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Design of beam position monitoring interlocking protection system

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The machine protection system guarantees the safe operation of the HIAF (High Intensity heavy-ion Accelerator Facility) in different operating modes and also prevents damage to the online equipment in the event of a failure. Beam current data such as beam current position and phase is an important basis for analysing and diagnosing accelerator faults. In this paper, the authors designed the beam position and phase interlock monitoring system. The system is based on circular buffer and AXI4 protocol to realize the interaction of interlock data and locking of interlock status. At the same time, the system uses memory mapping to save the interlock beam data. Laboratory tests show that the system could save the beam position, beam phase, SUM signals and amplitude of sensed signal per probe path during interlocking before and after 8ms and latch the interlock status of 25 channels. The system was deployed at the CAFe-LINAC gas pedal in March 2024 to complete online measurements.

Footnotes

Funding Agency

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