Abstract Submitted
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Gravitational Leptogenesis, Reheating, and Models of Neutrino Mass[1] PETER ADSHEAD, University of Illinois at Urbana-Champaign, ANDREW LONG, KICP, University of Chicago, EVANGELOS SFAKIANAKIS, Nikhef and Institute Lorentz of Theoretical Physics — Gravitational leptogenesis refers to a class of baryogenesis models in which the matter-antimatter asymmetry of the universe arises through the standard model lepton-number gravitational anomaly. In these models chiral gravitational waves source a lepton asymmetry in standard model neutrinos during the inflationary epoch. We point out that gravitational leptogenesis can be successful in either the Dirac or Majorana neutrino mass scenario. In the Dirac mass scenario, gravitational leptogenesis predicts a relic abundance of sterile neutrinos that remain out of equilibrium, and the lepton asymmetry carried by the standard model sector is unchanged. In the Majorana mass scenario, the neutrinos participate in lepton-number-violating interactions that threaten to washout the lepton asymmetry during post-inflationary reheating. However, we show that a complete (exponential) washout of the lepton asymmetry is prevented if the lepton-number-violating interactions go out of equilibrium before all of the standard model Yukawa interactions come into equilibrium. The baryon and lepton asymmetries carried by right-chiral quarks and leptons are sequestered from the lepton-number violation, and the washout processes only suppress the predicted baryon asymmetry by an order unity factor. The sign of the resulting baryon asymmetry depends on the model parameters in such a way that a future measurement of the primordial gravitational wave chirality would constrain the scale of lepton-number violation (heavy Majorana neutrino mass).

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