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# Deep Learning-Based C14 Pile-Up Identification in the JUNO Experiment

Measuring neutrino mass ordering (NMO) poses a fundamental challenge in neutrino physics. To address this, the Jiangmen Underground Neutrino Observatory (JUNO) experiment is scheduled to commence data collection in late 2024, aiming to determine the NMO at a 3-sigma confidence level within 6 years. A key factor in achieving this is ensuring a high-quality energy resolution of positrons. However, the presence of residual C14 isotopes in the liquid scintillator introduces pile-up effects that can impact the positron energy resolution. Mitigating these effects requires identifying pile-up events, which presents a significant challenge. The signal from C14 is considerably smaller compared to the positron signal, making its identification difficult. The close event time and vertex between a positron and a C14 further compound the identification challenge. This contribution focuses on the application of deep learning models for the identification of C14 pile-up events. It encompasses a range of models, including convolutional-based models and advanced transformer models. Through performance evaluation, the study showcases the robust capabilities of deep learning models in accurately and effectively identifying pile-up events.

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