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Accelerator Reliability Workshop

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Automatic Fault Identification and Recording in the CERN accelerator complex

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The CERN Accelerator Complex for protons consists of a chain of 5 accelerators from LINAC4 to the LHC, in which any machine fault will affect the downstream chain. Availability is key for efficient operation of the complex. Recently, the CERN Accelerator Fault Tracking (AFT) system was complemented by a automatic fault recording system, including fault detection, root cause identification, and attribution across the accelerator chain. The system consists of individual fault recording instances per accelerator with domain-specific logic, each of which exposes ongoing fault information to the downstream machines.

This contribution presents the automatic fault recording architecture, which is built on top of other monitoring and interlocking layers at CERN, for example the Beam Interlock (BIS), Software Interlock (SIS) and LHC Post Mortem (PM) systems. It shows how information from these systems is combined to record fault information used for consolidation and predictive maintenance, and permit automatic root cause identification for faster fault diagnostics and mitigation.

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