Calibration of veto discriminators

Fragmentation Trigger FOOT

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Goal of the measure

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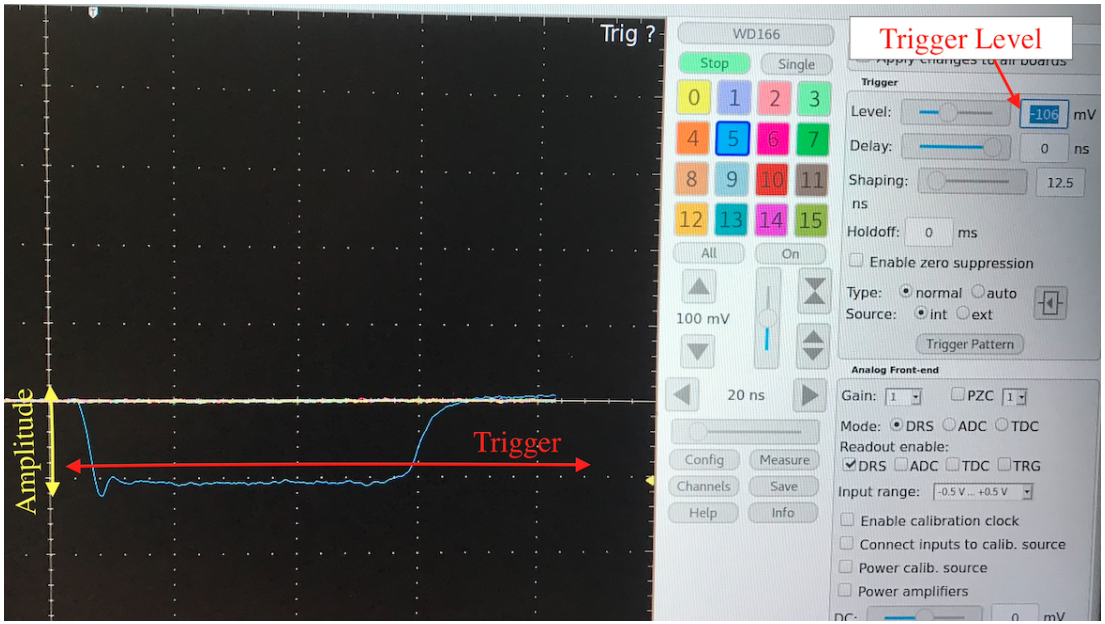
We want to calibrate the inputs of WaveDream 166.

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-Iss1A.pdf

Crate

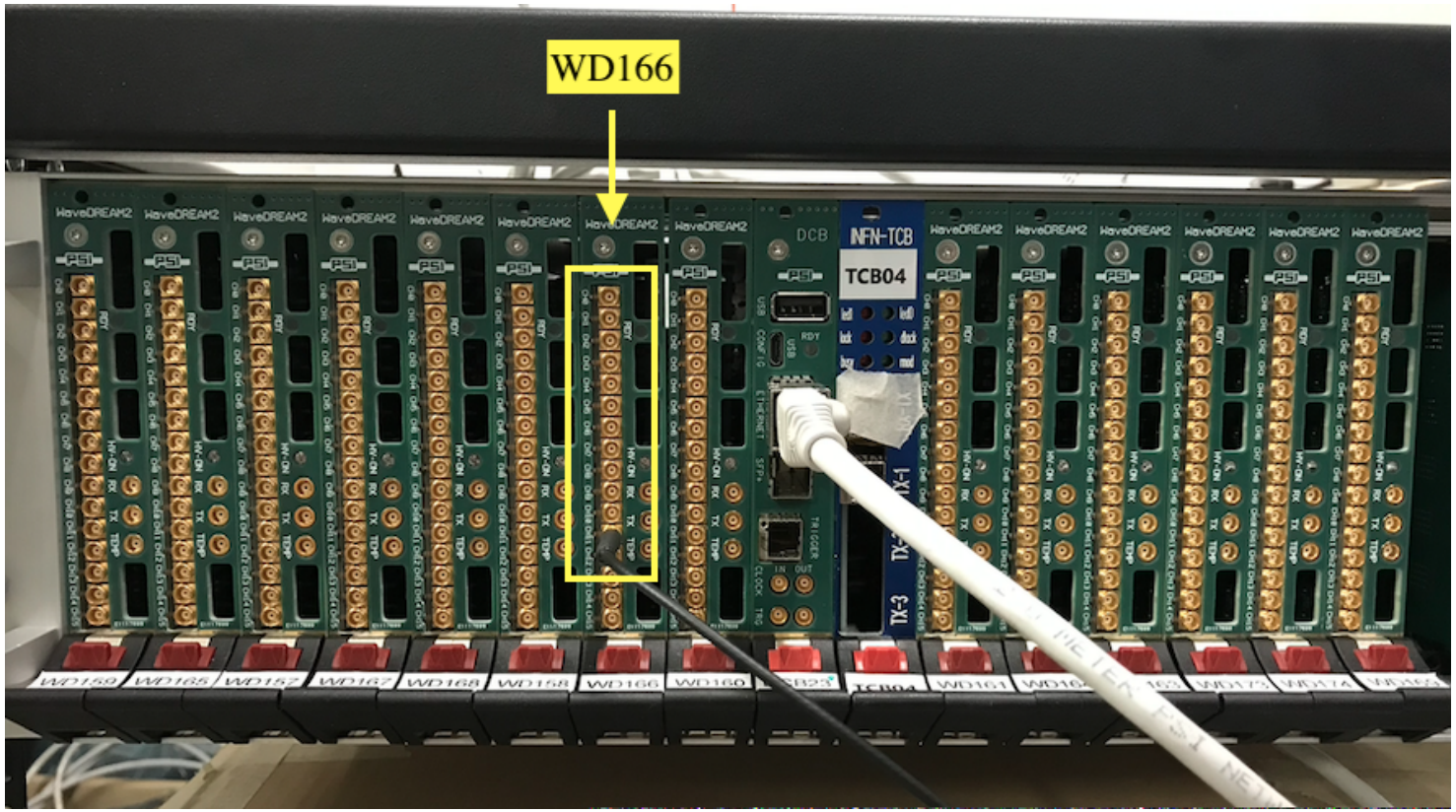


Figure: Channel 0 to 11 of WaveDream 166.

Method

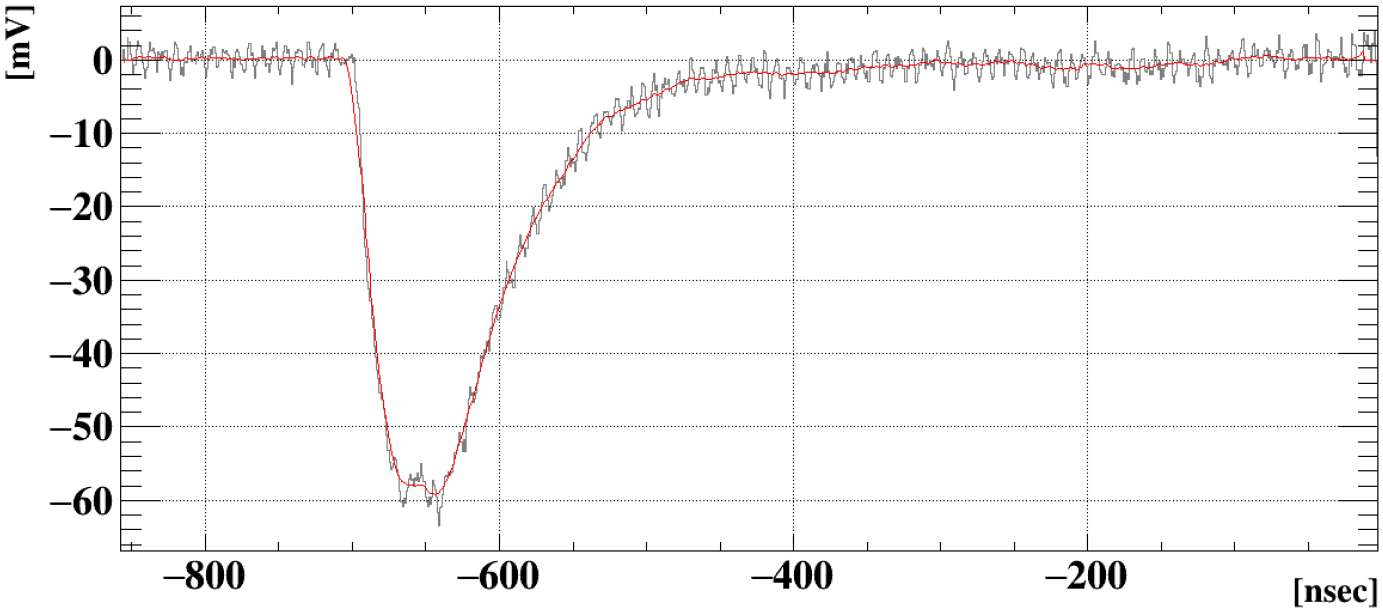


Figure: Example Waveform recorded by DRS4

- Select the channel of interest (ch 0 $\longrightarrow$ 11)
- Measure the amplitude of the signal ($\pm$ 5 mV)
- Correlate with the trigger value ($\pm$ 3 mV)

Amplitude and Trigger correlation

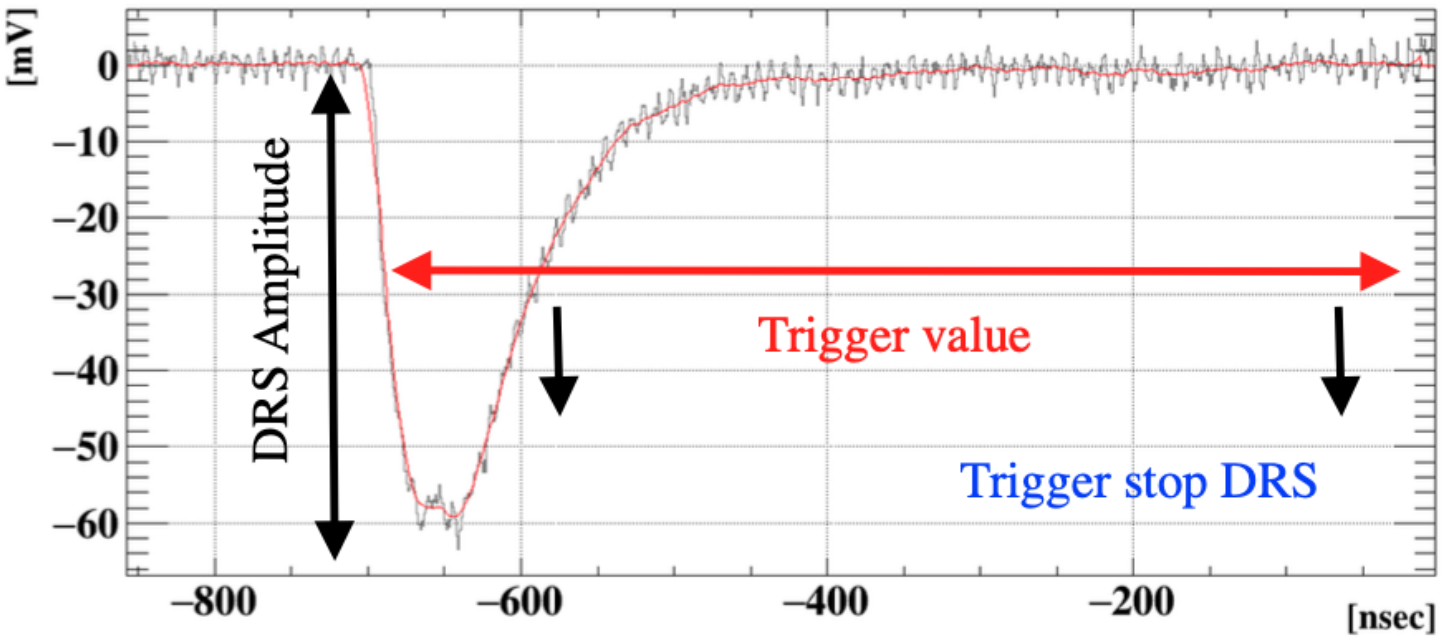
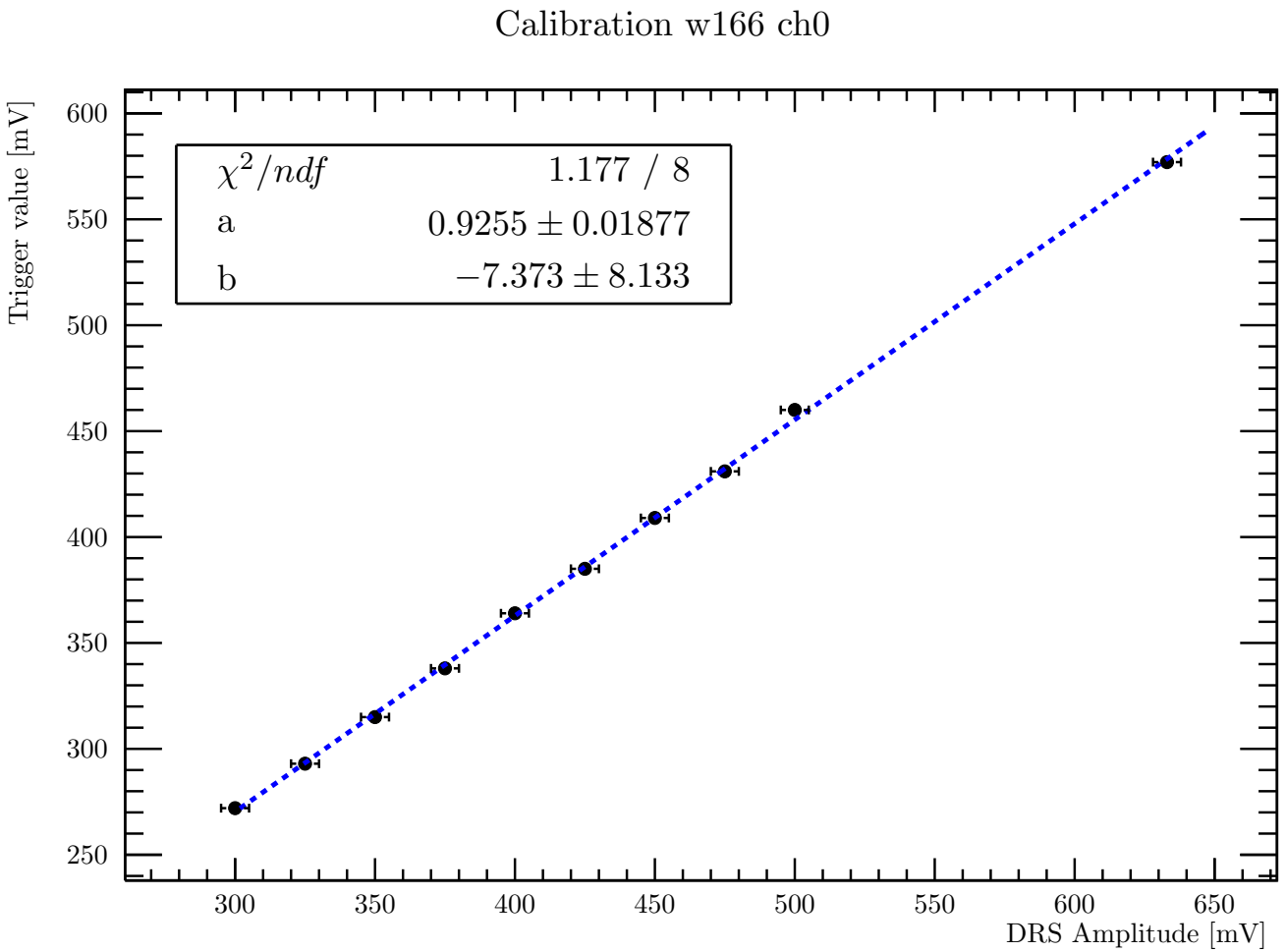


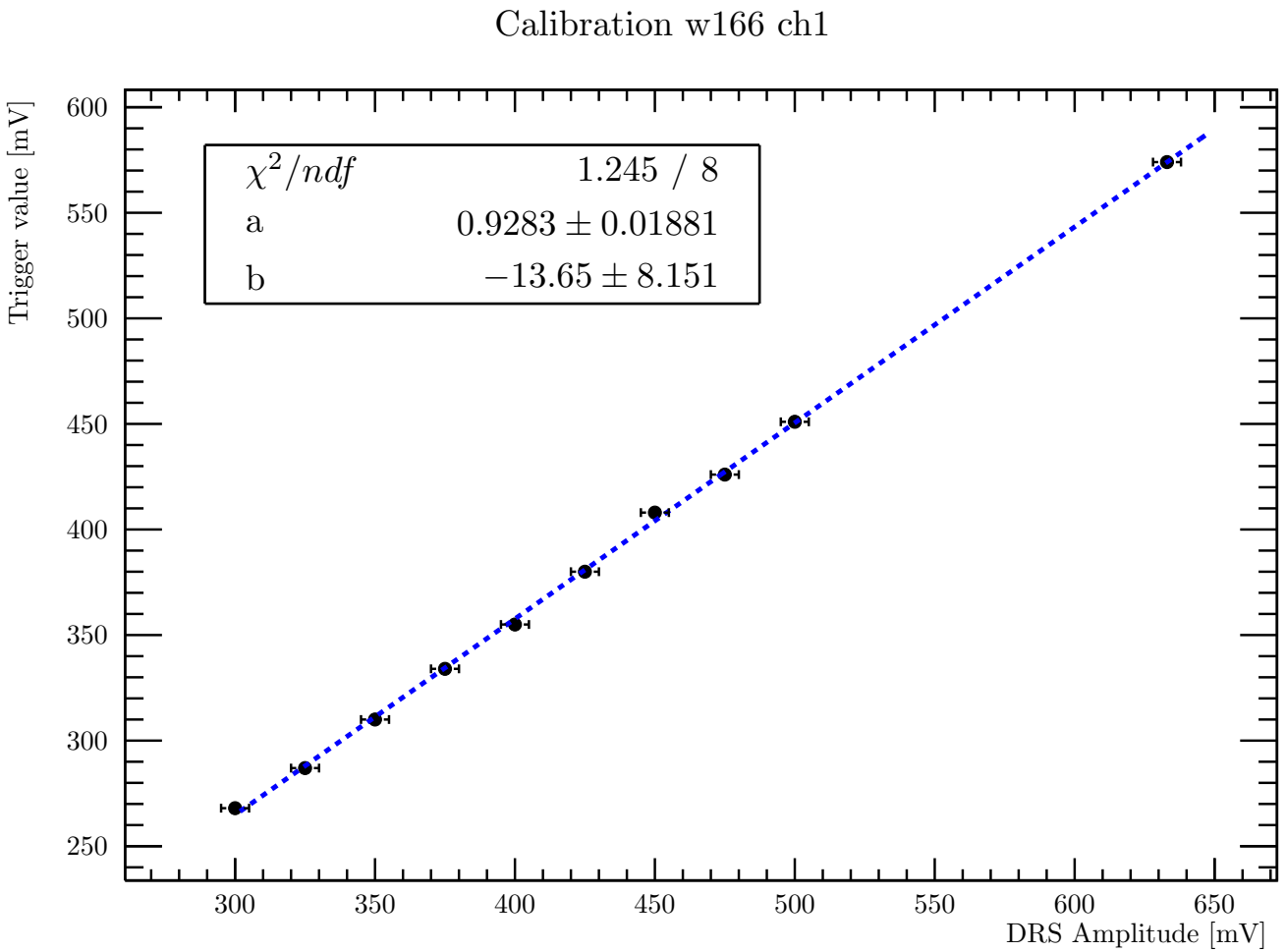
Figure: Example Waveform recorded by DRS4

- 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.

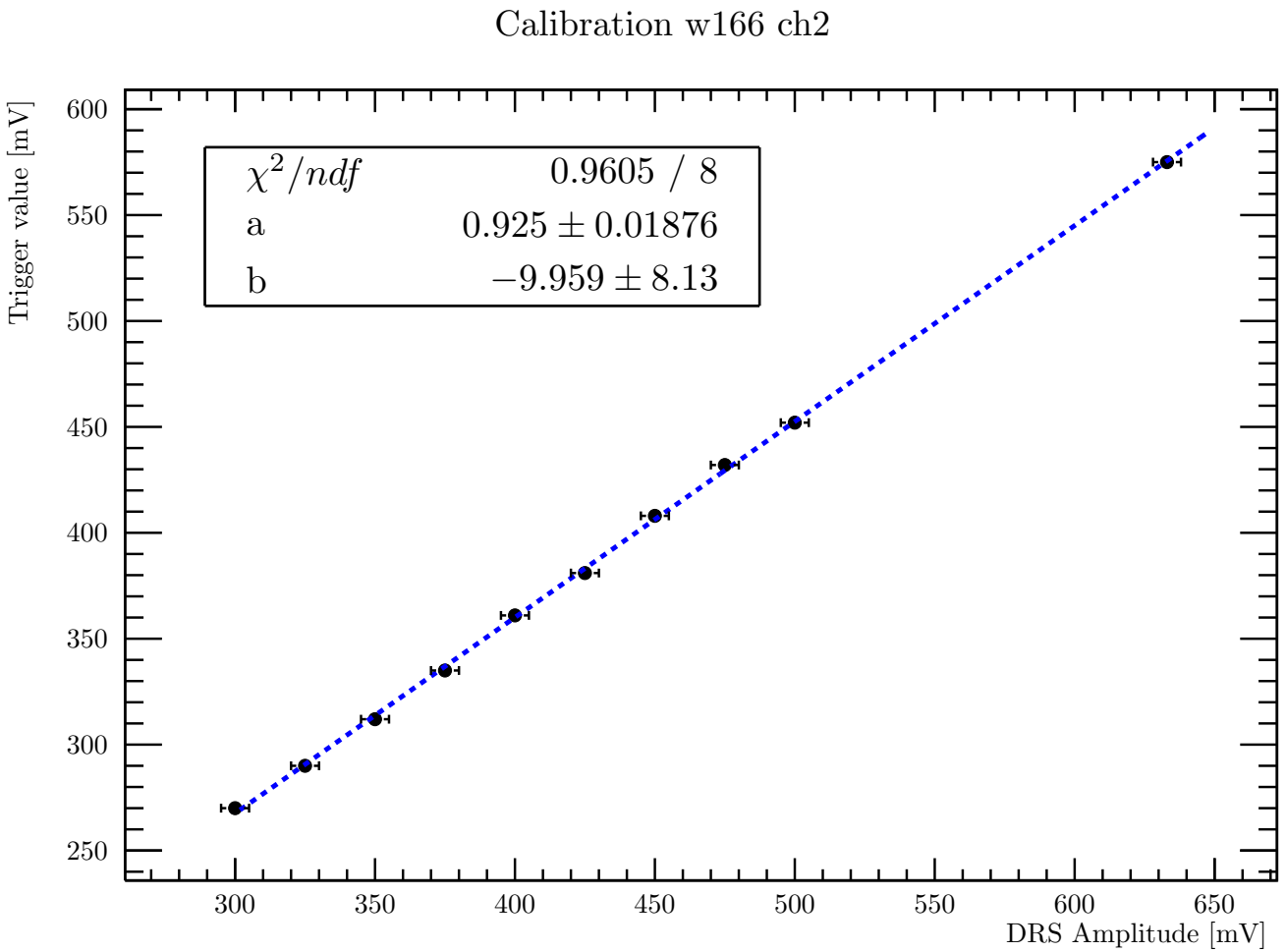
Channels calibration 0



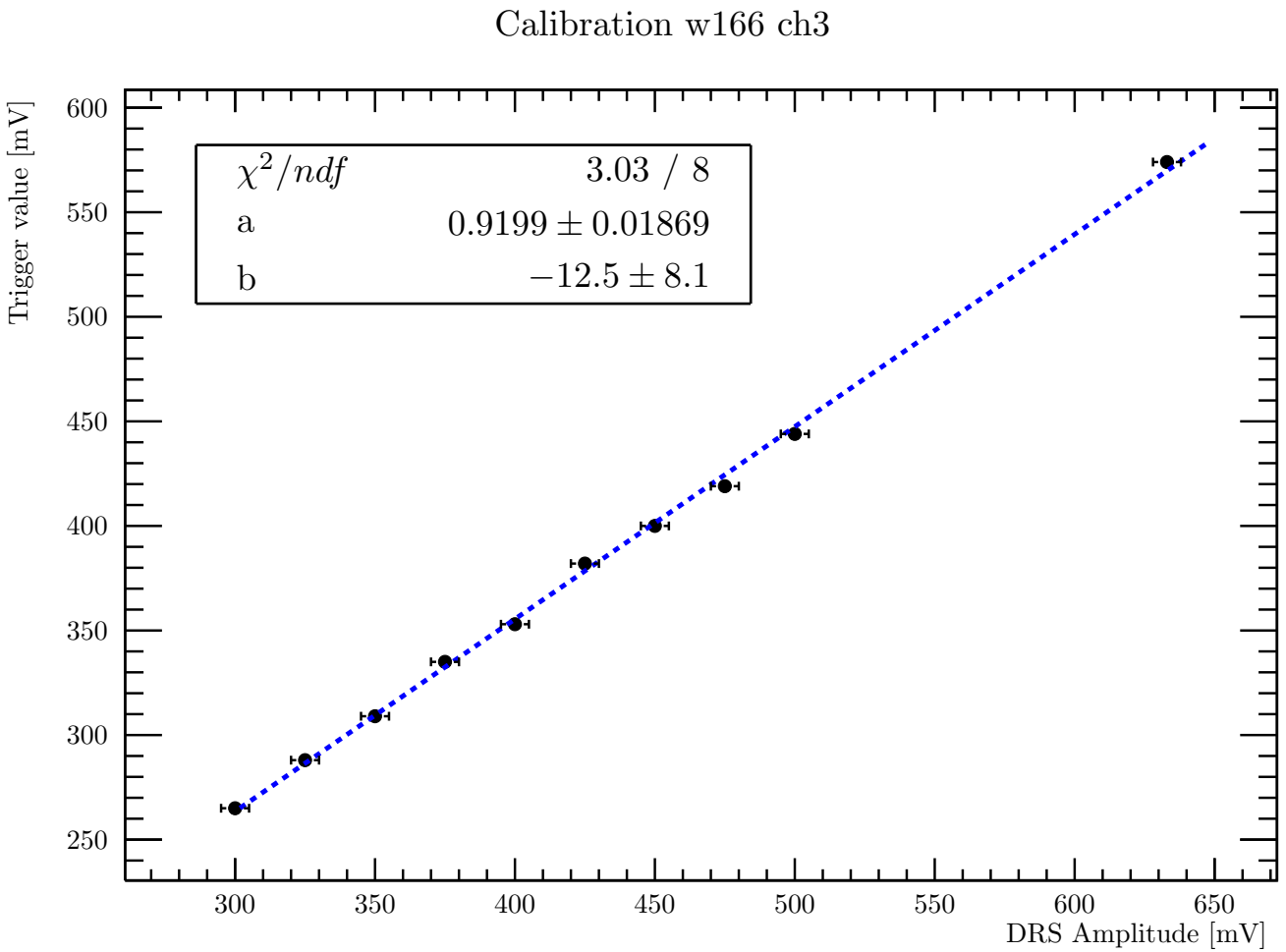
Channels calibration 1



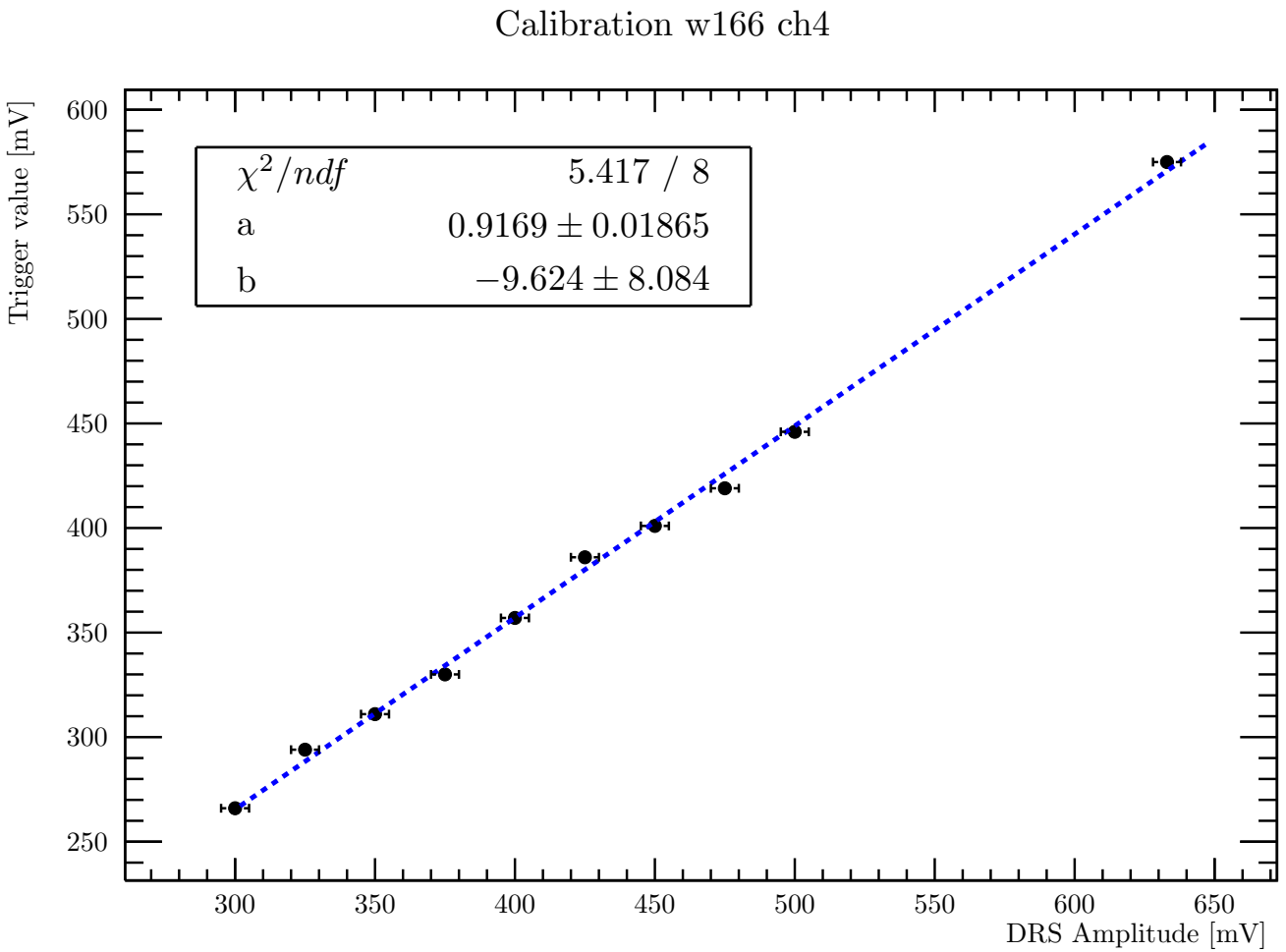
Channels calibration 2



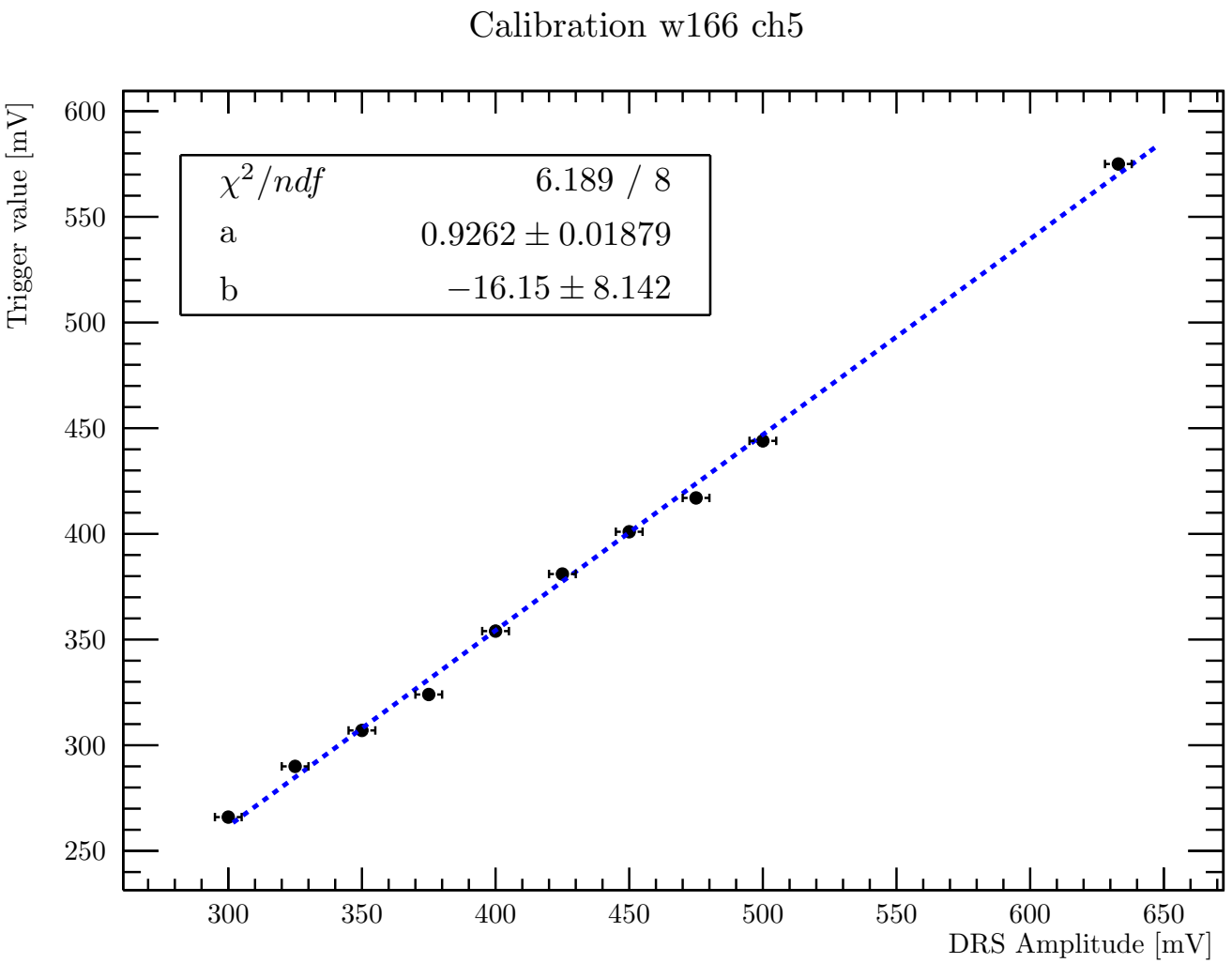
Channels calibration 3



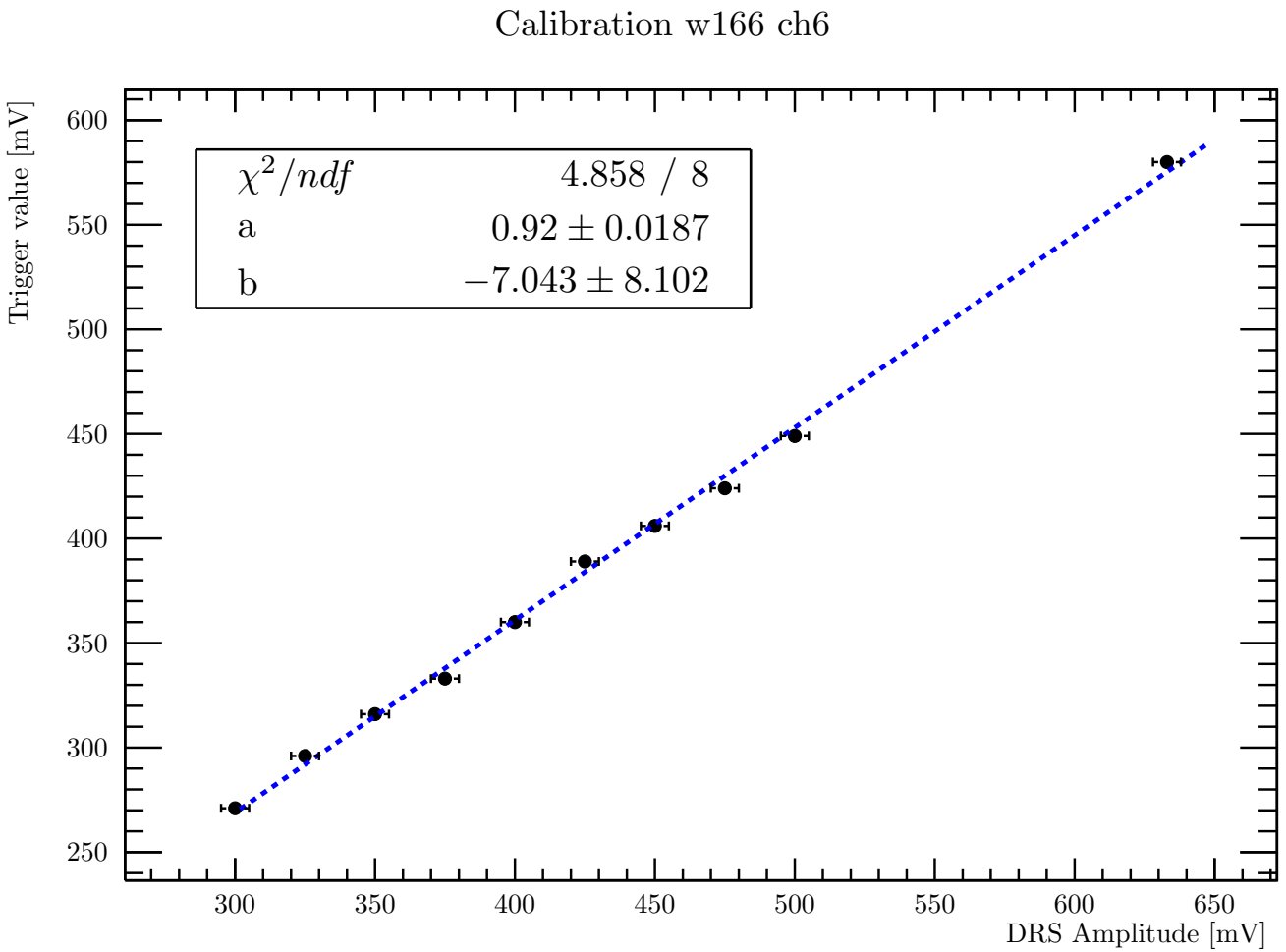
Channels calibration 4



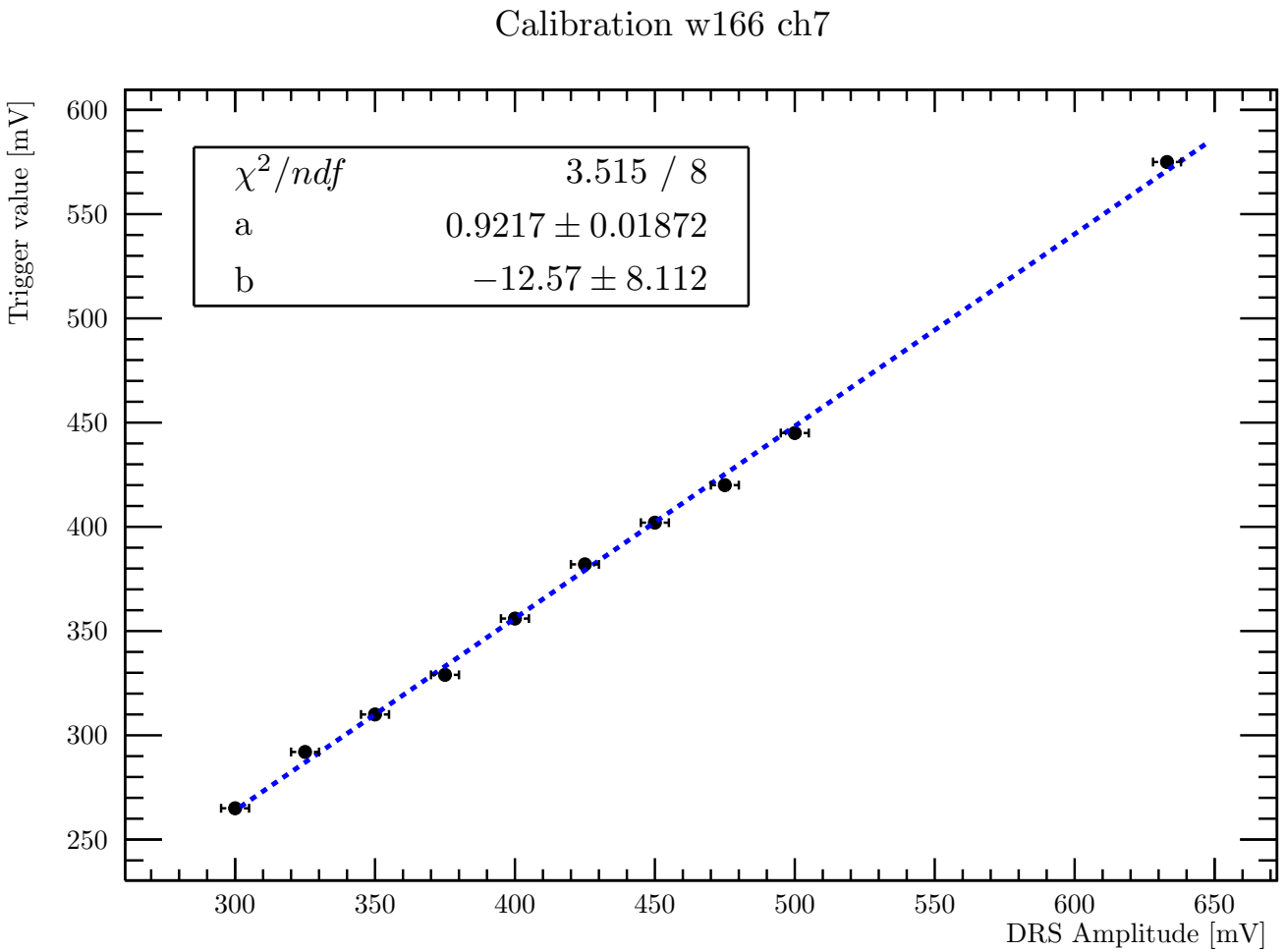
Channels calibration 5



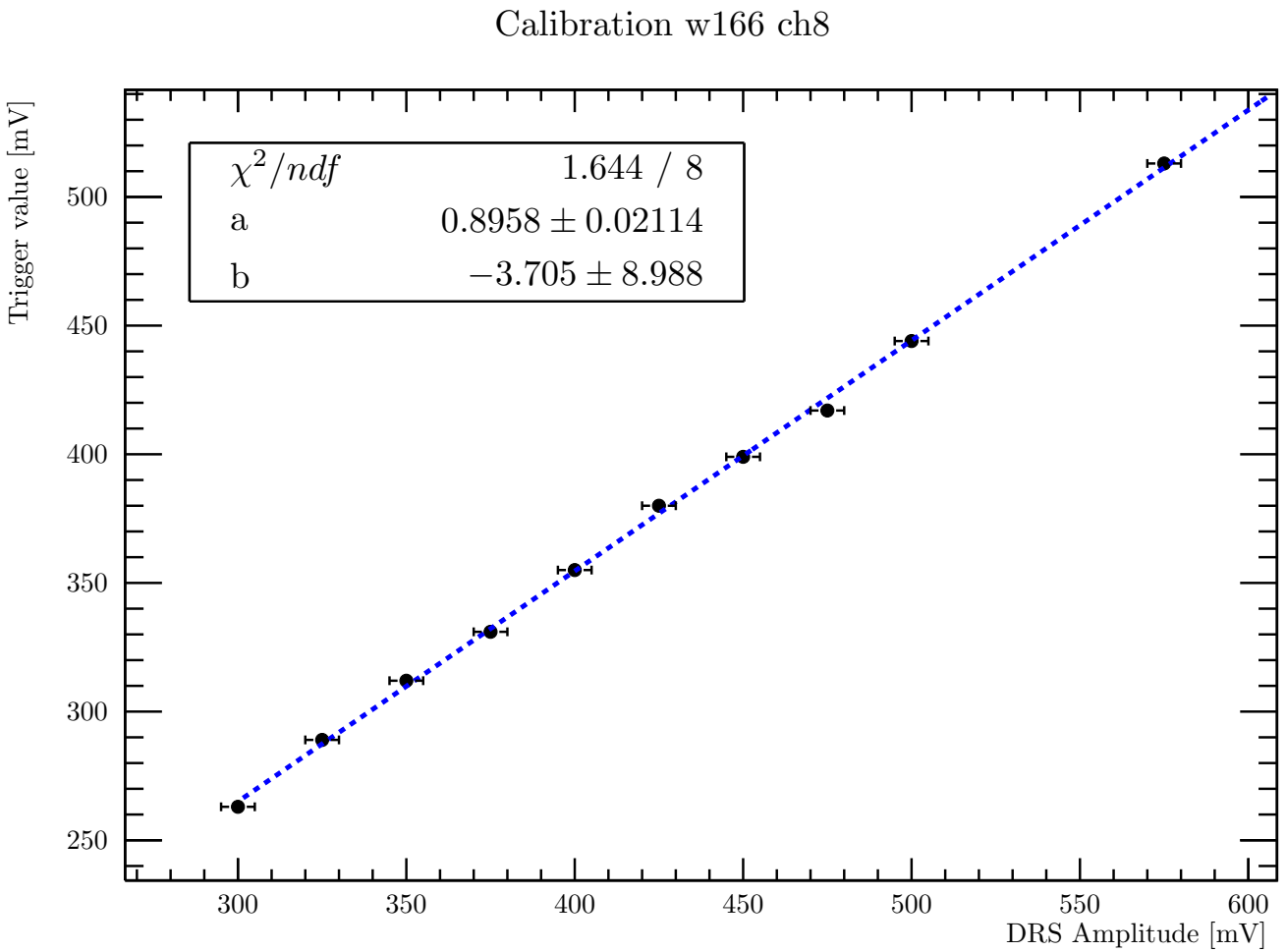
Channels calibration 6



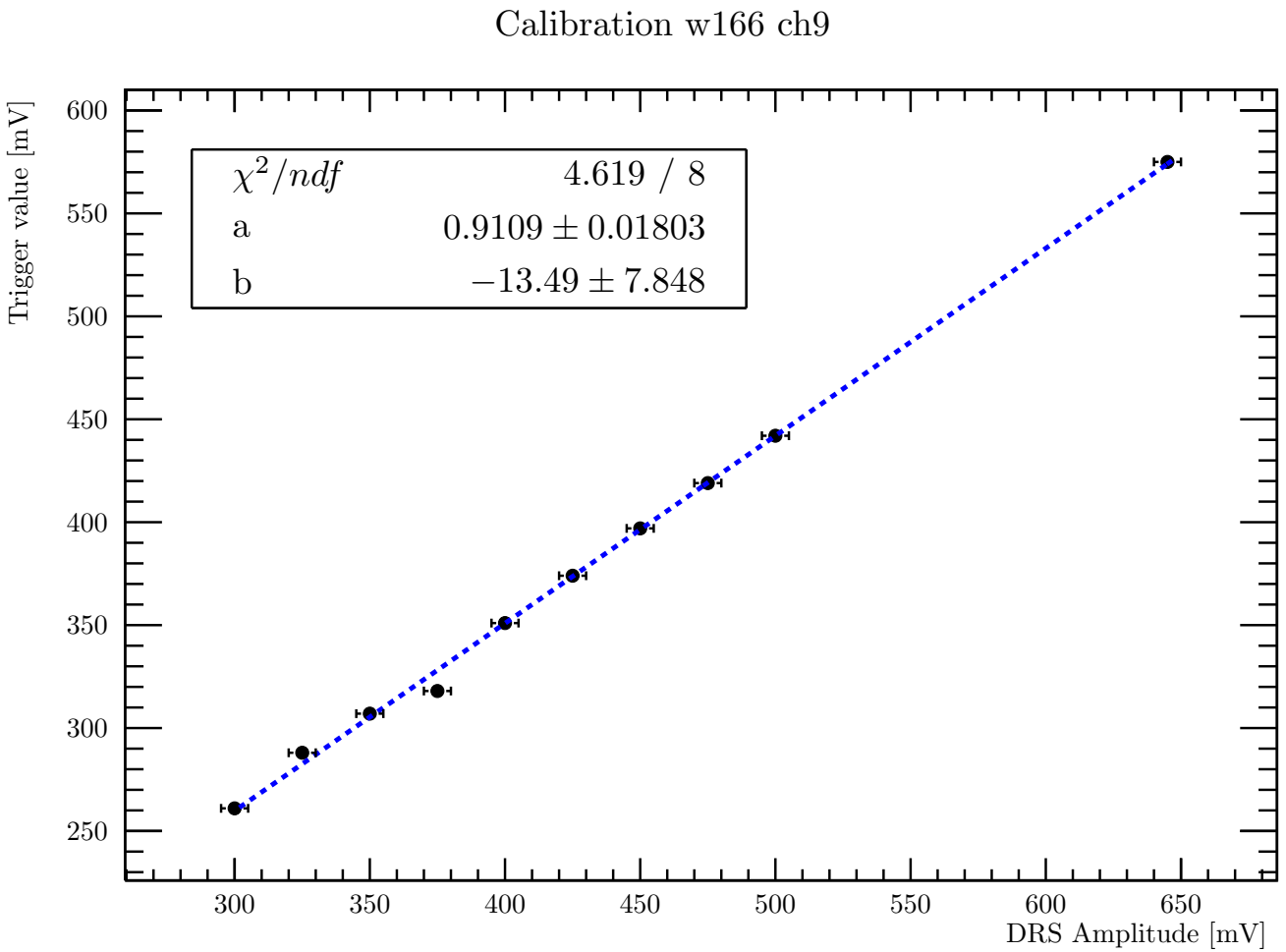
Channels calibration 7



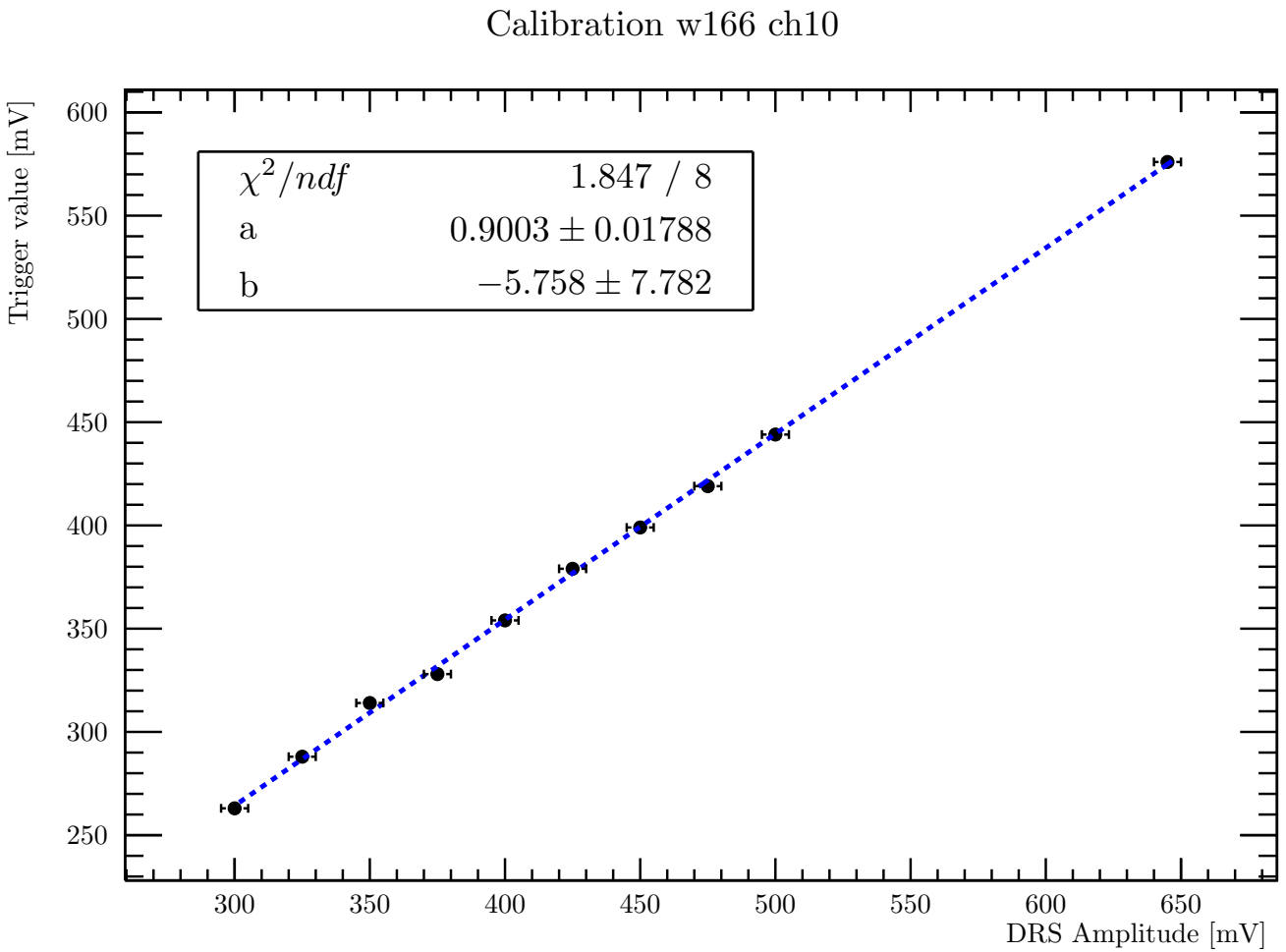
Channels calibration 8



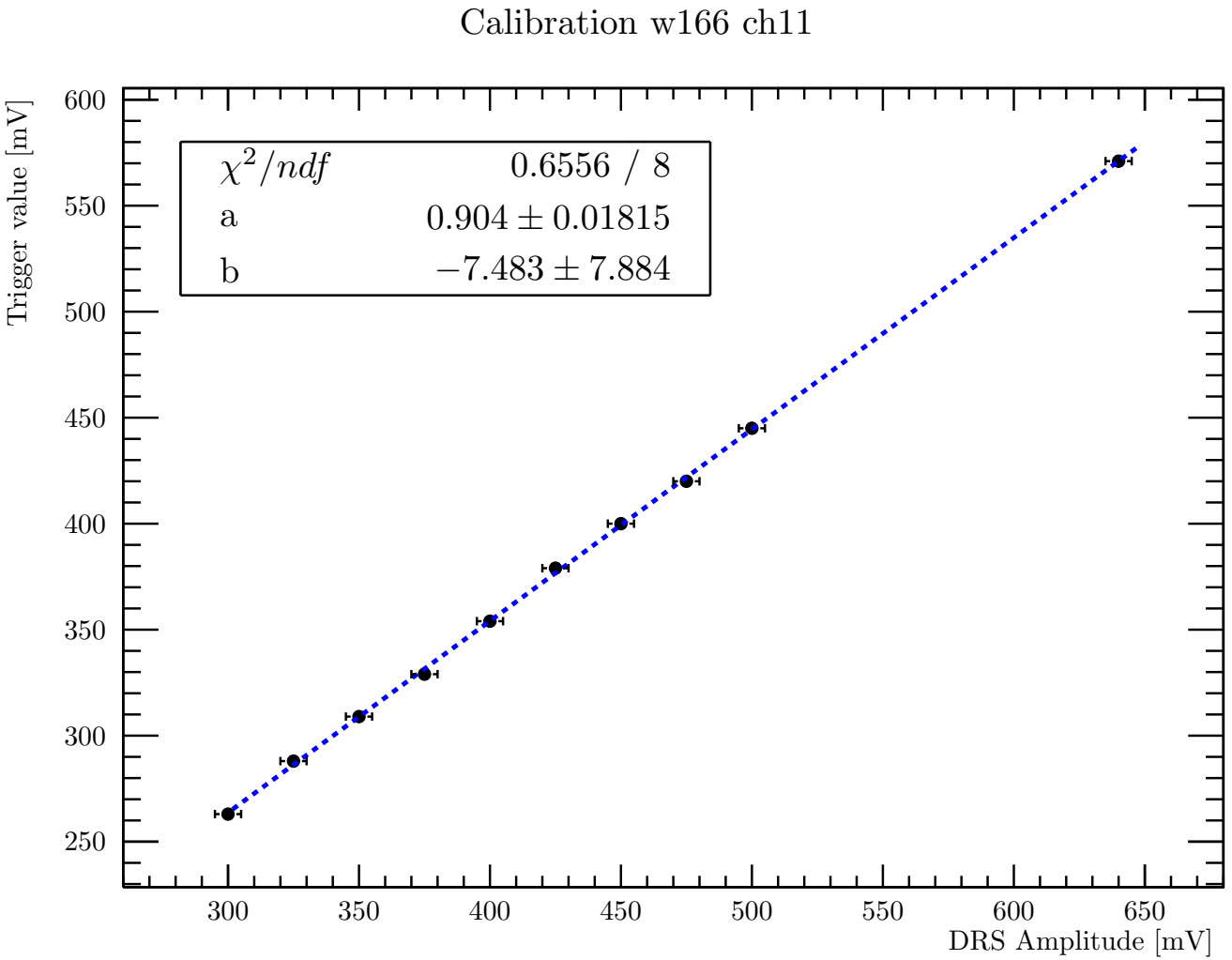
Channels calibration 9



Channels calibration 10



Channels calibration 11



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

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

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