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Light scalars in the triplet seesaw model

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The Standard Model (SM) is the most successful theory in physics, accurately describing the electromagnetic, weak, and strong interactions of fundamental particles. However, it fails to explain some observed phenomena, such as neutrino oscillations/masses, leptonic charge-parity (CP) violation and mixing patterns, i.e., the neutrino flavor puzzle.

In this work, we explore an extension of the SM via the two-scalar-triplet model. This framework naturally generates small neutrino masses through the Type-II seesaw mechanism and gives rise to leptonic CP violation through spontaneous CP violation. Furthermore, it addresses the neutrino flavor puzzle by accommodating two texture zeros in the neutrino mass matrix, which are enforced by softly broken Abelian symmetries. Finally, we present a numerical analysis of the model's predictions for the non-decoupled scalars and evaluate the compatibility of the texture zeros with experimental data.

Field of Research/Work

Particles and Fields

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