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## Beam Loss Monitoring for LHC Machine Protection

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The energy stored in the nominal LHC beams is two times 360 MJ, 100 times the energy of the TEVATRON. As little as 1 mJ/cc deposited energy quenches a magnet at 7 TeV and 1 J/cc causes magnet damage. The beam dumps are the only places to safely dispose of this beam. One of the key systems for machine protection is the beam loss monitoring (BLM) system. About 3600 Ionization chambers are installed at likely or critical loss locations around the LHC ring. The losses are integrated in 12 time intervals (from 40 us to 84 s), and compared to threshold values defined in 32 energy ranges. A beam abort is requested when potentially dangerous losses are detected, or when any of the numerous internal system validation tests fails. In addition, loss data are used for machine set-up and operational verifications. The collimation system for example uses the loss data for set-up and regular performance verification. Commissioning and operational experience of the BLM will be presented: The machine protection functionality of the BLM system has been fully reliable; the LHC availability has not been compromised by false beam aborts. Future system improvements are also discussed.

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