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Future Circular Collider - The High-Energy LHC (HE-LHC)

This report contains the description of a novel research infrastructure based on a high-energy hadron collider, which extends the current energy frontier by almost a factor 2 (27 TeV collision energy) and an integrated luminosity of at least a factor of 3 larger than the HL-LHC. In connection with four experimental detectors, this infrastructure will deepen our understanding of the origin of the electroweak symmetry breaking, allow a first measurement of the Higgs self-coupling, double the HL-LHC discovery reach and allow for in-depth studies of new physics signals arising from future LHC measurements. This collider would directly produce particles at significant rates at scales up to 12 TeV. The project re-uses the existing LHC underground infrastructure and large parts of the injector chain at CERN. This particle collider would succeed the HL-LHC directly and serve the world-wide physics community for about 20 years beyond the middle of the 21st century.

Author: BENEDIKT, Michael (CERN)

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