

LArFCS Cryogenic System progress

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LArFCS Cryogenic Operation

▶ LArFCS Cryogenic Operation 2nd Run

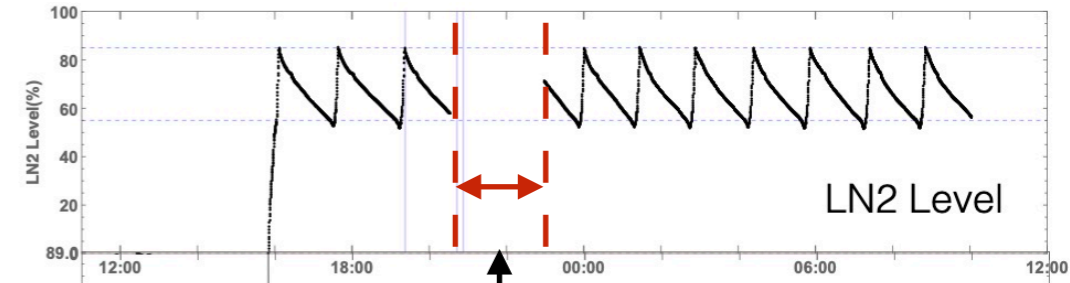
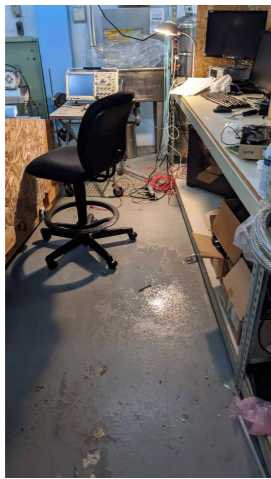
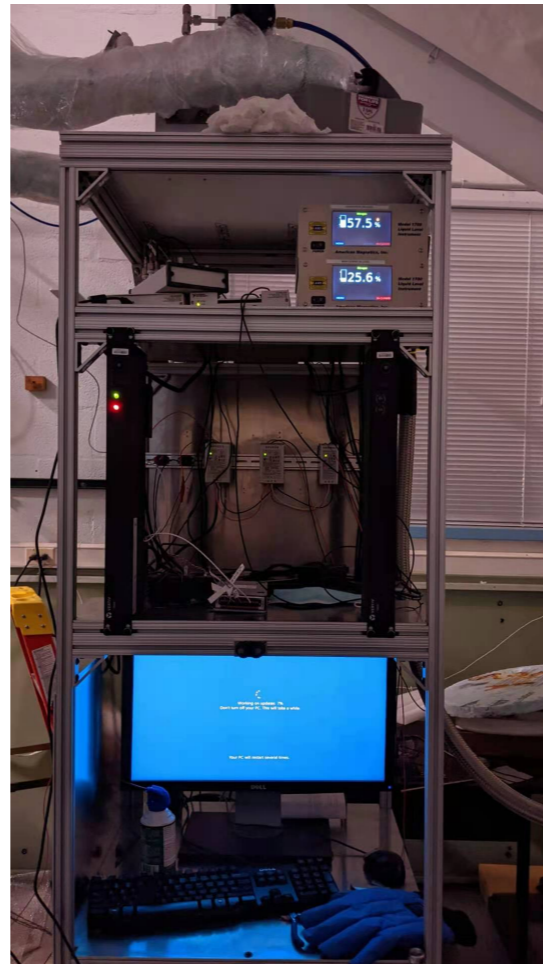
- LAr delivered last week
- No LN2 delivery on every Thursday now
- Filling to the main dewar on Monday
- The cryogenic operation runs stably for ~24 hr
- An interruption by control PC rebooting found luckily in time



LArFCS Cryogenic Operation

► LArFCS Cryogenic Operation 2nd Run

- Roof leaks in High Bay
 - Storm on Sunday caused leaks on the highbay roof, 6 leaks found at least, Building manager and safety noticed
 - Tent protects the system getting wet, 2 leaks at least on top our setup
- Control PC
 - A Windows10 reboot occurred at 8:32pm last night, lasted for 2.5 hrs
 - The LN2 filling was done 2 times manually during the interruption
 - Complaints to ITD and it was an annual major updates pushed out before adding the machine to the exempt list
 - ITD staff ensures it won't happen for a year and will add me to the notification mailing list for avoid future incident



PC reboot
Wins Updates
~2.5 hrs

These updates help protect you in an online world

Don't turn off your PC

LArFCS Cryogenic Operation

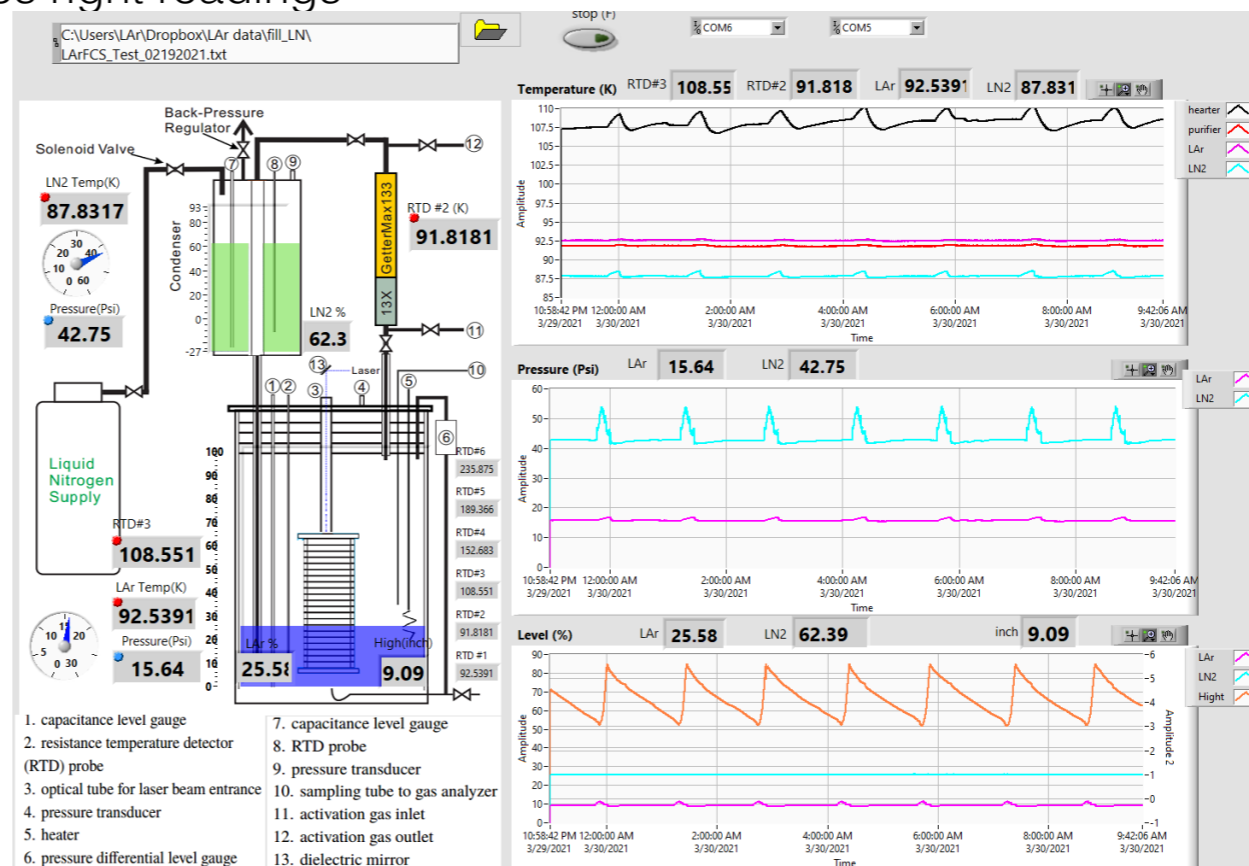
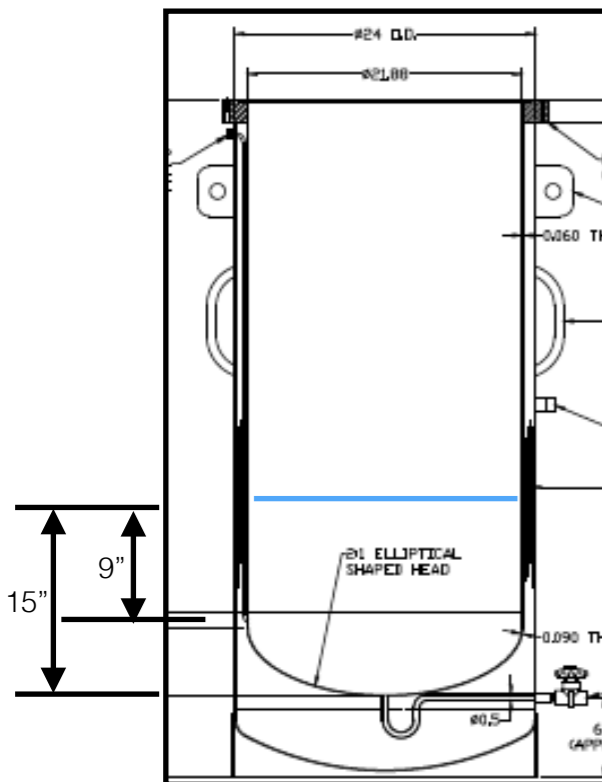
► LArFCS Cryogenic Operation 2nd Run

• 2nd Run

- The cool down consumed large amount LAr
- With 3/4 LAr dewar volume, the main dewar filled to 15" from the bottom, i.e. 70 L of LAr.
- Stable Cryogenic circulation established this time
- LN2 consumption is ~4.53L/hour, preliminary heat load is ~100W, each full LN2 tank can last ~48 hrs

• All components worked this time

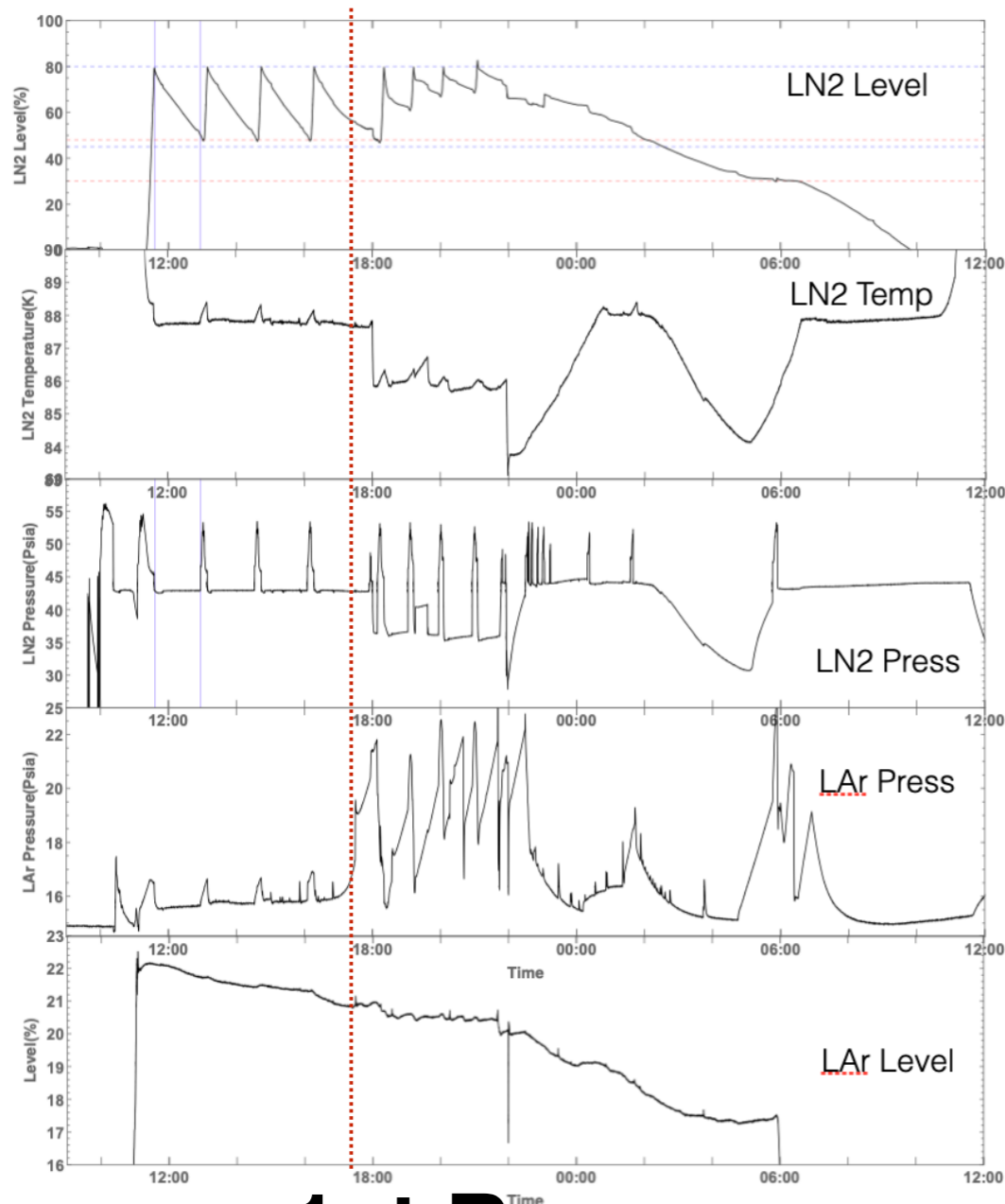
- RTD probe provides an approximate level this time
- Press differential level gauge provides right readings



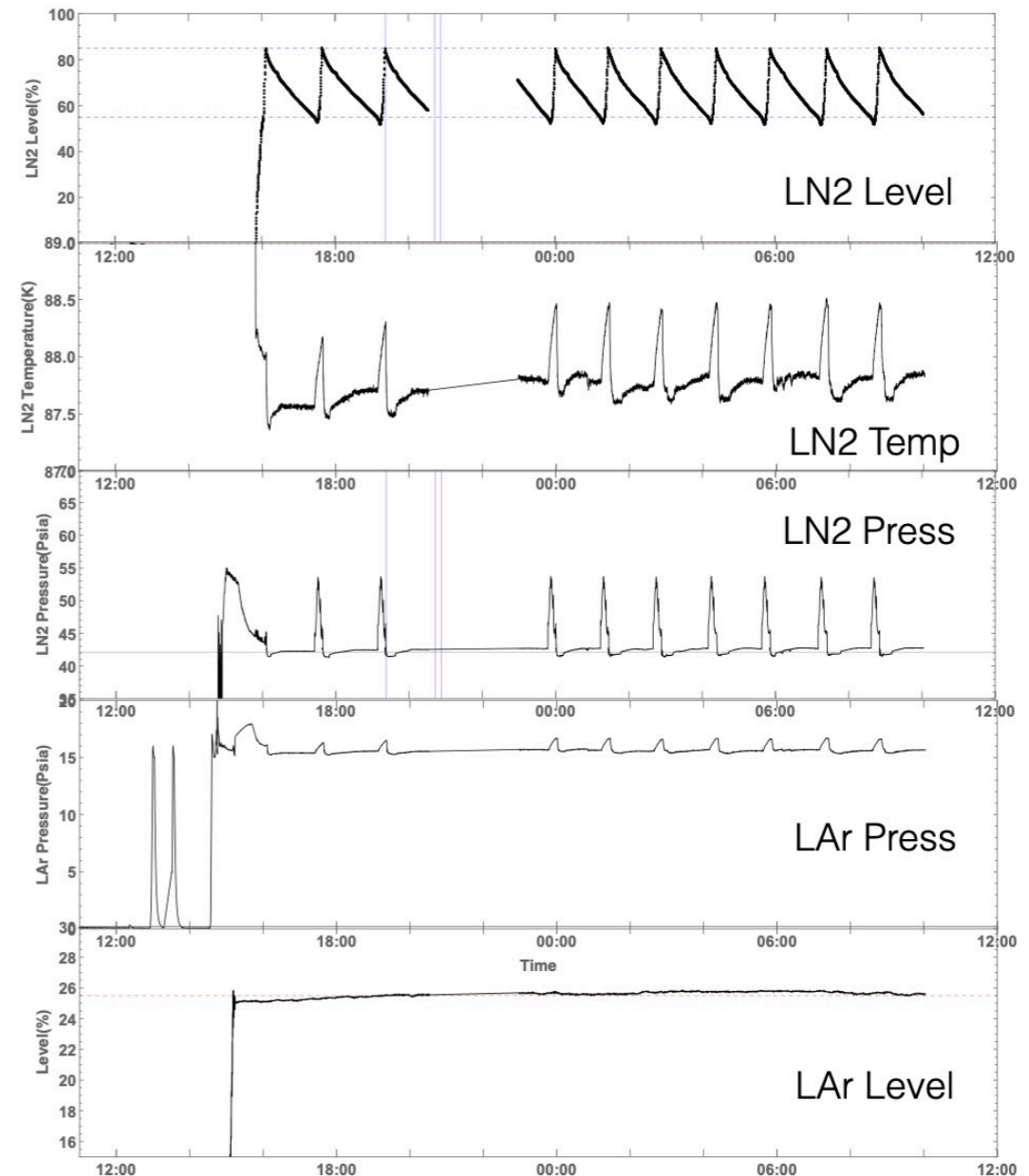
LArFCS Cryogenic Operation

► Comparison between the 1st and 2nd Fill

- 1st Run last < 24 hr, stable for 3 filling cycle(~8 hrs) and terminated early
- 2nd Run runs for ~24hrs and stable
- The goal of stable cryogenic operation of LArFCS system achieved



1st Run



2nd Run

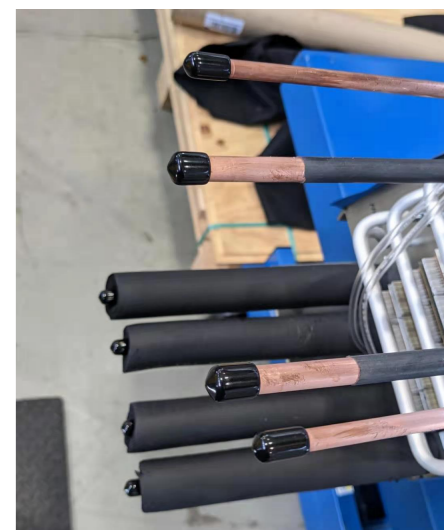
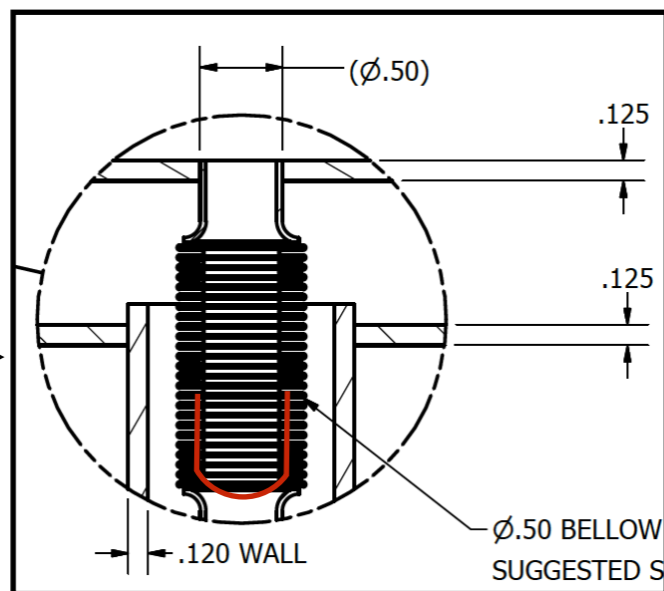
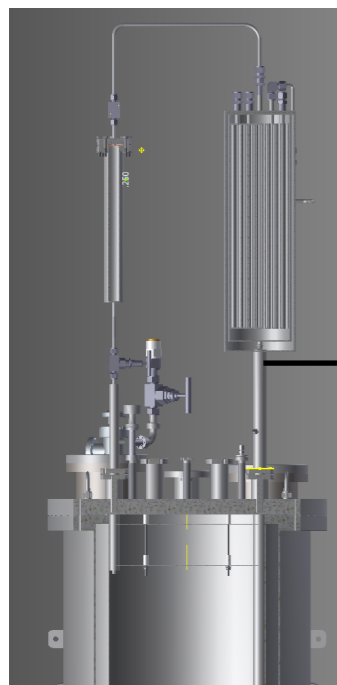
LArFCS Cryogenic Operation

► 2nd Run findings

- 1st run issue due to the blockage in the condenser
- 2 tanks of LAr required to fill the dewar to a workable level from warm system
- Some condensation observed on LN2 filling hose, needs to be pumped down again

► Plan for this week

- Maintain the cryogenic operation to next week
- 2nd run data analysis for LAr level calibration
- Accelerated circulation with heater to test condensing power
- Condenser blockage test at the end
- Return the LAr back to supply dewar

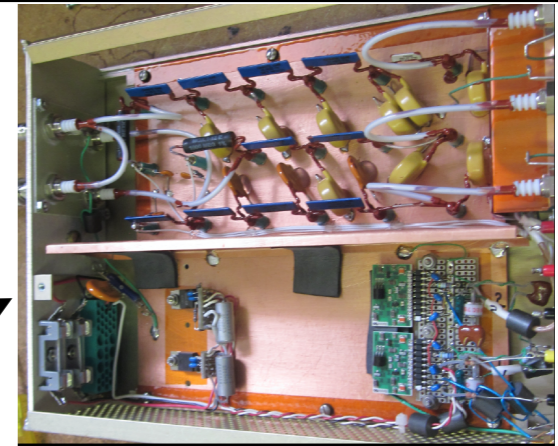


LArFCS Purity Monitor

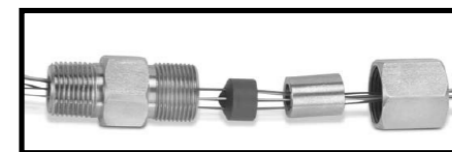
► Purity Monitor

- Talked Jianming from UCI for the PrM collaboration
- The dominant cost is the electronics and Xeon lamp
- Reach an agreement to send parts of electronics with the stack for assembly
- Assuming we can re-use our Xe lamp, it can bring the cost down by more than half down to ~\$4500 from the table
- It would need 3x 2.75" CF flanges on the top flange, we can use on spare 8" CF on the LArFCS top flange for PrM

Readout Electronics parts ~\$600



Fiber Feedthru



HV feedthru(We have feedthru) ~\$650



Item	Cost per PrM (\$)	Quantity	Total Cost (\$)
Electronics	3,000	1	3,000
High Voltage	BNL	1	BNL
Digitizer	2,000	1	2000
Fibers	1,000	1	1,000
HV feedthrough+g10 tube+cryoepoxy	1500	1	1,500
Flashlamp+optical trigger	4,000	1	4,000
Photocathodes	500	1	500
Top Flange+mounti	BNL	-	BNL
DAQ PC	BNL	1	BNL
Sub-total (direct cost)			12000

Xe Lamp: Check if the one found in lab still works

Photocathode: free from UCI' batch