

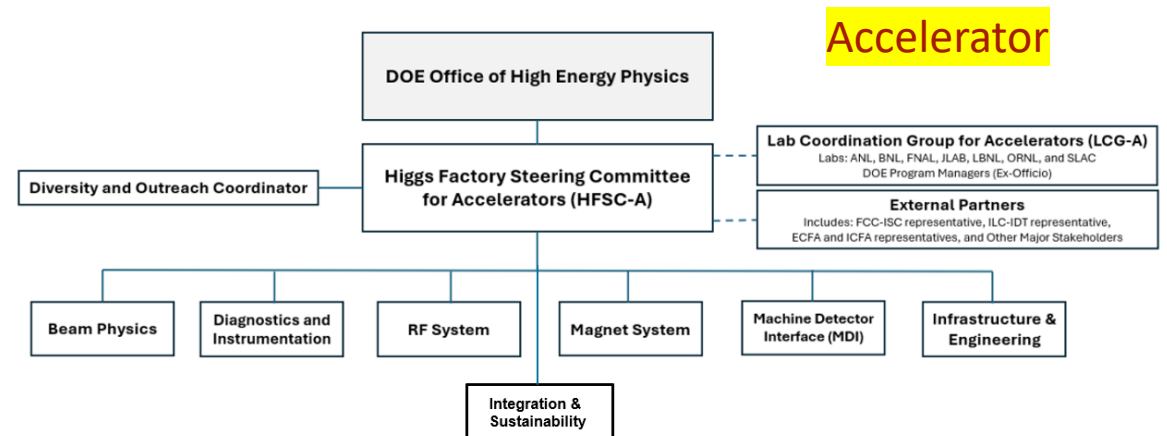
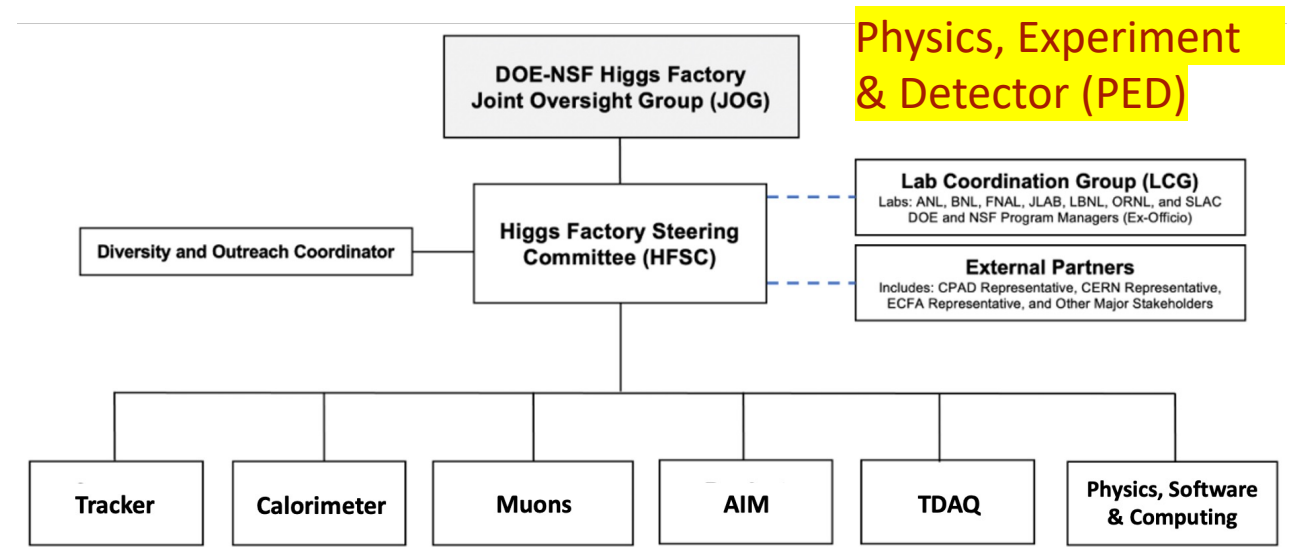
Introduction

This primary objective of this workshop is to engage the broader community to prepare the HFCC input to the ongoing update of the European Strategy for Particle Physics.

HFCC Organization

Created by DOE and NSF, **in response to the P5 recommendation**, the Higgs Factory Coordination Consortia (HFCC) provides strategic direction and leadership for the U.S. community to engage, shape, and thereby advance the development of the PED and Accelerator program for a potential future Higgs factory; and to ensure cooperation with our partners in the international program.

As part of the, the HFCC is responsible for preparing the charge input to the the ongoing ESPPU



Editorial Board

- DOE and NSF have requested an Editorial Board assume the responsibility of preparing the input to the ESG **in consultation with the U.S. community**.
 - This is an HFCC input to ESG, there will be other inputs from U.S.
- ESG consists of the members of the two steering groups (HFSC-PED and HFSC-ACC) and 4 early career scientists appointed by the agencies.
- Current Composition:
 - Josh Bendavid (MIT), Viviana Cavaliere (BNL),
 - Spencer Gessner (SLAC), Kellen McGee (FNAL)
 - Marcel Demarteau (ORNL), Sarah Eno (UMD), Ritchie Patterson (Cornell)
 - Steve Gourlay (FNAL), Matthias Liepe (Cornell), Jean-Luc Vay (LBNL)
 - Sriniraj Rajagopalan (BNL), Tor Raubenheimer (SLAC) - co-chairs of Ed Board
 - ex-officio:
 - Mike Tuts (US rep to ESG), Anadi Canepa (US rep to PPG), Jinlong Zhang (CPAD)

The state in Europe

- The 2020 ESPPU declared the “**electron-positron Higgs factory is the highest-priority next collider**”.
- In June 2021, CERN council approved and funded the FCC feasibility study with a focus on the first stage (FCC-ee).
- In 2024, mid-term review of FCC Feasibility Study was thought positive enough by CERN Council to accelerate the conclusion of the study.
- European Strategy Group (ESG), chaired by K. Jakobs, has been created to again provide an update to ESPP (ESPPU).
 - “To develop a visionary and concrete plan that greatly advances knowledge in fundamental physics through the realization of the next flagship collider at CERN, and to prioritize alternative options to be pursued if the preferred plan turns out not to be feasible or competitive”.
 - Submission of ESG Strategy document to CERN council early 2026.

U.S. input to ESG

- The U.S. is by far the largest national partner in CERN based projects and it is critical that we engage in the ongoing process and provide our comments.
- The U.S. Higgs Factory Coordination Consortia (HFCC-PED & HFCC-ACC) have been requested by DOE and NSF (for PED) to provide our input to the ongoing European Strategy Update.
- Our goal is to build on the P5 recommendations and consult with the U.S. community to deliver a coherent and focused input.
 - We are organizing several meetings with the wider US community to collect input.
- There will be two parts to our input:
 - A **strategic** input partly in response to the questions from ESG
 - A **technical** input highlighting the potential areas of U.S. contribution

U.S. input to ESG should:

- Be consistent with the P5 report
- Seek to engage the broad US HEP community in developing the HFCC input to ESG
- Emphasize P5 discussion on the need to maintain a well-balanced program and a vibrant scientific community while partnering in an off-shore Higgs Factory.
 - This includes U.S. hosted facilities such as DUNE, CMB-S4, etc, as well as an aggressive R&D program to support a 10 TeV pCM collider.
- Ensure coherency with other U.S. national inputs, including Muon Collider and DPF/DPB
- Recognize developments since P5, notably
 - Progress on the FCC feasibility study
 - Joint CERN/US statement
 - Limited funding allocated in US for HF R&D
- Capture US enthusiasm and ability to make critical technical contributions to both the accelerator and detector grounded on our decades of achievements.
- Respond to the ESG strategic questions, at least in part

Outline of the white paper (limited to 10 pages)

- Executive summary: ½ page
- Introduction: 1 page
 - set context, who is providing input. what is the scope. What have we done to collect input (process)
- U.S. position: 1 page
 - P5 priorities incl. on the importance of HL LHC and other on-shore program priorities
 - U.S. White House statement
- Experimental capabilities and opportunities for engagement (technical): 2 pages
- Accelerator capabilities and opportunities for engagement (technical): 2 pages
- Strategic discussion on choice of colliders: 2 pages
- Perspectives of the Early Career: ½ page
- Summary: ½ page.
- References: ½ page
- **Because of page limits, we will prepare more detailed documents and reference those from the main white paper.**

Technical Input

- Parallel sessions to discuss and document potential areas of U.S. involvement in an off-shore Higgs Factory. An overleaf template has been provided for each activity area. Input requested on:
 - Challenges/Requirements wrt the specific subsystem
 - U.S. capabilities and expertise (relying on our historical achievements)
 - Opportunities to leader technical developments
 - Potential U.S. institutes
- The potential opportunistic areas **do not** represent any commitment but serves to highlight the breadth of U.S. expertise and capabilities and where it could potentially assume responsibility.
 - The scope of the U.S. contribution will be assessed later, by a panel, as recommended P5 and subject to many factors.
- This workshop seeks to engage the community to develop the above narrative.
- Friday morning plenary session will hear reports from each technical area.
 - Aids to inform all on the activities in different areas as well as seek to put together a coherent U.S. input for ESG.
- Longer version of document in arXiv, Referenced from the main white paper.
- We must aim to complete the detailed document by end of January, a draft with the main elements will already be developed at this workshop.

Strategic Input

- ECFA has proposed a guideline (a set of questions) for providing strategic input to ESG.
- HFCC Editorial Board have put together a slide deck to address the questions, **intended to serve as a starting point for discussion** at this meeting (SLAC) as well as at the FNAL meeting in January.
 - The slide deck was made public on 12/17, posted on SLAC indico.
- During the Friday afternoon session, we will go through the slide deck and seek further comments from you on each of those questions.
 - We acknowledge that there will be a wide range of opinions, but we will consider your input. It will only serve to strengthen the U.S. input to ESG.
- Input from the community will be collected at SLAC, FNAL as well as from an online survey (and other private communications are encouraged).
- Editorial Board will subsequently provide a first draft of the white paper (~end of January) and further iterate with you at that time.

Timeline

- Slide deck addressing ESG questions: now
- Outline of white paper: now
- SLAC (PED) meeting: 12/19 – 12/20
- FNAL (ACC) meeting: 1/15 – 1/16
- 1st complete draft: 1/31
- 2nd complete draft: 2/24
- Joint meeting with MuC, DPF/DPB: 2/27– 2/28 (tbc)
- Draft sent to DOE/NSF: by 3/7
- White paper submission 3/28

Engaging Early Career

- A Higgs Factory will be built and operated by early career scientists
- Critical to engage the early career scientists who will be working on the experiments and accelerator. We also need to think about how to engage the pre-scientists who could be early career scientists in 20 years!
- Will have some direct input into the white paper from the EC members of the editorial board
- Early Career sessions are planned at SLAC/FNAL (Friday morning at SLAC)
- A web form has been constructed and distributed to gather input
 - **Aimed at Early career but decided to be more inclusive and open to anyone.**
- More details on ECR planning and the survey tomorrow.
 - **All ECR are encouraged to attend this session.**

Summary

- DOE/NSF have requested HFCC to provide input to ESG in consultation with the community.
 - This workshop serves to consult the community to collect comments and prepare our input.
- Several sessions today and concluding tomorrow morning to discuss technical input:
 - Emphasizing our historical developments and highlighting our expertise and capabilities in projecting our level of partnership and engagement in future colliders.
- Friday PM session to discuss the strategic input and collect comments.
- We are working to coordinate with other efforts (MuC, DPF/DPB)
- Have an aggressive timeline to complete the white paper