

2024/05/30

SNOLAB Report

Jodi Cooley

Executive Director | SNOLAB

Professor of Physics | Queen's University

Adjunct Research Professor SMU



Land Acknowledgement

SNOLAB is located on the traditional territory of the Robinson-Huron Treaty of 1850, shared by the Indigenous people of the surrounding Atikameksheng Anishnawbek

First Nation as part of the larger Anishinabek Nation.

We acknowledge those who came before us and honour those who are the caretakers of the land and the waters.

Introduction to SNOLAB

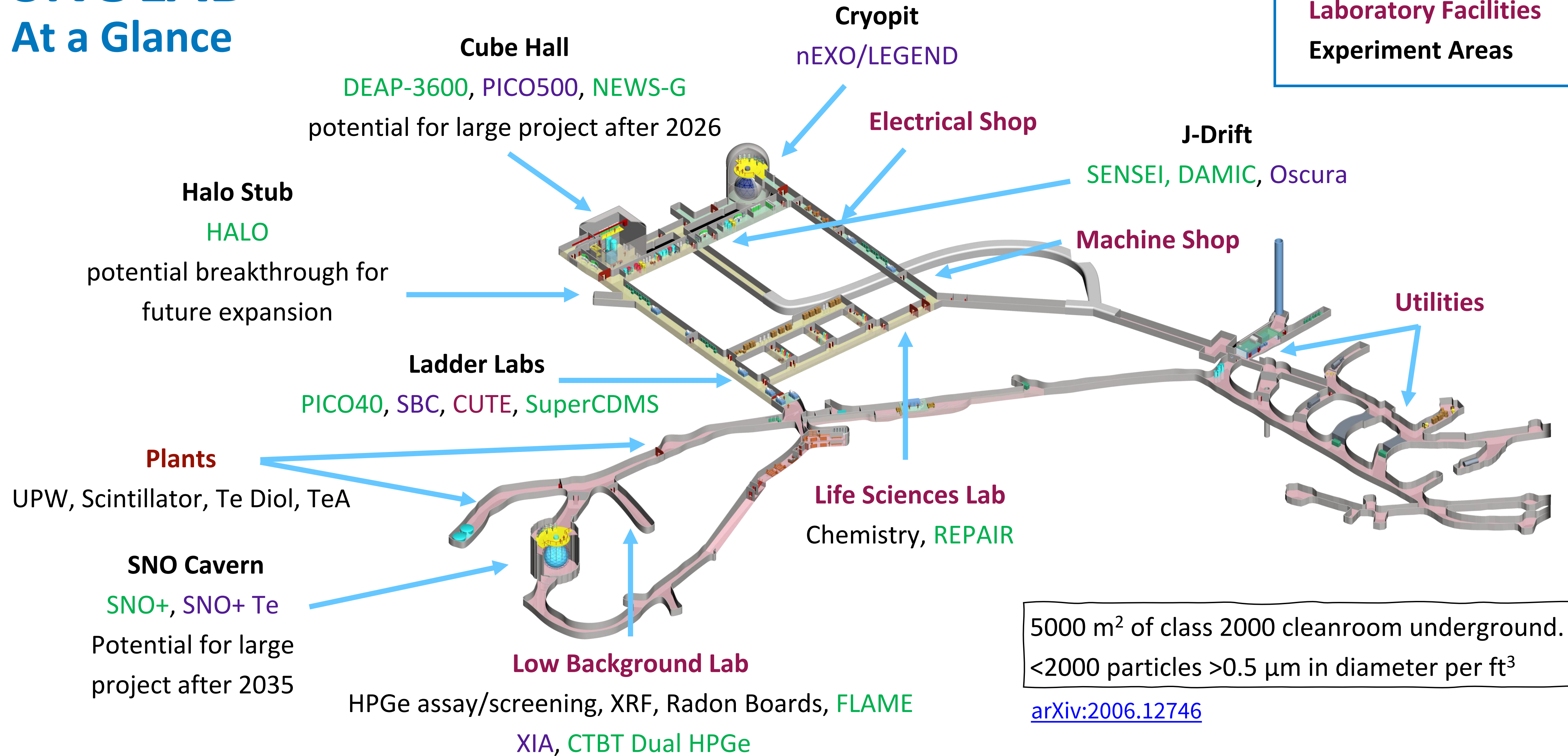


- SNOLAB hosts rare event searches and measurements. It's located 2 km underground in the active Vale Creighton nickel mine near Sudbury, Ontario, Canada. [L] [SEP]
- SNOLAB is operated jointly by University of Alberta, Carleton University, Laurentian University, University of Montreal, and Queen's University. [L] [SEP]
- SNOLAB operations are funded by the Province of Ontario, and the Canada Foundation for Innovation.



SNOLAB – At a Glance

Current Experiments
Future Experiments
Laboratory Facilities
Experiment Areas



5000 m² of class 2000 cleanroom underground.
<2000 particles >0.5 μm in diameter per ft³

[arXiv:2006.12746](https://arxiv.org/abs/2006.12746)

Our Vision:

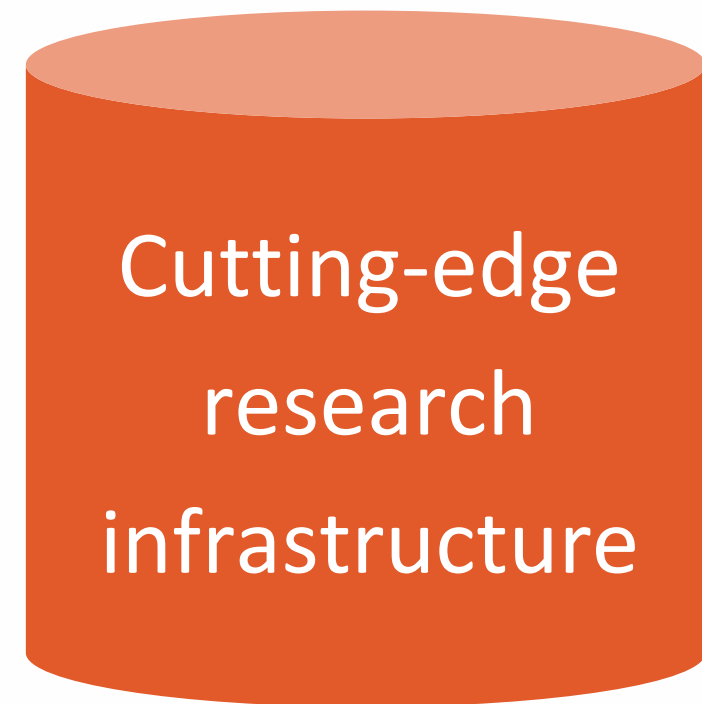
*To be the leading international laboratory
in deep underground science, hosting the world's most advanced
experiments that provide insight into the nature of the universe.*



Our Core Pillars:



Excellent
Science



Cutting-edge
research
infrastructure



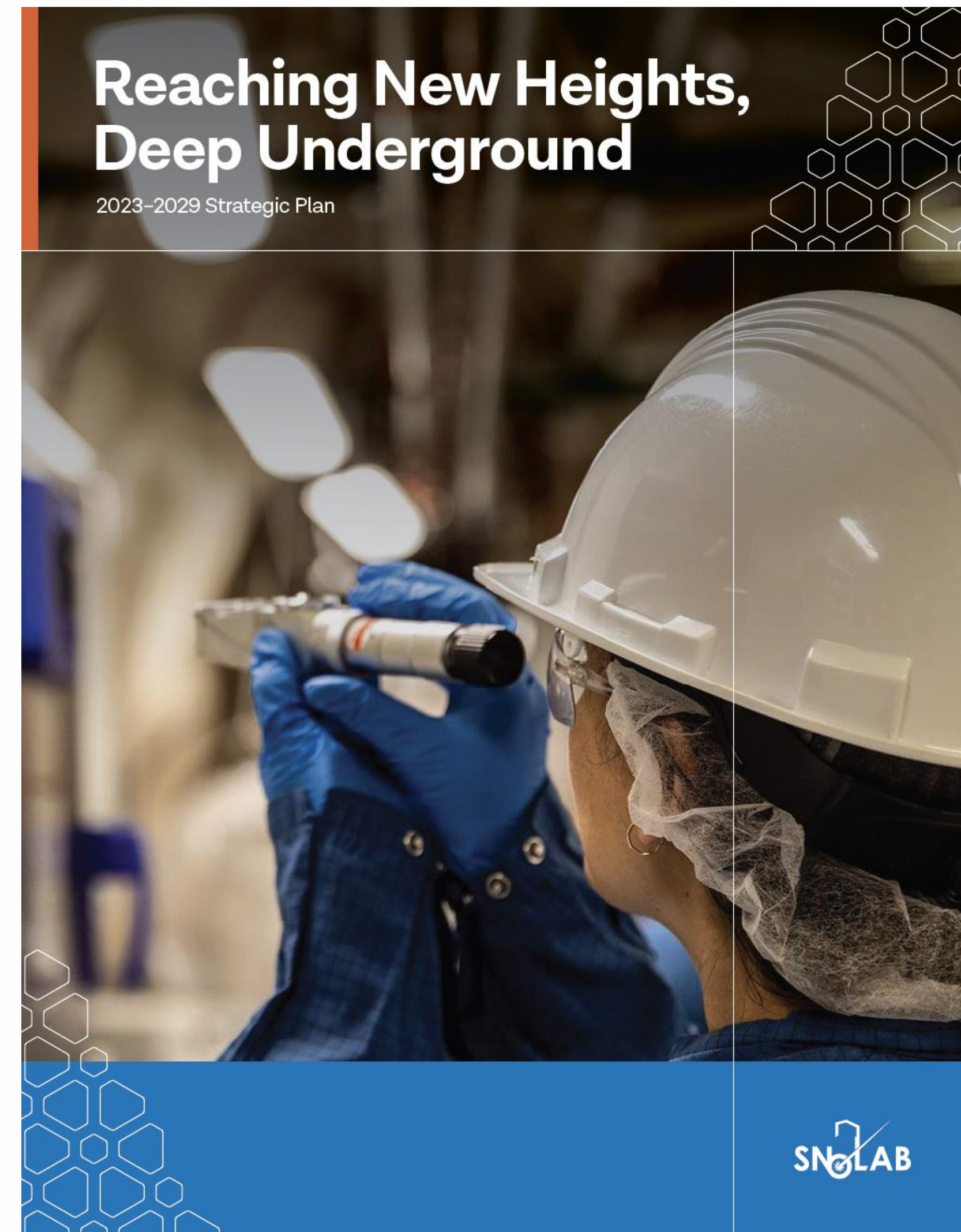
Skilled
people

Our Mission

Enable world-class underground science
Spearhead research and development
Catalyze scientific collaboration
Promote innovation
Inspire the next generation

Our Core Values

Safety
Accountability
Diversity
Excellence
Teamwork



1

Excellent science

Drive breakthrough discoveries at the frontiers of underground science.

Expected outcomes:

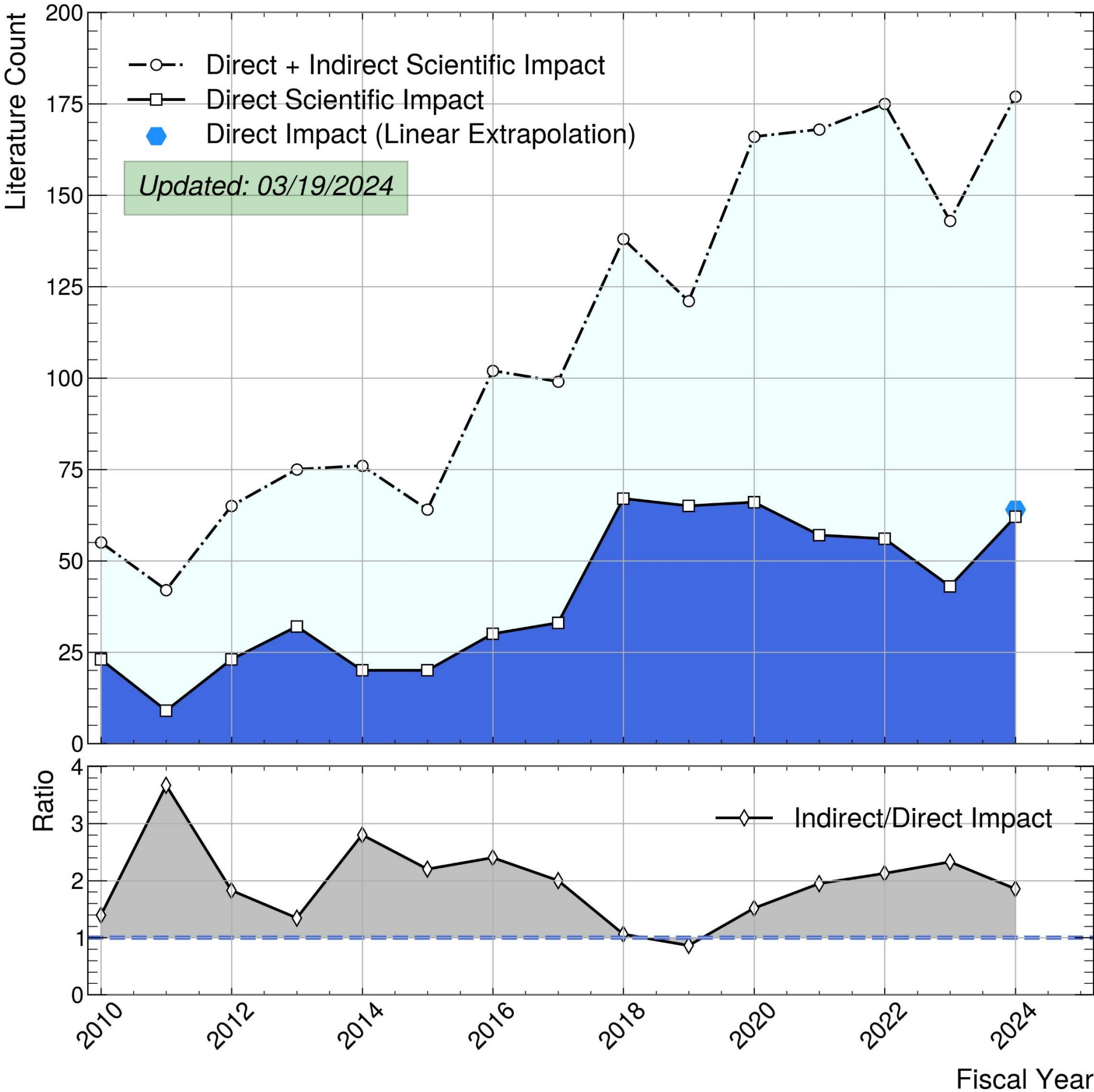
- Cementing of Canada's leadership in deep underground science
- A stronger, more competitive Canada in scientific discovery
- More Canadian researchers positioned as global leaders

Scientific Achievements



- The scientific productivity was excellent last year
- Most experiment collaborations published data taken underground over the last year
- New capabilities were developed including new germanium detectors, mass spectroscopy, radon assay, cleanliness and seismic monitoring
- Thank you for your contributions to these outputs!

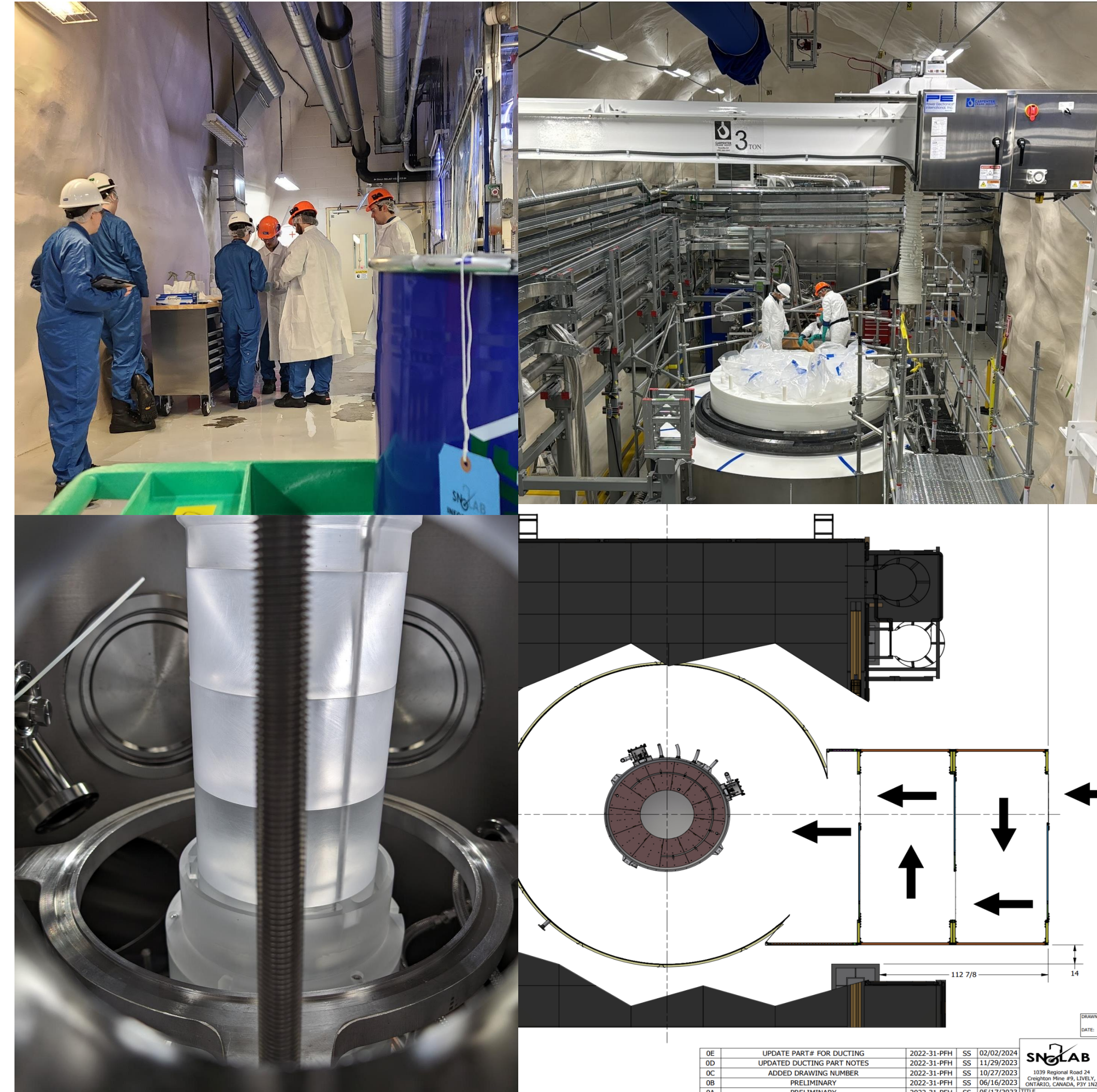
SNOLAB Scientific Contributions + Proceedings + Books/Chapters



Several complex construction activities are scheduled to complete next year

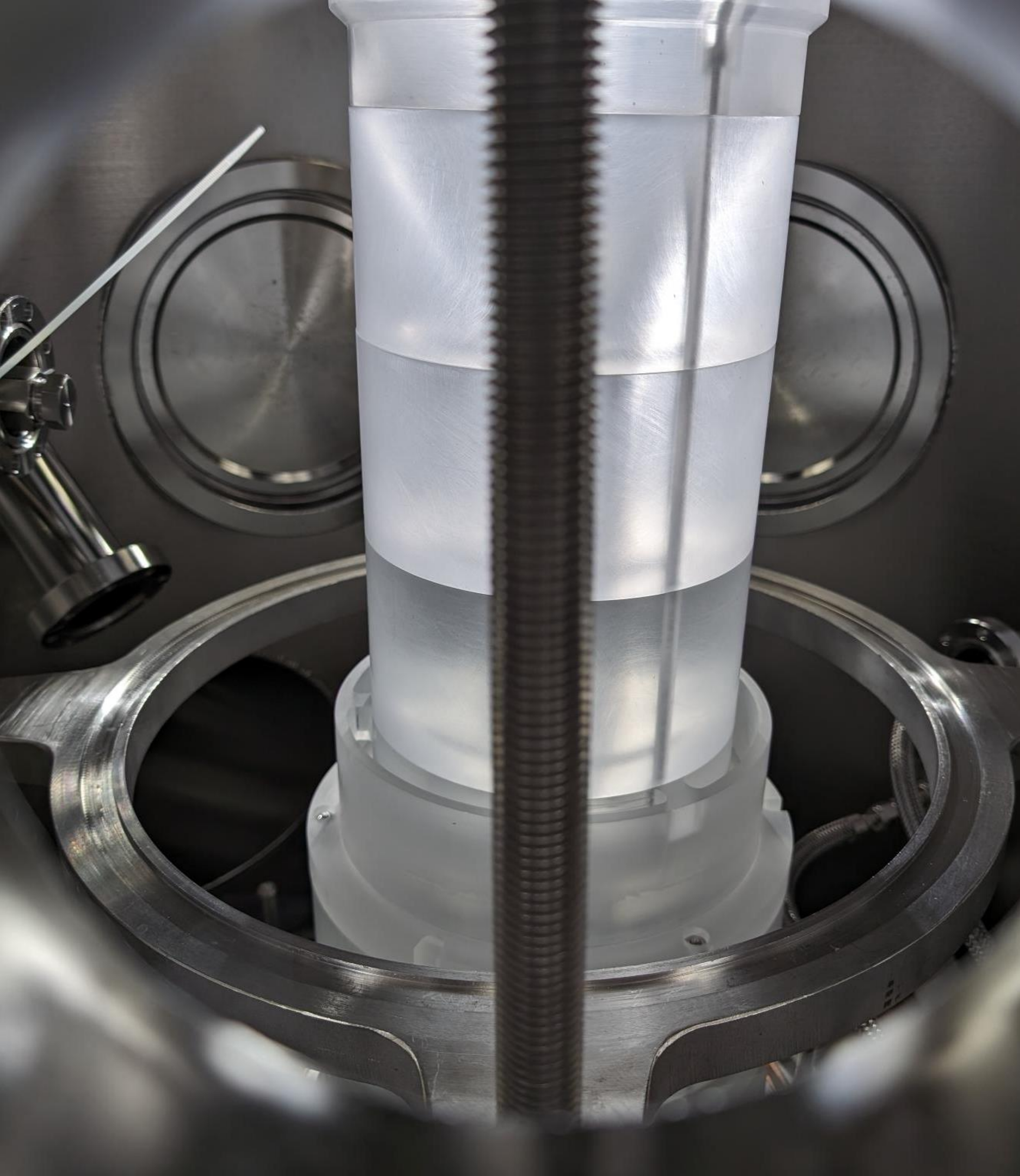


- Many projects are planning to make major progress this year
- In particular, the following experiments have major work that will be ongoing.
 - DEAP-3600
 - PICO-500
 - SNO+
 - SuperCDMS



REV	DESCRIPTION	JOB FILE #	BY	DATE
0E	UPDATE PART # FOR DUCTING	2022-31-PFH	SS	02/02/2024
0D	UPDATED DUCTING PART NOTES	2022-31-PFH	SS	11/29/2023
0C	ADDED DRAWING NUMBER	2022-31-PFH	SS	10/27/2023
0B	PRELIMINARY	2022-31-PFH	SS	06/16/2023
0A	PRELIMINARY	2022-31-PFH	SS	05/17/2023

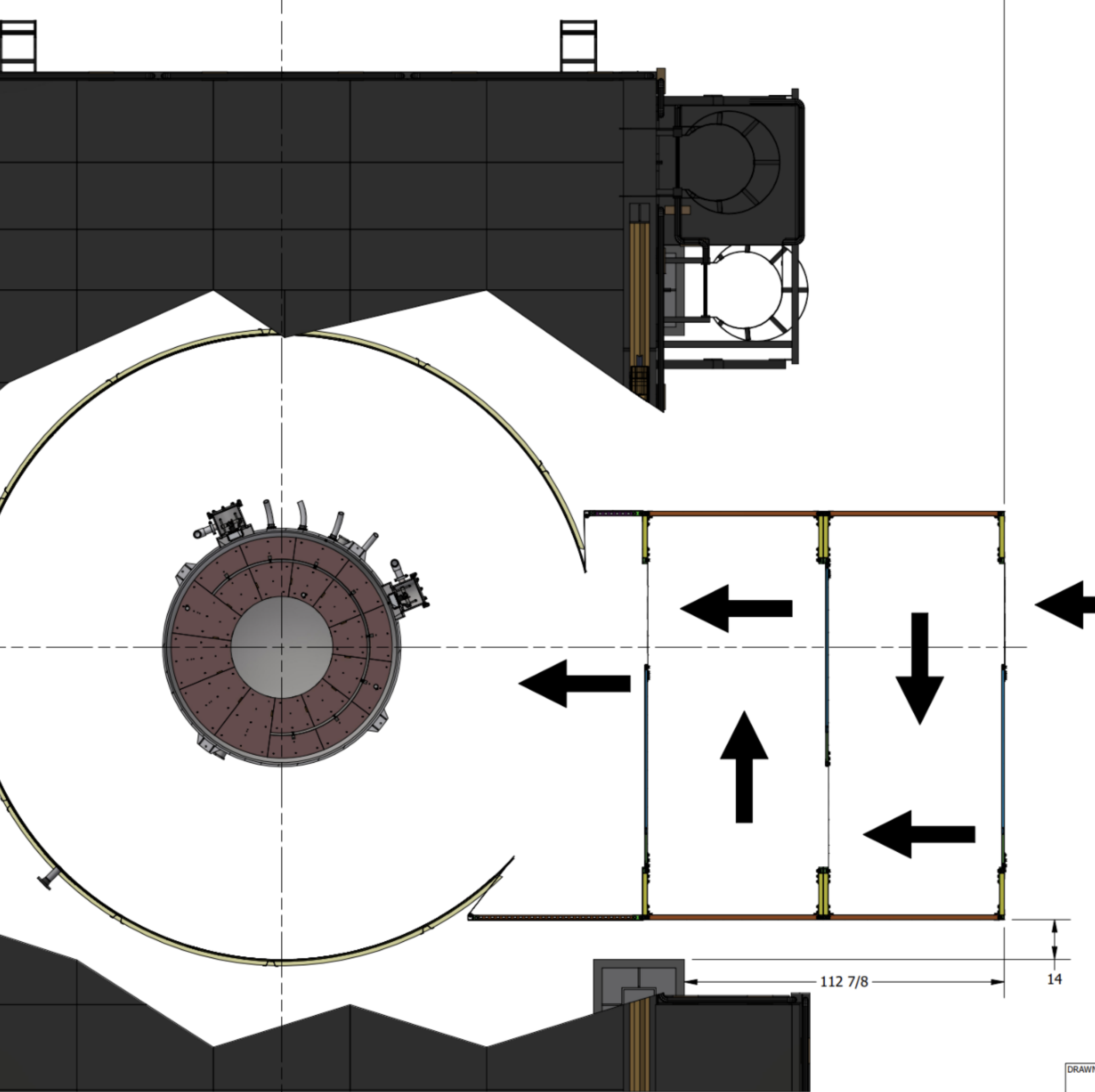
1039 Regional Road 24
Georgetown, ONTARIO, CANADA, P1N 1B5
PICO-500 WELDING
WELDING VESTIG



DEAP-3600

- The DEAP upgrades are rapidly converging to an upgraded detector.
- Construction activities in DEAP should complete this summer and then transition to commissioning.
- The detector will be taking science quality data by this time next year.


PICO-500



- The TDR for PICO-500 was held April 16 and 17th.
- Welding in the Cube Hall will begin later this year.
- PICO-500 will be ready for commissioning next year.

0E	UPDATE PART# FOR DUCTING	2022-31-PFH	SS	02/02/2024
0D	UPDATED DUCTING PART NOTES	2022-31-PFH	SS	11/29/2023
0C	ADDED DRAWING NUMBER	2022-31-PFH	SS	10/27/2023
0B	PRELIMINARY	2022-31-PFH	SS	06/16/2023
0A	PRELIMINARY	2022-31-PFH	SS	05/17/2023
REV	DESCRIPTION	JOB FILE #	BY	DATE

DRAWN
DATE:



1039 Regional Road 24
Creighton Mine #9, LIVELY,
ONTARIO, CANADA, P3Y 1N2

TITLE
PICO-500 WELDING C
WELDING VESTIE

SNO+

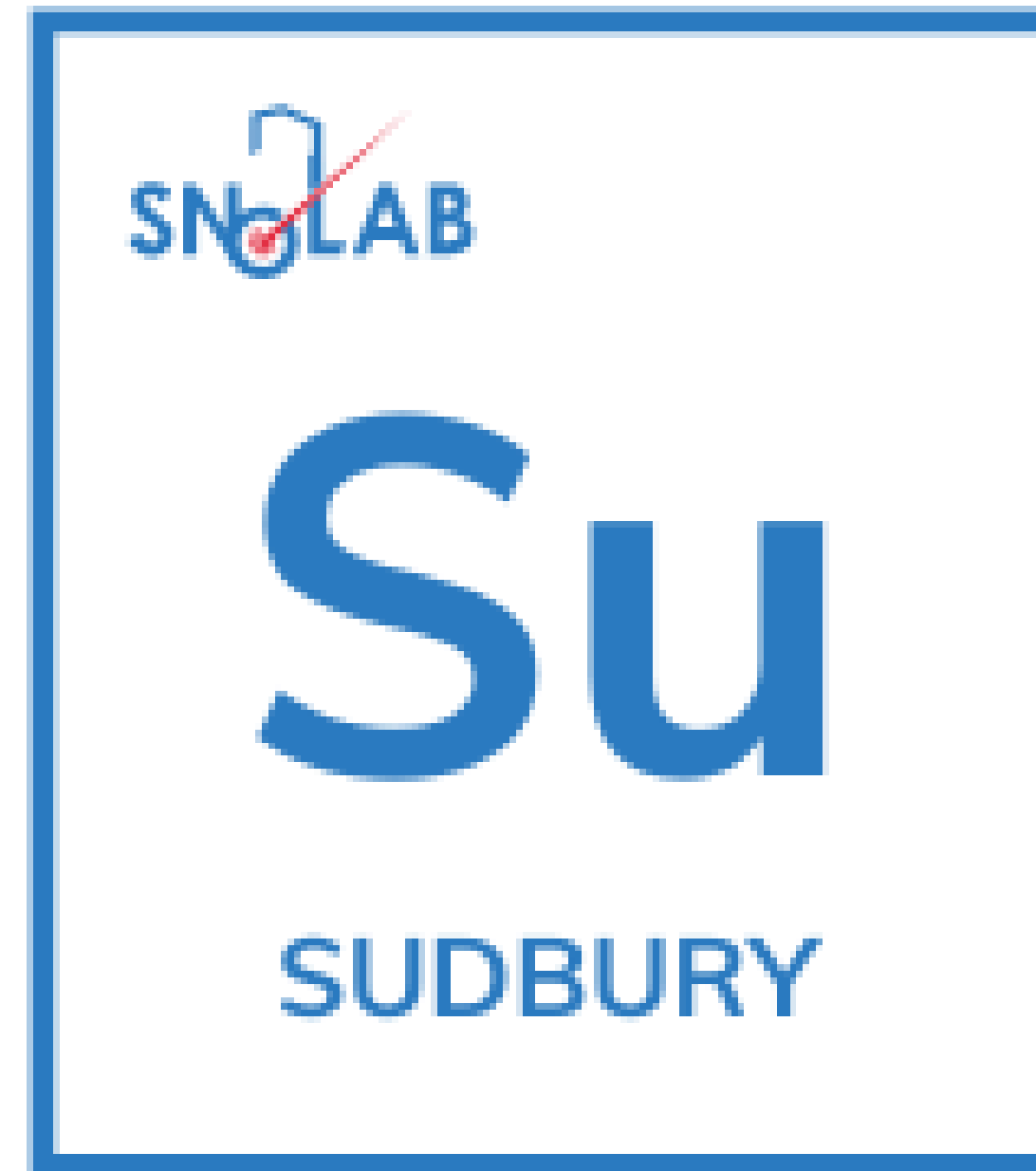
- SNO+ is in the middle of a **Telluric Acid** purification campaign (results have been excellent)
- Congratulations to the team for achieving this milestone!
- Work will continue with tellurium throughout the year





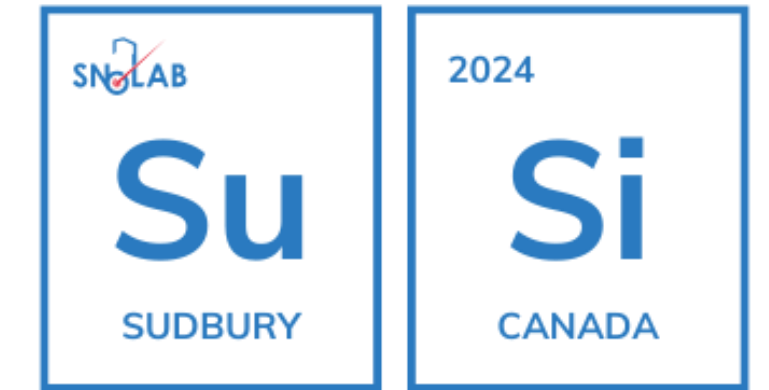
SuperCDMS

- SuperCDMS operated their first production tower for four months
- Congratulations to the team for achieving this milestone!
- Construction is ongoing. The team will focus on shield construction interleaved with cryostat assembly.
- The construction will progress to a fully assembled cryostat by this time next year.



SNOLAB Underground Science Institute

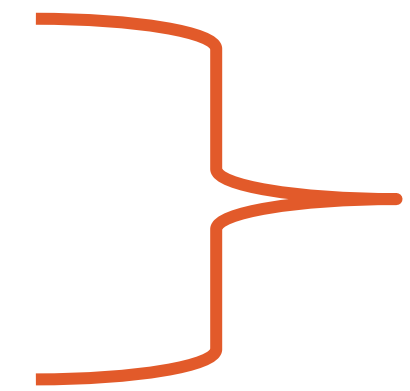
Summer at SNOLAB



SNOLAB Underground
Science Institute

Become an intellectual hub that fosters collaboration and connection.

- Pilot a program designed around experimentalists at SNOLAB, **June 24 – August 16**.
- Three core thematic lecture periods (aimed at graduate students and postdocs, all invited)
 - The Dark Cosmos
 - Neutrino Science
 - Quantum Technology
- SNOLAB events around the lecture period:
 - User Meeting: June 26-27
 - TRISEP: July 8-19
 - Collaboration meetings: SNO+, SuperCDMS, DEAP, ...
- More information and application details:



Each period is two weeks in length and has 5 lectures.



<https://indico.snolab.ca/event/3/>



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

FY25 SNOLAB Experiment and Infrastructure Initiatives



PRIORITY #	STRAT PLAN OBJ	POG PROJECT #		GATEWAY
00-SP4			Imminent Safety Issues and Facility Emergency Repairs	
01-SP4			Facility Operations	
02-SP4			Executive Requirements	
03-SP1			Experiment Operations (HALO, CUTE, DAMIC, FLAME, REPAIR, Xe-Still, SNO+, NEWS-G, SENSEI, PICO-40)	GW-3
04-SP4	P2102		Information Security	GW-1
05-SP2	P2104		MPC Breaker Upgrade	GW-2
06-SP1	P1806		SuperCDMS	GW-2
07-SP1	P2204		SNO+ Te	
08-SP1	P2101		PICO-500	GW-1a
09-SP1	P2006		DEAP Upgrades	GW-2
10-SP1	P2105		SBC	GW-1
11-SP2	P2508		Generator Tie-in and UPS for ICPMS	GW-0
12-SP2	P2503		UG Flooring Pilot	GW-0
13-SP1	P1902		nEXO	GW-0
13-SP1	P1903		LEGEND-1000	GW-0
14-SP1	P2007		CTBT Counter	GW-2
15-SP1	P2206		OSCURA	GW-1
16-SP2	P2511		CUTE Cryogenic Fridge Enhancement	GW-0
17-SP2	P2301		HC Environmental Monitoring Station	GW-2
18-SP2	P2509		GPS Time Server Replacement	GW-0
19-SP2	P2505		UG Monitoring Security	GW-0
20-SP2	P2108		Mobile Etching/Cleaning Cart	GW-0
21-SP2	P2111		UG Compressed Air Upgrades	GW-2
22-SP2	P2504		Electrical Room Wall	GW-0
23-SP2	P2205		Denka Boom	GW-2
24-SP2	P2510		Everbridge Safety Connection	GW-0
25-SP2	P2502		Spherical Proportional Counters as Radon Detector (RnSPC)	GW-0
26-SP2	P2501		Argon Removal from LN2	GW-0
27-SP2	P2011		Surface Cryostat	GW-2
28-SP2	P2506		Underground Monuments	GW-0
29-SP2	P2109		Background Measurement Improvements	GW-2

- 10 experiments operating
- 9 experiments under design or construction.
- 18 initiatives to upgrade instrumentation and infrastructure include:
 - Piloting solutions for the underground lab flooring
 - Upgrades to the CUTE facility and environmental monitoring capabilities
 - Upgrades and additions to background/assay instrumentation
 - Continuation of a multi-year phased information security project

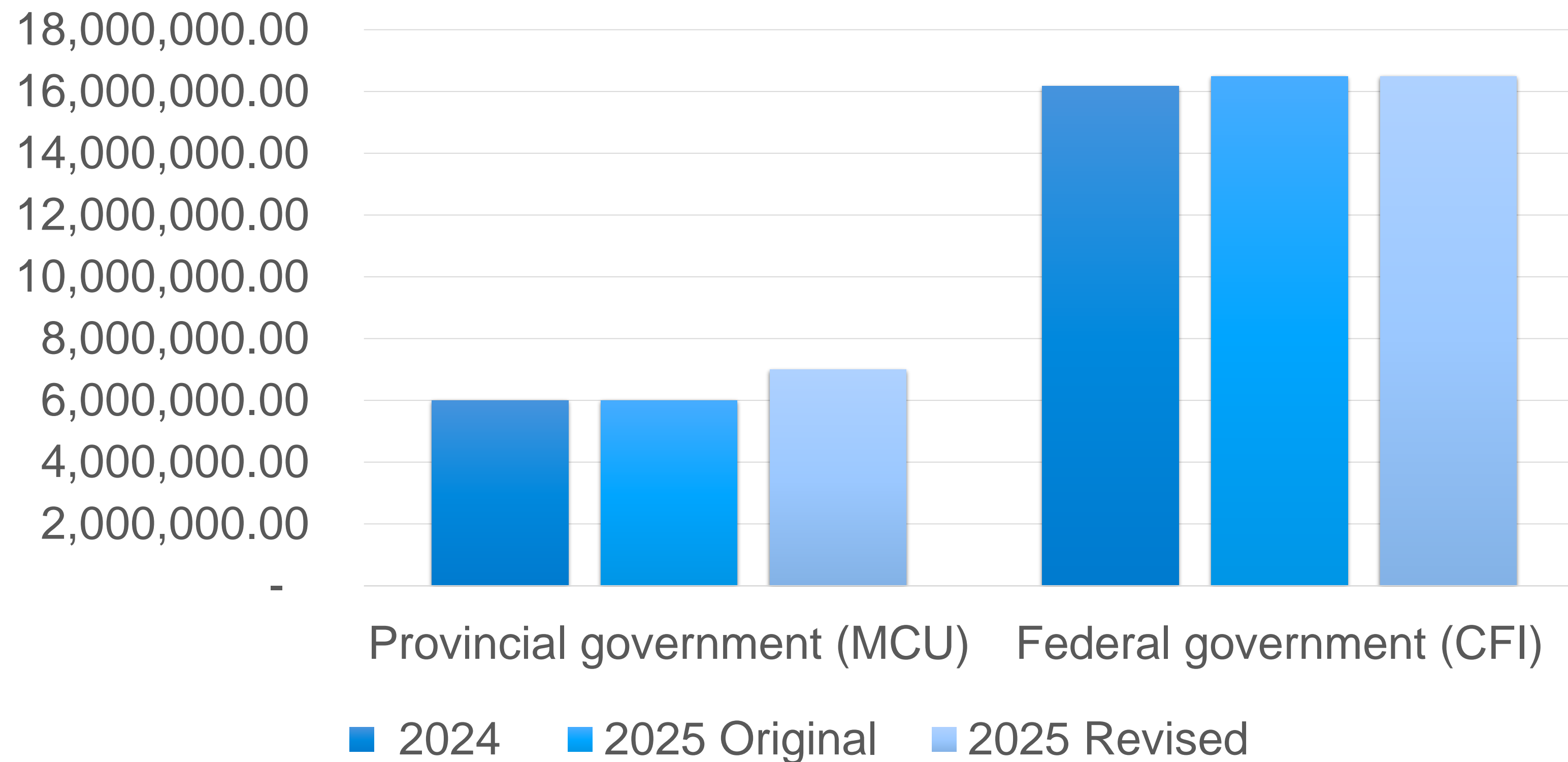
	Responsive Requirements
	Internal Projects
	Science Programme

Budget

Budget – Grant Revenue



Budgeted Grant Revenue



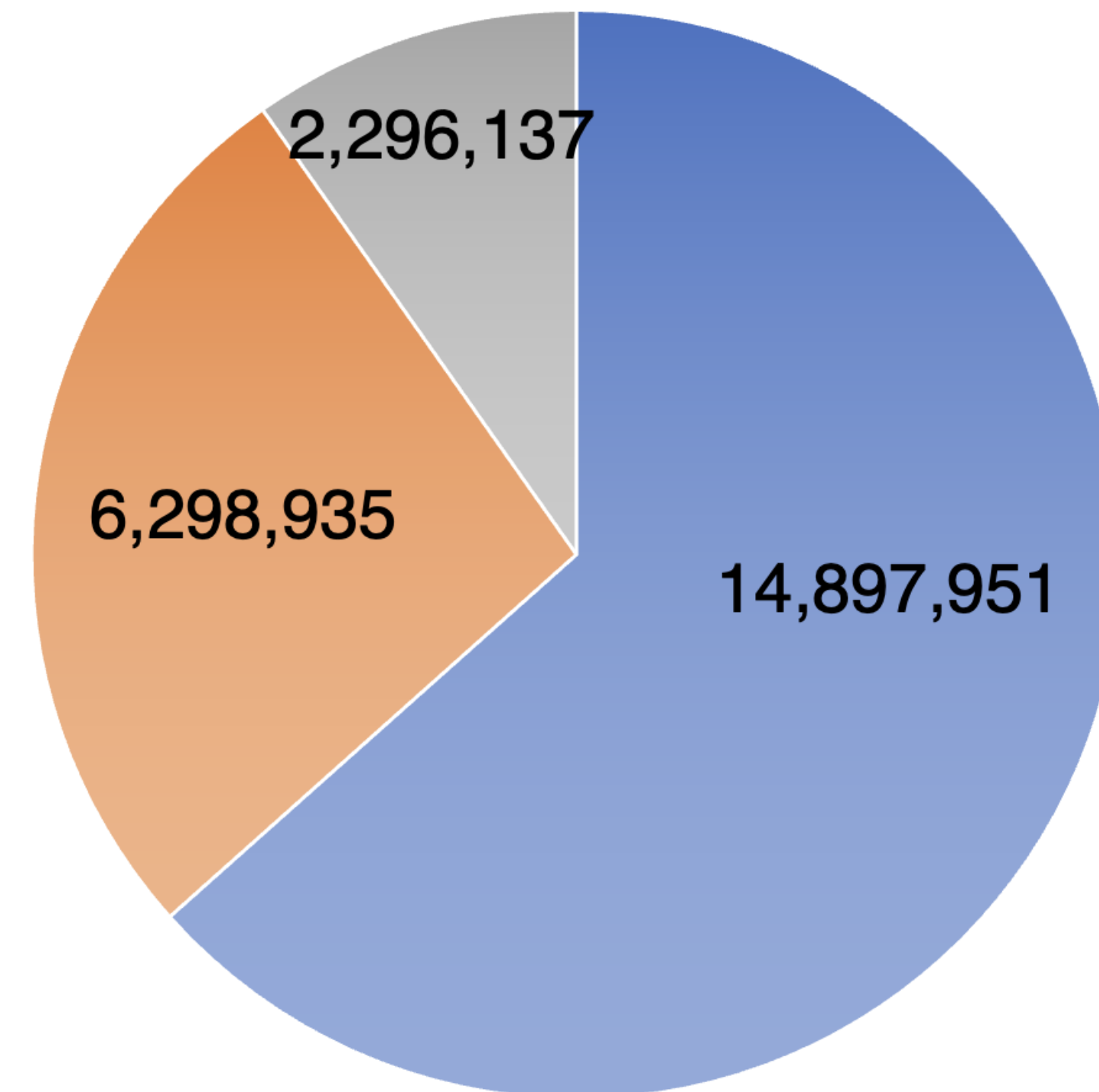
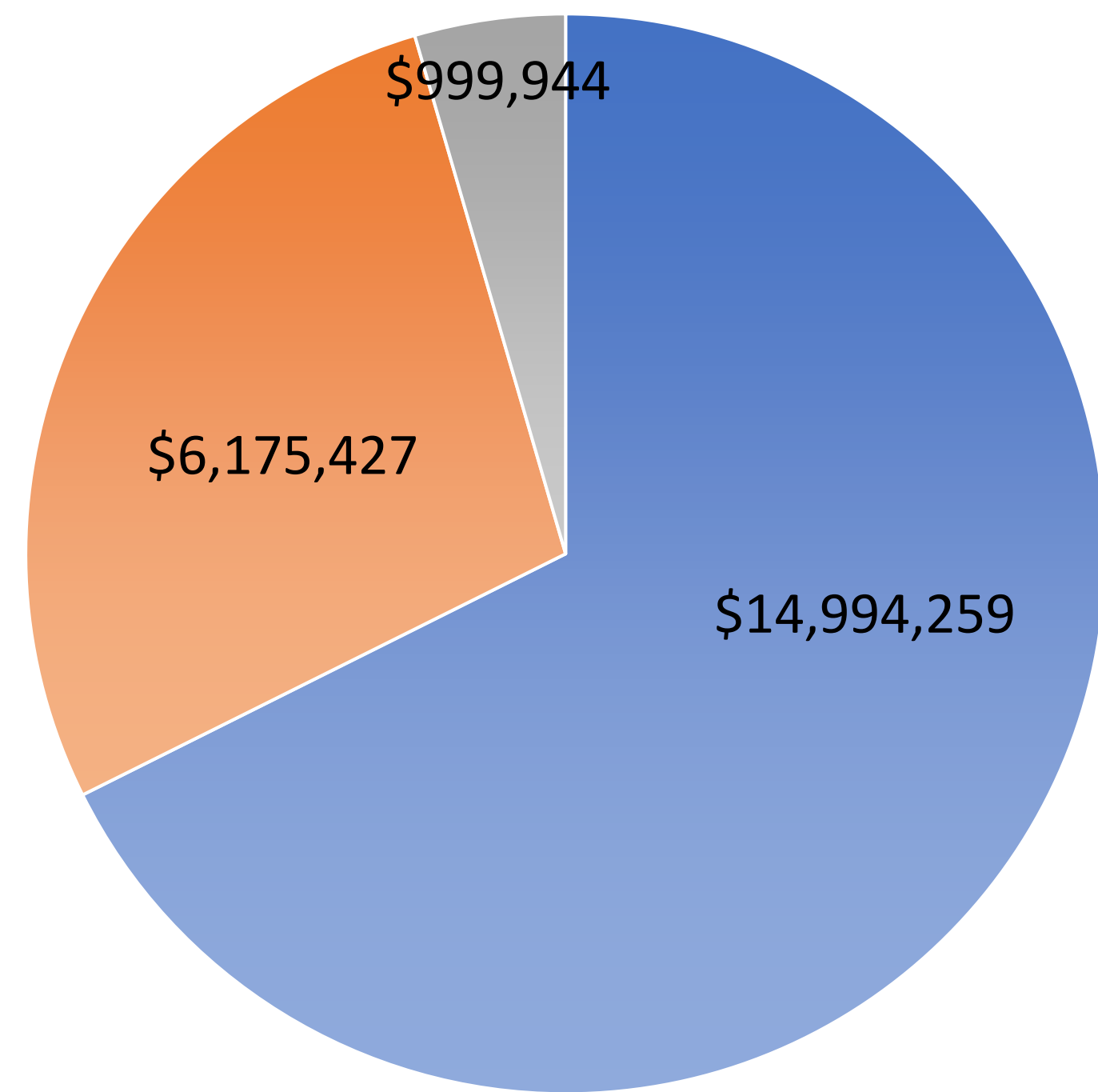
- Additional \$1,000,000 in Provincial funding in 2025 will allow us to maintain the current staffing levels.
- We will receive an additional \$1,000,000 over the original budget in fiscal 2026 as well.

Budget and Expenditures



FY24 Budget: \$22,169,630

FY25 Budget: \$23,493,023



- Salaries and Benefits
- Operational Costs
- Minor Upgrades & Experiment Commitments

- Reduction of staff between FY24 and FY25 required to fit into the new fiscal reality.
- Strategy was to defer commitment to experiments and facility upgrades by a year to maintain core staffing compliment until we access the increased provincial funding.

SNOLAB Core Staffing



Group	Sept 2022	April 2023	April 2024
EDO/Directorate	8	6	5
Administrative Support	5	5	4
Corporate Service Division	23	23	22
Finance	-	-	3
Engineering	14	13	12
Scientific Support	10	12	11
Project Management	15	14	15
Research Scientist	15	14	12
Technical Services	15	18	15
Operations	30	30	27

Notes:

- Reductions were made in staffing across many departments to fit our new fiscal reality.
- EDO and administrative support have been reduced.
- Increased number of IT techs and EHS techs to meet needs of the community regarding safety and IT.
- Finance broken out into its own departments.

Conclusions



- SNOLAB is a clean, underground laboratory hosting a variety of experiments.
- We have launched our 2023-2029 Strategic plan and are making progress towards its goal..
- Experimental collaborations have produced many scientific results at SNOLAB and many more world-leading results are expected over the next decade.
- I am very excited about the opportunities that SNOLAB provides the scientific community. I believe SNOLAB well positioned to attract world-class experiments and support major discoveries in the next decade.
- SNOLAB has a broad, multidisciplinary science program. I hope to see your experiment in out lab some day soon!

Thank you! Questions?

