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Falsifying Baryogenesis Models via Observation of Lepton Number Violation

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Interactions that manifest themselves as lepton number violating processes at low energies in combination with sphaleron transitions typically erase any pre-existing baryon asymmetry of the Universe. We demonstrate in a model independent approach that the observation of lepton number violation, namely in neutrinoless double beta decay and at the LHC, would impose a stringent constraint on mechanisms of high-scale baryogenesis, including leptogenesis scenarios. In combination with the observation of lepton flavor violating processes, we can further strengthen this argument, closing the loophole of asymmetries being stored in different lepton flavors.

Summary

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