



Extracting W +jets normalization using sideband data

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*On behalf of $H \rightarrow WW$ ($lvjj$) working group
(September 28, 2011)*

Why I am showing this ?



It was pointed out during last week's meeting that

by using the events in our “signal region” ($65 < m_{jj} < 95$ GeV) to extract W +jets normalization and then again using the same events to set limit on Higgs cross section

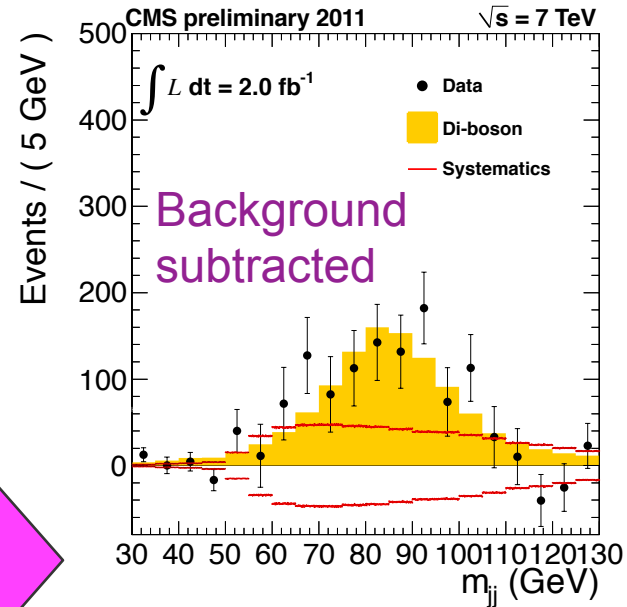
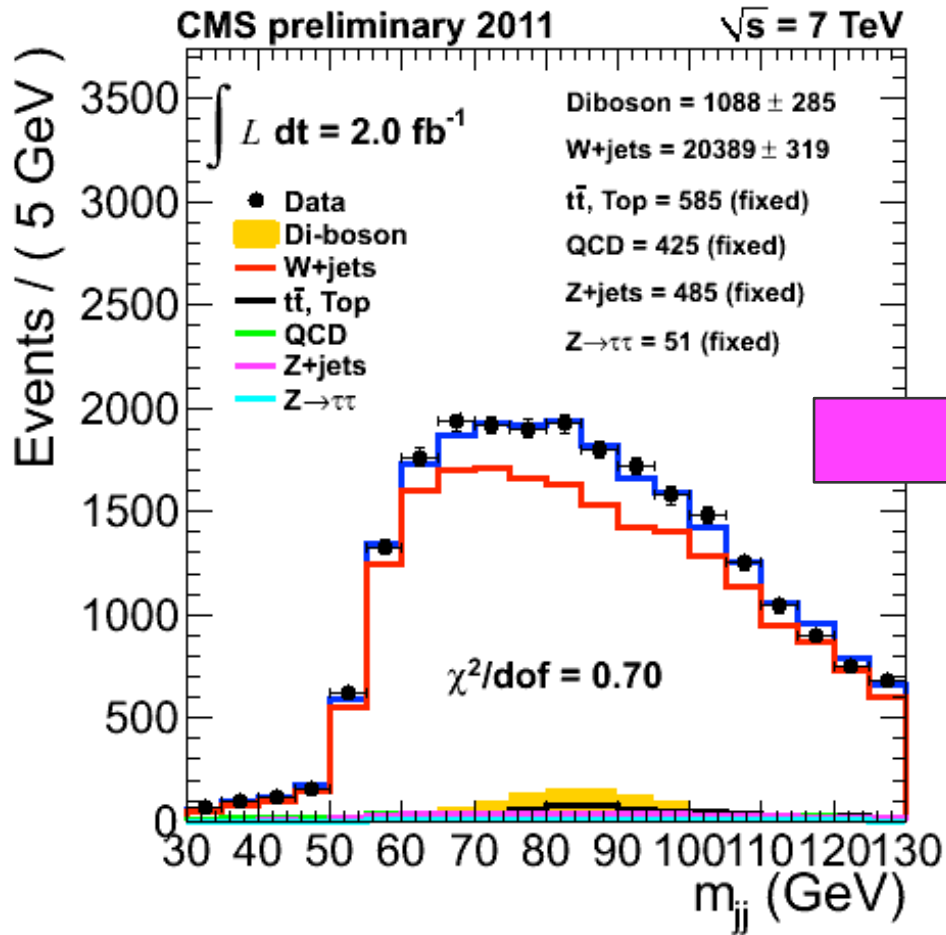
we were somehow attempting to have a free lunch that wasn't there.

I claimed that it didn't matter much which events I use to obtain the W +jets normalization because the end result (normalization and uncertainty, and hence the Higgs limit) will change by minor amounts and be covered in our systematics. Today I will elaborate on this.

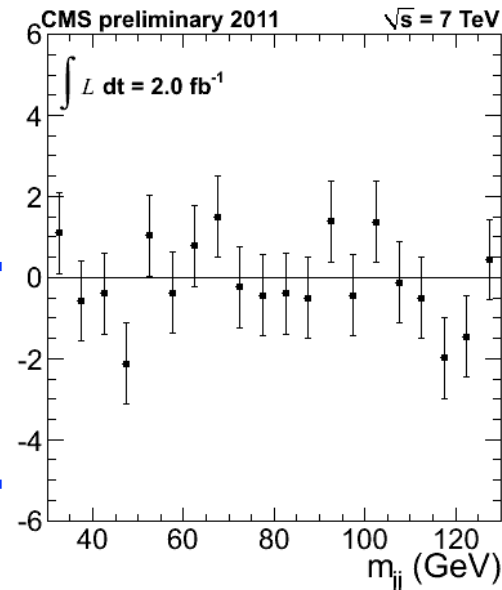
Last week's fit (used events in full m_{jj} range)



e, μ data combined



[Data - Fit] / Error



[This week's fit (used $m_{jj} < 65$ && $m_{jj} > 95$ GeV)

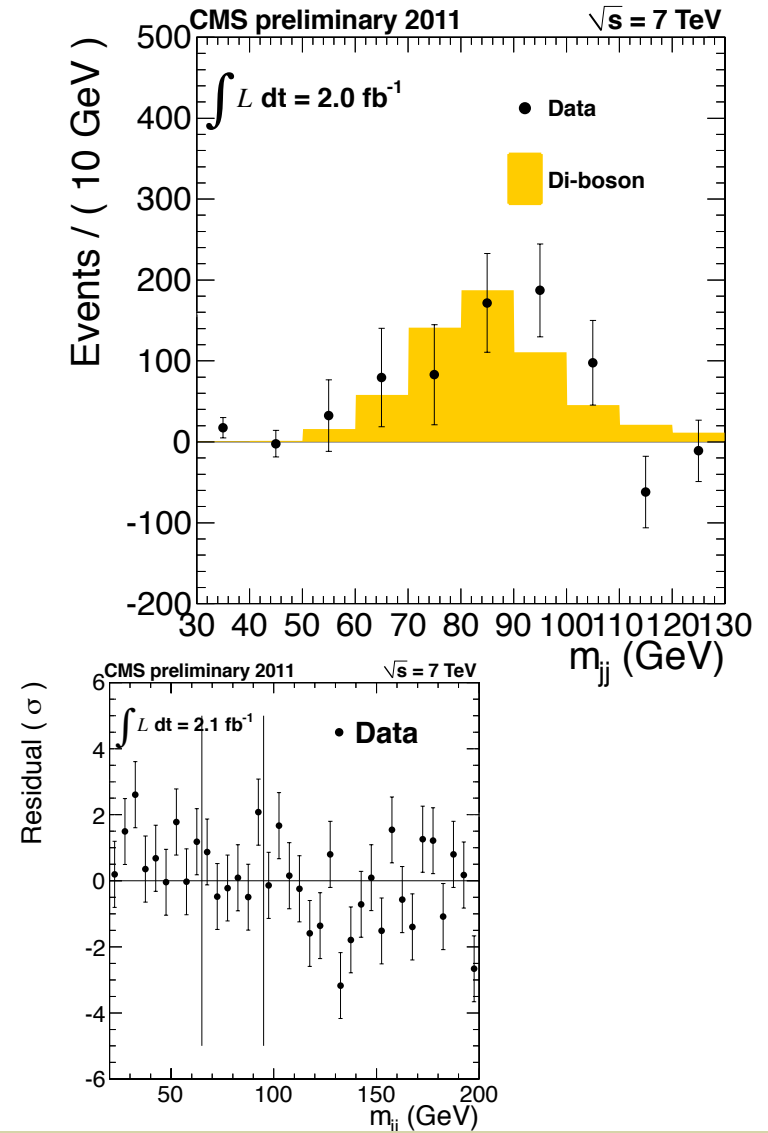
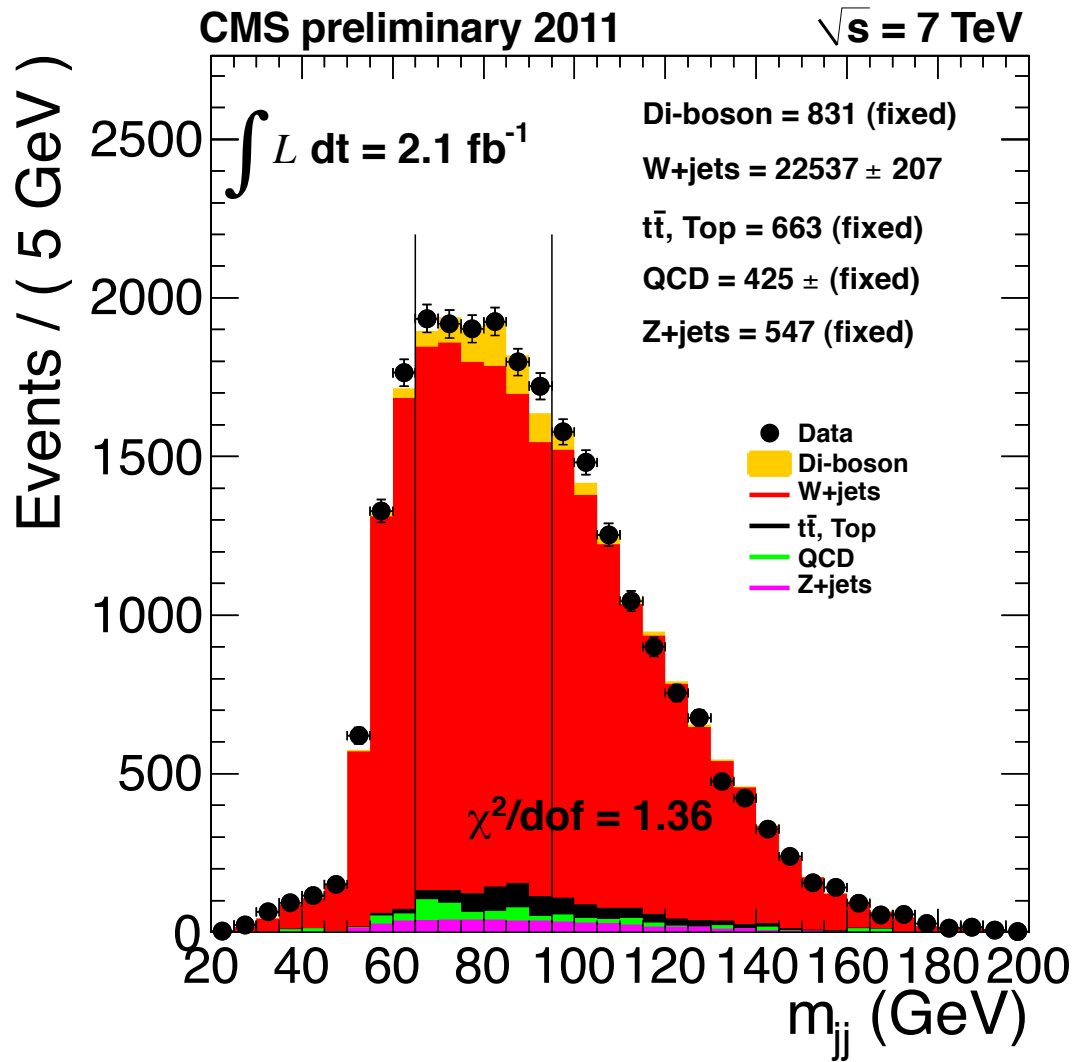


Data remain the same. Few minor changes in the modeling:

1. single top MC: Madgraph \rightarrow Powheg
2. removed $Z \rightarrow \tau \tau$ because our Z+jets MadGraph sample already contains tau decay
3. Rounded off the integrated lumi value to 2.1 fb^{-1}

Would need to repeat last week's fit with these changes to make real apple-to-apple comparison.

This week's fit (used $m_{jj} < 65$ && $m_{jj} > 95$ GeV)



This week's fit (used $m_{jj} < 65$ && $m_{jj} > 95$ GeV)



Yields in mass range 65--95 GeV:

numData = 11200

numDiboson = 589.689

numWjets = 9731.73

numTTbar = 340.607

numSingleTop = 3.04974

numQCD = 223.975

numZjets = 237.108

numTotal = 11126.2

numBkg = 10536.5

The template fit gives you back what you would get if you subtracted all processes other than W+jets from data.

We can try to improve the goodness-of-fit by optimizing the sideband region for this truncated template fit, if we decide this is the way to go. Otherwise we can simply, cut & count to compute the W+jets yield. Perhaps the latter will have smaller systematic uncertainty.

backup slides