

IoLS Updates

David Rivera

October 15th, 2024



Laser Periscope 2 (P2) Updates

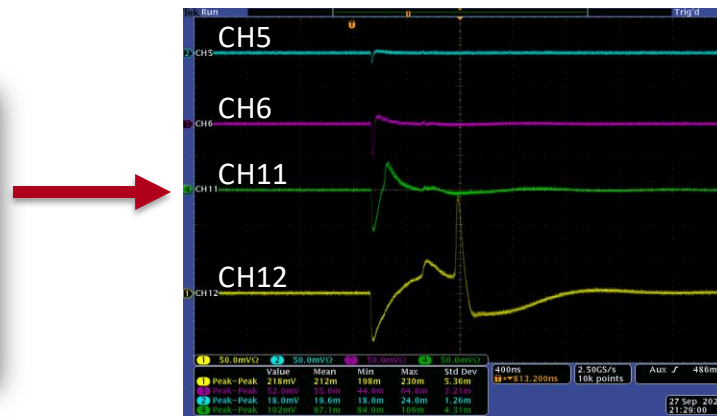
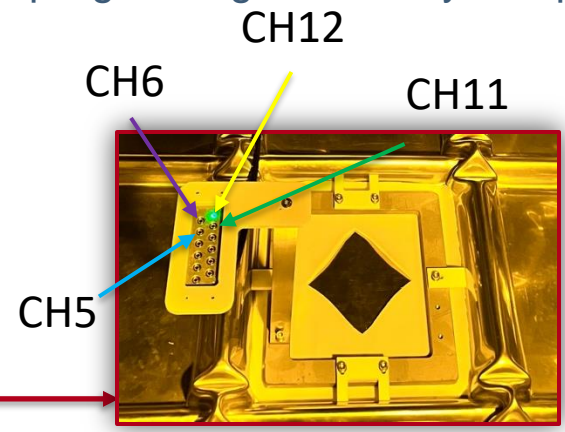
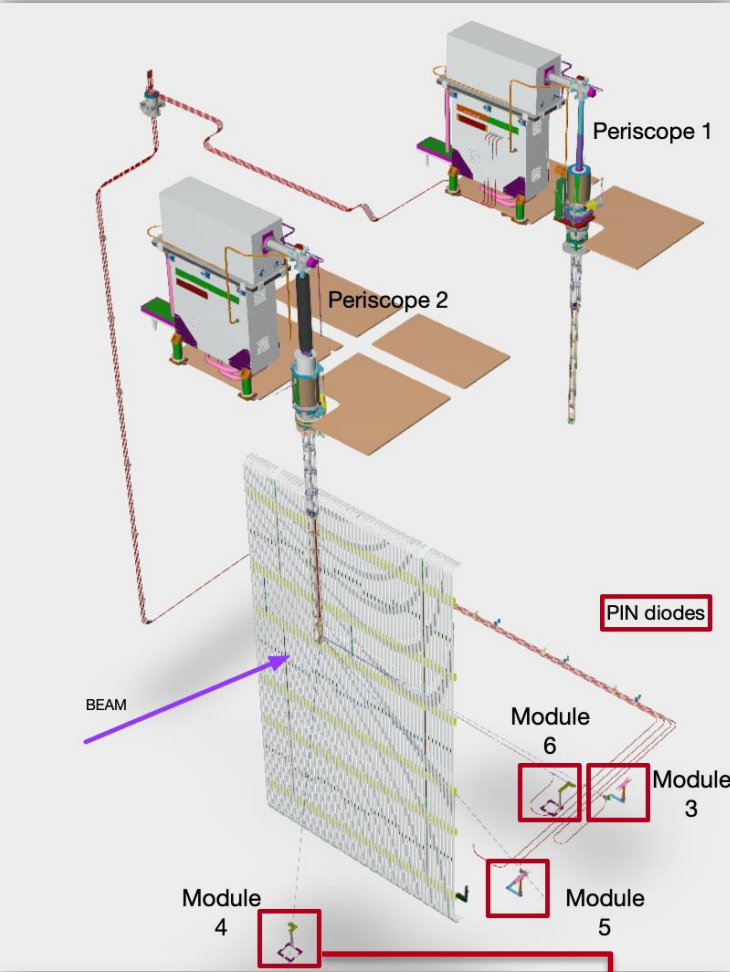
#	Server	Node Id	Display Name
1	open62541...	NS2[String]LS1.PM1.average_options	average_options
2	open62541...	NS2[String]LS1.PM1.average_options	average_options
3	open62541...	NS2[String]LS1.PM1.average_reading	average_reading
4	open62541...	NS2[String]LS1.PM1.average_window	average_window
5	open62541...	NS2[String]LS1.PM1.baud_rate	baud_rate
6	open62541...	NS2[String]LS1.PM1.id	id
7	open62541...	NS2[String]LS1.PM1.measurement_mode	measurement_mode
8	open62541...	NS2[String]LS1.PM1.measurement_options	measurement_options
9	open62541...	NS2[String]LS1.PM1.port	port
10	open62541...	NS2[String]LS1.PM1.pulse_length_options	pulse_length_options
11	open62541...	NS2[String]LS1.PM1.pulse_width	pulse_width
12	open62541...	NS2[String]LS1.PM1.range_options	range_options
13	open62541...	NS2[String]LS1.PM1.range_selected	range_selected
14	open62541...	NS2[String]LS1.PM1.serial_number	serial_number
15	open62541...	NS2[String]LS1.PM1.state	state
16	open62541...	NS2[String]LS1.PM1.trigger_threshold	trigger_threshold
17	open62541...	NS2[String]LS1.PM1.wavelength	wavelength
18	open62541...	NS2[String]LS1.A1.acceleration	acceleration
19	open62541...	NS2[String]LS1.A1.baud_rate	baud_rate
20	open62541...	NS2[String]LS1.A1.deceleration	deceleration
21	open62541...	NS2[String]LS1.A1.device_port	device_port
22	open62541...	NS2[String]LS1.A1.id	id
23	open62541...	NS2[String]LS1.A1.idle_current_setting	idle_current_setting
24	open62541...	NS2[String]LS1.A1.max_speed	max_speed
25	open62541...	NS2[String]LS1.A1.motor_state_options	motor_state_options
26	open62541...	NS2[String]LS1.A1.moving_current_setting	moving_current_setting
27	open62541...	NS2[String]LS1.A1.offset	offset
28	open62541...	NS2[String]LS1.A1.resolution_options	resolution_options
29	open62541...	NS2[String]LS1.A1.resolution_setting	resolution_setting
30	open62541...	NS2[String]LS1.A1.serial_number	serial_number
31	open62541...	NS2[String]LS1.A1.state	state
32	open62541...	NS2[String]LS1.A1.transmission	transmission
33	open62541...	NS2[String]LS1.A1.position	position

Major progress in commissioning activities for the Ionization Laser System:

- EndWall periscope design working stably
- Successfully aimed and hit PIN diodes channels using Class IV UV laser
- Calibration Interface Board (CIB) successfully used to trigger on laser shots → DAQ readout for P2 events
- Slow Controls (SC) integration of the Laser Systems progressing and nearly complete

Laser system SC parameters

PIN diode CH12 and nearest neighbor response to UV in LAr from a direct hit to CH12

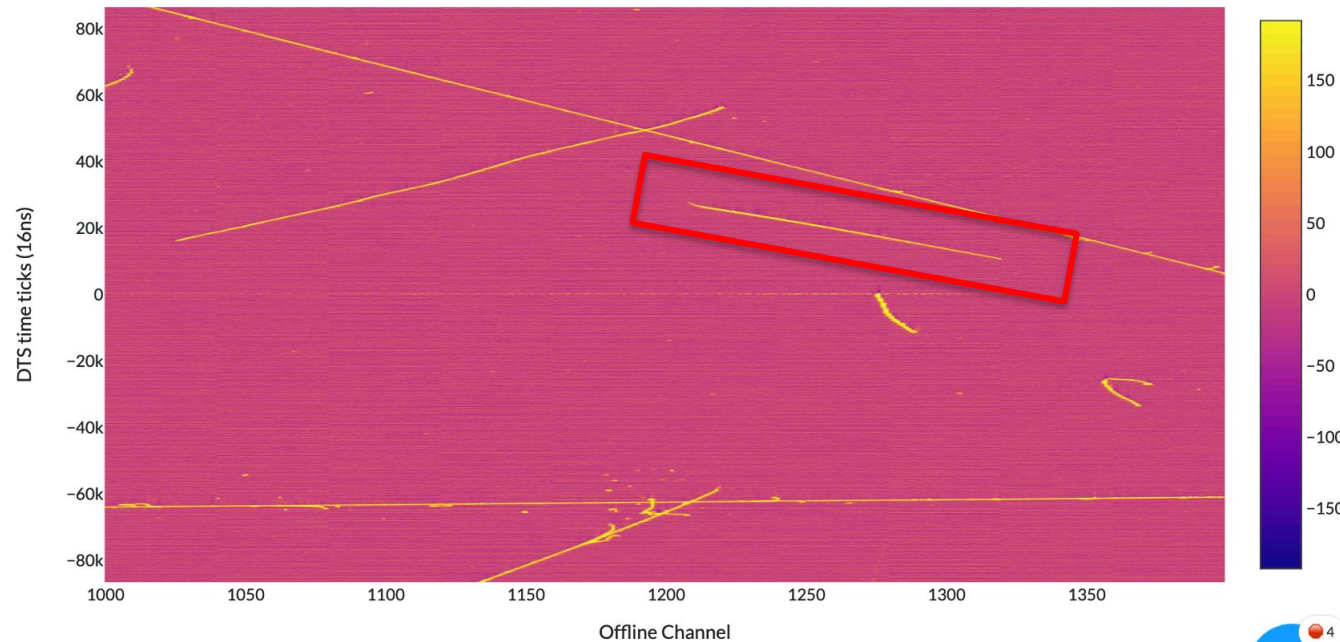


First Confirmed P2 Laser track events

ADC Counts: V-plane

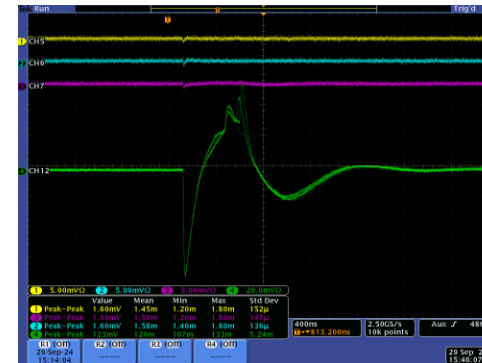
Run 29390 Trigger 1120, APA1

Powered by DUNE-DAQ



Event display for events triggered by P2 while aimed at PIN diode Module 5, CH12.

- P2 aimed at PIN diode Module 5, CH12
- Module is mounted onto bottom-end of the APA1 frame and sits beneath the field cage
 - Two field cage gaps must be crossed to hit
- Energy ramped up from 100 μJ \rightarrow 14 mJ
- Laser track entering the field cage and exiting the field cage captured in run 29390



Response from PIN diode CH12 (green) to 100 μJ of UV



Response from PIN diode CH12 (green) to 14 mJ of UV

Slow Controls interface

- Steady progress
- Able to control all serial devices via the Slow Controls server
 - Laser, attenuator, power meter
 - Most recently: the motors for periscope actuation

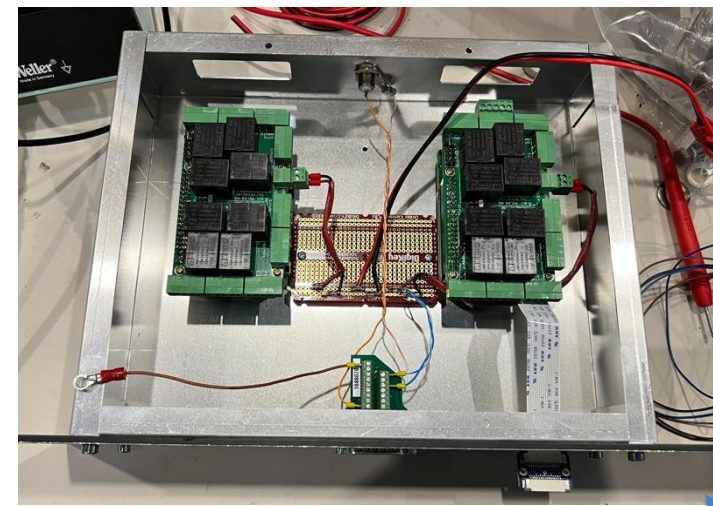
Next steps:

- Fire the laser and control motors simultaneously
- Link the geoNavigator software to the SC server and use it to define a scan

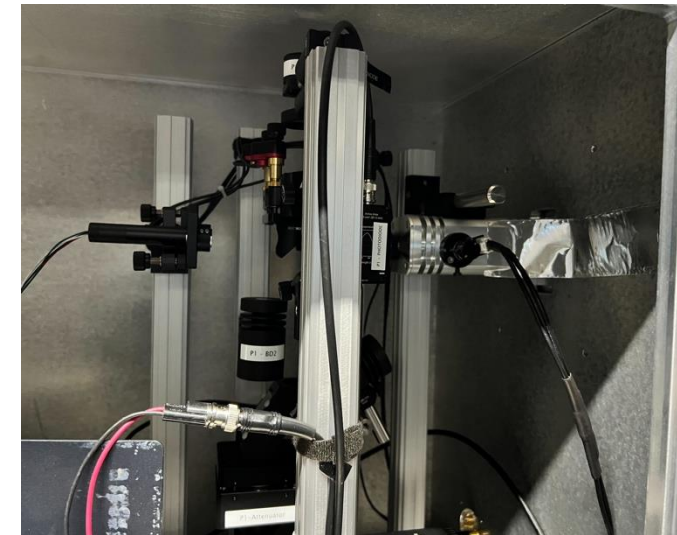
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received "b"TRQ?"\n"
received "b"TRQ?"\n"
received "b"ALMP?"\n"
received "b"SPD?"\n"
received "b"TMP?"\n"
received "b"POS?"\n"
received "b"TRQ?"\n"
received "b"ALMP?"\n"
received "b"TMP?"\n"
received "b"POS?"\n"
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10.73.137.148 - - [15/Oct/2024 14:51:08] "GET /api/position HTTP/1.1" 200 -
10.73.137.148 - - [15/Oct/2024 14:51:08] "GET /api/position HTTP/1.1" 200 -
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10.73.137.148 - - [15/Oct/2024 14:51:10] "GET /api/info HTTP/1.1" 200 -
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10.73.137.148 - - [15/Oct/2024 14:51:11] "GET /api/position HTTP/1.1" 200 -
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[motors] 0:python3 -l.bash 2:python3? "mp04-iols-rpi4-m2" 16.24
```

Shutter integration

- Shutter aligned for P1 & P2
 - Interface w/ CIB re-tested
- Completed the circuit for the optical switch on the linear stages
- CIB has a 50 Ohm termination at the input from the optical switch (needs to be removed or a buffer needs to be added)
 - Optical switch signal can be seen on the scope (High Z) and the (5V) transitions can be measured

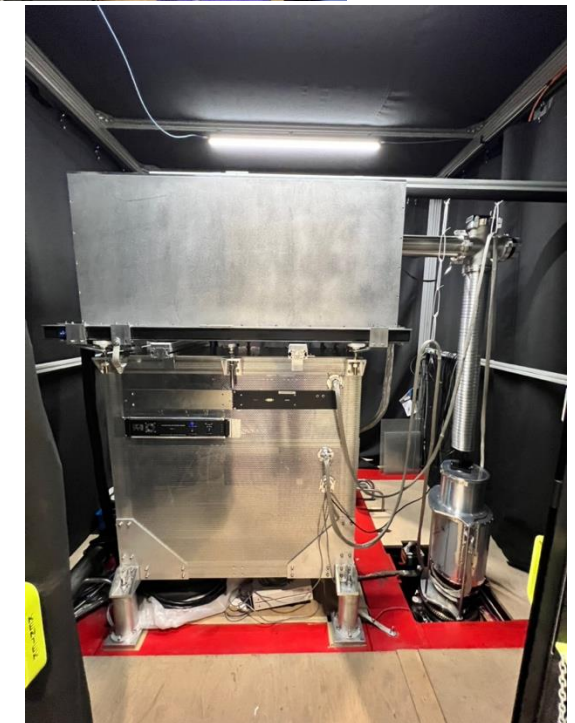
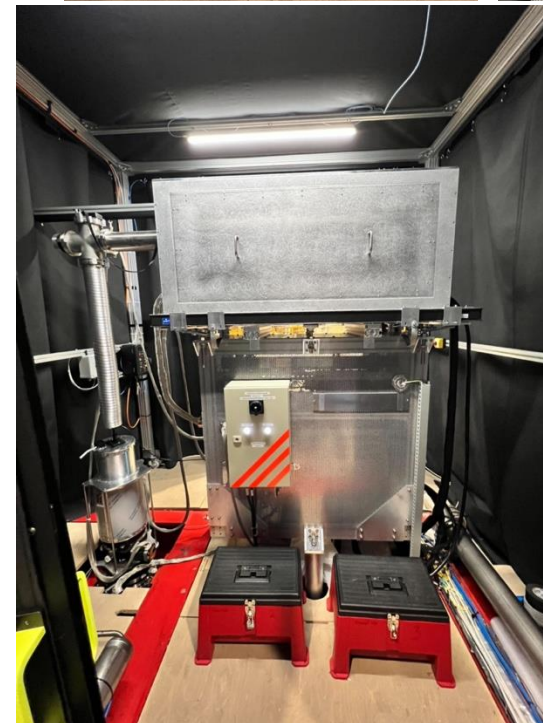
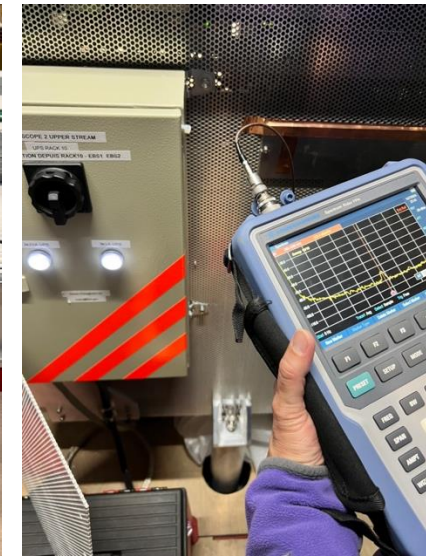


DB15 w/ optical switch sig
and limit switches



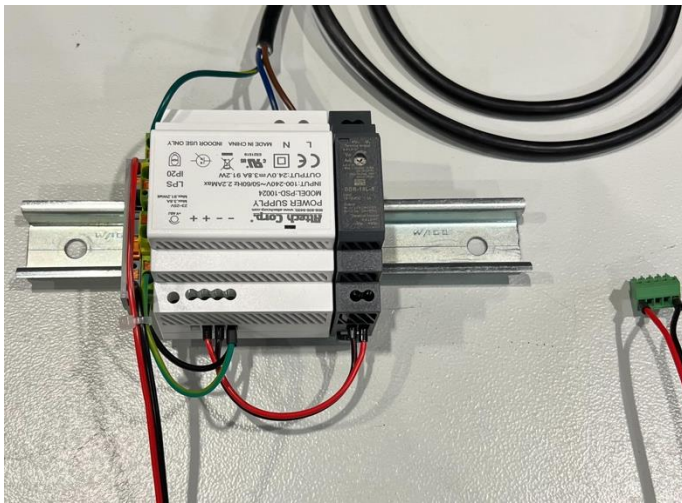
Electrical review

- Second grounding review by Terri & Linda in late September
 - No noticeable change in the noise found while searching w/ antenna and spectrum analyzer
 - (Not even with the fans running at full blast!)
 - Redid some of the grounding to lower the impedances and cleaned up existing grounding using wide, Aluminum tape



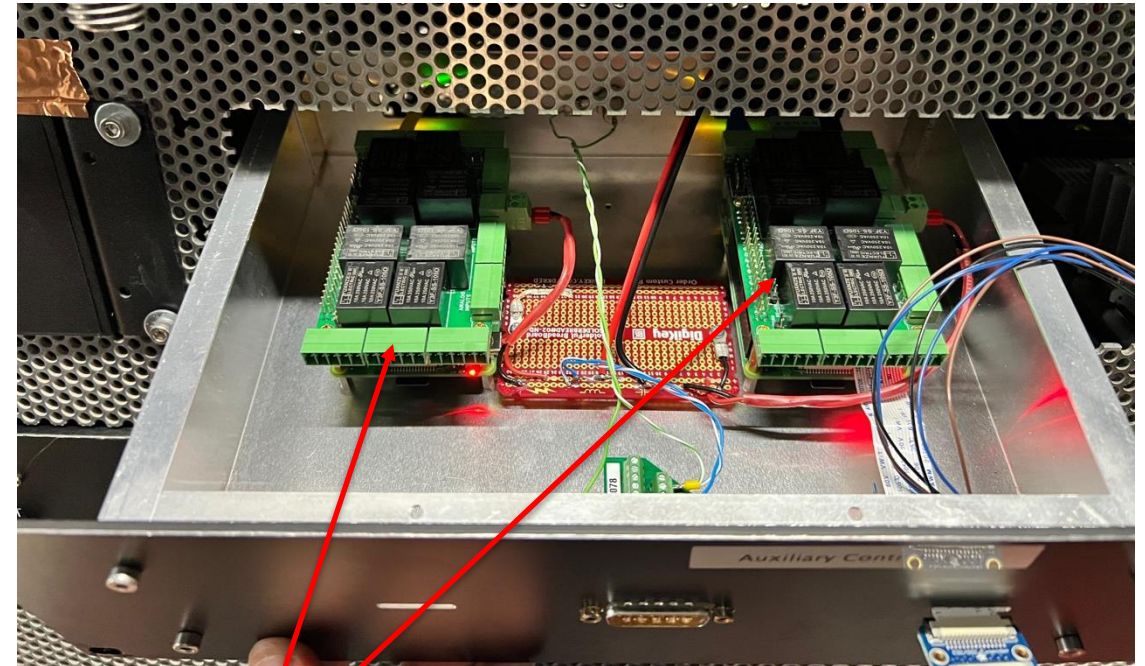
Miscellaneous

- Finished RPi Auxiliary Controls Box
 - Fans mounted inside the laser stand can be controlled remotely via Rpi and relay board
- Cleanroom re-organized and cleaned in preparation for arrival of P3



Power rail for fans and RPIs

Auxiliary Controls Box



Relay boards

Rpi camera extender board

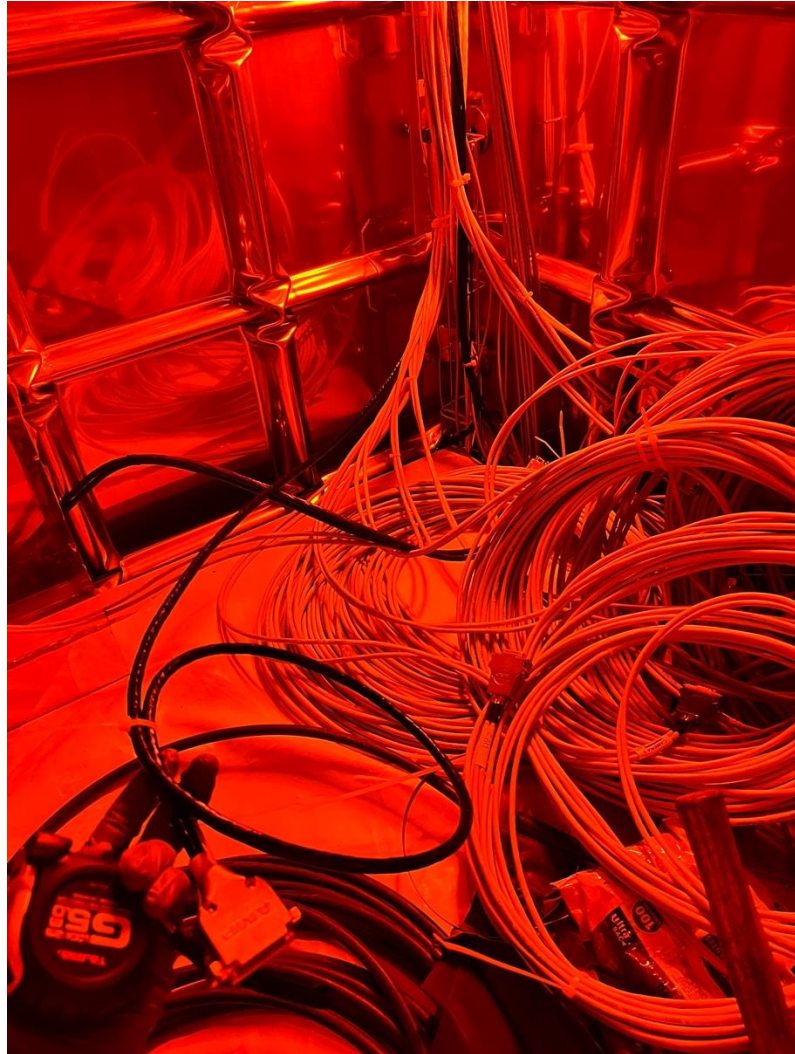
Schedule

- Many ongoing tests
 - Noise tests will take place this week
 - ~2 days requested by Roger et al.
 - Requires HV and bias to be OFF
 - Will check the noise contribution from IoLS to the cold electronics readout
 - DAQ performance tests (w/ HV and bias ON)
 - PDS tests (~5 days)
 - BSM study w/ neutrino data overnight

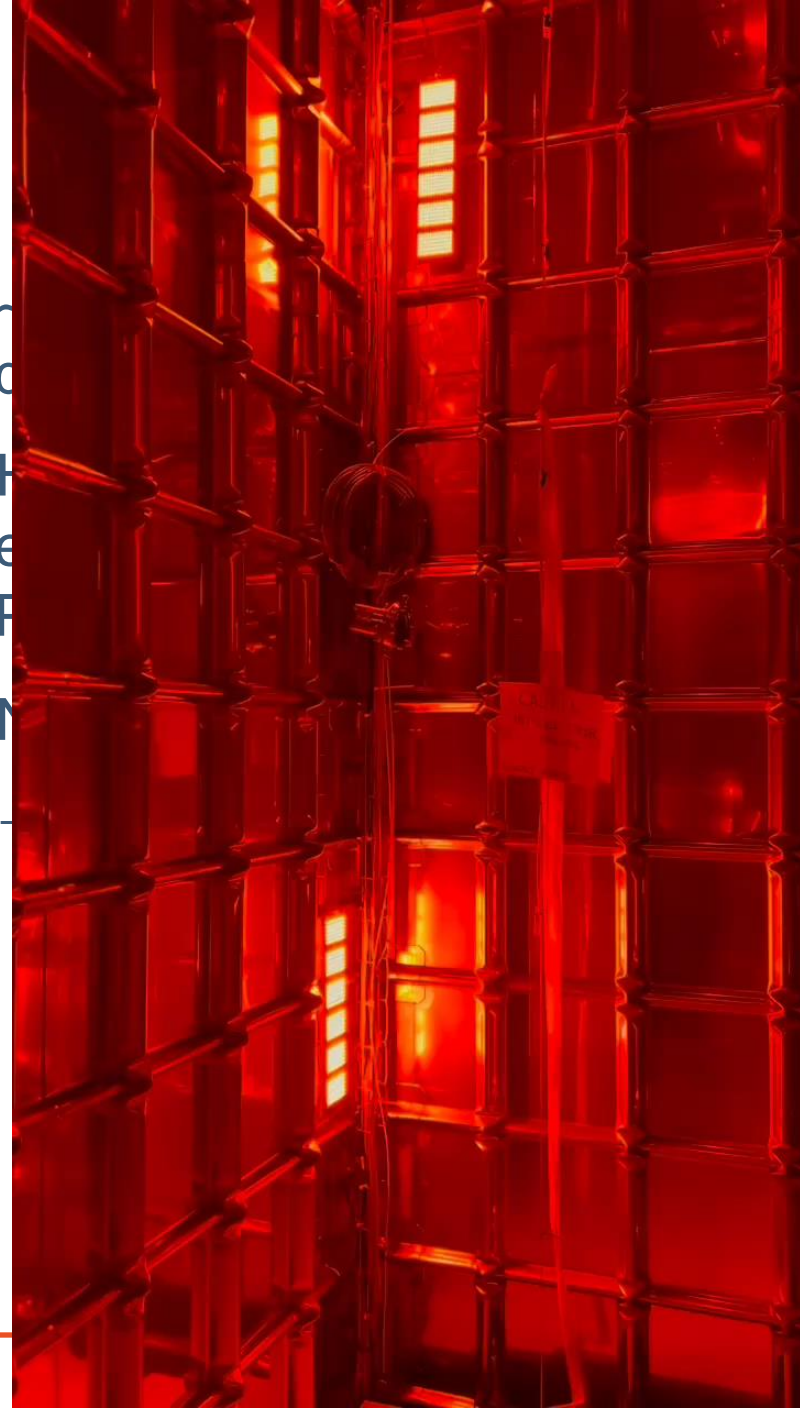
VD:

- Cryostat sealed
- PINdiode cable routed by Xavier in early Oct.

PINdiode cable



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VD

- Status of the VD roof:



Shipment 24

- Contains P3 parts (feedthrough, motors, periscope, quartz tubes, etc)
- Picked up yesterday, expect delivery by next week