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Constraints on dark matter annihilation to fermions and a photon

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We consider Majorana dark matter annihilation to fermion - anti-fermion pair and a photon in the effective field theory paradigm, by introducing dimension 6 and dimension 8 operators in the Lagrangian. For a given value of the cut-off scale, the latter dominates the annihilation process for heavier dark matter masses. We find a cancellation in the dark matter annihilation to a fermion - anti-fermion pair when considering the interference of the dimension 6 and the dimension 8 operators. Constraints on the effective scale cut-off is derived while considering indirect detection experiments and the relic density requirements and then comparing them to the bound coming from collider experiments.

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