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NOvA Short-Baseline Tau Neutrino Appearance Search

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Standard three-flavor neutrino oscillations have well explained by a wide range of neutrino experiments. However the anomalous results, such as electron-antineutrino excess seen by LSND and MiniBooNE do not fit the three-flavor paradigm. This can be explained by an additional fourth flavor sterile neutrino at a larger scale than the existing three flavor neutrinos. The NOvA experiment consists of two finely segmented, liquid scintillator detectors operating 14 .6 mrad off-axis from the NuMI muon-neutrino beam. The Near Detector is located on the Fermilab campus, 1 km from the NuMI target, while the Far Detector is located at Ash River, MN, 810 km from the NuMI target. The NOvA experiment is primarily designed to measure electron-neutrino appearance at the Far Detector using the Near Detector to control systematic uncertainties; however, the Near Detector is well suited for searching for anomalous short-baseline oscillations. This poster will present a novel method for selecting tau neutrino interactions with high purity at the Near Detector using a convolutional neural network. Using this method, the sensitivity to anomalous short-baseline tau-neutrino appearance due to sterile neutrino oscillations will be presented.

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