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# On Canada's Membership in the APCTP and the Canadian Theoretical Physics Landscape

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## ABSTRACT

Canada has just become a member nation of the APCTP. The idea that Canada could be a member started almost 8 years ago. In this essay I will try to recount my campaign for obtaining Canadian membership and also describe what I think the future of the membership could mean for Canada and the APCTP.

## INTRODUCTION

I first learned of the APCTP during a wonderful sabbatical leave that I spent from September 2007 to June 2008 at the Center for Quantum Spacetime, Sogang University, Seoul. My host was Professor Bum-Hoon Lee, who is now the president of the APCTP. During my visit, I participated in many activities of the Korean Physical Society, but also activities that were organized by the APCTP. In the early spring of 2008, I went to a meeting at the headquarters of the APCTP in Pohang. I was immediately enchanted by the facilities. During the meeting, I was approached by Professor Seunghwan Kim, who was the Executive Director of the APCTP at that time. He decried the fact that not a single nation from the eastern side of the Pacific was a member nation of the APCTP. He asked me if I could help to secure Canada as a member country. I felt it was a wonderful opportunity, and I agreed to try my best to convince the Canadian theoretical physics community to join.

## MEMBERSHIP VISION FOR CANADA

When I returned to Canada in September of 2008, I started informally discussing with my colleagues about pursuing Canadian membership in the APCTP. The

APCTP already had some ties with Canada. Three theoretical physics institutes in Canada had signed Memoranda of Understanding (MOUs) with the APCTP: the Pacific Institute for Mathematical Sciences in Vancouver, the Perimeter Institute for Theoretical Physics in Waterloo, Ontario, and the Centre de Recherche Mathématiques, Montreal. The APCTP also has had a tradition of funding external activities in Canada, such as the annual Summer School/Workshop on Particles, Fields and Strings and variations of those themes that was established by Professor Gordon Semenoff of UBC in Vancouver. With the facilities in Pohang and the opening to the rest of the Asia Pacific member nations afforded by membership in the APCTP, it would be clearly beneficial for Canada to become a member.

However, Canada is geographically a large country with a sparse population. I felt that it would be important that a reasonable distribution of institutes, geographically and in terms of fields of study, should contribute to the membership fee. In that way, all Canadian theoretical physicists could feel that the membership was theirs, and not related to a particular institute or a particular field of study. I thought that five institutes, spread over the entire country from west to east would be an appropriate distribution. I felt that a \$2,000.00 contribution from each institute with a guarantee for five years as a trial period would be a reasonable first run.

I spoke informally with many well-known stalwarts of the Canadian theoretical physics scene. I felt the response was largely favourable; however, there was always a question as to how exactly Canada would benefit from mem-

bership. I also spoke with the directors of the original three institutes, which had MOUs already in place with the APCTP, with an explicit request to push forward with the gathering of amounts needed for the membership. Professor Rob Myers was very positive about the proposal and confirmed that the Perimeter Institute would be ready to fund the initiative. I tried informally to get the backing from four other institutes in Canada, but after four years of little progress, I felt I was hitting a brick wall. At that point I realized that to push for a distributed membership required a formal organization that would take charge of the membership administration and responsibility for its obligations. This led me to think of the Canadian Association of Physicists.

### **THE CANADIAN ASSOCIATION OF PHYSICISTS AND ITS DIVISION OF THEORETICAL PHYSICS**

The Canadian Association of Physicists (CAP) is the nation-wide umbrella organization that represents all of physics in Canada. Its multitude of divisions represent all of the areas of physics that are studied in Canada. Its Division of Theoretical Physics (DTP) is ideally suited to taking on the charge of obtaining the guarantees of funding for the membership dues. Therefore I proposed at the DTP meeting in 2012 that the DTP formally take charge of the dossier and that the vice-chair of the DTP be charged with the task of obtaining funding for a five-year membership period from various theoretical physics institutes in Canada. The proposal was overwhelmingly adopted at that meeting, and the vice-chair at the time, Professor Arundhati Dasgupta, began an official fundraising campaign sanctioned by the DTP. Following her term, Professor Svetlana Barkanova became the vice chair. She continued the fund raising campaign and managed to obtain the backing of TRIUMF: Canada's National Particle and Nuclear Physics Laboratory. The target funding institutions and of course the institutions in Canada that would be involved in research collaborations with the APCTP membership would be, from west to east: The Pacific Institute for Mathematical Sciences (Vancouver), The Pacific Institute for Theoretical Physics (Vancouver), The Quantum Matter Institute (Vancouver), TRIUMF (Vancouver), The Theoretical Physics Institute (Edmonton), The Institute for Quantum Information Technology (Calgary), The Winnipeg Institute for Theoretical Physics (Winnipeg), The Perimeter Institute for Theoretical Physics (Waterloo), The Institute for Quantum Computing (Waterloo), The Canadian Institute for Theoretical Astrophysics (Toronto), The Fields Institute

for Research in Mathematical Sciences (Toronto), The Centre de Recherche Mathematiques (Montreal), The Physics of Quantum Information Research Team (Sherbrooke), The Atlantic Association for Research in the Mathematical Sciences (Atlantic Canada), The Canadian Institute for Advanced Research (pan-Canadian) and the Institute for Particle Physics (pan-Canadian). These institutes cover the gamut of theoretical physics, including condensed matter physics, particle physics, fundamental/mathematical physics (including strings, gravity and field theory), astrophysics, and quantum information theory.

As the required backing was not materializing, at the 2014 DTP meeting, I asked if I could be formally deputized to take over the task of obtaining the necessary funding for the membership, which was quickly accepted. I managed to obtain a guarantee of funding from the Theoretical Physics Institute, Alberta; therefore, we had the backing of Perimeter Institute, Triumf, and the Theoretical Physics Institute. I visited Sogang University in March 2016 and spoke with APCTP president Bum-Hoon Lee and Executive Director Han-Yong Choi, and together we realized that I had been trying to get the required backing for eight years, and perhaps it would be sensible to accept Canada as a member of the APCTP for a trial period of three years. This period would give us the opportunity to demonstrate unequivocally what a great benefit to Canada it is to be a member of the APCTP.

Thus, at the Annual Congress of the CAP held at the University of Ottawa in June 2016, the entry of Canada as a member of the APCTP was formalized. Professor Bum-Hoon Lee came to the meeting in Ottawa, as did representatives of the three funding organizations. President Lee and the President of the CAP, Professor Adam Sarty, signed the formal membership agreement.

### **EXPECTATIONS FOR THE FUTURE**

Now that Canada is a member of the APCTP, what can we expect in the coming years? Clearly, the intersection of Canadian physics and Korean physics, along with physics in the other member nations of the APCTP will be greatly increased. There will not only be participation in joint activities at the APCTP facilities in Pohang, but also at other external activities of the APCTP in Korea, the other member nations, and of course, in Canada. The great importance of being a member of the APCTP is the access that it affords to the entire panoply of theo-

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retical physicists working throughout the Asia-Pacific sector. I have participated in a multitude of APCTP-sponsored activities not only held in Asia, but also in Canada, and the participation of so many scientists from all the member nations is uplifting to see. In the short term it is most important to demonstrate to the Canadian theoretical physics community that being a member in the APCTP is a win-win-win situation, for Canada, Korea, and the other member nations of the organization.

As a member nation, Canada will be involved with organizing APCTP activities, both at the headquarters in Pohang but also external activities in Canada, as well as in other member nations. This involvement will make the interaction between Canadian theorists and the theorists from the other member nations no longer superficial or cursory, but a profound, comprehensive and serious interaction, in principle at all levels: between advanced, se-

nior researchers, young rising junior faculty, postdoctoral researchers, and of course graduate students.

I also believe that the expansion of the APCTP to include other nations from the east side of the Pacific, notably the United States, but also the Central and South American countries would be most beneficial. This will give the APCTP a truly global reach in its purview. Canada becoming a member nation should be seen as an important step in the full evolution of the APCTP.

**Acknowledgement:** I thank Bum-Hoon Lee and Han-Yong Choi for helping make this dream a reality. I also thank Richard MacKenzie, Svetlana Barkanova, and Francine Ford at the CAP for doing the necessary for the signing ceremony at such short notice. Finally, I thank Rob Myers, Richard Sydora, and Jonathan Bagger for agreeing to fund this initiative.



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