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Chiral EFT Treatment of Neutrinoless Double Beta Decay with Majoron Emission

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Lepton number conservation is an accidental symmetry of the Standard Model. However, lepton flavour is violated by the prominent example of neutrino oscillations. Therefore it is reasonable to investigate whether lepton number is truly conserved in nature. A popular test for this is neutrinoless double beta decay ($0\nu\beta\beta$) which physicists have been investigating for a long time already. A variation of this is $0\nu\beta\beta$ with additional emission of a scalar, the so-called Majoron ϕ . This is the case that will be presented in this talk. We are aiming to treat this case using chiral effective field theory (chiral EFT). I will give an introduction to work that has already been performed on this topic for both $0\nu\beta\beta$ with Majoron emission ($0\nu\beta\beta\phi$) and $0\nu\beta\beta$ in chiral EFT. Then I will present the current state of our work of using chiral EFT methods to investigate $0\nu\beta\beta\phi$.

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