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Neutral Pion Production at MINERvA

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The MINERvA experiment was designed to measure neutrino-nucleus interactions using the NuMI beam at Fermilab. Between 2013 and 2017, 12×10^{20} protons on target were delivered both in neutrino and antineutrino modes with an average neutrino energy of 6 GeV, providing a high statistics neutrino interaction data sample. Among neutrino interactions, a significant primary charged current process is pion production. While charged pions can be detected by ionisation-induced scintillation, as neutral particles, π^0 can only be detected from their decay into two photons producing two separate gamma showers. The reconstructed gammas are then used to reconstruct the π^0 kinematics. This talk will present the different neutral pion analyses in the MINERvA scintillator tracker, as well as passive iron and lead targets with $\langle E_\nu \rangle$ at 6 GeV. This talk will also present a machine learning based semantic segmentation gamma selection, relying on the high statistics of the plastic scintillator.

Keyword-1

neutrino

Keyword-2

Pion

Keyword-3

MINERvA

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