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Probing Non-holomorphic MSSM via precision constraints, dark matter and LHC data

In this analysis we explore the phenomenological constraints of models
with non-holomorphic soft SUSY breaking terms in a beyond the MSSM scenario
having identical particle content. The model referred as NHSSM shows various
promising features like the possibility of a strong reduction in electroweak fin
e-tuning even for a scenario of a heavy higgsino type of LSP, a fact that is unavailable in pMSSM models. The
other important aspect is satisfying the muon $g-2$ data even for a small
$\tan\beta$ via a small value of coupling A'_μ associated with the tri-linear non-holomorphic soft term. Thus, a large
SUSY contribution to muon $g-2$ is possible
even for a significantly large smuon mass $m_{\tilde{\mu_1}}$. The Higgs mass radiative corrections are contributed by both
the holomorphic and non-holomorphic trilinear soft parameters A_t and A'_t, thus diluting the requirement to
have a larger A_t
to satisfy the Higgs mass data. The model also provides with valid parameter space
satisfying the constraint of $B \to X_s + \gamma$ for large values of
$\tan\beta$, a scenario unfavourable in pMSSM.

Primary author: Prof. CHATTOPADHYAY, Utpal (Indian Association for the Cultivation of Science)

Co-author: Mr DEY, Abhishek (Maulana Azad College, Kolkata)

Presenter: Prof. CHATTOPADHYAY, Utpal (Indian Association for the Cultivation of Science)

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