Preliminary STT results of December 2014 beam-time for ASIC/TRB readout

Haroutioun Ohannessian | 18 March 2015 | Tracking Session

Beam Overview

- Proton beam with 2.0 - 1.3 - 1.0 - 0.8 GeV/c

- Different beam intensity measurements ranging from ~200 kHz to ~80kHz

- Different beam cross-sections measurements

- Data was taken at 1750V (3×10^4), 1800V (5×10^4), 1850V (9×10^4), 1900V (13×10^4)
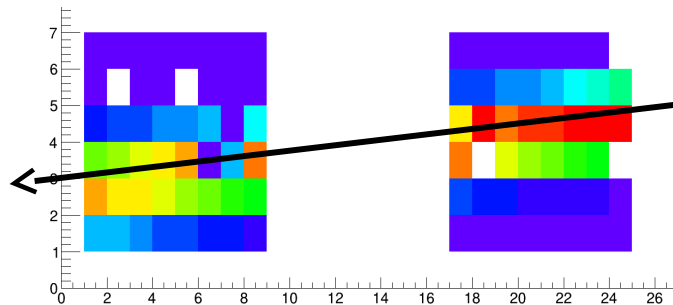

Vertically narrow beam
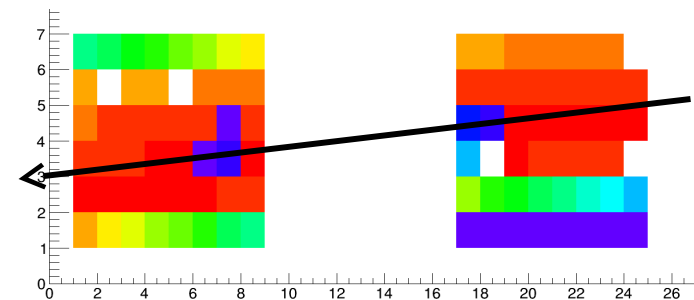
Vertically wide beam

Beam is coming from the right side
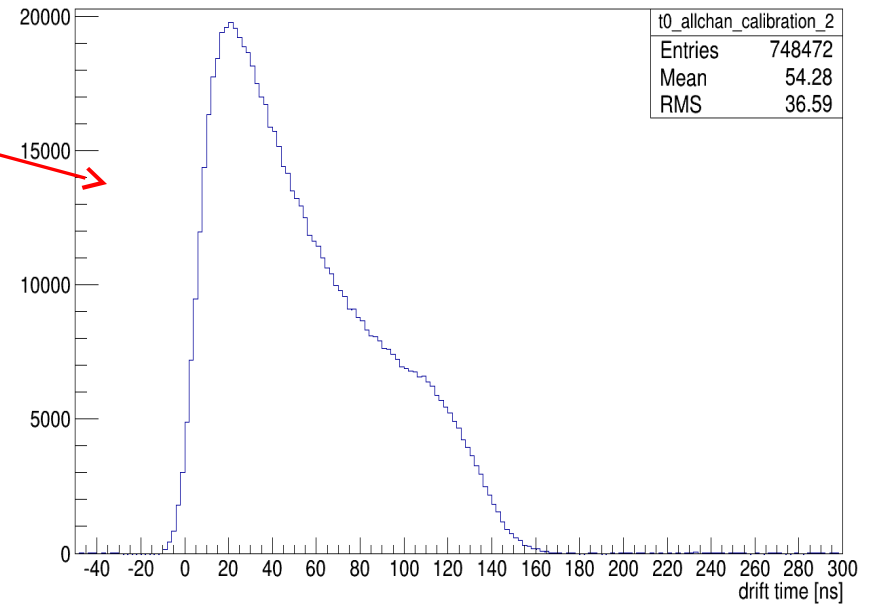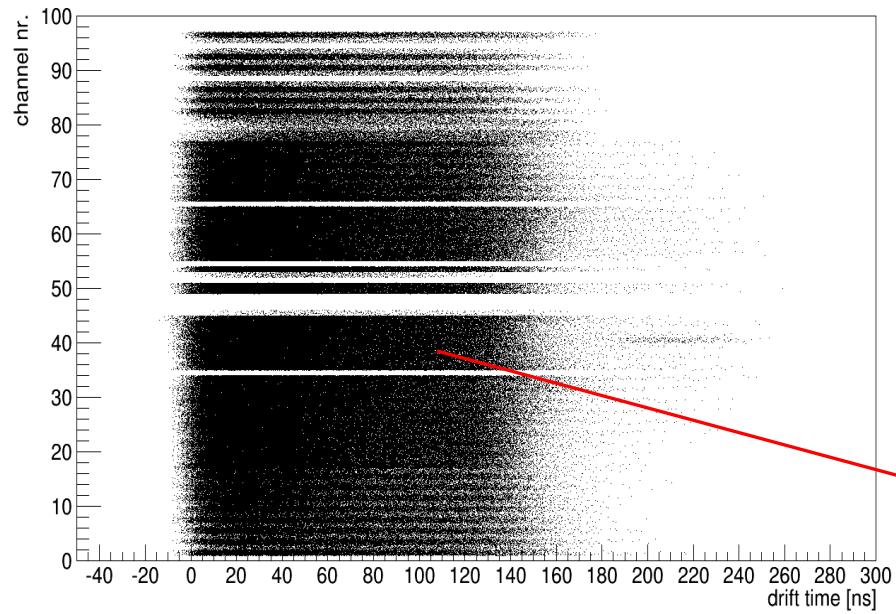
Data Selection and Calibration

- First hit selection

- Number of hits per event cut

- Drift time loose cut

- Drift time correction and background subtraction

- Drift time tight cut and calibration channel selection

- Isochrone- time calibration curve r(t)
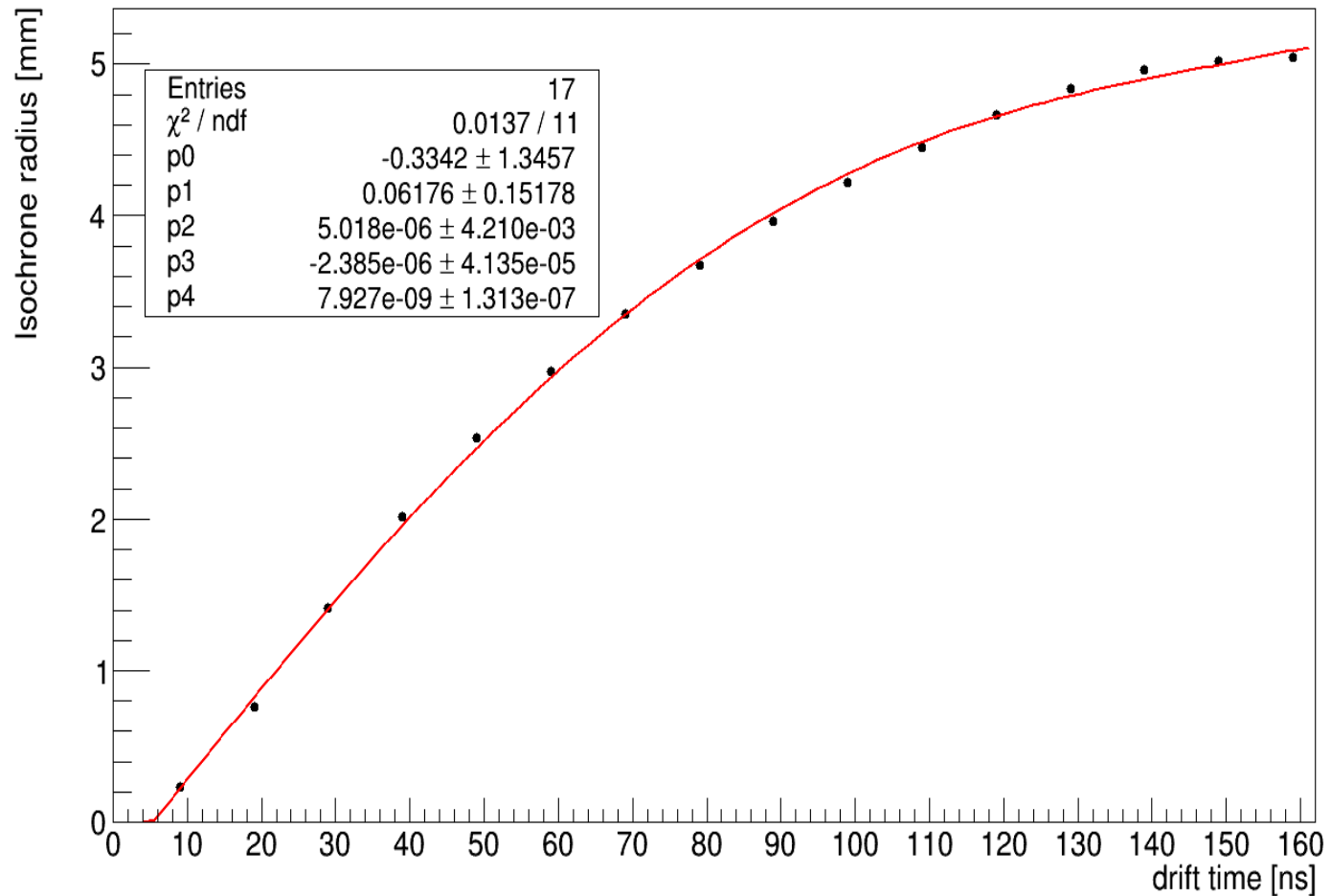
Data set used : 800 MeV/c

Number of Hits/Event
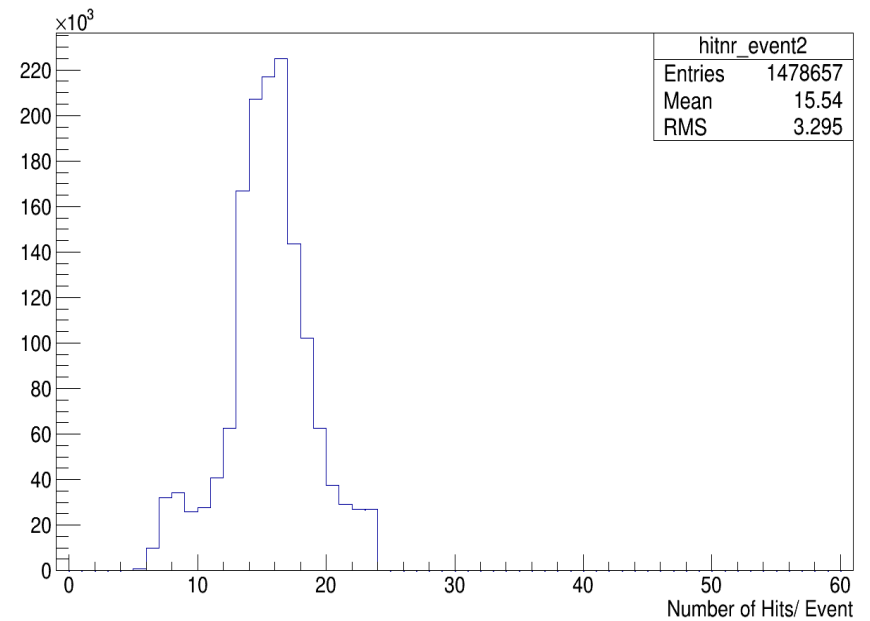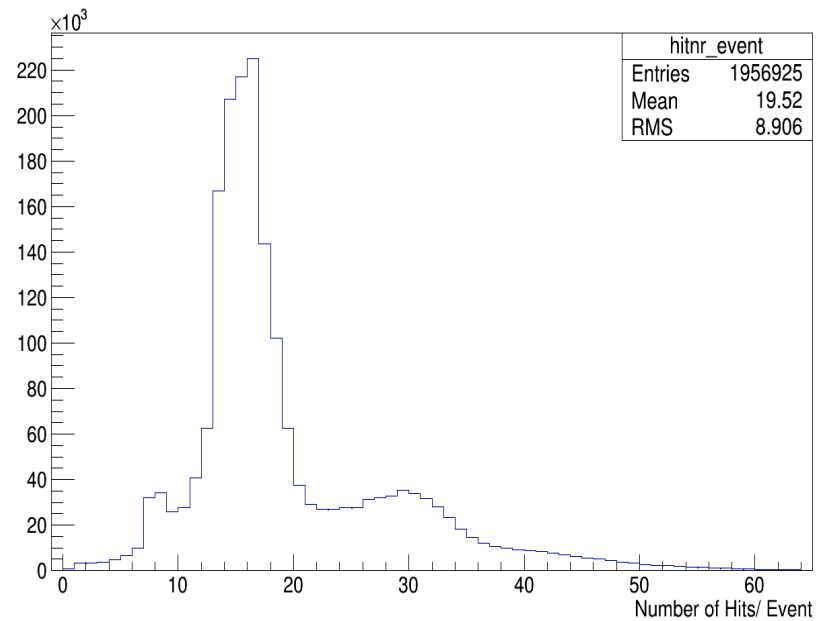
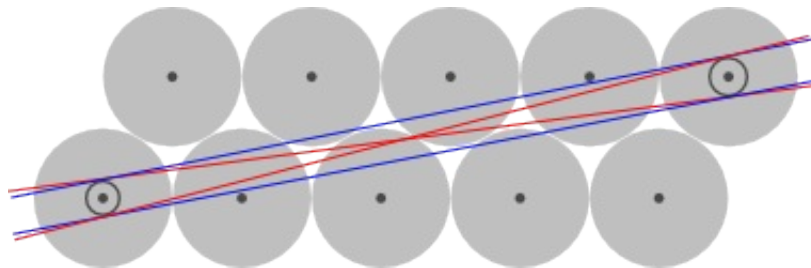# Drift Time Correction and Cuts
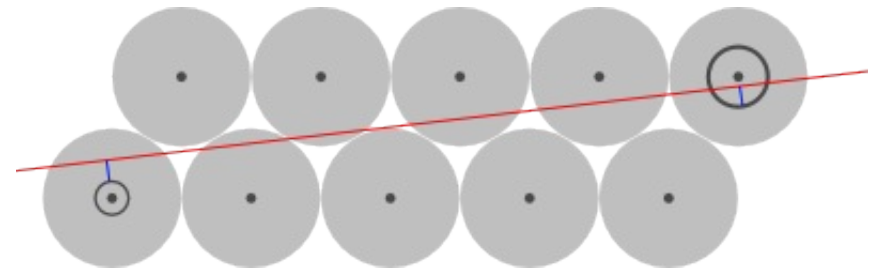
Calibration curve

Tracking (only single tracks)

- Prefit
- Track reconstruction
- Autocalibration
- Mean Residual → Spatial Resolution

Prefit and Track Reconstruction

- 4 prefit possible candidates

- Residual definition $\Delta r = r_{track} - r_{iso}$

- Residual minimization using χ^2 method
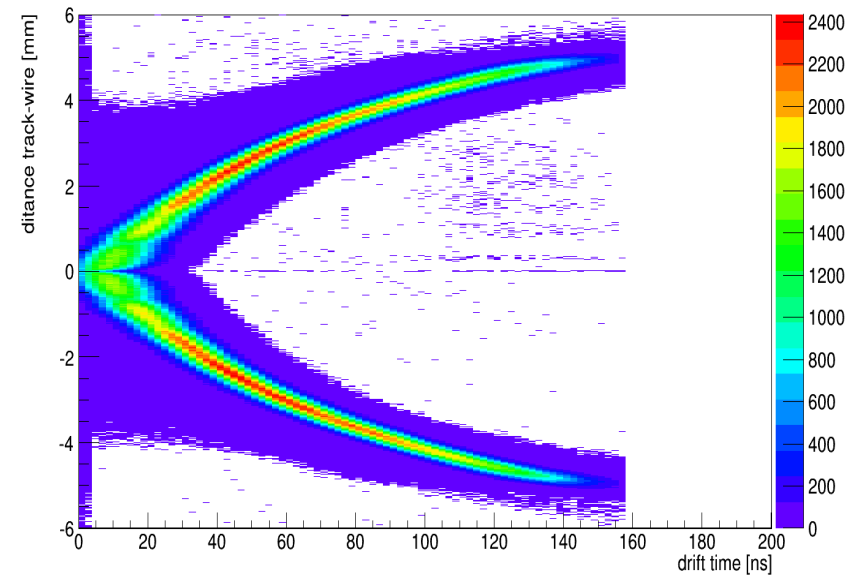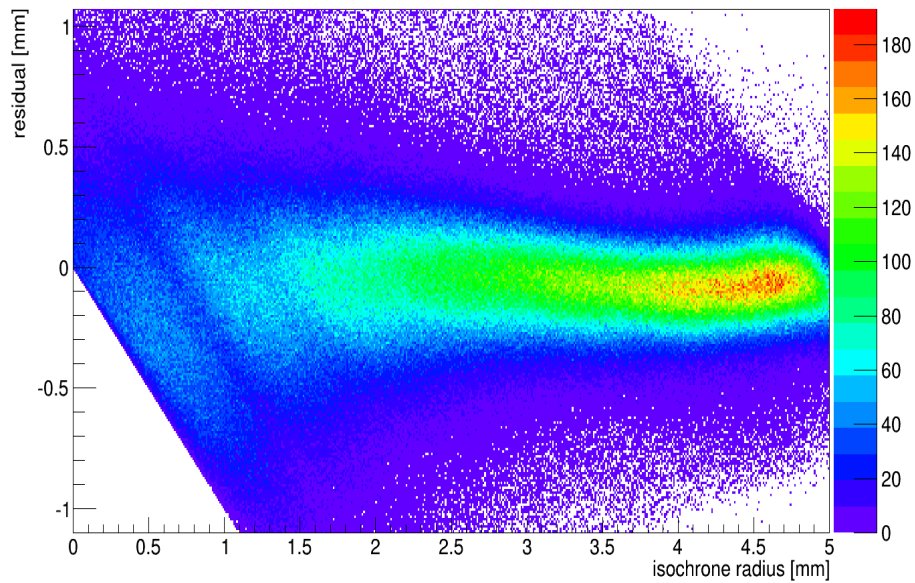
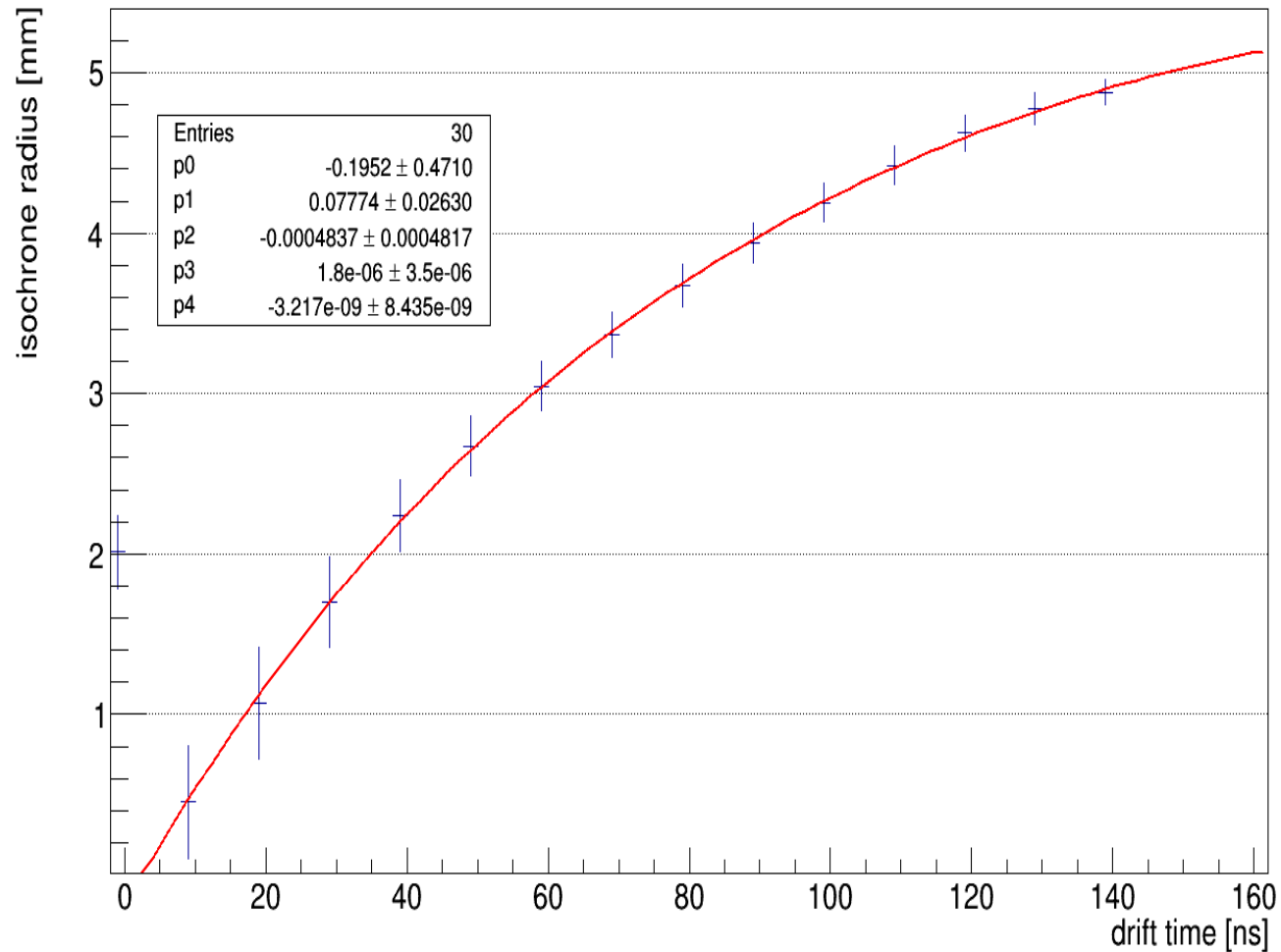- $\chi^2 = \Delta r^2 / \sigma^2_{radial\_pos}$
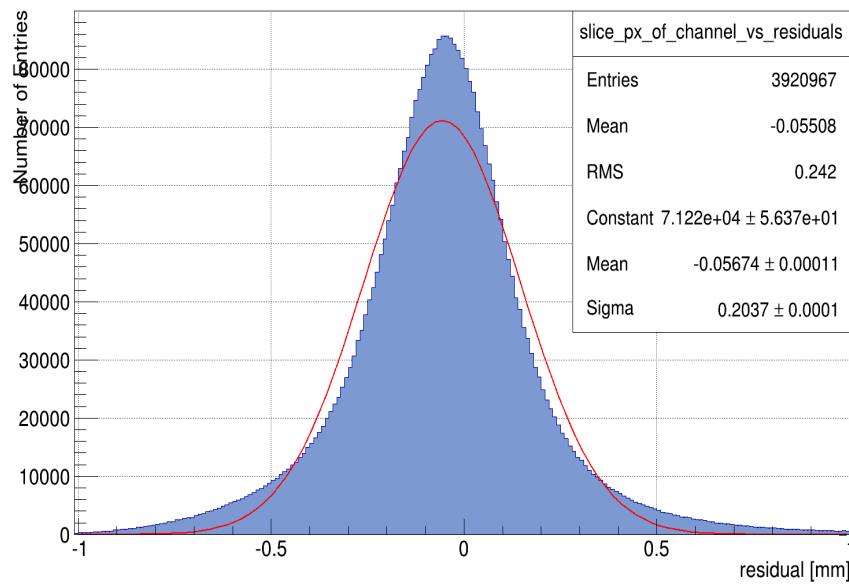
Prefit selection
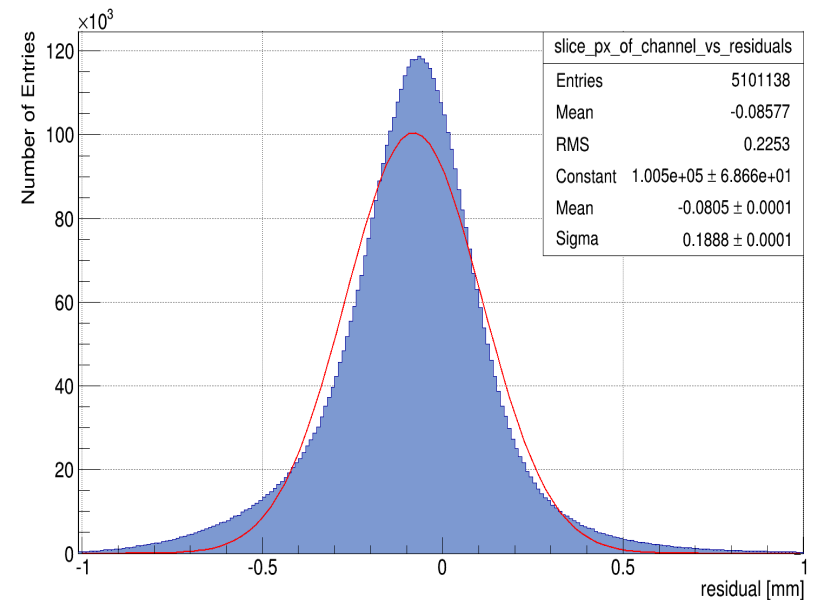
Residual minimization
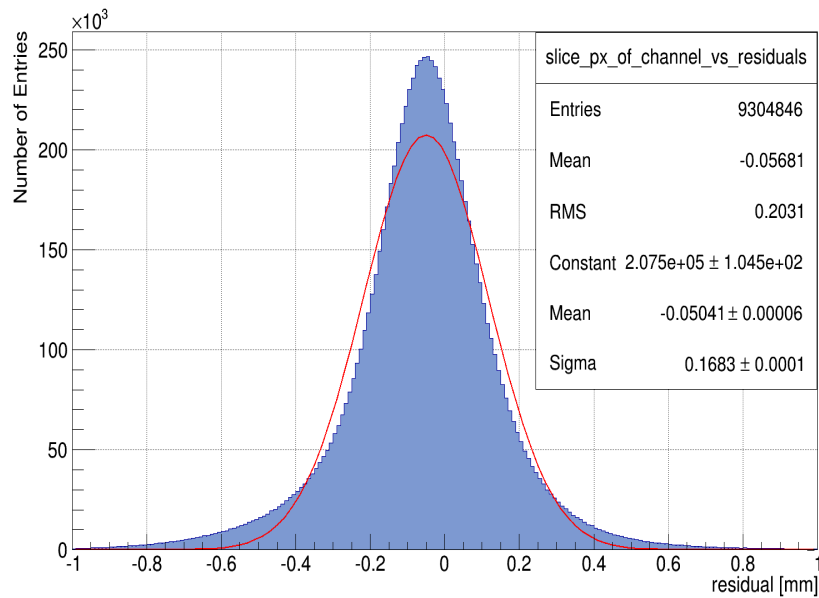
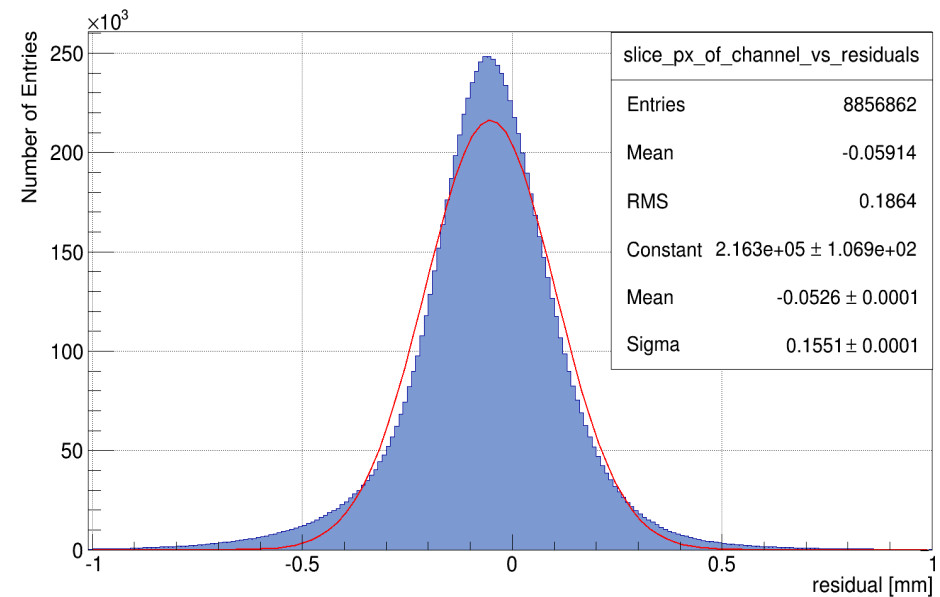# Autocalibration

Autocalibration

Spatial Resolution (1)

1750 V

1800 V

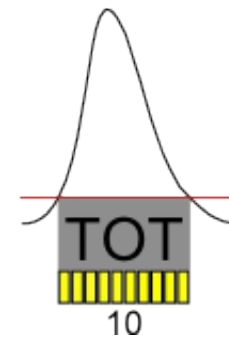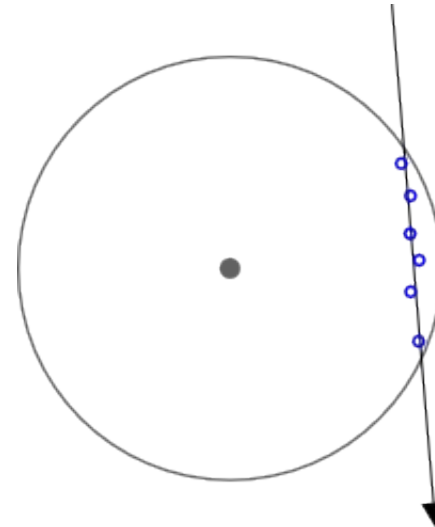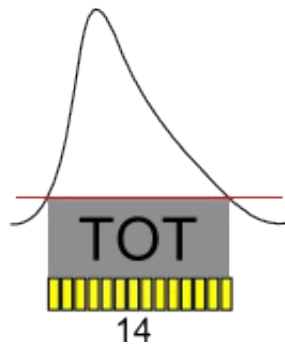# Spatial Resolution (2)
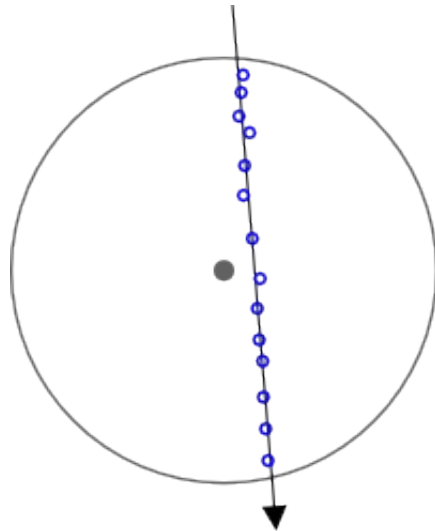

1850 V

1900 V

Particle Identification
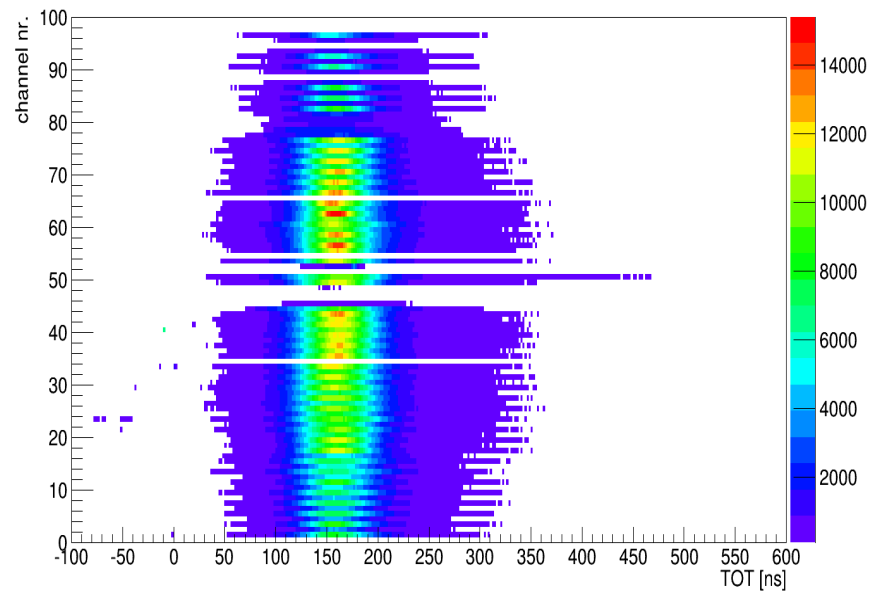
- TOT measurement
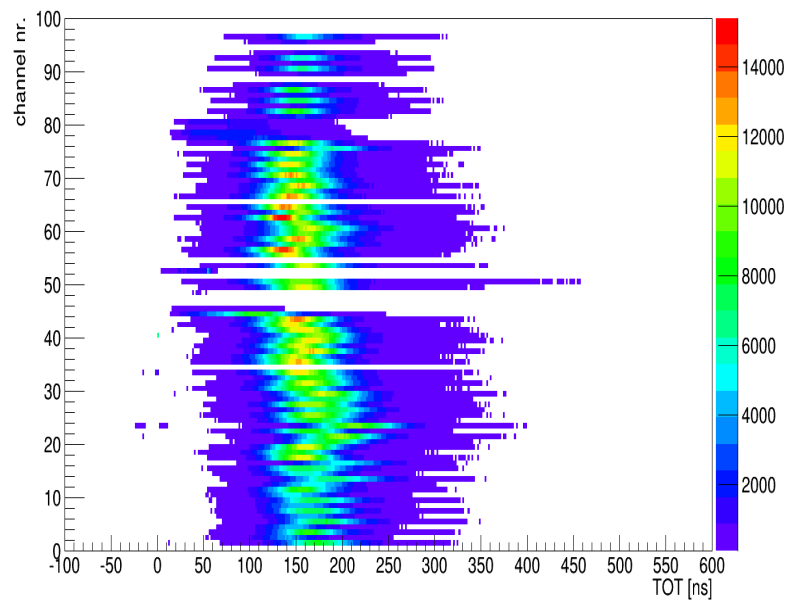- TOT correction
- Removing the radial dependency of TOT
- TOT/dx
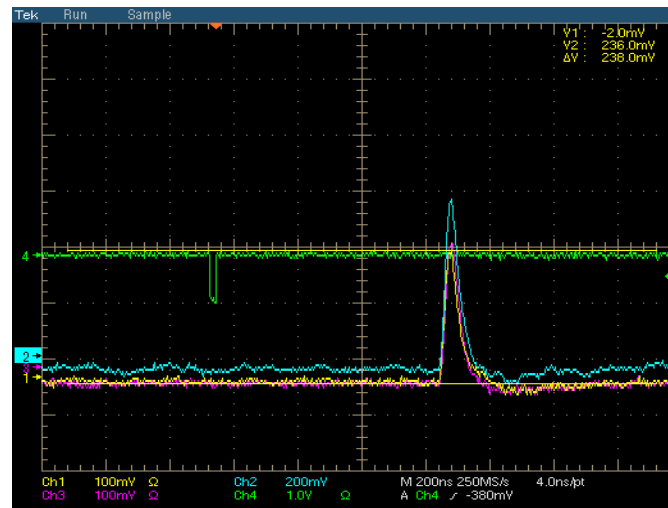
Data set used : 1800 V

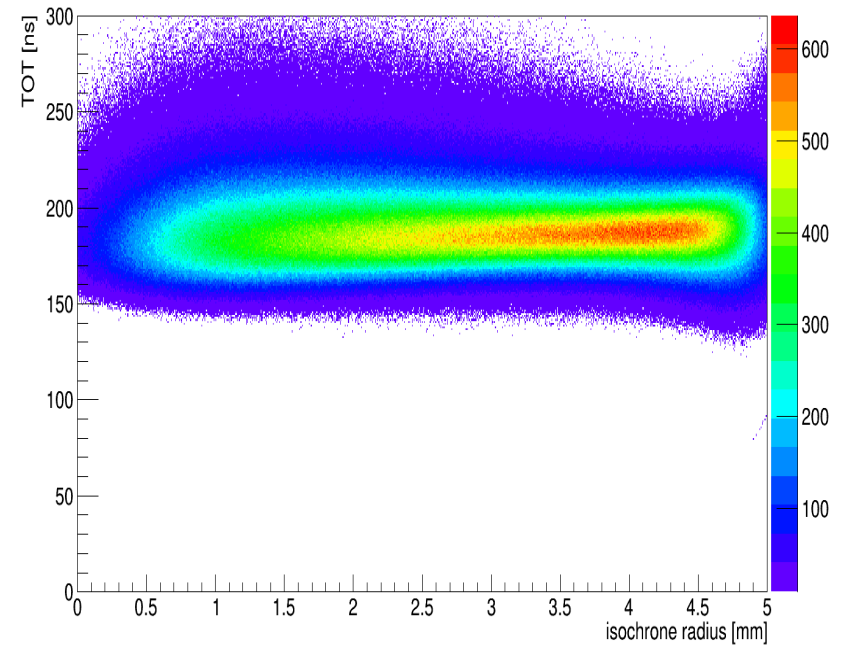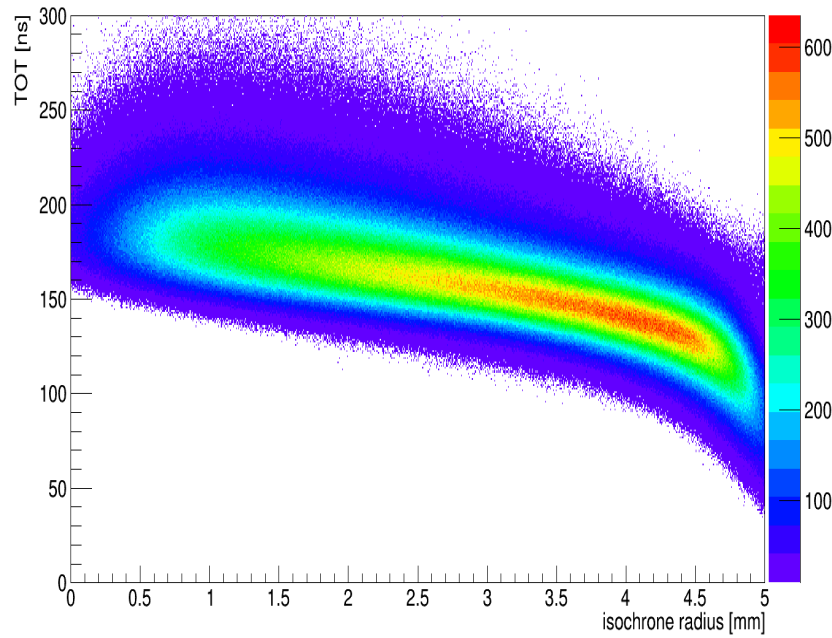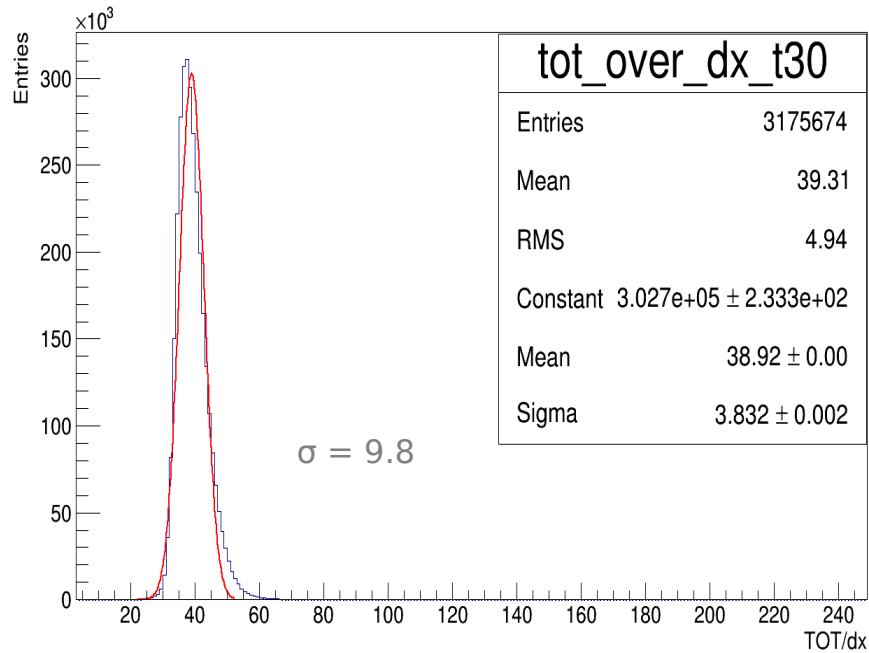# TOT Measurement
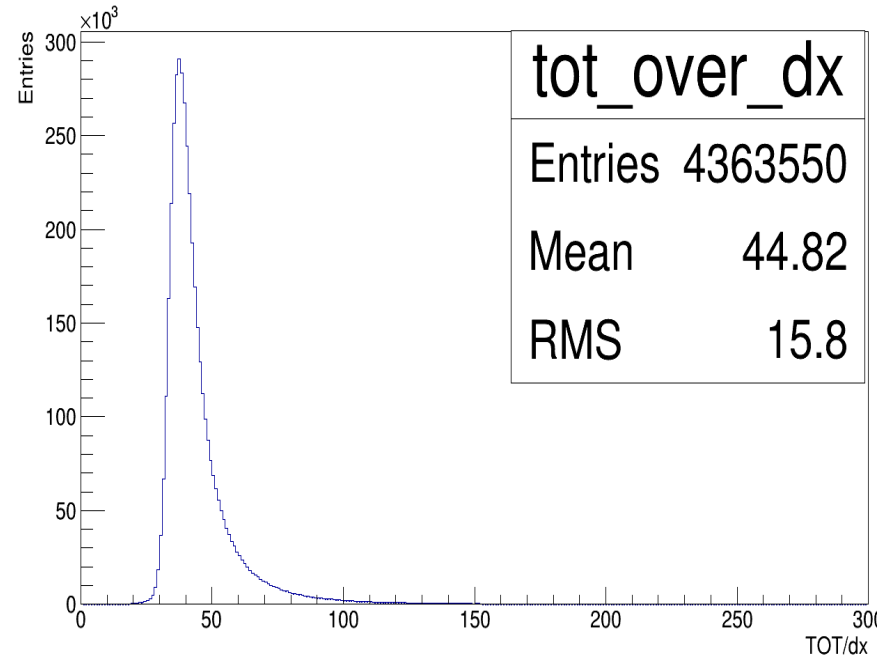
TOT Correction

Radial Dependency

TOT/dx 1800V

800 MeV/c truncated 30%

800 MeV/c

Conclusion

Results

- With 1900 V 155 μm spatial resolution was reached
- An Energy resolution better than 10% is plausible

Outlook

- Continue the optimization of the spatial resolution
- Testing different TOT correction methods and their outcomes
- Defining a valid dx
- Second ASIC chip shows promising improvements (channel density, better rising times etc…)
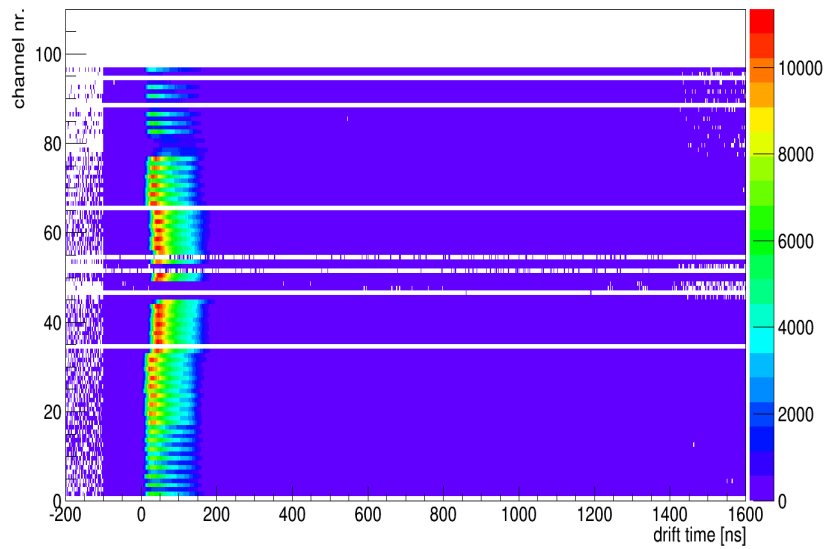
Thank You For Your Attention
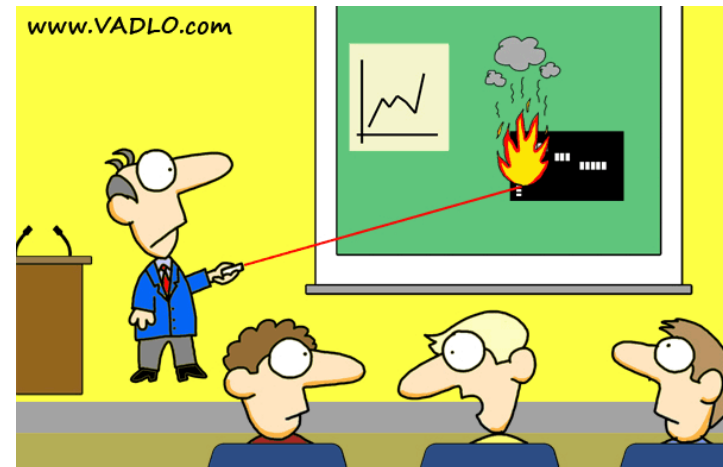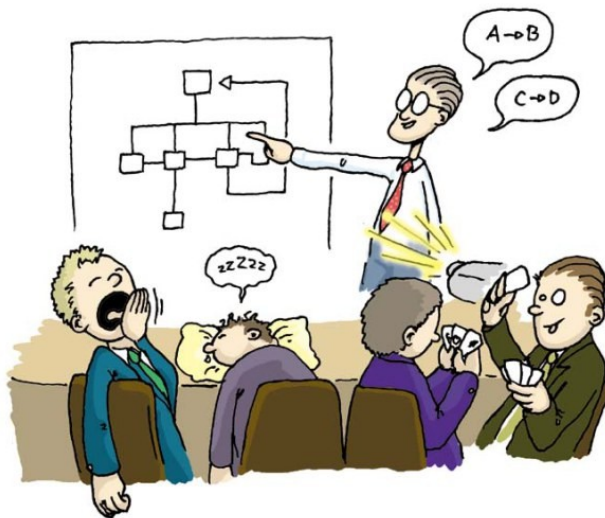
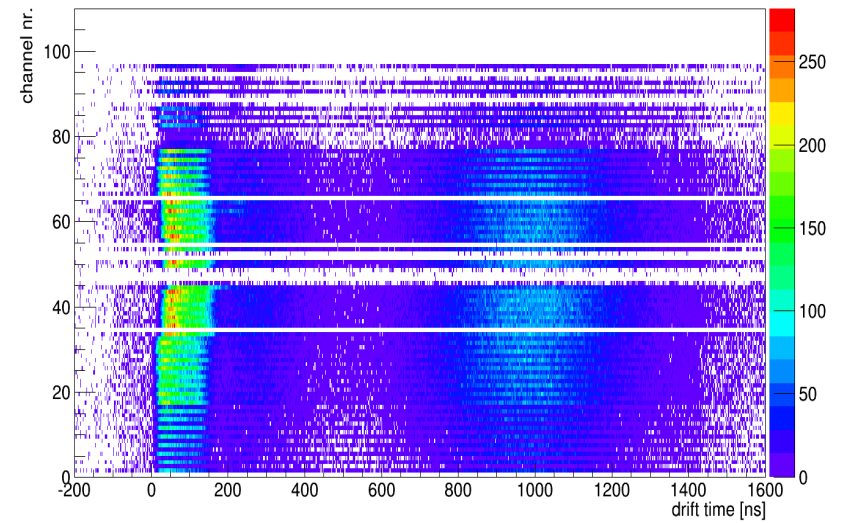"This is what happens when you are stuck on a slide for 15 mins!"

Difference between science and business presentations
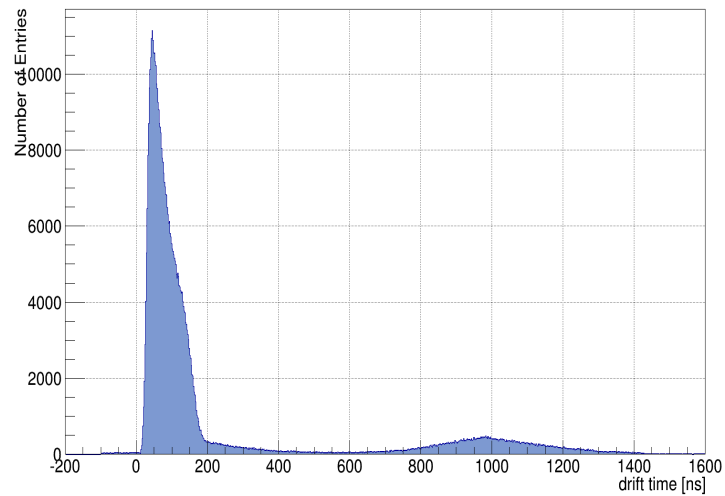
Backup Slides
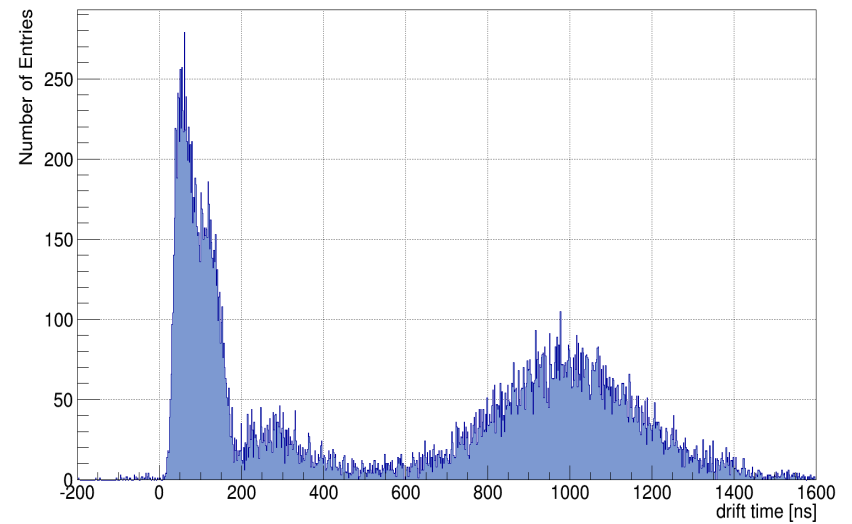
First Hit Selection
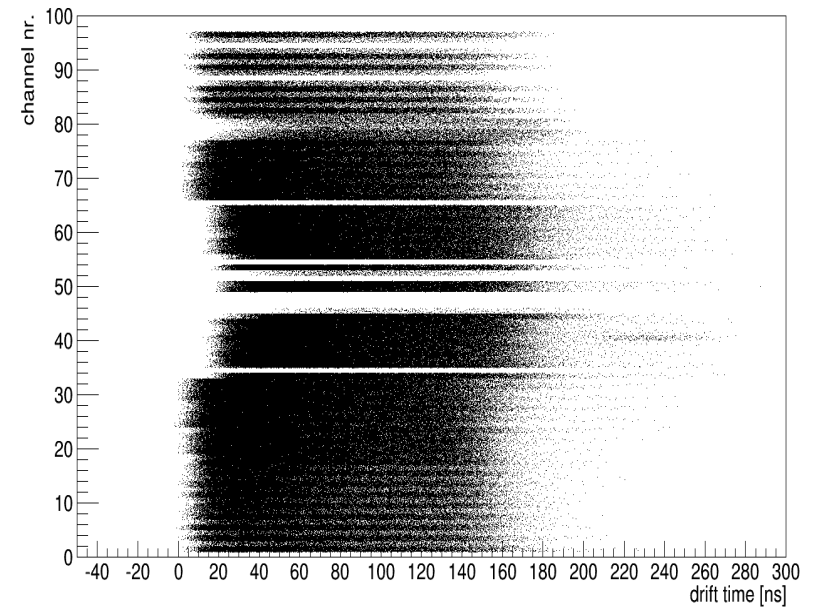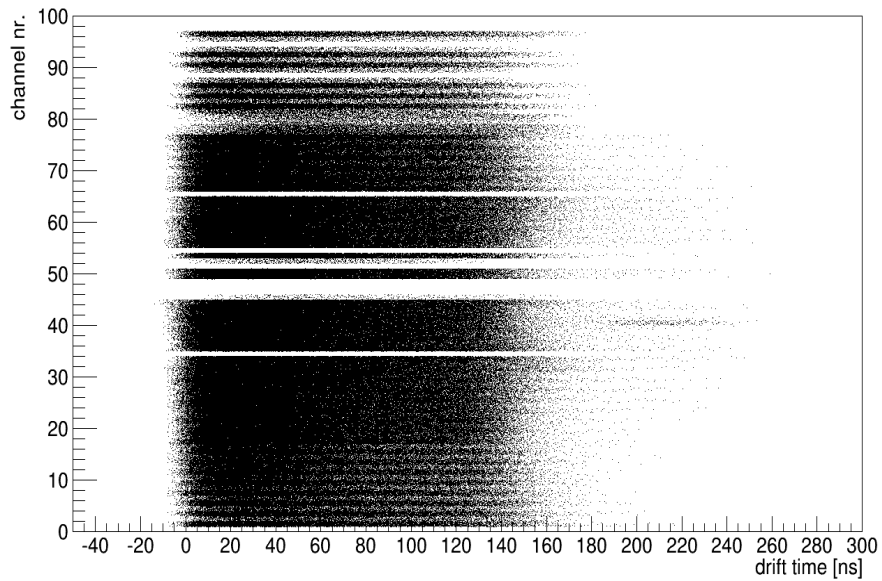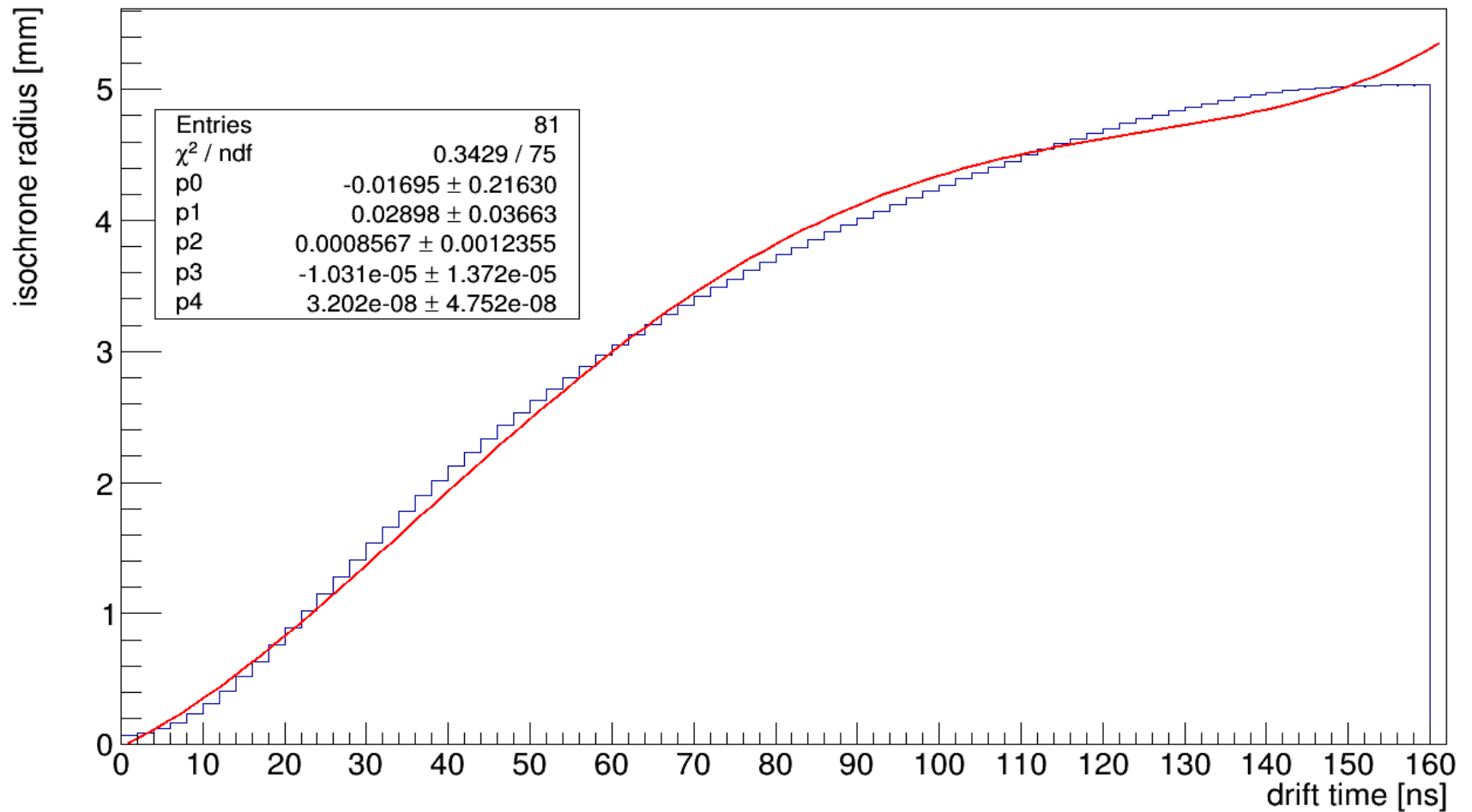

First hits
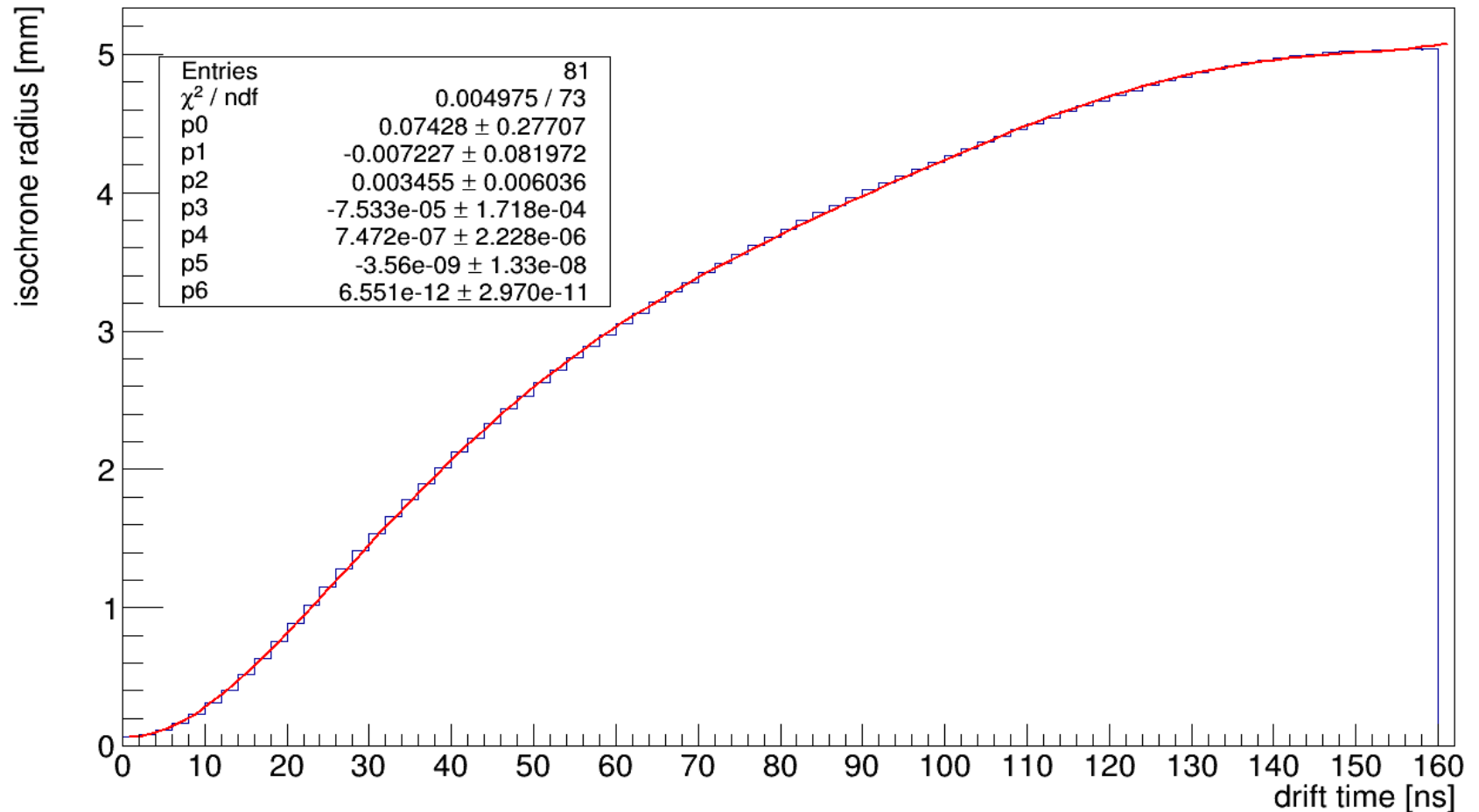

Second hits
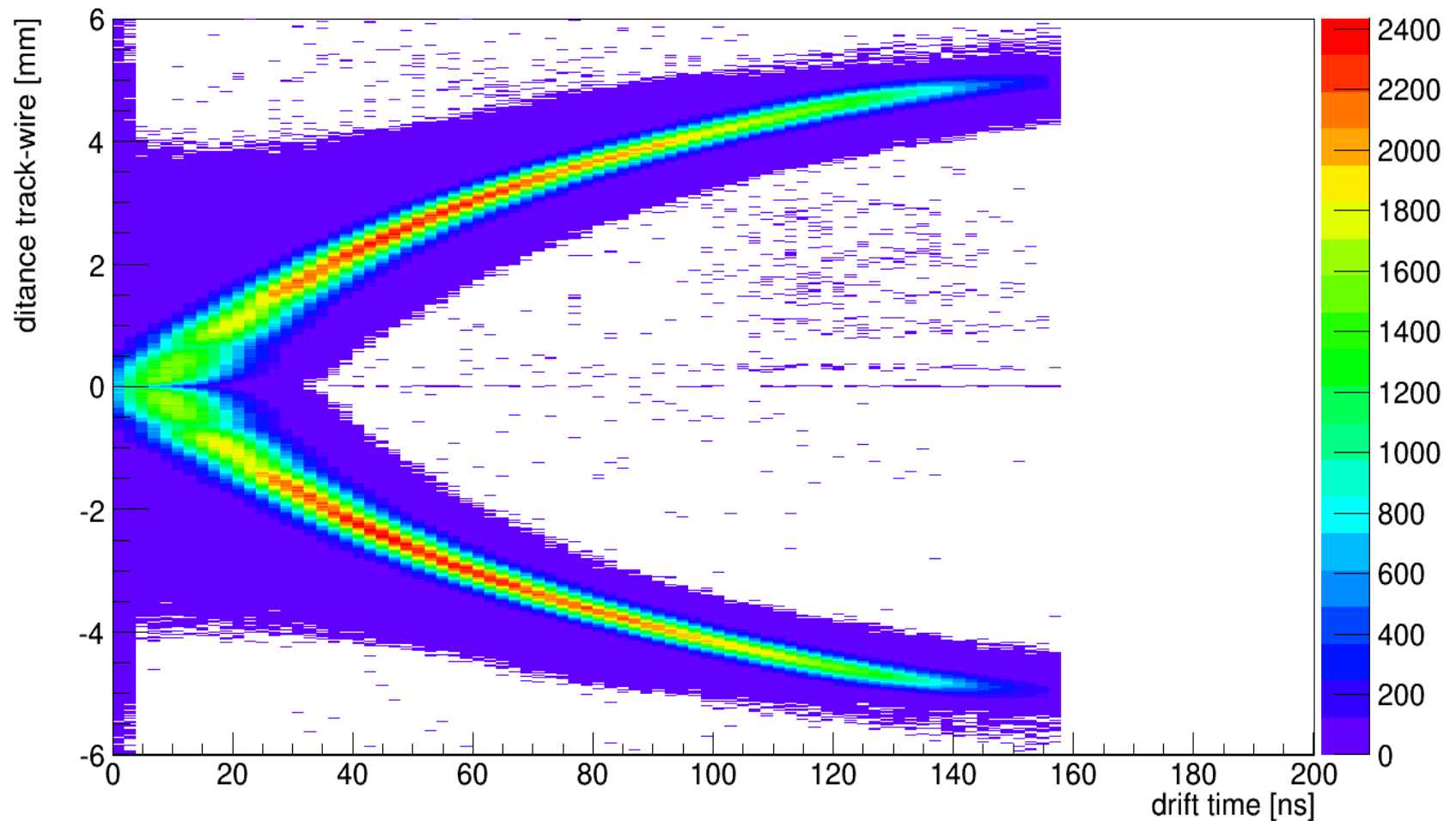
First Hit Selection

First hits

Second hits

Drift Time Correction
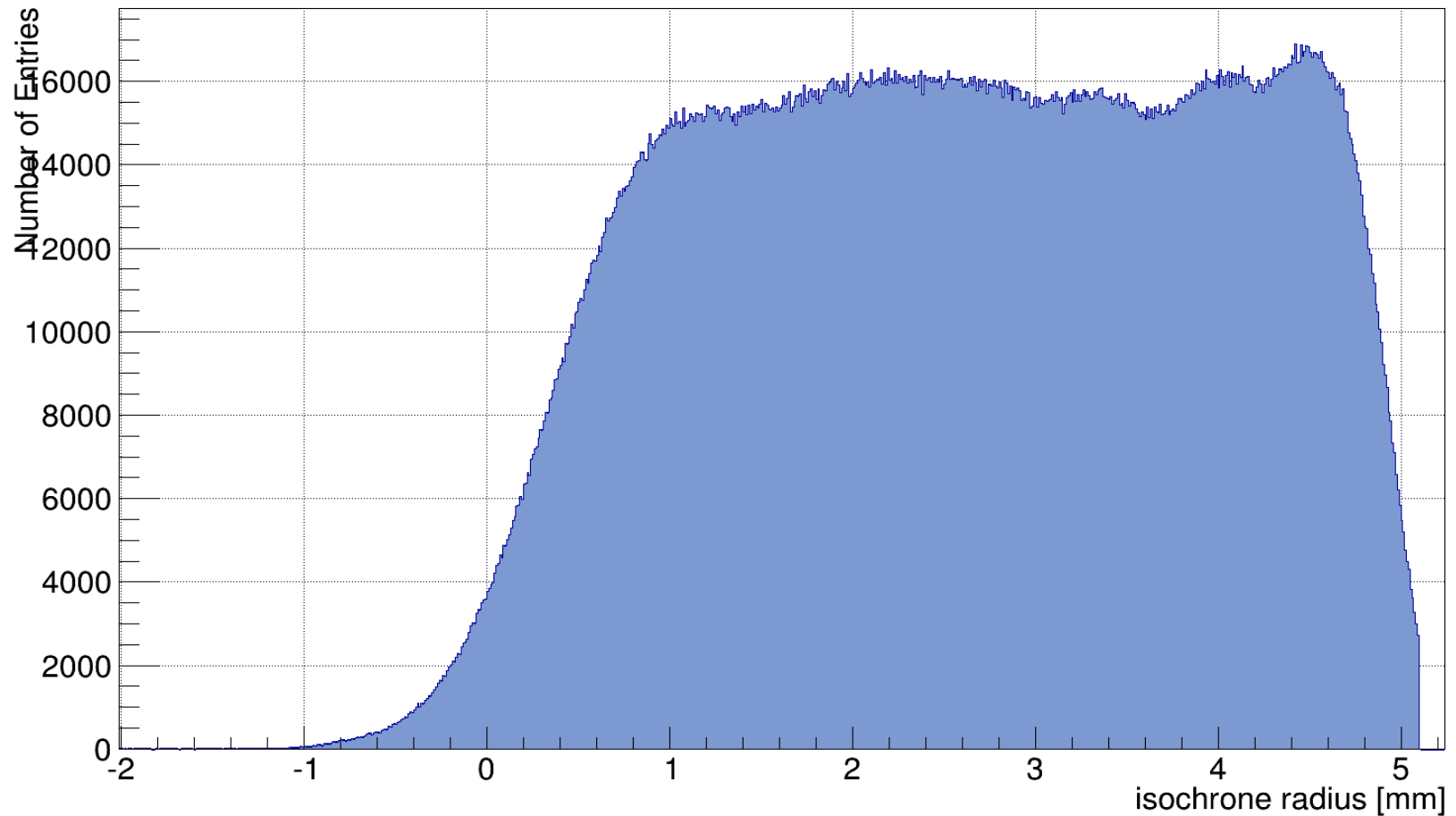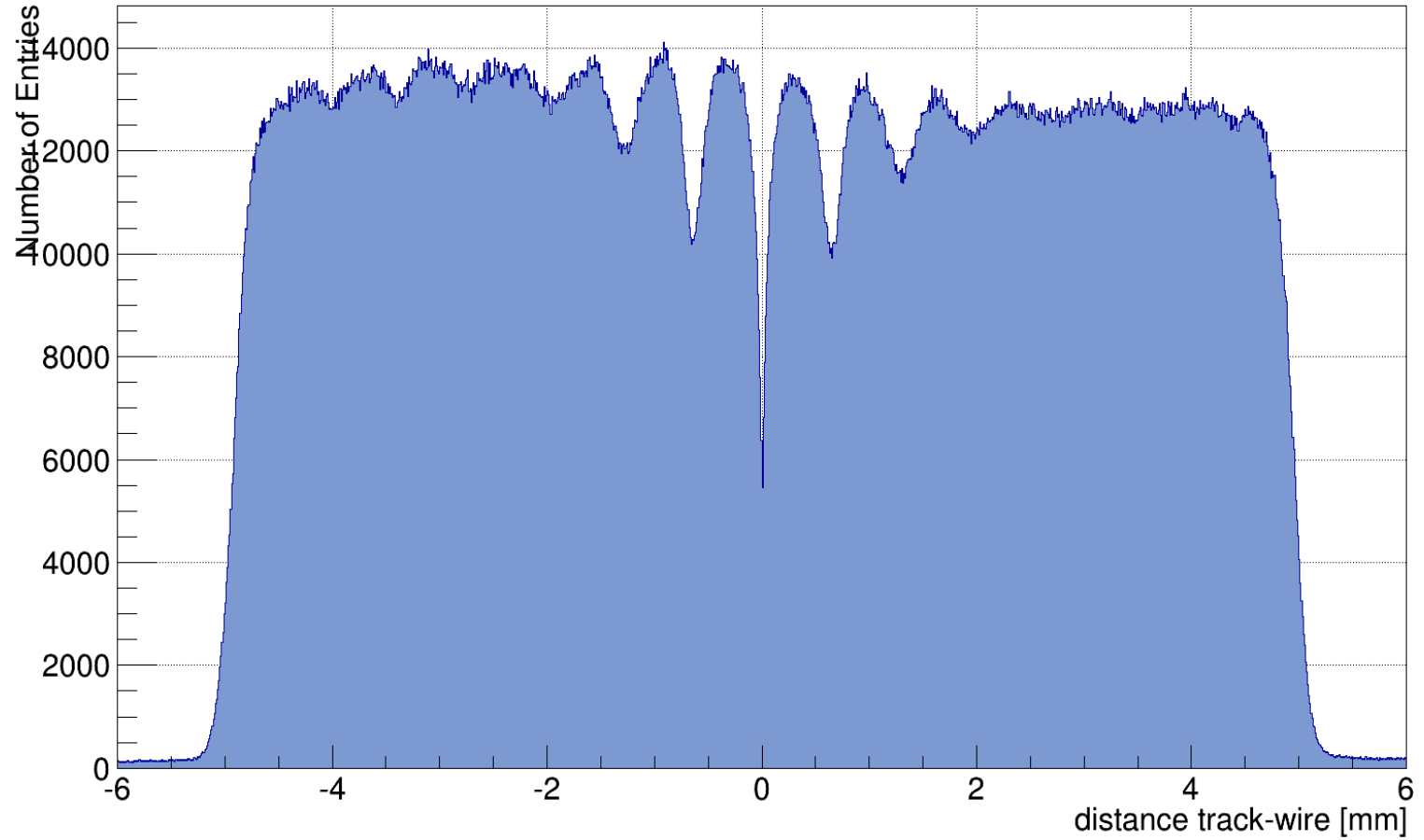
Calibration Curve

Calibration Curve

Autocalibration

Isochrone Radius Distribution

Distance From Track-wire

Resolution 1800V 11 straws with p(800 MeV/c)

slice_px_of_channel_vs_residuals

Entries	680198
Mean	-0.05757
RMS	0.2355
Constant	1.49e+04 ± 2.64e+01
Mean	-0.05901 ± 0.00023
Sigma	0.1628 ± 0.0002