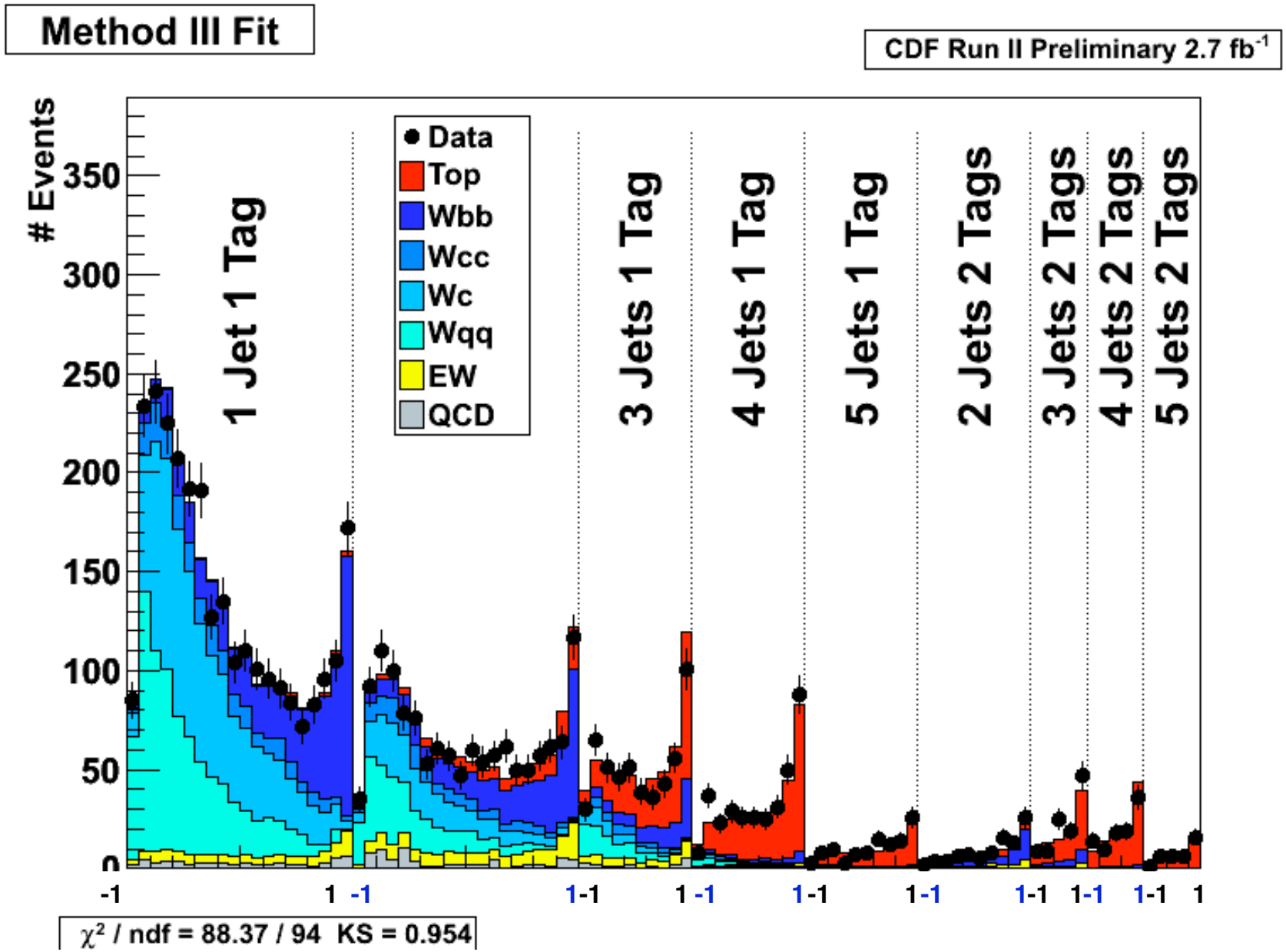
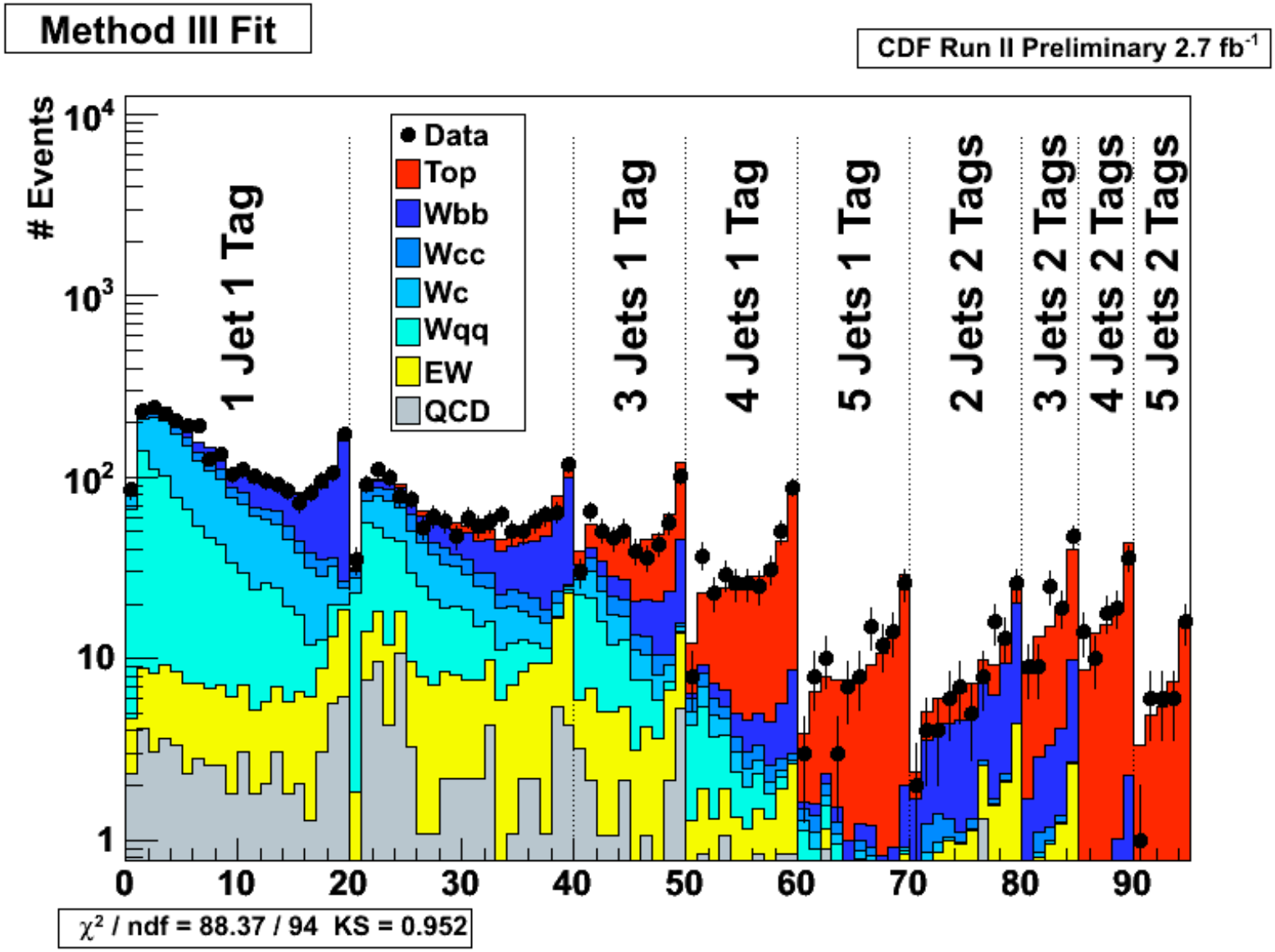
Fit


Method III Fit
CDF Run II Preliminary 2.7 fb^{-1}
Events
Data
Top
Wbb
Wcc
Wc
Wqq
EW
QCD
1 Jet 1 Tag
3 Jets 1 Tag
4 Jets 1 Tag
5 Jets 1 Tag
2 Jets 2 Tags
3 Jets 2 Tags
4 Jets 2 Tags
5 Jets 2 Tags
χ^2 / ndf = 88.37 / 94 KS = 0.954

Log plots


Method III Fit
CDF Run II Preliminary 2.7 fb^{-1}
Events
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Top
Wbb
Wcc
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1 Jet 1 Tag
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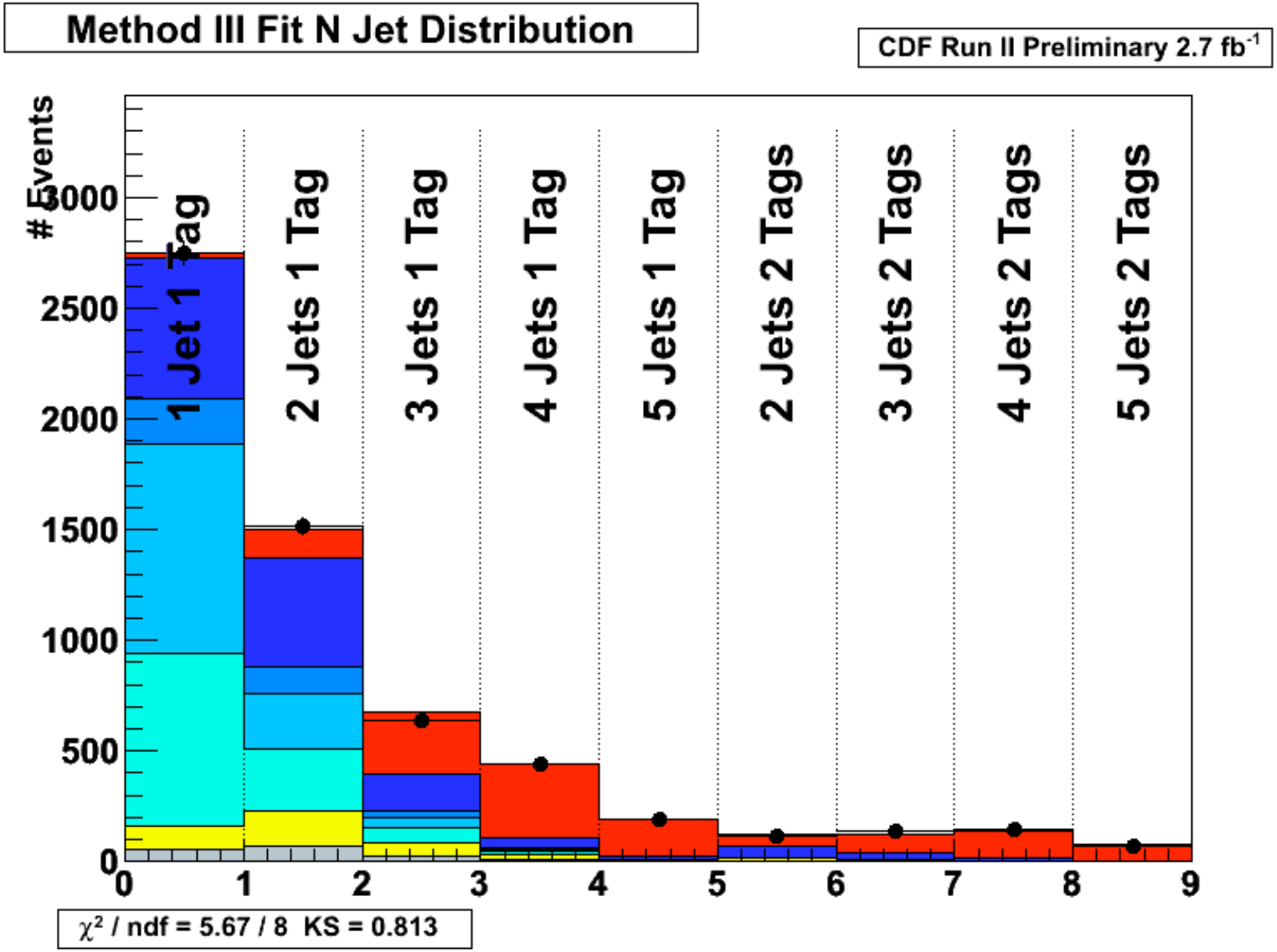
2 Jets 2 Tags
3 Jets 2 Tags
4 Jets 2 Tags
5 Jets 2 Tags
χ^2 / ndf = 88.37 / 94 KS = 0.952

N Jet Spectrum



Preliminary Results

CDF Run II Preliminary 2.7 fb^{-1}

Sample	Measured Value	Expected Uncertainty (mean $\pm$ rms)
$\sigma_{t\bar{t}}$	$7.64^{+0.57}_{-0.54}$ pb	0.53 ± 0.04 pb
K_{Wbb}	$1.57^{+0.28}_{-0.22}$	0.27 ± 0.17
K_{Wcc}	$0.94^{+0.90}_{-0.71}$	0.93 ± 0.36
K_{Wc}	$1.90^{+0.34}_{-0.32}$	0.43 ± 0.31
K_{Wqq}	$1.10^{+0.34}_{-0.25}$	0.27 ± 0.07
K_{EW}	$1.00^{+0.10}_{-0.10}$	0.10 constraint
K_{QCD}	$0.82^{+0.26}_{-0.26}$	0.30 constraint
r_{Btag}	$0.31^{+0.64}_{-0.64}$	0.68 ± 0.02
r_{Mistag}	$-0.05^{+0.98}_{-0.98}$	0.99 ± 0.06
r_{IFSR}	$0.13^{+0.90}_{-0.89}$	0.87 ± 0.09
r_{JES}	$0.47^{+0.63}_{-0.61}$	0.65 ± 0.09
r_{Q^2}	$0.07^{+0.43}_{-0.44}$	0.44 ± 0.09

"K"-Factors*

Shifts

Fit with Gaussian Constraints

*All W + Jets "K"-Factors are normalized to inclusive W yield. EW and QCD normalized to their expectations.

Comparing U "Old Method"

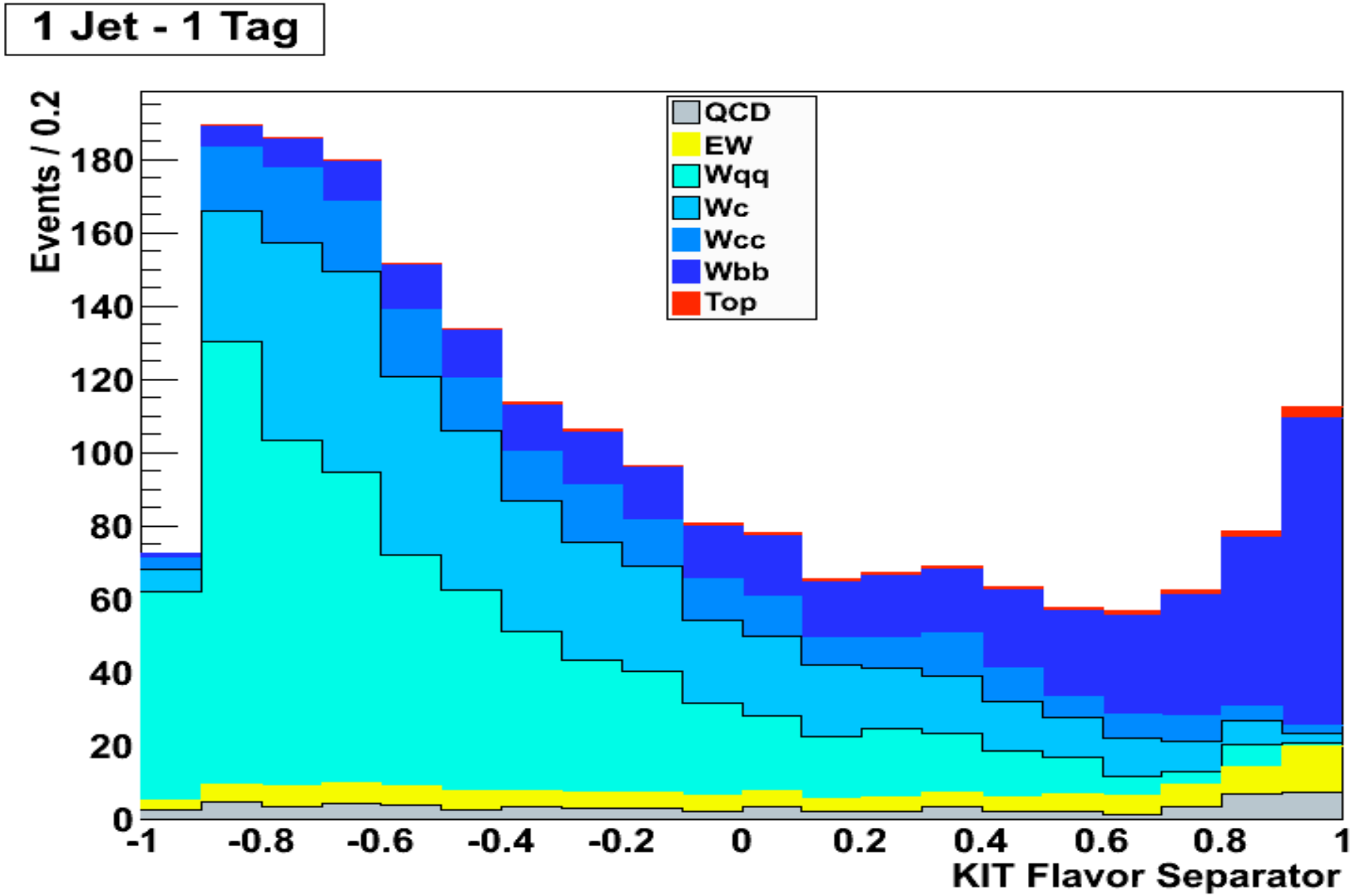
- Table of Uncertainties:

CDF Run II Preliminary 2.7 fb^{-1}

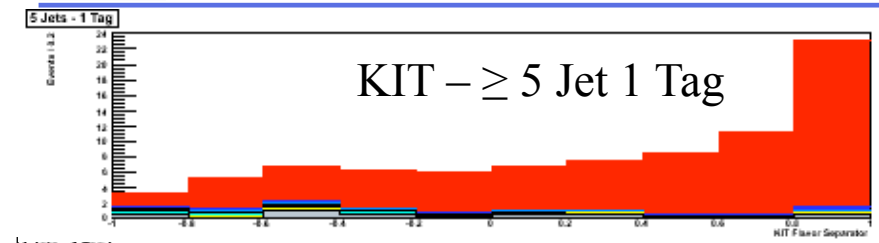
Uncertainty	Method II	Method III
Statistical	0.36 pb	0.33 pb
HF K-Factor	0.27 pb	Inc in stat
Q^2	Not estimated	0.21 pb
B Tagging	0.39 pb	0.23 pb
Mistags	0.17 pb	0.08 pb
JES	0.29 pb	0.29 pb
ISR/FSR	0.06 pb	0.01 pb
Parton Showering	0.21 pb	0.11 pb
QCD Shape	0.06 pb	0.01 pb
KIT FS Correction	Not estimated	0.10 pb
PDF	0.04 pb	0.05 pb
Lepton ID / trigger	0.04 pb	0.05 pb
Z0	0.02 pb	0.02 pb
Total without Lumi	0.72 pb	0.57 pb
Luminosity	0.43 pb	0.45 pb
Total	0.84 pb	0.73 pb

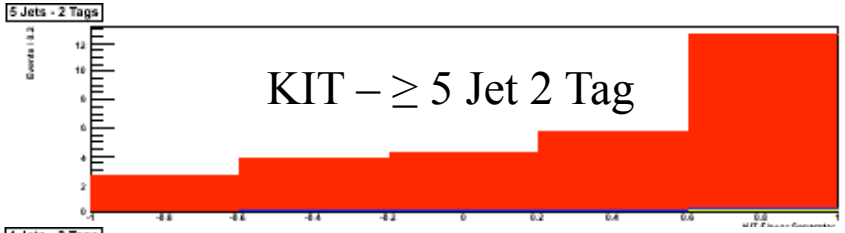
20% Improvement!

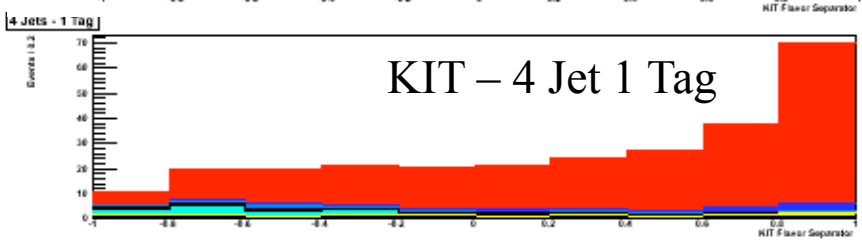
The Templates

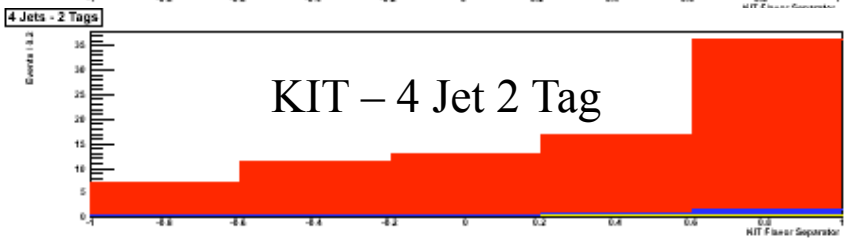


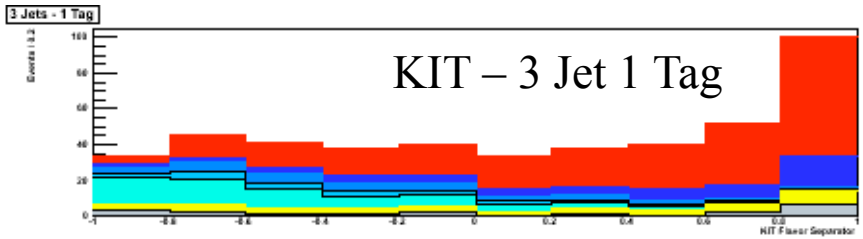
The Templates

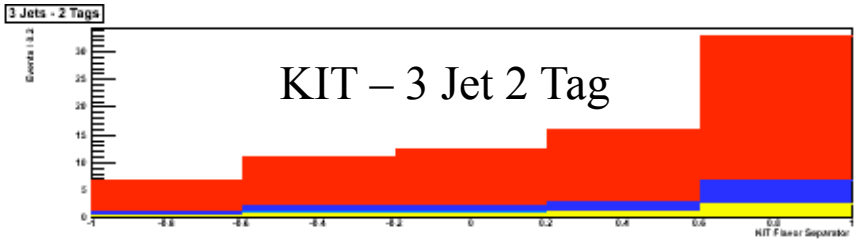


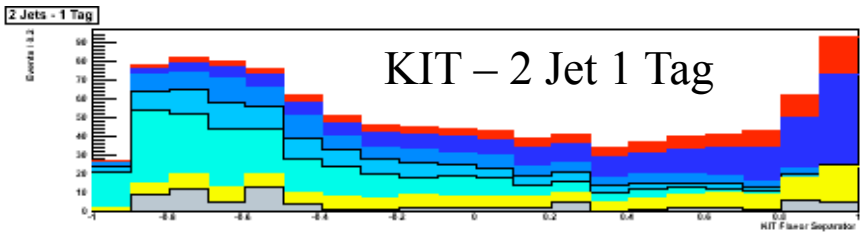


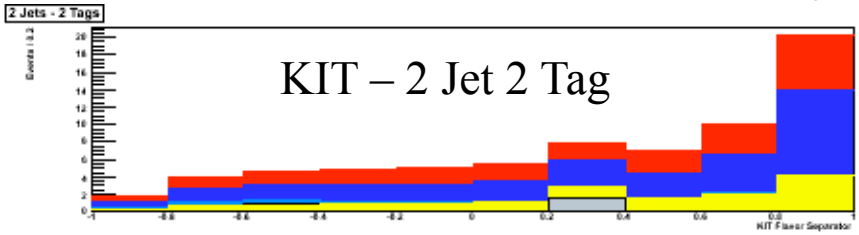


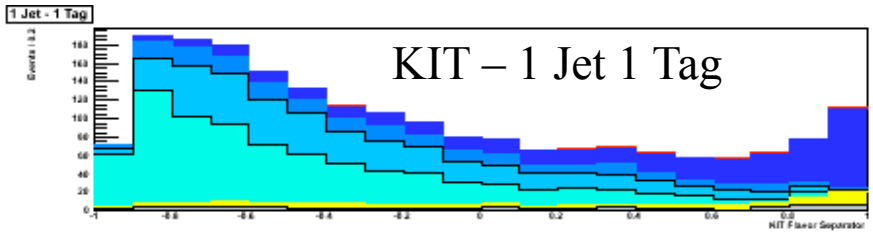


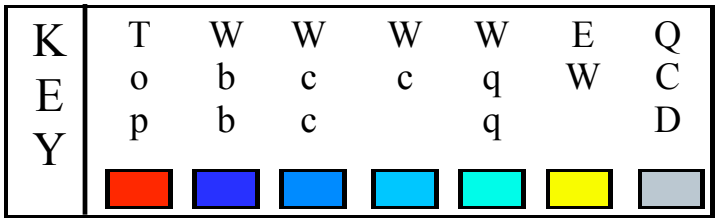








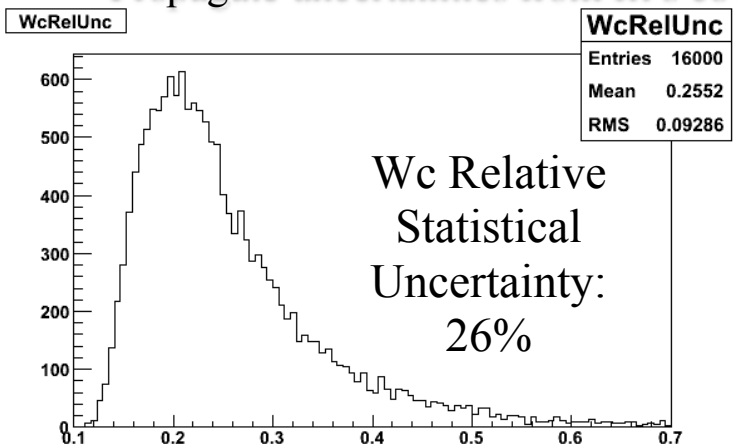


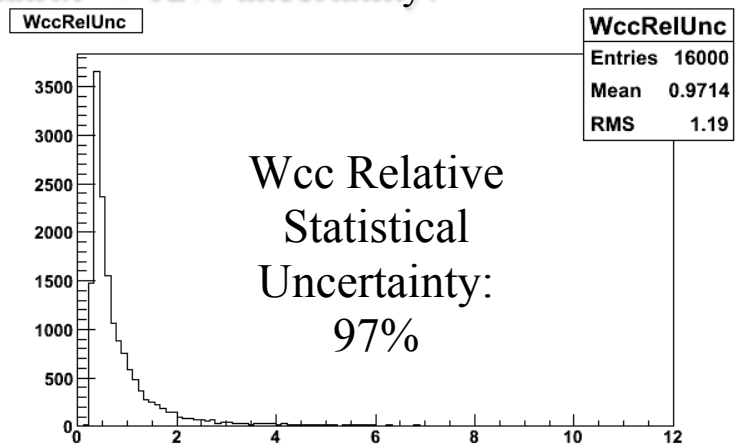


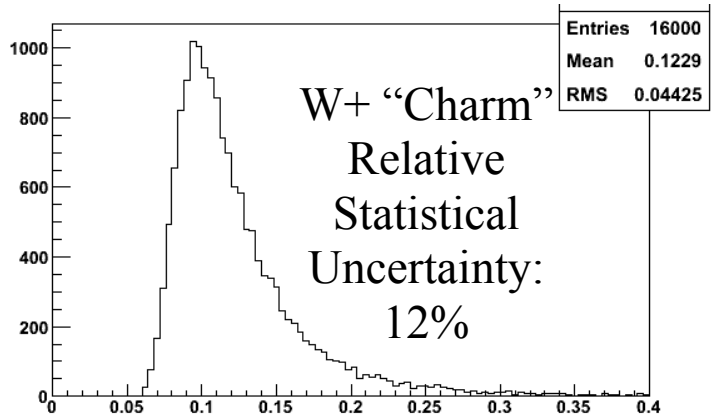
W + "Charm"

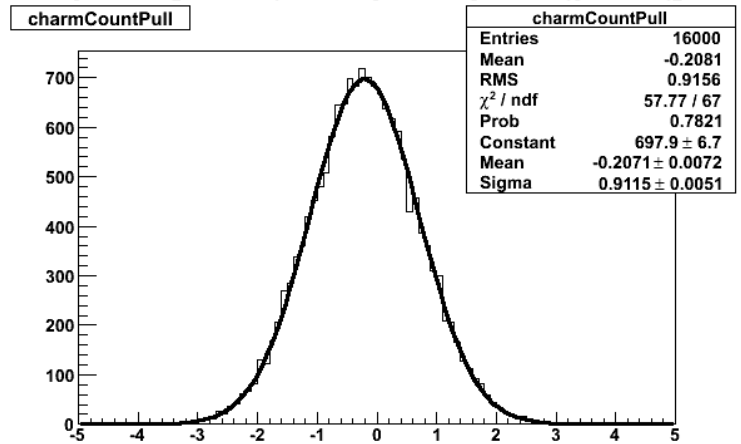
- We expect 26% relative statistical uncertainty on Wc cross section and 97% on Wcc.
- Can we do any better?
  ⇒ Yes! The measured Wc and Wcc values are **highly *anti*-correlated**.

- Have fitter report on total Wc + Wcc yield.
  - Propagate uncertainties from fit's covariance matrix ⇒ 12% uncertainty!

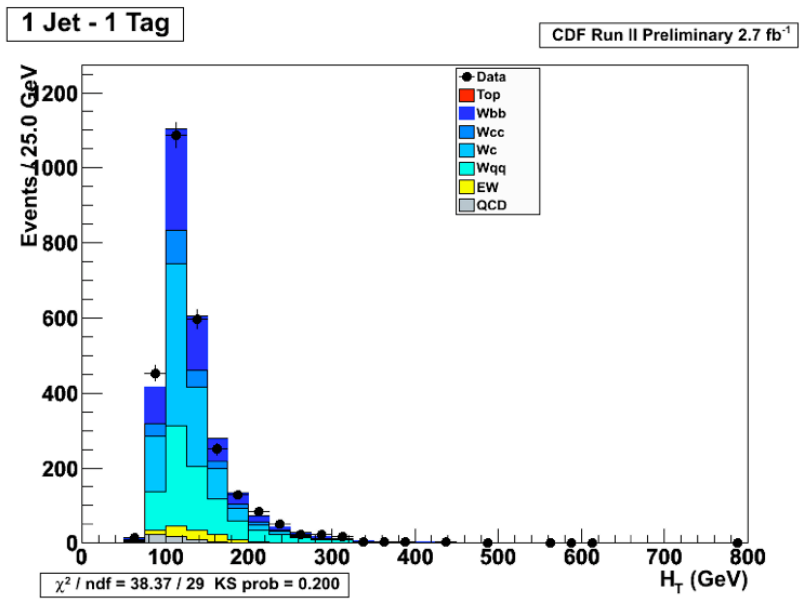


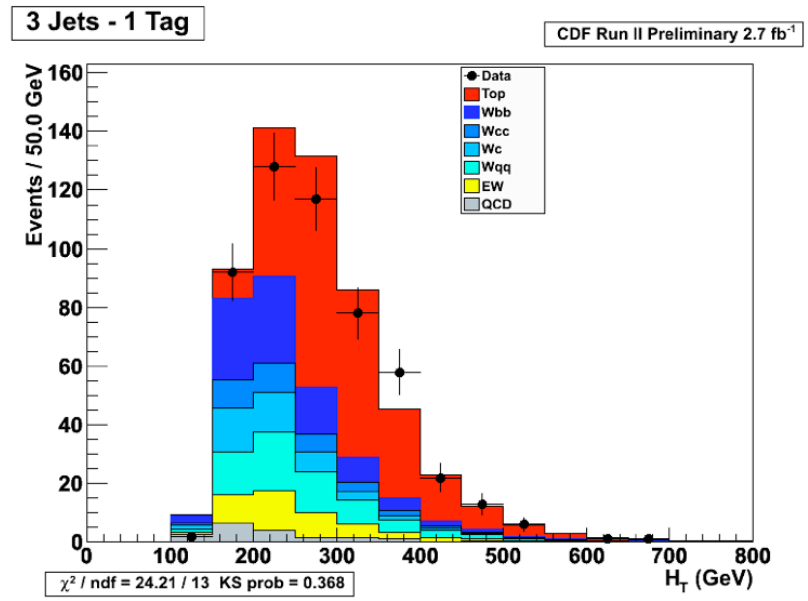


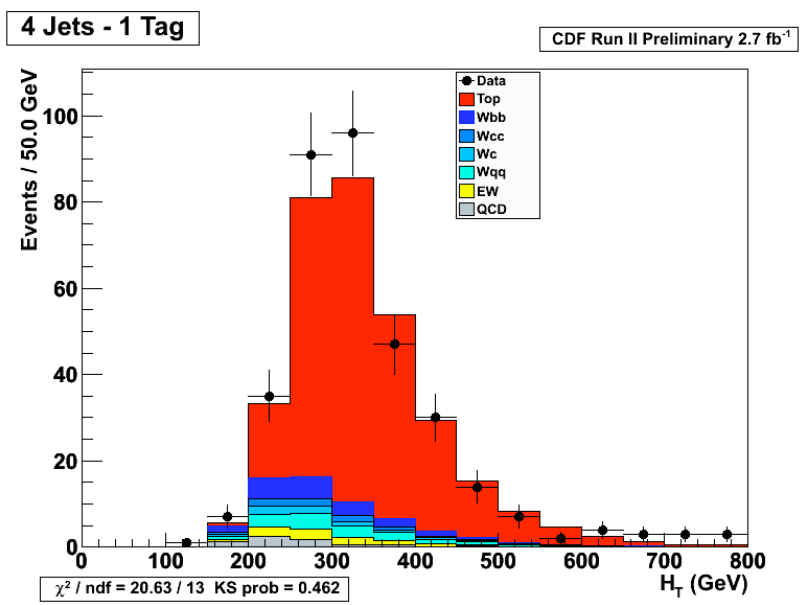


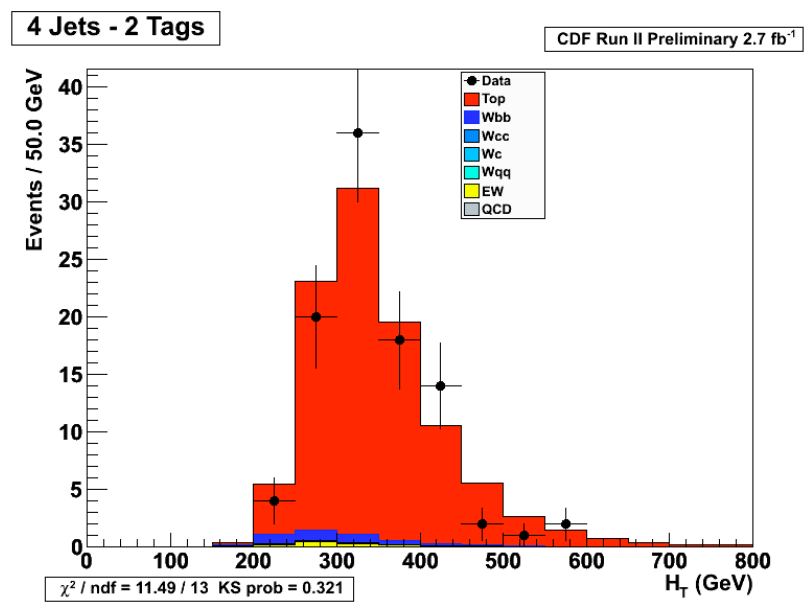


Kinematic Distributions

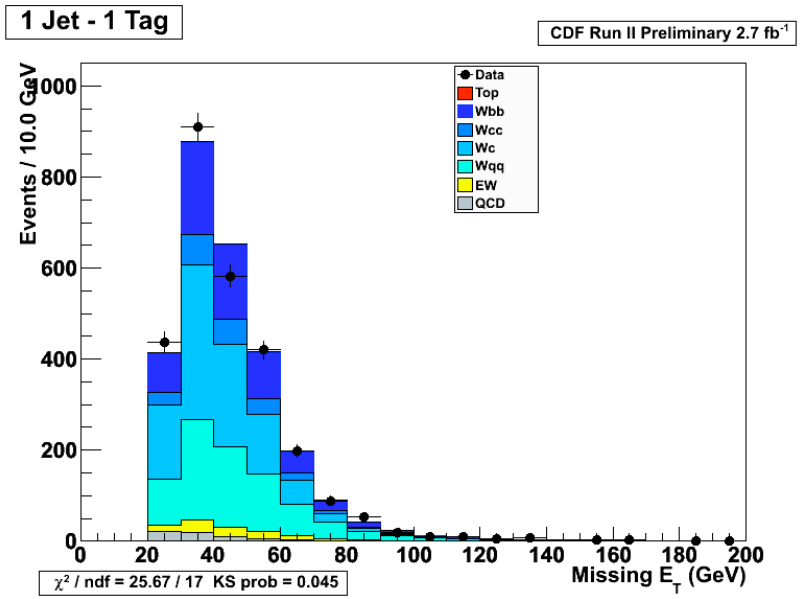


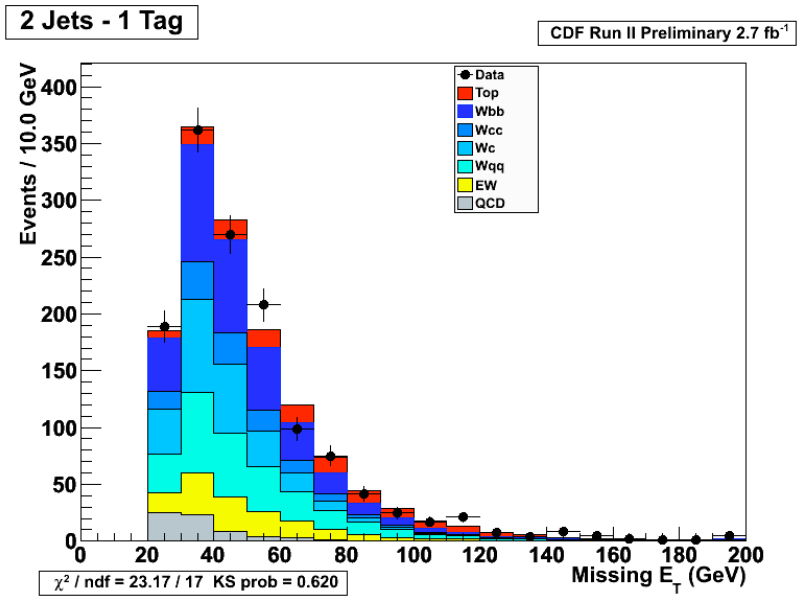


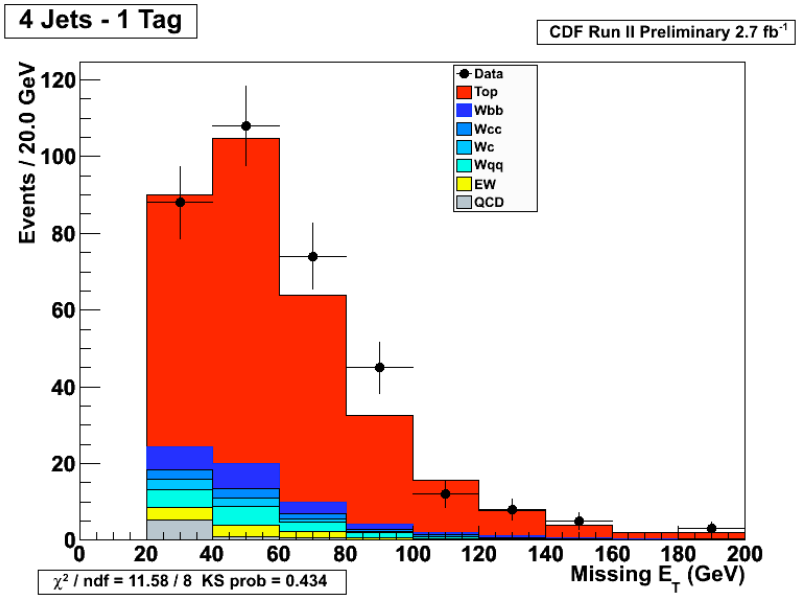


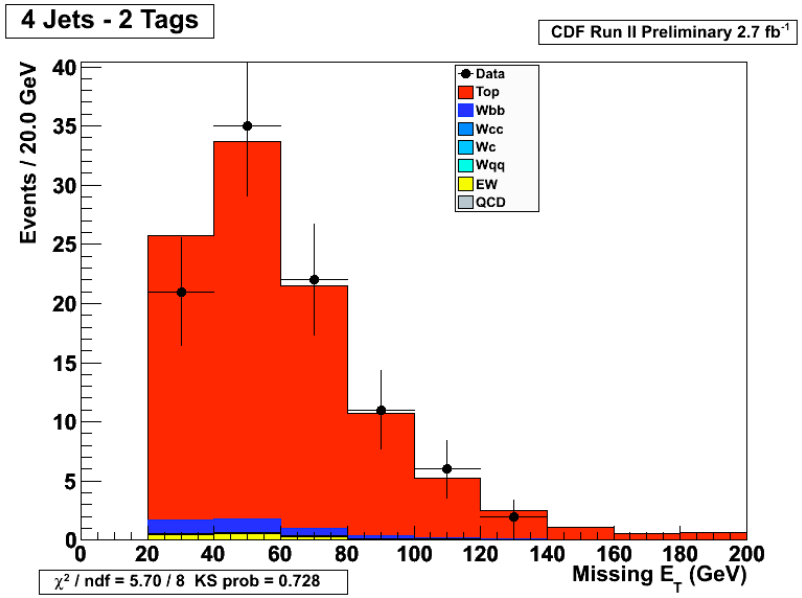


Kinematic Distributions









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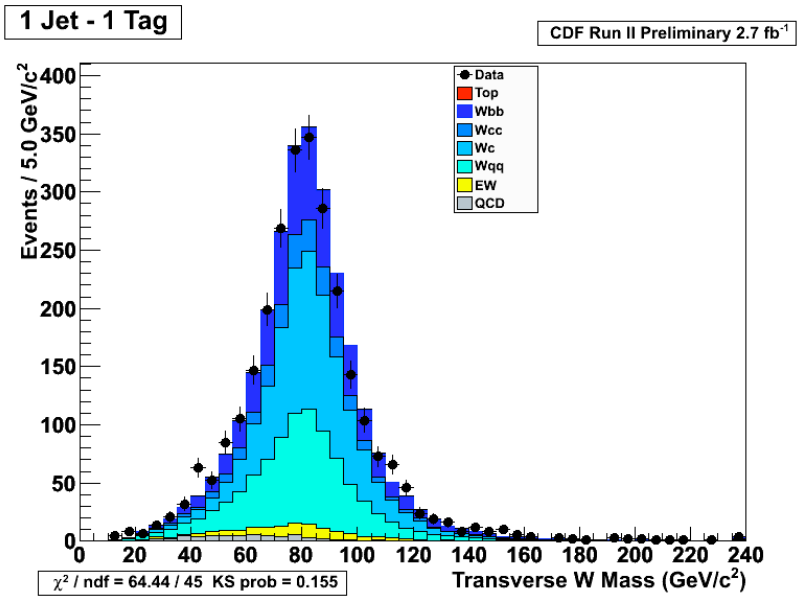
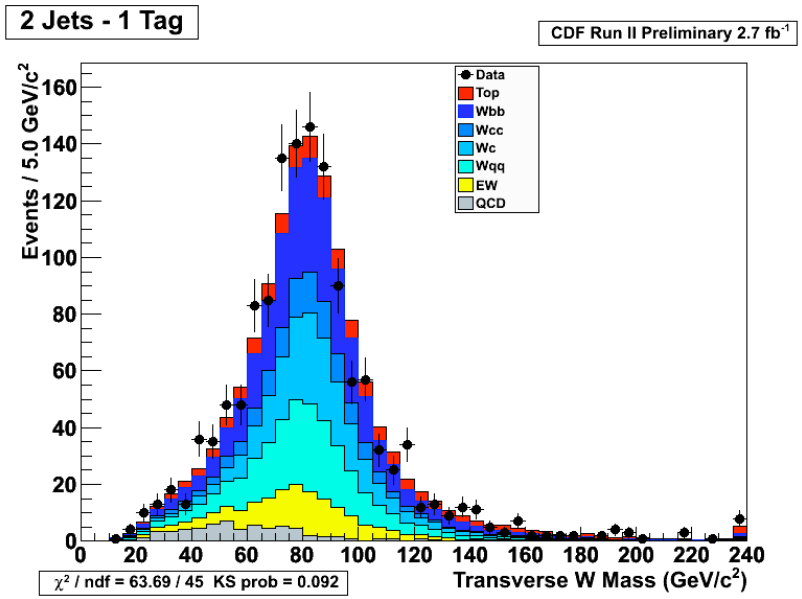
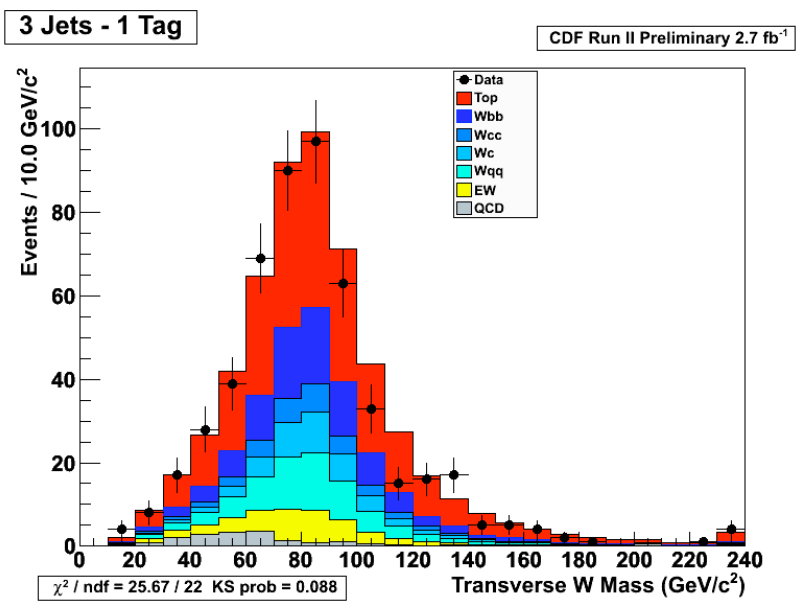
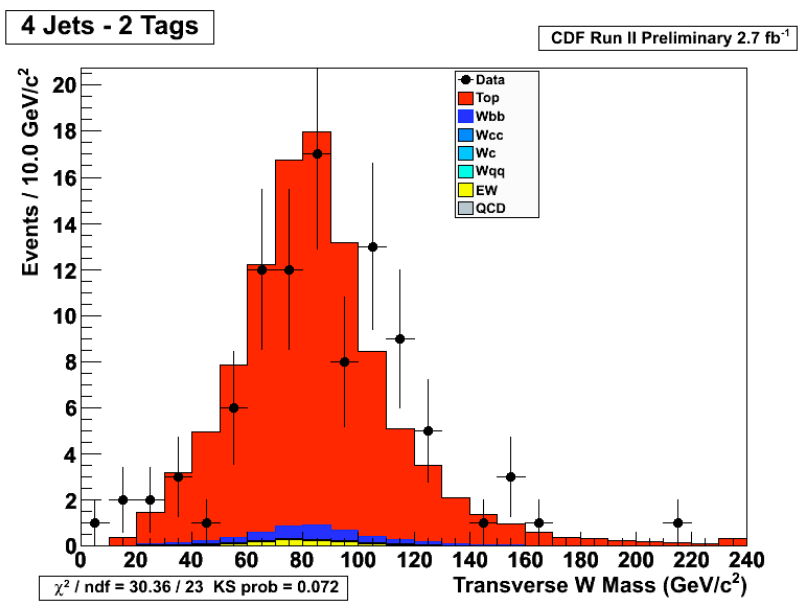
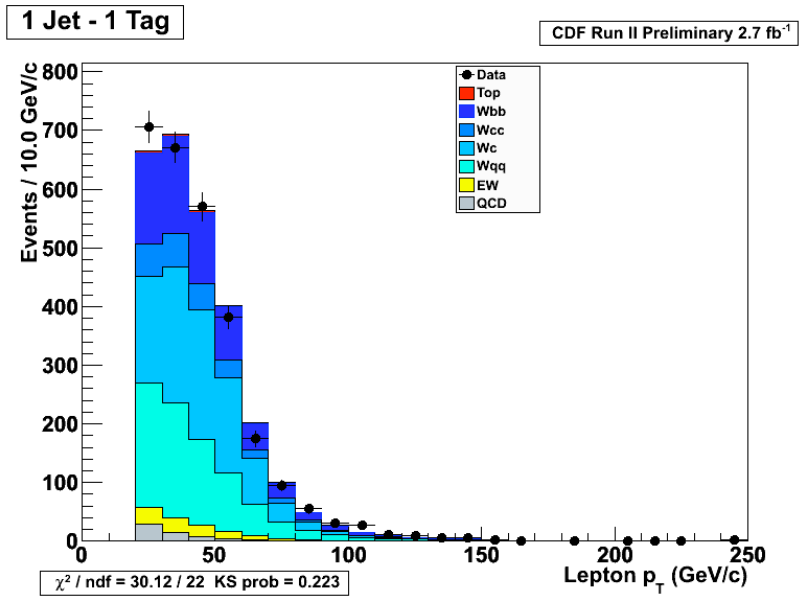


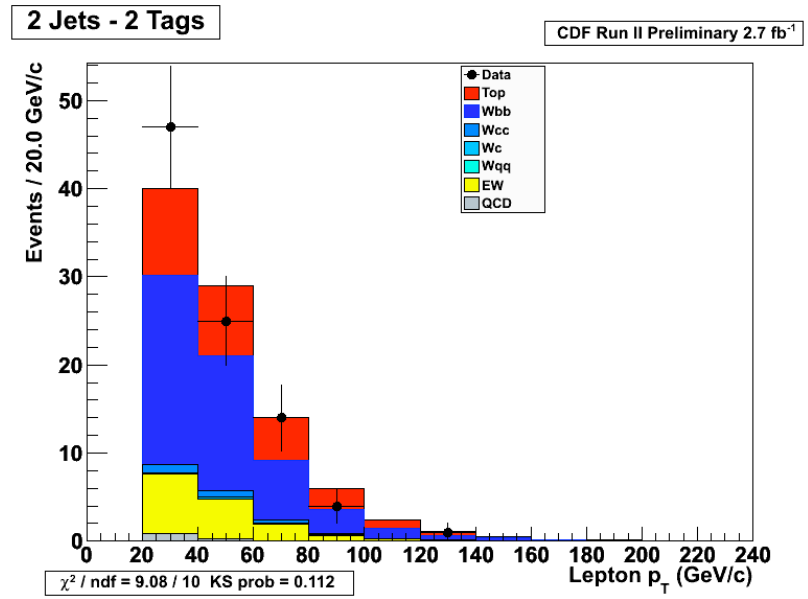


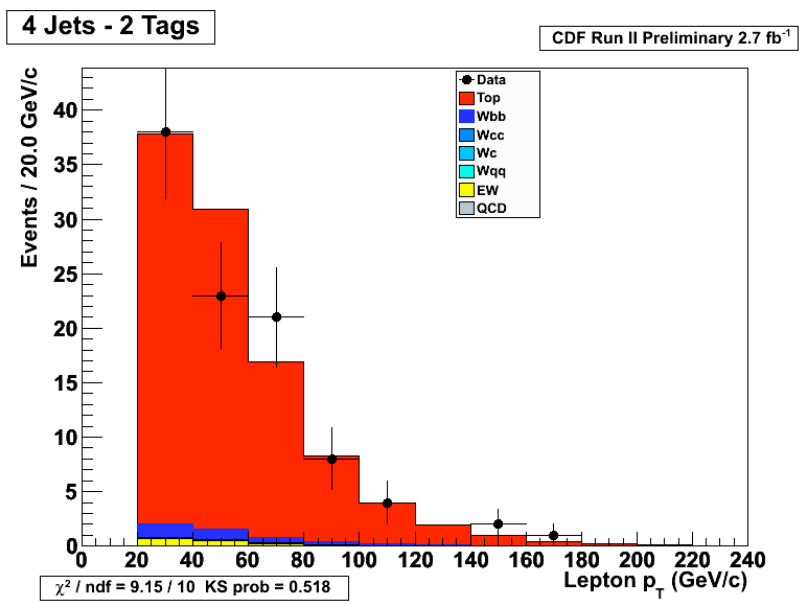


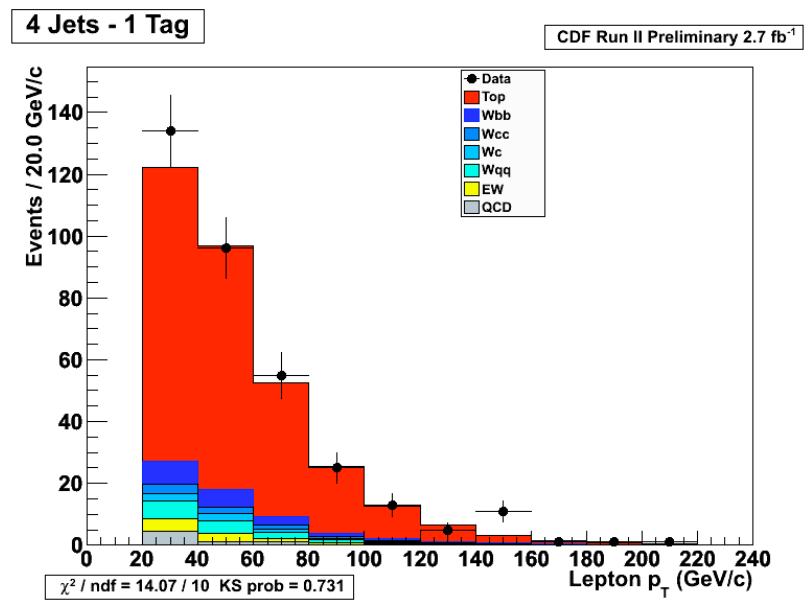


Kinematic Distributions

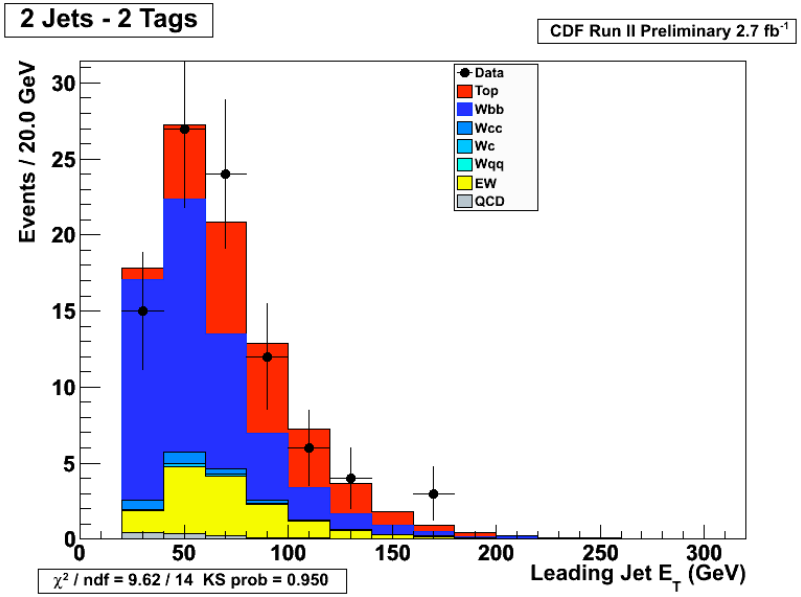


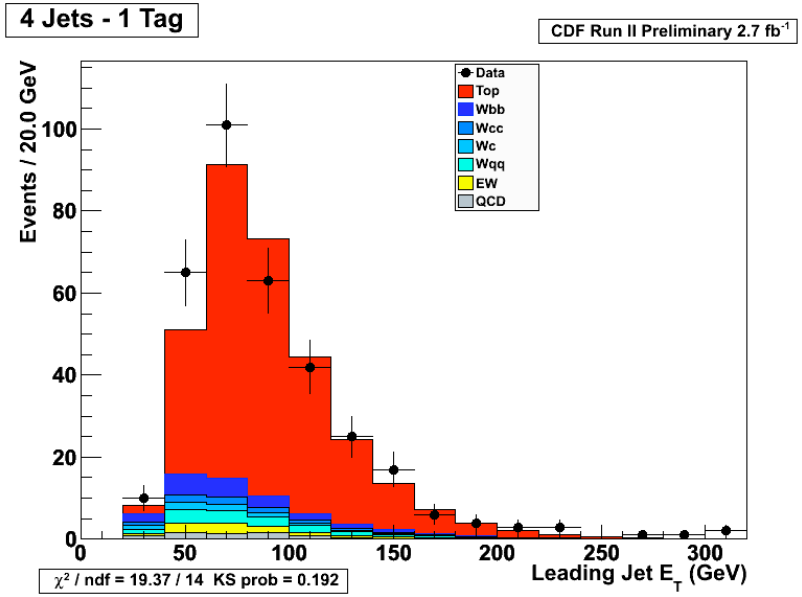


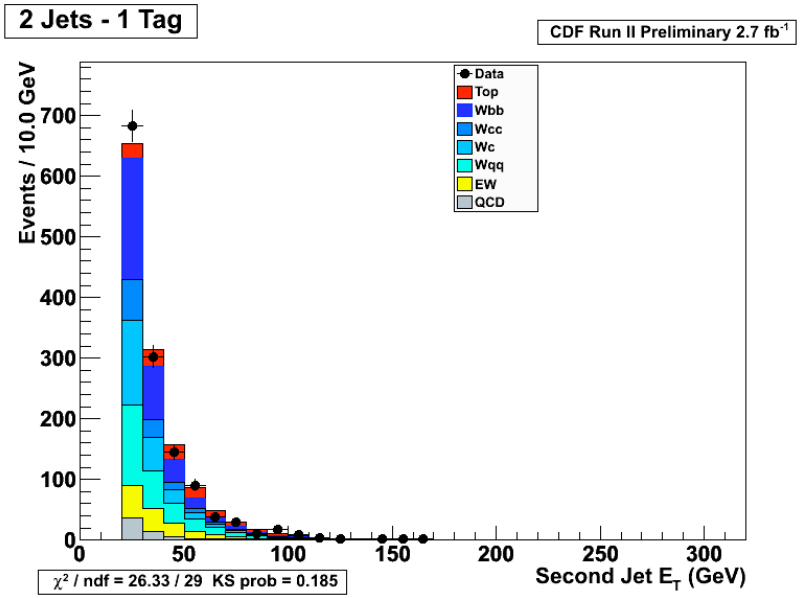


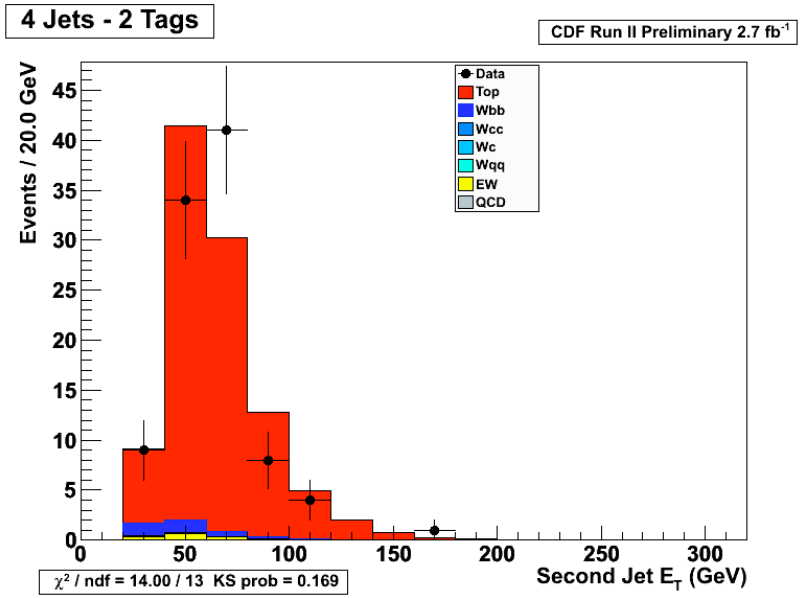


Kinematic Distributions

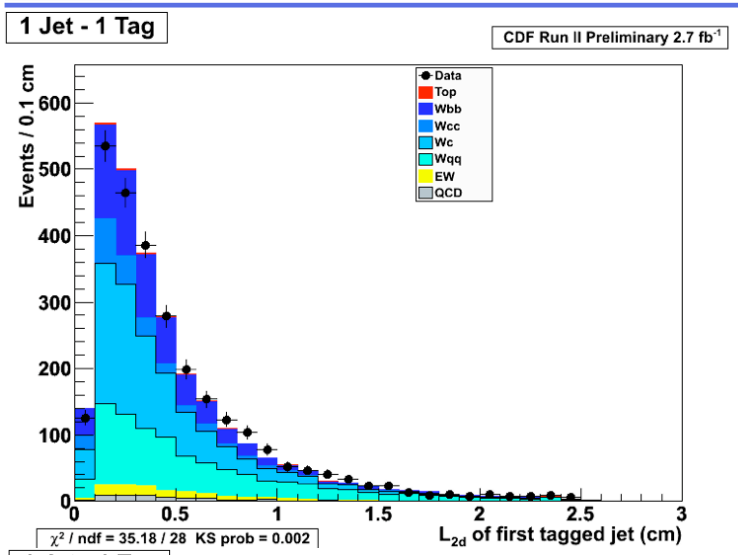


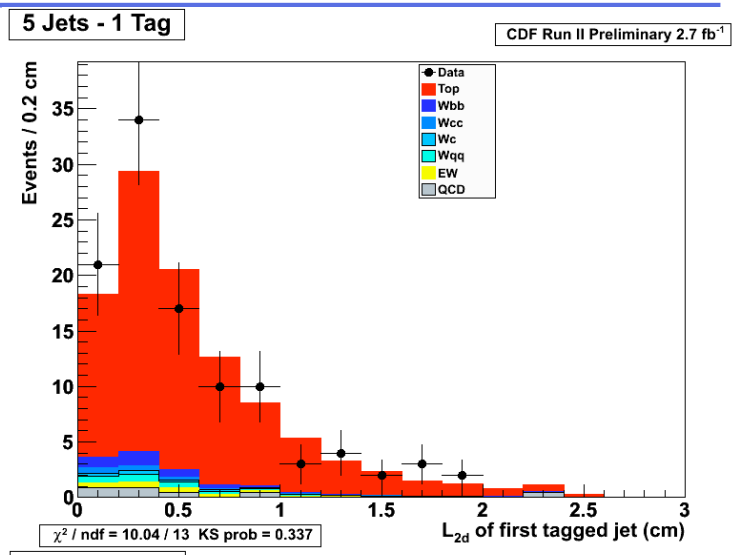


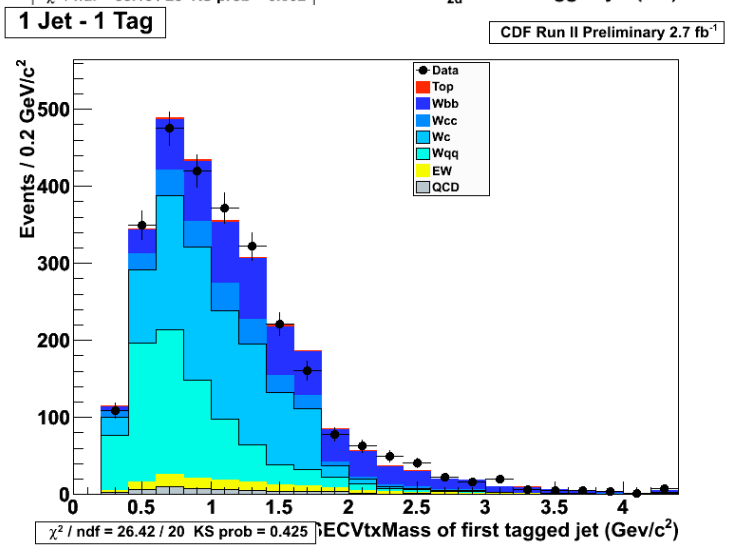


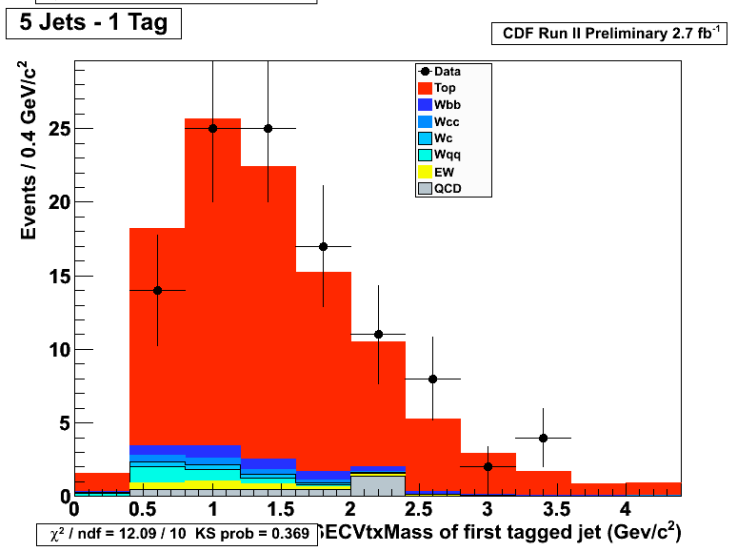


Kinematic Distributions









The full set of plots is available at
http://www-cdf.fnal.gov/internal/physics/top/RunIITopProp/anaInternal/method3_2.7invfb/

Summary

1,

- Measure top cross section to be:

$$\sigma_{t\bar{t}} = 7.64 \pm 0.57\ (\text{stat} + \text{syst}) \pm 0.45\ (\text{lumi})\ \text{pb}$$

$$\sigma_{t\bar{t}} = 7.64 \pm 0.73\ \text{pb}$$

$m_t = 175\ \text{GeV}/c^2$

* Does not consider color reconnection effects.