Abstract Submitted
for the APR21 Meeting of
The American Physical Society

Measuring neutral pion production cross sections in NOvA using a convolutional neural network FAN GAO, University of Pittsburgh, NOVA COLLABORATION — NOvA is a long-baseline neutrino oscillation experiment primarily designed to measure the muon (anti)neutrino disappearance and electron (anti)neutrino appearance in the off-axis Fermilab NuMI beam. It uses two functionally identical liquid scintillator detectors separated by 810 km and a narrow band beam centered around 2 GeV. Energetic neutral pions produced in Δ resonant and deep-inelastic interactions are a significant background to the electron (anti)neutrino appearance measurement as the photons coming from neutral pion decay may be misidentified as an (anti)neutrino appearance signal. The high statistics antineutrino mode data in the Near Detector (ND) can be used to perform a measurement of the cross-section of the muon antineutrino charged-current (CC) neutral-pion production. The analysis uses a convolutional neural network (CNN) trained on individually simulated particles to identify neutral pions in the final state. The development and the performance of the CNN approach to neutral pion identification and the status of the analysis are presented.

Fan Gao
University of Pittsburgh

Date submitted: 07 Jan 2021 Electronic form version 1.4