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Reconsideration of leptogenesis via circularly polarized gravitational waves

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We revisit the gravitational leptogenesis scenario in which the lepton asymmetry is generated by circularly polarized gravitational waves during inflation, through the gravitational anomaly in the lepton number current. We consider a specific model in which the inflaton is coupled to gravity by the Chern-Simons term, and constrain the possible model parameter space by requiring the absence of ghost modes below the cutoff scale. We then evaluate the net baryon asymmetry in this model for typical reheating processes, which turned out to be insufficient to explain the observed baryon asymmetry of the Universe. We show that, however, with the kination scenario realized e.g. in the k- and G-inflation models, a sufficient baryon asymmetry can be generated within a feasible range of the model parameters.

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