

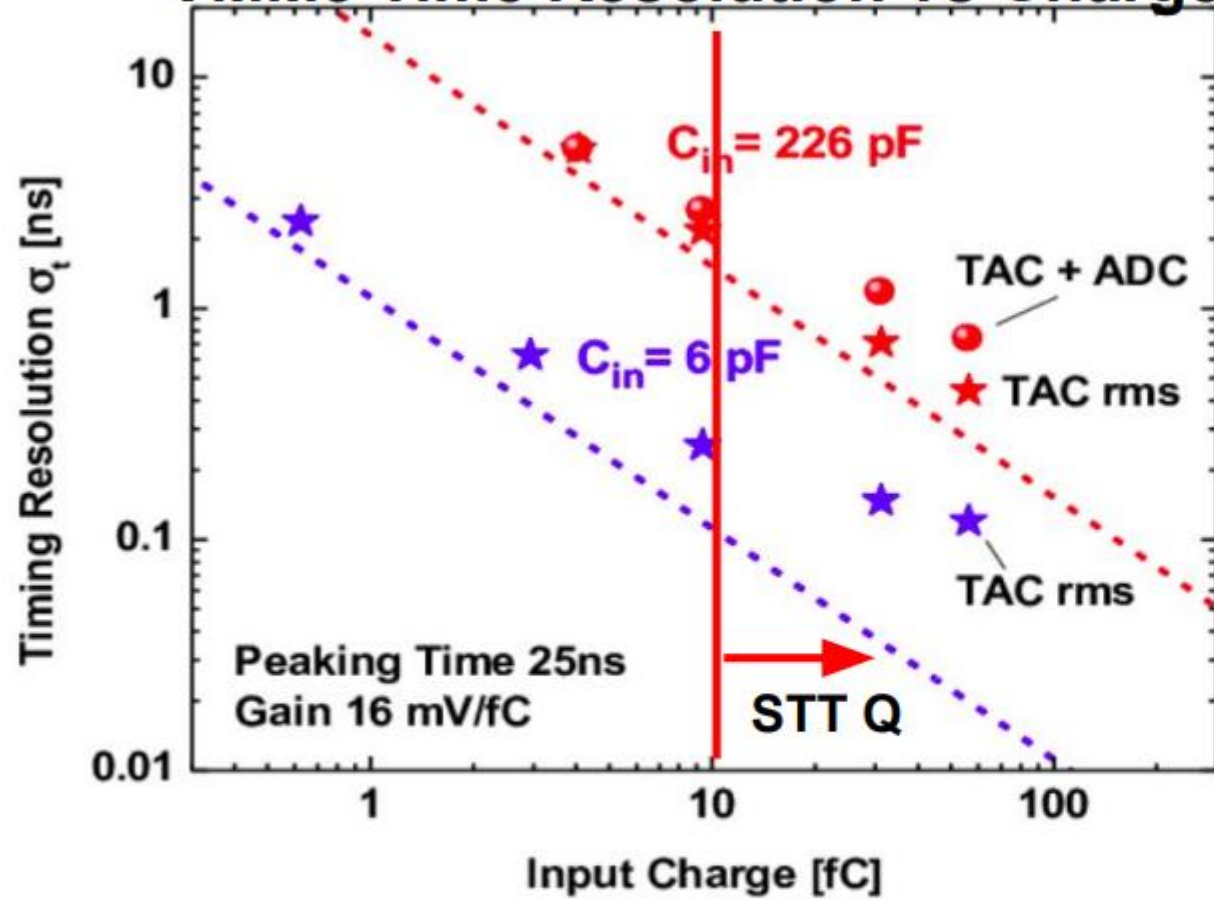
VMM3 Straw Tracker electronics

30/09/2021

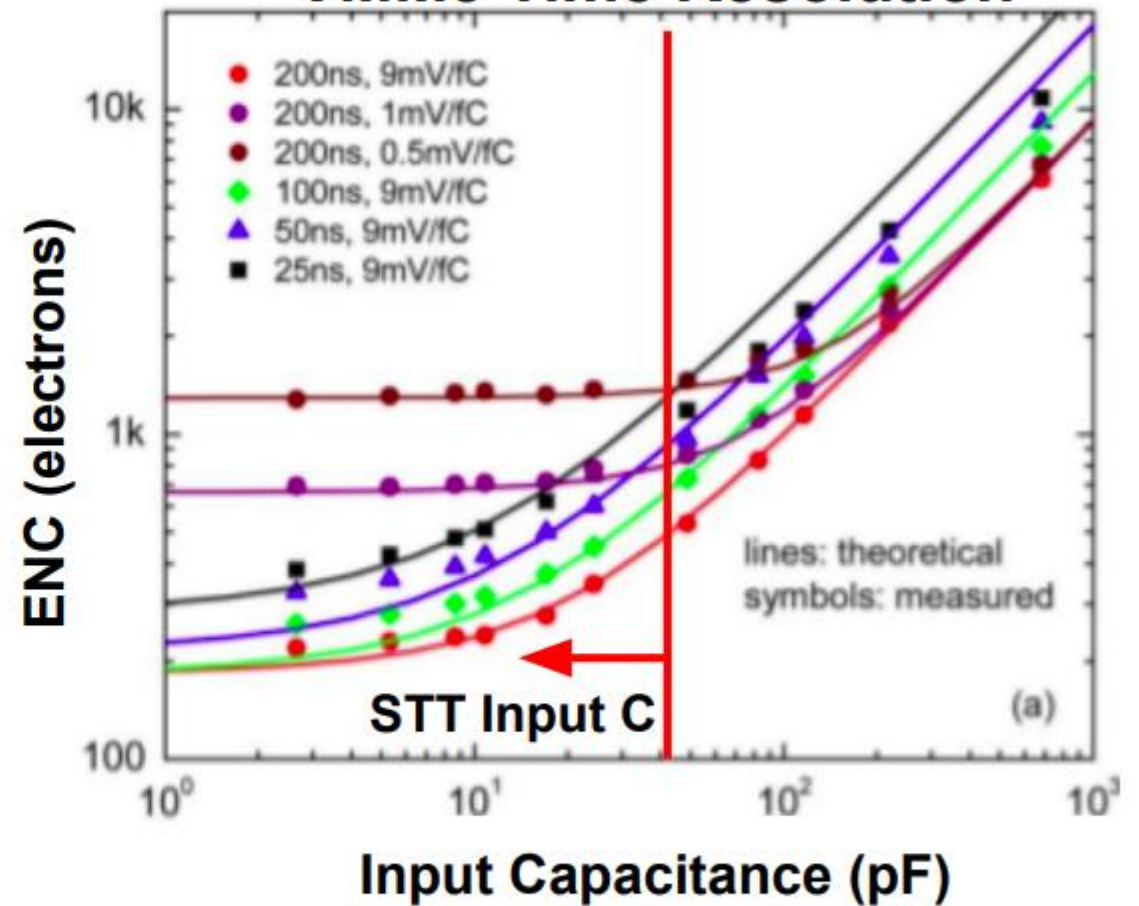


VMM3 Meets STT Readout Requirements

VMM3 Time Resolution vs Charge



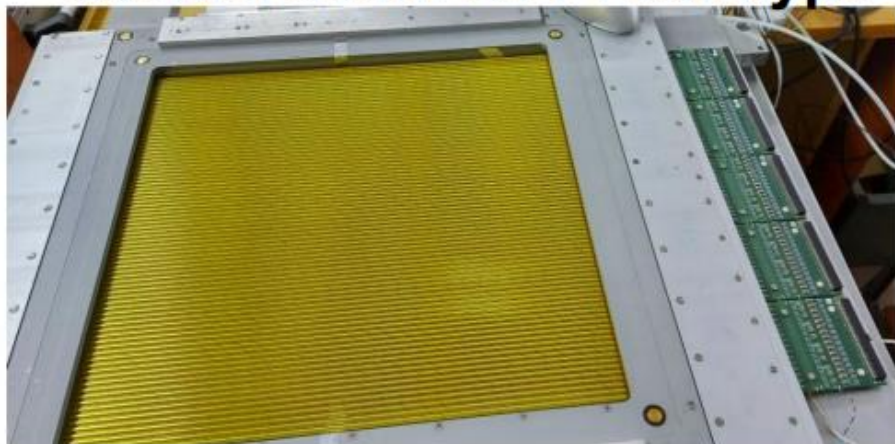
VMM3 Time Resolution



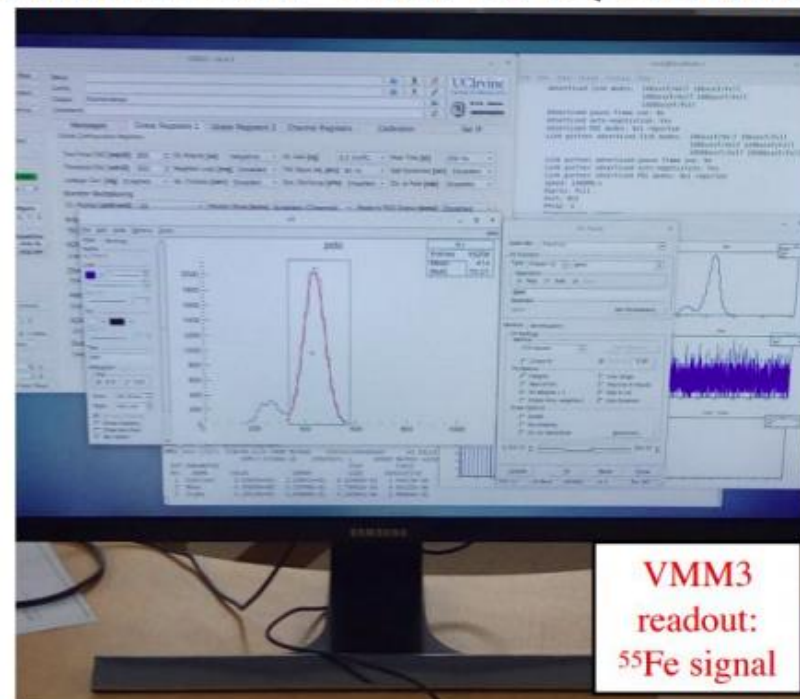
- VMM3a measures Q + T on each input for pulses above threshold
- VMM3a well matched to STT capacitance (<40pF) and charge signals (>10fC)
- Expect better than <1ns timing

VMM3 Readout Tests with STT Prototype

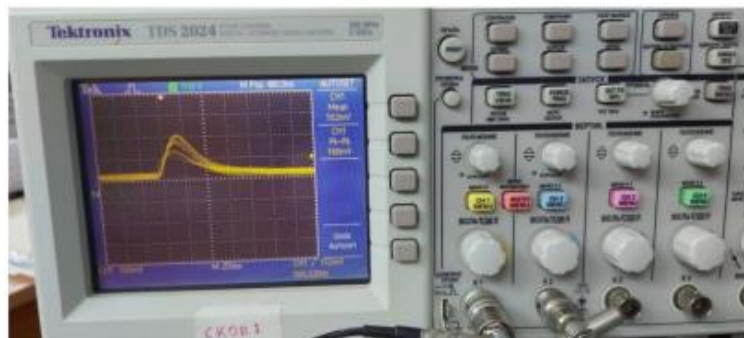
50cm x 50cm STT Prototype



VMM3+STT Test DAQ Software

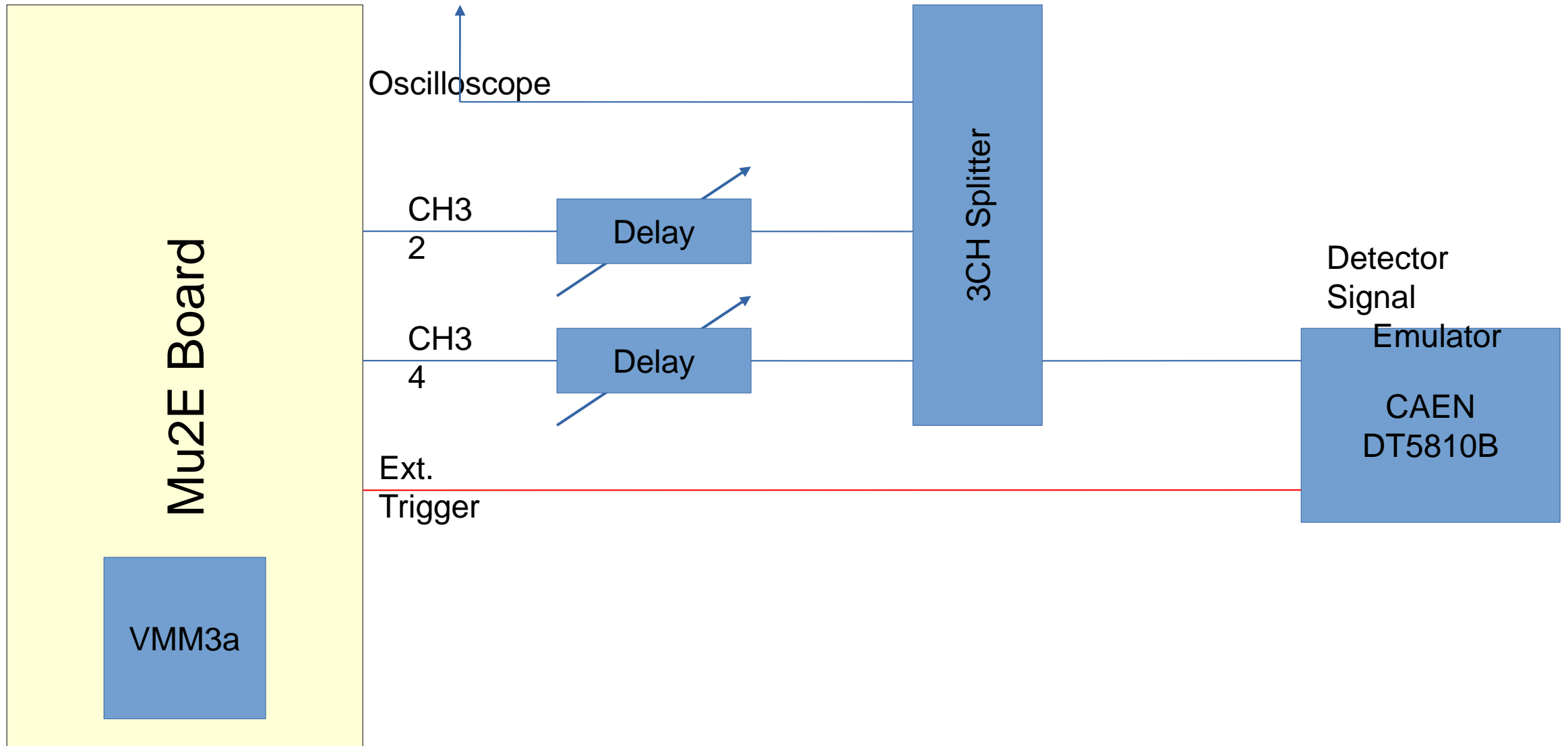


VMM3 Board with STT Signals Shown on Analog Output

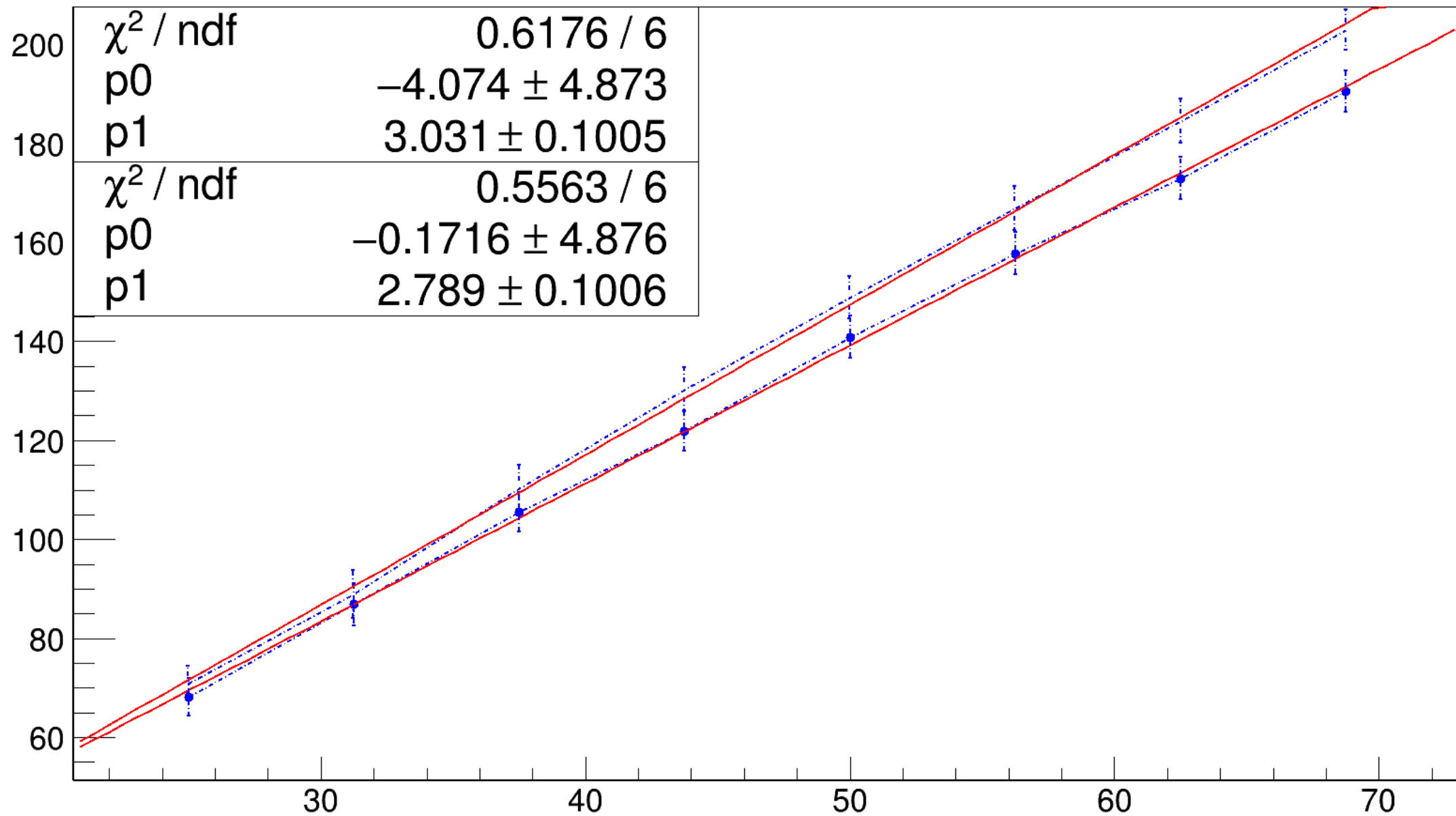


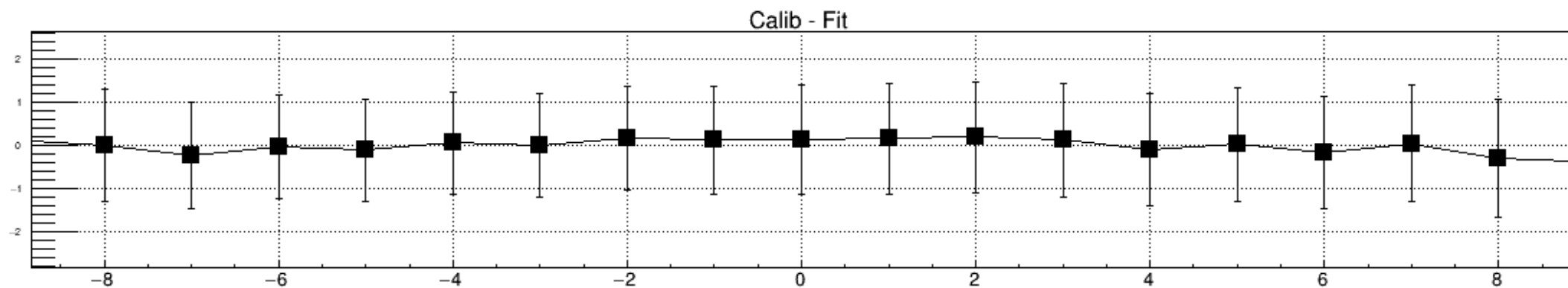
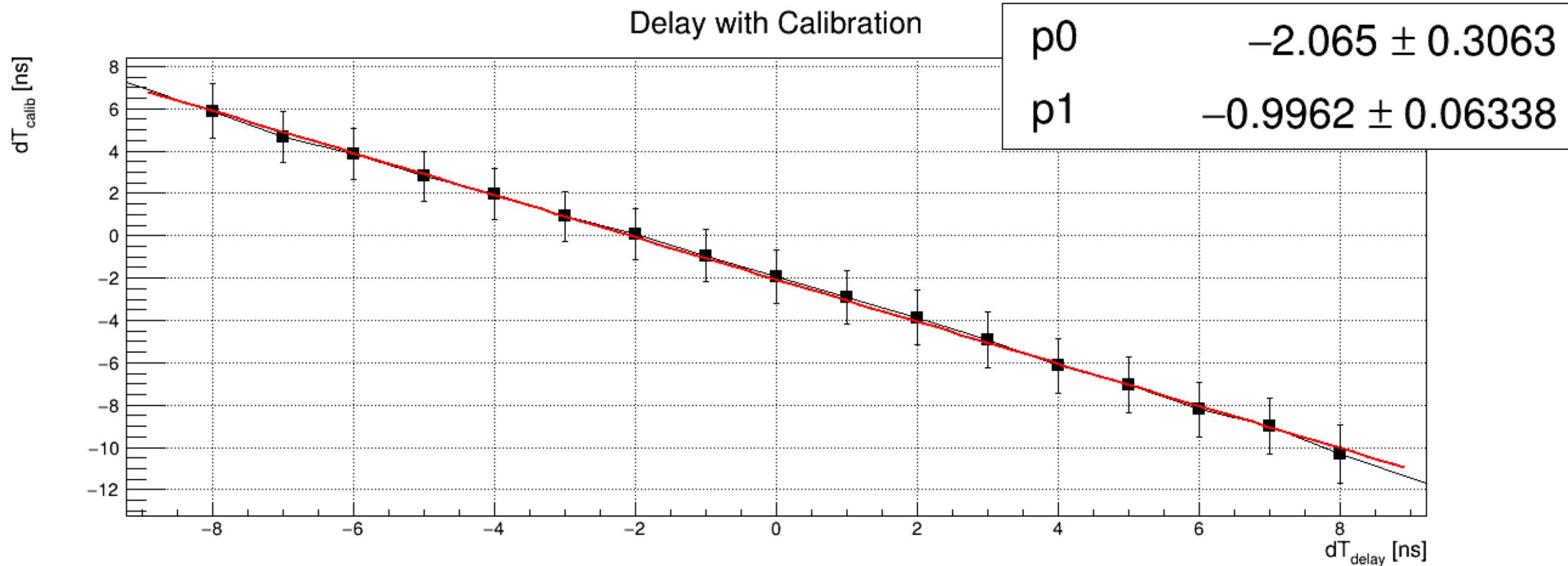
- VMM3 FEB single-ASIC prototype boards used to read out STT prototype in lab, validate readout
- Use existing VMM3 FPGA-readout test DAQ
- Tests ongoing, good charge resolution obtained
- 2 wafers of new VMM3a ASICs produced, covers prototyping effort and initial production

VMM3a TDO Test Circuit

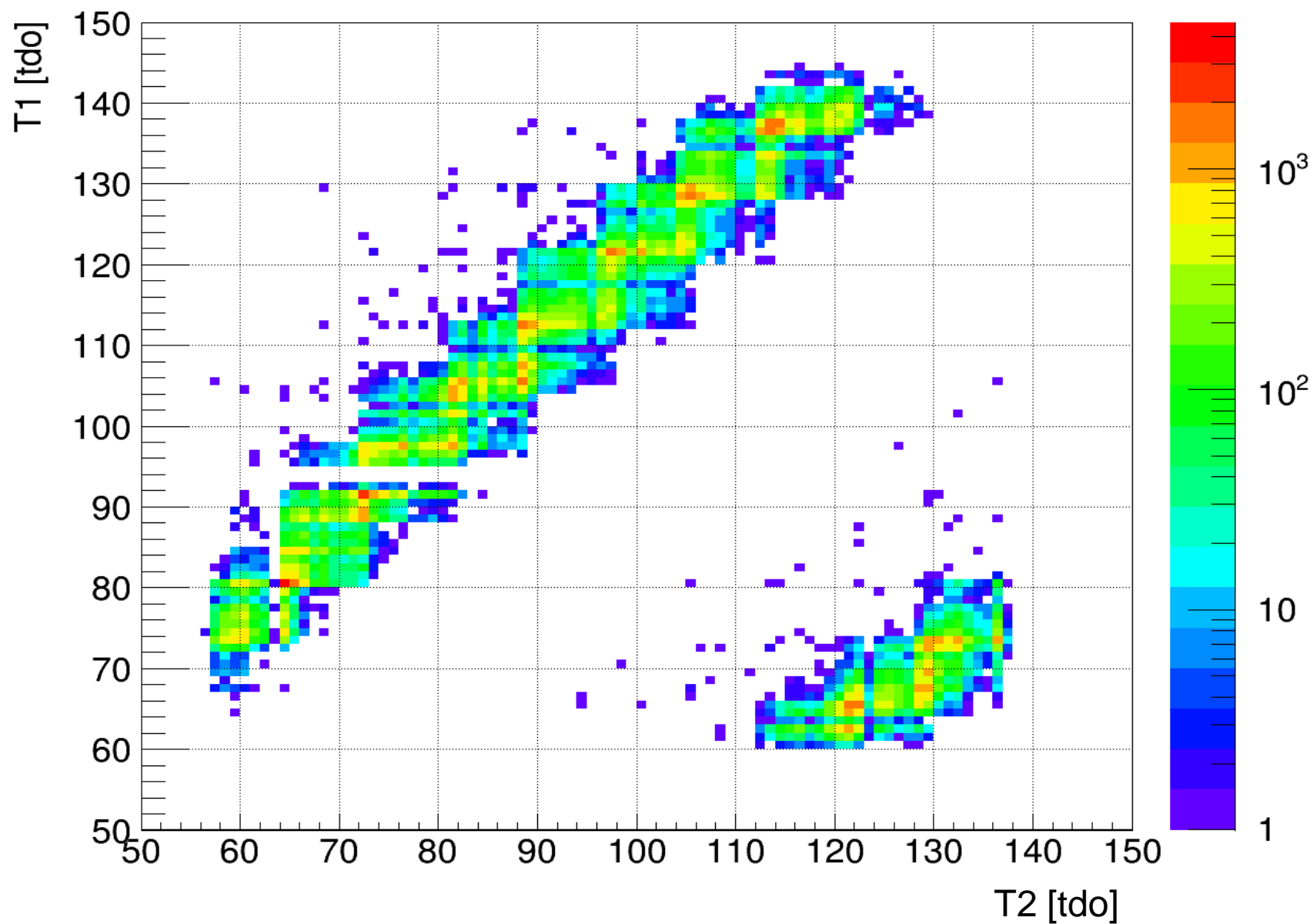


CH32 & CH34 Fixed Window Calib





CH32 TDO vs CH34 TDO Plot (ADC issues)



Phase-1 activities: VMM3 testing

1) Testing and certifying of the VMM3a ASIC chips used in the frontend readout electronics in the Micromegas and sTGC subdetectors of the New Small Wheels (NSW) detectors of the ATLAS detector;

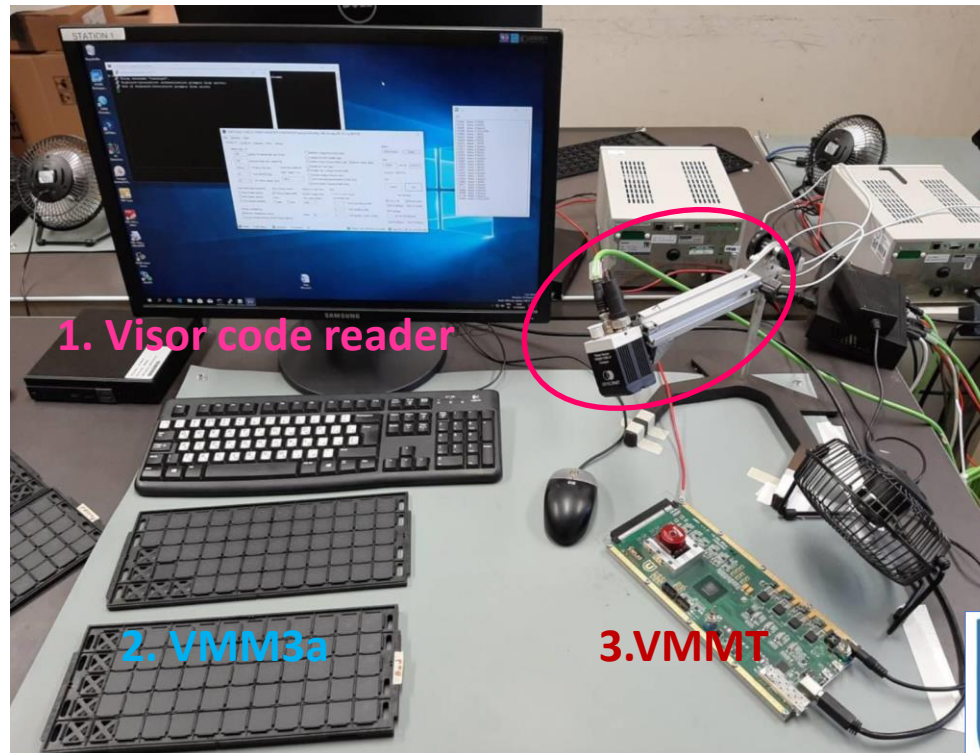
- development and building of four test systems for VMM3a ASIC testing and certifying;
- testing and certification of 42000 VMM3a chips used in NSW detectors;

VMM3a chips test stand

1. Visor code reader – an intelligent bar code and printed data-code reader system used to read serial numbers of the test VMM3 chips;

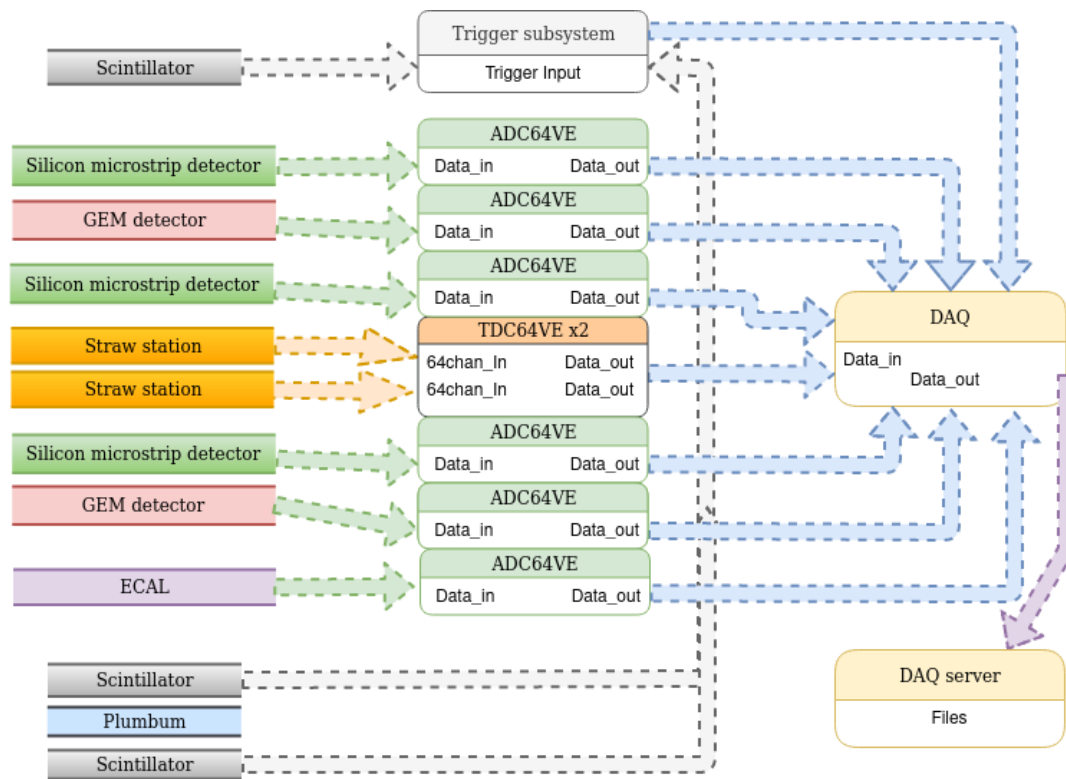
2. High performance and radiation hard VMM3a ASIC chips during the testing;

3. VMMT – a multifunctional test-board for VMM3 ASICs testing and characterization developed at TSU;

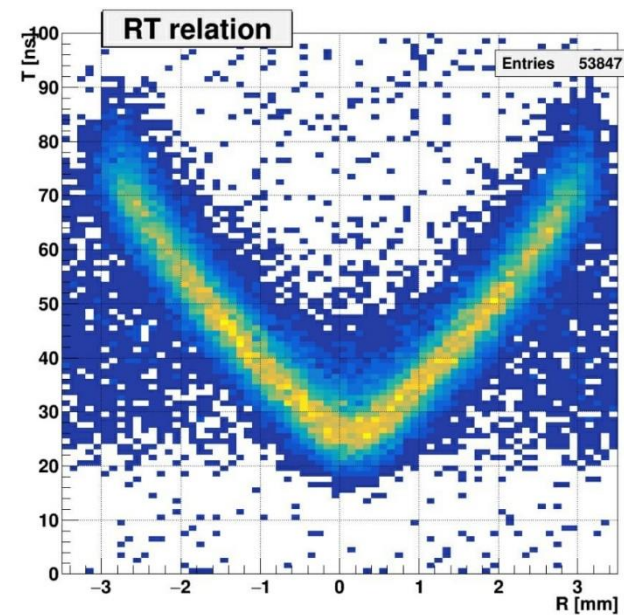


High Energy Physics Data Analysis Laboratory
National Research Tomsk State University

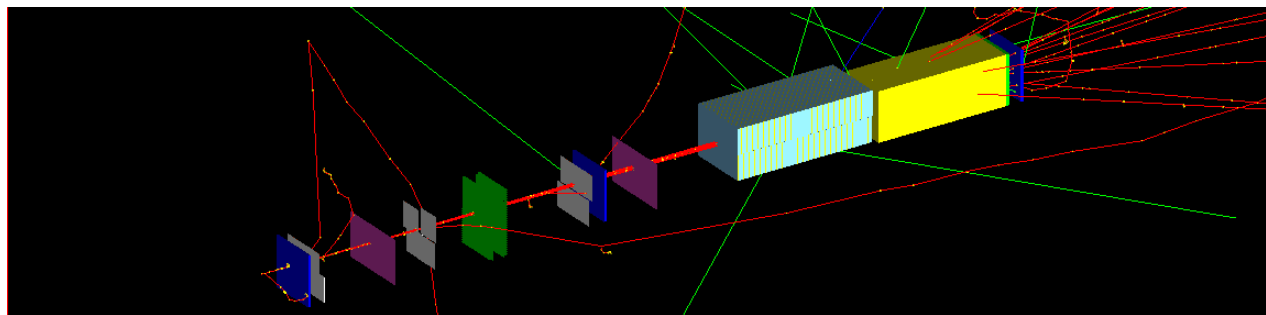
MiniSPD testing facility



DAQ BM&N and MPD
Straw+Vertex+Colorimeter



Spatial resolution 180mkm



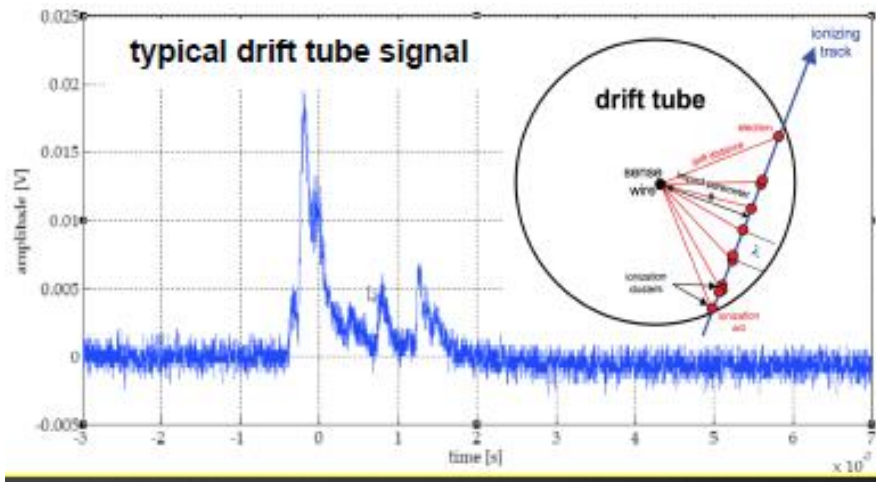
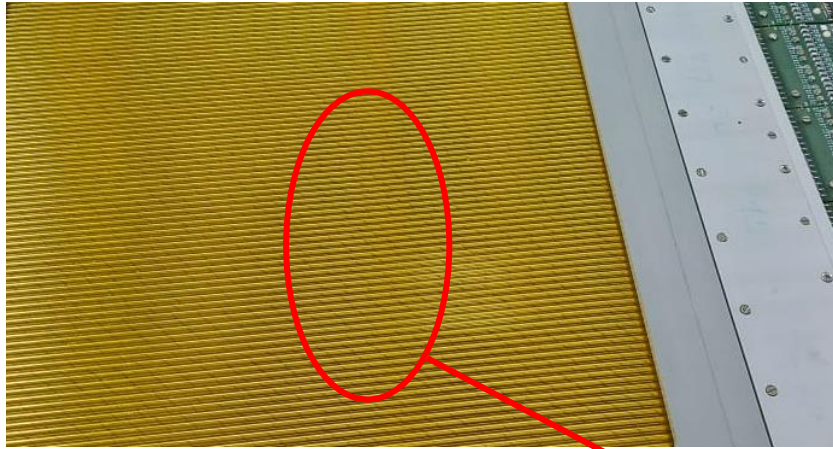
STRAW chamber 200x200mm

4 layer - XXYY

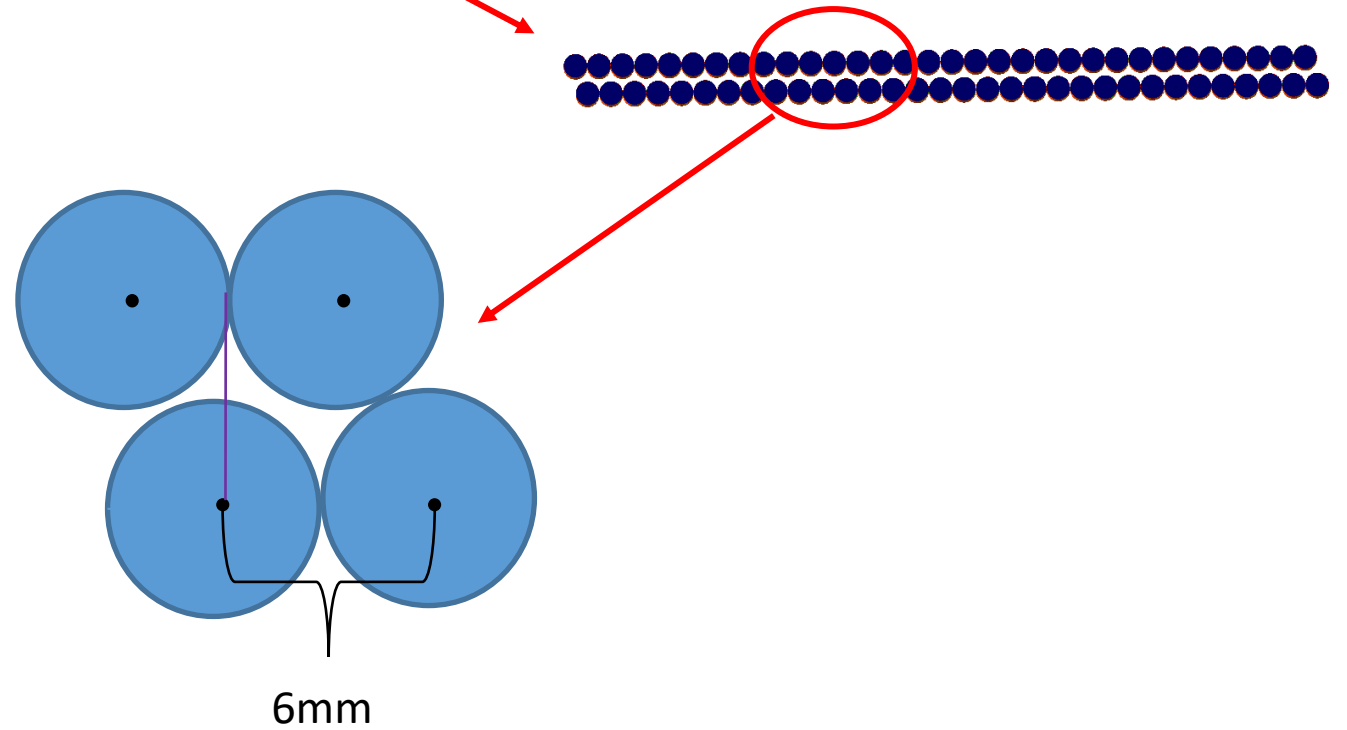
Diameter straw-6mm

Diameter anod-30mkm

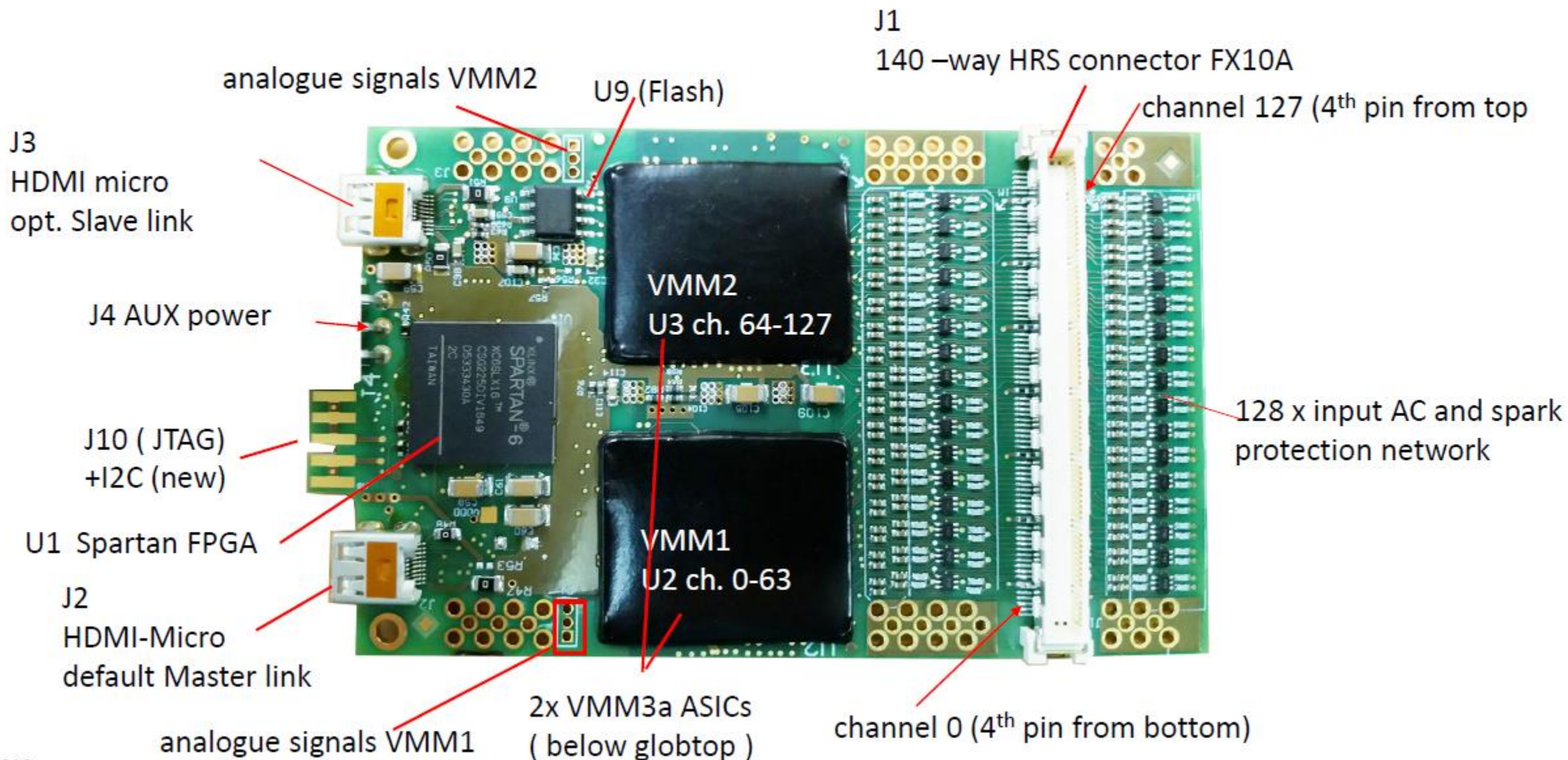
Gas Ar:CO₂/70:30



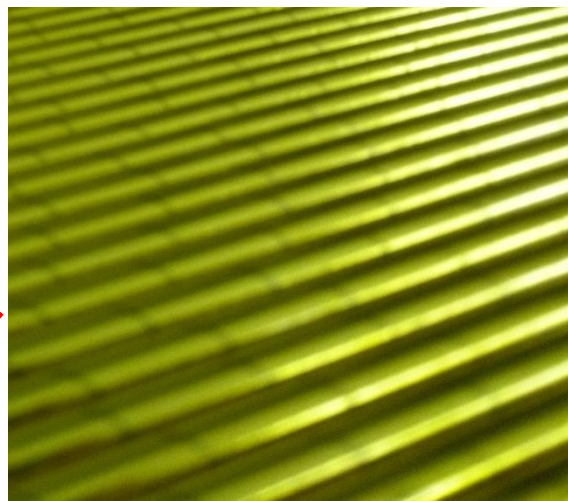
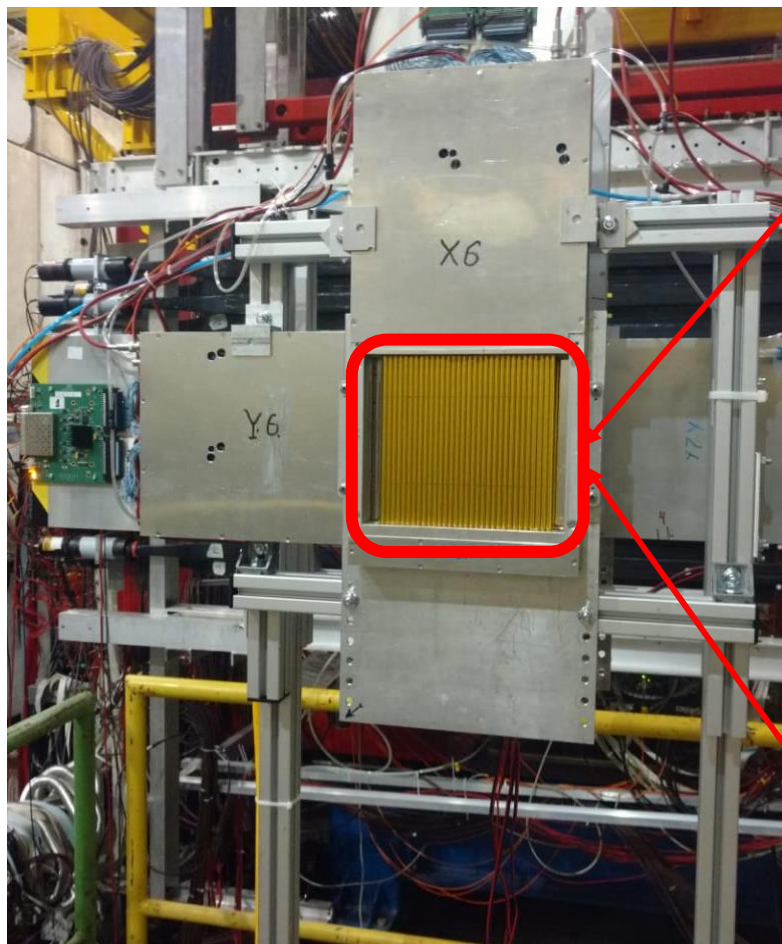
Drift time – 60nsec



VMM hybrid (V4.0 2020)



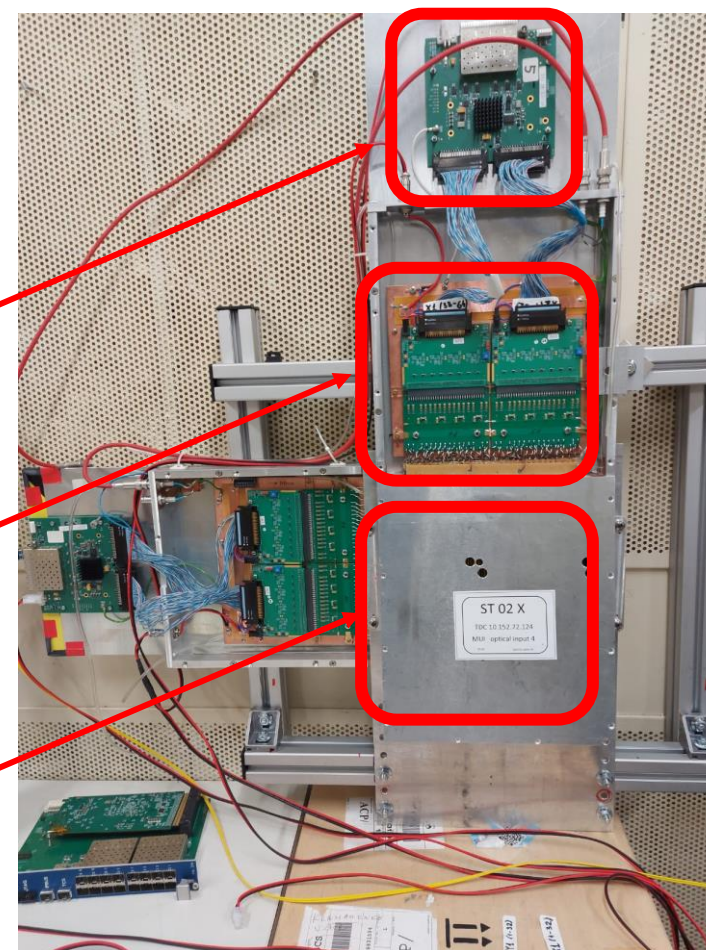
Straw tracker NA64



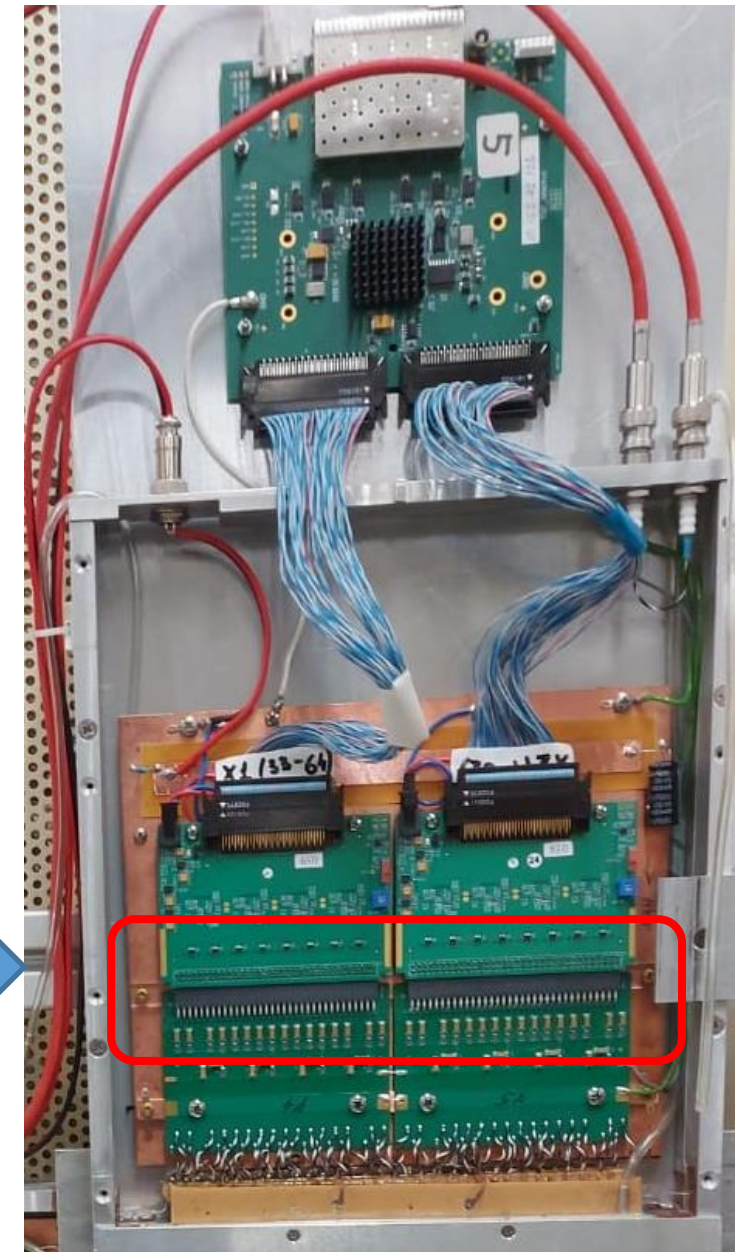
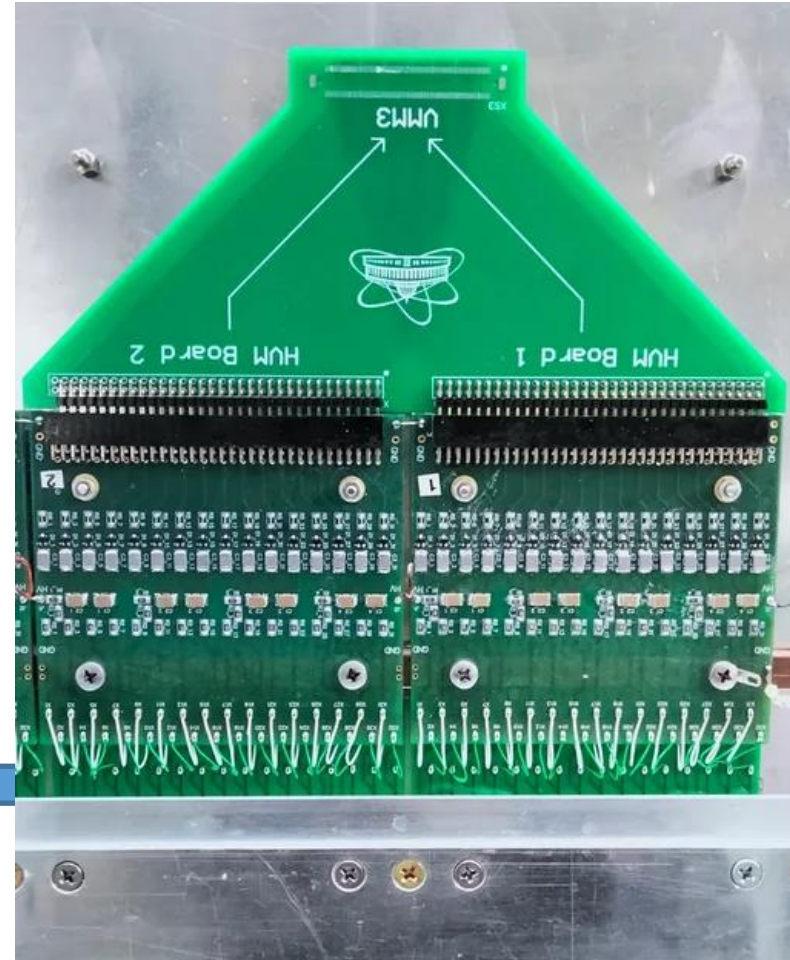
64chan TDC

2x32chan Preamp

200x200mm
D-6mm
4layer-XXYY



it is planned to start the experiment at
the end of October



connection board between VMM3
and Straws Tracker