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Commissioning the LHC Accelerator and its Physics Programme

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The LHC is an accelerator with unprecedented complexity where the energy stored in the magnets and in the beams exceeds that of other accelerators by one-to-two orders of magnitude. An initial phase of so-called "hardware commissioning" has thus been introduced, during which the comprehensive commissioning of all technical systems is undertaken without beam in an effort to ensure a safe and reliable start-up of the LHC accelerator and in order to minimise any technical problems. This paper presents the experience from this approach and presents the results. The strategy for the staged commissioning period with beam that is to follow the "hardware commissioning" phase is also presented. Typical accelerator parameters and associated performance levels are given for each stage with beam and a typical LHC accelerator schedule is shown.
All experiments will have installed initial detectors and will be ready for commissioning with beam at the start of LHC operation in 2008. The physics programme is expected to be rich even at the projected initial luminosities. This talk also presents the requirements and expectations of the experiments for the accelerator start-up with beam and early collisions, the heavy-ion runs and the special proton runs, initial conditions that may be used subsequently to set priorities in order to exploit optimally the first LHC beams for physics.

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