Preparations/Setups/Measurements for EDD CERN 2015 phase I

PANDA Collaboration meeting June 2015

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JLU Gießen

The Preparations

TRB v3 Readout
PADIWA's

MCP"s, and
their DAQ
Interface, PCB's

Radiators,
FLG's, Optic
measurements

We have started this for Giessen
Cosmic test station(12 channel),
then it turned
to be mainly for CERN2015
Prototype(300 channel)

Julian owes us
to describe it in
near future

here credits and
requests goes to Erik

We will see a few
results of checks/
measurements

Resumes here was ,
We could read 160(from 300)
Channels from Photonis
And 128(from6X128) Hamamatsu
MCP's

Resume was ,
we have 2 qartz
Radiators and
3 FLG's

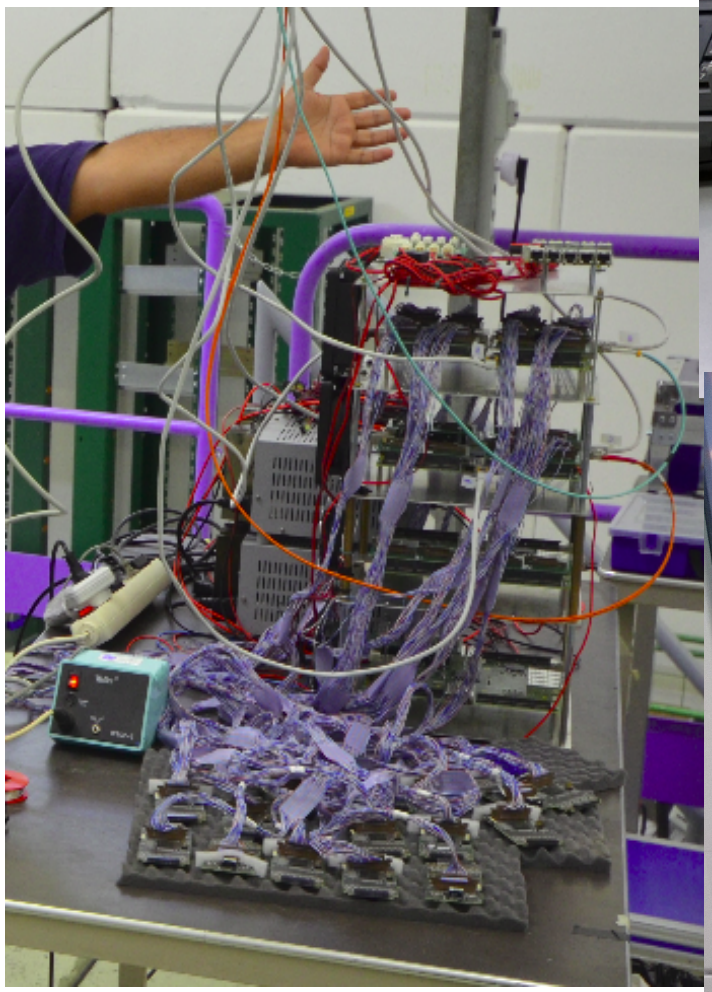
Tools used in preparation

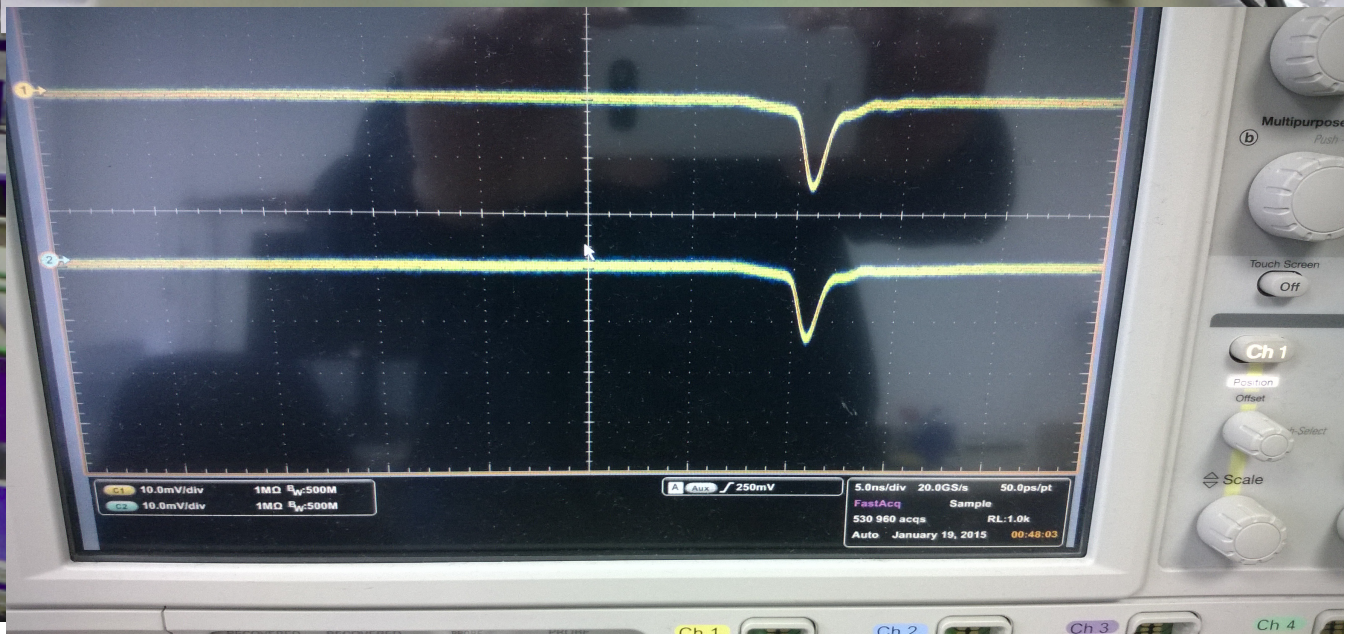
TRB V3 tower 3 Boards

Pulse Generator
to mimic MCP signals

two new MCP
6X128 Hamamatsu

3X100 Photonis

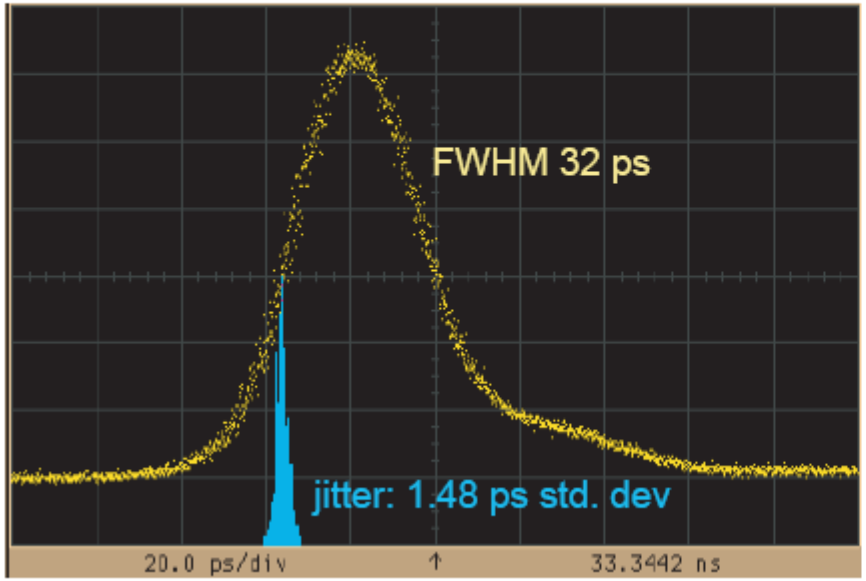


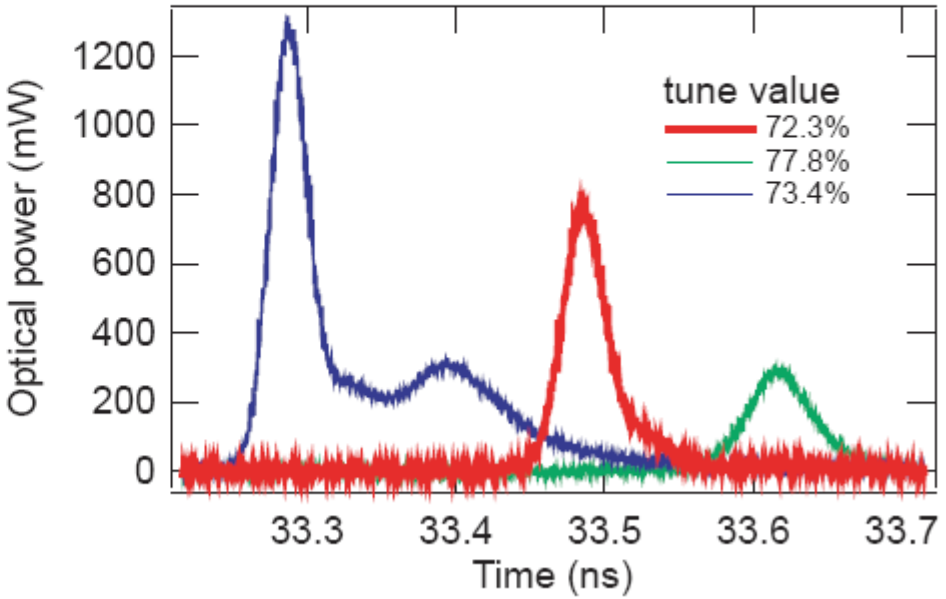


PiLas Laser

Sample data of a PiLas with center wavelength of 405 nm (PiL040)

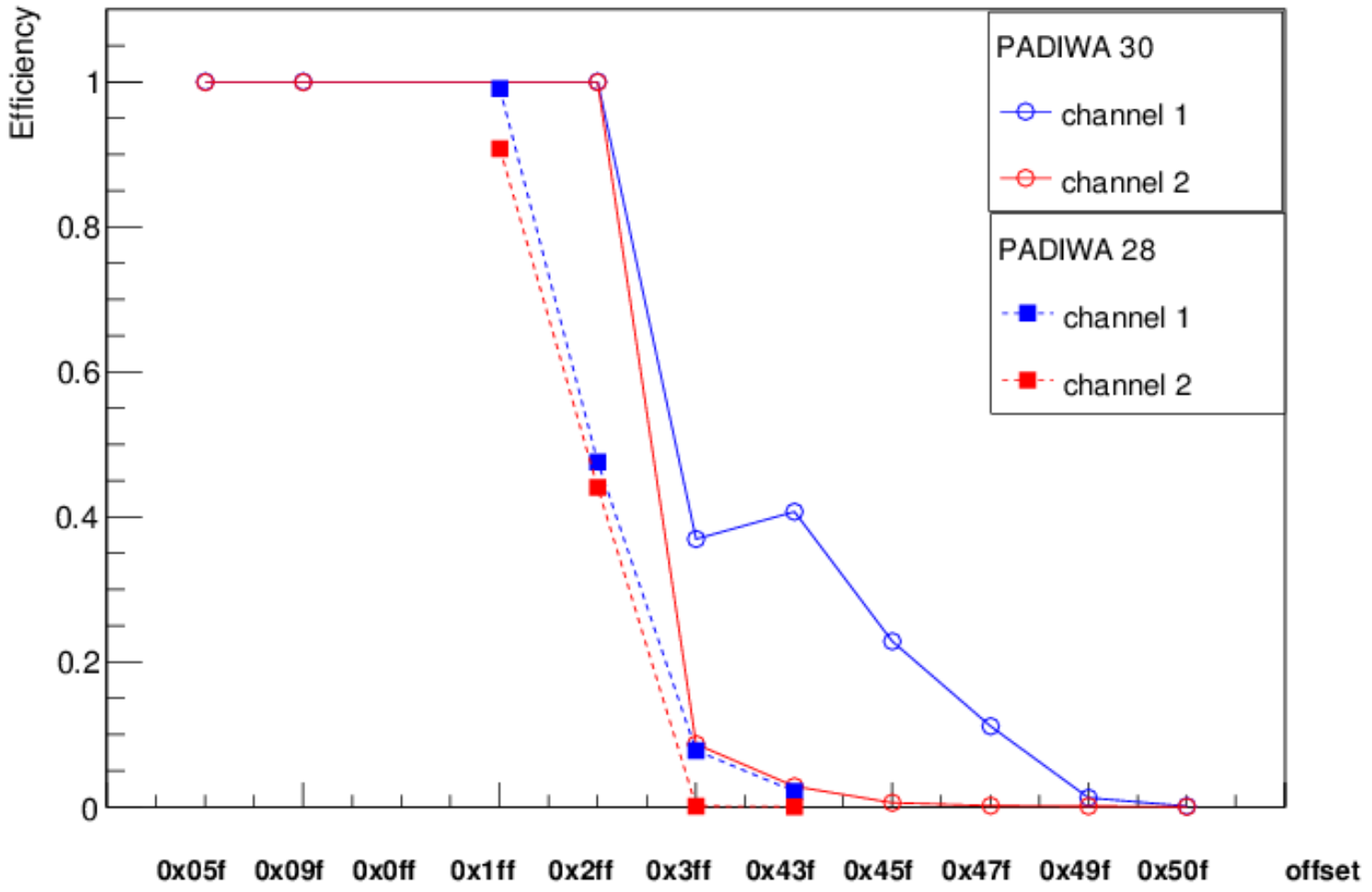
Sampling oscilloscope data





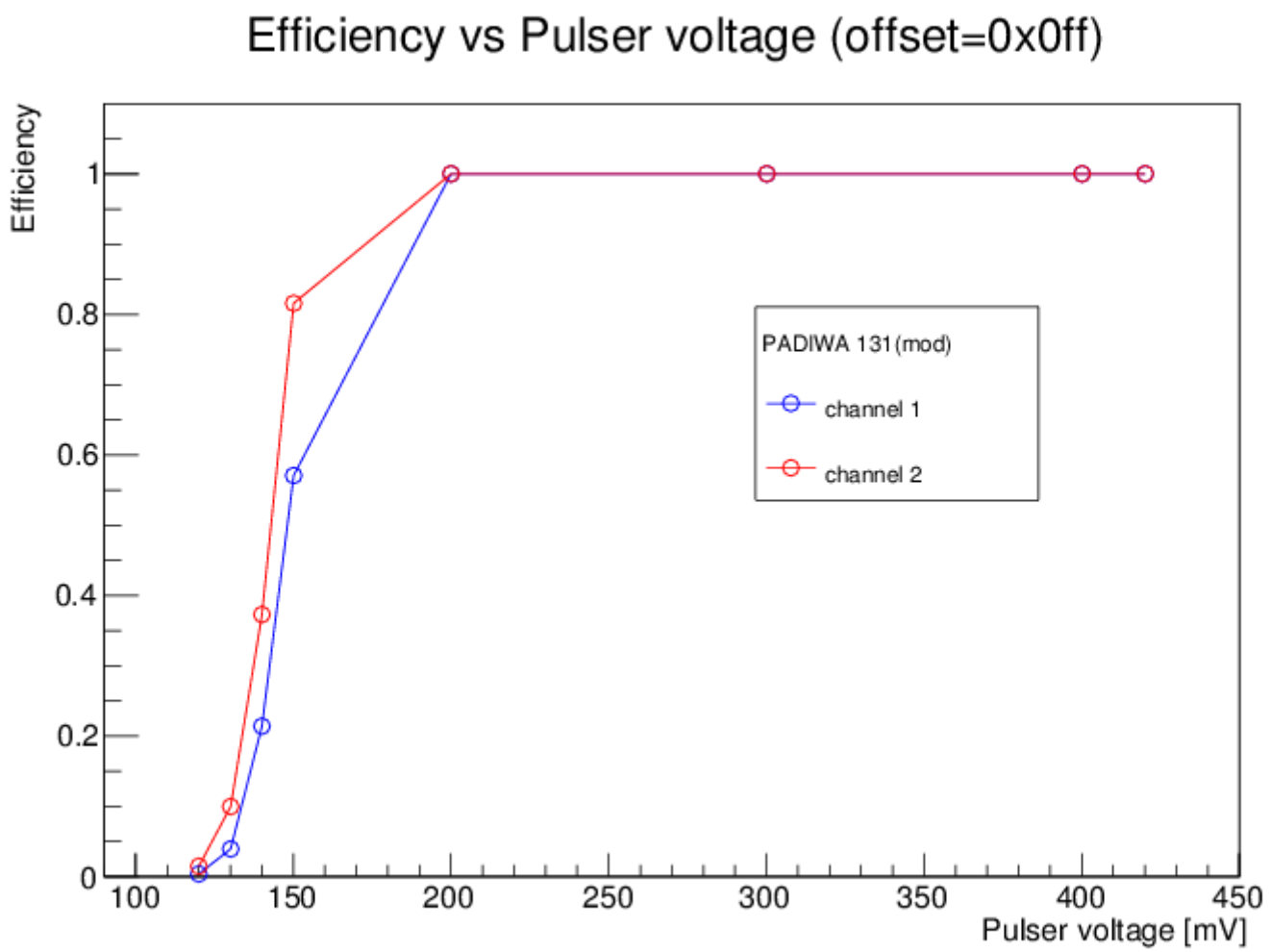
Possibility to Run using Internal/External Triggers up to 1 MHz
One can “match” in discrete way the wavelength to the photon detector QE maximum
More than 200mW peak power yield, enough to get hits from all channels
We have run our Laser for a fixed 10kHz rate and accumulated a few runs every day
Analysis of this runs should tell us about stability of detector gain and timing scale

Few Results from Lab, threshold scan



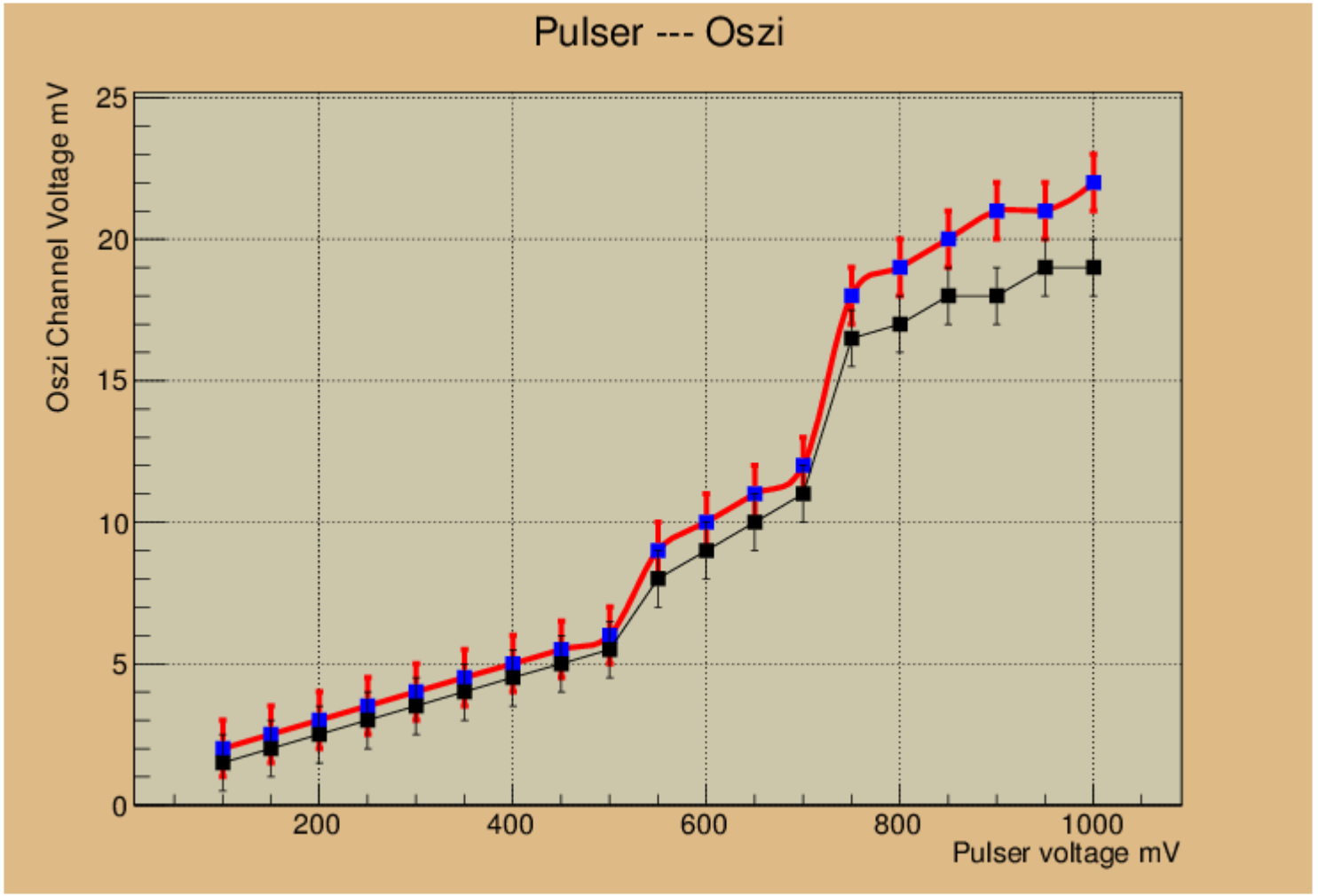
One can see that if we supply PADIWA/TRB with circa 10mV signals and chose Correct threshold(here the offsets are shown) an 100% efficiency could be achieved
Similar behavior we had also for Carsten two modified PADIWAs(**Thanks Carsten**)
0x05f ~ 0.5mV, 0.8mV, 1.3mV, 2.6mV, 3.9mV, 5.2mV, 5.5mV, 5.7mV, 0x47f~5.85mV

Few Results from Lab, amplitude scan



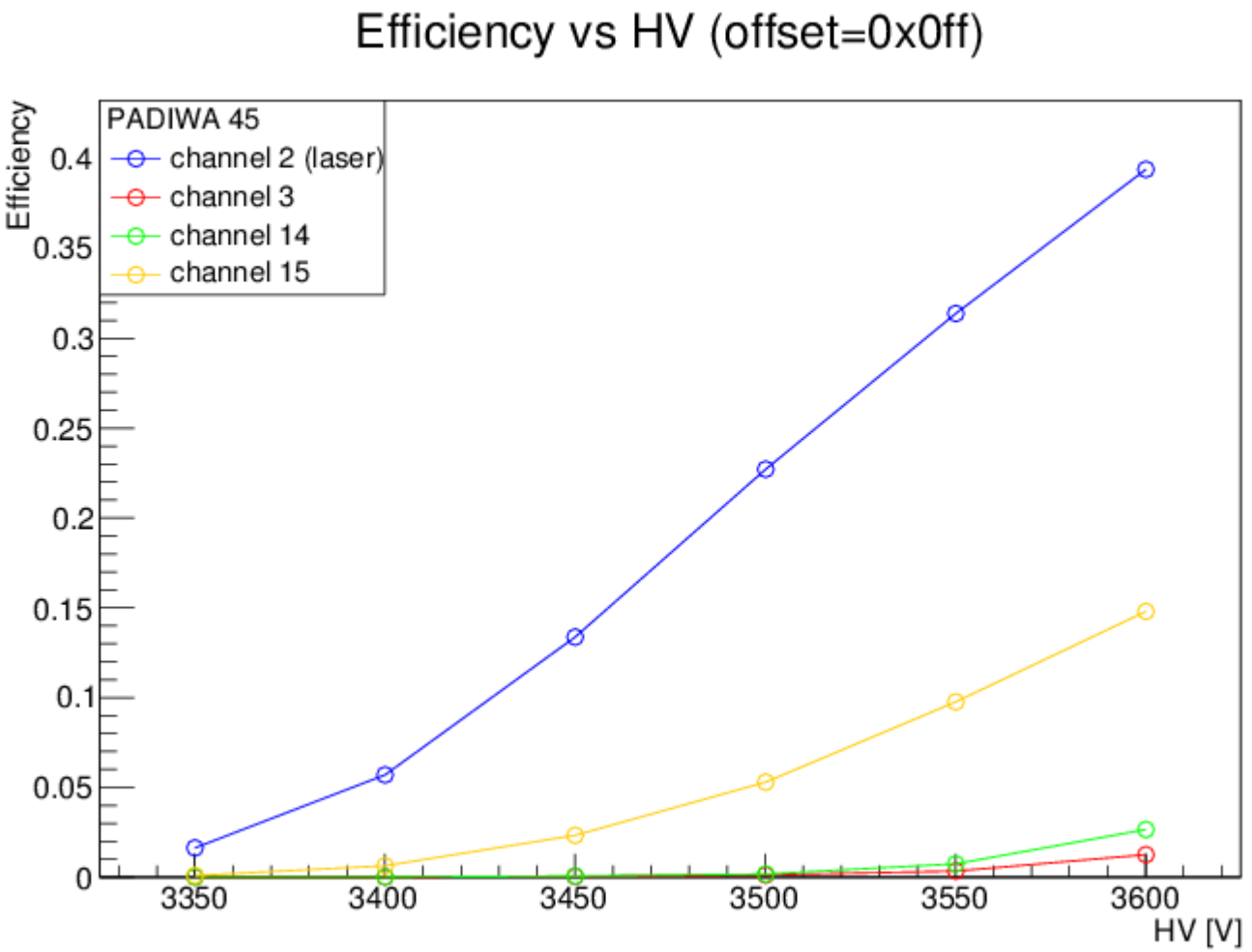
And this is Carsten modified PADIWA Nr. 131 (**Thanks Carsten**)
See next page how we attenuate the pulser to get a FEW mV signals on PADIWA input

Few Results from Lab, amplitude scan



And this is Carsten modified PADIWA Nr. 131 (**Thanks Carsten**)
We attenuate the pulser to get a FEW mV signals on PADIWA input, default setting
Was at 430mV yielding ~5mV input signals on PADIWAs

Few Results from Lab, HV scan



This one is from Hamamatsu MCP and Pilas Laser focused as J. R. described
In his talk done at previous Coll meeting

PADIWA	TDC	Source of signal	Efficiency at thr=0x0ff	Second peak
30	0c22, chain 0	pulser	1ch = 0.999867 2ch = 0.999386	no
28	0c23, chain0	Pulser	thr= 0x1ff 0.990655 0.907581	Yes (in both ch.)
131(modified)	0c23, chain 0	Pulser	0.999999 1	No
41	0c23, chain 2	Pulser	0.092495 0.999872	Yes (in both ch.)
42	0c23, chain 1	Pulser	1 1	no
132(modified)	0c10, chain 0	Pulser	0.999986 1	Yes (few events in 1 ch.)
24	0c10, chain 1	Pulser	0.919092 1	Yes(1 ch.)
20	0c10, chain 2	Pulser	1ch -No signal 2ch - 0.999752	yes
36	0c13, chain 0	Pulser	0.794562 0.999991	yes
38	0c13, chain 1	Pulser	0.99999 1	no
44	0c13, chain 2	Pulser	0.948138 0.999995	yes
45	0c13, chain 0	MCP PMT, U=3450V	0.131916 0.000268086 0.000332946 0.0977476	yes(small)
39	0c13, chain 1	MCP PMT, U=3450V	0.105714 0.000646515 0.00116139 0.0426451	Yes(small)
18	0c13, chain 2	MCP PMT, U=3450V	0.0703536 0.00027354 0.00152689 0.0238002	Yes
26	0c13, chain 2	MCP PMT, U=3450V	0.0509922 0.00012604 0.000510162 0.00554976	Yes
21	0c01, chain 2	MCP PMT, U=3450V	0.0419599	yes(small)

As a summary for preparations
we drove on 4th of May
with 24X16 channel
DAQ readout,
with two MCPs,
3 FLG and
2 quartz radiators

Available Test beam setup's

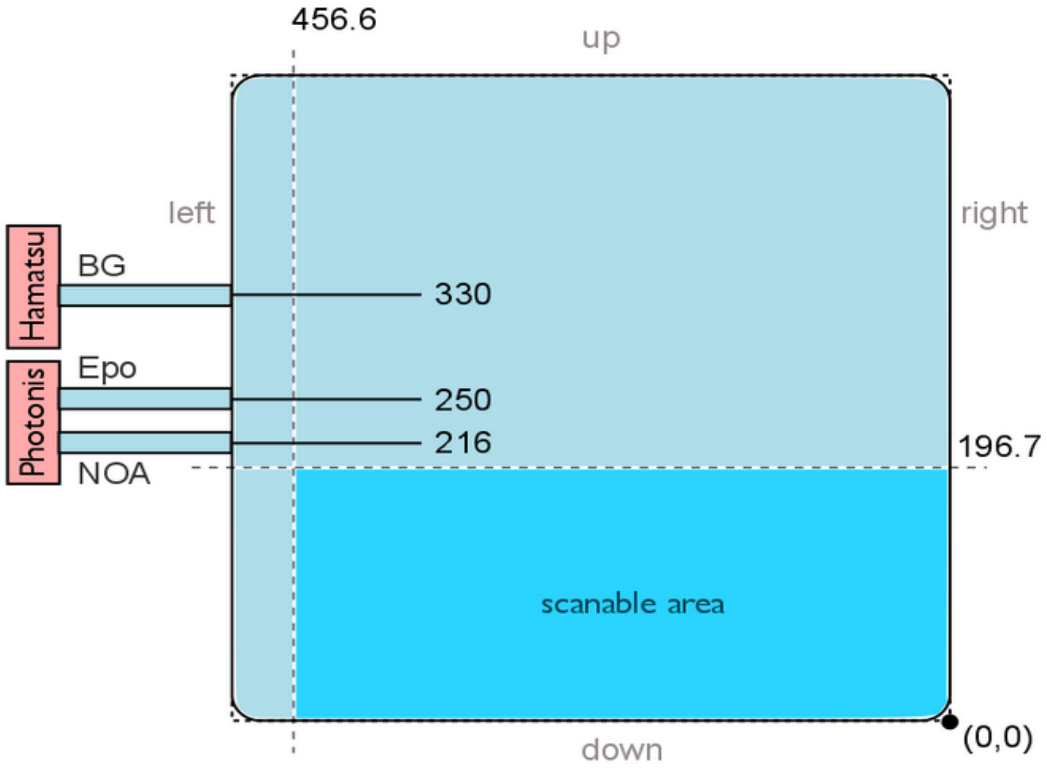
Setup Testbeam May 2015

Setup 1.1.1 — 15.05.2015

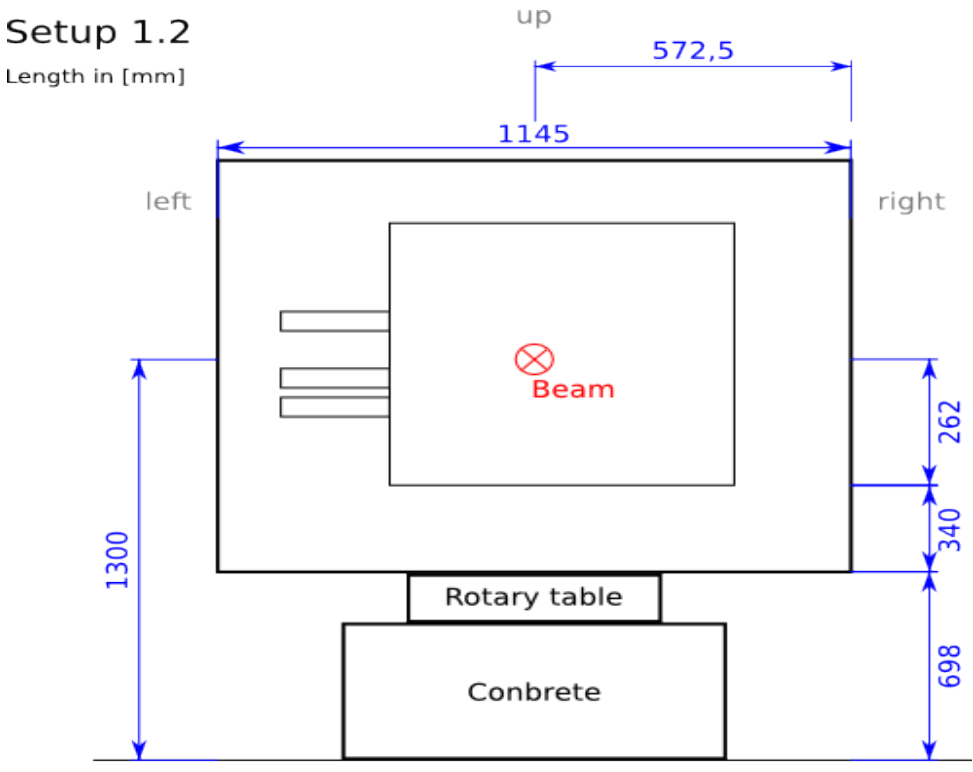
Minimum height table surface - floor: 77.5 cm

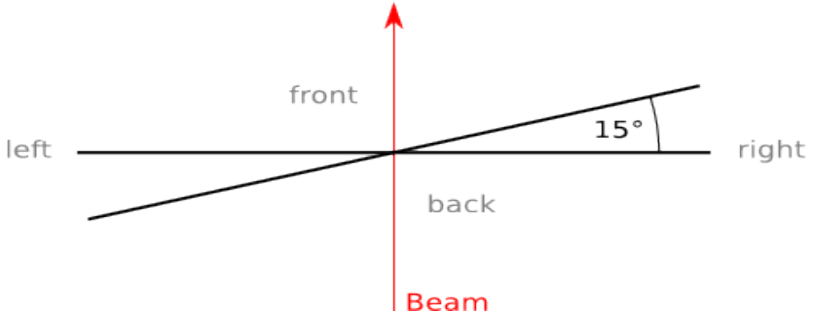
Height of alignment laser above beam: ~ 21.0 cm

Rotation of plate towards beam: 11.2°



Coordinates are table coordinates

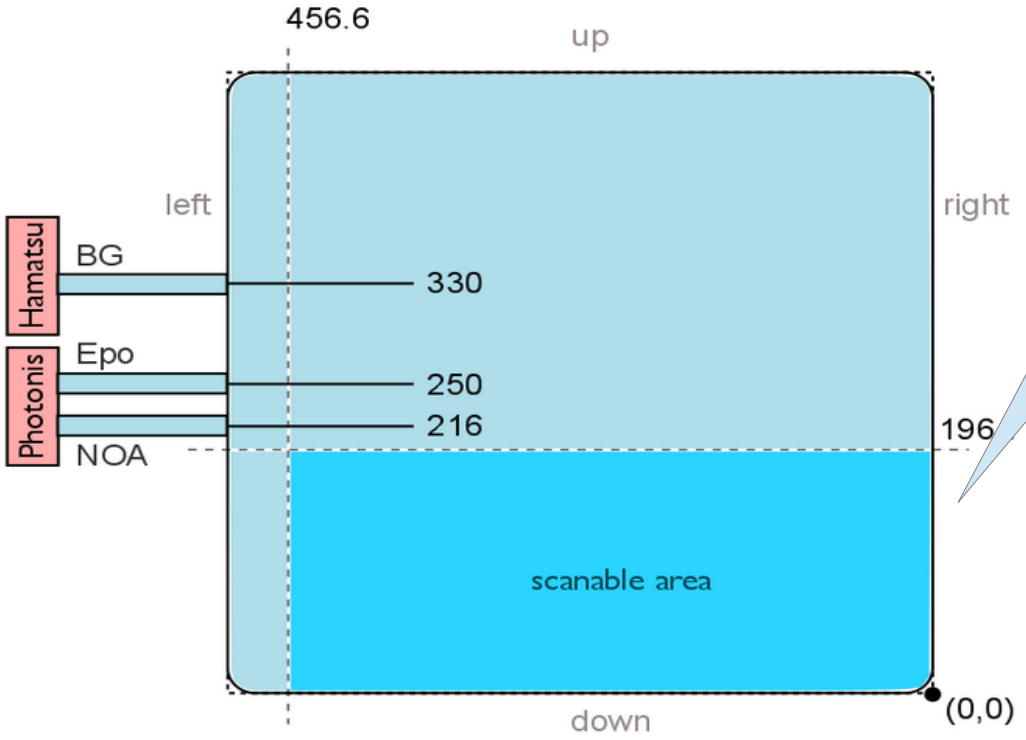




fiber shinning inside Disc

Setup Testbeam May 2015

Setup 1.1.1	15.05.2015
Minimum height table surface - floor:	77.5 cm
Height of alignment laser above beam:	~ 21.0 cm
Rotation of plate towards beam:	11.2°



Coordinates are table coordinates

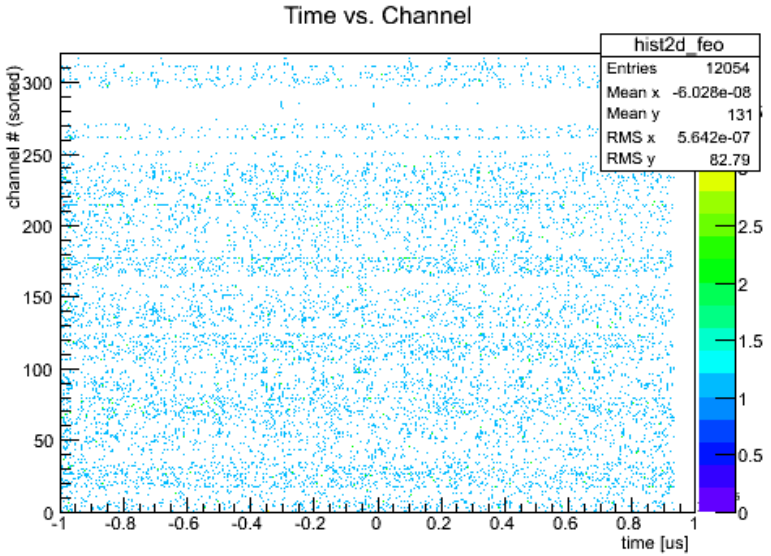
An “multi-mode” fiber coming from Laser shinning into DISC

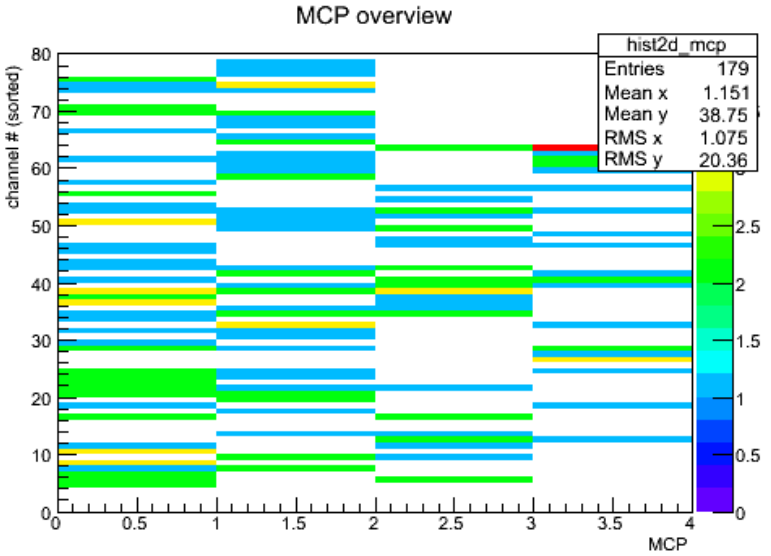
We get response from ALL channels

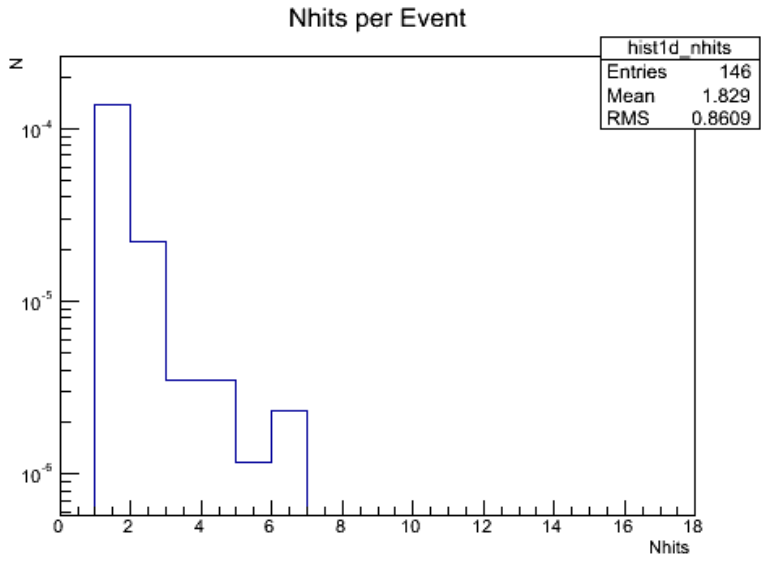
The signal then is sensitive to the Disc and photon detector characteristics

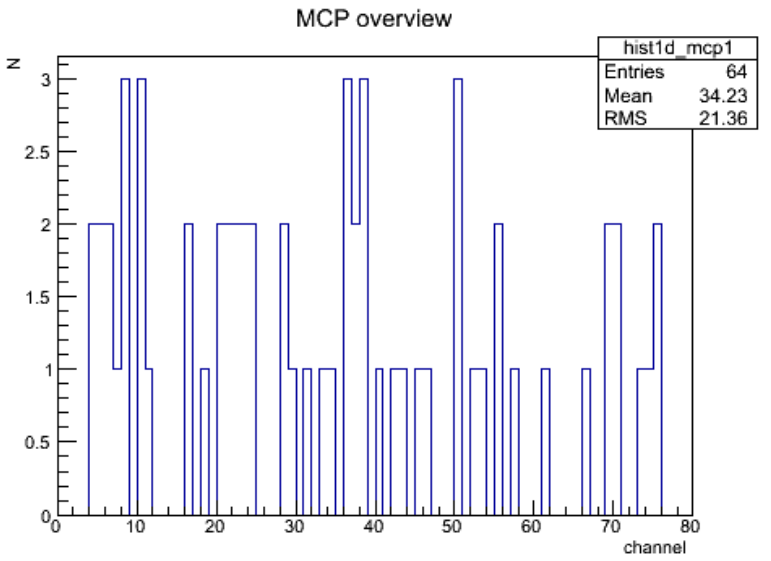
Independent of setup(coord scan table or rotary table) Laser injection was always possible

Control Measurements,
EDD is out of beam, clean from Bckg

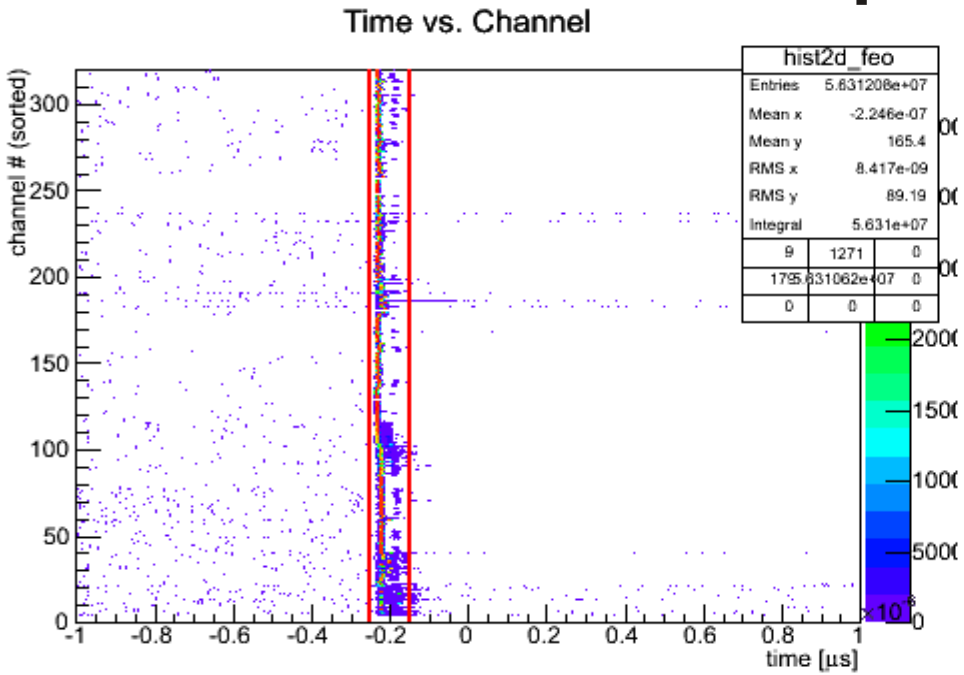


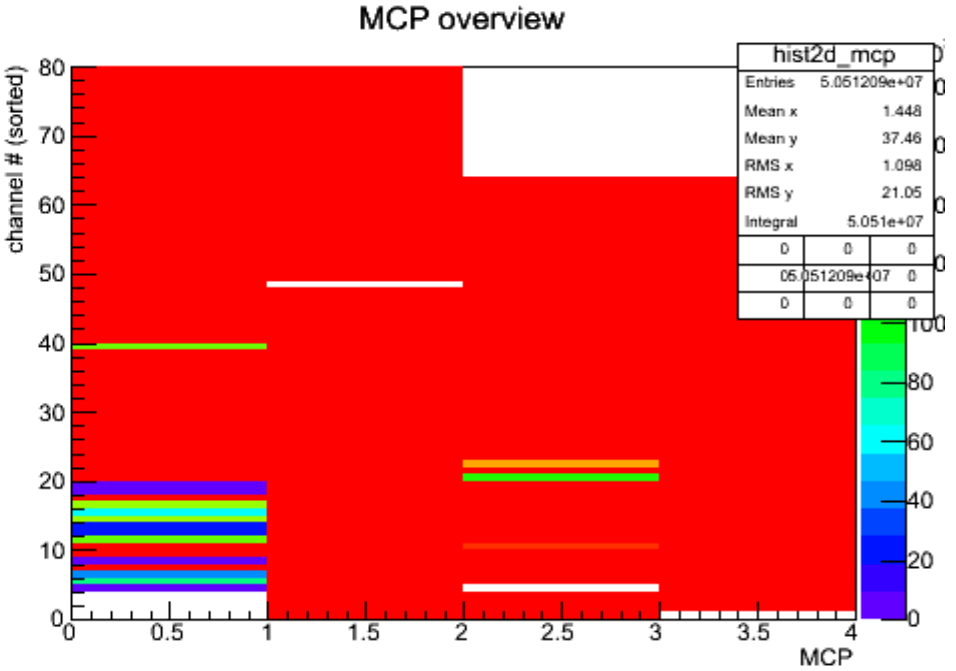


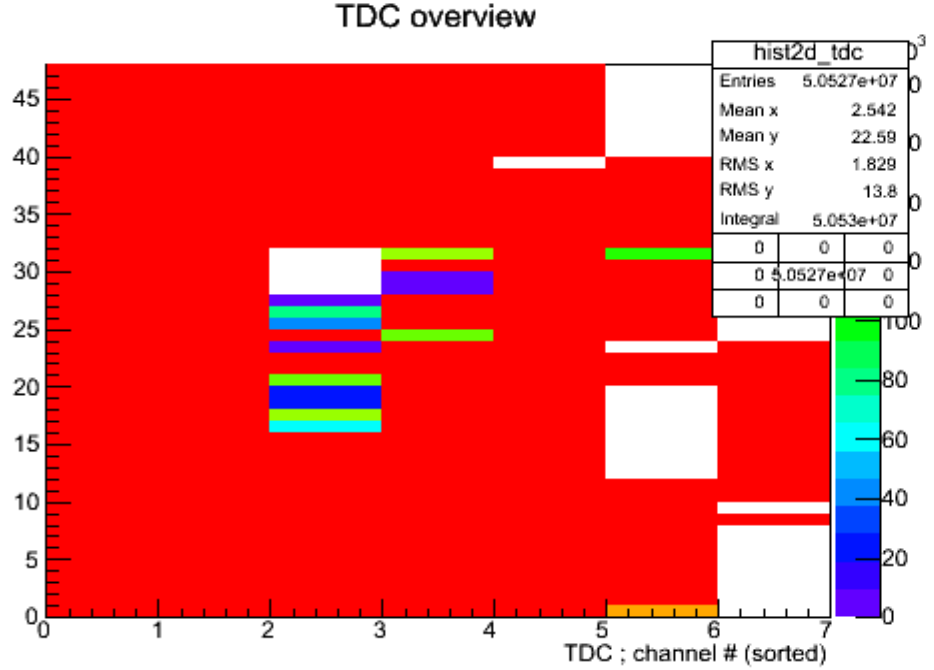


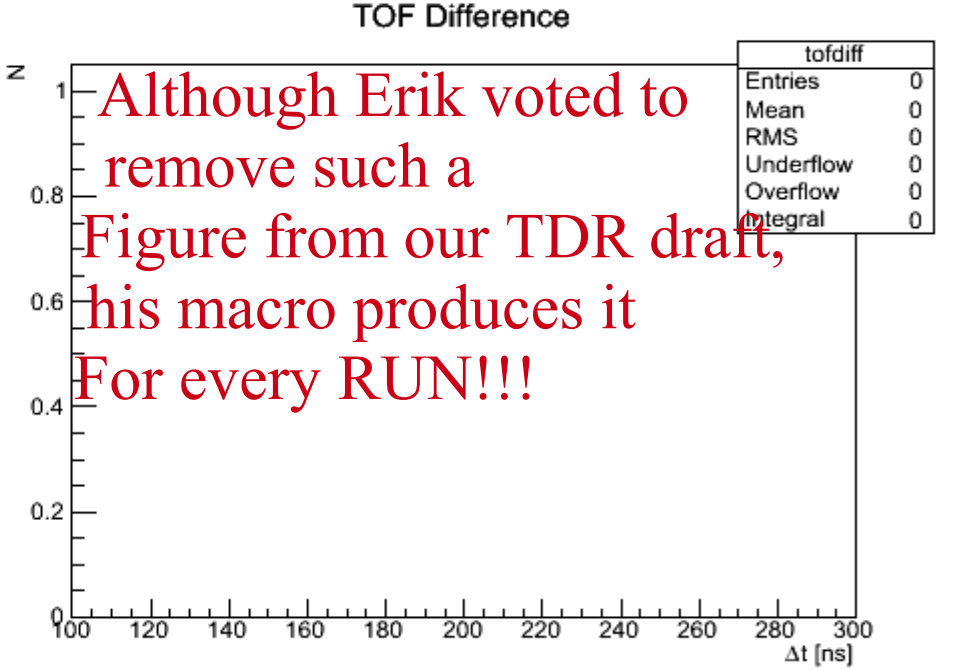


EDD response to PiLas





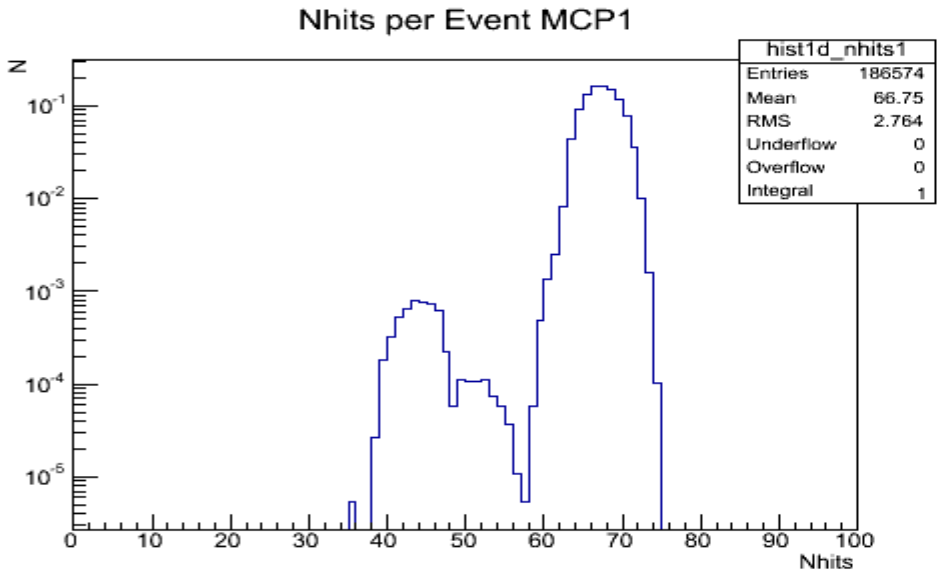


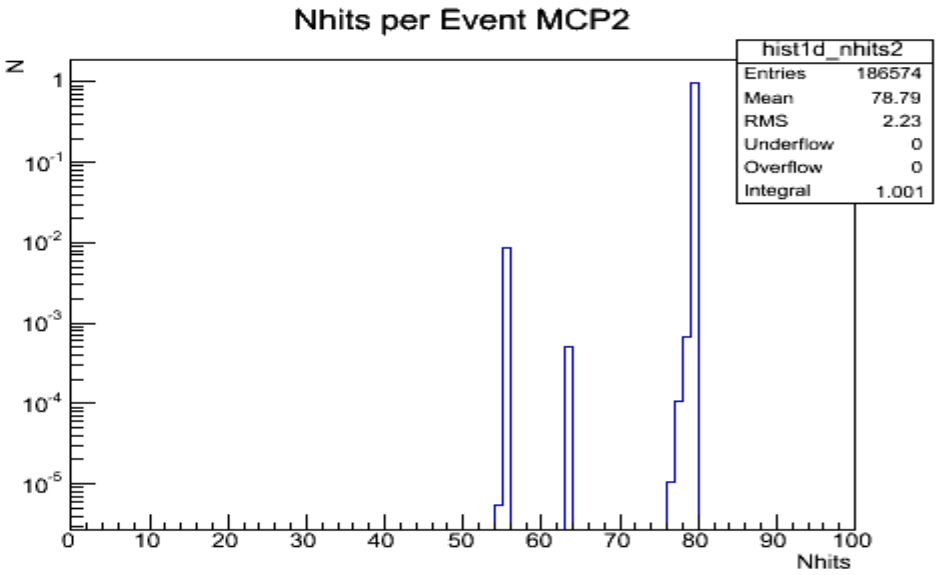


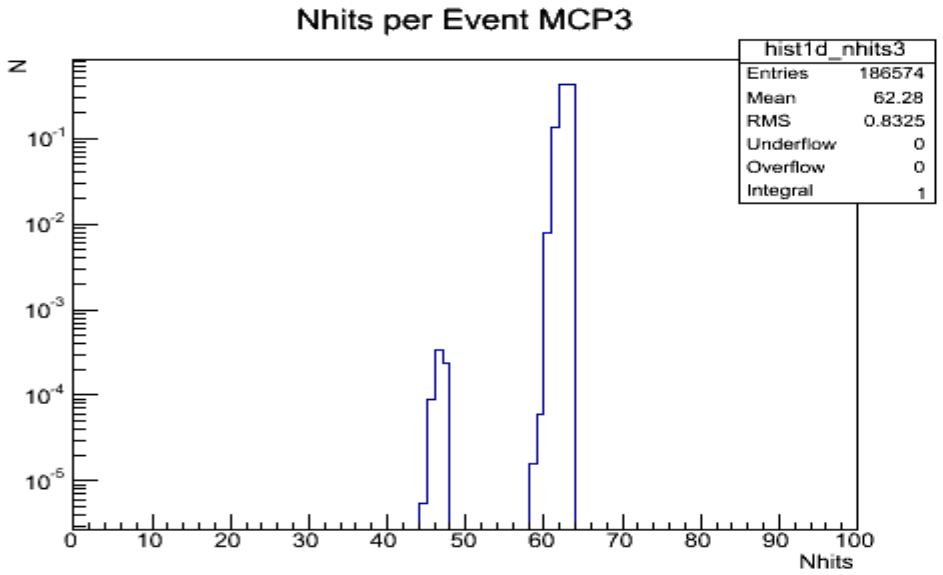
Although Erik voted to remove such a Figure from our TDR draft, his macro produces it For every RUN!!!

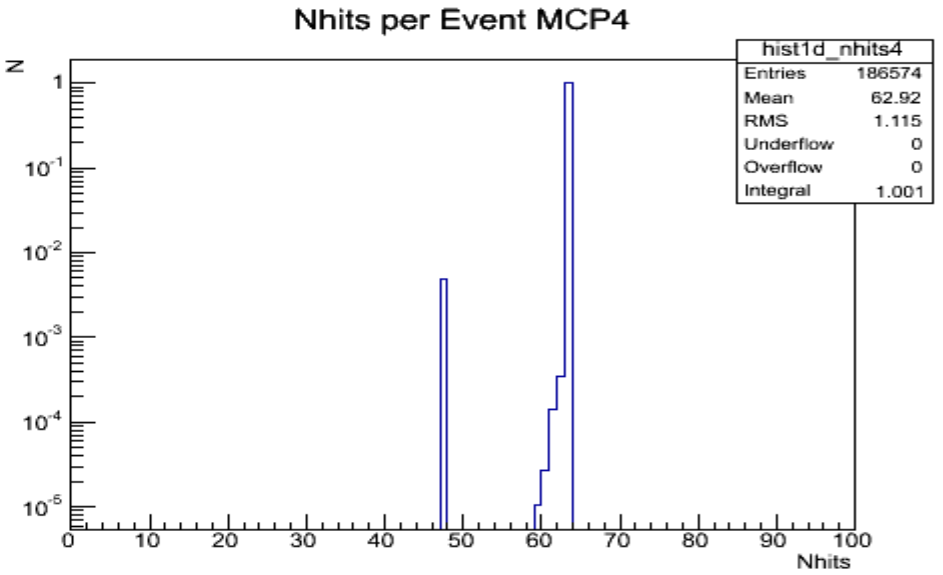
nice hit occupancy from Laser

we are missing only 10 channel from Photonis



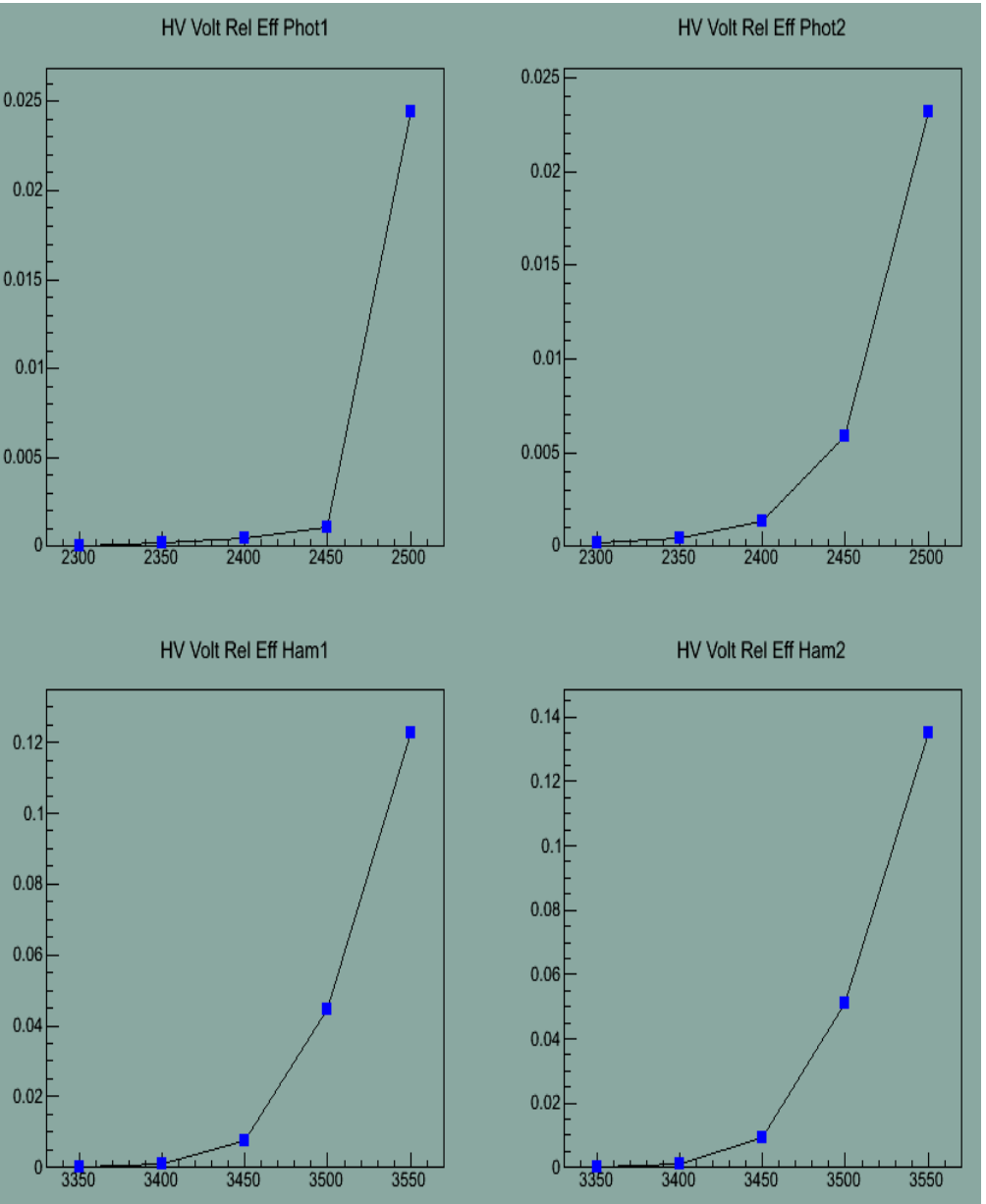


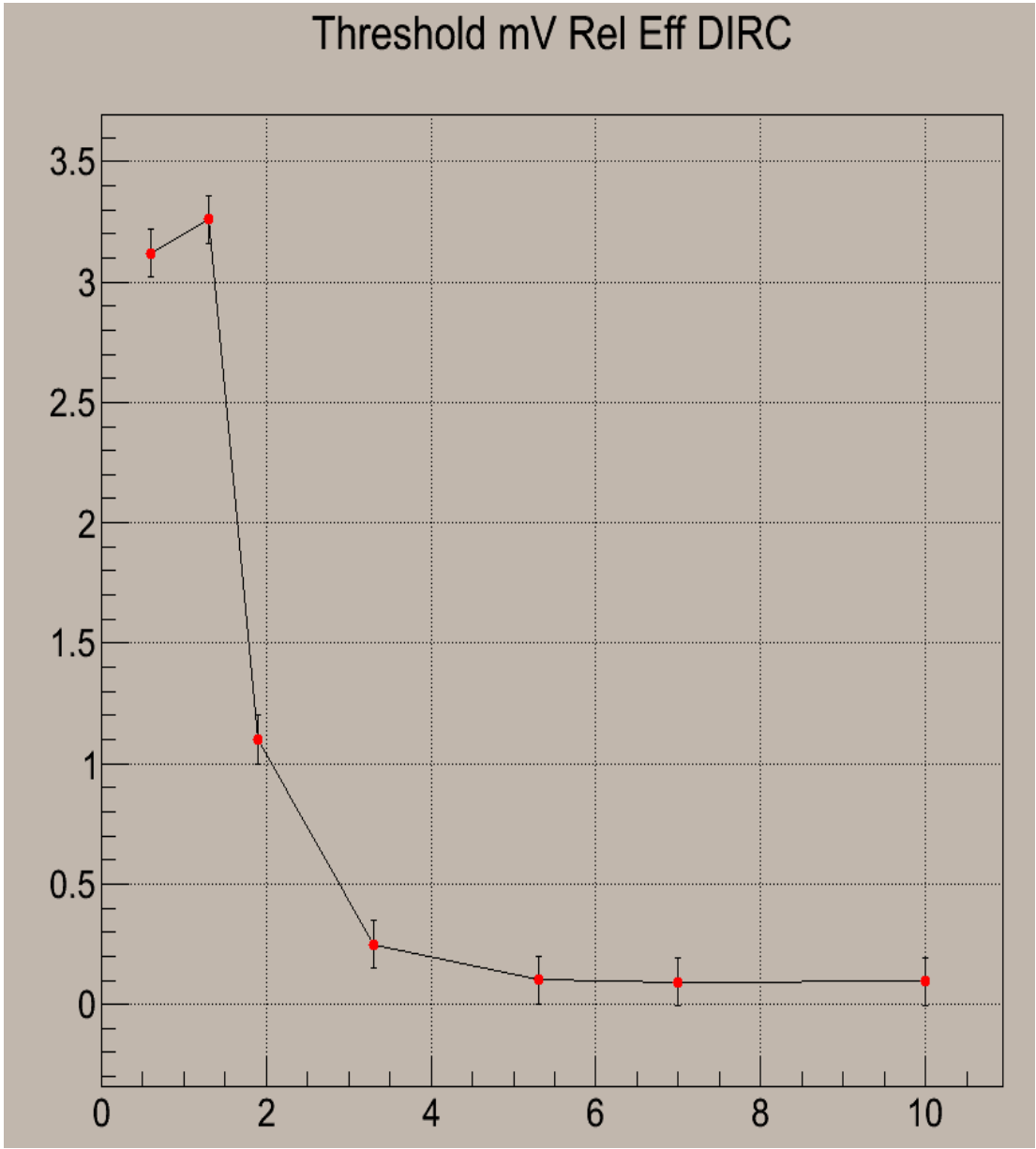




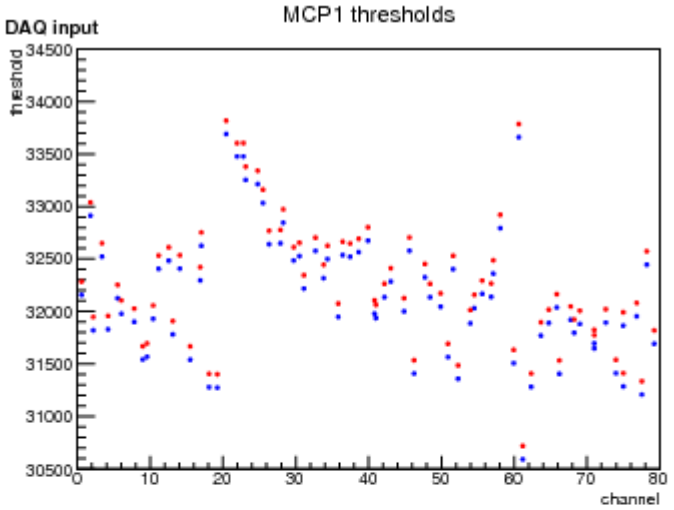
A few more test measurements, threshold scan, HV scan

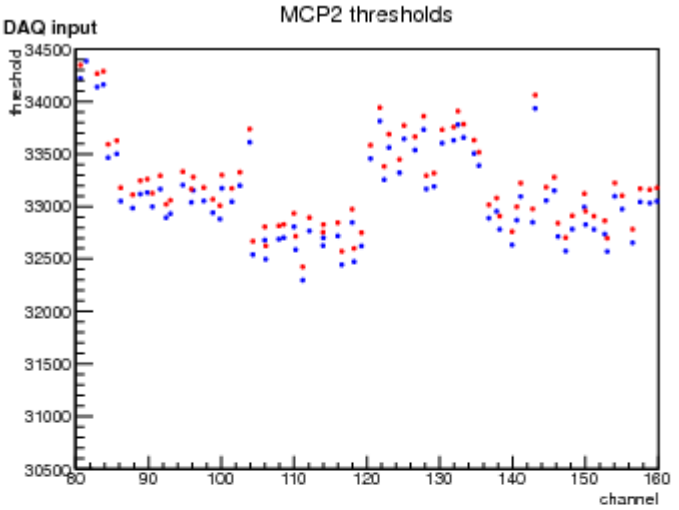
one can compare the right figure with the one measured in LAB(page5)

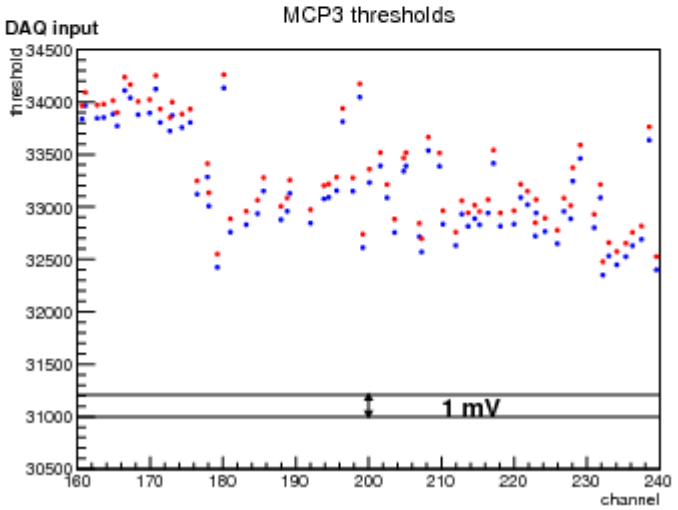


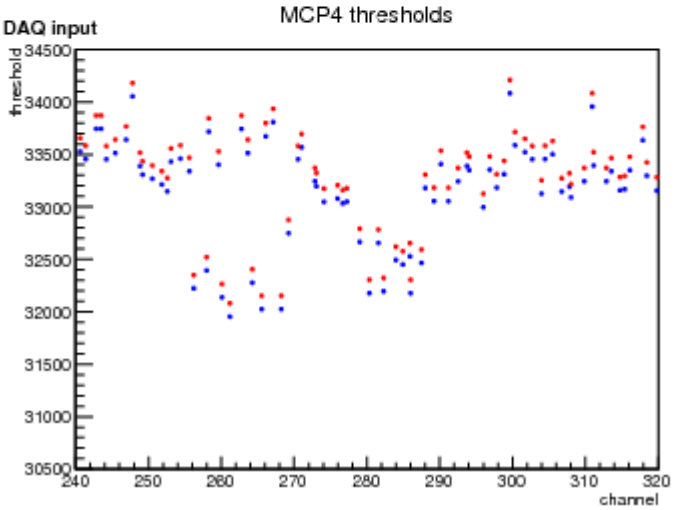


Thresholds during Testbeam



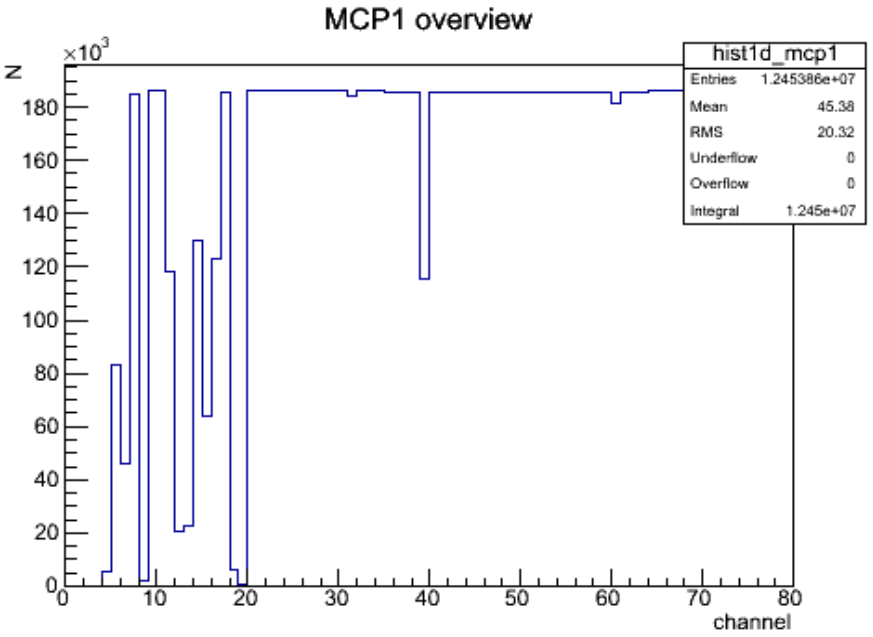


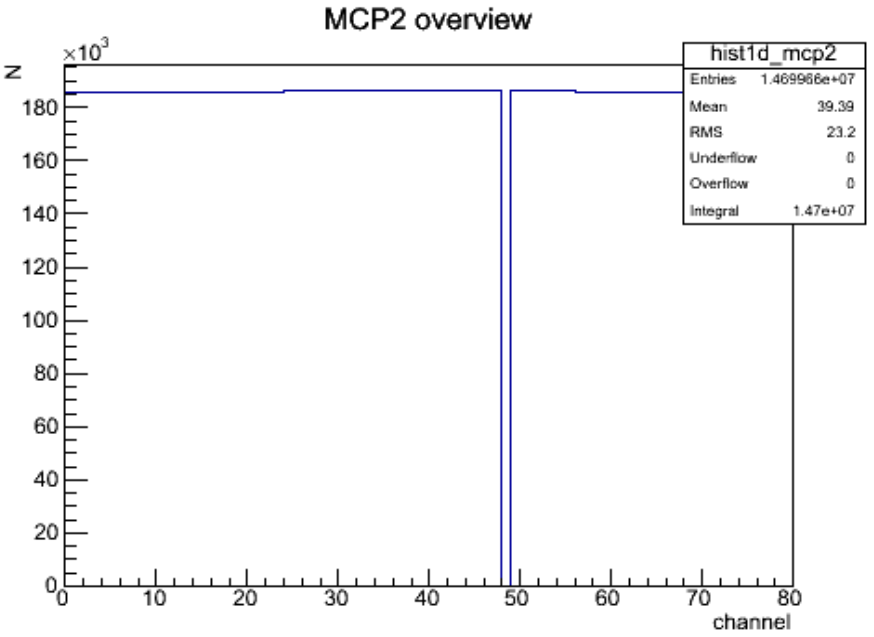


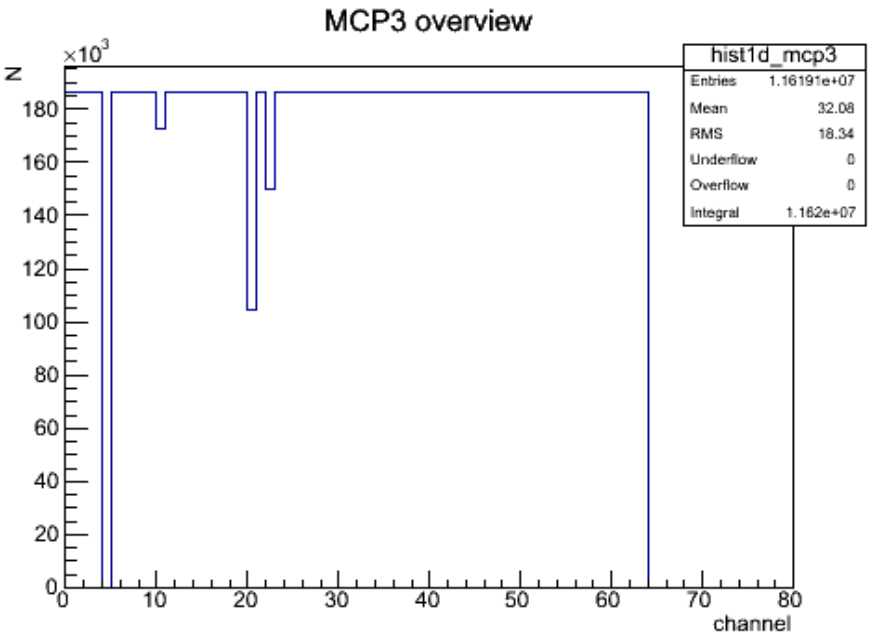


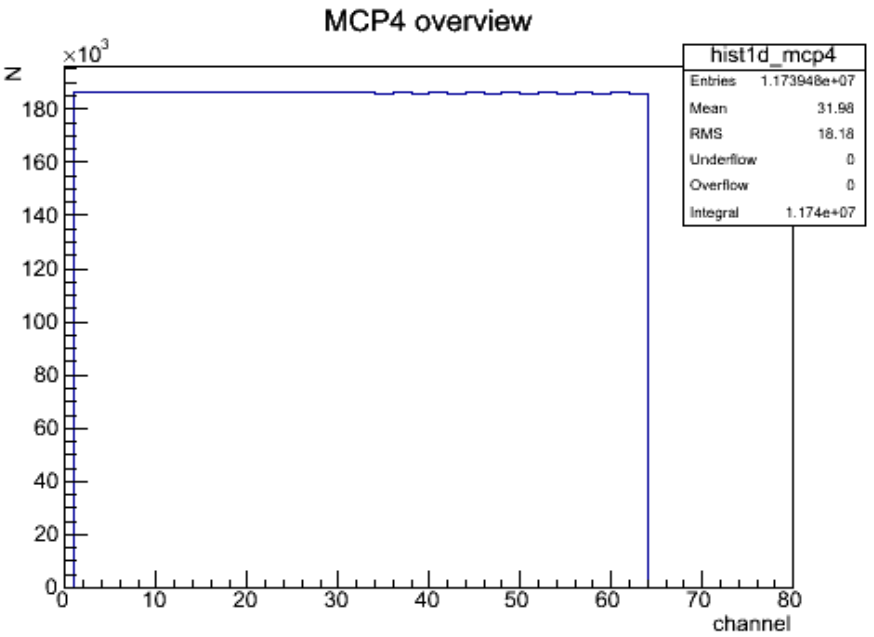
Detailed analysis of thresholds behavior should yield information about their stability
This is only 1(from ~100) measurement

Almost all channels response equally

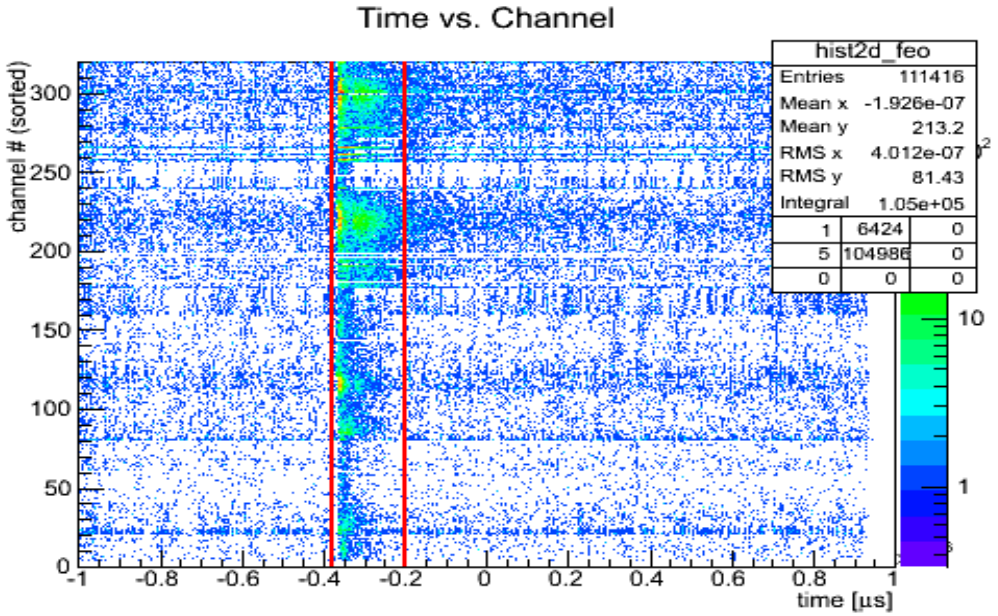


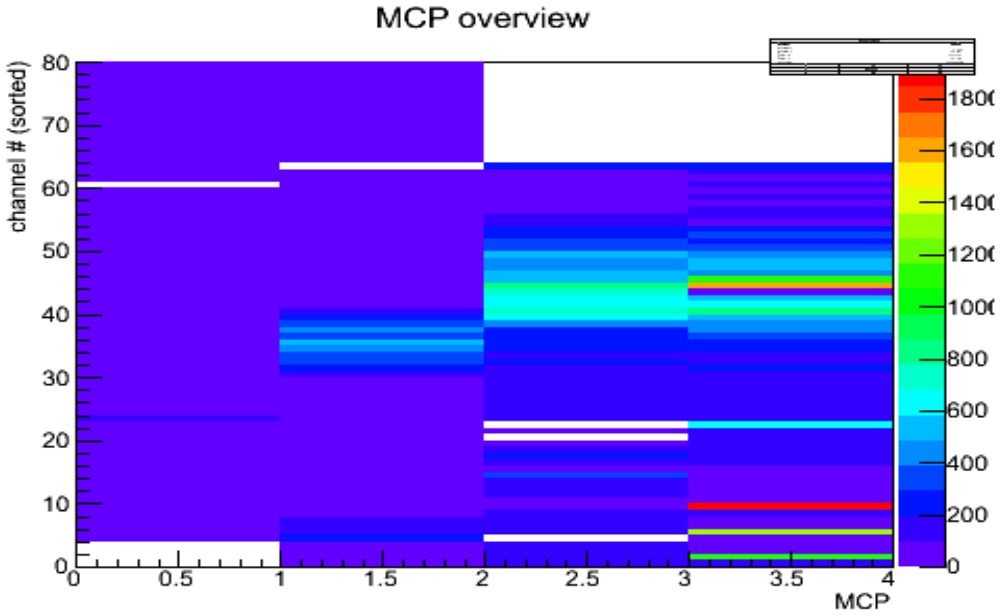


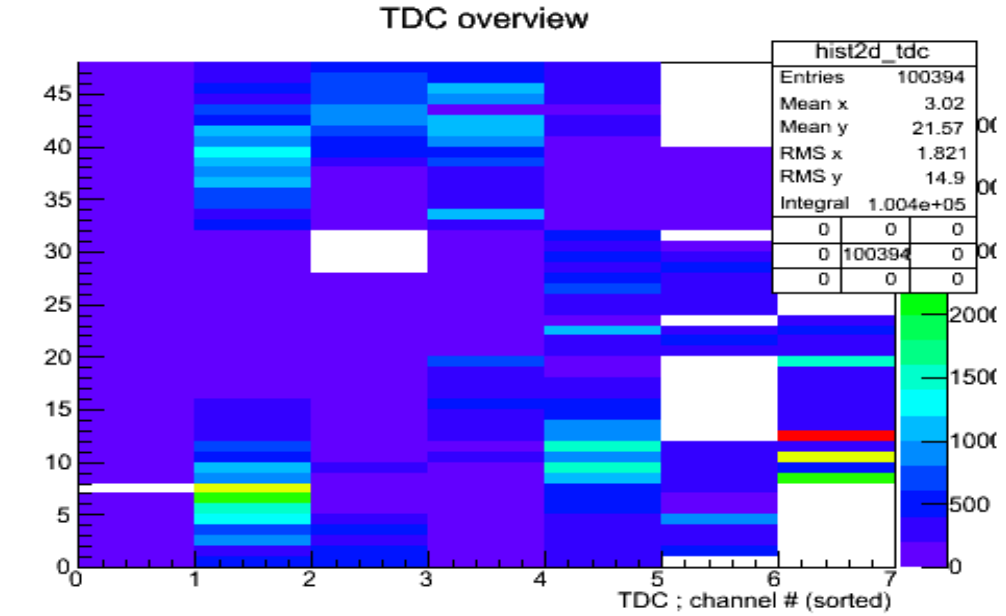


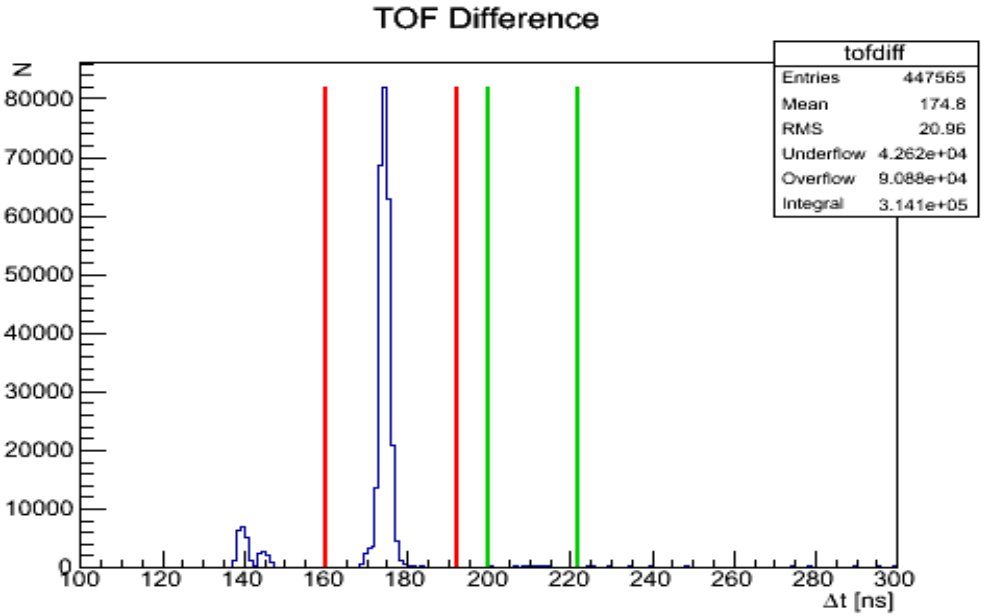


ready for beam....

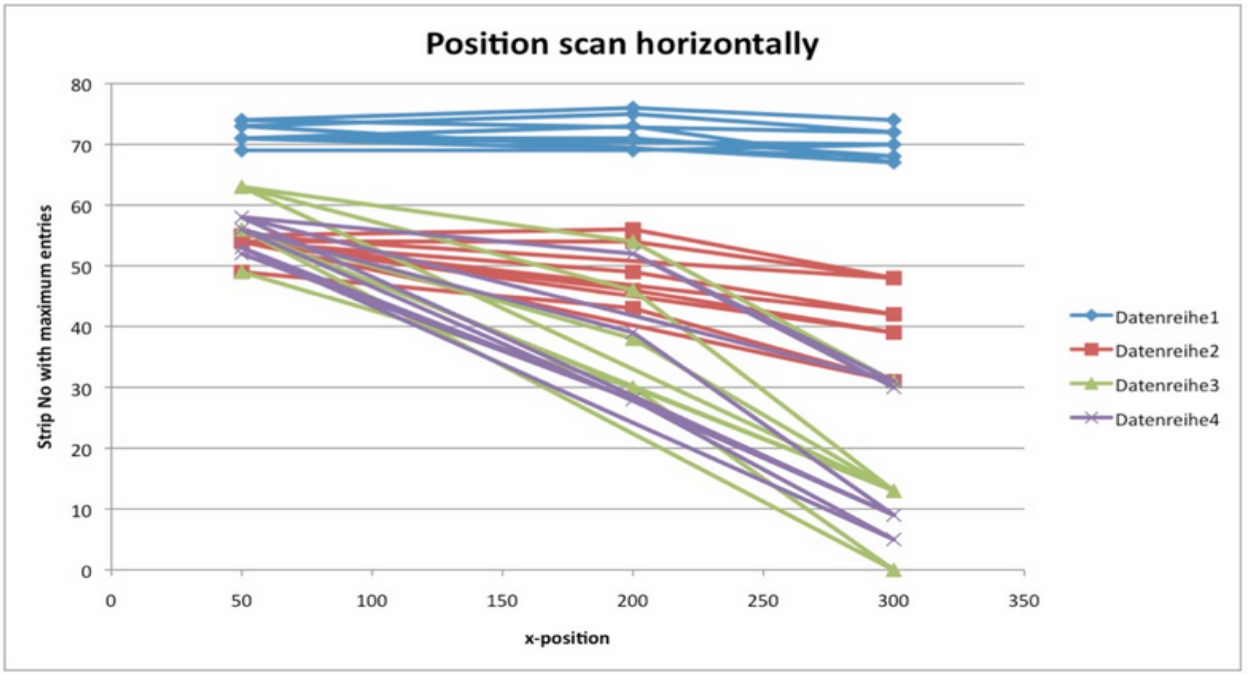


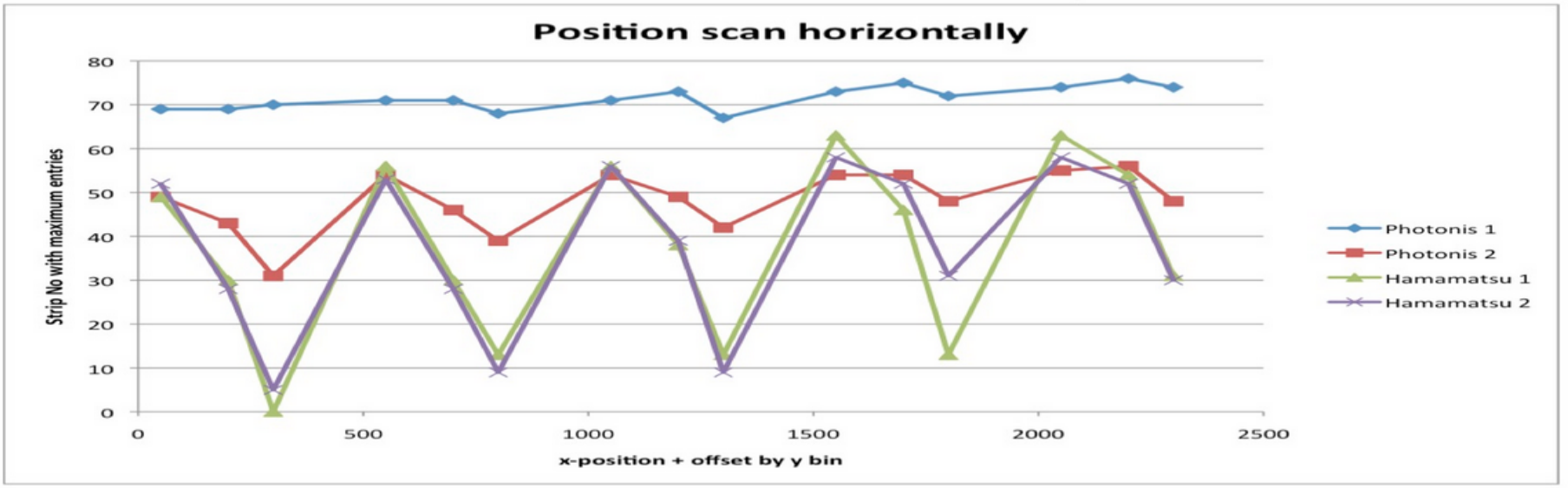




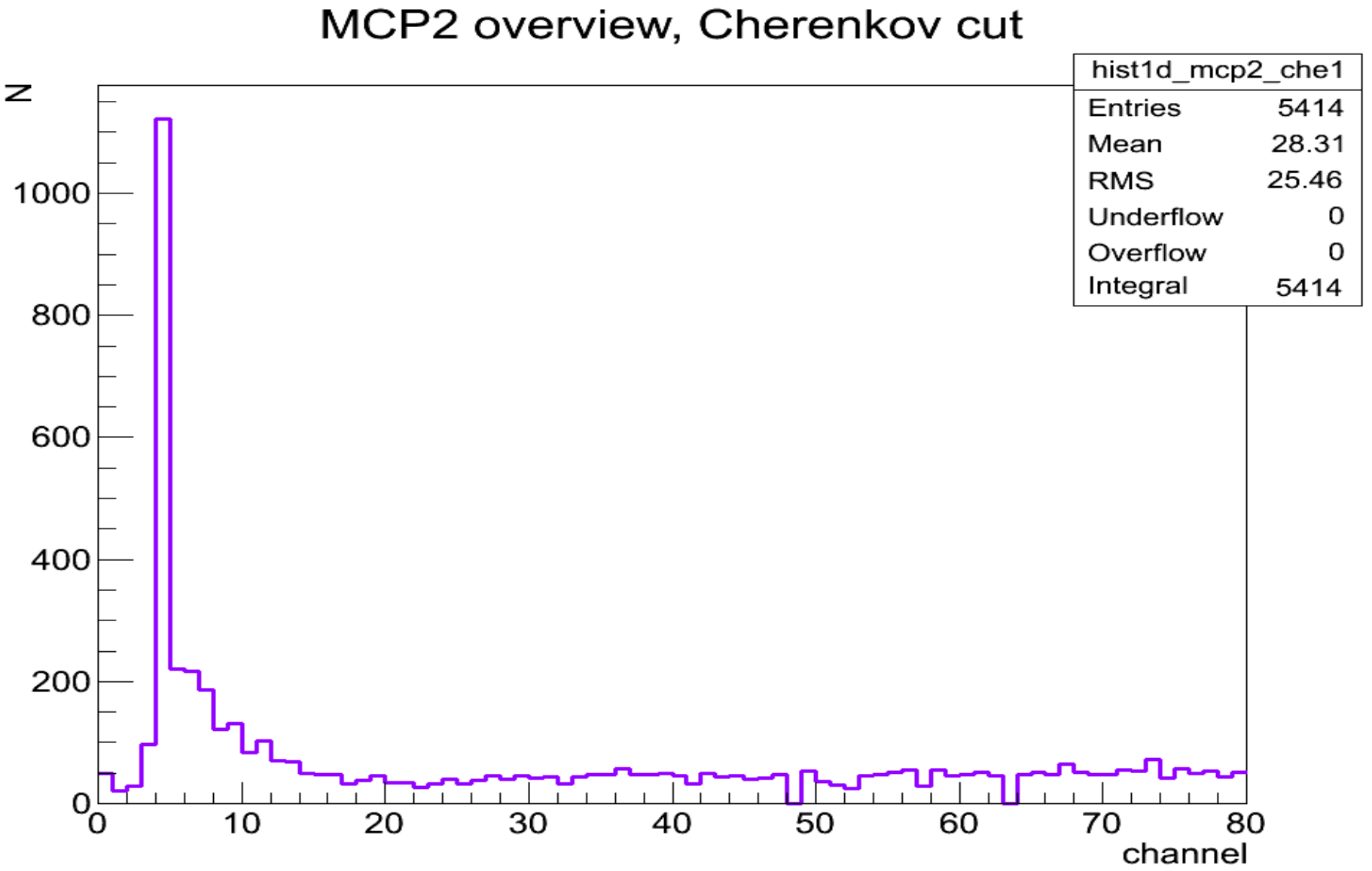


Online analysis of coordinate scan from Michael

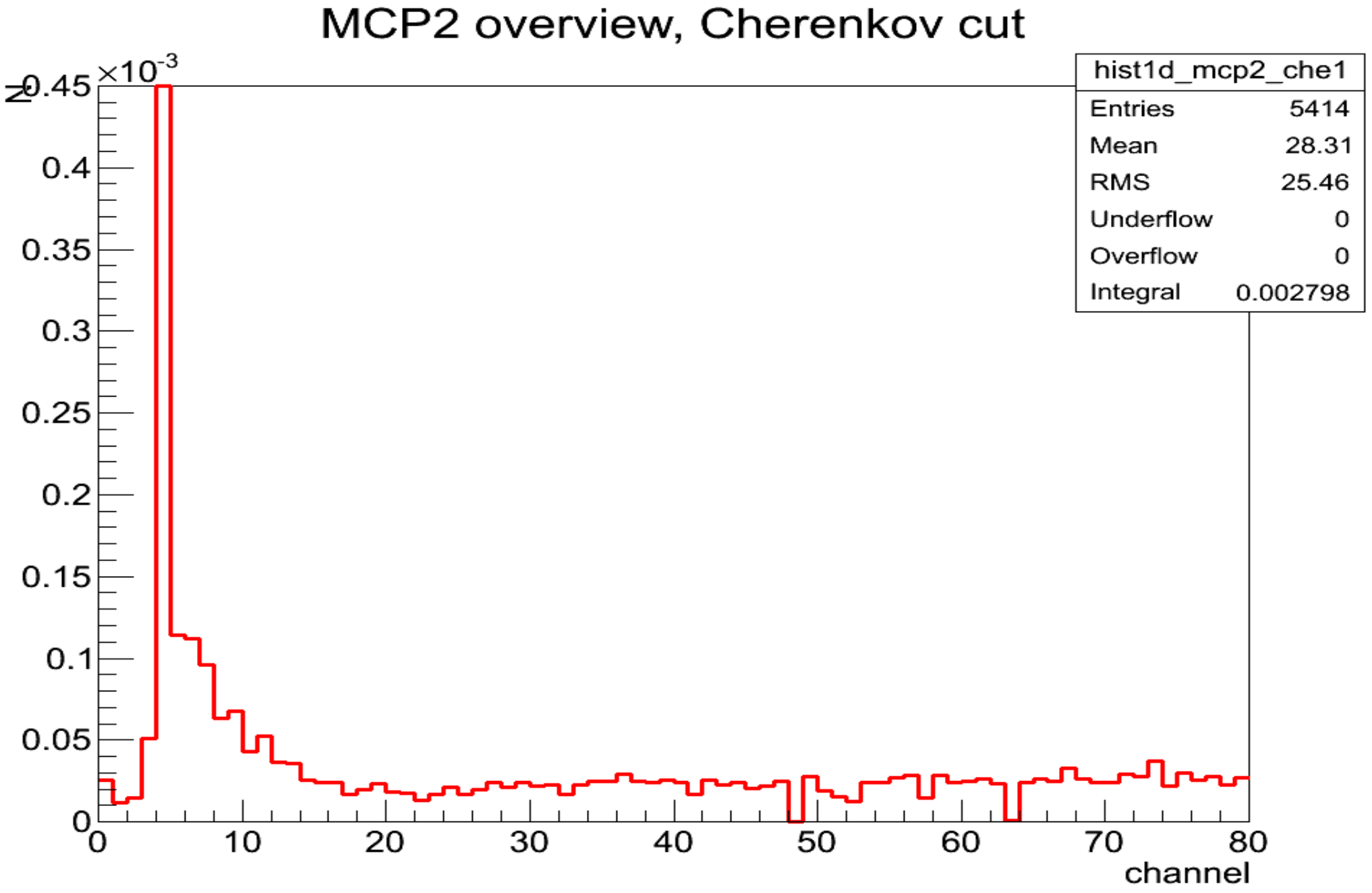




Angle scan in absolute scale(-2...20 degree)



Angle scan in normalized(online trigger) scale (-2...20 degree)



DANKSAGUNG

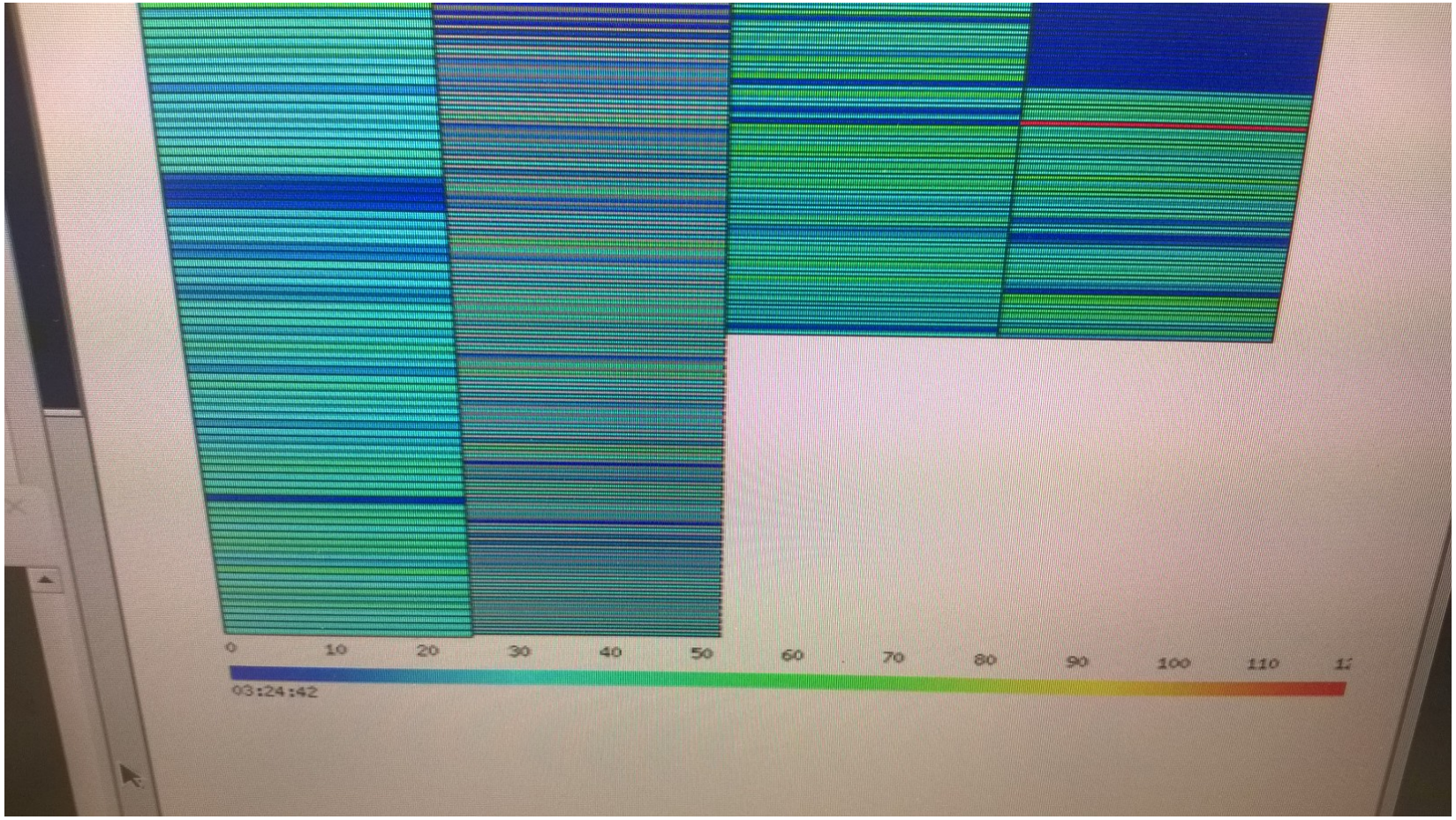
- Special Thanks to TRB TEAM

  M.T., C. U., J. M., G. K., Michael Wiebusch(see his online EDD plot), Sergey Linev for Go4....

- ALL GSI Team, but I like also here to type names, J. S., C. S., Andreas(for allowing us special channel throughout!!!)
- Erlangen(A. L.) and Mainz(M.H.) teams

  (well known names again are typed in short)

Special Thank also to Michael Wiebusch for Online Display



DATA we have her in Giessen for offline analysis

- Coordinate scans(different beam momentums)
- Angle scans (3,5,10 GeV/c momentums)
- Laser Runs
- (threshold variation, HV variation, measurements when DISC is in/out of beam, Cherenkov cone in/out of acceptance)
- Possibility to define offline trigger, use threshold Cherenkov or ToF, use of Mainz hodoscope?
- ALL in ALL it was very nice experience to work together, at least I have learned a lot

Շնորհակալություն