

PARTNERS

The consortium is composed of 16 internationally leading universities and research organisations and it is coordinated by CERN:

CERN, Switzerland
ALBA, Spain
CEA, France
CIEMAT, Spain
CNRS, France
École Polytechnique Fédérale de Lausanne, Switzerland
INFN, Italy
Karlsruhe Institute of Technology, Germany
KEK, Japan
STFC, UK
Tampere University of Technology, Finland
TU Darmstadt, Germany
University of Genève, Switzerland
University of Liverpool / Cockcroft Institute, UK
University of Oxford, UK
University of Twente, Netherlands

In addition, 4 US laboratories are associated to the project with focus on high-tech developments for accelerators:

National High-Field Magnet Laboratory, USA
Brookhaven National Accelerator, USA
Fermi National Accelerator Laboratory, USA
Lawrence Berkeley National Laboratory, USA

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The goal of particle physics is to understand the fundamental building blocks that make up the world we live in.

With the discovery of the Higgs boson, the story is really only just beginning to get interesting: Only 5% of the Universe is explained by the Standard Model. What about the other 95%?



EUROPEAN CIRCULAR COLLIDER

A key to New Physics



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WHAT IS EUROCIRCOL?

European Circular Collider (EuroCirCol) is a project that contributes to the Future Circular Collider design study (FCC) for a research infrastructure that will give access to new fundamental discoveries in particle physics.



The objective of this project is to develop the conceptual design of a future hadron collider beyond the capabilities of the Large Hadron Collider (LHC), as an international, collaborative effort under European leadership.

With an increased energy the future collider will shed light on some of the greatest mysteries of science like the nature of 'dark matter' or the imbalance between matter and antimatter in the Universe.

The study, funded by the European Union under the Horizon 2020 Programme, is led by CERN and brings together an international consortium of 16 universities and research centers.

EuroCirCol is part of the global FCC study that joins resources worldwide to assess the merits of different future accelerator scenarios.

"In today's challenging period, all regions need to step up support for research and innovation to ensure - in a global competitive environment - the sustainable development of science and technology necessary for the upturn and growth of everybody's economy."

Rolf Heuer, CERN

NOW IS THE TIME

The LHC, completed in 2008, is currently the largest scientific facility ever built. With a circumference of 27 km, it used particle beams colliding at extreme energies to discover the Higgs boson, one of the biggest scientific achievements of our generation.

The LHC has an operational lifetime of at least 25 years. That is about the same time it took to design and to build it. Therefore the planning for a possible successor should start now.

To reinforce its pole position throughout the 21st century, Europe must be ready to propose an ambitious post-LHC accelerator facility.

The new accelerator poses a huge technological challenge that can only be addressed in a coordinated international effort involving the best of both research and industry.

EuroCirCol will examine the feasibility and costs of the hadron collider, contributing to the preparation of the conceptual design of FCC, in time for the next update of the European Strategy for Particle Physics in 2019.



"The role of technology in the natural sciences, or curiosity-driven science if you like, is very important. Astrophysics and HEP experiments that take place today thanks to the latest exciting advancements wouldn't be possible few years ago. Our understanding of nature has advanced in step with technological developments. It is also the case that some of these advancements may be used for other purposes, so funding for research should concern society as a whole."

James Peebles, Emeritus Professor of Cosmology, Princeton University



BENEFITS

A new scientific infrastructure of such scale depends on the availability of key technologies pushed beyond the current state of the art. The industries that will benefit from the EuroCirCol study include:

- Radioprotection
- Superconducting materials
- High field magnets
- Vacuum and cryogenics
- Civil engineering

Advanced energy efficiency, reliability and cost effectiveness are additional key factors to build and operate such an accelerator within realistic time scale and cost.

EuroCirCol is a vital project to maintain the leading role of Europe in particle physics, which has a global community of over 10,000 scientists.

"The beauty of science is that dreaming is allowed or I would say even encouraged. Keep in mind that even in established fields with a long tradition there may still be surprises. So keep your natural curiosity, keep dreaming, and keep your mind prepared."

George Bednorz - Nobel Laureate, IBM Research laboratory