NEWS RELEASE

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Office of the Premier
Ministry of Small Business, Technology and Economic Development
TRIUMF and the University of Victoria

NEARLY $31M SUPPORTS WORLD-CLASS ISOTOPE RESEARCH

VANCOUVER – A $30.7-million provincial investment in one of the world's top subatomic physics labs is expected to help lead the way in alleviating future medical isotope shortages, while keeping B.C. and Canada at the forefront of particle and nuclear physics, Premier Gordon Campbell announced today.

"B.C. has a well-earned international reputation for its contributions to nuclear medicine, which saves lives by detecting and treating cancer and heart disease," Premier Campbell said. "Our latest investment in TRIUMF will provide the tools to demonstrate one new way to produce the radio isotopes needed by doctors and patients everywhere, and to help Canada continue its leadership in emerging global industries based on nuclear physics."

This funding announcement supports ARIEL (Advanced Rare IsotopE Laboratory), a $62.9-million project to build an underground beam tunnel that will surround a ground-breaking linear accelerator. ARIEL will allow TRIUMF to broaden its research in producing and studying isotopes for medicine and physics, including materials science.

The linear accelerator, or e-linac, will produce intense beams of particles to create isotopes of chemical elements. It uses brand new technology developed in B.C. that produces some of the most powerful beams in the world: up to the equivalent of 5,000 light bulbs concentrated in one square centimetre. In addition to medical applications, the laboratory will expand TRIUMF's capacity for addressing a wide range of issues, including reducing fertilizer runoff, making paper mills more efficient, and developing systems to remove pollutants created by coal-fired plants around the world.

In addition to the Province's $30.7-million contribution, ARIEL is being supported by $14.4 million through TRIUMF and its partners and $17.8 million from the Canada Foundation for Innovation. The foundation's contribution directly supports the linear accelerator portion of the project, which is led by the University of Victoria.

TRIUMF is located on the University of British Columbia's Vancouver campus and is Canada's national laboratory for particle and nuclear physics. It is owned and operated by a consortium of 15 Canadian universities. TRIUMF was started by the University of Victoria, UBC and Simon Fraser University in 1968, when it was called the TRI University Meson Facility.

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"We're very excited about the tremendous potential of the ARIEL project and our role in it," said University of Victoria president David Turpin. "This facility will have a dramatic impact in multiple sectors of research, the health sciences and commercialization, and sends a clear signal to the world about Canada's commitment to accelerator physics and engineering."

ARIEL is projected to increase the province's gross domestic product by an estimated $70 million over five years, and to result in $7.5 million added provincial tax revenues over the same period.

"The project will also create 160 spinoff jobs in the private sector, universities and other research agencies – not to mention 90 person-years of employment during construction," said Iain Black, Minister of Small Business, Technology and Economic Development.

TRIUMF attracts top physicists from around the world who collaborate on research related to particle and nuclear physics, molecular and materials science, and nuclear medicine. In partnership with TRIUMF, MDS Nordion produces 2.5 million patient doses of medical isotopes a year at its Vancouver site.

"This is a tremendous step for TRIUMF, for B.C., and for Canada," said Nigel Lockyer, director of TRIUMF. "Building on our strengths, ARIEL and the e-linac will attract global talent and ideas to B.C. with intellectual, economic and social benefits for all Canadians."

The ARIEL project is funded through the $14-billion capital infrastructure program supported by the Province that is creating up to 88,000 jobs and building vital public infrastructure in every region of B.C.

As well as contributing to the linear accelerator, the federal government also supports TRIUMF's core operating expenses.

"Our government is investing in science and technology to improve the quality of life for Canadians," said Stockwell Day, federal Treasury Board president, minister responsible for British Columbia, and MP for Okanagan Coquihalla. "I am pleased that our government has helped fund this new isotope lab. This facility will bring employment, health and scientific benefits for British Columbians and people across Canada."

Since 2001, the provincial government has invested $1.8 billion in research and innovation. This funding has attracted another $1.3 billion in research funding from other sources.

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A backgrounder follows.

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BACKGROUNDER

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PROVINCIALLY FUNDED TRIUMF FACILITIES

Since 2001, four provincially supported projects worth a total of $63.9 million have been undertaken at TRIUMF, in addition to the $62.9-million ARIEL project announced today:

1. Muon beam line upgrade – to open in 2011

Muons are subatomic particles that can be used to probe small, local magnetic fields of electronic or nuclear origin. This $6-million upgrade, $2.4 million of which was provided by the Province, will increase the availability and quality of muon beams at TRIUMF, and will benefit teams throughout the world involved in molecular and materials research. The only other facility in the world with a comparable muon beam line is in Switzerland.

2. ATLAS Data Centre – opened in 2007

The ATLAS experiment at the Large Hadron Collider at CERN in Geneva, Switzerland, uses proton-proton collisions at the highest energy ever achieved in the laboratory to look for answers for why matter has mass. ATLAS can produce up to five petabytes of data per year (one petabyte is one million gigabytes). For comparison, if this data were stored on double-density DVDs, the stack – without cases – would be four times as tall as Vancouver's Scotia Centre.

CERN has co-ordinated an international network of large high-performance computing centres that are linked by "grid" tools to analyze this information. This network includes the $20.5-million ATLAS Tier-1 Data Centre led by Simon Fraser University at TRIUMF, built with $4 million from the Province.

3. ISAC-II – $8.7 million – opened in 2003

The TRIUMF Isotope Separator and Accelerator – ISAC – produces high-quality beams of separated isotopes that can be delivered directly to a variety of experimental facilities. These unique beams support a diverse program of research spanning the fields of nuclear astrophysics, nuclear structure, fundamental interactions, and condensed matter physics, much of which cannot be carried out anywhere else in the world. ISAC-II, a $27.6-million facility, was built with $8.7 million in provincial funding.

4. Laboratory for Advanced Detector Development – opened in 2002

The Laboratory for Advanced Detector Development is used for developing innovative radiation detectors and their application to particle and nuclear physics, medical imaging and other fields. This has enhanced work in this field at UBC and TRIUMF, as well as at the University of Montreal. The $9.8-million lab received $2.6 million from the provincial government.

THE SCIENCE BEHIND ARIEL

- The new Advanced Rare IsotopE Laboratory (ARIEL) at TRIUMF will house an electron linear accelerator facility (e-linac) and an underground beam tunnel. The complex allows TRIUMF to broaden its research capabilities in particle and nuclear physics and materials science, and to develop the technology to advance Canada's supply of medical isotopes.

- The e-linac portion of ARIEL – the first of its kind in Canada – is being designed and built by a 13-university consortium led by University of Victoria physicist Dean Karlen, who is jointly appointed to TRIUMF. The project also involves collaborations with researchers in the U.S., the U.K., Germany and India.

- At the heart of the e-linac is a new and highly efficient way of accelerating particle beams – known as superconducting radio frequency technology. Superconductors are materials that conduct electricity with no loss of energy when cooled to very low temperatures.

- The e-linac design consists of five cylinders, or cavities, placed end to end. Each cavity contains nine disc-like cells made from pure niobium, a superconducting metal often used to strengthen jet and rocket engines. When cooled, these niobium cells can store enough electromagnetic energy to accelerate particles to close to the speed of light.

- At full power, the e-linac will deliver up to 500 kilowatts of beam power – the same as 5,000 light bulbs concentrated into a square centimetre.

- Once it exits the accelerator, the particle beam strikes a target to produce a variety of isotopes for pure and applied research. The e-linac will advance knowledge in nuclear physics, nuclear astrophysics, and molecular and materials science.

- An isotope is a variant of a basic element, as determined by the number of neutrons in its nucleus. Every chemical element has more than one isotope. An example is carbon-14 – widely used for dating organic material – which has two extra neutrons than the more abundant carbon-12.

- The e-linac also opens up new avenues for the production of medical isotopes used for disease imaging and treatment. There are a limited number of facilities around the world capable of producing medical isotopes. Expanding the range of production facilities and varieties of isotopes will help maintain Canada's leading role in worldwide medical isotope delivery and ensure reliable sources for Canadians in the future.

- Superconducting radio frequency cavities are so technologically sophisticated that only five groups in the world have the ability to make them. One of these groups is a partnership between TRIUMF and PAVAC Industries in Richmond, a world leader in the development of commercial high-energy electron beam applications.

- The total area of the ARIEL facility will be about 2,700 square metres. The underground beam tunnel – built with 1.8-metre concrete walls – will connect the existing TRIUMF Proton Hall with the existing ISAC-I and ISAC-II experimental halls. The e-linac will be built in the lower section of the Proton Hall.

- The ARIEL facility will attract scientists from around the world to participate in experiments. It will also be a training ground for graduate and undergraduate students in the design, fabrication and operation of superconducting accelerator technology.

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