

## dilepton\_HL info

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ATLAS

dilepton + MET

Energy: 14 TeV

Luminosity: 3000 fb<sup>-1</sup>

Montecarlo: MG5+Pythia6

This analysis does not correspond to any official ATLAS high luminosity study. It is loosely based on the ATLAS dilepton search at 8 TeV (arXiv:1403.5294) for charginos, neutralinos and sleptons. The final states consist of  $e^+e^-$ ,  $\mu^+\mu^-$  or  $e^\pm\mu^\mp$  and missing transverse momentum. The signal regions  $m_{T2}^{200}$ ,  $m_{T2}^{250}$ ,  $m_{T2}^{270}$ ,  $m_{T2}^{300}$  GeV use the  $m_{T2}$  variable to suppress backgrounds. The signal region Zjets requires a leptonically decaying Z boson and two light, central jets consistent with hadronically decaying W (chargino-neutralino production). Below one can find the summary of selections and a detailed information about SM backgrounds contributions due to diboson production. Based on the information from arXiv:1403.5294 the  $t\bar{t}$  background was assumed to be negligible.

SR	$m_{T2}^x$	Zjets
lepton flavour	DF, SF	SF
central light jets	0	$\geq 2$
central $b$ -jets	0	0
forward jets	0	0
$ m_{\ell\ell} - m_Z $ [GeV]	$> 10$	$< 10$
$E_T^{\text{miss,rel}}$ [GeV]	-	$> 120$
$p_{T,\ell\ell}$ [GeV]	-	$> 80$
$m_{T2}$	$> x$	-
$\Delta R_{\ell\ell}$	-	[0.3, 1.5]
$m_{jj}$ [GeV]	-	[50, 100]

Table 1: Selection for signal regions  $m_{T2}^x$  ( $x = 200, 250, 270, 300$ ) GeV and Zjets.

Signal region	WZ	ZZ	WW	Sum SM	$pp \rightarrow \tilde{\ell}^+ \tilde{\ell}^-$
$m_{T2}^{200}$ SF	74	230	330	$630 \pm 50$	46.7
$m_{T2}^{200}$ DF	0	6	154	$160 \pm 20$	0
$m_{T2}^{250}$ SF	32	110	132	$274 \pm 35$	43
$m_{T2}^{250}$ DF	0	0	74	$74 \pm 13$	0
$m_{T2}^{270}$ SF	22	94	110	$226 \pm 31$	41
$m_{T2}^{270}$ DF	0	0	49	$49 \pm 10$	0
$m_{T2}^{300}$ SF	7.8	71	74	$153 \pm 25$	39
Zjets	43	125	130	$298 \pm 36$	0

Table 2: Diboson background contributions (events for 3000 fb<sup>-1</sup> to different signal regions and sample signal (slepton pair production  $m_{\tilde{\ell}} = 850$  GeV, summed over  $R, L, e, \mu$ ,  $m_{\tilde{\chi}_1^0} = 100$  GeV, BR( $\tilde{\ell} \rightarrow \ell\tilde{\nu}$ )= 100%).