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A careful look at phase transitions in the Standard Model Effective Field Theory (SMEFT)

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It is well known that quantum and temperature corrections to the scalar potential are important when considering vacuum dynamics and phase transition phenomena. It is also true that a naive application of perturbation theory gives gauge dependent results. Further complications arise when one is considering dim $d > 4$ operators in the Lagrangian.

In this work we present an extended prescription to consistently perform such calculations in a gauge invariant way, and apply it to the determination of the strength of the Electroweak Phase Transition in the SMEFT (Standard Model Effective Field Theory). In particular we discuss whether a first order phase transition is consistent with current limits on the SMEFT coefficients coming from all available data.

Abstract Track

Astroparticle physics

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