

Control Region and Systematic Errors

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Collider Detector at Fermilab

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Summary

- 1 Control Regions
 - Basic Values
 - Discriminating Variables
 - NN Control

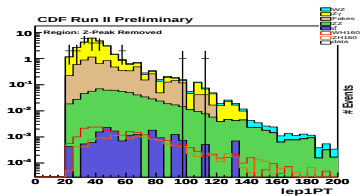
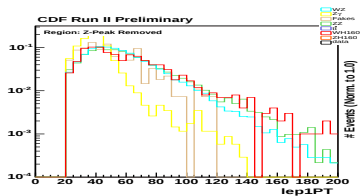
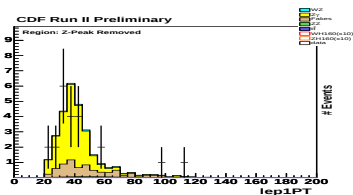
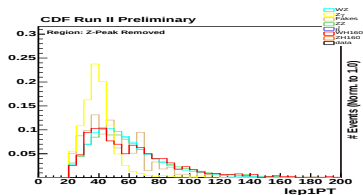
- 2 Limits w/ Systematics

The Regions

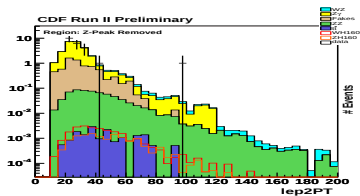
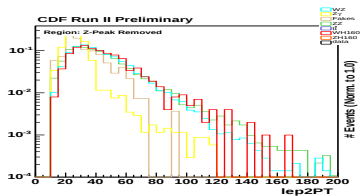
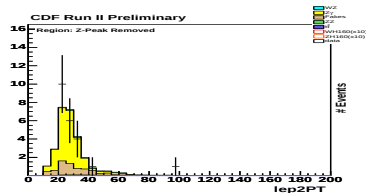
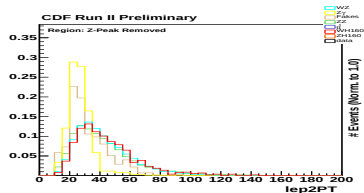
- NoZPeak Control: $10.0 < E_T < 20.0$
- InZPeak Control: $N_{\text{Jet}} == 0$

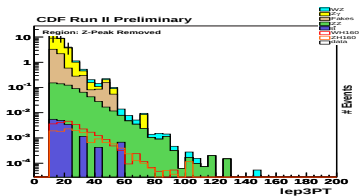
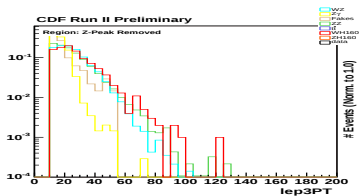
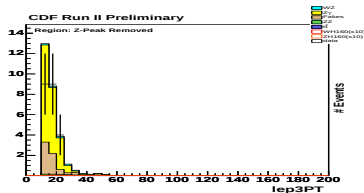
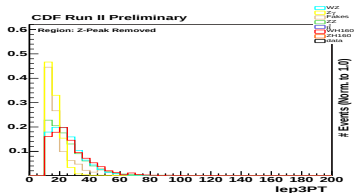
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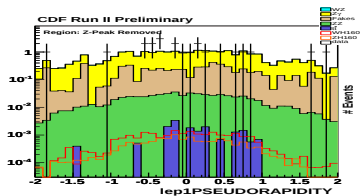
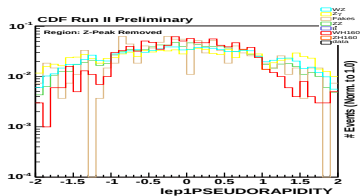
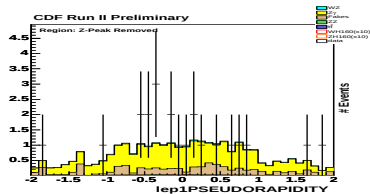
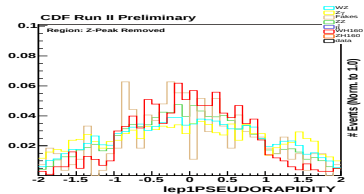
Process	NoZPeak	InZPeak
WZ	0.73	28.5
ZZ	0.68	3.18
$Z\gamma$	20.2	5.82
Fakes (WW, W +Jets, Z +Jets)	6.35	7.22
$t\bar{t}$	0.02	0.00
WH 160 Signal	0.02	0.05
ZH 160 Signal	0.01	0.06
Background Stack	28.0	44.7
Total Background + MC signal	28.0	44.8
data(4.8 fb^{-1})	22	45

NoZ Peak: Lead Lept. p_T 

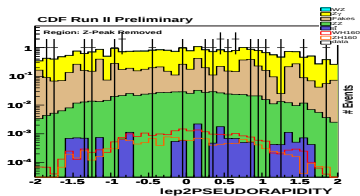
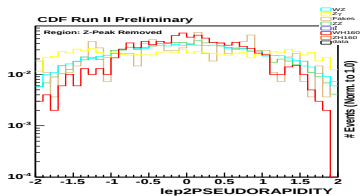
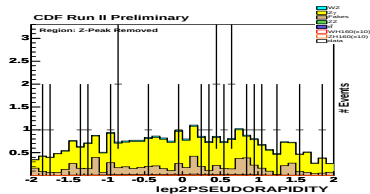
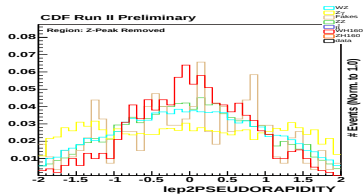
NoZ Peak: 2nd Lept. p_T

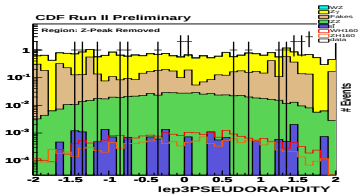
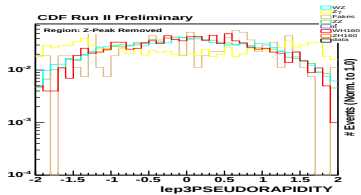
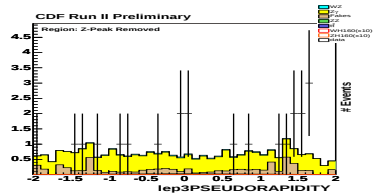
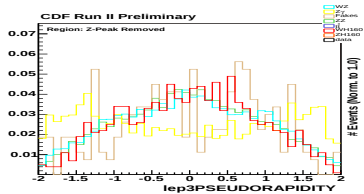


NoZ Peak: 3rd Lept. p_T 

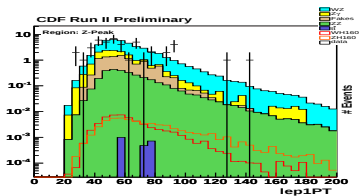
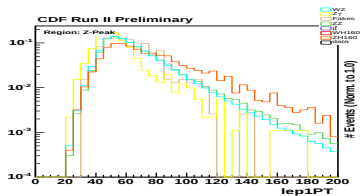
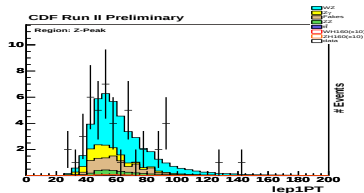
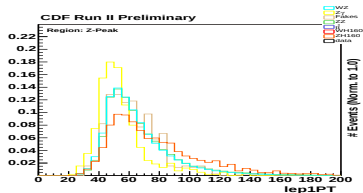
NoZ Peak: Lead Lept. η 

NoZ Peak: 2nd Lept. η

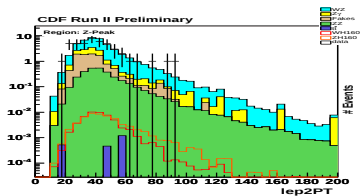
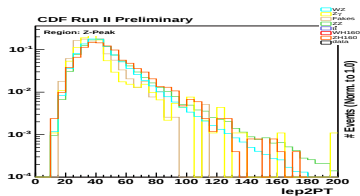
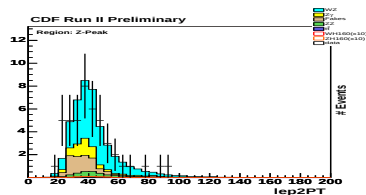
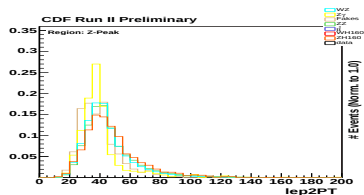


NoZ Peak: 3rd Lept. η 

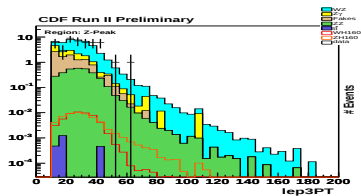
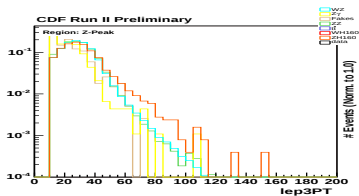
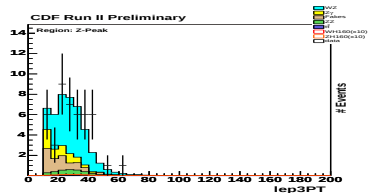
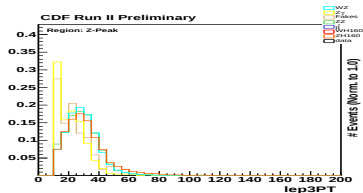
InZ Peak: Lead Lept. p_T



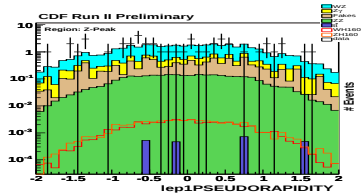
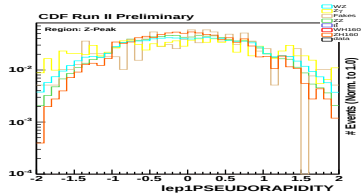
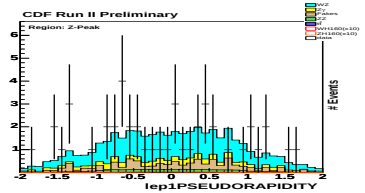
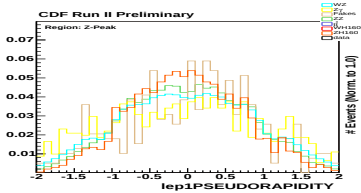
InZ Peak: 2nd Lept. p_T



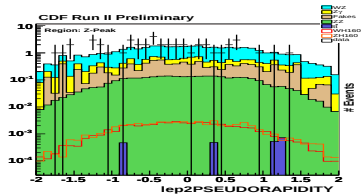
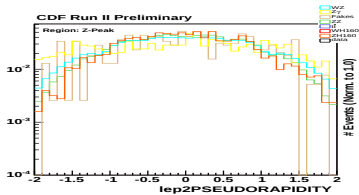
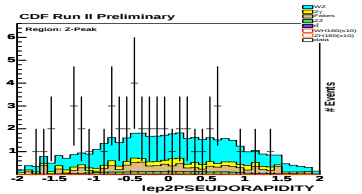
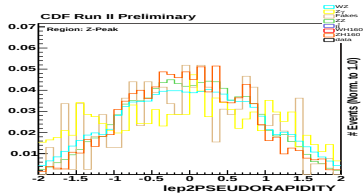
InZ Peak: 3rd Lept. p_T



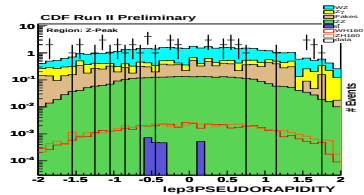
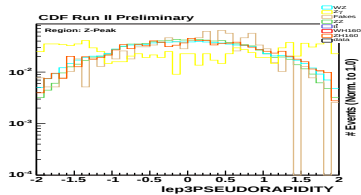
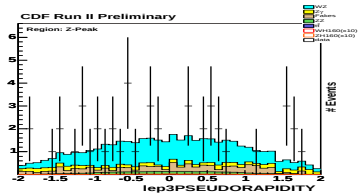
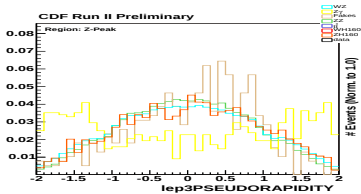
InZ Peak: Lead Lept. η



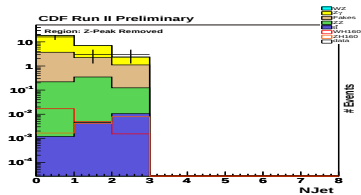
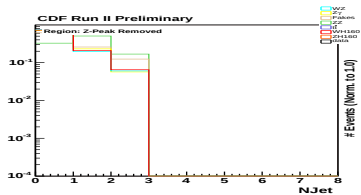
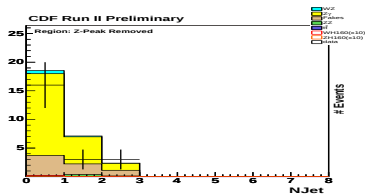
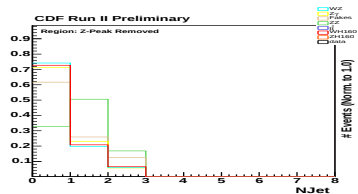
InZ Peak: 2nd Lept. η



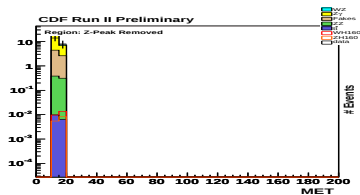
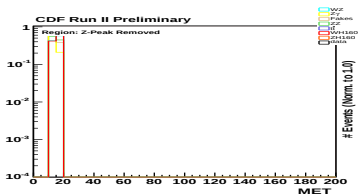
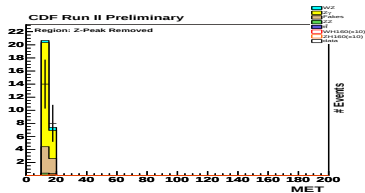
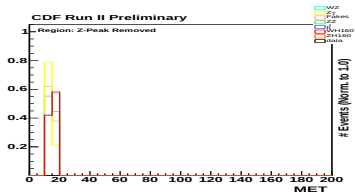
InZ Peak: 3rd Lept. η



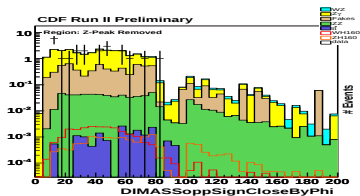
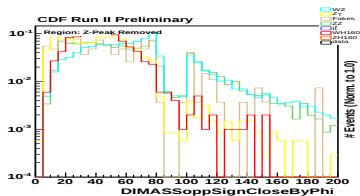
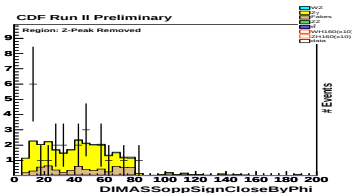
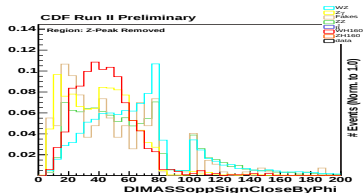
NoZ Peak: NJet



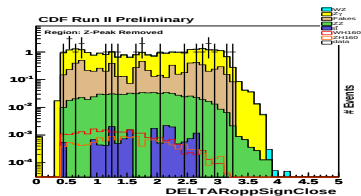
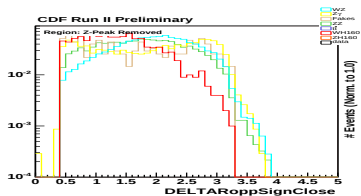
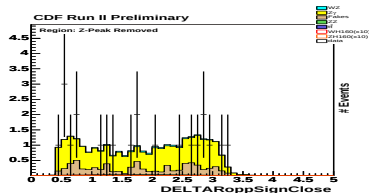
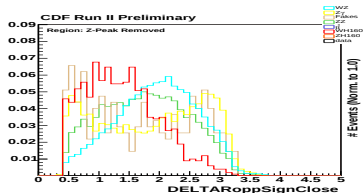
NoZ Peak: $\cancel{E}_T$



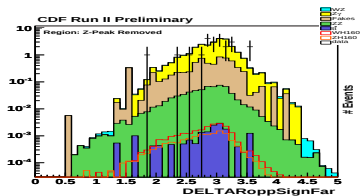
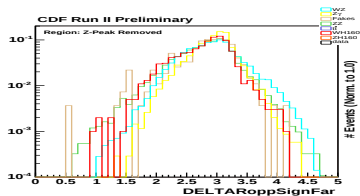
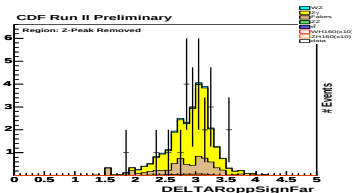
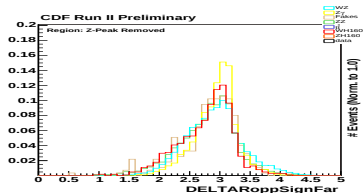
NoZ Peak: Dimass Opp. Sign. Close by ϕ

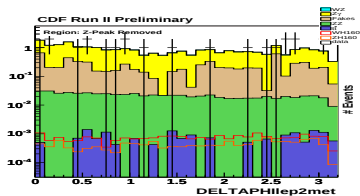
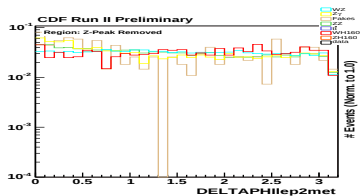
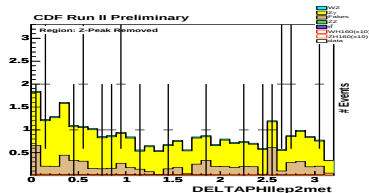
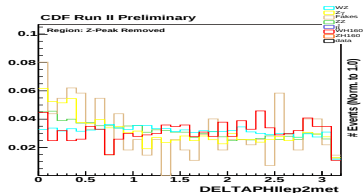


NoZ Peak: ΔR Opp. Sign Close

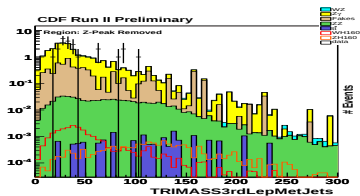
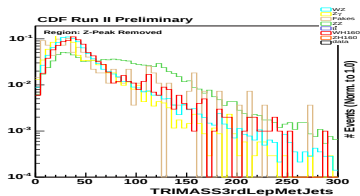
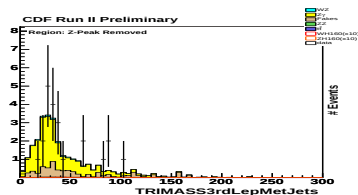
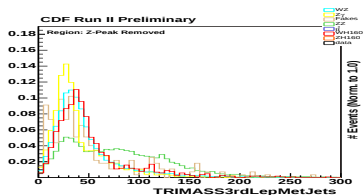


NoZ Peak: ΔR Opp. Sign Far

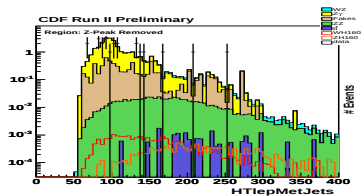
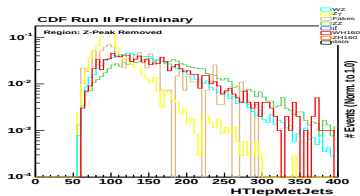
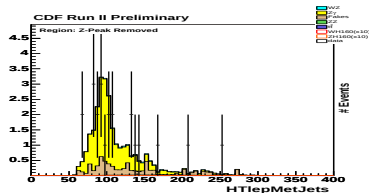
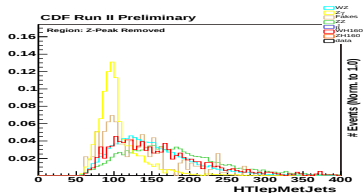


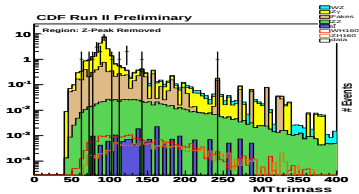
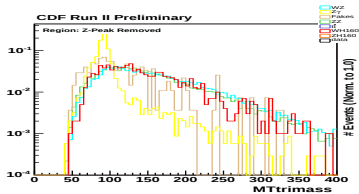
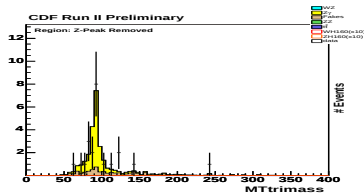
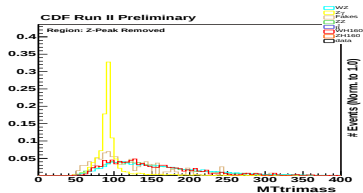
NoZ Peak: $\Delta\phi$ 2nd lepton and $\cancel{E}_T$ 

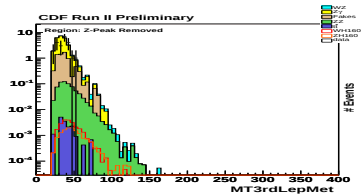
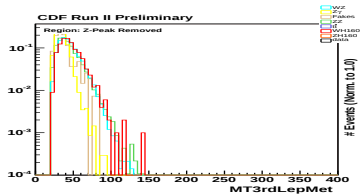
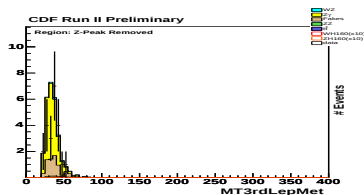
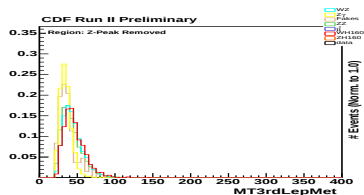
NoZ Peak: Inv. Mass of 3rd lepton, $\cancel{E}_T$, Jets

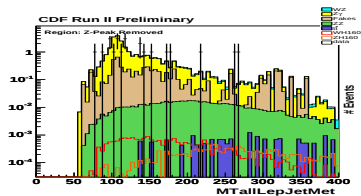
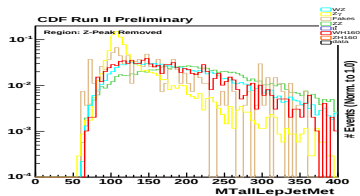
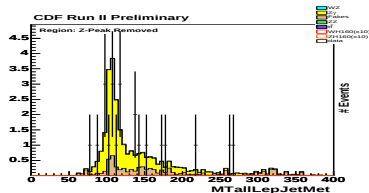
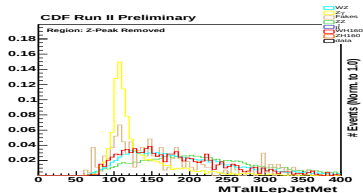


NoZ Peak: H_T leptons, $\cancel{E}_T$, Jets

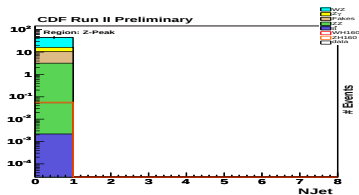
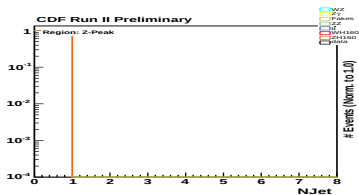
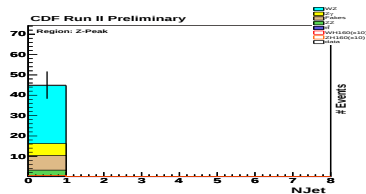
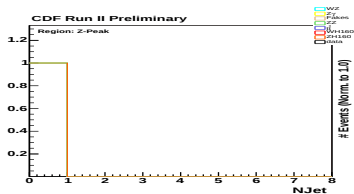


NoZ Peak: m_T leptons

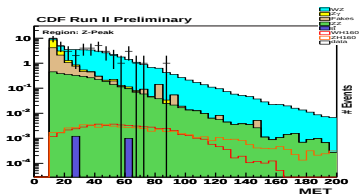
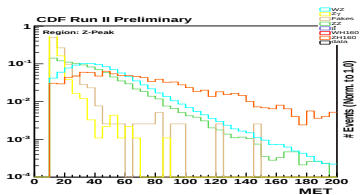
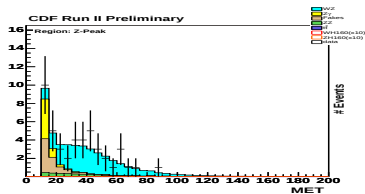
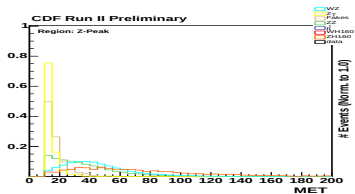
NoZ Peak: m_T 3rd lepton, $\cancel{E}_T$ 

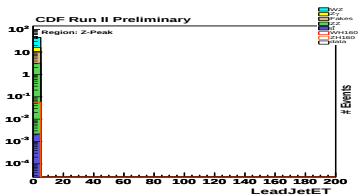
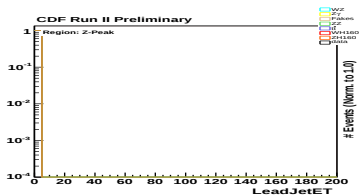
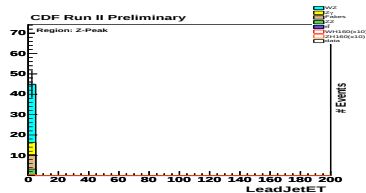
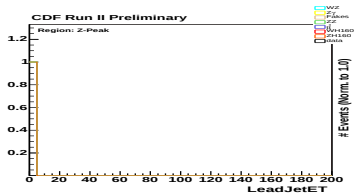
NoZ Peak: m_T leptons, $\cancel{E}_T$, Jets

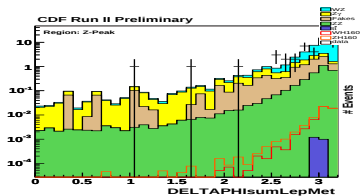
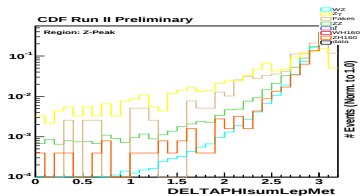
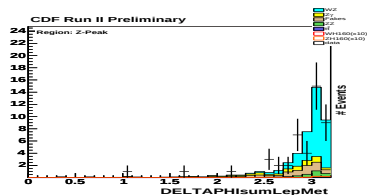
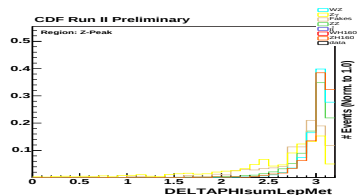
InZ Peak: NJet



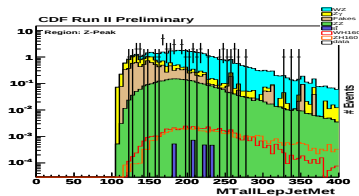
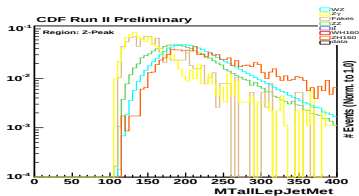
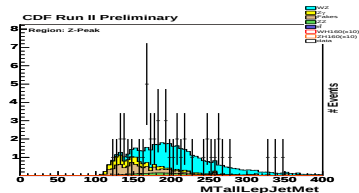
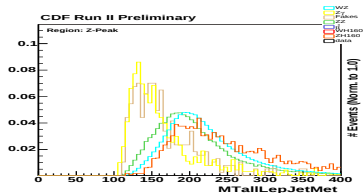
InZ Peak: $\cancel{E}_T$



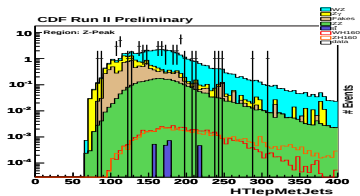
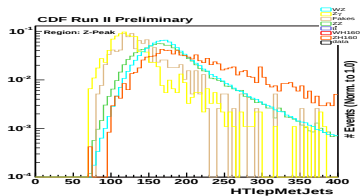
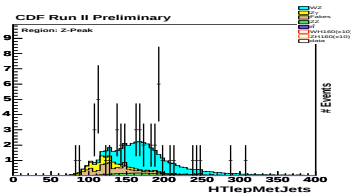
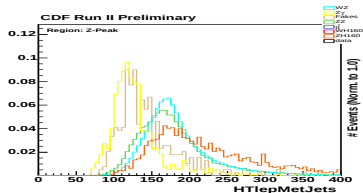
InZ Peak: Lead Jet E_T 

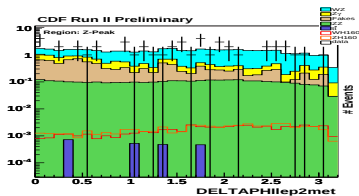
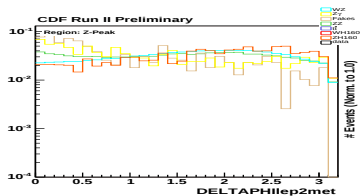
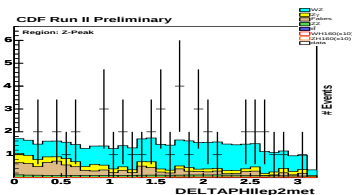
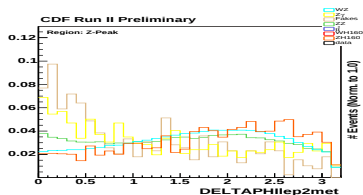
InZ Peak: $\Delta\phi$ Leptons, $\cancel{E}_T$ 

InZ Peak: m_T Leptons, $\cancel{E}_T$, Jets

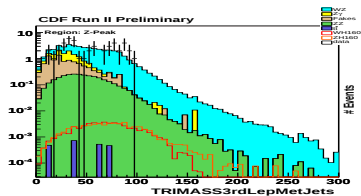
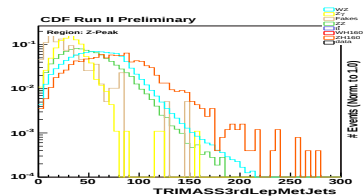
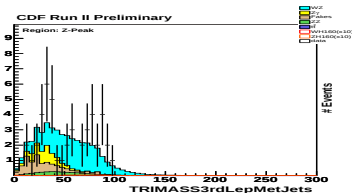
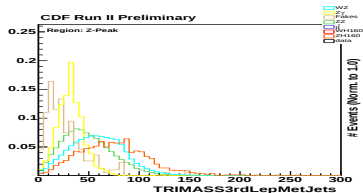


InZ Peak: H_T Leptons, $\cancel{E}_T$, Jets

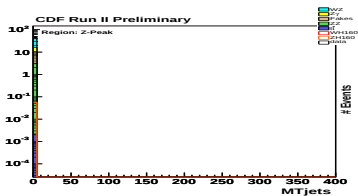
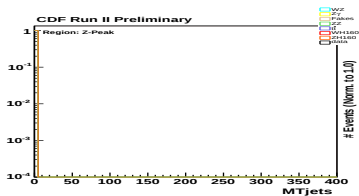
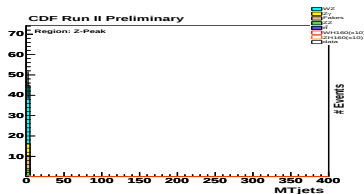
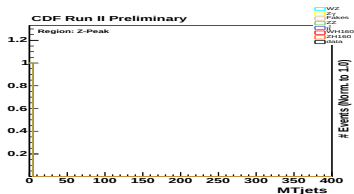


InZ Peak: $\Delta\phi$ 2nd Lepton, $\cancel{E}_T$ 

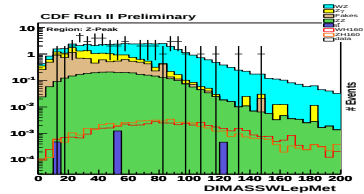
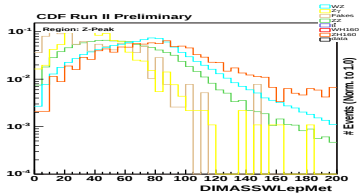
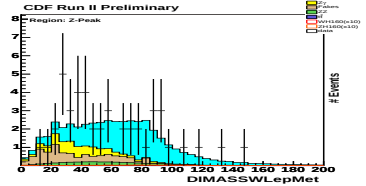
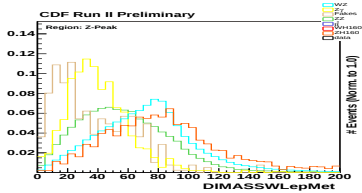
InZ Peak: Inv. Mass 3rd Lepton, $\cancel{E}_T$, Jets



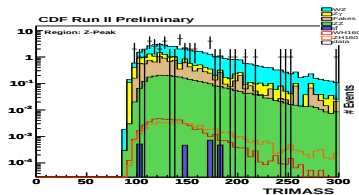
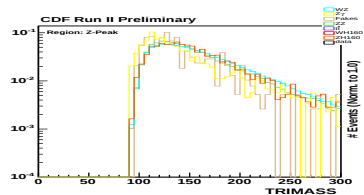
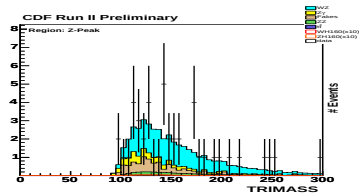
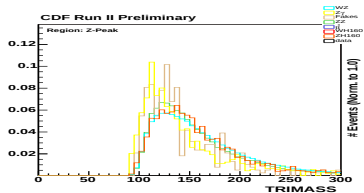
InZ Peak: m_T All Jets

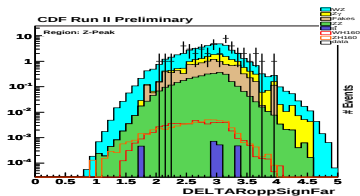
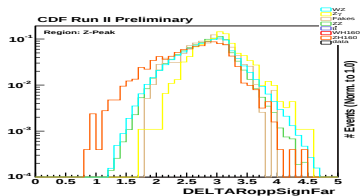
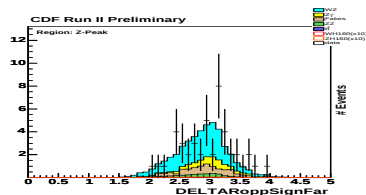
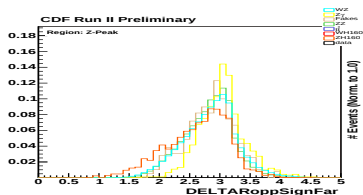


InZ Peak: Inv. Mass W-Lepton, $\cancel{E}_T$

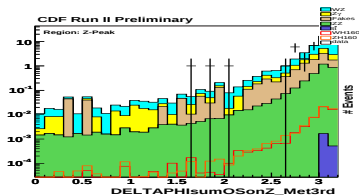
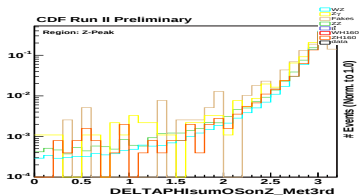
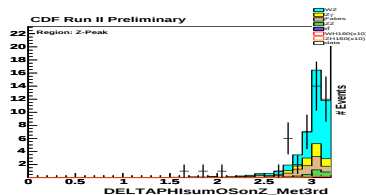
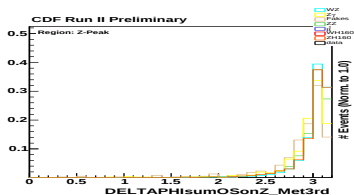


InZ Peak: Trilepton Inv. Mass

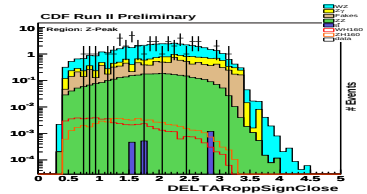
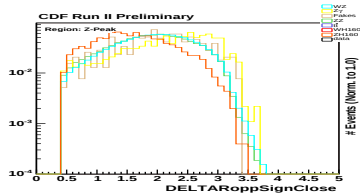
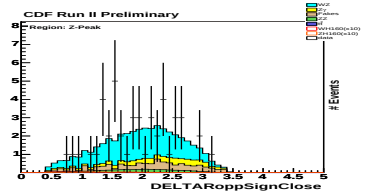
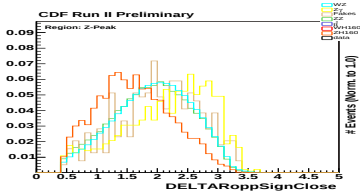


InZPeak: ΔR Opp. Sign. Far

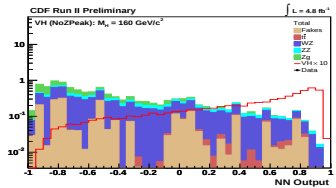
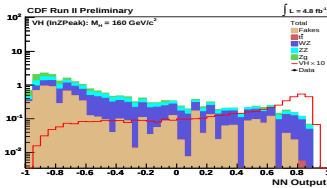
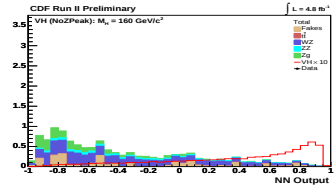
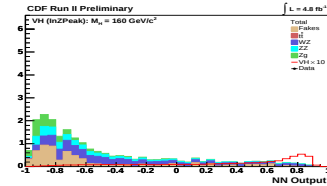
InZ Peak: $\Delta\phi$ b/w Sum of Z-leptons and the 3rd Lepton



InZ Peak: ΔR Opp Sign Close

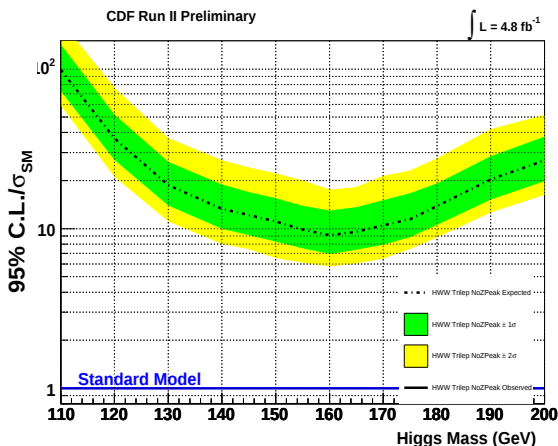


NN Control



NoZ Peak: Limits w/ Systematics

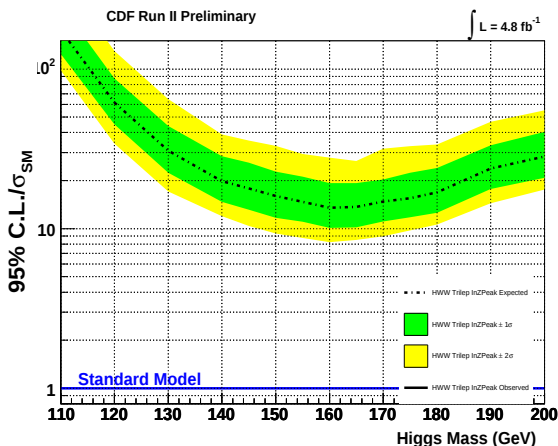
Still missing systematic for faked b-jets in $t\bar{t}$.



GeV	Limit
110	98.9
120	36.9
130	18.8
140	13.3
145	12.2
150	11.1
155	9.88
160	9.09
165	9.54
170	10.5
175	11.4
180	13.9
190	20.3
200	26.8

InZ Peak: Limits w/ Systematics

Still missing systematic for faked b-jets in $t\bar{t}$.



GeV	Limit
110	175
120	61.8
130	30.8
140	19.9
145	17.9
150	16.0
155	14.7
160	13.5
165	13.7
170	14.8
175	15.5
180	16.9
190	23.8
200	28.3