

2026/05/26

SNOLAB Now and in the Future: Perspectives from the Executive Director

Jodi Cooley

Executive Director | SNOLAB

Professor of Physics | Queen's University

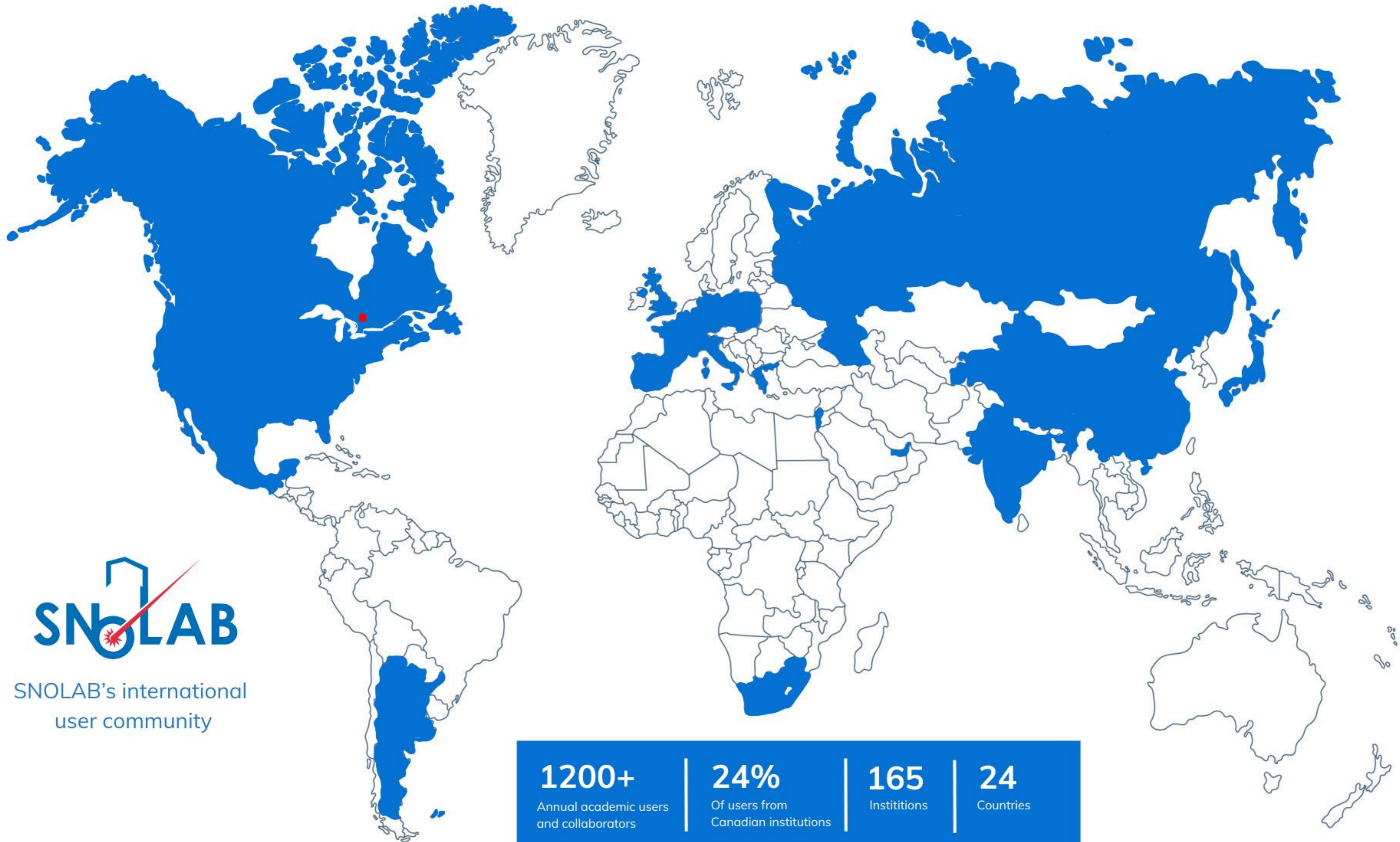


Visionary Partners



Funding Partners





SNOLAB's international
user community

1200+ Annual academic users and collaborators	24% Of users from Canadian institutions	165 Institutions	24 Countries
--	--	----------------------------	------------------------

Reaching New Heights, Deep Underground

2023–2029 Strategic Plan

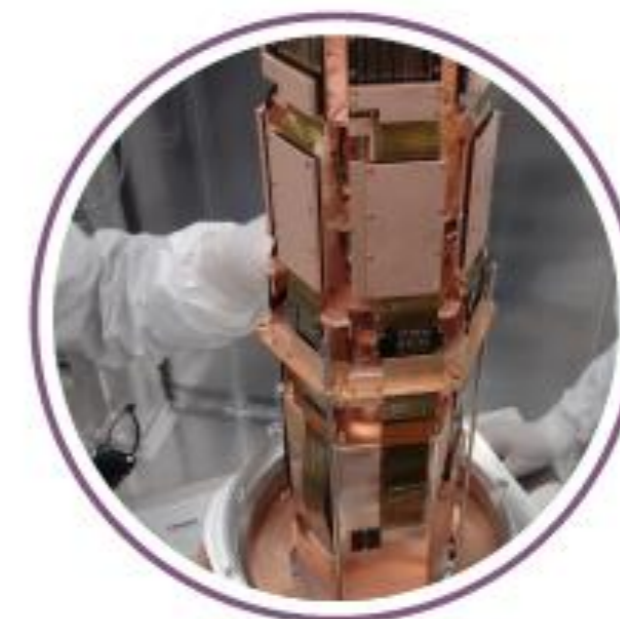


Three core pillars drive our Strategic Plan.



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



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?

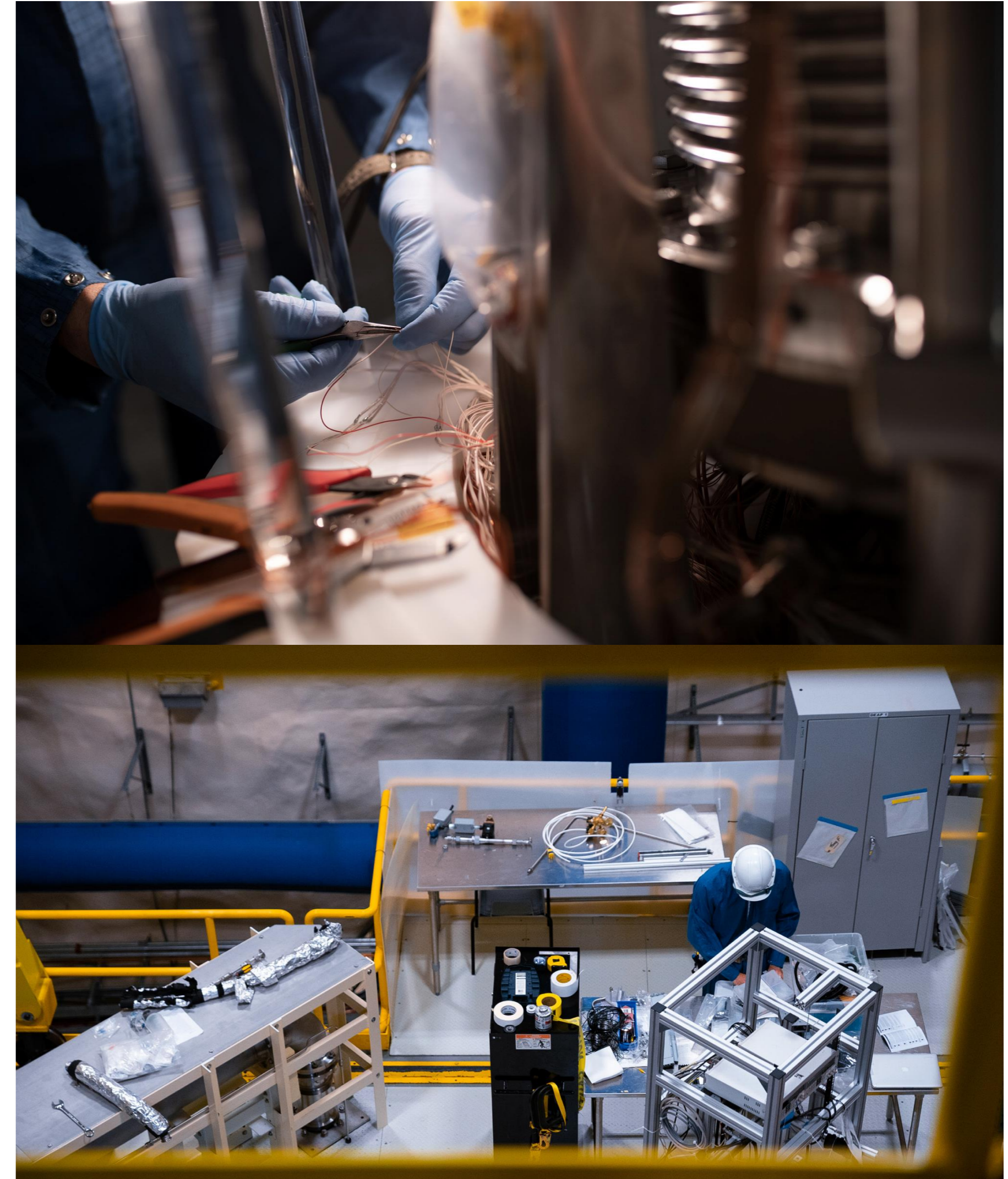
Continue to collaborate in scientific research requiring deep underground facilities.

- 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

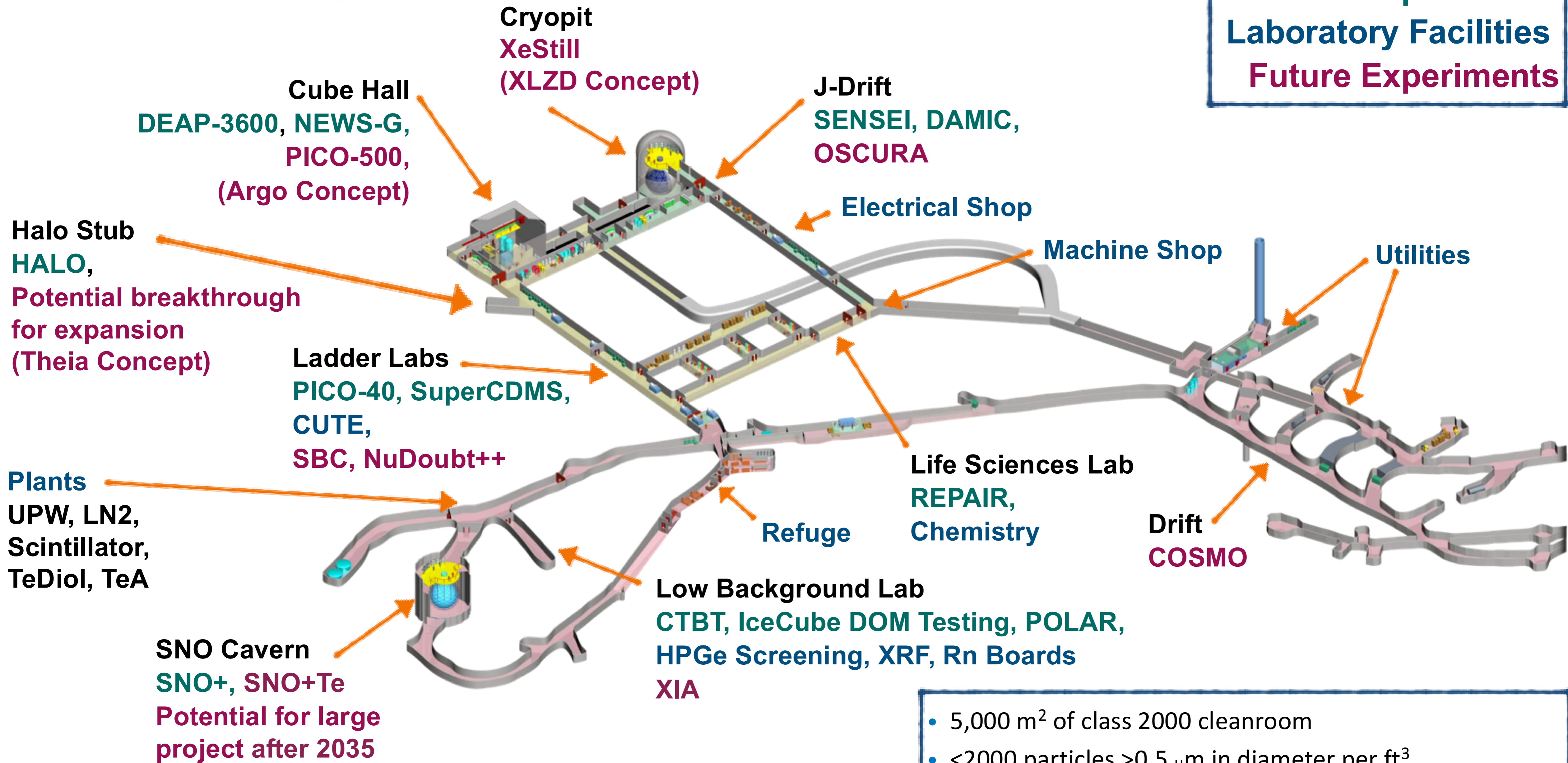
- Quantum technologies (quantum computers, sensors, and materials)

Become an intellectual hub that fosters collaboration and connection.



Spaces @ SNOLAB

Experiment Areas
Current Experiments
Laboratory Facilities
Future Experiments



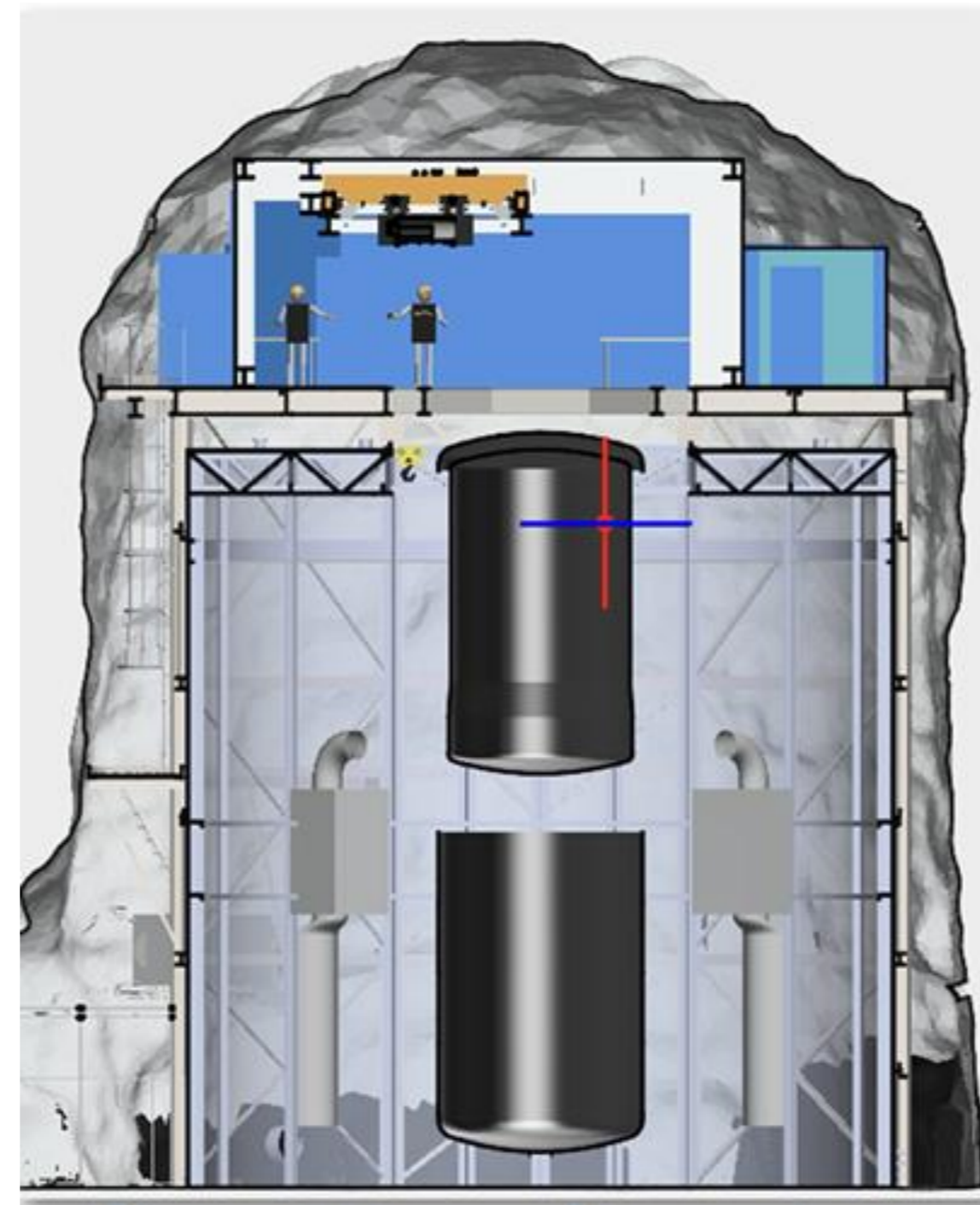
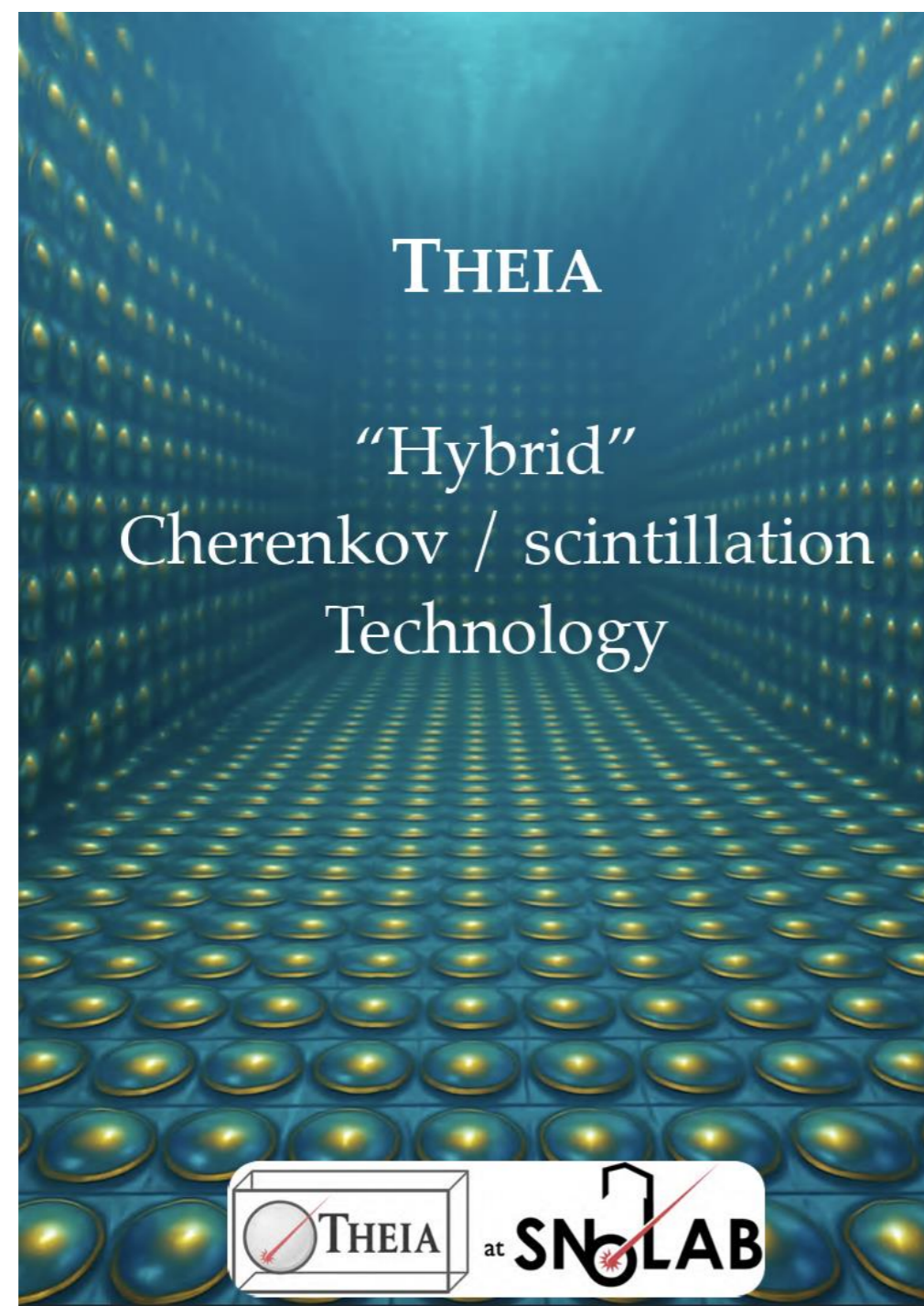
- 5,000 m² of class 2000 cleanroom
- <2000 particles >0.5 μm in diameter per ft³

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 (**P**oint of **C**are **U**ltrasound - POCUS) in underground environments

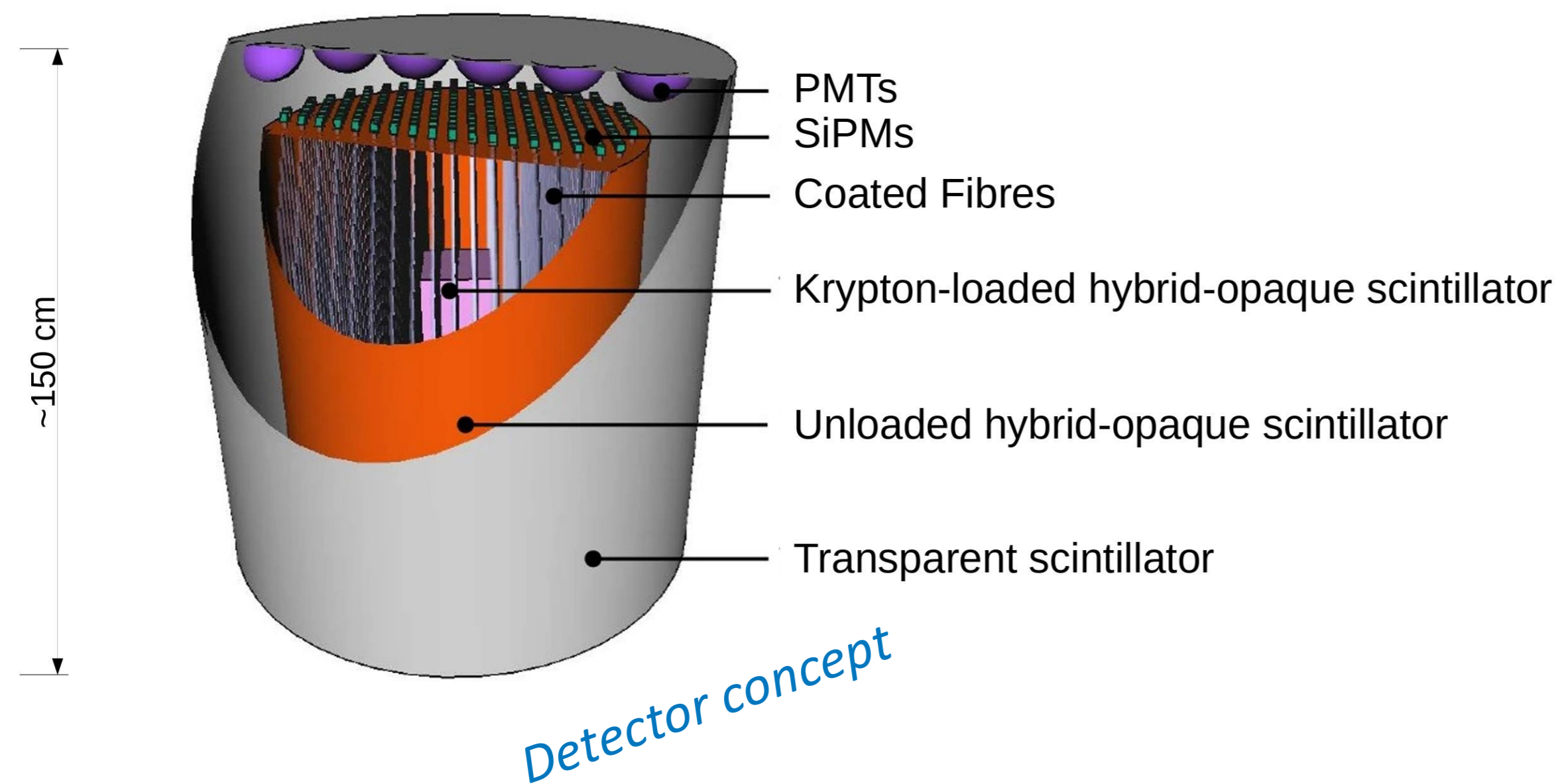


And Continues!

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

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

NuDoubt++



COSMO

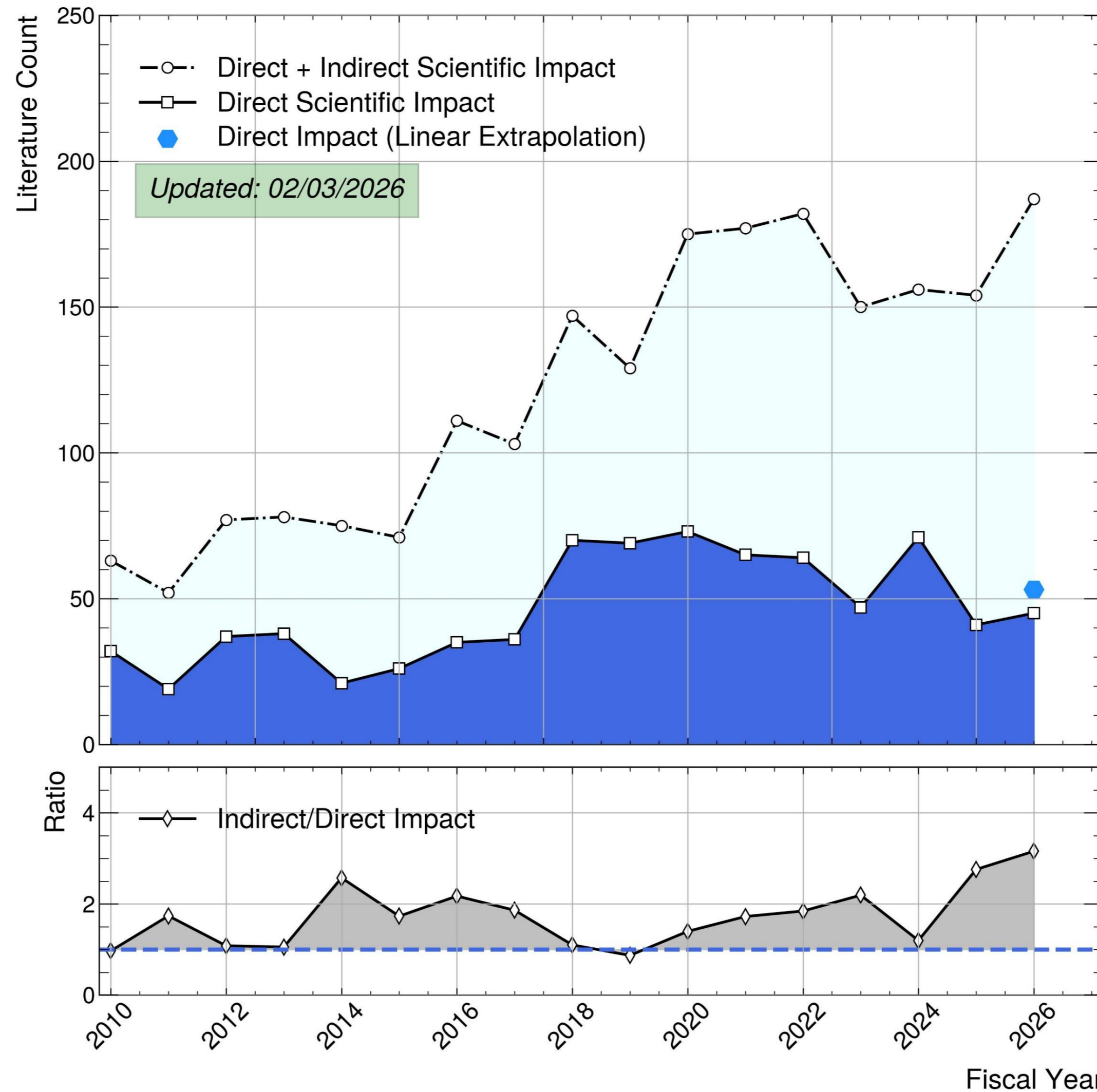
Propose to deploy 8 detector modules



FY26 Research Outputs



SNOLAB Scientific Contributions + Proceedings + Books/Chapters



SNOLAB cited →

SNOLAB authors →



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 Upgrades	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

Status Update: SNOLAB Cryopit



July 2024

- nEXO accepted as SNOLAB project to be constructed in Cryopit

Dec 19, 2024

- DOE indicated support for nEXO-related R&D activities rather than a full project.

May 26–27, 2025

- 3rd International Summit, Heidelberg
- Formation of Joint Oversight Group (funding agencies & facility directors)
- Canadian attendees: ISED, CFI, NSERC, SNOLAB

Nov 12–14, 2025

- Workshop at McGill University on $0\nu\beta\beta$ in ^{136}Xe
- Consensus: next-gen flagship experiment needed
- Follow-up meeting in Manchester, UK (2026)

February 2026

- Canadian interest in XLZD collaboration grows; membership proposal in preparation

New Funding to Advance XLZD Design



- **January 8, 2026:** CFI invited SNOLAB to submit a proposal by January 30th for additional funding to advancing the design of XLZD in SNOLAB's Cryopit.
- **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.
- **March 25, 2026:** SNOLAB notified that we awarded the \$1.2M requested to complete this work.

A 15-Year Plan for SNOLAB

15 Year Plan: Why Now?

New decision-making framework was introduced in the 2024 Canadian federal budget to support Canadian Major Research Infrastructures.

– *Six research facilities introduced including SNOLAB*

Central Pillar Lifecycle funding for designated facilities

– *Requires CFI to assess long-term capital and operational needs of each MRF*

SNOLAB was asked to provide detailed and reliable budget estimates for the next 15 years under three budget scenarios.

- 1. Maintaining current levels of operation*
- 2. Fully supporting the needs of the Canadian research community*
- 3. Increasing global competitiveness.*

Process for Developing the 15 Year Plan

- Engagement with SNOLAB staff (Dec and Jan 2025).
- Roth consulting on asset management plan and JLR & EXP consulting on architectural estimates.
- Multiple engagements with SNOLAB community.
 - SEF meeting
 - SNOLAB Future Projects
 - Town Hall at CAP
 - Annual MI meeting



Delivery of World-Class Science: Astroparticle and Neutrino Physics, Quantum Technologies, UG



Biology

Future Project Workshop: many ideas for potential experiments

- Deep Underground Biology
- HeLIOS (superfluid He)
- Small-scale Experiments for light dark matter
- Cryogenic solid-state detectors for dark matter detection
- Skipper CCDS and related efforts
- Liquid Noble Bubble Chambers
- $0\nu\beta\beta$ decay w/ bolometers
- R&D for normal hierarchy

- Beyond SNO+ Te
- ARGO, ARGO-lite, Darkside-LM
- nEXO 2.0
- NEXT
- XLZD
- Theia at SNOLAB

**This list is illustrative. It is not exhaustive, nor does it indicate SNOLAB approval or space allocation.*

***Community Report from the 2025 SNOLAB Future Projects Workshop. [arXiv:2507.11368]*

New Campus Key Features

New building --

- Scenario 1
 - Located outside the industrial controlled zone
 - Auditorium space large enough to accommodate current staff, collaborations, and SuSi programs, kitchenette
 - Training space
 - Additional surface lab space
 - Additional office and collaboration space
- Scenario 2
 - Warehouse
- Scenario 3
 - Additional surface lab, office and collaboration space
 - Visitor Center
 - Guesthouse
 - Day Care
 - Cafeteria

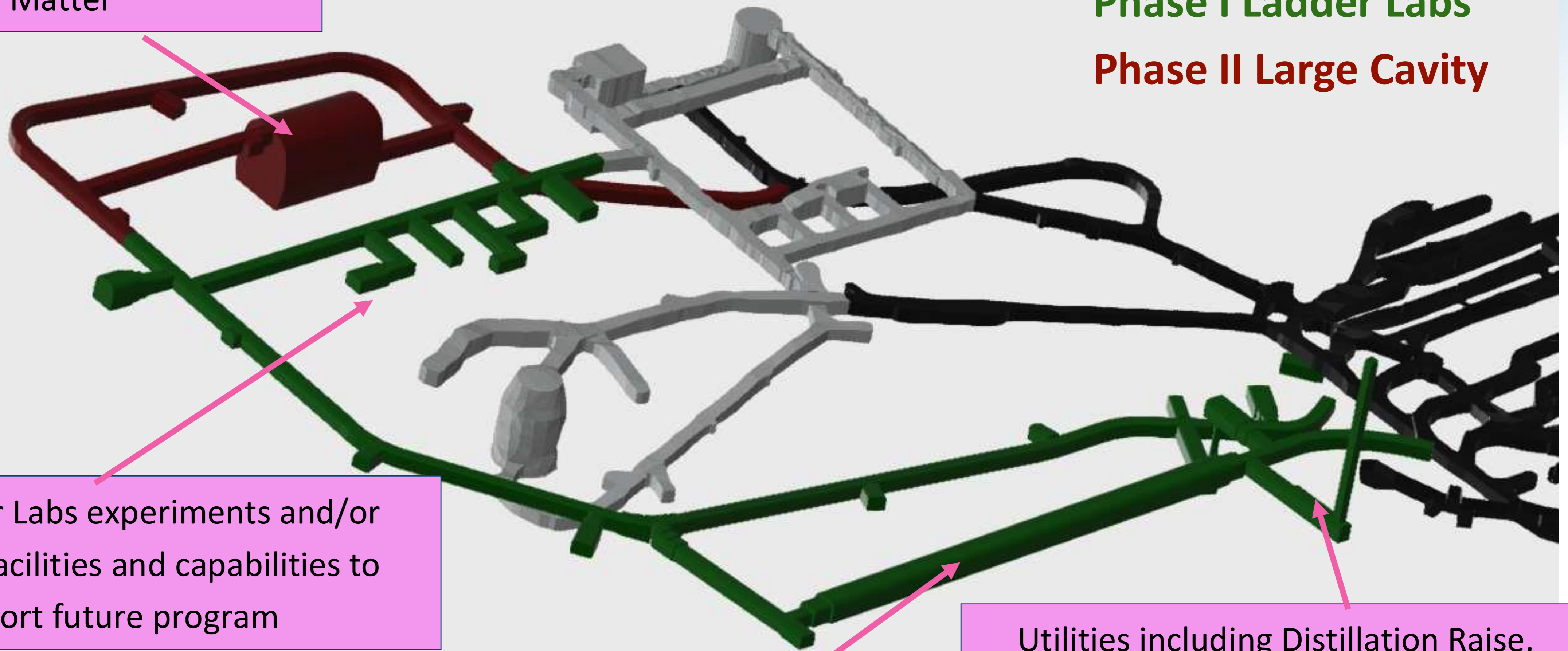
New Underground Lab Space

Large Cavity for Beyond Tonne Scale $0\nu\beta\beta$ decay or Future Dark Matter

Existing Lab

Phase I Ladder Labs

Phase II Large Cavity



New Ladder Labs experiments and/or expanded facilities and capabilities to support future program

Argon Storage

Utilities including Distillation Raise, Chiller Raise, Electrical Room

15 Year Plan Summary

Maintaining current levels of operation

- Current laboratory at 100% occupancy
- New modest surface building offsite: “New Campus”.
- ~15% increase in staff

Fully supporting the needs of the Canadian research community

- Expand underground laboratory with new ladder labs to meet increased demands for space and capabilities.
- New larger surface building offsite: “New Campus”.
- ~55% increase in staff

Increasing global competitiveness

- Expanded underground laboratory with new ladder labs and large cavern to potentially host a beyond tonne-scale $0\nu\beta\beta$ beta decay, a beyond 3rd generation dark matter experiment, or something else
- “New Campus” with expanded facilities (guesthouse, cafeteria, ...?)
- ~70% increase in staff

MRF and 15-Year Plan Update



Conclusions



- SNOLAB has established Canada as a global leader in underground science, infrastructure, and expertise.
- SNOLAB's uniquely low-radiation environment enables a broad and multidisciplinary program of internationally recognized research.
- Experimental collaborations at SNOLAB have already delivered transformative scientific results, with many additional discoveries anticipated in the coming decade.
- Continued investments are ensuring that SNOLAB's underground infrastructure evolves to meet the future needs of the scientific community.
- Our recently completed 15-year strategic plan positions SNOLAB to support the next generation of scientific programs and technologies.
- We look forward to enabling future discoveries together and to welcoming new experiments and collaborations to SNOLAB.

Discussion and Questions

