

Uncertainty	$t\bar{t}$	Single t	V+jets	QCD multijet
Integrated luminosity	2.5%	2.5%	2.5%	2.5%
Pileup	0–1%	0–1%	—	—
Lepton identification/trigger	1.9%	1.9%	1.9%	—
JEC	0–5%	0–5%	—	—
JER	0–0.6%	—	—	—
b tag scale factor	3%	3%	2–3%	—
b mistag scale factor	0.5%	1%	3–6%	—
Background normalization	—	15%	30%	30%
QCD multijet CR definition	—	—	—	0–60%
Factorization and renormalization scales	0–6%	2–5%	0–15%	—
PDF	0.5–1.5%	0.5–1.5%	—	—
$\alpha_S(m_Z)$ in PDFs	1%	1.5%	—	—
Top quark mass	1–5%	—	—	—
Top quark $p_T$ modeling	0–0.5%	—	—	—
Parton shower				
-NLO shower matching	1.5–5%	—	—	—
-ISR	2–3%	—	—	—
-FSR	0–9%	0–12%	—	—
-Color reconnection	0–3%	—	—	—
-b jet fragmentation	0–3%	0–5%	—	—
-b hadron branching fraction	3%	2.5–3%	—	—
Weak correction $\delta_{\text{QCD}}\delta_{\text{W}}$	0–0.2% ( $Y_t=2$ )	—	—	—