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LHC Machine Interlocks and Beam Operation

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The correct functioning of the Machine Interlocks (MI) is vital for safe operation throughout all operational phases of the Large Hadron Collider (LHC). The two main components composing the MI are the LHC Beam Interlock System and the LHC Powering interlock systems, both for super conducting and normal conducting magnets. The first one is highly reliable and fast. It relays Permit signals from the connected subsystems in case of failure for emergency extraction of beam to the LHC beam dump block. The second one is reliable as well and is essential for safe commissioning and operation of the magnet system. It protects about 1700 electrical circuits powering almost 10000 magnets.

The presentation reports on the operational experience with the MI systems, and details the tests and the diagnostic tools deployed to validate correct functionality. It also reports on the automated software tools, used on a regular basis to assess the readiness for beam operation. It demonstrates that MI systems have been not only designed to be reliable but to be also helpful and valuable for having efficient machine operation.

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