

Redeveloping a Readout System for Particle Tracking at Fermilab's Test Beam Facility

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Abstract

Fermilab's Test Beam Facility provides national and international users with access to accelerated particle beams for individual detector experimentation. Experimentalists may use the primary beam for 120 GeV protons; secondary beam for 1 GeV pions, muons, and electrons; or the tertiary beam for 200 MeV pions and protons. In order for users to calibrate their detectors, they compare their results to those of the instrumentation provided by the facility to test triggering, tracking, and particle identification capabilities. This instrumentation includes scintillator counters, multiwire proportional chambers (MWPCs), Cherenkov detectors, segmented wire ionization chambers, time-of-flight systems, Silicon pixel telescopes, and lead glass calorimeters. Due to advancing technology, the existing electronics and readout systems have become obsolete and are being not only upgraded, but entirely redeveloped. The new MWPC software is written in Python and is designed to communicate with a Wiener CC-USB CAMAC controller to collect particle data, to set threshold configurations, and to handle errors through a system of diagnostic debugging.