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Confronting neutrino mixing schemes with correlations of neutrino oscillation data

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The observed pattern of fermion masses and mixing is an outstanding puzzle in particle physics, generally known as the flavor problem. To explain the typical mixing pattern in the neutrino sector, various mixing schemes are proposed, such as trimaximal mixing (TM1 and TM2), $\mu - \tau$ reflection symmetries, etc. Such mixing schemes can emerge within the framework of discrete flavor symmetries, proving a theoretical origin for observed neutrino mixing and generating specific predictions for the neutrino mixing parameters. Once we consider the correlation among observed neutrino oscillation data, these predictions get further constrained. The methodology proposed here can be implemented in any viable neutrino mixing scheme. In this work, as an example, we discuss constraints on trimaximal (TM1 and TM2) mixing schemes, taking into account the full range of correlations coming from global analysis of neutrino mixing angles and the Dirac CP phase. Furthermore, we also show the implications of such constraints on the effective neutrino masses in the tritium and neutrinoless double beta decay experiments.

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