FM2 Operator for WWZ

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Overview

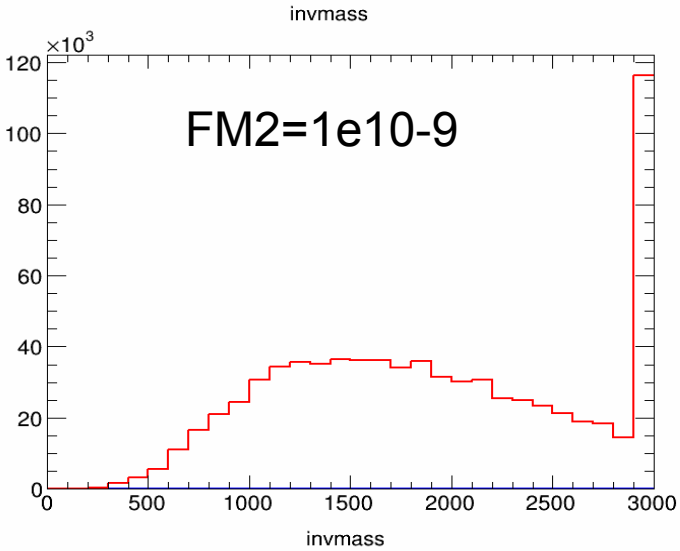
- Generated files based on cross-sections shown last week by Shih-Chieh
  - Using same generator cuts, pt < 10 GeV, |eta| < 2.5
- Four coupling values, 1e10-9, 1e10-10, 1e10-11, 1e10-12
- Includes electrons and muons

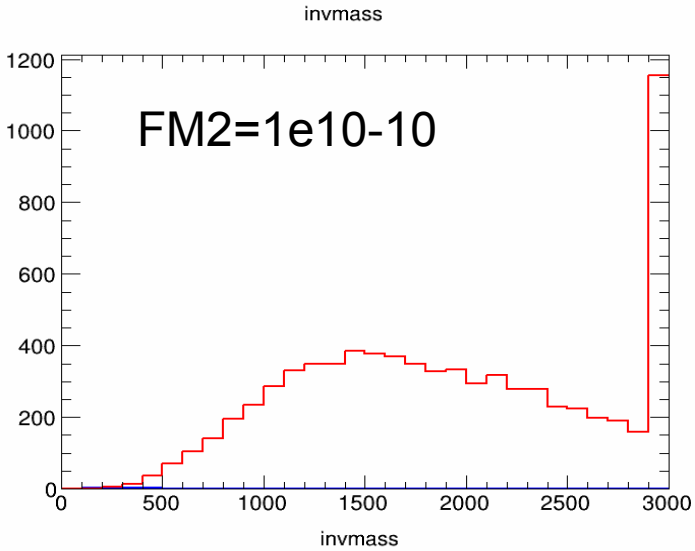
- Cross-section basically follows factor of 10 changes for coupling value through 1e10-12
  - At that point, it still slightly larger than SM

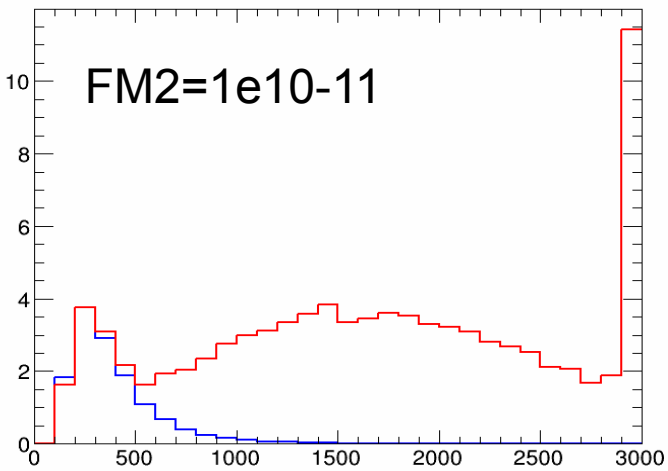
WWZ, 14 TeV, FM2	1e10-9	1e10-10	1e10-11	1e10-12	SM
Cross-section (pb)	10.703	0.10711	0.0011806	0.0001209	0.00011192

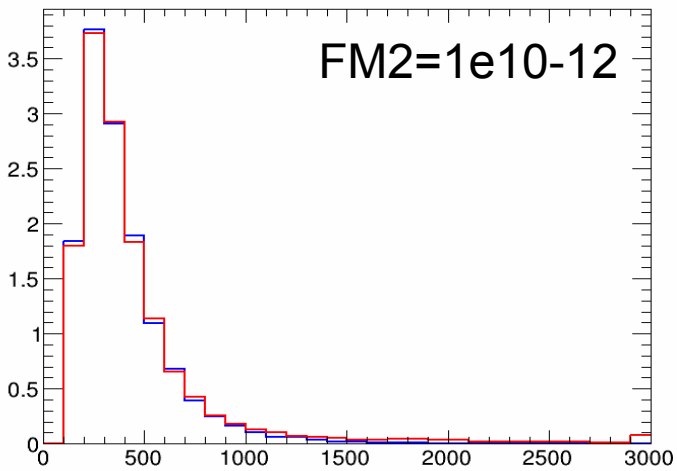
Plots

- Invariant mass of the leptons, requiring exactly 4 leptons
- Number of events for 14 TeV, 300 fb-1
- SM is in blue, too small to see in first two plots





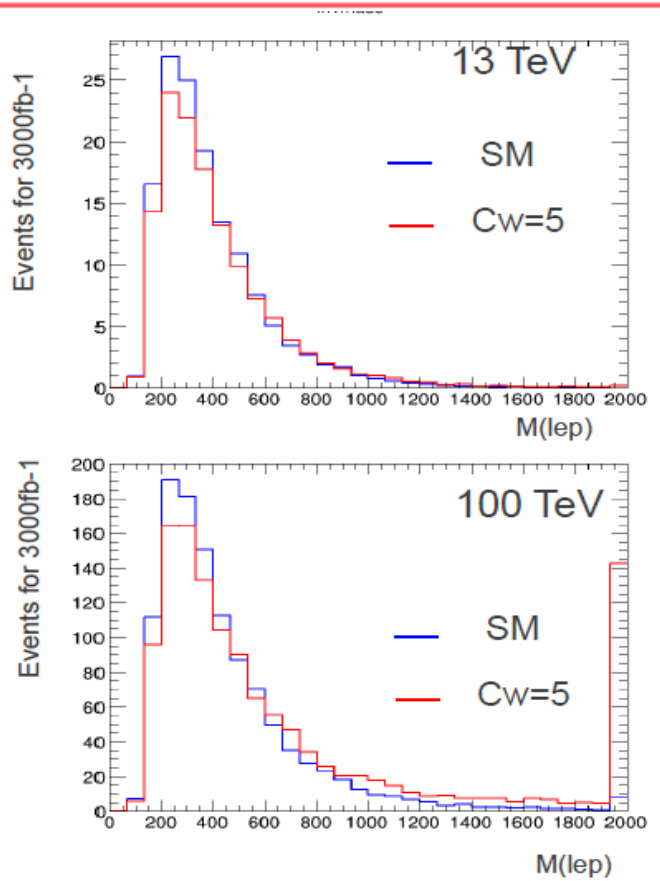




Comparison to dim6 from BNL, with x10 more luminosity

Example of WWZ Anomalous Couplings

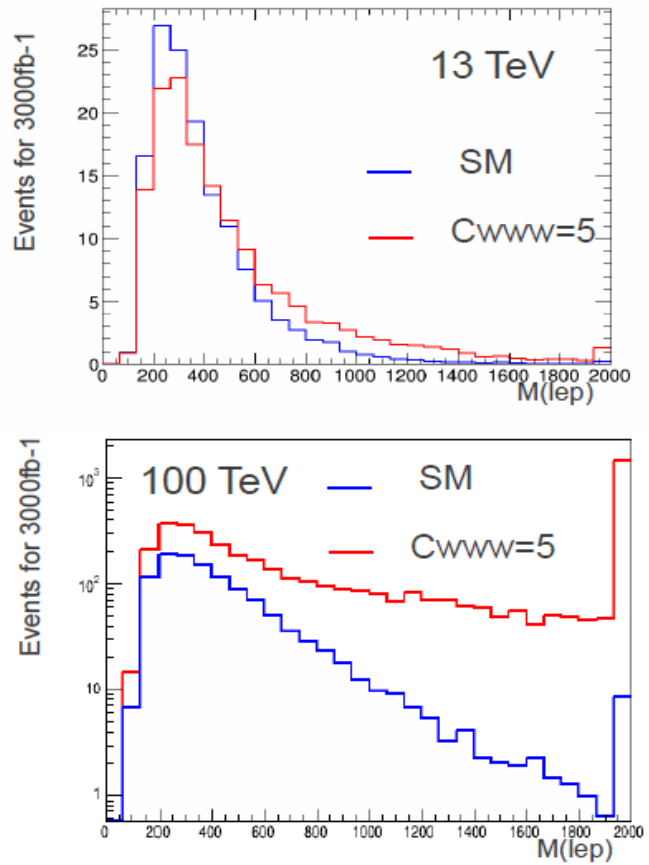
- 50,000 events
- Require exactly 4 leptons
- WWZ has the middle cross-section (from Madgraph) of the three diboson processes
- Probably will see more background events, along with more signal



Comparison to dim6 from BNL, with x10 more luminosity

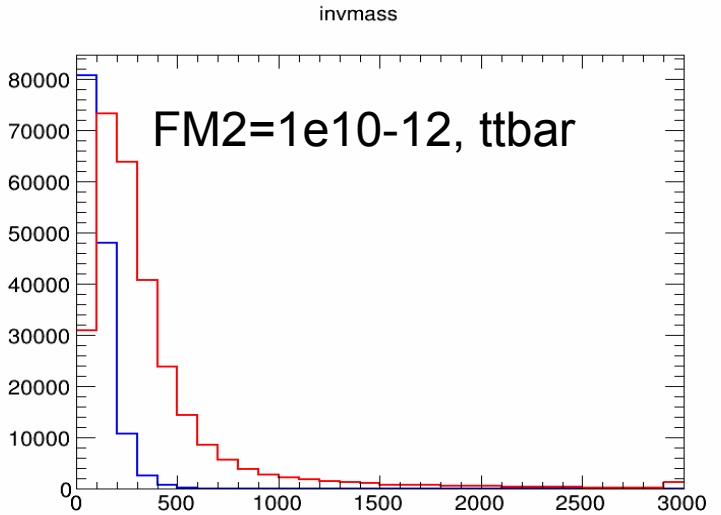
Example of WWZ Anomalous Couplings for Cwww

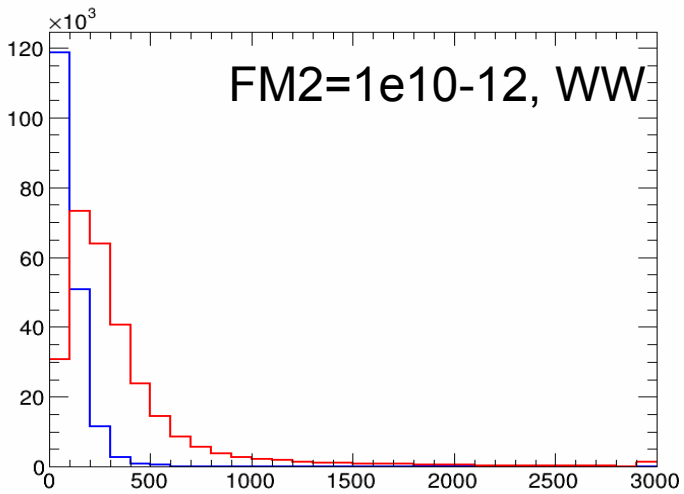
- 50,000 events
- Require exactly 4 leptons
- Cwww has larger impact than Cw
- No impact from Cb = 5



Plots with Backgrounds

- Invariant mass of the leptons, requiring >= 2 leptons (bkgds removed for == 4 leptons)
- Red is FM2, Blue is background
- 14 TeV, 300 fb-1 (except ttbar is 13 TeV)
  - Both cross-sections set to 1.0
- Can see even if use more leptons, could still remove bkgd with invariant mass cut around 500 GeV





To Do

- Understand and implement limit setting code
- Include more backgrounds, such as ZZ->4 leptons and WZ
  - Don't have lepton ID efficiency included right now
- Consider other machine energies and other processes (like WWW)