

Experimental uncertainties

Year	2016	2017	2018	Effects	Affected processes
Luminosity	1.2%	2.3%	2.5%	norm	all except Z +X
e efficiency	3-10%	3-9%	3-9%	norm	all except Z +X
μ efficiency	1-2%	1-2%	1-2%	norm	all except Z +X
$e(\mu)$ energy scale	0.15(0.03)%			shape	all with energy convolution
$e(\mu)$ energy resolution	10(3)%			shape	all with energy convolution
jet energy scale	$\approx 1\%$			norm	all except Z +X
jet energy resolution	$\approx 1\%$			norm	all except Z +X
jet b-tagging efficiency	0.1%			norm	all except Z +X
ggF interference	9-11%			norm	interferences
VBF interference	13-18%			norm	interferences
Z + X (4μ)	30%	30%	30%	norm	Z +X
Z + X ($4e$)	31%	31%	30%	norm	Z +X
Z + X ($2e2\mu$)	31%	30%	30%	norm	Z +X

Theoretical uncertainties

BR($X \rightarrow ZZ$)	2%			norm	signals
QCD scale	1-15%			shape: qqZZ norm: others	all except Z +X
PDF	0.1-7%			shape: qqZZ norm: others	all except Z +X
α_S	0.1-7%			norm	all except Z +X
pythia scale	0.4-10%			norm	all except Z +X
qqZZ K factor	0.1-30%			shape	qqZZ
ggZZ K factor	10%			norm	ggZZ