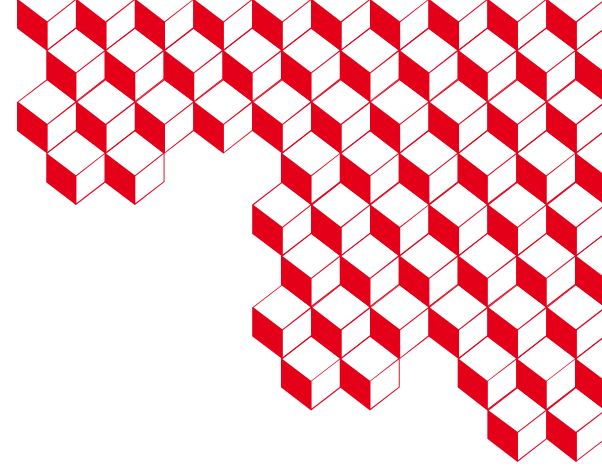




The EICROC Project

Update on EICROC0 testing effort at IRFU

Florent BOUYJOU

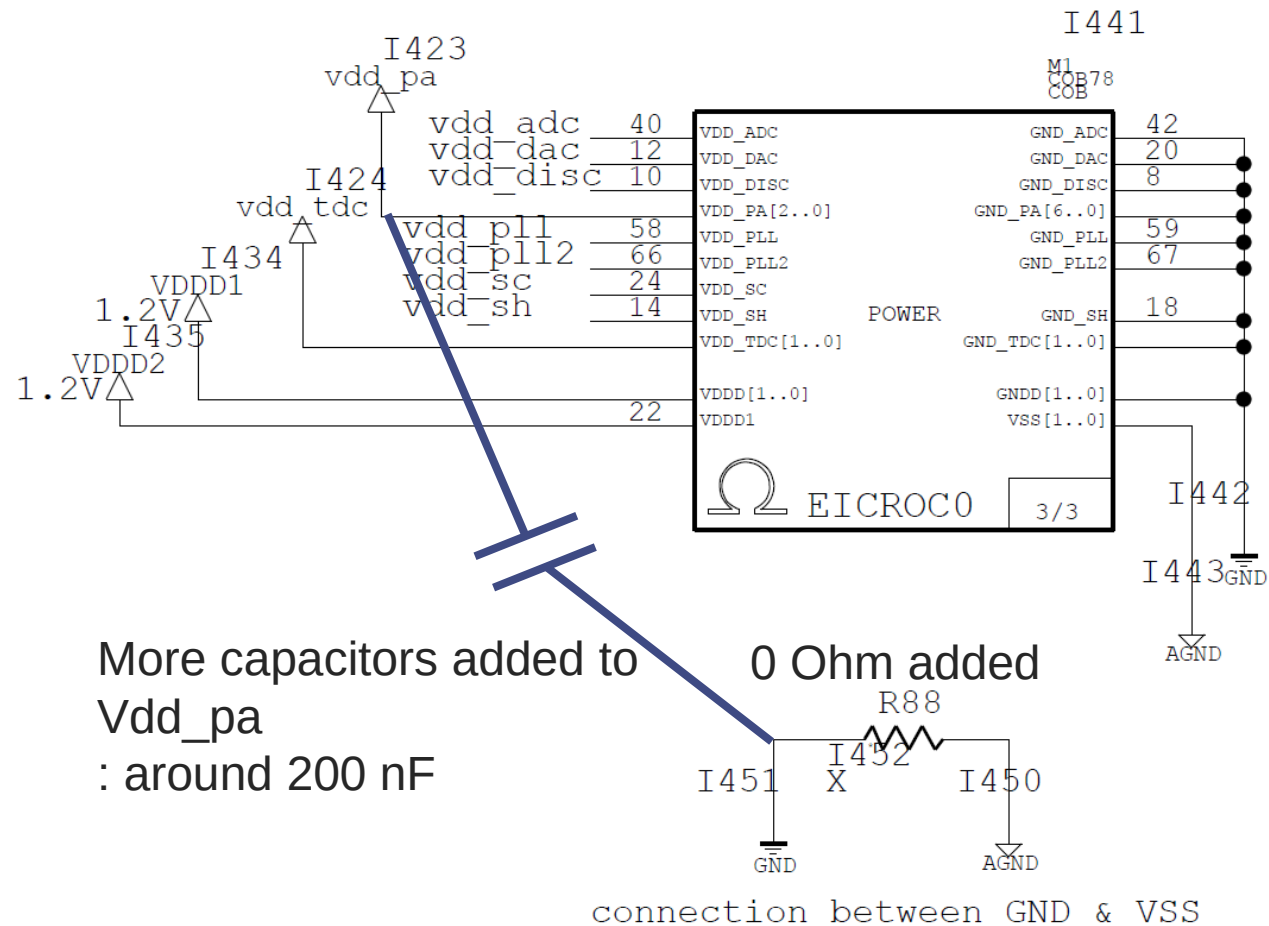
20/10/2023



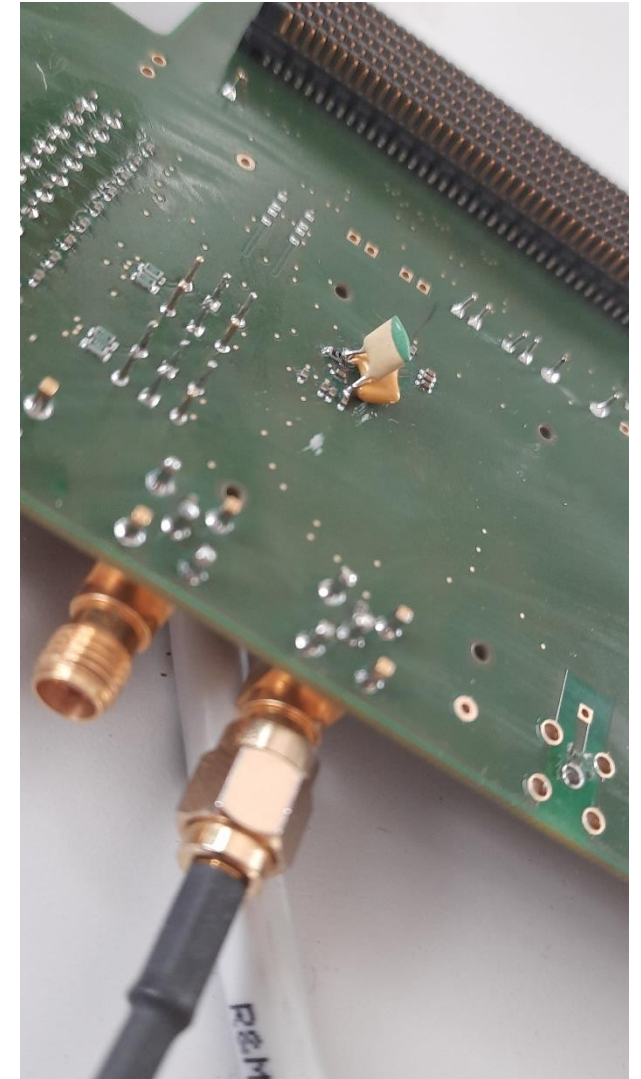
DOE/eRD109

Investigation : 160 MHz clock coupling to PA input: a limitation for TOA measurements

After tinker : a way of improvement :



Bottom vue



EICROC0 TZ Pre Amplifier Probe output signal amplitudes

Clocks: **40 MHz** (not used by EICROC0) & **160 MHz** (mandatory for TDC and ADC)

- No notable improvements observed
- When the PAs are off (SC) the probe output still sees the clocks?

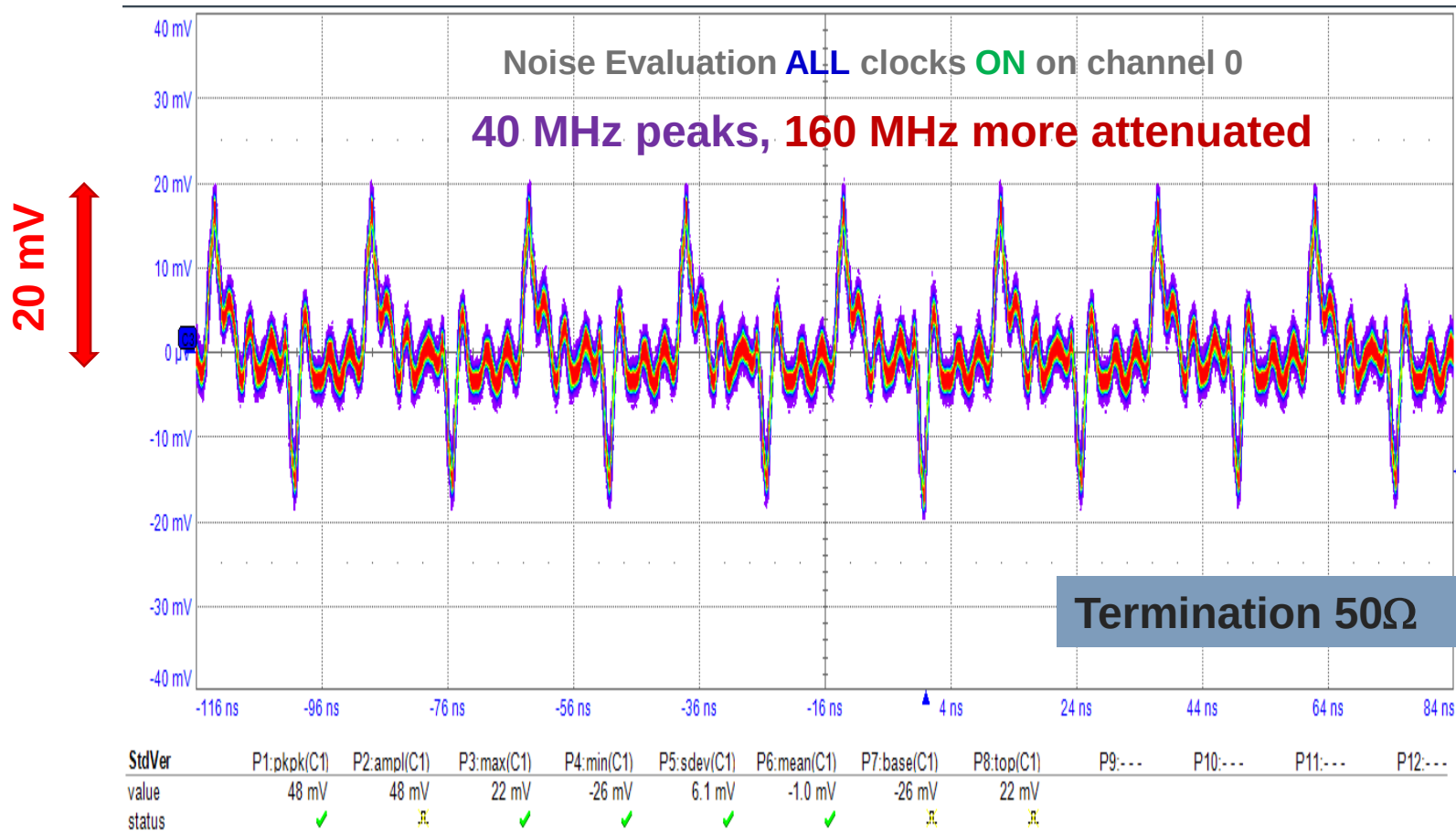
SC mods :

0x20B , B'1000-00-00, # Bit4-2 : dac_biaspa[3:0]

bit2-3 : dac bias current in input PA 1=200 μ A

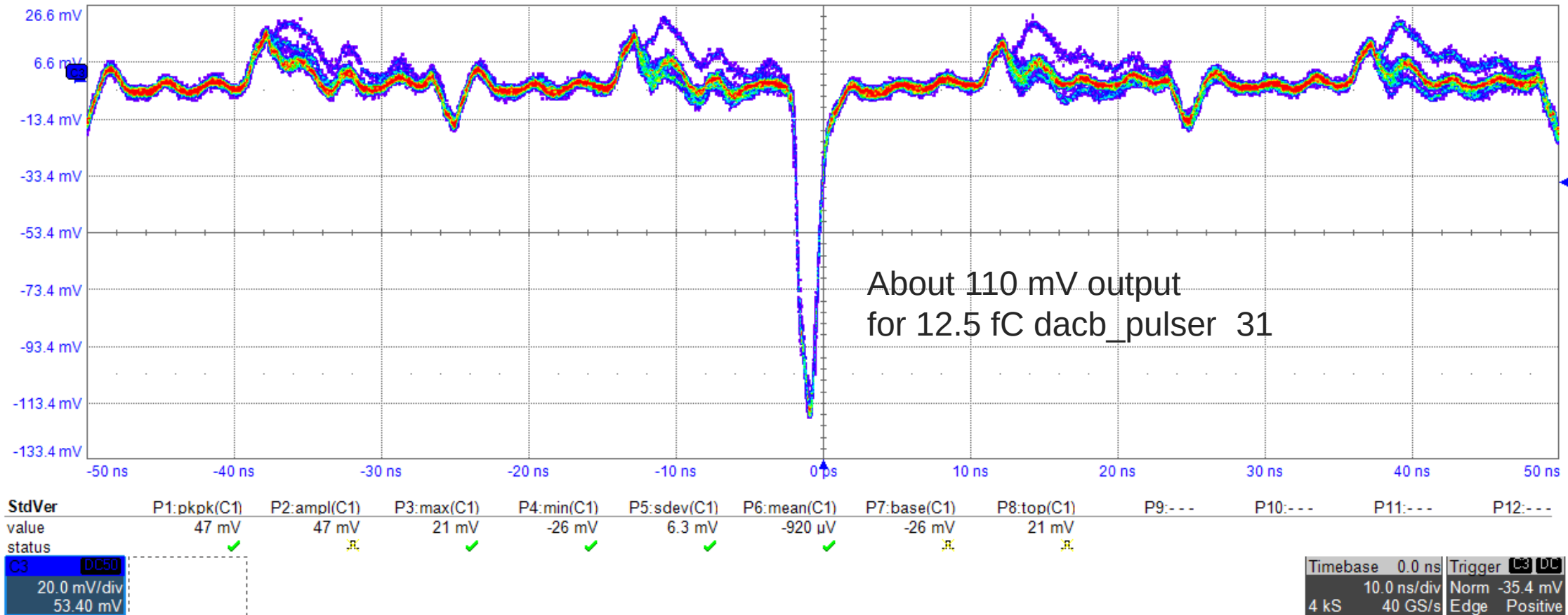
0x20D , B'01-100000, # Bit7-6 : S[1:0]

Bit5-0 : dac_bias_rtr[5:0]



EICROC0 TZ Pre Amplifier Probe output signal amplitudes

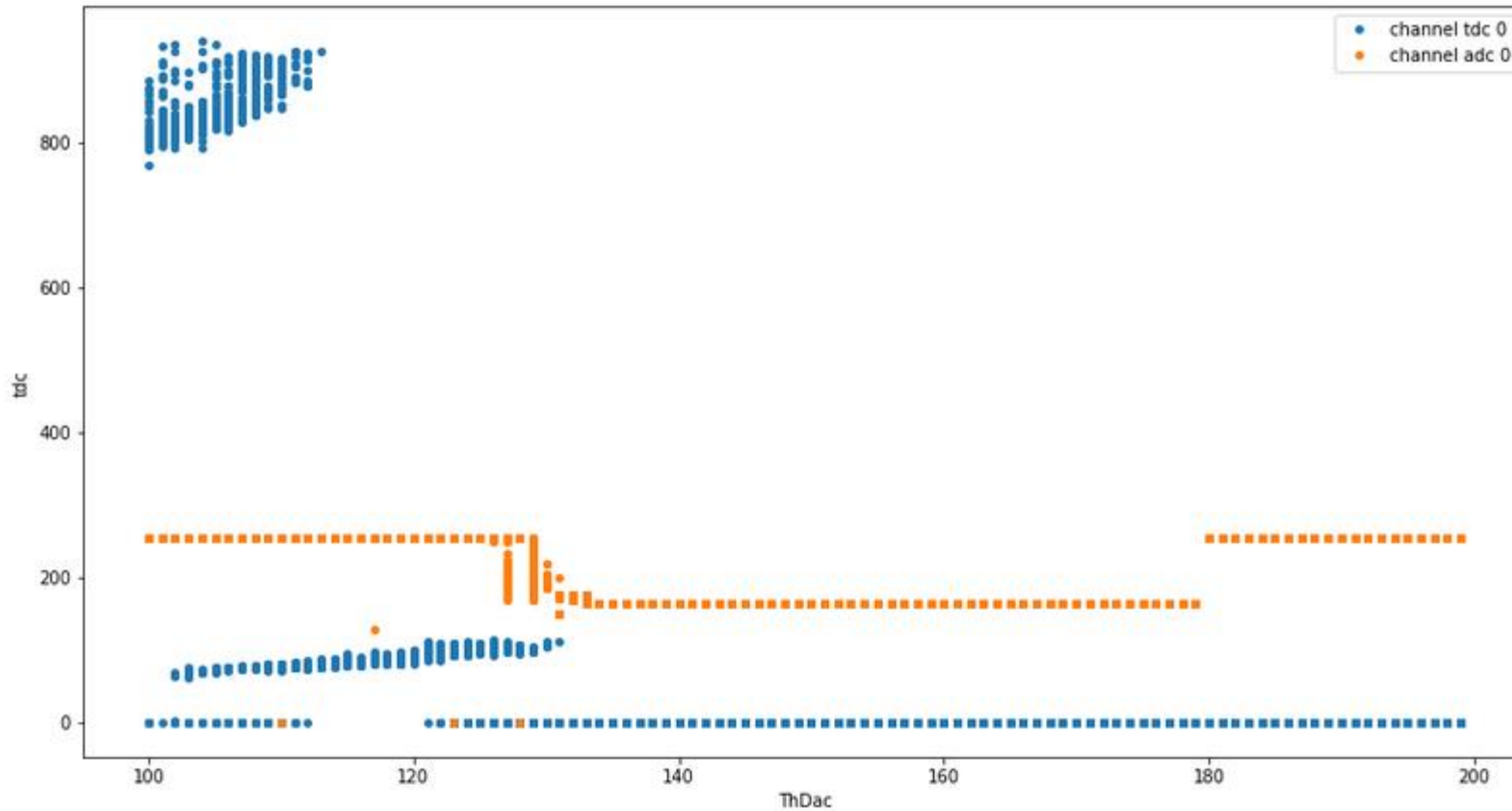
ALL clocks ON on channel 0



Termination 50 Ω

Zoom on ThDac noise region

In this test we measure channel 0 others are off and see the data function of ThDac (theshold)
Test with DIS_clkgating = '0' ADC data move when the disci is activated



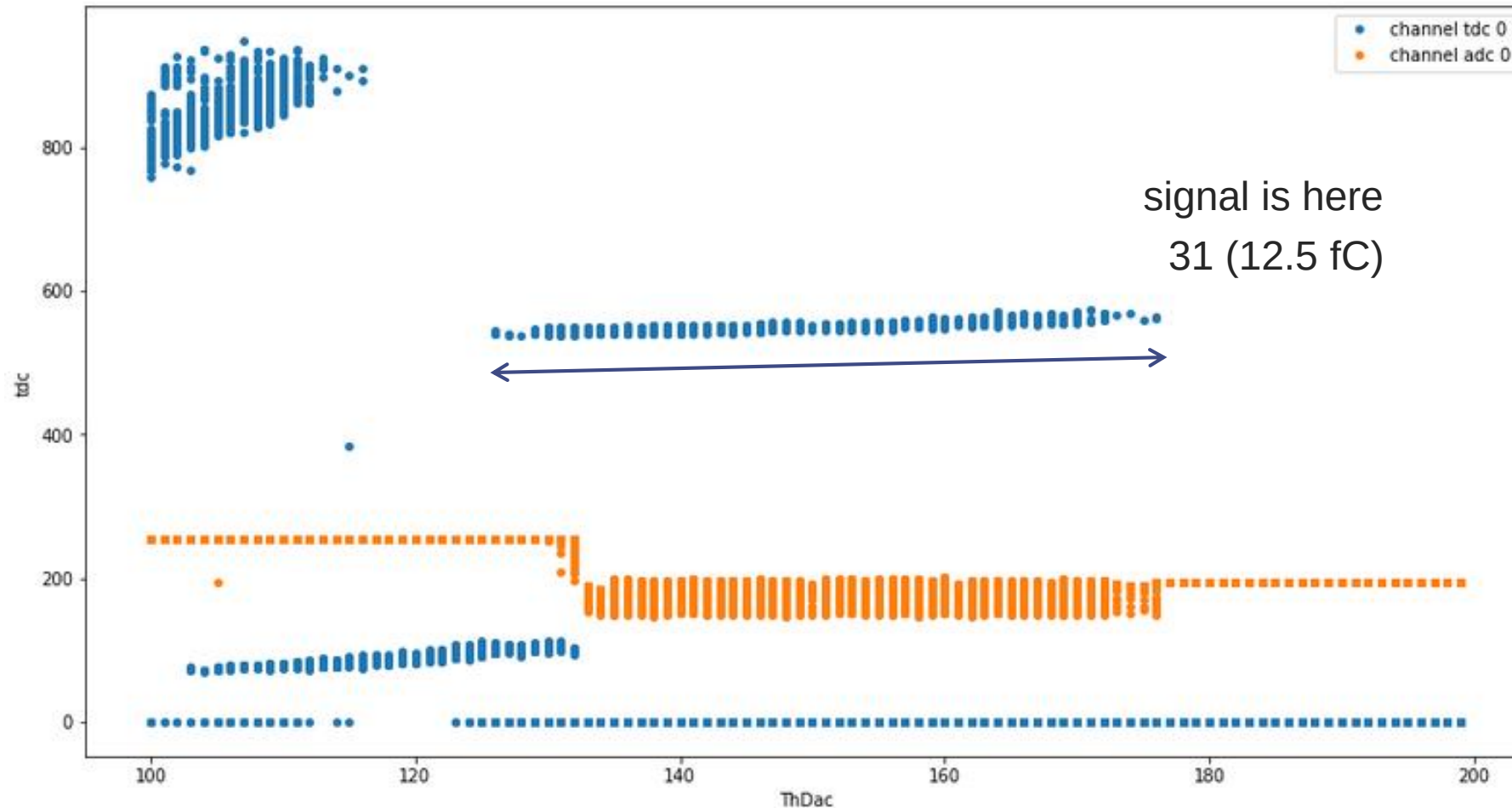
Zoom on ThDac noise region

In this test we measure channel 0 others are off and see the data function of ThDac (theshold)

We activate the injection in the pixel by ON_test = '1'

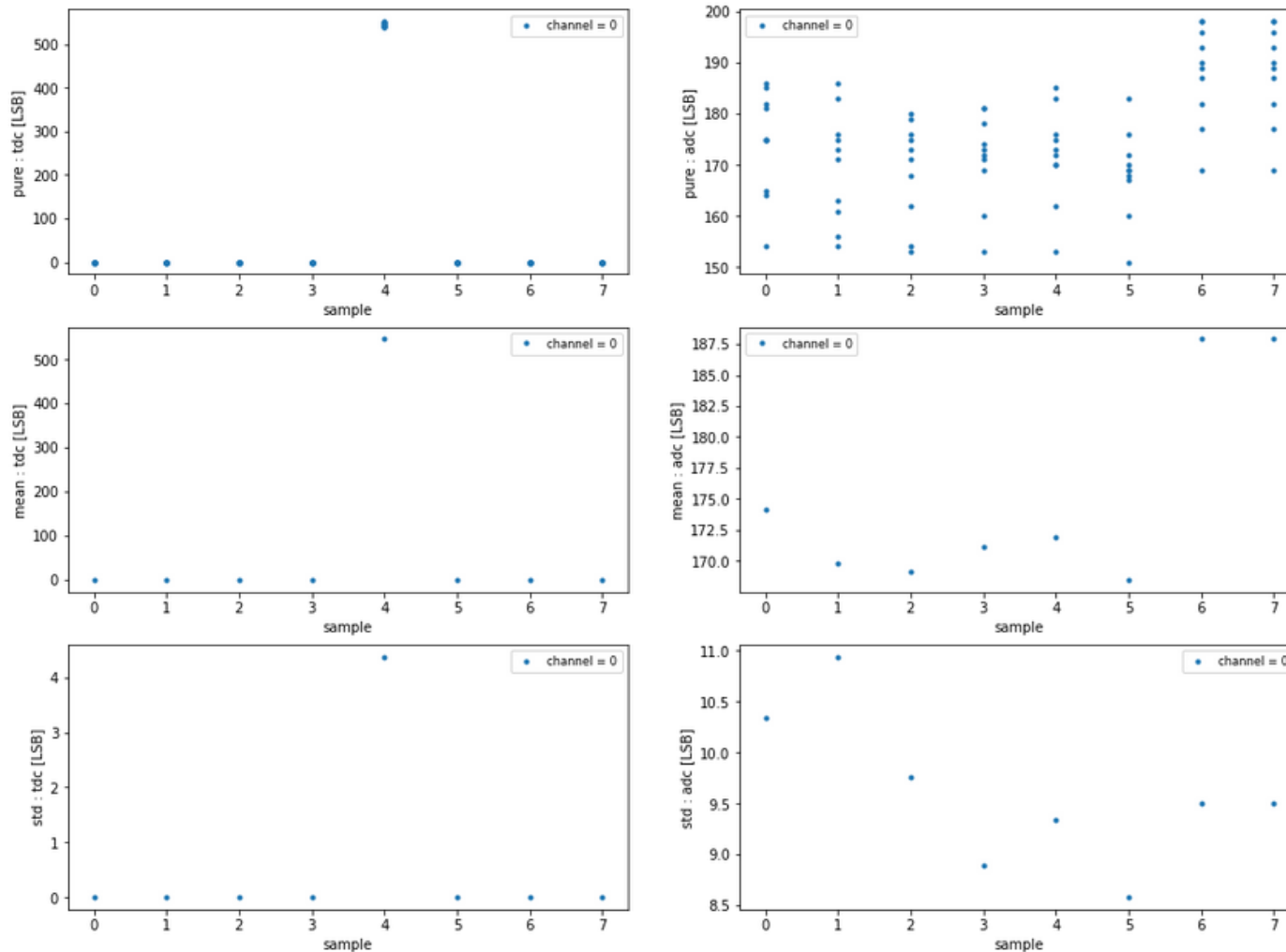
The injection 'dacb_pulser' = 0 max value

'dacb_pulser' = 31 (12.5 fC) scan ThDac over the theshold



Zoom on ThDac noise region

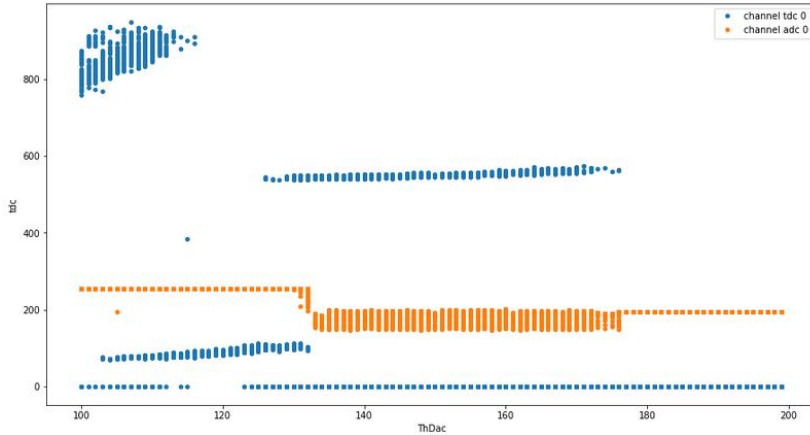
If we zoom in the signal region for exemple ThDac = 150, the TDC data is located on sample 4
We see a std value of 4 LSB RMS



Injection over the noise floor

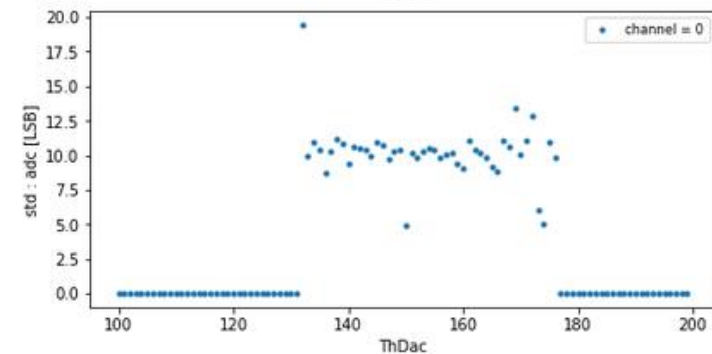
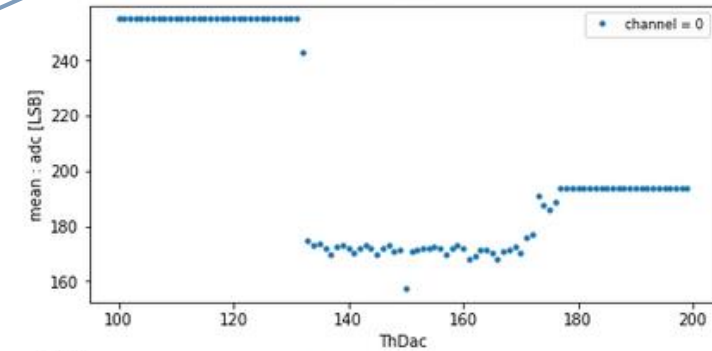
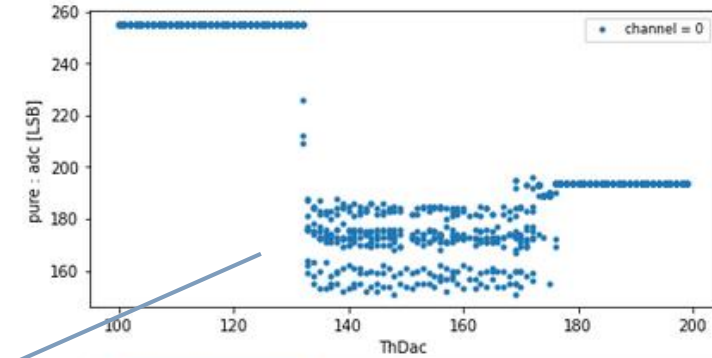
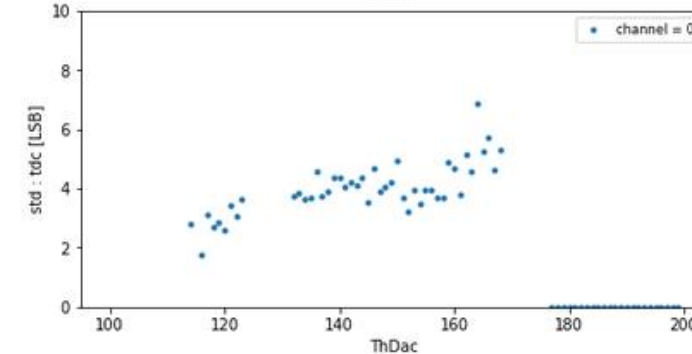
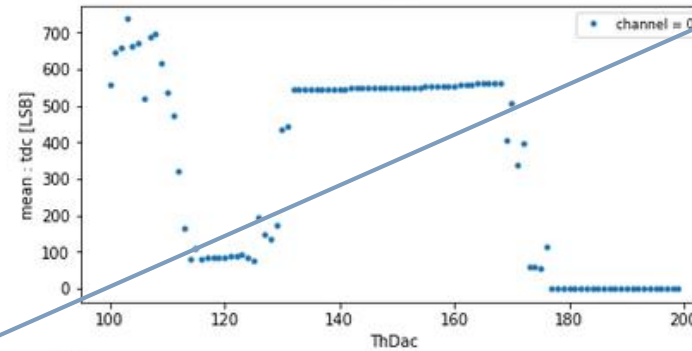
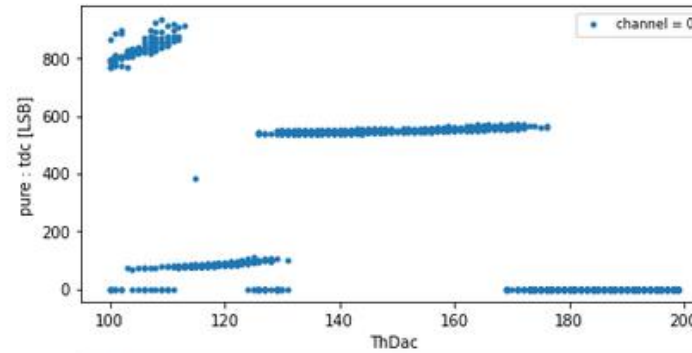
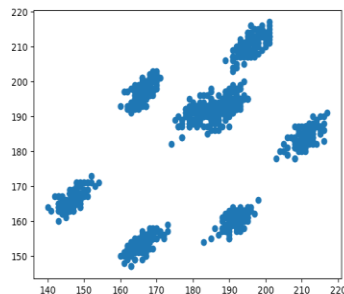
'dacb_pulser' = 31 (12.5 fC) scan ThDac over the threshold

TDC data is located in sample @4 see :

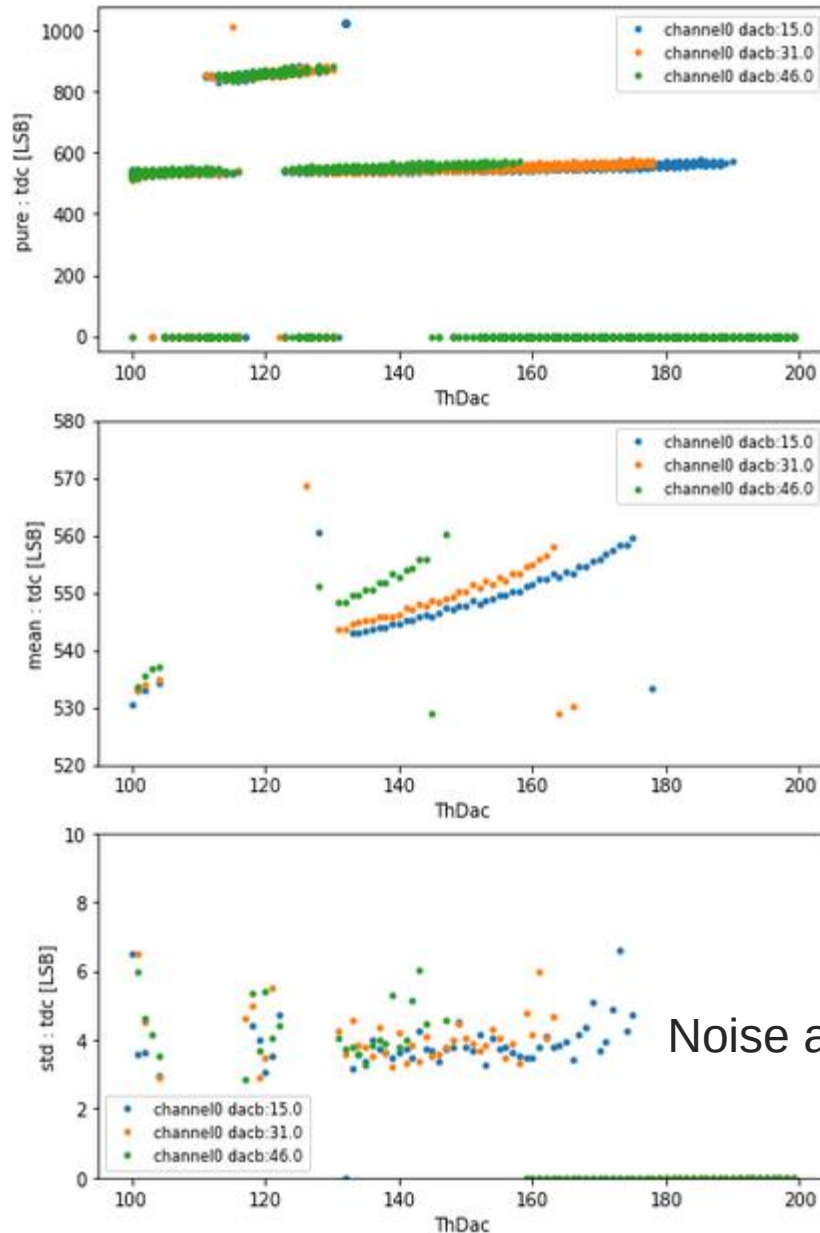


Update on EICROC0 testing effort at IJCLab and perspectives
eRD112/ AC-LGAD meeting, 06/06/2023

8-fold noise structure observed : ?



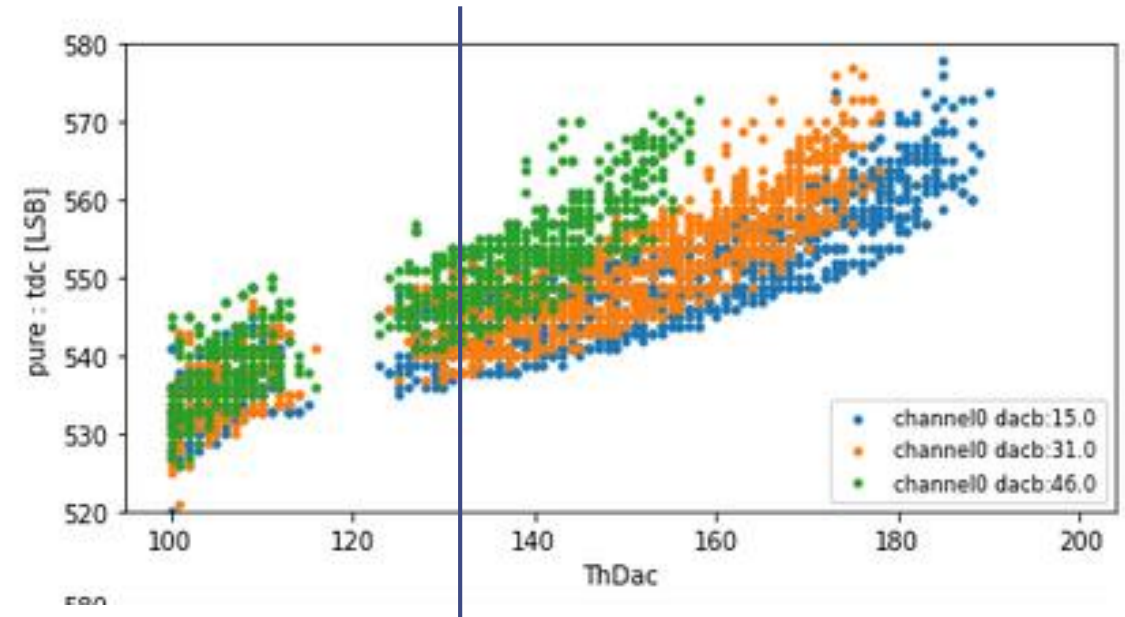
TDC with 3 different injections



dacb_pulser :

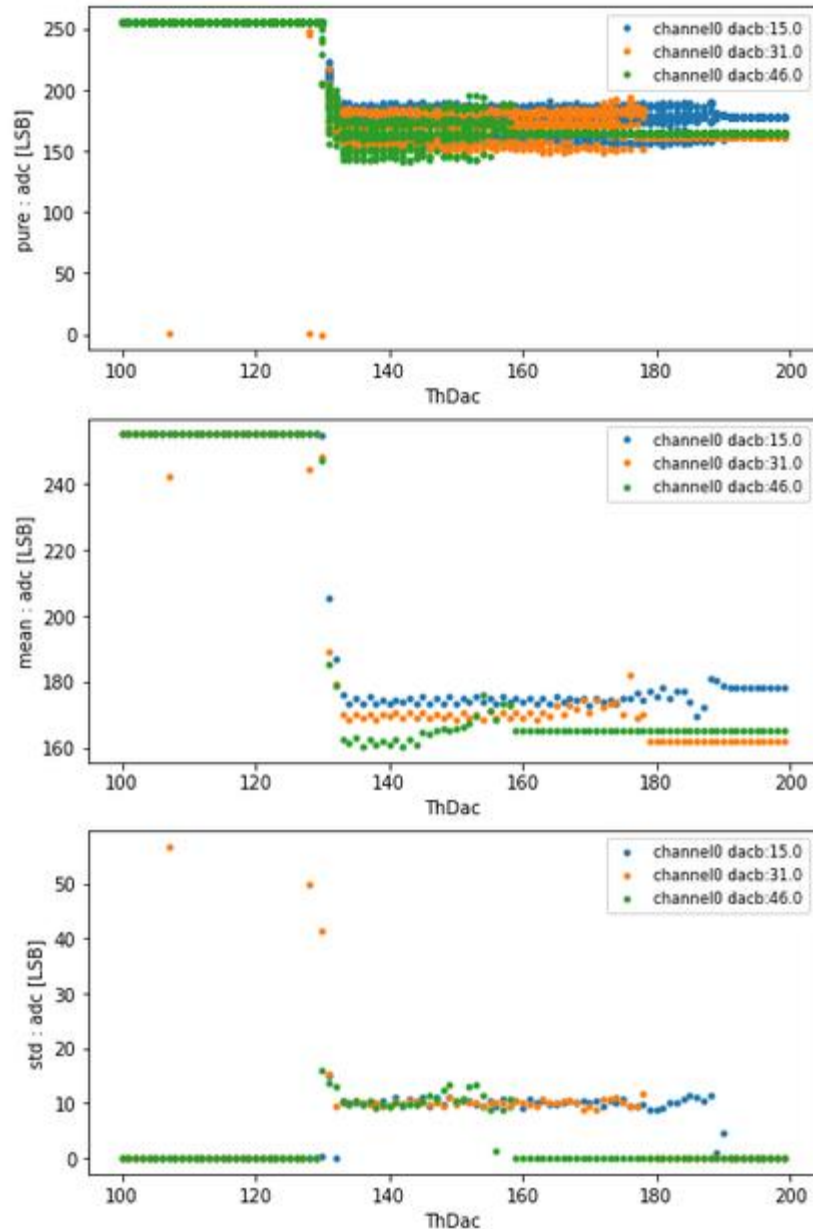
- 46 (6.2 fC)
- 31 (12.5 fC)
- 15 (18.7 fC)

Estimated noise floor : 2 fC ?



Noise around 3.5 LSB (low stats)

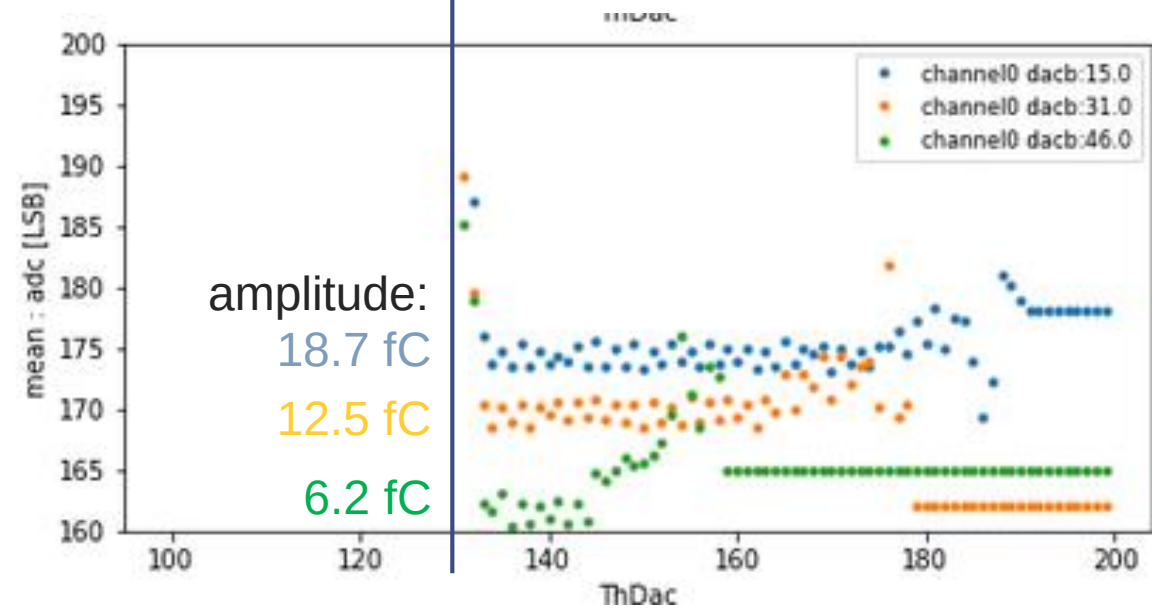
ADC with 3 different injections



dacb_pulser :

- 46 (6.2 fC)
- 31 (12.5 fC)
- 15 (18.7 fC)

Estimated noise floor : 2 fC ?



Noise around 10 LSB (low stats)