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Constraining MSSM Benchmark Scenarios through Vacuum Stability

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Since the LHC has not provided us with any hints towards new physics, it is ever more interesting to constrain BSM theories from purely theoretical considerations. Requiring that the electroweak vacuum in any BSM model is at least metastable, can lead to stringent constraints on the parameter space of the model. Many popular extensions of the SM, such as supersymmetry, feature greatly extended scalar sectors. In the resulting high dimensional scalar potential, vacuum decay can happen in many different field directions. Constraints from vacuum decay thus rely on finding all minima of multidimensional scalar potentials which is a nontrivial task even at tree-level. We study the impact of these constraints on the newly proposed benchmark scenarios for the MSSM.

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