Poster session 3 – Wednesday 6 July

P3.069 **Analyzing LArTPC images with deep learning**

M Toups[1], M Weber[2] and K Terao[3]

[1]Fermi National Accelerator Laboratory, USA, [2]Laboratorium fuer Hochenergiephysik - Universitaet Bern, Switzerland, [3]Columbia University, USA

on behalf of MicroBooNE collaboration

Deep Learning, a machine learning algorithm using convolutional neural networks, is the state-of-the-art technique in the field of artificial intelligence, in particular computer vision. Deep learning has found a vast number of applications ranging from automated human face recognition, real-time object detection for self-driving cars, teaching a robot Chinese, and even playing Go. In this poster, we present our first steps in exploring the use of Deep Learning to the task of analyzing neutrino events coming from Liquid Argon Time Projection Chambers (LArTPC), in particular the MicroBooNE detector. LArTPCs consist of a large volume of liquid argon sandwiched between a cathode and anode wire planes. These detectors are capable of recording images of charged particle tracks with breathtaking resolution. Such detailed information will allow LArTPCs to perform accurate particle identification and calorimetry, making it the detector of choice for many current and future neutrino experiments. However, analyzing such images can be challenging, requiring the development of many algorithms to identify and assemble features of the events in order to identify and remove cosmic-ray-induced particles and reconstruct neutrino interactions. We present here our progress in an alternative approach, applying deep learning techniques to analyze LArTPC images, and show the current performance of these networks on performing particle identification and neutrino interaction identification and localization.