Cut	Count	Efficiency (%)
No cut	3186	
E_{EM} cut	3094	$97.11^{+0.28}_{-0.31}$
E_{HAD} cut	3130	$98.24^{+0.23}_{-0.26}$
COT hits cut	3183	$99.91^{+0.05}_{-0.09}$
d_0 cut	3163	$99.28^{+0.15}_{-0.19}$
Isolation cut	3031	$95.13^{+0.40}_{-0.43}$
Δx_{CMU} cut	3175	$99.65^{+0.11}_{-0.14}$
Δx_{CMP} cut	3120	$97.93^{+0.24}_{-0.30}$
All above cuts	2806	$88.07^{+0.55}_{-0.62}$
All cuts excl. isol.	2940	$92.28^{+0.47}_{-0.51}$
Sliding isol. cut	3084	$96.80^{+0.30}_{-0.34}$
All cuts (sliding isol.)	2853	$89.55^{+0.54}_{-0.56}$
χ^2 cut	3186	$100.00^{+0.00}_{-0.06}$
All cuts (χ^2)	2806	$88.07^{+0.55}_{-0.62}$
All track cuts	2875	$90.24^{+0.51}_{-0.57}$
All trk cuts excl. isol.	3013	$94.57^{+0.43}_{-0.45}$

TABLE I: Dataset bhmumm24_SAM: Muon ID efficiencies for CMUP

Cut	Count	Efficiency (%)
No cut	2011	
E_{EM} cut	1952	$97.07^{+0.37}_{-0.41}$
E_{HAD} cut	1968	$97.86^{+0.31}_{-0.38}$
COT hits cut	2010	$99.95^{+0.04}_{-0.11}$
d_0 cut	2001	$99.50^{+0.14}_{-0.22}$
Isolation cut	1892	$94.08^{+0.50}_{-0.58}$
Δx_{CMX} cut	2001	$99.50^{+0.14}_{-0.22}$
All above cuts	1788	$88.91^{+0.69}_{-0.78}$
All cuts excl. isol.	1891	$94.03^{+0.55}_{-0.62}$
Sliding isol. cut	1924	$95.67^{+0.44}_{-0.48}$
All cuts (sliding isol.)	1815	$90.25^{+0.71}_{-0.75}$
χ^2 cut	2011	$100.00^{+0.00}_{-0.09}$
All cuts (χ^2)	1788	$88.91^{+0.69}_{-0.78}$
All track cuts	1798	$89.41^{+0.68}_{-0.69}$
All trk cuts excl. isol.	1901	$94.53^{+0.51}_{-0.56}$

TABLE II: Dataset bhmumm24_SAM: Muon ID efficiencies for CMX

Cut	Count	Efficiency (%)
No cut	1630	
E_{EM} cut	1581	$96.99^{+0.44}_{-0.49}$
E_{HAD} cut	1594	$97.79^{+0.38}_{-0.40}$
COT hits cut	1629	$99.94^{+0.06}_{-0.14}$
d_0 cut	1622	$99.51^{+0.16}_{-0.23}$
Isolation cut	1528	$93.74^{+0.64}_{-0.63}$
Δx_{CMX} cut	1623	$99.57^{+0.15}_{-0.24}$
All above cuts	1442	$88.47^{+0.84}_{-0.82}$
All cuts excl. isol.	1532	$93.99^{+0.59}_{-0.68}$
Sliding isol. cut	1552	$95.21^{+0.54}_{-0.63}$
All cuts (sliding isol.)	1463	$89.75^{+0.72}_{-0.84}$
χ^2 cut	1630	$100.00^{+0.00}_{-0.11}$
All cuts (χ^2)	1442	$88.47^{+0.84}_{-0.82}$
All track cuts	1449	$88.90^{+0.80}_{-0.86}$
All trk cuts excl. isol.	1539	$94.42^{+0.55}_{-0.62}$

TABLE III: Dataset bhmumm24_SAM: Muon ID efficiencies for CMX Arches

Cut	Count	Efficiency (%)
No cut	328	
E_{EM} cut	320	$97.56^{+0.83}_{-1.22}$
E_{HAD} cut	323	$98.48^{+0.69}_{-1.06}$
COT hits cut	328	$100.00^{+0.00}_{-0.56}$
d_0 cut	326	$99.39^{+0.39}_{-0.78}$
Isolation cut	313	$95.43^{+1.16}_{-1.38}$
Δx_{CMX} cut	326	$99.39^{+0.39}_{-0.78}$
All above cuts	299	$91.16^{+1.52}_{-1.80}$
All cuts excl. isol.	311	$94.82^{+1.18}_{-1.56}$
Sliding isol. cut	319	$97.26^{+0.94}_{-1.21}$
All cuts (sliding isol.)	304	$92.68^{+1.36}_{-1.76}$
χ^2 cut	328	$100.00^{+0.00}_{-0.56}$
All cuts (χ^2)	299	$91.16^{+1.52}_{-1.80}$
All track cuts	301	$91.77^{+1.49}_{-1.83}$
All trk cuts excl. isol.	313	$95.43^{+1.16}_{-1.38}$

TABLE IV: Dataset bhmumm24_SAM: Muon ID efficiencies for CMX Miniskirt

Cut	Count	Efficiency (%)
No cut	53	
E_{EM} cut	51	$96.23^{+2.41}_{-4.62}$
E_{HAD} cut	51	$96.23^{+2.41}_{-4.62}$
COT hits cut	53	$100.00^{+0.00}_{-3.42}$
d_0 cut	53	$100.00^{+0.00}_{-3.42}$
Isolation cut	51	$96.23^{+2.41}_{-4.62}$
Δx_{CMX} cut	52	$98.11^{+1.59}_{-4.27}$
All above cuts	47	$88.68^{+4.68}_{-6.06}$
All cuts excl. isol.	48	$90.57^{+4.16}_{-6.00}$
Sliding isol. cut	53	$100.00^{+0.00}_{-3.42}$
All cuts (sliding isol.)	48	$90.57^{+4.16}_{-6.00}$
χ^2 cut	53	$100.00^{+0.00}_{-3.42}$
All cuts (χ^2)	47	$88.68^{+4.68}_{-6.06}$
All track cuts	48	$90.57^{+4.16}_{-6.00}$
All trk cuts excl. isol.	49	$92.45^{+3.45}_{-5.54}$

TABLE V: Dataset bhmumm24_SAM: Muon ID efficiencies for CMX Keystone

Cut	Count	Efficiency (%)
No cut	381	
E_{EM} cut	371	$97.38^{+0.82}_{-1.14}$
E_{HAD} cut	374	$98.16^{+0.71}_{-0.95}$
COT hits cut	381	$100.00^{+0.00}_{-0.48}$
d_0 cut	379	$99.48^{+0.35}_{-0.67}$
Isolation cut	364	$95.54^{+1.04}_{-1.30}$
Δx_{CMX} cut	378	$99.21^{+0.42}_{-0.75}$
All above cuts	346	$90.81^{+1.47}_{-1.65}$
All cuts excl. isol.	359	$94.23^{+1.18}_{-1.55}$
Sliding isol. cut	372	$97.64^{+0.75}_{-1.10}$
All cuts (sliding isol.)	352	$92.39^{+1.46}_{-1.67}$
χ^2 cut	381	$100.00^{+0.00}_{-0.48}$
All cuts (χ^2)	346	$90.81^{+1.47}_{-1.65}$
All track cuts	349	$91.60^{+1.47}_{-1.66}$
All trk cuts excl. isol.	362	$95.01^{+1.18}_{-1.36}$

TABLE VI: Dataset bhmumm24_SAM: Muon ID efficiencies for MiniKey

Cut	Count	Efficiency (%)
No cut	800	
E_{EM} cut	764	$95.50^{+0.74}_{-0.82}$
E_{HAD} cut	779	$97.37^{+0.53}_{-0.74}$
COT hits cut	800	$100.00^{+0.00}_{-0.23}$
d_0 cut	798	$99.75^{+0.16}_{-0.32}$
Isolation cut	756	$94.50^{+0.76}_{-0.90}$
Δx_{CMU} cut	797	$99.62^{+0.22}_{-0.37}$
All above cuts	707	$88.38^{+1.18}_{-1.17}$
All cuts excl. isol.	742	$92.75^{+0.95}_{-1.00}$
Sliding isol. cut	771	$96.38^{+0.65}_{-0.82}$
All cuts (sliding isol.)	721	$90.13^{+1.04}_{-1.21}$
χ^2 cut	800	$100.00^{+0.00}_{-0.23}$
All cuts (χ^2)	707	$88.38^{+1.18}_{-1.17}$
All track cuts	709	$88.63^{+1.12}_{-1.22}$
All trk cuts excl. isol.	744	$93.00^{+0.90}_{-1.06}$

TABLE VII: Dataset bhmumm24_SAM: Muon ID efficiencies for CMU-only

Cut	Count	Efficiency (%)
No cut	881	
E_{EM} cut	863	$97.96^{+0.46}_{-0.62}$
E_{HAD} cut	871	$98.86^{+0.33}_{-0.50}$
COT hits cut	881	$100.00^{+0.00}_{-0.21}$
d_0 cut	874	$99.21^{+0.28}_{-0.40}$
Isolation cut	835	$94.78^{+0.78}_{-0.88}$
Δx_{CMP} cut	857	$97.28^{+0.53}_{-0.64}$
All above cuts	786	$89.22^{+1.07}_{-1.18}$
All cuts excl. isol.	826	$93.76^{+0.82}_{-0.93}$
Sliding isol. cut	853	$96.82^{+0.59}_{-0.68}$
All cuts (sliding isol.)	803	$91.15^{+0.99}_{-1.06}$
χ^2 cut	881	$100.00^{+0.00}_{-0.21}$
All cuts (χ^2)	786	$89.22^{+1.07}_{-1.18}$
All track cuts	808	$91.71^{+0.91}_{-1.04}$
All trk cuts excl. isol.	849	$96.37^{+0.65}_{-0.71}$

TABLE VIII: Dataset bhmumm24_SAM: Muon ID efficiencies for CMP-only

Cut	Count	Efficiency (%)
No cut	736	
E_{EM} cut	705	$95.79^{+0.75}_{-0.91}$
E_{HAD} cut	717	$97.42^{+0.58}_{-0.69}$
COT hits cut	730	$99.18^{+0.30}_{-0.48}$
d_0 cut	726	$98.64^{+0.41}_{-0.57}$
Isolation cut	685	$93.07^{+0.92}_{-1.03}$
Min E cut	709	$96.33^{+0.69}_{-0.87}$
All above cuts	623	$84.65^{+1.39}_{-1.54}$
All cuts excl. isol.	657	$89.27^{+1.07}_{-1.28}$
Sliding isol. cut	702	$95.38^{+0.76}_{-0.90}$
All cuts (sliding isol.)	639	$86.82^{+1.17}_{-1.37}$
χ^2 cut	736	$100.00^{+0.00}_{-0.25}$
All cuts (χ^2)	623	$84.65^{+1.39}_{-1.54}$

TABLE IX: Dataset bhmumm24_SAM: Muon ID efficiencies for CMIO

Cut	Count	Efficiency (%)
No cut	684	
E_{EM} cut	658	$96.20^{+0.72}_{-0.84}$
E_{HAD} cut	657	$96.05^{+0.77}_{-0.89}$
COT hits cut	684	$100.00^{+0.00}_{-0.27}$
d_0 cut	680	$99.42^{+0.27}_{-0.47}$
Isolation cut	623	$91.08^{+1.01}_{-1.14}$
Min E cut	680	$99.42^{+0.27}_{-0.47}$
All above cuts	595	$86.99^{+1.39}_{-1.34}$
All cuts excl. isol.	635	$92.84^{+0.96}_{-1.09}$
Sliding isol. cut	633	$92.54^{+1.06}_{-1.19}$
All cuts (sliding isol.)	604	$88.30^{+1.25}_{-1.29}$
χ^2 cut	684	$100.00^{+0.00}_{-0.27}$
All cuts (χ^2)	595	$86.99^{+1.39}_{-1.34}$

TABLE X: Dataset bhmumm24_SAM: Muon ID efficiencies for SCMIO

Category	Fiducial	w/ Stub	Efficiency (%)
CMUP	3604	3100	$86.02^{+0.56}_{-0.62}$
CMX	2071	1943	$93.82^{+0.57}_{-0.61}$
CMX Arches	1626	1570	$96.56^{+0.44}_{-0.54}$
CMX Miniskirt	367	318	$86.65^{+1.73}_{-1.98}$
CMX Keystone	78	55	$70.51^{+5.66}_{-6.26}$
CMU-only	861	762	$88.50^{+1.10}_{-1.15}$
CMP-only	1004	868	$86.45^{+1.09}_{-1.15}$
CMX MiniKey	445	373	$83.82^{+1.82}_{-1.89}$

TABLE XI: Dataset bhmumm24_SAM: Muon reconstruction efficiencies

1st leg	2nd leg	1st passes	both pass	Efficiency (%)
CMUP	CMUP	1064	951	-
CMX	CMUP	1225	1155	$94.35^{+0.47}_{-0.43}$
CMUP	CMX	1300	1155	-
CMX	CMX	457	352	$88.28^{+0.75}_{-0.71}$
CMUP	ARCH	1054	1011	-
CMUP	MK	246	144	-
ARCH	ARCH	316	278	-
ARCH	MK	115	66	-
MK	ARCH	70	66	$95.32^{+0.57}_{-0.53}$
MK	MK	22	8	$71.19^{+2.46}_{-2.34}$

TABLE XII: Dataset bhmumm24_SAM: Muon L1 trigger efficiencies

Category	Events Passing	Efficiency (%)
Pass L1	1155	-
CMUP	930	$96.70^{+0.62}_{-0.75}$
CMX	848	$88.17^{+1.04}_{-1.11}$
CMUP-CMX	820	-
CMUPA	810	-
CMUPMK	120	-
CMUPARCH	716	$88.40^{+1.16}_{-1.19}$
CMUP-MK	104	$86.67^{+2.98}_{-4.05}$

TABLE XIII: Dataset bhmumm24_SAM: Muon L2 trigger efficiencies

Category	Events Passing	Efficiency (%)
Pass L1	1155	-
CMUP-CMUP$_S$	873	-
CMX-CMX$_S$	800	-
CMUP-CMX-CMUP$_S$	769	$90.68^{+0.97}_{-1.08}$
CMUP-CMX-CMX$_S$	772	$83.01^{+1.27}_{-1.27}$
CMUP-CMX-CMX$_S$-A	673	$83.09^{+1.39}_{-1.35}$
CMUP-CMX-CMX$_S$-MK	99	$82.50^{+3.63}_{-4.18}$

TABLE XIV: Dataset bhmumm24_SAM: Muon L2 SLAM trigger efficiencies

Category	Efficiency (%)
CMUP	$90.68^{+0.77}_{-0.91}$
CMX	$77.17^{+1.14}_{-1.21}$
ARCH	$83.55^{+1.23}_{-1.29}$
MK	$61.10^{+3.02}_{-3.75}$
CMUP$_S$	$85.04^{+1.02}_{-1.15}$
CMX$_S$	$72.65^{+1.29}_{-1.31}$
ARCH$_S$	$78.53^{+1.42}_{-1.40}$
MK$_S$	$58.16^{+3.29}_{-3.74}$

TABLE XVI: Dataset bhmumm24_SAM: Muon combined trigger efficiencies

Category	Events Passing	Efficiency (%)
Pass L2	820	-
CMUP	815	$99.38^{+0.25}_{-0.43}$
CMX	813	$99.14^{+0.30}_{-0.48}$
CMUP-CMX	808	-
CMUPA	712	-
CMUPMK	103	-
CMUPARCH	706	$99.16^{+0.33}_{-0.50}$
CMUP-MK	102	$99.03^{+0.82}_{-2.20}$

TABLE XV: Dataset bhmumm24_SAM: Muon L3 trigger efficiencies