# The LaTeX report

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This report has been generated automatically by MadAnalysis 5.

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> **E. Conte, B. Fuks and G. Serret**,
> *MadAnalysis 5, A User-Friendly Framework for Collider Phenomenology*,
> Comput. Phys. Commun. **184** (2013) 222-256,
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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/-
signal_no_cuts_ma10GeV_Lambda1TeV/axion_signal_no_cuts_ma10GeV_Lambda1TeV.lhe as signal
ma5>
# define bg and signal samples
ma5>set signal.type = signal
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>select (PT(a[1]) > 300 and M(a[1] a[2]) > 500)
ma5>
# define which plots to make
ma5>plot M(jets[1] jets[2])
ma5>submit no_mg_cuts_mjj_zoom
```

## 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/-post_optimization_studies/ma_scripts .
- Sample consisting of: signal events.
- Generated events: 124 events.
- Normalization to the luminosity: 32687864+/- 27644788 events.
- Ratio (event weight): 263611 - 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/axion_signal/-signal_no_cuts_ma10GeV_Lambda axion_signal_no_cuts_ma10GeV_L | 124 | 817 @ 84% | 0.0 |

# 3 Histos and cuts

## 3.1 Cut 1

*** Cut: select 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 | 0.0 +/- 0.0 | 32687864 +/- 27644788 | 0.0 +/- 0.0 | 0.0 +/- 0.0 |

### 3.2 Histogram 1

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

| Dataset | Integral | Entries per event | Mean | RMS | % underflow | % overflow |
|---|---|---|---|---|---|---|
| signal | 0.0 +/- 0.0 | 0. | 0.0 | 0.0 | 0.0 | 0.0 |

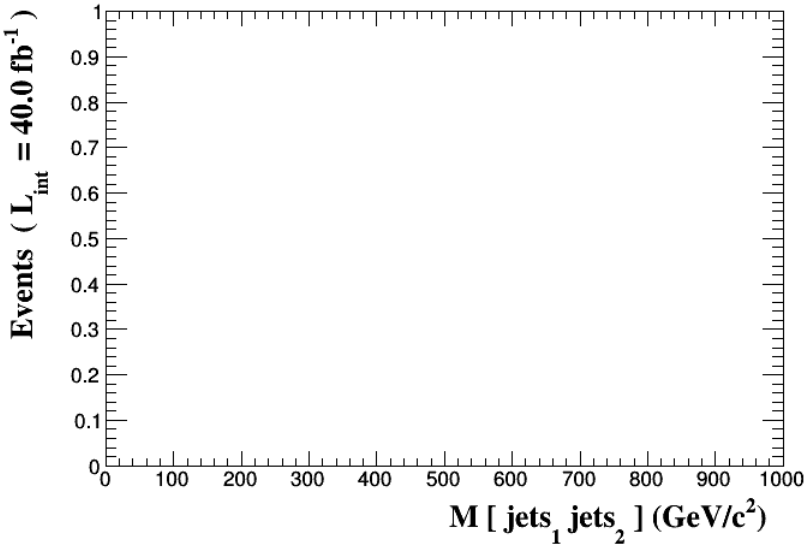


**Figure 1**.

# 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) | 32687864 +/- 27644788 | | |
| SEL: PT ( a[1] ) > 300.0 and M ( a[1] a[2] ) > 500 | 0.0 +/- 0.0 | | |