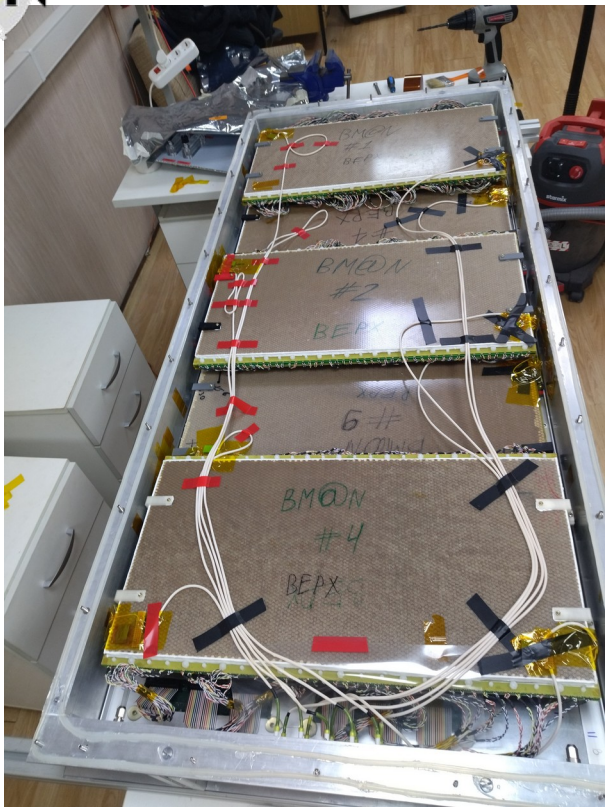
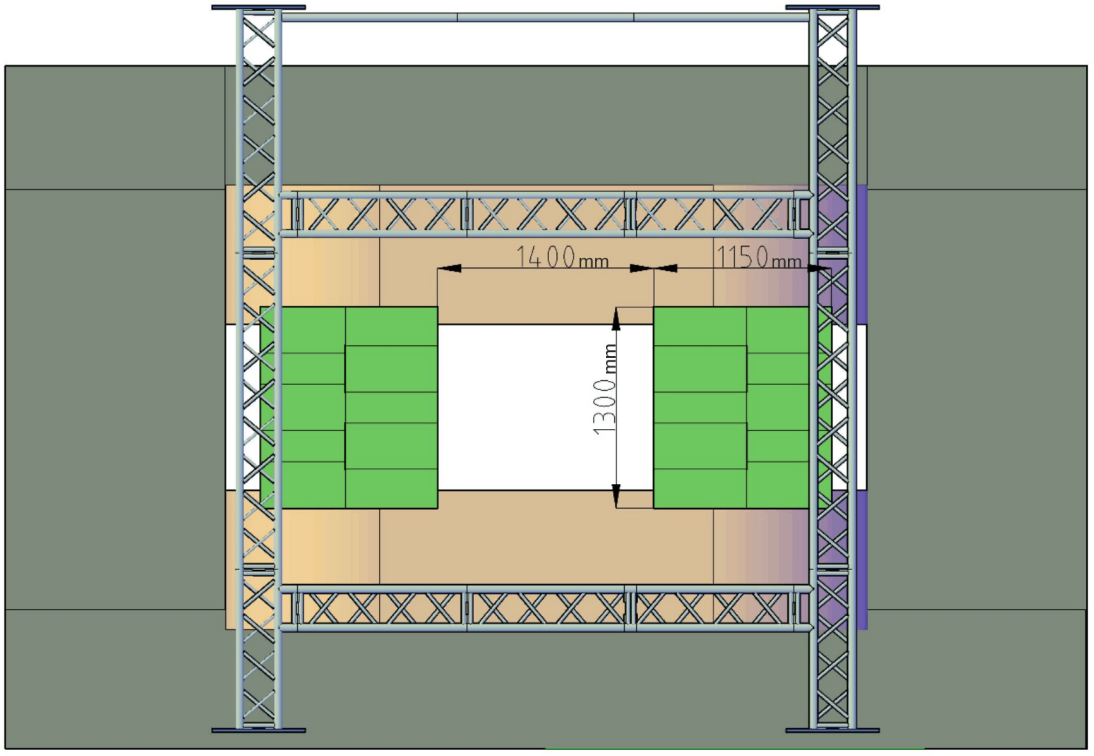
Data processing status of the TOF400 detector

TOF400 system.

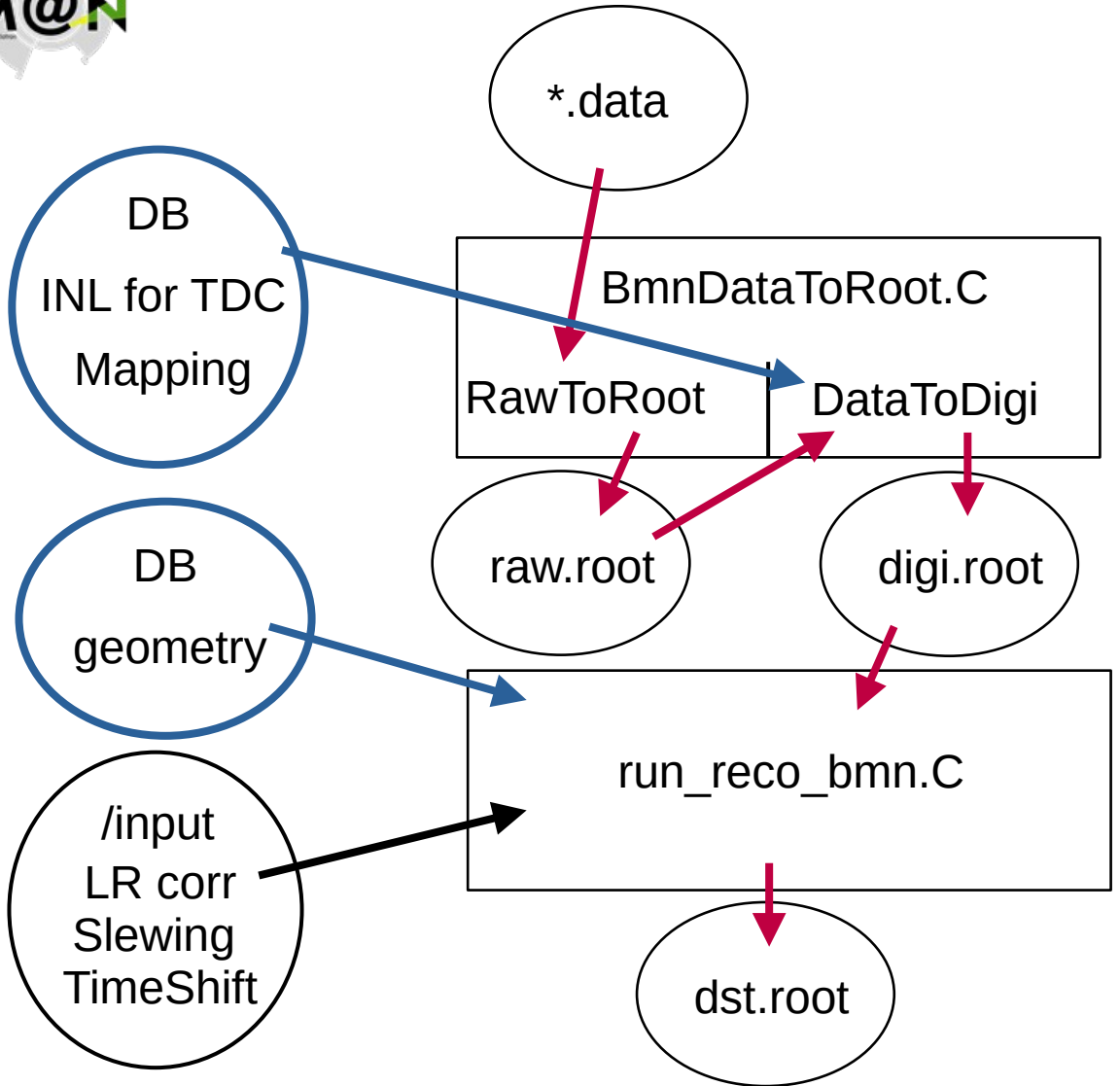


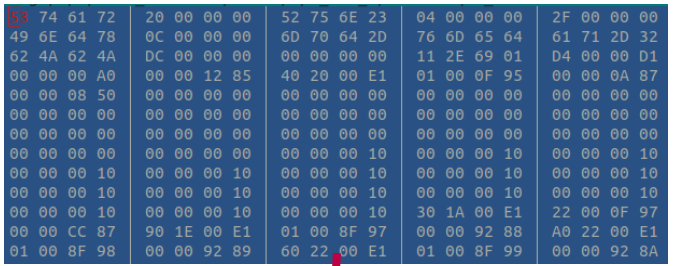


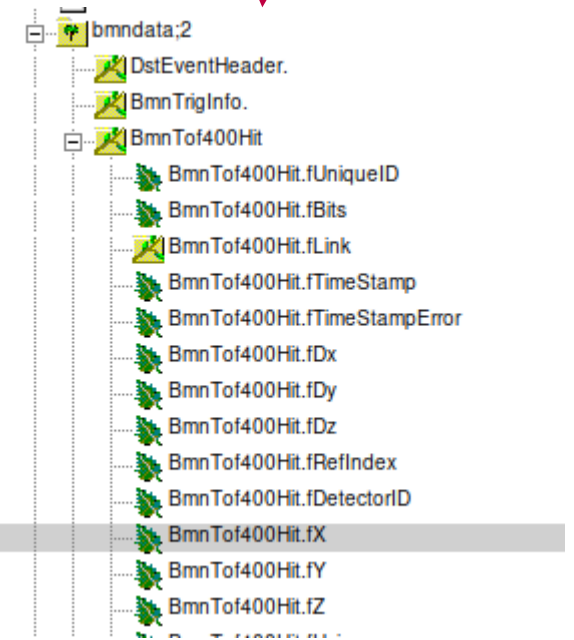
- mRPC detector with active area 30*60 cm^2.
- 48 readout strips of 1*30 cm^2 in one mRPC.
- 90%$C_2H_2F_4$ + 5% SF_6 + 5% i-C_4H_{10}
- 11,5 kV working point

- Two arms of 10 mRPC detectors each.
- Active area 2*1,1*1,3 m^2
- 960 Readout strips.
- 1920 channel of FEE.

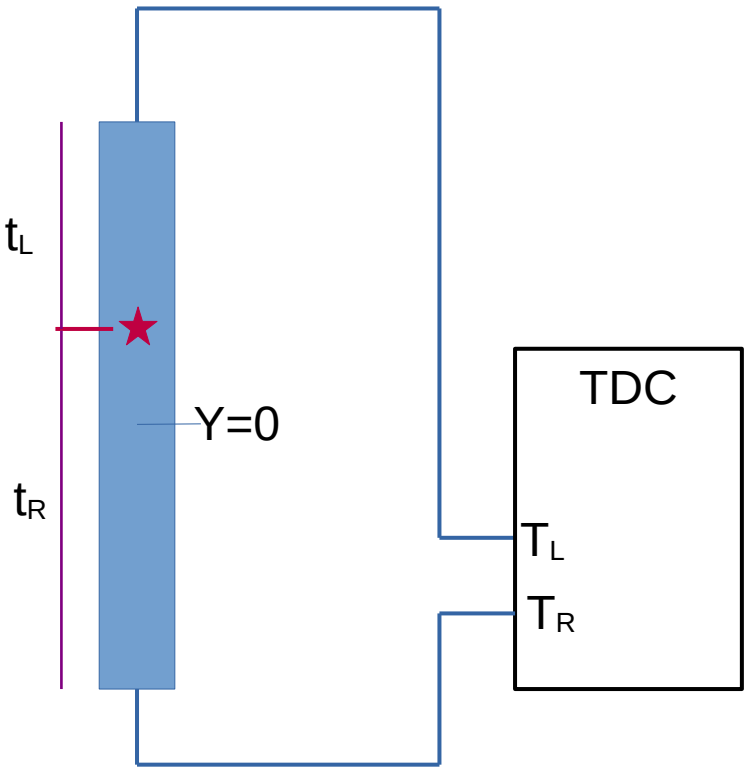
Data processing flow for TOF400.

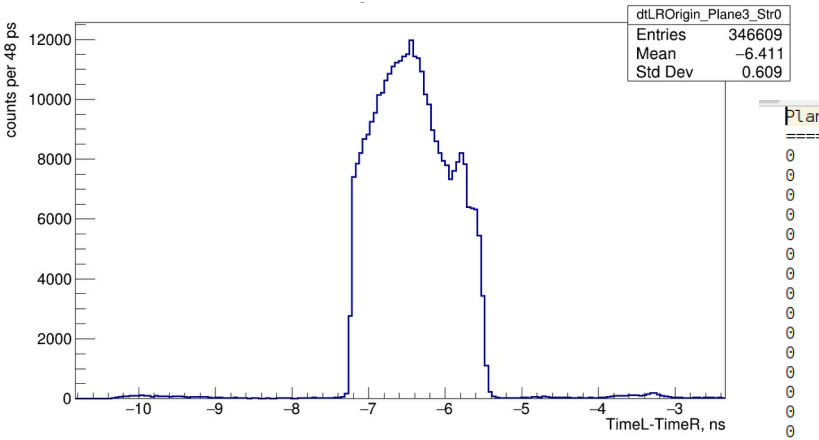




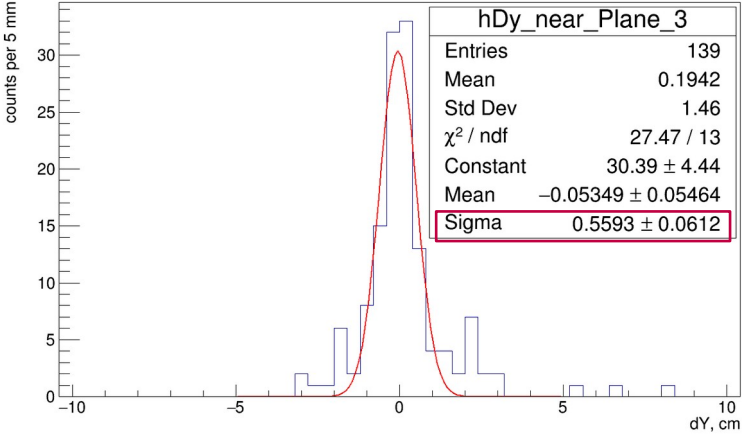


Calibration of cable length (LR correction).



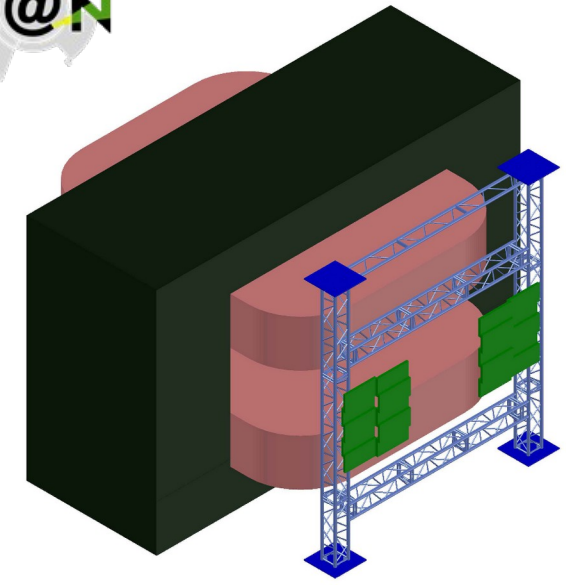


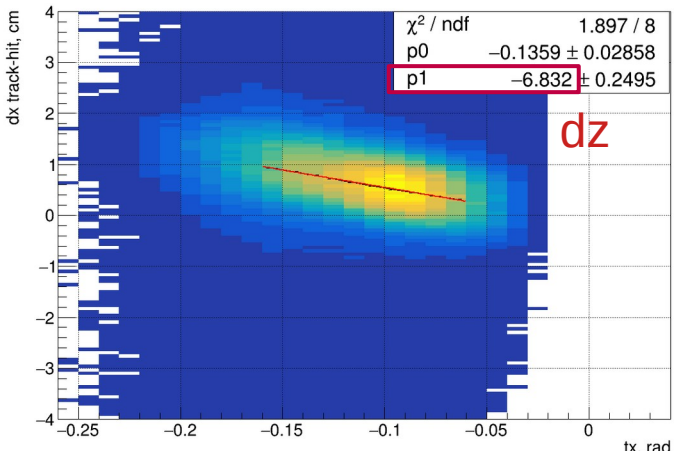
$$Y = \frac{T_L - T_R}{2} * V$$

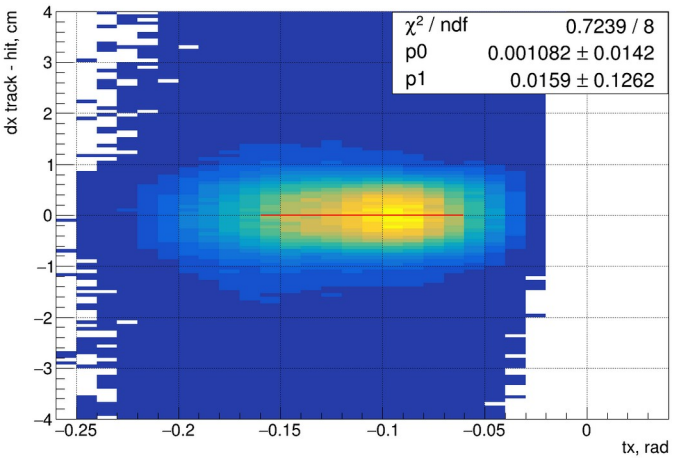


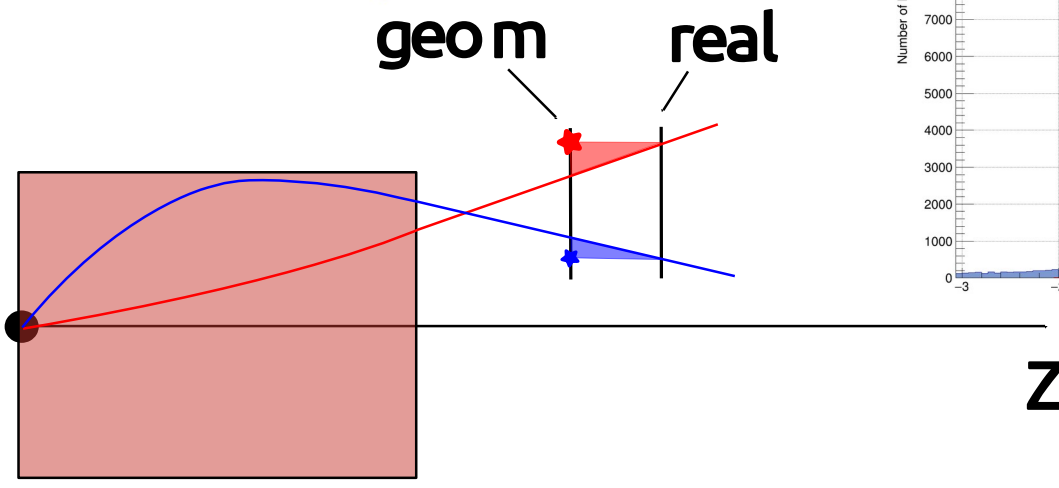
Plane	Strip	MeanFit Mean	
0	47	0.0703125	0.0703125
0	46	0.0703125	0.0703125
0	45	-0.0234375	-0.0234375
0	44	0.140625	0.140625
0	43	0.0703125	0.0703125
0	42	-0.0234375	-0.0234375
0	41	-0.0234375	-0.0234375
0	40	10.9475 0.870028	
0	39	-0.09375	-0.09375
0	38	0.140625	0.140625
0	37	0.0703125	0.0703125
0	36	-2.39021e-13	-1.82656e-17
0	35	-0.09375	-0.09375
0	34	0.09375 0.09375	
0	33	-0.046875	-0.046875
0	32	-7.12154e-14	-1.31062e-17
0	31	-2.05224e-13	-0
0	30	-2.79432e-13	-2.53863e-17
0	29	1.10247e-13	2.93402e-17
0	28	0.046875	0.046875
0	27	-0.09375	-0.09375
0	26	0.046875	0.046875
0	25	0.046875	0.046875
0	24	0.046875	0.046875
0	23	-0.046875	-0.046875
0	22	-0.09375	-0.09375
0	21	-0.046875	-0.046875
0	20	0.046875	0.046875
0	19	-0.046875	-0.046875
0	18	1.34638e-14	2.22756e-17
0	17	-0.046875	-0.046875
0	16	-3.39297e-13	3.7387e-18
0	15	-5.12775e-16	1.08957e-17
0	14	0.0703125	0.0703125
0	13	-0.140625	-0.140625
0	12	0.046875	0.046875
0	11	-2.23705e-13	7.01002e-18
0	10	5.70026e-13	-6.91473e-18

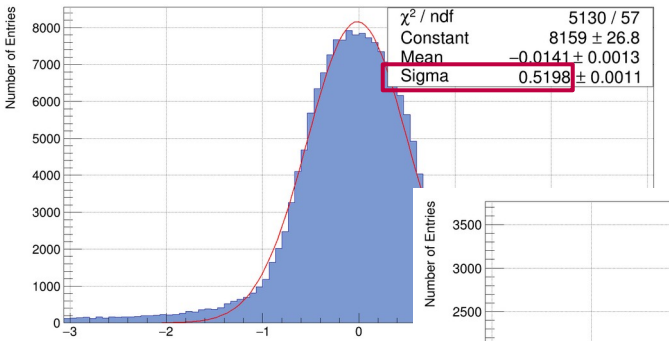
Geometry alignment of the TOF400.





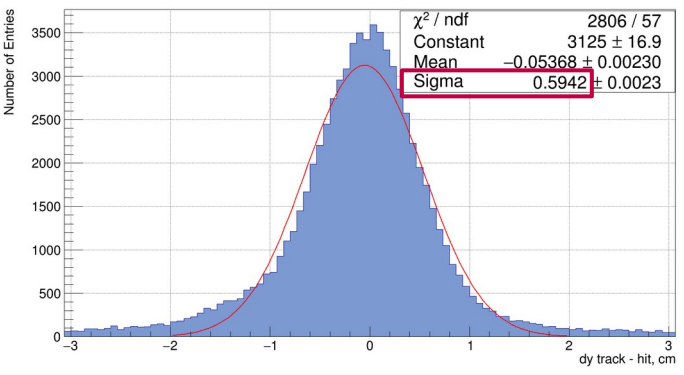






σ_x(track-hit) = 5,2 mm

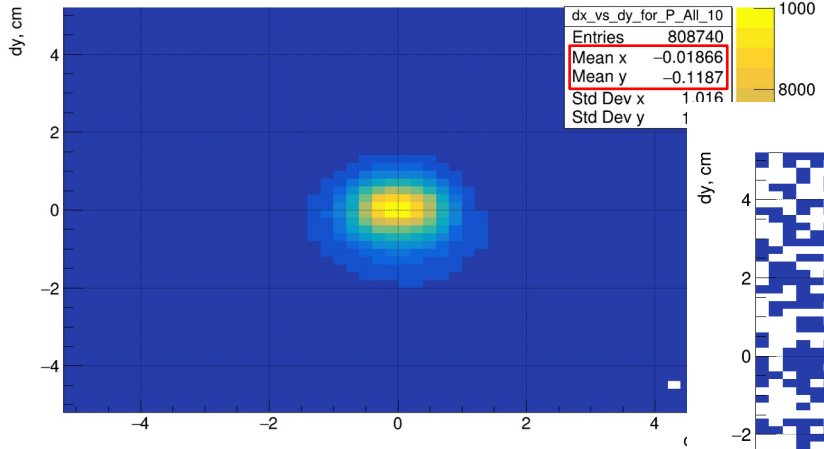
σ_y(track-hit) = 6 mm



Geometry alignment of the TOF400.

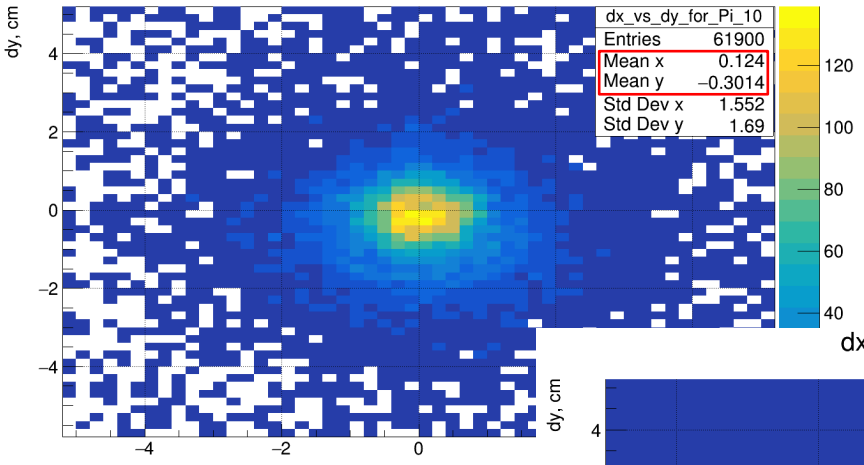
Z + 6,5cm - > Y (Plane) - > Z (Plane) - > X (Plane) - > Z (Plane) - > XY (Plane).

dx_vs_dy_for_P_All_10



p

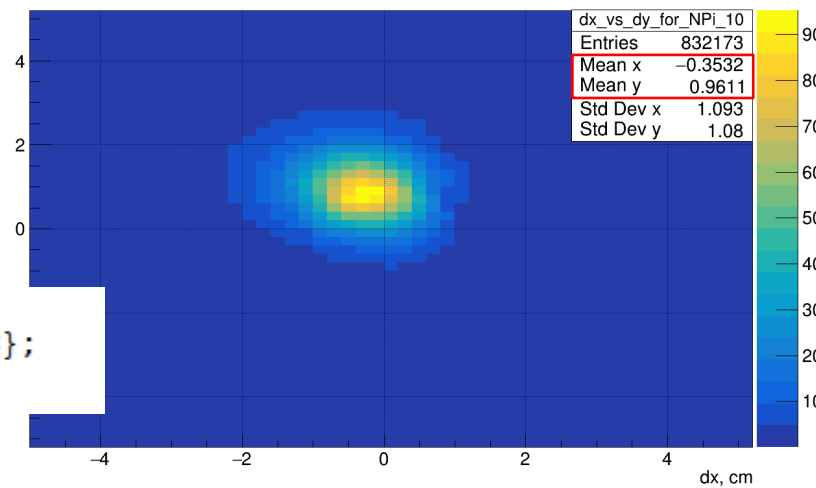
dx_vs_dy_for_Pi_10



π+

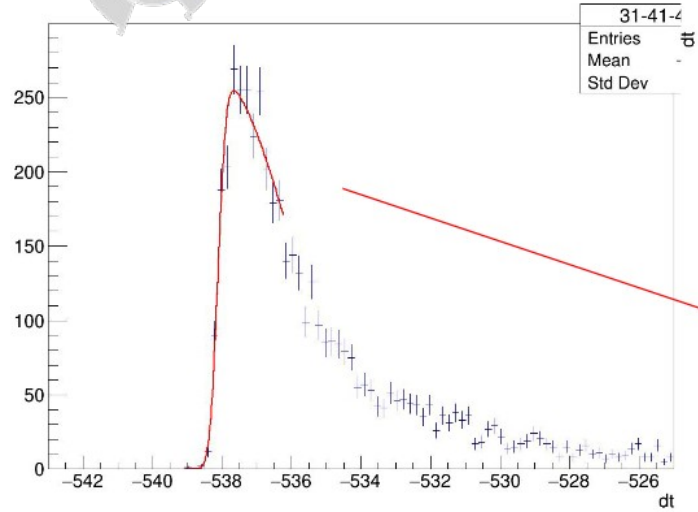
π-

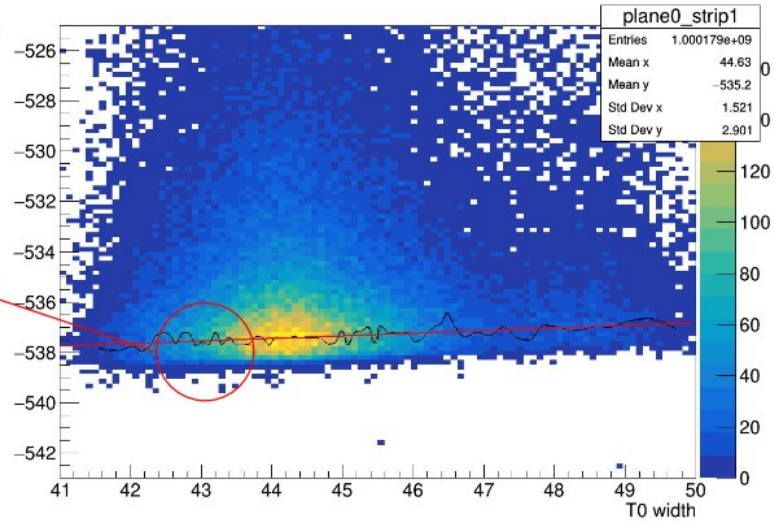
dx_vs_dy_for_NPi_10



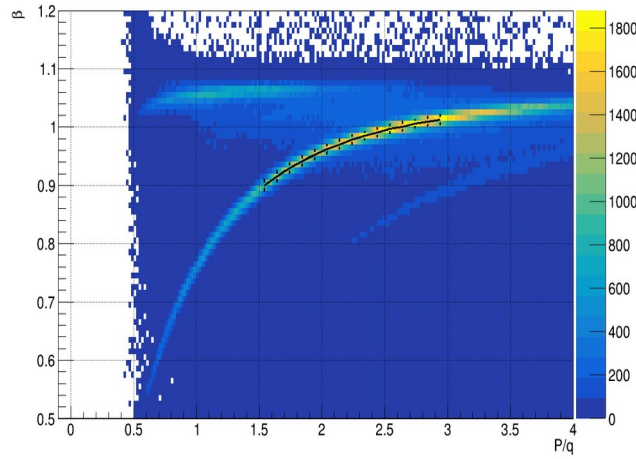

```
const Double_t corr_X_box2[5] = {0.926, 0.717, 0.067, -0.579, -0.178};
const Double_t corr_Y_box2[5] = {-0.293, -0.299, -0.204, -0.143, 0.948};
const Double_t corr_Z_box2[5] = {1.61, 1.22, 0.57, -0.083, 0.922};
```

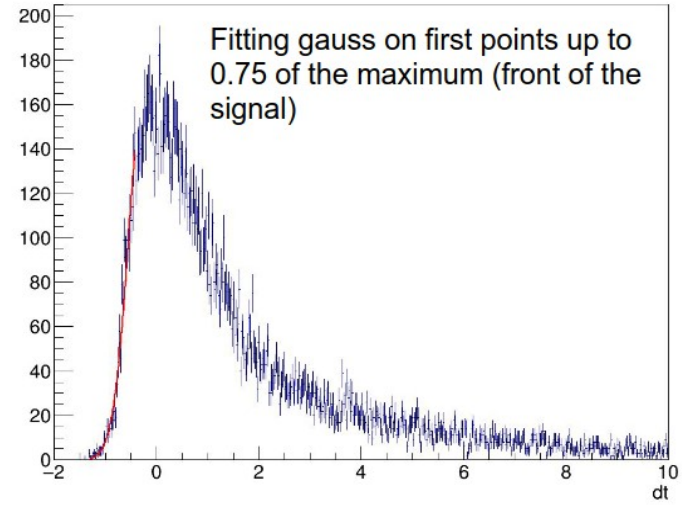
Slewing correction of the TOF400.
Presented by Mikhail Mamaev at 10th BM@N collaboration meeting.

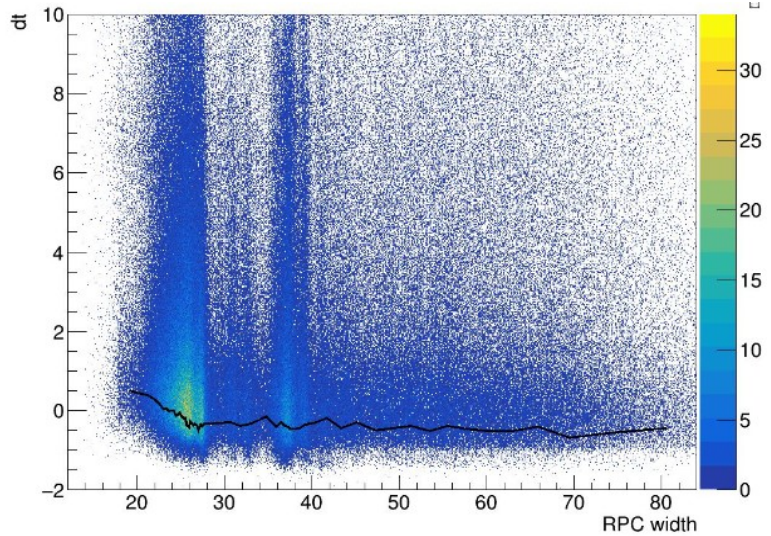




Step 1:
Correction for T0
by line

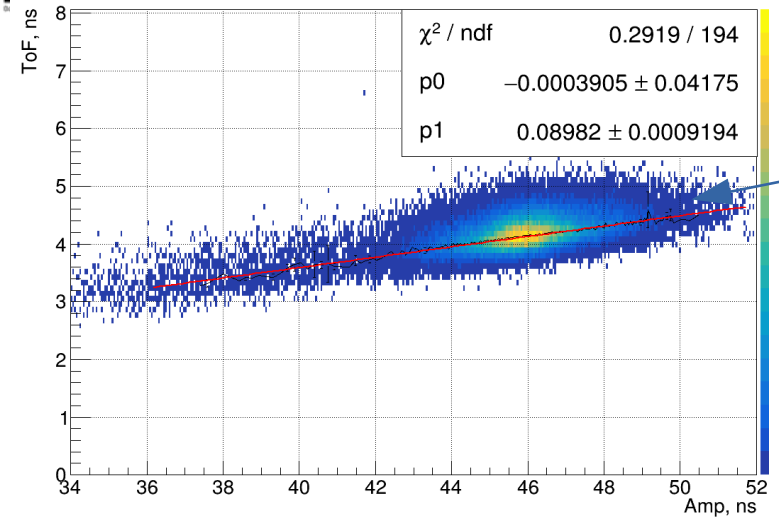




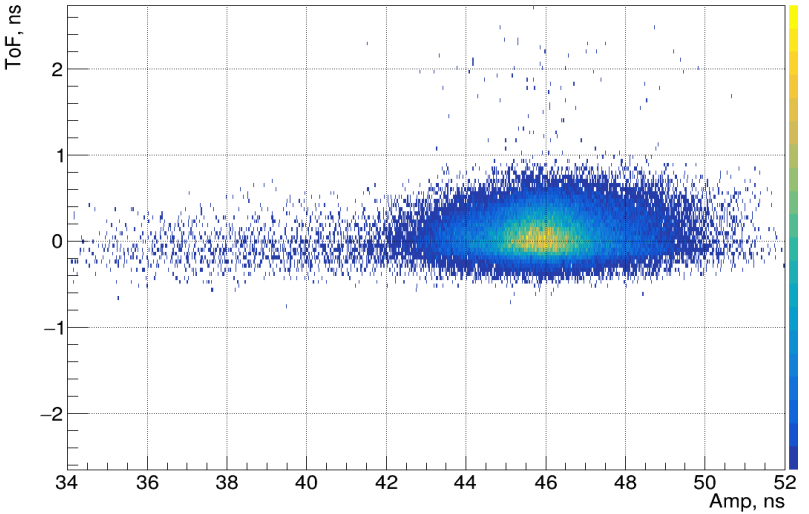


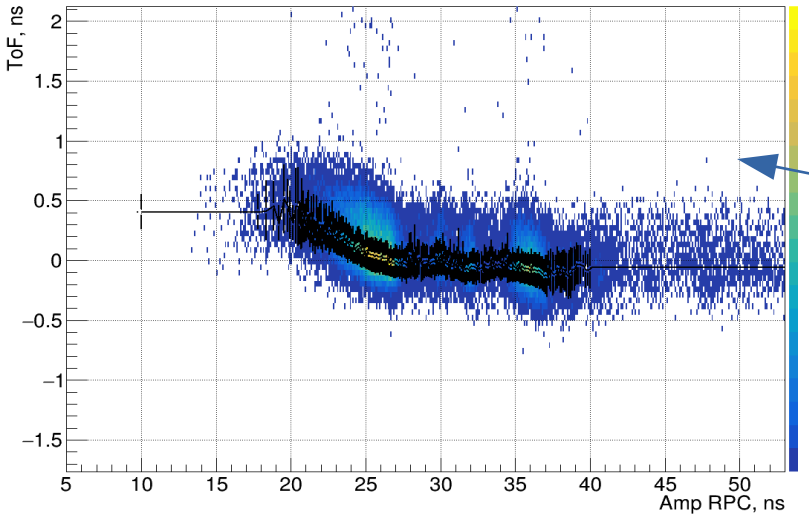
Step 2:
Correction for RPC

Slewing correction of the TOF400 by π+(-) particles.

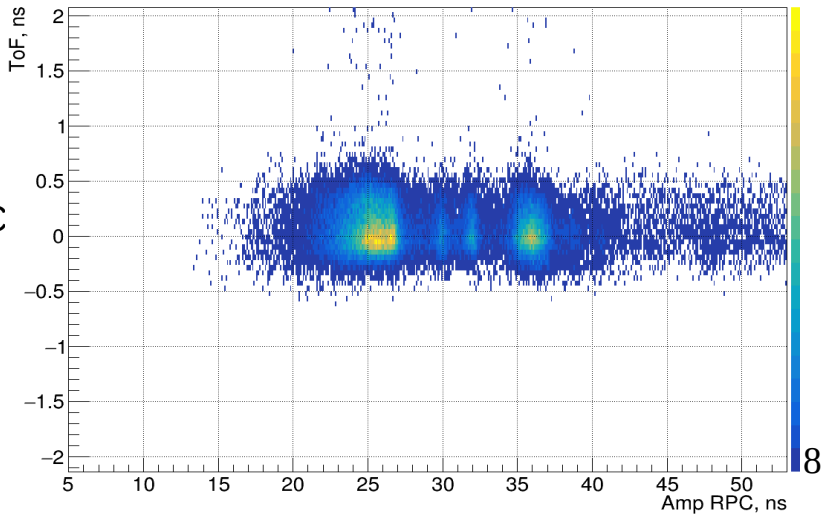


Step 1:
Correction for T0
by line

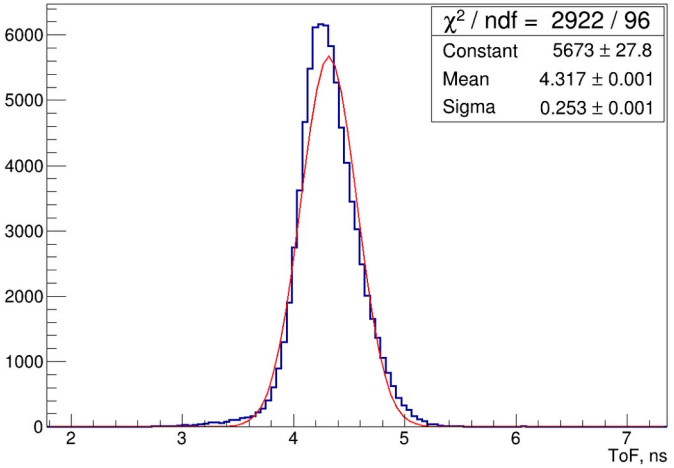




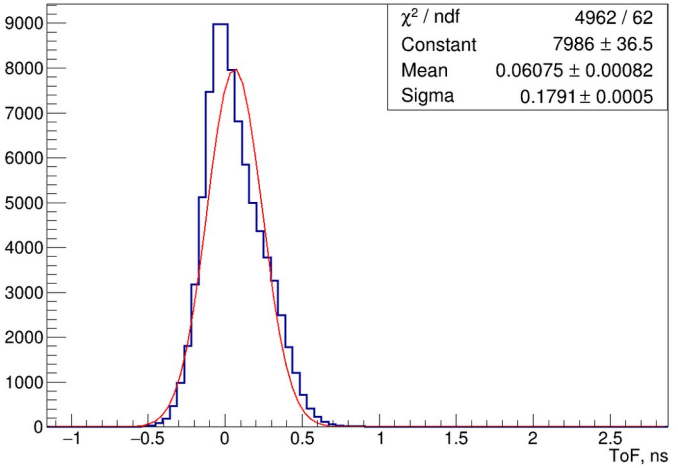
Step 2:
Correction for RPC



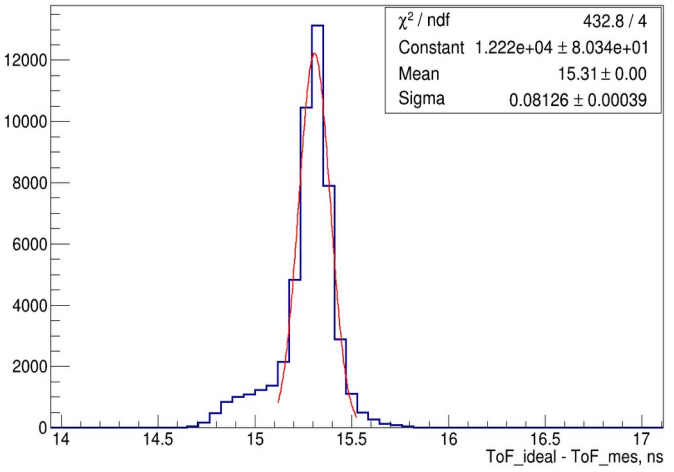
Time shift correction of the TOF400.



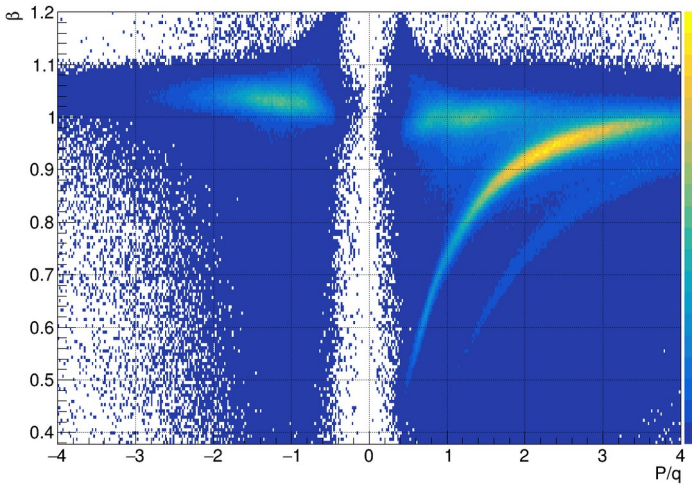
ToF for π+ band w/o Slewing



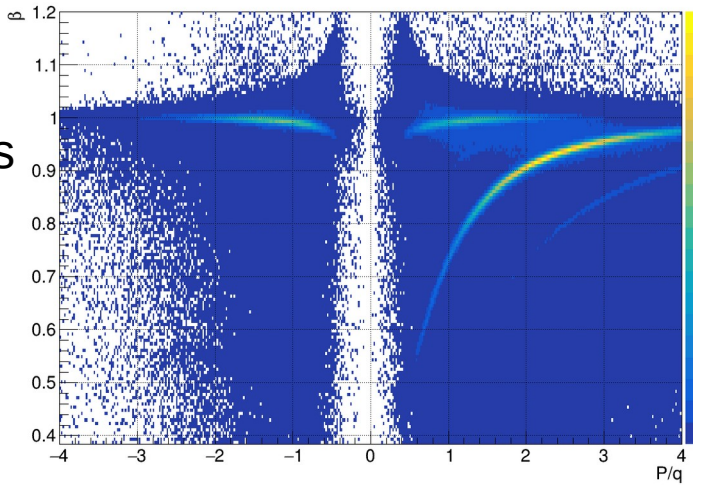
ToF for π+ band with Slewing



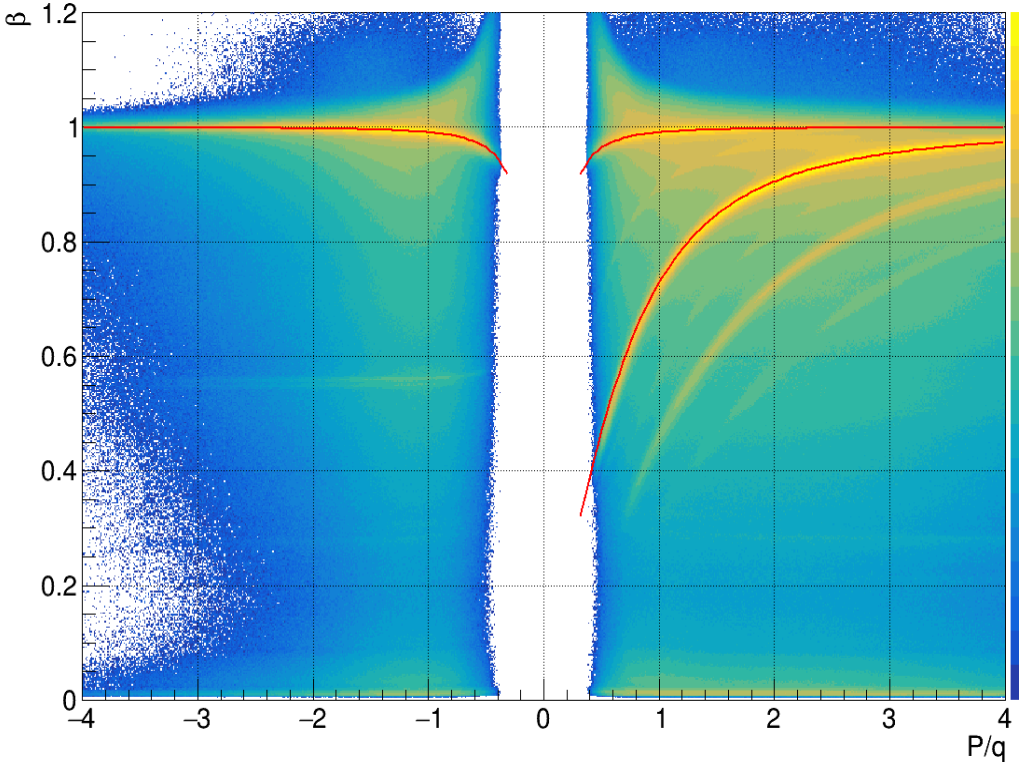
ToF_{ideal} — ToF_{mes} for π+ band

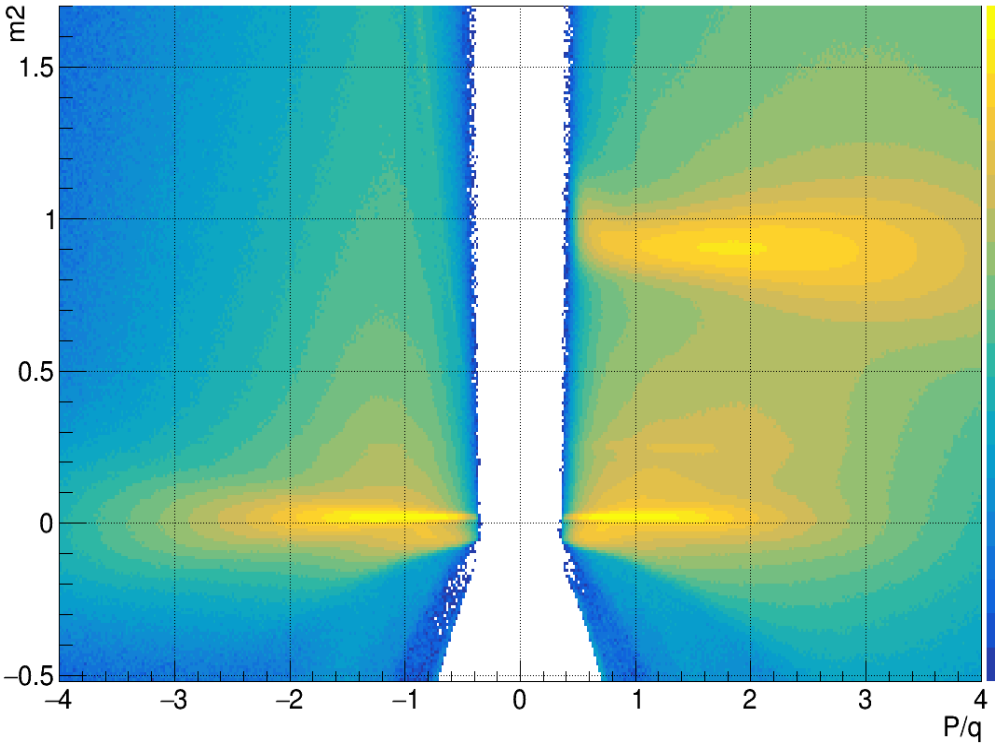


After all corrections

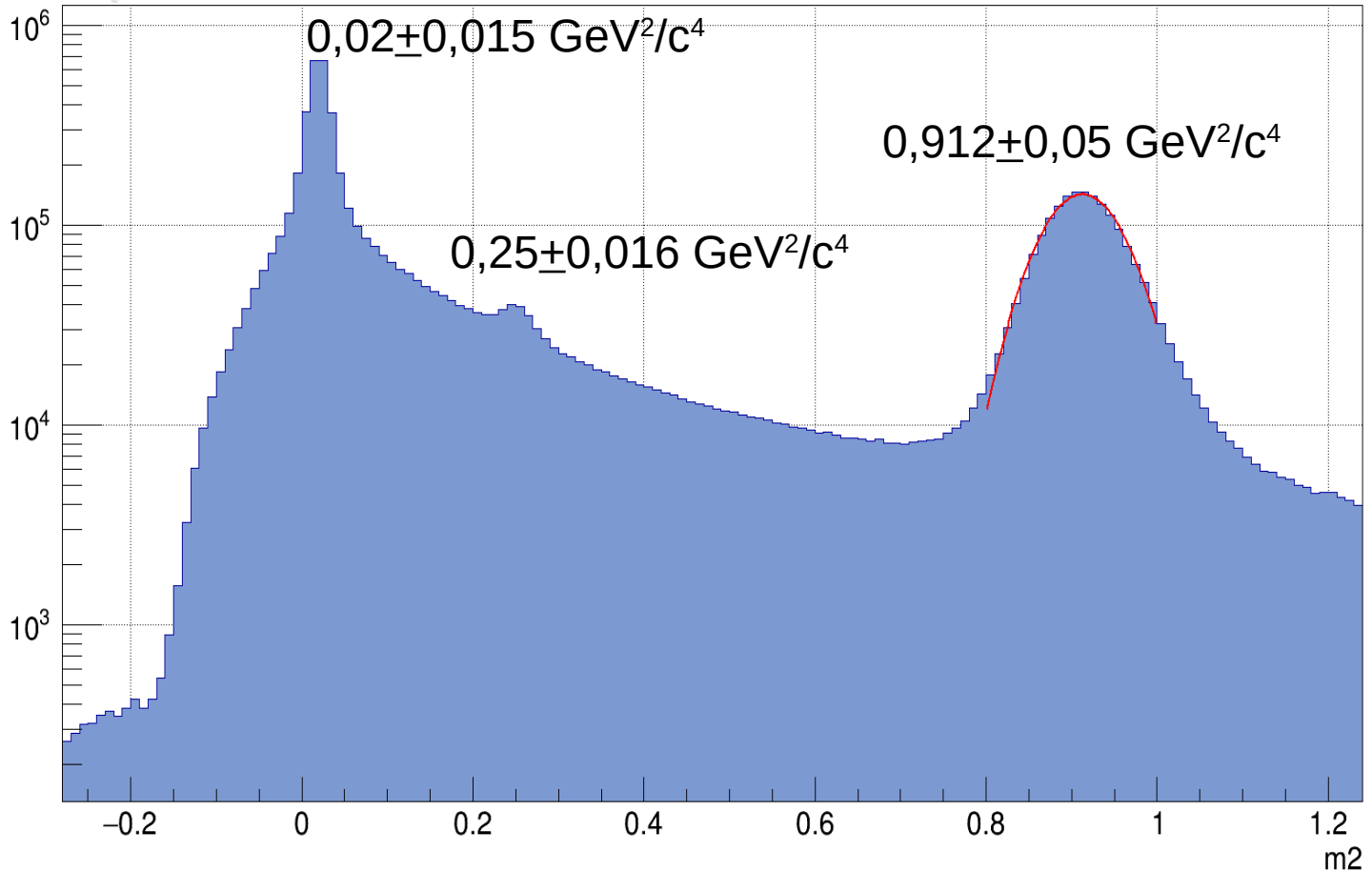


PID possibility.





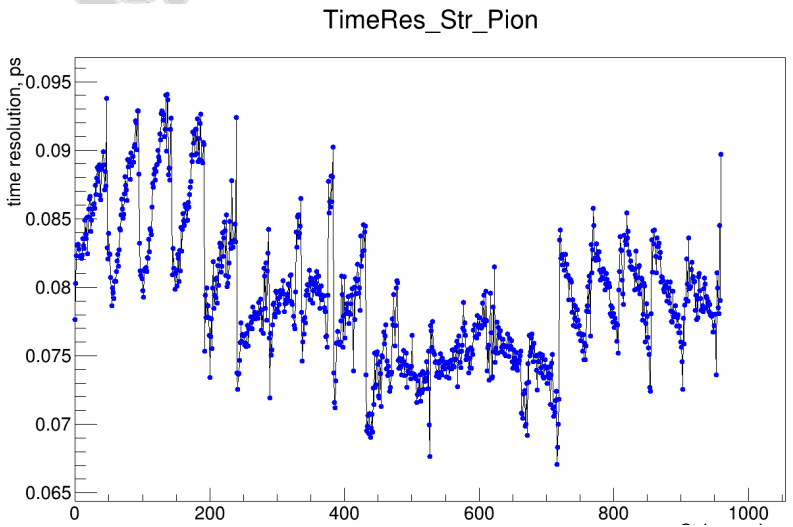
PID possibility.

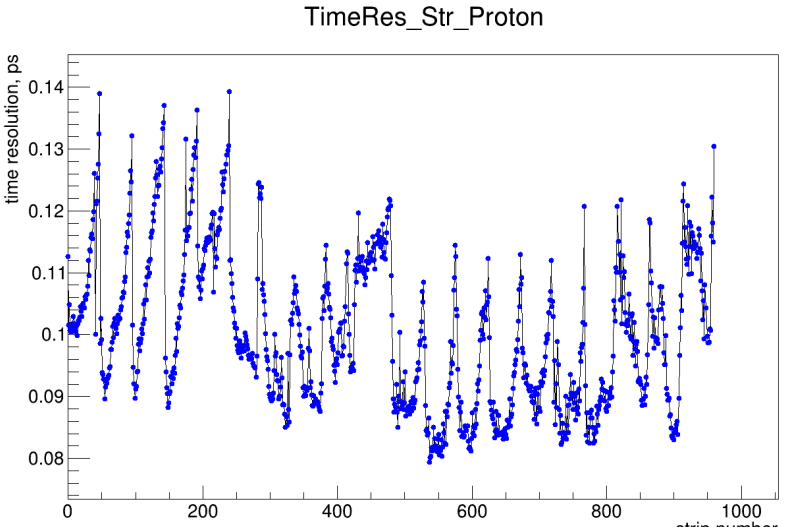


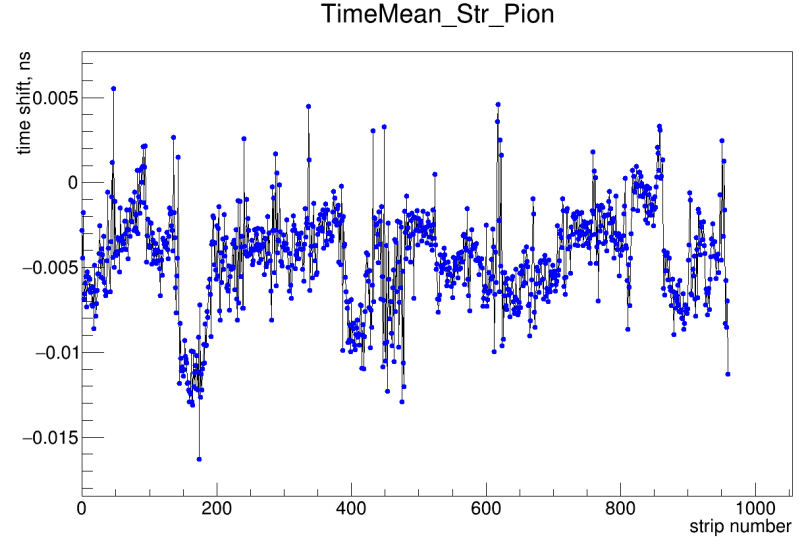
$m^2(\pi) = 0{,}018\ GeV^2/c^4$
$m^2(k) = 0{,}243\ GeV^2/c^4$
$m^2(p) = 0{,}880\ GeV^2/c^4$

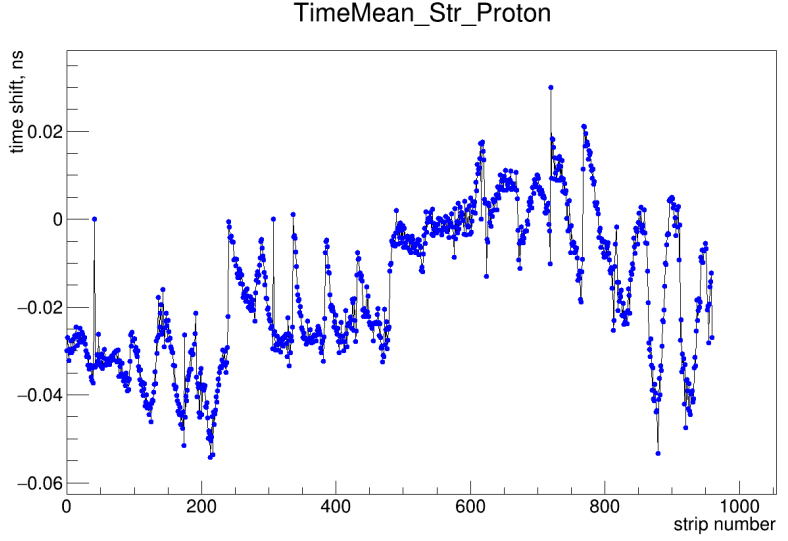
Spector of m^2 in 1-1,1 GeV/c momentum range.

ToF performance.



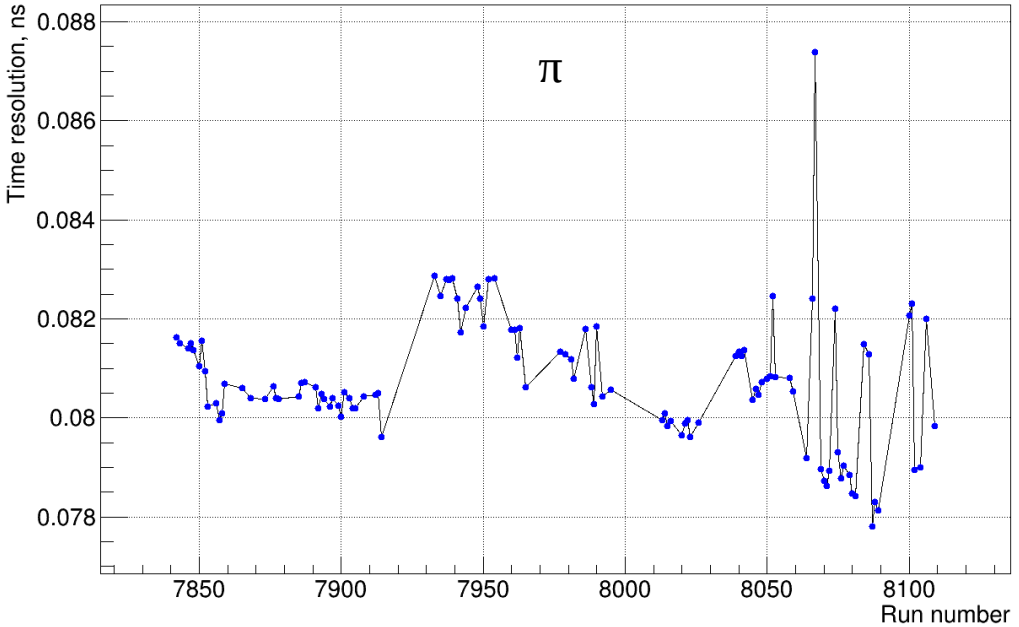


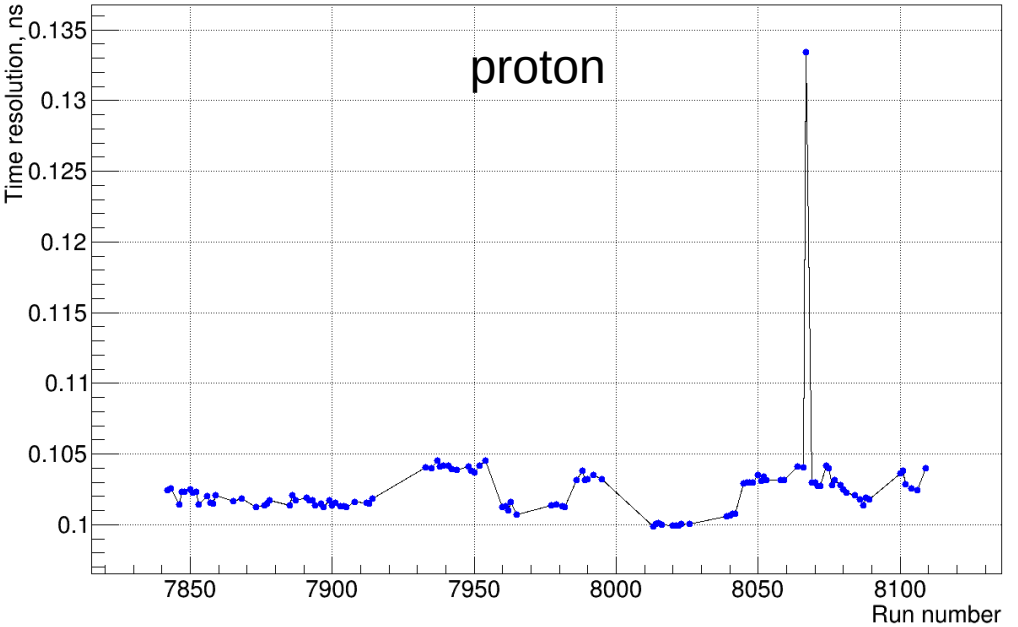




What should we choose for time calibration, π or p?

ToF performance.
Time resolution during the data taking.





Conclusion.

- The main work on calibrating the TOF 400 system has been completed.
- After proton peak correction, all calibrations will be pushed to git.
- The problem of mismatching particles of different charges has not been solved.
- Ehe problem of choosing the type of particle for time calibration has not been solved.

Thank you for your attention!