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Future collider concepts to reach the high energy frontier

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Abstract

In particle physics accelerators remain the key tools for understanding the building blocks of matter and the origin of the universe.
Exploring collisions at even higher energy will enable the investigation of yet smaller and more intricate features. Many feasibility studies for new accelerators reaching the energy frontier are currently under way. These accelerators include both linear and circular collider projects such as ILC, CLIC, FCCee, FCChh, Muon and plasma-based colliders. This talk gives an overview of the future collider concepts, their challenges, technical readiness levels and addresses the requirements for the new detectors.

Biography

Dr. Edda Gschwendtner obtained her PhD in physics from the Vienna University of Technology, Austria, working at CERN on benchmarking the particle background in the LHC ATLAS experiment. During the last 25 years she has contributed significantly to several accelerator and particle physics projects. She was involved in the development of the LHC beam loss detection system, the LHC luminosity detectors and high-resolution detectors for future neutrino factory experiments. She was the responsible beam physicist for the CERN Neutrino Gran Sasso beam, led as liaison physicist the design, commissioning and operation of beam lines from the CERN SPS to the experimental areas and was SPS supervisor, responsible for optimizing the performance of the SPS.
Since 2012 Edda Gschwendtner is the Project Leader of CERN's plasma wakefield acceleration experiment, AWAKE; This accelerator R&D experiment demonstrated for the first time ever plasma wakefield acceleration of electrons in wakefields driven by a SPS proton bunch and has the aim to bring the R&D development to a point where particle physics applications can be proposed and realized in the near future.
Edda's area of research involves also Physics Beyond Colliders studies on particle physics applications based on the AWAKE technology.
As co-chair of the "Expert Panel on High-Gradient –Plasma and Laser Accelerators"she was involved in the preparation of a plasma accelerator R&D roadmap for HEP colliders and applications for the European Strategy for Particle Physics.
Edda Gschwendtner is Section Leader of the 'Lepton Accelerator Facilities'section at CERN, which is responsible for theoretical, numerical, and experimental studies on the beam dynamics of future lepton accelerators, facilities, and colliders such as FCCee, CLIC and the Muon collider.
Edda is co-author of more than 150 papers and has supervised undergraduate students, PhD students and post-doctoral students, some of them winning PhD thesis prizes and young career awards.
Edda Gschwendtner is Principal Scientist at CERN and is member of several international scientific advisory committees and review panels.

Summary (500 words)

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