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Automation of pulse identification at J-PARC

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At J-Parc, the 500 μs long macro-pulses generated by the LINAC are separated into intermediate-pulses to synchronize it to the frequency of the Rapid-Cycling-Synchrotron (RCS). To secure a stable operation, the knowledge of position and length of those intermediate pulses are crucial, as the pulses need to be adjusted to the RCS frequency. The measurement for this adjustment is done by a beam position monitor (BPM), positioned directly behind the LINAC section in the low energy beam transport (LEBT) section. Since the form of the detected pulses can vary, the implementation of classical algorithms for the automatic detection and identification of pulses proofed unreliable. Because of that, it was decided to develop a machine learning algorithm for the automatic pulse identification. In this paper, the background, training and results of different machine learning algorithms developed for the described problem will be introduced and discussed. Additionally, a test of the developed program during active beam operation is being planned, and will be introduced.

Footnotes

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Author: WAGNER, Stephan (Goethe University Frankfurt)

Co-authors: PODLECH, Holger (Goethe University Frankfurt); LIU, Yong (High Energy Accelerator Research Organization)

Presenter: WAGNER, Stephan (Goethe University Frankfurt)

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