

# DESY Test Beam Run - 15–29 November, 2021

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## Tests with a 5x5 lead tungstate calorimeter

- lead tungstate crystals generously on loan from Tanja Horn, CUA
- measurements performed at the DESY test beam facility area TB24

## Multiple reasons for the tests

- performance of  $\text{PbWO}_4$  calorimeter, compare with MC simulation
  - EIC EmCal
  - TPEX
- run with triggered and streaming data acquisition systems in parallel
  - triggered DAQ using CAEN QDC
  - streaming DAQ using JLab FADC250
  - streaming DAQ using CAEN digitizer

Mostly very successful !



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## Setup went very smoothly

- despite Covid restrictions
- ready to go after 4 days (one day lost for synchrotron maintenance)

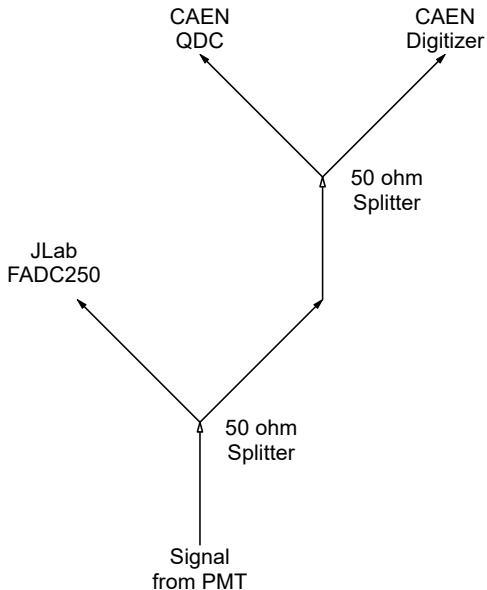
## Then discovered problems

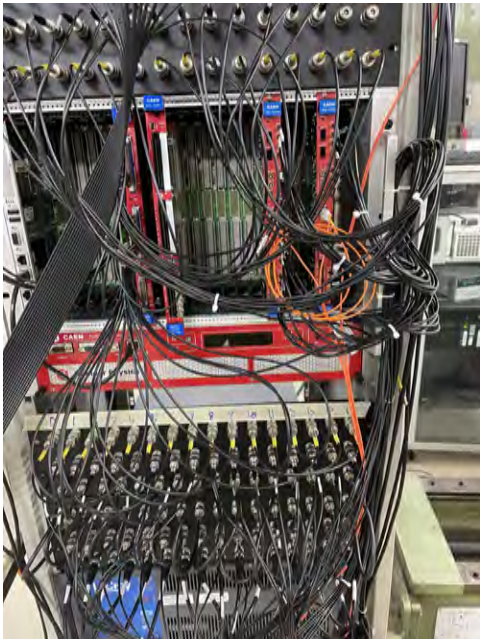
- some HV trips that needed to be repaired
- real problem was huge changes in gains and pedestals
- spent several days trying to identify the problem
- finally identified as arising from JLab FADC250 system
  - induced level shifts on the splitter affecting QDC and Digitizer signals
  - seemed to vary randomly, sometimes stable, sometimes not !
  - finally solved by disconnecting JLab system
  - **hope for a more useful solution for next time**

Started taking good data November 24



# Signal Splitting



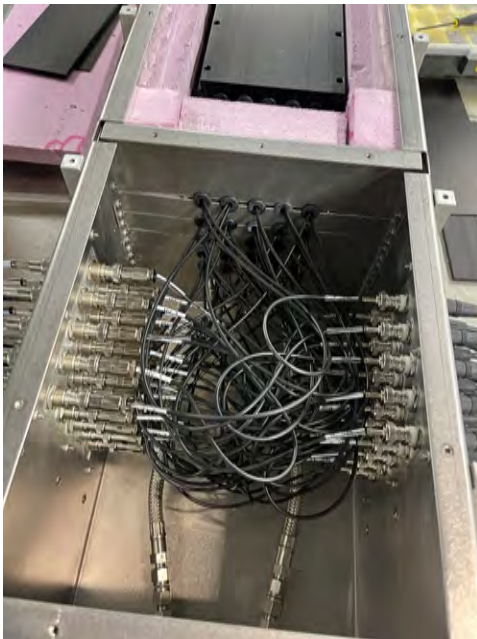


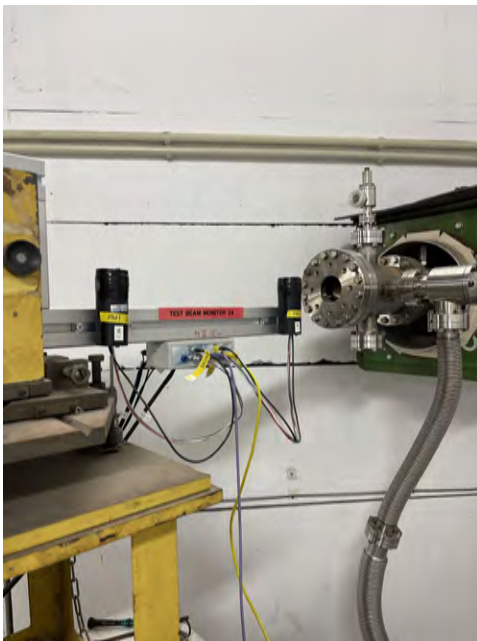








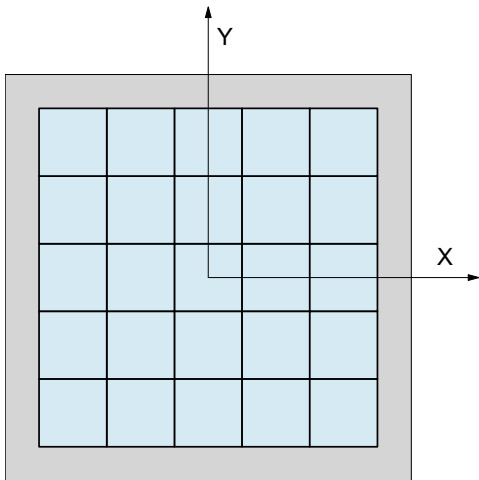








# Calorimeter Geometry



## Data Collection

With  $2 \times 2 \text{ mm}^2$  collimator aperture

Following scans made at beam energies of 2, 3, 4, and 5 GeV

Horizontal scans -60 mm to +60 mm in 5 mm steps

- at  $Y = 0, -5, -10, -15,$  and  $-20 \text{ mm}$
- similar vertical scans
- unfortunately made before disconnecting FADC250

Detailed horizontal scans -15 mm to +15 mm in 3 mm steps

- at  $Y = 0, -3, -6, -9, -12,$  and  $-15, \text{ mm}$

Repeat detailed horizontal scans with 3.7, 7.8, 15.6, and 23.4 mm Pb

Repeat detailed horizontal scans with calorimeter rotated  $\sim 6^\circ$



# Next DESY Test Beam Run - May 2–15, 2022

Hope to have JLab FADC250 working stably

Possibly with scintillating glass crystals - Tanja ?

Similar scans but at temperature scans  $-25^\circ$ ,  $-10^\circ$ ,  $+10^\circ$ , and  $+25^\circ$

## Thanks to:

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