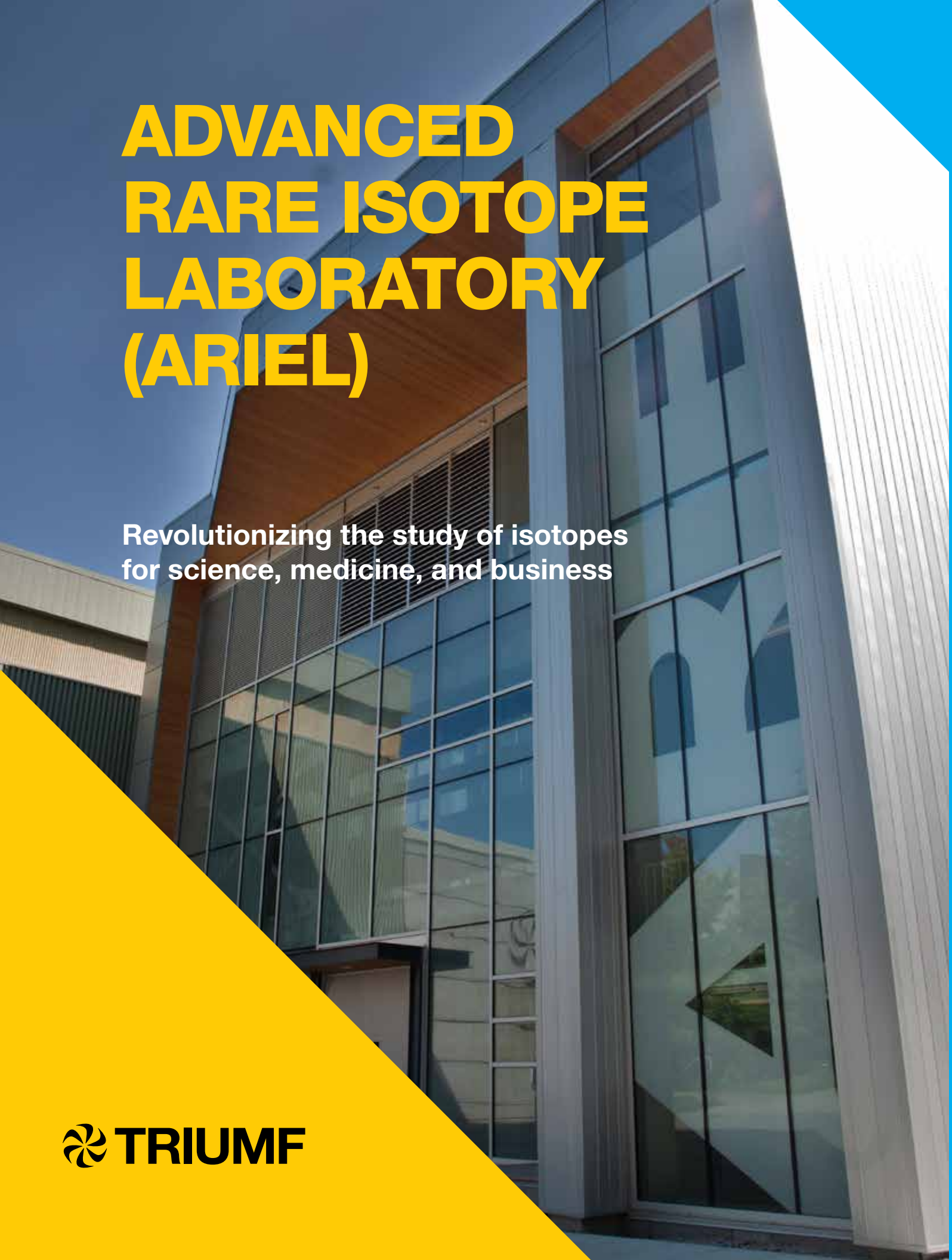


ADVANCED RARE ISOTOPE LABORATORY (ARIEL)

Revolutionizing the study of isotopes for science, medicine, and business

TRIUMF

ARIEL AT A GLANCE

A WORLD LEADER IN RARE ISOTOPE SCIENCE

Highest power rare isotope facility of its kind for producing isotopes for fundamental research in nuclear physics and quantum materials, as well as for medicine and business.

30 MILLION VOLTS OF SCIENTIFIC POTENTIAL

Canadian-built superconducting electron linear accelerator, the most powerful of its kind, to unleash the full power of our accelerator complex.

MORE ISOTOPES, MORE OFTEN

Two additional targets, tripling isotope production rates and expanding the catalogue of isotopes available to a multitude of world-class experimental facilities.

USING RARE ISOTOPE BEAMS TO UNCOVER THE MYSTERIES OF THE UNIVERSE

The fleeting, unstable nature of rare isotopes — exotic versions of elements not typically occurring on Earth — makes them powerful scientific tools. They are critical for scientific experiments at the forefront of nuclear physics, for understanding how stars burn and explode, and for uncovering new phenomena in fundamental physics. They are also key tools in materials science and nuclear medicine studies, particularly the development of radionuclide cancer therapies.

The Advanced Rare Isotope Laboratory (ARIEL) is the only multi-user facility in the world for producing rare isotopes. Powered by some of the most advanced tools for producing and processing short-lived isotopes, ARIEL will revolutionize the study of isotopes for science, medicine, and business. It will enable TRIUMF and its partners to pursue critical advances in the understanding of isotopes and shed light on some of the most fundamental questions in science, like:

- How and where are the heavy elements — from iron to uranium — produced in the universe?
- What are the best quantum materials for next-generation superconductors or batteries?
- How can we use rare isotopes in the fight against cancer or Alzheimer's disease?

SUPERCHARGING TRIUMF'S SCIENTIFIC CAPACITY FOR CANADA AND THE WORLD

Producing more isotopes means creating more opportunities for Canadian and international researchers in topics ranging from particle and nuclear physics to the life and materials sciences. These endeavours will expand our horizons and increase the economic and societal impact of Canadian science and innovation.

ARIEL will also bolster Canada's knowledge economy. A training ground for scientists, engineers, technicians, students, tradespeople, and other professionals, ARIEL will develop a highly-skilled stream of talent and provide career-long professional development in a variety of fields, including:

- accelerator science
- quantum materials
- nuclear and particle physics
- nuclear chemistry
- radiopharmaceuticals
- cryogenics
- magnetic, high-vacuum, and radiofrequency technologies
- engineering
- advanced computing and data science

ARIEL WILL OFFER

1

FULL MULTI-USER CAPABILITY

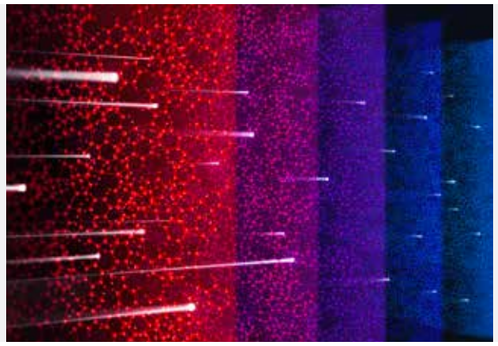
With ARIEL, TRIUMF's rare isotope production will triple, taking our world-class experiments to the next level and enabling parallel and longer experiments. With this boost in capacity comes an increased supply of exotic isotopes for cutting-edge science, medicine, and business.

2

EXPANDED ISOTOPE REACH

The new electron linear accelerator and advances in isotope target and ion source technologies will enable access to new isotopes currently out of reach. ARIEL will enable the study of very short-lived isotopes critical for our understanding of the origin of the elements.

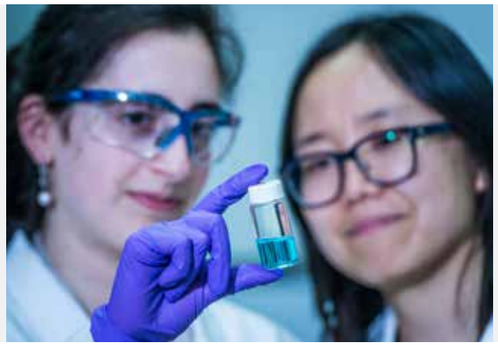
3



NEW TOOLS FOR CHARACTERIZING QUANTUM MATERIALS

ARIEL's use of rare isotopes will grow our materials science program to a world-leading user program that enables the development of new quantum materials, next-generation batteries, and a better understanding of biomolecules.

4



SYMBIOTIC MEDICAL ISOTOPE PRODUCTION

A symbiotic isotope production target, positioned behind an ARIEL science target, will facilitate the development of critical medical isotopes for next-generation radionuclide therapies for metastatic cancers.

TRIUMF

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Learn more about ARIEL and our Five-Year Plan 2020-2025

https://fiveyearplan.triumf.ca

www.triumf.ca
@TRIUMFLab

ARIEL university partners:

University of Alberta
The University of British Columbia
University of Calgary
Carleton University
University of Guelph
Université Laval
University of Manitoba
McGill
McMaster University
Université de Montréal
UNBC University of Northern British Columbia
Queen's University
University of Regina
Saint Mary's University
University of Saskatchewan
SFU Simon Fraser University
University of Toronto
University of Victoria
Western University
The University of Winnipeg
York University

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Discovery, accelerated