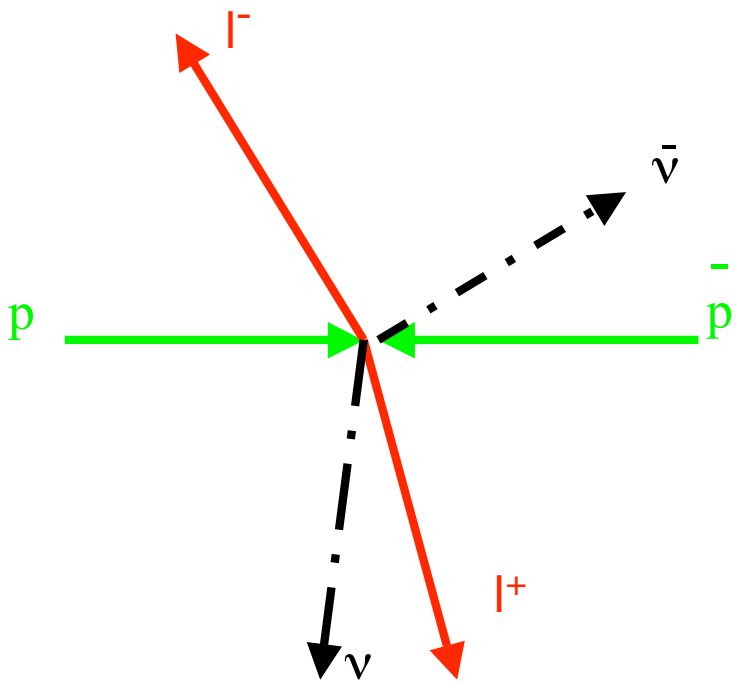
Mini-talk slides and plots

WW analysis using the
lepton + isolated track data sample

Analysis Review for WW analysis using the lepton + isolated track data sample

$pp \rightarrow WW \rightarrow l\nu l\nu$



2 Leptons

- 1 electron or muon
- 1 isolated track
  - $p_T > 20$ GeV
- $|\eta| < 1$

+ Missing Et

- Missing $E_T > 25$
- Missing E_T Significance > 5.5

+ ≤ 1 jets

- $|\eta| < 2$
- $E_T > 20$

Event Selection (Plain Hebrew)

- Identify lepton leg
  - Central muon or electron with E_t/p_T>20 GeV
- Recluster jets, recalculate MET w.r.t. lepton
- Identify isolated track candidates
- Correct MET for isolated track candidates
- Require MET>25
  - Reject events with MET co-linear with jets
- Select highest momentum isolated track
  - Reject events with MET parallel or anti-parallel to track
- If track-lepton pair mass is in Z region, require MET>40
- Require MET Significance: $MET/\sqrt{_E_T} > 5.5$
- Require both leptons to have opposite charge
- Require zero or one jet

Results of counting experiment

CDF II preliminary 200 pb^{-1}

Event count	0+1 jet bin
WW	16.3 ± 0.4
DY	1.8 ± 0.3
WZ+ZZ	2.4 ± 0.1
top	1.8 ± 0.1
fakes	9.1 ± 0.8
Tot bkg	15.1 ± 0.9
Tot pred	31.5 ± 1.0
observed	**39**

Statistical uncertainties only

Systematics

CDF II Preliminary 200 pb^{-1}

Signal Uncertainty

Source	(%)
Tight lepton ID	2
Loose lepton ID	2
ISR/FSR	1
PDF	2
MC generator	10

Background Uncertainty

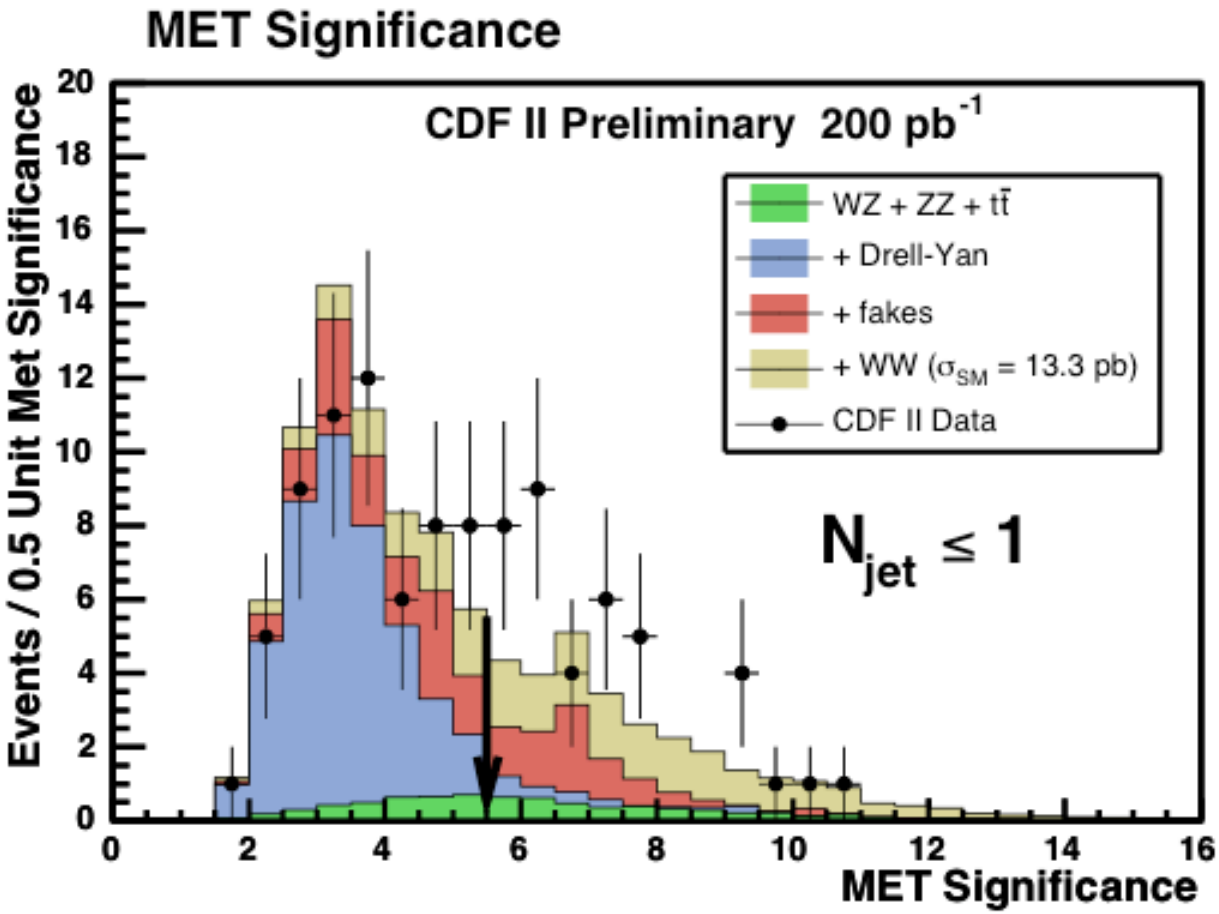
Source	(%)
Tight lepton ID	2
Loose lepton ID	2
Jet energy scale	10
Diboson MC	7
Drell-Yan	39
Fake	39

Result

$$\sigma_{WW} = 19.4 \pm 5.1(\mathrm{stat}) \pm 3.5(\mathrm{syst}) \pm 1.2(\mathrm{lumi})\,\mathrm{pb}$$

assuming BR($W \rightarrow l\nu$) = 10.8 %

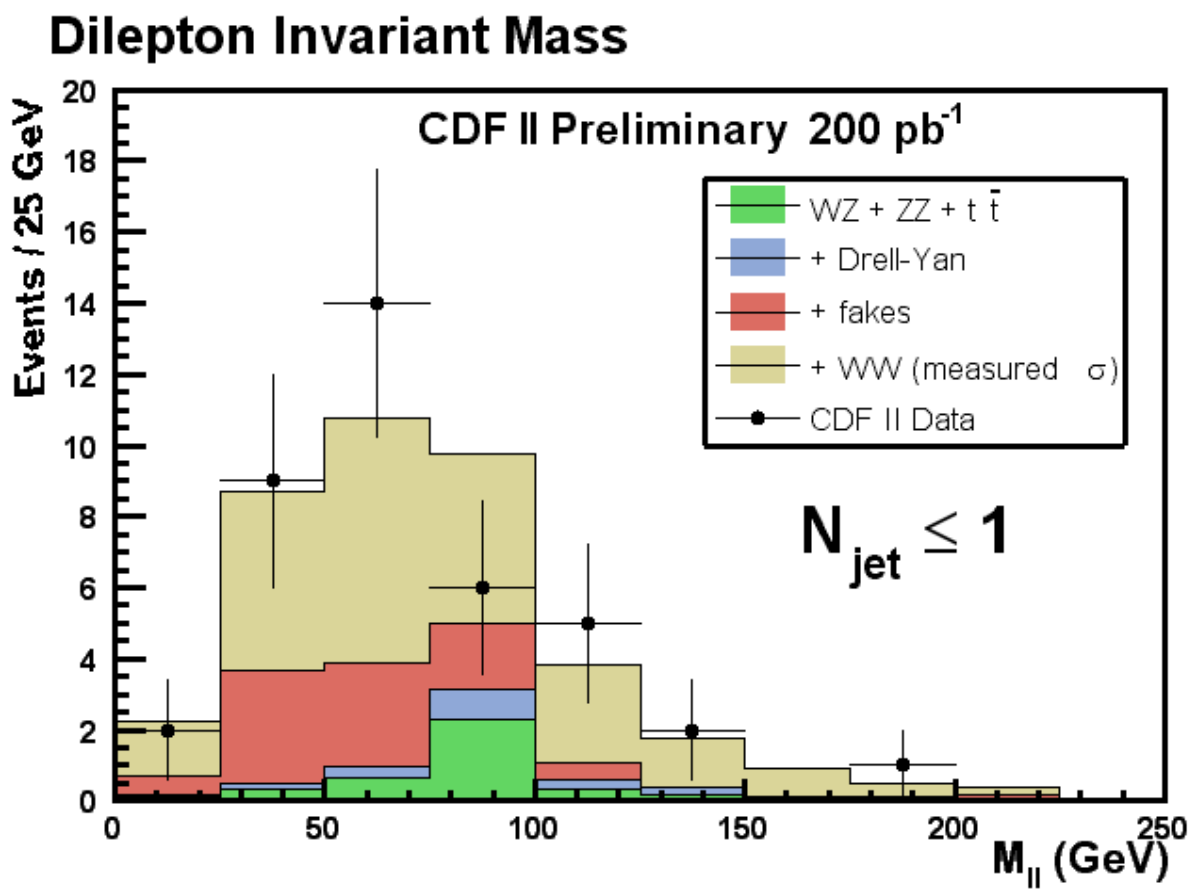
MET Significance



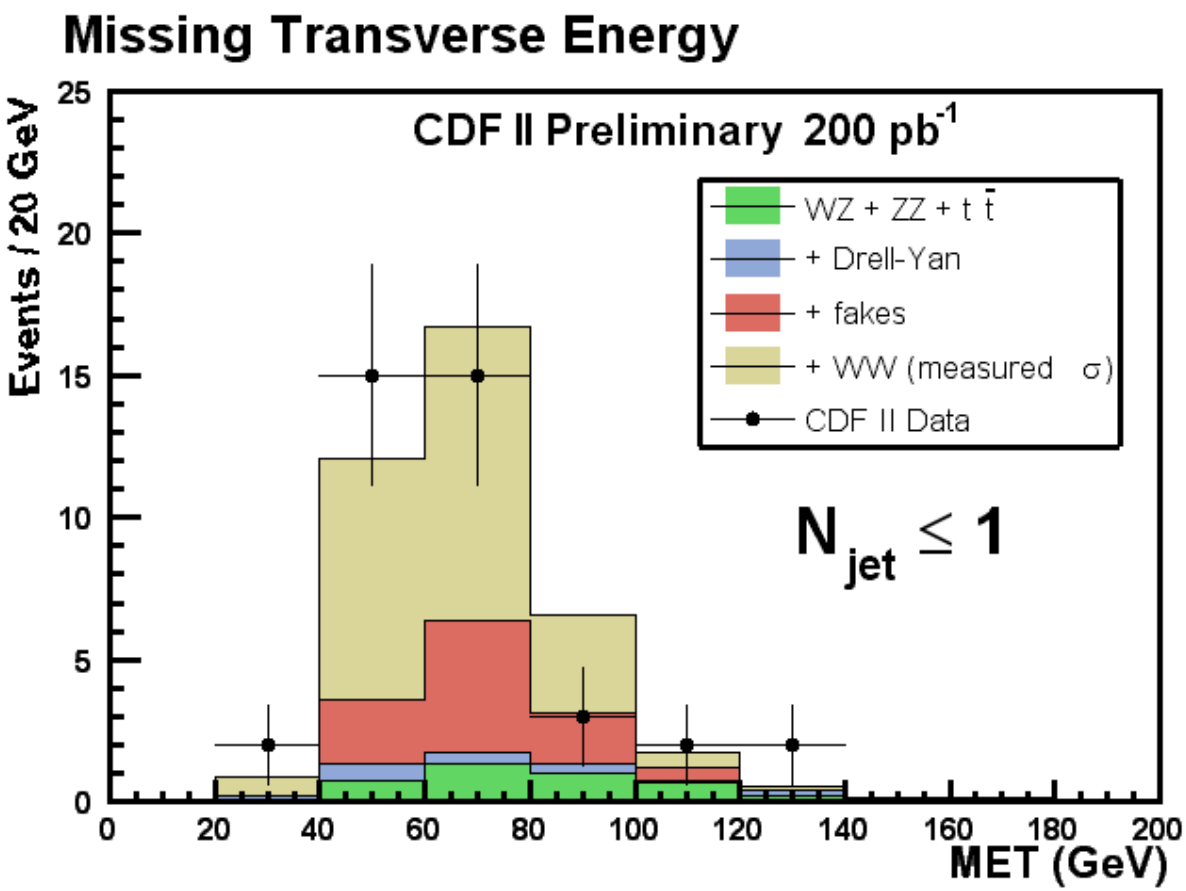
MET Significance = MET/SQRT(SumET)

Distribution after all cuts, but MET Significance cut applied. The cut value is indicated by the arrow.

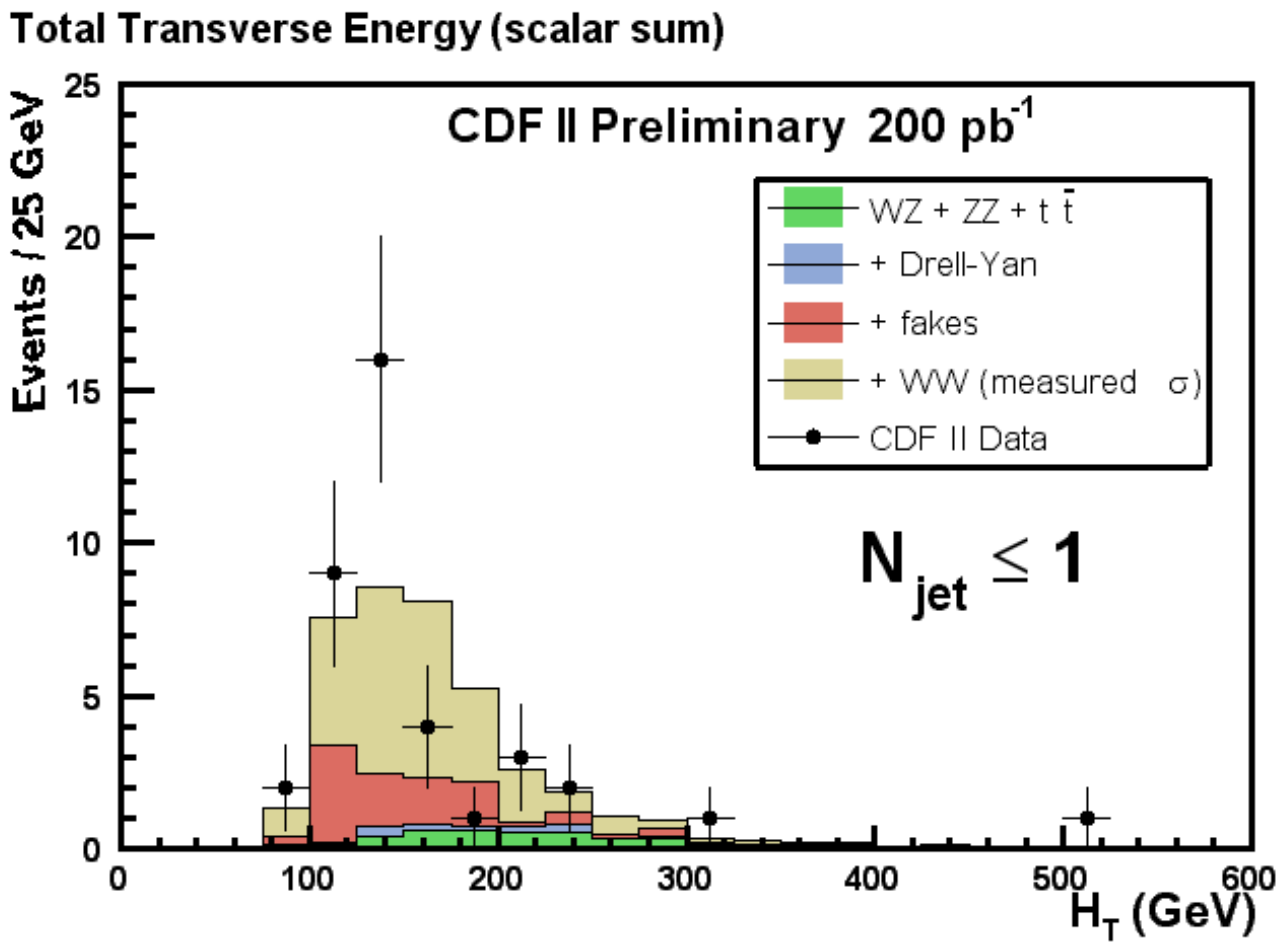
Dilepton Invariant Mass



MET

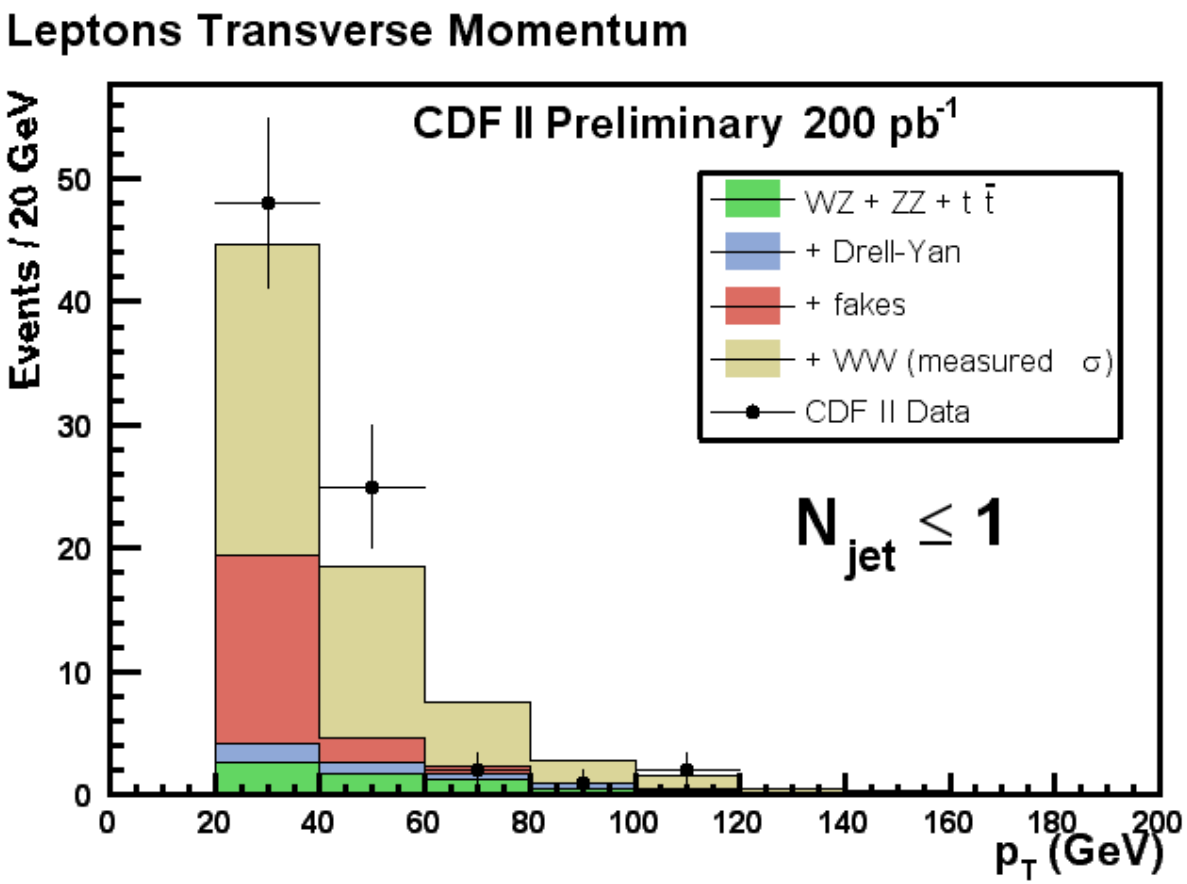

Missing Transverse Energy
CDF II Preliminary 200 pb^{-1}
WZ + ZZ + t $\bar{t}$
+ Drell-Yan
+ fakes
+ WW (measured σ)
CDF II Data
$N_{jet} \leq 1$
Events / 20 GeV
MET (GeV)
0
5
10
15
20
25
0
20
40
60
80
100
120
140
160
180
200

H_T - Total Transverse Energy



H_T: scalar sum of lepton P_T, MET and $JetE_T$

Lepton P_T


Leptons Transverse Momentum
CDF II Preliminary 200 pb-1
WZ + ZZ + t t̄
+ Drell-Yan
+ fakes
+ WW (measured σ)
CDF II Data
N jet ≤ 1
Events / 20 GeV
0
10
20
30
40
50
0
20
40
60
80
100
120
140
160
180
200
p T (GeV)