

TPC Single Track Systematics

6th November 2023

Package: tpcSingleTrackEffSystematics

Samples used for Data PROD7 V13(full: run4 air,
run6a air FHC,
run6b air RHC,
run6c air RHC,
run6d air RHC,
run6e air RHC,
run6f air FHC,
run7b,
run8 water FHC) POT:9.4021510e+20

Samples used for MC PROD7 V12(full: run4 air,
rrun8 water,
run6b antinu-air,
run7b antinu-water) POT:6.1647594e+21

Samples used for Data for comparison PROD6 & PROD7:

Data PROD7 (run4 air) POT:1.7895474e+20

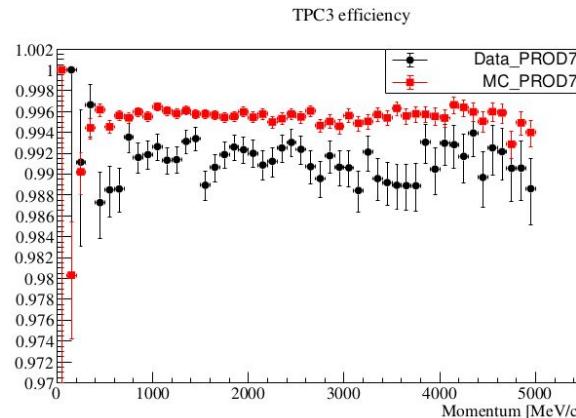
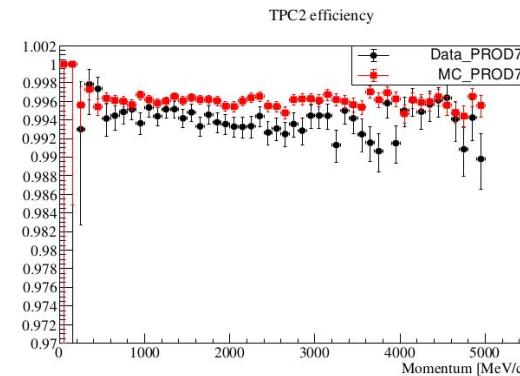
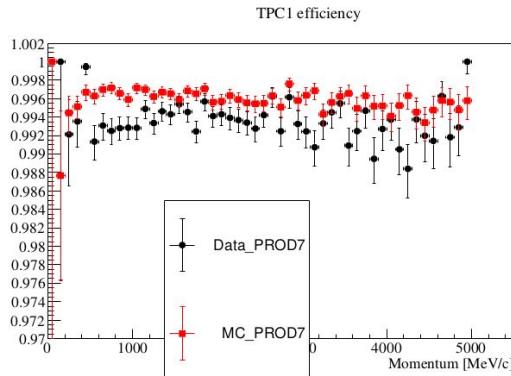
Data PROD6 (run4 air+water) POT:3.48455495729484923e+20

Samples used for MC for comparison PROD6 & PROD7:

MC PROD7 (run4 air) POT: 3.4504682e+21

MC PROD6 (run4 air+water) POT: 7.22434321272520311e+21

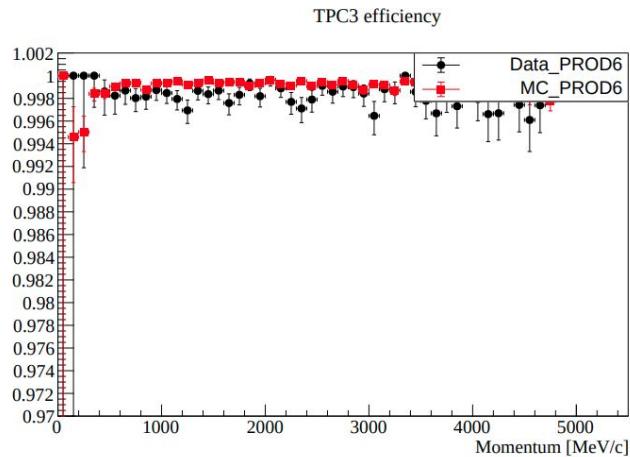
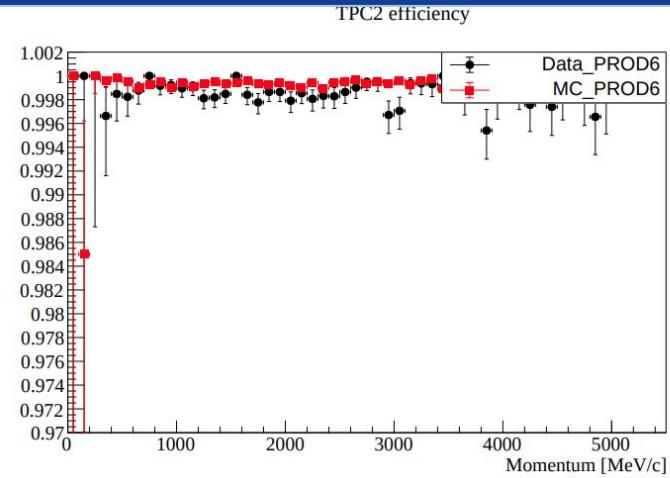
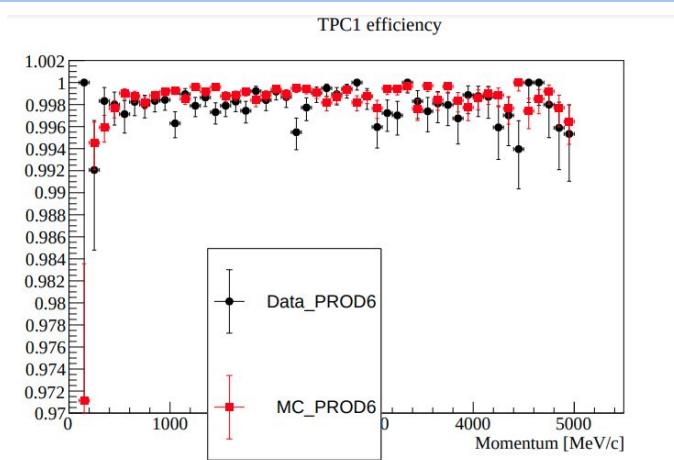
Comparison 7PROD: DATA & MC



Comparison 7PROD: DATA & MC

Efficiency(%)	Data	MC
TPC1	99.367 +0.021-0.021	99.613 +0.013-0.013
TPC2	99.397 +0.019-0.019	99.602 +0.009-0.009
TPC3	99.134 +0.024-0.024	99.555 +0.008-0.009

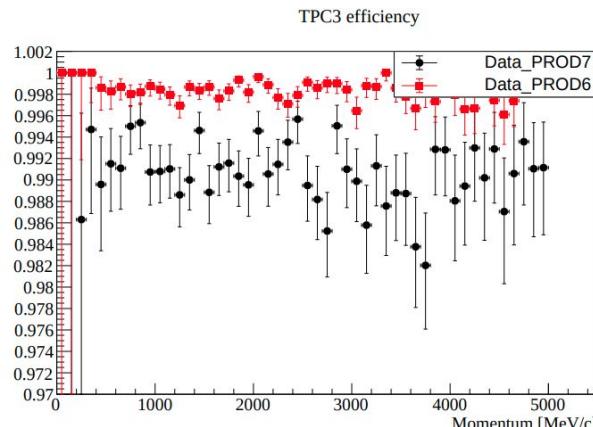
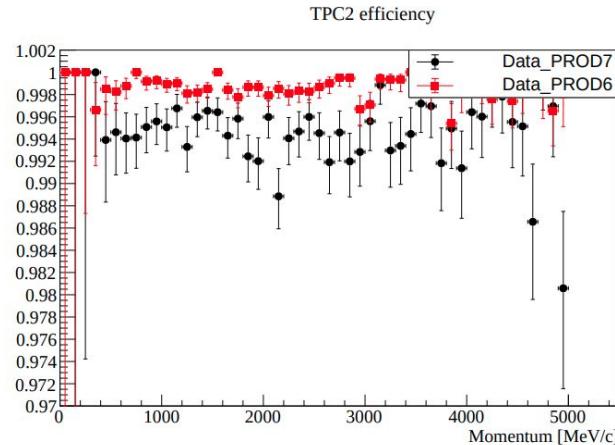
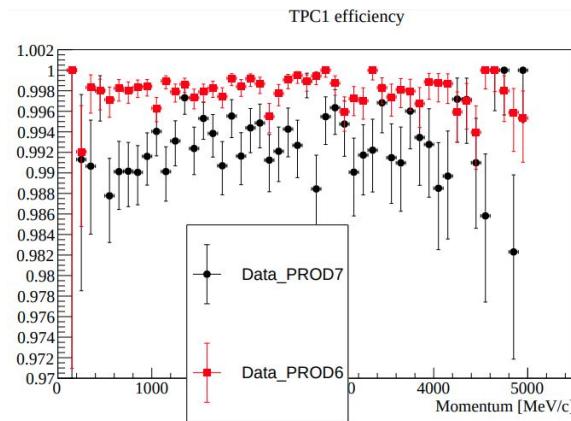
Comparison 6PROD: DATA & MC



Comparison 6PROD: DATA & MC

Efficiency(%)	Data	MC
TPC1	99.807 +0.015-0.016	99.879 +0.008-0.008
TPC2	99.864 +0.012-0.013	99.933 +0.004-0.004
TPC3	99.834 +0.014-0.014	99.920 +0.004-0.004

Comparison DATA: 6PROD & 7PROD



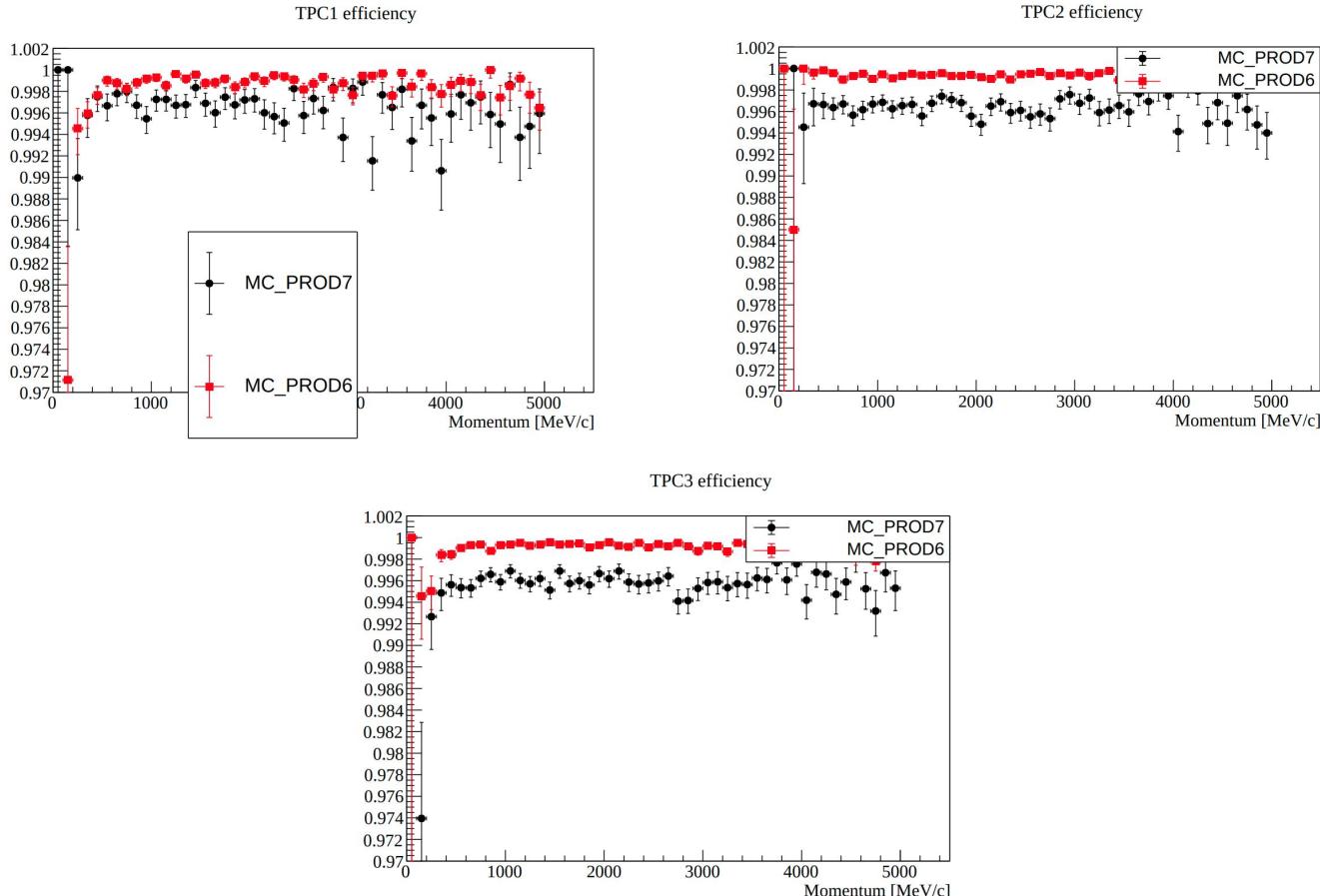
*PROD6: run 4 water + run 4 air
*PROD7: run 4 air

Comparison DATA: 6PROD & 7PROD

Efficiency(%)	PROD6	PROD7
TPC1	99.807 +0.015-0.016	99.303 +0.041-0.043
TPC2	99.864 +0.012-0.013	99.452 +0.034-0.035
TPC3	99.834 +0.014-0.014	99.077 +0.046-0.047

*PROD6: run 4 water + run 4 air
*PROD7: run 4 air

Comparison MC: 6PROD & 7PROD



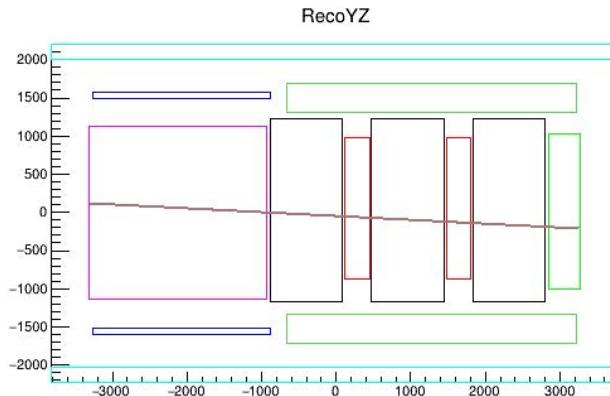
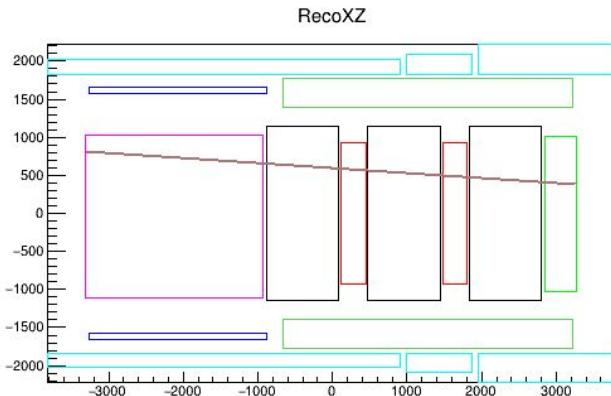
Comparison MC: 6PROD & 7PROD

Efficiency(%)	PROD6	PROD7
TPC1	99.879 +0.008-0.008)	99.658 +0.020-0.021
TPC2	99.933 +0.004-0.004	99.640 +0.014-0.014
TPC3	99.920 +0.004-0.004	99.589 +0.013-0.014

Event analysis

Run: 9427
SubRun: 22
Evt: 255919

Event reconstructed in PROD7

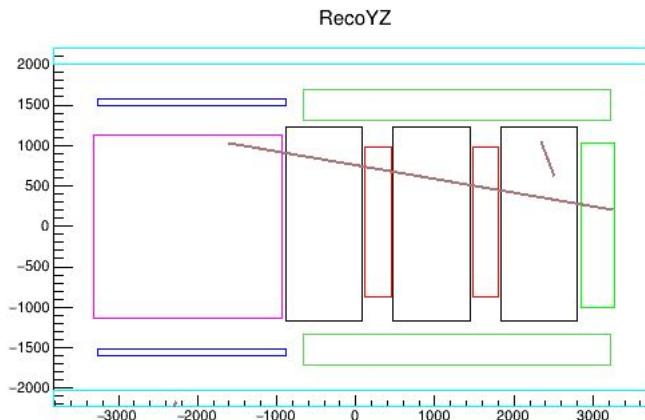
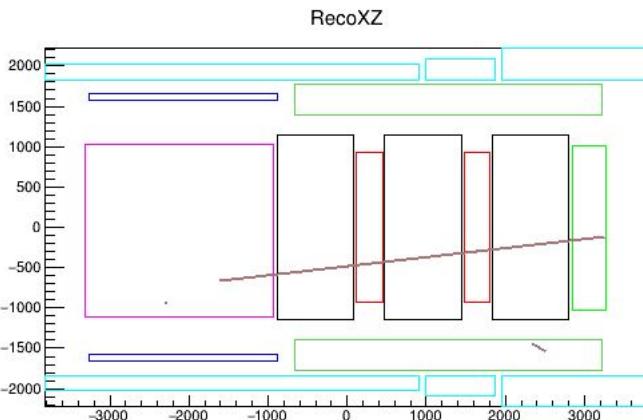


NTPCs:	3
NFGDs:	2
NP0Ds:	1
NECALs:	1
NSMRDs:	0
IsFlipped:	0

Event analysis

Run: 9427
SubRun: 22
Evt: 265014

Event reconstructed in PROD7



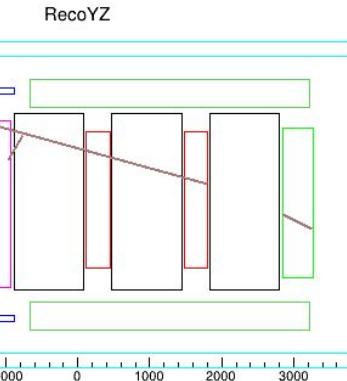
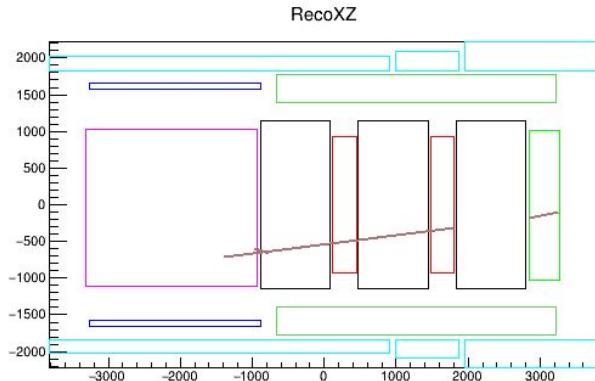
NTPCs: 3
NFGDs: 2
NP0Ds: 1
NECALs: 1
NSMRDs: 0
IsFlipped: 0

Event analysis

Run: 9427
SubRun: 30
Evt: 355264

PROD7

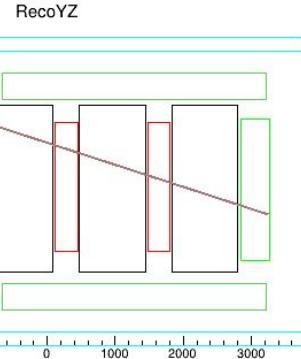
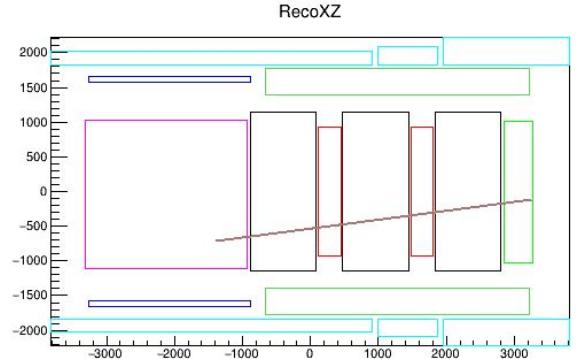
Event not reconstructed in PROD7



particle 0

NTPCs: 2
NFGDs: 2
NP0Ds: 1
NECALs: 0
NSMRDs: 0
IsFlipped: 0

PROD6



particle 0

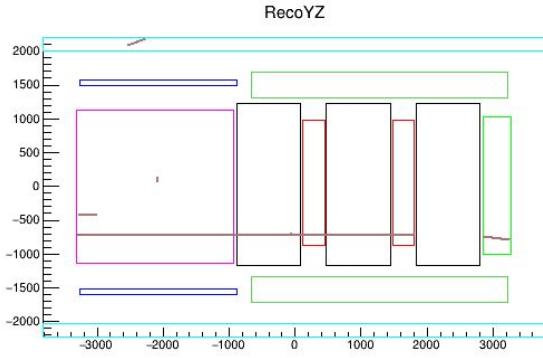
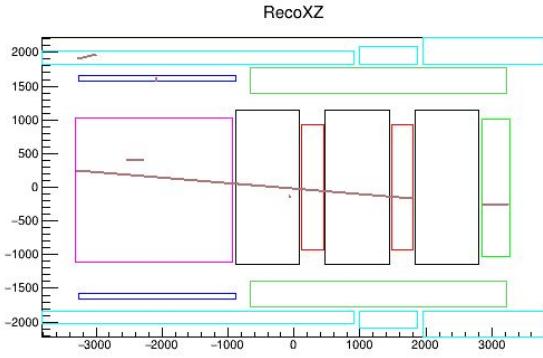
NTPCs: 3
NFGDs: 2
NP0Ds: 1
NECALs: 1
NSMRDs: 0
IsFlipped: 0

Event analysis

Run: 9427
SubRun: 22
Evt: 256281

PROD7

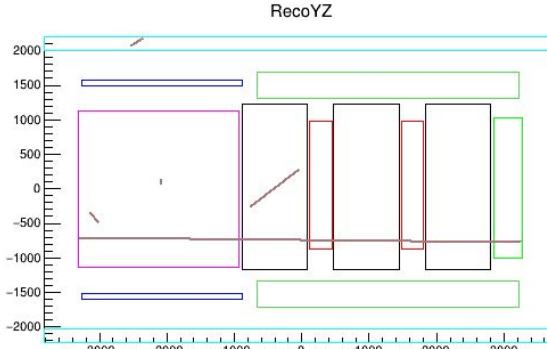
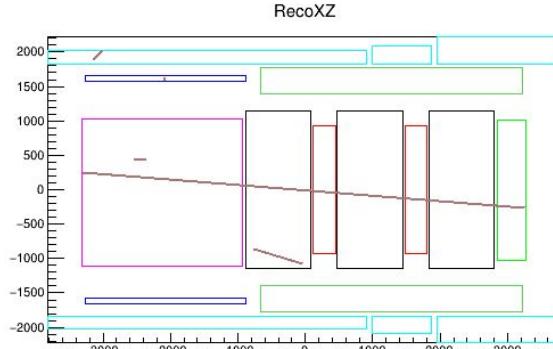
Event not reconstructed in PROD7



particle 0

NTPCs:	2
NFGDs:	2
NP0Ds:	1
NECALs:	0
NSMRDs:	0
IsFlipped:	0

PROD6

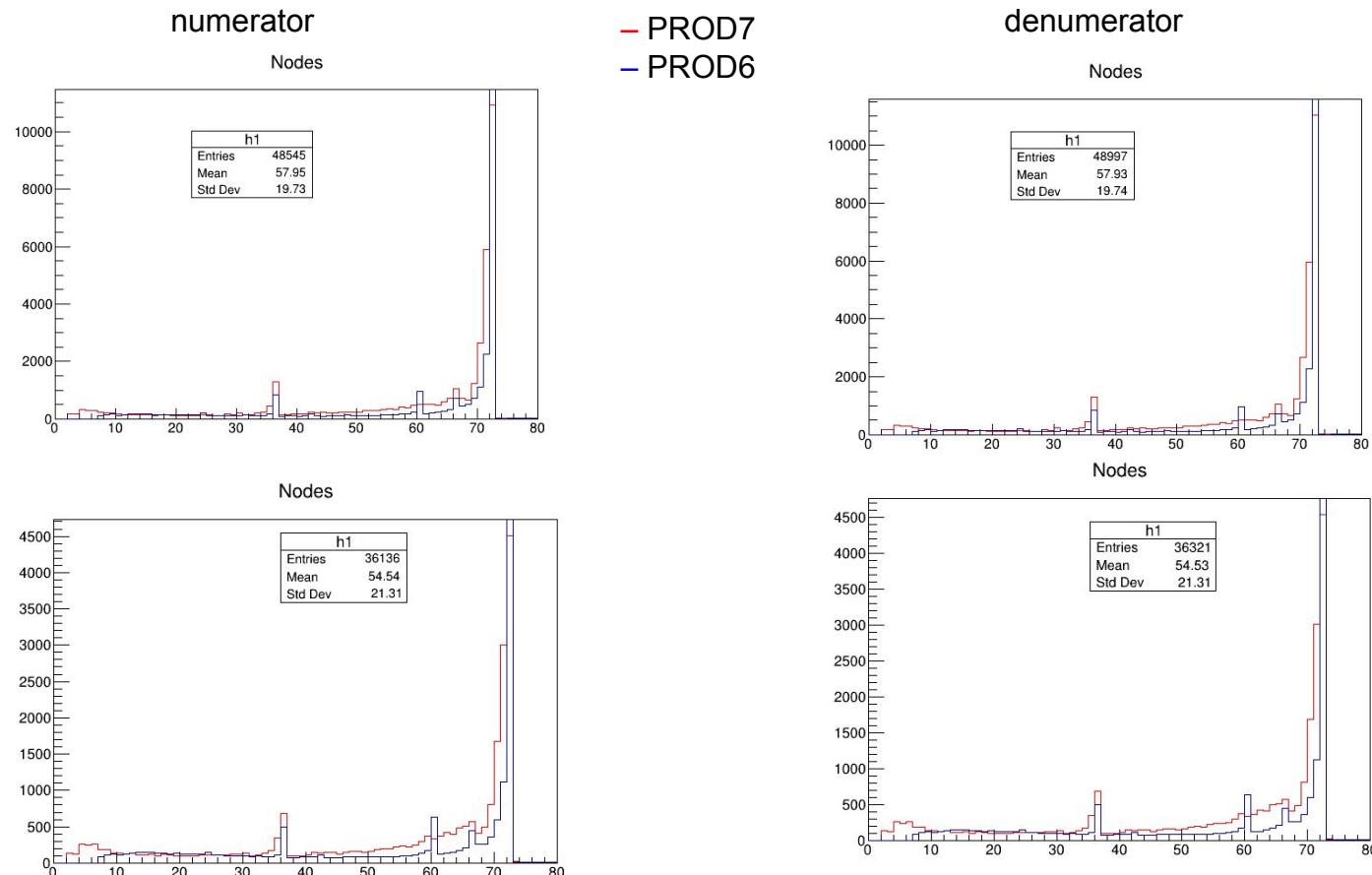


particle 0

NTPCs:	3
NFGDs:	2
NP0Ds:	1
NECALs:	1
NSMRDs:	0
IsFlipped:	0

Nodes for TPC1

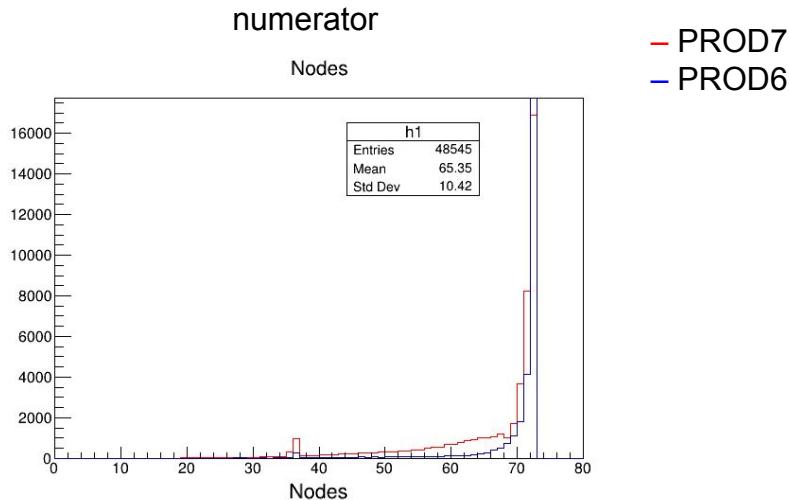
Data



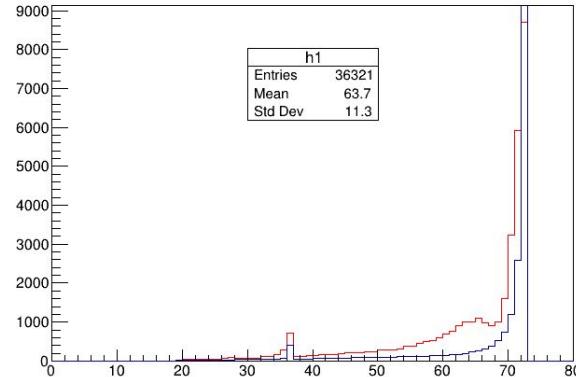
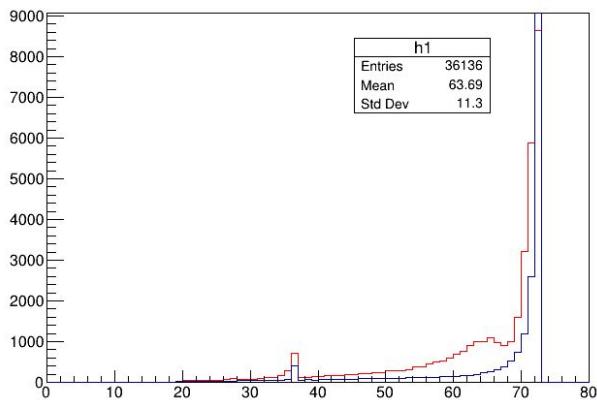
MC

Nodes for TPC2

Data

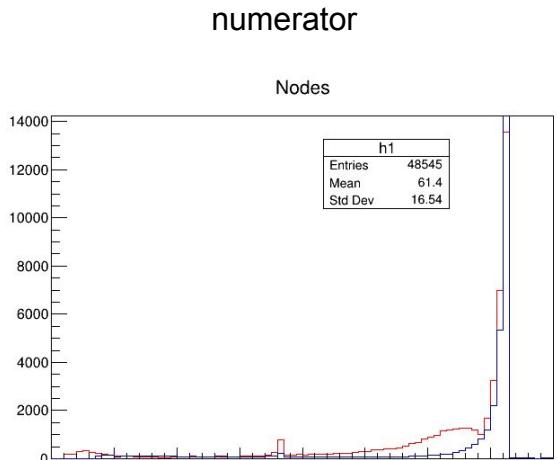


MC



Nodes for TPC3

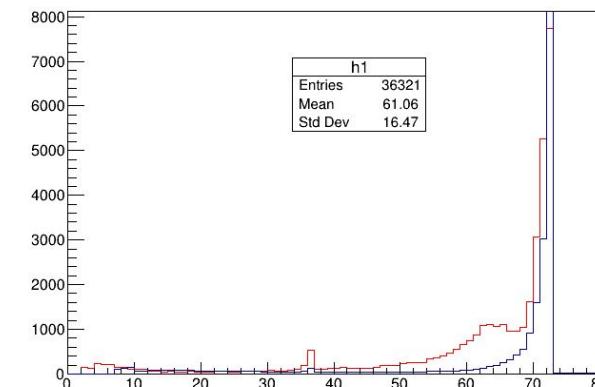
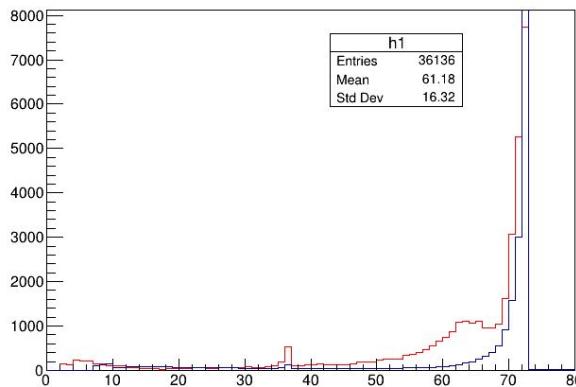
Data



— PROD7
— PROD6

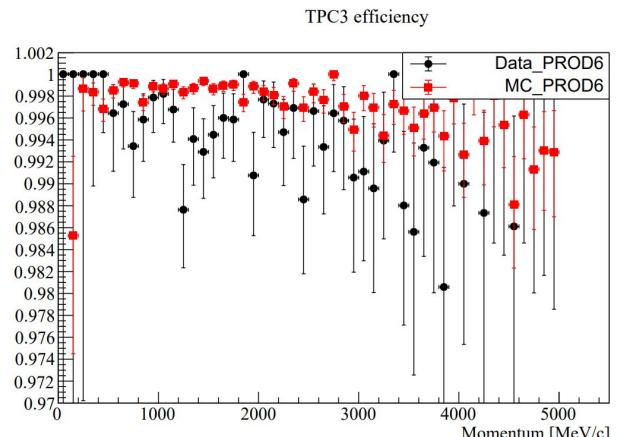
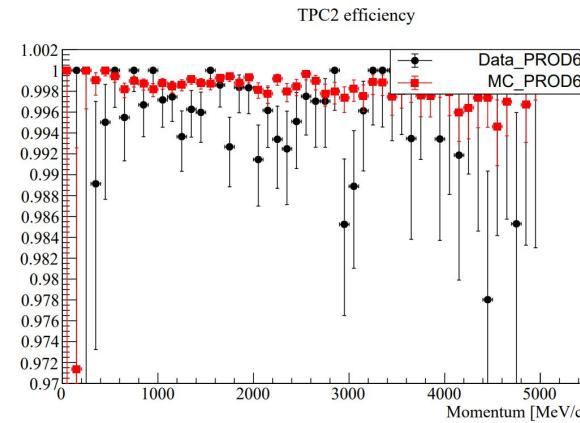
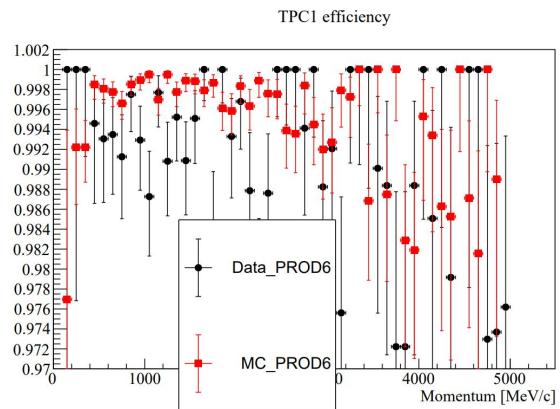


MC



Comparison Data PROD6 and MC PROD6 . Track crosses the cathode

Eff_SameCathSide == 0



Comparison Data PROD6 and MC PROD6 .

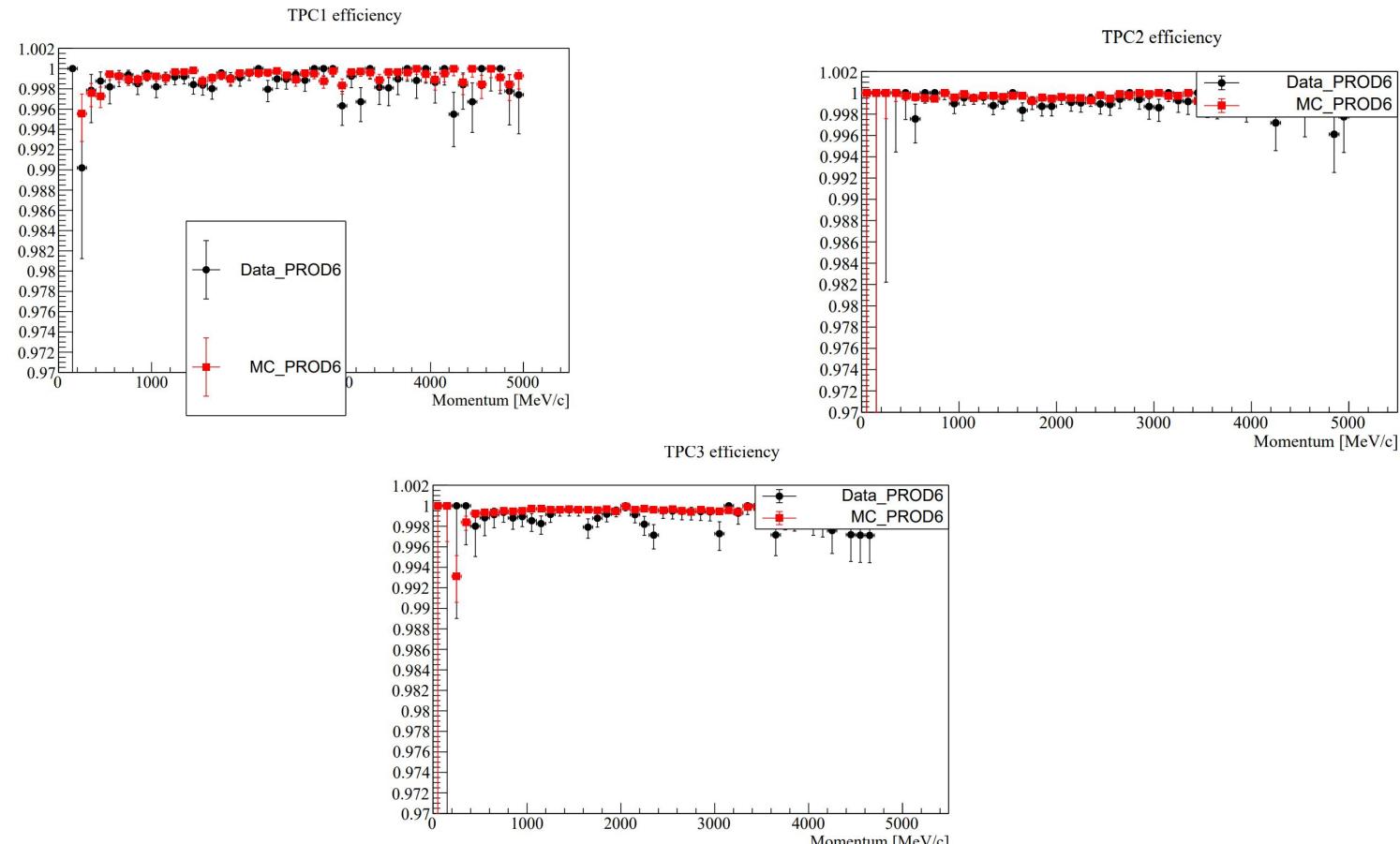
Eff_SameCathSide == 0

Track crosses the cathode

Efficiency(%)	Data	MC
TPC1	99.257 +0.084-0.090	99.682 +0.029-0.031
TPC2	99.607 +0.046-0.050	99.858 +0.011-0.012
TPC3	99.464 +0.061-0.067	99.807 +0.012-0.013

Comparison Data PROD6 and MC PROD6 . On the one side

Eff_SameCathSide == 1

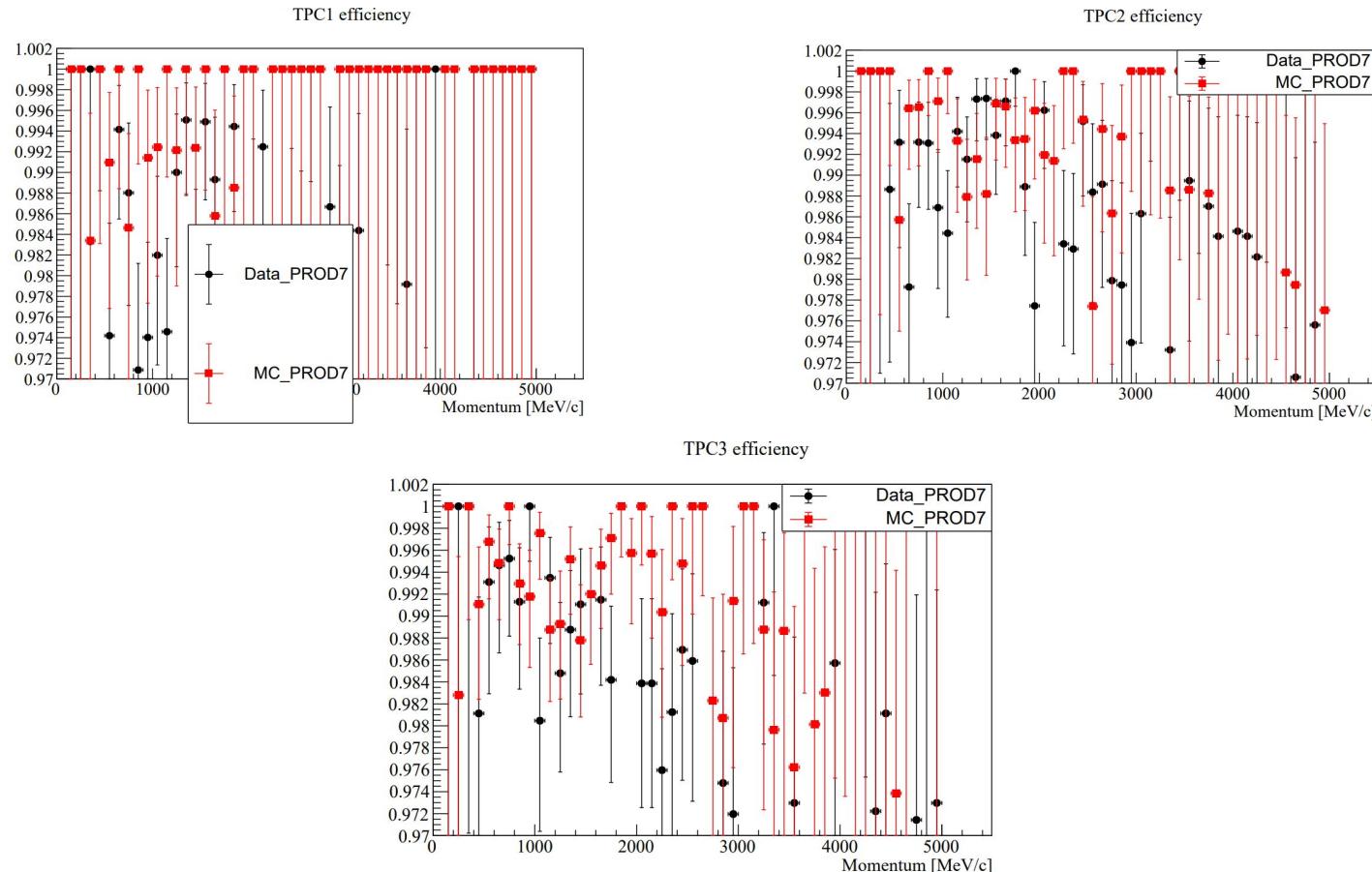


On the one side

Efficiency(%)	Data	MC
TPC1	99.887 +0.012-0.013	99.926 +0.007-0.007
TPC2	99.926 +0.010-0.011	99.963 +0.004-0.004
TPC3	99.902 +0.011-0.012	99.956 +0.003-0.003

Comparison Data PROD7 and MC PROD7. Track crosses the cathode

Eff_SameCathSide == 0



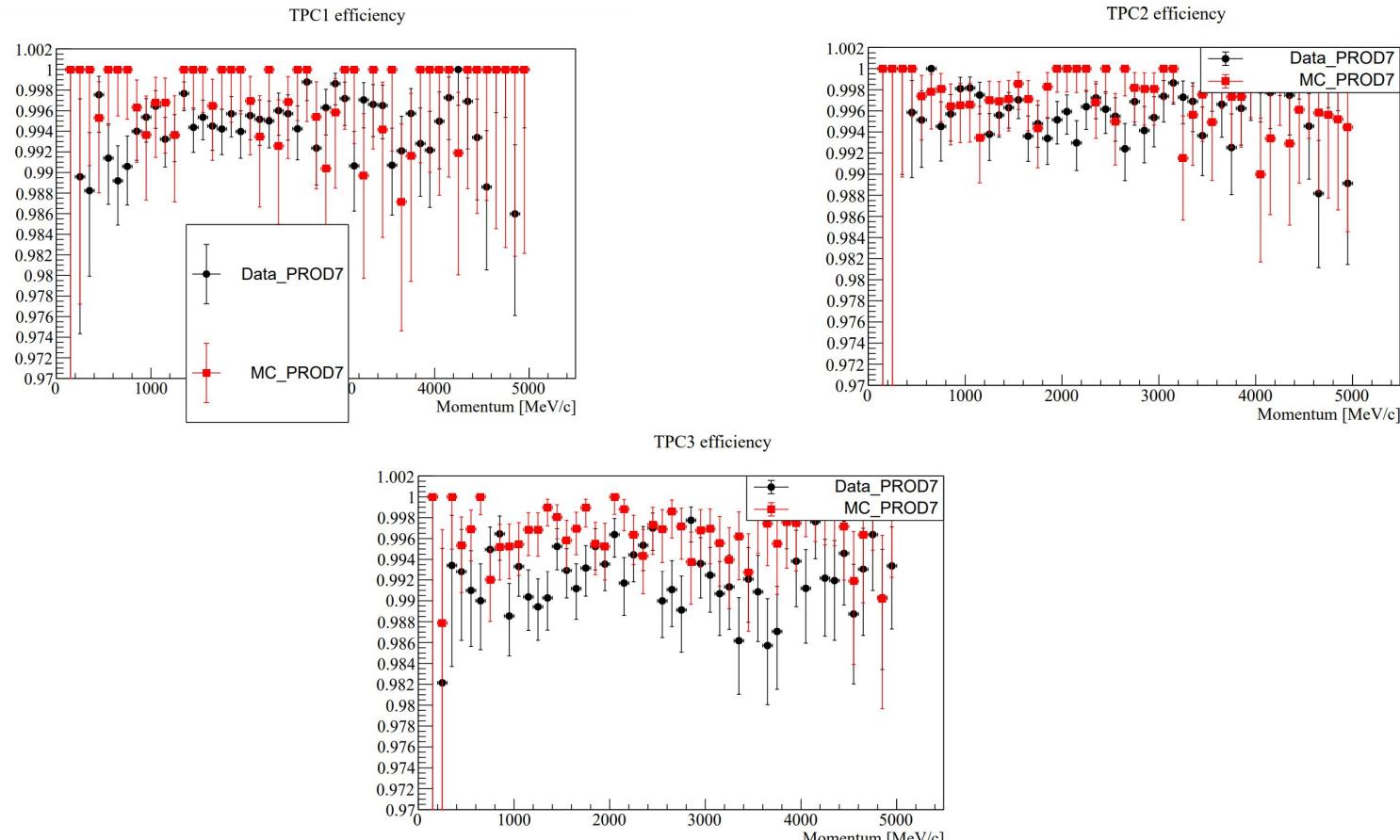
Comparison Data PROD7 and MC PROD7. Track crosses the cathode

Eff_SameCathSide == 0

Efficiency(%)	Data	MC
TPC1	98.054 +0.191-0.205	99.416 +0.148-0.178
TPC2	98.820 +0.115-0.123	99.435 +0.088-0.098
TPC3	98.076 +0.168-0.179	99.348 +0.089-0.097

Comparison Data PROD7 and MC PROD7. On the one side

Eff_SameCathSide == 1

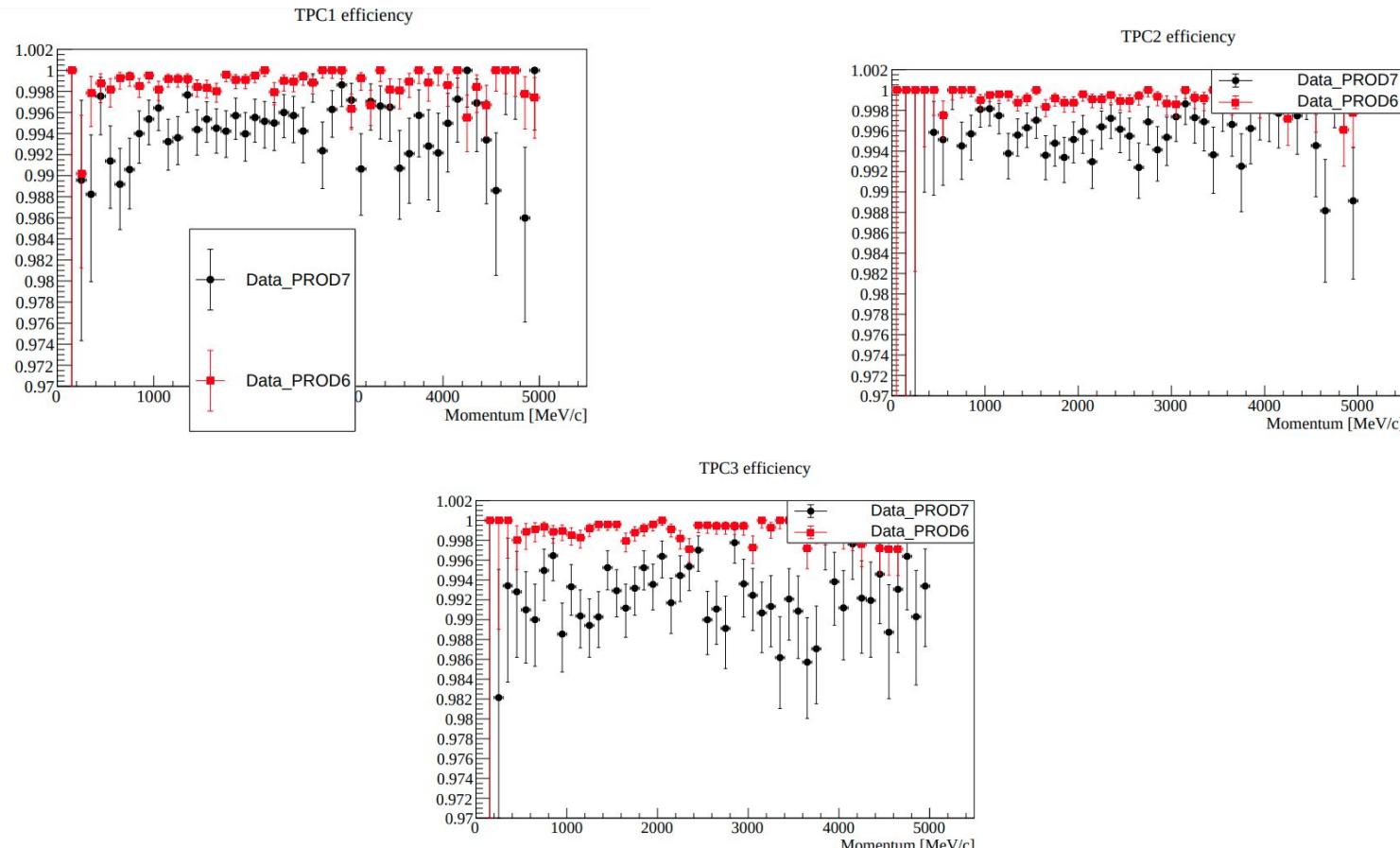


On the one side

Efficiency(%)	Data	MC
TPC1	99.479 +0.038-0.040	99.740 +0.050-0.058
TPC2	(99.589 +0.032-0.034	99.736 +0.037-0.040
TPC3	99.254 +0.045-0.047	99.674 +0.035-0.038

Comparison Data PROD6 and Data PROD7. On the one side

Eff_SameCathSide == 1



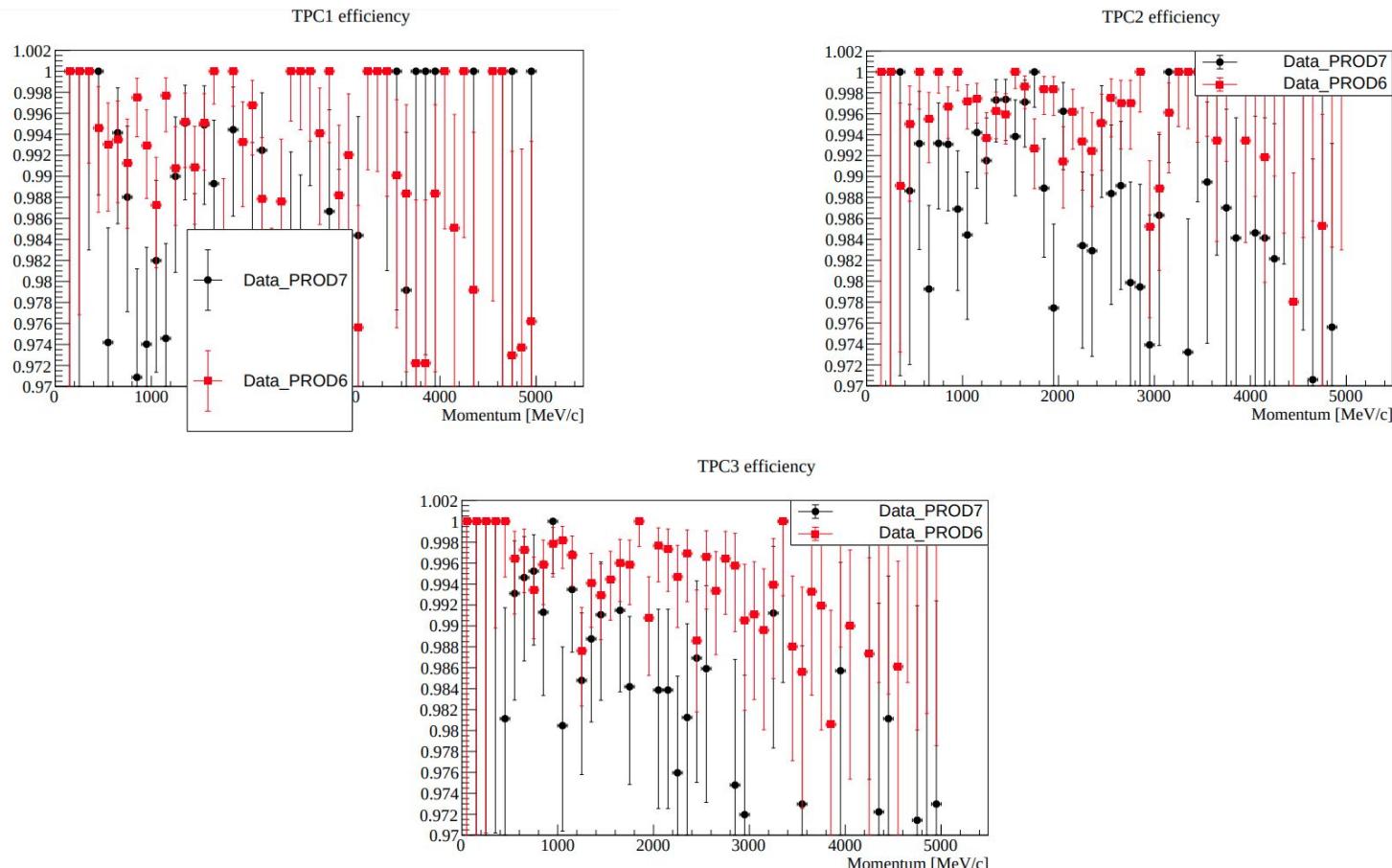
Comparison Data PROD6 and Data PROD7. Eff_SameCathSide == 1

On the one side

Efficiency(%)	PROD6	PROD7
TPC1	99.887 +0.012-0.013	99.479 +0.038-0.040
TPC2	99.926 +0.010-0.011	99.589 +0.032-0.034
TPC3	99.902 +0.011-0.012	99.254 +0.045-0.047

Comparison Data PROD6 and Data PROD7. Track crosses the cathode

Eff_SameCathSide == 0



Comparison Data PROD6 and Data PROD7. Eff_SameCathSide == 0

Track crosses the cathode

Efficiency(%)	PROD6	PROD7
TPC1	99.257 +0.084-0.090	98.054 +0.191-0.205
TPC2	99.607 +0.046-0.050	98.820 +0.115-0.123
TPC3	99.464 +0.061-0.067	98.076 +0.168-0.179