

# Constraining Majoron from Big-Bang Nucleosynthesis

Friday 19 July 2024 20:40 (20 minutes)

Majoron-like particle  $J$  in the mass range between 1 MeV to 10 GeV, which dominantly decays into the standard model (SM) neutrinos, can be constrained from the big-bang nucleosynthesis (BBN). For majoron lifetime ( $\tau_J$ ) smaller than 1sec, the injected neutrinos from the majoron decay heat up the background plasma and it results in the deficit of Helium-4 abundance and enhancement of Deuterium (D) abundance. For  $\tau_J$  larger than 1sec, the injected neutrinos enhance the conversion rate of  $p \rightarrow n$  which results in the enhancement of Helium-4 and D abundance. We found that in both cases, the constraint from the measurement of D is the strongest. We also estimate the  $\Delta N_{\text{eff}}$  constraint on the majoron parameter space and compare it with the BBN bounds, obtained from our analysis.

## Alternate track

1. Beyond the Standard Model

## I read the instructions above

Yes

**Primary authors:** SHIN, Chang Sub; CHANG, Sanghyeon; Mr GANGULY, Sougata (Chungnam National University); JUNG, Tae Hyun; PARK, Tae-Sun

**Presenter:** Mr GANGULY, Sougata (Chungnam National University)

**Session Classification:** Poster Session 2

**Track Classification:** 08. Astro-particle Physics and Cosmology