LAr R&D Progress Updates 07/02/26

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Lab Safety and Space Management

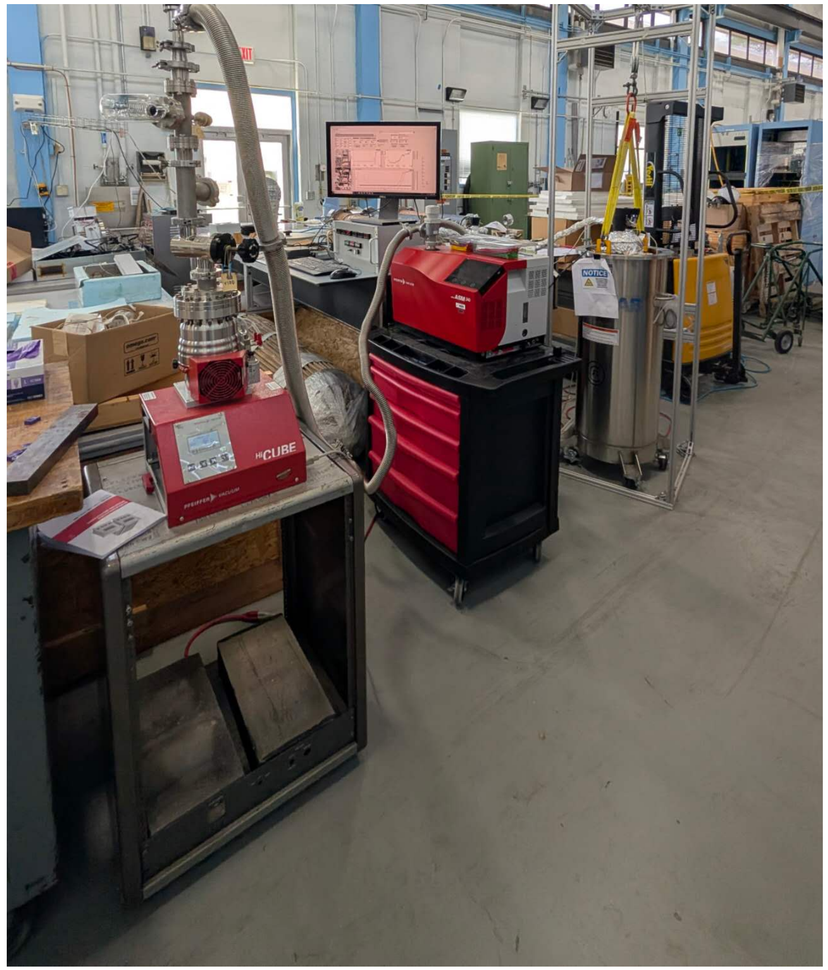
- Work Restart Review
  - I was selected for interview for works restart
  - House keeping issue brought by the reviewer during Work Restart Review
  - Highbay lab was cleaned up overnight to an unprecedented level
  - Pass the ESH walkthrough on Thursday
- ESR brief
  - I the PI for 2 ESR
  - Both have been approved to restart

Measurement taken last/this week

- Prototype 3D printing design and printing
  - Pusher block was produced by 3D printing
- Xenon collection assembly
  - Baking just started
  - Will organize the safety walkthough asap

Xenon collection system baking

- Henry and Amoggh handled all the heating tape and aluminum foil wrapping
- The system baking started around 11:30am today
- Now running at 100C, will increase to 150C later
- The process will last for 72hr for the initial baking
- Future baking time is expected to be shorter



Plan for summer intern students

Photon Detection System Development and Optical Characterization

Project Goals

- Characterize pTP wavelength-shifting (WLS) filters for PDS applications.
- Calibrate and evaluate VUV SiPM performance.
- Develop a prototype optical detector assembly.

Major Tasks

1. pTP Filter Characterization

- Complete measurements of remaining pTP filter samples.
- Study effects of:
  - Filter thickness
  - Manufacturing variations with longer scanning distance
- Evaluate coating conditions
- Comparison measurement with SBU samples
- Quantum yield measurement
- Transmission measurement

2. VUV SiPM Characterization

- Single Photoelectron (SPE) measurements using oscilloscope.
- Gain calibration and breakdown voltage determination.
- Gain vs. Overvoltage.

3. Detector Prototype Development

- CAD design and 3D printing (PLA prototype).
- Assembly of:
  - Filter mount
  - SiPM holder
  - Detector base
- Mechanical integration testing.

4. Optical Studies

- Investigation of Total Internal Reflection (TIR) effect
- Angular response measurements.
- Relative light collection efficiency measurements.

5. Monochromator Measurements

- Debris sample expected from Yimin

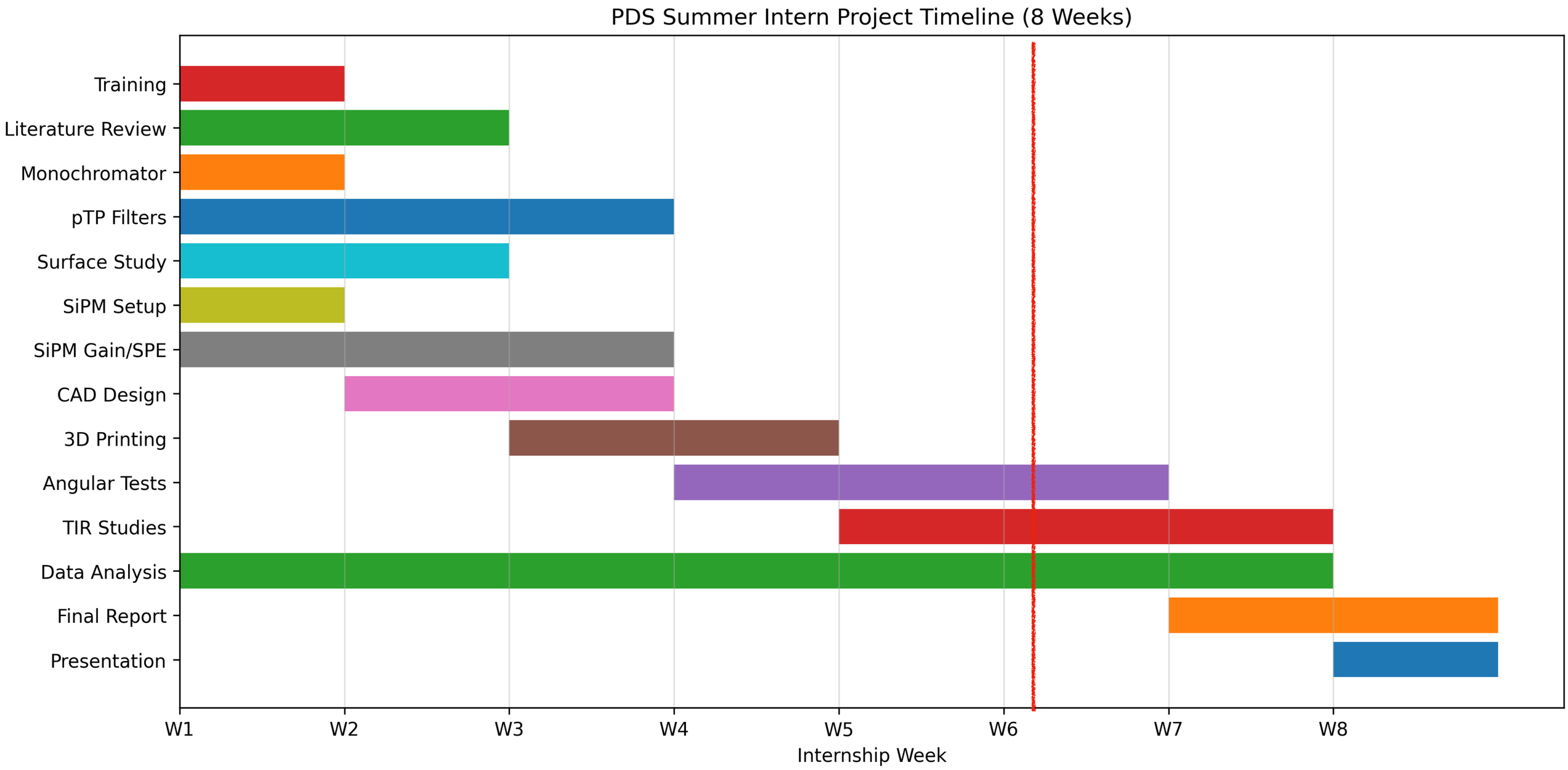
Deliverables

- Complete pTP filter performance database.
- SiPM calibration and SPE analysis package.
- Prototype detector assembly.
- Final technical report(tentative):
  "Characterization of pTP Filters and VUV SiPMs for Photon Detection Systems"

Skills Gained

✓ Optical measurements
✓ SiPM characterization
✓ Data analysis
✓ Mechanical design & 3D printing
✓ Detector instrumentation: spectrometer, profilometer, oscilloscope and etc.

Photon Detection System Development and Optical Characterization Plan



Plan for summer intern students

LAr Stand and Xenon Collection System Project

Cryogenic Operations, Xenon Collection, and Purity Monitoring

Project Goals

- Gain hands-on experience with liquid argon cryogenic systems.
- Support xenon collection and cryogenic operations.
- Construct and commission Xenon collection system
- Operation of cryogenic system

Major Tasks

1. Xenon Collection System

- Study system design and operation.
- Participate in system construction
  - Cryogenic plumbing
  - Leak check
  - Gas handling
  - Hardware installation
- Monitor xenon recovery performance.

2. Cryogenic Hardware & Controls

- Learn detector support infrastructure.
- Work with sensors, instrumentation, and controls.
- Introduction to LabVIEW monitoring and operation.

3. Inline Filter Construction

- Assemble new inline filter
- Leak checking and validation.
- Activation and commissioning procedures.

4. LAr Filling and Purity Measurements

- Liquid argon fills.
- Monitor purity evolution and system performance.
- Analyze purity-monitor data.

Deliverables

- Xenon collection performance assessment.
  Commissioned inline filter system.
- Purity measurement dataset and analysis.
- Final technical report:
  "Commissioning and Performance Evaluation of the Xenon Collection System"

Skills Gained

✓ Cryogenic operations
✓ Vacuum and gas systems
✓ Detector support systems
✓ Hardware assembly and troubleshooting
✓ LabVIEW controls
✓ Experimental data analysis

LAr Stand and Xenon Collection System Project Plan