

MAD *Analysis* **5** The LaTeX report

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1 Setup

1.1 Command history

```
ma5>import /eos/uscms/store/user/pjacome/mg5/SM_tttt_8TeV_10000ev_r*.lhe as sm
ma5>import /eos/uscms/store/user/pjacome/mg5/GH400_GH_tttt_8TeV_10000ev_r*.lhe
as gh400
ma5>import /eos/uscms/store/user/pjacome/mg5/GH1000_GH_tttt_8TeV_10000ev_r*.lhe
as gh1000
ma5>set main.lumi = 19.7
ma5>set main.stacking_method = superimpose
ma5>set sm.title = 'pp > tttt (SM)'
ma5>set sm.type = background
ma5>set gh400.title = 'pp > gh400 > tttt'
ma5>set gh400.type = signal
ma5>set gh1000.title = 'pp > gh1000 > tttt'
ma5>set gh1000.type = signal
ma5>plot NPID
ma5>set selection[1].statuscode = initialstate
ma5>set selection[1].titleX = 'initialstate'
ma5>plot NPID
ma5>set selection[2].statuscode = interstate
ma5>set selection[2].titleX = 'interstate'
ma5>plot NPID
ma5>set selection[3].statuscode = finalstate
ma5>set selection[3].titleX = 'finalstate'
ma5>plot MET 50 0 700
ma5>#set selection[4].statuscode = finalstate
ma5>plot MHT 50 0 700
ma5>#set selection[5].statuscode = finalstate
ma5>plot SQRTS 50 0 5000
ma5>#set selection[6].statuscode = finalstate
ma5>plot TET 50 0 4000
ma5>#set selection[7].statuscode = finalstate
ma5>plot THT 50 0 4000
ma5>#set selection[8].statuscode = finalstate
ma5>#
ma5>plot PT(t t ) 50 0 1000
ma5>set selection[9].statuscode = finalstate
ma5>plot M(t t ) 50 0 2000
ma5>set selection[10].statuscode = finalstate
ma5>plot ETA(t t )
ma5>set selection[11].statuscode = finalstate
ma5>plot E(t t ) 50 0 2000
```

```
ma5>set selection[12].statuscode = finalstate
ma5>#
ma5>define topantitop = t t
ma5>plot PT(topantitop) 50 0 1000
ma5>set selection[13].statuscode = finalstate
ma5>plot M(topantitop) 50 0 2000
ma5>set selection[14].statuscode = finalstate
ma5>plot ETA(topantitop)
ma5>set selection[15].statuscode = finalstate
ma5>plot E(topantitop) 50 0 2000
ma5>set selection[16].statuscode = finalstate
ma5>#
ma5>#display selection
ma5>submit pp-to-tttt
```

1.2 Configuration

- MadAnalysis version 1.1.11 (2014/07/17).
- Histograms given for an integrated luminosity of 19.7fb^{-1} .

2 Datasets

2.1 sm

- Samples stored in the directory: [/uscms_data/d3/pjacome/MadGraph5_v1_5_9/-madanalysis5](#) .
- Sample consisting of: [background](#) events.
- Generated events: [80000](#) events.
- Normalization to the luminosity: [14+/- 1](#) events.
- Ratio (event weight): [0.00017](#) .

Paths to the event files	Nr. of events	Cross section (pb)	Negative wghts (%)
/eos/uscms/store/- user/pjacome/mg5/- SM_tttt_8TeV_10000ev_r01.l	10000	0.000714 @ 0.35%	0.0
/eos/uscms/store/- user/pjacome/mg5/- SM_tttt_8TeV_10000ev_r02.l	10000	0.000715 @ 0.37%	0.0
/eos/uscms/store/- user/pjacome/mg5/- SM_tttt_8TeV_10000ev_r03.l	10000	0.00072 @ 0.35%	0.0
/eos/uscms/store/- user/pjacome/mg5/- SM_tttt_8TeV_10000ev_r04.l	10000	0.000716 @ 0.37%	0.0
/eos/uscms/store/- user/pjacome/mg5/- SM_tttt_8TeV_10000ev_r05.l	10000	0.000719 @ 0.36%	0.0
/eos/uscms/store/- user/pjacome/mg5/- SM_tttt_8TeV_10000ev_r06.l	10000	0.000713 @ 0.4%	0.0
/eos/uscms/store/- user/pjacome/mg5/- SM_tttt_8TeV_10000ev_r07.l	10000	0.000719 @ 0.37%	0.0
/eos/uscms/store/- user/pjacome/mg5/- SM_tttt_8TeV_10000ev_r08.l	10000	0.000716 @ 0.43%	0.0
Sum	80000	0.000716 @ 0.13%	0.0

2.2 gh400

- Samples stored in the directory: `/uscms_data/d3/pjacome/MadGraph5_v1_5_9/-madanalysis5` .
- Sample consisting of: `signal` events.
- Generated events: `100000` events.
- Normalization to the luminosity: `3+/- 1` events.
- Ratio (event weight): `3e-05` .

2.3 gh1000

- Samples stored in the directory: `/uscms_data/d3/pjacome/MadGraph5_v1_5_9/-madanalysis5` .
- Sample consisting of: `signal` events.
- Generated events: `100000` events.
- Normalization to the luminosity: `0+/- 1` events.
- Ratio (event weight): `0.0` .

Paths to the event files	Nr. of events	Cross section (pb)		Negative wghts (%)
/eos/uscms/store/- user/pjacome/mg5/- GH400_GH_tttt_8TeV_10000	10000	0.000176 0.17%	@	0.0
/eos/uscms/store/- user/pjacome/mg5/- GH400_GH_tttt_8TeV_10000	10000	0.000176 0.16%	@	0.0
/eos/uscms/store/- user/pjacome/mg5/- GH400_GH_tttt_8TeV_10000	10000	0.000176 0.15%	@	0.0
/eos/uscms/store/- user/pjacome/mg5/- GH400_GH_tttt_8TeV_10000	10000	0.000176 0.17%	@	0.0
/eos/uscms/store/- user/pjacome/mg5/- GH400_GH_tttt_8TeV_10000	10000	0.000176 0.17%	@	0.0
/eos/uscms/store/- user/pjacome/mg5/- GH400_GH_tttt_8TeV_10000	10000	0.000175 0.16%	@	0.0
/eos/uscms/store/- user/pjacome/mg5/- GH400_GH_tttt_8TeV_10000	10000	0.000176 0.18%	@	0.0
/eos/uscms/store/- user/pjacome/mg5/- GH400_GH_tttt_8TeV_10000	10000	0.000176 0.15%	@	0.0
/eos/uscms/store/- user/pjacome/mg5/- GH400_GH_tttt_8TeV_10000	10000	0.000176 0.16%	@	0.0
/eos/uscms/store/- user/pjacome/mg5/- GH400_GH_tttt_8TeV_10000	10000	0.000176 0.21%	@	0.0
Sum	100000	0.000176 0.054%	@	0.0

3 Histos and cuts

3.1 Histogram 1

* Plot: NPID

Paths to the event files	Nr. of events	Cross section (pb)		Negative wghts (%)
/eos/uscms/store/- user/pjacome/mg5/- GH1000_GH_tttt_8TeV_1000	10000	3.08e-05 0.13%	@	0.0
/eos/uscms/store/- user/pjacome/mg5/- GH1000_GH_tttt_8TeV_1000	10000	3.07e-05 0.13%	@	0.0
/eos/uscms/store/- user/pjacome/mg5/- GH1000_GH_tttt_8TeV_1000	10000	3.07e-05 0.17%	@	0.0
/eos/uscms/store/- user/pjacome/mg5/- GH1000_GH_tttt_8TeV_1000	10000	3.07e-05 0.15%	@	0.0
/eos/uscms/store/- user/pjacome/mg5/- GH1000_GH_tttt_8TeV_1000	10000	3.07e-05 0.13%	@	0.0
/eos/uscms/store/- user/pjacome/mg5/- GH1000_GH_tttt_8TeV_1000	10000	3.07e-05 0.15%	@	0.0
/eos/uscms/store/- user/pjacome/mg5/- GH1000_GH_tttt_8TeV_1000	10000	3.07e-05 0.14%	@	0.0
/eos/uscms/store/- user/pjacome/mg5/- GH1000_GH_tttt_8TeV_1000	10000	3.07e-05 0.15%	@	0.0
/eos/uscms/store/- user/pjacome/mg5/- GH1000_GH_tttt_8TeV_1000	10000	3.07e-05 0.15%	@	0.0
/eos/uscms/store/- user/pjacome/mg5/- GH1000_GH_tttt_8TeV_1000	10000	3.07e-05 0.15%	@	0.0
Sum	100000	3.07e-05 0.046%	@	0.0

3.2 Histogram 2

* Plot: NPID

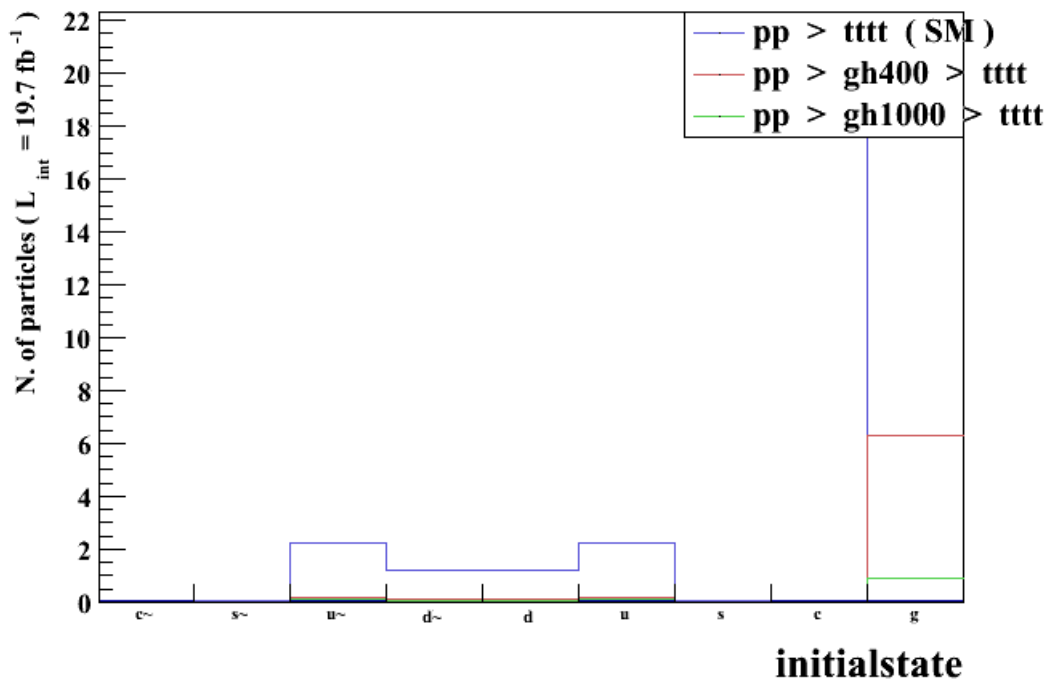


Figure 1.

3.3 Histogram 3

* Plot: NPID

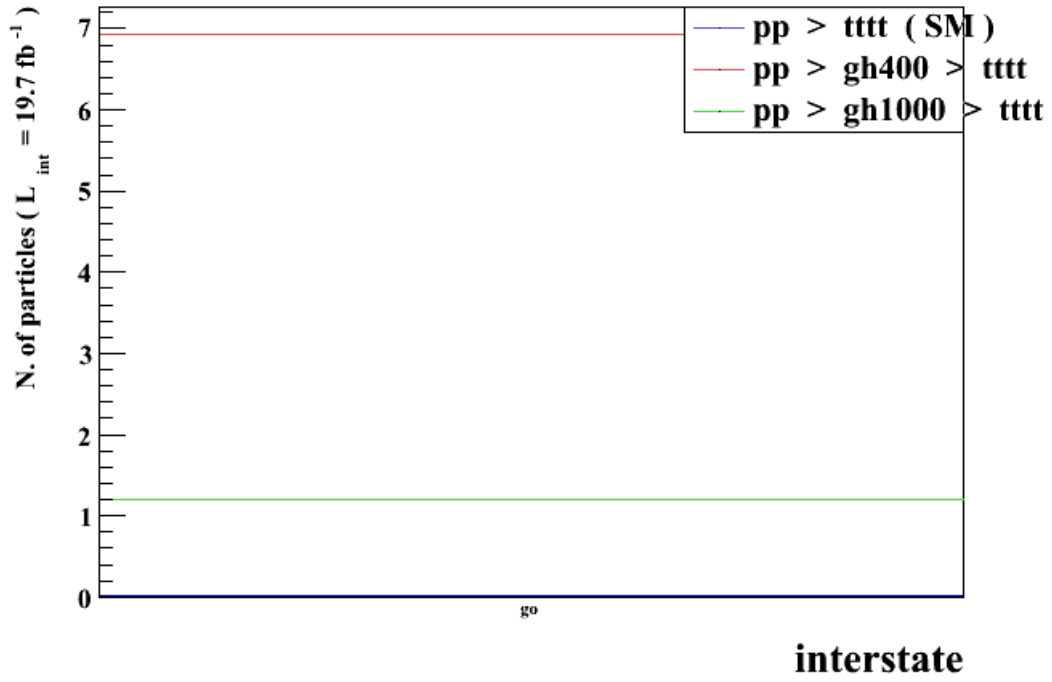


Figure 2.

3.4 Histogram 4

* Plot: MET

Table 1. Statistics table

Dataset	Integral	Entries / events	Mean	RMS	%Underflow	%Overflow
sm	14.1	1.0	4.69274e-09	3.038e-09	0.0	0.0
gh400	3.46	1.0	3.7347e-09	2.715e-09	0.0	0.0
gh1000	0.605	1.0	6.52545e-09	5.692e-09	0.0	0.0

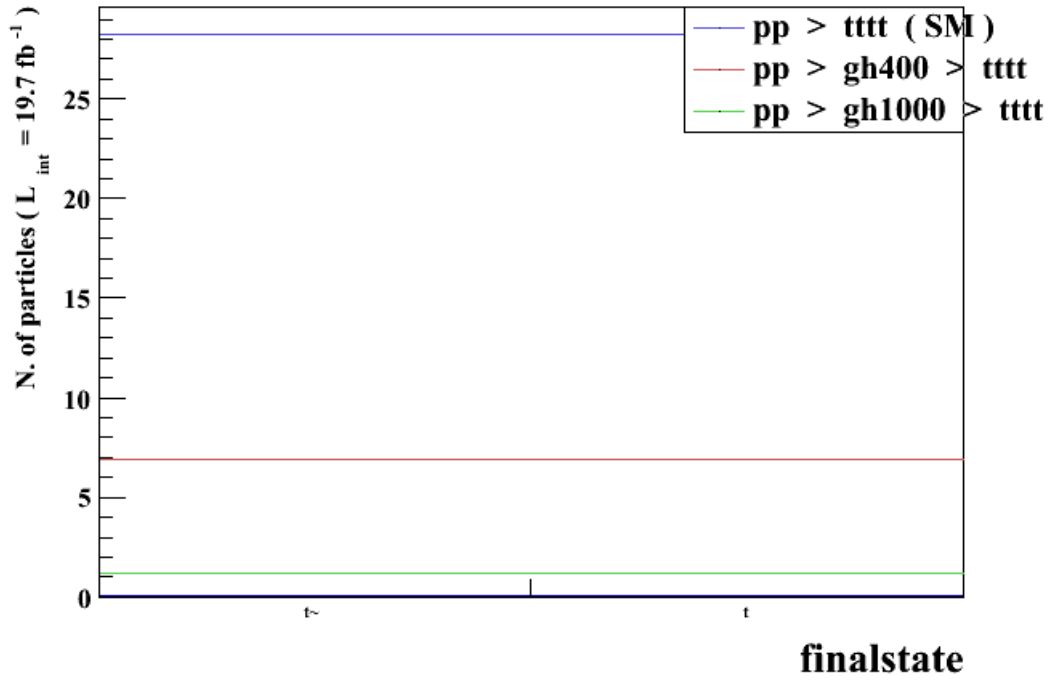


Figure 3.

3.5 Histogram 5

* Plot: MHT

Table 2. Statistics table

Dataset	Integral	Entries events	/	Mean	RMS	%Underflow	%Overflow
sm	14.1	1.0		0.0	0.0	0.0	0.0
gh400	3.46	1.0		0.0	0.0	0.0	0.0
gh1000	0.605	1.0		0.0	0.0	0.0	0.0

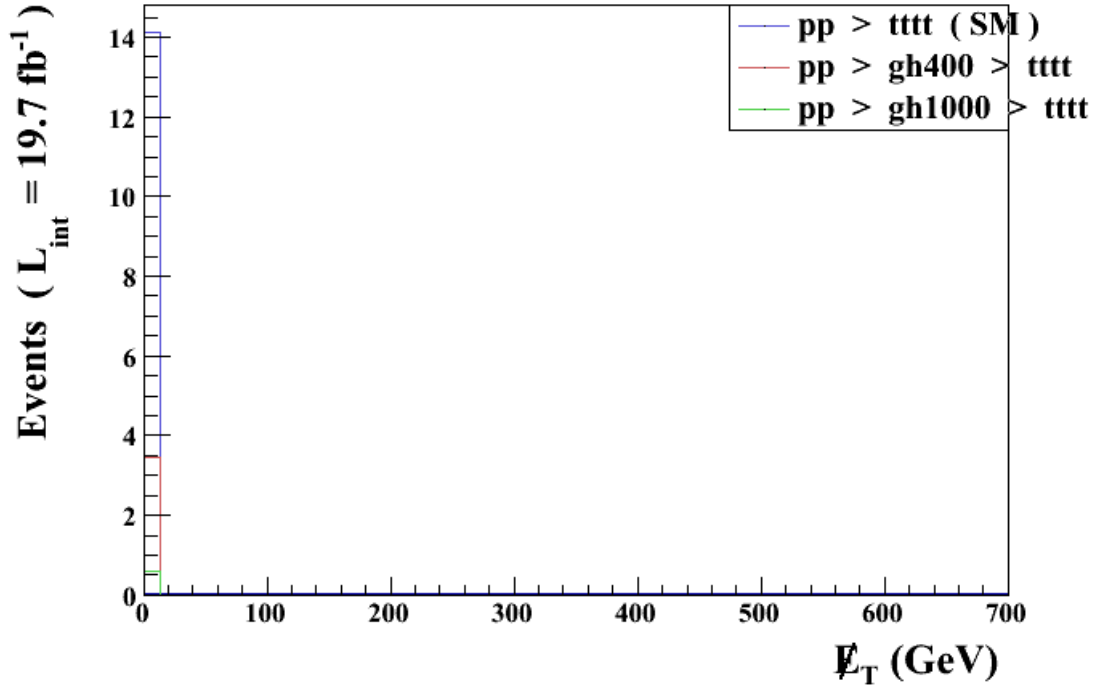


Figure 4.

3.6 Histogram 6

* Plot: SQRTS

Table 3. Statistics table

Dataset	Integral	Entries events	Mean	RMS	%Underflow	%Overflow
sm	14.1	1.0	1375.38	381.3	0.0	0.0
gh400	3.46	1.0	991.125	191.3	0.0	0.0
gh1000	0.605	1.0	2327.98	288.6	0.0	0.001001

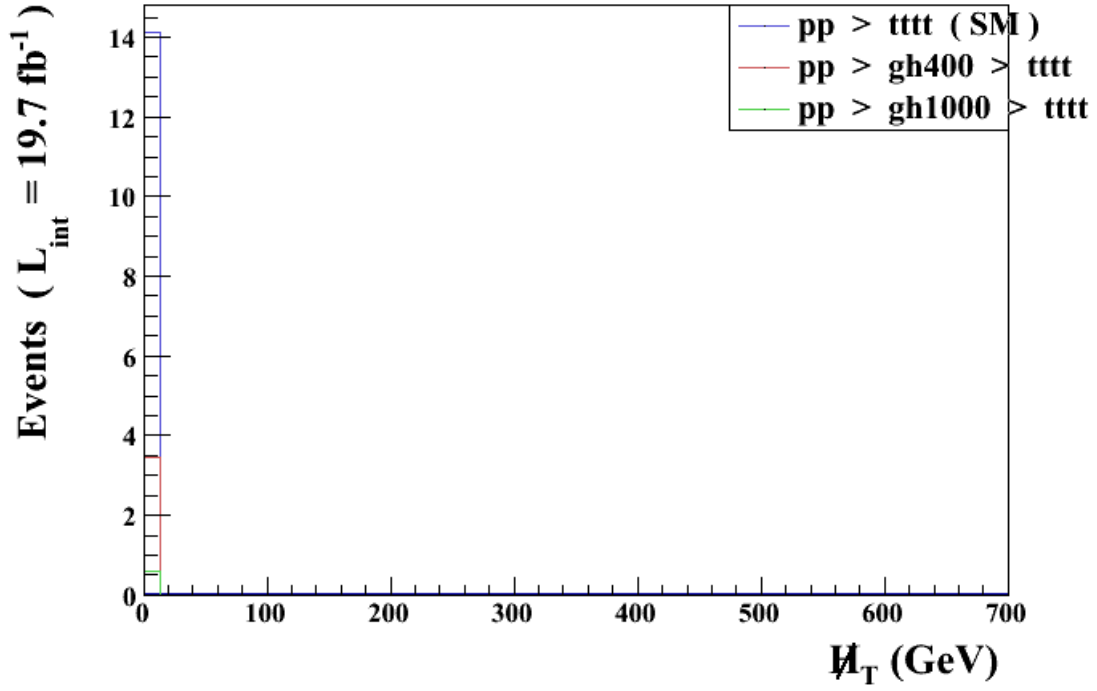


Figure 5.

3.7 Histogram 7

* Plot: TET

Table 4. Statistics table

Dataset	Integral	Entries events	/	Mean	RMS	%Underflow	%Overflow
sm	14.1	1.0		737.547	309.1	0.0	0.0
gh400	3.46	1.0		518.003	227.8	0.0	0.0
gh1000	0.605	1.0		1740.22	380.6	0.0	0.007

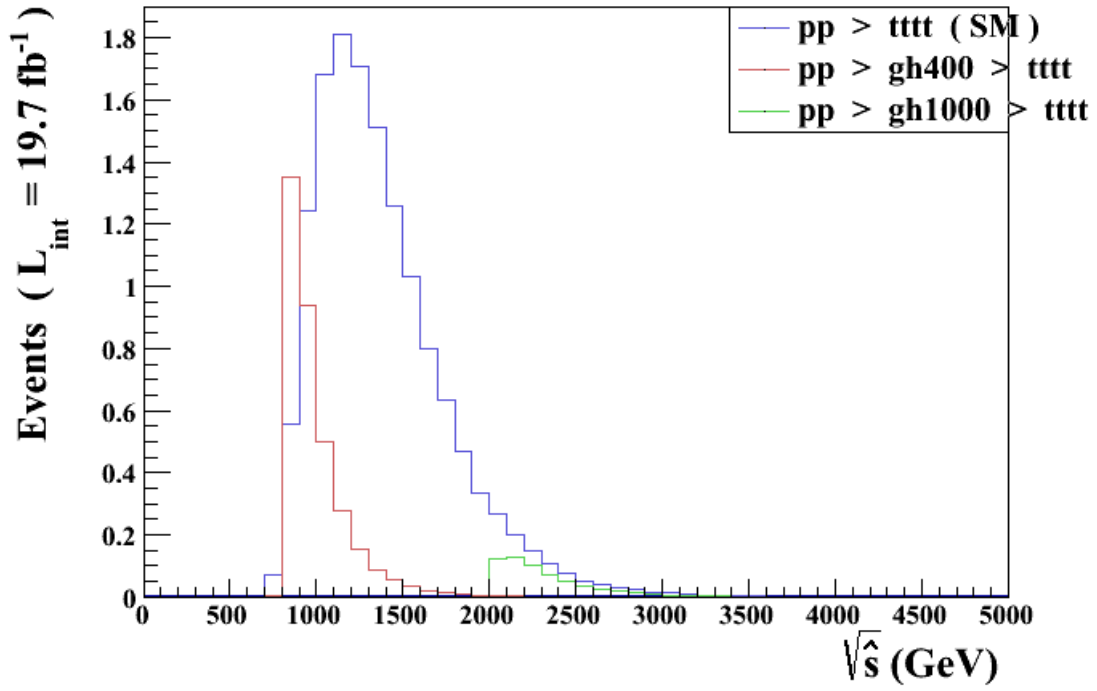


Figure 6.

3.8 Histogram 8

* Plot: THT

Table 5. Statistics table

Dataset	Integral	Entries events	/	Mean	RMS	%Underflow	%Overflow
sm	14.1	1.0		0.0	0.0	0.0	0.0
gh400	3.46	1.0		0.0	0.0	0.0	0.0
gh1000	0.605	1.0		0.0	0.0	0.0	0.0

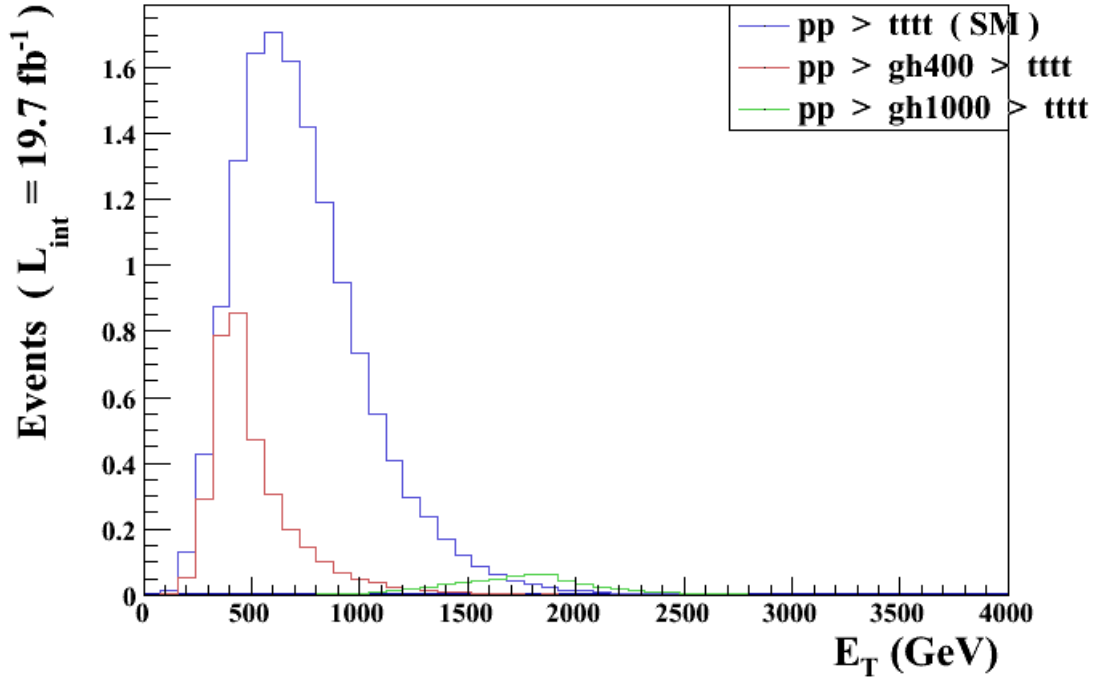


Figure 7.

3.9 Histogram 9

* Plot: PT (t t)

Table 6. Statistics table

Dataset	Integral	Entries events	Mean	RMS	%Underflow	%Overflow
sm	56.4	4.0	223.521	137.3	0.0	0.05437
gh400	13.9	4.0	158.925	114.0	0.0	0.0325
gh1000	2.42	4.0	475.546	257.1	0.0	2.398

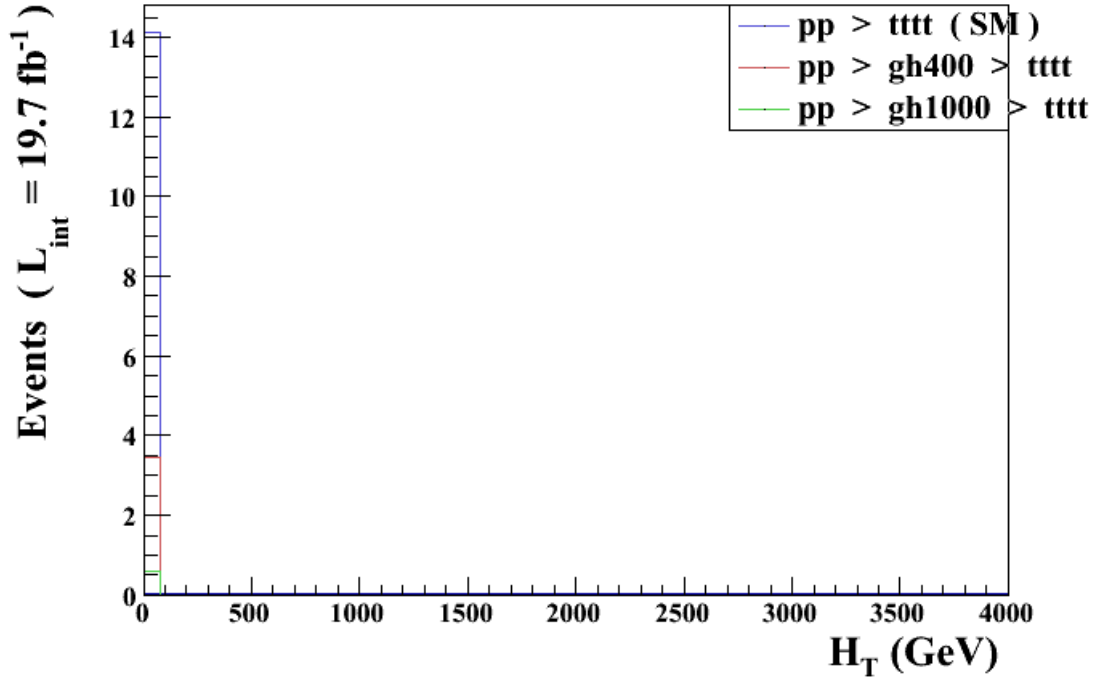


Figure 8.

3.10 Histogram 10

* Plot: $M(t\bar{t})$

Table 7. Statistics table

Dataset	Integral	Entries events	Mean	RMS	%Underflow	%Overflow
sm	56.4	4.0	566.463	207.2	0.0	0.05623
gh400	13.9	4.0	434.597	89.78	0.0	0.000751
gh1000	2.42	4.0	949.456	258.9	0.0	0.5002

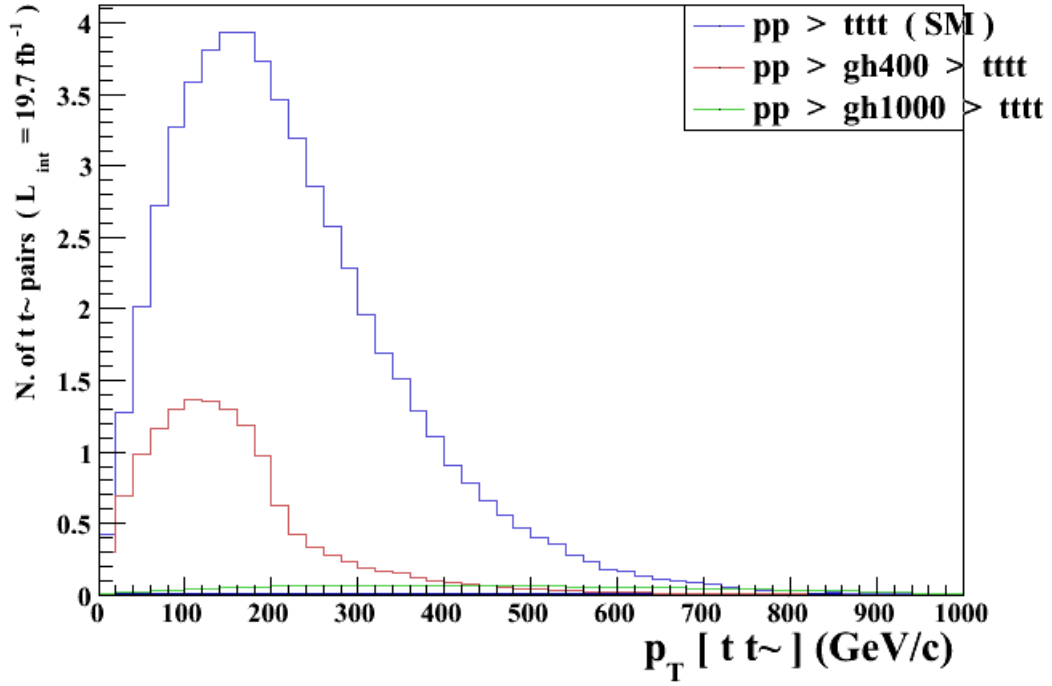


Figure 9.

3.11 Histogram 11

* Plot: $\text{ETA} (t\bar{t})$

Table 8. Statistics table

Dataset	Integral	Entries events	Mean	RMS	%Underflow	%Overflow
sm	56.4	4.0	-0.000854729	1.605	0.0	0.0
gh400	13.9	4.0	0.00333128	1.679	0.0	0.0
gh1000	2.42	4.0	-0.003262	1.196	0.0	0.0

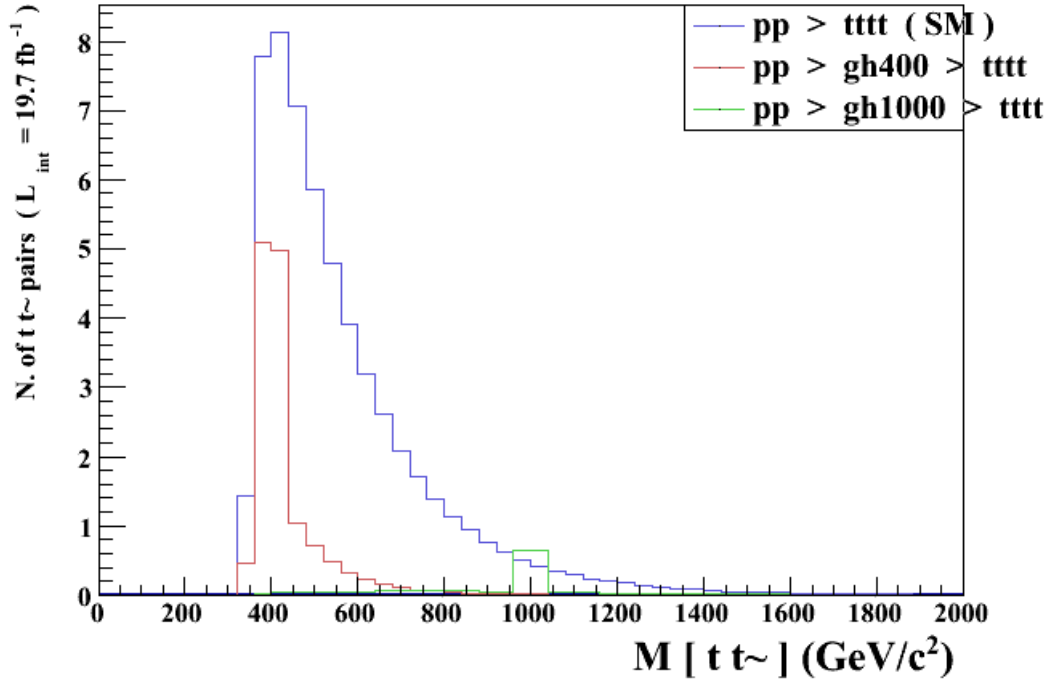


Figure 10.

3.12 Histogram 12

* Plot: $E(t\bar{t})$

Table 9. Statistics table

Dataset	Integral	Entries events	Mean	RMS	%Underflow	%Overflow
sm	56.4	4.0	789.285	306.7	0.0	0.4919
gh400	13.9	4.0	593.804	195.6	0.0	0.027
gh1000	2.42	4.0	1239.44	282.6	0.0	2.053

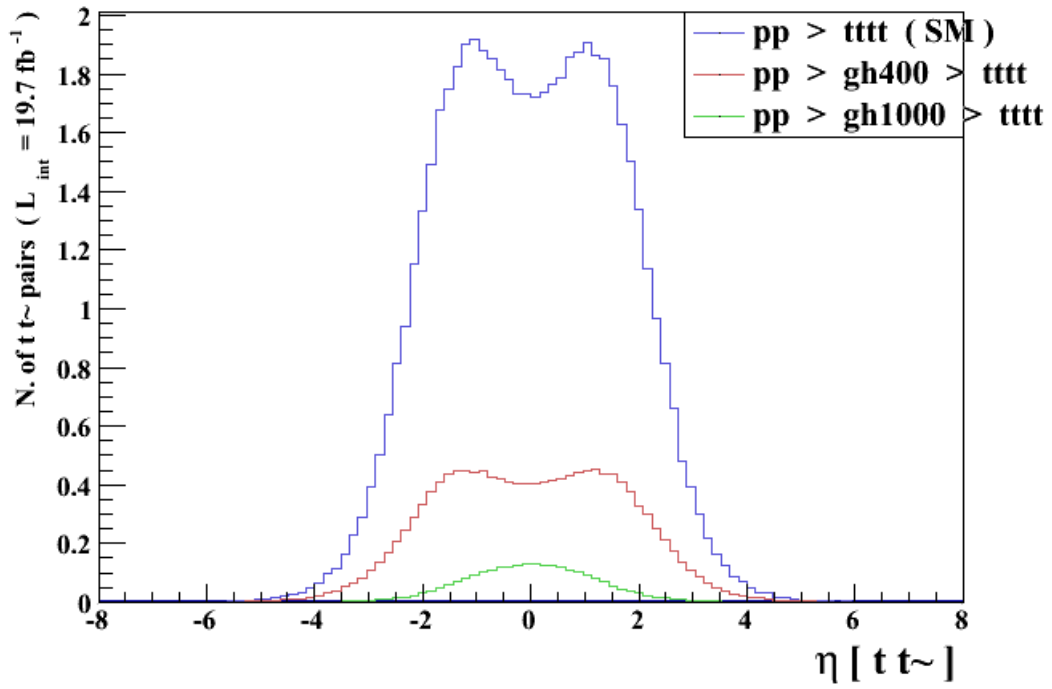


Figure 11.

3.13 Histogram 13

* Plot: PT (topantitop)

Table 10. Statistics table

Dataset	Integral	Entries events	Mean	RMS	%Underflow	%Overflow
sm	56.4	4.0	184.387	120.7	0.0	0.02094
gh400	13.9	4.0	129.501	80.47	0.0	0.001251
gh1000	2.42	4.0	435.055	199.8	0.0	1.192

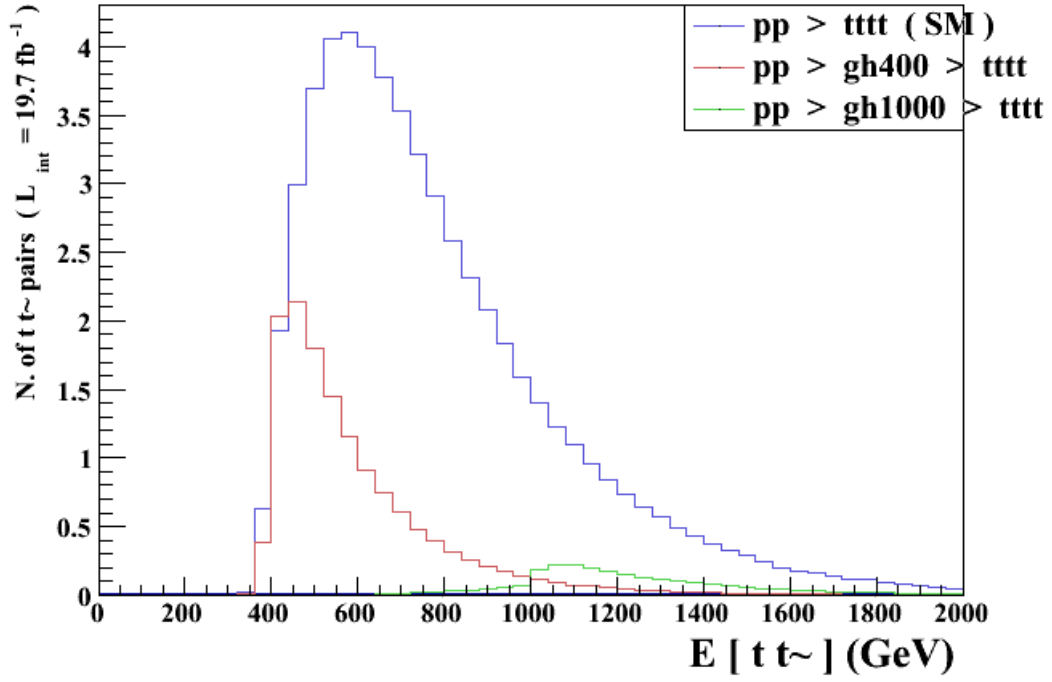


Figure 12.

3.14 Histogram 14

* Plot: M (topantitop)

Table 11. Statistics table

Dataset	Integral	Entries events	Mean	RMS	%Underflow	%Overflow
sm	56.4	4.0	173.0	0.04377	0.0	0.0
gh400	13.9	4.0	172.0	0.1323	0.0	0.0
gh1000	2.42	4.0	172.0	0.1158	0.0	0.0

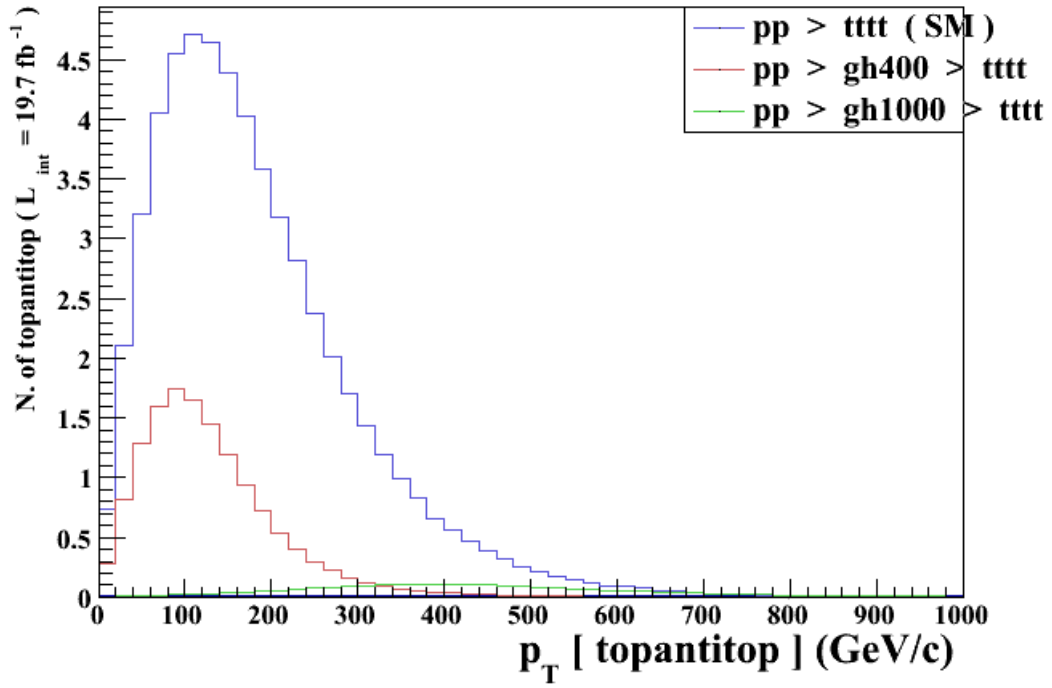


Figure 13.

3.15 Histogram 15

* Plot: ETA (topantitop)

Table 12. Statistics table

Dataset	Integral	Entries events	Mean	RMS	%Underflow	%Overflow
sm	56.4	4.0	0.000919132	1.387	0.0	0.0
gh400	13.9	4.0	0.0016214	1.317	0.0	0.0
gh1000	2.42	4.0	0.00137741	0.98	0.0	0.0

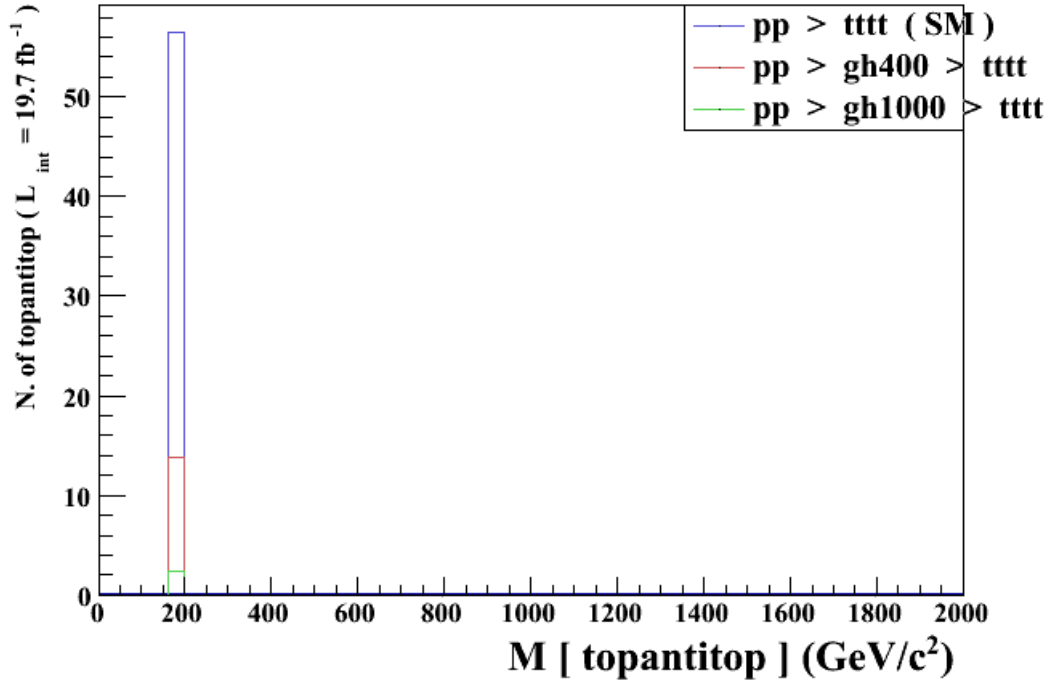


Figure 14.

3.16 Histogram 16

* Plot: E (topantitop)

Table 13. Statistics table

Dataset	Integral	Entries events	Mean	RMS	%Underflow	%Overflow
sm	56.4	4.0	394.642	211.4	0.0	0.0147
gh400	13.9	4.0	296.902	122.9	0.0	0.0
gh1000	2.42	4.0	619.722	232.0	0.0	0.024

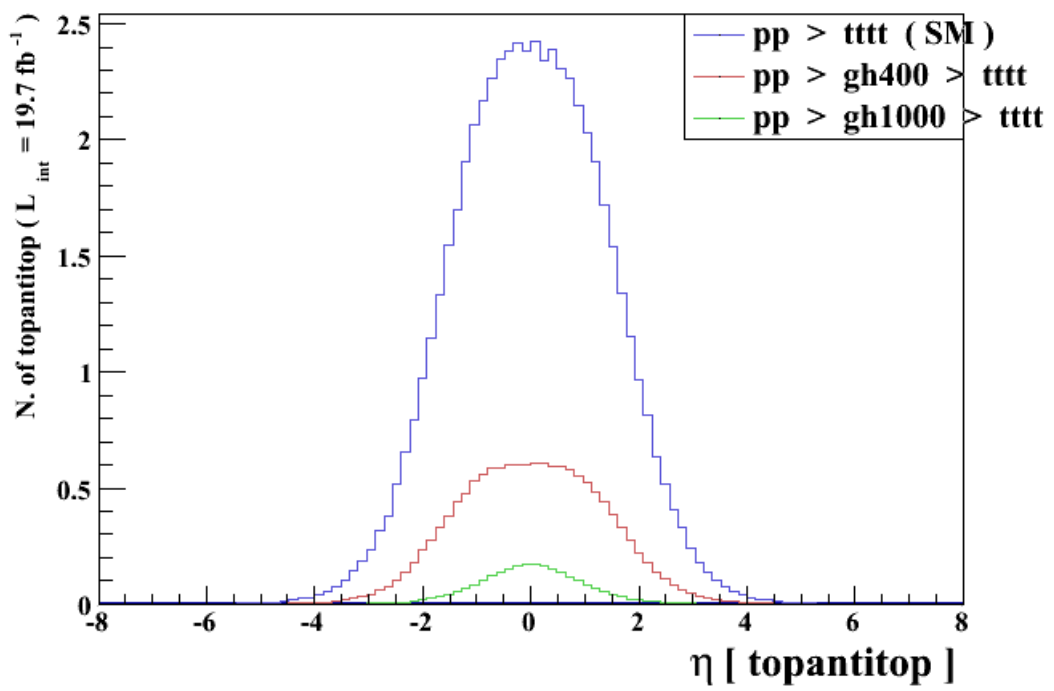


Figure 15.

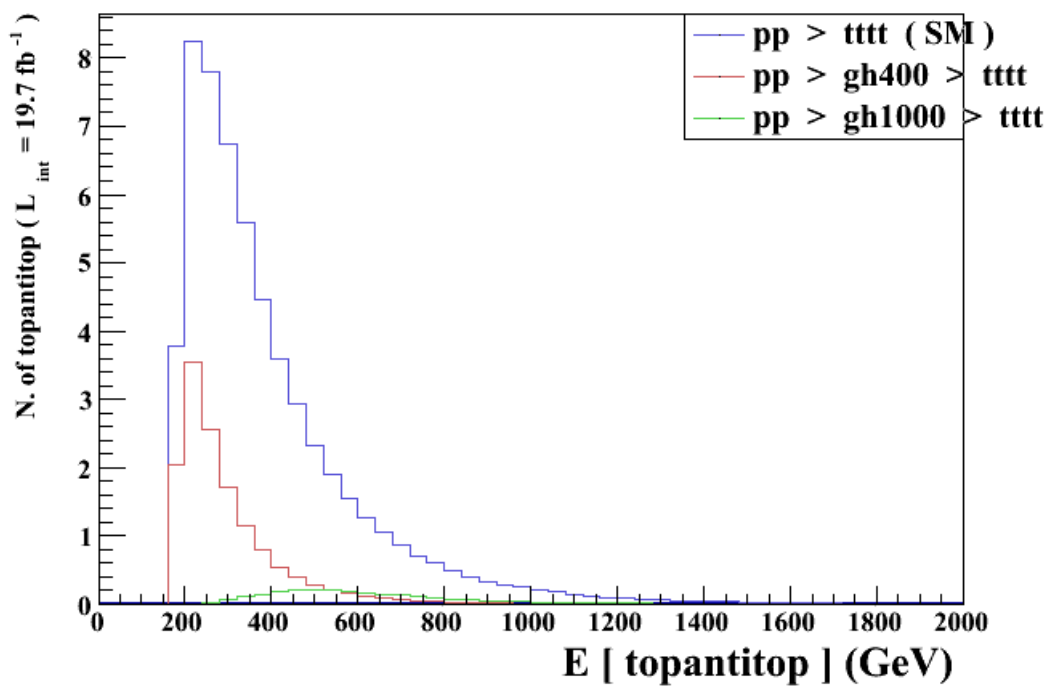


Figure 16.