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A Neural Net Trigger for a Monopole Search with the NOvA Far Detector

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The NOvA experiment is studying a variety of neutrino properties using a long-baseline neutrino beam and near and far detectors. Due to its surface proximity and large area the NOvA far detector is particularly sensitive to a large range of magnetic monopole masses and energies. The monopole trigger, like all NOvA data-driven triggers, is software only using data collected and sent to a farm of on-site computers. The trigger must be fast, have a high efficiency, and a large rejection factor in order to reduce the background of over 150,000 cosmic rays that course through the detector every second to no more than 10 s-1. The present cut-based trigger has an efficiency uncertainty due to irreducible uncertainties in the expected monopole energy deposit in the detector. We discuss and show the performance of a novel neural net trigger with a much improved efficiency and lower uncertainties. Sensitivities for the monopole search using the previous trigger data and the improved trigger data will be given.

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