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## Design and performance challenges of the future high energy colliders

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The recent update of the European Strategy recommends that “Europe, together with its international partners, should investigate the technical and financial feasibility of a future hadron collider at CERN with a centre-of-mass energy of at least 100 TeV, with an electron-positron Higgs and electroweak factory as a possible first stage. “

These studies will feed into the next update of the European Strategy. They include the optimisation of the conceptual design and the performance study of the complex colliders, as well as a strong focus on the European Accelerator R&D Roadmap. The roadmap aims at increasing the R&D efforts on the different subsystems of the Future Circular Colliders (FCC) as well as on novel techniques and types of accelerators. In particular, the European Accelerator R&D Roadmap also includes a 10 or more TeV muon collider. After a brief introduction to the FCC and muon collider projects, we will give an overview of the major challenges and French contributions to the entire collider complex. A special focus will be given to the design challenges of the hadron collider and the final acceleration stage up to the leptons colliders, as well as a performance evaluation of the current injector design.

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