IPAC '23

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Measurement of beam energy in the Fermilab's Linac taken at the transfer line

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Linac is the first machine in the accelerator chain at Fermilab where H^- ions are accelerated from 35 keV to 401.5\,MeV and then injected into a synchronton known as Booster where they are stripped of their electrons to become protons. One of the tools used during tuning of the Linac extraction energy is two beam pickups known as Griffin Detectors. Our goal is to control the output energy using machine learning techniques to increase the reliability and quality of the beam delivered from Linac. The first step is to understand the data from the diagnostics to develop reliable and accurate energy measurement, and control methods before implementing machine learning techniques. Two methods of energy measurement were studied, and their results are compared. The first method was the time of flight measurement using Beam Position Monitors that provide beam phase measurement. The second method used the relation between beam transverse positions and dispersion values to calculate momentum variation. The results of these two measurement methods are found to be consistent.

Funding Agency

Footnotes

I have read and accept the Privacy Policy Statement

Yes

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