

Assessing and Installing Avalanche Photodiodes on the NOvA Near Detector
Jaime Vasquez (Hartnell Community College, Salinas, CA 93901), Mathew Muether (Fermi National Accelerator Laboratory, Batavia, IL 60510).

Abstract

As of today, scientists suspect that neutrinos played a vital role in the evolution of the universe, contributing to all existing matter in the cosmos. How that evolution occurred still remains a mystery due to our lack of understanding of the puzzling properties of neutrinos. The NuMI Off-Axis ν_e Appearance (NOvA) experiment will seek to find some answers by studying neutrinos in order to understand matters as flavor state oscillation, mass hierarchy, and symmetry between matter and antimatter. Two massive detectors are being used: a 300 ton near detector at Fermi National Accelerator Laboratory (Fermilab) and a 14 kiloton far detector in Minnesota located 810 km away. To actually discern the presence of neutrinos, thousands of photodetectors are utilized to detect light as neutrinos interact with atoms of liquid scintillator. The scintillator light that is emitted will be transferred by wavelength-shifting (WLS) fibers to the photodetectors. Afterwards, the light is then converted into electrical pulses and recorded digitally.