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Cosmological constraints on the decay of heavy relics into neutrinos

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A massive particle decaying into neutrinos in the early Universe is known to be less constrained than if it was decaying into other standard model particles. However, even if the decay proceeds into neutrinos, the latter still inevitably emit secondary particles undergoing electromagnetic interactions that can be probed. We analyse in details how sensitive various cosmological probes are to such secondary particles, namely CMB anisotropies, CMB spectral distortions, and Big Bang Nucleosynthesis. For relics whose lifetime is shorter than the age of the Universe, this leads to original and stringent bounds on the particle's lifetime as a function of its abundance and mass.

Summary

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