

Implications of a new SU(2) flavour group in early-universe phase transitions

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Mounting evidence suggests that planned and present gravitational-wave detectors may be sensitive to signatures from first-order phase transitions in the early universe. Here, we investigate the influence of heavy vector-like fermions on the phase transition. Specifically, we consider the recently-proposed “flavour transfer” model, where the SM flavour structure is augmented by a new horizontal SU(2) flavour gauge group. For such a model, the new gauge symmetry is broken far above the electroweak scale and constraints are dominated by “flavour-transfer” operators rather than flavour-changing currents. We calculate the finite-temperature corrections to the effective potential and determine the critical temperature at which we expect a phase transition. We examine the parameters for which the phase transition is strongly first order, and estimate whether the corresponding peak frequency of the gravitational-wave lies within the sensitivity windows of upcoming detectors.

Alternate track

1. Astro-particle Physics and Cosmology

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