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LHC SUSY and WIMP dark matter searches confront the string theory landscape

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The string theory landscape of vacua solutions provides physicists with some understanding as to the magnitude of the cosmological constant. Similar reasoning can be applied to the magnitude of the soft SUSY breaking terms in supersymmetric models of particle physics: there appears to be a statistical draw towards large soft terms which is tempered by the anthropic requirement of the weak scale lying not too far from ˜100 GeV. For a mild statistical draw of˙m_{soft}ˆn with n=1 (as expected from SUSY breaking due to a single F term) then the light Higgs mass is preferred at ˜125 GeV while sparticles are all pulled beyond LHC bounds. We confront a variety of LHC and WIMP dark matter search limits with the statistical expectations from a fertile patch of string theory landscape. The end result is that LHC and WIMP dark matter detectors see exactly that which is expected from the string theory landscape: a Standard Model-like Higgs boson of mass 125 GeV but as yet no sign of sparticles or WIMP dark matter. SUSY from the n=1 landscape is most likely to emerge at LHC in the soft opposite-sign dilepton plus jet plus MET channel. Multi-ton noble liquid WIMP detectors should be able to completely explore the n=1 landscape parameter space.

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