The LaTeX report

Generated by elijahsheridan on 04 September 2020, 02:57:12

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Please cite:

> **E. Conte, B. Fuks and G. Serret**,
> *MadAnalysis 5, A User-Friendly Framework for Collider Phenomenology*,
> Comput. Phys. Commun. **184** (2013) 222-256,
> arXiv:1206.1599 [hep-ph].

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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 = 0.25
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/-
signal_120mjj_2deta_100MeVma_2TeVL/ma100MeV_L2TeV_deta2.lhe as signal
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>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># 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
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```
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 or sdETA(jets[1] jets[2]) < -2) and M(jets[1]
jets[2]) > 750) and (PT(a[1]) > 300 and M(a[1] a[2]) > 500)
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 = 750
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 = 2
ma5>set selection[10].xmax = 15
ma5>set selection[10].titleX = "#Delta#eta(j_{1},j_{2})"
ma5>set selection[11].xmin = 500
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 = 300
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 ma100MeV_L2TeV_deta2_1
```

1.2 Configuration

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

2 Datasets

2.1 signal

- Samples stored in the directory: /Users/elijahsheridan/MG5_aMC_v2_6_5/axion_pheno/-post_optimization_studies/mad_analyses .
- Sample consisting of: signal events.
- Generated events: 100000 events.
- Normalization to the luminosity: 106+/- 1 events.
- Ratio (event weight): 0.0011 .

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/-signal_120mjj_2deta_100MeVma_2 ma100MeV_L2TeV_deta2.lhe	100000	0.00267 @ 0.14%	0.0

2.2 bg_dip_0_100

- Samples stored in the directory: /Users/elijahsheridan/MG5_aMC_v2_6_5/axion_pheno/-post_optimization_studies/mad_analyses .
- 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_c merged_lhe/-diphoton_double_isr_background_l	1040000	67.8 @ 0.17%	0.0

2.3 bg_dip_100_200

- Samples stored in the directory: /Users/elijahsheridan/MG5_aMC_v2_6_5/axion_pheno/-post_optimization_studies/mad_analyses .
- 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_d merged_lhe/-diphoton_double_isr_background_l	1040000	27.4 @ 0.14%	0.0

2.4 bg_dip_200_400

- Samples stored in the directory: /Users/elijahsheridan/MG5_aMC_v2_6_5/axion_pheno/-post_optimization_studies/mad_analyses .
- 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_d merged_lhe/-diphoton_double_isr_background_l	1040000	5.99 @ 0.17%	0.0

2.5 bg_dip_400_600

- Samples stored in the directory: /Users/elijahsheridan/MG5_aMC_v2_6_5/axion_pheno/-post_optimization_studies/mad_analyses .
- 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_d merged_lhe/- diphoton_double_isr_background_l	1040000	0.72 @ 0.18%	0.0

2.6 bg_dip_600_800

- Samples stored in the directory: /Users/elijahsheridan/MG5_aMC_v2_6_5/axion_pheno/-post_optimization_studies/mad_analyses .
- 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_d merged_lhe/- diphoton_double_isr_background_l	662009	0.167 @ 0.41%	0.0

2.7 bg_dip_800_1200

- Samples stored in the directory: /Users/elijahsheridan/MG5_aMC_v2_6_5/axion_pheno/-post_optimization_studies/mad_analyses .
- 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_d merged_lhe/- diphoton_double_isr_background_l	1040000	0.0736 @ 0.17%	0.0

2.8 bg_dip_1200_1600

- Samples stored in the directory: /Users/elijahsheridan/MG5_aMC_v2_6_5/axion_pheno/-post_optimization_studies/mad_analyses .
- 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

2.9 bg_dip_1600_inf

- Samples stored in the directory: /Users/elijahsheridan/MG5_aMC_v2_6_5/axion_pheno/-post_optimization_studies/mad_analyses .
- 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

2.10 bg_vbf_0_100

- Samples stored in the directory: /Users/elijahsheridan/MG5_aMC_v2_6_5/axion_pheno/-post_optimization_studies/mad_analyses .
- 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

2.11 bg_vbf_100_200

- Samples stored in the directory: /Users/elijahsheridan/MG5_aMC_v2_6_5/axion_pheno/-post_optimization_studies/mad_analyses .
- 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

2.12 bg_vbf_200_400

- Samples stored in the directory: /Users/elijahsheridan/MG5_aMC_v2_6_5/axion_pheno/-post_optimization_studies/mad_analyses .
- 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

2.13 bg_vbf_400_600

- Samples stored in the directory: /Users/elijahsheridan/MG5_aMC_v2_6_5/axion_pheno/-post_optimization_studies/mad_analyses .
- 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

2.14 bg_vbf_600_800

- Samples stored in the directory: /Users/elijahsheridan/MG5_aMC_v2_6_5/axion_pheno/-post_optimization_studies/mad_analyses .
- 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

2.15 bg_vbf_800_1200

- Samples stored in the directory: /Users/elijahsheridan/MG5_aMC_v2_6_5/axion_pheno/-post_optimization_studies/mad_analyses .
- 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

2.16 bg_vbf_1200_1600

- Samples stored in the directory: /Users/elijahsheridan/MG5_aMC_v2_6_5/axion_pheno/-post_optimization_studies/mad_analyses .
- 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

2.17 bg_vbf_1600_inf

- Samples stored in the directory: /Users/elijahsheridan/MG5_aMC_v2_6_5/axion_pheno/-post_optimization_studies/mad_analyses .
- 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

3 Histos and cuts

3.1 Cut 1

*** Cut: select ((sdETA (jets[1] jets[2]) > 2.0 or sdETA (jets[1] jets[2]) < -2.0) and M (jets[1] jets[2]) > 750.0) and (PT (a[1]) > 300.0 and M (a[1] a[2]) > 500.0)**

Dataset	Events kept: K	Rejected events: R	Efficiency: K / (K + R)	Cumul. efficiency: K / Initial
signal	52.67 +/- 5.17	54.19 +/- 5.17	0.4929 +/- 0.0484	0.4929 +/- 0.0484
bg_dip_0_10	0.0 +/- 0.0	2710847 +/- 4613	0.0 +/- 0.0	0.0 +/- 0.0
bg_dip_100_	3.16 +/- 1.78	1095359 +/- 1527	2.89e-06 +/- 1.62e-06	2.89e-06 +/- 1.62e-06
bg_dip_200_	25.80 +/- 5.08	239523 +/- 413	1.08e-04 +/- 2.12e-05	1.08e-04 +/- 2.12e-05
bg_dip_400_	34.8 +/- 5.9	28763.9 +/- 52.5	0.001209 +/- 0.000205	0.001209 +/- 0.000205
bg_dip_600_	18.83 +/- 4.33	6655.5 +/- 27.9	0.002822 +/- 0.000649	0.002822 +/- 0.000649
bg_dip_800_	11.44 +/- 3.38	2930.90 +/- 6.06	0.00389 +/- 0.00115	0.00389 +/- 0.00115
bg_dip_1200_	1.92 +/- 1.38	511.59 +/- 2.96	0.00374 +/- 0.00269	0.00374 +/- 0.00269
bg_dip_1600_	0.492 +/- 0.700	187.292 +/- 0.754	0.00262 +/- 0.00373	0.00262 +/- 0.00373
bg_vbf_0_10	0.0486 +/- 0.2204	12150.3 +/- 23.1	4.00e-06 +/- 1.81e-05	4.00e-06 +/- 1.81e-05
bg_vbf_100_	1.16 +/- 1.08	9694.2 +/- 16.6	0.000120 +/- 0.000111	0.000120 +/- 0.000111
bg_vbf_200_	6.68 +/- 2.58	5406.6 +/- 11.2	0.001235 +/- 0.000477	0.001235 +/- 0.000477
bg_vbf_400_	7.09 +/- 2.65	979.76 +/- 2.98	0.00719 +/- 0.00269	0.00719 +/- 0.00269
bg_vbf_600_	3.7 +/- 1.9	248.42 +/- 1.92	0.01452 +/- 0.00753	0.01452 +/- 0.00753
bg_vbf_800_	2.15 +/- 1.45	112.61 +/- 1.46	0.0187 +/- 0.0127	0.0187 +/- 0.0127
bg_vbf_1200_	0.384 +/- 0.614	20.212 +/- 0.615	0.0187 +/- 0.0298	0.0187 +/- 0.0298
bg_vbf_1600_	0.0963 +/- 0.3084	7.562 +/- 0.309	0.0126 +/- 0.0403	0.0126 +/- 0.0403

3.2 Histogram 1

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

Dataset	Integral	Entries per event	Mean	RMS	% underflow	% overflow
signal	52.9	1.0	437.038	323.1	0.0	0.1455
bg_dip_0_100	0.0 +/- 0.0	0.	0.0	0.0	0.0	0.0
bg_dip_100_20	3.16	1.0	98.8303	32.52	0.0	0.0
bg_dip_200_40	25.8	1.0	242.467	53.8	0.0	0.0
bg_dip_400_60	34.8	1.0	377.137	78.1	0.0	0.0
bg_dip_600_80	18.8	1.0	523.022	98.22	0.0	0.0
bg_dip_800_12	11.4	1.0	711.008	150.7	0.0	0.0
bg_dip_1200_1	1.92	1.0	967.95	209.5	0.0	0.0
bg_dip_1600_i	0.492	1.0	1226.56	278.3	0.0	1.541
bg_vbf_0_100	0.0486	1.0	42.7818	7.815	0.0	0.0
bg_vbf_100_20	1.16	1.0	109.408	25.35	0.0	0.0
bg_vbf_200_40	6.68	1.0	216.071	56.72	0.0	0.0
bg_vbf_400_60	7.09	1.0	355.753	73.24	0.0	0.0
bg_vbf_600_80	3.66	1.0	499.763	93.4	0.0	0.0
bg_vbf_800_12	2.15	1.0	685.828	142.7	0.0	0.0
bg_vbf_1200_1	0.385	1.0	954.553	196.9	0.0	0.0
bg_vbf_1600_i	0.0982	1.0	1260.94	294.5	0.0	1.844

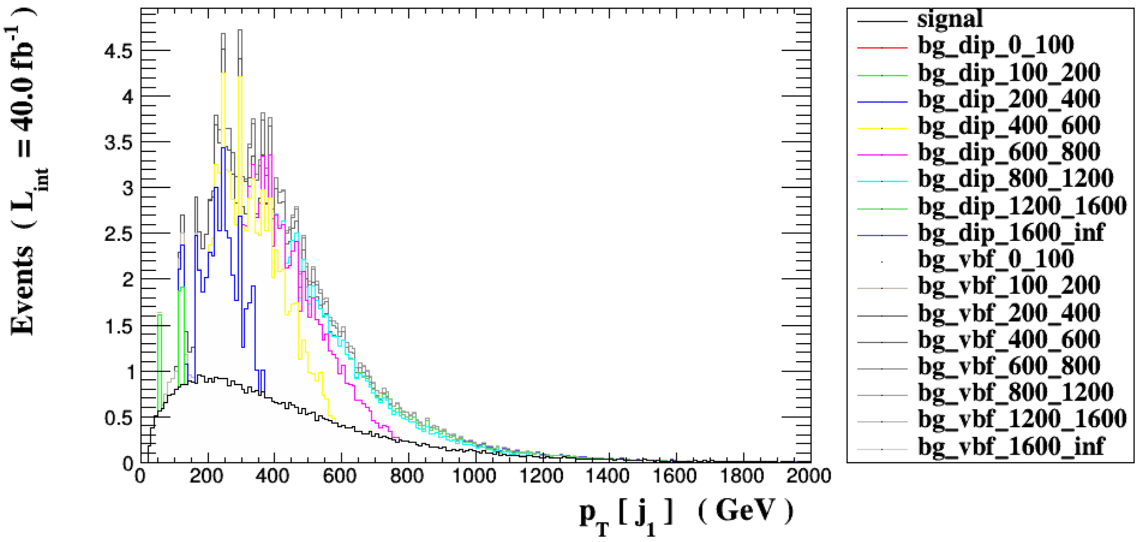

Figure 1.

3.3 Histogram 2

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

Dataset	Integral	Entries per event	Mean	RMS	% underflow	% overflow
signal	52.9	1.0	-0.00747599	1.887	0.0	0.0
bg_dip_0_100	0.0 +/- 0.0	0.	0.0	0.0	0.0	0.0
bg_dip_100_20	3.16	1.0	1.65038	2.73	0.0	0.0
bg_dip_200_40	25.8	1.0	0.0327822	1.622	0.0	0.0
bg_dip_400_60	34.8	1.0	0.0508046	1.367	0.0	0.0
bg_dip_600_80	18.8	1.0	-0.0541901	1.213	0.0	0.0
bg_dip_800_12	11.4	1.0	0.00988796	1.116	0.0	0.0
bg_dip_1200_1	1.92	1.0	-0.041622	1.098	0.0	0.0
bg_dip_1600_i	0.492	1.0	0.0236354	1.091	0.0	0.0
bg_vbf_0_100	0.0486	1.0	0.873486	2.934	0.0	0.0
bg_vbf_100_20	1.16	1.0	0.133336	2.773	0.0	0.0
bg_vbf_200_40	6.68	1.0	0.0158882	2.195	0.0	0.0
bg_vbf_400_60	7.09	1.0	-0.0150998	1.768	0.0	0.0
bg_vbf_600_80	3.66	1.0	-9.49209e-06	1.521	0.0	0.0
bg_vbf_800_12	2.15	1.0	-0.0314427	1.333	0.0	0.0
bg_vbf_1200_1	0.385	1.0	-0.015205	1.192	0.0	0.0
bg_vbf_1600_i	0.0982	1.0	0.026085	1.094	0.0	0.0

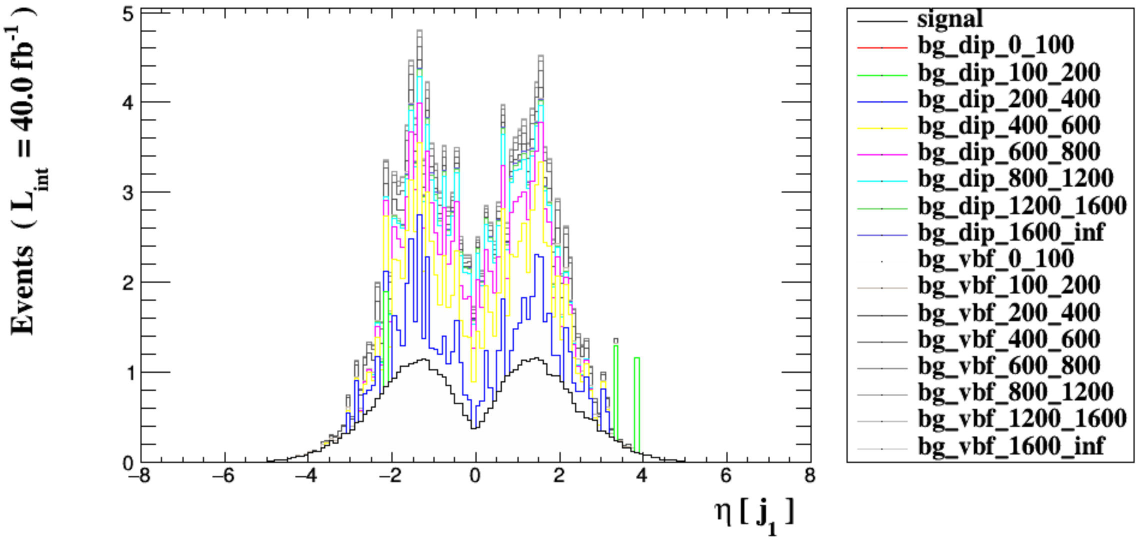

Figure 2.

3.4 Histogram 3

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

Dataset	Integral	Entries per event	Mean	RMS	% underflow	% overflow
signal	52.9	1.0	0.00275702	1.825	0.0	0.0
bg_dip_0_100	0.0 +/- 0.0	0.	0.0	0.0	0.0	0.0
bg_dip_100_20	3.16	1.0	0.466209	0.3607	0.0	0.0
bg_dip_200_40	25.8	1.0	-0.0184691	1.809	0.0	0.0
bg_dip_400_60	34.8	1.0	-0.032295	1.807	0.0	0.0
bg_dip_600_80	18.8	1.0	0.0217009	1.85	0.0	0.0
bg_dip_800_12	11.4	1.0	-0.0214499	1.813	0.0	0.0
bg_dip_1200_1	1.92	1.0	-0.0349831	1.831	0.0	0.0
bg_dip_1600_i	0.492	1.0	-0.0245294	1.837	0.0	0.0
bg_vbf_0_100	0.0486	1.0	-0.168141	1.997	0.0	0.0
bg_vbf_100_20	1.16	1.0	-0.0767497	1.778	0.0	0.0
bg_vbf_200_40	6.68	1.0	-0.0861787	1.817	0.0	0.0
bg_vbf_400_60	7.09	1.0	0.0245695	1.804	0.0	0.0
bg_vbf_600_80	3.66	1.0	0.0164854	1.806	0.0	0.0
bg_vbf_800_12	2.15	1.0	0.0186246	1.811	0.0	0.0
bg_vbf_1200_1	0.385	1.0	0.0173015	1.812	0.0	0.0
bg_vbf_1600_i	0.0982	1.0	0.0489667	1.807	0.0	0.0

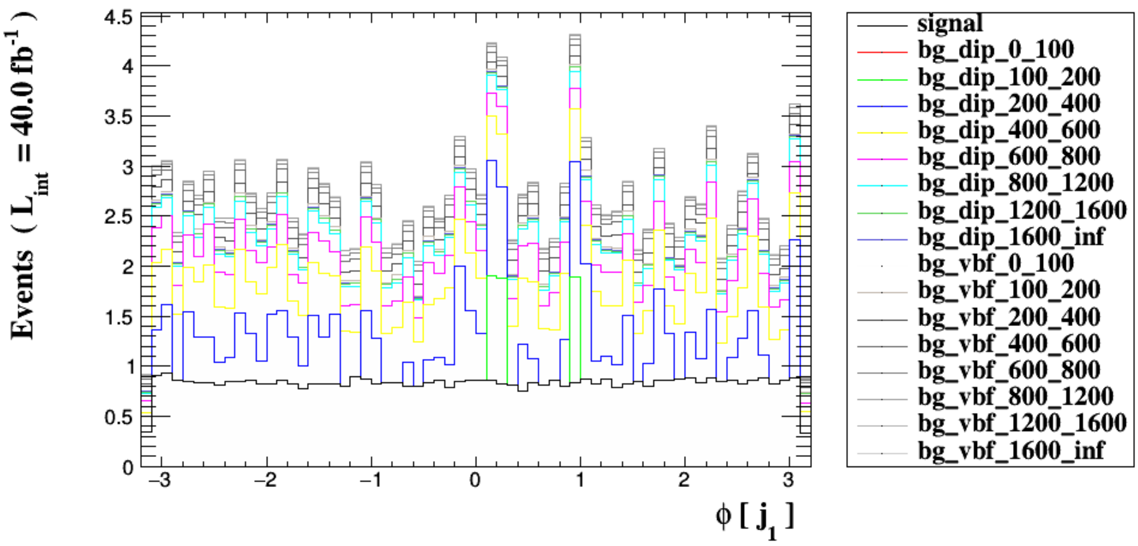

Figure 3.

3.5 Histogram 4

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

Dataset	Integral	Entries per event	Mean	RMS	% underflow	% overflow
signal	52.9	1.0	149.999	130.2	0.0	0.05862
bg_dip_0_100	0.0 +/- 0.0	0.	0.0	0.0	0.0	0.0
bg_dip_100_20	3.16	1.0	49.3379	16.83	0.0	0.0
bg_dip_200_40	25.8	1.0	80.1038	38.82	0.0	0.0
bg_dip_400_60	34.8	1.0	120.487	64.78	0.0	0.0
bg_dip_600_80	18.8	1.0	164.154	90.7	0.0	0.0
bg_dip_800_12	11.4	1.0	229.974	135.8	0.0	0.0
bg_dip_1200_1	1.92	1.0	373.02	205.5	0.0	0.0
bg_dip_1600_i	0.492	1.0	650.81	284.8	0.0	7.302
bg_vbf_0_100	0.0486	1.0	31.916	8.29	0.0	0.0
bg_vbf_100_20	1.16	1.0	53.936	17.53	0.0	0.0
bg_vbf_200_40	6.68	1.0	94.1307	38.71	0.0	0.0
bg_vbf_400_60	7.09	1.0	136.14	60.57	0.0	0.0
bg_vbf_600_80	3.66	1.0	186.868	85.24	0.0	0.0
bg_vbf_800_12	2.15	1.0	257.298	127.5	0.0	0.0
bg_vbf_1200_1	0.385	1.0	392.815	188.0	0.0	0.0
bg_vbf_1600_i	0.0982	1.0	599.859	284.3	0.0	5.572

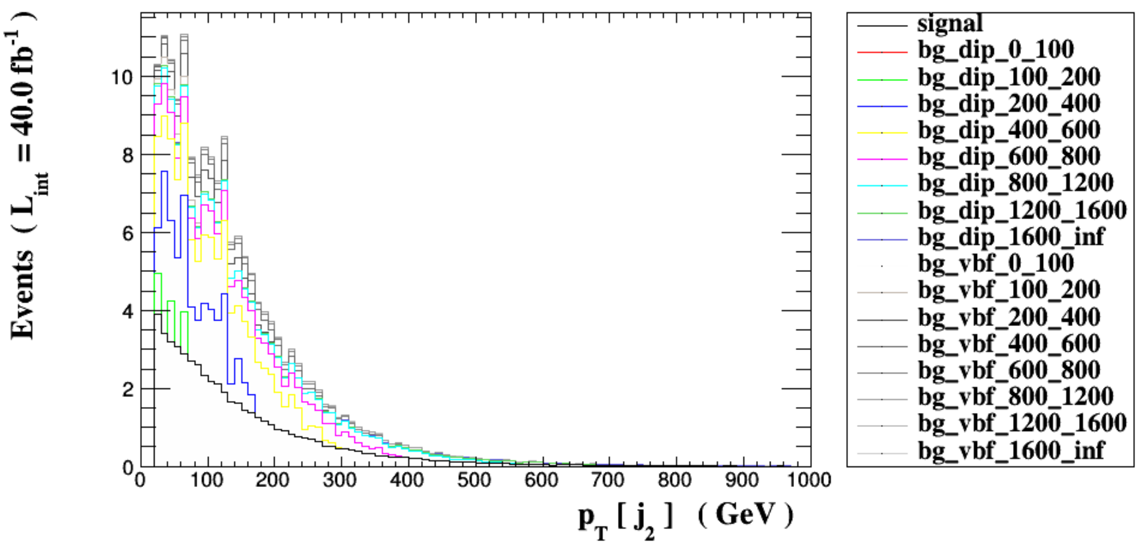

Figure 4.

3.6 Histogram 5

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

Dataset	Integral	Entries per event	Mean	RMS	% underflow	% overflow
signal	52.9	1.0	-0.00789021	2.717	0.0	0.0
bg_dip_0_100	0.0 +/- 0.0	0.	0.0	0.0	0.0	0.0
bg_dip_100_20	3.16	1.0	0.140052	2.918	0.0	0.0
bg_dip_200_40	25.8	1.0	0.341283	2.913	0.0	0.0
bg_dip_400_60	34.8	1.0	-0.046237	2.471	0.0	0.0
bg_dip_600_80	18.8	1.0	0.0328972	2.251	0.0	0.0
bg_dip_800_12	11.4	1.0	-0.0295072	2.126	0.0	0.0
bg_dip_1200_1	1.92	1.0	-0.00220058	1.896	0.0	0.0
bg_dip_1600_i	0.492	1.0	-0.0593366	1.605	0.0	0.0
bg_vbf_0_100	0.0486	1.0	1.04772	3.507	0.0	0.0
bg_vbf_100_20	1.16	1.0	-0.324417	3.174	0.0	0.0
bg_vbf_200_40	6.68	1.0	0.0369757	2.866	0.0	0.0
bg_vbf_400_60	7.09	1.0	0.0457121	2.548	0.0	0.0
bg_vbf_600_80	3.66	1.0	0.00762408	2.33	0.0	0.0
bg_vbf_800_12	2.15	1.0	0.0416591	2.175	0.0	0.0
bg_vbf_1200_1	0.385	1.0	0.0257553	1.974	0.0	0.0
bg_vbf_1600_i	0.0982	1.0	-0.0204758	1.781	0.0	0.0

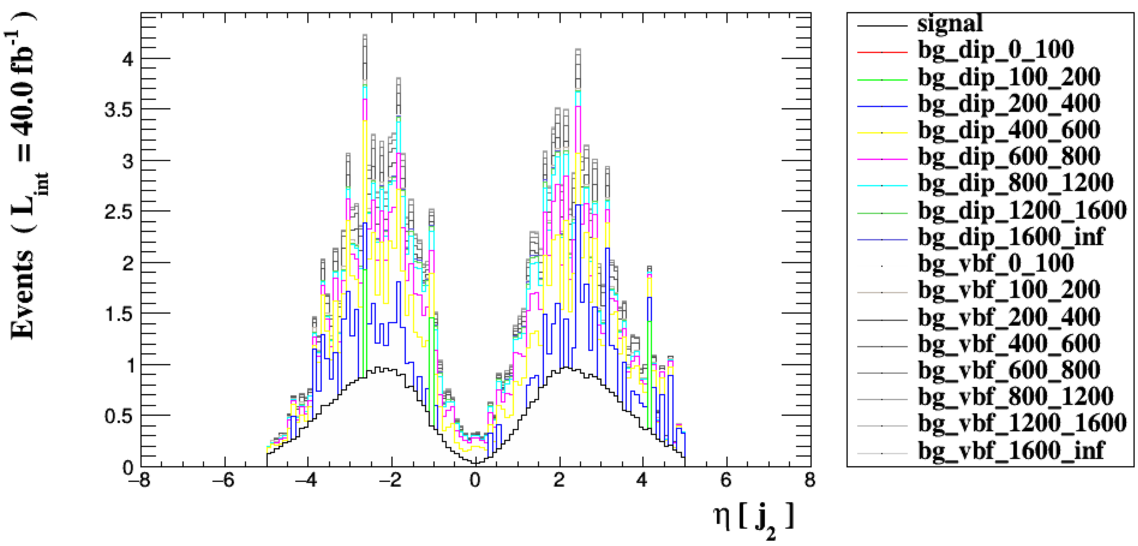

Figure 5.

3.7 Histogram 6

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

Dataset	Integral	Entries per event	Mean	RMS	% underflow	% overflow
signal	52.9	1.0	-0.00536837	1.814	0.0	0.0
bg_dip_0_100	0.0 +/- 0.0	0.	0.0	0.0	0.0	0.0
bg_dip_100_20	3.16	1.0	1.00733	1.634	0.0	0.0
bg_dip_200_40	25.8	1.0	-0.0150701	1.924	0.0	0.0
bg_dip_400_60	34.8	1.0	-0.0100722	1.806	0.0	0.0
bg_dip_600_80	18.8	1.0	0.0584177	1.785	0.0	0.0
bg_dip_800_12	11.4	1.0	0.0255093	1.793	0.0	0.0
bg_dip_1200_1	1.92	1.0	-0.000600709	1.8	0.0	0.0
bg_dip_1600_i	0.492	1.0	-0.0251717	1.798	0.0	0.0
bg_vbf_0_100	0.0486	1.0	0.0859607	1.498	0.0	0.0
bg_vbf_100_20	1.16	1.0	0.17327	1.879	0.0	0.0
bg_vbf_200_40	6.68	1.0	-0.0623337	1.832	0.0	0.0
bg_vbf_400_60	7.09	1.0	-0.0408524	1.826	0.0	0.0
bg_vbf_600_80	3.66	1.0	-0.0166052	1.814	0.0	0.0
bg_vbf_800_12	2.15	1.0	-0.0206916	1.807	0.0	0.0
bg_vbf_1200_1	0.385	1.0	-0.0182899	1.813	0.0	0.0
bg_vbf_1600_i	0.0982	1.0	0.00781695	1.811	0.0	0.0

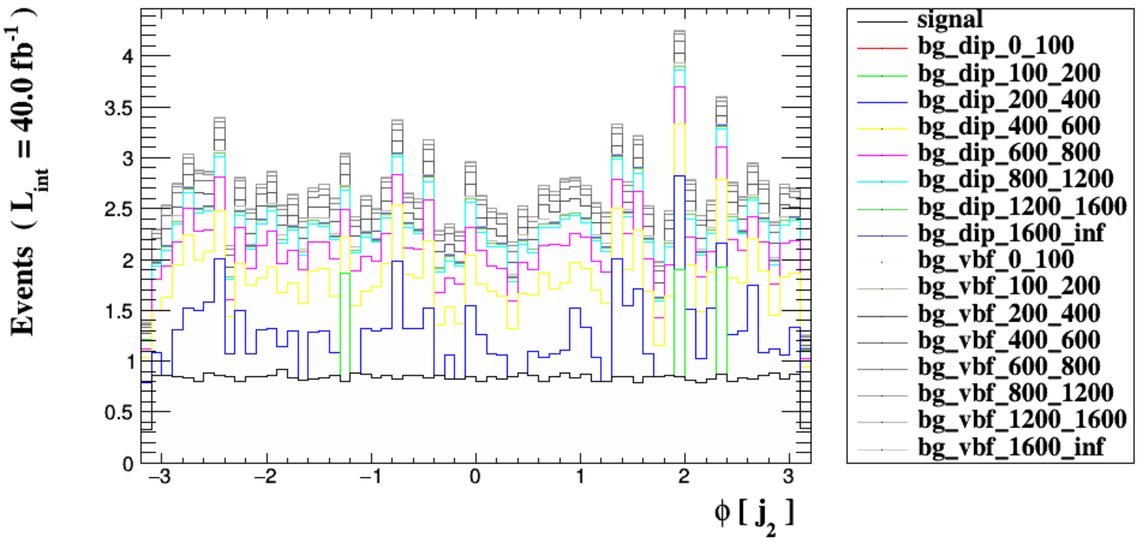

Figure 6.

3.8 Histogram 7

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

Dataset	Integral	Entries per event	Mean	RMS	% underflow	% overflow
signal	52.9	1.0	4.56273	1.361	0.0	0.0
bg_dip_0_100	0.0 +/- 0.0	0.	0.0	0.0	0.0	0.0
bg_dip_100_20	3.16	1.0	5.99929	0.4811	0.0	0.0
bg_dip_200_40	25.8	1.0	4.61504	0.7198	0.0	0.0
bg_dip_400_60	34.8	1.0	3.97985	0.723	0.0	0.0
bg_dip_600_80	18.8	1.0	3.73769	0.6876	0.0	0.0
bg_dip_800_12	11.4	1.0	3.67888	0.627	0.0	0.0
bg_dip_1200_1	1.92	1.0	3.64813	0.5268	0.0	0.0
bg_dip_1600_i	0.492	1.0	3.64692	0.4106	0.0	0.0
bg_vbf_0_100	0.0486	1.0	6.62263	0.3293	0.0	0.0
bg_vbf_100_20	1.16	1.0	5.99091	0.8146	0.0	0.0
bg_vbf_200_40	6.68	1.0	5.10685	0.9126	0.0	0.0
bg_vbf_400_60	7.09	1.0	4.47075	0.8988	0.0	0.0
bg_vbf_600_80	3.66	1.0	4.15115	0.8308	0.0	0.0
bg_vbf_800_12	2.15	1.0	3.9473	0.727	0.0	0.0
bg_vbf_1200_1	0.385	1.0	3.79885	0.606	0.0	0.0
bg_vbf_1600_i	0.0982	1.0	3.70894	0.5026	0.0	0.0

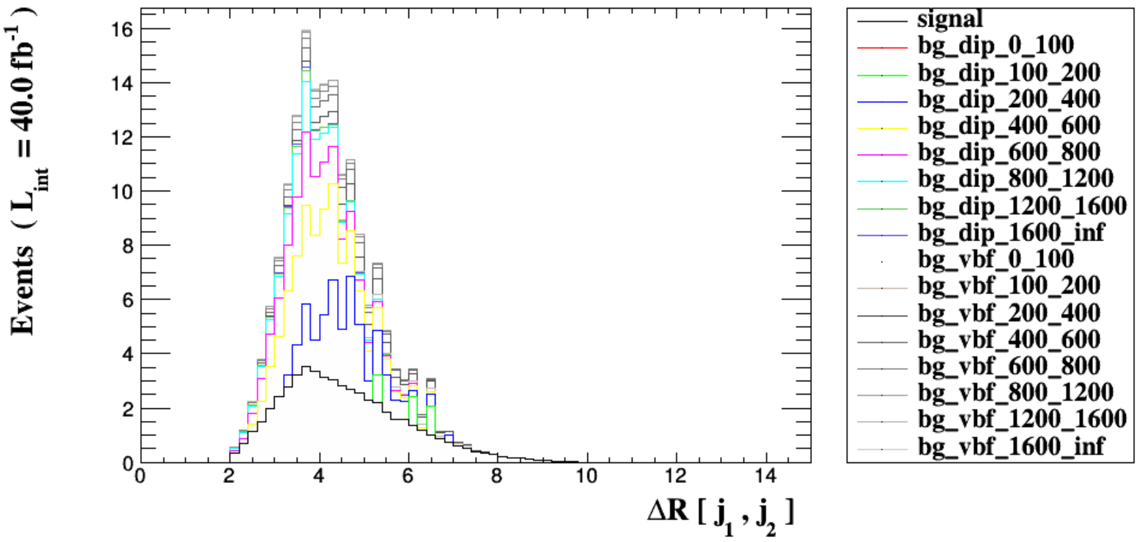

Figure 7.

3.9 Histogram 8

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

Dataset	Integral	Entries per event	Mean	RMS	% underflow	% overflow
signal	52.9	1.0	1665.19	783.1	0.0	0.002023
bg_dip_0_100	0.0 +/- 0.0	0.	0.0	0.0	0.0	0.0
bg_dip_100_20	3.16	1.0	1172.68	166.8	0.0	0.0
bg_dip_200_40	25.8	1.0	1086.69	339.7	0.0	0.0
bg_dip_400_60	34.8	1.0	1108.51	363.5	0.0	0.0
bg_dip_600_80	18.8	1.0	1260.28	434.4	0.0	0.0
bg_dip_800_12	11.4	1.0	1581.5	568.2	0.0	0.0
bg_dip_1200_1	1.92	1.0	2160.02	744.2	0.0	0.0
bg_dip_1600_i	0.492	1.0	3060.71	890.4	0.0	0.0
bg_vbf_0_100	0.0486	1.0	886.102	84.95	0.0	0.0
bg_vbf_100_20	1.16	1.0	1373.99	562.4	0.0	0.0
bg_vbf_200_40	6.68	1.0	1609.96	785.9	0.0	0.0
bg_vbf_400_60	7.09	1.0	1683.8	828.2	0.0	0.0
bg_vbf_600_80	3.66	1.0	1843.6	850.5	0.0	0.0
bg_vbf_800_12	2.15	1.0	2099.49	865.8	0.0	0.0
bg_vbf_1200_1	0.385	1.0	2594.53	883.7	0.0	0.005615
bg_vbf_1600_i	0.0982	1.0	3248.25	956.8	0.0	0.02892

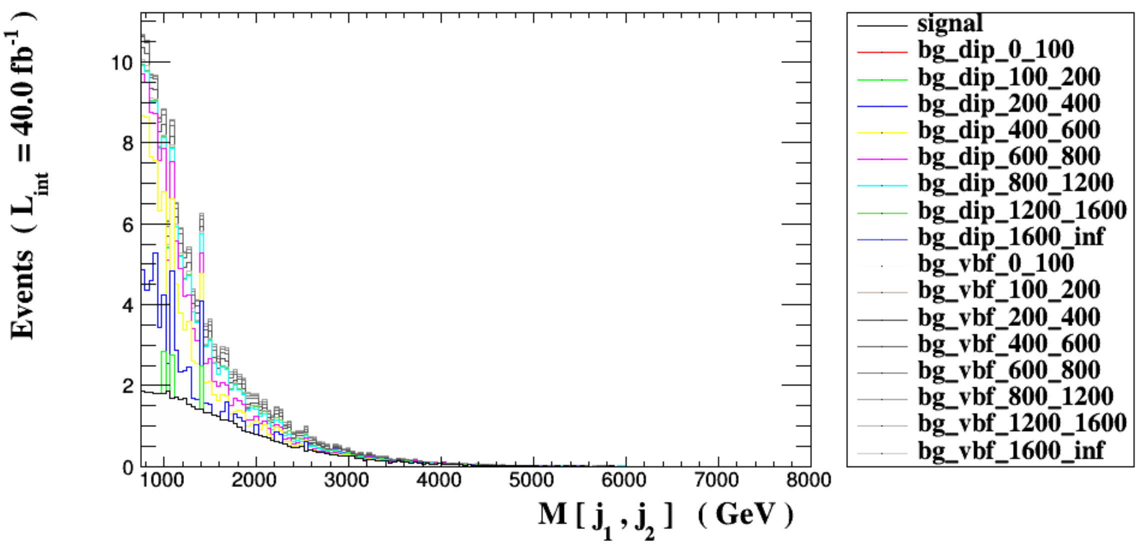

Figure 8.

3.10 Histogram 9

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

Dataset	Integral	Entries per event	Mean	RMS	% underflow	% overflow
signal	52.9	1.0	0.000414212	4.407	49.99	0.0
bg_dip_0_100	0.0 +/- 0.0	0.	0.0	0.0	0.0	0.0
bg_dip_100_20	3.16	1.0	1.51032	5.585	33.38	0.0
bg_dip_200_40	25.8	1.0	-0.308501	4.231	54.46	0.0
bg_dip_400_60	34.8	1.0	0.0970417	3.473	48.45	0.0
bg_dip_600_80	18.8	1.0	-0.0870872	3.076	51.5	0.0
bg_dip_800_12	11.4	1.0	0.0393952	2.891	49.24	0.0
bg_dip_1200_1	1.92	1.0	-0.0394215	2.694	50.67	0.0
bg_dip_1600_i	0.492	1.0	0.082972	2.48	48.4	0.0
bg_vbf_0_100	0.0486	1.0	-0.174236	6.403	50.0	0.0
bg_vbf_100_20	1.16	1.0	0.457753	5.752	46.55	0.0
bg_vbf_200_40	6.68	1.0	-0.0210876	4.873	50.04	0.0
bg_vbf_400_60	7.09	1.0	-0.0608118	4.106	50.68	0.0
bg_vbf_600_80	3.66	1.0	-0.00763357	3.637	50.18	0.0
bg_vbf_800_12	2.15	1.0	-0.0731017	3.293	51.18	0.0
bg_vbf_1200_1	0.385	1.0	-0.0409604	2.969	50.52	0.0
bg_vbf_1600_i	0.0982	1.0	0.0465608	2.701	49.38	0.0

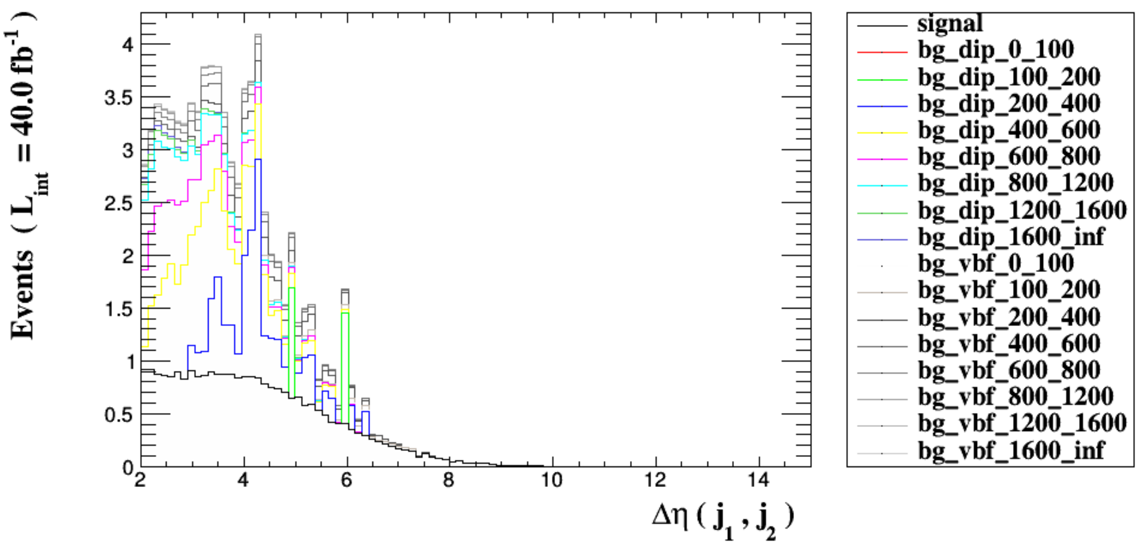

Figure 9.

3.11 Histogram 10

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

Dataset	Integral	Entries per event	Mean	RMS	% underflow	% overflow
signal	52.9	1.0	1430.57	799.7	0.0	1.182
bg_dip_0_100	0.0 +/- 0.0	0.	0.0	0.0	0.0	0.0
bg_dip_100_20	3.16	1.0	674.287	36.08	0.0	0.0
bg_dip_200_40	25.8	1.0	806.444	369.4	0.0	0.0
bg_dip_400_60	34.8	1.0	756.124	297.2	0.0	0.0
bg_dip_600_80	18.8	1.0	781.031	322.1	0.0	0.0
bg_dip_800_12	11.4	1.0	814.453	348.2	0.0	0.0
bg_dip_1200_1	1.92	1.0	844.472	365.4	0.0	0.0
bg_dip_1600_i	0.492	1.0	872.363	403.7	0.0	0.0
bg_vbf_0_100	0.0486	1.0	999.408	375.3	0.0	0.0
bg_vbf_100_20	1.16	1.0	847.835	279.9	0.0	0.0
bg_vbf_200_40	6.68	1.0	801.713	329.2	0.0	0.0
bg_vbf_400_60	7.09	1.0	750.135	282.4	0.0	0.0
bg_vbf_600_80	3.66	1.0	761.9	286.2	0.0	0.0
bg_vbf_800_12	2.15	1.0	780.346	299.0	0.0	0.0
bg_vbf_1200_1	0.385	1.0	798.746	322.8	0.0	0.02242
bg_vbf_1600_i	0.0982	1.0	824.802	350.7	0.0	0.02892

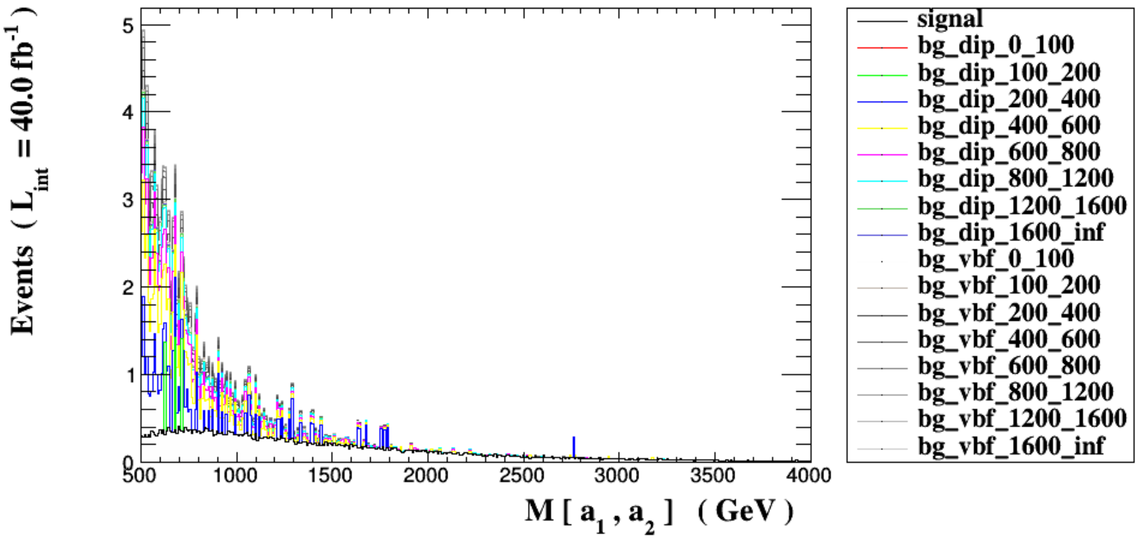

Figure 10.

3.12 Histogram 11

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

Dataset	Integral	Entries per event	Mean	RMS	% underflow	% overflow
signal	52.9	1.0	775.56	380.5	0.0	1.059
bg_dip_0_100	0.0 +/- 0.0	0.	0.0	0.0	0.0	0.0
bg_dip_100_20	3.16	1.0	327.174	7.434	0.0	0.0
bg_dip_200_40	25.8	1.0	400.151	82.89	0.0	0.0
bg_dip_400_60	34.8	1.0	445.165	113.4	0.0	0.0
bg_dip_600_80	18.8	1.0	529.399	160.6	0.0	0.0
bg_dip_800_12	11.4	1.0	638.285	244.3	0.0	0.02474
bg_dip_1200_1	1.92	1.0	750.786	377.2	0.0	0.0
bg_dip_1600_i	0.492	1.0	746.417	471.4	0.0	1.725
bg_vbf_0_100	0.0486	1.0	379.899	64.59	0.0	0.0
bg_vbf_100_20	1.16	1.0	373.902	77.67	0.0	0.0
bg_vbf_200_40	6.68	1.0	392.202	92.25	0.0	0.0
bg_vbf_400_60	7.09	1.0	436.628	112.8	0.0	0.0
bg_vbf_600_80	3.66	1.0	508.867	149.0	0.0	0.0
bg_vbf_800_12	2.15	1.0	620.887	223.3	0.0	0.0
bg_vbf_1200_1	0.385	1.0	762.723	338.6	0.0	0.028
bg_vbf_1600_i	0.0982	1.0	874.736	484.8	0.0	1.73

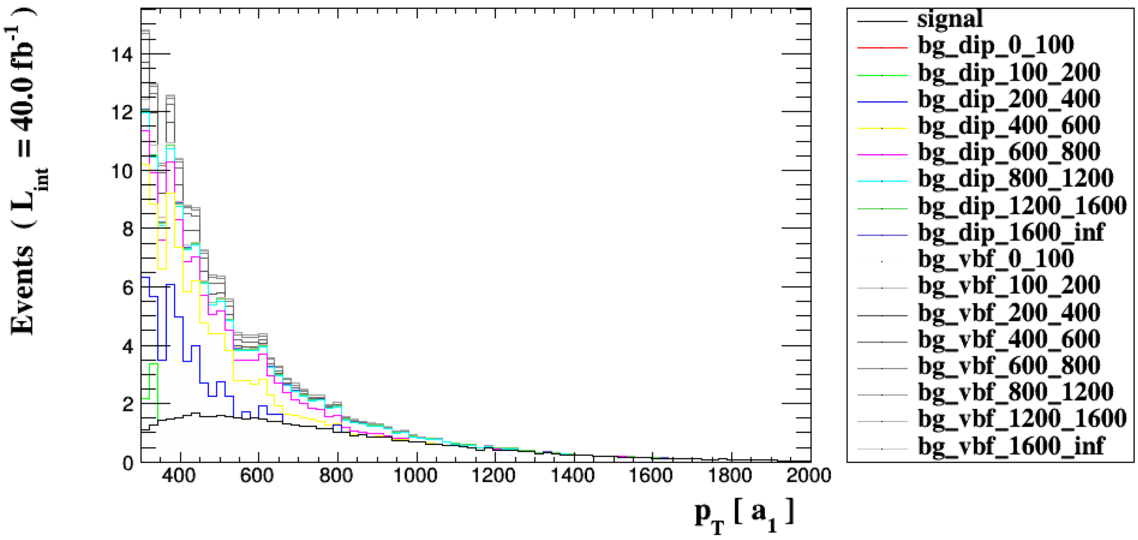

Figure 11.

3.13 Histogram 12

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

Dataset	Integral	Entries per event	Mean	RMS	% underflow	% overflow
signal	52.9	1.0	507.74	344.5	0.0	0.3779
bg_dip_0_100	0.0 +/- 0.0	0.	0.0	0.0	0.0	0.0
bg_dip_100_20	3.16	1.0	253.391	44.39	0.0	0.0
bg_dip_200_40	25.8	1.0	191.937	101.6	0.0	0.0
bg_dip_400_60	34.8	1.0	143.019	101.1	0.0	0.0
bg_dip_600_80	18.8	1.0	139.123	105.0	0.0	0.0
bg_dip_800_12	11.4	1.0	138.571	114.8	0.0	0.0
bg_dip_1200_1	1.92	1.0	131.66	116.5	0.0	0.0
bg_dip_1600_i	0.492	1.0	138.93	127.7	0.0	0.0
bg_vbf_0_100	0.0486	1.0	359.837	74.21	0.0	0.0
bg_vbf_100_20	1.16	1.0	285.217	94.57	0.0	0.0
bg_vbf_200_40	6.68	1.0	209.279	119.1	0.0	0.0
bg_vbf_400_60	7.09	1.0	164.173	118.0	0.0	0.0
bg_vbf_600_80	3.66	1.0	162.598	113.4	0.0	0.0
bg_vbf_800_12	2.15	1.0	169.681	124.3	0.0	0.0
bg_vbf_1200_1	0.385	1.0	175.082	135.1	0.0	0.0
bg_vbf_1600_i	0.0982	1.0	183.775	152.5	0.0	0.0

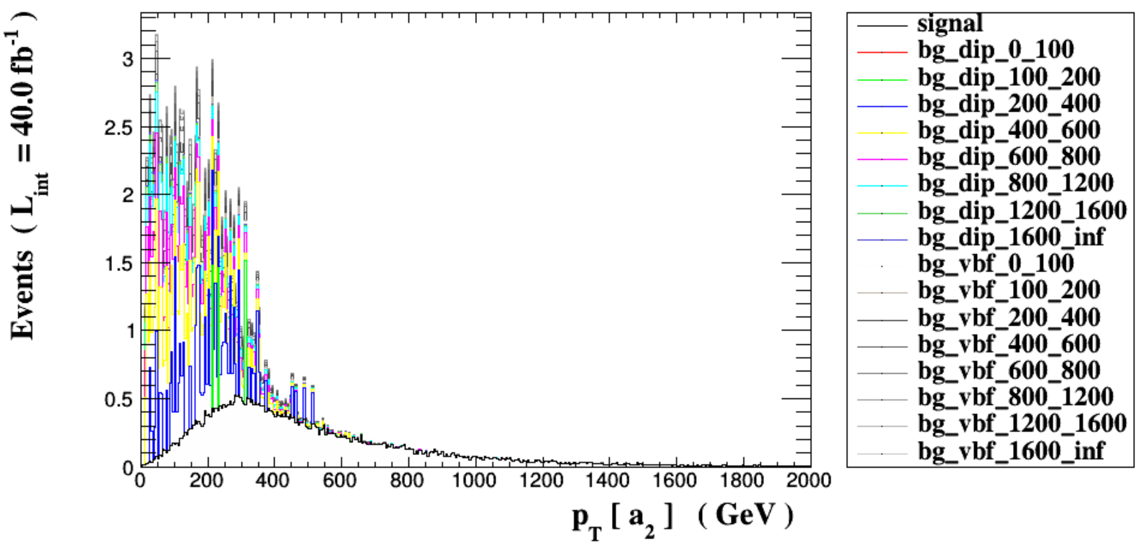

Figure 12.

3.14 Histogram 13

*** Plot: THT**

Dataset	Integral	Entries per event	Mean	RMS	% underflow	% overflow
signal	52.9	1.0	587.037	392.4	0.0	0.0
bg_dip_0_100	0.0 +/- 0.0	0.	0.0	0.0	0.0	0.0
bg_dip_100_20	3.16	1.0	148.168	37.58	0.0	0.0
bg_dip_200_40	25.8	1.0	322.57	51.94	0.0	0.0
bg_dip_400_60	34.8	1.0	497.625	57.16	0.0	0.0
bg_dip_600_80	18.8	1.0	687.176	55.95	0.0	0.0
bg_dip_800_12	11.4	1.0	940.982	106.9	0.0	0.0
bg_dip_1200_1	1.92	1.0	1340.97	107.2	0.0	0.0
bg_dip_1600_i	0.492	1.0	1877.37	276.5	0.0	0.0
bg_vbf_0_100	0.0486	1.0	74.6978	15.53	0.0	0.0
bg_vbf_100_20	1.16	1.0	163.344	25.73	0.0	0.0
bg_vbf_200_40	6.68	1.0	310.201	55.23	0.0	0.0
bg_vbf_400_60	7.09	1.0	491.892	56.3	0.0	0.0
bg_vbf_600_80	3.66	1.0	686.63	56.67	0.0	0.0
bg_vbf_800_12	2.15	1.0	943.126	106.9	0.0	0.0
bg_vbf_1200_1	0.385	1.0	1347.37	108.8	0.0	0.0
bg_vbf_1600_i	0.0982	1.0	1860.8	269.2	0.0	0.02892

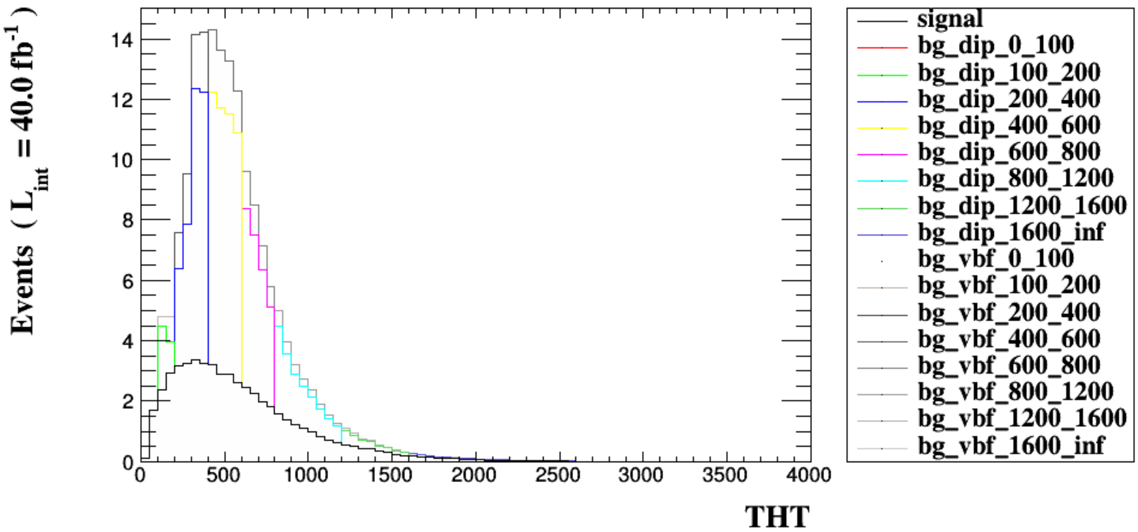

Figure 13.

3.15 Histogram 14

*** Plot: MET**

Dataset	Integral	Entries per event	Mean	RMS	% underflow	% overflow
signal	52.9	1.0	1.05124e-08	1.342e-08	0.0	0.0
bg_dip_0_100	0.0 +/- 0.0	0.	0.0	0.0	0.0	0.0
bg_dip_100_20	3.16	1.0	2.6048e-09	5.584e-10	0.0	0.0
bg_dip_200_40	25.8	1.0	5.18557e-09	2.976e-09	0.0	0.0
bg_dip_400_60	34.8	1.0	5.50193e-09	3.048e-09	0.0	0.0
bg_dip_600_80	18.8	1.0	5.57689e-09	3.42e-09	0.0	0.0
bg_dip_800_12	11.4	1.0	6.63131e-09	6.456e-09	0.0	0.0
bg_dip_1200_1	1.92	1.0	1.29426e-08	1.548e-08	0.0	0.0
bg_dip_1600_i	0.492	1.0	2.00468e-08	1.843e-08	0.0	0.0
bg_vbf_0_100	0.0486	1.0	2.92664e-09	2.061e-09	0.0	0.0
bg_vbf_100_20	1.16	1.0	4.59216e-09	2.634e-09	0.0	0.0
bg_vbf_200_40	6.68	1.0	5.34226e-09	3.094e-09	0.0	0.0
bg_vbf_400_60	7.09	1.0	5.62969e-09	3.683e-09	0.0	0.0
bg_vbf_600_80	3.66	1.0	5.77165e-09	3.524e-09	0.0	0.0
bg_vbf_800_12	2.15	1.0	6.6188e-09	5.623e-09	0.0	0.0
bg_vbf_1200_1	0.385	1.0	1.30944e-08	1.537e-08	0.0	0.0
bg_vbf_1600_i	0.0982	1.0	2.22335e-08	2.038e-08	0.0	0.0

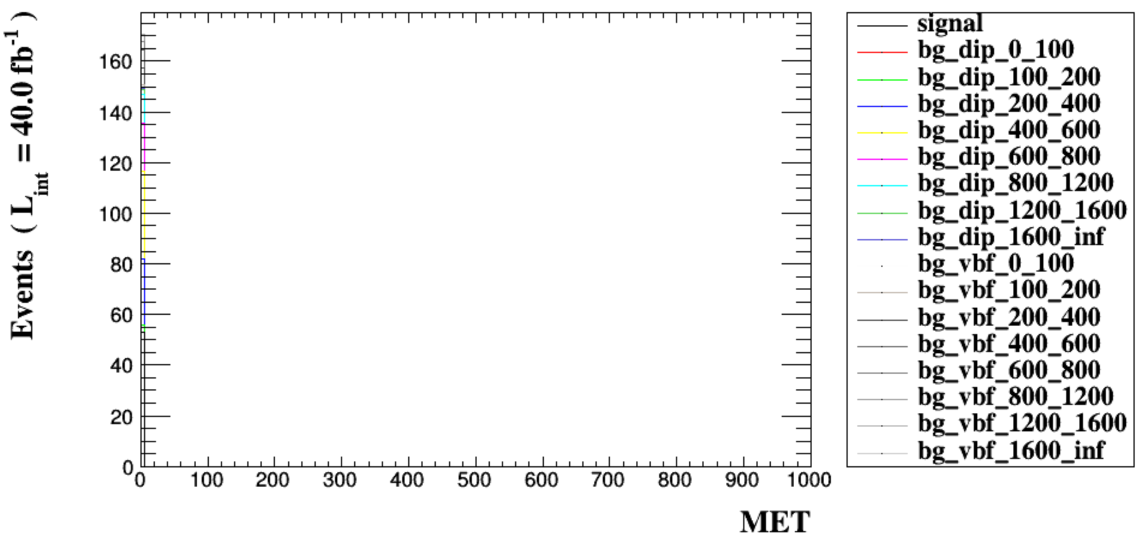

Figure 14.

3.16 Histogram 15

*** Plot: TET**

Dataset	Integral	Entries per event	Mean	RMS	% underflow	% overflow
signal	52.9	1.0	1870.34	827.6	0.0	0.004039
bg_dip_0_100	0.0 +/- 0.0	0.	0.0	0.0	0.0	0.0
bg_dip_100_20	3.16	1.0	728.733	80.65	0.0	0.0
bg_dip_200_40	25.8	1.0	914.659	167.9	0.0	0.0
bg_dip_400_60	34.8	1.0	1085.81	190.6	0.0	0.0
bg_dip_600_80	18.8	1.0	1355.7	222.6	0.0	0.0
bg_dip_800_12	11.4	1.0	1717.84	310.2	0.0	0.0
bg_dip_1200_1	1.92	1.0	2223.42	420.2	0.0	0.0
bg_dip_1600_i	0.492	1.0	2762.71	554.7	0.0	0.0
bg_vbf_0_100	0.0486	1.0	814.434	141.3	0.0	0.0
bg_vbf_100_20	1.16	1.0	822.463	164.7	0.0	0.0
bg_vbf_200_40	6.68	1.0	911.682	196.9	0.0	0.0
bg_vbf_400_60	7.09	1.0	1092.69	207.8	0.0	0.0
bg_vbf_600_80	3.66	1.0	1358.1	214.6	0.0	0.0
bg_vbf_800_12	2.15	1.0	1733.69	293.4	0.0	0.0
bg_vbf_1200_1	0.385	1.0	2285.17	379.1	0.0	0.0
bg_vbf_1600_i	0.0982	1.0	2919.31	576.8	0.0	0.0

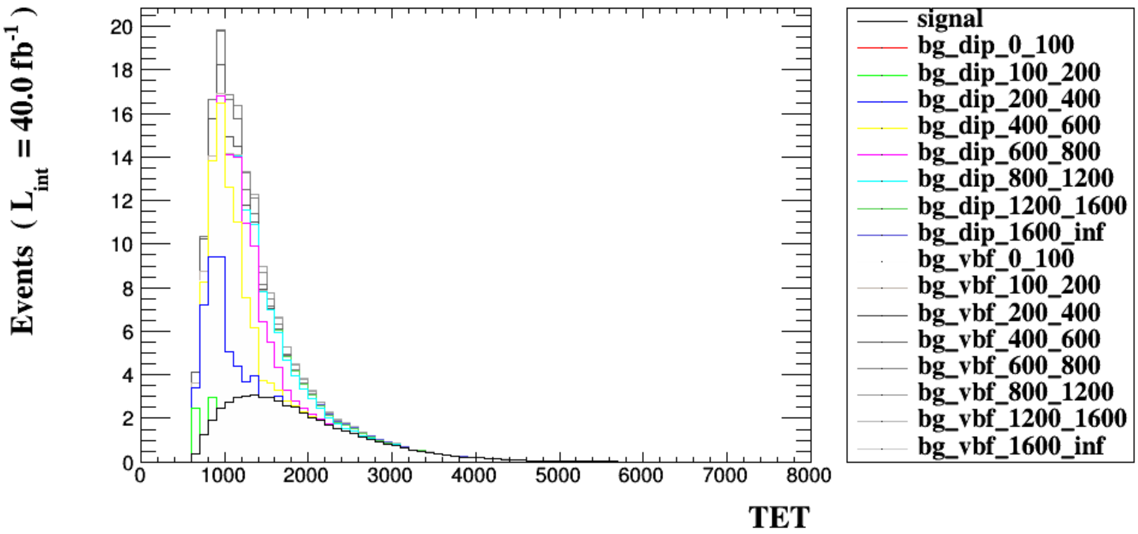

Figure 15.

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)	106.858 +/- 0.148	4113516 +/- 4877	1.04e-04 +/- 9.46e-08
SEL: ((sdETA (jets[1] jets[2]) > 2.0 or sdETA	52.67 +/- 5.17	117.7 +/- 10.8	1.636 +/- 0.115