Hit Position Reconstruction with Machine Learning Techniques for TPEX[1] ETHAN CLINE, Stony Brook University, TPEX COLLABORATION — The two-photon exchange (TPE) contribution in elastic electron-proton scattering has been of significant interest to the nuclear physics community as a possible explanation for the proton form factor ratio discrepancy. Three experiments (VEPP-3, CLAS12, and OLYMPUS) have reported on direct measurements of TPE in recent years and show effects in agreement with phenomenological predictions, but in disagreement with theory, up to $Q^2 = 2.5$ (GeV/c)^2. At larger Q^2, for which other theoretical approaches, like those based on GPDs, become feasible the effect remains untested. The proposed Two-Photon Exchange eXperiment (TPEX) will measure hard two-photon contribution to ep scattering in the momentum transfer range up to $Q^2 = 4.7$ (GeV/c)^2. The experiment uses electromagnetic calorimeter blocks at fixed angles to detect scattered electrons. In this talk we will discuss using a Deep Neural Net (DNN) and Multi-Layer Perceptron (MLP) to reconstruct the ep hit position, and compare to the simple analytical solution. Some prelimary results from a Monte Carlo simulation of the experiment will be shown, and future work will be discussed.

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