



FCalPulse

Analysis Meeting

Cryostat Update

September 15, 2021

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Equipment Status & What's Next

- 3 of 4 boxes have arrived Sept 10.
 - Cryostat crate was left at a shipping hanger in GVA.
 - Working on getting it shipped.
 - ETA for AZ delivery unknown.
 - Boxes in very good shape, have not opened.
- As soon as equipment arrives:
 - Setup cryostat for running in lab.
 - Reconfigure for current measurements.
 - Same setup as previous AZ LAr studies.
 - pA meter electrode readout.
 - Study oxygen analyzer readings.
 - Certified gas
 - Understand what was problem at CERN.

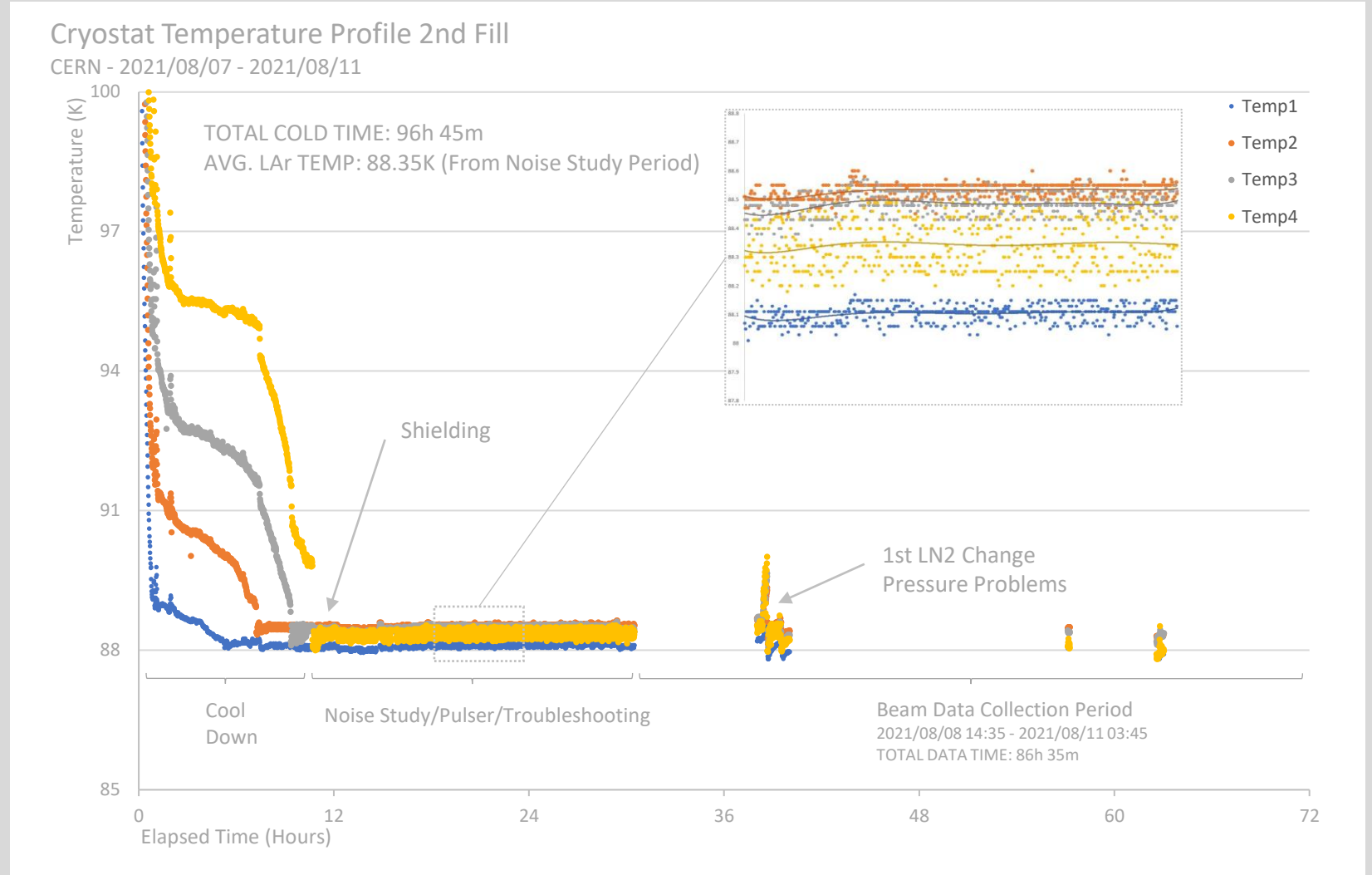


Quick look at cryostat's data

Temperature

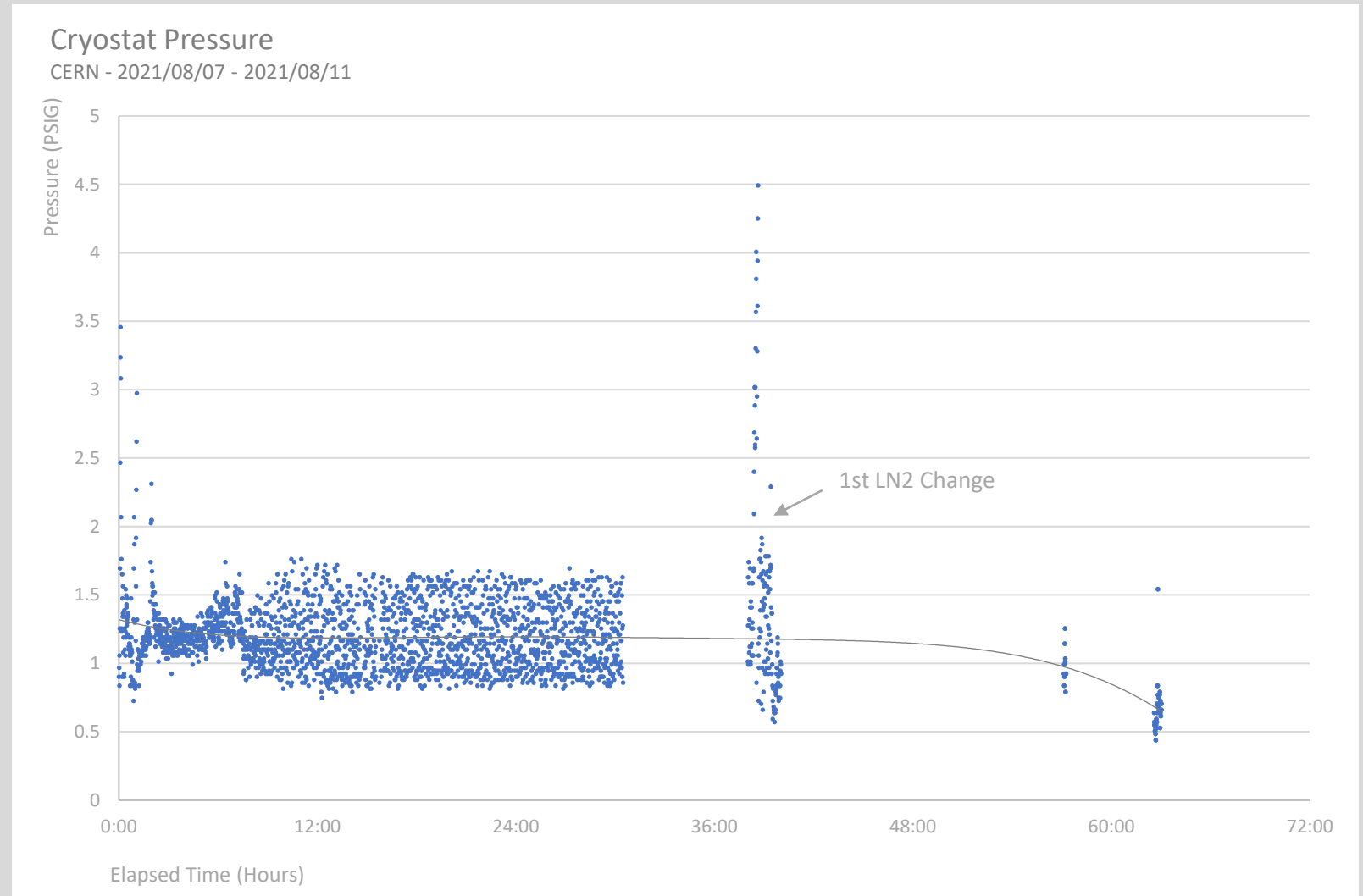
Things to note:

- Fill 1 dumped due to high O₂
- 2nd fill began Aug. 7 @ 02:30
- Fill times ~12 hours
- After beam data started, limited cryostat data taken to limit noise
- Total cold time: 96h 45m
- Total data collection time: 86h 35m
- Dumped LAr Aug. 8 @ 03:45



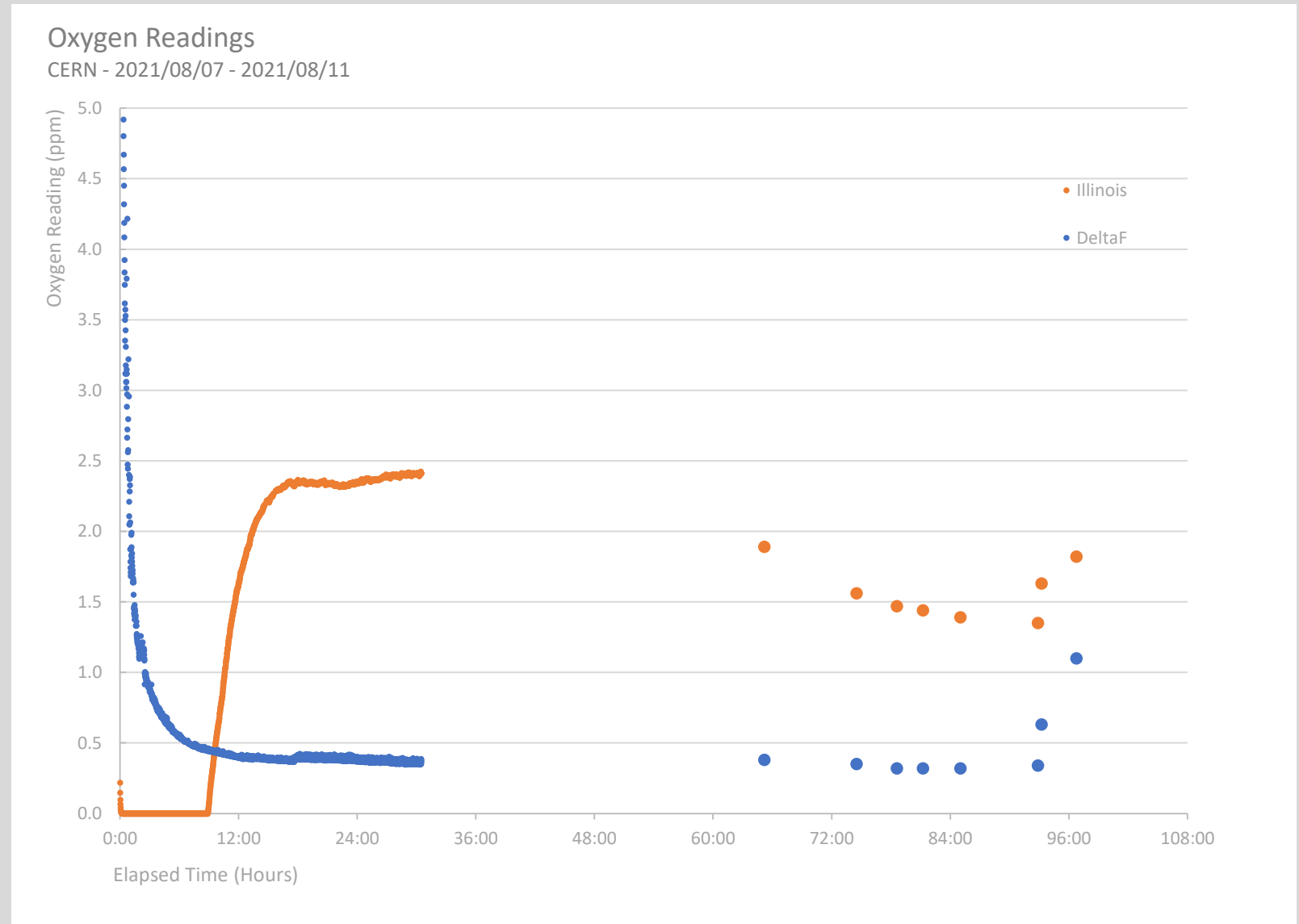
Pressure

- Operating pressure range is lower than at AZ.
- LN2 change problem due to dewar pressure too high.
 - 4 bar vs needed 1.7 bar
- Consumed more LN2 than expected, not sure why.
 - Used about 1L/h more than at AZ.
 - Will try to get better estimate of actual AZ consumption next run.



Oxygen

- Argon gas used <0.1ppm.
- Delta F operated in expected way.
 - Appears stable if extrapolated through missing data.
 - Avg. 0.385ppm for 12h-30h
- Illinois Instruments had issues.
 - Never seemed to stabilize.
 - 0ppm is below lowest measurable levels of machine.
 - Possible causes of problems: exposed to air, leak in unit, assay cell is at end of life.
 - Probably needs serviced and calibrated after AZ studies completed.
- Last 8 data points read out manually.
- Last 3 data points are after addition of O₂.



More things to note:

- Found mapping errors when disassembling setup for return to AZ.
 - All were from the modules to the cold board.
 - All corrections have been recorded.
 - Need to verify FT cold side to cold boards and cold FT board wiring once apparatus is back in AZ.
 - Don't expect any changes.

Other improvements/changes:

- Work on reducing noise further.
 - Get to levels that can run cryostat readout through entire run?
 - Identify largest sources in the sensor feedthrough.
- Split cryostat sensor readout into subsystems
 - Oxygen readings are made externally from the cryostat, could be recorded regardless of readout of internal cryostat systems.
 - Get liquid level readings working.
- Improve internal wiring – specifically modules to cold boards.
- Change cold board pin/socket connections.
- Improve cryostat lifting and lowering equipment.
- Improve argon flow rate to oxygen analyzers – needs stabilizing.