



# Update on $W(\rightarrow ev) + jj$ : Reconstructable W Pairs

Kalanand Mishra  
*Fermilab*

After streamlining the event selection machinery and  
synchronizing with Top PAG selection

# Candidate events



## ◆ $W \rightarrow e\nu$ reconstruction

- GsfElectron passing tight WP70 criteria
- Electron  $E_T > 30$  GeV
- PF MET  $> 25$  GeV
- Z veto

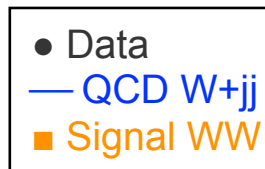
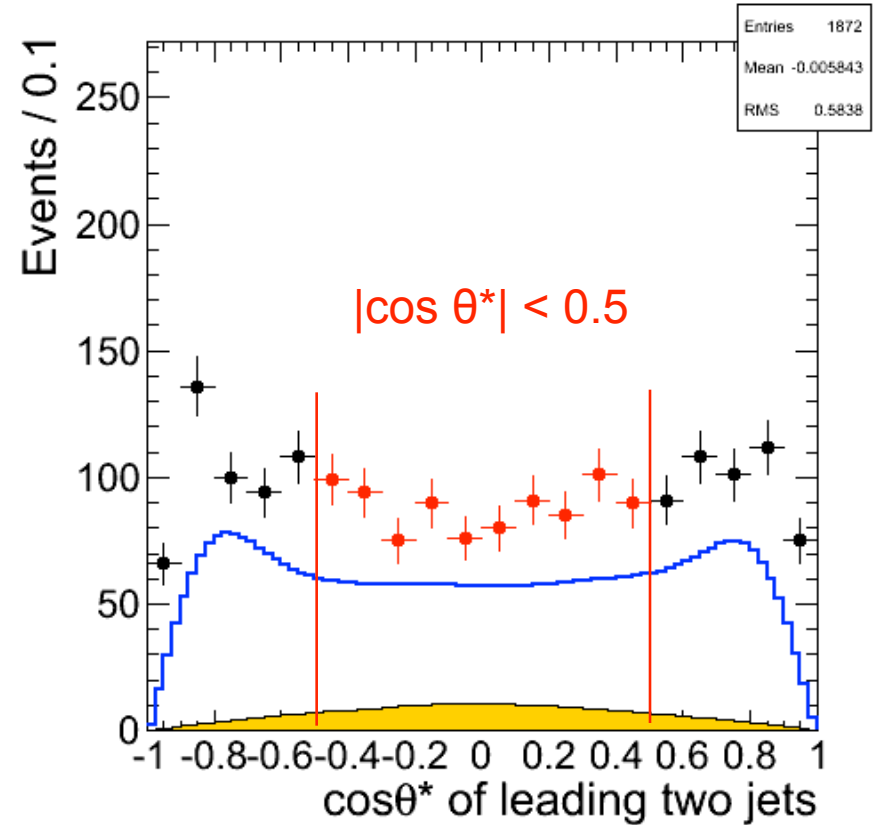
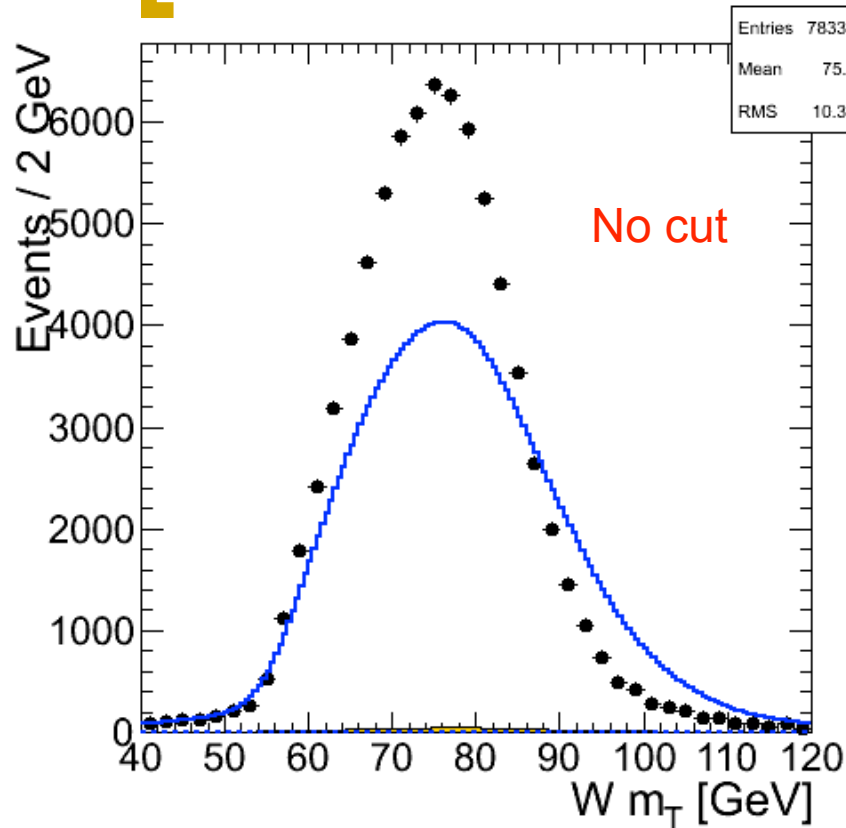
Now in sync with  
Top PAG !

## ◆ Require exactly two PF jets in the event

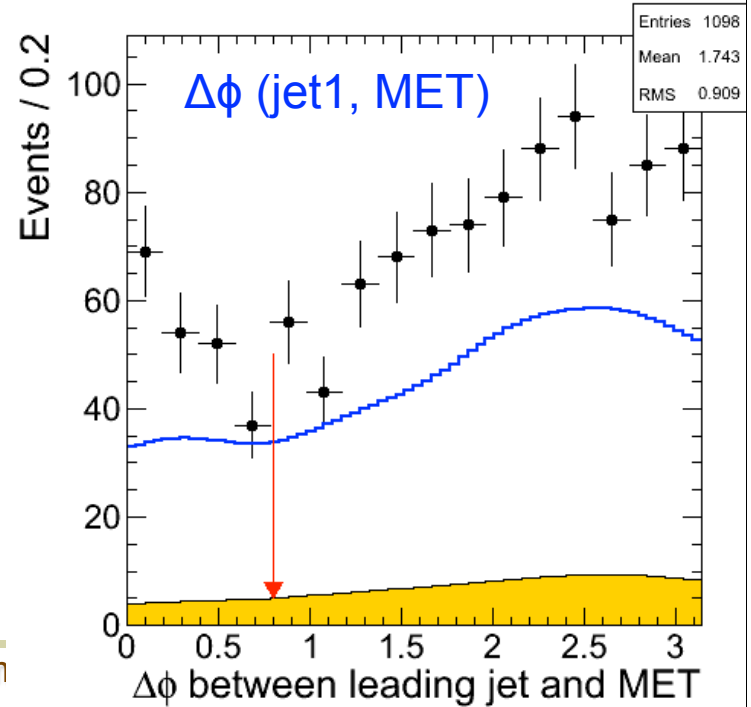
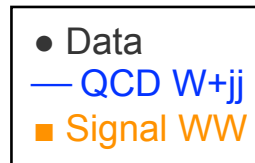
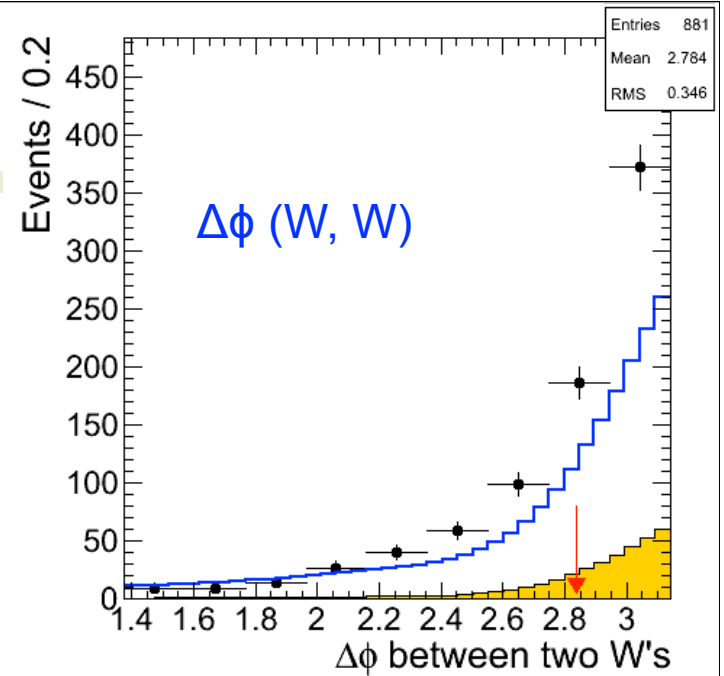
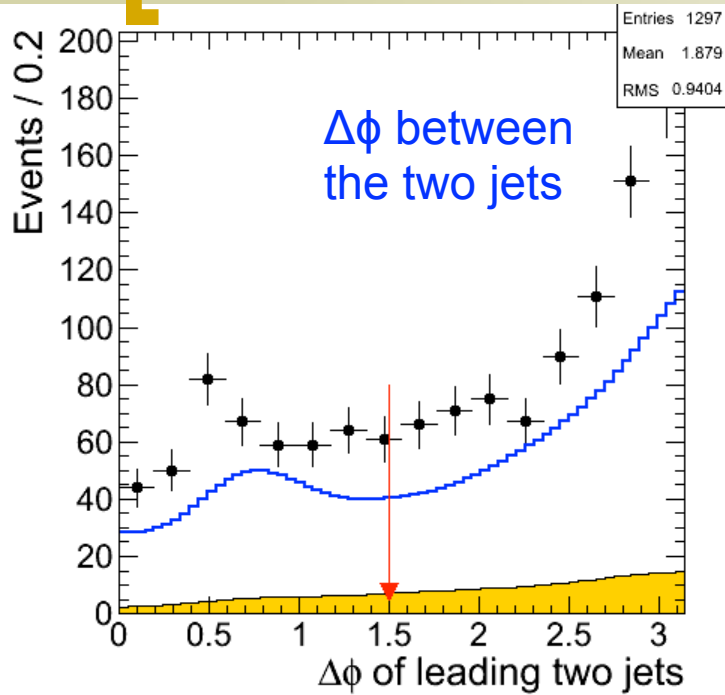
- each jet with corrected  $p_T > 20$  GeV and  $|\eta| < 2.4$
- $p_T^{3rd}/p_T^{1st} < 0.2$  OR  $p_T^{3rd} < 15$  GeV
- Both jets should be **anti b-tagged** (SSV-HE medium)



# Leptonic and hadronic W's



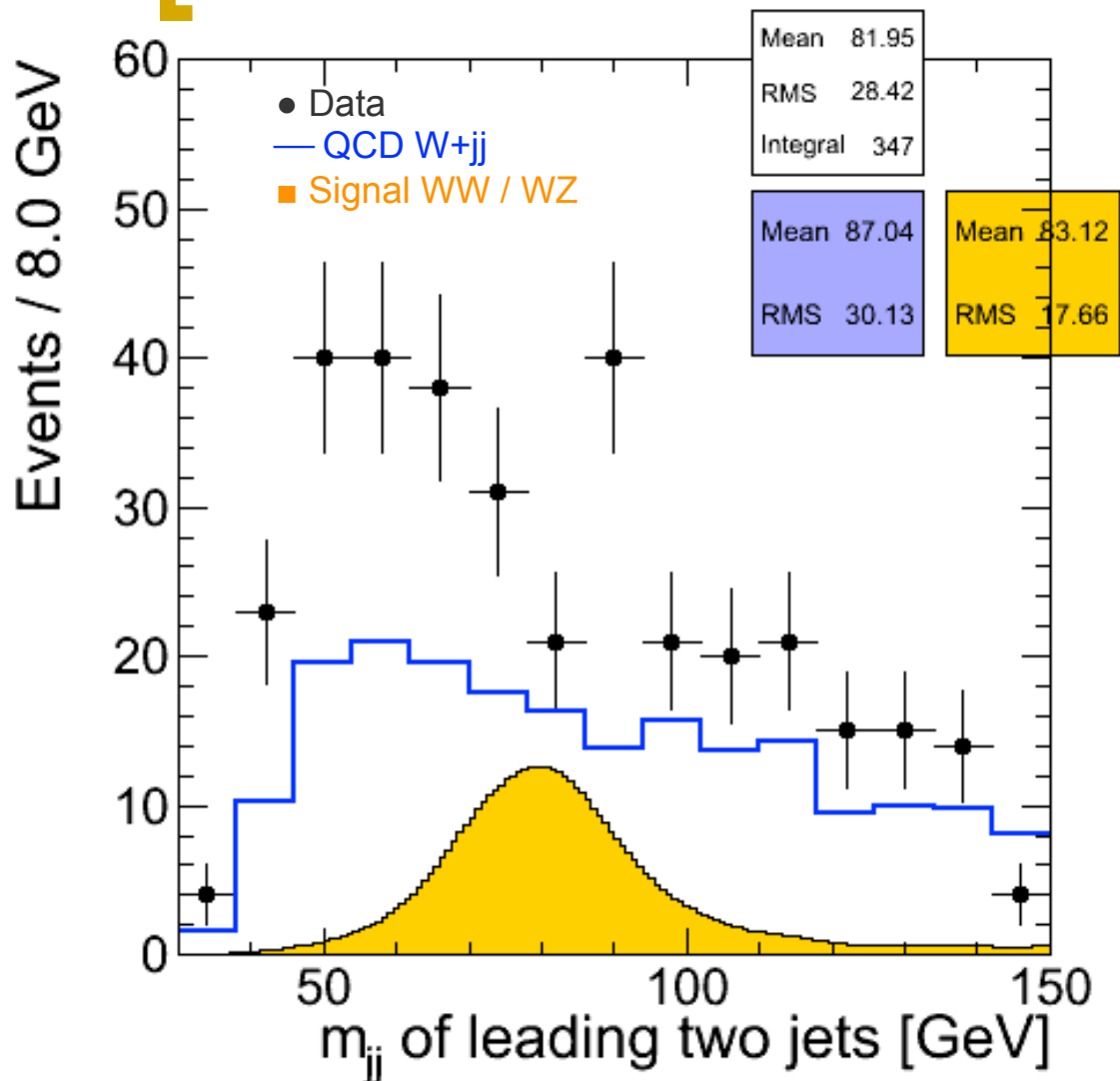
# Cut flow: angular information



Angular distributions provide some discrimination between WW and QCD W+jj



# $m_{jj}$ distribution for W+jj events



# observed events in data = 347

MC predicts:

- QCD W+jj bkg = 50
- WW/WZ signal = 51

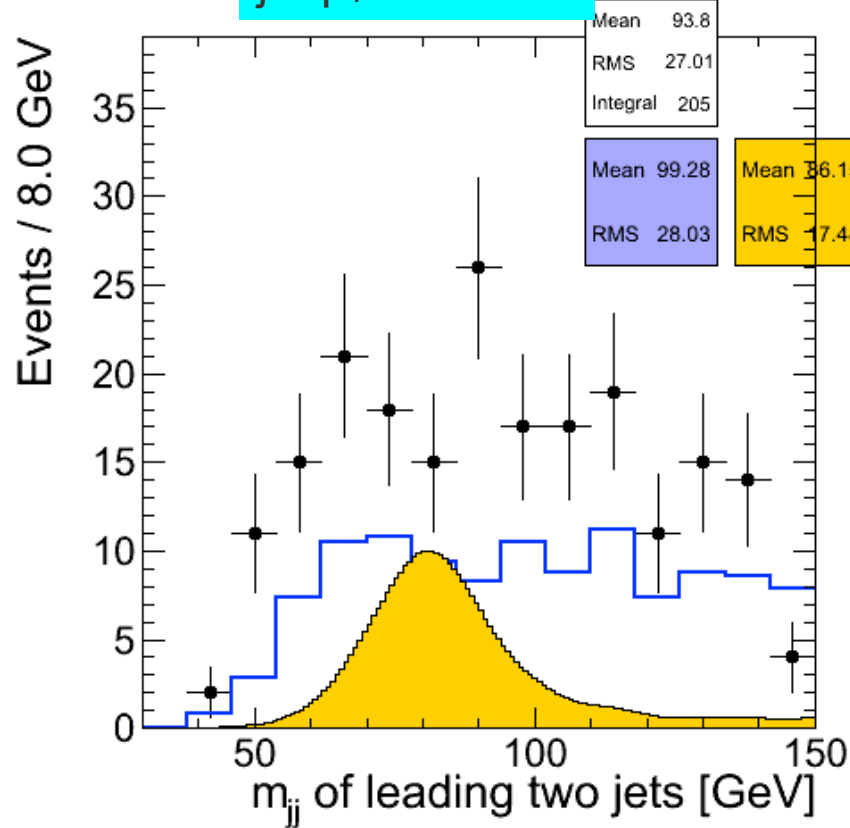
See clear signal peak but

- MC normalization of W+jj is not correct (not a big surprise)
- Jet energy scale is overestimated by 5–10% (again not a big surprise b/c the default JEC is derived for generic QCD jets which are ~90% gluon-initiated at low  $p_T$ )

# Increasing the jet $p_T$ threshold does not help



jet  $p_T > 25$  GeV

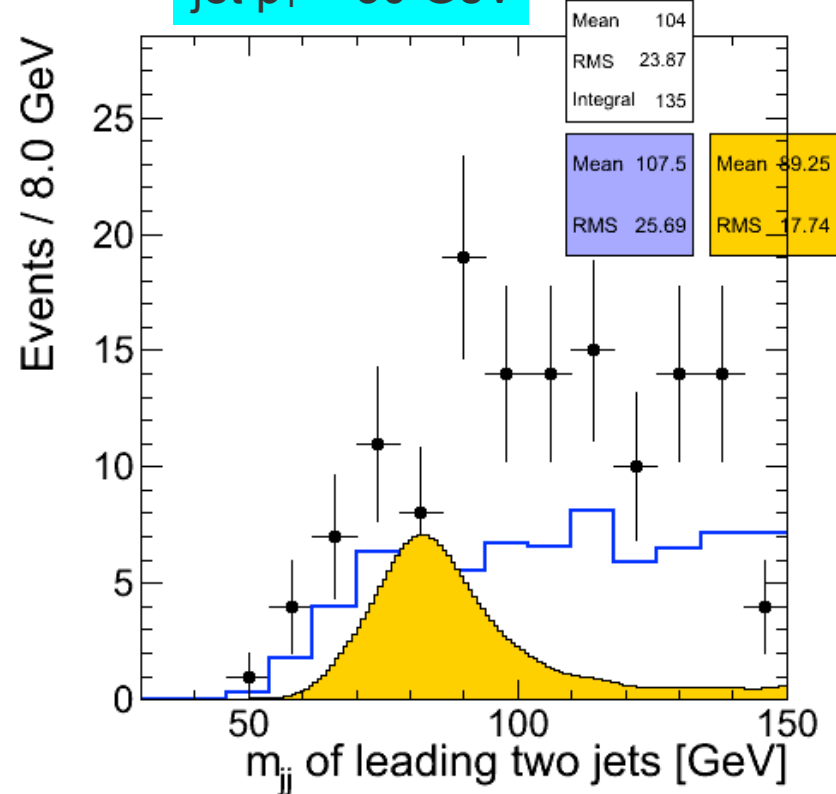


# observed events in data = 205

MC predicts:

- QCD W+jj bkg = 28
- WW/WZ signal = 38

jet  $p_T > 30$  GeV



# observed events in data = 135

MC predicts:

- QCD W+jj bkg = 18
- WW/WZ signal = 26