

New methods for studying the Electroweak phase transition

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Gravitational waves offer a new way to understand the Higgs via the Electroweak phase transition. The signal from such a transition would, if observed, give crucial information of the underlying physics. Provided that the transition is first-order and proceeds through nucleating bubbles. Yet theoretical predictions of the gravitational-wave spectrum are rife with uncertainties. Large ones at that—spanning several orders of magnitude for some models. Fortunately, many uncertainties can be reduced by using modern EFT techniques. In this talk I give an overview of these results. To be specific, I review state-of-the-art techniques for calculating the bubble-nucleation rate and related observables at high temperatures. In addition, I discuss when conventional methods fail, and how far we can trust perturbation theory.

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