

Cosmological constraints on atomic dark matter

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An atomic dark matter model, consisting of self-interacting “dark protons,” “dark electrons,” and “dark photons,” as explored by Cyr-Racine and Sigurdson (2013), is observationally viable, provides new observational signatures beyond non-interacting cold dark matter, and might provide a solution to the Hubble tension and the σ_8 tension. We present updates to constraints on the model from cosmic microwave background (CMB) and baryon acoustic oscillation (BAO) data, both with and without Cepheid-calibrated supernovae constraints on the Hubble constant. We set limits, in these two scenarios, on the fraction of dark matter that could be atomic dark matter. We also find that lower values of σ_8 are allowed with lower dark photon temperature in both scenarios.

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