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Realisation of Two-Zero Texture of Neutrino Mass Matrix Using Γ_3 Modular Group with Type II Seesaw Dominance in Left-Right Symmetric Model

Assuming that neutrinos are Majorana particles, we have realized two-zero textures using the Γ_3 modular group. The Γ_3 modular group is a finite modular group isomorphic to the A_4 group. By assigning the matter fields of the model to irreducible representations of A_4 and choosing appropriate modular weights, we successfully construct two-zero textures of the neutrino mass matrix. The model is based on the Left-Right Symmetric Model (LRSM), where the active neutrino masses are generated via type II seesaw dominance. To achieve this dominance, the particle content of the LRSM is extended by introducing one sterile fermion per generation, and the scalar sector is augmented by adding scalar doublets (χ_L, χ_R). After constructing the two-zero textures, we compute the neutrino oscillation parameters and the baryon asymmetry of the universe (BAU) for each texture. We find that the textures can successfully reproduce the neutrino oscillation parameters and the effective Majorana mass. However, not all of the realized textures yield a satisfactory result in the calculation of BAU.

Author: KUMAR, Bhabana (Tezpur University)

Co-authors: Dr DUTTA, Debajyoti (Bhattadev University); Prof. DAS, Mrinal Kumar (TEZPUR UNIVERSITY)

Presenter: KUMAR, Bhabana (Tezpur University)

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