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Electroweak symmetry breaking by a neutral sector: Dynamical relaxation of the little

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We propose a new dynamical relaxation mechanism based on a singlet extension of the MSSM. In this scenario, a small enough soft mass of the MSSM singlet is responsible for the electroweak symmetry breaking and the Higgs VEV of order 100 GeV, whereas the effects of a large soft mass parameter of the Higgs boson, $-m_{\{hu\}}^2$ are dynamically compensated by an MSSM singlet field. The smallness of the Higgs VEV can be protected by a hierarchy between the gravity and gauge mediated SUSY breaking scales and the smallness of the relevant Yukawa couplings. Since its VEV is adjusted by the VEV of the Higgs of order 100 GeV, the Z boson mass can remain light even if the stop mass is heavier than 10 or 20 TeV. A focus point of the singlet's soft mass parameter emerges around the stop decoupling scale, and so the various fine-tuning measures can be reduced to order 10.

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