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The GERDA Experiment

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The Germanium Detector Array (GERDA) experiment, located at the Laboratori Nazionali del Gran Sasso (LNGS), is searching for the neutrinoless double beta decay of Ge-76. The observation of this Beyond the Standard Model process would prove the existence of a neutrino Majorana mass component and provide information on the neutrino mass hierarchy and absolute mass scale. The Majorana nature of the neutrinos could be responsible for the matter anti-matter asymmetry in the early universe.

The GERDA experiment operates enriched germanium diodes, acting simultaneously as the source and detector material, directly submerged in liquid argon. As a result, Phase I of GERDA achieved the world's best lower limit of T_1/2(0νββ)

2.1 ·1025 yr (90% C.L.) on the half-life of the neutrinoless double beta decay of 76 Ge. With the recent completion of the upgrade to Phase II, an additional 20 kg of germanium detectors – for a total of 35 kg –and a liquid argon veto system have been implemented. The goal is an order of magnitude
lower background with a projected sensitivity of 1.4 ·1026 yr for T_1/2(0νββ).

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