

# LAr R&D Progress Report

Yichen, Milind, Aleksey, Steve

5/7/24



# Lab Safety and Space Management

## ▶ ESH walkthru

- A ESH walkthru by safety conducted on 05/01
- Hammon Lee, CPO of NPP attended the walkthru
- No complains to our lab

## ▶ 6000 gallon LN2 tank refill

- Filling portable dewars from the dewar so far, the reliable LN2 supply is critical
- ~24% volume left, refill of 4000 gallon ordered in advance, PO pinned today
- Will try to coordinate for the delivery as soon as possible
- Minor leakage on the plumbing when getting cold but not critical



# Lab Safety and Space Management

## ▶ **LN2 plumbing project**

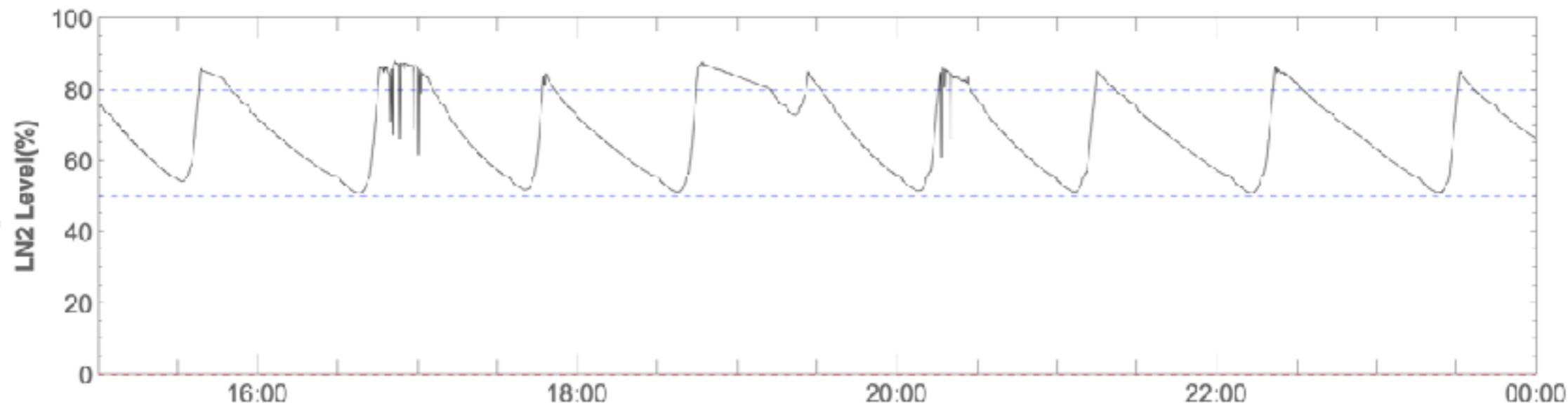
- Internal review contents period ends on 05/03
- Comments mainly from Deputy COO, Paul
- MPO is expected to resolve the comments with the Technifab
- We are also trying to understand the increase of the price of ~\$30k

## ▶ **6000 gallon owner change**

- It was a surprise to find it is under my name in the recent asset inventory check
- Changing it to a part of the build

# 260L LAr System Cryogenic Operation Status

- It has been 1 month+3 days since the beginning of the operation
- No LAr loss so far
- Lingyun helped maintain the cryogenic operation of the 260L system when I was away
- Milind took data everyday
- The cryogenic operation is overall very smooth
  - LN2 supply dewar was kept switching ~24 hrs
  - Recently observed some strange behavior in the LN2 boiling off, trying to under the reason
  - The LAr conditions are still stable within the safety limit



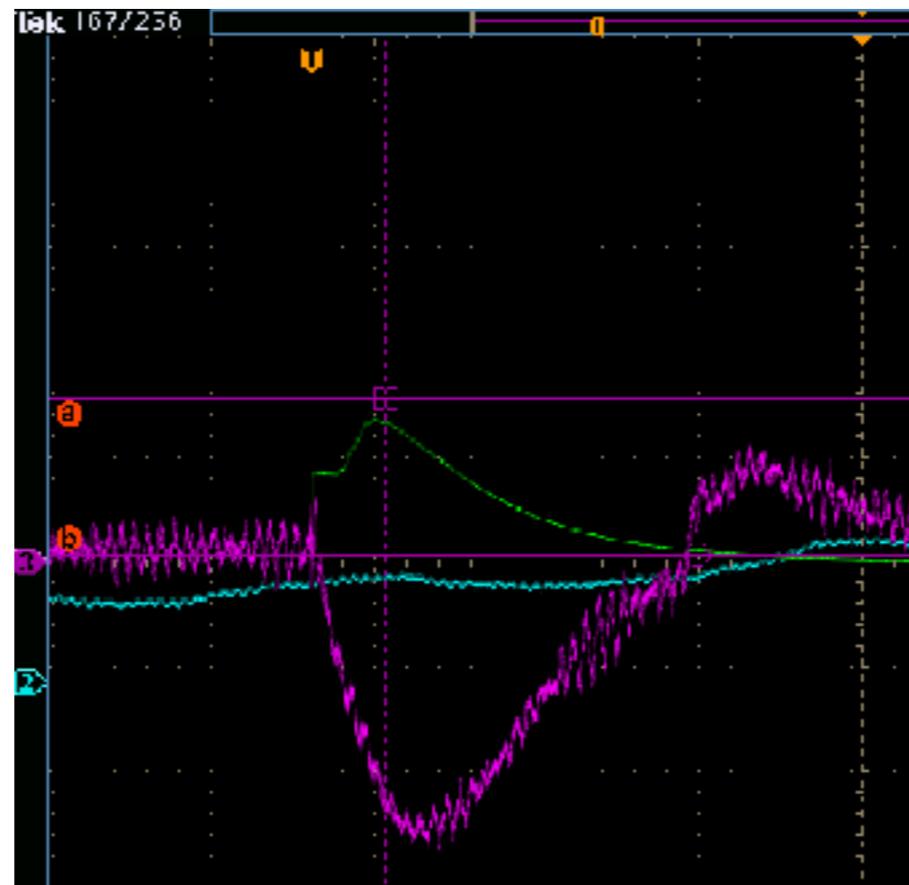
# Problems found during the operation so far

- Icing noticed on the super insulated filling hose
  - The vacuum seal plug popped
  - Need to re-evacuate before next run
- Ice accumulation on the N2 venting plumbing
  - Significant ice ball on the relief valve and un-insulated plumbing
  - Conducting the de-icing with heat gun once a week
  - Adding a fans should be helpful



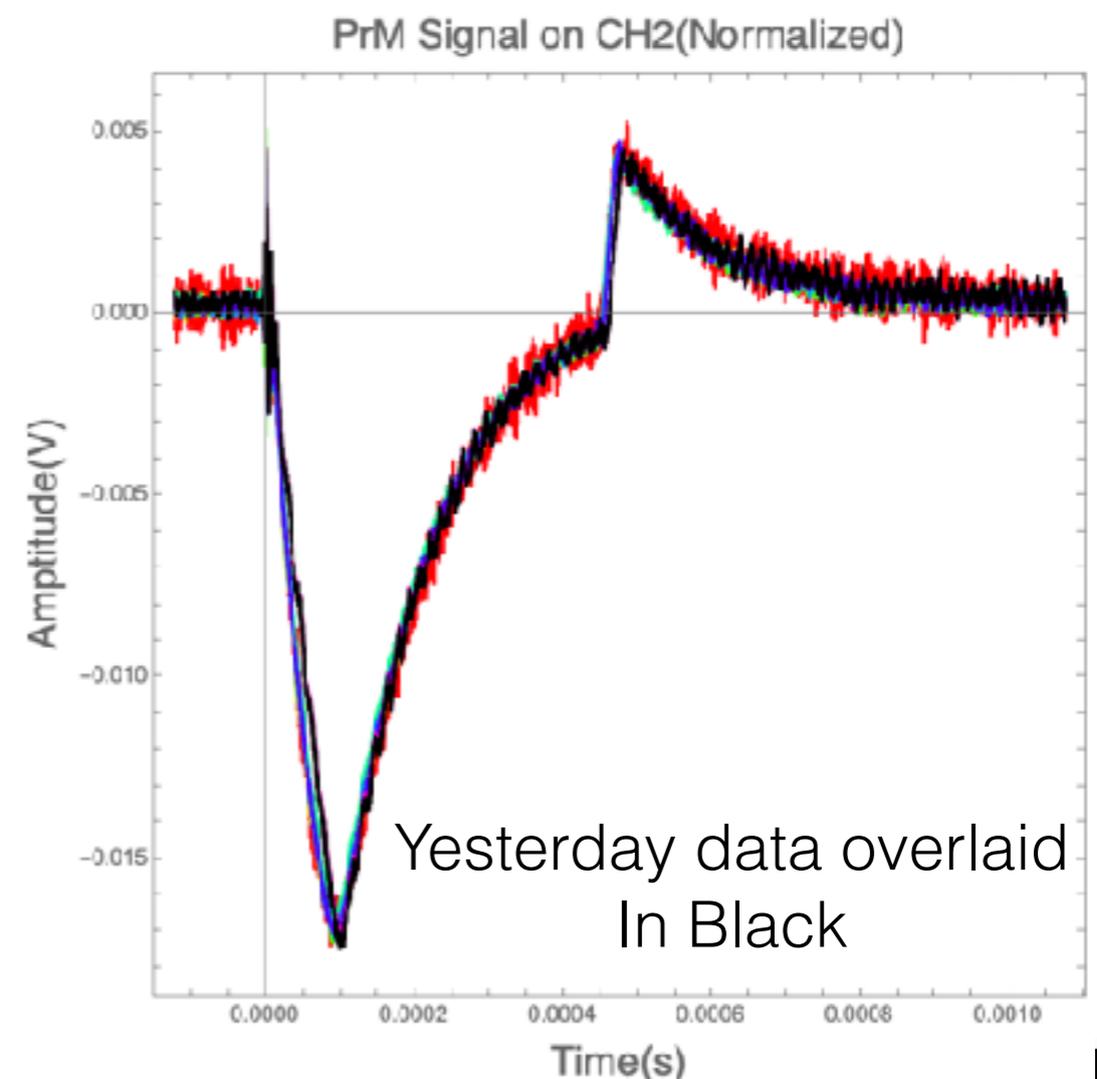
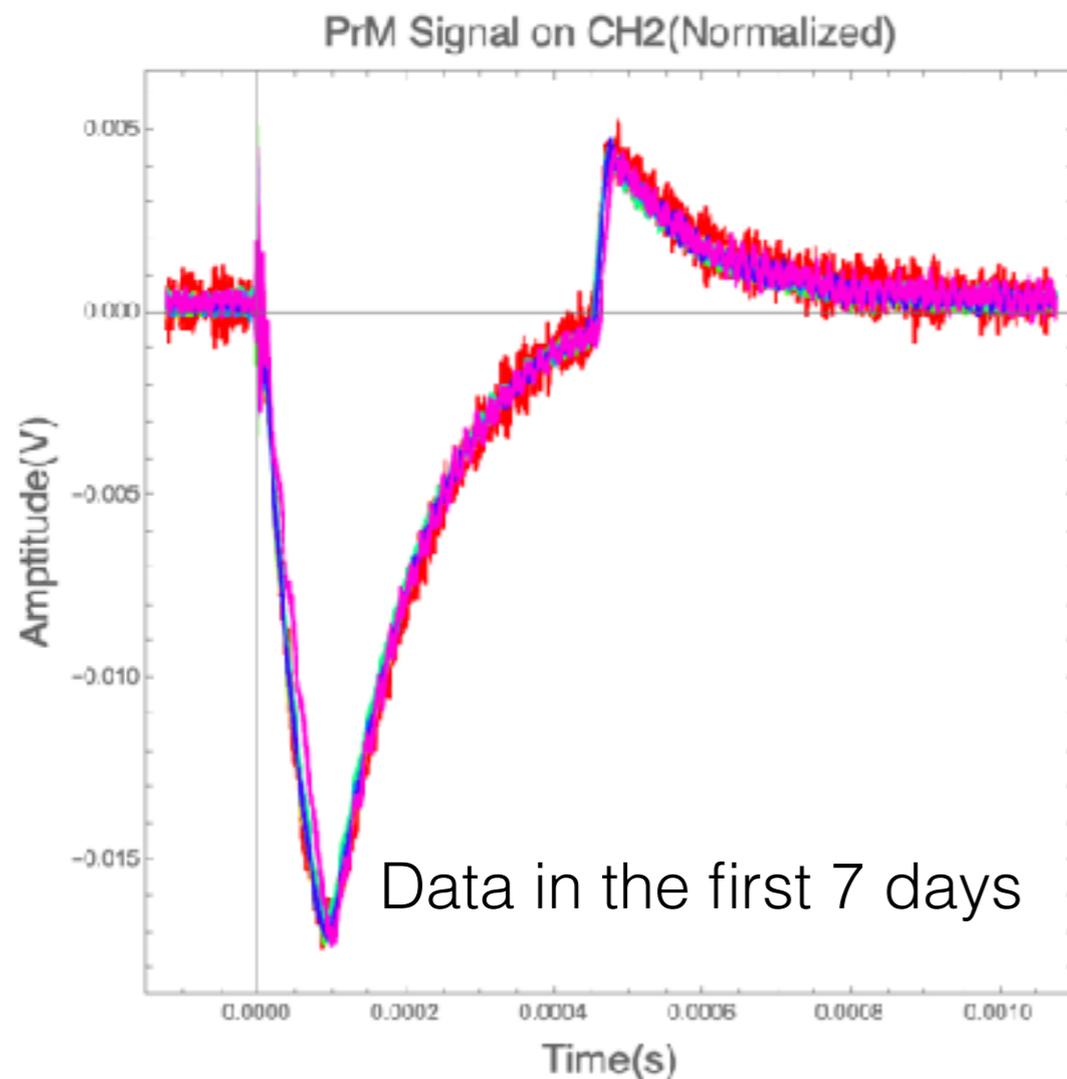
# Problems found during the operation so far

- Xenon lamp pulse shape is strange with some after pulses
  - Current solution is running on single mode with high trigger threshold
  - The bulb may be aged, consulting with Hamamatsu tech support and quote for additional spares
- PrM electronics
  - Still only have one normal channel
  - Waiting for Jianming's response on getting a spare, and sending the one we have back for repair



# 260L LAr System Purity Performance Preliminary Results

- Normalized the data to the peak of cathode signals
  - The electron lifetime by the peak ratio is kept about the same
  - The purity keeps about the same level



# 260L LAr System Running Plan

- Continue running with purification this week
- Start to run without purification next Monday, i.e. bypass the purifier, with frequency electron lifetime measurement, every 1/2 half for 1-2 days
  - Electron lifetime degradation expected
  - The rate should tell us about the leak rate
- Restore the purification, for a week, until electron lifetime restored to the current level
  - Electron lifetime is expected to improve with time
  - The cleaning up rate should tell us the cleaning efficiency and circulation rate
- Another fill to check how soon the purity can be achieved
- A JINST tech report draft about the 260-L system on overleaf:
  - <https://www.overleaf.com/7284791279ptjcyrszcgyn#3e119a>
  - Currently just uploaded the draft of 20-L JINST tech report as a template to start with

# Meeting Plan

- ▶ **Have a technical meeting next week on Tuesday 05/14 to address the issues mentioned in the previous slides**
  - Addition equipments to purchase
  - Hardware issue resolutions
  - Test chamber design
  - Additional equipment for the next run, a heater?
  - Have a technical meeting every two weeks
  - Drafting a lesson learned document to summarize the problem and solutions in this run