

# European Strategy for Particle Physics

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Future Colliders for Early-Career Researchers: CZ/SK Edition

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**ECFA**

European Committee for Future Accelerators



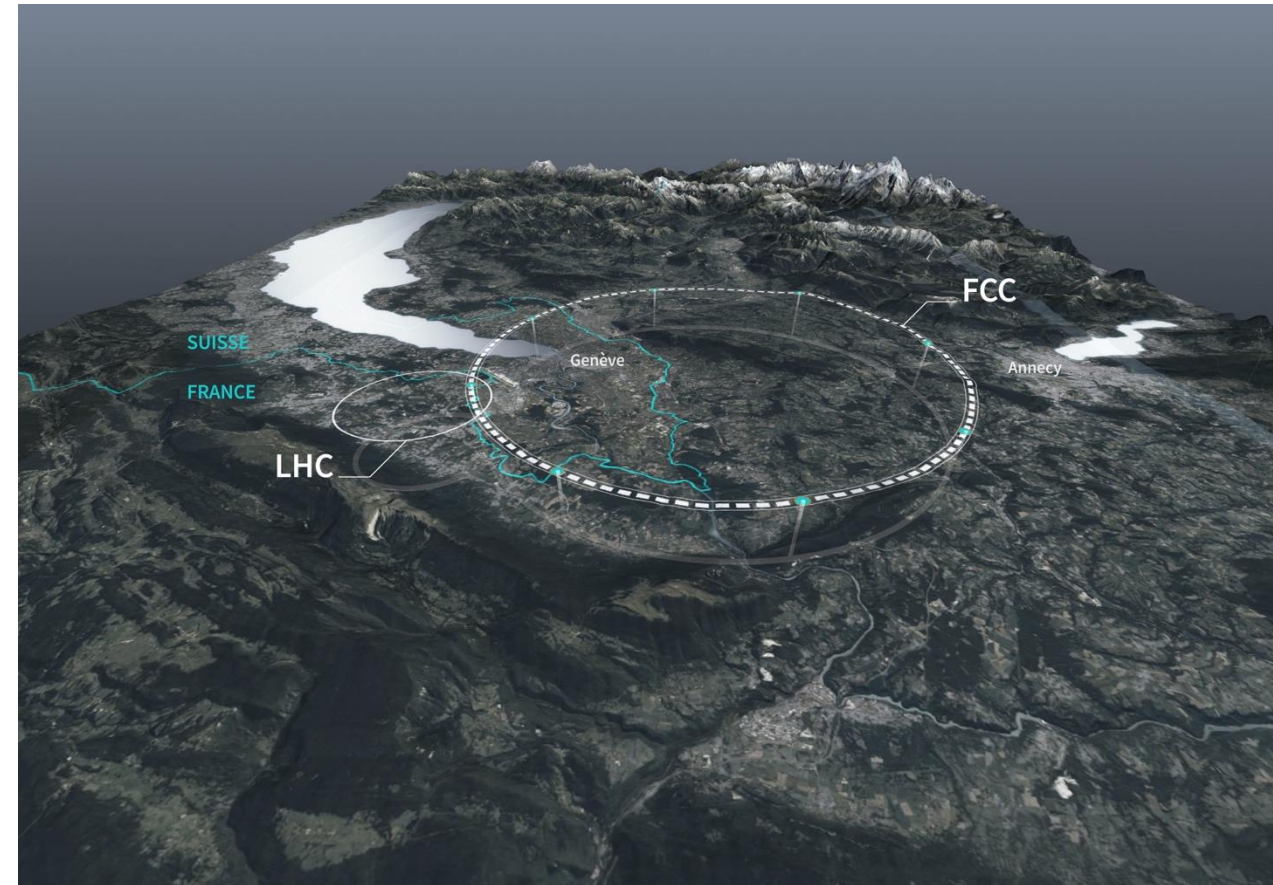


# What is ECFA

- The **European Committee for Future Accelerators (ECFA)** is a scientific advisory body that plays a key role in shaping the future of particle physics in Europe
- Established in 1963 under the auspices of CERN, its primary mission is to coordinate and promote collaborative efforts in high-energy physics research
- ECFA provides recommendations on the design, construction, and operation of particle accelerators
- ECFA is actively engaged in discussions about future accelerator projects such as the Future Circular Collider (FCC)

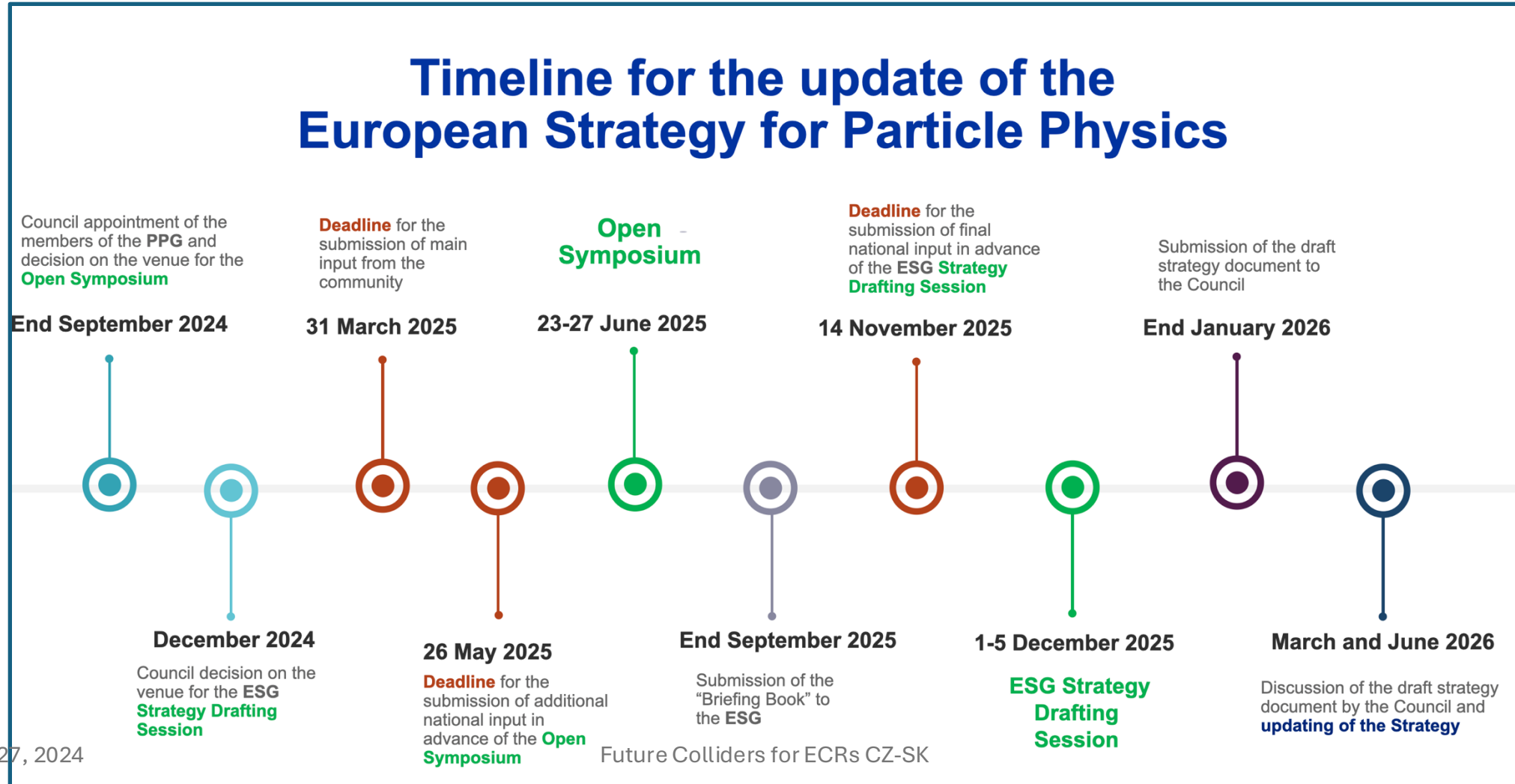
# Short and Long Term Questions

- How to answer fundamental questions about the universe?
- How to find physics beyond the Standard Model?
- What tool/experiment/laboratory do we need?
- What should be the next collider to be built?



# European Strategy for Particle Physics Update

- <https://europeanstrategy.cern/european-strategy-for-particle-physics>



# ESPP

- Strategy Secretariat: chair Karl Jakobs
  - <https://europeanstrategyupdate.web.cern.ch/strategy-secretariat>
- European Strategy Group: CZ Rupert Leitner
  - <https://europeanstrategyupdate.web.cern.ch/european-strategy-group-esg>
- Physics Preparatory Group (PPG)

The ESG is mandated to take into consideration:

- **The input of the particle physics community;**
- The implementation of the **2020 Strategy update**;
- The accomplishments in recent years, including results from the LHC and other experiments/facilities worldwide, progress in the construction of the High-Luminosity LHC, the FCC Feasibility Study, and recent technological developments in accelerator, detectors and computing;
- The international landscape.

# ESPP – Timeline

- Input from national particle physics communities by Mar 31, 2025
  - We plan to organize 2 CZ meetings (end of January, second half of March)
- Open Symposium June 23-27, 2025 (Venice, Italy, to be approved)
- Briefing Book
- Drafting Session December 1-5, 2025
- Approval in 2026

# ESPP – Recommendations

- <https://ecfa.web.cern.ch/ecfa-guidelines-collecting-input-european-high-energy-physics-community-2026-update-european>

2) **The ESG's remit explicitly states that “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.

# ESPP – Questions

## 3) Questions to be considered by countries/regions when forming and submitting their “national input” to the ESPP:

- a) Which is the preferred next major/flagship collider project for CERN?
- b) What are the most important elements in the response to 3a)?
  - 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
- c) Should CERN/Europe proceed with the preferred option set out in 3a) 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?



# ESPP – Questions p2

- 4) The remit given to the ESG also specifies that “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 4a)? (The set of considerations in 3b 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.

# Summary

- European Strategy for Particle Physics should present a vision for the near- and long-term future
- On which project should the community concentrate?
- Two national meetings planned for Jan and Mar 2025