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The status and physics potential of the LHC

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Abstract content

The Large Hadron Collider (LHC) at the European Center for Particle Physics (CERN) in Geneva, Switzerland, is presently commissioned for its first its first proton-proton collisions expected in fall of 2008. The design collision energy is 14 TeV at the center of mass, with a luminosity of 10ˆ34 cmˆ-2 sˆ-1, making this machine the highest energy man-made particle accelerator with the highest collision rate so far.

In this talk the most up to date status of the machine and its two largest detectors, ATLAS and CMS, is presented. Expectations for the initial physics potential at reduced luminosity and beam energy are discussed, with a focus on the discovery potential for the Higgs particle and physics beyond the Standard Model. The corresponding experimental issues like the precision and signal resolution required for the reconstruction of the final state of the proton-proton collisions of interest and the corresponding initial limitations are emphasized. Initial estimates for the performance of the detectors with respect to reconstructing the individual particles, particle jets, and missing transverse momentum are given. An outlook to the longer term physics potential, especially with respect to the discovery of the Higgs and possible super-symmetric particles, concludes the talk.

Summary

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