



VHBB ANALYSIS

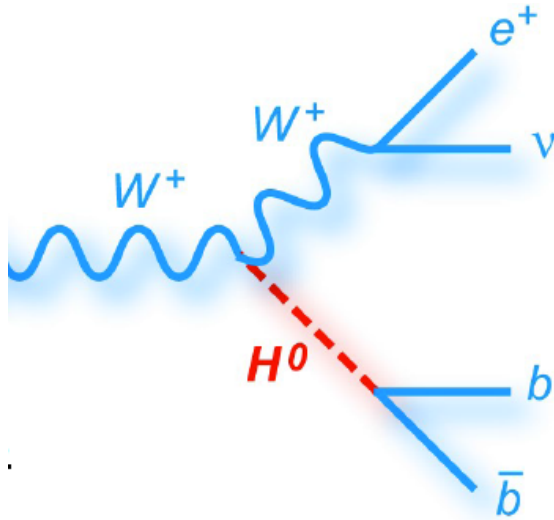
MPI Higgs Physics Analyses,
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Introduction

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Signal:



Background:

- $t\bar{t}$
- W^+ jets

Cuts

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- Trigger cut
- min. 2 jets
- min. 2 signaljets
- one lepton
- $\text{MET} > 30 \text{ GeV}$
- $m_{\text{TW}} > 20 \text{ GeV}$
- $p_{\text{TW}} > 120 \text{ GeV}$
- $\text{deltaPhi}(\text{MET}, \text{jets}) > 1.0$
- exactly 2 btags & leading signal jet $p_{\text{T}} > 45 \text{ GeV}$

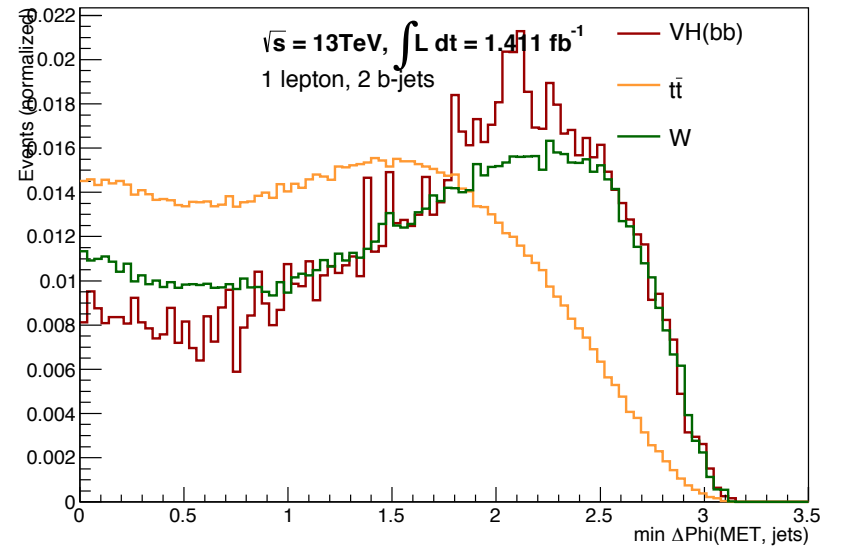
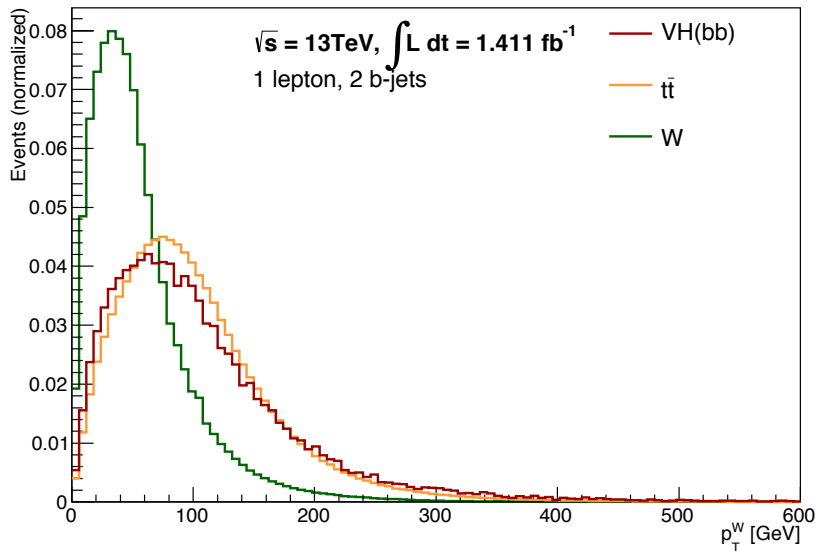
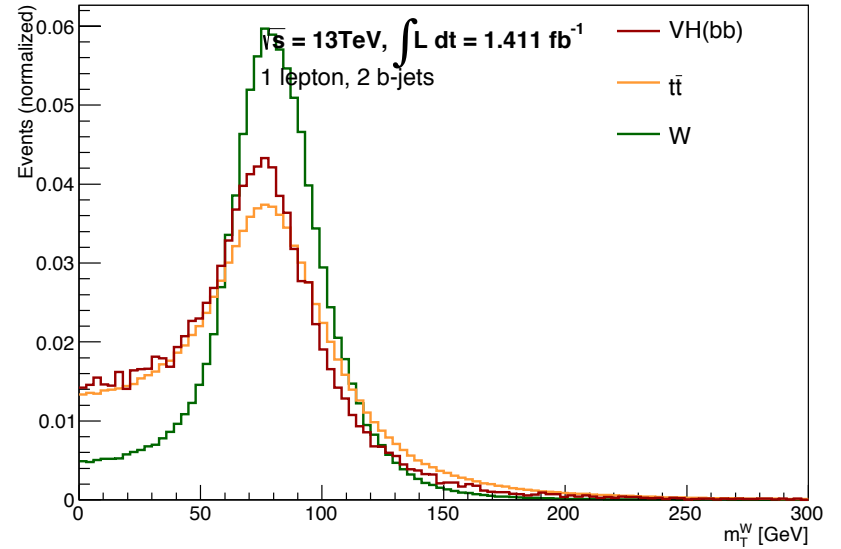
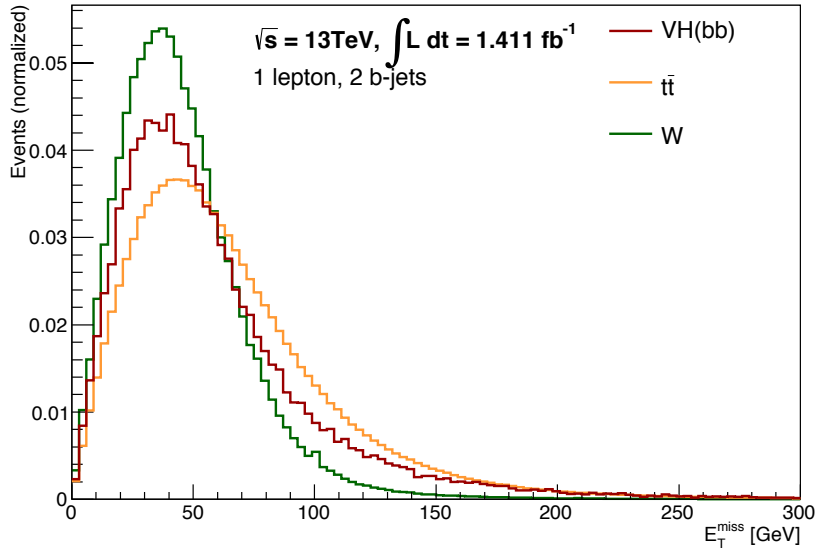
Cutflow (luminosity = 1.411 fb^{-1})

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	WH	t \bar{t}	W+b	W+c	W+l
All	130.7 ± 0.5	235080 ± 130	314750 ± 670	1070800 ± 1500	6058400 ± 7400
trigger	108.8 ± 0.4	191410 ± 110	271050 ± 620	888600 ± 1300	4950800 ± 6900
2 jets	97.4 ± 0.4	189730 ± 110	145660 ± 470	517100 ± 1000	1988600 ± 5300
2 signal jets	89.4 ± 0.4	186840 ± 110	126430 ± 440	460640 ± 990	1646000 ± 5100
1 lepton	89.4 ± 0.4	186840 ± 110	126430 ± 440	460640 ± 990	1646000 ± 5100
MET	67.7 ± 0.3	152190 ± 100	90960 ± 380	315470 ± 880	1160800 ± 4700
mTW	61.0 ± 0.3	138220 ± 100	87690 ± 380	303420 ± 870	1122500 ± 4700
pTW	20.1 ± 0.2	43580 ± 50	7070 ± 80	29307 ± 83	79610 ± 360
mindPhi	15.4 ± 0.2	26280 ± 40	4800 ± 80	19727 ± 71	58090 ± 330
2 btags	4.49 ± 0.08	1940 ± 10	55 ± 2	15.6 ± 1.6	0.042 ± 0.249

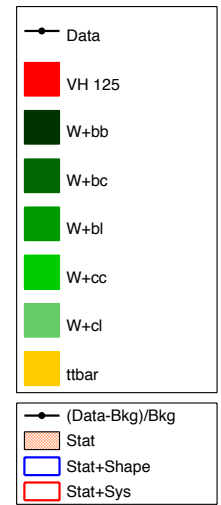
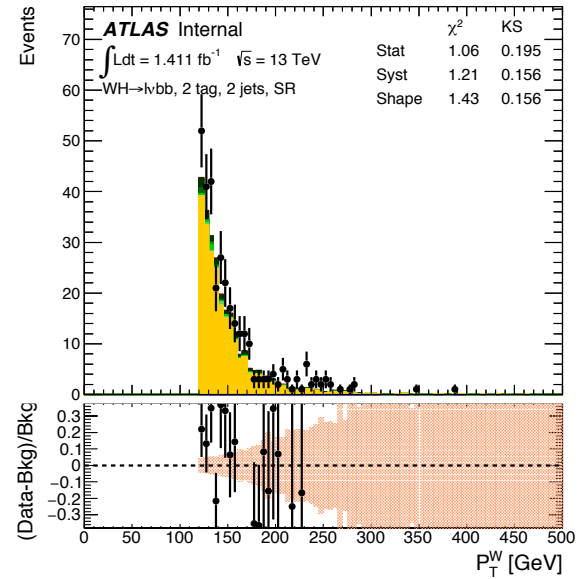
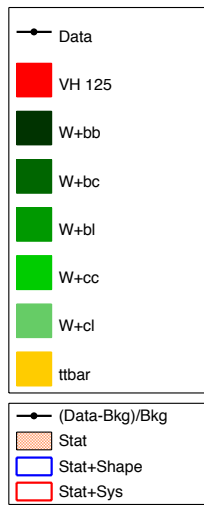
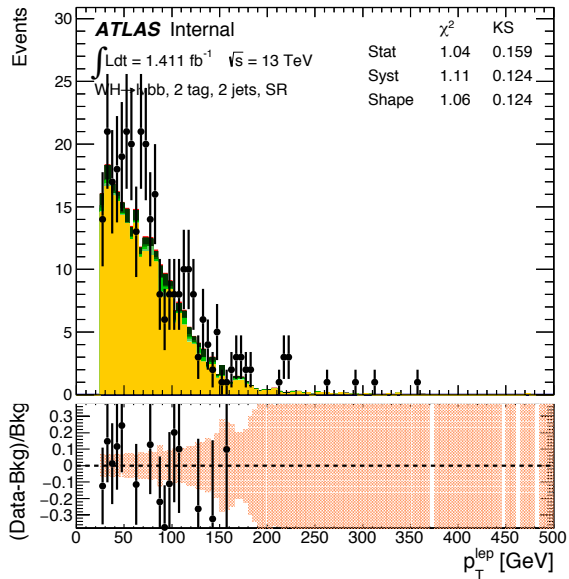
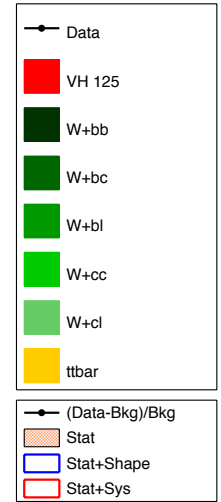
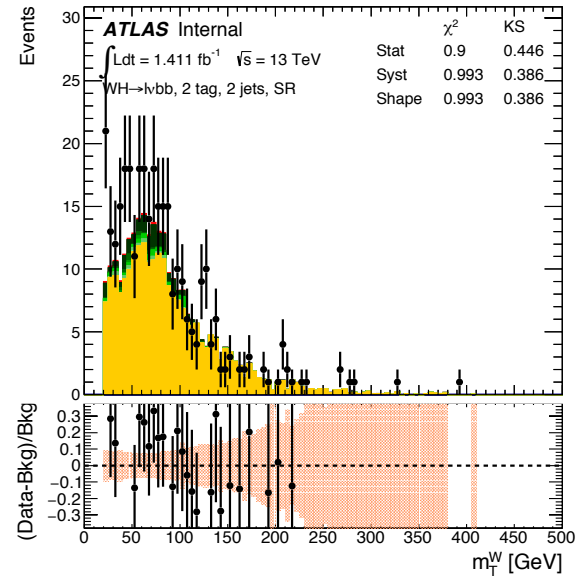
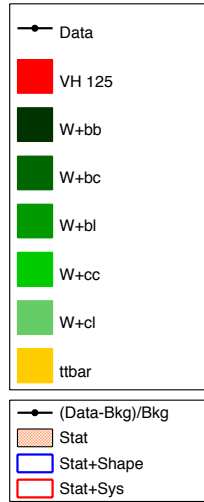
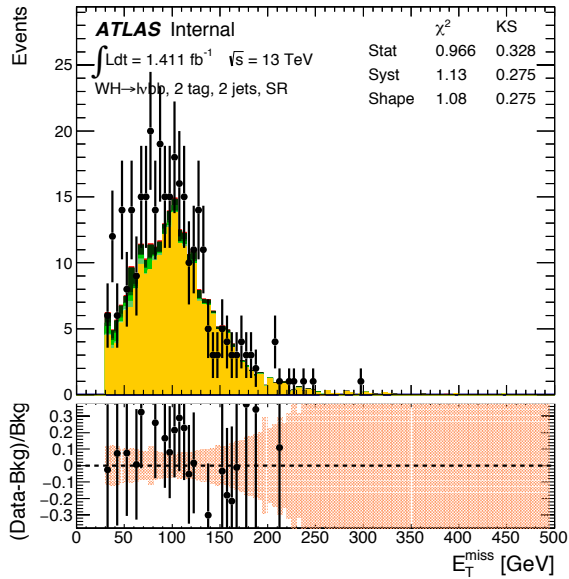
Plots before cuts

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Plots after cuts

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Higgs tagging

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	pTV =	120 – 160	160 – 200	200 – 250	> 250
Xbb medium	WH	0	0.0011 ± 0.0009	0.0170 ± 0.0056	0.397 ± 0.024
	background	11.01 ± 0.84	8.87 ± 0.77	6.28 ± 0.63	7.89 ± 0.70
significance Z	1.411 fb^{-1}	0	0.00037	0.00678	0.1402
	10 fb^{-1}	0	0.00098	0.0181	0.3732
Xbb tight	WH	0	0.0011 ± 0.0009	0.0014 ± 0.0048	0.316 ± 0.022
	background	9.40 ± 0.77	7.38 ± 0.70	4.65 ± 0.54	5.02 ± 0.56
significance Z	1.411 fb^{-1}	0	0.00040	0.00065	0.1396
	10 fb^{-1}	0	0.00108	0.00172	0.3716

$$Z = \sqrt{2 \cdot ((s + b) \cdot \ln \left(1 + \frac{s}{b}\right) - s)}$$