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High Scale Electroweak Baryogenesis

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We explore the possibility that the electroweak phase transition happens at a scale much higher than the electroweak scale today. In this context, high scale CP-violating sources for electroweak baryogenesis are not constrained by low-energy experiments. We propose a scenario of high-scale electroweak baryogenesis linked to flavour physics. This scenario allows for a period of enhanced Yukawa couplings during the evolution of the universe, which source time-dependent CP violation. The electroweak symmetry is never restored after the high-scale phase transition due to negative contributions to the Higgs thermal mass squared from a large number of additional electroweak-scale neutral scalars coupling to the Higgs. As a result, the washout of the baryon asymmetry is avoided.

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