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Non-minimal SU(5) modular flavor model

In this work we study a supersymmetric extension of the minimal SU(5) grand unified model. This extension consists in adding an S3-modular symmetry. This symmetry takes the role of flavour symmetry between quarks and leptons. Futhermore, the Higgs scalar sector is extended to include six doublets in contrast to the minimal Higgs sector of the Standard Model. Then, we proceed to group the particle fields in the different irreducible representations of SU(5) and within the irreducible representations of S3. Once the matter content is established, we proceed to construct the Yukawa potential where modular forms are used and specific modular weights are assigned to the particle fields in order to make the potential invariant under the flavour symmetry. From the mass matrices associated with the potential, which exhibit two zero textures, the mixing matrices are constructed. In view of these results and by means of a $\chi 2$ adjustment, we seek to reproduce the mass hierarchy and the mixing angles between the different quark and lepton flavors that are known experimentally in the MZ scale taking into account the RGE evolution and the SUSY threshold corrections.

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