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Radioassays for the LEGEND ^{76}Ge neutrinoless double beta decay experiment

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The LEGEND experiment searches for neutrinoless double beta decay in ^{76}Ge -enriched high-purity germanium detectors operating in liquid argon, whose scintillation acts as an active veto against external background events. Using specialized detector geometries, pulse shape discrimination is performed to further veto background events. LEGEND-200 has completed about one year of stable physics data-taking at Laboratori Nazionali del Gran Sasso (LNGS) in Italy, with the first data recently unblinded. With a planned ultimate exposure of 1 ton \cdot yr and a target background index of 2×10^{-4} cts/(keV \cdot kg \cdot yr) at $Q_{\beta\beta} = 2039$ keV, LEGEND-200 is expected to reach a 3σ discovery sensitivity of 10^{27} years half-life. The next generation experiment, LEGEND-1000, will operate 1000 kg of detectors and reach an expected discovery sensitivity of 10^{28} years half-life, covering the inverted neutrino mass hierarchy. To reach the required low background, LEGEND uses an extensive radioassay program, which will be discussed with highlights on recent measurements.

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Primary authors: VARRIANO, Louis (University of Washington); ON BEHALF OF THE LEGEND COLLABORATION

Presenter: VARRIANO, Louis (University of Washington)

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