

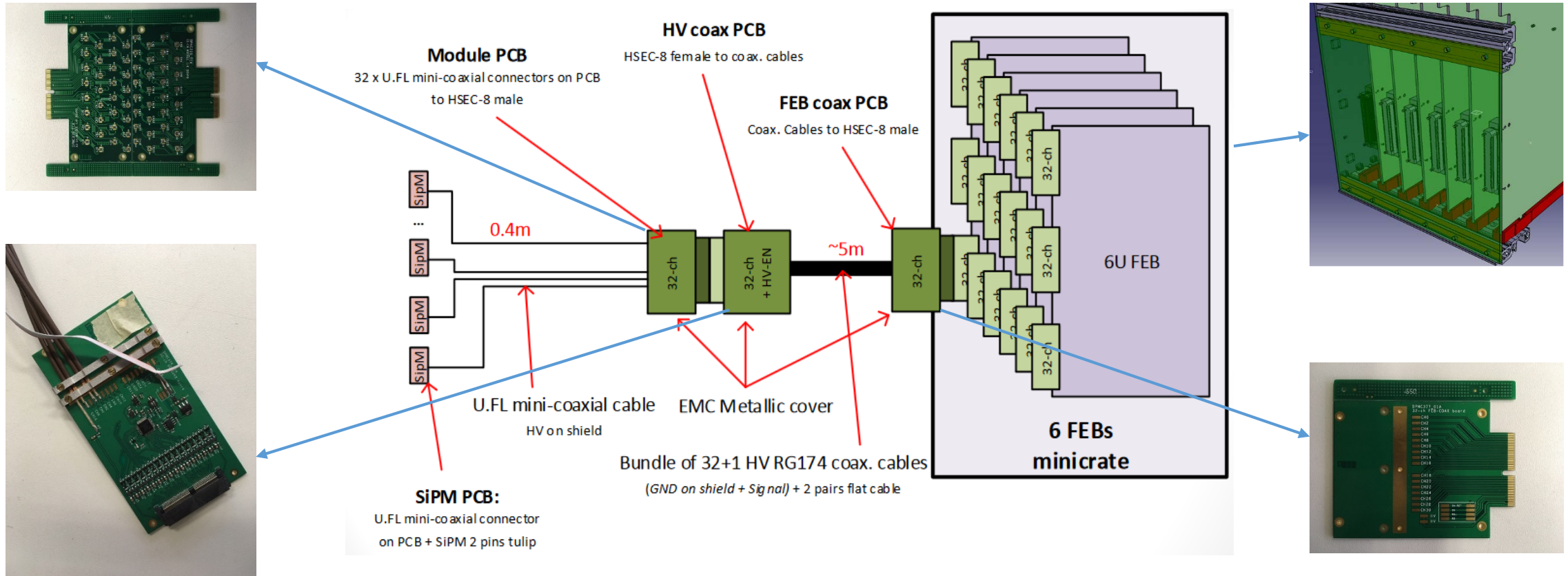
New Cabling Scheme

Crosstalk studies

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Validation of the new cabling scheme



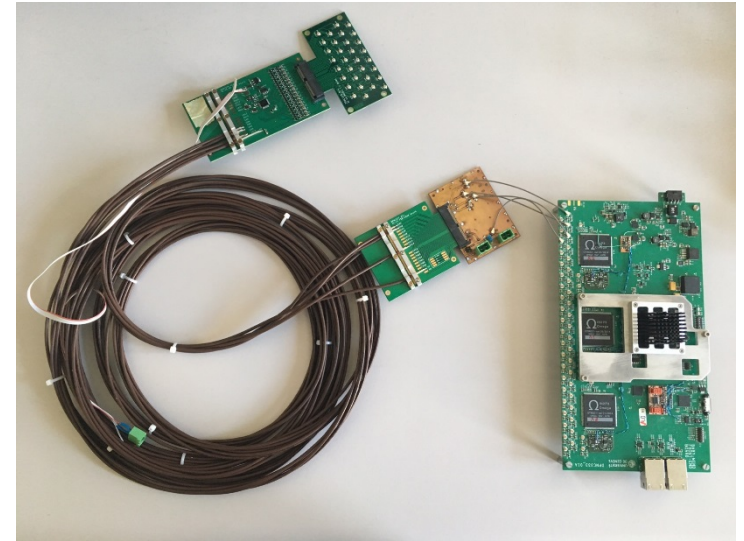
Setup for crosstalk studies

- 4 channels [65, 69, 73, 77] on FEB1 has been modified to be compatible with the new cabling scheme.
- One channel at a time is connected to LED signal and the three other channels are being monitored in order to detect crosstalk signal.

What is crosstalk?

Crosstalk is a signal above the baseline induced on a channels with no SiPM connected (does not receive any light), by an adjacent channel carrying a high amplitude signal. The baseline for each channel is located between 160- 240 ADC counts.

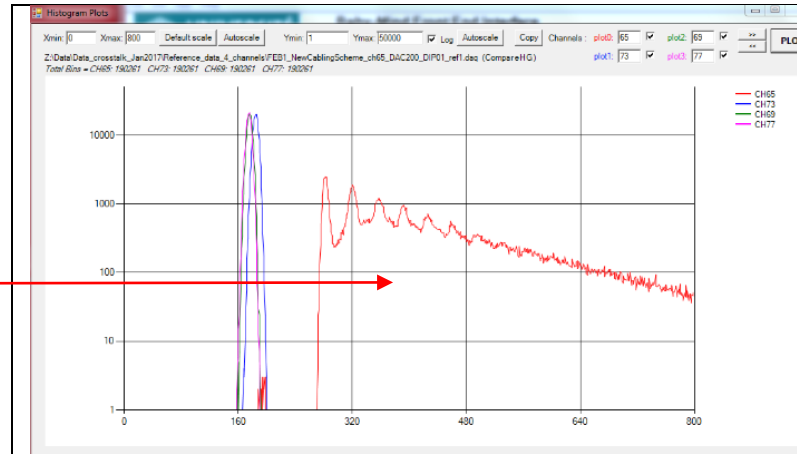
This signal if not eliminated, can trigger the electronics as a fake event.



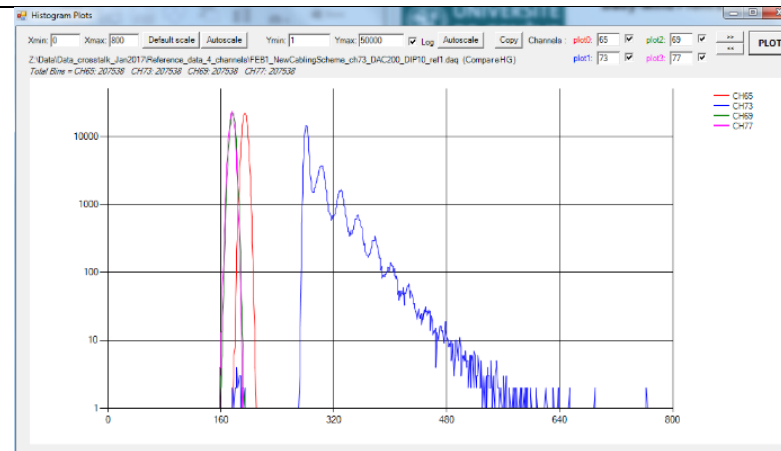
Reference Fingerplots for 4 channels

Channel 65 is damaged!

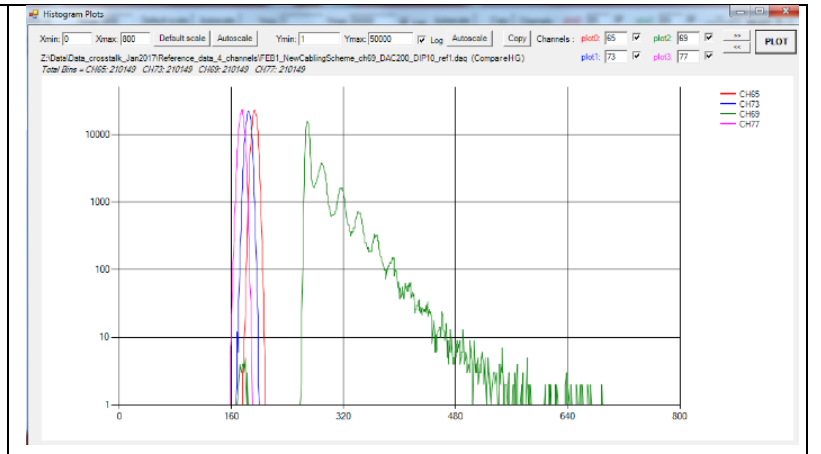
High voltage applied is 69.9 instead of 67.5
-> fingerplot is noisy



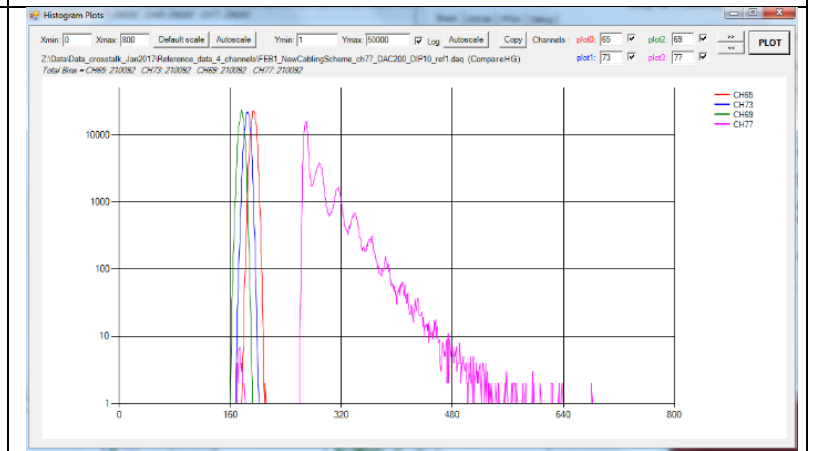
Channel 65:



Channel 73:



Channel 69:



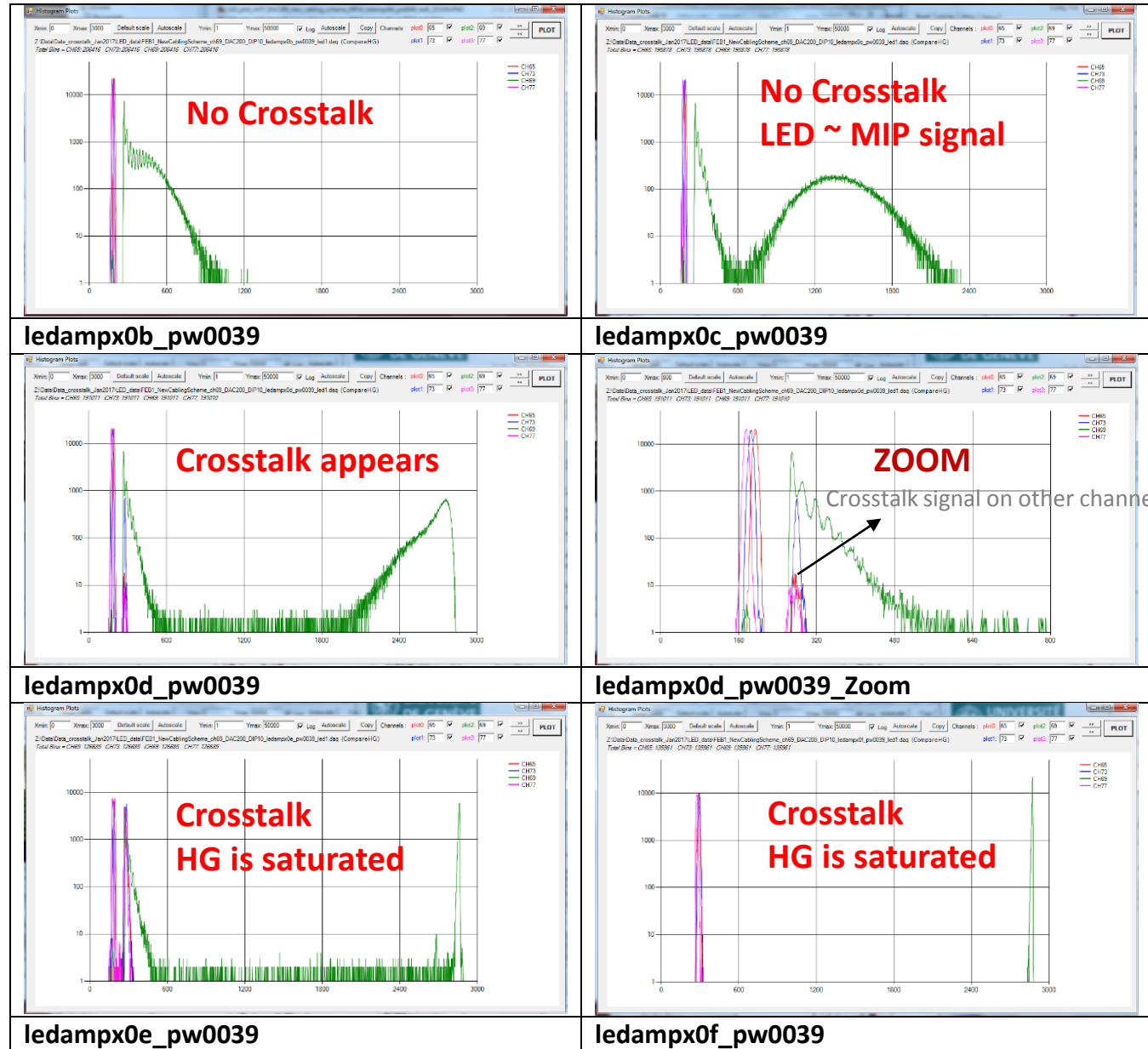
Channel 77:

LED Signal on channel 69

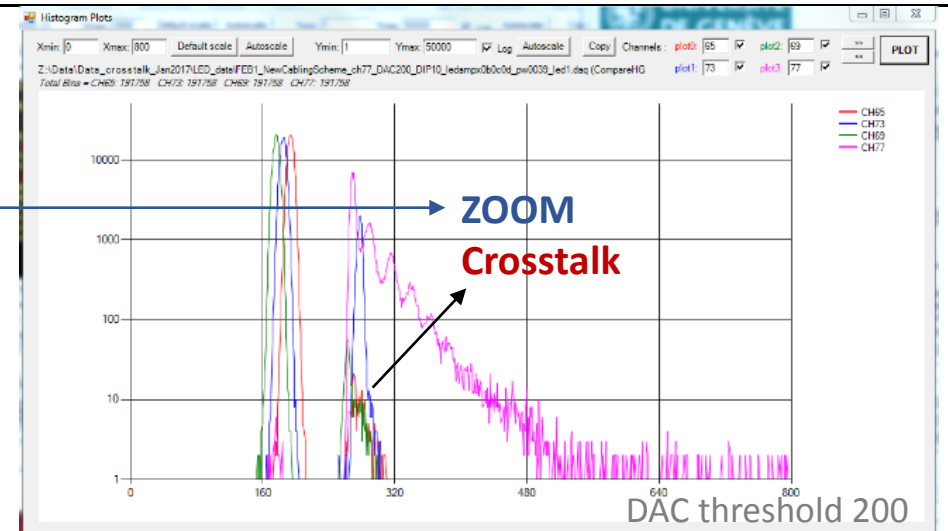
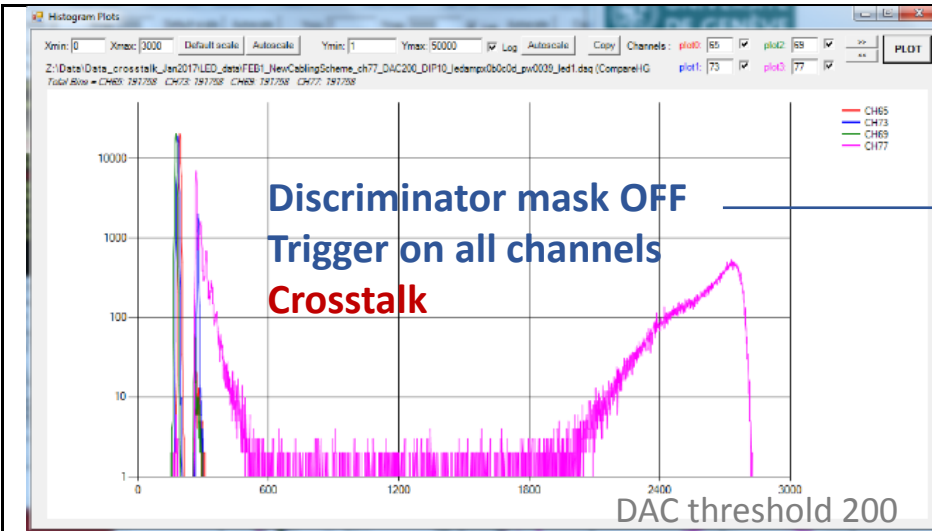
In this configuration the LED signal is sent to one channel [Ch 69] and three other channels are monitored [65, 73, 77]. The discriminator mask is off for all the four channels i.e the CITIROC can trigger on any of the four channels so long as the signal is above the discriminator DAC threshold [200].

- For low intensity LED signals [0b and 0c], equivalent to a MIP, -> **No crosstalk** between channels, i.e no signal above the baseline which is located between 160- 240 ADC counts),
- High intensity LED intensity so that the HG path is saturated the crosstalk signals appear on other channels.

In all cases even with a very intense LED signal the crosstalk signal amplitude remains below 3 photoelectrons.

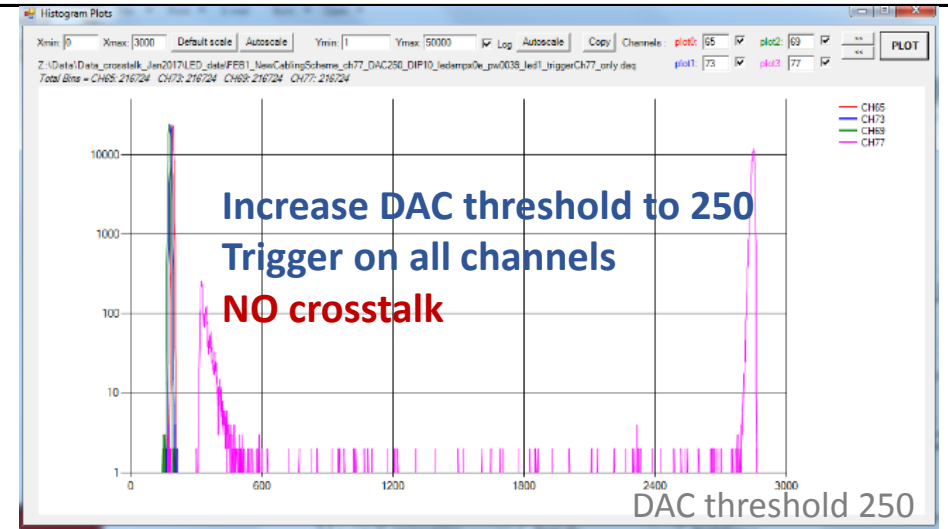


Channel 77_HG



ledampx0d_pw0039

ledampx0d_pw0039_Zoom

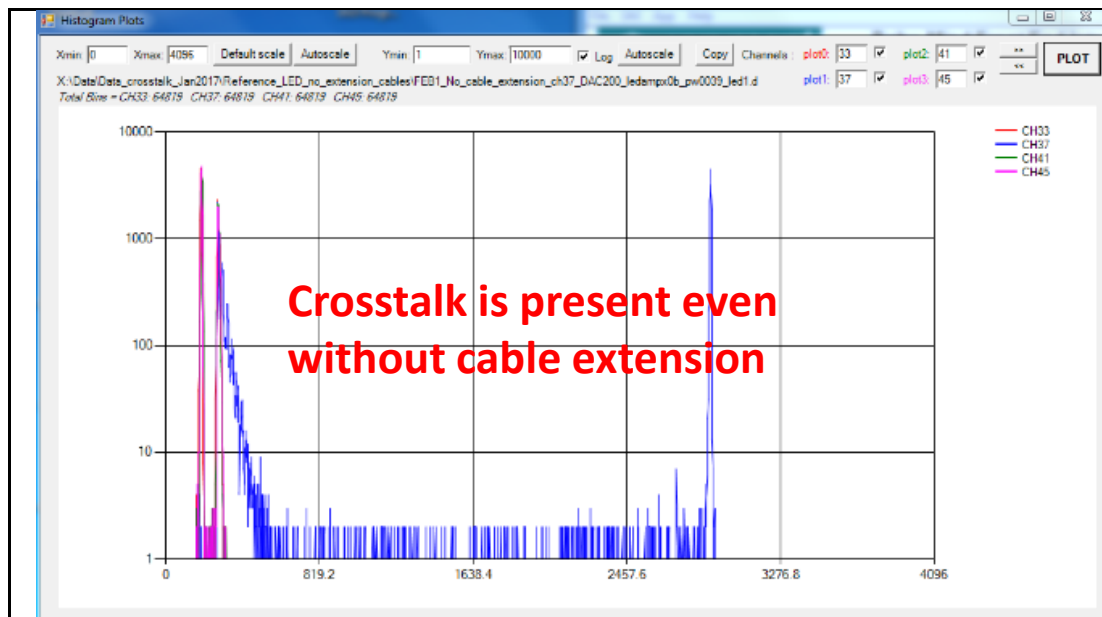


ledampx0d_pw0039_triggerCh77_only

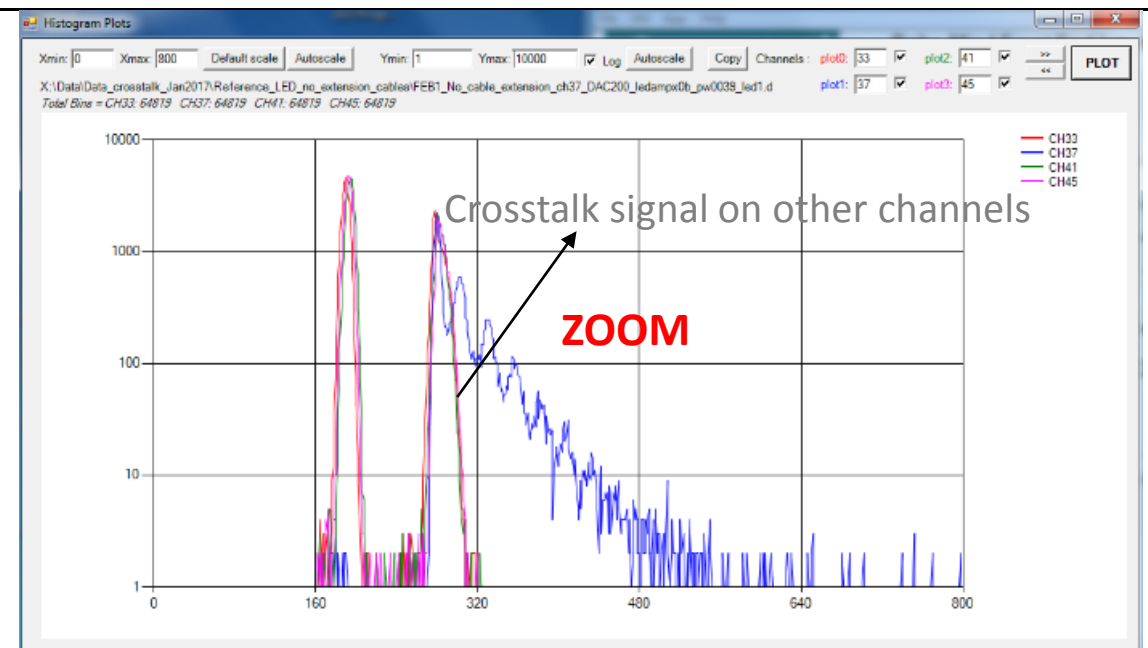
ledampx0d_pw0039_Zoom_DAC250

Crosstalk without the extension cable (old scheme)

Similar measurement has been performed on the identical channels of ASIC 1, i.e channels 33, 37,41, 45 with the SiPM directly connected to the FEB without the 5m extension cable. And a similar crosstalk behavior has been observed, as shown in the plots below.



ledampx0f_pw0039



ledampx0f_pw0039_Zoom

Conclusion

- For very high intensity LED signal there is crosstalk induced on other channels of the same ASIC.
- The crosstalk is not related to the extension cable.
- In all cases the crosstalk signal does not exceed 3 photoelectrons.
- We can eliminate triggering on the crosstalk signal by choosing DAC threshold value 250.