

WH Paper/Technicolor Report

Y. Kusakabe, T. Masubuchi, J. Nielsen, A. Taffard, W. Yao, et al

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- Introduction
- WH Paper Status
- Technicolor Report: a few additional checks
- Conclusion

Introduction

- Search for Standard Model Higgs produced in association with W boson.
- The result with 320 pb^{-1} has published in PRL 96 081803 (2006).
- We have updated the analysis for 1 fb^{-1} with following improvements:
 - Three times more data
 - Improved btagging with Neural Network
 - Search strategies Dividing into single and double tags
 - Improved Gen5 Monte Carlo and including CMX Miniskirt + Keystone
- Plan is to submit a PRD

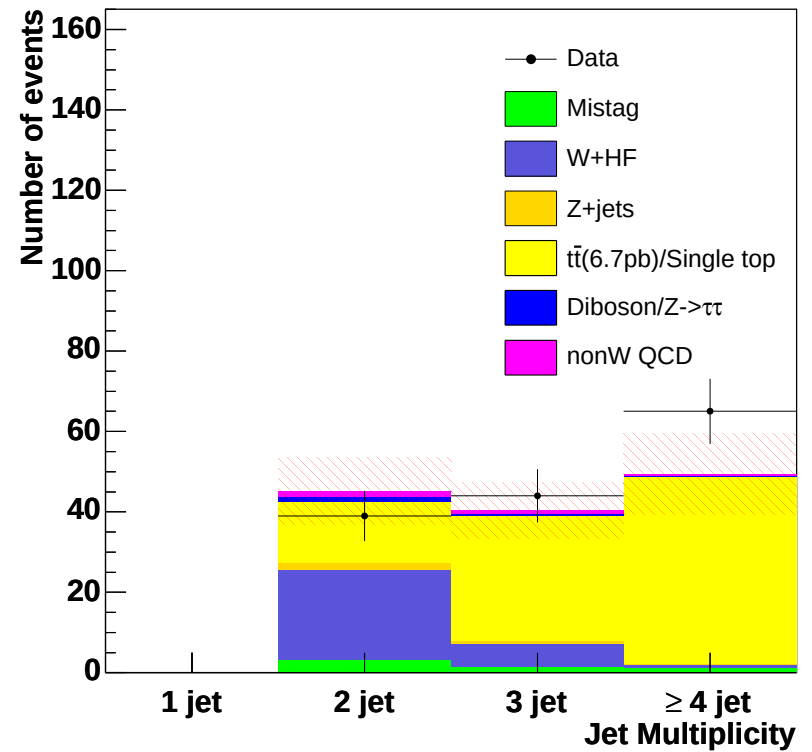
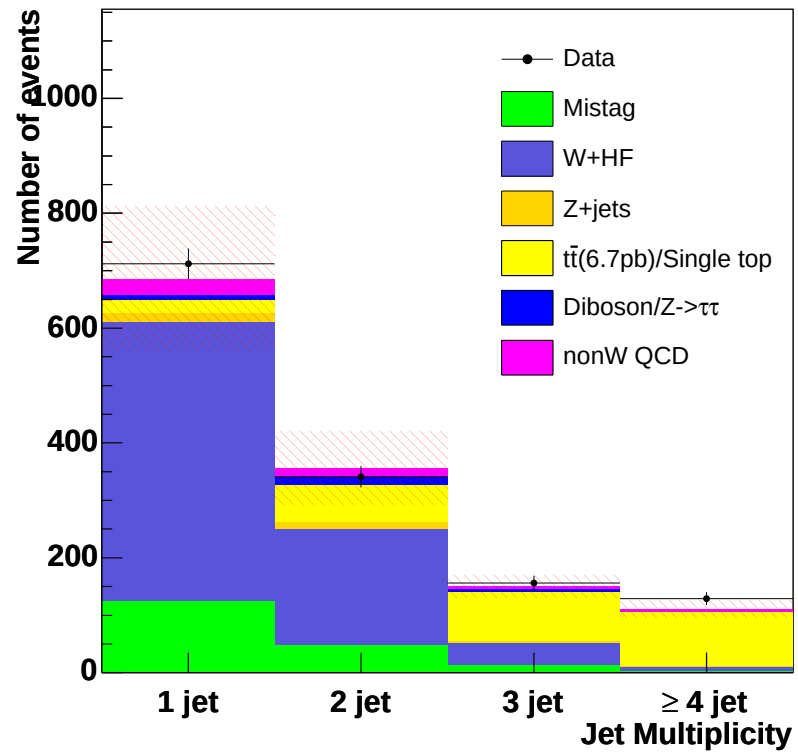
WH Paper

- The main analysis has been documented in Yoshiaki's thesis
- The aim is to have a preliminary draft by the end of this year
- Start review early with GP committee (not assigned yet)
- Some remain issues:
 - Should we include plug electrons ?
 - Including some shape systematic ?
- Submit for publication next spring ?

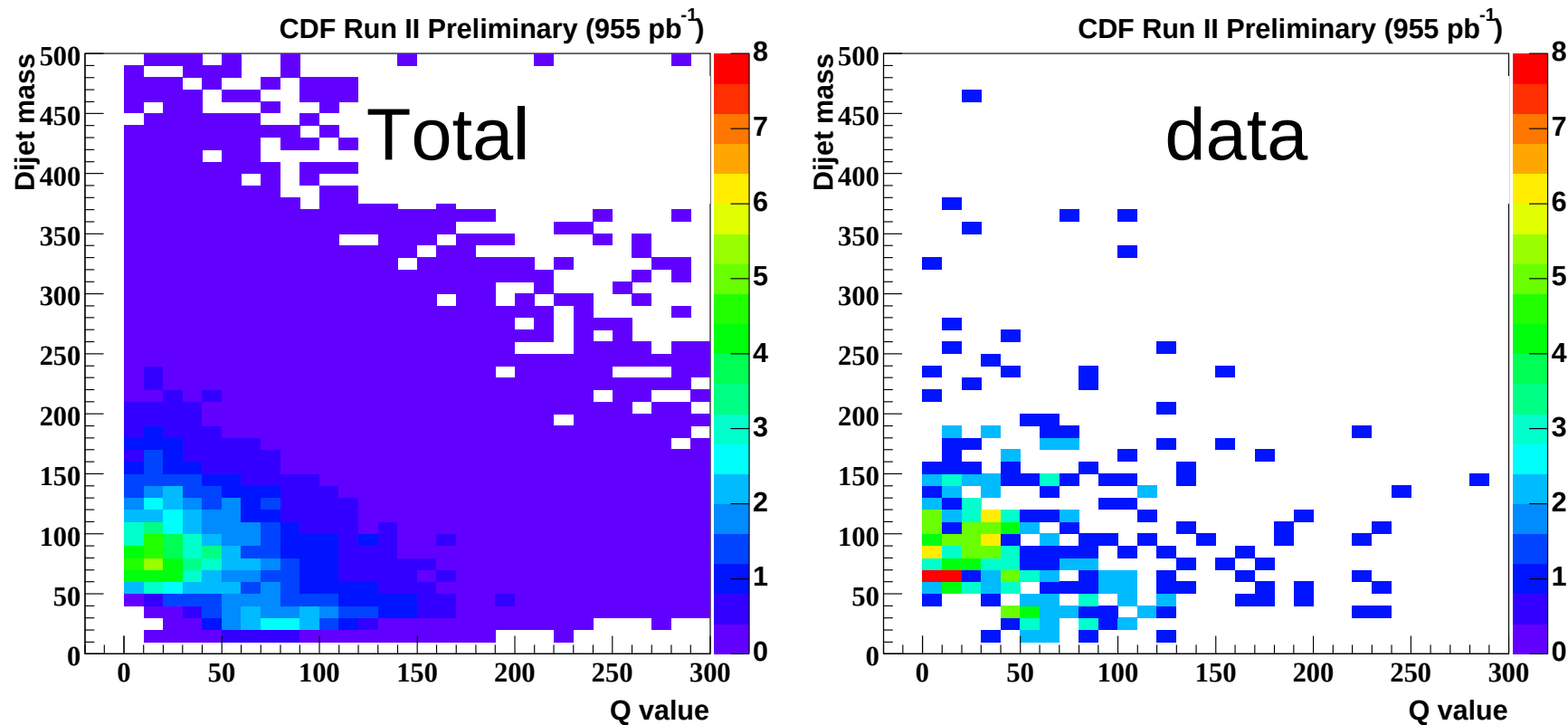
Technicolor Report

- Search for $p\bar{p} \rightarrow \rho_T \rightarrow W \pi_T \rightarrow l\nu b\bar{b}$
- The signature is W+2jet, the same final states as WH analysis
- We use the same selection and background estimation as in WH analysis
- The analysis was preblessed last week by Tatsuya (CDF Note 8535)
 - $E_T(P_T) > 20 \text{ GeV}/c^2$
 - $\cancel{E}_T > 25 \text{ GeV}$ for single tag events
 - 2jet with $E_T > 15 \text{ GeV}$ and $|\eta| < 2$
 - 2b's or 1b's with NN btag
 - Luminosity(pb^{-1}): 954 (CEM,CMUP), 941(CMX A), 622 (MK)

Background Summary

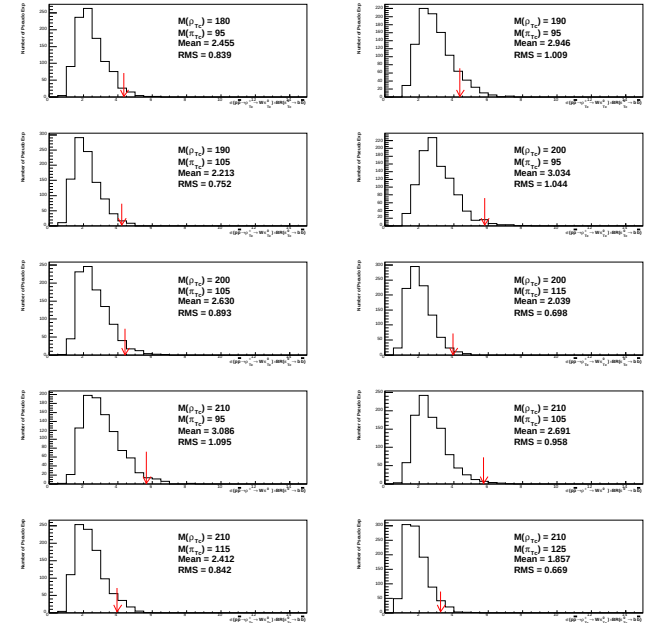
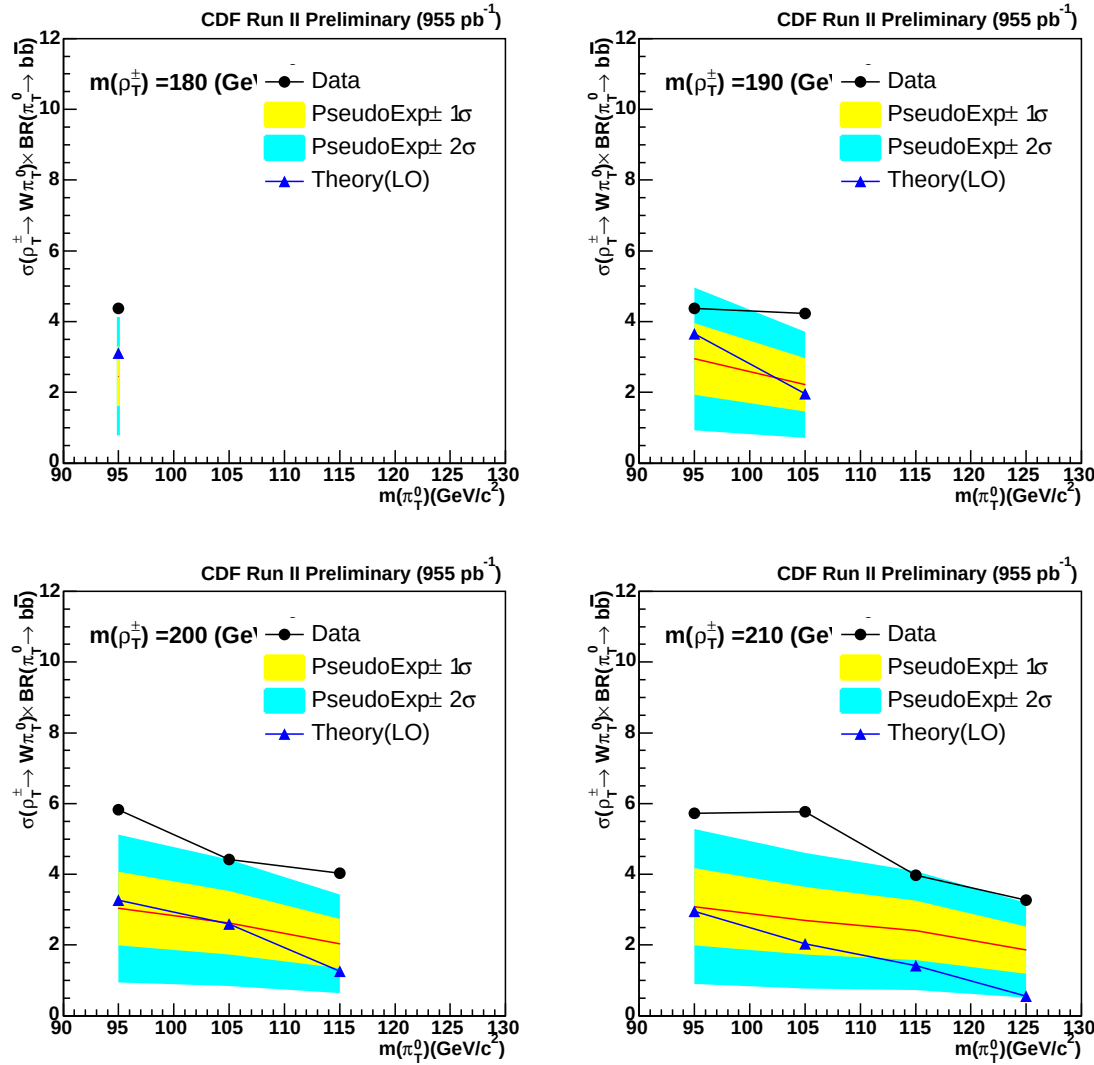


Reconstructed Masses: Q vs $M_{b\bar{b}}$



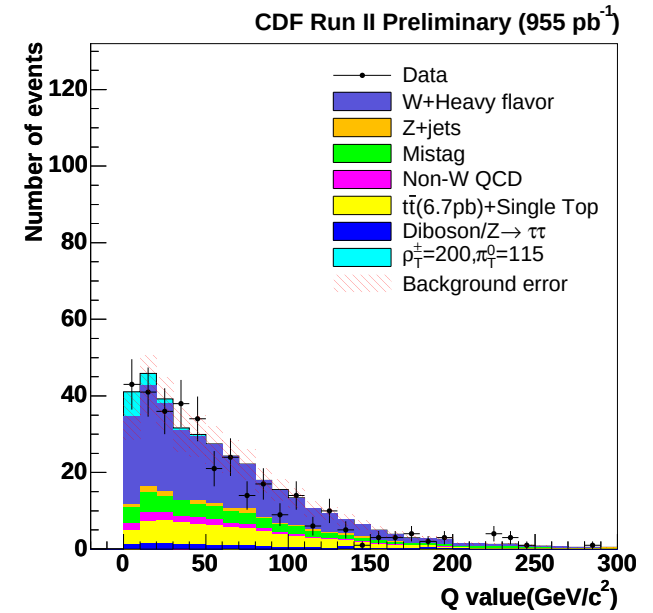
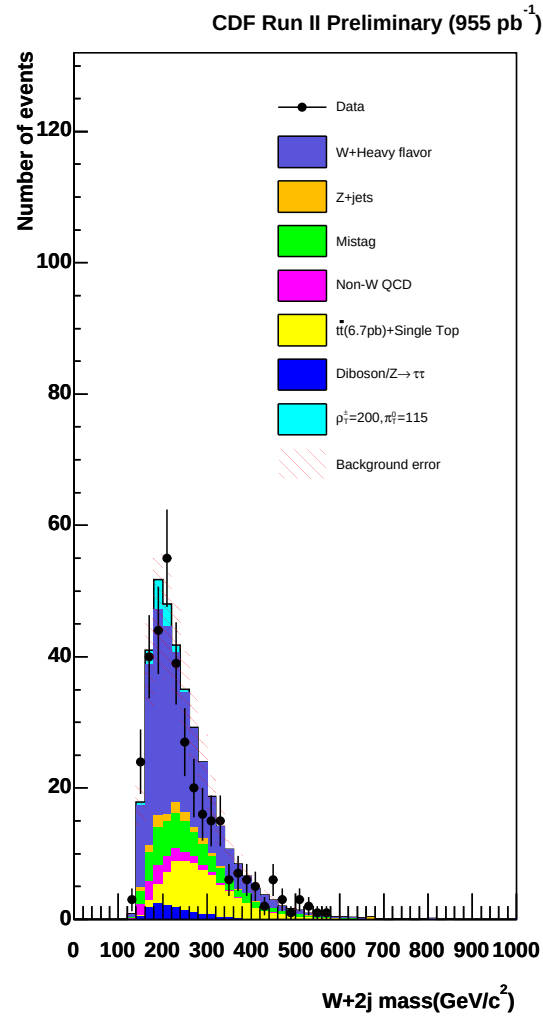
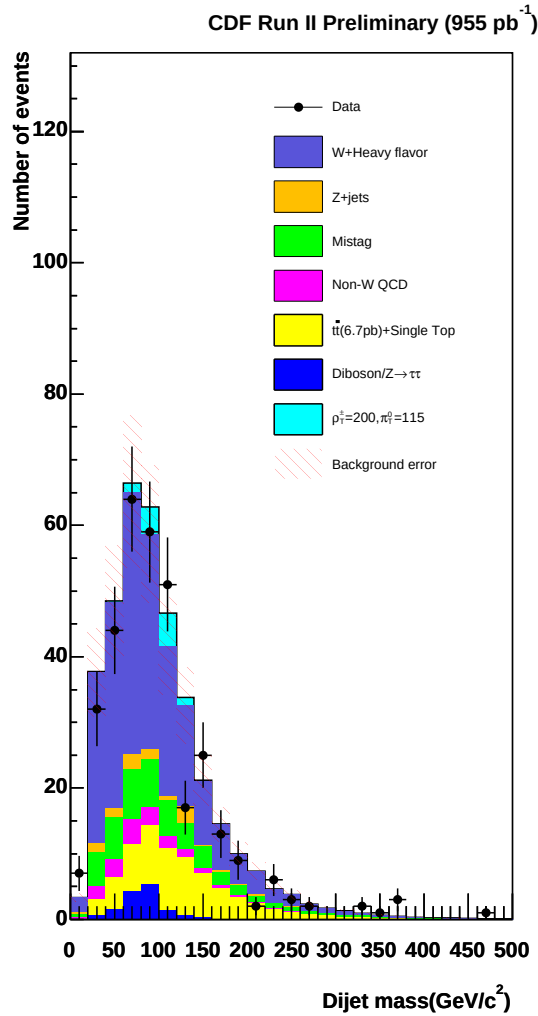
- For One btag + NN only: left (background); right (data)
- Double tags are statistic limit, ok so far

Observed vs Expected 95% CL Limits

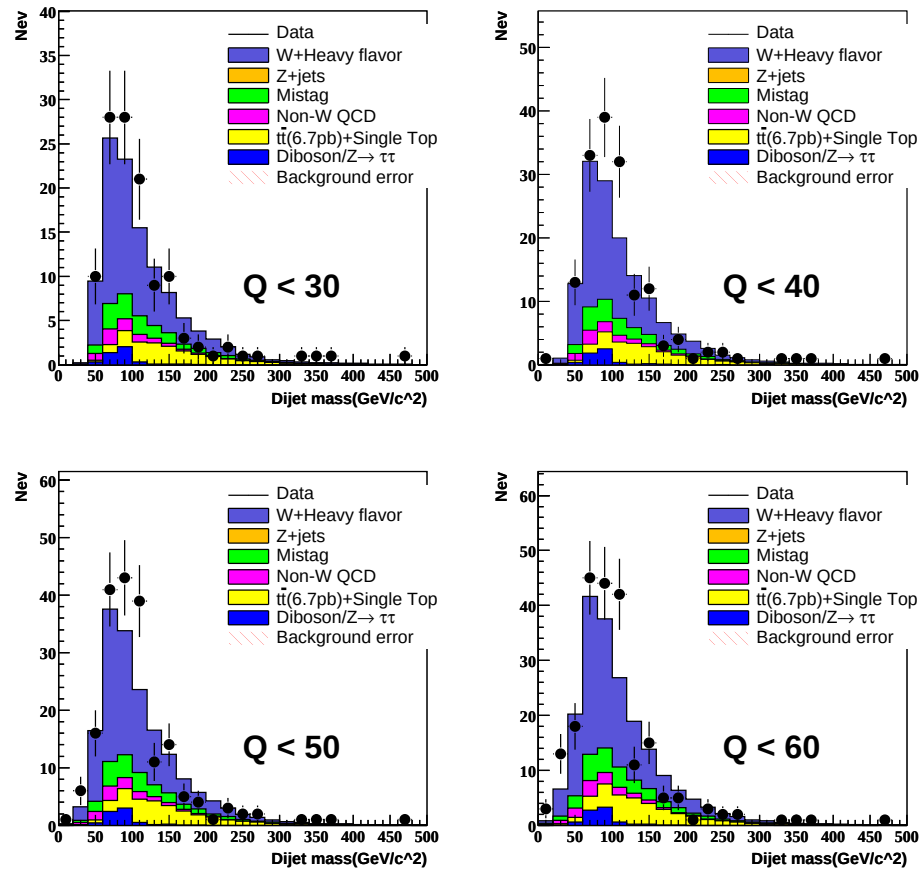


- Some data seem excess close to 3 σ level.

Reconstructed $m_{b\bar{b}}$ and Q

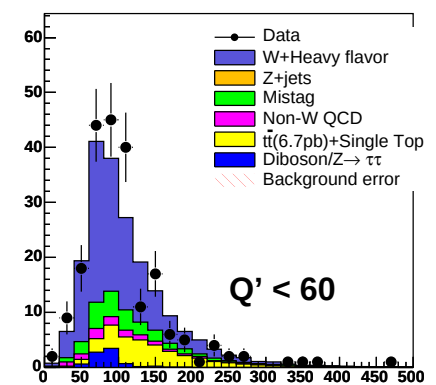
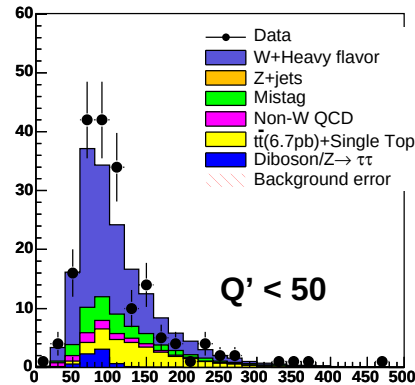
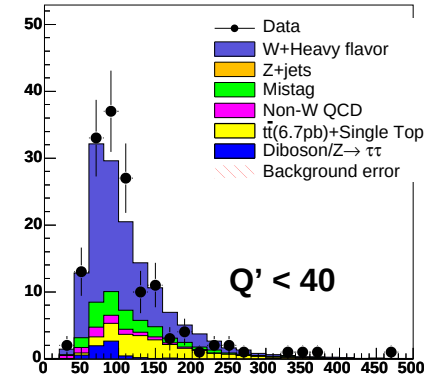
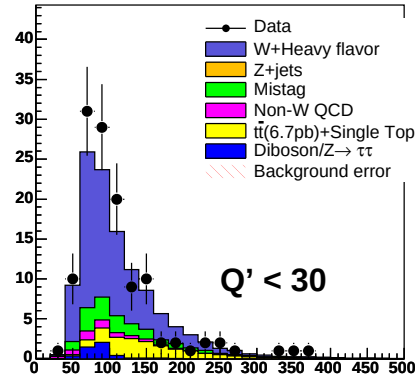
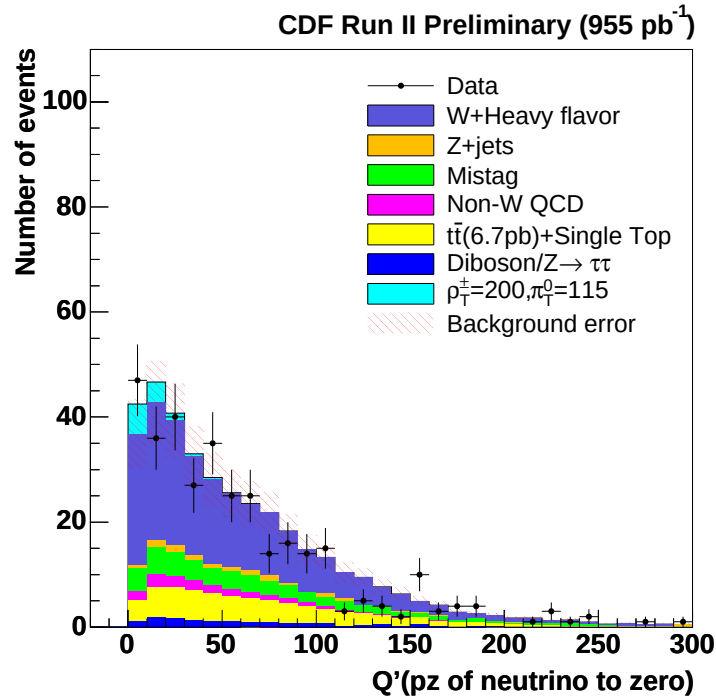


Reconstructed after Q Cuts



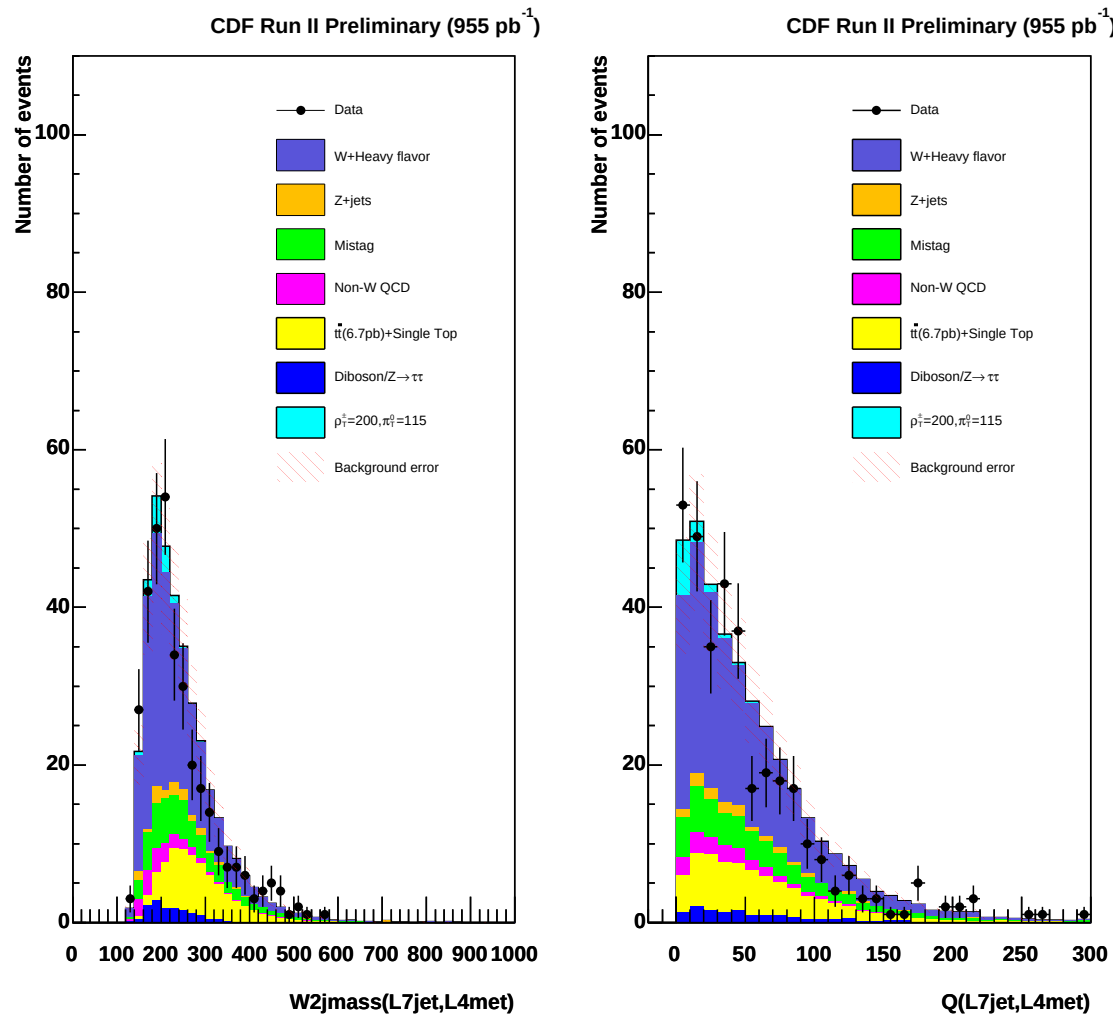
- Some excess seems visible after Q cut
- Excess is about 24 ± 14 in two bins

With $P_z^\nu = 0$



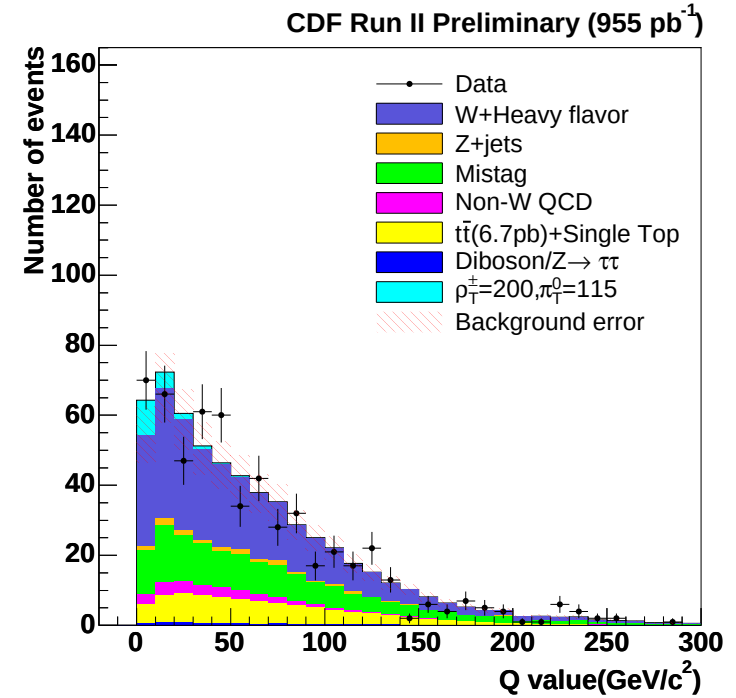
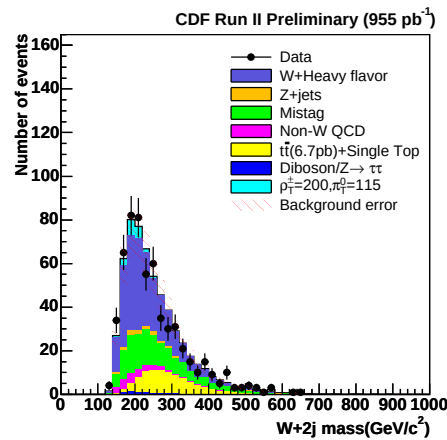
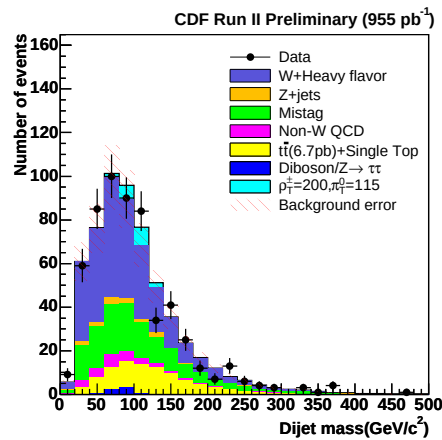
- Define Q' with $P_z^\nu = 0$ and the results are almost identical.

With E_T at L4



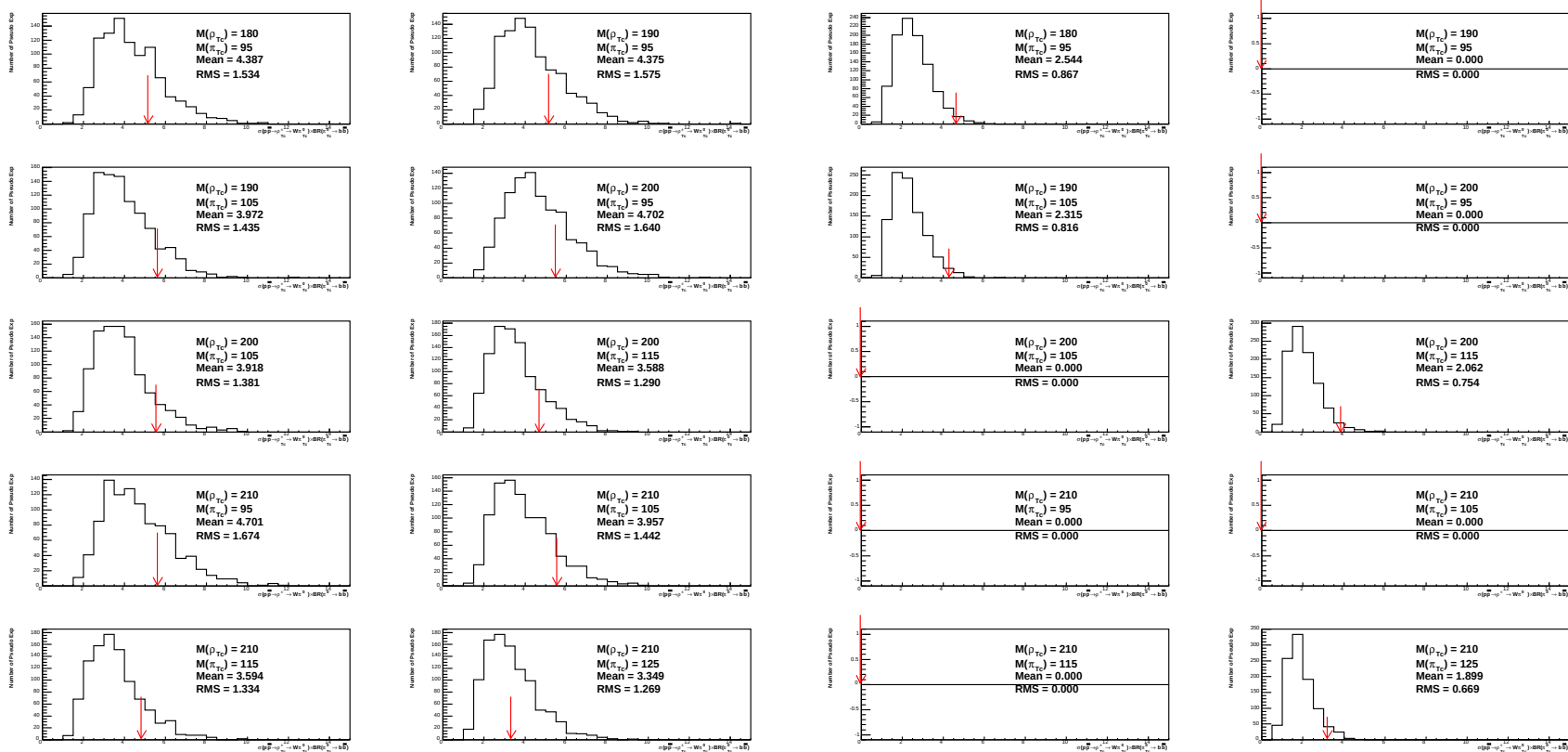
- The results are almost identical.

With ≥ 1 SecVtx Tight tag (No NNbtag)



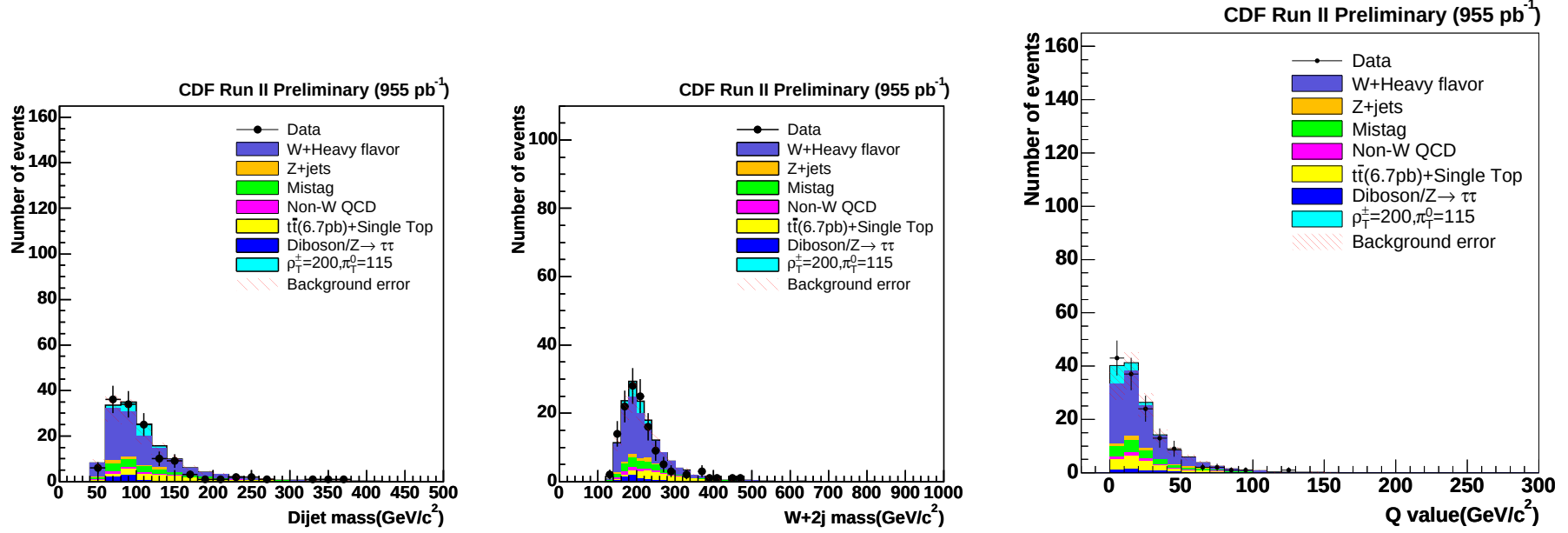
- The results are consistent.

Expected 1D Limit w/o Technicolor cuts



- Technicolor cuts: $Pt_{b\bar{b}} < 50$ GeV and $\delta\phi_{b\bar{b}} > 2.0$, similar to Q cut
- With Tc cuts, the limits improve by 20% and 2D limits are the best...

Reconstructed Masses After Technicolor cuts



Conclusion

- Have done many cross checks and the results are stable
- Some data seems excess close to 2σ , not alarm yet
- There will be Q&A and more checks at the blessing
- This is the first result of low mass Technicolor search from Run2 data at CDF
- More checks needed for publication, especially for shape systematic, but after DPF.