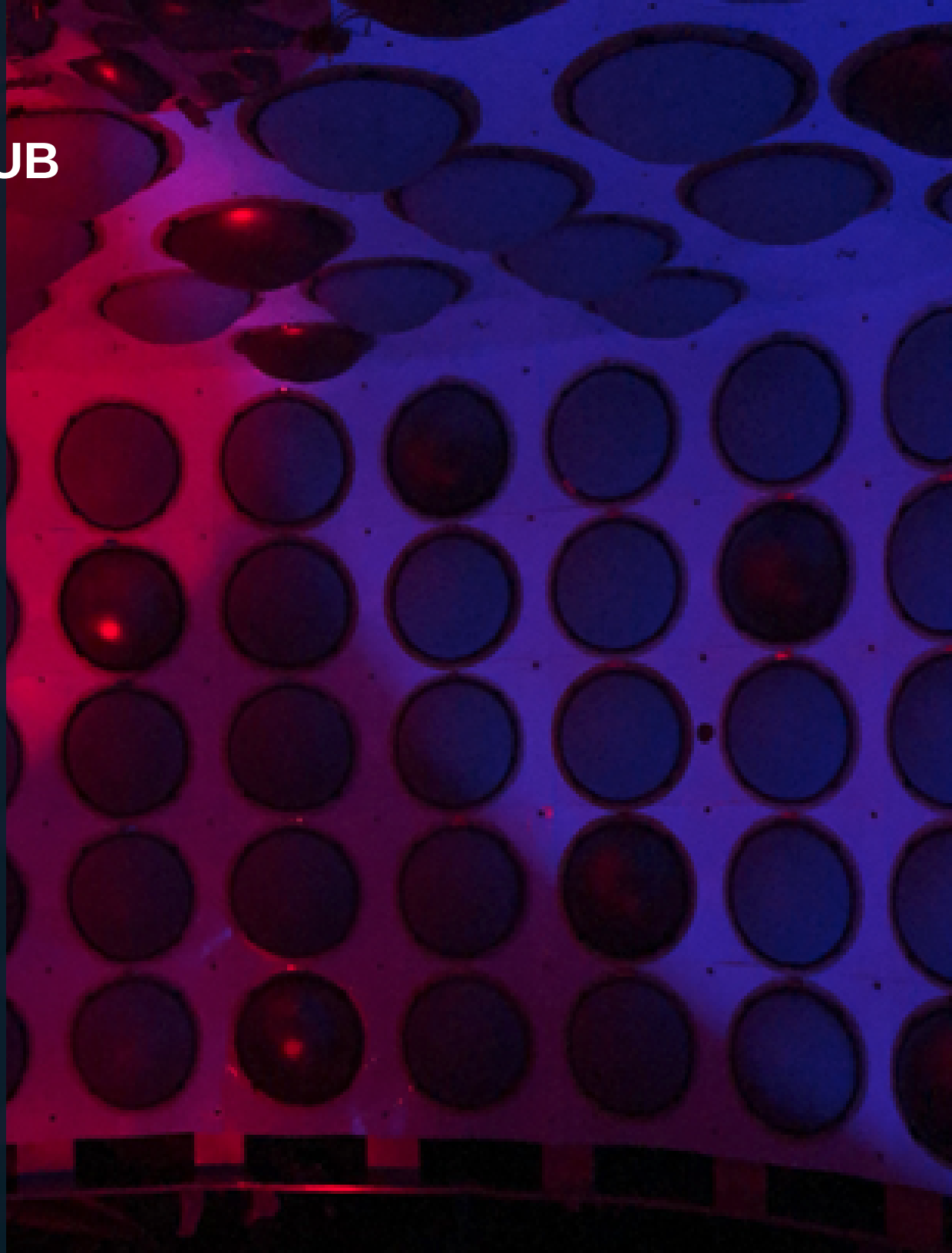
TERRANCE (T.J.) SCHAUB

NUCLEAR EXPERIMENTAL SYSTEMS COMMISSIONING - I&C

Selected engineering portfolio highlighting hands-on system integration, commissioning, controls, vacuum, cryogenic, high-voltage and experimental operations work at Los Alamos National Laboratory.



Fond du Lac, Wisconsin

920-979-0856 | tschauby@gmail.com
tjschaub.com

Selected portfolio - detailed project record available online

ENGINEERING PROFILE

Cross-disciplinary systems work

Strengths that carry across experiments, facilities and commissioning environments

Hands-on nuclear experimental systems professional with 8 years supporting construction, integration, testing, commissioning, operations, maintenance

Commissioning & Integration

Walkdowns, readiness verification, startup, functional testing, fault isolation, retest and operational handoff.

Controls & Instrumentation

PLC/HMI, analog and digital I/O, 4-20 mA / 0-10 V instrumentation, DAQ, communications, trending and diagnostics.

Vacuum & Cryogenics

High-vacuum systems, leak checking, LHe/LN2 distribution, helium-liquefier support and cryogenic instrumentation.

Mechanical & Facility Systems

Piping/tubing, gas distribution, beamline hardware, fabrication, rigging, cranes, installation and field modifications.

Work Process Control

Procedures, work documents, walkdowns, permits/tickets, hazard controls and coordination with engineering, crafts and facility personnel.

Field Troubleshooting

Verify actual system state, isolate from source to load, compare local and remote indication, correct deficiencies and retest.

BUILD
Fabricate & install

→

INTEGRATE
Connect disciplines

→

COMMISSION
Test & diagnose

→

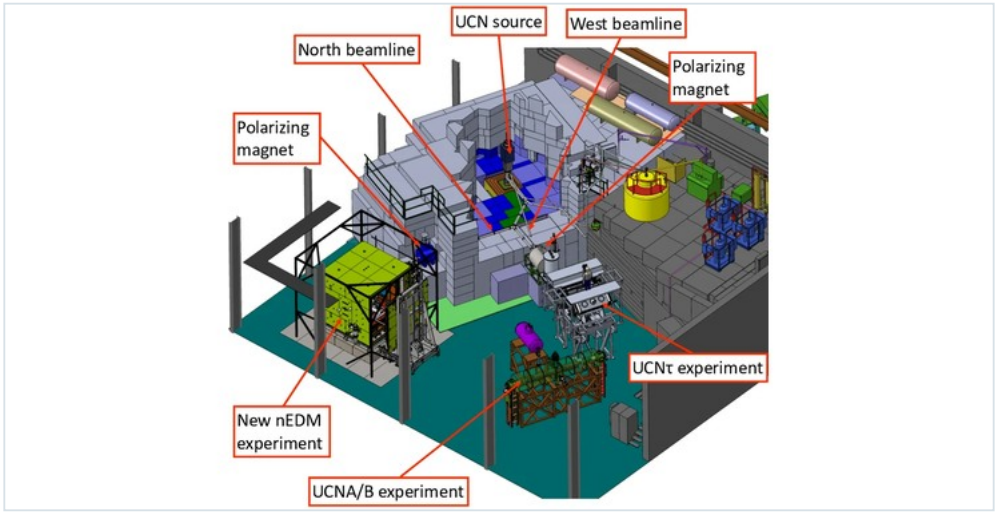
OPERATE
Maintain & optimize

FACILITY SYSTEMS

Ultracold Neutron Facility

Shared infrastructure supporting multiple precision neutron experiments





Facility-scale ownership

My responsibilities spanned nitrogen and helium distribution, helium-liquefier operation, superconducting-magnet support, vacuum pumping on primary UCN beamlines, deuterium-gas infrastructure, PLC/HMI controls, beamline pressure and temperature instrumentation, experimental-user integration and general facility hardware support.

- Cryogenic distribution
- Beamline instrumentation
- High vacuum & gas
- PLC / HMI controls
- Superconducting magnets
- User integration

How I approached facility work

UNDERSTAND
Walk down actual configuration

→

DOCUMENT
Capture interfaces & state

→

INTEGRATE
Utilities, controls & hardware

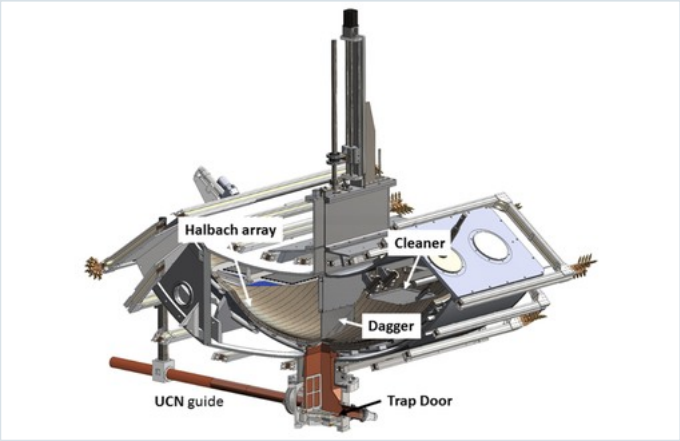
→

VERIFY
Readiness before beam / users

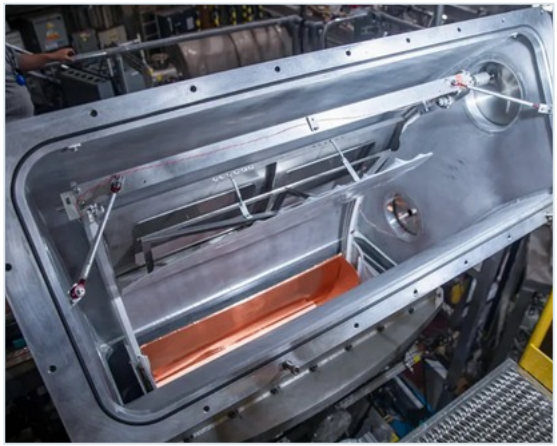
EXPERIMENTAL INTEGRATION

UCNτ / UCNτ+

Vacuum operations, rigging, detector integration, diagnostics and upgrade commissioning





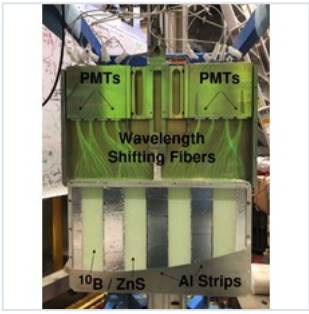


My role

I supported UCNτ by bringing electrical power, compressed air and gas utilities to the experiment; performing major vacuum-chamber operations and crane lifts; supporting dagger installation and beamline connection readiness; and helping bring new hardware into an operable experimental configuration. I also built a custom IR-camera fixture to investigate vibration during trap motion.

UCNτ+ upgrade

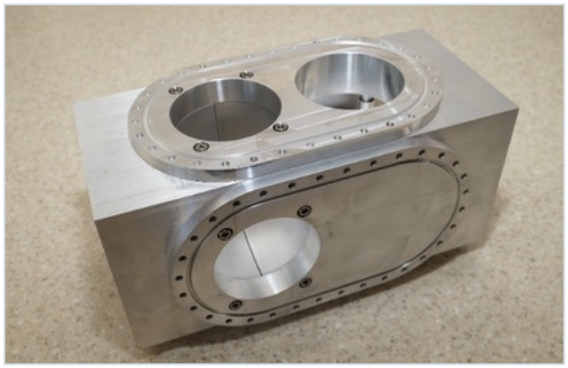
The later elevator / vacuum-extension upgrade added substantial mechanical and vacuum hardware above the existing experiment. My work centered on craning, fitting, alignment, vacuum interfaces and functional checkout as the upgrade moved from installation toward operation.

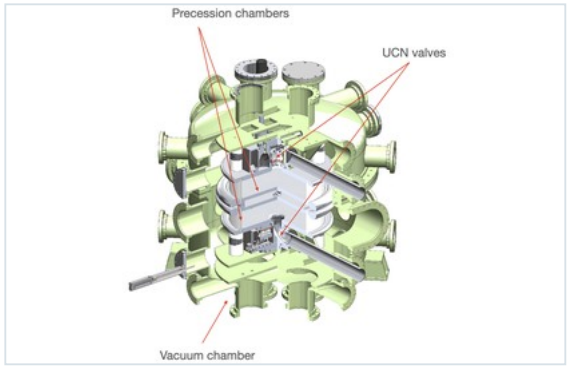


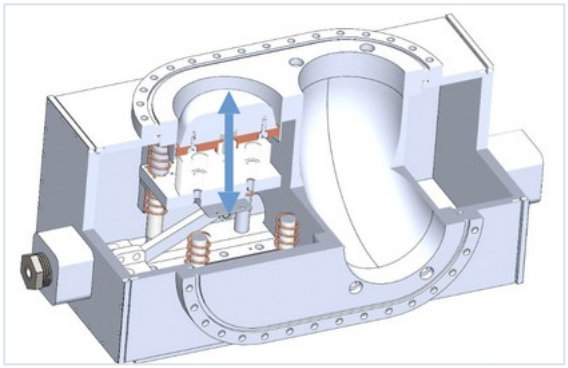
CASE STUDY 01

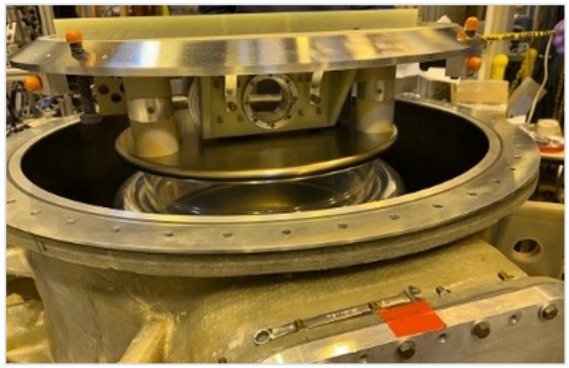
LANL nEDM - Build & Integration

Taking a precision UCN apparatus from machined hardware toward an integrated system









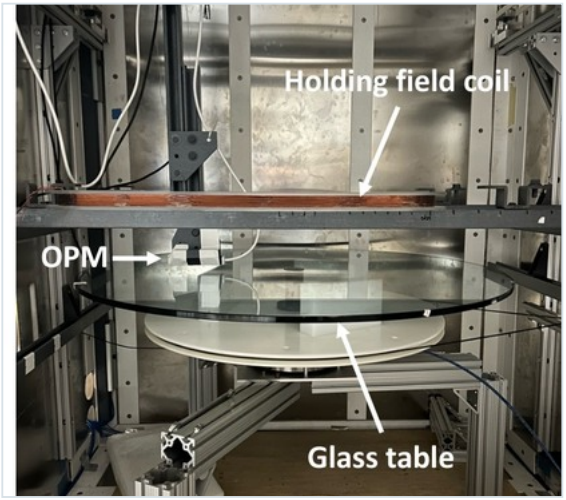
What I built and integrated

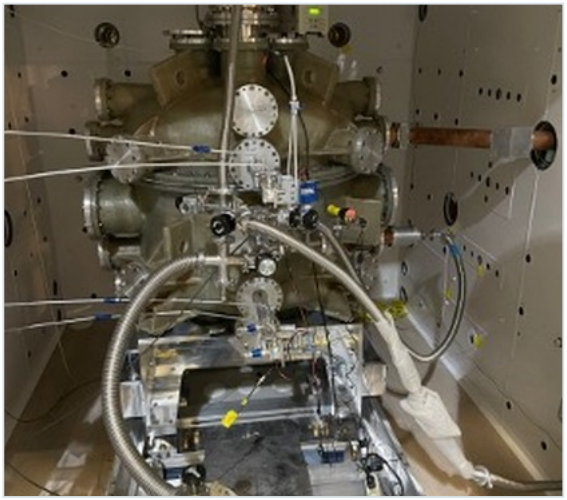
- Main neutron vessel with two storage / precession cells and UCN valve hardware.
- Custom high-vacuum valve box and associated mechanical interfaces.
- Hydraulic actuation system, pump stand and flow-control hardware.
- Instrumentation / controls enclosure for pressure, position and relay control.
- Assembly, alignment, vacuum testing and preparation for beamline installation.

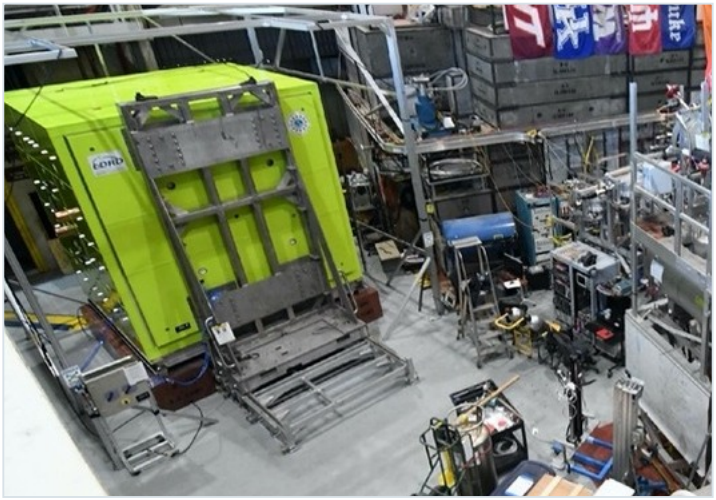
CASE STUDY 01

LANL nEDM - Commissioning & Troubleshooting

Verify behavior, isolate faults, correct hardware and retest







Commissioning pattern

VERIFY
Vacuum, alignment, motion

→

EXERCISE
Cycle valves & hydraulics

→

ISOLATE
Find mechanical / I&C faults

→

RETEST
Confirm corrected behavior

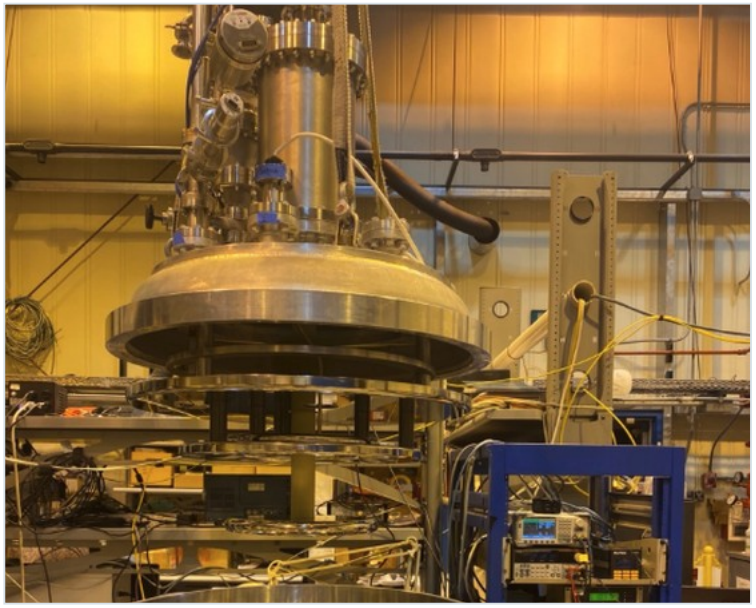
Examples of field work

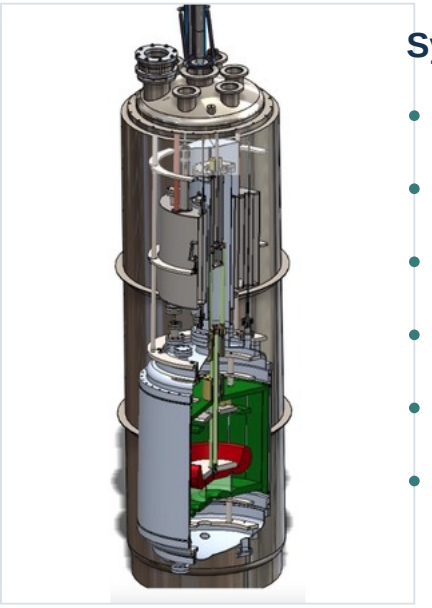
I tuned hydraulic needle valves, performed endurance and vacuum checks, supported magnetic-impurity scanning, worked through internal mechanical interference and loose hardware discovered during assembly, and supported final installation into the UCN beamline. I also maintained and troubleshot mechanical interfaces on the magnetic-shield-room door.

CASE STUDY 02

Cavallo Cryogenic & High-Voltage R&D

Building the systems around a first-of-a-kind electrostatic HV multiplier





Systems I owned around the HV volume

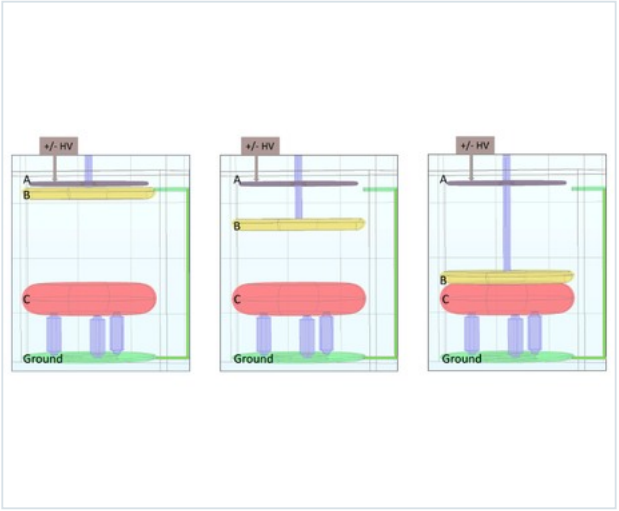
- 316 stainless tubing and cryogenic / gas plumbing from small instrument lines through larger exhaust runs.
- Nitrogen fill and exhaust infrastructure; support for the earlier LHe configuration and later LN2/N2 configuration.
- Vacuum pumps, gauges, leak checking and component-to-subsystem-to-system vacuum verification.
- Temperature, pressure and level instrumentation; DAQ checkout and custom level-sensor calibration.
- SF6 gas support for room-temperature HV testing, electronics-rack organization and facility utilities.
- Crane operations and physical integration of the central HV volume into the dewar.

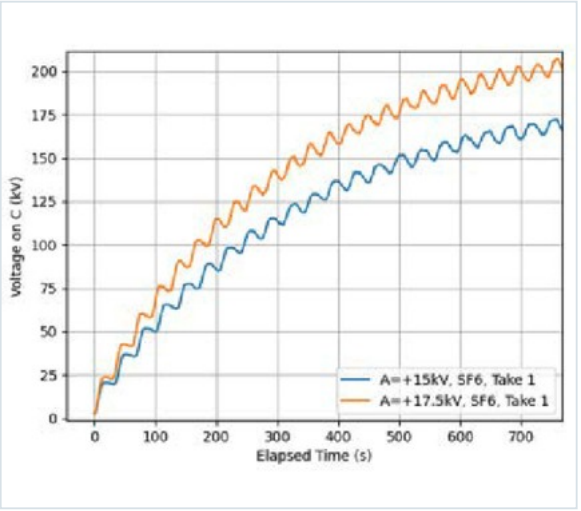
CASE STUDY 02

Cavallo - Test, Commission & Learn

A commissioning story where surrounding systems worked and the vessel interface became the limiting issue







Commissioning work

I worked with engineering on formal LN2 test procedures and supported electrical, pressure, cryogenic and industrial-hygiene walkdowns. The rebuilt plumbing, instrumentation and support systems were brought into an operational configuration and checked routinely during the test campaign.

What the test revealed

The inherited dewar top / vessel interface prevented the system from maintaining the stable pressure needed for the intended measurement. That distinction matters in commissioning: the job is not simply to make hardware run, but to establish which subsystem is limiting performance, document actual behavior and leave the system in a known state for the next design decision.

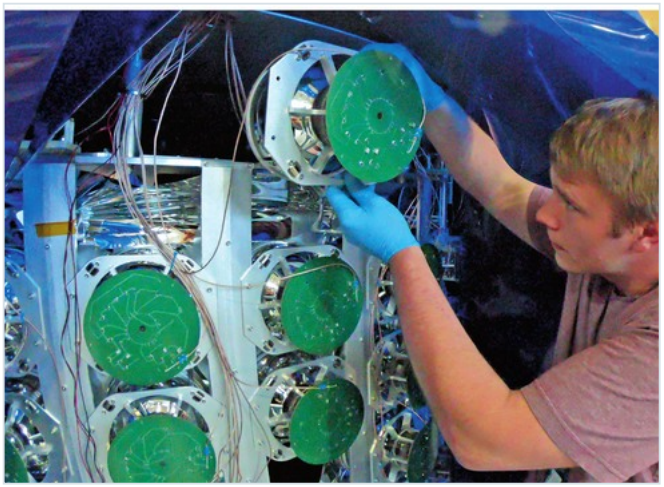
DETECTOR CONSTRUCTION TO OPERATIONS

CCM200

Large liquid-argon detector integration, commissioning and experimental operations







My contribution

I supported CCM200 from detector construction and staging through installation, power-up, testing, commissioning, operations, optimization and troubleshooting. The 10-ton liquid-argon detector used 200 photomultiplier tubes, making repeatable assembly, cabling, channel verification and operational monitoring central to reliable data taking.

ASSEMBLE
PMTs, hardware & cabling

→

INSTALL
Rigging & detector integration

→

COMMISSION
Power, signals & checks

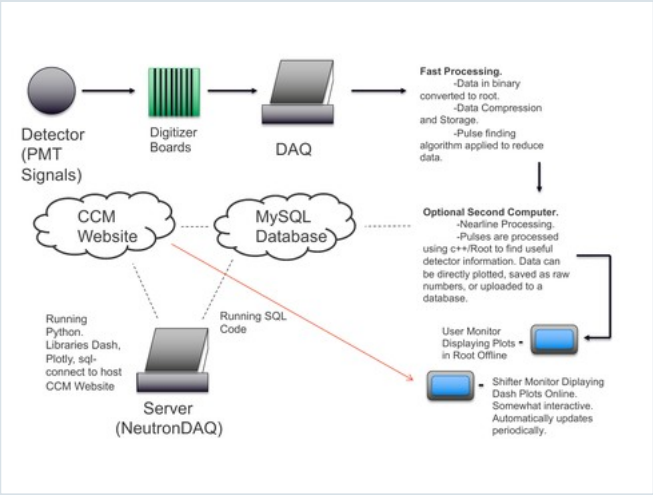
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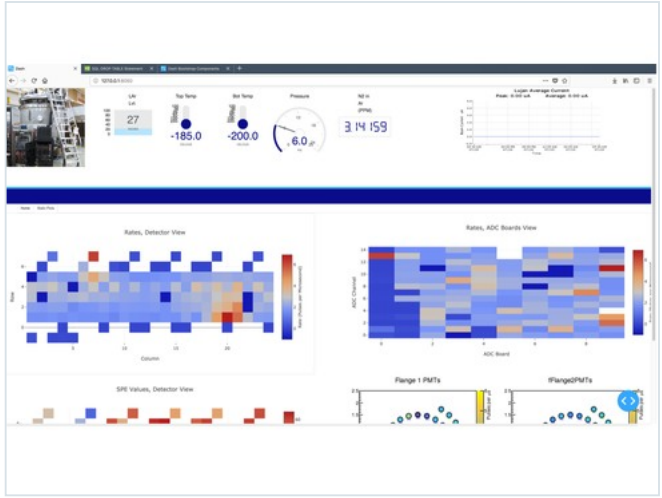
OPERATE
Monitor, troubleshoot, optimize

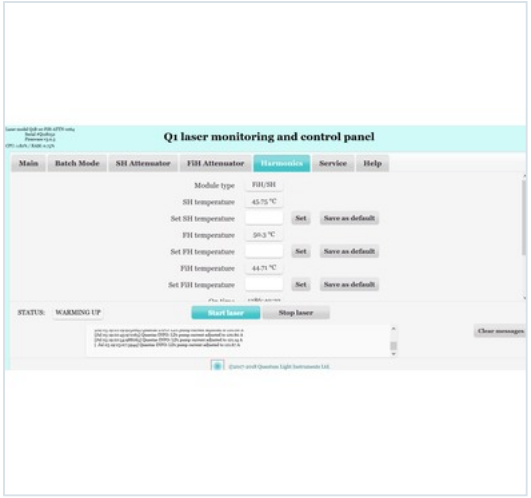
CROSS-PROJECT CAPABILITY

Controls, Instrumentation & Data

Using measured system state to make equipment operable and diagnosable







Controls toolkit

PLC / HMI

Schneider M340, structured logic, manual / automatic operation, timers, interlocks.

Instrumentation

Pressure, flow, temperature, level, vacuum and position; scaling and calibration.

Communications

RS-232, Modbus TCP, device polling, offline control networks and logging.

DAQ / Trending

Waveforms, nearline analysis, SQL databases, Python monitoring and diagnostic trends.

Embedded / Prototypes

Arduino-class controls, SSR / relay interfaces and first-pass experimental automation.

Commissioning mindset

Enough feedback to distinguish a real process event from a bad sensor and reconstruct failures.

TECHNICAL RECORD

Selected Publications & Qualifications

External technical output plus field-readiness training

Selected publications

2026	**Demonstration of 255-kV high-voltage generation with a Cavallo multiplier system**
2026	**High-voltage and electrode system for a cryogenic experiment to search for the neutron electric dipole moment**
2025	**Detection of ultracold neutrons with powdered scintillator screens**
2025	**First Event-by-Event Identification of Cherenkov Radiation from Sub-MeV Particles in Liquid Argon**
2022	**LANSCE-PSR Short-Pulse Upgrade for Improved Dark Sector Particle Searches with the Coherent CAPTAIN-Mills Experiment**
2022	**First dark matter search results from Coherent CAPTAIN-Mills**
2018	**Unsupervised learning about 4D features of microparticle motion**

Selected training & qualifications

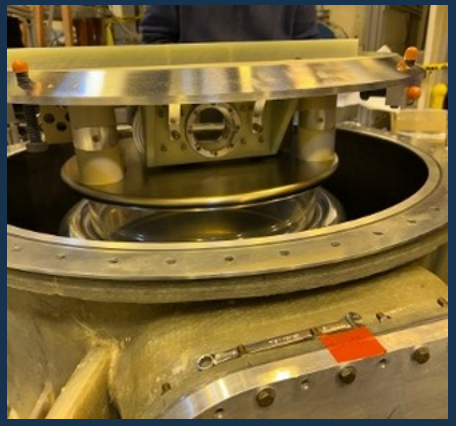
- Primary Beam Access Areas
- Advanced Pressure Systems
- Pressure & Vacuum Systems
- Cryogenic Person in Charge (PIC)
- Cryogen Safety
- Energized Electrical Work
- Electrical Safety
- Radiological Worker II
- Laser Safety - Class 3B & 4
- Crane Operator
- Forklift Operator
- Gas Cylinder / Chemical Hazard Safety

Education

B.A., St. John's College, Santa Fe - History of Math & Science; graduate coursework in the Electrical and Computer Engineering Department at UNM.

HOW I WORK

Build physical systems, integrate disciplines, verify behavior and stay with the equipment through operation.



BUILD

Fabrication | assembly | installation

INTEGRATE

Mechanical | electrical | controls | vacuum | cryogenics

COMMISSION

Test | diagnose | modify | retest | document

OPERATE

Readiness | troubleshooting | maintenance | optimization

Terrance Schaub

Nuclear Experimental Systems | Commissioning | Instrumentation & Controls

Fond du Lac, WI | 920-979-0856 | tschauby@gmail.com

Full project detail, source references and additional photographs are available in the online portfolio.