

Non-thermal cosmic Neutrino Background

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Abstract content

I will discuss that for Dirac neutrinos there could, in addition to the standard thermal cosmic neutrino background (CνB), also exist a non-thermal neutrino background with comparable number density. Today's relic density of the non-thermal background can be as large as $0.5 \cdot n_{\gamma}$. It is constrained by the observational limits on the effective number of massless degrees of freedoms, N_{eff} , which thereby can be larger than 3.046 in the absence of any exotic states. Non-thermal relic neutrinos can be discovered by future experiments which are aiming to detect the CνB such as PTOLEMY. I will also mention a scenario of chaotic inflation in which a non-thermal background can naturally be generated by inflationary preheating. The non-thermal relic neutrinos, thus, may constitute a novel window into the very early universe.

Summary

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