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Recent results from KamLAND-Zen, a neutrinoless double-beta decay search experiment using 136Xe

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Neutrinoless double-beta (0ν2β) decay is physics beyond the Standard Model. If discovered, it would demonstrate that neutrinos are their own antiparticles, a property known as Majorana nature.

KamLAND-Zen is a project to search for the 0ν2β decay of 136Xe. It uses an organic liquid scintillator with dissolved xenon gas as both the source and detector. The experimental apparatus is located in the Kamioka Mine in Gifu, Japan, 1,000 m below Mt. Ikenoyama. At this depth, the cosmic ray muon arrival rate is ~10^{-5} that of the surface. The current phase (KamLAND-Zen 800) uses 750 kg of xenon (136Xe is 91% enriched) and has been running since January 2019.

This presentation will cover recent results from KamLAND-Zen, including the search for the 0ν2β decay [1] and the measurement of muon spallation products in the xenon-loaded liquid scintillator [2].

References
[1] KamLAND-Zen Collaboration, Phys. Rev. Lett., 130, 051801 (2023).
[2] KamLAND-Zen Collaboration, (Accepted by Phys. Rev. C), arXiv:2301.09307 (2023).

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