

Future Circular Collider Study - FCC

Mandate

Context

A conceptual design study of options for a future high-energy frontier circular collider at CERN for the post-LHC era shall be carried out, implementing the request in the 2013 update of the European Strategy for Particle Physics (CERN-Council-S/106), which states, inter alia, that:

"..., Europe needs to be in a position to propose an ambitious post-LHC accelerator project at CERN by the time of the next Strategy update, when physics results from the LHC running at 14 TeV will be available." and that "CERN should undertake design studies for accelerator projects in a global context, with emphasis on proton-proton and electron-positron high-energy frontier machines. These design studies should be coupled to a vigorous accelerator R&D programme, including high-field magnets and high-gradient accelerating structures, in collaboration with national institutes, laboratories and universities worldwide."

(<http://cds.cern.ch/record/1567258/files/esc-e-106.pdf>)

This design study shall be organised on a world-wide international collaboration basis under the auspices of the European Committee for Future Accelerators (ECFA) and shall be available in time for the next update of the European Strategy for Particle Physics, foreseen by 2018.

Scope

The main emphasis of the conceptual design study shall be the long-term goal of a hadron collider with a centre-of-mass energy of the order of 100 TeV (currently referred to as VHE-LHC) in a new tunnel of 80-100 km circumference for the purposes of studying physics at the highest energies. The hadron collider and its detectors shall determine the basic requirements for the tunnel, surface and technical infrastructures. The corresponding hadron injector chain shall be included in the study, taking into account the existing CERN accelerator infrastructure and long-term accelerator operation plans. The performance and cost of the hadron collider shall be compared to a high-energy LHC based on the same high-field magnet technology and housed in the LHC tunnel.

The conceptual design study shall also include a lepton collider and its detectors (currently referred to as TLEP), as a potential intermediate step towards realization of the hadron facility. The design of the lepton collider complex shall be based on the hadron collider infrastructure and any substantial incompatibilities with respect to the hadron collider infrastructure requirements shall be analysed and quantified. Potential synergies with linear collider detector designs should be considered.

Options for e-p scenarios and their impact on the infrastructure shall be examined at conceptual level.

The study shall include cost and energy optimisation, industrialisation aspects and provide implementation scenarios, including schedule and cost profiles.

Organization

On the CERN side the study shall be organized and led by the study coordinator Michael Benedikt and the deputy coordinator Frank Zimmermann. The study coordinator shall report directly to the CERN Directorate.

The mandate of the study coordinator shall be to:

- nominate and convene a study coordination group to define the scope and organise the work; the nominations shall be subject to approval by the CERN Directorate;
- establish collaborations with institutes, laboratories and universities worldwide;
- ensure coherent communications inside and outside CERN;
- coordinate all CERN resources associated with these studies;
- organize workshops, conferences and meetings relevant to implementation of the mandate to complete the conceptual design study;
- integrate all existing activities concerning future circular colliders at CERN into the common study.

A study coordination group shall be created with the remit to:

- organize and carry out a conceptual design study at international level for high-energy frontier circular collider(s) at CERN for the post LHC era;
- elaborate the specific physics cases and formulate the key parameters for the different collider options and experiments;
- provide machine and infrastructure conceptual designs and detector concepts;
- identify, launch and co-ordinate related R&D programmes in particular in the areas of high-field magnets and superconducting RF and other key technologies;
- identify synergies with other high-energy frontier collider studies worldwide;
- provide cost estimates and propose implementation scenarios for the technical design, realization and operation phases.

CERN shall act as host laboratory for the FCC study.

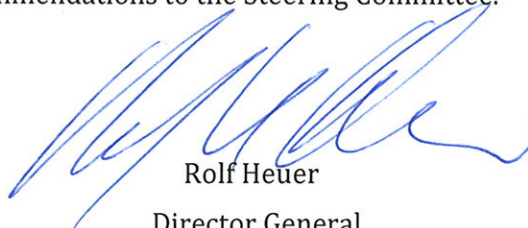
A Study Support Office at CERN shall support the study coordinator in administrative and organisational matters. This shall cover in particular scheduling, resource planning and project coordination matters.

An International Steering Committee shall be set up to refine the goals of the study, approve the work programme and review the study progress.

An International Collaboration Board shall be set up to review the resources, including the channelling of the external contributions. It shall report to the Steering Committee.

An International Advisory Committee shall be set-up to review the scientific and technical progress of the study and to submit recommendations to the Steering Committee.

Geneva, December 1st 2013



Rolf Heuer
Director General
CERN