

THE LONG-RANGE PLAN FOR CANADIAN SUBATOMIC PHYSICS: 2027-2034

TERMS OF REFERENCE - May 16 2025

I. CONTEXT

The Canadian subatomic physics community establishes its scientific, and thus funding, priorities through periodic Long-Range Plans (LRP). These plans advise the Canadian subatomic physics research community and relevant stakeholders on priorities for both current and future endeavours. The most recent Long-Range Plan covered the period 2021-2026, in addition to providing an assumption-based forecast into 2036. A new LRP exercise is to be conducted. The new plan will be in effect from 2027 through 2034, with its scope extending through 2041. A renewal of this 2027-2034 plan will occur before 2033. The Canadian Subatomic Physics Long-Range 2027-2034 is jointly supported by the Institute of Particle Physics (IPP), the Canadian Institute of Nuclear Physics (CINP), the Natural Sciences and Engineering Research Council (NSERC) and the Canada Foundation for Innovation (CFI). The additional stakeholders, TRIUMF, SNOLAB, the McDonald Institute, and the Perimeter Institute are supportive of this process.

II. COMMITTEE

The LRP process will be driven by the Canadian subatomic physics community. A Committee will be asked to review this community's input and to formulate the Long-Range Plan. The LRP Committee will be composed of an appropriate number of experts who will cover the main sub-disciplines of subatomic physics in Canada, including both experimental and theoretical aspects: nuclear physics, nuclear astrophysics, physics of elementary particles and fields, and particle astrophysics. The Committee will be co-chaired by senior members of the research community with an extensive knowledge of the Canadian and international subatomic physics research environments. The membership may have some overlap with that of the previous LRP Committee to ensure continuity.

The following representatives from the LRP commissioning bodies will be non-voting members on the LRP Committee.

- Director of the Institute of Particle Physics
- Executive Director of the Canadian Institute of Nuclear Physics
- NSERC Manager working with subatomic physics
- CFI Associate Director of Programs working with subatomic physics
- Co-Chairs of the NSERC Subatomic Physics Evaluation Section for 2025-2026

In addition, the LRP Committee will invite *ex-officio* members who will be non-voting observers and resources for the other members:

- TRIUMF Director
- SNOLAB Director
- McDonald Institute Director
- Perimeter Institute representative

The LRP Committee may choose to hold certain closed sessions without the presence of *ex-officio* members.

III. MANDATE

The Committee is asked to identify subatomic physics scientific ventures and priorities that should be pursued by the community on a 7 to 14 year horizon and that would enable Canadian global scientific leadership, taking into account the following factors:

- the optimization of the human and financial resources of the Canadian subatomic physics community in terms of research excellence and impact
- the alignment of research endeavors with the established expertise and strengths of the Canadian community
- the need to coordinate large projects and collaborations with Canada's international partners in a manner that maximizes scientific excellence and impact
- the concurrent requirement to maintain and further develop world-class domestic research programs and infrastructure

Budgetary estimates, both for new capital investments and for operations, must be provided, including funding ranges for prioritized endeavours. These ranges should include funding levels that would allow for a restrained, yet efficient, contribution to the ventures, as well as levels that would enable a more extensive contribution. The scenarios also need to address the intellectual capacity available in the community. The overarching goal needs to be to facilitate coalescence around the most impactful projects.

To best make the case for continued and enhanced support for Canadian subatomic physics, the Committee is also asked to consider the broader impacts of Canadian subatomic physics research. These may include both current and projected industrial connections, the potential for exploiting IP generated by the community, and the enabling skills from an education in subatomic physics that can be applied to important societal needs. This could be done by highlighting successful graduates, entrepreneurs, and industry connections, or by statistical analysis of existing Canadian data.

The Committee's assessment will be based on a broad consultation with the Canadian subatomic physics community. The Committee will have to assess the scientific potential and international context of projects, and the alignment of intellectual and required financial resources needed to succeed. It is crucial that such an assessment be made through a fair and rigorous process.

The Committee is also asked to consider and discuss factors that affect the subatomic physics community and to make recommendations on how to possibly lessen any negative impacts they may have, or enhance any positive ones. Examples of such factors include, but are not limited to, various funding opportunities, the relationship between funding agencies and other organizations, the activities of national research organizations, and the international context.

The report must consider Equity, Diversity and Inclusion and the support of early career researchers within all elements of the report, where relevant, as these are integral aspects for advancing the impact of Canadian subatomic physics research.

IV. PROCESS AND TIMELINE

The LRP Committee membership recruitment will be completed by Spring 2025, and a kickoff meeting will be held immediately after. CINP and IPP will coordinate membership recruitment in consultation with the Committee Co-Chairs, NSERC, and CFI.

CINP and IPP will be tasked to prepare briefs for the LRP Committee. These briefs must summarize the scientific vision and priorities put forward by the sub-communities they represent and serve, including both experimental and theoretical facets. Overall recommendations may also be included in the briefs. It is expected that each institute will broadly consult with the sub-communities through various formats and ensure a fair and rigorous process. The briefs are to be submitted to the LRP Committee no later than November 30, 2025. The Institutes must ensure that the briefs are available to the entire community through their public websites. Eventual responses to the briefs by individuals or organizations would be accepted. Throughout the process, the LRP Committee may also solicit additional input from various sources, as it sees fit.

The LRP Committee will hold public consultations (town hall meetings) in early 2026, after receiving the briefs. Face-to-face or virtual meetings of the Committee will then be held up to the Summer of 2026.

V. Deliverables

The LRP Committee will submit its final report to CINP, IPP, NSERC and CFI no later than September 30, 2026. The report will be publicly released, thereafter, in both official languages.

VI. CONFLICTS OF INTEREST AND CONFIDENTIALITY

All members must strictly comply with the Code of Ethics and Business Conduct for Members of NSERC Standing and Advisory Committees. Moreover, for the purpose of this exercise, a member will be considered to be in a situation of conflict of interest during a discussion on prioritization of a specific endeavour that would directly benefit the member or the member's organization.
