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KamLAND-Zen Experiment

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KamLAND-Zen is a double beta decay experiment with the enriched xenon-loaded liquid scintillator. Increasing the number of double beta-decay nucleus is a key to improve the sensitivity on the neutrinoless decay mode. Among a dozen of target nuclei, xenon gas is easily solved in the liquid scintillator by about 3 wt%, so the experiment with 380 kg xenon (KamLAND-Zen 400) became feasible early and demonstrated excellent sensitivity. To enhance the sensitivity, the KamLAND-Zen detector was upgraded to larger volume containing 745 kg xenon (KamLAND-Zen 800), corresponding to a twofold increase. Based on the improved analysis with 1 ton-year exposure, KamLAND-Zen has provided the most stringent on the effective neutrino mass, and started probing the inverted mass ordering region for the first time.

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