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Minimizing SNS beam loss using machine learning and virtual accelerator

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To quickly and continuously minimize the beam loss at the spallation neutron source, we implement a reinforcement learning (RL) algorithm to control the tens of magnet settings based on the readbacks of tens of loss monitors.

To make this an operational procedure the can be safely used without damaging the accelerator, the RL is tested on a virtual accelerator and its settings go through a proxy gateway to keep the settings within predefined limits.

We describe the setup and testing of the RL algorithm running on a GPU cluster inside the accelerator network.

Footnotes

Funding Agency

DOE/BES

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Yes

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