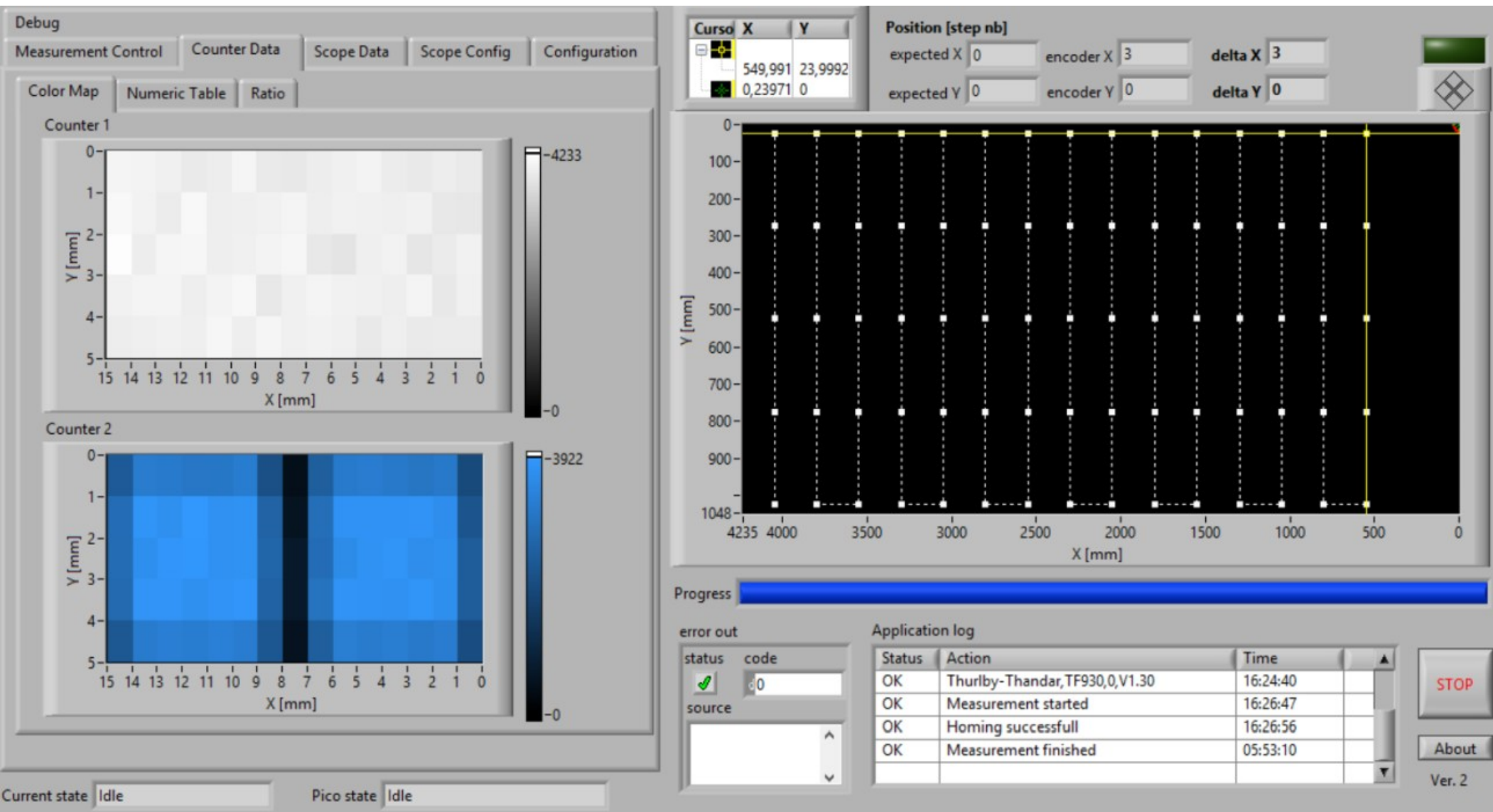


SSD validation in Kraków

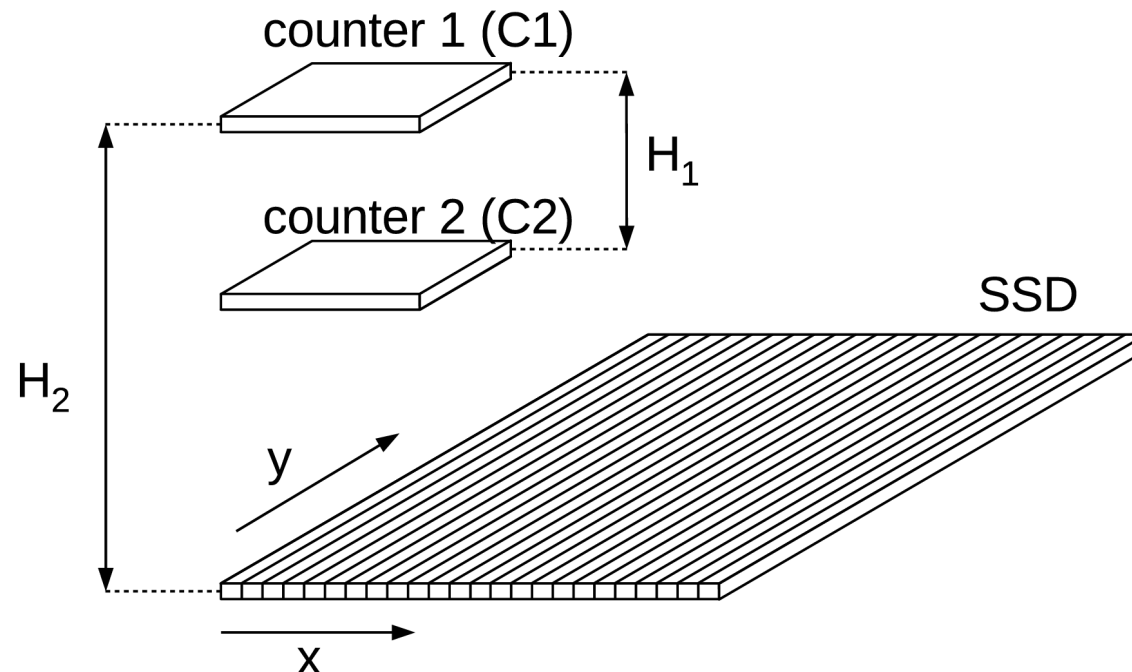


Measurement setup

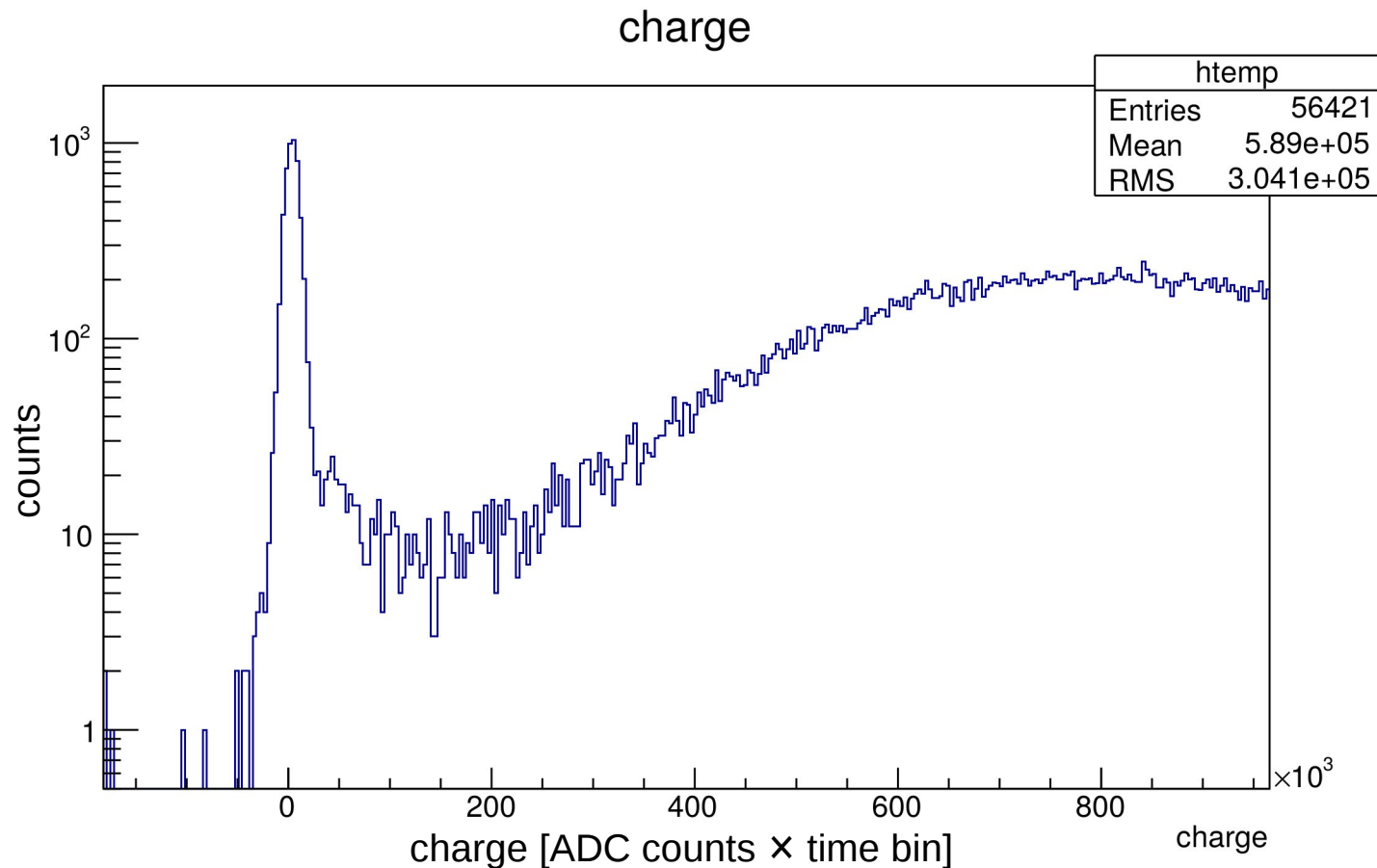
Measurement performed on a dedicated stand, using 2 plastic scintillator detectors (C1, C2), of 25×25 cm area.

Movable mount of the detectors C1 and C2 enables automatic change of positions in the course of measurements.

SSD output read out with Picoscope – currently recording 380 ns long trace (1900 samples of 0.2 ns).



Measurement results – C1-C2 trigger



Histogram of charges from all recorded traces at one position of C1-C2 over SSD

MIP peak at ~800 000 ADC, equivalent to ~280 pVs (at 50 ohms – 5,6 pC)

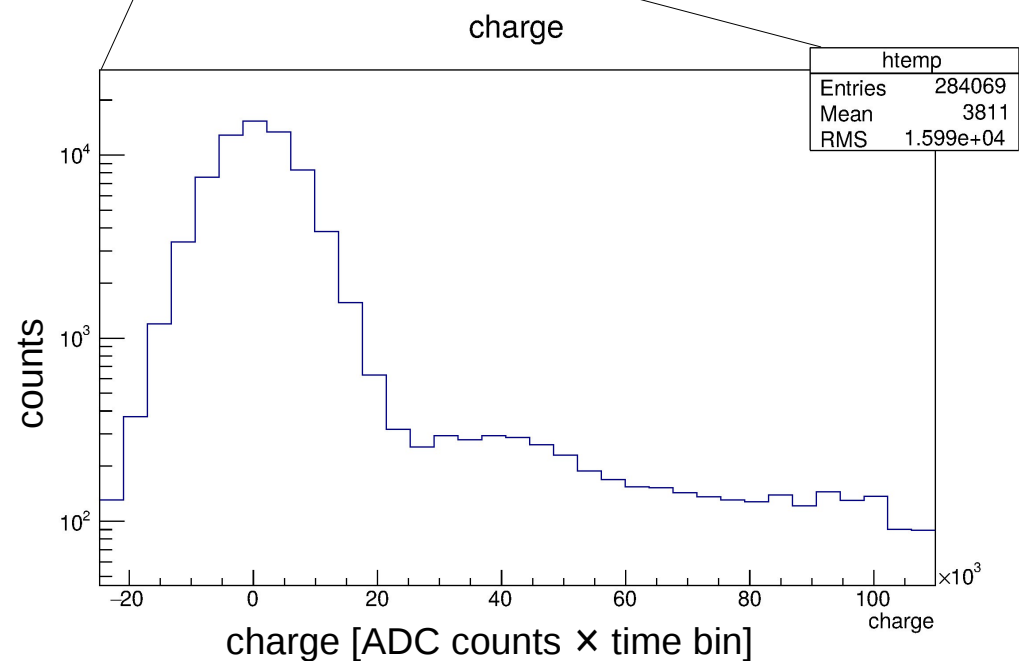
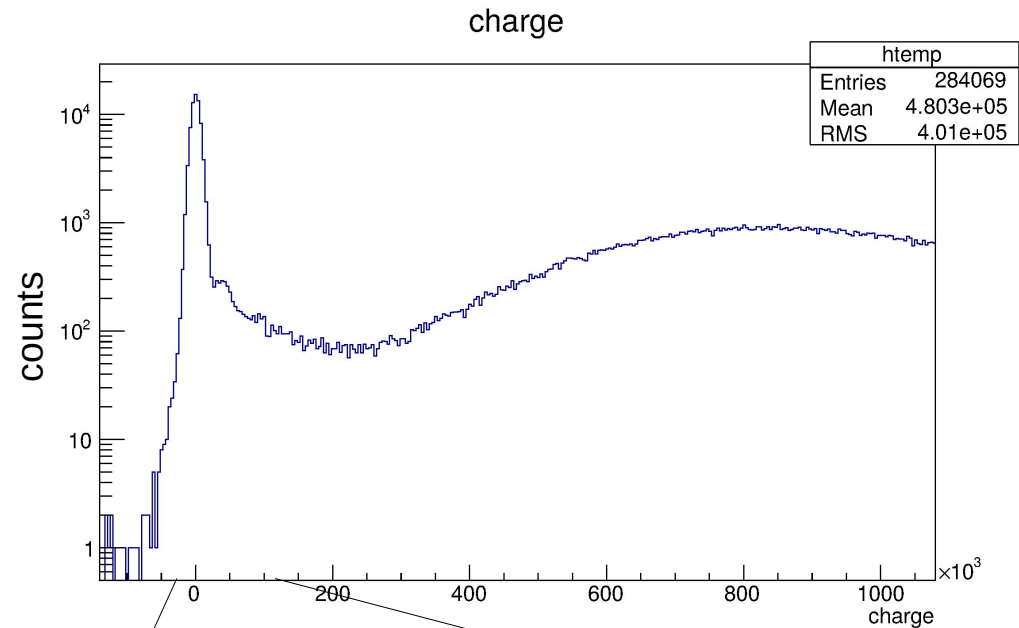
FWHM: ~70%

Measurement results – C1-C2 trigger

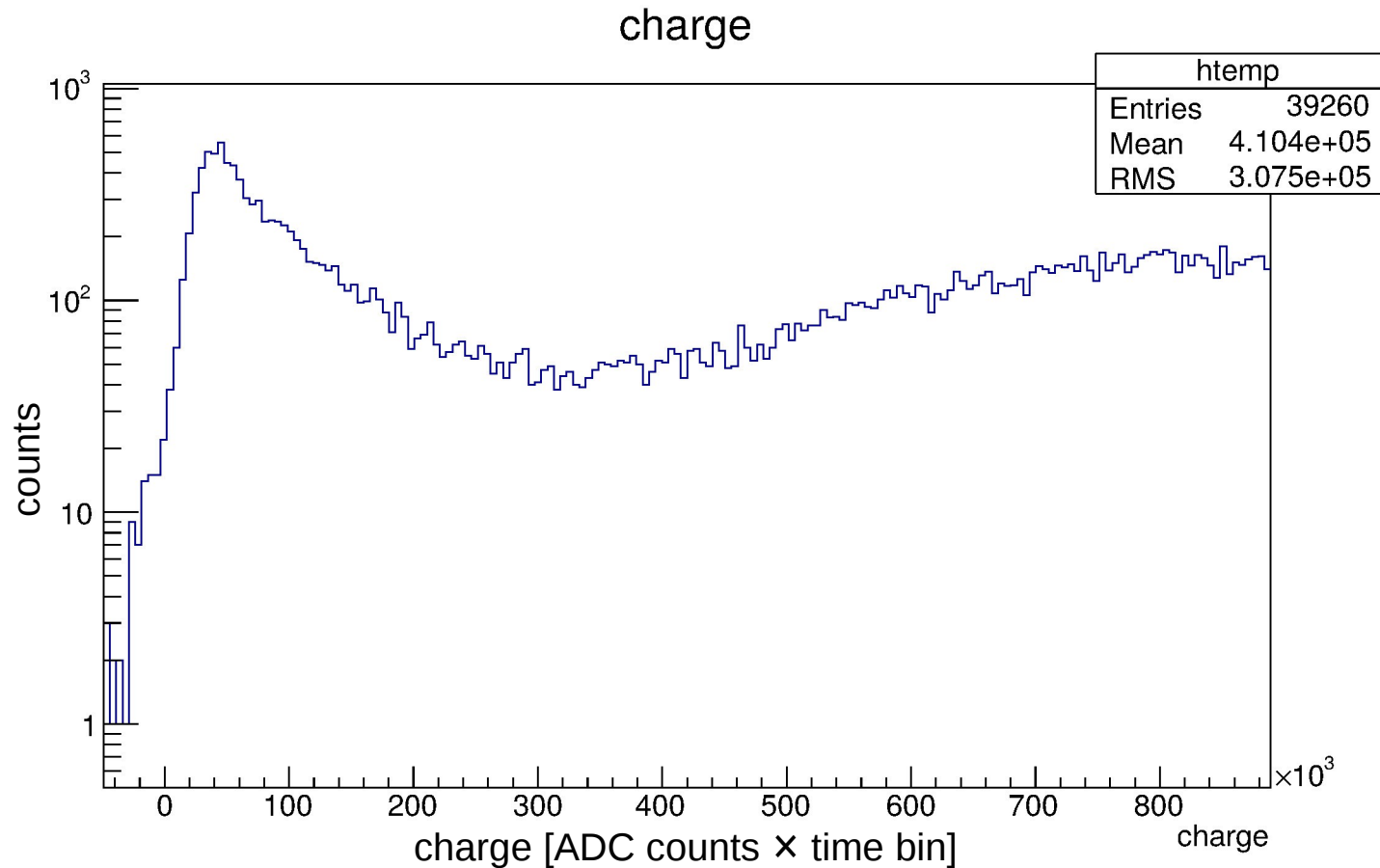
Overnight measurement of the whole area of SSD – higher statistics

Broad peak near zero from electronics noise

No significant SPE signals

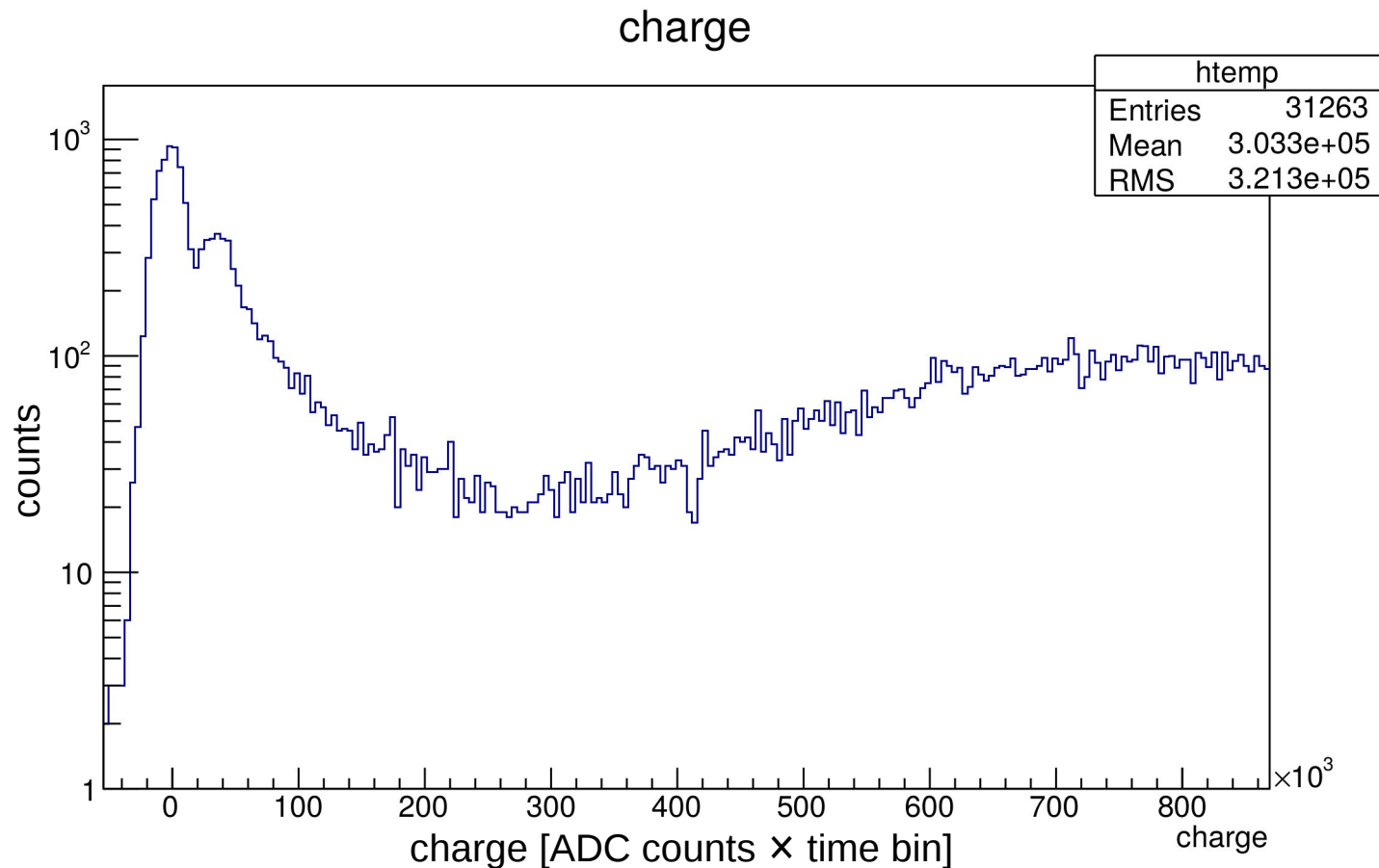


Measurement results – C2-SSD trigger



- SSD signal included into trigger
- electronics noise traces cut out
 - risk of introducing a bias

Measurement results – SSD trigger



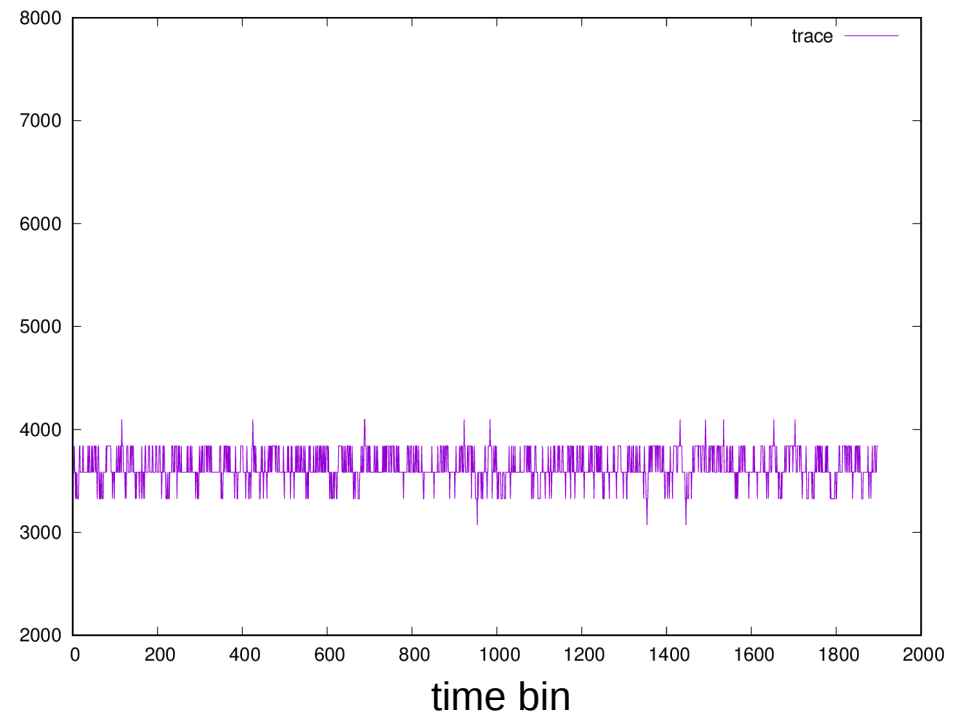
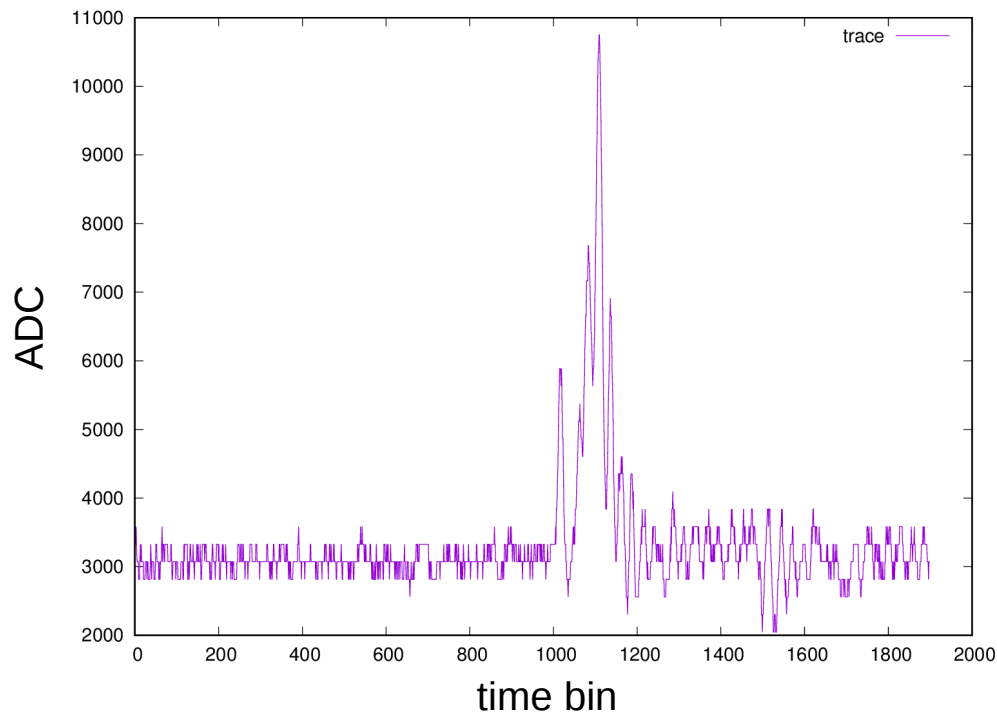
Measurement performed using SSD trigger only – at sufficiently low threshold observed are peaks from SPE and electronics noise

Traces

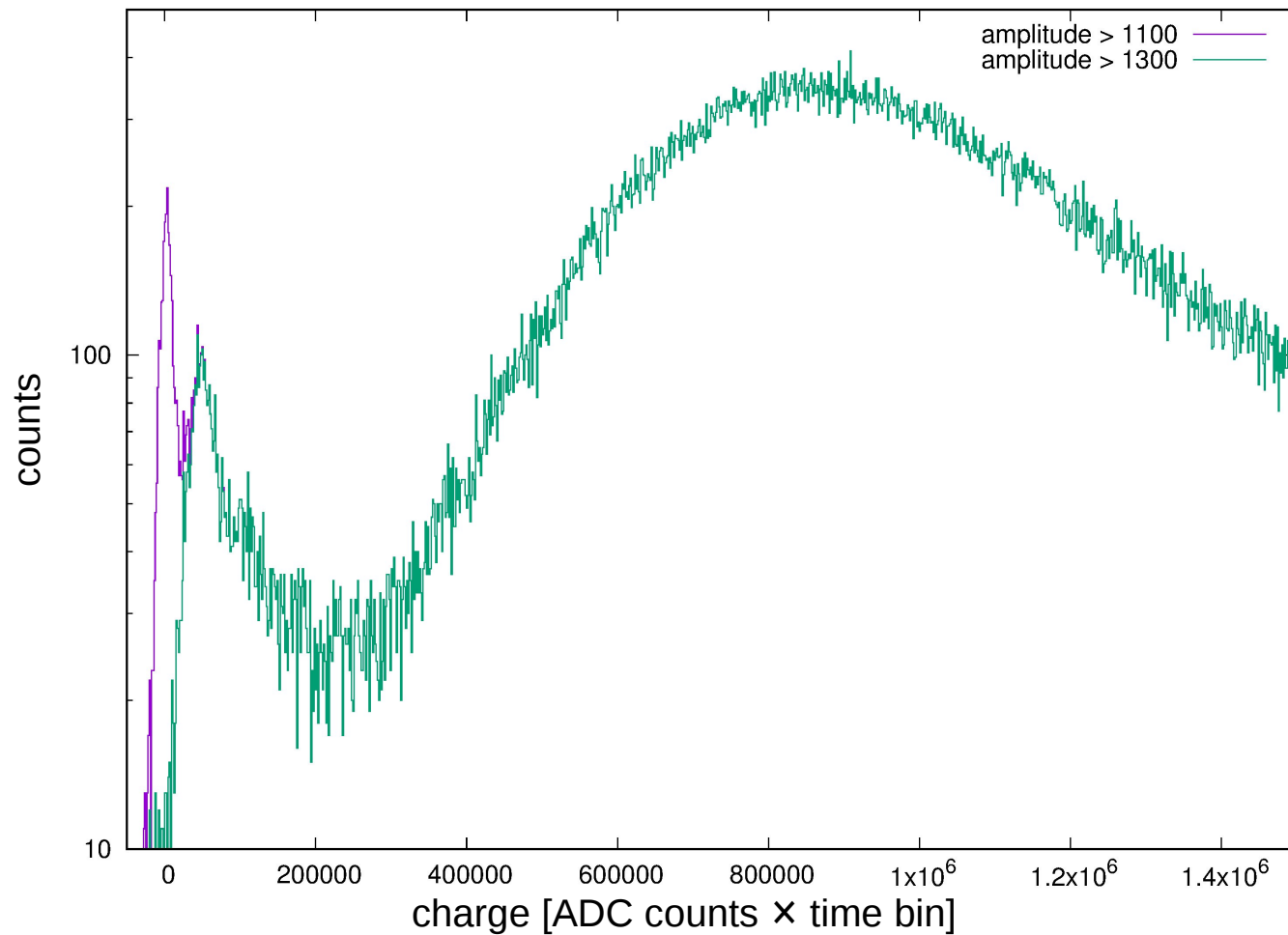
In measurement results there are traces with no peaks – trace selection necessary

Maximal and minimal value in the whole trace are found; if difference smaller than 4 or 5 steps of ADC value – trace excluded

Samples recorded before the maximum value (earlier than 40 ns before the maximum) used for baseline calculation



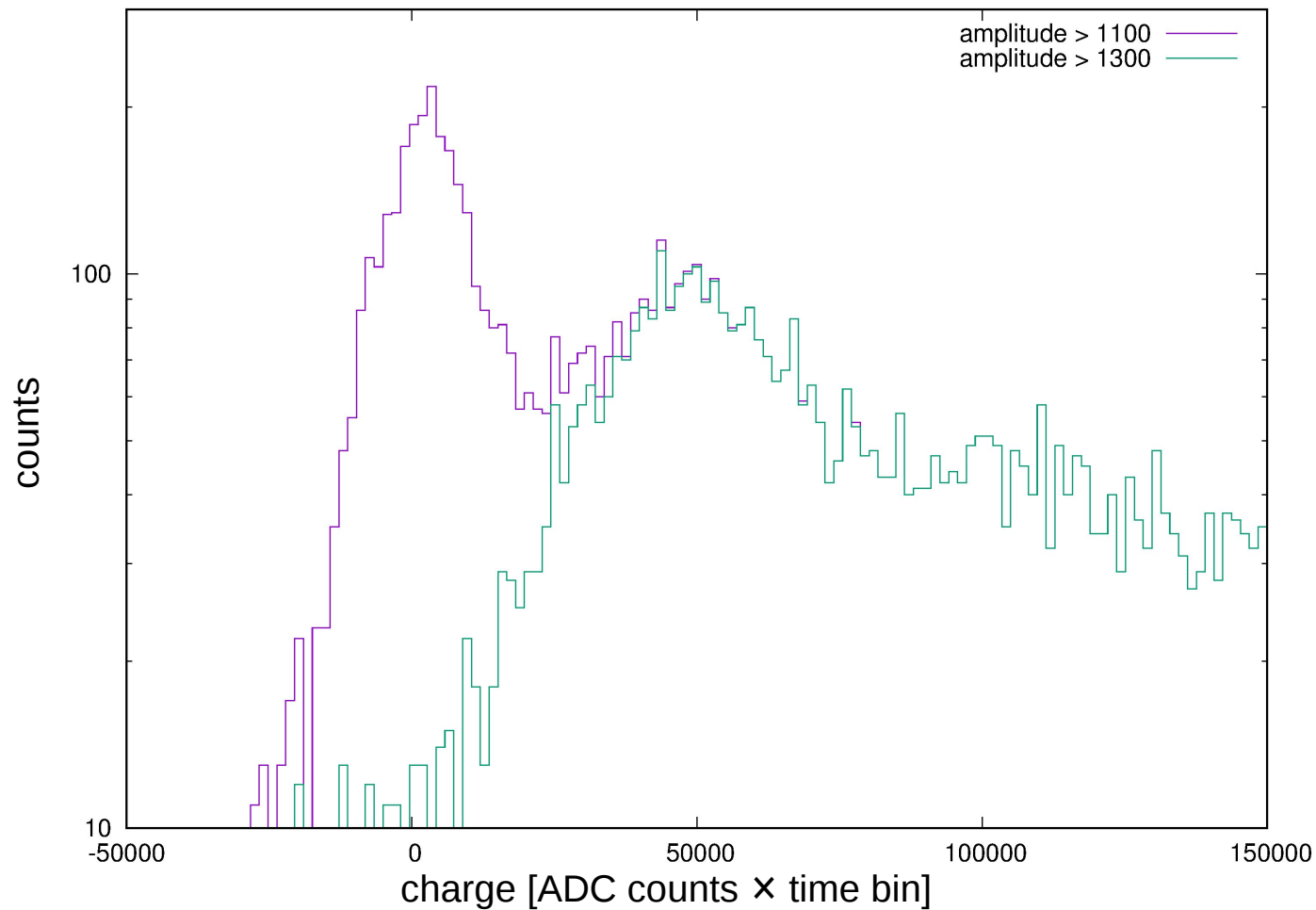
Trace selection



Histogram of selected traces

MIP peak (at $\sim 880\,000$ ADC, $\sigma \approx 280\,000$ ADC) is distinctly present, as before

Trace selection



Selection eliminates most traces with electronics noise
SPE peak visible at ~48 000 ADC ($\sigma \approx 20\,000$ ADC)
MIP/SPE ratio: ~18

Summary

As of now, we did not get satisfying results of SSD tests.

Tests were performed using different SSD units, which otherwise seem fine – it is possible, that some components of the testing setup influence the results (electronics noise, external interference).

We plan to check again the electronics, exchange some components (e.g. cables), and keep testing the setup.