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Implications of Dark- θ_{12} Solution on Two-zero Texture Inverse Neutrino Mass Matrix

Friday 16 December 2022 14:00 (1 hour)

We investigate the possibility of two-zeros in inverse neutrino mass matrix (M_ν^{-1}) in light of “dark” large mixing angle ($dark-\theta_{12}$) solution to the solar neutrino problem where solar mixing angle lies in the second octant ($\sin^2 \theta_{12} \simeq 0.7$). The zeros in right-handed Majorana neutrino mass matrix M_R corresponds to the zeros in M_ν^{-1} if Dirac and charged lepton mass matrices are diagonal. Out of fifteen possible two-zero textures, only seven are found to be consistent with $dark-\theta_{12}$ solution. All the textures with vanishing (1,1) element are found to be inconsistent with $dark-\theta_{12}$ solution. We, also, obtained predictions of the model for $0\nu\beta\beta$ amplitude $|M_{ee}|$. For five out of seven allowed textures, the predicted 3σ lower bound on $0\nu\beta\beta$ amplitude $|M_{ee}|$ is $\mathcal{O}(10^{-2})$ which is within the sensitivity reach of $0\nu\beta\beta$ decay experiments like SuperNEMO, KamLAND-Zen, NEXT and nEXO. Furthermore, these textures are found to be necessarily CP -violating. Within Type-I seesaw setting, we have shown that the allowed M_ν^{-1} textures can be realized using A_4 discrete flavor symmetry wherein the standard model particle content has been enlarged with three right-handed neutrinos and a scalar singlet field.

Session

Neutrino Physics

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