

LEGEND: Next-Generation Neutrinoless Double-Beta Decay Search in Germanium-76

The LEGEND Collaboration was recently formed with the aim of combining of the successes of the GERDA Experiment and the Majorana Demonstrator with newly-developed technologies in a ton-scale, germanium-based experiment. The LEGEND Collaboration has established a phased deployment scheme: an initial 200-kg array (LEGEND-200), deployed in the repurposed GERDA cryostat and shielding infrastructure at LNGS, followed by a 1000-kg array (LEGEND-1000) in a newly-constructed liquid cryogen shield and veto. This phased approach allows for the rapid construction of a world-leading experiment with half-life sensitivities in excess of 10^{27} yrs at modest cost, followed by a nearly-background-free experiment with 10 t-y exposure, yielding detection sensitivity for half-lives in excess of 10^{28} yrs. The plans for the design and construction of LEGEND-200 and LEGEND-1000 will be discussed, with emphasis on the design choices and technological development that will allow for improvement upon the backgrounds already demonstrated in GERDA, the lowest of any $0\nu\beta\beta$ experiment to date.

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