

Validation of CMS_SUS_16_048

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$(m_{\tilde{\chi}_1^+}, m_{\tilde{\chi}_2^0})$ GeV		ΔM (GeV)	CMS Results	CheckMATE-1.2.2		CheckMATE-2.0.7	
			$r(= N/S95_{OBS})$	$r(= N/S95_{OBS})$	DIFF	$r(= N/S95_{OBS})$	DIFF
P1	120,89	31	1	0.82	-18%	0.92	-8%
P2	180,157	23	1	0.94	-6%	0.94	-6%
P3	180,171	9.5	1	1.28	28%	1.27	27%
P4	230,210	20	1	0.81	19%	0.77	-23%

Table 1: Electroweakino signal region validation

1 Eletroweakino-like Signal Region Validation

We have validated our codes according to Figure 5 in Page 15 in the CMS document CM-S_PAS_SUS_16_048 because no cutflow information is given by the CMS group. Our simulation agrees with the corresponding CMS analysis within $\pm 20\%$ uncertainty (except one point within $\pm 30\%$). What's more, we've validated our codes both in CheckMATE-1.2.2 and CheckMATE-2.0.7.

In the left plot of Figure 5, we choosed four points on the observed exclusion contours shown in Table 1. We generated events using MG5_aMC.v2.4.3 with Pythia6.4.

For the point P1, we generated 471727 events after matching to one additional jet with $xqcut=17$. For CheckMATE-1.2.2 the acceptance ratio is 0.00039 for the most significant signal region (SR) $20GeV < M(\ell) < 30GeV, E_T^{miss} = [125 - 200]GeV$. For CheckMATE-2.0.7, the acceptance ratio is 0.00039 for the most significant SR $10GeV < M(\ell) < 20GeV, E_T^{miss} = [200 - 250]GeV$.

For the point P2, we generated 497811 events after matching to one additional jet with $xqcut=25$. For CheckMATE-1.2.2 the acceptance ratio is 0.000458 for the most significant SR $10GeV < M(\ell) < 20GeV, E_T^{miss} = [200 - 250]GeV$. For CheckMATE-2.0.7, the acceptance ratio is 0.00044795 for the most significant SR $10GeV < M(\ell) < 20GeV, E_T^{miss} = [200 - 250]GeV$.

For the point P3, we generated 123481 events after matching to two additional jets with $xqcut=50$. For CheckMATE-1.2.2 the acceptance ratio is 0.00093942 for the most significant SR $4GeV < M(\ell) < 10GeV, E_T^{miss} > 250GeV$. For CheckMATE-2.0.7 the acceptance ratio is 0.00092322 for the most significant SR $4GeV < M(\ell) < 10GeV, E_T^{miss} > 200GeV$.

For the point P4, we generated 518831 events after matching to one additional jet with $xqcut=32$. For CheckMATE-1.2.2, the acceptance ratio is 0.00115837 for the most significant SR $10GeV < M(\ell) < 20GeV, E_T^{miss} > 250GeV$. For CheckMATE-2.0.7, the acceptance ratio is 0.00110248 for the most significant SR $10GeV < M(\ell) < 20GeV, E_T^{miss} > 250GeV$.

2 \tilde{t} -like Signal Region Validation

Sorry for no validation yet.