LAr R&D Progress Updates 04/21/26

Yichen

Brookhaven National Laboratory

Lab Safety and Space Management

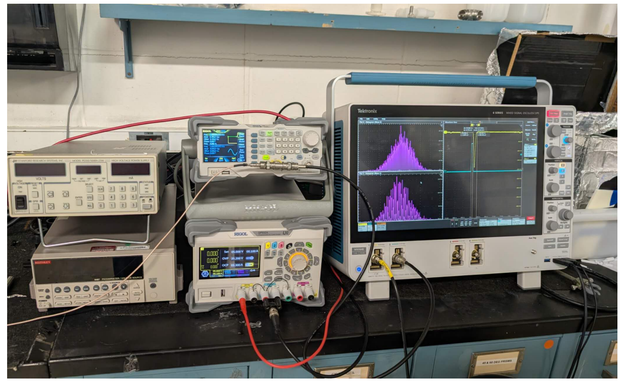
- Physics Department Electrical Safety Assessment out-briefing
  - Lab QA department provide the feedback
  - Very positive outcomes, only strength, no findings or other negativity
- ESH walkthru on 04/29
  - Will clean up the lab for the walkthru
- Lab space clean up
  - Paul was asking for clean up by remove items not in use
  - Basement storage cost only 1/5 of lab space
  - We don’t have much to spare
  - The Xenon cylinders are expected to be excess after transfer

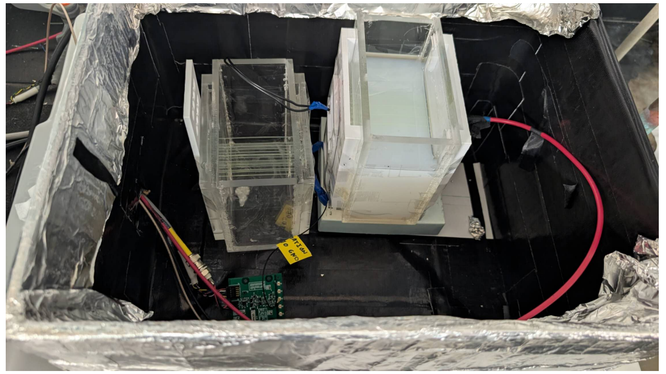
Xenon safety calculation

- Transfer Plan
  - 60 kg Xe total → ~4.6 kg per cylinder
  - Maximum Transferring 4 cylinders → ~18.5 kg Xe
- Receiving Cylinder
  - Liquid phase safety: not exceed 60% of total volume
    - Volume = 15.7 L
    - Max allowed liquid fill = 60% → 9.42 L
    - Liquid Xe density ≈ 3.1 kg/L
    - Maximum filling volume = 6 L (well below the limit of 9.42L)
  - Pressure safety: < 1600 psi
- Drafting work permit using the template from Kin

SiPM measurement setup

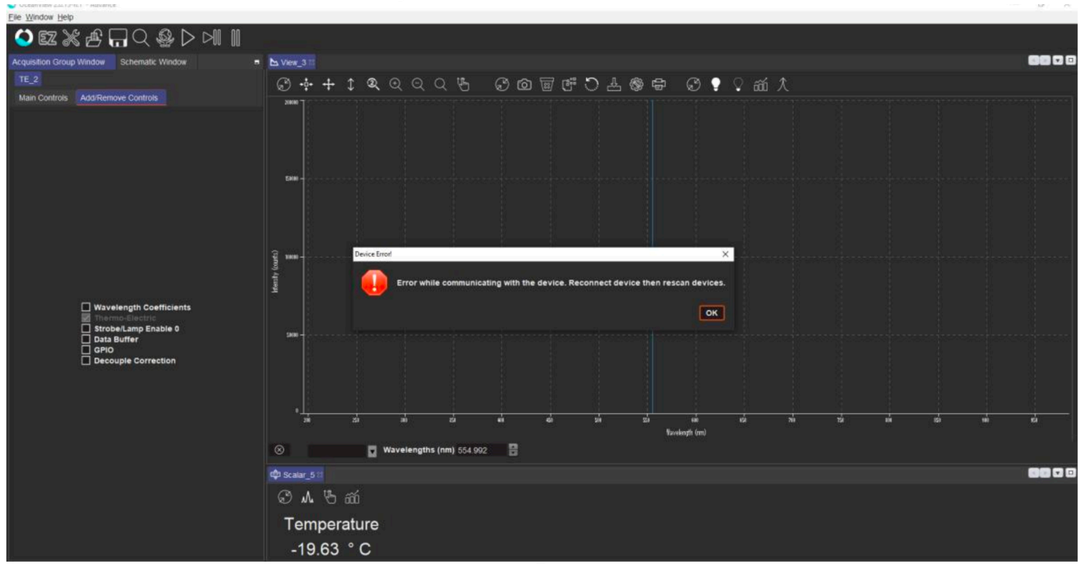
- I looked up the setup currently using for WbLS testing, figured out the checklist of equipment
  - Low voltage DC supply for readout electronics board
  - Pulse generator to drive light source
  - High voltage DC supply for SiPM bias >55V
- Gannon can help me setup up but not sure when the setup will be back
  - Duplicating the same setup
  - We have everything except for the HV DC supply
  - 3D printing mounting structure for the filter and SiPMs





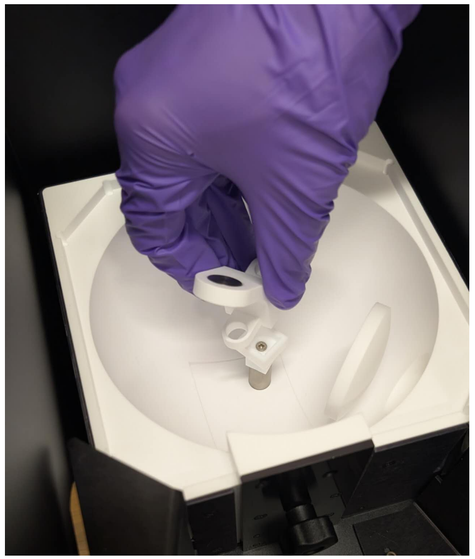
Spectrometer Repair and Focal Length Measurement

- The spectrometer has been fixed by the vendor
  - With my instruction, they do see the malfunctioning of the spectrometer after running for a few hours on high integration time of 10s with the cooling on at -20C
    - The control program issued a lost connection error
    - After restart, the lost connection error occurred again after a few hours
  - It is diagnosed to be lost connection between the motherboard and daughter board
    - The daughterboard was replaced
  - Although not exactly duplicating what I observed, they believe the connection issue is the fundamental reason
- Just got the spectrometer back from receiving, will test later today
- Scheduling with Bob to finish the focal length measurement today or tomorrow



Transmission and QE measurement in Chemistry

- Spectrometer in Chemistry
  - Commercial product from Edinburgh Instruments: light source; sample chamber; readout photon detector(PMT)
  - Equipped with 2 chambers, one for transmission, another for QE measurement with integration sphere
    - Integration sphere has 2 sample mounts
      - 1 for square vail for liquid measurement
      - The other for powder sample with reflective mirror and cover with small size of 18mm diameter
        - Inquiring with the company about requirement for solid sample like our filter
        - Further trimming down of out filter may needed



LN2 supply dewar repair

- I recently had a talk with a cryogenic expert worked at Airgas on vacation
  - There two LN2 dewar had issues of withdrawing LN2
  - I’ve told it often occurs due to accumulated moisture inside the dewar after full warm up, when the accumulated water is sufficient to block the tubing
  - The industrial fix of the issue is to flow heated dry gas into the container to evaporate the accumulated water
  - Using the house dry compressed air to conduct the similar operation on one dewar, plan to run for a week
  - There has been noticeable change in the pitch of venting noise
- Two new dewars have been delivered to highbay