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## WIMPlless dark matter in Anomaly Mediated SUSY breaking

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### **Abstract:**

In anomaly-mediated supersymmetry breaking, superpartners in a hidden sector have masses that are proportional to couplings squared, and so naturally freeze out with the desired dark matter relic density for a large range of masses. We present an extremely simple realization of this possibility, with WIMPlless dark matter arising from a hidden sector that is supersymmetric QED with  $N_F$  flavors. Dark matter is multi-component, composed of hidden leptons and sleptons with masses anywhere from 10 GeV to 10 TeV, and hidden photons provide the thermal bath. The dark matter self-interacts through hidden sector Coulomb scatterings that are potentially observable. In addition, the hidden photon contribution to the number of relativistic degrees of freedom is in the range  $\Delta N_{\text{eff}} \sim 0 - 2$ , and, if the hidden and visible sectors were initially in thermal contact, the model predicts  $\Delta N_{\text{eff}} \sim 0.2 - 0.4$ . Data already taken by Planck may provide evidence of such deviations.

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