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Progress of the Charged Pion Semi-Inclusive Neutrino Charged-Current Cross Section in NOvA

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The NOvA experiment is a long-baseline neutrino oscillation experiment designed to measure the rates of electron neutrino appearance and muon neutrino disappearance. The NOvA near detector is located at Fermilab, 800-m from the primary target and provides an excellent platform to measure and study neutrino interaction and cross sections. We present the status of the measurement of the double differential cross section with at least one charged pion in the final state, $\nu_\mu + N \rightarrow N + \mu^\pm \pi^\mp X$. A convolutional neural network based approach is presented for the identification of neutrino interactions with the specific final state topology. This method of event classification has been used successfully to identify charged current electron neutrinos interactions in the NOvA oscillations measurements. The approach is nearly ideal for semi-inclusive cross section measurements as it does not require detailed a priori particle by particle reconstruction of the sub-leading tracks to classify the signal events. In this talk we present event classification efficiency studies using this event identification and classification methodology, along with background estimates and prospects for the measurement.

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