2026/05/26

SNOLAB Report

Jodi Cooley
Executive Director | SNOLAB
Professor of Physics | Queen's University

Visionary Partners

Carleton University

VALE

Université de Montréal

University of Alberta

Laurentian University / Université Laurentienne

Sudbury

Queen's University

Funding Partners

INNOVATION Canada Foundation for Innovation / Fondation canadienne pour l'innovation

VALE

Ontario

NSERC CRSNG

Reaching New Heights, Deep Underground

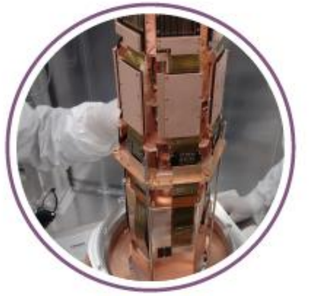
2023–2029 Strategic Plan

SNOLAB

Three core pillars drive our Strategic Plan.

Excellent Science

GOAL: Drive breakthrough discoveries at the frontiers of underground science



Cutting-Edge Infrastructure

GOAL: Continuously improve our research infrastructure to remain state of the art

Skilled People

GOAL: To foster and develop diverse talent in an inclusive environment

Our core values underpin our vision and goals.

Safety | Excellence | Teamwork | Accountability | Diversity

SNOLAB

Innovation lives at SNOLAB

Annual Report 2024-2025

Ontario's training ground for scientists, technologists, and tradespeople

SNOLAB

Annual Report for April 1, 2024 – March 31, 2025 is now available online

1200+

Annual academic users and collaborators

24%

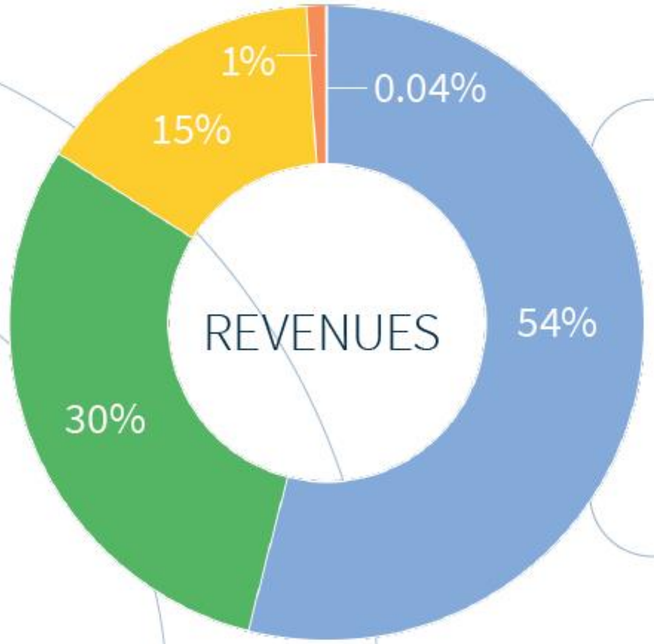
of users from Canadian institutions

166

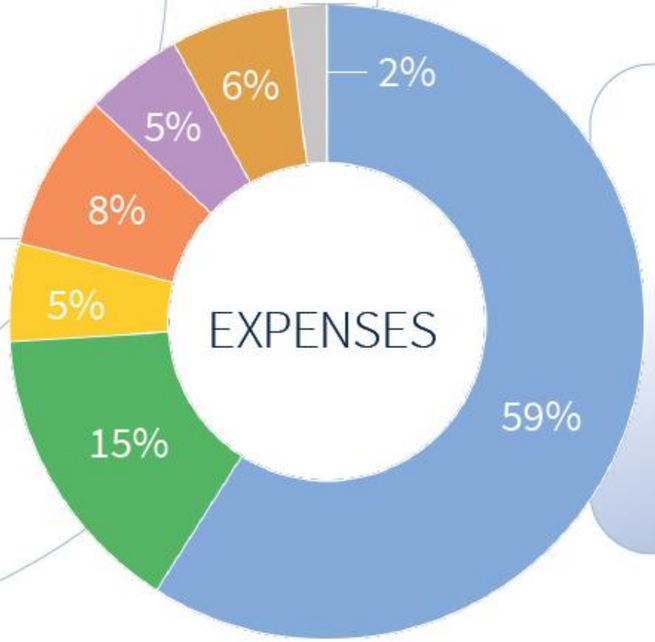
Institutions

26

Countries



Grant Funding - Federal	$12,586,723
Grant Funding - Provincial	$7,000,000
Amortization of deferred capital contributions	$3,442,830
McDonald Institute funding	$306,686
Other	$10,000
TOTAL	**$23,346,239**



Salaries and benefits	$13,837,239
Amortization of capital assets	$3,442,830
External Contracts (Other)	$1,848,512
Supplies	$1,429,623
Equipment	$1,227,677
External Contracts (Vale)	$1,046,196
Travel	$516,883
TOTAL	**$23,348,960**

SNOLAB's audited financial statements for FY25 are available online

1

Excellent science

Drive breakthrough discoveries at the frontiers of underground science.

Expected outcomes:

- Cementing of Canada's leadership in deep underground science
- A stronger, more competitive Canada in scientific discovery
- More Canadian researchers positioned as global leaders

Science Strategy

Increase our understanding of the particles and forces that have shaped the universe.

- What is the nature of dark matter?
- What is the nature of the neutrino?

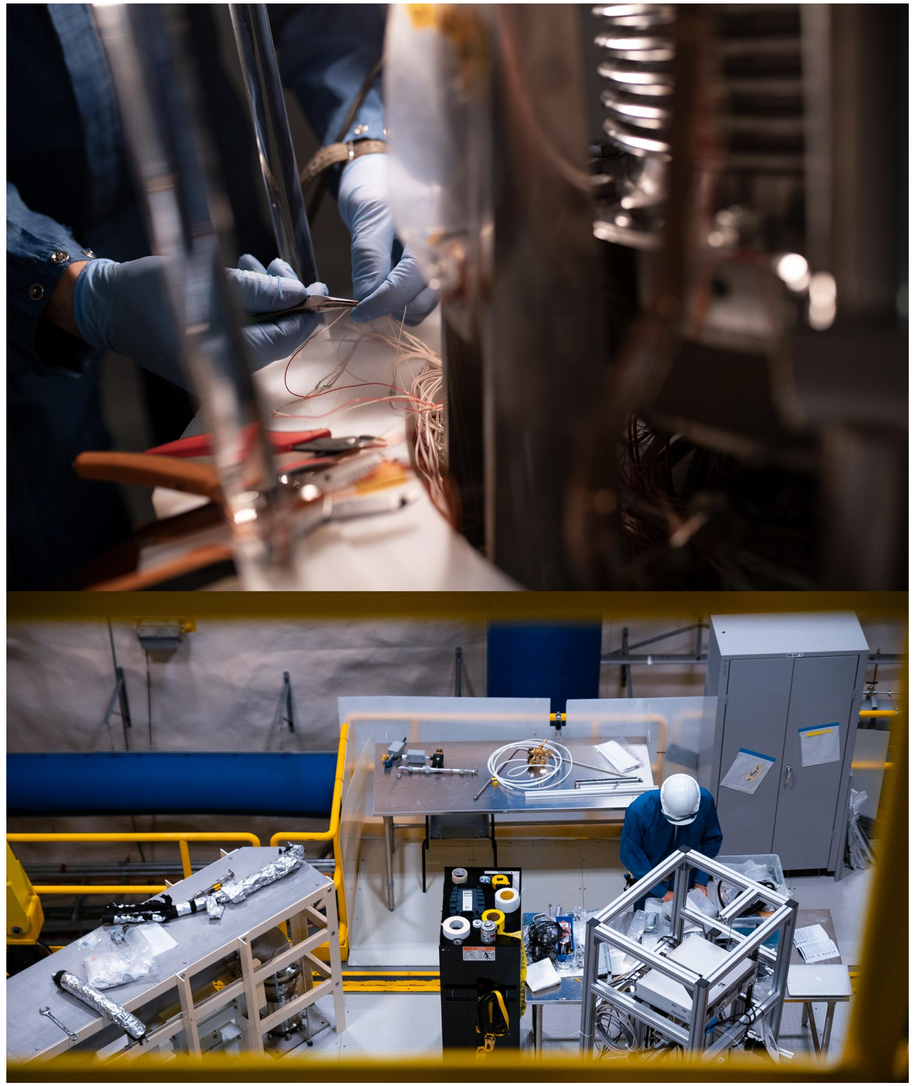
Continue to collaborate in scientific research requiring deep underground facilities.

- Neutrino observatories (solar, supernovae, geo, reactor, etc.)
- Effects of radiation on biological systems
- Environmental monitoring (nuclear non-proliferation, etc.)

Pursue new collaborations and opportunities in emerging areas of underground science

- Quantum technologies (quantum computers, sensors, and materials)

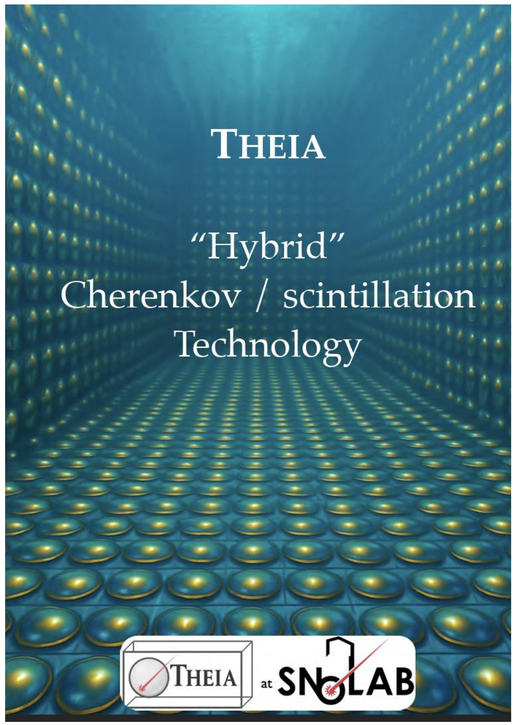
Become an intellectual hub that fosters collaboration and connection.

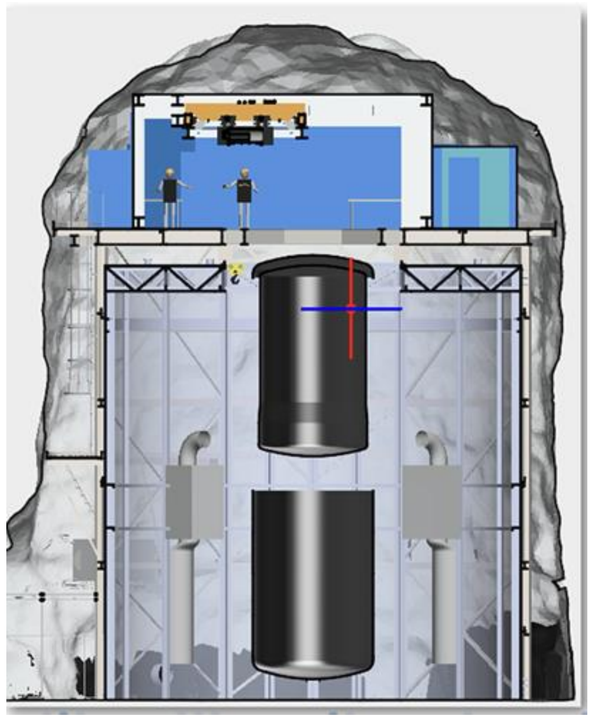


Interest in SNOLAB continues to grow

At the July 2025 EAC meeting three letters of intent were received:

- Conceptual design for Theia at SNOLAB
- Conceptual design for XLZD at SNOLAB
- POLAR (**Po**int of **C**are **U**ltra**s**ound - POCUS) in underground environments



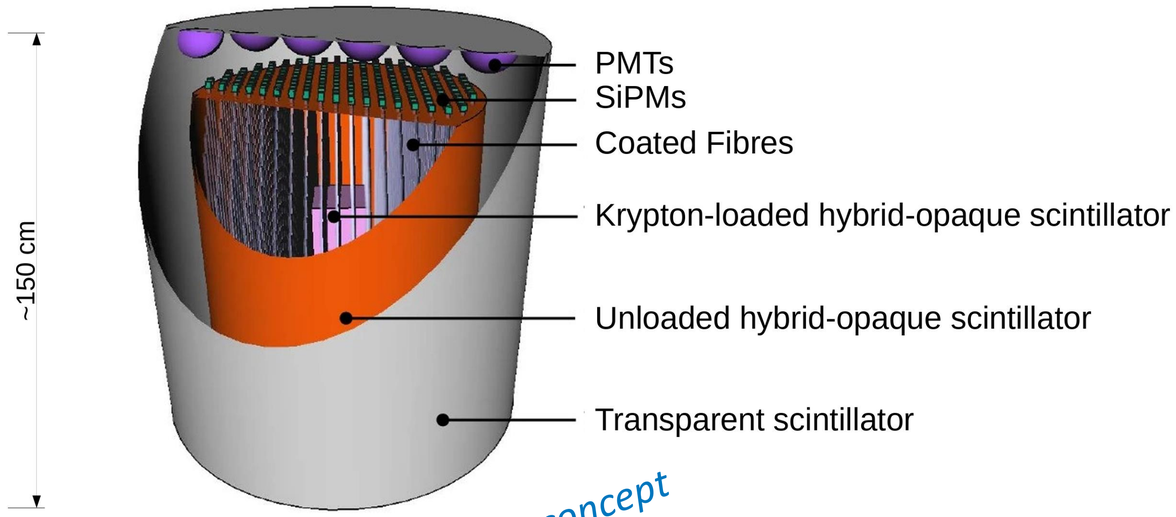


And Continues!

At the February 2026 EAC meeting three letters of intent were received:

- NuDoubt++
- COSMO – **CO**smic ray **S**easonal **M**odulation **O**bservatory

NuDoubt++



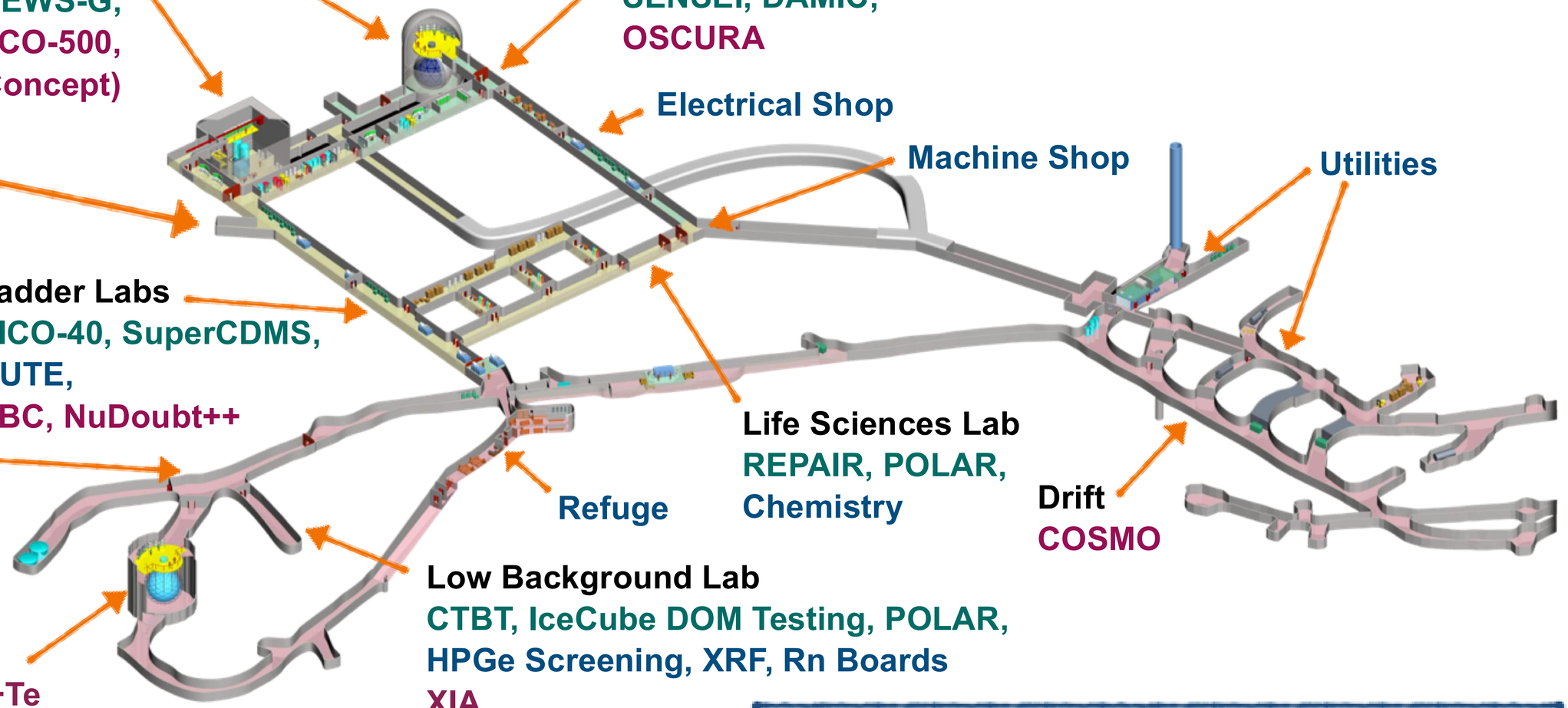
Detector concept

COSMO

Propose to deploy 8 detector modules

Spaces @ SNOLAB

Experiment Areas
Current Experiments
Laboratory Facilities
Future Experiments



Cryopit
XeStill
(XLZD Concept)

Cube Hall
DEAP-3600, NEWS-G,
PICO-500,
(Argo Concept)

J-Drift
SENSEI, DAMIC,
OSCURA

Electrical Shop

Halo Stub
HALO,
Potential breakthrough
for expansion
(Theia Concept)

Machine Shop

Utilities

Ladder Labs
PICO-40, SuperCDMS,
CUTE,
SBC, NuDoubt++

Plants
UPW, LN2,
Scintillator,
TeDiol, TeA

Life Sciences Lab
REPAIR, POLAR,
Chemistry

Refuge

Drift
COSMO

Low Background Lab
CTBT, IceCube DOM Testing, POLAR,
HPGe Screening, XRF, Rn Boards
XIA

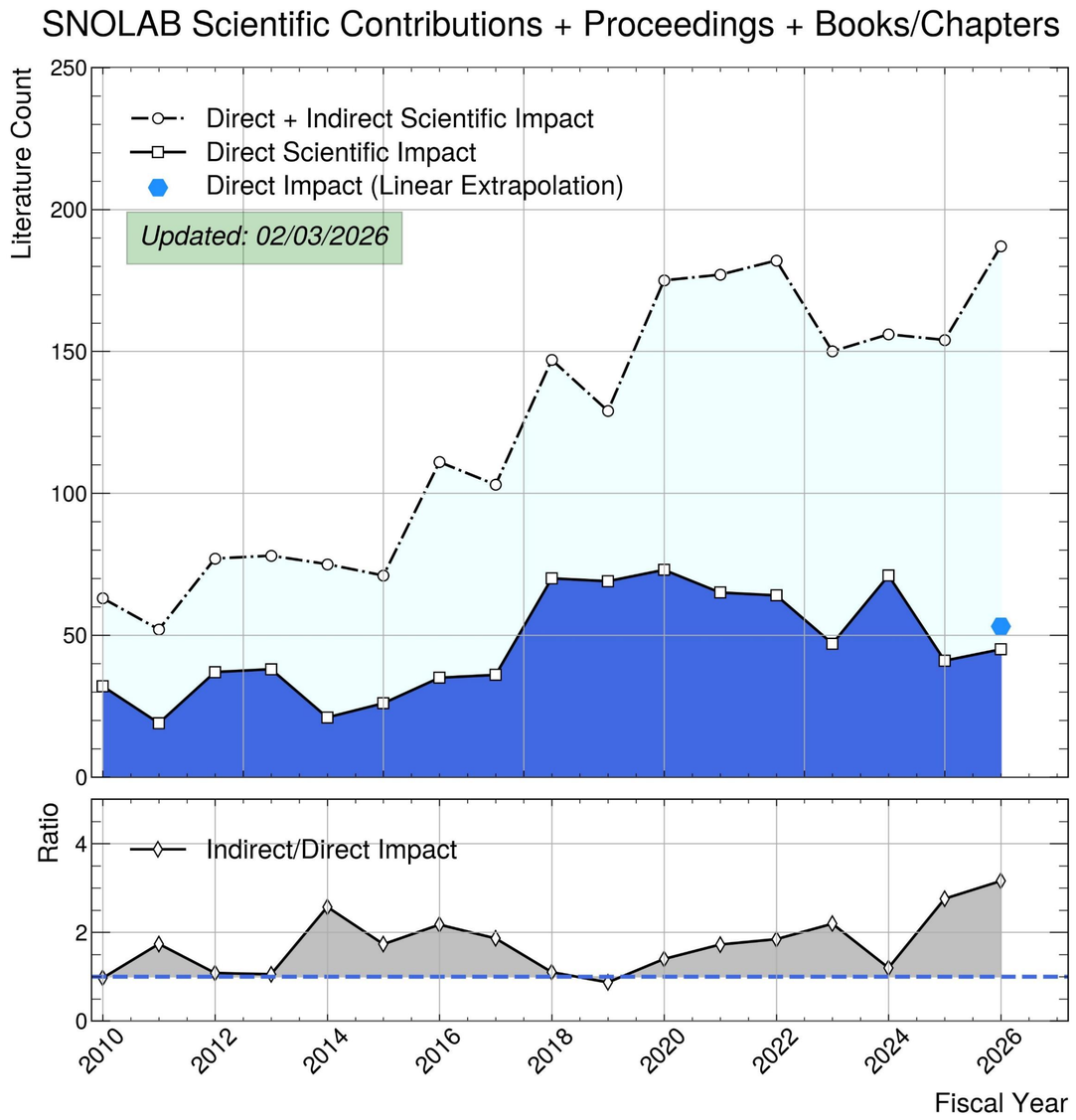
SNO Cavern
SNO+, SNO+Te
Potential for large
project after 2035

- 5,000 m^2 of class 2000 cleanroom
- <2000 particles >0.5 μm in diameter per ft^3

FY26 Research Outputs

SNOLAB cited →

SNOLAB authors →



SuperCDMS Reaches Base Temp!

March 17, 2026, coordinated press release across several institutions

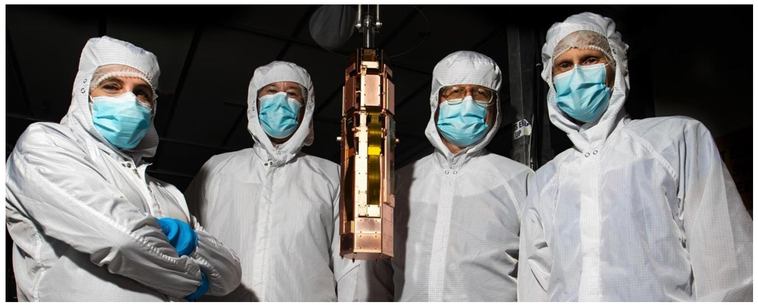
SNOLAB officially becomes one of the coolest places on Earth

[SNOLAB public website]

A chilling new search for dark matter will soon be underway

[Fermilab news]

SuperCDMS SNOLAB cools down to near absolute zero, setting the stage for one of the world's most sensitive dark matter searches



[SLAC public website]

SNOLAB officially becomes one of the coolest places on Earth

By Mike Whitehouse

Published: March 17, 2026 at 1:49PM EDT

[Toronto's CP24 new channel]

SNOLAB staff escort the dilution fridge 1.2 kilometers through the mine drift to the lab entrance. (Mike Whitehouse/SNOLAB)

Chilly SNOLAB experiment reaches near absolute zero

The experiment is part of Super Cryogenic Dark Matter Search, a project aimed at finding the sub-atomic particle believed to comprise up to 85 per cent of the mass of the universe

Sudbury.com Staff
Mar 19, 2026 8:00 PM

The SLAC team inspects an installed tower at the bottom of the dilution refrigerator used for tower testing. | Image: Christopher Smith/SLAC National Accelerator Laboratory

[Sudbury.com local news]

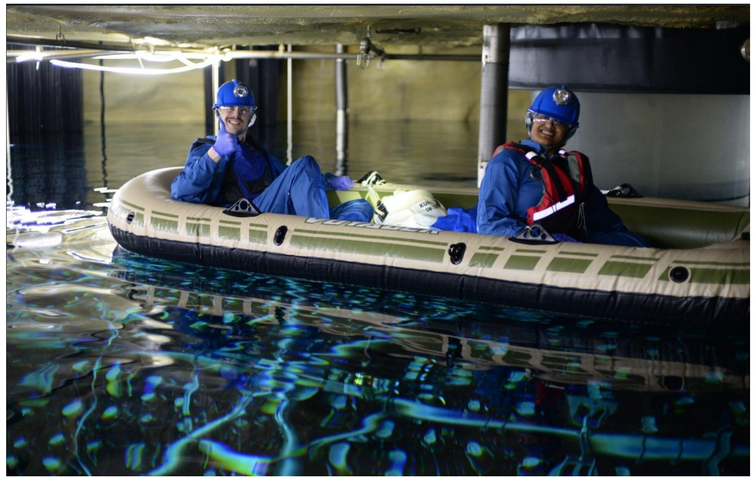
PICO-500 Construction Progress

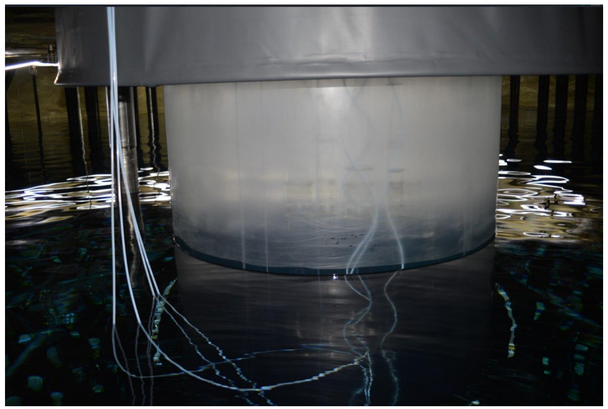
- Completed *in situ* welding and testing of pressure vessel
- Inner vessel assembled and cleaned; additional cleaning ongoing
- Pressure vessel successfully suspended
- Performing radon emanation measurements of pressure vessel
- Expect to complete installation in 2026
- Expect to begin commissioning toward the end of 2026 with science operations starting in 2027

SNO+ Cavity Access for Repairs

Team (left)

Matt, Varshini in boat (right)

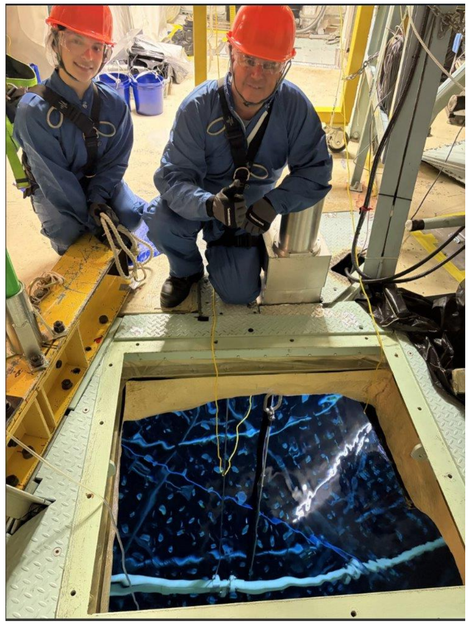




No damage to the neck. AV was not stuck

Anchor point good. No degradation of structure

Installing lights …



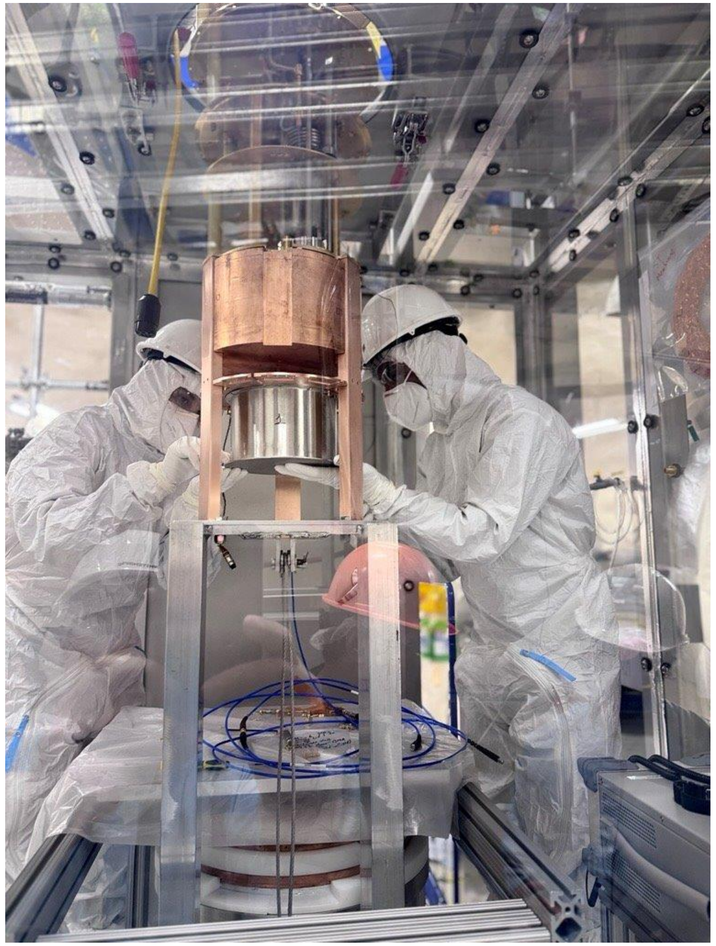
Rescue team (Sling-Choker)

Photo of Undisturbed Cavity – Camera Only

Quantum Science at SNOLAB

CUTE water tank & cleanroom

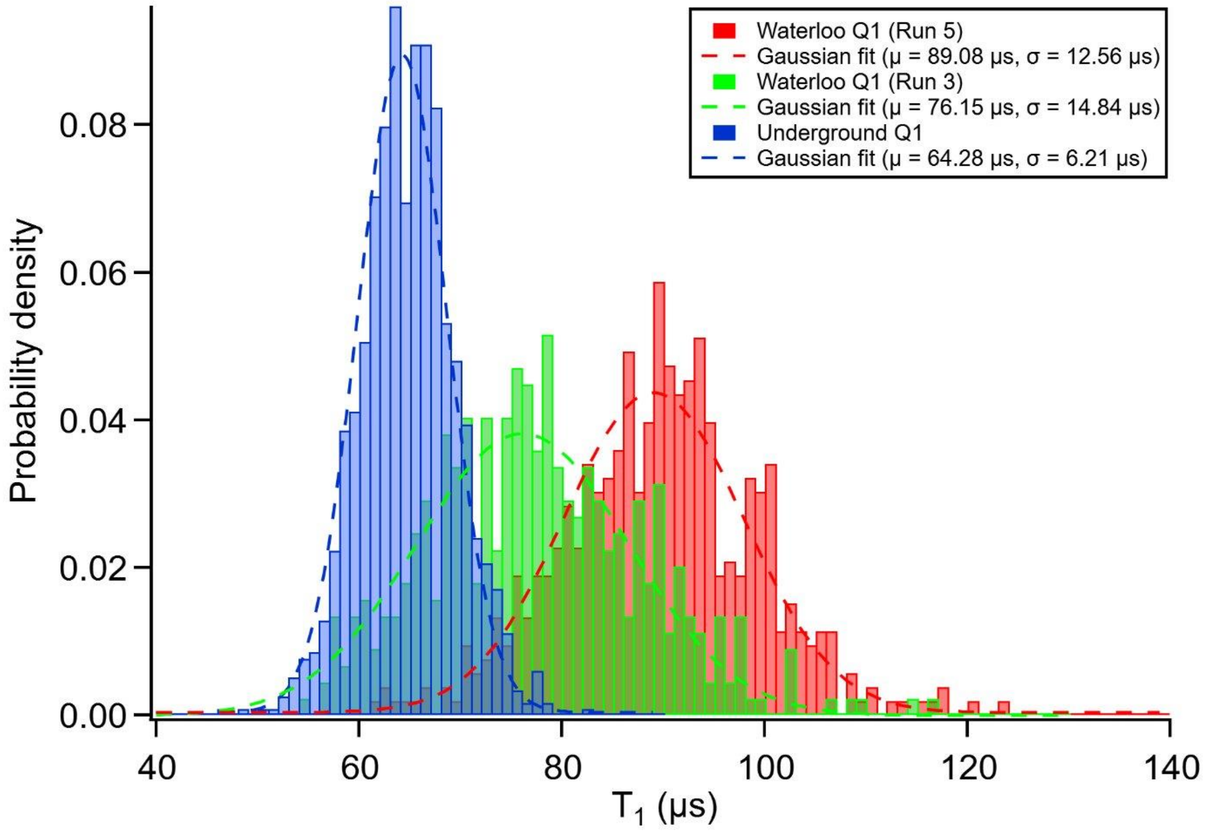
Qubit installation in cleanroom



Lowering of DR into drywell

Quantum Science at SNOLAB

- First qubit data comparison between surface and underground operations shows some interesting differences
- Smaller standard deviation of T1coherence time observed underground at CUTE (blue) versus at the surface at University of Waterloo (green & red)
- Broadening of distributions also observed when qubits exposed to gamma rays from 133Ba source
- Analysis is ongoing… stay tuned!

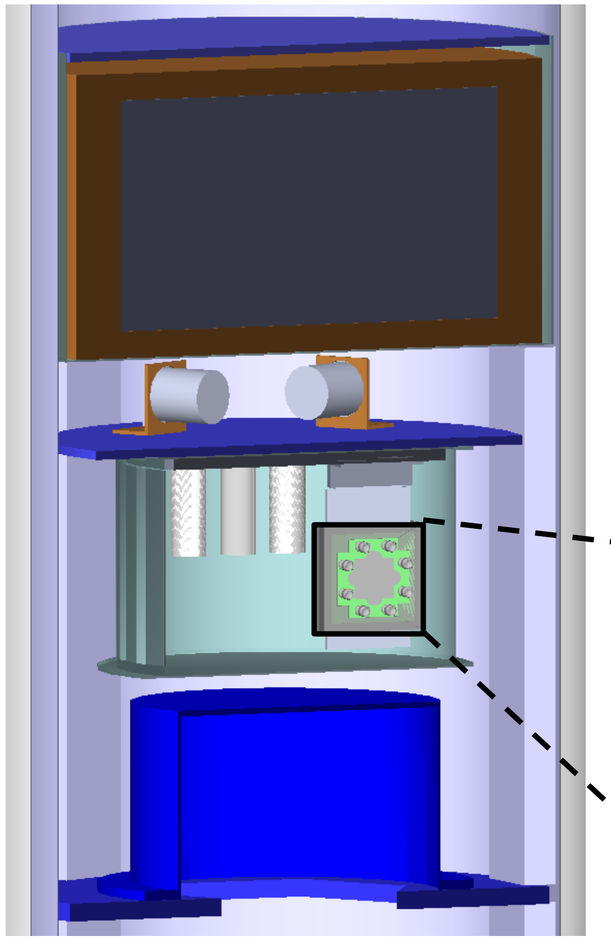


Quantum Science at SNOLAB

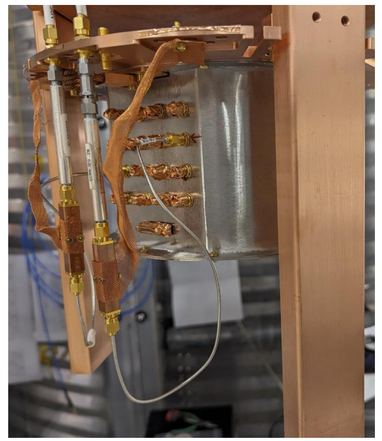
Work in Progress:

- Upgrade of CUTE facility to include additional RF readout lines and device mounting schemes
- Operation of Qubit Tower to study correlated errors across physically separated devices
- Device simulations using Geant4condensed matter physics (G4CMP) phonon/charge transport code, including G4CMP development to improve general QIS applicability

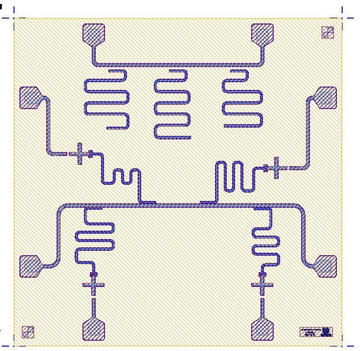
Simulation geometry



Qubit tower



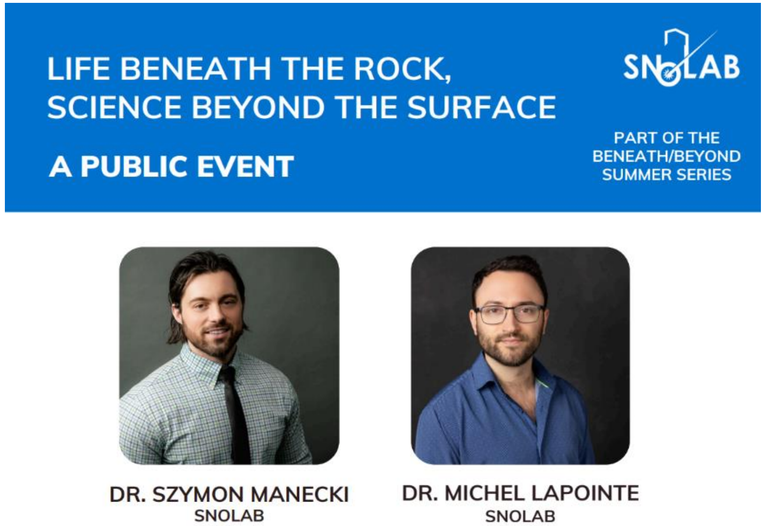
2-qubit device



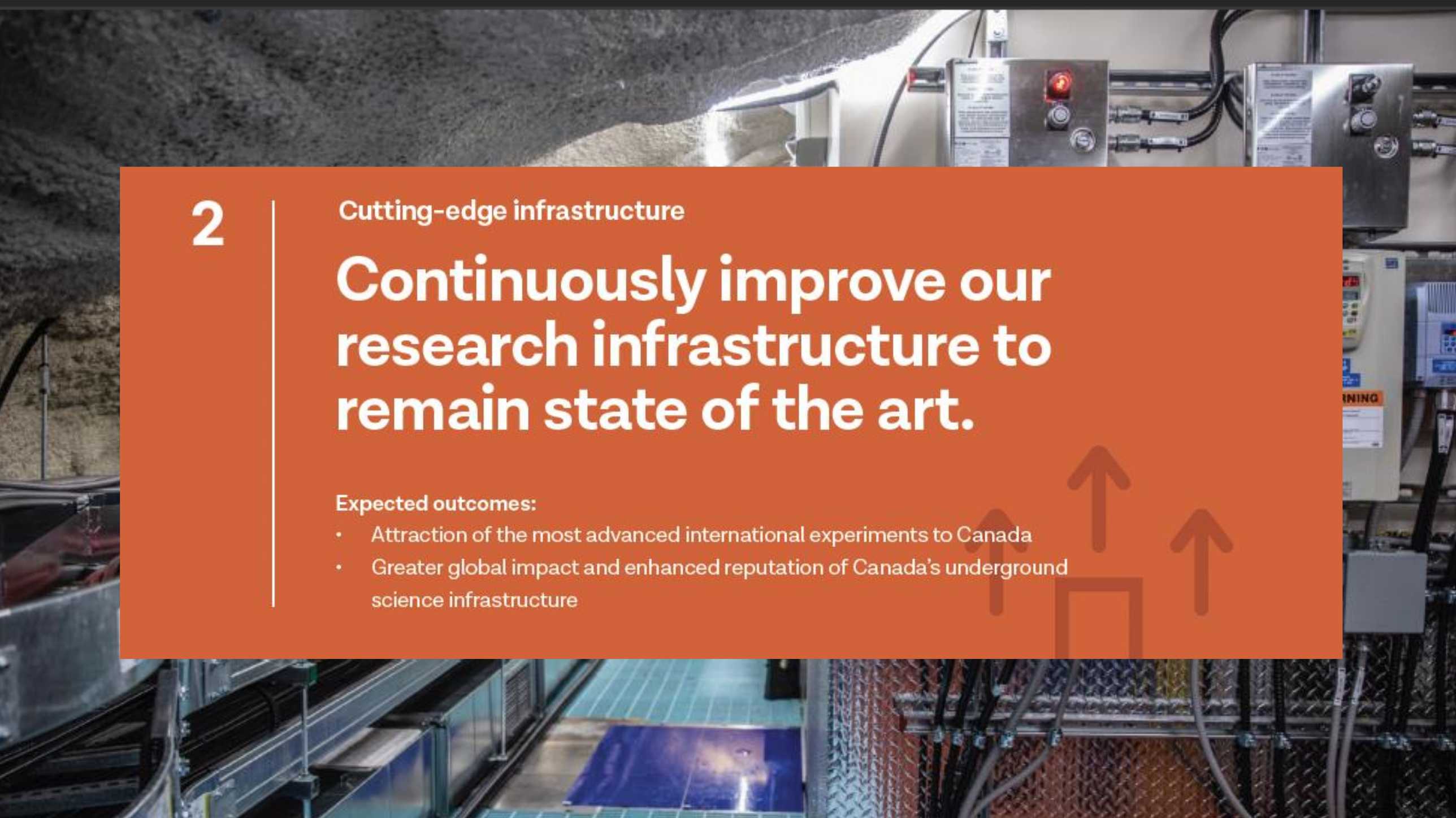
3rd SNOLAB Underground Science Institute (SuSi): Summer Lecture Program is Underway!

Participant lecture program and featured speakers will continue through the summer (Jun 8 – Aug 7), including **hands-on workshops** throughout. The program is capped off by the **Canadian Astroparticle Summer Student Talks (CASST) symposium** Aug 12-13.

Lecturer(s)	Topic(s)	Dates
Christopher Thome (NOSM/Laurentian) Michel Lapointe (SNOLAB, NOSM, Laurentian) Douglas Boreham (NOSM, Laurentian)	Radiobiology and Underground Biology	June 8 - 19
Yoni Kahn (University of Toronto)	The future of dark matter direct detection	June 22 - 26
Michela Lai (Queen's University)	Noble Liquids and Dark Matter Detection	July 2 - 10
Ziqing Hong (University of Toronto)	Cryogenic detectors for rare event search experiments, including sensors, electronics and digital processing	July 13 - 17
Jason Holt (TRIUMF, McGill University)	First-principles nuclear theory towards new physics searches	July 27 - August 7



Free summer public event series, “Beneath/Beyond”, next talk is June 29 (7pm) at The Refettorio on Durham Street.



2

Cutting-edge infrastructure

Continuously improve our research infrastructure to remain state of the art.

Expected outcomes:

- Attraction of the most advanced international experiments to Canada
- Greater global impact and enhanced reputation of Canada's underground science infrastructure

New Projects for FY27

- ~$2.7M investment in underground infrastructure: chiller drift remediation, TAD Expansion, Water Line replacement.
- ~730K investment in IT Upgrades including the final phases of the IT security project.

Experimental commitments	**226,245.43**
1806: SCDMS	65,614.00
2101: PICO	152,631.43
2105: SBC	8,000.00
2616: XLZD	-
Underground	**2,753,994.09**
2600: Chiller Drift	1,363,157.59
2613: TAD Extension	578,530.26
2713: 6800L Water Line Replacement	812,306.23
IT Ugrades	**732,539.85**
2720: Auditorium AV Upgrade	107,540.93
2102: IT Security	624,998.92
Existing projects	**220,120.32**
2501: LiNEAR	52,200.00
2603: DT Generator	30,349.00
2604: RAMPS	35,479.63
2605: Fast Neutron Detector	37,641.24
2606: MAPLE	52,019.13
2608: Radon Trap	12,431.33
New initiatives	**397,296.82**
2701: MICRO	30,392.06
2704: Radon Calibration	8,964.17
2707: Cleanliness Initiatives	20,998.05
2711: ICP-MS	51,630.04
2712: Surface Chemical Storage	134,428.35
2717: NEARLINE	126,819.00
2718: Solid Scintillator Synthesis	24,065.15

Investment in Underground Systems

- ~1.05M investment in upgrading key systems and purchasing replacement parts.

UG Fire protection system upgrades	50,000.00
Surface building roof maintenance	200,000.00
Sanitary waste ejector pump	25,000.00
Fluid cooler loop critical spare pump	35,000.00
Chilled water loop critical spare pump	60,000.00
Double track sump pumps	25,000.00
Dolphin pump critical spare	71,000.00
HRV-1 replacement	150,000.00
Replacement UPSs	50,000.00
Surface AC-3	40,000.00
Underground AHUs	150,000.00
Furniture	193,000.00
	1,049,000.00

Update: Cryopit Plans

SNOLAB Cryopit Timeline

Dec 2024

US led nEXO project was paused.

August 2025

XLZD was approved as a conceptual design study at SNOLAB.

March 2026

Canadian scientists were accepted as members of the XLZD collaboration.

March 2026

CFI awards $1.2 M to SNOLAB for the accelerated advancement of the design of XLZD in SNOLAB’s cryopit.

June 2026

SNOLAB successfully completed a technical site review as one of four international sites being evaluated to host XLZD

Montréal Workshop: Canadian PI Organize

- May 5&6, 2026
  - Meeting between Canadian PIs and XLZD leadership.
  - At least one Canadian PI connected to each WBS (with exception of WBS 1.04 Cryogenics where PD Frederic Girard will connect for now)
- May 7&8, 2026
  - Meeting of Canadian XLZD PIs
  - Discussed strategy and bylaws
  - Discussed funding proposals:
    - CFI IF 2027
    - NSERC

New Funding to Advance XLZD Design

SNOLAB's proposal focused on 4 objectives:

- **Cryostat:** understand how to build the XLZD cryostat in the SNOLAB Cryopit.
- **Heat Rejection:** develop the chilled-water system needed to support XLZD cryogenic operations and assess associated oxygen-deficiency hazards.
- **Xenon Storage & Recovery:** develop solutions for underground storage and recovery of up to 100 tonnes of xenon.
- **Logistics:** increase capacity for movement of materials and equipment into SNOLAB.

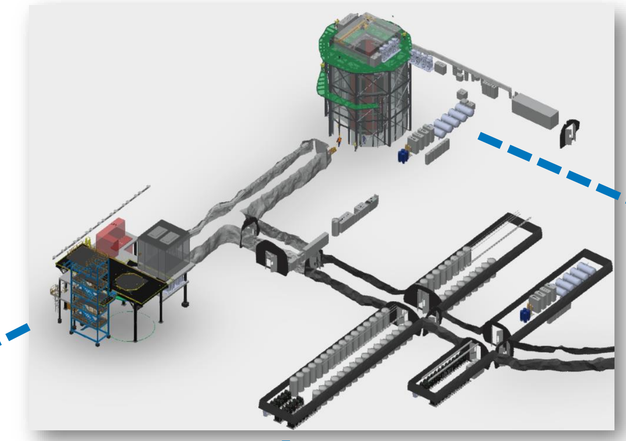
XLZD Technical Site Review Preparations

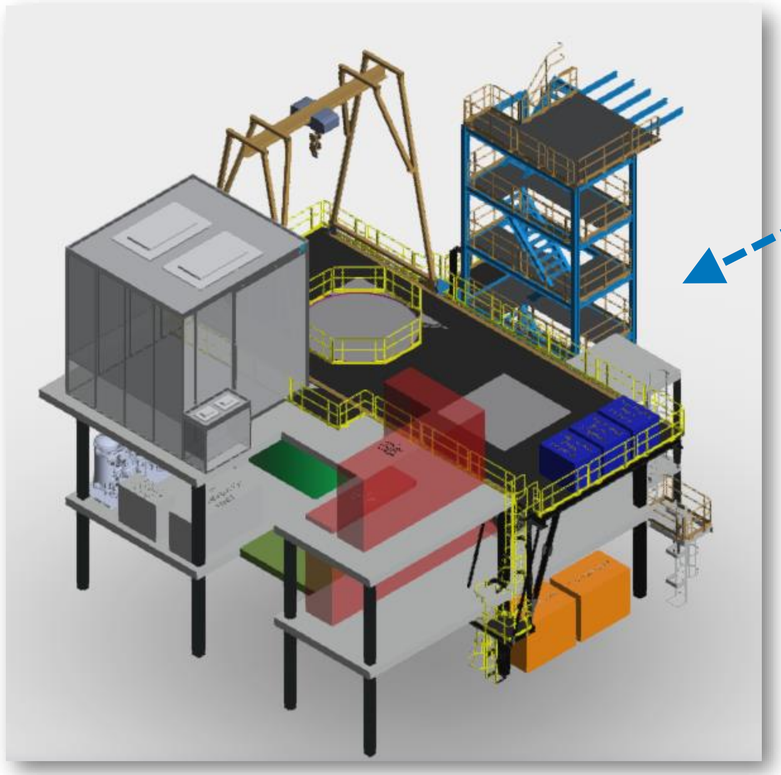
- In preparation for the June 10, 2026 (virtual) technical site review, SNOLAB hosted an in-person Red Team Review in preparation of the XLZD siting review (May 27, 2026)
- Two external experts, Cherwinka and Orrell, visited the SNOLAB underground site to provide additional feedback and suggestions for project realization within the underground facility.

Red Team Review Committee

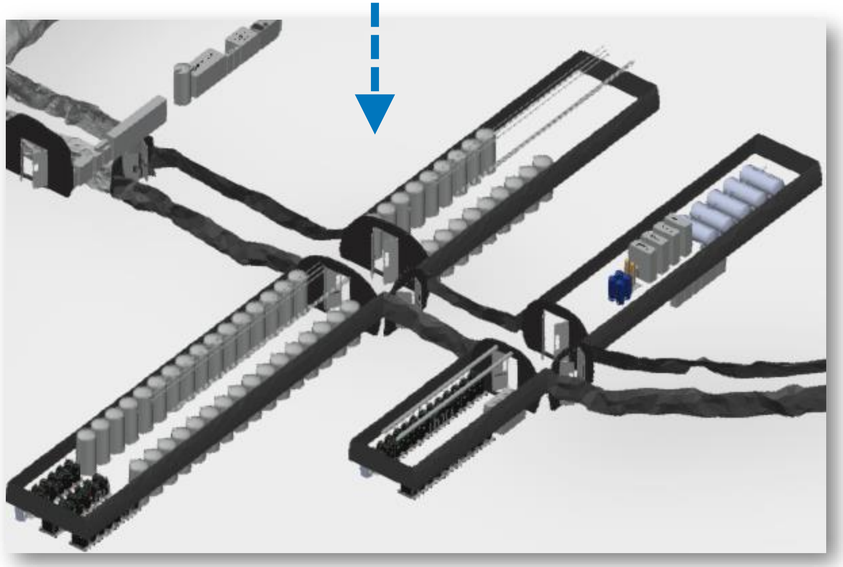
John Orrell (PNNL) – Chair
Jeff Cherwinka (Madison) – engineering/LZ expertise
Michael Stoddart (SNOLAB) – operations
Michael Hood (SNOLAB) – technical services
Paul Larochelle (SNOLAB) – engineering
Mehwish Obaid (SNOLAB) – project management
Richard Ford (SNOLAB) – operations
Ray Bunker (SNOLAB) – research

XLZD @ SNOLAB Concept

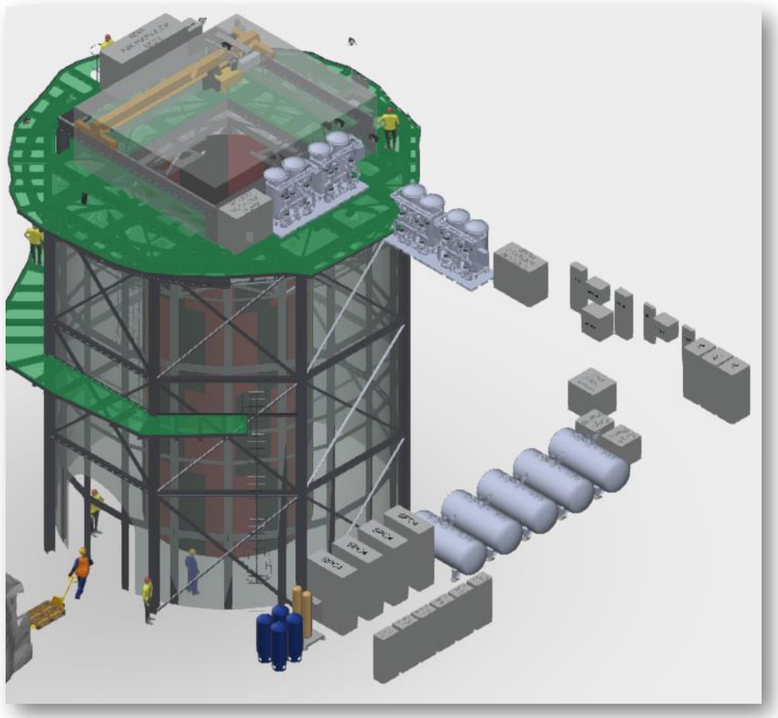




Xenon Process Systems
& Clean Assembly Areas



Xenon Storage &
Recovery



Detector, Shielding Tank
& Cooling Systems

15-Year Plan

SNOLAB in 15 years:

The world's leading underground science facility

Here's how we envision SNOLAB in 15 years:

A global powerhouse in discovery science

Leading transformative experiments that push the boundaries of knowledge

A vibrant intellectual and training hub

Attracting and nurturing the next generation of leaders

A unique state-of-the-art infrastructure

Continuously evolving to support high-impact underground science and top-tier talent

A national centre for scientific knowledge

Inspiring Canadians and improving science literacy

Looking ahead, at SNOLAB we are

- Building on a foundation of scientific excellence and operational success.
- Investing in infrastructure that enables the next generation of underground science.
- Supporting Canada's bid to host XLZD and other transformative future projects.
- Expanding opportunities for scientific discovery, innovation, training, and international collaboration.
- Continuing to position Canada at the forefront of underground science.

Discussion and Questions