LAr R&D Progress Report

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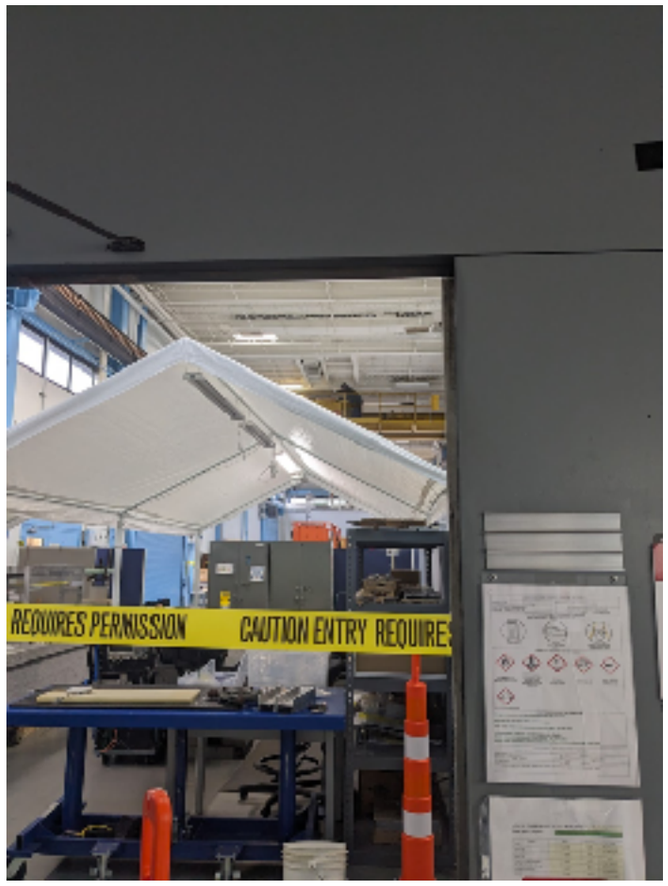
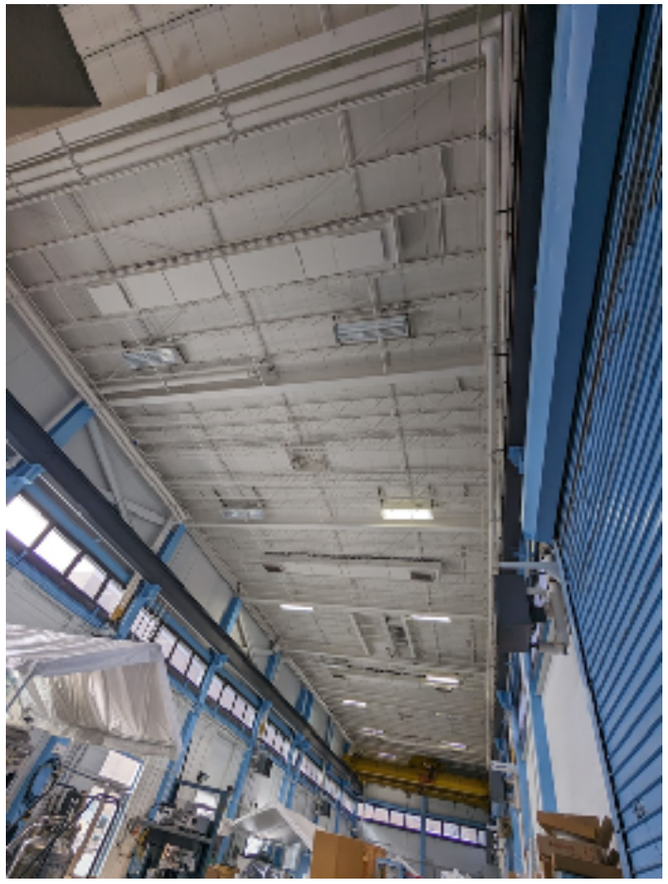
10/24/23

Lab Safety and Space Management

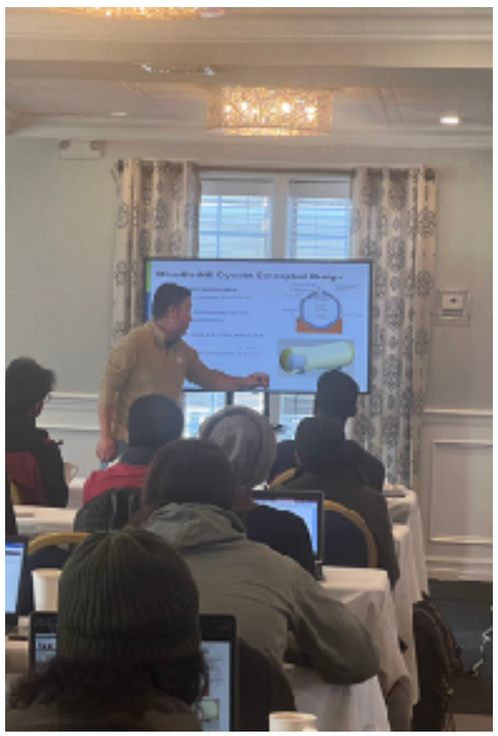
- High Bay overhead lighting repair
  - A large number of overhead lights replaced
  - The entire lab has to be evacuated for the work
  - The lighting in the lab area has been significantly improved
  - There are 4 lights on top of our lab area not been replaced due to parts shortage
  - They are expected to be replaced later when new parts arrived





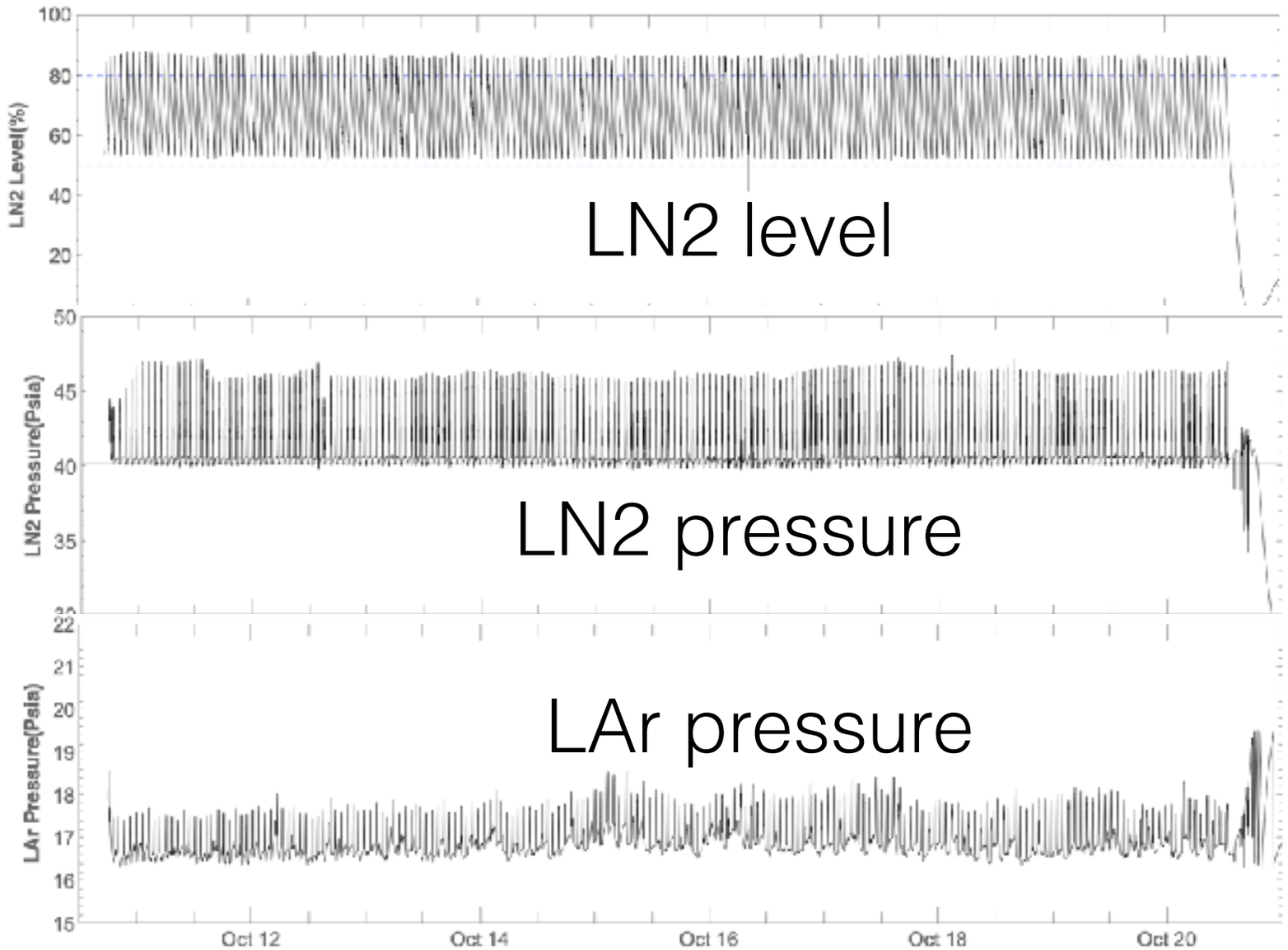
EDIT school 2023

- The EDIT school ran from 10/20-10/20
- Pretty intensive schedule with lectures in the morning at Danford's at Port Jeff. Lab section 1:30-6:00 in the afternoon
- Me, Haiwang, and Shanshan each gave a 1 hr lecture
- LAr lab includes LAr cryogenic lab and CE tests
  - 260L system was filled on 10/20 with LAr and running until the end of the school
  - Students involved in limited cryogenic operation due to safety restrictions
  - All 13 pcs of old Xenon detectors were disassembly by the students
  - Lab section finished with no safety incident



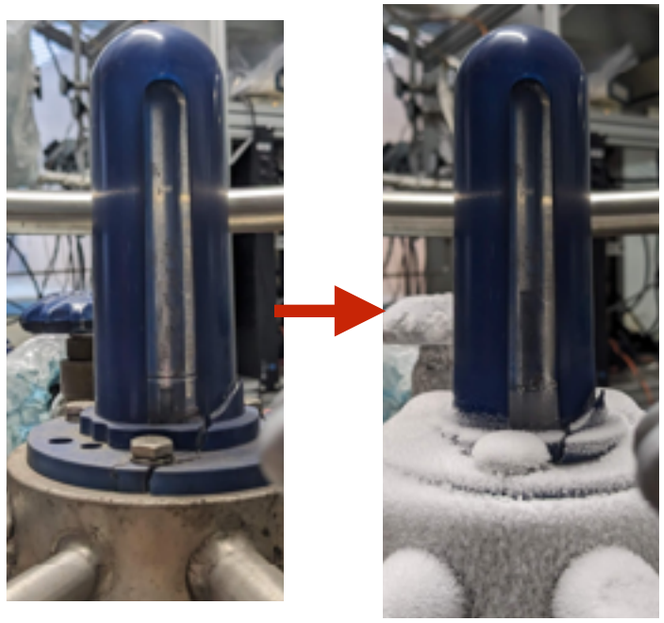
260-L System Cryogenic Operation

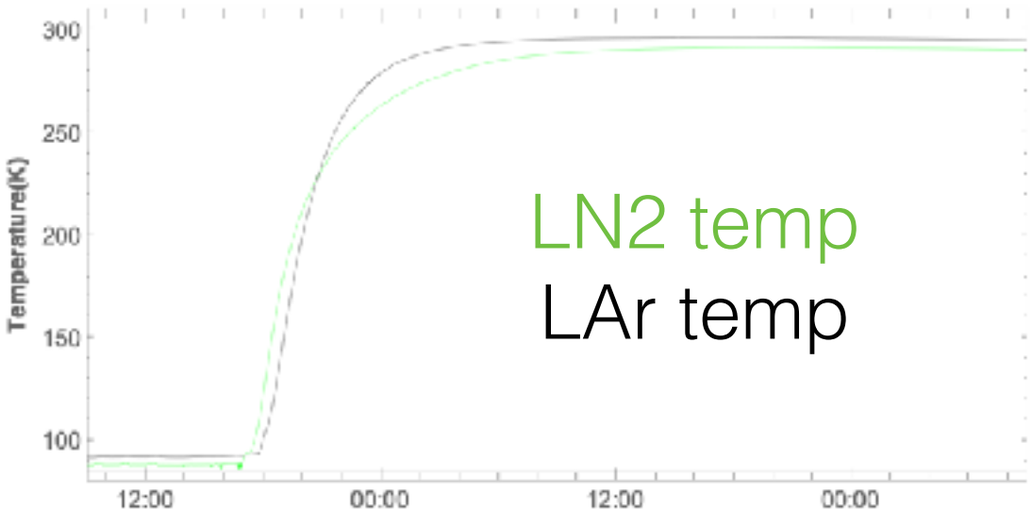
- LAr was delivered on 10/09
- System filled on 10/10, run for 10 days
- Cryogenic operation is very stable with sustainable LN2 supply



260-L System Cryogenic Operation

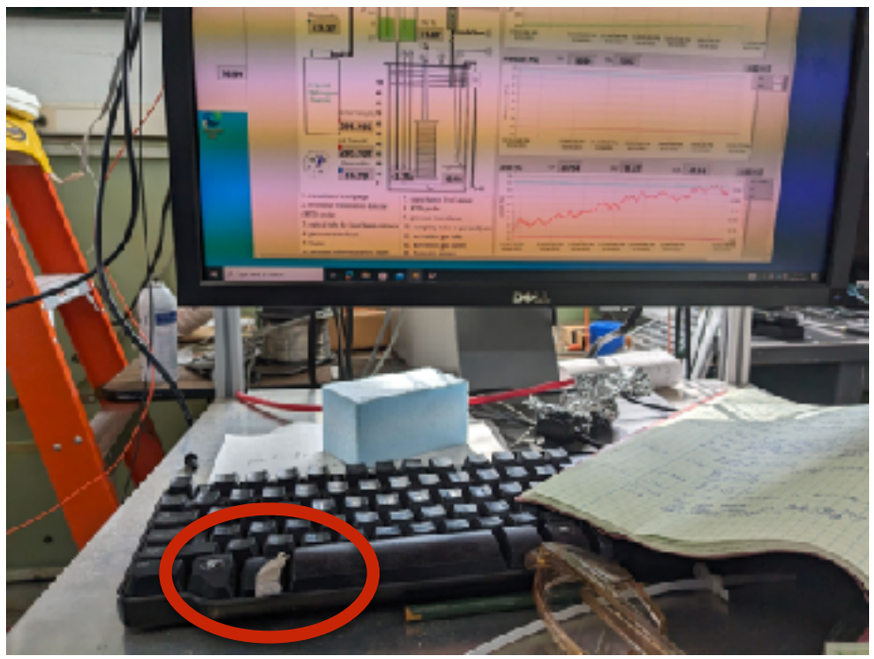
- System warmed up started on 10/20
- Residual LAr in the 260 L dewar was backfilled into the supply dewar
- ~1/3-1/4 Full volume recovered
- Full warm-up took about 24 hrs





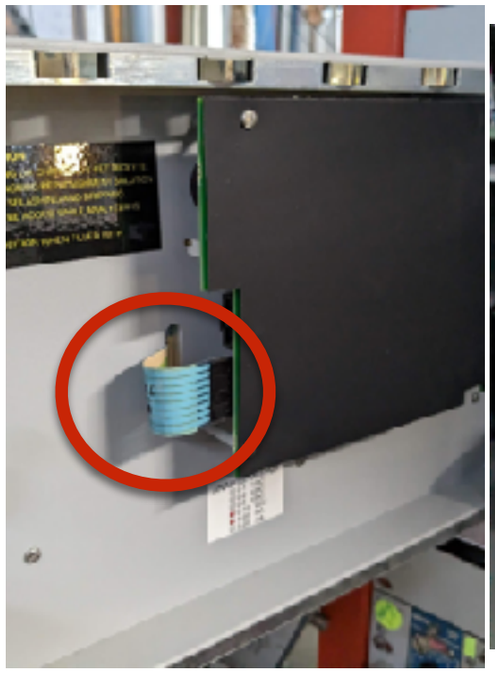
Problems found in the Run

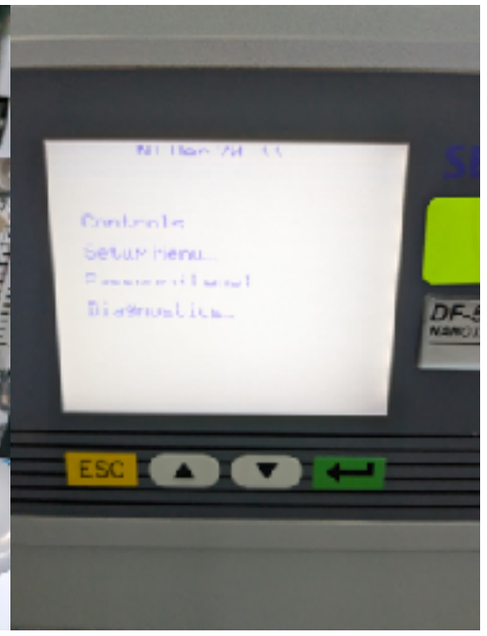
- Local PC account blocked by cyber security
  - DUO authentication was implemented with the updates
  - Had to rewrite the control program under my own account
  - In contact with cyber security to get an exempt
- Press-differential level gauge malfunctioning
  - Replacing the part for the next run
- LN2 hose insulation quality reduced, with water condensation on the surface when cold
  - Will re-evacuate the hose before next run



Problems found in the Run

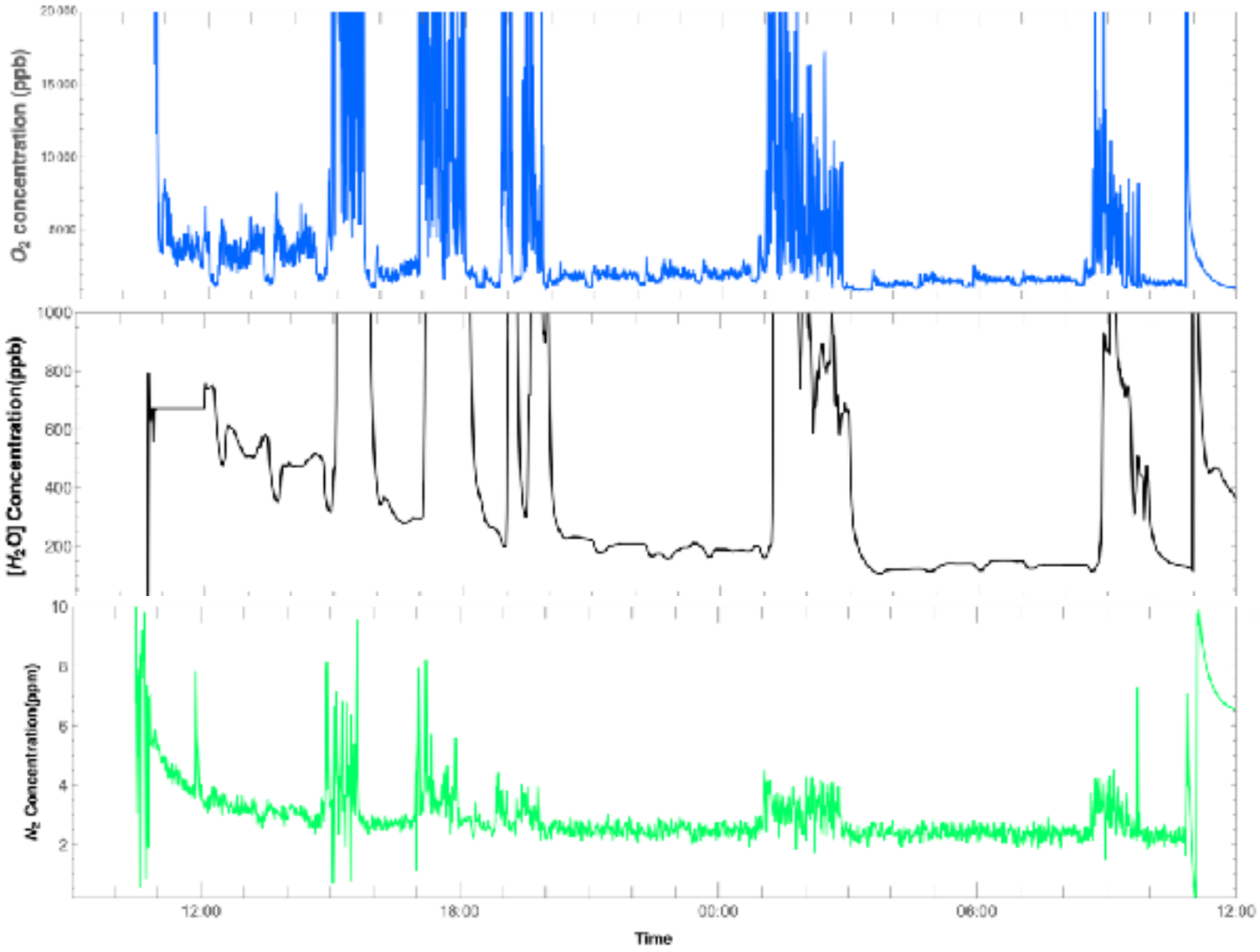
- O2 analyzer display issue
  - No display on the screen
  - Temporary fixed with bending the ribbon cable
  - Need a replacement screen
  - Ran out of electrolyte solution, refilled with fresh electrolyte
- H2O analyzer pressure issue
  - The H2O analyzer was able to give readings but issue a pressure over range warning
  - Sent the diagnosis file to the vendor for troubleshooting
- PrM no reading in vacuum
  - Going to do troubleshooting after opening up





Purity performance

- Only limited purity readings near the end of the run
  - Water and O2 readings are very high
  - N2 concentrations is at the acceptable level



Plan for the next run

- The system can be used for light measurement given the current N2 concentration level
- Supporting structure design and construction for the filter measurement
- It is essential to get the PrM work in the next run
- Going to ask help from Nitish with his previous experience working on PrM