

Abstract

The NO ν A experiment is a long-baseline neutrino oscillation experiment designed to measure electron neutrinos (ν_e) appearing in the NuMI beam, a muon neutrino (ν_μ) source at Fermilab. Its two detectors, Near and Far, are functionally identical active tracking calorimeters. This thesis is focused on the relative calibration of the Near Detector. The individual steps of the process, threshold, shadowing and attenuation calibration, are described. For the calibration, NO ν A standardly uses cosmic muons. Alternative source, so called rock muons which are muons that originated from interactions of beam ν_μ s with a rock surrounding the Near Detector, is introduced. The thesis guides through the development of selection criteria used to distinguish rock muon tracks from the data. Selected sample of rock muon tracks is used for the relative calibration and at each step the results are compared to the cosmic muons based calibration. The whole analysis is performed using simulated Monte Carlo data.