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Study of kinematic factors in double-beta decay

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Until the recent past not to much importance was given to the kinematic factors related to the double-beta decay, i.e. the phase space factors, electronic spectra and angular correlations between the emitted electrons. The reason was largely because on the one side they were considered to be calculated/predicted with enough precision (in comparison for example with the nuclear matrix elements) and, on the other side, the experimental measurements had not reached a sufficient degree of accuracy to be able to distinguish fine details of them. This situation is changing now. A detailed analysis of the DBD electron spectra and angular correlations can provide us with useful information on transitions to excited states, on decay modes and mechanisms contributing to neutrinoless DBD and, very recently on possible effects of Lorentz symmetry violation in the neutrino sector.
In my presentation I will give first a short review about the challenges in computation of the space phase factors, electron spectra and electron angular correlations. Then, I refer to the analysis of observable effects of Lorentz violation (LV) in two-neutrino DBD in the framework of the Standard Model Extension (SME) and I present a comparison between the methods of calculation the summed electron spectra including the deviations due to LV associated to the like-time component of the so-called countershaded operator.
Finally, I show that our predictions regarding electronic spectra correlated with their precise measurements that are currently being done in DBD experiments (like EXO-2000, SuperNEMO, etc.) for searching LV effects, can improve with up to 30% the actual upper limits of the (ä)3of coefficient that governs the LV contribution.

References

J. S. Diaz, Phys. Rev. D 89, 036002 (2014).
J. Kotila and F. Iachello, Phys. Rev. C 85, 034314 (2012).
S. Stoica and M. Mirea, Phys. Rev. C88, 037303 (2013).
M. Mirea, T. Pahomi, and S. Stoica, Rom. Rep. Phys.67, 872 (2015).
S. Stoica, MEDEX'19, Prague, May 28, 2019.
S. Stoica and M. Mirea, Phase space factors for double-beta decay, Frontiers in Physics, ID 436288, 2019.

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