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Gerda: Final Results and Physics Beyond Neutrinoless Double-Beta Decay

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The Gerda experiment searched for the lepton number violating neutrinoless double-beta ($0\nu\beta\beta$) decay of 76Ge. Observation of this decay would provide answers to fundamental problems in particle physics and cosmology, including the origin of neutrino masses and baryon asymmetry in the universe. The Gerda experiment achieved the most stringent lower limit on the half-life of the $0\nu\beta\beta$-decay of 1.8 · 10^26 yr at 90% C.L. (which coincides with the sensitivity) by operating high-purity germanium (HPGe) detectors enriched in 76Ge submerged in liquid argon (LAr). The collaboration could achieve this breakthrough by reducing the background event rate to 5.2 · 10^−4 counts/(keV kg yr) at the end-point energy. This unprecedented background index could be achieved by developing unique technologies like utilizing the scintillation light of the LAr to reject efficiently background events that deposit energy simultaneously in the HPGe detectors and in LAr, and the pulse shape discrimination which exploits specific event topologies of backgrounds and signal candidates. Due to the ultra-low background approach the Gerda data is also suited for other rare event searches beyond the $0\nu\beta\beta$ decay like the search for super-WIMPs. This talk will present an overview of the Gerda experiment, its final results and prospects for other physics in the Gerda data.

Reference to paper (DOI or arXiv)

Your gender (free text)

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