

Validation of atlas-conf-2015-078

Paper : arxiv:1602.09058

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1 SR0b3j with events from model in figure 1a

cut	Events	Normalized events	ratio of cutted events (errors)
produced	20051	148	-
≥ 3 leptons ($p_T > 20, 20, 10$ GeV)	2026	14.4 ± 0.4	0.097 (0.0946-0.1)
trigger	2024	14.3 ± 0.4	0.99 (0.94-1.0)
no bjet ($p_T > 20$ GeV)	1665	11.66 ± 0.33	0.82 (0.77-0.86)
≥ 3 jets ($p_T > 50$ GeV)	1556	10.91 ± 0.32	0.94 (0.88-0.99)
$E_T^{miss} > 200$ GeV	1079	7.52 ± 0.27	0.69 (0.65-0.74)
$m_{eff} > 550$ GeV	1079	7.52 ± 0.27	1.0 (0.93-1.0)

Table 1: Cutflow from paper

Comment: The ratios and the corresponding error intervals have been calculated using the Normalized events and their given errors.

cut	Events	Normalized events	ratio of cutted events (errors)
produced	44682	143.7	-
≥ 3 leptons ($p_T > 20, 20, 10$ GeV)	4339	14.0 ± 1.3	0.0971(0.081,0.116)
trigger	4202	13.5 ± 1.2	0.97(0.81,1.0)
no bjet ($p_T > 20$ GeV)	3565	11.46 ± 1.0	0.85(0.71,1.0)
≥ 3 jets ($p_T > 50$ GeV)	3343	10.7 ± 0.97	0.94(0.78,1.0)
$E_T^{miss} > 200$ GeV	2387	7.7 ± 0.70	0.71(0.60,0.86)
$m_{eff} > 550$ GeV	2387	7.7 ± 0.70	1.0(0.83,1.0)

Table 2: Cutflow implemented analysis

Comment: The normalized events have been calculated via the formula:

$$N_{Norm} = \frac{N \sigma_{\tilde{g}, \tilde{g}} \mathcal{L}_{int}}{N_{gen}}, \quad (1)$$

where $\sigma_{\tilde{g}, \tilde{g}} = 0.0449 \pm 0.00398$ pb is the NLO+NLL xsection for gluino pair production from NLL-Fast. I used $m_{\tilde{g}} = 1.3$ TeV and $m_{\tilde{q}} = 450$ TeV.¹ The

¹The squark masses are just set very high like one also does in the spectrumfile!

error on the xsection comes from the scale variation.

To get the error on N_{Norm} I did a simple error propagation:

$$\sigma_{N_{Norm}} = \sqrt{\left(\frac{\sigma_N \sigma_{\tilde{g}, \tilde{g}} \mathcal{L}_{int}}{N_{gen}}\right)^2 + \left(\frac{N \sigma_{\tilde{g}, \tilde{g}} \mathcal{L}_{int}}{N_{gen}}\right)^2}, \quad \sigma_N = \sqrt{N} \quad (2)$$

The ratio and of the cutted events and the corresponding error intervals are calculated (like in the paper) from the normalized values.

Comment: The starting normalized events are not exactly equal due to slightly different xsections.

2 SR1b with events from model in figure 1c

cut	Events	Normalized events	ratio of cutted events (error interv)
produced	94706	560	-
≥ 2 SS leptons ($p_T > 20$ GeV)	4115	25.5 ± 0.5	0.0455 (0.0446-0.0464)
trigger	3901	23.1 ± 0.4	0.91 (0.87-0.94)
≥ 1 bjet ($p_T > 20$ GeV)	3367	20.0 ± 0.4	0.87 (0.83-0.899)
≥ 4 jets ($p_T > 50$ GeV)	1881	11.23 ± 0.3	0.56 (0.54-0.59)
$E_T^{miss} > 150$ GeV	1148	7.08 ± 0.24	0.63 (0.59-0.67)
$m_{eff} > 550$ GeV	1148	7.08 ± 0.24	1.0 (0.93-1.0)

Table 3: Cutflow from paper

cut	Events	Normalized events	ratio of cutted events (errors)
produced	26154	550	-
≥ 2 SS leptons ($p_T > 20$ GeV)	1143	$24. \pm 2.0$	0.044(0.037,0.052)
trigger	991	20.9 ± 1.8	0.87(0.73,1.0)
≥ 1 bjet ($p_T > 20$ GeV)	831	17.5 ± 1.5	0.84(0.70,1.0)
≥ 4 jets ($p_T > 50$ GeV)	418	8.8 ± 0.84	0.50(0.42,0.60)
$E_T^{miss} > 150$ GeV	246	5.2 ± 0.54	0.59(0.48,0.72)
$m_{eff} > 550$ GeV	246	5.2 ± 0.54	1.0(0.81,1.0)

Table 4: Cutflow from implemented analysis

$\sigma_{\tilde{b}_1, \tilde{b}_1^*} = 0.172 \pm 0.00144$ pb is the NLO+NLL xsection for gluino pair production from NLL-Fast. I used $m_{\tilde{b}_1} = 600$ GeV and $m_{\tilde{g}} = 450$ TeV. The error on the xsection comes from the scale variation.

3 SR3b with events from model in figure 1d

cut	Events	Normalized events	ratio of cutted events (errors)
produced	100000	275	-
≥ 2 SS leptons ($p_T > 20$ GeV)	3535	9.28 ± 0.18	0.0338 (0,0331-0,0344)
trigger	3386	8.53 ± 0.17	0.92 (0.88-0,956)
≥ 3 bjet ($p_T > 20$ GeV)	1704	4.26 ± 0.12	0.499 (0.48-0.524)
$E_T^{miss} > 125$ GeV	1320	3.31 ± 0.11	0.78 (0.73-0.826)
$m_{eff} > 650$ GeV	1280	3.20 ± 0.10	0.97 (0.91-1.0)

Table 5: Cutflow from paper

cut	Events	Normalized events	ratio of cutted events (errors)
produced	44348	267.5	-
≥ 2 SS leptons ($p_T > 20$ GeV)	1452	8.8 ± 0.80	0.0327(0.0273,0.0391)
trigger	1297	7.82 ± 0.72	0.89(0.74,1.0)
≥ 3 bjet ($p_T > 20$ GeV)	596	3.60 ± 0.35	0.46(0.38,0.56)
$E_T^{miss} > 125$ GeV	462	2.79 ± 0.28	0.78(0.64,0.94)
$m_{eff} > 650$ GeV	444	2.68 ± 0.27	0.96(0.79,1.0)

Table 6: Cutflow from implemented analysis

$\sigma_{\tilde{g},\tilde{g}} = 0.0836 \pm 0.00735$ pb is the NLO+NLL xsection for gluino pair production from NLL-Fast. I used $m_{\tilde{g}} = 1.2$ TeV and $m_{\tilde{q}} = 450$ TeV. The error on the xsection comes from the scale variation.