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Stealth Supersymmetry

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We present a broad class of supersymmetric models that preserve R-parity but lack missing energy signatures. These models have new light particles with weak-scale supersymmetric masses that feel SUSY breaking only through couplings to the MSSM. The simplest scenario has low-scale SUSY breaking, with nearly-supersymmetric NLSPs leading to missing E_T only from soft gravitinos. We emphasize that this scenario is natural, lacks artificial tunings to produce a squeezed spectrum, and is consistent with gauge coupling unification. The resulting collider signals will be jet-rich events containing false resonances that could resemble signatures of R-parity violation or of other scenarios like technicolor. We discuss several concrete examples of the general idea, and emphasize photon-jj resonances and very large numbers of b-jets as two possible discovery modes.

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