PASSPORT, SiWLC ECAL **SLAB 17**

SLAB ID

Slab ID : 17

ASU version :FEV11

Skiroc version : Skiroc2 **NASICS :** 16

DIF ID : 28 **Firmware version :** 1603

SBM ID : V4b 16 **SMBversion :** SMBV4

Wafers ID/Info : ?

Comments :
Kapton tape covering the internal face of the aluminum plate that covers the ASU.

Folder → slab17

Thresholds set to >= 230 (too conservative?)

GOOD SLAB

Commisioning by : *A. Irles*

at : *LAL, ECAL workshop*

setup : *Prototype rack (as used in 2016). PVC prototype for single slab. Cosmics taken in a table.*
Cable : HV 6 connected to first HV connector in patch pannel.
Slab/dif 1, connected to first connector in patch pannel.
GDCC V1_1, port 1

SOLDERING POINTS, CABLING, etc (visual inspection)

With closed aluminum cover, turn around the slab and check soldering points in :
*- **DIF resistors (for slow control)** OK*
*-**HV (GND at SMB)** Ok*

comments and others :
- aluminum plate is not grounded.
- bottom of the slab (aluminum) is grounded (2 ohm)

Turn slab around, open aluminim cover and do a check of soldering points :
*- **Not possible (glued cover?)***

comments and others :

ELECTRICAL + SIGNAL CHECKS (multimeter)

Electrical checks (NOT POWERED SLABS)		
		Comments
GND/PCB	ok	
RESISTOR/DVDD	ok	
SlowControl :	ok	
S4-S16	?	the aluminum cover was too tight or glued.
SRIN-SROUT	?	the aluminum cover was too tight or glued.
Readout Return S9-S21	?	the aluminum cover was too tight or glued.
GND HV and bottom PCB	ok	tested partially because of the cover
No shortcuts between VDDA/VDD/GND	ok	

Electrical checks (Low Votlage on)		
		Comments
Green LED in SLAB	ok	
BLUE LED light (DIF) blinking	ok	
1.2V and 2.5V in J3 and J4 (DIF)	ok	
VDDA	ok	3.5 V
VDDD	ok	3.29 V
Configure : RED LED blinks	ok	

Comments :

DAQ SETUP

Short acquisitions tests :

- *spill 4Hz, widht 5 ms, BT mode*
- *1 minute*
- *dif_1_1_1*

PA=1.2pF
cc=6pF
hold (manual) =150
DAC (manual) = 200 DAC & 230 DAC

Find noisy, scurves

- *spill 4Hz, widht 5.0ms, BT mode*
- *dif_1_1_1*

PA=1.2pF
cc=6pF
hold (manual) =150

Cosmics

- *spill 4Hz, widht 150ms, BT mode*
- *1h*
- *dif_1_1_1*

PA=1.2pF
cc=6pF
hold (manual) =150

CALICOES/PYRAME VERSION :

DATA/RESULTS folder : */home/data/prototech/BTJune2017_commissioning/slab17 (pc-ecal03)*

SlowControl :

0xFE000031FE2F8A80828000000000000000000444444444444444444444444444444444444444444
4444444444444444444444442842AA000000000000000000000000000000000000000000000019D

ANALYSYS code :

https://github.com/airqui/tpecal/commit/8d5eb4a32a5522ccfd476e5257d9aac9ed78258a

COMMENTS : *(suspicious ADC=4 channels masked by default)*

```
rocN=0
for roc in list_dev("skiroc","root"):
    reconfigure(roc,"allow_trig_chans_skiroc","all")
    reconfigure(roc,"enable_preamp_chans_skiroc","all")
    reconfigure(roc,"disable_preamp_chans_skiroc","37")
    reconfigure(roc,"disallow_trig_chans_skiroc","37")
    if rocN==1 or rocN==9:
        #preamp
        reconfigure(roc,"disable_preamp_chans_skiroc","41")
        reconfigure(roc,"disable_preamp_chans_skiroc","42")
        reconfigure(roc,"disable_preamp_chans_skiroc","43")
        reconfigure(roc,"disable_preamp_chans_skiroc","44")
        reconfigure(roc,"disable_preamp_chans_skiroc","45")
        reconfigure(roc,"disable_preamp_chans_skiroc","46")
        reconfigure(roc,"disable_preamp_chans_skiroc","47")
        reconfigure(roc,"disallow_trig_chans_skiroc","41")
        reconfigure(roc,"disallow_trig_chans_skiroc","42")
        reconfigure(roc,"disallow_trig_chans_skiroc","43")
        reconfigure(roc,"disallow_trig_chans_skiroc","44")
        reconfigure(roc,"disallow_trig_chans_skiroc","45")
        reconfigure(roc,"disallow_trig_chans_skiroc","46")
        reconfigure(roc,"disallow_trig_chans_skiroc","47")
        print("roc=%s"%(roc))
    if rocN==0 or rocN==8:
        reconfigure(roc,"disable_preamp_chans_skiroc","5")
        reconfigure(roc,"disallow_trig_chans_skiroc","5")
    if rocN==7 or rocN==15:
        reconfigure(roc,"disable_preamp_chans_skiroc","3")
        reconfigure(roc,"disallow_trig_chans_skiroc","3")
        reconfigure(roc,"disable_preamp_chans_skiroc","9")
        reconfigure(roc,"disallow_trig_chans_skiroc","9")
        reconfigure(roc,"disable_preamp_chans_skiroc","10")
        reconfigure(roc,"disallow_trig_chans_skiroc","10")
    if (rocN==9 or rocN==1):
        reconfigure(roc,"disable_preamp_chans_skiroc","48-53")
        reconfigure(roc,"disallow_trig_chans_skiroc","48-53")
    rocN=rocN+1
    if rocN==16:
        rocN=0
```

short ACQ tests

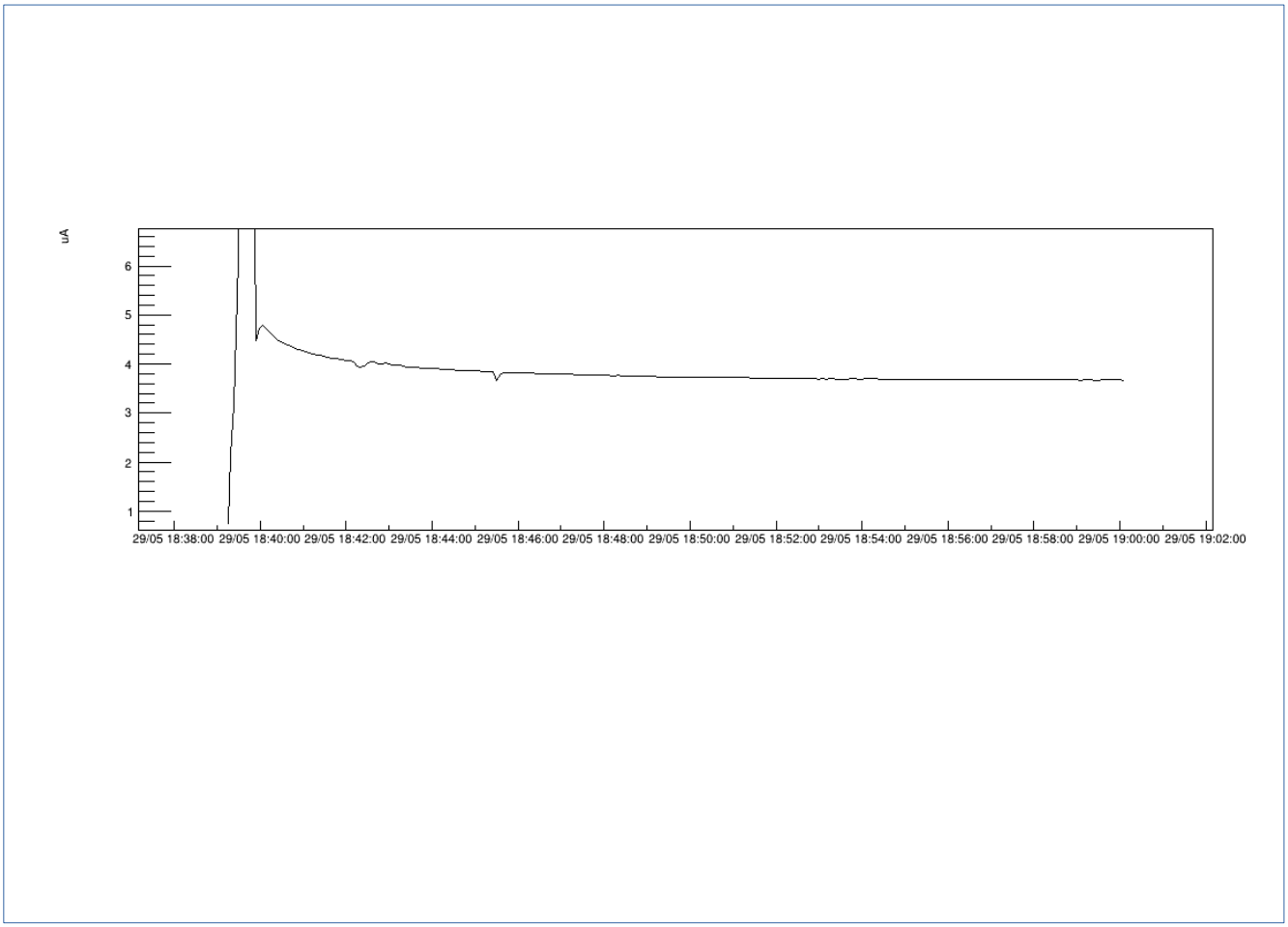
Horizontal position. Closed slab.
NOISE 0 : *Make short acquisition and convert the data → Conversion ok ? YES*

Place it in the PVC prototype, cover it with black waste bag, HV ramp up..
NOISE_1 :*Short acquisition, convert data → conversion ok ? YES*

Wait 30 minutes (HV stabilization)

Comments :

HV current vs time plot



FIND NOISY :

Algorithm :
timed_find_noisy_scan_run(run_name,trigger_thr_fn,trigger_step_fn,acq_time_fn,acq_time_final_fn,spill_lenght_final,1,1,0.05,0.01)

Final threshold = 230 DAC, 5 steps, 30 s and 45 s, internal thresholds =0.05 and 0.01

disallows triggers and disable preamps of all noisy channels.

Outuput/cmd file: /home/data/prototech/BTJune2017_commissioning/slab17/MaskedChannels.cmd

List of channels :
34 channels + 50ADC4 channels = 8 %

reconfigure("skiroc_1_1_1_1_1","disallow_trig_chans_skiroc","12")
reconfigure("skiroc_1_1_1_1_1","disable_preamp_chans_skiroc","12")
reconfigure("skiroc_1_1_1_1_2","disallow_trig_chans_skiroc","0")
reconfigure("skiroc_1_1_1_1_2","disable_preamp_chans_skiroc","0")
reconfigure("skiroc_1_1_1_1_2","disallow_trig_chans_skiroc","38")
reconfigure("skiroc_1_1_1_1_2","disable_preamp_chans_skiroc","38")
reconfigure("skiroc_1_1_1_1_2","disallow_trig_chans_skiroc","39")
reconfigure("skiroc_1_1_1_1_2","disable_preamp_chans_skiroc","39")
reconfigure("skiroc_1_1_1_1_2","disallow_trig_chans_skiroc","40")
reconfigure("skiroc_1_1_1_1_2","disable_preamp_chans_skiroc","40")
reconfigure("skiroc_1_1_1_1_2","disallow_trig_chans_skiroc","54")
reconfigure("skiroc_1_1_1_1_2","disable_preamp_chans_skiroc","54")
reconfigure("skiroc_1_1_1_1_2","disallow_trig_chans_skiroc","55")
reconfigure("skiroc_1_1_1_1_2","disable_preamp_chans_skiroc","55")
reconfigure("skiroc_1_1_1_1_5","disallow_trig_chans_skiroc","52")
reconfigure("skiroc_1_1_1_1_5","disable_preamp_chans_skiroc","52")
reconfigure("skiroc_1_1_1_1_7","disallow_trig_chans_skiroc","61")
reconfigure("skiroc_1_1_1_1_7","disable_preamp_chans_skiroc","61")
reconfigure("skiroc_1_1_1_1_14","disallow_trig_chans_skiroc","3")
reconfigure("skiroc_1_1_1_1_14","disable_preamp_chans_skiroc","3")
reconfigure("skiroc_1_1_1_1_15","disallow_trig_chans_skiroc","50")
reconfigure("skiroc_1_1_1_1_15","disable_preamp_chans_skiroc","50")
reconfigure("skiroc_1_1_1_1_10","disallow_trig_chans_skiroc","34")
reconfigure("skiroc_1_1_1_1_10","disable_preamp_chans_skiroc","34")
reconfigure("skiroc_1_1_1_1_10","disallow_trig_chans_skiroc","35")
reconfigure("skiroc_1_1_1_1_10","disable_preamp_chans_skiroc","35")
reconfigure("skiroc_1_1_1_1_10","disallow_trig_chans_skiroc","38")
reconfigure("skiroc_1_1_1_1_10","disable_preamp_chans_skiroc","38")
reconfigure("skiroc_1_1_1_1_10","disallow_trig_chans_skiroc","39")
reconfigure("skiroc_1_1_1_1_10","disable_preamp_chans_skiroc","39")
reconfigure("skiroc_1_1_1_1_10","disallow_trig_chans_skiroc","40")

reconfigure("skiroc_1_1_1_1_10","disable_preamp_chans_skiroc","40")
reconfigure("skiroc_1_1_1_1_10","disallow_trig_chans_skiroc","54")
reconfigure("skiroc_1_1_1_1_10","disable_preamp_chans_skiroc","54")
reconfigure("skiroc_1_1_1_1_10","disallow_trig_chans_skiroc","55")
reconfigure("skiroc_1_1_1_1_10","disable_preamp_chans_skiroc","55")
reconfigure("skiroc_1_1_1_1_10","disallow_trig_chans_skiroc","56")
reconfigure("skiroc_1_1_1_1_10","disable_preamp_chans_skiroc","56")
reconfigure("skiroc_1_1_1_1_10","disallow_trig_chans_skiroc","57")
reconfigure("skiroc_1_1_1_1_10","disable_preamp_chans_skiroc","57")
reconfigure("skiroc_1_1_1_1_10","disallow_trig_chans_skiroc","58")
reconfigure("skiroc_1_1_1_1_10","disable_preamp_chans_skiroc","58")
reconfigure("skiroc_1_1_1_1_10","disallow_trig_chans_skiroc","61")
reconfigure("skiroc_1_1_1_1_10","disable_preamp_chans_skiroc","61")
reconfigure("skiroc_1_1_1_1_16","disallow_trig_chans_skiroc","63")
reconfigure("skiroc_1_1_1_1_16","disable_preamp_chans_skiroc","63")
reconfigure("skiroc_1_1_1_1_10","disallow_trig_chans_skiroc","13")
reconfigure("skiroc_1_1_1_1_10","disable_preamp_chans_skiroc","13")
reconfigure("skiroc_1_1_1_1_14","disallow_trig_chans_skiroc","47")
reconfigure("skiroc_1_1_1_1_14","disable_preamp_chans_skiroc","47")
reconfigure("skiroc_1_1_1_1_16","disallow_trig_chans_skiroc","49")
reconfigure("skiroc_1_1_1_1_16","disable_preamp_chans_skiroc","49")
reconfigure("skiroc_1_1_1_1_1","disallow_trig_chans_skiroc","44")
reconfigure("skiroc_1_1_1_1_1","disable_preamp_chans_skiroc","44")
reconfigure("skiroc_1_1_1_1_9","disallow_trig_chans_skiroc","15")
reconfigure("skiroc_1_1_1_1_9","disable_preamp_chans_skiroc","15")
reconfigure("skiroc_1_1_1_1_10","disallow_trig_chans_skiroc","3")
reconfigure("skiroc_1_1_1_1_10","disable_preamp_chans_skiroc","3")
reconfigure("skiroc_1_1_1_1_13","disallow_trig_chans_skiroc","47")
reconfigure("skiroc_1_1_1_1_13","disable_preamp_chans_skiroc","47")
reconfigure("skiroc_1_1_1_1_15","disallow_trig_chans_skiroc","7")
reconfigure("skiroc_1_1_1_1_15","disable_preamp_chans_skiroc","7")
reconfigure("skiroc_1_1_1_1_1","disallow_trig_chans_skiroc","0")
reconfigure("skiroc_1_1_1_1_1","disable_preamp_chans_skiroc","0")
reconfigure("skiroc_1_1_1_1_8","disallow_trig_chans_skiroc","21")
reconfigure("skiroc_1_1_1_1_8","disable_preamp_chans_skiroc","21")
reconfigure("skiroc_1_1_1_1_15","disallow_trig_chans_skiroc","18")
reconfigure("skiroc_1_1_1_1_15","disable_preamp_chans_skiroc","18")

SCURVES :

Algorithm :

```
 run_name="%s/scurves_64_%sHz_%sms_masked"%
(run_group,str(spillfreq),str(spill_lenght_final))
    run=new_run(run_name)

acq=timed_scurves("0",run,int(trigger_max_sc),int(trigger_min_sc),int(trigger_step_sc),float(60),
"skiroc")
    rc_exec("/opt/root/bin/root -l -q /opt/calicoes/standard/ConvertDirectory.cc\(\\\"%s/0/\\\"\)"%
(run["path"]))
    rc_exec("/home/calice/tpecal/bin/tpecalana %s/0/ %s scurves 16 0 0 %s"%
(run["path"],run["path"],dif))
```

Outuput/cmd file:

/home/data/prototech/BTJune2017_commissioning/slab17/scurves_64_4Hz_5.0ms_masked/Scurves_PlaneEvThresh64_buff0_dif_1_1_1_3sigma.cmd

/home/data/prototech/BTJune2017_commissioning/slab17/scurves_64_4Hz_5.0ms_masked/Scurves_PlaneEvThresh64_buff0_dif_1_1_1_5sigma.cmd

/home/data/prototech/BTJune2017_commissioning/slab17/scurves_64_4Hz_5.0ms_masked/Scurves_PlaneEvThresh64_buff0_dif_1_1_1_3sigma_firstzero.cmd

Final set of thresholds = Max(230, mean value + 5 sigma) per chip :

reconfigure("skiroc_1_1_1_1_1","set_gtrigger_skiroc",str(230))
reconfigure("skiroc_1_1_1_1_2","set_gtrigger_skiroc",str(236))
reconfigure("skiroc_1_1_1_1_3","set_gtrigger_skiroc",str(230))
reconfigure("skiroc_1_1_1_1_4","set_gtrigger_skiroc",str(230))
reconfigure("skiroc_1_1_1_1_5","set_gtrigger_skiroc",str(230))
reconfigure("skiroc_1_1_1_1_6","set_gtrigger_skiroc",str(230))
reconfigure("skiroc_1_1_1_1_7","set_gtrigger_skiroc",str(231))
reconfigure("skiroc_1_1_1_1_8","set_gtrigger_skiroc",str(230))
reconfigure("skiroc_1_1_1_1_9","set_gtrigger_skiroc",str(230))
reconfigure("skiroc_1_1_1_1_10","set_gtrigger_skiroc",str(238))
reconfigure("skiroc_1_1_1_1_11","set_gtrigger_skiroc",str(230))
reconfigure("skiroc_1_1_1_1_12","set_gtrigger_skiroc",str(230))
reconfigure("skiroc_1_1_1_1_13","set_gtrigger_skiroc",str(230))
reconfigure("skiroc_1_1_1_1_14","set_gtrigger_skiroc",str(230))
reconfigure("skiroc_1_1_1_1_15","set_gtrigger_skiroc",str(230))
reconfigure("skiroc_1_1_1_1_16","set_gtrigger_skiroc",str(230))

COSMICS :

Algorithm : Commissioning_cosmics.py

DIF

Wafer 1 :
Estimated cosmic rate :

~3.4 cosmic/ min cm^2

MIP = 51.4 (0.4)
Chi2/NDF = 1.18

Wafer 3 :
Estimated cosmic rate :

~3.2 cosmic/ min cm²

MIP = 54.0 (0.5)
Chi2/NDF = 1.47

Wafer 2 :
Estimated cosmic rate :

~3.7 cosmic/ min cm²

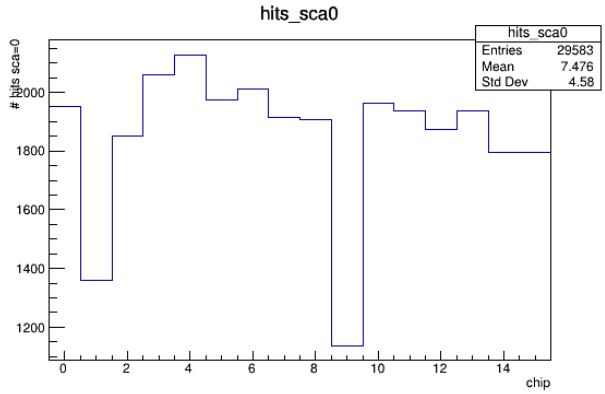
MIP= 50.9 (0.4)
Chi2/NDF = 1.35

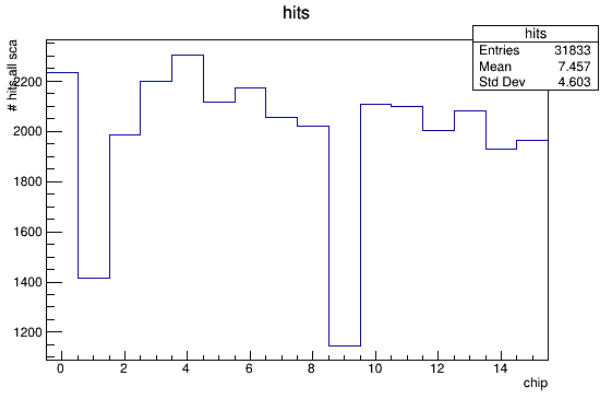
Wafer 4 :
Estimated cosmic rate :

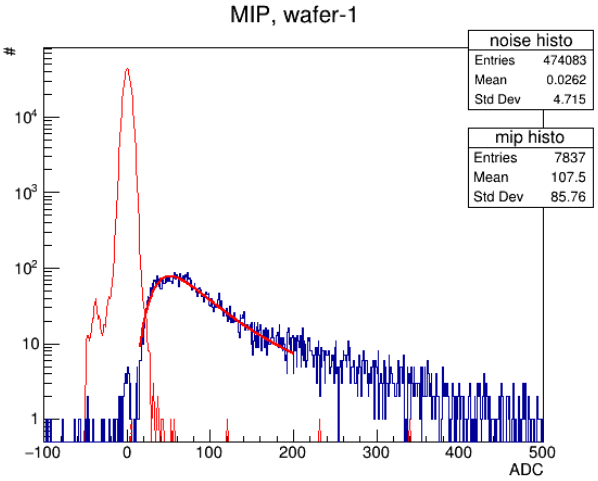
~3.4 cosmic/ min cm²

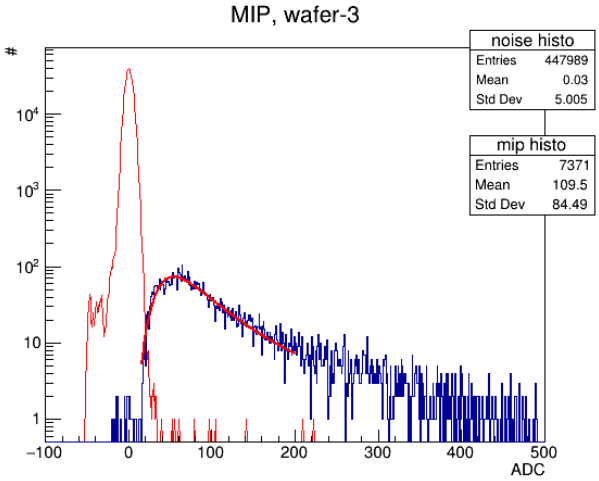
MIP = 55.5(0.5)
Chi2/NDF = 1.3

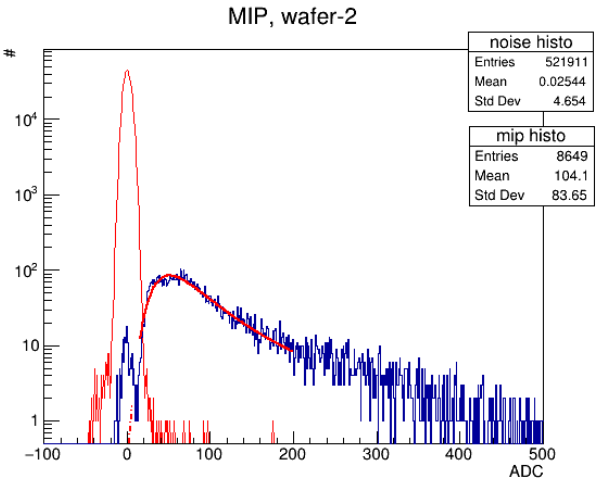
Plots :

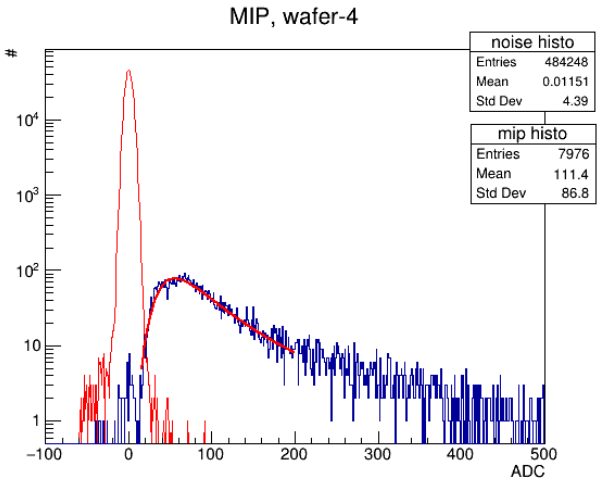

hits_sca0
hits_sca0
Entries 29583
Mean 7.476
Std Dev 4.58
hits sca=0
chip

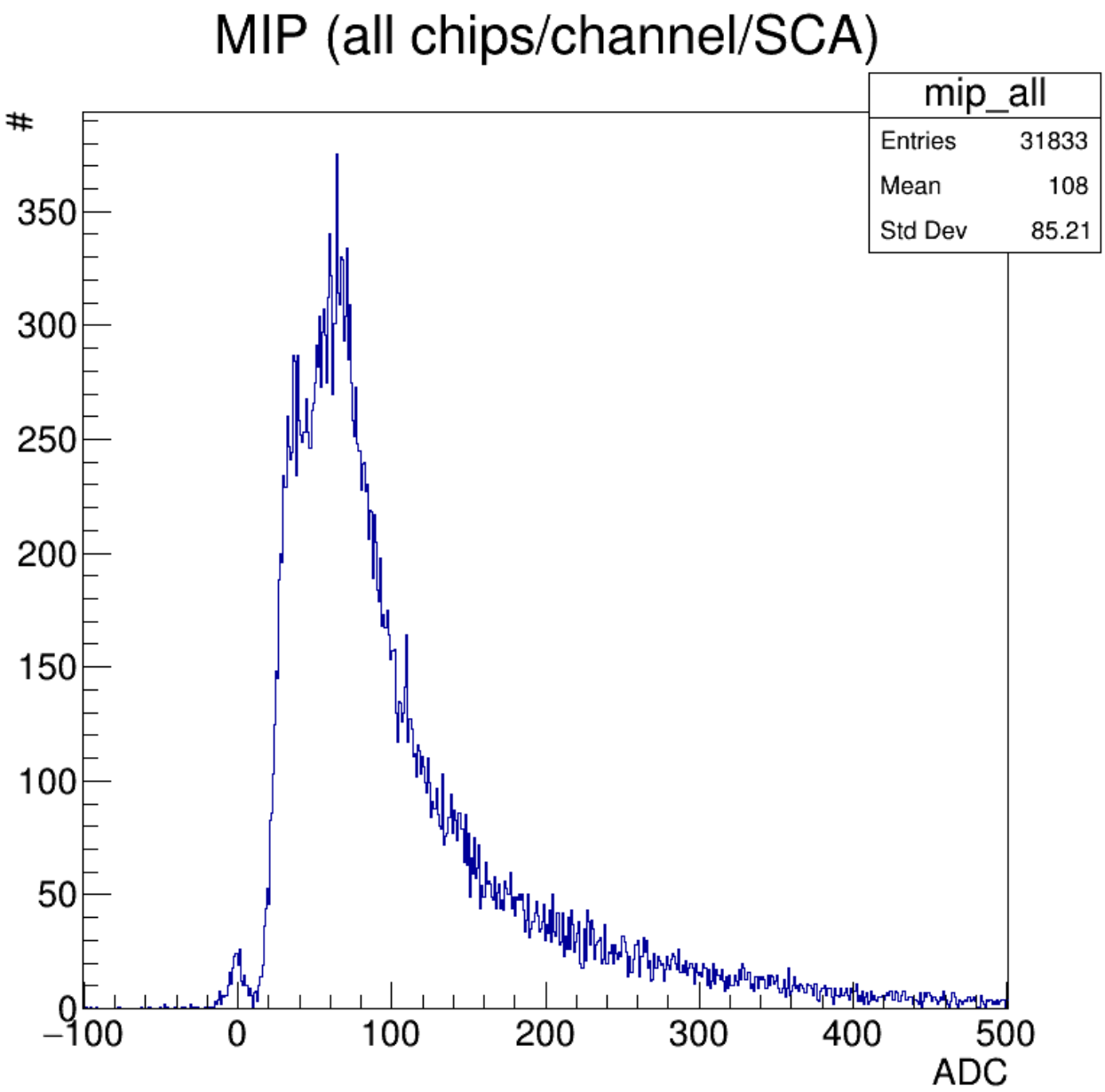

hits
hits
Entries 31833
Mean 7.457
Std Dev 4.603
hits all sca
chip


MIP, wafer-1
noise histo
Entries 474083
Mean 0.0262
Std Dev 4.715
mip histo
Entries 7837
Mean 107.5
Std Dev 85.76
ADC


MIP, wafer-3
noise histo
Entries 447989
Mean 0.03
Std Dev 5.005
mip histo
Entries 7371
Mean 109.5
Std Dev 84.49
ADC


MIP, wafer-2
noise histo
Entries 521911
Mean 0.02544
Std Dev 4.654
mip histo
Entries 8649
Mean 104.1
Std Dev 83.65
ADC

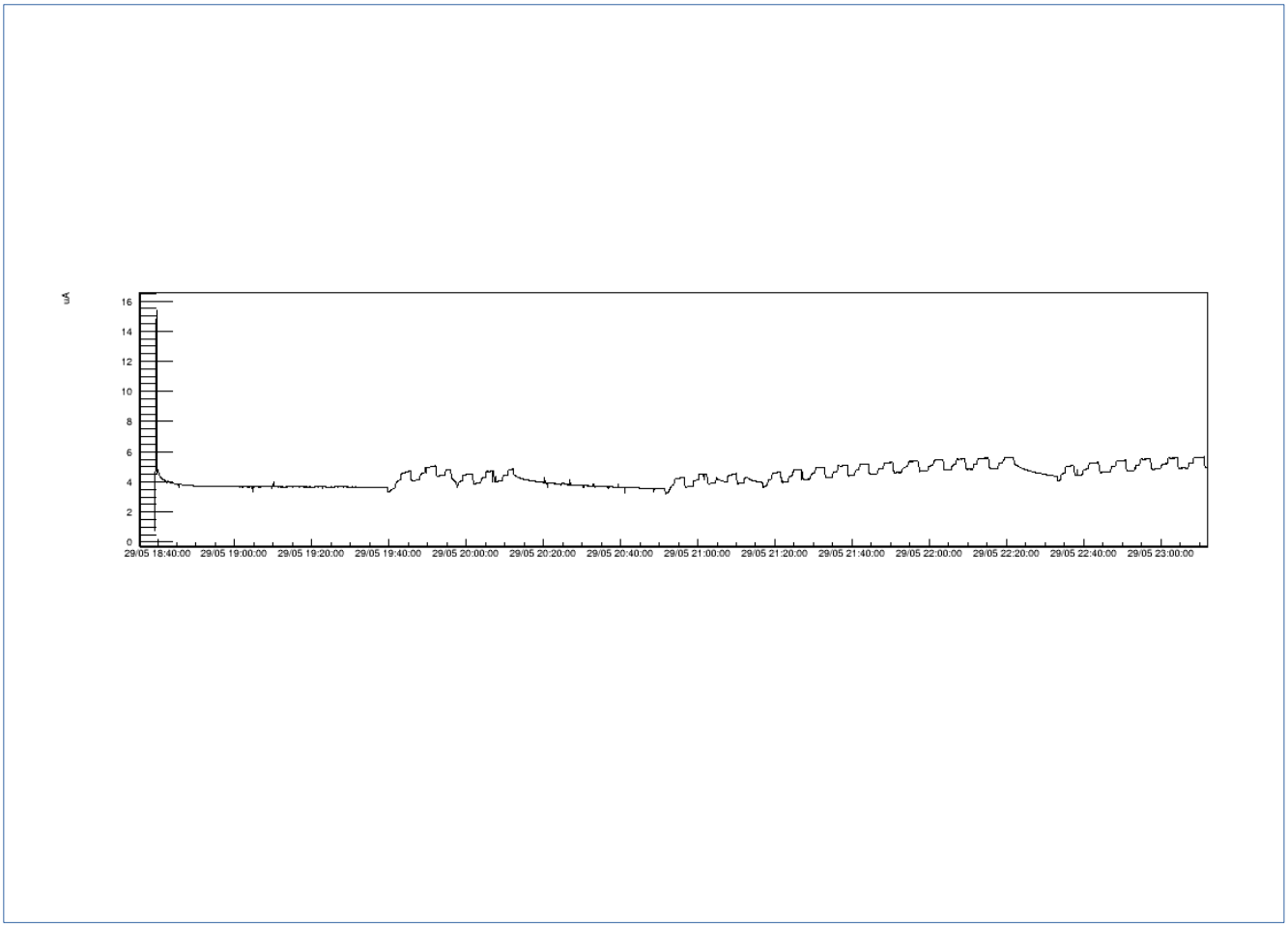

MIP, wafer-4
noise histo
Entries 484248
Mean 0.01151
Std Dev 4.39
mip histo
Entries 7976
Mean 111.4
Std Dev 86.8
ADC

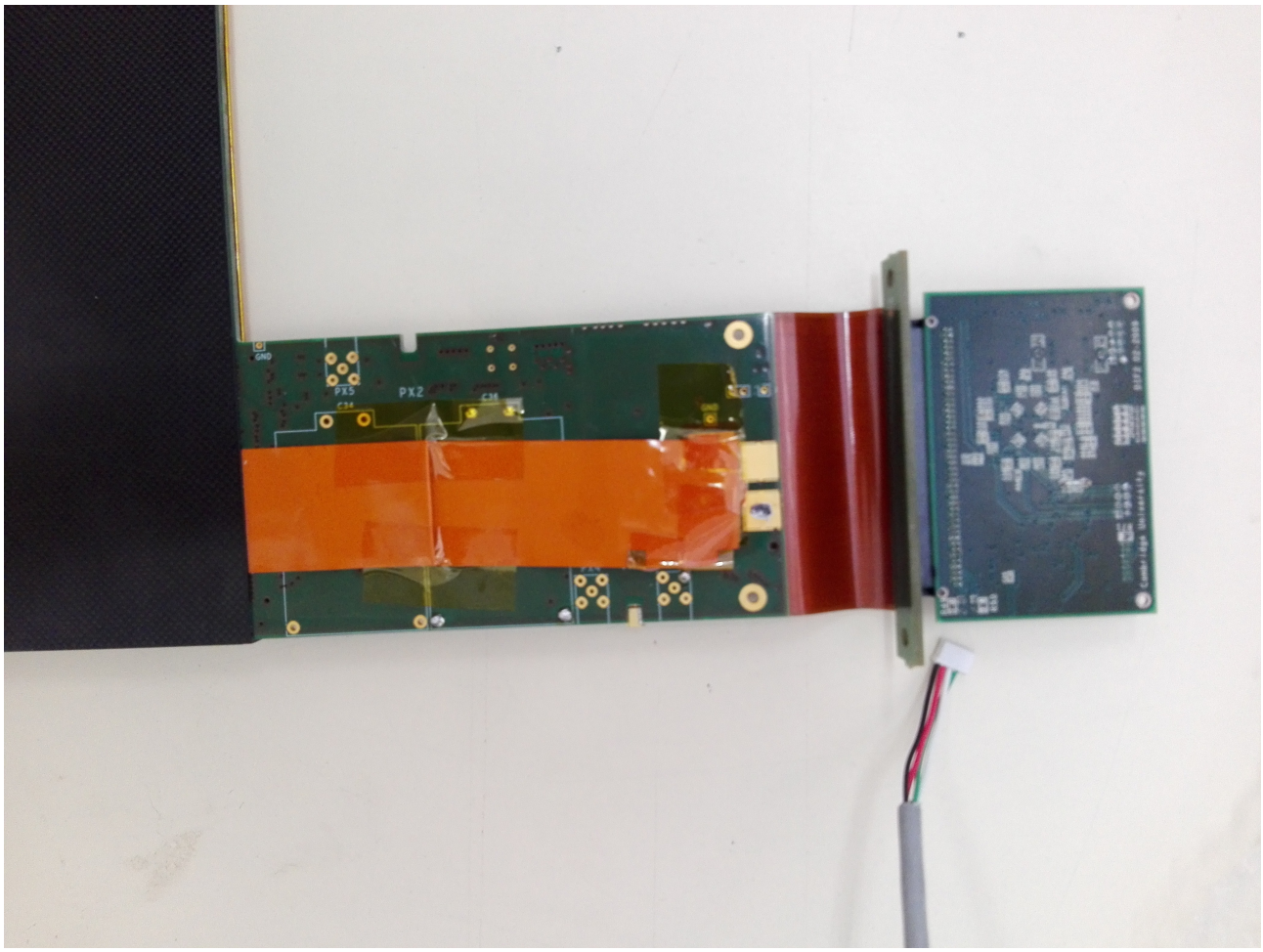

MIP (all chips/channel/SCA)
mip_all
Entries 31833
Mean 108
Std Dev 85.21
#
350
300
250
200
150
100
50
0
−100
0
100
200
300
400
500
ADC

DATA INTEGRITY SUMMARY
total number of spills = 12647
TOTALGOOD 99.9605 % are spills with acceptable data
bad -- 0 % have bad data size
bad -- 0 % have more than 15 SCA
bad -- 0 % have bad chip number
bad -- 0 % have extra bits in BCID
bad -- 0 % have extrabits in low gain.
bad -- 0 % have extrabits in high gain
bad -- 0.0395351 % have different hit bit for low and high gain
bad -- 0 % bad number of SCA or channels
ANALYSE HITS
get 5700 out of 5700 events for chip 0 (100%)
get 6923 out of 6923 events for chip 1 (100%)
get 4865 out of 4865 events for chip 2 (100%)
get 5414 out of 5414 events for chip 3 (100%)
get 6080 out of 6080 events for chip 4 (100%)
get 5924 out of 5924 events for chip 5 (100%)
get 6077 out of 6077 events for chip 6 (100%)
get 5731 out of 5731 events for chip 7 (100%)
get 5272 out of 5272 events for chip 8 (100%)
get 14396 out of 14396 events for chip 9 (100%)
get 6016 out of 6016 events for chip 10 (100%)
get 5760 out of 5760 events for chip 11 (100%)
get 5538 out of 5538 events for chip 12 (100%)
get 5697 out of 5697 events for chip 13 (100%)
get 4900 out of 4900 events for chip 14 (100%)
get 5302 out of 5302 events for chip 15 (100%)

SUMMARY:

HV current vs time plot




GND
PX2

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