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Controls of the new eddy current septum for the CERN PS fast extraction

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The CERN PS fast extraction septum deflects protons and ions towards the experimental areas of the PS complex and the SPS. With the increased number of extractions per year since it was first put into service in 1994, the magnet lifetime is nowadays estimated at two years, implying bi-annual rebuilds of the septum, significant costs, and non-negligible radiation doses taken by personnel. Additionally, the present power converter is approaching its end-of-life.

In view of its superior robustness, an eddy current septum system was chosen to replace the original direct-drive septum. Due to the different technology of the magnet, the existing power converter is replaced by a new fast pulse generator, which implies a complete new control system.

This paper describes the different units and functionalities of this new control system, covering a wide range of technologies such as high-voltage switch triggering modules, slow interlocks based on PLC, fast interlocks and timing implemented in FPGAs, temperature-compensated acquisition chains, and software-based regulation algorithms. Preliminary results of the system performance are also presented.

Footnotes

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