

Particle Physics Faculty Meeting

- Agenda
 - News/Update
 - Roundtable

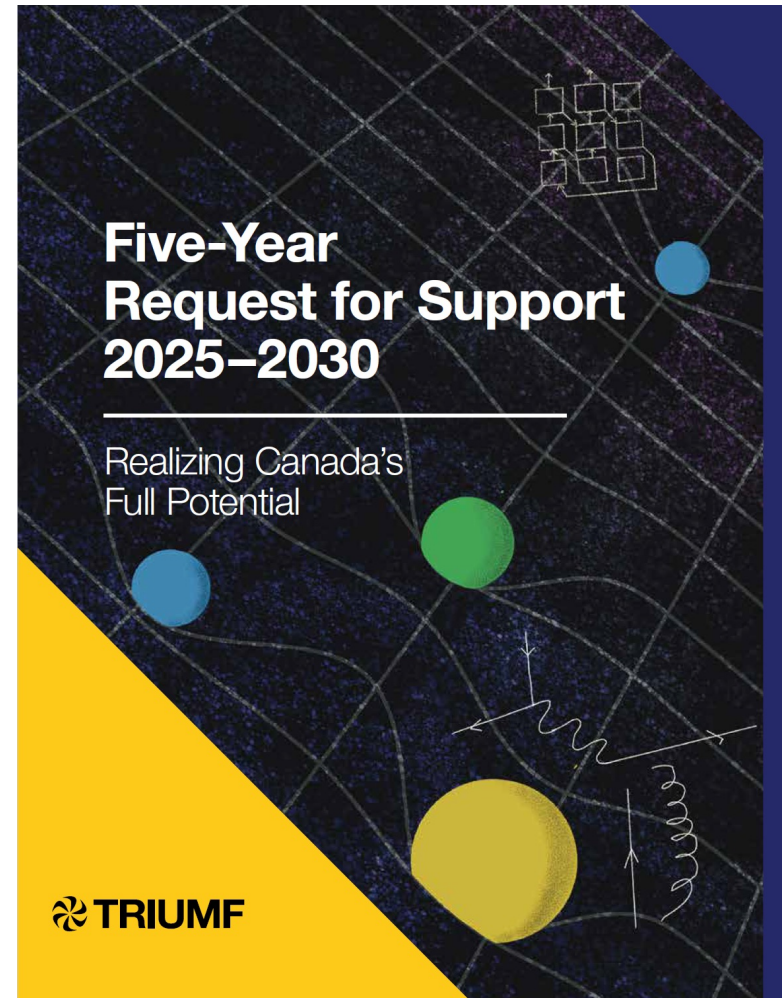
TRIUMF Five-Year Plan

- Now public

Figure 4: Heat map visualizing various funding-level scenarios, including those of reduced funding from the \$450M ask over five years. The impact on key areas of the program is demonstrated through a colour coding, running from green to red to illustrate the anticipated level of delivery possible.

	Funding Level			
	≤ 300	350	400	450
Operational excellence	Yellow	Green	Green	Green
IAMI	Yellow	Green	Green	Green
Facility utilization	Yellow	Yellow	Yellow	Green
Domestic research ecosystem	Red	Yellow	Yellow	Green
Site maintenance	Red	Yellow	Yellow	Green
Talent and training	Red	Yellow	Yellow	Green
Major deferred maintenance (BL1A/substation)	Red	Red	Yellow	Green
Innovation & commercialization	Red	Red	Yellow	Green
International research ecosystem	Red	Red	Yellow	Green
ARIEL completion	Red	Red	Yellow	Green
ARIEL operations	Red	Red	Yellow	Green

- REALIZING TRIUMF'S SCIENTIFIC POTENTIAL THROUGH RESEARCH CENTRES



Peer Review Cttee

- [Now public](#)

Particle physics

According to the PRC, TRIUMF particle physicists play an active role in setting the national priorities. This enables them to simultaneously articulate a local research strategy and support the intellectual interests of member universities in service of a pan-Canadian research program.

The division maintains unique facilities and technical expertise, enabling Canada to compete on the world stage. The group designs, creates or operates key parts of large international experiments that cannot be created elsewhere.

TRIUMF's particle physicists direct work in the construction or operation of large-scale international experiments towards detector elements that provide key data for physics analyses that Canadian physicists are pursuing.

The division also invested in a scientific computing group to help particle physicists learn to apply new machine learning and artificial intelligence tools to solve pressing issues in theoretical simulations or data analysis.

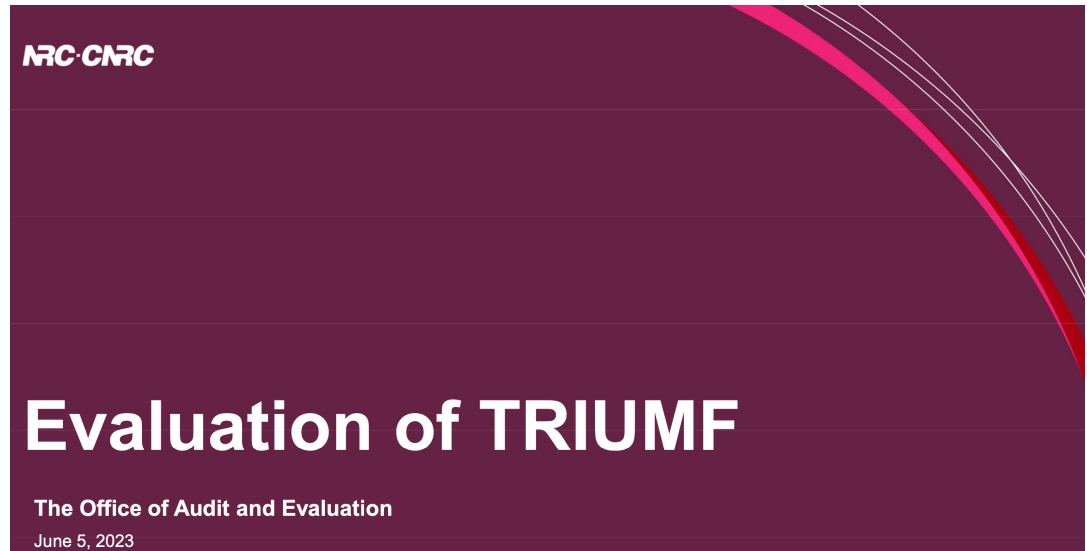
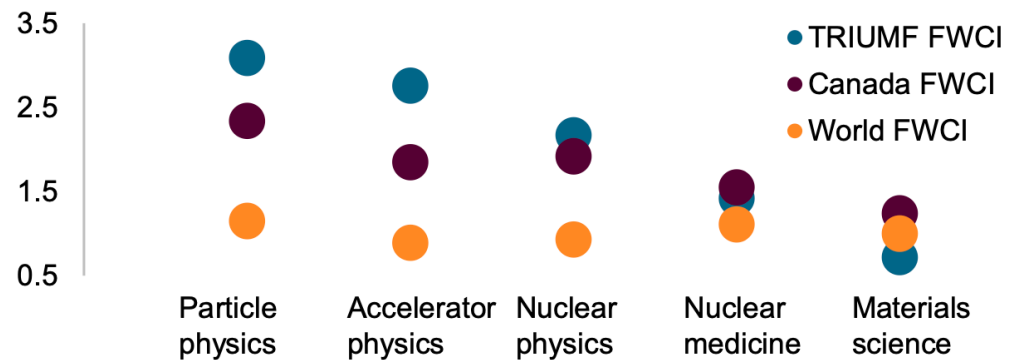


Figure 9. TRIUMF's FWCI rates are higher than those of Canada and the world in particle, accelerator and nuclear physics, 2022



ACOT

- Particle Physics / Science & Technology / Scientific Computing parallel session
 - Nov 27th from 8am-10am
- Meeting with director on Wednesday Dec 6th

- Checked with Young-Kee on agenda (will be her last ACOT)
 - 1) high level achievements since the last meeting, 2) 5-year plan, 3) challenges and concerns
- Proposed agenda
 - Research highlights – 45min
 - Updates / 5-year plan / SciTech 3.0
 - Meet with students and postdocs – 30min at the end

- Send your research highlights by end of next week, we can rehearse talks Thursday Nov 23rd

From PSD Mixer

Announcements – Next CFI Competition

- The 2025 CFI Innovation Fund competition – submission deadlines expected to be announced soon
 - In preparation and to align with the member university internal deadlines, TRIUMF will announce internal process timeline asap – tentative:
 - Expression of interest – this month
 - Project Initiation Sheet – January 2024
 - Review by the Science Council – February 2024
 - PMOG presentations – March 2024
 - **The Gate 0 approvals will be granted only once the next 5Y funding is announced**
 - Gate 1 reviews September 2024
- CFI deadline to submit notice of intent (NOI) October 2024 (anticipated)
- CFI Deadline to submit proposals February 2025 (anticipated)

Postdoc Policy/Procedure

- Discussions have started concerning the policy and/or procedure for postdoc hiring and employment
- This would, in principle, set ranges for postdoc compensation
- K. Pachal and M. Hartz have joined group consulting on the development of this policy/procedure
- We are at the information collection stage
- Request to this group for input from supervisors
- Appreciate general feedback, but also answers to the following questions:
 - Have you received any useful feedback from postdocs concerning compensation and cost-of-living? If so, can you share this feedback (without breaking confidentiality where applicable)?
 - Is there a gap between what you would ideally want to pay, and what is possible to pay given current funding levels? If so, what is the scale of the gap?
 - Do you have information about postdoc pay at other universities in Vancouver? If so, is postdoc pay in your group in line with postdocs at universities in Vancouver doing similar work?

Various

- UCN position
 - Awaiting public ad draft

- New graduate student policy in effect
 - Monika collected forms

- Budget request submitted, added ~1K for Quantum and Detector seminars

- A hybrid town hall meeting hosted jointly by DPF and Fermilab to discuss the P5 report will be held on Dec. 11, 2023 from 1-6 Xiaoyue is organizing a “watch party”

- Chloe is hosting Etienne Auffray-Hillemanns (CMS) and Hartmut Hillemanns (ALICE) from CERN who will be visiting TRIUMF next Tuesday (Nov 14th). If you’d like to meet with either or both of them and participate in the tour, please sign up in this [agenda](#)



Colloquium

- EDI in Physics Collaborations – Erica Caden



AOB

ALPHA Update

- First scientific result from **ALPHA-g!**
 - 17/71 authors are TRIUMF-affiliated, including 3 graduate students.
 - This publication made headlines all over the world.
- ALPHA-2** run is coming to an end.
 - Successful spectroscopy campaigns, aided by Be⁺-assisted antihydrogen production and laser cooling.
- HAICU**, the Canadian project to support antihydrogen research
 - Ongoing optimization of the hydrogen trap design.
 - Hydrogen decelerator from UBC is near completion and will be delivered to TRIUMF.

Article

Observation of the effect of gravity on the motion of antimatter

https://doi.org/10.1038/s41586-023-06527-1

Received: 6 May 2023

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Open access

Check for updates

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Science

Scientists drop antimatter to see if it falls

Antimatter is influenced by gravity just like matter, ALPHA-g experiment finds

rs démontrent que l'antimatière pas vers le haut

observé, pour la première fois, le comportement d'antiatomes en ue pour attirer les masses de matière ordinaire entre elles, n'est ière.

Sign in

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NEWS

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EXPLAINER

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Scientists get closer to mystery of antimatter

Gravity test: Antimatter falls down, but where did it all go?

From Star Trek to PET scans, antimatter has thrilled and worried humankind. Now, scientists have resolved a key mystery.

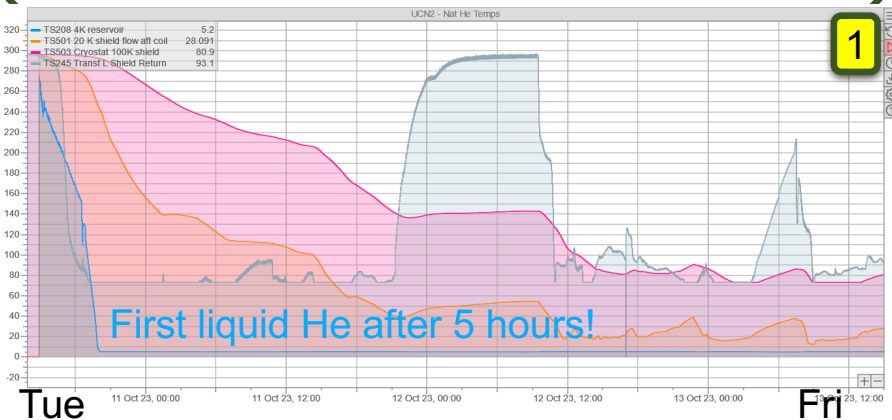
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Source



TUCAN
TRIUMF Ultra Cold
Advanced Neutron source

- **Successful Phase 2A cooldown** (4.2 K) **1**
Oct 10 to 13
 - Cryostat, He return system, slow control and liquefier performed well! No cold leaks. **Big milestone!**
 - Thanks to everybody involved!
- **Good meeting with Jon Aro from CNSC** on Oct 17. Received initial feedback on safety analysis report. Just minor comments.
- **Great meeting with TSBC** on Oct 23: go ahead for manufacturing tail section at TRIUMF!
- Now pushing for Phase 2B cooldown (1.5 K) before liquefier repair (Dec)



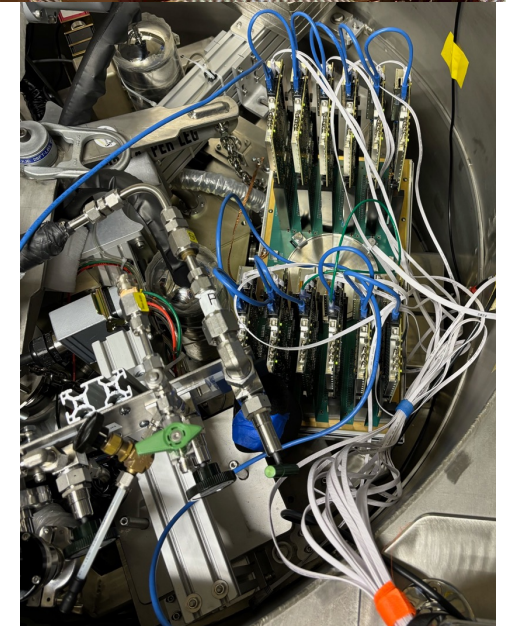
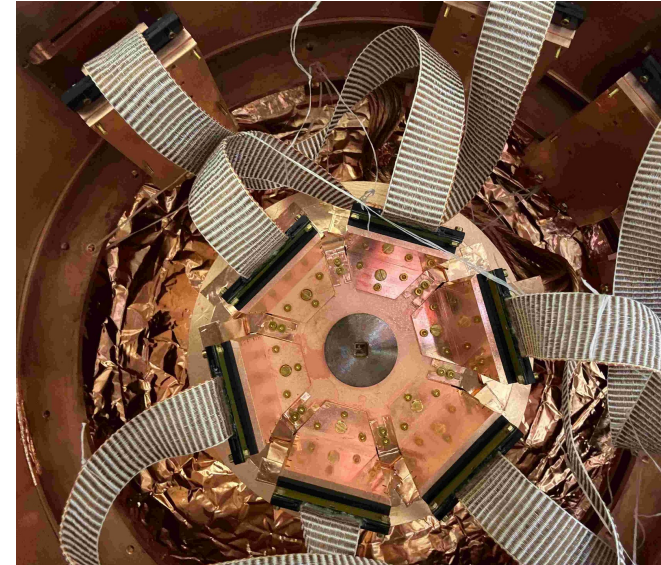
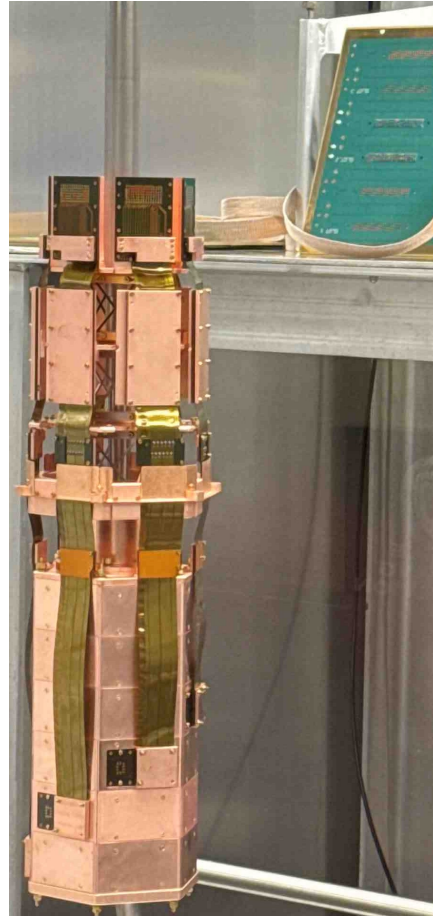
EDM update

- **MSR installation almost complete**, 5/5 layers installed, **shielding factor measurement shows a deficit**... investigating. **2**
- B0 coil production has started **3**
- Gate 2/3 review happening in November
- Nov 5-9 nEDM 2023 workshop in Santa Fe with many TUCAN participants: <https://web.cvent.com/event/ab450600-c4ab-40c9-9935-0b54734dada0>



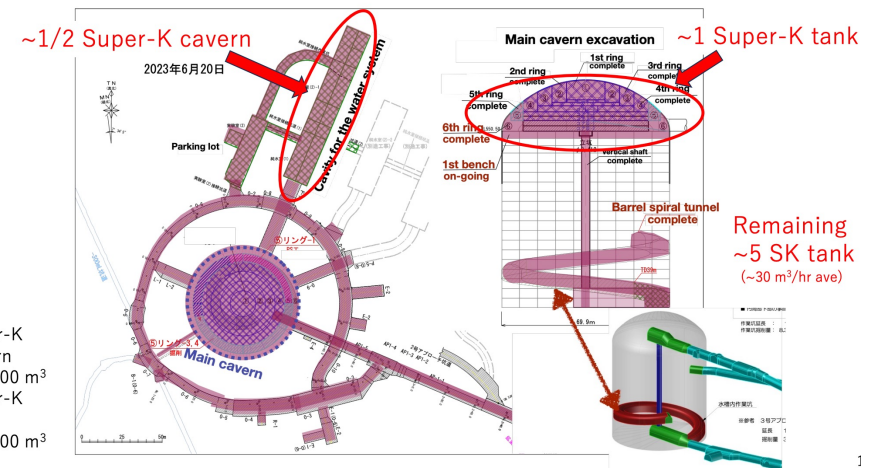
SuperCDMS Update

- First full detector tower installed into CUTE! Required tremendous effort from collaboration and from members of the TRIUMF SuperCDMS group in particular
- Detectors cold as of Oct 23
- Detector tuning and noise studies underway. Intend to operate detectors into January.
- Major parts of cryo system for full payload experiment shipped from FNAL to Sudbury.



T2K/Hyper-K Update

- Hyper-K Collaboration Meeting held October 23-28 in Mozumi, Japan
- The excavation of the dome section of the Hyper-K detector is completed
 - Excavated volume = 1 Super-K volume
 - Progress reported on NHK national evening news including interview with HK co-spokesperson
- Postdoc Felix Cormier is at J-PARC to prepare OTR monitor for T2K beam restart
- T2K beam restart expected on Nov. 20



NA62: Two TRIUMF Led Papers Accepted for Publication.

- **NA62 Liquid Krypton Purity Monitor**, J. Bremer, D. Bryman, H. Danielsson, V. Falaleev, T. Koettig, L. Kurchaninov, J. Liberadzka-Porret, A. Onufrena, Nucl. Instr. Meth. A (to be pub.) 2210.16232. 14

Collaboration between TRIUMF and the CERN motivated by the necessity of refilling the NA62 liquid krypton (LKr) calorimeter with clean Kr gas following a leak. At TRIUMF we developed a SiPM-triggered time projection chamber system to measure the attenuation of drifting ionization in LKr and showed that the purity (< 0.2 ppb) produced by the filtering system was more than adequate for NA62 operations; the calorimeter was subsequently refilled. We also made comparable measurements of the purity of the LKr in the calorimeter.

- **Improved calorimetric particle identification in NA62 using machine learning techniques**, NA62 Collaboration, JHEP (to be pub.) [2304.10580](#).

Carried out at TRIUMF by students and postdocs with significant contributions from W. Fedorko. NA62 calorimetric particle identification performance, a key component in the suppression of background for the measurement of $K^+ \rightarrow \pi^+ \nu \bar{\nu}$, was improved substantially using an algorithm based on a convolutional neural network classifier augmented by a filter. The muon misidentification probability was reduced by a factor of six with respect to the previously realized value for a fixed pion-identification efficiency of 75%. Alternatively, the pion identification efficiency was improved from 72% to 91% for a fixed muon misidentification probability of 10^{-5} . The algorithm is being implemented in the NA62 analysis framework.

PIONEER

- PIONEER Collaboration meeting
CENPA – University of Washington
16-18 Oct - 6 TRIUMF scientists present + other
TRIUMF and Canadian colleagues online
- New PIONEER postdoc : Ben Davis-Purcell starting
Nov 1st at TRIUMF
- PIONEER beamtime at PSI Nov 15th-30th
Ben at PSI in November
- Pion lifetime measurement: 24h beamtime on Nov
27th at TRIUMF to evaluate momentum bite in M20
beamline
- PIONEER large prototype
- DAQ for the prototype (g-2 DAQ) to be received
mid of Nov at TRIUMF



Round Table

- ATLAS
- T2K/HyperK
- TUCAN
- ALPHA
- SuperCDMS
- DarkLight
- n-EXO / PHORWARD
- PIONEER
- NA62
- P-One
- SNO+
- HALO
- g-2
- Belle
- Theory



Next Meeting

- Dec 14th