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Liquid argon light collection and veto modeling in GERDA Phase II

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The ability to detect liquid argon (LAr) scintillation light from within a densely-packed high-purity germanium detector array allowed the GERDA experiment to reach an exceptionally low background rate in the search for neutrinoless double-beta decay of ^{76}Ge. Proper modeling of light propagation throughout the experimental setup, from any origin in the LAr volume to its eventual detection by the light read-out system, provides insight into the rejection capability and is a necessary ingredient to obtain robust background predictions. In this contribution, I will present a model of the GERDA LAr veto, as obtained by Monte Carlo simulations and constrained by calibration data, and highlight its application for background decomposition. The model is crucial to boost the sensitivity of beyond-the-standard-model double-beta decay signal searches, whose results have been recently published by GERDA. The LEGEND collaboration is further developing this modeling technique, applied to its LAr instrumentation system, to enable sensitive new-physics analyses with the LEGEND-200 detector and inform the LEGEND-1000 design.

Submitted on behalf of a Collaboration?

Yes

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