Electroweak search with soft leptons

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1 Validation

Process: $pp \to \tilde{\ell}^+\tilde{\ell}^- \to \ell^+\ell^-\tilde{\chi}_1^0\tilde{\chi}_1^0$, $\ell = e, \mu$
$m_\ell = 110$ GeV, $m_{\tilde{\chi}_1^0} = 100$ GeV Events generated with `MG5_aMC 2.6.0` interfaced to `Pythia8` with up to two extra partons. 60000 MC events weighted to 36.1/fb.

Selection	ATLAS	CheckMATE
Total	19900	19855
$E_{\mathrm{T}}^{\mathrm{miss}} > 200$ GeV	476	521
$N_{\mathrm{baseline}}^{\ell}$	267	285
$N_{\mathrm{signal}}^{\ell}$	165	196
Same flavour	162	196
Opposite charge	162	196
$p_T^{\ell_1} > 5$ GeV	162	196
$N_{\mathrm{b-jets}} = 0$	134	157
$p_T(j_1) > 100$ GeV	133	155
$\Delta\phi(j_1, \mathbf{p}_T^{\mathrm{miss}}) > 2$	133	154
$\min(\Delta\phi(\text{any jet}, \mathbf{p}_T^{\mathrm{miss}})) > 0.4$	129	142
Veto $m_{\tau\tau} \in [0, 160]$ GeV	113	125
$m_{\ell\ell} > 1$ GeV	112	125
Veto $m_{\ell\ell} \in [3, 3.2]$ GeV	112	125
$m_{\ell\ell} < 60$ GeV	89	96
$\Delta R_{\ell\ell} > 0.05$	89	96
SR$\ell\ell$-$m_{\ell\ell}$ selection (uncertainties essentially the same)		
$E_{\mathrm{T}}^{\mathrm{miss}}/H_{\mathrm{T}}^{\mathrm{lep}} > \max(5, 15 - 2m_{\ell\ell}/\mathrm{GeV})$	68 ± 4	75
$\Delta R_{\ell\ell} < 2$	37 ± 3.5	39
$m_{\mathrm{T}}^{\ell_1} < 70$ GeV	30 ± 3	31
$m_{\ell\ell} < 40$ GeV	29 ± 3	29
$m_{\ell\ell} < 30$ GeV	23.8 ± 3	24.2
$m_{\ell\ell} < 20$ GeV	14.3 ± 2	13.6
$m_{\ell\ell} < 10$ GeV	4.7 ± 1.2	3.6
$m_{\ell\ell} < 5$ GeV	1.2 ± 0.6	1.0
$m_{\ell\ell} < 3$ GeV	0.5 ± 0.4	0
SR$\ell\ell$-m_{T2}^{100} selection (uncertainties essentially the same)		
$E_{\mathrm{T}}^{\mathrm{miss}}/H_{\mathrm{T}}^{\mathrm{lep}} > \max(3, 15 - 2(m_{\mathrm{T2}}^{100}/\mathrm{GeV} - 100))$	65 ± 4	71
$m_{\mathrm{T2}}^{100} < 130$ GeV	65 ± 4	71
$m_{\mathrm{T2}}^{100} < 120$ GeV	65 ± 4	71
$m_{\mathrm{T2}}^{100} < 110$ GeV	63 ± 4	69
$m_{\mathrm{T2}}^{100} < 105$ GeV	23 ± 3	26
$m_{\mathrm{T2}}^{100} < 102$ GeV	3.7 ± 1.1	4.3