

*Paris Sphicas
CERN & NKUA
ECFA 3rd HET Factory Workshop
Paris, October 9, 2024*

- ❑ **Update of the European Strategy for Particle Physics (ESPP)**
 - ❑ Launch of the next (current) update
 - ❑ Secretariat, EDG, PPG and working groups
 - ❑ Working Groups and Conveners
- ❑ **ECFA guidelines for national HEP community inputs**
 - ❑ Lessons learned in 2018-2020 exercise
 - ❑ The guidelines
 - ❑ Questions/issues to be addressed
- ❑ **Goals of this workshop**

ESPP: organization, bodies and charges

ESPP (I): launch of next (current) update

□ In March 2024 CERN Council launched the new ESPP process:

□ Timeline:



ESPP (II): Secretariat, EDG, PPG and working groups

- **"Secretariat":**
 - Secretary (chair): K. Jakobs
 - CERN SPC chair: H. Montgomery
 - ECFA chair: PS
 - LDG chair: D. Newbold
 - M. Seidel from 1/1/2025
- **European Strategy Group (ESG):**
 - Secretariat (secretary chairs ESG);
 - One rep per CERN member state;
 - One rep per lab in LDG;
 - CERN DG, CERN DG-elect;
 - Invitees: PPG, President of Council, 1 rep from each Associate Member State and Observer State, 1 rep from EC; chairs of ApPEC, NuPECC, ESFRI
- **Physics Preparatory Group (PPG):**
 - Secretariat (secretary chairs ESG);
 - 4 people nominated by SPC
 - 4 people nominated by ECFA
 - 2 people nominated by Americas
 - 2 people nominated by Asia
 - 1 person nominated by CERN
- **Nine Working Groups (WGs):**
 - Last time's Computing and Instrumentation split (8 WGs of 2020 ESPP→ 9 WGs):
 - **Computing WG and Instrumentation WG**
 - **Increase engagement by HEP community:**
 - Each WG: only one co-convenor from PPG
 - Second co-convenor from SPC/ECFA lists
 - So: Ex-officio members (ECFA, SPC and LDG Chairs) and representatives from the Americas and Asia are not co-convenors.
 - **Role of representatives from Asia and the Americas, and ex-officio members and Chair: maintain coherence of overall effort.**
 - **Engage the generation most concerned: Each WG must appoint a scientific secretary who is an Early Career Researcher:**
 - A scientist without an indefinite position and within 10 years from PhD.
 - To be selected by convenors, using nominees collected by ECFA and their own knowledge of the people in the thematic area.

ESPP (III): Working Groups and Conveners

Charge to WG conveners:

- Selection of Early Career Scientists
- Definition of sub-topics and appointment of additional WG members
- Definition of Benchmark processes
- Organisation of WG meetings
- Writing the Physics Briefing Book (will be supported by Roger Forty, who has agreed to be Scientific Secretary of the Strategy update)

Instrumentation WG:

- The “portal” to all that we want the next ESPP to contain
- Co-convended by Thomas Bergauer and Ulrich Husemann
- Things to consider: areas of concentration; suggestions for key participants (to Thomas & Ulrich)
- Closer to EDP: it would be very useful to have active involvement by EDP members in the Instrumentation group

Working group	Co-conveners	Co-conveners
	PPG member	
Electroweak physics	Monica Dunford (DE, exp)	Jorge de Blas (ES, <u>theory</u>)
Strong interaction	Cristinel Diaconu (FR, exp)	Andrea Dainese (IT, exp, HI)
Flavour physics	Gino Isidori (CH, theory)	Marie-Hélène <u>Schune</u> (FR, <u>exp</u>)
BSM physics	Fabio Maltoni (BE/IT, theory)	Rebecca Gonzales-Suarez (SE, exp)
Neutrino physics and cosmic messengers	Pilar Hernandez (ES, theory)	Sara Bolognesi (FR, exp)
Dark matter and dark sector	Jocelyn Monroe (UK, exp)	Matthew McCollough (CERN, theory)
Accelerator science and technology	Gianluigi Arduini (CERN, acc)	Phil Burrows (UK, exp, acc)
Detector instrumentation	Thomas Bergauer (AT, exp)	Ulrich Husemann (DE, exp)
Computing	Tommaso Boccali (IT, exp, comp)	Borut Kersevan (SL, exp, comp)

10 European countries and CERN represented
12 men, 6 women; 13 experiment, 5 theory

ESPP (IV): responsibilities of PPG/WG and ESG

PPG: Physics + Technology working groups

- Electroweak physics (including Higgs physics)
- Strong interaction
- Flavour physics
- Beyond the Standard Model physics
- Neutrino physics and cosmic messengers
- Dark matter and dark sector
- Accelerator science and technology
- Detector instrumentation
- Computing

à **Physics Briefing Book**

ESG: Overarching topics

- **National input / roadmaps (à strategic)**
- **Projects (FCC, LC, LE-FCC-hh, MC, ..)**
(**timeline, costs, (physics à PPG)**)
- Comparisons across proposed projects
- Relations with other fields of physics
- Implementation of the Strategy
(role of CERN and National Labs, coordination of European participation in projects sited outside Europe, ...)
- Knowledge and Technology transfer
- Sustainability, environmental impact
- Public engagement, education, communication
- ...

**ESPP: ECFA guidelines
for inputs by the
National HEP communities**

ESPP: Some lessons learned from 2020 update

- **Last ESPP: there was a round of receiving “national inputs”**
 - Responses varied widely:
 - For small(er) countries, feedback was ~uniform and easy to interpret.
 - For large(r) countries, feedback was non-uniform, often favoring multiple priorities (e.g. type of next collider)
 - Wide range of responses made it difficult to summarize the “opinion” or “position” of several countries
 - Lesson learned: while it will always be difficult to summarize the “position” of an entire country, at least we can aim at uniform responses and targeted questions.
- **Plan for ECFA: facilitate wide discussion(s);**
 - Engage maximum number of colleagues, especially ECRs
 - Guide the formation of the “national inputs” to better inform the ESPP process.
 - National inputs can be collected individually by each single country or a group of countries/region.
 - Formulated set of questions and issues for discussion by national communities
 - Clearly, not an exclusive list, countries/groups could/should add their own issues/concerns/wishes etc

[Link to ECFA guidelines](#)

ECFA guidelines for national inputs to the ESPP

- **Suggest: two national community (“town-hall” or similar) meetings.**
 - Clearly, each country/region remains at liberty to decide on the number.
 - The meeting(s) could/should be co-organised by the RECFA delegate and the country’s representative on the ESG (for some countries this is the same person).
 - Suggested timing of town-hall meetings (beyond any meetings prior to March 2025):
 - After contributions are in (end March 25) and before Open Symposium
 - After release of Briefing Book (end Sep 25)
 - National inputs to the ESPP update can be sent at different points in time:
 - Prior to the deadline of 31 March 2025 for the submission of input to the ESPP;
 - After March 2025 deadline and by 26 May, in time for Open Symposium;
 - After Briefing Book, by 14 Nov 2025, in time for ESPP Drafting Session.
- **To be of greatest use in informing the ESPP, the information collected must be as coherent and as uniform as possible, especially when addressing the key issues.**
 - **ECFA has drawn a list of “standard questions” to be addressed by the national communities**

National Input on “next collider at CERN” (I)

Central element of the next ESPP: the choice of next collider at CERN.

ESG remit: “The Strategy update should include the preferred option for the next collider at CERN and prioritised alternative options to be pursued if the chosen preferred plan turns out not to be feasible or competitive”.

→ It is imperative that the European HEP community should provide explicit feedback on both the preferred and alternative options for this “next collider at CERN”, which will be the Laboratory's next flagship project, and an explanation of any specific prioritisation.

- a) Which is the preferred next major/flagship collider project for CERN?
- b) What are the most important elements in the response to (a)?
 - i) Physics potential
 - ii) Long-term perspective
 - iii) Financial and human resources: requirements and effect on other projects
 - iv) Timing
 - v) Careers and training
 - vi) Sustainability

National Input on “next collider at CERN” (II)

c) Should CERN/Europe proceed with the preferred option set out in (a) or should alternative options be considered:

i) if Japan proceeds with the ILC in a timely way?

ii) if China proceeds with the CEPC on the announced timescale?

iii) if the US proceeds with a muon collider?

iv) if there are major new (unexpected) results from the HL-LHC or other HEP experiments?

d) Beyond the preferred option in (a), what other accelerator R&D topics (e.g. high-field magnets, RF technology, alternative accelerators/colliders) should be pursued in parallel?

e) What is the prioritised list of alternative options if the preferred option is not feasible (due to cost, timing, international developments, or for other reasons)?

f) What are the most important elements in the response to (e)? (The set of considerations in (b) should be used).

National Input on non-collider projects and other fields

Remit to ESG also specifies:

“The Strategy update should also indicate areas of priority for exploration complementary to colliders and for other experiments to be considered at CERN and at other laboratories in Europe, as well as for participation in projects outside Europe.”

It would thus be most useful if the national inputs explicitly included the preferred prioritisation for non-collider projects. Specific questions to address:

- a) What other areas of physics should be pursued, and with what relative priority?

- b) What are the most important elements in the response to (a)? (The set of considerations as for the “next collider” should be used).

- c) To what extent should CERN participate in nuclear physics, astroparticle physics or other areas of science, while keeping in mind and adhering to the CERN Convention? Please use the current level and form of activity as the baseline for comparisons.

Goals of this workshop

What we have to do

- **This is the third and final workshop in the HET factory series**

- **Goals:**
 1. Review where we stand. Assess what is mature and ready to go into the Report.
 2. Define first draft of skeleton/items that will be included in the final Report
 3. Estimate what else can be completed in the next few weeks so it can be included in the Summary Report.
 4. Take the oath of finishing it all, having it approved by RECFA and submitting it in time for the March 31st deadline for contributions to the ESPP

- **A few parting words:**

Analyses/work/results that may mature on a longer timescale should not (and will not) be ignored.

There is the possibility of submitting a short addendum to our report in time for consideration at the Symposium.