Calorimeter Insert Prototype Test at RHIC

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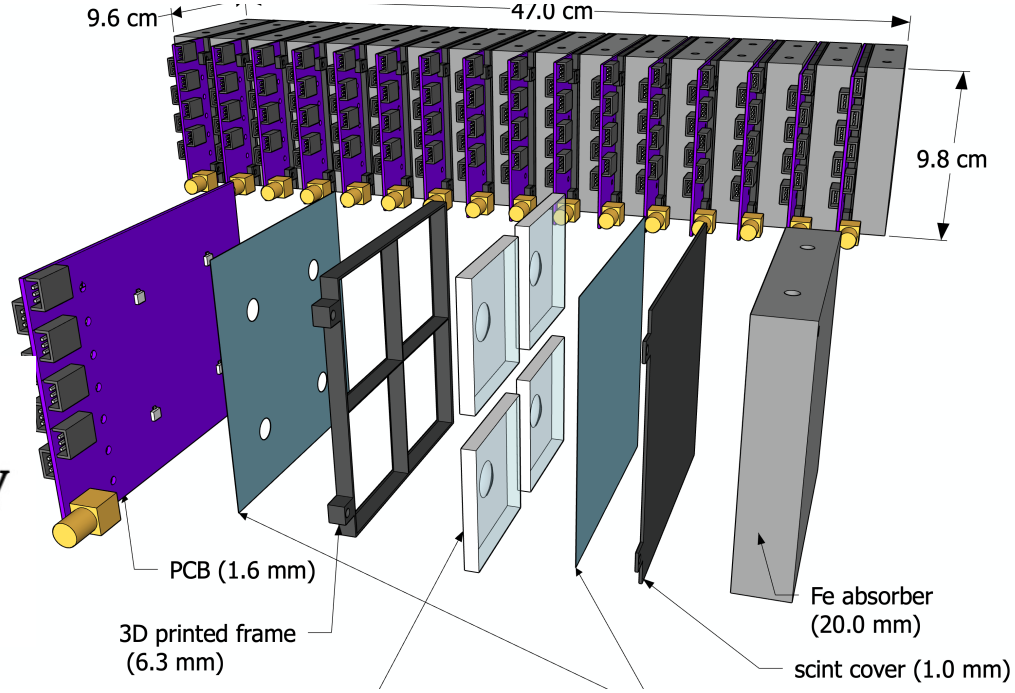
Gen I Prototype

- Gen I Prototype was tested at Jefferson Lab Hall D pair spectrometer
- Consisted of 40 channels, 10 layers of iron absorbers / SiPM-on-tile boards
- Published paper in Instruments



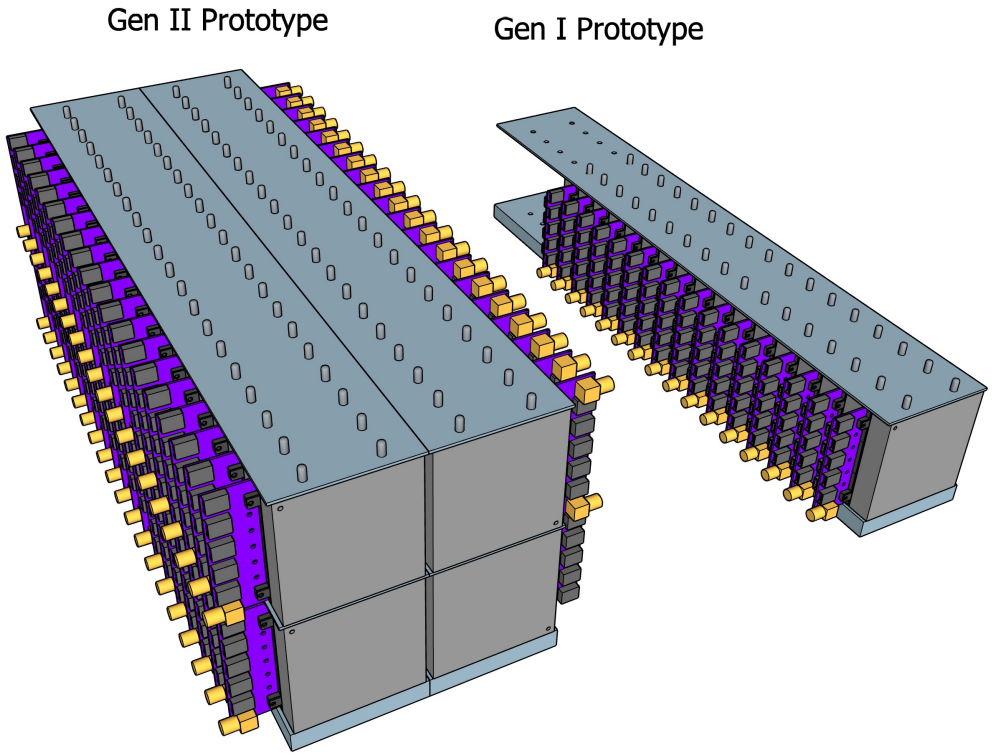
Article

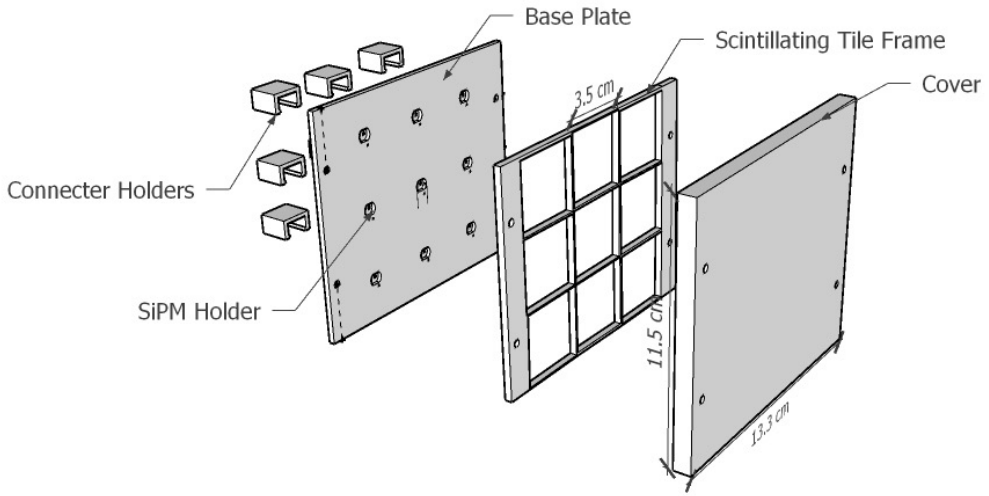
Beam Test of the First Prototype of SiPM-on-Tile Calorimeter Insert for the EIC Using 4 GeV Positrons at Jefferson Laboratory

Miguel Arratia [1,2,*], Bruce Bagby[1], Peter Carney[1], Jiajun Huang[1], Ryan Milton[1], Sebouh J. Paul[1], Sean Preins[1], Miguel Rodriguez[1] and Weibin Zhang[1]

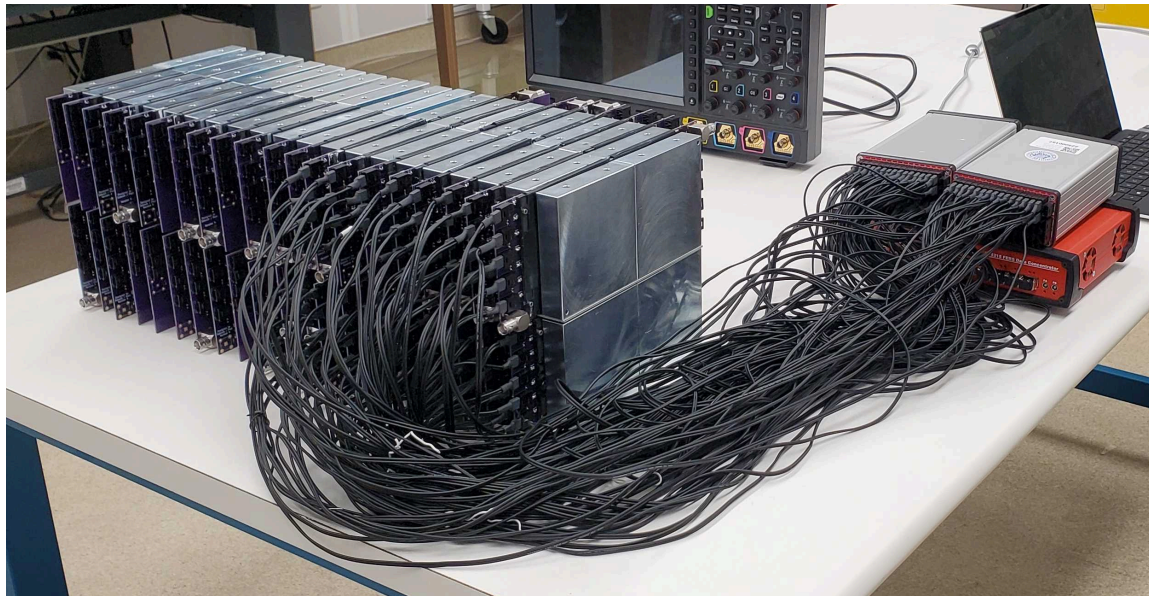
Gen II Prototype

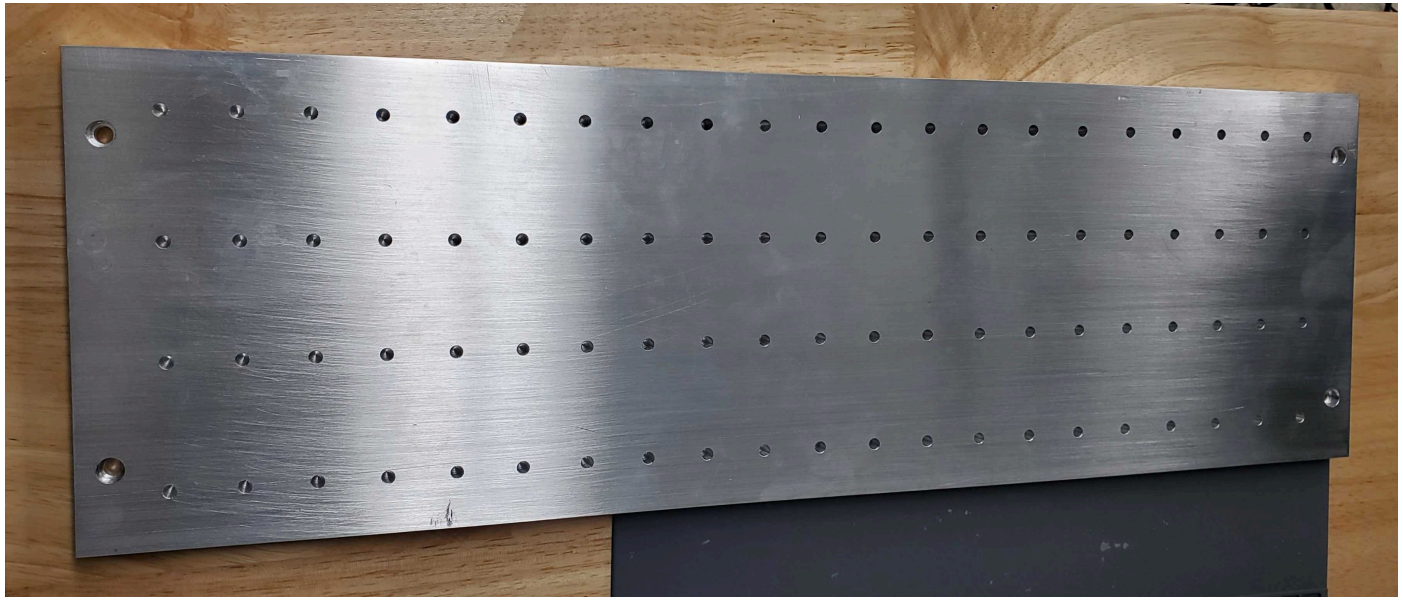
- Gen II prototype will consist of ~300 channels, 20 iron layers
- 4x the cross-sectional area of Gen I prototype
- Will have three hodoscope layers in front, and external trigger tiles
- Will be tested in the east side of STAR at RHIC, within $3.2 < \eta < 4.0$ range to emulate CALI conditions in ePIC



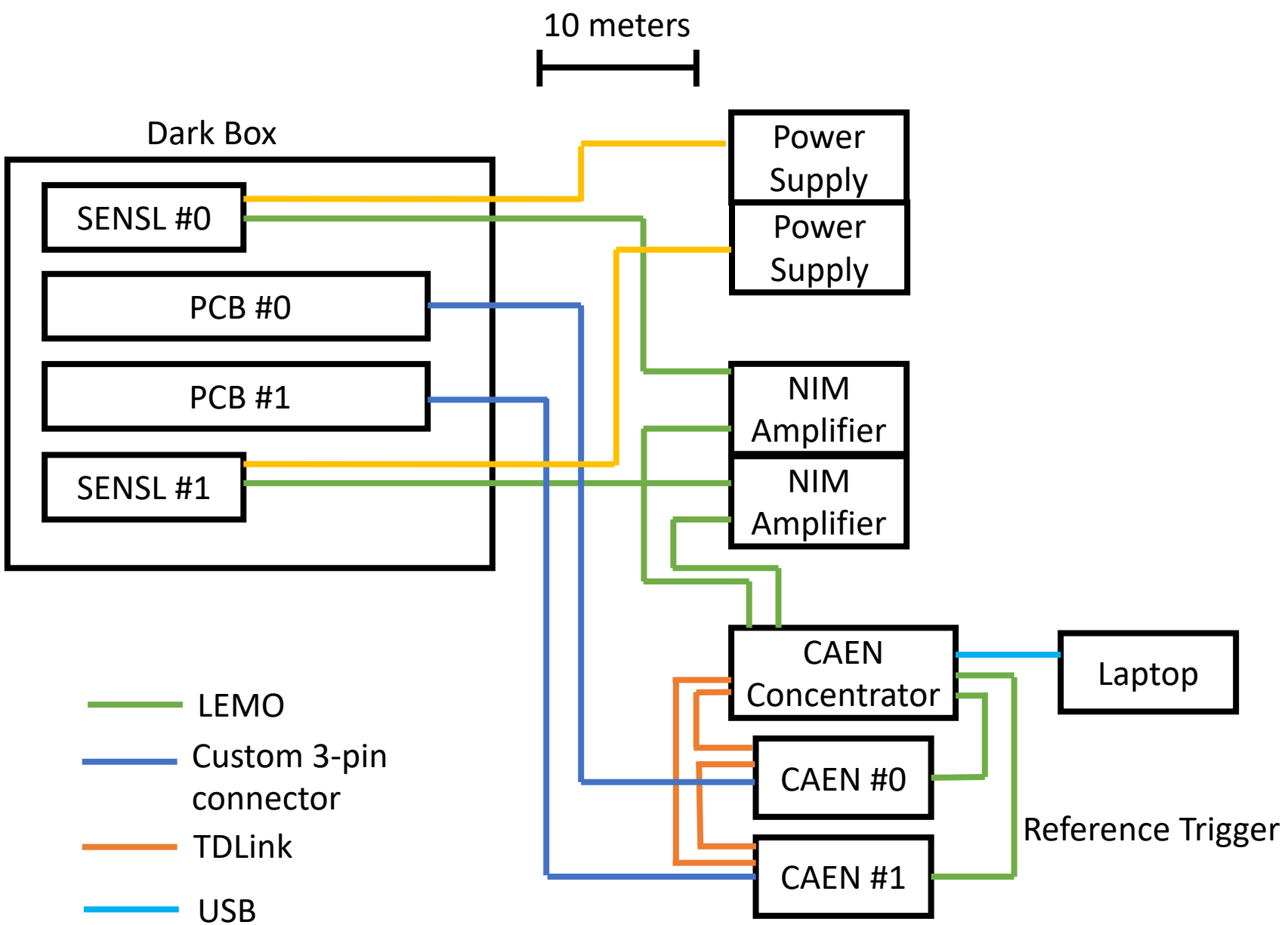


- Base plate, dividing plates, and scintillating tiles are machined in-house
- Consists of high granularity hexagonal tiles in front, larger granularity square tiles in rear
- Dark box will consist of an 8020 frame, covered in black-out fabric
- Plan to install in STAR on Feb 23
- Goals:
  - MIP calibration
  - π^0 analysis
  - SiPM radiation hardness test

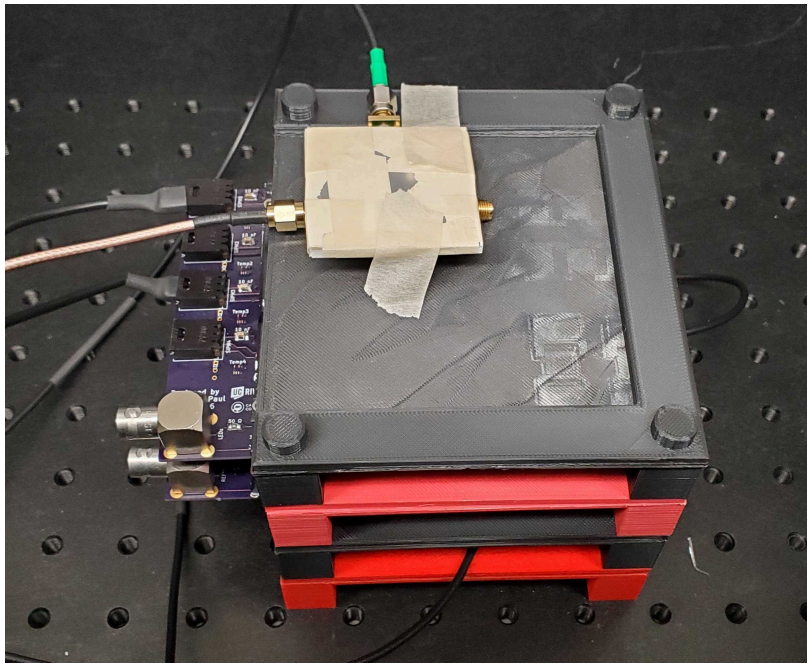




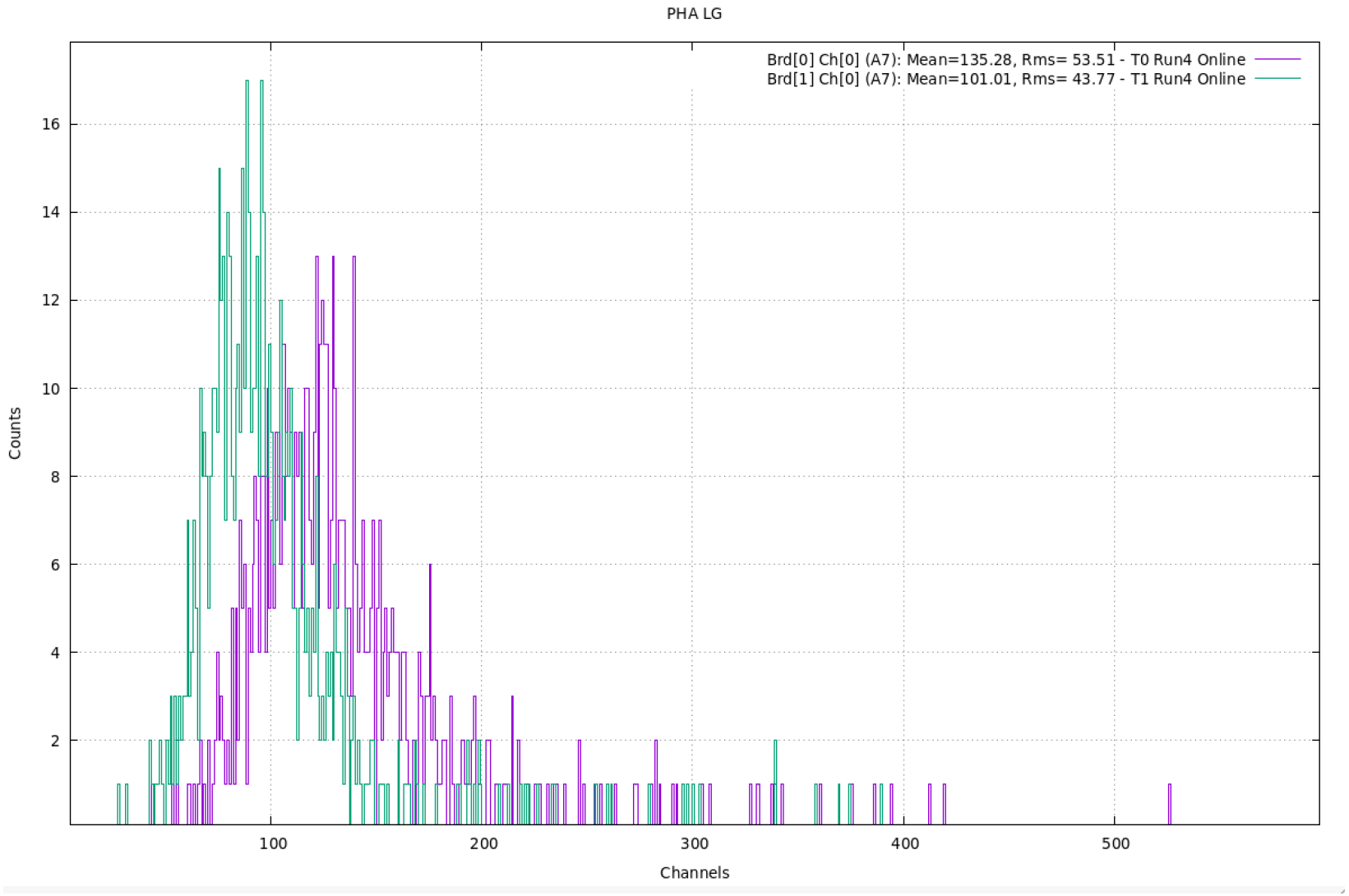
Cosmic Test Setup



Coincidence test with two external trigger tiles, recording across two CAEN units



- Cosmic ray landaus measured, triggered on external tiles, with 10-meter-long cables



Prototype Setup