

MVA Higgs $\tau\tau$ Short Update

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*ATLAS Pisa
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**travelling to Genova for the LHCpp Workshop*

Latest Schedule

Friday May 3: circulate first draft to the EdBoard

Monday May 6: HiggsWG preapproval [<-- yesterday](#)

Tuesday May 14: ask EdBoard approval to unblind

Thursday May 23 circulate unblinded draft to EdBoard and Hi

Tuesday May 28: HiggsWG approval

Friday June 7: ask EdBoard to approve public draft to ATLAS

Monday June 10: ATLAS circulation

Monday June 17: ATLAS approval

Monday June 24: Lepton-Photon Conference

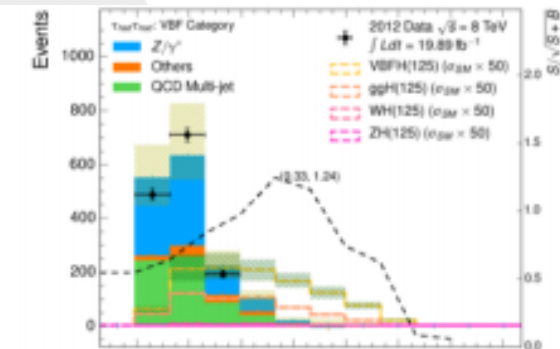
Had-Had Updates

- * Trying to finalize the input training variables in the 4 event categories
- * We have new ntuple skims with new SFs
- * Try to correctly implement all SFs (tau ID eff, tau fake rate, tau trigger efficiency, pile up, etc) according to the latest recommendations
- * Trying the notOS instead of the current SS QCD model
- * Trying the embedding $Z\tau\tau$ instead of simulation

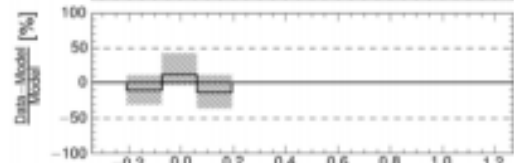
Short-term tasks

- *Check mass spectrum for unblinded BDT region.
- *Check control plots for higher mass cuts (eg. raise 60GeV to 75GeV).
- * Try to share small ntuples with BDT score written-out
- *Change to simultaneous track+mass fit
- * Updated cut-based result.

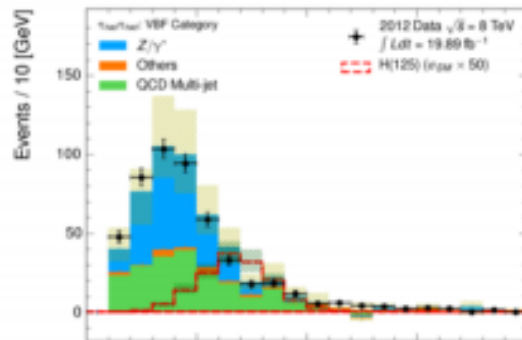
Had-Had Signal Regions



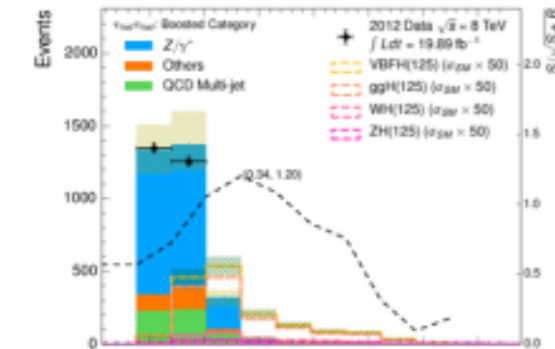
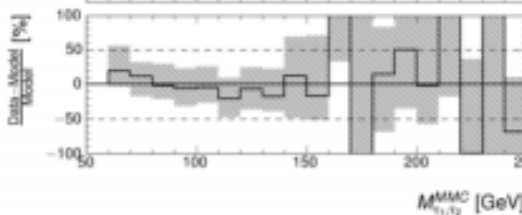
BDT Score



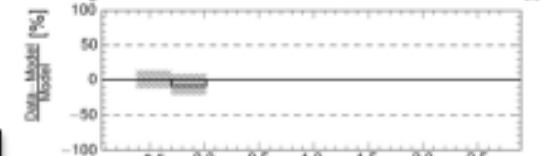
VBF



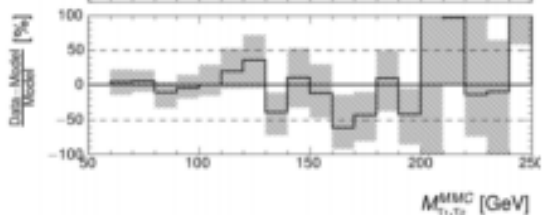
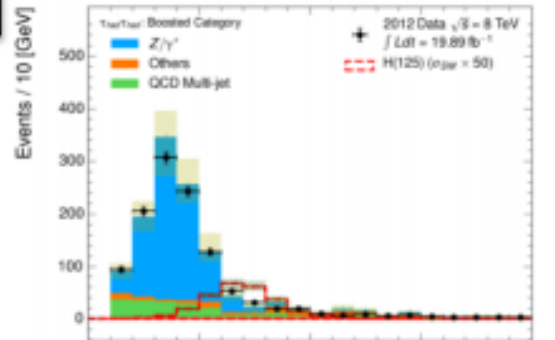
Bkg-reweighted
MMC score



→ Alpgen used
for these plots



Boosted



MVA Preliminary Results

Limit [x SM]	VBF	Boosted	1J	0j	Combined
Lep-had	1.78	2.26	3.64	7.24	1.17
Had-had	1.91	2.64	6.90	11.82	1.29
Lep-lep*	2.2	3.4	(ongoing)	--	(ongoing)

Had-Had

→Need to implement updated QCD model

→Would like to employ simultaneous mass-nTrack fit in final result (presently they are decoupled)

More information

The sharepoint has the latest plots.

<https://espace.cern.ch/atlas-project-HSG4/HTauTauHH/default.aspx>

Combined support note

https://svnweb.cern.ch/trac/atlasphys/browser/Physics/Higgs/HSG4/FullDataset_7and8TeV_tautau/Combined_tautau_MVA_support