

High-Luminosity-LHC: Performance and Availability

Andrea Apollonio Cave, European Organization for Nuclear Research, CERN, Geneva, Switzerland

One of the key figures of merit for future accelerators and accelerator systems will be availability. For future colliders, the limit imposed by the event pile-up at the experiments will limit the peak beam performance that could potentially be achieved. HL-LHC is the future upgrade of the LHC that aims at delivering an integrated luminosity of 3000 fb^{-1} over about 10 years of operation, starting from 2025. Luminosity leveling will be used to limit the event pile-up, by keeping the instantaneous luminosity constant and below the theoretical maximum value. This implies that the integrated luminosity will have to be increased by extending the time with colliding beams, i.e. by increasing the machine availability. The introduction of new accelerator systems for the HL project (e.g. crab cavities) will on one hand improve the accelerator performance, but on the other hand possibly have an impact on availability due to the additional protection required. Increasing the machine complexity as well as that of the related protection systems can lead to an increase of the number of yearly false failures, leading to unnecessary beam dumps. Therefore in this paper/presentation the main factors affecting HL-LHC availability will be discussed and predictions on the impact of future system upgrades on integrated luminosity calculated.

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