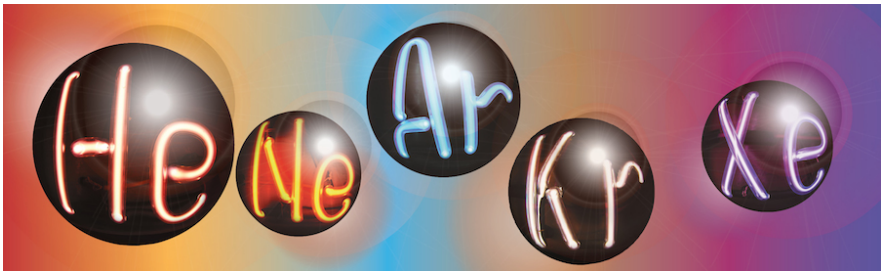

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Exploiting Event Topologies in Liquid Argon Scintillation Signals for Background Identification in LEGEND-200

Thursday, 23 October 2025 14:20 (20 minutes)

LEGEND-200 [arXiv:2505.10440] is a low-background experiment searching for neutrinoless double beta decay of ^{76}Ge. Located deep underground at LNGS, it operates up to 200 kg of enriched high-purity germanium detectors immersed in a liquid argon (LAr) cryostat. To reject backgrounds, the LAr is used as an active shield to detect scintillation light produced by interactions with ionizing radiation. In this talk, I will present the background suppression performance of the LAr instrumentation, based on both physics data and dedicated calibration measurements. I will also outline ongoing efforts to improve the LAr background rejection condition by leveraging the characteristics of scintillation light emission and the detection pattern across all argon instrumentation channels, using machine learning methods. Exploiting the information in the scintillation time profile also enables particle discrimination with the LAr detector system, which I will demonstrate with the search for ^{222}Rn daughters.
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