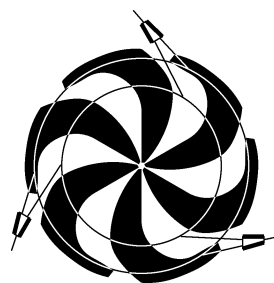


# TRIUMF



## ANNUAL REPORT SCIENTIFIC ACTIVITIES 2005

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**CANADA'S NATIONAL LABORATORY  
FOR PARTICLE AND NUCLEAR PHYSICS**

OPERATED AS A JOINT VENTURE

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UNDER A CONTRIBUTION FROM THE  
NATIONAL RESEARCH COUNCIL OF CANADA

DECEMBER 2006

*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.*

## CONFERENCES, WORKSHOPS AND MEETINGS

### CAP05 CONGRESS AND THE WORLD YEAR OF PHYSICS

The 2005 Canadian Association of Physicists annual congress was held at the Woodward IRC Centre at UBC, jointly organized by TRIUMF and the UBC physics department.

581 attendees enjoyed a wide range of presentations in as many as 65 parallel sessions and 12 plenary sessions. The congress was preceded by a two day symposium on theoretical physics, and a one day workshop for high school physics teachers.

The World Year of Physics was celebrated with a special event at the Chan Centre at UBC where about 1000 guests were treated to a concert by the Borealis Quartet which performed the world premiere of a composition by A. Hryciw, a Ph.D. physics student of the University of Alberta, and to a lecture on the legacy of Einstein by Prof. Clifford Wills (Washington University, St. Louis) entitled "Was Einstein Right?".

Also in the context of the World Year of Physics, TRIUMF (and the UBC physics department) held an open house for the general public on Saturday, June 4 which attracted close to 1000 visitors for a tour of TRIUMF's facilities.

The great success of these events was made possible by the strong participation of TRIUMF staff and students.

### TRIUMF SUMMER INSTITUTE

The TRIUMF Summer Institute (TSI) has a long standing tradition and has, over the years, attracted many students from Canada and around the world to lectures on a wide variety of topics, all in direct relation to forefront physics pursued at TRIUMF. The 2005 TSI, the 17th in the series, took place at TRIUMF July 11–22 and attracted 46 students. It was entitled Atom and Ion Traps: Techniques and Applications. The Institute is structured with formal lectures in the morning and a tutorial session in the afternoon, where open discussions were encouraged. The presence of various lecturers during these open sessions made for interesting discussions and allowed the students to tackle a broad variety of questions from different viewpoints, both experimental and theoretical. The Institute is recognized by many universities as a formal course and students used this opportunity to arrange for credit, which is given based on homework. In addition to the formal part, three excursions were organized, including an ocean kayak trip.

A poster session was held where the participants presented their research to fellow students and lecturers. The posters were judged by the lecturers and prizes

(donated by American Magnetics) were awarded at the Institute dinner held at the Vancouver Aquarium. The winners were P. Schury (MSU/NSCL), M. Brodeur (UBC/TRIUMF) and W. Trimble (U. Washington).

The lecturers and topics this year were:

- J. Behr (TRIUMF) Atom Traps for Weak Interaction Studies
- G. Bollen (Michigan State U., USA) Applications of Ion Traps in Nuclear Physics
- J. Crespo (MPI Heidelberg, Germany) Electron Beam Ion Traps
- M. Fujiwara (TRIUMF) Traps for Anti-Hydrogen
- G. Gwinner (U. Manitoba) Very Large Ion Traps: Storage Rings
- B. King (McMaster U.) Quantum Computing with Ion Traps
- H. Metcalf (Stony Brook U., USA) Fundamentals of Atom Traps
- D. Steck (U. Oregon, USA) Quantum Chaos and Quantum Transport
- M. Weidemller (U. Freiburg, Germany) Applications of Atom Traps
- G. Werth (U. Mainz, Germany) Fundamentals of Ion Traps

The organizing committee was chaired by Jens Dilling and included Byron Jennings, Kirk Madison (UBC) and Matthew Pearson.

### TRIUMF USERS' GROUP ANNUAL GENERAL MEETING

The 2005 TRIUMF Users' Group Annual General Meeting was held in the TRIUMF auditorium on Wednesday, December 7 in the midst of a week of important meetings. The Subatomic EEC had been held the previous Thursday to Saturday, followed by the NSERC Subatomic Physics Long Range Plan Town Hall Meeting in Montreal Monday and Tuesday, and the Molecular and Materials Science EEC followed on Thursday and Friday. The meeting had 55 registrants and several Users who were unable to travel to TRIUMF watched the live video stream on the Web. The video files are archived on <http://video.triumf.ca/cgi-bin/archive/TUGdec05>.

The meeting began with the traditional set of talks by the Director and Division Heads reporting on the state of the laboratory and reorganization, the science highlights and future beam schedule, and the cyclotron status and plans for future refurbishing and upgrades. The latter was a farewell talk by Roger Poirier prior to his retirement and the Users acknowledged his many

contributions to TRIUMF over his career. Paul Schmor reported on the status of the ISAC-I and ISAC-II accelerators, and alluded to possible delays in ISAC-II experimental programs due to licensing issues.

Jens Dilling led a discussion on actinide target support, a topic of great interest to many ISAC users with several high-priority experiments awaiting its development and construction. A physicist was about to be hired to lead the effort, and a workshop was being planned for spring 2006.

Jens Dilling reported on the NSERC Subatomic Physics Long Range Plan Town Hall Meeting in Montreal, which had finished the previous evening, where TRIUMF experimental programs and support for off-shore experiments were emphasized and well represented.

After lunch, there were two status reports followed by two talks presented by Matthew Pearson and Blair Jamieson highlighting recent TRIUMF results.

Under TUEC business, Jens Dilling reported that the TRIUMF Users' Group by-laws had been amended early in the year following a ballot where members almost unanimously approved the addition of Subsection (d) to Article V, Section 3. This specifies the procedures to be followed in the event of a tie in the vote for chair elect, or in the vote for the two representative positions. The by-laws can be seen at <http://www.triumf.ca/tug/usersbylaws.html>. TUEC's efforts during the year providing input to the NSERC Subatomic Physics Long Range Plan were outlined. Finally, the results of the election for the vacant 2006 TUEC positions were announced. By acclamation, U. Greife (Colorado School of Mines) was elected as chair elect for 2006. R. McPherson (U. Victoria/IPP) and J.J. Ressler (SFU) were elected as members for 2006/2007.

TUEC nominates two members to represent the Users on the TRIUMF Operating Committee. In April 2005, L. Lee (U. Manitoba) moved from being the on-site alternate to member, replacing S. Yen (TRIUMF), and J. Dilling (TRIUMF) became the on-site alternate, while J.E. Sonier (SFU) moved from being the off-site alternate to member, replacing G.M. Luke (McMaster U.), and W.A. MacFarlane (UBC) became the off-site alternate.

The meeting ended with an agreement that a two

day Users' Group Meeting would be held in late July 2006, following the EEC meetings, in order to highlight and discuss the various TRIUMF programs. This was in recognition of the fact that the AGM often conflicts with the commitments of members at academic institutions. These members also tend to be at TRIUMF during the summer to conduct their research. The meeting would serve as a starting point for the formulation of the next five year plan.

Welcome	Jens Dilling
State of the Laboratory and Reorganization	Alan Shotter
Science Division Report	Jean-Michel Poutissou
Cyclotron Status	Roger Poirier
ISAC Report	Paul Schmor
Actinide Target Support	Jens Dilling
Report on NSERC SAP LRP Montreal Town Hall Meeting	Jens Dilling
Status Report and Future Plans on High Performance Computing and Collaborative Tools in Canada	Renée Poutissou
TRIUMF Library	Lothar Buchmann
Determination of the $^{11}\text{Li}$ Nuclear Charge Radius	Matthew Pearson
First TWIST Measurement of the Muon Decay Asymmetry Parameter	Blair Jamieson
TUEC Business	Jens Dilling

#### TUEC Membership for 2005

J. Dilling	TRIUMF	<i>Chair</i>
P.E. Garrett	U. Guelph	<i>Chair Elect</i>
J.E. Sonier	SFU	<i>Past Chair</i>
P. Bricault	TRIUMF	2004/2005
A. Laird	U. York, UK	2004/2005
G. Gwinner	U. Manitoba	2005/2006
M. Nozar	TRIUMF	2005/2006
F. Sarazin	Colorado School of Mines	2005/2006
M. Comyn	TRIUMF	<i>Liaison Officer</i>