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Electron Neutrino Identification in the NOvA Detector

The neutrino is an elusive elementary particle; it is electrically neutral, has very little mass, passes through most matter without interaction, and oscillates between three “flavors” as it travels. The NuMI Off-Axis ν_e Appearance experiment, or NOvA project, will measure neutrino and anti-neutrino oscillations. After the detector’s construction is complete, physicists hope to collect data to clarify our understanding of neutrinos and the universe as we know it. My project included analysis and development of software algorithms that classify signatures collected in the detector as signal (electron neutrinos) or background (muon and tau neutrinos). I used simulated pictures of events in a neutrino detector and considered many variables that could separate the different types of events. A Monte Carlo and artificial neural network were used to create a list of variables to optimize a figure of merit on signal and background separation.



Poster Number: Session: