TRIUMF

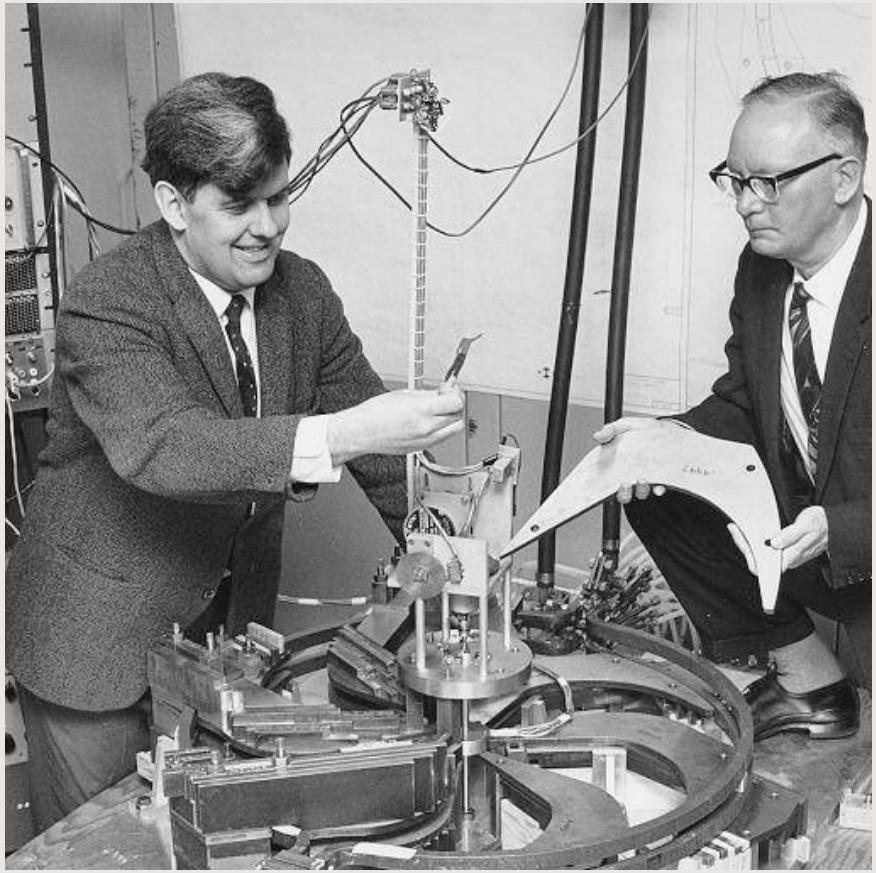
Canada's national laboratory for particle and nuclear physics
Laboratoire national canadien pour la recherche en physique nucléaire
et en physique des particules

Erich Vogt (1929-2014)

Putting TRIUMF on the World Map

Ewart Blackmore (TRIUMF)

Erich, UBC, TRIUMF and me



Co-founders of TRIUMF
Erich Vogt, John Warren
1966

E. Blackmore Timeline

- **1963 Summer student at Chalk River – met Erich Vogt**
- **1963-1967 UBC graduate student with John Warren as my supervisor using 3 MeV VdeG.**
- **1965 Erich joins UBC Physics department.**
- **1967-69 Postdoc at Rutherford Lab UK (H^- experiment).**
- **1969 Hired at TRIUMF.**
- **1974-1980 Initial cyclotron commissioning and operation.**
- **1981-1994 Erich Vogt director and I was one of the first division heads**

Electric Dissociation of H^- Ions in Magnetic Field-1968

ELECTRIC DISSOCIATION OF H^- IONS BY MAGNETIC FIELDS

G. M. STINSON, W. C. OLSEN, W. J. McDONALD and P. FORD

Department of Physics, The University of Alberta, Edmonton, Canada

D. AXEN

Department of Physics, The University of British Columbia, Vancouver, Canada

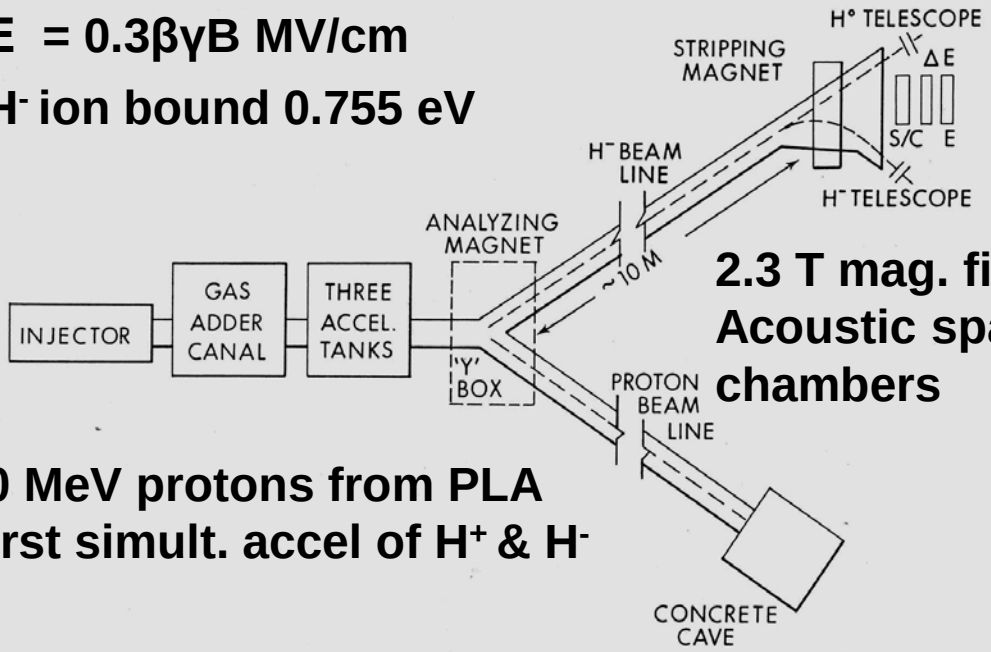
E. W. BLACKMORE

Rutherford High Energy Laboratory, Chilton, Didcot, Berkshire, England

Received 21 May 1969

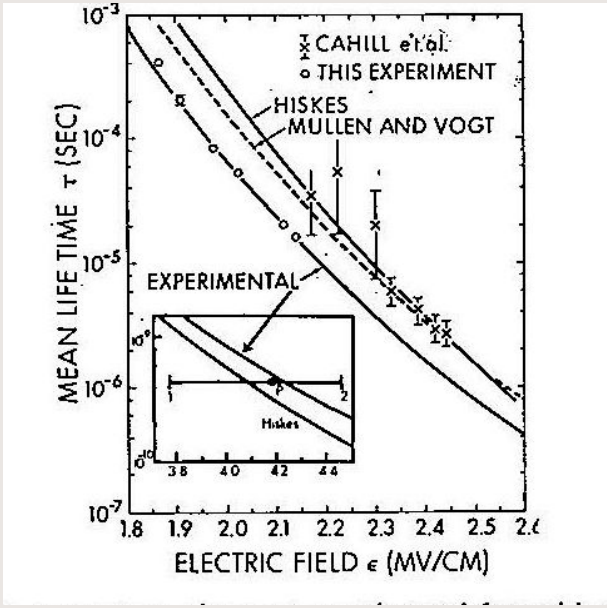
E = 0.3βγB MV/cm

H^- ion bound 0.755 eV



2.3 T mag. field
Acoustic spark chambers

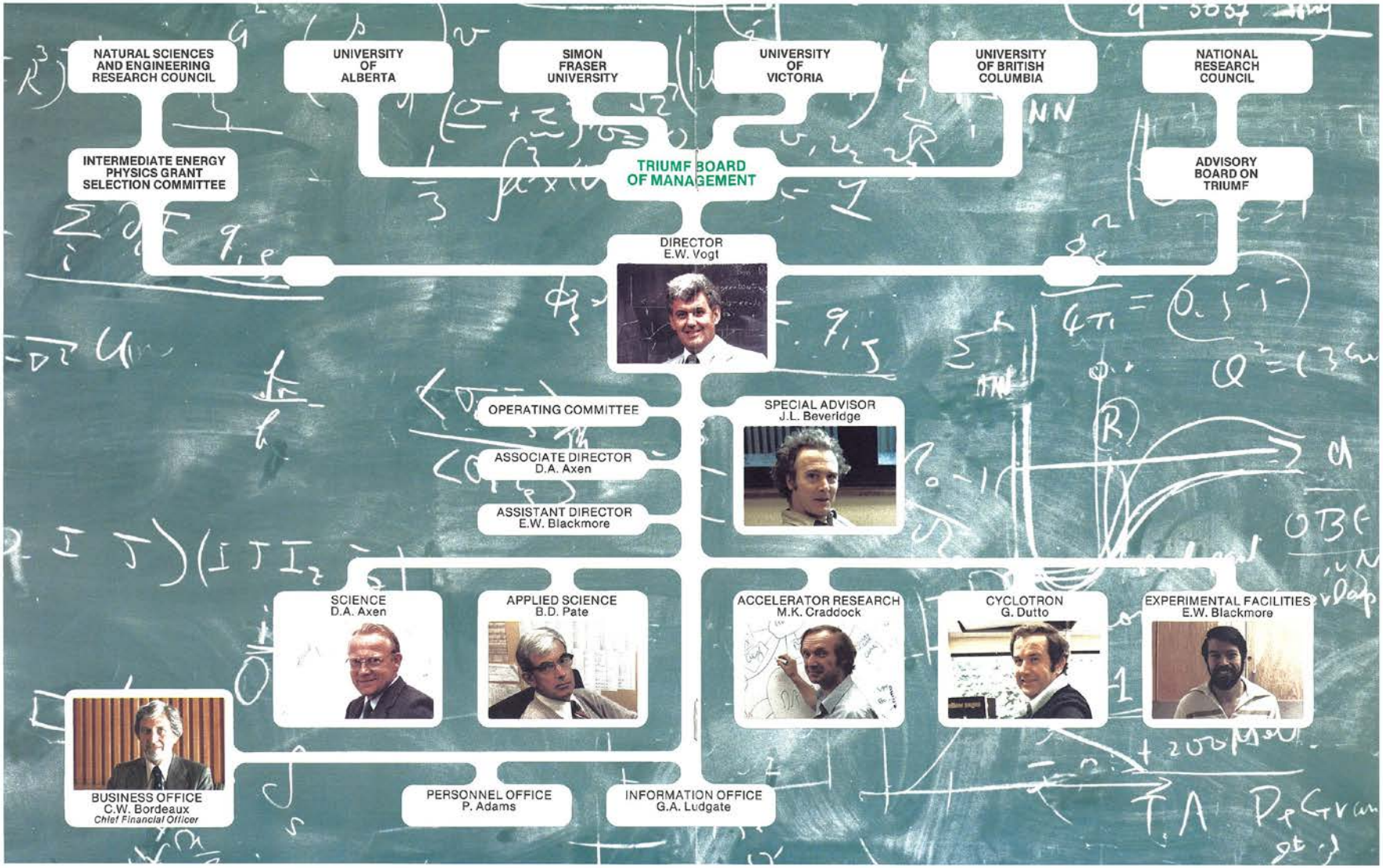
50 MeV protons from PLA
First simult. accel of H^+ & H^-



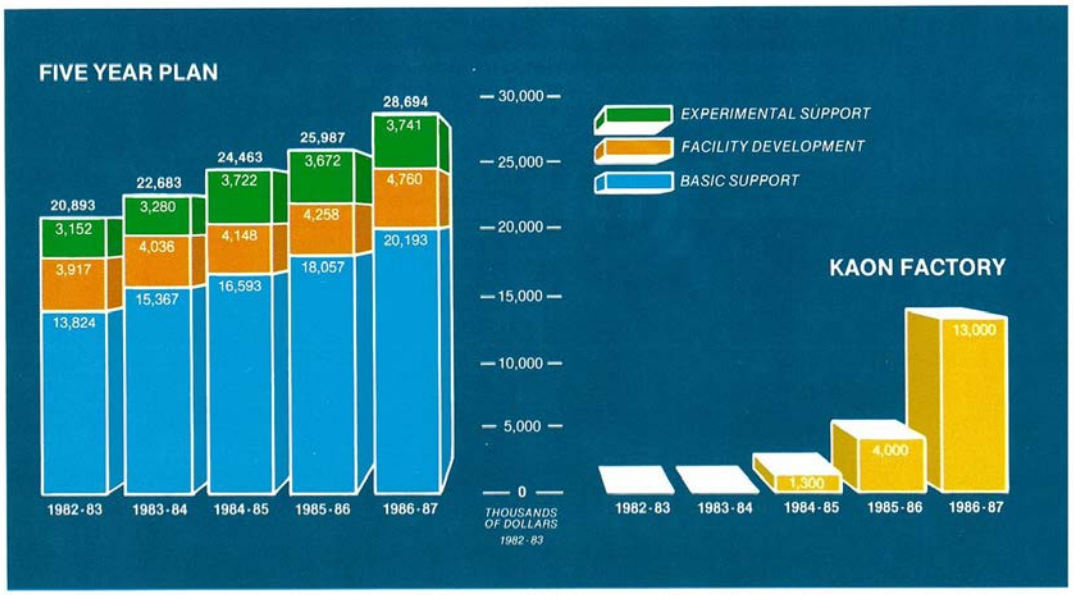
Consequences

- **increase in cyclotron by 4%**
- **20 scale model → 20.8 model**
- **peak field 5.76 kG**
- **confirmed in 1976 with TRIUMF beam**

Erich Vogt TRIUMF Director 1981-1994



Erich Vogt – TRIUMF 5 Year Plans



TRIUMF 5 YEAR PLAN
(Thousands of 1982-83 dollars)

	1982-83	1983-84	1984-85	1985-86	1986-87
Basic Support	13,824	15,367	16,593	18,057	20,193
Facility Development (excl. Kaon Factory)	3,917	4,036	4,148	4,258	4,760
Experimental Support	3,152	3,280	3,722	3,672	3,741
Subtotal	20,893	22,683	24,463	25,987	28,694
Kaon Factory	—	—	1,300	4,000	13,000
Total	20,893	22,683	25,763	29,987	41,694

15

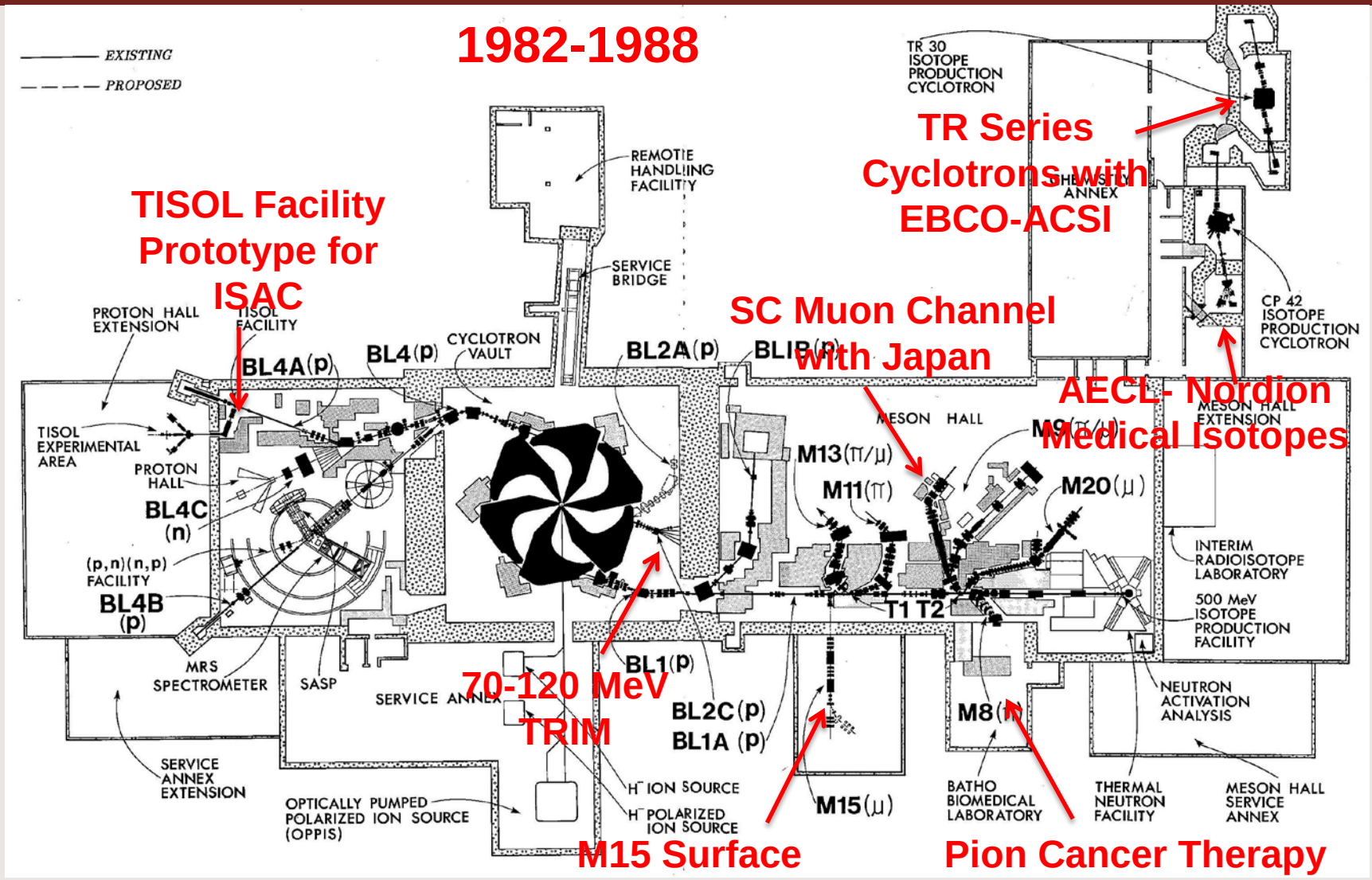
NRC Funding based on ``Rolling 5 Year Plan``

1982-1987

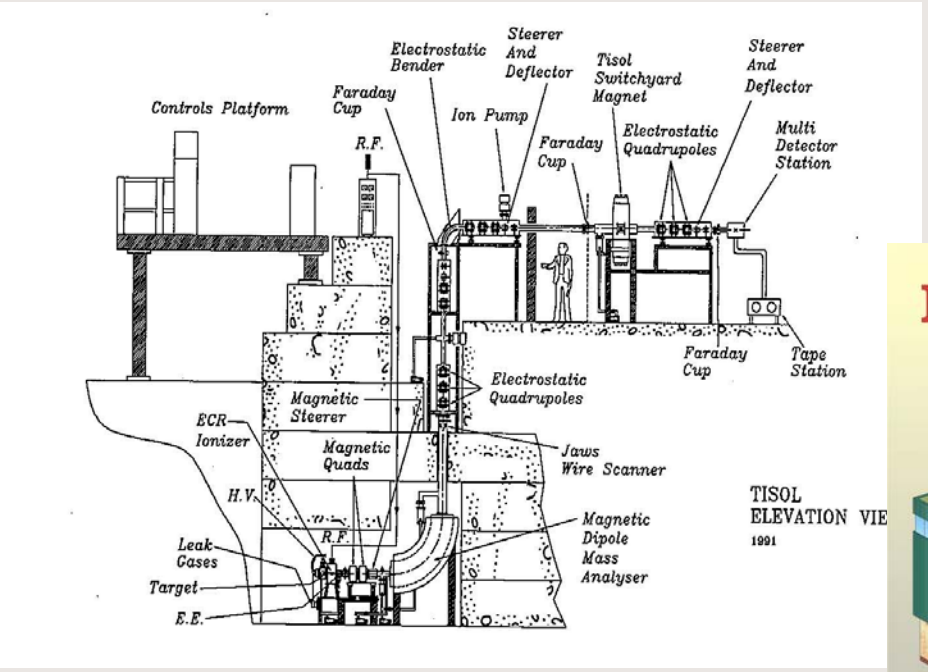
Request in1982
$20.89 to $28.69 M$

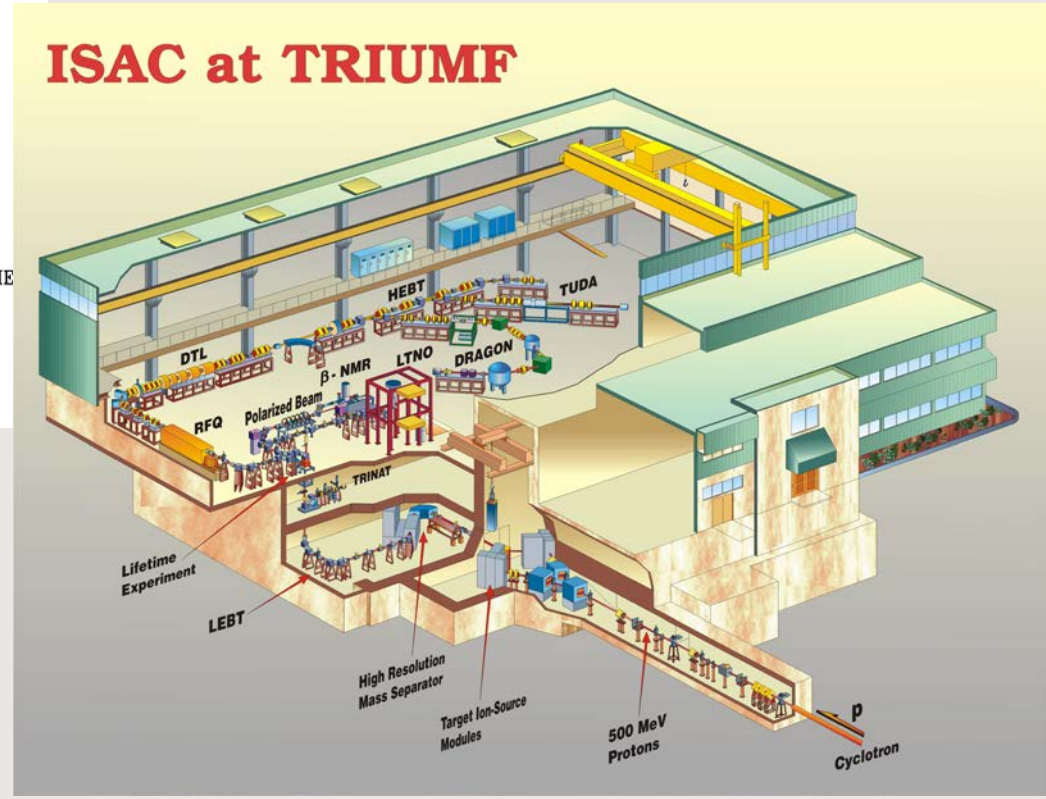
Actual 1987
$20.89 to $26.10 M$

Expanding TRIUMF Facilities, Tech Transfer & Science



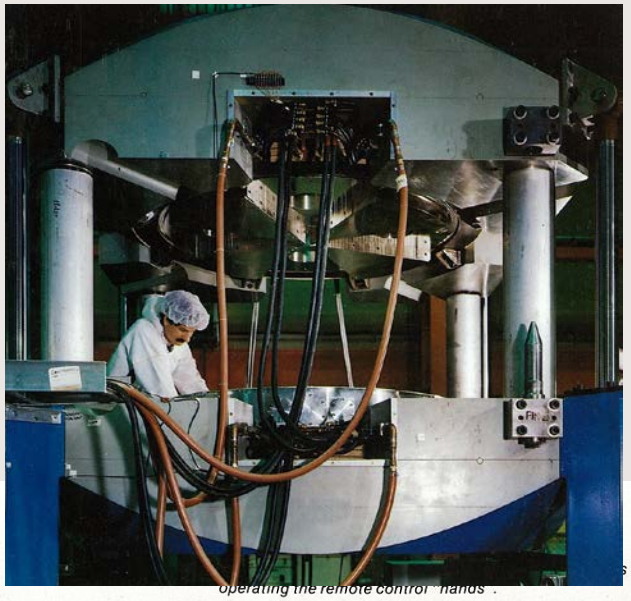
TISOL leads to ISAC





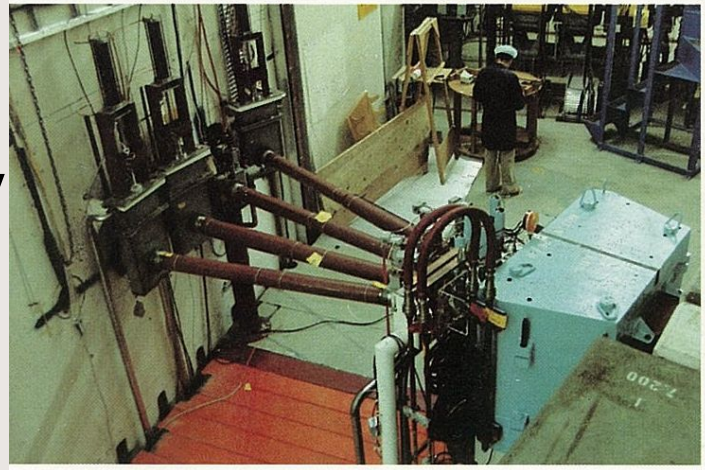
Isotope Production for Research and Commercial

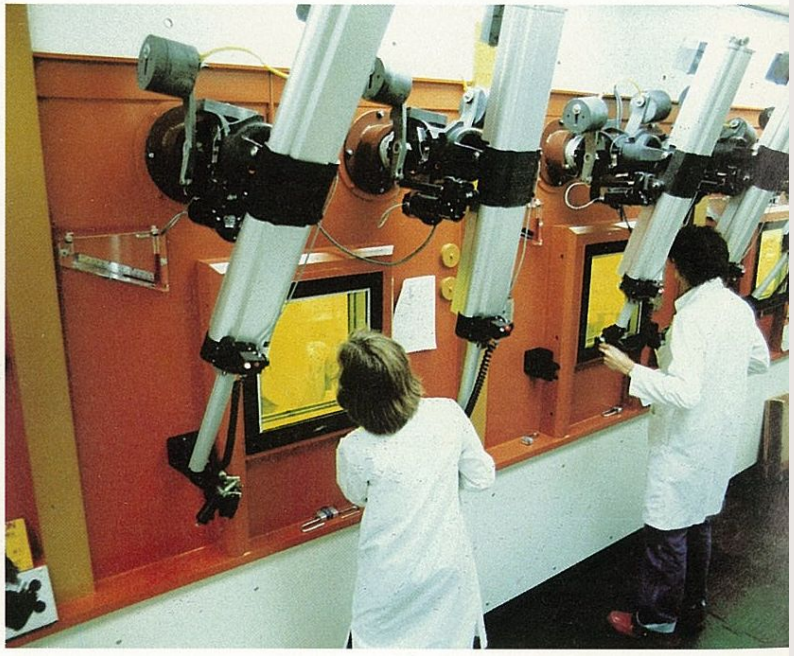
TR30 Cyclotron 1989 by EBCO-ACSI



Collaboration with AECL Commercial Products now Nordion for Cyclotron produced Isotopes CP-42 cyclotron 1982

BL2C 70-120 MeV Sr-82



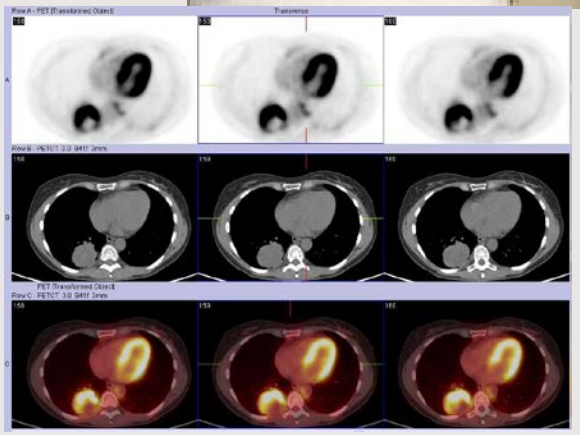


Positron Emission Tomography

PET Program
Positron Emission Tomography

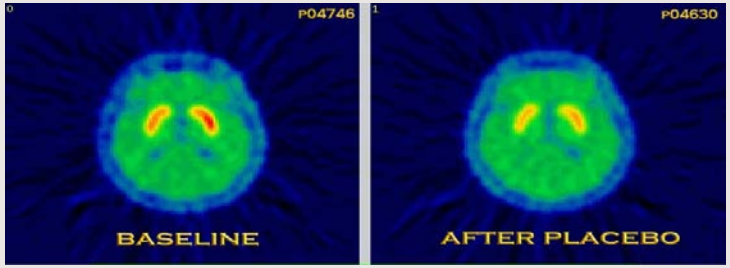
Isotopes C-11, F-18 (FDG)

UBC PET Scanner



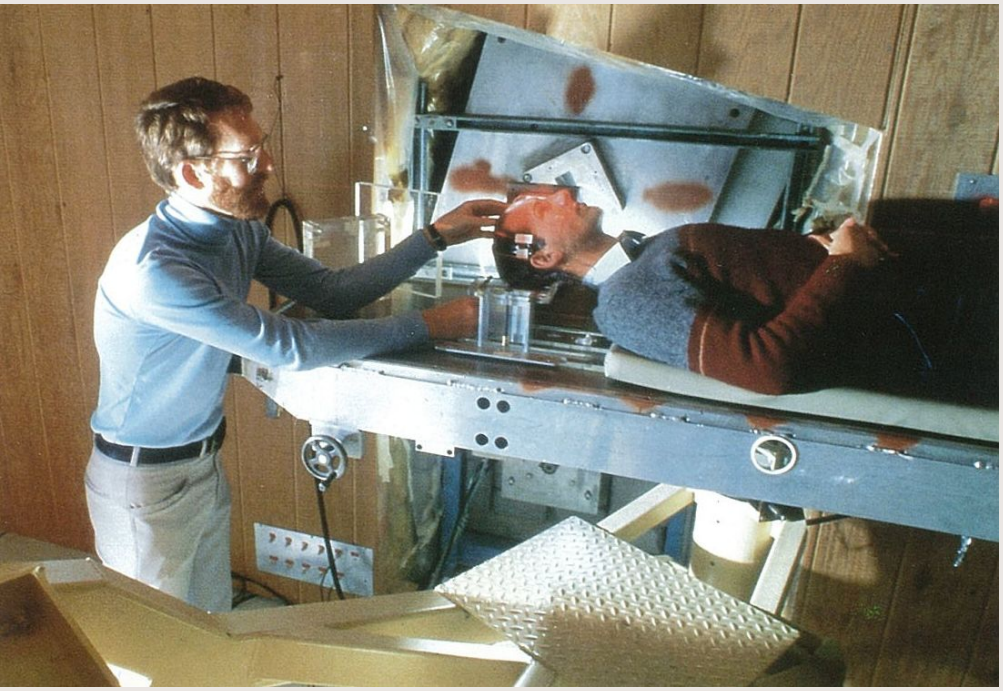
TR13 Cyclotron

Inside TR13



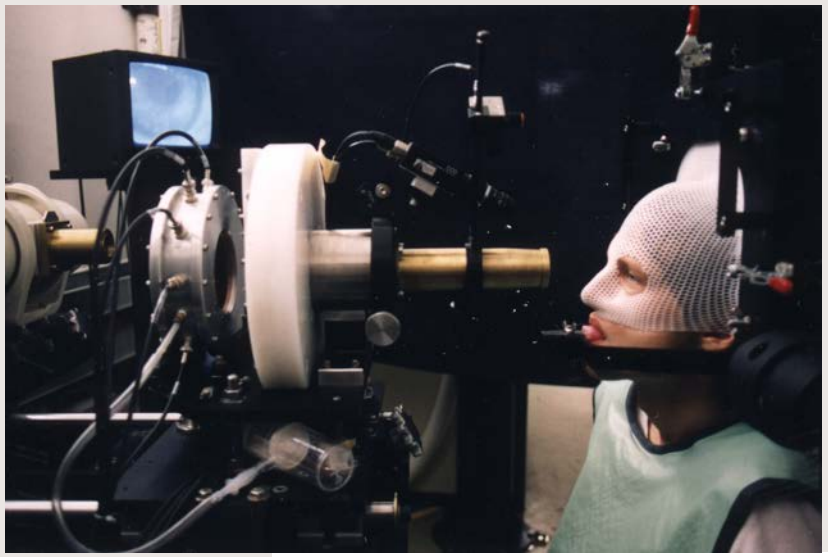
Pacific Parkinsons Research Centre

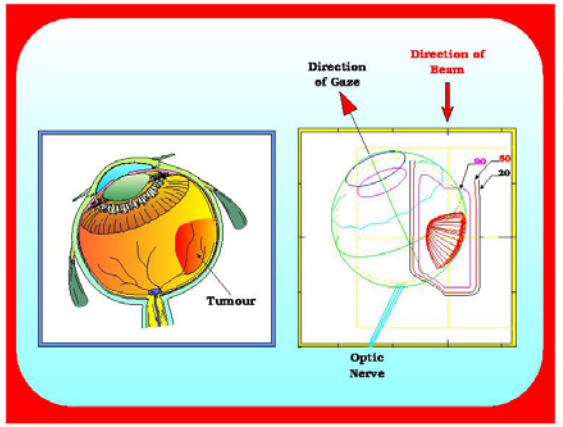
Pion Therapy leads to Proton Therapy



Pion Therapy 1982-1994
Scanned beam and patient
Brain & Prostate Cancers

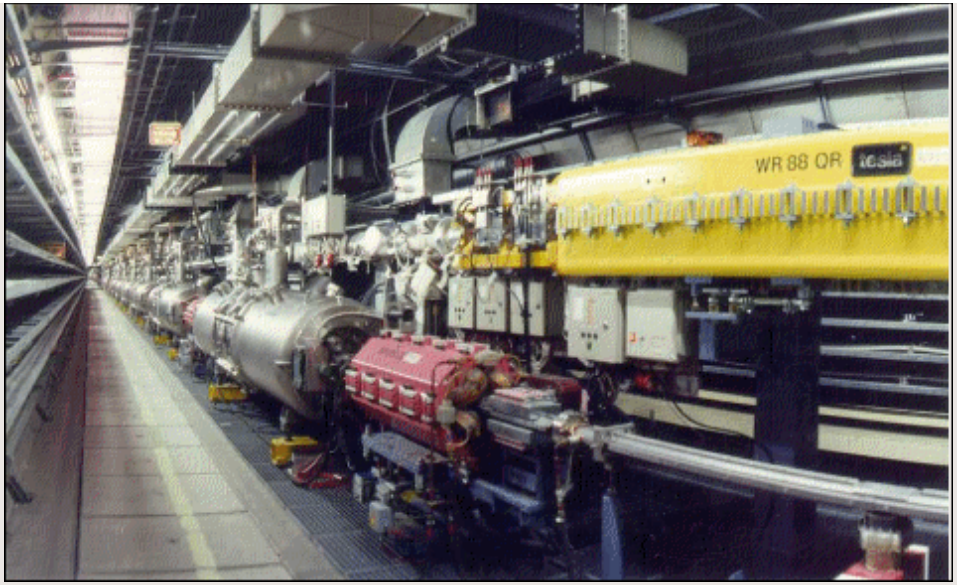
Proton Therapy 1995-present
Ocular Melanoma





BC Cancer Agency
600 West 10th Avenue
Vancouver, BC Canada
V5Z 4E6

HERA electron-proton collider at DESY



DESY Director: Volker Soergel (1981-1993)

HERA Project Leader: Bjorn Wiik

Canadian Experiments ZEUS, HERMES

Timeline Accelerator 1981-1991 Experiments 1992-2007

International Accelerator Contributions

January 1985

Professor D.G. Stairs
Physics Department
McGill University
Montreal, Quebec
H3A 2T8

IPP Initiative Funded by NSERC for HERA Accelerator Contributions

Dear Professor Stairs:

Attached is the requested proposal from TRIUMF to participate in the construction of a beam transfer line for HERA. It has been prepared by Dr. Ewart Blackmore and his colleagues and is fully supported by TRIUMF.

TRIUMF has been (and remains) very keen to participate in the Canadian contribution to HERA. The HERA Project is of great importance for the world effort in particle physics during the next decade. Canada helped significantly in getting HERA off the ground and we are proud of that. We expect that the HERA experimental program will be important for the future work and growth of Canada's own particle physics effort. This opportunity comes at a time unparalleled for its urgent new questions in subatomic physics. The work in the transfer line could give TRIUMF and its local suppliers valuable experience.

Let me also add that we believe this proposal to be very cost effective. There are none of the normal overheads. We are costing it as we would any of our own high-priority internal projects. That is a measure of how important we view our potential contribution to HERA to be.

Yours sincerely,

E.W. Vogt,
Director.

HERA 50 MeV H^- Transfer Line

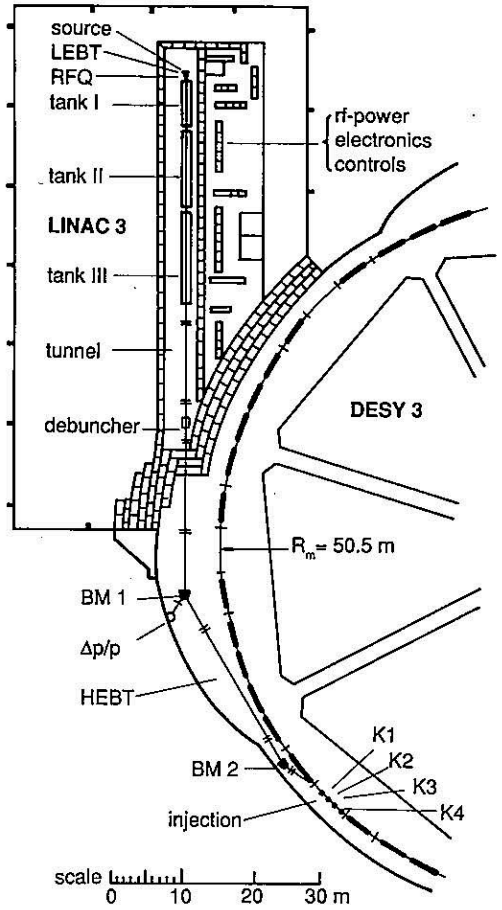


FIG. 1. Floor plan of LINAC3, HEBT, and DESY3. The short lines across the HEBT denote quadrupoles; all but one arranged in doublets. They appear as singlets also in the synchrotron lattice.

1985-1987

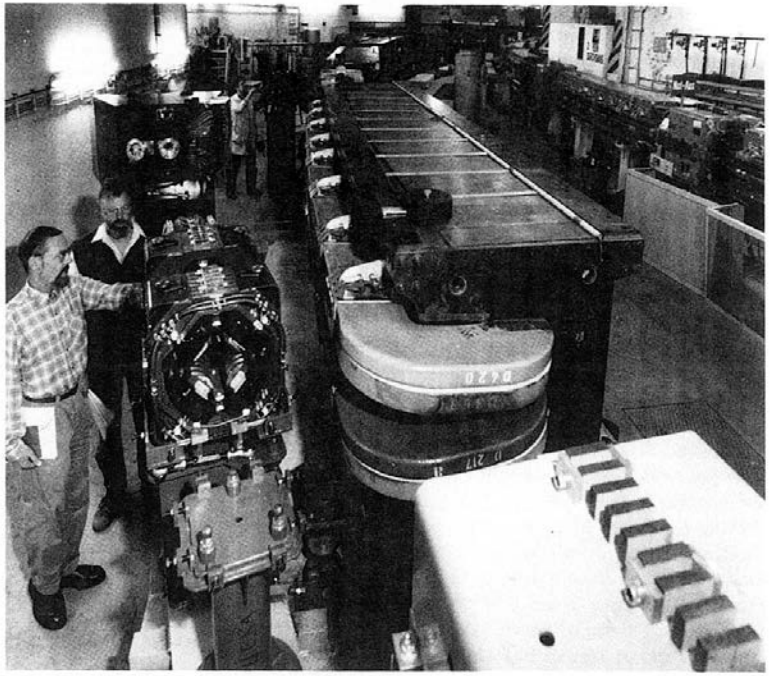
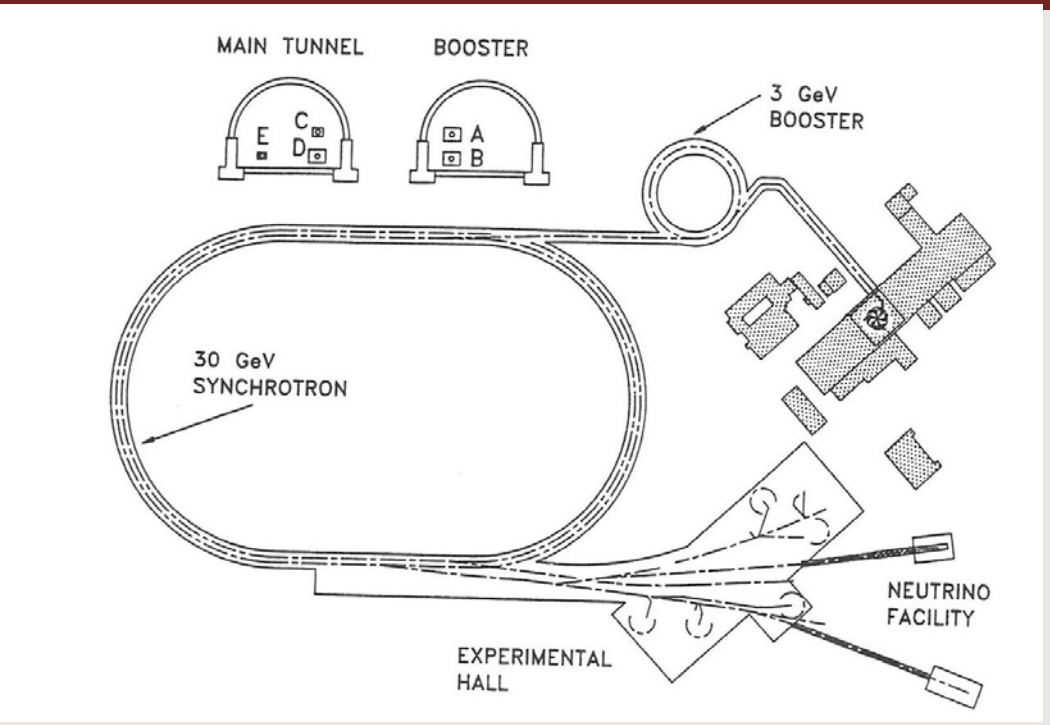


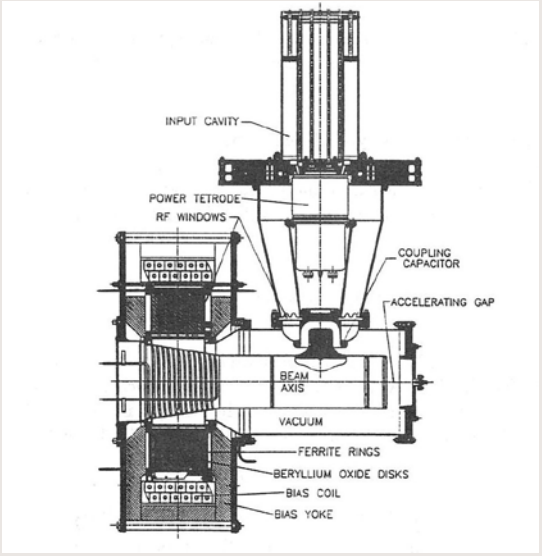
Fig. 116. Beam line equipment provided by TRIUMF being installed at DESY.

TRIUMF Contributions

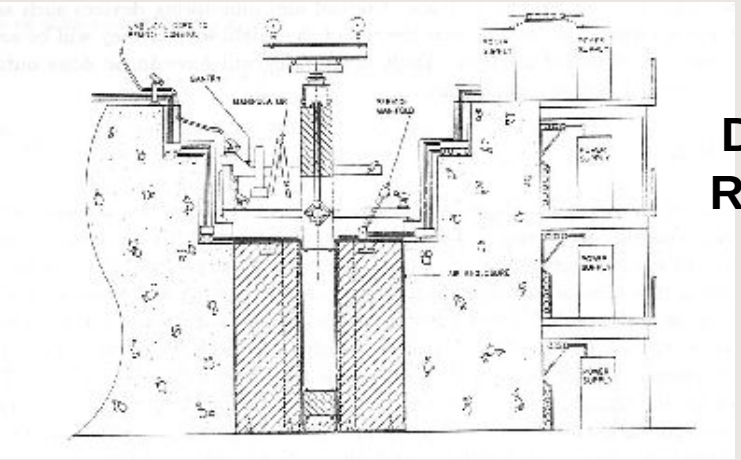
- Beam Optics design
- Quadrupole Magnets
- Double Steering Magnets
- Large Dipole Magnet
- Beam diagnostic boxes
- Used Canadian Industry

Kaon Factory Project Definiton Study - Technical

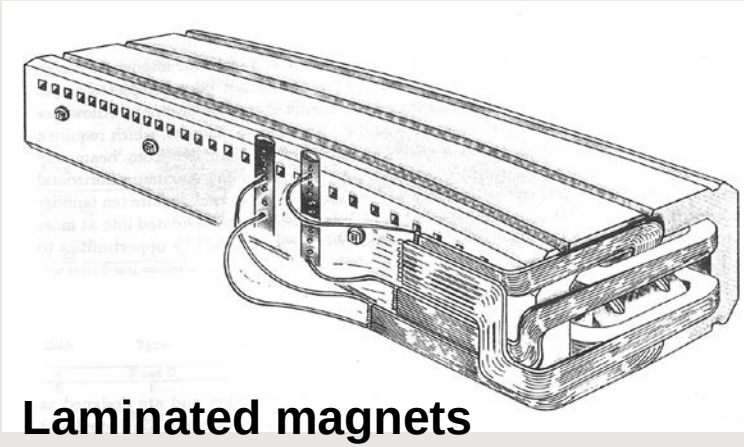




Synchrotron Radiofrequency Systems



Design of High Radiation Areas



Laminated magnets

International Use of KAON Expertise

Advanced TRIUMF`s expertise in:

- synchrotron beam dynamics – LHC, SSC
- radiofrequency systems – LHC, ISAC
- laminated magnet design – LHC
- kicker magnets – LHC, ISAC, J-PARC
- beam instrumentation – LHC, ISAC
- power converters – LHC, BNL, ISAC
- high radiation experimental areas – BNL, ISAC, J-PARC
- kaon separated beams – BNL, J-PARC
- high power targets – ISAC, J-PARC
- Canadian Industrial Capability Study – ISAC, LHC

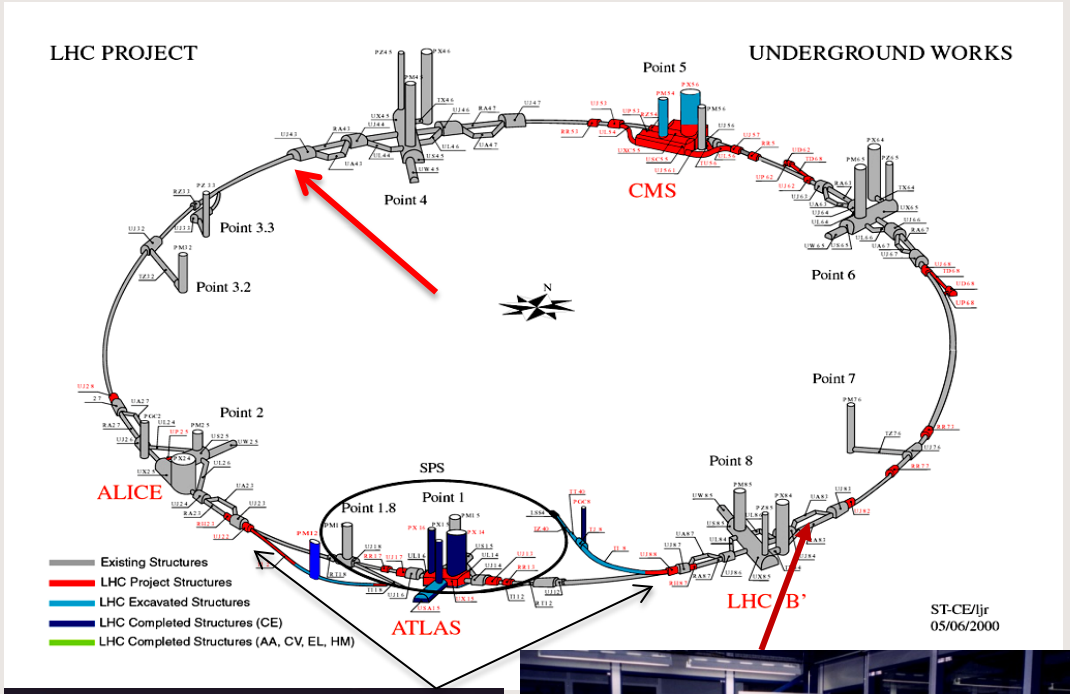
Canadian Contributions to the LHC

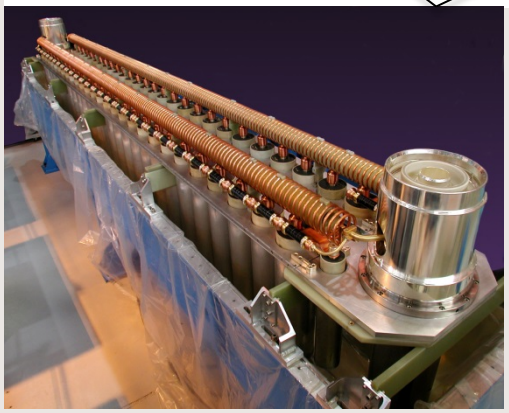
1995-2005 - $41.5M

- **PS conversion project – booster upgrade**
- **52 warm magnets – beam cleaning**
- **LHC kicker components**
- **beam instrumentation**

Equipment delivered on time

>80% Canadian industry involvement

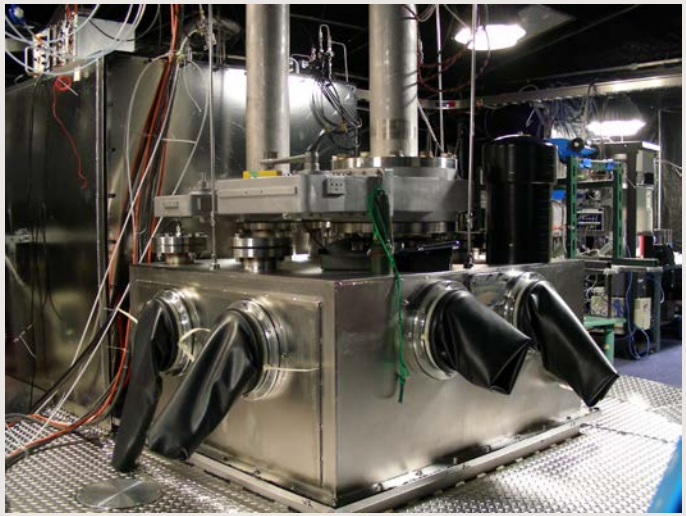




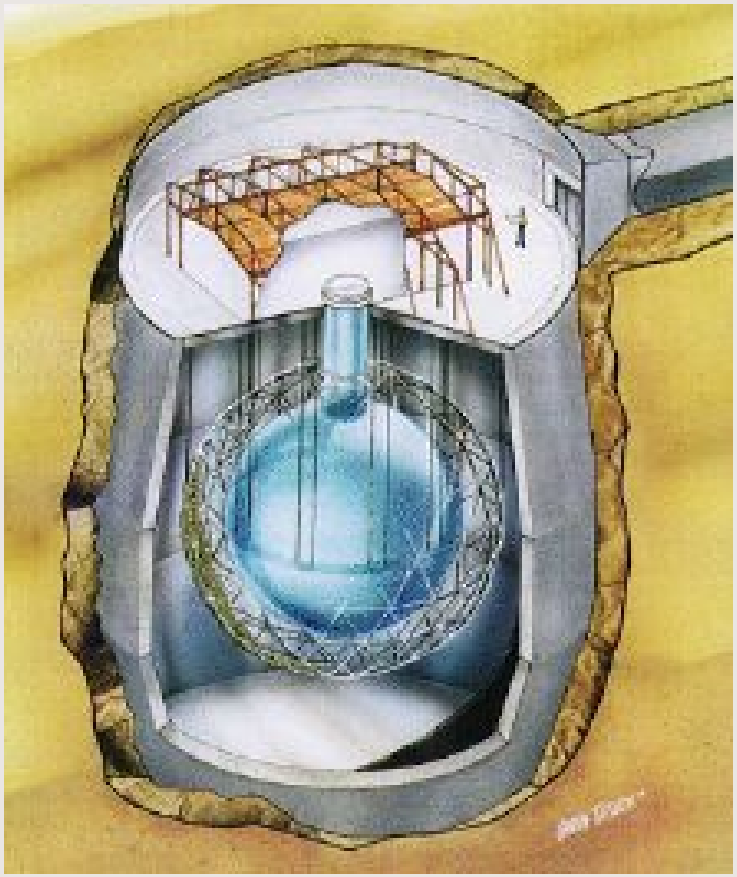
PFNs for Kickers

Twin-Aperture Quads

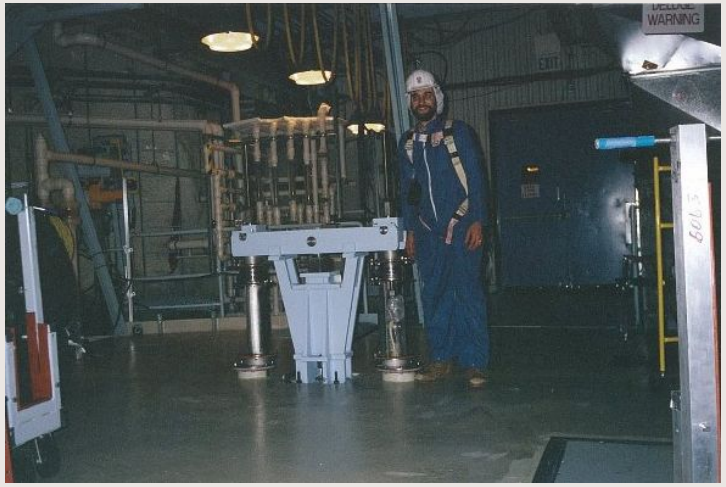
SNO Detector contributions from TRIUMF



Glove Box for source access

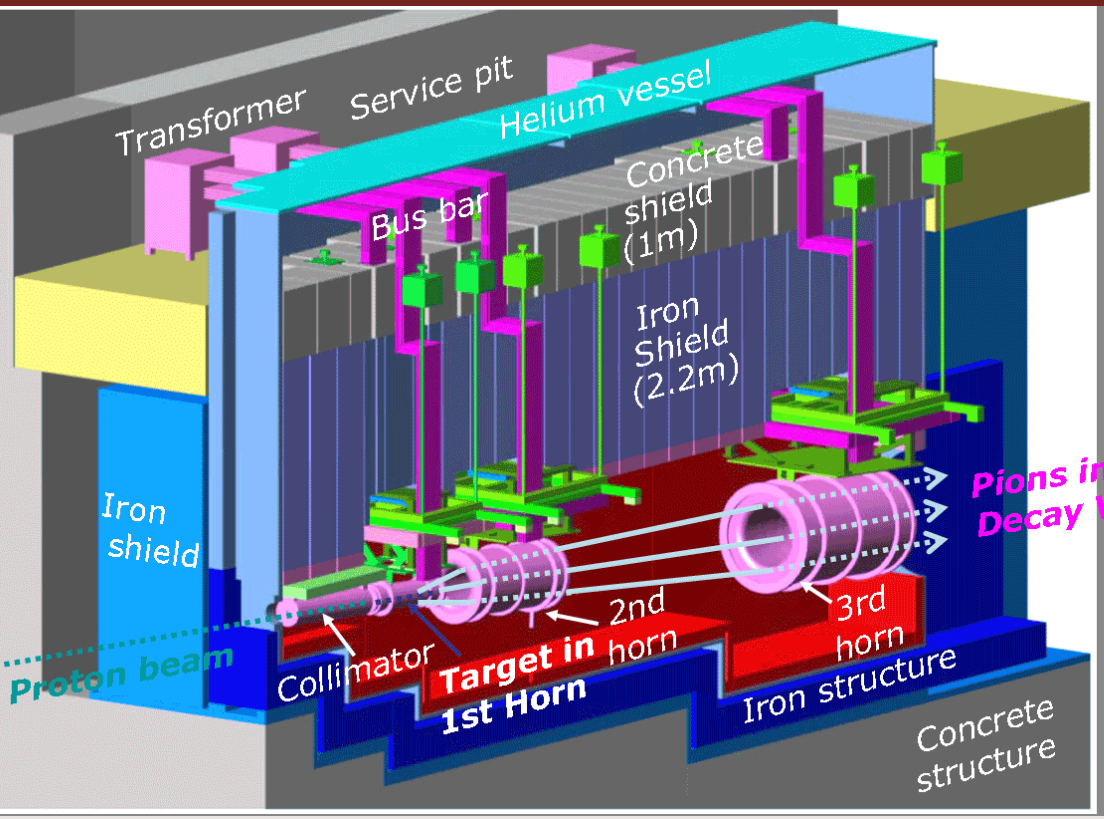


SNO Detector



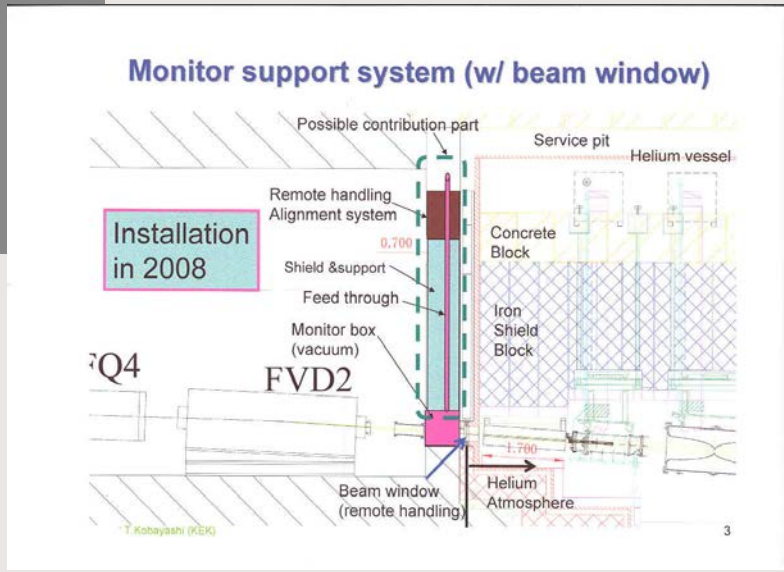
Rope Equalizers

J-PARC T2K TRIUMF Contributions



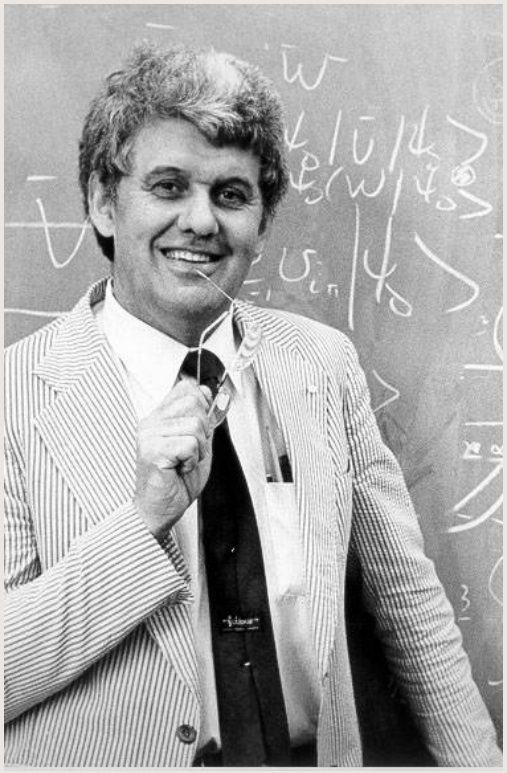
2004-2009

~ 800KS contribution



- **Neutrino target hall design for remote handling**
- **Hot cells and manipulators**
- **Beam monitor station**
- **Facility reviews**

Summary – Putting TRIUMF on the World Map



Thanks to Erich Vogt

- **TRIUMF becomes an attractive user facility for international scientists.**
- **TRIUMF becomes a base for supporting science at other international labs.**
- **TRIUMF initiates international accelerator contributions.**
- **TRIUMF broadens its program into material sciences, medical isotopes, technology transfer.**

Erich's Xmas Cake

TRIUMF

Canada's national laboratory for particle and nuclear physics
Laboratoire national canadien pour la recherche en physique nucléaire
et en physique des particules

Thank you!
Merci

TRIUMF: Alberta | British Columbia | Calgary | Carleton | Guelph | Manitoba | McGill | McMaster | Montréal | Northern British Columbia | Queen's | Regina | Saint Mary's | Simon Fraser | Toronto | Victoria | Winnipeg | York

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