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Hints for decaying dark matter from S_8 measurements

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Recent weak lensing surveys have revealed that the direct measurement of the parameter combination $S_8 = \sigma_8 (\Omega_m/0.3)^{0.5}$ – measuring the amplitude of matter fluctuations on 8 Mpc/h scales – is $\sim 3\sigma$ discrepant with the value reconstructed from cosmic microwave background (CMB) data assuming the Λ CDM model. In this talk, I discuss that it is possible to resolve the tension if dark matter (DM) decays with a lifetime of $\Gamma^{-1} \sim 55$ Gyrs into one massless and one massive product, and transfers a fraction $\epsilon \sim 0.7\%$ of its rest mass energy to the massless component. The velocity-kick received by the massive daughter leads to a suppression of gravitational clustering below its free-streaming length, thereby reducing the σ_8 value as compared to that inferred from the standard Λ CDM model, in a similar fashion to massive neutrino and standard warm DM. Contrarily to the latter scenarios, the time-dependence of the power suppression and the free-streaming scale allows the 2-body decaying DM scenario to accommodate CMB, baryon acoustic oscillation, growth factor and uncalibrated supernova Ia data.

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