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Constraining Ultralight Scalar Dark Matter with Quadratic Couplings from Big Bang Nucleosynthesis

Tuesday 9 May 2023 17:30 (15 minutes)

In this talk I present recent work, deriving constraints on ultralight dark matter form Big Bang Nucleosynthesis. The work shows that the presence of ultralight dark matter can modify the effective values of fundamental constants during Big Bang Nucleosynthesis, affecting the predicted abundances of the primordial elements such as Helium-4. The dark matter evolution is influenced by interactions with the Standard Model, leading to novel phenomenology that must be accounted for to correctly estimate the effect on the Helium-4 abundance. It's shown that Big Bang Nucleosynthesis provides strong constraints of ultralight dark matter with quadratic couplings to the Standard Model for a large range of masses as compared to other constraints.

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