

Validation of 1908.08215

ATLAS analysis for chargino and slepton production at 13 TeV with 139 fb^{-1} Luminosity.

Signal : two leptons + E_T^{miss} .

Feature : Object-Based E_T^{miss} significance.

1 Chargino Pair Production

1.1 Chargino decay via W

Selection Cuts	ATLAS Event no.	Event no. from Checkmate
Raw Events	24679	30000
Initial Event weighted	1144	1144
Trigger	793	738
OS signal leptons	661	737
$p_T^{\ell_1, \ell_2} > 25$ GeV	565	635
$m^{\ell_1, \ell_2} > 25$ GeV	559	627
$n_{\text{bjets}} = 0$	526	591
SR-DF-0J		
Different Flavour & $n_{\text{non-bjets}} = 0$	122.7	132.6
$m^{\ell_1, \ell_2} > 100$ GeV	94.2	102.0
$E_T^{\text{miss}} > 110$ GeV	46.5	48.0
E_T^{miss} significance > 10	42.2	48.0
$m_{T2} > 100$ GeV	26.4	30.7
SR-DF-1J		
Different Flavour & $n_{\text{non-bjets}} = 1$	81.9	93.8
$m^{\ell_1, \ell_2} > 100$ GeV	62.3	73.0
$E_T^{\text{miss}} > 110$ GeV	33.8	37.8
E_T^{miss} significance > 10	27.2	30.5
$m_{T2} > 100$ GeV	15.3	18.3
SR-SF-0J		
Same Flavour & $n_{\text{non-bjets}} = 0$	138.7	131.3
$m^{\ell_1, \ell_2} > 121.2$ GeV	92.4	87.7
$E_T^{\text{miss}} > 110$ GeV	47.1	40.8
E_T^{miss} significance > 10	42.9	40.8
$m_{T2} > 100$ GeV	25.4	25.8
SR-SF-1J		
Same Flavour & $n_{\text{non-bjets}} = 1$	88.8	91.2
$m^{\ell_1, \ell_2} > 121.2$ GeV	58.9	59.1
$E_T^{\text{miss}} > 110$ GeV	32.6	30.8
E_T^{miss} significance > 10	26.9	24.9
$m_{T2} > 100$ GeV	14.0	14.4

Table 1: Chargino production with $[\chi_1^\pm, \chi_1^0] = [300, 50]$ GeV.

1.2 Chargino Decay via Slepton

Selection Cuts	ATLAS Event no.	Event no. from Checkmate
Raw Events	10316	11000
Initial Event weighted	1320	1320
Trigger	516	572
OS signal leptons	439	571
$p_T^{\ell_1, \ell_2} > 25$ GeV	430	546
$m^{\ell_1, \ell_2} > 25$ GeV	429	545
$n_{\text{bjets}} = 0$	401	505
SR-DF-0J		
Different Flavour & $n_{\text{non-bjets}} = 0$	82.8	97.3
$m^{\ell_1, \ell_2} > 100$ GeV	77.8	91.4
$E_T^{\text{miss}} > 110$ GeV	66.8	78.1
E_T^{miss} significance > 10	62.9	78.1
$m_{T2} > 100$ GeV	53.8	63.6
SR-DF-1J		
Different Flavour & $n_{\text{non-bjets}} = 1$	66.3	82.8
$m^{\ell_1, \ell_2} > 100$ GeV	61.3	77.6
$E_T^{\text{miss}} > 110$ GeV	53.4	66.6
E_T^{miss} significance > 10	48.6	63.0
$m_{T2} > 100$ GeV	40.7	52.9
SR-SF-0J		
Same Flavour & $n_{\text{non-bjets}} = 0$	89.8	90.4
$m^{\ell_1, \ell_2} > 121.2$ GeV	82.2	79.7
$E_T^{\text{miss}} > 110$ GeV	68.7	69.5
E_T^{miss} significance > 10	63.5	69.5
$m_{T2} > 100$ GeV	56.0	56.1
SR-SF-1J		
Same Flavour & $n_{\text{non-bjets}} = 1$	74.0	81.9
$m^{\ell_1, \ell_2} > 121.2$ GeV	65.5	75.5
$E_T^{\text{miss}} > 110$ GeV	55.9	66.8
E_T^{miss} significance > 10	49.7	62.7
$m_{T2} > 100$ GeV	41.7	49.0

Table 2: Chargino production with $[\tilde{\chi}_1^\pm, \tilde{\ell}^\pm, \tilde{\chi}_1^0] = [600, 300, 1]$ GeV.

2 Slepton pair production

Slepton decay to lepton and neutralino.

Selection Cuts	ATLAS Event no.	Event no. from Checkmate
Raw Events	6303	10000
Initial Event weighted	503	503
Trigger	352	374
OS signal leptons	318	374
$p_T^{\ell_1, \ell_2} > 25$ GeV	316	368
$m^{\ell_1, \ell_2} > 25$ GeV	315	367
$n_{\text{bjets}} = 0$	298	335
SR-DF-0J		
Different Flavour & $n_{\text{non-bjets}} = 0$	0.17	0
$m^{\ell_1, \ell_2} > 100$ GeV	0.17	0
$E_T^{\text{miss}} > 110$ GeV	0.10	-
E_T^{miss} significance > 10	0.06	-
$m_{T2} > 100$ GeV	0.06	-
SR-DF-1J		
Different Flavour & $n_{\text{non-bjets}} = 1$	0.12	0
$m^{\ell_1, \ell_2} > 100$ GeV	0.01	0
$E_T^{\text{miss}} > 110$ GeV	-	-
E_T^{miss} significance > 10	-	-
$m_{T2} > 100$ GeV	-	-
SR-SF-0J		
Same Flavour & $n_{\text{non-bjets}} = 0$	136.0	107.7
$m^{\ell_1, \ell_2} > 121.2$ GeV	123.5	97.6
$E_T^{\text{miss}} > 110$ GeV	97.5	74.2
E_T^{miss} significance > 10	88.5	74.2
$m_{T2} > 100$ GeV	75.1	60.9
SR-SF-1J		
Same Flavour & $n_{\text{non-bjets}} = 1$	99.2	101.7
$m^{\ell_1, \ell_2} > 121.2$ GeV	90.3	92.0
$E_T^{\text{miss}} > 110$ GeV	71.8	72.6
E_T^{miss} significance > 10	61.3	66.8
$m_{T2} > 100$ GeV	51.1	52.8

Table 3: Slepton production with $[\tilde{\ell}^\pm, \tilde{\chi}_1^0] = [400, 200]$ GeV.