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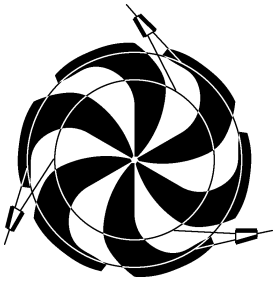

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CANADA'S NATIONAL LABORATORY
FOR PARTICLE AND NUCLEAR PHYSICS

OPERATED AS A JOINT VENTURE

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UNDER A CONTRIBUTION FROM THE
NATIONAL RESEARCH COUNCIL OF CANADA

OCTOBER 2002

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

2001 WESTERN REGIONAL NUCLEAR AND PARTICLE PHYSICS CONFERENCE

The 38$^{\text{th}}$ annual Western Regional Nuclear and Particle Physics Conference was held February 16–18 at the Chateau Lake Louise. This marked the 18$^{\text{th}}$ consecutive year that the conference was held at the Chateau. This year the conference was organized by Simon Fraser University and TRIUMF. The organizing committee consisted of Gordon Ball (Chair), John D'Auria, Peter Jackson, Elly Driessen, Martin Comyn and Eileen Conning. Sponsors of this year's meeting were Simon Fraser University, TRIUMF, TUEC, The Canadian Association of Physicists and The University of Alberta (who provided carry-over funds from WRNPPC 2000). Attendance was high this year with 58 participants, 8 invited talks and 14 contributed talks (10 by students). The program covered a wide variety of topics of current interest in subatomic physics with invited talks given by:

- Hendrik Schatz, NSCL, Michigan State University, *Radioactive Beam Experiments for Nuclear Astrophysics*
- Mark Chen, Queen's University, *Neutrino Oscillation Update*
- John Carr, CPPM, IN2P3, *ANTARES: A Neutrino Telescope in the Mediterranean Sea*
- Nathalie Knitz, TRIUMF, *Open Questions in the Nuclear Structure of the Second Potential Well*
- Joe Mildenberger, TRIUMF, *Recent Results from E787*
- Michel Lefebvre, University of Victoria, *Status of Higgs Particle Searches*
- Marcello Pavan, University of Regina/TRIUMF, *CHAOS and QCD Chiral Dynamics*
- John Behr, TRIUMF, *Atom Traps for Beta Decay Studies*
- Peter Krieger, Carleton University, *And Now the End is Near: Physics Results from LEP2*

The calibre of the student talks was excellent with three prizes awarded to:

- Laura Stumf, University of Victoria, *The $\tau^- \to \mu^- \nu_\mu \nu_\tau$ Branching Ratio Measurements at OPAL*
- Shawn Bishop, Simon Fraser University, *Classical Novae and the Astrophysical $^{21}Na(p,\gamma)^{22}Mg$ Nuclear Reaction Rate: A First Astrophysics Experiment at DRAGON*
- Jaret Heise, University of British Columbia, *Searching for Supernovae with the Sudbury Neutrino Observatory*

The format of the meeting was the same as in previous years with a short session on Friday evening followed by a reception, morning and evening sessions on Saturday with the afternoon free to enjoy skiing, skating, or hiking and the final session on Sunday morning. Thanks to all the participants for making WRNPPC 2001 a great success. Next year the meeting will be hosted by the University of British Columbia.

WORKSHOP ON EXPERIMENTAL FACILITIES FOR ISAC-II

This year the WRNPPC was preceded by a workshop on Experimental Facilities for ISAC-II. The workshop began on Thursday evening (February 15) and continued on Friday (February 16). In April, 2000, TRIUMF received approval to upgrade the ISAC radioactive beam facility. This upgrade (called ISAC-II), scheduled for completion in 2006, will provide radioactive beams for all masses up to $A = 150$ at energies up to 6.5 MeV/u. The aim of this workshop was to discuss the experimental facilities required to exploit the physics potential of ISAC-II. At the present time the Canadian nuclear structure/astrophysics community has identified the need for three new instruments: a high efficiency segmented HPGe detector array, a large acceptance magnetic spectrometer and a multi-segmented charged particle detector array. The workshop, sponsored by TRIUMF, was well attended with 38 participants, 7 invited talks, 3 contributed talks and lots of time for discussion. A summary of the workshop was presented at the start of the WRNPPC meeting on Friday evening. The invited speakers included:

- Pierre Bricault, TRIUMF, *ISAC-II: Accelerator Complex and Experimental Area*
- Alfredo Galindo-Uribarri, ORNL, *Research Tools of the HRIBF*
- Paul Nolan, University of Liverpool, *EXOGAM: a γ-Ray Detector for Exotic Nuclei* (this talk was give by Kai Vetter because Paul Nolan was unable to attend)
- Kai Vetter, LBNL, *Signal Processing in Segmented Ge Detectors*
- Carl Svensson, University of Guelph, *TIGRESS: Concepts for a Next Generation γ-Ray Spectrometer at ISAC*
- Philip Woods, University of Edinburgh, *Nuclear Structure and Astrophysical Reactions of Exotic Proton-Rich Nuclei Using ISAC-II*
- Wolfgang Mittig, GANIL, *A Variable Optical Mode Spectrometer for the Study of Reactions Induced by Secondary Beams*

In addition to identifying key areas for research and development at ISAC-II, the workshop provided an excellent venue for the Canadian community to seek international collaborators to join in this unique physics opportunity.

SUMMER NUCLEAR INSTITUTE AT TRIUMF

The 2001 Summer Nuclear Institute at TRIUMF was held July 9–20. The topics were chosen to be of interest to a wide range of the graduate students involved in the experimental program at TRIUMF. The lecturers and their subjects are given below:

- Prof. L. Lyons, Oxford University, *Statistics for Experimenters*
- Dr. M. Dombsky, TRIUMF, *Isotope Production Methods at ISAC*
- Dr. J. Ng, TRIUMF, *Topics in Particle Physics at the Precision Frontier*
- Prof. J. Deutsch, Université Catholique de Louvain, *Weak Interaction Tests of the Standard Model*
- Prof. P. Depommier, Université de Montréal, *Spin and Polarization*
- Dr. J. Behr, TRIUMF, *Atomic Physics for Subatomic Physicists at ISAC*
- Prof. J. Kluge, GSI, *Atomic Physics (Techniques) at Accelerators*
- Dr. J. Escher, TRIUMF, *Nuclear Reaction Rates for Astrophysics*
- Prof. S. Kahana, Brookhaven National Lab, *Relativistic Heavy Ion Collisions: A Primer*

As in previous years, the general format involved three lectures each morning with an informal tutorial and discussion session in the afternoon. There were 24 registrants. The Institute was organized by J.-M. Poutissou, K.P. Jackson and G.C. Ball.

INTERNATIONAL LOW TEMPERATURE NUCLEAR ORIENTATION WORKSHOP

Previous meetings on low temperature nuclear orientation (LTNO) have been held in Bad Honnef, Leuven, Oxford, and Oak Ridge. It was decided to host an international LTNO workshop in Vancouver at TRIUMF in 2001 because LTNO has been actively pursued at UBC for several decades, and, particularly, because of the installation of the new LTNO facility at ISAC. The meeting, which took place on August 9–10, was jointly organized by UBC (B. Turrell) and TRIUMF (P. Delheij) with valuable assistance from C. Davis, E. Driessen, and K. Elliott.

25 participants from groups in Asia, Australia, Europe, and North America attended. LTNO is used to investigate problems in condensed matter, nuclear and fundamental physics, and talks and discussions covered recent work in all these fields. J.-M. Poutissou welcomed the participants and described the new ISAC facility. B. Turrell gave tribute to two colleagues, E. Hagn (Munich) and L. Vanneste (Leuven) who had died recently. They both had made outstanding contributions to LTNO, and this workshop was dedicated to their memory.

W. Brewer described the work of the Berlin group. A systematic and precise determination of nuclear spin-lattice relaxation rates for dilute *nd* impurities in Fe and other ferromagnetic hosts had been completed and analyzed. Results of studies on the multilayer systems $[Fe/Ag]_x$ and $[Co/Ag]_x$, and the "exchange bias" trilayer Co/Au/CoO were also discussed.

N. Severijns gave an overview of work by the Leuven group. His group had studied problems in all the areas mentioned above. T. Phalet presented results obtained from an LTNO study of the multilayer system [Fe/Ag] that revealed an out-of-plane orientation of the Ag hyperfine field. S. Versyck described on-line experiments at ISOLDE-CERN and Louvain-la-Neuve in which beta asymmetry measurements were used to probe meson exchange currents in first-forbidden beta decay in the lead region. B. Delaure discussed a weak interaction trap for charged particles (WITCH) to be set up at CERN. It will be used for very high precision measurements of the energy spectrum of ions recoiling after beta decay, the motivation being to search for physics beyond the standard model.

C. Tramm from P. Herzog's Bonn group reported on two investigations: the first was the measurement of hyperfine fields in the CoPd alloy system; the second was a study using the MAPON technique of quadrupole interactions after warm and cold implantation of ^{82}Br into iron.

From Oxford, J. Rikovska Stone discussed on-line NMRON measurements of ground state magnetic moments of odd-A isotopes in the vicinity of doubly-closed shell nuclei and the interpretation of these results. N.J. Stone reported on a program of experiments involving direct proton emission and beta-delayed proton and neutron emission from oriented nuclei designed to study quantum barrier penetration.

S. Ohya detailed the "brute force" experiments of the Niigata group using a 12 T magnet to perform NMRON on Ce, Nd and Pm isotopes. He also discussed the possibility of on-line LTNO in Japan. T. Ohtsubo described NMRON measurements to determine the magnetic moments of Sc isotopes recoil-implanted into iron.

D. Chaplin, from Canberra, paid tribute to pioneering Canadian work using various LTNO techniques to study antiferromagnetic insulators, and presented

recent results on these systems and on rare earth-transition metal metamagnetic alloys. W. Hutchison described experiments utilizing MAPON combined with beta detection to measure electric field gradients in various crystallographic directions in iron. They also had studied ^{54}MnCo (fcc), and detected NMR in iron via the Mössbauer effect.

From the Munich group, E. Zech described how cold rolling of polycrystalline iron or nickel foils could produce a nearly uniform orientation of the crystallographic axis. These foils could then be used as quasi-single crystals. G. Seewald made two contributions: the first was an improved tight binding model for the spin-orbit induced electric field gradient in cubic ferromagnets; the second concerned nuclear spin-lattice relaxation of iridium isotopes in iron.

P. Delheij described the installation of the LTNO facility at TRIUMF-ISAC and the experimental program planned for this new facility. He gave two examples: preliminary measurements on ^{79}Rb, and a proposal for the measurement of parity violation in the mass 225 region.

B. Turrell reported on the UBC measurements of an anomalous frequency pulling effect in quasi-2-dimensional manganous acetate tetrahydrate, the successful experiments by the UBC-Leuven collaboration to implant ^{56}Mn into antiferromagnetic insulators, and studies of the effect of the NMRON line in $^{54}MnMnCl_2.4H_2O$ due to cobalt impurities of various concentrations.

In a special invited talk, S. Cottenier described how one can make *ab initio* calculations of hyperfine fields and presented some case studies relevant to LTNO. The participants also enjoyed two talks about other experimental programs at TRIUMF-ISAC. J. Behr described the trapping of radioactive ions with lasers and how the study of their beta decay properties was being used to test weak interaction physics. R. Kiefl discussed the production of low energy spin-polarized nuclei, e.g. ^{8}Li, and their use to probe ultrathin films and surfaces. There was also a tour of the ISAC experimental hall.

MATERIALS SCIENCE WORKSHOP

In 2001 the TRIUMF Users' Executive Committee (TUEC) sponsored a series of workshops on topics relevant to TRIUMF science in anticipation of a Long Range Planning Committee (LRPC) meeting sometime in 2002. One of these topics was materials science, by which was meant mainly condensed matter physics and chemistry. The title of the workshop was New Opportunities for Accelerator-Based Materials Research in Canada.

Naturally we were most interested in areas of these fields where accelerators like TRIUMF can make important contributions, such as μSR and β-NMR, but we also hoped to explore opportunities for coordinated development of other accelerator-based materials science probes like synchrotron radiation or spallation neutrons.

Based on initial User response and logistic necessity, the workshop was held at TRIUMF on the weekend of August 11–12, 2001. The format was extremely informal and adaptable in response to fresh ideas, a sort of "think tank with lectures".

Informality notwithstanding, a few formal talks were important to "get the ball rolling". For the final catchment, see the Program at http://musr.triumf.ca/conf/ws2001/prog.html.

To facilitate free discussion before the workshop, we set up an "electronic bulletin board" (BB) where people could post their thoughts and peruse those of others. This BB is still available at the Web site http://musr.triumf.ca/conf/ws2001/bb.html but its content has now been absorbed into the ongoing μSR Bulletin Board at http://musr.triumf.ca/bb/MUG/ which provides a continuing forum for members of the TRIUMF μSR Users' Group (MUG) (see http://musr.triumf.ca/users/).

The workshop was attended "in person" by 23 participants; another 20 or so members of the TRIUMF materials science community participated electronically. Discussions focused mainly on the TRIUMF μSR User Facility, whose home page URL is probably obvious by now, so we were unsuccessful in our attempt to engage practitioners of related accelerator-based probes; but this is probably due to short notice and the fact that the workshop was, after all, at TRIUMF.

An extract of the program is as follows:
Friday, August 10, RECEPTION 4554 W. 11th Ave.
Saturday, August 11 – TRIUMF Auditorium
Morning Session: "SCIENCE SHOW & TELL" (new results/ideas as a warm up)

- J. Brewer, *Welcome*
- J. Brewer, *μ^-SR on Nuclei with Spin*
- K. Ghandi, *Chemistry in Pressurized Water Nuclear Reactors Probed by μSR*
- D. Fleming, *Molecular Motion in Zeolites: Static MuC_6H_6 in NaY*
- I. McKenzie, *Novel Alpha Muoniated Radicals*
- K. Matsuta, *Nuclear Moment of ^{16}N Studied by β-NMR*
- R. Kiefl, *Tour & Demonstration of β-NMR Experiment at ISAC*

Afternoon Session: "FRIENDLY FACILITIES" (management, accessibility, reliability, versatility)

- S. Kreitzman, *TRIUMF μSR User Facility*

- Open Discussion
- S. Cottrell, *RAL-ISIS μSR User Facility*
- Open Discussion
- (Panel) *Barriers to Participation – What Keeps People Away From μSR?*
- Open Discussion

Sunday, August 12 – TRIUMF Auditorium
Morning Session: "NEW CAPABILITIES" (hardware ideas from the fantastic to the pragmatic)

- J. Brewer, *Ultra-Slow Muons at TRIUMF?*
- K. Chow, *The MULTI Spectrometer*
- M. Larkin, *Spatially Resolved μSR*
- S. Cottrell, *Upgrade Plans at ISIS*
- J. Brewer, *Replacing M8 – a New Concept Surface Muon Channel*

Afternoon Session – "POLITICS" (strategies and tactics for design development, support of existing facilities, grant applications, etc.)

- J. Sonier, *Refurbishing M9A and MULTI Spectrometer*
- Open Discussion
- (Panel) *Major Facility Access Grant(s)*
- Open Discussion
- CLOSURE and Good-bye

FUTURE OPPORTUNITIES IN NEUTRINO PHYSICS

Neutrino physics is currently commanding a great deal of interest world wide. Recently, attention has been focused on strong hints of neutrino oscillations in which one flavour of neutrino can metamorphose into another. These hints have come from studies of neutrinos produced both in the atmosphere [Fukuda *et al.*, Phys. Rev. Lett. **86**, 5656 (2001)] and in the sun [Abdurashitov *et al.*, Phys. Rev. **C60**, 055801 (1999); Hampel *et al.*, Phys. Lett. **B447**, 127 (1999); Altmann *et al.*, Phys. Lett. **B490**, 16 (2000); Fukuda *et al.*, Phys. Rev. Lett. **86**, 5651 (2001); Cleveland *et al.*, Astrophys. J. **496**, 505 (1998); Ahmad *et al.* (SNO collaboration), Phys. Rev. Lett. **87**, 071301 (2001)], with Canadian physicists making a significant contribution to the solar studies through construction and operation of the Sudbury Neutrino Observatory (SNO) [Ahmad *et al., op. cit*; Boger *et al.*, Nucl. Instrum. Methods **A449**, 172 (2000)]. The interest stems from the fact that oscillations imply neutrinos are massive particles and there is mixing among the generations, while in the standard model neutrinos are massless and do not mix. Hence, oscillations provide evidence of physics beyond the standard model. Many new experiments have been proposed and/or are under way to study further both the properties of neutrinos themselves and to use them as a probe to study other phenomena. Participation by Canadian physicists in some of these experiments has received a high priority in the recent report of the Five Year Planning Committee for Subatomic Physics in Canada. In order to explore the avenues by which Canada could continue to make significant contributions to this effort and to identify a potential community which would be interested in the program, a workshop entitled *Future Opportunities in Neutrino Physics* was held by the Canadian neutrino physics community. The workshop was organized under the auspices of the TRIUMF Users' Executive Committee, TRIUMF, the Sudbury Neutrino Observatory, and the Institute of Particle Physics. It was held from November 9–12 in the Dunsmuir Lodge, near Sydney, B.C.

Sessions were generally arranged to begin with an invited talk summarizing the status of a particular aspect of the field at the present time. These were followed by contributed talks aimed at discussions of future experiments which could address the questions to be answered, and finally by shorter, more specific proposals for some of these experiments. To begin the workshop, however, an overall view of the whole field was presented by John Ellis. Of prime interest to future neutrino measurements are the determination of θ_{13}, the angle which in a sense connects the atmospheric and solar measurements, and δ, a possible CP violating phase in the MNS matrix, the neutrino equivalent of the CKM matrix of the quark sector.

In the session on solar and atmospheric neutrinos, Yoji Totsuka brought us up to date on the status of currently operating experiments and outlined the contributions expected soon from Borexino and KamLAND. He pointed out that the currently operating experiments have been good for discovering surprises – the atmospheric neutrino anomaly, solar neutrino deficit, etc. – but also that they have insufficient resolving power for measuring the underlying parameters well. KamLAND can do this for solar neutrinos if the large mixing angle solution is the correct solution for the solar anomaly, while Borexino will see a large day-night difference if the *low* solution is correct. Unfortunately for Yoji Totsuka and the other Japanese who attended the workshop, the calamity at SuperKamiokande occurred while they were in flight returning to Japan. Everyone was devastated to hear about this disaster, and all hope that repairs will go speedily and satisfactorily so this wonderful detector will be back online as quickly as possible.

Later in the session, Hamish Robertson summarized the status of our understanding of the MNS matrix and presented a summary of future solar experiments, particularly those with low energy thresholds, which will further our knowledge of the pa-

rameters of this matrix. Chang Kee Jung discussed UNO as representative of a future versatile, megaton-scale, water Čerenkov detector useful for studies of nucleon decay, solar/atmospheric/supernova neutrinos, and accelerator-based neutrino oscillation experiments. Ideas for several other detectors were also presented in this session. Some are aimed at most or all of these same measurements (3M, AquaRICH), while others are aimed more specifically at supernova (LAND, OMNIS) or atmospheric (Monolith) neutrinos. A common thread among many of these proposals is that they all aim to take the next step in observation of oscillation phenomena. For example, UNO, 3M, AquaRICH and Monolith would all search for the first oscillation swing in the atmospheric neutrino anomaly. The status of the supernova early warning system (SNEWS) was also described in this session.

Viktor Zacek summarized the situation generally in particle astrophysics. There were more detailed presentations of double beta decay (Jean-Luc Vuillermier) and underwater neutrino telescopes (Paschal Coyle). In recognition of the growing interdependence between standard model type physics with astrophysics and cosmology, we also heard about the PICASSO dark matter experiment based at the Université de Montréal (Marie di Marco) and the STACEE γ-ray astronomy experiment (David Hanna). Both these experiments were of particular interest because of the Canadian involvement. David Sinclair discussed the plans for an upgrade to some of the facilities at SNO, particularly the excavation of a new hall for smaller scale experiments. Tony Noble brought us up to date on the much larger equivalent in the U.S. with a summary of the recent discussions at Homestake.

One session was devoted to a discussion of neutrino factories, in which muons in a storage ring decay in long, straight sections. There would be unprecedented fluxes of neutrinos and the beams would be well collimated. Construction of such facilities is beyond the present planning period, but R&D is being carried out now and it might prove fruitful to take part in that effort. Alain Blondel presented an overview and the R&D work going on in Europe, and Ken Peach and Yoshi Kuno summarized studies taking place in Britain and Japan, respectively. Debbie Harris summarized activities in the U.S., particularly with respect to the possible non-oscillation physics which could be done at a near detector.

The session on accelerator-based long baseline oscillation experiments began with a general overview by Ron Shrock. He presented an excellent theoretical outline of the ways in which neutrino masses and mixings can be generated, and how these in turn can lead to neutrino oscillations. He then reviewed the current experimental evidence for oscillations and the new information which might become available in the near- and mid-term as results from the currently, or soon to be, operating experiments come in. The information expected from these experiments includes measurement of the energy spectrum in muon neutrino disappearance experiments, looking for dips caused by oscillations, comparison of neutral current and charged current interaction rates to check for evidence of sterile neutrinos, and looking for tau appearance in $\nu_\mu \rightarrow \nu_\tau$ oscillations. Combining all these purposes can be used to confirm atmospheric neutrino results and to further constrain the mixing parameters. Further down the road, with more intense (superbeam) facilities it will be possible to explore $\nu_\mu \rightarrow \nu_e$ appearance to get information on θ_{13} and possibly on leptonic CP violation.

More detailed descriptions of several of the experiments possible with a superbeam were presented during the remainder of this session. Specific activities at Fermilab (Harris), the JHF to Kamioka experiment planned in Japan (Koichiro Nishikawa), studies being carried out in Europe (Blondel), and Canada (Akira Konaka) were presented. One item of particular interest was the possibility of locating an off-axis detector in Canada where the NuMI beam to Soudan for the MINOS experiment emerges from the ground. The JHF-Kamioka experiment also plans to make use of the off-axis idea by aiming the beam about two degrees away from the detector at Kamioka. These plans were particularly gratifying to the Canadian participants since the off-axis idea originated at TRIUMF [Helmer, Proc. 9$^{\text{th}}$ Lake Louise Winter Inst., February 20–24, 1994, eds. Astbury *et al.* (World Scientific, Singapore, 1995) 291].

One session was devoted to summaries of past and present activities in Canada where expertise in specific areas had been developed which could be drawn on for some of the possible future experiments. With expertise in high intensity beams developed especially during the KAON proposal era at TRIUMF, Canada is well positioned to make contributions to beam line, target, and accelerator design and construction. In fact, ionization cooling of muons beams, necessary for the operation of a neutrino factory, is being studied now by an international collaboration using beams at TRIUMF (MUSCAT, TRIUMF Expt. 875). Expertise developed in the underground laboratory at SNO leaves Canada well-positioned for the type of physics which can be carried on in this type of environment as well.

The final day began with Barry Barish walking the participants through the history of neutrino physics and offering some glimpses of where it might be headed. He finished by pointing out that within this decade it is expected that gravity wave detectors will

be capable of receiving a signal from a supernova explosion from as far away as the Virgo cluster and he issued a little challenge suggesting that ways of detecting a neutrino signal from that distance ought to be explored. The Canadian participants then held a close-out session during which two working groups were formed. One is charged with helping to flesh out the possible future activities at SNO and the other with possible involvement in accelerator-based experiments. Future workshops are planned in which the areas where Canada might become involved will be narrowed down, with a view to having a well-defined program in place by the end of 2002.

Slides of many of the presentations, as well as other summaries, are available on the workshop Web site http://www.phys.ualberta.ca/∼neutrino/.

TRIUMF USERS' GROUP ANNUAL GENERAL MEETING

The TRIUMF Users' Group Annual General Meeting was held on Wednesday, December 12, sandwiched between the Subatomic and Materials Science two-day EEC meetings. The meeting was well attended with 49 paid registrants and much larger audiences for certain talks. For the first time, on a trial basis, the meeting was also available as a live video stream on the Web via http://video.triumf.ca/ for Users who were unable to travel to TRIUMF.

The very full agenda began with the traditional status reports by the Director and division heads, followed by presentations on the latest plans for the ISAC-II facility. After lunch, John Carr reported on the underwater Antares Neutrino Telescope which is being constructed and deployed in the Mediterranean Sea south of Marseille.

Nate Rodning reported on the efforts of the TRIUMF Users' Executive Committee (TUEC) during the year to promote and sponsor workshops which would lead to the development of proposals for the next five-year plan. Two such workshops had been held during the year; Jess Brewer reported on the Materials Science Workshop, and Rich Helmer on the Neutrino Workshop.

TUEC had been represented on the TRIUMF House task force which was charged with finding a suitable replacement for the present TRIUMF House. TUEC had discussed the matter extensively and polled the Users to get their views, resulting in the formulation of a list of basic requirements. Jim Hanlon presented an overview of the process and the present state of the negotiations with UBC who would donate the land and assist with the architectural designs, while TRIUMF would pay for the construction and maintenance of the building.

Present and future funding of subatomic physics through the GSC-19 envelope was outlined by Ken Ragan, chair of the grant selection committee. The NSERC reallocation exercise and IPP issues were presented by Jean-Michel Poutissou.

Under the business meeting heading, Nate Rodning reported on the activities of TUEC during the year which, in addition to the items covered above, included development of the TUG Web site at http://www.triumf.ca/tug/ and the full implementation of the new membership database. He announced that, by acclamation, W.D. Ramsay (U. Manitoba) had been elected as chair-elect for 2002; J.E. Sonier (SFU) as a member for 2002; and G.S. Hackman (TRIUMF) and M.M. Pavan (U. Regina/TRIUMF) as members for 2002/2003. TUEC had selected two members to represent the Users on the TRIUMF Operating Committee: G.M. Marshall (TRIUMF) and G.M. Luke (McMaster U.) [replacing E. Mathie (U. Regina)] with alternates S. Yen (TRIUMF) and J.E. Sonier (SFU) [replacing G.M. Luke (McMaster U.)], respectively.

After dinner, a lively discussion ensued regarding TRIUMF's image and how it might best be presented. Many ideas were proposed and discussed. The AGM finally ended on an optimistic note over twelve hours after it had begun.

Welcome	Nate Rodning
State of the Laboratory	Alan Shotter
Science Division Report	Jean-Michel Poutissou
Cyclotron	Gerardo Dutto
ISAC-I	Paul Schmor
ISAC-II – Machine	Bob Laxdal
ISAC-II – Facilities	Greg Hackman
The Antares	John Carr
Neutrino Telescope	*CPPM IN2P3 Marseille*
Moving Toward	
a Long Range Plan	Nate Rodning
Materials Science Workshop	Jess Brewer
Neutrino Workshop	Rich Helmer
TRIUMF House	Jim Hanlon
GSC-19	Ken Ragan *McGill U.*
Reallocation / IPP	Jean-Michel Poutissou
Business Meeting	Nate Rodning
Dinner at TRIUMF	

TUEC Membership for 2001

N. Rodning	U. Alberta	*Chair*
G.M. Luke	McMaster U.	*Chair-elect*
J.H. Brewer	UBC	*Past-chair*
R. Helmer	TRIUMF	2000/2001
A.K. Opper	Ohio U.	2000/2001
G.D. Morris	LANL	2001/2002
W.D. Ramsay	U. Manitoba	2001/2002
M. Comyn	TRIUMF	*Liaison Officer*