

Table 1: the latest expected limits

Analysis	$B(t \rightarrow Hu)$	$B(t \rightarrow Hc)$	Channels	$L(fb^{-1})$	Limit Type	Reference
ATLAS 2016	$1.2 \times 10^{-3}$	$1.1 \times 10^{-3}$	$b\bar{b}, \tau^+\tau^-, \gamma\gamma$ , multilepton	36.1	Observed	JHEP 05 (2019) 123
TOP-20-007	$3.4 \times 10^{-4}$	$4.0 \times 10^{-4}$	$\gamma\gamma$	137	Expected	This Analysis

Table 2: Mass of wboson candidates with various hypothetical tprime masses for three years

	600	625	650	675	700	800	900	1000	1100	1200
2016	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00
	81.20 $\pm$ 11.41	81.35 $\pm$ 11.41	81.40 $\pm$ 11.39	81.62 $\pm$ 11.36	81.58 $\pm$ 11.41	82.32 $\pm$ 11.50	82.95 $\pm$ 11.55	83.65 $\pm$ 11.92	84.18 $\pm$ 12.54	84.63 $\pm$ 13.02
2017	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00
	81.39 $\pm$ 11.75	81.50 $\pm$ 11.77	81.58 $\pm$ 11.79	81.86 $\pm$ 11.74	81.94 $\pm$ 11.76	82.49 $\pm$ 11.80	83.05 $\pm$ 11.97	83.74 $\pm$ 12.23	84.26 $\pm$ 12.69	84.84 $\pm$ 13.48
2018	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00
	81.36 $\pm$ 11.79	81.42 $\pm$ 11.69	81.49 $\pm$ 11.75	81.65 $\pm$ 11.72	81.80 $\pm$ 11.66	82.38 $\pm$ 11.71	83.03 $\pm$ 11.94	83.69 $\pm$ 12.15	84.17 $\pm$ 12.61	84.82 $\pm$ 13.38

Table 3: Mass of top candidates with various hypothetical tprime masses for three years

	600	625	650	675	700	800	900	1000	1100	1200
2016	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00
	169.31 $\pm$ 19.32	169.54 $\pm$ 19.23	169.74 $\pm$ 19.04	170.07 $\pm$ 18.88	170.11 $\pm$ 18.95	171.25 $\pm$ 18.50	172.51 $\pm$ 18.37	173.77 $\pm$ 18.14	174.66 $\pm$ 18.49	175.73 $\pm$ 18.31
2017	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00
	169.07 $\pm$ 19.81	169.05 $\pm$ 19.75	169.43 $\pm$ 19.77	169.84 $\pm$ 19.52	169.95 $\pm$ 19.39	171.03 $\pm$ 19.05	172.02 $\pm$ 18.95	173.32 $\pm$ 18.69	174.34 $\pm$ 18.61	175.41 $\pm$ 18.96
2018	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00
	168.89 $\pm$ 19.57	169.08 $\pm$ 19.55	169.22 $\pm$ 19.62	169.53 $\pm$ 19.38	169.89 $\pm$ 19.25	170.84 $\pm$ 18.94	172.02 $\pm$ 18.91	173.17 $\pm$ 18.57	174.17 $\pm$ 18.60	175.42 $\pm$ 18.69

Table 4: Mass of tprime candidates with various hypothetical tprime masses for three years

	600	625	650	675	700	800	900	1000	1100	1200
2016	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00
	587.28 $\pm$ 43.22	611.48 $\pm$ 44.38	635.66 $\pm$ 46.61	660.35 $\pm$ 47.57	684.06 $\pm$ 49.84	781.59 $\pm$ 56.80	878.76 $\pm$ 65.45	974.82 $\pm$ 75.11	1068.12 $\pm$ 88.64	1161.32 $\pm$ 102.09
2017	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00
	586.05 $\pm$ 44.03	610.08 $\pm$ 45.69	634.73 $\pm$ 47.50	659.47 $\pm$ 48.77	683.42 $\pm$ 50.09	780.42 $\pm$ 57.84	876.62 $\pm$ 66.51	971.89 $\pm$ 76.66	1066.36 $\pm$ 87.98	1159.02 $\pm$ 102.57
2018	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00	0.00 $\pm$ 0.00
	586.05 $\pm$ 43.44	610.41 $\pm$ 45.39	634.21 $\pm$ 47.32	658.99 $\pm$ 48.43	683.28 $\pm$ 50.14	779.85 $\pm$ 57.79	876.99 $\pm$ 66.11	972.39 $\pm$ 75.92	1066.84 $\pm$ 87.19	1158.87 $\pm$ 103.40