

Liquid Argon Instrumentation for Background Suppression in LEGEND-200 Experiment

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The LEGEND-200 experiment at Laboratori Nazionali del Gran Sasso, is designed to search for neutrinoless double beta decay of ^{76}Ge . The experiment uses about 200 kg of high-purity germanium (HPGe) detectors, enriched in ^{76}Ge , deployed within a cryostat filled with liquid argon (LAr). The LAr acts as a cooling medium and as an active shield. The LAr instrumentation is deployed in LEGEND-200 to detect the LAr scintillation light emitted by background nuclear processes occurring within the LAr and that accompany signal response in the HPGe detectors. Background events originate from α -, β -, γ - or neutron interactions, coming from primordial, anthropogenic or cosmogenic unstable isotopes. They may impact the detection of neutrinoless double beta decay signals, which involve energy deposition inside the HPGe detectors, with no corresponding energy deposition occurring in the LAr. The poster will cover the LAr instrumentation setup, the performance during commissioning and physics runs. The Event Topology Classifier (ETC) utilized to discriminate between β/γ and α radiation will also be presented. We showcase the ETC's role in tagging delayed Po-alphas depositing energy in the LAr following prompt signals of Bi-gammas detected in the HPGe detectors.

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Poster prize

Yes

Given name

Surname

First affiliation

Second affiliation

Institutional email

Gender

Collaboration (if any)

LEGEND

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