

Dark Matter from Anomaly Cancellation

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We discuss a class of theories that predict a fermionic dark matter candidate from gauge anomaly cancellation. As an explicit example, we study the predictions in theories where the global symmetry associated with baryon number is promoted to a local gauge symmetry. In this context, the symmetry-breaking scale has to be below the multi-TeV scale in order to be in agreement with the cosmological constraints on the dark matter relic density. The new physical “Cucuyo” Higgs boson in the theory has very interesting properties, decaying mainly into two photons in the low mass region, and mainly into dark matter in the intermediate mass region. We study the most important signatures at the Large Hadron Collider, evaluating the experimental bounds. We discuss the correlation between the dark matter relic density, direct detection, and collider constraints. We find that these theories are still viable and are susceptible to being probed in current, and future high-luminosity, running.

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