

Overview of neutrinoless double beta decay

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The Standard Model, as it currently stands, is not able to explain some of the most important questions about our universe such as what was the mechanism that led to the observed antimatter-matter asymmetry. Answers to these fundamental questions may come from neutrinos, which are one of the least understood particles. One of the most interesting possibilities is that neutrinos could be their own antiparticle, i.e. a Majorana fermion, which would inherently violate lepton number – a crucial ingredient in theories such as leptogenesis. In addition, this opens the possibility that the Standard Model is a low-energy effective field theory and alternative mass-generating mechanisms beyond the usual Higgs mechanism. Neutrinoless double beta decay is the most feasible method of determining if the neutrino is a Majorana fermion and in this talk, I will give an overview of the theoretical aspects of this ultra-rare process.

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