The impact of particle production on gravitational baryogenesis

José Ademir Sales de Lima
Universidade de São Paulo, Brazil

Douglas Singleton
California State University, United States

Baryogenesis driven by curvature effects is investigated by taking into account gravitationally induced particle production in the very early Universe. In our scenario, the baryon asymmetry is generated dynamically during an inflationary epoch powered by ultra-relativistic particles. The adiabatic particle production rate provides both the needed negative pressure to accelerate the radiation dominated Universe and a non-zero chemical potential which distinguishes baryons and anti-baryons thereby producing a baryon asymmetry in agreement with the observed value. Re- ciprocally, the present day asymmetry may be used to determine the inflationary scale at early times. Successful gravitational baryogenesis is dynamically generated for many different choices of the relevant model parameters.