

Photon to axion conversion during Big Bang Nucleosynthesis

Tuesday 3 October 2023 09:40 (20 minutes)

We investigate how the resonant conversion at a temperature $\bar{T} = 25\text{-}65\text{ keV}$ of a fraction of the CMB photons into an axion-like majoron affects BBN. The scenario, that assumes the presence of a primordial magnetic field and the subsequent decay of the majorons into neutrinos at $T \approx 1\text{ eV}$, has been proposed to solve the H_0 tension. We find two main effects. First, since we lose photons to majorons at $\bar{T}$, the baryon to photon ratio is smaller at the beginning of BBN ($T > \bar{T}$) than during decoupling and structure formation ($T \ll \bar{T}$). This relaxes the 2σ mismatch between the observed deuterium abundance and the one predicted by the standard ΛCDM model. Second, since the conversion implies a sudden drop in the temperature of the CMB during the final phase of BBN, it interrupts the synthesis of lithium and beryllium and reduces their final abundance, possibly alleviating the lithium problem

Authors: CUESTA, Antonio J.; Dr ILLANA, Jose Ignacio (University of Granada); MASIP, Manuel

Presenter: Dr ILLANA, Jose Ignacio (University of Granada)

Session Classification: CPAN - Red Temática de Astropartículas (RENATA)

Track Classification: CPAN - Red Temática de Astropartículas (RENATA)