

Description	Value	Templates affected	Type
Luminosity	2016: 1.2%	MC	lnN
	2017: 2.3%		
	2018: 2.5%		
DY+jets production cross section	2%	DY	lnN
$t\bar{t}$ production cross section	6%	$t\bar{t}$	lnN
W+jets production cross section	4%	W+jets	lnN
Di-boson production cross section	5%	VV	lnN
Single top quark production cross section	5%	ST	lnN
$t\bar{t}$ +V+jets production cross section	15%	$t\bar{t}$ +V+jets	lnN
Higgs boson production cross section	2-5%	H (except bbH)	lnN
$H \rightarrow \tau\tau$ branching fraction	2.1%	$H \rightarrow \tau\tau$	lnN
$H \rightarrow WW$ branching fraction	1.5%	$H \rightarrow WW$	lnN
$\alpha_S$ variation	3.2%	bbH	lnN
$\mu(e)$ identification	1(2)%.	MC	lnN
$\mu$ trigger	2%	MC	lnN
$\tau_h$ trigger	$p_T$ dep.	MC	shape
b tagging	1-9%	$t\bar{t}$ , ST	shape
$\mu(e) \rightarrow \tau_h$ FR	$\eta_{\tau_h}$ dep.	MC with $\ell \rightarrow \tau_h$	shape
$\tau_h$ identification	$p_T$ and DM dep. (2-3%)	MC	shape
$\tau_h$ ES	DM dep. (1%)	MC	shape
$\mu$ ES	0.4–2.7%	MC	shape
$\mu \rightarrow \tau_h$ ES	1%	MC with $\mu \rightarrow \tau_h$	shape
$e \rightarrow \tau_h$ ES	$\eta_{\tau_h}$ and DM dep.	MC with $e \rightarrow \tau_h$	shape
Jet ES	event-dep.	MC	shape
Jet energy resolution	event-dep.	MC	shape
$p_T^{\text{miss}}$ recoil corr.	event-dep.	MC	shape
$p_T^{\text{miss}}$ unclustered ES	event-dep.	MC	shape
top quark $p_T$ reweighing	10%	$t\bar{t}$ , ST	shape
Z $p_T$ reweighing	10%	DY	shape
QCD multijet unc.	event-dep.	non-prompt $\ell$ ( $e\mu$ channel)	lnN
FF uncertainties	event-dep.	$j \rightarrow \tau_h$ fakes	shape
Pre-firing	event-dep.	MC	lnN
MC bin-by-bin stat. unc.	$\sqrt{N_{events}}$	All	shape