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# Enhancing XENONnT's Sensitivity to Neutrinoless Double-beta Decay with TextCNN

*Tuesday, May 14, 2024 3:00 PM (20 minutes)*

XENONnT employs a large target mass and dual-phase TPC to achieve unparalleled sensitivity in rare event searches. The neutrinoless double-beta ($0\nu\beta\beta$) decay searches at XENONnT encounters limitations due to gamma-rays emitted by the detector material. Therefore, a TextCNN (convolutional neural network for text) model with waveform augmentation is designed to extract maximum information from the detector data. It demonstrates remarkable capability, achieving over 60% background rejection while maintaining a 90% signal acceptance. It significantly improved the background rejection for $0\nu\beta\beta$ searches at XENONnT, which can potentially improve the sensitivity of the $0\nu\beta\beta$ search for $^{136}$Xe by over 30%. This highlights the potential for utilizing $^{136}$Xe enriched xenon to achieve heightened sensitivity to $0\nu\beta\beta$ decay in future dark matter experiments such as XLZD.

**Primary author:** ZHONG, Min (University of California, San Diego)

**Presenter:** ZHONG, Min (University of California, San Diego)

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