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Constraints from electroweak bremsstrahlung and prospects for gamma ray detection

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It is well known that the annihilation of Majorana dark matter particles into
light leptons can be significantly enhanced by electromagnetic bremsstrahlung processes, which give rise to potentially observable signal in gamma-rays.
Due to the gauge invariance, this mechanism inevitably leads to electroweak
bremsstrahlung processes, which in turn lead to the production of antiprotons even when the leading order hadronic annihilation channels are forbidden. We investigate the constraints on the electroweak bremsstrahlung processes from the present measurements of the antiproton-to-proton fraction and we discuss the prospects to observe a gamma-signal in view of the antiproton constraints.

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