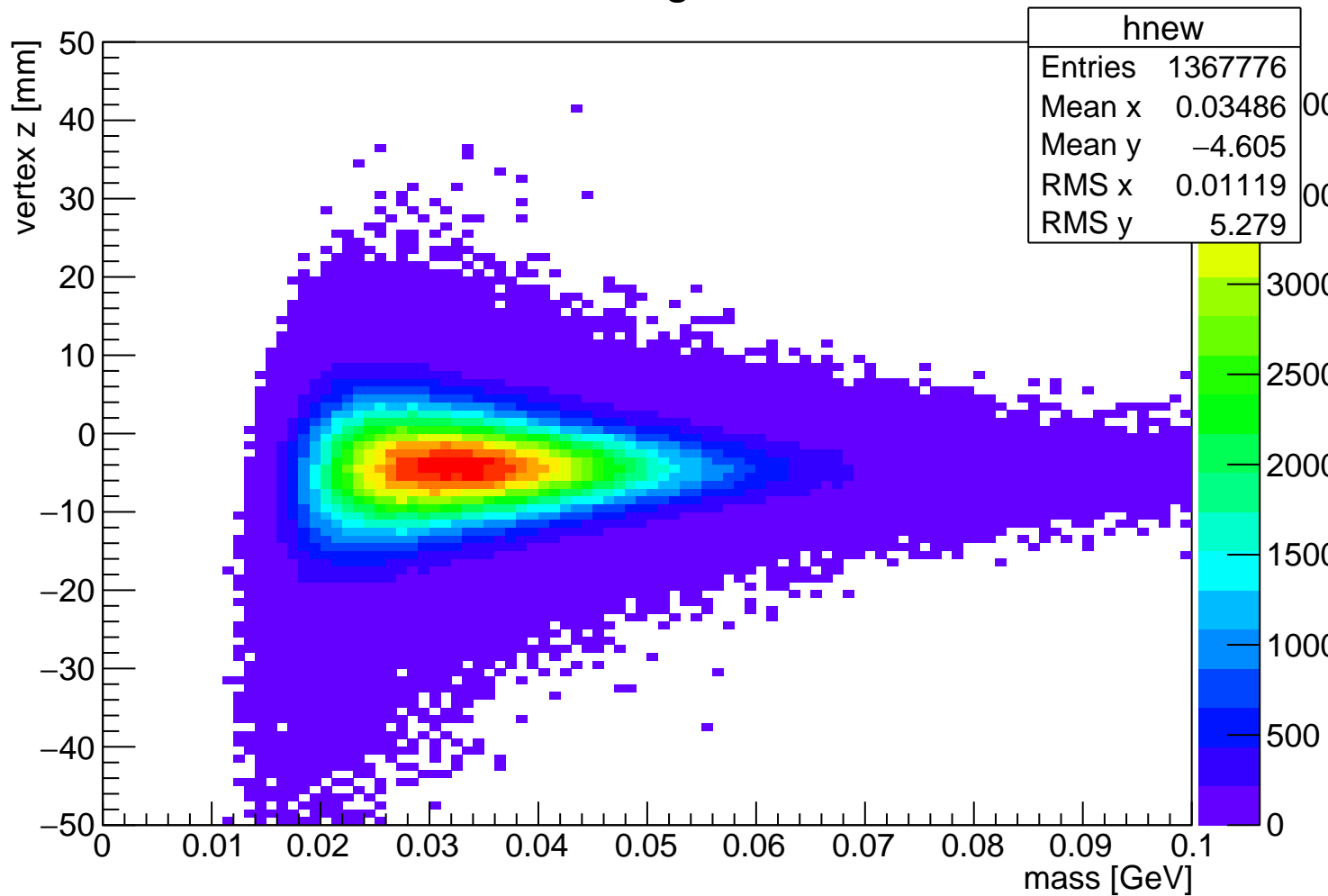
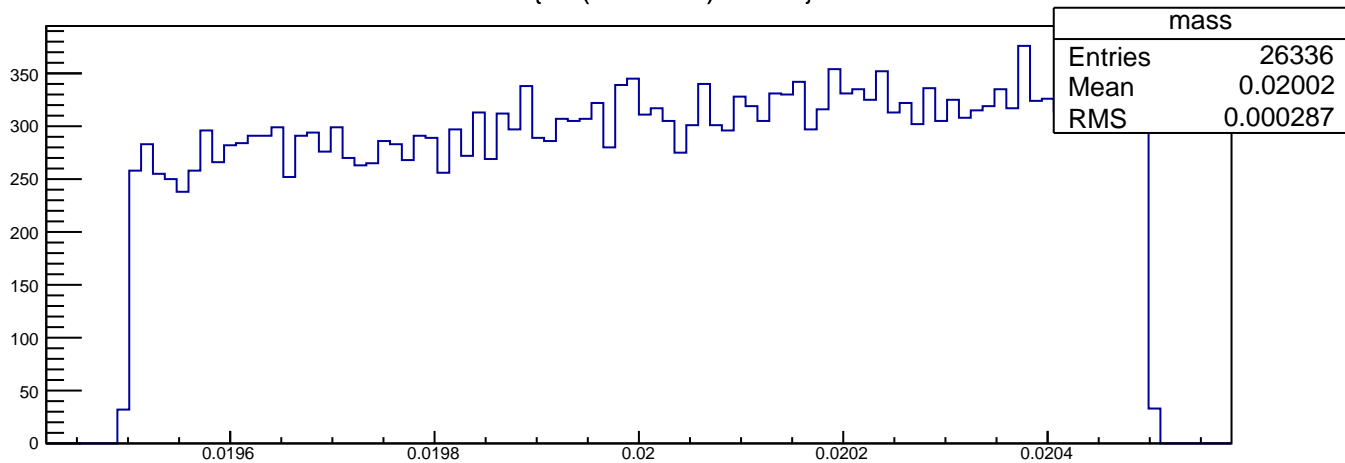


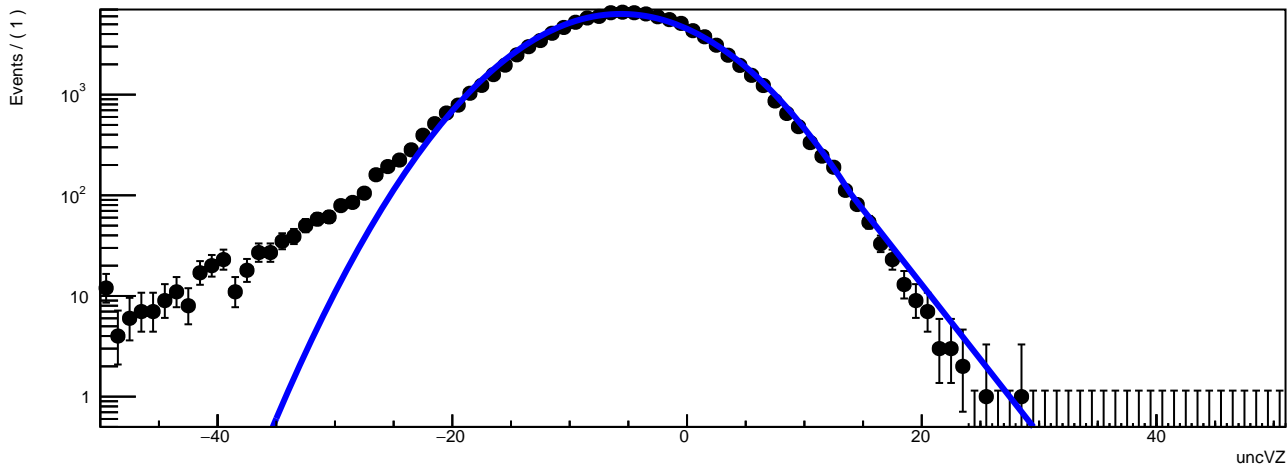
# vertexing data



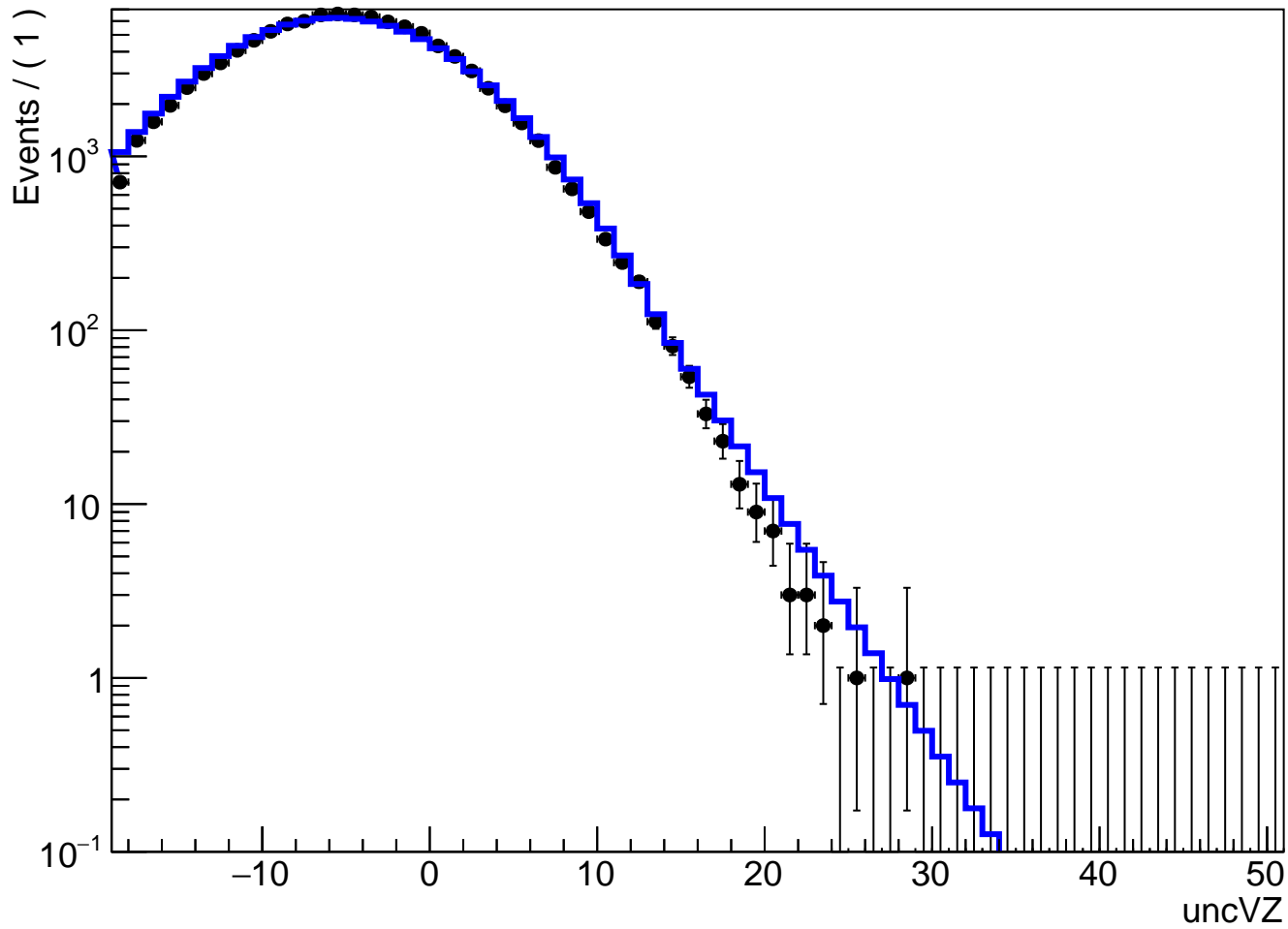
uncM {abs(uncM-0.02)<0.0005}



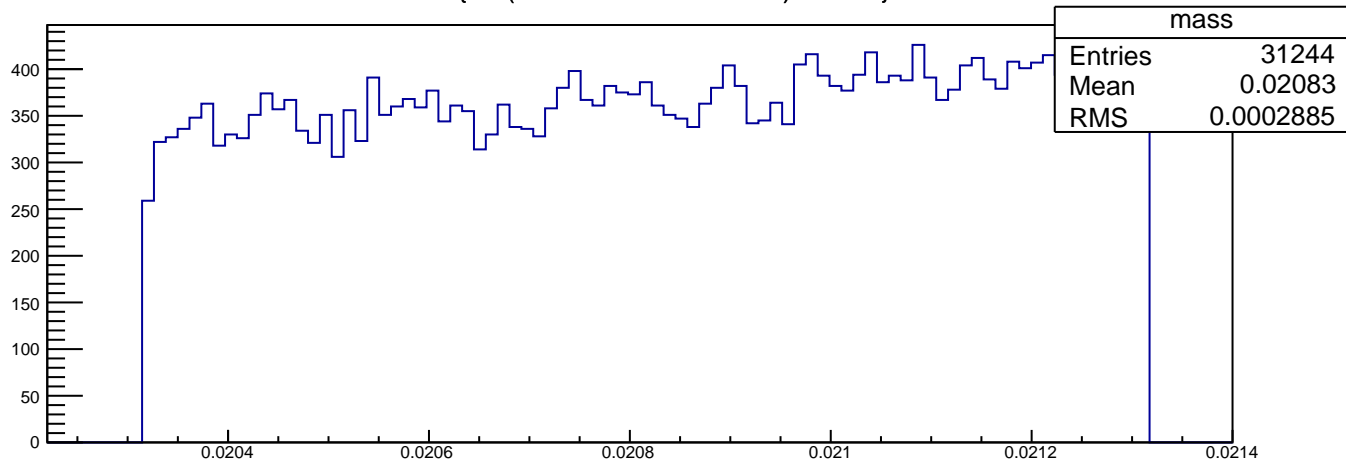
vertex Z, mass 0.02 +/- 0.00207641316145 GeV, zcut 32.5488283124 mm



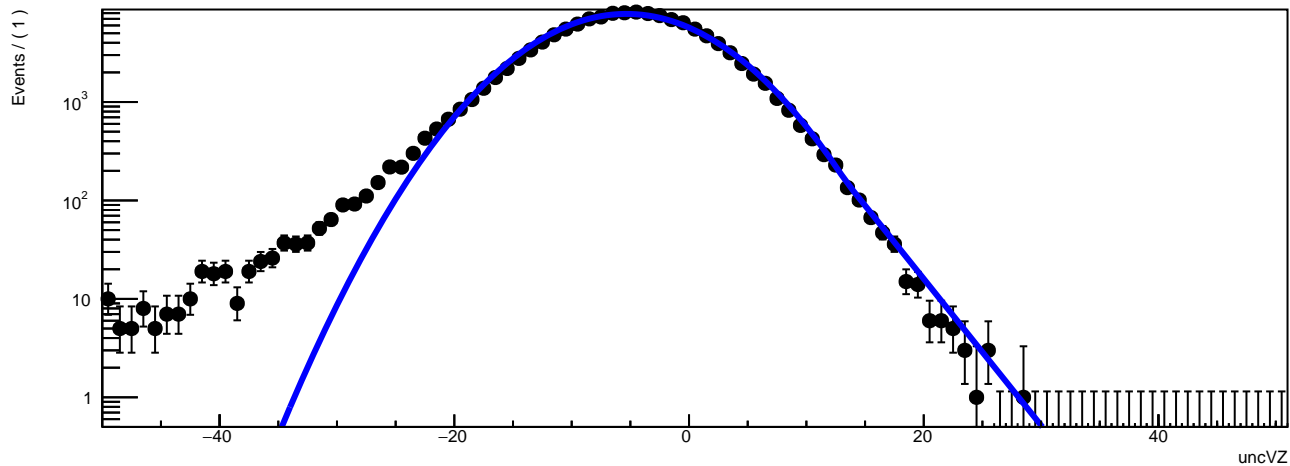
vertex Z, mass  $0.02 \pm 0.00207641316145$  GeV, zcut 32.5488283124 mm



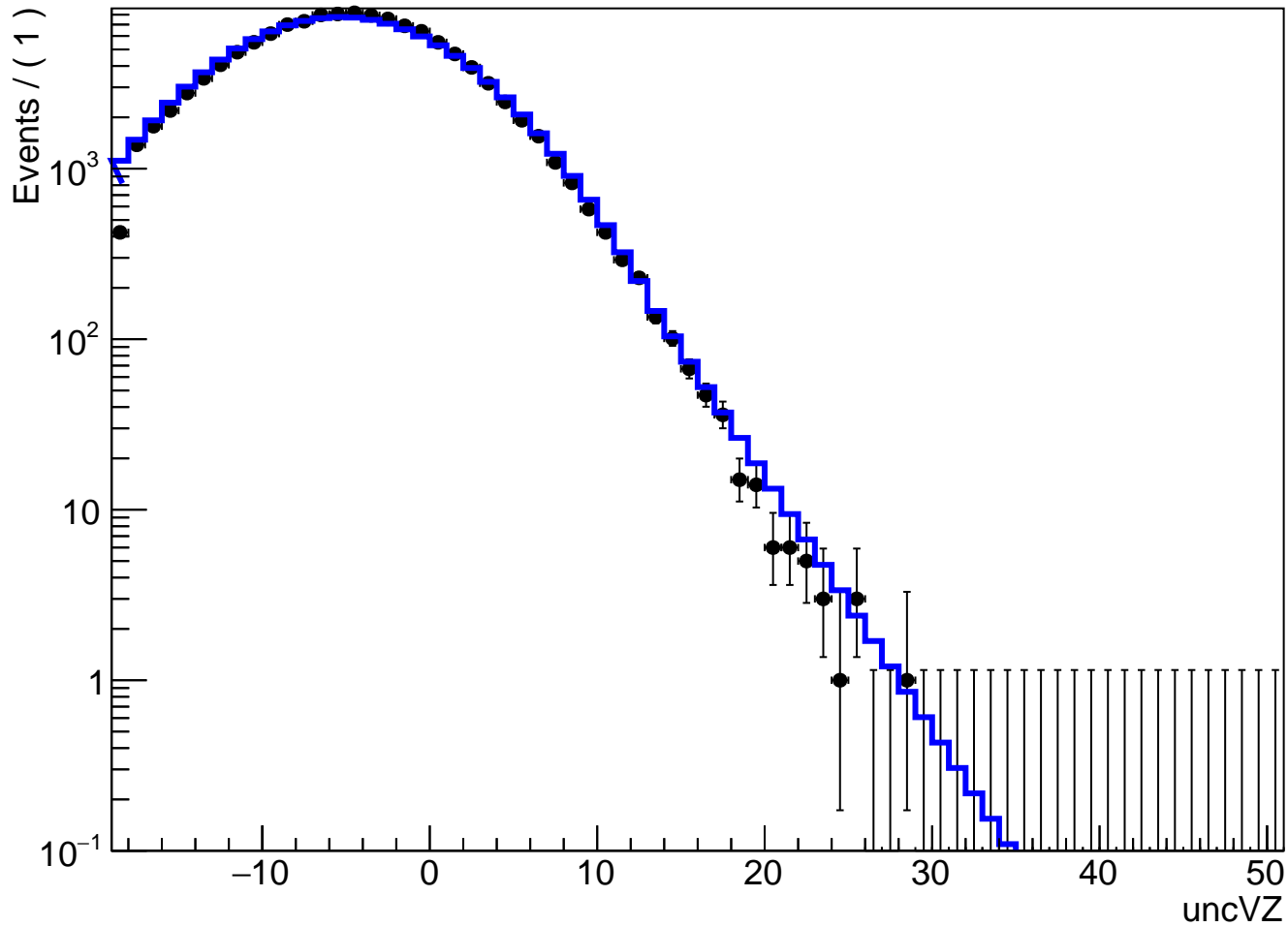
uncM {abs(uncM-0.0208163265306)<0.0005}



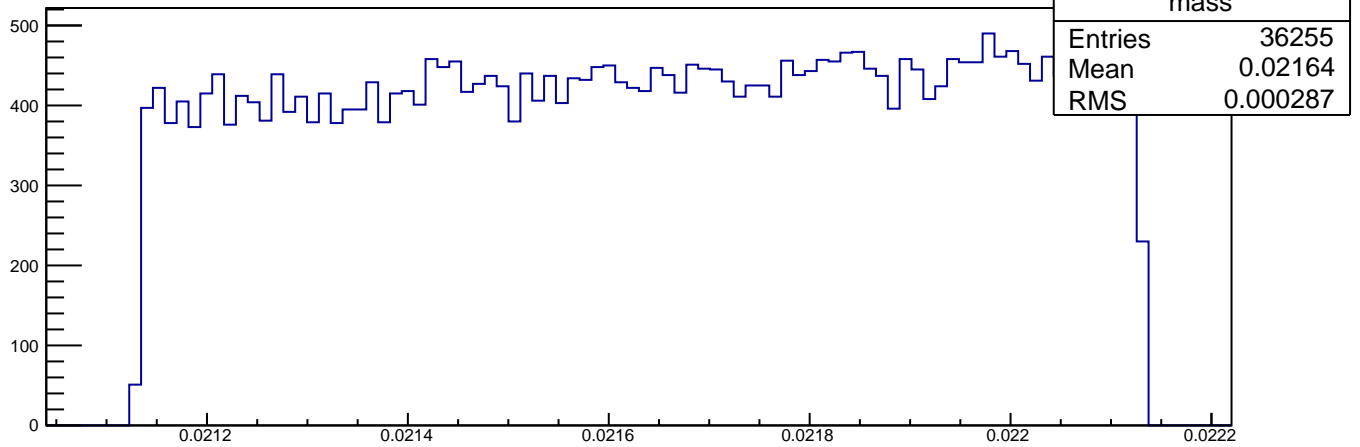
vertex Z, mass 0.0208163265306 +/- 0.00212000993478 GeV, zcut 33.1344656058 mm



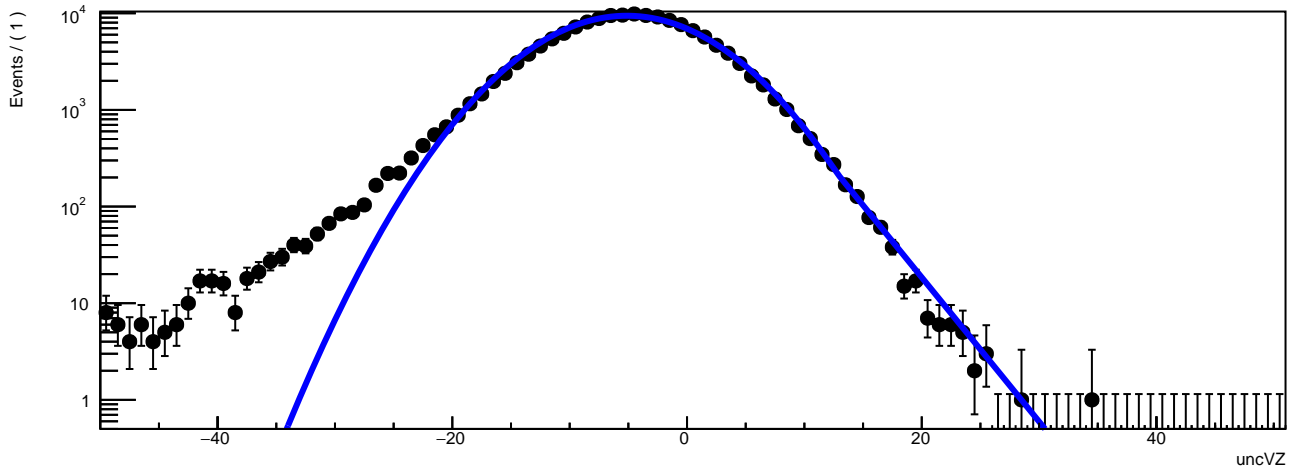
vertex Z, mass  $0.0208163265306 \pm 0.00212000993478$  GeV,  $z_{\text{cut}} 33.1344656058$  mm



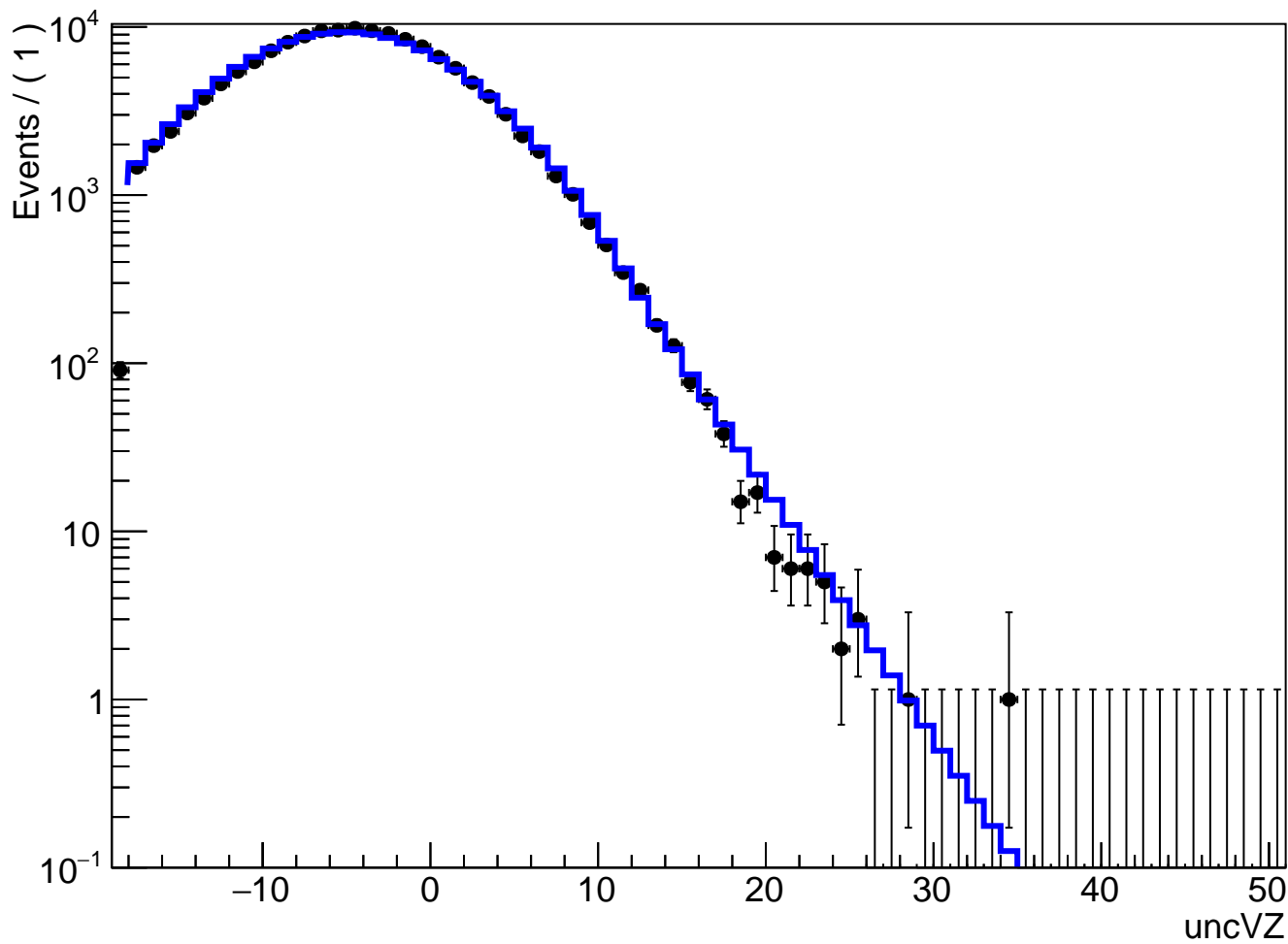
uncM {abs(uncM-0.0216326530612)<0.0005}



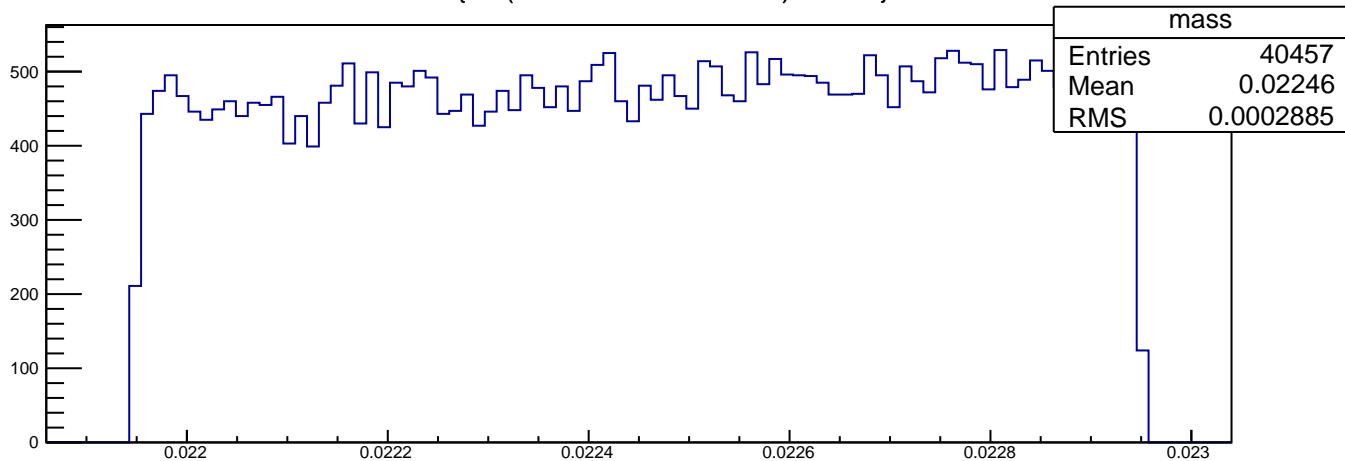
vertex Z, mass 0.0216326530612 +/- 0.00216360670812 GeV, zcut 33.5245258478 mm



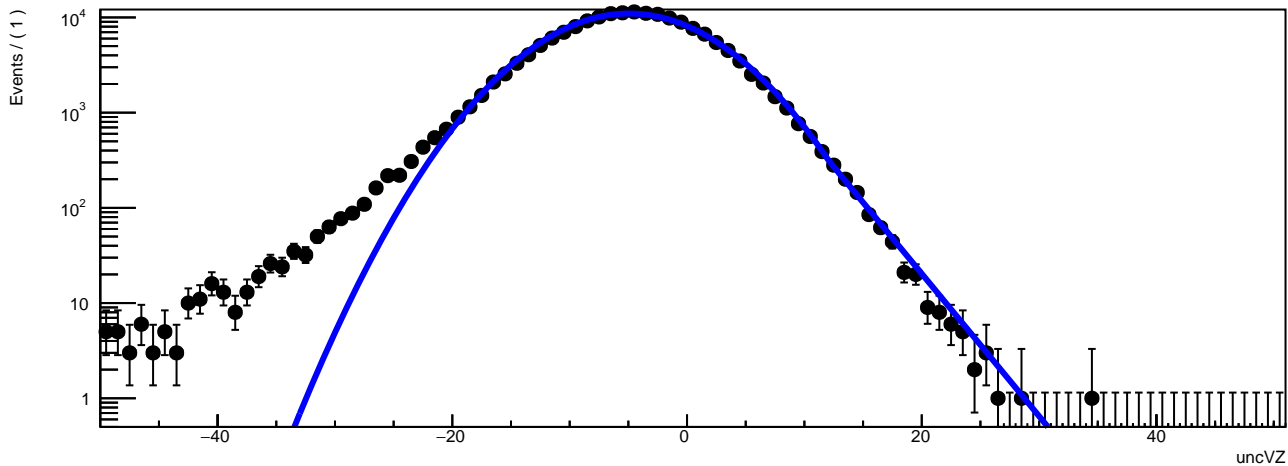
vertex Z, mass  $0.0216326530612 \pm 0.00216360670812$  GeV,  $z_{\text{cut}} 33.5245258478$  mm



uncM {abs(uncM-0.0224489795918)<0.0005}

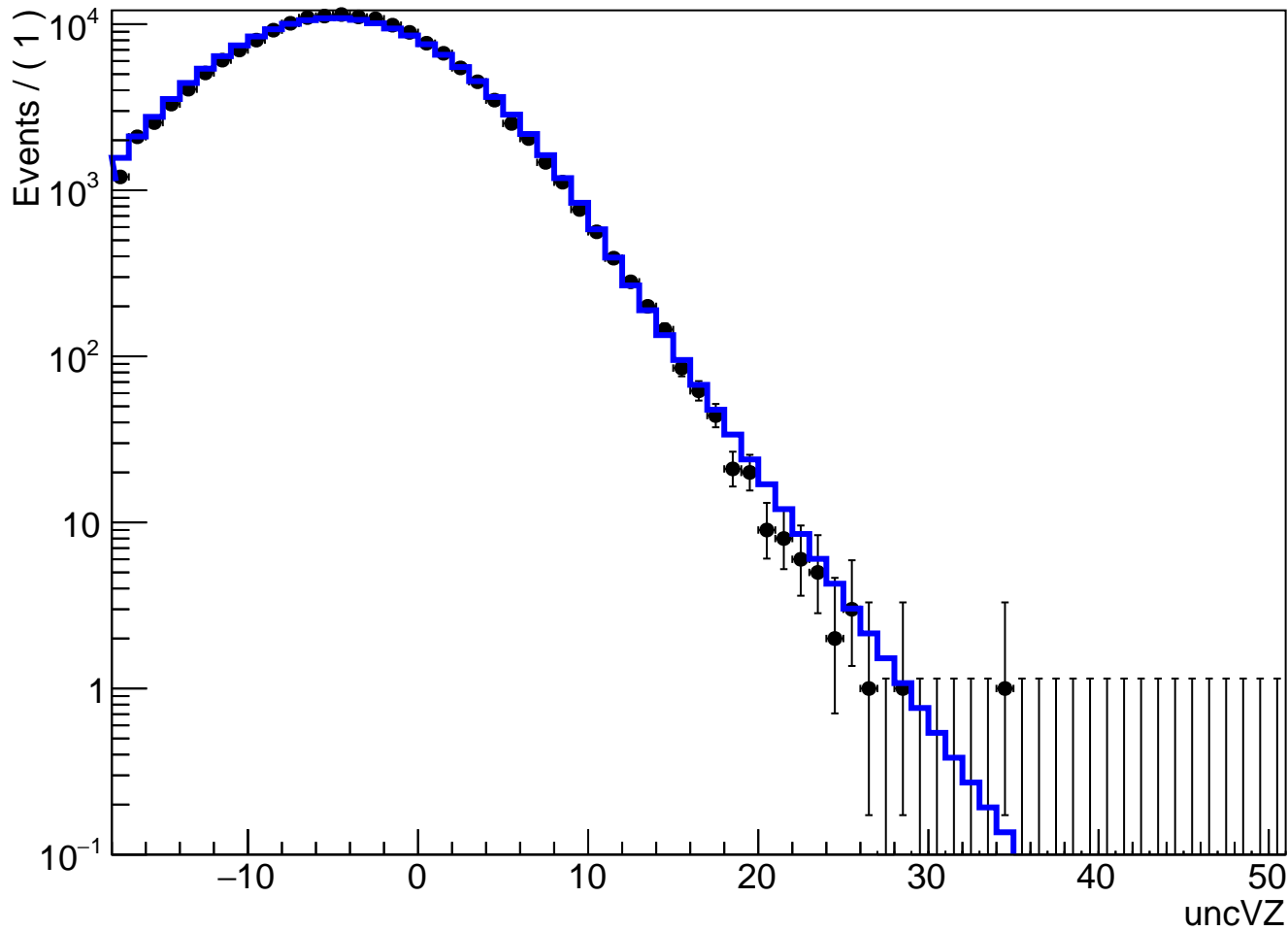


vertex Z, mass 0.0224489795918 +/- 0.00220720348146 GeV, zcut 33.7527116999 mm

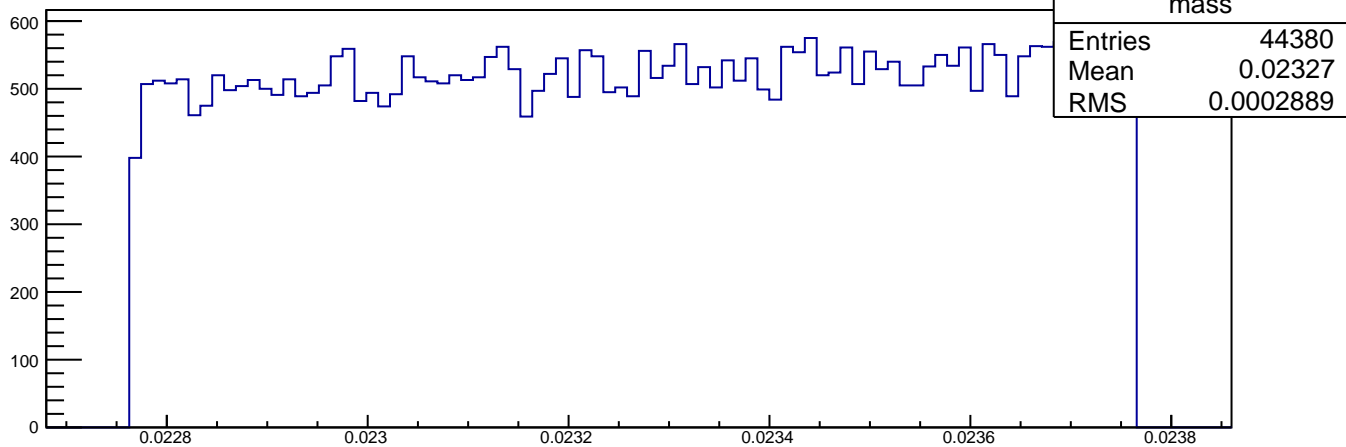




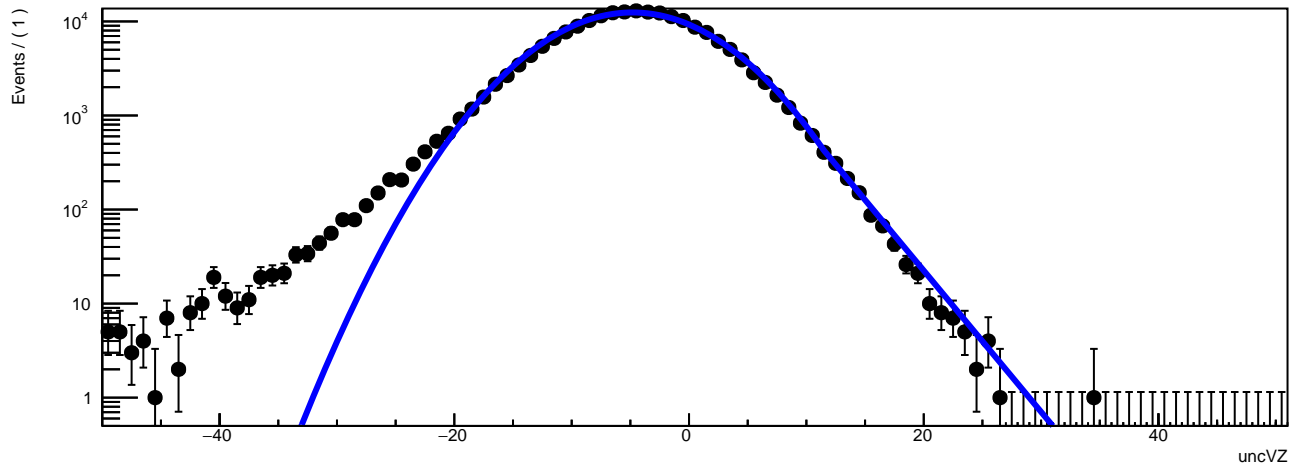
vertex Z, mass  $0.0224489795918 \pm 0.00220720348146$  GeV,  $z_{\text{cut}} 33.7527116999$  mm



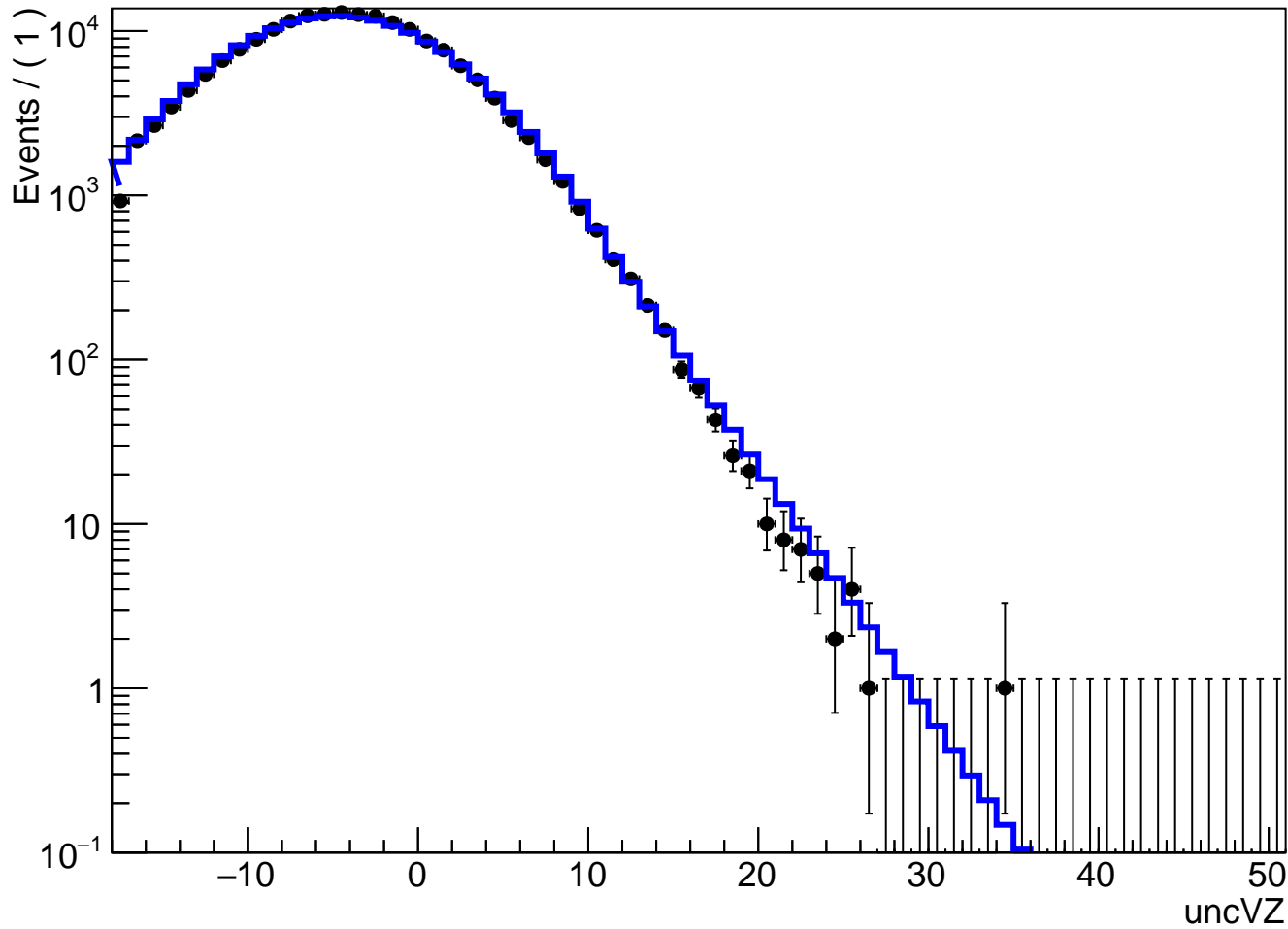
uncM {abs(uncM-0.0232653061224)<0.0005}



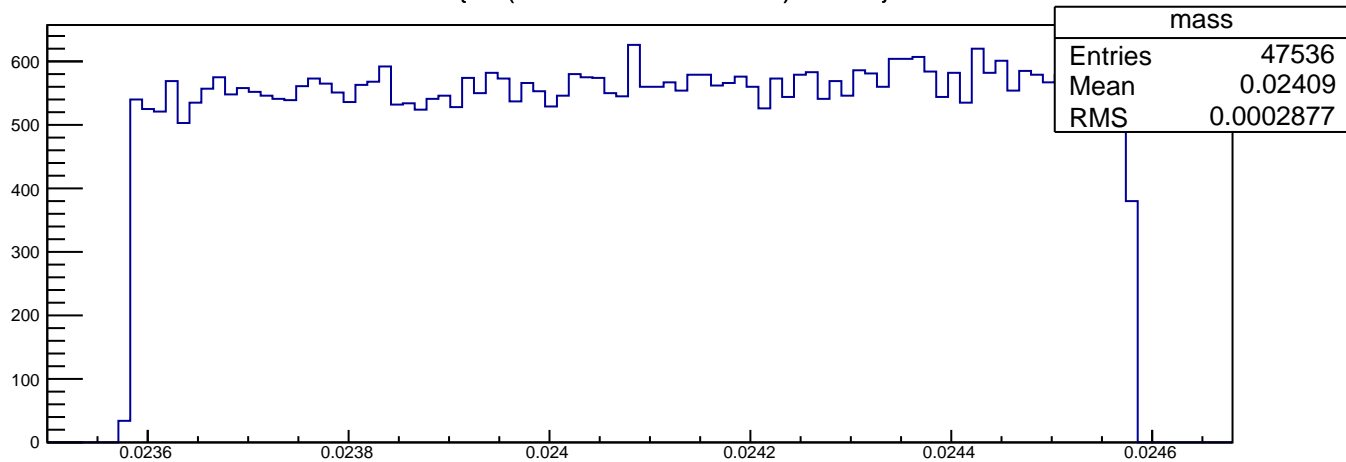
vertex Z, mass 0.0232653061224 +/- 0.0022508002548 GeV, zcut 33.9701739005 mm



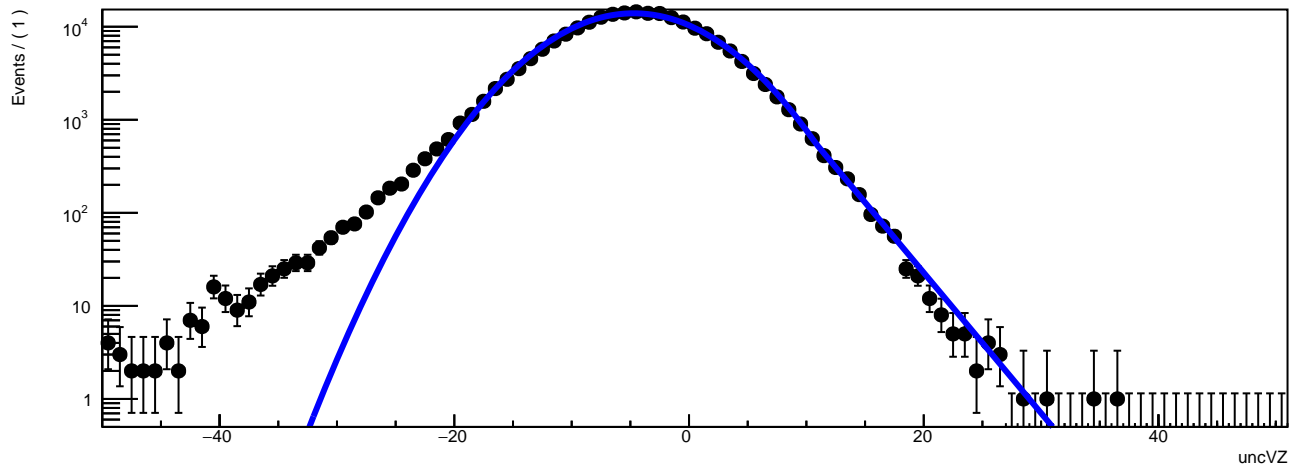
vertex Z, mass  $0.0232653061224 \pm 0.0022508002548$  GeV, zcut 33.9701739005 mm



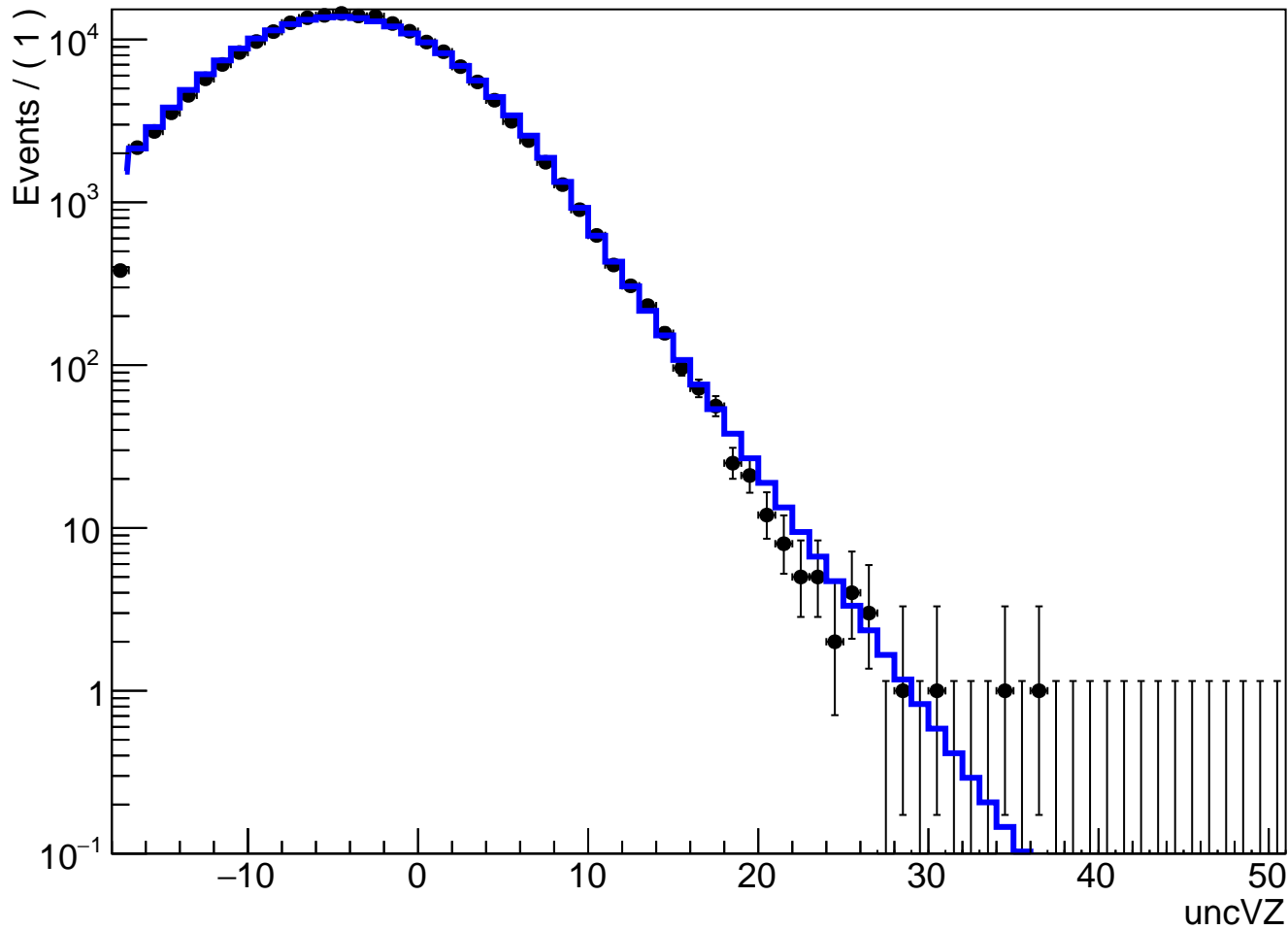
uncM {abs(uncM-0.0240816326531)<0.0005}



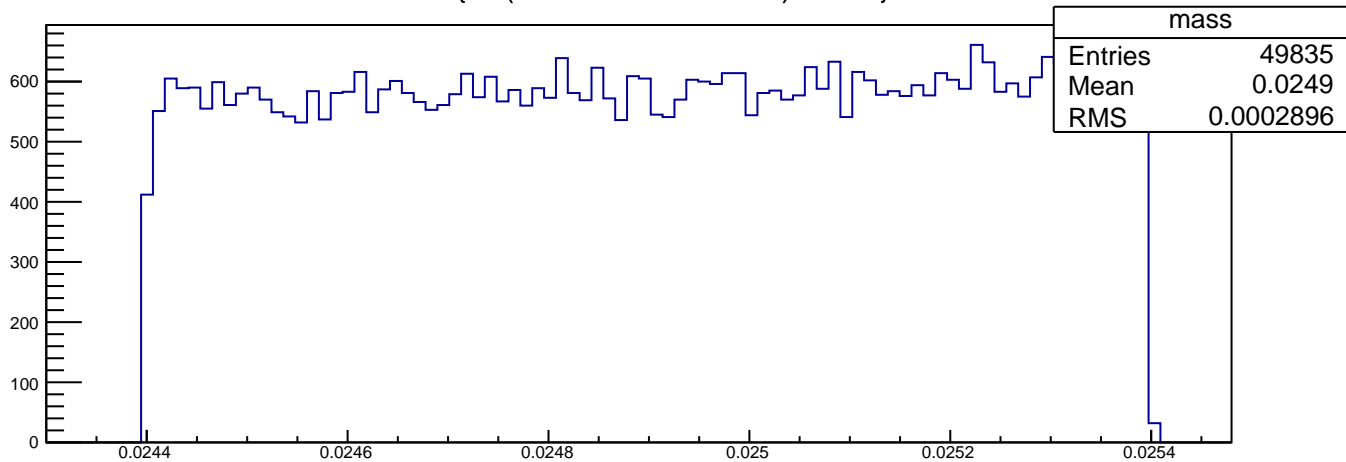
vertex Z, mass 0.0240816326531 +/- 0.00229439702813 GeV, zcut 33.931145227 mm



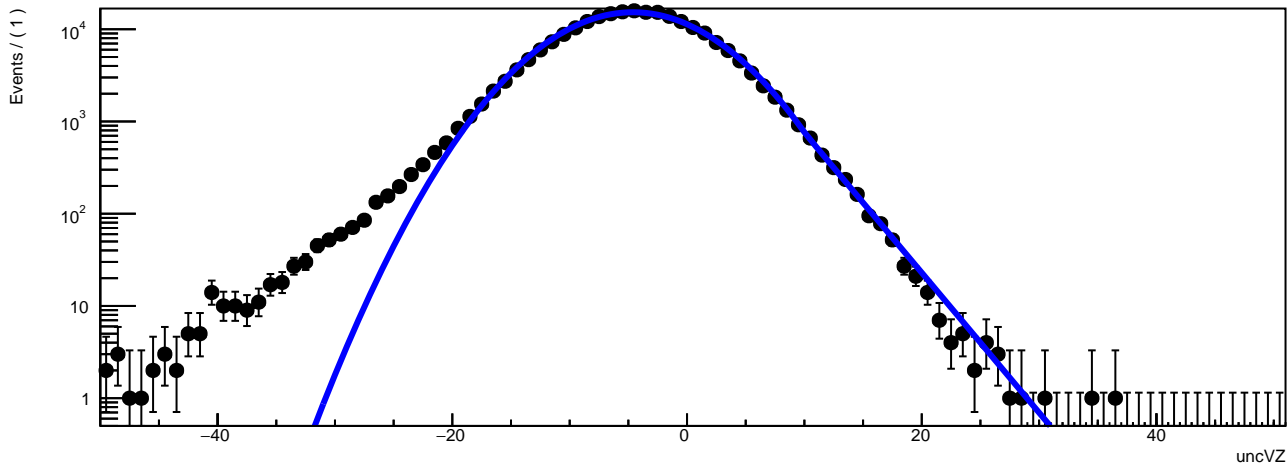
vertex Z, mass  $0.0240816326531 \pm 0.00229439702813$  GeV, zcut 33.931145227 mm



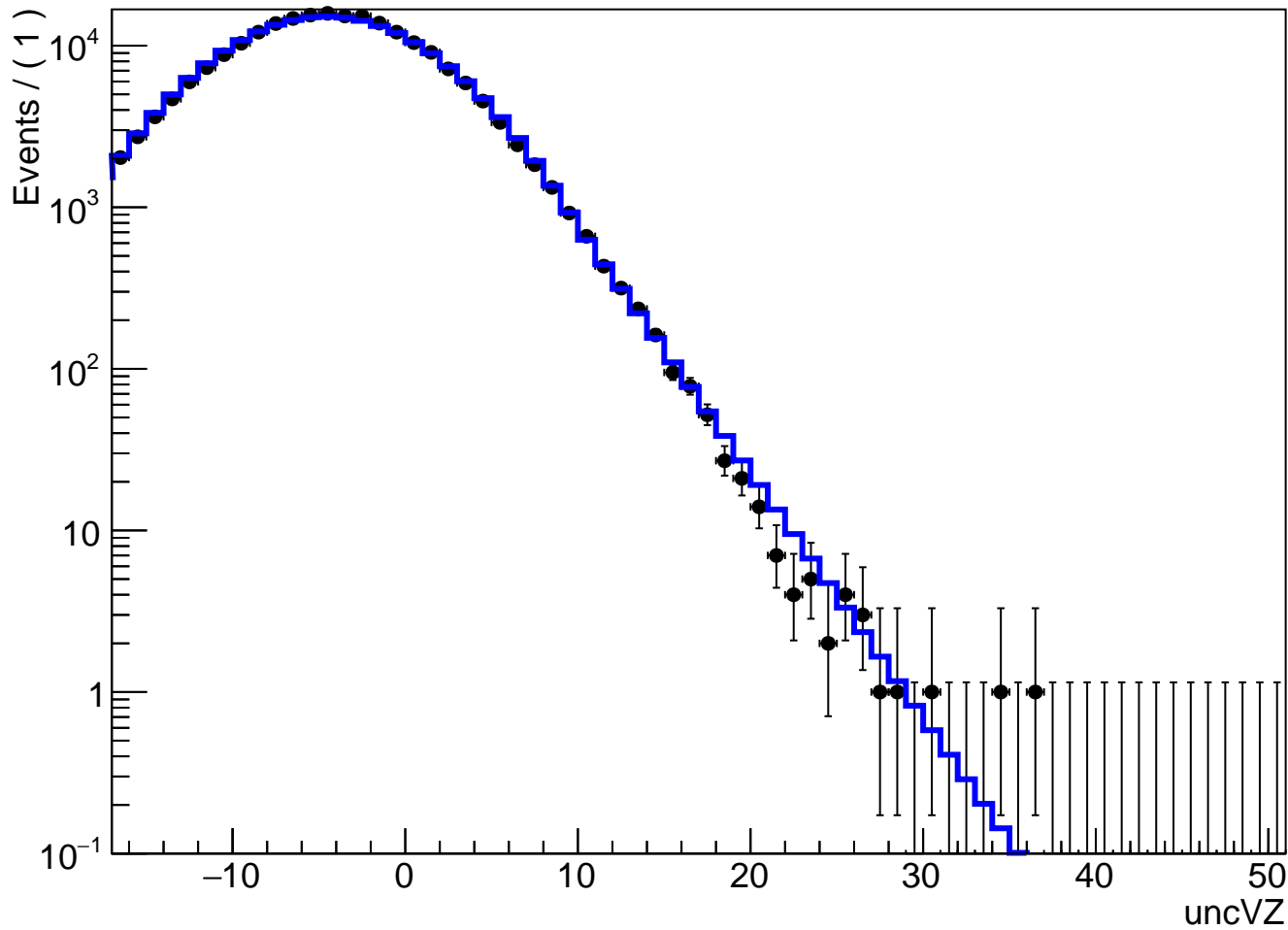
uncM {abs(uncM-0.0248979591837)<0.0005}



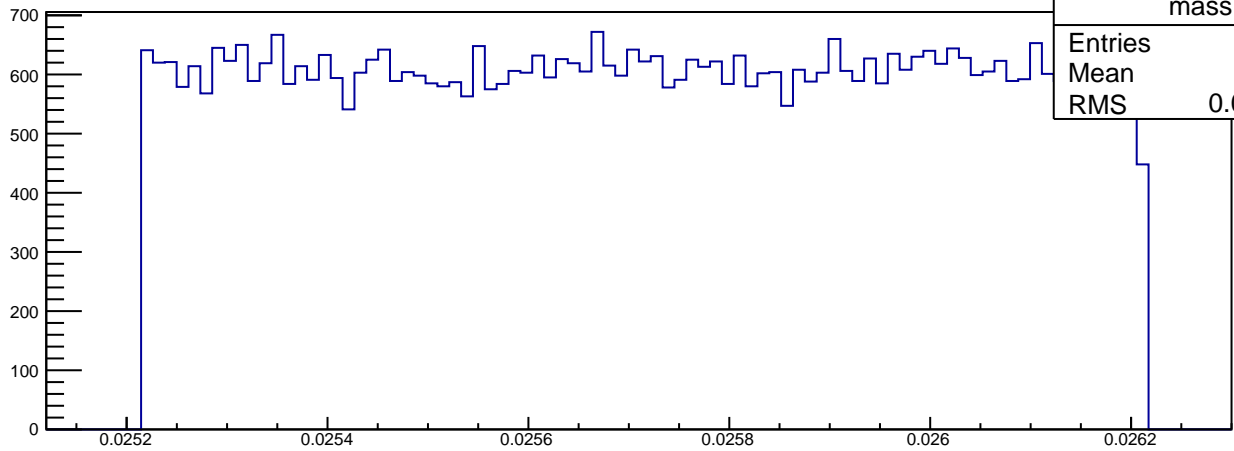
vertex Z, mass 0.0248979591837 +/- 0.00233799380147 GeV, zcut 33.8653543455 mm



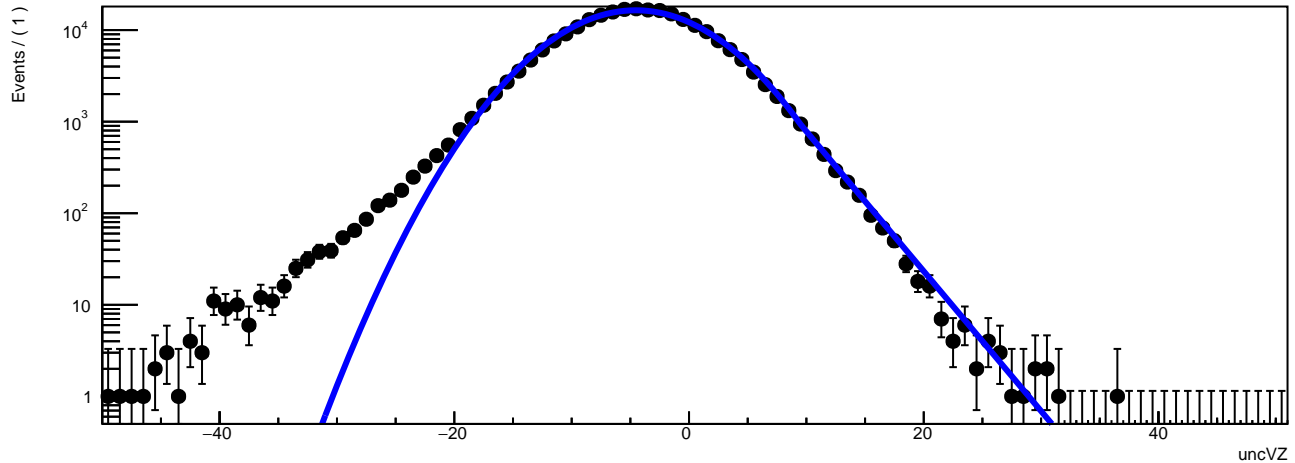
vertex Z, mass  $0.0248979591837 \pm 0.00233799380147$  GeV,  $z_{\text{cut}} 33.8653543455$  mm



uncM {abs(uncM-0.0257142857143)<0.0005}

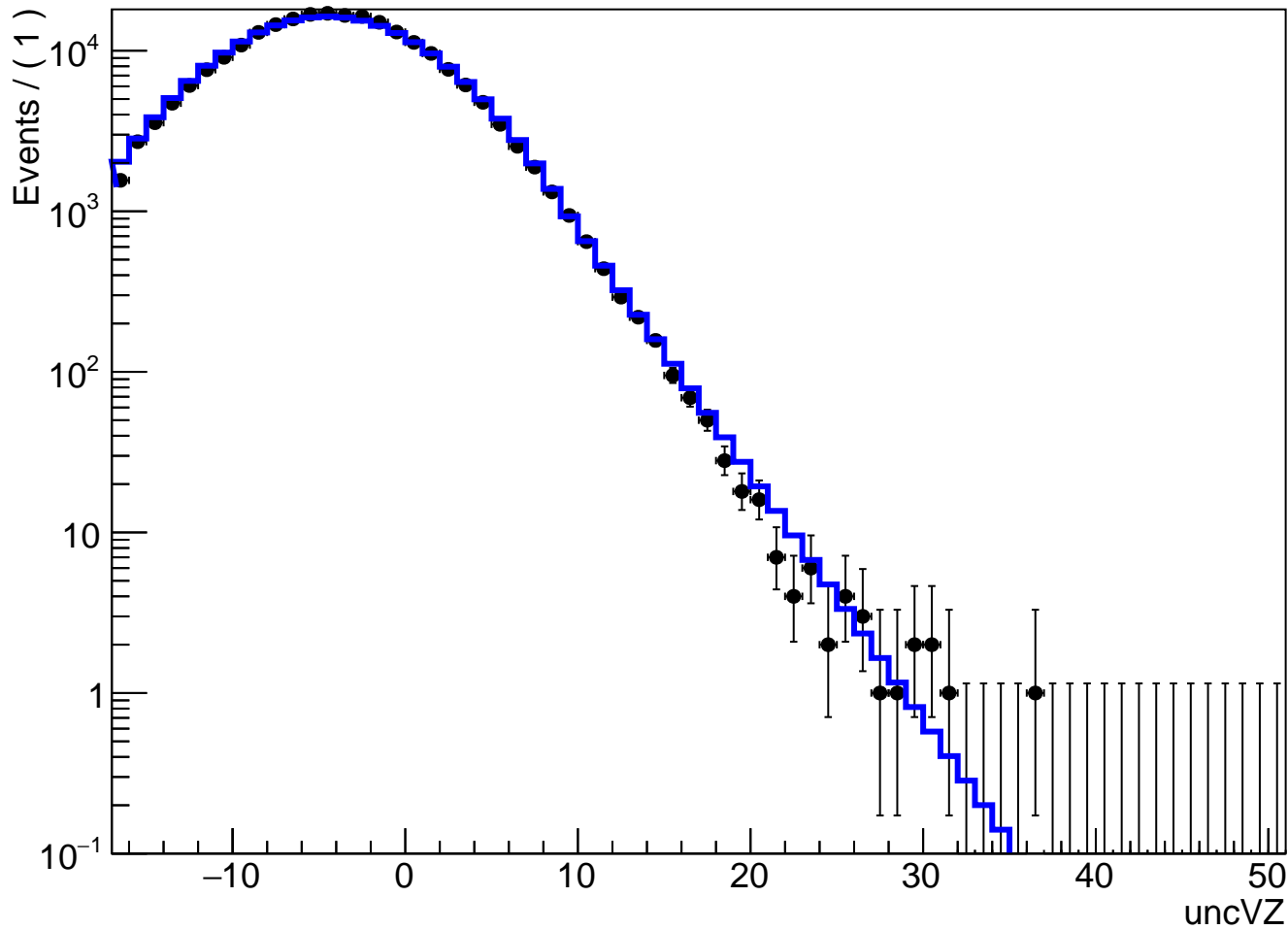


vertex Z, mass 0.0257142857143 +/- 0.00238159057481 GeV, zcut 33.7996226114 mm

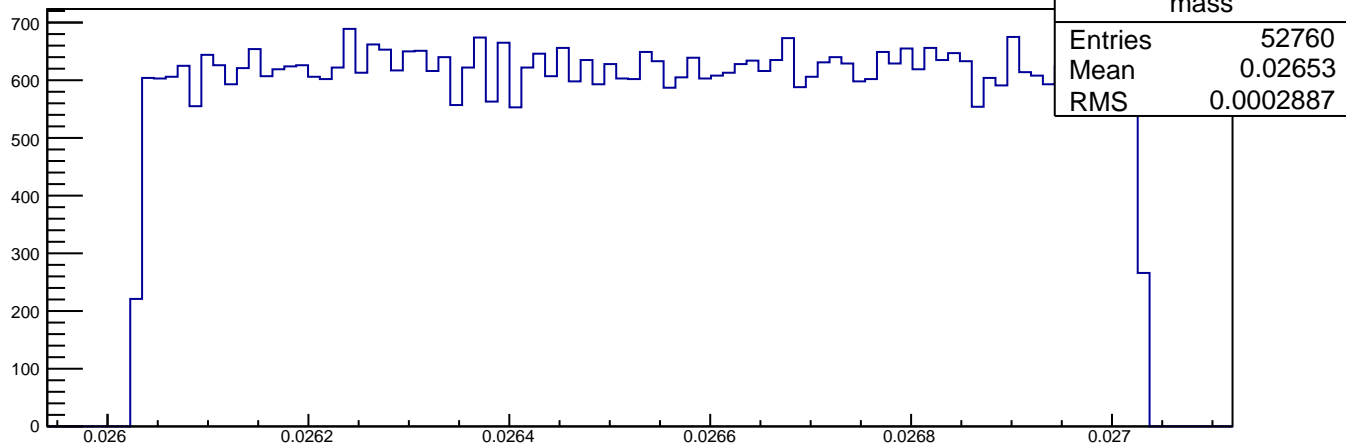




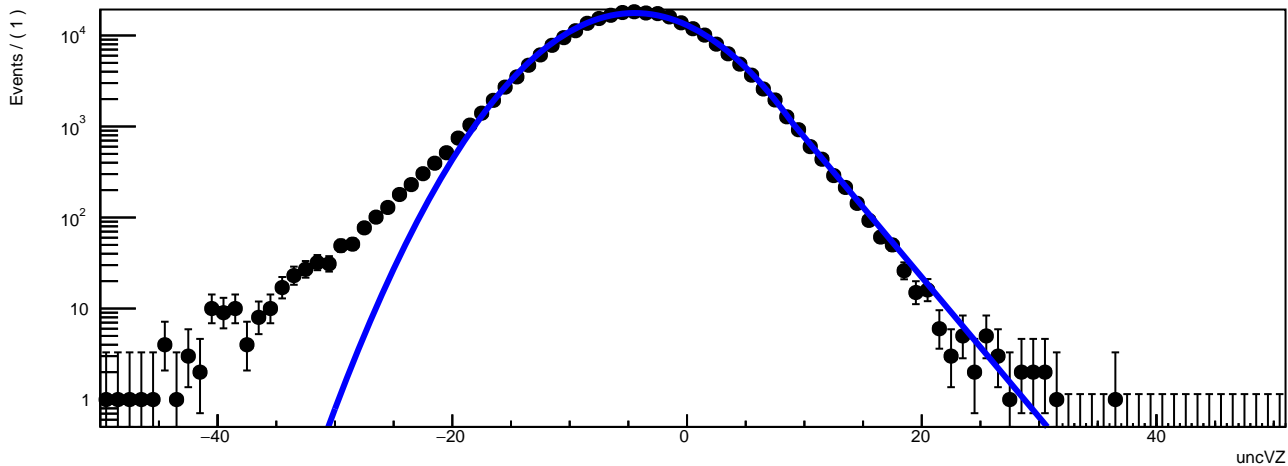
vertex Z, mass  $0.0257142857143 \pm 0.00238159057481$  GeV,  $z_{\text{cut}} 33.7996226114$  mm



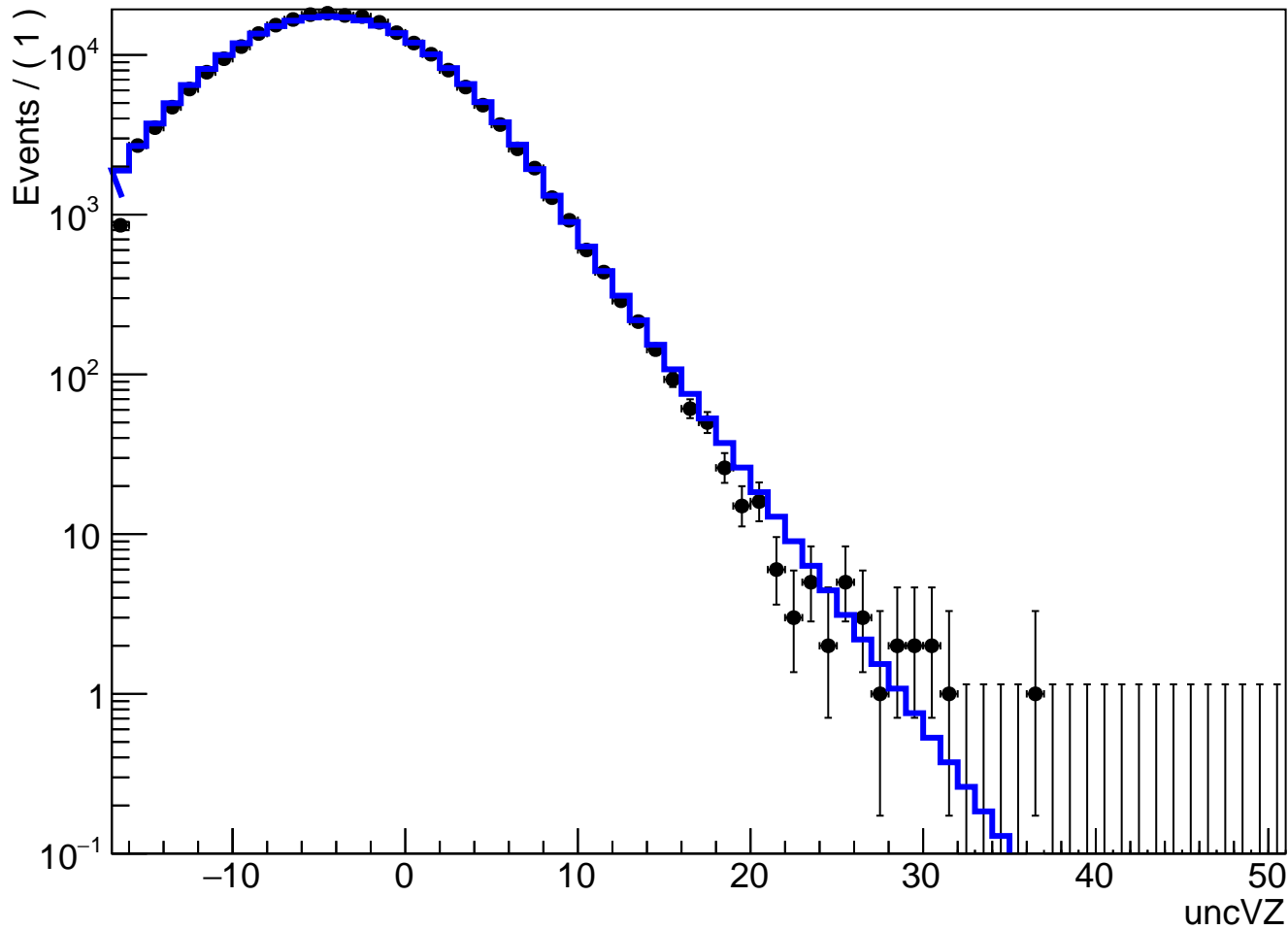
uncM {abs(uncM-0.0265306122449)<0.0005}



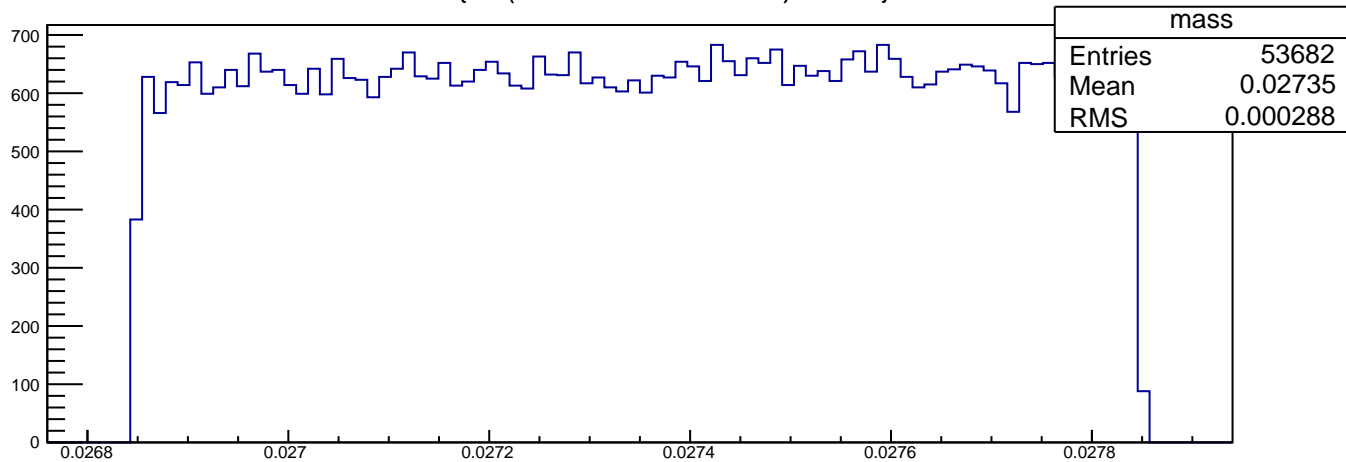
vertex Z, mass 0.0265306122449 +/- 0.00242518734815 GeV, zcut 33.5493396544 mm



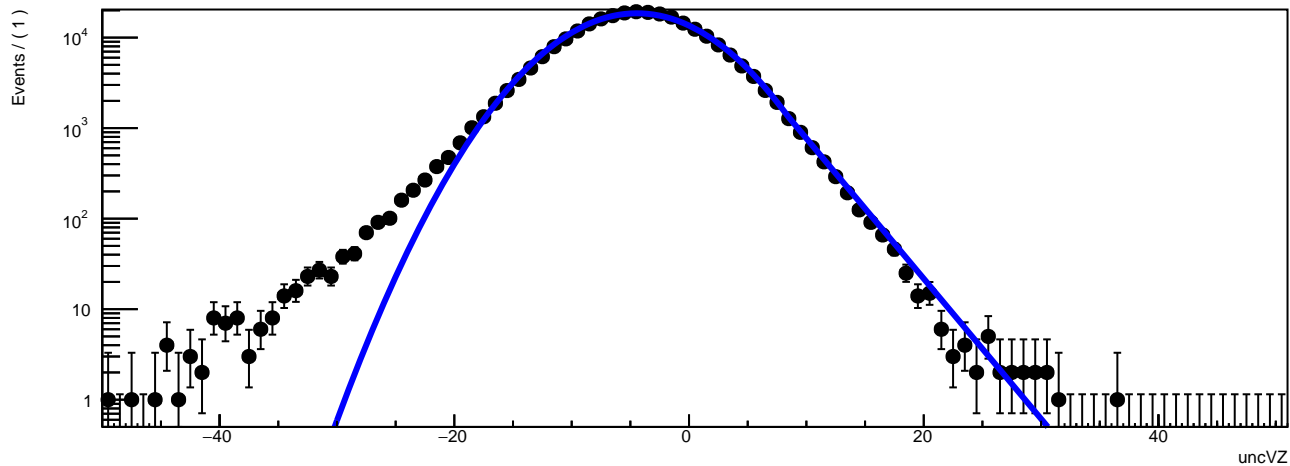
vertex Z, mass 0.0265306122449 +/- 0.00242518734815 GeV, zcut 33.5493396544 mm



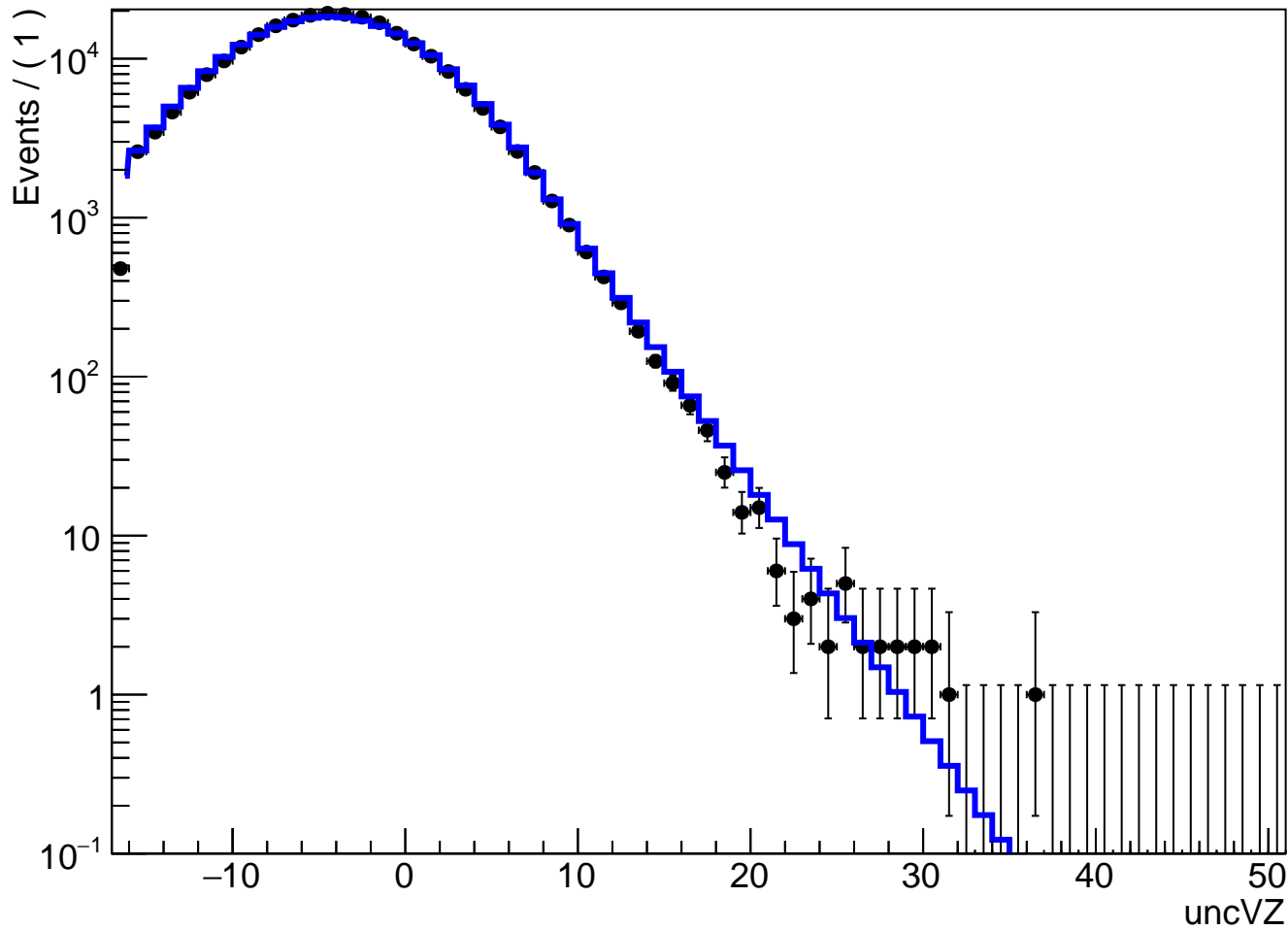
uncM {abs(uncM-0.0273469387755)<0.0005}



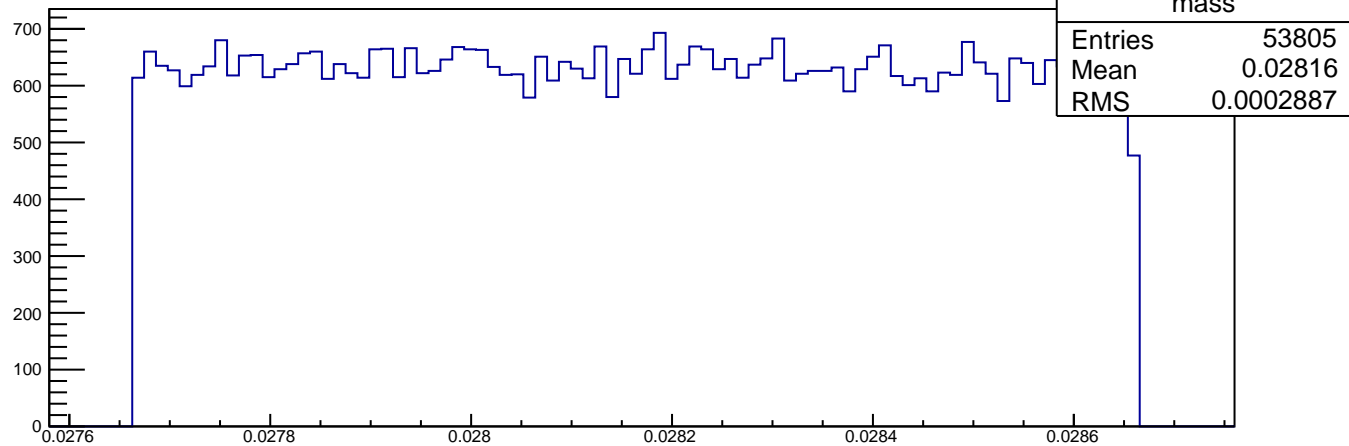
vertex Z, mass 0.0273469387755 +/- 0.00246878412148 GeV, zcut 33.378932014 mm



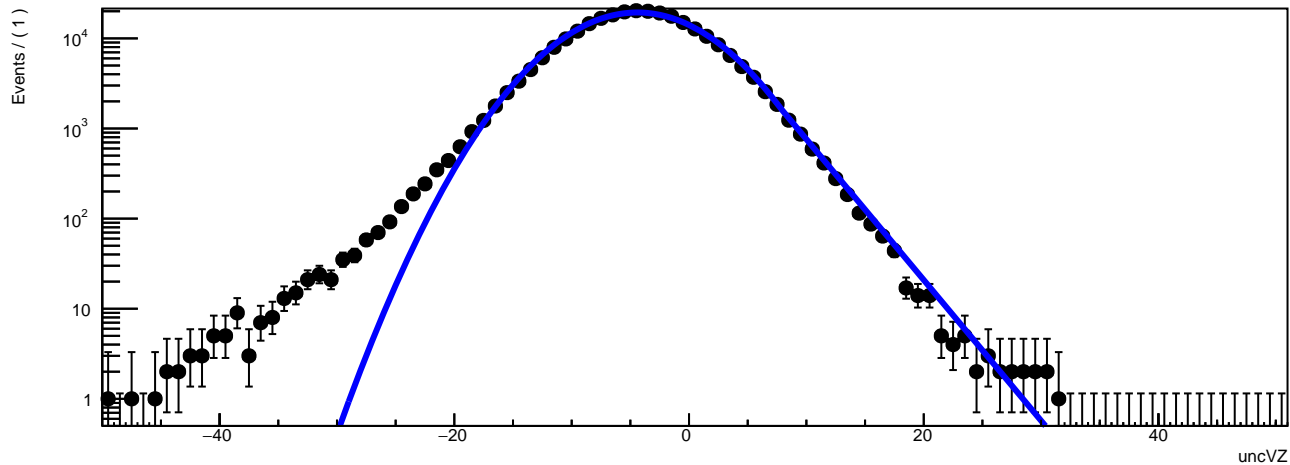
vertex Z, mass  $0.0273469387755 \pm 0.00246878412148$  GeV, zcut 33.378932014 mm



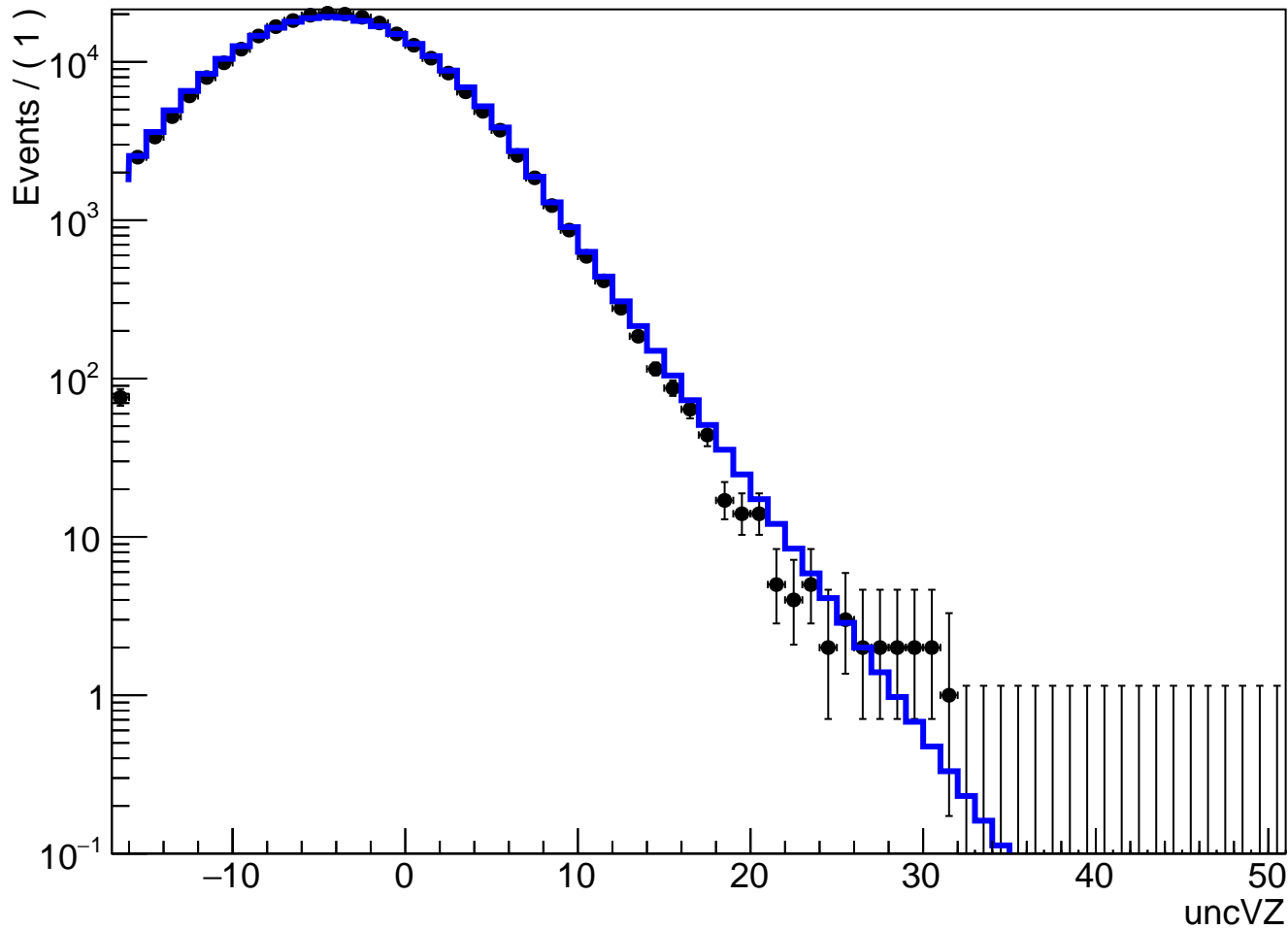
uncM {abs(uncM-0.0281632653061)<0.0005}



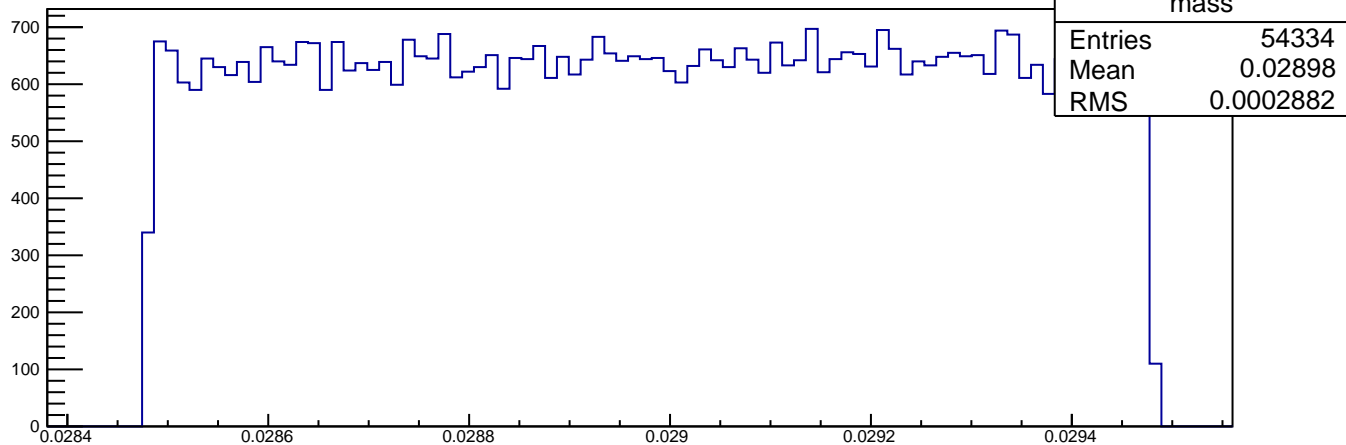
vertex Z, mass 0.0281632653061 +/- 0.00251238089482 GeV, zcut 33.12876072 mm



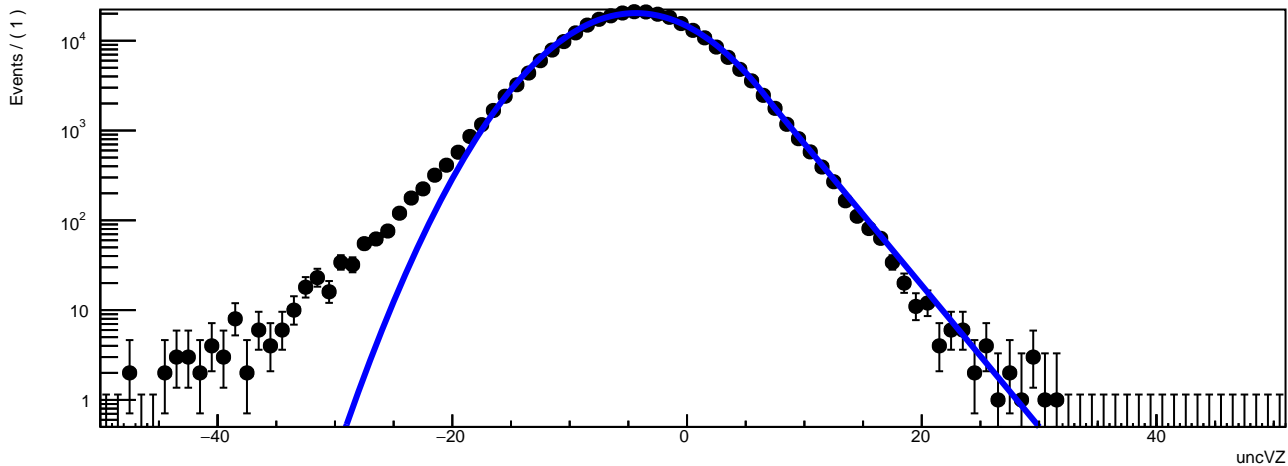
vertex Z, mass 0.0281632653061 +/- 0.00251238089482 GeV, zcut 33.12876072 mm



uncM {abs(uncM-0.0289795918367)<0.0005}

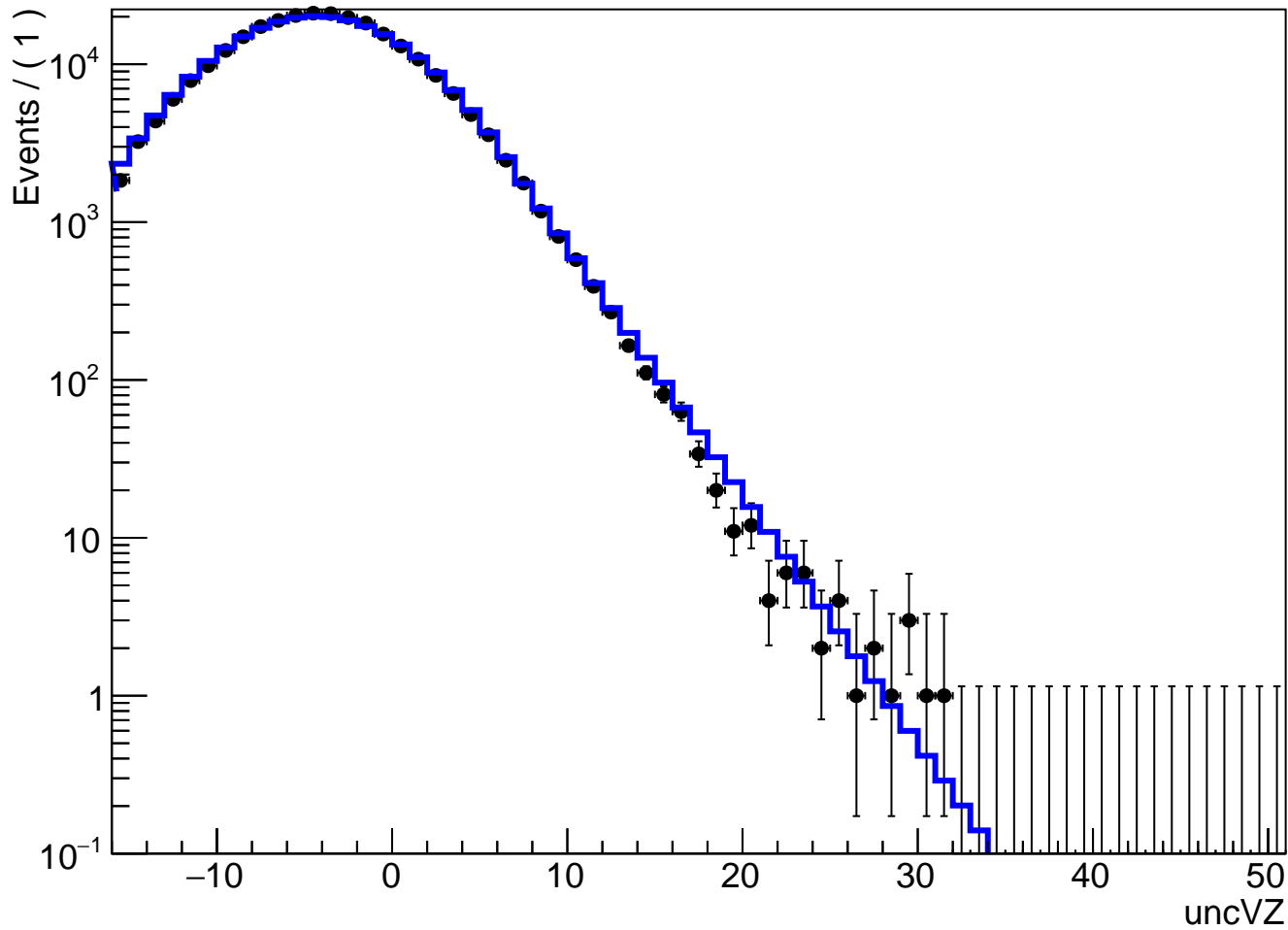


vertex Z, mass 0.0289795918367 +/- 0.00255597766816 GeV, zcut 32.7218163859 mm

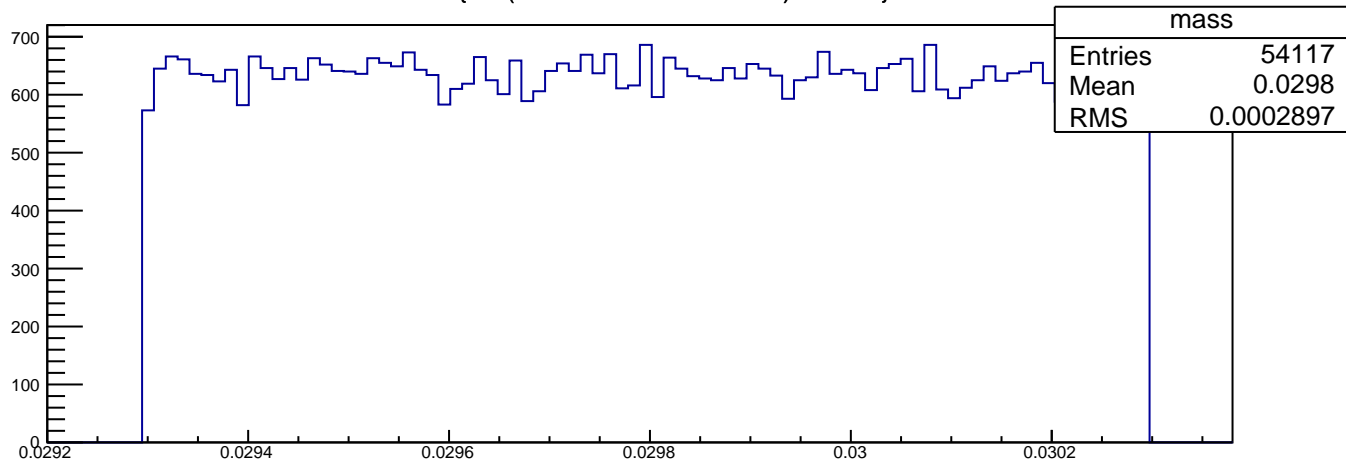




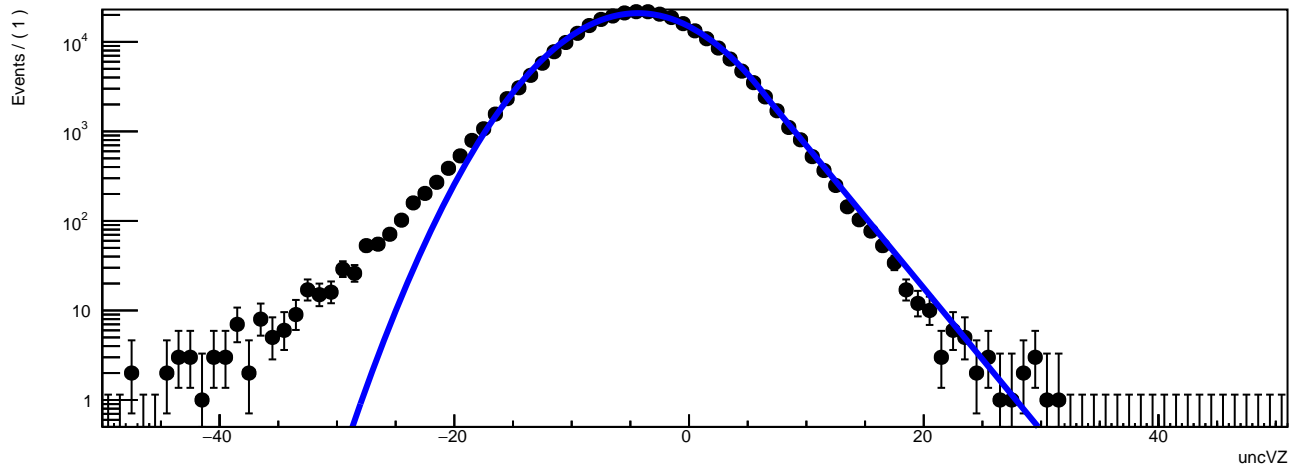
vertex Z, mass  $0.0289795918367 \pm 0.00255597766816$  GeV,  $z_{\text{cut}} 32.7218163859$  mm



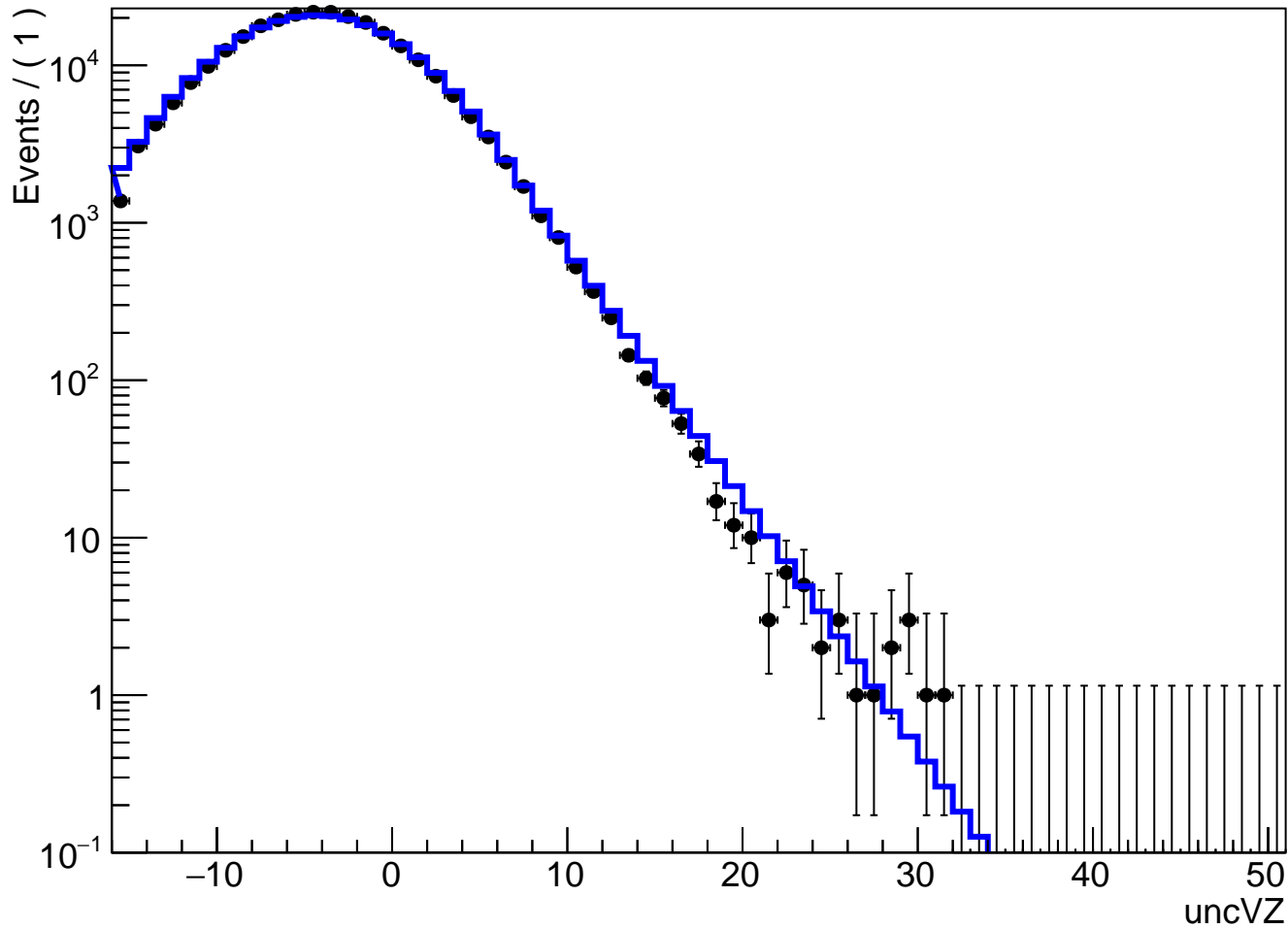
uncM {abs(uncM-0.0297959183673)<0.0005}



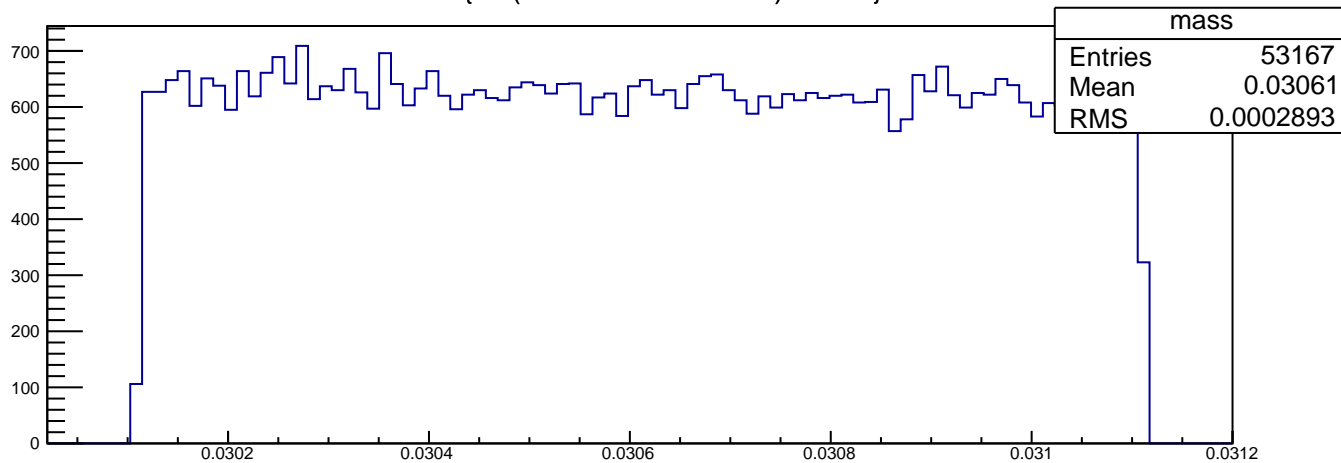
vertex Z, mass 0.0297959183673 +/- 0.0025995744415 GeV, zcut 32.4105960813 mm



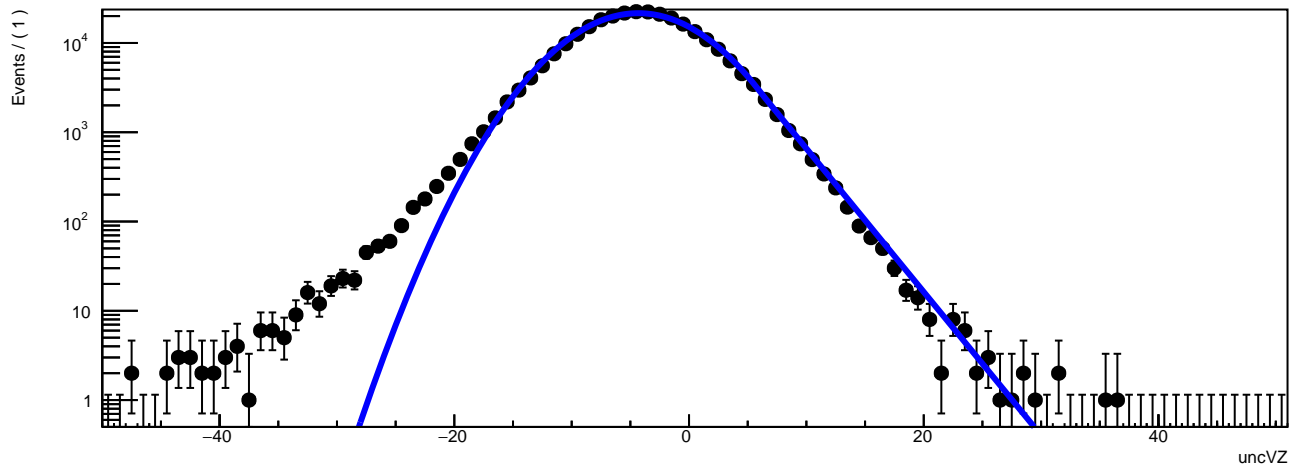
vertex Z, mass  $0.0297959183673 \pm 0.0025995744415$  GeV, zcut 32.4105960813 mm



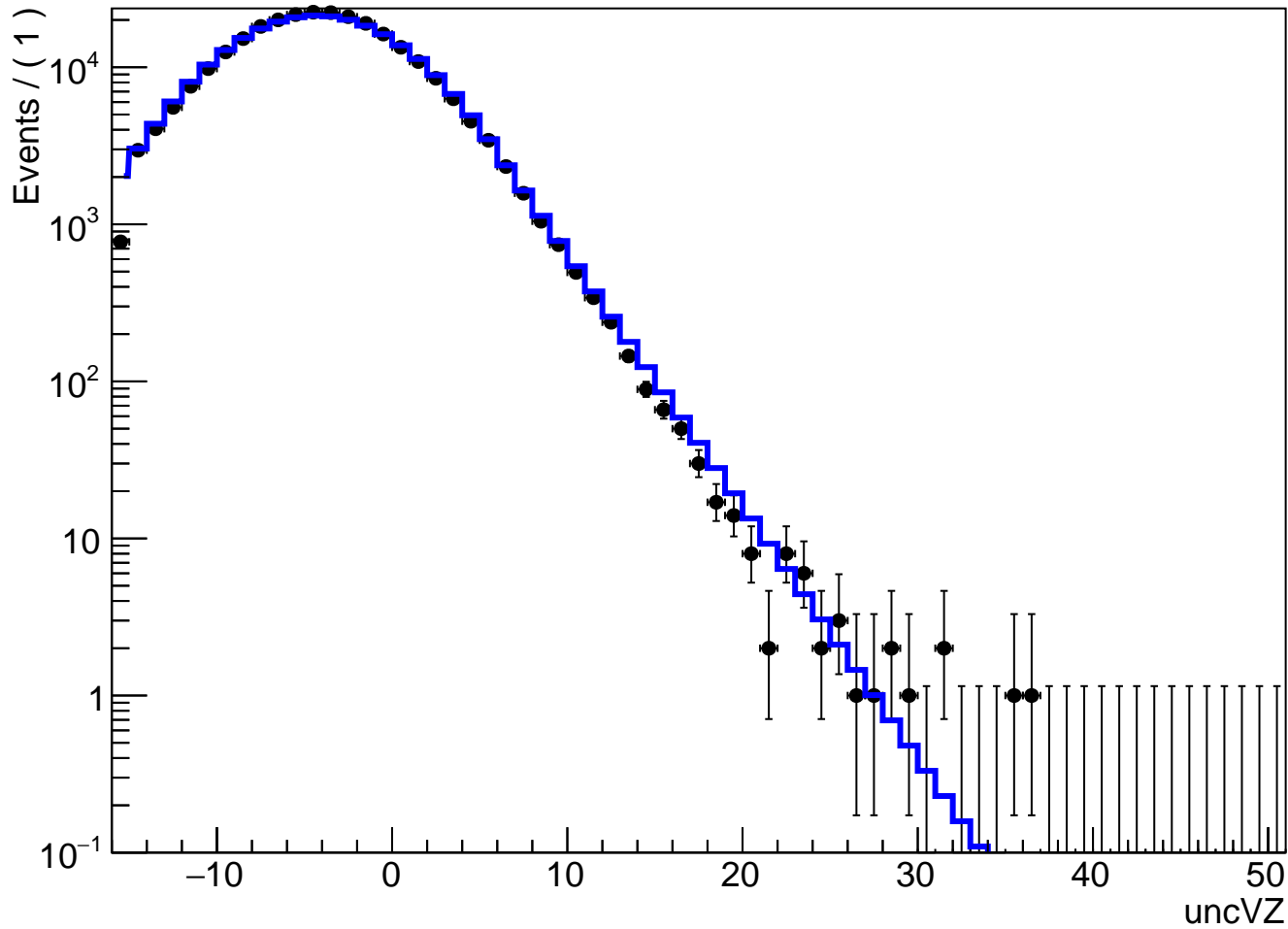
uncM {abs(uncM-0.030612244898)<0.0005}



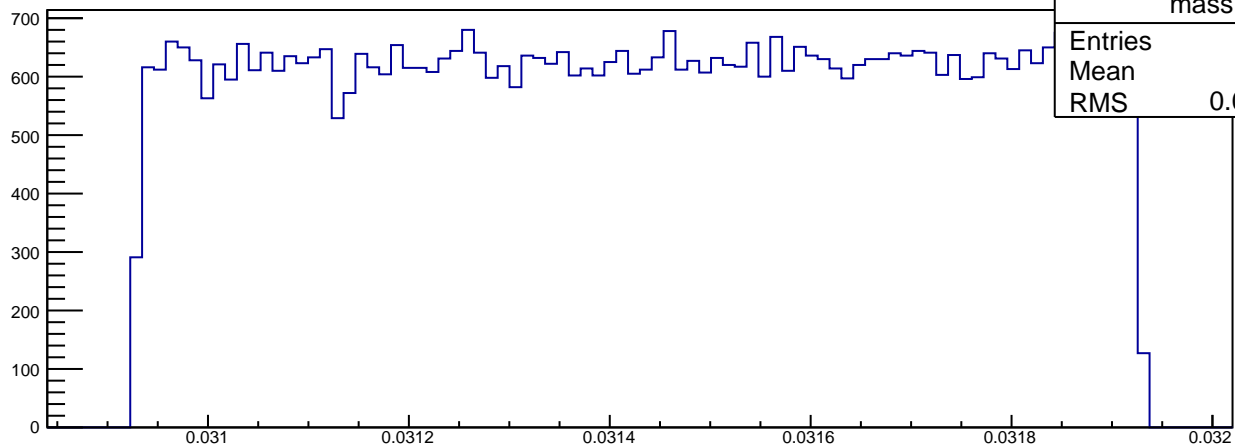
vertex Z, mass 0.030612244898 +/- 0.00264317121483 GeV, zcut 32.0142232431 mm



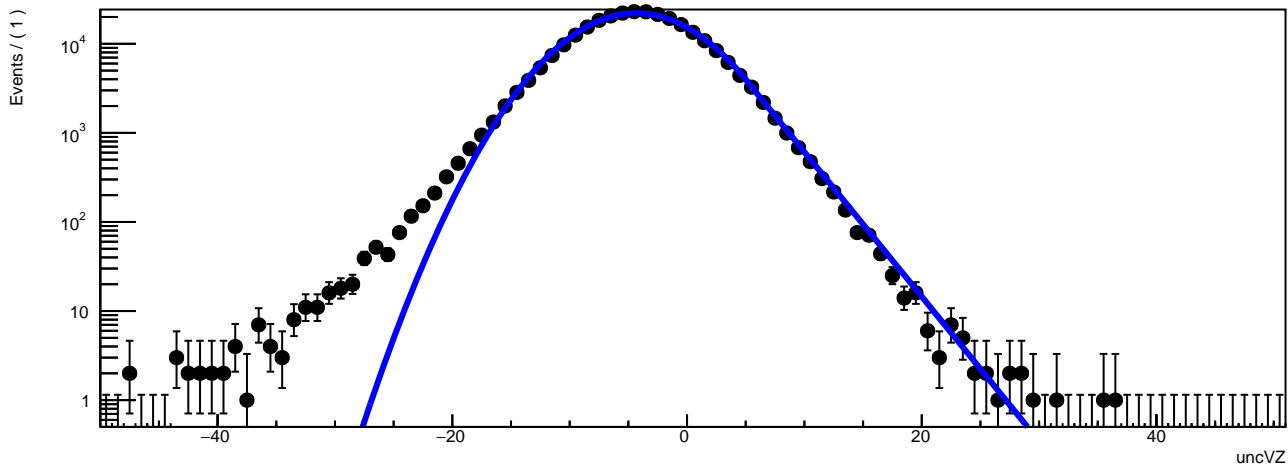
vertex Z, mass 0.030612244898 +/- 0.00264317121483 GeV, zcut 32.0142232431 mm



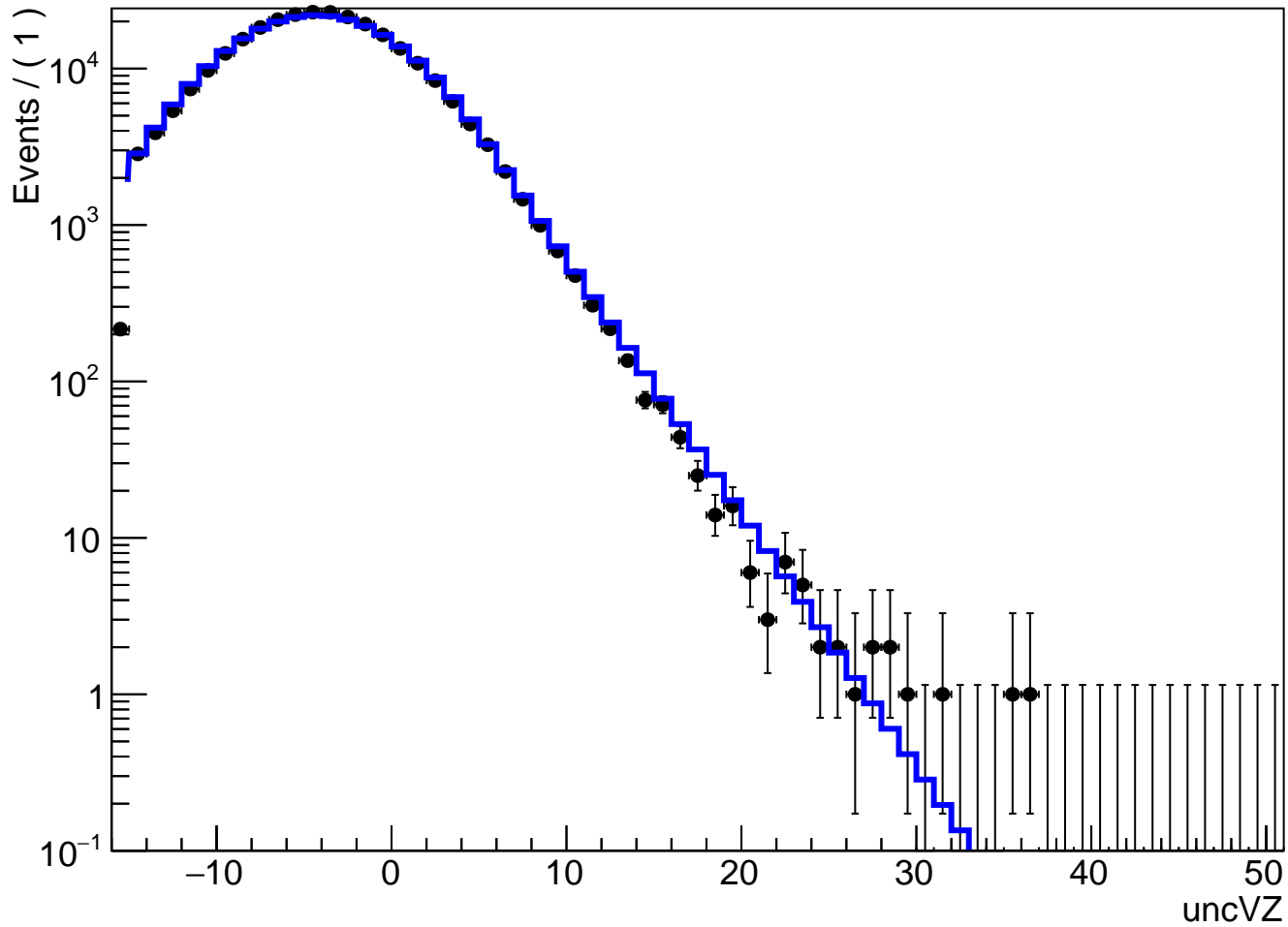
uncM {abs(uncM-0.0314285714286)<0.0005}



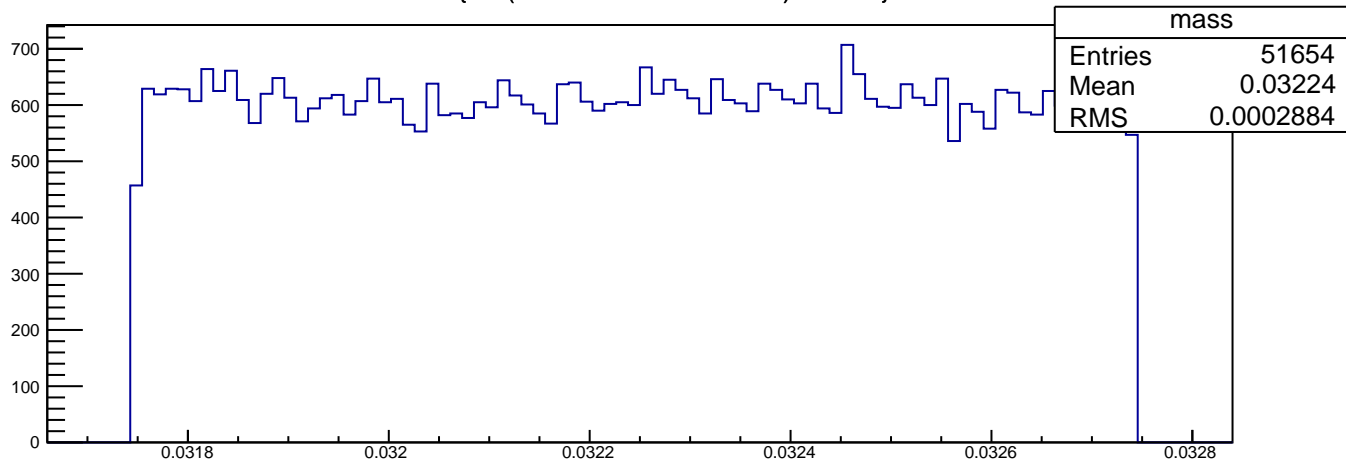
vertex Z, mass 0.0314285714286 +/- 0.00268676798817 GeV, zcut 31.5602677552 mm



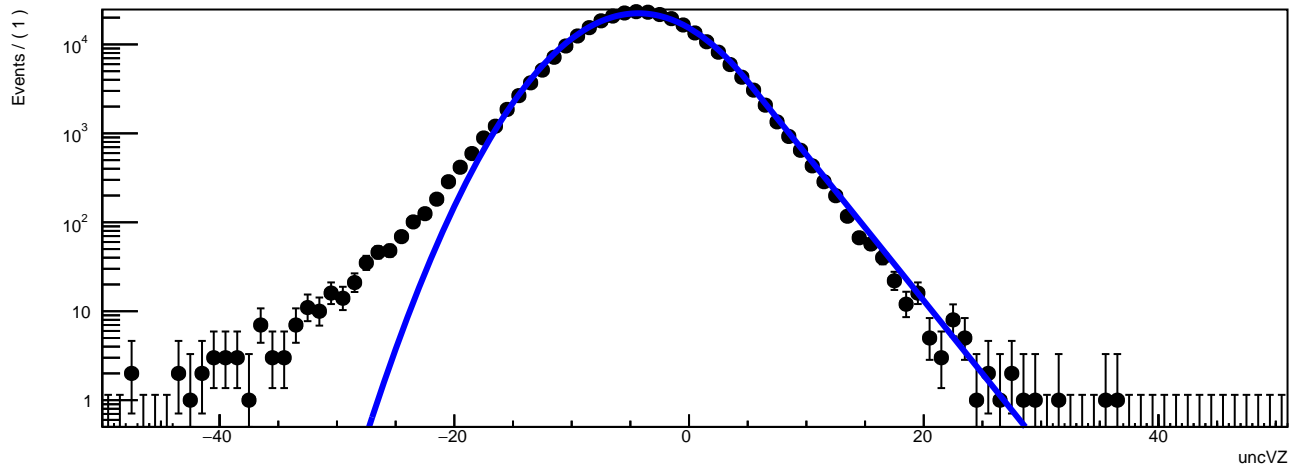
vertex Z, mass  $0.0314285714286 \pm 0.00268676798817$  GeV, zcut 31.5602677552 mm



uncM {abs(uncM-0.0322448979592)<0.0005}

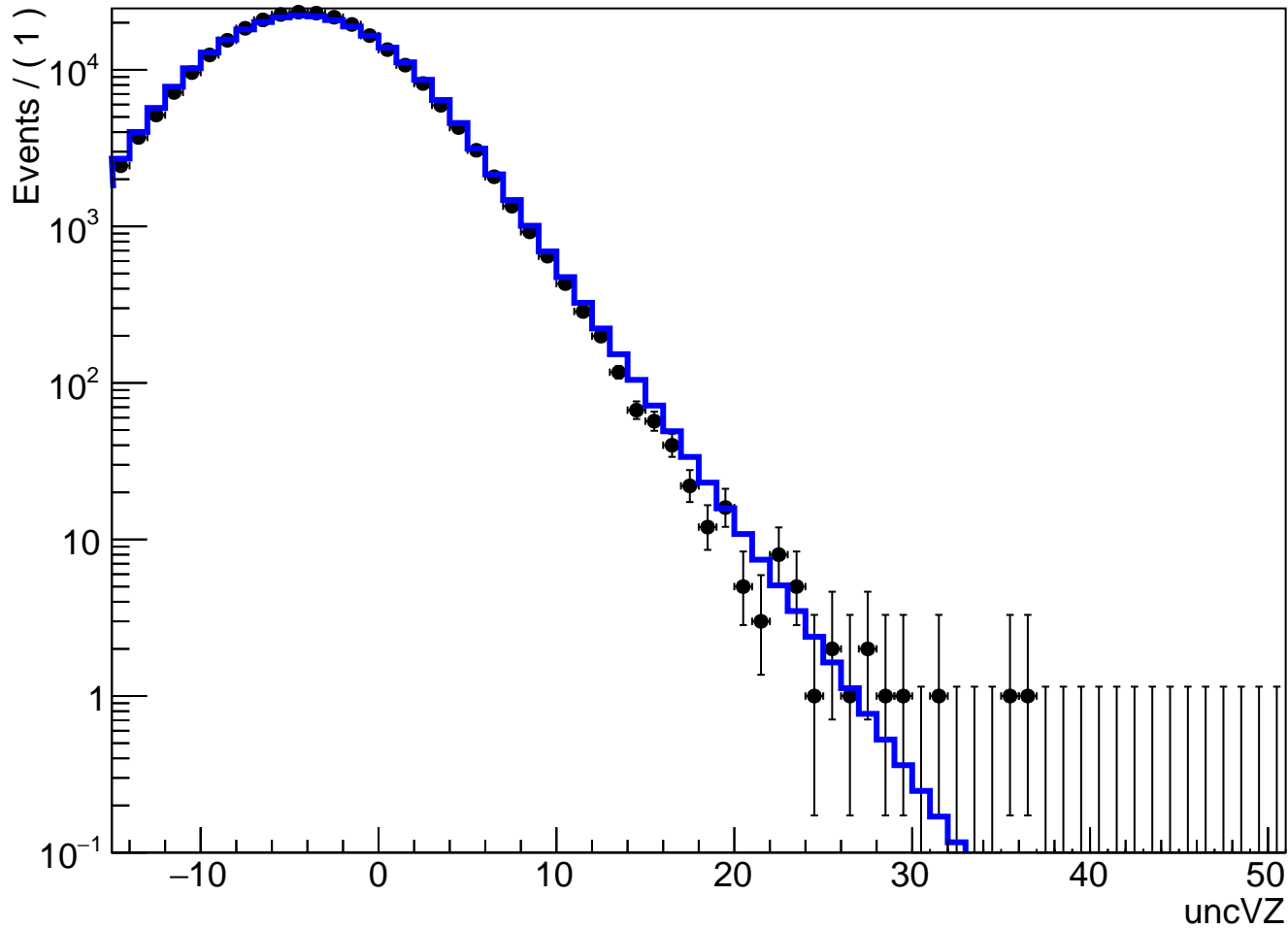


vertex Z, mass 0.0322448979592 +/- 0.00273036476151 GeV, zcut 31.1429949613 mm

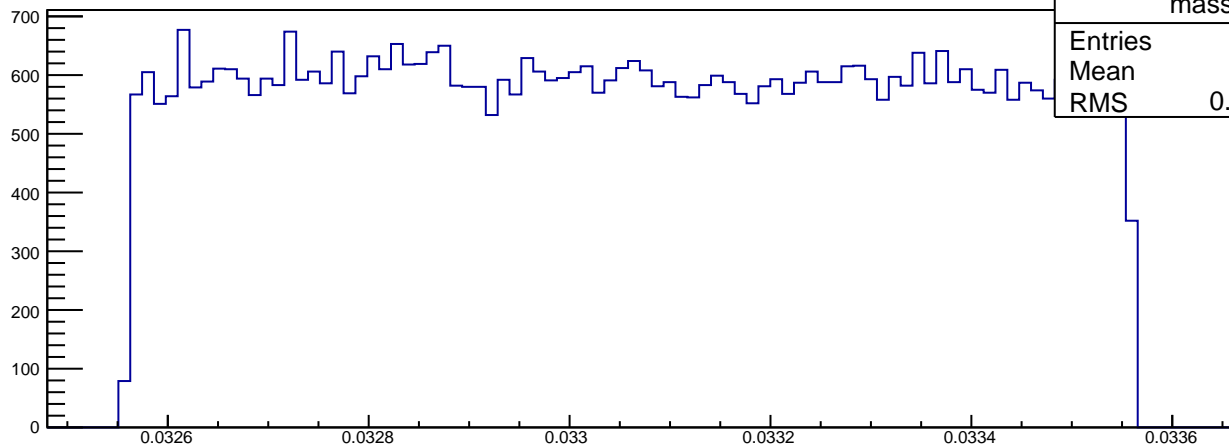




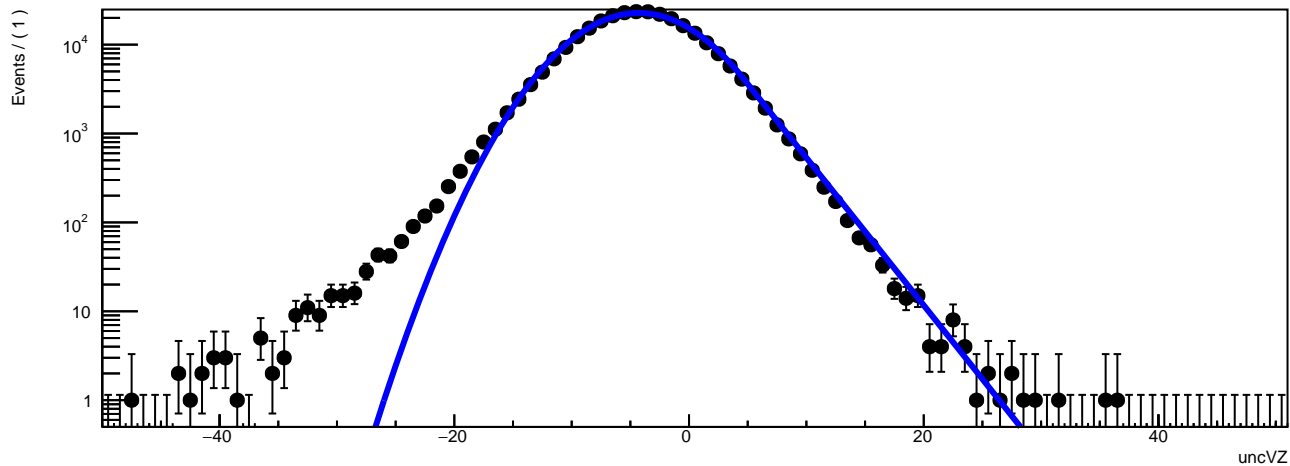
vertex Z, mass 0.0322448979592 +/- 0.00273036476151 GeV, zcut 31.1429949613 mm



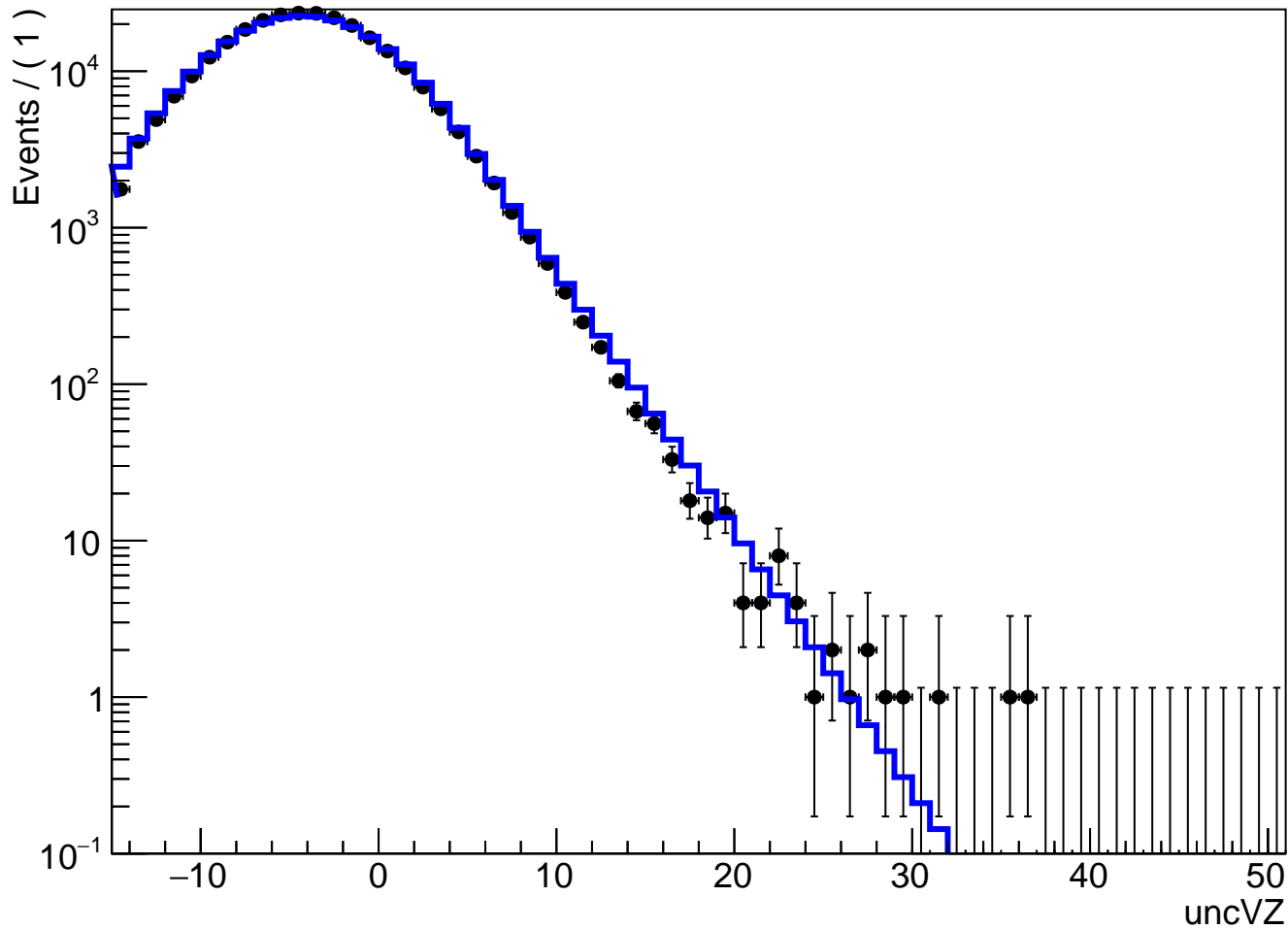
uncM {abs(uncM-0.0330612244898)<0.0005}



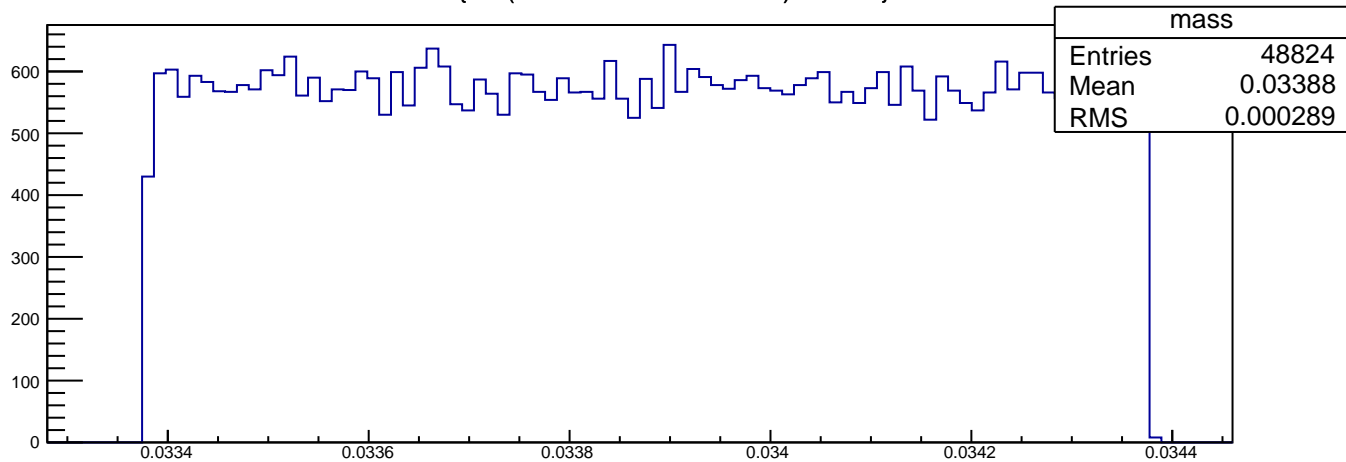
vertex Z, mass 0.0330612244898 +/- 0.00277396153485 GeV, zcut 30.6731455769 mm



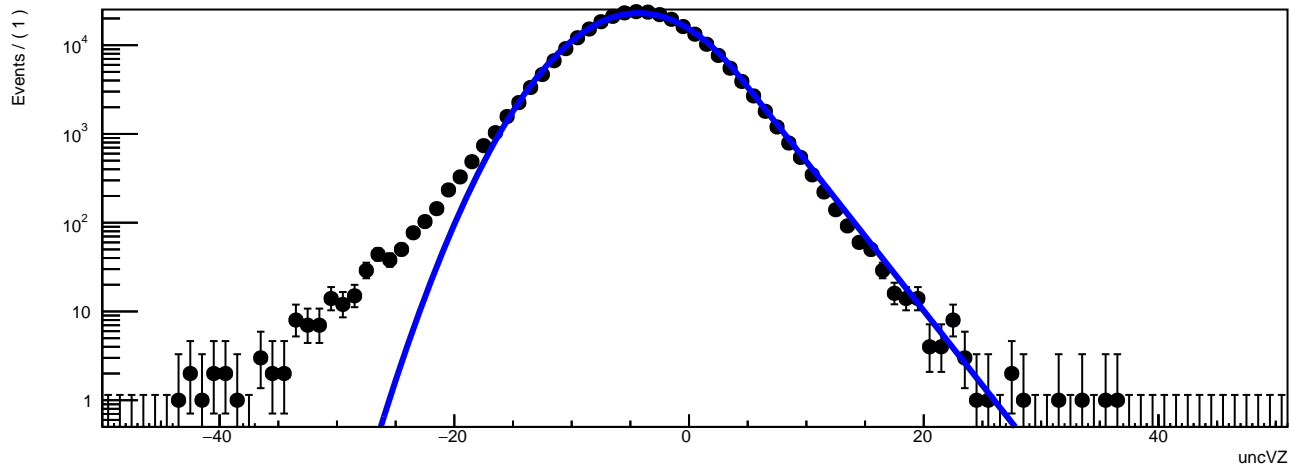
vertex Z, mass 0.0330612244898 +/- 0.00277396153485 GeV, zcut 30.6731455769 mm



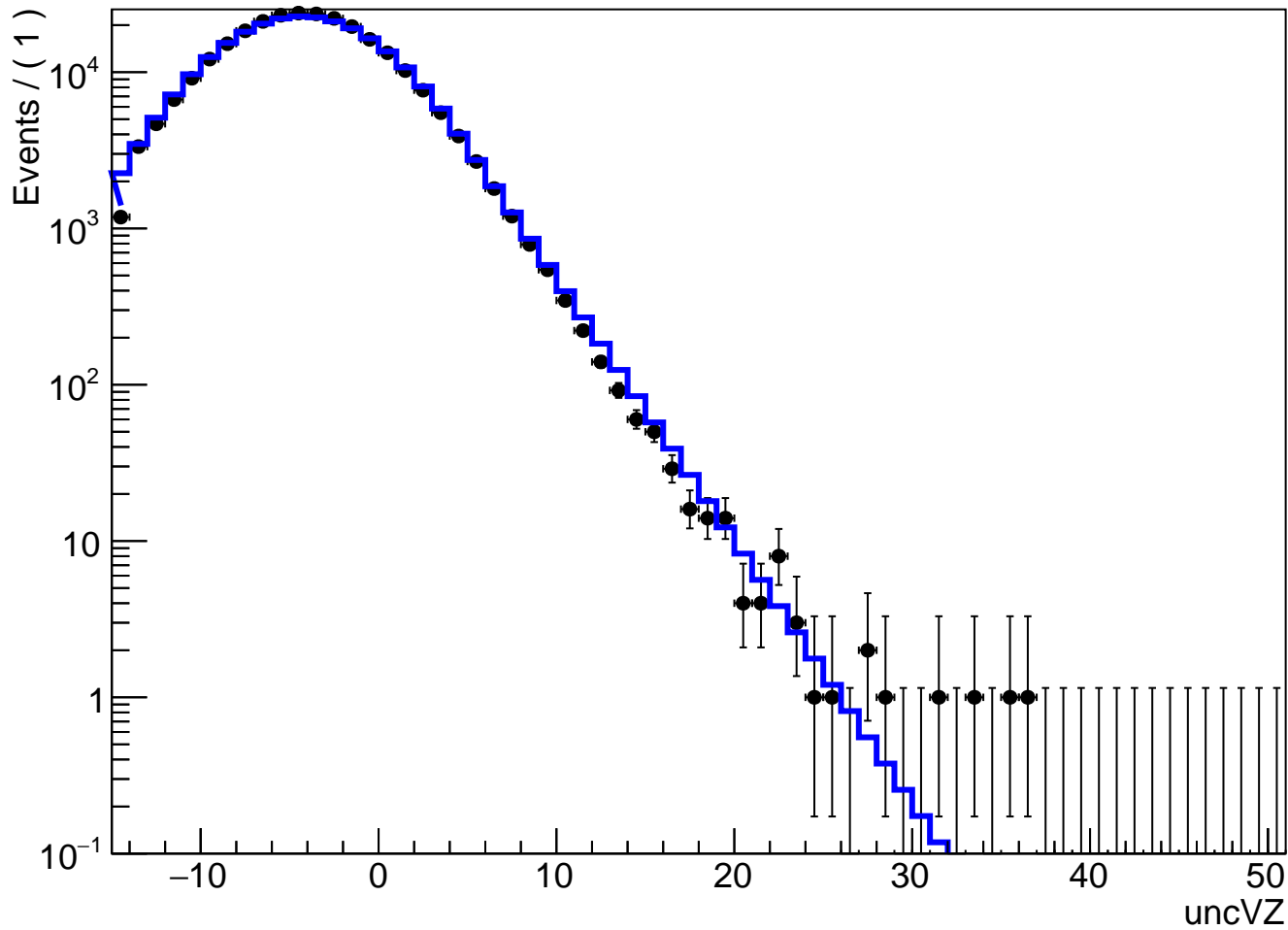
uncM {abs(uncM-0.0338775510204)<0.0005}



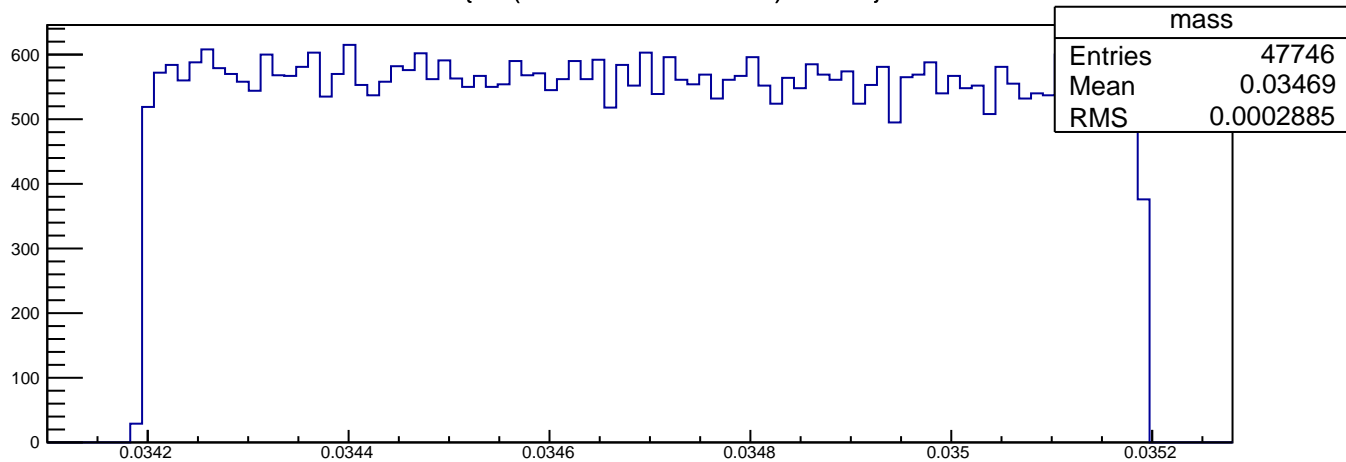
vertex Z, mass 0.0338775510204 +/- 0.00281755830818 GeV, zcut 30.1612074326 mm



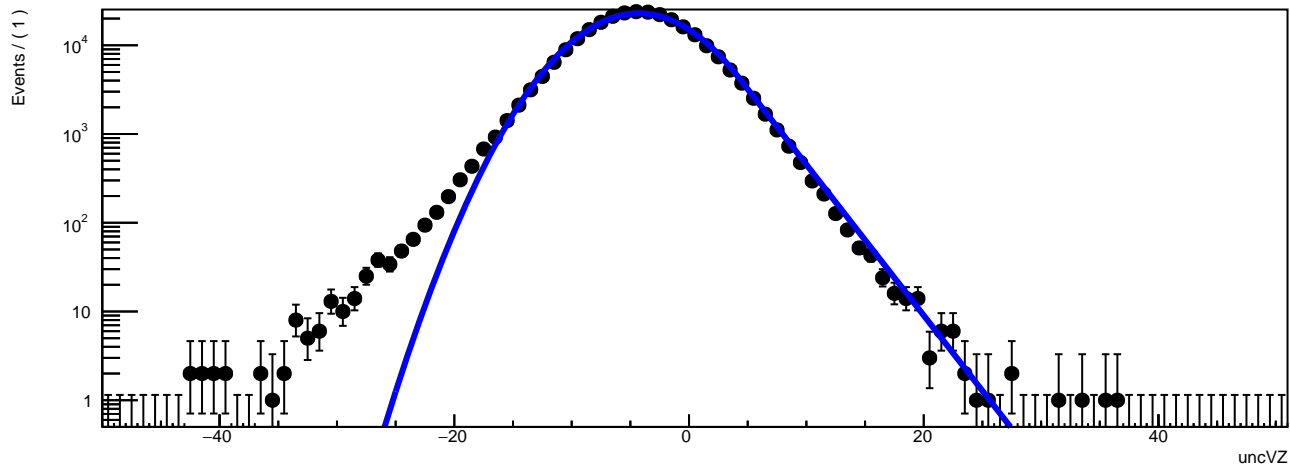
vertex Z, mass 0.0338775510204 +/- 0.00281755830818 GeV, zcut 30.1612074326 mm



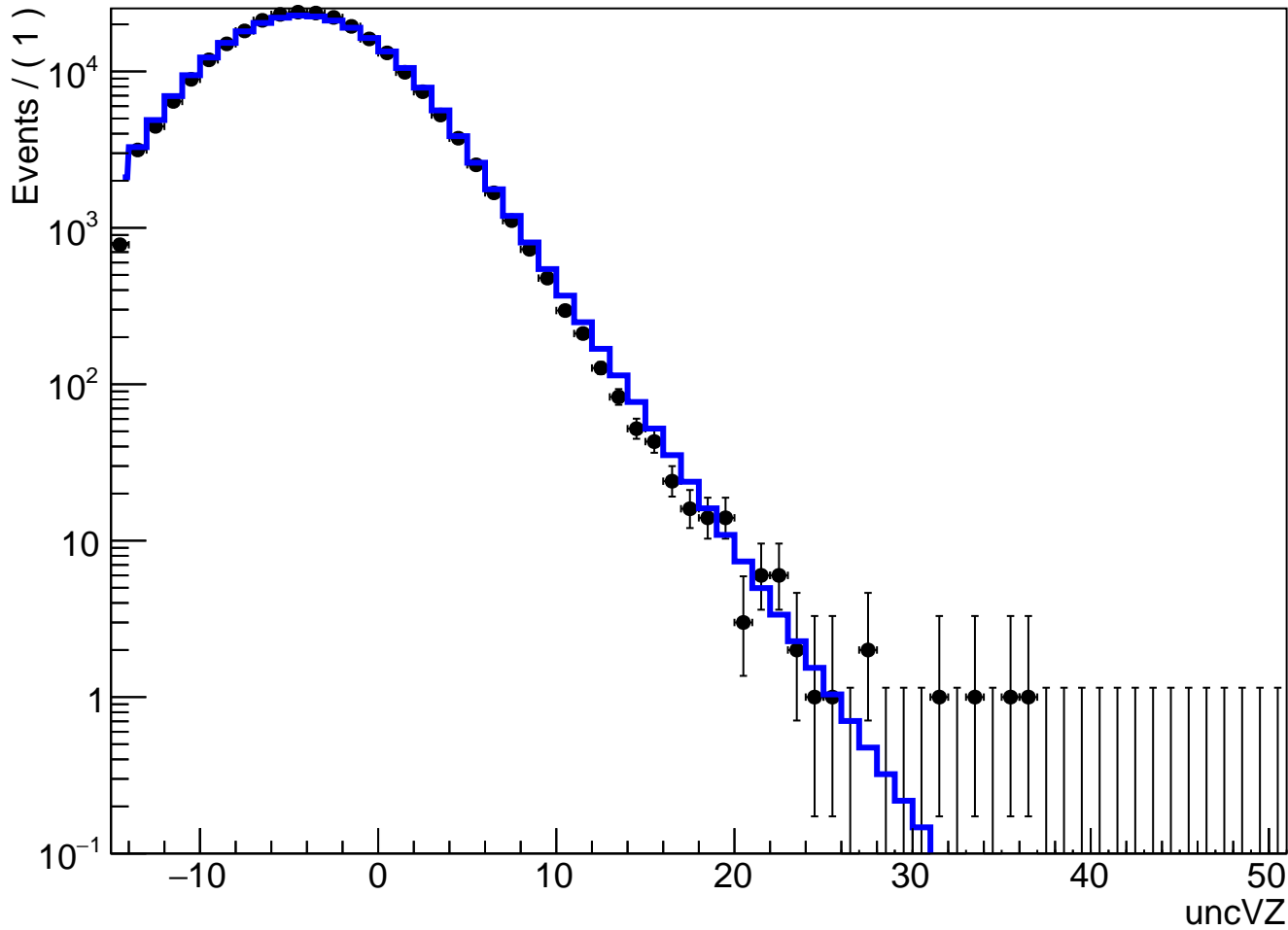
uncM {abs(uncM-0.034693877551)<0.0005}



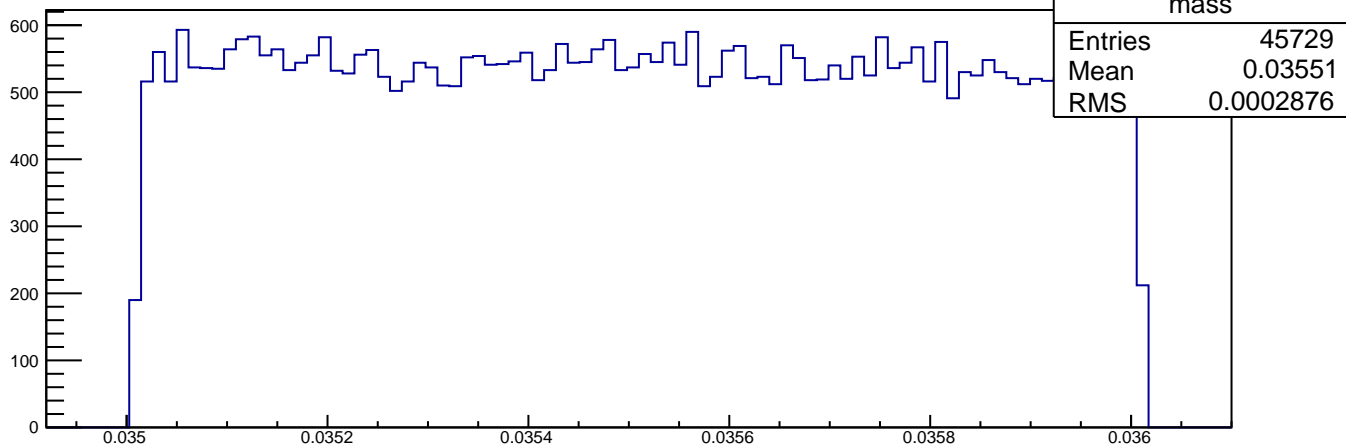
vertex Z, mass 0.034693877551 +/- 0.00286115508152 GeV, zcut 29.6993798046 mm



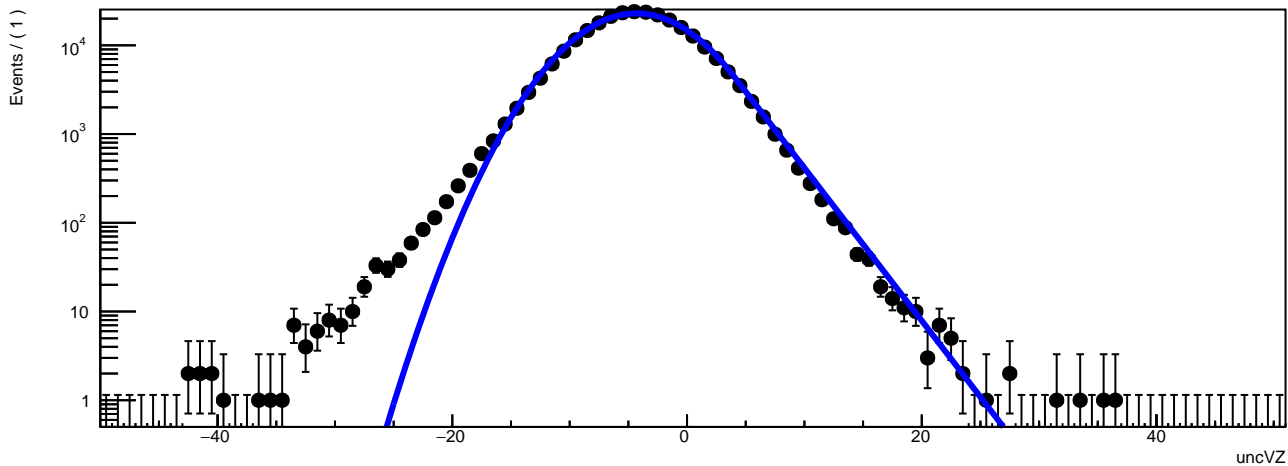
vertex Z, mass 0.034693877551 +/- 0.00286115508152 GeV, zcut 29.6993798046 mm



uncM {abs(uncM-0.0355102040816)<0.0005}

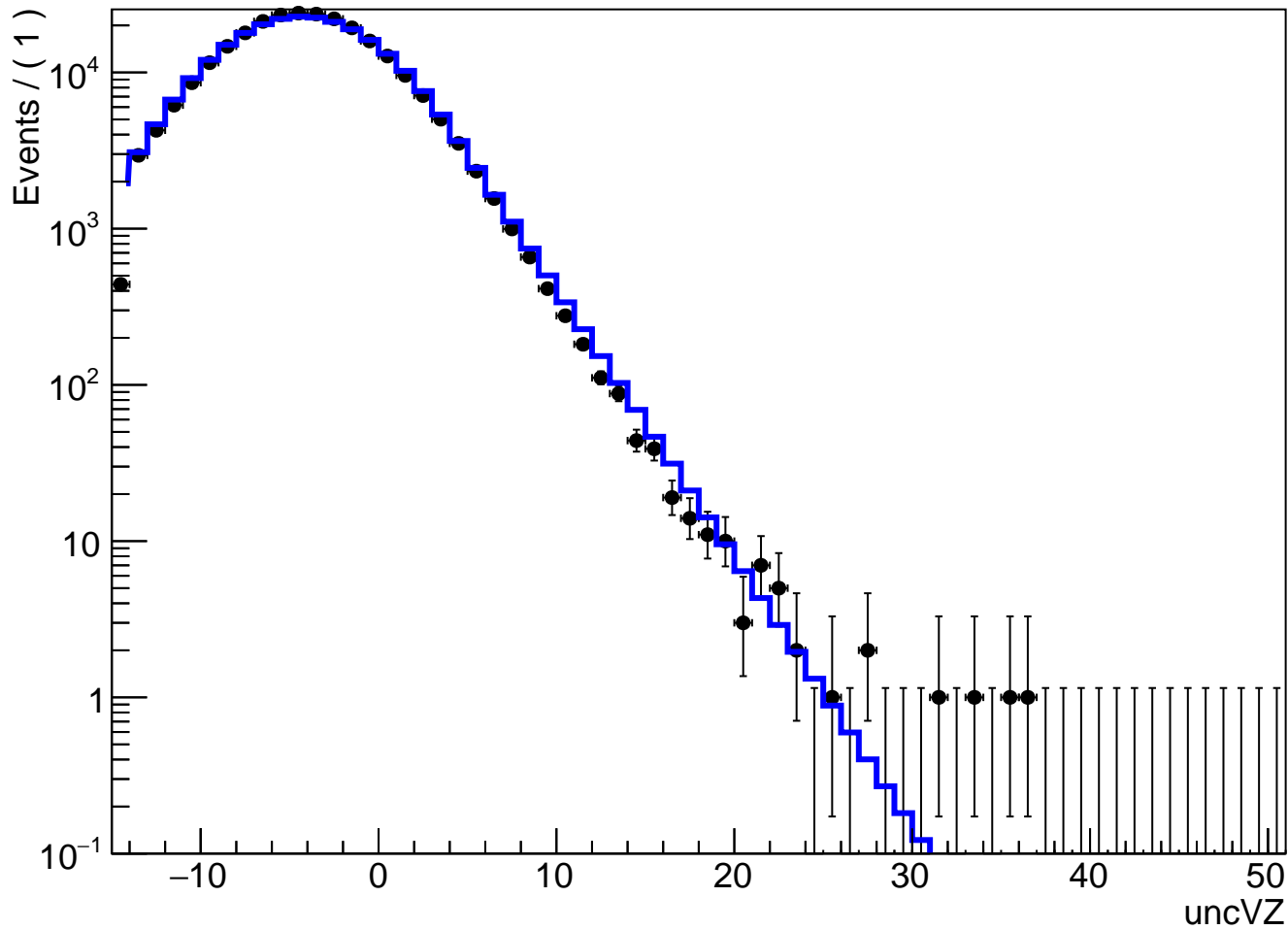


vertex Z, mass 0.0355102040816 +/- 0.00290475185486 GeV, zcut 29.2030296817 mm

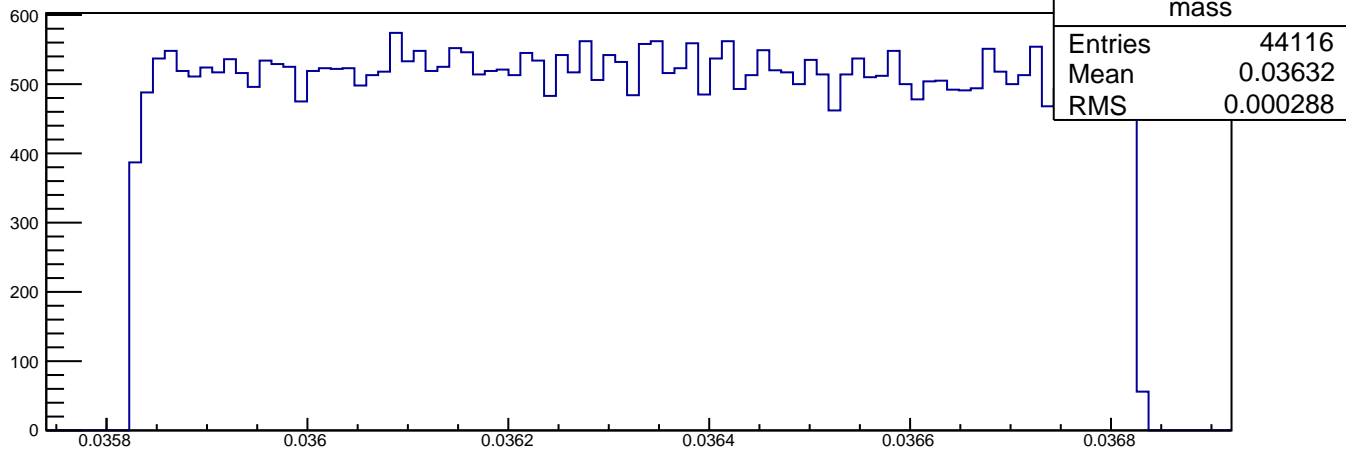




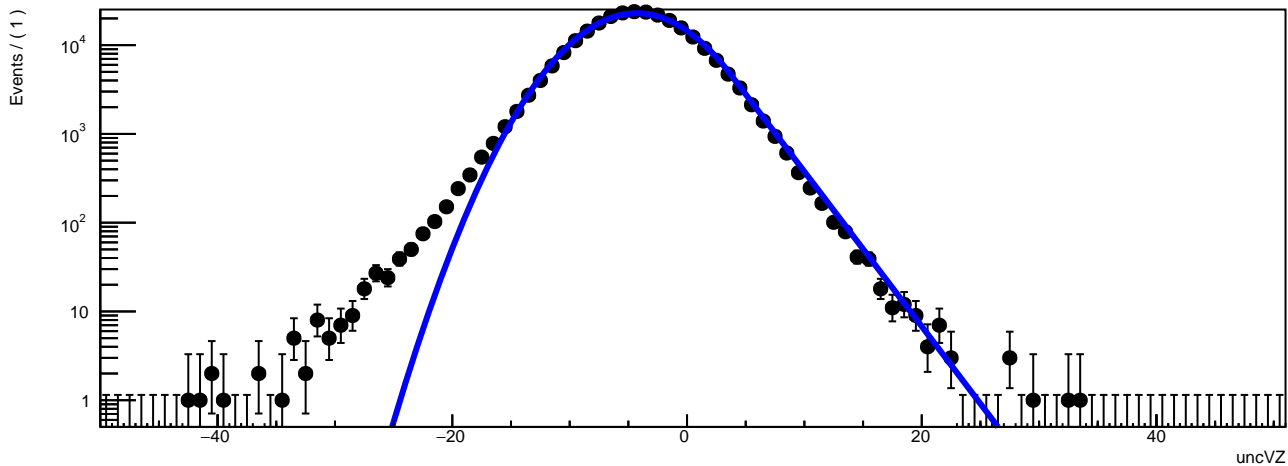
vertex Z, mass 0.0355102040816 +/- 0.00290475185486 GeV, zcut 29.2030296817 mm



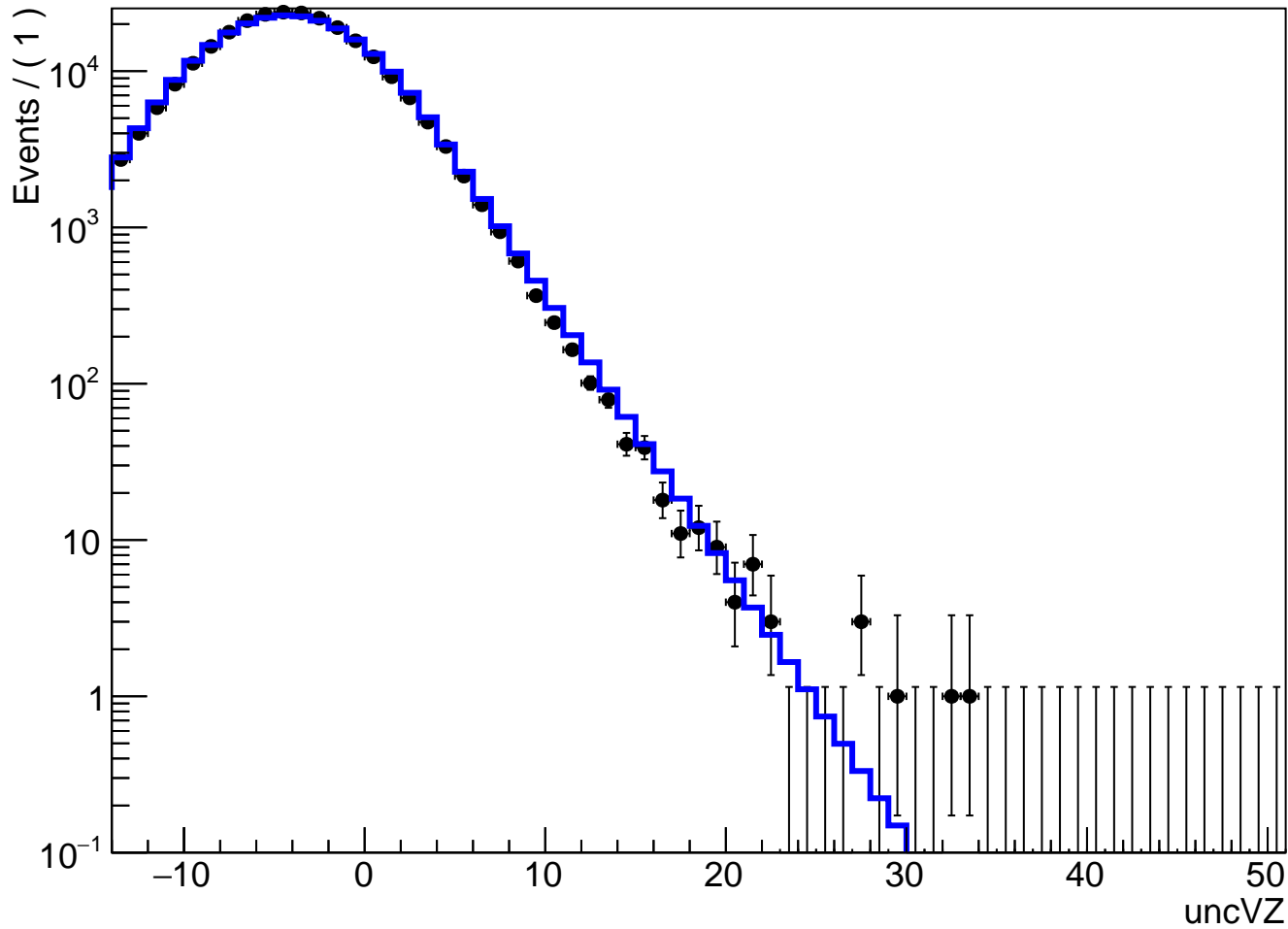
uncM {abs(uncM-0.0363265306122)<0.0005}



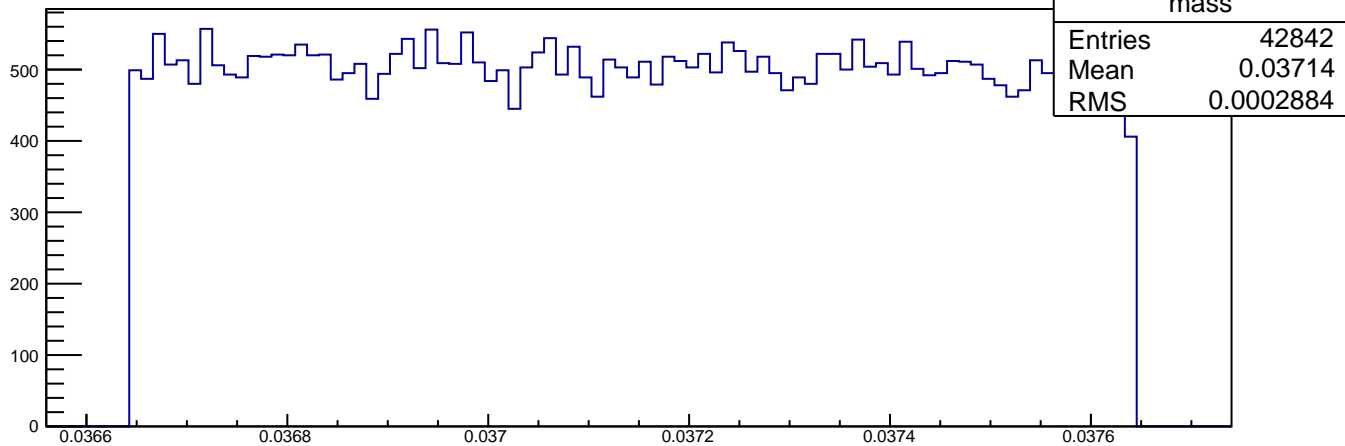
vertex Z, mass 0.0363265306122 +/- 0.0029483486282 GeV, zcut 28.6803463105 mm



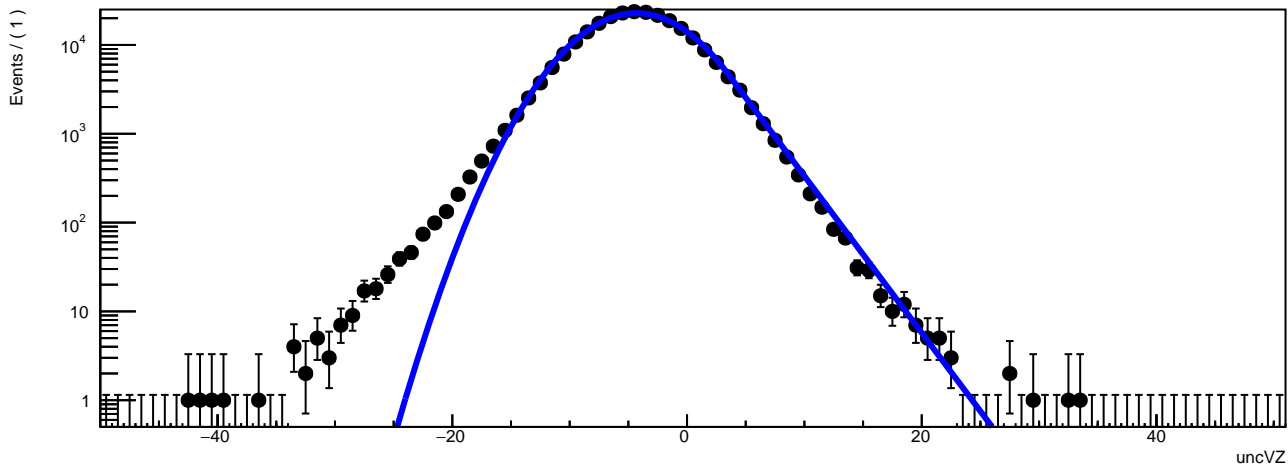
vertex Z, mass 0.0363265306122 +/- 0.0029483486282 GeV, zcut 28.6803463105 mm



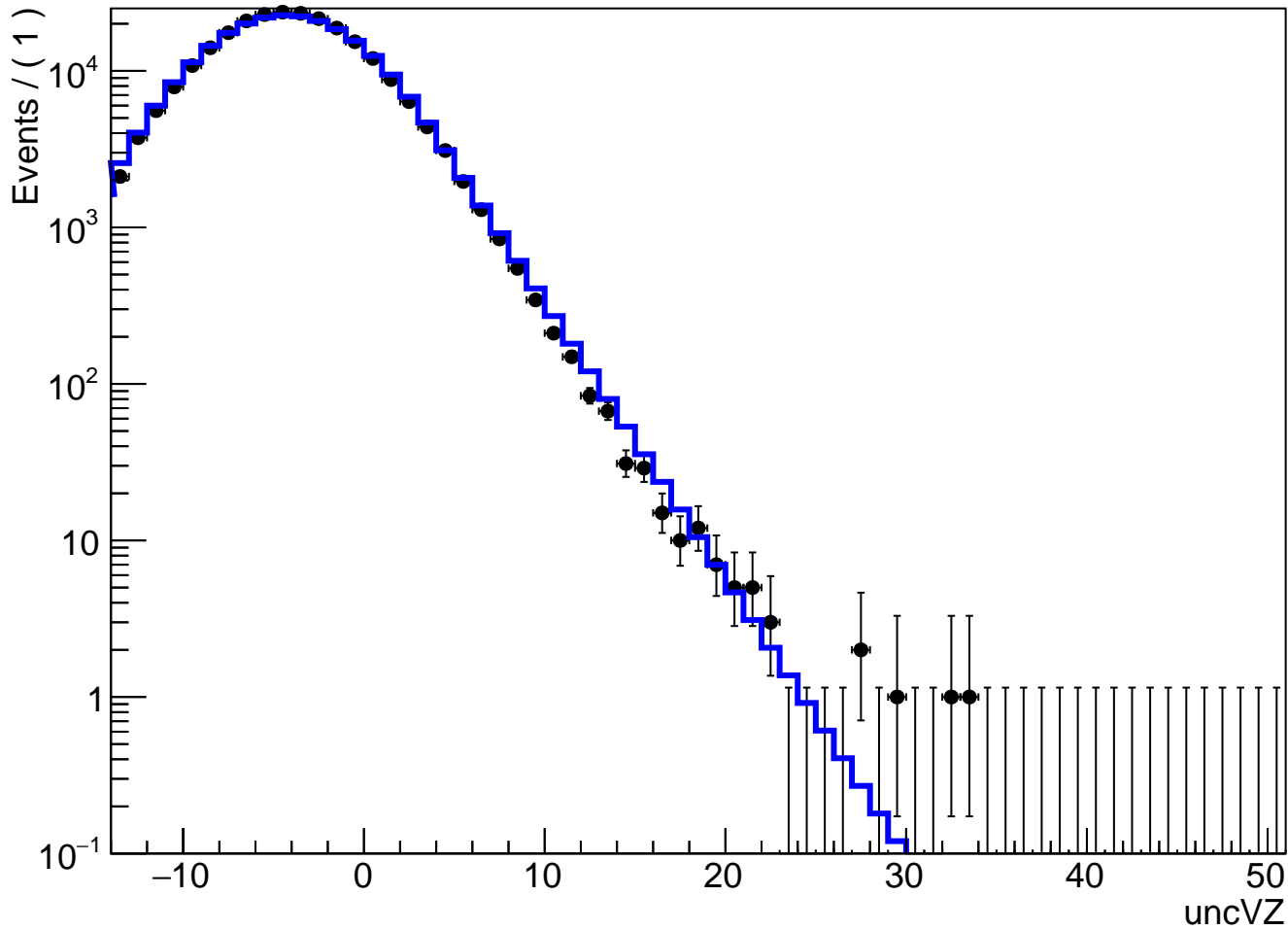
uncM {abs(uncM-0.0371428571429)<0.0005}



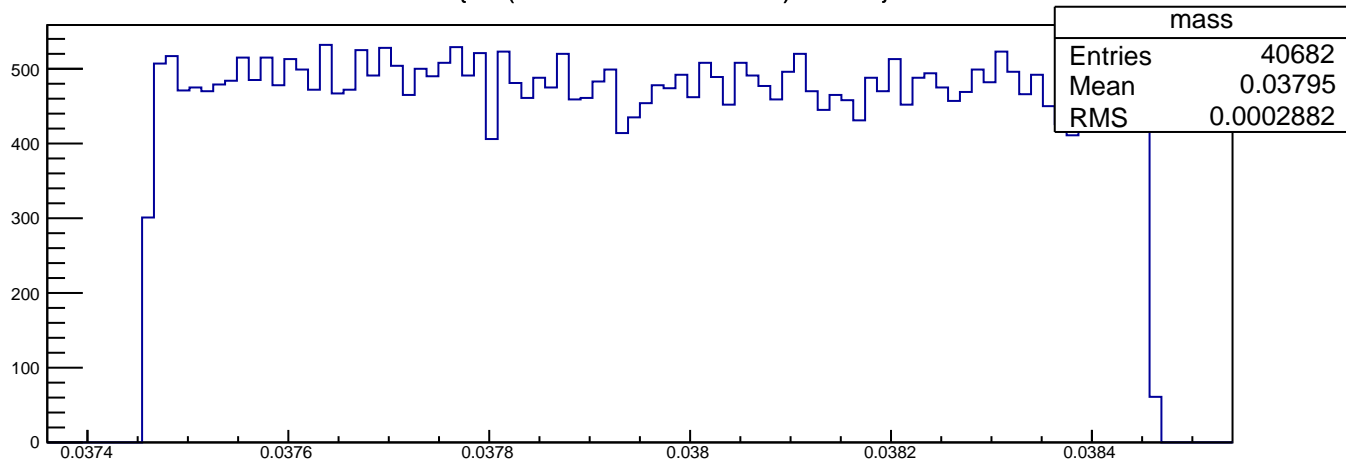
vertex Z, mass 0.0371428571429 +/- 0.00299194540153 GeV, zcut 28.120372966 mm



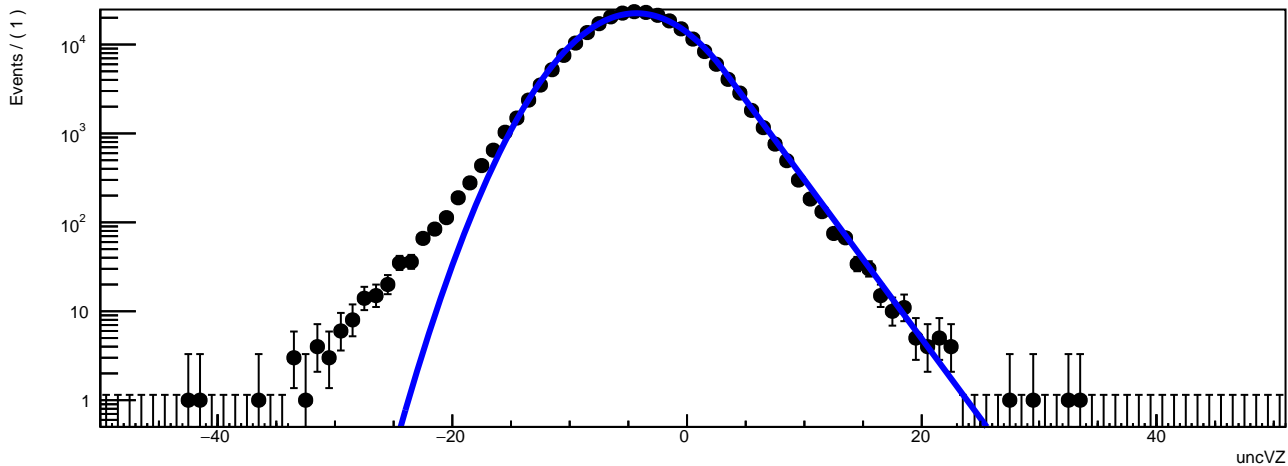
vertex Z, mass  $0.0371428571429 \pm 0.00299194540153$  GeV, zcut 28.120372966 mm



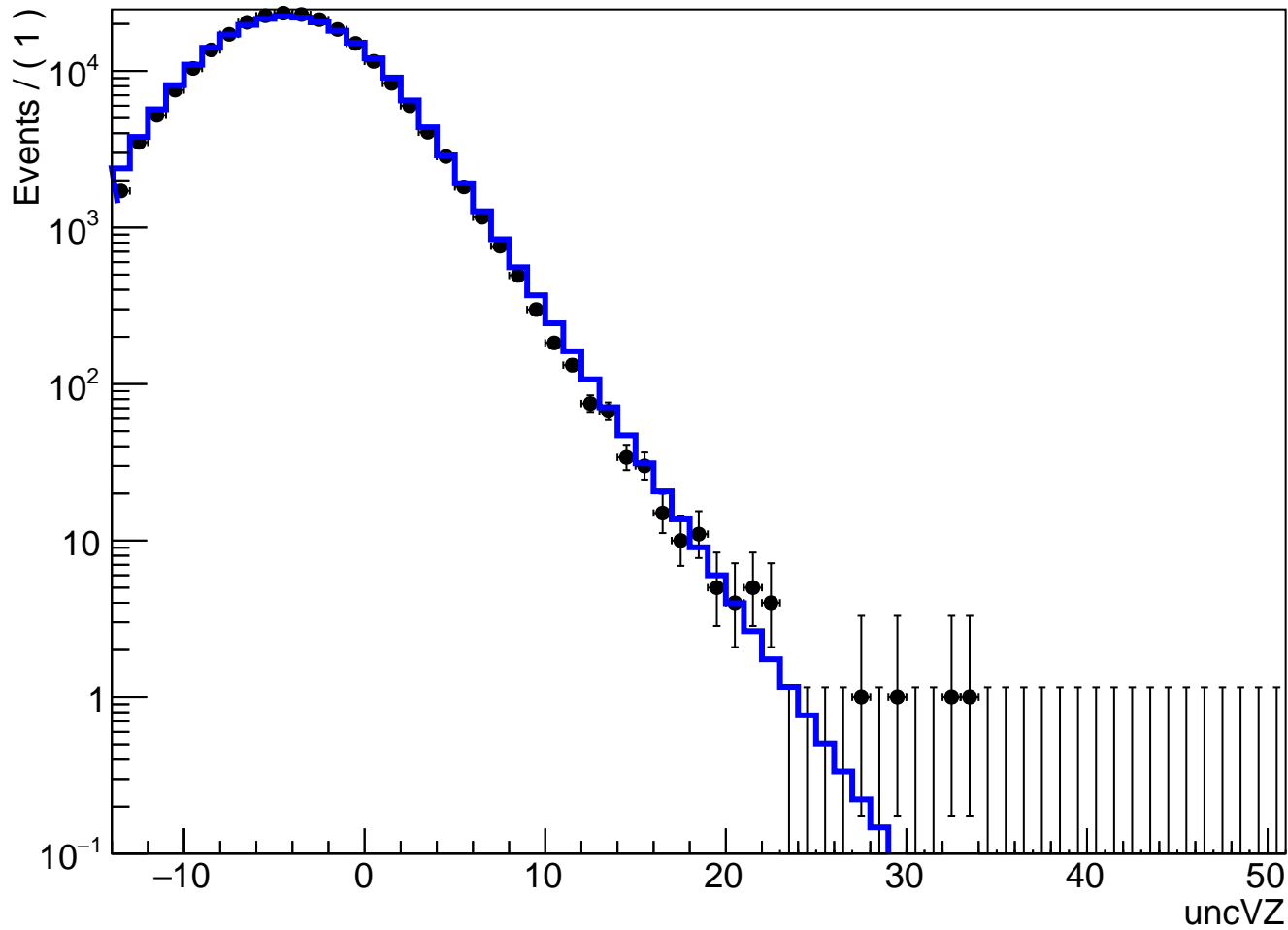
uncM {abs(uncM-0.0379591836735)<0.0005}



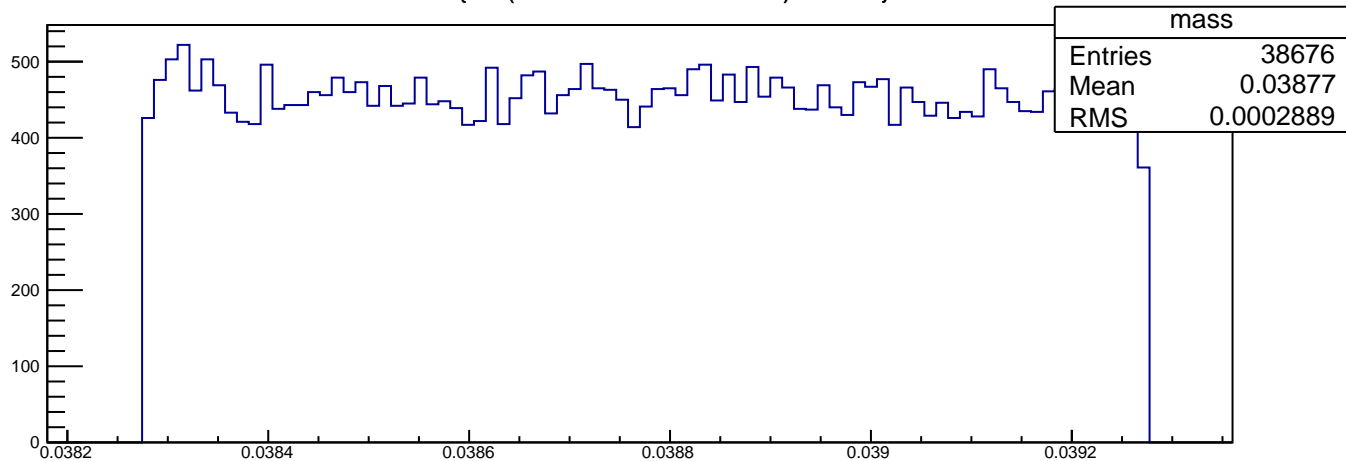
vertex Z, mass 0.0379591836735 +/- 0.00303554217487 GeV, zcut 27.6063814547 mm



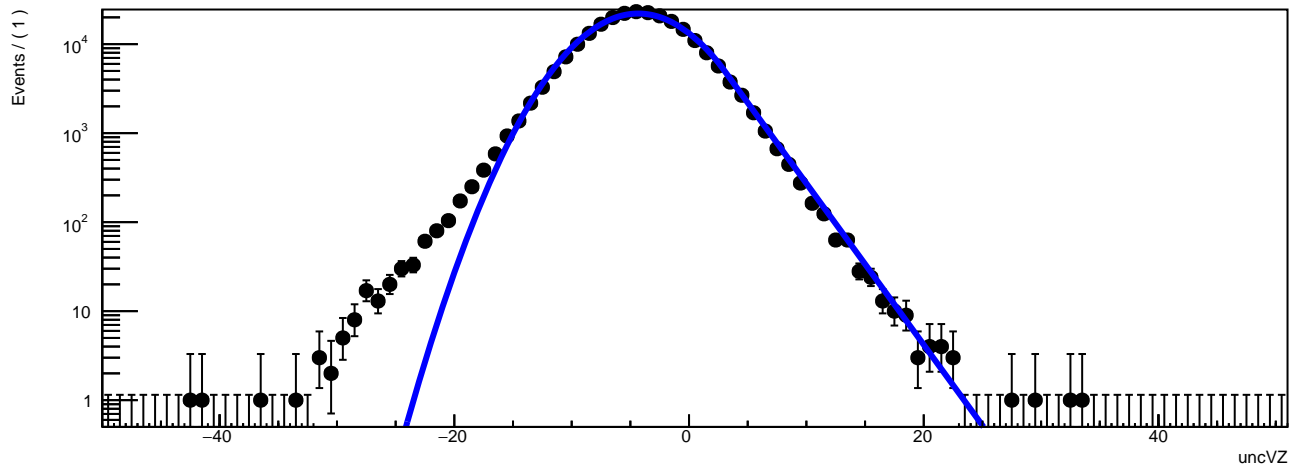
vertex Z, mass  $0.0379591836735 \pm 0.00303554217487$  GeV, zcut 27.6063814547 mm



uncM {abs(uncM-0.0387755102041)<0.0005}

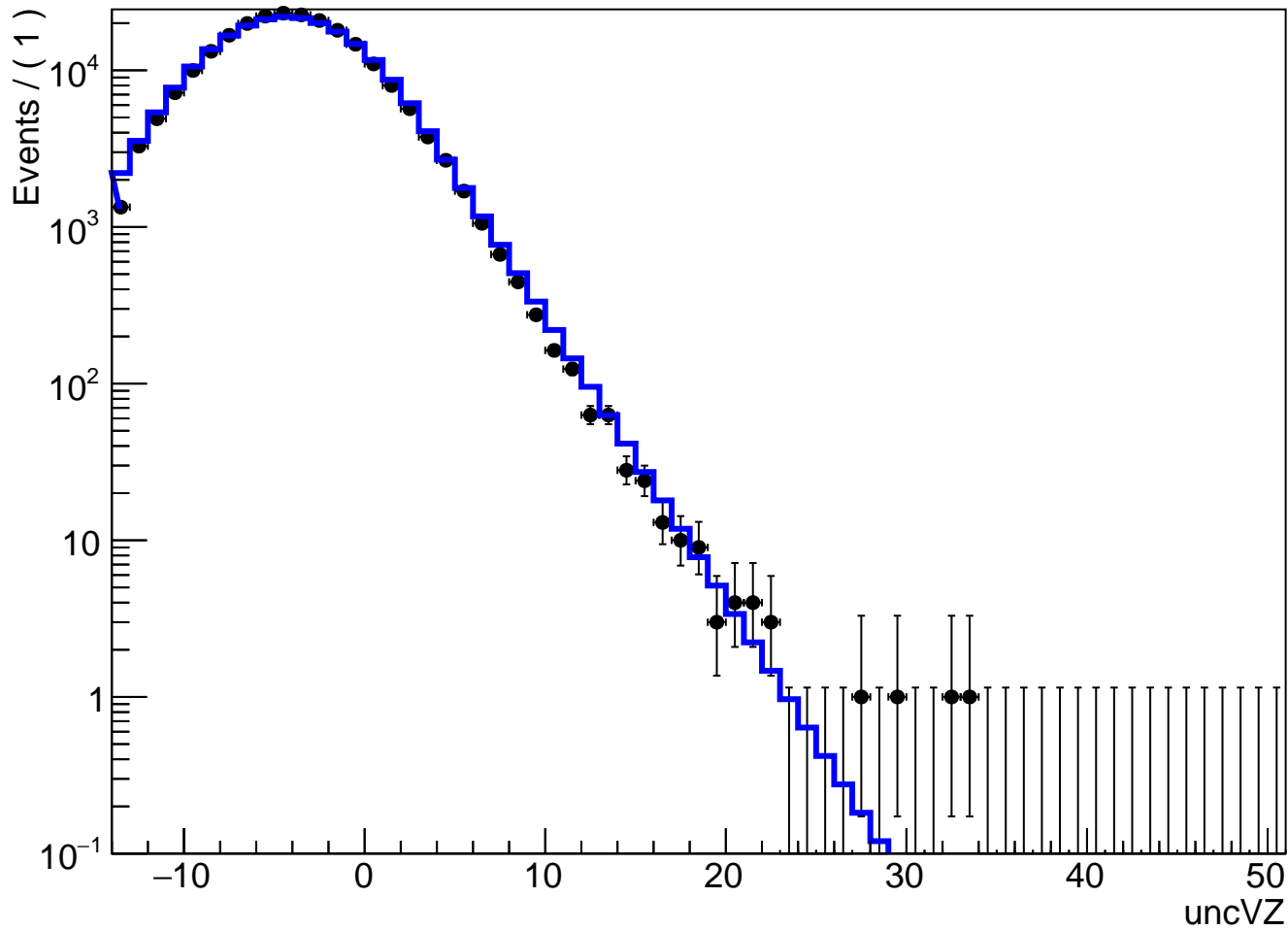


vertex Z, mass 0.0387755102041 +/- 0.00307913894821 GeV, zcut 27.0934765153 mm

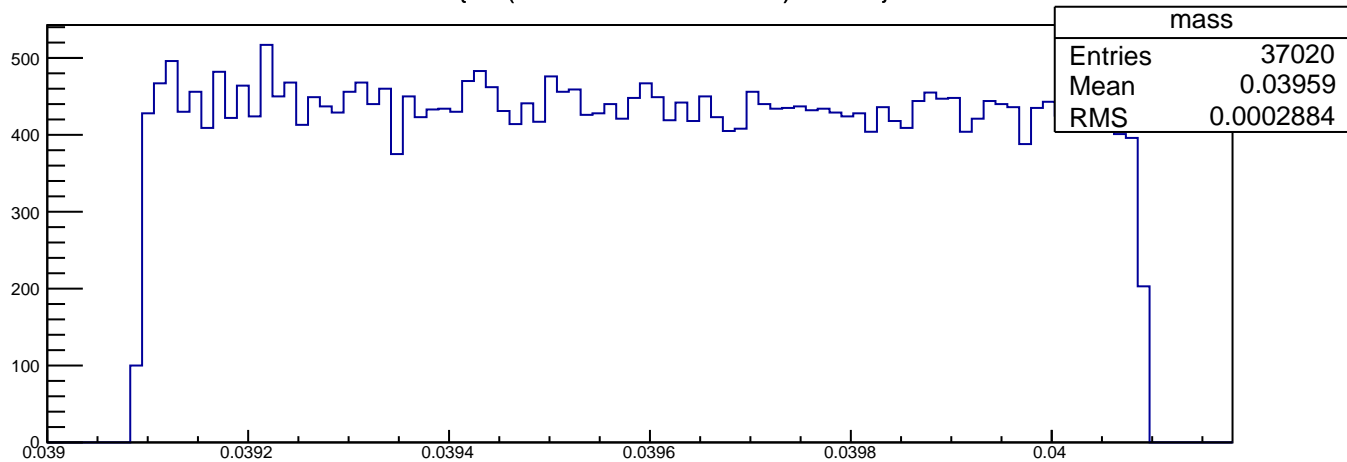




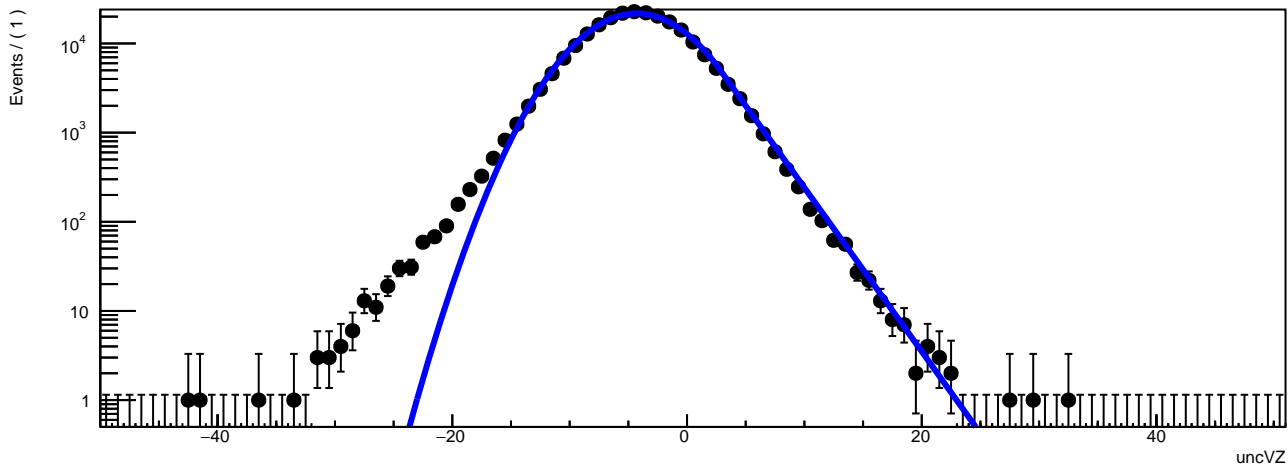
vertex Z, mass 0.0387755102041 +/- 0.00307913894821 GeV, zcut 27.0934765153 mm



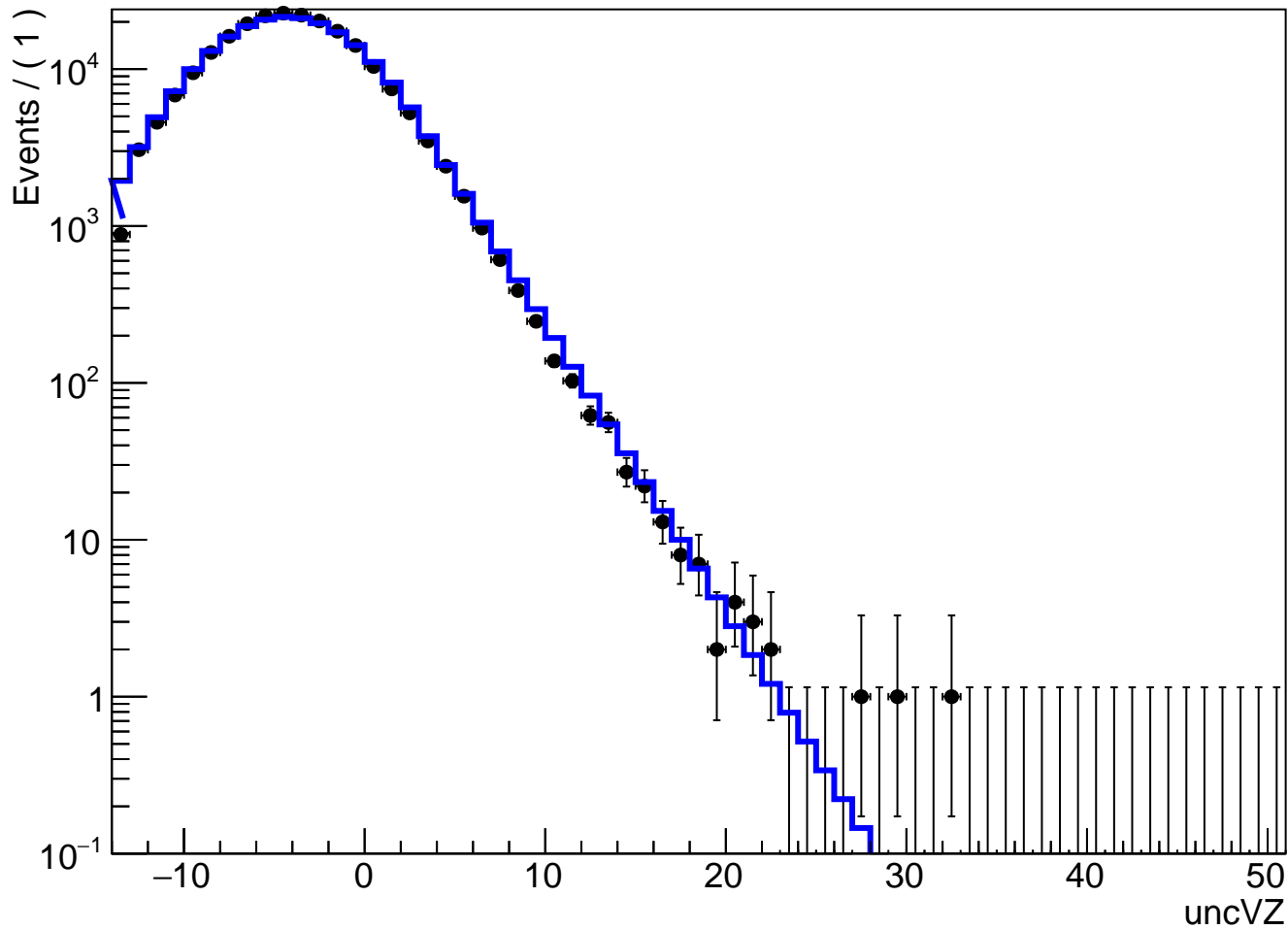
uncM {abs(uncM-0.0395918367347)<0.0005}



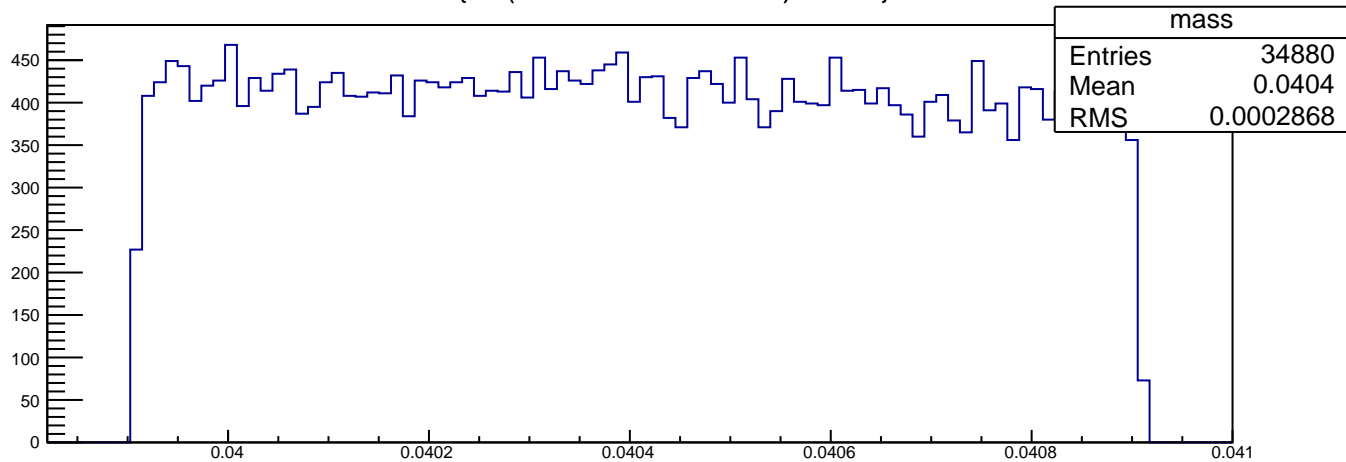
vertex Z, mass 0.0395918367347 +/- 0.00312273572155 GeV, zcut 26.5477873097 mm



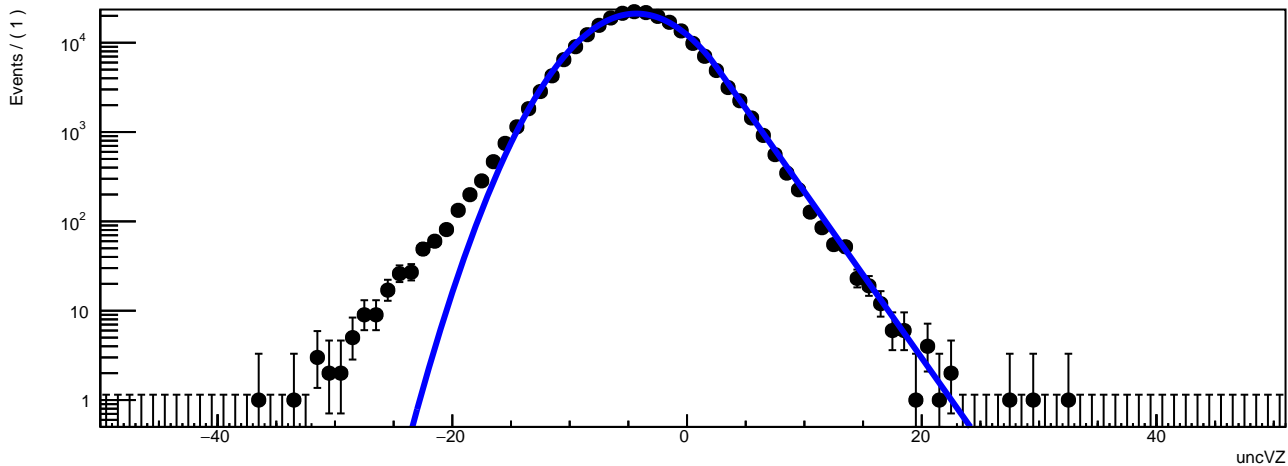
vertex Z, mass 0.0395918367347 +/- 0.00312273572155 GeV, zcut 26.5477873097 mm



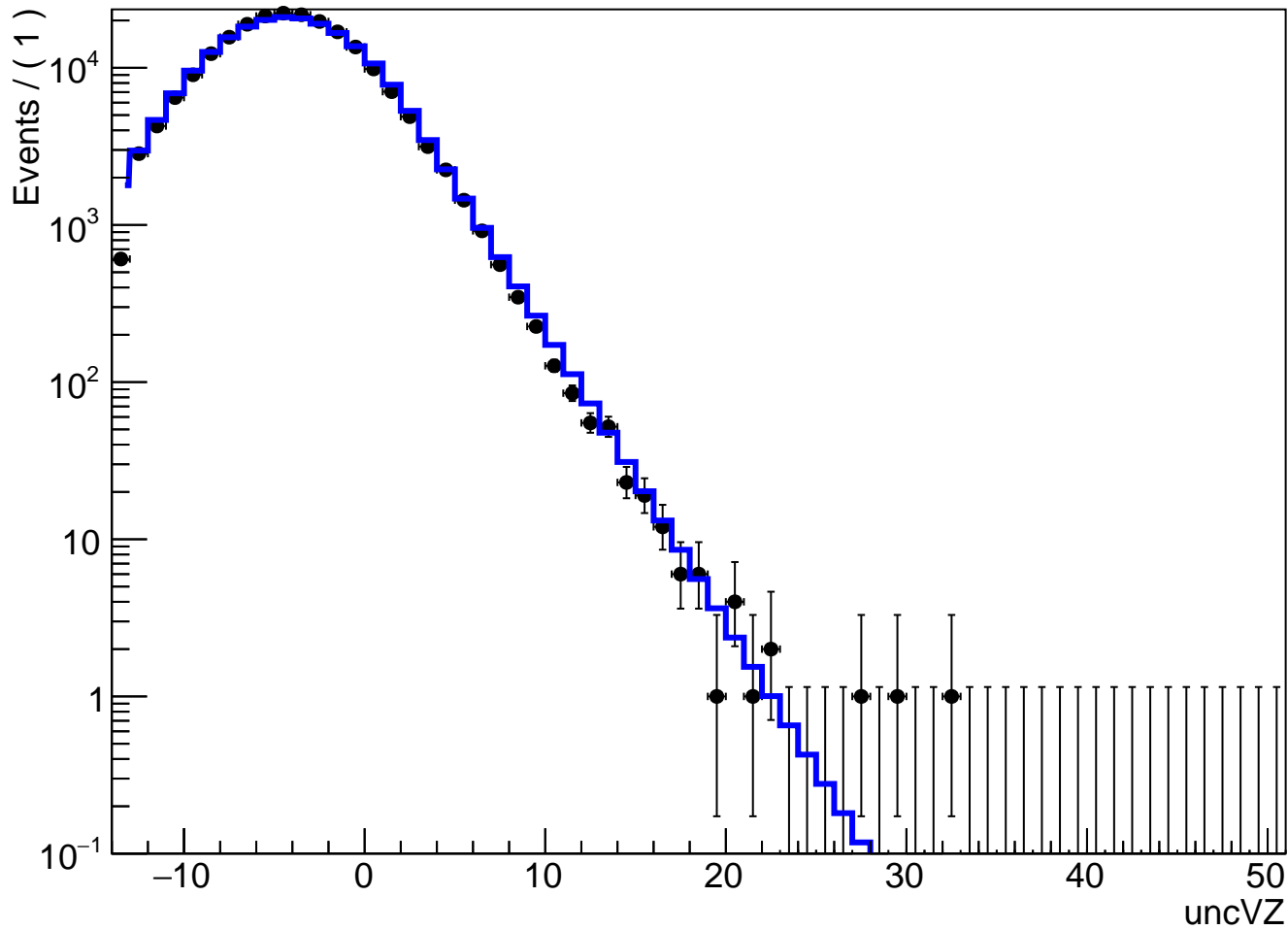
uncM {abs(uncM-0.0404081632653)<0.0005}



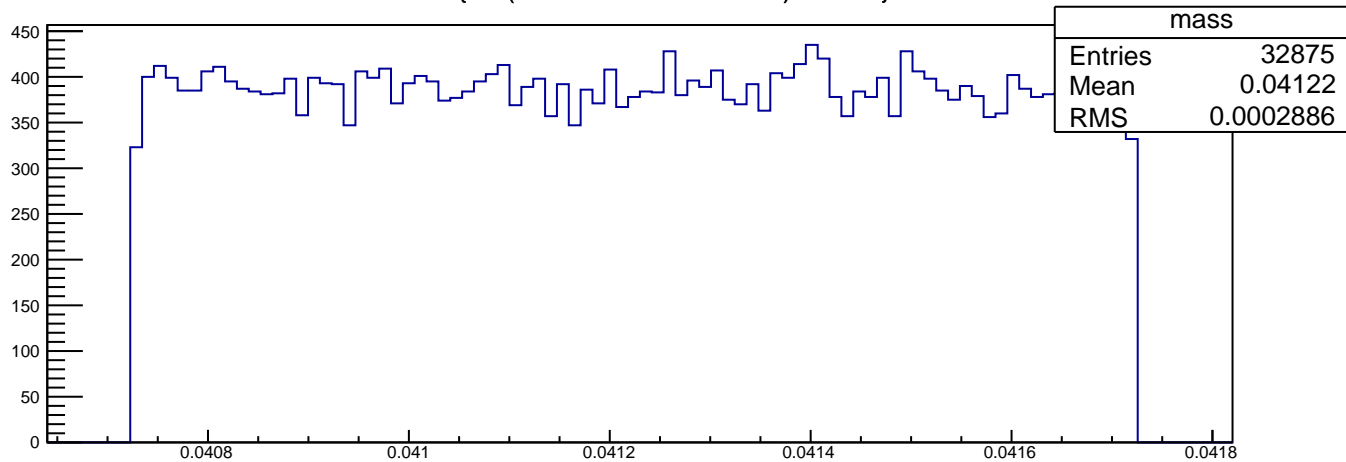
vertex Z, mass 0.0404081632653 +/- 0.00316633249488 GeV, zcut 26.0278026966 mm



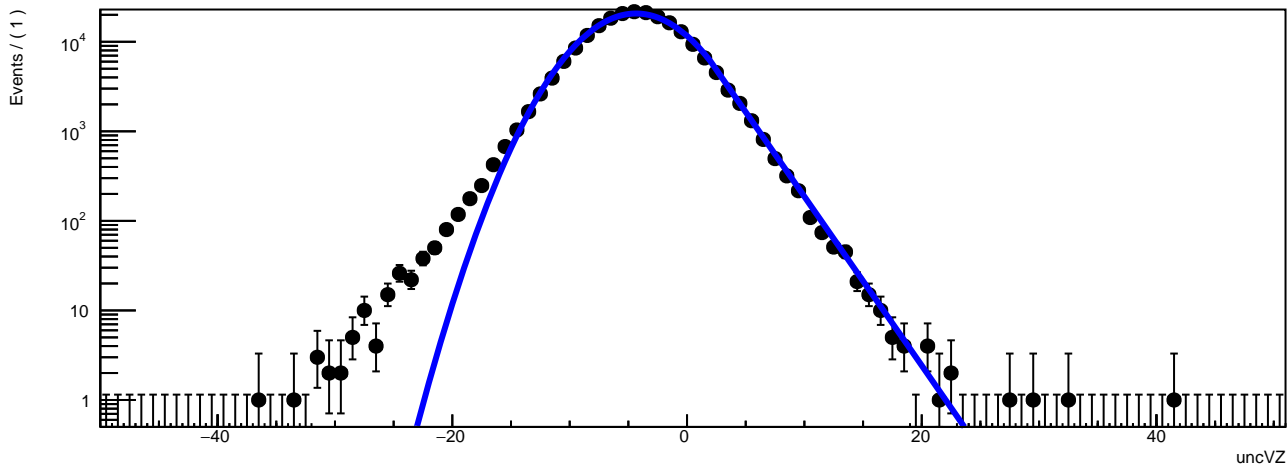
vertex Z, mass 0.0404081632653 +/- 0.00316633249488 GeV, zcut 26.0278026966 mm



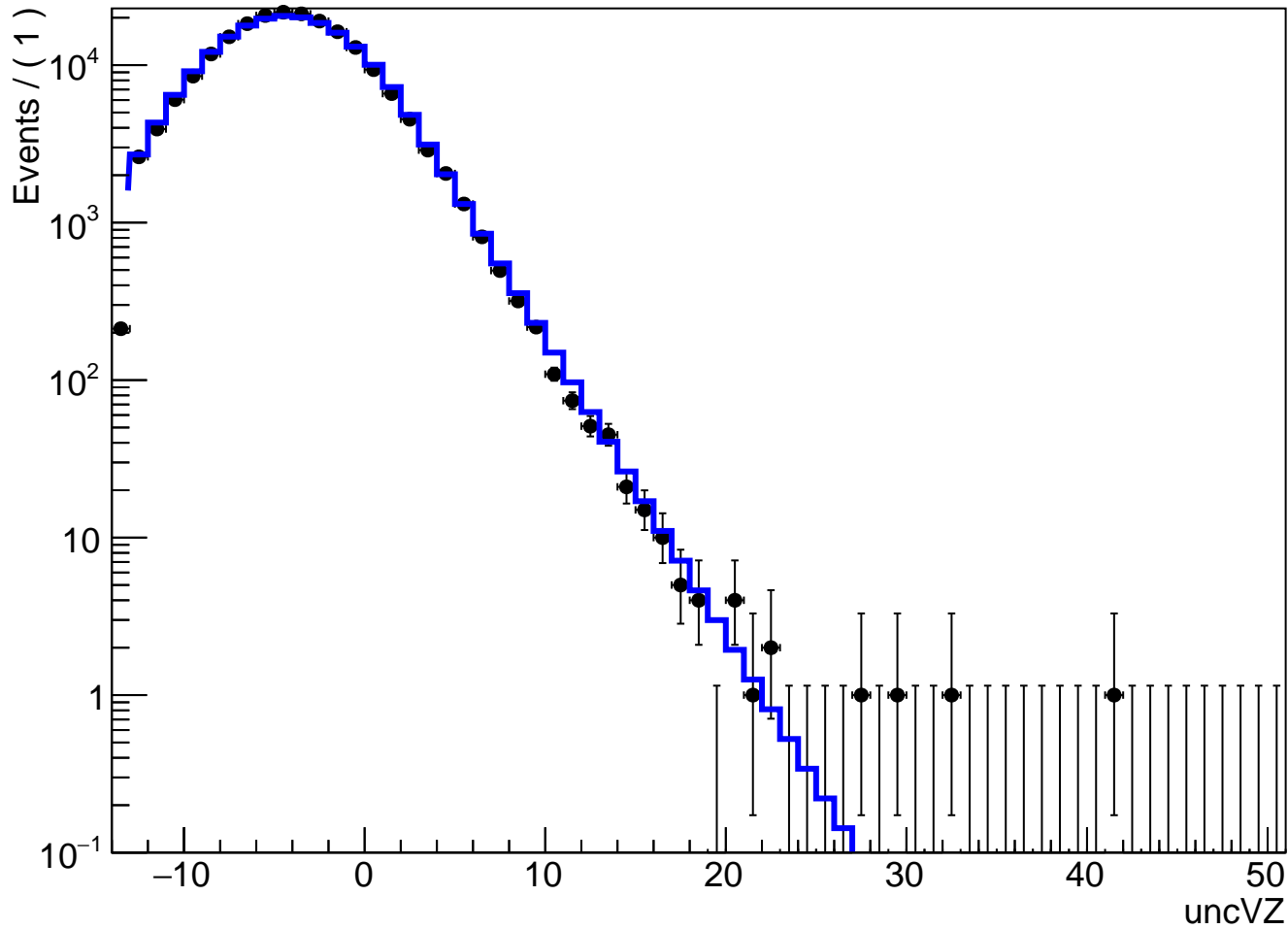
uncM {abs(uncM-0.0412244897959)<0.0005}



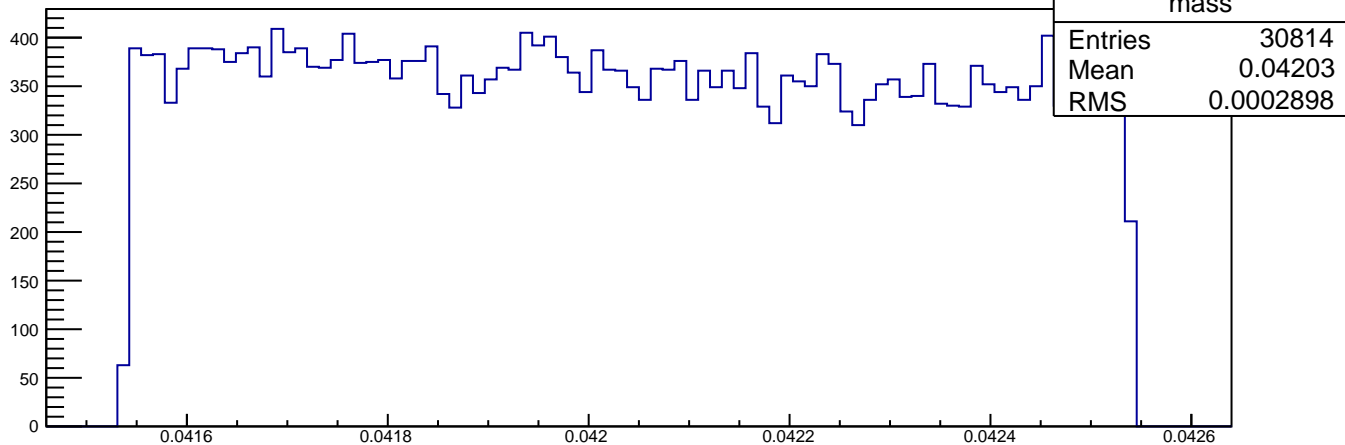
vertex Z, mass 0.0412244897959 +/- 0.00320992926822 GeV, zcut 25.4568320138 mm



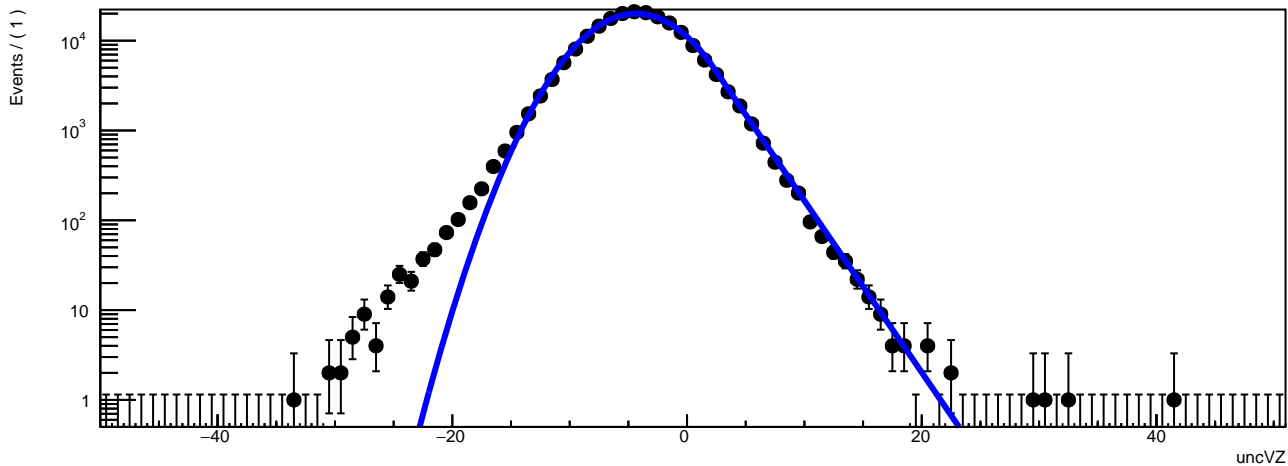
vertex Z, mass 0.0412244897959 +/- 0.00320992926822 GeV, zcut 25.4568320138 mm



uncM {abs(uncM-0.0420408163265)<0.0005}

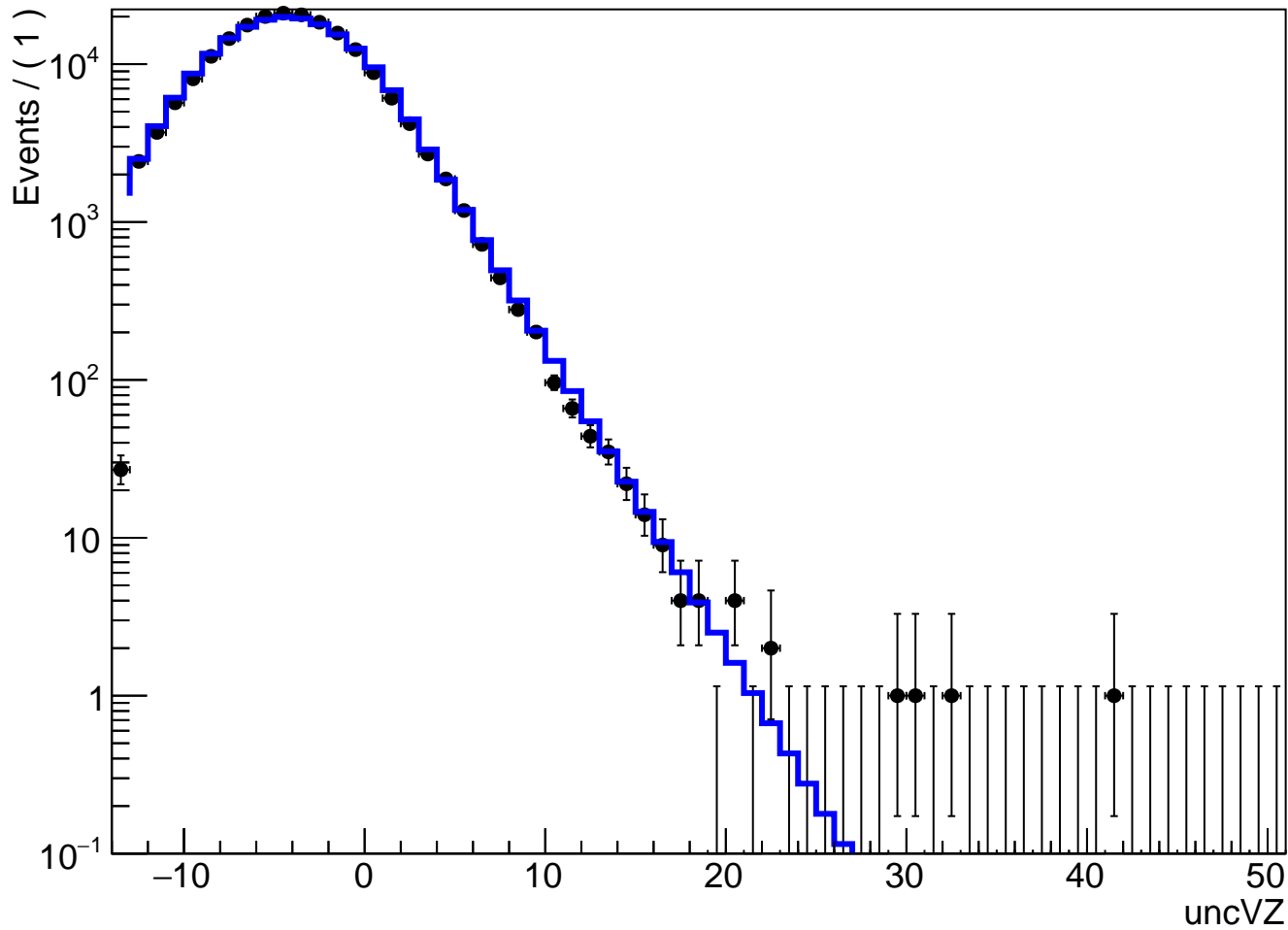


vertex Z, mass 0.0420408163265 +/- 0.00325352604156 GeV, zcut 24.9415378132 mm

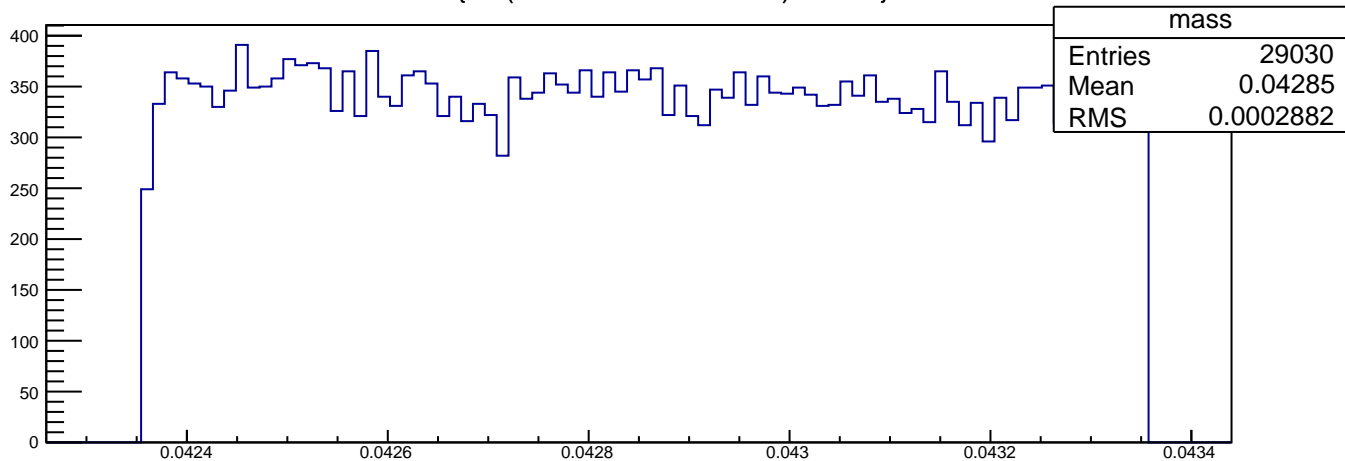




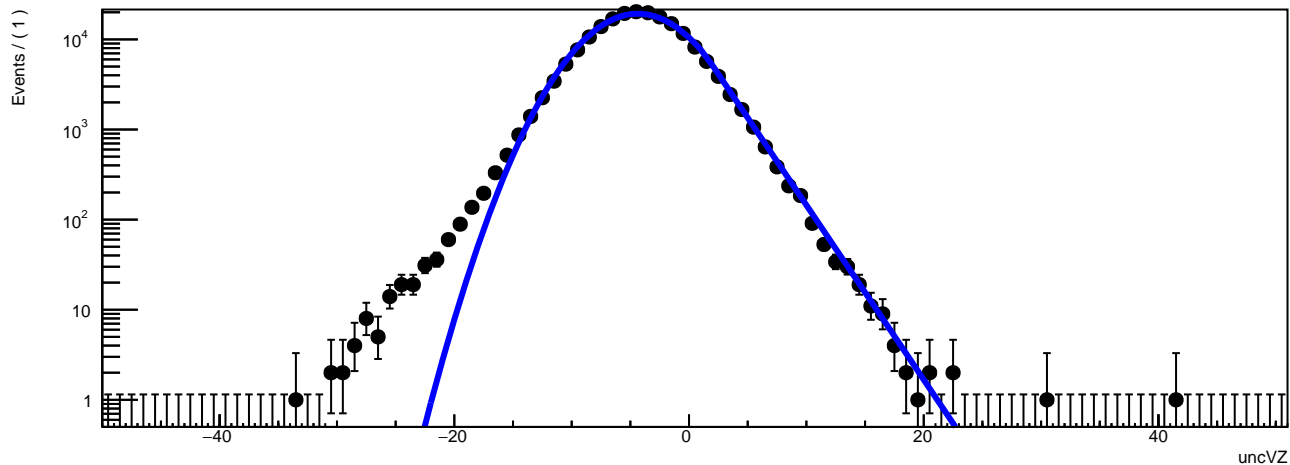
vertex Z, mass  $0.0420408163265 \pm 0.00325352604156$  GeV, zcut 24.9415378132 mm



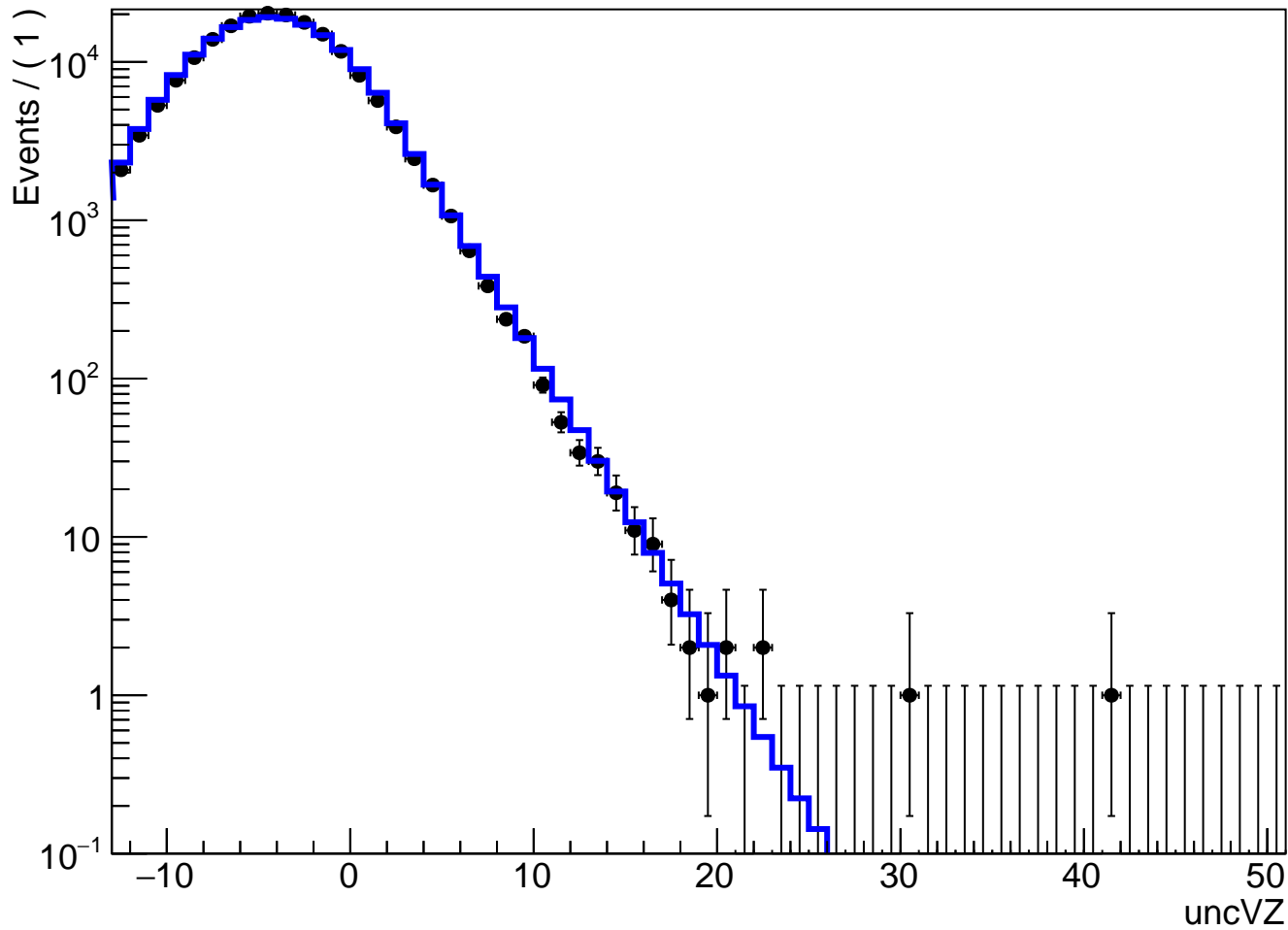
uncM {abs(uncM-0.0428571428571)<0.0005}



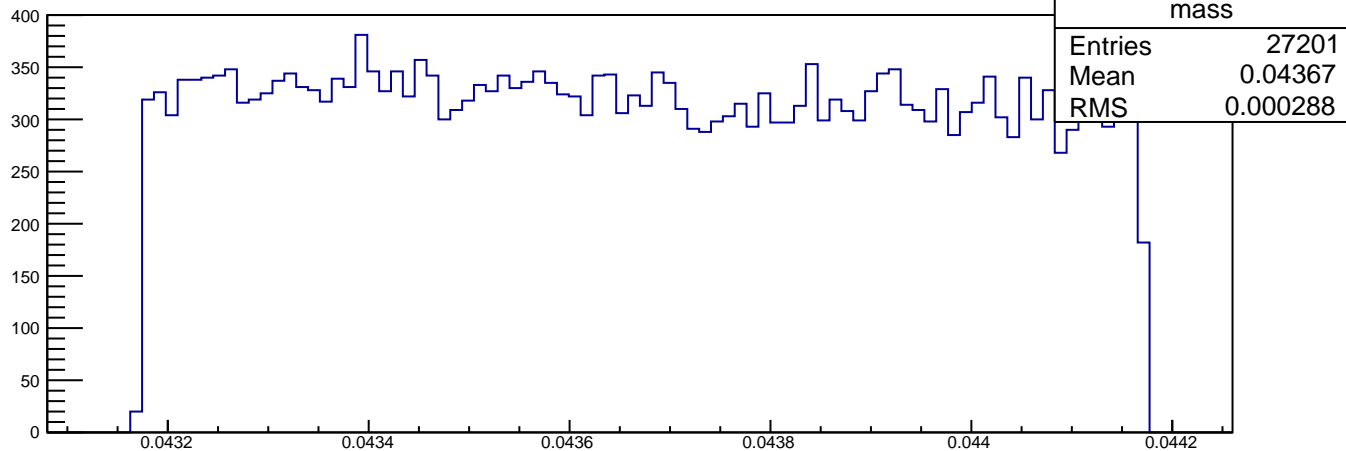
vertex Z, mass 0.0428571428571 +/- 0.0032971228149 GeV, zcut 24.4172706999 mm



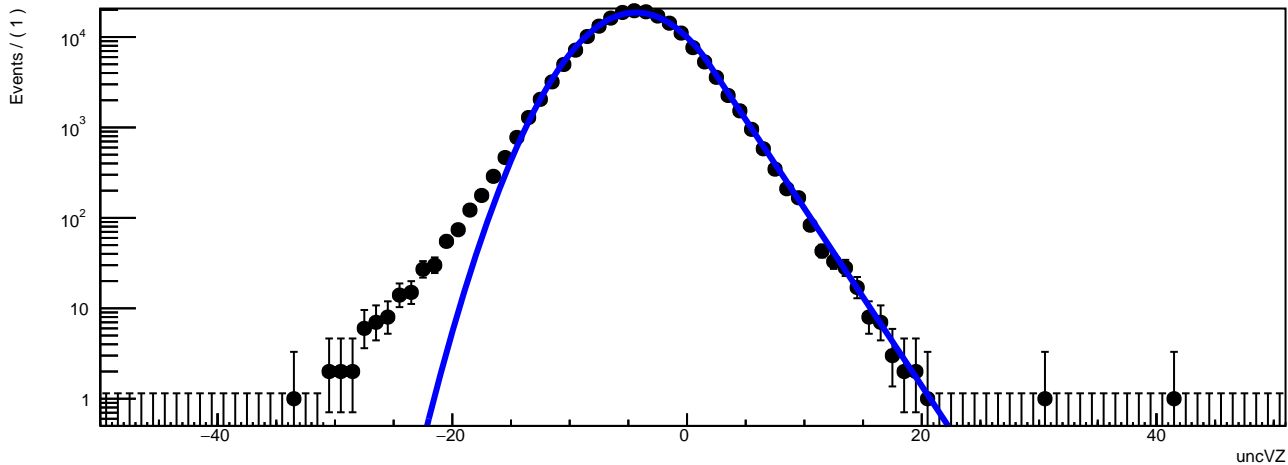
vertex Z, mass  $0.0428571428571 \pm 0.0032971228149$  GeV, zcut 24.4172706999 mm



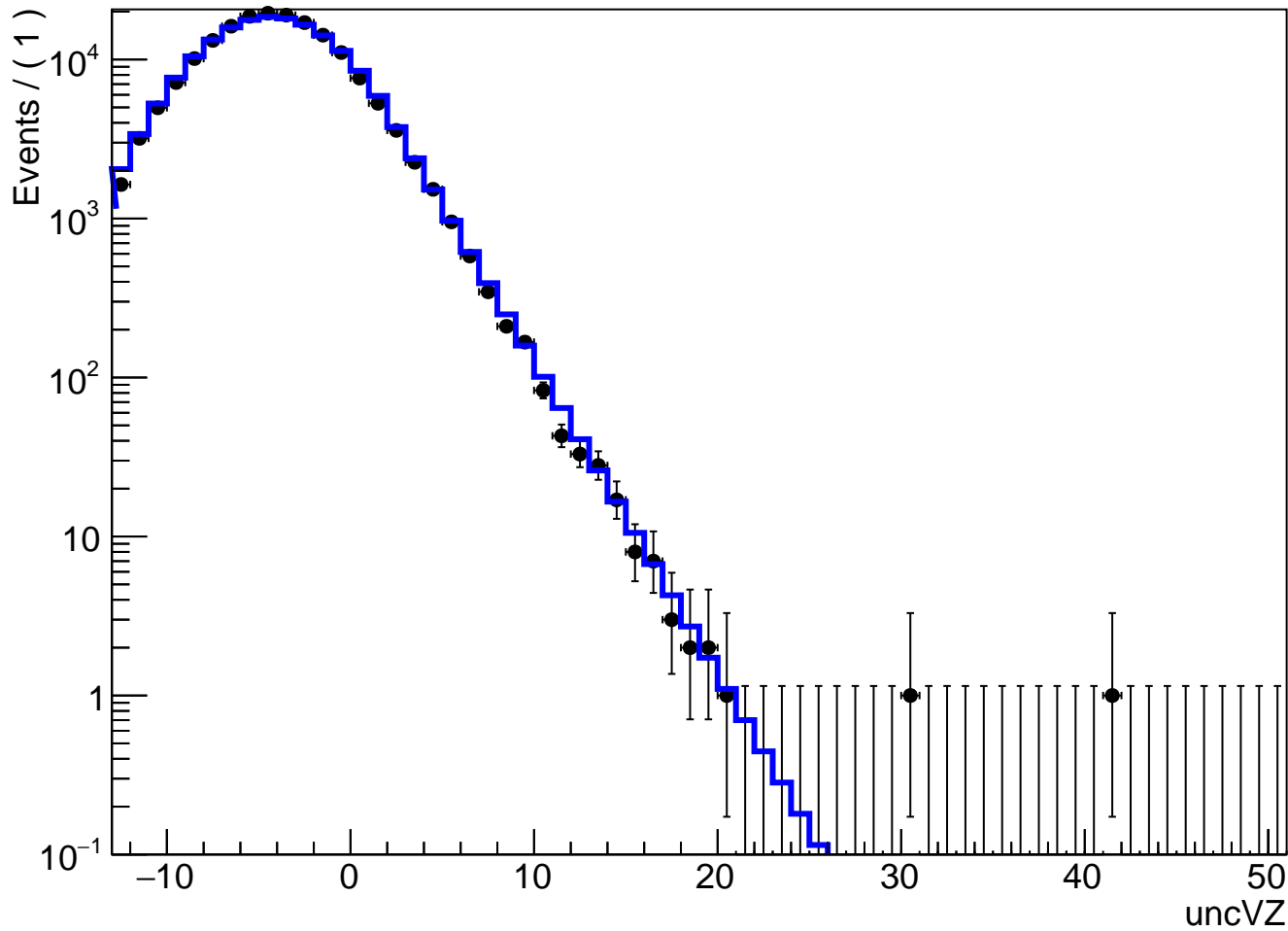
uncM {abs(uncM-0.0436734693878)<0.0005}



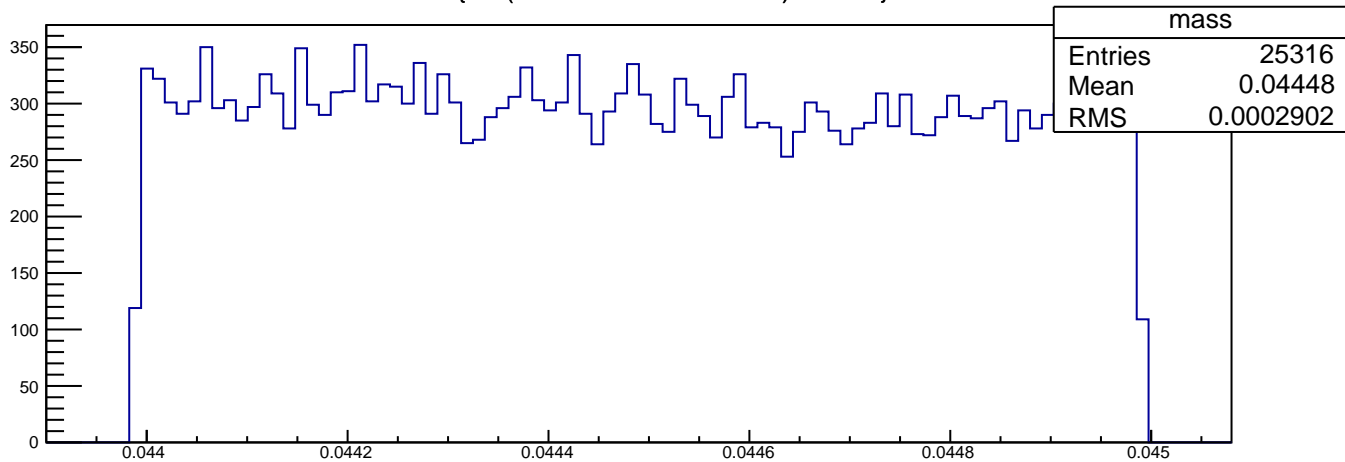
vertex Z, mass 0.0436734693878 +/- 0.00334071958823 GeV, zcut 23.9161250809 mm



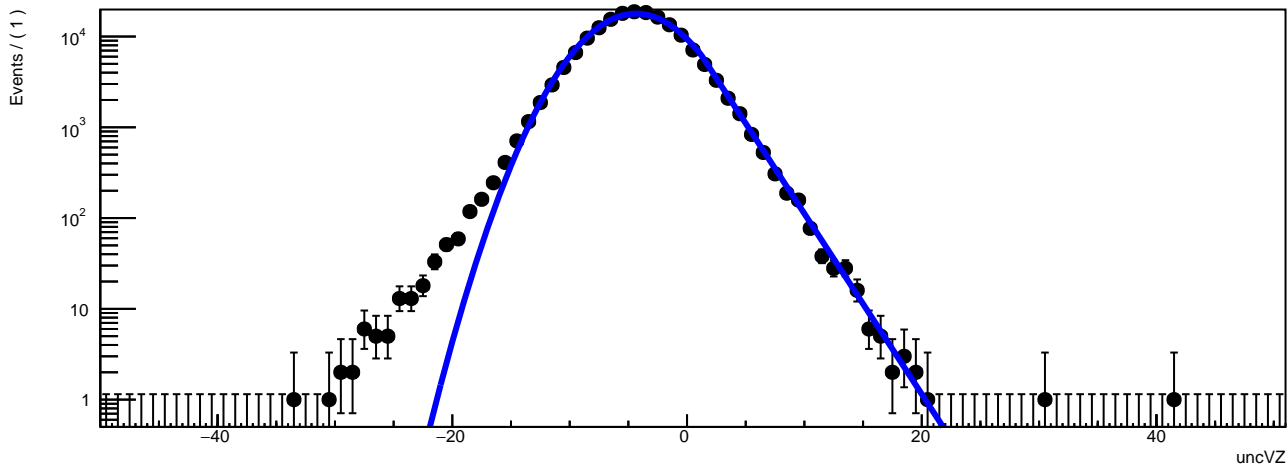
vertex Z, mass  $0.0436734693878 \pm 0.00334071958823$  GeV, zcut 23.9161250809 mm



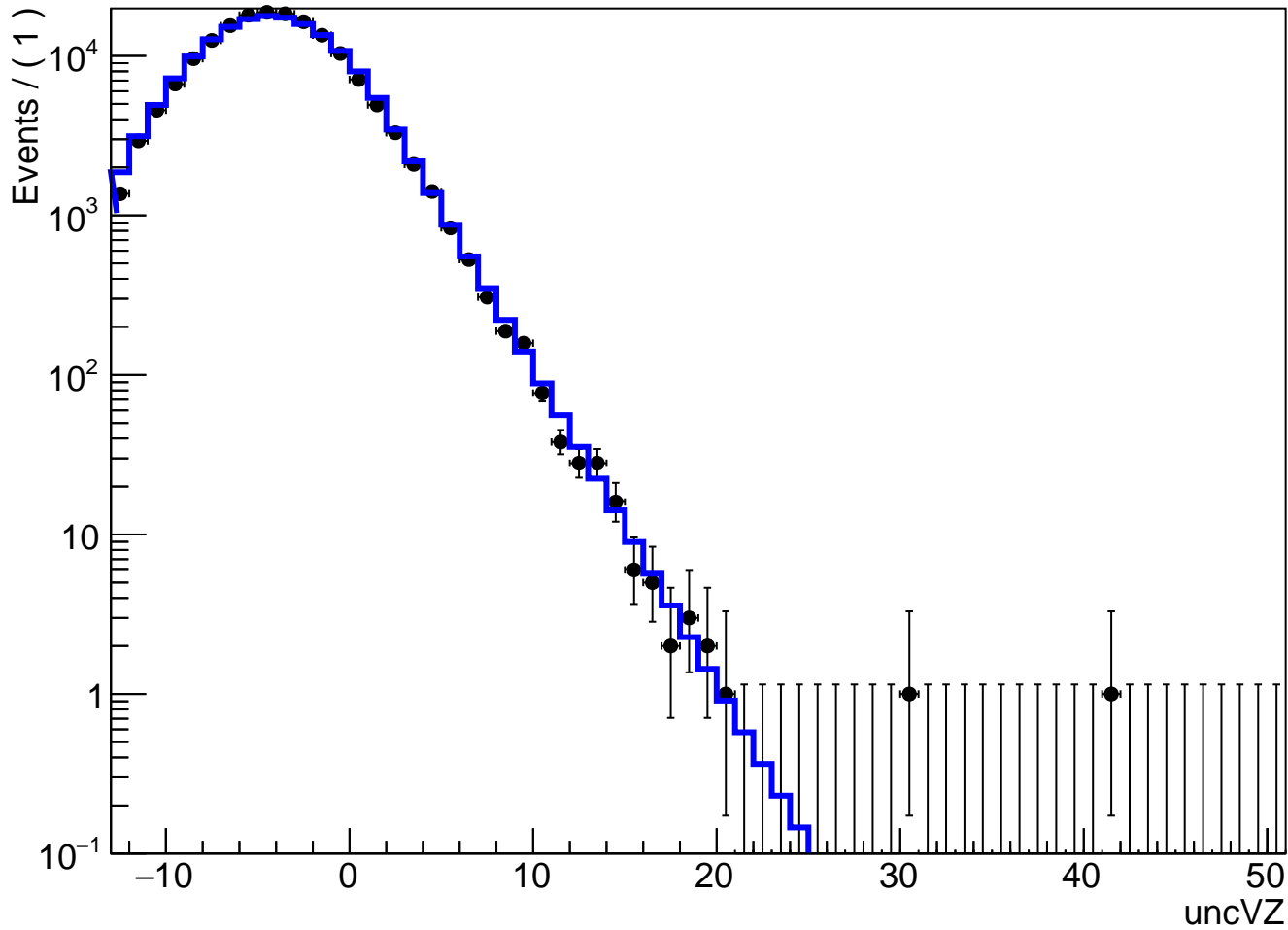
$\text{uncM} \{ \text{abs}(\text{uncM} - 0.0444897959184) < 0.0005 \}$



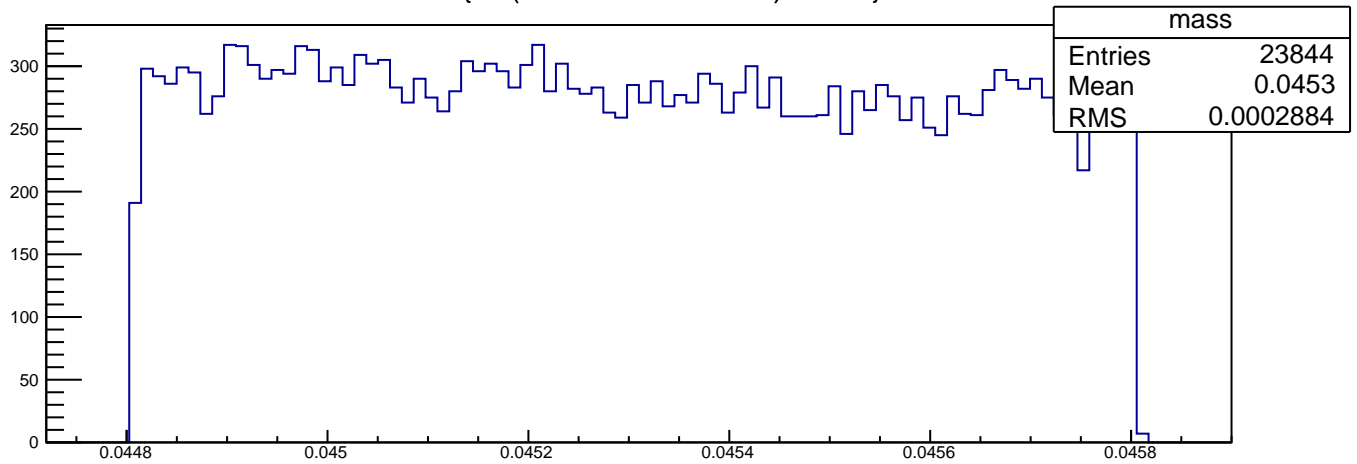
vertex Z, mass  $0.0444897959184 \pm 0.00338431636157$  GeV, zcut 23.4270321463 mm



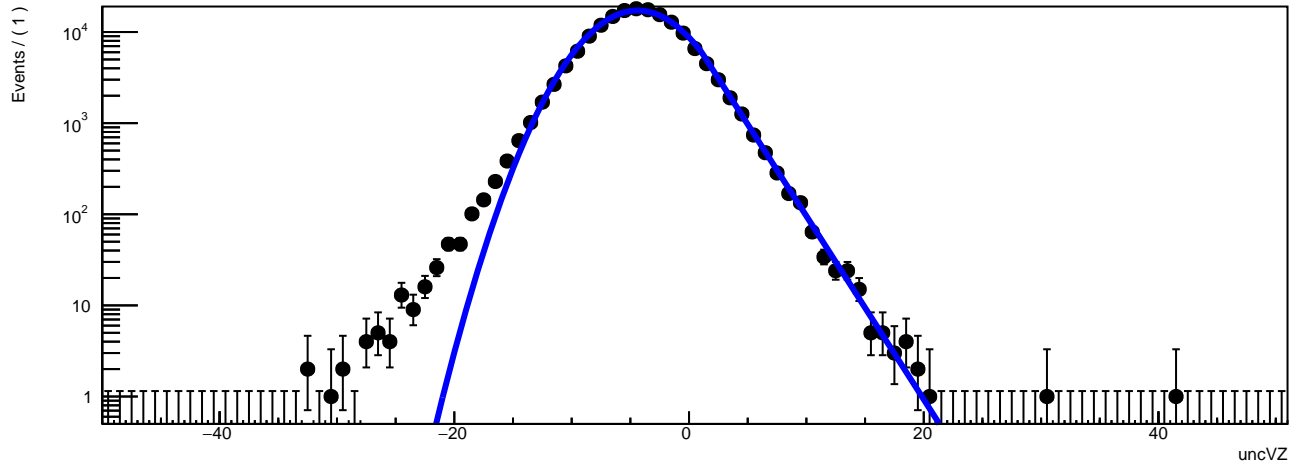
vertex Z, mass  $0.0444897959184 \pm 0.00338431636157$  GeV, zcut 23.4270321463 mm



uncM {abs(uncM-0.045306122449)<0.0005}

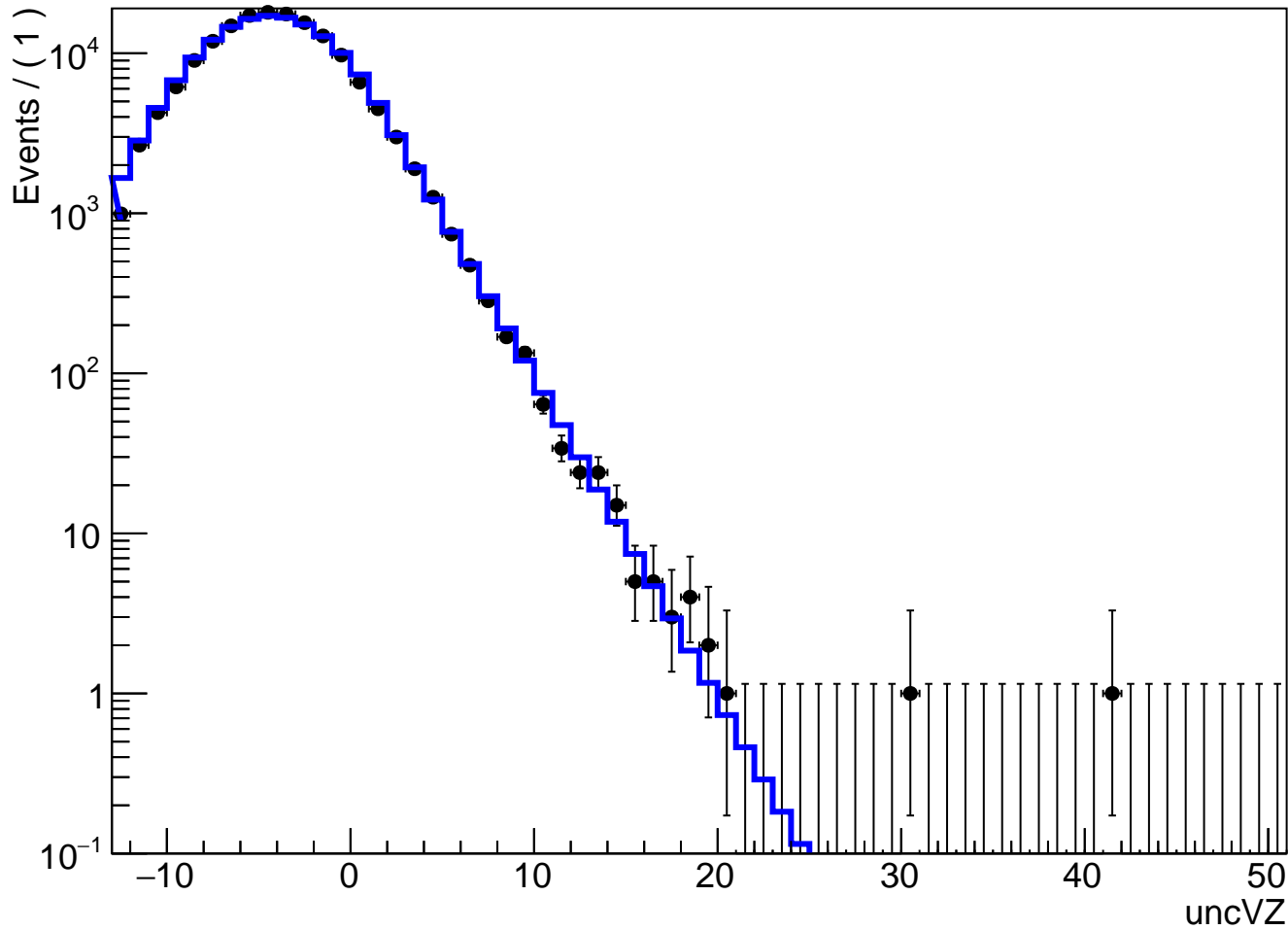


vertex Z, mass 0.045306122449 +/- 0.00342791313491 GeV, zcut 22.8985164752 mm

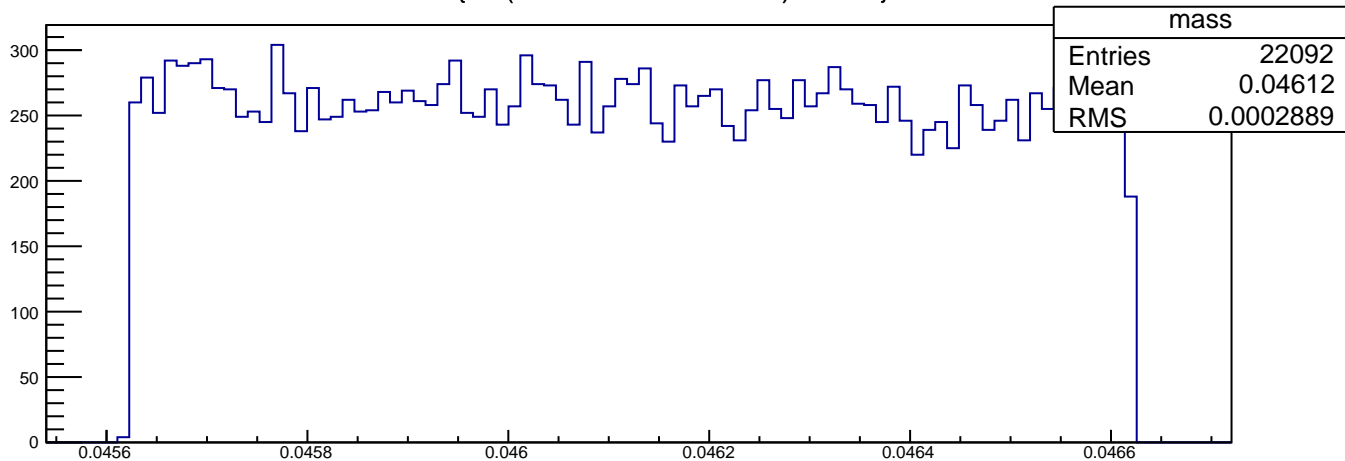




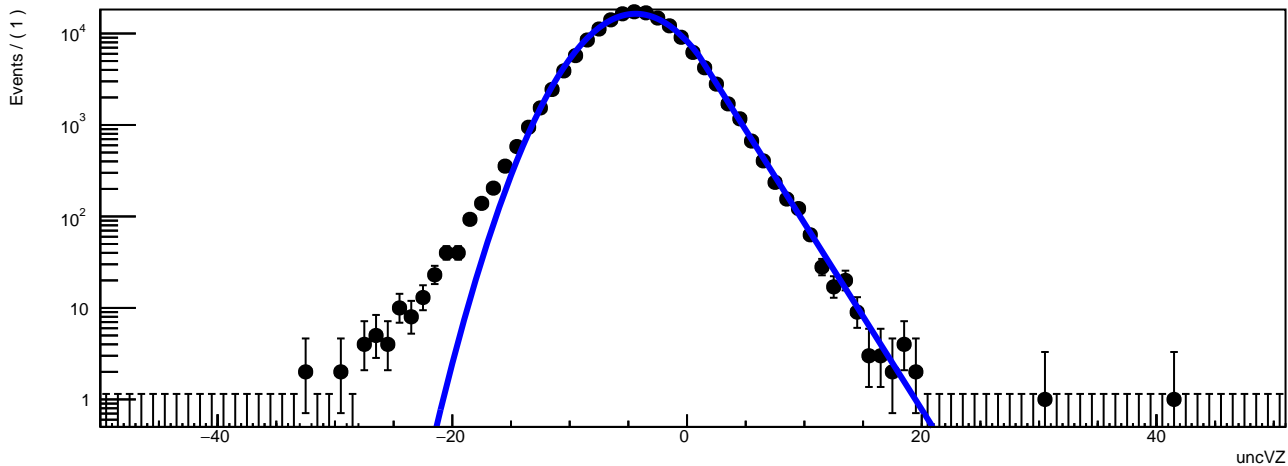
vertex Z, mass 0.045306122449 +/- 0.00342791313491 GeV, zcut 22.8985164752 mm



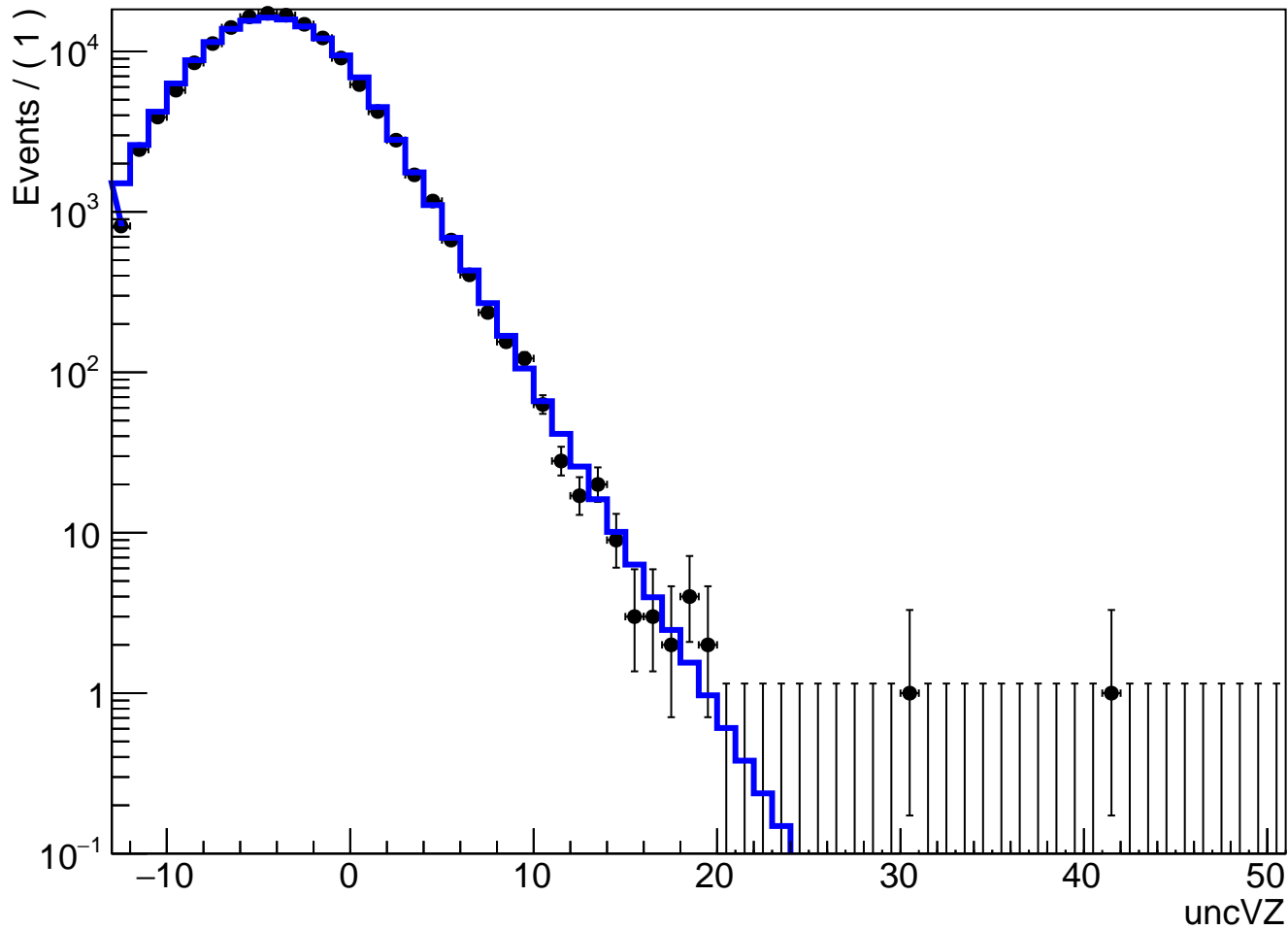
uncM {abs(uncM-0.0461224489796)<0.0005}



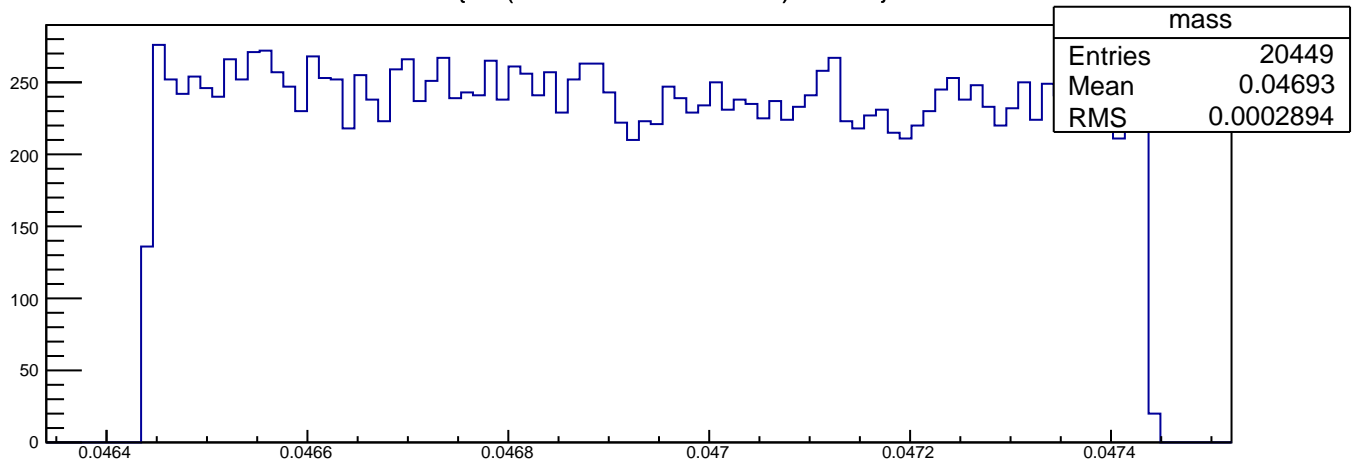
vertex Z, mass 0.0461224489796 +/- 0.00347150990825 GeV, zcut 22.4509065736 mm



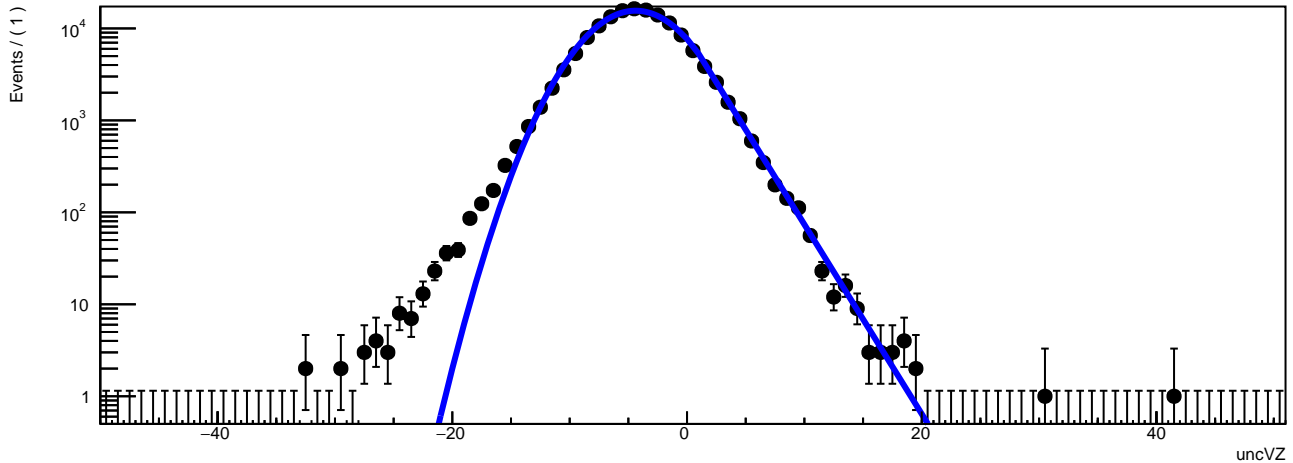
vertex Z, mass  $0.0461224489796 \pm 0.00347150990825$  GeV, zcut 22.4509065736 mm



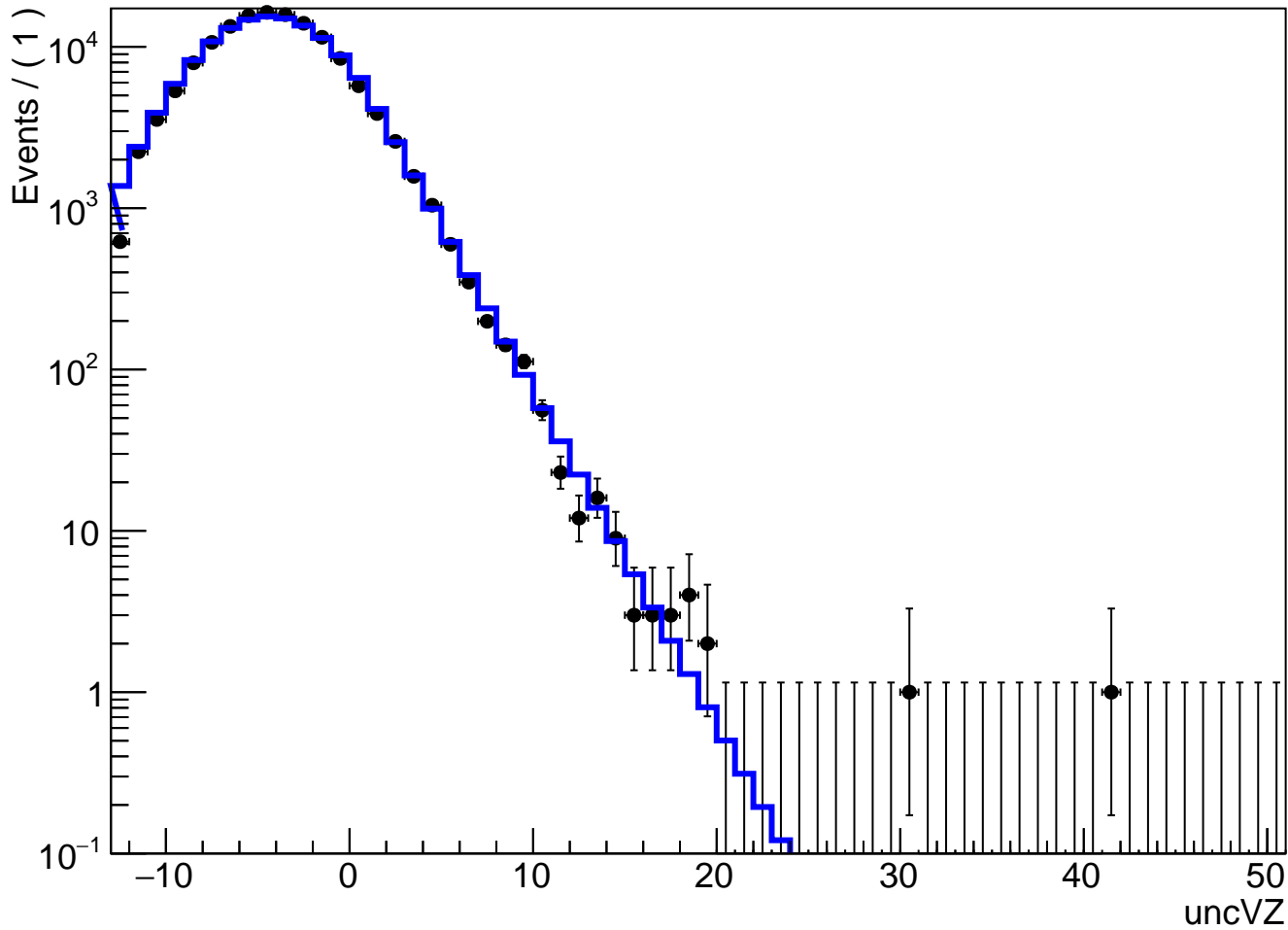
uncM {abs(uncM-0.0469387755102)<0.0005}



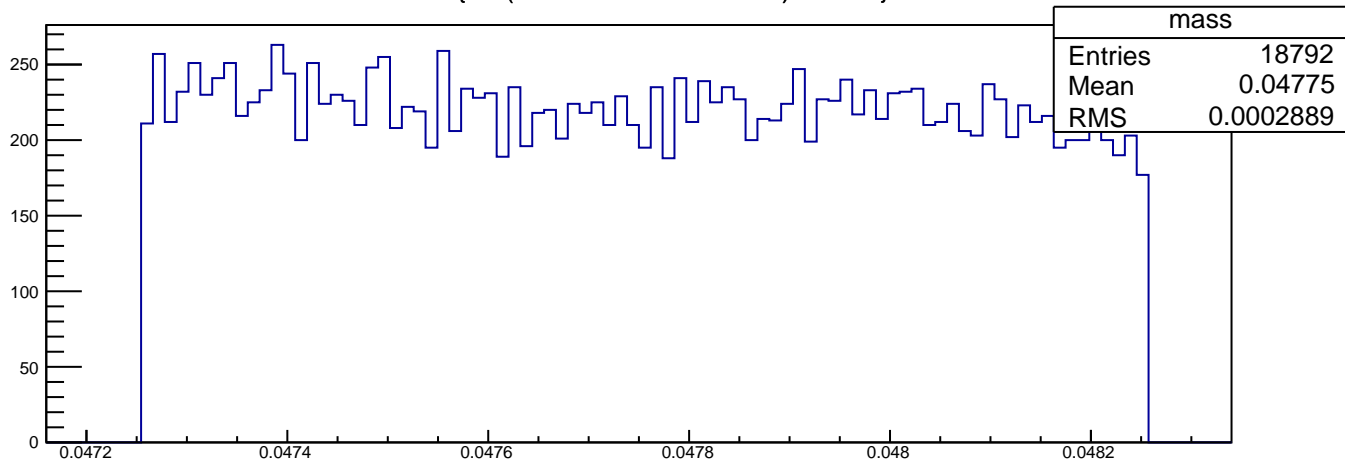
vertex Z, mass 0.0469387755102 +/- 0.00351510668158 GeV, zcut 22.0011793998 mm



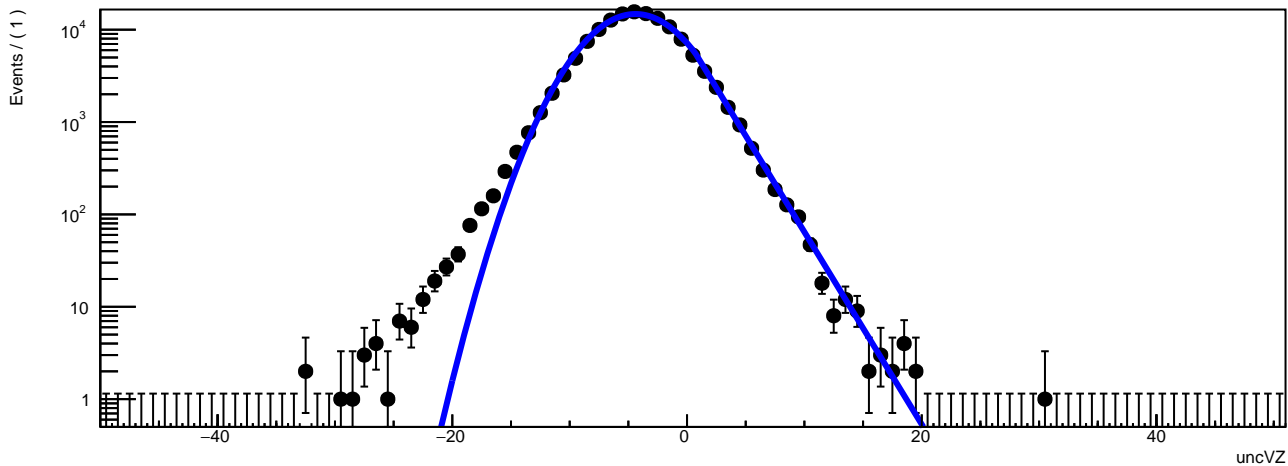
vertex Z, mass 0.0469387755102 +/- 0.00351510668158 GeV, zcut 22.0011793998 mm



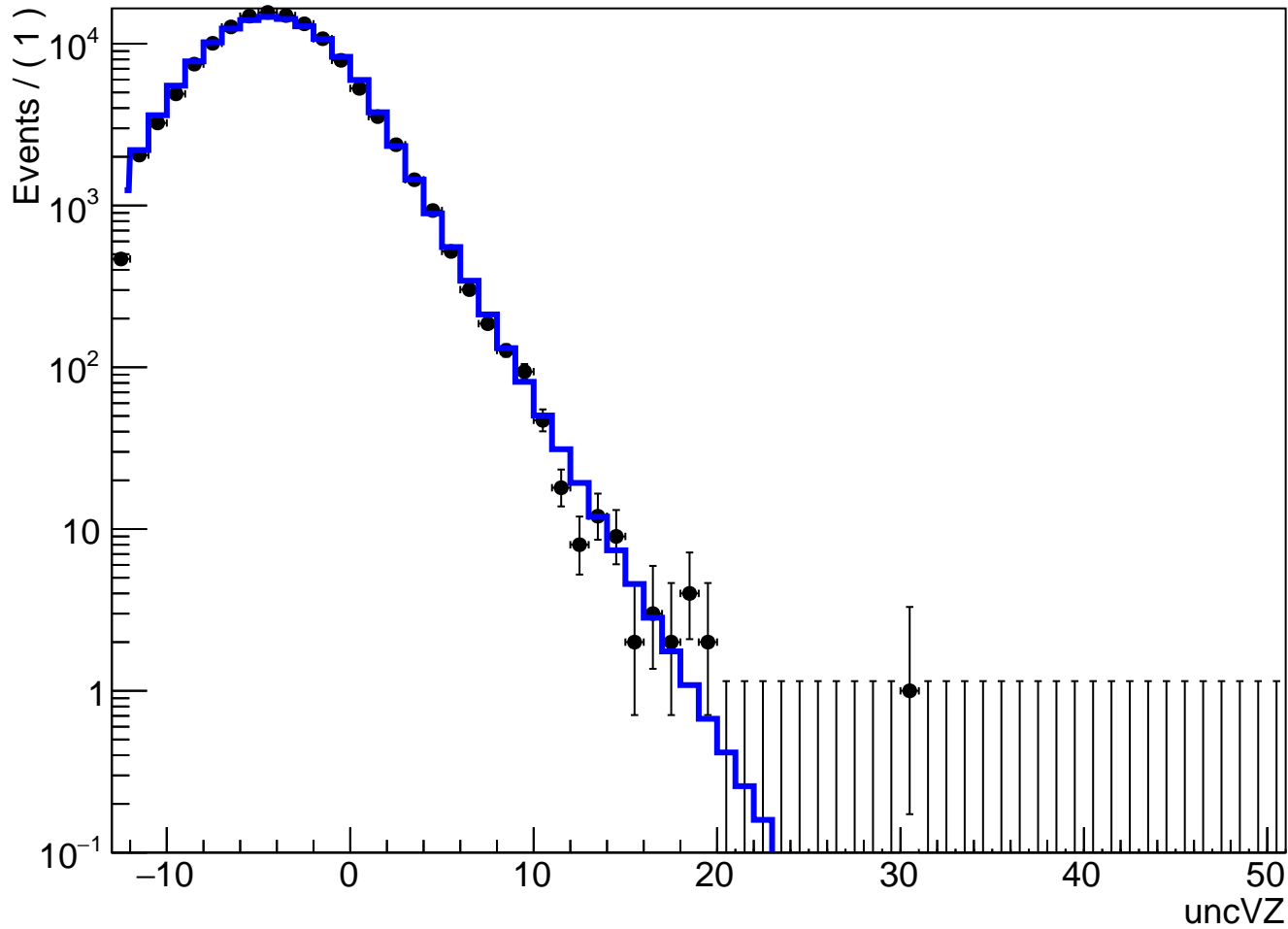
$\text{uncM} \{ \text{abs}(\text{uncM} - 0.0477551020408) < 0.0005 \}$



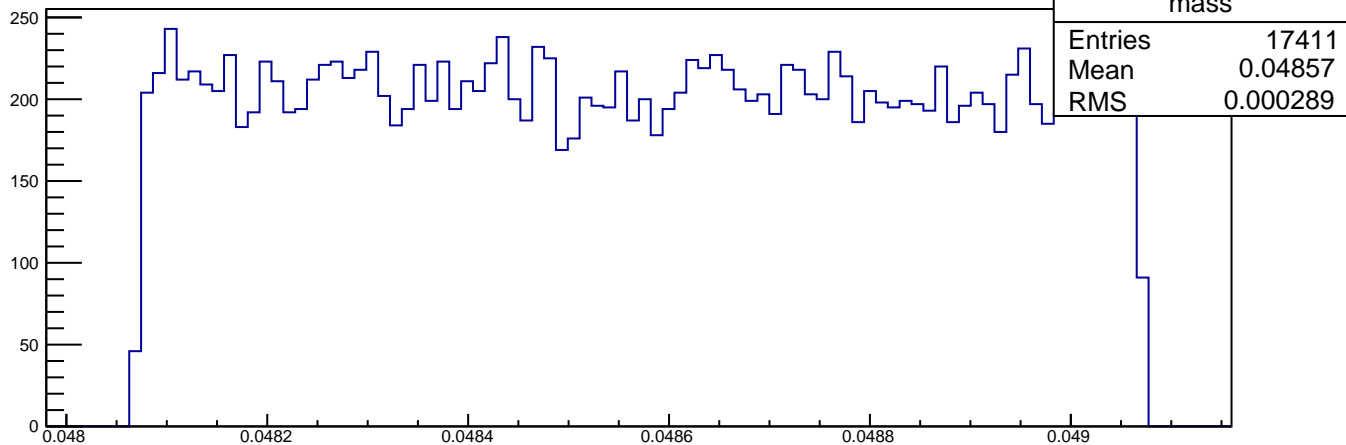
vertex Z, mass 0.0477551020408 +/- 0.00355870345492 GeV, zcut 21.5680810673 mm



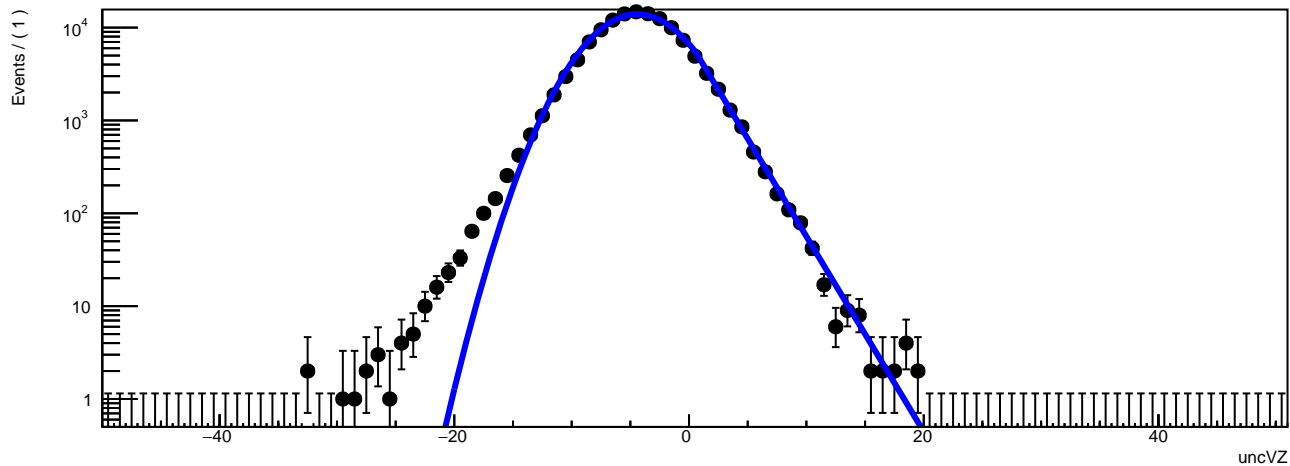
vertex Z, mass 0.0477551020408 +/- 0.00355870345492 GeV, zcut 21.5680810673 mm



uncM {abs(uncM-0.0485714285714)<0.0005}

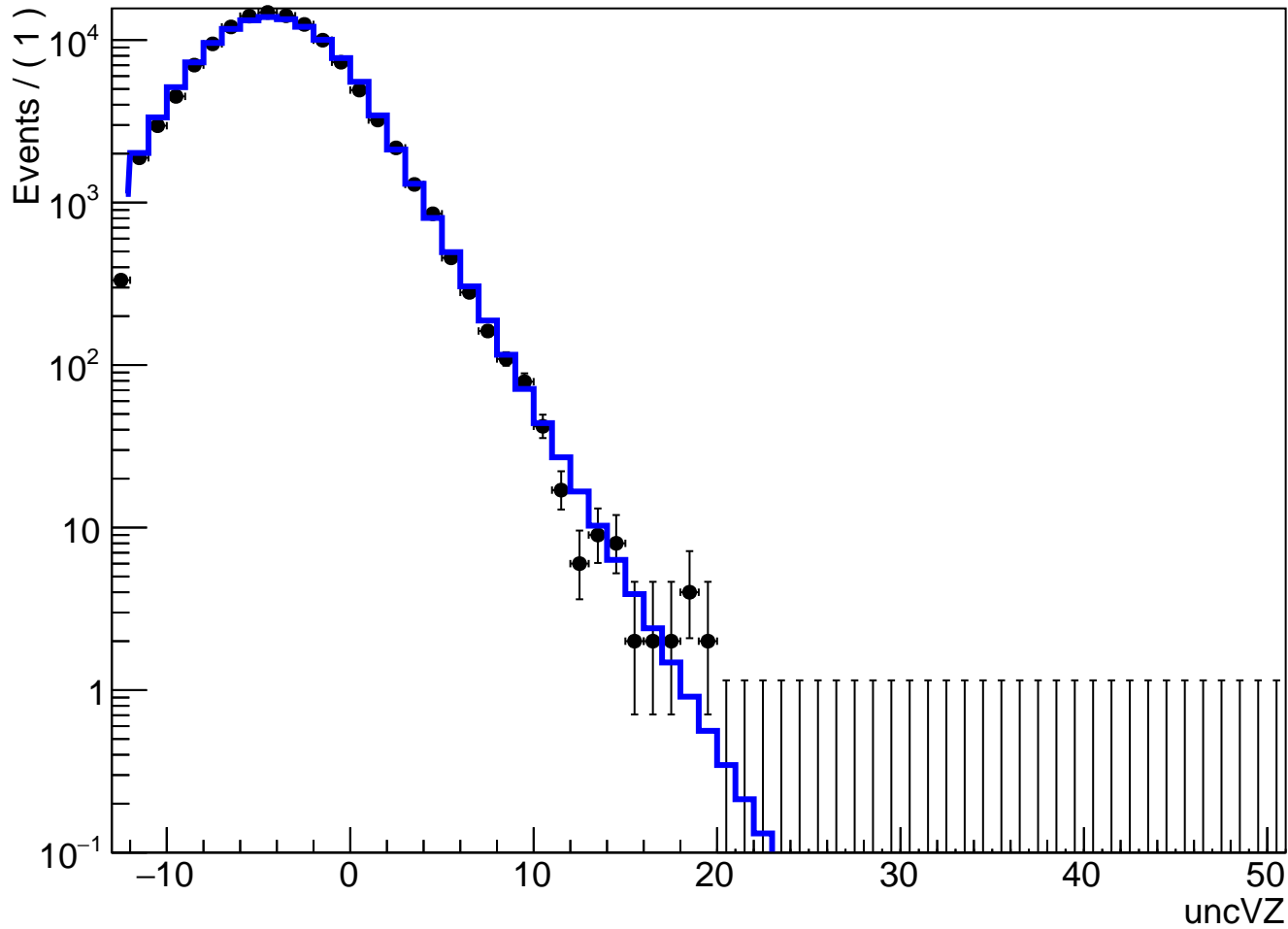


vertex Z, mass 0.0485714285714 +/- 0.00360230022826 GeV, zcut 21.154185588 mm

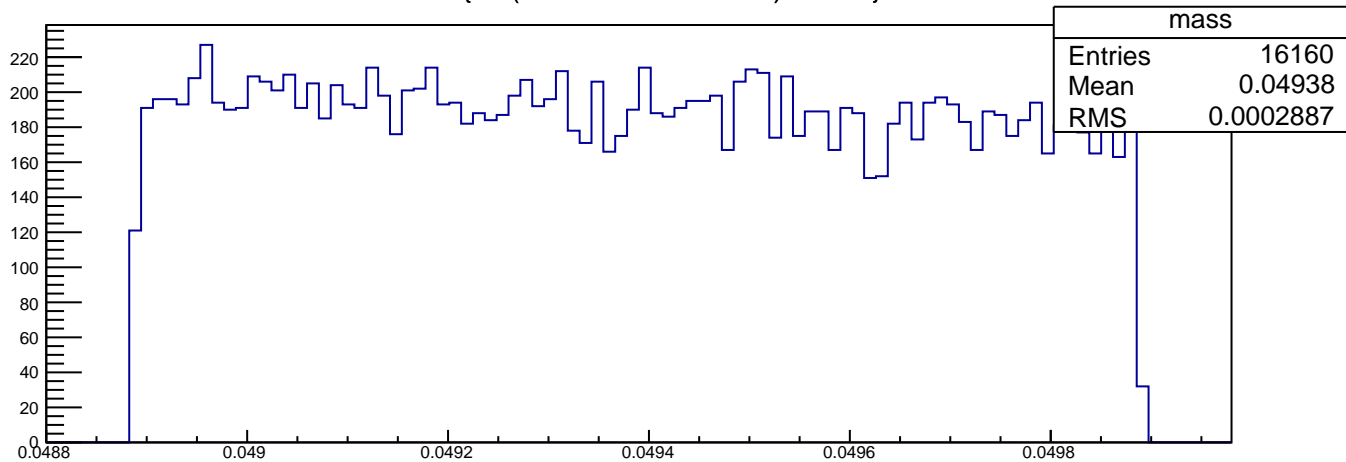




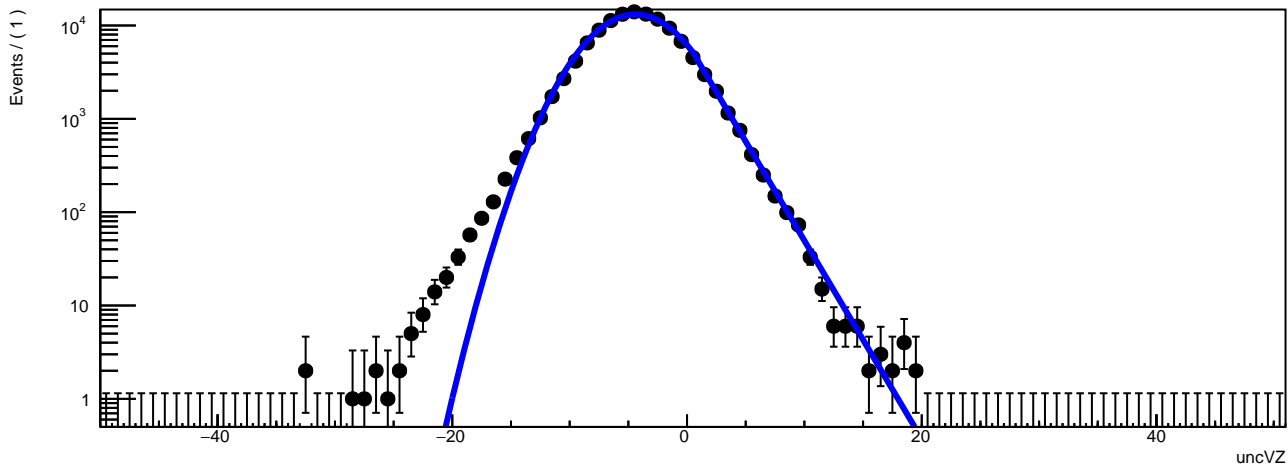
vertex Z, mass  $0.0485714285714 \pm 0.00360230022826$  GeV, zcut 21.154185588 mm



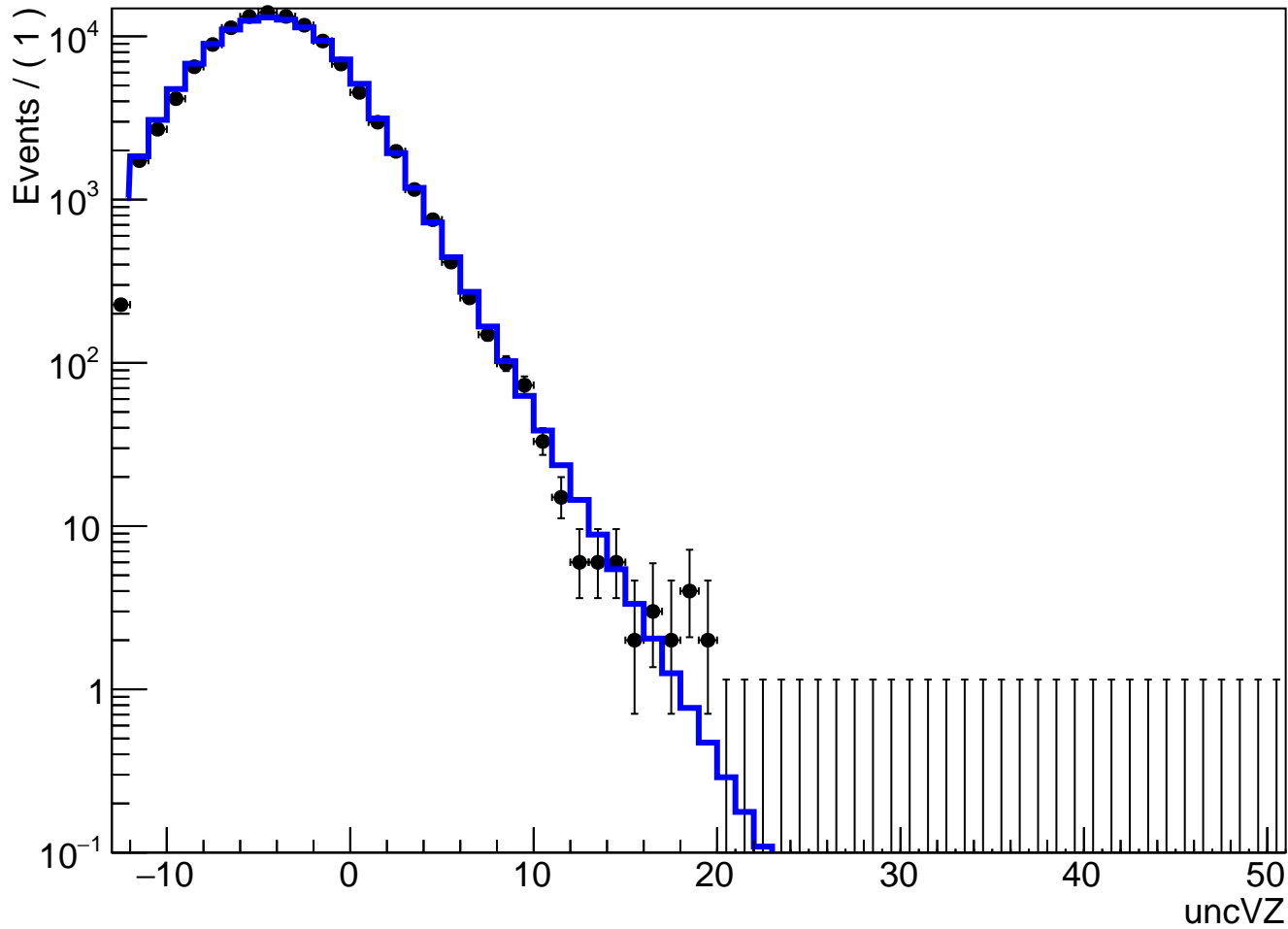
uncM {abs(uncM-0.049387755102)<0.0005}



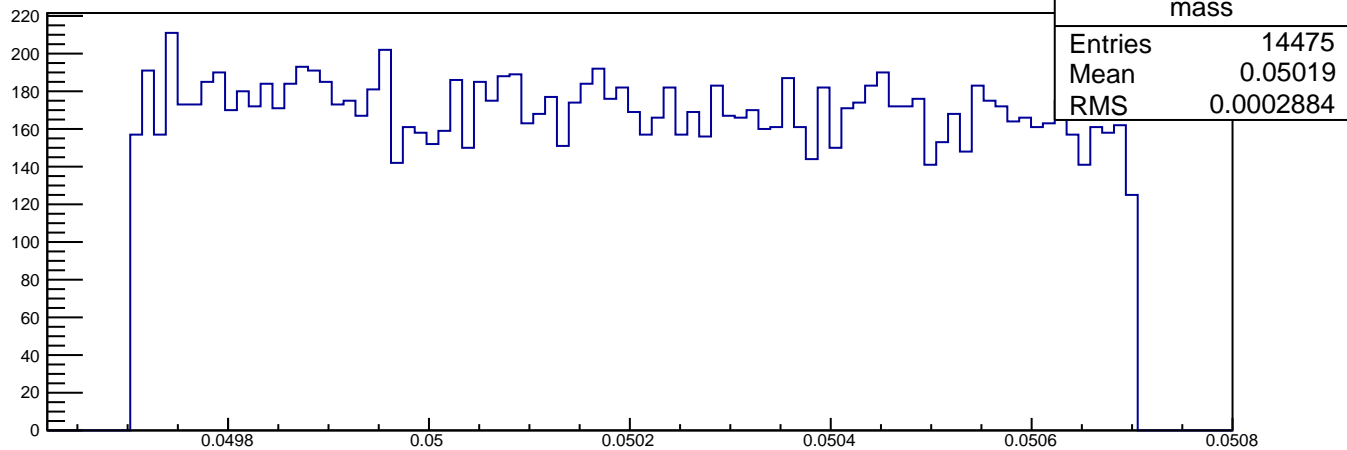
vertex Z, mass 0.049387755102 +/- 0.0036458970016 GeV, zcut 20.7619616594 mm



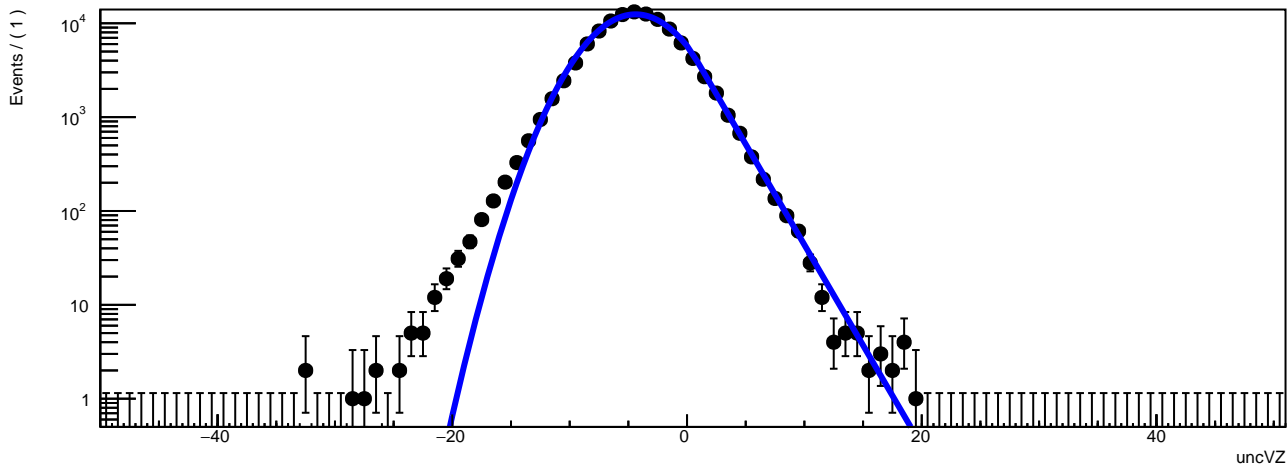
vertex Z, mass 0.049387755102 +/- 0.0036458970016 GeV, zcut 20.7619616594 mm



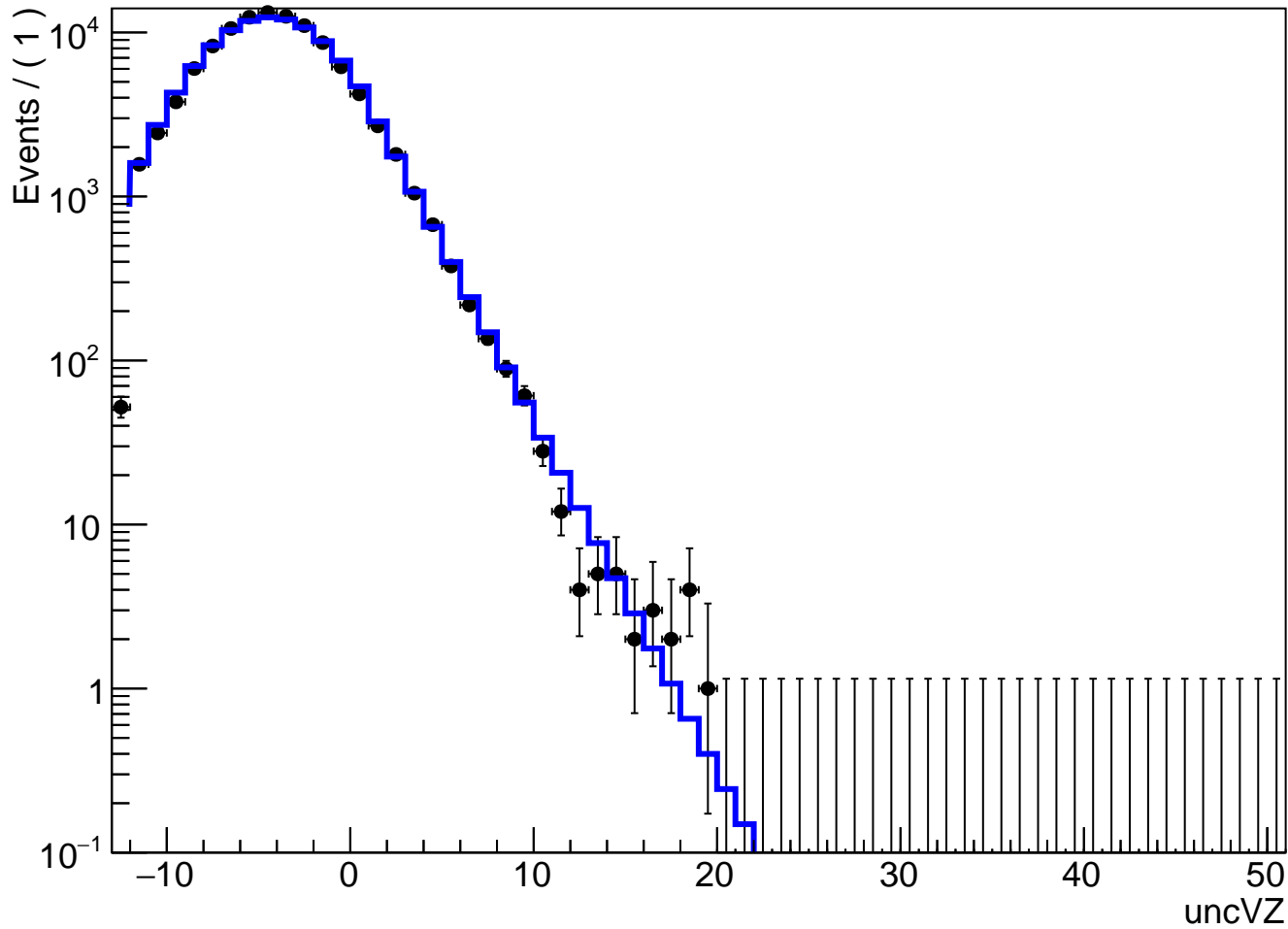
uncM {abs(uncM-0.0502040816327)<0.0005}



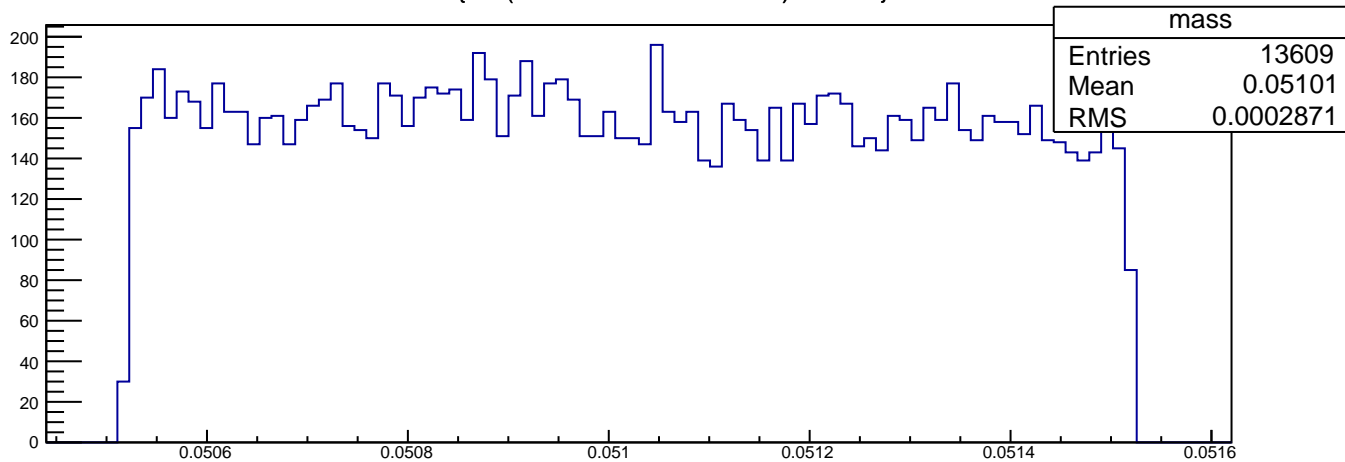
vertex Z, mass 0.0502040816327 +/- 0.00368949377493 GeV, zcut 20.3953151826 mm



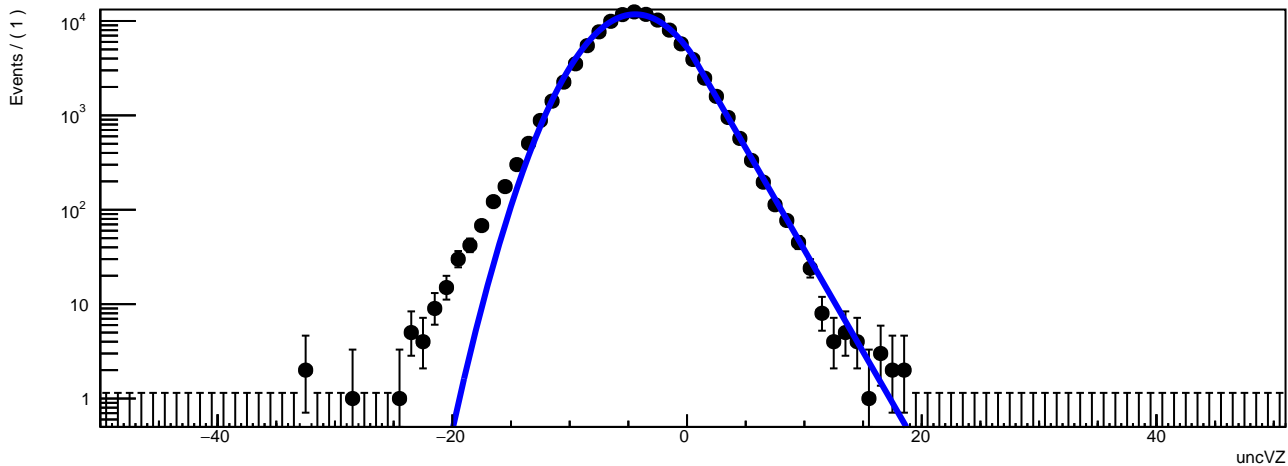
vertex Z, mass 0.0502040816327 +/- 0.00368949377493 GeV, zcut 20.3953151826 mm



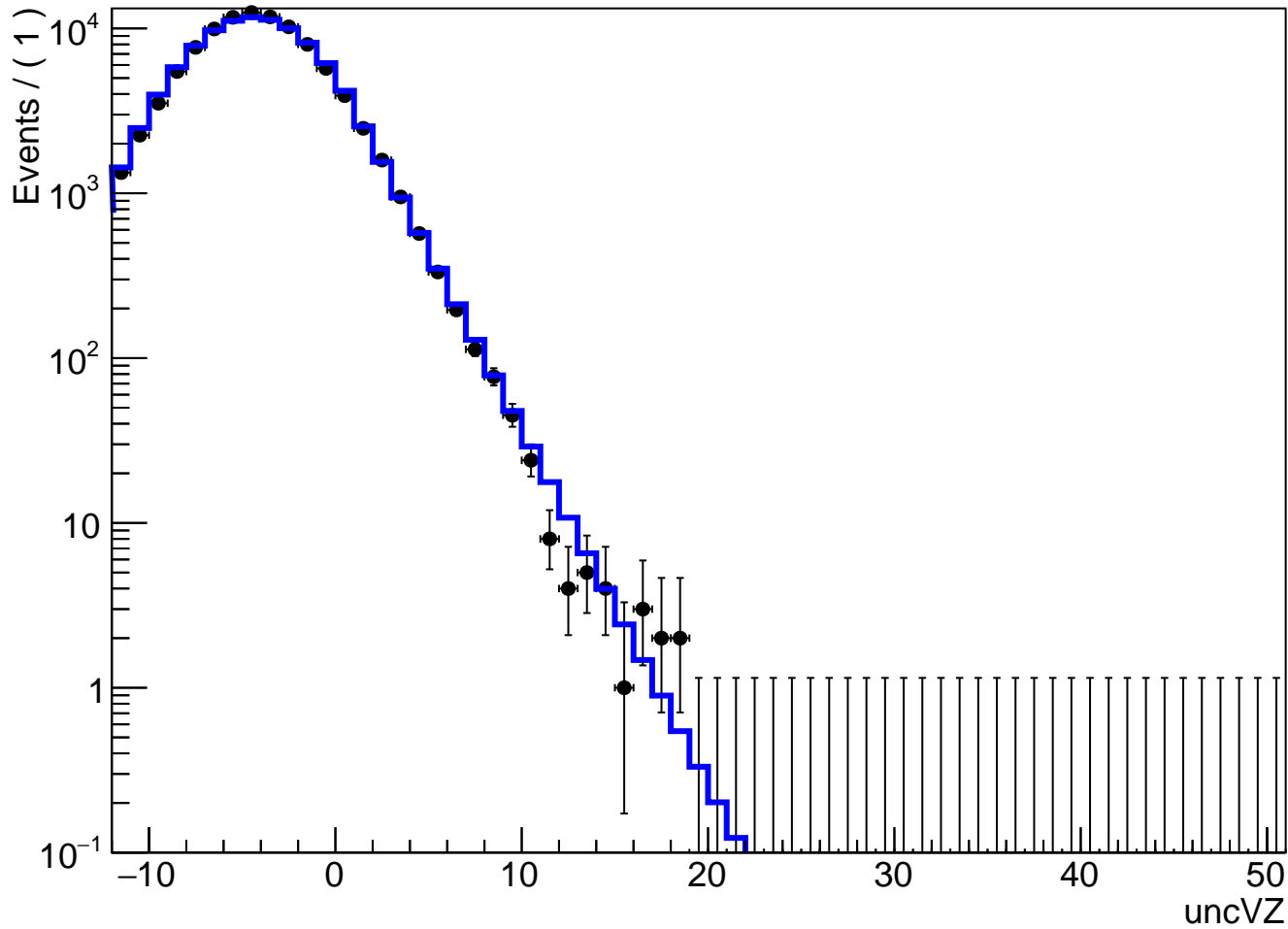
uncM {abs(uncM-0.0510204081633)<0.0005}



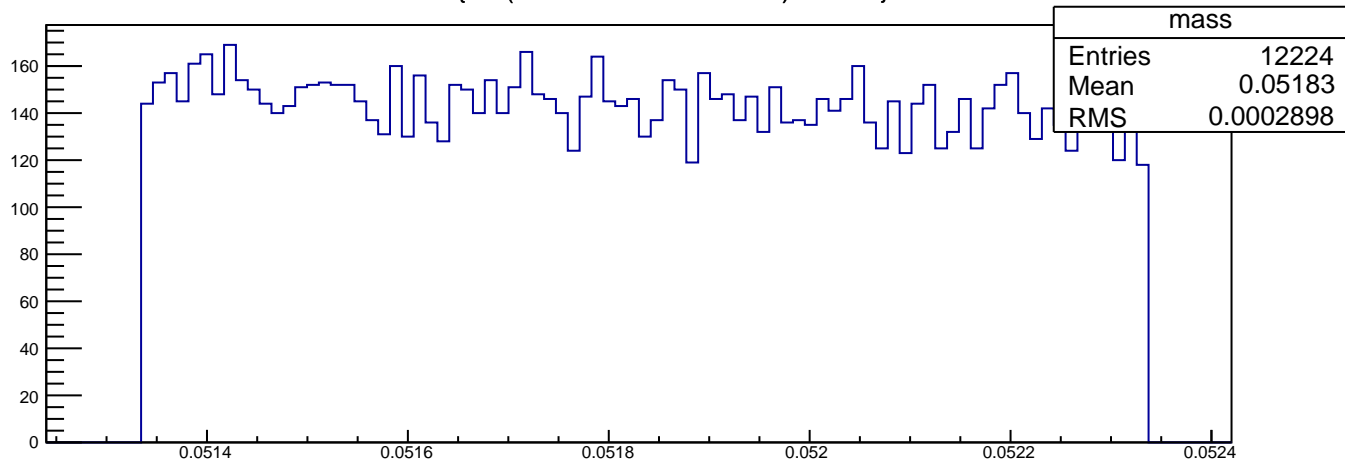
vertex Z, mass 0.0510204081633 +/- 0.00373309054827 GeV, zcut 19.9971389134 mm



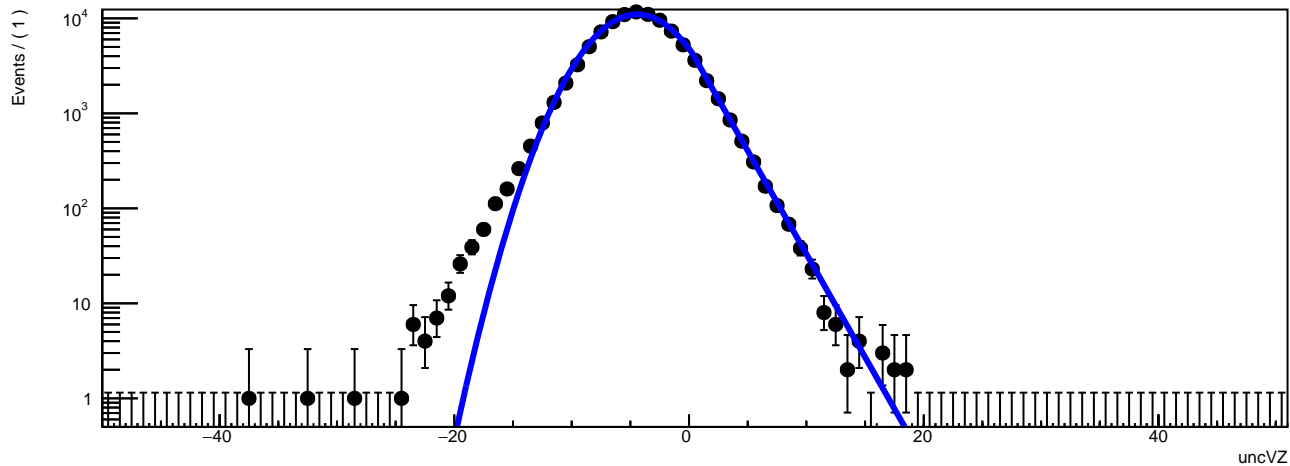
vertex Z, mass  $0.0510204081633 \pm 0.00373309054827$  GeV, zcut 19.9971389134 mm



uncM {abs(uncM-0.0518367346939)<0.0005}

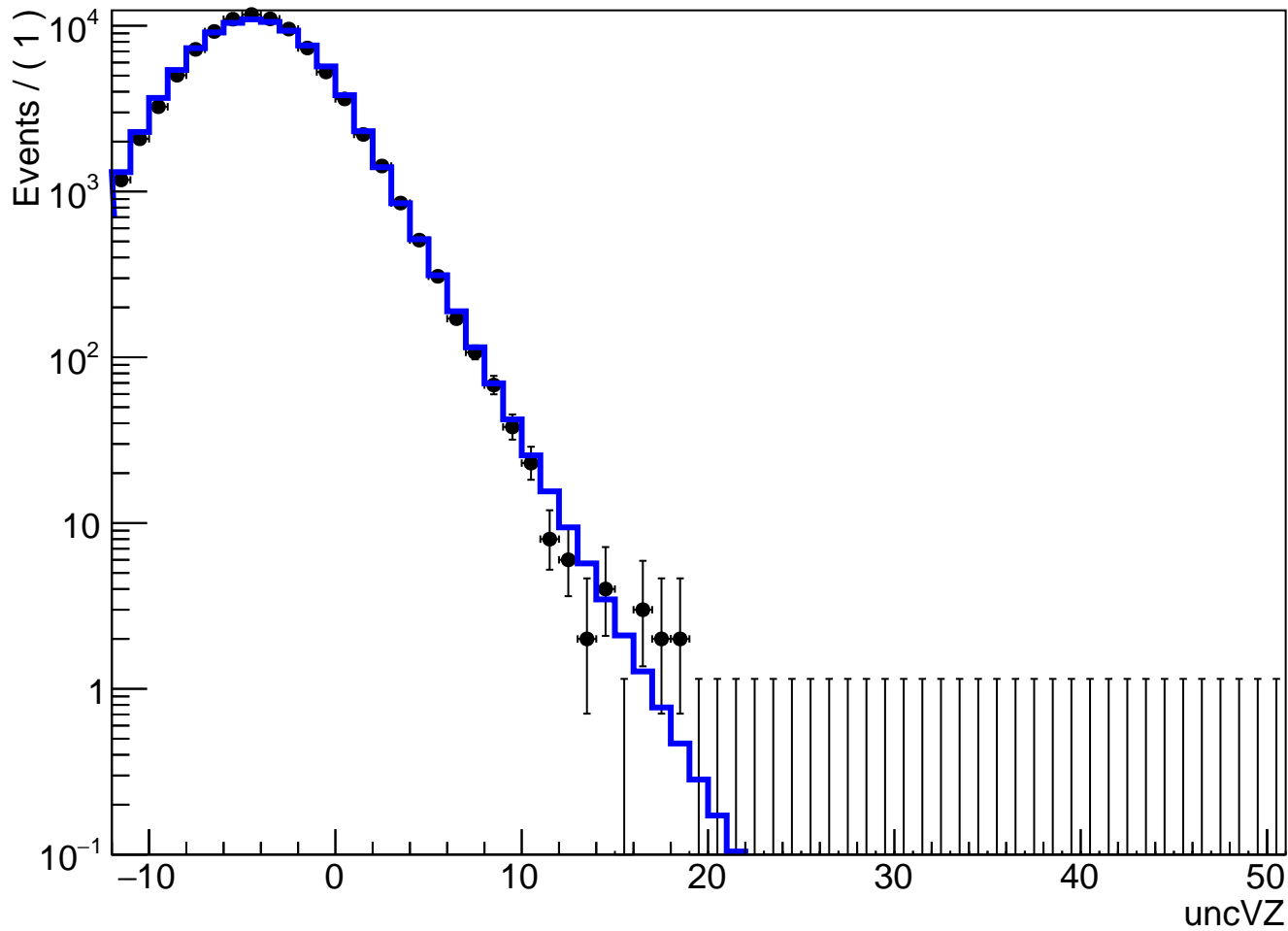


vertex Z, mass 0.0518367346939 +/- 0.00377668732161 GeV, zcut 19.6661465206 mm

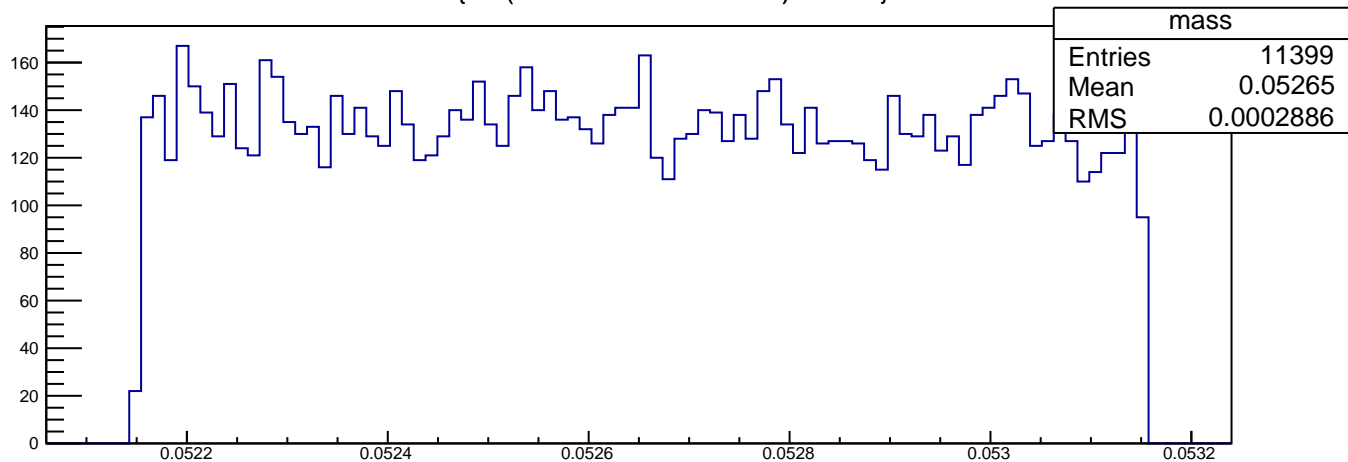




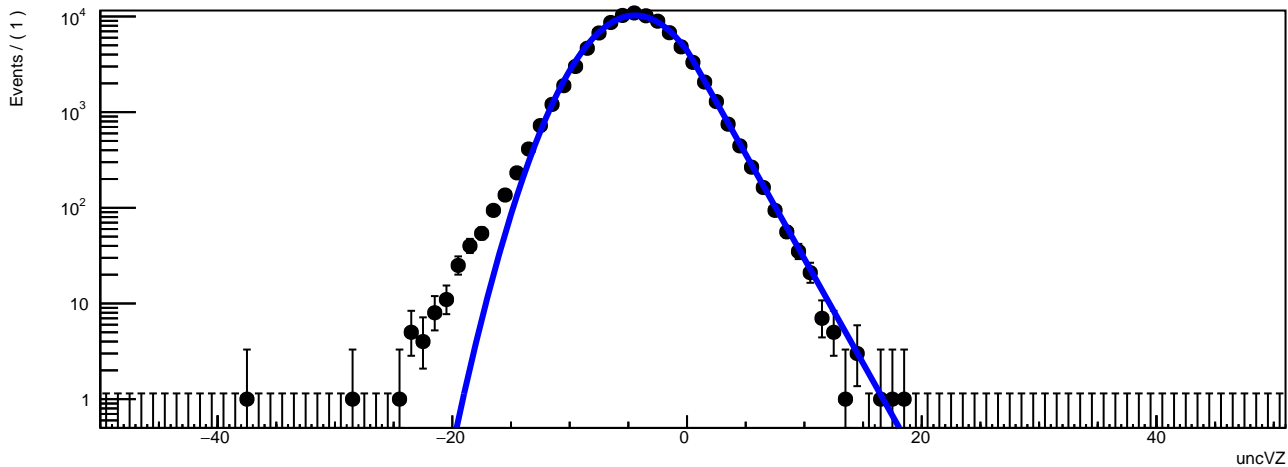
vertex Z, mass  $0.0518367346939 \pm 0.00377668732161$  GeV, zcut 19.6661465206 mm



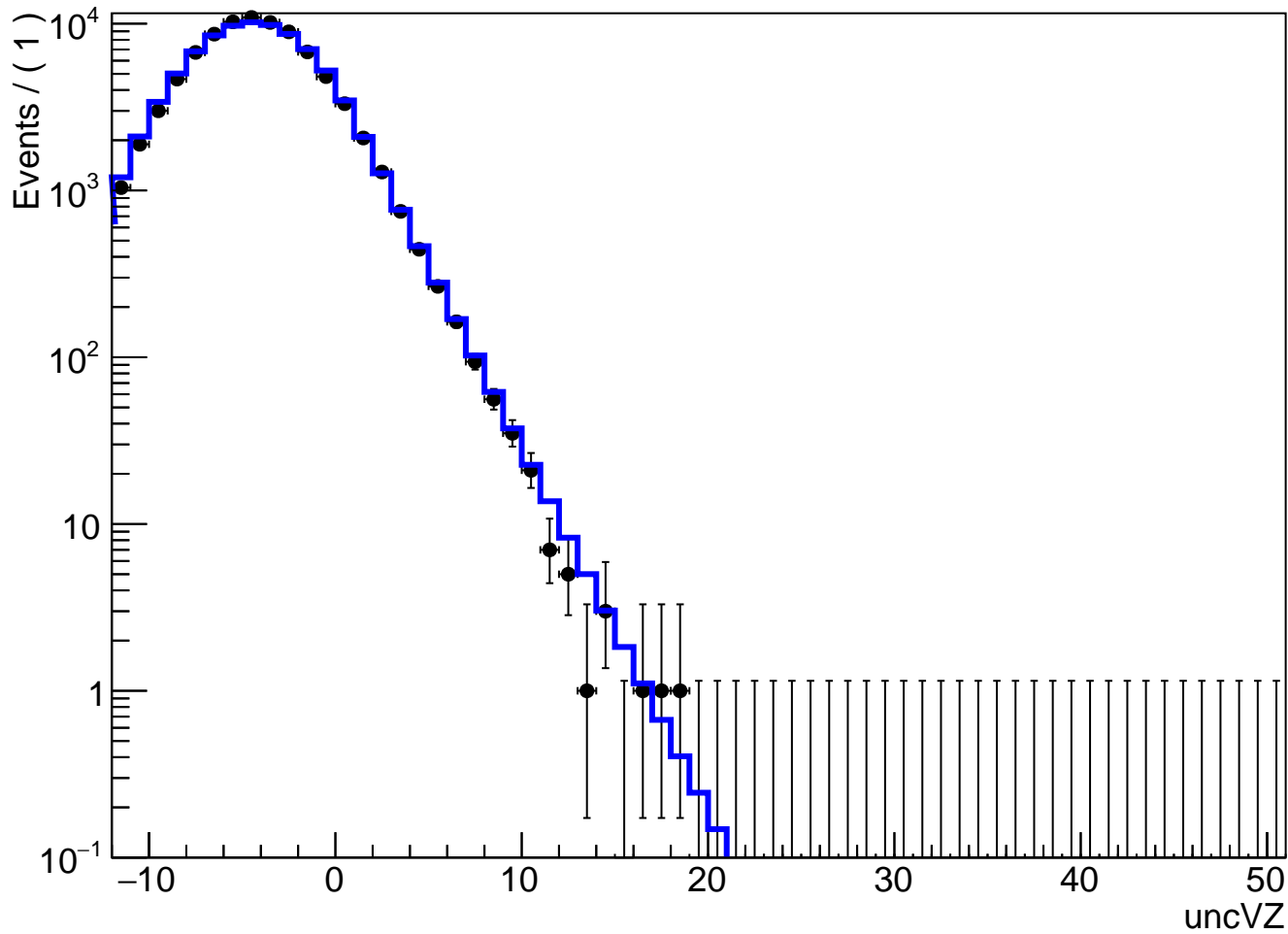
$\text{uncM} \{ \text{abs}(\text{uncM} - 0.0526530612245) < 0.0005 \}$



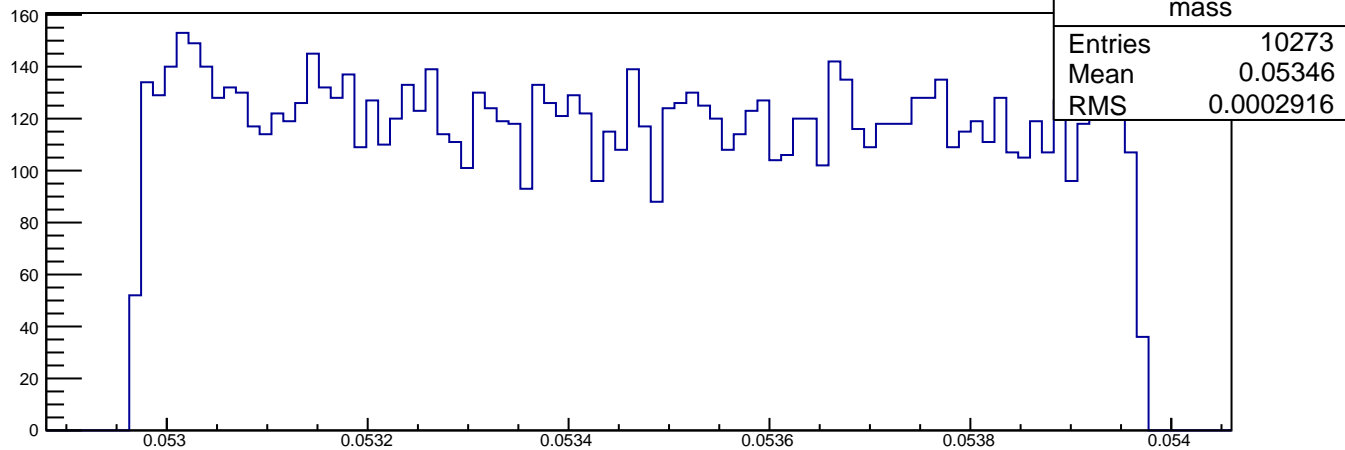
vertex Z, mass 0.0526530612245 +/- 0.00382028409495 GeV, zcut 19.3593179406 mm



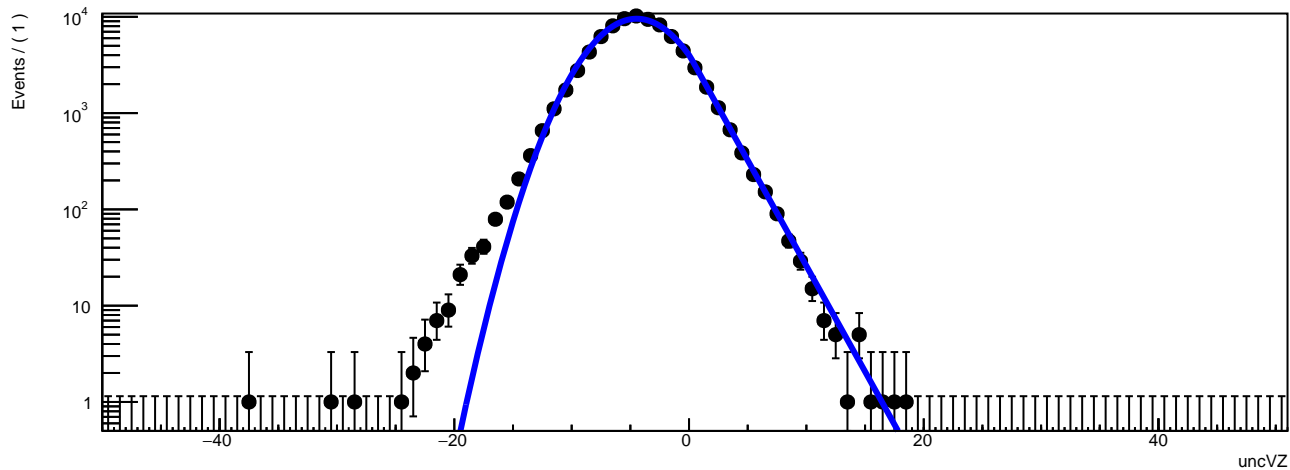
vertex Z, mass 0.0526530612245 +/- 0.00382028409495 GeV, zcut 19.3593179406 mm



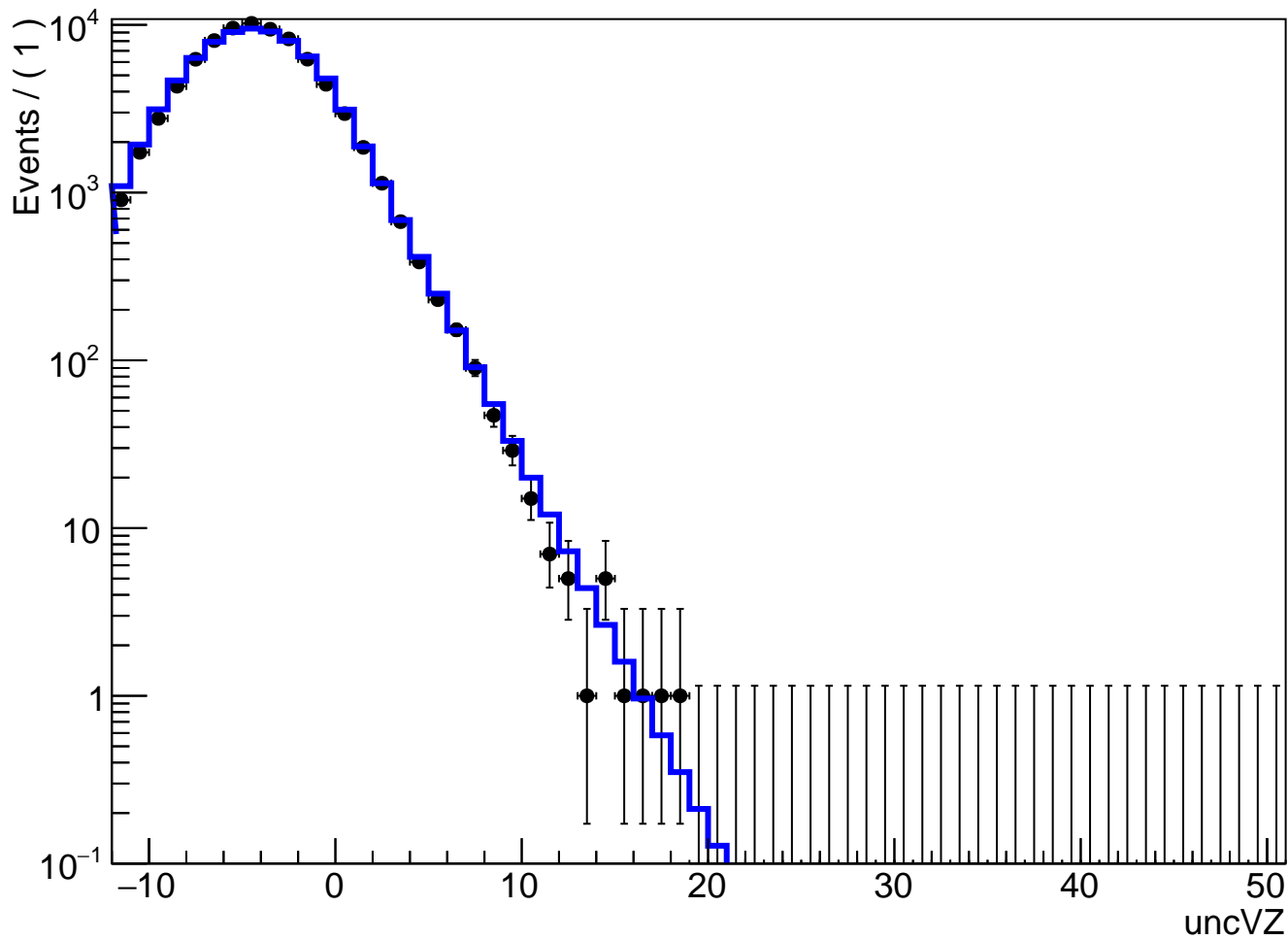
uncM {abs(uncM-0.0534693877551)<0.0005}



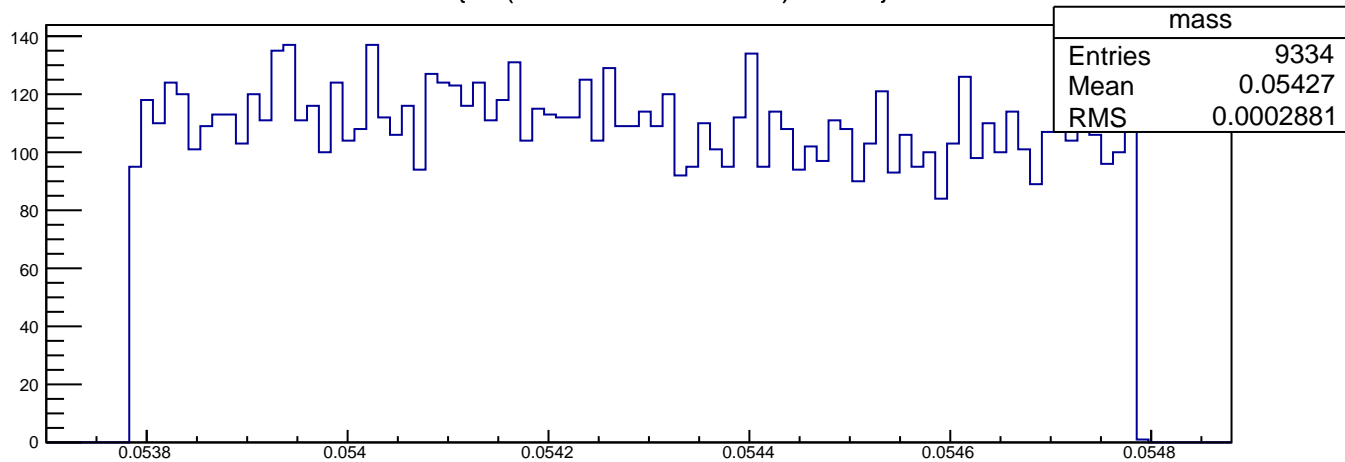
vertex Z, mass 0.0534693877551 +/- 0.00386388086828 GeV, zcut 19.0625915161 mm



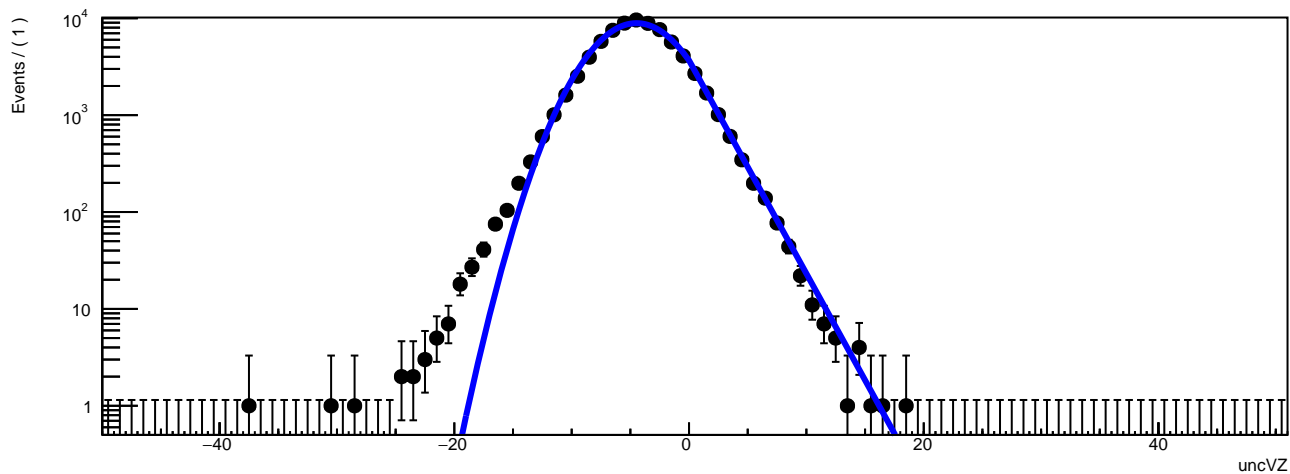
vertex Z, mass  $0.0534693877551 \pm 0.00386388086828$  GeV, zcut 19.0625915161 mm



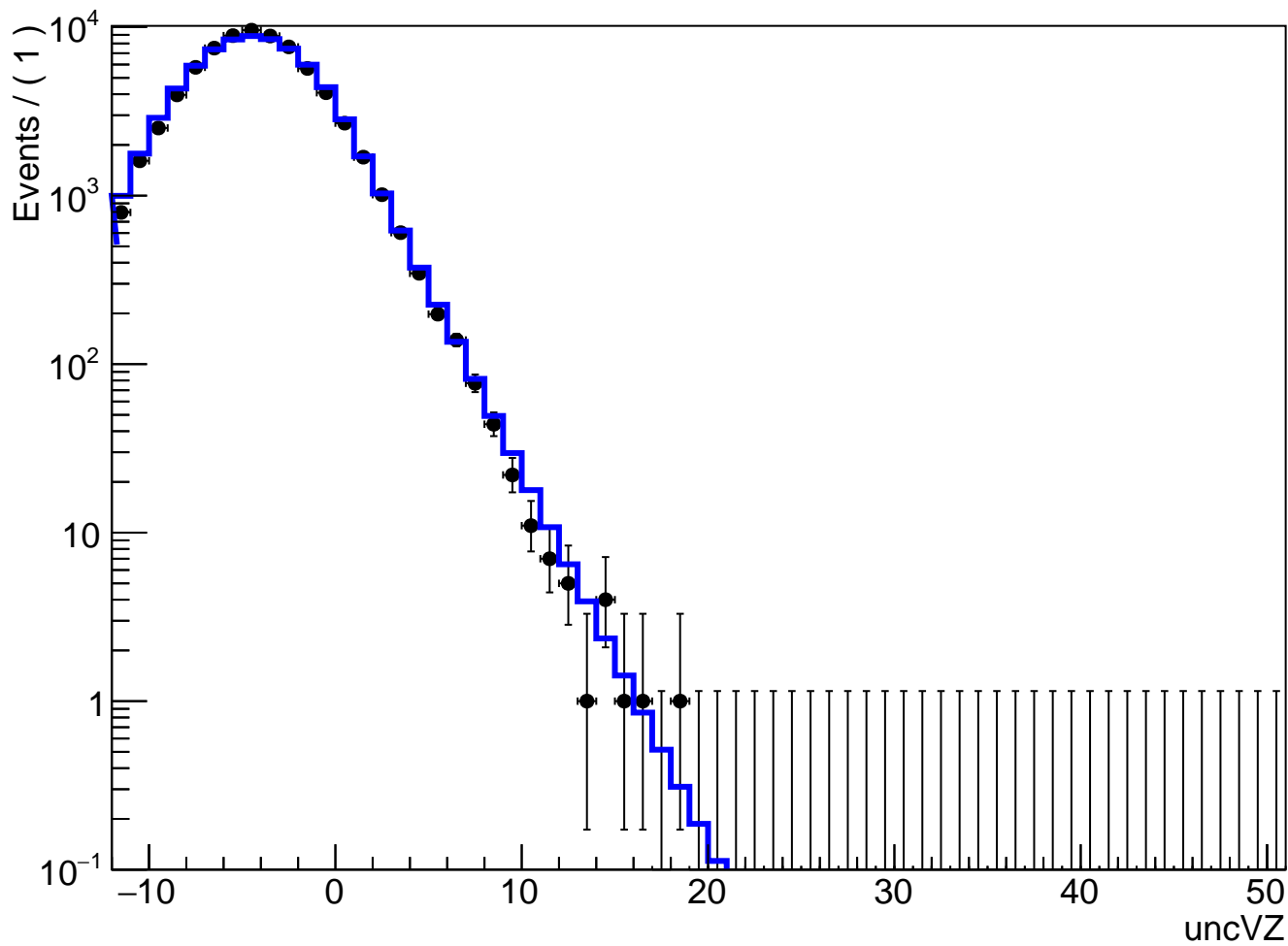
uncM {abs(uncM-0.0542857142857)<0.0005}



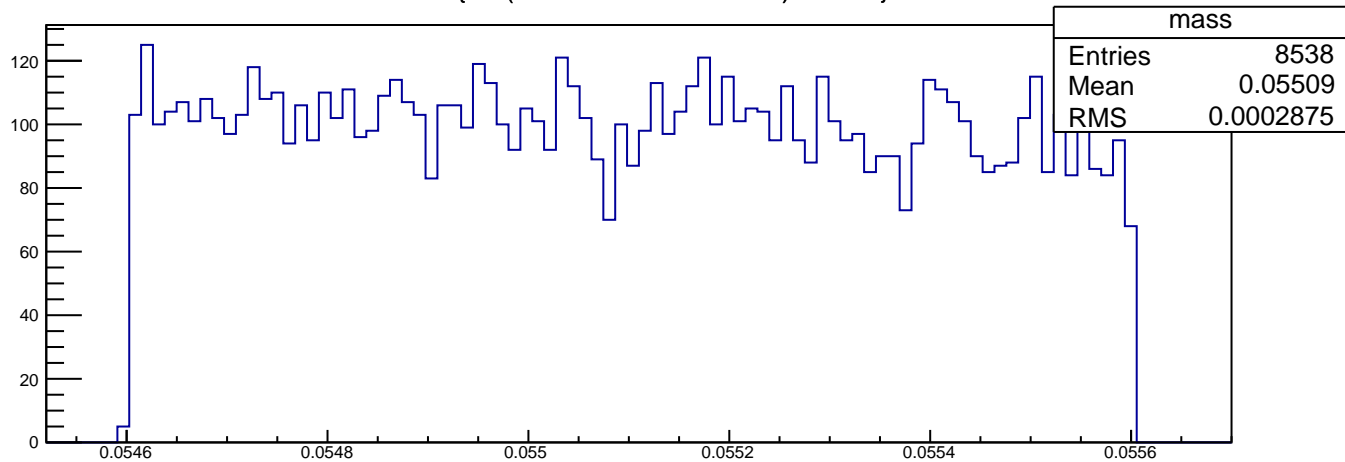
vertex Z, mass 0.0542857142857 +/- 0.00390747764162 GeV, zcut 18.8115667173 mm



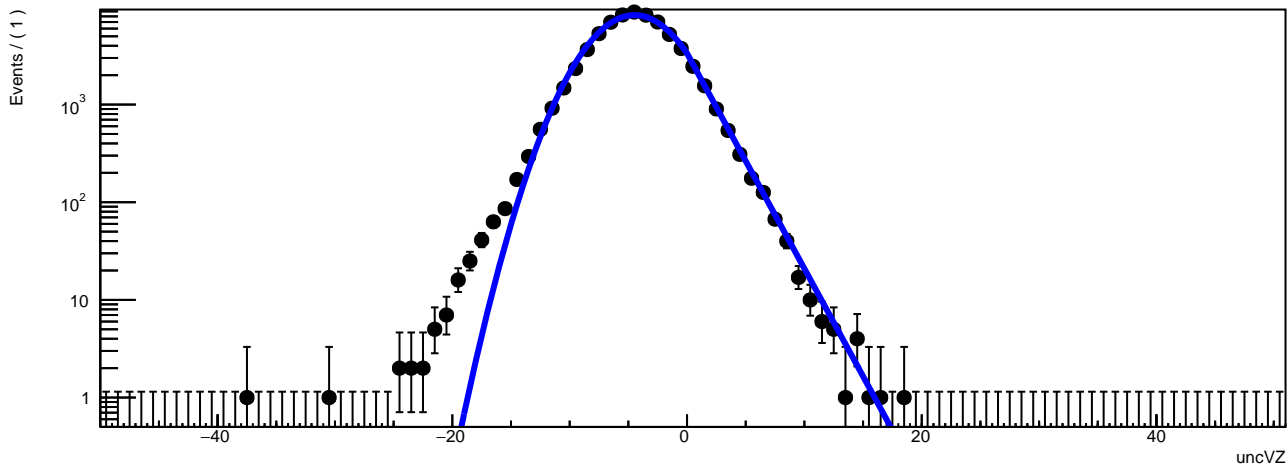
vertex Z, mass 0.0542857142857 +/- 0.00390747764162 GeV, zcut 18.8115667173 mm



uncM {abs(uncM-0.0551020408163)<0.0005}

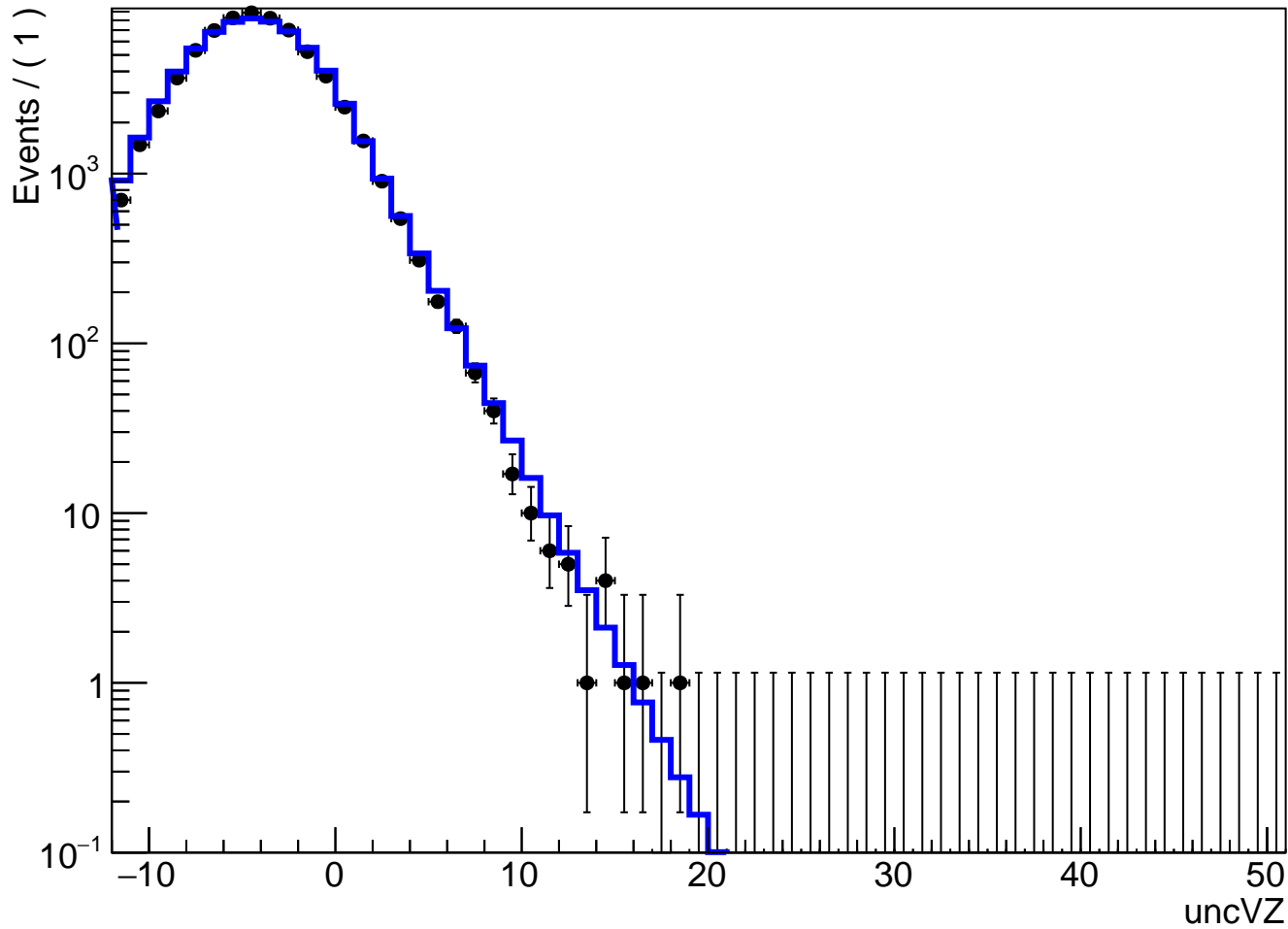


vertex Z, mass 0.0551020408163 +/- 0.00395107441496 GeV, zcut 18.5885994211 mm

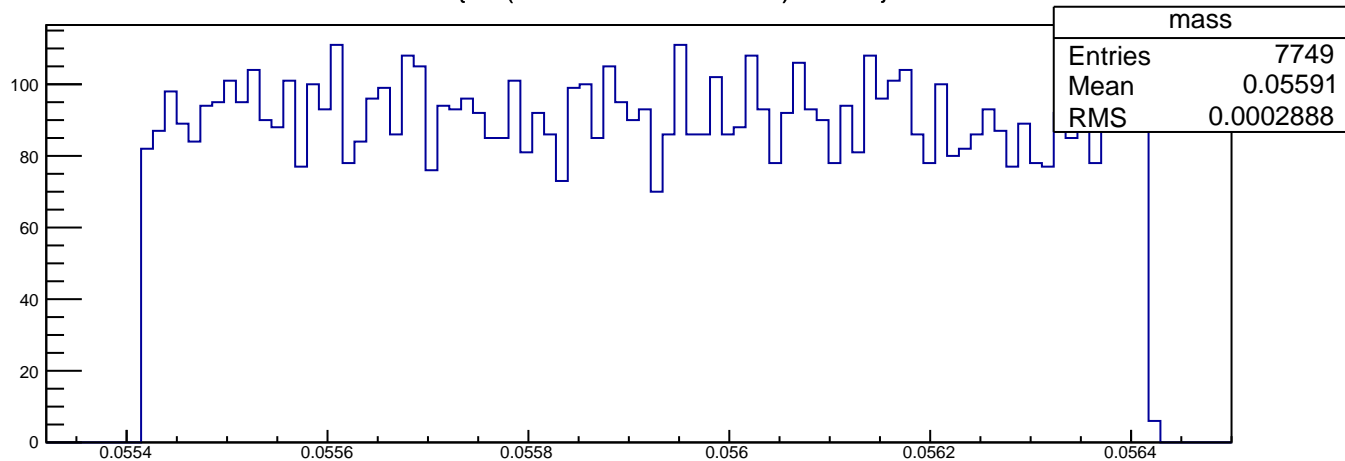




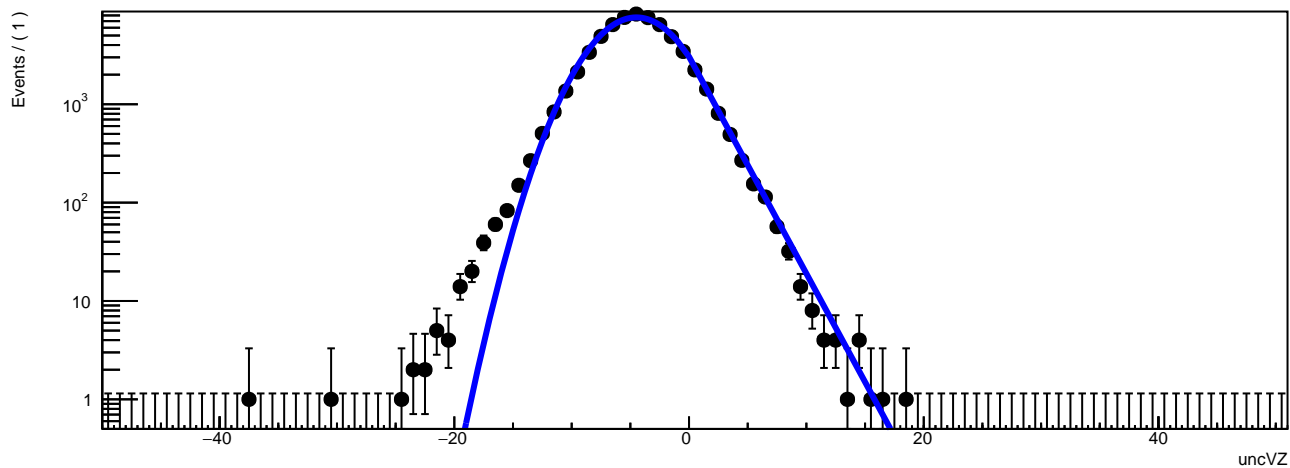
vertex Z, mass  $0.0551020408163 \pm 0.00395107441496$  GeV, zcut 18.5885994211 mm



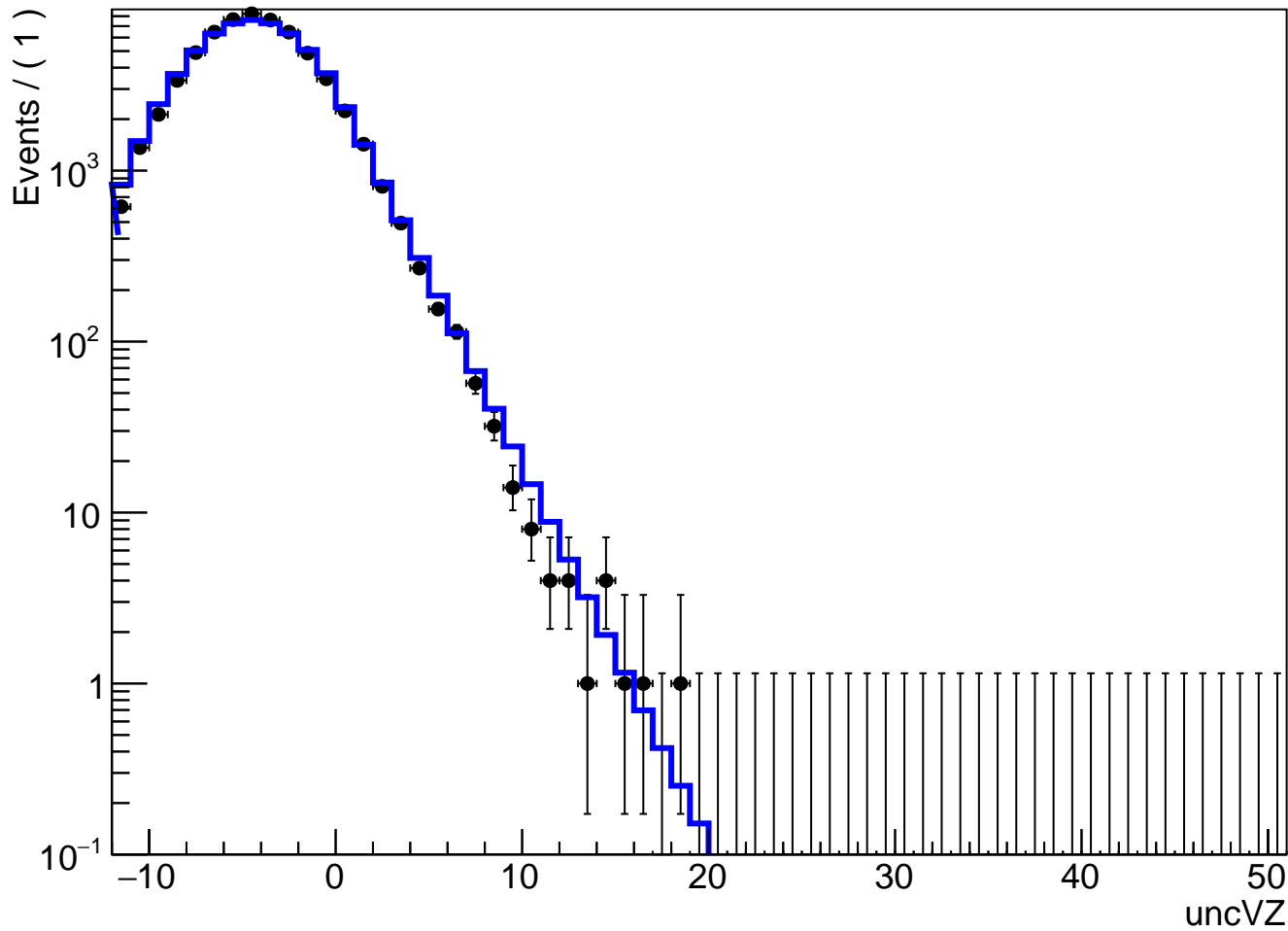
uncM {abs(uncM-0.0559183673469)<0.0005}



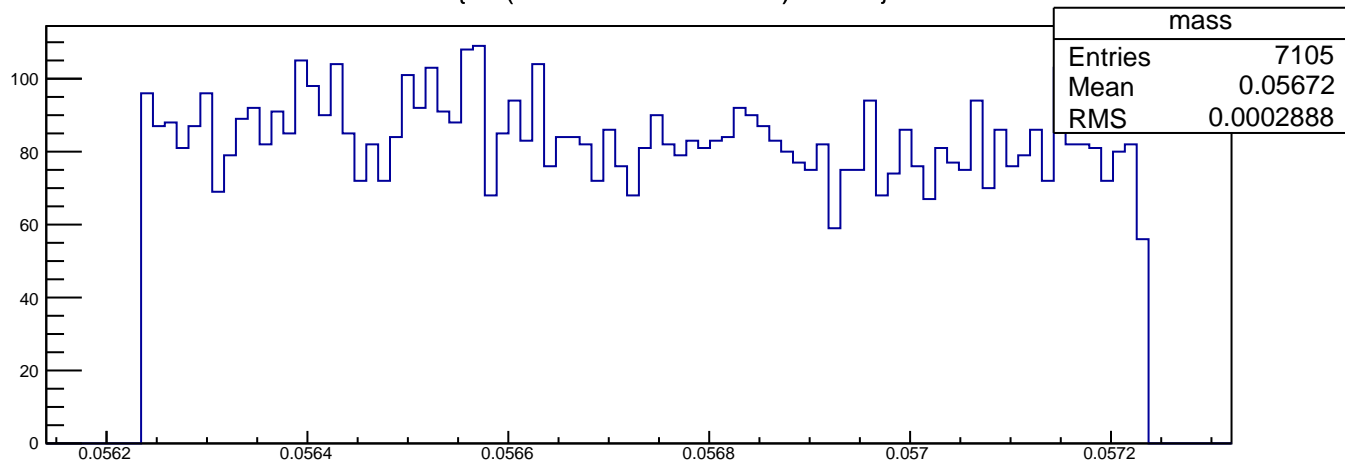
vertex Z, mass 0.0559183673469 +/- 0.0039946711883 GeV, zcut 18.399472096 mm



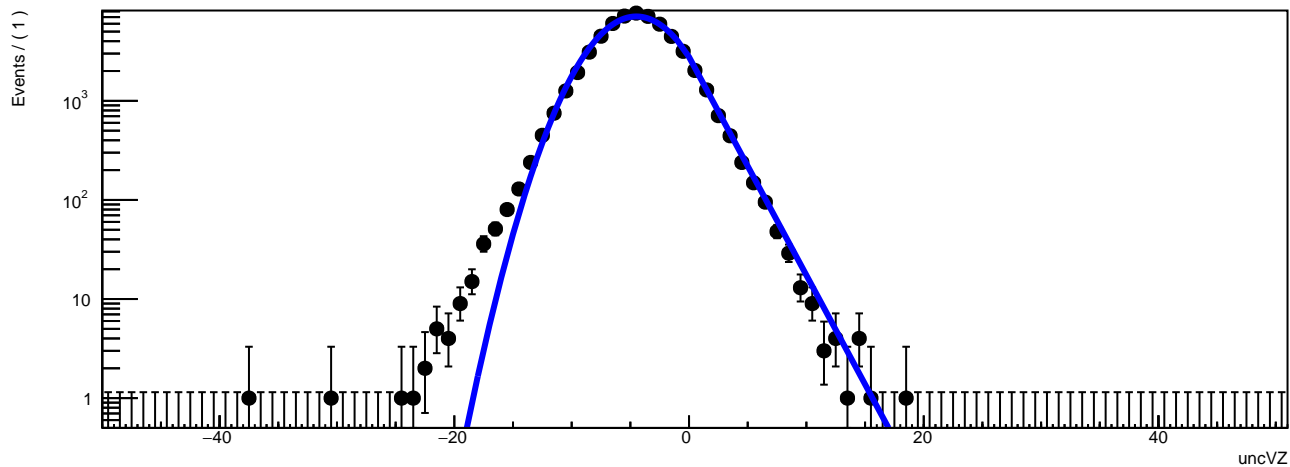
vertex Z, mass 0.0559183673469 +/- 0.0039946711883 GeV, zcut 18.399472096 mm



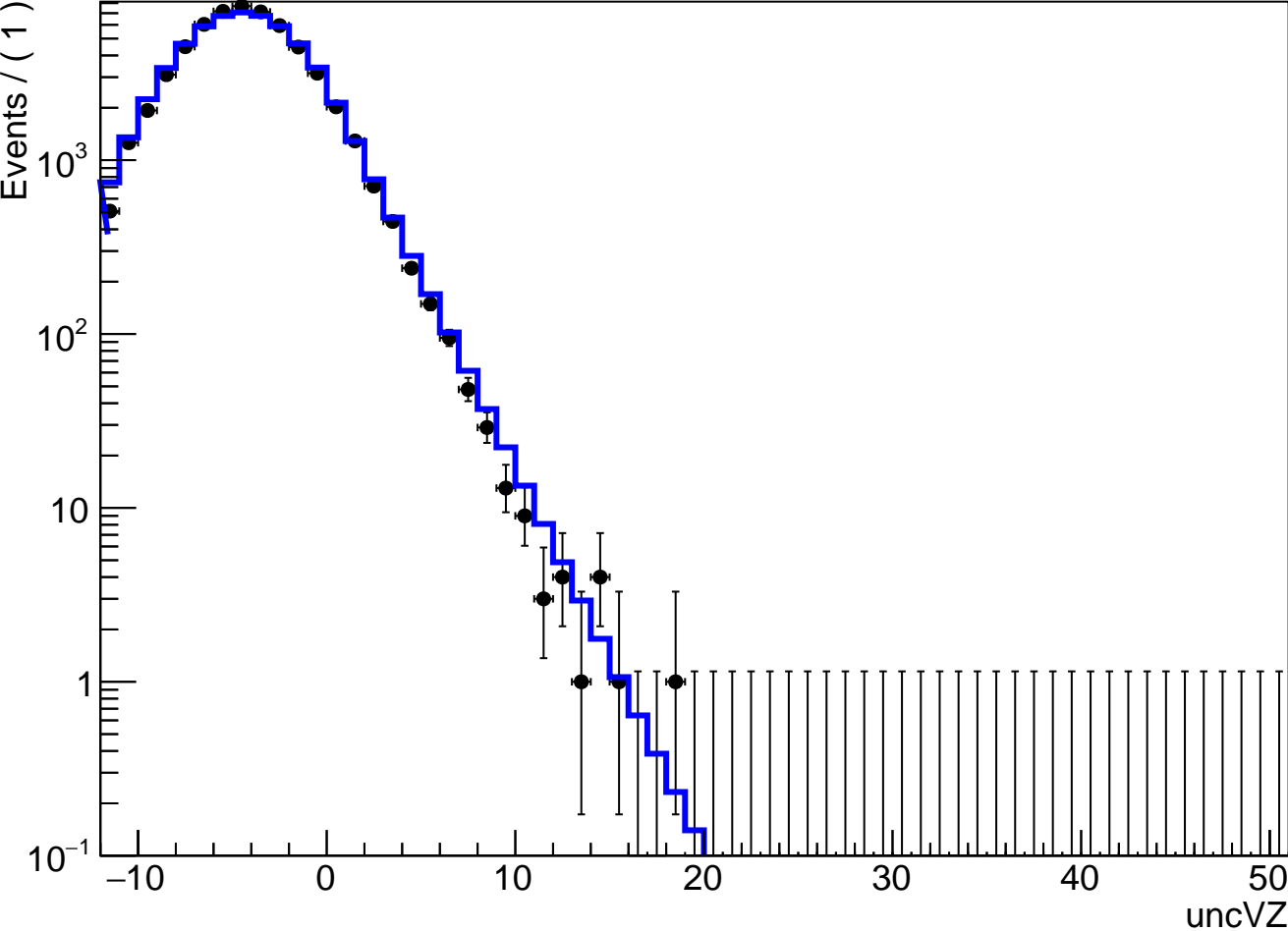
uncM {abs(uncM-0.0567346938776)<0.0005}



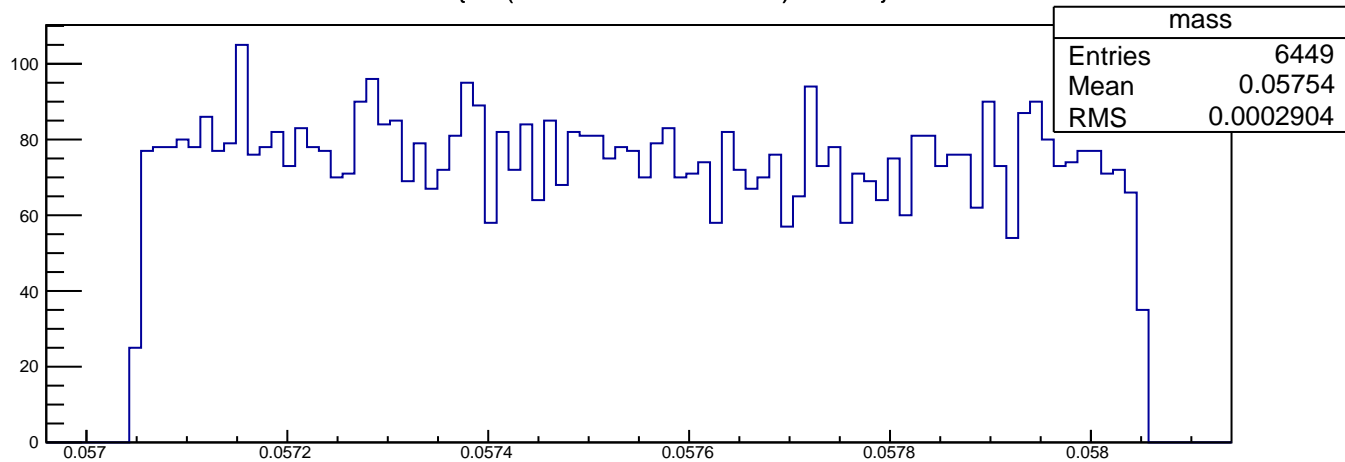
vertex Z, mass 0.0567346938776 +/- 0.00403826796163 GeV, zcut 18.238466158 mm



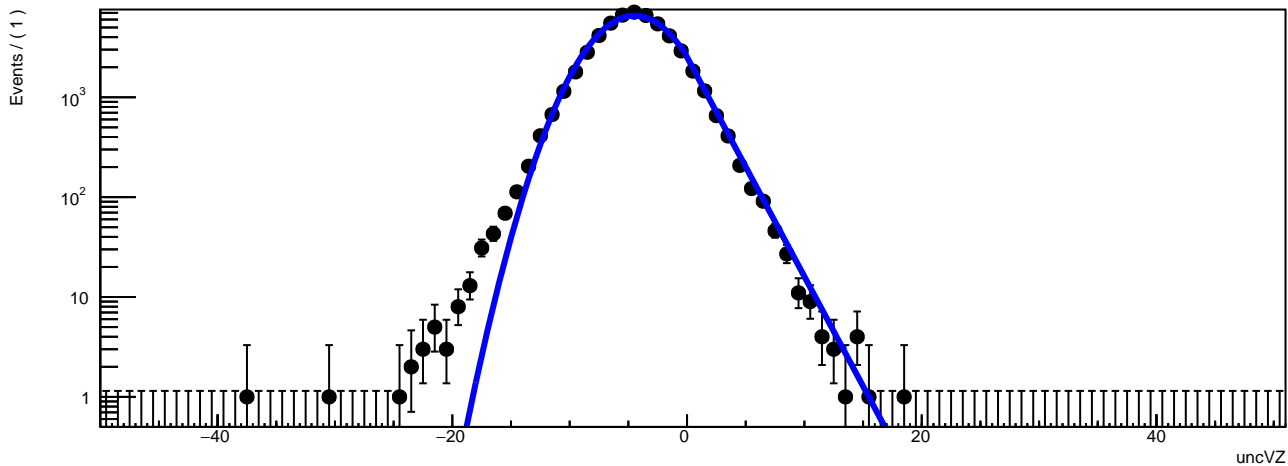
vertex Z, mass 0.0567346938776 +/- 0.00403826796163 GeV, zcut 18.238466158 mm



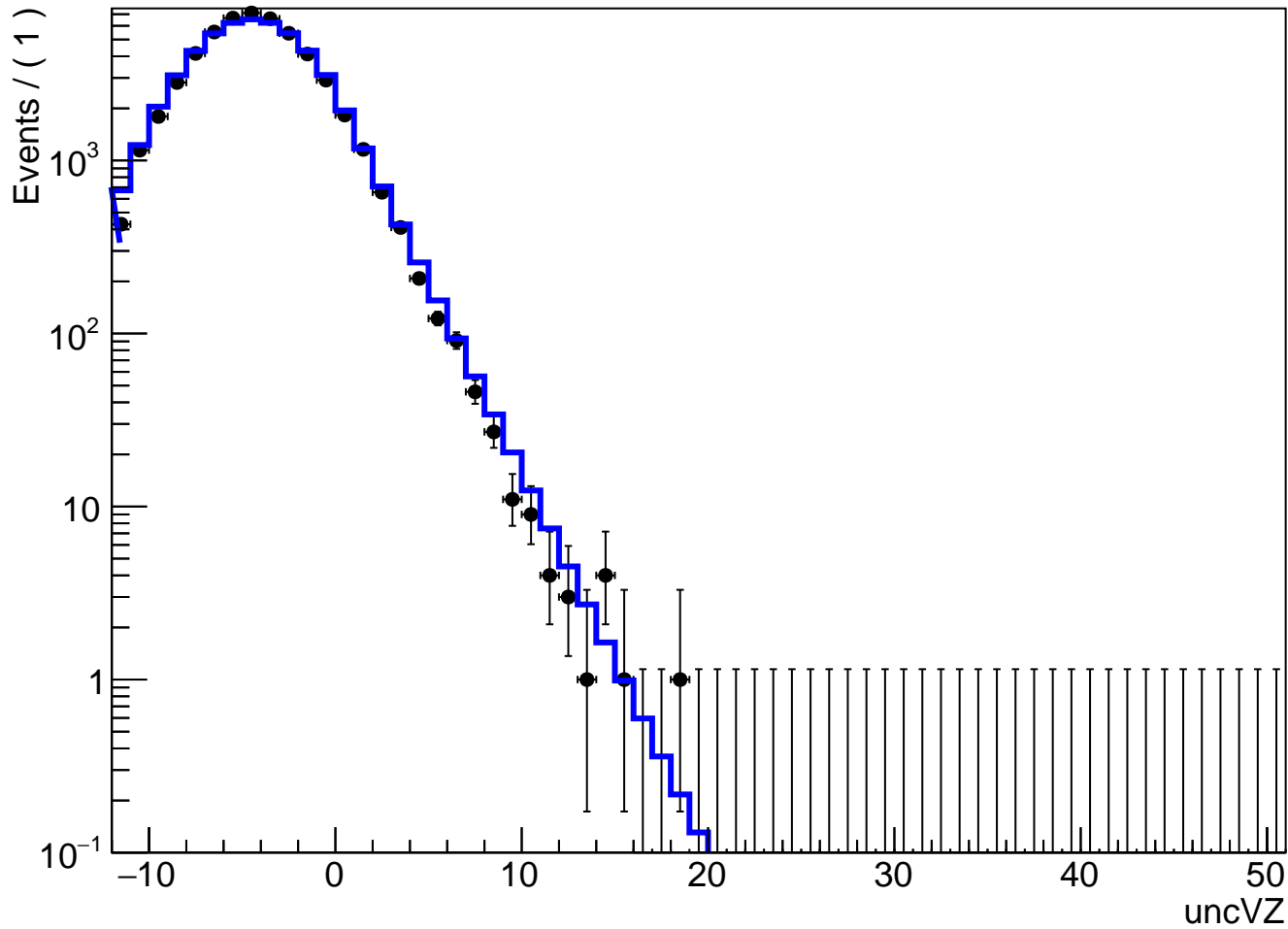
uncM {abs(uncM-0.0575510204082)<0.0005}



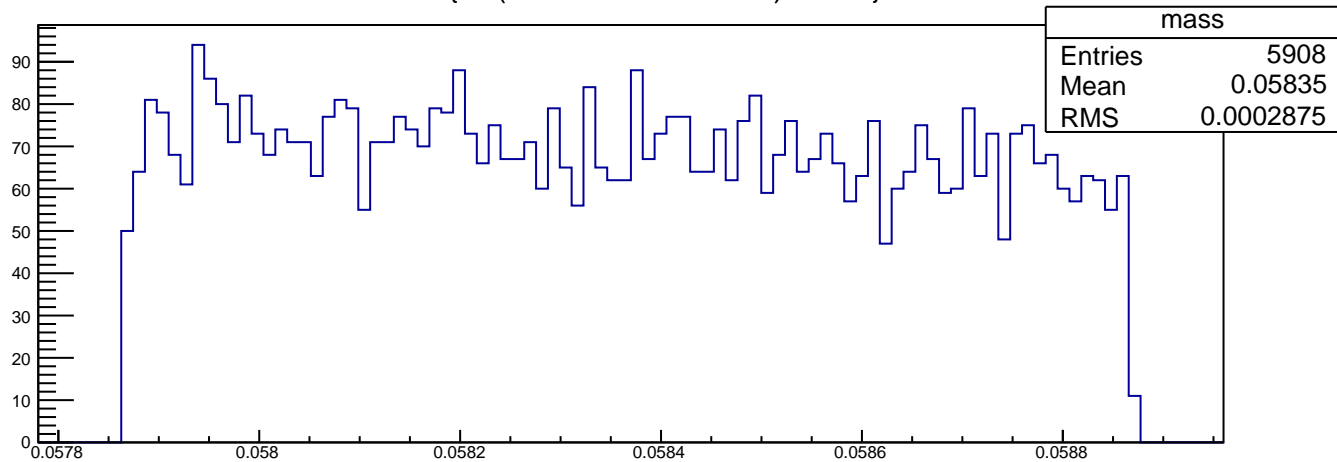
vertex Z, mass 0.0575510204082 +/- 0.00408186473497 GeV, zcut 18.1058959247 mm



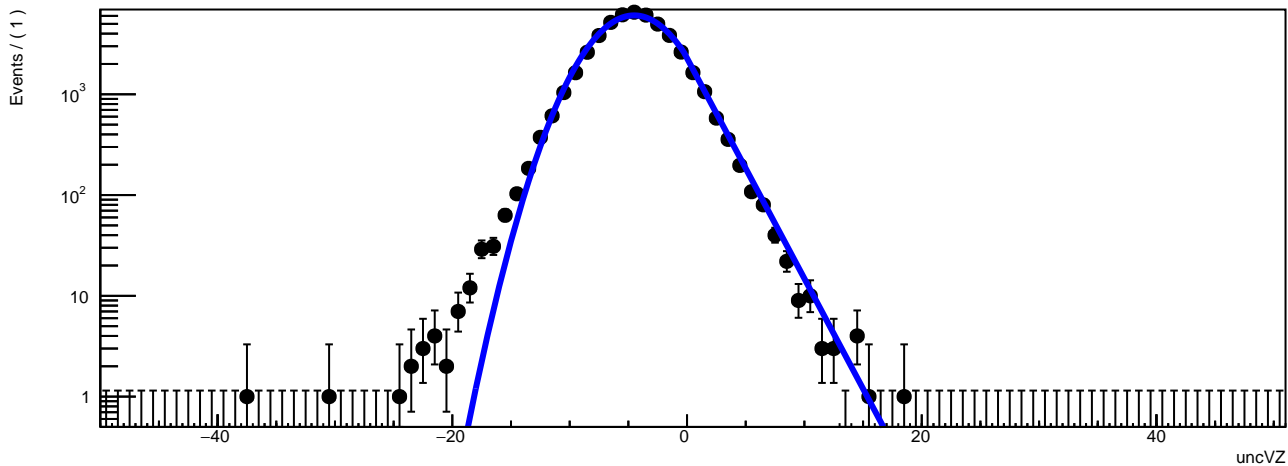
vertex Z, mass  $0.0575510204082 \pm 0.00408186473497$  GeV, zcut 18.1058959247 mm



uncM {abs(uncM-0.0583673469388)<0.0005}

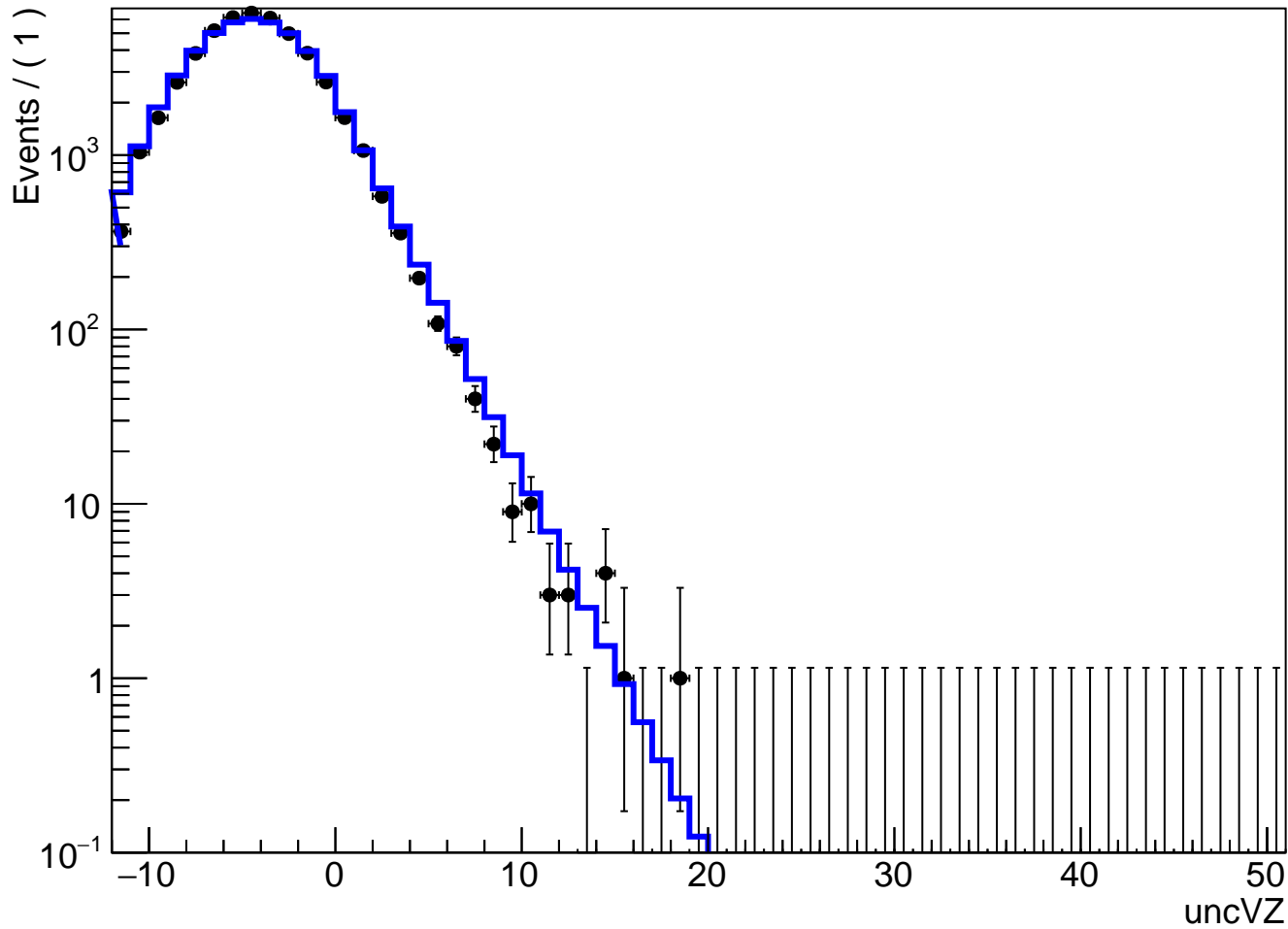


vertex Z, mass 0.0583673469388 +/- 0.00412546150831 GeV, zcut 17.9966602775 mm

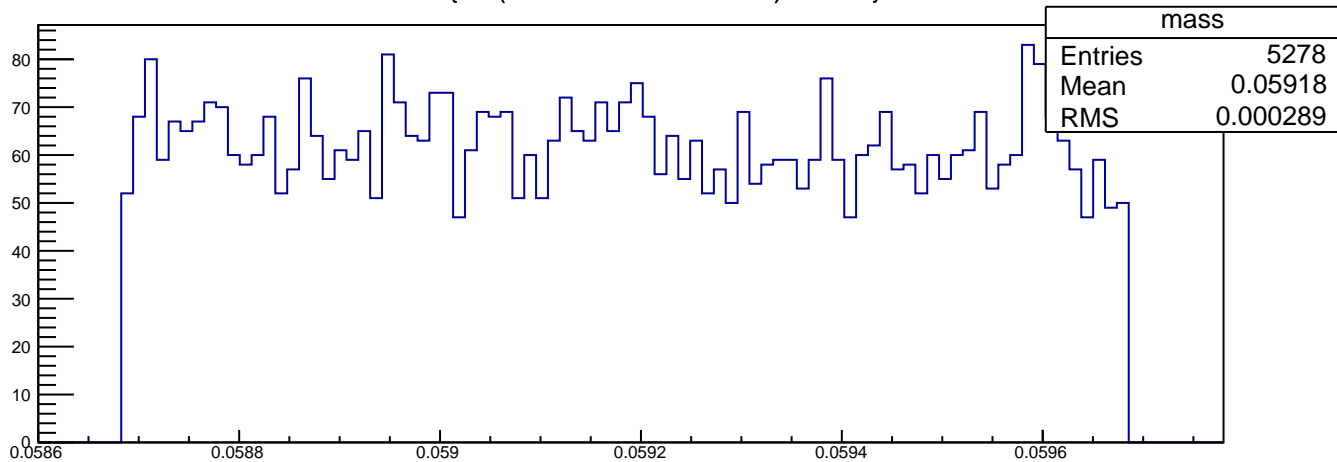




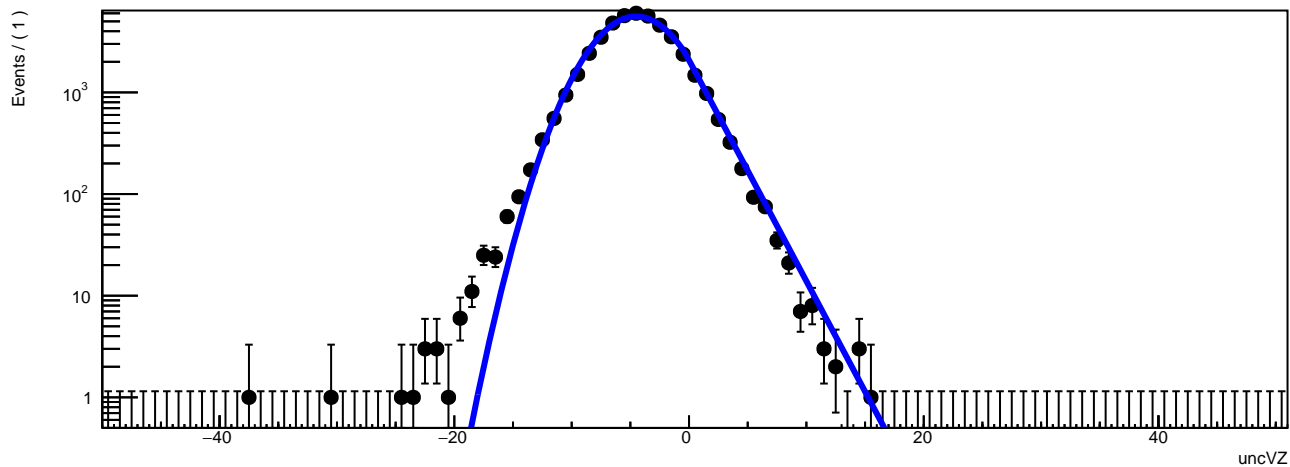
vertex Z, mass  $0.0583673469388 \pm 0.00412546150831$  GeV, zcut 17.9966602775 mm



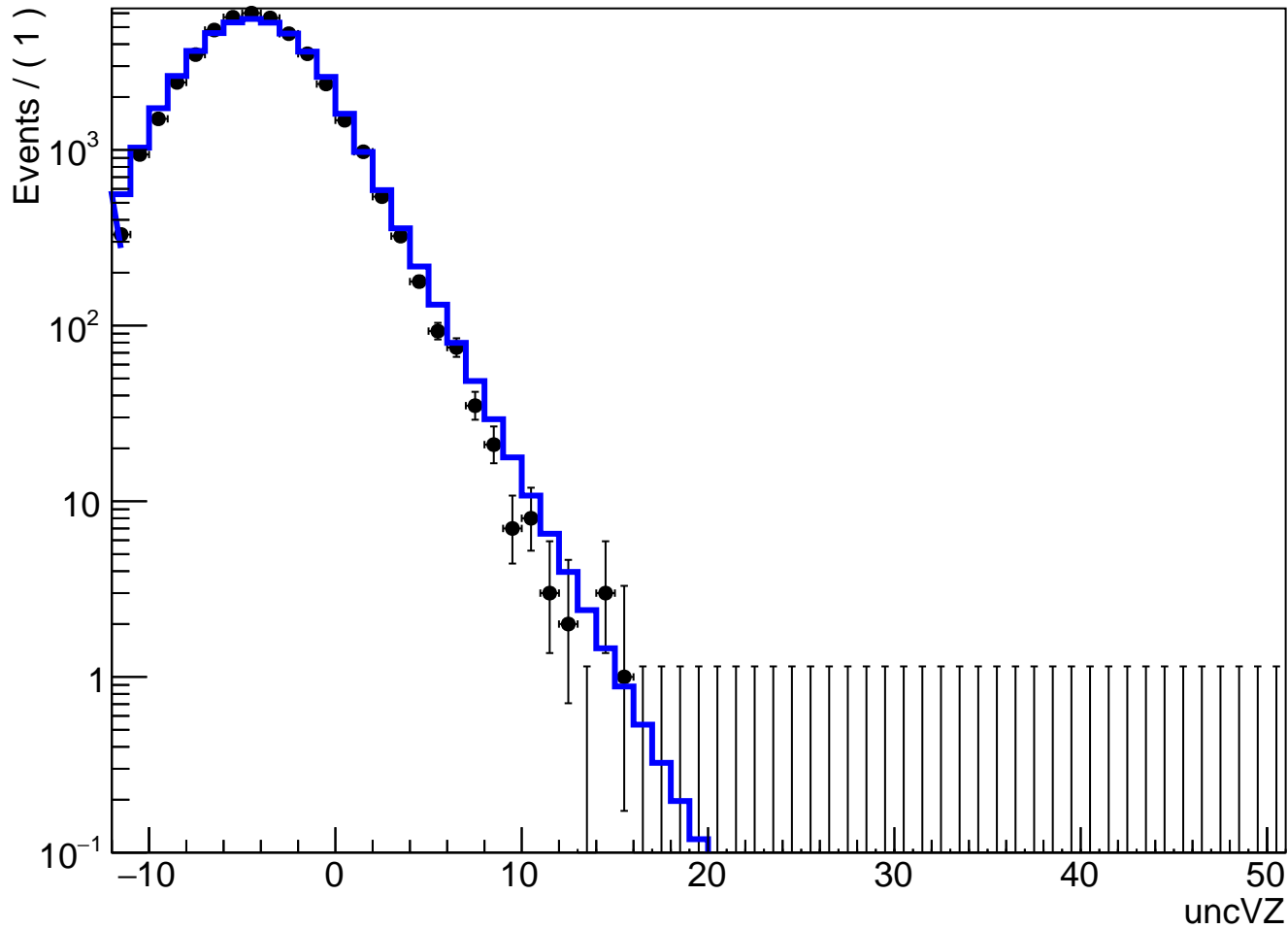
uncM {abs(uncM-0.0591836734694)<0.0005}



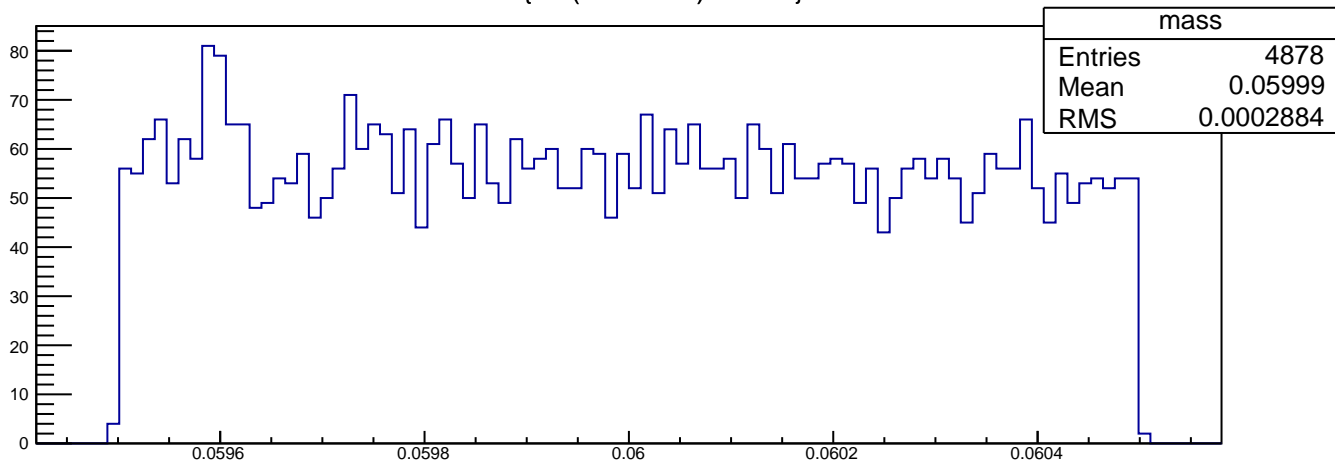
vertex Z, mass 0.0591836734694 +/- 0.00416905828165 GeV, zcut 17.9283242665 mm



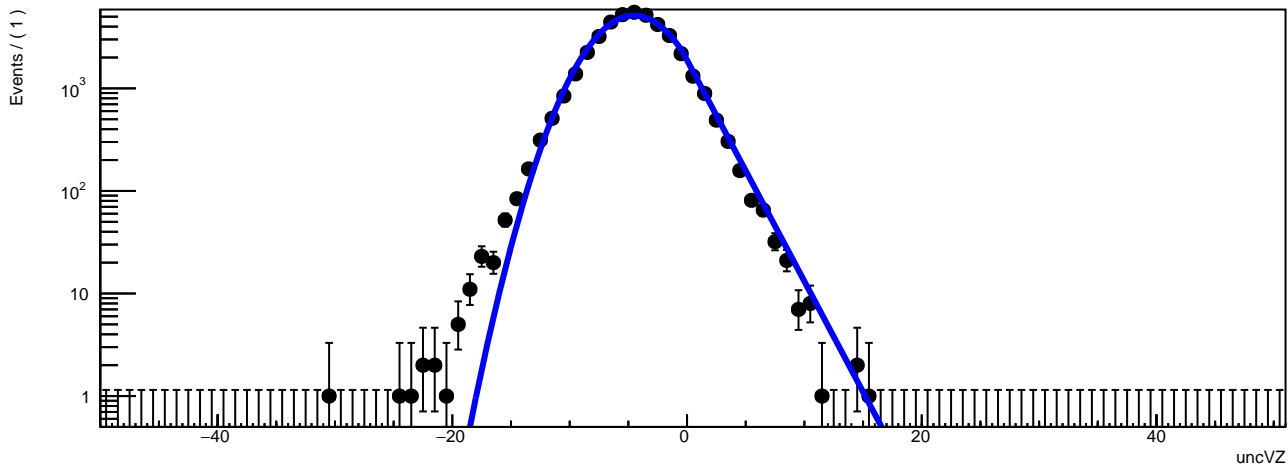
vertex Z, mass  $0.0591836734694 \pm 0.00416905828165$  GeV,  $z_{\text{cut}} 17.9283242665$  mm



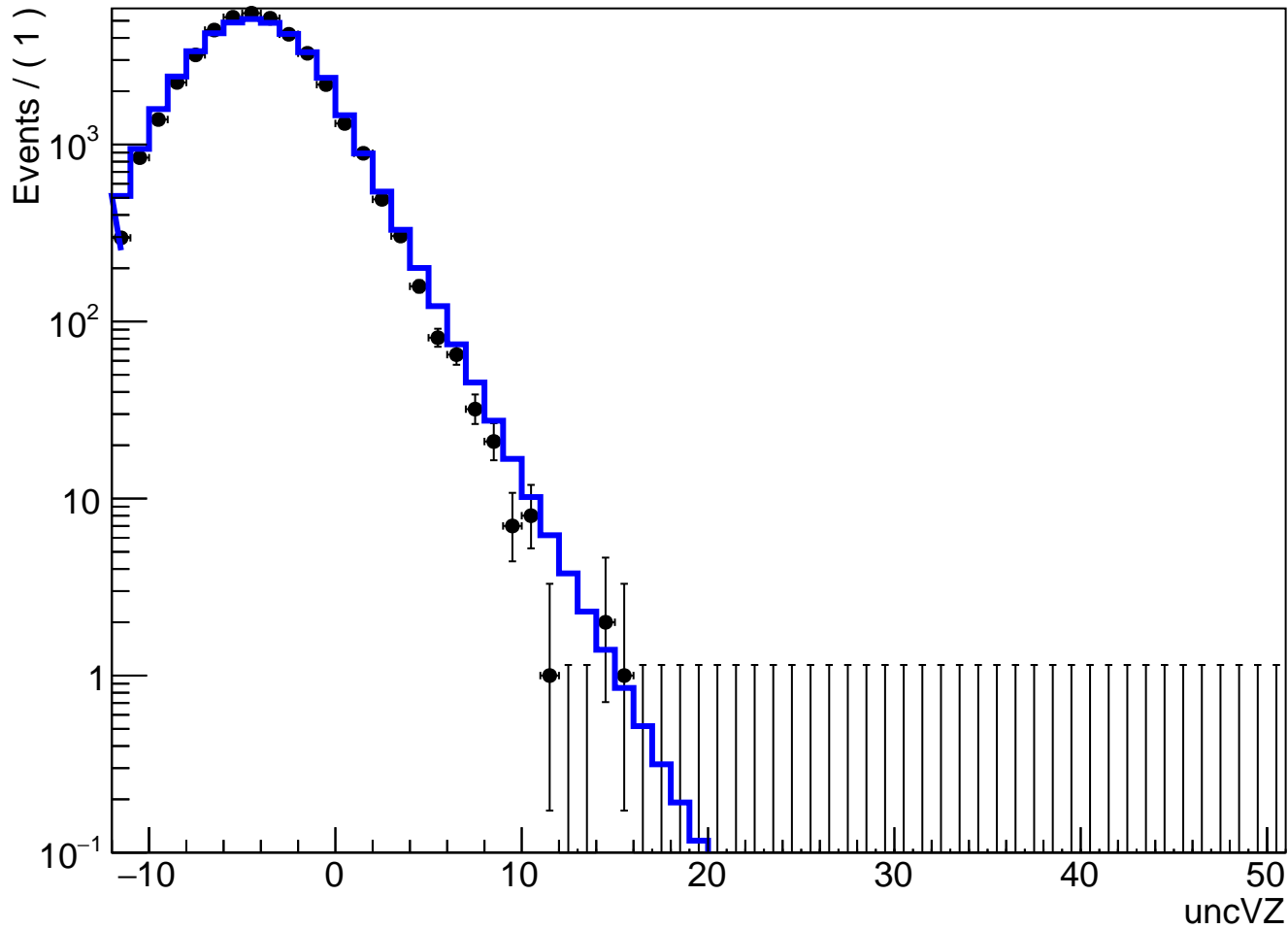
uncM {abs(uncM-0.06)<0.0005}



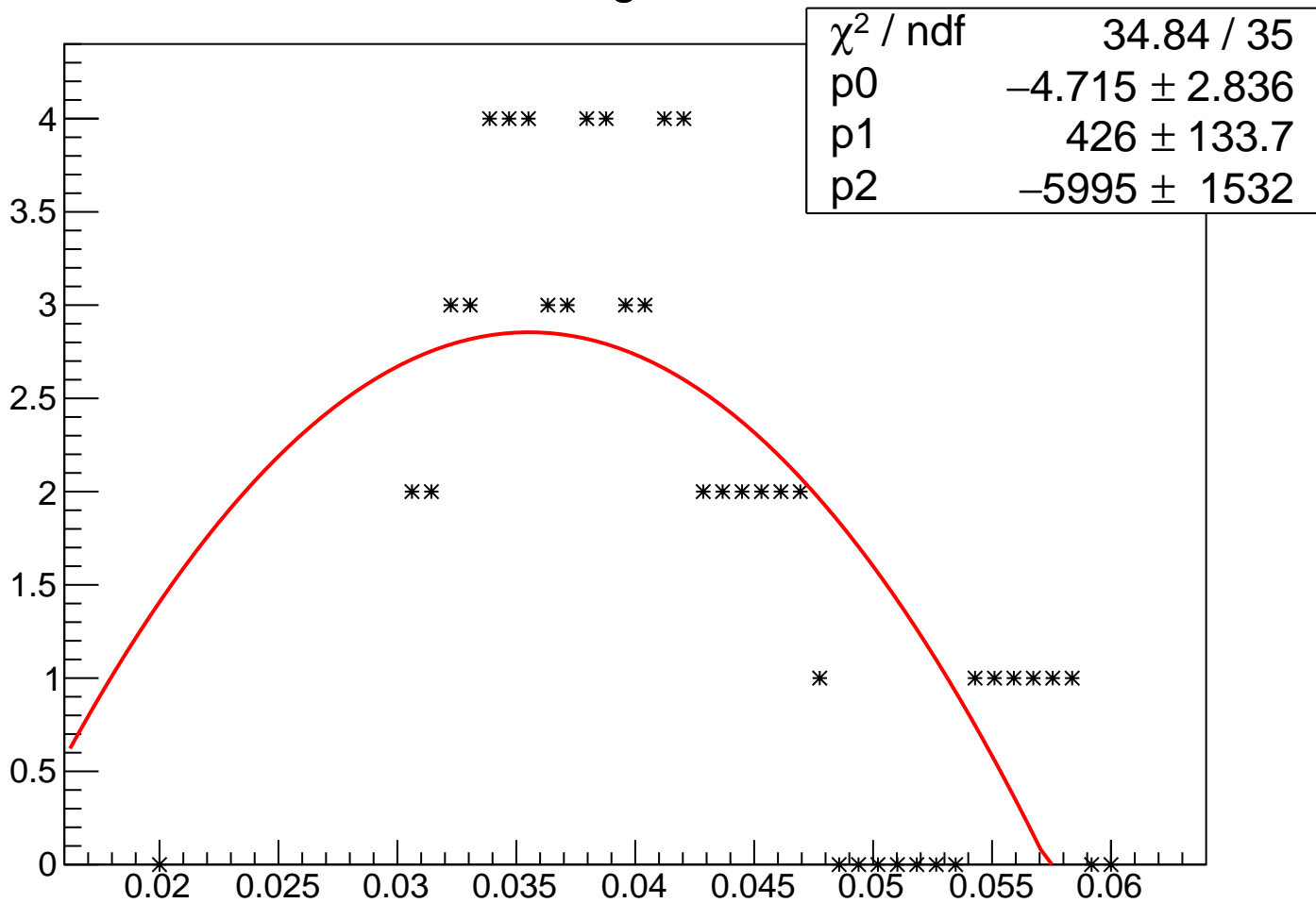
vertex Z, mass 0.06 +/- 0.00421265505498 GeV, zcut 17.8913199171 mm



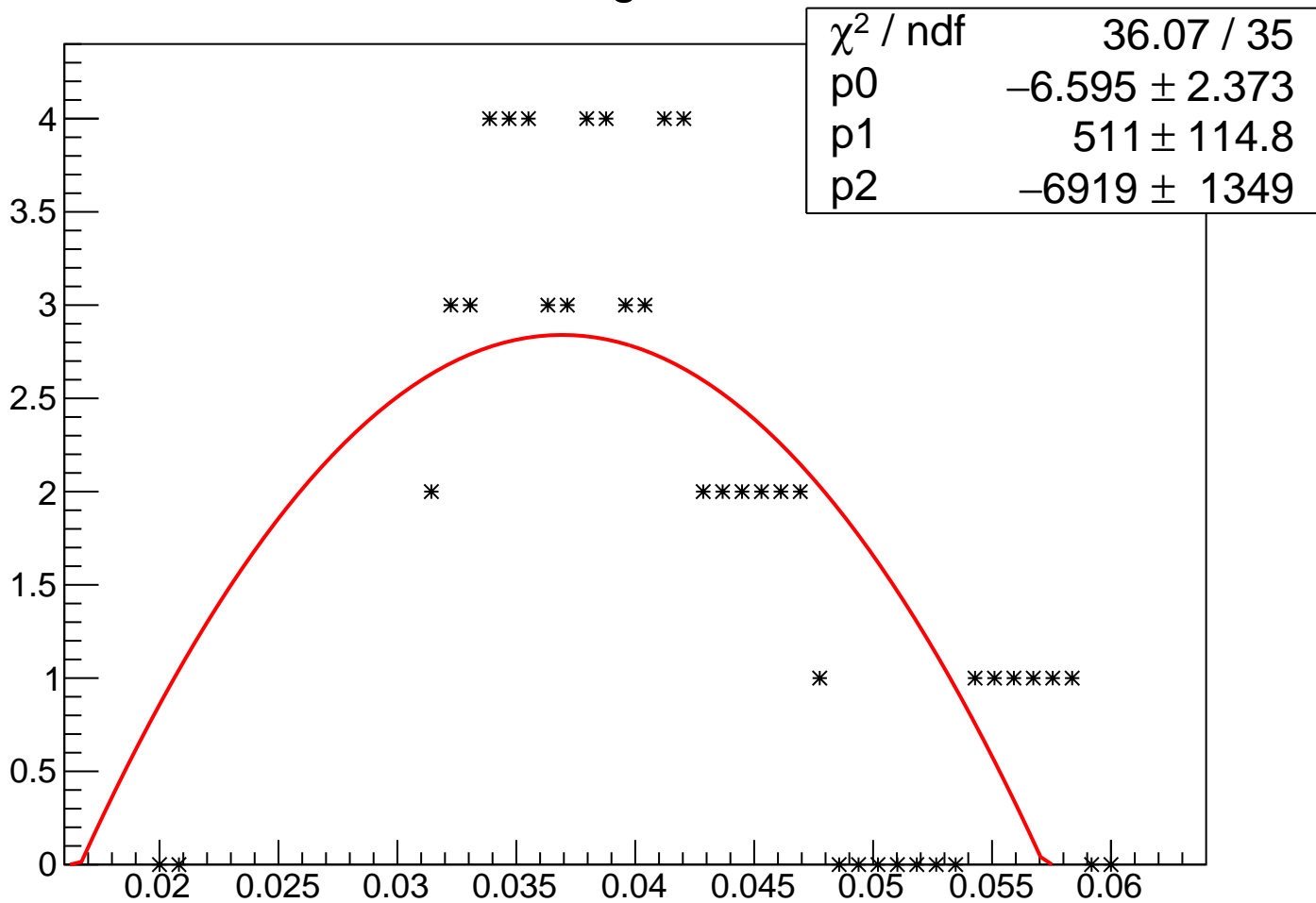
vertex Z, mass  $0.06 \pm 0.00421265505498$  GeV, zcut 17.8913199171 mm



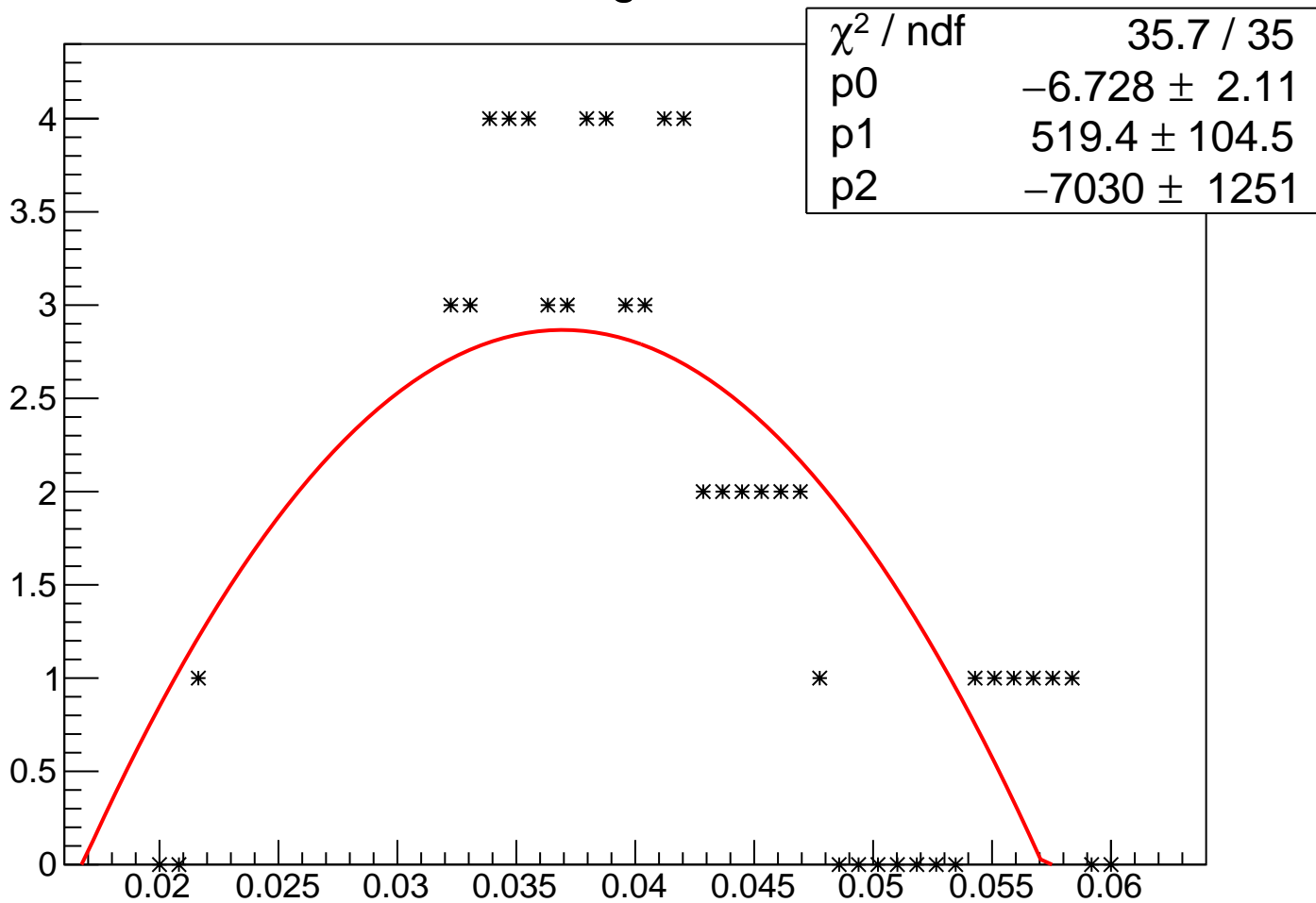
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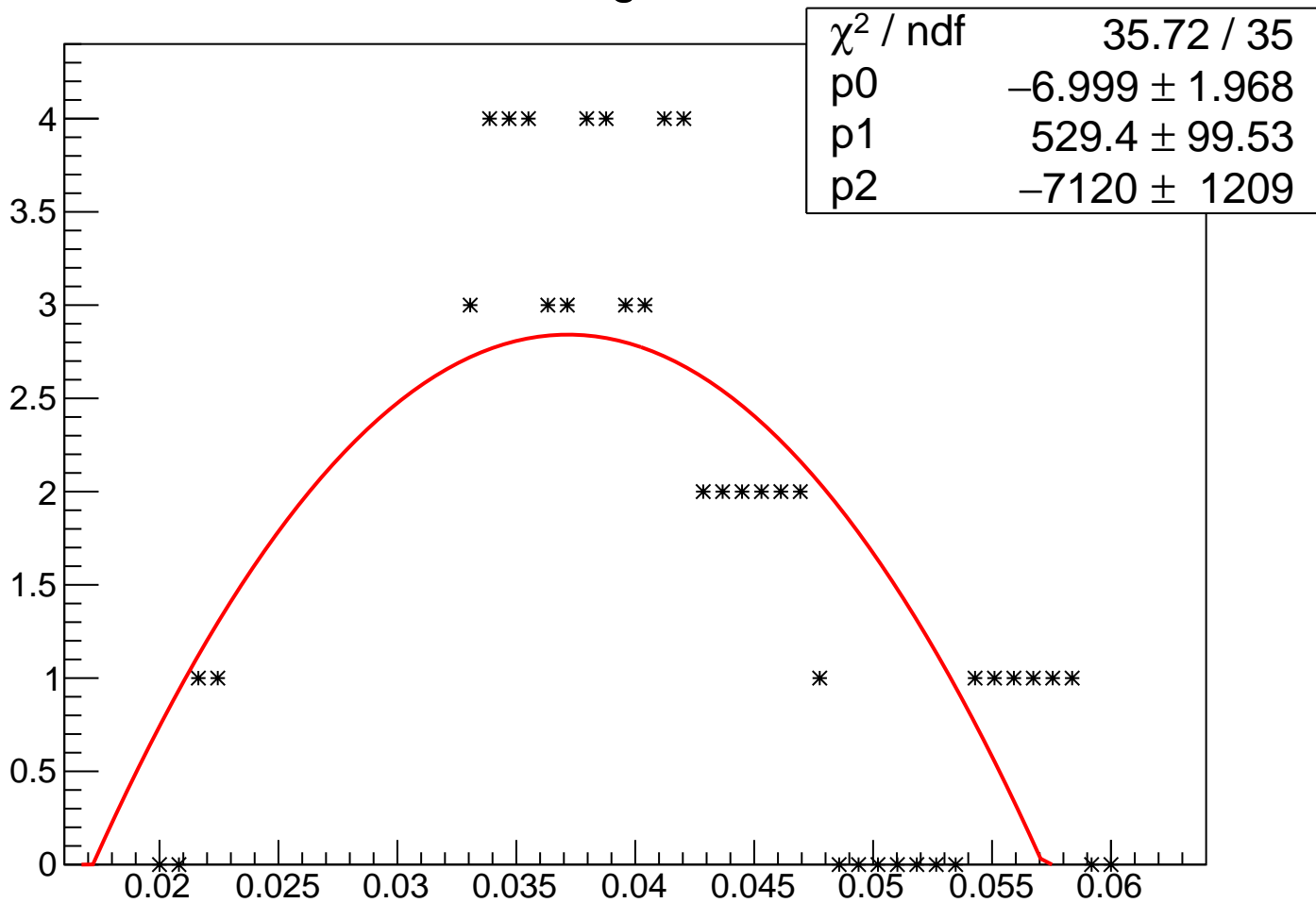


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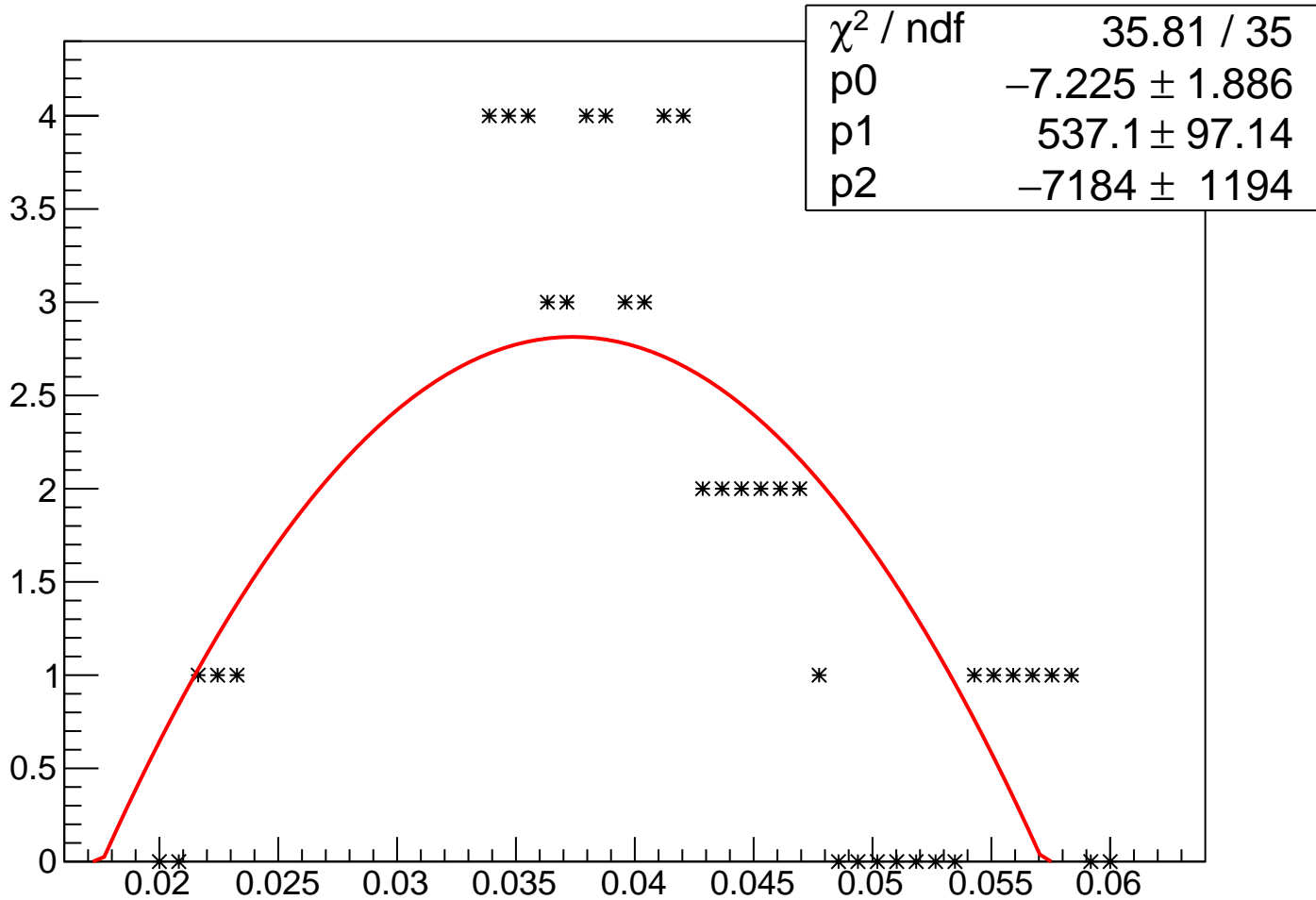




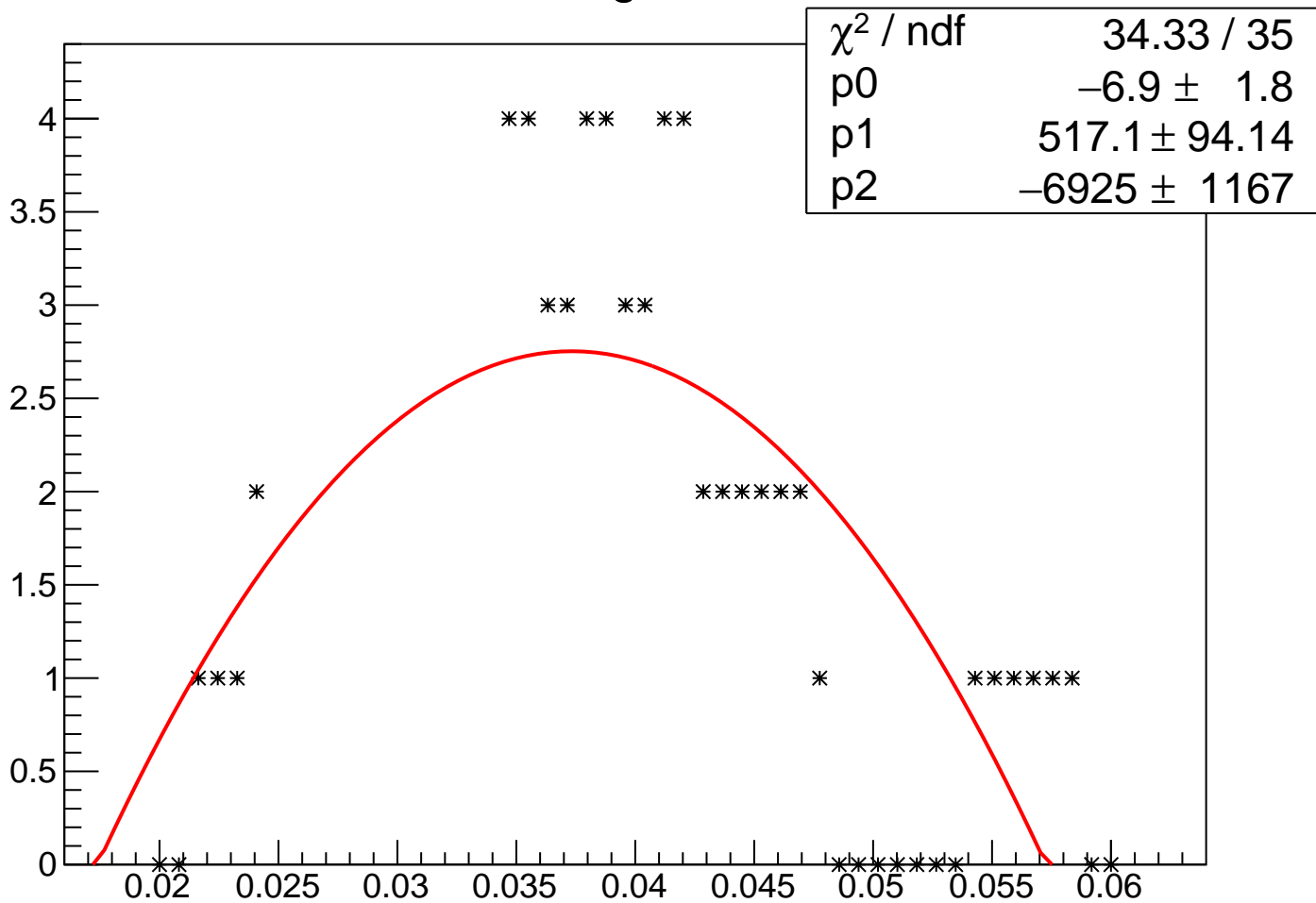
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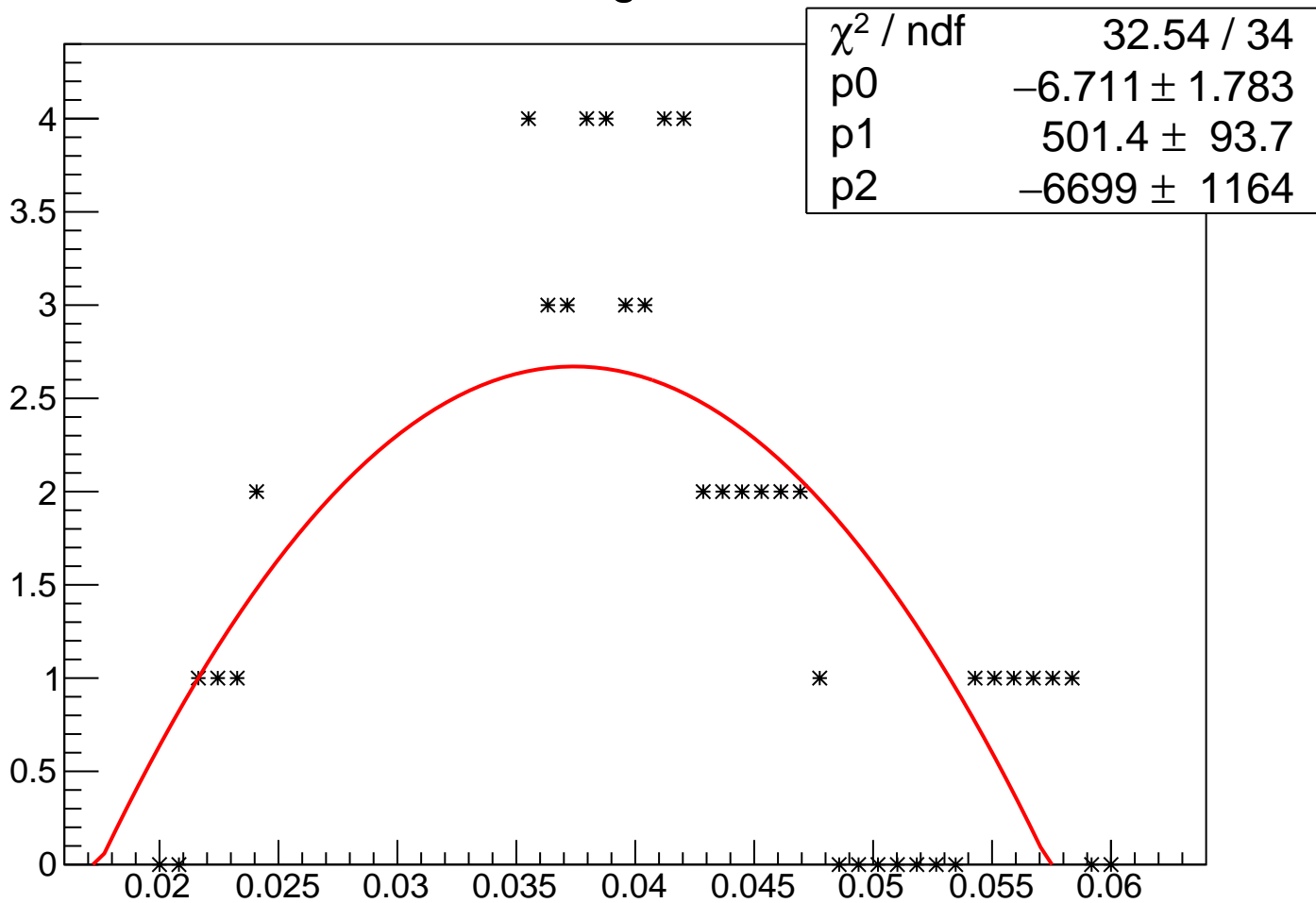
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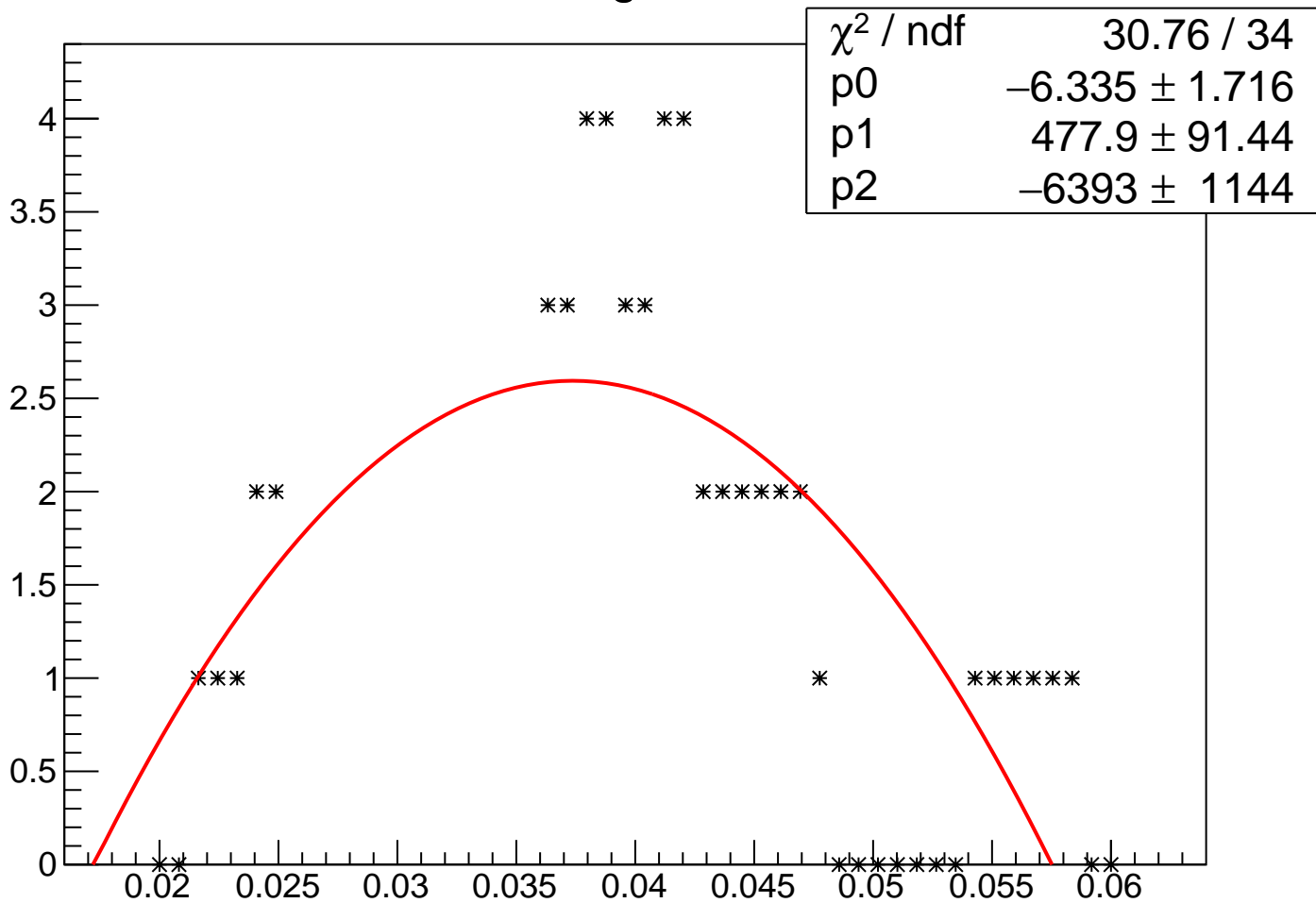
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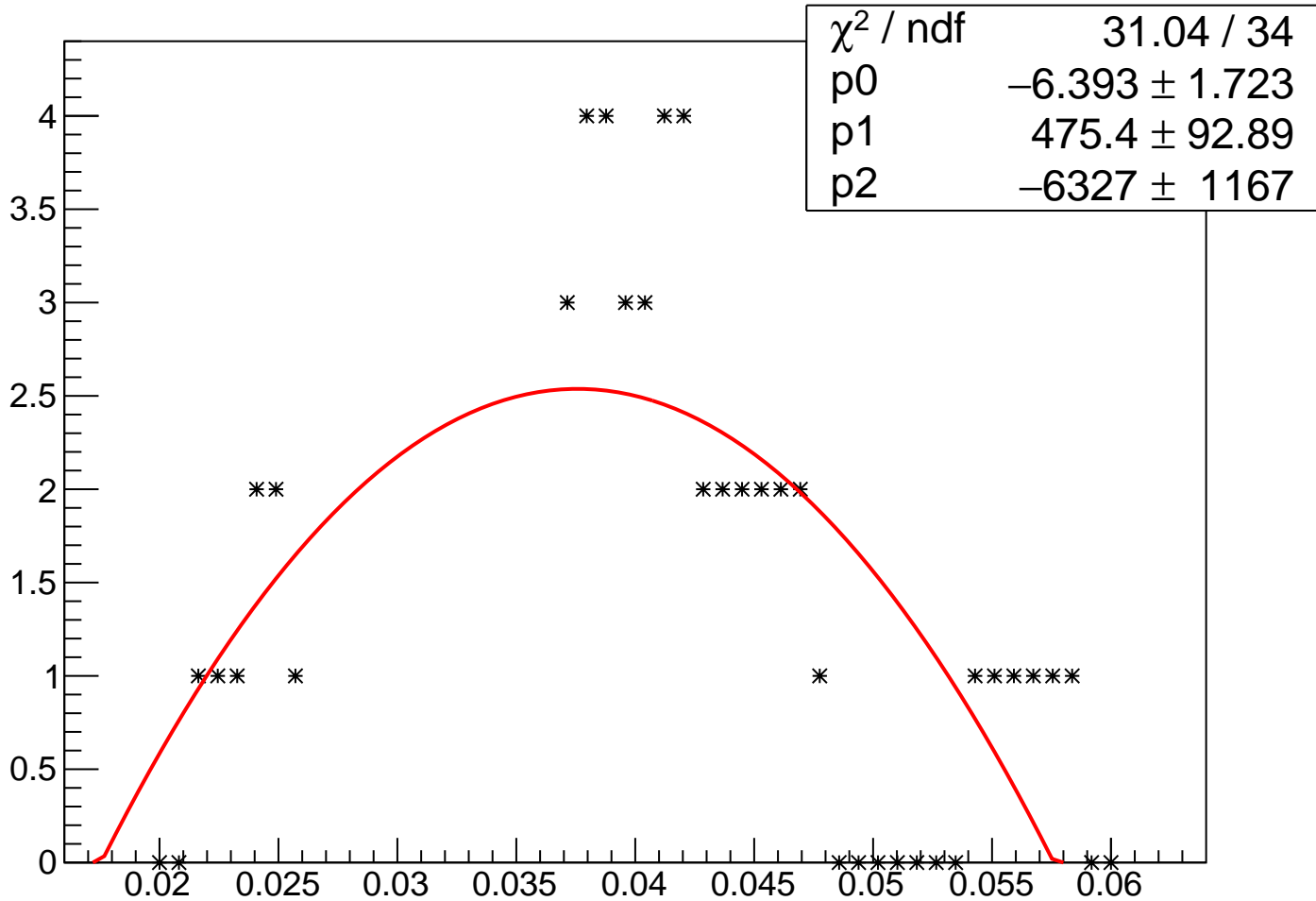
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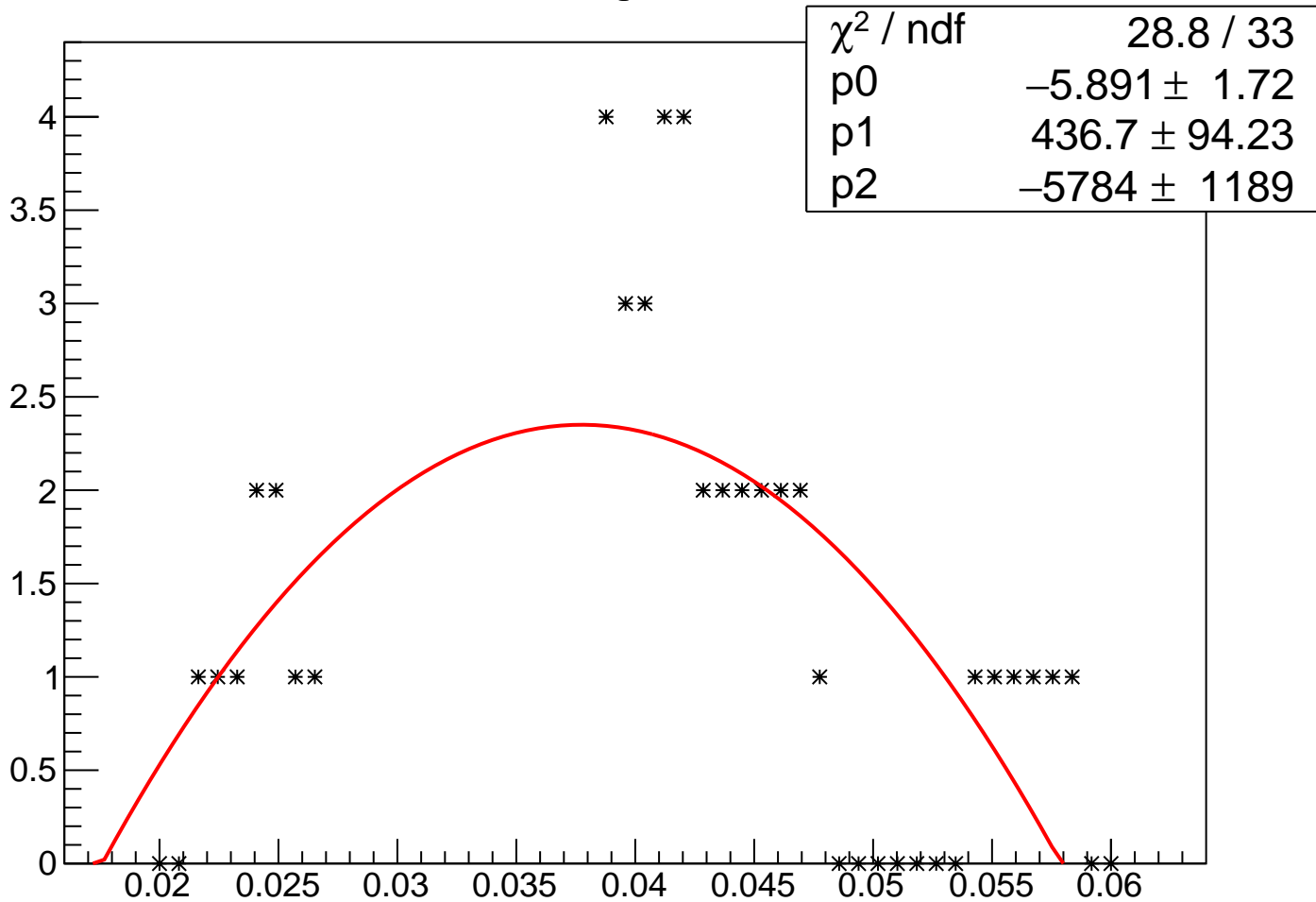
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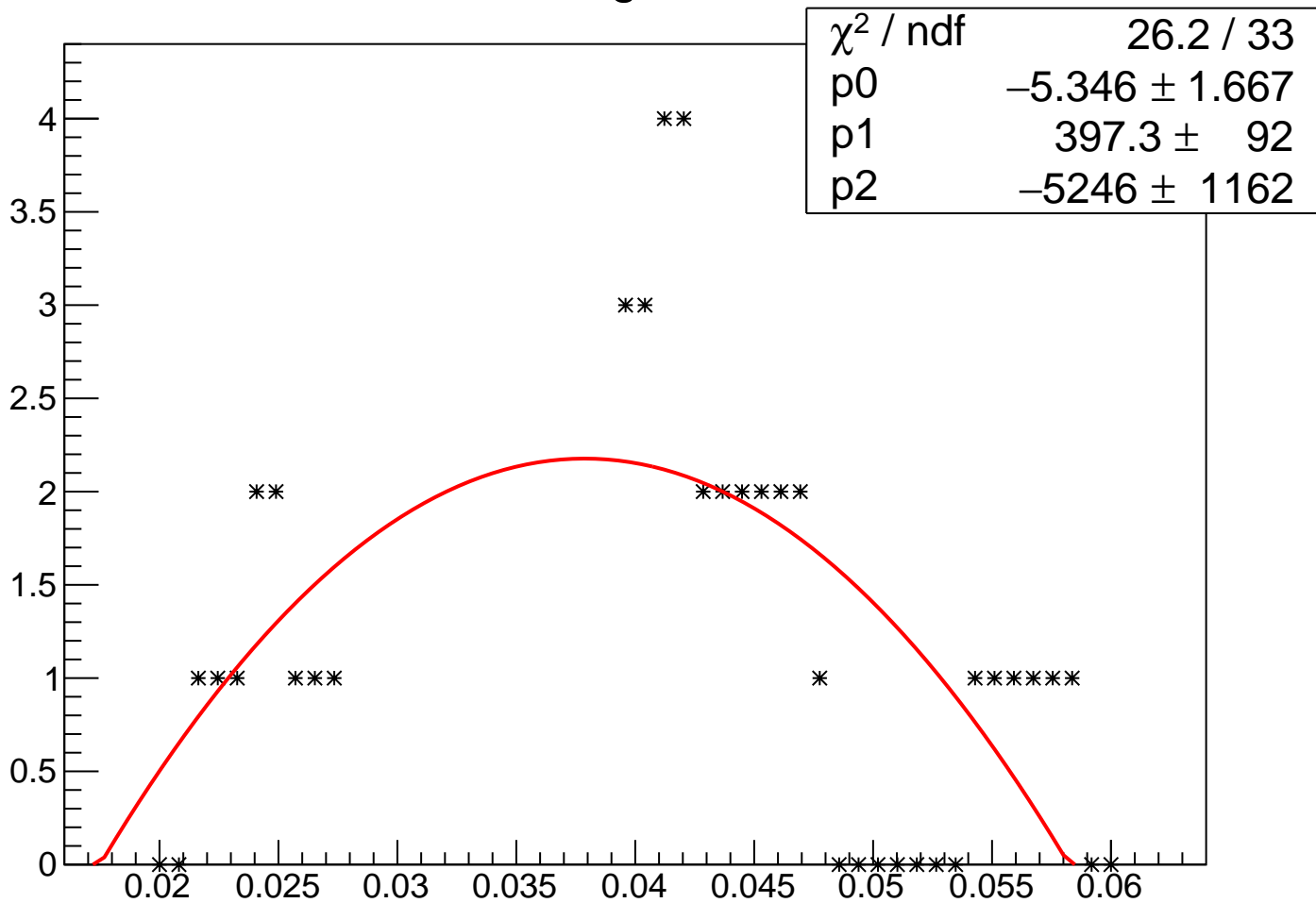
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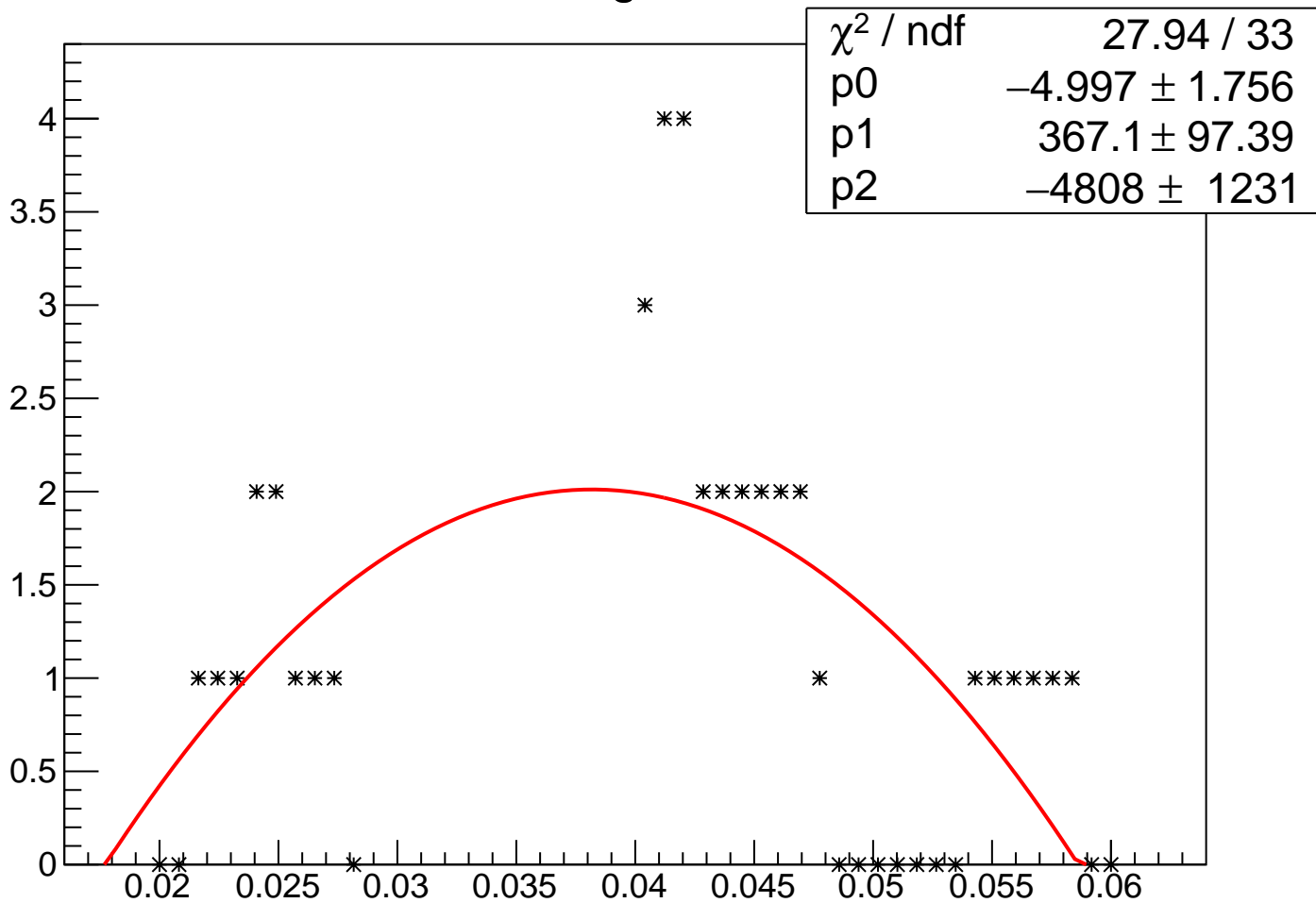


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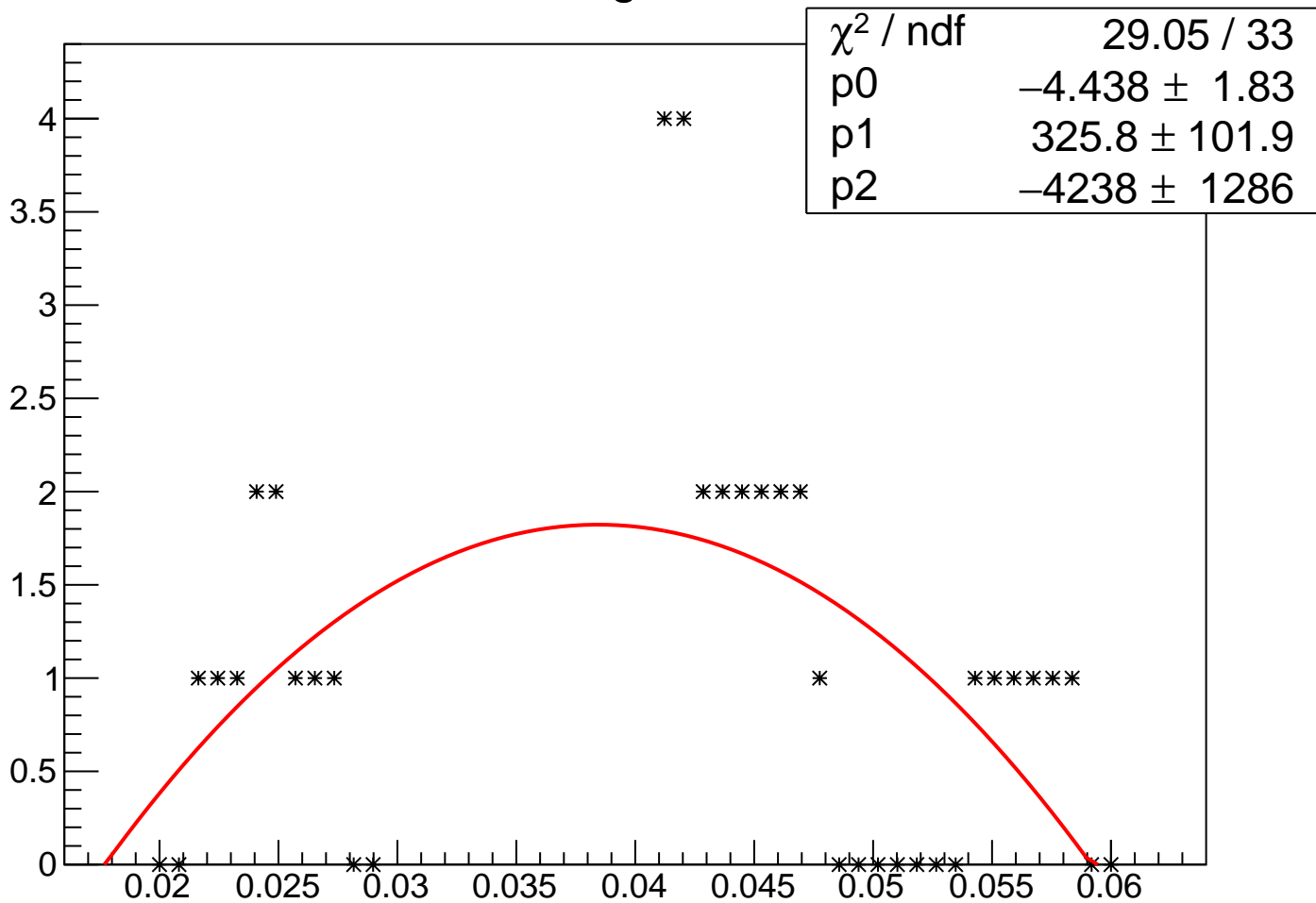




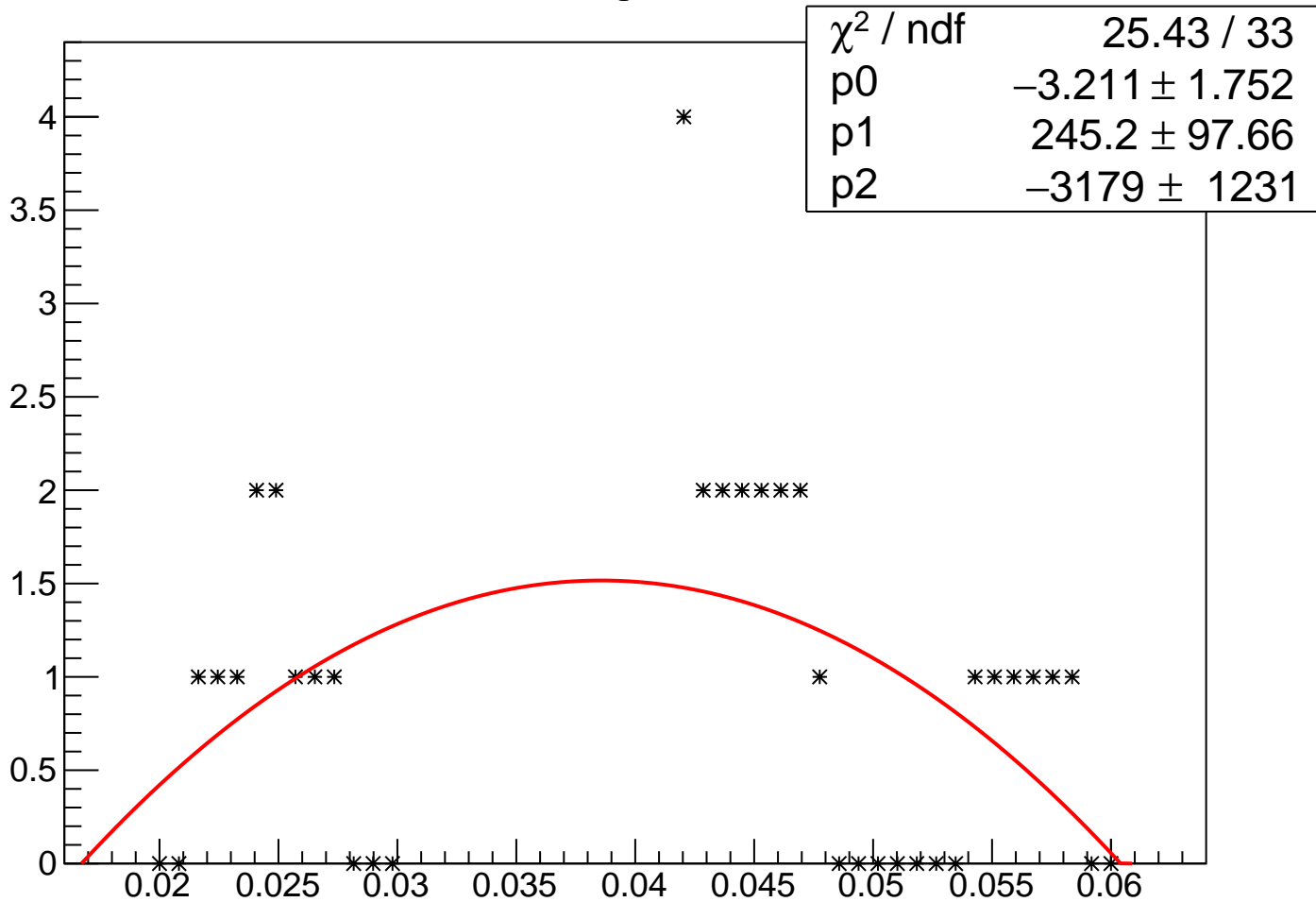
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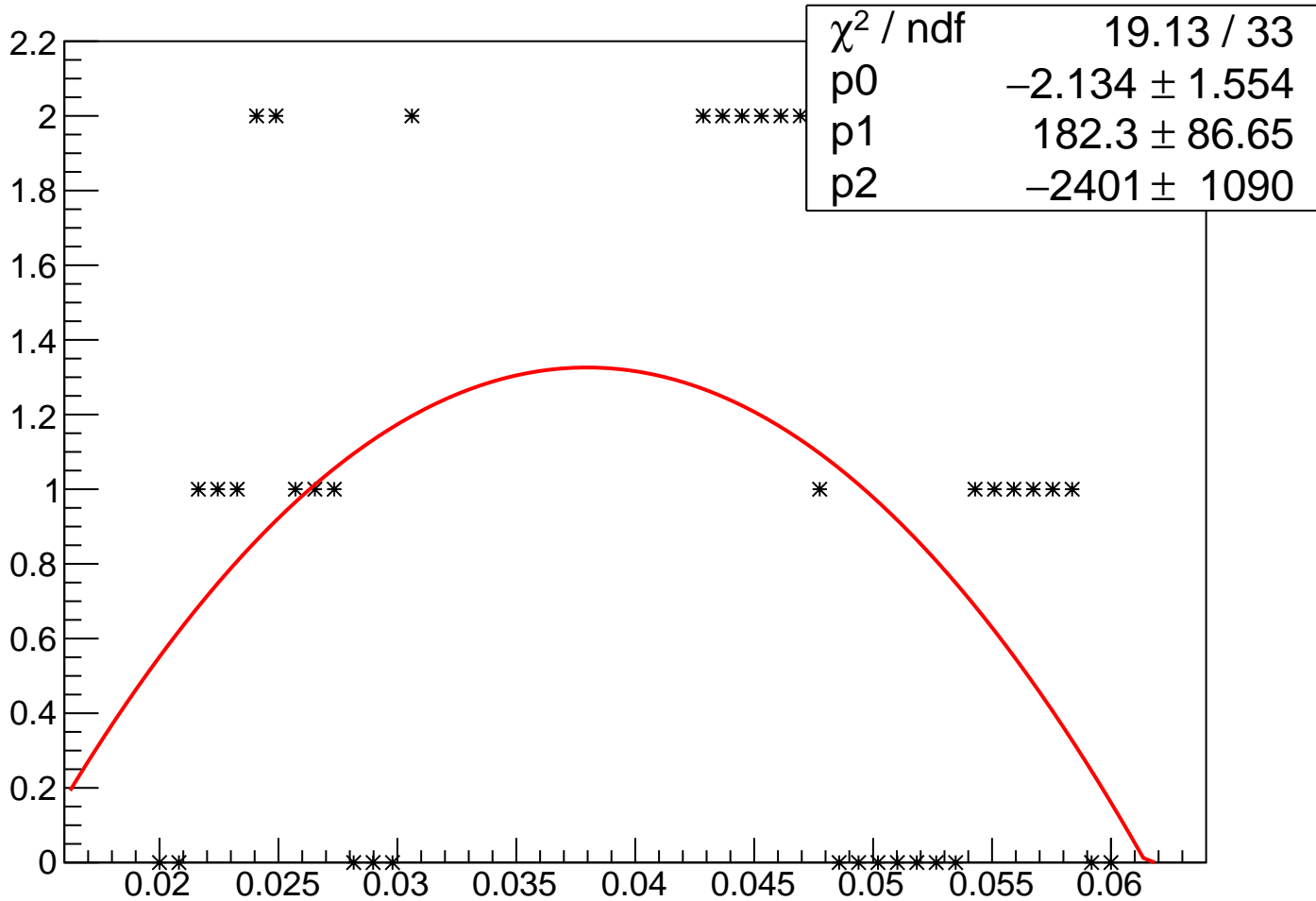
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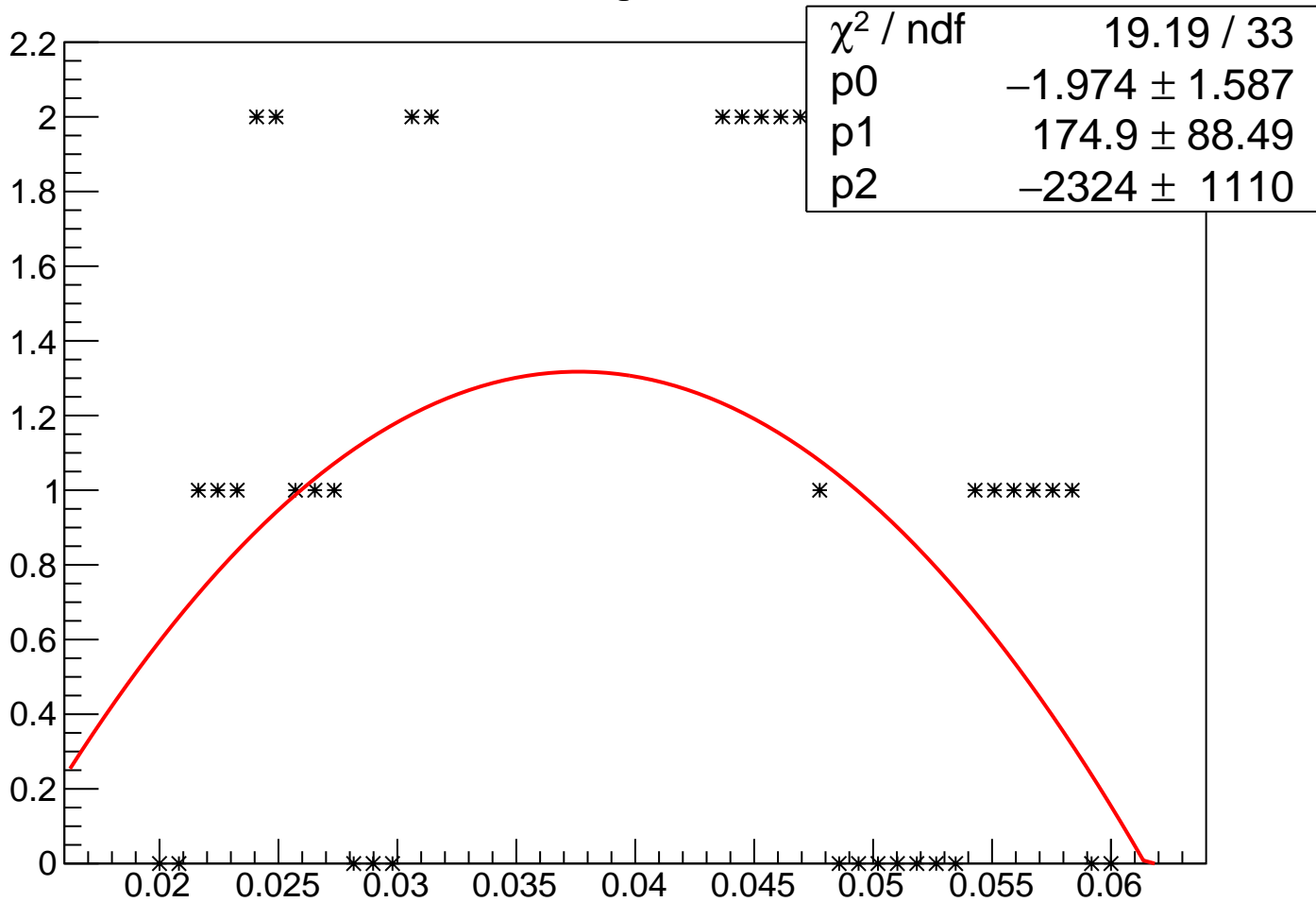
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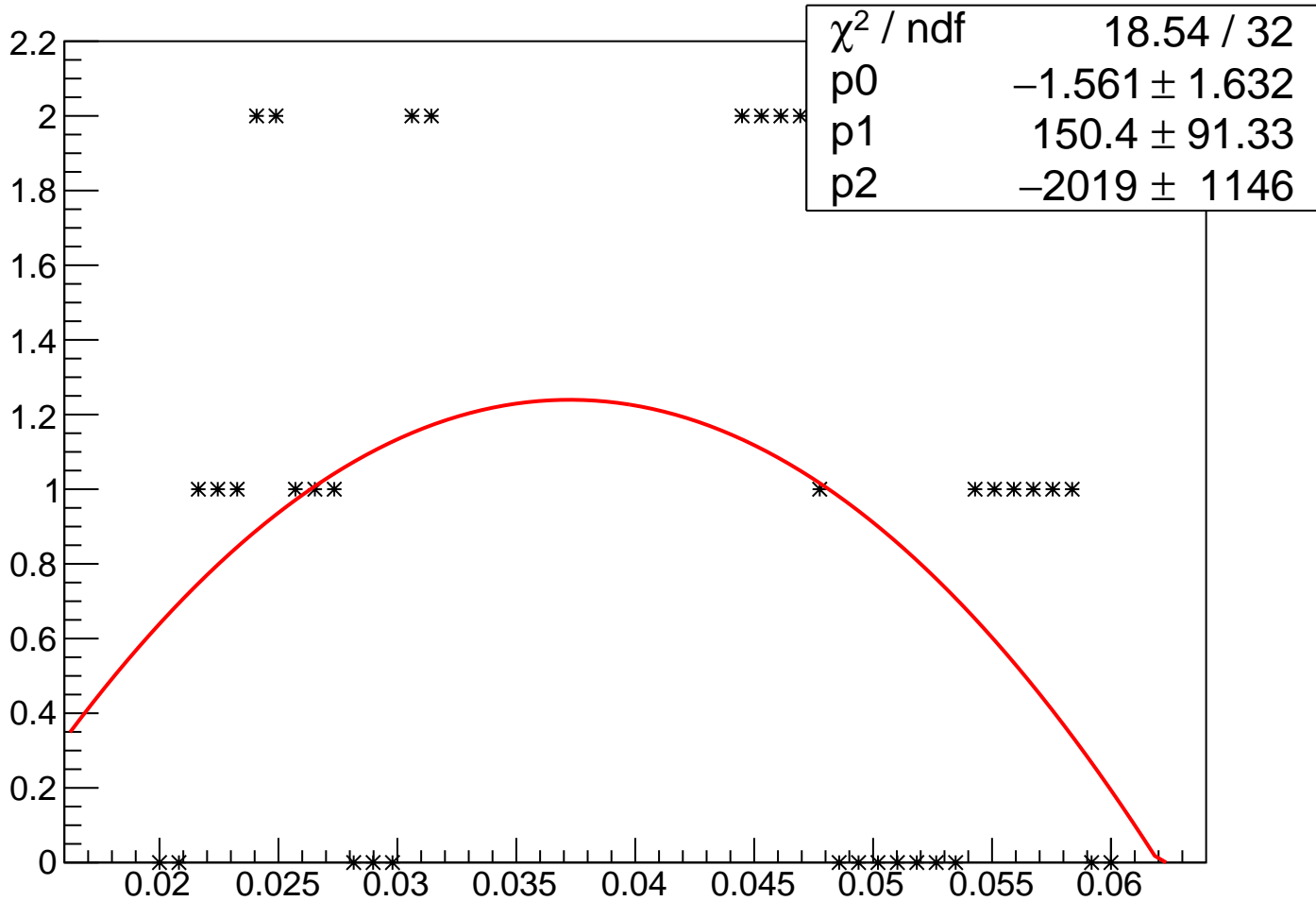
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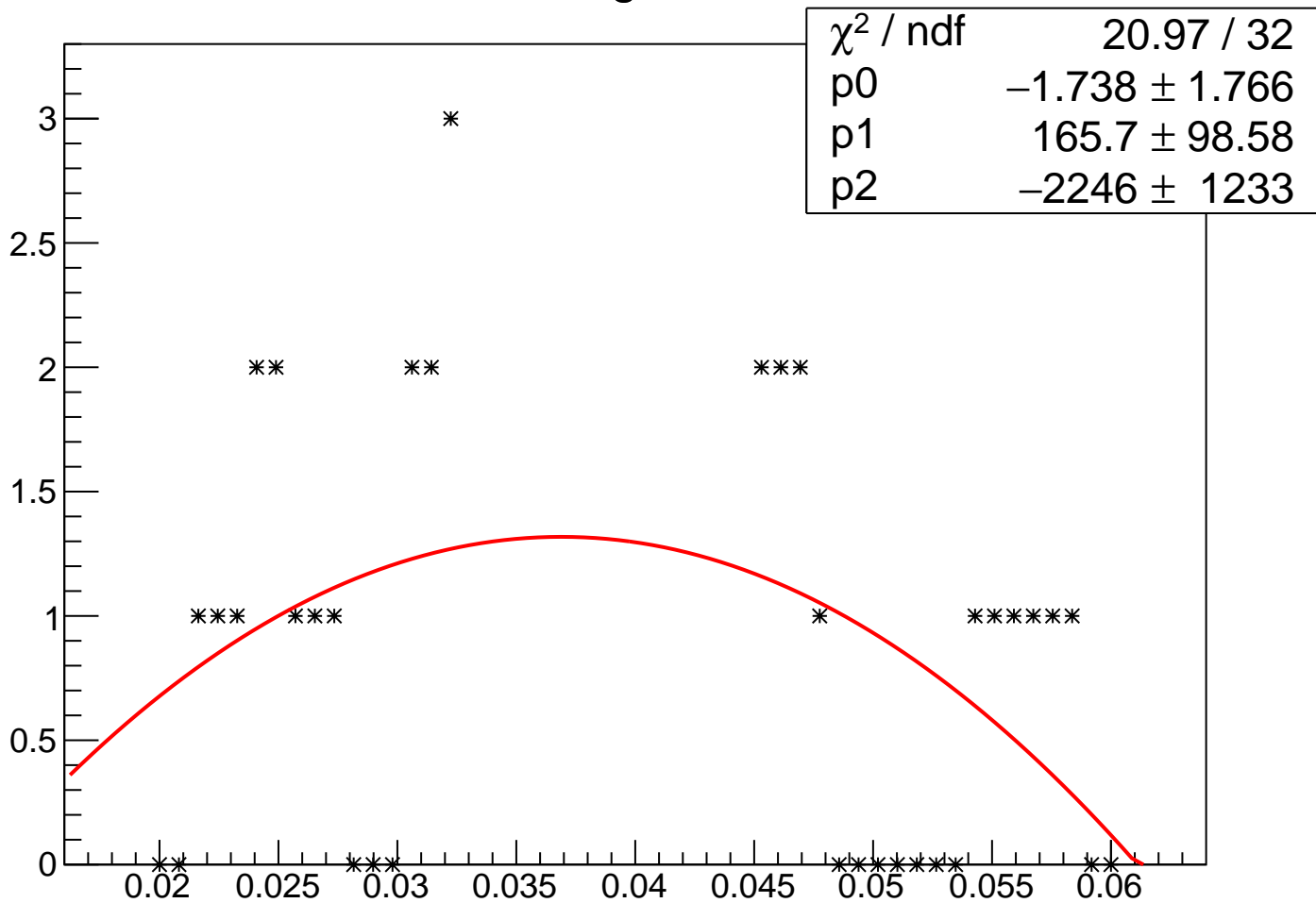
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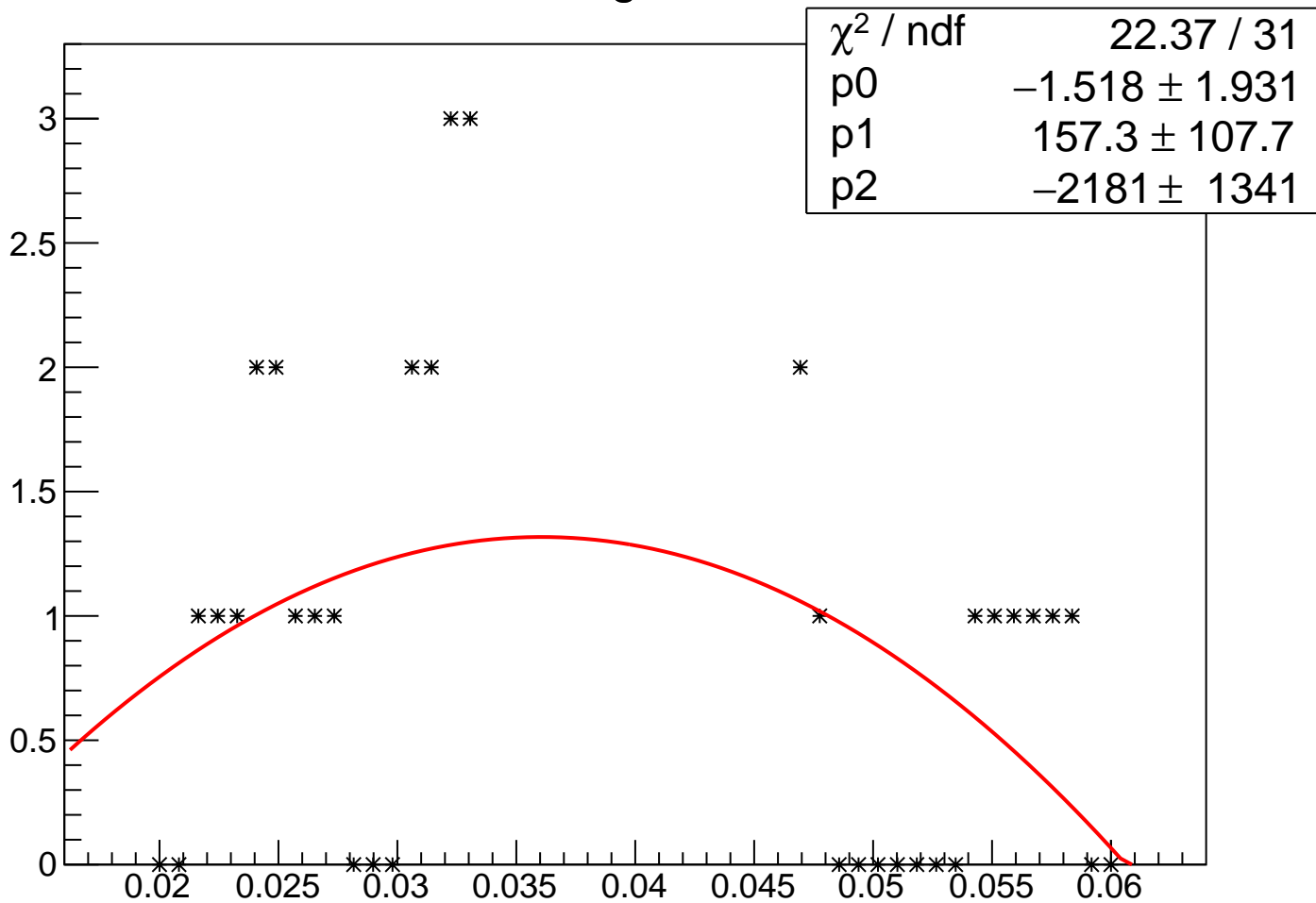
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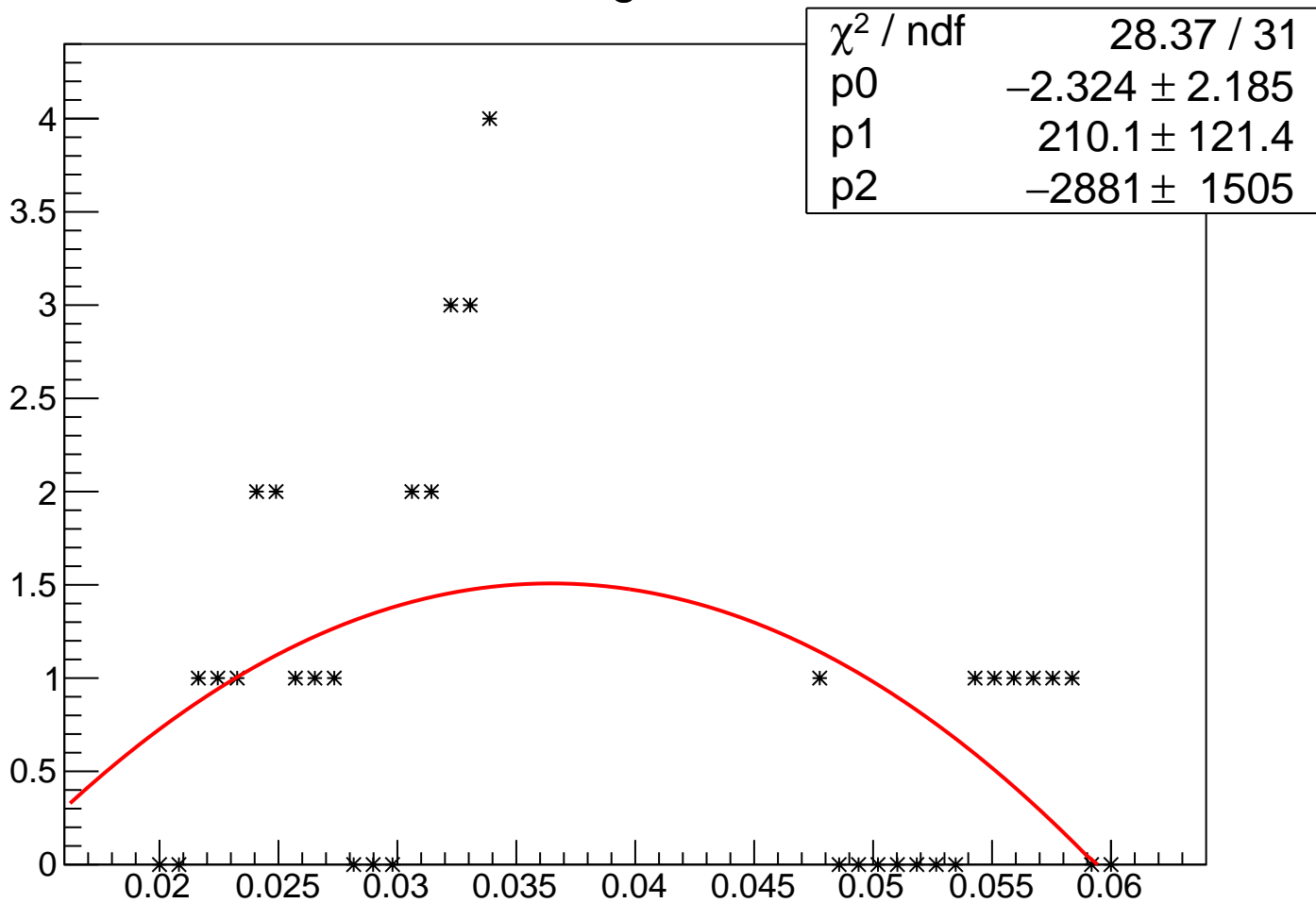


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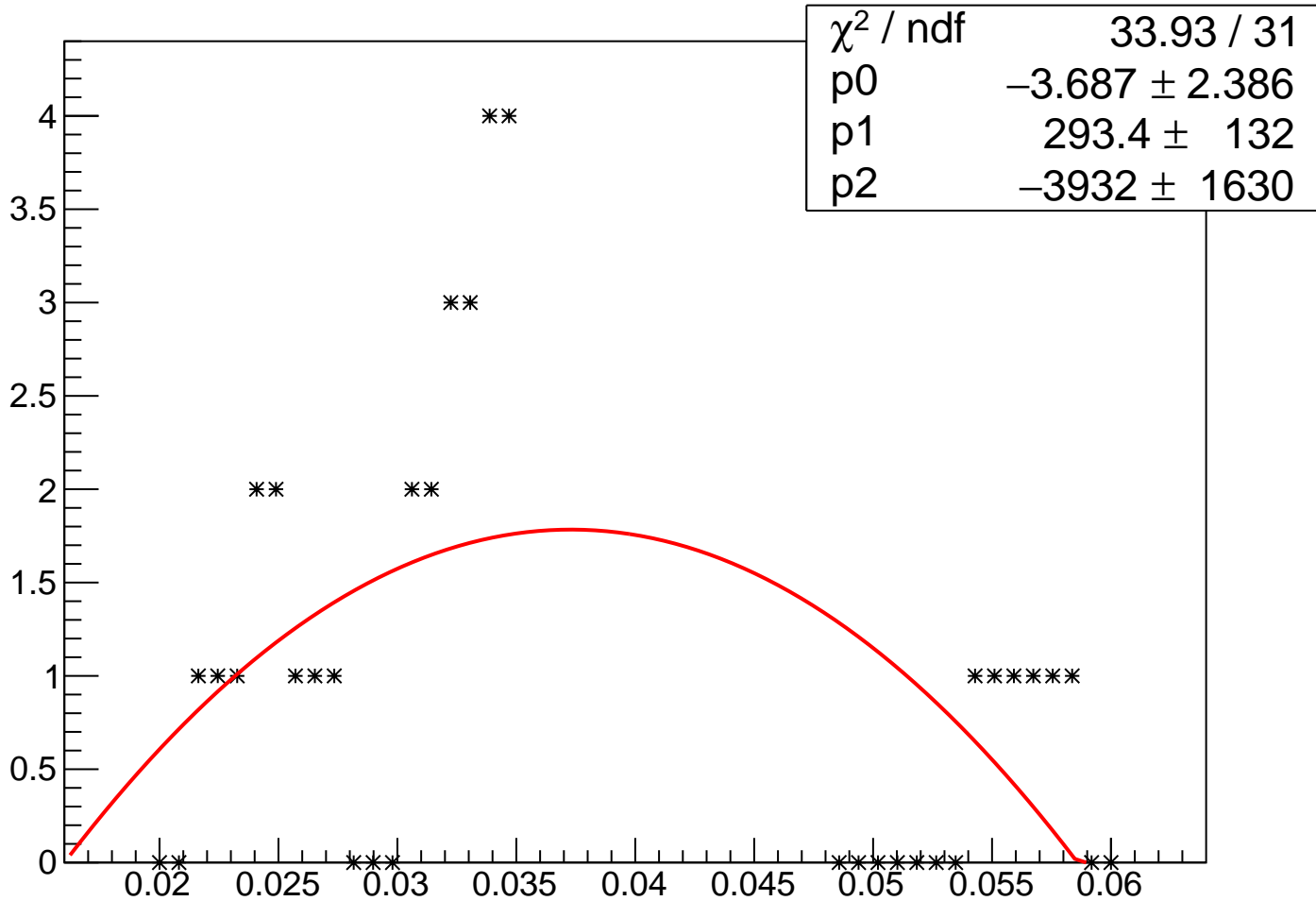




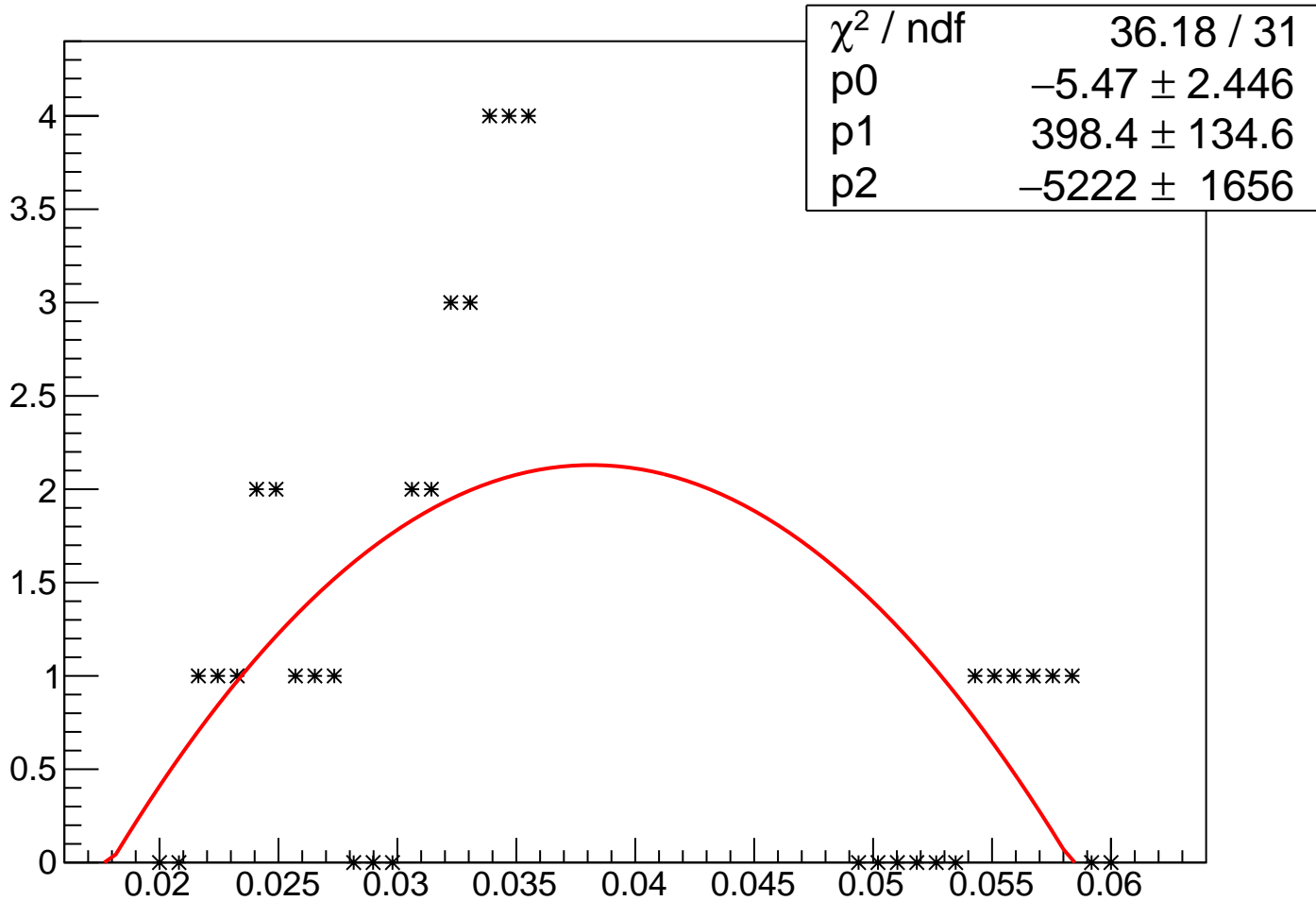
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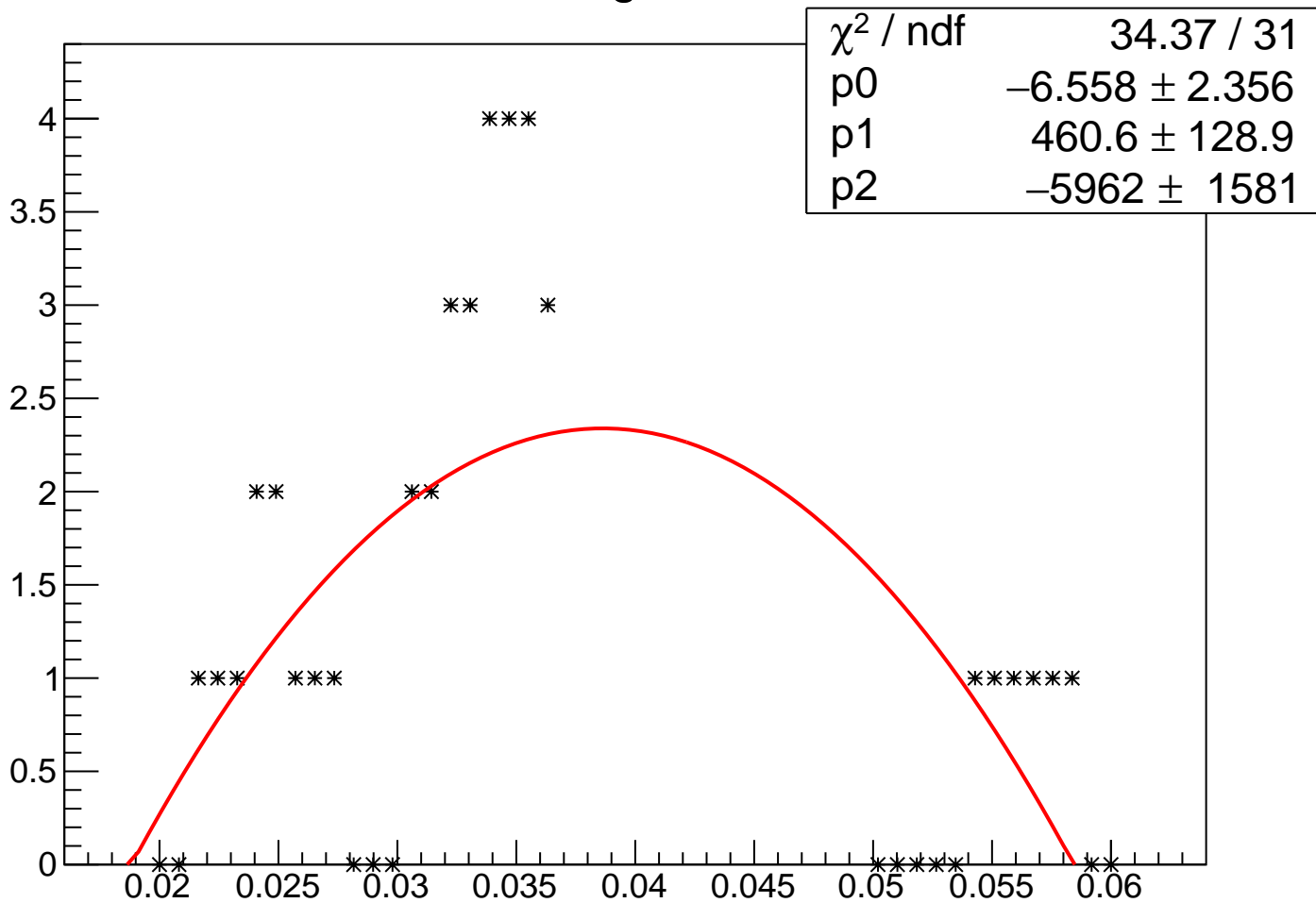
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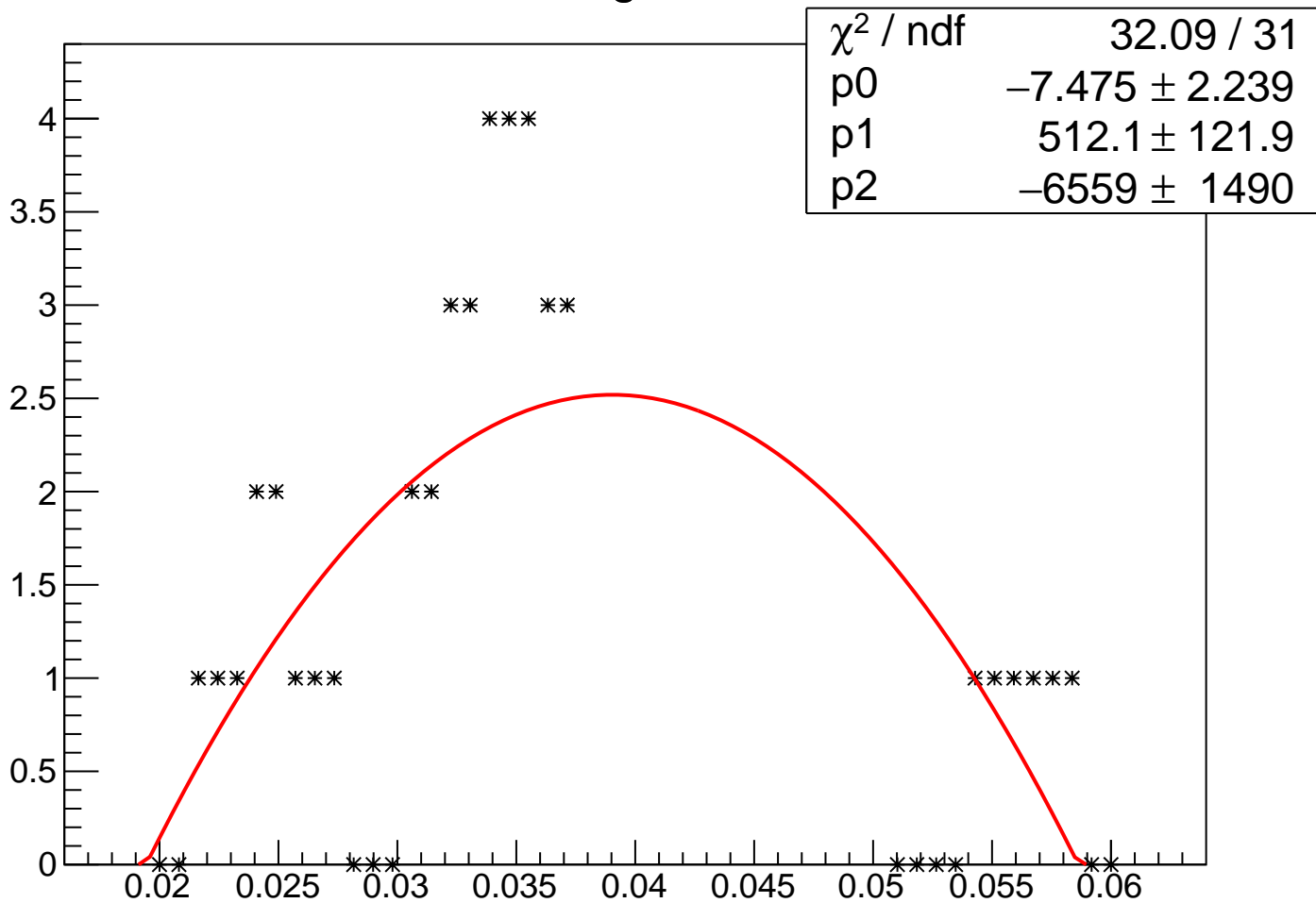
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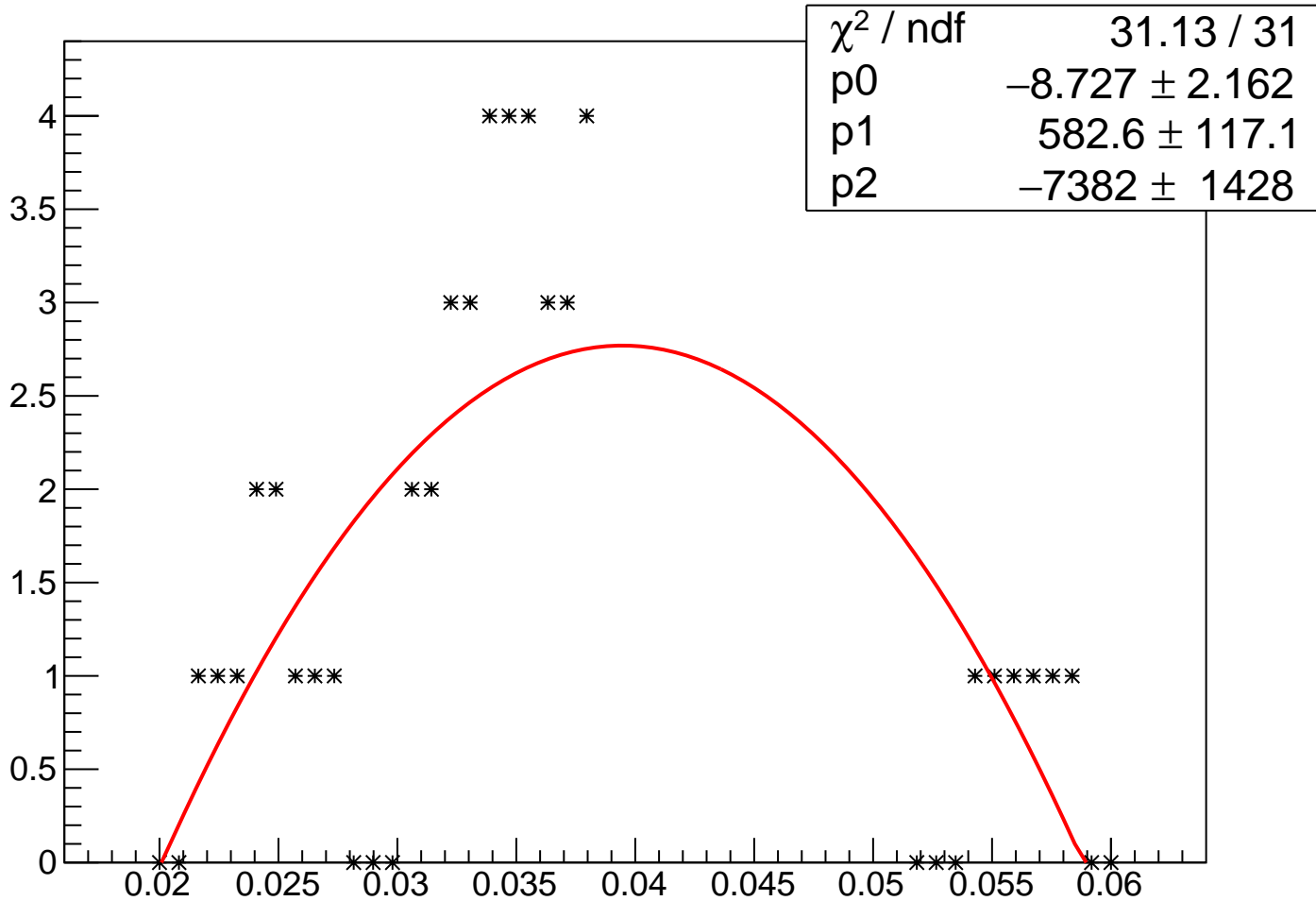
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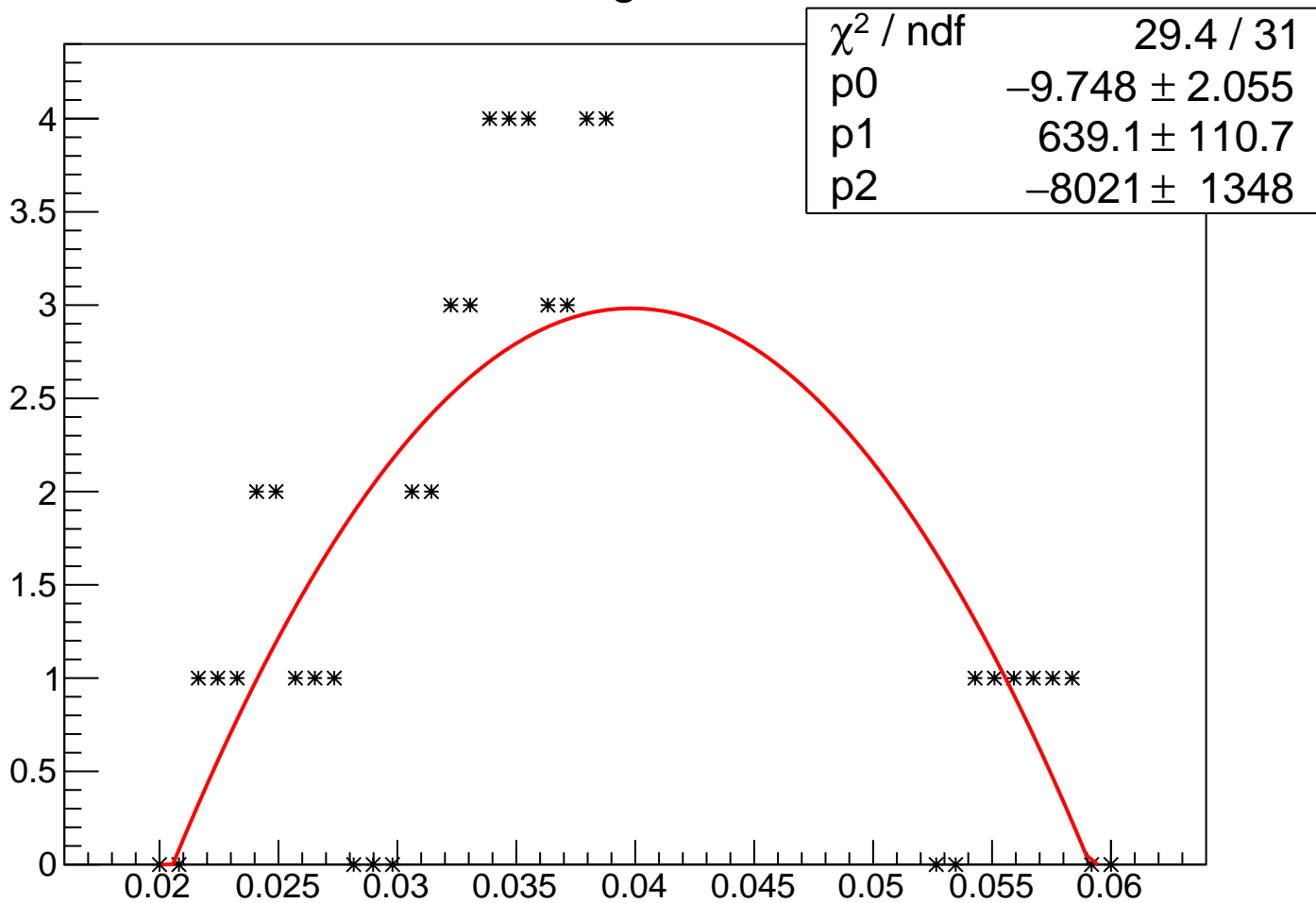
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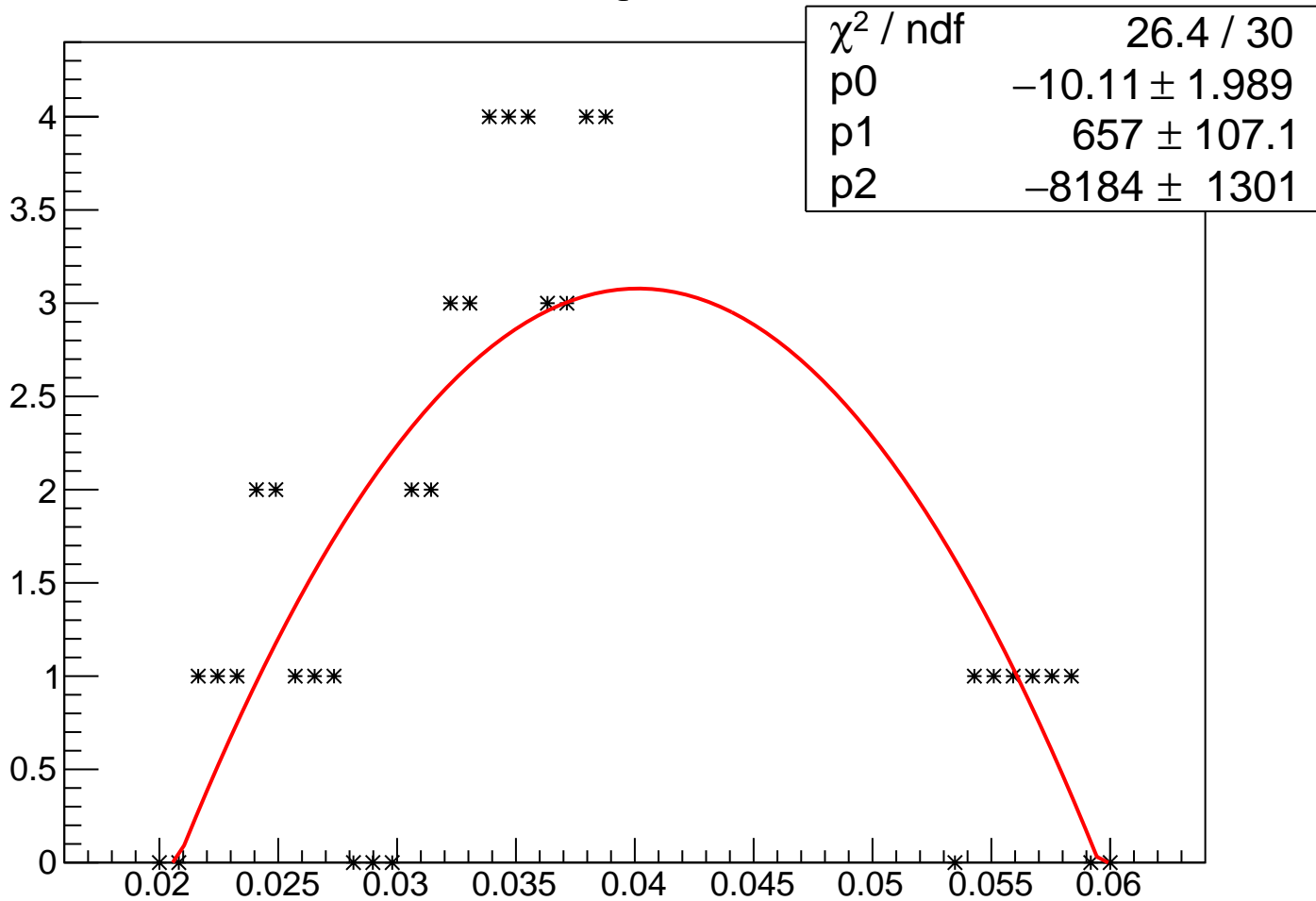
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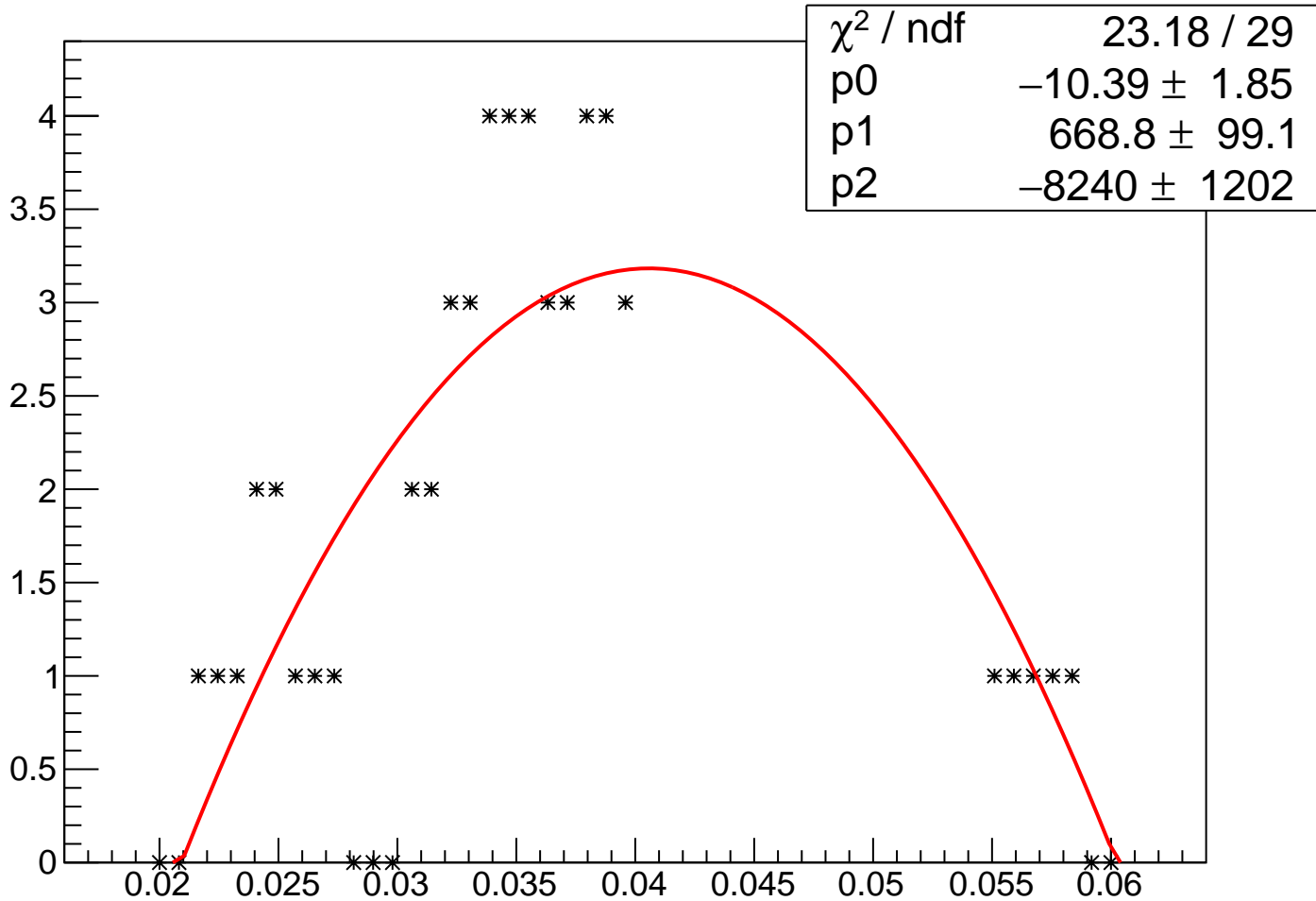


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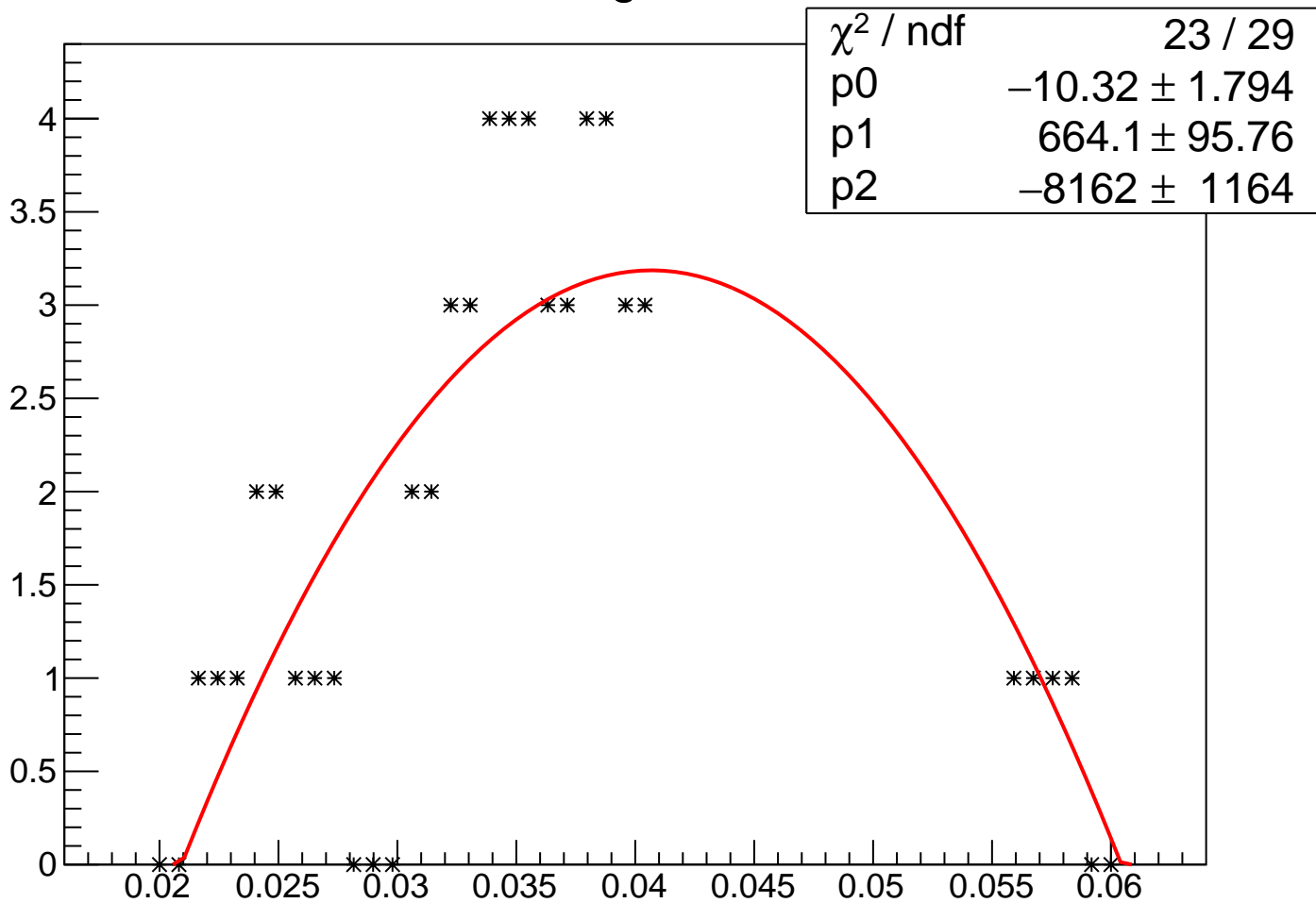




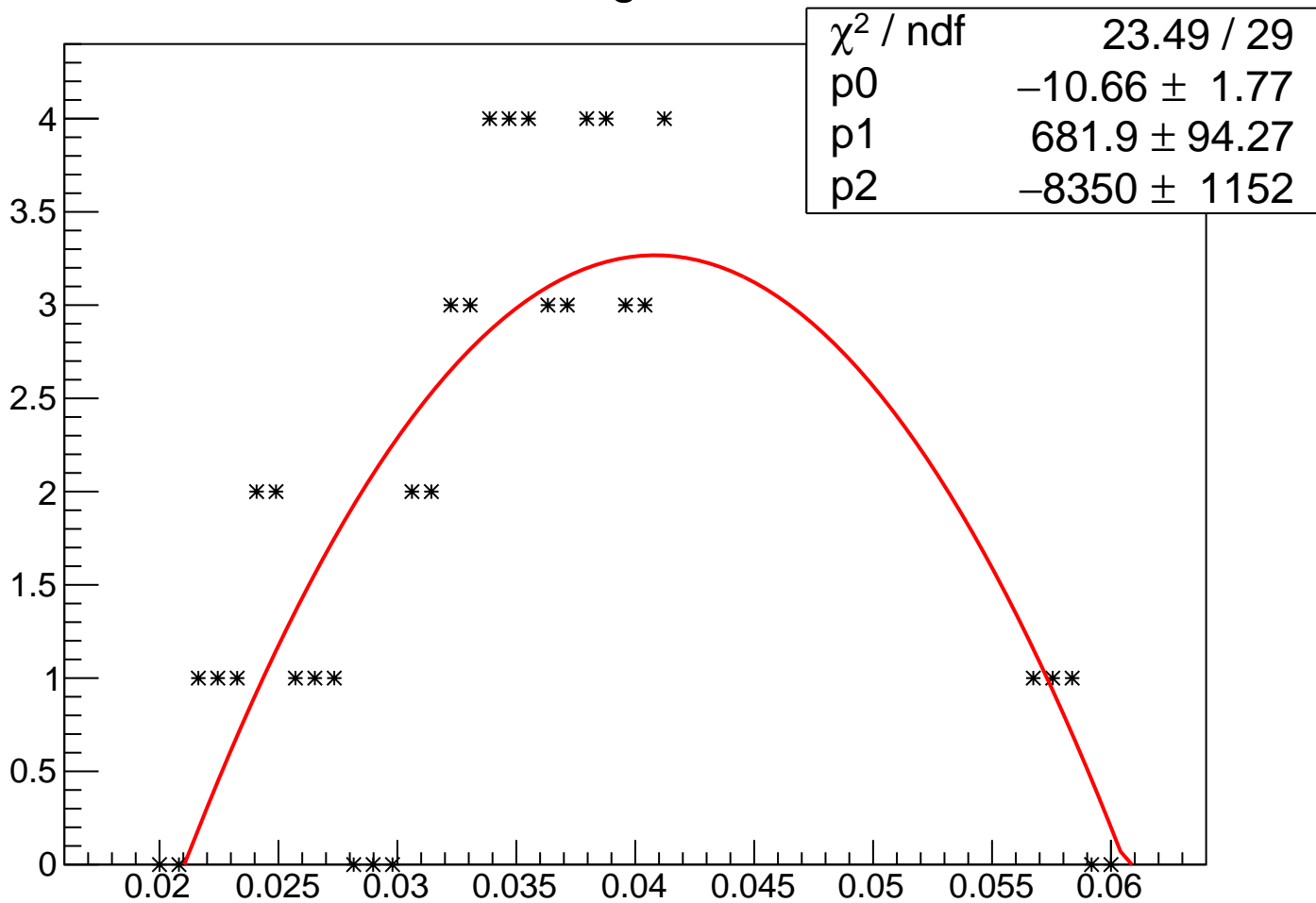
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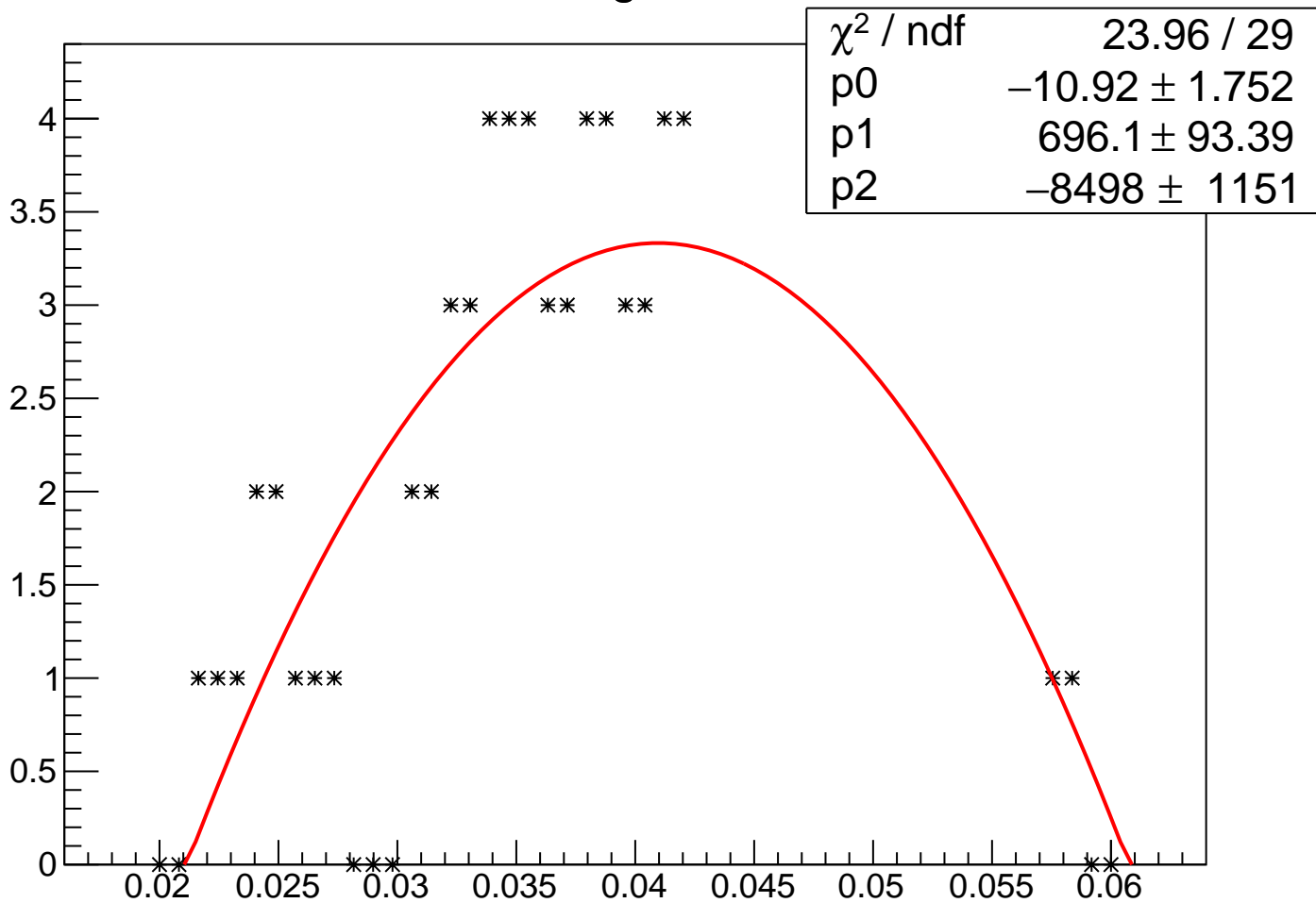
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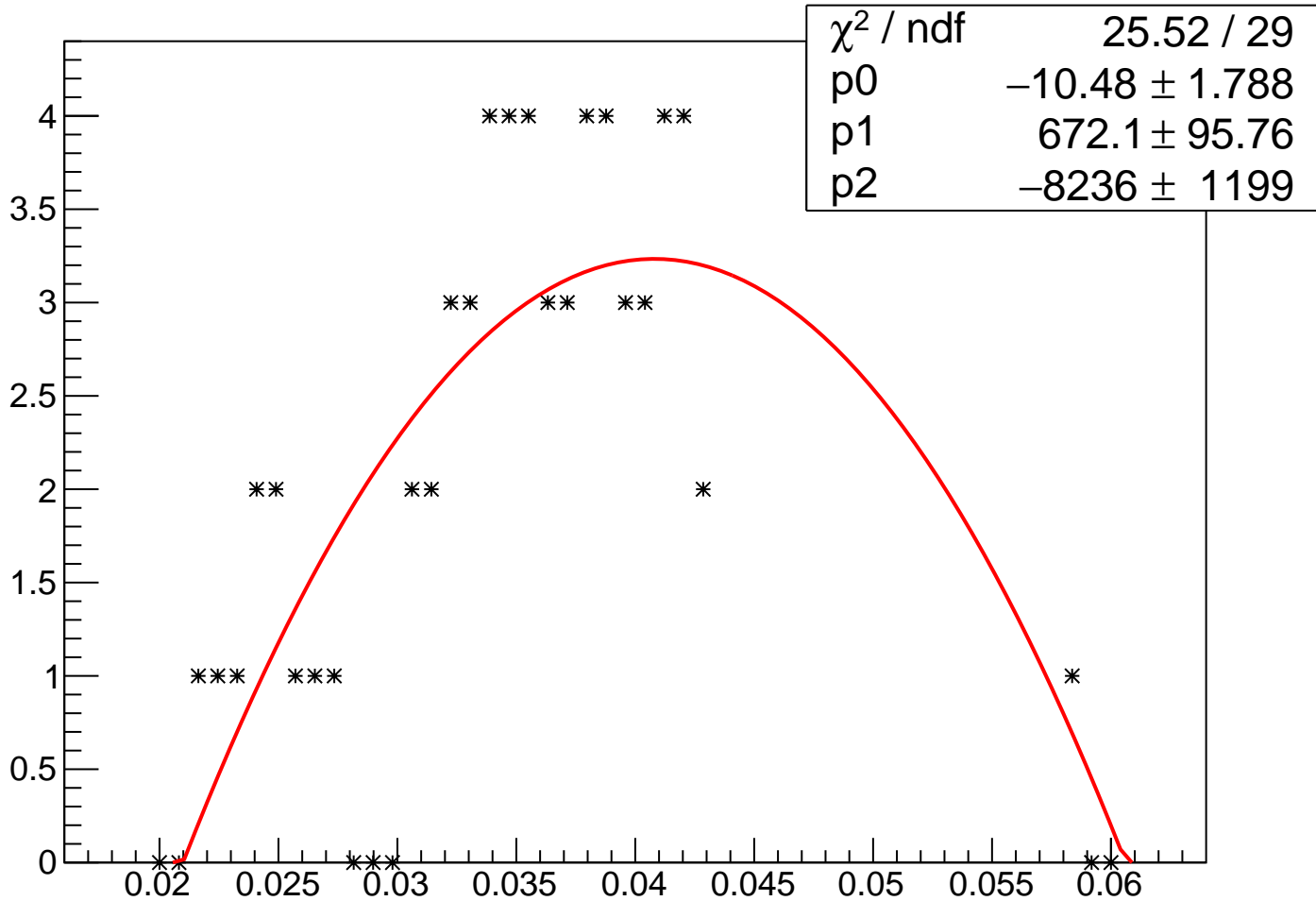
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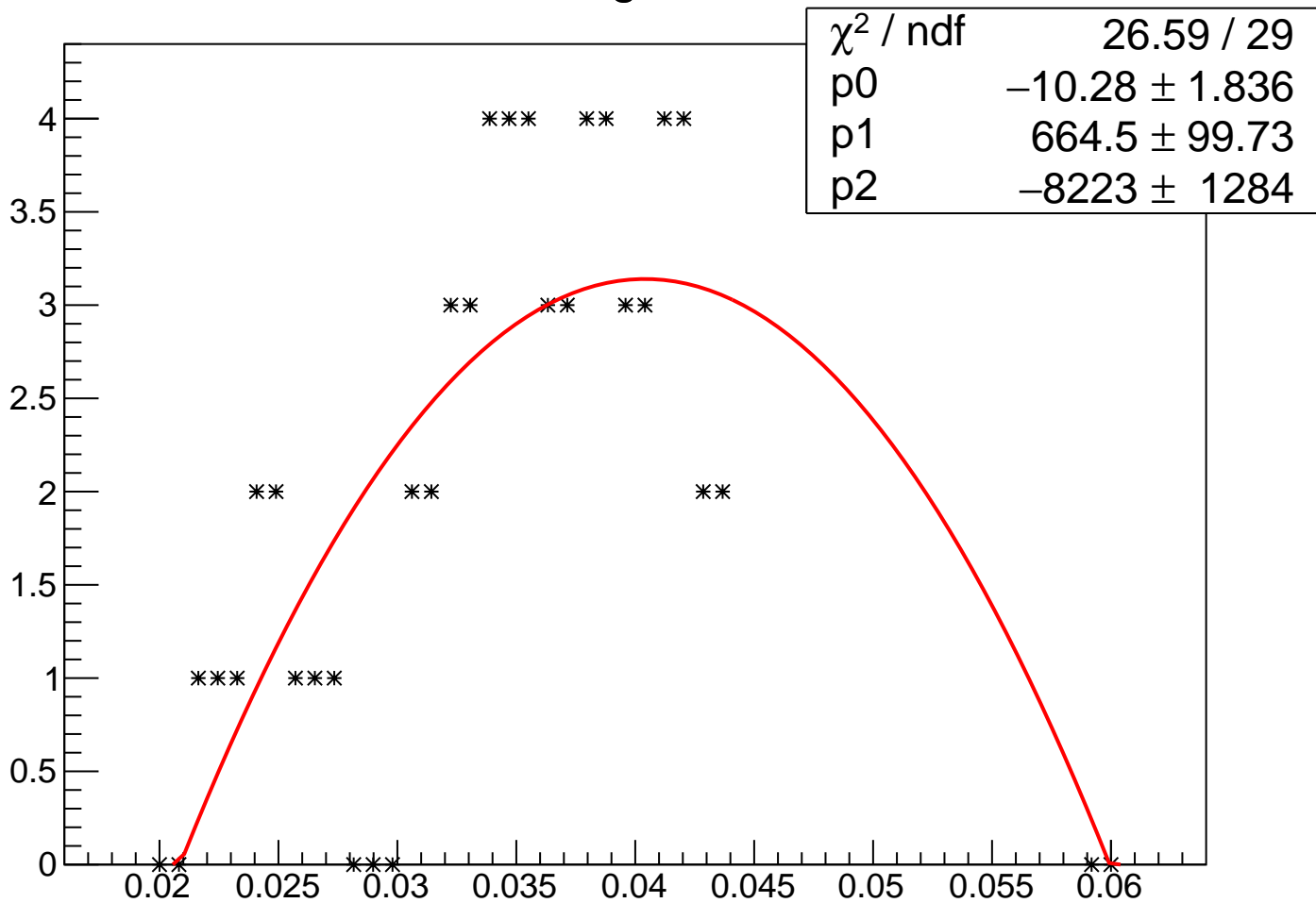
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