

Resonant leptogenesis in minimal $U(1)_X$ extensions of the Standard Model

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We investigate a general $U(1)_X$ scenario where we introduce three generations of Standard Model (SM) singlet Right-handed Neutrinos (RHNs) to generate the light neutrino mass through the seesaw mechanism after the breaking of $U(1)_X$ and electroweak symmetries. In addition to that, a general $U(1)_X$ scenario involves an SM-singlet scalar field and due to the $U(1)_X$ symmetry breaking the mass of a neutral beyond the SM (BSM) gauge boson Z' is evolved. The RHNs, being charged under $U(1)_X$ scenario, can explain the origin of observed baryon asymmetry through the resonant leptogenesis process. Applying observed neutrino oscillation data we study Z' and BSM scalar induced processes to reproduce the observed baryon asymmetry. Hence we estimate bounds on the $U(1)_X$ gauge coupling and the mass of the Z' for different $U(1)_X$ charges and benchmark masses of RHN and SM-singlet scalar. Finally we compare our results with limits obtained from the existing limits from LEP-II and LHC.

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