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Suppression of Cosmic Muon Spallation Backgrounds in KamLAND-ZEN Using ConvolutionalNeural Network

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Liquid scintillator-based detectors are one of the leading detector technologies in the search for neutrinoless double beta decay.KamLAND-ZEN, one of the leading experiment in this region, is currently limited by naturally occurring and spallation induced backgrounds. In the future they will be limited by the neutrino-electron scattering of boron-8 solar neutrinos.With the advancements in machine learning technology, we attempt to recognize neutrinos using a Spherical Convolutional Neural Network based model. We manage to reject backgrounds that are previously considered "impossible" in Monte Carlo data. With the advancement in this field, we are looking forward to adopt sophisticated algorithm, and tackle hard problems including directionality reconstruction.

Primary author: Mr LI, Aobo (Boston University)

Co-authors: Dr HARDIN, John (Massachusetts Institute of Technology); Mr FU, Zhenghao (Massachusetts Institute of Technology); ELAGIN, Andrey (University of Chicago); GRANT, Chris (UC Davis); WINSLOW, Lindley (Massachusetts Institute of Technology)

Presenter: Mr LI, Aobo (Boston University)

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