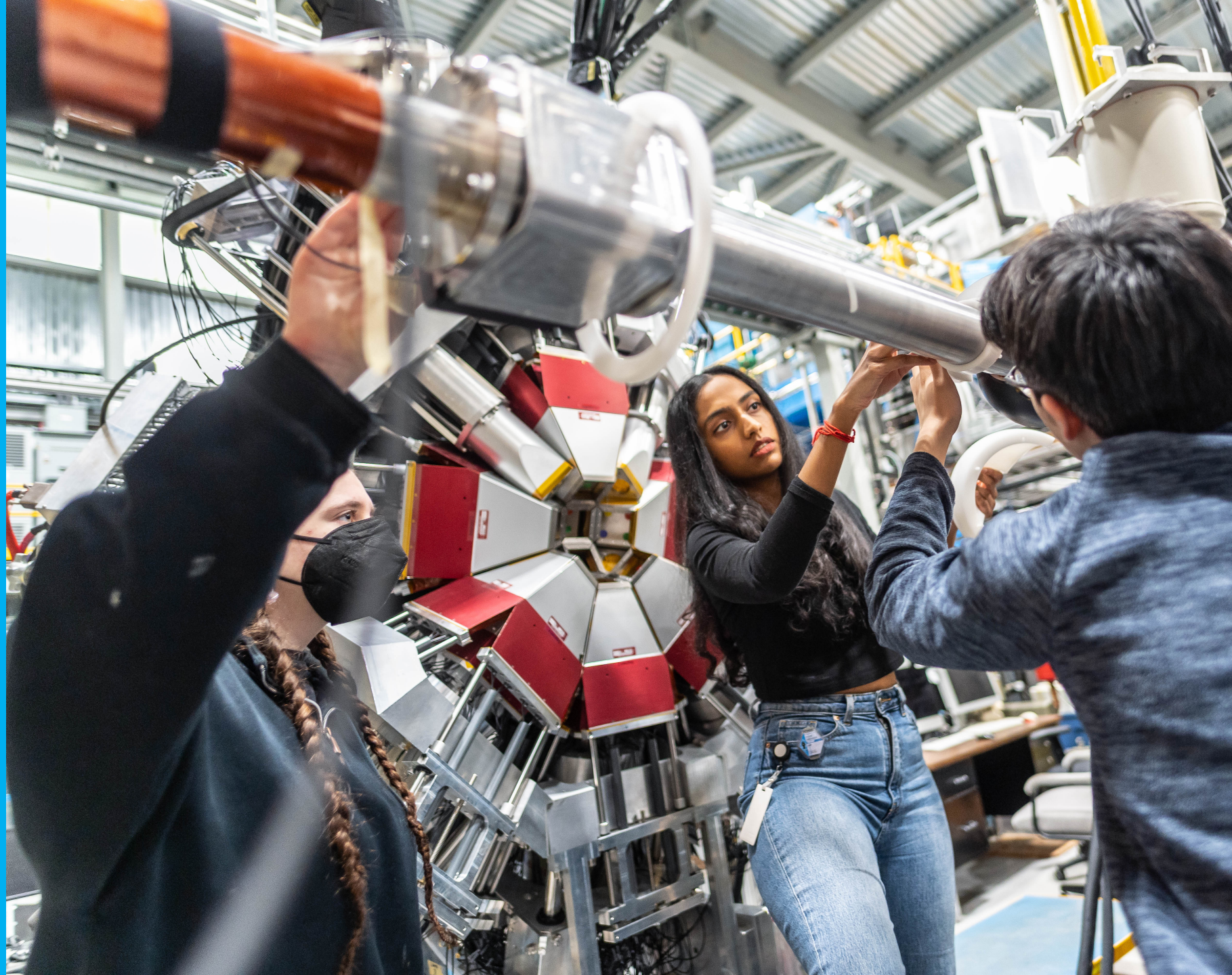




TARA Welcome update

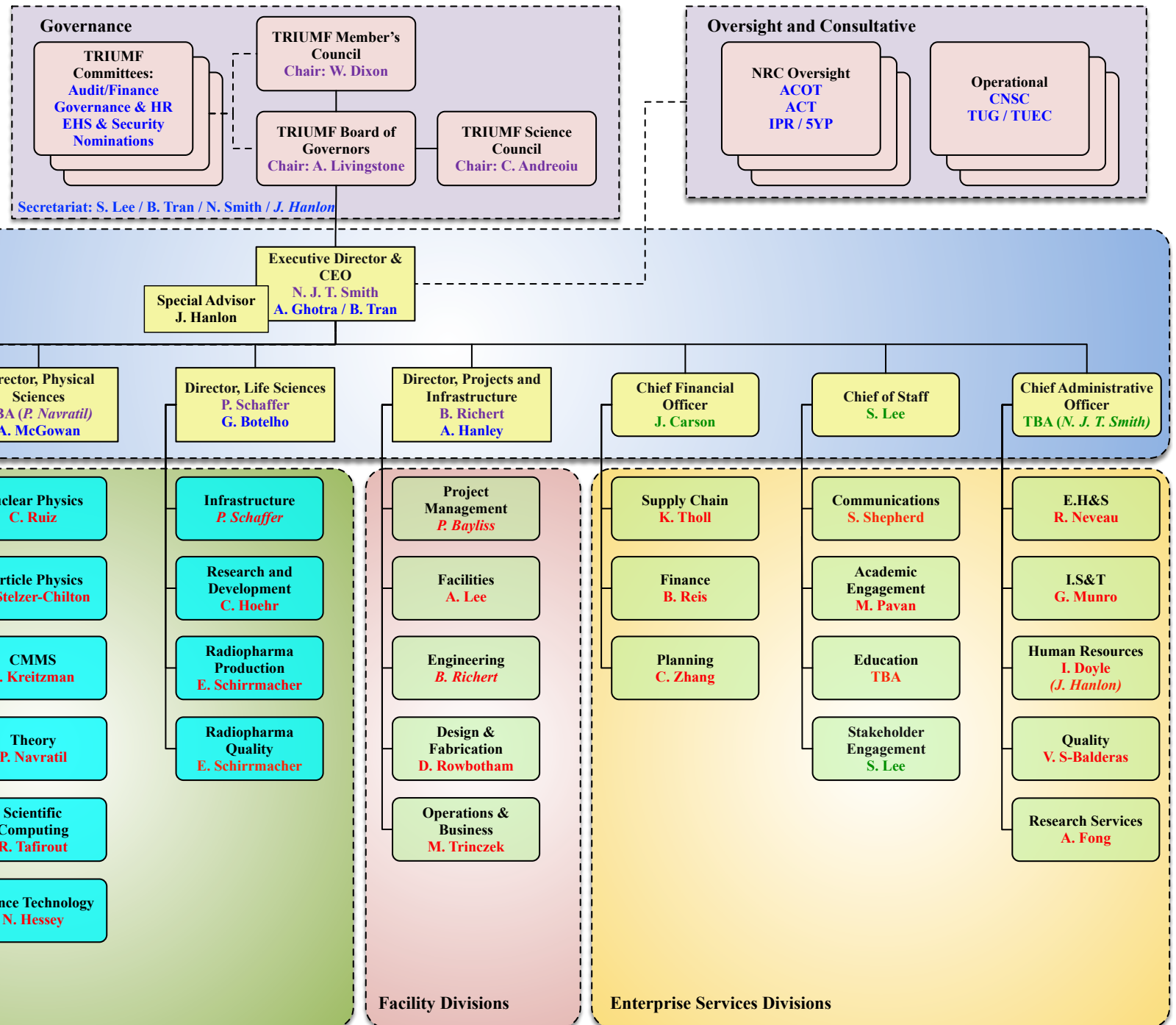
Nigel Smith,
Executive Director
& CEO

November 09, 2022



2022 continues to be a period of major transition for TRIUMF

- Completing governance changes re Joint Venture, TRIUMF Accelerators Inc., and progress on addition of new Members (previous Associate members)
- Board processes being refined and shaken down as Board oversight engages more directly, regular engagement with Members' Council and Science Council including our first AGM
- CNSC relicensing completed, but substantial oversight being implemented by CNSC staff, including a major change of philosophy from our programme officer towards License Conditions Handbook
- Organisational structure evolution continues, accounting for retirements, removal of deputy director level implemented earlier this year, enhancement of support for governance and oversight
- We have faced a rapidly changing environment and risks - major projects drawing large resource loads, reduction in income, geopolitical issues, staff turnover...
 - ... and a pandemic which affects everyone and everything, including supply chains



CNSC Relicensing

CNSC relicensing

- During mid-June, TRIUMF secured a **10-year** license from CNSC to operate TRIUMF accelerators
 - Tremendous success, testament to the huge amount of work put in by the TRIUMF team (supported by CNSC) prior to, and during, the relicensing process. A 10-year renewal was not guaranteed, even though supported by CNSC
- As a consequence of the direction from the Commission, CNSC staff continue to have vigorous oversight on TRIUMF. Our new programme officer has much more formal approach, which requires substantial re-engineering of LCH
 - Major focus continues to be on the Management Systems at TRIUMF
 - Recent inspection has been held on environmental protection programme, next major inspection on Management Systems in the New Year.

CNSC relicensing - decision details

the Commission, pursuant to section 24 of the *Nuclear Safety and Control Act*, renews the Class IB particle accelerator operating licence issued to TRIUMF Accelerators Inc. for its particle accelerator facilities located in Vancouver, British Columbia. The renewed licence, PA1OL-01.00/2023, is valid from July 1, 2022 until June 30, 2032.

the Commission, pursuant to section 24 of the *Nuclear Safety and Control Act*, transfers the renewed licence, PA1OL-01.00/2023, from TRIUMF Accelerators Inc. to TRIUMF Inc.

- **Management System**

- The Commission highlights the importance of compliance with CSA N286-12 and expects TAI to meet the requirements of the standard in a timely manner.
 - the Commission agrees with CNSC staff's assessment that, despite TAI's incomplete implementation of CSA N286-12, TAI has an adequate management system in place to operate the facility
 - the Commission agrees with CNSC staff's assessment that TAI has an action plan in place to fully implement CSA N286-12 by 2023
 - CNSC staff will conduct increased oversight activities to verify TAI's timely implementation of N286-12
 - the Commission is satisfied that the evidence presented by TAI demonstrates that TAI has an acceptable safety culture and has implemented a sufficient plan to further improve

- **Occupational Health and Safety**

- The Commission encourages TAI to compare its LTI statistics against industry-leading facilities to benchmark performance.

- **Decommissioning and Financial Guarantee**

- The Commission directs the licensee to provide the original financial guarantee instrument documentation that conforms with G-206 within 90 days from the issuance of this Record of Decision.

CNSC has delivered the following documents to TRIUMF, Inc.

- **Class 1B Particle Accelerator Operating Licence**
- **Licence Conditions Handbook (LCH)**

The LCH expands upon the Licence, and outlines in detail how TRIUMF will perform all work under governance of our new 10-yr licence.

 Canadian Nuclear Safety Commission / Commission canadienne de sûreté nucléaire

CLASS 1B PARTICLE ACCELERATOR OPERATING LICENCE

TRIUMF INC.

I) **LICENCE NUMBER:** PA1OL-01.01/2032

II) **LICENSEE:** Pursuant to section 24 of the *Nuclear Safety and Control Act*, this licence is issued to:

TRIUMF INC. (hereinafter "TRIUMF").
4004 Wesbrook Mall
Vancouver, British Columbia
V6T 2A3

III) **LICENCE PERIOD:**

This licence is valid from **July 1, 2022**, to **June 30, 2032**, unless otherwise suspended, amended, revoked or replaced.

IV) **LICENSED ACTIVITIES:**

This licence authorizes the licensee to:

a) Operate the following facilities at the location referred to in Part II of this licence:

- i) Class I:
 - a 500 MeV cyclotron and its associated beamlines and targets
- ii) Class II:
 - CP42, a 42 MeV cyclotron
 - TR30-1, a 30 MeV cyclotron
 - TR30-2, a 30 MeV cyclotron
 - TR13, a 13 MeV cyclotron
 - ISAC I, a radioactive ion beam accelerator
 - ISAC 2, a radioactive ion beam accelerator

b) Service the above facilities;

c) Produce, possess, process, transfer, use and store within the boundaries of the site any nuclear substance required for, associated with or incidental to the activity described in a) above;

d) Produce, possess, process, transfer, use, import, export and store within the boundaries of the site any other nuclear substance, subject to condition 4.3.

**Licence
Implemented
through the LCH**

Canada's Nuclear Regulator 

E-DOCS #6827252 (Word)
E-DOCS #6827253 (PDF)

LICENCE CONDITIONS HANDBOOK

LCH-TRIUMF-R000
TRIUMF INC.
ACCELERATOR OPERATING LICENCE

PA1OL-01.01/2032

Revision 0

 Canadian Nuclear Safety Commission / Commission canadienne de sûreté nucléaire



COVID Update

COVID Protocols

- TRIUMF has taken and will continue to take a measured, safety-first approach to deciding which measures to put in effect.
- Layers of COVID measures (order may change based on variants)
 - Site Occupancy Restrictions – Essential Staff only
 - Site Occupancy Restrictions – Remote Work recommendation
 - Room Occupancy Limits
 - Mandatory Mask Usage / Mask Recommendations
 - Vaccination Policy (site)
 - Vaccination Policy (staff)
 - Restricting Public Events
 - Restricting Friends and Family Tours

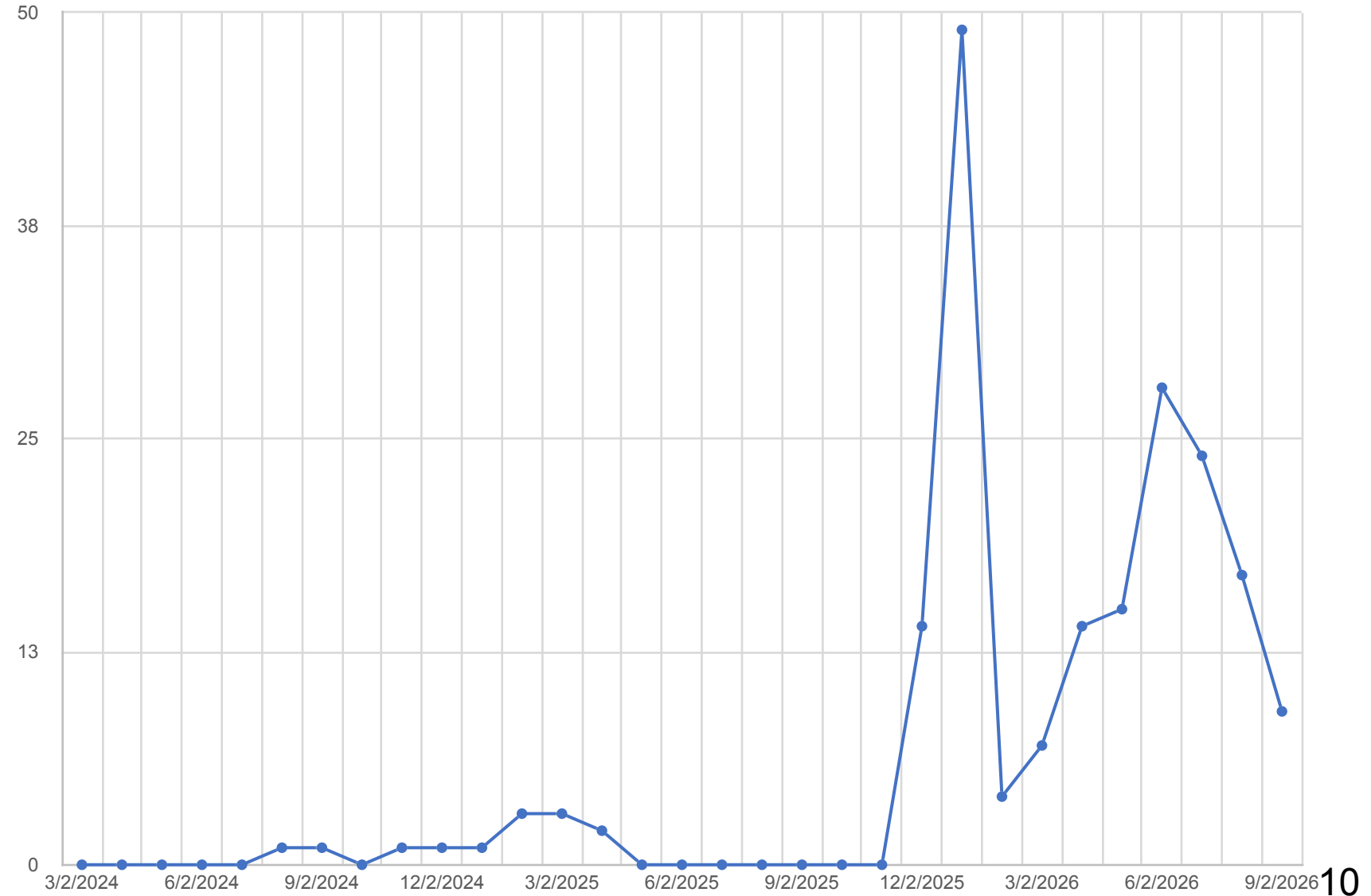


Factors:
Regulations
TRIUMF Cases
Transmission
Severity
Community

COVID Update

- Occupancy now at ~500
- Mask mandate has been lifted on site and are a personal choice
 - Masks are recommended for indoor gatherings with over 20 participants
- Vaccination mandate is in place for all TRIUMF appointees
 - Removed for visitors
- Events and conferences have resumed

TRIUMF COVID Monthly Case Count

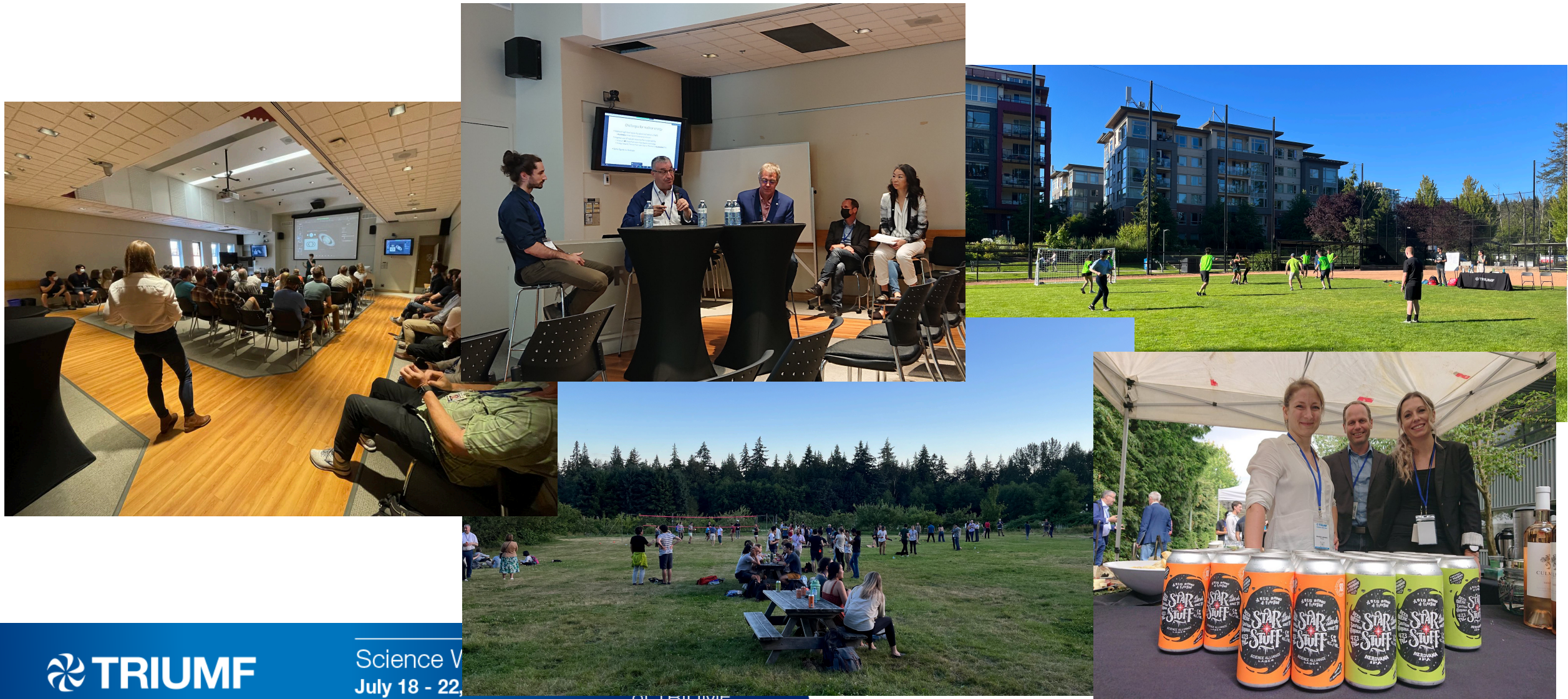


Science Week 2022

Science Week Overview

- Science Week 2022 featured 3 main program streams:
 - Celebrate - recent achievements from the past year and articulate the science drivers for our current program through invited local speakers and from our networks
 - Collaborate - on major science directions and new initiatives for the next 5-Year Plan - guided by TRIUMF's 20-Year Vision
 - Connect - through ample networking opportunities for community, students and postdoc engagements
-
- Science Week marked the start of the 5-Year Plan preparation process with input from the community, divisional planning and stakeholders from across our networks
 - A major component of our community engagement and communication

Celebrate - Collaborate - Connect



**20-year Vision, NRC OAE
Evaluation and 5-year Plan**

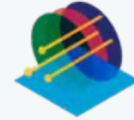
TRIUMF 20-year Visio

- TRIUMF has now completed the 20-year vision process to define longer term planning requirements (TRIUMF is funded in five-year cycles)
- An 18-month process engaging a broad research and stakeholder community, leading to five core themes
- All previous work leading to the Vision is available from the TRIUMF web site
 - Includes input from focus groups, interim pillars and themes, and theme development



A global leader in discovery science, delivering breakthroughs that unlock the deepest mysteries of the universe

Strengthening Canada's leadership in groundbreaking particle and nuclear physics



A world-class accelerator centre driving use-inspired research – from the life sciences to quantum and green technologies

Leveraging our unique infrastructure to pursue research in Canada that will change the world



An inclusive multidisciplinary talent incubator, attracting and developing the best people from around the world

Producing Canada's future science leaders and innovators



A leader in a flourishing national Big Science ecosystem

Catalyzing the success and growth of Canada's network of major research facilities



A national innovation hub translating discovery science into health and sustainability solutions

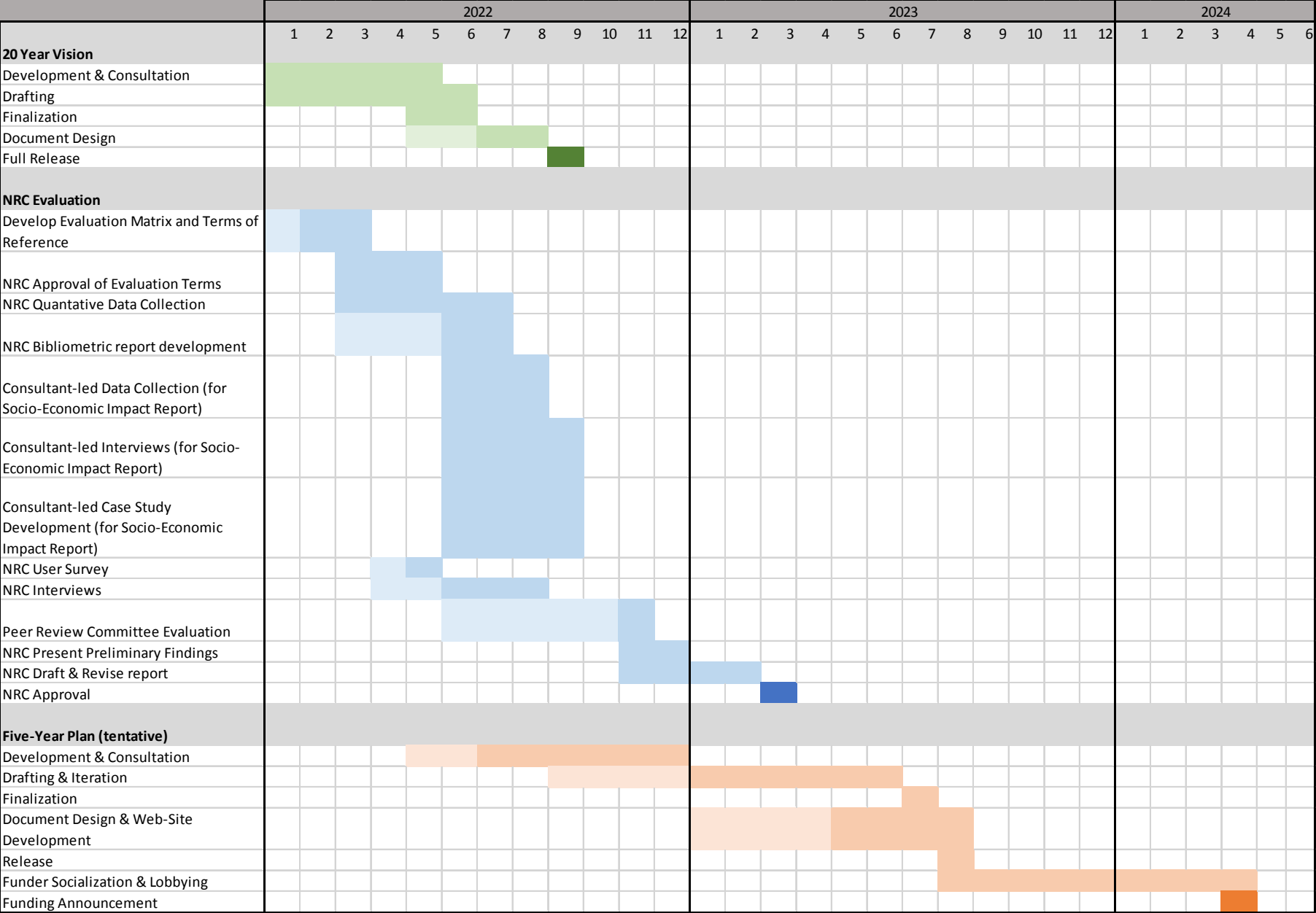
Responding nimbly to complex societal challenges for the benefit of Canadians

20-year Vision

- The final version of the inaugural 20-Year Vision has been completed and approved by the Board following Science Council recommendation
- Limited number of hardcopy versions available; Digital version uploaded to the TRIUMF website
 - <https://www.triumf.ca/sites/default/files/2022-TRIUMF-20YP-Web-Vertical.pdf>



Evaluation Processes & Timelines & 5YP



LEGEND

← Process began early 2021

Planning process

Work underway

Target completion

Status of TRIUMF

(cf current Five-year Plan)

Science & Technology – ARIEL

Collaboration with VECC

- All VECC deliverables manufacturing completed, shipped or ready for shipment
- AETE targetry and RIB systems prototype testing complete using the Target Ion Source Acceptance (TISA) test stand
- The prototype target module front end and the unique High Voltage Feedthrough (HVFT) used for the tests are deliverables to VECC
- HVFT is second largest single capital investment.



Target Module front end



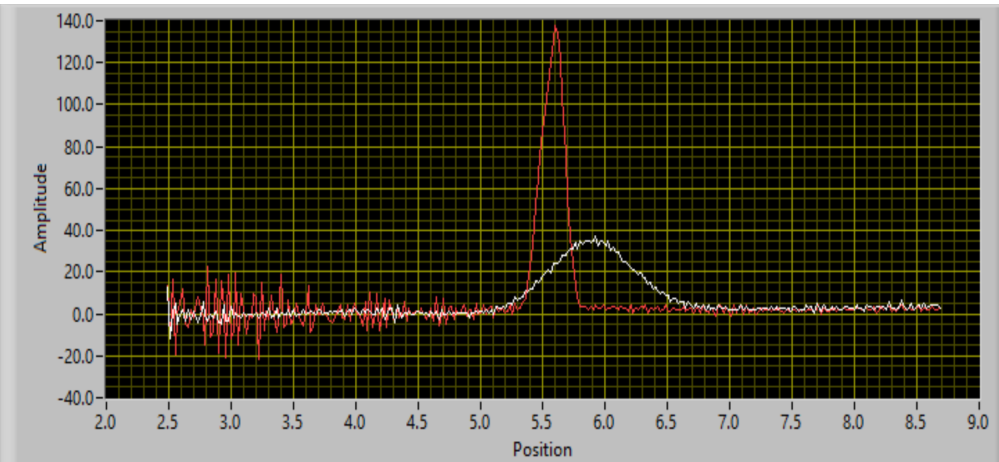
HVTF



Science & Technology – ARIEL

Hot cell and driver accelerators

- The ARIEL Hot cell is largest single capital investment for the project. Hot cell installation completed; risks retired.
- ARIEL primary beam drivers – SC e-linac and the 520 MeV cyclotron:
 - Cyclotron has again 4 beam extraction ports. Proton beam extracted successfully into BL4N vault section
 - 30 MeV, 10 kW electron beam delivered to beam dump with increase reliability and better beam quality.
→ reliability road map action plan execution



E-LINAC	
BEAM PATH	ON
	EHD:DUMP
PEAK CUR.	498 μ A
ENERGY	30.2 MeV
POWER	10.0 kW

Profile of beam extracted into the vault section of BL4N

Science & Technology – IAMI

Building Services Commissioning

- majority completed (some deficiencies remain to be addressed)
- Documentation well underway
- Training of TRIUMF FTEs on maintenance and operation performed

22



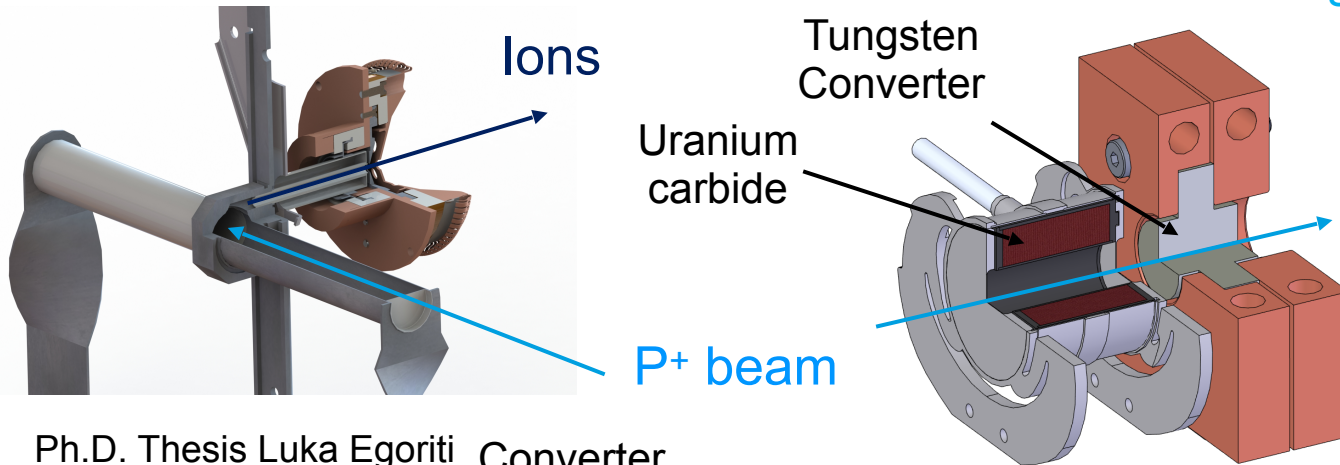
Additional Science Highlights

Science & Technology – Accelerators

A new proton-to-neutron converter target for pure and intense radioisotope beams

Conventional ISAC

New converter target

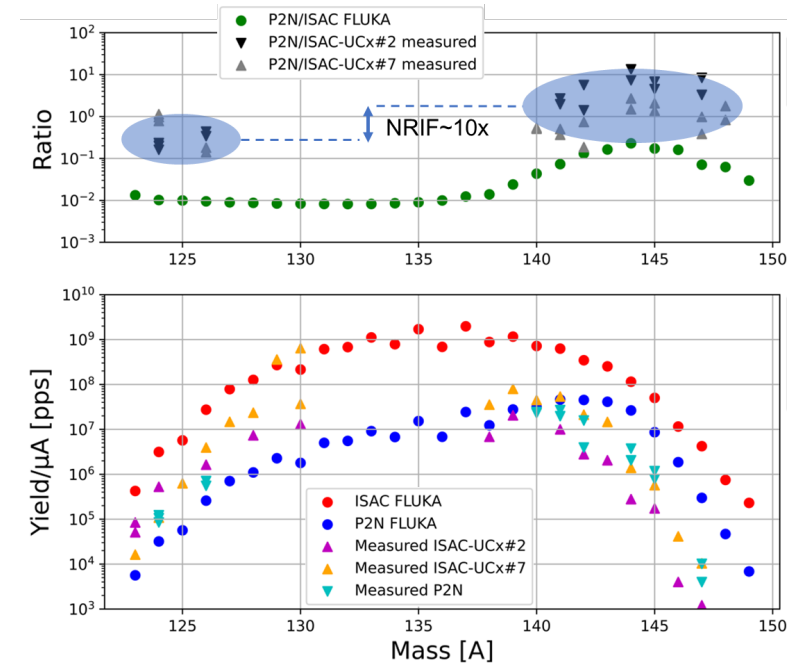
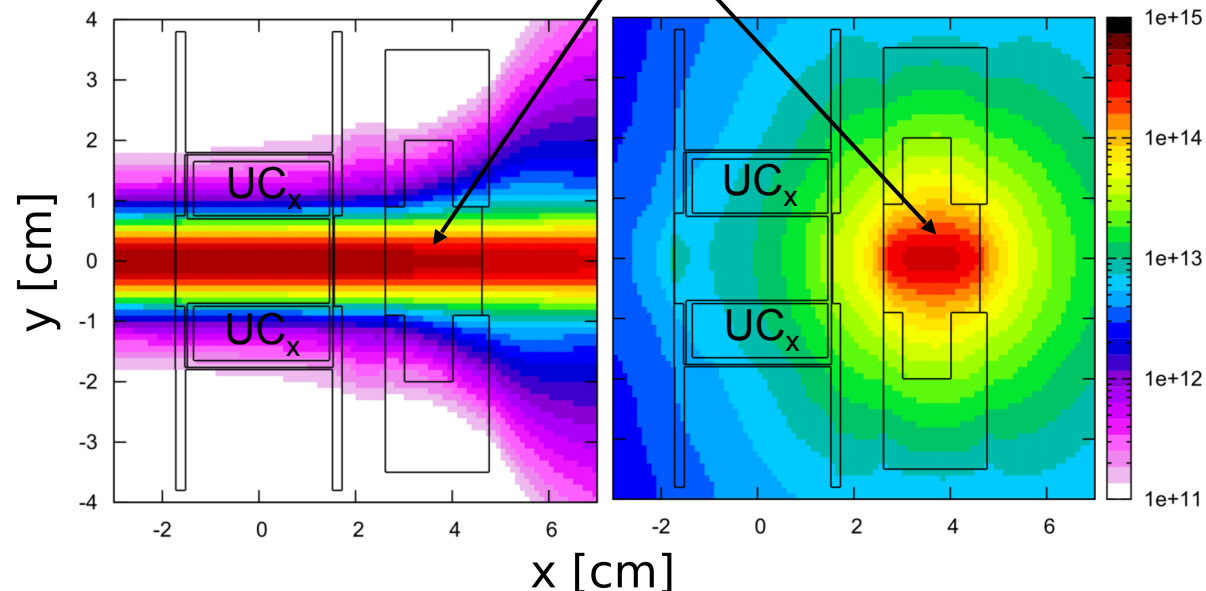


Ph.D. Thesis Luka Egoriti

Converter

Proton flux

Neutron flux [1/cm²/100μA]



Neutron-Rich Improvement Factor (NRIF):

- P2N converter purity improvement vs conventional ISAC
- Measured between 10-50x on Rb, Cs, Sn

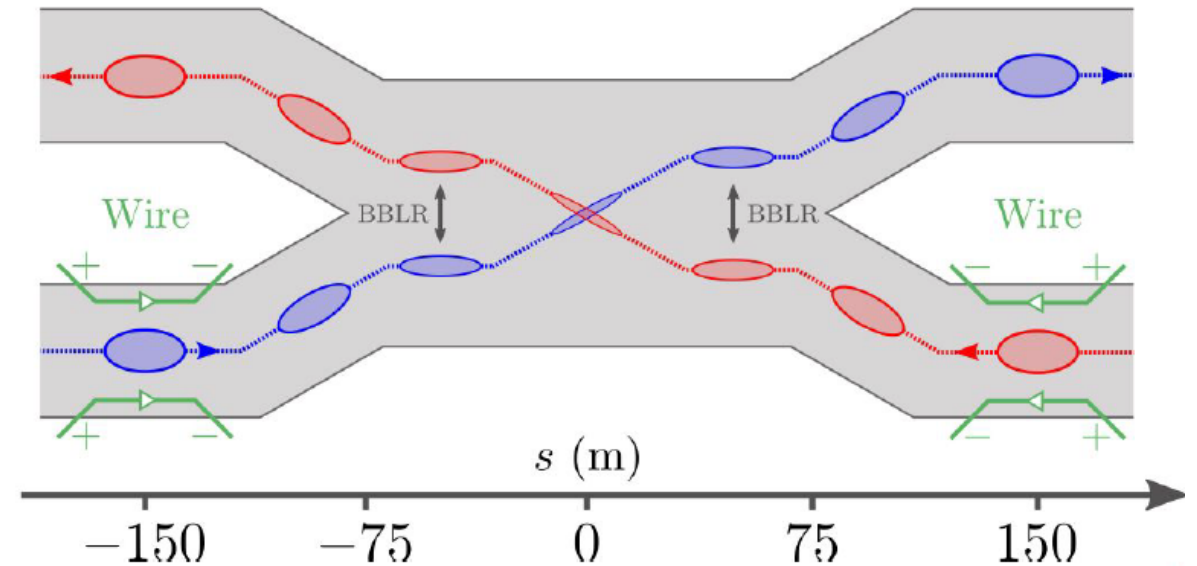
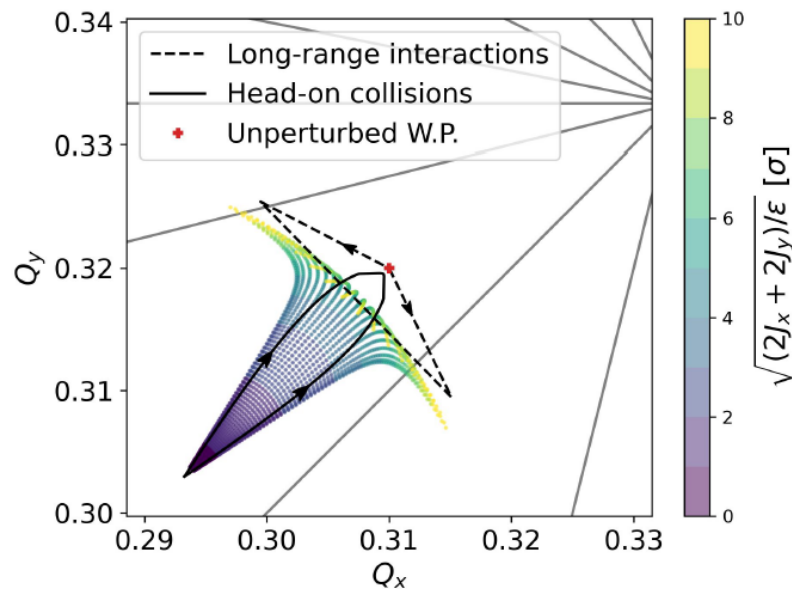
→ Converter configuration available as online production target for more intense and purer neutron-rich radioisotope beams

Science & Technology – Accelerators

Accelerator Beam Physics

- Beam Beam Long-Range (BBLR) compensation using DC wires in LHC
- Simulation of the tune footprint, long range BB effects lead to resonance crossing
- Lateral wings need to be compressed to avoid resonances
→ Compressing the footprint using DC wires

Ph.D. Thesis Philippe Belanger



- Analytic calculation of tune shift and resonance driving terms from BB effects including wires by TRIUMF beam physics group members.
- Comparison of the resulting footprint with MAD-X shows very good agreement.
- Development of Python packages for the computation to support CERN collaborators and support for LHC machine development.

Science & Technology – Accelerators

New 'beta-SRF' Facility Commissioned at beta-NMR *

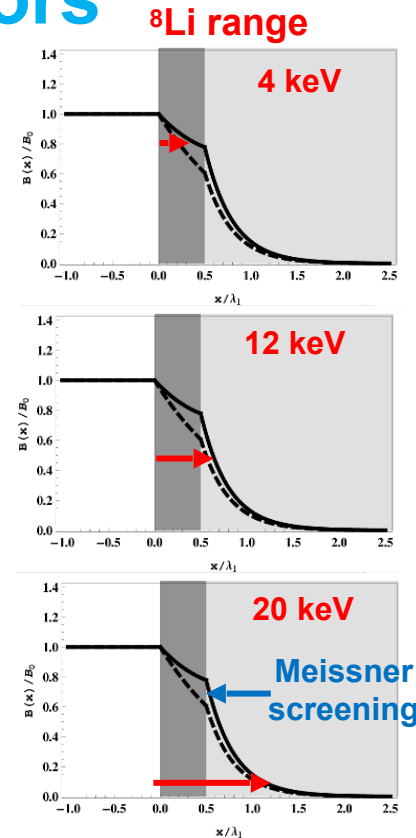
- New beamline extension installed at β -NMR facility for SRF materials characterization
 - Commissioning and first experiments completed
- Unique facility in the world for depth profiling materials in parallel magnetic fields up to 200mT – SRF regime
- Collaboration between Accelerator Division and CMMS

First paper

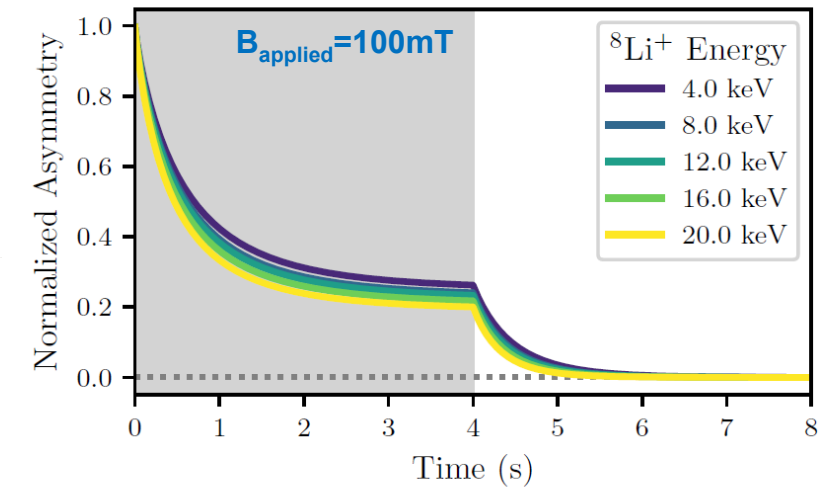
A New High Parallel-Field Spectrometer at TRIUMF's β -NMR Facility

E. Thoeng, R.M.L. McFadden, S. Saminathan, G.D. Morris, P. Kolb, B. Matheson, M. Asaduzzaman, R. Baartman, S.R. Dunsiger, D. Fujimoto, T. Junginger, V.L. Karner, S. Kiy, R. Li, M. Stachura, J.O. Ticknor, R.F. Kiefl, W.A. MacFarlane, and R.E. Laxdal, to be submitted to RSI

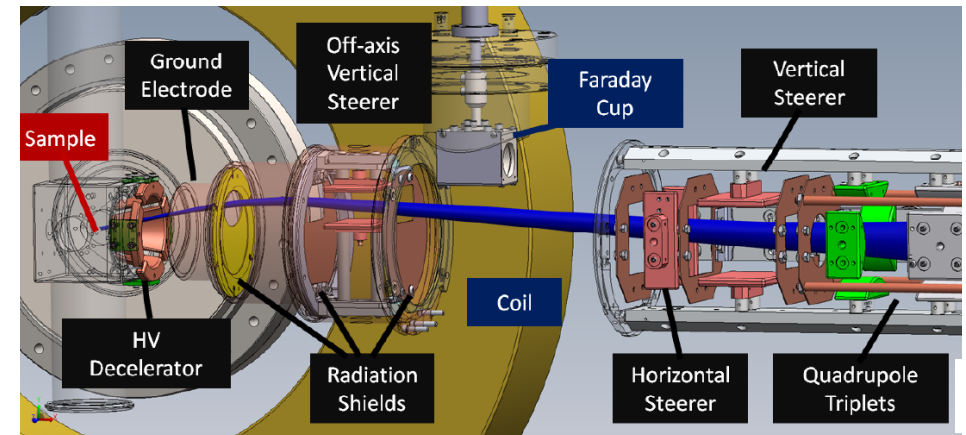
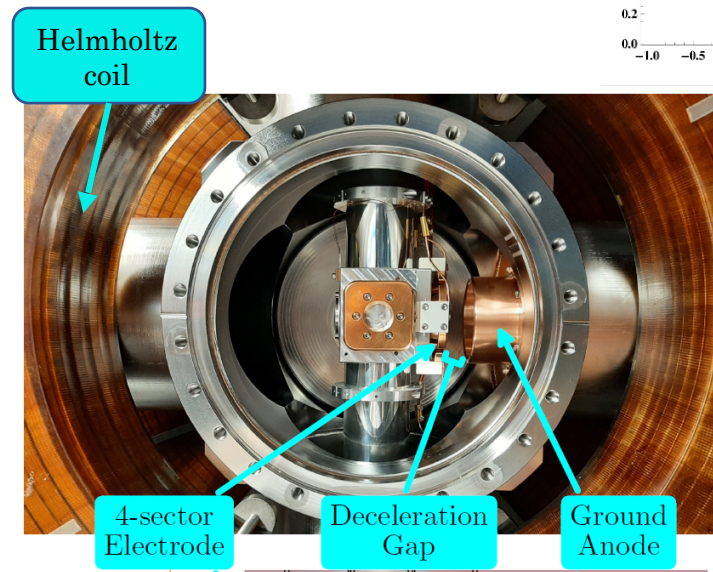
*Funded through NSERC RTI



First Results



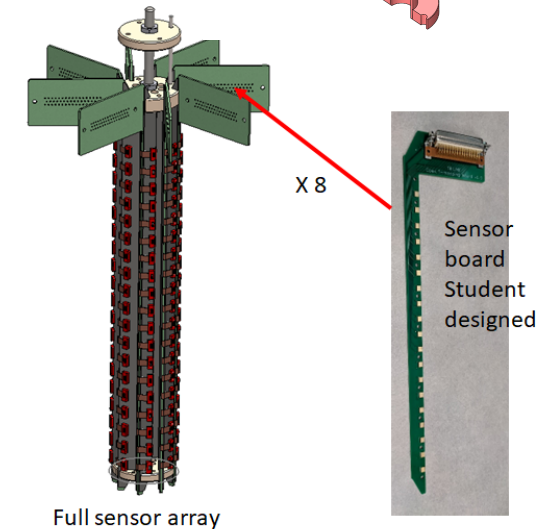
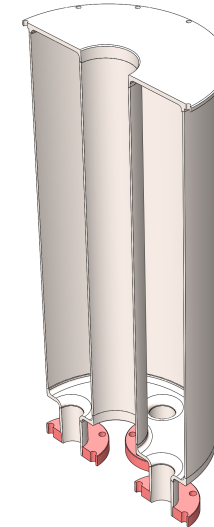
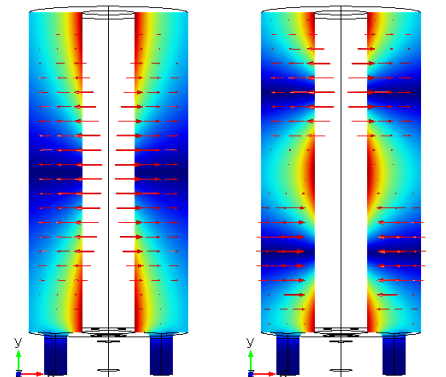
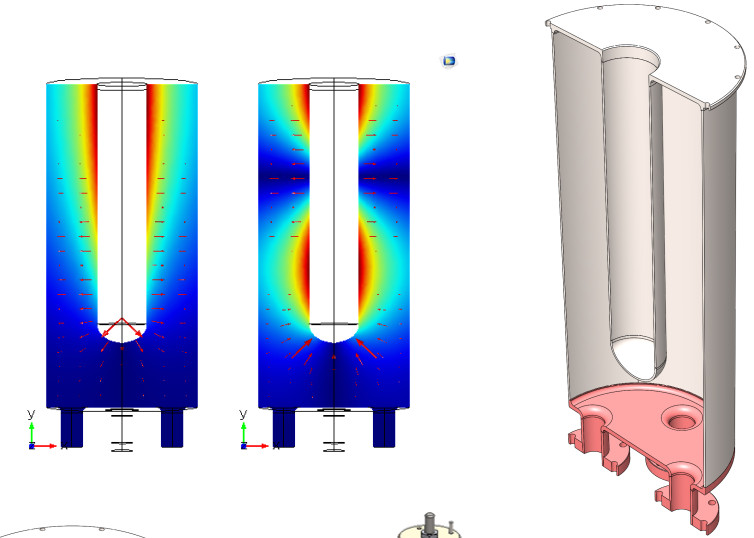
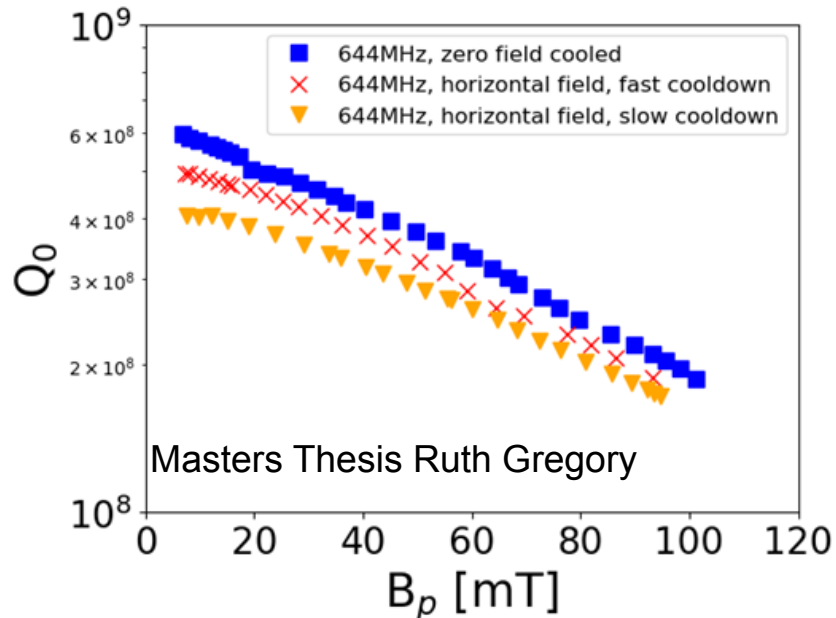
First results taken on SRF samples at 50 and 100mT parallel field show Meissner screening (increased depolarization with depth)



Science & Technology – Accelerators

Unique SRF research on coaxial cavities

- Testbed cavities with simplified geometry for new surface treatments.
- Excitation of different resonant modes to determine frequency dependence of the cavity performance.
- Using 3D Helmholtz coils, we transition the cavity into the superconducting state with different background fields
→ influence on the quality factor



Development of Temperature Mapping for Coaxial Cavities

- Sensor array to measure temperature distribution on the cavity surface
- Unique in the world – no one has done this for coaxial cavities before

Science & Technology – Life Sciences

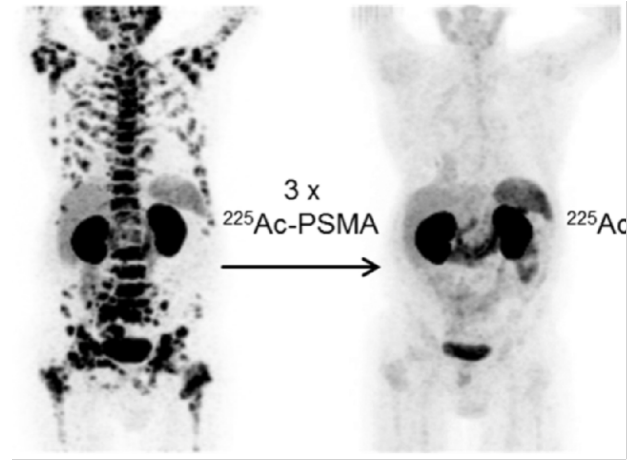
Medical Isotope R&D at 500 MeV

²²⁵Ac
actinium
TAT

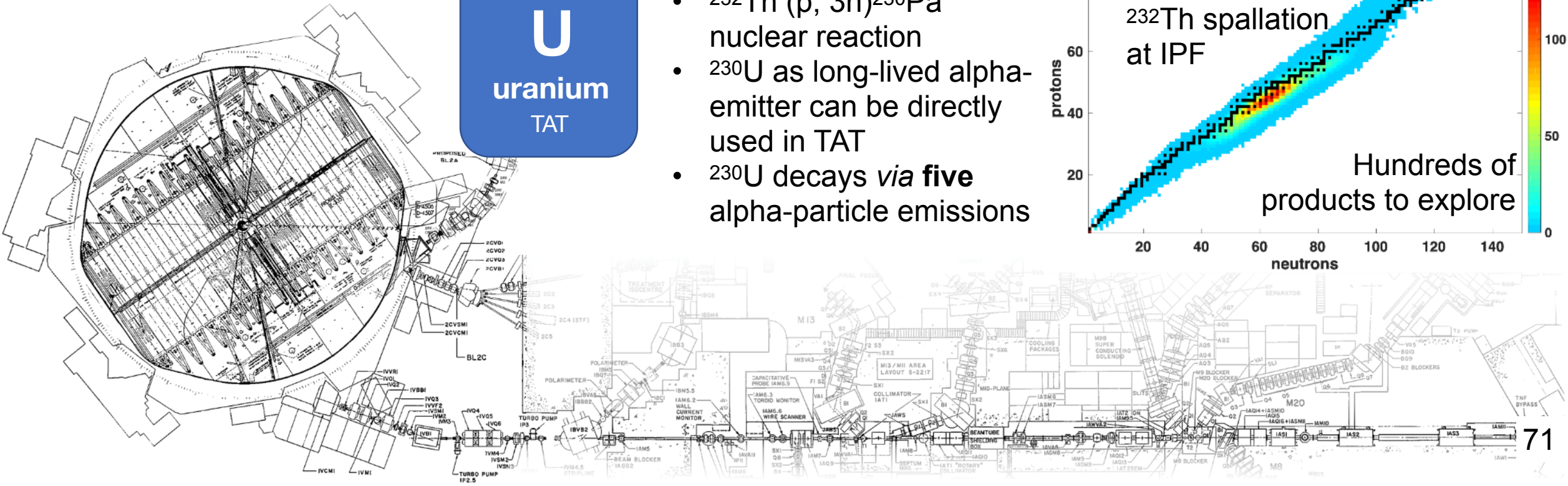
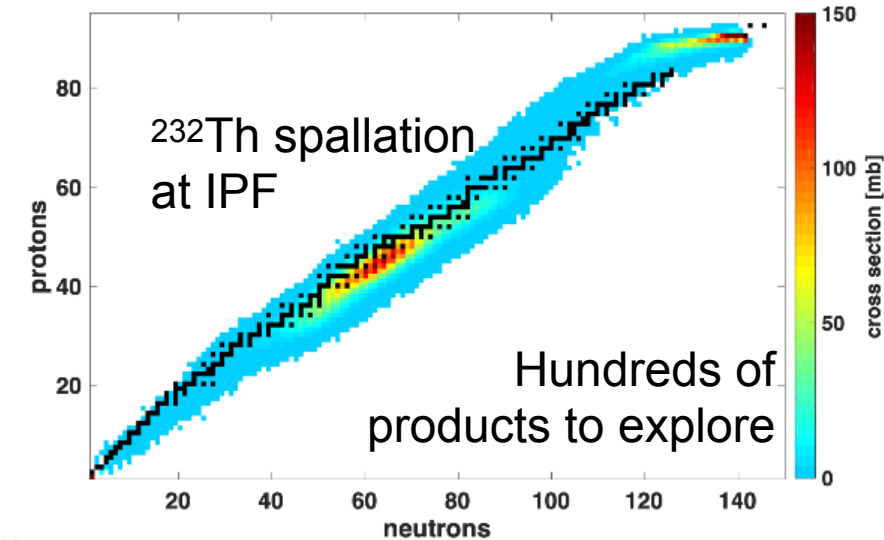
Objective: demonstrate processes and procedures required for safe, routine production and QC of ²²⁵Ac

²³⁰U
uranium
TAT

2020: 3 targets, total of 6,320 μAh
2021: 5 targets, total of 28,900 μAh
2022: 7* targets, total of 80,000 μAh
*2022 campaign underway
10 GBq ²²⁵Ac and 1.1 GBq ²²⁵Ra isolated to date in 2022



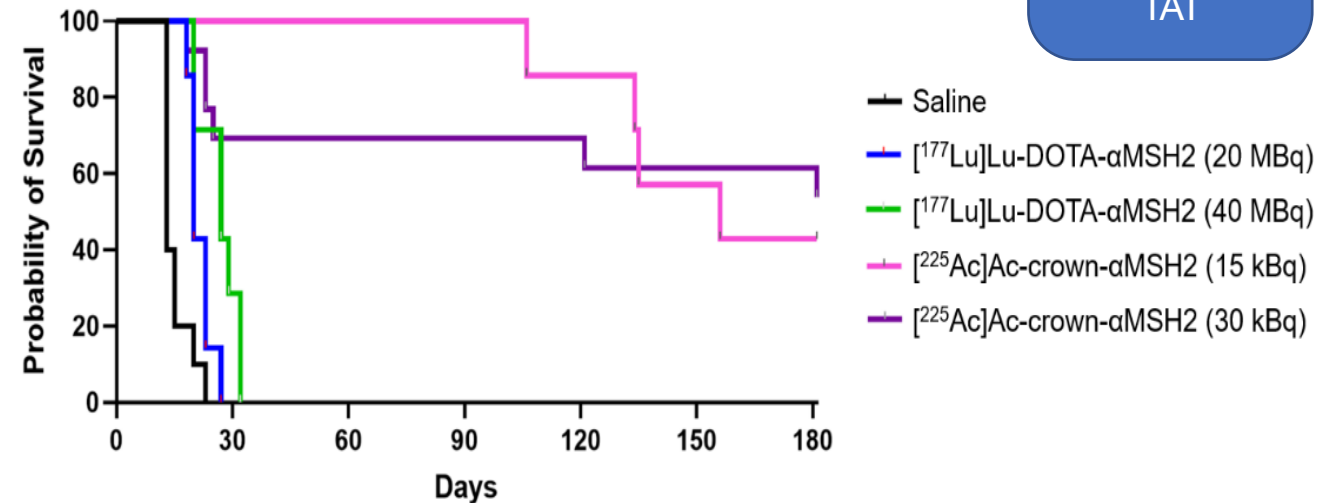
- ²³²Th (p, 3n)²³⁰Pa nuclear reaction
- ²³⁰U as long-lived alpha-emitter can be directly used in TAT
- ²³⁰U decays *via* **five** alpha-particle emissions



Science & Technology – Life Sciences

Medical Isotope R&D at 500 MeV

**^{225}Ac -crown-
aMSH**



- Late-stage melanoma: low long-term survival, difficult curable option
- MSH derivatives targeting MC1R are highly promising for therapy and imaging
- Using TRIUMF-created chelator, ^{225}Ac -crown-aMSH showed high tumor accumulation and low uptake in healthy organs and tissues (low toxicity)

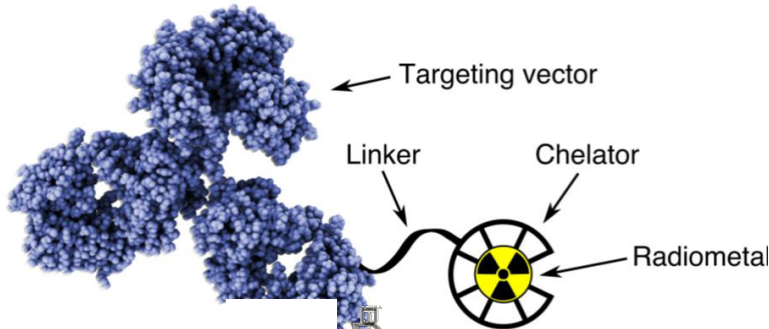
Science & Technology – Life Sciences

ISAC-ISOL for next generation radiopharmaceutical research



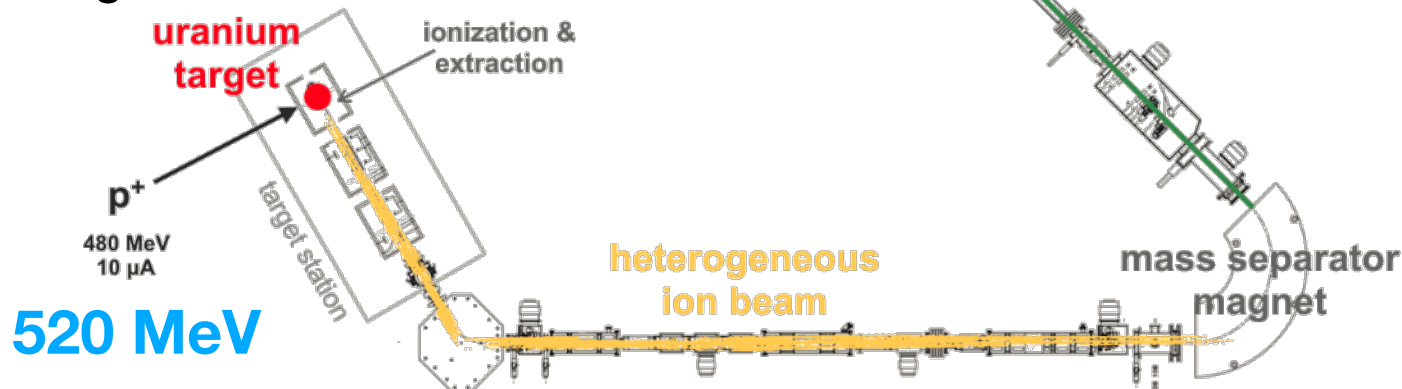
- ^{225}Ac surrogate w/ imageable photons
- Potential therapeutic with multiple α -emitting daughters

^{226}Ac
Ac
actinium
theragnostic

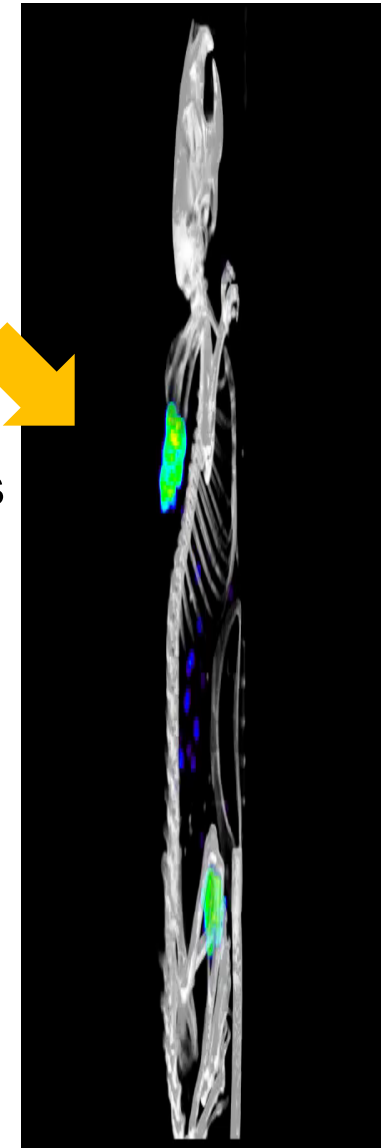


^{155}Tb
Tb
terbium
SPECT

- High contrast images
- Good tumour uptake
- Low injected dose
- β^+ , α , β^- , γ -emitting isotopes available



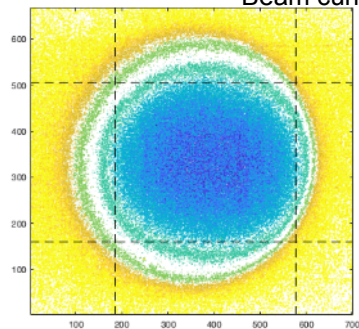
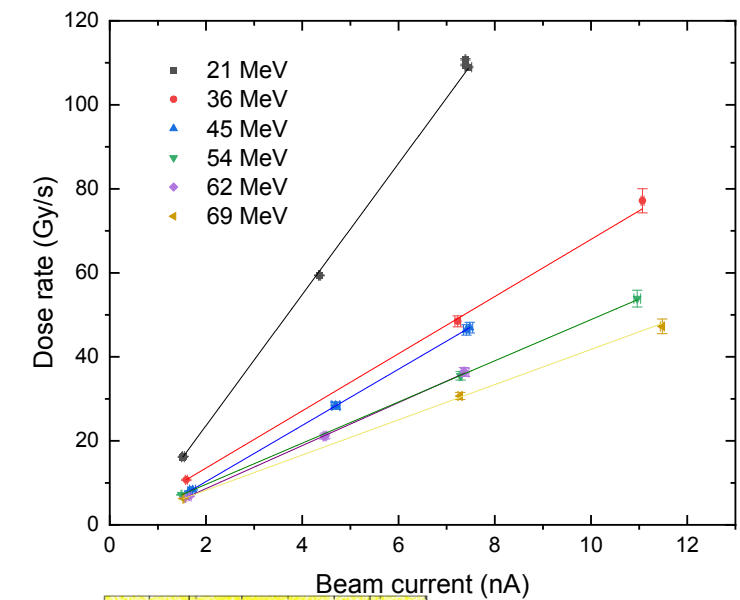
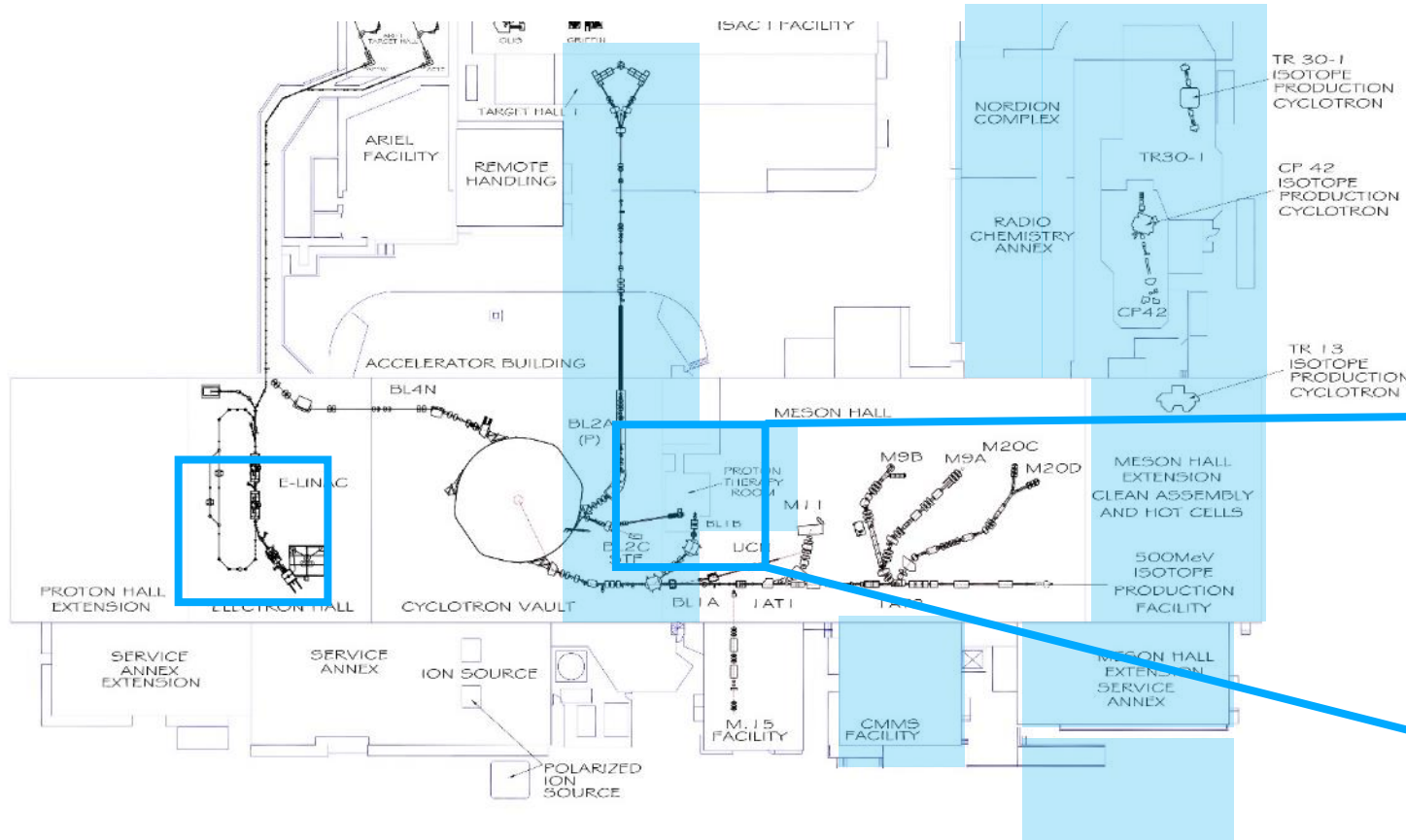
tumor uptake



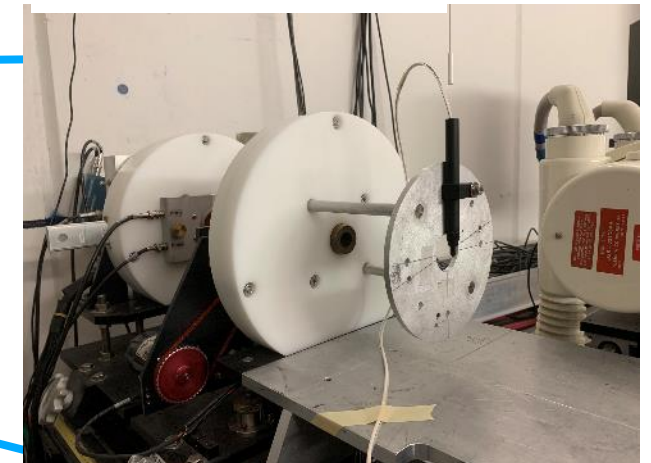
Science & Technology – Life Sciences

FLASH Proton and X-ray Therapy

- **Justification:** improve on conventional proton therapy ~ 0.03 Gy/s
- **Objective:** demonstrate FLASH (<40 Gy/s) therapy at TRIUMF
- **Current Status:** Dosimetry experiments; DNA and cell experiments underway; comparison with Photon FLASH
- **Next steps:** prepare CFI application (2025)

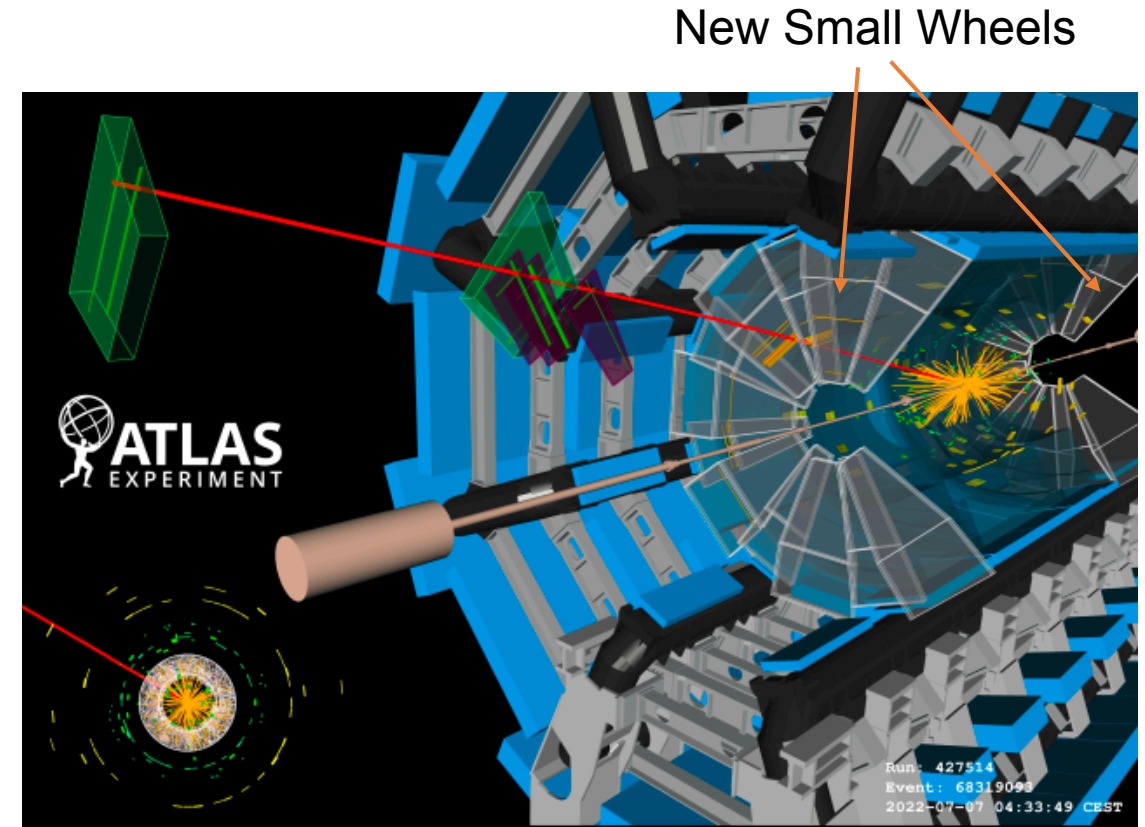


Beam size:
 ~ 1.6 cm



Science & Technology – Particle Physics Highlights

LHC Run 3 has started and the ATLAS New Small Wheels are starting to take data (event display to right)



Many ATLAS results released at ICHEP:

- ATLAS explores the self-interaction of the Higgs boson (with substantial TRIUMF group participation including Chris Gubbels' thesis work)
- Observation of potential four-charm tetraquark, Joint polarization of W and Z bosons, Quantum interference when protons bounce off of each other

Science & Technology – Particle Physics Highlights

- Celebrated the 10th anniversary of the Higgs Boson discovery by ATLAS and CMS on July 4th
- ATLAS TRIUMF post-doc Marco Valente did a “takeover” of the Science World Twitter account
- Max Swiatlowski gave a Higgs@10 talk at the Science Rendezvous event at UBC and wrote a blog post for Quantum Diaries

Article

A detailed map of Higgs boson interactions by the ATLAS experiment ten years after the discovery

<https://doi.org/10.1038/s41586-022-04893-w>

Received: 21 March 2022

Accepted: 23 May 2022

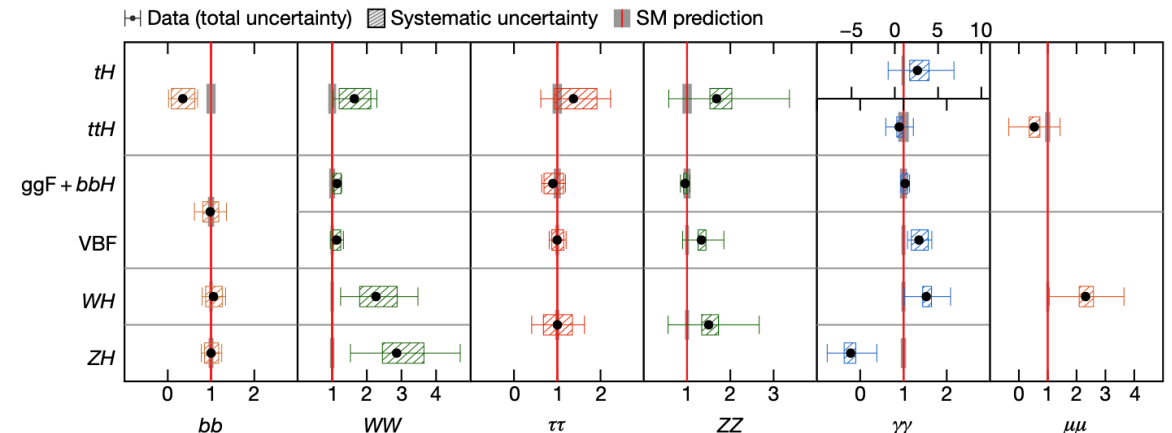
Published online: 04 July 2022

Open access

 Check for updates

The ATLAS Collaboration¹⁵²

The standard model of particle physics^{1–4} describes the known fundamental particles and forces that make up our Universe, with the exception of gravity. One of the central features of the standard model is a field that permeates all of space and interacts with fundamental particles^{5–9}. The quantum excitation of this field, known as the Higgs field, manifests itself as the Higgs boson, the only fundamental particle with no spin. In 2012, a particle with properties consistent with the Higgs boson of the standard model was observed by the ATLAS and CMS experiments at the Large Hadron Collider at CERN^{10,11}. Since then, more than 30 times as many Higgs bosons have been recorded by the ATLAS experiment, enabling much more precise measurements and new tests of the theory. Here, on the basis of this larger dataset, we combine an unprecedented number of production and decay processes of the Higgs boson to scrutinize its interactions with elementary particles. Interactions with gluons, photons, and W and Z bosons—the carriers of the strong, electromagnetic and weak forces—are studied in detail. Interactions with three third-generation matter particles (bottom (b) and top (t) quarks, and tau leptons (τ)) are well measured and indications of interactions with a second-generation particle (muons, μ) are emerging. These tests reveal that the Higgs boson discovered ten years ago is remarkably consistent with the predictions of the theory and provide stringent constraints on many models of new phenomena beyond the standard model.



Science & Technology – Nuclear Physics Highlights

THE ASTROPHYSICAL JOURNAL, 936:107 (18pp), 2022 September 10

© 2022. The Author(s). Published by the American Astronomical Society.

OPEN ACCESS

<https://doi.org/10.3847/1538-4357/ac80fc>



Measuring the β -decay Properties of Neutron-rich Exotic Pm, Sm, Eu, and Gd Isotopes to Constrain the Nucleosynthesis Yields in the Rare-earth Region

G. G. Kiss¹, A. Vitéz-Sveicz^{1,4}, Y. Saito^{3,4}, A. Tarifeño-Saldivia^{5,6}, M. Pallas⁵, J. L. Tain⁶, I. Dillmann^{3,7}, J. Agramunt⁶, A. Algara^{1,6}, C. Domingo-Pardo⁶, A. Estrade⁸, C. Appleton⁹, J. M. Allmond¹⁰, P. Aguilera^{11,12}, H. Baba¹³, N. T. Brewer^{10,14}, C. Bruno⁹, R. Caballero-Folch³, F. Calvino⁵, P. J. Coleman-Smith¹⁵, G. Cortes⁵, T. Davinson⁹, N. Fukuda¹³, Z. Ge¹³, S. Go^{13,16}, C. J. Griffin³, R. K. Grzywacz^{10,14}, O. Hall⁹, A. Horváth¹⁷, J. Ha^{13,18}, L. J. Harkness-Brennan¹⁹, T. Isobe¹³, D. Kahl⁹, T. T. King¹⁴, A. Korgul²⁰, S. Kovács², R. Krücken^{3,4}, S. Kubono¹³, M. Labiche¹⁵, J. Liu²¹, J. Liang³, M. Madurga¹⁴, K. Miernik²⁰, F. Molina¹¹, A. I. Morales⁶, M. R. Mumpower^{22,23}, E. Nacher⁶, A. Navarro⁵, N. Nepal⁸, S. Nishimura¹³, M. Piersa-Siłkowska²⁰, V. Phong¹³, B. C. Rasco^{10,14}, B. Rubio⁶, K. P. Rykaczewski¹⁰, J. Romero-Barrientos¹¹, H. Sakurai¹³, L. Sexton^{3,9}, Y. Shimizu¹³, M. Singh¹⁴, T. Sprouse^{22,23}, T. Sumikama¹³, R. Surman²⁴, H. Suzuki¹³, T. N. Szegedi¹, H. Takeda¹³, A. Tolosa⁶, K. Wang⁸, M. Wolinska-Cichocka²⁵, P. Woods⁹, R. Yokoyama²⁶, and Z. Xu¹⁴

¹ Institute for Nuclear Research (ATOMKI), 4026 Debrecen, Bem tér 18/c, Hungary; ggkiss@atomki.hu

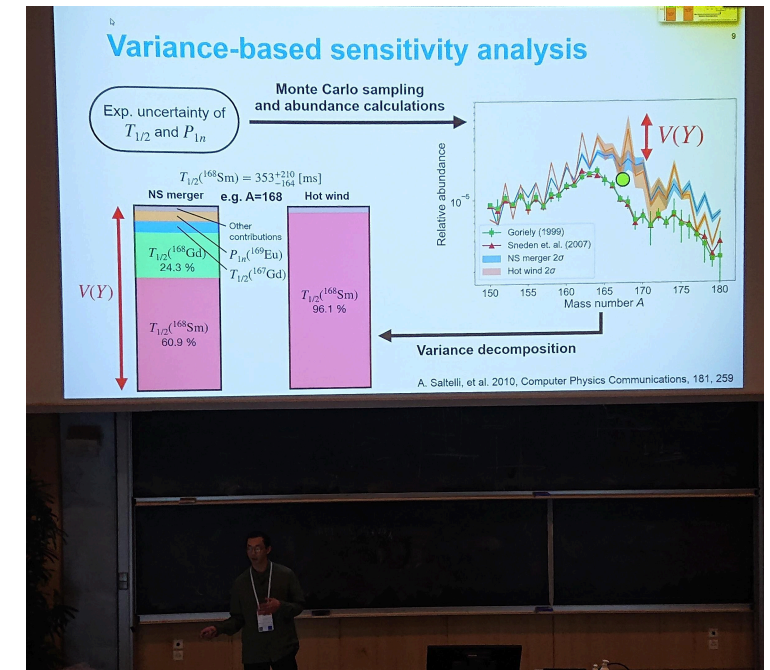
² University of Debrecen, 4001 Debrecen, Egyetem tér 1, Hungary

³ TRIUMF, 4004 Wesbrook Mall, Vancouver, BC V6T 2A3, Canada; saito@triumf.ca

⁴ Department of Physics and Astronomy, The University of British Columbia, Vancouver BC V6T 1Z1, Canada

- Latest paper from **BRIKEN collaboration** published in Astrophys. J.
- **28 new neutron-branching ratios and 9 new half-lives** of most neutron-rich lanthanides
- **Astrophysical interpretation led by UBC/TRIUMF PhD student Yukiya Saito** – developed novel techniques for uncertainty quantification of nuclear physics parameters on r-process abundance curve

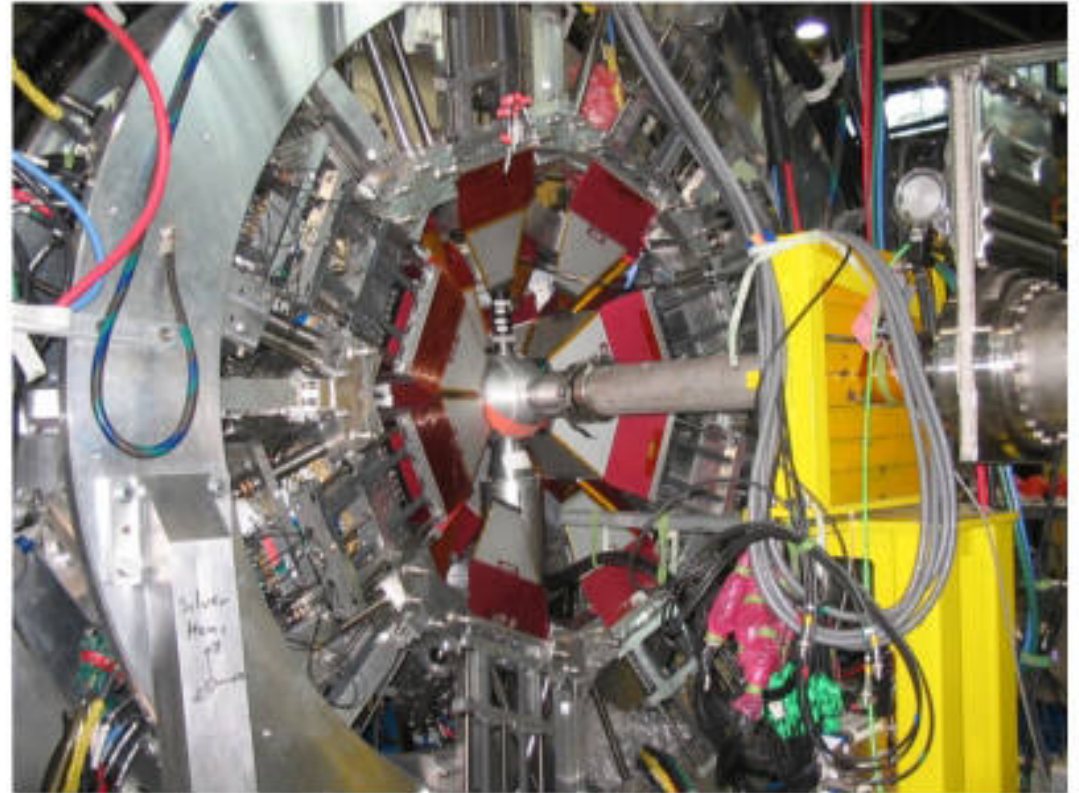
New BRIKEN @RIKEN Nishina Center paper published!



Science & Technology – Nuclear Physics Highlights

Recent Publications of the TIGRESS Collaboration

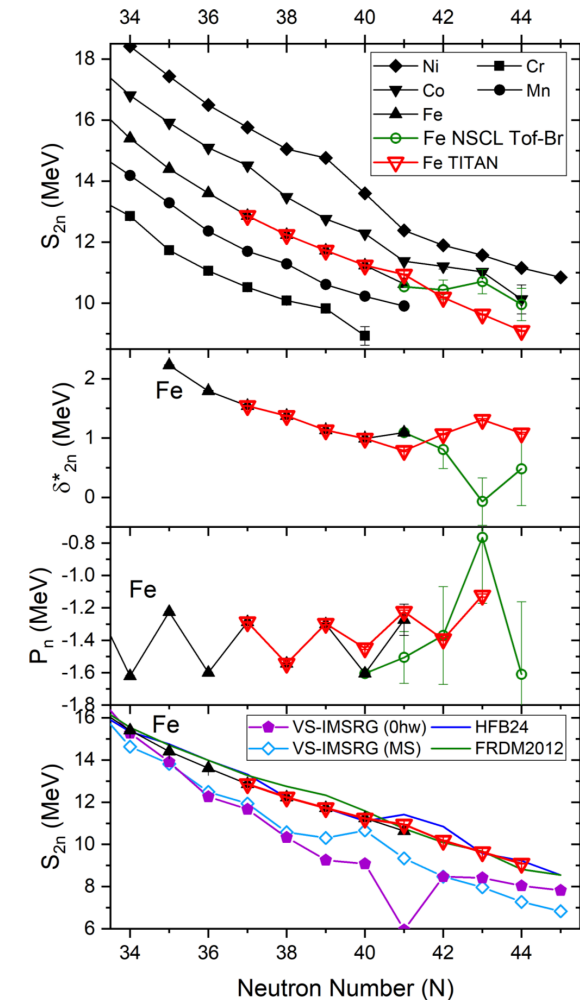
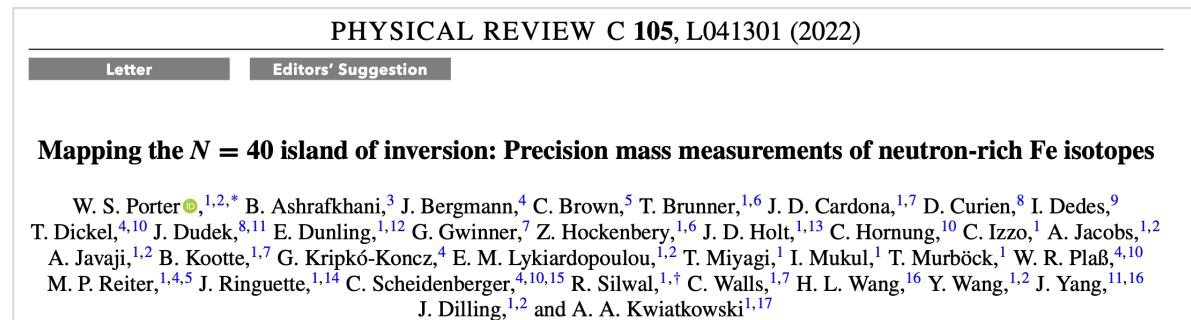
- “Single neutron transfer on ^{23}Ne and its relevance for the pathway of nucleosynthesis in astrophysical X-ray bursts”, G. Lotay et al., Phys. Lett. B 833, 137361 (2022); the measurement utilized the SHARC highly-segmented Si array, and a novel ionization technique used for the first time at ISAC, extracting 2^+ ions from the forced electron beam induced arc discharge source
- “Improved measurement of the $0^+ \rightarrow 0^+$ $E0$ transition strength for ^{72}Se using the SPICE spectrometer”, J. Smallcombe et al., Phys. Rev. C 106, 014312 (2022); the experiment used the SPICE internal conversion electron spectrometer



Science & Technology – Nuclear Physics Highlights

TITAN

- Precision mass measurements of neutron-rich Fe isotopes
 - MR-ToF-MS system
 - Discovery of a new long-lived odd-even isomer
 - Comparison to in-house theoretical calculations



Science & Technology – Theory Highlights

- High-profile *ab initio* nuclear theory publications
 - Calculations of neutron skin in ^{208}Pb published in Nature Physics
 - The heaviest nucleus calculated within *ab initio* framework
 - *Ab initio* calculation of the deuterium capture on ^4He – BBN reaction – in PRL
- High-profile nuclear astrophysics publications
 - Investigation of the origin of ^{244}Pu in the Solar System published in Universe
- Particle theory publication in Physics Reports

ARTICLES
<https://doi.org/10.1038/s41567-022-01715-8>


OPEN
Ab initio predictions link the neutron skin of ^{208}Pb to nuclear forces

Baishan Hu ^{1,11}, Weiguang Jiang ^{2,11}, Takayuki Miyagi ^{1,3,4,11}, Zhonghao Sun^{5,6,11}, Andreas Ekström², Christian Forssén ² , Gaute Hagen ^{1,5,6}, Jason D. Holt ^{1,7}, Thomas Papenbrock ^{5,6}, S. Ragnar Stroberg^{8,9} and Ian Vernon¹⁰

PHYSICAL REVIEW LETTERS **129**, 042503 (2022)

Ab Initio Prediction of the $^4\text{He}(d,\gamma)^6\text{Li}$ Big Bang Radiative Capture

C. Hebborn ^{1,2,*}, G. Hupin ³, K. Kravvaris ², S. Quaglioni ², P. Navrátil ⁴ and P. Gysbers ^{4,5}

MDPI

Article
Origin of Plutonium-244 in the Early Solar System

Maria Lugaro ^{1,2,3,4,*} , Andrés Yagüe López ^{5,†} , Benjámín Soós ^{1,2,3}, Benoit Côté ^{1,2,6,7,†} , Mária Pető ^{1,2} , Nicole Vassh ⁸, Benjamin Wehmeyer ^{1,2,9} and Marco Pignatari ^{1,2,6,10,†}

Physics Reports 961 (2022) 1–35

Contents lists available at ScienceDirect
Physics Reports
journal homepage: www.elsevier.com/locate/physrep

Cosmological constraints on dark matter interactions with ordinary matter

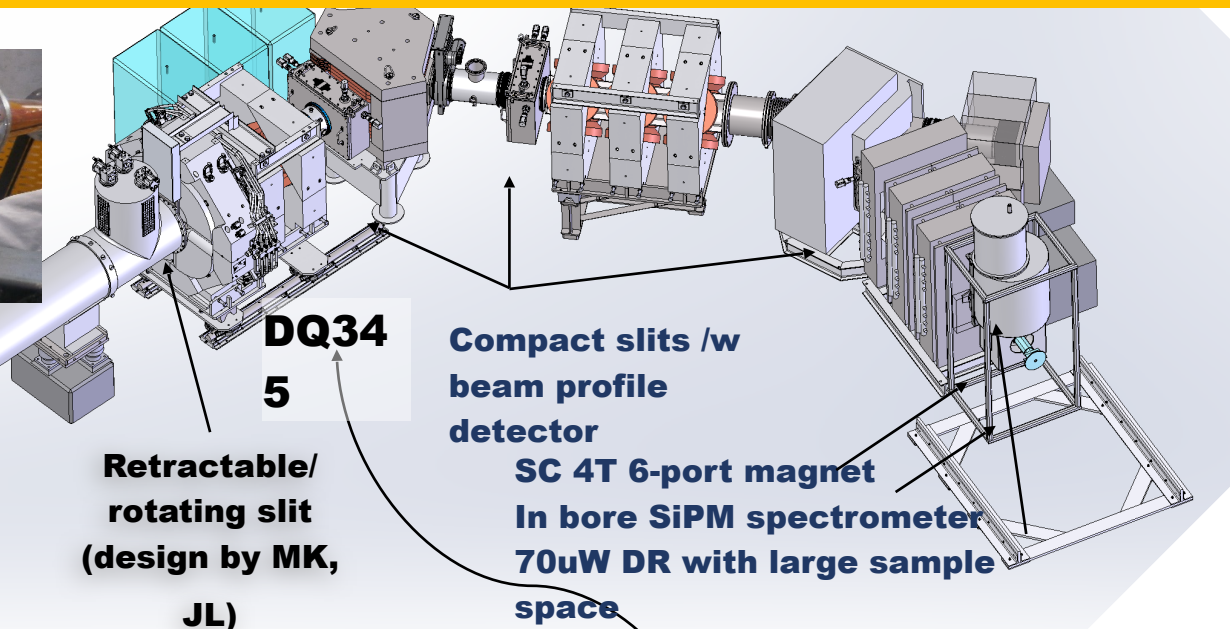
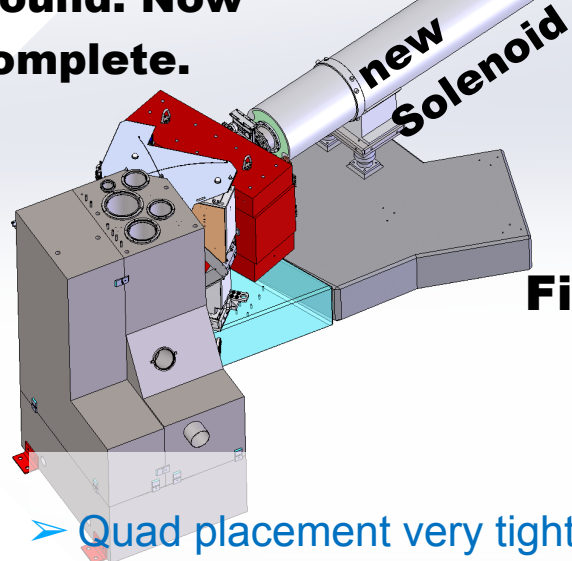
Manuel A. Buen-Abad ^{a,b,*}, Rouven Essig ^c, David McKeen ^d, Yi-Ming Zhong ^e


Science & Technology – Molecular and Materials Science Highlights

The Rising of the TRIUMF M9H Phoenix, with new chops



Solenoid coil being wound. Now complete.



First muon decay channel explicitly designed for delivery of transversely spin polarized beams.

Post Solenoid Triplet:

- Quad placement very tight to solenoid exit to capture beam “phase space”.
- Triplet encompasses strong horizontal and vertical steering capabilities to collect and steer off-axis spin polarized muons

M9H Solenoid compared to previous M9B version:

- 5T recondensing RT-bore solenoid, operates in persistent mode with a robust 10hr hold time during total power loss or interruption
- Increased bore diameter
- Awarded to Tesla Engineering, U.K



Thank You!
Merci!

www.triumf.ca
[@TRIUMFLab](https://twitter.com/TRIUMFLab)

