νν̄H-->νν̄WW*-->νν̄lνqq̄ @ 500 GeV

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LC-REP-2013-XXX: http://www-jlc.kek.jp/jlc/sites/default/files/users/tianjp/HiggsCouplingsCombine.pdf

$$e^+ + e^- \to \nu\bar{\nu}H \to \nu\bar{\nu}(WW^*) \to \nu\bar{\nu}l\nu qq$$

full simulation @ 500GeV
samples with DBD software

pre-selection:

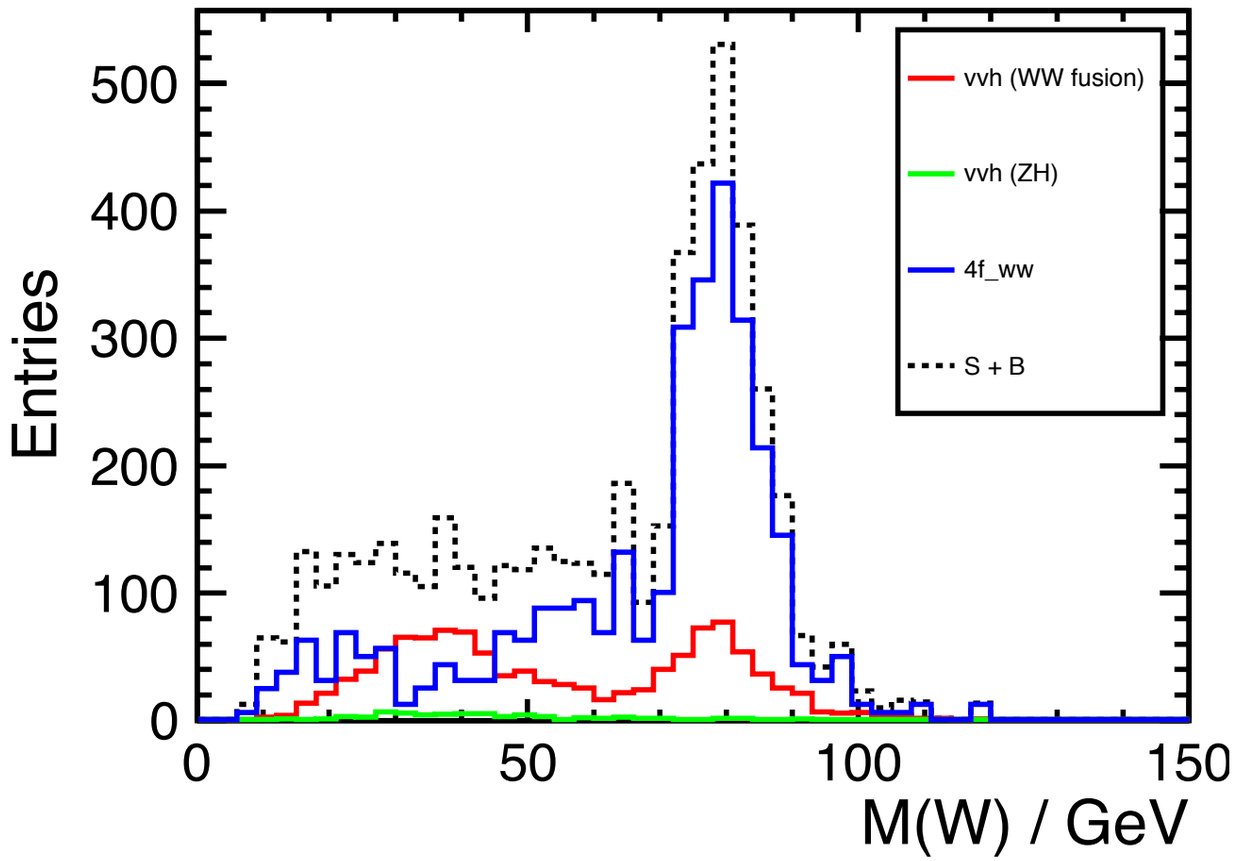
- select one isolated electron or muon (BS and FSR recovered)
- MVA to remove the very forward overlaid particles
- two jets clustering and flavor tagging, each jet at least two charged high Pt (>500 MeV) particles (to either suppress τ from Z or W, or overlay contamination)

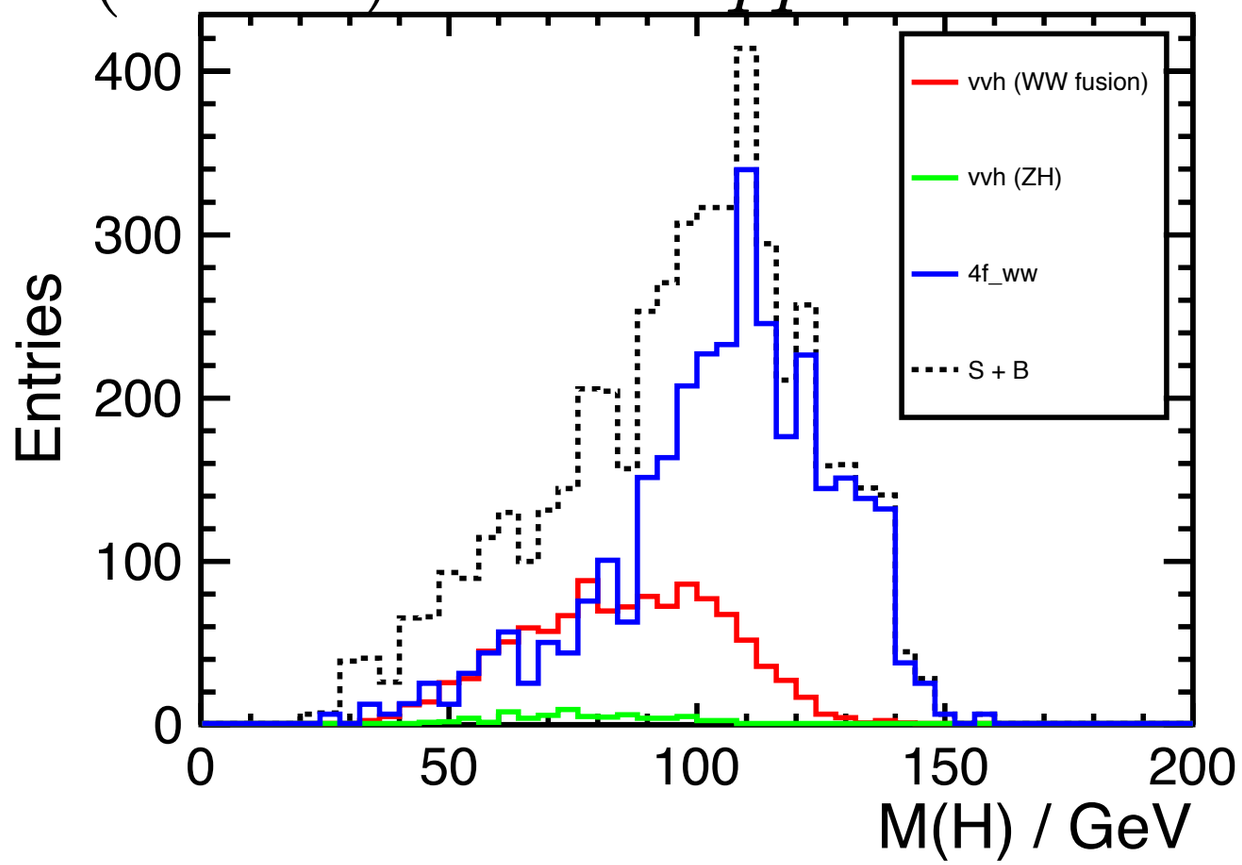
final-selection:

- separate to two categories, muon-type or electron-type, which have very different background contamination and hence selection optimization.
- require large missing energy and large missing Pt (to suppress full hadronic background).
- use flavor tagging to suppress events with b-jets.
- cut on angle between W and lepton, recoil mass of one W (to suppress the dominant background WW).
- cut on electron polar angle (to suppress ee or eν fusion background), also angle between electron and jet (to suppress mis-tagged electron).
- Higgs mass cut

Higgs mass and W mass

$$e^+ + e^- \rightarrow \nu\bar{\nu}H \rightarrow \nu\bar{\nu}(WW^*) \rightarrow \nu\bar{\nu}l\nu qq$$





$$e^+ + e^- \to \nu\bar{\nu}H \to \nu\bar{\nu}(WW^*) \to \nu\bar{\nu}l\nu qq$$

Polarization: (e-,e+)=(-0.8,+0.3) $E_{\rm cm} = 500{\rm GeV}, M_H = 125{\rm GeV}$ $\int {\rm L} = 500\ {\rm fb}^{-1}$

muon-category:

#Signal	#Background	significance
1002 (982)	2187	17.4σ

electron-category:

#Signal	#Background	significance
879 (858)	2528	14.7σ

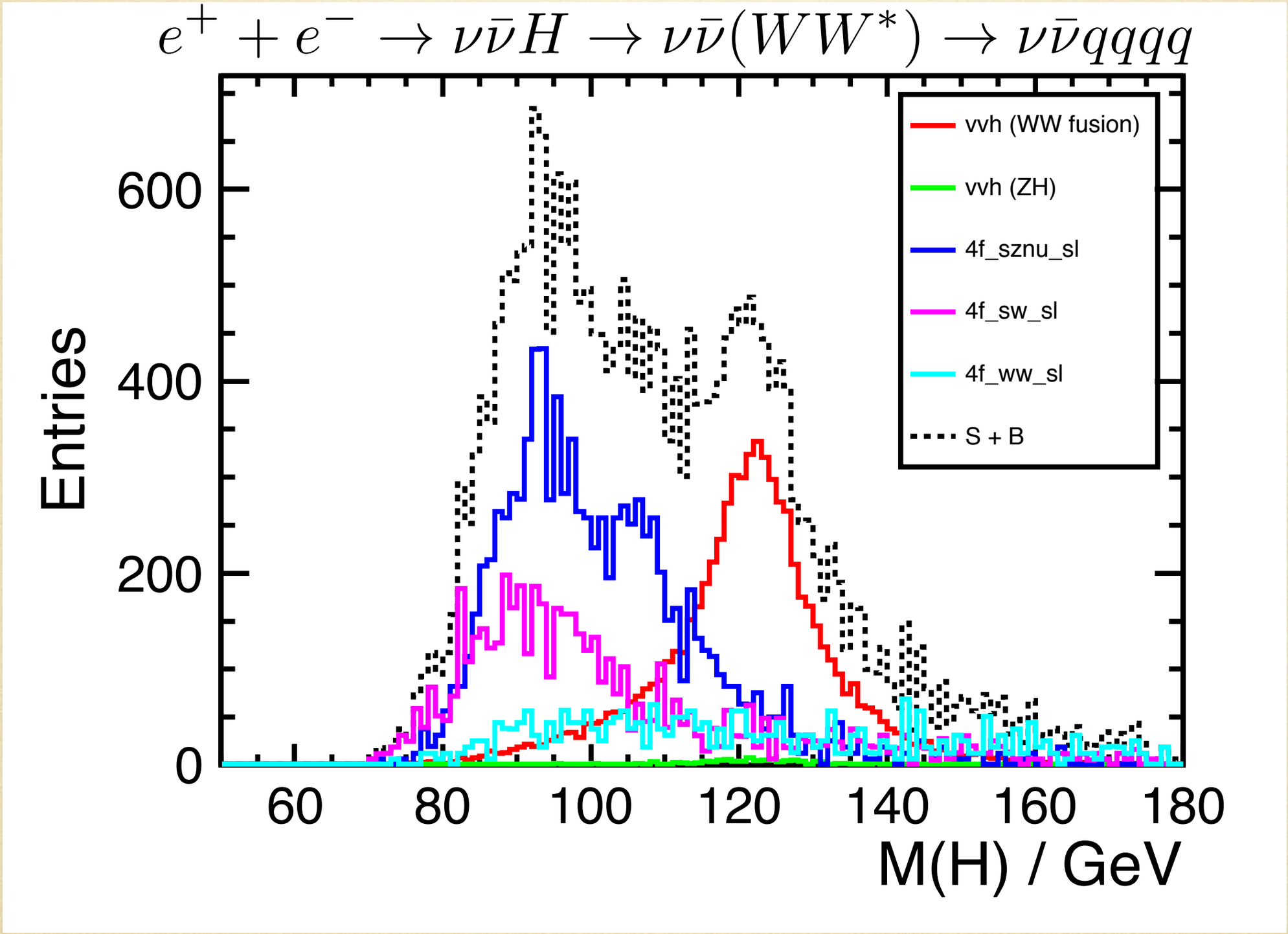
combined: 22.8σ $\qquad \dfrac{\Delta(\sigma \cdot {\rm Br})}{\sigma \cdot {\rm Br}} = 4.4\%$

comparable with WW*-->qqqq (2.8%), together giving accuracy of σBr(WW*) 2.4%

H-->ZZ* ongoing, thank Miyamoto-san for preparing the signal samples very quickly

backup

Higgs Mass (after the preceding 5 cuts)



114 GeV < M(H) < 142 GeV