

Study of neutrino mass matrices with vanishing trace and one vanishing minor

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In this work we carry out a systematic texture study of the neutrino mass matrix with the ansatzes - (i) one vanishing minor and (ii) the zero sum of the mass eigenvalues with the CP phases (henceforth vanishing trace). There are six possible textures of a neutrino mass matrix with one vanishing minor. The viability of each texture is checked with 3σ values of current neutrino data by drawing scatter plots. In our analysis we are motivated to use the ratio of solar to atmospheric mass-squared differences R_ν for its precise measurement (and also the atmospheric mixing angle θ_{23}) to constrain phenomenologically first the Dirac CP phase δ in the range of $(0^\circ - 360^\circ)$ for a given texture with the solutions of the constraint equations. Subsequently we employ this constrained δ to determine the range of completely unknown Majorana CP Phases (α and β) for all the viable textures. We also check the neutrinoless double beta decay rate, $|m_{ee}|$ and the Jarlskog invariant, J_{CP} for the textures. Finally the symmetry realization of all the viable textures under the flavor symmetry group Z_5 via seesaw mechanism is implemented along with the FN mechanism to determine mass hierarchy structure.

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