



University of Antwerp
| Particle Physics Group

European Strategy for Particle Physics Update

Belgian community input

5 February 2025

What is the ESPP?

European Strategy for Particle Physics

- Mandated by the CERN Council to set the long-term future of the field
- Regularly updated (previously in 2013 and 2020)
- <http://europeanstrategyupdate.web.cern.ch/>

Priorities from the 2020 update

- full exploitation of the (HL-) LHC
- investigation of a future hadron collider at CERN with $\sqrt{s} \geq 100$ TeV, with a e^+e^- Higgs and EW factory as a possible first stage
- continued development of scientific programmes beyond colliders at CERN
- develop roadmaps for R&D in accelerator and detector technologies

Third Update of the ESPP

Remit of the European Strategy Group

Develop a visionary and concrete plan for the realisation of the next flagship project at CERN, attracting international collaboration and allowing Europe to continue to lead the field.

- Timeline approved by CERN Council in March 2024
- Strategy Secretariat and European Strategy Group established in June 2024
- Physics Preparatory Group established in September 2024
- Should include the **preferred option** for the next collider at CERN and **prioritised alternative options**
- Should also indicate **priorities complementary to colliders** at CERN and other laboratories inside and outside Europe
- Expect to submit draft Strategy Document to Council by January 2026
- Final ratification by Council in June 2026

Timeline



Other relevant information will become available by the end of 2025

- FCC Feasibility Study
- Clearer view on the international landscape for future colliders

Input from national communities

Facilitate wide discussions

- Engage maximum number of colleagues, especially Early Career Researchers
- National meeting organized by RECFA delegate and ESG representative
- Questionnaire prepared by ECFA

Deadlines

- 31 March 2025: main input from the community
- 26 May 2025: further input in advance of the Open Symposium
- 14 November 2025: final input, following the submission of the Physics Briefing Book and prior to the Drafting Session

Update process in Belgium

National community meeting: February 5, UAntwerp

- Full day meeting at the UAntwerp City Campus
- Purpose: get informed about main projects of interest to Belgian community
- <https://indico.cern.ch/e/BIESPPU>

Follow-up

- February: Discussions within your group/laboratory; appoint 1-2 delegates to participate in subsequent discussions
- March: Meeting with group delegations to converge on national input; select 1-2 penholders to draft Belgian input to ESPPU
- March-April: Further offline iterations as needed

Backup

The European Strategy Group

Set up by Council to establish a proposal for the third update of the **medium- and long-term European Strategy for Particle Physics**

Composition

- Strategy Secretary (acting as chair)
- One representative per CERN Member state (→ **PVM for Belgium**)
- One representative appointed by each “Large Particle Physics Laboratory”
- CERN Director-General and CERN Director-General-elect
- SPC (Scientific Policy Committee) and ECFA (European Committee for Future Accelerators) chairs

Also invited: President of the CERN Council, one representative per Associated Member and Observer State, one representative of the European Commission, APPEC, NuPECC, and ESFRI chairs, members of the Physics Preparatory Group

The ESG Working Groups

The ESG will work on the following topics

- National input for the Strategy update / scientific diversity in European particle physics
- Project comparison group
- Implementation of the Strategy / Deliverability of larger projects
- Relations with other fields of physics
- Sustainability and environmental impact
- Public engagement, education and communication
- Social and career aspects for the next generation
- Knowledge and technology transfer

The Physics Preparatory Group

Set up by Council to prepare the **scientific contribution** to the work of the European Strategy group and to prepare a **Physics Briefing Book**, based on input from the community

Composition

- Strategy Secretary (acting as chair)
- Eight members appointed by Council (4 on recommendation of SPC, 4 on recommendation of ECFA) (→ **Fabio Maltoni**)
- One representative of CERN
- Two representatives of the Americas and two representatives from Asia (appointed by ICFA)
- The SPC, ECFA, and LDG chairs

ECFA Questionnaire

Next collider at CERN

- (a) Which is the preferred next major/flagship collider project for CERN?
- (b) What are the most important elements in the response to (a)?
physics potential / long-term perspective / financial and human resources (incl. effects on other projects) / timing / careers and training / sustainability
- (c) Should CERN/Europe proceed with the preferred option set out in (a) or should alternative options be considered?
if Japan proceeds with the ILC / if China proceeds with the CEPC / if the US proceeds with a muon collider / 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 should be pursued in parallel?
e.g. high-field magnets / RF technology / alternative accelerators
- (e) What is the prioritised list of alternative options if option (a) is not feasible?
- (f) What are the most important elements in the response to (e)?

Non-collider projects and other fields

- (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)?
- (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?