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Flavored Gauge Mediated Supersymmetry Breaking Models with Discrete Non-Abelian Symmetries

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We investigate flavored gauge mediation models in which the Higgs and messenger doublets are embedded in multiplets of the discrete non-Abelian symmetry S_3 . In these theories, the S_3 symmetry correlates the flavor structure of the quark and lepton Yukawa couplings with the structure of the messenger Yukawa couplings that contribute to the soft supersymmetry breaking mass parameters. We provide a systematic exploration of possible scenarios within this framework that lead to the needed hierarchical quark and charged lepton masses, and examine the resulting phenomenological implications in each case. Quite generally, we find a split spectrum for the superpartner masses compared to flavored gauge mediation models controlled by Abelian symmetries, due to the need in our scenarios for two pairs of messenger fields. We also demonstrate that the flavor violation that is expected in these scenarios generally falls within phenomenologically viable ranges.

Summary

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