



Status and Plans for $H \rightarrow WW^*$ Analysis

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Search for SM Higgs in $WW^* \rightarrow l\nu l\nu$ channel

□ Best channel to search for a heavy SM Higgs (> 135 GeV)

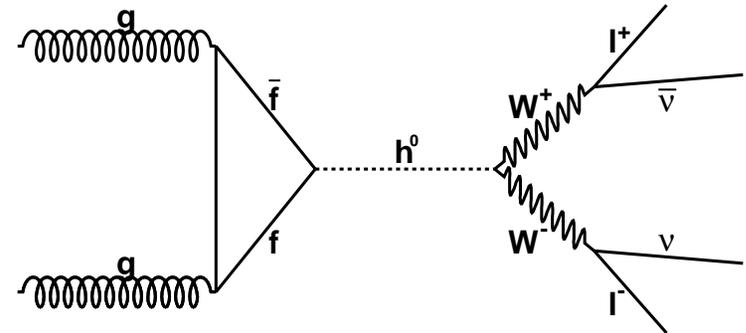
- Largest production mode: $gg \rightarrow H$
 - 8x larger than W/ZH
 - Could also help discover a lighter Higgs (~ 125 GeV)

■ Largest decay branching fraction

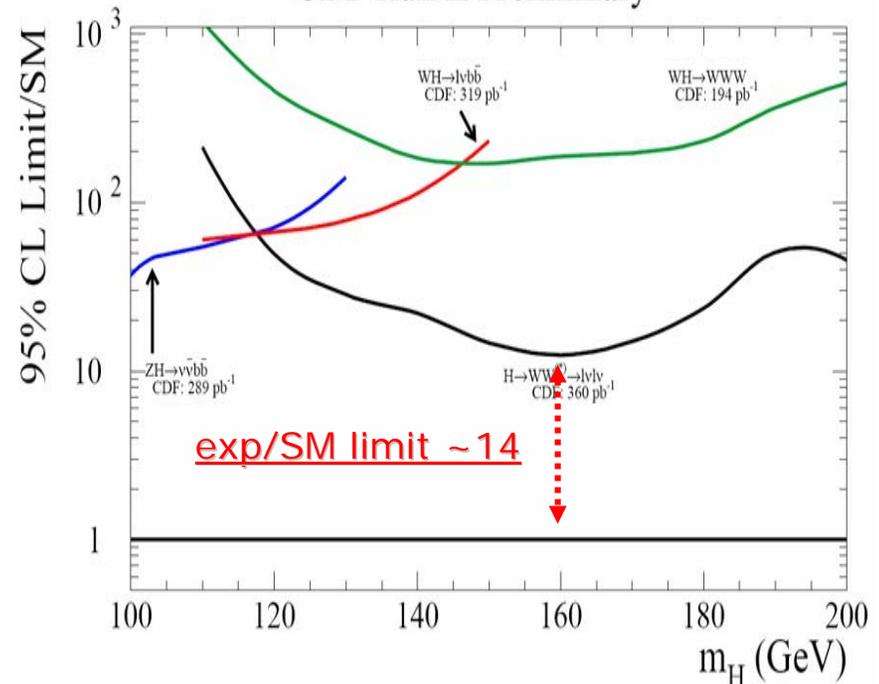
- $\sigma(gg \rightarrow H \rightarrow WW) = 0.27$ pb ($M_H = 160$ GeV)
- CDF could produce ~ 270 $H \rightarrow WW$ events in 1 fb^{-1} , if $M_H = 160$ GeV !
 - Unfortunately $WW \rightarrow l\nu l\nu$ only 5% !

□ 360/pb analysis in God-parents hands!

- Analysis passed the review
- Hope to have a 1st draft released to the collaboration by Christmas!



CDF Run II Preliminary



Towards 1 fb⁻¹ Analysis

- ❑ Migrating analysis code to Gen 6
 - Allow to work with any ntuple, in particular StNt and TopNt
 - Having a more Object Oriented code
- ❑ Strategy on the Monte Carlo generation
 - Will use Gen 6 tarball (6.1.3)
 - ❑ Add extra min-bias events (better agreement with data)
 - ❑ DY, WW, WZ, ZZ, W γ , Z γ to be generated by Electroweak
 - ❑ We will produce ttbar and signal samples
 - ❑ Preparing to generate signal samples for post-shutdown run range
 - HWW: 110, 120, ... , 200 GeV
 - ❑ Also generate VBF samples
 - Increase the acceptance by 7%
- ❑ Data samples Status
 - Inclusive electrons and muons already in TopNt and StNt
 - Plug electrons (MET_PEM) are being stripped ?!
 - Jet samples already Stntuplized ?!

Fake Background Workshop

- In the past we spend 1/2 of the time calculating fake background (10% of the total)
- On Monday (Dec 12th,05) we had a mini-workshop on fakes
 - Brainstorming of new ideas to better understand the fake background.
 - Discuss how to standardize the procedure

$$n = N_{\text{leptons}} \\ m = N_{\text{jets}}$$

determined using
jet triggered data

$$\text{Fake Bckd } N(n,m) = \text{Prob}(\text{"jet"} \rightarrow \text{lepton}) * N(n-1, m+1) + O(n-2, m+2)$$

what can we
learn from MC?

denominator
definition?

trigger bias
removal?

real leptons
removal ?

Future plans

- Shorter term:
 - Focus on a heavy Higgs search ($\sim 160\text{-}180$ GeV)
 - Estimate the signal acceptance and backgrounds
 - Perform the usual control region studies using new data
 - Measure $Z \rightarrow ee, \mu\mu$ cross-sections
 - Compare fake background with the number of same-sign events
 - Look in a missing energy window (20, 45) GeV where WW dominates
 - Improvements
 - Loosening lepton identification criteria
 - Include BMUs ?!
 - Optimization to separate WW from HWW (new variables)
 - Include HW and VBF contributions (15% more acceptance)
 - Open the box with ~ 700 /pb of data
 - Blessing before Summer Conferences is realistic