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Progress on the autonomous event detection system for the laser particulate counter

Wednesday, 22 May 2024 16:00 (2 hours)

Field emission is one of the most important issues that limits the performance of the superconducting radio frequency (SRF) systems and leads to SRF cavity trips at the Continuous Electron Beam Accelerator Facility (CEBAF) at Jefferson Lab. Studies have confirmed that particulates are the dominant source of field emitters and the particulates can be transported into a cavity from other parts of the accelerator. To monitor the transportation of the particulates, a prototype of a novel, non-invasive laser particulate counter (LPC) is being developed and tested at Jefferson Lab. Experiments have been done to validate the capability of the LPC, in which precisely-created defects with various sizes on rotating disks were used to mimic the motion of the particulates in a tabletop system, and the readout from the LPC was saved as the response to the "particulates". We are developing a machine learning model that will be used to continuously monitor the readout from the LPC and to recognize real events generated by particulates from noises. In this report, we will present how the data are prepared and how the model is trained. We will also discuss the performance of the model.

Footnotes

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North America

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