Comments

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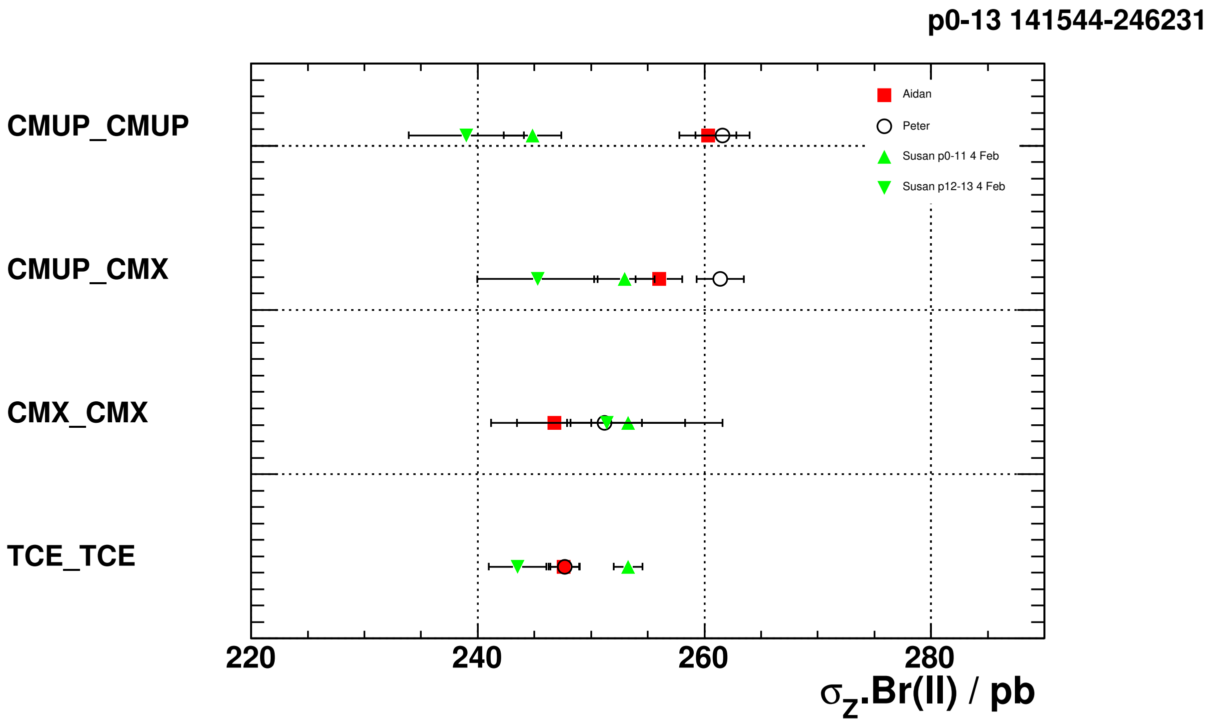
Prioritized Executive Summary

- Resolution of Z cross sections inconsistencies.
- Updating ofMC@NLO treatment
- Addition of representation of the systematic treatment.
- Input variables: Choice of variables study is done; choice of net should be irrelevant and real Pseudoexperiments should show this.(Need to complete); ME and NN variable relationship shown to be very natural and should be stated in paper.
- Plots: Some useful plots are missing. This will also impact one figure in the paper.
- Underpinning studies: Plots are entirely missing from the public material and should be referred to in the paper.

Z cross section

- CMUP-CMUP, CMX-CMX, CMUP-CMX, TCE-TCE disagree between Aidan/Peter and Susan; CMX-CMX 2Aidan-Peter. Numbers disagree Aidan-Peter but σ ok: Selection difference?



Systematics

- Systematics are clearly needed to determine if Data/MC agree as we expect
- DphiLL, Dphi LJet show disagreement: is it within systematic?
- Essential for input distributions
- Also being pressed for by D0

Input Variable Choice (1.9 fb^{-1})

	Best Set LR	All[2]	No LR[2]	Set Used
MVA	Only[2]	TMVA	TMVA	Neurobayes
Sens	2.9	2.7→2.6	2.8	2.8
		$R_{\ell\ell}$	$R_{\ell\ell}$	$R_{\ell\ell}$
	LRWj	LRWj		LRWj
		or MetSpec	MetSpec	MetSpec
	LRHWW[1]	LRHWW[1]	H_t	LRHWW
		Very	E_2^{lep}	
		Little	E_1^{lep}	
		Order	N_{jet}	
		Impact	SumEtLeptonJet	
			E_t^{jet}	
			Met	Met
			addEt	
			dPhiLeptons	dPhiLeptons
			dimass	dimass
			MetDelPhi	MetDelPhi
	LRZZ			LRZZ
	LRWg			LRWg
	LRWW			LRWW

[1] LRHWW first in Separation; [2] Sensitivity Ordered

LRHWW and NN depend most on

- P_t of 2 leptons
- E of 2 leptons
- boost (Jet Et, "Met")
- Vector sum of the Lepton p_t

Should check optimization with Neurobayes and check 2.5fb^{-1}.

NN Choice

Common features of both NN's and the ME

- All use an matrix element as input. Pythia or MC@NLO for NN, MCFM for ME.
- All convert parton kinematics to observables. ME uses a "transfer function", NN's uses CDFSim.
- All compare input variables in control regions. ME uses 4-vector values and NN uses best choice. We have shown this to be equivalent and the best choice NN is a better test of ME input.
- The minimization and numerical techniques differ yet give the same results.

Sentence Summarizing This

"We find that the important variables are $R_{\ell\ell}$, MetSpec and LRHWW. The same sensitivity is achieved to within $\sigma_{95}/\sigma_{SM} = 0.1$ if LRHWW is replaced with the two lepton transverse momenta and energies, and the vector sum of the lepton pt's. Two neural net algorithms give the same result. The similarity of results across technique and algorithm provides convincing evidence of the robustness of the multivariate techniques."

Additional Plots to add to Blessed

- Higgs Signal on top (Hi,Lo, and Hi+Lo S/B)
- σ_{95} Higgs Signal (Frank's request)(Hi,Lo, and Hi+Lo S/B)
- Input Distributions in $0 < NN < 0.1, 0.1 < NN < 80\%$, $80\% < NN < 1$

Studies Done

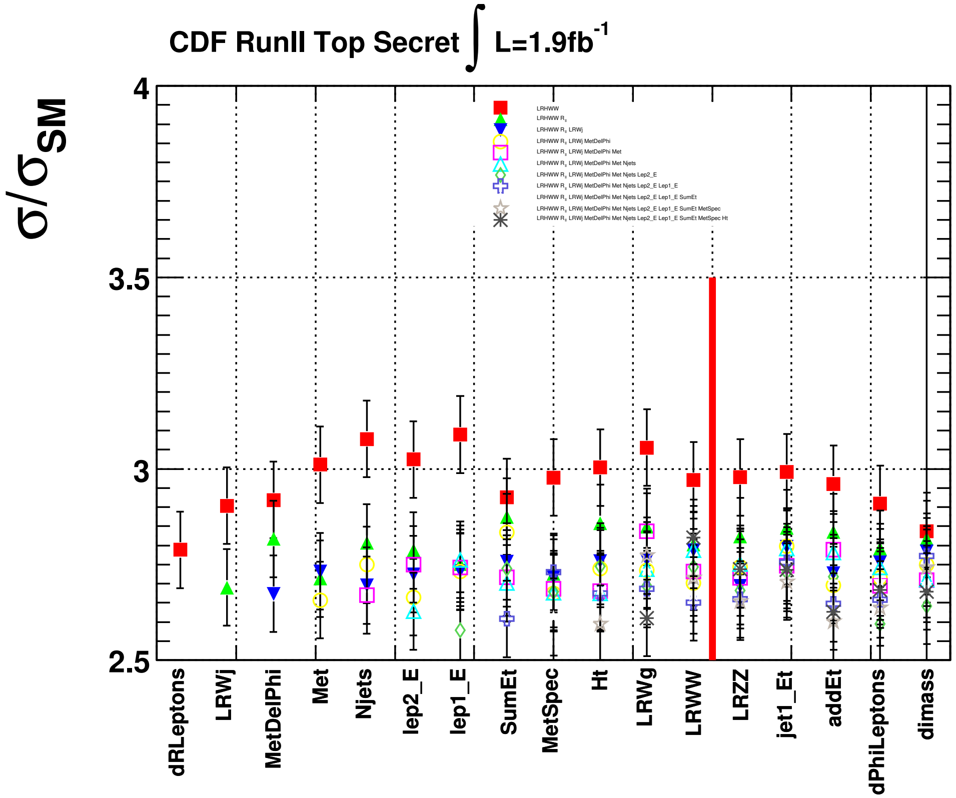
Should be referenced with a phrase in the paper and written up as separate work. Some NN stuff would fit nicely into workshop proceeedings. Others should go to the appropriate CDF group for comment and eventual publication.

- Separation of UE in DY and WW and relation to boost. (In paper this is a phrase. QCD)
- Robustness of results against variables and training details. (Phrase in paper. Workshop)
- Random seed (In paper, this is encapsulated in NB and NN giving same result. Workshop.)
- Jet Multiplicity, Energy scale (Mention in systematics in paper. Check shapes. QCD)

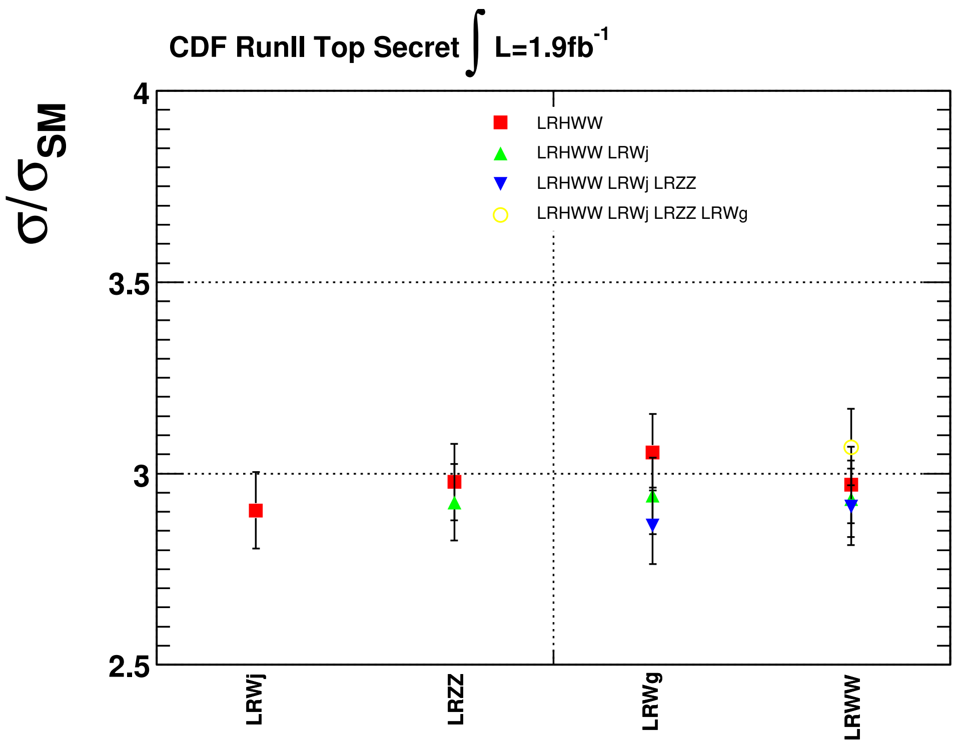
- Shape errors (Check again, pay attention to signal region. Phrase in paper)
- Check Multiparton scatter nonshower bug. (Not for paper. QCD)

backup

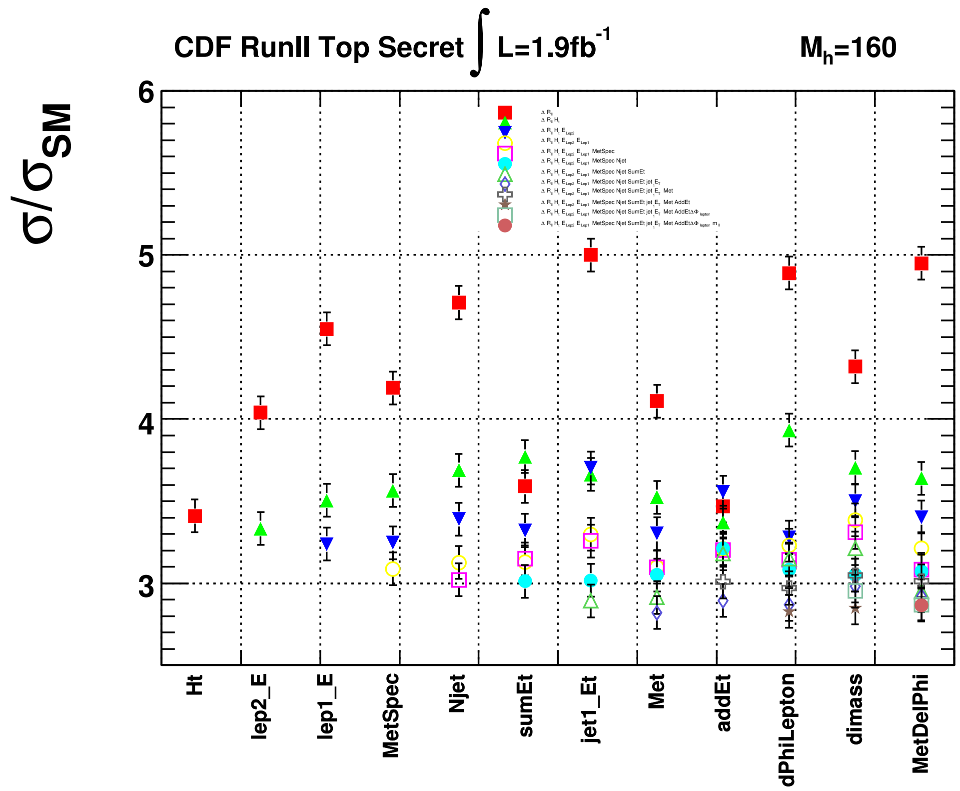
All Variable Study



LR Only Study



Non-LR Study


CDF RunII Top Secret ∫ L=1.9fb-1
Mh=160
σ/σSM
6
5
4
3
Ht
lep2_E
lep1_E
MetSpec
Njet
sumEt
jet1_Et
Met
addEt
dPhiLepton
dimass
MetDelPhi

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		E_2^{lep}	E_t^{jet}	
		SumEtLeptonJet	Met	Met
		H_t	addEt	
		LRWg	dPhiLeptons	dPhiLeptons
		LRWW	dimass	dimass
		LRZZ	MetDelPhi	MetDelPhi
	LRZZ	E_t^{jet}		LRZZ
	LRWg	addEt		LRWg
	LRWW	dPhiLeptons		LRWW
		dimass		

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