

Exploring loop-induced first order electroweak phase transition in the Higgs effective field theory

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We discuss how we can explore electroweak phase transitions (EWPTs) via collider experiments and gravitational wave (GW) observations. The nature of the EWPT is important to understand the thermal history of the early Universe and to determine the scenario of baryogenesis. To obtain model independent results, we focus on an effective field theoretical approach, which is known as the nearly aligned Higgs Effective Field Theory. We demonstrate that Higgs coupling measurements and GW observations can provide constraints on the scale of new physics models in which the first-order EWPT is realized. Our results show that we can determine the nature of the EWPT by the combination our results with direct new physics searches at current and future collider experiments.

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