Update on BSM gg → H → hh → WWyy Search with lvjjyy final state

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Fit error for different fits

For no_lep control sample exponential fit

The fit is 13.48% +- 0.01%

For no_lep control sample polynomial fit

The fit is 13.49% +- 0.1%

For dijet control sample fit

The fit is 13.22%+-1%

Also when check the no_lep control sample

I checked both W/O MET requirement

They are 13.489% to 13.484%

VBF sample

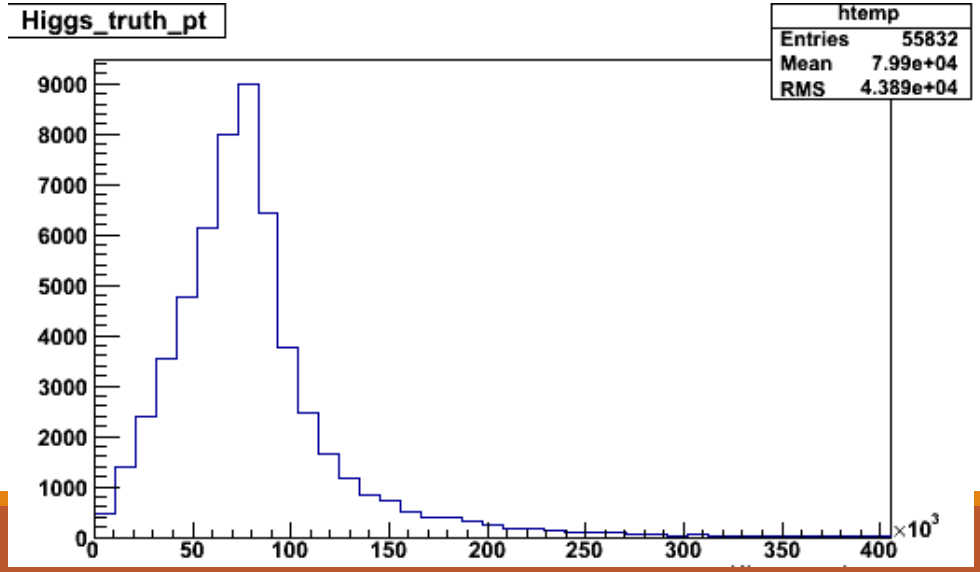
Extremely low efficiency due to the Boost of H

Only less than 10 events can pass our selection

For the ggH sample the H is in rest frame

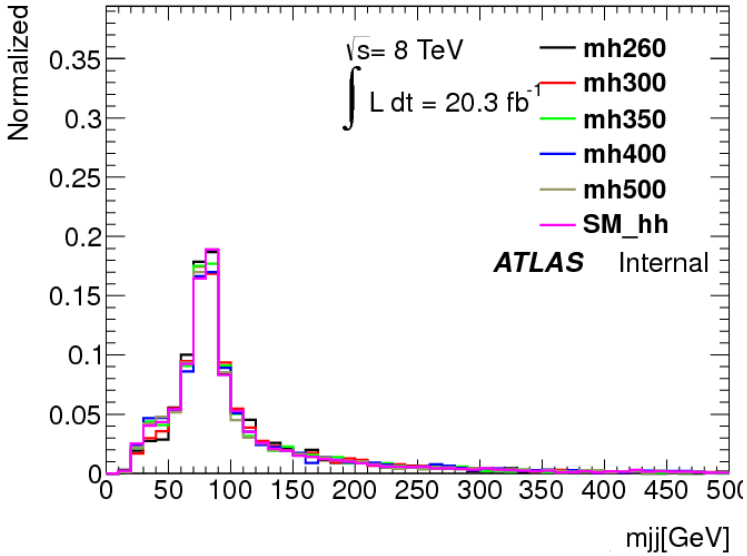
But for VBF sample, we have some boost on H,

That make all the objects close together and fail the iso/overlap cut



Back up

Information from the four events



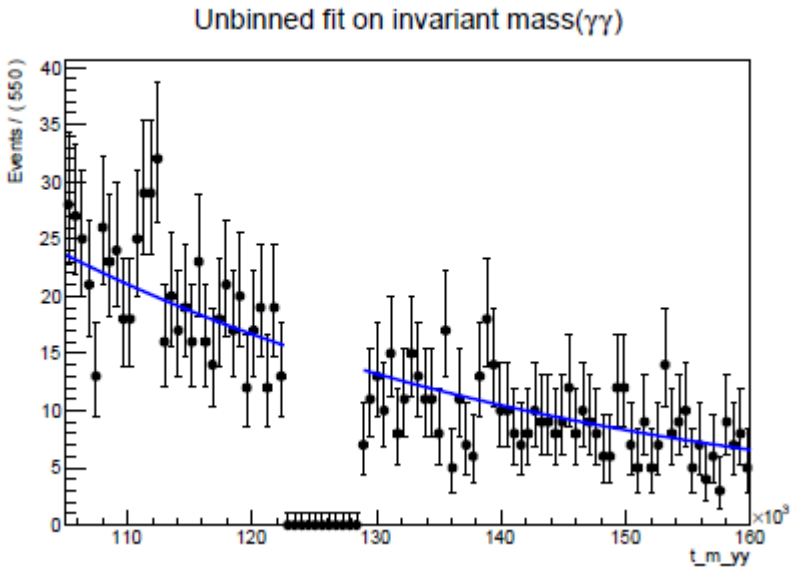
	203779/34925996	205071/53075031	206409/21404695	215414/177177613
Leading γ $p_T/\eta/\phi$	98.5633/-0.852812/-1.69113	67.4636/1.64648/1.21016	93.7528/1.62641/-1.74615	67.9589/2.12717/-0.52795
Subleading γ $p_T/\eta/\phi$	34.9792/0.0311352/1.72492	33.0454/-0.107483/-2.80046	32.9373/-0.293423/-2.2777	34.4934/0.0372347/-1.26547
$m_{\gamma\gamma}$	128.088	127.06	127.234	125.582
Leading jet $p_T/\eta/\phi$	45.1088/2.50567/0.937492	71.9527/1.98968/-0.644554	27.4681/0.002.86039/2.22521	256.965/0.647262/2.43716
Subleading jet $p_T/\eta/\phi$	25.6507/1.02382/-1.87857	33.917/-1.60218/2.50418	25.217/-2.40485/2.019	88.1251/-0.917844/-1.25418
m_{jj}	88.498	305.972	81.4373	390.198
Lepton $p_T/\eta/\phi$	10.6429/1.25487/1.6025	26.4419/0.277112/-0.80789	17.1516/2.43317/0.732764	33.5298/0.902979/-1.09434
E_T^{miss}	72.8039	35.2994	48.2987	79.7535
E_T^{miss} significance	2.7585	2.37516	1.08125	5.10453
$m_T(l\nu)$	58.9137	8.145	45.3455	53.019
$m_T(l\nu jj)$	257.24.1	146.545	265.114	462.958
$m(l\nu\gamma\gamma jj)$	632.455	538.601	654.406	820.708
number of jets	2	2	4	2
number of muons	1	0	1	1
number of electrons	0	1	0	0

Table 21: Kinematics of the four events found in signal region after unblinding.

Look again into the hadhad channel?

This was done by Xiaohu before with an MVA study

Could be useful to improve the significance because of the high statistic



γ-related	*jet*-related	γ *jet*-related
$p_T(\gamma 1)$	$p_T(jet1)$	η^*
$\eta(\gamma 1)$	$\eta(jet1)$	$\Delta\phi(\gamma\gamma, jet12)$
$\phi(\gamma 1)$	$\phi(jet1)$	$\Delta\eta(\gamma\gamma, jet12)$
$p_T(\gamma 2)$	$E(jet1)$	$min\Delta R(\gamma, jet)$
$\eta(\gamma 2)$	$p_T(jet2)$	$E(missW)$
$\phi(\gamma 2)$	$\eta(jet2)$	$m(missW)$
$p_T(\gamma\gamma)$	$\phi(jet2)$	$\phi(missW)$
$\eta(\gamma\gamma)$	$E(jet2)$	
$\phi(\gamma\gamma)$	$p_T(jet12)$	
$p_{T_t}(\gamma\gamma)$	$\eta(jet12)$	
$\Delta\phi(\gamma,\gamma)$	$\phi(jet12)$	
$\Delta\eta(\gamma,\gamma)$	$E(jet12)$	
	$\Delta\eta(jet1,2)$	