National input from the United Kingdom to the 2026 Update to the European Strategy for Particle Physics: Addendum on prioritisation of alternative options if the preferred option is not feasible or not competitive

Compiled on behalf of the UK's national particle physics community

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The UK community has held a further discussion in October 2025 to determine this input. This was supported by online polls both before and during the meeting to gauge the level of support for statements

1 What is the preferred large-scale post-LHC accelerator for CERN?

The UK community's preferred large-scale post-LHC accelerator is a new large-circumference tunnel at CERN (the FCC tunnel), enabling an integrated FCC-ee → FCC-hh programme or a direct FCC-hh pathway.

The community strongly supports this vision while emphasising the need for continued diversity of CERN's programme, which is essential to the field's vitality. Recognising that such an endeavour will require substantial resources beyond CERN's current budget, the UK community gives CERN a clear mandate to seek additional funding and expresses full support for its leadership in pursuing this.

2 What is the preferred alternative, if the preferred option is not feasible?

Taking the preferred plan A to be FCC proceeding on the current proposed timescales two pathways are considered in this scenario.

2.a FCC delayed by > 10 years

If the FCC were delayed by around a decade, the highest priority would be to maintain momentum toward the FCC through an appropriate intermediate programme.

In this case, community discussions showed a modest preference for further exploiting the existing LHC infrastructure within budget constraints. Additional notable physics can be obtained by extending p–p collisions, including the Forward Physics Facility, and by enabling e–p and e–ion collisions via an LHeC. For the LHeC it was discussed that a scenario with reduced performance, without the full ERL, could be considered as it would reduce both the cost and construction duration of the project whilst still providing unique physics output.

LEP3 received more limited support, with some concerns stated on its possible effect on the FCC programme. It was recognised as a potentially useful element in a strategy that preserves flexibility and continuity of collider physics at CERN.

2.b FCC is unaffordable

In this case the plan-B alternative should be affordable without an increase in the CERN subscription beyond the usual indexing, and without relying on special contributions beyond in-kind, proportionate contributions from non-member states.

The three guiding principles under this scenario are:

- Avoiding a long (>10 year) gap in collider physics at CERN
- Maintaining strategic flexibility to eventually reach the 10 TeV pCM scale.
- Preserving the diversity of the particle physics programme as an essential element of Europe's strength and balance.

Under this scenario CERN should pursue

- An intermediate collider project as already discussed above with the preference toward further exploiting the existing LHC infrastructure (p-p/FPF, eP, e-ion as outlined above).
- A significant, sustained accelerator R&D programme toward the 10 TeV pCM scale. High-priority topics identified by the community include novel acceleration technologies (muon demonstrators, plasma and sustainable accelerators) and high-field magnets.

A linear collider remains a scientifically strong option with an established road-map, for which there is solid but not majority support within the community. Whilst subsequent higher energy upgrades would provide decades of collider output at CERN concerns about the lack of a clear route to the 10 TeV pCM energy scale were raised.

3 What is the preferred alternative, if the preferred option is not competitive?

The UK community took note of the recent announcement from CEPC. The answer to this question was considered based on an alternative e+e- collider becoming available in the 10 years following the LHC. In this case top priority of the UK community is to develop FCC-hh, possibly at a lower energy, in a shorter time frame. If such a programme would leave a gap in collider physics output at CERN then an intermediate bridging project should be pursued as discussed in the previous question.