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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 β -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 + 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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