Weekly Meeting

HUIJUN

Cut flow for electrons

	SM	Resonant						
	Higgs pair	260 GeV	300 GeV	350 GeV	400 GeV	500 GeV	800 GeV	1000 GeV
Total	100%	100%	100%	100%	100%	100%	100 %	100 %
Author	83.68%	85.65%	84.80%	84.75%	83.15%	84.48%	82.88%	82.32%
Electron η	83.51%	85.36%	84.55%	84.43%	82.95%	84.27%	82.76%	82.22%
Electron p_T	67.98%	65.15%	65.61%	66.79%	67.15%	69.81%	71.26%	71.47%
Electron ID	55.62%	55.79%	56.17%	56.34%	55.61%	56.84%	51.08%	45.29%
Electron isolation	43.87%	50.63%	50.23%	47.95%	46.34%	43.55%	28.27%	21.37%
Electron revmoval	43.75%	50.49%	49.96%	47.82%	46.24%	43.53%	28.27%	21.34%

Table 4: Efficiencies for electron selections at object level.

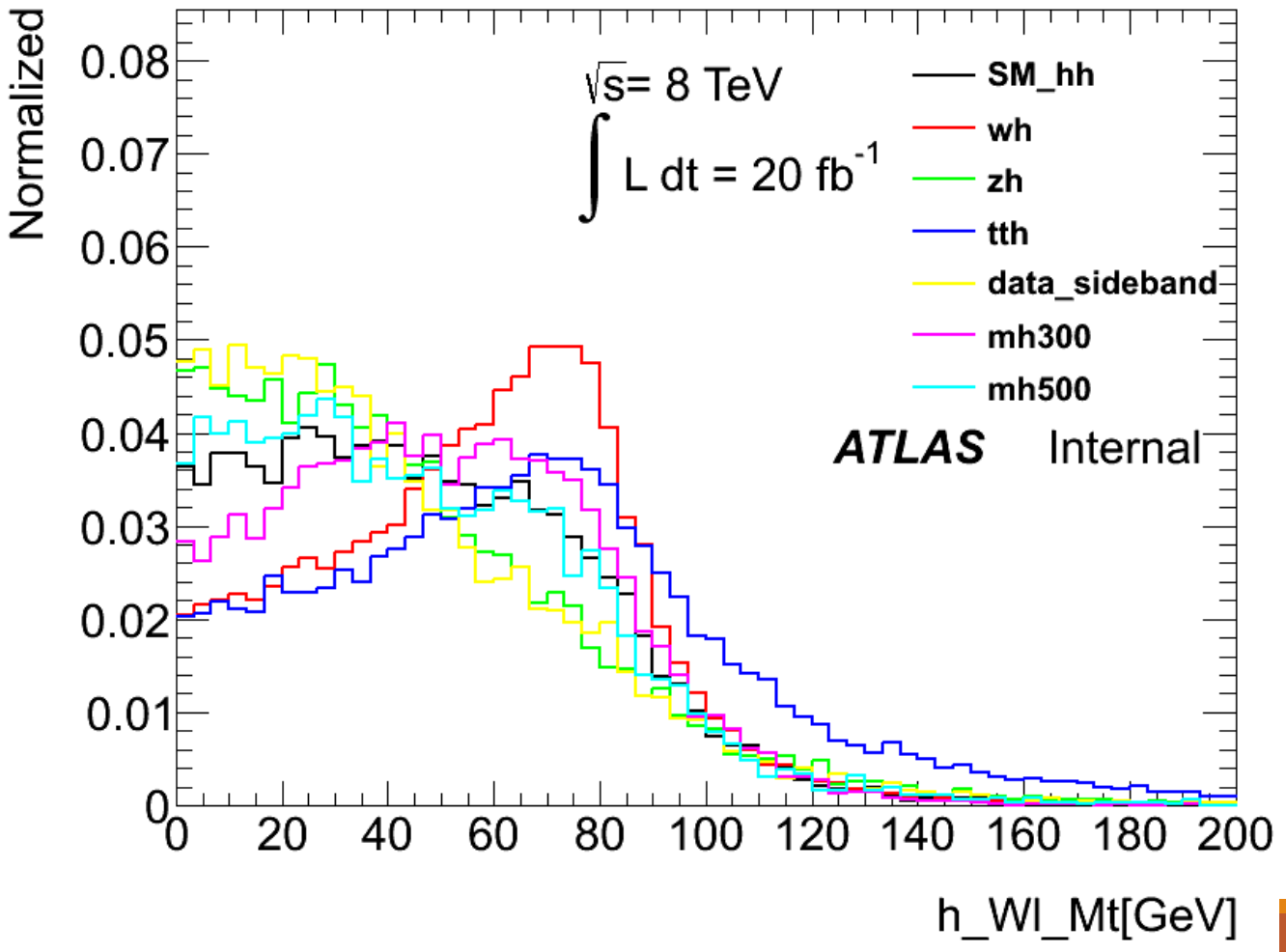
Cut flow on muon

	SM	Resonant						
	Higgs pair	260 GeV	300 GeV	350 GeV	400 GeV	500 GeV	800 GeV	1000 GeV
Total	100%	100%	100%	100%	100%	100%	100%	100%
Author	95.56%	96.82%	96.43%	96.18%	95.80%	95.52%	93.98%	92.94%
Muon p_T-η	85.82%	85.39%	85.93%	85.36%	86.41%	86.81%	87.87%	87.00%
Muon ID	84.94%	84.42%	84.88%	84.27%	85.58%	85.90%	86.96%	85.95%
Muon isolation	61.55%	67.00%	67.48%	64.82%	65.78%	58.58%	42.41%	30.36%
Muon revmoval	57.64%	66.19%	65.97%	62.21%	62.84%	54.53%	35.63%	24.72%

Table 5: Efficiencies for muon selections at object level.

Back UP

MT of lv


Normalized
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
0
20
40
60
80
100
120
140
160
180
200
h_Wl_Mt[GeV]
√s= 8 TeV
∫ L dt = 20 fb-1
SM_hh
wh
zh
tth
data_sideband
mh300
mh500
ATLAS Internal

Remaining questions from EB

5 questions left after last EB meeting

1. ~~Use the anti-phi of sumEt of all the hard object as the direction of MET~~
2. ~~Resolve the z part of MET to reconstruct H mass~~
3. Using fit instead of number counting to get the result
4. ~~Madgraph multijet overlap removal between different background components~~
5. ~~Change the algorism in tables of object selection~~

Comparison between toy and asymptotic

300_toy
expected limit (+2 sig) 14.3005
expected limit (+1 sig) 10.3368
expected limit (median) 7.84938
expected limit (-1 sig) 6.31249
expected limit (-2 sig) 5.78947

300_as
+2sigma: 18.1965
+1sigma: 12.0146
-1sigma: 5.79612
-2sigma: 4.3174
Injected: 9.14863
Median: 8.04396
Observed: 8.06476

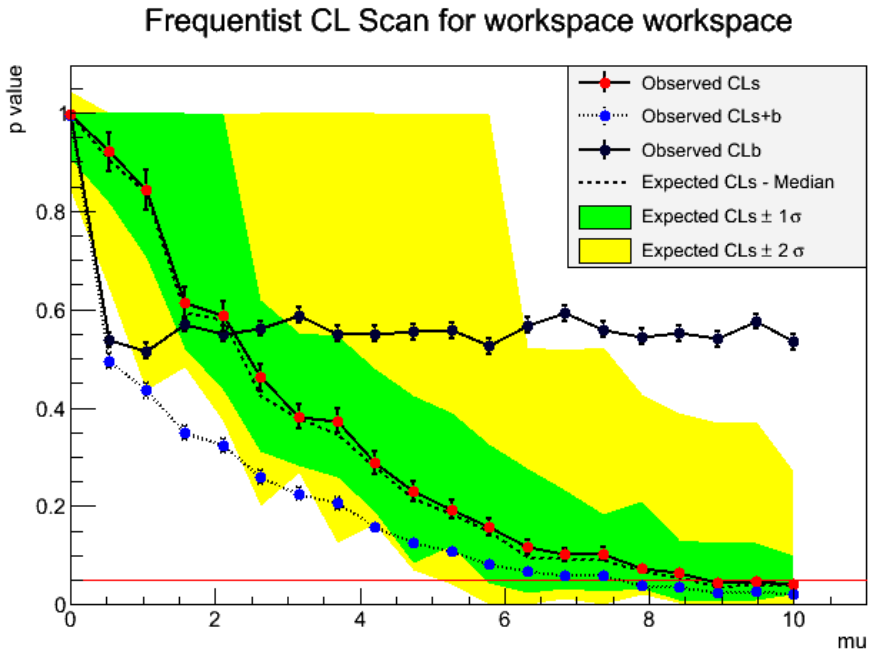
800_toy
expected limit (+2 sig) 10.2869
expected limit (+1 sig) 8.43876
expected limit (median) 6.12493
expected limit (-1 sig) 4.20474
expected limit (-2 sig) 3.68421

800_as
+2sigma: 13.1369
+1sigma: 8.60869
-1sigma: 4.13297
-2sigma: 3.07856
Injected: 6.92603
Median: 5.73581
Observed: 5.74425

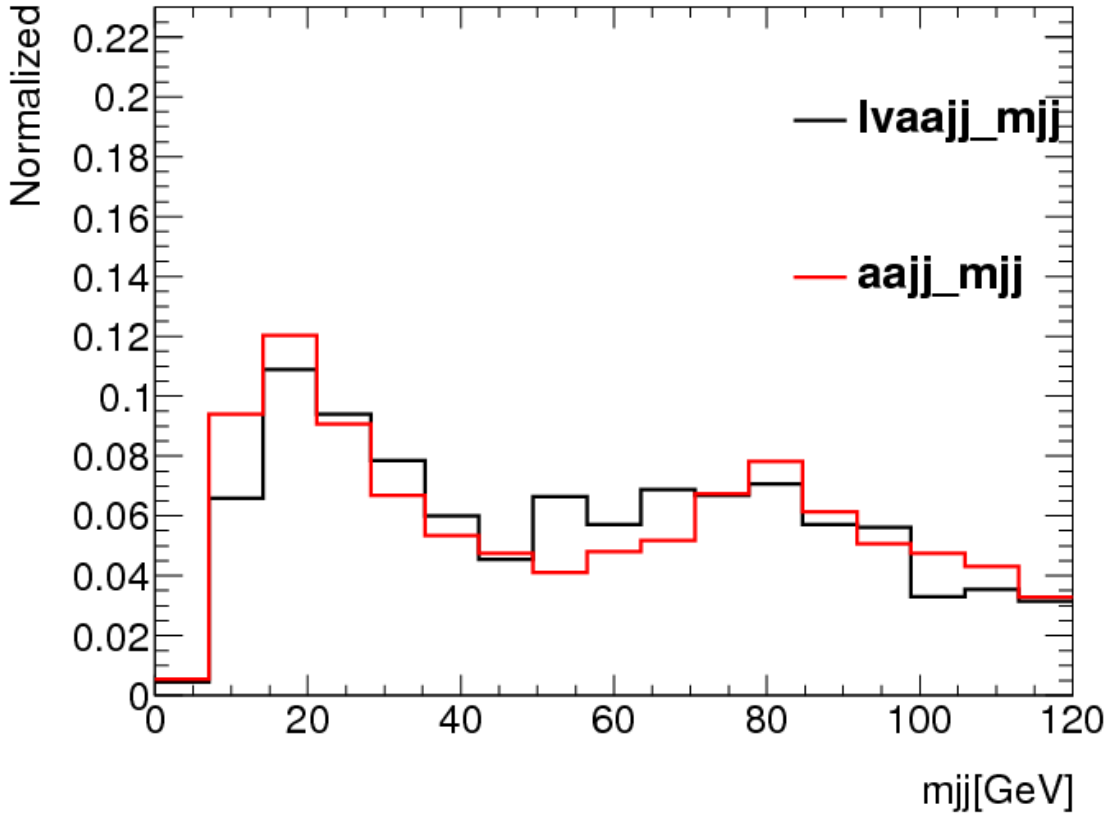
Fit result

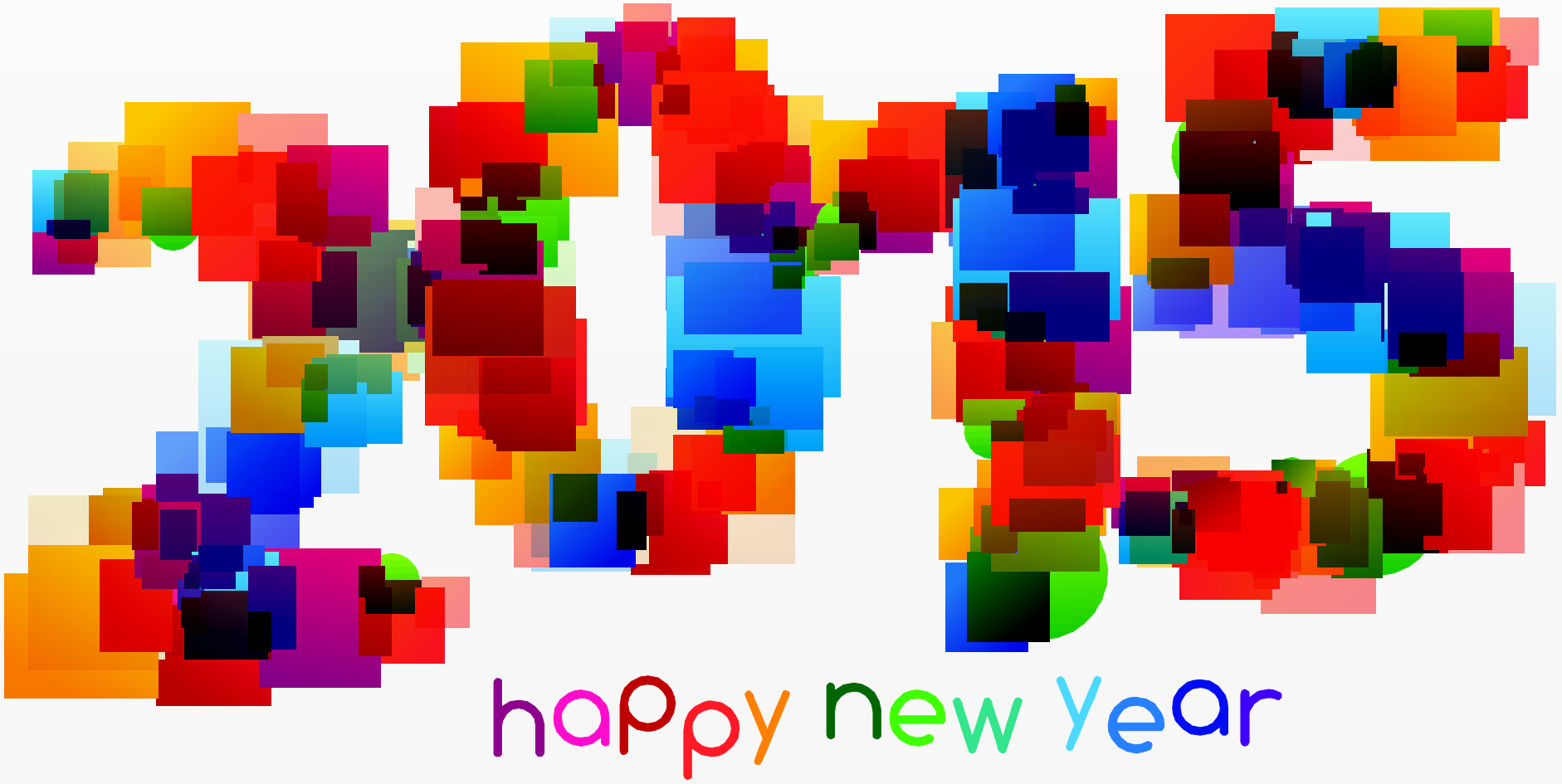
Using bkg only instead of bkg+signal assumption

The result is still worse than number counting



Dijet mass


Normalized
0.22
0.2
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
0
20
40
60
80
100
120
mjj[GeV]
lvaajj_mjj
aajj_mjj


2025
happy new year

Backup

Answering the questions from EB

4 questions left:

1. ~~Use the anti-phi of sumEt of all the hard object as the direction of MET~~
2. ~~Resolve the z part of MET to reconstruct H mass~~
3. Using fit instead of number counting to get the result
4. The overlap between different background components

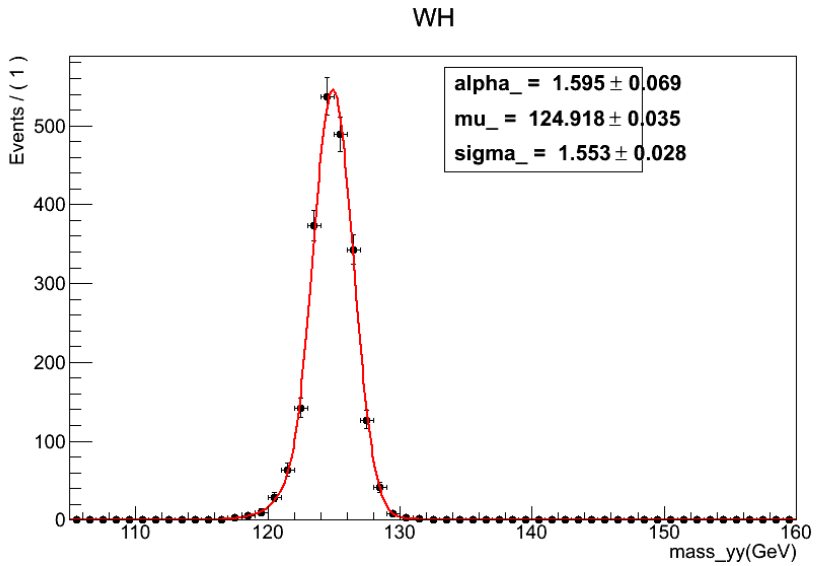
Fit

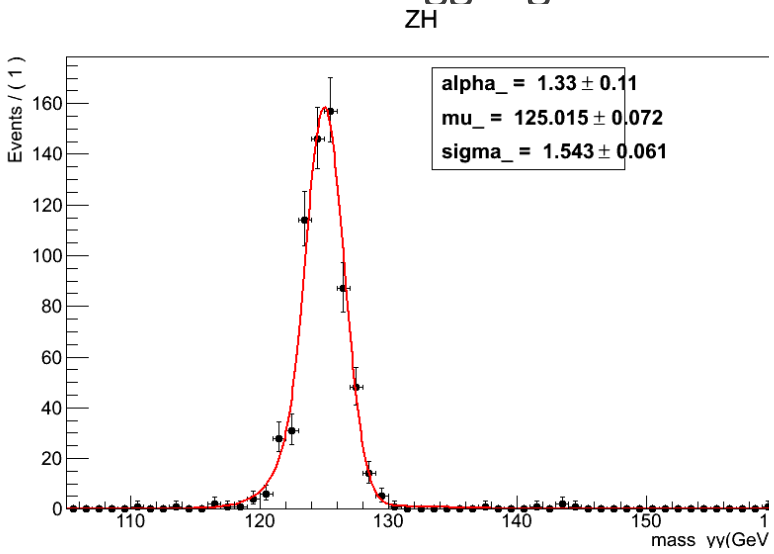
The result of fit result is quite dependent on parameters

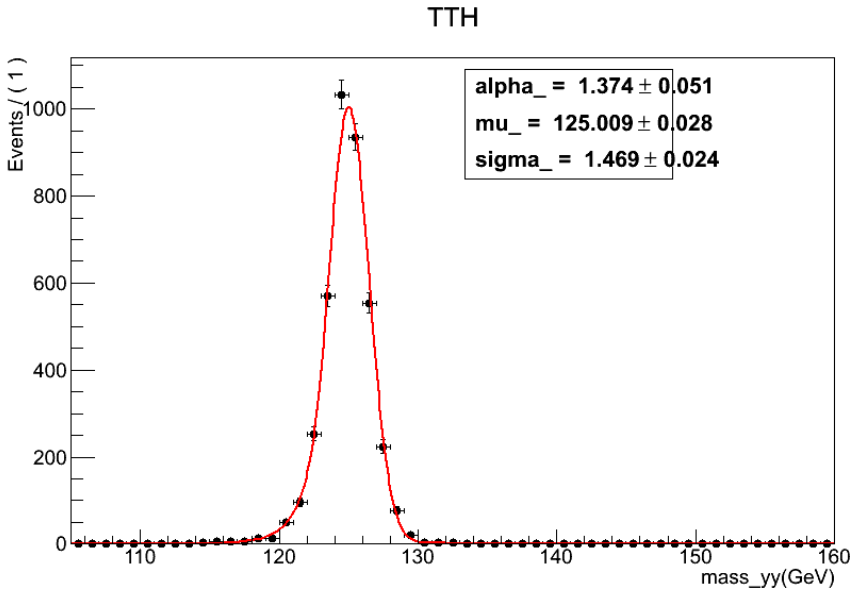
We have to fix each para to reduce freedom

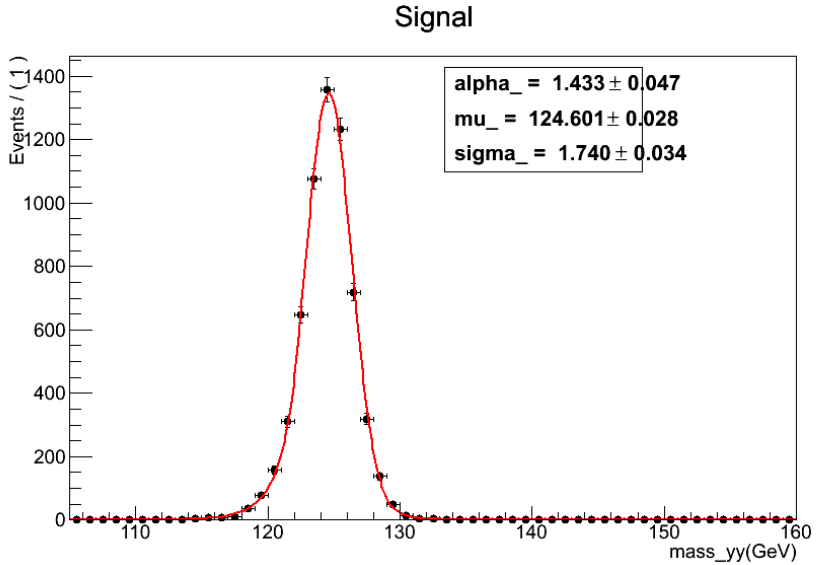
We cannot use 1 pdf to describe signal wh zh tth..

I am struggling on that…









Background components

Here we just consider p p > lvyyjj with different

QCD vertex number to avoid the overlap caused

By parton shower