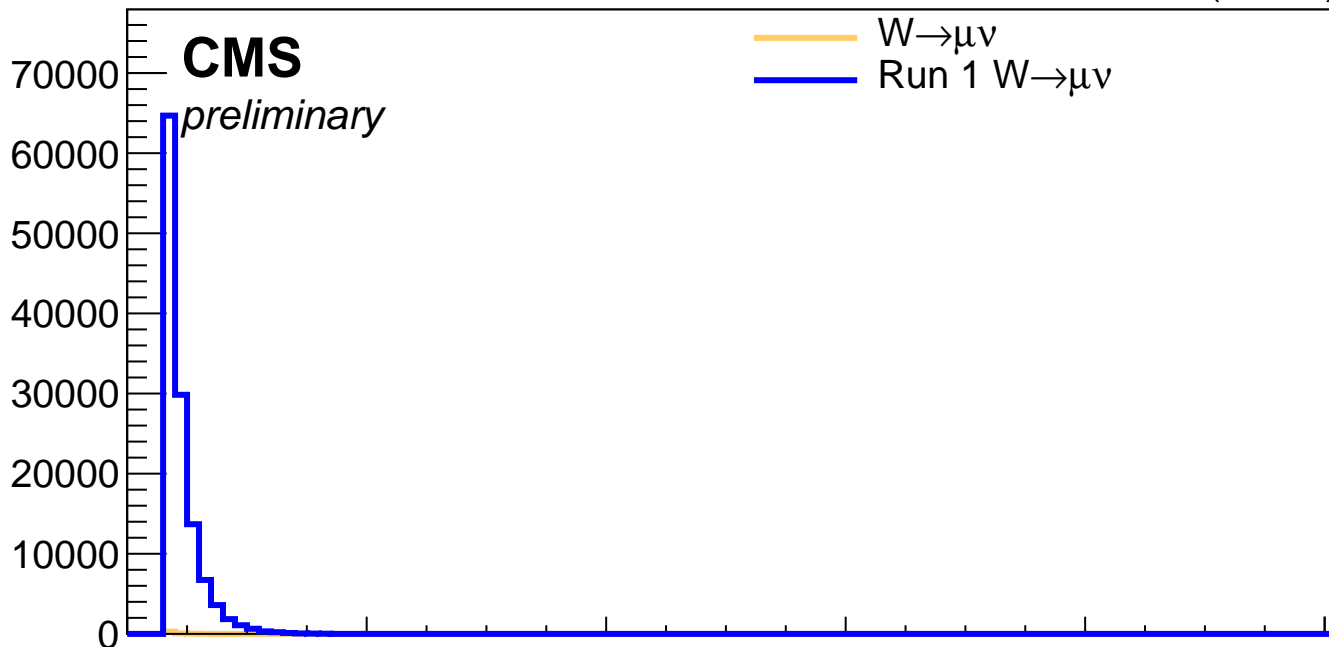


19.2 fb<sup>-1</sup> (8 TeV)

**CMS**

*preliminary*

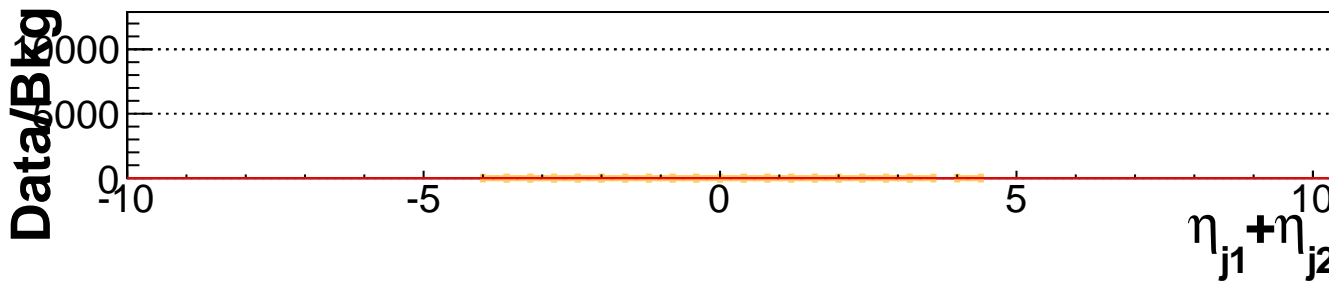
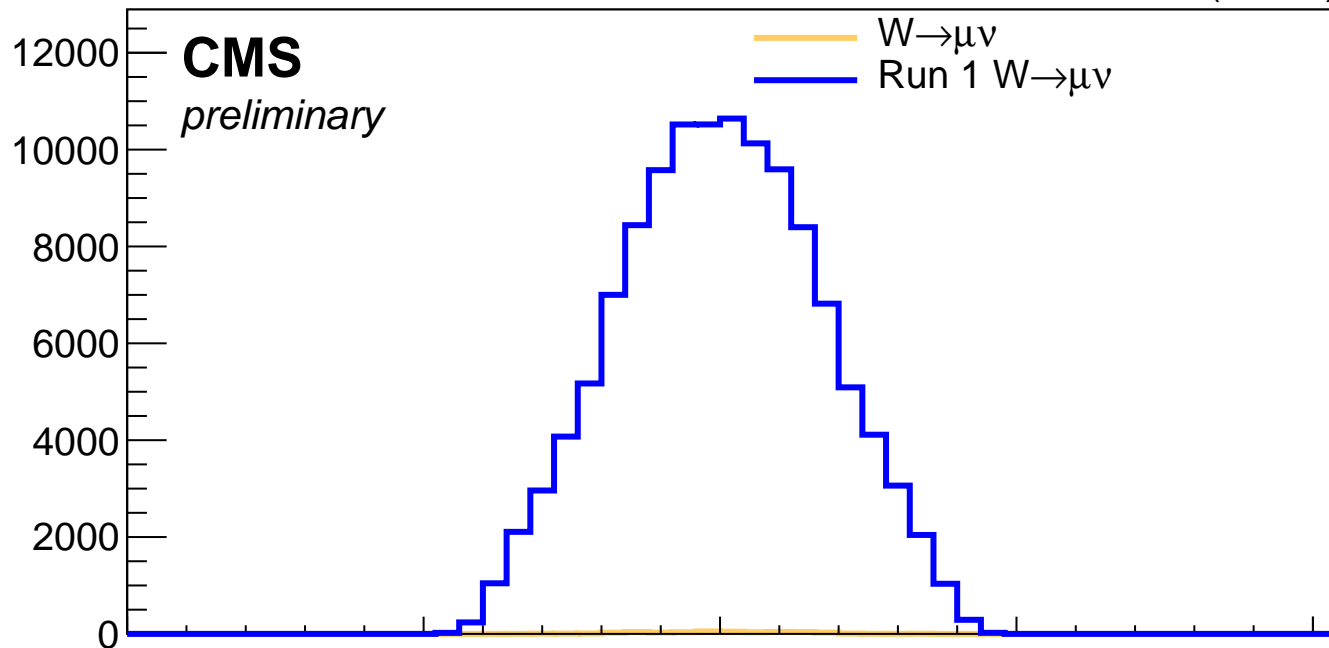
—  $W \rightarrow \mu \nu$   
— Run 1  $W \rightarrow \mu \nu$



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

**CMS**  
*preliminary*

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



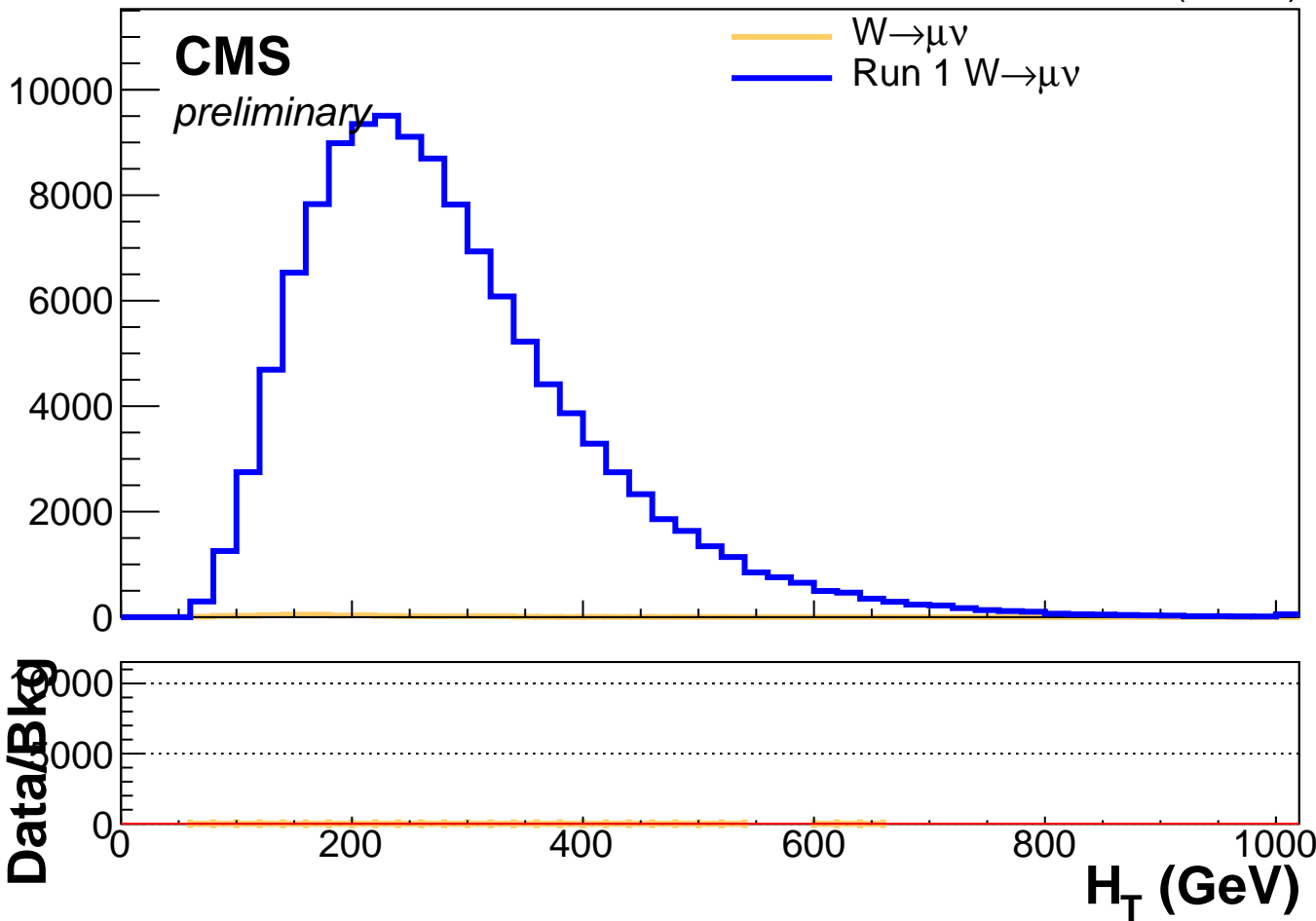


19.2 fb<sup>-1</sup> (8 TeV)

**CMS**

*preliminary*

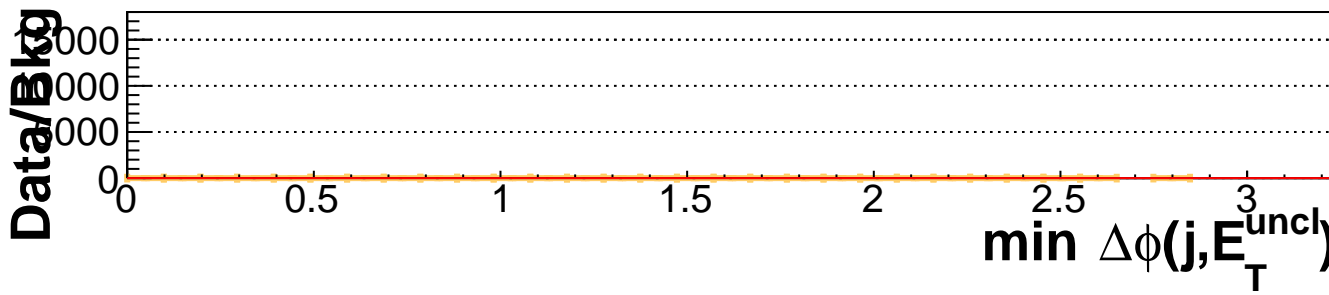
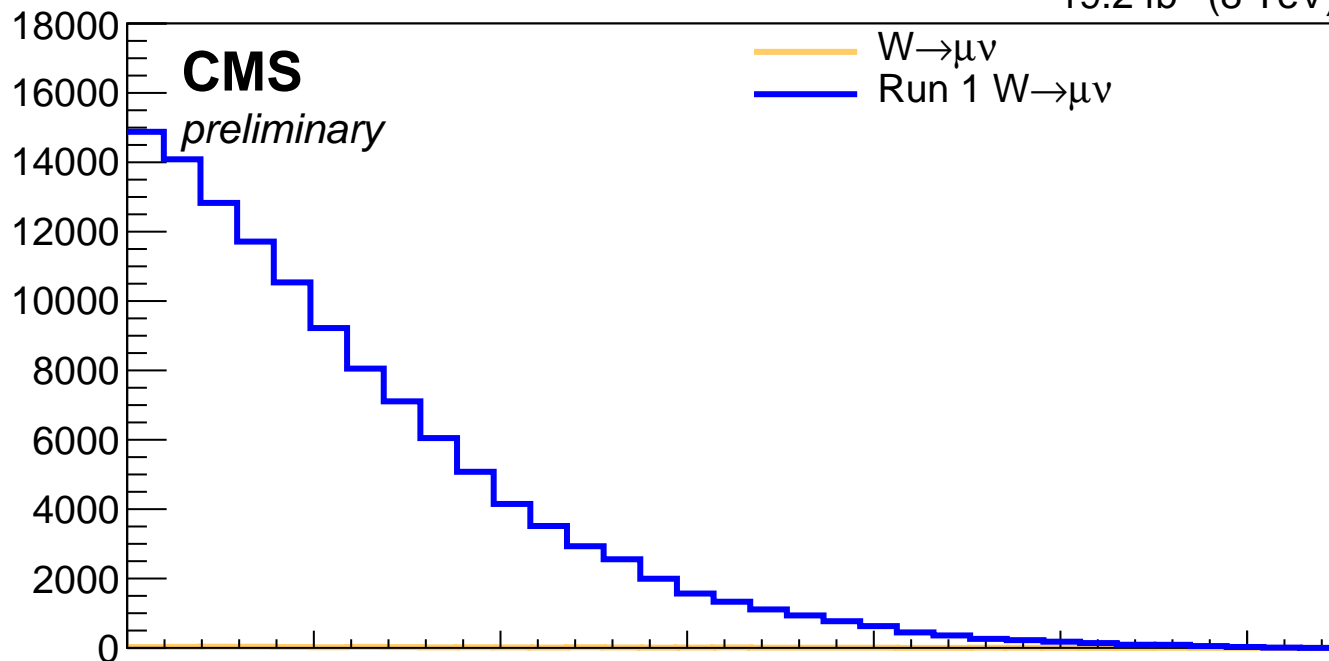
—  $W \rightarrow \mu\nu$   
— Run 1  $W \rightarrow \mu\nu$



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

**CMS**  
*preliminary*

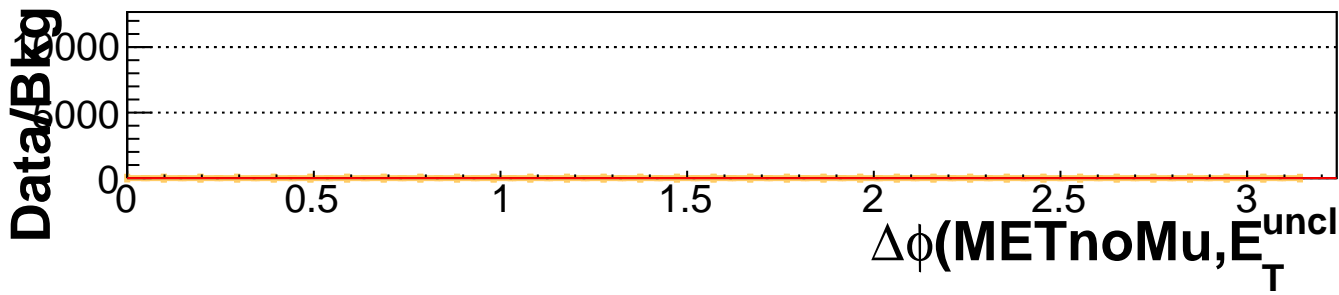
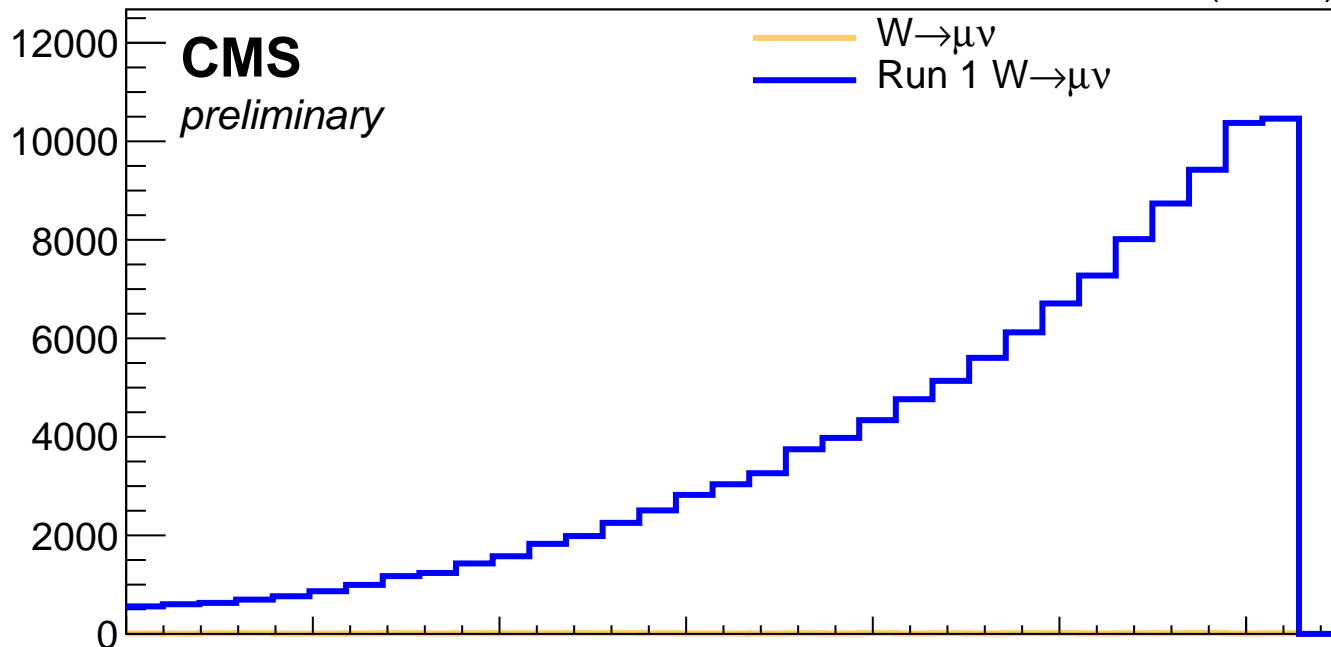
—  $W \rightarrow \mu \nu$   
— Run 1  $W \rightarrow \mu \nu$



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

**CMS**  
*preliminary*

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

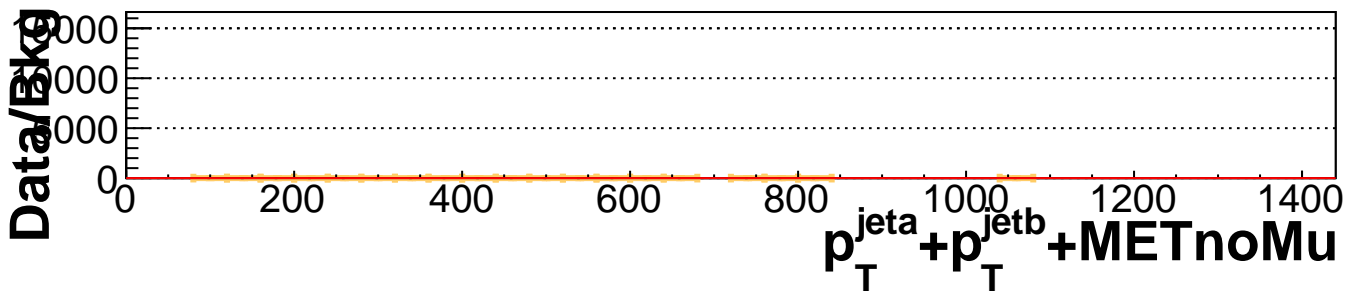
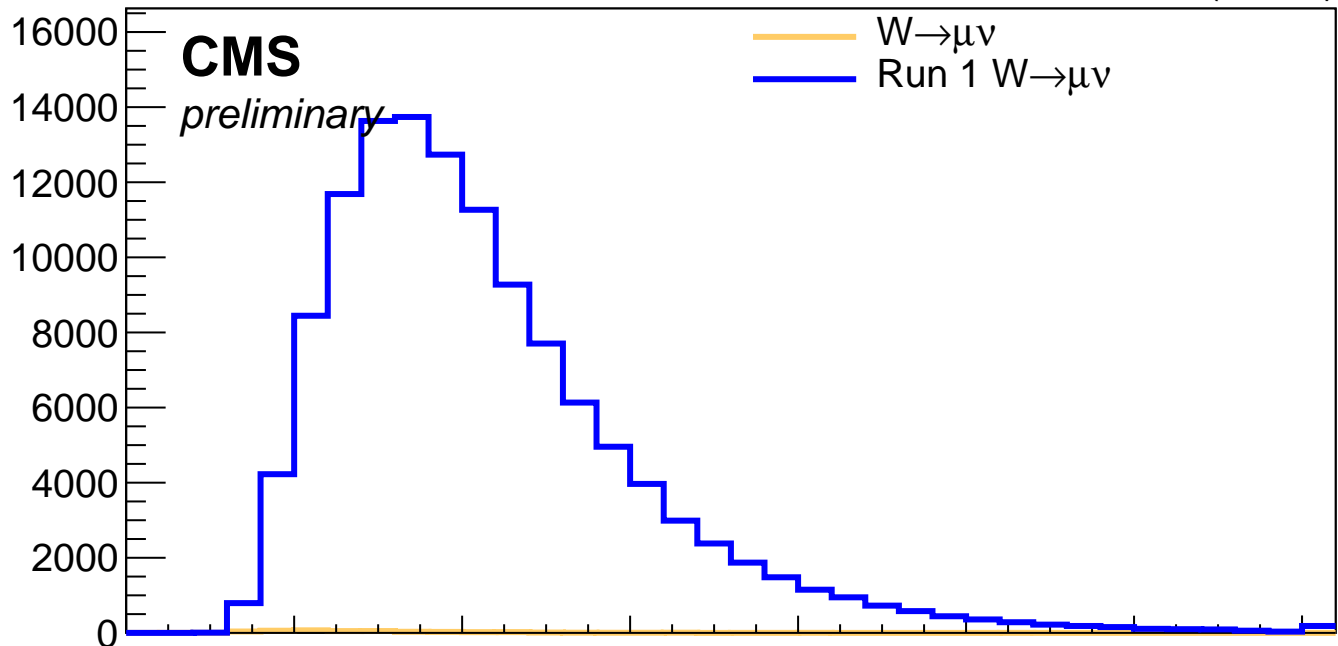


19.2 fb<sup>-1</sup> (8 TeV)

**CMS**

*preliminary*

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



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

**CMS**

*preliminary*

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

50000  
40000  
30000  
20000  
10000  
0

Data/Bkg

1000  
500  
0

0

50

100

150

200

250

300

350

400

$p_T(ja+jb+METnoMu)$

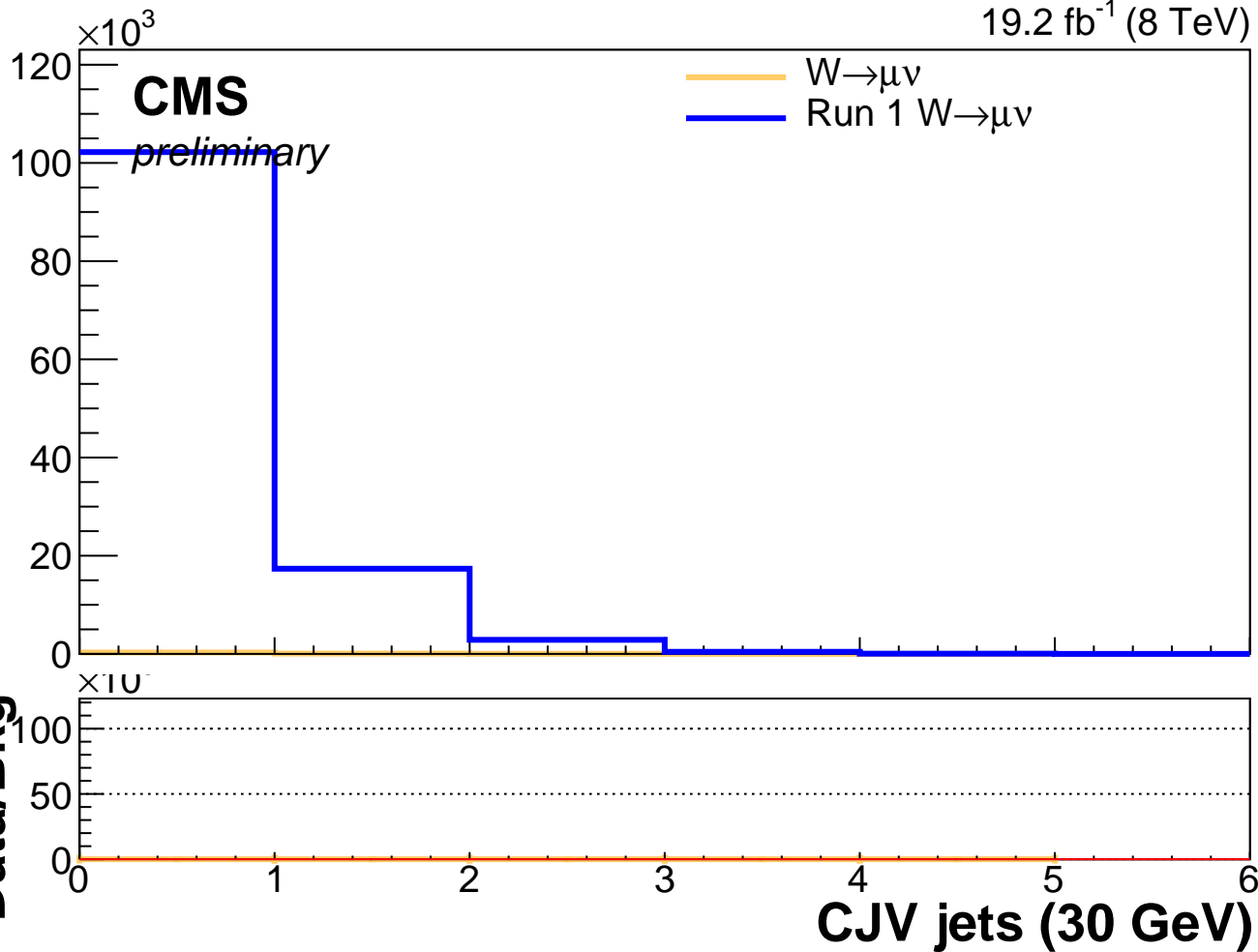
19.2 fb<sup>-1</sup> (8 TeV)

**CMS**

*preliminary*

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

**Data/Bkg**



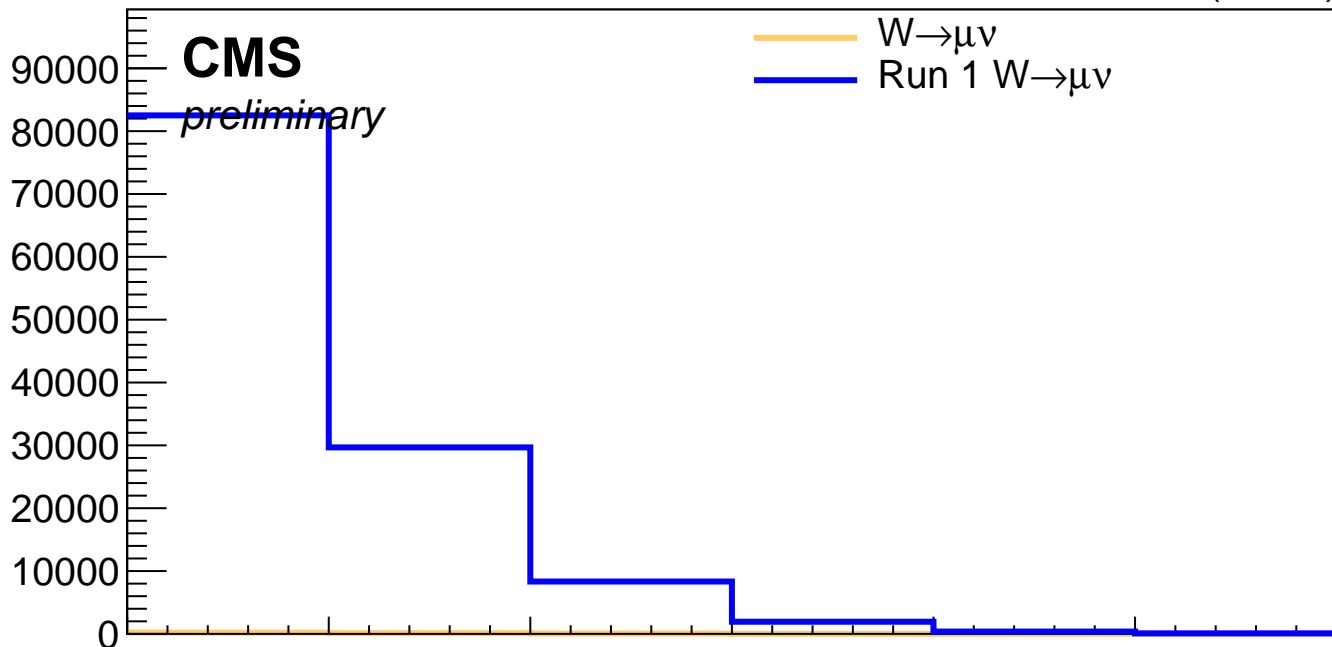
19.2 fb<sup>-1</sup> (8 TeV)

**CMS**

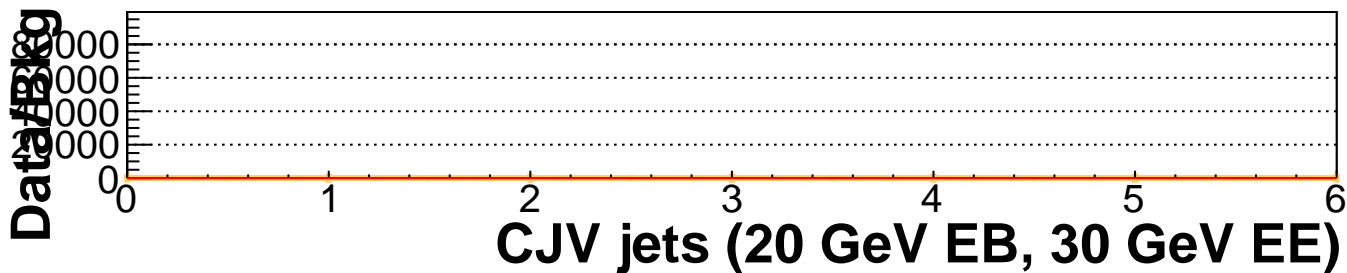
*preliminary*

W→μν

Run 1 W→μν



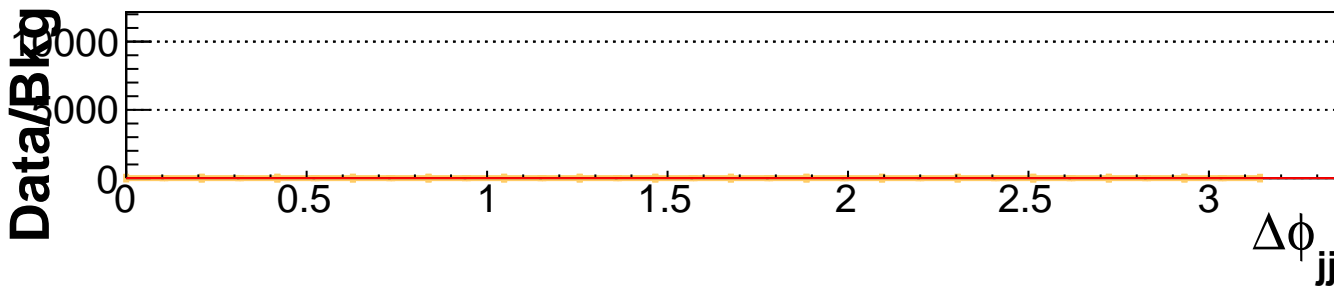
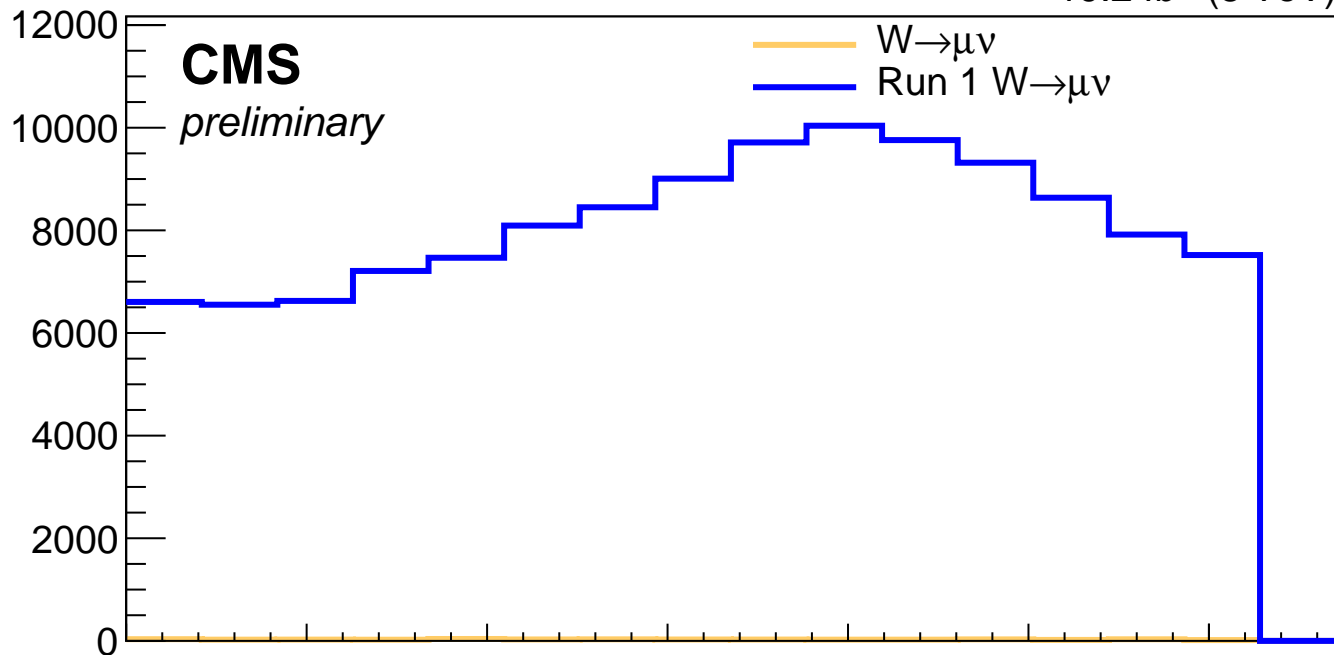
**Data/Bkg**



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

**CMS**  
*preliminary*

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





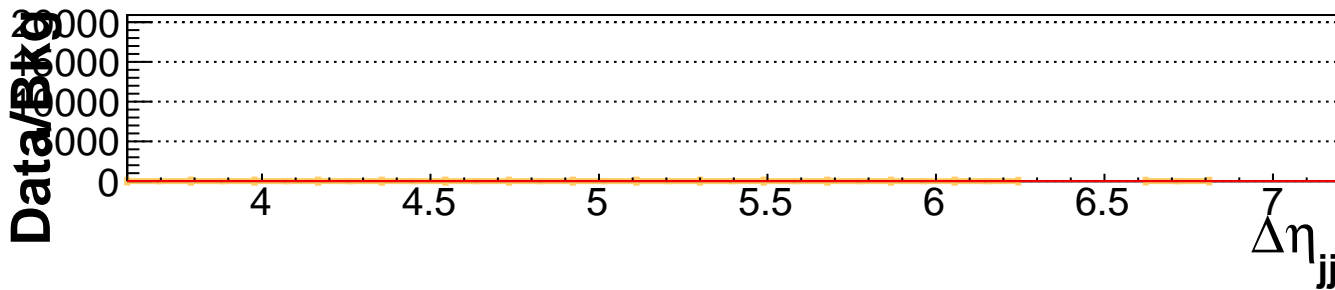
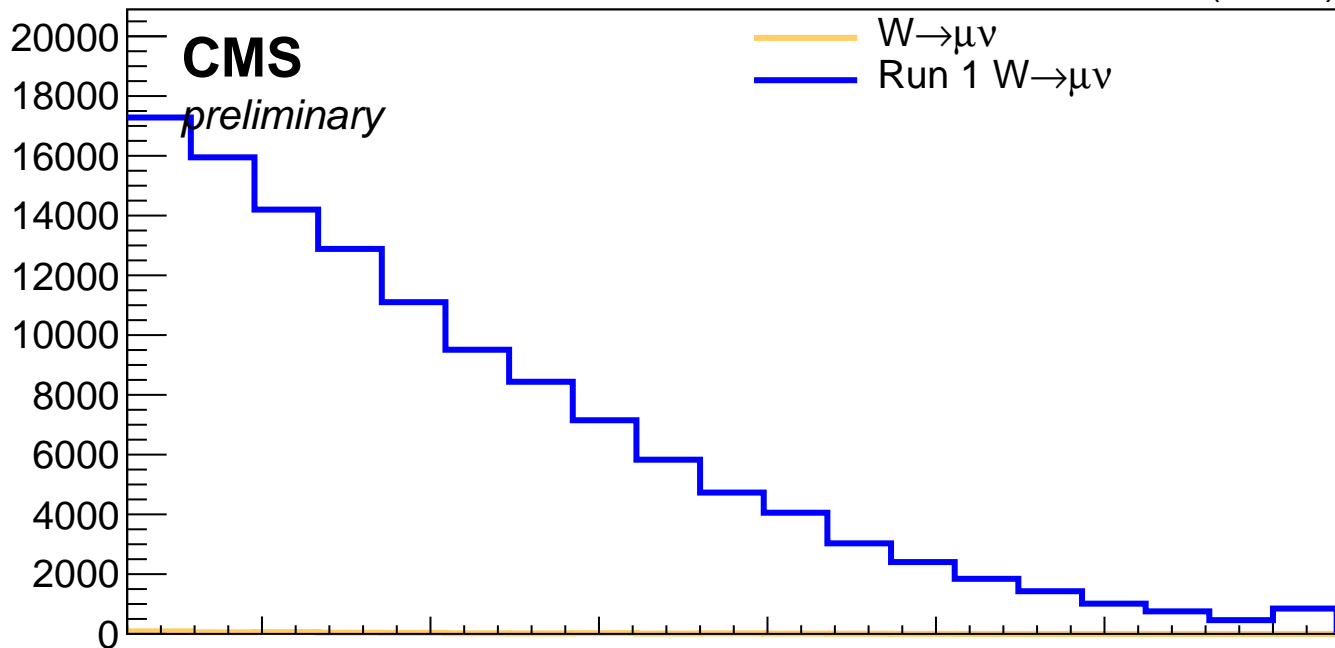
19.2 fb<sup>-1</sup> (8 TeV)

**CMS**

*preliminary*

W→μν

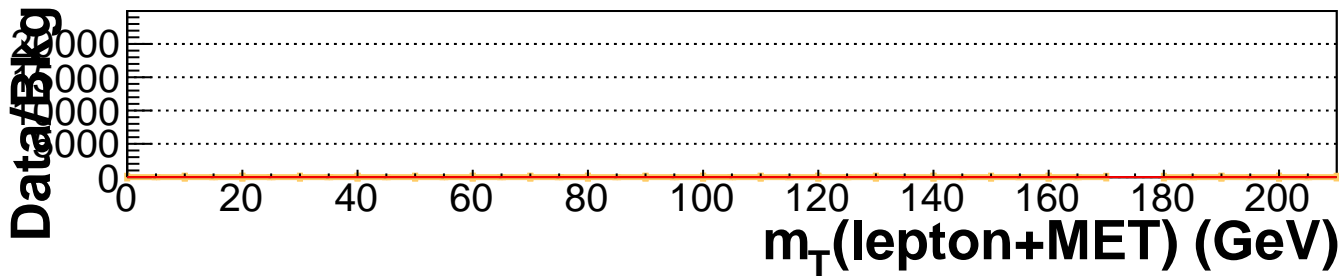
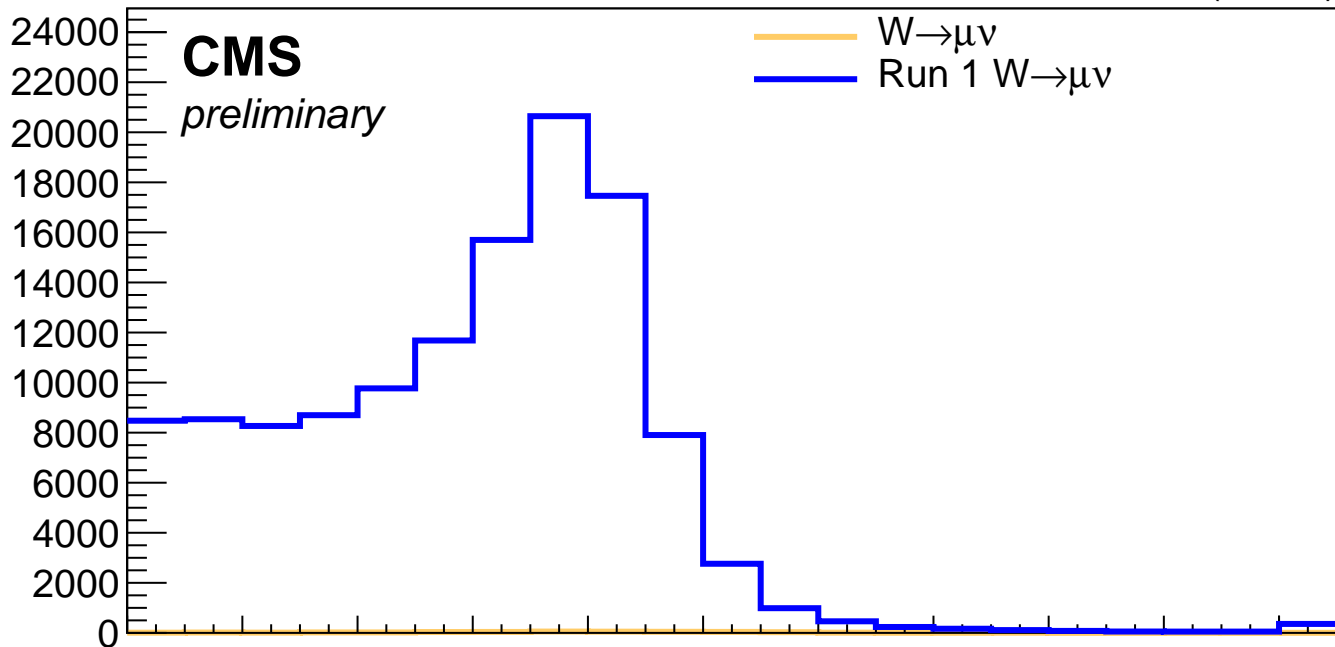
Run 1 W→μν



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

**CMS**  
*preliminary*

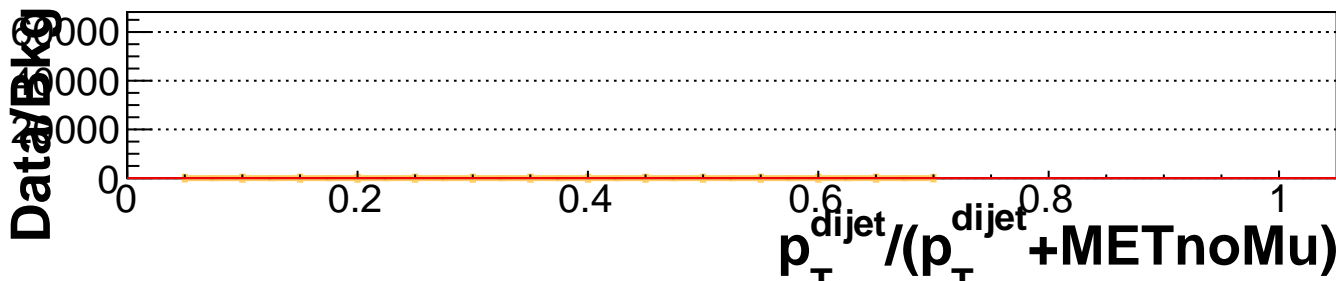
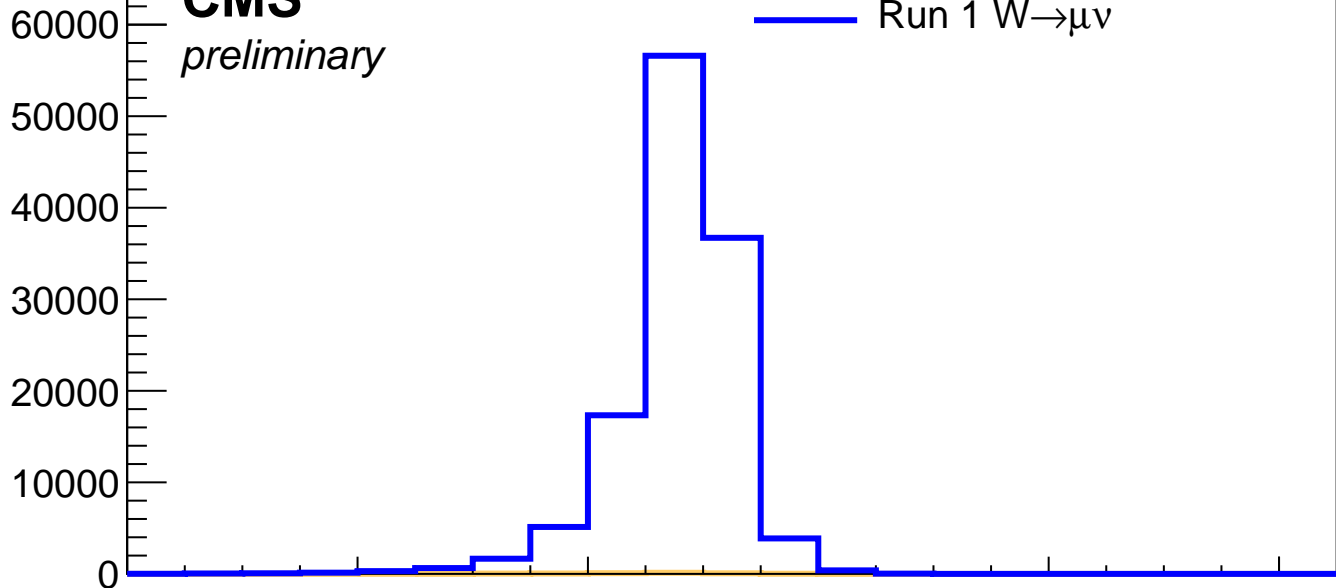
— W→μν  
— Run 1 W→μν



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

**CMS**  
*preliminary*

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

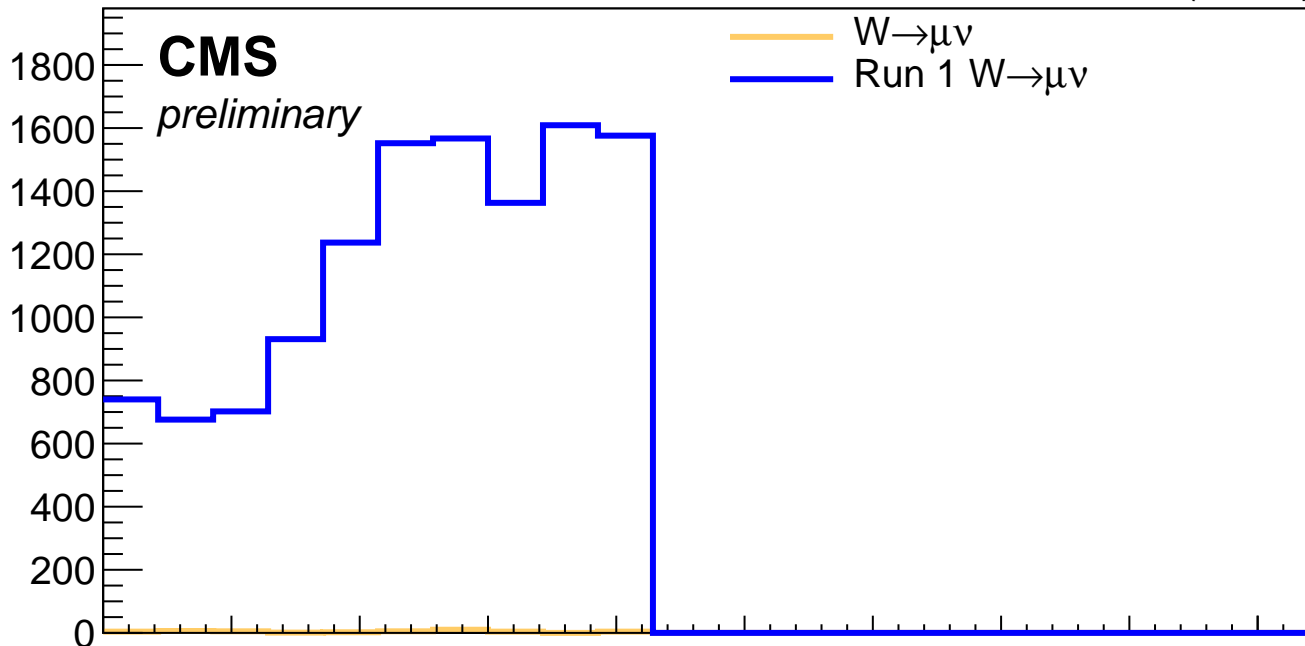


19.2 fb<sup>-1</sup> (8 TeV)

**CMS**

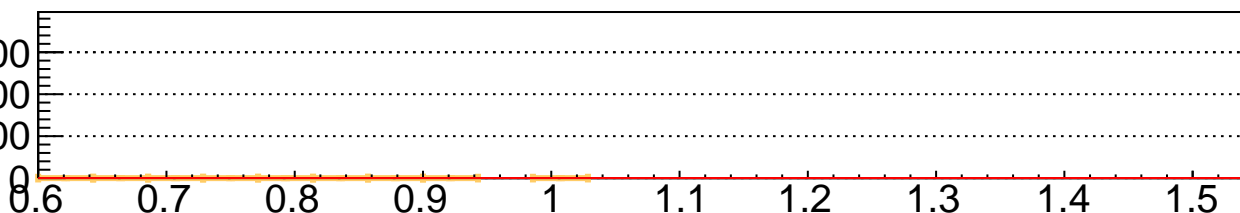
*preliminary*

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



**Data/Bkg**

**Jet 1 CSV**

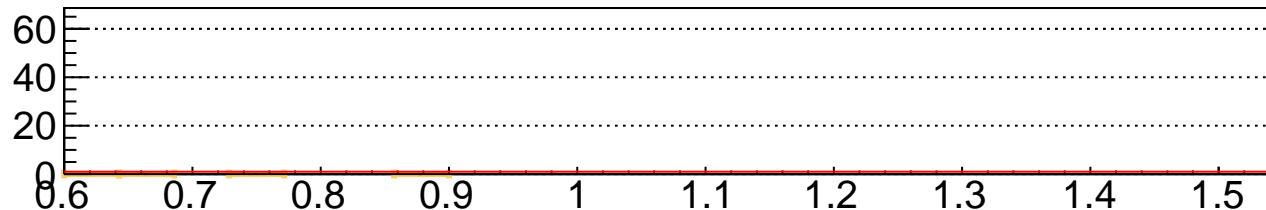
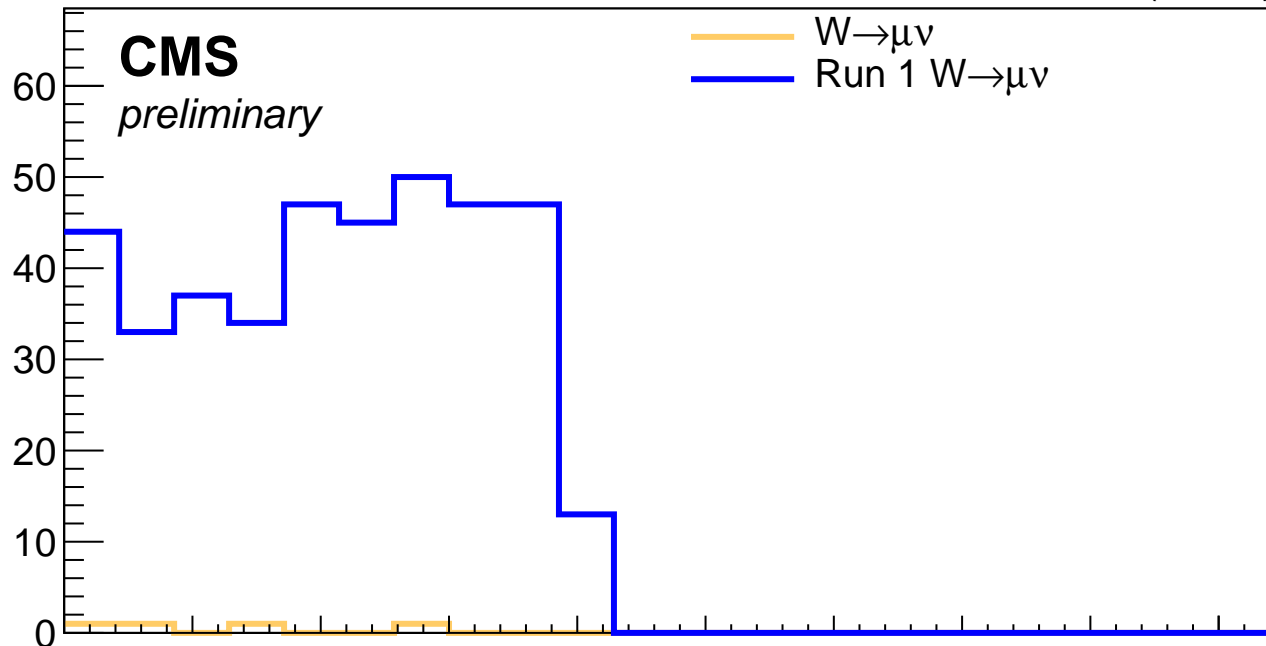


19.2 fb<sup>-1</sup> (8 TeV)

**CMS**  
*preliminary*

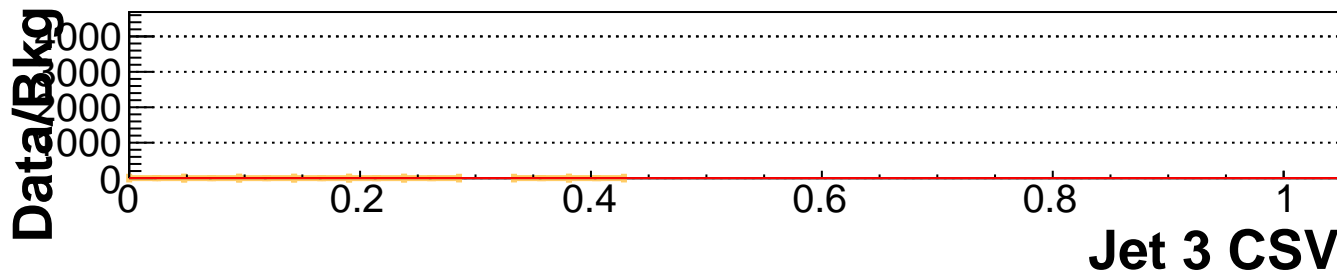
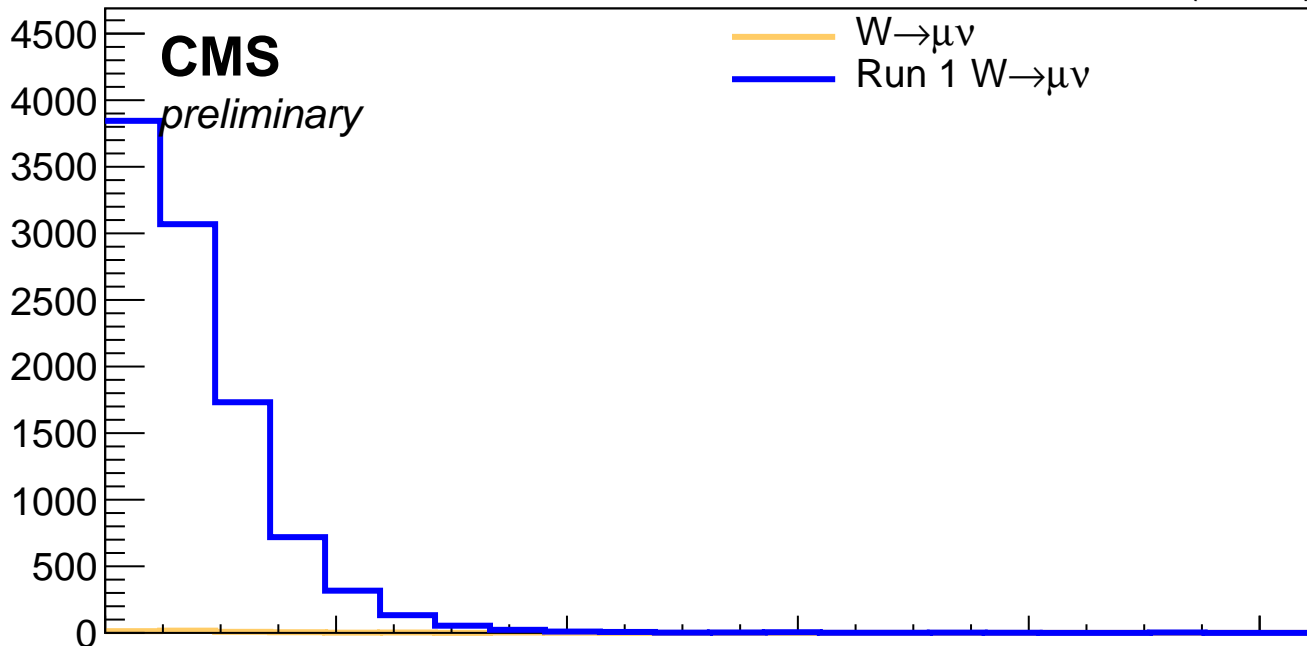
—  $W \rightarrow \mu\nu$   
— Run 1  $W \rightarrow \mu\nu$

**Data/Bkg**



**Jet 2 CSV**

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



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

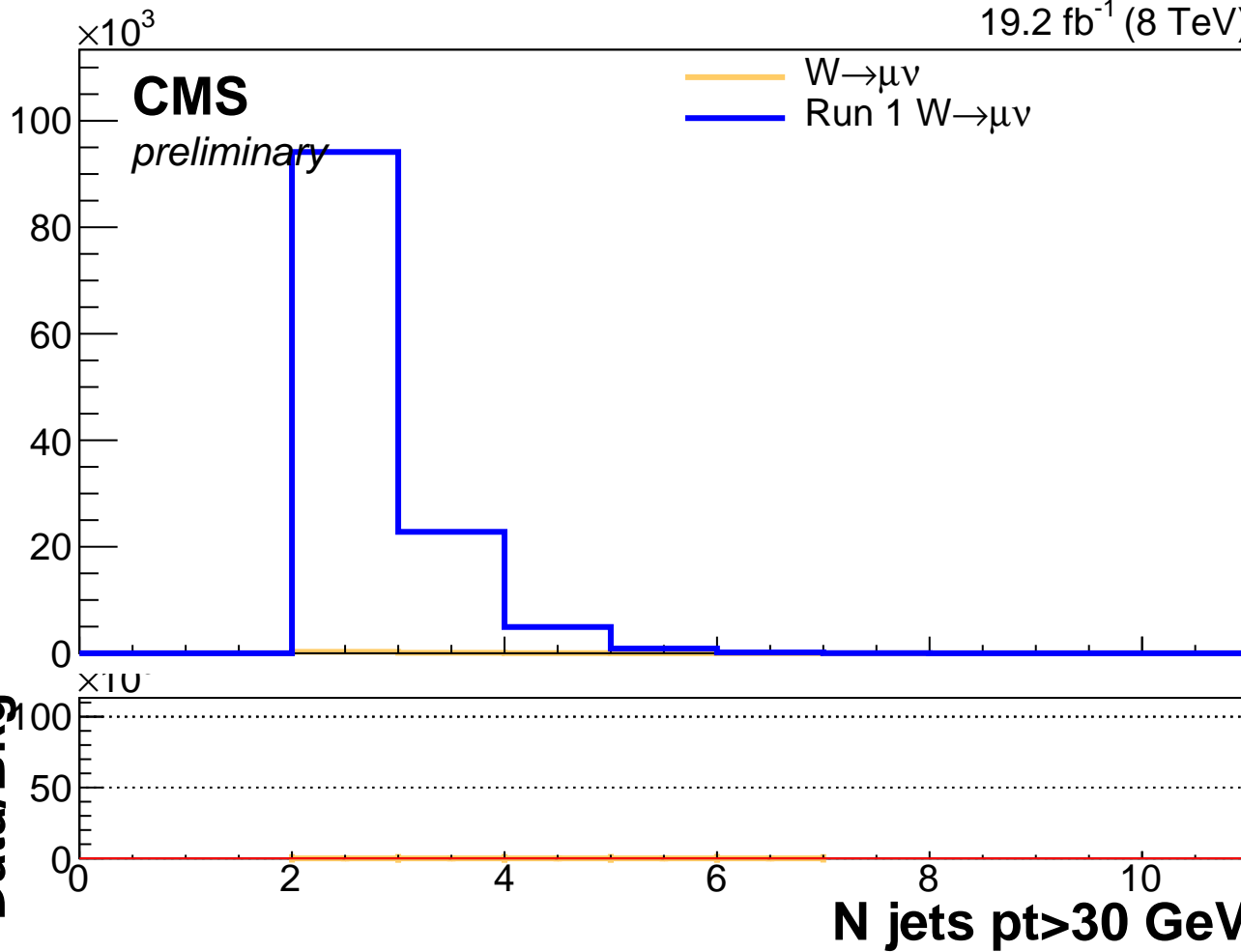
**CMS**

*preliminary*

W→μν

Run 1 W→μν

**Data/Bkg**



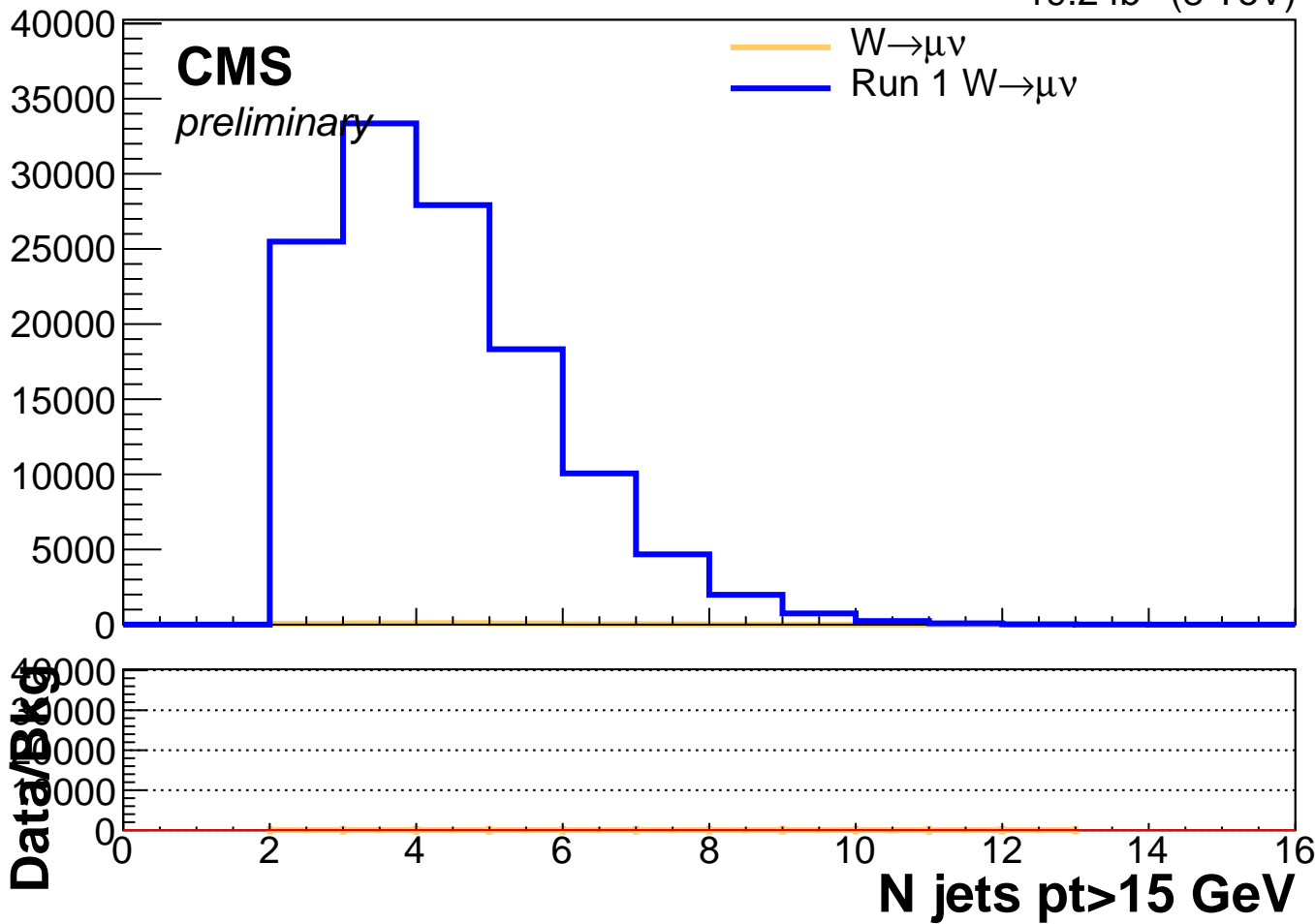
19.2 fb<sup>-1</sup> (8 TeV)

**CMS**

*preliminary*

W→μν

Run 1 W→μν

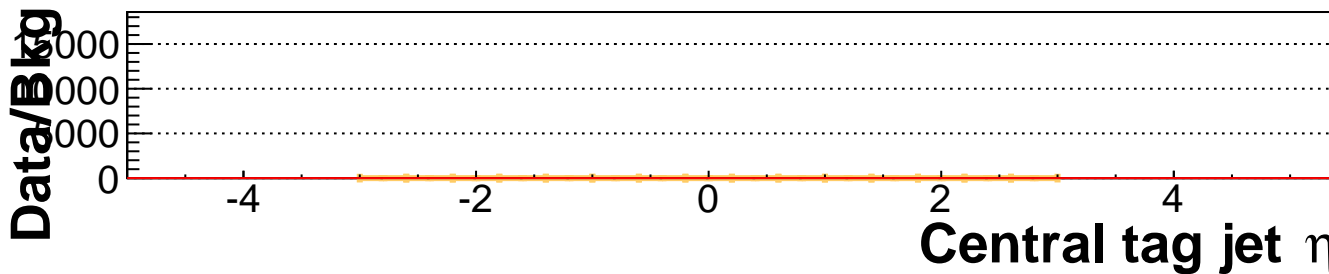
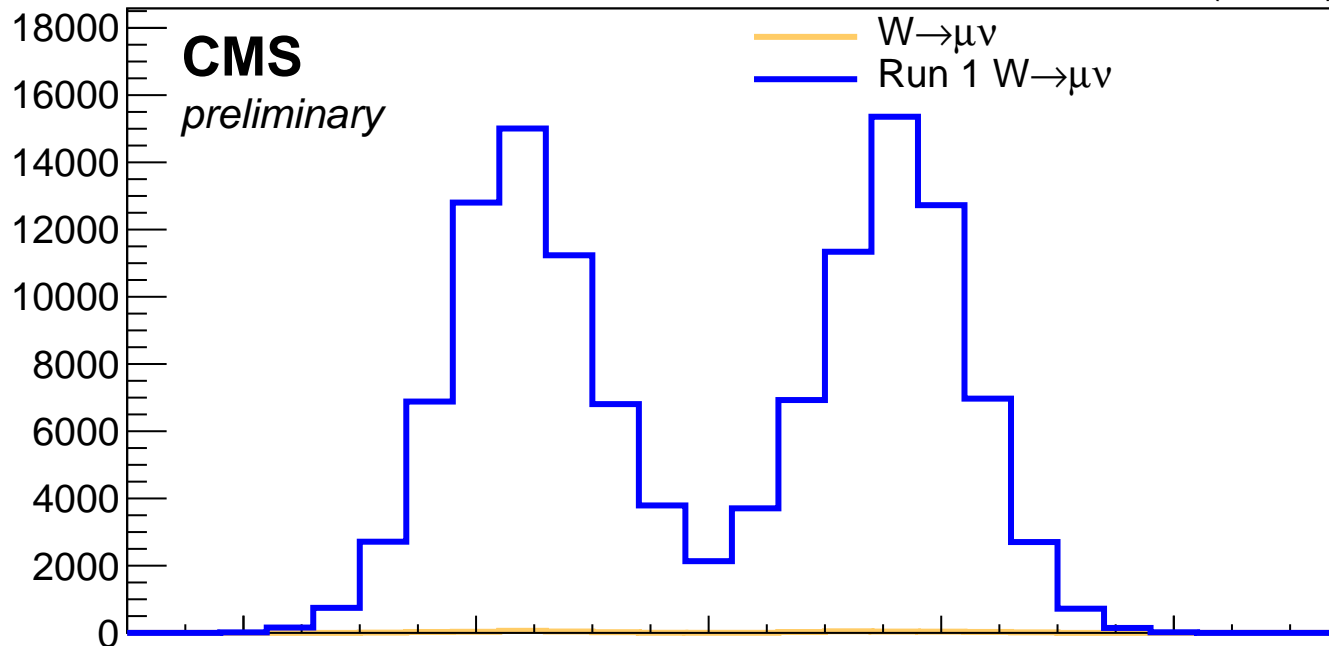




19.2 fb<sup>-1</sup> (8 TeV)

**CMS**  
*preliminary*

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



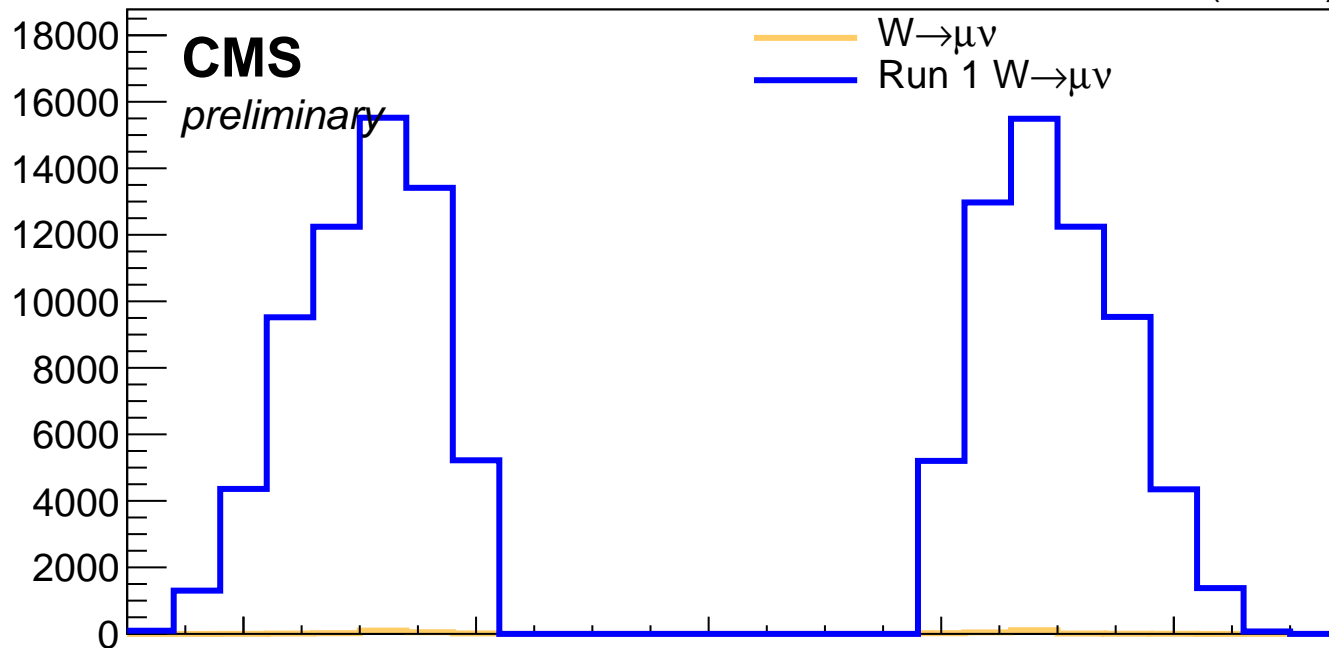
19.2 fb<sup>-1</sup> (8 TeV)

**CMS**

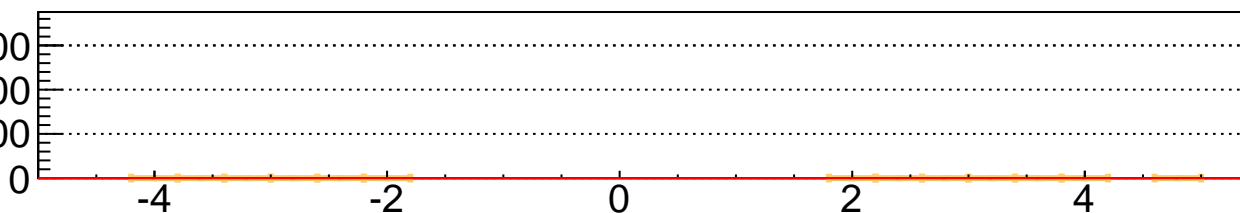
*preliminary*

—  $W \rightarrow \mu\nu$

— Run 1  $W \rightarrow \mu\nu$



**Data/Bkg**



**Forward tag jet  $\eta$**