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Study of Texture Zero Neutrino Models with Vanishing Sub-trace and their Flavor Structures

In this work, we carry out a systematic investigation of thirty six possible structures of neutrino mass matrix, M_ν having textures of one zero element and one vanishing sub-trace taking the latest 3σ neutrino data. Correlation plots of the ratio of solar to atmospheric mass splittings, R_ν and the Dirac CP phase δ for each texture are examined and found only fourteen textures phenomenologically viable with 3σ range. The restricted ranges of δ for allowed textures are used to predict theoretically the Majorana CP Phases (α and β) which are yet to be measured experimentally. With these results, we also calculate the Majorana mass term, $|m_{ee}|$ on which the neutrinoless double beta decay rate depends, and the Jarlskog invariant, J_{cp} for the strength of CP violation and also study the correlations between the CP phases and the mixing angle θ_{23}. Besides them, we also checked the experimental compatibilities for the parameters effective electron neutrino mass m_{ν_e}, total 'sum' of neutrino masses Σ_ν. The consistency of mass orderings of textures is checked with $\frac{m_3}{m_1}$ and phenomenological identification of textures having no octant degeneracy for θ_{23}. Finally, the flavor symmetry realization of textures is done under the symmetry group $S_3 \times Z_4$ in Type II seesaw mechanism.

Field of contribution

Phenomenology

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