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Dark gauge-mediated supersymmetry breaking

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We investigate dark gauge-mediated supersymmetry breaking with an unbroken U(1) gauge symmetry and a massless dark photon. Messengers charged under both Standard Model and dark gauge groups generate new soft SUSY-breaking terms via gauge kinetic mixing. Large mixing significantly alters superpartner spectra compared to standard GMSB, reduces the μ parameter, and predicts a relatively light Higgsino detectable at the LHC. Simple messenger scenarios yield a very light bino-dark photino state observable in exotic Higgs decays at future colliders. The cosmological and phenomenological effects of stable, fractionally charged messenger states are also explored.

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