

# The LaTeX report

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# 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 # need to
change this directory path -> exit and type "pwd" to get the path
ma5>set main.lumi = 40.0
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># define weights for the samples
ma5>#set sample_1.weight = 1
ma5>#set sample_2.weight = 1
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># selections
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>select PT(a[1]) > 350 and M(a[1] a[2]) > 200
ma5>submit analysis_loose_pta350_maa200

```

## 1.2 Configuration

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

## 2 Datasets

### 2.1 signal

- Samples stored in the directory: [/Users/elijahsheridan/MG5\\_aMC\\_v2\\_6\\_5/axion\\_pheno/-optimization](#) .
- 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.lh	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](#) .
- 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_100	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](#) .
- Sample consisting of: [background](#) events.
- Generated events: [965662](#) events.

- Normalization to the luminosity: 9695 $\pm$ 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 .
- Sample consisting of: background events.
- Generated events: 984165 events.
- Normalization to the luminosity: 5413 $\pm$ 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 .
- Sample consisting of: background events.
- Generated events: 1000000 events.
- Normalization to the luminosity: 986 $\pm$ 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](#) .
- 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](#) .
- 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](#) .
- 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 (%)
<a href="#">/Users/elijahsheridan/-MG5_aMC_v2_6_5/-axion_pheno/madgraph_data/-vbf_diphoton_background_data/-merged_lhe/-vbf_diphoton_background_ht_1200</a>	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](#) .
- 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 (%)
<a href="#">/Users/elijahsheridan/-MG5_aMC_v2_6_5/-axion_pheno/madgraph_data/-vbf_diphoton_background_data/-merged_lhe/-vbf_diphoton_background_ht_1600</a>	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](#) .
- 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

### 2.11 bg\_dip\_100\_200

- Samples stored in the directory: [/Users/elijahsheridan/MG5\\_aMC\\_v2\\_6\\_5/axion\\_pheno/-optimization](#) .
- 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_c 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](#) .
- 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_c 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](#) .
- 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 (%)
<a href="#">/Users/elijahsheridan/-MG5_aMC_v2_6_5/-axion_pheno/madgraph_data/-diphoton_double_isr_background_cmerged_lhe/-diphoton_double_isr_background_l</a>	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](#) .
- 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 (%)
<a href="#">/Users/elijahsheridan/-MG5_aMC_v2_6_5/-axion_pheno/madgraph_data/-diphoton_double_isr_background_cmerged_lhe/-diphoton_double_isr_background_l</a>	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](#) .
- 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 .
- 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 .
- 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 Cut 2

\* Cut: select  $PT(a[1]) > 350.0$  and  $M(a[1] a[2]) > 200.0$

Dataset	Events kept: K	Rejected events: R	Efficiency: K / (K + R)	Cumul. efficiency: K / Initial
signal	1312.3 +/- 29.9	399.5 +/- 19.0	0.7666 +/- 0.0102	0.32055 +/- 0.00729
bg_vbf_0_10	0.0 +/- 0.0	204.2 +/- 14.2	0.0 +/- 0.0	0.0 +/- 0.0
bg_vbf_100_	0.251 +/- 0.501	950.6 +/- 29.3	0.000264 +/- 0.000527	2.59e-05 +/- 5.17e-05
bg_vbf_200_	4.04 +/- 2.01	1143.8 +/- 30.1	0.00352 +/- 0.00175	0.000746 +/- 0.000371
bg_vbf_400_	11.30 +/- 3.34	338.1 +/- 14.9	0.03234 +/- 0.00946	0.01145 +/- 0.00339
bg_vbf_600_	7.5 +/- 2.7	103.69 +/- 7.81	0.0676 +/- 0.0238	0.0298 +/- 0.0107
bg_vbf_800_	4.28 +/- 2.03	36.04 +/- 4.97	0.1061 +/- 0.0485	0.0373 +/- 0.0177
bg_vbf_1200_	0.579 +/- 0.750	3.91 +/- 1.78	0.129 +/- 0.158	0.0281 +/- 0.0364
bg_vbf_1600_	0.102 +/- 0.318	0.682 +/- 0.788	0.131 +/- 0.381	0.0134 +/- 0.0415
bg_dip_0_10	0.0 +/- 0.0	229.4 +/- 15.1	0.0 +/- 0.0	0.0 +/- 0.0
bg_dip_100_	0.0 +/- 0.0	990.1 +/- 31.5	0.0 +/- 0.0	0.0 +/- 0.0
bg_dip_200_	9.67 +/- 3.11	1632.1 +/- 40.4	0.00589 +/- 0.00189	4.04e-05 +/- 1.30e-05
bg_dip_400_	26.69 +/- 5.16	1039.9 +/- 31.7	0.02503 +/- 0.00478	0.000927 +/- 0.000179
bg_dip_600_	18.13 +/- 4.25	513.2 +/- 21.9	0.03412 +/- 0.00788	0.002716 +/- 0.000637
bg_dip_800_	11.32 +/- 3.36	181.9 +/- 13.1	0.0586 +/- 0.0169	0.00385 +/- 0.00114
bg_dip_1200_	1.49 +/- 1.22	20.31 +/- 4.42	0.068 +/- 0.054	0.00289 +/- 0.00237
bg_dip_1600_	0.246 +/- 0.496	3.82 +/- 1.94	0.0604 +/- 0.1181	0.00131 +/- 0.00264

## 4 Summary

### 4.1 Cut-flow charts

- How to compare signal (S) and background (B):  $S/\sqrt{S+B}$  .
- 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
SEL: PT ( a[1] ) > 350.0 and M ( a[1] a[2] ) > 200	1312.3 +/- 29.9	95.60 +/- 9.74	34.975 +/- 0.442