

SUSY 2025

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Book of Abstracts

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Supersymmetry phenomenology and experiment / 1**Status of Weak Scale Supersymmetry, 2025****Author:** Howard Baer¹¹ *University of Oklahoma***Corresponding Author:** baer@nhn.ou.edu

In spite of extensive searches for supersymmetric matter at LHC and SUSY WIMPs at ton-scale noble liquid dark matter search experiments, the status of SUSY is good. I review why early naturalness estimates overestimated finetuning while the more recent model-independent measure DEW leaves broad swaths of natural SUSY parameter space. Rather general arguments from the string landscape favor large soft breaking terms subject to the anthropic condition that the derived value of the weak scale lie within the ABDS window of allowed values. Then this stringy naturalness favors natural SUSY models over finetuned models. Discrete R-symmetries can be used to solve the SUSY mu problem and other problems, but then lead to both PQ and R-parity as accidental, approximate symmetries which then imply that all SUSY dark matter should be DFSZ axions with depressed detection rates. Prospects for SUSY at high-lumi LHC are also reviewed, especially the soft dilepton plus jets plus MET signature arising from light higgsino pair production.