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Quest for the Nature of the Neutrino

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Neutrinos are remarkable particles. They are the only known fermions that interact only via the weak force and have unusually small but finite masses. Although we have learned much about their nature over the past decades, fundamental question remain. A key one is whether neutrinos are Majorana fermions, which would imply that they are their own antiparticles. Surprisingly, this is a very difficult property to test experimentally, and the current best experimental method is to search for neutrinoless nuclear double-beta decay (NDBD). Just demonstrating the existence of this decay would show that neutrinos are Majorana fermions. In this talk I will give a theoretical and historical overview of NDBD, followed by a discussion of the experimental challenges and current international efforts to search for NDBD.