

Sbottoms as probes to MSSM with nonholomorphic soft interactions

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Presence of non-holomorphic soft SUSY breaking terms is known to be a possibility in the popular setup of the Minimal Supersymmetric Standard Model (MSSM). It has been shown that such a scenario known as Non-Holomorphic Supersymmetric Standard Model (NHSSM) could remain 'natural' (i.e., not fine-tuned) even in the presence of a rather heavy higgsino-like LSP. In a first study of such a scenario at colliders (LHC), we explore a possible way that focuses on the sbottom phenomenology. This exploits the usual $\tan\beta$ -dependence (enhancement) of the bottom Yukawa coupling but reinforced/altered in the presence of non-vanishing non-holomorphic soft trilinear parameter A'_b . For a given set of masses of the sbottom(s) and the light electroweakinos (LSP, lighter chargino etc.) which are known from experiments, the NHSSM could manifest itself via event rate in the $2b + \text{MET}$ final state, which could be characteristically different from its MSSM expectation. Impact on the phenomenology of the stops at the LHC is also touched upon.

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