LAr R&D Progress Updates 05/05/26

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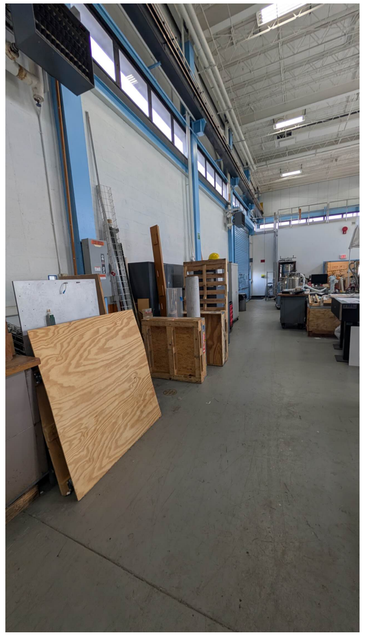
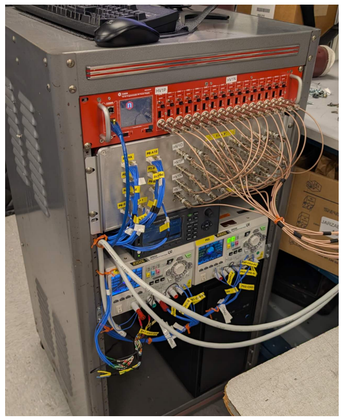
Lab Safety and Space Management

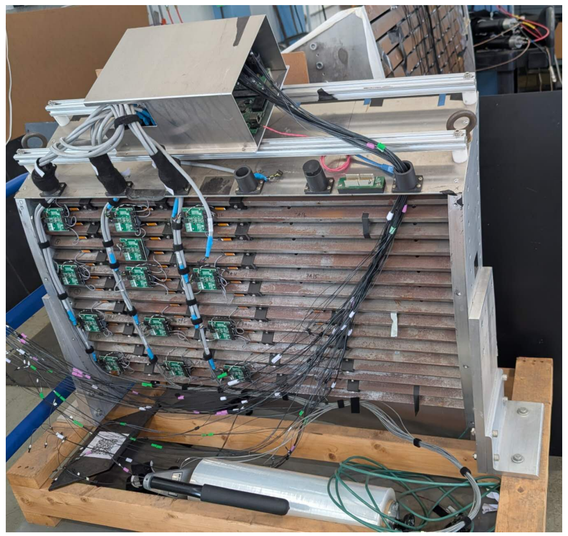
- ESH walkthru on 04/29
  - The walkthru went well, no negative findings
  - The minor issue was addressed immediately that no ticket was written
- LN2 filling tutorial
  - CE team plan to assign a technician to fill the LN2 portable dewar for the future
  - I will give me a tutorial on the operation after this meeting
  - Ordering a refill soon
- Another EEI inspection request from Shanshan





SiPM measurement setup

- sPHENIX prototype part out
  - All the SiPMs and readout electronics boards on the prototype has been removed
  - Eric Mannel is the designer of the electronics
  - He is keeping the scintillator panels
  - I took over all the electronics and SiPMs

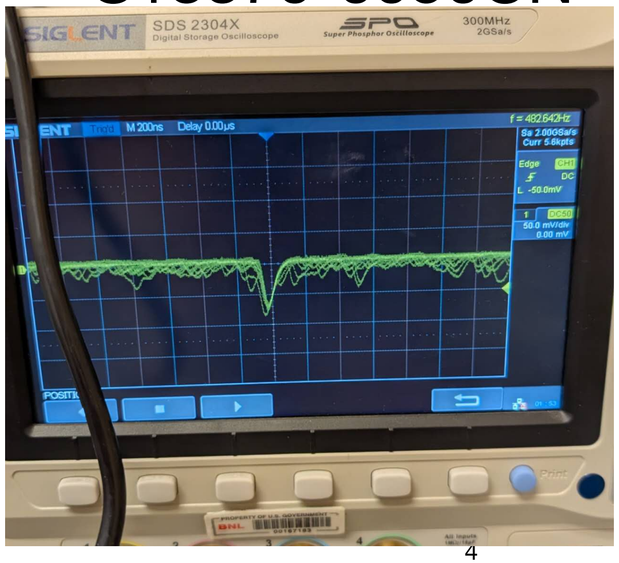


SiPM measurement setup

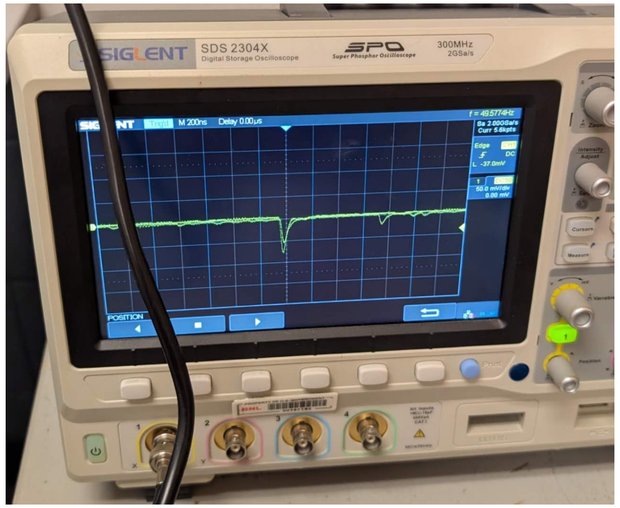
- Dark signal at SiPMs in dark room
  - There were some difficulties on observing the dark count on the sPHENIX SiPMs: S12572-015, tried multiple readout boards and double checked pinout
  - So we took a S13370-6050CN SiPM from WbLS setup in Chemistry and check the pinout
  - No signal at the beginning on both SiPMs
  - Resolved after joined the Pulser and DAC pin on the readout electronics
  - The sPHENIX SiPM requires higher bias, claimed to be 69V, actually need bias to about 74V to observe signal
- Next step is to conduct single photon

S13370-6050CN

S13370-6050CN



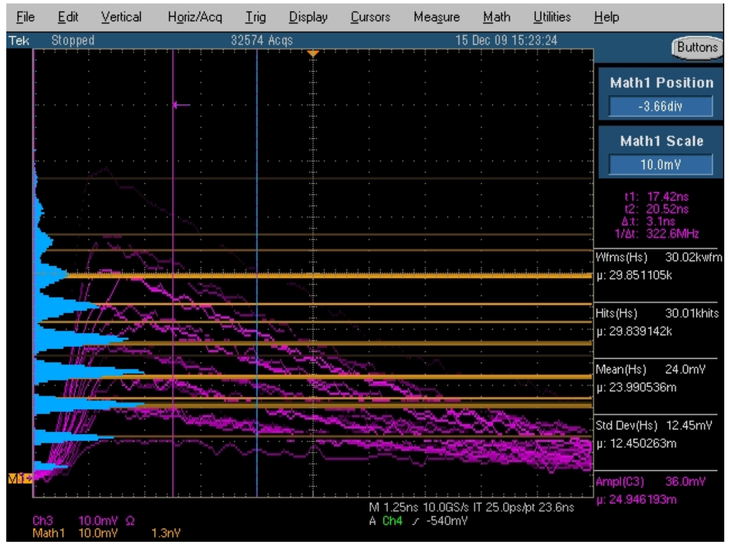
S12572-015 sPhenix



SiPM measurement setup

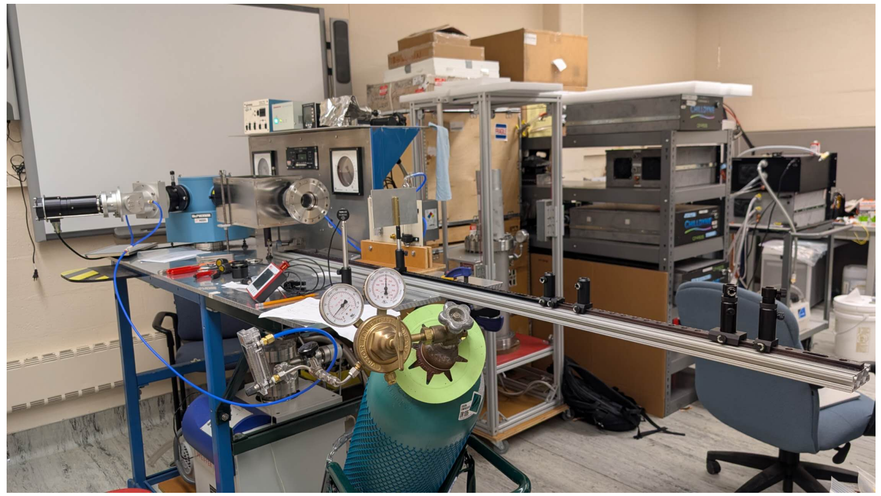
- Next step is to conduct single photon spectrum measurement
  - We have the light source-Pulser Xenon lamp, very high intensity for the purpose
  - Also need to feed the photon to the SiPM in dark room: just found the calibration fiber bundle on the sPHENIX prototype is useful
  - Will setup the light source to conduct the measurement using a better oscilloscope

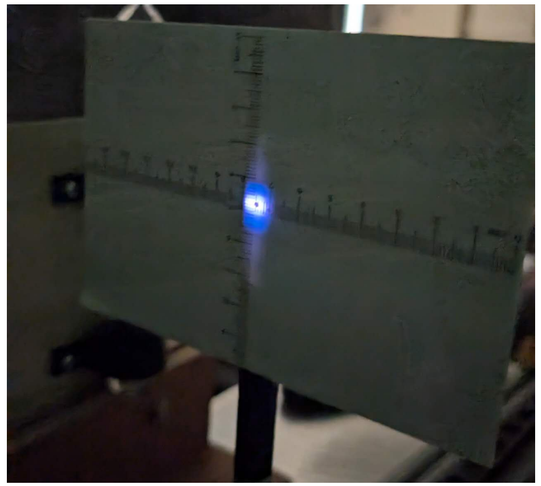
Expected signal illustration (Plot found online)

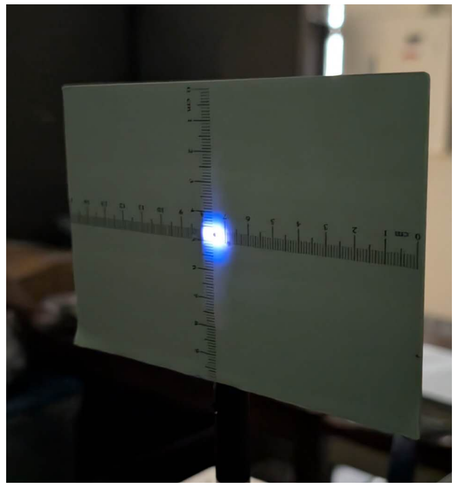


Monochromator Focal Length Meausrement

- Original plan using marked target screen
  - Optical holder on scaled track from along the light path
  - Measured on the width of light spot at multiple locations on the light path
  - The change is observable but the resolution with the marked targe screen is not sufficient
  - Changed to a camera

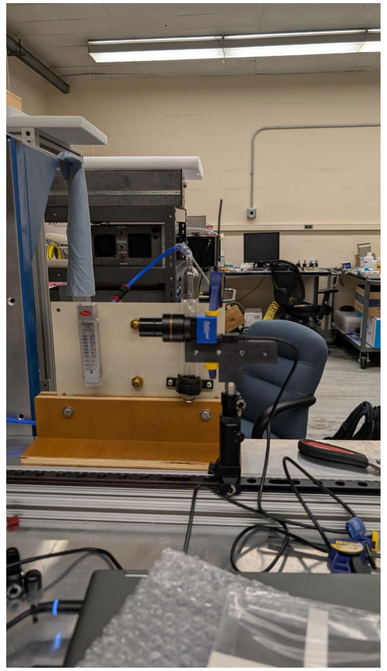


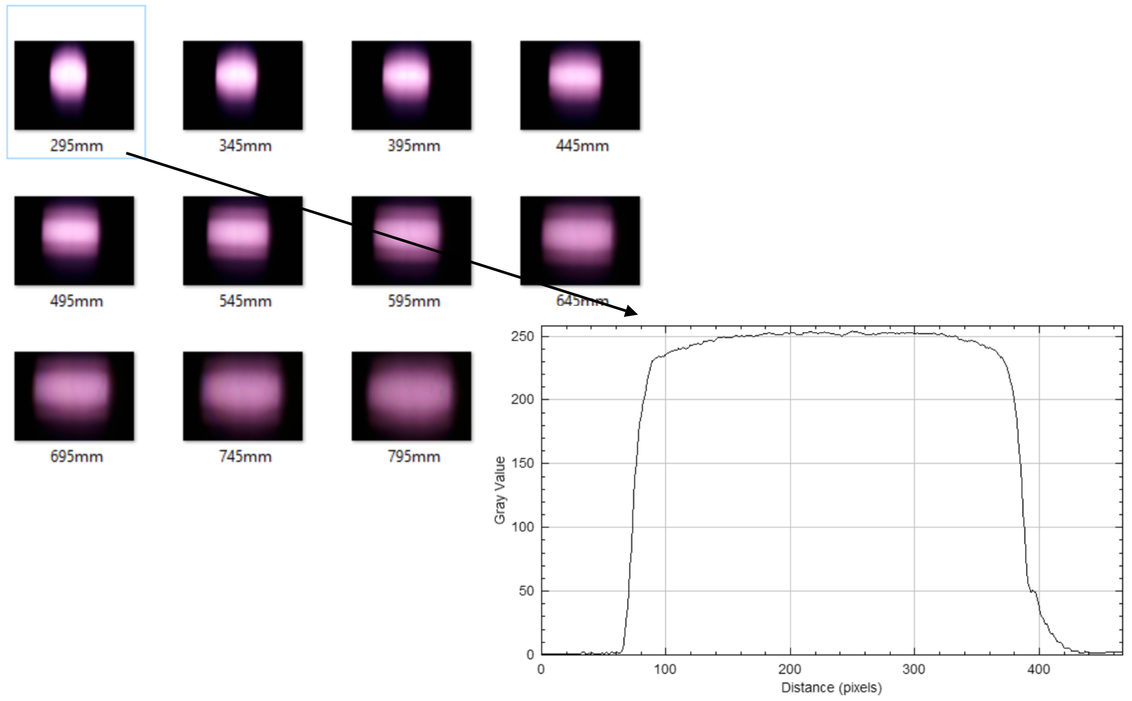


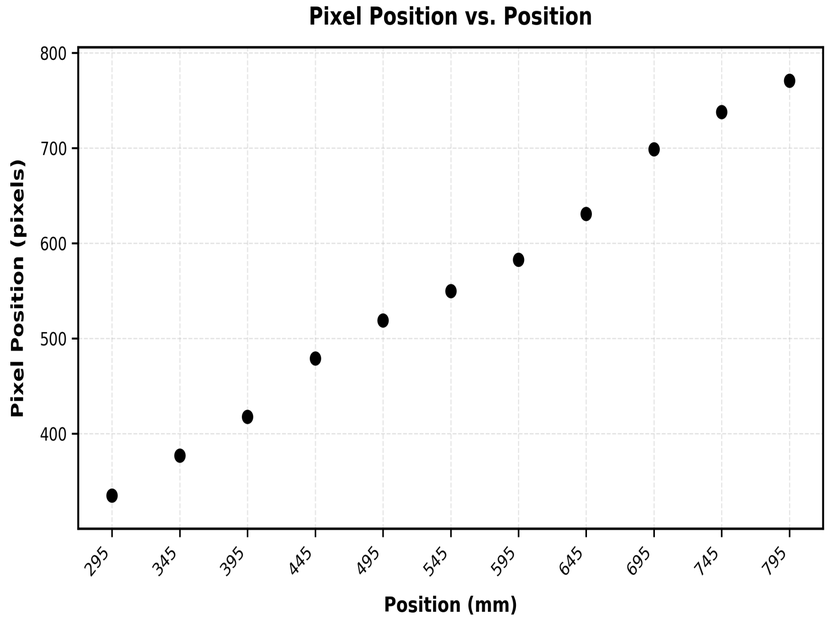


Monochromator Focal Length Measurement

- Bob provided a AmScope camera for the measurement
  - A lens was used to keep the light spot on the CCD
  - The change of light spot can be measured with the CCD pixel occupany
  - The light spot size keeps increasing along the distance-focal point seems to be very short, so we tried the new mirrors

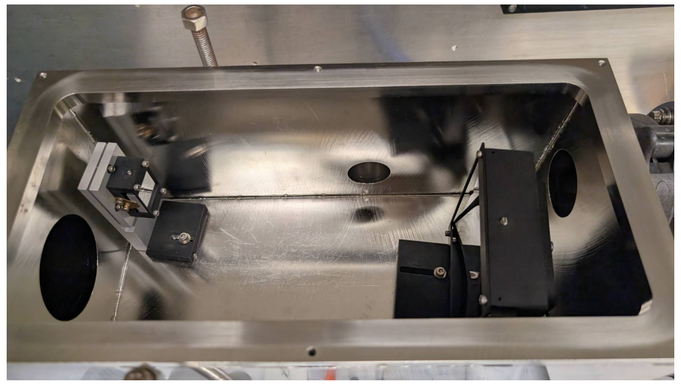


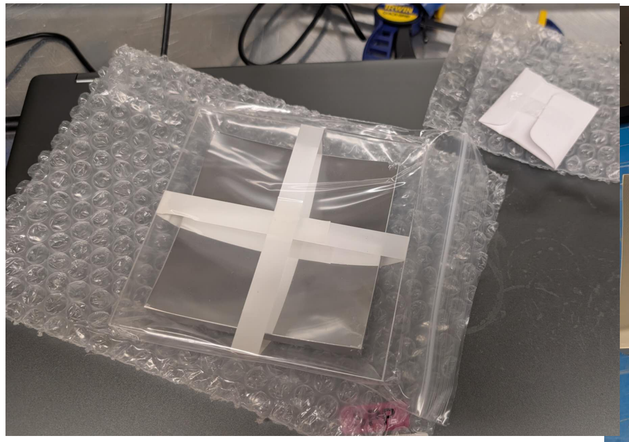




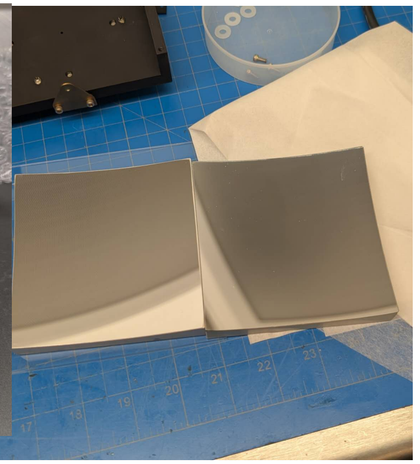
Monochromator Focal Length Measurement

- To save the new optics, the mirrors in the collimator box were old ones
- We switched in the new mirrors we ordered
  - An issue was found, the large collection mirror is curved, the small collimation mirror is flat, not concave
  - The new mirrors were replaced and put back to the collimator box
  - The light spot with the flat mirror spread too wide
  - Rolling back to the old collimator mirror for now
  - Bob will figure out with vendor about correct mirror

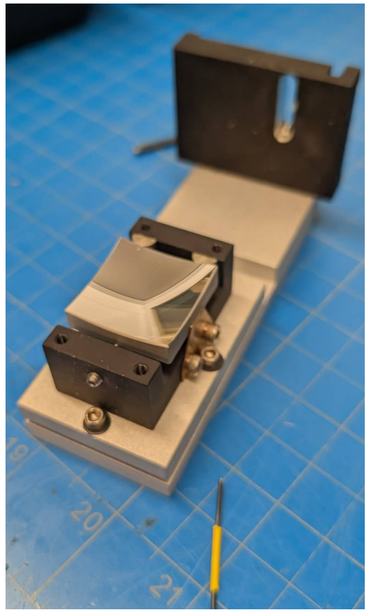




NEW OLD



OLD



NEW