

TRIUMF



ANNUAL REPORT SCIENTIFIC ACTIVITIES 1998

CANADA'S NATIONAL MESON FACILITY
OPERATED AS A JOINT VENTURE BY:

MEMBERS:

UNIVERSITY OF ALBERTA
SIMON FRASER UNIVERSITY
UNIVERSITY OF VICTORIA
UNIVERSITY OF BRITISH COLUMBIA

ASSOCIATE MEMBERS:

UNIVERSITY OF MANITOBA
UNIVERSITÉ DE MONTRÉAL
UNIVERSITY OF TORONTO
UNIVERSITY OF REGINA
CARLETON UNIVERSITY
QUEEN'S UNIVERSITY

UNDER A CONTRIBUTION FROM THE
NATIONAL RESEARCH COUNCIL OF CANADA

APRIL 1999

TRIUMF

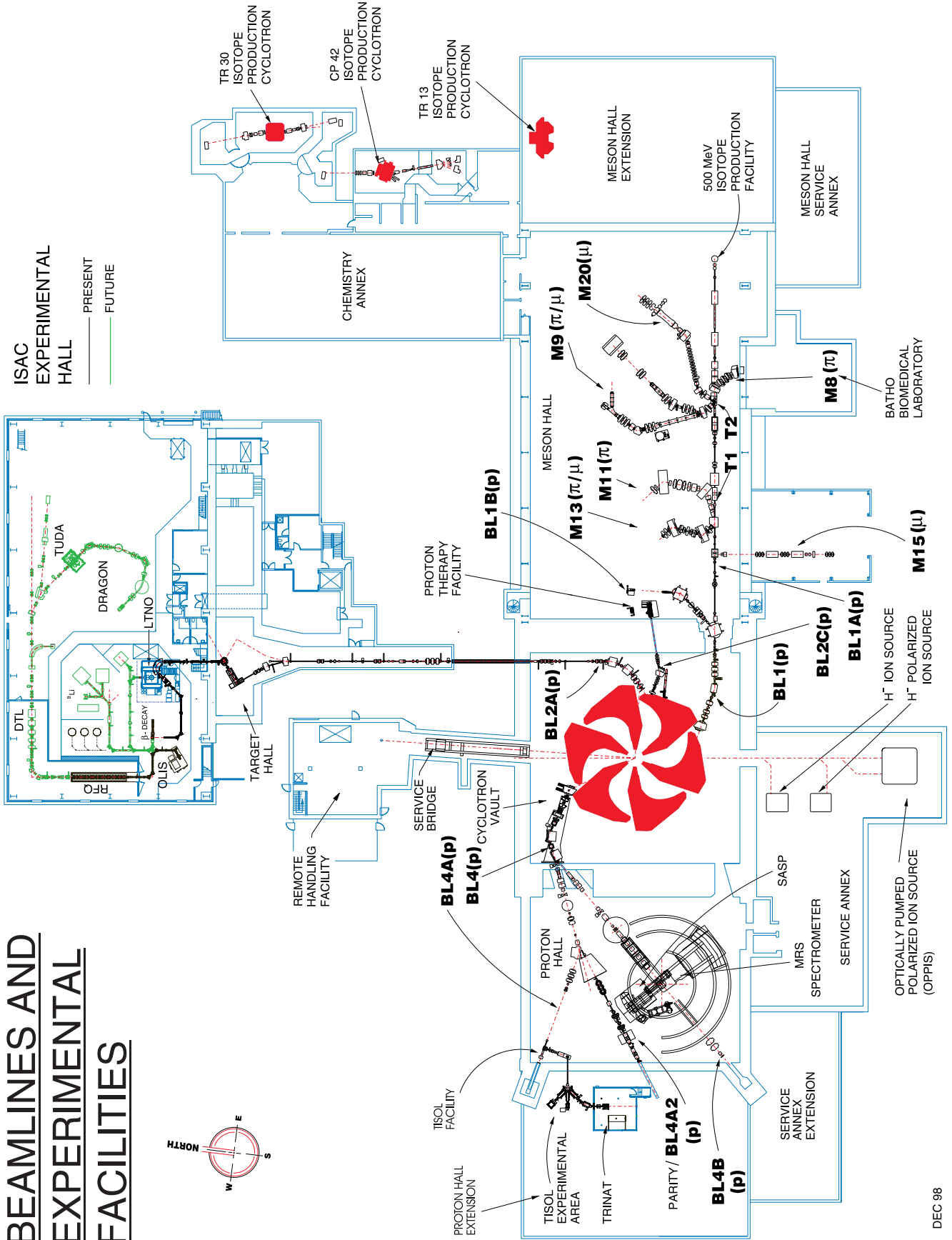
ANNUAL REPORT SCIENTIFIC ACTIVITIES 1998

Postal Address:

TRIUMF
Publications Office
4004 Wesbrook Mall
Vancouver, B.C.
Canada
V6T 2A3

<http://www.triumf.ca/annrep>

BEAMLINES AND EXPERIMENTAL FACILITIES



The contributions on individual experiments in this report are outlines intended to demonstrate the extent of scientific activity at TRIUMF during the past year. The outlines are not publications and often contain preliminary results not intended, or not yet ready, for publication. Material from these reports should not be reproduced or quoted without permission from the authors.

FOREWORD

The year 1998 was one of outstanding achievement for TRIUMF and the laboratory fully met its goals across a broad front.

On November 30, ISAC delivered its first radioactive beam. The target set for the ISAC project was to achieve a low energy beam before the end of 1998. The isotope $^{38\text{m}}\text{K}$ was detected at the TRINAT beam stop in the early evening of the last day of November. This was a superb effort for all concerned, and accolades showered onto TRIUMF as news of the event reached the world's laboratories.

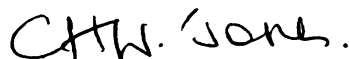
TRIUMF's "in kind" contribution to the Large Hadron Collider (LHC) project at CERN has provided Canada with a seat "on the stage" in what is truly a global scientific endeavour. High quality, high-tech equipment has been provided on time, mostly from within Canadian industry, and TRIUMF has emerged as a highly valued collaborator in accelerator physics.

Through the year, TRIUMF made good progress towards becoming a truly national laboratory for nuclear and particle physics in Canada. Both Carleton University and Queen's University were admitted as associate members, joining Regina, Manitoba, Toronto, and Montreal. In addition, terms have been agreed to for the admission of Carleton as a full member of TRIUMF beyond April, 2000.

The culmination of the year in many senses was the review of TRIUMF's past program and future plans by a NRC-appointed, international peer-evaluation committee. The review provided a very strong endorsement of TRIUMF's progress to date and the plans for 2000-2005. This applied to all areas of TRIUMF's program including nuclear and particle physics, condensed matter studies and the life sciences program. Of particular note, the review committee was also full of praise for TRIUMF's technology transfer activities, pointing out the very considerable economic benefits which flow to Canada from a basic research facility.

This record of achievement, coupled with the very strong peer-evaluation conducted by the NRC, has positioned TRIUMF exceptionally well to make the case for funding for the full program beyond 2000. Soon these efforts will be in the political arena, where unfortunately nothing is certain. However, the excellent peer review will allow a very strong case to be made at the political level.

The staff of TRIUMF can look back with pride on 1998. The hard work and dedication have paid off, and TRIUMF has achieved excellent visibility across Canada and internationally. I know I speak for all the members of the Board of Management when I say to all of the staff, "Well done — this was a great year!"



C.H.W. Jones
Chair, Board of Management

TRIUMF was established in 1968 as a laboratory operated and to be used jointly by the University of Alberta, Simon Fraser University, the University of Victoria and the University of British Columbia. The initial consortium has been expanded to include the University of Manitoba, the Université de Montréal, the University of Toronto, the University of Regina, Carleton University and Queen's University as associate members. The facility is also open to other Canadian as well as foreign users.

The experimental program is based on a cyclotron which is capable of producing four simultaneous beams of protons, two of which are individually variable in energy from 180–520 MeV, the third from 472–510 MeV, and the fourth between 70 and 110 MeV. The potential for high beam currents – 100 μA at 500 MeV to 300 μA at 400 MeV – qualified this machine as a ‘meson factory’.

Fields of research include basic science, such as particle and nuclear physics and condensed matter research, as well as life sciences based primarily on isotope research. There are also biomedical research facilities which used π mesons and now use protons in cancer research and treatment.

The ground for the main facility, located on the UBC campus, was broken in 1970. Assembly of the cyclotron started in 1971. The machine produced its first full-energy beam in 1974 and its full current in 1977.

The laboratory employs approximately 325 staff at the main site in Vancouver and 19 based at the participating universities. The number of university scientists, graduate students and support staff associated with the present scientific program is about 625.