

weekly report

outline

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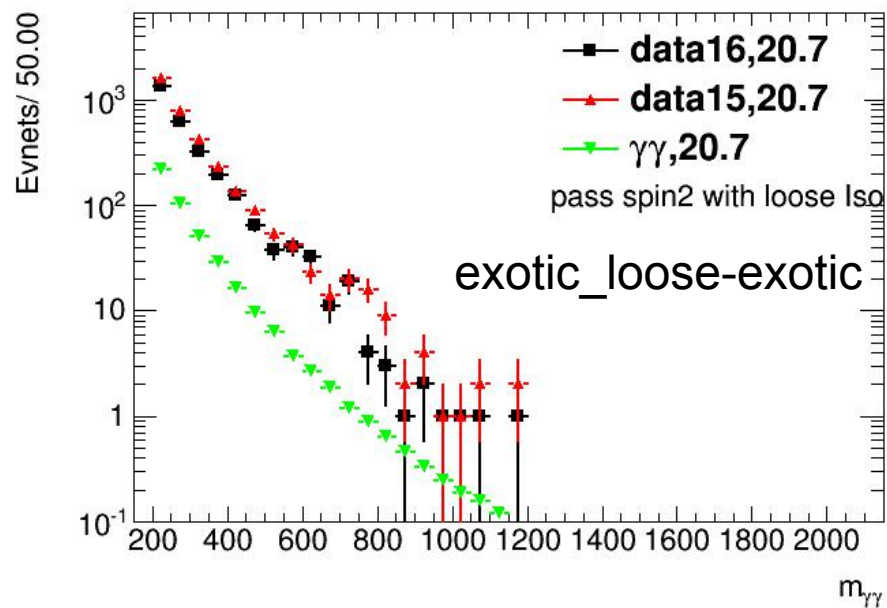
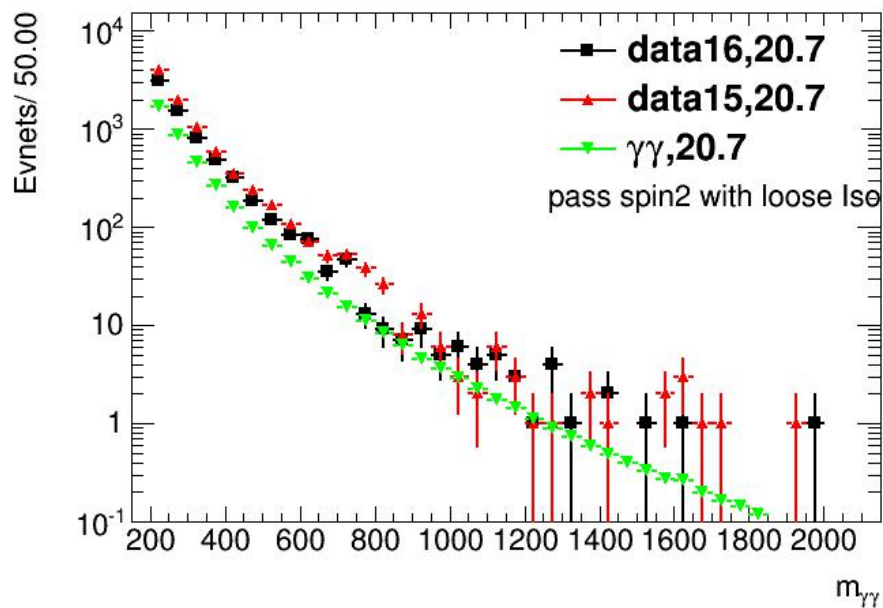
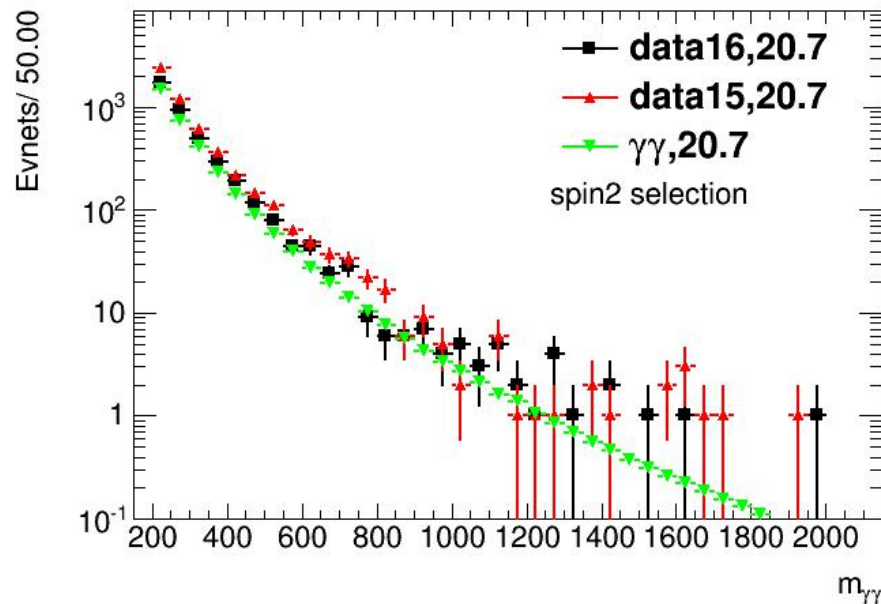
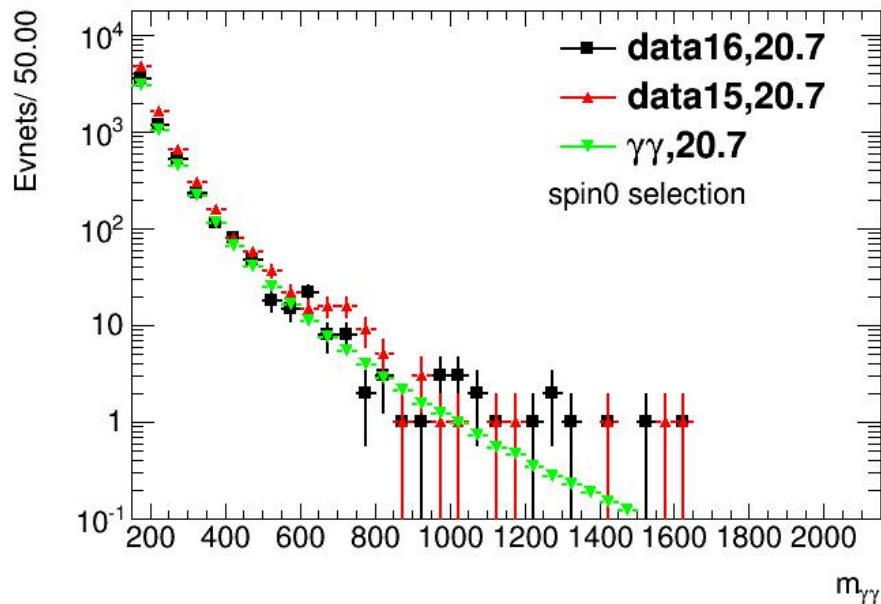
- cross check on 750 diphoton with full 2016 data
- categorization on photon photon model
- various check on SM Higgs

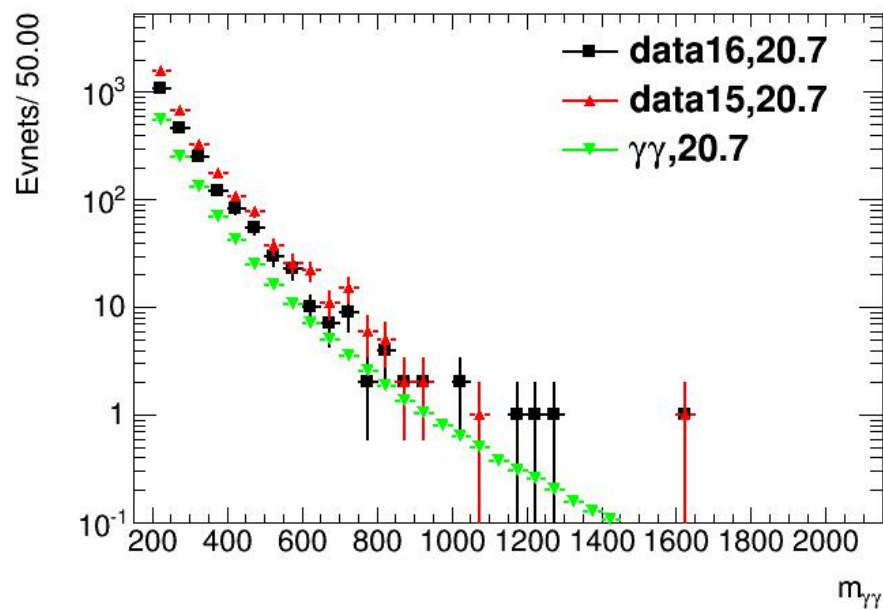
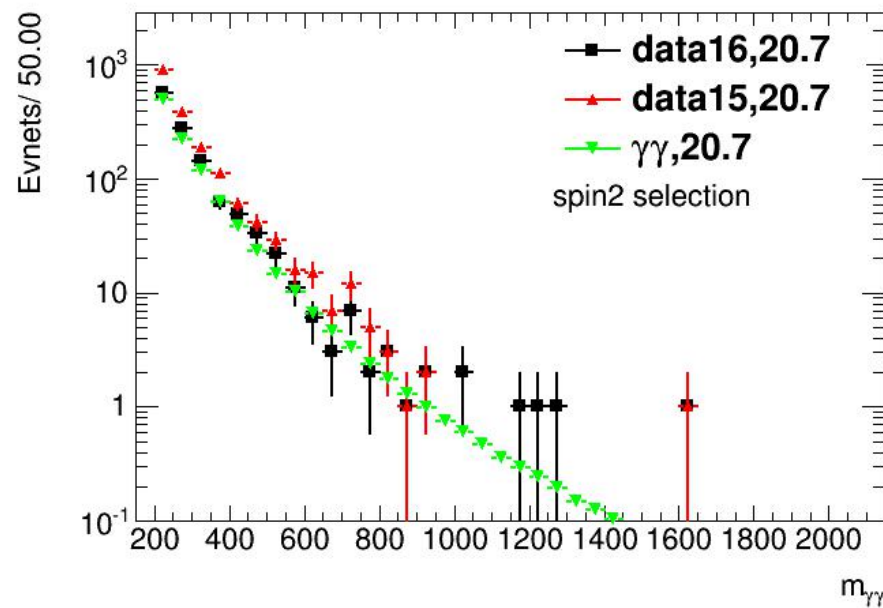
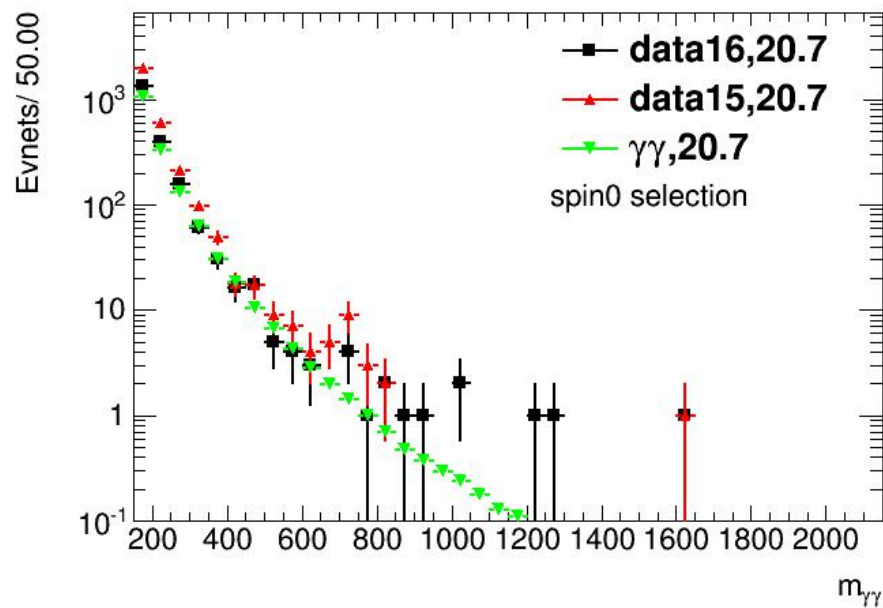
cross check on 750GeV

dataset

4

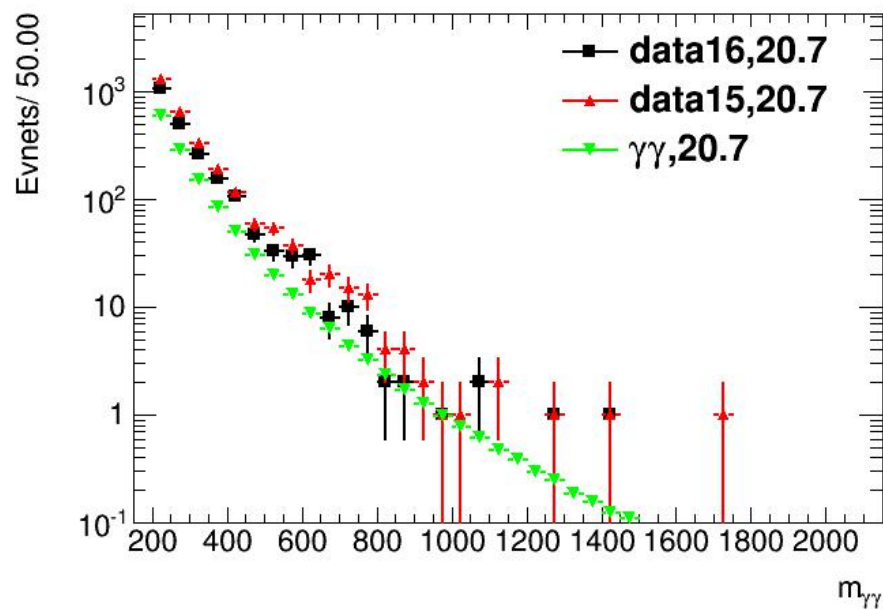
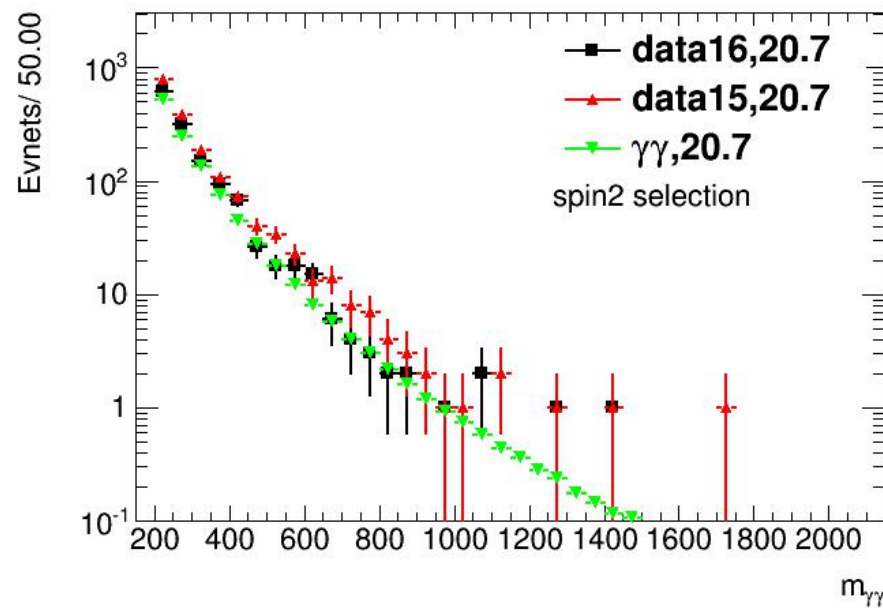
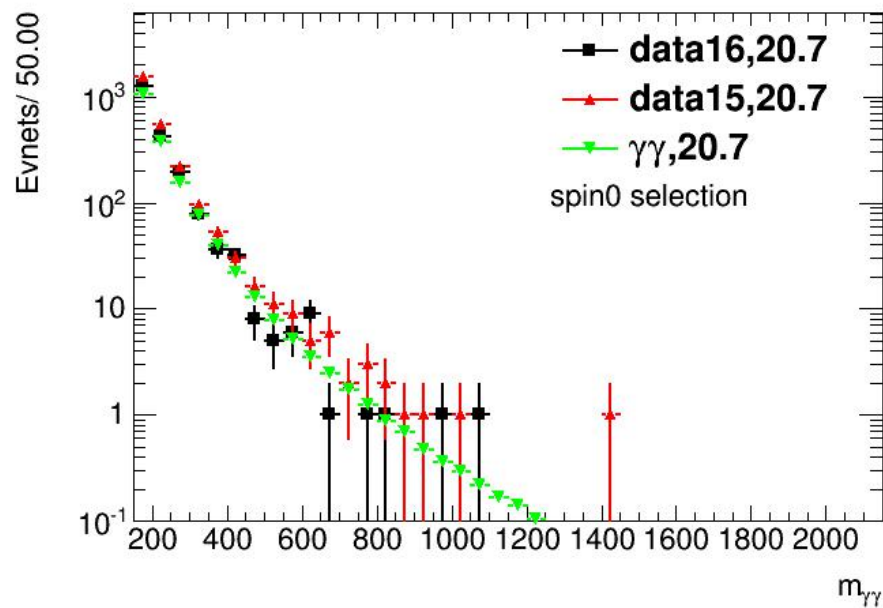
- about $\sim 2.6/\text{fb}$ (official job are not totally done, private all done, to organize them)





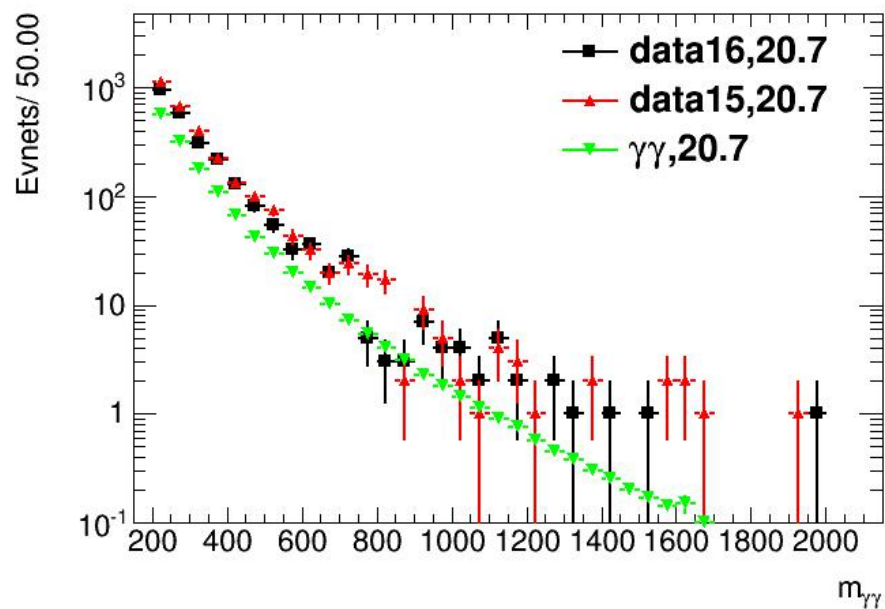
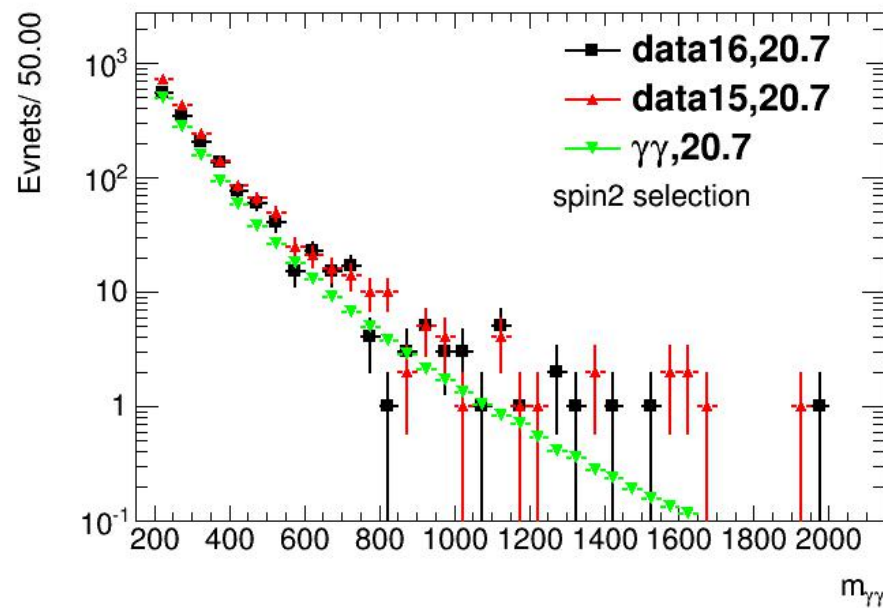
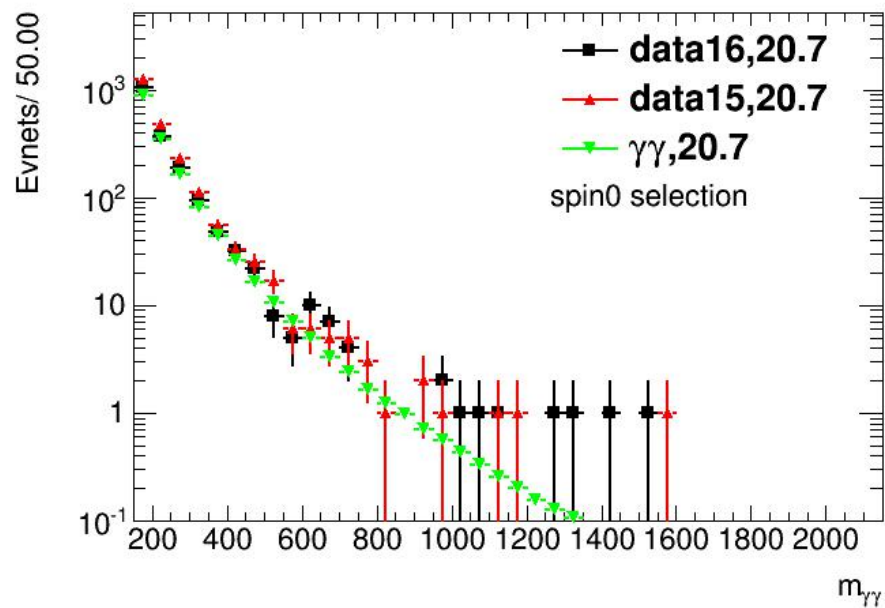
1jet

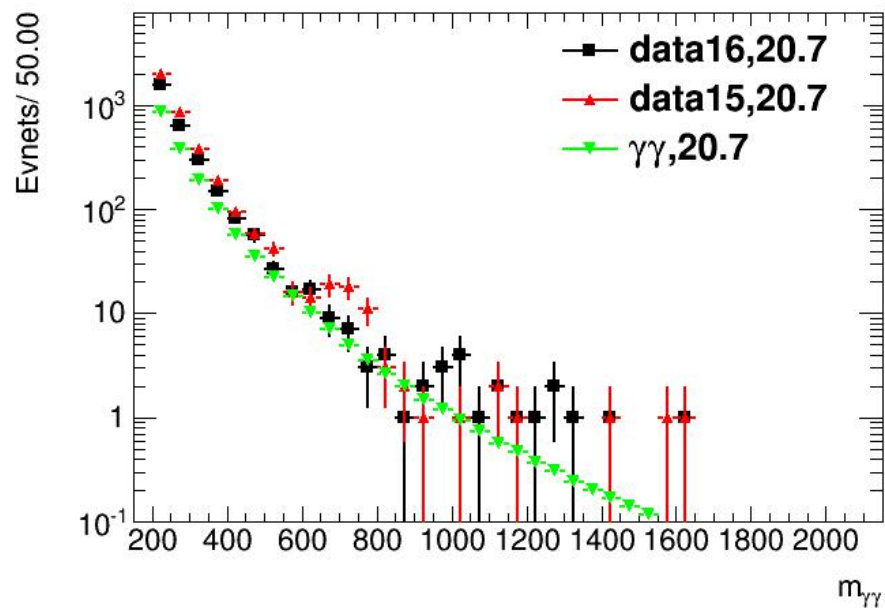
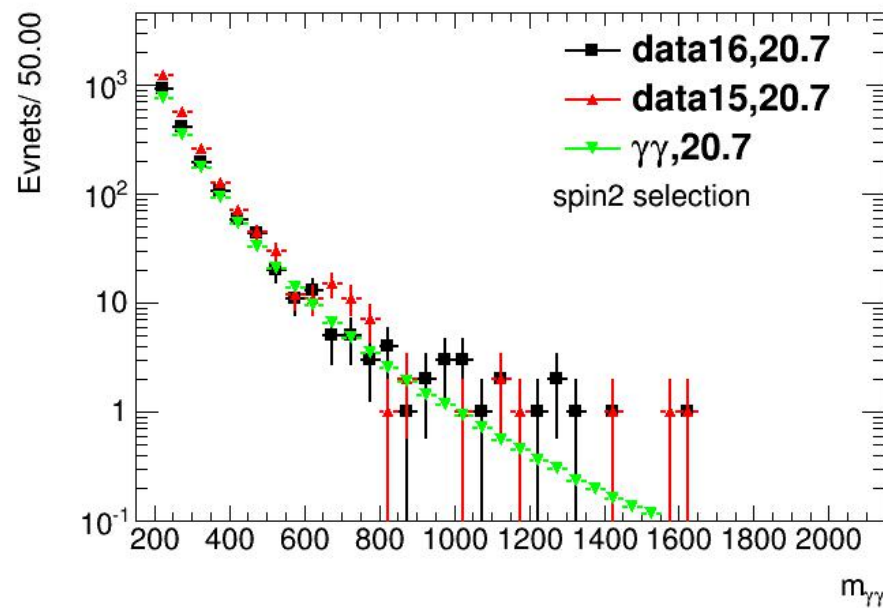
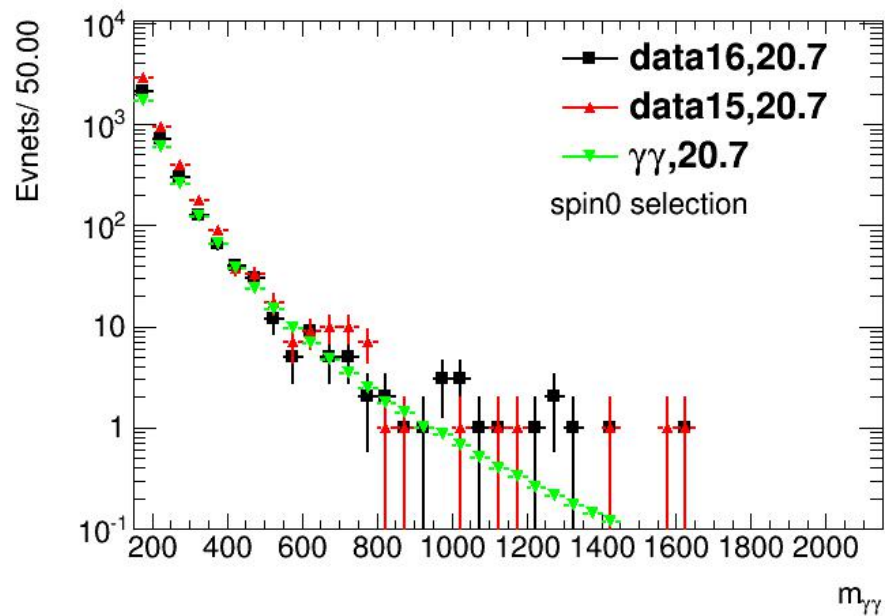
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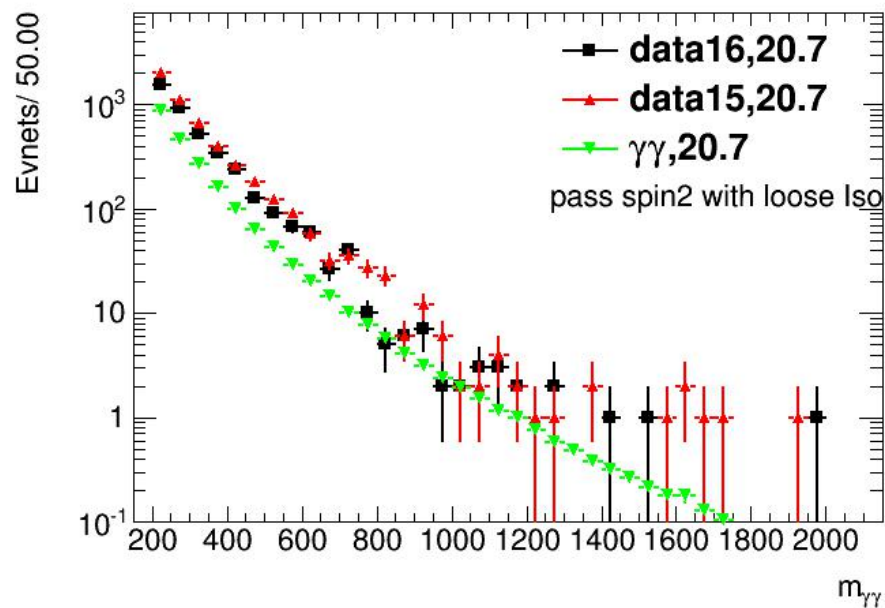
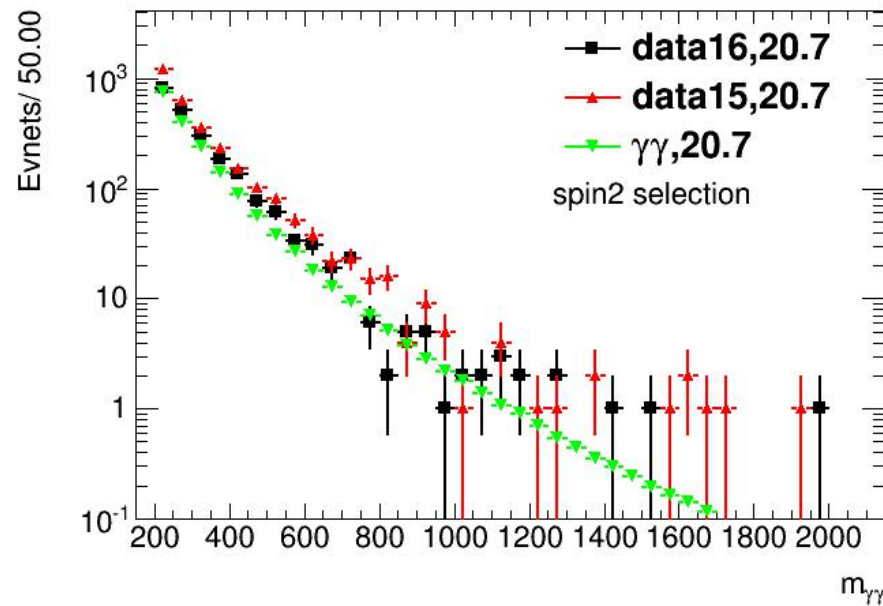
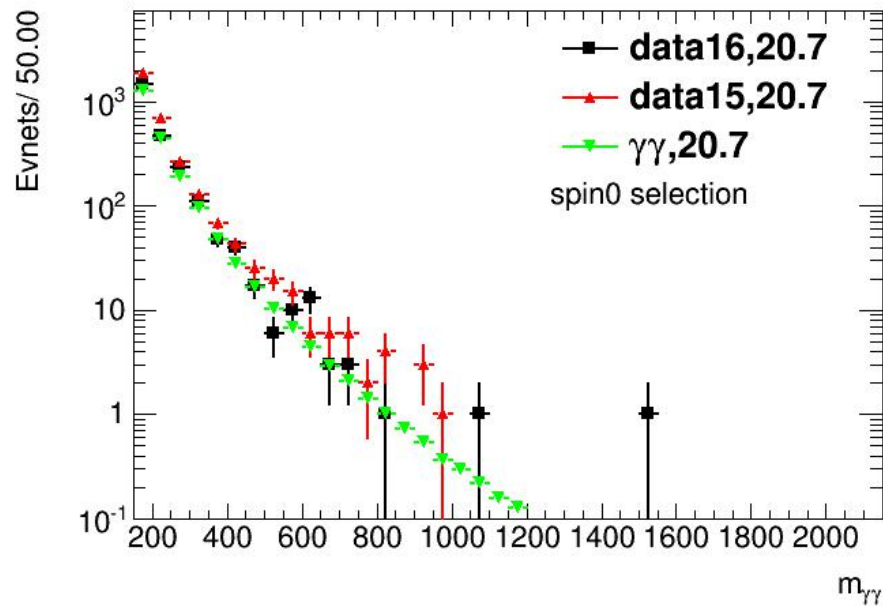


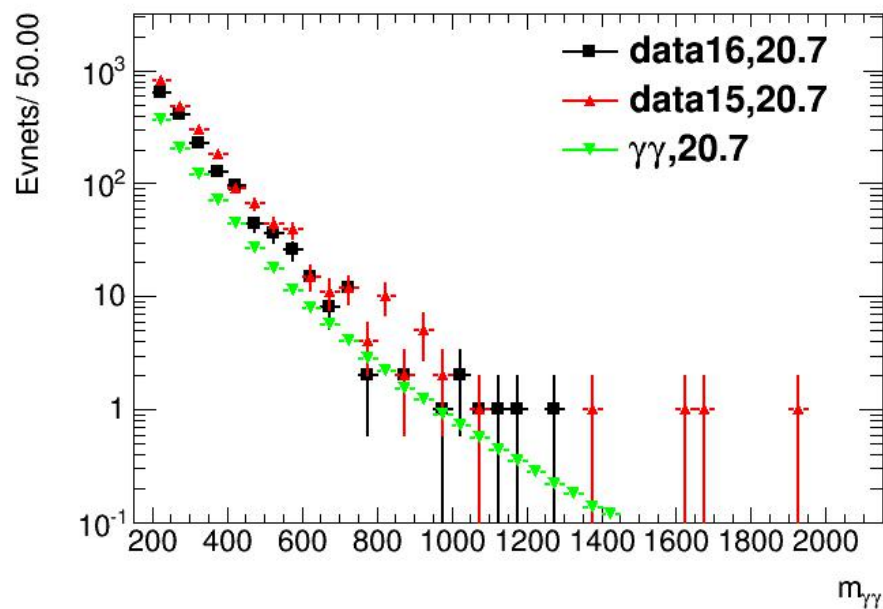
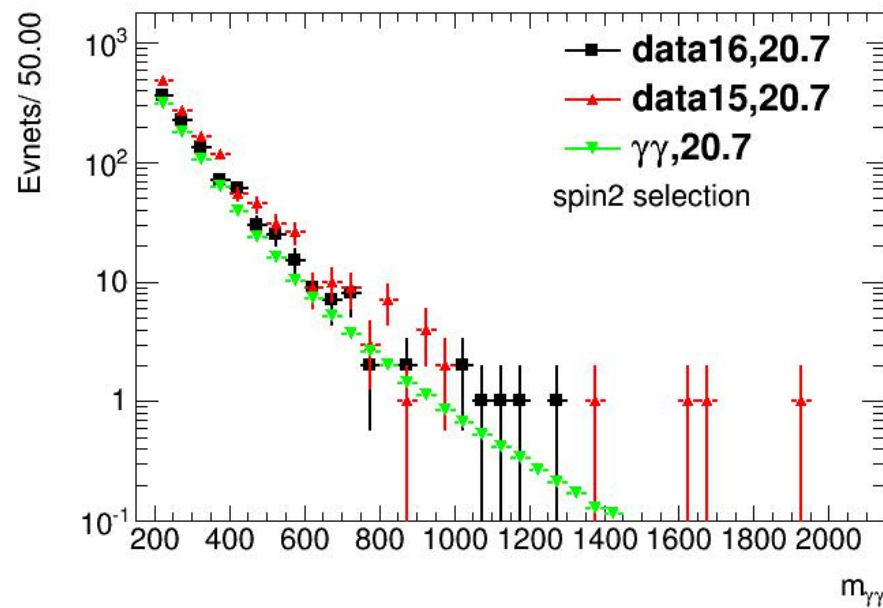
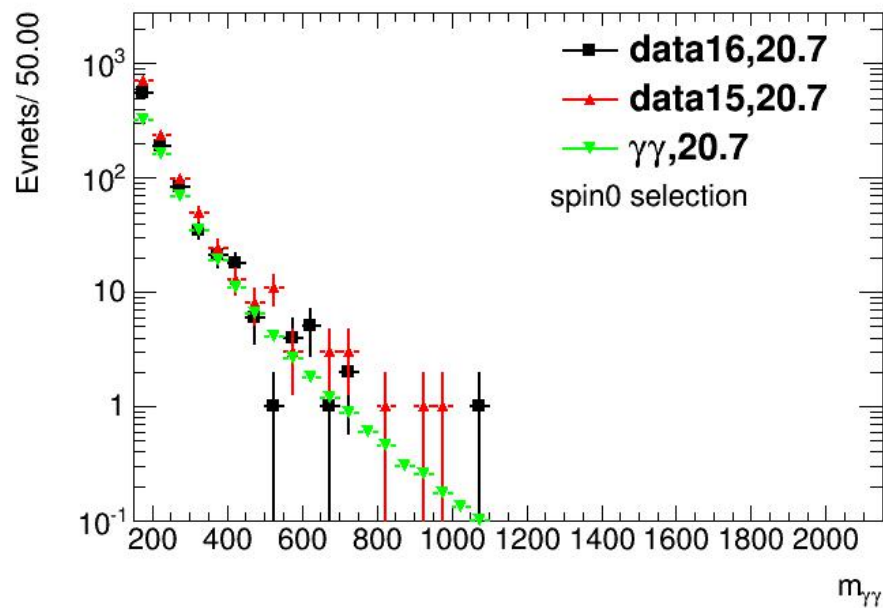
$\geq 2\text{jet}$

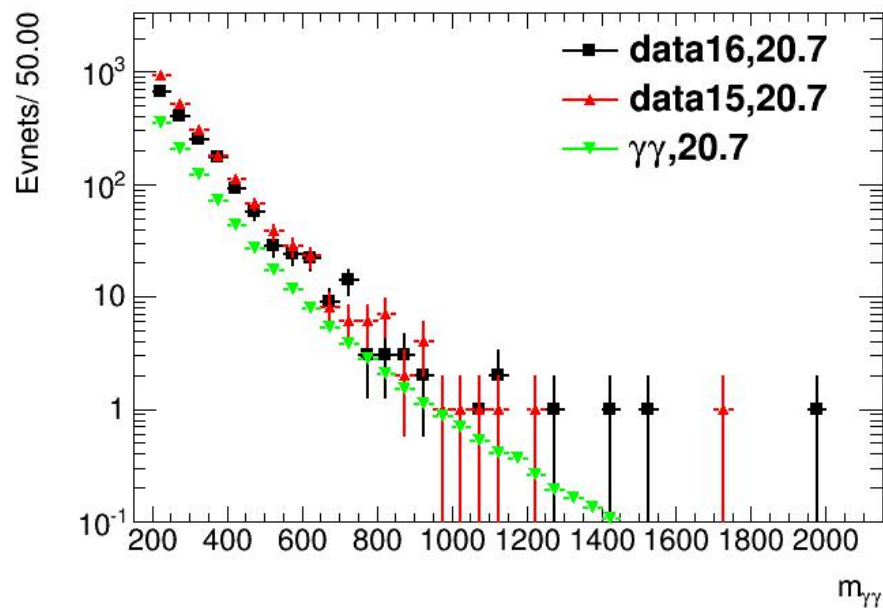
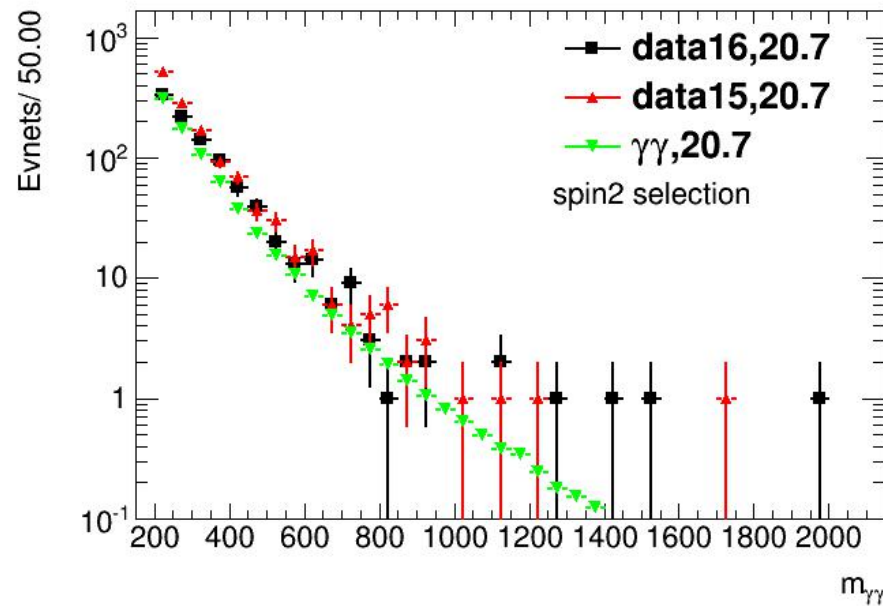
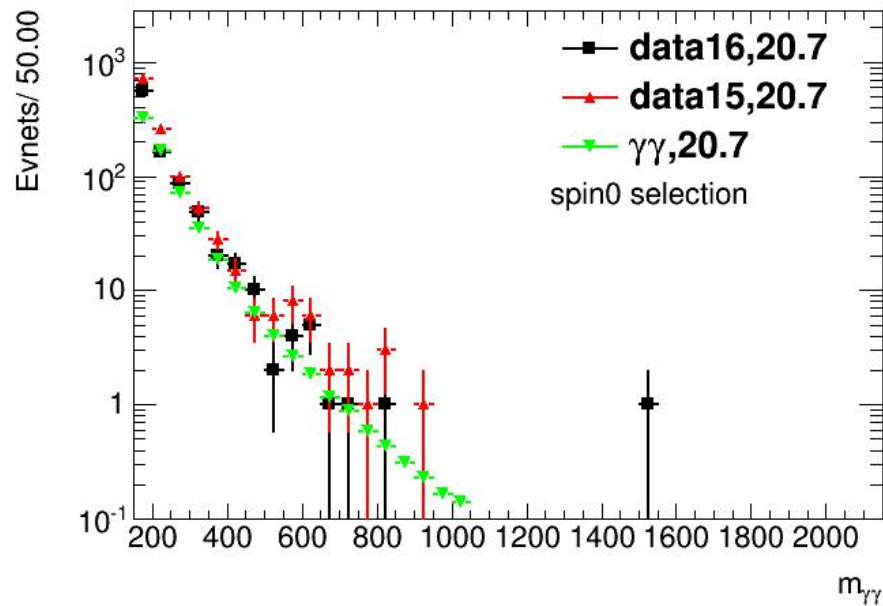
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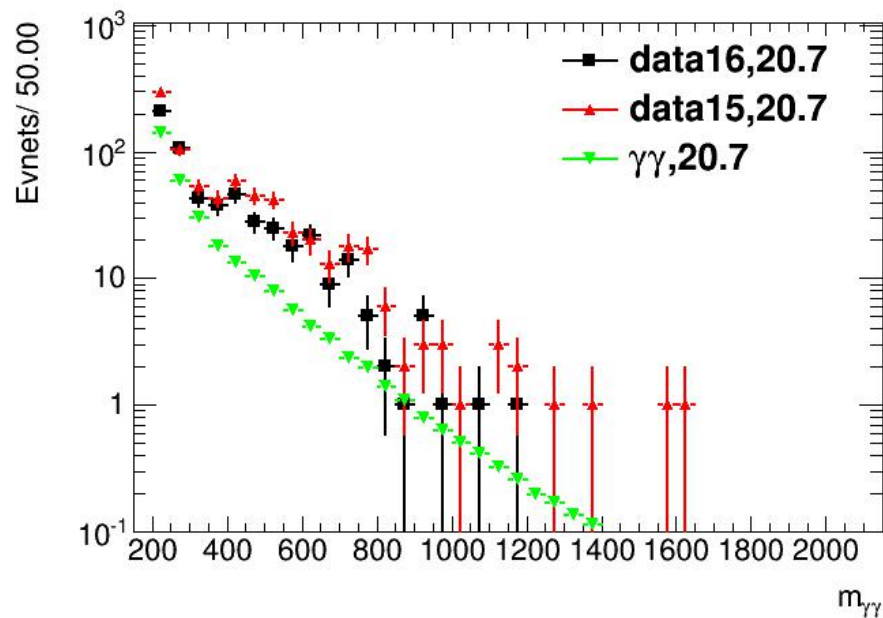
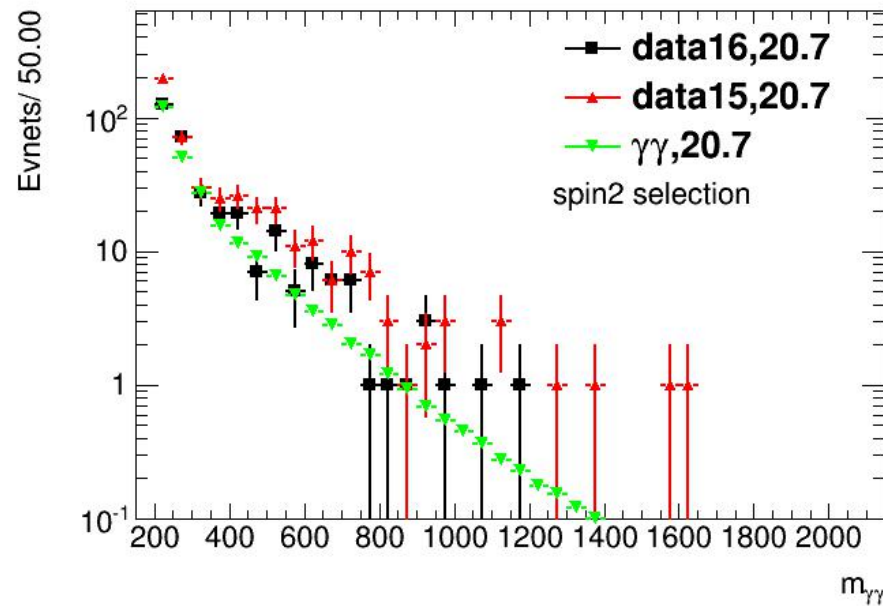
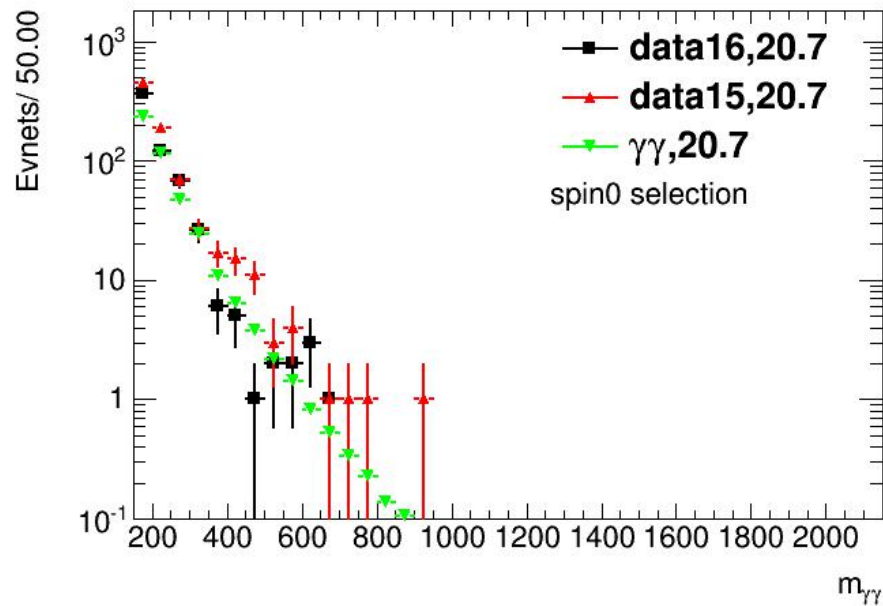


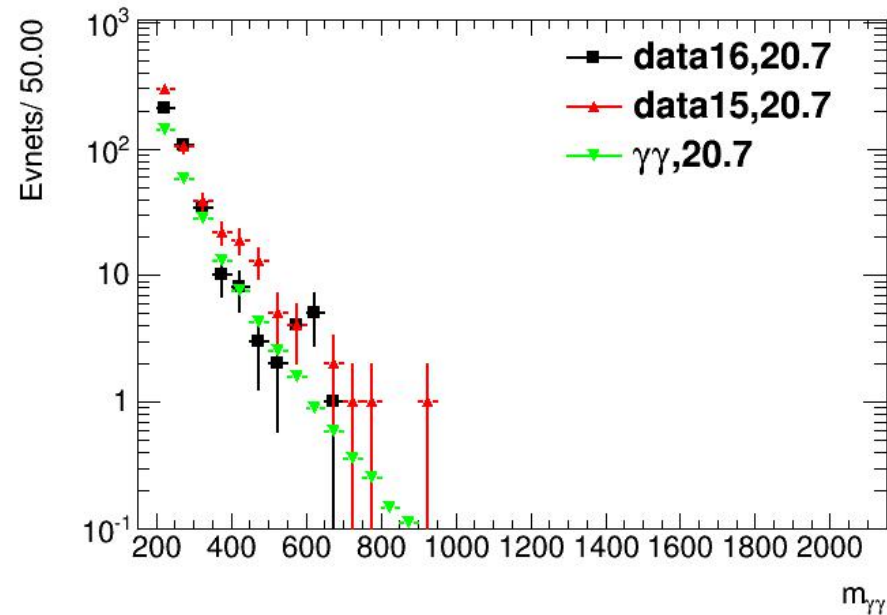
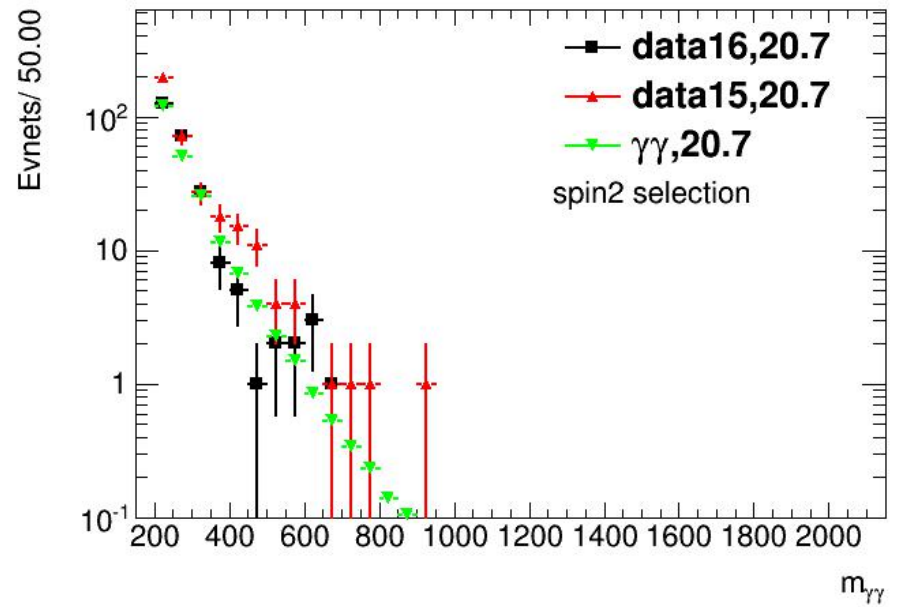
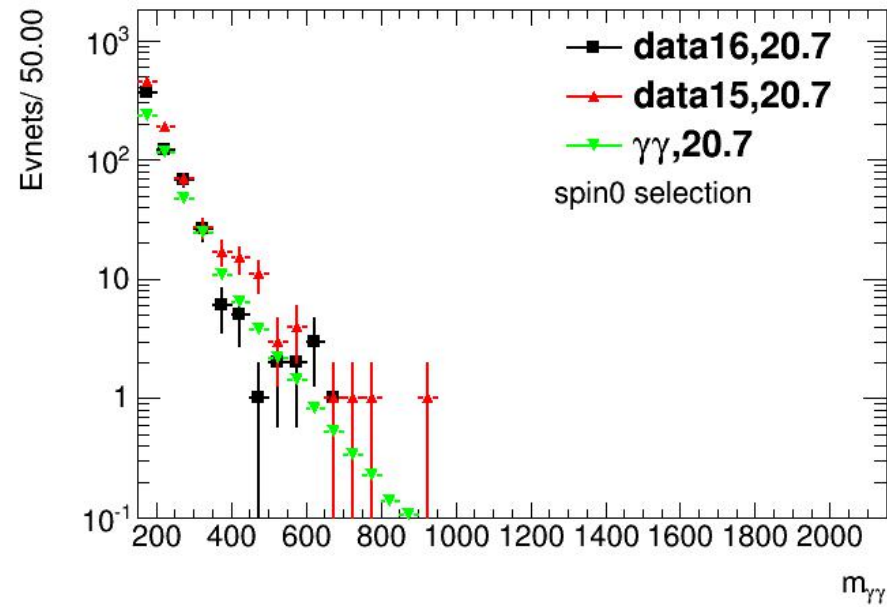


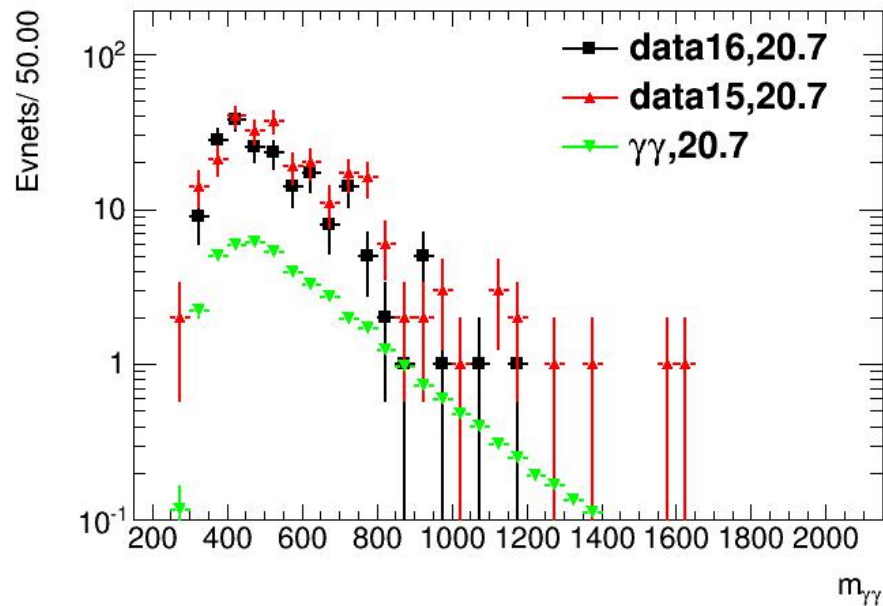
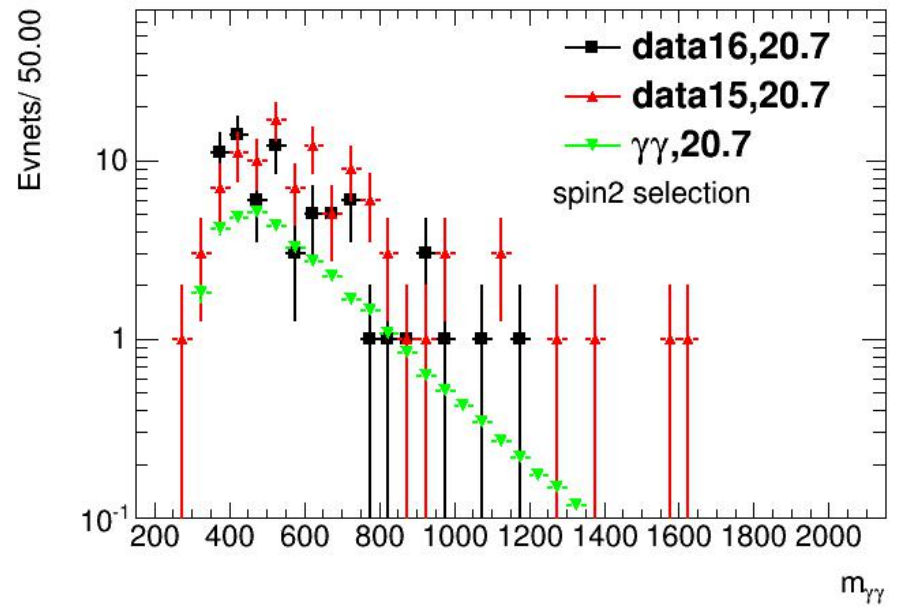
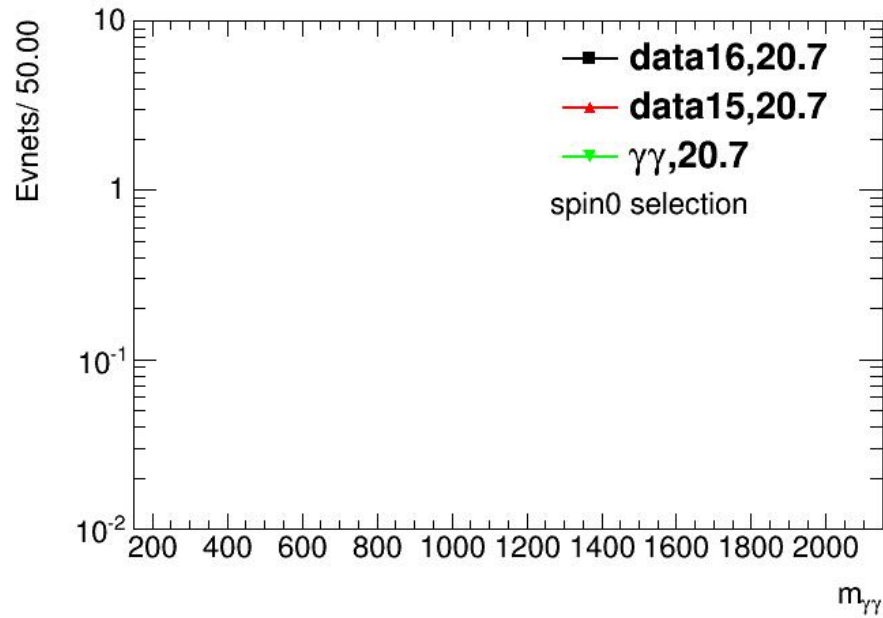












cutflow, EE events fraction

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single photon kinematic

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diphoton kinematic

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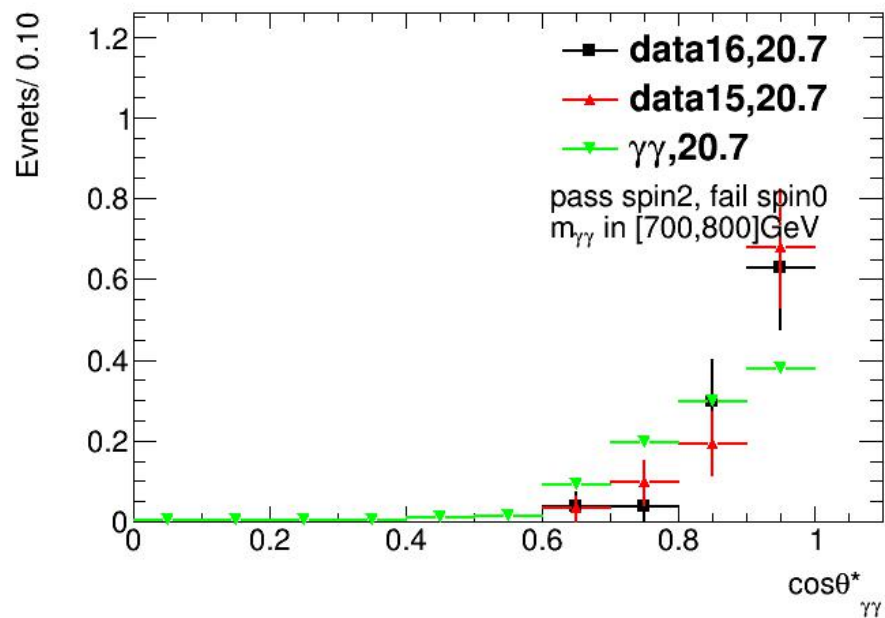
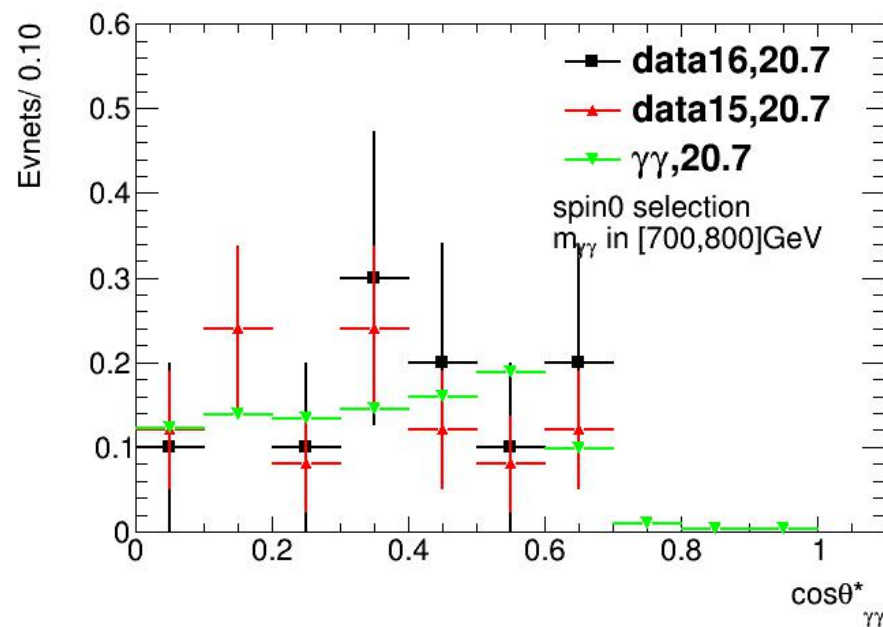
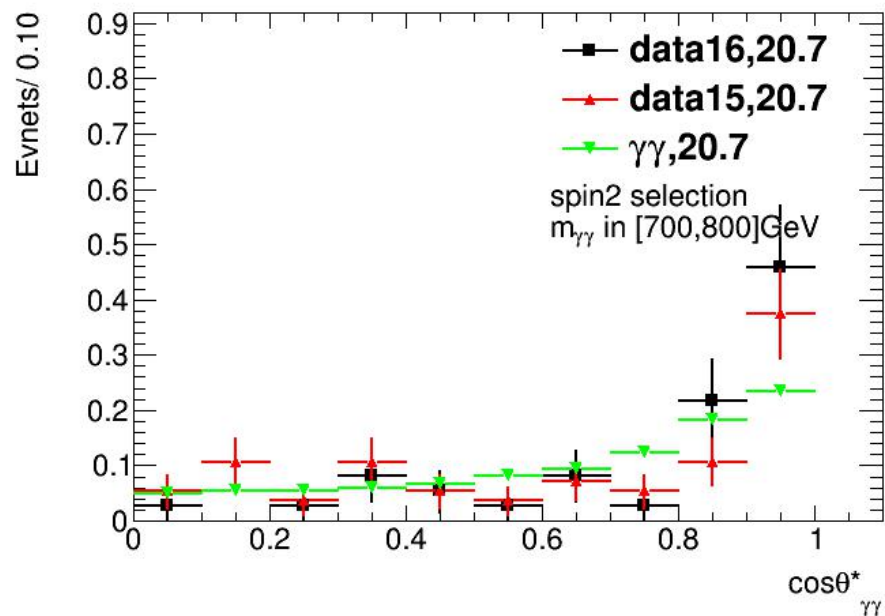
isolation

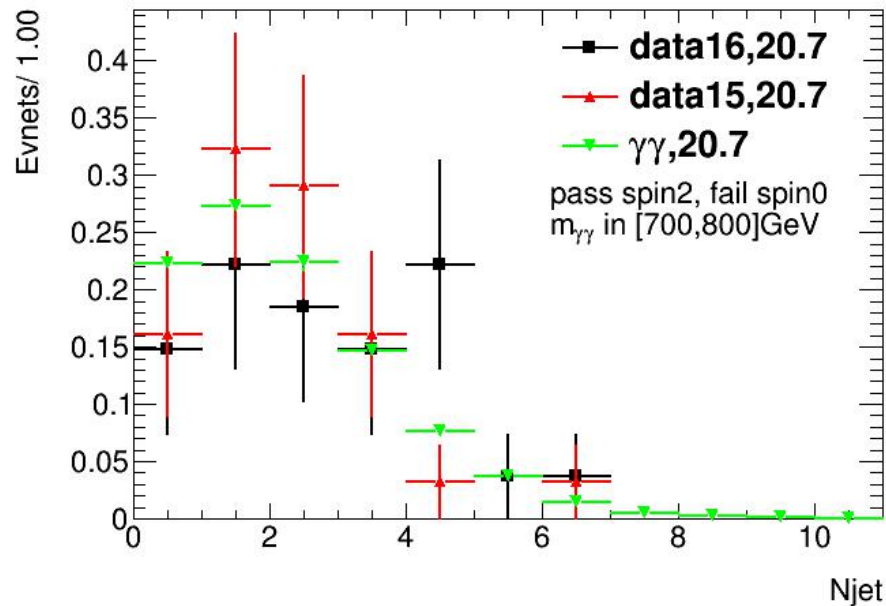
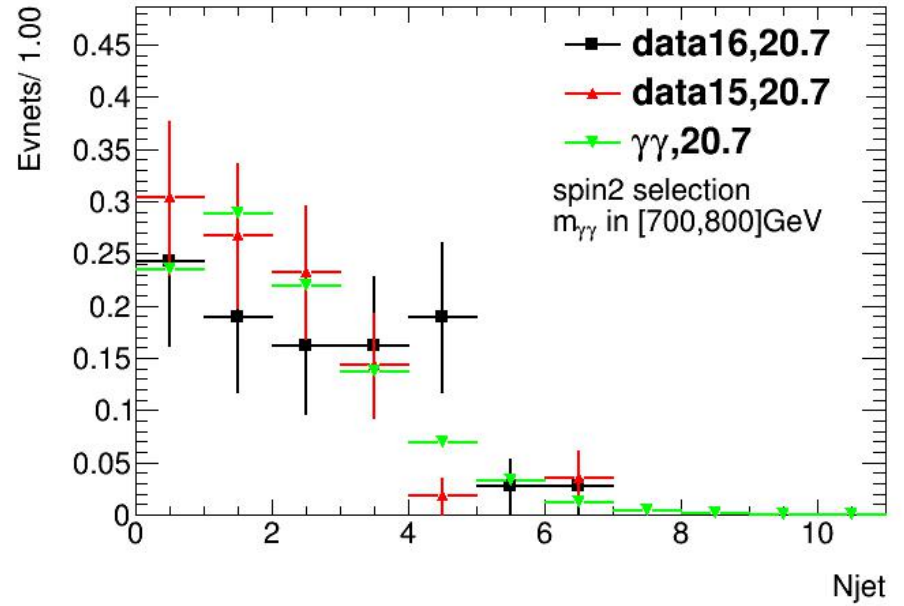
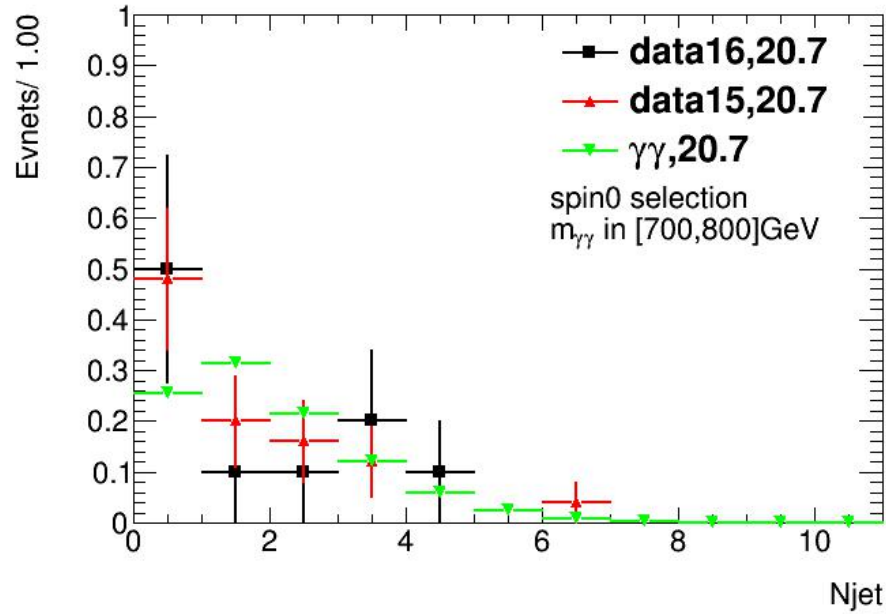
shower shape

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calibraton variable

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categorization
on photon photon fusion model

Sample status

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- full simulation is done
- official derivation is submitted, but not running (grid issue)
 - https://prodtask-dev.cern.ch/prodtask/inputlist_with_request/7841/
 - https://prodtask-dev.cern.ch/prodtask/inputlist_with_request/7851/
- private DAOD
 - cache 20.7.6.4,noskimmed
 - user.zhangyu:user.zhangyu.aaF_NW.DAOD_HIGG1D1_noskimmed_test_EXT0/
 - user.zhangyu:user.zhangyu.aaF_LW45GeV.DAOD_HIGG1D1_noskimmed_test_EXT0/
- private MxAOD
 - h012 configuration
 - user.zhangyu:user.zhangyu.aaF_NW.private.MxAOD.h012_MxAOD.root/
 - user.zhangyu:user.zhangyu.aaF_LW45GEV.private.MxAOD.h012_MxAOD.root/

- Compared with
 - h012: ggF750_w6p
 - h012: VBF800
 - h012: Sherpa_gamgam_650-1000
- discuss
 - cutflow comparison : baseline spin0 selection
 - photon and jet kinematic
 - VBF-sensitive variables
 - categorization : 0jet , 1jet , ≥ 2 jet
 - upper limit

Variables	Definition
m_{jj}	Invariant mass of dijet
$\Delta\eta_{jj}$	Pseudo-rapidity separation of dijet
$\Delta\Phi_{\gamma\gamma,jj}$	Azimuthal angle between diphoton and dijet system
p_{Tt}	Diphoton p_T projected perpendicular to the diphoton thrust axis
$\Delta R_{\gamma,j}^{\min}$	Minimum ΔR between either leadingsubleading photon and leadingsubleading jet
$\eta^{\text{Zeppenfeld}}$	$ \eta_{\gamma\gamma} - 0.5 * (\eta_{j1} + \eta_{j2}) $

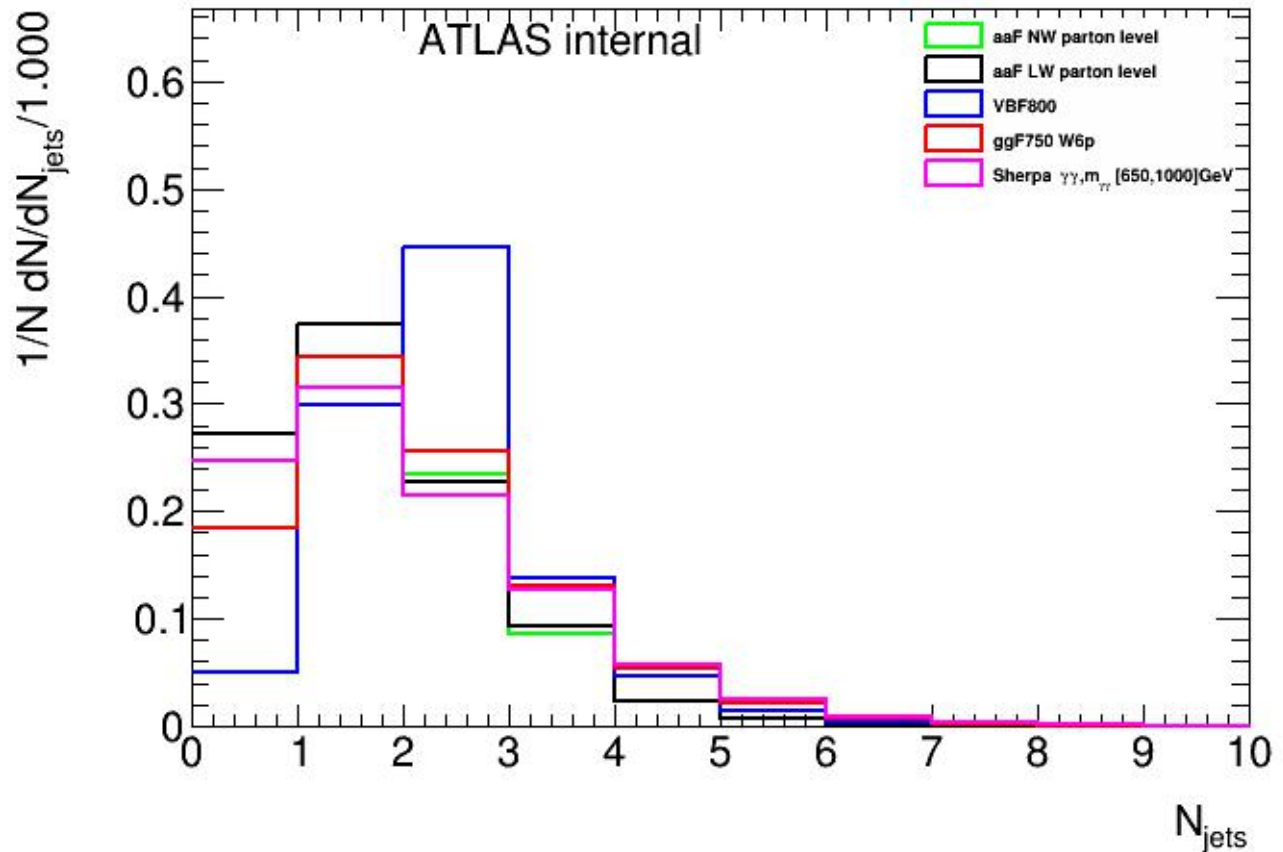
- remove dalitz event($\gamma \gamma^* \rightarrow \gamma f\bar{f}$), optimization is ongoing

	aaF_NW	ggH750	VBF800
initial	100000(abs)(rel)	298000(abs)(rel)	300000(abs)(rel)
remove dalitz	93886(0.94)(0.94)	279828(0.94)(0.94)	282476(0.94)(0.94)
pre-selection	70510(0.71)(0.75)	210207(0.71)(0.75)	219689(0.73)(0.78)
ID	62535(0.63)(0.89)	187705(0.63)(0.89)	196336(0.65)(0.89)
tight-isolation	58094(0.58)(0.93)	168506(0.57)(0.90)	184036(0.61)(0.94)
relative-pT	41498(0.41)(0.71)	124783(0.42)(0.74)	137001(0.46)(0.74)
Njet>=2	17338		
$\Delta\eta>2$	8557		
mjj>400	6730		
$\Delta R^{\min}_{\gamma,j}$	6283		

inclusive Njet

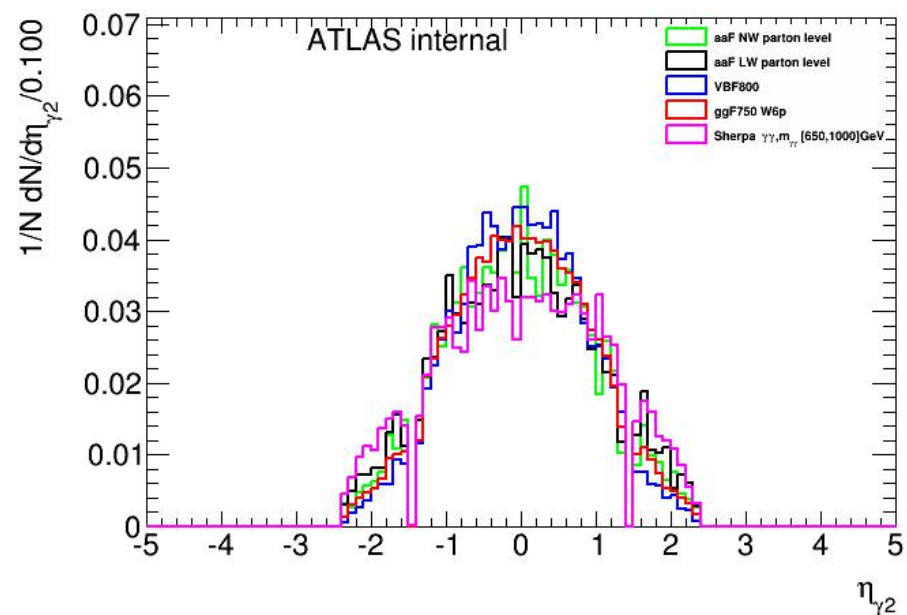
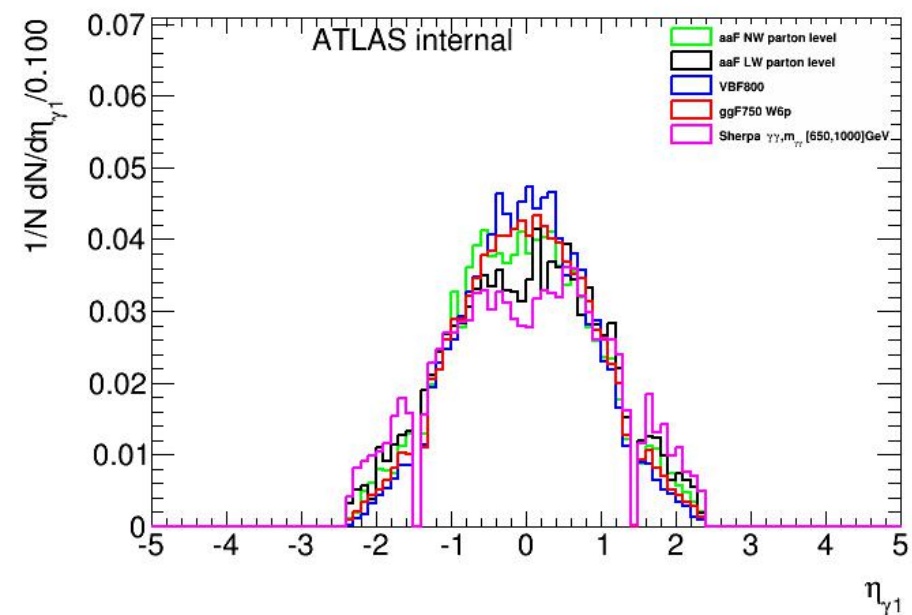
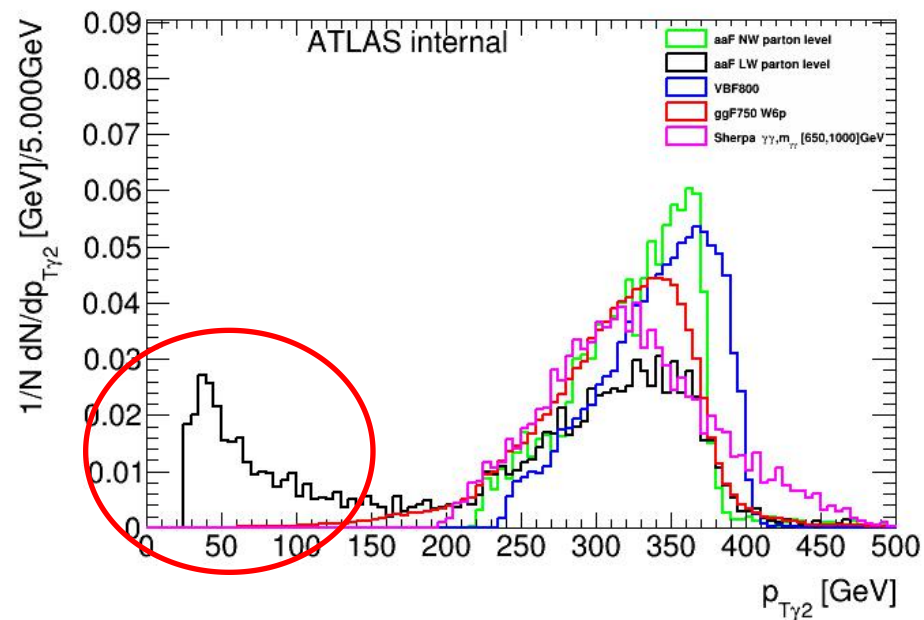
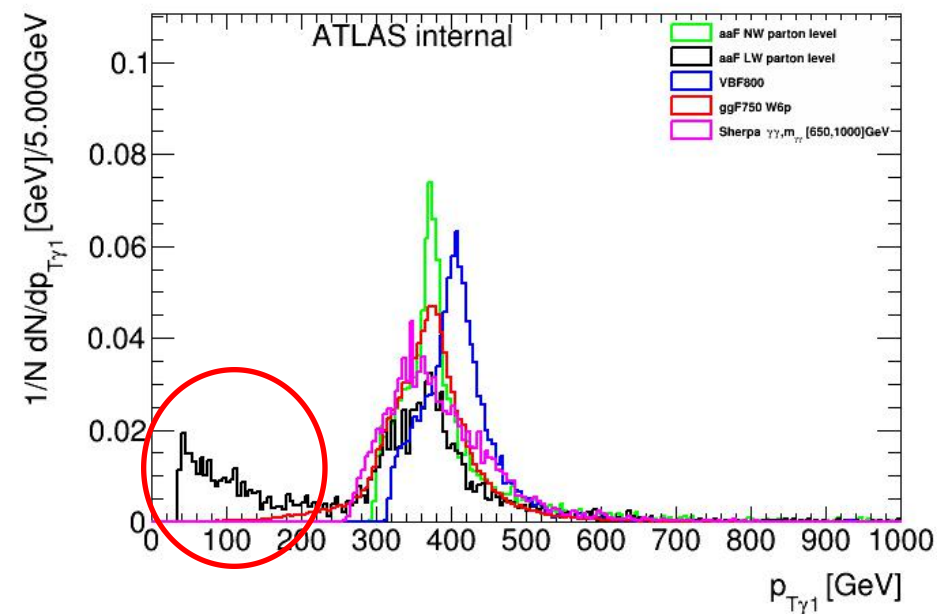
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- surprise! will cross check truth level
- photon photon fusion : 0jet 22.4% 1jet 35.8% ≥ 2 jet 41.8%



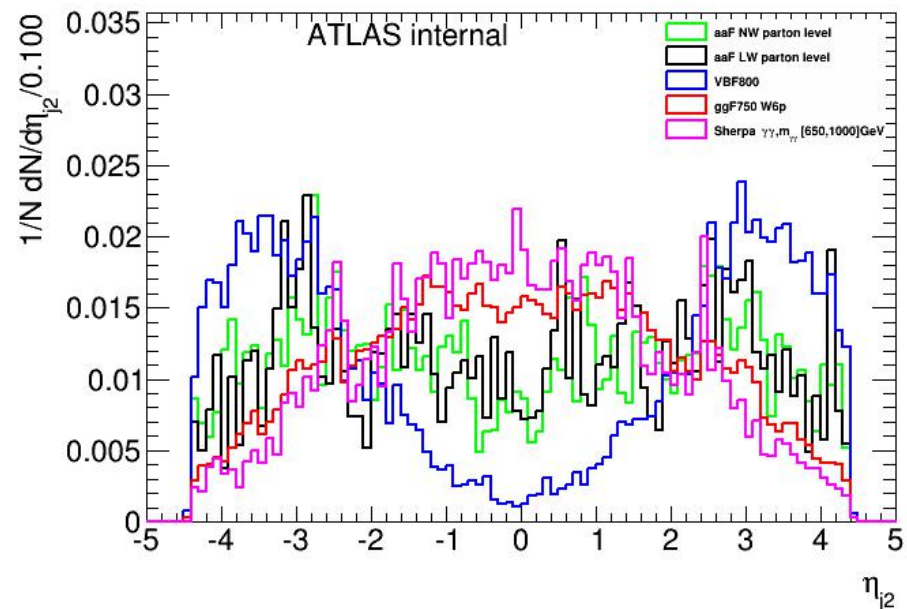
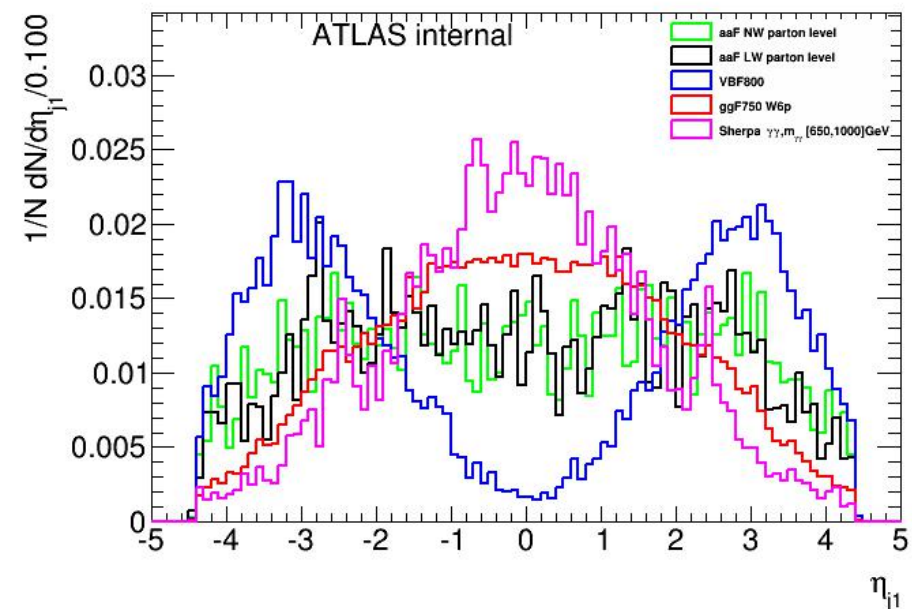
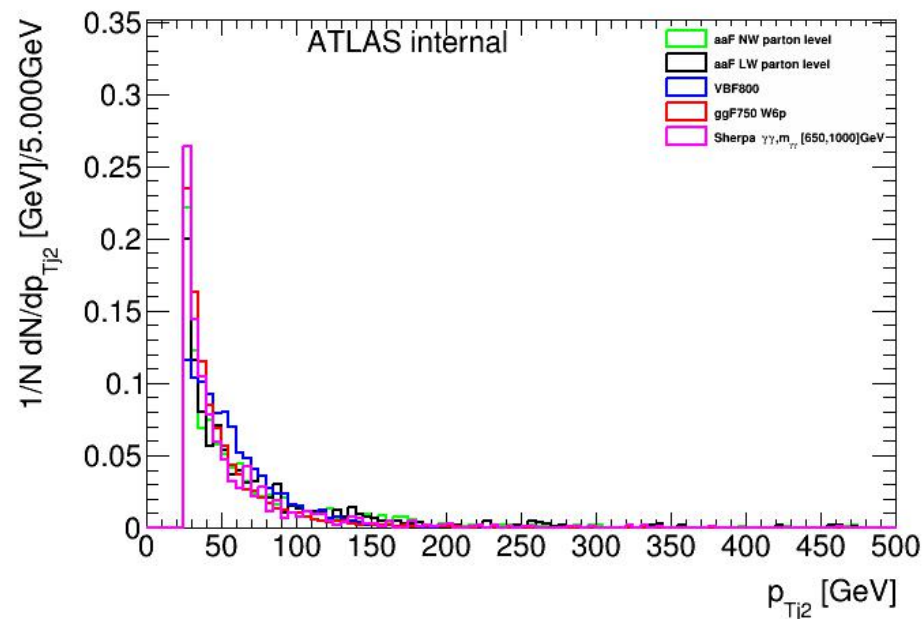
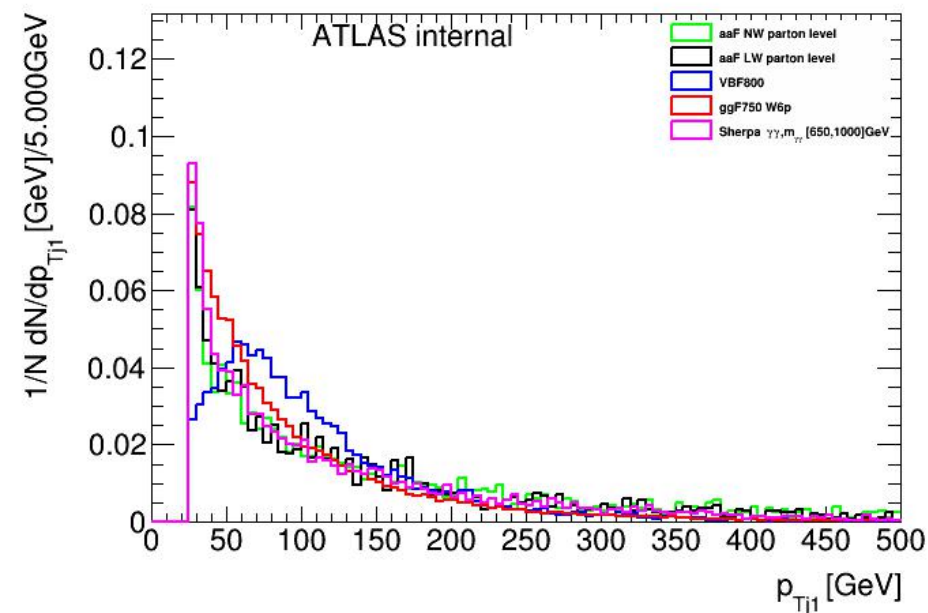
photon kinematic

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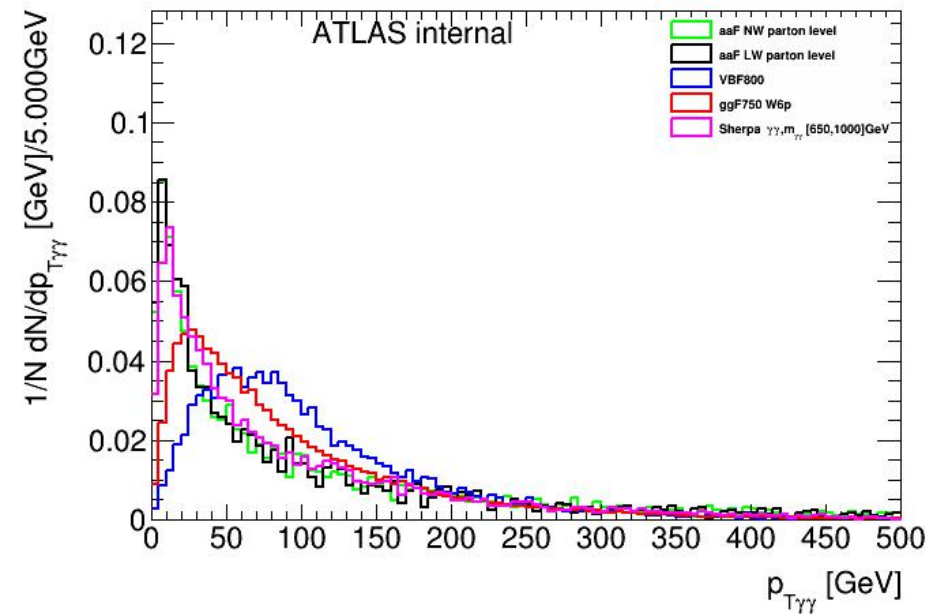
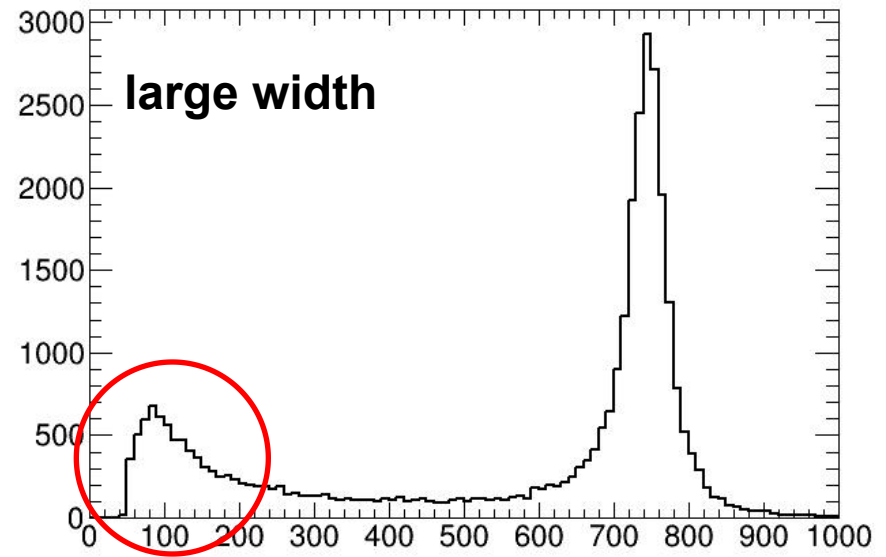
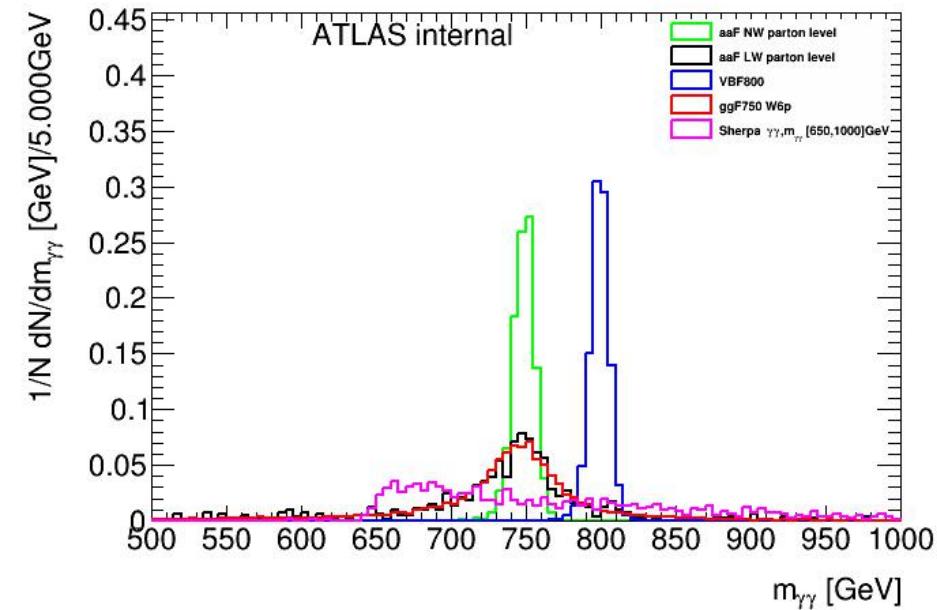
jet kinematic

30



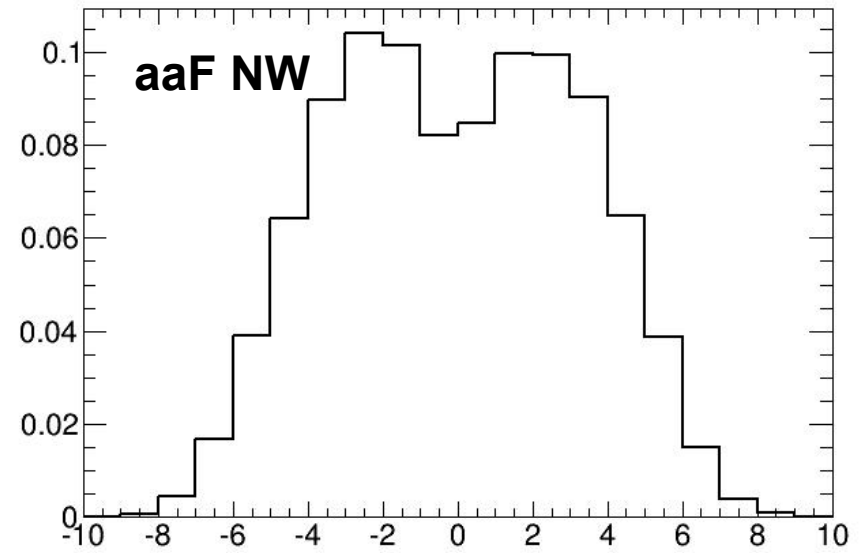
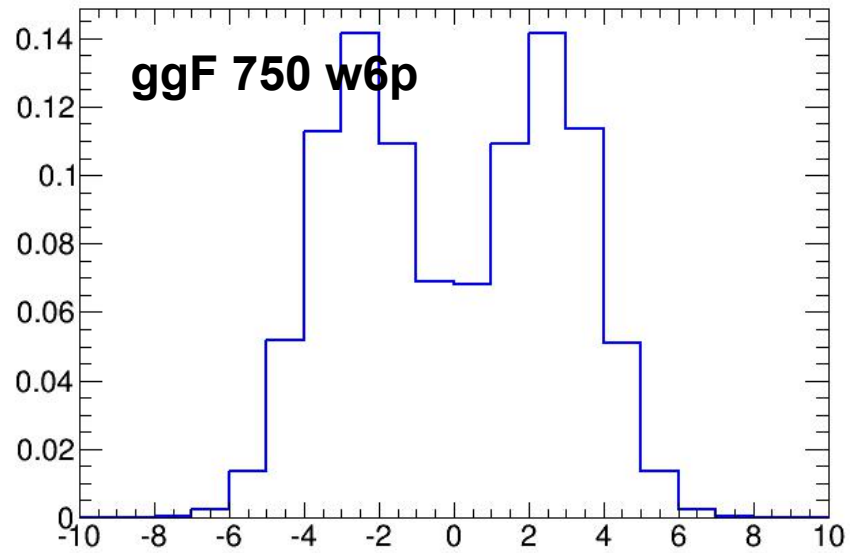
diphoton kinematic

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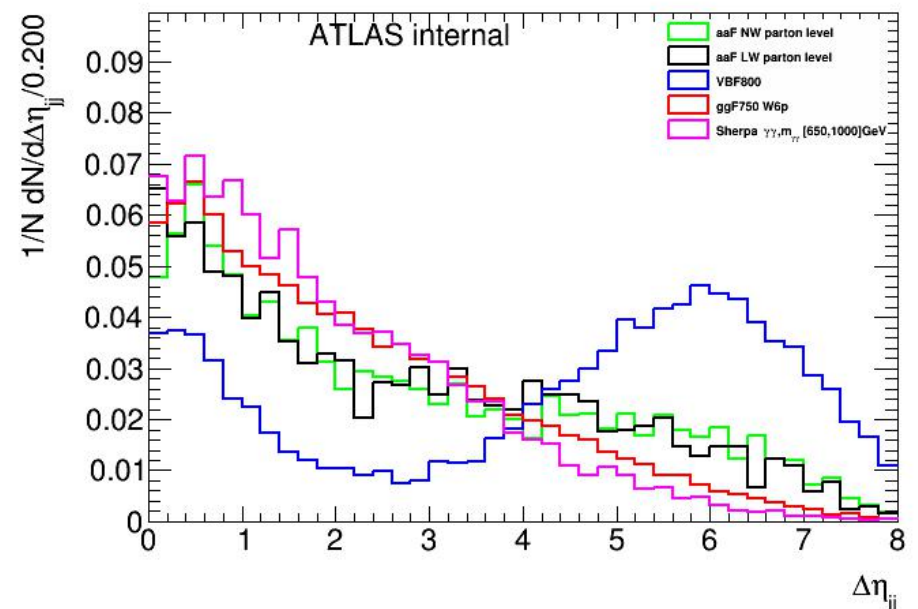
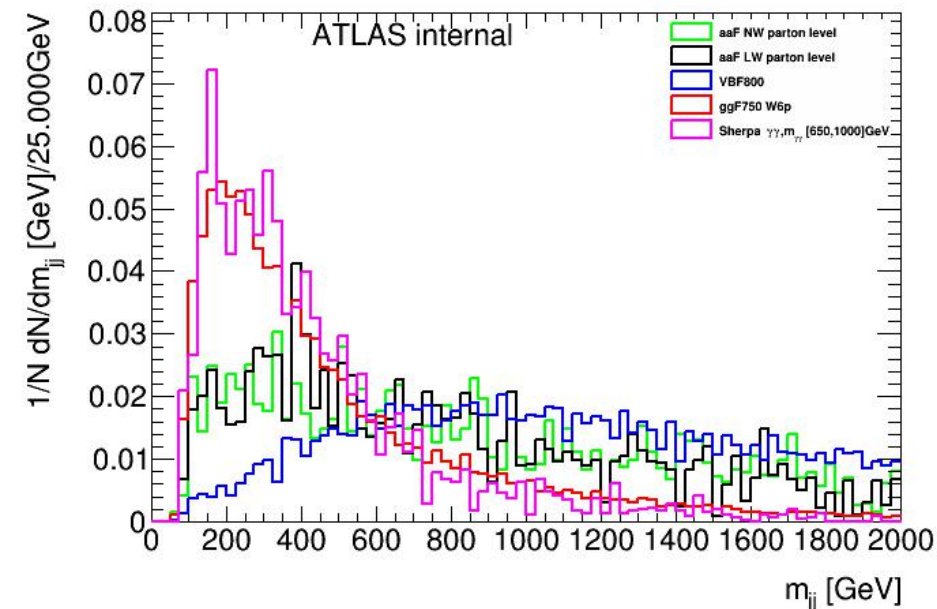
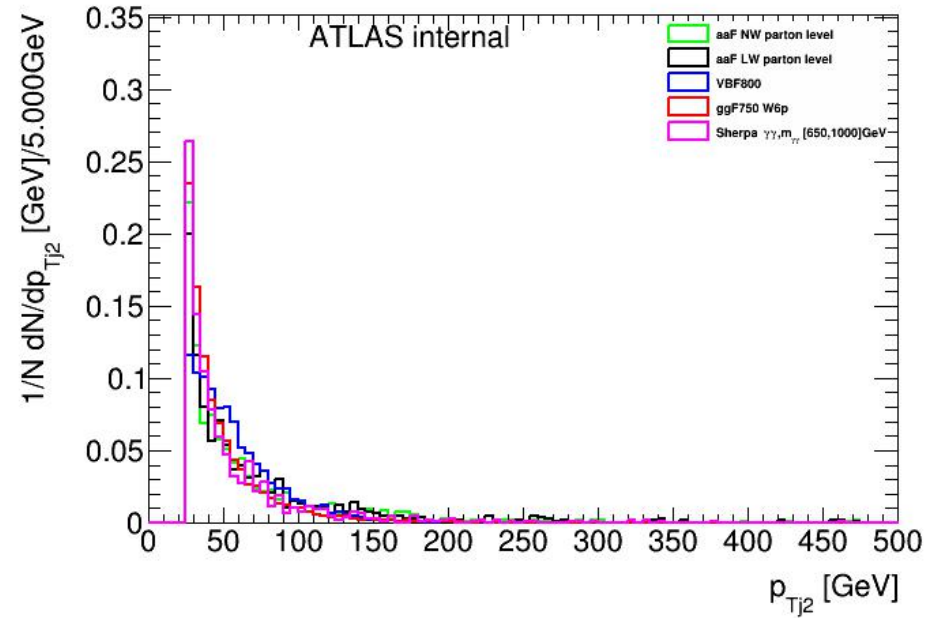
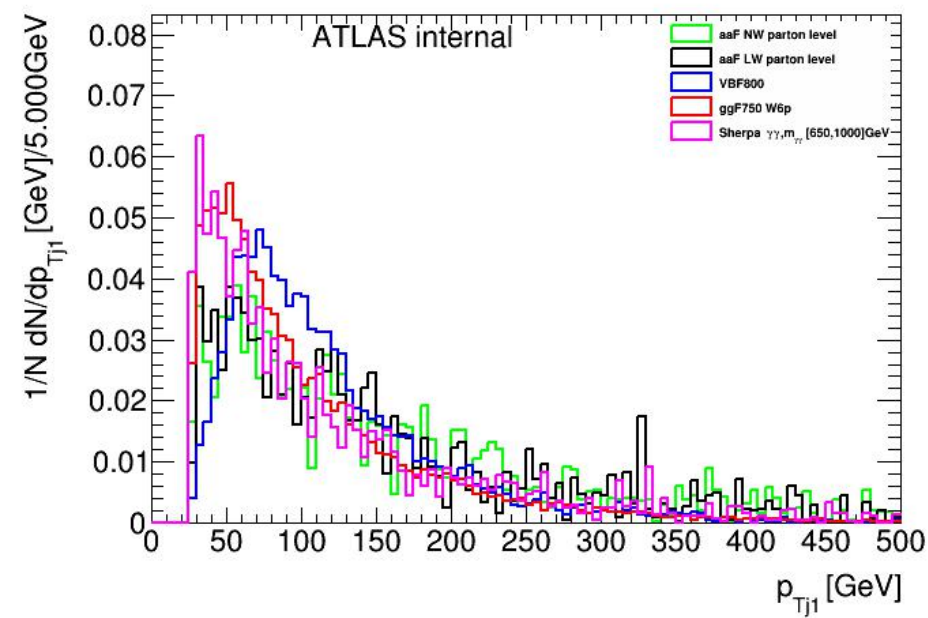


diphoton eta

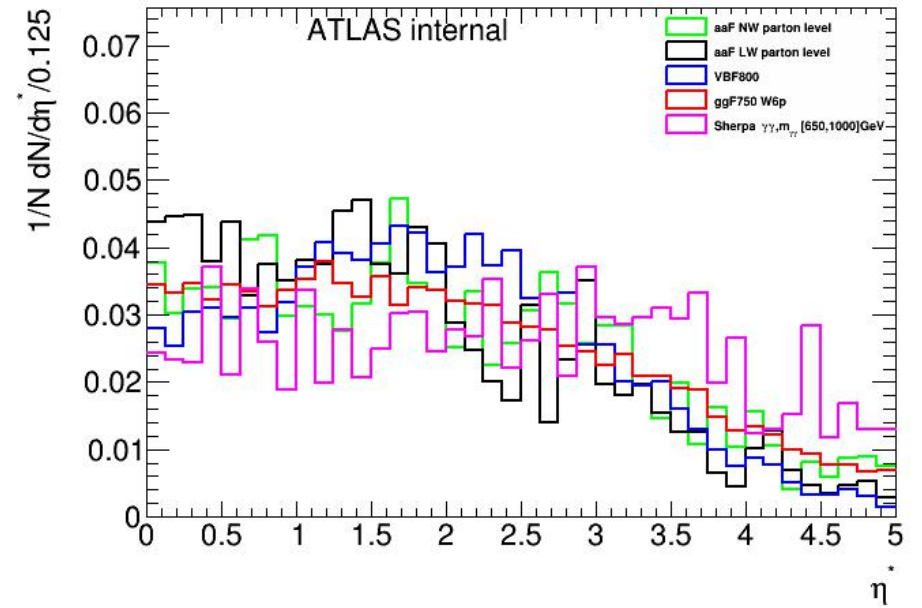
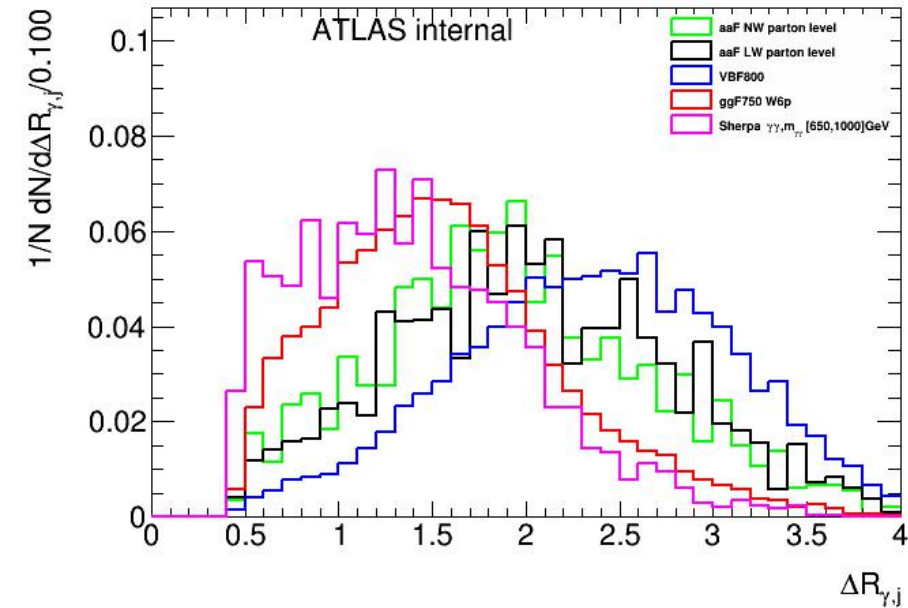
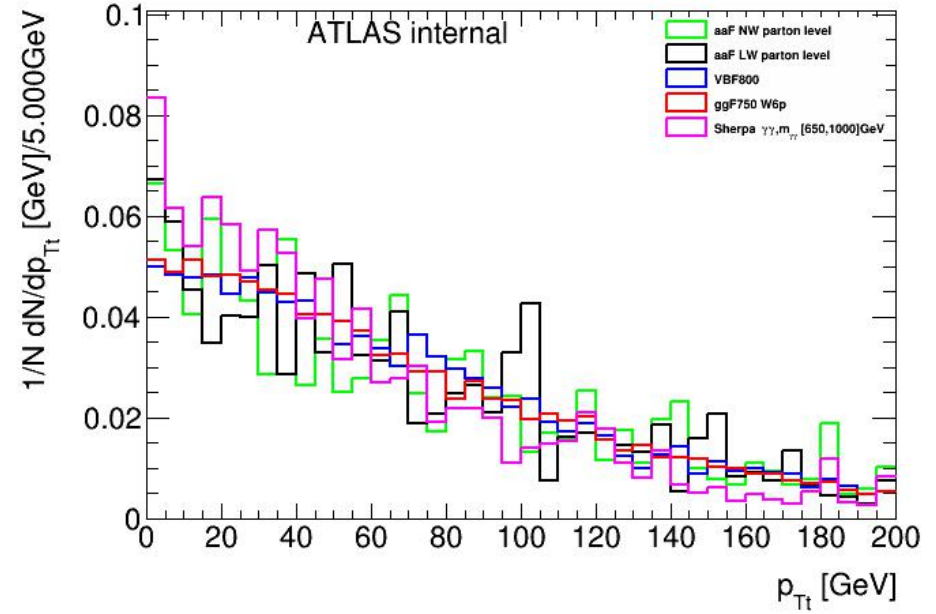
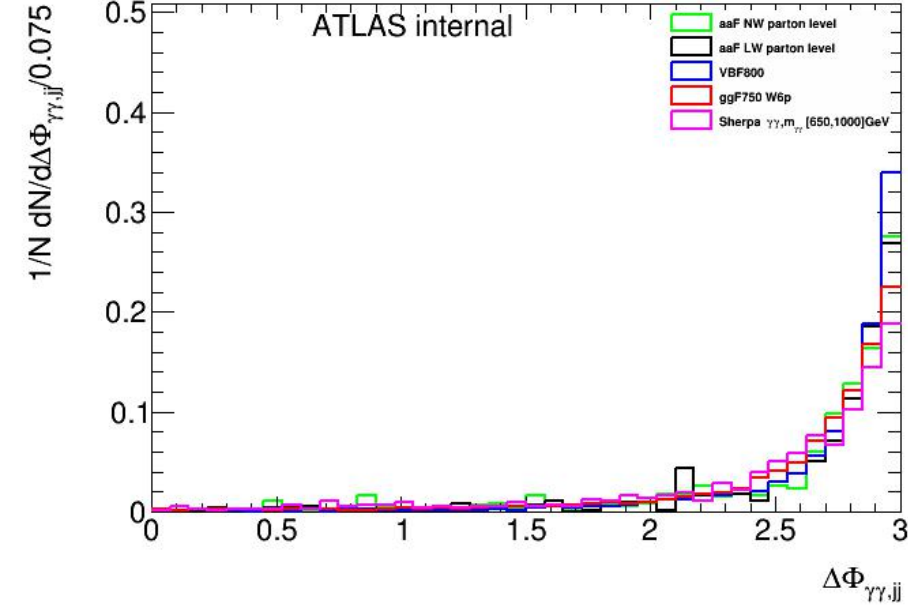
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VBF variable--- $N_{\text{jet}} \geq 2, \Delta \eta > 2$ 33



VBF variable---Njet ≥ 2 , $\Delta \eta > 2$ 34



upper limit

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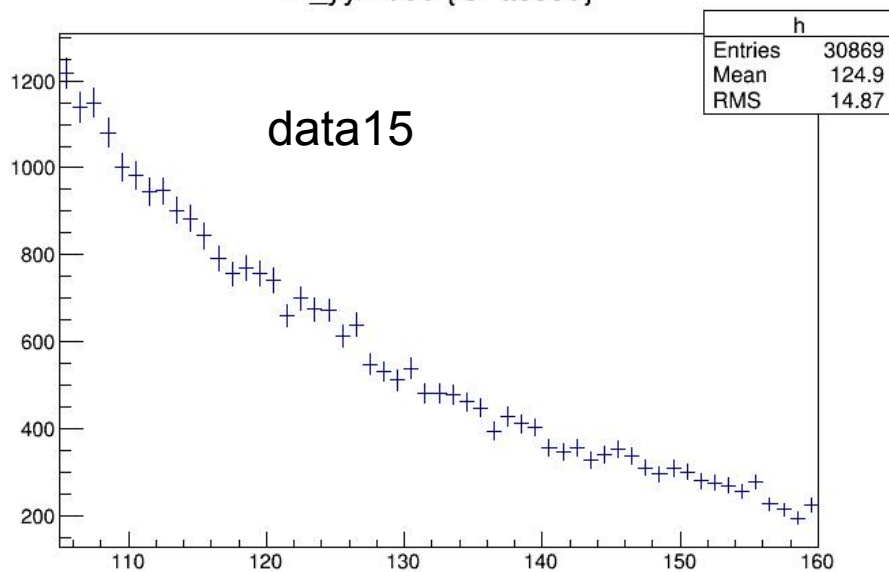
- preliminary categorization strategy (to be optimized)
 - 2 jet cateogry, $\Delta \eta > 2$, $m_{jj} > 400 \text{ GeV}$, $\Delta R^{\min}_{\gamma, j} > 1$ (not the best one)
 - rest: (to test some other **diphoton variables** in this region)
 - 1 category : $N_{\text{jet}} < 2$
 - **OR** two categories : 0jet category and 1 jet category
- upper limit
$$\sigma(pp \rightarrow X \rightarrow \gamma\gamma) = \frac{2 \times \sqrt{N_{bkg, SR}}}{\text{eff}(s) \times L}$$
- normalized to **30fb-1**, N_{bkg} in [700,800] and signal efficiency in each category, γj and jj are **not** taken into account

	2jet	<2jet	0jet	1jet
Nbkg	22.2	187.3	81.3	106.0
eff(s)	6.3%	24.2%	9.3%	14.9%
upper limit(fb)	4.98	3.76	4.60	6.46

checks on SM Higgs
(most plot is 1352/pb)

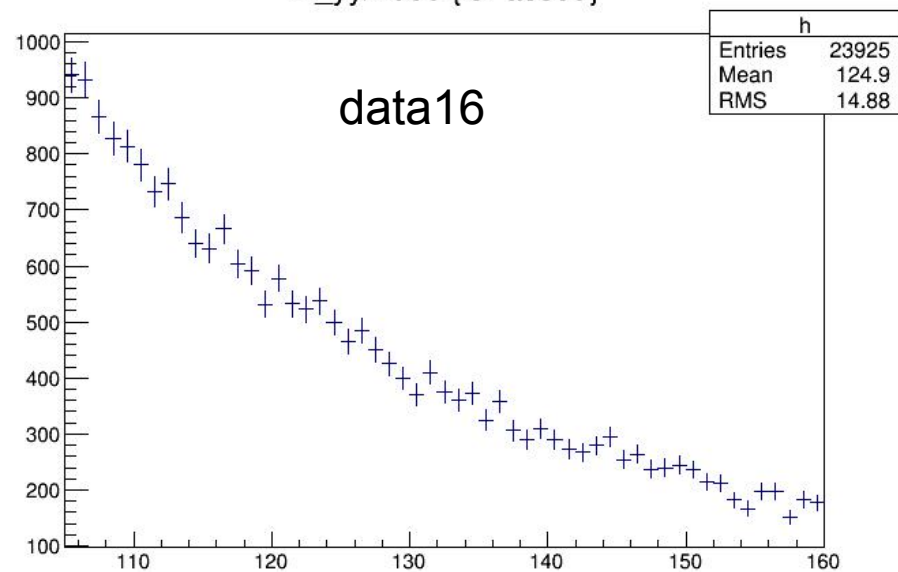
m_yy/1000 {isPassed}

data15



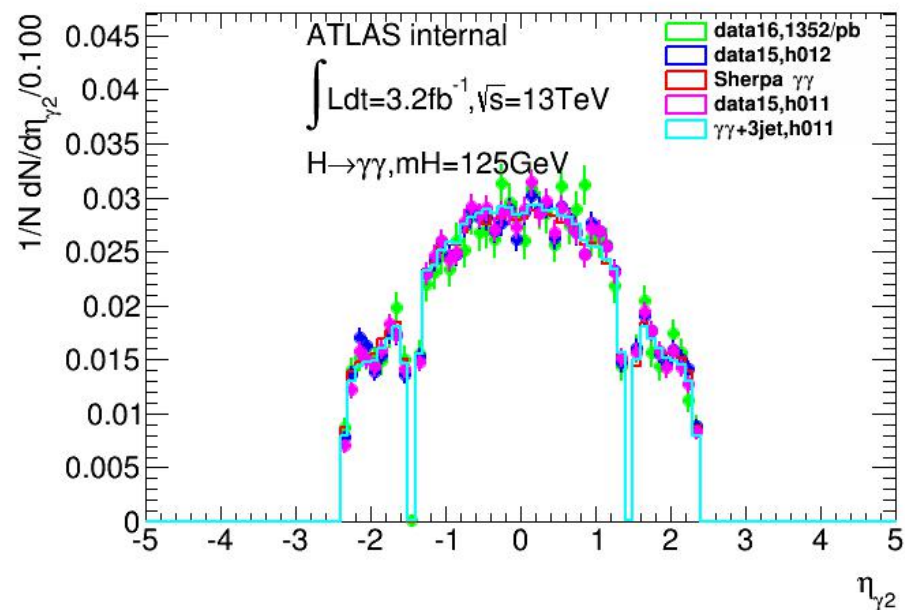
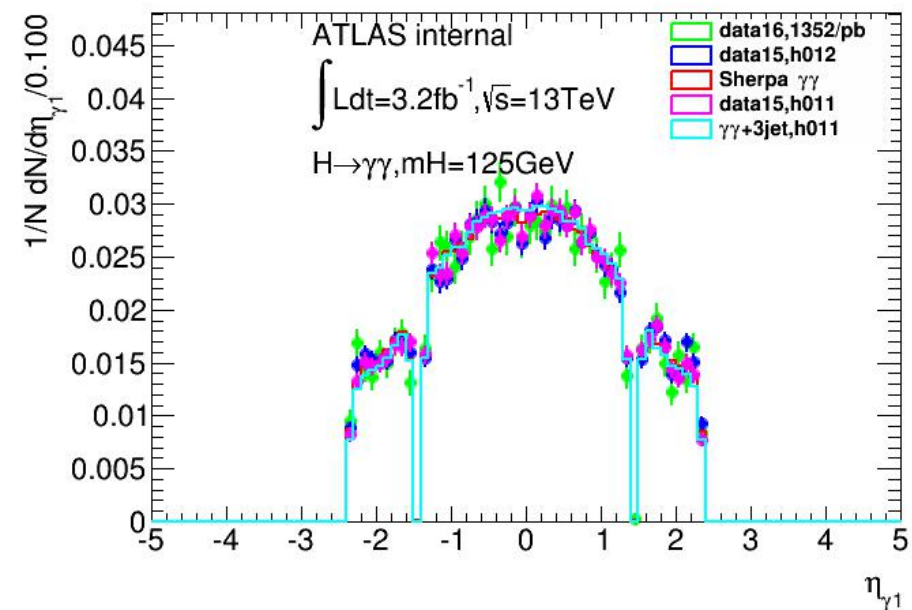
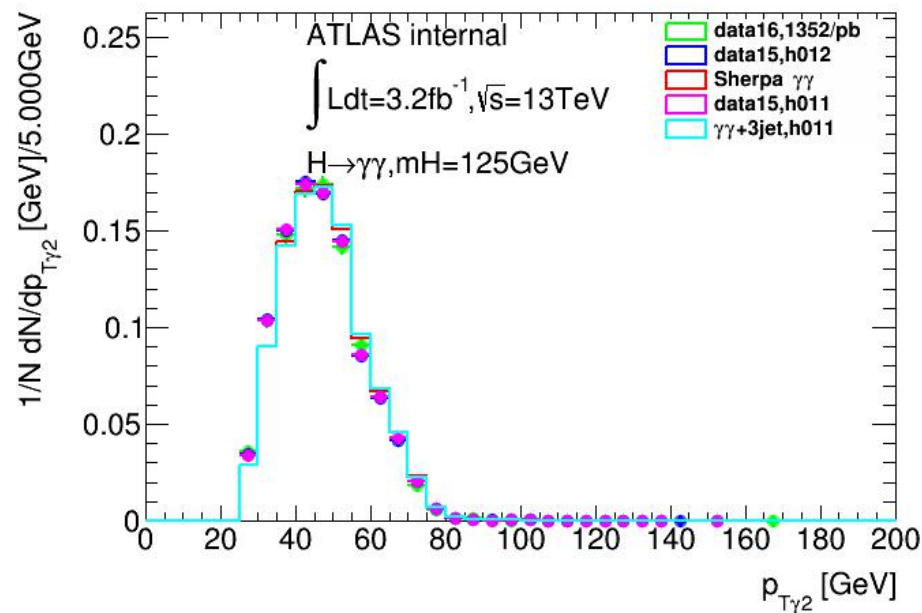
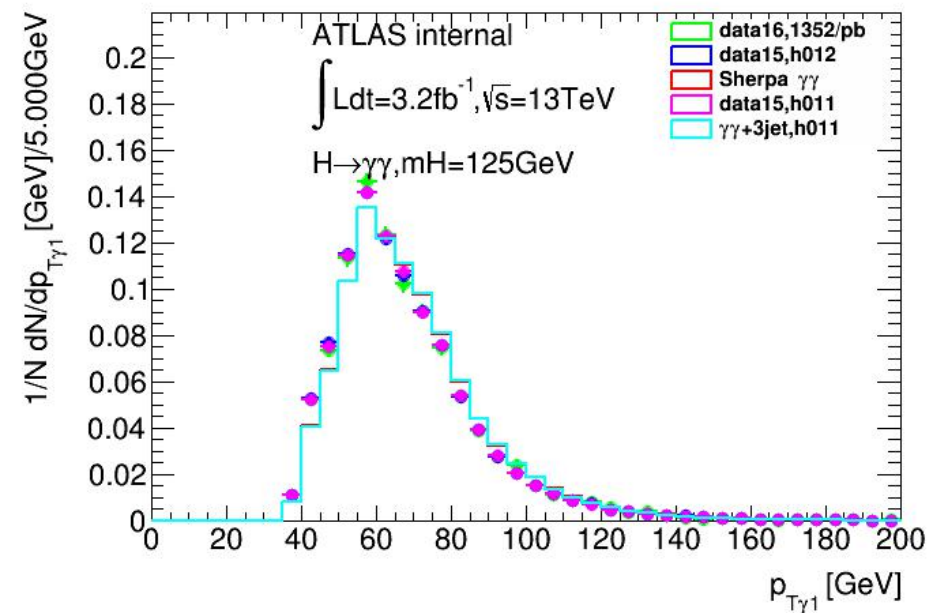
m_yy/1000 {isPassed}

data16



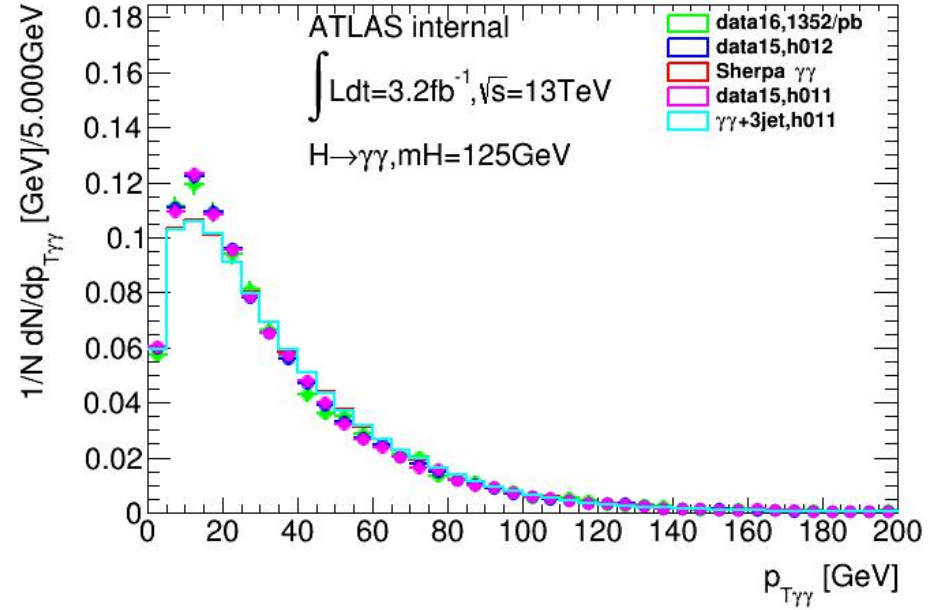
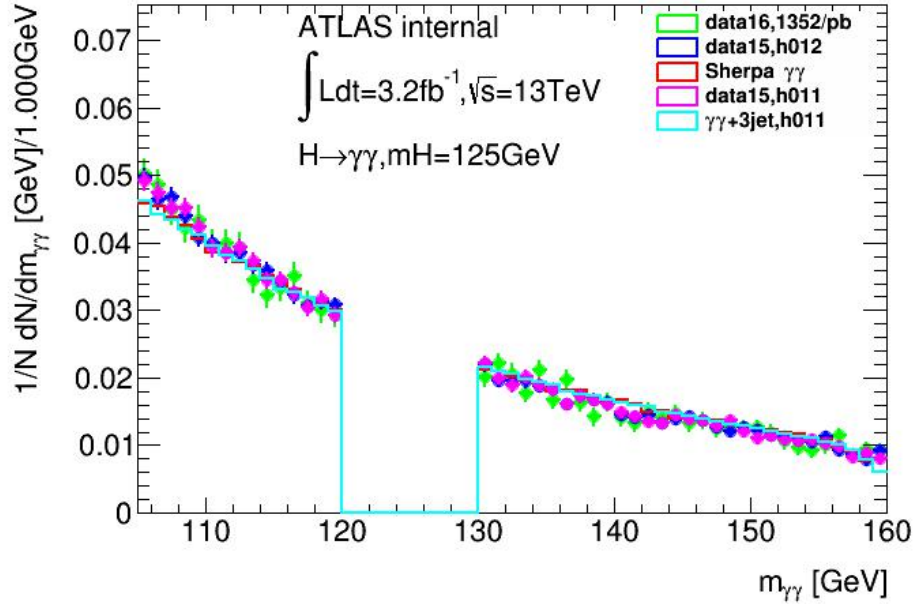
photon kinematic

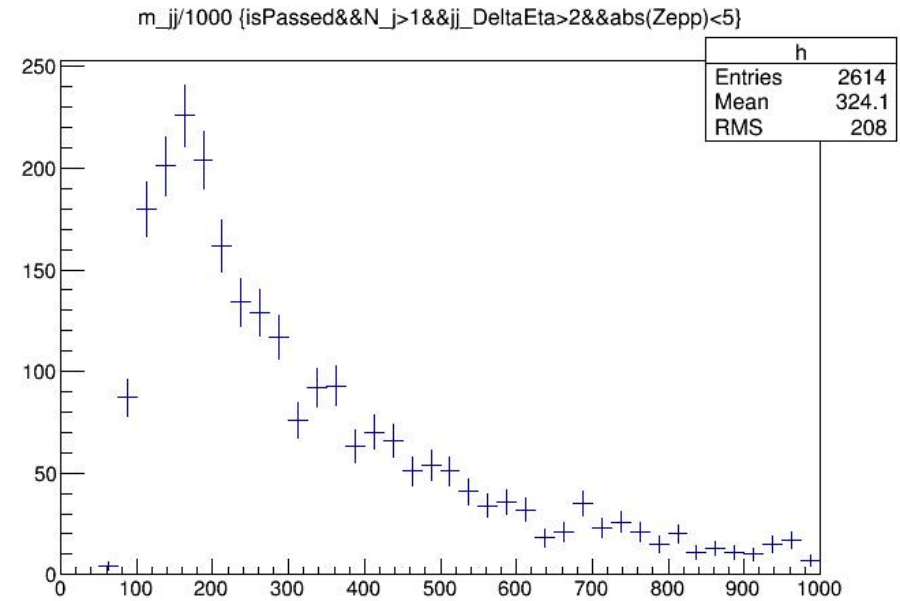
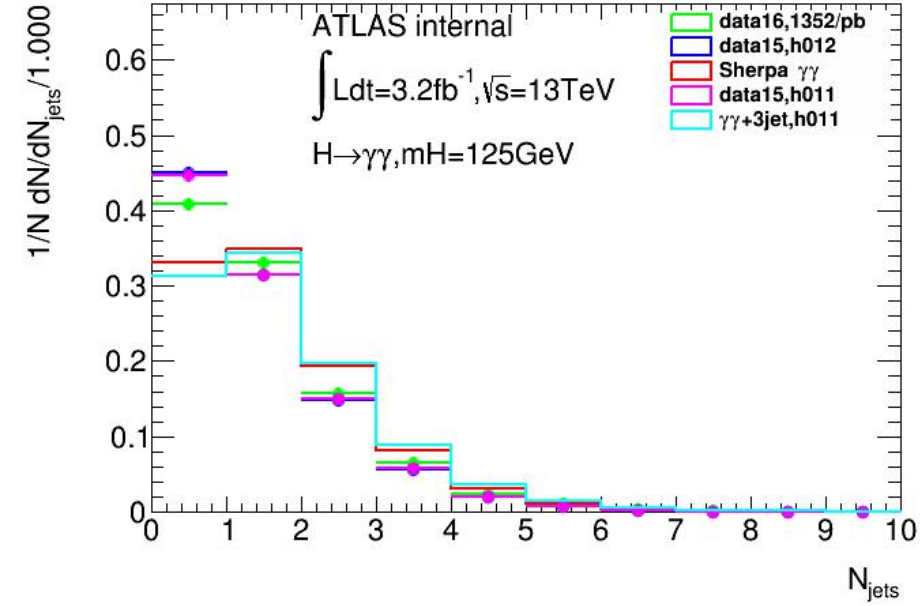
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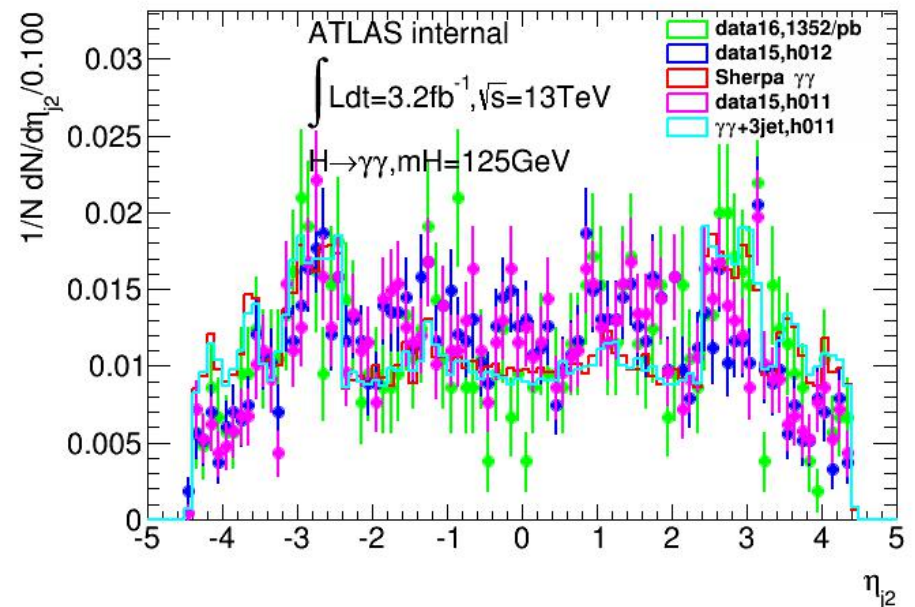
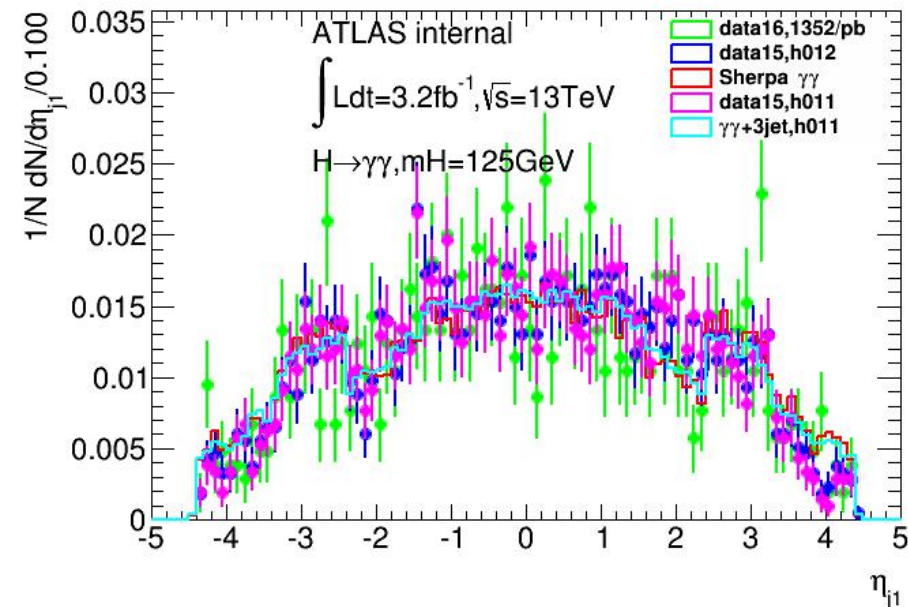
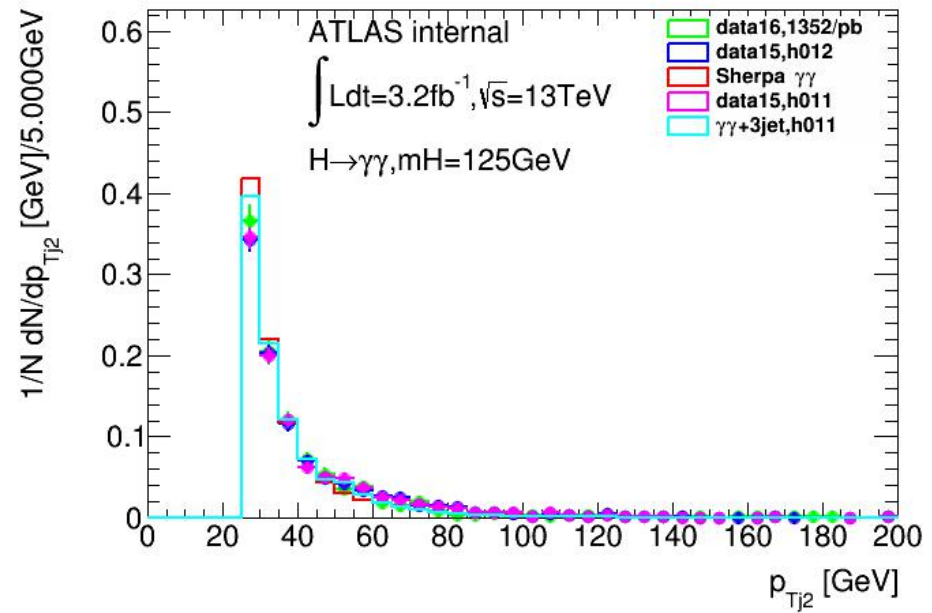
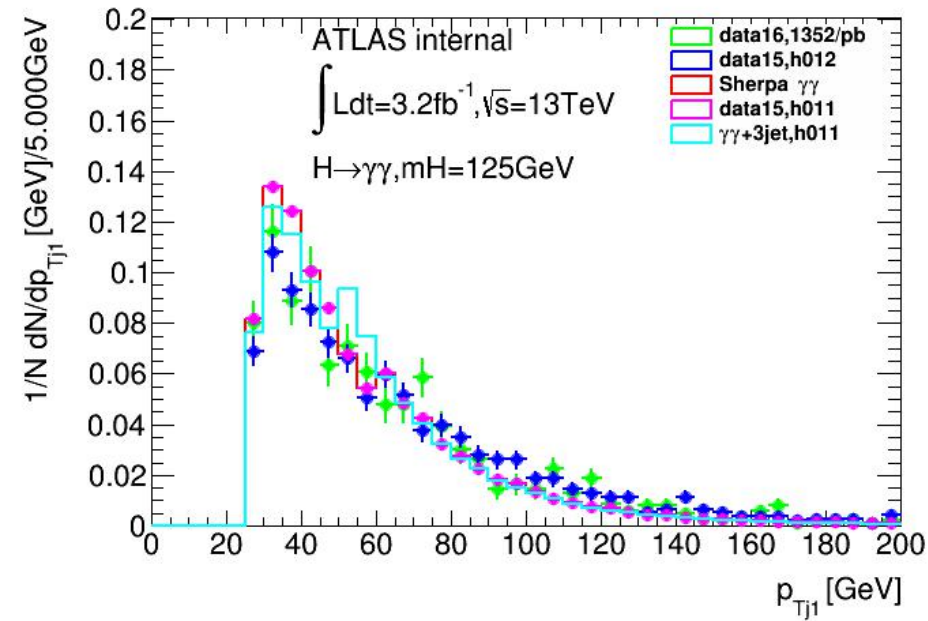
diphoton kinematic

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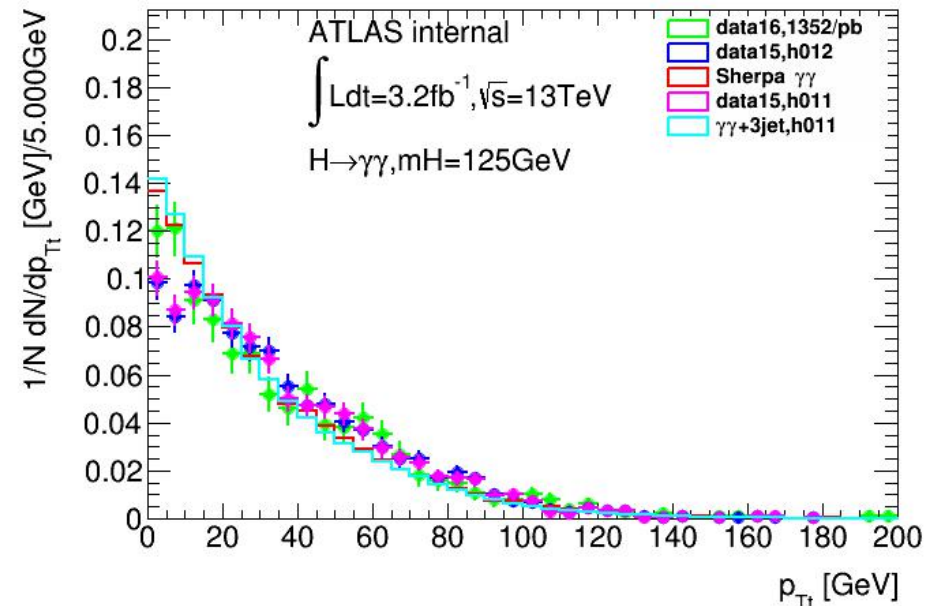
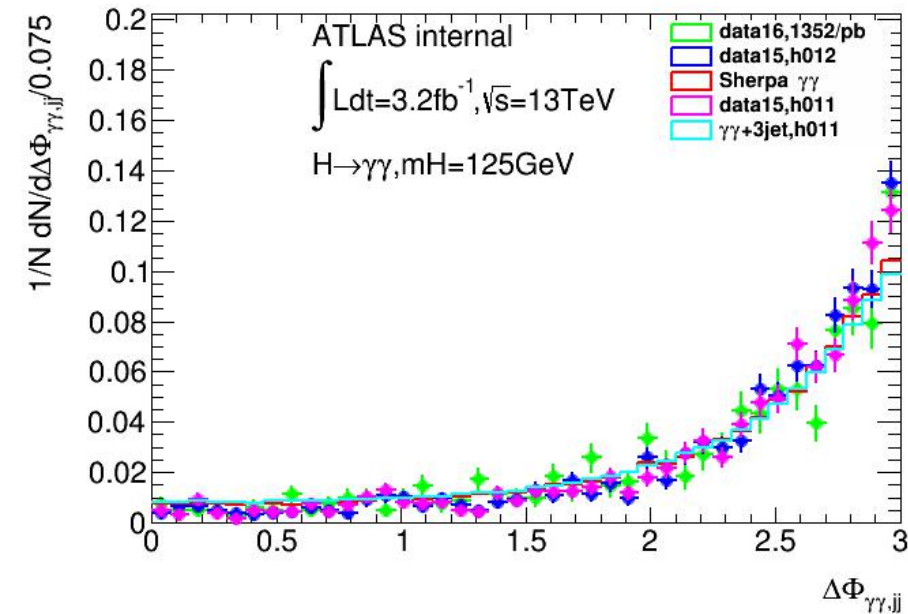
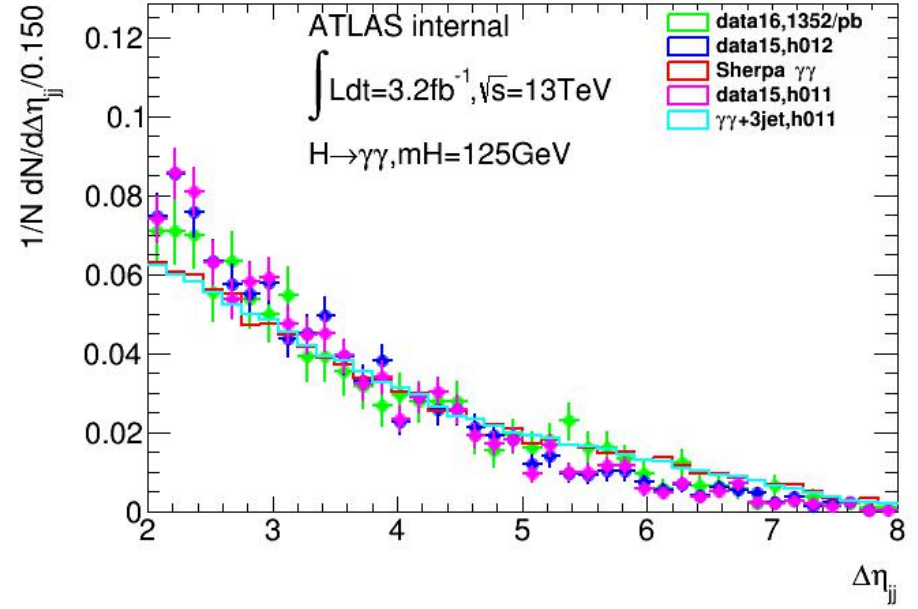
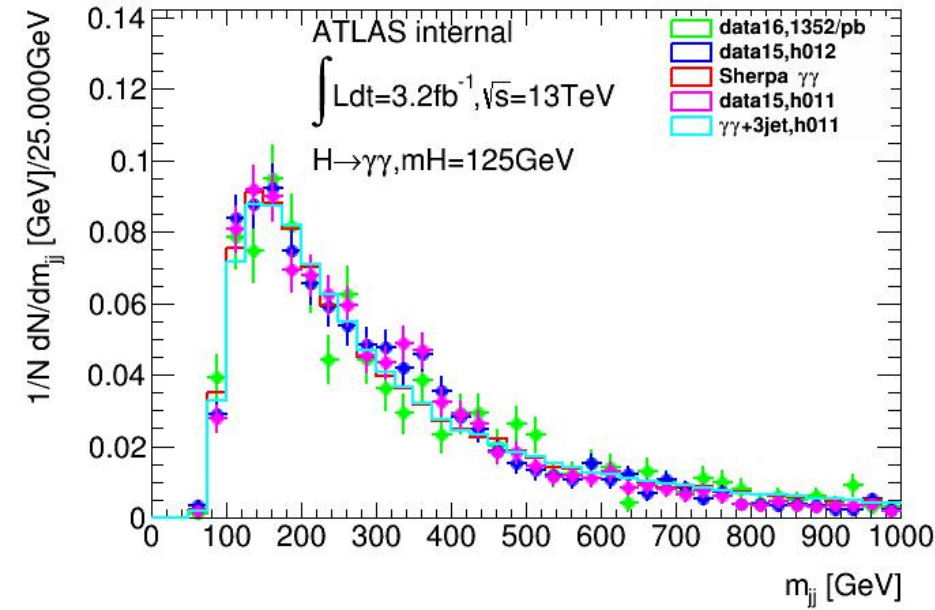




VBF variables, $N_{\text{jet}} \geq 2, \Delta\eta > 2, \eta^{\text{Zeppenfeld}} < 5$ 41



VBF variables, $N_{\text{jet}} \geq 2, \Delta\eta > 2, \eta^{\text{Zeppenfeld}} < 5$ 42



VBF variables, $N_{\text{jet}} \geq 2, \Delta\eta > 2, \eta^{\text{Zeppenfeld}} < 5$ 43

