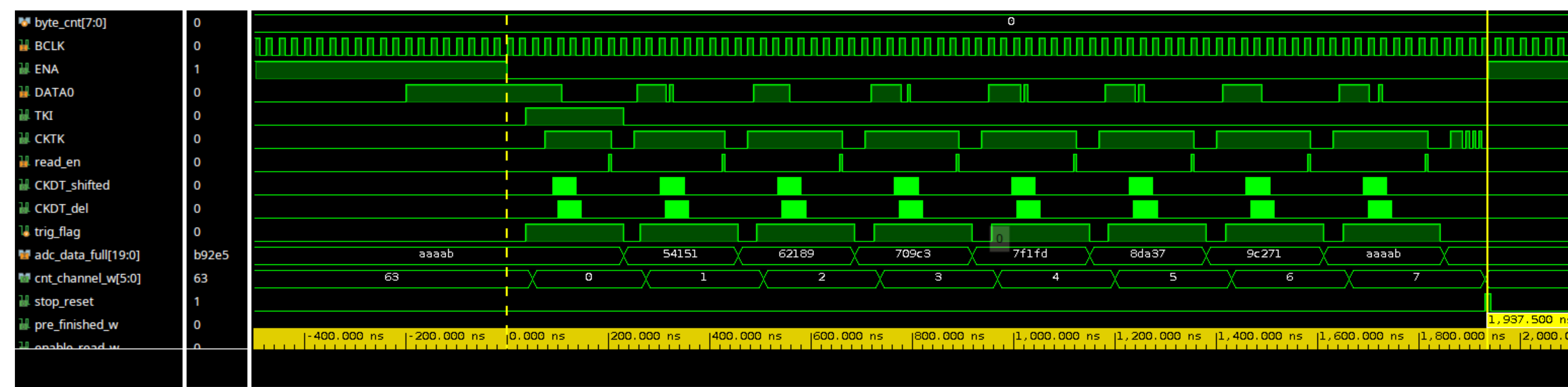


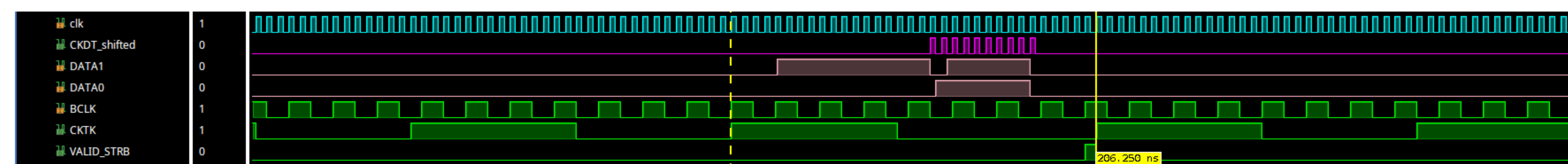
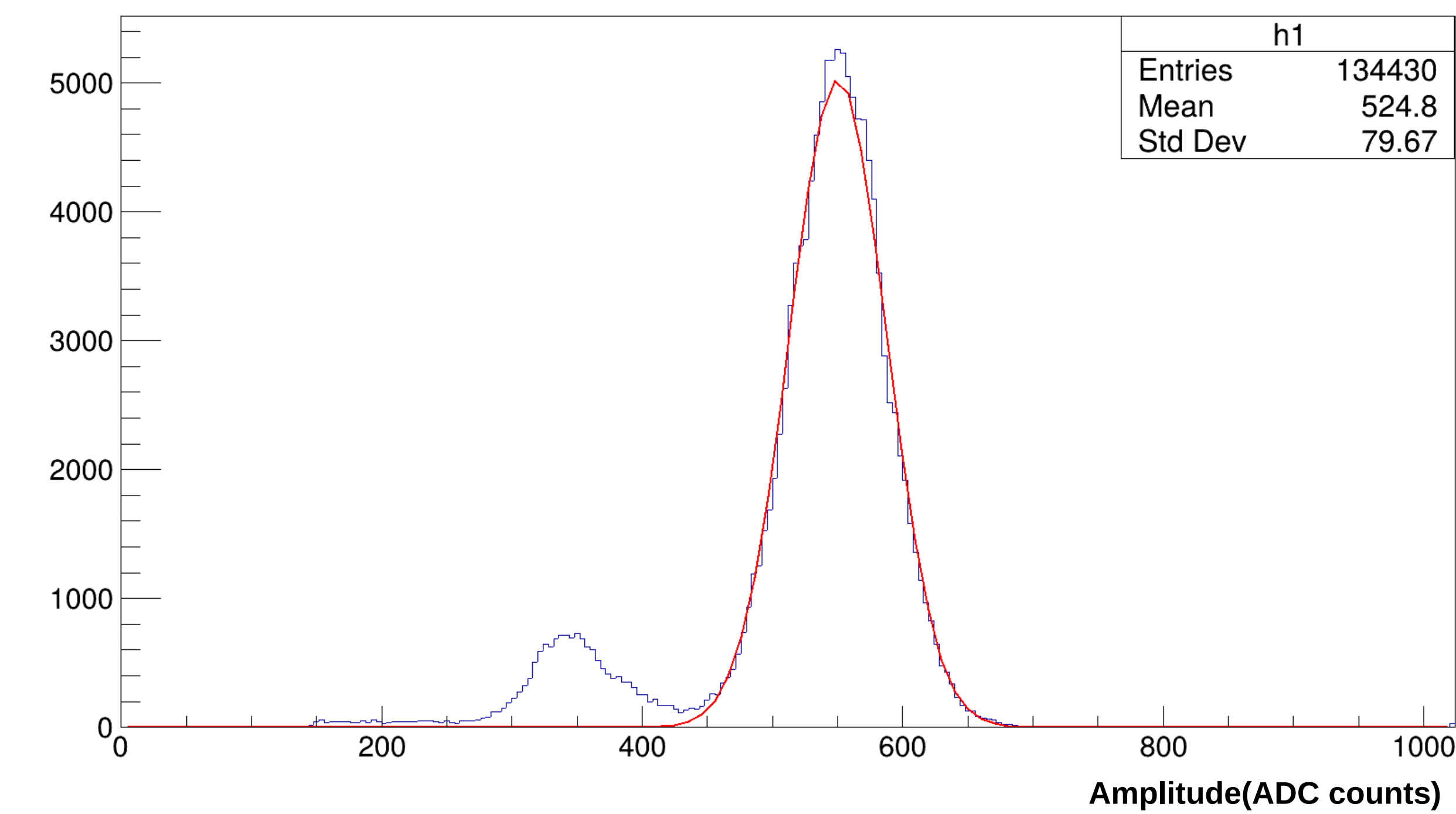
V. Bautin, T. Enik, I. Kapitonov, K. Salamatin, D. Sosnov for the StrawTrackerRD team

The VMM3a is an Application-Specific Integrated Circuit (ASIC), specifically developed for the readout of gaseous detectors. It can be used in two different modes: by using its internal ADC or an external ADC. The internal (continuous) mode provides a higher-speed readout. The main advantage of using the external ADC is that it gives higher precision of measurements. The NICA SPD Stage-1 experiment needs high-precision energy measurements, so we expect to use the external ADC with VMM3a for this stage, while the NICA SPD Stage-2 will have high event rates (up to 200 kHz per channel), so the continuous mode will allow us to achieve higher efficiency.

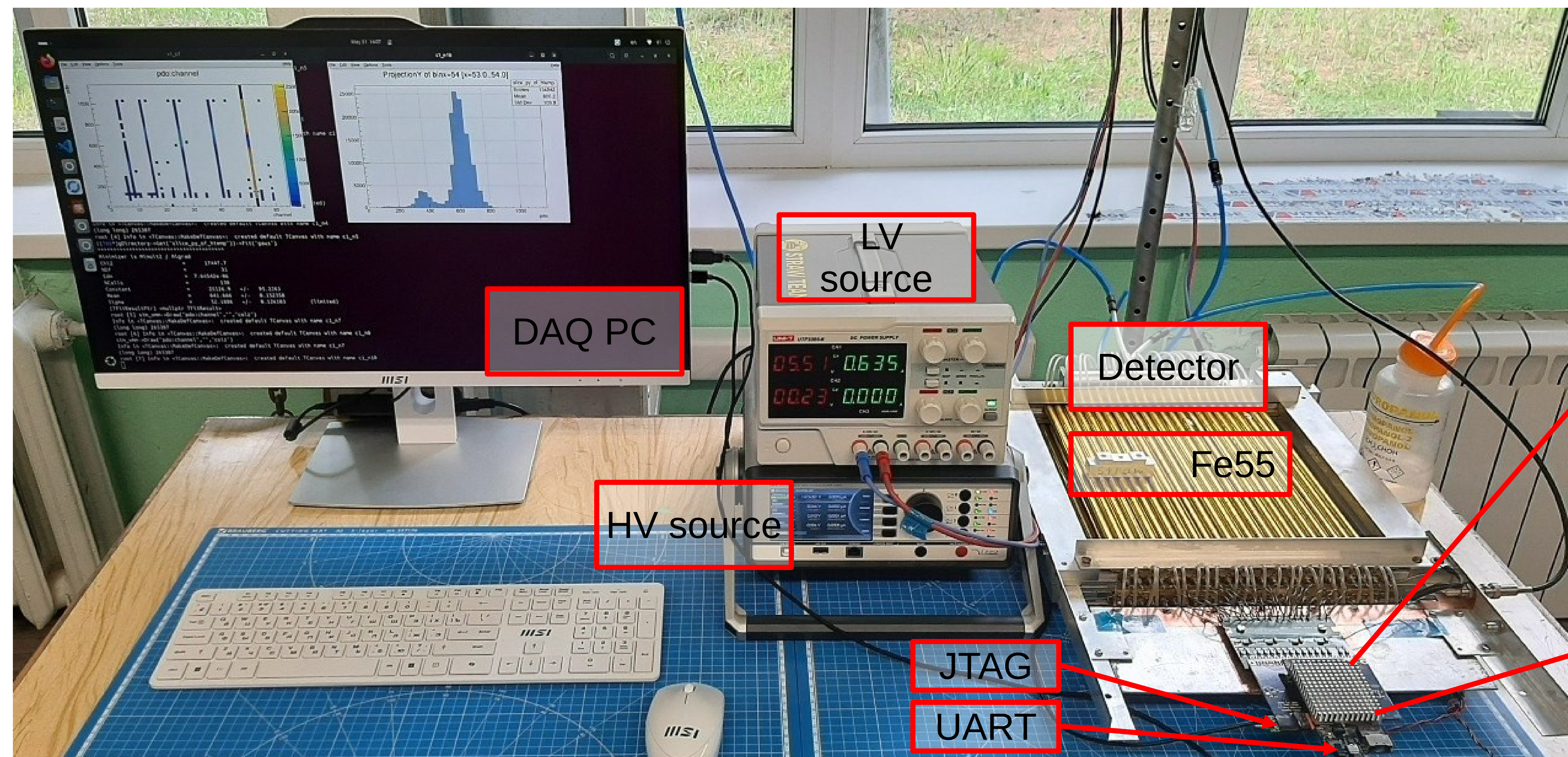
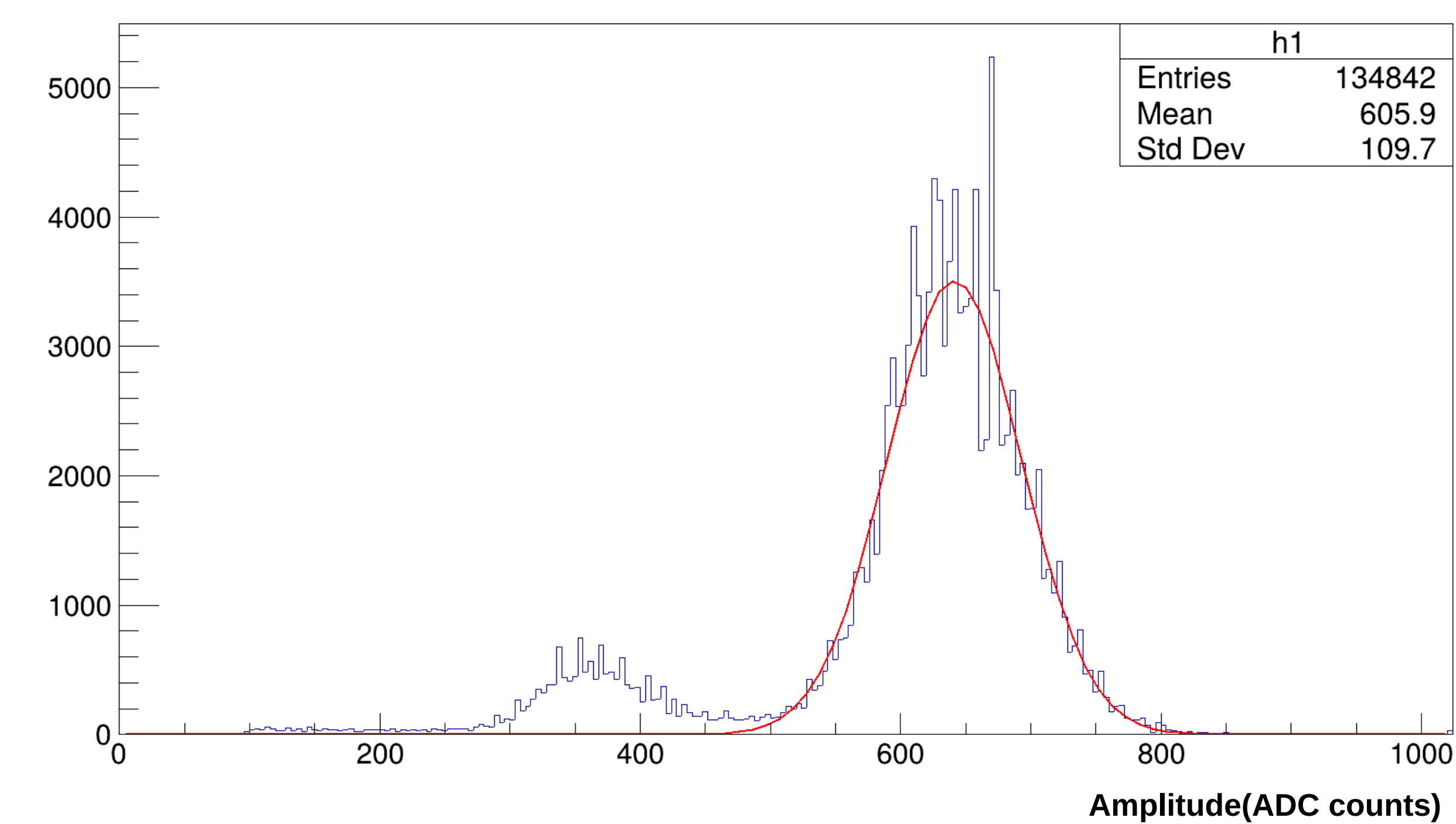
Up to now, we have achieved a readout speed that allows us to process rates of about 600 kHz per chip with the external ADC and about 5 MHz per chip in the continuous mode. The speed of the readout clock of VMM3a in both modes is 160 MHz. We are glad to demonstrate the results for both modes in measurements of the energy spectrum of ^{55}Fe and to show the difference in precision between the two modes.



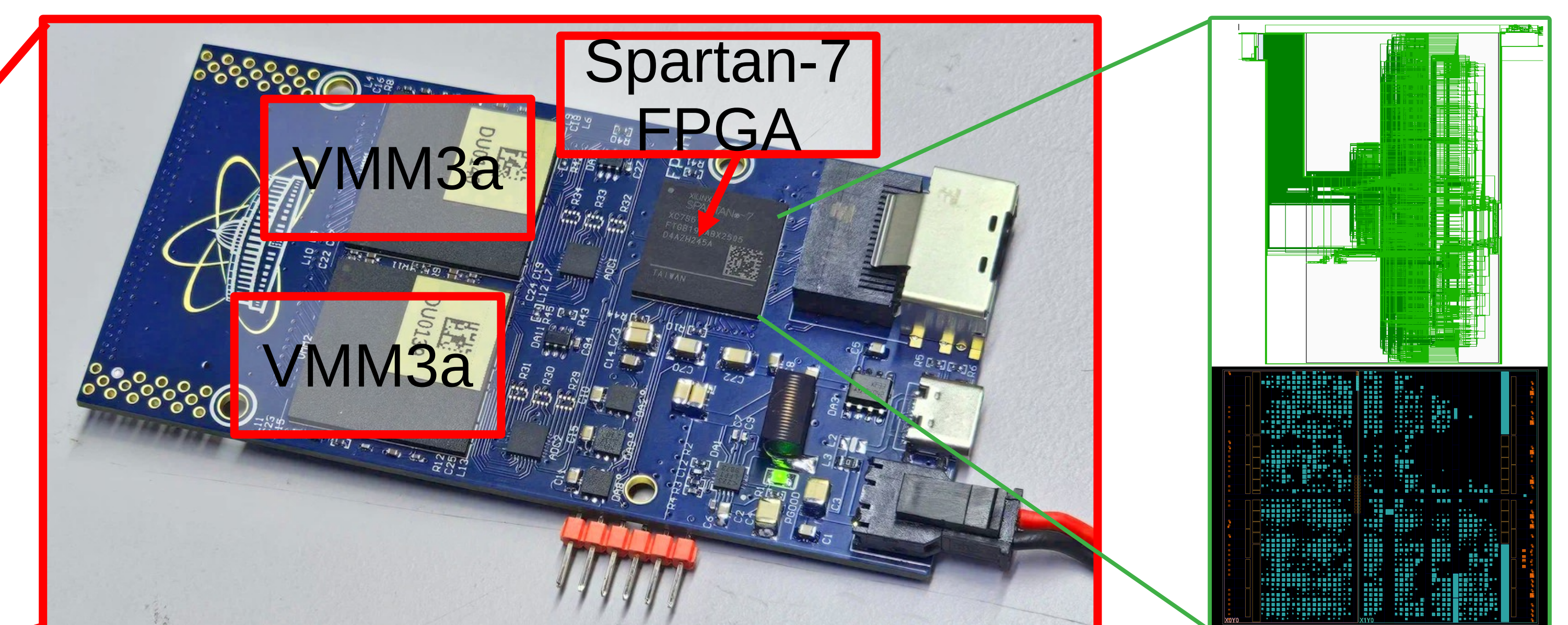
VMM3a readout diagram and ^{55}Fe spectrum with external ADC AD3910



VMM3a readout diagram and ^{55}Fe spectrum with internal ADC (Continuous mode)



Photograph of an R&D set-up



VMM3a readout board

FPGA design

Conclusion

As we can see external ADC gives more precision spectrum. Our next goal is try to achieve more high speed of readout for both modes.