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The Fine-tuning of the Minimal Supersymmetric Standard Model: Constraints by the LHC, Future Colliders and Dark Matter searches

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We evaluate the fine-tuning of the phenomenological minimal supersymmetric standard model (pMSSM). We show that the fine-tuning of the pMSSM is not large yet, nor under pressure by LHC searches. We also determine GUT scale models with the same low fine-tuning.

Low sbottom, stop and gluino masses turn out to be less relevant for low fine-tuning than commonly assumed. Fine-tuning arguments point to models with a dark matter candidate yielding the correct dark matter relic density: a bino-higgsino particle with a mass of 35–155 GeV. We show how upcoming searches at the LHC, with Dark Matter detection experiments and at future colliders will constrain the fine-tuning of the MSSM. In addition we briefly discuss the relevance of Machine Learning in recasting LHC limits (SUSY-AI project).

Experimental Collaboration

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