

Dark matter decays from non-minimal coupling to gravity

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Summary

We consider the Standard Model extended with a dark matter particle in curved spacetime and we investigate the impact on the dark matter stability of terms in the Lagrangian linear in the dark matter field and proportional to the Ricci scalar. We show that this “gravity portal” induces decay even if the dark matter particle only has gravitational interactions, and that the decay branching ratios into Standard Model particles only depend on the dark matter mass. We calculate the dark matter decay widths in some simple scenarios and we set conservative limits on the non-minimal coupling parameter from experiments.

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