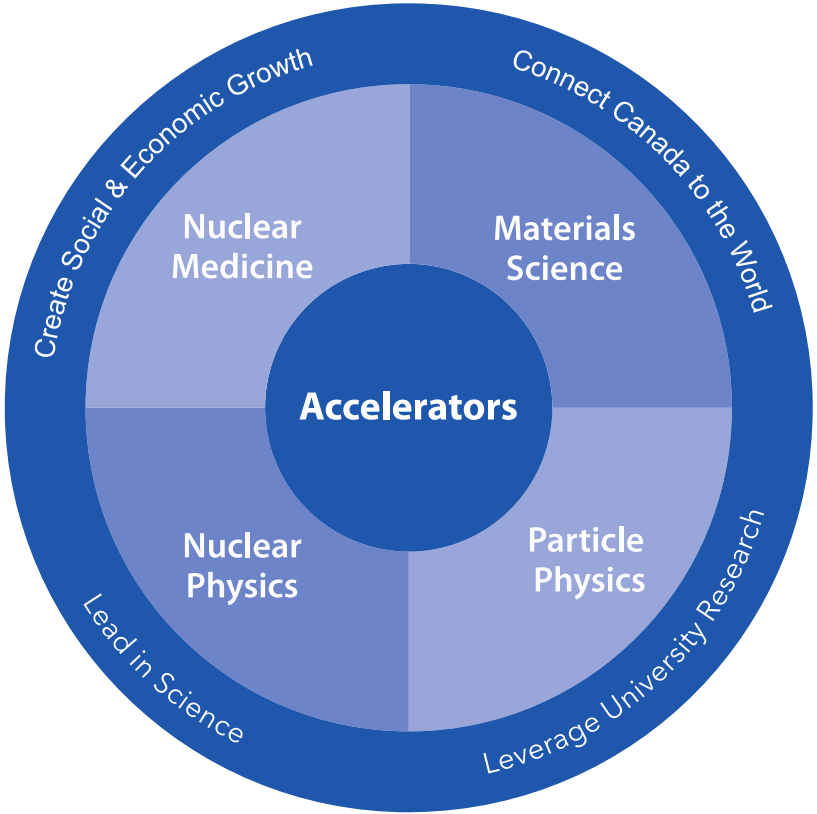
TRIUMF

Canada's national laboratory
for particle and nuclear physics
and accelerator-based science

Accelerating Science, Innovation and Business for Canada

TRIUMF program in a nutshell



Nuclear Physics
- Rare Isotopes – ISAC/ARIEL

Particle Physics
- Energy frontier – ATLAS & LHC at CERN
- Neutrinos – T2K/HyperK in Japan, nEXO at SNOLAB
- Antihydrogen – ALPHA at CERN
- Neutron EDM – UCN facility at TRIUMF

Accelerator Sciences
- Cyclotrons, SRF, linear accelerators, beam dynamics,
- RIB targets/sources, remote handling, beam diagnostics

Materials Science
- MuSR, Beta-detected NMR

Life Sciences
- Accelerator based medical isotopes
- Radiotracers for imaging and therapeutics
- Proton Therapy

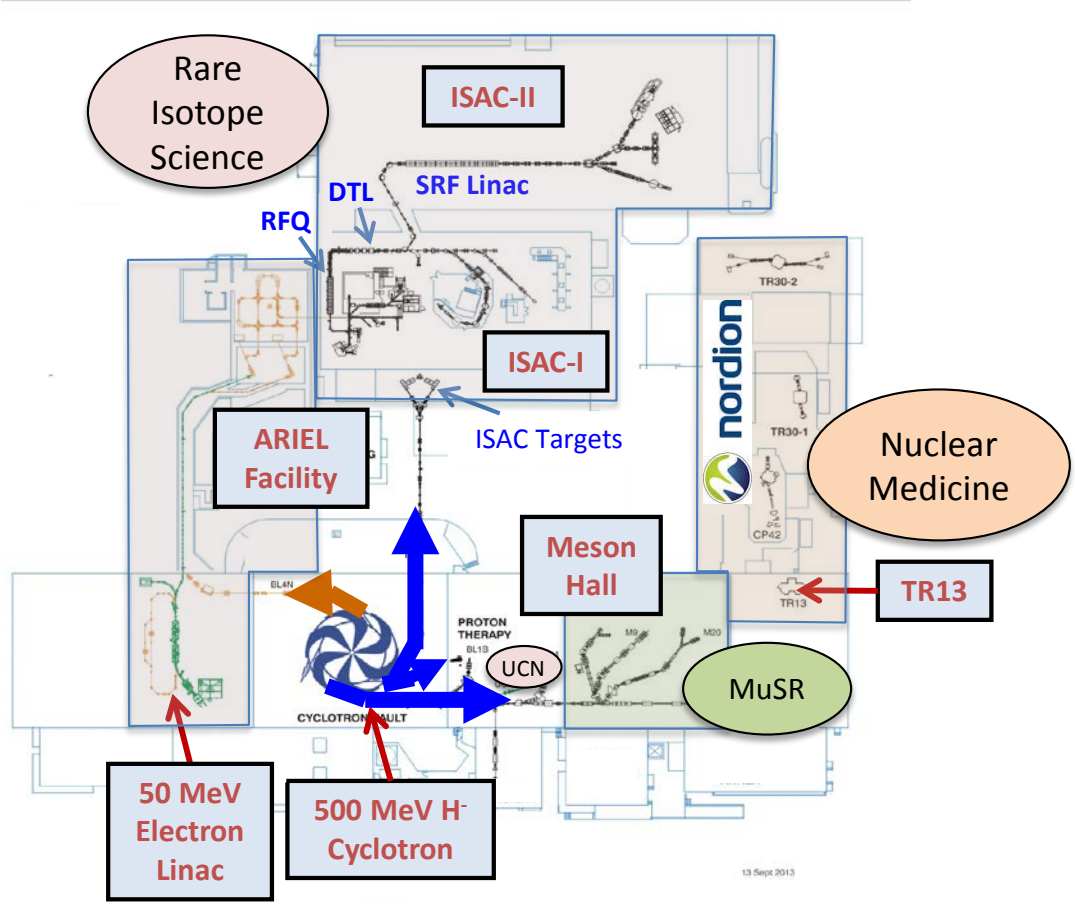
Advanced detector technologies
- SiPM, gas detectors, electronics

Commercialization
- Technology transfer, licensing, spin-offs
- Irradiation services

TRIUMF accelerator complex

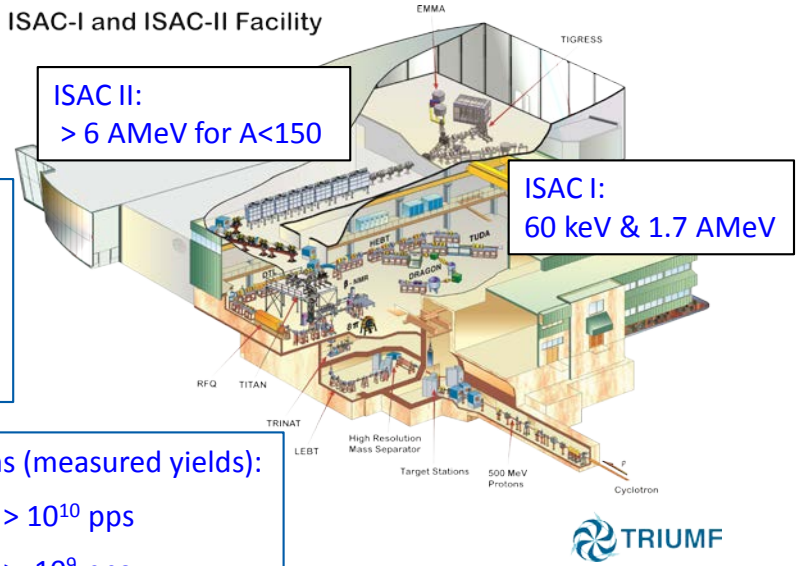
TRIUMF Accelerators:

- 500 MeV, 350μA,H^- cyclotron
- 4 medical isotopes cyclotrons
  (TR13, CP42, 2x TR30)
- ISAC 50kW ISOL facility
  - RFQ, 3 ≤ A/q < 30
  - DTL, A/q ≤ 7, 0.1-1.8 MeV/u
  - 40 MV Heavy Ion SC linac
- ARIEL e-linac (10mA, 30-50 MeV)



Isotope Separator and Accelerator (ISAC)

ISOL facility with highest primary beam intensity (100 µA, 480 MeV protons)



Select accelerated RIBs:

$^{95}Sr^{15+}$	**10^7 pps**
$^{11}Li^{+}$	$3x10^3$ pps
$^{11}Be^{+}$	10^5 pps

Selected beams (measured yields):

^{26}Al	> 10^{10} pps
$^{37,38m}K$	> 10^9 pps
$^{211\text{-}213}Fr$	> 10^9 pps
^{211}Rn	**> 10^8 pps**
^{225}Ra	**> 10^8 pps**
^{103}Rb	~ 3 pps

Programs in

- Nuclear Structure & Reactions
- Nuclear Astrophysics
- Fundamental Symmetries
- Material Science
- Nuclear Medicine

- ~3500 RIB hours / yr
- 600 users, 2/3 international, 5% from Japan
- Factor 2-2.5 oversubscribed
- ~ 2 year backlog
- Complementary capabilities to in-flight facilities like FRIB, RIBF