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Review on Neutrinoless Double Beta Decay

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The observation of neutrino oscillations has established non-zero masses of neutrinos, the flavour change and mixing of neutrinos. After these discoveries the global physics community is facing the next challenging problem, whether neutrinos are indeed Majo- rana particles (i.e. identical to its own antiparticle). The search for neutrinoless double beta decay allows in principle fixing of the neutrino mass scale, the neutrino nature (the Dirac or Majorana particles) and possible CP violation effects. A clear detection of the neutrinoless double beta decay will prove the total lepton number (LN) to be broken in nature, and neutrinos to be Majorana particles. In this review history and motivation of neutrinoless double-beta decay are briefly discussed. The status, recent results and advancements of current neutrinoless double-beta decay experiments are reviewed, and requirements and prospects of the new generation of experiments are presented.

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