

Validation of ATLAS_CONF_2016_076

September 27, 2016

AUTHOR: Junjie Cao, Krzysztof Rolbiecki, Liangliang Shang, Jamie Tattersall, Peiwen Wu, Jin Min Yang, Yuanfang Yue and Yang Zhang

EMAIL: junjiec@itp.ac.cn,
krzysztof.rolbiecki@desy.de,
shlwell1988@gmail.com,
tattersall@physik.rwth-aachen.de,
peiwen.wu123@gmail.com,
jmyang@itp.ac.cn,
yuanfang405@gmail.com,
zhangyang@itp.ac.cn

Validation for the hadronic m_{T2} search			
$(m_{\tilde{t}_1}, m_{\tilde{\chi}_1^\pm}, m_{\tilde{\chi}_1^0})$ [GeV]	400,106,50		
$\sigma(pp \rightarrow t \tilde{t})$ [pb]	1.74		
Generated luminosity [fb^{-1}]	13.3		
Expected events for 13.3 fb^{-1}			
	ATLAS	CheckMATE	DIFF
SR_{Low}^{hadMT2}	27.4 \pm 3.4	31.4 \pm 1.2	14.7%
SR_{High}^{hadMT2}	12.4 \pm 2.5	14.0 \pm 0.8	13.3%

Table 1: Validation of the hadronic m_{T2} signal regions for an integrated luminosity of $13.3fb^{-1}$. These signal regions target the scenario with a large mass difference between the top squark and the lightest chargino. The numbers in column ATLAS and CheckMATE are events fallen into these signal regions with their uncertainties (there are only statistical uncertainties in the column CheckMATE) and those in column DIFF are the relative differences between the central value ATLAS and CheckMATE, i.e., (events numbers in CheckMATE - events number in ATLAS) / events number in ATLAS.

Validation for the hadronic m_{T2} search			
$(m_{\tilde{t}_1}, m_{\tilde{\chi}_1^\pm}, m_{\tilde{\chi}_1^0})$ [GeV]	500,106,50		
$\sigma(pp \rightarrow t \tilde{t})$ [pb]	0.498		
Generated luminosity [fb^{-1}]	13.3		
Expected events for 13.3 fb^{-1}			
	ATLAS	CheckMATE	DIFF
SR_{Low}^{hadMT2}	16.2 \pm 1.6	13.5 \pm 0.5	-16.3%
SR_{High}^{hadMT2}	10.8 \pm 1.1	8.9 \pm 0.4	-16.9%

Table 2: Validation of another point $(m_{\tilde{t}_1}, m_{\tilde{\chi}_1^\pm}, m_{\tilde{\chi}_1^0}) = (500,106,50)$ [GeV] in hadronic m_{T2} search. Others are same as Table 1.

Validation for SR_W^{3-body} search			
$(m_{\tilde{t}_1}, m_{\tilde{\chi}_1^0})$ [GeV]	250,160		
$\sigma(pp \rightarrow \tilde{t} \tilde{t})$ [pb]	20.3		
Generated luminosity [fb^{-1}]	13.3		
Expected events for 13.3 fb^{-1}			
	ATLAS	CheckMATE	DIFF
$SR_W^{3-body} - SF$	21.8±1.8	17.6±3.0	-18.91%
$SR_W^{3-body} - DF$	18.1±2.0	18.2±3.1	0.5%

Table 3: Validation of three-body results with $(m_{\tilde{t}_1}, m_{\tilde{\chi}_1^0})=(250,160)$ GeV. These signal regions target the scenario where 3-body decay mode dominates when the two-body decay modes are kinematically forbidden. Since events in $SR_t^{3-body} - SF$ and $SR_t^{3-body} - DF$ are rare (events number < 1), so we omitted these signal regions. Others are same as Table 1.

Validation for signal region SR_W^{3-body} search			
$(m_{\tilde{t}_1}, m_{\tilde{\chi}_1^0})$ [GeV]	300,150		
$\sigma(pp \rightarrow \tilde{t} \tilde{t})$ [pb]	8.02		
Generated luminosity [fb^{-1}]	13.3		
Expected events for 13.3 fb^{-1}			
	ATLAS	CheckMATE	DIFF
$SR_W^{3-body} - SF$	5.3±0.8	4.9±1.0	7.2%
$SR_W^{3-body} - DF$	5.1±0.6	6.0±1.2	18.2%
$SR_t^{3-body} - SF$	7.4 ±1.1	6.0±1.2	-18.4%
$SR_t^{3-body} - DF$	6.7±1.0	5.4±1.1	-19.9%

Table 4: Validation of another point $(m_{\tilde{t}_1}, m_{\tilde{\chi}_1^0})=(300,150)$ GeV in the three-body search. Others are same as Table 1.