	700 C-V 10 2017		
	700 GeV, 10 cm, region 2017		
Cut	$\epsilon_i^{ ext{CMS}}$	$\epsilon_i^{\rm sim},{ m MLM}$	$\epsilon_i^{\rm sim}$, MLM, no pileup
total	$1.0^{+0.00}_{-0.00}$	$1.0^{+0.00}_{-0.00}$	$1.0^{+0.00}_{-0.00}$
trigger	$1.8^{+0.02}_{-0.02} \times 10^{-1}$	$1.4^{+0.01}_{-0.01} \times 10^{-1}$	$1.4^{+0.01}_{-0.01} \times 10^{-1}$
passes $p_{\mathrm{T}}^{\mathrm{miss}}$ filters	$1.8^{+0.02}_{-0.02} \times 10^{-1}$	$1.4^{+0.01}_{-0.01} \times 10^{-1}$	$1.4^{+0.01}_{-0.01} \times 10^{-1}$
$p_{\mathrm{T}}^{\mathrm{miss}} > 120\mathrm{GeV}$	$1.7^{+0.02}_{-0.02} \times 10^{-1}$	$1.4^{+0.01}_{-0.01} \times 10^{-1}$	$1.4^{+0.01}_{-0.01} \times 10^{-1}$
≥ 1 jet with $p_{ m T} > 110{ m GeV}$ and $ \eta < 2.4$	$1.3^{+0.02}_{-0.02} \times 10^{-1}$	$10.0^{+0.09}_{-0.09} \times 10^{-2}$	$9.9^{+0.09}_{-0.09} \times 10^{-2}$
==0 pairs of jets with $\Delta \phi_{\rm jet,\ jet} > 2.5$	$1.1^{+0.02}_{-0.02} \times 10^{-1}$	$8.9^{+0.08}_{-0.08} \times 10^{-2}$	$8.8^{+0.08}_{-0.08} \times 10^{-2}$
$ \Delta\phi({ m leading\ jet}, ar{p}_{ m T}^{ m miss}) > 0.5$	$1.1^{+0.02}_{-0.02} \times 10^{-1}$	$8.9^{+0.08}_{-0.08} \times 10^{-2}$	$8.8^{+0.08}_{-0.08} \times 10^{-2}$
$\geq 1 \text{ track with } \eta < 2.1$	$1.1^{+0.02}_{-0.02} \times 10^{-1}$	$8.9_{-0.08}^{+0.08} \times 10^{-2} 8.4_{-0.08}^{+0.08} \times 10^{-2}$	$8.8^{+0.08}_{-0.08} \times 10^{-2} \\ 8.3^{+0.08}_{-0.08} \times 10^{-2}$
$\geq 1 \text{ track with } p_{\mathrm{T}} > 55 \mathrm{GeV}$	$4.8^{+0.10}_{-0.10} \times 10^{-2}$	$8.4^{+0.08}_{-0.08} \times 10^{-2}$	$8.3^{+0.08}_{-0.08} \times 10^{-2}$
≥ 1 track passing fiducial selections	$3.2^{+0.09}_{-0.09} \times 10^{-2}$	$7.1^{+0.07}_{-0.07} \times 10^{-2}$	$7.1^{+0.08}_{-0.08} \times 10^{-2}$
≥ 1 track with ≥ 4 pixel hits	$1.7^{+0.05}_{-0.05} \times 10^{-2}$	$2.5^{+0.05}_{-0.05} \times 10^{-2}$	$2.4^{+0.05}_{-0.05} \times 10^{-2}$
≥ 1 track with no missing inner hits	$1.7^{+0.06}_{-0.06} \times 10^{-2}$	$1.9^{+0.04}_{-0.04} \times 10^{-2}$	$1.8^{+0.04}_{-0.04} \times 10^{-2}$
≥ 1 track with no missing middle hits	$1.6^{+0.06}_{-0.06} \times 10^{-2}$	$1.9^{+0.04}_{-0.04} \times 10^{-2}$	$1.8^{+0.04}_{-0.04} \times 10^{-2}$
≥ 1 track with relative track isolation $< 5\%$	$5.3^{+0.33}_{-0.33} \times 10^{-3}$	$5.4^{+0.21}_{-0.21} \times 10^{-3}$	$5.0^{+0.21}_{-0.21} \times 10^{-3}$
$\geq 1 \text{ track with } d_{xy} < 0.02 \text{cm}$	$5.3^{+0.33}_{-0.33} \times 10^{-3}$	$5.4^{+0.21}_{-0.21} \times 10^{-3}$	$5.0^{+0.21}_{-0.21} \times 10^{-3}$
$\geq 1 \text{ track with } d_z < 0.5 \text{ cm}$	$5.3^{+0.33}_{-0.33} \times 10^{-3}$	$5.4^{+0.21}_{-0.21} \times 10^{-3}$	$5.0^{+0.21}_{-0.21} \times 10^{-3}$
≥ 1 track with $\Delta R(\text{track, jet}) > 0.5$	$5.1^{+0.33}_{-0.33} \times 10^{-3}$	$5.3^{+0.21}_{-0.21} \times 10^{-3}$	$5.0^{+0.21}_{-0.21} \times 10^{-3}$
$\geq 1 \text{ track with } \Delta R(\text{track, electron}) > 0.15$	$5.0^{+0.31}_{-0.31} \times 10^{-3}$	$5.3^{+0.21}_{-0.21} \times 10^{-3}$	$5.0^{+0.21}_{-0.21} \times 10^{-3}$
$\geq 1 \text{ track with } \Delta R(\text{track, muon}) > 0.15$	$5.0^{+0.31}_{-0.31} \times 10^{-3}$	$5.3_{-0.21}^{+0.21} \times 10^{-3}$ $5.3_{-0.21}^{+0.21} \times 10^{-3}$ $5.3_{-0.21}^{+0.21} \times 10^{-3}$	$\begin{array}{c} 5.0^{+0.21}_{-0.21} \times 10^{-3} \\ 5.0^{+0.21}_{-0.21} \times 10^{-3} \\ 5.0^{+0.21}_{-0.21} \times 10^{-3} \\ 5.0^{+0.21}_{-0.21} \times 10^{-3} \end{array}$
$\geq 1 \text{ track with } \Delta R(\text{track}, \tau_{\text{h}}) > 0.15$	$5.0^{+0.31}_{-0.31} \times 10^{-3}$	$5.3^{+0.21}_{-0.21} \times 10^{-3}$	$5.0^{+0.21}_{-0.21} \times 10^{-3}$
$\geq 1 \text{ track with } E_{\text{calo}} < 10 \text{GeV}$	$4.9^{+0.31}_{-0.31} \times 10^{-3}$	$5.3^{+0.21}_{-0.21} \times 10^{-3}$	$5.0^{+0.21}_{-0.21} \times 10^{-3}$
≥ 1 track with ≥ 3 missing outer hits	$\begin{array}{c} 3.0_{-0.31} \times 10 \\ 4.9_{-0.31}^{+0.31} \times 10^{-3} \\ 4.9_{-0.31}^{+0.31} \times 10^{-3} \\ 4.9_{-0.31}^{+0.31} \times 10^{-3} \end{array}$	$5.2^{+0.21}_{-0.21} \times 10^{-3}$	$\begin{array}{c} 3.0_{-0.21} \times 10 \\ 4.9_{-0.21}^{+0.21} \times 10^{-3} \\ 2.6_{-0.15}^{+0.15} \times 10^{-3} \\ 1.2_{-0.10}^{+0.10} \times 10^{-3} \end{array}$
≥ 1 track 4 layers	$3.0^{+0.24}_{-0.24} \times 10^{-3}$	$2.8^{+0.16}_{-0.16} \times 10^{-3}$	$2.6^{+0.15}_{-0.15} \times 10^{-3}$
≥ 1 track 5 layers	$\begin{vmatrix} 3.0^{+0.24}_{-0.24} \times 10^{-3} \\ 1.1^{+0.16}_{-0.16} \times 10^{-3} \end{vmatrix}$	$1.2^{+0.10}_{-0.10} \times 10^{-3}$	$1.2^{+0.10}_{-0.10} \times 10^{-3}$
$\geq 1 \text{ track} \geq 6 \text{ layers}$	$8.1^{+1.21}_{-1.21} \times 10^{-4}$	$1.1^{+0.10}_{-0.10} \times 10^{-3}$	$1.0^{+0.09}_{-0.09} \times 10^{-3}$

Table 1: Cutflow comparison for 700 GeV, $10~\mathrm{cm}$, region 2017

	700 GeV, 10 cm, region 2018A		
Cut	$\epsilon_i^{ ext{CMS}}$	$\epsilon_i^{\mathrm{sim}},\mathrm{MLM}$	$\epsilon_i^{\rm sim}$, MLM, no pileup
total	$1.0^{+0.00}_{-0.00}$	$1.0^{+0.00}_{-0.00}$	$1.0^{+0.00}_{-0.00}$
trigger	$1.5^{+0.02}_{-0.02} \times 10^{-1}$	$1.4^{+0.01}_{-0.01} \times 10^{-1}$	$1.4^{+0.01}_{-0.01} \times 10^{-1}$
passes $p_{\mathrm{T}}^{\mathrm{miss}}$ filters	$1.4^{+0.02}_{-0.02} \times 10^{-1}$	$1.4^{+0.01}_{-0.01} \times 10^{-1}$	$1.4^{+0.01}_{-0.01} \times 10^{-1}$
$p_{\mathrm{T}}^{\mathrm{miss}} > 120\mathrm{GeV}$	$1.4^{+0.02}_{-0.02} \times 10^{-1}$	$1.4^{+0.01}_{-0.01} \times 10^{-1}$	$1.4^{+0.01}_{-0.01} \times 10^{-1}$
≥ 1 jet with $p_{ m T} > 110{ m GeV}$ and $ \eta < 2.4$	$1.3^{+0.02}_{-0.02} \times 10^{-1}$	$10.0^{+0.09}_{-0.09} \times 10^{-2}$	$9.9^{+0.09}_{-0.09} \times 10^{-2}$
==0 pairs of jets with $\Delta \phi_{\rm jet,\ jet} > 2.5$	$1.1^{+0.01}_{-0.01} \times 10^{-1}$	$8.9^{+0.08}_{-0.08} \times 10^{-2}$	$8.8^{+0.08}_{-0.08} \times 10^{-2}$
$ \Delta\phi({ m leading jet}, ar{p}_{ m T}^{ m miss}) > 0.5$	$1.1^{+0.01}_{-0.01} \times 10^{-1}$	$8.9^{+0.08}_{-0.08} \times 10^{-2}$	$8.8^{+0.08}_{-0.08} \times 10^{-2}$
≥ 1 track with $ \eta < 2.1$	$1.1^{+0.01}_{-0.01} \times 10^{-1}$	$8.9^{+0.08}_{-0.08} \times 10^{-2}$	$8.8^{+0.08}_{-0.08} \times 10^{-2}$
$\geq 1 \text{ track with } p_{\mathrm{T}} > 55 \mathrm{GeV}$	$ 4.7^{+0.10}_{-0.10} \times 10^{-2} $	$8.4^{+0.08}_{-0.08} \times 10^{-2}$	$8.3^{+0.08}_{-0.08} \times 10^{-2}$
≥ 1 track passing fiducial selections	$3.1^{+0.08}_{-0.08} \times 10^{-2}$	$7.1^{+0.07}_{-0.07} \times 10^{-2}$	$7.1^{+0.08}_{-0.08} \times 10^{-2}$
≥ 1 track with ≥ 4 pixel hits	$1.7^{+0.06}_{-0.06} \times 10^{-2}$	$2.5^{+0.05}_{-0.05} \times 10^{-2}$	$2.4^{+0.05}_{-0.05} \times 10^{-2}$
≥ 1 track with no missing inner hits	$1.7^{+0.06}_{-0.06} \times 10^{-2}$	$1.9^{+0.04}_{-0.04} \times 10^{-2}$	$1.8^{+0.04}_{-0.04} \times 10^{-2}$
≥ 1 track with no missing middle hits	$1.5^{+0.05}_{-0.05} \times 10^{-2}$	$1.9^{+0.04}_{-0.04} \times 10^{-2}$	$1.8^{+0.04}_{-0.04} \times 10^{-2}$
≥ 1 track with relative track isolation $< 5\%$	$5.3^{+0.34}_{-0.34} \times 10^{-3}$	$5.4^{+0.21}_{-0.21} \times 10^{-3}$	$5.0^{+0.21}_{-0.21} \times 10^{-3}$
$\geq 1 \text{ track with } d_{xy} < 0.02 \text{cm}$	$5.1^{+0.34}_{-0.34} \times 10^{-3}$	$5.4^{+0.21}_{-0.21} \times 10^{-3}$	$5.0^{+0.21}_{-0.21} \times 10^{-3}$
$\geq 1 \text{ track with } d_z < 0.5 \text{ cm}$	$5.1^{+0.31}_{-0.31} \times 10^{-3}$	$5.4^{+0.21}_{-0.21} \times 10^{-3}$	$5.0^{+0.21}_{-0.21} \times 10^{-3}$
≥ 1 track with $\Delta R(\text{track}, \text{jet}) > 0.5$	$4.9^{+0.31}_{-0.31} \times 10^{-3}$	$5.3^{+0.21}_{-0.21} \times 10^{-3}$	$5.0^{+0.21}_{-0.21} \times 10^{-3}$
$\geq 1 \text{ track with } \Delta R(\text{track, electron}) > 0.15$	$4.7^{+0.31}_{-0.31} \times 10^{-3}$	$5.3^{+0.21}_{-0.21} \times 10^{-3}$	$5.0^{+0.21}_{-0.21} \times 10^{-3}$
$\geq 1 \text{ track with } \Delta R(\text{track, muon}) > 0.15$	$4.7^{+0.31}_{-0.31} \times 10^{-3}$	$5.3^{+0.21}_{-0.21} \times 10^{-3}$	$5.0^{+0.21}_{-0.21} \times 10^{-3}$
$\geq 1 \text{ track with } \Delta R(\text{track}, \tau_{\text{h}}) > 0.15$	$4.7^{+0.31}_{-0.31} \times 10^{-3}$	$5.3^{+0.21}_{-0.21} \times 10^{-3}$	$5.0^{+0.21}_{-0.21} \times 10^{-3}$
$\geq 1 \text{ track with } E_{\text{calo}} < 10 \text{GeV}$	$ 4.7^{+0.31}_{-0.31} \times 10^{-3} $	$5.3^{+0.21}_{-0.21} \times 10^{-3}$	$5.0^{+0.21}_{-0.21} \times 10^{-3}$
≥ 1 track with ≥ 3 missing outer hits	$\begin{array}{c} 1.7_{-0.31} \times 10 \\ 4.6_{-0.31}^{+0.31} \times 10^{-3} \\ 2.8_{-0.24}^{+0.24} \times 10^{-3} \\ 0.2_{-0.34}^{+1.36} \times 10^{-4} \end{array}$	$5.2^{+0.21}_{-0.21} \times 10^{-3}$	$4.9^{+0.21}_{-0.21} \times 10^{-3}$
≥ 1 track 4 layers	$2.8^{+0.24}_{-0.24} \times 10^{-3}$	$2.9^{+0.16}_{-0.16} \times 10^{-3}$	$2.6^{+0.15}_{-0.15} \times 10^{-3}$
≥ 1 track 5 layers	$ 9.2_{-1.36}^{+} \times 10^{-4} $	$1.2^{+0.10}_{-0.10} \times 10^{-3}$	$1.2^{+0.10}_{-0.10} \times 10^{-3}$
$\geq 1 \text{ track} \geq 6 \text{ layers}$	$9.5^{+1.36}_{-1.36} \times 10^{-4}$	$1.1^{+0.10}_{-0.10} \times 10^{-3}$	$1.0^{+0.09}_{-0.09} \times 10^{-3}$

Table 2: Cutflow comparison for 700 GeV, $10~\mathrm{cm}$, region $2018\mathrm{A}$

	700 GeV, 10 cm, region 2018B		
Cut	$\epsilon_i^{ ext{CMS}}$	$\epsilon_i^{\mathrm{sim}},\mathrm{MLM}$	$\epsilon_i^{\rm sim}$, MLM, no pileup
total	$1.0^{+0.00}_{-0.00}$	$1.0^{+0.00}_{-0.00}$	$1.0^{+0.00}_{-0.00}$
trigger	$1.5^{+0.02}_{-0.02} \times 10^{-1}$	$1.4^{+0.01}_{-0.01} \times 10^{-1}$	$1.4^{+0.01}_{-0.01} \times 10^{-1}$
passes $p_{\mathrm{T}}^{\mathrm{miss}}$ filters	$1.4^{+0.02}_{-0.02} \times 10^{-1}$	$1.4^{+0.01}_{-0.01} \times 10^{-1}$	$1.4^{+0.01}_{-0.01} \times 10^{-1}$
$p_{\mathrm{T}}^{\mathrm{miss}} > 120\mathrm{GeV}$	$1.4^{+0.02}_{-0.02} \times 10^{-1}$	$1.4^{+0.01}_{-0.01} \times 10^{-1}$	$1.4^{+0.01}_{0.01} \times 10^{-1}$
≥ 1 jet with $p_{\mathrm{T}} > 110\mathrm{GeV}$ and $ \eta < 2.4$	$1.3^{+0.02}_{-0.02} \times 10^{-1}$	$10.0^{+0.09}_{-0.09} \times 10^{-2}$	$\begin{array}{c} 9.9^{+0.09}_{-0.09} \times 10^{-2} \\ 8.8^{+0.08}_{-0.08} \times 10^{-2} \\ 8.8^{+0.08}_{-0.08} \times 10^{-2} \end{array}$
==0 pairs of jets with $\Delta \phi_{\rm jet, jet} > 2.5$	$1.1^{+0.01}_{-0.01} \times 10^{-1}$	$8.9^{+0.08}_{-0.08} \times 10^{-2}$	$8.8^{+0.08}_{-0.08} \times 10^{-2}$
$ \Delta\phi({ m leading\ jet}, ar{p}_{ m T}^{ m miss}) > 0.5$	$1.1^{+0.01}_{-0.01} \times 10^{-1}$	$8.9^{+0.08}_{-0.08} \times 10^{-2}$	0.0_0.08 ^ 10
≥ 1 track with $ \eta < 2.1$	$1.1^{+0.01}_{-0.01} \times 10^{-1}$	$8.9^{+0.08}_{-0.08} \times 10^{-2}$	$8.8^{+0.08}_{-0.08} \times 10^{-2}$
$\geq 1 \text{ track with } p_{\mathrm{T}} > 55 \mathrm{GeV}$	$4.7^{+0.09}_{-0.09} \times 10^{-2}$	$8.4^{+0.08}_{-0.08} \times 10^{-2}$	$8.3^{+0.08}_{-0.08} \times 10^{-2}$
≥ 1 track passing fiducial selections	$3.1^{+0.07}_{-0.07} \times 10^{-2}$	$7.1^{+0.07}_{-0.07} \times 10^{-2}$	$7.1^{+0.08}_{-0.08} \times 10^{-2}$
≥ 1 track with ≥ 4 pixel hits	$1.7^{+0.06}_{-0.06} \times 10^{-2}$	$2.5^{+0.05}_{-0.05} \times 10^{-2}$	$2.4^{+0.05}_{-0.05} \times 10^{-2}$
≥ 1 track with no missing inner hits	$1.7^{+0.06}_{-0.06} \times 10^{-2}$	$1.9^{+0.04}_{-0.04} \times 10^{-2}$	$1.8^{+0.04}_{-0.04} \times 10^{-2}$
≥ 1 track with no missing middle hits	$\begin{array}{ c c c }\hline 1.5^{+0.06}_{-0.06} \times 10^{-2} \\ 5.3^{+0.33}_{-0.33} \times 10^{-3} \\ \end{array}$	$1.9^{+0.04}_{-0.04} \times 10^{-2}$	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$
≥ 1 track with relative track isolation $< 5\%$		$5.4_{-0.21}^{+0.21} \times 10^{-3}$ $5.4_{-0.21}^{+0.21} \times 10^{-3}$	$5.0_{-0.21}^{+0.21} \times 10^{-3} 5.0_{-0.21}^{+0.21} \times 10^{-3} 5.0_{-0.21}^{+0.21} \times 10^{-3}$
$\geq 1 \text{ track with } d_{xy} < 0.02 \text{cm}$	$5.2^{+0.33}_{-0.33} \times 10^{-3}$	$5.4^{+0.21}_{-0.21} \times 10^{-3}$	$5.0^{+0.21}_{-0.21} \times 10^{-3}$
$\geq 1 \text{ track with } d_z < 0.5 \text{ cm}$	$ 5.2^{+0.32}_{-0.32} \times 10^{-3} $	$5.4^{+0.21}_{-0.21} \times 10^{-3}$	$5.0^{+0.21}_{-0.21} \times 10^{-3}$
≥ 1 track with $\Delta R({ m track, jet}) > 0.5$	$ 5.0^{+0.32}_{-0.32} \times 10^{-3} $	$5.3^{+0.\overline{21}}_{-0.21} \times 10^{-3}$	$5.0_{-0.21}^{+0.21} \times 10^{-3}$
≥ 1 track with $\Delta R(\text{track}, \text{electron}) > 0.15$	$\begin{array}{ c c c }\hline 4.8_{-0.32}^{+0.32} \times 10^{-3} \\ 4.8_{-0.32}^{+0.32} \times 10^{-3} \\ \hline \end{array}$	$5.3_{-0.21}^{+0.21} \times 10^{-3}$ $5.3_{-0.21}^{+0.21} \times 10^{-3}$ $5.3_{-0.21}^{+0.21} \times 10^{-3}$	$\begin{array}{c c} 5.0^{+0.21}_{-0.21} \times 10^{-3} \\ 5.0^{+0.21}_{-0.21} \times 10^{-3} \end{array}$
$\geq 1 \text{ track with } \Delta R(\text{track, muon}) > 0.15$	$4.8^{+0.32}_{-0.32} \times 10^{-3}$	$5.3^{+0.21}_{-0.21} \times 10^{-3}$	$5.0^{+0.21}_{-0.21} \times 10^{-3}$
$\geq 1 \text{ track with } \Delta R(\text{track}, \tau_{\text{h}}) > 0.15$	$4.8^{+0.32}_{-0.32} \times 10^{-3}$	$5.3^{+0.21}_{-0.21} \times 10^{-3}$	$5.0^{+0.21}_{-0.21} \times 10^{-3}$
$\geq 1 \text{ track with } E_{\text{calo}} < 10 \text{GeV}$	$4.7^{+0.32}_{-0.32} \times 10^{-3}$	$5.3^{+0.21}_{-0.21} \times 10^{-3}$	$5.0^{+0.21}_{-0.21} \times 10^{-3}$
≥ 1 track with ≥ 3 missing outer hits	$4.7^{+0.32}_{-0.32} \times 10^{-3}$	$5.2^{+0.21}_{-0.21} \times 10^{-3}$	$4.9^{+0.21}_{-0.21} \times 10^{-3}$
$\phi(p_{ m T}^{ m miss}) < -1.6 \text{ or } \phi(p_{ m T}^{ m miss}) > -0.6$	$3.8^{+0.28}_{-0.28} \times 10^{-3}$	$4.3^{+0.19}_{-0.19} \times 10^{-3}$	$4.2^{+0.19}_{-0.19} \times 10^{-3}$
≥ 1 track 4 layers	$2.3^{+0.22}_{-0.22} \times 10^{-3}$	$2.3^{+0.14}_{-0.14} \times 10^{-3}$	$2.2^{+0.14}_{-0.14} \times 10^{-3}$
≥ 1 track 5 layers	$7.2^{+1.30}_{-1.30} \times 10^{-4}$	$1.0^{+0.09}_{-0.09} \times 10^{-3}$	$9.9^{+0.92}_{-0.92} \times 10^{-4}$
$\geq 1 \text{ track} \geq 6 \text{ layers}$	$8.0^{+1.30}_{-1.30} \times 10^{-4}$	$1.0^{+0.09}_{-0.09} \times 10^{-3}$ $8.8^{+0.87}_{-0.87} \times 10^{-4}$	$8.7_{-0.86}^{+0.86} \times 10^{-4}$

Table 3: Cutflow comparison for 700 GeV, $10~\mathrm{cm}$, region 2018B