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MicroBooNE Investigation of Low-Energy Excess Using Deep Learning Algorithms

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MicroBooNE is a neutrino experiment based at Fermilab which consists of a liquid argon time-projection chamber in the Booster Neutrino Beam (BNB). The experiment aims to investigate the excess of electron neutrino-like events seen by the MiniBooNE experiment, also located in the BNB, which is potential evidence for new non-Standard Model physics such as sterile neutrinos. In this talk, I will discuss the status of our search for low-energy electron neutrino interactions within the MicroBooNE detector. This analysis features a hybrid approach of traditional reconstruction methods along with the use of convolutional neural networks (CNNs), a type of deep learning algorithm highly adept at pattern recognition. This talk will describe the selection of events and the ways in which the CNNs are used. It will also outline the ways we are addressing issues related to applying CNNs, which are trained on simulated data, to data from the detector.

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