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A Convolutional Neural Network for Shower Energy Reconstruction in MicroBooNE

Tuesday, 25 August 2020 15:00 (15 minutes)

The MicroBooNE experiment at Fermilab is designed to test the low energy excess of electron-like events observed in the MiniBooNE experiment. The MicroBooNE detector consists of a liquid argon time projection chamber (LArTPC) in which ionization electrons created by charged particles traversing the detector are collected by a set of three anode wire planes. The wire readout is combined with the drift time of the ionization electrons to reconstruct the 3D path of the charged particle. Electrons from neutrino interactions will create electromagnetic showers, which appear in the wire planes as a region of charge that must be identified by a "clustering" algorithm. Electron energy reconstruction methods in MicroBooNE currently rely on the combination of a clustering algorithm and a linear calibration between the shower energy and charge contained in the cluster. Recent effort has been made to improve this reconstruction process through the use of a convolutional neural network (CNN). This talk will cover the current status of the CNN method and show initial comparisons between the CNN and the traditional clustering method. Near-future directions for improving and validating the performance of the CNN will also be discussed.

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