JÜLICH
FORSCHUNGSZENTRUM

panda

Overview of the STT prototype results in December ’14 beam-time for the ASIC/TRB readout

Alexandros Apostolou | 9 June 2015

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Beam and setup overview

Proton beam with different momenta: 0.8, 1.0, 1.3, 2.0 GeV/c

Beam intensity ranging from 80 kHz to 200kHz

96 channels/tubes

Voltages: 1700, 1750, 1800, 1850, 1900 V

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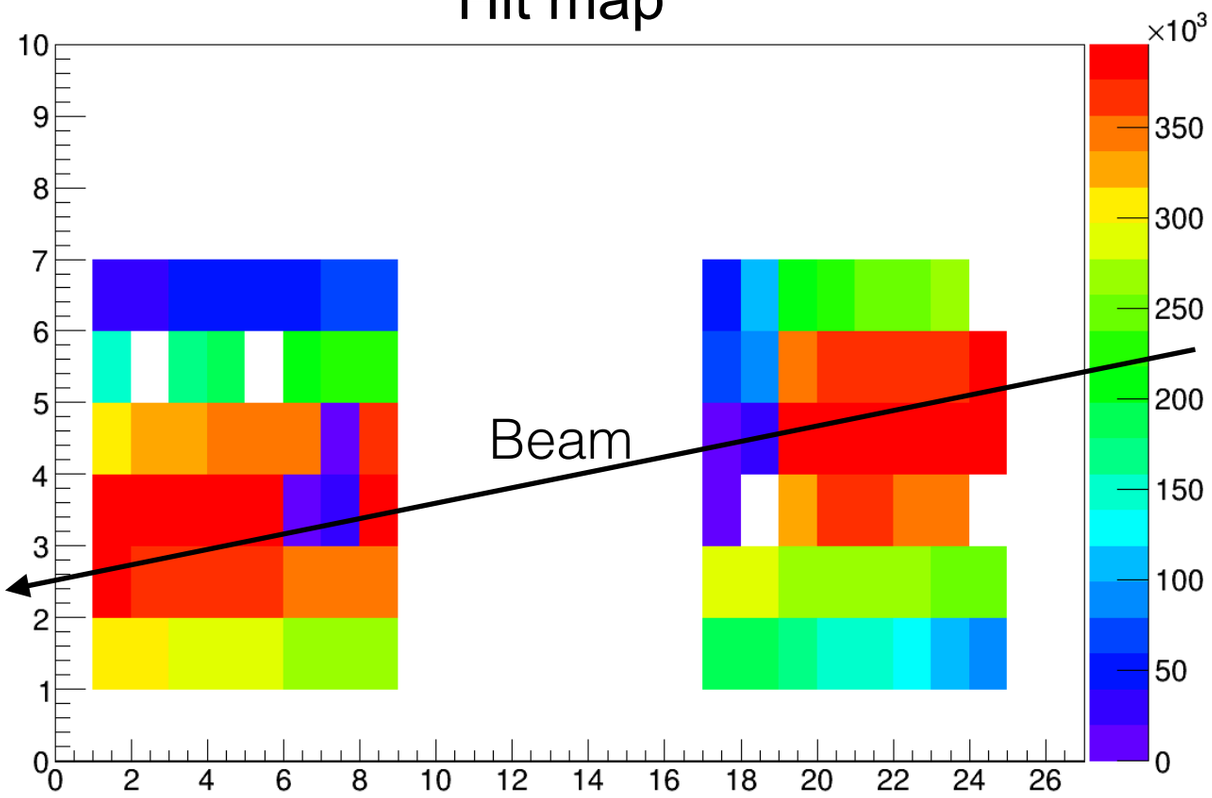
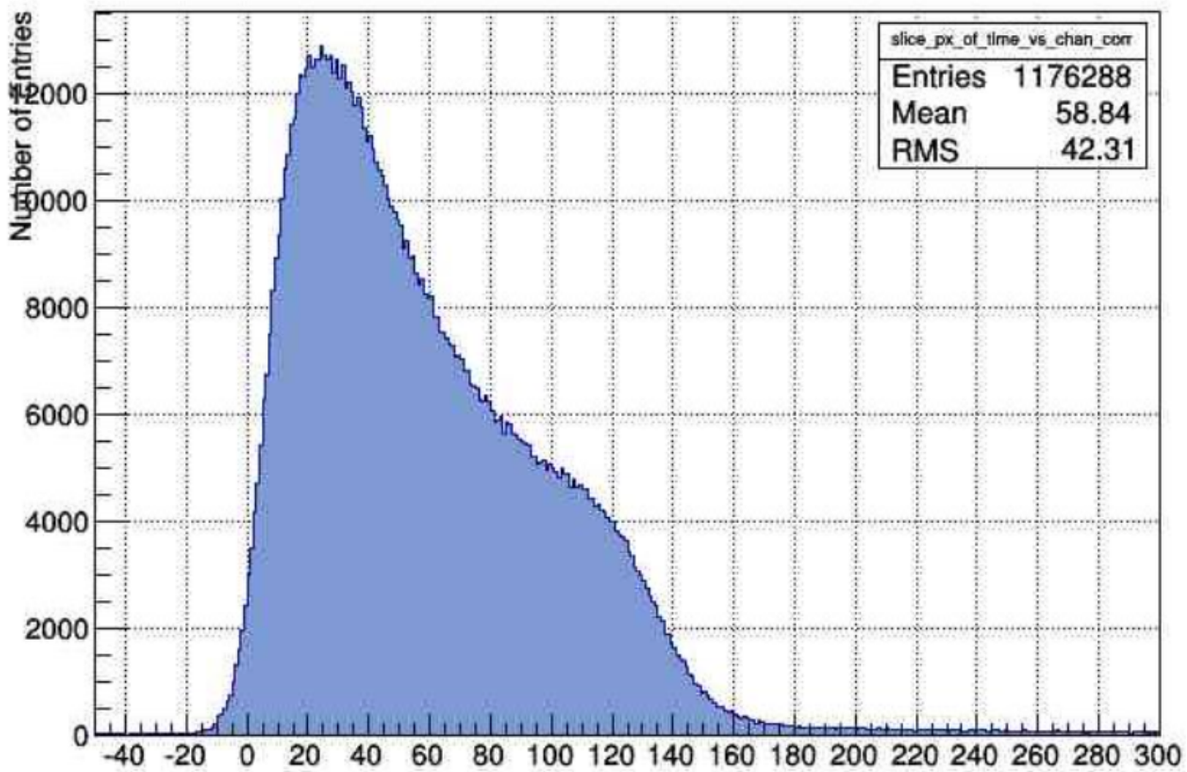
General plots

Hit map



~ 12 hits per event

Drift times



Drift times: ~160nsec

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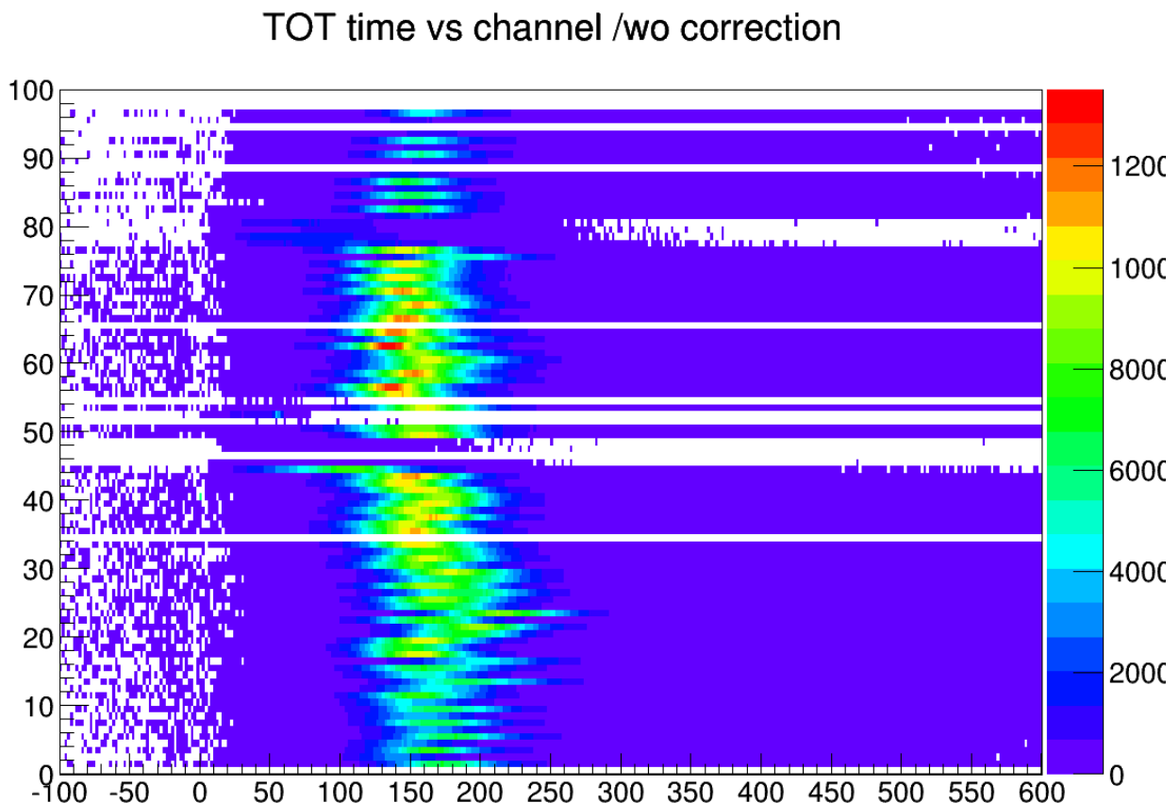

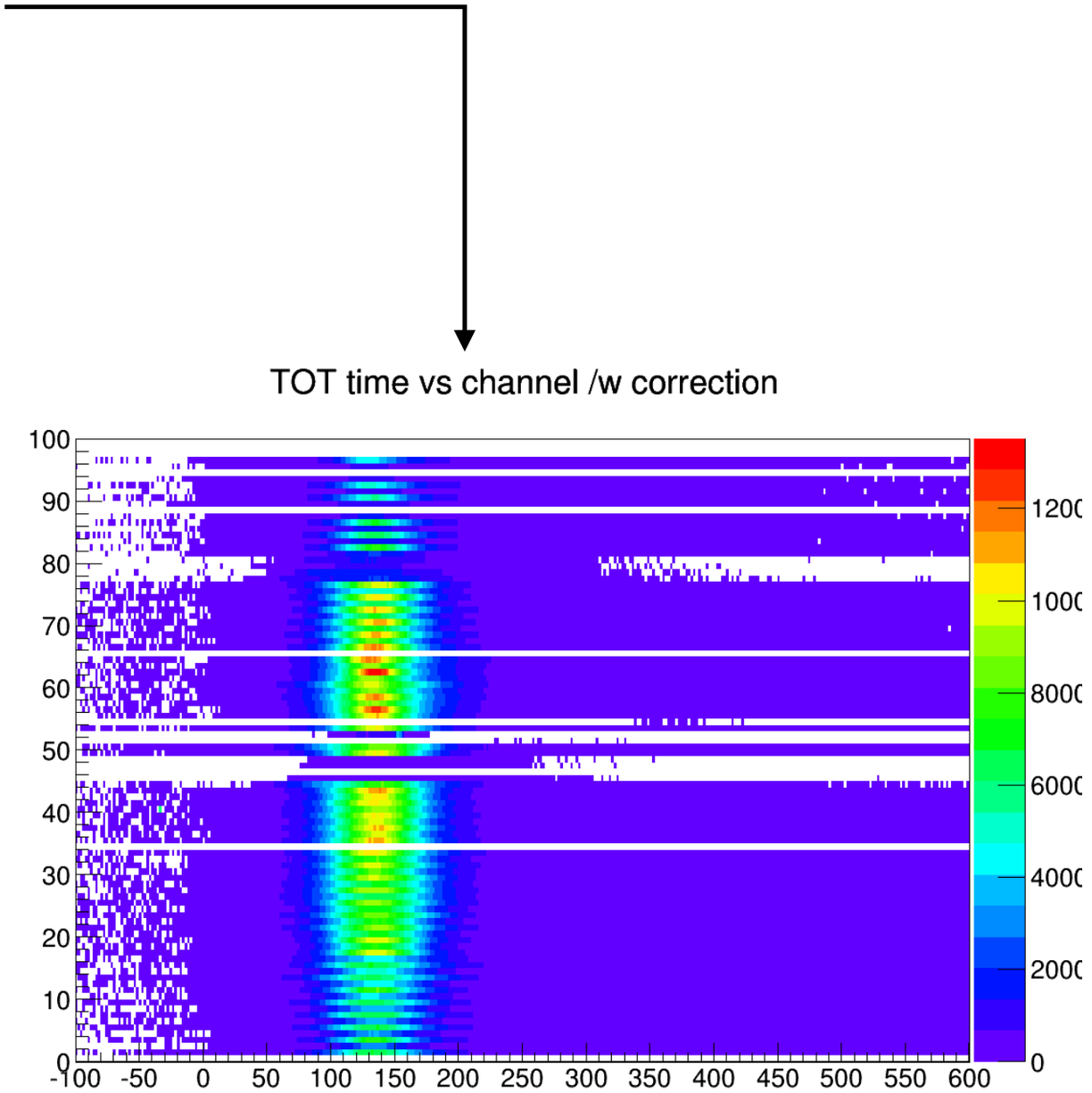

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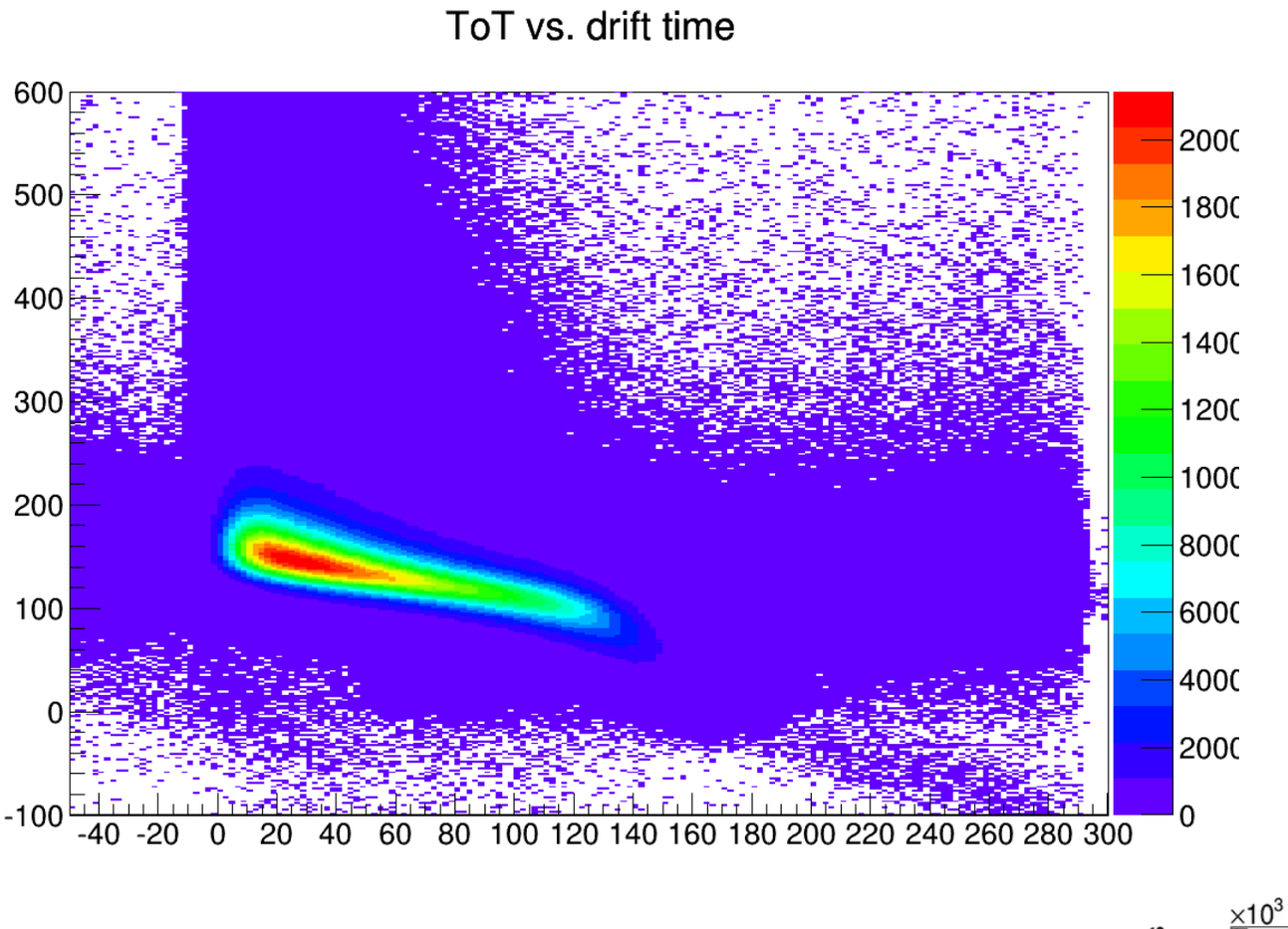
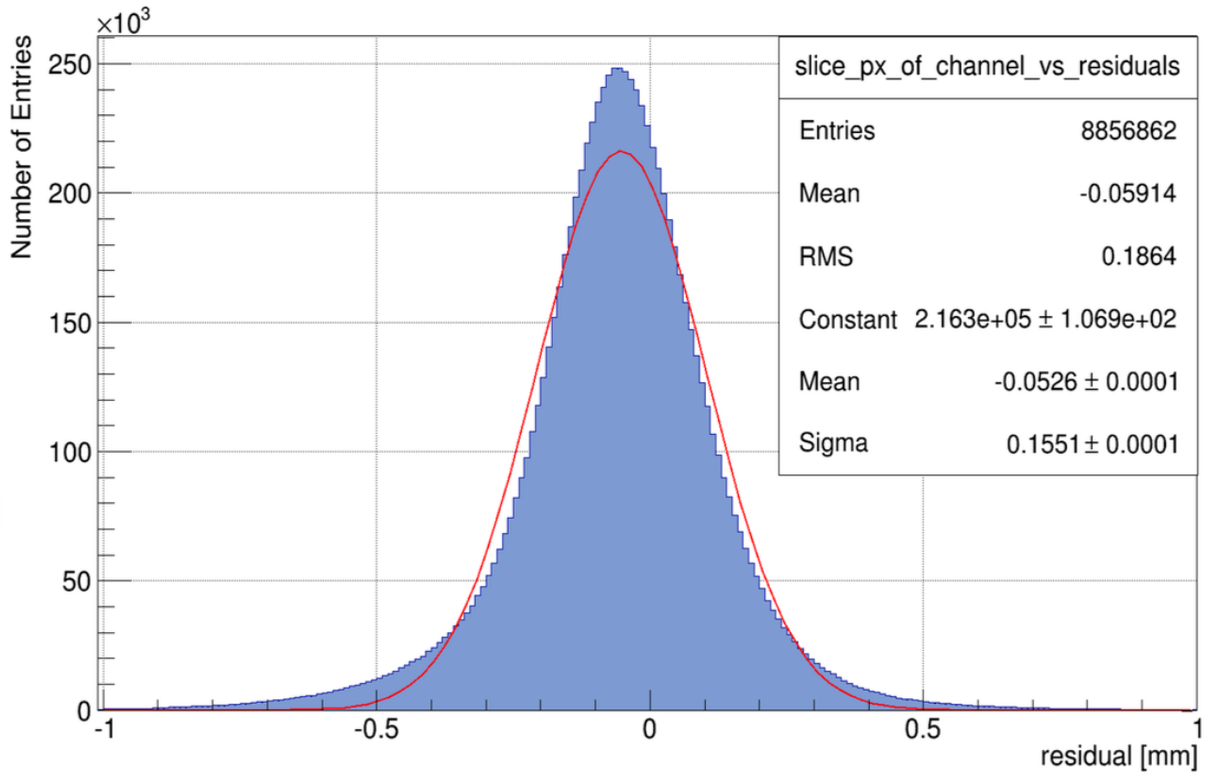


Few background hits

Spatial resolution: ~ 155 µm



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Calculating TOT/dx and separation power

- Corrected TOT

- 1800 V

- For each event: calculate TOT/dx per hit and then, calculation of Σ_{TOT}/Σ_{dx} per event ⟶ Landau

- Depending on the truncation: remove hits with the largest TOT/dx values and then, calculation of Σ_{TOT}/Σ_{dx} per event ⟶ Gauss

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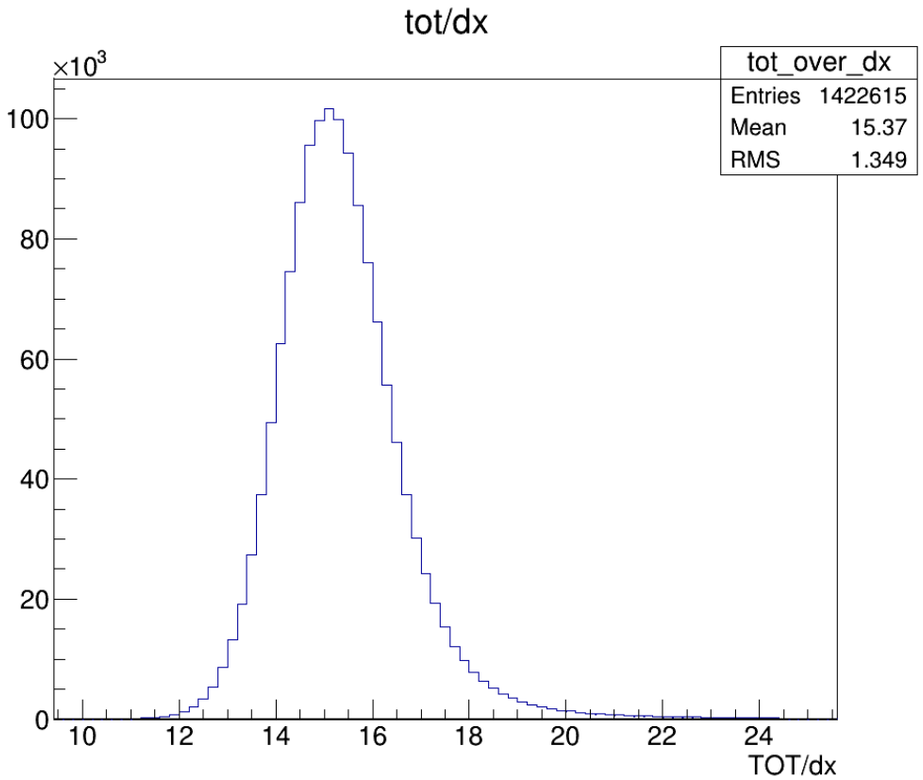
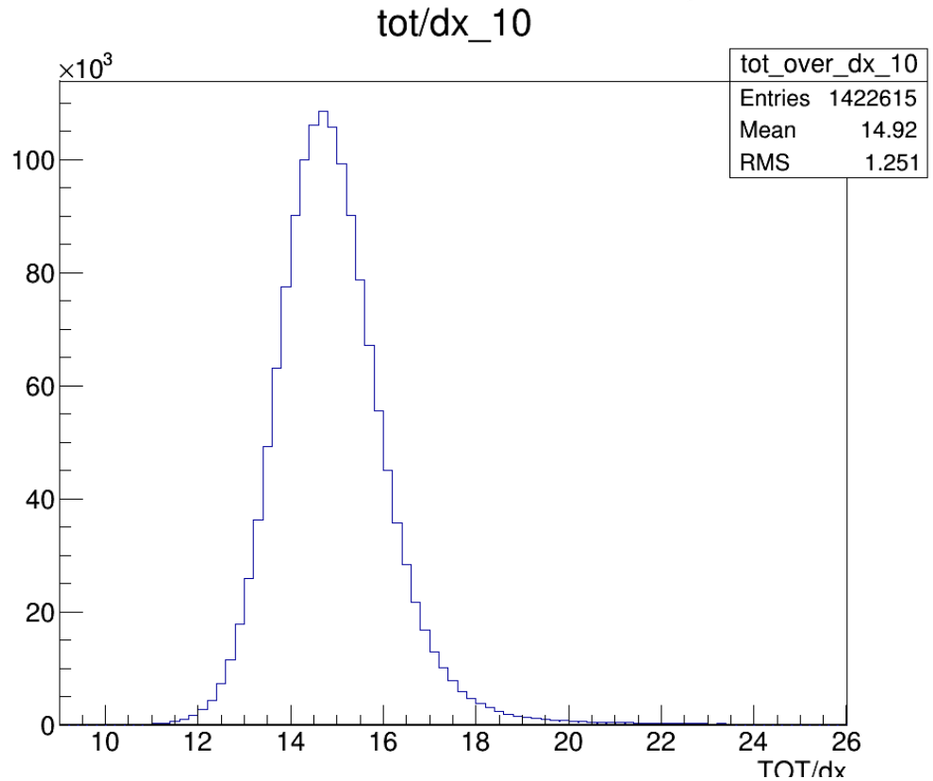
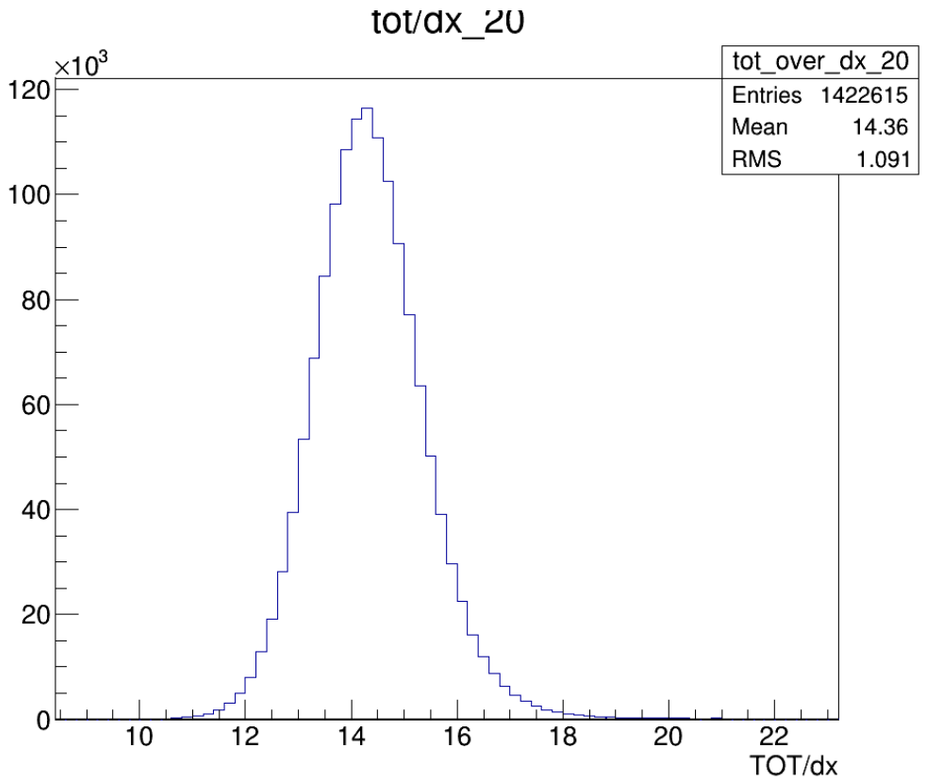
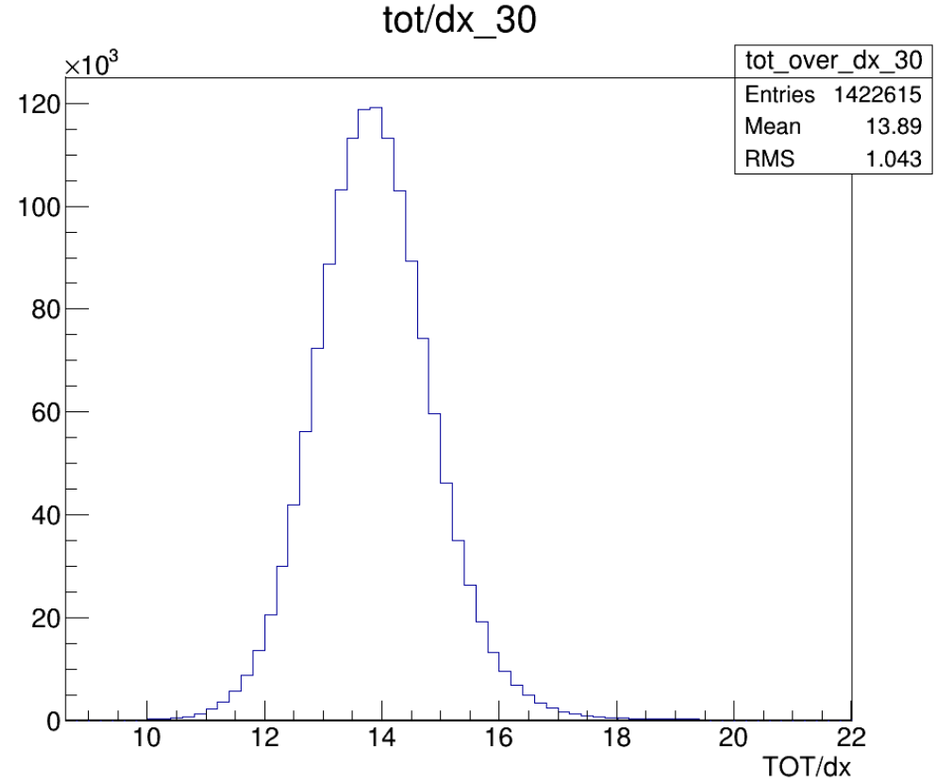
2000 MeV/c









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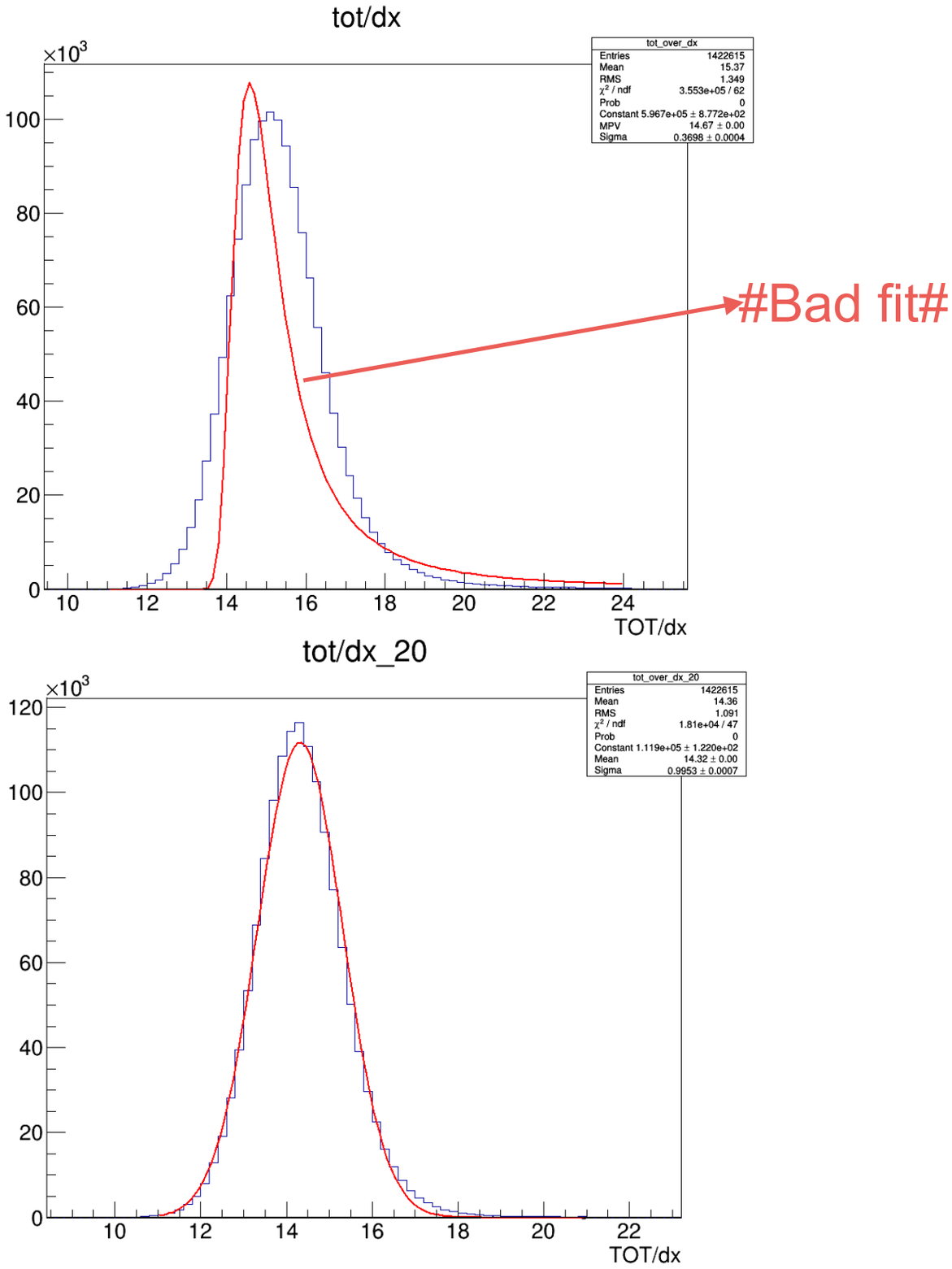
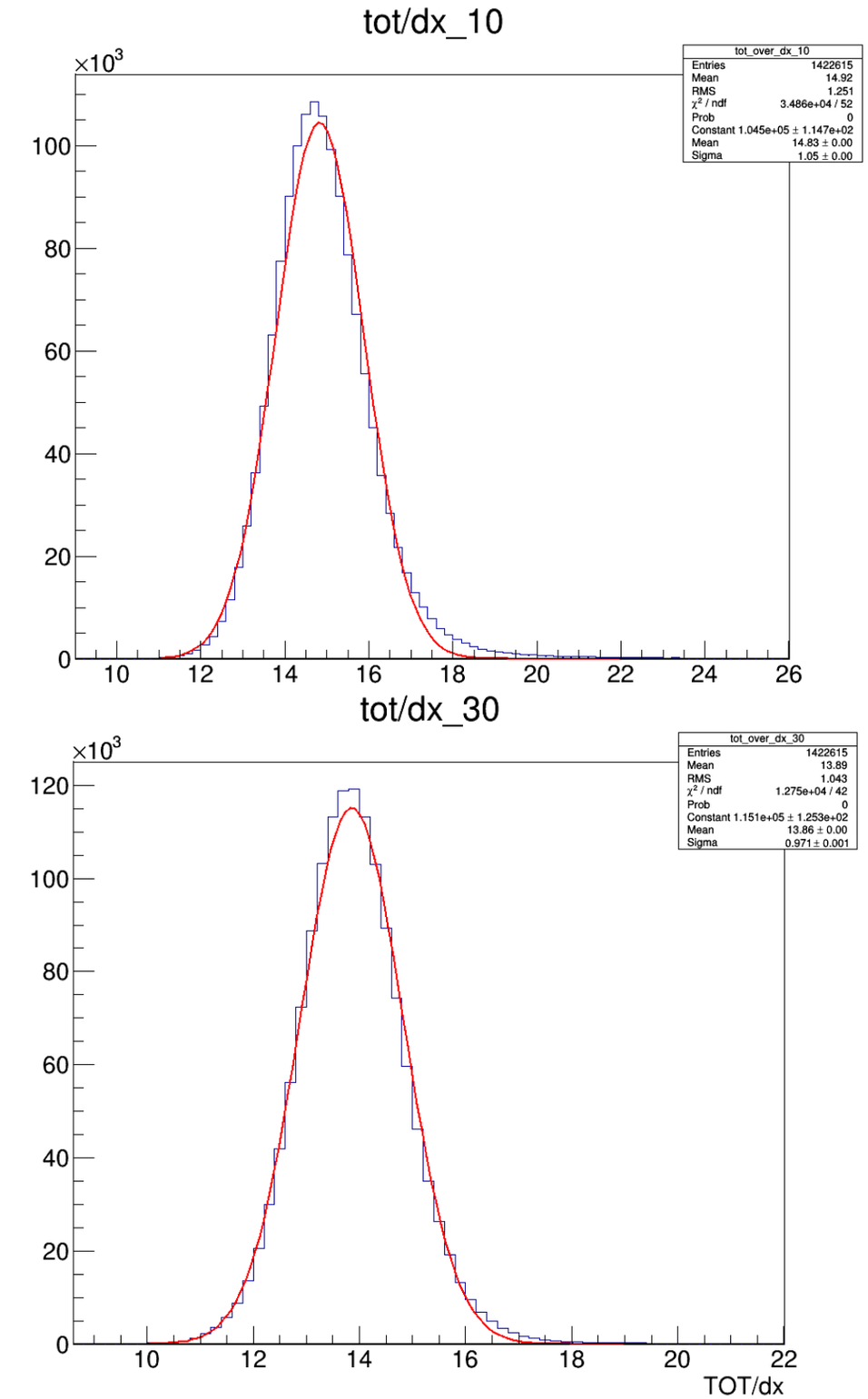
2000 MeV/c





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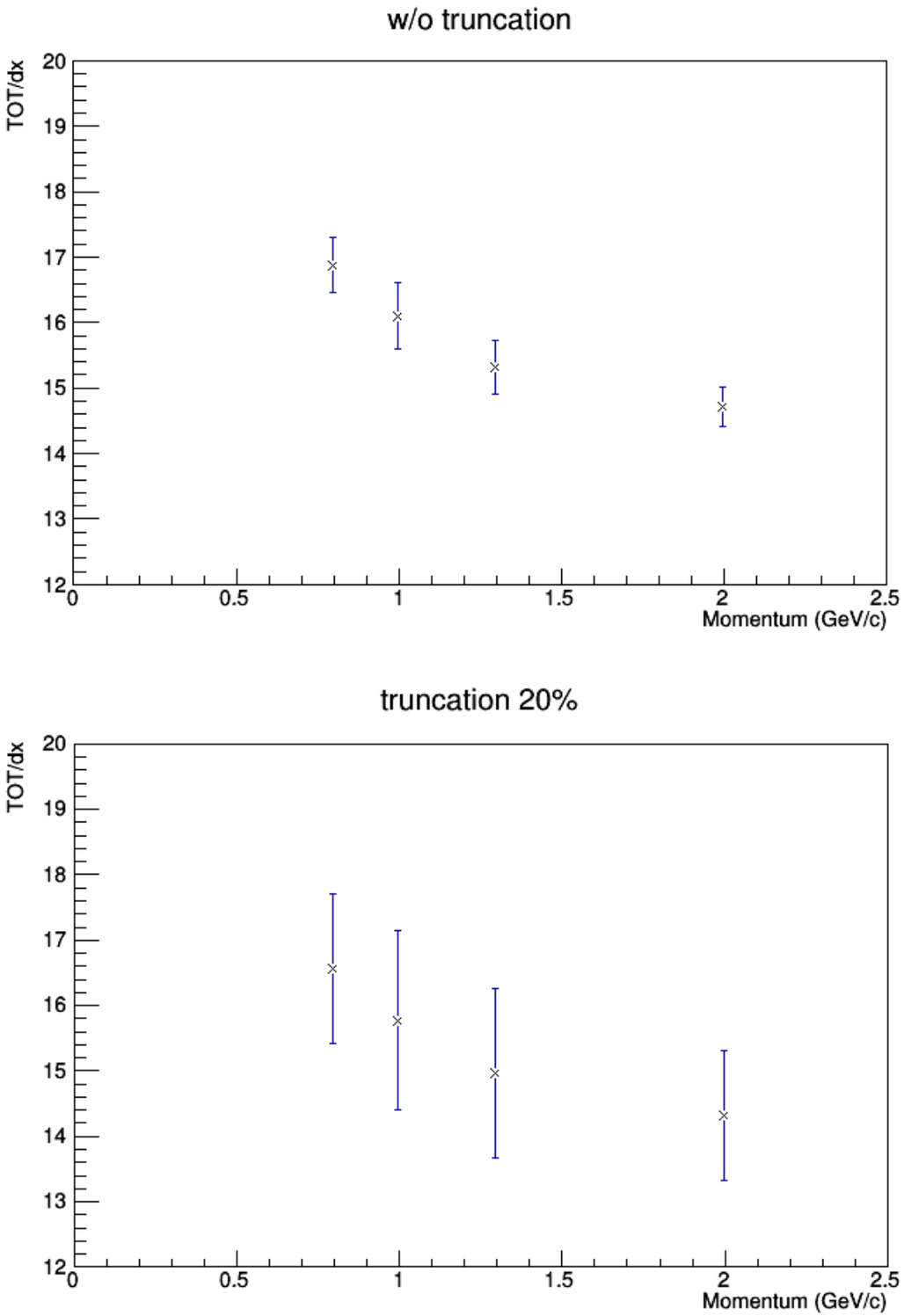
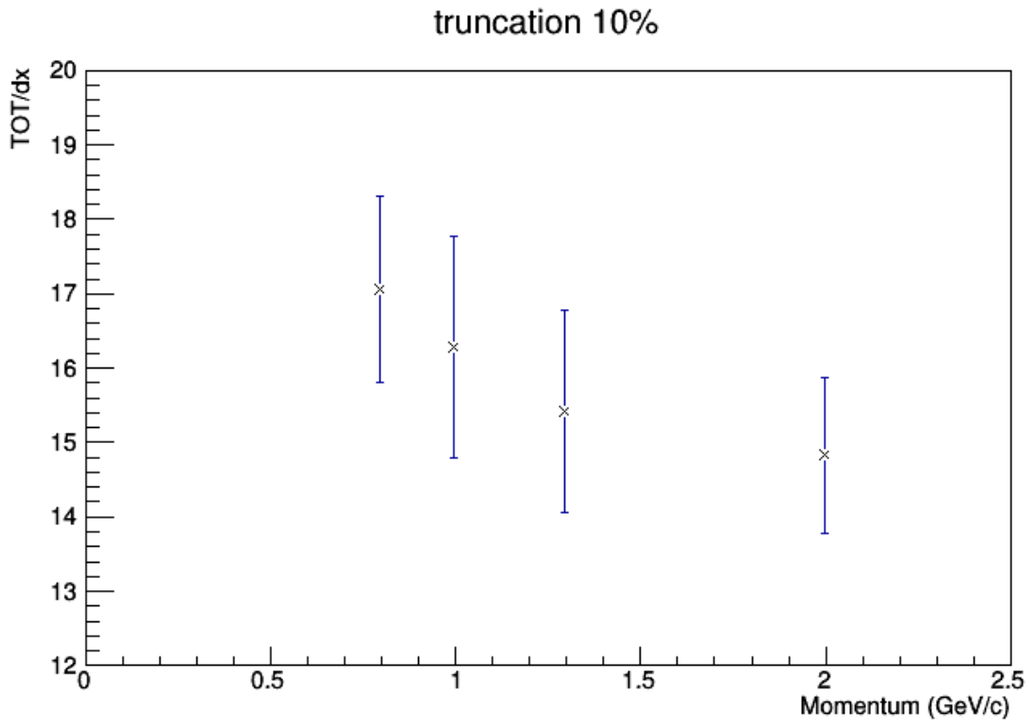
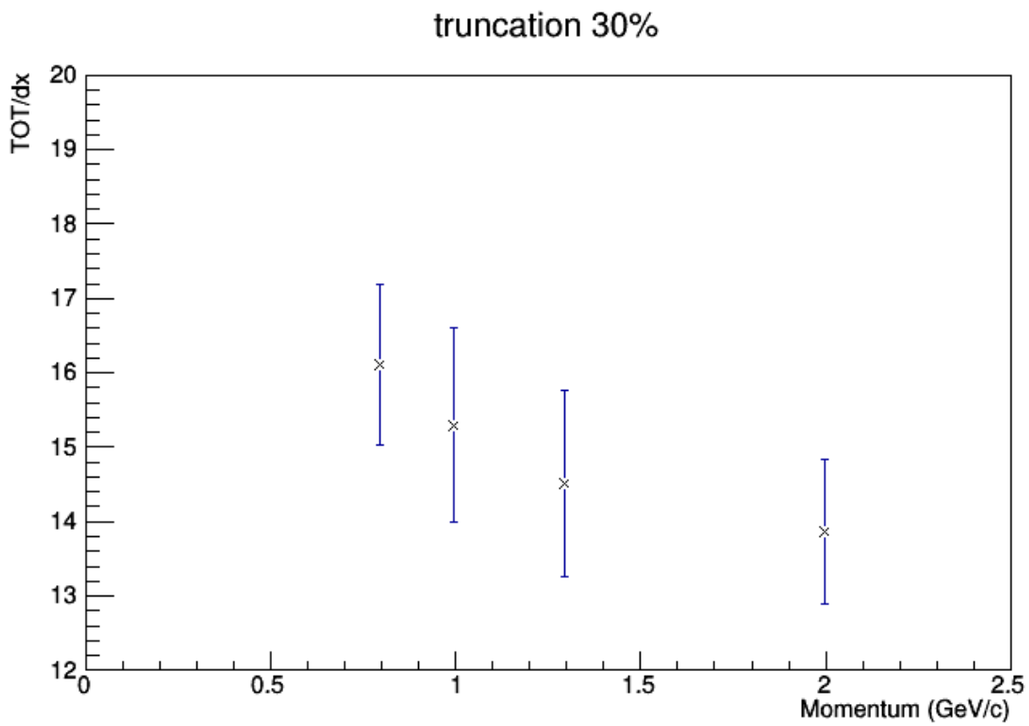
<TOT/dx> vs momentum







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Summary table

Momentum (MeV/c)	800	1000	1300	2000
No truncation (landau)	μ = 16,88 σ = 0,43 σ/μ = 2,55%	μ = 16,10 σ = 0,51 σ/μ = 3,16%	μ = 15,32 σ = 0,42 σ/μ = 2,74%	μ = 14,72 σ = 0,39 σ/μ = 2,03%
10% truncation (gaus)	μ = 17,06 σ = 1,26 σ/μ = 7,41%	μ = 16,28 σ = 1,48 σ/μ = 7,24%	μ = 15,42 σ = 1,36 σ/μ = 8,82%	μ = 14,83 σ = 1,05 σ/μ = 7,08%
20% truncation (gaus)	μ = 16,56 σ = 1,15 σ/μ = 6,95%	μ = 15,77 σ = 1,37 σ/μ = 8,68%	μ = 14,96 σ = 1,29 σ/μ = 8,62%	μ = 14,32 σ = 0,99 σ/μ = 6,91%
30% truncation (gaus)	μ = 16,11 σ = 1,07 σ/μ = 6,64%	μ = 15,30 σ = 1,31 σ/μ = 8,56%	μ = 14,51 σ = 1,24 σ/μ = 8,54%	μ = 13,86 σ = 0,97 σ/μ = 6,99%

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Conclusions

- Spatial resolution already at the goal value: ~ 155μm
- Resolution is better than expected: ~ 7-8%
- Correlation of <TOT/dx> and momentum
- Constrained by the number of channels which are hit ⟶ large errors

NEW DATA from beam-time in May!!!

Both STT and FTT data : 0.6, 0.8, 2.95 GeV/c

*****STT ⟶ 144 channels*****

Work in progress…

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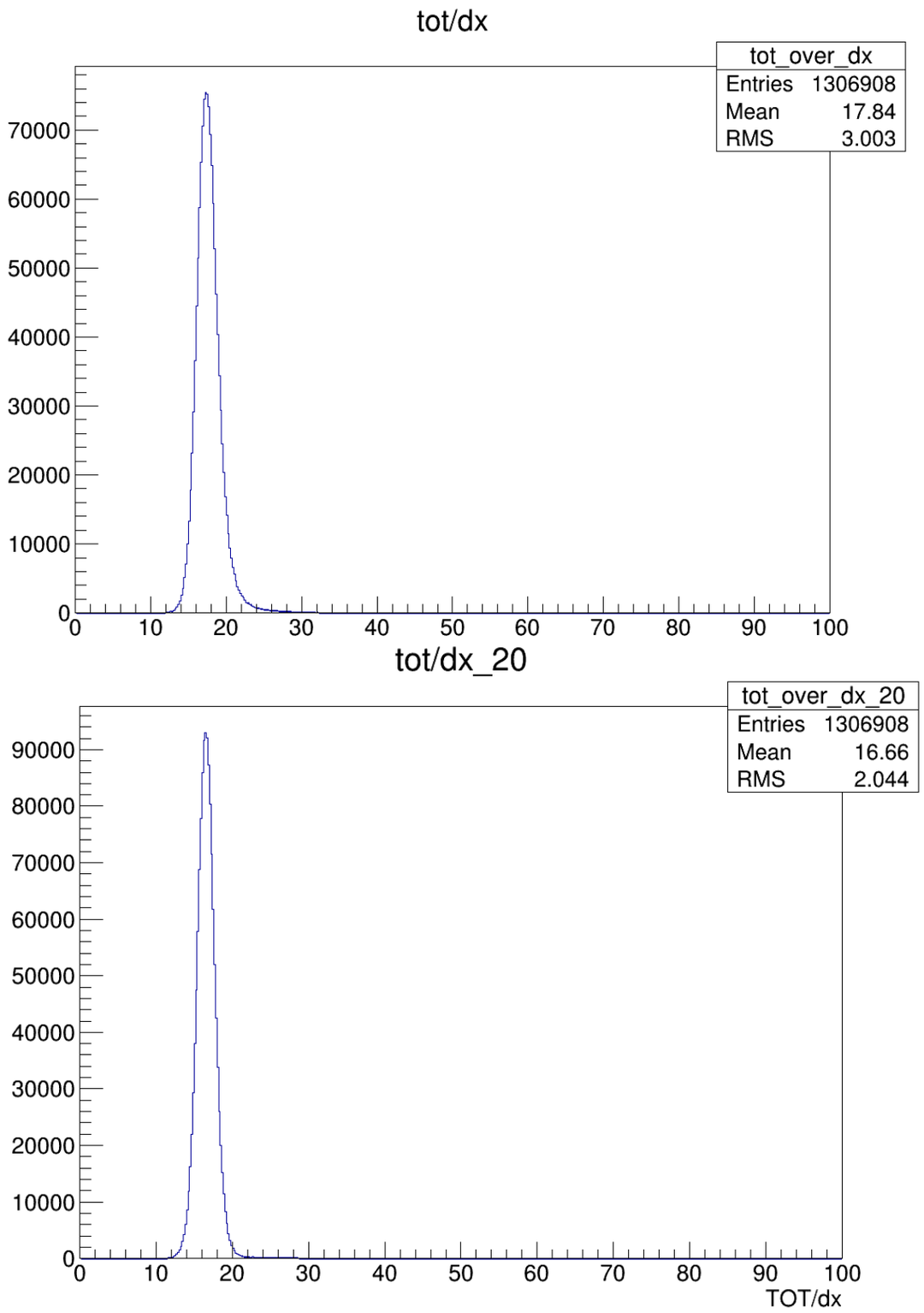
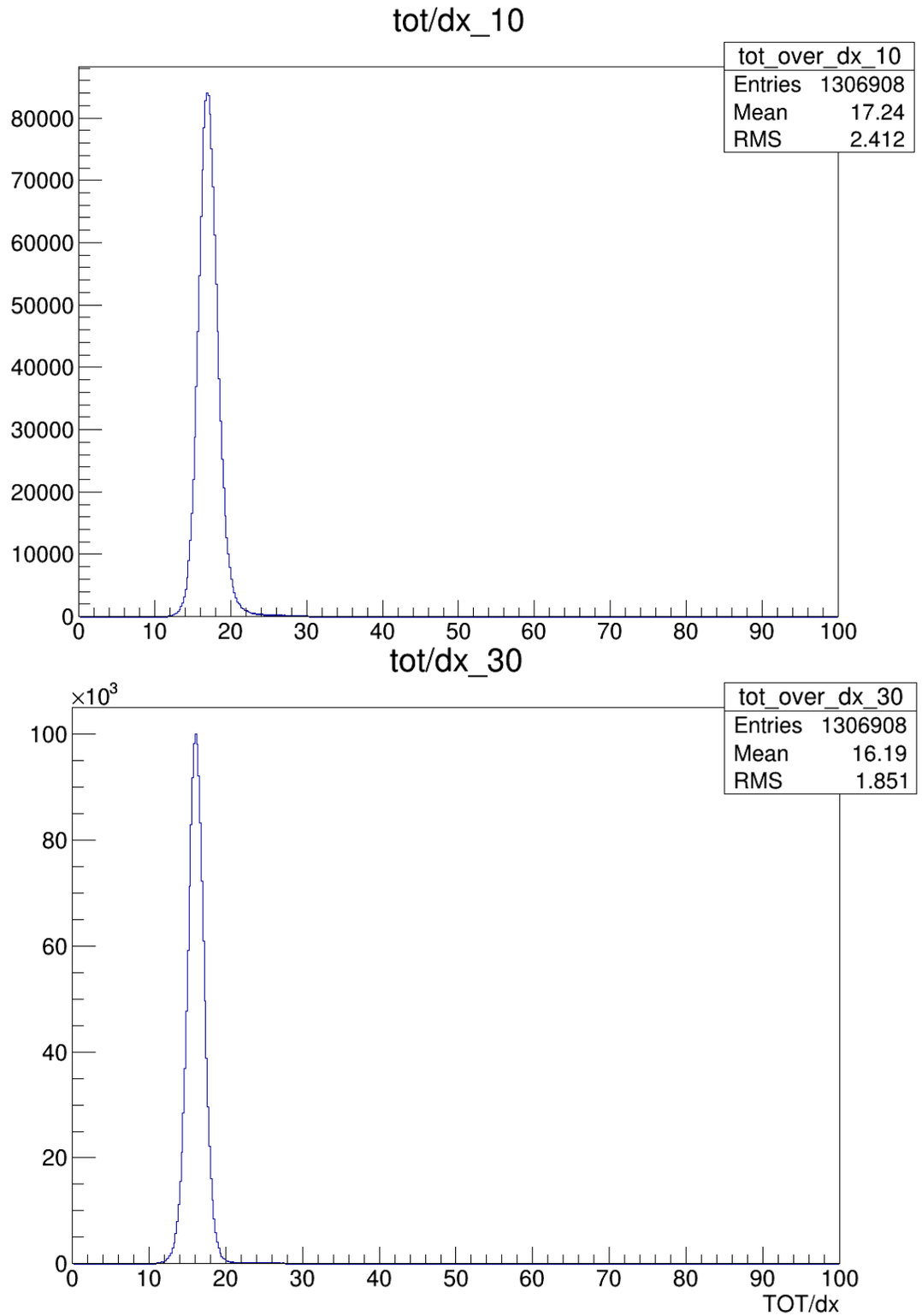
800 MeV/c





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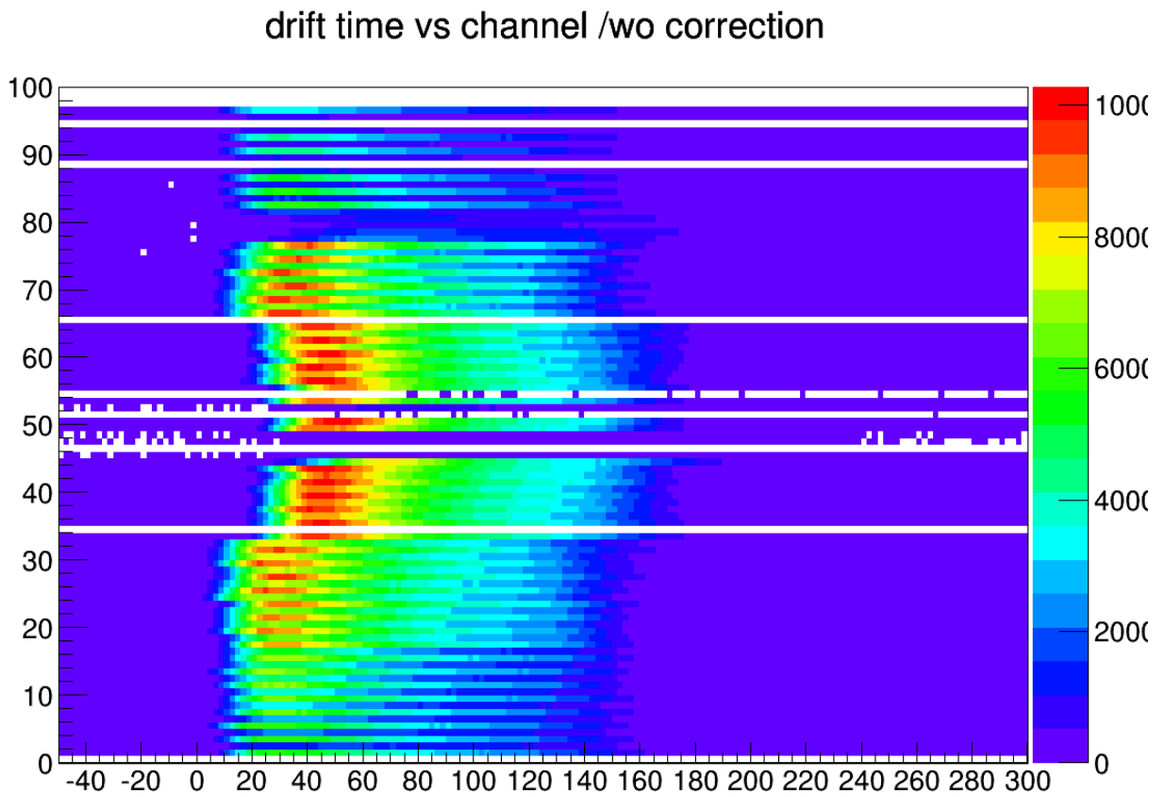

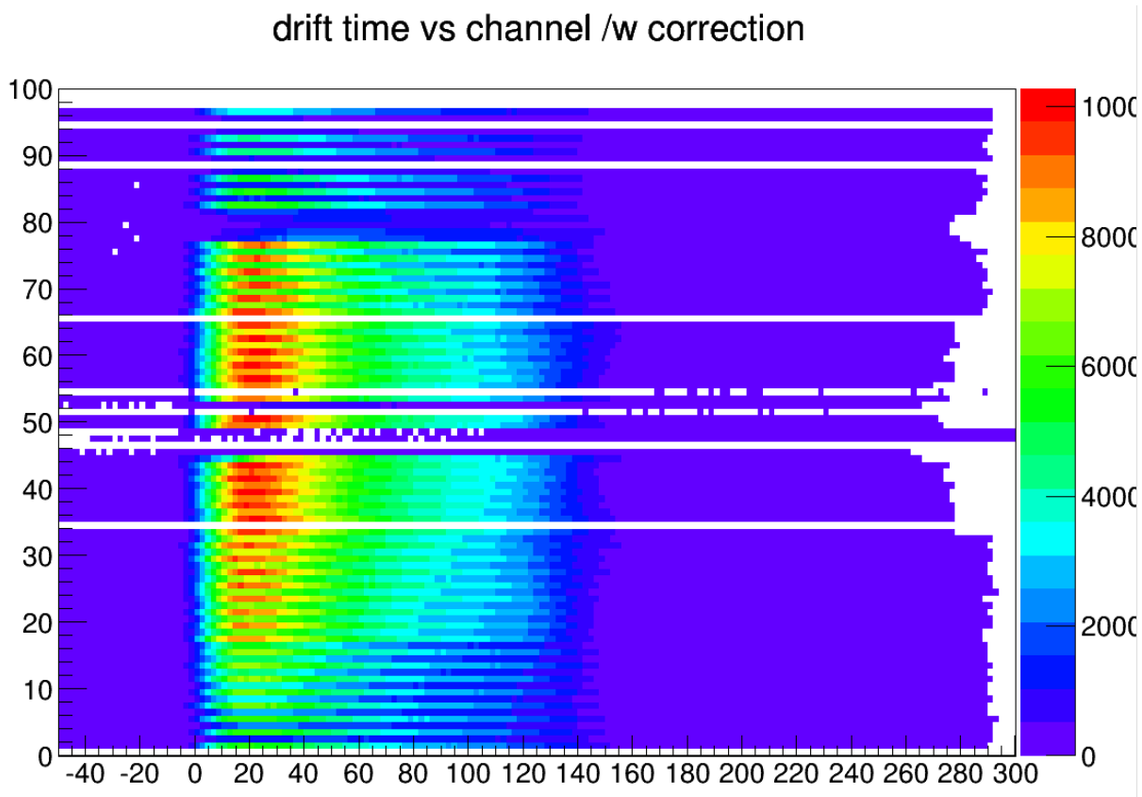

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