

Commissioning the Coordinate Detector for the Super BigBite Spectrometer(SBS)



Katie Whitcomb, Ralph Marinaro,
Dr. Peter Monaghan, Christopher Newport University
Dr. Bogdan Wojtsekhowski, Jefferson Lab

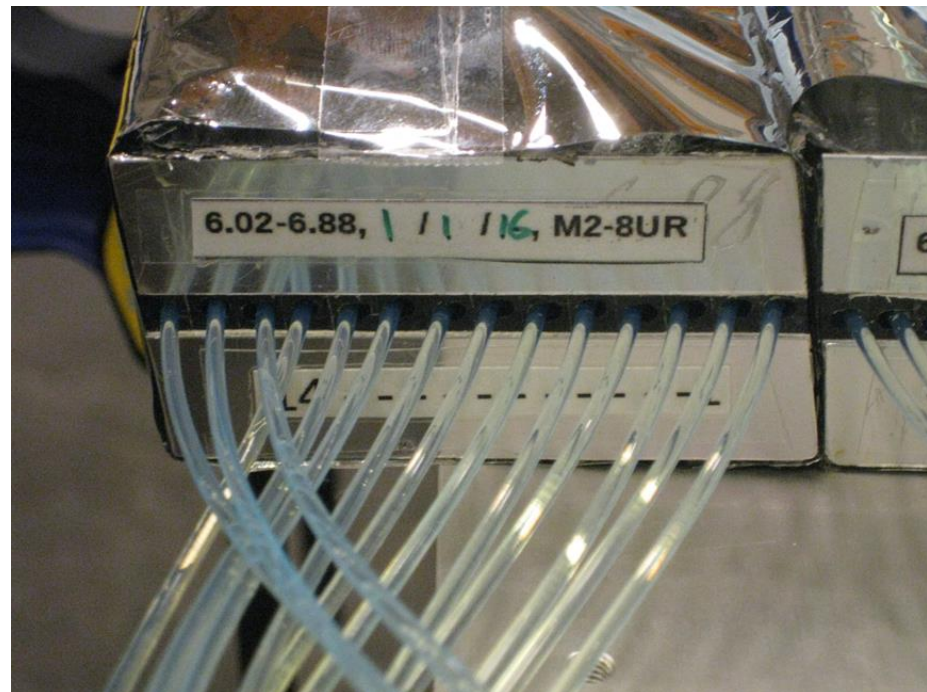


Abstract

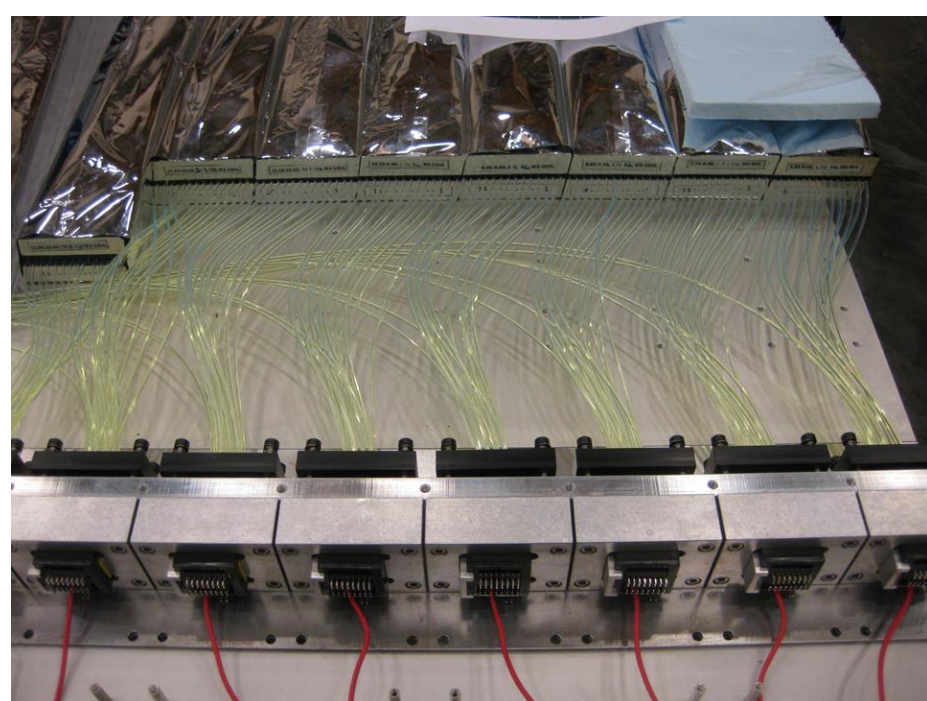
The Coordinate Detector (CDet) is a 2352-channel two-layer scintillator hodoscope being commissioned for use with the Super BigBite Spectrometer (SBS) in the nucleon form factor experiments at the Thomas Jefferson National Accelerator Facility (JLab). The coordinate detector will provide supplemental charged particle tracking data, with a resolution of 2 mm. Each scintillator paddle in the detector has a wavelength-shifting optical fiber through the middle of it which is connected to a single pixel of a multi-anode photomultiplier tube. An overview of the detector and the commissioning efforts, including determining the threshold and efficiency of every channel and reducing crosstalk between channels, is shown below.

Materials

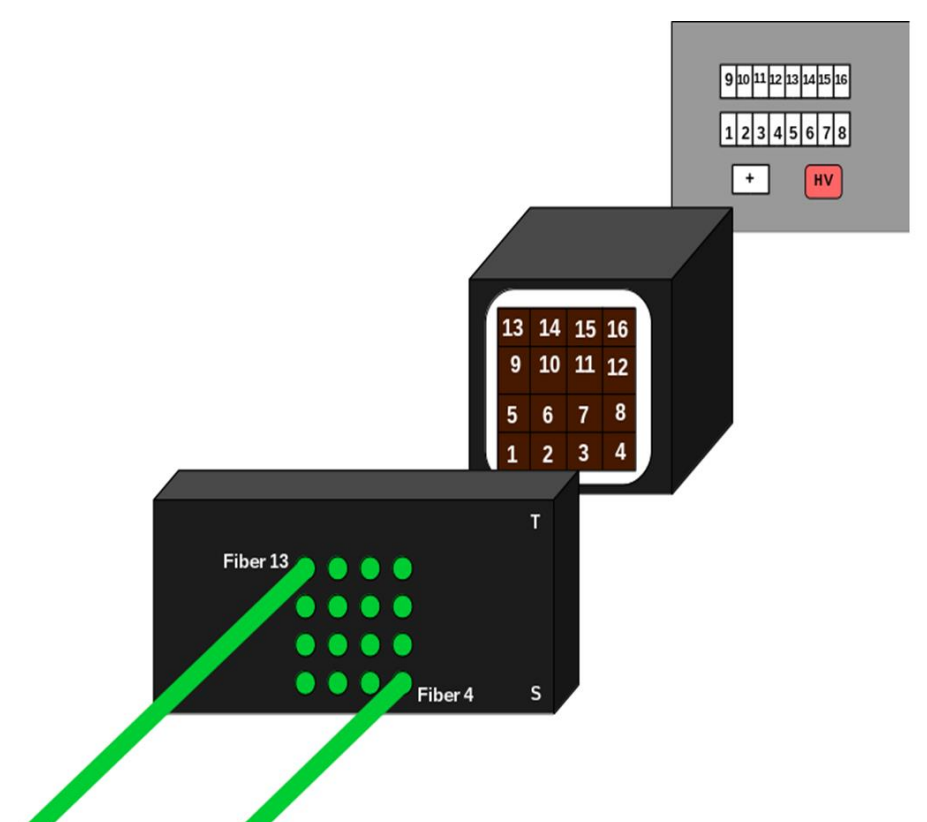
- Scintillating Paddles



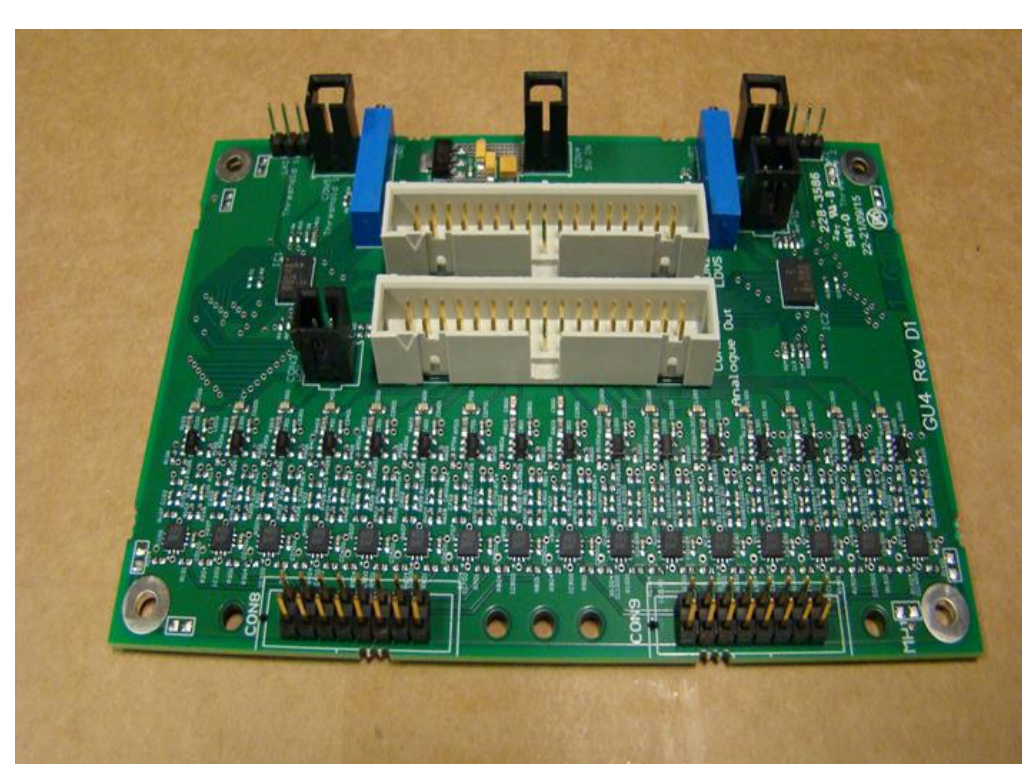
- Optical Fibers



- Photomultiplier Tube (PMT)

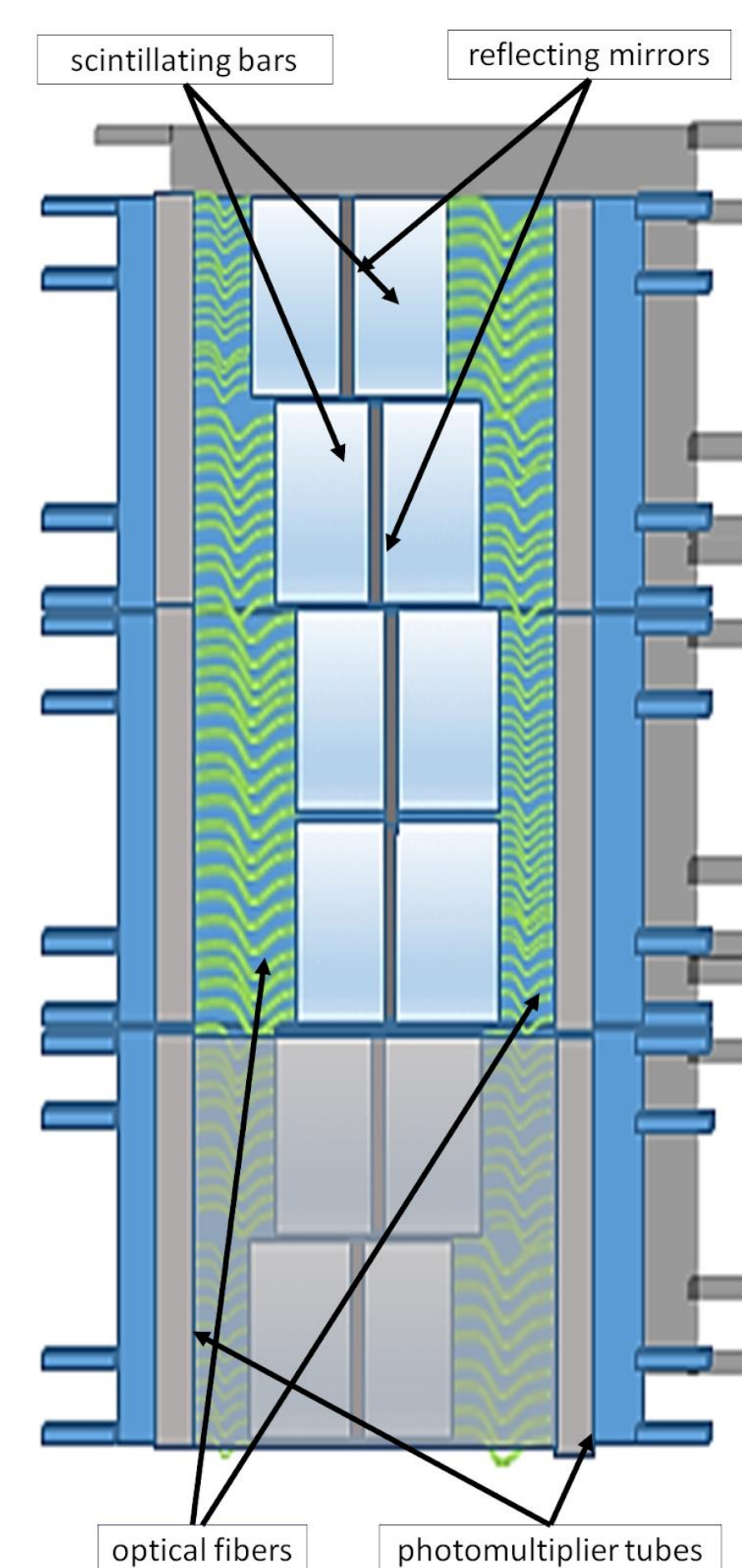


- NINO cards

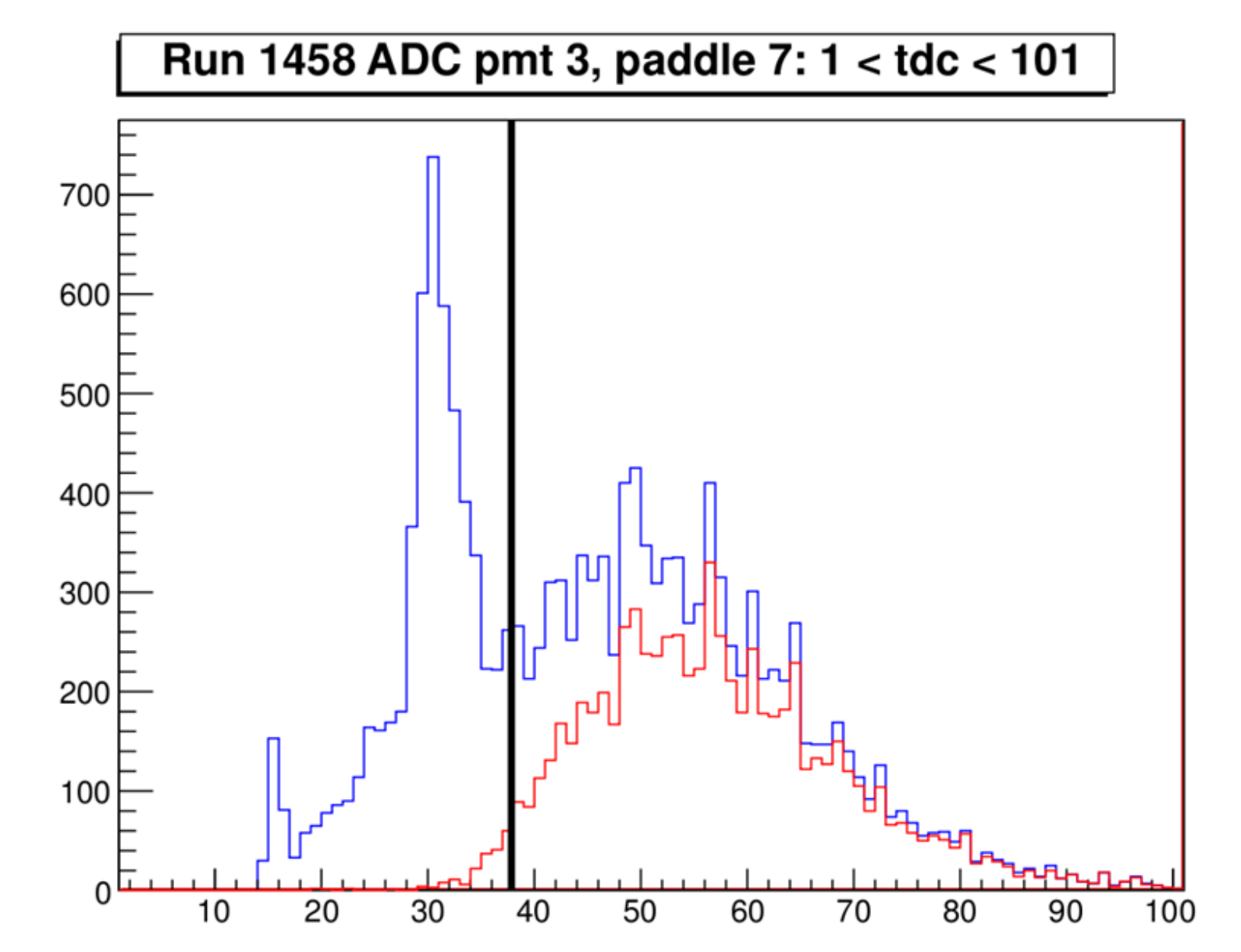
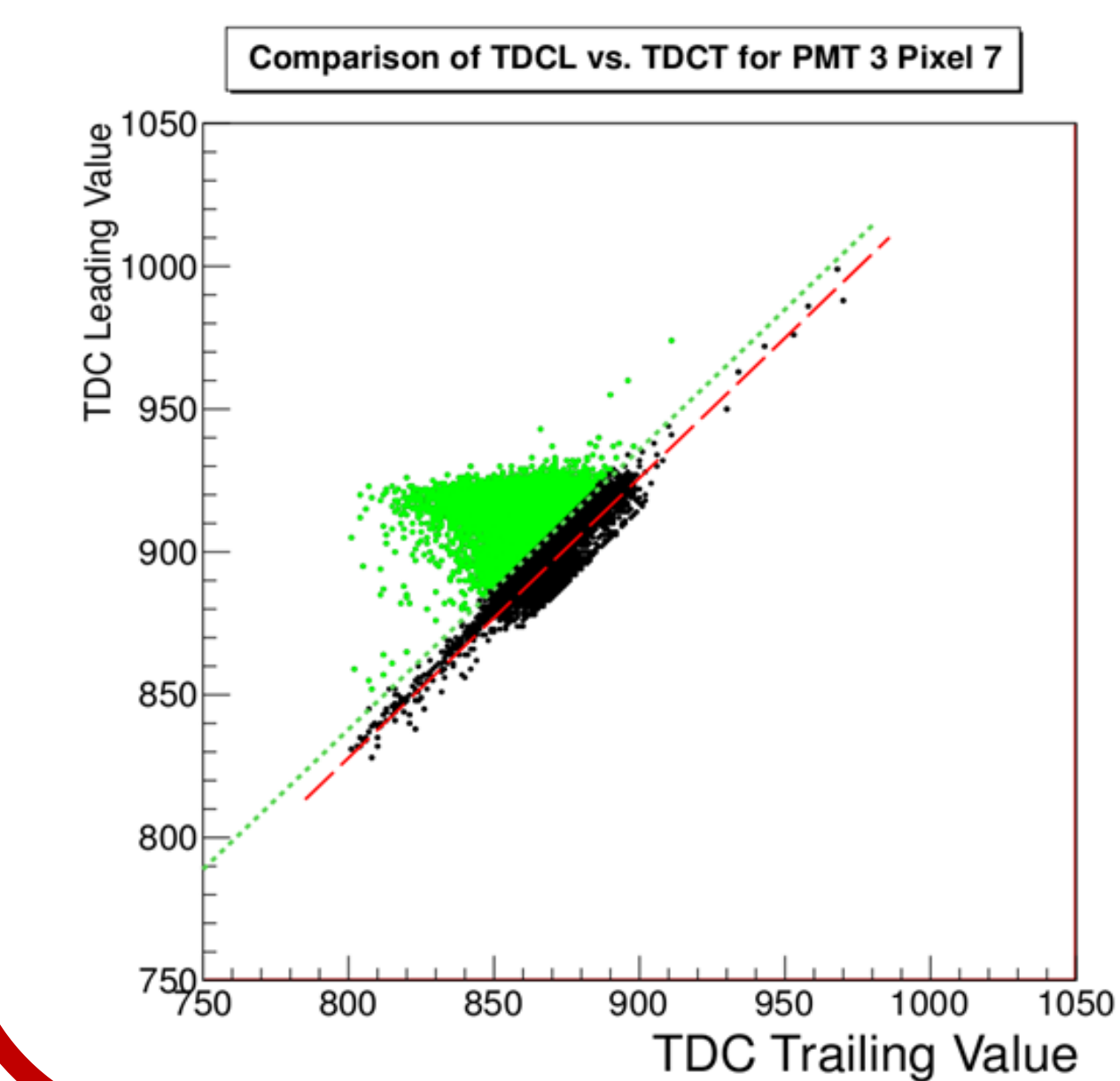


Design

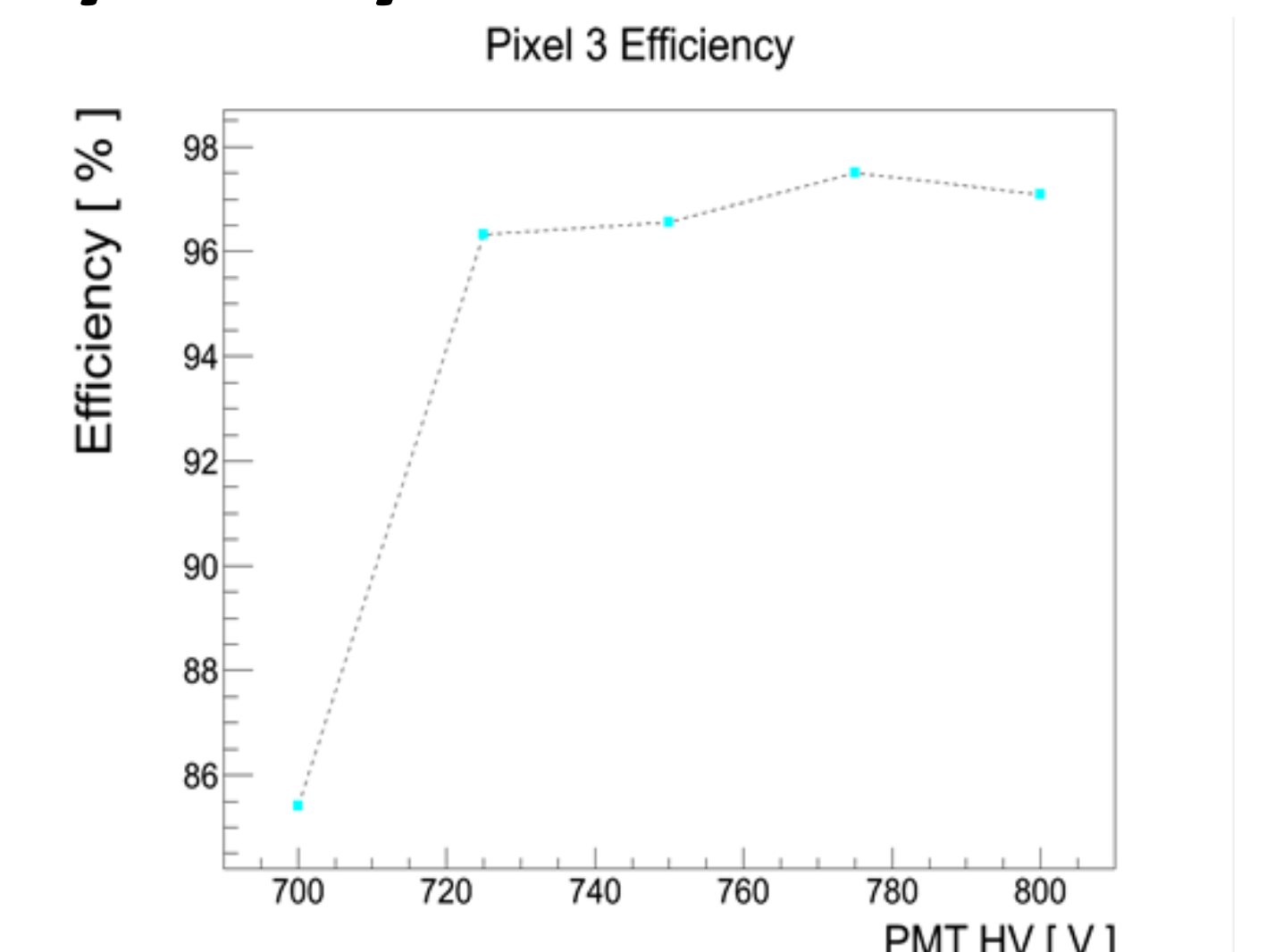
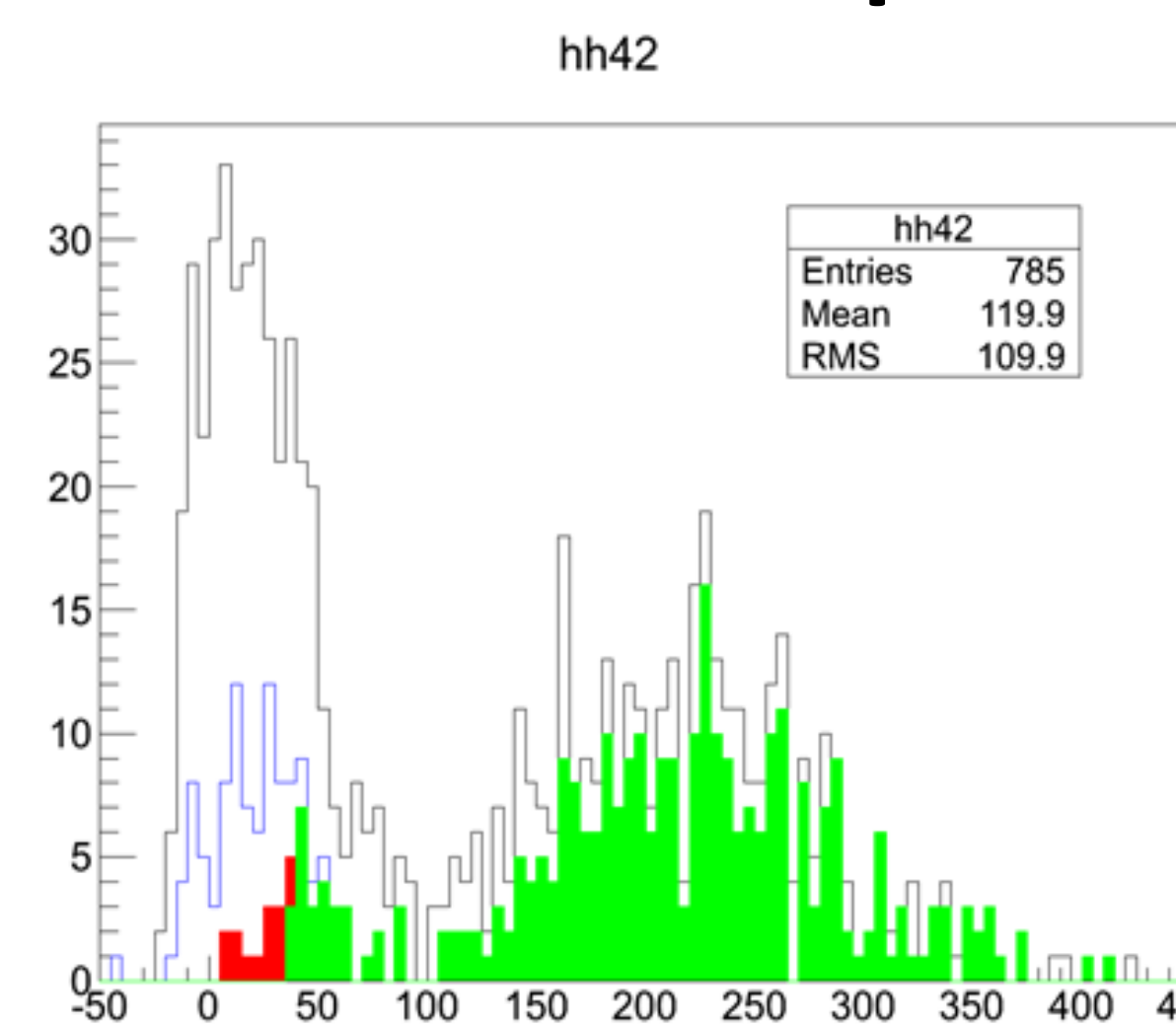
- 6 modules
- 2 layers
- Paddles angled towards the target



Step 3: Crosstalk Reduction

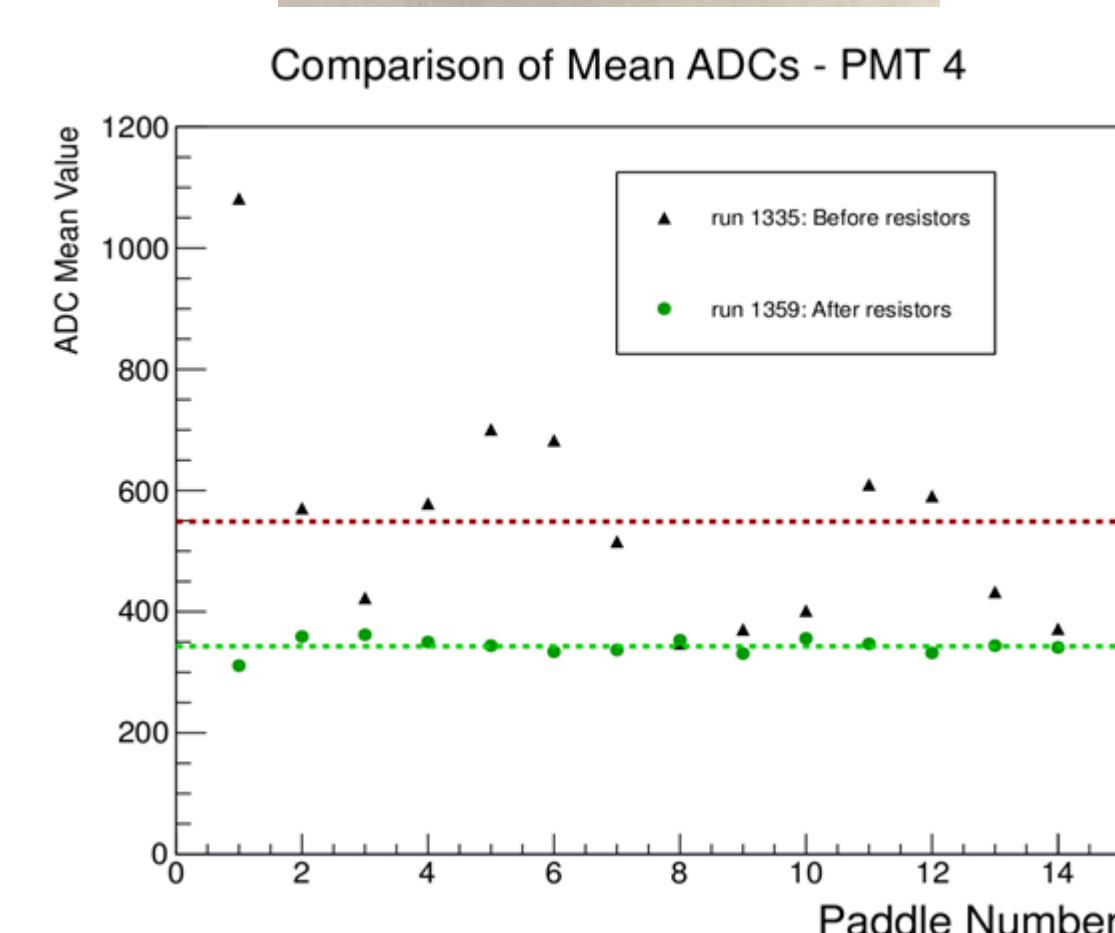
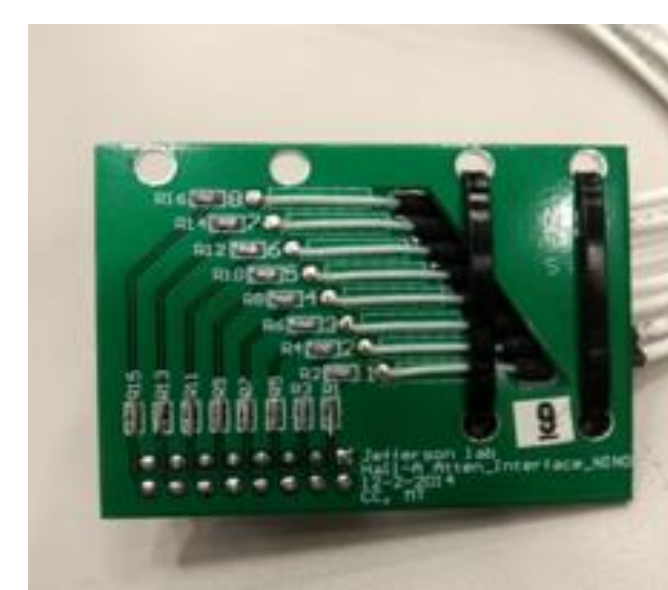


Step 4: Efficiency Analysis

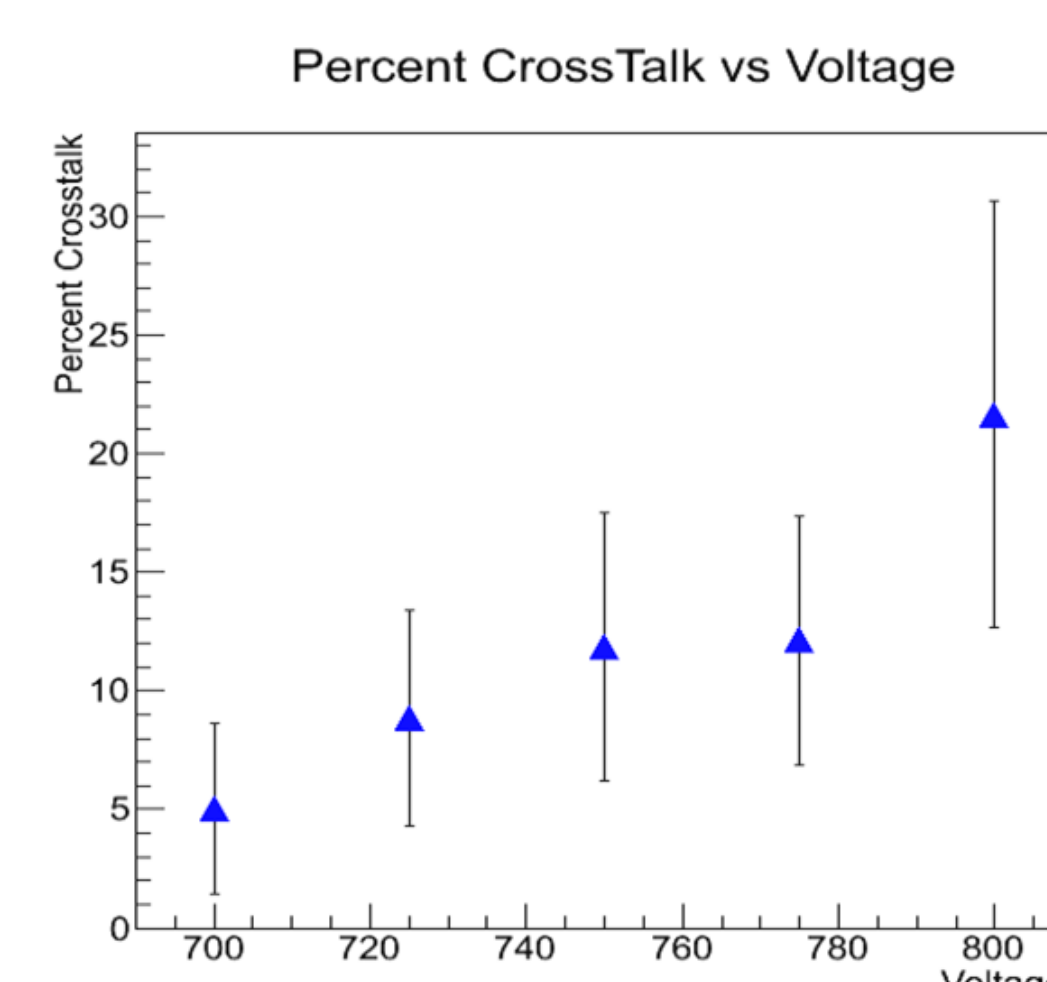


Step 1: Charge Normalization

$$R = \frac{R_{even} + R_{odd} + 50}{R_{even}}$$



Step 2: Crosstalk Analysis



Current Status

- Module 1 and 2 completed
- Preparing Module 3 (installing PMTs and NINO cards, testing for light tightness)
- Completing efficiency analysis of Module 2

Acknowledgements

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