Low Radioactivity Techniques (LRT2022)



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Detector characterization for the LEGEND-200 experiment

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The LEGEND collaboration is developing an experimental search for the neutrinoless double-beta $(0\nu\beta\beta)$ decay of the isotope ⁷⁶Ge. The first stage, LEGEND-200, is based on 200kg of ⁷⁶Ge-enriched high-purity germanium detectors immersed in liquid argon. It is currently under construction at the Laboratori Nazionali del Gran Sasso in Italy.

Among others, novel inverted coaxial point-contact detectors provide the information to effectively discriminate against background events. Such background discrimination requires a precise understanding of the behavior of the germanium detectors, necessitating extensive detector characterization. The acceptance tests aim to verify the performance of the delivered detectors meets specifications and to determine their optimal operational parameters. Furthermore, one of the most important issues is the determination of the active volume of the detectors. It can be attained by studying the detector response when irradiated by radioactive sources.

The first results of the characterization program with an emphasis on active volumes are presented.

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