

Fermionic Dark Matter in the light of AMS-02 Positron-fraction excess

We consider the existence of a fermionic dark matter along with the extension of the Standard Model (SM) of particle physics by the two Higgs doublet model. The Yukawa interaction of the Higgs doublets with the SM fermions, in the Lepton Specific configuration, is responsible for the generation of the latter's mass. The two doublets couple to the dark matter (fermionic singlet) through a non-renormalisable coupling which provides a new physics scale. We investigate whether the electron-positron pair produced as a result of the annihilation of such a dark matter can explain the excess in the positron-fraction in the primary cosmic rays observed by the Alpha Magnetic Spectrometer (AMS-02) on board the International Space Station (ISS) beyond 10 GeV, peaks around 350 GeV. Since no such excess has been reported in the anti-proton fraction, it can be concluded that such a dark matter would not couple to the SM quarks in the tree-level. We calculate the positron flux from such annihilating dark matter and compare with those reported by the AMS-02 experiment.

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