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Systematic decomposition of the neutrinoless double beta decay operator

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If the standard model is an effective model of a fundamental theory realized at high energy scales, the full Lagrangian that describes physics at the electroweak scale should contain the series of higher-dimensional operators whose mass dimensions are higher than four. Such effective interactions suppressed by the inverse power of new physics scale Λ_{NP} are typical low-energy remnant of new physics at high energy scales

In this talk, we focus on dim=9 operators which contribute to the neutrinoless double beta decay (0n2b) process. An interesting observation is that the next generation 0n2b experiments, which are aimed at discovering the effective neutrino mass of O(0.1) eV, are also sensitive to the dim=9 operators with $Lambda_{NP}$=O(1) TeV. With a list of the possible high-energy — TeV scale — completions of the effective dim=9 operators, we discuss the complementarity between the 0n2b signal and the LHC observables, and seek the relation between the dim=9 operators and the existent models, such as radiative neutrino mass models.

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