

Cosmic Ray Background Rejection in NOvA

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The Numi Off-axis Neutrino Appearance (NOvA) experiment measures electron neutrino appearance at a distance of 810 km from where muon neutrinos are generated. The experiment consists of two functionally identical detectors, a Near Detector (ND) at Fermilab and a Far Detector (FD) at Ash River in Northern Minnesota. The detectors are fully commissioned and have been taking beam neutrino data since 2014. The FD is located on the surface, under 14 radiation lengths of barite and concrete overburden. Abundant cosmic rays passing through the FD present a unique challenge in cosmic ray background rejection. The cosmic background rejection in the FD is done in two steps: first, a set of cosmic ray veto cuts common to all NOvA beam neutrino analyses are applied, then additional, analysis specific cuts are applied. This talk will focus on the latter step of the rejection stream, the cosmic rejection cuts designed specifically for the study of electron neutrino appearance analysis in NOvA. The cosmic background to signal ratio is reduced significantly and the figure of merit increases after the cuts are applied.

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