Contribution ID: **85** Type: **Parallel Talk**

Thermal leptogenesis in the minimal gauged $U(1)_{L_{\mu }-{L}_{\tau}} model

Monday 10 June 2024 15:45 (20 minutes)

We discuss the thermal leptogenesis mechanism within the minimal gauged U(1)$_{L_\mu - L_\tau}$ model to explain the observed baryon asymmetry of the Universe (BAU).
In such framework, the phases of the Pontecorvo–Maki–Nakagawa–Sakata neutrino mixing matrix and the sum of the Standard Model neutrino masses are predictable because of a restricted neutrino mass matrix structure. Additionally, in the context of thermal leptogenesis, the BAU can be computed in terms of the three remaining free variables that parameterise the right-handed neutrino masses and their Yukawa couplings to the Higgs and lepton doublets. We identify the ranges of such parameters for which the correct BAU can be reproduced. We adopt the formalism of the density matrix equations to fully account for flavour effects and consider the decays of all the three right-handed neutrinos. Our analysis reveals that thermal leptogenesis is feasible within a wide parameter space, specifically for Yukawa couplings ranging from approximate unity to $\mathcal{O}(0.03 - 0.05)$ and mass of the lightest right-handed neutrino M_1
$gtrsim 10^{11-12}$ GeV, setting a leptogenesis scale in the considered model which is higher than that of the non-thermal scenario.

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Session Classification: Flavour physics and neutrinos

Track Classification: Flavour physics and neutrinos