Status of the SiWECal TB preparation

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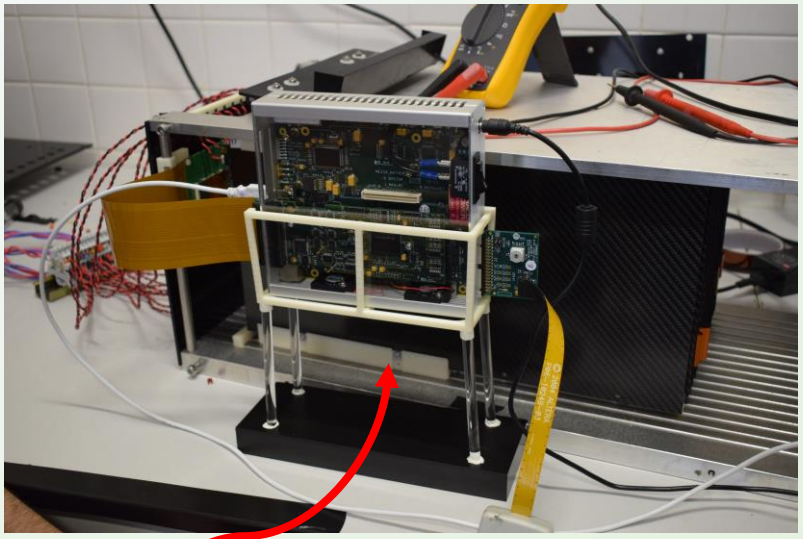
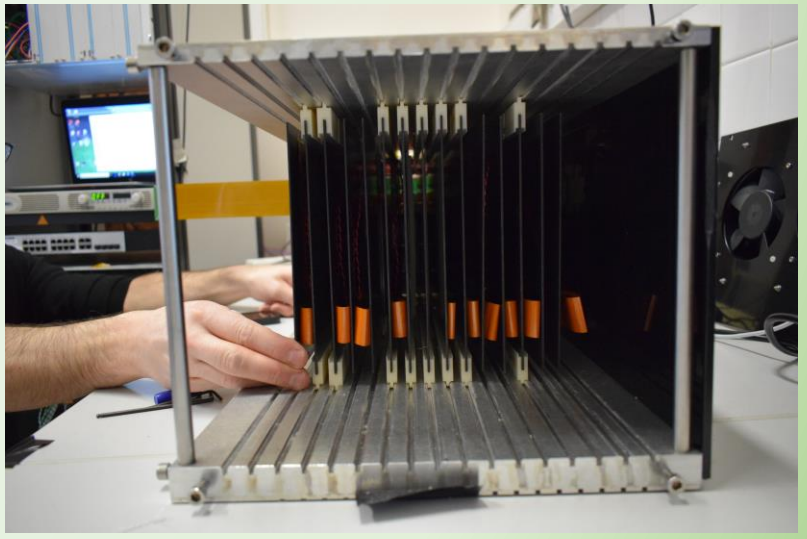
LABORATOIRE DE L'ACCÉLÉRATEUR LINÉAIRE

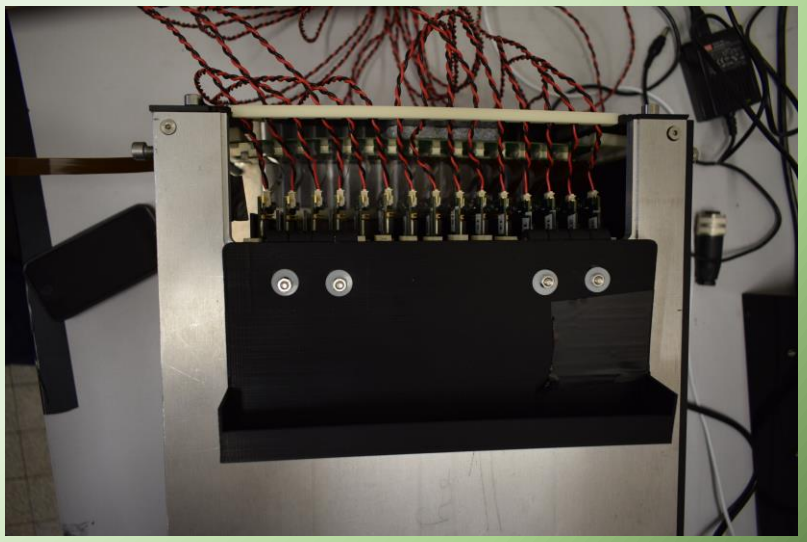
SiW-ECal prototype

A total of 15 layers were installed inside the prototype's box without the absorber (Tungsten) for commissioning.



Control and DAQ card for all slabs

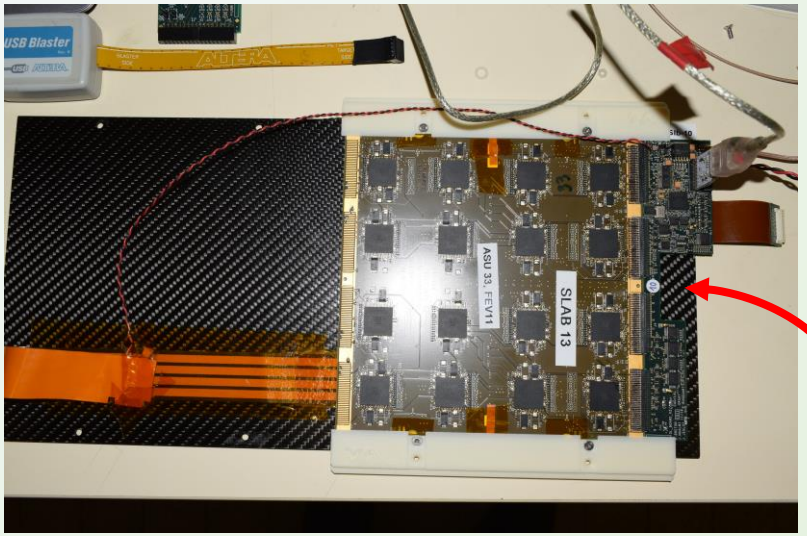




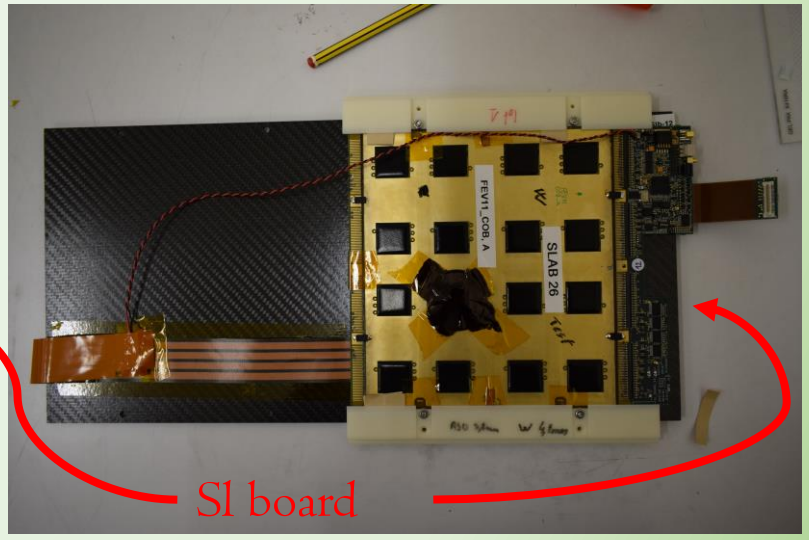
SiW-ECal prototype

Two types of slabs were prepared for the TB:

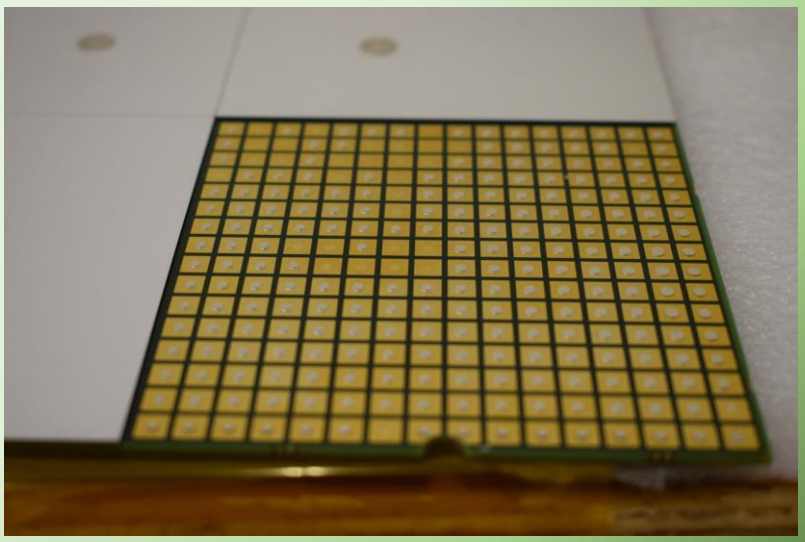
FEV



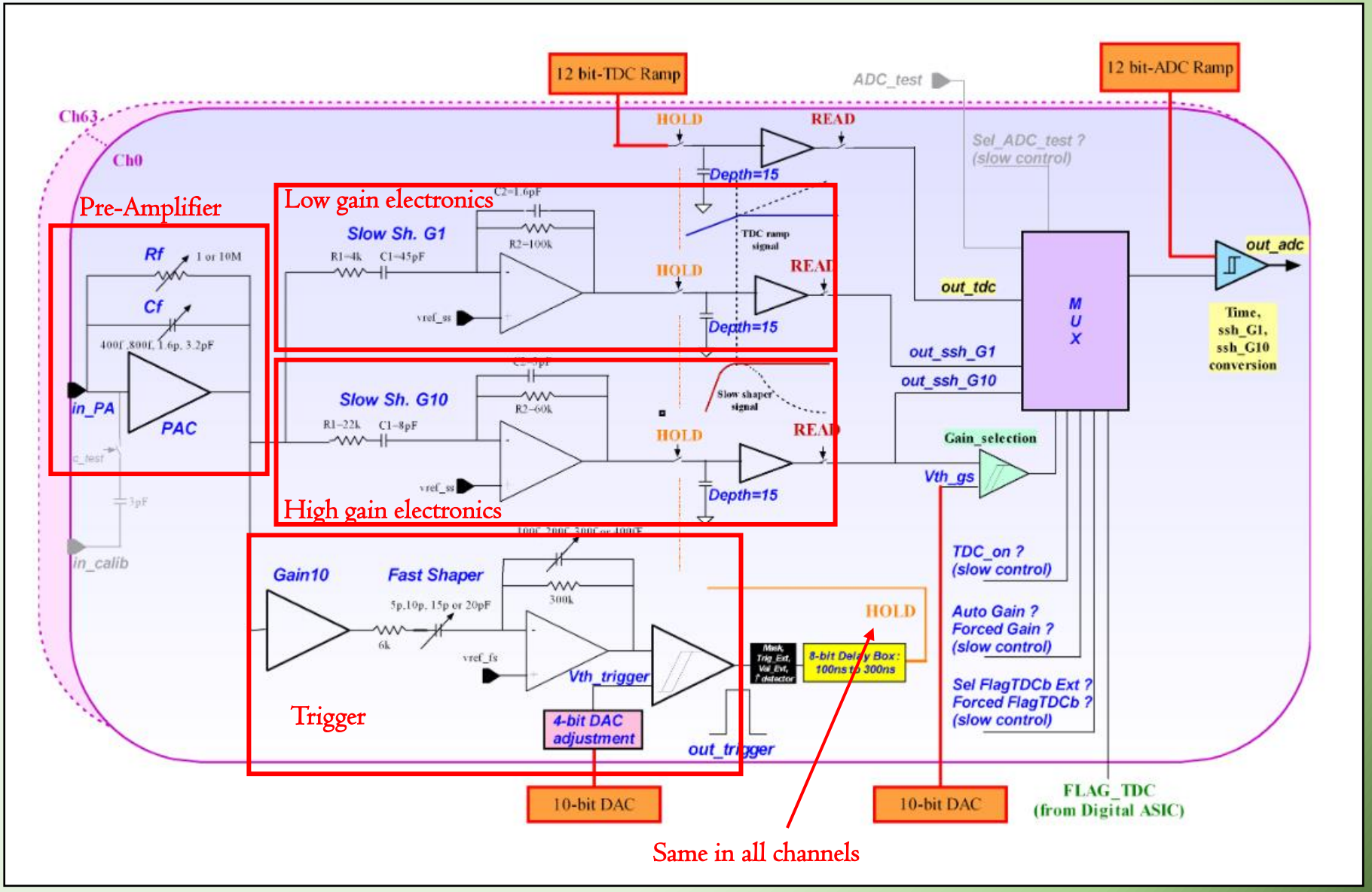
COB



Each slab has 4 silicon wafers with 4 chips per wafer making a total of 16 chips in a slab. A chip controls 64 PIN diode channels. For each channel there are 15 memory cells.

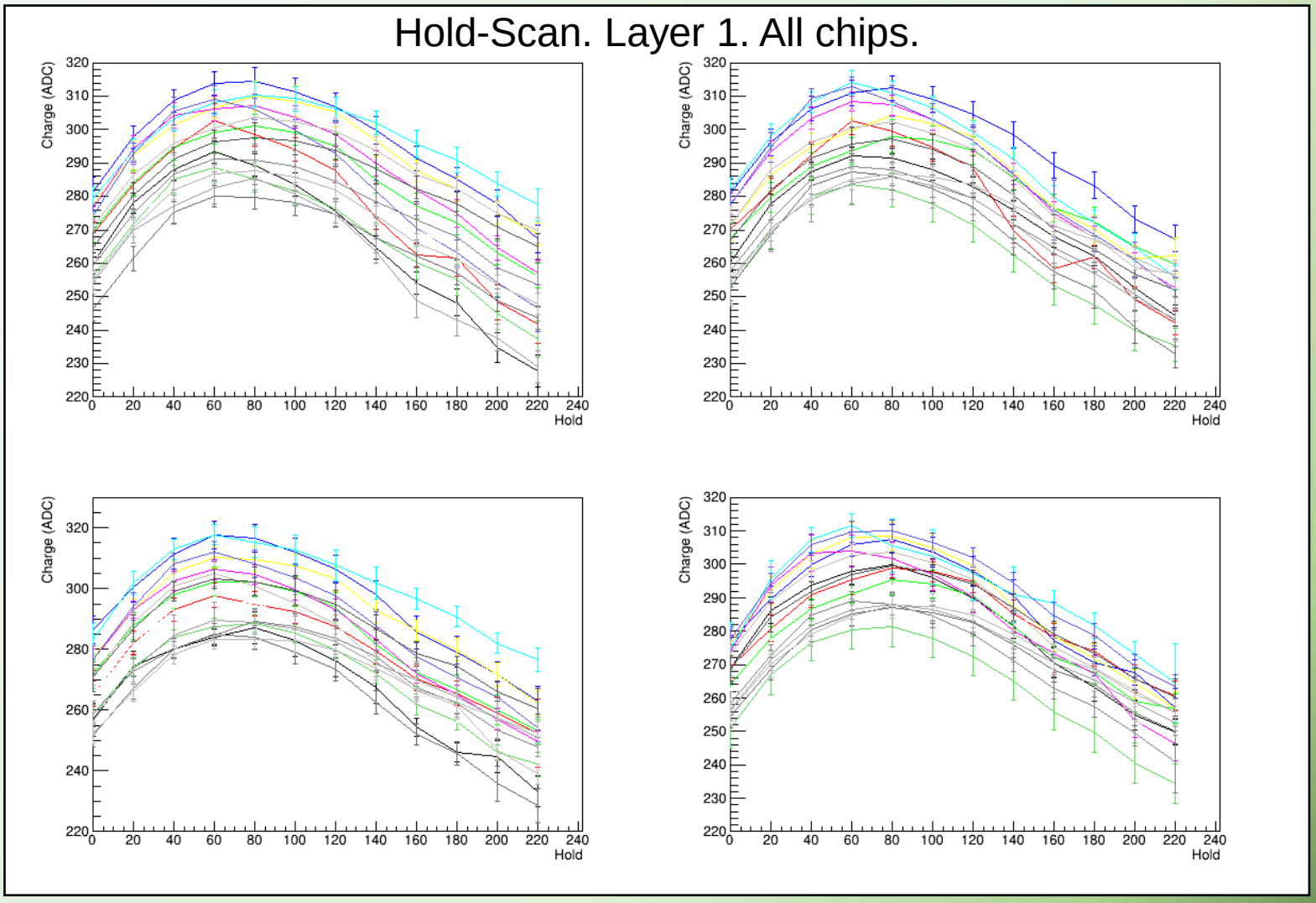


SKIROC: Silicon pin Kalorimeter Integrated ReadOut Chip



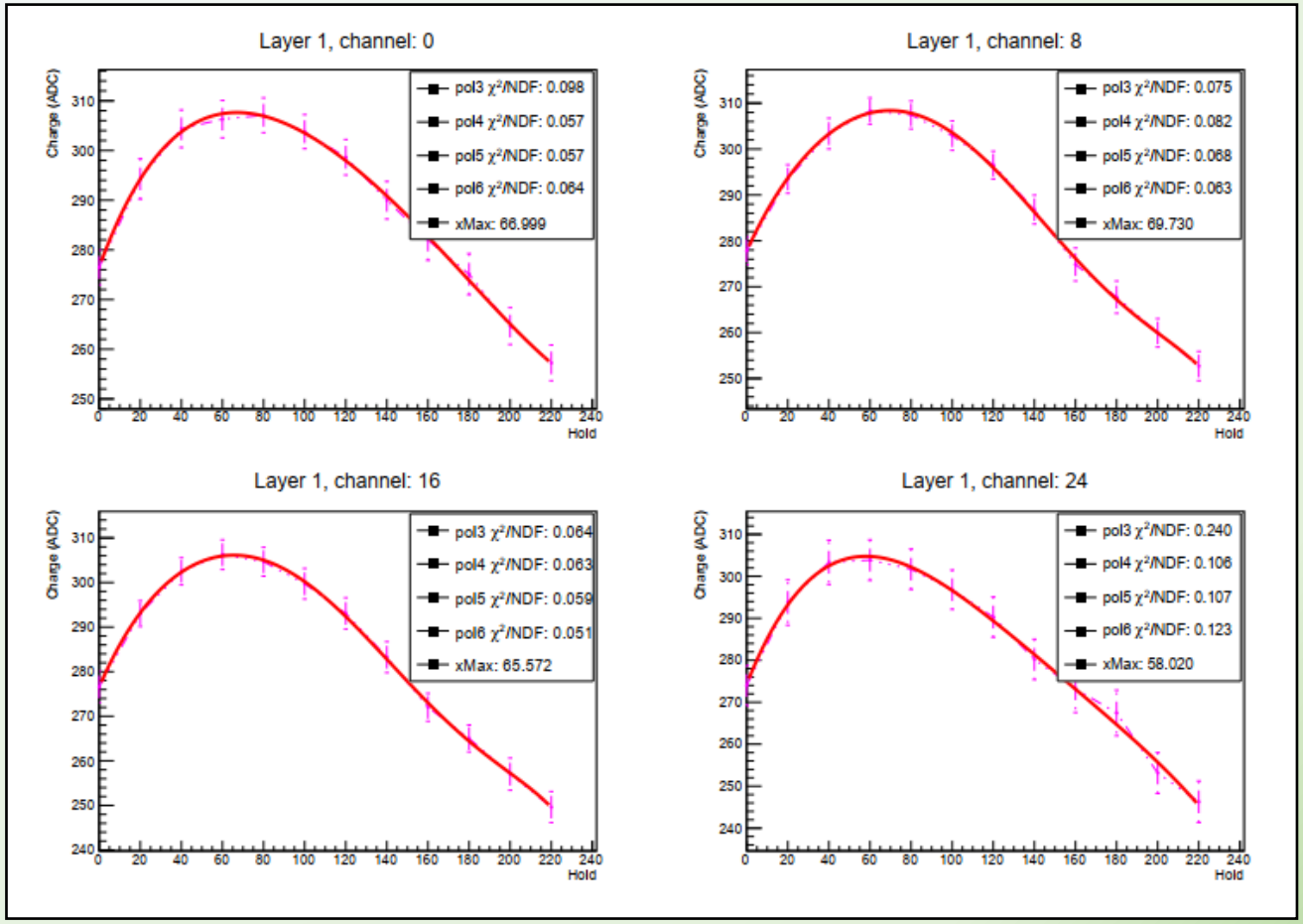
SiW-ECal. Hold-Scan

For each chip an optimal value of the hold needs to be found. To do that a small charge (1 MIP approx.) is injected for different values of the hold.



SiW-ECal. Hold-Scan fits

The hold scan is then fitted to a polynomial function to find the maximum and the selected optimal hold value is the mean for all channels.

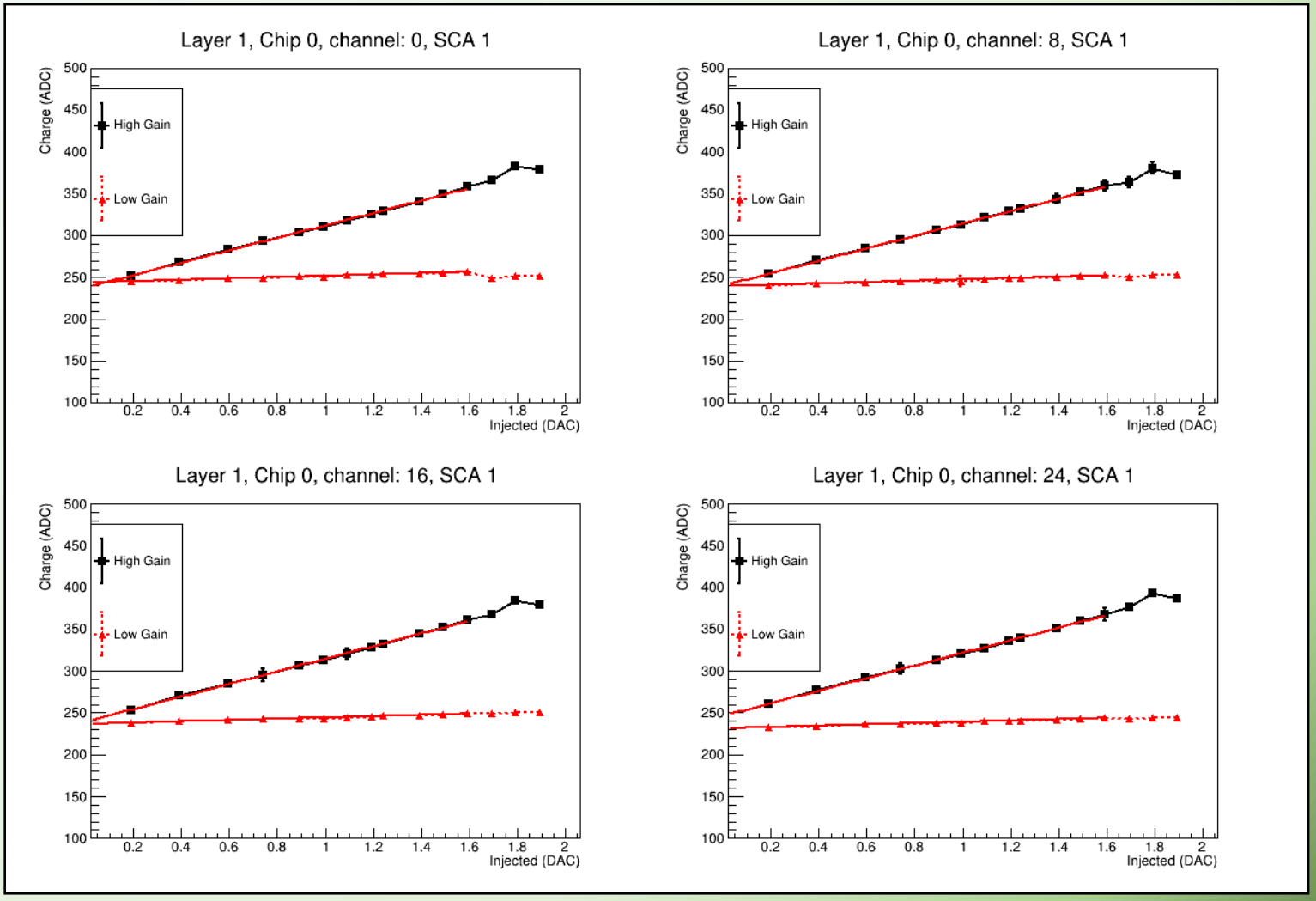


Output File

```
#hold scan results: 20200226_dac1.15V_chn0to3
#layer chip hold error fitfunc
0 0 74.8123 1.59259 pol6 pol6 pol4 pol5
0 1 72.0559 4.10285 pol3 pol5 pol5 pol4
0 2 81.5356 7.04917 pol4 pol3 pol6 pol4
0 3 94.0402 3.99469 pol4 pol4 pol6 pol4
0 4 140.216 89.7758 pol3 pol6 pol5 pol6
0 5 62.1894 1.8918 pol3 pol5 pol3 pol3
0 6 95.1555 33.5164 pol5 pol6 pol5 pol5
0 7 89.6917 59.6565 pol6 pol6 pol3 pol3
0 8 62.11 2.26285 pol3 pol6 pol6 pol5
0 9 73.5652 1.5959 pol4 pol5 pol6 pol6
0 10 78.8351 8.41269 pol5 pol3 pol5 pol5
0 11 85.5032 7.4936 pol6 pol3 pol5
0 12 52.2774 51.6465 pol3 pol3 pol6 pol4
0 13 89.2618 51.5803 pol6 pol5 pol6 pol3
0 14 53.2831 30.9809 pol3 pol4 pol6 pol3
0 15 84.4835 6.96193 pol3 pol5 pol5
1 0 71.5066 7.61075 pol5 pol4 pol6 pol6
1 1 72.758 7.48302 pol5 pol5 pol4 pol6
1 2 80.0483 5.66974 pol5 pol6 pol6 pol4
1 3 74.8822 3.10136 pol6 pol3 pol5 pol6
1 4 78.1894 5.80729 pol6 pol4 pol5 pol6
1 5 65.0804 4.34149 pol5 pol6 pol6 pol4
1 6 67.5325 8.91708 pol4 pol5 pol6 pol6
1 7 67.4142 3.37813 pol6 pol4 pol3 pol4
1 8 64.6871 3.79291 pol5 pol6 pol5 pol4
1 9 76.9834 7.14202 pol6 pol5 pol6 pol4
1 10 73.5779 8.15409 pol3 pol6 pol4 pol6
1 11 76.925 5.07873 pol4 pol6 pol5 pol6
1 12 73.0187 4.45532 pol6 pol5 pol5 pol3
1 13 73.8021 8.57451 pol6 pol6 pol6 pol5
1 14 77.2308 3.1157 pol6 pol6 pol5 pol5
1 15 81.8692 4.53601 pol3 pol3 pol3 pol6
2 0 76.2857 4.46375 pol3 pol3 pol5 pol3
2 1 77.6629 2.80281 pol6 pol3 pol4 pol6
2 2 77.1537 2.04207 pol3 pol6 pol5 pol6
2 3 78.6167 2.1476 pol5 pol4 pol5 pol4
2 4 69.2506 1.52198 pol3 pol5 pol5 pol5
2 5 74.0519 5.79192 pol3 pol3 pol6 pol3
```

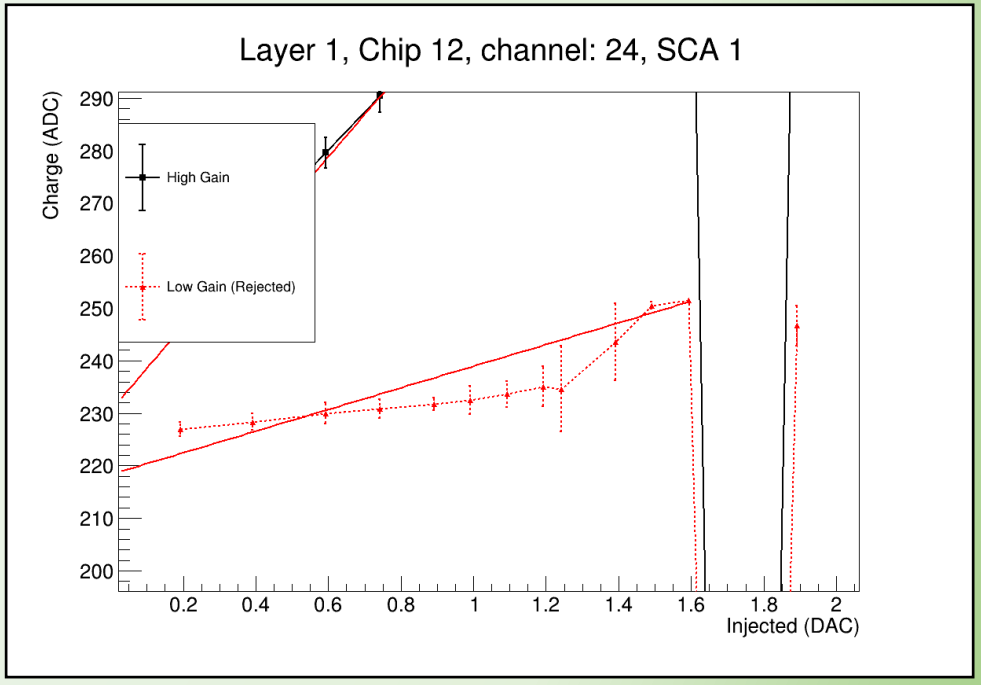
SiW-ECal. Pedestal search

Once the value of the hold is fixed, several different charges are injected. The pedestal is found with the fit to a straight line at zero injected charged. Due to different paths in the electronics there is a pedestal for high and low gains in each channel and memory cell.



SiW-ECal. Pedestal search

The fit is not accepted if it does not satisfy the cut $\frac{\chi^2}{ndf} < 2.5$



Output File

```
#pedestal results (injection fits): calib_02272020_pa1.2fb_trig230_chn0.8.16.24_calib_small
#chip channel ped0 eped0 accept0 ped1 eped1 accept1 ... pedn epedn acceptn (All sca)
0 0 235.865 1.86103 1 238.092 1.956 1 233.201 1.90987 1 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0
0 8 238.306 2.13907 1 240.368 2.12456 1 239.098 2.01358 1 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0
0 16 229.644 1.96574 1 239.45 2.12033 1 230.576 1.82366 1 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0
0 24 249.715 1.8661 1 246.51 2.06078 1 242.225 1.9308 1 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0
1 0 247.631 2.93473 1 244.51 2.69025 1 251.32 1.2188 1 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0
1 8 244.85 2.98707 1 247.957 2.70917 1 243.858 2.97717 1 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0
1 16 243.071 2.48755 1 240.731 2.62854 1 243.665 1.27522 1 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0
1 24 246.145 2.86726 1 247.926 2.57714 1 243.849 1.50373 1 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0
2 0 250.3 2.68712 1 245.25 2.61678 1 250.484 2.2449 1 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0
2 8 248.527 2.35204 1 247.861 2.66272 1 241.681 2.33489 1 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0
2 16 243.225 2.09054 1 251.028 2.12118 1 248.621 1.89492 1 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0
2 24 240.683 4.9099 1 246.499 2.61746 1 243.859 2.19948 1 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0
3 0 262.076 2.9138 1 258.369 2.66202 1 262.558 2.39878 1 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0
3 8 259.073 2.84099 1 257.32 3.40745 1 254.78 3.12229 1 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0
3 16 265.954 3.00395 1 263.652 4.02628 1 261.77 2.27722 1 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0
3 24 250.016 4.08597 1 259.152 2.79807 1 255.022 1.87876 1 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0
4 0 255.681 2.78616 1 258.882 2.43331 1 252.87 2.12294 1 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0
4 8 250.058 2.73019 1 256.85 2.48565 1 242.959 2.3458 1 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0
4 16 257.55 2.69122 1 252.699 2.29148 1 256.283 2.04818 1 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0
4 24 250.298 2.89936 1 253.966 2.41618 1 257.08 2.318 1 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0
5 0 251.805 2.08078 1 250.937 2.26898 1 250.404 2.89862 1 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0
5 8 250.63 2.23627 1 250.813 2.20684 1 253.233 1.24663 1 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0
5 16 244.369 3.33523 1 250.132 2.22887 1 248.018 3.25031 1 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0
5 24 245.223 3.25388 1 248.05 2.80925 1 251.294 2.58848 1 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0
6 0 254.171 2.85762 1 254.919 2.21959 1 256.734 2.11493 1 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0
6 8 253.944 2.8818 1 255.681 2.31599 1 256.385 2.4267 1 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0
6 16 263.11 2.65723 1 254.488 2.78872 1 260.63 1.64149 1 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0
6 24 251.145 3.54815 1 241.258 2.92942 1 256.843 2.76575 1 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0 0.0 0 0
```

Summary

The output files from the hold-scans and the pedestal search are needed for the event building procedure.

However, these analysis were made with a preliminary test injecting charge in only 4 channels.

Work on hold due to current “situation”:

- Data taking for all channels with the final setup.
- Event building and reconstruction of events.
- Development of a fast and simple event display for debugging.

Back-up