

Cosmology-friendly time-varying neutrino masses in beta decay experiments

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The original sterile neutrino explanation to short baseline anomalies is in strong tension with cosmological observations, because of the copious thermalisation of an extra degrees of freedom. However, we show that this will no longer be an issue in the context of the mass-varying sterile neutrino, for which the sterile neutrino production can be greatly suppressed by the time-varying potential in the early Universe. The time-varying mass is assumed to be generated by the coupling between the sterile neutrino and an ultralight scalar field.

We show how the presence of such mass-varying neutrinos can have relevant implications for terrestrial neutrino experiments. In particular, we study the signatures expected in beta decay experiments, focusing in KATRIN.

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