

Plan on VBF $H \rightarrow \gamma\gamma$ and $hh \rightarrow \gamma\gamma WW$

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June 18, 2017

- Plan
 - Man power and timeline
 - Plan of VBF $H \rightarrow \gamma\gamma$
 - Plan of $hh \rightarrow \gamma\gamma WW$
- Technique discussion

- Man power
 - Supervisor : Yaquan Fang
 - VBF $H \rightarrow \gamma\gamma$: Yu Zhang, Fangyi Guo(main contributor)
 - $hh \rightarrow \gamma\gamma WW$: Qi Li, Kaili Zhang/Yi Fang(perhaps one of them will be the main contributor)
- Timeline
 - Aiming for TDR in the end of September, the time is quite tight.
 - Finish the analysis before August.
 - Finish the note in the middle of August.
 - Is it fine for the group?

Plan of VBF $H \rightarrow \gamma\gamma$

- impact of high pileup
 - more potential background and ggH contamination
 - distort the photon performance
- baseline analysis
 - investigate some VBF-sensitive variables
 - perform the BDT optimization
 - significance or what other results should be reported?
- interesting investigation if enough time
 - diphoton pointing in high pileup environment
 - other photon performance

Plan of $hh \rightarrow \gamma\gamma WW$

- Model
 - BSM non-resonant or resonant search for additional heavy Higgs in 2HDM etc.
- baseline analysis
 - Focus on semi-leptonic channel and work on di-lepton channel if possible.
 - Re-visit the selection
 - Upper limit setting and interpretation in 2HDM

- VBF $H \rightarrow \gamma\gamma$
 - It says we can use full simulation sample and ggH and VBF samples are available but background is not.
 - Then we can share some codes from HGam group and the analysis chain of AOD $\rightarrow$ DAOD $\rightarrow$ MxAOD.
 - But is there a dedicated photon ID and Isolation WP in the recommendations?
 - Or do smearing on truth information?
- $hh \rightarrow \gamma\gamma WW$
 - Smearing the truth as bb $\gamma\gamma$ did
 - Unfortunately, the samples are not available
 - Samples needed
 - Signal : non-resonant, $m_H = 260, 300, 400, 500$ GeV of $hh \rightarrow \gamma\gamma WW$
 - Background : inclusive $l\nu\gamma\gamma jj$
 - Need to prepare the evgen files.