



INVITATION

for a

VERA - SEMINAR

with

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**The quest for Majorana neutrinos with
GERDA and LEGEND**

Since neutrinos have no electric charges, they may be their own antiparticles, referred to as Majorana neutrinos, and thus violate lepton number conservation. Neutrinoless double beta decay would be a direct consequence, and the search for this decay mode is the most sensitive method to unravel the Majorana nature of neutrinos. By operating bare germanium diodes, enriched in Ge-76, in an active liquid argon shield, the GERDA experiment achieved an unprecedentedly low background index of $5.2 \cdot 10^{-4}$ counts/keV kg yr in the signal region and collected an exposure of 100 kg yr in a background-free regime. No signal was observed, and a limit on the half-life of $0\nu\beta\beta$ decay in Ge-76 is set at $T_{1/2} > 1.8 \cdot 10^{26}$ yr (90 % C.L.). Hence, Majorana neutrino masses are constrained to $m_{\beta\beta} < 79-180$ meV (90 % C.L.). The LEGEND Collaboration builds on the success of GERDA and the Majorana Demonstrator, and develops a phased, Ge-76-based double-beta decay experimental program with a $T_{1/2}$ - discovery potential beyond 10^{28} years. Its first stage, LEGEND-200, started data-taking in early 2023, and LEGEND-1000 is under preparation. In this talk, I will present the final results of GERDA, the performance of LEGEND-200 and discuss the preparatory works and plans for LEGEND-1000.

Thursday, 18.01.2024, 16:30 o'clock

**1090 Wien, Währinger Str. 17, "Kavalierstrakt",
1. Stock, Victor-Franz-Hess Hörsaal**