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Probing Lepton Flavor Violating decays in MSSM with Non-Holomorphic Soft Terms

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The Minimal Supersymmetric Standard Model (MSSM) can be extended to include non-holomorphic trilinear soft supersymmetry (SUSY) breaking interactions that may have distinct signatures. We consider non-vanishing off-diagonal entries of the coupling matrices associated with holomorphic (of MSSM) and non-holomorphic trilinear terms corresponding to sleptons with elements A_{ij}^l and $A_{ij}^{\prime l}$. We first improve the MSSM charge breaking minima condition of the vacuum to include the off-diagonal entries A_{ij}^l (with $i \neq j$). We further extend this analysis for non-holomorphic trilinear interactions. No other sources of lepton flavor violation like that from charged slepton matrices are considered. We constrain the interaction terms via the experimental limits of processes like charged leptons decaying with lepton flavor violation (LFV) and Higgs boson decaying to charged leptons with LFV. Apart from the leptonic decays we compute all the three neutral LFV Higgs boson decays of MSSM. We find that an analysis with non-vanishing $A_{e\mu}^l$ involving the first two generations of sleptons receives the dominant constraint from $\mu \rightarrow e\gamma$. On the other hand, $A_{e\tau}^l$ or $A_{\mu\tau}^l$ can be constrained from the LHC 13 TeV analysis giving limits to the respective Yukawa couplings via considering SM Higgs boson decaying into $e\tau$ or $\mu\tau$ final states. Contributions from $A_{ij}^{\prime l}$ is too little to have any significance compared to the large effect from A_{ij}^l .

Summary

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