

Source	Uncertainty	Process	Final state	Correlated (years)	Correlated (process)
Normalization only					
Luminosity	1–2%	All	All		✓
Electron identification/isolation/trigger	3%	All	OSDL+SL		✓
Muon identification/isolation/trigger	3%	All	OSDL+SL		✓
Modelling $t\bar{t}$ + HF	4–8%	$t\bar{t} + \geq 1b$	OSDL+SL	✓	✓
ME-PS matching (I_{damp})	+7.5%/–9.6%	$t\bar{t}$	OSDL+SL		
Cross section $t\bar{t} + \geq 1b$	+4.8%/–5.5%	$t\bar{t} + \geq 1b$	OSDL+SL	✓	
Cross section $t\bar{t} + 0b$	+4.8%/–5.5%	$t\bar{t} + 0b$	OSDL+SL	✓	
Cross section TOP	4%	TOP	SL	✓	
Cross section $t\bar{t} + H$	20%	$t\bar{t} + H$	All	✓	
Cross section $t\bar{t} + V$	50%	$t\bar{t} + V$	OSDL	✓	
Cross section $t\bar{t} + \text{rare}$	50%	$t\bar{t} + \text{rare}$	OSDL	✓	
Cross section EW	3.8%	EW	OSDL+SL	✓	
Electron/muon veto	0–5%	tX	hadronic		✓
Data-prediction normalization uncertainty	5–40%	data-driven QCD+ $t\bar{t}$	hadronic		
Shape and normalization					
Prefire	$\pm\sigma$	All	All, 2016+2017 only		
Pileup	$\sigma_{\text{minbias}} \pm 4.6\%$	All	All	✓	✓
Jet energy scale	$\pm\sigma(p_T, \eta)$	All	All		✓
Jet energy resolution	$\pm\sigma(\eta)$	All	All		✓
DEEPCSV tagging	$\pm\sigma(p_T)$	All	SL	✓	✓
DEEPCSV tagging stats	$\pm\sigma$	All	SL		✓
DEEJET tagging	$\pm\sigma$	All	OSDL, hadronic	✓	✓
DEEJET tagging stats	$\pm\sigma$	All	OSDL, hadronic		✓
SL resolved t tagging: statistical	$\pm\sigma$	All	SL		✓
SL resolved t tagging: CS purity	$\pm\sigma(p_T)$	All	SL		✓
SL resolved t tagging: closure	$\pm\sigma(N_{jet})$	All	SL		✓
Hadronic resolved t tagging: efficiency SF	0–5%	All	hadronic		✓
Hadronic resolved t tagging: mistag SF	0–10%	All	hadronic		✓
DEEPAK8 boosted t tagging SF	0–5%	All	hadronic		✓
DEEPAK8 boosted W tagging SF	0–10%	All	hadronic		✓
PDF	$\pm\sigma$	All	All	✓	✓
Renorm./fact. energy scale	envelope($\times 2, \times 0.5$)	All	SL, hadronic	✓	
Renorm./fact. energy scale	$\times 2, \times 0.5$	All	OSDL	✓	
Statistics of data-driven backgrounds	5–30%	data-driven QCD+ $t\bar{t}$	hadronic		
Statistics of transformed samples	10%	data-driven QCD+ $t\bar{t}$	hadronic		
Statistics of simulated samples	0-20%	All	hadronic		
Hadronic trigger efficiency	0–5%	All	hadronic		✓
Shape only					
ISR	$\pm\sigma$	All	All	✓	
FSR	$\pm\sigma$	All	All	✓	
BDT shape correction	$\pm\sigma$	All	SL		✓
Data-prediction shape uncertainty	*	data-driven QCD+ $t\bar{t}$	hadronic		