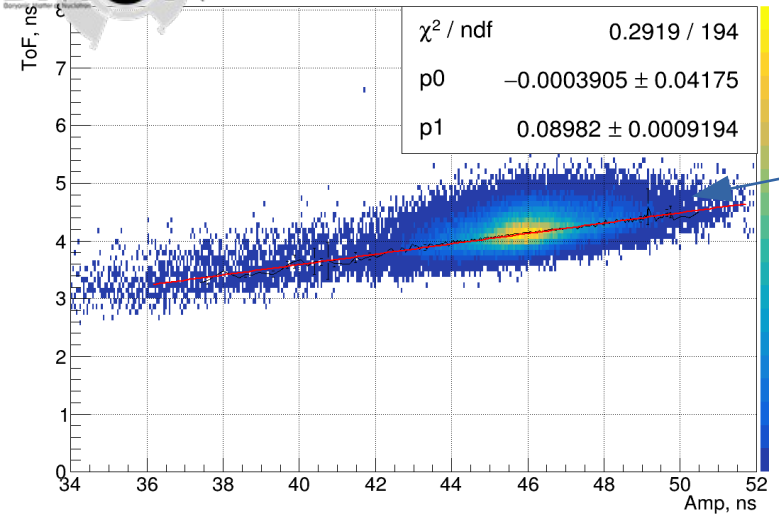
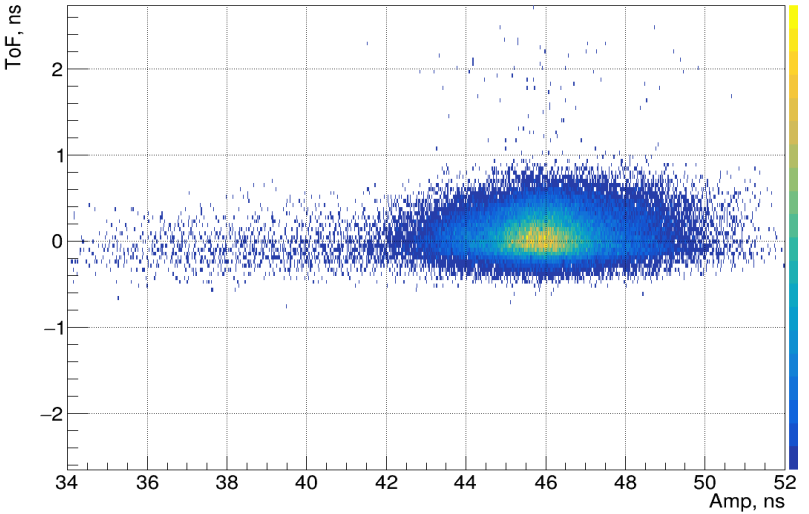
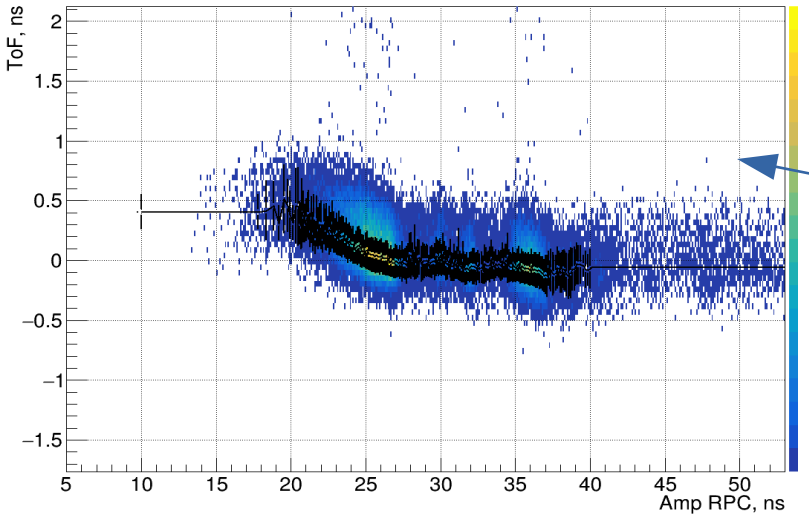
Калибровка масс в TOF400

Slewing correction of the TOF400 by π+(-), 1 GeV/c < p < 2 GeV/c.

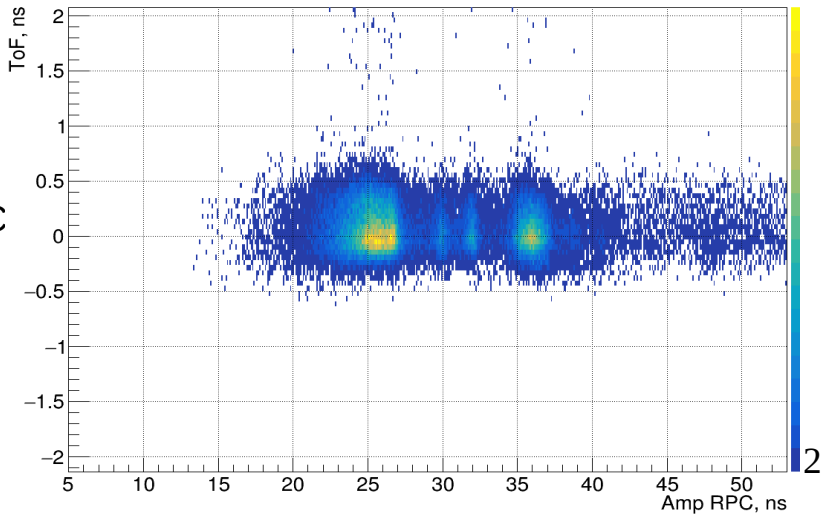


Step 1:
Correction for T0
by line

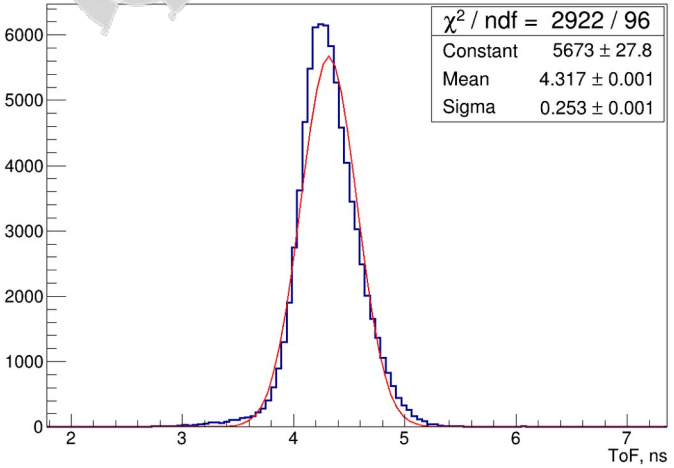




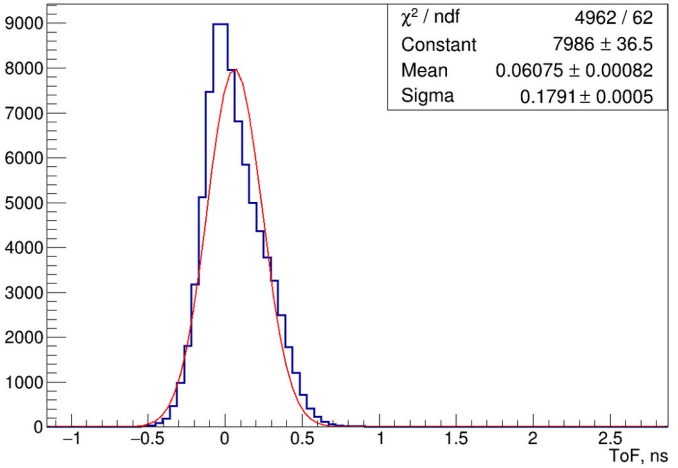
Step 2:
Correction for RPC



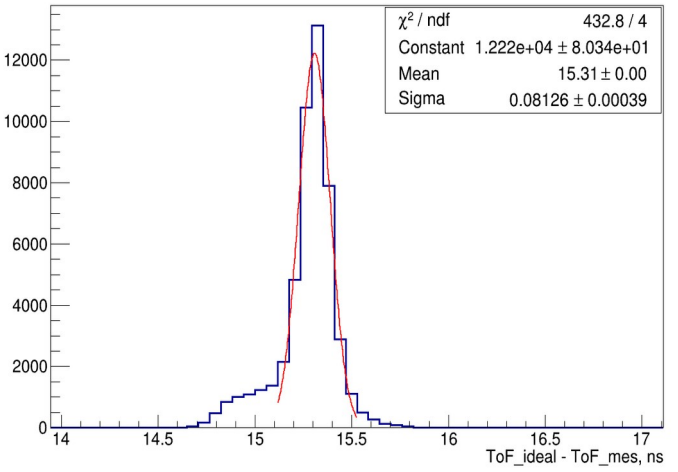
Time shift correction of the TOF400.



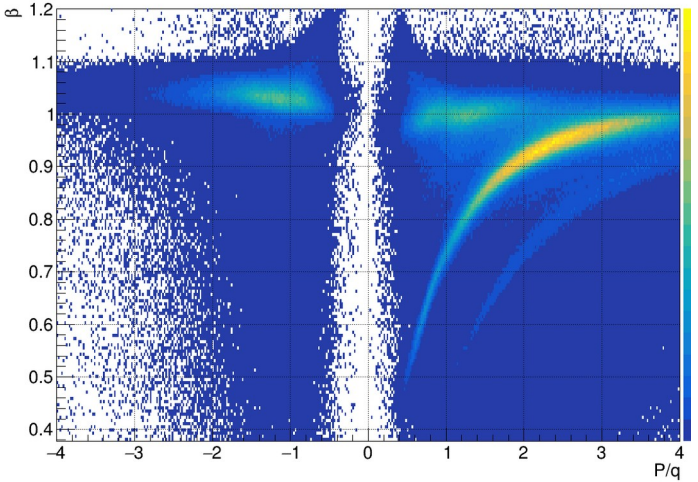
ToF for π+ band w/o Slewing



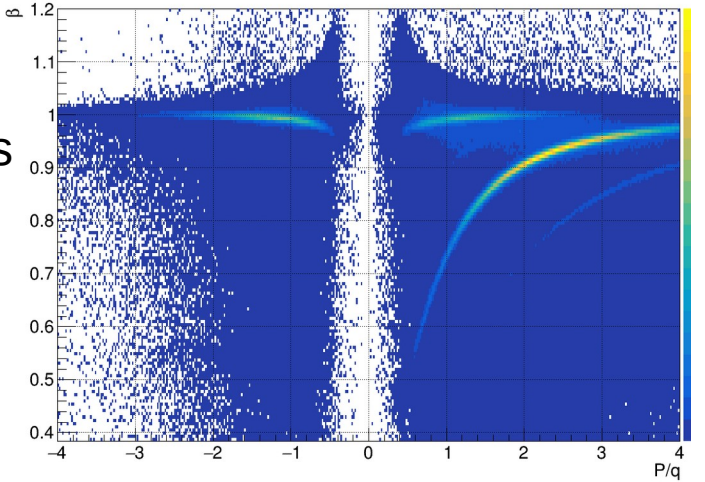
ToF for π+ band with Slewing



ToF_{ideal} — ToF_{mes} for π+ band

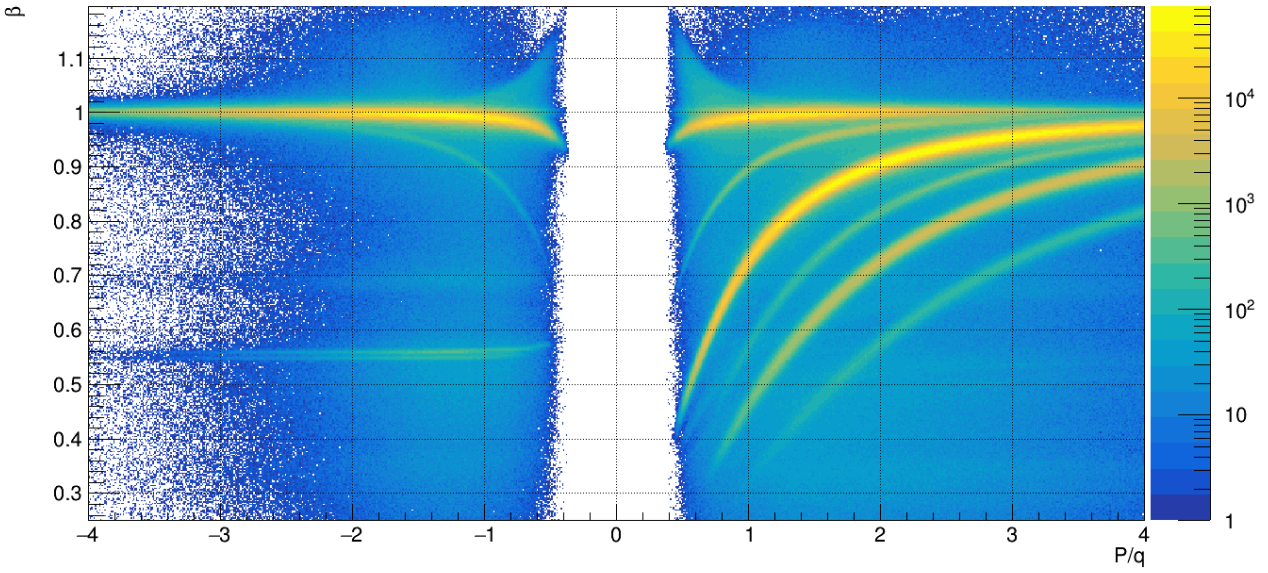


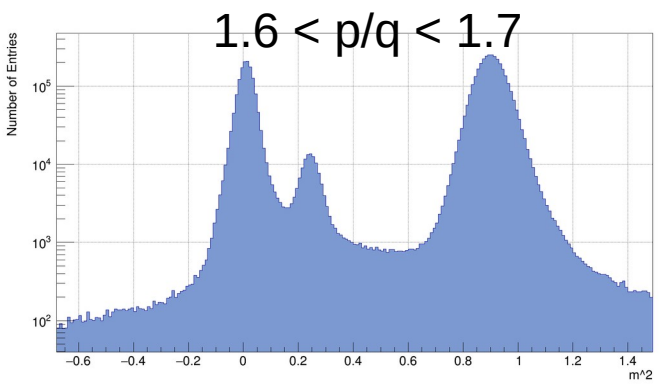
After all corrections

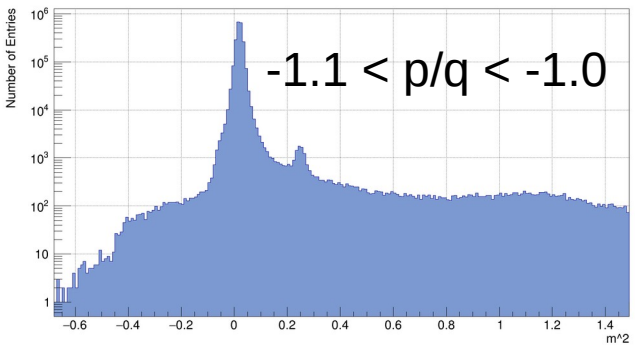


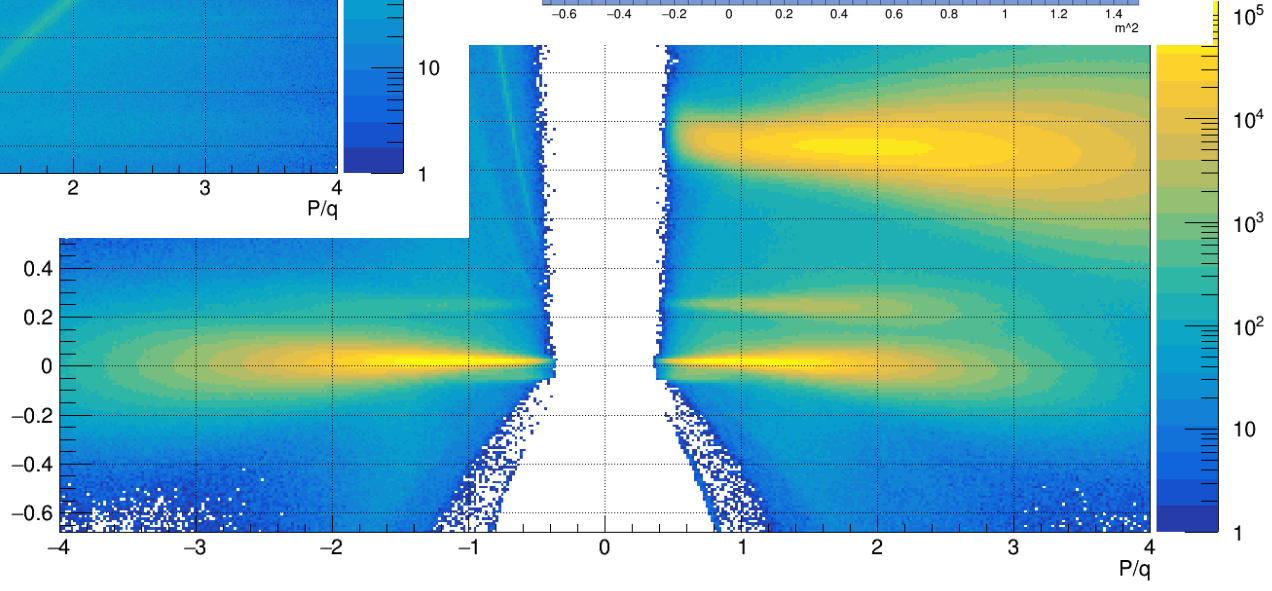
Final result of the correction on proton band. Committed 25.03.2024

Run 7892-7905. ~ 120 Mevents.

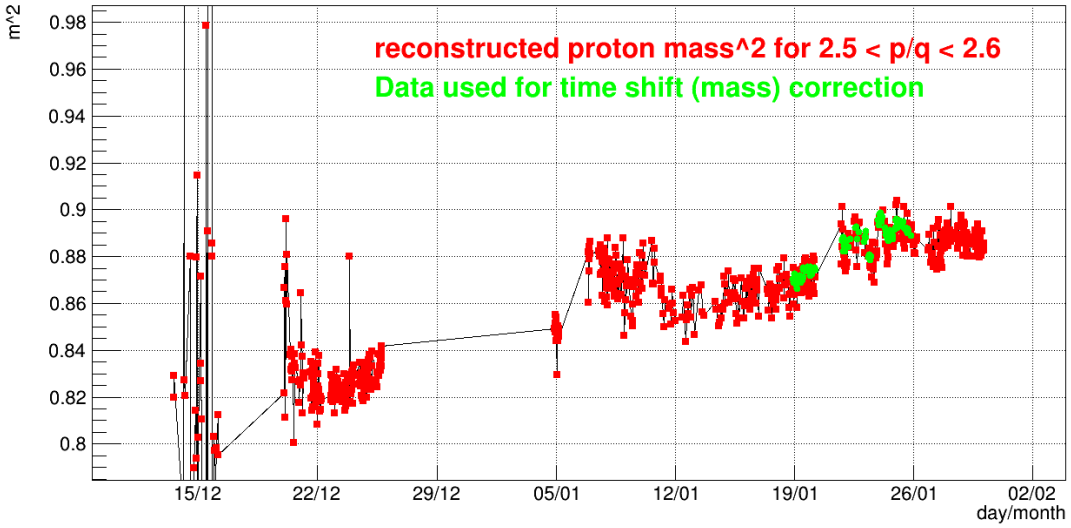


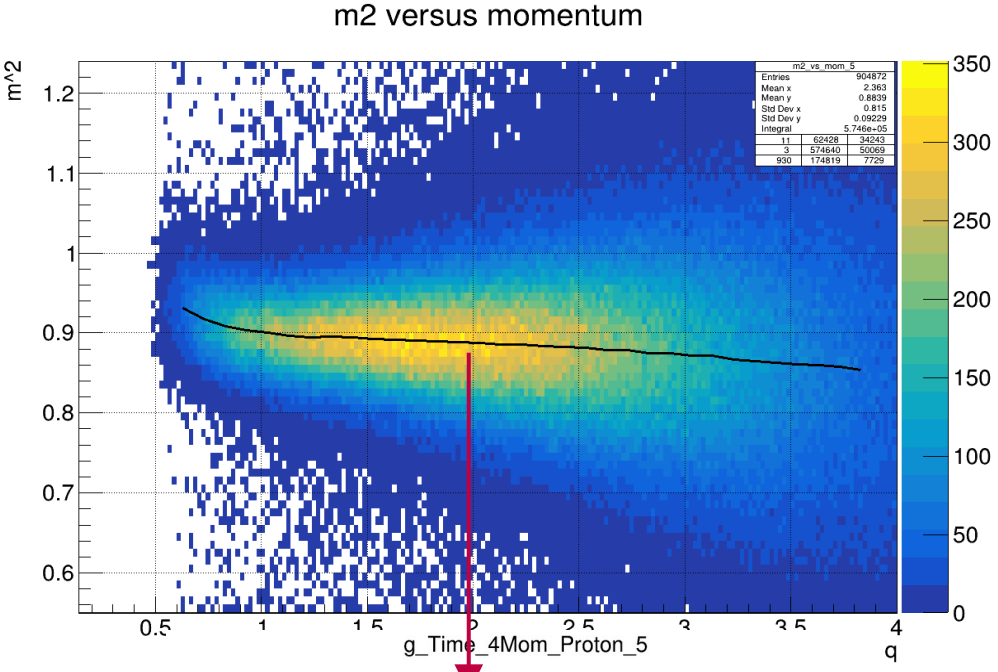


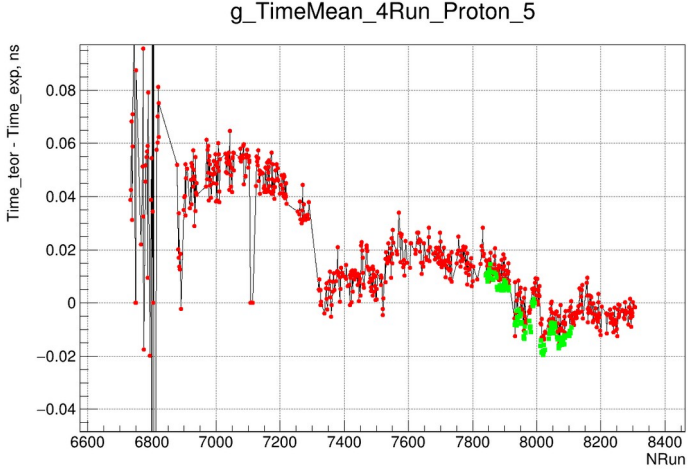




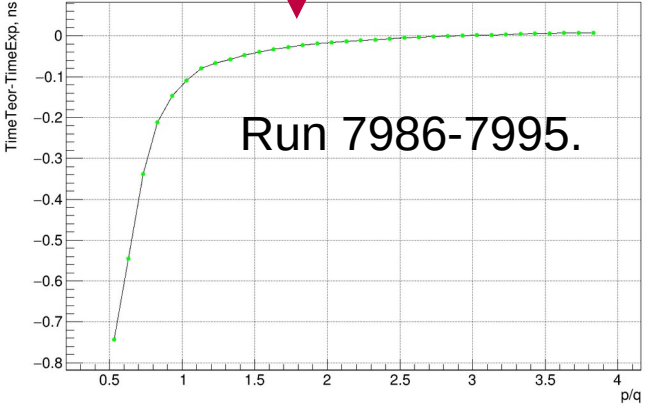
Detailed analysis and problems of mass reconstruction.





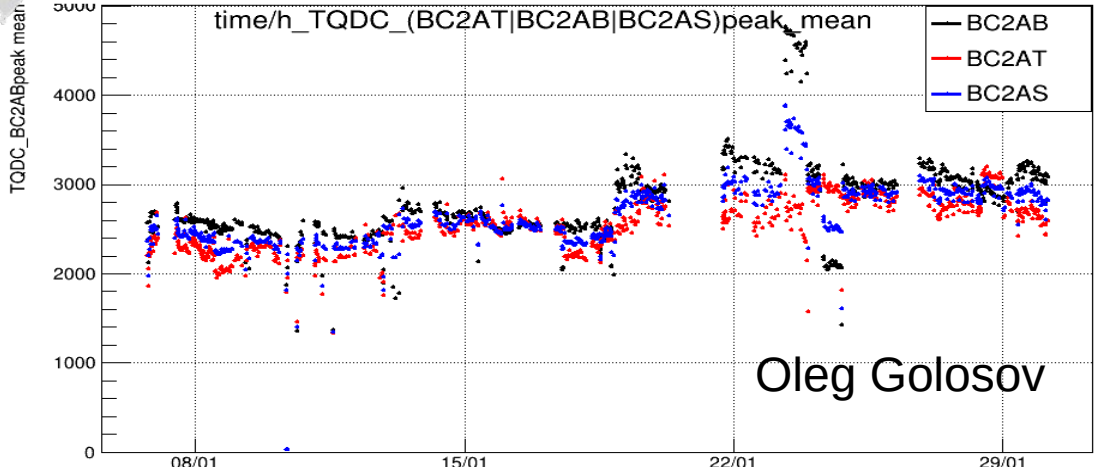


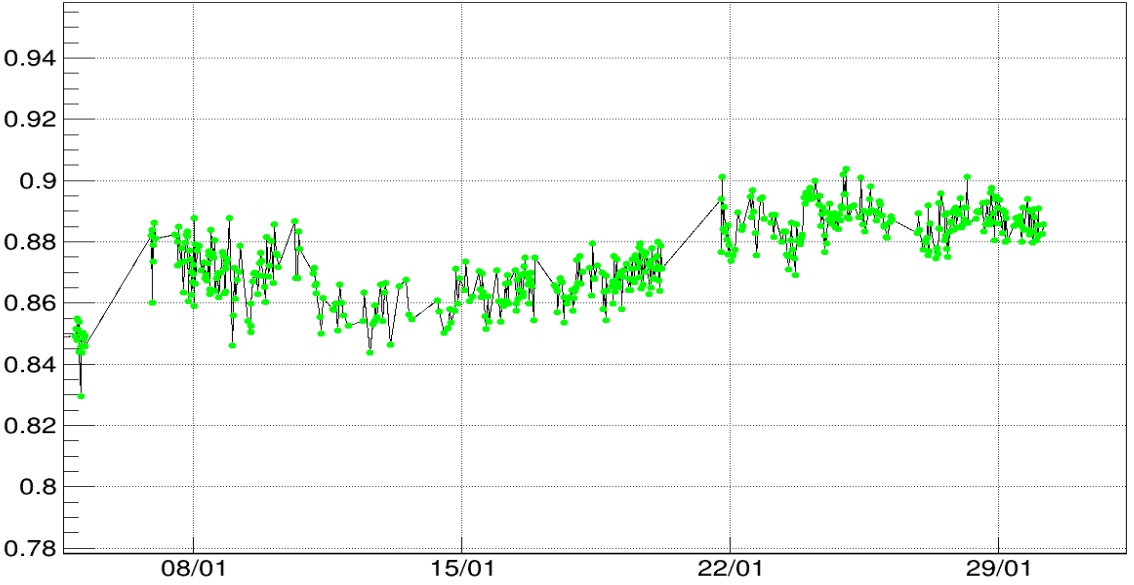
$$m^2 = \frac{p^2}{c^2}\left(\frac{t^2 * c^2}{L^2} - 1\right)$$



Run 7986-7995.

Dependency of the mass reconstruction vs run/time.



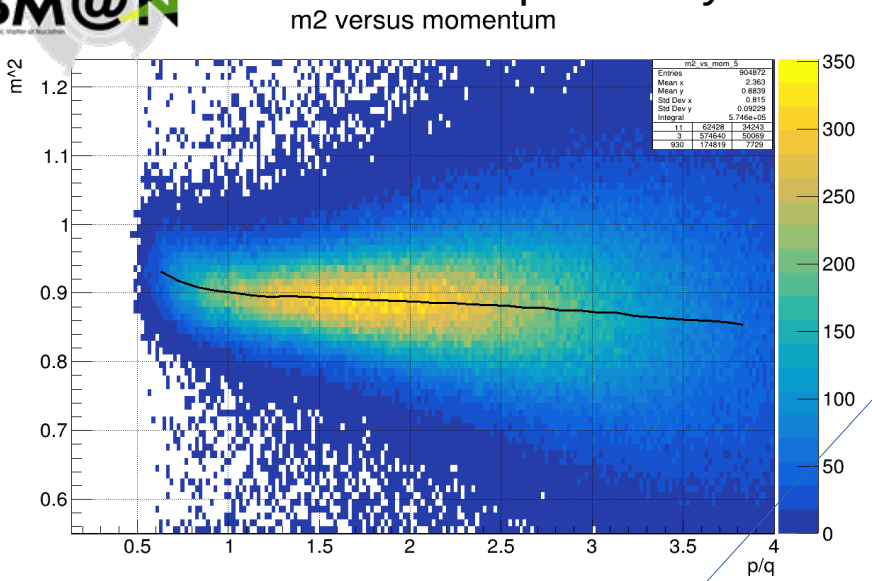


Maybe the reconstructed time depends on the stability of the starting detector BC2?

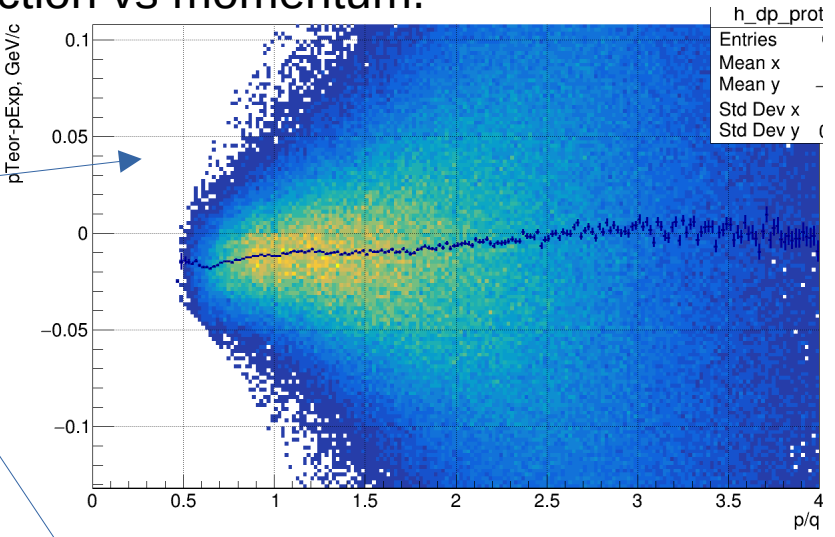
I don't see any dependency.

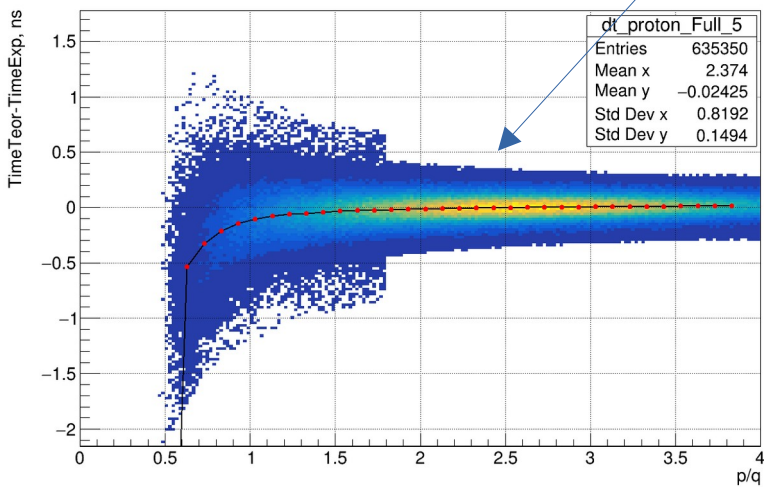
Solution:
We can make the time calibration for each run.

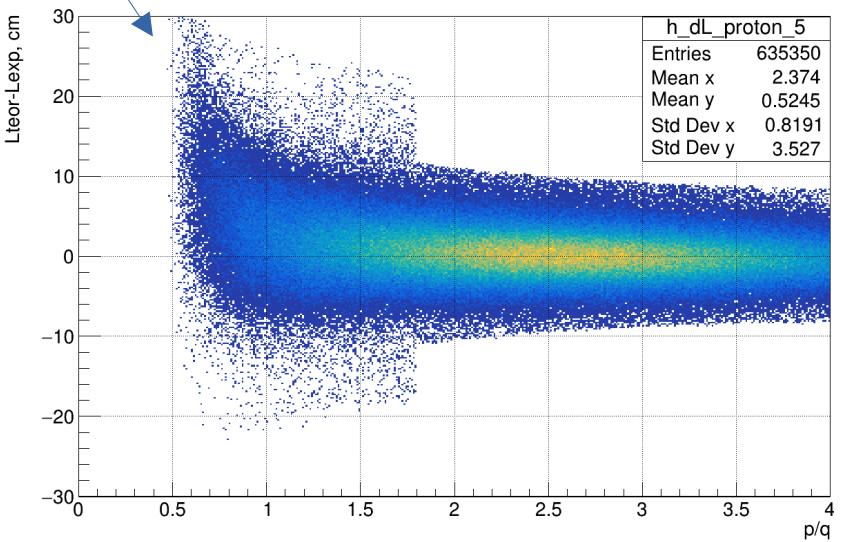
Dependency of the mass reconstruction vs momentum.



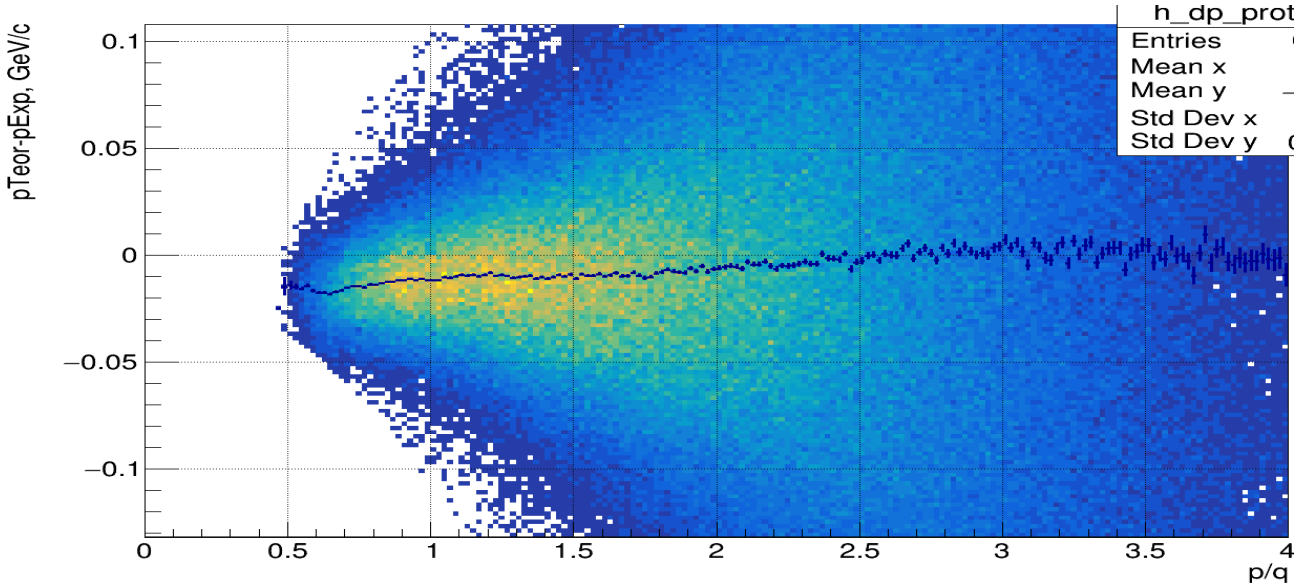
$$m^2 = \frac{p^2}{c^2}\left(\frac{t^2 * c^2}{L^2} - 1\right)$$

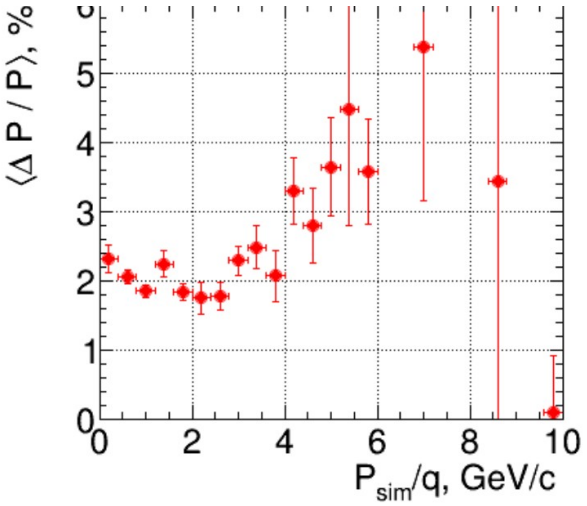


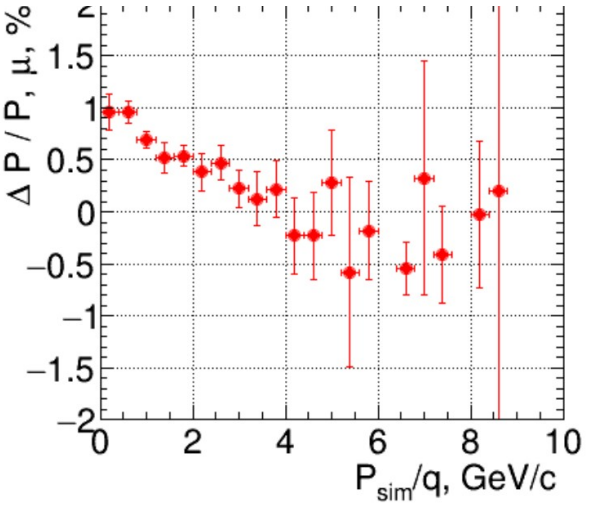




Dependency of the mass reconstruction vs momentum.

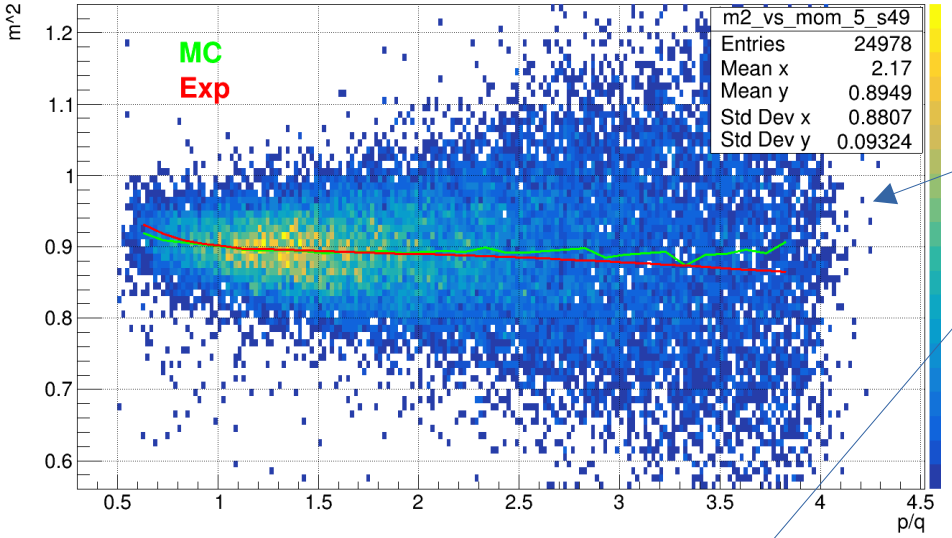






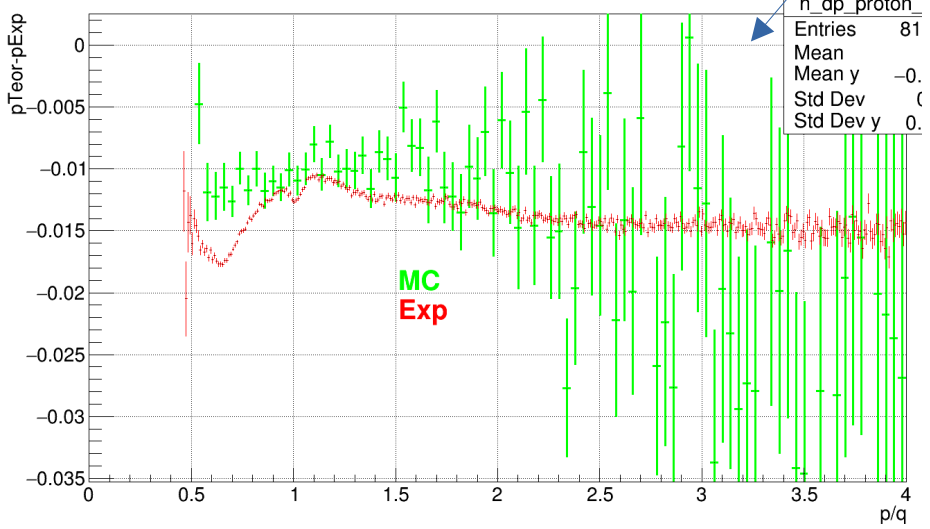
S. Merts

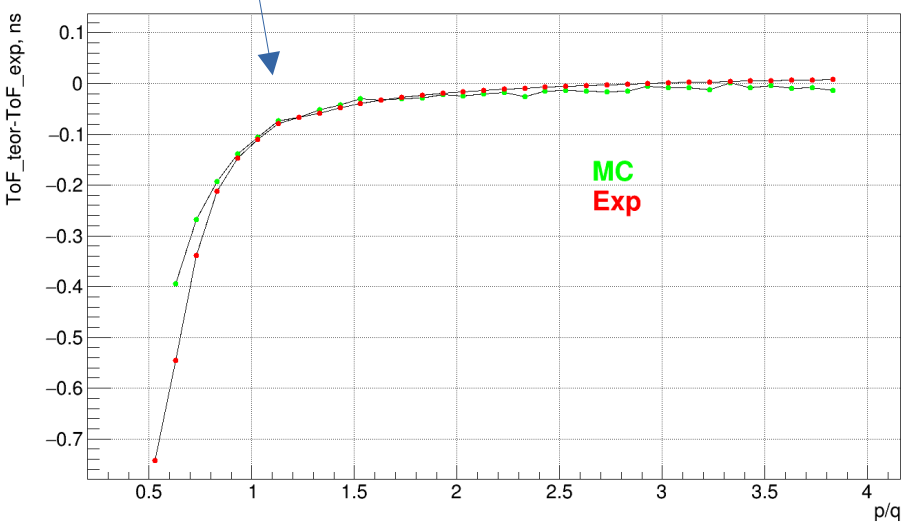
Dependency of the mass reconstruction vs momentum for MC.



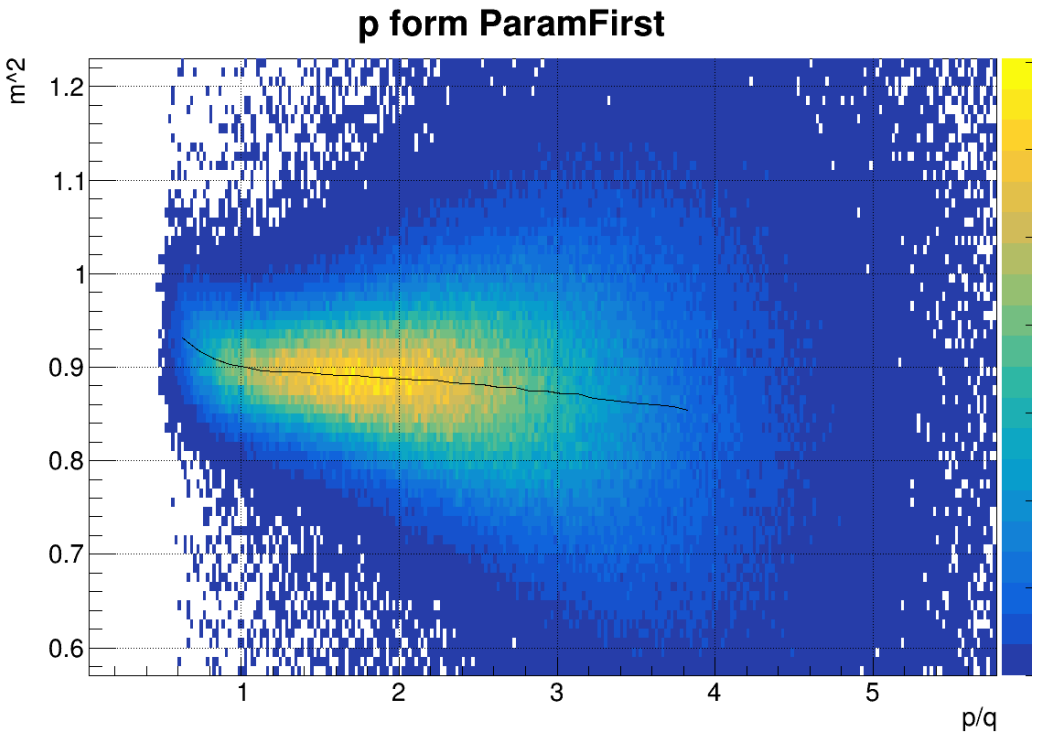
$$m^2 = \frac{p^2}{c^2}\left(\frac{t^2 * c^2}{L^2} - 1\right)$$

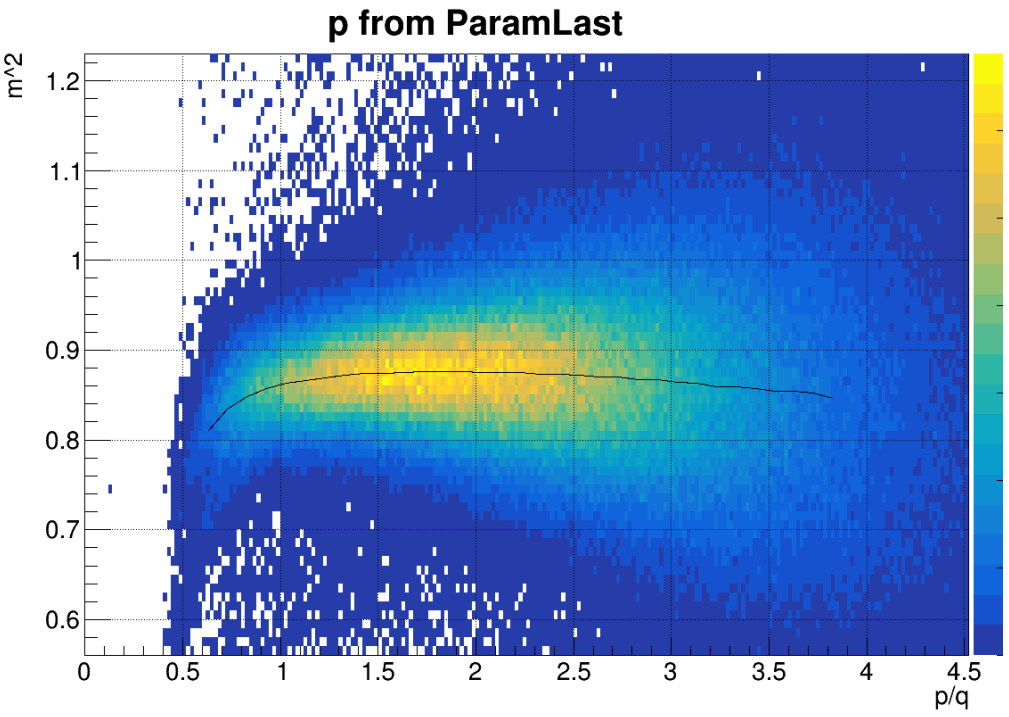
When calculating the mass, it is assumed that the momentum of the particle does not change along the trajectory. But in reality this is not true.





Dependency of the mass reconstruction vs momentum.





We need to make a decision on what momentum to use!