Abstract Submitted
for the 4CF17 Meeting of
The American Physical Society

Multi-Particle Identification Using Convolutional Neural Networks In MicroBooNE[1] SAMANTHA SWORD-FEHLBERG, New Mexico State University, MICROBOONE EXPERIMENT COLLABORATION — Experiments in particle and nuclear physics often produce events with many energetic particles in the final state. Reconstructing the energy and momentum of those particles from detector information is often challenging. In the last decade, image-reconstruction software has started to be used in the identification of particles in physics event data. Multi-particle identification (MPID) is a process in which a convolutional neural network can be used to identify the types of particles within a reconstructed image. This is different from traditional reconstruction techniques which try to first identify each particle individually and then put together the multi-particle aspects of the event in a second step. MPID not only mitigates bias in training due to imperfect cluster reconstruction but can also lead to particle multiplicity recognition. The MicroBooNE collaboration is interested in using these methods in identification of events with a single lepton and proton in the final state, which are useful in the exploration of the excess of low energy electromagnetic events seen in MiniBooNE as well as in the exploration of nucleon-nucleon (NN) correlations. We present here the results of a simulated lepton+proton test sample as well as future plans for NN correlation studies.

[1]Center for Computing Excellence:HEP, Department of Energy, New Mexico State University, Fermilab

Samantha Sword-Fehlberg
New Mexico State University

Date submitted: 20 Sep 2017 Electronic form version 1.4