Weekly report

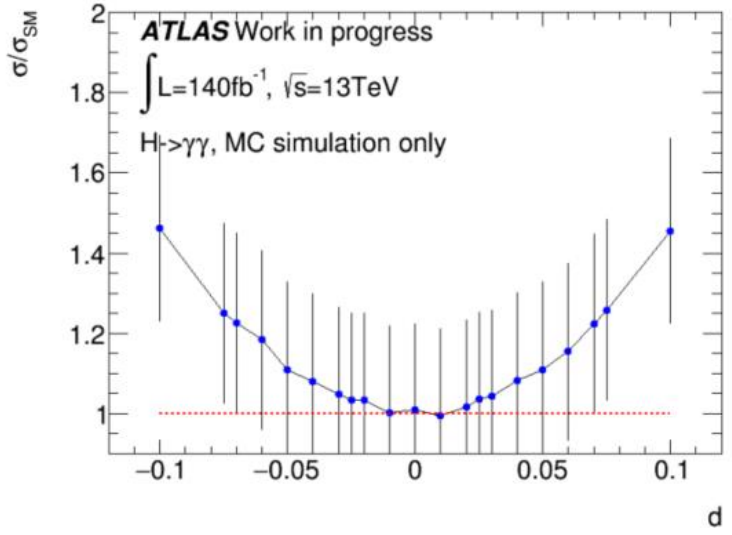
FANGYI GUO

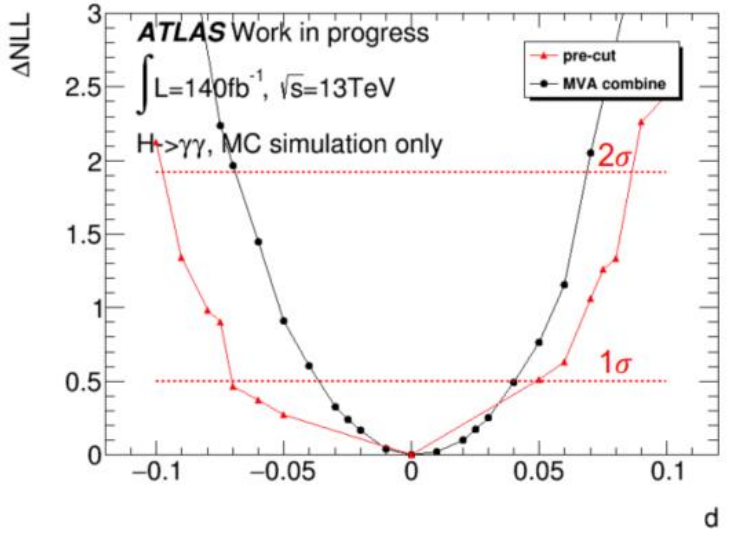
VBF Higgs CP test

MVA combined fit

- Still MC only, finished 140ifb stat. only MVA combined result.
- Simultaneously fit μ_{VBF} only. Should the $\langle OO \rangle$ also be fitted simultaneously?
- Present result: [-0.04, 0.04]@68% CL, [-0.07,0.07]@95%CL.

$$PDF_{total}(m_{\gamma\gamma}, OO) = \hat{\mu}_{VBF} \times N_{VBF}^{SM} \times f_{sig}(m_{\gamma\gamma}) \times g_{VBF}(OO) + N_{ggF}^{SM} \times f_{sig}(m_{\gamma\gamma}) \times g_{ggF}(OO) + \widehat{N}_{bkg} \times f_{sig}(m_{\gamma\gamma}) \times g_{ggF}(OO)$$





VBF Higgs CP test

Data-MC comparison:

- 2017, 2018 data used EventInfoAux.averageInteractionsPerCrossing to represent mu. Need to correct in my code
- This variable can not be read as ntuple, find why or change my codes into Athena.
- Alternative way: directly use sideband data, no MC.

About MVA categories:

- 4 categories: HjjHigh, HjjLow with BDT tight and loose are provided by Hgam
- Shall we use the combination or the best one?

	ggF	VBF	Di-photon background	VBF purity
HjjLow_loose	20.82527	42.2653	3198.648	57.96%
HjjLow_tight	5.99863	41.539	381.4368	66.99%
HjjHigh loose	31.82538	10.2294	6176.05	87.38%
HjjHigh tight	33.61908	33.1906	3654.045	24.32%
Total event number	92.2682	127.225	13410.15	49.68%