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Design and Operation of a Charged Particle Beamline for the NOvA Test Beam Experiment

NOvA is a long-baseline neutrino oscillation experiment based at Fermilab, Illinois, sampling the NuMI neutrino beam at two functionally-identical detectors. The NOvA Test Beam program consists of a third, scaled-down detector placed in a charged particle beam, and aims to provide an improved understanding of the detector response and energy calibration to enable higher precision measurements of the neutrino oscillation parameters.

As part of this program, a new beamline was deployed, derived from 120 GeV protons accelerated by Fermilab's Main Injector. This tertiary beamline provides 0.2–2 GeV/c charged particles sampled by the NOvA detector. It includes an analyzer magnet, time-of-flight system, and tracking using multi-wire proportional chambers, providing particle identification and precise momentum determination of the particles. This poster will discuss the design and performance of the beamline and show results from the first 4 months of data taking.

Mini-abstract

NOvA has deployed a new beamline to provide tagged charged particles for its Test Beam program.

Experiment/Collaboration

NOvA Collaboration

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