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Leptonic sector in a 2HDM with a discrete flavor symmetry.

We propose a Standard Model extension in which we consider the type-III 2HDM plus massive neutrinos and the horizontal flavor symmetry S_3 (ν2HDM$\otimes S_3$). In this extension and with the explicit sequential breaking of S_3 symmetry, all Yukawa matrices in the flavor adapted basis are represented by means of a matrix with two texture zeroes. The active neutrinos are considered as Majorana particles and their masses are generated through the type-I seesaw mechanism. The unitary matrices that diagonalize to the mass matrices, as well as the flavor mixing matrices are expressed in terms of fermion mass ratios. In the mass basis, the entries of the Yukawa matrices naturally acquire the form of the so-called Cheng-Sher ansatz. In the leptonic sector, we compare the theoretical expressions of the flavor mixing angles with the current experimental data on masses and flavor mixing, through a χ^2 likelihood test. The results obtained are in very good agreement with the current experimental data. We also obtained an allowed value ranges for the "Dirac-like" phase factor, as well as for the two Majorana phase factors. Furthermore, we study the phenomenological implications of these numerical values of the CP-violation phases on the neutrinoless double beta decay, and for Long Base-Line neutrino oscillation experiments such as T2K, NOνA, and DUNE.

Parallel Session

BSM aspects of Flavour and Neutrino Physics

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