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LHC abort gap monitor electronics upgrade

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The LHC Abort Gap Monitor (AGM) is part of the LHC machine protection system (MPS) and is designed to measure the particle population in a 3 μ s wide region known as the “abort gap.” This region needs to be kept empty to ensure safe beam dumps. The AGM captures the synchrotron light generated in the visible part of the spectra and converts it into an electric signal. This signal is then processed by an acquisition system and can trigger the ‘abort gap cleaning’ process.

The current AGM, which has been in operation since 2010, uses an analogue integrator ASIC and a 40 MHz analogue-to-digital (ADC) converter to provide the particle population information. However, this solution is now considered obsolete and is being replaced by a digital signal processing approach. Working directly in the digital domain not only offers more scalability but also better determinism and reliability.

This work presents the new technical solution for the acquisition chain, compares the characteristics of both implementations, and showcases recent measurements conducted on the LHC ion and proton beams.

Footnotes

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Europe

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