The LaTeX report

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Contents

1 Setup

1.1 Command history

```
ma5>
# set directory where running "./bin/ma5"; set lumi; define the signal significance
ma5>set main.currentdir = /Users/elijahsheridan/MG5_aMC_v2_6_5/axion_pheno/madgraph_data
# need to change this directory path -> exit and type "pwd" to get the path
ma5>set main.lumi = 40
ma5>set main.fom.formula = 5
ma5>set main.fom.x = 0.0
ma5>
# import samples -> change the path to the LHE file
ma5>import /Users/elijahsheridan/MG5_aMC_v2_6_5/axion_pheno/madgraph_data/axion_signal/-
axion_signal_gurrola_cuts_1MeV.lhe.gz as signal
ma5>import /Users/elijahsheridan/MG5_aMC_v2_6_5/axion_pheno/madgraph_data/vbf_diphoton_background_
merged_lhe/vbf_diphoton_background_ht_0_100_merged.lhe.gz as bg_vbf_0_100
ma5>import /Users/elijahsheridan/MG5_aMC_v2_6_5/axion_pheno/madgraph_data/vbf_diphoton_background_
merged_lhe/vbf_diphoton_background_ht_100_200_merged.lhe.gz as bg_vbf_100_200
ma5>import /Users/elijahsheridan/MG5_aMC_v2_6_5/axion_pheno/madgraph_data/vbf_diphoton_background_
merged_lhe/vbf_diphoton_background_ht_200_400_merged.lhe.gz as bg_vbf_200_400
ma5>import /Users/elijahsheridan/MG5_aMC_v2_6_5/axion_pheno/madgraph_data/vbf_diphoton_background_
merged_lhe/vbf_diphoton_background_ht_400_600_merged.lhe.gz as bg_vbf_400_600
ma5>import /Users/elijahsheridan/MG5_aMC_v2_6_5/axion_pheno/madgraph_data/vbf_diphoton_background_
merged_lhe/vbf_diphoton_background_ht_600_800_merged.lhe.gz as bg_vbf_600_800
ma5>import /Users/elijahsheridan/MG5_aMC_v2_6_5/axion_pheno/madgraph_data/vbf_diphoton_background_
merged_lhe/vbf_diphoton_background_ht_800_1200_merged.lhe.gz as bg_vbf_800_1200
ma5>import /Users/elijahsheridan/MG5_aMC_v2_6_5/axion_pheno/madgraph_data/vbf_diphoton_background_
merged_lhe/vbf_diphoton_background_ht_1200_1600_merged.lhe.gz as bg_vbf_1200_1600
ma5>import /Users/elijahsheridan/MG5_aMC_v2_6_5/axion_pheno/madgraph_data/vbf_diphoton_background_
merged_lhe/vbf_diphoton_background_ht_1600_inf_merged.lhe.gz as bg_vbf_1600_inf
ma5>import /Users/elijahsheridan/MG5_aMC_v2_6_5/axion_pheno/madgraph_data/diphoton_double_isr_back
merged_lhe/diphoton_double_isr_background_ht_0_100_merged.lhe.gz as bg_dip_0_100
ma5>import /Users/elijahsheridan/MG5_aMC_v2_6_5/axion_pheno/madgraph_data/diphoton_double_isr_back
merged_lhe/diphoton_double_isr_background_ht_100_200_merged.lhe.gz as bg_dip_100_200
ma5>import /Users/elijahsheridan/MG5_aMC_v2_6_5/axion_pheno/madgraph_data/diphoton_double_isr_back
merged_lhe/diphoton_double_isr_background_ht_200_400_merged.lhe.gz as bg_dip_200_400
ma5>import /Users/elijahsheridan/MG5_aMC_v2_6_5/axion_pheno/madgraph_data/diphoton_double_isr_back
merged_lhe/diphoton_double_isr_background_ht_400_600_merged.lhe.gz as bg_dip_400_600
ma5>import /Users/elijahsheridan/MG5_aMC_v2_6_5/axion_pheno/madgraph_data/diphoton_double_isr_back
merged_lhe/diphoton_double_isr_background_ht_600_800_merged.lhe.gz as bg_dip_600_800
ma5>import /Users/elijahsheridan/MG5_aMC_v2_6_5/axion_pheno/madgraph_data/diphoton_double_isr_back
merged_lhe/diphoton_double_isr_background_ht_800_1200_merged.lhe.gz as bg_dip_800_1200
ma5>import /Users/elijahsheridan/MG5_aMC_v2_6_5/axion_pheno/madgraph_data/diphoton_double_isr_back
merged_lhe/diphoton_double_isr_background_ht_1200_1600_merged.lhe.gz as bg_dip_1200_1600
ma5>import /Users/elijahsheridan/MG5_aMC_v2_6_5/axion_pheno/madgraph_data/diphoton_double_isr_back
merged_lhe/diphoton_double_isr_background_ht_1600_inf_merged.lhe.gz as bg_dip_1600_inf
ma5>
# define bg and signal samples
ma5>set signal.type = signal
ma5>set bg_vbf_0_100.type = background
ma5>set bg_vbf_100_200.type = background
ma5>set bg_vbf_200_400.type = background
```

```
ma5>set bg_vbf_400_600.type = background
ma5>set bg_vbf_600_800.type = background
ma5>set bg_vbf_800_1200.type = background
ma5>set bg_vbf_1200_1600.type = background
ma5>set bg_vbf_1600_inf.type = background
ma5>set bg_dip_0_100.type = background
ma5>set bg_dip_100_200.type = background
ma5>set bg_dip_200_400.type = background
ma5>set bg_dip_400_600.type = background
ma5>set bg_dip_600_800.type = background
ma5>set bg_dip_800_1200.type = background
ma5>set bg_dip_1200_1600.type = background
ma5>set bg_dip_1600_inf.type = background
ma5># a jet can be from a light quark or b quark
ma5>define jets = j
ma5>define e = e+ e-
ma5>define mu = mu+ mu-
ma5>define ta = ta+ ta-
ma5>define lept = e mu ta
ma5>define ax = 9000005
ma5># cuts
ma5>select (sdETA(jets[1] jets[2]) > 2.6 or sdETA(jets[1] jets[2]) < -2.6) and M(jets[1]
jets[2]) > 1250
ma5># define which plots to make
ma5>plot PT(jets[1])
ma5>plot ETA(jets[1])
ma5>plot PHI(jets[1])
ma5>plot PT(jets[2])
ma5>plot ETA(jets[2])
ma5>plot PHI(jets[2])
ma5>plot DELTAR(jets[1], jets[2])
ma5>plot M(jets[1] jets[2])
ma5>plot sdETA(jets[1] jets[2])
ma5>plot M(a[1] a[2])
ma5>plot PT(a[1])
ma5>plot PT(a[2])
ma5>plot THT
ma5>plot MET
ma5>plot TET
ma5>#set the plot/graph parameters
ma5>set selection[2].xmin = 0
ma5>set selection[2].xmax = 2000
ma5>set selection[2].nbins = 200
ma5>set selection[2].rank = PTordering
ma5>set selection[2].titleX = "p_{T}[j_{1}] (GeV)"
ma5>set selection[3].xmin = -8
ma5>set selection[3].xmax = 8
ma5>set selection[3].nbins = 160
ma5>set selection[3].rank = PTordering
```

```
ma5>set selection[3].titleX = "#eta[j_{1}]"
ma5>set selection[4].xmin = -3.2
ma5>set selection[4].xmax = 3.2
ma5>set selection[4].nbins = 64
ma5>set selection[4].rank = PTordering
ma5>set selection[4].titleX = "#phi[j_{1}]"
ma5>set selection[5].xmin = 0
ma5>set selection[5].xmax = 1000
ma5>set selection[5].nbins = 100
ma5>set selection[5].rank = PTordering
ma5>set selection[5].titleX = "p_{T}[j_{2}] (GeV)"
ma5>set selection[6].xmin = -8
ma5>set selection[6].xmax = 8
ma5>set selection[6].nbins = 160
ma5>set selection[6].rank = PTordering
ma5>set selection[6].titleX = "#eta[j_{2}]"
ma5>set selection[7].xmin = -3.2
ma5>set selection[7].xmax = 3.2
ma5>set selection[7].nbins = 64
ma5>set selection[7].rank = PTordering
ma5>set selection[7].titleX = "#phi[j_{2}]"
ma5>set selection[8].xmin = 0
ma5>set selection[8].xmax = 15
ma5>set selection[8].nbins = 75
ma5>set selection[8].rank = PTordering
ma5>set selection[8].titleX = "#DeltaR[j_{1},j_{2}]"
ma5>set selection[9].xmin = 0
ma5>set selection[9].xmax = 8000
ma5>set selection[9].nbins = 160
ma5>set selection[9].rank = PTordering
ma5>set selection[9].titleX = "M[j_{1},j_{2}] (GeV)"
ma5>set selection[10].xmin = -15
ma5>set selection[10].xmax = 15
ma5>set selection[10].titleX = "#Delta#eta(j_{1},j_{2})"
ma5>set selection[11].xmin = 0
ma5>set selection[11].xmax = 4000
ma5>set selection[11].nbins = 400
ma5>set selection[11].rank = PTordering
ma5>set selection[11].titleX = "M[a_{1},a_{2}] (GeV)"
ma5>set selection[12].xmin = 0
ma5>set selection[12].xmax = 2000
ma5>set selection[12].nbins = 80
ma5>set selection[12].rank = PTordering
ma5>set selection[12].titleX = "p_{T}[a_{1}]"
ma5>set selection[13].xmin = 0
ma5>set selection[13].xmax = 2000
ma5>set selection[13].nbins = 400
ma5>set selection[13].rank = PTordering
ma5>set selection[13].titleX = "p_{T}[a_{2}] (GeV)"
```

```
ma5>set selection[14].xmin = 0
ma5>set selection[14].xmax = 4000
ma5>set selection[14].nbins = 80
ma5>set selection[14].rank = PTordering
ma5>set selection[14].titleX = "THT"
ma5>set selection[15].xmin = 0
ma5>set selection[15].xmax = 1000
ma5>set selection[15].nbins = 200
ma5>set selection[15].rank = PTordering
ma5>set selection[15].titleX = "MET"
ma5>set selection[16].xmin = 0
ma5>set selection[16].xmax = 8000
ma5>set selection[16].nbins = 80
ma5>set selection[16].rank = PTordering
ma5>set selection[16].titleX = "TET"
ma5>submit loose_analysis_sdeta_2.6_mjj_1250
```

1.2 Configuration

- MadAnalysis version 1.6.33 (2017/11/20).
- Histograms given for an integrated luminosity of 40.0fb^{-1}.

2 Datasets

2.1 signal

- Samples stored in the directory: /Users/elijahsheridan/MG5_aMC_v2_6_5/axion_pheno/-optimization/ma_scripts .
- Sample consisting of: signal events.
- Generated events: 1000000 events.
- Normalization to the luminosity: 4094+/- 2 events.
- Ratio (event weight): 0.0041 .

Path to the event file	Nr. of events	Cross section (pb)	Negative wgts (%)
/Users/elijahsheridan/-MG5_aMC_v2_6_5/-axion_pheno/-madgraph_data/axion_signal/-axion_signal_gurrola_cuts_1MeV.ll	1000000	0.102 @ 0.028%	0.0

2.2 bg_vbf_0_100

- Samples stored in the directory: /Users/elijahsheridan/MG5_aMC_v2_6_5/axion_pheno/-optimization/ma_scripts .
- Sample consisting of: background events.
- Generated events: 1000000 events.
- Normalization to the luminosity: 12150+/- 24 events.
- Ratio (event weight): 0.012 .

Path to the event file	Nr. of events	Cross section (pb)	Negative wgts (%)
/Users/elijahsheridan/-MG5_aMC_v2_6_5/-axion_pheno/madgraph_data/-vbf_diphoton_background_data/-merged_lhe/-vbf_diphoton_background_ht_0_1(	1000000	0.304 @ 0.19%	0.0

2.3 bg_vbf_100_200

- Samples stored in the directory: /Users/elijahsheridan/MG5_aMC_v2_6_5/axion_pheno/-optimization/ma_scripts .
- Sample consisting of: background events.
- Generated events: 965662 events.

- Normalization to the luminosity: 9695+/- 17 events.
- Ratio (event weight): 0.01 .

Path to the event file	Nr. of events	Cross section (pb)	Negative wgts (%)
/Users/elijahsheridan/-MG5_aMC_v2_6_5/-axion_pheno/madgraph_data/-vbf_diphoton_background_data/-merged_lhe/-vbf_diphoton_background_ht_100_	965662	0.242 @ 0.17%	0.0

2.4 bg_vbf_200_400

- Samples stored in the directory: /Users/elijahsheridan/MG5_aMC_v2_6_5/axion_pheno/-optimization/ma_scripts .
- Sample consisting of: background events.
- Generated events: 984165 events.
- Normalization to the luminosity: 5413+/- 11 events.
- Ratio (event weight): 0.0055 .

Path to the event file	Nr. of events	Cross section (pb)	Negative wgts (%)
/Users/elijahsheridan/-MG5_aMC_v2_6_5/-axion_pheno/madgraph_data/-vbf_diphoton_background_data/-merged_lhe/-vbf_diphoton_background_ht_200_	984165	0.135 @ 0.2%	0.0

2.5 bg_vbf_400_600

- Samples stored in the directory: /Users/elijahsheridan/MG5_aMC_v2_6_5/axion_pheno/-optimization/ma_scripts .
- Sample consisting of: background events.
- Generated events: 1000000 events.
- Normalization to the luminosity: 986+/- 2 events.
- Ratio (event weight): 0.00099 .

Path to the event file	Nr. of events	Cross section (pb)	Negative wgts (%)
/Users/elijahsheridan/-MG5_aMC_v2_6_5/-axion_pheno/madgraph_data/-vbf_diphoton_background_data/-merged_lhe/-vbf_diphoton_background_ht_400_	1000000	0.0247 @ 0.14%	0.0

2.6 bg_vbf_600_800

- Samples stored in the directory: /Users/elijahsheridan/MG5_aMC_v2_6_5/axion_pheno/-optimization/ma_scripts .
- Sample consisting of: background events.
- Generated events: 1000000 events.
- Normalization to the luminosity: 252+/- 1 events.
- Ratio (event weight): 0.00025 .

Path to the event file	Nr. of events	Cross section (pb)	Negative wgts (%)
/Users/elijahsheridan/-MG5_aMC_v2_6_5/-axion_pheno/madgraph_data/-vbf_diphoton_background_data/-merged_lhe/-vbf_diphoton_background_ht_600_	1000000	0.0063 @ 0.13%	0.0

2.7 bg_vbf_800_1200

- Samples stored in the directory: /Users/elijahsheridan/MG5_aMC_v2_6_5/axion_pheno/-optimization/ma_scripts .
- Sample consisting of: background events.
- Generated events: 400839 events.
- Normalization to the luminosity: 114+/- 1 events.
- Ratio (event weight): 0.00028 .

Path to the event file	Nr. of events	Cross section (pb)	Negative wgts (%)
/Users/elijahsheridan/-MG5_aMC_v2_6_5/-axion_pheno/madgraph_data/-vbf_diphoton_background_data/-merged_lhe/-vbf_diphoton_background_ht_800_	400839	0.00287 @ 0.16%	0.0

2.8 bg_vbf_1200_1600

- Samples stored in the directory: /Users/elijahsheridan/MG5_aMC_v2_6_5/axion_pheno/-optimization/ma_scripts .
- Sample consisting of: background events.
- Generated events: 953803 events.
- Normalization to the luminosity: 20+/- 1 events.
- Ratio (event weight): 2.1e-05 .

Path to the event file	Nr. of events	Cross section (pb)	Negative wgts (%)
/Users/elijahsheridan/-MG5_aMC_v2_6_5/-axion_pheno/madgraph_data/-vbf_diphoton_background_data/-merged_lhe/-vbf_diphoton_background_ht_1200	953803	0.000515 @ 0.16%	0.0

2.9 bg_vbf_1600_inf

- Samples stored in the directory: /Users/elijahsheridan/MG5_aMC_v2_6_5/axion_pheno/-optimization/ma_scripts .
- Sample consisting of: background events.
- Generated events: 270148 events.
- Normalization to the luminosity: 7+/- 1 events.
- Ratio (event weight): 2.6e-05 .

Path to the event file	Nr. of events	Cross section (pb)	Negative wgts (%)
/Users/elijahsheridan/-MG5_aMC_v2_6_5/-axion_pheno/madgraph_data/-vbf_diphoton_background_data/-merged_lhe/-vbf_diphoton_background_ht_1600	270148	0.000191 @ 0.11%	0.0

2.10 bg_dip_0_100

- Samples stored in the directory: /Users/elijahsheridan/MG5_aMC_v2_6_5/axion_pheno/-optimization/ma_scripts .
- Sample consisting of: background events.
- Generated events: 1040000 events.
- Normalization to the luminosity: 2710847+/- 4614 events.

- Ratio (event weight): 2.6 - warning: please generate more events (weight larger than 1)!

Path to the event file	Nr. of events	Cross section (pb)	Negative wgts (%)
/Users/elijahsheridan/-MG5_aMC_v2_6_5/-axion_pheno/madgraph_data/-diphoton_double_isr_background_ merged_lhe/-diphoton_double_isr_background_l	1040000	67.8 @ 0.17%	0.0

2.11 bg_dip_100_200

- Samples stored in the directory: /Users/elijahsheridan/MG5_aMC_v2_6_5/axion_pheno/-optimization/ma_scripts .
- Sample consisting of: background events.
- Generated events: 1040000 events.
- Normalization to the luminosity: 1095362+/- 1528 events.
- Ratio (event weight): 1.1 - warning: please generate more events (weight larger than 1)!

Path to the event file	Nr. of events	Cross section (pb)	Negative wgts (%)
/Users/elijahsheridan/-MG5_aMC_v2_6_5/-axion_pheno/madgraph_data/-diphoton_double_isr_background_ merged_lhe/-diphoton_double_isr_background_l	1040000	27.4 @ 0.14%	0.0

2.12 bg_dip_200_400

- Samples stored in the directory: /Users/elijahsheridan/MG5_aMC_v2_6_5/axion_pheno/-optimization/ma_scripts .
- Sample consisting of: background events.
- Generated events: 1040000 events.
- Normalization to the luminosity: 239548+/- 414 events.
- Ratio (event weight): 0.23 .

Path to the event file	Nr. of events	Cross section (pb)	Negative wgts (%)
/Users/elijahsheridan/-MG5_aMC_v2_6_5/-axion_pheno/madgraph_data/-diphoton_double_isr_background_ merged_lhe/-diphoton_double_isr_background_l	1040000	5.99 @ 0.17%	0.0

2.13 bg_dip_400_600

- Samples stored in the directory: /Users/elijahsheridan/MG5_aMC_v2_6_5/axion_pheno/-optimization/ma_scripts .
- Sample consisting of: background events.
- Generated events: 1040000 events.
- Normalization to the luminosity: 28798+/- 53 events.
- Ratio (event weight): 0.028 .

Path to the event file	Nr. of events	Cross section (pb)	Negative wgts (%)
/Users/elijahsheridan/-MG5_aMC_v2_6_5/-axion_pheno/madgraph_data/-diphoton_double_isr_background_merged_lhe/-diphoton_double_isr_background_l	1040000	0.72 @ 0.18%	0.0

2.14 bg_dip_600_800

- Samples stored in the directory: /Users/elijahsheridan/MG5_aMC_v2_6_5/axion_pheno/-optimization/ma_scripts .
- Sample consisting of: background events.
- Generated events: 662009 events.
- Normalization to the luminosity: 6674+/- 28 events.
- Ratio (event weight): 0.01 .

Path to the event file	Nr. of events	Cross section (pb)	Negative wgts (%)
/Users/elijahsheridan/-MG5_aMC_v2_6_5/-axion_pheno/madgraph_data/-diphoton_double_isr_background_merged_lhe/-diphoton_double_isr_background_l	662009	0.167 @ 0.41%	0.0

2.15 bg_dip_800_1200

- Samples stored in the directory: /Users/elijahsheridan/MG5_aMC_v2_6_5/axion_pheno/-optimization/ma_scripts .
- Sample consisting of: background events.
- Generated events: 1040000 events.
- Normalization to the luminosity: 2942+/- 6 events.

- Ratio (event weight): 0.0028 .

Path to the event file	Nr. of events	Cross section (pb)	Negative wgts (%)
/Users/elijahsheridan/-MG5_aMC_v2_6_5/-axion_pheno/madgraph_data/-diphoton_double_isr_background_c merged_lhe/-diphoton_double_isr_background_l	1040000	0.0736 @ 0.17%	0.0

2.16 bg_dip_1200_1600

- Samples stored in the directory: /Users/elijahsheridan/MG5_aMC_v2_6_5/axion_pheno/-optimization/ma_scripts .
- Sample consisting of: background events.
- Generated events: 337115 events.
- Normalization to the luminosity: 513+/- 3 events.
- Ratio (event weight): 0.0015 .

Path to the event file	Nr. of events	Cross section (pb)	Negative wgts (%)
/Users/elijahsheridan/-MG5_aMC_v2_6_5/-axion_pheno/madgraph_data/-diphoton_double_isr_background_c merged_lhe/-diphoton_double_isr_background_l	337115	0.0128 @ 0.51%	0.0

2.17 bg_dip_1600_inf

- Samples stored in the directory: /Users/elijahsheridan/MG5_aMC_v2_6_5/axion_pheno/-optimization/ma_scripts .
- Sample consisting of: background events.
- Generated events: 1040000 events.
- Normalization to the luminosity: 187+/- 1 events.
- Ratio (event weight): 0.00018 .

Path to the event file	Nr. of events	Cross section (pb)	Negative wgts (%)
/Users/elijahsheridan/-MG5_aMC_v2_6_5/-axion_pheno/madgraph_data/-diphoton_double_isr_background_c merged_lhe/-diphoton_double_isr_background_l	1040000	0.00469 @ 0.15%	0.0

3 Histos and cuts

3.1 Cut 1

*** Cut: select (sdETA (jets[1] jets[2]) > 2.6 or sdETA (jets[1] jets[2]) < -2.6) and M (jets[1] jets[2]) > 1250.0**

Dataset	Events kept: K	Rejected events: R	Efficiency: K / (K + R)	Cumul. efficiency: K / Initial
signal	1711.8 +/- 31.6	2382.3 +/- 31.6	0.41812 +/- 0.00771	0.41812 +/- 0.00771
bg_vbf_0_10	204.2 +/- 14.2	11946.1 +/- 26.8	0.01681 +/- 0.00117	0.01681 +/- 0.00117
bg_vbf_100_	950.9 +/- 29.3	8744.4 +/- 32.9	0.09808 +/- 0.00302	0.09808 +/- 0.00302
bg_vbf_200_	1147.9 +/- 30.2	4265.4 +/- 31.3	0.21205 +/- 0.00556	0.21205 +/- 0.00556
bg_vbf_400_	349.4 +/- 15.0	637.5 +/- 15.0	0.3540 +/- 0.0152	0.3540 +/- 0.0152
bg_vbf_600_	111.21 +/- 7.88	140.87 +/- 7.89	0.4412 +/- 0.0313	0.4412 +/- 0.0313
bg_vbf_800_	40.31 +/- 5.11	74.45 +/- 5.12	0.3513 +/- 0.0446	0.3513 +/- 0.0446
bg_vbf_1200_	4.49 +/- 1.87	16.10 +/- 1.87	0.218 +/- 0.091	0.218 +/- 0.091
bg_vbf_1600_	0.784 +/- 0.839	6.874 +/- 0.839	0.102 +/- 0.110	0.102 +/- 0.110
bg_dip_0_10	229.4 +/- 15.1	2710617 +/- 4612	8.46e-05 +/- 5.59e-06	8.46e-05 +/- 5.59e-06
bg_dip_100_	990.1 +/- 31.5	1094372 +/- 1526	9.04e-04 +/- 2.87e-05	9.04e-04 +/- 2.87e-05
bg_dip_200_	1641.8 +/- 40.5	237907 +/- 412	0.006854 +/- 0.000169	0.006854 +/- 0.000169
bg_dip_400_	1066.5 +/- 32.1	27732.1 +/- 59.6	0.03703 +/- 0.00111	0.03703 +/- 0.00111
bg_dip_600_	531.3 +/- 22.2	6143.1 +/- 33.7	0.07960 +/- 0.00331	0.07960 +/- 0.00331
bg_dip_800_	193.3 +/- 13.4	2749.1 +/- 14.2	0.06568 +/- 0.00457	0.06568 +/- 0.00457
bg_dip_1200_	21.80 +/- 4.57	491.71 +/- 5.22	0.0424 +/- 0.0089	0.0424 +/- 0.0089
bg_dip_1600_	4.1 +/- 2.0	183.71 +/- 2.01	0.0217 +/- 0.0106	0.0217 +/- 0.0106

3.2 Histogram 1

*** Plot: PT (jets[1])**

Dataset	Integral	Entries per event	Mean	RMS	% underflow	% overflow
signal	1711	1.0	546.446	330.0	0.0	0.1925
bg_vbf_0_100	204	1.0	47.8851	10.41	0.0	0.0
bg_vbf_100_20	950	1.0	89.1176	20.25	0.0	0.0
bg_vbf_200_40	1147	1.0	164.604	39.1	0.0	0.0
bg_vbf_400_60	349	1.0	277.961	50.47	0.0	0.0
bg_vbf_600_80	111	1.0	387.341	64.64	0.0	0.0
bg_vbf_800_12	40.3	1.0	526.575	99.79	0.0	0.0
bg_vbf_1200_1	4.5	1.0	745.55	129.7	0.0	0.0
bg_vbf_1600_i	0.799	1.0	993.611	185.4	0.0	0.2088
bg_dip_0_100	229	1.0	49.299	10.59	0.0	0.0
bg_dip_100_20	990	1.0	91.6835	23.0	0.0	0.0
bg_dip_200_40	1641	1.0	171.76	41.63	0.0	0.0
bg_dip_400_60	1066	1.0	278.376	48.83	0.0	0.0
bg_dip_600_80	531	1.0	378.004	57.2	0.0	0.0
bg_dip_800_12	193	1.0	513.641	90.96	0.0	0.0
bg_dip_1200_1	21.8	1.0	726.047	112.2	0.0	0.0
bg_dip_1600_i	4.07	1.0	969.206	153.5	0.0	0.07985

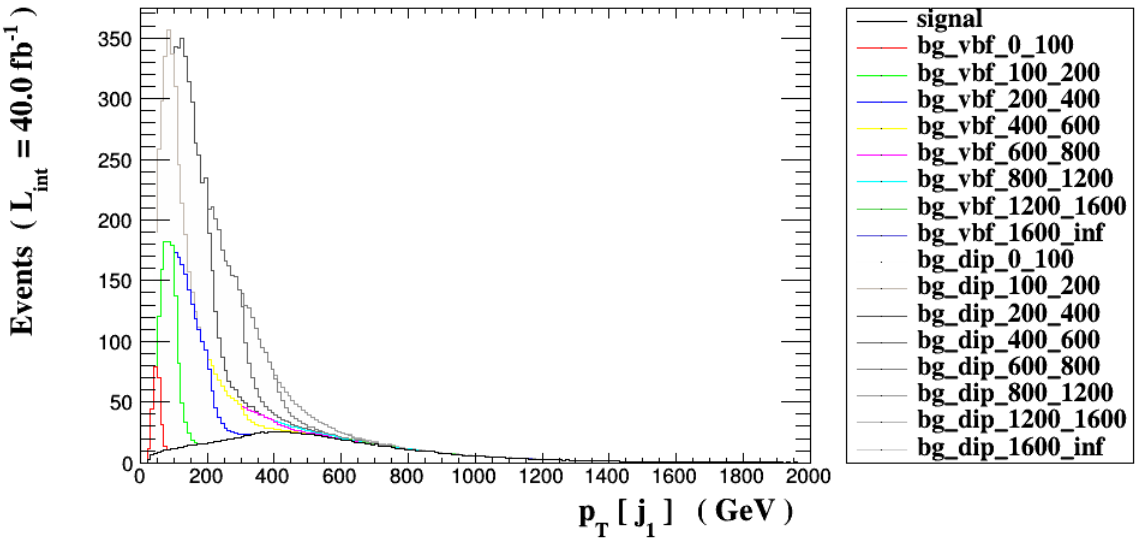

Figure 1.

3.3 Histogram 2

*** Plot: ETA (jets[1])**

Dataset	Integral	Entries per event	Mean	RMS	% underflow	% overflow
signal	1711	1.0	-0.00581565	1.731	0.0	0.0
bg_vbf_0_100	204	1.0	0.0255299	3.764	0.0	0.0
bg_vbf_100_20	950	1.0	0.0172509	3.146	0.0	0.0
bg_vbf_200_40	1147	1.0	-0.00174525	2.593	0.0	0.0
bg_vbf_400_60	349	1.0	-0.00173146	2.089	0.0	0.0
bg_vbf_600_80	111	1.0	0.0020977	1.808	0.0	0.0
bg_vbf_800_12	40.3	1.0	-0.00231718	1.676	0.0	0.0
bg_vbf_1200_1	4.5	1.0	-0.00298601	1.552	0.0	0.0
bg_vbf_1600_i	0.799	1.0	0.00881323	1.479	0.0	0.0
bg_dip_0_100	229	1.0	0.198023	3.598	0.0	0.0
bg_dip_100_20	990	1.0	0.0777096	3.122	0.0	0.0
bg_dip_200_40	1641	1.0	-0.0337468	2.545	0.0	0.0
bg_dip_400_60	1066	1.0	-0.00739953	2.021	0.0	0.0
bg_dip_600_80	531	1.0	-0.0106118	1.726	0.0	0.0
bg_dip_800_12	193	1.0	-0.00347502	1.629	0.0	0.0
bg_dip_1200_1	21.8	1.0	-0.0122901	1.543	0.0	0.0
bg_dip_1600_i	4.07	1.0	-0.00592309	1.481	0.0	0.0

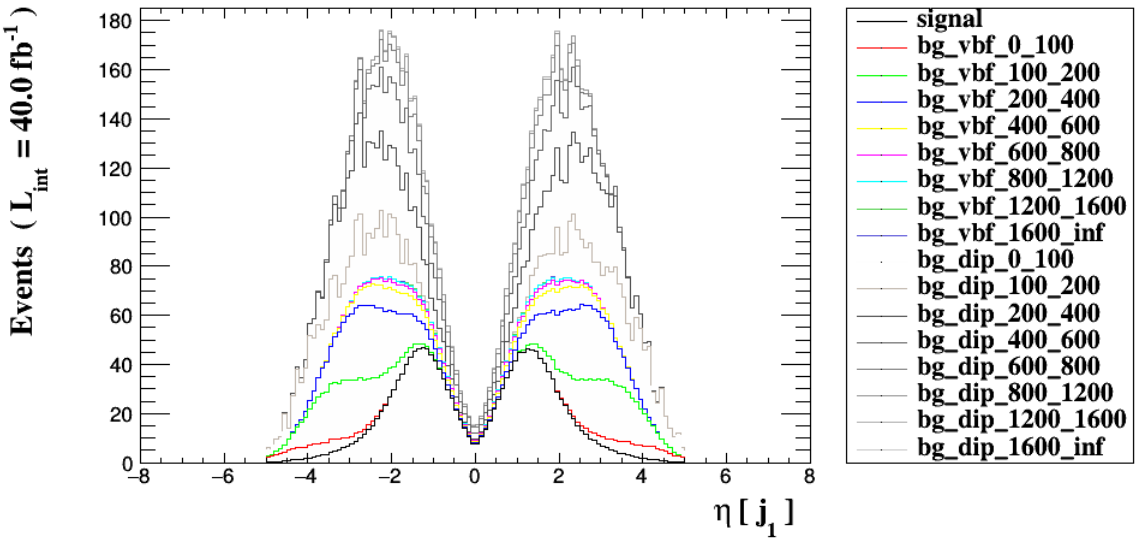

Figure 2.

3.4 Histogram 3

*** Plot: PHI (jets[1])**

Dataset	Integral	Entries per event	Mean	RMS	% underflow	% overflow
signal	1711	1.0	0.00236515	1.814	0.0	0.0
bg_vbf_0_100	204	1.0	0.0127227	1.804	0.0	0.0
bg_vbf_100_20	950	1.0	-0.00612524	1.816	0.0	0.0
bg_vbf_200_40	1147	1.0	0.00165979	1.815	0.0	0.0
bg_vbf_400_60	349	1.0	-0.00395082	1.814	0.0	0.0
bg_vbf_600_80	111	1.0	-0.000210013	1.813	0.0	0.0
bg_vbf_800_12	40.3	1.0	-0.00302679	1.815	0.0	0.0
bg_vbf_1200_1	4.5	1.0	0.00754016	1.81	0.0	0.0
bg_vbf_1600_i	0.799	1.0	0.000322334	1.817	0.0	0.0
bg_dip_0_100	229	1.0	0.0706185	1.855	0.0	0.0
bg_dip_100_20	990	1.0	0.0130569	1.802	0.0	0.0
bg_dip_200_40	1641	1.0	-0.00350058	1.814	0.0	0.0
bg_dip_400_60	1066	1.0	-0.0097731	1.809	0.0	0.0
bg_dip_600_80	531	1.0	-0.00511468	1.819	0.0	0.0
bg_dip_800_12	193	1.0	0.00918557	1.814	0.0	0.0
bg_dip_1200_1	21.8	1.0	-0.0252849	1.815	0.0	0.0
bg_dip_1600_i	4.07	1.0	-0.00239307	1.818	0.0	0.0

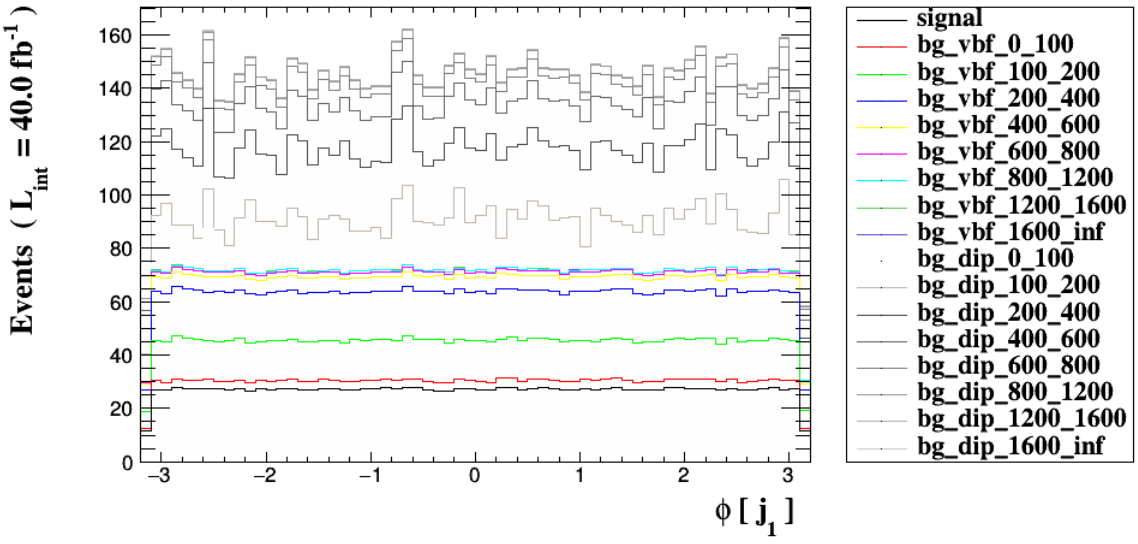

Figure 3.

3.5 Histogram 4

*** Plot: PT (jets[2])**

Dataset	Integral	Entries per event	Mean	RMS	% underflow	% overflow
signal	1711	1.0	205.425	142.6	0.0	0.03946
bg_vbf_0_100	204	1.0	32.1623	7.242	0.0	0.0
bg_vbf_100_20	950	1.0	59.3867	16.82	0.0	0.0
bg_vbf_200_40	1147	1.0	115.434	33.16	0.0	0.0
bg_vbf_400_60	349	1.0	203.39	46.99	0.0	0.0
bg_vbf_600_80	111	1.0	291.533	61.31	0.0	0.0
bg_vbf_800_12	40.3	1.0	401.723	94.43	0.0	0.0
bg_vbf_1200_1	4.5	1.0	591.439	127.2	0.0	0.0
bg_vbf_1600_i	0.799	1.0	824.784	180.9	0.0	10.52
bg_dip_0_100	229	1.0	31.8991	6.401	0.0	0.0
bg_dip_100_20	990	1.0	57.6486	17.6	0.0	0.0
bg_dip_200_40	1641	1.0	119.557	36.98	0.0	0.0
bg_dip_400_60	1066	1.0	213.756	47.08	0.0	0.0
bg_dip_600_80	531	1.0	301.65	54.43	0.0	0.0
bg_dip_800_12	193	1.0	414.614	87.31	0.0	0.0
bg_dip_1200_1	21.8	1.0	611.392	110.2	0.0	0.0
bg_dip_1600_i	4.07	1.0	856.726	153.1	0.0	12.47

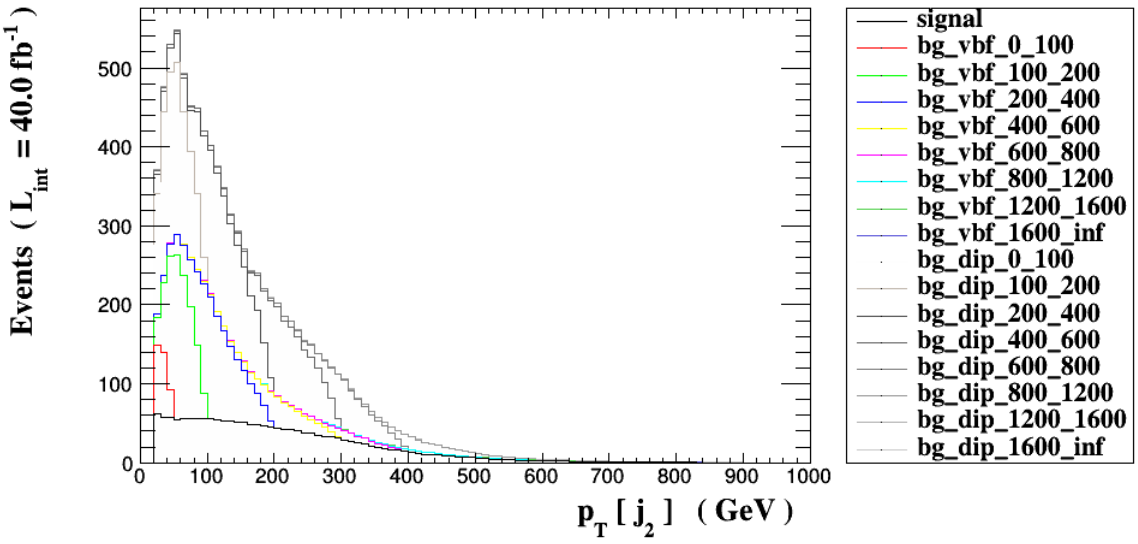

Figure 4.

3.6 Histogram 5

*** Plot: ETA (jets[2])**

Dataset	Integral	Entries per event	Mean	RMS	% underflow	% overflow
signal	1711	1.0	0.0078115	2.582	0.0	0.0
bg_vbf_0_100	204	1.0	-0.0350942	3.93	0.0	0.0
bg_vbf_100_20	950	1.0	-0.01618	3.43	0.0	0.0
bg_vbf_200_40	1147	1.0	5.76943e-05	2.866	0.0	0.0
bg_vbf_400_60	349	1.0	0.00206883	2.338	0.0	0.0
bg_vbf_600_80	111	1.0	-0.000872282	2.034	0.0	0.0
bg_vbf_800_12	40.3	1.0	-0.00281866	1.898	0.0	0.0
bg_vbf_1200_1	4.5	1.0	0.00495067	1.752	0.0	0.0
bg_vbf_1600_i	0.799	1.0	-0.0126747	1.638	0.0	0.0
bg_dip_0_100	229	1.0	-0.00249304	3.869	0.0	0.0
bg_dip_100_20	990	1.0	0.0777798	3.283	0.0	0.0
bg_dip_200_40	1641	1.0	0.00708046	2.574	0.0	0.0
bg_dip_400_60	1066	1.0	0.00949568	2.013	0.0	0.0
bg_dip_600_80	531	1.0	0.00901514	1.737	0.0	0.0
bg_dip_800_12	193	1.0	-0.00128	1.683	0.0	0.0
bg_dip_1200_1	21.8	1.0	0.0150044	1.604	0.0	0.0
bg_dip_1600_i	4.07	1.0	0.00644888	1.528	0.0	0.0

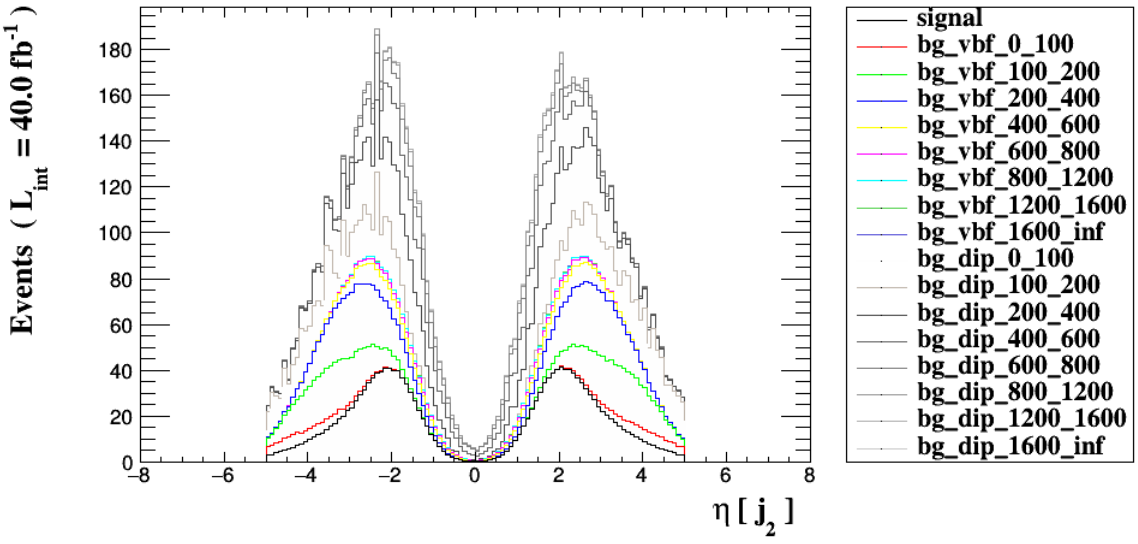

Figure 5.

3.7 Histogram 6

*** Plot: PHI (jets[2])**

Dataset	Integral	Entries per event	Mean	RMS	% underflow	% overflow
signal	1711	1.0	-0.00526894	1.813	0.0	0.0
bg_vbf_0_100	204	1.0	-0.0174788	1.811	0.0	0.0
bg_vbf_100_20	950	1.0	0.00838798	1.816	0.0	0.0
bg_vbf_200_40	1147	1.0	-0.00494322	1.813	0.0	0.0
bg_vbf_400_60	349	1.0	-0.00225727	1.815	0.0	0.0
bg_vbf_600_80	111	1.0	0.00135572	1.814	0.0	0.0
bg_vbf_800_12	40.3	1.0	-0.00372357	1.811	0.0	0.0
bg_vbf_1200_1	4.5	1.0	-0.00712373	1.818	0.0	0.0
bg_vbf_1600_i	0.799	1.0	0.0036205	1.806	0.0	0.0
bg_dip_0_100	229	1.0	-0.125013	1.693	0.0	0.0
bg_dip_100_20	990	1.0	0.000160922	1.83	0.0	0.0
bg_dip_200_40	1641	1.0	-0.00751175	1.822	0.0	0.0
bg_dip_400_60	1066	1.0	-0.00246686	1.818	0.0	0.0
bg_dip_600_80	531	1.0	-0.00314447	1.806	0.0	0.0
bg_dip_800_12	193	1.0	2.29237e-05	1.813	0.0	0.0
bg_dip_1200_1	21.8	1.0	-0.00214286	1.814	0.0	0.0
bg_dip_1600_i	4.07	1.0	-0.00248925	1.81	0.0	0.0

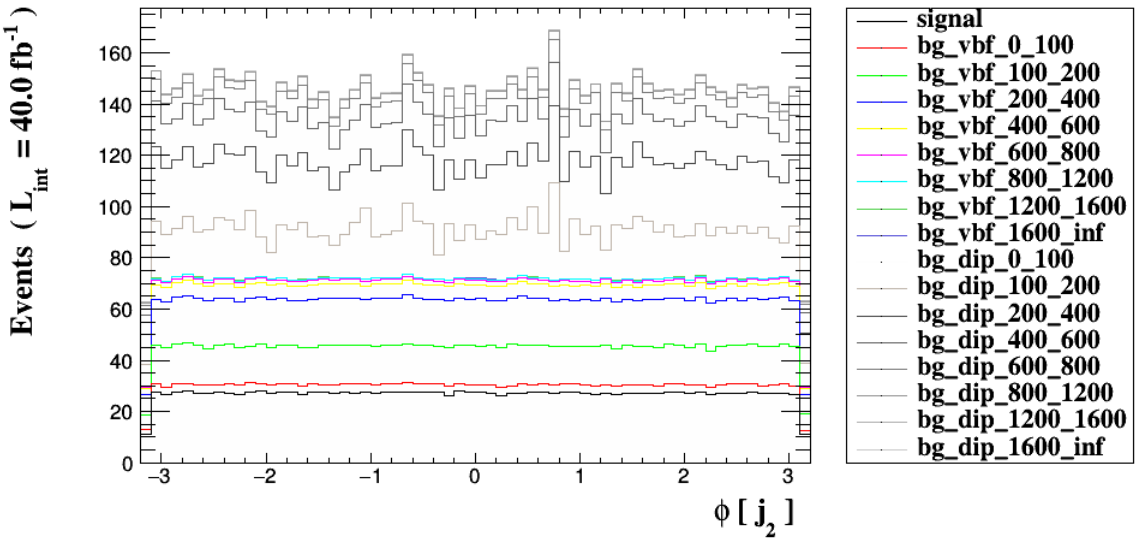

Figure 6.

3.8 Histogram 7

*** Plot: DELTAR (jets[1] , jets[2])**

Dataset	Integral	Entries per event	Mean	RMS	% underflow	% overflow
signal	1711	1.0	4.42315	1.168	0.0	0.0
bg_vbf_0_100	204	1.0	7.94905	0.5894	0.0	0.0
bg_vbf_100_20	950	1.0	6.92988	0.6153	0.0	0.0
bg_vbf_200_40	1147	1.0	5.94241	0.6428	0.0	0.0
bg_vbf_400_60	349	1.0	5.06578	0.5942	0.0	0.0
bg_vbf_600_80	111	1.0	4.61039	0.5527	0.0	0.0
bg_vbf_800_12	40.3	1.0	4.45418	0.47	0.0	0.0
bg_vbf_1200_1	4.5	1.0	4.32226	0.3646	0.0	0.0
bg_vbf_1600_i	0.799	1.0	4.24491	0.2879	0.0	0.0
bg_dip_0_100	229	1.0	7.70361	0.3668	0.0	0.0
bg_dip_100_20	990	1.0	6.66956	0.4741	0.0	0.0
bg_dip_200_40	1641	1.0	5.59422	0.4888	0.0	0.0
bg_dip_400_60	1066	1.0	4.76053	0.4194	0.0	0.0
bg_dip_600_80	531	1.0	4.35312	0.3714	0.0	0.0
bg_dip_800_12	193	1.0	4.29845	0.3336	0.0	0.0
bg_dip_1200_1	21.8	1.0	4.25223	0.2739	0.0	0.0
bg_dip_1600_i	4.07	1.0	4.218	0.2134	0.0	0.0

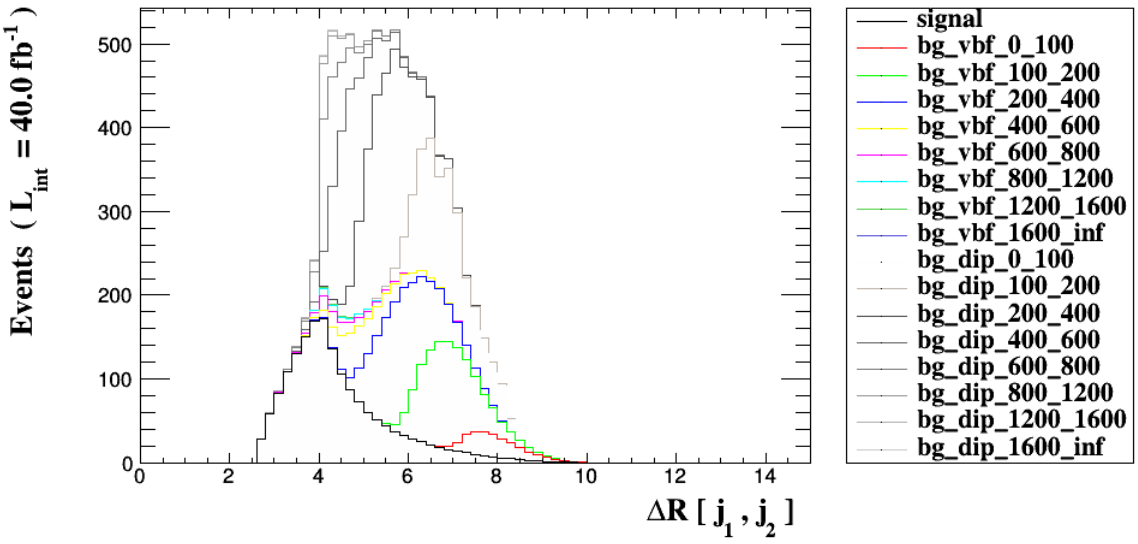

Figure 7.

3.9 Histogram 8

*** Plot: M (jets[1] jets[2])**

Dataset	Integral	Entries per event	Mean	RMS	% underflow	% overflow
signal	1711	1.0	1999.64	665.4	0.0	0.0
bg_vbf_0_100	204	1.0	1750.26	539.1	0.0	0.0
bg_vbf_100_20	950	1.0	1794.82	579.5	0.0	0.0
bg_vbf_200_40	1147	1.0	1934.25	656.0	0.0	0.001439
bg_vbf_400_60	349	1.0	2013.29	730.8	0.0	0.001695
bg_vbf_600_80	111	1.0	2139.1	770.9	0.0	0.003172
bg_vbf_800_12	40.3	1.0	2585.26	787.0	0.0	0.007096
bg_vbf_1200_1	4.5	1.0	3330.57	768.8	0.0	0.01295
bg_vbf_1600_i	0.799	1.0	4218.89	825.2	0.0	0.09226
bg_dip_0_100	229	1.0	1492.0	232.6	0.0	0.0
bg_dip_100_20	990	1.0	1516.34	292.6	0.0	0.0
bg_dip_200_40	1641	1.0	1567.0	332.1	0.0	0.0
bg_dip_400_60	1066	1.0	1616.65	382.7	0.0	0.0
bg_dip_600_80	531	1.0	1732.63	433.9	0.0	0.0
bg_dip_800_12	193	1.0	2248.73	523.4	0.0	0.0
bg_dip_1200_1	21.8	1.0	3101.05	583.0	0.0	0.0
bg_dip_1600_i	4.07	1.0	4086.58	707.2	0.0	0.00887

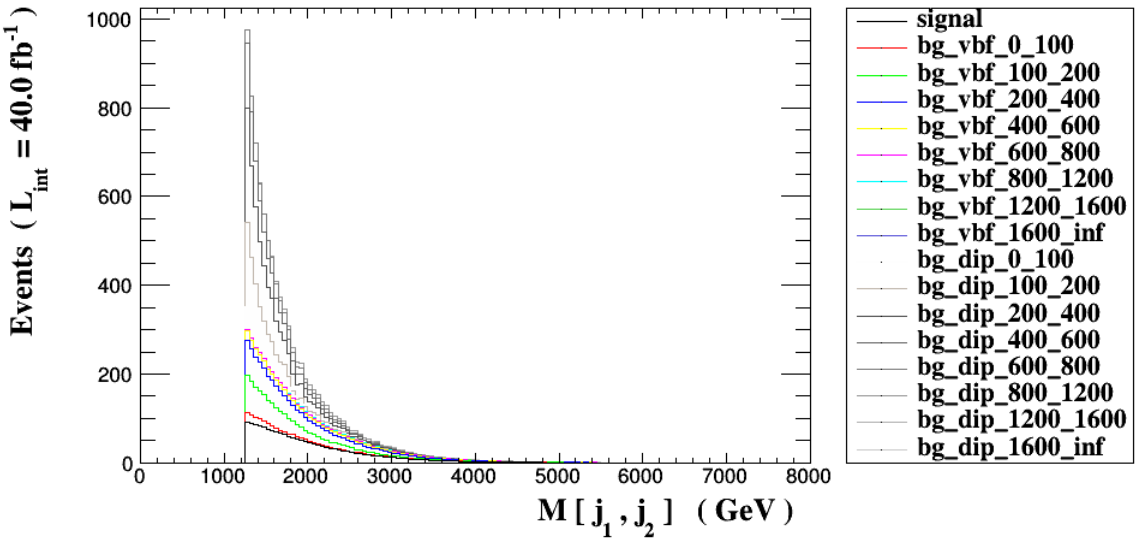

Figure 8.

3.10 Histogram 9

*** Plot: sdETA (jets[1] jets[2])**

Dataset	Integral	Entries per event	Mean	RMS	% underflow	% overflow
signal	1711	1.0	-0.0136271	4.137	0.0	0.0
bg_vbf_0_100	204	1.0	0.0606241	7.595	0.0	0.0
bg_vbf_100_20	950	1.0	0.0334309	6.433	0.0	0.0
bg_vbf_200_40	1147	1.0	-0.00180295	5.3	0.0	0.0
bg_vbf_400_60	349	1.0	-0.00380029	4.241	0.0	0.0
bg_vbf_600_80	111	1.0	0.00296998	3.642	0.0	0.0
bg_vbf_800_12	40.3	1.0	0.000501484	3.406	0.0	0.0
bg_vbf_1200_1	4.5	1.0	-0.00793668	3.175	0.0	0.0
bg_vbf_1600_i	0.799	1.0	0.021488	3.02	0.0	0.0
bg_dip_0_100	229	1.0	0.200516	7.284	0.0	0.0
bg_dip_100_20	990	1.0	-7.00843e-05	6.146	0.0	0.0
bg_dip_200_40	1641	1.0	-0.0408273	4.854	0.0	0.0
bg_dip_400_60	1066	1.0	-0.0168952	3.774	0.0	0.0
bg_dip_600_80	531	1.0	-0.019627	3.205	0.0	0.0
bg_dip_800_12	193	1.0	-0.00219502	3.107	0.0	0.0
bg_dip_1200_1	21.8	1.0	-0.0272945	3.005	0.0	0.0
bg_dip_1600_i	4.07	1.0	-0.012372	2.915	0.0	0.0

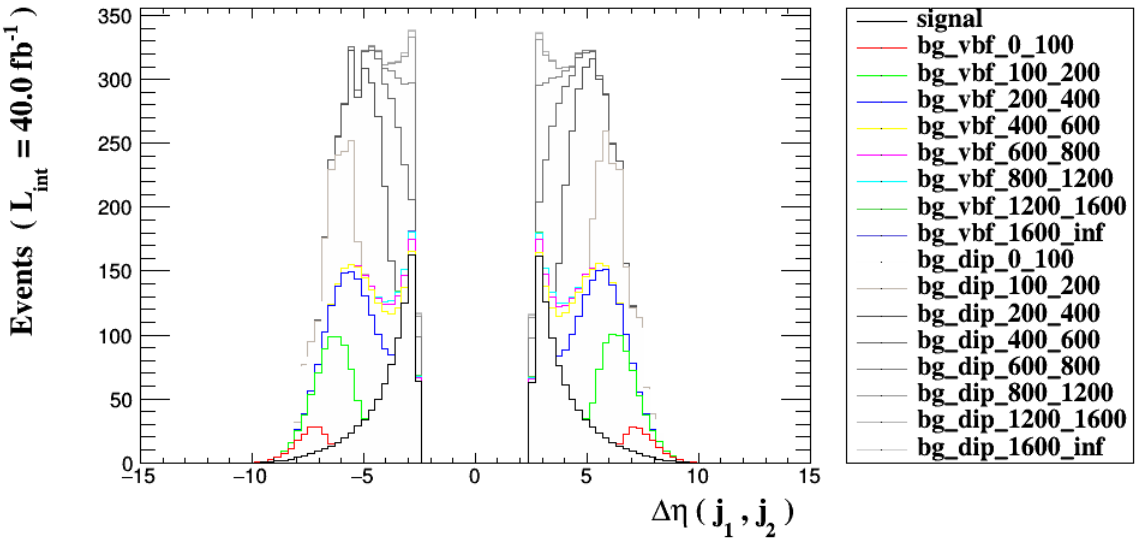

Figure 9.

3.11 Histogram 10

*** Plot: M (a[1] a[2])**

Dataset	Integral	Entries per event	Mean	RMS	% underflow	% overflow
signal	1711	1.0	994.987	714.5	0.0	0.3408
bg_vbf_0_100	204	1.0	74.0504	63.82	0.0	0.0
bg_vbf_100_20	950	1.0	89.0692	83.23	0.0	0.0
bg_vbf_200_40	1147	1.0	113.126	112.7	0.0	0.0
bg_vbf_400_60	349	1.0	133.465	138.2	0.0	0.0
bg_vbf_600_80	111	1.0	145.906	156.9	0.0	0.0
bg_vbf_800_12	40.3	1.0	163.396	180.5	0.0	0.0
bg_vbf_1200_1	4.5	1.0	176.598	202.7	0.0	0.0004788
bg_vbf_1600_i	0.799	1.0	181.471	214.6	0.0	0.0
bg_dip_0_100	229	1.0	60.9776	49.6	0.0	0.0
bg_dip_100_20	990	1.0	85.5064	91.83	0.0	0.0
bg_dip_200_40	1641	1.0	103.465	123.5	0.0	0.0
bg_dip_400_60	1066	1.0	116.893	138.9	0.0	0.0
bg_dip_600_80	531	1.0	127.77	153.4	0.0	0.0
bg_dip_800_12	193	1.0	149.066	183.9	0.0	0.0
bg_dip_1200_1	21.8	1.0	167.631	209.6	0.0	0.0
bg_dip_1600_i	4.07	1.0	176.968	215.0	0.0	0.0

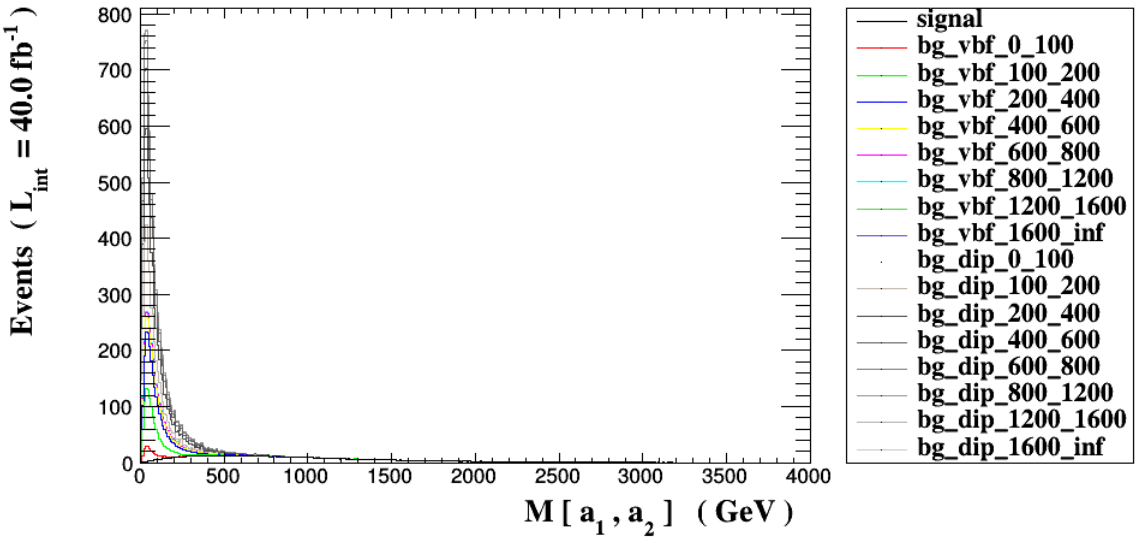

Figure 10.

3.12 Histogram 11

*** Plot: PT (a[1])**

Dataset	Integral	Entries per event	Mean	RMS	% underflow	% overflow
signal	1711	1.0	655.426	371.8	0.0	0.4802
bg_vbf_0_100	204	1.0	37.4145	21.35	0.0	0.0
bg_vbf_100_20	950	1.0	51.5705	34.51	0.0	0.0
bg_vbf_200_40	1147	1.0	79.1223	64.44	0.0	0.0
bg_vbf_400_60	349	1.0	114.28	106.4	0.0	0.0
bg_vbf_600_80	111	1.0	141.058	144.7	0.0	0.0
bg_vbf_800_12	40.3	1.0	176.287	200.4	0.0	0.0
bg_vbf_1200_1	4.5	1.0	209.819	271.0	0.0	0.001915
bg_vbf_1600_i	0.799	1.0	225.128	328.2	0.0	0.1771
bg_dip_0_100	229	1.0	37.194	24.39	0.0	0.0
bg_dip_100_20	990	1.0	58.3072	44.9	0.0	0.0
bg_dip_200_40	1641	1.0	76.4723	72.86	0.0	0.0
bg_dip_400_60	1066	1.0	89.5307	96.69	0.0	0.0
bg_dip_600_80	531	1.0	103.64	118.7	0.0	0.0
bg_dip_800_12	193	1.0	128.721	168.0	0.0	0.0
bg_dip_1200_1	21.8	1.0	147.085	219.2	0.0	0.0
bg_dip_1600_i	4.07	1.0	143.473	228.4	0.0	0.1154

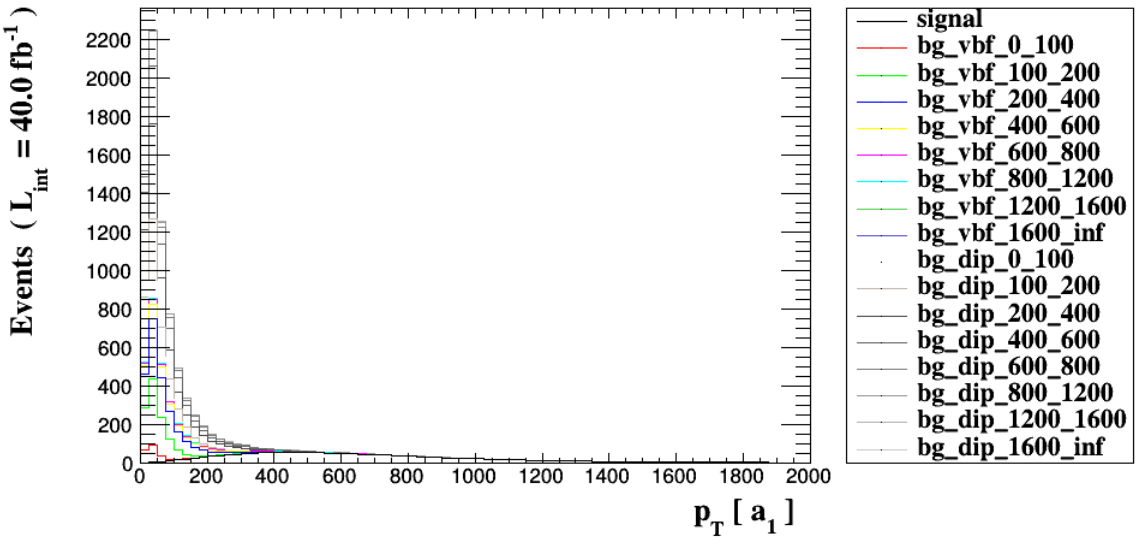

Figure 11.

3.13 Histogram 12

*** Plot: PT (a[2])**

Dataset	Integral	Entries per event	Mean	RMS	% underflow	% overflow
signal	1711	1.0	351.252	283.9	0.0	0.1021
bg_vbf_0_100	204	1.0	19.8396	12.78	0.0	0.0
bg_vbf_100_20	950	1.0	23.2752	18.44	0.0	0.0
bg_vbf_200_40	1147	1.0	27.9759	25.71	0.0	0.0
bg_vbf_400_60	349	1.0	33.009	34.4	0.0	0.0
bg_vbf_600_80	111	1.0	36.3182	40.78	0.0	0.0
bg_vbf_800_12	40.3	1.0	39.8439	48.44	0.0	0.0
bg_vbf_1200_1	4.5	1.0	42.8734	56.24	0.0	0.0
bg_vbf_1600_i	0.799	1.0	44.5812	62.29	0.0	0.0
bg_dip_0_100	229	1.0	18.4801	10.66	0.0	0.0
bg_dip_100_20	990	1.0	22.6198	18.79	0.0	0.0
bg_dip_200_40	1641	1.0	24.9159	23.25	0.0	0.0
bg_dip_400_60	1066	1.0	27.0652	26.21	0.0	0.0
bg_dip_600_80	531	1.0	29.049	30.02	0.0	0.0
bg_dip_800_12	193	1.0	31.6789	35.11	0.0	0.0
bg_dip_1200_1	21.8	1.0	33.1883	38.44	0.0	0.0
bg_dip_1600_i	4.07	1.0	34.1566	40.71	0.0	0.0

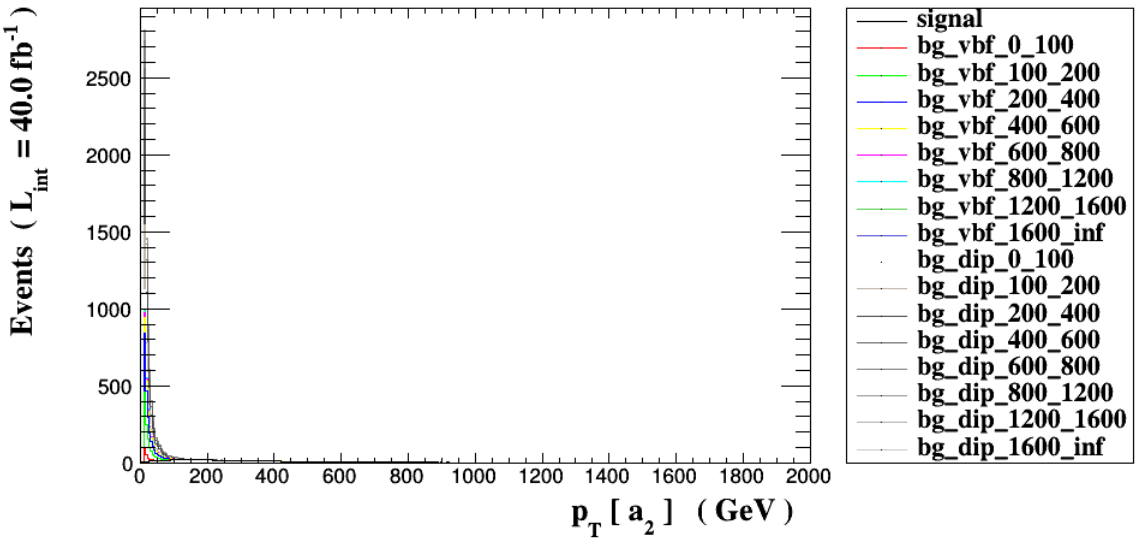

Figure 12.

3.14 Histogram 13

*** Plot: THT**

Dataset	Integral	Entries per event	Mean	RMS	% underflow	% overflow
signal	1711	1.0	751.872	392.2	0.0	0.0
bg_vbf_0_100	204	1.0	80.0473	13.56	0.0	0.0
bg_vbf_100_20	950	1.0	148.504	28.23	0.0	0.0
bg_vbf_200_40	1147	1.0	280.038	55.43	0.0	0.0
bg_vbf_400_60	349	1.0	481.352	56.08	0.0	0.0
bg_vbf_600_80	111	1.0	678.874	55.13	0.0	0.0
bg_vbf_800_12	40.3	1.0	928.299	102.6	0.0	0.0
bg_vbf_1200_1	4.5	1.0	1336.99	104.9	0.0	0.0
bg_vbf_1600_i	0.799	1.0	1818.4	216.7	0.0	0.0
bg_dip_0_100	229	1.0	81.198	11.55	0.0	0.0
bg_dip_100_20	990	1.0	149.332	28.78	0.0	0.0
bg_dip_200_40	1641	1.0	291.317	57.13	0.0	0.0
bg_dip_400_60	1066	1.0	492.131	57.54	0.0	0.0
bg_dip_600_80	531	1.0	679.654	54.62	0.0	0.0
bg_dip_800_12	193	1.0	928.255	102.1	0.0	0.0
bg_dip_1200_1	21.8	1.0	1337.44	105.0	0.0	0.0
bg_dip_1600_i	4.07	1.0	1825.93	223.9	0.0	0.0

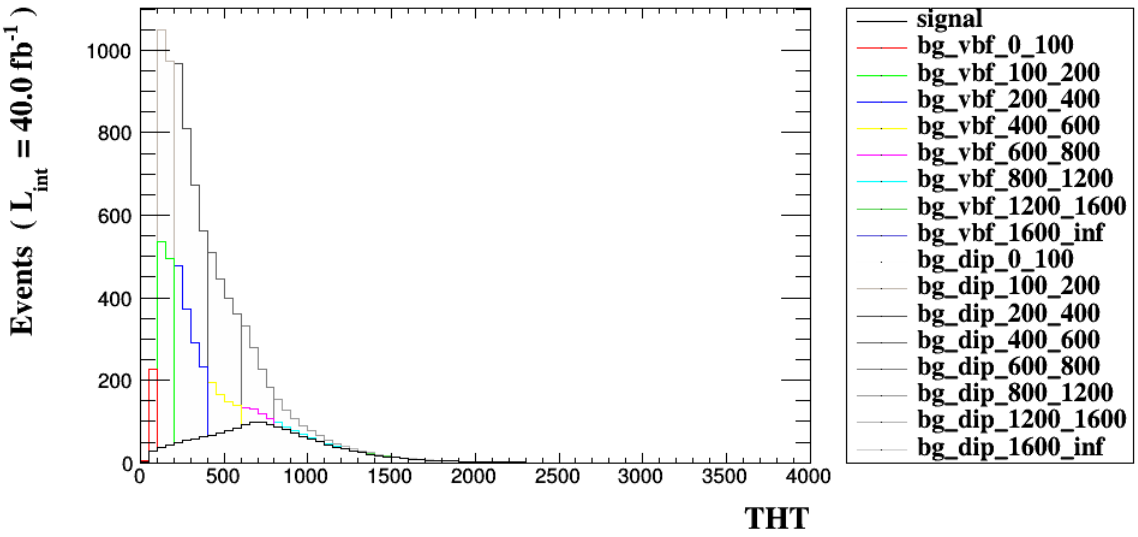

Figure 13.

3.15 Histogram 14

*** Plot: MET**

Dataset	Integral	Entries per event	Mean	RMS	% underflow	% overflow
signal	1711	1.0	9.38036e-09	1.184e-08	0.0	0.0
bg_vbf_0_100	204	1.0	6.13592e-10	4.552e-10	0.0	0.0
bg_vbf_100_20	950	1.0	1.03092e-09	1.186e-09	0.0	0.0
bg_vbf_200_40	1147	1.0	3.36865e-09	2.263e-09	0.0	0.0
bg_vbf_400_60	349	1.0	4.57227e-09	2.631e-09	0.0	0.0
bg_vbf_600_80	111	1.0	4.93846e-09	2.738e-09	0.0	0.0
bg_vbf_800_12	40.3	1.0	5.21468e-09	3.065e-09	0.0	0.0
bg_vbf_1200_1	4.5	1.0	6.28579e-09	6.683e-09	0.0	0.0
bg_vbf_1600_i	0.799	1.0	1.03291e-08	1.327e-08	0.0	0.0
bg_dip_0_100	229	1.0	6.61933e-10	5.01e-10	0.0	0.0
bg_dip_100_20	990	1.0	1.14677e-09	1.31e-09	0.0	0.0
bg_dip_200_40	1641	1.0	3.50426e-09	2.297e-09	0.0	0.0
bg_dip_400_60	1066	1.0	4.48976e-09	2.602e-09	0.0	0.0
bg_dip_600_80	531	1.0	4.79561e-09	2.682e-09	0.0	0.0
bg_dip_800_12	193	1.0	5.05254e-09	2.955e-09	0.0	0.0
bg_dip_1200_1	21.8	1.0	5.75182e-09	5.338e-09	0.0	0.0
bg_dip_1600_i	4.07	1.0	9.20818e-09	1.229e-08	0.0	0.0

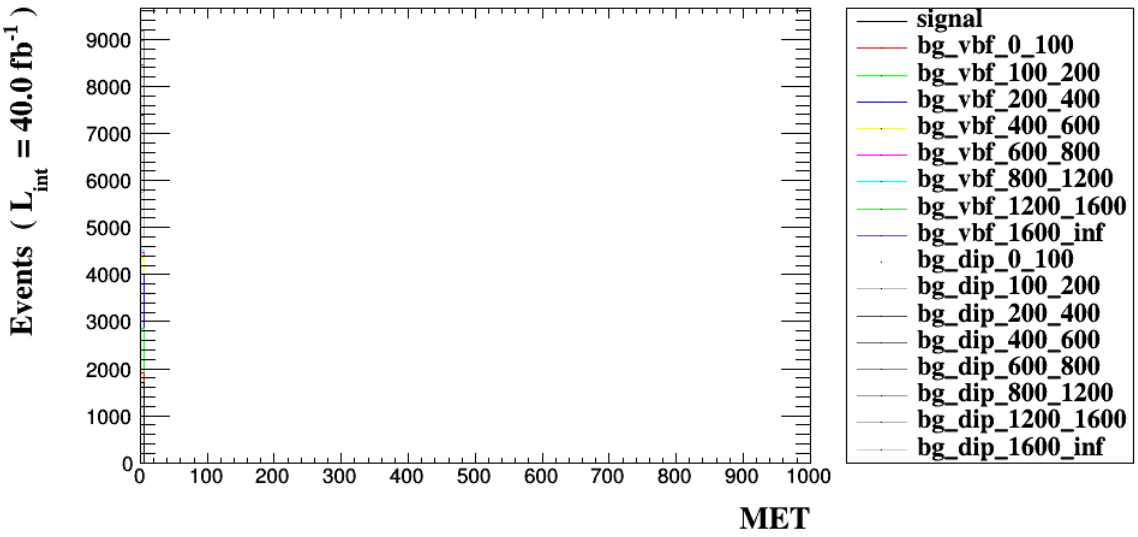

Figure 14.

3.16 Histogram 15

*** Plot: TET**

Dataset	Integral	Entries per event	Mean	RMS	% underflow	% overflow
signal	1711	1.0	1758.55	809.3	0.0	0.0
bg_vbf_0_100	204	1.0	137.302	35.41	0.0	0.0
bg_vbf_100_20	950	1.0	223.35	59.19	0.0	0.0
bg_vbf_200_40	1147	1.0	387.136	104.6	0.0	0.0
bg_vbf_400_60	349	1.0	628.641	140.5	0.0	0.0
bg_vbf_600_80	111	1.0	856.25	177.4	0.0	0.0
bg_vbf_800_12	40.3	1.0	1144.43	250.8	0.0	0.0
bg_vbf_1200_1	4.5	1.0	1589.68	315.9	0.0	0.0
bg_vbf_1600_i	0.799	1.0	2088.1	418.8	0.0	0.0
bg_dip_0_100	229	1.0	136.872	36.77	0.0	0.0
bg_dip_100_20	990	1.0	230.259	67.3	0.0	0.0
bg_dip_200_40	1641	1.0	392.705	108.1	0.0	0.0
bg_dip_400_60	1066	1.0	608.728	126.8	0.0	0.0
bg_dip_600_80	531	1.0	812.343	147.6	0.0	0.0
bg_dip_800_12	193	1.0	1088.66	214.0	0.0	0.0
bg_dip_1200_1	21.8	1.0	1517.71	260.1	0.0	0.0
bg_dip_1600_i	4.07	1.0	2003.56	332.9	0.0	0.0

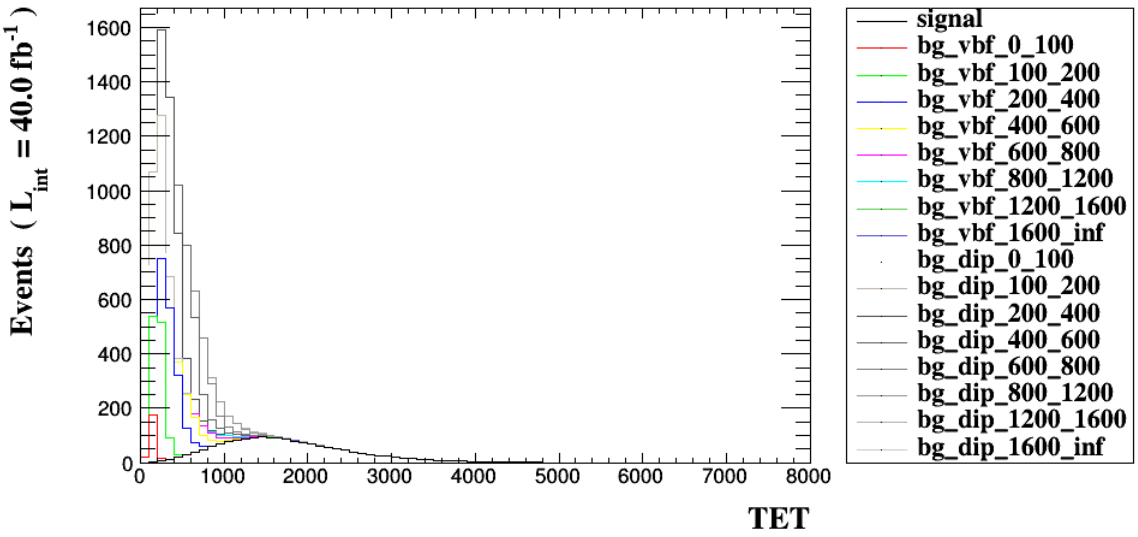

Figure 15.

4 Summary

4.1 Cut-flow charts

- How to compare signal (S) and background (B): S/sqrt(S+B+(xB)**2) .
- Object definition selections are indicated in cyan.
- Reject and select are indicated by 'REJ' and 'SEL' respectively

Cuts	Signal (S)	Background (B)	S vs B
Initial (no cut)	4094.08 +/- 1.13	4113516 +/- 4877	2.01760 +/- 0.00132
SEL: (sdETA (jets[1] jets[2]) > 2.6 or sdETA (	1711.8 +/- 31.6	7487.3 +/- 82.9	17.848 +/- 0.309