Subatomic Physics Evaluation Section
Annual Report

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University of Wisconsin-Madison
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I. Introduction

This report summarizes the activities of the Subatomic Physics (SAP) Evaluation Section (SAPES) in fiscal year 2014-15, including the results of the March 2015 competition. The report is provided for information to the NSERC Committee on Grants and Scholarships, and to the Canadian subatomic physics community. The format and content of the report follow the reports from previous years very closely.

The Subatomic Physics Evaluation Section is a standing review committee that oversees a suite of programs. Funding for the Subatomic Physics suite of programs has been made through an independent envelope mechanism since 1991. Individual, Team and Project Discovery, Research Tools and Instruments (RTI), and Major Resources Support (MRS) grant applications in subatomic physics are evaluated together by SAPES. This comprehensive approach is essential given the complexity and inter-dependency of many proposals, which are often and ever-more frequently parts of international programs and collaborations, and involve many universities and national laboratories. This approach is also essential for planning and stability of execution of large-scale and long-term projects, and for maintaining a balance between large projects and the smaller research efforts that are essential to the breadth and future success of the Canadian SAP program. The envelope structure also helps SAPES maintain as appropriate a balance between operations and capital investments as possible. Moreover, the SAP community's five-year Long-Range Plan includes the community's priorities, and provides guidance to SAPES' deliberations. The most recent Long-Range Plan was produced in 2011 and covered the period 2011-2016.

Another unique strength of SAPES is the extent to which it solicits reviews by international experts of the highest calibre. All major Team, Project, RTI and MRS grants are separately reviewed by *ad hoc* or standing committees of internationally-recognized experts drawn from institutions from around the world. These committees perform exhaustive scientific, technical, and budgetary evaluations, and produce detailed written reports which provide exceptionally valuable input to SAPES for its assessment of the grant applications. Moreover, SAPES generally selects a substantial proportion of international external reviewers for each proposal, from the smallest individual discovery grant to the largest project proposal. Finally, the membership of SAPES is itself substantially international, with half or more of its members generally coming from institutions in the U.S. and

Europe. This level of international review provides an exceptionally high degree of scrutiny and validation of the research funded by this Evaluation Section.

In its report, *The State of Science and Technology in Canada, 2012*, the Council of Canadian Academies identified Nuclear and Particle Physics as one of the sub-fields in which Canada excels and leads the world in terms of scientific impact. Despite the internationally-recognized excellence of Canadian SAP research, and the unique strengths of the SAPES envelope structure and review processes, the past several years have been increasingly difficult for this Evaluation Section to financially support the community's short- and long-term objectives at an appropriate and competitive level to ensure the maximum scientific return on substantial investments already made. Specifically, the SAPES budget has been practically flat for the past seven years, while the number of full-time faculty has increased by more than 10% over the same time. Several high-priority research programs are in the ramping-up phase of their activities, while others are at the full scientific exploitation stage.

Looking back nine years ago (a small window over the typical timescale of SAP projects), the scenario of a flat envelope was thoroughly analyzed in the 2006 LRP report, with the conclusion that it would lead to a curtailing of research operating support and affect growth possibilities in Canadian SAP research activities. In such a scenario, it was recognized that the ability of the Canadian subatomic physics community to exploit the major capital investments of the past decade and to achieve its long-term scientific vision would be jeopardized.

The 2011 LRP report, *The Subatomic Universe: Canada in the Age of Discovery*, describes the constrained support provided to the "flagship research programs" over the past 5 years as they neared the stage of data-taking and science exploitation, with concurrent reductions from elsewhere in the envelope. The report warns that if this trend continues, funding for investment in equipment will suffer as a consequence of increasing needs from small and large projects in an era of decreasing budgets.

There is an urgent need to protect and exploit the considerable investments that have already been made in SAP research. One can justifiably state that the Canadian SAP program has become a victim of its own excellence and successes, and that the currently available operating funds are enough only to maintain existing activities at a constrained level that is not always sufficient to allow Canadian researchers to contribute to the full extent of their potential. Clearly, the internationally-recognized excellence and contributions of the Canadian SAP community, coupled with the unique strengths of the SAPES envelope, ensure that additional investments in this area will yield exceptionally high returns in cutting-edge knowledge and the training of highly-qualified personnel (HQP). As stated in the 2011 LRP report, and demonstrated by the outcome of recent competitions, such additional investments are now more needed than ever if the Canadian SAP research program is to continue to produce excellent science both now and in the future.

II. Update on the Envelope Funding

The pressure on the Section's funding envelope has been building for the last several years; it has now reached a level that is difficult to manage. In particular, substantial investments by federal and provincial government funding agencies have annually injected funds into the SAP program in excess of 50% of the entire SAPES envelope, including substantial capital investments from CFI and various agencies of the Ontario government (but excluding NRC funding of TRIUMF). Other substantial investments by the Canadian government in science and technology, such as the Canada Research Chairs (CRC) program, have also resulted in a fast growth of the number and the quality of young faculty in SAP at many Canadian institutions. The latter increase has, in turn, been accompanied by a substantial growth in the number and quality of graduate students and other highly qualified personnel.

The SAP community has been very effective in making use of CFI's programs for major capital equipment. This additional source of funding is welcome, but it is important to highlight the fact that it is in turn generating further pressure on the envelope as the latter is the main funding source in support of research-related costs. It is unfortunate that repeated attempts to foster the necessary level of coordination between CFI and NSERC have not yet succeeded. The Section can only reiterate the recommendation made in the 2011-16 Long Range Plan in this respect. Without such coordination, there is a risk for research funding to be spread too thin, leading to failure of major parts of the Canadian subatomic physics programme. An alternative risk would be for research funding to be focused only on a few state-of-the-art major infrastructures, leaving several others unexploited.

Since the 2006 Long-Range Plan was released, new funds were allocated to NSERC by the federal government in Canada's annual budgets, but were mostly provided for clearly targeted priority areas which did not include SAP. In *Budget 2011*, NSERC received $15M to "support outstanding research in the natural sciences and engineering fields, such as the Strategy for Partnerships and Innovation (SPI)." NSERC devoted half of those funds to enhance the support given to Early Career Researchers (ECRs) across all disciplines in the form of supplements to their Discovery grants. ECRs with active grants in subatomic physics have received such supplements. Even though this is a welcome development, it has translated into a limited influx of funds into the envelope ($125k). In *Budget 2014*, NSERC received an additional $15M "to support advanced research in the natural sciences and engineering". These funds are being phased into the Discovery grants program over the five-year cycle, with approximately $3M being added to the budget each year starting in 2014-2015. The share of $3M being added to the subatomic physics envelope is approximately $158k. Given that much of the spending in the subatomic physics envelope is directed toward Project Grants of three-year duration, the funds will be phased in over a three year period, with the addition of $474k in FY 2015, $632k in FY 2016 and $790k in FY2017. As a reminder, the 2011-16 LRP report recommends an injection of $2.5M into the envelope to restore R&D funding and an additional $1M to further support flagship projects to fully reap the rewards of previous investments.

III. Evaluation Section

This year's SAPES comprised 11 members, including three theorists. Three new members joined this year; they were Eckhard Elsen (DESY and Universität Hamburg), Naomi Makins (University of Illinois at Urbana-Champaign), Adam Ritz (University of Victoria). The full SAPES membership is given below.

Name	Organization	Final Year
Yorick Blumenfeld	Institut de physique nucléaire d'Orsay	(2016)
Andrzej Czarnecki	University of Alberta	(2015)
Eckhard Elsen	DESY and Universität Hamburg	(2017)
Morten Hjorth-Jensen	University of Oslo/Michigan State University	(2015)
Augusto Macchiavelli	Lawrence Berkeley National Laboratory	(2016)
Naomi Makins	University of Illinois at Urbana-Champaign	(2017)
Mark Messier	Indiana University	(2016)
Adam Ritz	University of Victoria	(2017)
Neil Spooner	University of Sheffield	(2016)
Julia Thom-Levy	Cornell University	(2016)
Stefan Westerhoff (Chair)	University of Wisconsin – Madison	(2015)

Dr. John Martin (Professor Emeritus in Residence, University of Toronto) served as *Ad hoc* Peer Review Process Advisor to the SAPES. In this capacity, he provided advice on process as well as supplemental knowledge of the Canadian SAP community.

The Chair would like to acknowledge the very demanding task faced by SAPES members throughout the year, up to and especially through competition week. Very long hours of deliberations ensured that each proposal was fairly and consistently evaluated according to the selection criteria. The remarkable professionalism and dedication of SAPES members is manifest in the high quality of the Section's recommendations. The Chair also wishes to sincerely thank SAPES members for their careful and constructive attitude throughout the competition, and for ensuring the conduct of our many discussions in a pleasant atmosphere. Special thanks also go to this year's retiring members, Andrzej Czarnecki and Morten Hjorth-Jensen, for three years of outstanding service to the Canadian SAP community; it is deeply appreciated.

It is a pleasure for the Chair to thank NSERC staff and the Physics Group Chair for their expert guidance and help in the months leading up to the competition, and during the many long days of competition week: Shashini Jayaratne (Program Assistant), Jamie Cousineau and James Murphy (Program Officers), Sarah Overington (Team Leader), Elizabeth Boston (Director, Mathematical, Environmental and Physical Sciences), Pierre Charest (Vice-President, Research Grants and Scholarships), and Li-Hong Xu (Group Chair, Physics).

IV. Orientation/Policy Meeting and Information Visits

Each year, SAPES launches its operations during an orientation and policy meeting. This is a critical opportunity for the new members to familiarize themselves with NSERC and SAPES operating procedures, to be informed of the process leading to competition week, and to interact with the returning members. News from NSERC, including a detailed review of the competition budget, is also communicated to the members. The orientation and policy meeting for this competition was held on November 6, 2014 via teleconference. Given ongoing budgetary constraints, this is the third year this meeting is held entirely via teleconference.

Until the 2011 competition, it had been a tradition, following the policy meeting, for SAPES to visit Canadian institutions with subatomic physics research programs on a 3-year rotation basis. The visits were conducted for informational purposes only and were not a part of the grant evaluation process. They provided opportunities to communicate information about NSERC and the review process to researchers, while the Section members heard presentations about the researchers' activities and learned first-hand about their infrastructure and environment. The learning process that accompanied these visits was particularly important considering the large number of SAPES members affiliated with non-Canadian research institutions, in addition to the variety of sub-disciplines covered by the envelope. These visits were also a valuable opportunity for Canadian members to get a full sense of the research environments of their colleagues from one end of the country to the other over their three years of service on SAPES.

Since the 2011 competition, owing to operating budget pressures at NSERC, these information visits are no longer held. With these discontinued visits and the now fully tele-conferenced orientation meeting, competition week is the first and only time per year that Section members meet. This is viewed by members of SAPES, and indeed much of the SAP community, as a negative development. The benefits to the review process that leads to multimillion funding recommendations completely justify the relatively modest costs involved in the information visits. The Section appreciates the budgetary constraints under which NSERC is operating. The Section strongly recommends, however, that NSERC considers reinstating these visits.

This year, the IPP and CINP were invited to jointly prepare a document for SAPES on the context of the Canadian research environment, with the opportunity for the committee to ask questions on it. This was in response to the CINP's and the IPP's request (echoed in previous SAPES Annual Reports) to reinstate the discontinued SAPES fall site visits, given their value to both national and international members of the Evaluation Section in understanding the Canadian research context and environment. The document provided an overview of the roles that various Canadian funding agencies play in supporting subatomic physics research and provided details about Canadian subatomic physics research institutes. The document further provided information about the structure and different options for Canadian M.Sc. and Ph.D. programs, followed by details about the regional differences in the training of Highly Qualified Personnel (HQP). An Appendix listing the typical level of graduate student support at different Canadian universities across the country was included

as well.

As recommended by the Section last year, a second pre-competition teleconference was again held just prior to competition week in order to remind the members of NSERC's policies and guidelines, and present the most up-to-date budget for the competition. Up to competition 2012, such a session used to be held right at the start of competition week. Again this year, the Evaluation Section members indicated that such a pre-competition session was very useful and that it should continue to be part of the yearly lead-up to competition week.

V. Pre-Review Process

The review of the Notifications of Intent to Apply for a Subatomic Discovery Grant took place in September. Discovery grants include Individual, Team, and Project grants. The review involved all the Section Chairs of the Physics Evaluation Group, including the SAPES Chair, and the Group Chair. Its objective was to discuss those applications whose research topics crossed the boundaries of two or more Sections within the Physics Evaluation Group or related to a discipline other than physics. For each application, the intent was to identify the Section (or Evaluation Group, if the research topic related to another discipline) that should take the lead for the review and determine the need to provide or receive expert input to/from other Evaluation Groups. In the case of SAPES, which operates in a standalone mode with a separate membership, the need to provide or receive expert input was primarily related to the other Sections of the Physics Evaluation Group. This year, however, the Mechanical Engineering Evaluation Group also made one request of SAPES for expert input.

As a result of this process, two applications submitted to the Physics Evaluation Group were transferred to SAPES. Moreover, for four Subatomic Physics grant application, members from the Physics Evaluation Group, with relevant expertise, were asked to participate in the deliberations during competition week. Likewise, members of SAPES participated in the review of three Discovery grant applications in other Sections of the Physics Evaluation Group and in the Mechanical Engineering Evaluation Group. One member of SAPES also provided recommendations for external reviewers on one application in another Section of the Physics Evaluation Group.

Furthermore, when the Notifications of Intent to Apply for a Subatomic Physics Discovery, Category 2 or 3 RTI, or MRS grant are received, each application is assigned by the Chair to first and second internal reviewers, who are SAPES members with the most appropriate expertise, and with careful consideration of balancing the full workload among all of the members. Additionally, a third reviewer is systematically assigned, with special responsibility for budget scrutiny, for Discovery or MRS grant applications that request funds averaging $500k/year or more. Likewise, a third internal reviewer is systematically assigned to Category-3 RTI grant applications.

In the case of Discovery grant applications, the first reviewer is required to recommend five external reviewers for each of his/her assigned proposals. Typically, up to two of the external reviewers could be chosen from the list of suggested reviewers on the Notification of Intent to Apply. It is in the applicant's interest to suggest reviewers who are not in conflict of interest according to NSERC's guidelines. Internal reviewers generally recommend a substantial fraction of external reviewers who are from outside Canada. This year, an average of 2.2 external reviewer reports per Discovery grant application was received. The average number of reviewers has declined steadily over the last years, and this year's average is again considerably smaller than in the previous year. Given the importance of external reviews for the competition, it is imperative to understand the reasons for this decline and find ways to encourage a better response from the community.

Similarly, once Category 1 RTI grant applications are received, the Chair assigns first and second internal reviewers to each of them. External reviewer reports are not typically sought for RTI grant applications.

VI. *Ad hoc* Expert Review Committees

Ad hoc expert reviews are typically held for Discovery grant applications requesting more than an average of $1M per year or for Category-3 RTI grant applications. In this year's competition, four *ad hoc* expert reviews were conducted prior to the competition, in fall 2014/winter 2015, and one SAPES member was present for each of them. These reviews were related to the Discovery Project grant application submitted by ATLAS-Canada, the Discovery Project and Category 1 RTI grant applications submitted by the Canadian BELLE-II Collaboration, the Discovery Project grant application submitted by SNO+, and the ongoing DEAP-3600 Discovery Project grant. The SNO+ and ATLAS-Canada reviews were held through face-to-face meetings in Kingston on December 6-7, 2014 and in Vancouver on December 11-12, 2014, respectively. The other reviews were held through a teleconference-based process: the DEAP-3600 review was held on November 25, 2014 and January 14, 2015, and the BELLE-II review was held on January 7 and 16, 2015.

The reviews were carried out by *ad hoc* or standing Committees of experts. Full reports with recommendations, including budget recommendations when applicable, were prepared for SAPES. The reports, without the budget recommendations, were sent by NSERC to the applicants prior to Large Project Day. The reports *with* the budget recommendations are sent to the applicants after the results of the competition are announced.

Moreover, the Chair attended the meeting of the Advisory Committee on TRIUMF (ACOT) held on October 3-4, 2014.

VII. Large Project Day

It has proved extremely useful to devote one day prior to the beginning of the competition to presentations by applicants of Discovery and MRS grant applications typically

requesting an average of $500k per year or more, besides applicants of Category-2 or Category-3 RTI grant proposals. This is referred to as Large Project Day (LPD). These large proposals are typically complex, with extensive budgets, international commitments and project planning timelines which go far beyond those of smaller scale grant applications. The success or failure of a scientific program can depend on factors beyond the control of the Canadian research team. There have been notable examples in recent years in which the funding decisions in a host country forced changes in the scientific direction of the Canadian team between time of grant submission and assessment by SAPES. The opportunity to question the projects in writing and in-person in advance of the SAPES deliberations is critical to a thorough evaluation and a judicious recommendation to NSERC.

The focus of LPD is to meet with representatives of large Canadian projects. However, it is also now customary to meet on LPD with management representatives from the Canadian Institute of Nuclear Physics (CINP), the Institute of Particle Physics (IPP), the Perimeter Institute, SNOLAB, and TRIUMF. LPD was held this year in Ottawa on Sunday, March 8, 2015. The agenda is attached as Appendix 1.

The day began with *in camera* presentations. Garth Huber (Executive Director of the CINP) presented on behalf of the CINP, with Paul Garrett available by teleconference for questions on the CINP MRS grant application. The *in camera* session continued with presentations by Peter Krieger (Member of the Scientific Council for the IPP), Philip Schuster (representing the Director of the Perimeter Institute), Nigel Smith (Director of SNOLAB), and Reiner Kruecken (Head of the Science Division at TRIUMF). They provided the Section with the perspective of the communities served by their organizations and answered questions previously submitted by the Evaluation Section. Applicants then made presentations and answered questions previously submitted by the Evaluation Section; this was done in an open session that was attended by about twenty members of the community. The invited grant proposals were, in order of presentation, the projects TITAN, Belle-II, and ATLAS, the Category-3 RTI for fundamental SRF research at TRIUMF, and the projects IceCube, SNO+, and SuperCDMS.

VIII. Beginning of the Competition

The funds available to the Section at the beginning of the competition are shown in Table 1.

There was a forward borrowing of $23k from last year's competition into this year's budget, mostly due to adjustments on ongoing instalments.

Taking into account on-going commitments from previous competitions, $11.432M was available for the 2015 competition (53% of the envelope). This year, SAPES received 58 applications. At the start of competition, the total funds requested for fiscal year 2015 amounted to $17.780M. Consequently, at that point in the competition, the projected average funding rate for fiscal year 2015 was 64%. For comparison, the funding rates for

the years 2007 to 2014 were 55%, 66%, 66%, 46% (57% without SNOLAB operations), 61%, 69%, 53%, and 52% respectively.

2015 Competition - Subatomic Physics Envelope Budget
BEGINNING OF COMPETITION

(millions of dollars)

Budget Item	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
Base Budget[1]	21.188	21.188	21.188	21.188	21.188	21.188	21.188
Cumulative Permanent Transfers:							
New Applicants / Early Career Researchers[2]	1.702	1.747	1.747	1.747	1.747	1.747	1.747
Transfers due to population dynamics[3]	-0.223	-0.241	-0.265	-0.265	-0.265	-0.265	-0.265
Budget 2014 addition of funds[5]				0.474	0.632	0.790	0.790
Temporary Transfers:							
Forward-Borrow	-0.150	-0.150	0.000	0.000	0.000	0.000	0.000
Total Fiscal Year	22.517	22.544	22.670	23.121	23.302	23.460	23.460
Actual Spending by End of Yearly Competitio	22.717	22.555	22.680				
Carry-forward[4]	0.049	0.038	-0.023				
Commitments				-11.690	-5.918	-1.236	-0.636
Available for competition				11.431			

[1] *Includes any past (re-)allocations and transfers from other programs.*

[2] *Following Budget 2011, a supplement of $5,000 was provided towards the support of each Early Career Researcher (active grant) starting from FY2011. The cumulative increase to the envelope has been of $125k (up to 2013-14).*

[3] *Net total of grants held by returning applicants whose new applications are transferred in/out from SAP Evaluation Section.*

[4] *For each year, the carry forward is calculated by subtracting the actual spending from the total fiscal year allotment, then adding the previous year's carry-forward amount.*

[5] *Following Budget 2014, new funds are being phased into the enevelope over a three-year period, beginning in FY2015.*

Table 1. Overall budget available at the beginning of the 2015 competition.

IX. The 2015 Competition

On Thursday, March 5, 2015, the Section held a teleconference in order to prepare for the competition. During this teleconference, members were reminded of policies and procedures, and the competition budget was presented.

The competition was held in Ottawa over a period of five days, from Monday, March 9 to Friday, March 13, 2015. The first day started with a review of the logistics. The Evaluation Section then started Round 1 of the competition, and proceeded with the review of the applications.

The format of the discussions strictly followed NSERC's guidelines and SAPES internal procedures. Previously, in the fall of 2014, at least two SAPES members were assigned to conduct an *internal* review of each application. During competition week, for each application, the first internal reviewer presented all aspects of the proposal and made his/her recommendations (ratings, funding, duration). This was followed by additional comments and/or a presentation by the second internal reviewer, who also made recommendations. For grant applications requesting support in excess of an average of $500k per year, or for Category 3 RTI grant applications, a third presentation, concentrating on budget matters, was made. These in-depth assessments were carried out independently by the internal reviewers (who were not aware of the other's identity before the first reviewer's presentation), and took into account the reports received from external reviewers, if available, as well as reports from *ad hoc* expert committees where applicable. Each application was then thoroughly discussed by all SAPES members. At the end of the discussion, each member was asked to rate the application against NSERC's selection criteria: (i) excellence of the researcher(s), (ii) merit of the proposal, (iii) contributions to the training of Highly Qualified Personnel (HQP), and (iv) need for funds. SAPES then decided whether to recommend funding the application, the level of funding, and the funding duration. Any recommendation was determined through secret electronic voting. The median vote was selected as the final SAPES recommendation. Members in conflict with any particular application left the meeting room before the internal reviewers were identified and the application was discussed; they were never informed, even by the end of the competition, of the final result or of the identity of the internal reviewers.

The entire Section reviewed experimental Individual, Team, and Project Discovery grant applications as well as any Categories 2 and 3 RTI proposals. The entire Section also reviewed Category 1 RTI proposals that were tied to Project grant applications and theory applications where additional expertise was needed in the review. Once these reviews were completed, SAPES members were divided into two sub-Sections: theory and RTI-1/MRS sub-Section. The theory sub-Section reviewed all the theory Individual grant applications. The RTI-1/MRS sub-Section reviewed the Category 1 RTI grant requests (up to $150k requested in total).

As usual, it was strictly forbidden for SAPES members to keep a cumulative total of the recommended awards, in order not to bias the review of applications discussed towards the end, and to ensure that all applications were treated consistently and fairly. As a matter of fact, taking into account the members' conflicts of interest and the split into two sub-Sections, such budget tracking is practically impossible.

Moreover, in order to ensure the integrity of the review process, applications could be flagged by any SAPES member, the Program Officer, or the Team Leader at any time in Round 1, if he/she felt that some aspects of the discussion or the recommendation necessitated further deliberations. Flagged applications are re-discussed before the budget balancing discussion that concludes the deliberations of Round 1.

The Round 1 deliberations concluded in the mid-afternoon on Wednesday, March 11. The Team Leader made a presentation on the budget, taking into account the sum of the

recommended awards for all the applications. The result was that a sum of $13.133M had been recommended from the envelope, to be compared to a total of $11.431M that was available to SAPES, and $17.780M in requested funds.

Prior to the start of Round 2, a thorough discussion took place to establish the guiding principles for the re-evaluation of all proposals in an attempt to balance the budget. The SAPES members were unanimous that the same set of principles would be applied to all proposals, that all proposals would again be assessed strictly on their merits, and that strict account would be taken of the Section's evaluations of the four criteria for each proposal, which had been recorded in Round 1. All applications were then re-assessed and revised funding recommendations made, again using secret electronic vote. As in Round 1, any application could be flagged if someone felt that some aspects of the re-assessment or the revised recommendation necessitated further deliberations.

The Round 2 deliberations concluded in the afternoon of Thursday, March 12. The Team Leader presented the results: the revised recommendation by the Section was for $11.496M from the envelope, compared again with the available sum of $11.431M. During the Competition, however, $47k in additional funds was secured for the SAP envelope, bringing the available sum to $11.478M.

At that stage, the SAPES members carefully reviewed the distribution of the recommended budget amongst the various categories of grant applications assessed within the envelope: research operating grants (Individual, Team and Project Discovery; MRS); Categories 2 and 3 RTI grants; and Category 1 RTI grants. The exercise was conducted at a "global" category level and no specific application was singled out or discussed during this process. The Section agreed to forward borrow $18k from the 2016 competition.

With a recommended total funding of $11.496M from the envelope and a total request for $17.780M, the funding rate for this year's competition is 65%.

X. End of Competition Results

The Section's final multiyear budget, broken down by breakdown of equipment, theory, experimental operating, and MRS allocations is shown in Table 2, while Table 3 gives the percentage share of the envelope in theory, equipment, and operations over the period from 2007 through 2015.

As forecast in the 2006 Long-Range Plan and confirmed in the 2011 Long-Range Plan, these figures provide quantitative measures of the funding crisis that continues to loom over the Canadian SAP community. The share of the envelope now committed to the support of research operations is at a record high, with little room for small-scale capital investments that are critical for emerging research endeavours.

Small-scale capital investments by SAPES, mostly for proposals that fall outside the mandate of the CFI, are needed for R&D efforts that are crucial for the future of Canadian

SAP, and to satisfy the capital needs of the smaller programs that are essential to the breadth of the community. Due to the long cradle-to-grave time scale of subatomic physics research programs, some overlap between current and next-generation discovery endeavours is unavoidable if Canada is to continue to play a leading scientific role in next-generation forefront research projects. At a time when Canadian researchers are actively and fruitfully exploiting the public investments made to date in leading endeavours, it would not be opportune to consider re-allocating a substantial part of the support to these efforts towards small-scale capital investments.

XI. Recommendations to the DAS Program

This is the eighth year of the Discovery Accelerator Supplements (DAS) program. The present objective of this program is to provide substantial and timely additional resources to researchers who have a superior research program that is highly rated in terms of originality and innovation, and who show strong potential to become international leaders within their field. SAPES directly allocates one DAS award. During the regular deliberations for each Individual and Team Discovery grant application, SAPES members could put forward the applicant(s) after the deliberation and vote. Following the final round, once the competition budget is balanced, all the potential candidates are discussed in detail against the DAS selection criteria and objectives. Subsequently, the members rate each candidate on a scale of 1 (very well) to 4 (No Support) through a secret vote, and the nominee(s) are selected by numerical tally of the Section's votes. This year, the Section quota for DAS nominees was one (1), as in recent years.

The DAS program is not aimed at Project grant applications. As indicated in the 2009 annual report, a procedure is available for any member of a Collaboration submitting a Project grant application to be considered by SAPES for the DAS program.

XII. Policy Matters

At the end of the competition, the Evaluation Section and NSERC representatives came together for a session devoted to policy matters. Pierre Charest (Vice-President, Research Grants & Scholarships), Elizabeth Boston (Director, Mathematical, Environmental and Physical Sciences), and Rawni Sharp (Research Ethics and Environmental Assessment Coordinator) attended this session.

Members of SAPES were asked to comment on the current Conflict of Interest guidelines and to recommend ways in which these could be adapted to enable an increase in the number of Canadian experimentalists on the Evaluation Section. The Section members noted that the Conflict of Interest rules are appropriate for individual grant applications but may be too strict when applied to larger projects, and they discussed examples where they felt the conflict of interest rules may be too strictly interpreted. International members put forward some examples of Conflict of Interest rules from other countries. SAPES members commented on the importance of having Canadian experimentalists as members of the Section.

Other topics discussed included: the role of Expert Review Committees, which are highly valued by the Section; the content of Messages to Applicants and how these could be improved; suggestions for continued improvement to the format of the CCV; and meeting logistics.

SUBATOMIC PHYSICS ENVELOPE MULTI-YEAR COMMITMENTS BY CATEGORY End of 2015 Competition					
	2015	2016	2017	2018	2019
RTI - COMMITTED	$21,000	$0	$0	$0	$0
RTI - NEW (2015 Competition)	$264,285	$85,000	$35,000	$0	$0
RTI - TOTAL	**$285,285**	**$85,000**	**$35,000**	**$0**	**$0**
THEORY - COMMITTED	$2,344,700	$1,616,700	$1,080,200	$526,000	$0
THEORY - NEW (2015 Competition)	$1,116,100	$1,088,100	$1,078,100	$949,100	$949,100
THEORY - TOTAL	**$3,460,800**	**$2,704,800**	**$2,158,300**	**$526,000**	**$0**
EXP OPS** - COMMITTED	$7,402,000	$4,181,000	$156,000	$110,000	$0
EXP OPS - NEW (2015 Competition)	$9,648,470	$8,436,370	$7,671,420	$151,370	$144,957
EXP OPS - TOTAL	**$17,050,470**	**$12,617,370**	**$156,000**	**$110,000**	**$0**
MRS - COMMITTED	$1,922,000	$120,000	$0	$0	$0
MRS - NEW (2015 Competition)	$467,444	$476,207	$484,173	$46,000	$48,000
MRS - TOTAL	**$2,389,444**	**$596,207**	**$484,173**	**$46,000**	**$48,000**
TOTAL - COMMITTED	$11,689,700	$5,917,700	$1,236,200	$636,000	$0
TOTAL - NEW (2015 Competition)	$11,496,299	$10,085,677	$9,268,693	$1,146,470	$1,142,057
GRAND TOTAL	**$23,185,999**	**$16,003,377**	**$10,504,893**	**$1,782,470**	**$1,142,057**
TOTAL ENVELOPE	**$23,190,811**	**$23,351,331**	**$23,509,251**	**$23,509,251**	**$23,509,251**
REIMBURSEMENT - FORWARD BORROW FROM PAST COMPETITIONS	**-$22,931**	**$0**	**$0**	**$0**	**$0**
FORWARD BORROW FROM FY2016 / AVAILABLE	**-$18,119**	**$7,329,835**	**$13,004,358**	**$21,726,781**	**$22,367,194**

Table 2. Breakdown of multiyear commitments at the end of the 2015 competition.

Subatomic Physics Evaluation Section
Evolution of Envelope's Shares

	2015	2014	2013	2012	2011	2010	2009	2009	2008	2007*
Theory	15%	14%	14%	14%	14%	14%	14%	14%	15%	16%
RTI	1%	5%	3%	3%	6%	4%	8%	8%	16%	14%
Total Research Ops	84%	81%	83%	83%	80%	82%	82%	82%	69%	70%
Exp. Ops	74%	71%	73%	72%	68%	69%	69%	69%	59%	61%
MRS	10%	10%	10%	11%	13%	13%	13%	13%	11%	10%

** Takes into account the fact that SNOLAB's MRS grant was subsequently paid from outside the envelope.*

Table 3. Envelope share in theory, experimental operations, and equipment, from 2007 to 2015.

Appendix 1

SUBATOMIC PHYSICS EVALUATION SECTION

2015 COMPETITION

LARGE PROJECT DAY

Sunday, March 8, 2015
Room 18-125 (18th Floor), Tower 2
Constitution Square, 350 Albert Street, Ottawa, Ontario

8h00 - 8h25	***Committee meets in camera***	
8h25 - 8h50	Meeting with the Canadian Institute of Nuclear Physics – *in camera*	*G. Huber / P. Garrett*
8h50 - 9h10	Meeting with the Institute of Particle Physics – *in camera*	*P. Krieger*
9h10 - 9h30	Meeting with Perimeter Institute – *in camera*	*P. Schuster*
9h30 - 10h00	Meeting with SNOLAB – *in camera*	*N. Smith*
10h00 - 10h30	Meeting with TRIUMF – *in camera*	*R. Kruecken*
10h30 - 10h50	***Coffee Break***	
10h50 - 11h25	Precision measurements with the TITAN ion trap system at ISAC	*J. Dilling*
11h25 - 12h00	The Belle II Project The Belle II Calorimeter R&D	*M. Roney*
12h00 - 13h00	***Lunch***	
13h00 - 13h45	The ATLAS Experiment at the CERN LHC	*R. McPherson*
13h45 - 14h20	Fundamental SRF Research into Niobium and New Materials	*R. Laxdal*
14h20 - 14h55	IceCube data analysis and detector upgrade developments	*D. Grant*
14h55 - 15h15	***Coffee Break***	
15h15 - 16h00	SNO+ Completion, Commissioning, Operations and Early Data	*M. Chen*
16h00 - 16h35	SuperCDMS SNOLAB construction	*W. Rau*
16h35	***Committee meets in camera***	

Presentation Time Requirements:	20 min. presentations: 15 min. for presentation and 5 min. for Q&A 25 min. presentations: 15 min. for presentation and 10 min. for Q&A 30 min. presentations: 20 min. for presentation and 10 min. for Q&A 35 min. presentations: 20 min. for presentation and 15 min. for Q&A 45 min. presentations: 25 min. for presentation and 20 min. for Q&A