

# Documentation Preamps testing

26.03.2021

## 0.1 Setup

For this testing the setup of the FOPRA was used. The preamps were tested on the big box with the five large crystals inside. The small box (with 8 small crystals) was used as reference to check if there are RCBus interferences. As the five crystals of the large box are connected to one single Sub-D connector, the signal processing from the APDs to the output of the MPRB could only be tested for 5 channels on the Preamp card 0. For all other channels the test was done solely using the pulser. As pulser signal a square signal shape (low end: 0mV, high end: 10mV, 50% duty) with frequency of 250 Hz.

The tested Preamps were labeled from 1 to 6 (see green label on the Preamps).

## 0.2 Test Results

All following plots are uncalibrated `lim_energy` plots. The pulser peak can be identified as the most right peak in the plots.

### 0.2.1 FOPRA Preamp

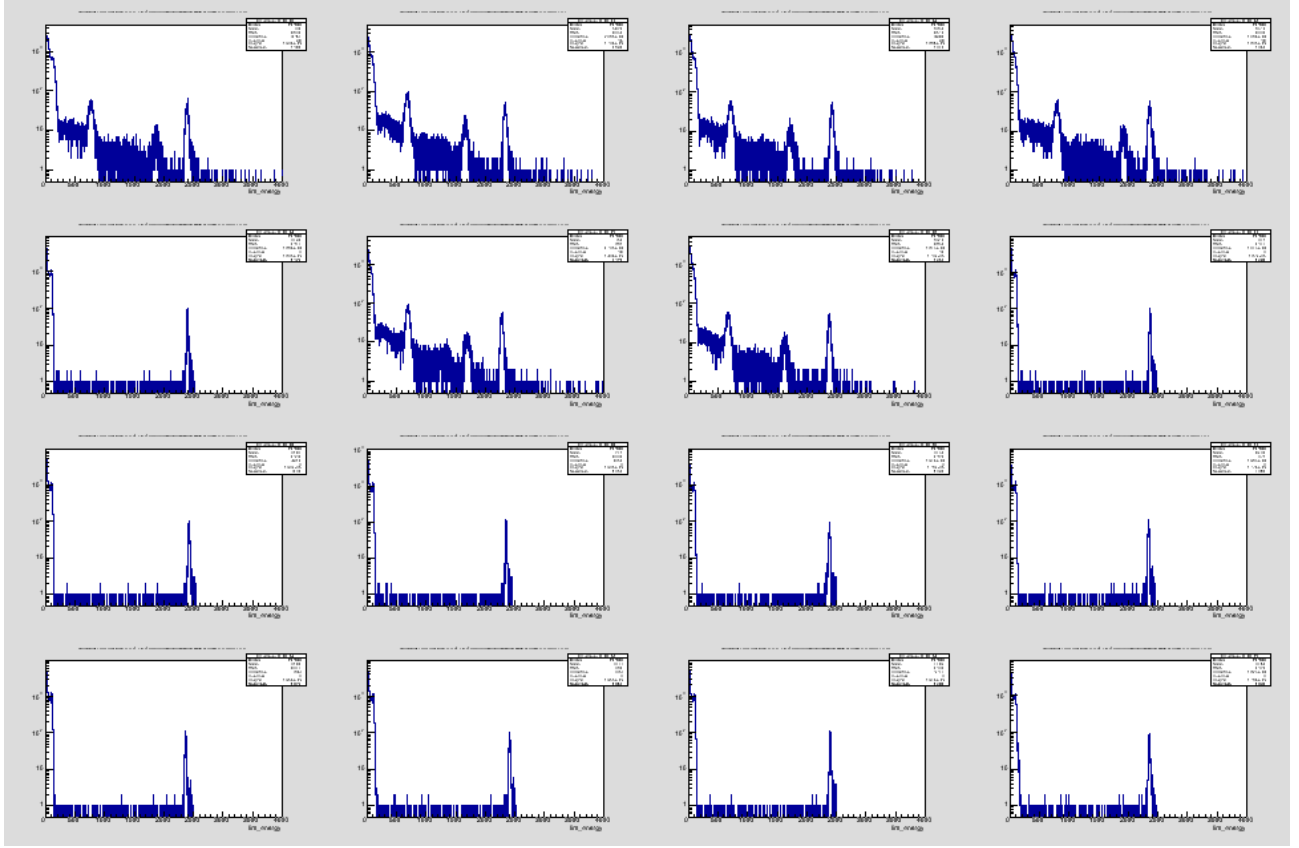
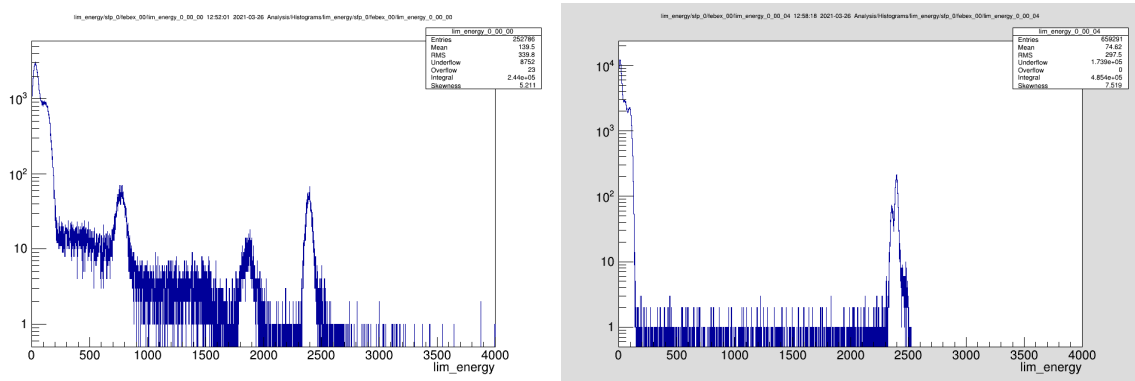


Abbildung 1: FOPRA Preamp, card 0, all channels, Na22 source with pulser.



(a) FOPRA Preamp,card 0, channel 0, Na22 source with pulser. (b) FOPRA Preamp,card 0, channel 4,no crystal, only pulser.

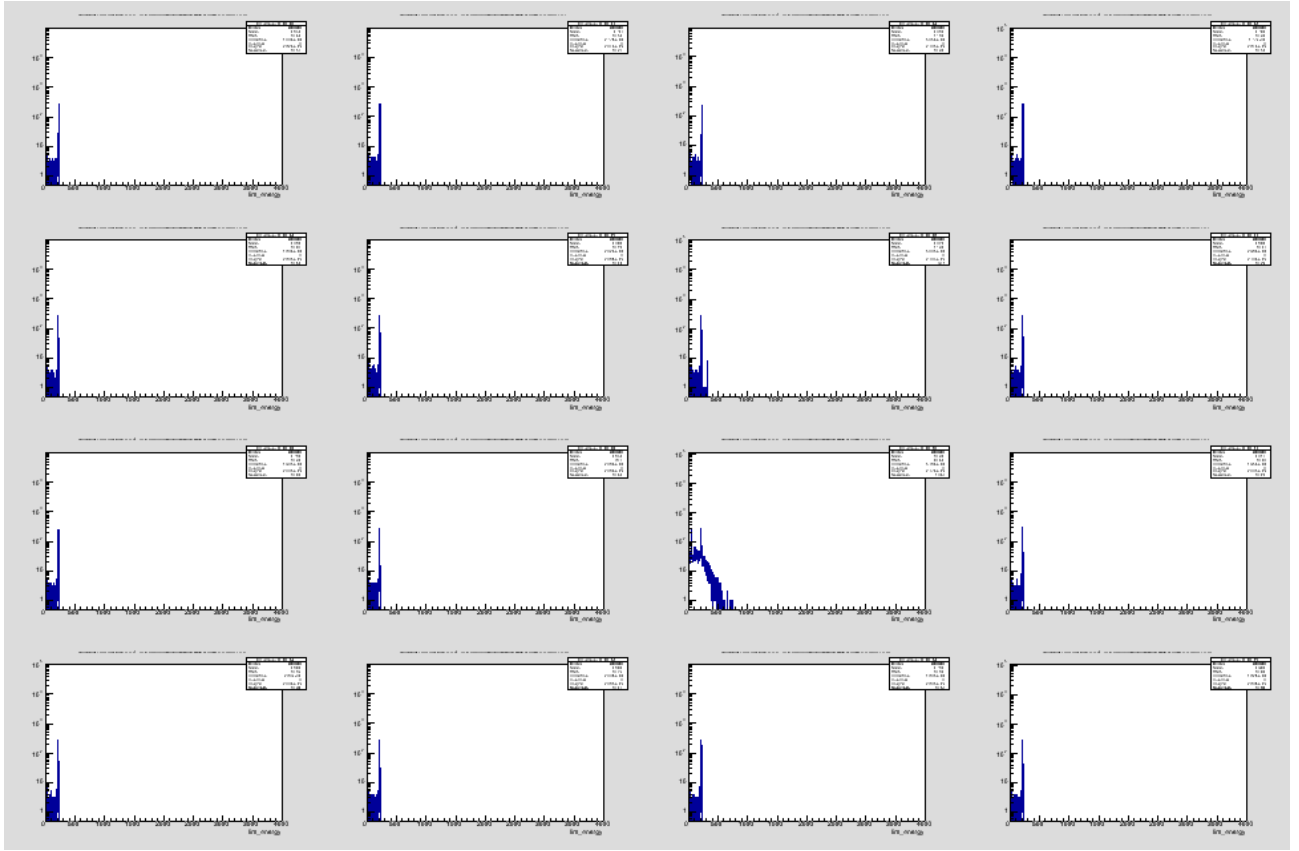
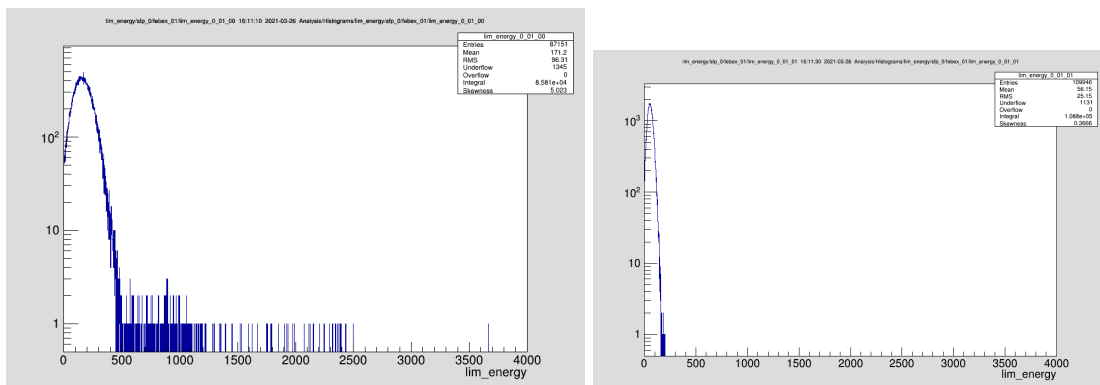


Abbildung 3: FOPRA Preamp, card 1, all channels, no crystal, only pulser.



(a) Reference Preamp, card 0, channel 0, Na22 source (b) Reference Preamp, card 0, channel 4, no crystal, no pulser.

Abbildung 4: Small Box reference for FOPRA Preamp.

## 0.2.2 Preamp 1

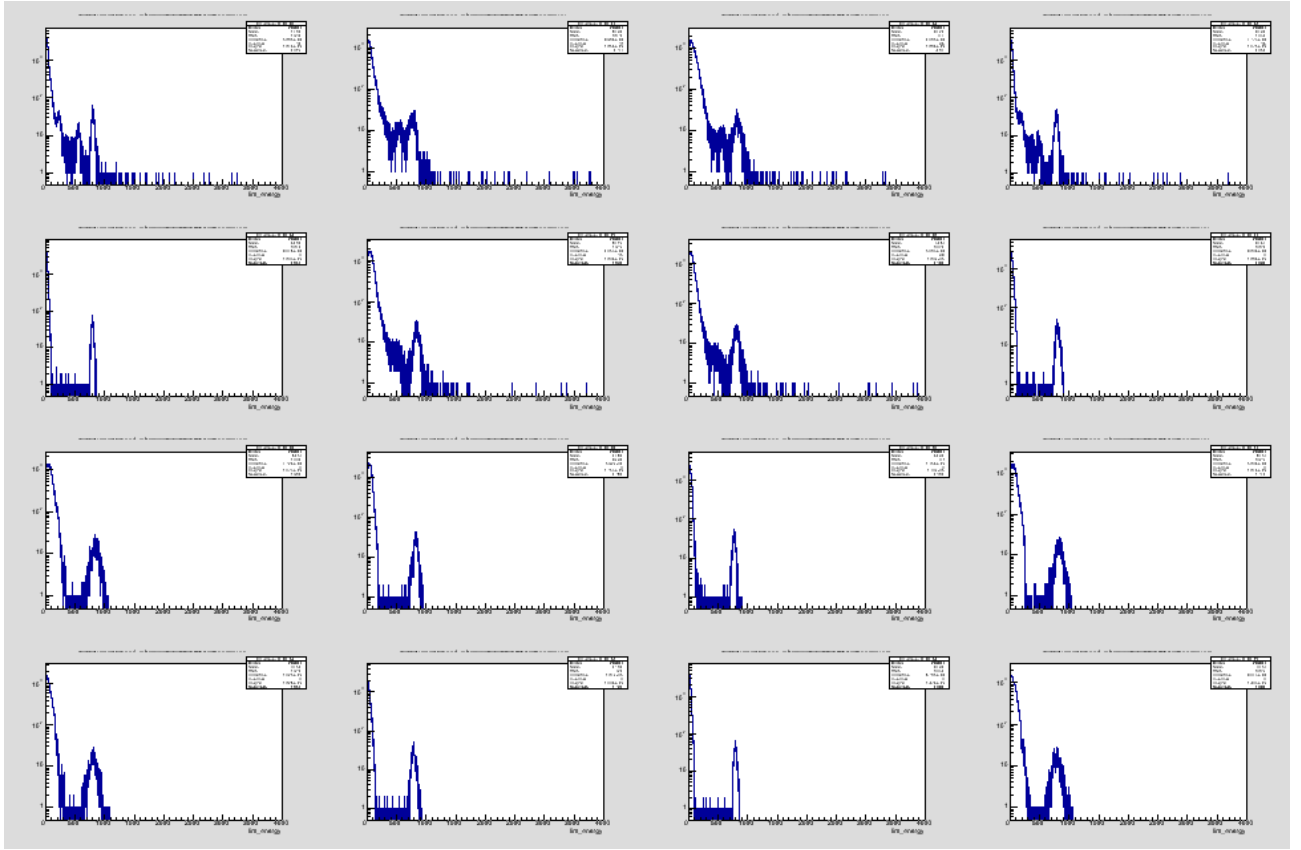
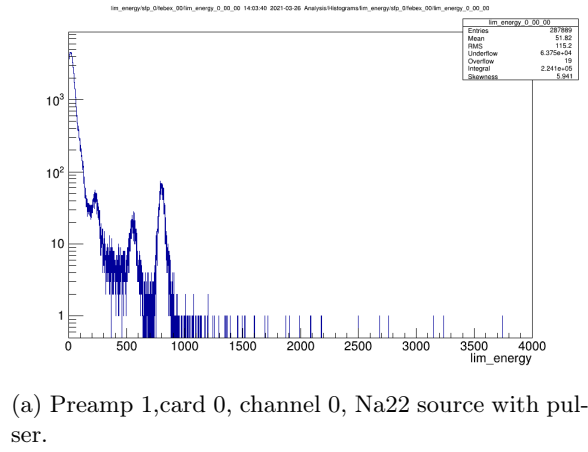
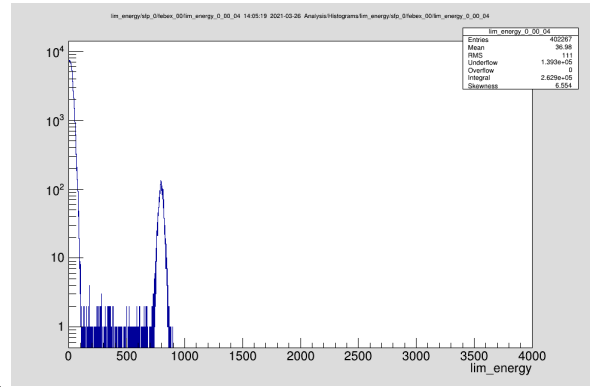


Abbildung 5: Preamp 1, card 0, all channels, Na22 source with pulser.



(a) Preamp 1, card 0, channel 0, Na22 source with pulser.



(b) Preamp 1, card 0, channel 4, no crystal, only pulser.

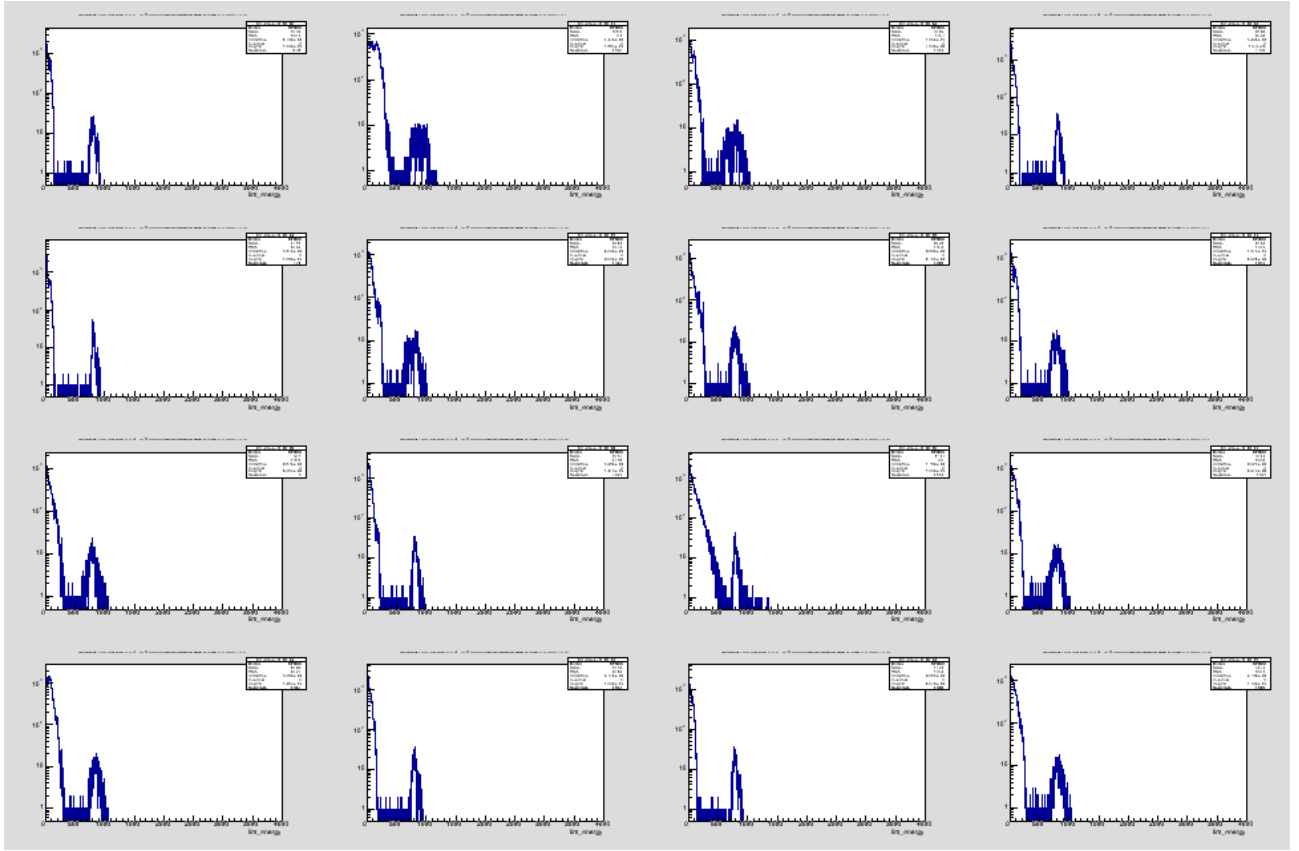
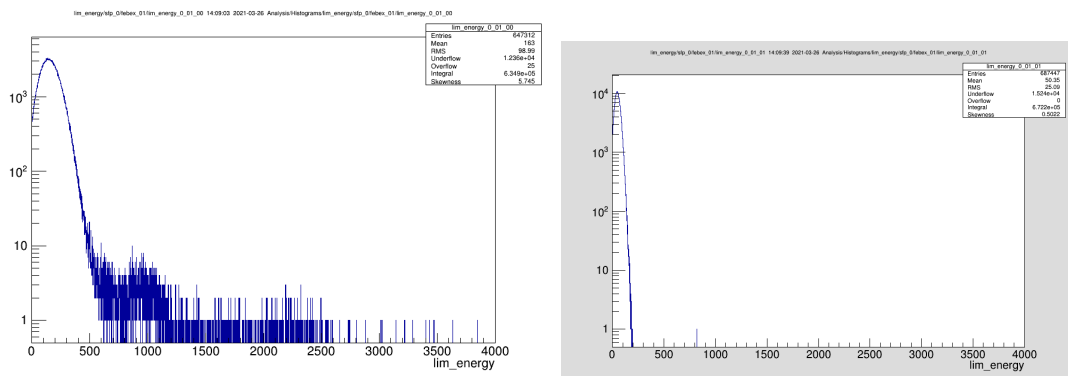


Abbildung 7: Preamp 1, card 1, all channels, no crystal, only pulser.



(a) Reference Preamp, card 0, channel 0, Na22 source (b) Reference Preamp, card 0, channel 4, no crystal, no pulser.

Abbildung 8: Small Box reference for Preamp 1.

### 0.2.3 Preamp 2

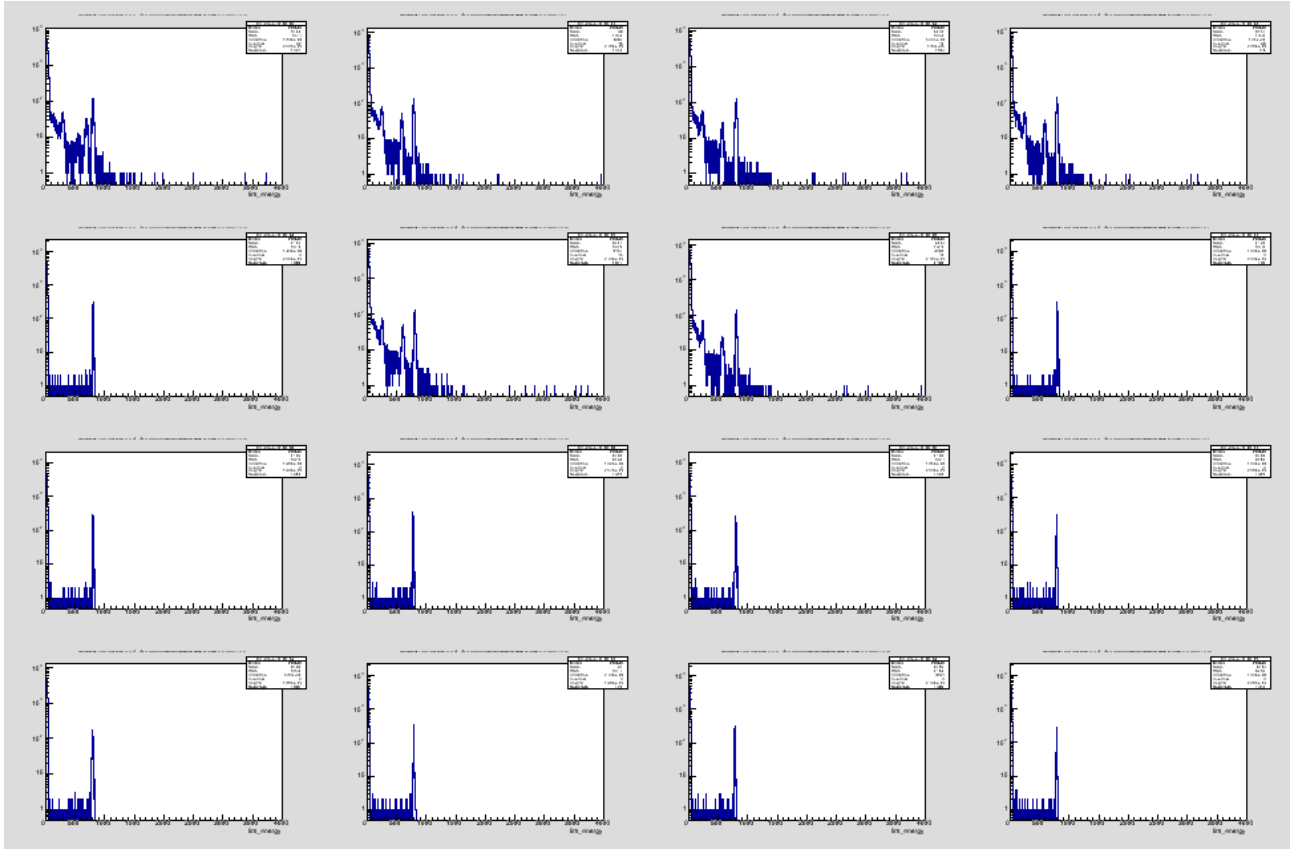
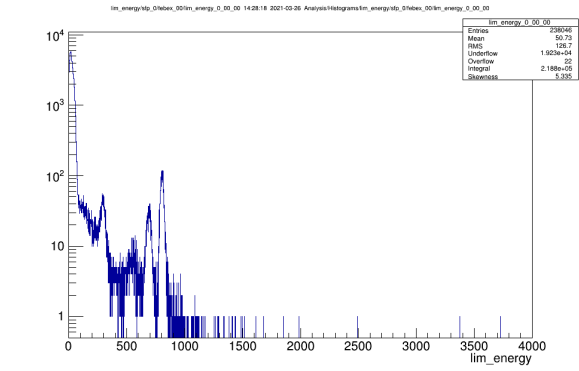
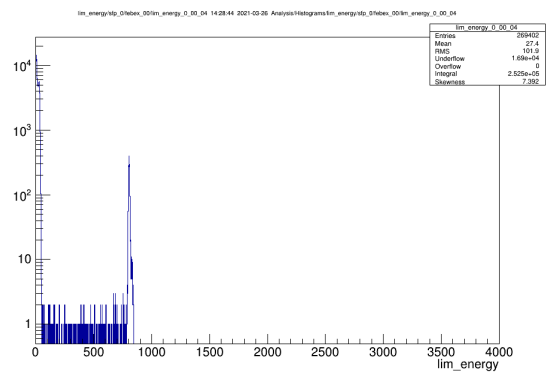


Abbildung 9: Preamp 2, card 0, all channels, Na22 source with pulser.



(a) Preamp 2, card 0, channel 0, Na22 source with pulser.



(b) Preamp 2, card 0, channel 4, no crystal, only pulser.

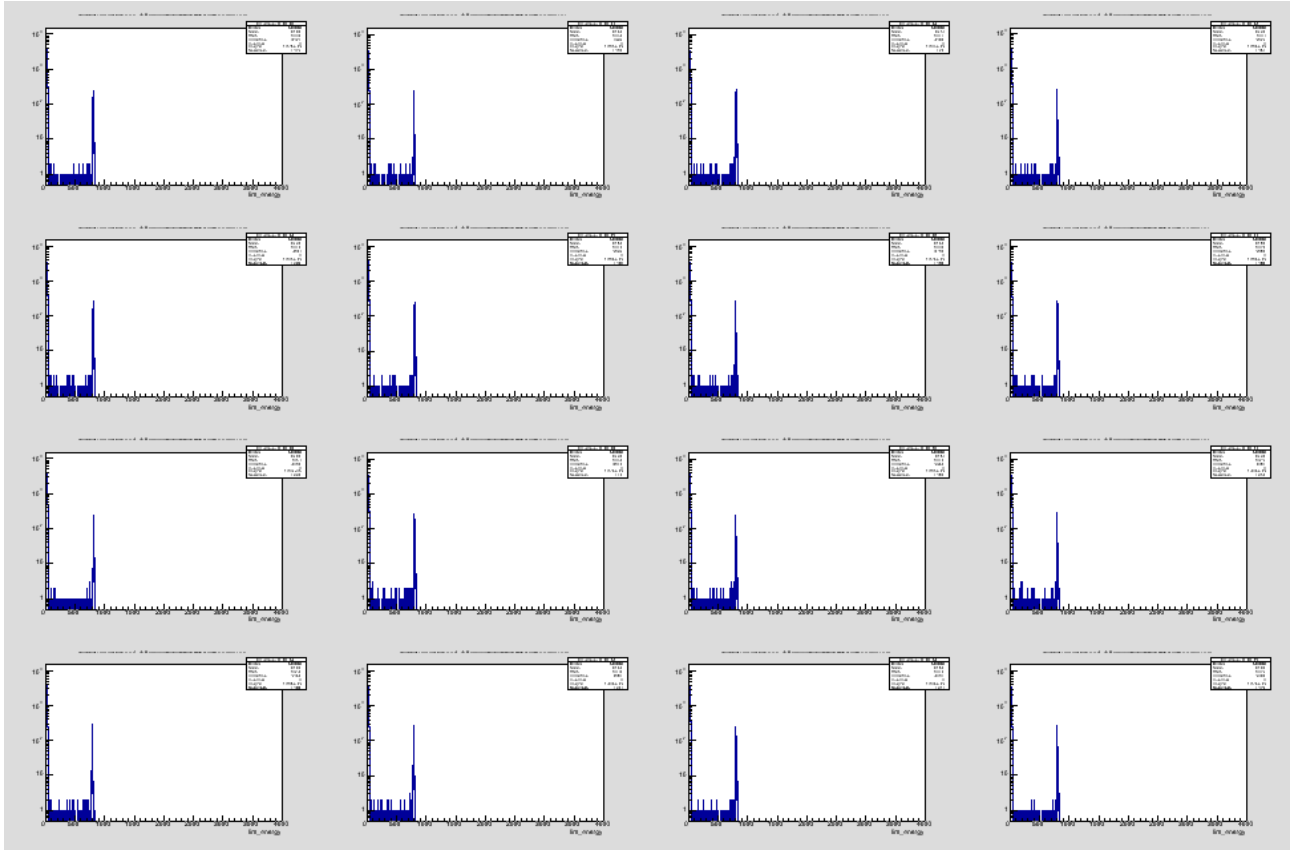
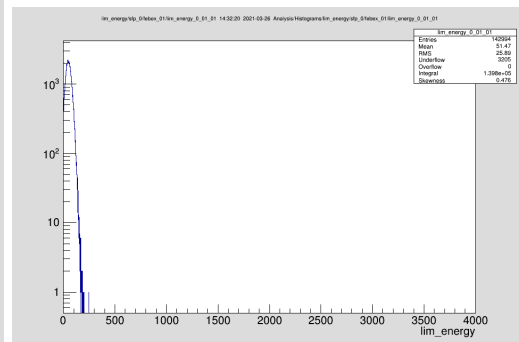
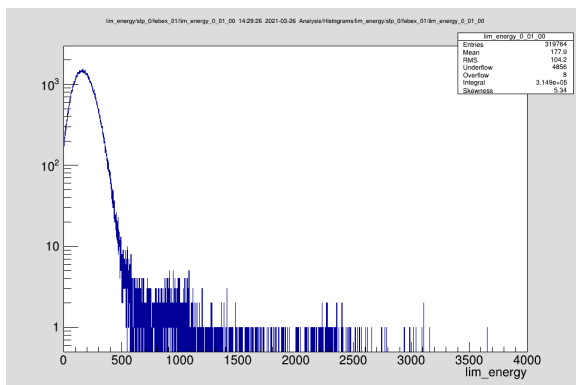


Abbildung 11: Preamp 2, card 1, all channels, no crystal, only pulser.



(a) Reference Preamp, card 0, channel 0, Na22 source (b) Reference Preamp, card 0, channel 4, no crystal, no pulser.

Abbildung 12: Small Box reference for Preamp 2.



## 0.2.4 Preamp 3

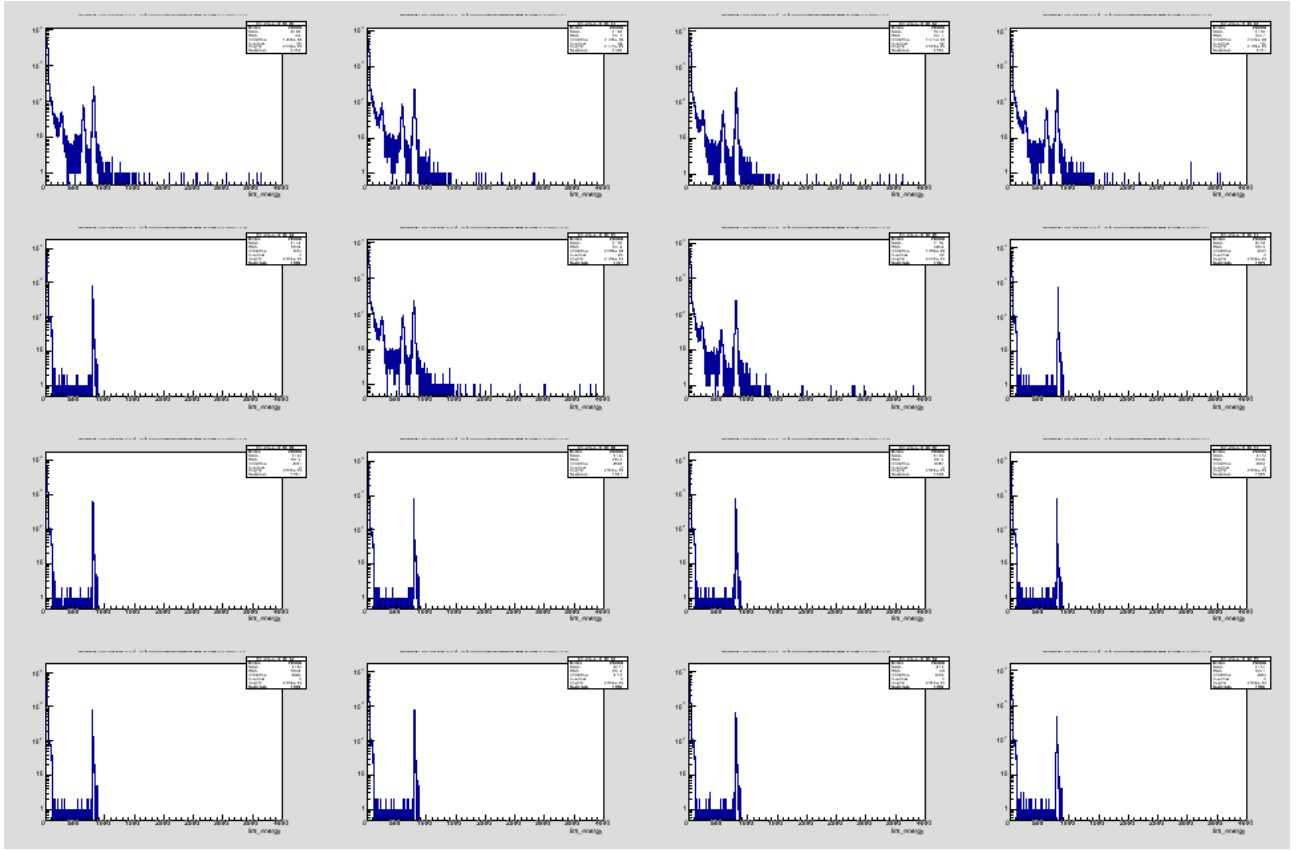
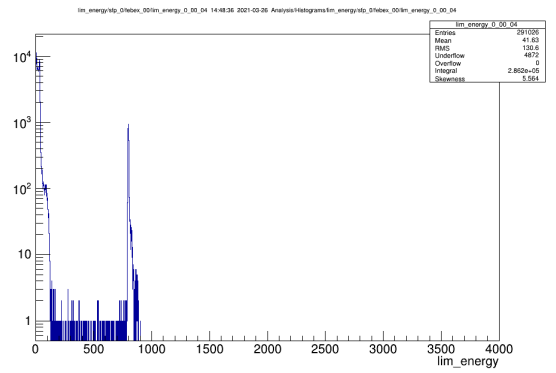
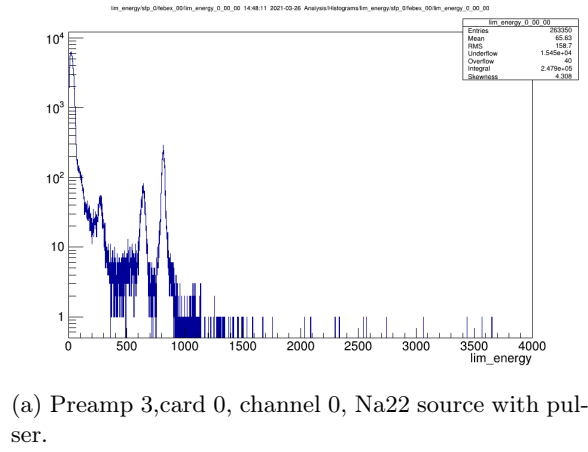


Abbildung 13: Preamp 3, card 0, all channels, Na22 source with pulser.



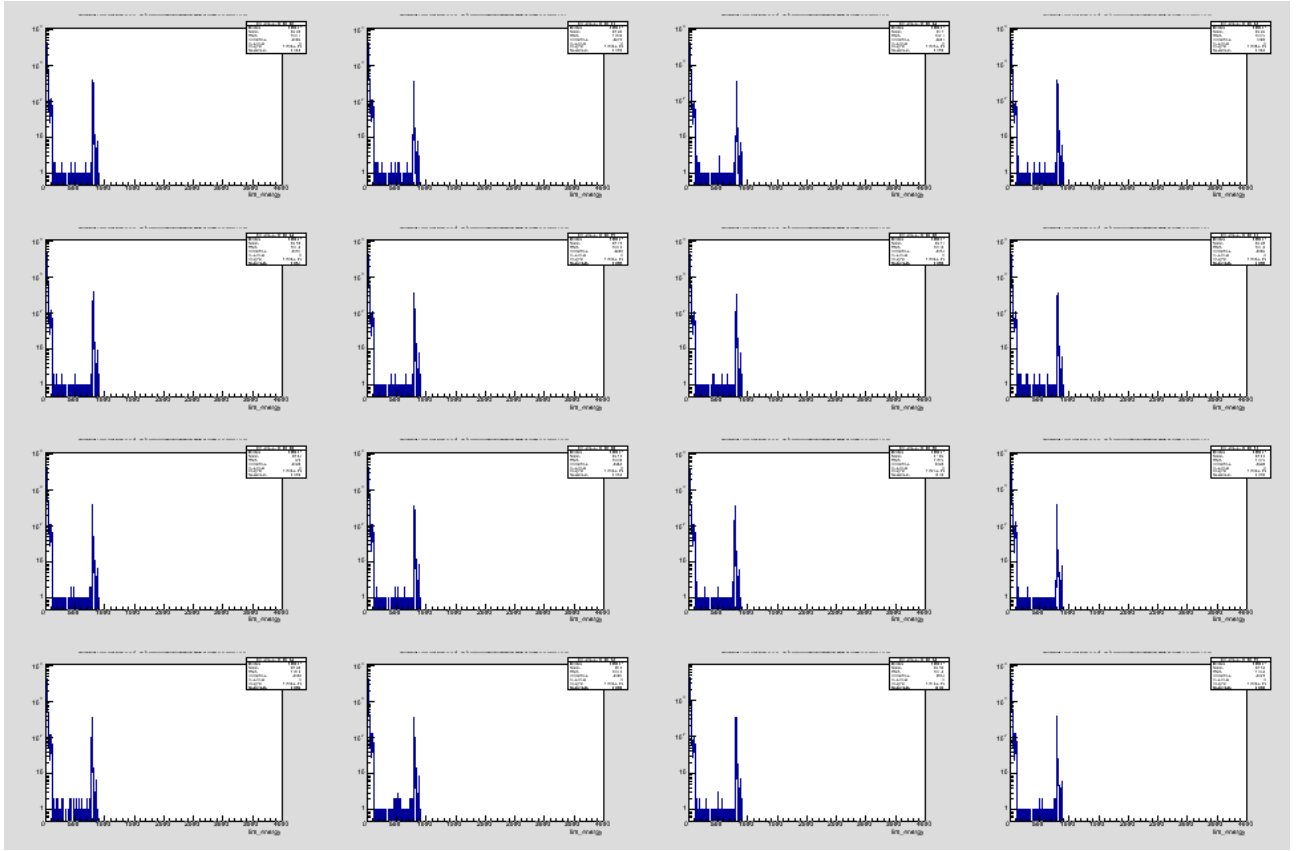
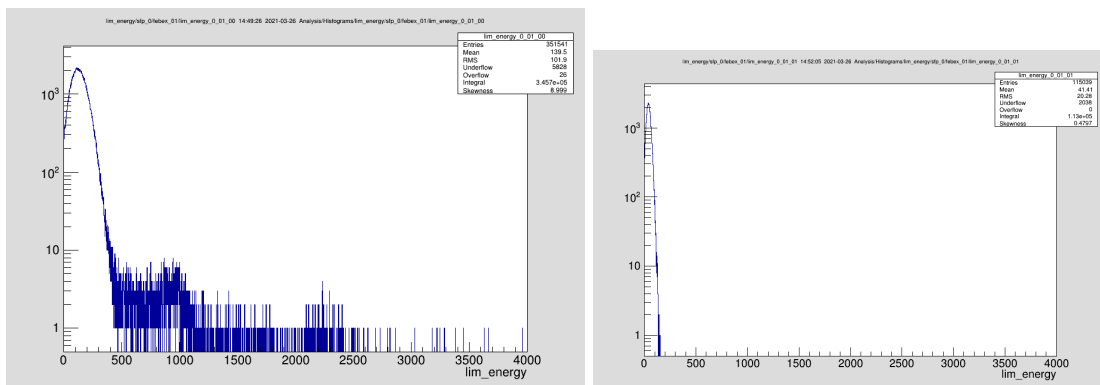


Abbildung 15: Preamp 3, card 1, all channels, no crystal, only pulser.



(a) Reference Preamp, card 0, channel 0, Na22 source (b) Reference Preamp, card 0, channel 4, no crystal, no pulser.

Abbildung 16: Small Box reference for Preamp 3.

## 0.2.5 Preamp 4

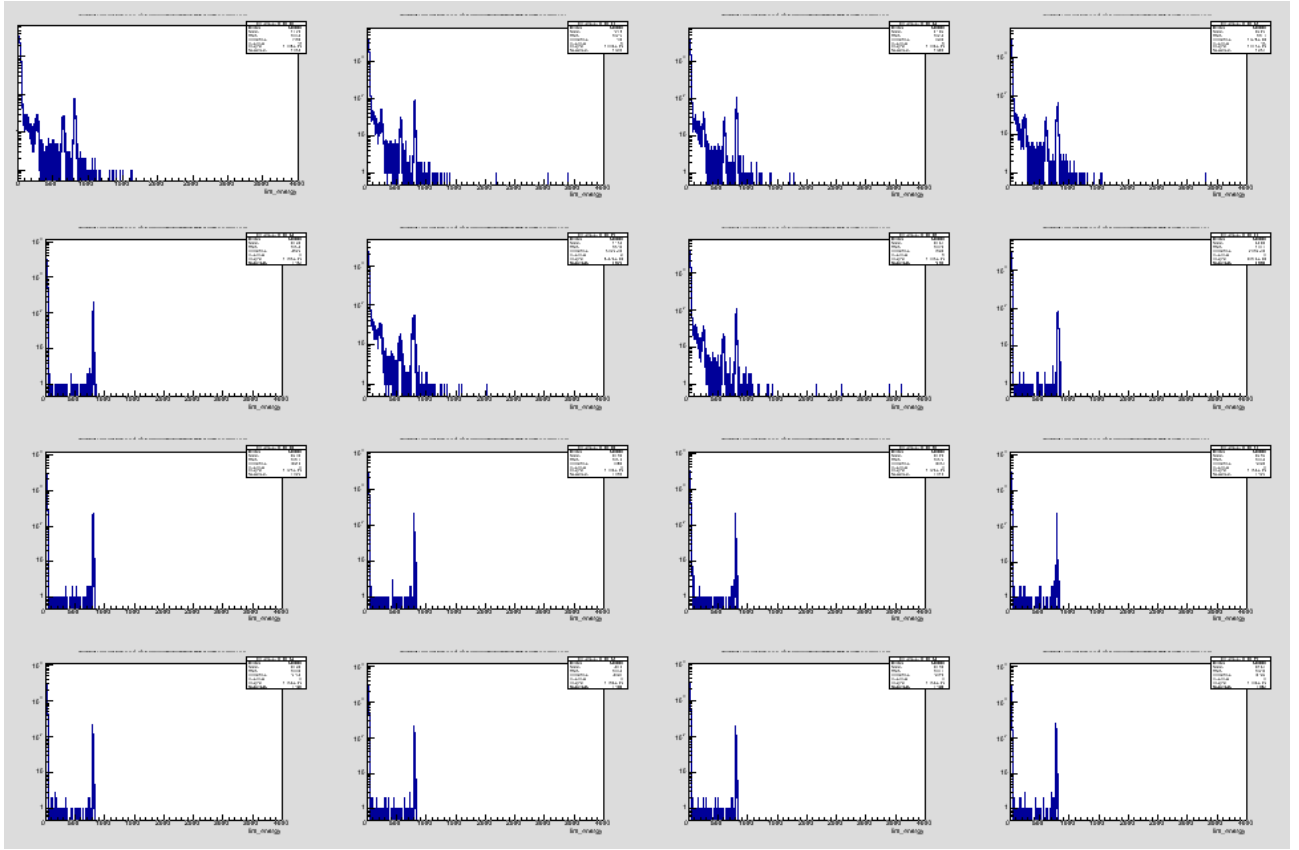
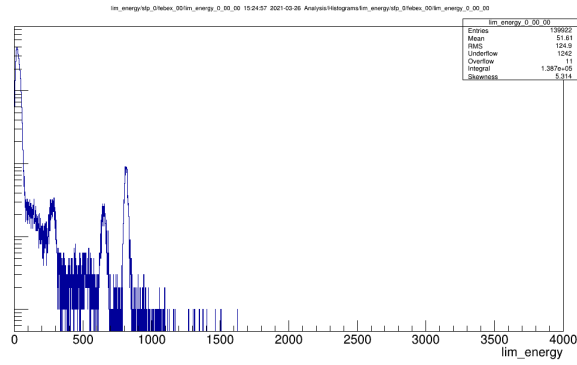
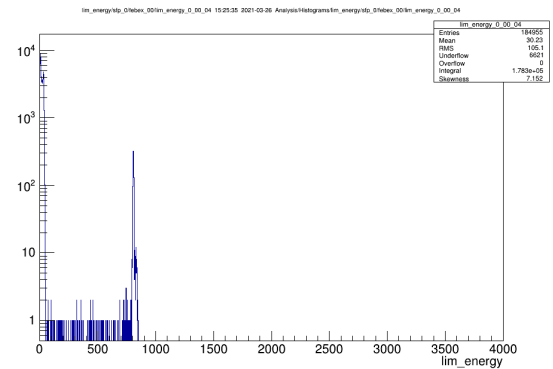


Abbildung 17: Preamp 4, card 0, all channels, Na22 source with pulser.



(a) Preamp 4,card 0, channel 0, Na22 source with pulser.



(b) Preamp 4,card 0, channel 4,no crystal, only pulser.

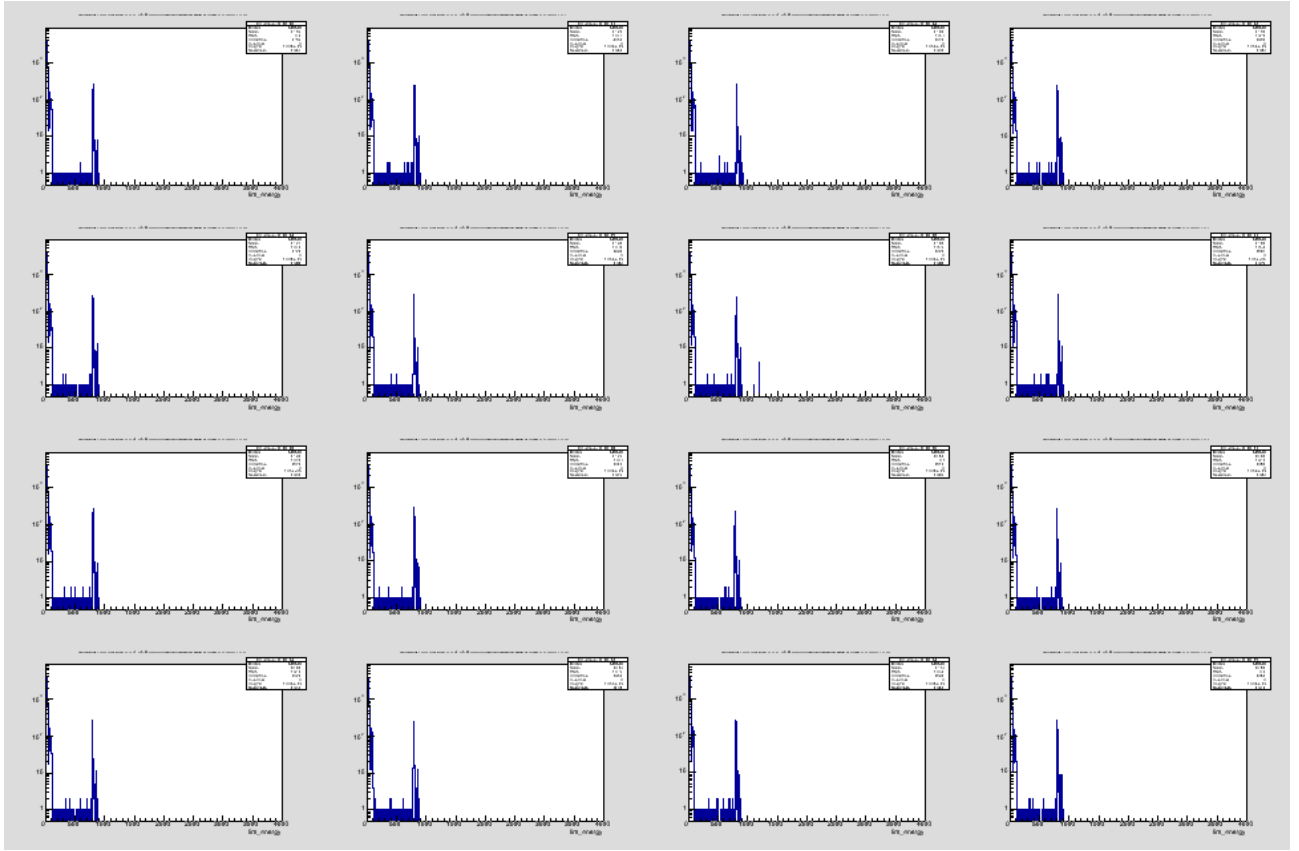
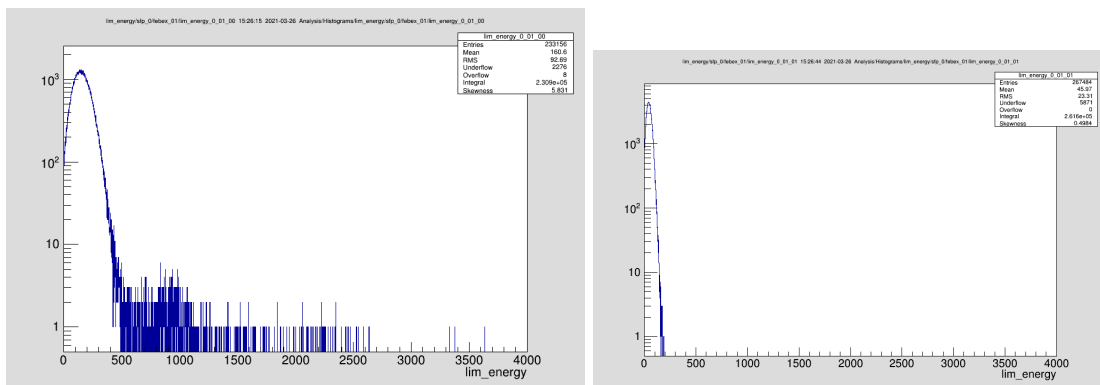


Abbildung 19: Preamp 4, card 1, all channels, no crystal, only pulser.



(a) Reference Preamp, card 0, channel 0, Na22 source (b) Reference Preamp, card 0, channel 4, no crystal, no pulser.

Abbildung 20: Small Box reference for Preamp 4.

## 0.2.6 Preamp 5

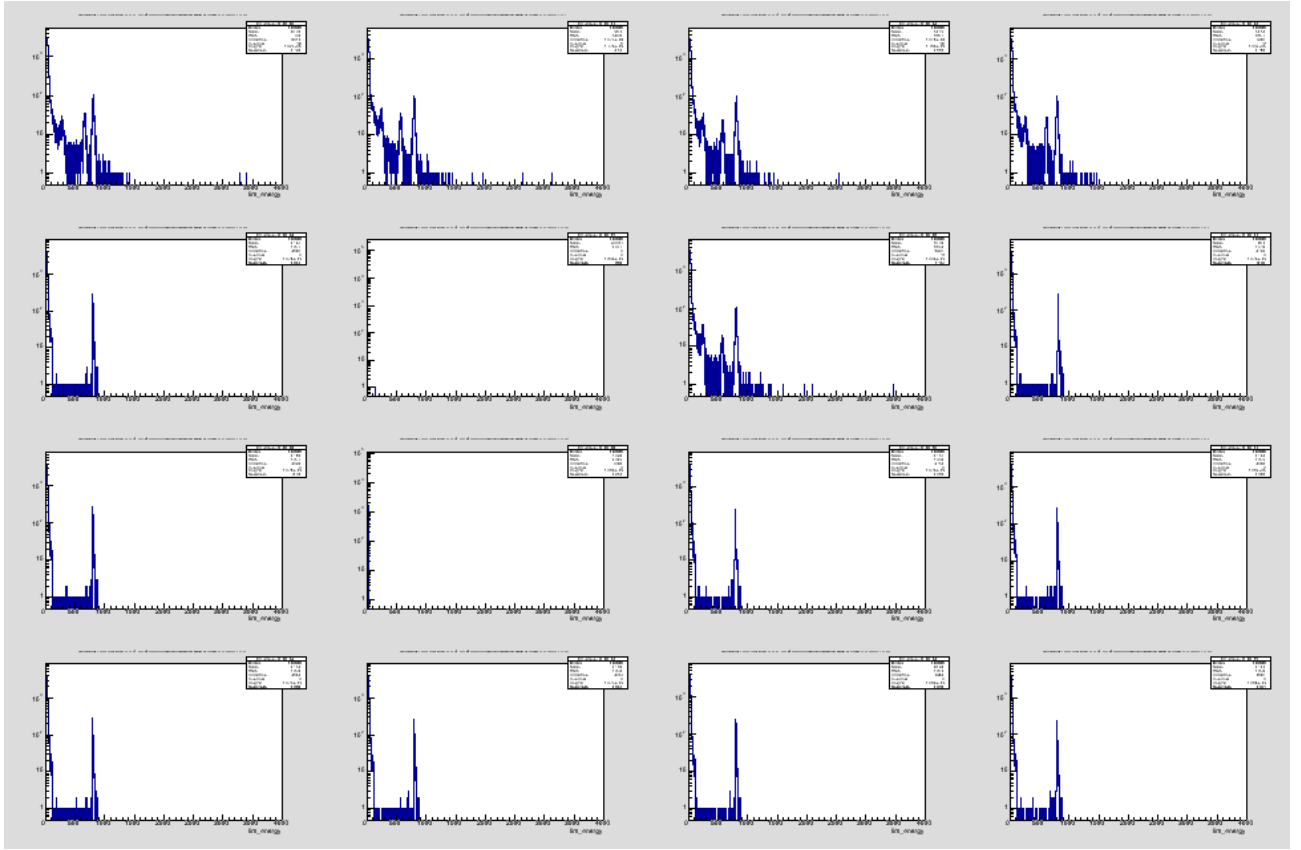
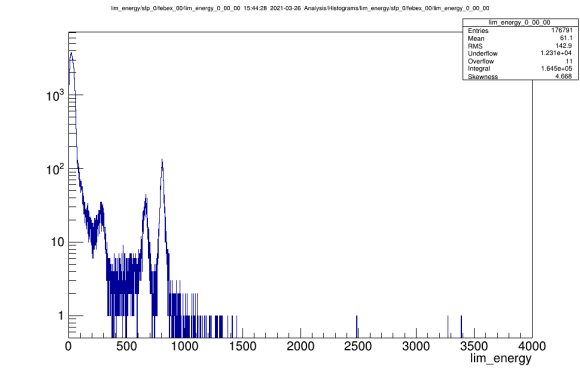
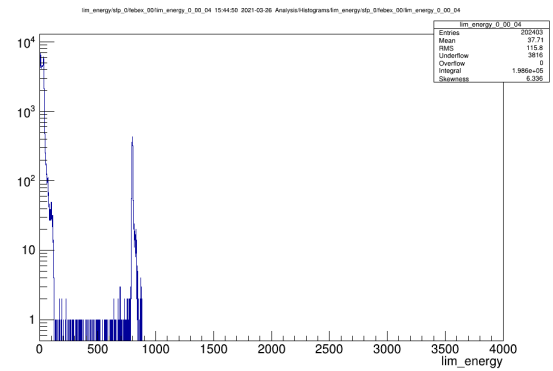


Abbildung 21: Preamp 5, card 0, all channels, Na22 source with pulser.



(a) Preamp 5, card 0, channel 0, Na22 source with pulser.



(b) Preamp 5, card 0, channel 4, no crystal, only pulser.

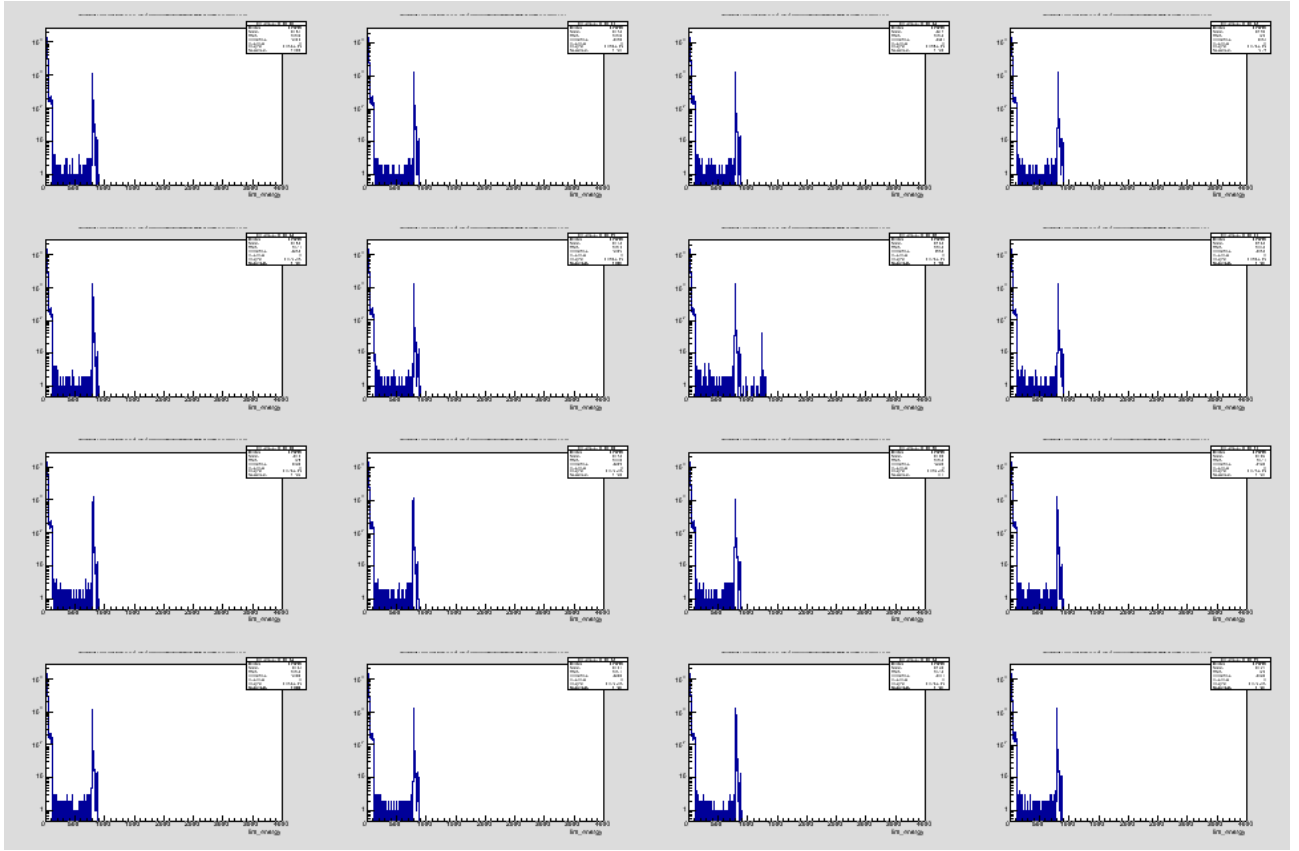
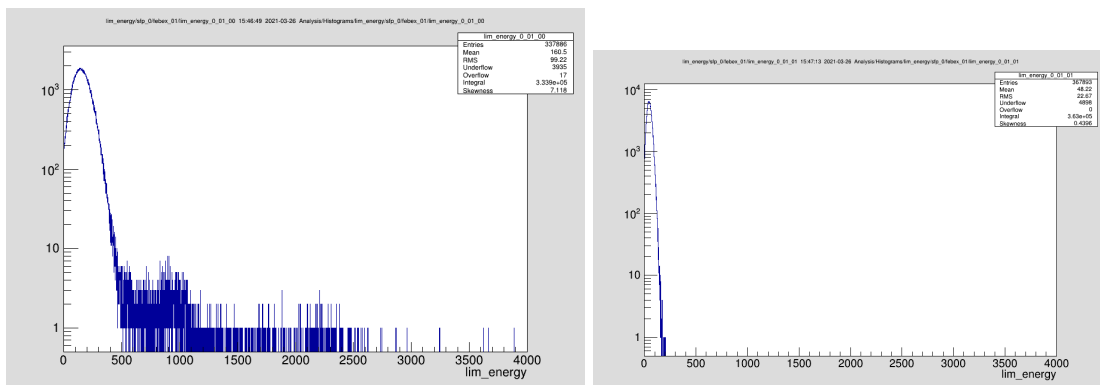


Abbildung 23: Preamp 5, card 1, all channels, no crystal, only pulser.



(a) Reference Preamp, card 0, channel 0, Na22 source (b) Reference Preamp, card 0, channel 4, no crystal, no pulser.

Abbildung 24: Small Box reference for Preamp 5.

## 0.2.7 Preamp 6 (Dual Range)

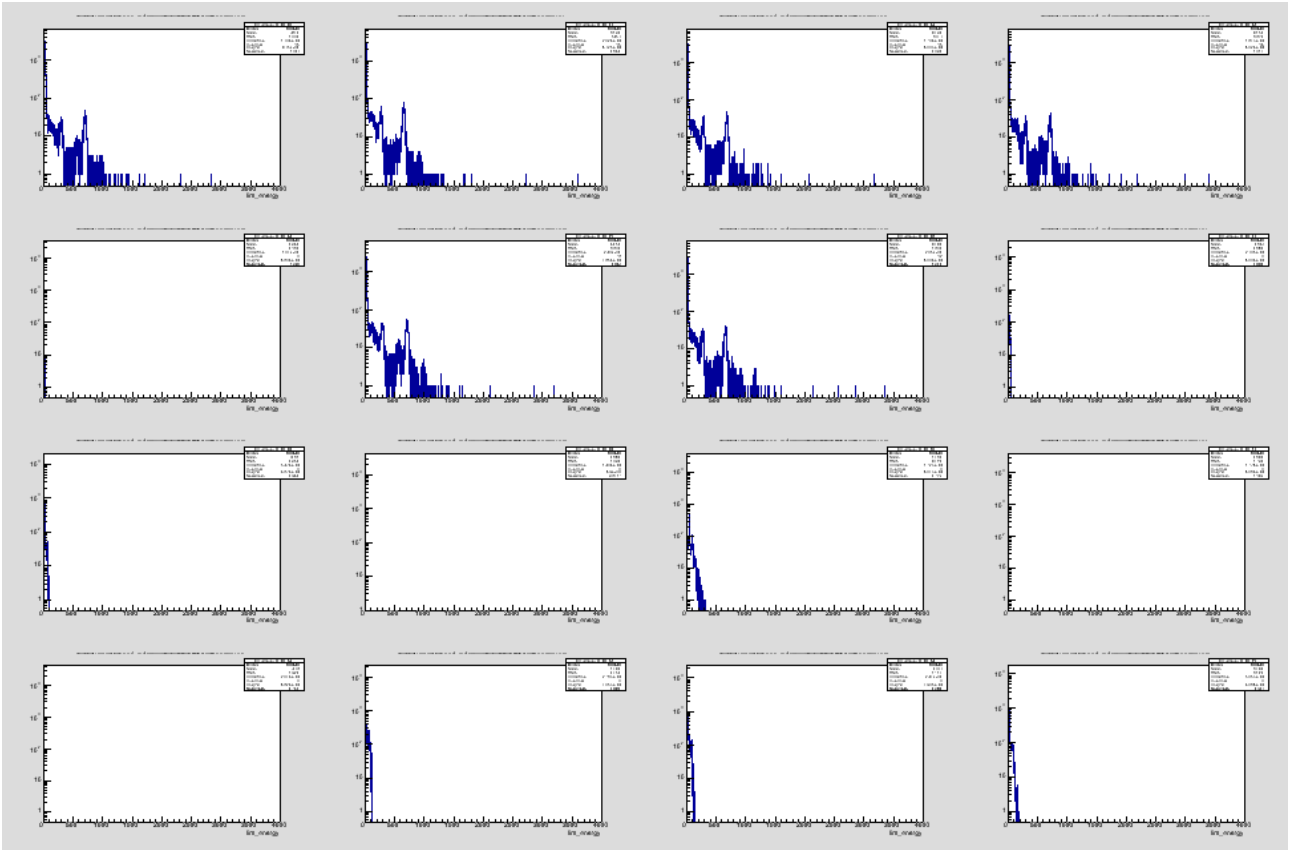


Abbildung 25: Preamp 6, card 1, all channels, Na22 source no pulser.

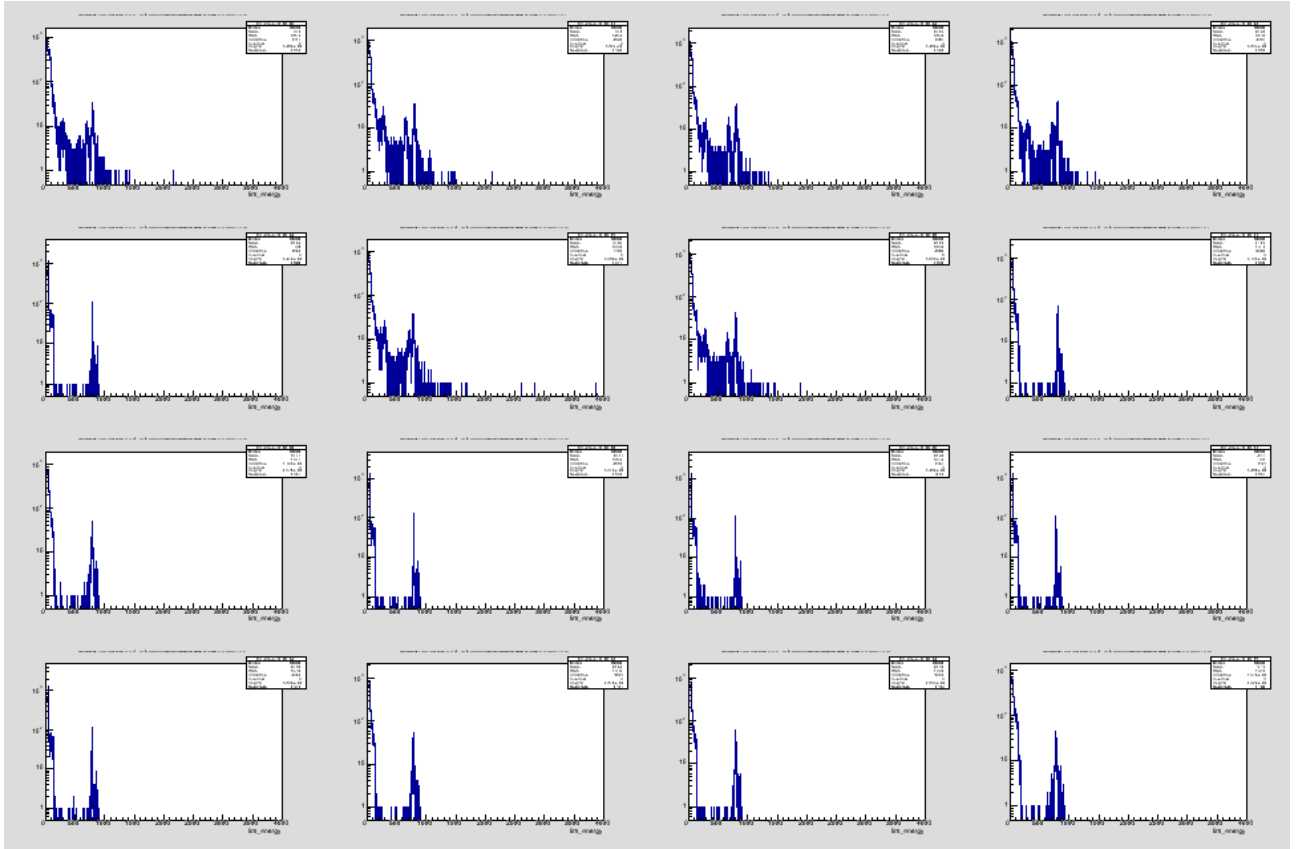


Abbildung 26: Preamp 6, card 1, all channels, Na22 source with pulser.

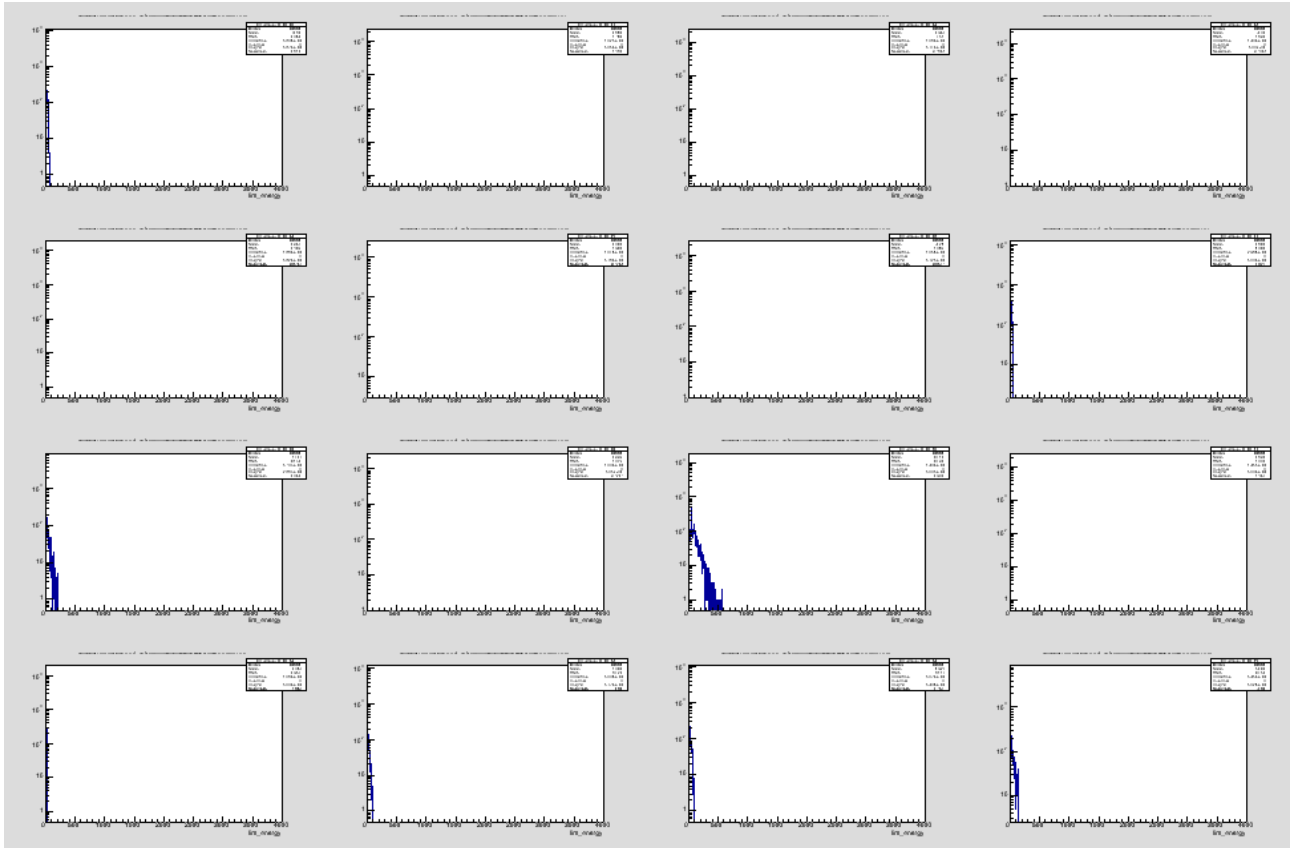


Abbildung 27: Preamp 6, card 1, all channels, Na22 source no pulser.



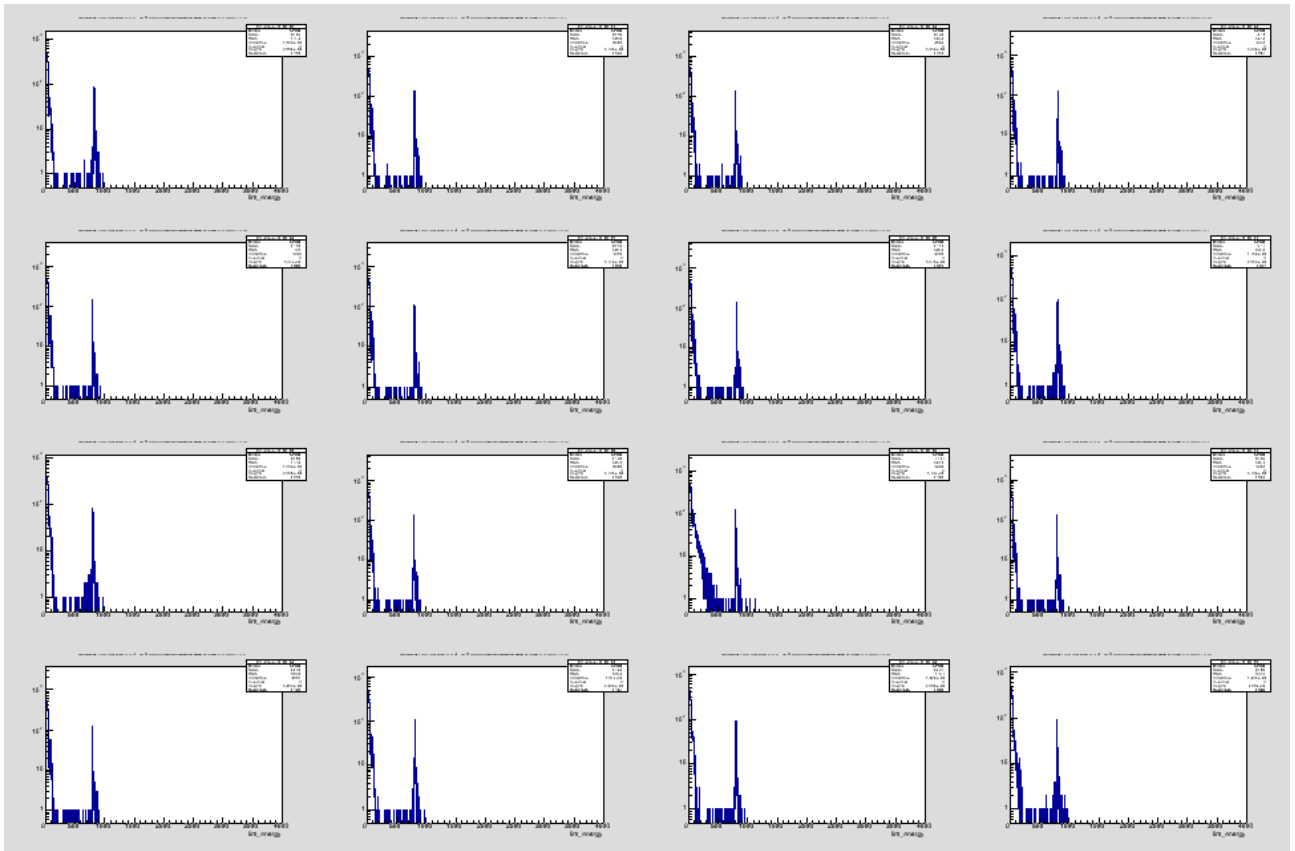


Abbildung 28: Preamp 6, card 1, all channels, Na22 source with pulser.

## 0.2.8 Preamp 7 (Dual Range)

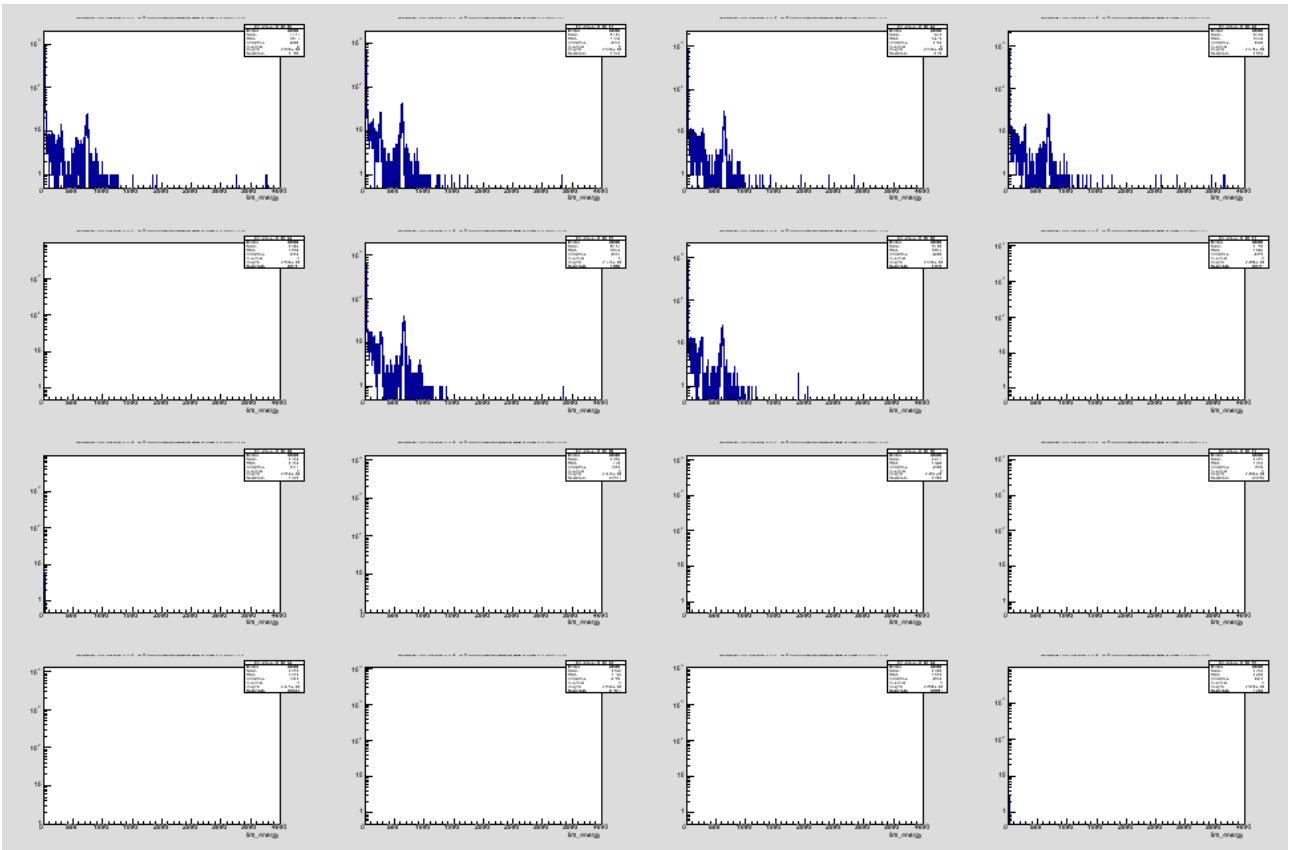


Abbildung 29: Preamp 7, card 0, all channels, Na22 source no pulser.

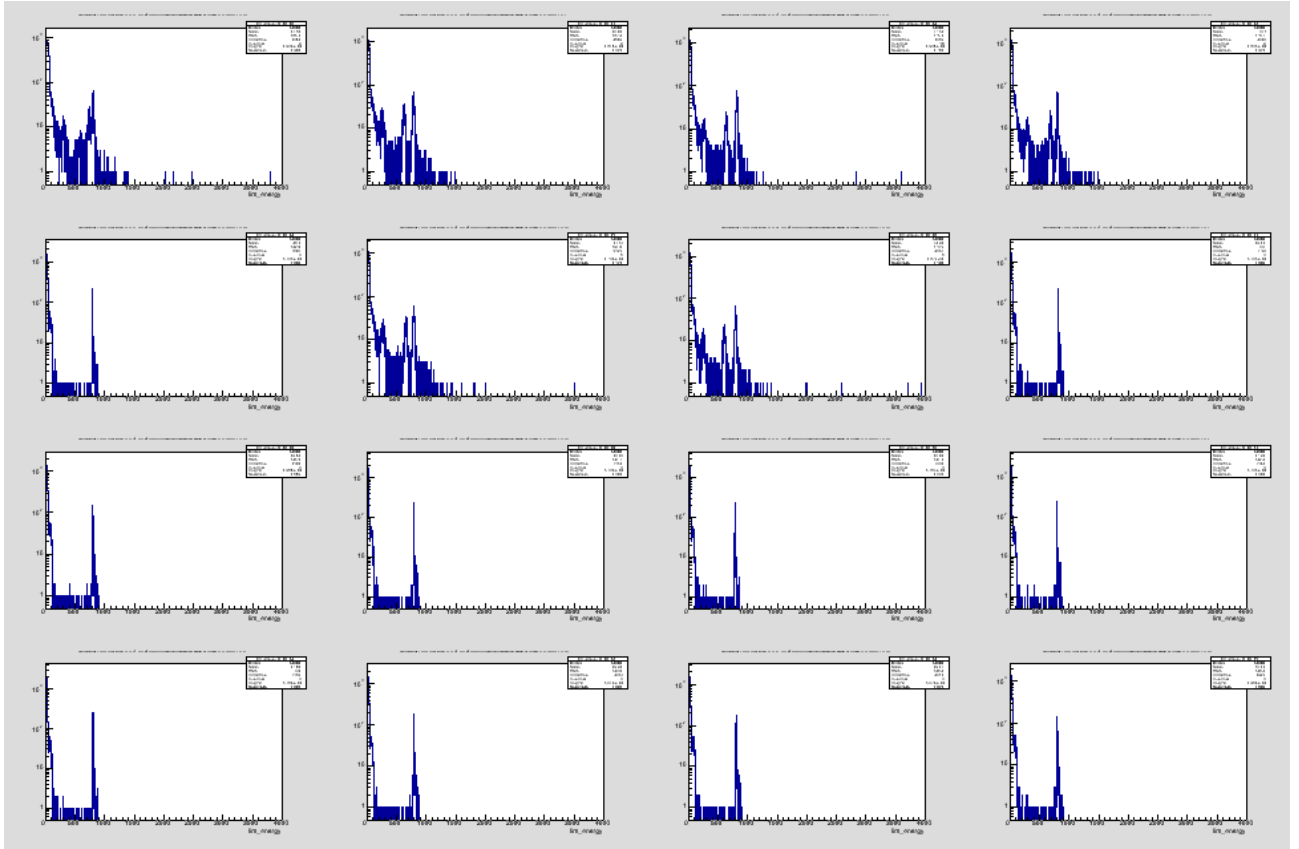


Abbildung 30: Preamp 7, card 0, all channels, Na22 source with pulser.

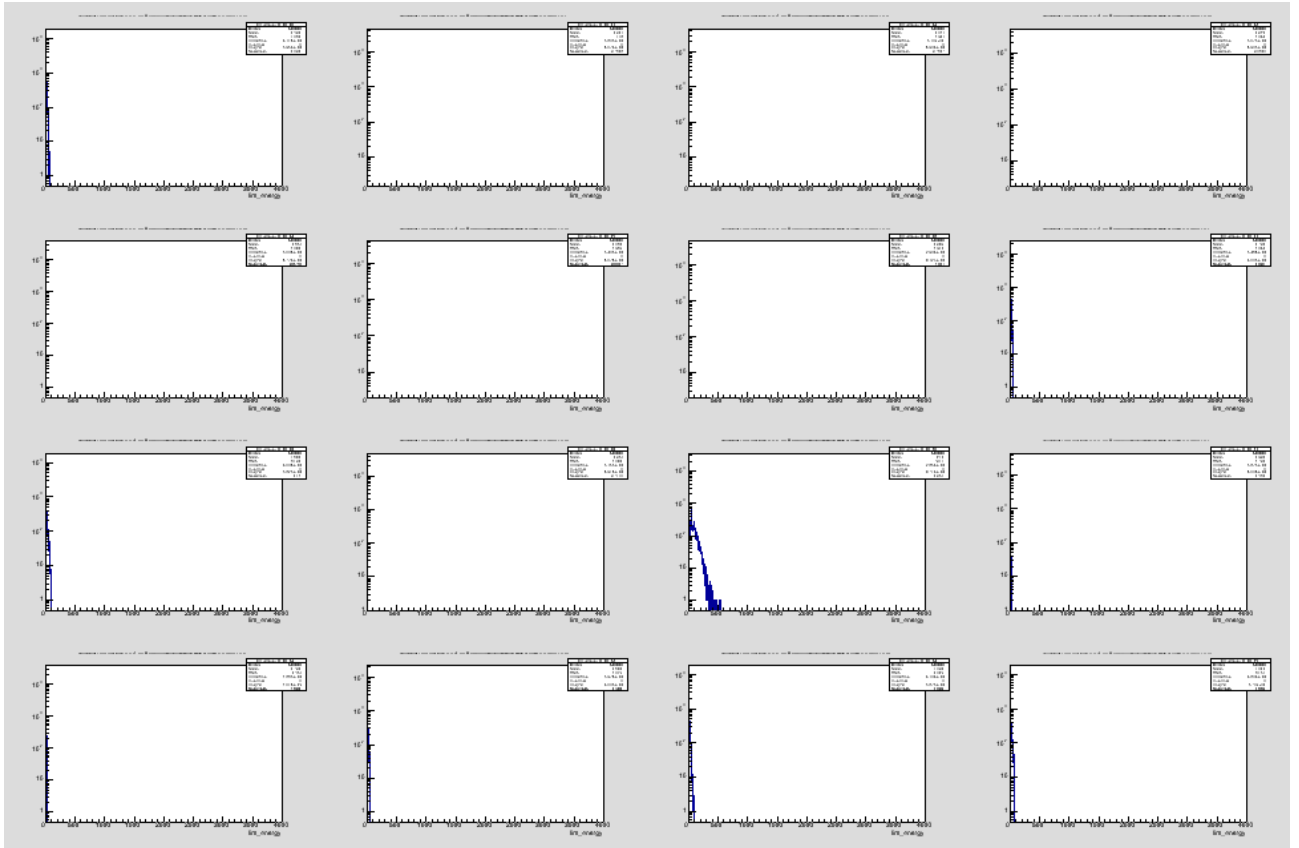


Abbildung 31: Preamp 7, card 1, all channels, Na22 source no pulser.

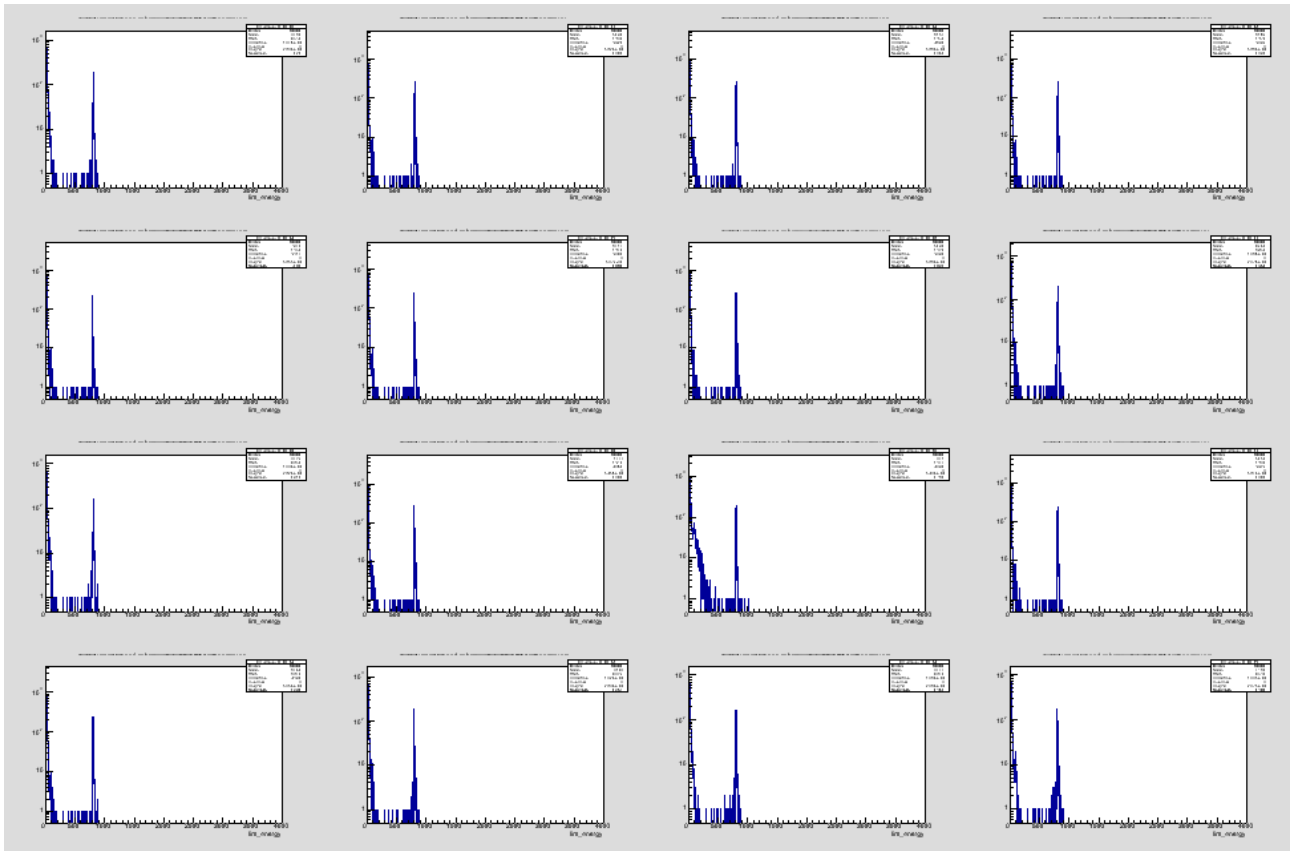


Abbildung 32: Preamp 7, card 1, all channels, Na22 source with pulser.

## 0.2.9 Preamp 8 (Dual Range)

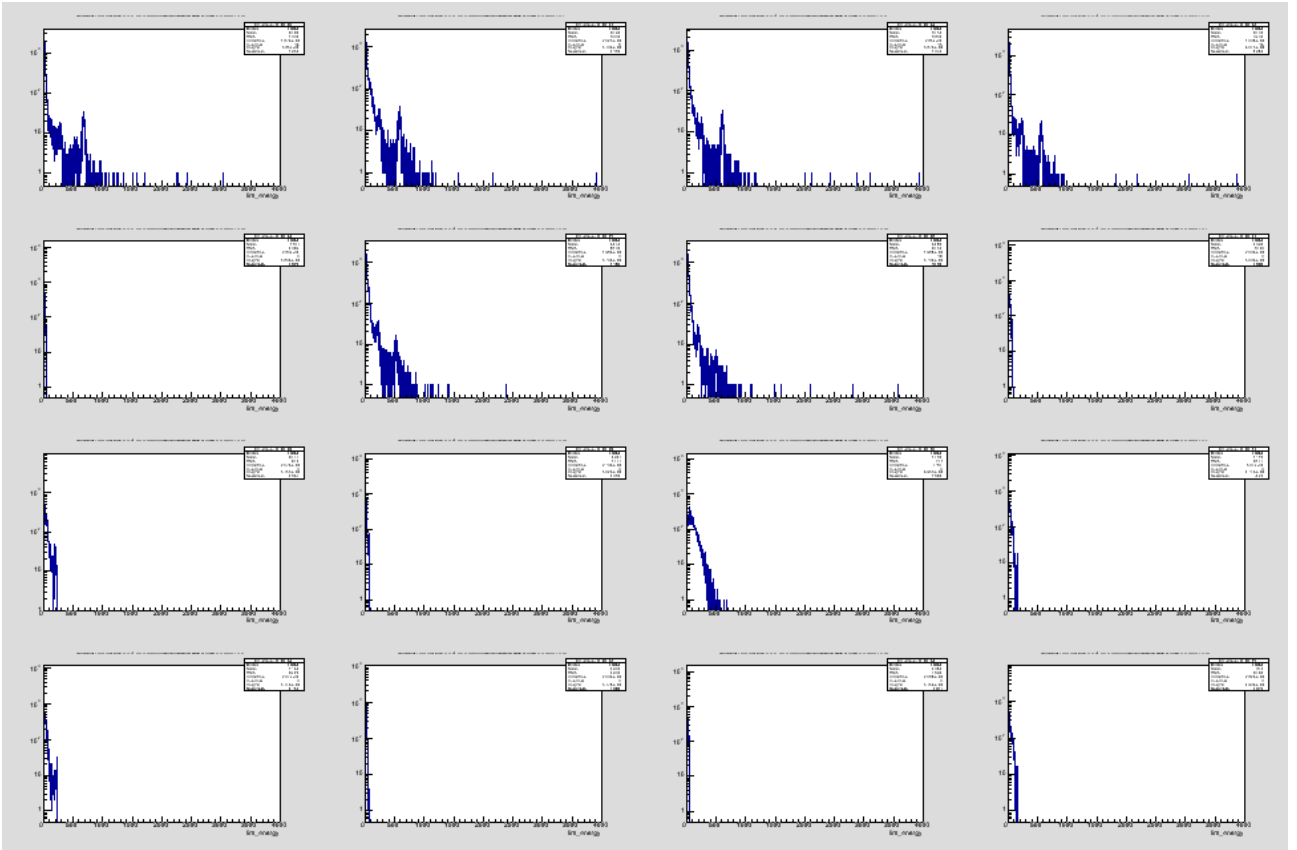


Abbildung 33: Preamp 8, card 0, all channels, Na22 source no pulser.

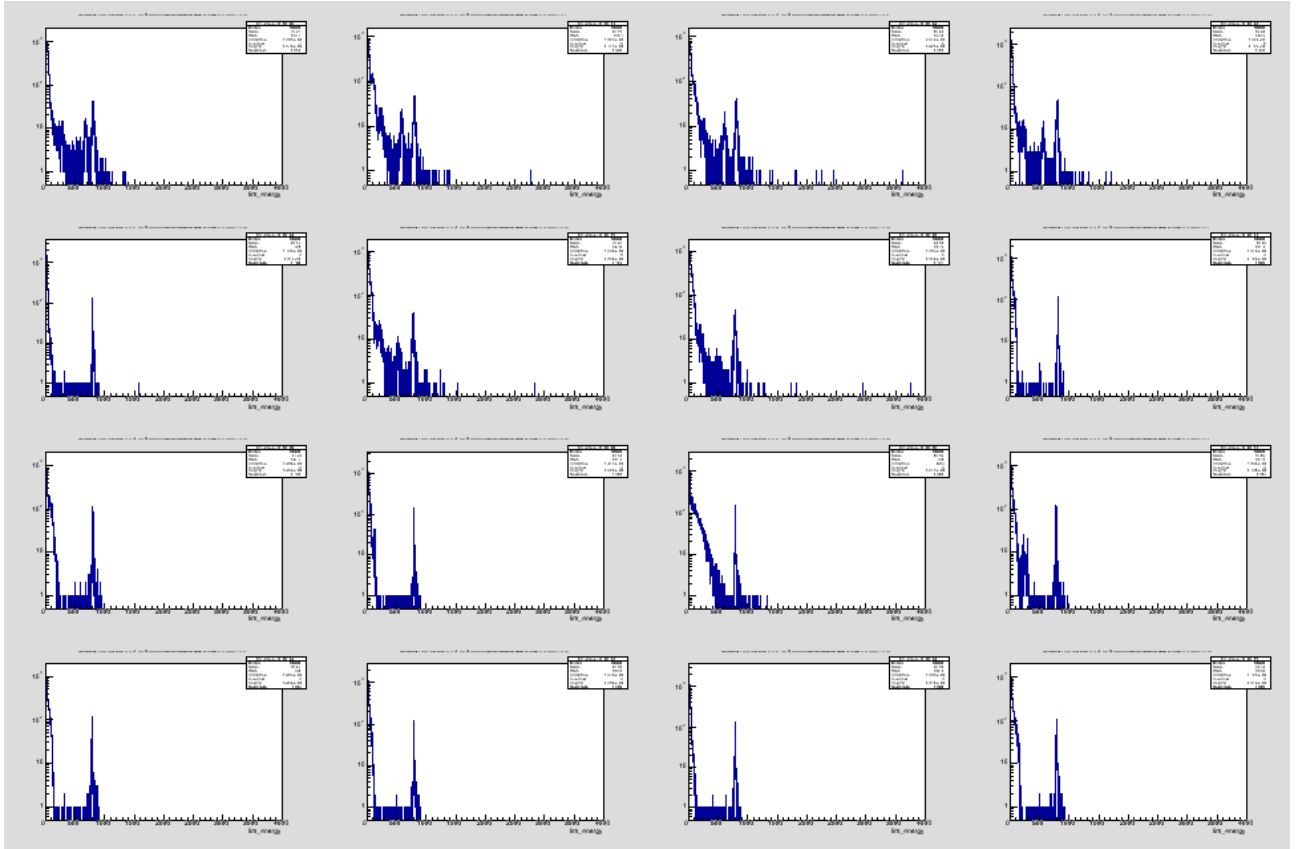


Abbildung 34: Preamp 8, card 0, all channels, Na22 source with pulser.

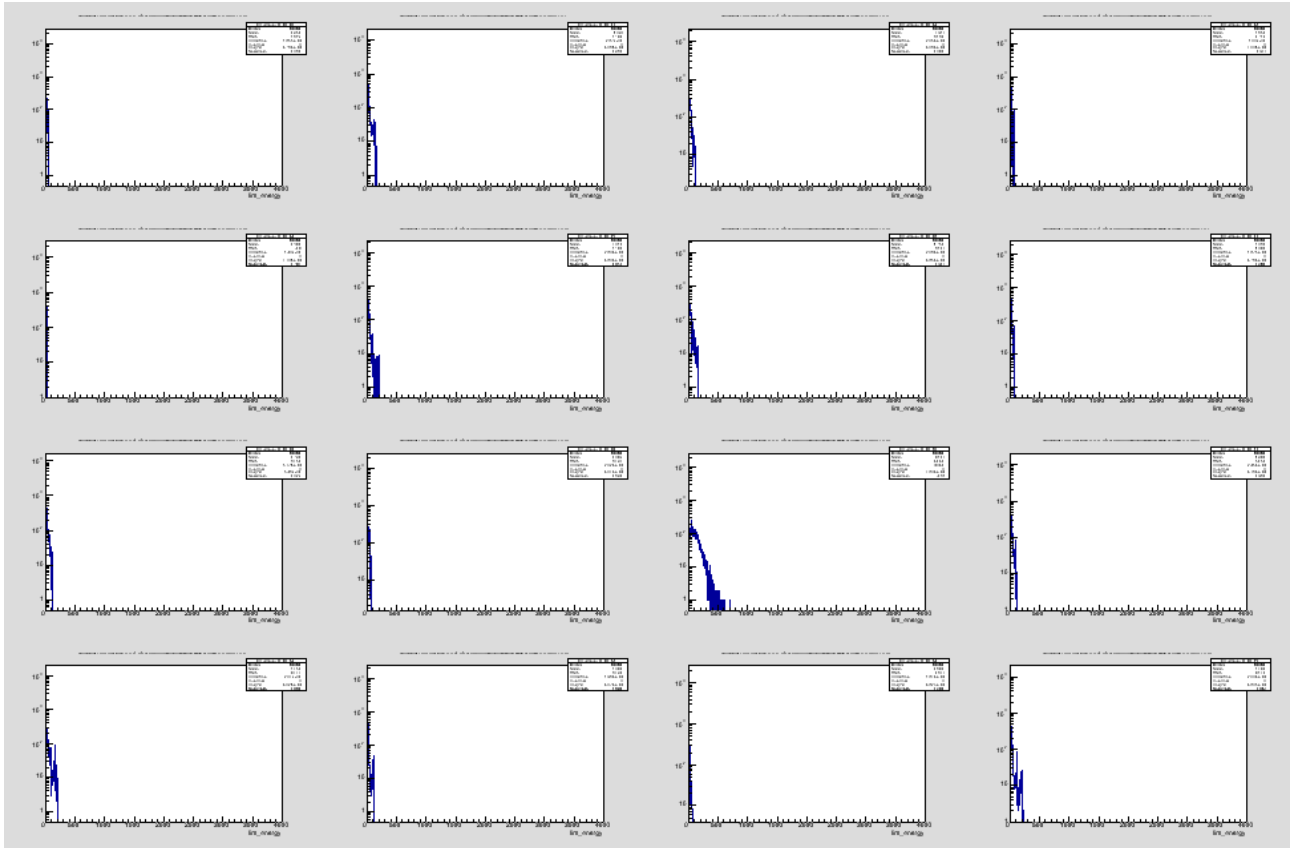
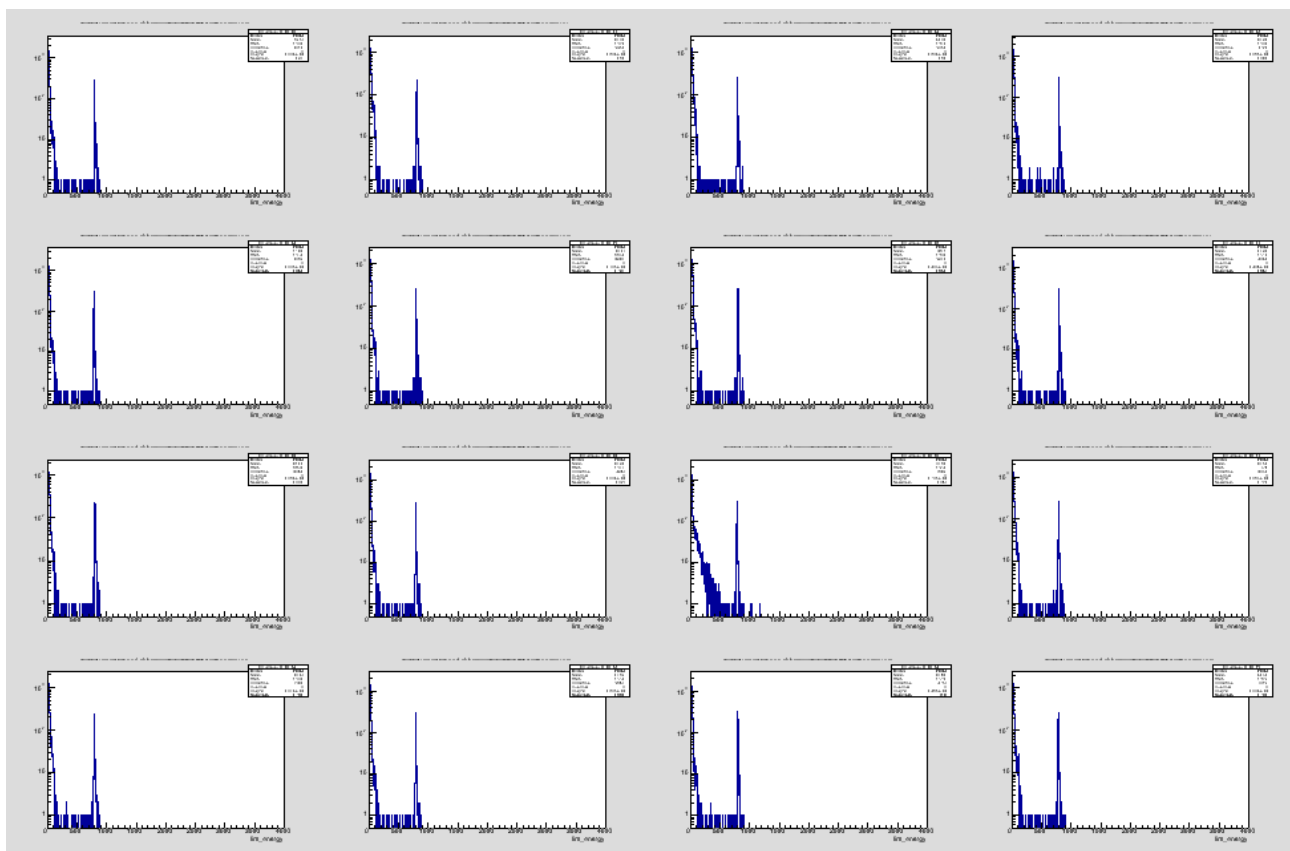


Abbildung 35: Preamp 8, card 1, all channels, Na22 source no pulser.



## 0.2.10 Preamp 9 (Dual Range)

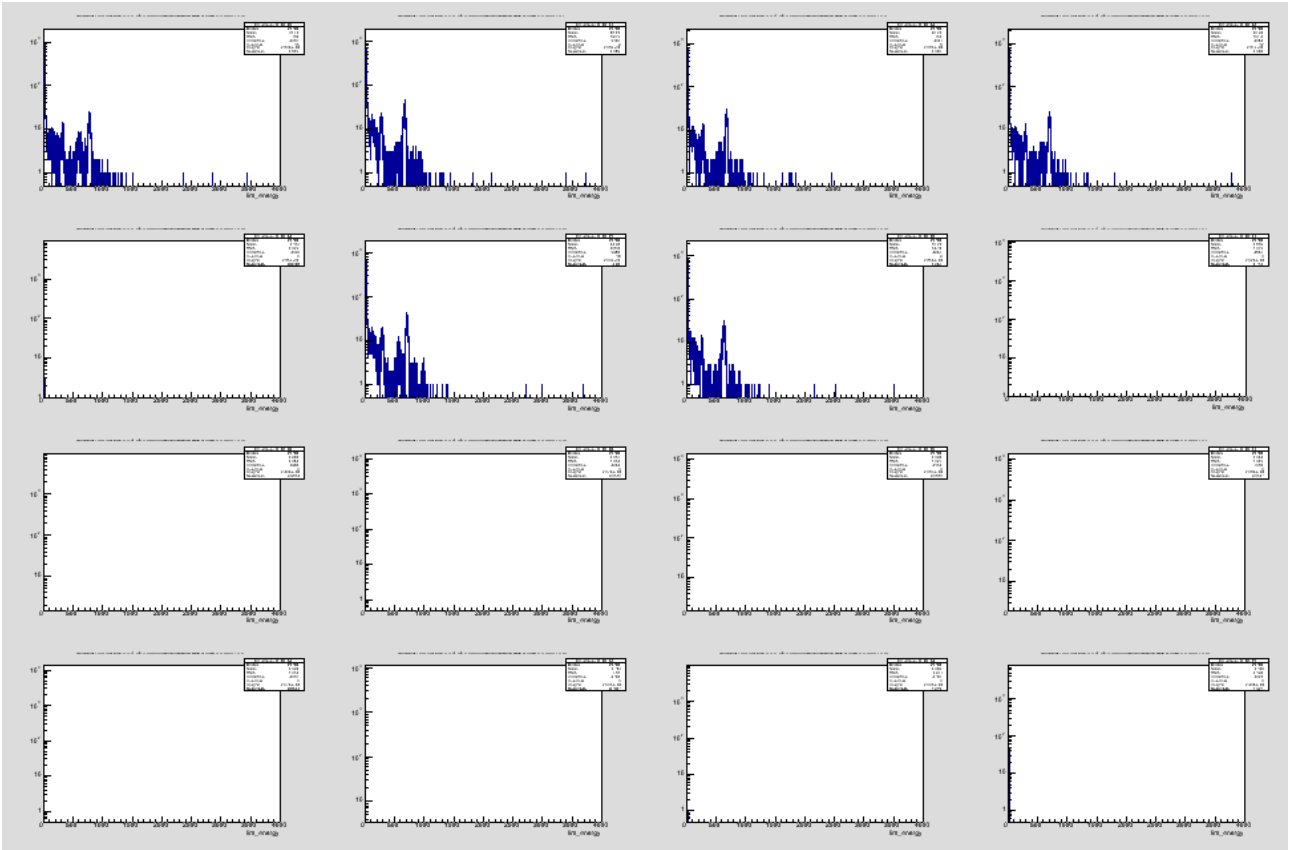


Abbildung 37: Preamp 9, card 0, all channels, Na22 source no pulser.



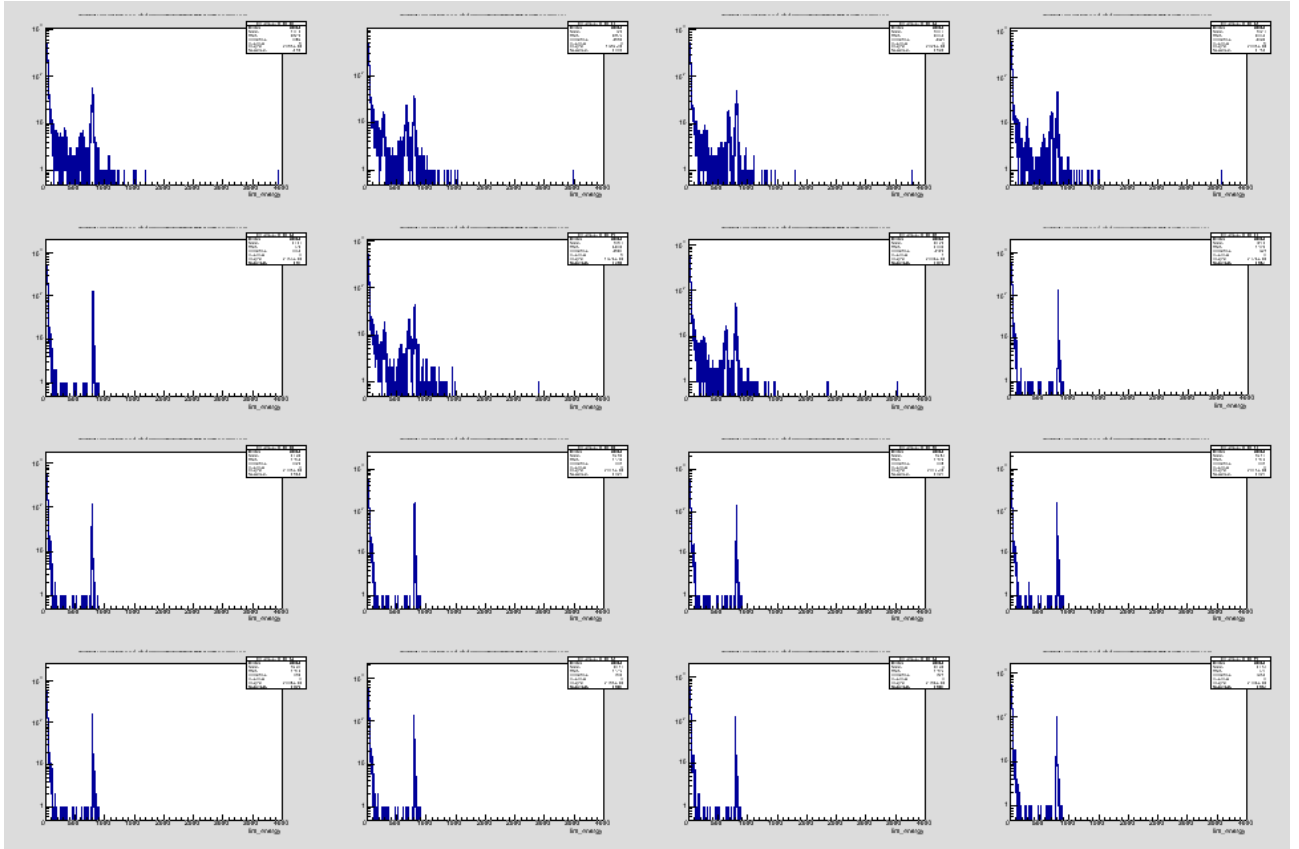


Abbildung 38: Preamp 9, card 0, all channels, Na22 source with pulser.

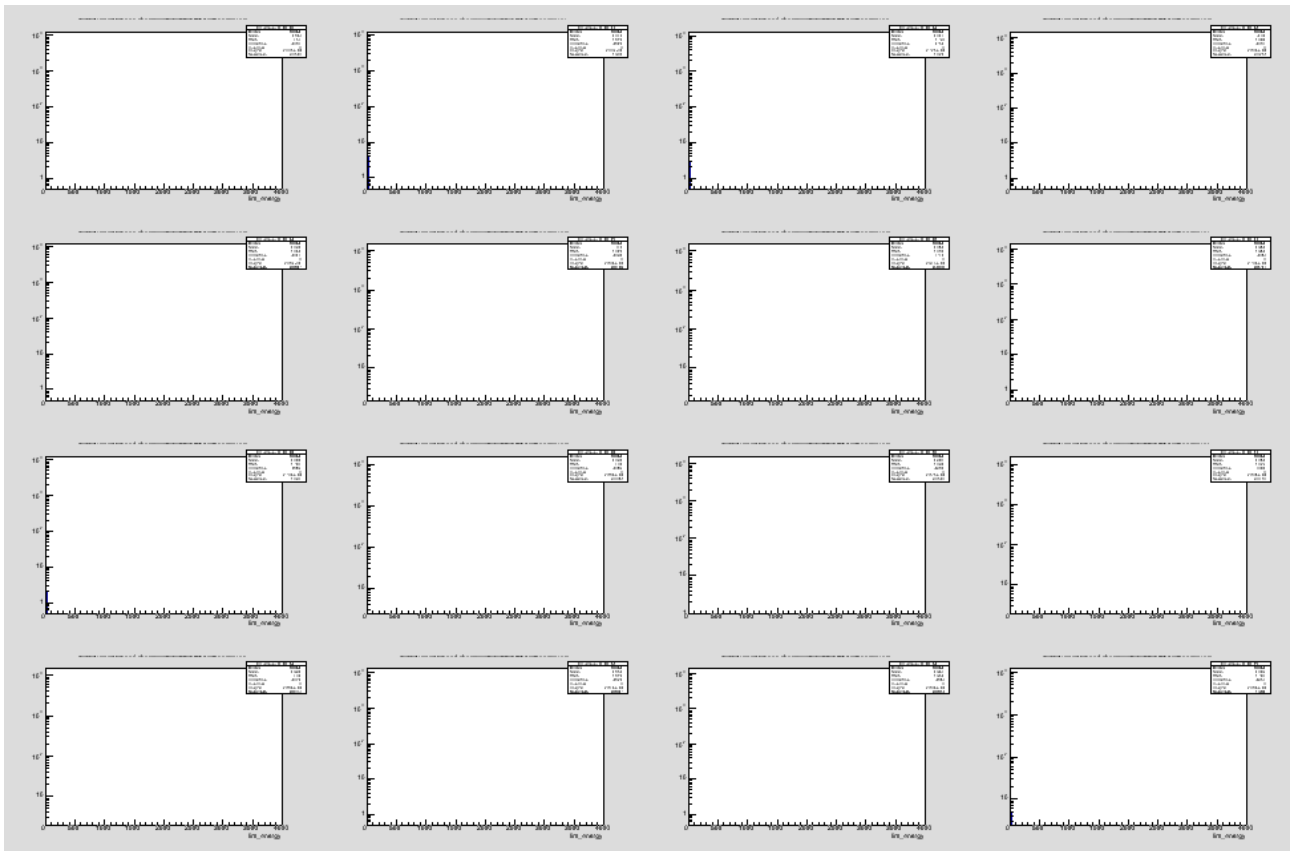


Abbildung 39: Preamp 9, card 1, all channels, Na22 source no pulser.

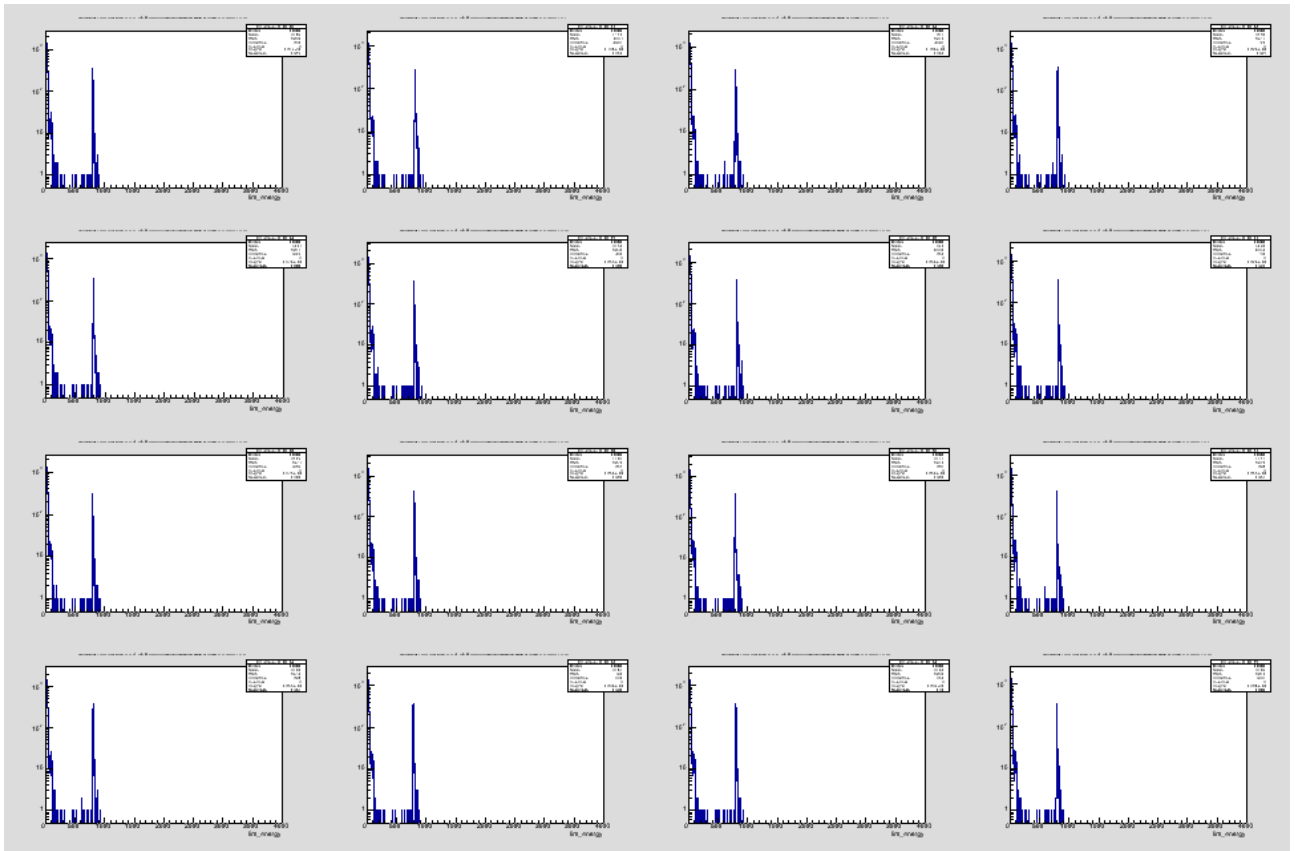


Abbildung 40: Preamp 9, card 1, all channels, Na22 source with pulser.

## 0.2.11 Preamp 10

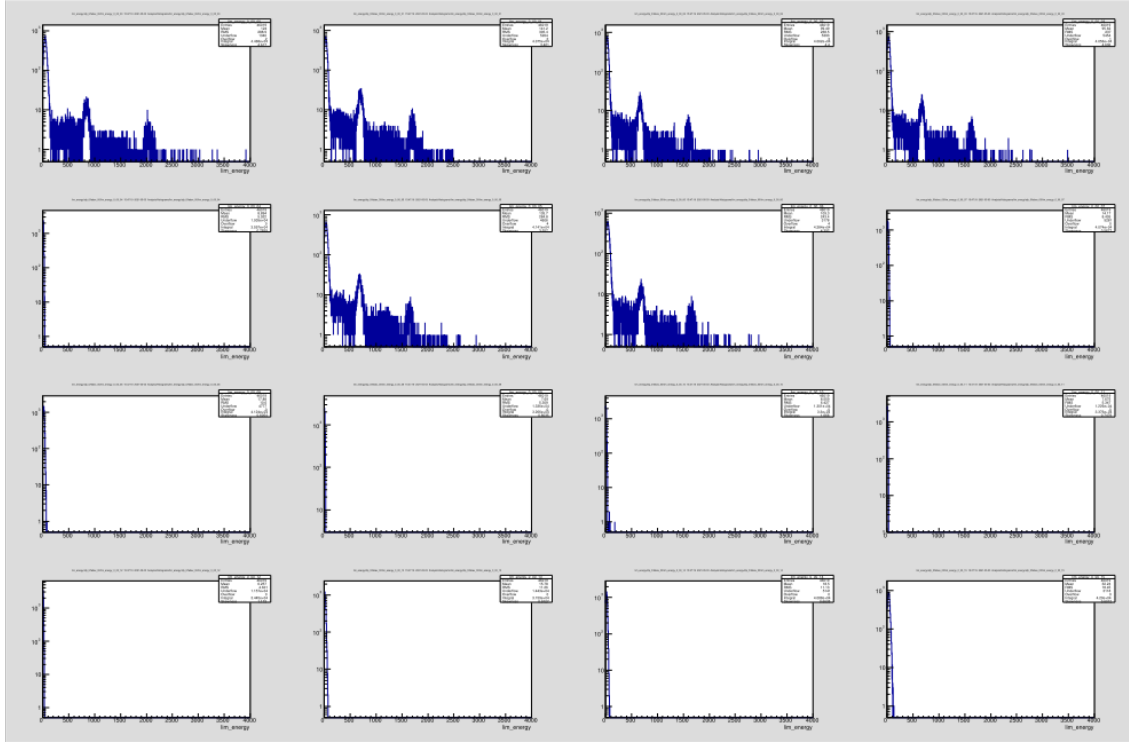


Abbildung 41: Preamp 10, card 0, all channels, Na22 source no pulser.

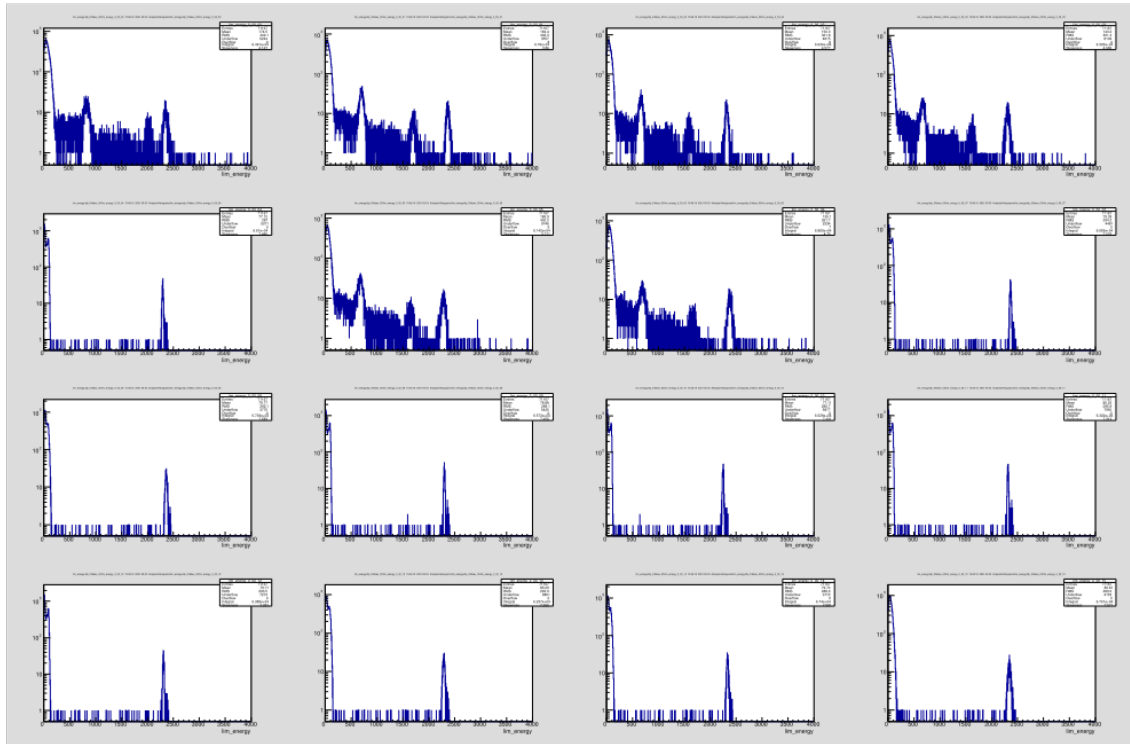


Abbildung 42: Preamp 10, card 0, all channels, Na22 source with pulser.

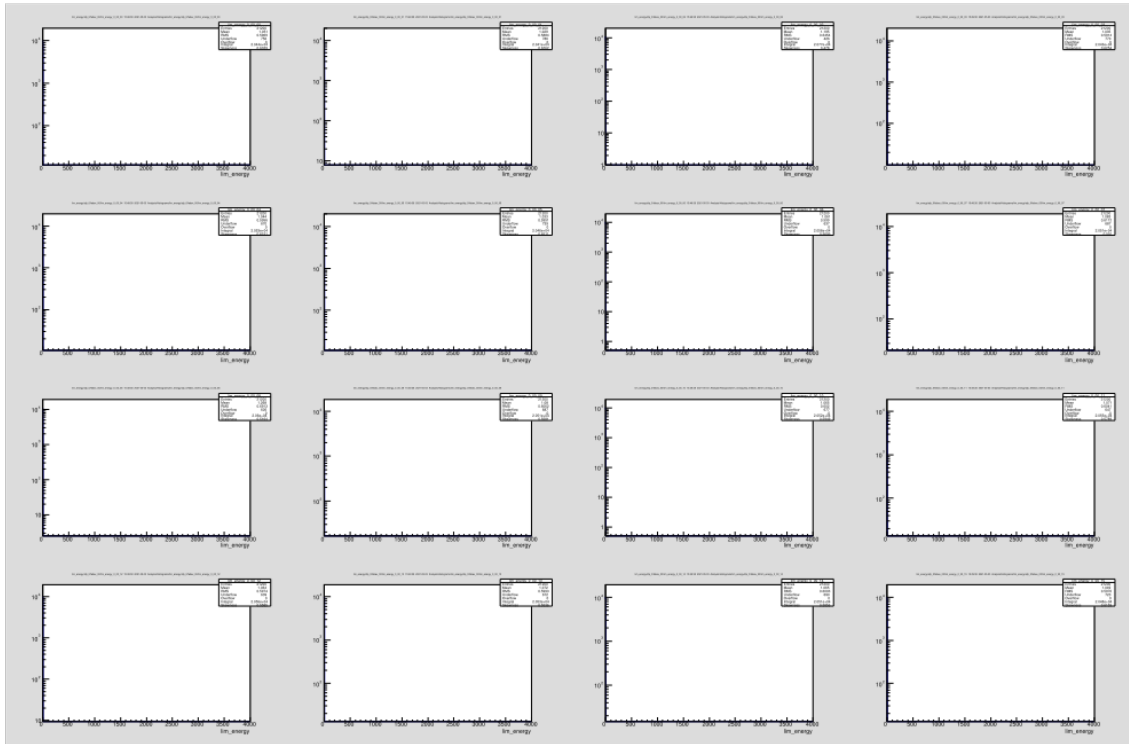


Abbildung 43: Preamp 10, card 1, all channels, Na22 source no pulser.

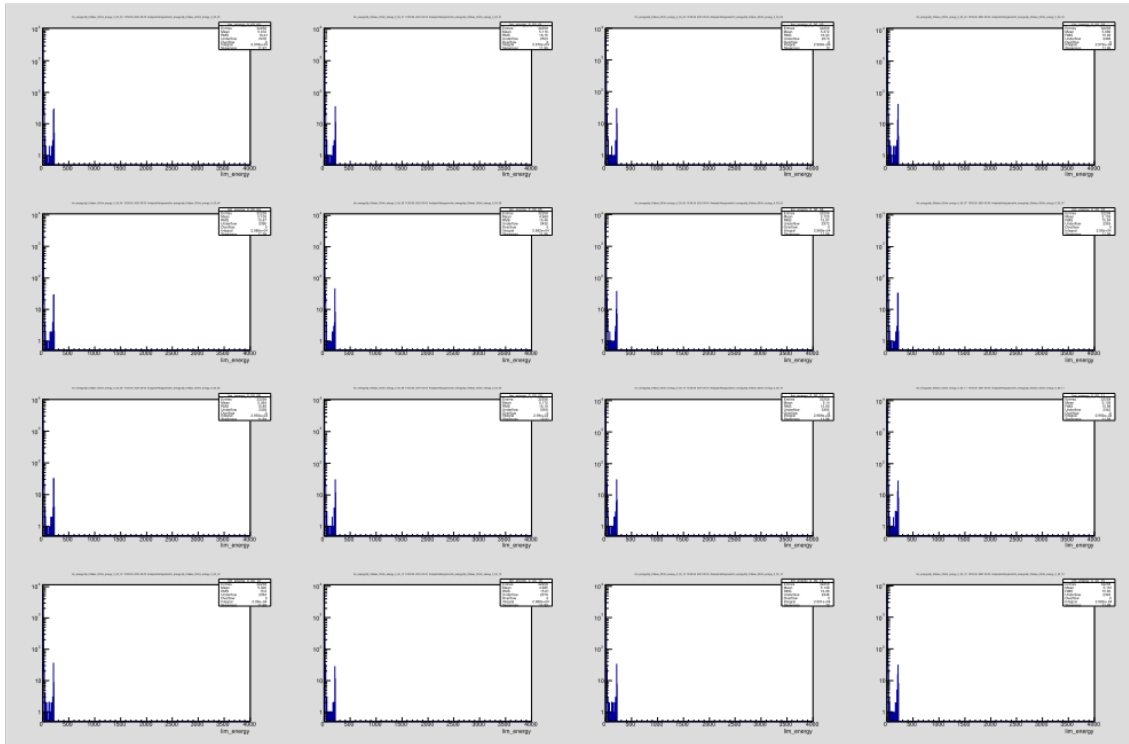


Abbildung 44: Preamp 10, card 1, all channels, Na22 source with pulser.

## 0.3 Summary

Preamp 1, seems to be noisy in both cards (0,1), bad resolution.

Preamp 2 seems to be ok.

Preamp 3 seems to be ok.

Preamp 4 seems to be ok. The power supply plug misses one screw. This has to be replaced.

Preamp 5, card 0: here we have missing channels 5 and 9. Everything else ok.

FOPRA Preamp, card 1: channel 10 noisy/broken (for the FOPRA this is irrelevant).

Over the whole testing period no RCBUS interference effects were observed.

## 0.4 Updated Summary

Preamp 1, seems to be noisy in both cards (0,1), bad resolution.

Preamp 2 seems to be ok. It's used for FOPRA

Preamp 3 seems to be ok. It's now at the GSI

Preamp 4 seems to be ok. It's now at the GSI

Preamp 5, card 0: here we have missing channels 5 and 9. Everything else ok.

FOPRA Preamp, card 1: channel 10 noisy/broken (for the FOPRA this is irrelevant).

Preamp 6, card 0: 9,10,11,12,15 channels are noisy. card 1: 7,8,9,10,11,12,15 channels are noisy.

Preamp 7, card 1: 0,7,8,10,13,14,15 channels are noisy

Preamp 8, card0: 8,9,10,11,12,15 channels are noisy. card1: all channels noisy

Preamp 9 seems to be ok.

Preamp10,card 0: 10,11,15 channels noisy.