MINISTERUL CERCETĂRII, INOVĂRII ŞI DIGITALIZĂRII

IFIN-HH

www.ifin.ro

TRD - ToF @ mCBM

PID

Alex Bercuci

mCBM Data Analysis Meeting

12th September 2023

Reco setup

CbmRoot
commit cdaca86458acbefc35e9ca4f88a3511ae07c885f (HEAD -> master, tag: dev_2023_36, origin/nightly_master, origin/master, origin/HEAD)
Author: se.gorbunov <se.gorbunov@gsi.de>
Date: Thu Aug 31 20:21:10 2023 +0000
CA: remove multithreading mode

+ **patched with MR** https://git.cbm.gsi.de/computing/cbmroot/-/merge_requests/1316 (Update of TOF classes to implement speed-of-light calibration option)
+ **patched with macro** ini_Clusterizer.C (/lustre/cbm/users/nh/git/cbmroot/macro/beamtime/mcbm2022/ini_Clusterizer.C)

cbmroot-parameters
commit a86380731a867b048ada71d1fc20a8fd00e5cde4 (origin/FASP-pairing, FASP-pairing)
Author: Alexandru Bercuci <abercuci@niham.nipne.ro>
Date: Mon Aug 28 11:39:32 2023 +0300
Fix mapping on odd rows, Fix mapping on CROB 28 (0xffc1)

+ **patched with ToF calibration** (/lustre/cbm/users/nh/git/cbmroot/macro/beamtime/mcbm2022/2391.4.0000_set022002500_93_1tofClust.hst.root)

reco-out
CbmTofEventClusterizer::InitCalibParameter: defaults set
CbmTofEventClusterizer::InitCalibParameter: read histos from file /home/niham/abercuci/usr/CbmRoot/cbmroot/install/share/cbmroot/parameters/mcbm//2391.4.0000_set022002500_93_1tofClust.hst.root
cl_SmT0_Svel cloned from /home/niham/abercuci/usr/CbmRoot/cbmroot/install/share/cbmroot/parameters/mcbm//2391.4.0000_set022002500_93_1tofClust.hst.root
Modify 000 Svel by 1.03 to 16.5006
Check for TCorY in /home/niham/abercuci/usr/CbmRoot/cbmroot/install/share/cbmroot/parameters/mcbm//2391.4.0000_set022002500_93_1tofClust.hst.root
Initialize TCorY: TSR 000, Bwid 0.81, Range 20.25
Modify 001 Svel by 1.03 to 16.2019
Check for TCorY in /home/niham/abercuci/usr/CbmRoot/cbmroot/install/share/cbmroot/parameters/mcbm//2391.4.0000_set022002500_93_1tofClust.hst.root
Initialize TCorY: TSR 001, Bwid 0.81, Range 20.25
Modify 002 Svel by 1.03 to 16.0062
Read new SmT0_sm000_rpc002_Ch015 bin 0 cen 0.200000 walk 0.000000 0.000000
……
Read new SmT0_sm000_rpc002_Ch015 bin 8 cen 3.400000 walk 0.049823 0.049823
……
Read new SmT0_sm000_rpc002_Ch015 bin 30 cen 12.200000 walk 0.000000 0.000000
Read new SmT0_sm000_rpc002_Ch015 bin 31 cen 12.600000 walk 0.000000 0.000000

Reco results

Yield

→ TS reco **20067**, TS digi 20931 (only 4% loss → see reco_error)
→ Events **30.7M**
→ Tracks ALL **577.6M** (before it was 372.7M) **up 55 %** !!!
→ Tracks 2xSTS **108.4M** (18.8%) down from 19.4%
→ Tracks TRD2D **437.4M** (75.6) down from 76.8%
→ Tracks ToF **250.7M** (43.4%) up from 41.8%

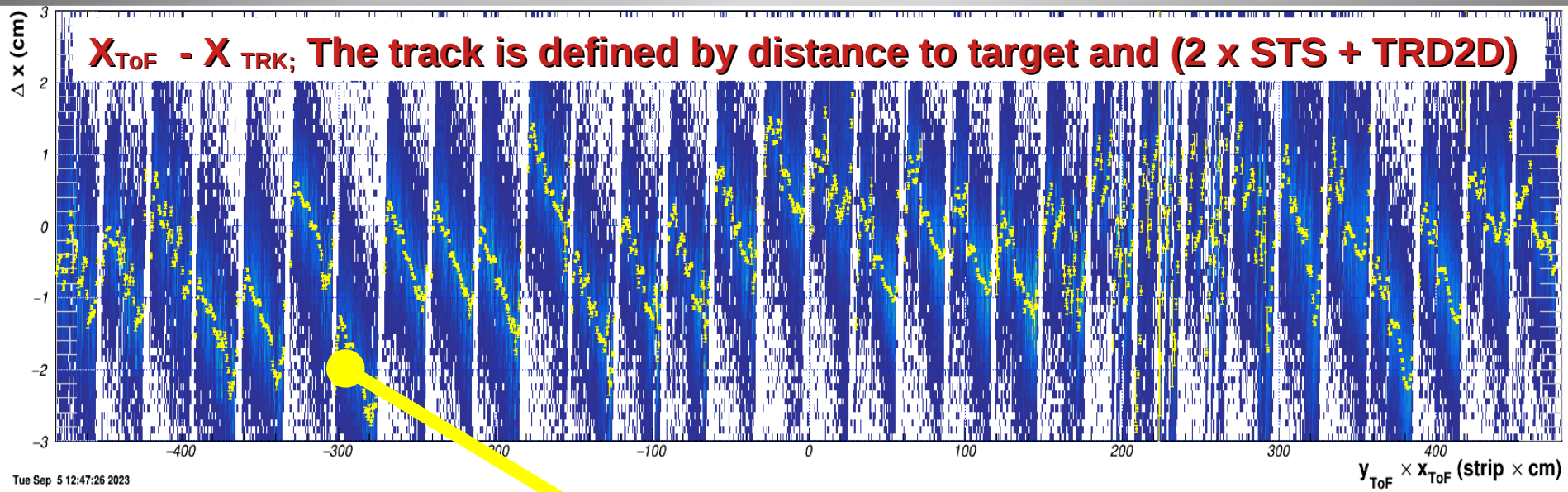
reco-error

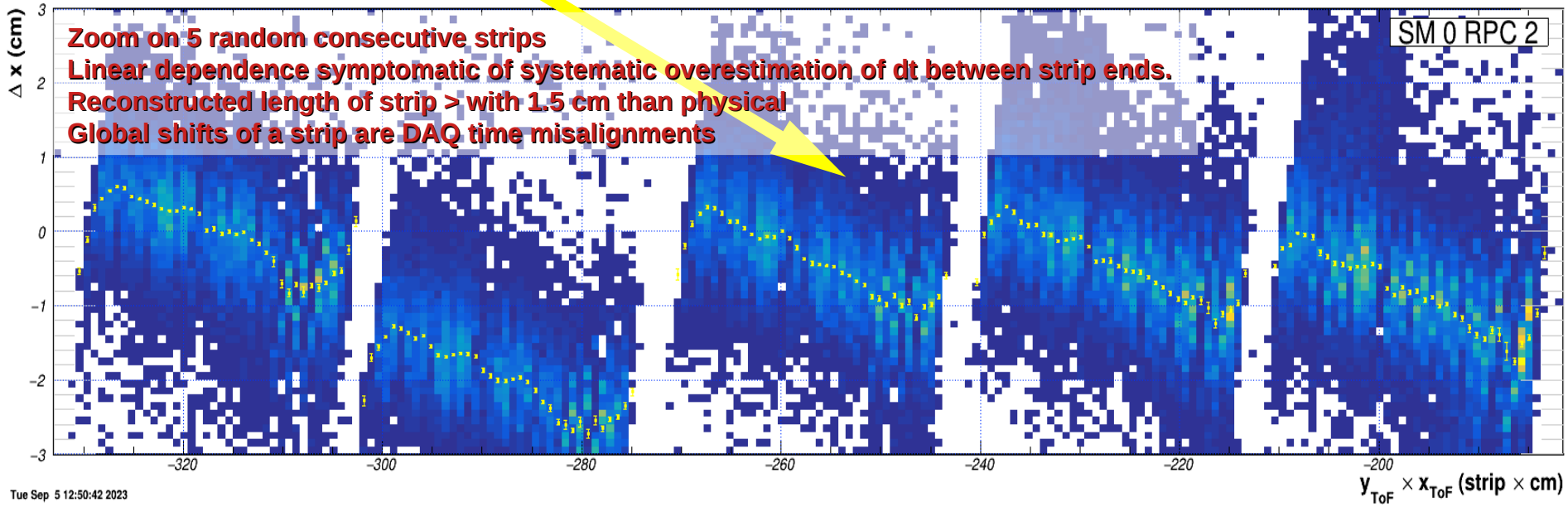
logs/RC_**2391_node8_0_0005**.e:root.exe:
/home/niham/abercuci/usr/CbmRoot/cbmroot/reco/L1/L1Algo/L1CaTrackFinderSlice.cxx:216:
void L1Algo::CaTrackFinderSlice(): Assertion `std::isfinite(time)' failed.

Yield

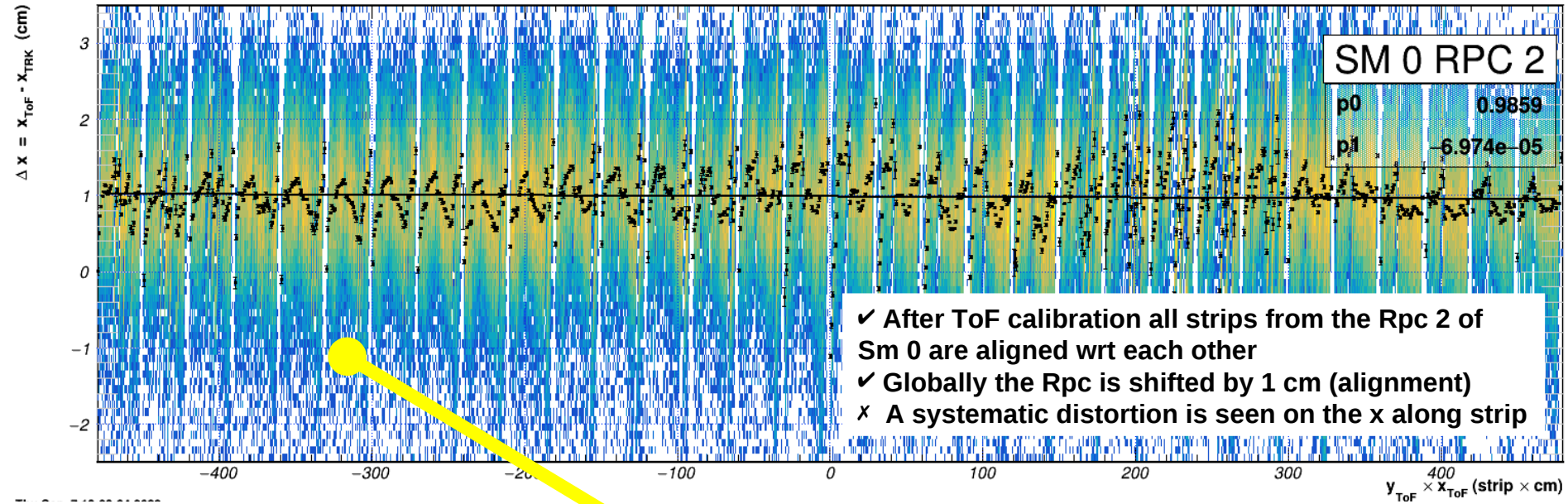
→ Tracks ALL **595.1M** (before it was 577.6M) **up 3 %**
→ Tracks 2xSTS **114.0M** (19.2%) up from 18.8%
→ Tracks TRD2D **457.3M** (76.8%) up from 75.6%
→ Tracks ToF **251.7M** (42.3%) down from 43.4%

ToF dx-x variation (Sm0 Rpc2)

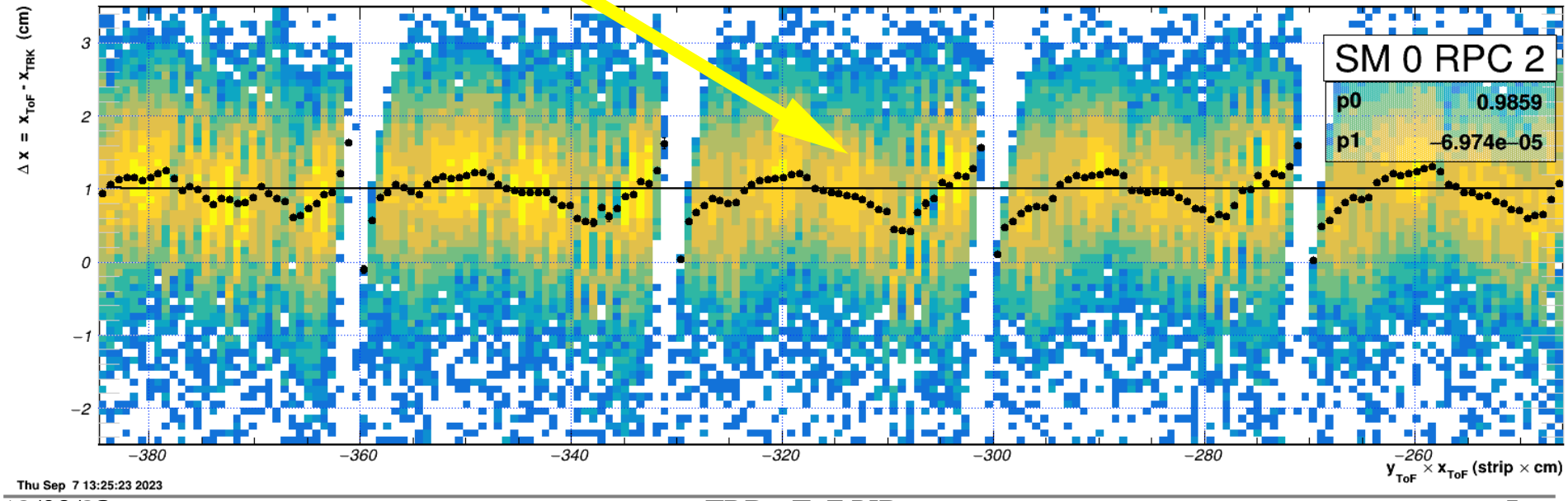




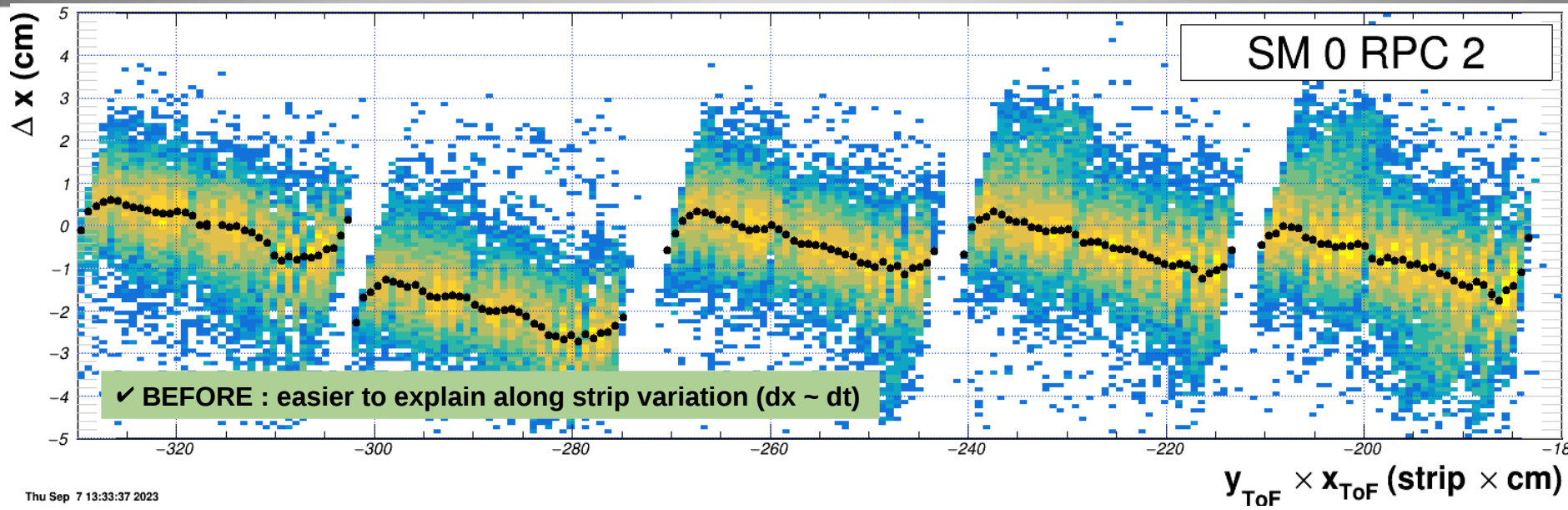
ToF calibration (Sm0 Rpc2)

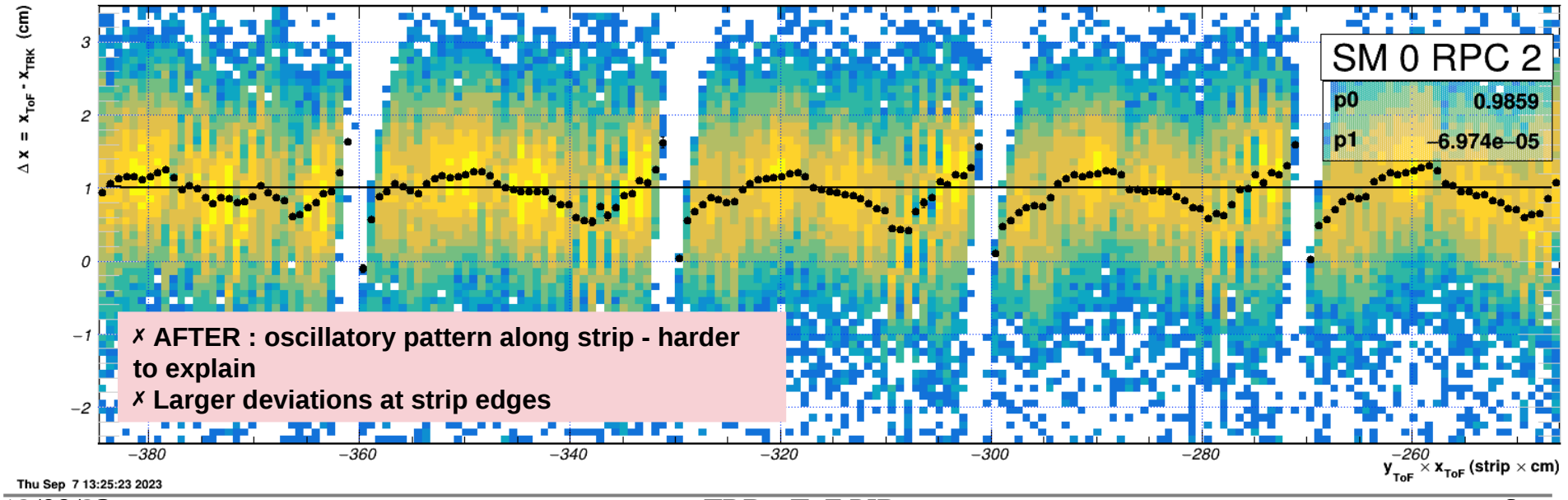


✔ After ToF calibration all strips from the Rpc 2 of Sm 0 are aligned wrt each other
✔ Globally the Rpc is shifted by 1 cm (alignment)
✗ A systematic distortion is seen on the x along strip

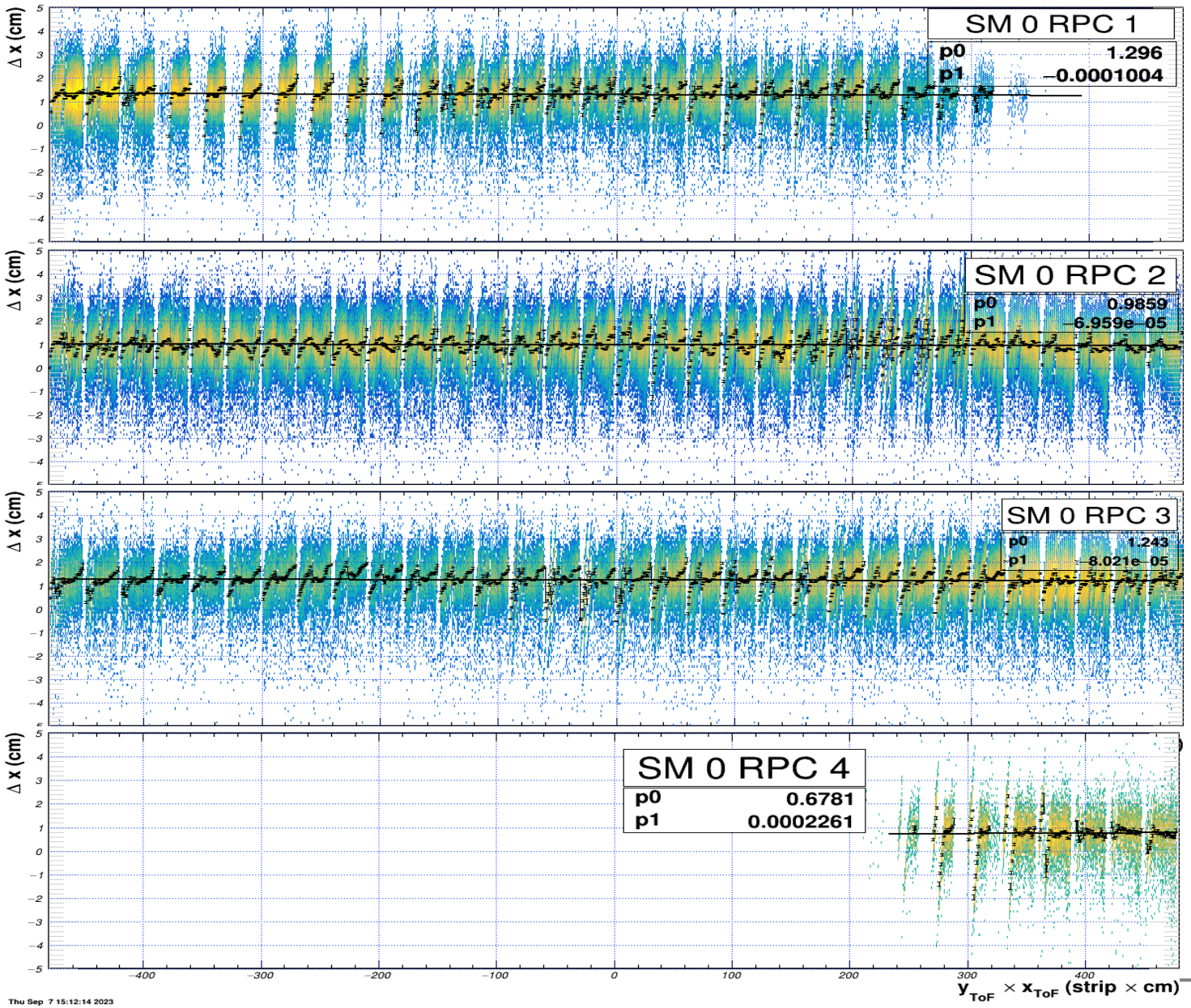


ToF calibration (Sm0 Rpc2)





ToF calibration Sm0



✔ The shift does not depend on y (strip – in a first approximation) but depend on Rpc, with a constant step of few mm.

✔ There is a clusterization between odd and even Rpcs

ToF alignment

✔ **The Rpc 1,3 seems to show a larger x shift due to a global rotation of the whole ToF geometry in the opposite direction**