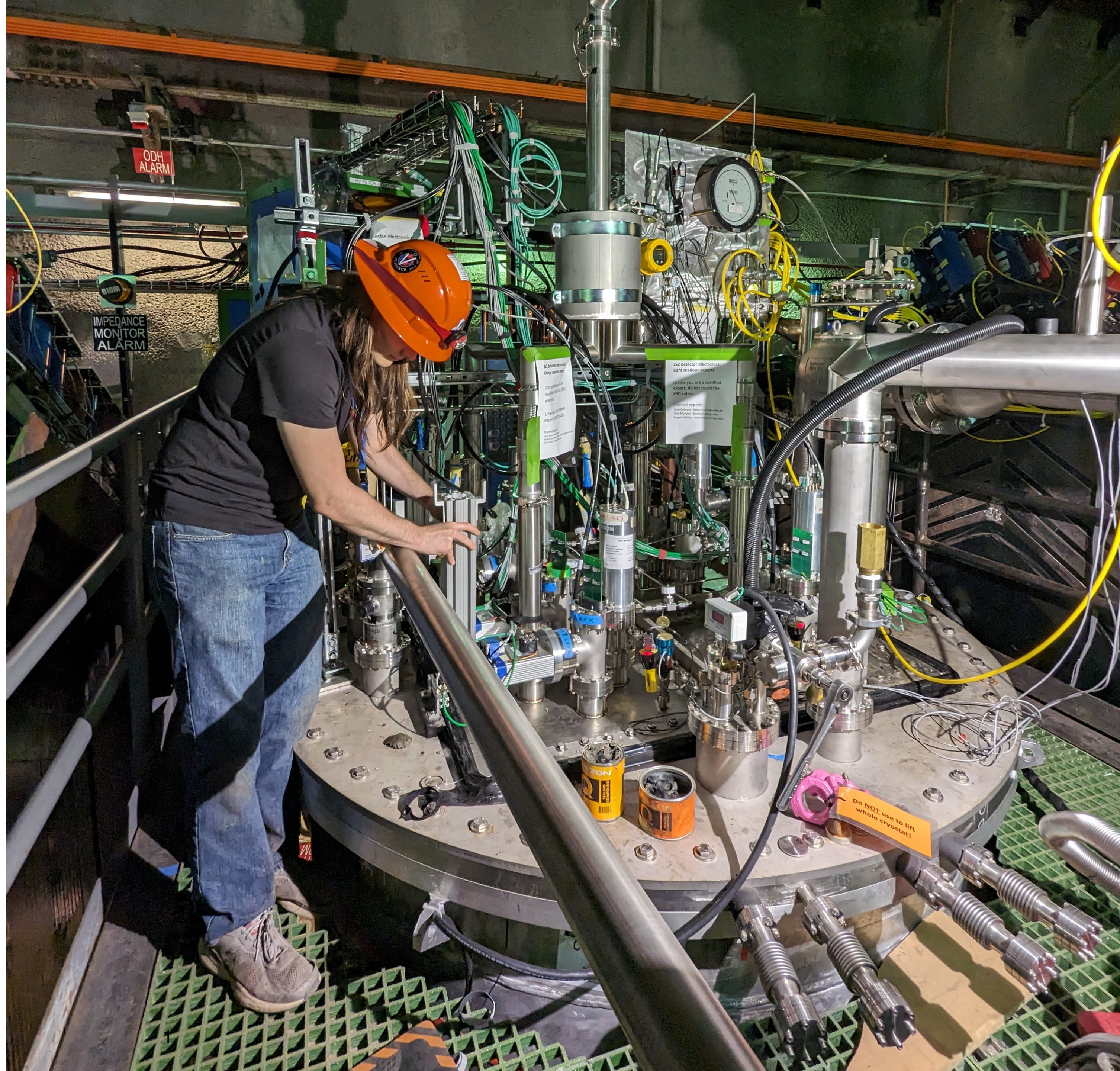


2x2 status update

Louise Suter

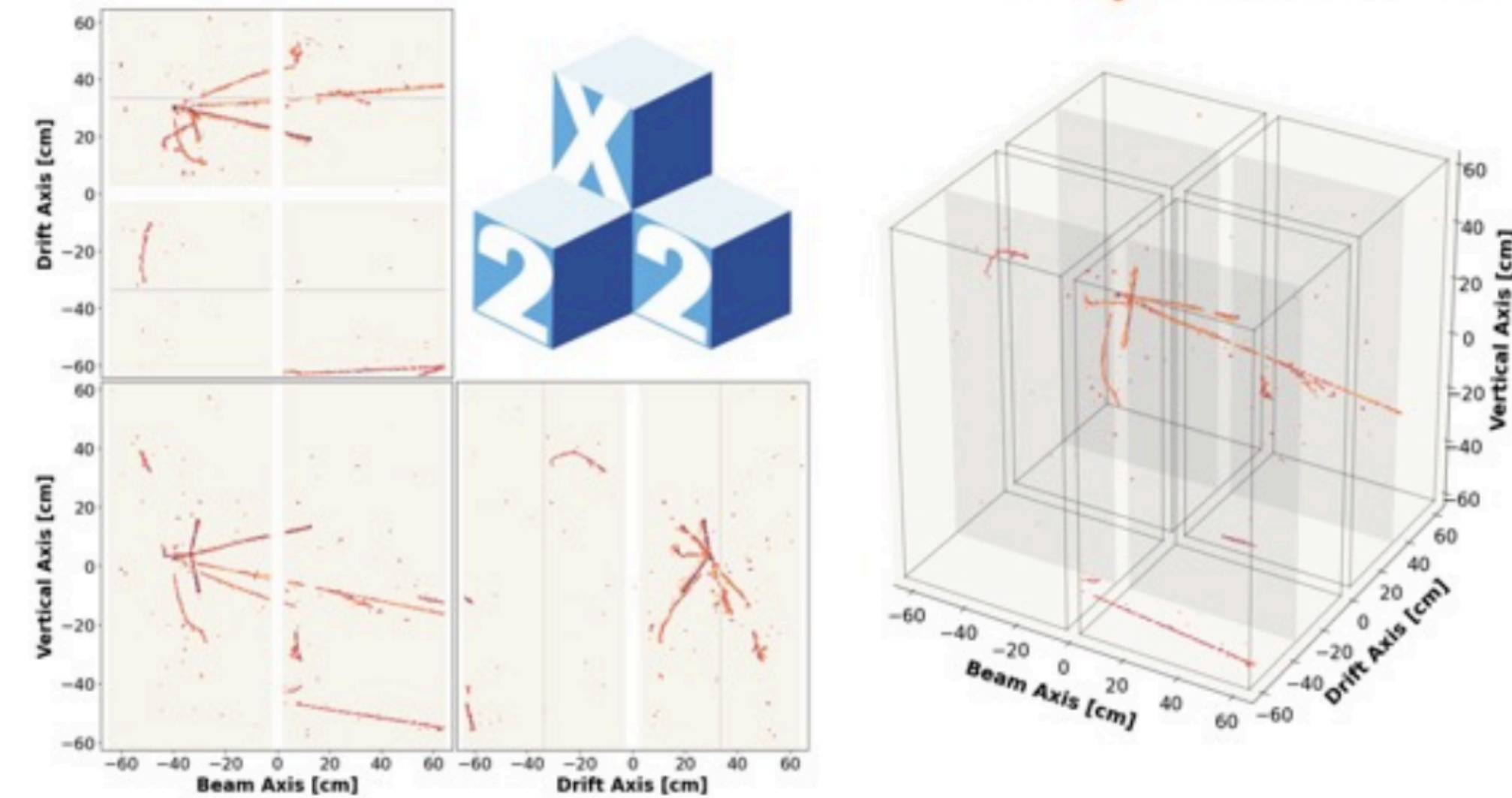
Aug 15th 2024



2x2 status

- 2x2 ran wonderfully, we took 5 days of high-purity full HV data, but there are some aspects of the cryogenic system which could be improved upon
- ND-LAr management formed a 2x2 summer 2024 cryogenic task force
 - Meet at least bi-weekly to determine and discuss the items with the most significant impact on stable operations
 - Many small items are ongoing: malfunctioning cold head on its way back to cryomec, filter media is being replaced, gas analyzer modified to test gAr dewars

Event 945 - 2024-07-11 19:52:24 UTC



2x2 Demonstrator: Cryogenics Modification Plan, Summer 2024

Created by: 14 July 2024 by D. Dwyer
Last Modified: 16 July 2024 by D. Dwyer

Overview

This document summarizes the plan for defining and then executing modifications to the 2x2 cryogenics system. A task force will be formed to assess options and then propose a modification plan to ND-LAr leadership (target: by the end of July 2024). Depending on the scope of the work, ND-LAr leadership may charge an independent review to review the plan (target: the first week of August 2024), after which work could commence.

Task Force Membership

We propose the following composition of the task force:

- Louise Suter (chair)
- Mike Zuckerbrot
- Kevin Wood
- Livio Calivers
- Tom Murphy
- Lori Meier
- Andrew Lambert
- Michele Weber (Ex-Ufficio)
- Dan Dwyer (Ex-Ufficio)

The task force should feel free to invite any technical experts and/or ND-LAr management to assist with their planning whenever they deem appropriate.

Cryostat draining and modification plan

- The task force produced its first report, proposing draining the cryostat to address the items that have the biggest impact on operations.
 - Leak rate through the indium seal
 - The current leak rate resulted in continuous top up with gAr, increasing the risk in both adding containments and the need for continuous top up
 - Investing in adding epoxy layer to indium and self-sealing blots
 - Location of condenser boil-off line
 - sets our maximum fill level - can be raised by 5 cm
- Draining since 8/6
 - opened vacuum jacket on 8/9 (was waiting for the after the power outage)
 - Stopped pump 8/12, when below modules
 - currently, at ~230k at the bottom of the TPC
- Prep, testing and design work ongoing. Work on addressing these items will start after lab shutdown when we have at room temp.

First report of the 2x2 Demonstrator: Cryogenics Modification Plan, Task Force Summer 2024 - July 31st 2024

The task force has met five times and focused on the following topics:

- Determining which items most impact operations,
- The time needed for different operations and to drain/fill
- Possibilities for leak improvement
- Details of moving the condenser boil-off line

We propose draining the cryostat, changing the level of the condenser boil-off line, and working to improve the leak rate. Various other smaller improvements are also planned or underway (including filter regeneration and new filter media, repair of condenser cold head, and installation of gAr testing for gas top-ups). Discussion continues on other items, which will be covered in more detail later and are not discussed in this report.

The decision to drain is time-critical and will be the focus of this document.

