TRIUMF

ANNUAL REPORT
SCIENTIFIC ACTIVITIES
2003

ISSN 1492-417X

CANADA'S NATIONAL LABORATORY
FOR PARTICLE AND NUCLEAR PHYSICS

OPERATED AS A JOINT VENTURE

MEMBERS:

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

ASSOCIATE MEMBERS:

THE UNIVERSITY OF GUELPH
THE UNIVERSITY OF MANITOBA
McMASTER UNIVERSITY
L'UNIVERSITÉ DE MONTRÉAL
QUEEN'S UNIVERSITY
THE UNIVERSITY OF REGINA
THE UNIVERSITY OF TORONTO

UNDER A CONTRIBUTION FROM THE
NATIONAL RESEARCH COUNCIL OF CANADA

DECEMBER 2004

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.

WESTERN REGIONAL NUCLEAR AND PARTICLE PHYSICS CONFERENCE

The 2003 Western Regional Nuclear and Particle Physics Conference (WRNPPC) was organized this year by the University of Northern British Columbia on February 14–16 at the Fairmont Chateau Lake Louise in Lake Louise, Alberta. This was the 40th WRNPPC, and the 20th to be held at the Chateau. As before, the conference provided a friendly setting for scientists and graduate students to present their work in nuclear and particle physics, and a forum where a significant portion of the Canadian subatomic physics program was covered by a number of invited speakers who are leading researchers in their respective fields. The talks presented were quite varied and covered topics ranging from low-energy nuclear physics and astrophysics, to intermediate energy hadronic, electromagnetic and electroweak physics, to high energy particle physics, as well as non-accelerator based neutrino physics. The attendance of the conference was quite respectable (47 participants) as was the active participation of graduate students (22). Twenty one institutions were represented, including 9 western Canadian, 6 eastern Canadian, 5 US, and one European.

Highlights of the conference included reports on first or new results from ISAC-I (DRAGON experiments), TRIUMF (TWIST and CSB-E704), Jefferson Lab (nucleon form factors), BaBar (CP violation), and SNO (solar neutrinos). Progress or review talks were also given on ATLAS-LHC, the next linear collider, final results from LEP-II, the new Higgs facility, the parity violation program at Jefferson Lab, and the PICASSO project at SNOLAB, to cite a few examples. In addition, the participants had a chance to hear a presentation on TRIUMF's next five year plan by Dr. Jean-Michel Poutissou, associate director of TRIUMF, and a review talk on the status of neutrino physics by a guest speaker, Dr. Baha Balantekin, chair of the APS Division of Nuclear Physics. Three graduate students, from the University of Guelph, the University of Washington, and Texas A&M University, were chosen for prizes for best talks by graduate students, while all graduate students were subsidized for their accommodation at the Chateau.

By all accounts the conference was a big success and served to emphasize at least two things: the very healthy and dynamic state of subatomic physics in Canada and the importance of carrying on with the WRNPPC tradition (perhaps with a more nationally inclusive character given the increasing participation of our eastern colleagues and students). Finally, the organizers (E. Korkmaz, T. Porcelli, D. Price and A. Hussein) would like to acknowledge one more time the sponsorship of the offices of the VP-Academic, VP-Research, and Dean of Science and Management at UNBC, the CAP divisions of nuclear and particle physics, and the organizers of the 38th WRNPPC (SFU/TRIUMF). The financial support of these groups was crucial for the success of the conference.

LAKE LOUISE WINTER INSTITUTE

The eighteenth Lake Louise Winter Institute, February 16–22, was a tremendous success. The program for pedagogical talks was a mixture of results from present experiments with their interpretation and a valuable look into the future possibilities for the physics as well as the facilities. The experiments at RHIC yield extremely valuable information about the early times after the Big Bang. New results from B-factories for CP violation and the recent results from microwave data provided a useful window on the development of the universe. Neutrinos provided a tantalizing glimpse of the interior of the sun and the stars. The experiments on nuclear astrophysics yield the mechanism for the production of energy and elements in the stars. The six speakers presented the pedagogical lectures with a coherent picture of the developments in particle physics and cosmology.

The six main speakers along with their topics were:

- M. Baker — Heavy Ion Physics
- J. Ellis — Physics at Future Accelerators
- K. Kowalewski — B Physics and CP violation
- D. Pogosyan — Recent Developments in Cosmology
- H. Schatz — Nuclear Astrophysics
- K. Scholberg — Neutrino Physics

The main talks were complemented by contributed talks from almost all the major experiments in the world. The talks presented new developments in experiments and in theoretical physics.

The outstanding facilities at the Chateau Lake Louise and participants from numerous countries made the Winter Institute a memorable event. The surroundings provided an excellent opportunity for discussions and exchange of ideas.

The Winter Institute is made possible by the financial support of TRIUMF, the Institute of Particle Physics, the Canadian Institute of Theoretical Astrophysics, the University of Alberta conference fund and the Dean, Faculty of Science. The University of Alberta Physics Department provided infrastructure support. Lee Grimard was responsible for many of the details

that made the Winter Institute a great success. The organisers are grateful for all this support.

Organizers: F. Khanna, B. Campbell, M. Vincter and A. Astbury.

WORKSHOP ON FUNCTIONAL IMAGING IN BASIC BIOMEDICAL RESEARCH THROUGH microPET IMAGING

A two-day workshop, held June 26–27, brought together international and national experts in functional imaging to address the issue of how to validate small animal models of human disease using microPET to achieve quantitative results for assessing physiological function. From this general goal we addressed specific questions that strike at the heart of using animal models of human disease.

1. How to develop a non-invasive imaging method for establishing a predictive assay for cancer treatment using positron emission tomography (PET).
2. Can we establish *in vivo* methods to assess whether we have an effective animal model of the neuropathology of schizophrenia?
3. How can we assess the effectiveness of pro-drugs for the treatment of diabetes using microPET?

The solution to any of these questions would represent a major step forward in using animal models of human disease ultimately leading to the reduction of the morbidity and mortality associated with major diseases (cancer, schizophrenia and diabetes) affecting society today.

The microPET is a positron emission tomographic camera designed specifically for imaging small animals such as mice and rats. The ability to track any molecule that has been appropriately tagged in a live animal means the potential applications of PET technology are vast. Small animal models, particularly genetically engineered mice, are increasingly recognized as powerful tools in cancer research. The potential that could be realized by the use of animal models has not yet been fully realized. Having a window on the functional changes induced by these genetically modified mice increases the power of our understanding of the interplay of these changes on multiple physiological systems. By measuring the effects of interventions in real time, microPET opens a window into such complex areas as brain chemistry function, hormonal regulation of insulin secretion, disruptions in enzymatic pathways, and tumour biology. Since microPET does not require animals to be sacrificed in order to obtain readings, animal behaviour observations can, for the first time, be correlated with physiological markers. Long-term follow-up physiological studies are now possible using the same animals.

The ultimate aim of the workshop was to enable the local researchers to design experiments that will enable them to collect pilot data in as short a time as reasonable so that they can go forward with grant applications for their research projects. Since this program is multidisciplinary by nature the research collaborations will have to contribute to the overall operation of the scanner and support infrastructure. By maintaining a common core, the team can be assured of the highest quality results that are consistent across the individual projects.

While most of the participants of the workshop have research programs that already utilize small animals in their research, there are a number who will not have this experience. There are several participants who serve on the UBC Committee for the Ethical Use of Animals in Research who provided the overview of the requirements and addressed particular questions that arose during the workshop. It was important to make sure that all participants left with a clear understanding of their obligations associated with using animals in research.

SUMMER NUCLEAR INSTITUTE AT TRIUMF – CKM AND MNS: QUARK AND LEPTON MIXINGS

Discovering the mixing matrices for quarks (CMK) and leptons (MNS) is currently an active topic of research both experimentally and theoretically. The goal of this year's Summer Nuclear Institute at TRIUMF (SNIT 2003, July 21 to August 1) was to give the students a background in this important area. In general this series of Institutes is designed to give graduate students an improved understanding of topics surrounding their research area.

The school attracted 39 students (close to the goal of 40 students). As in previous years they came from many different parts of the world: North America, Europe, and Asia. Over a third of the students were working on SNO with the next largest group working at TRIUMF. The 10 invited speakers came from Canada, the United States and Japan. In addition to the lectures, TRIUMF tours where given by Shawn Bishop and Sabine Engel. Attendance at the lectures was consistently high with some TRIUMF staff and Research Associates also attending.

Next year's Summer Nuclear Institute will be held July 5–16, 2004, just prior to the Nuclei in the Cosmos conference and Jens Dilling will be the lead organizer.

Byron Jennings for the organizing committee: Elly Driessen, Akira Konaka, Richard Helmer, Stephen Godfrey, and John Ng.

GEANT4 2003 WORKSHOP

Modern particle physics and nuclear physics experiments, telescopes flown on satelites, scanners in nuclear medicine, all require large-scale, accurate and comprehensive simulations of the particle detectors used in these applications. Over the last eight years, the object-oriented GEANT4 software package has become the tool of choice for many designers. GEANT4 was conceived and is being developed by an international collaboration. It builds on the accumulated experience in Monte Carlo simulations of many physicists and software engineers from around the world. The GEANT4 Workshops and Collaboration Meetings are the most important annual forum for the exchange of information and discussion among the developers. The eighth in a series of meetings which started at TRIUMF in 1996 returned to TRIUMF, September 2–6. The other previous workshops were held at SLAC, USA (97), Niigata University, Japan (98), ESA-ESTEC, The Netherlands (99), LAL Saclay, France (00), Genova University, Italy (01) and CERN, Switzerland (02). As well, this year, a one day Users Workshop was formally added to the program to take advantage of the occasion and bring together developers and some users, particularly from Canada. The workshop further provided the opportunity to motivate a collaboration and coordinate efforts toward future developments. To promote this goal, the program included speakers representing both the developers and the users.

Attendance and participation in the workshop exceeded all expectations. The 53 participants came from Canada (5), the United States (12), Europe (28), Japan (5), and three graduate students with TRIUMF affiliation. All the major HEP experiments which employ GEANT4 as their simulation platform had sent representatives to present their latest results and comment on their experience.

The Associate Director of TRIUMF gave a set of opening remarks, welcoming participants to Vancouver and TRIUMF. He described highlights of the locally based research program and stressed that TRIUMF also plays a key role in providing infrastructure to many Canadian particle/subatomic experiments, including international experiments based elsewhere. He concluded by flashing a transparency pulled from the weather office Web site promising a week of sunshine.

The conference was formatted as four and a half days of plenary sessions in the mornings and after lunch, followed by parallel sessions in the later part of the afternoon. The workshop program also included a tour of the TRIUMF facility and the first ever video conferenced GEANT4 Technical Forum, a new format to facilitate and intensify the communication between the GEANT4 developers and the worldwide community of users. The GEANT4 Technical Steering Board also met during the meeting and selected the Laboratori Nazionali del Sud, University of Catania, Italy, as the location of next year's workshop.

The open plenary talks were grouped into eight sessions: Large Experiments – Frameworks/Validation, Collaboration News and Reports, New Kernel/Interactive Framework/Analysis Developments, Software Acceptance and Release Process, Electromagnetic Physics, Hadronic Physics, Special Topics/Interfacing, Closing Plenary Session. Detailed discussions were held in parallel sessions on several of these topics. The last full day was devoted to GEANT4 Applications that brought the latest developments from the user community. One closed plenary session revolved around collaboration internal business. The workshop was complimented by a series of four TRIUMF lunchtime tutorials, beginning with an introduction to GEANT4 (M. Assai), followed by explanations of the electromagnetic physics (M. Maire) and hadronic physics (H.-P. Wellisch) found in GEANT4, and concluding with a presentation of a JAVA based analysis tool (M. Turri) being developed at SLAC.

The first morning of the workshop was devoted to presentations from large HEP experiments: BABAR, ATLAS, CMS, and HARP. This was followed by a presentation from the European Space Agency on several of their future satellite missions, with an emphasis on present achievements and challenges. One presentation of particular relevance described the efforts of the ALICE collaboration to develop a Virtual Monte Carlo with GEANT4 as one specific implementation. One of the primary issues of all the talks was ongoing efforts to validate the simulation results through test beam measurements. The next part of the workshop focused on new developments in GEANT4. Other topics discussed included the physics models described in GEANT4, their present status, and planned extensions. Three presentations described the special topics of how to introduce parallelism in GEANT4 and how to interface external physics packages such as EGS4 and JQMD.

Lively question periods following the talks, and informal discussions, always one of the most rewarding aspects of these meetings, continued during catered lunch and coffee breaks. Additional opportunites for plenty of discussion existed during a reception and conference dinner held in the Peak Chalet at the top of Grouse Mountain in North Vancouver (see Fig. 319).

The TRIUMF auditorium served as an excellent venue for the plenary sessions. Parallel working and discussion sessions were accommodated in the Board Room and the Conference Room. The local organizing committee was formed by P. Gumplinger, F.W. Jones,

Fig. 319. The G4 2003 Workshop participants on the veranda of the Grouse Mountain Peak Chalet where the conference dinner was held.

and E. Driessen. We would like to thank all people who helped to make this workshop efficient and productive, and thus the success it has been. A number of individuals who volunteered their time and efforts for this conference must also be acknowledged. Special thanks go to Corrie Kost, Fred Jones, Hossein Rafighi and Martin Comyn for their patience and extra efforts keeping all of the devices needed in the presentations available and running properly. Elly Driessen was very important during the registration process and budgeting, and in putting together a successful culinary and social program. F.W. Jones put the conference Web pages together.

Detailed information about the meeting, the participants and their e-mail addresses, and electronic versions of all presentations are available on the conference Web pages at http://www.triumf.ca/geant4-03/.

FALL 2003 HEPiX/HEPNT MEETING

HEPiX/HEPNT (High Energy Physics in Unix/NT) meetings have been held approximately every 6 months (alternating between Europe and North America) since 1991 (last held at TRIUMF in April, 1996). The meetings bring together UNIX and Windows support staff from the high energy physics community in order to exchange common concerns and establish (or at least discuss) common standards.

There were 76 participants (2 from Japan, 29 from North America, and 45 from Europe) for this meeting held October 20–24 at TRIUMF, unusually large for a North American meeting. The first three days were devoted to general sessions, including site reports from the various represented laboratories. The fourth day was devoted to security topics, and the morning of the fifth day was devoted to brainstorming on mass storage systems, while a parallel session discussed Windows issues.

Almost all sessions were Webcast in real time and recorded/converted/posted as Real Media files to allow for future replay of the talks (together with the posted Powerpoint or PDF file). A VRVS session, linking TRIUMF, BNL, DESY, CERN, FNAL, IN2P3, and Rutherford, for the mass storage system forum, took place on the final morning of the meeting. In a break with tradition, 2 vendors exhibited their products, and there were talks by commercial vendors – notably Red Hat and Microsoft. The pre-storing of all presentations into a dedicated laptop (pioneered at the GEANT4 workshop the previous month) significantly contributed to both the quality and seamlessness of the presentations. A record number (55) of wireless laptops, serviced by 3 access points, were in use in the auditorium during the meeting.

The need for prompt patches to both the operating kernels and system related utilities was emphasized during the sessions on security.

Details of the meeting can be found at http://www.triumf.ca/hepix2003/ with an excellent summary by Alan Silverman of CERN at http://www.triumf.ca/hepix2003/pres/24-03/summary/summary.pdf.

Fig. 320. HEPiX/HEPNT meeting logo.

EMMA WORKSHOP

On December 11–12 a workshop was held to discuss the physics opportunities that would be offered by a recoil mass spectrometer at ISAC-II, dubbed EMMA (ElectroMagnetic Mass Analyzer). The major goals of the workshop were specifying the important physics issues that can be studied with a recoil mass spectrometer and the essential characteristics such a spectrometer would require in order to meet the needs of the ISAC-II experimental community. In addition, a number of individuals were identified whose help in making the scientific case and developing auxiliary detectors and data acquisition systems for the spectrometer will be instrumental.

Among the thirty participants in the workshop were experimenters from Canada, France, Italy, the UK, and the USA. The attendees included the mainly Canadian, British, and American prospective users of EMMA, as well as several scientists involved in the design and operation of similar spectrometers from around the world. Table XLIX lists the invited speakers.

Table XLIX. Invited EMMA Workshop speakers.

Name	Institution
Jean-Michel Poutissou	TRIUMF
Barry Davids	TRIUMF
Paul Schmor	TRIUMF
Carl Svensson	University of Guelph
Cary Davids	Argonne National Lab
Wilton Catford	University of Surrey
Charles Barton	University of York
Jo Ressler	Yale University
Angelo Cunsolo	LNS Catania
Dan Bardayan	Oak Ridge National Lab
Eddie Paul	University of Liverpool
Herve Savajols	GANIL
Phil Woods	University of Edinburgh
Dave Hutcheon	TRIUMF

Following an introduction describing the beams that will be provided by ISAC-II, the talks concentrated on three main topics: the properties, limitations, and figures of merit of recoil mass spectrometers in general; classes and specific examples of reactions of interest; and the design parameters of a recoil separator that would allow experimenters to study these reactions most efficiently. The main classes of devices currently in use or under construction were discussed, large acceptance magnetic spectrometers, recoil mass spectrometers that contain both electric and magnetic bending elements, and hybrid devices that seek to combine the features of these classes in a single design in which elements can be turned on or off according to the needs of a specific experiment.

The trade-off between mass resolving power and large energy or angular acceptance, which is due to chromatic and geometric aberrations, was discussed, as was the fact that the purely magnetic and hybrid devices do not produce any physical separation between different masses. This is a real limitation of such spectrometers, in which measurements of the recoil's time of flight through the device and angle in the focal plane are required to achieve even the modest mass resolution of which they are capable. Presentations from those operating and building such devices indicated that the mass resolving power of these spectrometers is inadequate for many if not most of the types of experiments envisioned by those expressing interest in using a recoil spectrometer at ISAC-II.

As a result, the design effort will focus on improving on the designs of combined electric and magnetic recoil mass spectrometers that were built throughout the world in the 1980s and 1990s by increasing their angular, energy, and mass acceptance without unacceptable sacrifices in mass resolution and beam suppression. Some modest success along these lines has already been achieved in design studies following the workshop. The current plan calls for a funding proposal based on these design studies to be submitted to NSERC in September, 2004.

TRIUMF USERS' GROUP ANNUAL GENERAL MEETING

The 2003 TRIUMF Users' Group Annual General Meeting was held in the TRIUMF auditorium on Wednesday, December 10. The meeting format was slightly different from previous years in that there was a catered lunch rather than an evening meal, and the agenda was arranged so that the meeting would finish by 6 p.m. Another change was the inclusion of a general physics talk open to all TRIUMF staff. Boye Ahlborn of UBC gave an excellent talk, "Physics for the Birds". The talk was very well attended and there were many favourable comments afterwards. Another important item was the open forum on users' issues. Andrew Daviel Webcast the entire AGM live on streaming video, and Martin Comyn set up a computer so questions from remote viewers could be sent by e-mail. The video files are archived on http://video.triumf.ca/cgi-bin/archives/TUG2003. The agenda was as follows:

Welcome	Des Ramsay
State of the Laboratory	Alan Shotter
Science Division Report	Jean-Michel Poutissou
Cyclotron Status	Roger Poirier
ECR Source and Charge State Booster	Miguel Olivo
ISAC Status and 5 Year Plan	Pierre Bricault

ISAC Accelerators	Bob Laxdal
LADD Facility	Doug Bryman
Open Forum on Users' Issues	Des Ramsay–moderator
Physics for the Birds	Boye Ahlborn *UBC*
NSERC Subatomic GSC	Dean Karlen
Quality Assurance	Ewart Blackmore
WestGrid for Users	Mike Vetterli
TRIUMF Outreach	Marcello Pavan
New TRIUMF Public Web Site	Glenn Jones
TUEC Business Meeting	Des Ramsay

Excerpts from the Meeting

It is clearly not possible to summarize 8 hours of talks and discussion in one paragraph, but here are some brief excerpts to give the flavour.

- 2003 was a good year with 90% efficient beam delivery, ISAC-I producing physics results and the ISAC-II building completed.
- Development of the ISAC ECR ion source is stalled. It works on the bench, but not on-line with the production target. The ISAC schedule had to be re-arranged, as it had been assumed that the ECR source would be ready in the summer.
- CERN activities are proceeding well. 52 LHC quadrupoles and the ATLAS hadronic endcaps had already been delivered.
- A TRIUMF outreach project had been set up, headed by Marcello Pavan. The program is bringing TRIUMF science to the public and to the schools through such initiatives as an internship program for high school teachers.
- The Laboratory for Advanced Detector Development (LADD) had been funded in the amount of $9.8 million. The facility is headed by Doug Bryman.
- No new appointment had been made yet for the Theory group leader. Three candidates were interviewed for a joint TRIUMF/UBC appointment, but UBC found all three unsuitable.
- MDS Nordion had added a third cyclotron, a TR30, which is now in operation. 45,000 to 50,000 patient doses *per week* are now administered with isotopes from these machines.
- Construction on the new TRIUMF House will begin in 2004. A $3,000,000 loan had been obtained.
- Many people at TRIUMF had been working on the 2005–2010 five year plan. At the NRC review in September, both a review of activity over the period 1998–2003 and the plan for 2005–2010 were presented. The plan goes to NRC Council at the end of February, 2004. At the time of the AGM there was some political uncertainty due to the new Prime Minister and a shuffle of Cabinet Ministers.
- The Canadian Nuclear Safety Commission (CNSC) had demanded that TRIUMF set up a Quality Assurance (QA) program as a condition for the licence to operate a nuclear facility. A plan had been submitted and was to be implemented by the end of 2003. The users expressed the hope that paralyzing bureaucratic overlay could be avoided.
- The WestGrid computing network was in place. The UBC/TRIUMF Linux farm should be released to users soon. TRIUMF users who want to use "The Grid" should apply for a WestGrid user ID.
- A new TRIUMF Web site, www.triumf.info, had been launched. It was not only intended to be more accessible to the public, but also to make material for TRIUMF users easier to find by being presented in a standardized way.
- A new TRIUMF newsletter had been launched with a fixed deadline and a uniform content.

Open Forum on Users' Issues

An important role of the TRIUMF Users' Group is to provide a link between the TRIUMF users and the TRIUMF management. To this end, an open discussion was scheduled where issues could be raised and solutions to problems suggested. The forum centred around three main issues:

1. A new format for OPCOM – Jean-Michel Poutissou presented a suggested structure in which many different TRIUMF groups, including TUG, would send representatives.
2. A new format for TUEC – Greg Hackman had prepared a suggested model with formalized representation from the various user groups, such as ISAC. In his absence, it was presented by Tracy Porcelli.
3. A better information archive for facts about TRIUMF experiments (publications, people, graduate students, theses, talks, etc.) – Jeff Sonier presented some suggestions for a Web-based on-line software archive.

The discussion was lively with many suggestions from the floor and via e-mail. The session is archived on http://video.triumf.ca/cgi-bin/archive/TUG2003. The consensus of the discussion was:

1. OPCOM needs to be changed, as it is not providing useful guidance to the TRIUMF management, but there seemed to be a reluctance to remove the university representation. The new OPCOM positions could be filled by Director's appointment or by election from a slate prepared by a joint TUEC/TRIUMF nominating committee.
2. There seemed to be general opposition to forming several distinct users' groups at TRIUMF. It was not clear how to ensure broad representation on TUEC, although, so far, representation has been pretty even across the various interest groups.
3. Everyone could benefit from better record keeping. TUEC should lobby TRIUMF to produce an on-line archive of papers, talks, beam time, theses, collaborators, and graduate students for *every* experiment. What has to be developed is how to enforce compliance. For most experiments, making reporting a requirement for acceptance of an EEC proposal or beam time request would ensure compliance.

TRIUMF Business Meeting

Election results

There had been an exceptionally good voter turnout, with 40% of the 296 members voting. The by-laws specify a quorum of 25%, and in past years this had often barely been met. The successful candidates for the vacant positions were Jens Dilling as Chair Elect and Pierre Bricault and Alison Laird as Members for 2004/2005.

TUEC Membership for 2003

W.D. Ramsay	U. Manitoba	*Chair*
J.E. Sonier	SFU	*Chair Elect*
G.M. Luke	McMaster U.	*Past Chair*
G.S. Hackman	TRIUMF	2002/2003
M.M. Pavan	U. Regina/TRIUMF	2002/2003
A.A. Chen	McMaster U.	2003/2004
T.A. Porcelli	U. Northern BC	2003/2004
M. Comyn	TRIUMF	*Liaison Officer*

Membership review

The end of 2003 marks the tri-annual membership review. This policy was started in 1997. Each member will be asked to reaffirm his or her intention to remain active, and will be removed from the membership list unless membership is reaffirmed.