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SUBJECT: U.S. Higgs Factory Coordination Consortium

The [2023 report](#) of the Particle Physics Project Prioritization Panel (P5), developed under the auspices of the High Energy Physics Advisory Panel, laid out a compelling scientific program that recommended world-leading facilities with exciting new capabilities, as well as a robust scientific research program. As part of the efforts to implement the P5 recommendations, the Government of the United States and CERN jointly signed a [Statement of Intent](#) (SOI) in April 2024 concerning future planning of large research infrastructures, advanced scientific computing, and open science. Among the topics, the SOI expresses our intention to collaborate in an off-shore internationally driven Higgs factory, where decisions to proceed are subject to appropriate approvals in the U.S. and at CERN including those that are taken following the next update of the European Strategy for Particle Physics. The U.S. is also engaged in feasibility and design studies towards a next-generation future collider. To that end, the U.S. Department of Energy (DOE) is hereby forming a nationally coordinated U.S. Higgs Factory Coordination Consortium for Accelerators (HFCC-A) to provide strategic direction and leadership for the U.S. community to engage, shape, and thereby advance the development of the accelerator for a potential future Higgs factory; and to ensure cooperation with our partners in the international program.

The U.S. HFCC-A is to coordinate efforts in the following areas:

- (1) Physics and technical feasibility studies, including any associated design and Research & Development (R&D) efforts, to continue to advance the accelerator designs for a future e^+e^- collider;
- (2) Prioritization and stewardship of the national accelerator R&D efforts should funds be identified by DOE;
- (3) Development of the pre-project accelerator R&D scope that will be required prior to DOE initiating any accelerator project at a future e^+e^- collider;
- (4) Conceptualization of the accelerator controls software and computing framework that will enable highly automated and remote operation while maintaining appropriate security;
- (5) In consultation with DOE program managers, develop various funding models that will be required to support the R&D efforts described in items (3) and (4) above; and

- (6) Ensure collaborations by the U.S. with our partners are cost-effectively carried out to advance the future Higgs factory initiatives. Such partner efforts include, but are not limited to, those being undertaken by a) the DOE Office of High Energy Physics (HEP) General Accelerator R&D program; b) the CERN-hosted Future Circular Collider (FCC) Feasibility Study; c) the International Committee for Future Accelerators; d) the International Linear Collider (ILC) International Development Team (IDT); e) the European Committee for Future Accelerators; and f) other major stakeholders.

The 2023 P5 strategic plan also recommended that once a specific off-shore Higgs factory project has been deemed feasible, DOE and the National Science Foundation are to convene a targeted panel to consider the nature and level of U.S. contributions in the specific Higgs factory, including an evaluation of the associated schedule, budget, and risks once such information becomes available. Correspondingly, the U.S. HFCC-A will be uniquely positioned to inform the deliberations of this P5-envisioned targeted panel.

The organization for the U.S. HFCC-A is given in Figure 1. At the highest level, the consortium is to be stewarded through the DOE HEP, under which the Higgs Factory Steering Committee for Accelerators (HFSC-A) is requested to steer the consortium and regularly report to DOE HEP on the status and progress of the various activities described above. Next, a Lab Coordination Group for Accelerators (LCG-A) is an integral part of the U.S. HFCC-A and serves as a forum for each DOE national laboratory that has expressed an interest to participate in Higgs factory efforts to engage in the process and interact with the HFSC-A. The current laboratories in the LCG-A, where one representative is to be designated by each lab, include:

- 1) Argonne National Laboratory (ANL)
- 2) Brookhaven National Laboratory (BNL)
- 3) Fermi National Accelerator Laboratory (FNAL)
- 4) Thomas Jefferson National Accelerator Facility (JLAB)
- 5) Lawrence Berkeley National Laboratory (LBNL)
- 6) Oak Ridge National Laboratory (ORNL)
- 7) SLAC National Accelerator Laboratory (SLAC)

Program managers from DOE will serve in an ex-officio capacity in the LCG-A. Subsequently, the HFSC-A is to coordinate its plans and efforts with external partners and other major stakeholders, including but not limited to university participants as well as representatives from the FCC International Steering Committee and ILC-IDT. The points of contact for each partner are to be determined by the HFSC-A in consultation with the LCG-A and DOE. A Diversity and Outreach Coordinator is to be appointed by the HFSC-A to ensure that the U.S. particle physics community is adequately informed of the planning and development efforts for a future Higgs factory, and that such efforts reflect the diversity of the community.

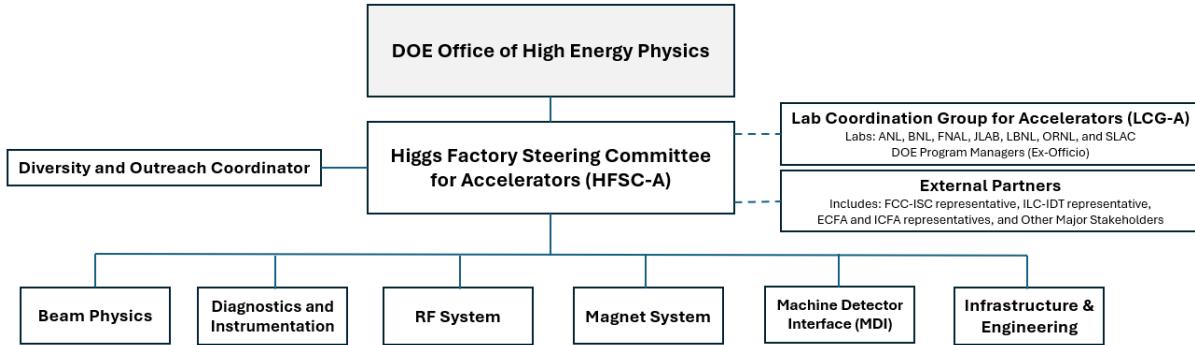


Figure 1: Organization of the U.S. Higgs Factory Coordination Consortium for Accelerators

As part of the U.S. HFCC-A structure and reporting directly to the HFSC-A, groups representing the various accelerator systems, as shown in Figure 1, are planned to undertake the associated topical conceptual design and R&D efforts. Several of the systems at this level naturally map onto the structure of the CERN-hosted FCC project collaboration structure and thereby help align U.S. efforts with those by our international partners. We request that the HFSC-A undertake a nomination process to identify individual experts from within the U.S. accelerator physics community to serve as the Level 2 R&D coordinators for these groups, with the selection of these coordinators subsequently to be made in coordination with the LCG and DOE.

Motivated by DOE's effort to bring the circular and linear collider communities together, the membership of the HFSC-A is composed of the current U.S. leaders of the community-driven e^+e^- collider teams:

- Drs. Tor Raubenheimer (SLAC)
- Dr. Steve Gourlay (FNAL)
- Dr. Matthias Liepe (Cornell University), and
- Dr. Jean-Luc Vay (LBNL)

The U.S. HFCC-A is to be initially chaired by Dr. Raubenheimer while Dr. Gourlay will serve as the Deputy Chair. Their appointment encompasses the period when the planning and R&D efforts might transition to the project phase, at which time it is expected that the U.S. institutions would naturally form collaborations to contribute to the work packages of an e^+e^- collider. Moreover, the U.S. HFSC-A members will serve as the national contacts to various international bodies and thereby help advocate U.S. interests for the Higgs factory.

As the U.S. HFCC-A carries out its efforts, periodic reports will be requested by DOE describing the status and progress of consortium activities as well as the progress of international efforts for an off-shore Higgs factory. Moreover, should any funds be allocated by DOE to the consortium's activities, agency reviews are anticipated to be scheduled, as needed, to ensure that U.S. national efforts follow DOE programmatic priorities and guidance and are aligned with international initiatives and efforts.

We truly appreciate the U.S. HFCC-A for undertaking these coordination and development efforts; your work is essential to develop the planning needed by DOE over the next years to ensure that the tradition of strong collaboration and effective leadership in particle physics in the United States continues at a future international off-shore Higgs factory.

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