

Faithful Pulse Shape Analysis by using Feature Importance Supervision

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The search for neutrinoless double beta decay is crucial to shed light on neutrino properties and broader cosmological questions. Experiments utilizing the isotope ^{76}Ge have been essential in advancing the sensitivity to neutrinoless double beta decay. The LEGEND project uses High Purity Germanium (HPGe) detectors and minimize background interference through the application of Pulse Shape Analysis (PSA) significantly. To further refine this process, we tested the adoption of a Neural Network enhanced by Feature Importance Supervision (FIS) adjusted for PSA in HPGe detectors. This approach integrates expert knowledge on waveform characteristics, enabling the model to tag signal from background noise without energy dependence. It has demonstrated considerable success in differentiating between the multi-site gamma radiation that forms background noise and the single-site signals indicative of neutrinoless double beta decay. In this poster, I will present the current status of the approach under development.

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Poster prize

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