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Machine learning for improved accelerator and target reliability

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The Spallation Neutron Source uses a high-power accelerator and target to produce neutrons to explore the nature of materials and energy. Running the facility at the cutting edge of technology does lead to occasional interruptions in the scientific program. We present results from a three year project aimed at exploring Machine Learning methods to improve accelerator and target reliability. Various application areas ranging from reducing beam trips, surrogate modeling of high-power targets, to improving on cryogenic system behavior will be discussed as well as lessons learned. Finally, we present our plans for the continuation of the project, including a continual learning framework necessary to integrate Machine Learning with Operations.

Footnotes

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