

[Sougata Ganguly] Constraining Majoron from Big-Bang Nucleosynthesis

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We estimate the Big Bang nucleosynthesis (BBN) constraint on the majoron in the mass range between 1MeV to 10GeV which dominantly decays into the standard model neutrinos. When the majoron lifetime is shorter than 1sec, the injected neutrinos mainly heat up background plasma, which alters the relation between photon temperature and background neutrino temperature. For a lifetime longer than 1sec, most of the injected neutrinos directly contribute to the protons-to-neutrons conversion. In both cases, deuterium and helium abundances are enhanced, while the constraint from the deuterium is stronger than that from the helium. ${}^7\text{Li}$ abundance gets decreased as a consequence of additional neutrons, but the parameter range that fits the observed ${}^7\text{Li}$ abundance is excluded by the deuterium constraint. We also estimate other cosmological constraints and compare them with the BBN bound.