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CMB constraints on non-minimally coupled ultralight dark matter

Tuesday 20 May 2025 18:00 (15 minutes)

In this talk, I will present bounds on the variation of fundamental constants from the cosmic microwave background (CMB). In our theoretically motivated model, the variation is modulated by a scalar field that behaves as an ultralight dark matter (ULDM). We self-consistently compute the effects of the variation of constants on big bang nucleosynthesis (BBN) and propagate those effects to the computation of the CMB spectra. We explore the degeneracies between various effects, such as changes in primordial Helium fraction (Y_p), changes due to modified recombination, and the effects on the ULDM. I will present the bounds on the variation of the electron mass and fine structure constant. I will also discuss the implications of the Hubble tension in this context.

Mini Symposia (Invited Talks Only)

Plenary (Invited talks only)

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