

Constraining majoron from big bang nucleosynthesis

Majoron-like particle J in the mass range between 1MeV to 10 GeV, which dominantly decays into the standard model (SM) neutrinos, can be constrained from the big-bang nucleosynthesis (BBN). For majoron lifetime (τ_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 τ_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 ΔN_{eff} constraint on the majoron parameter space and compare it with the BBN bounds, obtained from our analysis.

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