

Calibration of veto discriminators

Fragmentation Trigger FOOT

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October 2021

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Goal of the measure

Goal

We want to calibrate the inputs of WaveDream 166.

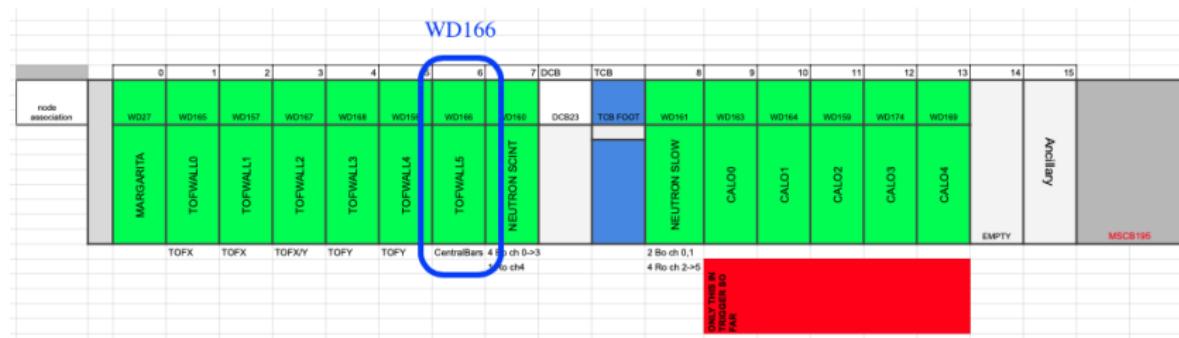
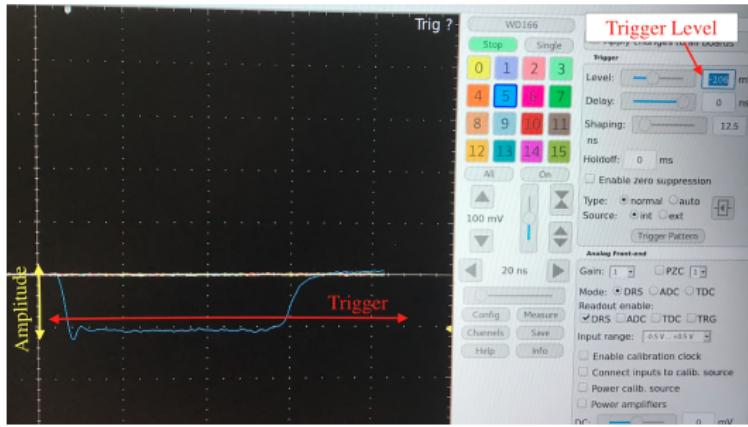


Figure: FOOT WDAQ crate configuration. Full System

Why a calibration?

Why is calibration necessary?

- Basically the problem is that the amplitude value [mV] on the PC display and the trigger value are not the same
- There is a slight difference between them that needs to be calibrated
- A good knowledge of the trigger value is required to be able to trigger between the various fragments



TGP110 Pulse Generator



Figure: TGP110. https://resources.aimtti.com/datasheets/AIM-TGP110_pulse_generator_data_sheet-lss1A.pdf

Crate

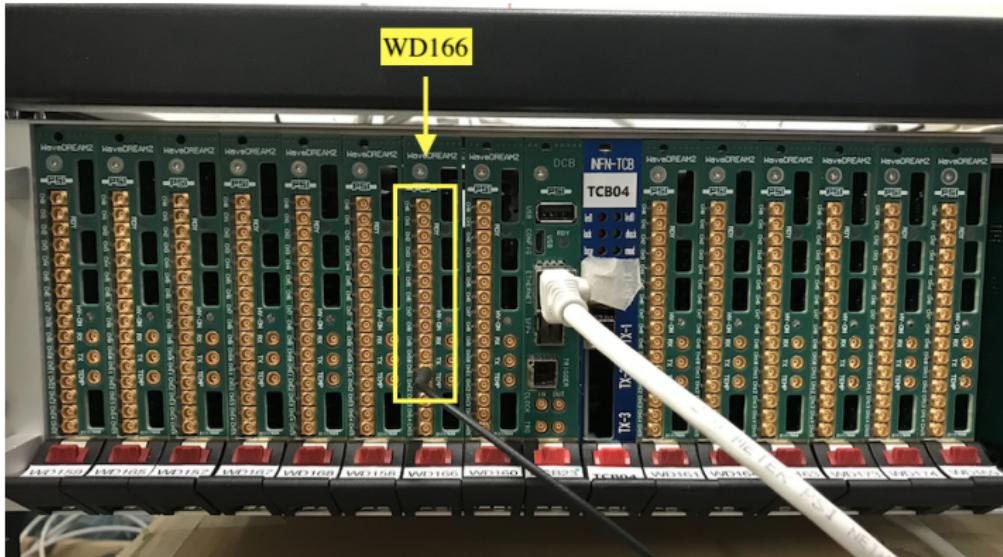


Figure: Channel 0 to 11 of WaveDream 166.

Connection map TOF

Why WaveDream 166?

Table: X-View TOF.

Ch TOF	Barra TOF	Nome WD	Slot WD	Ch WD	SiPM
16	X 8	wd166	6	0	12
17	X 8	wd166	6	1	50
18	X 9	wd166	6	2	14
19	X 9	wd166	6	3	62
20	X 10	wd166	6	4	15
21	X 10	wd166	6	5	48

Table: Y-View TOF.

Ch TOF	Barra TOF	Nome WD	Slot WD	Ch WD	SiPM
56	Y 8	wd166	6	6	71
57	Y 8	wd166	6	7	30
58	Y 9	wd166	6	8	65
59	Y 9	wd166	6	9	27
60	Y 10	wd166	6	10	73
61	Y 10	wd166	6	11	25

Method

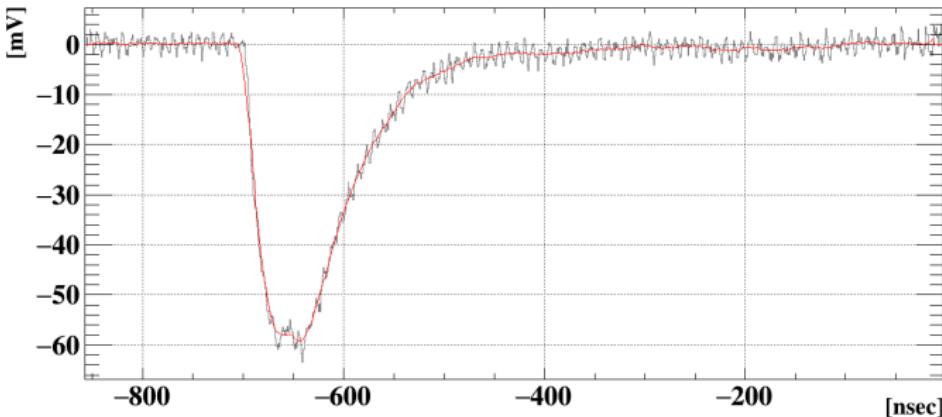


Figure: Example Waveform recorded by DRS4

- Select the channel of interest (ch 0 → 11)
- Measure the amplitude of the signal (± 5 mV)
- Correlate with the trigger value (± 3 mV)

Amplitude and Trigger correlation

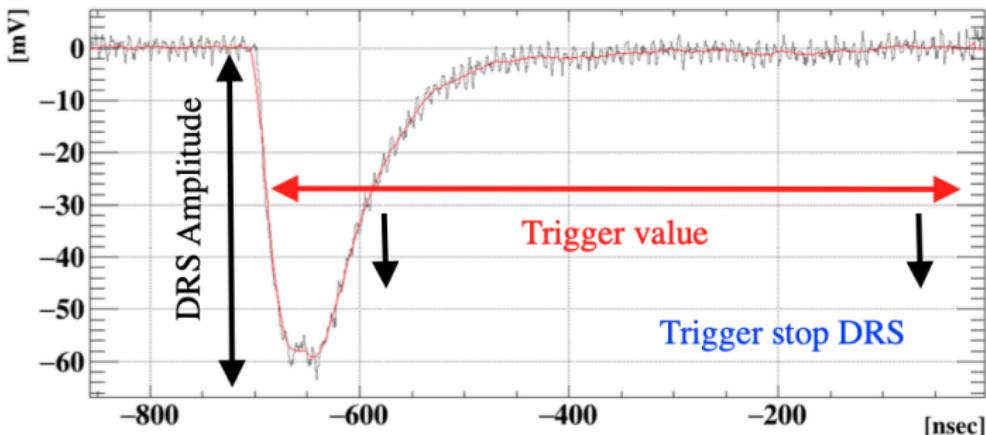
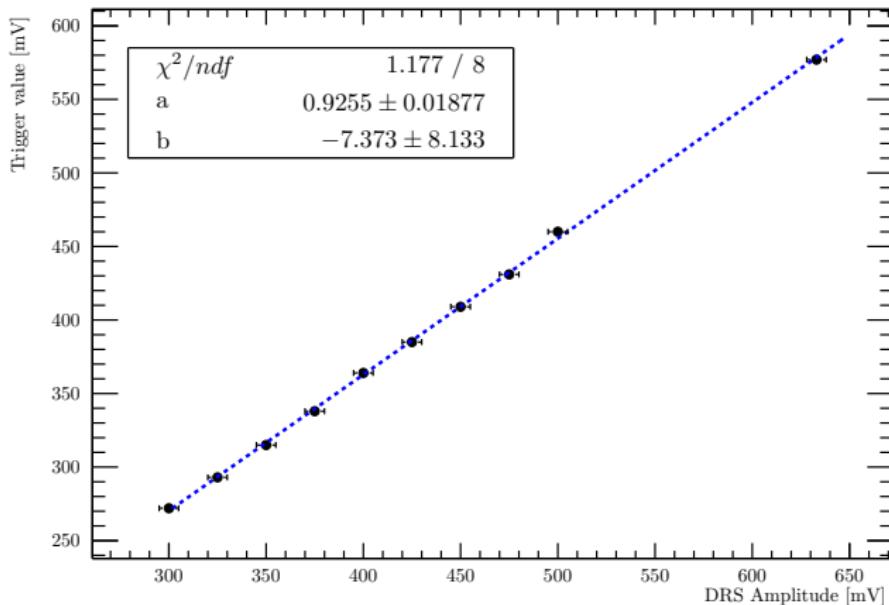


Figure: Example Waveform recorded by DRS4

- By changing the amplitude from a minimum value (300 mV) to a maximum value (full scale), in steps of 25 mV, check the linearity between the amplitude value and the trigger value.

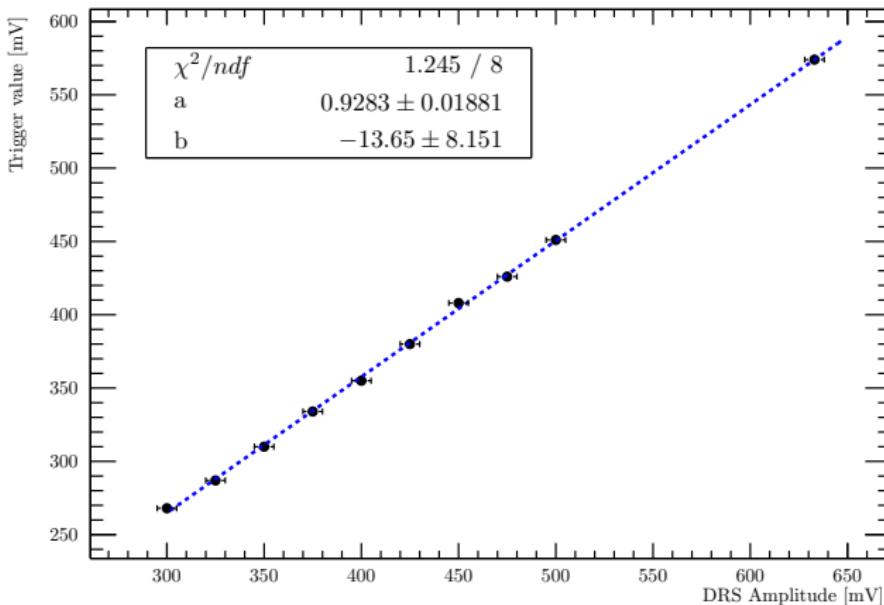
Channels calibration 0

Calibration w166 ch0



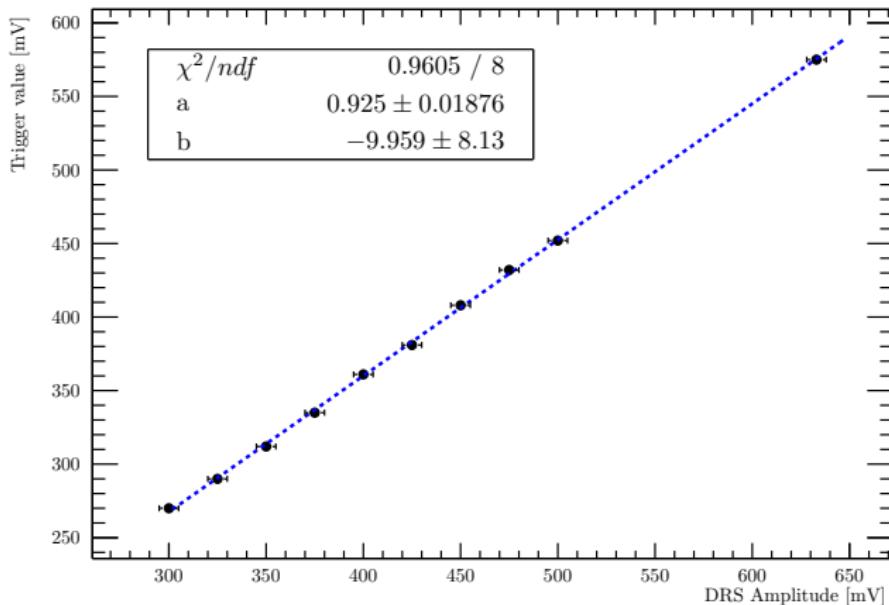
Channels calibration 1

Calibration w166 ch1



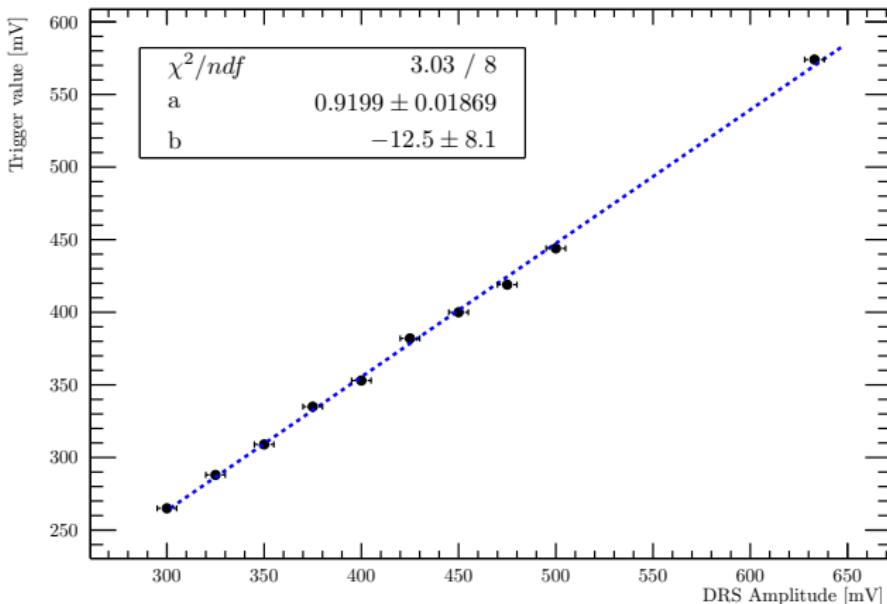
Channels calibration 2

Calibration w166 ch2



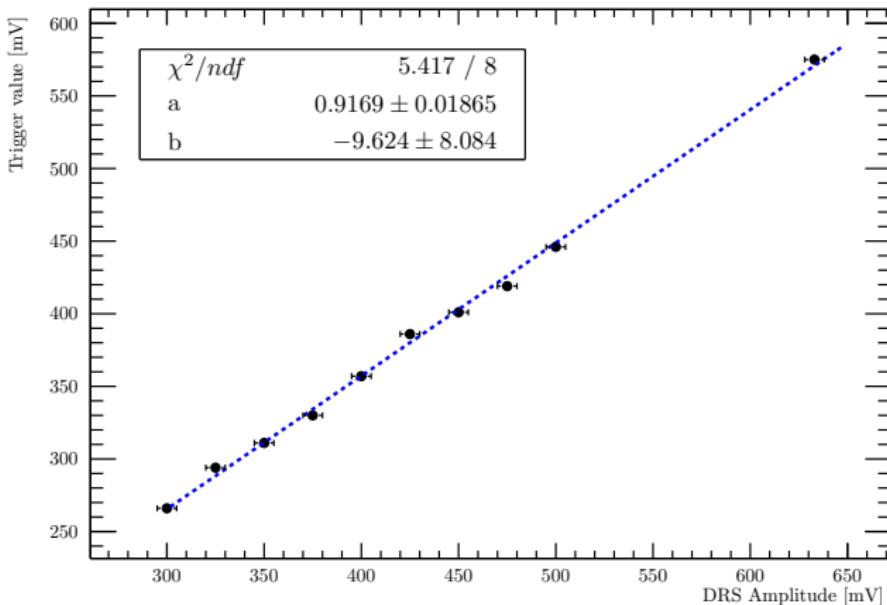
Channels calibration 3

Calibration w166 ch3



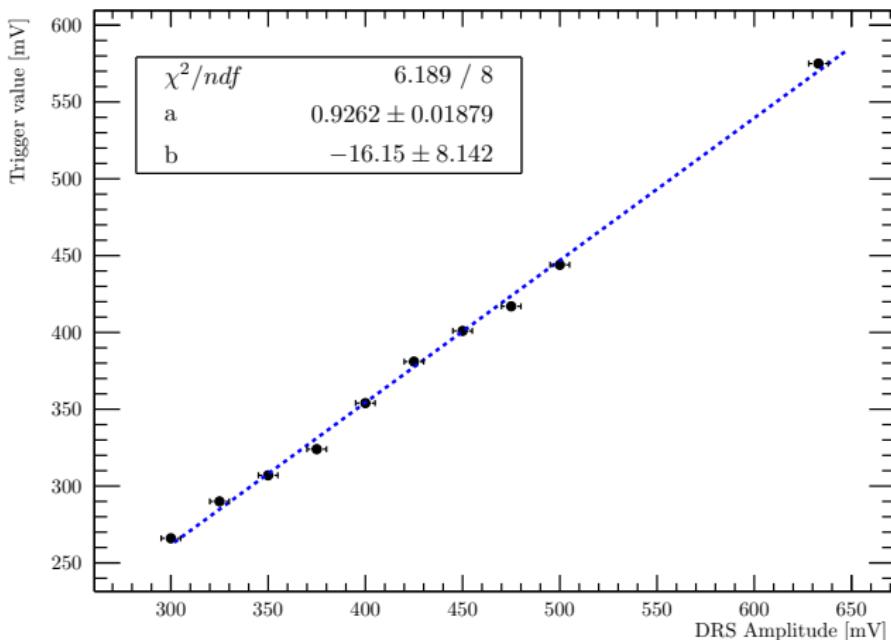
Channels calibration 4

Calibration w166 ch4



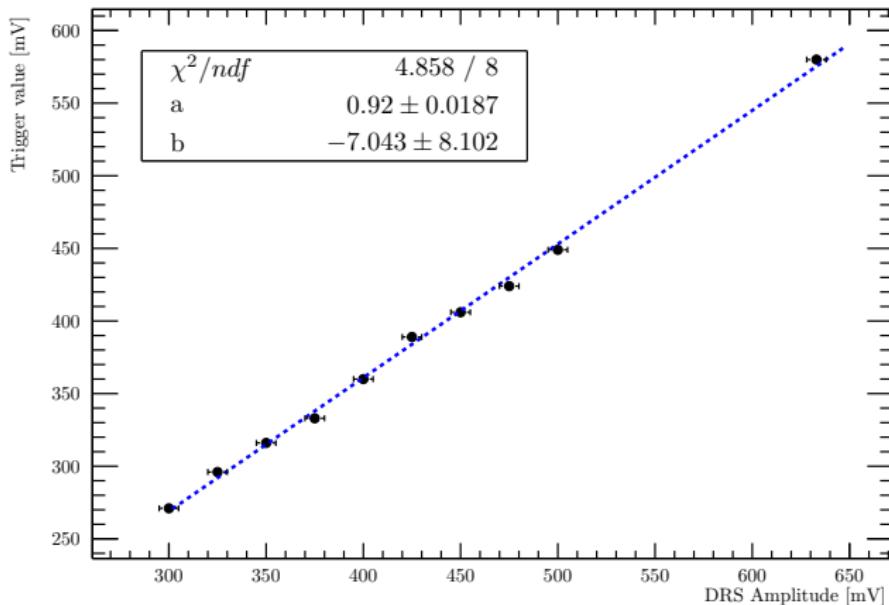
Channels calibration 5

Calibration w166 ch5



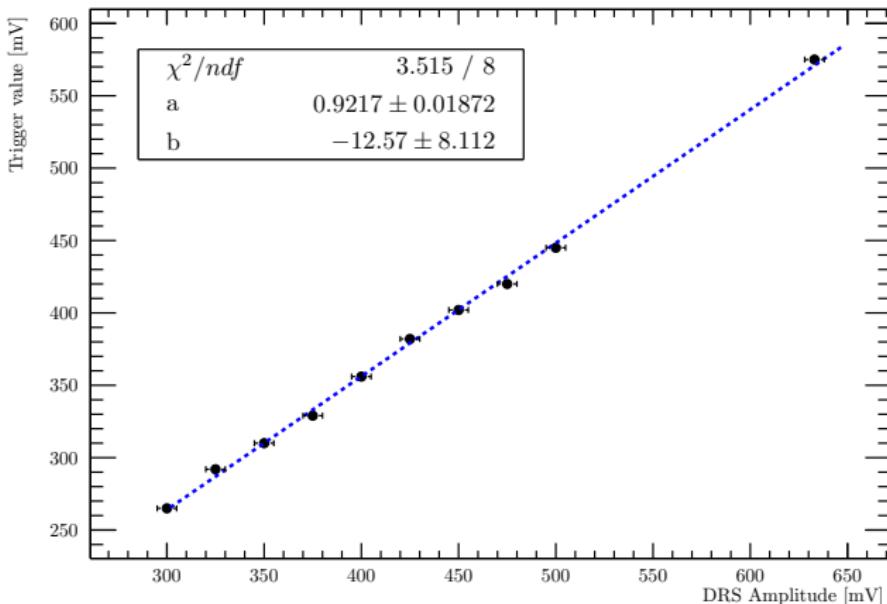
Channels calibration 6

Calibration w166 ch6



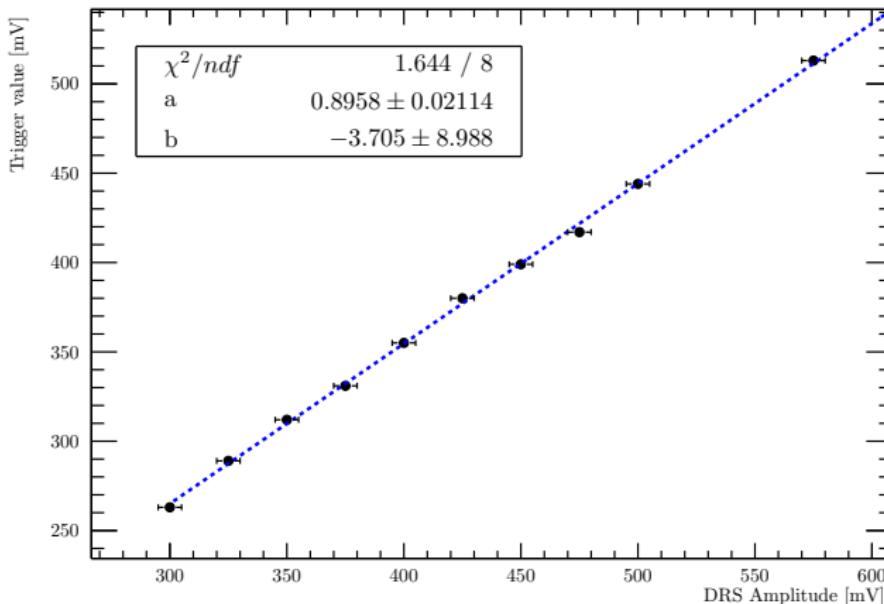
Channels calibration 7

Calibration w166 ch7



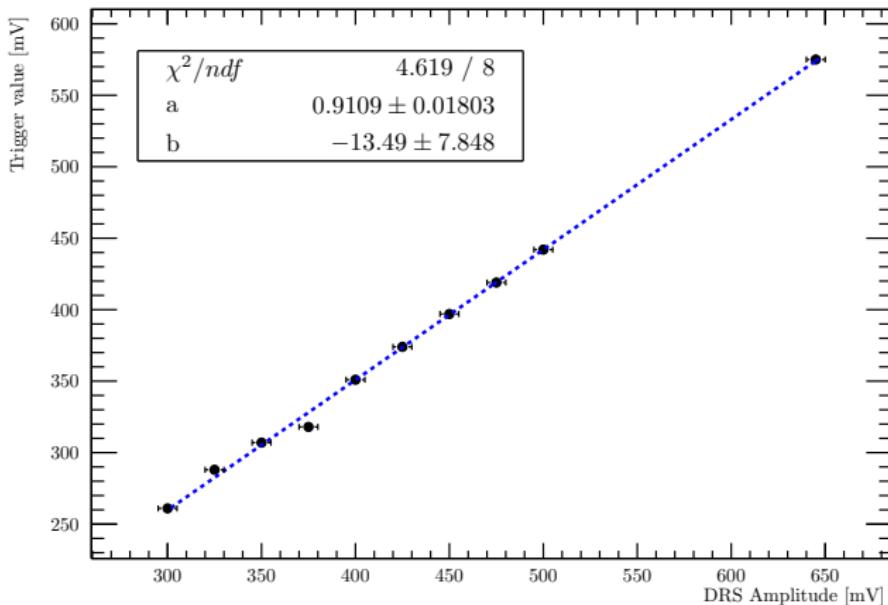
Channels calibration 8

Calibration w166 ch8



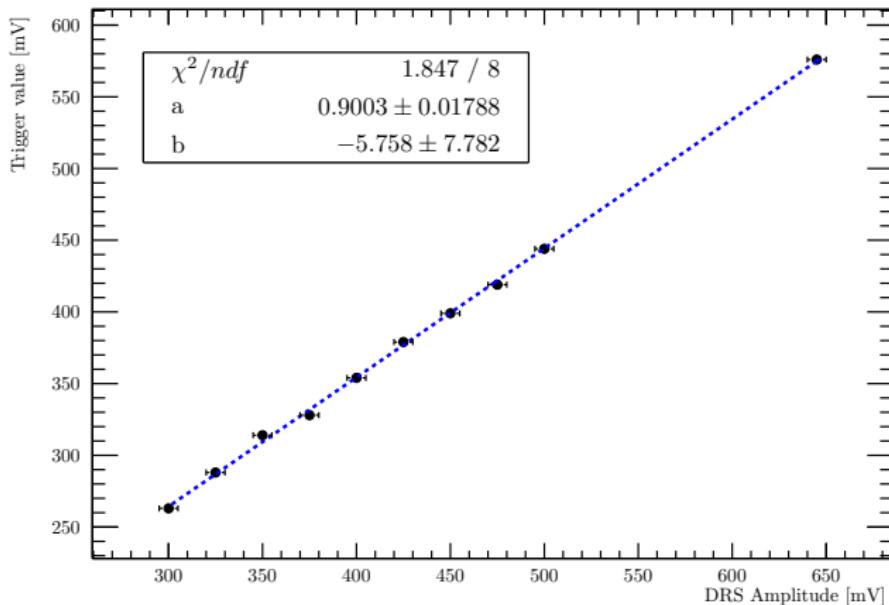
Channels calibration 9

Calibration w166 ch9

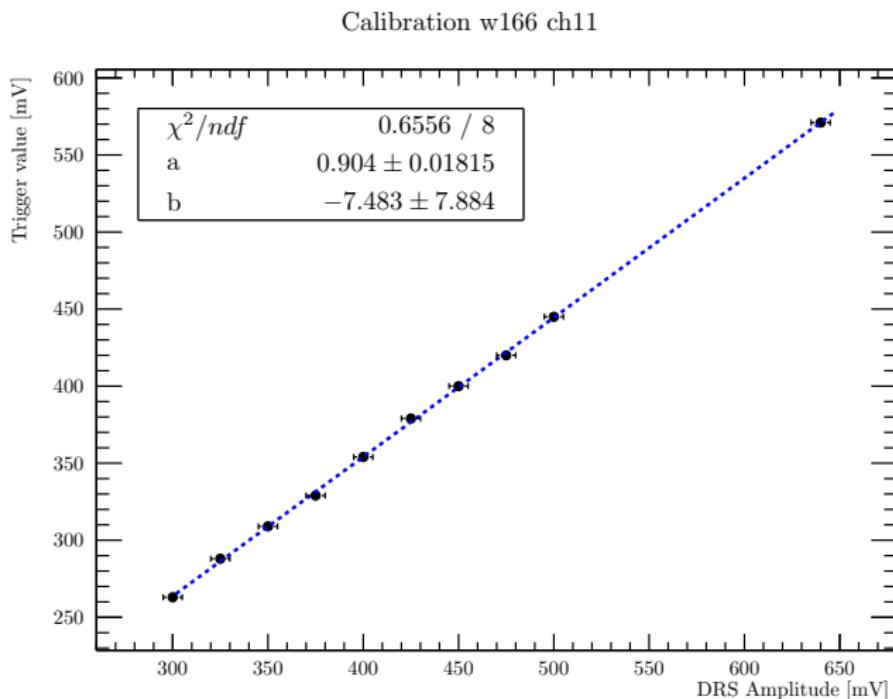


Channels calibration 10

Calibration w166 ch10



Channels calibration 11



$$\text{Trigger value} = a \times \text{DRS-Amplitude} + b$$

Channel	a [mV ⁻¹]	b [mV]
00	0.93 ± 0.02	-7.37 ± 8.13
01	0.93 ± 0.02	-13.65 ± 8.15
02	0.93 ± 0.02	-9.96 ± 8.13
03	0.920 ± 0.02	-12.50 ± 8.10
04	0.92 ± 0.02	-9.63 ± 8.08
05	0.93 ± 0.02	-16.15 ± 8.14
06	0.92 ± 0.02	-7.04 ± 8.10
07	0.92 ± 0.02	-12.57 ± 8.11
08	0.90 ± 0.02	-3.71 ± 8.99
09	0.91 ± 0.02	-13.49 ± 7.85
10	0.90 ± 0.02	-5.76 ± 7.78
11	0.90 ± 0.02	-7.48 ± 7.88

The parameters are different because the *chips*, that are on the gain lines of all the channels, are different.