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Proton pulse charge calculation algorithm in Beam Power Limiting System at the Spallation Neutron Source

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A proton pulse charge calculation algorithm in the Beam Power Limiting System (BPLS) at the Spallation Neutron Source (SNS) was developed and implemented in an FPGA. The algorithm calculates one-minute running average of the pulse charges and issues a fault to the Personal Protection System (PPS) and the Machine Protection System (MPS) when a limit is reached.

A bit-accurate model of the algorithm was first developed and tested in Matlab® and then implemented and simulated in VHDL using Vivado® design environment. Finally, the algorithm was verified on a µTCA-based hardware platform.

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Footnotes

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