PASSPORT, SiWLC ECAL **SLAB 19**

SLAB ID

Slab ID : 19

ASU version :FEV11

Skiroc version : Skiroc2 **NASICS :** 16

DIF ID : 31 **Firmware version :** 1603

SBM ID : V4b 21 **SMBversion :** SMBV4

Wafers ID/Info : ?

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

GOOD SLAB

Commisioning by : *A. Irles, J. Nanni*

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 Resoldered ground HV kapton (from the lemo to the « normal position »*

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

Turn slab around, open aluminim cover and do a check of soldering points :
Ok

comments and others :

ELECTRICAL + SIGNAL CHECKS (multimeter)

Electrical checks (NOT POWERED SLABS)		
		Comments
GND/PCB	ok	
RESISTOR/DVDD	ok	
SlowControl :	ok	
S4-S16	ok	
SRIN-SROUT	ok	
Readout Return S9-S21	ok	
GND HV and bottom PCB	ok	
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 ?	3.3 V
VDDD	ok	3.3 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*
- *1hAluminum cover is not grounded.*
- *Bottom of the slab is not grounded*
- *dif_1_1_1*

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

CALICOES/PYRAME VERSION :

DATA/RESULTS folder : */home/data/prototech/BTJune2017_commissioning/slab19 (pc-ecal03)*

SlowControl :

0xFE000031FE2F8A8082800000000000000044444444444444444444444444444444444444444444444444444444444442842AA0000000000000000000000000000000000000000000000019D

ANALYSYS code :(latest commit)

https://github.com/airqui/tpecal/commit/d645c3b8b3d9c2506a0b7bb5b5753660841a1b79

CALICOES version :(latest commit)

https://llrgit.in2p3.fr/online/calicoes/commit/8985754056b250523f1d0c96b601d15260c8f978

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

Horizontal position. Close slab.

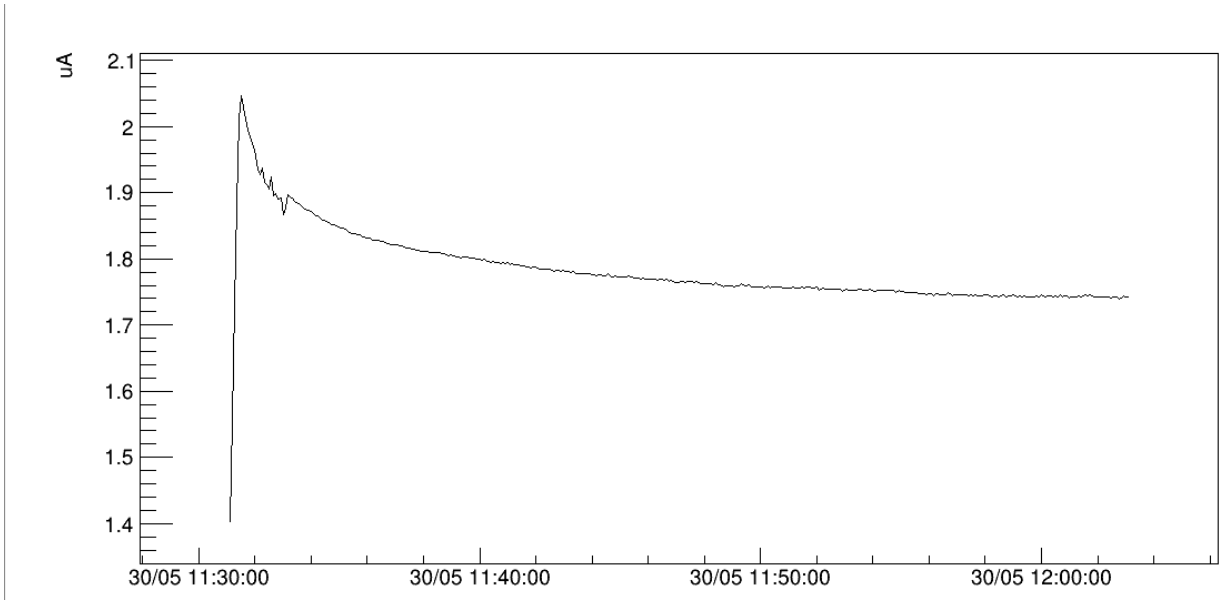
NOISE 1: *Make short acquisition and convert the data → Conversion ok ? YES*
Aluminum cover is not grounded.
Bottom of the slab is not grounded (70 ohm)

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 = 225 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/slab19/MaskedChannels.cmd

List of channels :
183 channels + 50ADC4 channels = 22 %

reconfigure("skiroc_1_1_1_1_3","disallow_trig_chans_skiroc","55")
reconfigure("skiroc_1_1_1_1_3","disable_preamp_chans_skiroc","55")
reconfigure("skiroc_1_1_1_1_4","disallow_trig_chans_skiroc","46")
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reconfigure("skiroc_1_1_1_1_9","disable_preamp_chans_skiroc","0")

SCURVES :

Algorithm :

```
 run_name="%s/scurves_64_4Hz_5.0ms_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/slab19/scurves_64_4Hz_5.0ms_masked/Scurves_PlaneEvThresh64_buff0_dif_1_1_1_3sigma.cmd

/
home/data/prototech/BTJune2017_commissioning/slab19/scurves_64_4Hz_5.0ms_masked/Scurves_PlaneEvThresh64_buff0_dif_1_1_1_5sigma.cmd

/
home/data/prototech/BTJune2017_commissioning/slab19/scurves_64_4Hz_5.0ms_masked/Scurves_PlaneEvThresh64_buff0_dif_1_1_1_3sigma_firstzero.cmd

Final set of thresholds = Max(225, mean value + 5 sigma) per chip :

reconfigure("skiroc_1_1_1_1_1","set_gtrigger_skiroc",str(225))
reconfigure("skiroc_1_1_1_1_2","set_gtrigger_skiroc",str(225))
reconfigure("skiroc_1_1_1_1_3","set_gtrigger_skiroc",str(228))
reconfigure("skiroc_1_1_1_1_4","set_gtrigger_skiroc",str(225))
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reconfigure("skiroc_1_1_1_1_11","set_gtrigger_skiroc",str(225))
reconfigure("skiroc_1_1_1_1_12","set_gtrigger_skiroc",str(225))
reconfigure("skiroc_1_1_1_1_13","set_gtrigger_skiroc",str(225))
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reconfigure("skiroc_1_1_1_1_15","set_gtrigger_skiroc",str(225))
reconfigure("skiroc_1_1_1_1_16","set_gtrigger_skiroc",str(225))

COSMICS :

Algorithm : Commissioning_cosmics.py
cosmic rate estimation assumes all channels enabled...

DIF

Wafer 1 :
Estimated cosmic rate :

~2.9 cosmic/ min cm^2

MIP = 56.1(0.5)
Chi2/NDF = 1.6

Wafer 3 :
Estimated cosmic rate :

~ 3 cosmic/ min cm²

MIP = 51.8 (0.5)
Chi2/NDF = 1.4

Wafer 2 :
Estimated cosmic rate :

~ 2.7 cosmic/ min cm²

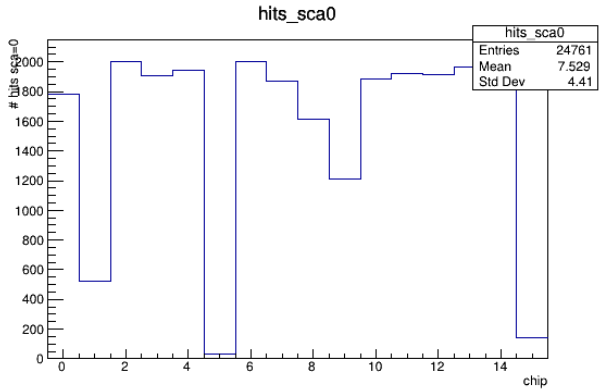
MIP= 54.5 (0.6)
Chi2/NDF = 1.6

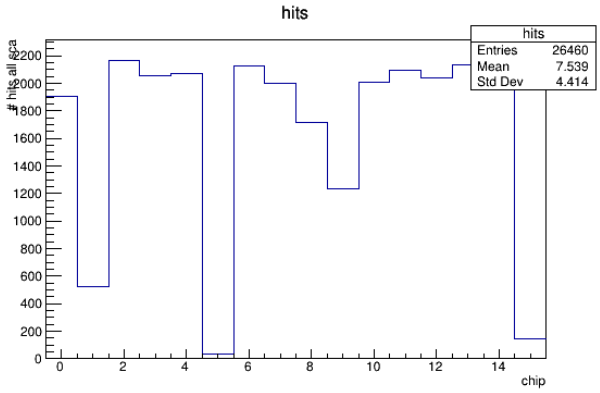
Wafer 4 :
Estimated cosmic rate :

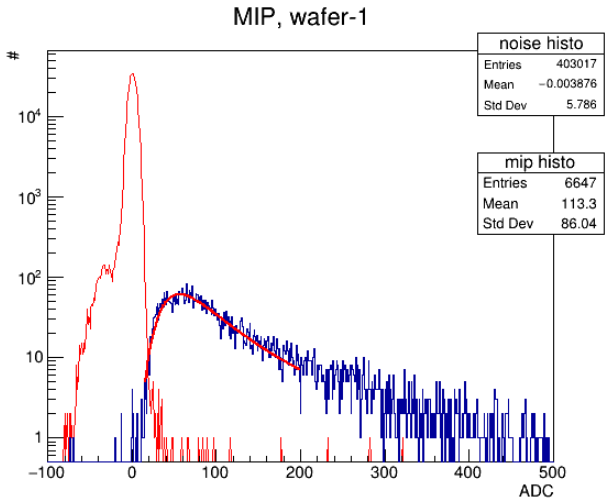
~ 2.9 cosmic/ min cm²

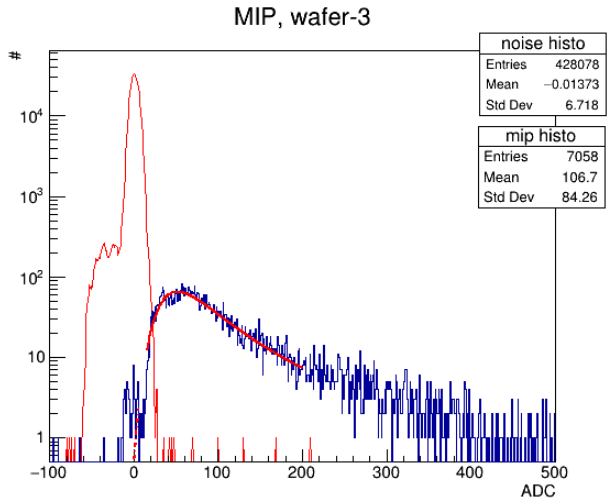
MIP = 59.9 (0.5)
Chi2/NDF = 1.3

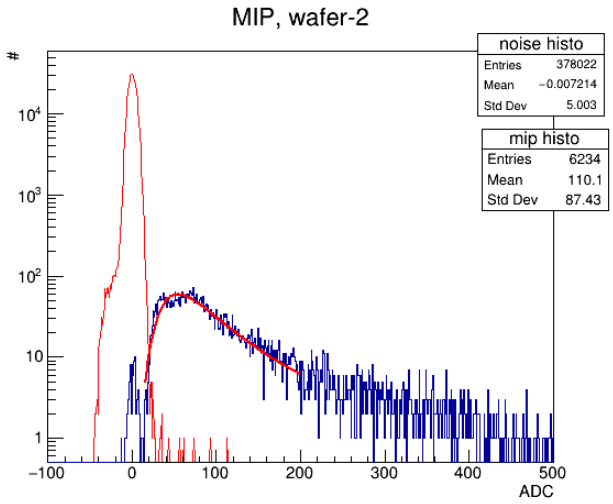
Plots :

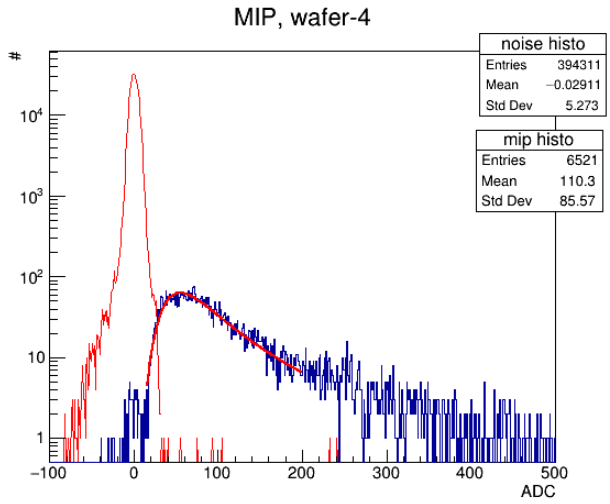

hits_sca0
hits_sca0
Entries 24761
Mean 7.529
Std Dev 4.41
hits sca=0
chip

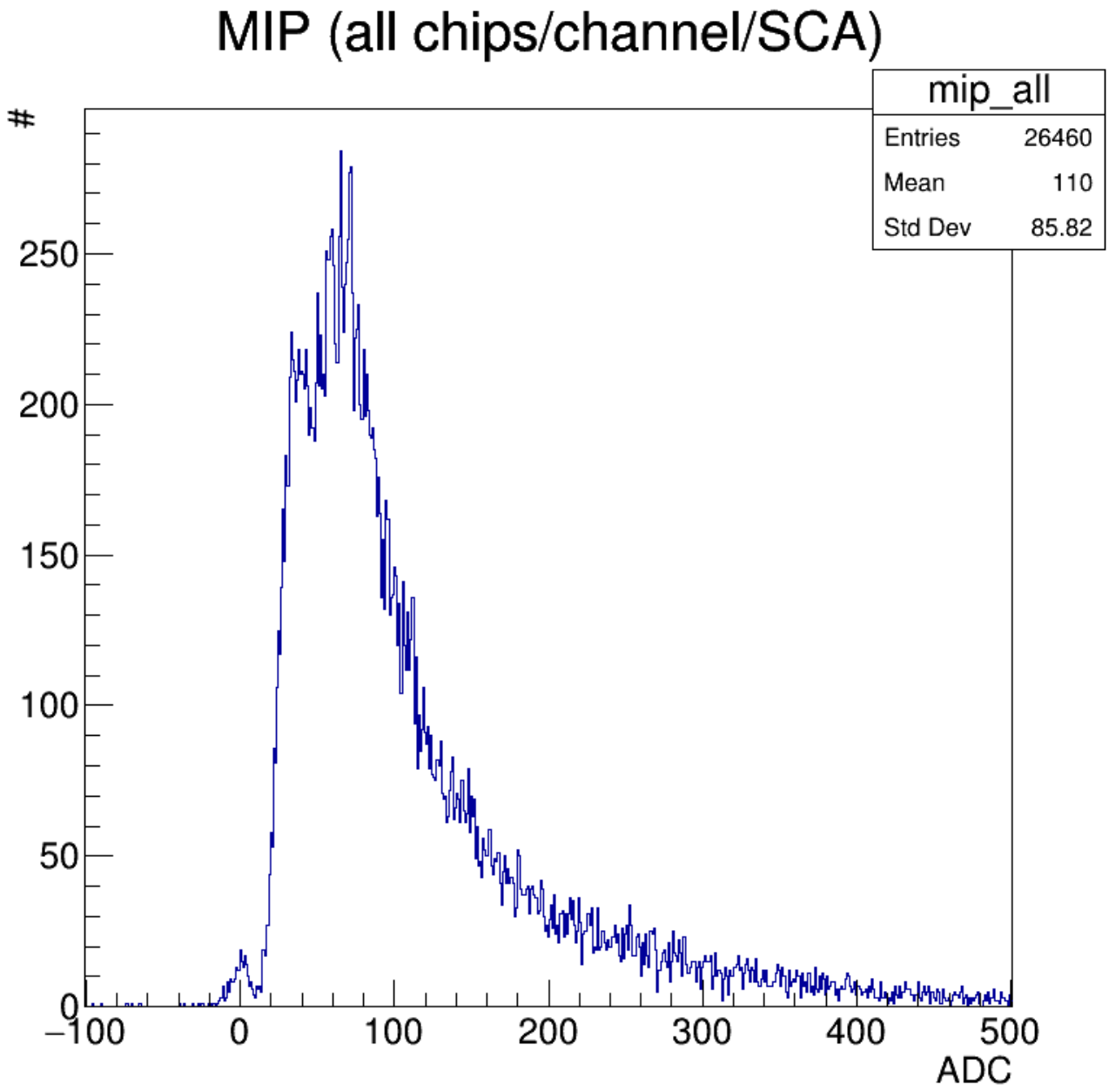

hits
hits
Entries 26460
Mean 7.539
Std Dev 4.414
hits all sca
chip


MIP, wafer-1
noise histo
Entries 403017
Mean −0.003876
Std Dev 5.786
mip histo
Entries 6647
Mean 113.3
Std Dev 86.04
#
ADC


MIP, wafer-3
noise histo
Entries 428078
Mean −0.01373
Std Dev 6.718
mip histo
Entries 7058
Mean 106.7
Std Dev 84.26
#
ADC


MIP, wafer-2
noise histo
Entries 378022
Mean −0.007214
Std Dev 5.003
mip histo
Entries 6234
Mean 110.1
Std Dev 87.43
#
ADC

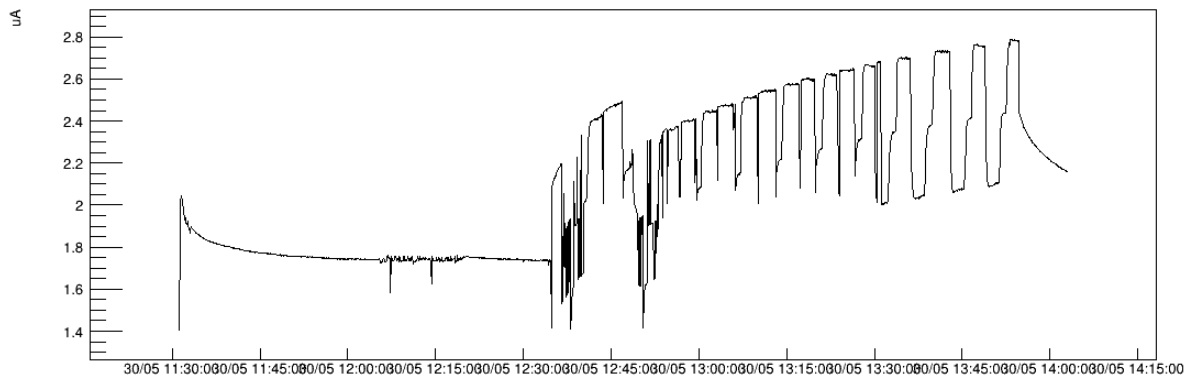

MIP, wafer-4
noise histo
Entries 394311
Mean −0.02911
Std Dev 5.273
mip histo
Entries 6521
Mean 110.3
Std Dev 85.57
#
ADC


MIP (all chips/channel/SCA)
mip_all
Entries 26460
Mean 110
Std Dev 85.82
#
250
200
150
100
50
0
−100
0
100
200
300
400
500
ADC

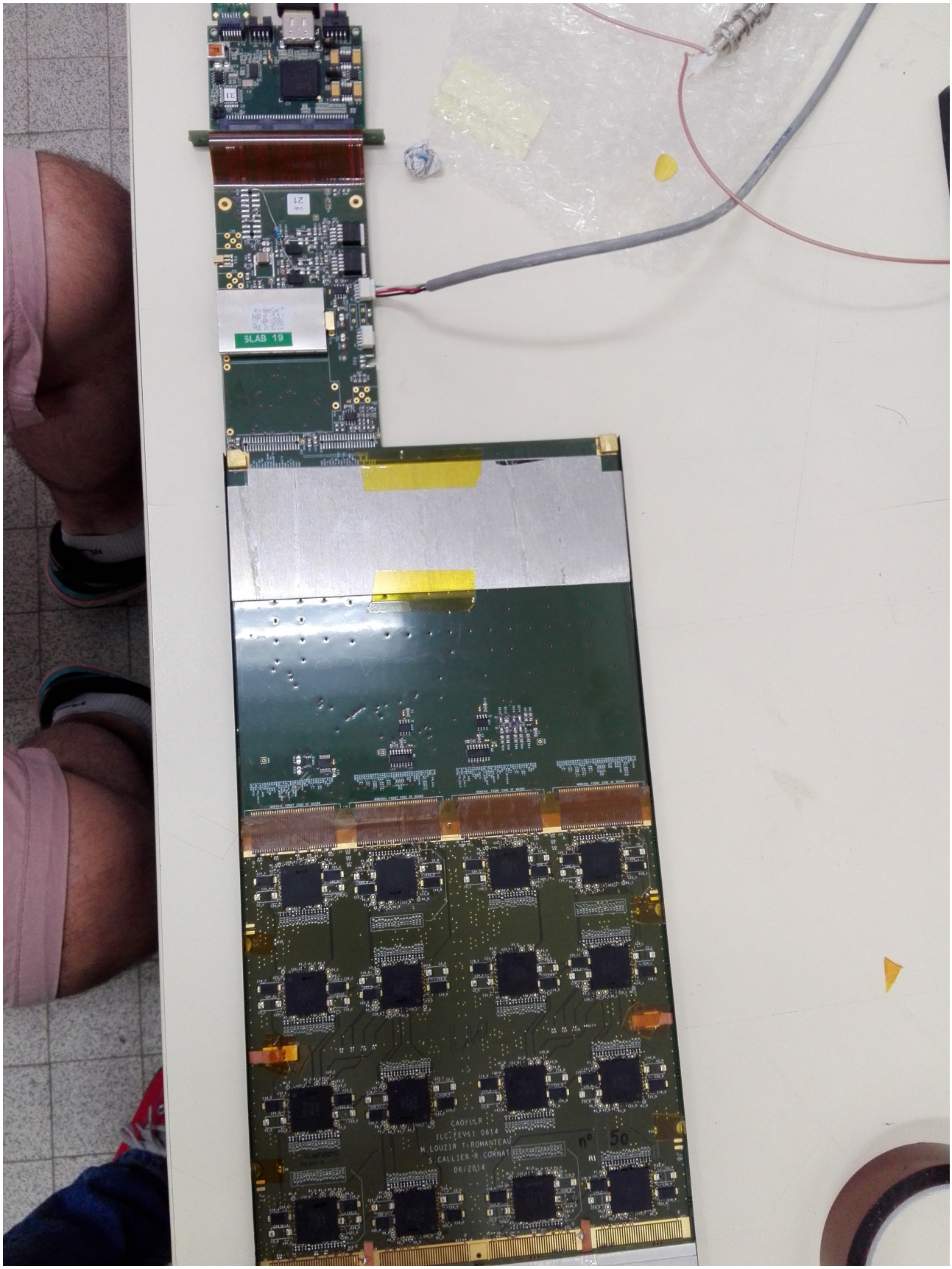
DATA INTEGRITY SUMMARY
total number of spills = 11963
TOTALGOOD 99.0471 % are spills with acceptable data
bad -- 0 % have bad data size
bad -- 0 % have more than 15 SCA
bad -- 0.869347 % have bad chip number
bad -- 0 % have extra bits in BCID
bad -- 0 % have extrabits in low gain.
bad -- 0 % have extrabits in high gain
bad -- 0.0835911 % have different hit bit for low and high gain
bad -- 0 % bad number of SCA or channels
ANALYSE HITS
get 5045 out of 5045 events for chip 0 (100%)
get 7111 out of 7111 events for chip 1 (100%)
get 6067 out of 6067 events for chip 2 (100%)
get 5868 out of 5868 events for chip 3 (100%)
get 5870 out of 5870 events for chip 4 (100%)
get 452 out of 452 events for chip 5 (100%)
get 6047 out of 6047 events for chip 6 (100%)
get 5604 out of 5604 events for chip 7 (100%)
get 4535 out of 4535 events for chip 8 (100%)
get 15305 out of 15305 events for chip 9 (100%)
get 5719 out of 5719 events for chip 10 (100%)
get 5882 out of 5882 events for chip 11 (100%)
get 5478 out of 5478 events for chip 12 (100%)
get 5548 out of 5548 events for chip 13 (100%)
get 6222 out of 6222 events for chip 14 (100%)
get 2045 out of 2045 events for chip 15 (100%)

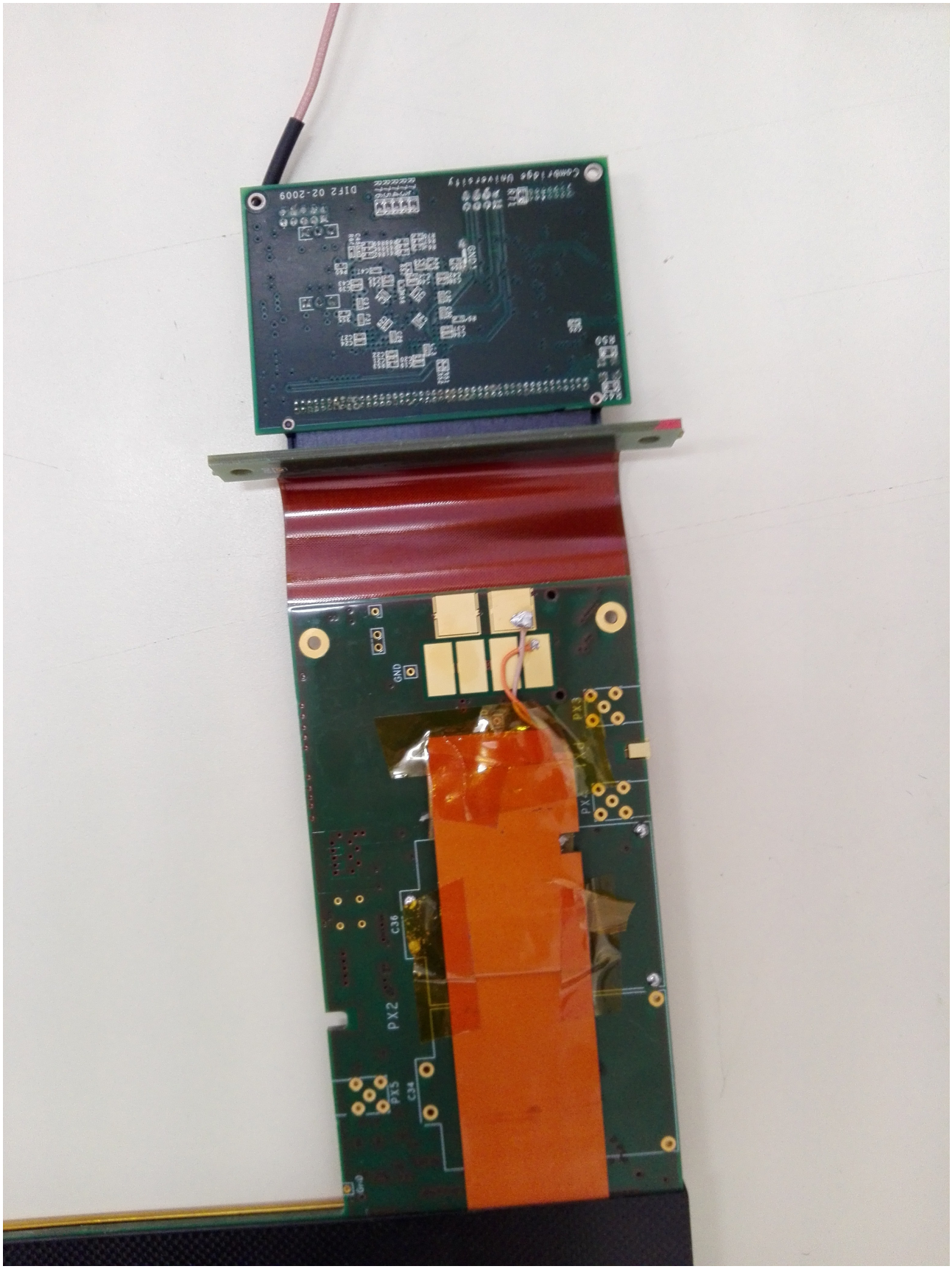
SUMMARY:

HV current vs time plot



PASSPORT, SiWLC ECAL SLAB 19




DIF2 02-2009
GND
PX3
PX4
C36
PX2
PX5
C34