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Probing Light Relics with CMB and BAO

Tuesday, 17 October 2017 12:00 (15 minutes)

Future cosmic microwave background (CMB) and large-scale structure (LSS) observations will provide us with percent-level measurements of the radiation content of the universe. I will show this by discussing current observational constraints and, in particular, providing forecasts of the capabilities of future CMB and LSS experiments such as CMB-S4 and DESI. In addition, I will provide analytical insights to the constraining power of these measurements, especially related to the phase shift in baryon acoustic oscillations (BAO). This then sets the stage for the discussion of constraints on the coupling of light thermal relics, in particular scalar particles such as axions, to the Standard Model. I will present future bounds on these weak couplings which have the potential to improve on current constraints by several orders of magnitude with measurements of future cosmological surveys alone.

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