

Abstract Submitted  
for the APR21 Meeting of  
The American Physical Society

**A Machine Learning Approach to Study the Electron-neutrino Charged-current Interaction On Iodine 127<sup>1</sup>** PEIBO AN, Duke University, COHERENT COLLABORATION — An inclusive measurement of the cross section of the electron-neutrino charged-current interactions on  $^{127}\text{I}$  will help study the quenching of  $g_A$ , the axial-vector coupling constant, which affects 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 a first measurement of the inclusive cross section with low statistical uncertainty, a 185 kg NaI[Tl] prototype was deployed by the COHERENT collaboration. To reduce the major background, cosmic muons, a convolutional neural network (CNN) classifier and a decision tree classifier were developed. The best performer, tested with simulations, achieved a 95% classification accuracy assuming nano-second timing resolutions (77% accuracy otherwise). To address the non-linearity of NaI[Tl] crystals at high energies, calibrations using Michel electrons from stopped muon decays are underway.

<sup>1</sup>U.S. DOE grant no.DE-FG02-97ER41033

Peibo An  
Duke University

Date submitted: 06 Jan 2021

Electronic form version 1.4