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Cosmic positron and antiproton constraints on the gauge-Higgs Dark Matter

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We calculate the cosmic ray positron and antiproton spectra of a gauge-Higgs dark matter candidate in a recently proposed warped five-dimensional SO(5) xU(1) gauge-Higgs unification model. The stability of the gauge-Higgs boson is guaranteed by the H parity under which only the Higgs boson is odd at low energy. The 4-point vertices of HHWW and HHZZ, allowed by H parity conservation, have the same magnitude as in the standard model, which yields efficient annihilation rate for $m_H > m_W$.
The most dominant annihilation channel is $HH \to W^+W^-$ followed by the
subsequent decays of the W bosons into positrons or quarks, which undergo fragmentation into antiproton. Comparing with the observed positron and
antiproton spectra with the PAMALA and Fermi/LAT, we found that the Higgs boson mass cannot be larger than 90 GeV, in order not to overrun the observations.
Together with the constraint on not overclosing the Universe, the valid range of the dark matter mass is restricted to 70-90 GeV.

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