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A Machine Learning Approach to Study the Neutrino Charged-current Interaction on ^{127}I

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An inclusive measurement of the cross section of the neutrino charged-current interactions on ^{127}I will help study the quenching of g_A , the axial-vector coupling constant, which determines the rate of neutrinoless double beta decays. At the Los Alamos Meson Production Facility (LAMPF), an exclusive measurement was made but with a large statistical error. To make an inclusive and more accurate measurement, a 185 kg NaI(Tl) prototype was deployed by the COHERENT collaboration. To reduce the major background, cosmic rays, a machine learning model based on a convolutional neural network (CNN) is being developed. The model, tested with simulations, can remove 78% of the backgrounds while preserving 77% of the cc signals.

Primary author: Mr AN, Peibo (Duke University)

Presenter: Mr AN, Peibo (Duke University)

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