Top Quark Production Cross Section Measurements

Status: November 2022

Model	E_{CM} [TeV]	$\int \mathcal{L}\,dt$ [fb^{-1}]	Measurement	Theory	Reference
$t\bar{t}$	13	139 fb^{-1}	$\sigma = 836 \pm 1 \pm 20$ pb	$\sigma = 832 + 40 - 45$ pb (top++ NNLO+NNLL)	ATLAS-CONF-2022-061
$t\bar{t}$	8	20.2 fb^{-1}	$\sigma = 242.9 \pm 1.7 \pm 8.6$ pb	$\sigma = 252.9 + 13.3 - 14.5$ pb (top++ NNLO+NNLL)	EPJC 74 (2014) 3109
$t\bar{t}$	7	4.6 fb^{-1}	$\sigma = 182.9 \pm 3.1 \pm 6.4$ pb	$\sigma = 177 + 10 - 11$ pb (top++ NNLO+NNLL)	EPJC 74: 3109 (2014)
$t\bar{t}$	5	0.3 fb^{-1}	$\sigma = 67.5 \pm 0.9 \pm 2.6$ pb	$\sigma = 68.2 + 5.2 - 5.3$ pb (top++ NNLO+NNLL)	arXiv:2207.01354
t_{t-chan}	13	3.2 fb^{-1}	$\sigma = 247 \pm 6 \pm 46$ pb	$\sigma = 217 \pm 10$ pb (NLO+NLL)	JHEP 04 (2017) 086
t_{t-chan}	8	20.3 fb^{-1}	$\sigma = 89.6 \pm 1.7 + 7.2 - 6.4$ pb	$\sigma = 87.8 + 3.4 - 1.9$ pb (NLO+NLL)	EPJC 77 (2017) 531
t_{t-chan}	7	4.6 fb^{-1}	$\sigma = 68 \pm 2 \pm 8$ pb	$\sigma = 64.6 + 2.7 - 2$ pb (NLO+NLL)	PRD 90, 112006 (2014)
Wt	13	3.2 fb^{-1}	$\sigma = 94 \pm 10 + 28 - 23$ pb	$\sigma = 71.7 \pm 3.9$ pb (NLO+NNLL)	JHEP 01 (2018) 63
Wt	8	20.3 fb^{-1}	$\sigma = 23 \pm 1.3 + 3.4 - 3.7$ pb	$\sigma = 22.4 \pm 1.5$ pb (NLO+NLL)	JHEP 01, 064 (2016)
Wt	7	2.0 fb^{-1}	$\sigma = 16.8 \pm 2.9 \pm 3.9$ pb	$\sigma = 15.7 \pm 1.1$ pb (NLO+NLL)	PLB 716, 142-159 (2012)
t_{s-chan}	13	139 fb^{-1}	$\sigma = 8.2 \pm 0.6 + 3.4 - 2.8$ pb	$\sigma = 10.3 \pm 0.4$ pb (NLO)	arXiv:2209.08990
t_{s-chan}	8	20.3 fb^{-1}	$\sigma = 4.8 \pm 0.8 + 1.6 - 1.3$ pb	$\sigma = 5.61 \pm 0.22$ pb (NLO+NNL)	PLB 756, 228-246 (2016)
$t\bar{t}W$	13	36.1 fb^{-1}	$\sigma = 870 \pm 130 \pm 140$ fb	$\sigma = 600 \pm 72$ fb (Madgraph5 + aMCNLO)	PRD 99, 072009 (2019)
$t\bar{t}W$	8	20.3 fb^{-1}	$\sigma = 369 + 86 - 79 \pm 44$ fb	$\sigma = 232 \pm 32$ fb (MCFM)	JHEP 11, 172 (2015)
$t\bar{t}Z$	13	139 fb^{-1}	$\sigma = 990 \pm 50 \pm 80$ fb	$\sigma = 840 + 90 - 100$ fb (NLO QCD + EW)	Eur. Phys. J. C 81 (2021) 737
$t\bar{t}Z$	8	20.3 fb^{-1}	$\sigma = 176 + 52 - 48 \pm 24$ fb	$\sigma = 215 \pm 30$ fb (HELAC-NLO)	JHEP 11, 172 (2015)
$t\bar{t}H$	13	80 fb^{-1}	$\sigma = 670 \pm 90 + 110 - 100$ fb	$\sigma = 507 + 35 - 50$ fb (LHCHXSWG NLO QCD + NLO EW)	PLB 784 (2018) 173
$t\bar{t}H$	8	20.3 fb^{-1}	$\sigma = 220 \pm 100 \pm 70$ fb	$\sigma = 133 + 8 - 13$ fb (LHCHXSWG NLO QCD + NLO EW)	PLB 784 (2018) 173
$t\bar{t}\gamma$	13	36.1 fb^{-1}	$\sigma = 521 \pm 9 \pm 41$ fb	$\sigma = 495 \pm 99$ fb (PRD 83 (2011) 074013)	EPJC 79 (2019) 382
$t\bar{t}\gamma$	8	20.2 fb^{-1}	$\sigma = 139 \pm 7 \pm 17$ fb	$\sigma = 151 \pm 25$ fb (MadGraph+PRD 83 (2011) 074013)	JHEP 11 (2017) 086
$t\bar{t}\gamma$	7	4.6 fb^{-1}	$\sigma = 63 \pm 8 + 17 - 13$ fb	$\sigma = 48 \pm 10$ fb (Whizard+NLO)	PRD 91, 072007 (2015)
tZj	13	139 fb^{-1}	$\sigma = 97 \pm 13 \pm 7$ fb	$\sigma = 102 + 5 - 2$ fb (Madgraph5 + aMCNLO (NLO))	JHEP 07 (2020) 124
$t\gamma$	13	139 fb^{-1}	$\sigma = 580 \pm 19 \pm 63$ fb	$\sigma = 406 + 25 - 32$ fb (NLO)	ATLAS-CONF-2022-013
4t	13	139 fb^{-1}	$\sigma = 24 + 7 - 6$ fb	$\sigma = 12.0 \pm 2.4$ fb (JHEP 02 (2018) 031)	JHEP 11 (2021) 118