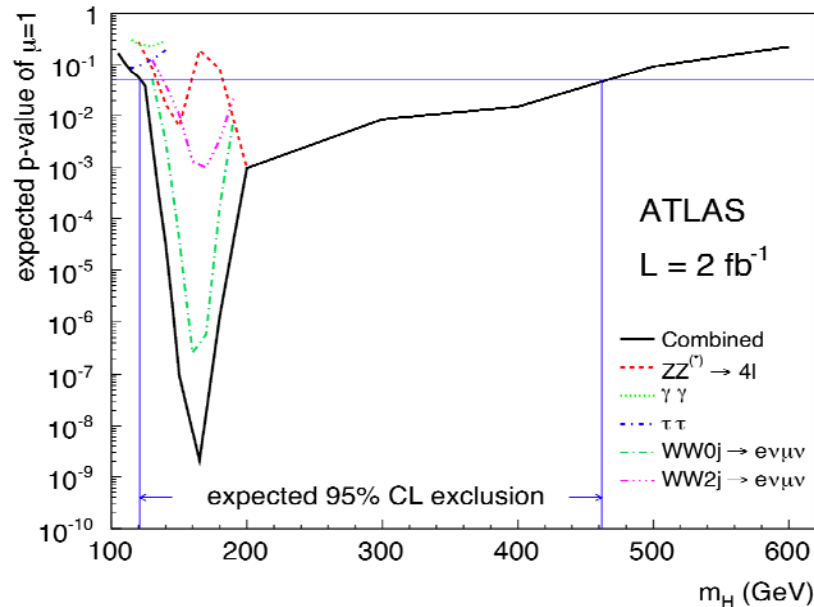


Higgs and Trigger

Ricardo Gonalo on behalf of the Higgs group
Trigger menu meeting - 19 November 2008



Combined exclusion reach of several Standard Model Higgs analyses for $L=2\text{fb}^{-1}$

- The information in this talk is (very) incomplete
 - More time is needed to have feedback from all analyses
 - More info in the run up to February workshop
- Re-running prescaled chains: no use-case identified so far, but still early days
- TrigDecisionTool: no feedback yet
 - My personal impression is that users have trouble with it and look for ways around it
 - Not robust or user-friendly enough
 - Caveat: much of Higgs group just emerging from CSC exercise and release 12!!
- Higgs analysis sensitivity begins at 1-2 fb^{-1}
 - Not yet clear how Higgs group will use 2009 data, but plans are emerging
 - Clearly, early data will be used to study reconstruction and trigger performance!

Overview from CSC

- See: <https://twiki.cern.ch/twiki/bin/view/AtlasProtected/HiggsWGTriggerPage>
- Many analyses rely on single-lepton or di-lepton triggers (e and μ)
 - $H \rightarrow 4l$; $H \rightarrow \tau\tau$; $H \rightarrow WW$; ttH ($H \rightarrow bb$); $A/H \rightarrow ll\nu\nu$; $bbh/H/H \rightarrow \mu\mu$; ZH ($H \rightarrow \text{inv.}$)
- $H \rightarrow \gamma\gamma$ is probably the main client for 2g17i
- A few analyses need hadronic τ triggers or $\tau+xE$
 - $H \rightarrow \tau\tau$; charged Higgs
- Vector-boson fusion production with invisible Higgs decay needs unprescaled missing ET
 - Looking into forward jet triggers (and contributing to its development)
 - XE70 enough for 10^{31} menu
 - But will need $xE + j + FJ$ for $L = 10^{33} \text{ cm}^{-2} \text{ s}^{-1}$
- Charged Higgs is a complicated case:
 - xE30 / xE40 / xE50 / tau30 / 3j20 / e22i / mu20 and combinations thereof (5 analyses)

$L=10^{31}$ menu

- Early feedback from $H \rightarrow WW \rightarrow ll\nu\nu$:
 - Interested in single- and di-lepton triggers from 10^{31} menu. E.g.:
 - 2MU4_Upsimumu
 - 2e5_medium
 - 2e5_medium1
 - 2e6_medium1
 - mu62mu4
 - Etc...
 - Also interested in prescaled, low- E_T , jet and E_T^{miss} triggers
- Triggers for charged Higgs signal not in the menu
 - Trying to understand what will be needed for first data and to do studies well in advance of higher lumi
- Data samples being produced:
 - With pileup - 5×10^{31} , 450ns bunch crossing, 1.8 collisions/crossing – (not sure)
 - Will allow studies in signal - investigating which other samples are available and what studies can be done
 - See:
https://twiki.cern.ch/twiki/bin/viewauth/AtlasProtected/HiggsWGMCSamples#MC_production_for_MC8_10_TeV_col
- More soon...

backup

Signal for Trigger WS 1/2



- HSG1 (120GeV)
 - 106384 Pythia H-> $\gamma\gamma$, 106367 MC@NLO H-> $\gamma\gamma$... OK
 - 105317 HW VBF H-> $\gamma\gamma$... rerun it soon.
 - Other $\gamma\gamma$ signal (WH, ZH, ttH) ... OK
- HSG2
 - H->ZZ->4l (several mass points) ... OK
 - 109234 H(300GeV)->ZZ->2l2tau ... new (evgen task is finished.)
 - 106319 ZH(130GeV)->inv ... not defined yet. (jobO is ready now.)
- HSG3 (165GeV)
 - 109136 MC@NLO H->WW->2l ... wait for 14.4.x release
 - Sherpa VBF H->WW->2l ... preparing jobO and input files
 - 109179 PY H->WW->2l ... new (evgen task is finished.)
 - 109206 HW VBF H->WW->2l ... wait for 14.4.x release
 - ttH, H->WW (109110-109115) ... yet. Asking...
 - WH, H->WW (109116-109119) ... yet. Asking...
 - VBF H->inv (109011, 105335) ... OK



17 Nov, 2008

Higgs subconvener meeting

6

Signal for Trigger WS 2/2



- HSG4
 - SM VBF H(120GeV)->tautau ... OK
 - MSSM bbA->tautau (Sherpa) ... OK except for H(120GeV)-> $\tau\tau$ ->lh (preparing jobO and input files)
 - MSSM A->tautau (Pythia) ... preparing jobO
 - MSSM bbA(200GeV) (Sherpa)->mumu ... OK
 - MSSM A(200GeV)->mumu (Pythia) ... OK
- HSG5
 - ttH and H⁺ ... rerun soon.
 - WH/ZH, H->bb ... preparing jobO
- Situation of HSG3/HSG5 is not good. It should be improved. I'll push the central prod to submit tasks again.
- I'll monitor all the datasets to get them before X-mas.

