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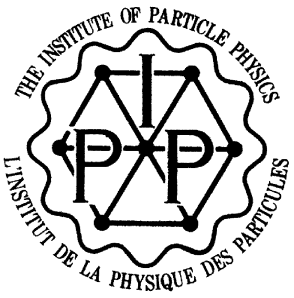

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Dr. Arthur Carty
National Science Advisor,
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85 Sparks St.
Ottawa, ON K1A 0A3

Dear Dr. Carty,

I am writing to you on behalf of the Canadian Institute of Particle Physics (IPP). Members of our community have read your discussion paper "A Framework for the Evaluation, Funding and Oversight of Canadian Major Science Investments" with interest and have several comments that I summarise here. I have solicited input from our 150 members across the country and discussed the paper with the six members of my advisory council. I hope you will find this input useful and look forward to further interactions as you implement such a framework.

Let me open by congratulating you on bringing the process to this point. Experimental particle physics requires major investments, such as those addressed by this framework. Our community has struggled with the variety of funding mechanisms available in Canada. We welcome your attempt to rationalise the process. We are particularly encouraged by your stated goal to address full life-cycle costs associated with major science investments. Recent experience with CFI projects has made it apparent that it is not just the initial capital investment that must be considered, but also operating, exploitation and decommissioning costs, when undertaking any such adventure. Subatomic physicists have long been aware that continued support for facility exploitation can be a much tougher sell than initial construction. Construction often implies direct benefits to Canadian industry and benefits other governmental jurisdictions while the exploitation "only" benefits scientists and students, sometimes at off-shore facilities. This has been a continuous struggle for us from the late 1980s with the ARGUS experiment at DESY in Germany, through the early 1990s when we were significant partners in the OPAL experiment at CERN. In both cases funding volatility forced our community to make scientific compromises that limited our involvement in projects that had seen significant initial Canadian capital investments. Currently, we are faced with the spectre of rescoping our involvement in the ATLAS experiment at CERN and are just beginning to address the funding for detectors at the new SNOLab facility, nearing completion in Sudbury. While the researchers usually recognise the full cost associated with these endeavours, our current funding system encourages us to compartmentalise funding requests in order to move forward. A scheme that took into account the full costs – but also appreciated all the benefits (scientific, economic and educational) – would have a significant, positive, impact.

The most commonly expressed concern about the document relates to the definition of the mechanism the MSIP uses to implement its decisions. While we understand it is difficult to identify a separate source of funds for big science projects, we are very concerned that the proposed framework would simply add another level of scrutiny and bureaucracy without providing obvious access to the resources necessary to make successes of the top ranked projects. We expect the MSIP would build on the peer-review that currently takes place within the individual agencies, however we might have expected it to have additional scientific prioritisation capabilities. Without a clear mechanism for the MSIP to implement successful projects it will be difficult (and potentially embarrassing) to involve top international peer-reviewers. We urge you to better define the mechanisms the MSIP would have at its disposal to implement positive recommendations.

We are also concerned by the explicit mention of a 3% funding level. While this may be the level that is currently invested in Canada, we point out that studies quoted in your talks over the last year indicate that Canada lags far behind other G8 countries in our investment in the physical sciences. This is, in part, due to the fact that we have not found an effective mechanism to fully support large science facilities such as particle accelerators and telescopes. While the US National Science Foundation (NSF) does invest about 3% of its resources in major research initiatives, it is a little known fact – even in Washington – that it is the US Department of Energy Office of Science (DOE OS) that provides the lion's share of funding for the physical sciences in the United States. The DOE OS invests $3.5B annually in research, the bulk of this in the physical sciences. Over half of these funds support their National Laboratory complex – arguably all major science investments – dwarfing contributions from the NSF. In one particular case – the US investment in CERN's Large Hadron Collider (LHC) – the DOE OS contributed 85% of the funding, with the remainder coming from the NSF. While this might not be entirely representative it seems clear that more than 3% of the US federal research resources are directed at major science initiatives. If Canada is to play a role on this scientific stage we need to find a way to enhance our investments. The MSIP is a welcome first step, but capping its resources at 3% of total expenditures would an unfortunate second step. A mechanism, where peer review could be used to establish an appropriate balance, would be most welcome.

One important aspect of international cooperation in big science projects is the ability to make long term scientific commitments. While Canada has done a better job of this than our neighbour to the south, in the recent past, a Canadian point of contact for such initiatives is often established in an ad-hoc way. As you suggest, the lead funding agency often plays this role, but it has only done so in cases where it felt able to accept full responsibility for the project in question. As projects get larger – exceeding the scope of any single Canadian funding agency – things can fall through the cracks. We would like to highlight two specific examples: 1) Canadian representation at CERN and 2) Canadian representation on the International Linear Collider (ILC) funding committee. First, Canadian researchers, with support from NSERC, have made highly visible contributions to CERN experiments (first OPAL and more recently ATLAS) over the last two decades. Recently TRIUMF has contributed to the refurbishment of the LHC injector complex. Together these contributions exceed $100M over two decades, far exceeding the contributions of several countries who have observer status at CERN. Being an observer to CERN council would give Canada a voice in the planning and evolution of the CERN scientific programme – that provides the research tools for over 100 Canadian researchers. Second, the particle physics community has identified an electron-positron linear collider (the ILC) as the

next major accelerator facility to be built as an international partnership. The researchers involved have started a world-wide grass-roots organisation to make the technical and scientific decisions necessary to make the project a success. Mirroring this, international partners have established a committee of Funding Agencies for the Linear Collider (FALC) that has met half a dozen times over the last three years. In both cases NSERC has been approached to champion Canada's interests. They have been reluctant to take on these roles, as their resources only allow them to provide part of Canada's contribution to these projects. Canada is missing important opportunities while the US, UK, EU and Japan have found ways to engage these bodies. While your document mentions Oversight and Monitoring Committees for projects that are underway it does not spell out how the MSIP might represent Canada's interests on such major science governance panels. We think this is an important aspect of an major science process.

Finally, several members of our community have commented on the ambiguity in the discussion paper on the role of the researchers in the proposed process. Perhaps most telling (or perhaps most confusing), in this regard, is the flow-chart in appendix A. We assume the research community would come forward with proposals to the box labeled “Proposal Development”. Proposals might also be identified by one of the existing funding agencies who would have a seat on the MSIP. Still there are worrying signs sprinkled throughout the document. For example, at the top of p14 you state that “sometimes communities need to be coaxed into action”. To what extent do you envisage a top-down process? Our community has been most successful when it has coalesced proposals from individual researchers, building a wide-spread community consensus that the science was the best available. In the few cases where a significant investment has been made to capitalise on the commitment of a funding agency or lab, we have struggled to maintain a vibrant community of researchers over the 10+ year lifetime of the project and the scientific payback has been sub-optimal. We encourage you to do everything you can to ensure that the initiatives considered by the MSIP are those of the research communities involved.

Just a couple of minor textual comments. We notice that the acronyms ATLAS and CERN are not defined in Appendix D. Similarly, the world-wide research community has now settled on a single design/technology for the linear electron-positron collider and dubbed it the International Linear Collider (ILC). It would be good to update the terminology in your document from “Linear Collider”, which was the generic term until August 2004.

Once again, let me thank you for undertaking this effort to rationalise the support for science in Canada. The particle physics community looks forward to helping further as your ideas come to fruition. We see significant benefits for Canada in the form of better science, the training of future generations of researchers with ties to the global scientific community and benefits to Canadian industry, if we are better able to engage credibly and effectively in such major international science projects.

William Trischuk
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