

Light sterile neutrino thermalisation in 3+1 and low reheating scenarios

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The existence of a light sterile species of neutrino is still under consideration, as it may offer an explanation to anomalies in short-baseline neutrino oscillation experiments. However, among the difficulties encountered in including such an extra neutrino species in the zoo of well-motivated new particles, the strongest restriction may come from cosmological observations. As the light sterile would act as an additional source of radiation during the early stages of the Universe, its parameter space is constrained by the observed value of N_{eff} , which disfavors the mixing parameters preferred by short-baseline anomalies. A way of reducing the inevitable tension is moving towards scenarios beyond the standard cosmology that allows for a reduction of N_{eff} . One such scenario consists in assuming a very low reheating temperature.

After presenting the implications for N_{eff} from a standard-cosmology sterile neutrino thermalisation, I describe the effect that a low reheating scenario can have on neutrino thermalisation, both of active and sterile species.

All results were obtained within the framework of a 3+1 scenario of neutrino oscillations, using the code FortEPiNO, that can follow neutrino thermalisation including the full 4x4 mixing matrix.

Abstract Track

Astroparticle physics

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