Contribution ID: 23

Baryogenesis via relativistic bubble expansion

Monday 15 May 2023 14:00 (35 minutes)

In this talk we will present a novel mechanism for baryogenesis relying on ultra relativistic bubble walls during a first order phase transition. The baryon asymmetry is sourced by the CP and baryon-number violating decay of heavy and out-of-equilibrium states which are produced as a result of high-energy particle-wall collisions. We illustrate two different realizations based on 1) light particles gaining a large mass upon crossing the bubble wall, and 2) production of heavy particles from light states scattering off the wall. The regime of the phase transition compatible with the observed baryon asymmetry (namely, moderate supercooling and relativistic walls) is complementary to standard scenarios of electroweak baryogenesis, and generically predicts a large background of gravitational waves.

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