Fake and Jet Rate Tests

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Aim

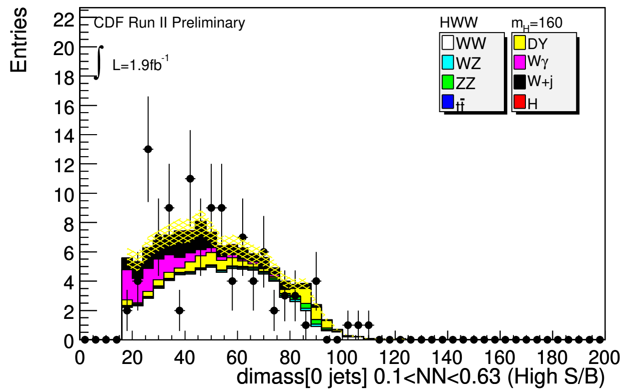
- Study the Jet rates and Fake rates
- Examine the Control region: $0.1 < NN < 80\%$
  - Dominated by WW in High S/B
  - Mixture of WW, W+jet and Wγ in equal parts in Low S/B
- Examine the DY Control region for jet rates: similar ISR structure as WW
- Examine the Base Same Sign region for W+jet and W$+\gamma$ contributions

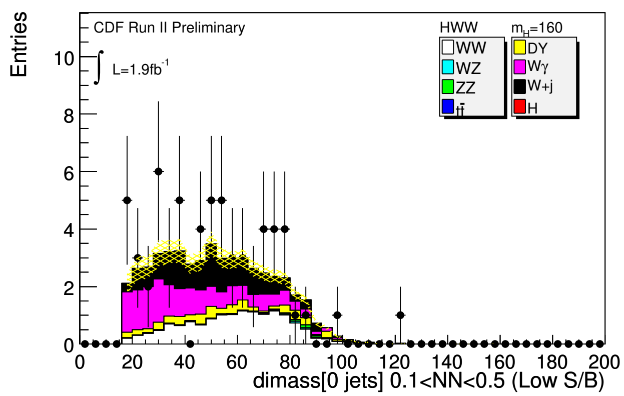
Counting events

Control Region	0 Jet Hi S/B	0 Jet Lo S/B	1 Jet Hi S/B	1 Jet Lo S/B
$0.1 < NN < 80\%$	0.97±0.09	1.24±0.14	0.87±0.15	0.94±0.24
DY	1.0	0.96	0.85	0.80

- 0 and 1 jet consistent between DY and NN control region in High S/B: The WW and DY radiation are indeed similar.
- The Low S/B has less statistics with some slight indication of disagreement in the 0 jet.

0 Jets, DiMass: 0.1 < NN < 80%



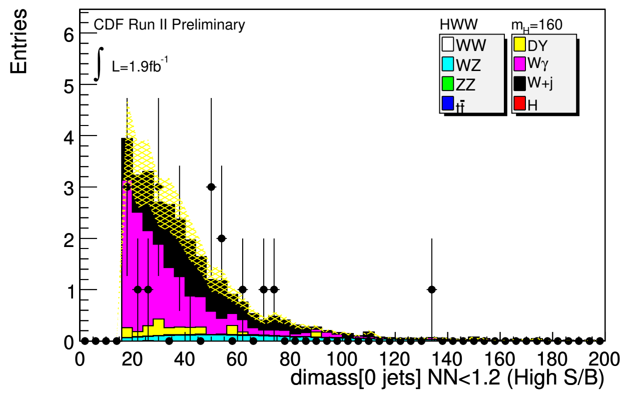


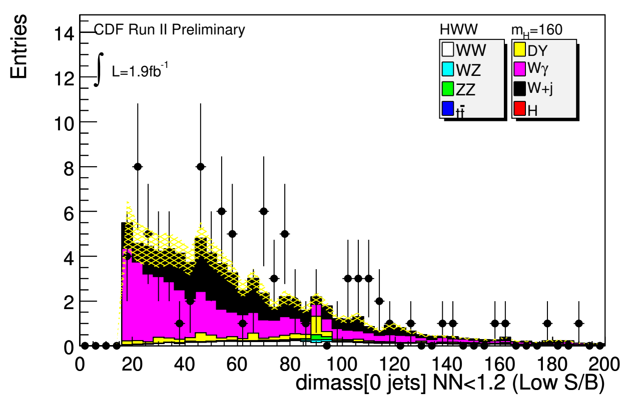
- High S/B OK
- Low S/B:

WW	14
Wγ	15
W+jet	15
Rest	5.7
Total	50
Data	62 ± 7

- Agree within statistics

0 Jets, DiMass: BaseSameSign



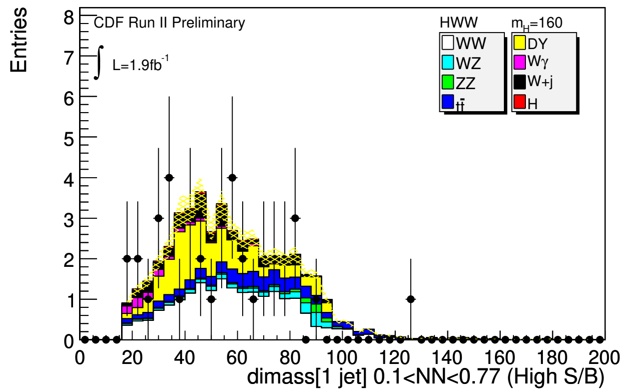


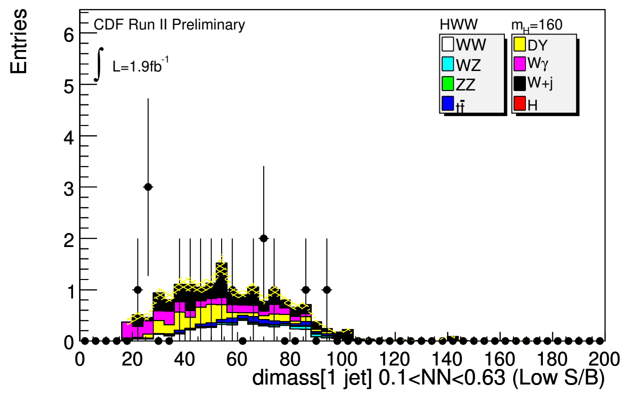
- High S/B OK
- Low S/B:

WW	5.5
Wγ	37
W+jet	29
Rest	6.8
Total	78
Data	93±9

- Again, agree within statistics.

1 Jet, DiMass: 0.1 $<$ NN $<$ 80%



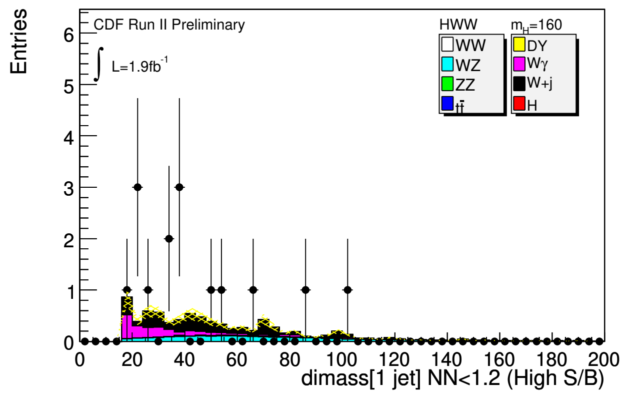


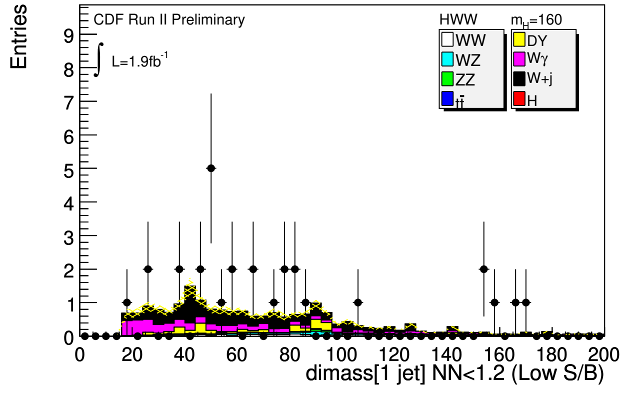
- High S/B ok
- Low S/B:

WW	4.2
Wγ	3.0
W+jet	5.2
Rest	4.7
Total	17
Data	16

- Agree within statistics

1 Jets, DiMass: BaseSameSign





	Hi S/B	Low S/B
WW	0	1.4
Wγ	1.9	5.2
▶ W+jet	3.6	9.5
Rest	2.6	3.9
Total	8	20
Data	15	29

- Statistics too low.

Conclusions

- Three control regions were examined. DY is used to interrogate the jet structure. The High S/B region is rich in WW events and that is compared to the DY. Consistency is found. The DY factor for scaling 1 jet events is 0.85. A systematic error of 0.14 should be applied for 1 jet events to account for the applicability of the DY measure to the ISR.
- Apply correction to WW, WZ, ZZ, top but systematic is 100% correlated. Can also apply to Higgs assuming that the quark/gluon initial difference is a negligible effect.
- Two control regions rich in $W\gamma$ and W+Jets were examined: Model consistent with data but with low statistical power (10%) which is smaller than the usual 20-30% error.

- What is the fake rate once one already has a jet? Could it be different? Statistics too low to say.